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8-4-81

August 4, 1981

- P. 2786 - 2795 Discussion of scheduling issues
- P. 2796 Mr. Marshall requests a subpoena for Mr. Chanddington, supervisor of Midland township. Marshall states that Mr. Chanddington will testify that the local building codes are more stringent than the NRC's regulations.
- P. 2797 & 2798 Both Consumers Power Company and the NRC Staff object to the subpoena on the basis of it being irrelevant whether the plant meets local codes, and that that issue is not properly before this particular licensing board.
- P. 2800 The Licensing Board declines to issue the subpoena on the basis of the offer testimony would be irrelevant.
- P. ~~2802~~²⁸⁰² The direct testimony of Stephan Howell is ~~excepted~~^{DIRECT} into evidence.
- P. 2803 Cross-examination by Ms. Stamiris.
- P. 2804 Howell has testified recently before the Michigan Public Service Commission. He does not recall that those PSC hearings even mentioned the costs of the soil settlement remediations.
- P. 2805 Howell compares the 1974 Cadwelding hearing with the present hearing insofar as they both were initiated by an Order, and that both involved questions concerning the quality assurance program.

- P. 2807 Howell states that in both the Cadwelding case and in the present case, Consumers has taken corrective actions.
- P. 2808 Howell describes in general terms what actions were taken to give the NRC reasonable assurance that QA would be properly implemented in the future. Howell does not agree that the improvements to the program back in 1974 are the same type of improvements that are being made today. He states that the development and application of QA regulations has evolved over the life of the Midland project, therefore, the QA actions the applicant took seven years ago are very different from the ones they are taking today.
- P. 2809 Howell states that he believes the general QA program has performed. He qualifies it by saying that that does not mean that there has not been any problems in the QA area, but the general program has been successful in accomplishing the overall goals. Howell had not involvement in the quality assurance stipulation.
- P. 2811 Howell states that he remembers generally, a letter from the Appeals Board to Manning Munsing, which is referred to in the 1974 Cadwelding hearings. However, he does not remember the details of that letter.
- P. 2812 Howell states that he was aware of the settlement problem at the admin. building contemporaneous with the identification of the problem. He does not remember the calendar date. Howell was involved in the decision to start construction of the DGB only in the sense that he had overview responsibilities for

the project. He does not remember anyone coming to him specifically and saying, may we start construction of the DGB.

P. 2813

The people responsible for scheduling and construction for Consumers and for Bechtel no doubt were aware of the admin. building settlement at the time that they made the decision to proceed with the construction of the DGB. Howell does not know one way or the other whether Consumers project engineer knew about the admin. building only after the settlement of the DGB, he adds that the construction superintendent certainly knew about the admin. building settlement contemporaneous with the event that construction superintendent was Thomas Cook.

P. 2814

Howell discusses the investigation and the admin. building, and the conclusion that the problem was an isolated one.

P. 2815

Howell states that if the DGB was started prior to completion of the admin. building settlement investigation that would not necessarily indicate to him a less than prudent judgment. Miller points out that that chronology contrary to the record. Keeley specifically testified that information was known about the admin. building settlement prior to construction of the DGB.

P. 2818

Howell cannot remember whether it was Consumers or the NRC who first suggested that the investigation in the soils issues extend to other structures. Howell states he does not think its particularly germane who first brought up the expansion of the scope of the investigation.

- P. 2819 Howell states that he thinks it is a measure of Consumers positive attitude that it is willing to look at all aspects of a problem and consider a decision as to what the best way to approach the problem is.
- P. 2822 Howell states that there has been some differences of technical opinions in certain areas, but we have always been able to work them out in the end.
- P. 2823 Howell made the decision to voluntarily stop work after issuance of December 6, 1979 Order.
- P. 2825 Howell states that the voluntary work stop went to the remedial measures. There may have been some minor soils work that was done after the Order. However, Howell was confident that anything that was done was discussed with and agreed to by the NRC.
- P. 2828 Howell explains why he voluntarily stopped the remedial work when the Order was issued. Specifically, it seemed imprudent to Howell to find out what the NRC's concerns were, to settle them before proceeding with more remedial work. In 1979, prior to the Order, it was Howell's impression that the NRC had no problems with the preload of the DGB. He admits however, that the NRC did not signoff or approve the preload prior to December 6, 1979.
- P. 2829 Howell states that when the NRC states the applicant is proceeding at its own risk that does not connote to them that the NRC has not approved their action. Stamiris Exhibit No. 7 is marked for identification. It is Bechtel notes of a December 4, 1979 meeting.

- P. 2830 Stamiris directs Howell's attention to page 5 and the comments under No. 7.
- P. 2831 Howell does not believe that those comments under No. 7 on page 5 of Exhibit 7 indicate that the NRC did not approve of the preload program. Stamiris Exhibit No. 7 is admitted into evidence.
- P. 2835 Howell describes two parts of the quality assurance program, the programmatic aspects and implementation aspects. He states that there must be satisfactory performance in each. He adds that the implementation need not be perfect and that even good programs have isolated problems. The important point is that when those problems arise that actions are taken immediately to correct them.
- P. 2836 Howell defines good performance of a quality assurance program is one that detects problems and corrects problems in an effort to avoid further problems.
- P. 2837 Howell reiterates that the idea of a quality assurance program is to find problems, to see that the problems are corrected and examined into the extent possible prevent the reoccurrence. Keppler has stated that one of the positive aspects of the QA program at Midland is its ability to identify its own problems. Howell admits that the identification of problems alone does not make for a good QA program.
- P. 2838 & 2839 Stamiris asked for other positive comments that the NRC has made about Consumers QA program. Howell responses by stating that it is not the NRC's philosophy to give positive endorsements in a formal fashion. However, he states that the

NRC feels that Consumers conservative approach to reporting 50.55E events has been good.

- P. 2841 Page 10 of Howells testimony discusses meetings which Howell attended that involved QA. These meetings were not specifically limited to a discussion to Midland QA but QA generally throughout Consumers Power Company.
- P. 2842 Howell cannot state just how many meetings he attended that involved only Midland QA topics.
- P. 2842 Page 11 of Howell's testimony discusses quality assurance resumes and monthly reports. These are not requirements laid out by the NRC. They are requirements that Howell developed. Howell does not believe that these resumes and reports were furnished to the NRC in accordance with ALAB 106 reporting requirements.
- P. 2843 On page 11 of Howell's testimony at the bottom where it dicusses reveiw of equipment qualifications, this does not refer to equipment qualification of compaction equipment, which had been a problem identified in inspection report 78-12.
- P. 2847 Howell describes the reorganization in 1980 as reflecting major changes. Specifically, there were additional people hired, additional departments created and there was some intergation to the Midland project departments and activities. For the first time an officer of the company was put directly in charge.

- P. 2848 Howell states that there was not one particular event that motivated the reorganization in 1980. Bechtel's announcement of the new cost increase from 1.67 billion to 3.1 billion and a 2-year delay in the completion schedule, was one of the factors that entered Howell's decision-making process on the reorganization.
- P. 2850 Howell describes the contract between Consumers and DAL. It is a best efforts contract to finish the plant and supply processed steam to the DAL plant. The contract provides that if Consumers cannot perform on that endeavor by December 31, 1984, DAL has the option to withdraw from that contract with appropriate payment of costs. Those costs are in the neighborhood of half-a-billion dollars.
- P. 2854 Barber states that some weight must be given to cost and schedule considerations in building a plant, but that it is her belief that there are unusual financial pressures at the Midland plant and that it is those unusual pressures that have led to unusual responses by Consumers. Howell is aware of the Michigan Public Service Commission's policy that unless a plant is completed and producing electricity that its costs cannot be paid or passed on to the rate payer.
- P. 2857 Howell states that the soil settlement problems were not a major consideration that went into the decision in 1980 to continue the construction of the plant.
- P. 2858 Howell remembers saying at the March 1980 Press Conference something to the effect that Consumers would try to improve on Bechtel's construction schedule.

- P. 2859 Howell is aware of statements made by Mr. Shelby to the effect that the NRC review of the FSAR, SER, and the Hearing Process is the major obstacle toward completing the plant and receiving an operating license.
- P. 2860 Howell admits that he made the statement that "the NRC has departed from the idea of appropriately licensing plants and is off chasing some of these things." That statement was made in March of 1980 and referred to a situation where no review by the NRC staff had gone on on the Midland application for over a year. Howell adds that during this time, he felt the NRC was chasing somethings to the detriment of the licensing process. Namely, resources were being spent on somewhat frivolous matters.
- P. 2861 When Howell wrote his testimony on contention 1, he was not aware of the fact that the NRC believed that Consumers had withheld information regarding the admin. building settlement problem.
- P. 2862 Howell states that public health and safety considers are given priority over cost and schedule considerations.
- P. 2863 Howell states that the preload of the DGB has provided a much better way in which to evaluate the settlement. He believes that that approach is better than mathematical calculations from test information.
- P. 2966 On page 17 of Howell's testimony, he refers to 1 error in 20 volumes of technical data. The error he was speaking of was the material false statement. This statement does not mean to say that there was only one inconsistency in the whole FSAR.

- P. 2867 Howell says that he does not think there were any other false statements in the FSAR because the word false to him implies intent. He adds that there are some incorrect things and some inconsistencies, but in his mine there are not false.
- P. 2867 Howell states that the statements made on the bottom of page 6 to attachment 6 to his testimony are true. That statement reflects inconsistencies between FSAR and drawings.
- P. 2870 Howell does not think that the early submittal FSAR contributed to the inconsistencies that there in.
- P. 2871 Discussion of admin. building settlement.
- P. 2872 Howell recalls that some instrumentation work was done in the Fall of 1978 and that in December of 1978 construction resumes on the DGB. That construction resumes only after the settlement had been investigated and studied, and Consumers had received an opinion and recommendation from the consultant to proceed with work.
- P. 2874 Stamiris Exhibit No. 8 is marked for identification. It is a memo from C. J. Dunicliff dated November 1, 1978, and it contains notes of an October 18, 1978, meeting onsite.
- P. 2876 Howell was not aware of the October 18th meeting which Stamiris Exhibit No. 8 for identification refers to. Stamiris Exhibit No. 9 is marked for identification, their meeting notes of the October 18, 1978, meeting.
- P. 2877 Howell admits that the instrumentation referred to on page 2 of Stamiris No. 9 for identification is not instrumentation that would be used if the removal and replacement option were chosen.

- P. 2878 Bechtel has the first line of making recommendations.
- P. 2880 Howell does not believe that it is unusual that Bechtel people were involved in the installation of the instrumentation.
- P. 2881 Miller states that this issue of the instrumentation was addressed by Mr. Keeley's direct testimony and Mr. Howell is not the appropriate person to be examined on it. Stamiris states that she is asking these questions because it is her belief that in October of 1978, for all practical purposes, the preload option had been selected and that this contradicts statements in Mr. Howell's testimony that the causes of the DGB settlement were adequately investigated before the remediation was begun.
- 2885 Stamiris Exhibit No. 10 is marked for identification, November 6 Meeting Notes.
- P. 2885 & 2886 The fact that some actions were taken towards installing preload instrumentation before the final decision was made preload. Howell does not believe was improper or inconsistent with good management. It is prudent to have contingency plans which would proceed down two paths and parallel until further information is gathered. and that is precisely what Consumers did in this case.
- P. 2886 Howell does not agree that the preload plan had been adopted for all practical purposes sometime in October.
- P. 2887 Howell states that removal and implacement option at this time is possible to perform. His personal feeling however is that it would be the wrong thing to do.

- P. 2888 Howell believes that it is economically possible to implement the removal and replacement option.
- P. 2891 Stamiris Exhibit No. 11 is marked for identification. It is interim report No. 2 transmitted by cover letter dated December 7, 1978. The activities listed on page 3 in this report under No. 5 are not all common to the option of removal and replacement.
- P. 2892 Stamiris Exhibit No. 11 is received in evidence.
- P. 2893 Howell reiterates that the four items listed under paragraph 5 of page 3 of Exhibit No. 11 not activities common to removal and replacement, however he states that they are not incompatible with that option.
- P. 2894 Howell states that those were not his words in Exhibit No. 11 and he thinks that perhaps the words under item 5 are not entirely correct. If you include removal and replacement of as one of the corrective options.
- P. 2895 Howell estimates that the cost of the instrumentation installation was in the tens of thousands of dollars. Howell estimates that the cost of the instrumentation is just a few percent of the total cost of the preload.
- P. 2898 Any action taken with respect to the boraded water storage tanks preload was not done as a short cut because of scheduling considerations at the protential expense of the public health and safety.

- . 2899 Howell says that even if there had been more time in the schedule for the borated water storage tank, he does not believe that a different approach would have been used. He states that the analysis showed that preload was the best way to proceed with the storage tanks.
- P. 2903 Howell states that there was a review procedure for the FSAR prior to the diesel generator building problem.
- P. 2905 The FSAR re-review was still in progress when Howell left the Midland project.
- P. 2908 Howell states that now is the first time he's become aware of a question having been raised about the adequacy of the FSAR re-review. This question read the adequacy of the re-review was in stated in I&E Report 80-32 which is attachment 3 to staff testimony on contention 3.
- P. 2910 Howell states that in his present position, he has no involvement iwth the Midland FSAR.
- P. 2911 Howell states that if he knew that there was something connected with the Midland project that would endanger public health and safety despite his lack of personnal envolvment in Midland at this time as an officer of this Company, he would say and do something about the matter.
- P 2915 Howell describes that under Article 9 of the Contract when there is a question with respect to the responsibility of the parties, Consumers must give notice to Bechtel, and this preserves Consumers rights under the contract. To the best of Howell's knowledge an Article 9 letter has been written on the soil settlement issue, but it has not been resolved as of now. Howell believes some

actions have been taken between Bechtel and the U.S. Testing, but he does not recall the details.

P. 2916

Contract provisions have always given Consumers both the authority and muscle to get what it wants from Bechtel. The contract did not have to be changed to accommodate the integrated QA organization. Consumers has always had the authority to direct Bechtel.

P. 2917

There has been no problems at Palisades which are comparable to the soil settlement problems at Midland.

P. 2918

Stamiris Exhibit No. 12 is marked for identification.

P. 2924

Stamiris Exhibit No. 12 was received into evidence.

P. 2925

Cross-examination of Howell by the staff begins. Notwithstanding Consumers policy to construct the plant in compliance with all regulatory requirements, Consumers in fact did not comply with all of the criteria enumerated in Appendix B to Part 50.

P. 2926

At the time Howell wrote his testimony, he was not aware of any allegation by the NRC that Consumers had withheld information concurring the administration building. Consumers management is dedicated to full disclosure. Howell was aware of the admin. building settlement contemporaneously with the event.

P. 2927

Howell explains why the NRC was not notified of the admin. building settlement program.

P. 2928

Consumers commitment to to full disclosure involves disclosing those things which are required and those things which Consumers believes are prudent. Full disclosure does not mean informing the NRC of every possible action connected with the plant.

7. 2929

Howell states that after the DGB settlement problem, it never occurred to him to connect that problem with the earlier admin. building settlement problem. Further, it did not cross his mind to inform the NRC of the admin. building problem after the diesel generator building problem was discovered. Howell is not aware of anyone in Consumers raising the issue of whether the NRC should be informed of the admin. building problem after the DGB settlement occurred. Howell was the corporate officer responsible for transmitting the FSAR. When he transmitted the FSAR, he was swearing to the adequacy of that document to the best of his knowledge and belief. That is regulatory requirement under 10 CFR 50.30. Howell admits that parts of the FSAR were subsequently found to be inaccurate.

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August 4, 1981
Continuation of transcript on
cross examination of Howell by Staff

- P. 2935 Testimony on contention 1-B.
Howell states there is no particular reason why he didn't attach the question and response to FSAR question 361.5 to his testimony.
- P. 2936 Page 19 of Howell's testimony states that Consumers has answered these FSAR questions promptly and completely.
- P. 2939 Question 361.5 requested a comparative analysis of seismicity in the region within 200 miles of the site with other similarly sized areas in the central stable region.
- P. 2940 Howell states that Consumers response to question 361.5 did not provide such an analysis per se. Consumers however, did provide such an analysis in response to question 361.7. Howell approved the decision to place a surcharge on the DGB.
- P. 2941 Howell recalls at the time the decision was made to proceed with the surcharge the identification of root causes was in the process of investigation. Howell does not understand how the root causes of the settlement problem could have any effect on the remedial measures. At the time he approved the surcharge program he had no concerns with organizational deficiencies in the QA program or with personnel.

- P. 2942 It has always been Consumers intent to have the best state-of-the-art QA program. In retrospect although there have been some deficiencies with the QA program, Howell believes that it has been successful in identifying problems and keeping a quality job. When Howell uses the term "program," he means that to include implementation as well as the program on paper.
- P. 2944 Howell states that there is not a significant change in his involvement or concern with quality assurance issues after August of 1978.
- P. 2944 Howell does not remember whether Consumers did a crack analysis prior to deciding to preload the DGB. Howell is not sure he would conclude that there are safety consequences associated with knowing whether the building is going to crack further as a result of the surcharge program.
- P. 2945 Howell does not remember whether Consumers made any determination as to the degree of differential settlement, that would be acceptable prior to the surcharge.
- P. 2946 Howell states that he's drawing a blank on what he meant by the phrase on page 21 of his testimony concerning the safety consequences of continuing work on the DGB.
- P. 2946 On page 23 of Howells' testimony he states that the preload was begun four months after January, 1979. This is in fact incorrect, the surcharge was placed on January 26, 1979. See page 10 of Keeleys' direct testimony.

- P. 2948 Howell states that post-TMI, the NRC was reviewing soil settlement issues. The NRC did not stop dealing with Consumers on the Midland project after TMI.
- P. 2949 Board examination begins.
- P. 2951 Howell states that information regarding lift thickness, compaction history, moisture in gradation ~~w~~here all measured and recorded during the laying down of the soil. Howell believes that the surcharge test was fully successful and adequate. Howell qualifies that he relied on expert opinion with respect to the surcharge program and that he does not have full and complete knowledge of the specific details that went in to making that recommendation.
- P. 2954 Howell states he has ^{more} than a casual interest in the Midland case.
- P. 2958 Howell does not know whether having had a geotechnical engineer on site during the placement of the soils would have prevented all of the soil settlement problems that arose.
- P. 2963 Bechtel is responsible for performing the construction and supplying the appropriate manpower and supervision.
- P. 2964 Howell does not believe that management should have been more involved in QA activities in the period of 1978 and 1979.

- 2965 Howell describes the various reasons for the QA re-organization. ~~One of these~~ was to produce a more efficient organization that would do a more effective job. The QA reorganization has resulted in more managerial involvement at Mr. Cook's level, since the QA department now reports to Mr. Cook.
- 2966 Howell does not think that there is a direct correlation between the soils problem and the decision to integrate the QA Organization.
- 2967 Howell does not believe he can draw any correlation between the past QA deficiencies and the decision to make the organizational change in the QA department.
- 2968 Howell speculates that he spent 25% percent of his meeting time on Midland QA v. Midland Construction matters.
- 2971 Howell remembers that Consumers proceeded with a re-review of the FSAR well before the December 6, 1979 Order was issued.
- 2972 Management had the expectation that the re-review of the FSAR would be done with quality control of that process.
- 2974 Keeley was director of QA up until sometime in 1975, at that point he was succeeded by a man named Mr. Southworth. Mr. Southworth did not have extensive background in QA so Howell decided to replace him and went on a nationwide search for Mr. Margolio.

P. 2976

Bechoffer asks if Howell would recommend anything further for the company to do to produce a better QA program.

Howell's response ^{is that} ~~at~~ this hearing has caused an incredible drain of manpower resources and that he believes Mr. Cook should hire some more senior help directly underneath him, in fact Mr. Cook is in the process of hiring some additional personnel.

P. 2978

Redirect by Mr. Miller, I and E has made positive comments to Consumers about its over inspection program.

P. 2979

Howell never received a request from the NRC for any report dealing with the grade beam settlement of the administration building, he also never received a request from the NRC for report dealing with a compaction of earth moving equipment. ~~He directed~~ ^{He did not} that either one of these reports not be turned over to the NRC. He never directed that the facts ^{sur}rounding the administration building settlement not be disclosed to the NRC.

P. 2980

The expenditure of money on the installation of the instrumentation had no effect on the decision to choose the preload option. Page 6 of Exhibit 6 to Howells' testimony makes some commitment with respect to the cracks in the DGB prior to implementation of the surcharge.

P. 2981

Settlement of the DGB has been monitored at a number of different locations for differential settlement.

- P. 2981 & 2982 Howell describes the makeup of the task force that investigated the soil settlement problem associated with the DGB.
- P. 2983 Howell received periodic results of the preload program, he has some knowledge of soils, compaction and stabilization and therefore was able to interpret the results.
- P. 2987 Continued recross by Staminis.
- P. 2988 Howell believes that it is important for QA^{to} maintain ~~an~~ independence from costs and schedule concerns.
- P. 2993 A similar process that was followed with respect to the decision to preload was followed with respect to the decision to remove the preload. During these discussions there was a discussion of the matter of rebound.
- P. 2994 Howell does not recall any differences of opinion with respect to the issue of rebound. Witness is excused.

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8-5-81

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MIDLAND PROCEEDING

August 5, 1981

- P. 2998-3010 Lengthy discussion of Dr. Peck appearing earlier as a Witness and the scope of his cross examination.
- P. 3013 Direct examination of Cordell Williams. Within the past few months the NRC became aware through Consumers of certain employee allegations regarding small-bore piping and hanger designs.
- P. 3014 The Applicant indicated to NRC that they were looking into the employee's allegations and that they would make available the results of their investigation. They also told the NRC that they had advised the employee of his option to approach the NRC on this matter. The individual did contact the NRC in mid June and July.
- P. 3015 The employee submitted documents outlining his concerns and allegations by letter dated July 2, it was received by Region 3 on July 13th. The employee's concern was that certain of the procedures and practices implemented by the licensee in response to the May 22nd IAL on piping and hanger designs were not in accordance with the outlined procedures and the intent as he perceived it the NRC IAL. Region 3 initiated an investigation on July 16th and 17th.

- P. 3016 As a result of Region 3's investigation the employee's concern and his allegations were confirmed. A description of the practice called "redlining".
- P. 3017 Region 3 did not issue an IAL as a result of their investigation. Following the investigation Region 3 presented its findings to the applicant, the applicant agreed with the findings and the actions Region 3 thought were appropriate for corrective actions. The licensee then submitted a letter to the NRC committing to those corrective actions.
- P. 3018 NRC Staff Exhibit 2 is marked for identification. ~~the~~ **It** is a letter dated July 28, 1981 from James Cook to Mr. Keeper.
- P. 3019 In Staff Exhibit 2, Consumers agreed to hold action on ~~concern~~ drawings which had been issued until such time that the CPDC's were well established. Secondly, Consumers committed to fully document their installation practices as well as modify existing procedures. These changed procedures are being submitted to the NRC for review and approval. Region 3 believes that the Licensee's commitment in Staff Exhibit 2 will resolve all of the NRC's and the employee's concerns.
- P. 3020 Staff Exhibit 2 is received in evidence.
On the basis of the Licensee revaluation of the unsupported drawings it is apparent that the concerns raised by the employee did not have an adverse impact on the ultimate adequacy of the piper and hangar systems.

Board Examination

Bechhoefer asks if the items referred to Appendix A to Staff Exhibit 1 on pages 3 and 4 specifically item 6, 7 and 8, if those involve the same matters as the matters Williams just testified to, Williams responds that they are very similar.

Redlining is an acceptable procedure. Redlining and field change procedures are essentially the same. Redlining is merely a mechanism for implementing a field change.

Cross Examination by Stamiris:

An IAL can stop work.

Williams states that when Region 3 first became aware of the allegations at one point during the investigation Region 3 seriously considered stopping work but the results of the investigation demonstrated that it was not necessary.

Williams explains why a stop work was not necessary, specifically, because it was clear that safety had not been seriously compromised, there had been no adverse impact on the structural integrity of the work that was ongoing or that had already been done.

Williams states that each line item in the May 22nd IAL which is attached to Staff Exhibit 1 have been rigorously adhered to by the Applicant.

- P. 3029-3030 Williams explains his rationale in not issuing an IAL in July as opposed as to why he issued one in May.
- P. 3030 Williams denies that the Applicant's failure to follow procedures in this matter reflects on managerial attitude.
- P. 3032 The first information that the NRC had with respect to these allegations came from Consumers. The May 22nd IAL did not specifically address the redlining practice. Williams reiterates that Consumers complied with the line items of the May 22nd IAL. This redlining practice has not caused the NRC Staff to reconsider its conclusion with respect to reasonable assurance at the Midland site.
- P. 3033 The individual who made the allegations to Consumers was a contracted employee working down the Bechtel chain. Consumers in turn notified the NRC of the employee's allegations.
- P. 3035 The Staff agrees with the first paragraph of Staff Exhibit 2 where it states that four items referenced in the May IAL have been completed.
- P. 3035-3036 Williams explains how the matters in the May 22nd IAL are separate and distinct from the notice of violation found in NRC Staff Exhibit 1 the inspection report 81-12.
- P. 3038-3039 Williams describes the procedure by which the design drawing is made and the piping is installed or a change is made to the design calculations.
- P. 3040 The procedures that Consumers has committed to developing in its July 27th letter will speak directly to what is a minor change and what is a major change and how major changes will be

handled in the field. Williams indicates that most major changes in design calculations need to be handled by the field change request method. This means that the change will receive the same level of consideration review as the original design did.

P. 3041

The resident engineer^{is} the individual who decides whether the change is a major or minor one.

P. 3043

Williams describes the difference between a preliminary design calculation and a committed preliminary design calculation.^(CPDC) He states that before you make the installation you must have a CPDC.

P. 3044

Consumers had assembled and installed approximately 75% percent of their piping and hangar systems without CPDCs. Nonetheless, their preliminary design calculations were so rigorous and conservative that after having reviewed approximately 1300 packages the staff has found only seven that did not meet the allowable stresses and those seven have not even been installed at this point. A CPDC is essentially a final design calculation.

P. 3047-3048

The term original calculation used in the last sentence of paragraph two of the July 27th letter is the same as preliminary calculations.

P. 3048

Region 3 is currently reviewing Consumers proposed redlining procedures and at some point in the near future will be in a position to acknowledge the adequacy of the procedure.

P. 3050

Williams states that he not aware of any individuals who have a differing interpretation of same facts or events involved in the redlining matter.

P. 3051

Stamiris asks the Board whether they would be interested in hearing from a witness ^{with a} differing interpretation of the same set of facts, the Chairman responds that under the Commission's policy on differing professional opinions if there ~~were~~ any ^{ed} the Board would be interested in knowing about it. The Chairman added that if there was such a differing professional opinion it would be incumbent on the Board to take notice of it and hear the opinion.

P. 3057

Williams is excused.

~~SECRET~~

SUMMARY OF TRANSCRIPT OF MIDLAND PROCEEDING

August 5, 1981

- 3057 Byrd, Rutgers and Dietrich were called as witnesses by
Consumers Power Company.
- 3059 The professional qualifications of the three witnesses follow
this page.
- 3060 Dietrich is employed as project quality assurance engineer by
Bechtel for the Midland project. He is affiliated with the
Bechtel quality assurance department and the Midland project
quality assurance department since November 1980. Byrd is with
Consumers, Rutgers is with Bechtel.
- 3061 Rutgers has been Midland project manager since August, 1979.
Miller marks Consumers Exhibit 13 for II'. Its an
organizational chart. MPQAD.
- 3062 Consumers Exhibit 13 is admitted. Miller states they are here
at the Board request and that they are now available for
examination.
- 3063 Judge Decker inquires, what does it tell you about a QA program
whether the discrepancy is found early or late. Byrd says find
them early because that is the time when the most efficient
means of correcting them is available.
- 3064 MPQAD's function comes after that - after the primary
organizations have had an opportunity to detect
non-conformances. Byrd says MPQAD, you could equate to QC "but

we are an overview organization". The primary organizations are Bechtel power and subcontractors who do the physical work and who have their own quality control organizations. MPQAD comes after that. Dietrich says he is the head of quality assurance for Bechtel - not quality control.

3065 Judge Decker asks, does the quality group within design engineering, report to design engineering and not to any separate quality group. Byrd's answer is on lines 16-18 and continues at the bottom of 3065 through 3066.

3066 Suppliers are required to have their own QA personnel. Bechtel has an organization known as procurement supplier quality, which has quality control called supplier quality representative. He then talks about getting into receipt inspection for supplied items coming to the site. He ends by saying MPQAD then only comes along after all that has happened. Where we as CPC provide our own independent assessment of the effectiveness of everything that went on before. The Board asks which Bechtel individual is the chief quality person on this project.

3067 Answer - Bechtel quality control is assigned to the site as a function under construction so that it is separate from MPQAD. It is headed up by Gene Smith.

3068 Clarification - Gene Smith is the lead individual assigned to Midland on site. He reports off-site to another superintendent that is separate from Midland. Judge Decker thinks he may be talking to the wrong man, but Byrd says I can answer your

question about the timing of discovering defects. Byrd talks about long range planning.

3069 More about long range planning. Rutgers says Bechtel now employs a qualified geotechnical engineer.

3070 He is on-site. He reports to project engineering. Judge Decker asks, do the qualified engineering personnel have the support of quality assurance people. Byrd says if you want to talk about soils and remedial work that is coming up, representatives from my organization Consumers site project office.

3071 And the Bechtel project team and Bechtel QC all did a task analysis of what coverage and qualifications of the people that would be required to follow that work to provide the assurance you are asking for. Most of those people are in place and we will obtain additional resources prior to the work actually starting.

3071 Judge Decker he did not realize that Bechtel had a quality control organization working for the project entirely separate from MPQAD. Judge Decker asks for limitations on the combined organization. Byrd starts his answer by saying that Mr. Dietrich is the lead Bechtel QA guy within MPQAD and

3072 At the same time he is the lead Bechtel quality assurance individual on the Midland project. He does serve a dual role. The Board then asks who is Gene Smith. Gene Smith is the head of Bechtel quality control. Byrd continues. Rutgers is relying on his people to do it right the first time. The

second level of assurance he gets is through MPQAD. Judge Decker asks Dietrich - do you have to rely on MPQAD for any services. Dietrich says - I do rely on those people to some degree, but

3073 On the Bechtel side of the house, my responsibilities are to make sure our ASME standards are maintained and I have people do that for me and thats beyond the MPQAD organization.

3073 Dietrich relies on MPQAD for trend analysis. Byrd says trend analysis is done by the same people in Bechtel that did it before the integrated organization.

