J. Kane
Rec'd. 2/26/81
via teletype

DEPARTMENT OF THE ARMY

DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231

REPLY TO ATTENTION OF
NCEED-T

DRAFT

SUBJECT: Interagency Agreement No. NRC-03-79-167, Task No. 1 - Midland Plant, Unit 1 and 2, Subtask No. 3 - Review Comment on Amendment 85

THRU: Division Engineer, North Central
ATTN: NCDED-G (James Simpson)

TO: U.S. Nuclear Regulatory Commission
ATTN: Dr. Robert E. Jackson
Division of Systems Safety
Mail Stop P-314
Washington, DC 20555

1. The Detroit District has reviewed the information received from the applicant through Amendment 85 to the operating license request, Revision 10 to the 10 CFR 50.54(f) requests. The information received addresses all the questions (Question 39 thru 48) raised by the Corps of Engineers in their letter report which was forwarded to the Nuclear Regulatory Commission on 7 July 1980, which subsequently was transmitted to the applicant on 4 August 1980 for his response.

2. The review comments are inclosed. The purpose of these review comments is to identify the discrepancies noted in the applicant response and apprise the NRC of the Corps of Engineers views as to the safety of the foundations of the structures deriving support from fill as well as from natural soil.

3. A listing of the specific discrepancies noticed during the review are as follows:

a. The shear strength parameters used in the analyses are not the representative parameters for the soils for which the analyses have been performed. The bearing capacity of the foundation soils for the Borated Water Tanks and the Diesel Generator Building appears to have been done on the basis of the shear strength parameters obtained from the test results on the soil samples which do not represent the soil conditions prevailing beneath these structures.

b. The evaluation of the settlements for the Borated Water Tanks, Diesel Generator Building, Service Water Structure and the Reactor Buildings have been done on either assumed values of the Young's modulus or on

FACSIMILE HEADER SHEET
(ER 105-1-5)

FROM (Name)	OFFICE SYMBOL	TELEPHONE NO.	RELEASER'S SIGNATURE
H.N. SINGH	NCEED-T	226-2227	Han Narain Singh

TO (Name)	OFFICE SYMBOL	TELEPHONE NO.	# PAGES	PRECEDENCE	DTG
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FORM 1 FEB 73 4960

compressibility coefficients obtained by an inadequately performed preloading test which provided questionable results.

c. In most of the cases of the settlement evaluations, only the immediate settlements have been considered. The consolidation and the creep settlements have not been considered. (Reactor Buildings, Service Water Building Foundation, etc.)

4. A listing of the specific discrepancies in the applicant response to Question 39 through 48 are given.

Question 39 - Reactor Building Foundation

(1) Settlement/Consolidation. The applicant response to Question 39(1) indicates that the settlements due to the dewatering have been computed on the basis of the Young's Modulus of the soil determined from the load-settlement relations between May 17, 1977 and March 11, 1978. The determination of the Young's Modulus using load-settlement requires use of the soil's poisson ratio and the influence factor of the footing. Further, the settlement that occurred immediately after the application of the load should be known and be used. The applicant has not explained how these parameters were determined. The Young's Moduli, determined by the procedure shown on page 39-8, should have been used to determine the settlements due to the dewatering instead of using constrained modulus used by the applicant. The Young's Modulus obtained by backfiguring is based on the appropriate confining pressure and as such is appropriate for computing the settlements caused by dewatering load. The consolidation and the secondary settlements have not been added to the total settlement. Therefore, the total settlement furnished by the applicant is not realistic.

(2) Bearing Capacity. The shear strength values used in the analysis of the bearing capacity of the soil under the Reactor Buildings was taken from the weighted average of the undrained shear strength of the soil samples obtained mostly from the cooling pond dikes area. A review of Table 2.5-6, (FSAR Volume 3) and the borings by the Michigan Drilling Company indicate that of all the samples tested for undrained shear strength, only one was taken from the area of the Reactor Buildings. Therefore, the shear strength used for the bearing capacity analysis is not representative of the soils on which the Reactor Building is founded. The undrained shear strength parameters (ϕ = 30°, C = 590 PSF) used in design of bearing capacity under static loads, also appear to be based on the average of the shear tests on the samples obtained from the entire plant area. In view of these facts, the response of the applicant is not satisfactory. The applicant must evaluate the shear strength parameters from the soil samples obtained from the soil mass below or near the Reactor Building foundation.

NCEED-T
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Question 40 - Diesel Generator Building.

(1) Settlement/Consolidation. The applicant has not furnished the requested information pertaining to the settlements of the Diesel Generator Building. The settlements computed on the basis of the compressibility parameters obtained from the preload test are questionable because of these reasons:

(i) There is no evidence to confirm that preload was held long enough to eliminate 100% primary consolidation.

(ii) Because of the flexibility of the footings, the surcharge loads were not evenly distributed. The foundation soils with relatively more compressible fill (southeast corner) have been subjected to a load intensity less than that of the surcharge, therefore, the applicant's statement that, "the stresses prevailing during surcharging at all dpeths in the fill beneath the building exceeded those that will prevail while the structure is operational," is questionable.

(iii) The sudden drops in the piezometric levels after the removal of the surcharge loads are indicative that excessive pore water pressure was not completely dissipated at the time of the surcharge load removal.

(2) Bearing Capacity. The bearing capacity analyses for the Diesel Generator Building furnished by the applicant are based on the shear strength parameters (ϕ,C), which are not representative of the soil fill beneath the Diesel Generator Building. The numerical values of the angle of internal friction, ϕ, and the cohesion, C, were determined on the basis of the results of consolidated undrained tests on five samples taken from the areas of the Tank Farm (Series T borings) and the Transformers (Series TR borings). A review of the boring logs indicates that all of the five samples were obtained from the zones of stiff to hard clay (blow counts in the neighborhood varies from 12 to 19), with dry densities ranging from 114.4 Pcf to 117.9 Pcf, liquid limits ranging from 20% to 35% and plasticity index ranging from 9 to 20. Three of the samples (T9-8, T16-5, TR2-2) had been overconsolidated to the overconsolidation ratio ranging from 1.1 to 2.2 prior to testing, which stiffened the samples and changed their shear strength characteristics in comparison to those which were not overconsolidated. Thus, it is evident that samples used to determine shear strength parameters are not representative and as such the information obtained by these tests indicate a soil type which does not exist in the effective Diesel Generator Building area. The soil types beneath the Diesel Generator Building range from layers of soft to hard clay as well as loose to very dense sand. An attempt to determine shear strength parameters by mixing the soil samples from layers of various soil types would result in misleading information as to strength. Samples from

each compressible clay layer should be tested and ϕ and C be determined to evaluate effects of each layer, under the footing, on the bearing capacity of the foundation soils.

