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

Cook

October 5, 1979

MEMORANDUM FOR:

R. C. Knop	R. Cook
D. W. Hayes	T. Vandel
D. H. Danielson	F. Jablonski
K. Naidu	E. Lee
G. Maxwell	G. Gallagher
W. Hansen	K. Ward
P. Barrett	

FROM: G. Fiorelli, Chief, Reactor Construction and Engineering Support Branch

SUBJECT: MIDLAND CONSTRUCTION STATUS REPORT AS OF OCTOBER 1, 1979

The attached draft report was developed based on discussion with you, as well as, your written feedback to D. Knop's memo dated August 28, 1979. Let me know by October 16, 1979 if you feel the items are not properly characterized or additional items should be included. Please review the document with the thought that you will be asked to concur in the final version. The document is not intended to identify such matters which we know must still be closed out such as unresolved items, 50.55(e), etc. Instead we are trying to characterize those significant matters we perceive warrants additional management attention, and if not provided could impact on the issuance of an operating license.

Note, in particular, the concluding paragraph - If any of you feel this has not been characterized properly, I will expect you to inform me.

Randall C. Wellia

for G. Fiorelli, Chief
Reactor Construction and
Engineering Support Branch

Attachment:
As stated

cc: J. G. Keppler

DRAFT

MIDLAND SUMMARY REPORT UPDATE

Facility Data

Docket Numbers	- 50-329 and 50-330
Construction Permits	- CPPR-81 and CPPR-82
Permits Issued	- December 14, 1972
Type Reactor	- PWR; Unit 1, 492 MWe*; Unit 2, 818 MWe
NSSS Supplier	- Babcox & Wilcox
Design/Constructor	- Bechtel Power Corporation
Fuel Load Dates	- Unit 1, ~~11/81~~ 4/82; Unit 2, ~~6/81~~ 11/81
Status of Construction	- Unit 1, 54% Unit 2, 61% Engineering 82%

*Approximately one-half the steam production for Unit 1 is dedicated, by contract, to be supplied to Dow Chemical Corporation, through appropriate isolation heat exchangers. ~~Capability exists to alternate to Unit 2 for the steam source~~ upon demand.

Chronological Listing of Major Events

July 1970	Start of Construction under exemption
9/29-30 & 10/1/70	Site inspection, four items of noncompliance identified, extensive review during CP hearings
1971 - 1972	Plant in mothballs pending CP
12/14/72	CP issued
9/73	Inspection at Bechtel Ann Arbor offices, five items of noncompliance identified
11/73	Inspection at site, four items of noncompliance identified (cadweld problem) precipitated the Show Cause Order
12/29/73	Licensee answers Show Cause Order commits to improvements on QA program and QA/QC staff
12/3/73	Show Cause Order issued suspending cadwelding operation
12/6-7/73	Special inspection conducted by RIII & HQ personnel
12/17/73	Show Cause order modified to allow cadwelding based on inspection findings of 12/6-7/73

12/5/75	CP reported that rebar spacing out of specification 50 locations in Unit 2 containment
3/5 & 10/75	CP reported that 63 #6 rebar were either missing or misplaced in Auxiliary Building
3/12/75	RIII held management meeting with CP

8/21/75	CP reported that 42 sets of #6 tie bars were missing in Auxiliary Building
3/22/76	CP reported that 32 #8 rebar were omitted in Auxiliary Building. A stop-work order was issued by CP
3/26/76	RIII inspector requested CP to inform RIII when stop-work order to be lifted and to investigate the cause and the extent of the problem. Additional rebar problems identified during site inspection
3/31/76	CP lifted the stop-work order
4/19 thru 5/14/76	RIII performed in-depth QA inspection at Midland
5/14/76	RIII management discussed inspection findings with site personnel
5/20/76	RIII management meeting with CP President, Vice President, and others.
6/7 & 8/76	RIII follow up meeting with CP management and discussed the CP 21 correction commitments
6/1-7/1/76	Overall rebar omission reviewed by R. E. Shewmaker
7/28/76	CP stops concrete placement work when further rebar placement errors found by their overview program. PN-III-76-52 issued by RIII
8/2/76	RIII recommends HQ notice of violation be issued
8/9 - 9/9/76	Five week full-time RIII inspection conducted
8/13/76	Notice issued
10/29/76	CP responded to HQ Notice of Violations
12/10/76	CP revised Midland QA program accepted by NRR
2/28/77	Unit 2 bulge of coutainment liner discovered
4/19/77	Tendon sheath omissions of Unit 1 reported
4/29/77	IAL issued relative to tendon sheath placement errors
5/5/77	Management meeting at CP Corporate Office relative to IAL regarding tendon sheath problem