3074 The pure mechanics of the trend program is handled under the box entitled "Administration".

3075 Dietrich clarifies a previous answer. He says I am not the head Bechtel quality guy, but the head Bechtel quality assurance guy for the Midland project. That is my job. Gene Smith is the head quality control guy for Bechtel at the Midland project.

3076 Tells who Dietrich reports to. Same with Rutgers.

3077 Where Rutgers spends his time. Keely is Rutgers counterpart.

3078 The Chairman establishes that MPQAD is involved generally in no QC activities. The Chairman then goes through the organization chart (CPC Exhibit 13). Starting on the left, he asks - what does QA engineering do. Byrd says - I will tell you, but what I say is also basically true of the QA services section that you see over on the right. QA services section are located in Ann Arbor and Jackson. QA engineering is on the site. Byrd

then tells what QA engineering provides at the bottom two lines of 3078 through the top of 3079.

3079 He explains his answer further. Line 23, the Chairman asks -
Concerning approval of a design change, if the field change request were initiated, would that be accomplished by this QA engineering department or the QA services department. Or would that be performed by the design engineers.

3080 Byrd answers essentially that QA is not in the design process. Only over review. The Chairman then asks what organizational section would be involved if an "as used" disposition was made. Byrd's answer is on line 16-24.

3081 Byrd discusses if there is a disagreement how they elevate the issue. Byrd talks about his quality engineering staff is made up of degreed engineers.

3082 Further concerning disputes, Byrd tells who they go to to resolve disputes.

3083 It's difficult to know what Byrd's answer is in response to. He talks about examination inspection verification test group are the people who are primarily responsible for our over-inspection. They also share equally with quality assurance engineering in the audit process, etc. He is continuing his explanation of the principle divisions of CPC Exhibit 13.

3084 By Byrd, the over-inspection is basically a QC activity. It is a repeat of the primary QC activities inspection. We usually go further than the specific activities of the Bechtel

inspector. We also look at it from a programmatic aspect to make sure all the right drawings were in place (GOOD EXPLANATION BY BYRD).

3085 Board question - Other than geographic location, how do you differentiate QA services from QA engineering. Answer by Byrd, the QA engineers are assigned physically to the areas that the action is in that they are supporting. The 7 or 8 person design QA engineering section is physically located in Ann Arbor. That is the group as a quality assurance group that the integrated organization really took over from what Bechtel had before. Judge Decker says that isn't it a that design engineering is the primary group taken over by MPQAD. The people are all still Bechtel people except one man.

3086 Byrd says a lot of it is still the same which is good. Because what was in place before was basically good. They now operate to a Consumers Power Department manual instead of a Bechtel manual. Rutgers volunteers that Consumers Power is very clearly in charge of MPQAD and the numbers of people have increased substantially from what it was before.

3087 The Chairman tries to clarify the previous discussion - if a specific engineering problem arises, how would it be determined whether it goes to an engineering section or to a QA services section. Byrd's answer starts on line 15.

3088 Byrd indicates the qualifications of the people in QA engineering and QA services is approximately the same. Byrd

explains why heating, ventilating and air conditioning work is different.

3090 ZACK does not do its own direct primary QC work at the site. They do at their fabrication in Chicago. The Board asks if that is a good situation. Byrd says its OK we provide the same service to the ZACK as they used to have within house. Rutgers volunteers that the first principle is building in quality as opposed to being inspected.

3091 The Board says but Mr. Rutgers would you like to have your own quality people removed from under your wing. Rutgers said that would make me uncomfortable. Rutgers volunteers that it was a Bechtel recommendation to Consumers to take over acceptance inspection from ZACK even though we thought given enough time ZACK could do it.

3092 The Chairman asks - is my understanding now correct that MPQAD is an overview organization. Byrd responds overview from the standpoing of inspection, but a line function as far as supporting the design and construction activities design procurement and construction activities. What is the difference between MPQAD and the old CPC overview organization that did exist. Byrd's answer, there are two changes. His answer continues through most of 3093.

3096 BARBARA STAMIRIS STARTS HER CROSS-EXAMINATION

3097 Barbara gives a speech about going back to the QA stipulation. She does not feel that CPC has provided any witness to her on her contention 2 concerning time and financial pressures. She

says Keely did not address her contention 2 in his testimony in which she tried to ask questions she was told another witness would be provided later.

3098 She was told that Cook and Howell would address her contention 2. Cook came on recently in 1980, but Mr. Howell did not respond to any kind of detail to the questions she had. She claims she is in a difficult position with respect to her contention 2. Miller responds that page 16 of Keely's prepared testimony - the second full para. talked about Stamiris contention 2.

3099 Miller says Howell and Keely both addressed the diesel generator building in their testimony. He also says that these gentlemen were not involved with the diesel generator building.

3100 Barbara says I want to pursue that matter with Consumers witnesses. I admit I did it with NRC witnesses. Miller says Peck and Hendron will be here to talk about the diesel generator building.

3102 Barbara asked Rutgers about the cost plus contract. Miller objects. The Chairman rules that the contract is relevant to the ability of CPC to exercise appropriate control of the project. Since this is the only Bechtel witness we will have, we overrule the objection. Rutgers says the contract is such that Bechtel is reimbursed actual cost for its services and in addition, gets a fixed fee.

3103 Barbara asks whether this type of contract effects incentives.

- 3104 Rutgers says to the extent that I have to work more than once, my return for that work is decreased because the fee is fixed. To the extent that the contract has bonus or early scheduled completion provisions, there could be a positive pay-off.
- 3105 Barbara explains her confusion concerning Donald Horn's position. Byrd responds that his position in October '80 is the same as it is today - supervisor of the quality assurance engineering group. His job has been the same since 1977. She asked him about two improvements to the MPQAD. One is that CPC is in charge and another was in eliminating some of the in-between steps. In March 1980, the MPQAD was formed under the Midland project office. The integration of Bechtel occurred in August of 1980.
- 3108 Barbara asked whether the two improvements came about at the same time. Byrd answers yes, in August. But both of them started earlier. Rutgers volunteers that he thinks there was a lot of visibility concerning CPC control when they took over in March of 1980. But the decrease in redundance (he apologizes for that word) came into being in August.
- 3111 Barbara asked - Do you believe that part of this reorganization and new approach was in relation to time and schedule considerations. Byrd says no.
- 3114 Prior to Byrd having his present position, Margulio was the head of quality assurance function organizations and Byrd worked for Margulio.

3115 She asks him - were you aware of a backlog of unresolved problems at that point. Byrd says there is always a backlog of quality assurance matters. Our job is to keep it within reasonable limits.

3116 She asked him if the backlog wasn't too great. Communications lost between Byrd and Barbara.

3117 Byrd feels no "overburden" in his new responsibilities and has had no difficulty. She asks - has there been an improved performance by quality assurance since March of 1980. Rutgers says QA program "has performed and is performing well". Its performing better in 1980 than in 1979.

3120 BOARD QUESTIONS

In March of '80 Byrd became manager with the IE and TV. Margulio and his organization maintained an audit function and they independently assessed the way I am doing business that was no lessening of CPC direct involvement by this organization. Byrd denies that they are harming Bechtel people or contract people to take over old CPC functions.

3121 Judge Decker asks Mr. Rutgers - have any of the recent organization changes inhibited you in any way in fulfilling Bechtel's contract responsibilities for the Midland project. He answers no.

3122 In fact, they have assisted him. Rutgers says communication lines are crisper and cleaner as a result of the reorganization. The Board asks Dietrich, what responsibilities does he have with which hat on. For example, Dietrich says he

is responsible for assuring the plans for the quality assurance activities described in the nuclear quality assurance manual and the Bechtel ASME Section 3 quality assurance related activities.

3123 Dietrich responds that Bechtel ASME activities are done with the Bechtel hat on. The NQAM is done with both hats on. Dietrich then goes down his whole list of responsibilities telling which hat he has on. Continues through 3124. Dietrich explains PQAE is project quality assurance engineers. He is the only one on this project.

3125 How does he fit into MPQAD. Answer - I have administrative functions in the MPQAD organization with the Bechtel people. He has no supervisory responsibility over the boxes on the charts. Byrd volunteers that Dietrich can ask for any resources he needs. Dietrich responds that the Bechtel quality assurance department has 6 people in project quality assurance.

3126 How many quality control people report to Gene Smith. Approximately 120. Rutgers says there is no QA quality organization that reports to him. Byrd says historically he spent more time in Jackson, but now he is spending two days a week in Jackson, two days a week at the site, and one day someplace else.

3127 Since Byrd is only there 40% of the time and Dietrich has no supervisory responsibility, who is running the show. Byrd responds the daily line supervision at the site is under Turnbull. He is there full time. MPQAD has resulted in some

elimination of duplication of the same people doing something twice and therefore it is more efficient. He gives an example.

3128 MPQAD will result in greater effectiveness. Byrd tells why starting at line 8. Better utilization of resources.

Subsequent answer seems to relate to better communications.

Question - will the new organization help CPC get to the root causes of problems.

3129 His answer is not responsive. He talks about turn around times on non-conformances being shortened then the general adequacy of evaluations by MPQAD of dispositions.

3130 FURTHER DIRECT EXAMINATION BY MILLER

Miller tries to relate his questions to the previous Board questions - does the over-inspection function occur simultaneously with the primary quality control inspection. Byrd says sometimes it does and sometimes it follows it shortly.

3130 With respect to Judge Decker's question about Bechtel being sure the soils work is performed properly, you referred first to a qualified geotechnical engineer and then you discussed other qualified personnel. Are there other resources? Rutgers refers to "staff group within Bechtel" or we can go outside Bechtel if we needed that kind of expertise. What division is geotechnical services in at Bechtel. Answer - its a staff group that includes people with expertise in hydrology, soils engineering, etc.

- 3132 What organization do you, Mr. Rutgers, look to for performing the quality assurance function at the site. Answer - MPQAD.
That organization does not report to me. And he does have direct communications with Mr. Byrd.
- 3133 We do up the Bechtel organization QA wise.
- 3134 Dietrich is asked to describe the circumstances under which Bechtel retained the quality assurance function for ASME work. Answer - to "maintain the ASME certification stamp" The ASME certified work that takes place in Midland involves engineering, procurement, construction, including pipe welding, procurement of equipment, and commodities.
- 3135 Can we distinguish between ASME equipment and other equipment. Byrd says from the point of view of MPQAD there is no difference. The reason for the separate organization was to keep the bookwork clean (I can't need this stuff for the findings). Miller question to Byrd - Can you describe in response to the Chairman's question, how the organization on CPC's exhibit 13 closes out CPC NCR's. But how are Bechtel NCR's closed out by this organization.
- 3136 The process is different. Bechtel non-conformance reports are written by Bechtel quality control. Its similar but different. Bechtel closes out their NCR's by QC after they receive their disposition from engineering. MPQAD's involvement in that is that we get the Bechtel NCR at two different points. I get it when its first issued and I get it when there's a disposition. Byrd describes the reporting systems concerning NCR's.

- 3139 Barbara is apparently asking questions. She asks him about the January 12, 1981 I&E report 81-01 in which commitments to re-review the FSAR were inspected by NRC. It is exhibit 3 to Stamiris contention 3. She also indicates she is going to ask about exhibit 10 to Margulio's testimony which represents the commitments made in response to NRC question 23 on the same subject.
- 3140 The Board corrects here to say that its the staff testimony on Stamiris contention 3 that she is referring to. She refers the witness to part B on page 3 of the inspection report.
- 3134 Do you agree it refers to design control.
- 3143 Byrd says we took it on ourselves to go back through all of the previous correspondence and the commitments in question 123 to read carefully and find anything we could designate a commitment. And we assigned an action item to each one of these. Barbara directs his attention to the section that says of the 26 action items which the NRC verified, eighteen had been satisfactorily accomplished and eight remain open.
- 3145 Byrd was satisfied with that progress (eighteen of twenty-six).
- 3146 Were you (Byrd) aware of audits that had been done on this problem the accuracy of the FSAR review prior to this inspection. He was aware of one audit. Byrd does not agree with the seriousness of the problem as indicated by the NRC. Barbara then directs his attention to page 8 of I&E report 80-32 (there is some confusion, I think she began asking about 81-01).

- 3147 Barbara references Block 8 of the FSAR review form.
- 3148 Has the problem been now corrected. Byrd answers "I believe that we have substantiated our conclusion, that the overall effectiveness of the re-review program was not compromised by the item under discussion here." [FSAR re-review is still an outstanding item with the NRC. We are to report later as discussed just before the 11 am break on either the August 13 or August 14].
- 3154 MPQAD is not responsible for FSAR re-review. But they are involved in three different ways as listed by Byrd.
- 3155 Once the block 8 item became an item of non-compliance, MPQAD was involved in the preparation of response to that item. Byrd explains his understanding of the FSAR re-review problem. First it was assigned to many parties and these parties assumed different roles.
- 3156 Byrd attempts to make light of the block 8 item [since this is presently an outstanding matter, that's probably as far as I need to go in these findings].
- 3157 Bechhoefer then sustains the objection to the questions concerning block 8 saying that these witnesses obviously are not knowledgeable on the subject.
- 3158 Barbara then directs the witnesses attention to Appendix A which is near the beginning of the report. Its the third piece of paper.
- 3159 Barbara's trying to set up Byrd with a lot of questions about 50.55e report and design documents.

- 3160 Byrd agrees that he is familiar that there have been some items of non-compliance associated with criterion 3 of Appendix B.
- 3161 STAMIRIS CROSS-EXAMINATION OF THE BYRD, RUTGERS, DIETRICH PANEL
- 3162 Barbara is trying to get a document in evidence. Miller volunteers that the document is dated November 1, 1978. Its from Martinez to Keely. It concerns the Midland project. The initial JAR are typed (Rutgers has stated that those are his initials).
- 3163 The stamp used for JAR is a CPC stamp, not a Bechtel stamp and therefore JAR is not Rutgers. Barbara talks about Stamiris exhibit 2 an audit finding report from August, 1980. I think its not in evidence yet.
- 3164 Byrd says he doesn't really have much of a memory concerning this exhibit.
- 3165 Barbara is trying to establish that her exhibit 2 should have been brought to the attention of the NRC. Miller says as audit finding reports, they are submitted to Region III pursuant to ALAB-106.
- 3166 The Board sustains Miller objections.
- 3167 Barbara asks Byrd - are you aware of any discussion in CPC concerning the possible stop work order in the soils area. Byrd says he was aware.
- 3168 Not good cross. Barbara asks Byrd - do you ever look at combined results of findings and consider overall impact as opposed to generic implementations from each individual finding, and he says yes. Byrd refers to the reports Barbara

is trying to get in (Stamiris exhibit 2) and says he remembers the discussion. We resolved these rather quickly, indicating we were happy with the disposition.

3169 Rutgers volunteers that for all purposes, we did stop work because of this matter and we wanted to get this cleared up once and for all. So although Rutgers does not remember the particulars, he remembers very well the time frame of August 1980 and the direct involvement of Bechtel and Consumers and the resolution of the problem.

3170 On line 13 Byrd agrees with Rutgers that in fact what happened is we did stop work. All three witnesses agree that NRC was not notified other than through the regular channels and files to Region III. (difficult to know what significance that has).

3171 Byrd says we absolutely follow the letter of the law for things that we have to report to the NRC and quite frequently we go beyond that. We have in the past called them where we had to stop work in effect to let them know immediately.

3173 BOARD QUESTIONS OF THE THREE MEMBER PANEL

Details on who signs off on the acceptance of the recommended action with respect to Stamiris Exhibit 2.

3174 A. The Chairman indicates he is trying to find out who approves the change and how does it get approved. Miller volunteers that Stamiris exhibit 2 are at an intermediate stage in the approval process. Byrd agrees. More details about who signs the final approval.

- 3175 The Chairman indicates he is still not sure that he's got an answer to his question. In order for a recommended corrective action to be adopted, what kind of a record does there have to be. Byrd says the two signatures you see is enough to issue the audit finding report to the responsible party. Byrd's answer continues on lines 12-20.
- 3176 The Board continues to pursue the matter. What if the audited organization says this recommendation is not appropriate for some reason or another - then what happens.
- 3177 The Board still pursues it, and if you do not agree, then what happens. Byrd says escalation is always a possibility.
STAMIRIS CROSS-EXAMINATION RESUMES. Stamiris Exhibit 2 is admitted into the evidence.
- 3178 Barbara asks Byrd about Stamiris Exhibit 12 which is an MCAR. Byrd describes the problem. The supplier made a Part 21 report. The NRC resident inspector discussed that report with a QA engineer. Byrd says there is a requirement for Bechtel to tell Consumers about a Part 21 report and apparently they had not done so.
- 3181 Bechtel did not knowingly withhold this information. Apparently the wrong people at Bechtel were aware of the Part 21.
- 3182 Rutgers volunteers his Joe Bechtel and Sam Bechtel statement. He says from now on Joe Bechtel will know what to do with a Part 21 report.

3185 Re-cross examination by the Staff. Byrd has been manager of MPQAD since April '80. The integrated organization has been operating since August of 1980.

3186 Byrd cannot identify any weaknesses in the new program.

3187 Do you have any problems at all now.

3188 No. Byrd sticks to his story that he knows of no problems whatsoever.

BOARD EXAMINATION.

Byrd says he would do it all over again even if we were back in early 1980.

3190 Byrd says we can do more with less resources. The Board asks whether there's a point when the work gets so bad that CPC might not have to pay for it. Rutgers says on cost plus contract CPC presumably pays cost.

3191 Rutgers states there are contracts where Bechtel would re-perform work at no cost to consumers. (He doesn't really answer the question). The Chairman specifically asks whether Consumers is taking any action with the respect to the soils problem and with respect to Bechtel's responsibility. Rutgers says in 1978 Bechtel received a letter from Consumers indicating it was their view that Bechtel had some responsibility in the contract and that issue is not resolved.

3192 RE-DIRECT BY MILLER

Did the absence of an incentive clause in the CPC/Bechtel contract have any effect on Bechtel and he says none. He asked Byrd - was there a written communication from CPC to the NRC

Staff with respect to the findings in the inspection report (I assume the May 18,-22, 1981 inspection).

- 3193 Yes, there was. And CPC had identified the specific problem concerning block 8 before NRC made its inspection. Correct. Miller asks Byrd to state what CPC decision was with respect to corrective action to block 8.
- 3194 Byrd says that they decided to try to physically change the procedure at that point in time would have added more confusion even though block 8 was not being filled out the same by all people. In fact, the reviewers were doing an adequate technical review. Byrd says that the re-review was being done adequately. Byrd then indicates that the adverse finding in inspection report 80-31 or 80-32 would not have come out the same way if the NRC had been aware of some information that CPC had.
- 3195 Miller shows Byrd a document signed by Cook to Keppler dated February 21, 1981 - Attachment 1 to that document is CPC's response to the notice of violation contained in NRC inspection report 80-32 and 33. It was marked as CPC Exhibit 14. Miller had no examination of it. He just said it contained more detail concerning the re-review.
- 3197 Miller indicates that Byrd will be back on Monday, at which time he will offer CPC Exhibit 14 in evidence. Byrd doesn't know whether this has been closed up by the NRC and subsequent inspection or not [I later found out that Ross Landsman had not closed it out].

- 3203 I am asking a follow-up question to the Board's question about the relationship between Bechtel and Consumers and the responsibility for the soils problem.
- 3204 Rutgers says he got his information from an attorney for Bechtel, so I declined to pursue it. Byrd sticks to the story that he has no problems with the NPQAD even in the fact of the inspection report from the May 18-22 inspection.
- 3205 Last page of transcript - the panel is excused.

Mc

all of me ~~_____~~

MIDLAND PROCEEDING

8-6-81

August 6, 1981

- P. 3209 Dr. Ralph Peck is called as a Witness.
- P. 3211 The testimony of Dr. Peck with respect to Contention 2 is bond into the record as if read.
- P. 3212 A surcharge is a pressure applied to the ground surface for the purpose of stressing subsoil to some desirable extent. The purpose of the surcharge at the DGB was to reduce or virtually eliminate settlements that might take place otherwise after the building had been put into service.
- P. 3213 If the material such as the clay has a low permeability the effect of a surcharge may take place slowly. On the other hand if it is a free draining material the effects of the surcharge take place almost immediately. One judges the effectiveness of a surcharge by making certain observations during the process of the surcharge. The most important observation is that of the settlement of the original ground surface under application of the surcharge. With clay soils there is first a delayed settlement that is a result of squeezing the water out of the pores, this process is called primary consolidation.
- P. 3214 If one plots the magnitude of settlement as a function of time the rate of settlement appears to decrease with time. When

surcharging clay soils the excess water pressure of the soils is measured. When a load is applied to clay soils the load is transferred largely to the water in the pores of the clay and that is what drives the water out of the clay soil and produces the consolidation.

P. 3215

Piezometers measure the rate at which the pressure builds up during the surcharging and the rate at which it dissipates after the load is applied. These measurements can give you an indication of the progress of the primary consolidation. When the surcharge has done its job that is when the excess pore pressures have been dissipated then the load can be removed. If subsequent loads on the building are less than those associated with the surcharge then future settlements will be minimal.

P. 3218

The DGB did not settle uniformly under the surcharge, it tilted slightly.

P. 3219

Cross Examination by the Staff:

In Peck's mind, root causes means those causes that he should know about as engineer in order to be able to solve the specific engineering problem presented by the DGB.

P. 3220

All that Peck needed to know concerning the cause of the settlement was the ~~general~~ ^{condition} of the material that constituted the fill, the knowledge that a large portion of that fill material was indeed a clay, and that settlement had occurred under the own weight of this fill material and the portion of the structure that had already been completed. The above is

all that Peck needed to know in order to determine that surcharging would be ^{an} effective solution. Any organizational deficiencies were irrelevant to Peck's knowing how to approach the settlement problem.

- P. 3221 Peck agrees that organizational deficiencies were not irrelevant in terms of implementing his decision to surcharge the DBG. ^{At} one of the early meetings the results of some field control tests showed that the ~~fill~~ ^{fill} had not been compacted to meet the particular requirements.
- P. 3222 Did not concern Peck that the people who had been responsible for compacting the fill might also be involved in implementing the surcharge program. At the time of the surcharge the DGB walls have been completed up to about the mezzanine level.
- P. 3223 The fill used at the DGB was variable and not uniform.
- P. 3224 The only detrimental effect of surcharging the building such as the DGB is the possibility of deformation under the settlement conditions. On the whole the preparation for the surcharge and the surcharge itself reduced some of the detrimental effects that ^{had} already taken place as a result of the settlement of the DGB.
- P. 3225-3226 Cutting the duct banks and placing the surcharge tended to close up cracks rather than open new ones. Peck concludes that the surcharging did not introduce any further detrimental effects.
- P. 3226 A possible detrimental effect of surcharging would be added stress on pipes and conduits. ^T That concern was recognized by

P. 3226 Con't

Consumers prior to the surcharge, Peck is not aware of the details of whether pipes in fact ^{have} ~~be~~ been over stressed. Peck does not know if there are more cracks in the DGB now than the were prior to the surcharge.



- P. 3227 Peck's involvement at the Midland site was his first experience in surcharging a substantially completed concrete reinforced structure. He adds that it is unusual to place a surcharge on that type of structure, however, it is not unprecedented.
- P. 3227 Peck explains the complexities that are associated with measuring pore pressure and partially saturated soils.
- P. 3228 The major problem with piezometer measurements of partially saturated soil is that the piezometers are measuring both water and air pressure, you need much more elaborate equipment to get accurate measurements when the soils are only partially saturated. The more accurate this equipment is the more complex it becomes and the more difficulties you have with it, thus it is very desirable to try to obtain conditions that permit using the standard and more rugged equipment.
- P. 3229 Peck explains further how it is much more accurate and better to deal with fully saturated soils when taking piezometer readings.
- P. 3230 Peck agrees that the soils were only partially saturated up to the foundation level of 628 feet at the time the surcharge was placed. The degree of saturation was probably not 100 percent anywhere in the foundation at the time the surcharge was placed. The sophisticated pore pressure measuring equipment was not used at the DGB, Peck relied exclusively upon stand pipe type piezometers.
- P. 3231 Peck states that he thinks the piezometers gave accurate readings for all practical engineering purposes. Peck discusses his hypothesis that the fill soils were placed dry of optimum moisture

- P. 3231 con't this hypothesis was later proven to be wrong.
- P. 3232 A secondary benefit of raising the pond level was to cause the foundation soils above the piezometer tips to also become saturated from pond seepage. The principal reason for raising the watertable however, was to submerge the piezometer tips. Peck does not recall the pond elevation in December of 1978 prior to the placement of the surcharge.
- P. 3234 Peck explains why it would be very surprising if an equilibrium the water level could have been reached and preserved during a period of a large fraction of a year.
- P. 3236 Peck confirms that at the November 7, 1978 meeting which is Attachment 3 to Contention No. 2, he suggested that the best sequence would be to place the preload and then to quickly raise the cooling pond water to its operating level, in fact the preload was placed at the same time that the cooling pond level was raised .
- P. 3237 The statement on Page 4 of Peck's testimony that the NRC had no logical technical basis for believing secondary consolidation had not been achieved was Peck's position both in early August 1979 and today, in fact his belief has been strongly reinforced by all subsequent studies.
- P. 3238 Nobody from the NRC ever told him that the Staff firmly believed that secondary consolidation had not been achieved. Peck had expected that the piezometer readings might come up between 5 and 15 feet when in fact they came up chiefly in the range of 2 to 3 feet. Peck roughly estimated that the range of settlement

- P. 3238 con't as a result of the surcharge would be between six and eighteen inches when in fact it was between an inch and one-half and three inches.
- P. 3239 The quote "pessimistic" estimate of six to eighteen inches of settlement is really the maximum that Peck would ever had expected to have occurred.
- P. 3240 Peck does not believe that the rise in the piezometer levels was do to the raising of the cooling pond level instead of the placement of the surcharge. Peck then qualifies that the piezometers levels reflected in the general way the raising and falling of the cooling pond level.
- P. 3241 Peck states that some of the piezometers gave anomolous readings he adds that this is not unusal. Peck explains how some of the readings were anomolous.
- P. 3243 Peck explains how one can determine that an anomalous reading is the result of the instrument not working properly as oppose to the result of some localized differenziat soil condition.
- P. 3244 The anomolous readings were largely in isolated areas that is not group together.
- P. 3246 With respect to a portion of Contention 1:
Peck does not recall whether anyone at the meeting of September 28, 1978 ceased Stamiris Exhibit 26, told him about the settlement of the grade beam at the Adminstration Building.

P. 3248

Cross Examination by Stamiris

P. 3250

At this time there are a couple of examples of anomalous piezometer readings but all of the rest can be eliminated or satisfactorily explained. These anomalies are not the fault of the instruments but they are the result of misreadings, miscalculations and misplottings. The anomalies are simply bookkeeping errors.

P. 3251

The more sophisticated equipment which was not used at the DGB might start giving wrong readings because problems with the electrical circuitry.

P. 3252

Piezometers readings were taken before during and after the surcharge.

P. 3254

Stamiris Exhibit 13 is marked for identification it is the document dated November 1, 1978 a letter from Mr. Martinez to Mr. Keeley.

P. 3255

Stamiris Exhibit 14 is marked for identification it is a memo dated December 20, 1979 from William Deloff to Mr. Afifi.

P. 3256

Stamiris Exhibit 14 discusses Sondex devices that were installed to determine the compression of different layers of the subsoil. These Sondex devices turned out to not give satisfactory results. The Sondex instruments were installed at the beginning of the surcharge program, they measure the same sort of thing as Borros anchors. The Sondex devices are newer than Borros anchors. Peck was not particularly anxious to use them during the preload because they are so sophisticated.

- P. 3257 Peck describes the readings that the Sondex instruments give. Peck believes the Sondex instruments were installed properly by Soil and Rock Instrumentation Company, he also believes they were read properly.
- P. 3258 The Sondex has certain limitations which made it really unsuitable and unsatisfactory for the DGB surcharge program. Peck thinks it was the soil rock instrumentation specialist who suggested that the Sondex devices be used.
- P. 3259 There were no anomalies associated with the Sondex instruments was simply a matter of the instrument not being designed for what it was trying to measure on the other hand the piezometers worked very nicely the problems with them was that there was an occasional human error involved with a particular reading taken from a piezometer, the instrument itself was not at fault in those instances. The Borros anchors were very consistent.
- P. 3262 Peck reiterates that the Sondex instruments were essentially experimental devices and that in this particular instance a rather unsuccessful one.
- P. 3266 Stamiris Exhibit 14 was received in evidence.
- P. 3267 Peck gives his hypothesis on why one piezometer reading was that much higher than all other ones. He states that this anomalous reading is not an indication of differential stress on the DGB.
- P. 3268 Peck does not know whether any new stress analyses were done when the Diesel Generator Building settlement problem was discovered.