(3) Preload Effectiveness. As discussed in our review comments on the applicant's response of Question 40-1, the preload program has not been effective in eliminating 100% of the primary consolidation, under the surcharge load of 2.2 KSF. We are not in agreement with the applicant's statement that the preload program carried out at the Diesel Generator Building has been successfully completed. The compressibility parameters obtained from the preload test are questionable and, therefore, cannot be used to predict the future settlement of the Diesel Generator Building. Validity of Figure 27-9 (Revision 6), in which the comparison of measured and predicted settlments is made, is questionable due to the reasons given in our review comments on the response of Question 41-1. Raising of the cooling pond's water level to elevation 627 in the beginning of April 1979, did not saturate the soil up to elevation 625 beneath the Diesel Generator Building during the surcharge, as stated by the applicant. The drops in the piezometer levels to elevation 622$\pm$ on removal of surcharge indicates the water table to be at elevation 622$\pm$, resulting in considerable capillary action in the fill material below the footing (el = 628). The effect of such capillary action is to resist settlement. A rise in moisture, causing saturation, such as cut-off water during rain, would decrease capillary action causing more settlement.

(4) Miscellaneous. The contour map (Figure 40-9) furnished by the applicant in response to Question 40-4, clearly shows warping of both the north and the south walls indicating curvatures created by bending moments. This warping would continue to grow with time, because of the future settlements of the east and the west ends about a rigid pivot in the center provided by the condensate pipe which has been reconnected after the removal of the surcharge load. An analysis of stresses induced by the warping should be performed taking into account the differential settlement over the life span of the plant (40 years). The analysis based on the present warping configuration would not reveal anything about the adequacy of the structure. Further, the differential settlements which had occurred prior to the date on which settlement observation began are not known; an evaluation of the stresses due to this unknown factor must be made. The applicant in his response has done too much rationalization of a complex problem. The origin of the cracks described by the applicant and given in response to Questions 14 and 28 are not satisfactory. Most of the cracks developed on the walls of the Diesel Generator Building are the results of the settlement of the building. Determination of the stresses by measuring the width of the cracks involves many variables which are difficult to assess and as such, stresses based on this method are questionable. Stresses should be determined on the basis of the bending moments and the shear force caused by the differential settlements and applied loads. In addition, the width of the crack would increase with the time dependent settlement, therefore, the stresses determined on the basis of the existing crack widths are unrealistic.

NCEED-T
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Question 41 - Service Water Building Foundation.

(1) Bearing Capacity. The use of drained shear strength parameters to analyze the ultimate bearing capacity of the proposed piles are not justified. The ultimate pile load capacity from the load test would simulate an undrained condition, (even a long duration pile load test would not create drained condition at the tip of the pile in this case); a static pile load analysis should be performed using undrained parameters. The shear strength parameters used in determinatin of the side frictions (F_1, F_2, F_3) and point resistance (F_4) are not the representative values for the soil condition prevailing at the locations where the piles will be driven. Same values of ϕ and C are used for sand as well as clay (see sheet 2 of Attachment 41-1). The applicant has used shear parameters for a soil type which he has created by mixing the test results of samples of Series T, TR and CT.

(2) Settlements.

(a) The applicants response to Question 41, Part 2a indicates a time dependent settlement of 0.1 inch for the portion of the Service Water Structure founded on glacial till and 0.05 inch for the portion to be supported on underpinning piles. The analyses for these settlements have many questionable assumptions and rationalizations such as:

(i) application of pile loads over an area of 15' x 3.5' (sheet 5 of 6 Attachment 41-2) at the tip elevation is not appropriate; according to Bjerrum et al (1975) such simplified method underestimates the settlements.

(ii) It is not known whether the soil moduli used in the analyses are for drained or undrained conditions, for long term settlement soil modulus for drained condition should be used.

(iii) The simplified approach used by the applicant is used in conjunction with one dimensional consolidation theory.

(iv) Creep settlement has not been considered in evaluation of long term settlement.

(v) The applicant planning to jack the underpinning piles after the dewatering settlement takes place is not realistic, dewatering settlement is a time-dependent settlement and it might take many years to complete. The dewatering settlement of the area under the pile tip is estimated to be 0.48 inch (sheet 3 of 6 Attachment 41-2, Line 2), but it is not known what compressibility parameters were used to compute this settlement. In view of these facts, the differential settlement problem still remains unresolved.

(b) The analyses indicating a factor of safety of 2.2 against failure for the slope behind the retaining wall near the Circulating Water Intake Structures based on soil parameters that may not be applicable to the type of fill material behind the wall. The applicant should base his analysee on the shear strength parameters from the test results on samples taken from fill in which the Slip Circle is going to form. A thirty feet (30') distance between the top edge of the failure plane and the nearest safety related Diesel Fuel Storage Tanks shown in Figure 41-4 does not appear adequate.

(3) Seismic Analysis.

(a) and (b). The analyses furnished and the additional work the applicant has committed to perform would insure the seismic safety of the foundations, provided the representative soil parameters have been used in the analyses.

Question 42 - Auxiliary Building, Electrical Penetration Areas and Feedwter Isolation Valve Pits.

(1) Settlement. The applicant's response that "Settlement of the Feedwater Isolation Valve Pit (FIVP) and the caisson of the Electrical Penetration Area (EPA) will be identical" is not correct. The caissons of the EPA and the concrete fill of the FIVP would not act monolithically. The continuity of the top few feet of the FIVP concrete fill around the casings of the caissons in the EPA would not establish adequate structural bond betwen concrete fill and the caissons. In the case it happens, the poor soil fill around the caissons below the concrete fill is still compressible and the problem still remains unsolved.

(2) (a) Temporary Dewatering System - The Corps is in agreement with the applicants response.