5/24-27/77	Special inspection by RIII, RI and HQ personnel to determine adequacy of QA program implementation at Midland site
6/75 - 7/77	Series of meetings and letters between CP and NRR on applicability of Regulatory Guides to Midland. Commitments by CP to the guides was responsive
7/24/78	Construction resident inspection assigned
8/21/78	Measurements by Bechtel indicate excessive settlement of Diesel Generator Building. Officially reported to NRC RIII on September 7, 1978 Date 30 55 c
12/78 - 1/79	Special investigation/inspection conducted at Midland sites Bechtel Ann Arbor Engineering offices and at CP corporate offices relative to Midland plant fill and Diesel Generator building settlement problem
2/7/79	Corporate meeting between RIII and CPC to discuss project status and future inspection activities. CPC informed construction performance on track with exception of diesel filling.
5/8-11/79	Mid-QA inspection conducted.
5/5/79	Congressman Albosta and aids visited Midland site to discuss TMI effect on Midland.
3/21/79	10 CFR 50.54 request for information regarding plant fill sent to CPC by NRR.
2/23/79	Meeting held in RIII with Consumers Power to discuss diesel generator building and plant area fill problems.
3/5/79	Meeting held with CPC to discuss diesel generator building and plant area fill problems.

Significant Major Events

Past Problems

1. Cadweld Splicing Problem and Show Cause Order

A routine inspection, conducted on November 6-8, 1973, as a result of intervenor information, identified eleven examples of four noncompliance items relative to rebar Cadwelding operations. These items were summarized as: (1) untrained Cadweld inspectors; (2) rejectable Cadwelds accepted by QC inspectors; (3) records inadequate to establish cadwelds met requirements; and (4) inadequate procedures.

As a result, the licensee stopped work on cadweld operations on November 9, 1973 which in turn stopped rebar installation and concrete placement. The licensee agreed not to resume work until the NRC reviewed and accepted their corrective action. However, Show Cause Order was issued on December 3, 1973, suspending Cadwelding operations. On December 6-7, 1973 RIII and HQ personnel conducted a special inspection and determined that construction activity could be resumed in a manner consistent with quality criteria. The show cause order was modified on December 17, 1973, allowing resumption of Cadwelding operations based on the inspection results.

The licensee answered the Show Cause Order on December 29, 1973, committing to revise and improve the QA manuals and procedures and make QA/QC personnel changes.

Prehearing conferences were held on March 28 and May 30, 1974, and the hearing began on July 16, 1974. On September 25, 1974, the Hearing Board found that the licensee was implementing its QA program in compliance with regulations and that construction should not be stopped.

2. Rebar Omission/Placements Errors Leading to IAL

Initial identification and report of rebar nonconformances occurred during an NRC inspection conducted on December 11-13, 1974. The licensee informed the inspector that an audit, had identified rebar spacing problems at elevations 642' - 7" to 652' - 9" of Unit 2 containment. This item was subsequently reported per 10 CFR 50.55(e) and was identified as a item of noncompliance in report Nos. 50-329/74-11 and 50-330/74-11.

Additional rebar deviations and omissions were identified in March and August 1975 and in April, May and June 1976. Inspection report Nos. 50-329/76-04 and 50-330/76-04 identified five noncompliance items regarding reinforcement steel deficiencies.

Licensee response dated June 18, 1976, listed 21 separate items (commitments) for corrective action. A June 24, 1976 letter provided a plan of action schedule for implementing the 21 items. The licensee committed not to resume concrete placement work until the items addressed in licensee's June 24 letter were resolved or implemented. This commitment was documented in a RIII letter to the licensee dated June 25, 1976. Although not stamped as an IAL, in-house memos referred to it as such.

Rebar installation and concrete placement activities were satisfactorily resumed in early July 1976, following completion of the items and verification by RIII.