- P. 3268 con't Peck explains that it is possible to measure strains and that stresses then can be computed from these strains.
- P. 3269 Peck had no involvement with the stress analyses performed at the borated water storage tanks.
- P. 3273 Peck states that the DGB is as good a building today as it was prior to the surcharge.
- P. 3274 Peck does not recall if there was continued construction between first identifying the settlement of the DGB and the initiation of the surcharge program.
- P. 3276 The water levels varied throughout the period of the surcharge.
- P. 3276 Peck believes the NRC had a technical basis for believing that secondary consolidation had been achieved. That basis can be found in the nine volumes of information provided.
- P. 3277 Peck does not know whether the NRC had every bit of the data that he had to evaluate in reaching his decision on secondary consolidation, however, he is quite sure that the NRC had possession of the nine volumes of information.
- P. 3280 The piezometers showed a drop at the time of removal of the surcharge, then the piezometers rose again to the general ground water level.
- P. 3281 Peck modifies his answer to the question about whether the NRC had all the information that he had when reaching the conclusion on secondary consolidation. Peck had some additional information he had requested from Bechtel this information consisted of

- P. 3281 con't plotted settlement data with tabulated values.
- P. 3282-3283 There is a discussion of the placement of the surcharge near the turbine building. The Building did tilt somewhat during the surcharge. Peck thinks the end of the building that settled less during the surcharge was that end which was near the turbine building.
- P. 3284 Discussion of the settlement benchmark:
Peck did not perform an independent analysis to determine whether this benchmark was stable.
- P. 3284 This benchmark was the reference point for Peck's surcharge program. Peck did not find it unusual that Consumers did not have long term records of the ground water table at Midland.
- P. 3286 Stamiris Exhibit 15 is marked for identification it is a letter from Dr. Peck to Mr. Afifi, in this letter Peck requests certain settlement benchmark information from Dow.
- P. 3287 Peck did not receive any written information from Dow concerning settlement as a result of salt extraction mining, however, he did receive a verbal report that the subsidence in the area due to salt extraction had been minimal.
- P. 3287-3288 Peck explains his interest in the significance of salt extraction mining. He explains that the salt formations in the Midland area are very much deeper then ones he had come across in the Detroit area. Peck concluded that give the geological situation in Midland and the depth of the salt deposits that subsidence if

- P. 3287-88 cont. it had indeed occurred was so uniform over the area that it had no significance with respect to the Midland plant.
- P. 3294 Applicant moves to strike all of the proceeding testimony on the subsidence associated with salt extraction mining.
- P. 3295 The Board denies the motion to strike.
- P. 3296-3312 Lengthy discussion of whether the Staff will provide any witnesses to Mrs. Stamiris on the issue of 50.55(e) reports from the years 1980 and 1981.
- P. 3312-3313 The Board decides that it will permit testimony subject to the following qualifications:
- 1) The event reported in the 55 (e) report must of taken place after December 6, 1979.
 - 2) It must have a bearing on the Staff's reasonable assurance finding.
 - 3) All parties must be provided a copy of the 55(e) reports Saturday at the close of the hearing.
- P. 3319-3325 A discussion of whether Mr. Ron Cook the resident inspector at Midland should appear and testify as to his interpretation of the small bore piping matters. Stamiris contends that he has a differing professional opinion from Region 3 on this matter. The Staff states that they will produce him as a witness the applicant objects to his production.
- P. 3325 The Board rules that Mr. Cook should come and testify to complete the record.
- P. 3328 There was some information available on the ground water level

- P. 3328 con't prior to the installation of piezometers. This information came from borings that had been taken over a considerable period of time.
- P. 3329 Peck has previous experience in consulting on foundation problems at nuclear plants.
- P. 3329 Peck explains the statement regarding scribe marks which is made at the bottom of page 2 of Stamiris Exhibit 6, discussion of hard spots beneath the DGB which are referred to on page 3 next to number 4 of Stamiris Exhibit 6.
- P. 3332 The test pits that are referred to on the bottom of page 3 of Stamiris Exhibit 6 were made not long after the meeting of September 28, 1978.
- P. 3333-3334 Peck describes what a proctor test is and what a pocket penetrometer is.
- P. 3334 Peck does not recall whether at the September 28th meeting anyone from Consumers or Bechtel mentioned the option of removing and replacing the Diesel Generator Building.
- P. 3337 Peck defines random fill as essentially unselected earth material it could be sand or boulders or gravel or molten rock.
- P. 3337-3338 Peck assessed the removal and replacement option on its geotechnical merits and concluded that the R & R option would lead to a less satisfactory foundation than the one we would have and now have by leaving the fill in place and surcharging it. Peck believes that the DGB would settle less on the fill that was in place and surcharged than the building that sat on newly compacted fill.

- P. 3539 Peck explains further why the surcharge foundation is superior and that is because the surcharge has in fact ironed out or squeezed out all of the settlement, that otherwise might have occurred in the future.
- P. 3340 The total compression caused by the surcharge is greater than the total compression provided by the building itself. The identification of soils beneath the DGB are irrelevant to determining the success of the preload.
- P. 3341 Peck states that even though there are some spots beneath the foundation that remain softer than others, he has no reason to believe that those soft spots will cause future settlement. This conclusion is based on the instrumentation readings.
- P. 3343 Peck states that the statement made next to letter F of page 3 of Attachment 11 to Contention 1; does not reflect what he thinks now or what he thinks he said at the time of the meeting.
- P. 3344 Peck's comments on Stamiris Exhibit 13 by adding that he remembers other options being discussed at this meeting. Peck states that the letter is probably only a partially correct statement or that the author had a little different impression of what was said than Peck did.
- P. 3346 Stamiris asks whether Peck was aware of any urgency associated with surcharge program. Peck responds that he knew there were schedules that people wanted to meet and that there are always urgencies associated with a problem such as this, he adds however,

- P. 3346 con't that he did not start working immediately so the urgency must have not been that great.
- P. 3347 Peck now remembers that construction recommenced after the placement of the surcharge.
- P. 3348 Peck states that he certainly takes schedule concerns into consideration in his work as a soil consultant, however, he did not let those considerations influence his judgment about the length of time that the surcharge had to be in place.
- P. 3349 Peck adds that he took scheduling into consideration and his judgment as to how to proceed with the preload program. There were no constraints set on the amount of time he had to implement his program, he remembers a conversation to the effect that five months or so wouldn't interfere too much with the schedule.
- P. 3350 Peck reiterates that there were no constraints in the sense that anybody was saying that he had to get the surcharge in a certain length of time.
- P. 3354 Peck states that it is appropriate for a geotechnical engineer in approaching and considering a solution to a problem to take into account timing, schedule and cost concerns with respect to each solution. Peck adds that he is a specialist in geotechnics and that people hire him for the practicality the utility and the reasonableness of the solutions that he proposes for problems.
- P. 3356 Stamiris Exhibit 16 is marked for identification they are handwritten notes of a November 6, in Champagne, Ill.
- P. 3358 Peck was present in a meeting in Champagne, Ill., on November 6 however, he has never seen these notes identified as

- P. 3358 con't Stamiris Exhibit 16 before nor does he recognize the hand writing.
- P. 3359 Peck does not remember whether anyone raised the issue of whether the foundation should have been suspect at this November 6 meeting.
- P. 3362 Peck begins to explain the problems with a sampling and testing program after a preload, that problem is that one is only getting occasional samples from small fractions of the total mass of the soil and in a nonuniform medium one has great difficulties in deciding what is a representative sample.
- P. 3363 Peck indicates that the preloading itself and the observation of it are the ultimate demonstration of the inventiveness and success of the program.
- P. 3365 At the November 6, 1978 meeting several people might have suggested that it would be a good idea to grout underneath the footings before they were cut loose. Further thought was given to this matter and as Peck recalls it was decided that it would not be necessary to grout before they were cut loose.
- P. 3366 Peck was not overly concerned with the matter of grouting beneath the footings, he never thought it was a very serious matter and didn't have a strong preference one way or the other.
- P. 3372 Stamiris Exhibits 13 & 15 were received in evidence only for the purpose of understanding the answers of the witnesses, not for matters in those documents about which the witnesses were not questioned.

MIDLAND PROCEEDING

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8-7-81

August 7, 1981

- P. 3376-3383 Further discussion of the 55(e) reports. Resumption of cross examination of Dr. Peck by Ms. Stamiris:
Peck's view that it would not be necessary or desirable to break up the mud mat at the DGB.
- P. 3384 Peck defines mud mat; its thickness varied from a few inches to little over a foot, it was not a continuous concrete slab. Placement of a mud mat is a routine event when building large structures with reinforced bars. The mud mat has nothing to do with the structural behavior of the finished structure.
- P. 3385 Peck does not know how far the mud mat extends beyond the DGB however, he guesses that it would probably only extend a few feet.
- P. 3389 Peck states that he was never directly asked about his assessment of the removal and replacement option.
- P. 3392 Peck is not aware of any reports or references to the removal and replacement option on its own geotechnical merits and the 54(f) or 55(e) reports.
- P. 3393 Stamiris Exhibit 17 is marked for identification, it is a portion of the response to question 21 and it is from volume 1 of the 54(f) responses.
- P. 3394 Peck agrees with the statement made on page 21-3 of Stamiris

- P. 3394 con't Exhibit 17 that the preload option may not produce densities uniformly meeting the PSAR compaction criteria but will produce foundation conditions that meet the design intent of the PSAR.
- P. 3395 Peck further agrees with the following sentence that states removal and replacement of the DGB fill would have allowed the achievement of the PSAR compaction criteria. The removal and replacement option would have allowed achievement of the original compaction criteria whether that is a superior action, Peck would question because it leads to an inferior result. Peck adds the R & R option satisfies the letter of the law but not the intent as well.
- P. 3398 Peck certainly discussed his opinion that the surcharge procedure would give the most satisfactory solution to the settlement problem at meetings with NRC personnel.
- P. 3400 The term geotechnical merits means to Peck what a civil engineer with expertise in geotechnics would think about a certain subject.
- P. 3402 Peck states that he does nothing on a purely scientific basis, science and engineering are not the same things. An engineering decision must include geotechnical factors, time, money and expedience factors as well. They are part of a problem and they are part of an engineering solution to a problem. Any engineer who tried to operator purely on the basis of a narrow technical scientific conclusion would be a poor engineer and would come up with a poor engineering solution.

- P. 3403 Stamiris states that when she used the term geotechnical merits in her questions, she meant it in the sense of being pure science.
- P. 3405 Stamiris Exhibit 17 is admitted into evidence, the date of Stamiris Exhibit 17 is April 24, 1979.
- P. 3406 Stamiris Exhibit 18 is marked for identification, there are meeting notes of a December 15, 1978 meeting.
- P. 3409 Peck does not believe he had an original recommendation or suggestion with respect to breaking up the mud mat.
- P. 3411 The bottom of page 4 of Attachment 3 to Contention 2 has a discussion of gradings being used inside the building instead of the compacted fill and slab to eliminate material placed above the foundation. Peck explains what this all involved. The idea was to reduce the weight of the DGB if it was not possible to place an amount of surcharge that would exceed the designed load of the building. Since it was possible to put on all of the surcharge that was necessary to increase the stresses above the future building stresses it was not necessary to make any design change to the building.
- P. 3413 When Peck became aware of the loose sands beneath the DGB he began to consider the liquifaction problem. Peck does not recall being told about the loose sands at his first meeting with Consumers, that came to light later.
- P. 3414 Peck and Hendron made their recommendation on the preload at

- P. 3414 con't the November 7th meeting in Champaign, Ill.
- P. 3415 Peck did not recommend grouting as a solution to the liquifaction problem. Grouting however, was a solution that was discussed and considered.
- P. 3417 Peck's recommendation for the liquifaction problem was permanent dewatering. Liquifaction is a potential foundation problem and Peck considered that within his area of expertise.
- P. 3419 Peck does not think he used the term what if type questions in the August 7, 1979 meeting notes which are found as attachment 13, Contention 1.
- P. 3422 Peck states that there can be responsible and there can outrageous what if questions.
- P. 3423-3424 Peck explains the discussion in the last paragraph of page 1 Stamiris Exhibit 18. Peck indicates that it was necessary to justify the preload solution to the NRC, it was Peck's opinion that the best information for such a justification was the field observations gathered during the preloading.
- P. 3425 Peck states that he realized before he put the preload on that he might be asked to justify the solution by takin certain borings. He felt that taking borings might in fact raise more questions then it would answer and would probably lead to incorrect conclusions for technical reasons. Peck believes he may his position on this issue clear to the NRC prior to the initiation of the preload.

- P. 3428 Peck explains the statement that is made in the last sentence of the first paragraph on page 2 of Stamiris Exhibit 18 with respect to laboratory tests on bearing capacity. He explains that he felt laboratory tests would give misinformation on the settlement problem, however, it would not give misinformation about bearing capacities.
- P. 3429 Stamiris Exhibit 18 was received in evidence.
- P. 3432 Peck states that the following statements are accurate:
"On June 27, 1979 the consultants predicted that the preload could be removed in approximately 8 weeks from that date. In Tab 70 (July 1979) the consultants jointly stated that the preload removal could begin in August, roughly corresponding to the eight week period. Actual removal began seven weeks from the June 27, 1979 date but memory and file documents indicate that both consultants Hendron and Peck gave approval prior to the beginning of the surcharge removal."
- P. 3436 Stamiris Exhibit 8-A is marked for identification, it is a figure entitled soil instrumentation.
- P. 3437 Stamiris Exhibit 19 a boring log is marked for identification
- P. 3440 Peck reiterates that he does not recall being informed of the administration building problem with any clarity.
- P. 3433-3442 Stamiris tries to show that there is some inconsistency between a boring log and the map. Specifically the boring log indicates that a mud mat was passed through yet this boring was not taken near the diesel generator building. Stamiris drops this line of

P. 3433-3442
con't

questioning when she's informed that there was a mud mat laid down for some temporary construction trailers that once sat in the area where the boring was taken.

P. 3442

Cross examination by Marshall

P. 3444

Peck does not recall what the water level was when the surcharge was placed.

P. 3449

Peck states that he knows there are no aquatic wet lands beneath the DGB. Aquatic bottom lands are probably poor material for a foundation.

P. 3450

Peck does not know if there were aquatic bottom lands beneath the diesel generator building nor does he know if they were removed.

P. 3451

Board examination begins:

Peck's principle involvement has been with the DGB he has participated however in discussion regarding the Aux. Building, the Service Water Building, to a lesser extent the borated water storage tank.

P. 3452

When surcharging a large homogenous mass of soil the shear strains will be the greatest around the edge of the loading. The shear strains would be practically zero beneath the center of the loaded area.

P. 3453

One would have the greatest compressive strain at the top of the load when surcharging the homogenous mass of soil.

P. 3454

The deformation caused by a surcharge is primarily inelastic.

- P. 3456 Peck repeats that Sondex instruments have not been used very much in surcharge situations like the one at Midland, the Sondex works very well in installation such as oil fields.
- P. 3456 Bechoeffer questions the prudence of throwing out the Sondex data.
- P. 3457-3458 Peck explains how information taken from borings can be misleading in so far as the disturbances caused during sampling leads to the reduction of the strength rigidity and of the apparent preconsolidation load that one would infer from the samples. Thus, one knows in advance that boring test results will always undervalue the effect of the surcharge.
- P. 3459 Peck states that he would have been happy to see the Sondex measurements continued it would have been very nice to have the comparison between them and the borros anchors. Peck would have like to have had the Sondex instrumentation continued just so he could gather further information on the reliability or the limitations of Sondex equipment.
- P. 3462 The statements on pages 3 & 4 of Attachment 4, to Singh's testimony are technical statements and if they were correct they would be logical.
- P. 3463 Mr. Decker asks a question which he wants to have answered at a later session of the hearing. The question is; are there ways to instrument the DGB or other means to give adequate warning in case settlement occurs which was not expected?
- P. 3464 Redirect with Dr. Peck

P. 3464 con't Surcharging engineering principles are the same whether a structure is completed or partially completed.

P. 3464 Peck's understanding of the statement in the November 7, 1978 meeting notes which are attached to Contention 2, concerning the best sequence for raising the pond and placing a surcharge was not that the preload should be applied first and after that was applied the pond should be raised, in his judgment both could be done simultaneously.

P. 3465 The fact that the ground water level was rising due to the raising of the cooling pond does not give Peck any difficulty interpreting the results of the piezometers it only introduced an additional consideration, it in no way precluded him from reaching a confident conclusion with respect to the effect of the surcharge.

P. 3467 Peck states that his review of data that has accumulated since the surcharge was removed up until mid June of 1981 has increased his confidence in the effectiveness of the surcharge. The proximity of the DGB to the turbine building did not prevent the application of a sufficient load. Peck had no doubt in his mind when the surcharge was initiated as to whether it was the best option based on the best possible engineering judgment. Nor does he have any doubt as to it being the best option now that it has already been implemented.

P. 3468 Dewatering is a more conservative alternative than grouting. Any what if type questions associated with grouting would certainly

- P. 3468 con't be eliminated by choosing the dewatering option.
- P. 3469 It is Peck's opinion that he had the best data available on the settlement on the DGB without the borings results. The statements made in Attachment 4 to Singh's testimony would provide a logical technical basis for concluding that secondary consolidation had not been reached if they were technically correct. In Peck's opinion they do not form a logical technical basis for concluding that secondary consolidation had not been achieved.
- P. 3471 If the mud mat isn't already broken up and if it should break up in the future that would not result in any significant additional settlement of the DGB.
- P. 3473 Peck qualifies his earlier statement that the R & R option would satisfy the letter of the law but not the intent, by intent Peck meant that it was everyone's intent to have a foundation that would perform satisfactorily.
- P. 3474 The R & R option would not be impossible to implement at this date, however, there would be problems moving things around in such close quarters. The rate of settlement of the DGB has increased somewhat since September 1980. The current rate however, is far less than the rate under the surcharge and far less than the projection of the future estimate of settlement.
- P. 3476 Peck states he does not know if the surcharge had weakened the structure compared with the condition it was in prior to surcharging, he's judgment is that it has not significantly impaired the ability of the DGB to function. The presence of cracks can have some bearing on the assessments of the integrity of the Building, however most concrete buildings have cracks in them.

P. 3480

Peck is excused.

MIDLAND SUMMARY OF TRANSCRIPT

- 3481 Joseph Kane calls a witness. Joe responds to Judge Decker's question about monitoring the settlement of the diesel generator building after completion.
- 3482 We are now attempting to predict the amount of settlement we can predict for the future and we intend to monitor the future settlement. We have posed a question in this regard to the applicant.
- 3483 Harry Singh is added to the panel. Testimony of Joseph Kane on Contention 4B follows tr. page 3484.
- 3485 Harry Singh corrections. Harry Singh's testimony received in evidence and follows transcript 3488.
- 3489 I refer Harry to the misgivings he had about certain of the borings on page 5 of his testimony. He says he raised the question about why samples taken from boring number 2 and 4 were not tested. His concern about that has not been resolved.
- 3490 He says Woodward Clyde has explained to him why these were not tested. I refer Harry to a letter dated July 27, 1981, but as far as I know that was never introduced into the record. Then I asked Harry what was the reason it was not necessary to test these two borings. Harry says that Woodward Clyde has not furnished some details they did not have in their original report and that satisfies his concerns.
- 3491 Samples in borings 2 and 4 are identical to those in five and those have been tested before.

- 3491 Staff Exhibit 3 is admitted into the record. It's the letter dated July 27, 1981 from James Cook of CPC to Mr. Harold Denton. Attachment 1 explains the matters just addressed by Harry Singh.
- 3492 I asked Harry to describe his concern concerning the 40 foot layer of very dense fine sand where glacial till had previously been indicated. Harry said he wanted the applicant to test this material and satisfy him that it is equal to or better than the glacial till he thought had been there. He knew it was very dense sand. That documentation has now been provided in Dr. Hendron's testimony.
- 3493 Cross-examination of the panel by Stamiris.
- 3497 Barbara has made no progress at this point.
- 3498 Barbara asks him whether he doesn't think this indicates a lack of looking on the applicant's part (not to have found the 40 foot dense layer of sand). Harry says no it is not unusual. Joe says we are not investigating that area initially. It is definitely not something they omitted. Then she tries to get into the "situation" in the plant area in other locations where a layer of sand had been discovered that was previously unknown.
- 3499 Joe Kane says we are talking about two issues. What has been uncovered with boring #7 finding sand deeper than had been originally anticipated.
- 3500 Joe says you are probably talking about the commitment in the FSAR to remove loose sands. Zamarin later correction to say

that was in the PSAR and Joe agrees. Then Joe explains in the review of the FSAR the Staff questioned the method that CPC used to identify the extent and location of the loose sands. CPC went out and did additional borings. At the time the borings were taken, fill had been placed and where loose sands had been suspected, the fill was adequate and they didn't have to be removed.

3501 She says that was after the fact, and Joe agrees. And then she asks him again - do you see any similarity between that and the discovery of the forty foot dense sand layer.

3502 Then Zamarin and I both object and Zamarin makes his argument about the borings showed that the sands that were there were not loose sands. "Therefore, there was no commitment to remove sands that were ultimately found". Very tricky Zamarin.

3504 Barbara continues to pursue the matter of trying to equate the forty foot dense sand layer in the glacial till with the suspected failure to remove loose sands that was in the PSAR.

3506 Joe explains precisely what Barbara's question is about removal of the loose sands and concludes that it is not a geotechnical question, its a legal question.

3510 She gets Harry to explain again what his problem was with the two borings.

3511 Joe adds to the explanation. He had at the time of writing his testimony all the data and it had been given to on two different occasions. The first one was a preliminary submittal

and the second one was final and he had that information when he wrote his testimony.

3512 The Chairman asks whether in view of the additional information Harry received in Dr. Hendron's testimony and in Staff Exhibit 3 is the conclusion you reach in para. 3 of page 5 still accurate. Harry says no, it has to be changed. Judge Bechhoefer specifically asks whether Harry has determined that the slope stability of the dikes adjacent to the emergency cooling water reservoir is susceptible to insure safe operation of the ECWR.

3513 Harry says yes. Harry says he is satisfied as to sudden draw down on the inside face of the cooling pond. That question has been answered by Dr. Hendron. But he hasn't been able to look at his calculations. Harry then concludes that he has not evaluated it for outbreak. He also has not evaluated the stability of the dike under seismic conditions.

3514 I advise the Board that Harry Singh could review the matters in Hendron's testimony in a couple of hours and might be able to satisfy himself in that respect. Decker asks for a replacement for the first sentence of para. 3. Zamarin then wants to interrupt Stamiris for questions on quick draw down.

3515 Harry responds that at the time he wrote his testimony, he did not have assurance with respect to slope stability, because he did not have documentation. He agrees he also did not have seismic input.

- 3516 Zamarin asks his questions about draw down. He suggests that Hendron came up with the lowest factor safety at 1.34.
- 3517 Zamarin asks Harry if that turns out to be the factor of safety and the calculations are correct, would you then be satisfied that there is no stability problem with regard to quick draw down. Harry says he hasn't reviewed it. Zamarin asks - doesn't the core use a factor of safety of 1. Harry responds - the maximum pool here is 627 and if the draw down is to 604 - for that the code manual is EN, etc. (He gives the number) - he says the suggested factor of safety is 1, so Harry would accept 1.3 for sudden draw down.
- 3518 Barbara asks concerning the question I have been advised that uncertainty with respect to glacial till, etc.
- 3519 Decker asks for an explanation as to what the sentence means.
- 3520 I state my basis for the above sentence in Harry's testimony. My statement continues through the end of 3521.
- 3522 Zamarin agrees that it has been their position that no portion of the dike is within the purview of the hearing, but they considered that continued arguments along those lines would be inprudent in face of the Board's rulings concerning Contention 4B.
- 3523 Zamarin continues his argument that despite the fact that they previously thought the dike was not in the hearing now, we should consider the entire dike. He did not accept my challenge at the top of 3523 to explain why anything other than the fill is within the scope of the proceeding.

3524 Decker suggests that we strike the second sentence of para. 3 on page 5, because it is not the statement of the witness. The Board says the sua sponte of the Board is well taken, so I guess it's out.

3525 BECHOEFFER RULES THAT THE ENTIPE DIKE IS WITHIN THE SCOPE OF THE PROCEEDING AND EXCEPT FOR THE POSTPONEMENT OF SEISMIC MATTERS "WE OUGHT TO WIND UP AND BE ABLE TO RULE ON THE STABILITY OF THE DIKE". He strikes the last 3 words on page 5 and the first 3 lines of page 6.

3526 In response to Stamiris contention, Joe Kane says the dike is commonly referred to as a perimeter dike. It goes along the major power block area as well as an extension into the cooling pond area. When it is adjacent to the power block complex (3527) it is to protect the fill that has been placed there. When it goes out into the cooling pond, its for retention of that pond. Barbara now asks if the fill soil in the power block area is intended to become saturated. Zamarin objects.

3528 Barbara asks about the sand layer that had been discovered under the plant fill - does it act like a sponge and draw water from the cooling pond dike. Joe responds there are sands in the plant fill both from placement to raise the fill above the floodwater and that's called plant fill. There are also natural sands, lacostrian sands, glacial sands (3529) the sands are more permeable. They need silts and clays so that if water were to enter these layers, it is not so much causing them to be drawn out, as much as that the resistance to seepage that

wants to go into these layers is more readily available. They can move through the sands quicker than they can move through the silts and clays. Along the perimeter dike, CPC has made an effort to reduce that seepage by putting in a trench below the dike, tie into an impervious natural layer, and where they were unable to do that they have installed a slurry trench to try to cut off seepage to those sands.

3530 Zamarin and I resist Barbara's further questions about the trench as not relating to the contention.

3535 After several pages of debate, Joe Kane responds to his interpretation of her question - whether there are sands in the plant fill that can be connected to layers that would permit entrance of seepage from the cooling pond into those sands. The answer is yes. The permanent dewatering system that is to be installed by CPC is attempting to pick up that seepage that would come from the cooling pond and keep it at an elevation below the localized loose sands that we have in the plant fill. NRC has a commitment from CPC to demonstrate the adequacy of the permanent dewatering system, that they would put the system into operation, draw down to elevations they have committed to meet and then shut the system off and NRC will observe the time for recovery to prove out the estimates of time they have made.

3536 She then asks him about the existence of permanent plant dewatering system in the original PSAR.

3538 Joe and I volunteer that he will talk to her about permanent dewatering, but he needs the PSAR.

- 3539 Barbara refers Harry Singh to the fourth page that comes after attachment no. 3. It is numbered 2 at the bottom. Zamarin says it would be enclosure 1, page 2, number 39 is written on it.
- 3540 Zamarin objects to the question because it relates to the borated water storage tank.
- 3531 The transcript says that the Chairman says that Harry should be able to answer questions about core evaluations? The Chairman overrules applicant's objection.
- 3542 Zamarin continues his objection saying that discovery did not disclose any connection between management attitude and borated water storage tank or the "this type of subject matter".
- 3542 The staff does not object because of her attempt to tie it up with managerial attitude. I don't object to her trying to do it. The Board rules that questions related to borated water storage tanks should be asked later in the fall.
- 3544 To clarify the record, Joe Kane indicates there will probably be a witness here from the Corps of Engineers in the fall. On Lines 19-22, the Chairman specifically rules that he will permit questions which may relate to management attitude with respect to those topics (borated water storage tank and maybe also "core evaluations - see page 3541") that we are not examining here.
- 3545 Zamarin pushes him again and the Chairman says yes, it is possible that we will get into those subjects in the fall. He is not sure that those subjects can be cleanly separated.

Zamarin expresses surprise that the borated water storage tank has anything to do with managerial attitude. Today is the first time he has heard of it and if we're going to do it, let's do it now.

- 3546 I agree with Zamarin. Then Zamarin agrees with me.
- 3547 After conference, the Board affirms it's previous statement. We will not sustain objections merely because they relate to managerial attitude at least in terms of the borated water storage tank. It's possible they may be connected.
- 3548 Barbara refers Harry to the page that comes before 2 of this enclosure with attachment 3.
- 3549 Barbara asks him about the stated purpose of the report. Zamarin objects.
- 3550 The Chairman sustains the objection in that the sentence speaks for itself.
- 3551 Unproductive exchange between Barbara and Harry about whether issues are resolved. Zamarin objects.
- 3552 The Staff joins in the objection.
- 3554 Cross-examination of the panel by Wendell Marshall.
- 3556 Wendell asks Joe about removing aquatic soils from the site before they put the fill soil in hole where they took it out. Were they removed before the soils were put in place. Joe says there was a commitment by the applicant to remove organic materials prior to placing fill and to his knowledge it was done.

- 3559 There are some pumps for construction dewatering that are already installed, but Joe doesn't know anything about them. Wendell asks Joe - where was the water table when you were putting in this fill dirt. Answer - it would have been whatever existing groundwater table was at the time and in doing this work, they would have been required to handle that water table, whatever it was, so that this foundation preparation would have been properly handled.
- 3560 The fill for the diesel generator building foundation came from the cooling pond excavation and went into both the dike and the plant fill area.
- 3562 Joe says he knows of no fluoride tests. He knows we have measuring gradient from the cooling pond to the river and we have observed seepage through the dike.
- 3563 The Board asks Joe Kane - was any of the material removed from the cooling pond area used in the construction of the dike. Answer - Yes. The Chairman clarifies that he was talking about diliterious material. Joe indicates that diliterious material was not used in the dike [he explained to me off the record that that was the top soil which would not be appropriate for fill].
- 3565 Wendell asks Harry to take and identify document and tell him whether it is a fraud or not.
- 3569 Marshall continues his argument about the document and I continue to say it is not related to the issue before the Board.

- 3571 In the middle of the argument with Wendell, Barbara starts asking questions and the answer by Joe on the bottom line - there are in the cooling pond dike that will show the gradient, hydraulic gradient, which is the level of seepage from the pond across the dike. We expect some seepage. The dike has been designed with a drainage zone pump to properly pick that up and keep the dike stable. Joe cannot answer a question about the acceptable level of seepage, but he says from the standpoint of stability, seepage has been anticipated and designed for.
- 3574 Bechhoefer sustains Barbara's question about the cooling pond being slightly retroactive (we still have not resolved the ruling on Marshall's previous question about whether the document was a fraud). At line 22 Marshall claims that the maps in his cover letter are still pertinent. The Board Chairman disagrees and sustains the objection.
- 3579 Board examination of Singh and Kane.
Judge Decker asked him whether his slope stability analysis included a flood condition. Harry says yes, the applicant has done a flood condition from outside the dike. The dike has two faces inside and outside. [Judge Decker dropped it at that point, but we got back into it later and presently may have an unresolved issue].
- 3577 Harry explains blow counts.
- 3577 The Chairman gets Joe Kane to confirm that the 30-inch diameter emergency discharge line conduits and the emergency cooling

water reservoir are the only portions of the cooling pond considered to be category 1.

3578 The Chairman asked whether the Staff's analysis has included "even the additional structure which Mr. Kane just mentioned" [he may be referring to the service water structure]. Harry answers yes, and refers to the two thirty-inch diameter concrete pipes that are considered category 1.

3579 The Corps of Engineers analyzed the dike with respect to the protection of those 30-inch return line excluding sudden draw down and excluding seismics analysis. Joe indicates slight confusion with Harry's answer. The confusion relates to the fact that he did not address the emergency cooling water reservoir. Harry answers - in my opinion, failing of these dikes will not affect the emergency cooling water reservoir. [CHECK THIS WITH JOE, I THINK OUR POSITION IS THAT THE DIKE IS STABLE ENOUGH SO THAT IT WON'T FAIL - NOT THAT IF IT FAILS IT WON'T AFFECT THE EMERGENCY COOLING WATER RESERVOIR]

3580 Marshall asks him about who issues the permit to remove the aquatic land. Joe says he assumes its the Corps of Engineers.