(b) Figure 42-68 shows the location of the access shaft. However, the location and the dimensions of the drift are not shown. The technical specifications for the work provided in Attachment 42-2 do not specify anything about the drifts. Item 3b of Attachment 42-2 indicates that the caissons will be extended at least 4' into the till; with this constraint the caissons' tip might end up with different elevations because of the sloping natural till surface caused by the foundation excavation of the containment buildings. In the design of the bearing capacity of the soils under the caissons tip, the effect of this factor has not been considerd. Item 3d, states that the caissons should have a vertical resistance capacity sufficient to produce a static moment of at least 325,000 foot-kips at column rows 5.3 and 7.8. The meaning of this statement is not clear. Item 4 of Attachement 42-2 provides a very brief outline of caisson load testing. But it is not clear what remedial measures will be taken if a completed caisson

fails to meet the load test. A caisson filled with concrete cannot be driven further. An empty shell test (EST) by loading to 1.0 times the design load prior to placing concrete appears unrealistic, because with only 4' penetration in glacial till it is not possible to obtain frictional resistance adequate to perform load test with 1.0 times the design load (frictional resistance of fill should be neglected for load test). In item 5.2.1e the applicant proposes to complete, test and wedge each caisson tight to the structure under a load equal to 1.5 times the design load, on a one by one basis. This procedure does not appear feasible; a previously wedged caisson under the bottom of the structure might be released when jacking for next caisson is applied under the structure.

(c) Temporary Surface Support - The response of the applicant for the temporary support system for the valve pit is vague. Additional design information should be provided to assess the stresses on members required for temporary support.

(d) The applicant's response indicates that the caissons capacities have been determined on the basis of the shear strength parameters determined from the soil samples obtained from other areas. On sheet 3 of 6 Attachment 42-3, in equation for ultimate bearing capacity, Q_f, the last term accounts for the contribution due to adhesion between the caisson surface and the soil. The cohesion value 6 K.S.I. used in this term must be multiplied by a reduction factor, α, to obtain the adhesion. For stiff clay as encountered at the tip of the caissons, using the full value of the cohesion as adhesion is not justified. Also, in computing load at the base of each caisson, the concrete fill and the soil between the caissons should be considered. This will have an effect of reducing the factor of safety. In case of an earthquake, an undrained conditon would prevail in the soil around the caissons, therefore, an analysis for caissons' group capacity and factor of safety based on an undrained condition are required. The applicant has not performed analysis for the caissons group capacity, considering the SSE earthquake. It is our understanding that the 4,000 kips which the caissons have to transmit to the glacial till do not include dynamic load due to a potential earthquake.

(e) Settlement of Auxiliary Building due to change in water level due to dewatering. See review comment of 42(1).

(f) The applicant's reponse is acceptable.

(g) The applicant's response is acceptable.

NCEED-T
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Questions 43 - Borated Water Tanks.

(1) Settlement. Since the soils beneath the tanks consists of not only granular type but also clay, the major part of the settlement will be consolidation settlement and creep settlement. Consolidation and creep settlements are time-dependent and might continue for the full operation life of the tanks. Therefore, settlement measured from full scale load test, as proposed by the applicant would not provide the accurate settlement. To accelerate the settlements, the tank must be surcharged with a load considerably more than the load which it has been designed to carry. However, because of the tanks fixed volumetric capacity, the surcharge load cannot be increased in excess of their designed load, if water or liquid of sp. gr. comparable to borated water is used as surcharge load. Blowcount plots shown in Figures 31-3 and 31-4 shows variations in blowcounts from a minimum of 6 to a maximum of 43 in the area of the East Borated Water Tank, and from a minimum of 4 to a maximum 57 in the area of the West Borated Water Tank, indicating that soils layers of variable density and consistency exist under the tanks. Therefore, the information obtained from plate load tests cannot be used to determine the settlements. The application of the theory of elasticity requires soil modulus for drained and undrained condition to determine time dependent and immediate settlements. It is not known what values the applicant has used to determine the differential settlements. To review the differential settlements, the numerical values of Youngs modulus of the soils and the methods used to determine them are required. Creep settlements also need to be evaluated to determine the structural adequacy of the tanks bottoms.

(b) The differential settlement of 1-1/2", using elastic plate theory, appears to be computed on assumed value of soil moduli; therefore, it does not present the potential differential settlement. The soil moduli ranging from 260 kips per cubic foot to 490 kips per cubic foot used to determine differential settlements for the ring walls are not realistic for the soil conditions prevailing under the tanks. The above values of soil moduli are applicable to soils with consistencies ranging from very stiff to very hard. Under the Borated Water Tank's the soil consistencies vary from soft to very stiff.

(2) Bearing Capacity. The shear strengths used in the analysis of the bearing capacity of the soils under the Borated Water Tanks are not appropriate to the soils conditions prevailing under the tanks. Figure 35-3, used to obtain the undrained shear strength, was constructed from the results obtained from the tests on the soil samples taken from the various locations of the plant area. These samples had densities ranging from 114.6 pcf to 131.3 pcf, water content 9.3% to 16.2%, and liquid limits ranging from 18% to

35%. Thus, the samples were not identical, and therefore, shear strengths obtained from Figure 35-3 are misleading. It is advisable to compute the bearing capacity of the soils using the soil parameters of the soil beneath the tanks. Attachment 43-1 shows the bearing capacity analyses. On sheet 2 of Attachment 43-1, there appears to be some computational error in evaluating effective confining pressure. The σ_3 (617) should be the average of pressure at elevation 600 (bottom of fill) and elevation 635 (top of fill). Also, the numerical value of 0.55 for the coefficient of lateral pressure at rest, K_o, is for over consolidation ratio (OCR) 2 which should not be used for fill material. A OCR of 1 is appropriate for the fill material, the K_o for this OCR is 0.49. The applicant should perform analysis for the factor of safety using the appropriate parameters as described above.

Question 44 - Underground Diesel Fuel Tank Foundation Design

(1) Bearing Capacity. The applicant's response is acceptable.

(2) Settlement. Although the soil under the Diesel Generator Building and under the Diesel Fuel Storage Tanks are of the same classifications, their strength, compressibilities and the permeabilities are not necessarily the same in numerical values. The use of classifications to evaluate the fundamental properties (shear strengths compressibilities, and permeabilities) it is not a sound engineering practice, particularly for the use in design of a Category I Structure of a nuclear power plant. The settlement evaluation of the Diesel Fuel Storage Tanks performed by the applicant by comparing the soil classifications under the Diesel Fuel Storage Tanks with those under the Diesel Generator Building are not acceptable. In addition, boring log DF-5 (Figure 33-1) indicates a layer of loose sand below the pads, which is susceptible to densification resulting in some settlement under a dynamic load. Therefore, settlement analyes due to dynamic load cannot be discounted, as stated by the applicant.