3582 End of transcript.

SUMMARY OF TRANSCRIPT OF MIDLAND PROCEEDING

first part of 0
3665-3700
missing - 1000
at 1000 - 1000
1000-1000

- 3585 Mapleton Exhibit #1 was marked for identification (the ruling denying admission of this exhibit appears at transcript 3574-5.
- 3586 I distribute copies of the 50.55e reports to the Board and all the parties.
- 3587 I say that I want to supplement the record concerning Judge Decker's question about the ability of the dike to withstand a flood. I'm about to get started and Barbara says that she has a preliminary matter.
- 3588 She wants to talk about what she thinks was Stamiris' exhibit 1B and a map that went with it which she had identified as Stamiris' exhibit 8A. It's the mysterious boring that I think that Zamarin later resolved with a lengthy statement on the record.
- 3589 Zamarin indicates they were construction trailers.
- 3589 Barbara says she is still concerned.
- 3590 She says it was not wise to take only two borings outside the localized administration building area. Now she is concerned there could have been some dishonesty or attempt to change information or cover up information with respect to this boring she wants to talk about.
- 3591 She talks about the first pour for the diesel generator building in October of 1977 and this boring log was September 1977. So she has a question about the location or existence of a concrete mud map. She goes on for another half a page. Zamarin calls the statement irresponsible.

- 3592 He continues ending with - it is ridiculous. Barbara just says she is raising a question.
- 3593 Zamarin gives another diatribe. Barbara then refers to some law that says if you ask for information and they refuse to give it, there's an assumption against the party that refused to give it.
- 3594 I suggest that the Staff gets together with Barbara Stamiris and tries to determine precisely what her problems are, and then give the Board the Staff's view as to whether or not it's a matter of interest to the Board. Zamarin demands that she produce her evidence right now. I repeat my suggestion.
- 3595 Stamiris clarifies that she was referring to exhibit 19 instead of 18.
- 3597 The exchange between Zamarin and Barbara continues, it's not getting anywhere.
- 3598 Barbara goes to her second preliminary matter. It relates to the basis for eliminating the original plant dewatering system. She says something about it being eliminated by the consumers of Bechtel without necessarily having the approval of the consultant Dames and Moore. She says she thinks this is an example of the same thing that is happening in the diesel generating building settlement problem.
- 3599 And it involves soils and the dewatering system and a cost of schedule consideration to eliminate what was the most conservative option in the first place. So she sees a tie-in with current issues. Zamarin responds that the original PSAR

showed that there had been a proposal for site dewatering which was eliminated by amendment 3, but he considers that entirely relevant to the issues before the Board.

3600 It was decided to design the buildings for a greater hydrologic head, but that has nothing to do with the present dewatering plan - it's history.

3601 I state the Staff's position that we see no possible connection between the elimination of the original dewatering system and the existing issues before the Board.

3602 Zamarin goes on for a full page about why it's improper.

3604 Barbara finishes her argument and Marshall starts.

3605 Zamarin refers the Board to the transcripts of July 9, pages 1336 through 1339 concluding with the Board's ruling at 1339 where the identical matter was raised by Mrs. Stamiris and according to Zamarin, at least, her claim was denied. The Chairman says we have made our decision. We have decided not to go into the matter. Our previous ruling was a ruling on the merits and still is. He didn't think there was enough on the record to warrant our going into the technical issues now.

3606 Barbara indicates her wish to explore the physical relationship of the sands and the existence of the sands and their relationship to the cooling pond water and how that effects the soil settlement matter. She wants to do that in October but the Board says I can't rule on that in the abstract. Zamarin states that in Stamiris exhibit 5, she included certain pages of amendment 3, dated August 13, 1969, but failed to include

page 5, (3607) - page 5 is the one in which Dames and Moore points out that the original dewatering system had been eliminated.

3607 Zamarin acknowledges that her exhibit 5 apparently was not admitted into the record. The Chairman indicates he thinks the first three pages were admitted. Barbara then says that she learned that the whole document remained stapled together, but the top two pages were identified as Board exhibit 2 and she has since referred to the rest of the exhibit as Stamiris 5. The Chairman says only the first three pages were admitted as a Board exhibit.

3608 Zamarin and Stamiris talk about the Stamiris exhibit 5 being incomplete.

3609 Barbara mentions her third preliminary matter - she wants to question Ron Cook - I think in connection with whether some building structures had burned down. This is in connection with the boring that she is interested in.

3610 Zamarin naturally objects. She agrees to talk to Cook before he testifies.

3616 We come back from a break and I tell the Board that we have talked to Mrs. Stamiris about her concerns and I offer to put Joe Kane on the stand to explain. (3614) Barbara agrees with that procedure.

3615 I ask Joe Kane whether she has just talked to Mr. Hood and Barbara concerning her problems with Stamiris exhibit 19 and 8A. Starting at line 17, Joe explains that her concern is that

boring D which was conducted in the investigation of the administration building is perhaps not properly located because it indicates that elevation 622, a concrete mud mats, the question is could that boring be improperly located.

3616 Barbara agrees that that's her concern. Then she says that's not her full concern.

3617 Zamarin cross and gets Joe to agree (3618) that a boring taken under the building would be better data than one taken 60 feet away [that seems to be very conclusive for Zamarin]. In response to Zamarin's last question, Joe agrees that it is normal practice to pour mud mats for construction trailers or for temporary type of structures on a site such as Midland. In response to redirect by the Staff, Joe agrees that the boring log shows blow counts that indicate the soil is competent.

3619 Stamiris asks Joe - is he aware that her concern is not with soil properties, but with why some location coordinates may or may not have been changed.

3620 Joe does understand that her concern has something to do with managerial attitude. She asks him why the mud mat was 7½ feet below the surface. Joe says it would not be common, but the trailer might have been located on a grade that was something other than the final grade.

3622 Barbara and Zamarin go back and forth arguing about relevance.

3623 The Chairman asks a question about if you are doing borings in connection with the administration building, why would you do a boring where there is a concrete mud mat? Joe gives an

- explanation as to why you might do it there, but he says (3624) if everything else was equal, you wouldn't do it at the mud mat because of the difficulty of getting through the mud mat. Going through the mud mat would not affect your results.
- 3626 Joe volunteers he doesn't understand the importance of her question as far as determining that the diesel generator building is safe because we are getting a lot more borings. Zamarin asks Joe - do you have any evidence that the boring log marked as Staniris exhibit 19 contains data of a boring in someplace other than the hole number D as shown on Exhibit 8A and Joe says no.
- 3627 Joe says this can easily be done because there is usually photographs or layouts available that would resolve the problem.
- 3627 Barbara continues her argument.
- 2628 She continues - Zamarin argues.
- 3629 The Chairman says - is there anybody from the Company who could testify as to this log.
- 3630 Zamarin indicates the difficulty with that.
- 3631 More about the driller and the logger, etc.
- 3632 The Board says don't bring him from California, but see if he's local.
- 3633 These logs are originally from Bechtel's files.
- 3634 Joe Kane suggests, get the name of the people that have input into the report on the administration building.

- 3635 Zamarin argues some more about why the investigation isn't appropriate.
- 3639 End of the discussion about the boring D [Zamarin later resolves it to Mrs. Stamiris' concerns with a lengthy statement on the record]. Hari Singh resumes the stand, and I ask him about Judge Decker's question concerning the ability of the dike to withstand a flood.
- 3640 Hari restates his answer of yesterday. The dike has been designed for flood and the outer slope of the dike is mainly concerned with flood elevation. The flood elevation event in the FSAK is 620 feet, so I did not investigate further what is the maximum flood level. Hari discovered somewhere else that the probable maximum flood is 631 feet so that matter should be referred to hydrologic engineers. Hari's responsibility is to take what they determine to be their probable maximum flood and see if the dike is designed for that.
- 3641 Joe explains that the problem has come about because, as a geotechnical engineer, he came to the hearing prepared to address the adequacy of the sheer strength parameters in the dike, but the applicant and the Board have expressed an interest in going further to look at the stability of the dike. So after yesterday's hearing, Joe contacted the NRC reviewer to determine the status of the review with respect to flood detection. The probable maximum flood would be 631 feet. Some indefinite number of feet above that for adequate freeboard would be needed, and it would probably be higher than the

present plant grade of 634 feet to allow for wave action during probable maximum flood conditions and the same thing is true as to the elevation at the top of the cooling pond dike. The hydrologic portions of this matter will have to be addressed at the OL review. Joe explains what he means by freeboard.

3643 Joe says if someone requires a raising of the dike to give you enough freeboard for probable maximum flood conditions, then that affects the dike section and it affects stability. Kane says a probable maximum flood is greater than a 100 year flood.

3644 It is a very extreme flood condition. It is the level nuclear power project are required to address. It is much more severe than a 100 year flood and it is the flood assumption on which the rest of the plant is designed. It is possible that the dike may have to be raised.

3644 This matter was addressed between NRC and Consumers in March of 1979.

3645 Joe says, up until a year or year and a half ago, there was a question of whether the cooling pond dike was category I and should have to be addressed. It is possible that the cooling pond dike may not have to address the probable maximum flood if it can be demonstrated that should that happen, it would not jeopardize the category I structures we have identified. Joe indicates we are reassessing the whole situation.

3646 The 620 foot level is the level to which they allowed draw down on the outer slope, it does not recognize the current problem about the probable maximum flood.

CROSS EXAMINATION BY BARBARA

She asks Joe about the category I labels on the dike. Joe says it's confusing. It's the interpretation of the NRC that those components and structures which are needed to safely shut down the plant under the design seismic event are identified as category I. If adjacent components and structures whose failure could impact on those category I structures. If they could by their failure impact, they are not classified as category I but they are made to address the equivalent of the category I design.

3647 So Joe does not think cooling pond dikes themselves are category I, but they have been investigated because their failure could be impact category I structures.

3648 The Chairman asks if the portion of the dike which the Staff is not required to adhere to category I standards should fail, could that impact the stability of the remainder of the dike. Joe says yes. We are now evaluating that impact. One of the considerations is rapid draw down.

3649 Cross examination by Zamarin. He refers Joe to the rapid draw down analysis that is now being done by the Staff. He says, is that the same thing on which I inquired of Mr. Singh yesterday. In asking him that if, in fact, the factors safety for rapid draw down were 1.34 and that analysis were done in conformance procedures which Mr. Singh said Dr. Hendron had done, would that satisfy your concerns with respect to sudden draw down. Joe said yes.

3650 Joe says that the 631 foot probable maximum flood elevation - that the Staff has asked Consumers to address that now. There is a little uncertainty in the record as to whether or not this is an actual Staff requirement at the present time.

3651 Joe says, it's my understanding there was a question Consumers to address the elevation developing from the probable maximum flood which is elevation 631 feet and to address the adequacy of feedwater above that level. Zamarin says - does this question of freeboard above the level of probable maximum flood affect the considerations with respect to the present dike materials. Joe says, if we are talking about properties of the materials, such as sheer strength in density - no. Joe agrees with Zamarin's conclusions, so this would not affect any of the testimony as far as you understand it with regard to whether the sheer strength parameters or strength of the dike as designed is adequate. Is that correct? But Joe said it does affect the ultimate question of stability. Zamarin pushes on - I'm talking about probable maximum flood doesn't have anything to do at this point with questions of soil properties of the dike which might be related to improper compaction of sand or something of that nature, is that correct? [Zamarin wants it both ways].

3652 Line 21. Joe agrees with Zamarin statement.

3653 Redirect examination of witness Kane by the Staff. I advised Joe that I want to talk about the portion of the dike adjacent to the 2 30-inch diameter emergency line conduits.

Joe says that the failure of the dike in that area could potentially affect those category I conduits. I ask Joe, am I correct in saying that the stability of that portion of the dike (adjacent to the category I structures) when considering the probable maximum flood is presently unresolved with the NRC.

3654

Joe agrees.

RE-CROSS EXAMINATION BY ZAMARIN

[I think we are now abandoning the flood and going back to the Hari Singh direct testimony concerning the dike. Hari says that the Consumers letter transmitting the Woodward Clyde report satisfies Hari's concerns concerning sample selection and documentation. Do you recall that the value for the effective angle of sheer resistance used by Dr. Hendron was $28\frac{1}{2}^{\circ}$. Hari says yes.

3655

Would you agree that $28\frac{1}{2}^{\circ}$ in that analysis is more conservative than 35° [Ask Joe Kane to read this sentence, there is a symbol in there I can't read]. Hari explains at length the three kinds of tests to determine sheer strength parameters of the soils. Q tests, R tests, etc. His answer continues over to the top of 3657. Hari says he reviewed Dr. Hendron's testimony "and if Dr. Hendron's calculations are correct in his views of this analysis that is adopted by the Corps and the calculations do come out with 1.34 then you would agree with his stated conclusions in his testimony, isn't that correct? Hari agrees. Zamarin starts a question at line 23 of page 3657.

- 3658 Hari agrees that that would be a conservative calculation. [review some of these pages with Joe]. Zamarin asks Joe if he has looked at the portion of Hendron's testimony that addresses the dynamic analysis and asks Joe if the approach used which is the assessment of a dynamic resistance in terms of yield acceleration is an accepted approach in effecting a dynamic analysis and Joe says yes, the NRC has accepted that approach. If conservative undrained shear strength relationships gave dynamic yield accelerations of .54 and .61, would you agree that based on your engineering judgment, that the slopes would not experience significant inelastic movement under page 3659 a ground acceleration of .19g. Joe says yes, but we have to check your assumptions.
- 3660 Hari says he found something unusual in Hendron's testimony. He questions Hendron's safety factor of 69. Hari says he thinks Hendron is right scientifically. It looks all right. But there is some things you cannot count on.
- 3661 So Hari says he doesn't think Hendron's testimony is inaccurate, but he'd like to raise some questions about it. He asked him, did you have any problem with Dr. Hendron's use of the core methodology or the factor of safety that was derived using the core methodology and Hari says I didn't review that in detail.
- 3662 After Barbara's objection, the Chairman says, Mr. Zamarin let me ask you, is your question that was objected to anything different than is the 1.34 safety factor good enough. Zamarin

said that is what I was leading to. The Corps approaches the one that gives 1.34. Zamarin says if that's clear to everybody - fine. He did not know that it was clear to everyone that what he was talking about was the Corps approach that provided the 1.34. The chair rules that the question was asked and answered. Zamarin says the analysis to which you referred gave a factor of 9.

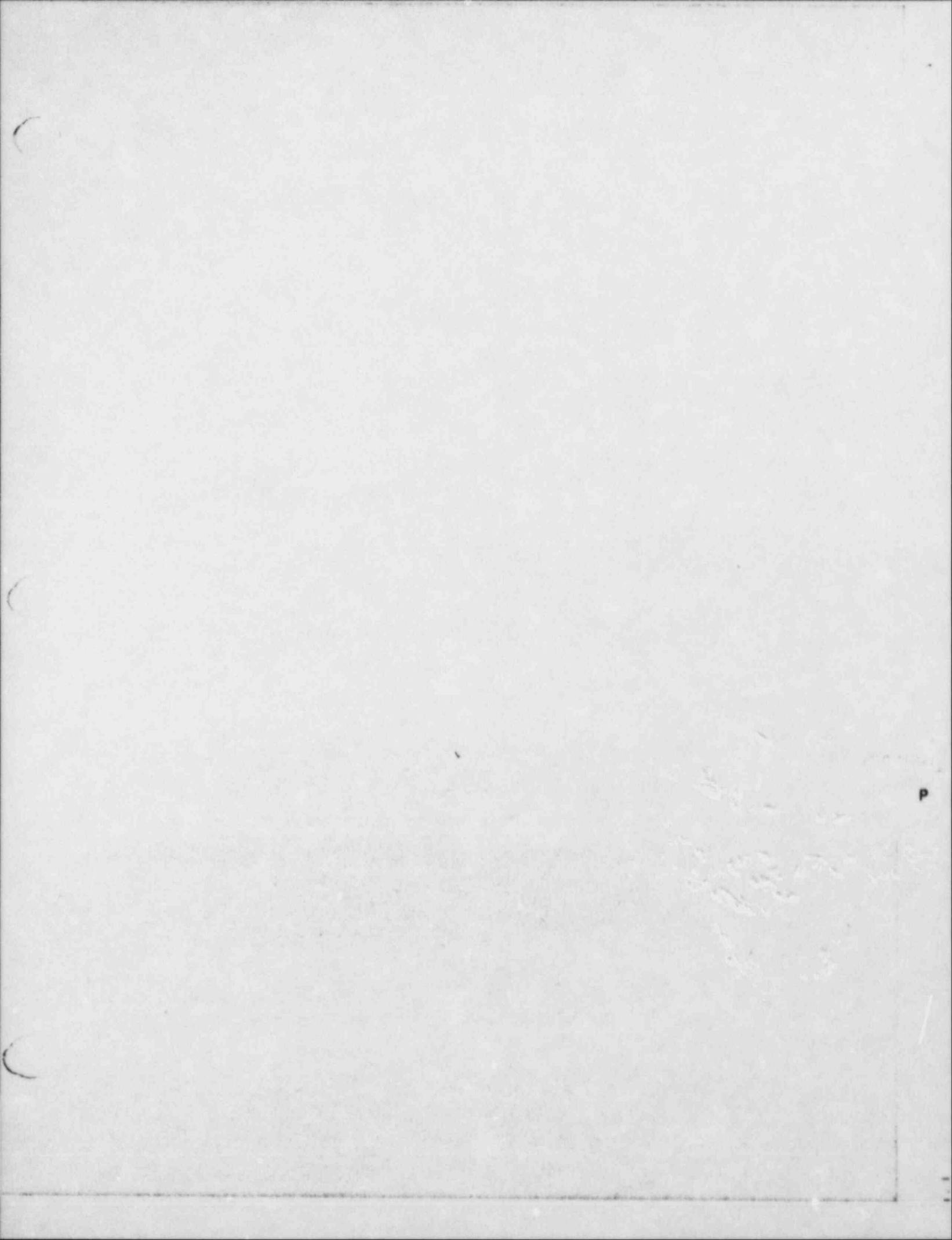
3663 Is it different from the factor of analysis that gave you a factor of 1.34. Hari says yes. The one that gave 1.34 is the Corps methods. Hari says yes. Hari gives an answer on line 6-10 where he ends up saying I don't know.

3664 RE-CROSS EXAMINATION BY MARSHALL

Hari answers the height of the fill near the emergency cooling water reservoir is approximately 35 feet.

3665 The panel is excused.

3665-3701
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& hood re
contention 2



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all of P
~~32-1-88 (2 parts)~~
~~1st~~
~~2nd~~

Page

- 3704 Marshall makes a request for somebody to talk about shutdown "because we can't get Einstein."
- 3705-6 The discussion sort of fades away like we might take care of it at the OL stage.
- 3707 Judge Decker makes a comment about John Gilray's professional qualifications indicating that both he and John Gilray had worked at the Space Nuclear Propulsion office at the same time.
- 3708 The Board ruled that there was no conflict.
- 3709 Gilray corrects his testimony.
- 3711 John tells the reasons for the changes in his testimony because there have been additional submittals presented by Consumers.
- 3712 One of the additional submittals is the quality assurance program update in Volumes 1 and 2. Also, the NRC's consideration of the final report presented by Management Analysis Corporation (MAC) which Consumers has submitted to the Staff.
- 3712 The misgivings John had previously expressed in his testimony concerning the information presented at the meeting of March 13

and in a letter to Keppler from Cook dated April 30 were a matter of documentation and that documentation is now been provided. Part of that documentation was the MAC report. Another part was the activities concerning the Crosby Associates and the last of three parts was the QA update, Volumes 1 and 2.

- 3713 John explains why each of those three items resolved his concerns.
- 3713 He talks about the corrective actions in the soils area. Additional attention will be given by Consumers and Bechtel with regard to clarify of procedures so that when an inspector goes out to do his job he knows exactly what he is suppose to look for--the acceptance or rejection criteria, how he is perform his job and even the individual responsible for doing the work.
- 3714 The qualifications of individual QC inspectors will be upgraded. They will be trained and qualified to specific areas of responsibility. He mentions over inspection the trend analysis program, the integration of the QA organization and most important the organizational changes at the higher levels including the assignment of the Vice President Cook and bringing in Mr. Rutgers from Bechtel. They certainly conveyed

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the leadership and genuine willingness to bring forth a strong, meaningful QA organization.

- 3715 Through line 10--again he emphasizes management. Lines 11-17--the fact that they got MAC shows they have the right attitude towards QA. Line 18-23--the same thing with Crosby Associates. Then he tells what MAC did.
- 3716 MAC did find problems but they were not substantive in nature.
- 3716 He concludes his remarks and then goes on to give perspective to training analysis.
- 3717 John indicates that too much emphasis has been placed on it. Just having a good trend analysis program is not the key to a successful QA program. The key is the top organizational structure--they should understand what QA is about and how to instill the right attitude to the lower levels of management and especially to the craft people out there. The trend analysis is just one little segment of that overall QA program. John, again, emphasizes the significance of bringing Cook and Rutgers.
- 3718 John Gilray's testimony is accepted into evidence.

test for

3719 The Board Chairman asks about putting the MAC report into the record. I advised the Board that those documents are six to eight inches thick and I didn't think we really needed them in evidence, partly because the QA program was never really an issue before the Board. And the only John Gilray is here is the stipulation.

3721 The Board rules that because the Staff has put so much emphasis on the MAC report, it should be admitted into the record. He alludes the Diablo Canyon case where the Appeal Board chastised the Licensing Board for not putting a document into evidence when that document was relied on.

3722 The Chairman raises the question of whether Gilray will be back in case anybody has any questions about it. I say we'll bring him back if you want him back and again offer to stipulate as to admissibility.

3723 So does the Applicant.

3724 Further discussion of procedure.

3725 Barbara S _____ states that she isn't prepared at this time to question Mr. Gilray about the MAC report. She hasn't seen the document. Then Zamron goes into his routine about the document not being secret. We keep hearing this, etc.

3726 Applicant agrees to supply copies of the document. I asked John to describe his review of the MAC report and whether the primary responsibility was with him or Region III and who in the NRC has been involved in the review of the MAC report. Response was first sent to Keppler. Later John reviewed it as part of response to question 23. It does represent implementation of the QA program and how effectively that program is being implemented.

3727 Since John generated questions 1 and 23, he felt it was his responsibility to assess it for adequacy and acceptability. He did not know what I&E had done with it.

3728 With respect to primary responsibility for review of the MAC report, John says in regard to response 23 it would be his. And the report was submitted in response to question 23.

3729 Primary responsibility for review of the report is with John.

3729 John thinks the Applicant's description of their interaction with Crosby Associates is in Volumes 1 and 2 of the quality assurance update.

3730 This reflects on managerial attitude in that it demonstrates a genuine desire to make sure they are doing the right things in

quality assurance and quality control. It's just an added accomplishment.

3731 Jo Ann Blume states that Cook discussed the interaction with Crosby Associates in his testimony on cross-examination--the information Mr. Gilray has was contained in Mr. Margulio's testimony. (That is the information in Volumes 1 and 2 of the QA update. There was no actual written report from Crosby Associates.)

3731-2 Staff exhibit 4, the MAC report, was received in evidence by stipulation.

3732 CROSS-EXAMINATION BY BARBARA S _____

3733 John references information attached to a letter dated June 26, 1981, that had to do with his change of testimony. The letter references two other letters transmitting revisions to the response to question 1 dated April 24, 1979, and May 31, 1979. It also addresses other responses to question 23 dated November 1979, August and November 1980 and March 1981. What he is doing is tying together all the different responses given to questions 1 and 23.

3734 Barbara talks about a document entitled "Midland Project Quality Assurance Program" March 13, 1981 Presentation

Region III Offices, Glenn Ellyn, Illinois." So she asked him what is new in the June 26 letter that you didn't have at the time you wrote your testimony. He says I didn't have the MAC report and I didn't have Volume 1 and 2 of the quality assurance update, and there is also a management summary submitted by Cook to Denton.

- 3735 He denies that he placed more emphasis on the program as opposed to program implementation. With regard to response to 23 both the programmatic elements are equally important in regard to discussion and implementation.
- 3738 With respect to route causes John says that was essentially associated with the response to 23 relative to identification of the deficiencies and root causes, corrective actions, both from a soil standpoint and a generic standpoint. (Her question at the bottom 3737 is very unclear. It doesn't really lead anywhere.)
- 3739 Barbara wants to get to the heart of the question about how you evaluated Consumers implementation of the program with regard to root causes. John says as to each deficiency they went into quite extensive detail explaining the extensiveness from which they evaluated the deficiency and what led to that deficiency as contrasted to the past when John was frustrated by the fact that corrective actions were not properly reflected. What is

the NRC structure for dealing with or looking at root causes lets say of 5055e reports. Answer: I&E would be involved in assuring adequate corrective action.

3740 Barbara then lists "the next assurance" that you were seeking that you mentioned was with regards to their identification of problems. He corrects her to say identification of the deficiencies. He said that was also looked at in the confines of those deficiencies identified in question 23. Barbara then lists the third aspect of his assurance had to do with their corrective actions. [All this relates to the question at the bottom of 3737] He said he had assurance that their corrective action approach and implementation was adequate. He states the basis for that conclusion at the bottom of 3740.

3741 Did you make an attempt to go on the items specifically identified in question 23. And he said yes to the point that Consumers Power in describing their corrective actions took it upon themselves to investigate other areas to look at procedures and they had some problems involving lack of clarity.

3742 The lack of detail was mainly in the implementation of the activity at the site such as installation and inspection. Some of the deficiencies were in regard to design but here again you get an appreciation of the extent and magnitude to which they

went back to evaluate these procedures, SAR commitments to assure that they were accurate. John does recall that I&E investigated the activity of the review of FSAR specifications. He does recall certain activities but he thinks that I&E found that those particular deficiencies were not substantive in nature.

3743 He came to the same conclusion. There was a heavy intensive effort and sincere effort by CPC to make sure that those specs and procedures did reflect accurately. [We develop later, I believe, that Ross Landsman still has this as an open item.] Barbara asks him do you remember an inspection report that indicates that the FSAR rereview was still in question. On lines 11 through 20 John gives a general description of the block 8 problem, proper documentation of what they did and he says that he though I&E got the feeling that it was adequately done but there was some problem with documentation.

3744 Barbara asks did you testify that your concern with respect to the FSAR rereview was lessened by the new programs and improvements that you had seen presented by the Applicant.

3745 I have confidence that the rereview of the FSAR was adequate. He didn't think that the deficiencies in the FSAR rereview were enough to say that they were unacceptable. John's feeling of

adequacy with respect to the FSAR was based at least in part on the programs and organizational improvements that he saw.

3746

3749 John accompanied I&E on their inspection.

3750 He found that the procedures were in very good shape. So the Chairman asked him what needed clarification. Answer: This is after the implementation and revision of certain procedures to be sure that they reflected the proper clarity and contained the hows and whos and what to dos. The Chairman asked him: whether he looked at specific instances of that type where they were in fact clarified or did he just look at the commitment to clarify. I think his answer was that he looked at the commitment. But it is not clear on lines 14 through 21.

3751 I found the rereview of the FSAR acceptable.

3752 Another part of the rereview was the organization and its restructuring of personnel that had been placed in high management and the attitude expressed by these people at meetings at Glenn Ellyn and Bethesda.

3753 John indicates that his conclusions were both objective and subjective. There was objective evidence demonstrated by the

individuals that gave them high confidence. [I think he is talking about Cook and Rutgers.] That you have strong managers recognizing the problems with QA and the desire to understand and seek out specialists in these areas to correct whatever weaknesses there may be over and above I&E and NRR.

3754 What do you mean by objective evidence? Answer: Seeking out MAC corporation, seeking out Crosby Associates. This is also subjective. The interrelationships that I&E and John had with Cook and Rutgers and Keppler's interaction with Selby. Appendix B implies that there must be a strong management organization to support the QA effort.

3755 Decker asks him what other plants are you responsible for.

3756 Do you compare the performance at Midland with other facilities. He says yes. He asks him to compare management's understanding of the functions of QA and willingness to support it with other plants. Answer: The track record is such that I felt that QA program and implementing it lacked integrity and credibility. Since the show cause order, he has seen a dramatic change. He thinks there is a start in the QA program where the credibility and integrity have been established and is continuing to improve. Matching it against other near-term CP's, Midland is above average. Too often utilities come in too cocky 3757 thinking that QA is just for window dressing.

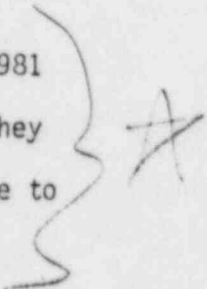
They are now going through a growing process. They are developing their procedures and working with Bechtel to get a well oiled machine. Bickering and animosities between Bechtel and CPC is normal at this stage. The start is acceptable at this time and bound improve. John says that if they continue in their present direction, he would continue to be satisfied. This is recognizing the checks and balances we have. There is an I&E resident, constant inspections, salp, the PAT team.

3758 And you have the continual independent assessment by MAC coupled with the fact that Consumers management team has a tremendous scar on their back and they can't afford to fail in the future.

3760 In response to John's previous remark that Consumers has a desire to improve their program, Barbara asks them didn't they have similar desires in 1974.

3761 He says that there was a point where he had seen no further improvement over what had been indicated in 1974 and he indicated to CPC that there was still unacceptable and since then he has seen a turn around in the organizational attitude in their involvement with QA and in his mind top management is the most important factor.

3762 He agrees it is difficult to evaluate attitude.

- 3762 She asks him when was it that you weren't satisfied with their responses to 1 and 23. He wasn't sure. She refers him to his "get well" remark about the March 13, 1981 meeting at Region III.
- 3763 The response to 23 was still unacceptable in mid-March of 1981 because they had not properly translated the improvements they spoke of into the docket. He now agrees that there response to 23 was at that time unacceptable in his mind. 
- 3765 He attended the March 13, 1981 meeting because it related to the response to question 23. Barbara asks him didn't you do MAC to satisfy the NRC.
- 3767 John says he read Keppler's testimony and that he, Keppler, had talked to Selby and indicated it would be nice to have an independent person come in and look at the plant. So they took him up on that. Just as he can't make a judgment of whether they did these things because they were pushed into doing it by the NRC. He personally feels that Cook Rutgers and Selby want to make sure the QA program is right regardless of the NRC.
- 3769 Barbara reviews with John that he considered the FSAR rereview to be a very heavy effort and a very sincere effort. Then she asks him if man-hours is enough.

- 3770 Then she explains to the Chairman that she is trying to find out how Gilray weighs the number of man-hours. He said he didn't weigh them.
- 3771 She says she is now going back to the clarity of procedures in evaluating the QA program. John says the procedures were not submitted as a part of the response to question 23. The response indicated this was an area of weakness. So they went back and looked at them. There were inspection procedures called QCI's and there are implementing procedures called QP's. They reviewed the procedures through quality control inspections, inspection procedures and they found some problems and corrected them. In turn, I&E went out and did their inspection to gain further confidence that what was done was in the spirit and intent of their commitment.
- 3774 Jo Ann Blume makes an objection based on the fact it is clear in John's testimony that the adequacy of the QA program "his evaluation of adequacy in the program is based on a 1970 and a 1977 SER report. The adequacy of the response to question 23 is something else. Then the Chairman rephrases Barbara's question. Are you trying to ask whether the QA evaluation insofar as it was based on clarity of procedures was based on merely the procedures or something broader.