(3) Uplift Pressure on Tanks. The applicant has not performed any analyses to demonstrate the effect of uplift pressure on the stability of the tanks. The stability of the tanks in uplift cannot be assured unless the applicant can demonstrate, by analysis, that an acceptable factor of safety against uplift of the tanks does exist.

Question 45 - Underground Utilities

(1) (a) Settlement - From the applicant's reponse it appears that they have no plan to perform inspection of the interior of the water circulating pipings for cracks and openings after the removal of the surcharge

load as requested in part (1)(a) of Questions 45. The applicant has made reference to the measurements of the deformations during surcharge for line 96-2YBJ-4, which was reported in response to Questions 19, 10 CFR 50-54(f). However, he has made no attempt to compute the pipe stresses from the measured deformations, and as such the measured deformations do not provide any information regarding the adequacy of the pipe. In absence of the requested information, it is not possible to check the adequacy of the pipings which were affected by the surcharging of the Diesel Generator Building.

(b) Duct Banks - The applicant response to Question 7, 10 CFR 50.54(f) indicates that reinforcing bars in the duct banks had exceeded the yield strain under the building load which the duct banks carried prior to their isolation from the walls of the Diesel Generator Building. This implies that permanent deformations have occurred in the reinforcing bars and cracks wider than normally permitted in reinforced concrete structures have already developed in the duct banks. In response to Question 30, 10 CFR 50.54(f), the applicant has provided the results of his seismic analyses for the duct banks, but it is not known whether or not he has taken into account the effects of permanent strains in the reinforcing bars created by the previous load. This aspect should be further reviewed by the appropriate engineering section of the Nuclear Regulatory Commission.

(c) Buried Piping - Applicant has stated he will respond after consultation with NRC.

(d) We concur with the applicant response except the response to Question 45(d)(1). In the applicant's response to Question 45(d)(1), the last column in Table 45-1, which is entitled "Building Displacement to Pipe (1)," gives minimum rattlespace requirements at penetrations of Category I free-field piping supported on plant fill into various structures. In that column of the table, the quantities given for the eight penetrations of the Diesel Generator Building are "V < .015 inch and H < 0.03 inch." For the nine penetrations for the Auxiliary Building, the quantities given are "V < .036 inch and H < 0.129 inch." These numbers seem much too small. What they imply is that they expect less than 1/8 inch relative displacement between the building and the nearby free field. The applicant should provide detailed information as to (a) the sources of the numbers mentioned above, (b) describe how they were computed, (c) what percentage of the free-field maximum displacement implicit in the shock spectrum or of the displacement obtained by double integration of the free-field acceleration are these rattlespace values. In addition, we are addressing the following two review comments to the applicant for his response.

(1) Since the structures are quite stiff, most of the relative movement between the pipe and the structure that will occur in a seismic event will be due to relative movements between the base of the structure and the free-field at the elevation of the penetration. Relative movements of the free-field at the two levels could be roughly estimated by $H \cdot V_{max}/V_s$ where H is the vertical distance between the base of the structure and the penetration, V_{max} is the free-field maximum particle velocity, and V_s is the shear wave velocity of the fill. Alternatively, the effect of an H/V_s time shift in a free-field ground motion vs time plot could be used to compute relative displacement of two points in the free-field. In addition, for heavy structures the question of whether the structure foundation moves with the free field should be considered.

(2) Table 45-1 indicates that everywhere there is much more than the applicant's stated minimum rattlespace requirements, but there are a few places where clearances "C" are less than 1 inch. This is an unacceptable situation, in our opinion. Some future settlement of the plant fill (under its own weight) in the nonsurcharged areas is to be expected. The pipes will move downward further reducing "C." After consideration of the original source for minimum clearances given in Table 45-1 and the range of numbers for the analyses suggested above, the applicant is requested to provide revised minimum clearances and state the action to be taken to achieve them.

(e) The applicant's response that "the analysis of the settlement stresses in the piping is unrelated to the properties of the supporting materials" is correct. The evaluation of the stresses using the radius of curvature computed from the measured deflections of the piping from their original positions, does not require soil properties of the bedding on which the pipes are laid. However, to review of the stabilities of the pipes near supports it is necessary to know the support conditions. Therefore, we are reiterating our request that the applicant should furnish the requested information in Question 45(1)(e).

(f) The applicant response to Question 45(1)(f) is not satisfactory. The shear strength parameters used in the analysis of slope stability of the dikes are not the representative values for the soil conditions prevailing in the soil mass of the dikes. The value of the angle of internal friction, ϕ, used in the total stress analysis has been manipulated from the ϕ (drained condition) given in FSAR Table 2.5-22 rather than using the actual value obtained from the test results on samples taken from the dikes, or from the test results of the record samplings. The values of the shear strength parameters provided in Table 45-2, page 45-7, are basically taken from the FSAR Table 2.5-22, which are assumed values for the design. Thus, the applicant has not demonstrated that the shear strength parameters of the soil mass in the dike are identical or better than those of the assumed values for the design of the dikes. The applicant has further attempted to justify his soil parameters on the basis of the average blowcount

Figure 45-4 thru 45-10) of the standard penetration test (SPT). The tests for this area (except boring No. P2-5) do not provide blowcount information for top 15' height of the dikes. As a matter of fact, except boring Series P2 involving five borings across one particular cross section of the emergency cooling pond dike, all of these tests were carried out in the natural soil, therefore, they provide no information about the fill material of the dikes.

Question 46 - Cooling Pond

(1) Emergency Cooling Pond. In paragraph 1 of his response, the applicant has referred to his submission of September 14, 1980, and has stated that as pointed out in the submission, the compaction to construct the cooling pond dike was different from the problem fill in the power block area. A review of the applicant submission of September 14, 1980, indicates that he has no intention to furnish the requested information. The explanations provided in the submission against making additional borings as requested by the staff has no engineering merits. The applicant has taken no record samplings at all to verify the design assumptions as to the shear strength parameters. He has performed no field control tests for compacted soils in dikes above elevation 620±. The boring logs of the standard penetration tests (SPT), through the dikes fill material conducted for the installation of the piezometers, show no blowcount numbers above elevations 620± with one exception of boring No. P2-4 where a blowcount number of 7 has been recorded at elevation 625.7±. Thus, the results of the standard penetration test furnished by the applicant provide no information regarding the soil conditons for approximately top 15' of the dikes. Further, the blowcount records from the boring No. P1-2 and P1-3 (see boring logs furnished with the response to Question 46) indicate soft clay in the east dike below elevation 620. In absence of requested information it is not possible to review the applicant response.

(2) Operating Cooling Pond - The applicant response to Question 46(2) is not satisfactory. Our comments on the applicant response to Question 46(1) are applicable to this question. In addition, the averaging of the blowcounts, which varies from a minimum of 4 (see boring log 611 in Figure 45-6) to a maximum of more than 100 for clays and silt and from a minimum of 10 to a maximum of more than 100 for sand, would provide a totally misleading information as to strength of soils. Averaging of the blowcounts is acceptable, if all the blowcounts belong to one particular consistency or relative density group. The method adopted by the applicant would not be able to locate weak and strong stratifications of the soils.

We concur with the remaining portions of the applicant response to Question 45(1)(f). If the appropriate values of shear strength parameters are used the analyses performed by him would assure the seismic safety of the foundations of the two Category I reinforced concrete return pipes.

NCEED-T
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48 - Seismic Analysis of the Structures on Plant Fill Material

(1) (a)(b)(c) The seismic analyses which have been completed, and the additional work the applicant has in process, or committed to perform, will either (a) assure the seismic safety of foundations of the Category I structures deriving support from the plant fill or, (b) provide definite data on the adequacy of the analyses that the applicant has relied on to demonstrate safety. However, in case of the Diesel Fuel Storage Tank Foundation, we disagree with the applicant response. A seismic investigation as to the settlement of the loose sand indicatd by boring DF-5 needs to be investigated.

(2) (a)(b)(c) The applicant has furnished the requested information, and we are satisfied with the applicant response.

5. If you have any question regarding our review comments, please contact Mr. H. N. Singh of our Geotechnical Section at FTS 226-2227. Resolution of discrepancies and concerns will depend on the expeditious receipt of the information mentioned in our review comments in paragraph 4.

FOR THE DISTRICT ENGINEER:

P. McCALLISTER
Chief, Engineering Division

Given in 3/26/81 Deposition

for Kane
17/136

FEB 13 1981

MEMORANDUM FOR: Chairman Ahearne

THRU: William J. Dircks, Executive Director for Operations

FROM: Victor Stello, Jr., Director, Office of Inspection and Enforcement

SUBJECT: POSSIBLE NEED FOR ADDITIONAL ENFORCEMENT ACTION IN MIDLAND

In response to your memorandum dated January 14, 1981, the following background information is provided. Mr. Keppler reported in the enclosed memorandum to me dated August 14, 1980 that on July 30-August 1, 1980 Mr. Gibbon, Legal Assistant to Commissioner Bradford, visited the Region III Office. He accompanied Region III inspectors on an inspection at the Perry site and met with Mr. Keppler and other members of the Region III principal staff to discuss a number of issues confronting NRC and Region III.

One of the subjects brought up by Mr. Gibbon was the NRC Construction Inspection Program. Mr. Gibbon's interest in construction inspection was directed toward the role the Commissioners might play to improve NRC enforcement capabilities that would result in better licensee performance in the construction of nuclear power plants. The potential ex parte contact that was recently brought to the attention of the Midland ASLB and involved parties represented only a few minutes in the overall discussions with Mr. Gibbon, which lasted the better part of the morning.

The recommendation that was discussed with Mr. Gibbon, which resulted in the mention of Midland, was that NRC should consider stopping a specific construction activity in a timely manner, as a matter of policy, when a significant safety-related problem has been identified and when NRC is unable to support the licensee's proposed corrective actions. The focus of this recommendation was aimed at NRC policy for future cases, not at reopening the Midland issue. Mr. Keppler has stated that the reasoning behind this recommendation was obviously based on NRC experiences at Midland. In March 1979, Region III notified Headquarters in writing of the initial concerns on the need to resolve this issue. Specifically, Region III questioned continuation of construction activities when the cause of the settlement problem had not been determined and suggested consideration of an NRR directive or show cause order which would expedite evaluations of the safety significance of the problem. It was Headquarters view, at that time, that a more appropriate action was for NRR to issue a 10 CFR 50.54(f) letter. Subsequently, NRR issued a 10 CFR 50.54(f) letter to the licensee to resolve the issue, but it was not until November 1979 that NRC attention was again focused on the adequacy of the basic design as affected by "random fill" soil. At that time

Region III recommended that enforcement action in the form of a civil penalty be taken to resolve that concern. I considered such action to be inadequate and, upon my personal initiative, an Order was issued jointly by the Directors of IE and NRR requiring the licensee to show cause why it should not be required to seek an Amendment regarding remedial actions associated with the soils foundation problem or stop further safety-related work in this area. Since the Order was not made immediately effective, the licensee challenged the Order, the Order was stayed, and the licensee has continued to work. Even today, the staff is still not in a position to agree or disagree with the licensee.

The personal view of Mr. Keppler on this subject is that, although construction problems rarely pose a safety-related concern requiring immediate cessation of work, it is not in the best interest of NRC or the licensee to allow questionable work to continue for a long period of time. I differ with this view. I believe that it may be in the best interests of the NRC, the licensee, and the public, especially the ratepayer, to allow construction to continue when, as in the Midland case, the NRC staff most expert in the technical disciplines involved are of the opinion that continued construction will not prohibit an acceptable level of safety being achieved prior to operation. Mr. Keppler also believes that, from a practical standpoint, the degree of construction completion is seemingly bound to influence regulatory action in that reduced, yet acceptable, safety margins may be approved by the staff. My view in this matter is that a lesser margin of safety shown to exist by more rigorous and detailed analytical analysis than that used to justify a larger numerical margin, is often more conservative and is routinely used in the licensing process to assure adherence to requirements.