3775 John says he is not sure he understands the question. His evaluation was on the corrective action associated with certain deficiencies and procedures. The corrective action was to go back and take a look at the procedures to assure that they were clear and convey the necessary requirements. They did that and found that some were deficient and they showed John how many were found deficient and were corrected and acceptability was based on those findings.

3776 How far beyond question 23 did you go in determining QA adequacy. John says he looked at what I&E was doing, he looked at the MAC report (he says additional things elsewhere such as Crosby). Jo Ann Blume clarifies that the question 23 attests to Margulio's testimony is the latest as of his time of his testimony which was February 1981.

3777 John gives a speech. We have alluded to the fact that I&E found some problems with the FSAR rereview. He has evaluated the I&E inspection and he still finds the response to 23 acceptable. The substantive nature of the findings are such that it doesn't impact that much as far as overall acceptance of response to question 23. He clearly took the I&E findings into account in finding the response acceptable.

3780 It was John's responsibility to review the response to question 23.

- 3780 John says I think you are accusing me of sitting in an ivory tower and not looking at day-to-day activities to ensure that they are properly implementing them. John says don't forget I&E is doing their job and that he accompanied I&E at the Bechtel corporate office. He does not think the fact that I&E does part of the job and he does the other part of the job delutes the effort.
- 3783 John agains accuses her of taking questions out of context. He says I had the adequacy of the responses to questions 1 and 23 and I factored these particular things in there. The problems that Barbara has pointed out in the last two or three pages are not 3784 that big of a problem. We are talking about a block 8 problem. The fact that the engineers did not fill out the check list in complete form gave a concern to Dr. Landsman. But he says it was nevertheless looked at in detail. There may be 1 or 2 that fall through the crack.
- 3785 Barbara sets forth the block 8 problem in great length. Jo Ann objects.
- 3787 John says I thought it was a problem at the time but my recollection tells me that the response given by CPC & I&E that it was not significant to have a serious impact with respect to the acceptability of question 23.

3787-8 John says you can identify each one of the problems noted by the I&E team that was there May 18-22 and say how can this response be acceptable when they are still having problems out there. John says no matter what utility you go into you find a large number of deficiencies. But you have to keep it in perspective. Keppler's testimony did that. Also, if you are challenging these items you should have done it with Keppler.

3790 After some more individual items brought to his attention, John says the important thing is what management does with these problems if indeed they are valid. And what you have here is a strong reaction by top management from Selby down to make dam sure those problems are adequately identified and elevated to the top level of management. Barbara asks him didn't they have the intent to make dam sure it was done right in 1974.

3791 There have been continuous difficulties but now they have a high degree of sincerity to do the job right. At TMI QA was window dressing. They didn't pay enough attention to it. Now they realize the importance of it. And they have one of the most effective QA programs. Mr. Rutgers is probably one of the best managers around.

3792 He has got strong people working for him and he has a high degree of confidence in Mr. Cook. "You can talk about all these little nonconformances and such if you don't back it up

as to what management does with regard to those with regard to quick effective identification reporting to upper management an intention to get corrective actions done, if you don't have that you don't have a good QA program. That is the most fundamental cornerstone of a good QA program.

3793 The Chairman asks him would you ever get to the point where the number of deficiencies would be so many 3794 that it's getting out of hand. John's response is to talk about the new management of CPC will be tested in the future by the number of problems that occur.

3797 Barbara asks him about the trend analysis program. He says the new integrated organization would provide a more effective means of assessing nonconformances and deficiencies.

3798 But he thinks a trend analysis has been given too much attention because that is just one small element of the overall QA program.

3799 The trend analysis program is important to I&E and it is important to John but only when put in the right context.

3800 She asks about Crosby Associates. He has been successful with AT&T _____ . New concepts on management

attitude improvements. He was very successful with AT&T. He doesn't advertise the companies have to go to him.

3801 More about the success of Crosby Associates. He brings in the top management, for example, here he would bring in Selby, Cook, Rutgers, Margulio.

3802 You bring them to a quality college in Florida and give them extensive training. The fundamental principle is that you have to do the job right the first time. Management has to have the right attitude and you have to transmit that down to lower supervisors.

3803 The indoctrination of QA principles, etc., would be more effective with a program that was not seventy percent complete. John agrees.

3805 John says the question is what effect would an attitudinal change have on QA work that is already done. If there are soft spots where you really can't justify the acceptability of the hardware new attitude would say spend money and make sure it was built right. John said he found information about qualifications of QC inspectors in response to question 23 and in quality assurance program update, Volumes 1 and 2.

3807 Have you in fact gone out to verify these things. No but he went over the last inspection report.

3808 Last line. The main element that contributed to the soil's problem 3809 relative to QA was lack of management's recognition of the need for QA to be actively involved in that area. Did the soil's problem go to a lack of procedures or a lack of following the procedures that were there. Response: We will separate design specification and requirements from procedures. The design specification requirements are to be translated into implementing procedures. Those procedures were not concise enough or clear enough. Questions: Were the procedures clear enough with respect to the FSAR commitments in question 23? Answer: No.

Last part of P

MIDLAND PROCEEDING

3811-12 The Board indicates its confused with respect to the questioning because "we thought the testimony stated that the procedures were not adequate at one point, and then the witness just stated that he was not familiar with the procedures, and so we will let the questioning proceed" [John stated on page 3810 that he was not intimately aware of the procedures that outlined the re-review of the FSAR.

3812 John clarifies - the generic deficiency identified in question 23 and the response was that there were certain procedures found to be deficient and there was an identified corrective action to go back and take a look at those procedures to make sure that they were correct and accurate.

3813 He says to selectively pick out the procedure for reviewing the SR to insure that they had been properly translated into design requirements, he was not familiar with that procedure and as reflected by the I&E findings, they did not strickly adhere to those procedures (the FSAR re-review procedures). John says he is not aware of any deficiencies in that procedure and then he says his overall assessment was the FSAR re-review was adequate [I understand the Board's confusion]. His overall assessment of the adequacy of the FSAR re-review was made without a clear awareness of the procedures by which the re-review was implemented. He said that's correct, that's I&E's job.

3814 She reminds him of this mornings question about the adequacy of having I&E and NRR deal with the same problem. Bechhoefer

sustains Blume's objection. Barbara refers him to attachment 3 to the Staff testimony on contention 3 (which I think is I&E report 80-32).

3815 She reads from page 4 where a procedure was amended to read "as determined by the group's supervisor" and further that this does not reflect the intent of the original requirement.

3816 More background. The question is - do you believe that there was objective procedure set forth to which a subject of judgment was introduced by the group supervisor.

3818 John explains. If you take this item out of context without proper input or response from Consumers, then I&E's conclusion. John's overall assessment in this area with Keppler and his people was that there was adequate close out of these items and that the open items, such as Barbara was indicating was not enough to impact the quality of the review. The particular item mentioned has been responded to by CPC.

3819 Blume objects, so Judge Decker asks his own question.

3820 Judge Decker quotes "Due to difficulties in controlling the FSAR in the past, a change was made to include revision which required whoever was supporting any change to get re-review of all those organizations which reviewed it in the first place. Then came revision 8 which weakened that firm requirement by leaving it up to the supervisor to determine whether that was necessary. John's answer on lines 11-14 is not clear, but he says this is the substantive issue, and then he says . was not

substantive in nature, I think what he means is it was not sufficiently adverse in nature to do anything about it.

3821 Barbara presses on about there being 5 examples of such relaxation and JoAnn Blume objects.

3822 John quotes from the Keppler letter to Consumers dated January 12, 1981 "during this inspection, certain activities appeared not to be in compliance with NRC requirements as described in enclosed 3823 appendix A and a written response is required. Just listing these items here does not mean they are in violation. In all fairness to CPC, you have to evaluate their response and then I&E's response to that.

3825 John says he does not give credit for what I&E does. His estimate of reasonable assurance with respect to QA in the future is done mainly on the commitments that are given in the SAR. When NRR reviews the SAR it is reviewed on the basis of their commitments and promises. Not on the fact that I&E may force them to do it.

3829 Marshall has been going on for several pages about when the bad QA became good. John says in response to questions 1 and 23 the initial response I thought fell far short of what a reputable organization should provide. He was disappointed in the professionalism of that response. And then organizational improvements were made.

3831 Marshall wants to know who furnished the bad workers. John says ask I&E. Marshall says is it Bectel or Consumers. John says both.

- 3831 John says at one point he was commenting on the adequacy of the response to questions 1 and 23 and then separately he addressed problems that go way back to the start of CPC getting a license and problems that occurred at that time.
- 3832 You now have a far better program than you had in the past. He says he associates the problems in the past with old management.
- 3834 Cross examination by JoAnn Blume. Is it your testimony that the docketed QA program for Midland applies with appendix B and the answer requirements on other quality regulations. Yes. And you're basing your evaluation on the SER filings of 1970 and 1977 among other things. Yes. JoAnn says that's what he says in his testimony.
- 3835 John looked at Mac, the Crosby commitments, Volumes 1 and 2 of the QA update and their response to question 23. The corrective actions described in Volumes 1 and 2 of the QA update filed in '81 included both ongoing and completed actions instigated prior to March of 1981.
- 3836 He says he thinks so in response to the above. Mac was an independent assessment of the overall organizational program and the second part is to assess the investigation that took place by CPC in evaluating the deficiencies and determining root causes and corrective actions.
- 3837 JoAnn is engaging in very friendly cross examination getting all the good stuff from John, including the fact that when he used the word integrity, he did not mean to denote dishonesty.

3838 Judge Decker hands John CPC Exhibit 13, the organization chart. He asks him the function of the box labeled "design QA engineering". They are responsible for the procurement area in regards to the review of procurement to be sure that necessary QA requirements have been reflected in the procurement document.

3839 These people are located in Ann Arbor and have always been located there. Judge Decker asks what's the significance of the fact that that's now part of MPQAD. The head of the organization is CPC employee.

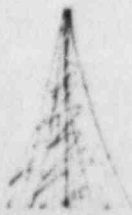
3840 Is that an improvement now that this is part of MPQAD. Decker presses on - do you see any improvement over previous practice. John says he really doesn't know, but the key is when you have good people at high levels of management what do you know about the people at Mac. John's answer is from the bottom of 3840 through 3841. He gives them very high grades.

3842 The Mac appraisal took many weeks. Mac did a fine job at Marble Hill. Their big concept is strong QA organization with QA engineering, quality control inspection, auditing and QA services, the administrative part of it. The Chairman inquires. Mac has been involved in many other utilities besides Marble Hill, for example South Texas.

3843 The commitment concerning Mac is that they will come in once a year for an overall assessment. Mac or somebody else, it could be every year or every two years.

Mac

- 3844 A comment on the qualifications of QC inspectors generally. Too often the utilities have qualified inspectors who are qualified generally to inspect concrete, but who are not qualified with respect to special unique features, such as slump tests, the mix at mixing plants. A generic certification in the field is not enough.
- 3845 Do you think in the context of some of the findings which I&E made concerning the qualification of inspectors, that the waivers allowed in the ANSE standards should be used or limited. John says he thinks the flexibility has to be there.
- 3846 When you go to the alternate approach you should document your justification. There are no standards in NRC Reg Guides which spell out what sort of documentation. We are going through pains in that area right now. Is there any test that you know of to determine whether a particular inspector could not only inspect the narrow area but also might have a broader picture of what might be going on.
- 3847 The Chairman says we have had a recommendation to do something about this. John says its an area that needs attention. You should certainly have "nice clean document indicating the justification for the certification".
- 3848 The Board said nothing about this in their decision. The company would not understand that they had to do anything about it. The documentation would be a good recommendation. There are a few other organizations that have an integrated structure such as MPQAD.



- 3849 John indicates the liability problem with the integrated structure "the mistake was under your management jurisdiction, I am not liable". That's the scenario that one could give. The advantages of the integrated organization outweigh the disadvantages.
- 3850 He's asked about Gallagher's suggestion about Selby. His answer is generally favorable. But he said there are disadvantages to just tell utility to give information to the NRC without telling them what to do with it. It isn't effective.
- 3851 The NRC could have made better use of the information supplied under ALAB-106, but he wasn't particularly keen on the recommendation made by the Board, by sending in every non-conformance report, you inundate the Staff. We don't have that kind of manpower. There was a conscientious effort at one time to review the ALAB-106 information. But it would be a horrendous task to do an intelligent review of that.
- 3852 I don't think a constructive effort was made by the NRC in this area, but I didn't like the recommendation made by the Appeal Board anyway. Getting back to Selby, John thinks its a good idea to have him report once a year at the beginning. I'd go 6 months, and then put it on a yearly basis. Have him give a one day presentation to the agency, backed up by a small report. Then he tells what NRC should do with the information.
- 3854 John says he did not take into account in his assessment Consumers reluctance to supply boring information. He didn't

get close to that exercise. Seemed to him it might be a difference of professional opinion.

3855 Referencing Gallagher's recommendation that a full-time geotechnical engineer be assigned by the NRC. John says he is not qualified. John says the NRC is doing so many inspections these days, there's not much time for the utility to do its own job. The pat team is very effective.

3856 Questions by Judge Cowan. He asks what I thought we had covered quite a bit previously. Whether MPQAD is a substantial improvement or just shifting around of things that isn't such a big deal. John says its a very good question and its hard to answer. He says he's sure there's some animosity and bickering, for example there's a hard hat out there pouring concrete and here comes somebody from another company inspecting it.

3857 Without close communication, you can create a situation that's worse than you had before. Time will tell, there is a pride working for your own company when your reporting CPC you have to be careful. Its got to be a lot of corporation.

3858 Redirect by the Staff.

3858 Response to question 23 concerned soils and other QA areas. In determining causes, some of these permeated into other areas. PAT stands for performance appraisal team. Its been in existence a couple of years.

- 3859 I&E brings in a group of specialists - 5 to 7 of these inspectors go into a plant and spend two or three weeks. They're very effective.
- 3859 He clarifies that he has not had a chance to talk to management concerning his comments about Mr. Selby. Those are his personal comments.
- 3860 Recross examination by Stamiris. He tells why having Selby report would be a good idea. He's going to have to know the details, etc.
- 3861 It puts him on record. How would that improve things. Answer - If I know I had to respond to the NRC, I'd be very sure to know what's going on out there and making sure that management is doing a good job. Its just another additional step to assure quality.
- 3862 The Selby recommendation is again just added assurance to what NRC can do.
- 3863 The satisfactory response from Consumers came in on June 26, 1981.
- 3865 The response to question 1 showed John that there were some individuals within Bechtel that were not so capable. When he had later meetings with Rutgers and with CPC individuals who had a keener appreciation as to what we were looking for and a willingness to provide candidly a description of good? causes and the corrective actions saw improvements in this area.
- 3869 John is aware of the stipulation and the distinction between QA before and after December 6, 1979. Regardless of that the

final conclusion is that he feels now there is sufficient improvement, he finds it acceptable now.

3873 JoAnn Blume refers the witness to the Chairman's questions about procedures Consumers uses to qualify QC inspectors to the ANSE requirements.

3874 The fact that he's qualified to one program does not mean he can't be qualified to another. John agrees.

3874 There is a generic effort in this regard.

3875 He agrees he has no evidence of bickering between Bechtel and Consumers right now.

3876 She develops that John has confidence in Vice President James Cook and that he reports directly to Mr. Selby.

3877 She is repeating everything he has said and getting him to agree with it. To assure that NRC properly responds to presentations by Selby, do you think that we should get Mr. Selby's counterpart in the NRC, say Mr. Stello or Mr. Denton. John immediately replies in the affirmative despite her expressed intent to suggest the President of the United States.

3878 Further Board examination. John generally agrees with the Chairman's alluding to Selby's reporting as being analogous to defense in-depth.

3879 John agrees with the Chairman's suggestion that because of problems in the past, there is more justification for having the Selby report than the usual case. Further cross by Stamiris. She refers to the bottom of the page that the NRC's

failure to review the information submitted in response to ALAB-106.

3880 The Chairman says he does not think the record establishes that the NRC did not review the report (JoAnn says I wouldn't be too sure about that). The Chairman says that Keppler's staff reviewed them at least on a spot check basis.

3882 JOHN GILRAY EXCUSED. Back to preliminary matters.

3883 JoAnn says there was an item introduced on redirect last Wednesday that is CPC's response to I&E report 80-32 (later identified as CPC Exhibit 14) and Mr. Byrd was to come back if anybody has any questions about it. I state I had no idea the item was going to come up at this time and Barbara says the same thing.

3885 I again state that I was not aware that Byrd was going to be here to address Consumers Exhibit 14.

3886 Barbara states her position essentially the same as mine. JoAnn points out transcript 3197 in introducing Exhibit 14, Mr. Miller says I have just ascertained that Mr. Byrd is going to be back on Monday and if there is additional examination, we can put him on at that time.

3887 The Chairman also forgot the reference to Monday.

3888 I offer to go back and read the transcript while we do the other preliminary matter.

3889 Barbara acknowledges that everybody forgot the specifics of the discussion except Consumers.

- 3890 The Chairman starts discussing Barbara's request for 50.55E reports. He says the Board has considerable questions as to whether any of them comply with the criteria set forth. There are 5 of them, 4 of them do not comply with the data criteria and on the others its not clear about dates. The report on let down cooler supports seems to have arisen in February 1979. The report on seismic model of the building stem from at least 1977 or perhaps earlier.
- 3891 The report on the reactor containment building major penetration seemed to cover 1973-1977 and the report on reactor coolant pumps anchor bolts seem to stem from 1977 to 1978. Those are obviously prior to December of 1979. And we could find nothing that would make those of relevance to the reasonable assurance findings with respect to QA after December 6, 1979. And he states at the bottom half of 3891 why he was unable to find any relationship between QA after December 6, 1979 and the rest of the reports.
- 3892 We would want to consider (I think later) the report on the seismic bottle of the building on the merits - whether the corrective actions are appropriate. [I will probably rely on Darl here for the three reports that he ultimately determined he wanted considered later].
- 3894 Barbara gives a lengthy explanation as to why she thinks some of the reports are relevant, should be admitted, ending in the middle of 3895.

- 3895 The Chairman tells her that in order to bear on a reasonable assurance finding since December 1979, the report should indicate that the management either took or failed to take some action after December 6, 1979.
- 3896 Barbara says she took five or six reports that had the same root cause in design analysis lacking and I looked at the corrective actions at the end of these reports and at the end of one that said this is an isolated incident. But there are a number of them. I'm trying to show that this relates to management attitude in 1980 and 1981 and they failed to take into account the cumulative effect of all of these reports, that they may have the same root cause. Its sort of a trend analysis.
- 3897 Zamarin says the NSSS matter dates to 1969 and 70. The reactor containment building major penetrations is November of 1973. The component cooling water design is 1974, 1975 as is the B&W cross-referencing. The emergency core cooling actuation system digital subsystem drawing circuitry again is around 76 or 77 and the Helba restraints were prior to the issuance in 1977 of the FSAR. The work was done in 76, 77.
- 3898 Zamarin continues. He does not see any trend because of some seismic consideration "while it does with regard to the model for the auxiliary building and I think one or two of the other items. I think that it is sheer speculation that those three items suggest some kind of a trend and with respect to the

Board's requirement that the event occur after December 6. It didn't happen as to any of these.

3898 Ellen agrees that the four listed reports clearly do not fall within the time frame. The rest are unclear. If Consumers is correct, then none of them fall within the time range.

3899 Ellen continues the failure to take into account a certain seismic design is an event of itself. She does not see the trend and if there is one, perhaps Mrs. Stamiris should articulate it further. The two that Barbara definitely relate to seismic would be the component cooling water design problem 80-06 and the Helba restraint design 80-04.

3900 Zamarin, the Chairman and Ellen agree that the last two mentioned reports have nothing to do with seismic analysis. Ellen argues that let's look at the reason we're looking at these reports and the reason is because she thought Keppler didn't give consideration to them and Keppler's testimony indicates clearly that he did. In Keppler's testimony, he said there were two significant quality assurance problems since the date of the order and those involve Zack and the anchor bolts, other than that the 50.55e reports were all of a routine nature and they were considered and they did not adversely affect his conclusion.

3901 Barbara said he was not aware of the details (I think that's consistent with Keppler's testimony). She admits he said he considered them, but he couldn't answer any questions about them.

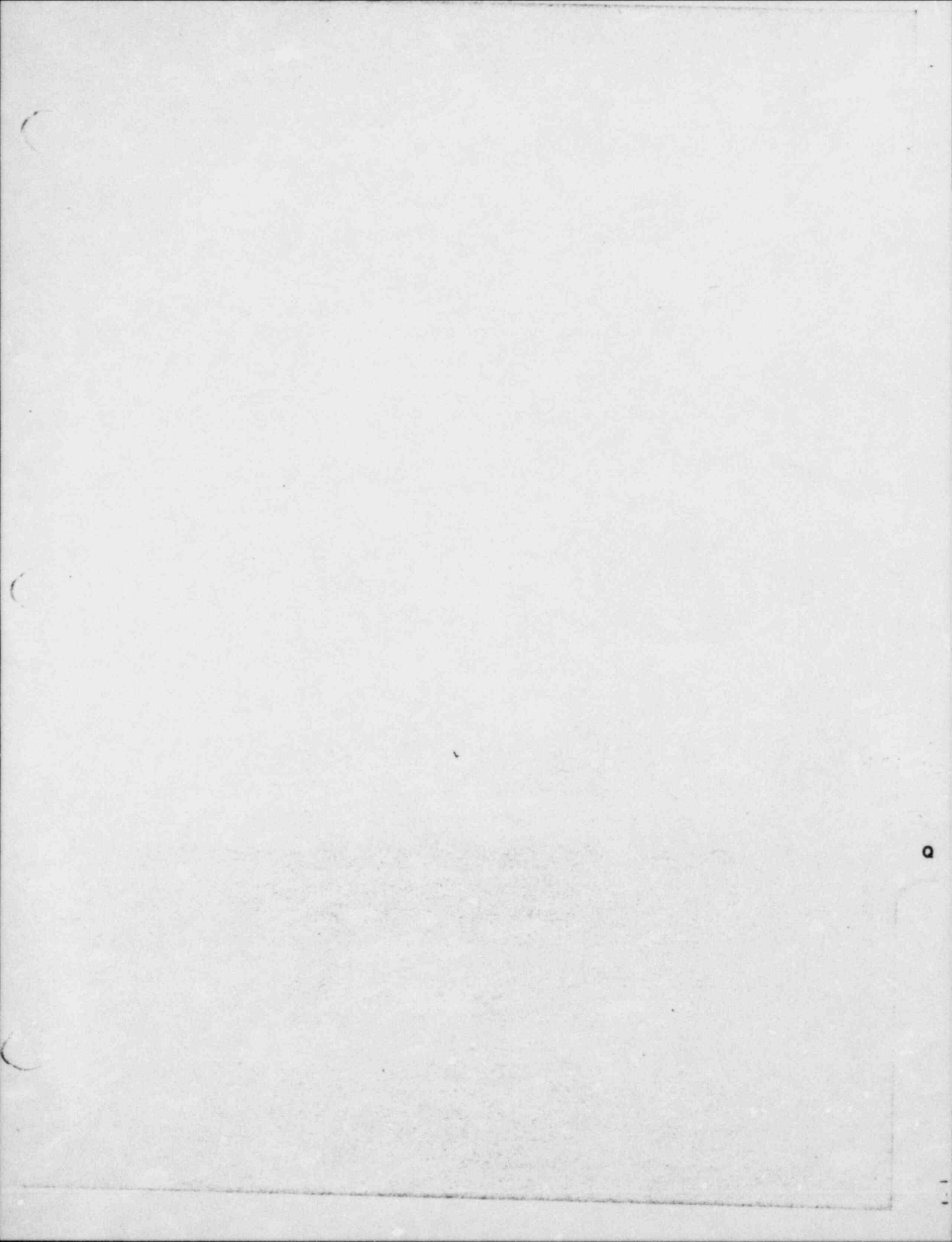
- 3902 The Chairman asks Barbara to address the fact that all of the statements were not within the date he specified and therefore how do they bear on the company's performance since December 6, 1979.
- 3902 The Chairman indicates that when we consider the seismic matters, we will want testimony on the two reports that deal with seismic matters.
- 3903 I do not see any management defects subsequent to December 1979 reflected in any of the 50.55e's.
- 3904-5 More argument between Zamarin and Stamiris.
- 3907 The argument continues. Ellen says that the particular report under discussion does not deal with the failure to develop a seismic event, but even if it did, it didn't meet the Board's December 6, 1979 criteria.
- 3908 Zamarin says what she's dealing with is non-seismic category 1 piping. No deficiency with respect to seismic analysis plus its way before 1979.
- 3909 I'm not sure why the report marked this in all caps EVENING SESSION 6:00 PM. Judge Decker directs a question to me (Ellen has been representing the Staff for at least an hour). He asks if Darl Hood would be available in the morning to respond to technical questions about the 50.55e's. Dr. Cowan suggests that Darl Hood state whether the seismic question, if any, presented in the 50.55e's bears on the OM proceeding or OL proceeding.

- 3910 He suggests it sounds to him like the piping problem is something that should be addressed in the OL proceeding. I indicate Darl Hood is available.
- 3913 Zamarin gives a speech about discovery. The Board correctly established the criteria for dates.
- 3914 I agree with Zamarin's position. I state we gave her a computer on the 50.55e several weeks ago. We loaned her the actual 50.55e's. We have been working on them and I don't think the showing she made today is not sufficient to cause this Board to inquire further.
- 3915 Scheduling witnesses.
- 3916 I indicate Staff has no questions with respect to CPC Exhibit 14.
- 3918 CPC Exhibit 14 is received in evidence. Zamarin then begins a very lengthy speech explaining the boring at location D with relation to Stamiris Exhibit 8a and I think 19 which continues through the top of 3920. (I think Barbara later indicates her satisfaction with the explanation).
- 3920-21 Exchange between Zamarin and the Board concerning boring D (he had lots of exhibits which I'm not sure whether he very put in evidence or not). At 3921 Stamiris says it appears to be a logical explanation and resolves my concerns and that was what I hoped could be done.
- 3922 The Chairman says from the statements that have been made, may I surmise that there is no need to put any of this information

into the record and that you no longer wish to admit exhibits 8a and 19. The Applicant, the Staff and Mrs. Stamiris agree.

3923

The Chair also rules that the statements have resolved the chair's concerns if they had any. Stamiris exhibit 8a and 19 previously marked for identification were withdrawn.



8-11-81

all of Q

~~1st 1/3 of Q~~

~~all of 5 but not~~

~~4005-4050~~

Page

3926 The Board rules that there has not been an adequate showing that any of the 5055e reports considered would have any bearing on management competence or dedication subsequent to December 6, 1979. He says we have mentioned one or two that should be considered at a later seismic session. In addition, the one concerning component cooling water design should be discussed at least to ensure that proper seismic analysis has been made of the pipe in question. He asked the Applicant when that problem arose because the Chairman's copy was not clear.

3927 _____ says we will check all that out. The Chairman says okay I think we have really only spelled out only two and one-half now for a later session.

3927 Some discussion about which ones the Chairman wanted dates for and which are the two or three that the Chairman indicates should be considered lately.

3928 The Chair indicates that they want dates on only the NSSS and the component cooling water design. On the others they either have dates or they did not see any relationship to management. The Chair then asks Mrs. _____ does she want any documents marked for appeal purposes. Lines 14 through 19. Before we adjourn the Board should know.

3929 The Board asked the Staff whether the Staff's response to Consumers Power Exhibit 14 is in the record. The "so-called closeout". The Chair explains that all witnesses say it was proper to consider not only the inspection report and the Company's response but the Staff's closeout. Is that in the record? The Staff and the Applicant agree that it is not in the record. Jo Ann says it is almost closed out.

3929a The Chair says it would be useful to put those in the record, the block 8 matter. Does the Staff agree with that? Jo Ann says it way it is closed out is merely mentioned in the next inspection report.

3930 The Chair continues lines 14 through 16 that it was not clear whether the Staff believed an adequate sampling had been used in the final audit. I state that I will find out where the Staff is on this one and report back where we are in closing those items out.

3932 _____ says that since Harry Sing is apparently satisfied with respect to Dr. _____ testimony he _____ will proceed with Dr. _____ and then put Harry on after Dr. H _____.

DR. HENDRON ASSUMES THE STAND

3939 The Chairman asks what do you want to do with the material that Dr. Hendron did not personally prepared.

3940 Dr. Hendron's testimony is bound in the record as a

_____.

3941 Further direct by Brenner. Did your slope stability analysis for the Midland cooling pond dikes account for three different conditions. Answer: Yes. The first was long-term slope stability that being the case where I considered long-term conditions such that drainage can occur so that you do not consider poor pressures because of shearing strength.

The second case was rapid drawdown on the upstream slope the water being from elevation 627 to 604. In the event there was a breach at some remote area on the dike that would let the water out of the main pond leaving the water in the emergency cooling pond one must consider the effects of the slopes of this rapid drawdown should the perimeter dike fail at some other location.

Third was that due to an earthquake occurring when you have the operating condition of the pool at elevation 627? He is asked to describe the methods used to analyze stability for each of these three conditions.

3942 Hendron proceeds to do this for each of the three conditions at the blackboard.

3949 Hendron is still explaining in very highly technical terms his analysis. At the bottom of the page he says in my testimony you will see some factors of safety quoted in a couple of places for rapid drawdown like six for one case and nine in another case.

3950 He says there is a drawback to it and he explains it. He says the more conservative way to do it is as suggested by the Corps of Engineer manual.

3952 [I'm picking up bits and pieces of Hendron at random]

It is important to notice from the Corp of Engineers manual that drawdown from maximum pool is a very severe and a very improbable event. That is why anything greater than one should be alright. The several reasons are (1) the very low probability of occurrence and (2) we are making conservative assumption.

3953 His explanation continues the top seven lines of this page.

Dr. Cowan asks him is it conservative to use an effective cohesion of zero. He completes his answer at 3955.

3955 He says I hope this explanation explains there are several variations in the factor of safety that I quoted for rapid drawdown. He also says the third condition I considered in the testimony was the dynamic analysis. There are several steps to dynamic analysis. One is to take the slope the way it exists today under the conditions that there like the 627-foot elevation pool and calculate what reserve capacity we have in that slope to resist dynamic motions with the undrained shear strength that is available.

3956 [This is just a sample of the heavy stuff Hendron has in the record]

The earthquake occurs much faster than the rapid drawdown and you don't have time for drainage for dissipation of pore pressures. You do have negative or positive pore pressures which can help you or hurt you. You have to live with them because there is no time to dissipate those pore pressures. So with the undrained shear strength we take the slope as it sits under the gravity load fixing the weight of this whole mass and put a force which he calls $n \times w$ which is just large enough to make the mass slide. That is a measurement of the additional resistance we have in that slope to resist the dynamic motions at the base of the slope. I don't understand the last paragraph on page 3956, 14 through 21. His analysis continued through the next page 3957.

3958 I think but I'm not sure used .19 g to show what sort or margin he would have in his seismic analysis. He says I referenced with respect to .19 to show what sort of margin you have before any inelastic displacement of the slope begins and the Chairman suggests it could be considerably higher than .19. I think he says for the _____ dike the n value is 1.31 and for the perimeter dike the n value was .196. [I'm not sure whether this is conservatively related to .19 or not]

3959 He is referenced to boring 7 and 7a taken in the _____ dike which showed a sand pocket at an elevation of 560 feet.

3960 In his prefiled testimony he drew a conclusion with respect to the effect of this sand pocket on the stability of the dike slopes.

3961 Borings taken by Woodward Clyde bore out Dr. Hendron's assumption that the angle of shearing resistance was at least 35 degrees. This information indicates the factors of safety with respect to slope stability was higher than he had quoted. Dr. Hendron did not analyze the probable maximum flood in his prefiled testimony. He is asked to assume that the probable maximum flood rises to an elevation to 631 feet.

3962 What is your opinion as to the stability of dike slopes in the vicinity of the emergency cooling water pipes during the

probable maximum flood conditions. Answer: This means that the water elevation on the outside of the dike, of course, would be 4 feet higher than the water on the inside of the dike and you would have a 4-foot head differential. Although it would be in the opposite direction, it would be much smaller than what the embankment is designed for. I would not be concerned about a 4-foot head differential on stability. I don't think there are stability problems but if you take that threat seriously, then you have got to look at erosion and decide whether you want rip rap on the downstream _____. There is rip rap now up to 615 feet. I don't see a stability problem but somebody ought to look at erosion possibilities. Could the erosion have any effect on the cooling water discharge pipes during a probable maximum flood?

- 3963 I don't see how it could. _____ indicates she wants to ask Dr. Hendron some questions concerning contentions 1 and 2.
- 3964 Further discussion of the above.
- 3965 The Chairman suggests we get started with contention 4b and then later consider contentions 1 and 2.

- 3967 Dr. Hendron volunteered he thinks he knows what Barbara is trying to ask him even though none of us may be able to express it in words.
- 3968 You are really concerned about where that water can circulate so the water can get back in and do its cooling job. So number 1 we are usually concerned with the breach of the pipe something that would cut them off and so on and slope stability problems if you shared the pipe and the soil was still there. A further lengthy explanation of what he thinks Barbara's question is.
- 3971 After several pages of questioning about blow counts of 67 and 100 he says 100 was not directly used for anything nor was the 67 but the 35 degrees was. (35 degrees is the angle of shearing resistance. See page 3969) The material would have been 35 degrees even if the blow count were on the order of 30.
- 3972 Barbara asks him was he aware of the original dewatering plan for Midland. _____ objects.
- 3973 The exchange between _____ and _____ continues.
- 3974 The Chairman rules that at the moment he is here only on dikes.

- 3975 Cross-examination by Marshall. In every dam there is some seepage.
- 3976 _____ takes over the questioning. Do you have any knowledge of any leaking of the cooling pond through the dike into the river. Answer continues through the middle of 3977. Marshall asks the witness about the "improbable maximum flood."
- 3978 Marshall assumes an earthquake and they go right through 5 dams upstream and turn every bit of the water loose at once. How much of the water can you say will not go over 631 feet. Hendron says I'm not an expert on hydrology. I'm not the guy who set the maximum probable flood.
- 3980 Z_____ discusses the diagrams to be submitted later by the Applicant in connection with Hendron's chalk talk.
- 3981 Zamron indicates he talked to Barbara about meetings at which Hendron was the only consultant and which did not relate to the testimony for which he was provided by the Applicant and that is the 4b testimony. Mr. _____ indicated a meeting of October 8 and didn't want to say anymore after that.
- 3983 Staff cross-examination of Hendron. In your stability analysis did you attempt to determine the critical sliding surface by

varying the radius of the sliding arc. Several more questions follow on 3983.

- 3984 Board questions. Hendron's testimony concerned only slope stability under the three cases he mentioned and he did not evaluate the return conduits themselves--the ability of the return conduits to withstand any seismic motion.
- 3985 Judge Decker asks about 90 degree joints in the conduits. Hendron gives him another chalk talk about what they did at the Alaskan pipeline.
- 3987 The Chairman asks him the results of his visual inspection of the _____ dike and perimeter dike. What value is that? Answer is if there is anything radically wrong such as slope sloughing you would see it. Hendorn saw nothing adverse in his inspection but he did not walk the entire 4 miles of the dike (Joe says it is 5).
- 3989 Line 4. He indicates this is the worst section I could find after some discussion on the previous page about he analyzed a section called why, why at a location where the average slope is the steepest.
- 3989 He is asked about his liquifaction analysis.

- 3991 Do you think there were enough borings done so that you could make fair evaluation of liquifaction. Answer was generally yes.
- 3992 Looking at page 22 of your testimony during a portion of your testimony you stated that you used a shearing resistance of about 35 degrees. He says yes but the silty sands encountered in boring number 7. Question: You made a statement on this page that for an effective stress analysis it would be most conservative to assume a cohesion of zero and an effective angle of shearing resistance at 28.5 degrees. How do those figures fit together? He says I did the 28.5 degree analysis assuming that that could be representative of the embankment fill. Explanation continues through the top of 3994.
- 3995 Further cross-examination by Barbara _____.
- 3997 Would you be concerned that visual inspections showed a 1.25 inch settlement of the other larger area of the dike. Answer: No.
- 3999 Cross by Marshall. Hendron did not see any seepage when he walked the dike.
- 4001 Further cross by Barbara. Hendron agreed it was hard to monitor seepage of the cooling pond dike to the river. He

tells how it is monitored. The Chairman announces that that concludes Dr. Hendron's testimony on contention 4b.

"Mrs. _____ may proceed with the other areas. Zamron renews his objection and Barbara responds.

4005 Further exchange between Zamron and Barbara on the limits of her cross (on what I think is going to be cross on contentions 1 and 2).

4006 The Chairman says we will proceed on an ad hoc basis. We will allow questioning on meetings where Hendron was the only one present.

4007 The Chairman says I would characterize this as direct testimony on behalf of Mrs. _____ with perhaps a hostile witness so that you may cross-examine the witness.

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- P. 4008 Stamiris calls Hendron as a witness for herself on her contention. Stamiris Exhibits 20 & 21 are marked for identification, 20 is drafted notes of an October 8th meeting 21 are the final notes for that meeting.
- P. 4009 Hendron was at the Midland site during this October 8th meeting.
- P. 4010 Paragraph 1, Stamiris Exhibit 20 states he also felt that preloading is quite possible. Hendron believes that he refers to himself and not to Dr. Peck. Hendron states that comment about the preload was not a recommendation at that point it was merely a possibility of one way to approach the problem.
- P. 4011 Hendron recalls that Bechtel did look at the utilities as suggested in Paragraph 2 of Stamiris Exhibit 20. Hendron can not remember whether maps were made of the areas where openings exist beneath the foundations to see if the openings are enlarging as request in Paragraph 3 of Stamiris Exhibit 20.
- P. 4012 Stamiris states that her intent is to go through Stamiris Exhibit 20 to determine whether or not these early suggestions were followed.

- P. 4013 Hendron clarifies that the notes in Stamiris Exhibit 20 are comments he made when he first visited the site before he had time to analysis the problem.
- P. 4016 Comment No. 4 of Stamiris Exhibit 20 concerning the monitoring of the settlement of fill where no structures are at present was done.
- P. 4017 Purpose of requesting settlement monitoring of the fill was to determine how much settlement could be contributed simply to the weight of the fill itself with no structure, this information was taken in to consideration before the decision was made to preload the DGB. Suggestion No. 5 of Stamiris Exhibit 20 was done to the best of their ability. Hendron was not sure if the entire history of the placement of the fill was completely reconstructed.
- P. 4018 Hendron explains Suggestion No. 6.
- P. 4019 Suggestion No. 7 of Stamiris Exhibit 20 concerns Hendrons' interest in having the NRC observe the test pits, Hendron is not sure whether anyone from the NRC saw the test pits. Stamiris believes that the test pits were filled in by December 4th when an NRC group came to the site and that only a photograph taken by Gallagher was available at that time.
- P. 4020 Hendron said that if people from the NRC saw the test pits as late as December 3rd or 4th that would satisfy his concerned stated in the October 8th meeting notes that NRC personnel see the test pits as soon as possible.

- P. 4021 Hendron explains that Stamiris Exhibit 20 is a draft of meeting notes written Afifi that were sent to Hendron to edit. For example Hendron inserted the words "not necessarily" on this document.
- P. 4023 Zamarin objects to further questioning of Hendron. Stamiris responses that she is not interested in pointing out any inconsistencies between the recommendations of Dr.s Hendron or Peck, she states she is concerned with inital suggestions of Dr. Hendron and how they relate to the decisions to preload the DGB made by Bectel and the timing of these matters.
- P. 4025 The Staff also objects to the continuation of Dr. Hendron's testimony.
- P. 4029 The Staff requests that Stamiris at least point out which subpart of which Contention she is questioning the Witness on.
- P. 4030 Stamiris Exhibit 21 was withdrawn.
- P. 4031 The Board declines to require Stamiris to point out just which contention she is asking questions on. They state that Ms. Stamiris will have to make that connection in her proposed findings.
- P. 4034 Hendron does not remember ever seeing Stamiris Exhibit 9 before. Peck reiterates that the statements found in Exhibit 20 were his suggestions and comments regarding the DGB they were not recommendations.

- P. 4036 Hendron made no recommendation to Consumers or Bechtel with respect to preloading the DGB between October 8th and the Urbana meeting in November. Marshall states that he's an old fossil.
- P. 4037 The R & R Option was one of the original options discussed at the Urbana meeting.
- P. 4039 Stamiris Exhibits 22 through 25 were marked for identification.
- P. 4041 Stamiris Exhibit 20 was received in evidence.
- P. 4044 Hendron states that the comments made at the top of page 4 of Attachment 3 to Contention 2 are correct. These were comments concerning the dike.
- P. 4045 Referring to the middle of page 3 of Stamiris Exhibit 22, Hendron recalls the option of removing and replacing the building beam discussed and he also remembers a discussion of the option of removing and replacing the building and the fill. Stamiris Exhibit 22 however, only reflects the option of removing and replacing the building.
- P. 4045 Hendron states that all options for correcting the settlement of the DGB was consider on their technical merit.
- P. 4047 Hendron discusses the risks inherent in the R & R option, namely that even putting new fill in properly compacted settlement will still occur, by preloading the building that risk is eliminated.
- P. 4048 Hendron repeats that the R & R option of the building and the fill was considered at the November meeting and that he doesn't

- P. 4040 con't think there is any particular reason why his letter, Stamiris Exhibit 22 does not specifically reflect that.
- P. 4049 Hendron is not aware of any other people thinking that he thought that the R & R option was the superior one nor did he in fact ever think that it was the superior option.
- P. 4050 The key to the success of a preload is how long you leave it there, there is never a problem with the surcharge remaining on to long. Hendron states he was not aware of the five month schedule considerations vis-a-vis the preload, however, he then add that reference in any meetings to certain number of months available in the schedule those discussions were cut short by Dr. Peck and himself because they knew that they could not be influence by them.
- P. 4051 Hendron essentially modifies his earlier response that he was not aware of schedule considerations and he says certainly he was that people were making scheduling comments. Hendron reassures Stamiris that the decision to remove the preload was the result of looking at settlement readings and the piezometers not the fact that there were certain scheduling constraints. The surcharge could be removed when the consultants were sure that primary consolidation had been achieved.
- P. 4052 Hendron explains that secondary consolidation may never be finished but that you want to leave the preload on longer enough to establish a slope of the secondary curve.

- P. 4053 The preload was not removed until that slope was established.
- P. 4054 Page 5 of Stamiris Exhibit 22 refers to Hendron's suggestion that the gaps beneath the footings be grouted. Hendron does not think those gaps were eventually grouted, despite the fact that it was his opinion that they should have been.
- P. 4055 Stamiris asked if the grouting had been done per Hendron's suggestion would the diesel generator building have experienced less stress? Hendron responses; I think that the way it turns out the building is strong enough to take the differential load but I think the load distribution would have been more uniform had the grouting been done.
- P. 4057 Stamiris Exhibit 22 is received in evidence.
- P. 4058 Hendron says he may have recommended to cut the condensate lines.
- P. 4059 As far as Hendron knows the recommendation to cut the lines was followed. He does not remember just when the lines were cut however, he remembers not giving any time schedule as to when they should be cut.

[Handwritten signature and scribbles]
308 → 4000

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- 4061 Continuation of examination of Hendron by Stamiris. Stamiris Exhibit 26 is marked for identification. It is a one page document dated December 20, 1978. Dr. Hendron has never seen Stamiris exhibit 26 before.
- 4062 Hendron was and is not aware of the discussions referred to in the second paragraph of Stamiris Exhibit 26. He reiterates that he did not set any time schedule for the cutting of the condensate lines.
- 4063 Hendron states that he said at one time that he would rather see the turbine building wall cracked then to have insufficient preload placed on the DGB. Hendron's concern regarding the amount of preload was satisfied when Consumers beefed up the wall structurally so they could put on an adequate preload.
- 4064 The DGB settled more on the south side and rotated as a rigid body towards the south because on that side of the building there was a higher percentage of cohesive soil then on the north side. Hendron does not believe that the differential settlement was caused by limitations placed on the preloading because of the turbine building. The differential settlement was caused by the different types of soils that lay underneath the building.
- 4065 Hendron states that Goldberg, Zoino and Dunicliff were associated with the installation of the instrumentation. Bechtel and Mr. Dunicliff, together, selected the locations for the instrumentation.

4067 The wall of the turbine building is not a class 1 structure.
4067 Hendron reviews Stamiris exhibit 23 and concludes that it is
essentially accurate.

4068 Recommendations 2 and 3 found on page 1 of Stamiris exhibit 23
were followed. Stamiris exhibit 23 is admitted into evidence.

4071 Stamiris asks Hendron if he ever felt that he is having trouble
getting some of his questions answers. Hendron responded no.
Grouting the sands was one of the options discussed to take
care of the liquifaction problem, however, there was never any
decision made to grout the sands.

4072 Hendron states that there is a chance that the SSE for the
project might change in an upward fashion and therefore there
could be a liquifaction problem.

4072 Hendron states that he thinks he still would have recommended
the preload option even if he had known that they would have to
dewater. As it turned out, the dewatering option really didn't
come into the picture until after the preload was placed and
additional borings were taken.

4073 Peck states that Consumers went to dewatering because of its
own concerns, not because of NRC concerns.

4074 The need for dewatering arose because of concerns regarding the
auxiliary building and the underpinnings therefore.

4074 Hendron states that the preload option had not been selected
for all practical purposes in October of 1978. He added that
all options were discussed openly at the November 6th meeting.

- 4075 Hendron thinks that he heard of the administration building settlement problem during his first visit to the site in October. Hendron cannot remember the details of what he was told about the administration building, however, it was significant to him that there had been such a problem.
- 4078 Hendron does not remember who told him about the administration building problem. He does not remember the details of what he was told, he does remember being told that there were differential settlements observed in the area of the administration building. Hendron does not remember making a recommendation to break up the mud mat underneath the DGB. He doesn't think its something he felt strongly about one way or the other.
- 4080 The mud mat were to crack at some point in the future. Hendron doesn't think anything significant would happen to the structure of the DGB. He doesn't remember whether Dr. Peck or some other consultant recommended breaking up the mud mat.
- 4081 Barbara asks with the benefit of hindsight whether Hendron thinks the R&R option would have been the better choice. Hendron responds no.
- 4082 Barbara asks whether the original compaction criteria of the PSAR can be satisfied by the surcharge. Hendron in essence states that the density criteria could not be met as a result of the preload.
- 4083 Hendron does not believe that the heterogeneity of the soil underneath the DGB will cause future problems. This is because

its been loaded to such an extreme weight that any future settlement will be minimal. Furthermore, the recent borings show that the sheer strength of the materials are more than adequate for bearing capacity.

- 4084 Hendron describes the extent of his involvement in the piping as limited to making some recommendations that certain pipes be cut.
- 4085 Stamiris Exhibit 24 is accepted into evidence.
- 4088 Hendron explains a concern that was stated at the very bottom of the first page of Stamiris Exhibit 25 with respect to the rebound after the removal of the surcharge.
- 4089 The DGB rebounded approximately $\frac{1}{4}$ " when the surcharge was removed.
- 4092 Hendron has never seen Stamiris exhibit 14, the letter between Mr. Dunnicliff and Mr. Afifi before. The main instrumentation that Hendron looked at in determining when to take the preload off was the deep borose anchors. The soundex instrumentation did not make much difference to him.
- 4093 Hendron does not have as much confidence in the soundex instrumentation as the borose anchors.
- 4094 Stamiris exhibit 25 is accepted into evidence.
Cross examination by Marshall. The diesel generator building is a safety-related structure.
- 4095 Hendron does not know whether the diesel generator building will be demolished.

- 4096 Cross examination by the Staff. Hendron read the pisometers prior to recommending removal of the surcharge. He states that the pisometers could have been reflecting both the influence of seepage from the pond and poor pressure from the surcharge. The Staff asks how the pisometer data was evaluated with respect to the pisometric level caused by the rising pond and pisometric level caused by the surcharge. Hendron states that you cannot entirely separate those two matters.
- 4098 Peck is aware of some cracking on the east wall of the diesel generator building but he is not fully aware of the extent of cracking that has occurred to date. The crack in the east wall is near where the duct bank supported the wall before the preload was applied. Hendron can't really tell whether the crack has changed in size since the surcharge was removed. Hendron does not know whether the pipes and conduits have been overstressed as a result of the surcharge. He knows that Bechtel's structural engineers are presently looking into that. He has no involvement in that matter.
- 4099 The diesel generator building rotated on almost an east-west axis during the surcharge.
- 4100 Board examination begins. Bechhoefer asks Hendron to comment on a comment made in the second to the last paragraph on page 3 of attachment 4 to Hari Singh's testimony. The comment was the following - there is questionable evidence to confirm that preload was held long enough to eliminate 100% of the primary consolidation. Hendron responds that the best evidence of

whether the preload has gone through 100% of the primary consolidation is on the secondary consolidation portion of the curve. That is the deflation vs. log time plots from the settlement data and from the borose anchors.

4101 Hendron states that most of the pisometer data shows that secondary consolidation has been achieved and primary consolidation is over. Hendron adds that wiggles in the curve of the pisometer readings are not of concern. It is much more important to look at the average readings.

4102 Hendron states that since the depositions were taken, a lot of wiggles in the pisometric curves have been looked into and it has been found that they were the result of certain insignificant errors. Hendron does not think there is near the controversy over the pisometer readings now as there were when attachment 4 to Singh's testimony was written.

4103 Cross examination by Zamarin. Hendron does not think that the failure to grout the footings of the DGB affected the effectiveness of the preload. Hendron doesn't know today whether or not the mud mat has been broken up. However, he states its quite possible that it is broken up.

4104 Hendron has no doubts whatsoever with respect to the safety of the DGB. He feels surcharging the DGB was the best approach. He also felt it was the best approach when he made the recommendation to surcharge.

4105 Hendron has no doubts that primary consolidation is completed under the surcharge. He had no doubts at the time the

surcharge was removed. Hendron has had experience with surcharging completed or partially completed structures. One of the projects he worked on involved a reinforced concrete structure that would contain tanks. Those structures are performing today with no problem.

4106 Hendron believes that there was sufficient load margin taken into consideration during the surcharge.

4106 Redirect by Stamiris.

4107 Hendron reiterates that he was not worried about the oscillatory measurements in the pisometer readings. Again he believes that the primary line of evidence for determining whether primary or secondary consolidation is the deflation measurements.

4107 Recross by Marshall. Hendron describes the difference in texture of grout and concrete. The advantage of using grout is that it can get into smaller cracks.

4108 Further Board examination. Hendron believes the loads in the surcharge were adequate all over. He is not saying that the loads were same at all points in the surcharge but they all exceeded any load ever expected to be applied during the lifetime of the DGB.

4109-12 Zamarin describes the diagrams that have been made of Hendron's chalkboard drawings and they are bound into the record without objection.

4113 Hendron is excused.

- 4114 HARI SINGH was recalled as a witness following Hendron. [The diagrams drawn by Consumers relative to Hendron's chalk talk follow Tr. 4112.
- 4114 Hari Singh has reviewed Hendron's testimony with regard to _____ Contention 4b. Did you find any errors? As a reviewer we review the approach and the process. We don't check all his arithmetic. Hari had a question about his Corp of Engineer approach for sudden drawdown.
- 4115 So we agree with the effective stress analysis he has got. The question suggests that the effective stress analysis Hari just referred to was what is on diagram c headed Rapid Drawdown.
- 4116 So in your opinion Dr. Hendron's use of this type of analysis and the effective stress analysis is appropriate in this case. Is that right? Yes. With regard to the balance of the analysis of the dikes for stability in Dr. Hendron's testimony did you find that to be in accordance with accepted Corp procedures and Corp manual. Answer: Yes. Board examination: Dr. Decker asks Hari do you want to change Paragraph 3 on page 5 of your testimony.
- 4117 Yes, because I now have all the evidence and the information required. We can certify that the dike is stable under static loading conditions. The Chairman asks Hari do you have an

opinion whether the factor of safety with rapid drawdown is sufficient so that a rapid drawdown from 632 to 604 could be handled. Hari says yes he has analyzed the drawdown from 627 to 604 and gotten a factor of safety of 1.34. Hari thinks it will be a little lower than that but is still better than one.

4119 I remind Hari of his answer to Judge Decker concerning obtaining proper documentation as to the slope stability of the dike and ask him whether he took into account 4120 the effect on the outer slope of conditions produced by the maximum probable flood.

4120 Recross by Barbara _____.

4121 The flood will affect the outside slope and near the emergency cooling pond in this area the dike is very wide. Maybe part of the dike is used as a railroad track. It is 30 or 31 1/2 feet wide there. If the outside face is affected by the flood and even if there is sudden drawdown and that slides, the railroad track might be gone but the conduit inside which is a category 1 structure will not be affected.

4122 Hari Singh is excused but I want to put on one more witness to state the NRC plans to review the effect on the outer slope with the probable maximum flood from Mr. Kane.

4123 Joe Kane. Question: Would you relate to the Board the NRC plan to look at the effect on the outer slope of a probable maximum flood. Answer: The height of the cooling pond dike is under question with regard to having adequate freeboard when you superimpose the probable maximum flood. What Mr. Singh testified to is that this outer slope could possibly have a slide or be eroded should the probable maximum flood and the wave action above that do damage to the cooling pond dike.

4124 The NRC is going to have to look at the exact height of the probable maximum flood. It may be somewhat lower than 631 because it is downstream of where the 631 has been. Joe explains outstanding questions in his mind that where he concludes I would not want to say that the NRC would today accept the stability of that outer slope until we have looked at it. It is quite possible that we would require a higher level of rip rap to prevent erosion. Question: Did you understand Mr. Singh to indicate that he had no concerns about the effect on any category 1 structure to 30 degree return lines? caused by the effect of a probable maximum flood on the outer slope, is that what he said? Yes that is what he said. I think he is assuming that you could have the probable maximum flood plus surface runup 4125 of waves over the cooling pond dike and that bad condition still would not jeopardize the 30-inch diameter pipes and the emergency cooling water reservoir. That is possible but I'm not sure these structures

are designed for those conditions. What I'm saying is that there is a possible sequence of events to where you could have the erosion from a probable maximum flood wave runup occurring and somehow not have a level within a pond that would be preventing damage to the category 1 pipes. The point Mr. Singh has pointed out is that you have a wide dike at that location is in favor of not having the problem but I would want to evaluate all the consequences of that before I would say that I don't have any problems. On line 19 through 23 Joe says he does not want to represent to this Board that the Board is assured that the effect of the probable maximum flood on the outer slope would not have some impact on the category 1 retaining walls. I would want to resolve the issue about what is the probable maximum flood, what is the required freeboard and then 4126 make a judgment based on that information whether I have a problem with category 1 structures. Joe volunteers that he thinks this is an OL issue.

4128 Zamron begins a line of cross-examination about some things that Joe told him and I think it became clear later that Joe told Zamron these things off the record. Zamron says that you told me this morning in your best engineering judgment that even though there may be erosion to the dike under probable maximum flood circumstances that there would be in your best judgment no danger to the emergency cooling water reservoir or discharge lines. Even though that is your best engineering

judgment, do you want the opportunity to complete the review and determination of the probable maximum flood?

4129 Joe indicates yes that the review should continue and certain things should be resolved--Rip rap protection, etc.

4130 Has your opinion of this morning changed?

4131 It is true is it not Mr. Kane that this morning you agreed that for the postulated maximum flood to elevation 631 that although there may be erosion to the dike that in your best engineering judgment there would be no danger to the emergency cooling water reservoir or the discharge lines. Joe denies that he said that was in his best engineering judgment. It was just in his judgment and best engineering judgment is after you have seen all the facts. He says the same thing again.

4132 They debate about whether Joe previously said best engineering judgment. Joe comments that he is now repeating himself three or four times.

4133 The Chairman says he testified that he did not react to the question he was asked this morning as including best engineering judgment. More debate about precisely what words were used.

- 4134 Continued debate about what words were used. At line 16, did you agree this morning that for a postulated probable maximum flood with elevation 631 although there may be erosion to the dike that in your engineering judgment there would be no danger to the emergency cooling water reservoir or discharge lines. Answer: I did indicate that. But I also indicated other considerations which is encouraging me not to make a complete right-off until I see the whole picture. I indicated to you the problem with regard to protecting the outer dike slope and you said that was none of your concern.
- 4135 One of the reasons is that the dike has not been designed to be overtopped. What it does hydrolycally on the inside has to be addressed and your insistence in say that it doesn't affect category 1 is not proper until those other issues are addressed. Further recross by _____. Joe says he doesn't think there was a commitment to design the dike to the probable maximum flood.
- 4136 He indicates some possible confusion in the original review about whether the cooling water reservoir and the 30-inch diameter pipes were category 1. We now think they are category 1. Has the NRC expressed some concern in soil settlement matters for the composition of the soil with which the dike was built.

- 4137 Yes. The testimony we have heard from Dr. Hendron and Mr. Singh is that the borings and test results have demonstrated adequate soil properties of the materials in the dike.
- 4138 Joe interprets Barbara's latest question. Is the material that is in the dike a cause for the erosion or somehow inadequate because we have the potential for erosion.
- 4138 Joe recharacterizes her question whether the material in the dike has somehow been the cause of the concern we have for erosion. The answer is no. The cause for erosion is coming about by the fact that we are now trying to make this cooling pond dike address the probable maximum flood. And the probable maximum flood is the cause of the eroding force. We are just now trying to evaluate the adequacy of the dike material in resisting that.
- 4139 Judge Decker rephrases her question. From the point of view of resistance to soils to flood to erosion as a result of floods is the soil as has been currently placed and compacted any less able to withstand floods than the soils described in the PSAR.
- 4140 Joe says the dike soils are no less resistant than the materials described in the PSAR.

4141 Joe Kane excused. We talk about schedule.

4142 End of transcript.

8-12-81

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- 4147 The resumption of cross examination of Joe Kane and Darl Hood on contention 2. This cross resumes from transcript page 3689 of the August 8, 1981 transcript.
- 4148-9 Kane explains how the raising of the cooling pond affected the pisometric measurements. This responds to item 2 of contention 2.
- 4149 Kane explains that the difficulty in interpreting the pisometric readings will hopefully be resolved by analyzing the laboratory tests of the borings.
- 4150 Kane mentions that Consumers appealed NRC's request for the borings. He states that it was a matter of differing technical opinion to the extent that the NRC did not feel that the pisometers were conclusive.
- 4151 Kane mentions that the Staff questioned whether the surcharge took into account the final design load that is dead load plus live load. Kane submits that there are difficulties associated with the lab tests, however, there are also difficulties associated with the field tests, both processes have their limitations. Thus, to be conservative and have confidence in this surcharge program, the NRC wanted to correlate the lab tests with the predictions from the field surcharge program. Kane hypothesizes that the lab tests may give a spread of information, at which point the Staff would have to use its engineering judgment to determine whether the lab tests support the prediction from the surcharge program.

~~XXXXXXXXXX~~

- 4152 Kane postulates that if the majority of the information from the lab tests indicates that the surcharge was not effective then he believes the position would be to place more reliance on the lab tests. On the other hand, if some of the lab tests support the surcharge and others do not, then Kane believes his opinion would be to have more confidence that the surcharge program was effective and rely more on future monitoring to show us that the DGB will not have problems.
- 4153 Hood states that Consumers appeal of the NRC request for borings does not reflect adversely on Consumers' attitude. Hood recognizes that the world reknowned experts in the field were telling Consumers that the borings were not needed. Hood also notes the right of a utility if they have a difference in technical view to express that view to NRC management for the purposes of resolution. This is precisely what Consumers did.
- 4154 Hood admits to having made statements about the frustration he was having with Consumers appeal of the boring requests. He states that his frustration did not go to bad attitude but to the fact that it would delay the overall review of the application. The exercise of the appeal to Hood's management carried with it a schedule of penalties.
- 4160 Stairis asks whether the failure to do the borings was an example of the lack of acceptance criteria.
- 4161 Hood states that he uses the term acceptance criteria to refer to information the Staff was looking for at the outset of the program to help the Staff understand what was going to be

accomplished. The boring information was information that would come to light after the fact not up front. In that sense, he does not believe that the results of the borings were acceptance criteria per se.

4162 Kane responds to the same question. Kane sees the lab test as being part of acceptance criteria. Since the lab tests will attempt to demonstrate the adequate compressibility characteristics of the soil.

4167 Kane states that documents that he has reviewed indicate that the NRC did have a concern with respect to the acceptability of the surcharge program prior to its removal. These Staff problems are reflected in questions that were asked in March of 1979 with respect to the engineering properties of the soil beneath the DGB and whether they would satisfy the commitments in the PSAR.

4169 Hood does not remember any specific request by Consumers for Staff approval of the surcharge program.

4170 Consumers decision to remove the surcharge was part of the proceed at his own risk option. Hood believes he was aware of Consumers decision to remove the surcharge by way of telephone communication.