There are some legal constraints on the Commission's authority to summarily suspend activities under a construction permit. Immediately effective suspensions are lawful only in cases of willfulness or those in which the public health, interest, or safety require such action. In an appropriate case a valid finding to support an immediately effective suspension of work during construction can be made. See, for example, the order to show cause issued to Consumers Power Company immediately suspending Cadwelding activities at the company's Midland construction site. However, language in the United States Supreme Court's PRDC decision should be carefully considered in determining whether a particular circumstance warrants an immediately effective suspension at the construction permit stage. There, noting that the licensee, PRDC, had "been on notice long since that it proceeds with construction at its own risk, and that all its funds may go for naught", the Court rejected the notion that "the Commission cannot be counted on, when the time comes [at the OL stage] to make a definitive safety finding, wholly to exclude the consideration that PRDC will have made an enormous investment". 367 U.S. at 415. It is my position that required regulatory actions will be taken as necessary at the operating license stage.

Within the context of the above, your specific questions are addressed as follows:

Question 1 - What is your position concerning the need to stop construction at Midland effective immediately?

Response - I do not believe there is a need to stop construction at Midland effective immediately. This was my view at the time the show cause Order was issued jointly with NRR in November 1979, and remains my position at this time. Furthermore, NRR was and is the lead Office for evaluation of design acceptability, and I have been informed by NRR that it was in November 1979, and currently is, of the opinion that construction at the Midland site need not be halted.

Question 2 - What are Mr. Keppler's concerns and how have they been addressed?

Response - Mr. Keppler has stated that his fundamental concern is that permitting construction to continue may result in safety-related problems associated with subsequently installed systems and equipment (e.g., excessive pipe stresses and questionable seismic response). In addition, he believes that permitting construction to continue after a major unanswered safety question is identified may lead to the natural tendency to "engineer away" expensive modifications by accepting reduced, yet acceptable, safety margins. His concerns will be addressed in the staff analyses and testimony being prepared for the forthcoming hearing.

Question 3 - If you now believe construction should be stopped effective immediately, what steps are you taking to do so and what is the bases for your change in position?

Response - As stated in the response to question 1, it is my position that construction need not be stopped effective immediately.

I hope that these responses are sufficient for your inquiry. Please let me know if I may be of further assistance.

Original Signed by
V. Stello

Victor Stello, Jr.
Director
Office of Inspection
and Enforcement

Enclosure:
Memo, Keppler to Stello
dated 8/14/80

cc: Commissioner Gilinsky
Commissioner Hendrie
Commissioner Bradford
OGC
SECY
PE

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

ENCLOSURE 1

August 14, 1980

MEMORANDUM FOR: Victor Stello, Jr., Director, Office of Inspection and Enforcement

FROM: James G. Keppler, Director

SUBJECT: VISIT TO REGION III BY THOMAS GIBBON

On July 30, 1980, Thomas Gibbon (Commissioner Bradford's Legal Assistant) visited the Region III Office. He then accompanied our inspectors on a construction inspection at the Perry facility on July 31 and August 1, 1980.

While in Region III, Mr. Gibbon met with the Regional Director and members of the principal staff and discussed a number of problem areas confronting the NRC and Region III. Areas of primary interest discussed were as follows:

1. NRC's Construction Inspection Program - of particular interest was our perceived lack of timeliness in identifying problems and what role the Commission should play in improving the Commission's enforcement capabilities to achieve quality in the construction area. Mr. Gibbon requested Region III to provide recommendations to him regarding our thoughts in this matter. Our comments will be coordinated with RCI.

2. Environmental Qualification of Electrical Equipment - Mr. Gibbon indicated that Commissioner Bradford viewed this as a major problem and was interested in our impressions of the effectiveness of the regional industry meetings. We told him that the Region III meeting went well and that a forceful message had been delivered to the industry that the NRC will not tolerate further delays in dealing with this problem.

3. Radioactive Material in the Public Domain - in response to Mr. Gibbon's inquiry into our major problem areas, our experiences with radioactive materials in the public domain in general were discussed. It was pointed out that the number of instances where radioactivity was being found in the public sector was large, the Regions were expending considerable manpower on these problems, and no real progress has been achieved primarily due to lack of policy in this area. The case of West Chicago was discussed specifically and Mr. Gibbon requested details concerning that case. The transmittal of this information will be coordinated with FFMSI.

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4. Loss of Personnel - Our concerns for the loss of key inspection personnel were also discussed. In particular, it was pointed out that some of these losses resulted from the inability to pay specialist type inspectors and their supervisors at a rate equivalent to project personnel (both reactor and nonreactor positions). It was emphasized that IE management was very much concerned about this disparity and was actively pursuing the matter with the Office of Administration.

Mr. Cordell Williams, who was with Mr. Gibbon on the inspection accompaniment, believes Mr. Gibbon was impressed with both the scope and depth of our inspection effort. During his accompaniment he raised questions in connection with the inspection program, management support and interface with NRR.

for James G. Keppler
Director

cc: R. C. DeYoung, IE
H. D. Thornburg, IE
J. H. Sniezek, IE

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

18/86

JUN 17 1981

MEMORANDUM FOR: Richard H. Vollmer, Director
Division of Engineering

THRU: James P. Knight, Assistant Director
for Components and Structures Engineering
Division of Engineering

FROM: George Lear, Chief
Hydrologic and Geotechnical Engineering Branch
Division of Engineering

SUBJECT: STATUS OF MIDLAND REVIEW

The following presents the status of the Midland technical/hearing review:

1. The additional borings which were requested by NRC and appealed by Consumers are now completed. Lab testing of samples from borings is underway and results are now being provided to the Staff.

2. New or changed remedial measures are being proposed by Consumers for the Service Water (SW) Structure and Auxiliary Building. Consumers changed the proposed pile support of SW Structure to a full length wall on footing founded on deeper, more competent glacial till. Consumers also changed from caisson support to mass concrete pier beneath Auxiliary Building where problem-fill will be removed over a large area beneath the Electrical Penetration Area.

3. Consumers and the Staff have agreed on proceeding with the installation of 20 back-up wells which will become part of the permanent dewatering system. These wells are also to be used to dewater the SW Structure Area in preparation for constructing the remedial foundation described above to support the overhang portion of the SW Structure.

4. Present schedule for ASLB Hearing is:

   1st Session - July 7 to July 18, 1981
   2nd Session - August 4 to August 15, 1981
   3rd Session - August 24 to August 29, 1981
   4th Session - October 1981

   The first session is expected to cover Q/A breakdown, managerial attitude and the false statement in the FSAR. D. Hood, G. Gallagher and J. Kimball are to appear as Staff witnesses. A stipulation on Q/A between Consumers

and the NRC was agreed upon: the stipulation states the NRC was justified in issuing the December 6, 1979 Order because there was a Q/A breakdown. J. Keppler, I&E Region III, indicates the current overall Q/A program is improved and now is found acceptable.