4171 Kane recalls a document sent to I&E from Consumers indicating its plans to remove the surcharge.

4172 Kane explains his response to item 4 of contention 2 - the grouting of the gaps prior to cutting the duct banks.

- 4173 Kane states that it was Consumers conclusion that it was not necessary to grout the gaps before releasing the duct banks. Kane is aware of the recommendation by the consultants to grout the gaps prior to isolating the duct banks.
- 4174 Kane adds that the Documents indicate that after further thought the consultants along with Bechtel came to the conclusion that it was not necessary to grout the gap.
- 4176 Kane does not know whether the consideration of the abruptness of the release of the duct banks was one of the considerations that went into the initial recommendation of the consultants to grout the gaps prior to cutting the duct banks.
- 4177 It is Kane's understanding that the gaps have now been grouted. Kane does not remember when though. Hood adds that they were grouted after the December 6, 1979 order. Hood adds that he considers the grouting a soils related matter.
- 4179 Hood states that he knows the condensate lines were cut but he does not recall when. The lines were only cut on one side of the DGB, because that was perceived all that was necessary. Hood explains that it was his misunderstanding that Consumers was going to cut the lines on both side of the DGB. He only recently learned that they had only cut the lines on one side of the DGB when he found out that the lines on the south side were overstressed. Hood explains there was no deception on the part of the applicant with respect to this matter. Hood just was not listening closely enough to the discussion of cutting the condensate lines.

- 4181 Hood clarifies that it was at the December 3rd or 4th meeting that he got the mistaken impression that the lines were being cut at both the south and north side of the DGB. He recalls the focus of the discussion at that meeting on the pipe as a hard spot to the structure. With that focus in mind it was sufficient to just cut the line at one end.
- 4182 Hood explains that the NRC's concern although not necessarily expressed at the December meeting was both with the pipes interfaced with the structure as well as the issue of the pipes integrity on its own.
- 4185 Hood states that the concern expressed in the last paragraph of Stamiris exhibit 26 for identification focusses on the interface of the condensate lines with the structure. This was the same concern that was expressed at the December 3rd and 4th meetings.
- 4189 See the last two sentences of Stamiris exhibit 26. Hood does not believe that Consumers position as taken in this document was unreasonable. He would not expect to see Consumers ordering Bechtel to cut the condensate lines.
- 4190 Hood states that these comments in Stamiris exhibit 26 do not indicate that Bechtel was making the final decision on the condensate lines. Hood believes that Bechtel would make a recommendation to Consumers and then Consumers would make the final decision on that matter.
- 4192 Marshall asks the Chairman if there is any possibility of getting a copy of the contract between Bechtel and Consumers.

- 4193 The Chairman states that the Board does not think the contract itself would be particularly relevant.
- 4194 The Chairman states that the contract would not be material to any of the matters before the Board. Furthermore, portions of the contract might be proprietary. Stamiris exhibit 26 is not admitted into evidence because of lack of foundation.
- 4195-97 There's a discussion of how the parties will respond to the Board's request at transcript pages 3929-3931 for the close-out of non-compliances listed in inspection report 80-32. The Applicant indicates that two items of noncompliance were closed out in report 80-32 and the other two are about to be closed out as soon as an NRC inspector visits Ann Arbor. When these two items are closed out, the Staff will file a documents with the Board. Stamiris indicates that she may be interested in asking some questions on the close out of the non-compliance concerning the FSAR re-review. The Chairman indicates that he will reserve decision on whether a witness should be provided on the close out until the Board sees the close out and what the questions might be.
- 4199 Hood believes that the condensate lines were cut after the start of the surcharge but prior to the placement of all of the surcharge.
- 4200 Hood has no first hand knowledge that the condensate line has been cut on the south side of the building to date.
- 4203 Stamiris asks Kane whether Kane would have recommended the surcharge back in 1978 if he had known everything that he now

knows about the soil problems associated with the DGB. Kane says yes, he would have recommended it, however, he qualifies that it is a difficult question and that there are some things that he would have done differently.

4204 Kane states that the fact that two years after the completion of the surcharge there are still issues outstanding with respect to the pipes and the cracking of the DGB is a good indication of the problems the Staff has had from the beginning with the surcharge approach.

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- P. 4205 Kane clarifies that he answered Stamiris's question on the supposition that everything he now knows would have been available to him back in 1978 when Consumers was considering what option to follow at the diesel generator building.
- P. 4206 Some of the problems that have occurred as a result of the surcharge are the traditional distortion of pipes and conduits and additional cracking of the DGB itself.
- P. 4209 & 4210 Kane states that in terms of safety alone, it is his opinion that the R&R option was a better solution. He adds however, that if one is considering cost, the impact on schedule considerations that engineers must address and the R&R option may not be the superior one. That remains to be seen since the bottom line with respect to the effectiveness of the surcharge program is now being reviewed by the NRC.
- P. 4212 Kane states that with the benefit of hindsight, he would now want to have a better understanding of what would be acceptable in terms of bending of pipes and the cracking to the diesel generator building prior to the surcharge. He also might elect to place a surcharge that had differential loads at different areas of the DGB in an attempt to cause a more uniform settlement.
- P. 4213 Kane states that he believes Bechtel was anticipating cracking problems, however, he thinks they were being encouraged in this regard by NRC.

4214

Hood adds that he does not believe that there was a full appreciation from the outset of the surcharge of matters like field tension analyses with respect to cracks and what a given increment of differential settlement means in terms of cracking.

P. 4215

Kane states that the surcharging did not improve the loose sands that were beneath the north side of the DGB. Thus, the surcharge did not have the significant effect in reducing the liquefaction potential. That potential was being addressed by another remedial measure, namely, permanent to watering.

P. 4216

Kane is not sure whether the final decision on dewatering was made after the surcharge had already been applied, however, he does know that the problem was being addressed and considered during the preload.

P. 4218

Kane states that dewatering is a more conservative approach than grouting the loose sands.

P. 4219

Kane recalls that the surcharge was placed in January 1979 and that the final decision to go with permanent dewatering was made in late 1979. The grouting and permanent dewatering options were being considered in parallel, that is at the same time.

P. 4221

The Chairman sustains a number of objections because one of the witnesses had responded that the surcharge had nothing to do with the solution to liquefaction question.

- .. 4222 The Chairman states that with respect to the surcharge, it does not matter whether Consumers considers one or another option for dewatering.
- P. 4224 The possible of dewatering would have an insignificant effect on the desirable of the preload option. That is because the surcharge deals with the compressibility, the finer soils that is the clays and the silts whereas dewatering deals with stabilizing the loose sands.
- P. 4225 The possibility of dewatering would affect the amount of surcharge that one would place on the structure. Since the goal was to saturate the soils prior to the surcharge, one would not be dewatering at the same time.
- P. 4226 Hood recalls that the full implications of the soil settlement matters with respect to dewatering was not understood at the time the decision to precede with the surcharge was made.
- P. 4227 Decker asks whether would the removal of the DGB and the fill and the replacement of the bad fill with properly compacted fill in the rebuilding of the DGB would that action have satisfied the liquefaction concerns for the DGB. Kane responses, yes.
- P. 4228 Hood states that the dewatering system extended beyond the DGB and encompassed numerous other structures at the plant.
- P. 4229 Kane describes the dewatering system as being required to draw the water table down to a level below where the sands are susceptible to liquefaction appear. The only difference in the dewatering system if you did not need to dewater the DGB area would be the locations of some of the wells. Kane is not sure that would be elimination

Kane
4303

of the dewatering beneath the DGB that there would be any fewer wells involved in the dewatering system.

P. 4231 Stamiris questions Hood on the notes to the December 3rd meeting. Specifically, on page 3 of attachment 11 to contention 1. The statement short of removing all of the fill above the hard glaser till of preload program would be the best approach.

P. 4231 Hood's vague recollection is that both the R&R option and the surcharge option were considered acceptable approaches by Peck at the December meeting.

P. 4233 Stamiris asks Kane whether when he evaluates the adequacy of the borings, does he totally ignore the fact that the building is now complete. Kane states that his decision on whether there is reasonable assurance that the DGB in pipes installed beneath it have an exceptional margin of safety for safe operation of the plant, is not at all influenced by the fact that the DGB is an completed structure.

P. 4235 to 4237 The parties decide to insert Mr. Turnbull at this point, and to resume with a cross-examination of Hood and Kane following the completion of the examination of Mr. Turnbull.

~~P. 4236 to 4239~~ There is a general discussion of the statistics on QA personnel that the applicant was trying to gather. Decker requests an update in the fall and the number of people in MPQAD and Bechtel quality control groups.

4290 Continued cross-examination of Kane and Hood by Stamiris. Stamiris Exhibit No. 27 marked for identification. It is a Bechtel boring log located at footing 8-CA, taken in September 1977.

4235 -> 4283

~~4286 -> 4250~~
~~4250~~

4235 Zammeron asks that we take Turnbow out of turn.

4237 Board examination of Turnbow starting with Dr. Cowan.

4238 The computer has nothing to do with the trend program. There are six categories of items that we call quality indicators: an audit finding report, a nonconformance report, a deviation report, a stop work order. The purpose of the trend program is to detect subtle changes in conditions which occur over a period of time.

4239 Cowan discusses the "quality indicator matrix" he does not identify which exhibit it is.

4240 Although the computer is not involved they have a method to fix the tension on how many items of a specific kind are recurring and therefore they get a trend from that.

4241 The trend program does not indicate the severity of the problem.

4243 Dr. Cowan indicates that page 2 of trend analysis number 1 which is part of Exhibit H seems to belong with trend analysis number 2. Dr. Cowan then refers him to some designations on exhibit 9.

- 4244 AFR's or audit finding reports, QAR's or quality action requests, RFI are request for information, DR are deviation reports, IPIN is a new name for the DR, MCAR is a management corrective action request. The trend analysis is a valuable tool. Turnbow doesn't think trend analysis can be overdone. It does not take substantial time but it does take time. [A typical Turnbow answer].
- 4245 Turnbow has been in this job 9 months. He was in QA before but not at Midland.
- 4246 What is your opinion of quality control awareness at the managerial level. Answer: I have been in a position to view this from many different companies the attitude as Consumers is "highly commendable".
- 4247 QA awareness at the rank and file level is "very good".
- 4248 QA in the future will be implemented as well as it possibly can be. On Judge Deckers question, results of the trend program are written up monthly by Tremble's department.
- 4249 Other than the reports that you mentioned what other mechanisms are there for you to inform management of the quality situation of the plant. Answer: We have bi-weekly meetings with Mr. James Cook at the site to discuss any problems that might

- exist. There are also bi-weekly meetings with the construction people on-site. (A different meeting).
- 4250 The Chairman's questions. Because the current program phase 3 to distinguish it from previous trend programs.
- 4251 Turnbow ends his discourse on whether there are four six or eight quality indicators. (It depends on what phase you're in). Actually that discussion continues for another page or two.
- 4253 The Chairman really gets into the nitty gritty. If one defect category should involve more than one trending entry could there be two entries. For example if there were poor workmanship and also bad drawings. Answer is not because there is probably only one true root cause.
- 4254 The Chairman asks line 23 is eight categories of quality indicators the correct number.
- 4255 He says in phase I they had 32 categories and in 1979 they changed it to four and his conclusion was that something in between was better. The Chairman asks if you have any interface problems in the integrated organization. Answer, not to date.
- 4256 Turnbow says "It is even beyond my ability to conceive" [this is exactly the opposite of what John Gilray said] and he tells why essentially that everybody is trying to get the job done.

- 4257 Cross-examination by Barbara S _____.
- 4258 He agrees that it is too early to make an assessment of the trend program under phase 3 since its only been operating since July 1, 1981.
- 4259 He says there is not relationship between the trending program and the assigning priorities to the severity of problems.
- 4261 Barbara asks him when you use the word priority does it indicate a level of severity. Answer, not necessarily. A priority number is an indication of the need for immediate attention to the problem and that may be because severity or scheduling.
- 4261 At the bottom the Chairman asks with respect to assigning priorities, could the scheduling aspect be preimminent over severity aspects.
- 4262 He says for the third time at least that the priority number is not part of the trending program.
- 4263 As far as the trend program is concerned (see line 3) an extremely severe defect could be less serious than two orivial defects. But remember that the severe defect is obtaining tension through other means. Barbara asks (this is on 4263)

how does quality assurance deal with MCAR. How do you get to the level of an MCAR?

4264 Turnbow's department makes recommendations as to whether an item is reportable under 50.55e, Bird makes the final decision.

4266 The Chairman says lines 1 and 2, that the Board's questions set the scope of the cross-examination (in response to JoAnn Blume's objection that a stimerous question was outside the scope of the Board's direct).

4267 Judge Decker asks Turnbow what is the function of this group of people shown on this organization chart. [Identified on 4266 as Consumers exhibit 13] entitled "Design QA Engineering".

4268 Their located in Anarbor they participate in design reviews, they audit the engineering organization, but it is not part of Turnbow's group.

4270 Cross-examination by Peyton. I refer him to applicants exhibit 10 in his handwriting, is a document that has the words on it "still detect on the part of some, etc." I asked him how many was the part of some, he said he didn't record the number so I asked him was it 2 or 50. I won't summarize all of this I gave Turnbow a bad time.

- 4278 Turnbow response of the 12 people at the meeting, 10 of them had varying degrees of "discomfort." They felt the program could be better if improvements were made.
- 4279 Back to Board examination. The Chairman asks why the MCARs and MCAR's/R not trended. Answer the MCAR is such a high level of instrument that I believe that only about 6 of them have been issued since the beginning of the job.
- 4280 They cover an area which is so broad that they can not usually be classified into a particular one of the slots that we have talked about. More details on 4280.
- 4281 Redirect examination by the Applicant. Phase 2 of the trending program is doing its job. Phase 3 was implemented because they suspect they can improve the program. What happens in terms of corrective action when you have an MCR. Answer is at the top of 4282. An MCR can result in a 50.55e or an MCAR. It's also placed in the trending program.
- 4283 Turnbow defines a trend under phase 2. The question is have any problems ever been found in the trend analysis program. Has it been useful in discovering problems. He says I can think of three cases

of the dewatering beneath the DGB that there would be any fewer wells involved in the dewatering system.

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4292

Stamiris asks Kane what significance if any statements in the boring log have to him. The boring log indicates that there is a zone under artesian pressure which caused water to run up through the boring and out of the hole. There is no relationship between that and the stability of the soils.

P. 4293

Based on the boring log, Kane states that the presence of sand is probably the major factor for this added pressure that is built up. The sand is probable the zone where the artesian pressure was confined to. Kane adds that he does not know the cause of the artesian pressure in this boring.

P. 4295

Kane states that it is his understanding that the purpose of this boring which is respresented is Stamiris Exhibit No. 27 was to investigate the extent of the fill problem identified with the admin. building. Kane states that the boring itself and the sampling does not give him concern, but what does give him concern is what caused the artesian pressure.

P. 4297

Kane repeats that the results of the boring presented in Exhibit No. 27 do not give him concern with the respect to investigating the plant fill, but the behavior of the water while drilling was a concern to him because he would like to understand whether the pressure in that zone was being caused by the pond. Kane has never raised this issue with Consumers or Bechtel since he just saw the boring log for the first time last week.

4300

Stamiris asked Kane whether the information regarding the settlement of the admin. building should have indicated a potential soil settlement problem at the DGB in October of 77 or before. Kane responds that it is very difficult to tell. He states that he could have concluded in 1977 that the settlement problem was tied to the back fill for the steam tunnel, that perhaps that back fill does not spread throughout the entire plant. He states that he would want more information before he reaches the conclusion on that question.

P. 4302

The Chairman asks whether if an expert reviewed Stamiris Exhibit No. 27. Is there anything there that begs for further investigation. Kane responds in the negative except for the artesian pressure issue. Both counts reported on the boring boring logs indicated that the material was competent.

P. 4303

Board examination begins. Decker asks whether there were any attempts to understand why the U.S. testing methodology failed to indicate problems with the fill at the admin. building. Kane says that attempts to understand why the methods used by U.S. testing has failed have been made, however, he is not sure that they were done at the same time as the investigation of the admin. building. He does not believe that this was looked into until the identification of the settlement problem of the DGB.

P. 4305

Kane says that he is going to look into the artesian pressure matter presented by Stamiris Exhibit No. 27 boring log and then he will pursue it with Consumers. Kane adds that he does not think this artesian pressure is being caused by the pond.

- 4307 Stamiris asks Hood what he meant in his response to Contention 2d when he said that the R&R option was a viable alternative. Hood responds that the word viable means that it still possible.
- P. 4308 Kane adds that if the surcharge is not proven to be successful he believes that the R&R option can be done. There will be problems associated with the R&R option, but he believes that these problems could be faced and adequately resolved.
- P. 4308 Kane believes that the R&R option could satisfy the PSAR compaction criterion.
- P. 4310 Kanes says that his conclusion that the R&R option is viable does not address the cost of that option. Hood reiterates that word viable goes to the technical feasibility of the project not the economics.
- P. 4311 Stamiris asks whether there were any less limitations to the R&R option in 1978 than there are today in 1981. Hood responses yes, insofar as several of the adjacent structures were not constructed back in 1978.
- P. 4312 Stamiris asks the question on the staff response to contention 2 item 1. Hood states that there were four more FSAR requests for information on the pre-load prior to March 21, 1979.
- P. 4313 Hood's earliest impression of the staff inquiry into root causes was the December 3 and 4 meeting.
- P. 4314 54 F request No. 4 concern quality assurance and in part root causes. Question 23 was a follow-up to request No. 1. Question 23 was required because the staff needed additional information from the applicant which showed the

the generic implementation of root causes and its implementation to areas other than soils.

- P. 4315 The NRC received an acceptable answer to Question 23, June 26, 1981. Hood may have read the June 26 response to Question 23 however, he is not really familiar with its contents.
- P. 4317 Stamiris asks some questions on Item 56 to Contention No. 2. Hoods states that his response in essence says that early submittal to the FSAR made no difference in terms of the inconsistencies that occurred therein.
- P. 4321 Hood states that the material false statement alleged in the order refers to an inconsistency that appeared in the original version of the FSAR. It was inconsistent with the condition that the site. Hood repeats that he believes that those inconsistencies would still have existed had the NRC received the FSAR in August of 1978.
- P. 4322 Hood again states his response of early submittal would not have precluded these inconsistencies.
- P. 4323 Hood clarifies that his written response to the Contention where he states little or no detection of inconsistencies would have occurred during this interval refers to detection by the applicant not the staff.
- P. 4323 Stamiris states that her contention item 6 was not really that concerned with the timing, but the lack of inadequate review of the FSAR. Accordingly, she asks whether inadequate review of the FSAR in any way affected the detection of inconsistencies.

4324

Hood responses that if the draft sections of the FSAR had been rigorously reviewed, he believes that the inadequate statements would have been found.

P. 4327

Hood postulates that had the inconsistencies been discovered it probably would have just resulted in correction of calculation, but it is hard for him to speculate that it would have revealed the existence of a soil settlement problem at that point in time.

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- P. 4333 - 4336 A discussion of the hearing schedule for the fall. Establishment of tentative hearing schedule for October, November and December.
- P. 4336 -A The applicant provides copies of staff Exhibit No. 4, the Mack Report.
- P. 4337 Continuation of cross-examination of Kane and Hood by Stamiris on Contention 2. Stamiris asks Kane some questions about the boring log represented by Stamiris Exhibit No. 19.
- P. 4338 Kane states that the fact that the boring holes starting caving in at 23 feet as indicated by boring log is not uncommon occurrence in drilling and does not cause any concern regarding the quality of the soils.
- P. 4339 Stamiris Exhibits 19 & 27 are admitted into evidence for the limited purpose of clarifying the purpose the testimony of Mr. Kane.
- P. 4340 Hood does not believe that Lyman Heller observed the test pits during the December 3rd and 4th visit. He thinks that it was Mr. Gallagher who observed them and took photographs of them.
- P. 4341 Hood states that it is difficult for him to speculate whether the identification and correction of a calculation in the FSAR would somehow have prompted the recognition of a broader problem in the soils area.

P. 4341

Hood states that in Inspection Report No. 78-20, it was identified that the applicant did have procedures for review of the PSAR and FSAR, but that those procedures had not be correctly followed.

P. 4343

A part of Inspection Report 80-32 also involved the failure to follow the established procedures. Items of noncompliance were found as a result of the failure to follow the established procedures in 80-32. Report 78-20 is attachment 2 to staff testimony and contention 3 report 80-32 is attachment 3 to staff testimony on contention 3.

P. 4344

Hood states that Appendix A of report 80-32 alleged to violation Appendix B Criterion 3 and that this was also a criterion that was alleged violated in the December 6, 1979, Order.

P. 4346

Hood states that that the problems identified in reports 78-20 and 80-32 are similar insofar as that they concern the amount of detail that a reviewer is going into and executing what was the established procedure.

P. 4347

In 78-20, the checker is acknowledging the review of the FSAR material as preformed by certain group, but not all of the content was checked out, thus, the checker is relying to some extent on the original. In contrast, in 80-32 the procedures that is being undertaken is a re-review and the checker is acknowledging that he merely checked the reference for consistency of subject matter not the technical substance vs. the FSAR statements.

P. 4349

The staff's conclusions found on page 21 of the prefile testimony that the examples listed in item 79 and 11 of contention 2 have had adversely affected the resolution of the soil settlement issues. That conclusion was depended on the fact that the R&R option is still available.

P. 4353

Kane postulates that had Consumers delayed in starting the surcharge program, it would be a good potential for some of the QA concerns to have been better resolved. Kane points out however, that at that time the staff had not anticipated the problems that did develop and were not staffed to handle such concerns.

P. 4357

Kane states that in fairness to Consumers if the 50.54f questions had been submitted earlier they might had been able to address them prior to the placement of the surcharge.

P. 4358

Kane state that he believes the consultants are only to address the portion of the problem, that is the settlement of the soils. However, NRC concerns go beyond that. The NRC's main concern is with the additional settlement that may be experienced with what is going to happen to the pipes and structures. This is Kane's understanding that that portion of the design of the plant is not the responsibility of the consultants.

P. 4359

The full extent of the soil settlement problem was not known in March of 79 when the first 54f request was issued. These questions were designed to flush out the scope of the problem.

4361

Kane believes that Consumers was aware of the integrity problem with the structures and the pipes prior to the preload. However, they felt that the surcharging would be the best solution. Bechoeffer ask whether Consumers took a reasonable approach prior to the preload. Kane responds, we I consider all aspects that an engineer is faced with to make when he makes a choice and that is not just safety but the other costs, I would say he meaning the applicant took a reasonable approach.

P. 4362

Kane states that what could have been done is to anticipate the maximum distortion of pipes that would have been acceptable, and also to have anticipated a condition of cracking that would have been unacceptable prior to the surcharge and with those in mind make sure that neither condition was developing under the surcharge loading. Kane does not believe that these two things were done in advance of the preload. Discussion of item 11 to contention 2, the depth and breath of the surcharge limited by the turbine building. Kane states that he does not believe the uneven settlement that resulted from the surcharge was caused by the fact that lesser charge was able to be applied near the turbine building.

P. 4363

Kane states that the smaller amount of settlement that was experienced on the north side, the turbine building side of the DGB was the result of the compressability of the materials not the weight of the surcharge. Stamiris asks whether the boring information which is referred to on page 22 of staff testimony whether that indicated the presence of the sands although it did not indicate the presence of loose sands.

Kane responds yes, the borings indicate the presence of sands beneath safety related structures.

P. 4364 & 4365

Kane indicates that the sand that is now not loose is the sand that earlier had been identified as loose and which Consumers had committed to removing in the FSAR. The borings which were done in August of 78 showed low counts which indicated that the sands were no longer classified as loose, but were adequate. Stamiris asks, are they the same sands, but do they have a different property at this point in time than they did before the soils fill was placed on top of them. Kane responds, I would believe that they are. He also indicates that Mr. Keeley's testimony states that they are the same sands.

P. 4366

These sands are not liquifiable sands. The sands were are being addressed by the dewatering systems are sands which were placed in the plant fill not natural occurring sands.

P. 4366 - 4368

General Discussion of the staff's response to item 10 of Contention No. 2 resolution of the seismic deferral motion.

P. 4369

Hood states that the QA program has always been acceptable.

P. 4371

Hood states that his conclusions about the QA program made on page 23 of staff testimony on Contention 2 is based on the prior testimony of Mr. Keepler and Mr. Gilray.

4373

Cross by Mr. Marshall.

P. 4374

To the best of Kane's recollection, top soil which was taken from the pond and the plant-fill foundation was used to top soil completed structure such as the imbankments above the riprap. To Kane's knowledge, none of it went back into beneath the DGB.

P. 4375

Temporary retaining wall kept the surcharge off the turbine building. That wall has now been removed.

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- P. 4375 Continuation of cross examination of Hood and Kane on Contention 2.
- P. 4377 Hood states that Bechtel utilizes the information from its consultants formulates its recommendations presents those to Consumers Power Management for decision, concurrence and authorization.
- P. 4379 Dr.s Peck and Hendron who formulated the recommendation for the surcharge.
- P. 4380 The Chairman reports that he has reserved the hearing room for the week scheduled in the fall with several minor exceptions with respect to starting later in the morning or adjourning early in the afternoon.
- P. 4381 Cross examination by Zamarin begins.
- P. 4381 Kane can not say that Consumers failed to excavate the loose sands that had been there.
- P. 4382 Kane adds that what were once loose sands could have been effected by the confining pressure of the fill that had been placed on top of them. Peck and Hendron considered the underground piping and the structure to the extent that the surcharging would effect both those systems and they made a judgment of what effect that might occur would be acceptable to them.

P. 4383

Zamarin asks whether there is any discussion in the 50.55(e) reports on the DGB about Consumers plans to monitor the effect of the surcharge on the underground utilities. Kane responds that there were statements in those documents about monitoring the underground facilities, however, there has been an ongoing controversy with the NRC over the extent of that monitoring.

P. 4388

Kane says he recalls testifying yesterday that it was the NRC that first encouraged crack mapping and pipe profiling with respect to the DGB. Kane clarifies that what he meant to indicate by that responses was that 50.54 F questions asked Consumers to do these things.

P. 4389

Kane recalls that the first set of 50-54F questions of March 1979 dealt with the effects of cracks. Zamarin asks Kane if he is aware of the fact that Interim Report No. 2 dated November 3, 1978, provided the NRC with information relating to visual monitoring and surveying of the DGB and the appropriate utilities under the building would be performed before and during the surcharge; Kane responds that he is aware of that now that it has been read to him.

P. 4391

Zamarin asks Kane if he is aware that the fact that in Interim Report No. 3 dated December 27, 1978, Consumers committed to mapping the existing cracks in the DGB after preloading and it also was going to place strain gauges at selected crack locations for monitoring during the preload; Kane responded that he is aware of these commitments now that they have been read to him.

P. 4391 con't

Kane states that the 54 F questions showed NRC's concern that whatever information was being collected whether it be crack mapping or otherwise was not being used to demonstrate that the DGB's integrity was acceptable. Kane concedes that crack mapping may have been started prior to the issuance of the 50-54F questions, nonetheless, Kane states Consumers was not evaluating the consequences of the crack mapping with respect to the distress of the structure.

P. 4396

Zamarin asks if the only evidence that Kane has prior to March 1979 that Consumers or Bechtel had not considered crack mapping information and looking at the effects of the structure is contained in 50-54 F question no. 14.

P. 4398

Kane responds its the only evidence he can think of. The Chairman asks if the Staff would have asked such a question on crack mapping if it already had the information in its possession; Kane responds it is not reasonable to expect a Staff ask a question where they already have the information.

P. 4399

Kane states that he has problems with Zamarin's question because it is Kane's understanding that his statement made yesterday was that the NRC encouraged the Consumers to address the effect of cracking. Hood responds that it is his job as project manager to screen questions and to assure that it is information that the NRC indeed needs and has not already been asked for. Zamarin asks Kane if he had meant to say that he had evidence that Consumers was not considering the effect on the structure of the information

- P. 4399 con't obtained from crack mapping before encouragement from the NRC; Kane responds no that was not what he meant to say.
- P. 4401 Kane states he doesn't ever remember having said that Consumers wasn't looking into this until after NRC encouragement.
- P. 4404 Kane is aware of the fact that Interim Report No. 3, dated December 27, 1978 stated that analyses will be performed as required to evaluate the effects upon the structures. The problem the NRC had with this was that the evaluation was going to be done after the surcharge was completed. Kane is aware of the fact that the NRC was notified by Interim Report No. 4, dated February 16, 1979 the condensate lines had been cut and that there was going to be continued surveillance of the cut pipe lines.
- P. 4405 Kane states that even today the NRC has questions that are unanswered about the stresses that were induced by the surcharge on the pipes.
- P. 4406 Kane was aware that in Interim Report No. 4, Consumers committed to doing additional profiling of the condensate lines to determine the effect of the preload on those lines.
- P. 4407 Zamarin asks Kane whether he is aware of the fact that Interim Report No. 4 dated February 16, 1979 advised the NRC that the existing cracks in the DGB had been mapped and that strain gauges had been placed at locations in the figures as provided. Kane states the date of this Interim Report is about the same time the

- P. 4407 con't NRC was generating questions on crack mapping, he adds that although the question was sent to Consumers in early March it was probably generated weeks before that.
- P. 4408 Kane says that Consumers during the course of the preload provided the NRC with the results of the crack mapping.
- P. 4409 It was not Kane's understanding that the surcharge was ever intended to improve the loose sands beneath the DGB so as to reduce the liquefaction potential.
- P. 4410 Kane states he really does not know whether the sections of the mudmat beneath the DGB are now broken up, he adds that the mudmat was only about three inches thick then he believes it would be broken up.
- P. 4411 Kane states that there is some reluctance on the part of the NRC to be doing things which are not easily demonstrated, he adds the staff is not in the business of research with respect to assuring plant safety. Kane is aware of no defect in the engineering judgments of either Dr. Peck or Dr. Hendron with respect to their recommendations of the surcharge.
- P. 4412 Kane states he has no knowledge of anyone telling Consumers or Bechtel don't precede with the surcharge program.
- P. 4415 Kane states that he has no evidence that Dr. Peck was not able to evaluate the piezometric measurements, simply because there was a rising ground water level related to the pond level rise.