The second and third sessions are expected to cover the adequacy of the remedial measures except for seismic design considerations and the fixes for the Auxiliary Building and SW Structure which are to be addressed in the October session. Responses to the contentions of Stamiris, Warren, Sinclair and Mapleton Intervenors are scheduled to be heard during the second and third sessions. Staff witnesses to appear include D. Hood, F. Rinaldi w/NSWC, J. Kane w/COE and possibly A. Cappucci w/ETEC. An important factor in deciding how the hearing will proceed is dependent on what the lab test results show (June and July 1981).

5. The three part seismic report has been provided to the NRC and is currently under review. A meeting in Bethesda on June 30, 1981 is scheduled with Consumers to discuss Part II, Site Specific Response Spectra for Structures founded on the plant fill.

6. * Resolution of the transfer and retrieval of 4 NRC-ONRR spaces to the C of E for Midland and Bailly licensing work must be completed by DE in near future. Corps personnel will be needed to prepare final stage of Midland SER as well as participate in hearings during FY 82. Bailly work (monitoring of pile driving, etc) will also be needed. Estimated 3 man-years (max) for Corps during FY 82 for Midland and Bailly will permit retrieval of one space.

Original signed by George Lear

George Lear, Chief
Hydrologic and Geotechnical
Engineering Branch
Division of Engineering

cc: W. Paton
D. Hood
R. Jackson
L. Heller
J. Kane

* In discussions w/ Neil Gehring on 6/15/81, Neil indicated Detroit had informed CCE (Rixby Hardy) that they estimated $23c,ccc to complete the Midland review (total). Up to April 1981, approximately $14c,ccc had been expended on Midland. Detroit also has indicated that they have estimated 2½ man-yrs. would be needed in FY-82 to work on Bailly & Midland.

OFFICE	HGEB:DE	HGEB:DE	HGEB:DE	A/D:ESE:DE			
SURNAME	JKane/mc	LHeller	GLear	JPKnight			
DATE	6/16/81	6/16/81	6/16/81	6/1/81			

NRC FORM 318 (10/80) NRCM 0240 OFFICIAL RECORD COPY USGPO 1980—329-824

James W Cook
Vice President - Project... and Construction

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

March 23, 1981

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

MIDLAND PROJECT
ACTIVITIES FOR THE RESOLUTION OF OUTSTANDING ISSUES REGARDING
THE MIDLAND SOILS HEARINGS
FILE: 0485.16, B2.5.2 UFI: 42*05*22*01, 00234S, 71*01 SERIAL: 11625

This letter is submitted to document the telephone conversation of February 27, 1981 between myself, R H Vollmer, and members of both our staffs. The call addressed several matters relating to the Midland soils hearings. In order to put the items discussed in context, a brief background summary is presented below.

On August 22, 1978 Consumers Power Company verbally notified the Region III Resident Inspector that the partially completed diesel generator building was experiencing more settlement than had been postulated. This was later determined to be due to inadequate compaction of backfill. A 50.55(e) report was initially issued on September 29, 1978 and further interim 50.55(e) reports were issued until the last report of February 7, 1980, after which subsequent information was supplied by 50.54(f) responses.

On March 21, 1979 the NRC issued the initial 50.54(f) request regarding plant fill and subsequent requests were issued. Answers to most of these 50.54(f) questions have been forwarded with the latest being Amendment 88 (Rev 11 to the 50.54(f) responses) dated March 16, 1981. On December 6, 1979 an Order Modifying Construction Permits No CPPR-81 and CPPR-82 was issued by the NRC. A principal reason this order was issued was due to the Staff's erroneous assumption that remedial actions, other than the surcharging of the diesel generator building, were proceeding. On December 26, 1979 Consumers Power Company requested a hearing in accordance with Part V of the Order.

On October 14, 1980 a letter from R L Tedesco to us indicated that one of the open items associated with the review of our operating licenses for Midland Units 1 and 2 was the establishment of additional seismological input parameters against which to review the plant structures and equipment. The letter stated that consideration of this open item would also be introduced into the review of the remedial actions associated with the soils settlement matter which was the subject of the December 6, 1979 Order Modifying Construction Permits.

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Since our initial notification to the NRC about the soils problem, there have been many meetings and telephone conversations to discuss the proposed remedial actions and the responses to questions by the NRC and their consultants. In addition, depositions have been taken by Consumers and the NRC.

During all the above activities it has become apparent that there are some areas of disagreement between the Staff and its consultants and Consumers and its consultants. In addition, the October 14, 1980 letter from R L Tedesco on a seismic response spectra has placed us in the position of having to evaluate our remedial fixes against an unknown, but possibly higher margin, since the site specific response spectra issue could result in structural loads larger than those resulting from an SSE zero period acceleration of 0.12g and modified Housner spectra which are the PSAR and FSAR design basis.

On February 27, 1981 I initiated the referenced call to R H Vollmer and other Staff personnel to inform the Staff of new developments. We hope these actions will help resolve certain issues that to date have been in contention with the Staff. We also hope that the Staff will look favorably on our requests to pursue with your concurrence certain activities which if not undertaken shortly will have a significant adverse schedule impact.

1. BORINGS

While we still disagree with the need to take additional borings and run tests, we will take borings as specified in the January 8, 1981 letter to us from R L Tedesco. Consolidation tests by an independent laboratory will be run on soils samples taken near the diesel generator area to obtain pre-consolidation pressures, and comparisons will be made to the calculated stresses to which the soils in the areas of the samples were subjected during the surcharge program. An evaluation of these tests and results will be undertaken to assess the level of uncertainty inherent in these data. Shear strength tests will be run on soils samples taken in the power block area to determine factors of safety for bearing capacity. Shear strength tests will also be run on soils samples taken from dike borings to substantiate slope stability. We will keep the Staff informed of all the above activities so that they can witness the activities, if desired. The results of the test program will be submitted and reviewed with the Staff.