- P. 4415 con't Kane adds however, that there are recognized difficulties that are brought into the piezometric evaluation because of the coincident occurrence of the surcharge application and the raising of the pond level.
- P. 4416 Kane states that because of the heterogeneous nature of the fill it is extremely difficult to ascertain the drainage paths.
- P. 4417 Kane states that he does not have sufficient knowledge of the drainage paths underneath the DGB so as to enable him to determine just what the rise in the piezometric measurements should have been in each of the instruments, a piezometer measures water pressure.
- P. 4419 The level of the cooling pond that existed just prior to the surcharge was 620 feet. In November of 1977 Hood believes that there was only rain water in the cooling pond. There is nothing in the two boring logs Stamiris Exhibit 19 & 27 that indicates lack of competence of the soil at those locations.
- P. 4420 Kane states that the true way to measure the ground water under the DGB would be to use piezometers and to allow sufficient time to were the piezometers would reflect stabilization.
- P. 4421 Kane states there really is no practical way to determine up front how long it would take for the ground water level to stabilize under the DGB.
- P. 4422 Kane states that Dr. Hendron is a highly regarded expert, nationally known. Kane has no evidence that either Dr. Peck's or Hendron's

P. 4422 con't

opinion with respect to the surcharge was based faulty soils or foundation engineering principles.

P. 4424

Kane has no evidence that the over stressing of the condensate lines was the result of either the surcharge vs. the soil settlement. Hood states he's not sure if it was specifically stated but it was his impression that the over stressing of the condensate line was the result of the soil settling under its own weight.

P. 4426

Hood states he has no direct evidence that Dr. Peck felt that the R & R option was better from an engineering standpoint than the surcharge option. Zamarin asks whether with respect to engineering properties of soil does it make any difference if the soil is homogeneous or heterogeneous as long as the soil is compacted to the required design criteria; Hood responds that if the compaction criteria is met that is the principle geotechnical concern.

P. 4427

Kane agrees that in so far as engineering properties of the soil as a foundation are concerned that heterogeneous soil would be as acceptable as homogeneous soil as long as it was compacted to acceptable design criteria. Question 23 was issued in September of 1979.

P. 4428

Consumers responded to question 23 in November of 1979. Consumers response included a discussion among other things root causes. Hood does not recall any communication by the Staff to Consumers between November of 1979 until of December of 1980 to the effect that the Staff was dissatisfied with the response to question 23, root causes matters. In December of 1980 there was

- P 4428 con't an audit conducted at the Bechtel Ann Arbor office of the
Question 23 closeout packets.
- P. 4430 Hood is not aware of Region 3 having expressed any dissatisfaction
of the root causes discussion contained in Question 23 between
November of 1979 and today. With respect to Staff testimony on
item 12 of Contention 2, the Staff's responses does not intend to
convey that any design or procedural changes were caused by
finanical or time pressures, nor does the Staff responses mean
to suggest that changes to design materials or procedural
specification should not have been made without prior NRC
approval.
- P. 4431 Hood reiterates that the Staff meaning NRR had not conveyed any
dissatisfaction about root cause response to Question 23 between
November of 1979 and today. Hood states that he did not focus on
Region 3 in response to this question he was thinking in terms
of Gilray. Hood adds that he much more familiar with Gilray's
activities then the activities of Region 3 personnel.
- P. 4433 Hood uses the word "root cause" and "exact cause" interchangeably
in his meeting notes found in Attachment 11 to Contention 1.
- P. 4434 Hood vaguely recalls a phone call he received on November 7, 1978
from Drs. Peck and Hendron which requested a meeting for December
3rd and 4th.
- P. 4435 The Staff does not have any QA concerns with the preload program.

P. 4436-4440

There is a discussion of whether we can voir dire Ron Cook on whether he has a different professional opinion. The Chairman rules that the voir dire will go to his competence but not to whether he has a differing professional opinion, that would be covered in direct examination.

P. 4441

Decker asks Hood if at the time of the PSAR review on the Staffs SER at the construction stage, does the Staff require the submission of acceptance criteria to be used in determining whether finished construction meets the finished PSAR commitments; Hood responds yes.

P. 4442

Decker asks what is the requirement that Consumers should have submitted acceptance criteria; Hood responses that the requirement is that the Staff must be able to have reasonable assurance, in order to obtain that assurance the Staff reviews that the outside of a project information such as acceptance criteria, and indeed in 1972 the Staff did have certain acceptance criteria represented in FSAR which it reviewed and upon which it relied for that reasonable assurance finding back in 1972.

P. 4443

Kane states that the behavior of the majority of the piezometers did not react to the surcharge in the way one would have anticipated and Kane believe that is partly because the soil was not fully saturated to where the piezometers would be measuring pore water pressure. The Staff recognized that there were anomalies with readings but it also had problems with the behavior at different times during the preload for instance when it was first load and when the surcharge was removed. The Staff and Consumers

P. 4443 con't

have not reached an agreement upon which readings were anomalous. The Staff feels there are many piezometers whose behavior indicates that the surcharge may not have been fully effective. The Staff has recently received information which attempts to explain the behavior of the piezometers upon surcharge removal which was attributed to survey error. Kane believes that the Staff will reach an agreement with Consumers on those anomalies. Resolution of that concern however, does not eliminate all of the Staff's concerns with the piezometer readings.

P. 4444

The Chairman asks Kane whether he agrees with Dr. Hendron's statement at transcript 4101, that in evaluating the effectiveness of the surcharge deformation data was preferable to data obtained by piezometric readings. Kane responds that surcharge deformation data is convincing to a certain point but it has its limitations, because the Staff is uncertain as to whether full saturation had been reached the Staff does not have the fullest confidence in the settlement data. Another problem presented by a total reliance on the surcharge deformation data is that if the load is being supported by conduits and pipes in the foundation then there could be a time delay in when the load will get to the compressible materials. These limitations have been addressed by the laboratory tests which will be saturated and therefore will eliminate the problem with partial saturation, these lab tests will be evaluated to see whether or not they substantiate the settlement deformation readings that were gathered in the field.

P. 4445

Kane says he has the sense that because of the complication with the pond and the question of partial saturation and the complication with the heterogeneous nature of the fill, the Staff may never be able to explain the behavior of the piezometers. However, the Staff can get pass that by have support from the lab test data that shows that the surcharge was effective by supporting the field measurements. If there is a scatter of results but we have some lab data that supports the field data then Kane's tendency would be to have enough confidence that he would rely on future monitoring of the DGB.

P. 4446

Kane explains how piezometric readings can be effective by the drainage paths. Kane does not have confidence that he knows all of the drainage paths in the DGB area not does he feel that Drs. Peck or Hendron know all of the drainage paths.

P. 4447

The reasons the Staff were given for the applicants decision not to grout the sands were; 1. it would be very hard to prove to the Staff that they had caulked all of the sand pockets and; 2. that there were different types of sands which would require different types of chemical grouting and it was difficult to know what type of grouting should be applied.

P. 4448

Both Kane and Hood state that they see no connection between the decision not to grout and time in scheduling pressures.

P. 4453

Kane states that he believes Zamarin's question was, does he have evidence that the loose sands were not removed; Kanes response was

- P. 4453 con't that he has to look at the data that's now available and that data shows that there are no loose sands.
- P. 4455 Referring to Stamiris Exhibit 1 Page 2 of Attachment C, Kane can not conclude that this document states that the loose sands were not excavated.
- P. 4457 Stamiris directs Kane's attention to the last page of Stamiris Exhibit 1, where the meeting notes state next to No. 12, Mr. Gallagher stated that the NRC does not view preloading of the structure to be a fix or resolution of the problems at this time. Kane confirms that's what the meeting notes state. The Chairman states that this comment isn't even close to the NRC telling them not to proceed with the preload.
- P. 4459 Hood indicates that he has stated to Mrs. Stamiris that in his opinion it is a given that the R & R option is superior to pre-load. In Hood's opinion the R & R option would be free of some of the disadvantages that are left from the surcharge program.
- P. 4460 In particular if the R & R option is properly executed one is no longer dependant for the life time of the plant upon an active dewatering system, in that respect the R & R option is superior to the surcharge program.
- P. 4461 Ignoring engineering considerations of cost and schedule, Hood believes that the R & R option would have been superior to the surcharge program. Only a portion of Question 23 goes to root causes.

P. 4463-4464

Hood repeats that if you were not to consider costs and scheduling delays he would prefer that Consumers demolish the DGB.

P. 4464

Re-cross by Zamarin

Hood agrees that if you have a structure that exist but has a problem or defect with it and if it can be reconstructed without that defect and one is not at all concerned with time and costs considerations it would always the most simple approach to start over.

P. 4465

Hood clarifies a response he gave earlier with respect to the need for dewatering if the DGB was demolished and rebuilt. Hood states that he clearly recognizes the need for dewatering would still exist at other areas of the Midland Plant even if the R & R option was implemented.

P. 4466

Zamarin asks Kane whether he's aware of any lab or test data which indicates that the foundation soils beneath the DGB were only partially saturated at the time of the surcharge. Kane responds that yes he has evidence from piezometer readings, certain readings show that soils at elevation 628 were not saturated.

P. 4467

Kane explains the piezometric levels only went up to 625 and he is unsure about how much of that elevation 625 was caused by the pond seepage and how much was caused by the effect of the surcharge. This opinion takes into consideration an analysis of the piezometer tip location with respect to the surrounding soil reading. Kane has not done any analysis of the relative deformation of various

- P. 4467 con't layers beneath the DGB to see if in fact the layers which are below the ground water table showed any significantly different deformation under the loads than the layer that may be above the ground water level.
- P. 4468 Kane indicates that he would have problems with doing a comparative analysis of these two layers that is the one beneath and the one above the water table, because it is unclear that one would be comparing a similar type of material in each layer. Midland foundation soils are heterogeneous in nature and therefore Kane does not believe you could draw any meaning conclusions from that type of comparative analysis.
- P. 4470 Hood states that when the NRC allows the applicant to proceed at his own risk that goes to financial risk.
- P. 4471 Witnesses Kane and Hood are excused.

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P. 473

Direct Examination of Ronald J. Cook

P. 4474

Cook is a senior resident inspector of the Midland site. He's been in that position since July of 1978. Cook does not have a strong differing professional opinion with the actions of Region 3 with respect to the form or the intent of the main 1981 IAL concerning small bore piping design calculation packages.

P. 4475

Cook has read Mr. Cordell William's testimony with respect to the small bore piping calculation and he does not have a differing opinion from the ones presented by Mr. Williams, Cook does not have a differing professional opinion from Region 3 with respect to whether a second IAL as opposed to a reverse IAL should have been issued after investigation of the red lining practices. Cook states that his opinions of the actions that were taken may be somewhat different from what Region 3 wanted to do but that is not a differing professional opinion.

P. 4476

Cook states that the final decision of Region 3 was to not issue a second IAL with respect to the red lining practice. Cook was not involved with that final decision making process. Cook does not have any concern or problem from a regulatory view point where the way this issue of small bore pipe design

P. 4476 con't

calculation packages was handled.

P. 4476

Cross Examination by Stamiris:

Cook defines the term differing professional opinion as when his opinion is strong enough to call it to the attention of the Regional Management either verbally or written form. Cook states that his opinions in this small bore piping matter were not strong enough to do that on a formal basis. During the discussion on the inspection findings, Cook states he had opinions that were different from some of the other individuals. However, he adds, that some of his opinions were similar to other individuals involved with the inspection.

P. 4477

Cook expressed his opinions at these meetings when they were discussing the findings of the inspection. Cook states that his difference of opinion went mostly to the approach to the problems rather than the ultimate resolution of the problem. Cook met with Mrs. Stamiris on July 29th.

P. 4479

Stamiris asks whether the NRC initially considered a more strongly worded May IAL. The Staff and the applicant objects to the relevance of this question.

P. 4480

The Chairman indicates that the Board thinks that Mr. Cook does not have a different professional opinion however the Chairman wants to ask some questions. The Chairman asks Cook what his differences were if any; Cook explains that he would have preferred that there be less latitude in the May IAL in terms of installing pipes and hangers without SPDC instead of setting a high priority as the IAL did he would have preferred that the

- P. 4480 con't IAL actually prohibit any further work in the field until those spcd's were made.
- P. 4481 With respect to the redlining allegations that came to light in June and July of 1981, Cook felt that a IAL should have been issued instead of a reverse IAL.
- P. 4484 Stamiris asks Cook whether he believes that the May 22nd IAL represented an attempt to resolve the problems in good faith, in which the NRC was giving the Consumers the benefit of the doubt; Cook responds that it was in good faith and that the NRC does alot of its work with a licensee in good faith.
- P. 4485 Region 3 made the finding that Consumers did live within the line-by-line items of the May 22nd IAL.
- P. 4486 Cook repeats that the Licensee did live within the words of the IAL, however, it was later when allegations were made with respect to redlining that it was found that the field engineering review of packages was being done without those packages being supported by cpdcs. There had not been physical installation of this work.
- P. 4489 The Chairman asked if Cook told Mrs. Stamiris anything in addition to what Cook has testified to today that might be of benefit to the Board in considering this issue. Cook responds that he had indicated to Stamiris that when he discovered the redlining practice he was disappointed, thats why he wanted to take a harder stance and issue a second IAL instead of a reverse IAL, the Chairman asks if the action Region 3 took is likely to resolve the redlining question; Cook responds yes it is.

- P. 4489 con't Stamiris attempts to distribute a draft of the reverse IAL, the Staff objects to it and the Board rules that it will not accept that draft document.
- P. 4490 The Chairman states that there are always differences of opinion that go into a final document that is the way a bureaucracy operates.
- P. 4492-4493 Cook explains that he attended a number of meetings where the consensus was that an IAL would be issued on the redlining practice and than he went on vacation for a day and when he got back to his office he received a reverse IAL at which time he call Region 3 to see how this had come about.
- P. 4494 Marshall asks Cook whether he is under some order of suppression from Region 3, Cook responds that he has never been under suppression from anybody let alone Region 3. There is nothing hampering Cook from doing his work.
- P. 4495 Cross examination by Zamarin
Zamarin asks what types of redlining were being done between the May 22nd IAL and the July 24th audits; Cook responds they were not major changes to the piping system.
- P. 4497 Cook states that he knows they were doing redlining on the hangers in this period but he can not state beyond a shadow of a doubt that some of these packages did not involve piping.
- P. 4498 Cook is aware of che fact that an audit was conducted in response to the allegation by Mr. Saunders, he is aware that the result of that audit by Consumers is that no redlining was performed on anything other then hangers.

- P. 4499 Cook has no reason to doubt the results of Consumers audit.
- P. 4500 Cook does not recall any redlining with regard to relocating drains. Cook is quite sure that it was the Staff's conclusion on the basis of Consumers audit that redlining was limited to hangers or circumstances where loadings on pipes were not changed.
- P. 4501 Zamarin asks wasn't it a fact that the investigation finding by the NRC with respect to the allegation only determined that there had been redlining with regard to hangers; Cook responds, your probably right that it was only done on hangers.
- P. 4504 Following the May 22nd IAL Consumers developed a "procedure" that would allow redlining if it fell into the minor catagory. Cook is not sure is would call it "procedure" when in fact it was just a memo from the engineering department, in fact the reverse IAL requires Consumers to develop it into a formal procedure which the NRC must approve. The development of this "procedure" went beyond the line-by-line items of the IAL in May.
- P. 4505 Cook was not actually involved in the inspection of the small bore pipes of May 1981, that was Isi Yin. Cook did collaborate with Mr. Yin on some of the findings however.
- P. 4506 Cook states that as a result of the inspection around July 16th and 17th Region 3 could not substantiate the allegations that

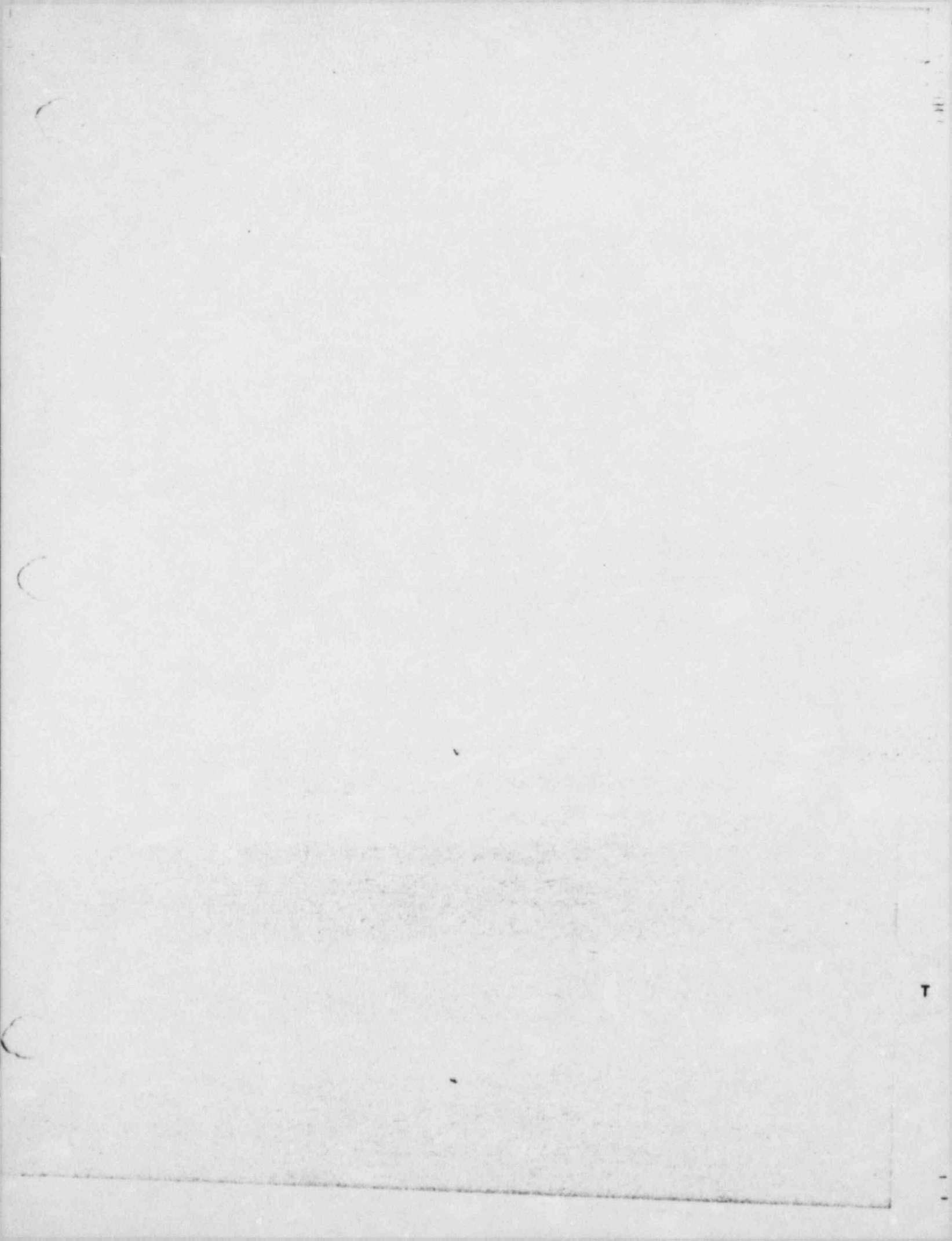
P. 4506 con't

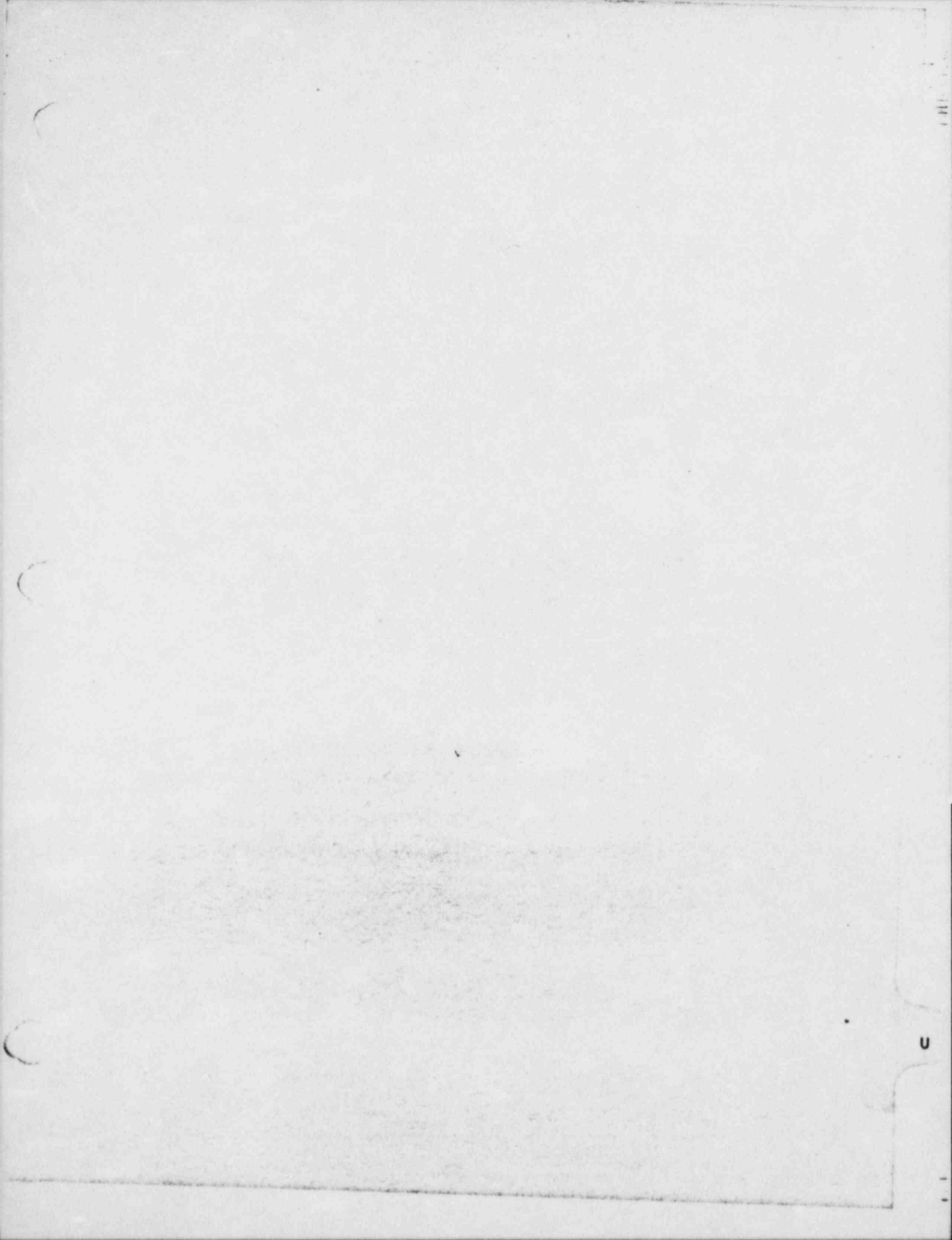
the Consumers was not living within the May 22nd IAL.

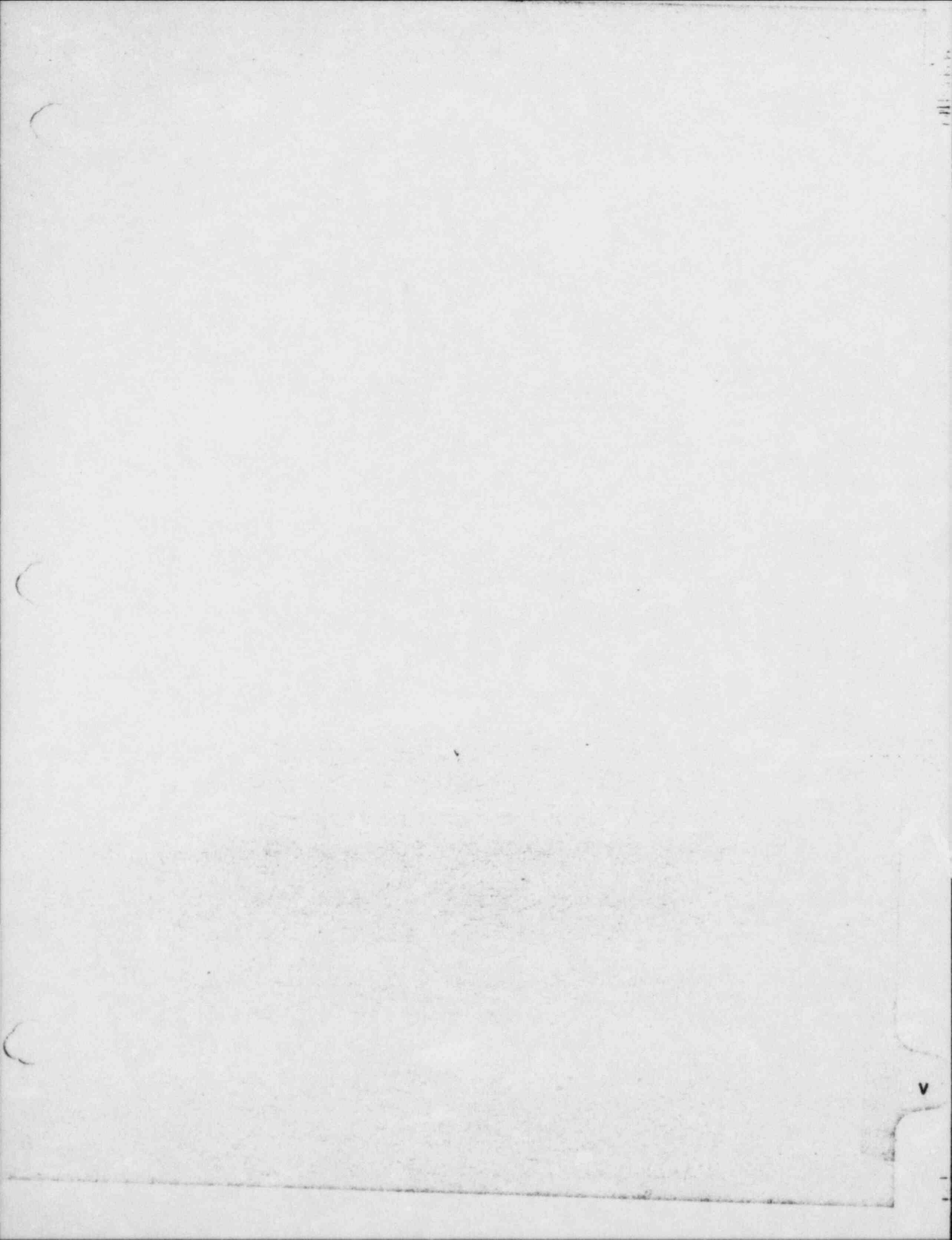
P. 4507

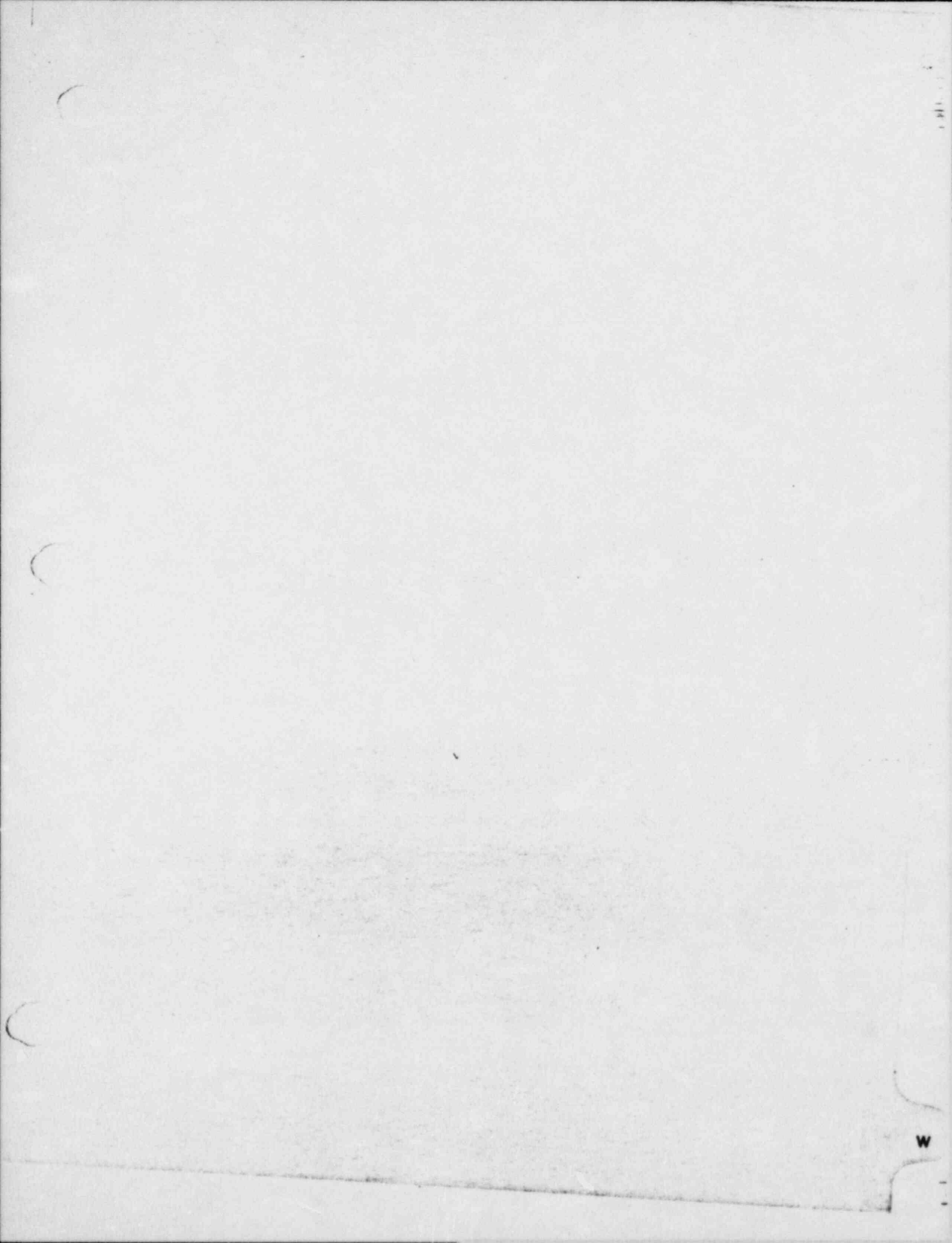
Mr. Williams was present at the meetings where the investigations of the redlining allegations were discussed. Williams was aware of Cook's feelings and others about preferring a second IAL as opposed to a reverse IAL.

The Witness is excused.









NOTE:

The contents of this package
are maintained in a three-ring
notebook by William Paton
Titled: Transcript Summaries -
July

NOTE:

The contents of this package
are maintained in a three-ring
notebook by William Paton
Titled: Midland Deposition Exhs.
October '80 — Before 01/15/81