2. SERVICE WATER BUILDING AND ELECTRICAL PENETRATION AREAS

The October 14, 1980 R L Tedesco letter on seismic, accelerated the completion of a margin analysis of the underpinning systems proposed as remedial actions. While all structural analyses have shown the fixes to be adequate for the plant seismic design basis of .12g, there was concern that a seismic margin analysis based on the currently undefined site specific response spectra would introduce new potential areas of contention with the Staff. As a result we have decided to change from a pile support design for the overhang portion of the service water building to an underpinning concept involving a full length wall under the overhang portion with the wall extending into the till. We are confident that this will provide sufficient margin for any reasonable resolution of the site

specific response spectra issue. The conceptual design for this approach will be available to allow discussions with the Staff in April 1981.

The remedial action under the electrical penetration area will remain essentially the same as has been described both in discussions and in answers to Staff questions, except that more caissons and some enlargement of the base of the pier under the valve pit will be utilized in order to obtain additional margin. Changed?

3. PERMANENT PLANT DEWATERING

Although it is our legal opinion that we can implement remedial actions at our own risk without Staff concurrence, we have chosen not to proceed without their knowledge and concurrence. The single pacing activity for the entire sequence of installing the remedial underpinnings is the completion of the permanent plant dewatering system. The first phase of this activty is the installation of a few back-up wells commencing in May of 1981. A large amount of information on the permanent plant dewatering system has been provided to the Staff. Installation of back-up wells along the service water and circulating water buildings will facilitate draw down and recharge rate tests, verify the design of the remainder of the permanent plant dewatering system, provide dewatering settlement data, and facilitate preparation for installation of the wall under the overhang portion of the service water structure.

Since the wells can be abandoned and grouted, we do not believe it is necessary to consider the installation of wells as an irrevocable committment.

We request that the Staff concur with our position and that we so notify the Soils Licensing Board.

4. SITE SPECIFIC SEISMIC CRITERIA

We have had several discussions with the Staff on this subject, and as previously requested by them we supplied them with the Final Report Part I "Response Spectra - Original Ground Surface" and Part III "Seismic Hazard Analysis". Part II entitled "Response Spectra For Top of Fill and Theoretical studies on possible Ground Motion Amplification Through Fill under the Diesel Generator Building" will be furnished by April 1981. As already scheduled, we will be meeting with the Staff on these issues on April 16, 1981.

Our objective is not only to resolve the site specific response spectra with the Staff but also to recognize and schedule with the Staff management the total sequence of seismic margin analysis activities that are currently required in the operating licensing process.

We are also petitioning the soils hearing Licensing Board to remove the seismic issue from that hearing and urge the Staff to consider our motion and join with us if possible.

In prior conversations with Mr Vollmer on the general topic of resolution of issues, it was anticipated that the Staff could support an expedited review of the underpinning designs. Based on the scheduled submittals of Attachment 1, we are hopeful that as much staff review of these materials as possible can be accomplished prior to the hearing while still reflecting the limitation of Staff resources. We will be in contact with the NRC's Midland project manager to pursue in detail the additional submittals and meetings referenced in this letter.

James W. Cook

JWC/GSK/cr

CC: RJCook, Midland Resident Inspector
Atomic Safety & Licensing Appeal Board
Atomic Safety & Licensing Board Panel
Charles Bechhoefer, Esq
James E Brunner, Esq
Myron M Cherry, Esq
Dr Frederick P Cowan
Mr Steve Gadler
D F Judd, Sr Project Manager
Frank J Kelley, Esq
Ralph S Decker
Mr Wendell H Marshall
Michael Miller, Esq
William D Paton, Esq
Ms Mary Sinclair
Barbara Stamiris
Mr C R Stephens
Chief, Docketing & Service Section

ATTACHMENT 1
NEAR TERM SCHEDULE MILESTONES FOR
ACTIVITIES RELATED TO SOILS HEARINGS

A. SEISMIC DESIGN CRITERIA

1. Submit Weston Report Part I and III to NRC. Completed and provided to NRC on 3/3/81.

2. Submit Part II in April 1981.

3. Meet with NRC Staff in April to discuss resolution of issues. Also discuss schedule for resolution of these issues with respect to Operating License.

B. PERMANENT PLANT DEWATERING

1. Drill and develop back-up wells along service water and circulating water pump house 5/1/81 start.

2. Drill and development remainder of permanent plant dewatering wells. 11/1/81 start.

C. AUXILIARY BUILDING

1. Meet with NRC on conceptual design April 1981.

2. Complete conceptual design 6/1/81.

3. Complete final design 8/1/81.

NOTE: Construction activities are scheduled to the following milestones:

Award subcontract 1/1/82; Mobilize 4/1/82; Start Excavation and installation 6/1/82; Complete April 1983.

D. SERVICE WATER PUMP STRUCTURE

1. Meet with NRC on conceptual design April 1981.

2. Complete conceptual design April 1981.

3. Complete design 6/15/81.

NOTE: Construction activities are scheduled to the following milestones:

Award subcontract 1/1/82; Mobilize 9/1/82; Start Excavation and installation 11/1/82; Complete May 1983.

E. UNDERGROUND UTILITIES

Meet with NRC in April 1981 on results of discussions with Consultants and discuss schedule for completion of investigation.

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F. BORINGS

1. Issue specification and retain subcontractor 3/23/81.

2. Commence Borings week of 3/23/81.

3. Commence Lab Testing week of 3/30/81.

4. Complete Borings 5/1/81.

5. Complete Lab Testing 6/8/81.

6. Periodically review results of detailed program 3/23/81 to 6/8/81, with NRC.

G. BORATED WATER STORAGE TANKS

1. Meet with NRC on remedial actions April 1981.

Subject: Resolving Transfer of [illegible] presently allotted to COE

J. Kane spoke w/C. Poslusny on the above subject on 6/23/81.

Presently C. Poslusny feeling is to ask the COE to return all 4 slots to the NRC but permit them to complete their work on Bailly & Midland in FY 82, if they will accept this arrangement. He indicated that DE has not taken a final position and that he plans to further discuss this matter w/ D. Vollmer and get back to HGEB.

J. Kane indicated his understanding of receipt letters between the Detroit District and the COE Chief's Office where Detroit District estimated they would need 2½ man-yrs. in FY 82 to complete anticipated NRC work on Bailly and Midland.

ROUTING AND TRANSMITTAL SLIP Date 6/23/81

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. L. Heller		
2. G. Lear		
3.		
4.		
5.		

Action	File	Note and Return
Approval	For Clearance	Per Conversation
As Requested	For Correction	Prepare Reply
Circulate	For Your Information	See Me
Comment	Investigate	Signature
Coordination	Justify	

REMARKS