Additional action taken is as follows:

a. By the NRC

(1) Assignment of an inspector full-time on site for five weeks to observe civil work in progress

(2) IE management meetings with the licensee at their corporate offices

(3) Inspection and evaluation by Headquarter personnel

b. By the Licensee

(1) June 18, 1976 letter committing to 21 items of corrective action

(2) Establishment of an overview inspection program to provide 100% reinspection of embedments by the licensee following acceptance by the contractor QC personnel

c. By the Contractor

(1) Personnel changes and retraining of personnel

(2) Prepared technical evaluation for acceptability of each identified construction deficiency

(3) Improvement in their QA/QC program coverage of civil work (this was imposed by the licensee)

3. Tendon Sheath Placement Errors and Resulting Immediate Action Letter (IAL)

On April 19, 1977, the licensee reported, as a Part 50, Section 50.55(e) item, the inadvertent omission of two hoop tendon sheaths from a Unit 1 containment concrete placement at

elevation 703' - 7". The tendon sheaths were, for the most part, located at an elevation in the next higher concrete placement lift, except that they were diverted to the lower placement lift to pass under a steam line penetration. Failure to rely on the proper source documents by construction and inspection personnel, contributed to the omission.

An IAL was issued to the licensee on April 29, 1977, which spelled out six licensee commitments for correction which included: (1) repairs and cause corrective action; (2) expansion of the licensee's QC over view program; (3) revisions to procedures and training of construction and inspection personnel.

A special QA program inspection was conducted in early May 1977. The inspection team was made up of personnel from RI, RIII, and HQ. Although five items of noncompliance were identified, it was the concensus of the inspectors that the licensee's program was an acceptable program, ~~and that the Midland construction activities were comparable to most other construction projects.~~

The licensee issued its final report on August 12, 1977. Final review on site was conducted and documented in report No. 50-329/77-08.

Current Problems

1. ~~Plant Fill~~ Diesel Generator Building Settlement

The licensee informed the RIII office on September 8, 1978, of per requirements of 10 CFR 50.55(e) that settlement of the diesel generator foundations and structures were greater than expected.

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

Cause of the excessive settlement include: (1) inadequate placement method - unqualified compaction equipment and excessive left thickness; (2) inadequate testing of the soil material; (3) inadequate QCinspection procedures; (4) unqualified quality control inspectors and field engineering; (5) reliance

The proposed remedial work and corrective action are as follows:

(1) Diesel Generator Building - apply surcharge load in and around building to preconsolidate the foundation material. Continue monitor soil response to predict long-term settlement.

(2) Service Water Pump Structure - Install piles to hard glacial till to support that portion of the structure founded on plant fill material.

(3) Tank Farm # Sill has been determined to be suitable for the support of Borated Water Storage Tanks. Tanks are to be constructed and hydro tested while monitoring soil response to confirm support of structures.

(4) Diesel Oil Tanks - No remedial measure; backfill is considered adequate.

(5) Underground Facilities - No remedial work is anticipated with regards to buried piping.

(6) Auxiliary Building and F. W. Isolation Valve Pits - Installed a number of caissons to glacial till material and replace soil material with concrete material under valve pits.

(7) Dewatering System - Installed site dewatering system to provide assurance against soil liquid action during a seismic event.

The above ~~proposed~~ remedial measures were proposed to the NRC staff on July 18, 1979. No endorsement of the proposed actions have been issued to the licensee to date. Licensee is proceeding with the above plans.

The NRC activities, to date, include:

Technical and Region review was transferred

a. ~~Transfer of~~ lead responsibility to NRR from IE by memo dated November 17, 1978.

b. Site meeting on December 3-4, 1978, between NRR, IE, Consumers Power and Bechtel to discuss the plant fill problem and proposed corrective action relative to the Diesel Generator Building settlement.

d. RIII conducted an investigation/inspection relative to the plant fill and Diesel Generator Building settlement. Finding are contained in Report 50-329/78-20; 330-78-20 dated March 1979.

e. NRC/Consumers Power Co/Bechtel meetings held in RIII office to discuss finding of investigation/inspection of site settlement (February 23, 1979 and March 5, 1979)

f. NRC issue of 10 CFR 50.54(f) regarding plant fill dated March 21, 1979.

g. Several inspections of Midland site settlement have been performed.

The Constructor/Designer activities include:

a. Issued NCR-1482 (August 21, 1978)

b. Issued Management Corrective Action Report (MCAR) No. 24 (September 7, 1978)

c. Prepared a proposed corrective action option regarding placement of sand overburden surcharge to accelerate and achieve proper compaction of diesel generator building sub soils.

d. Issued 10 CFR 50.55(e) interim report number 1 dated September 29, 1978.

e. Issued interim report No. 2 dated November 7, 1978.

f. Issued interim report No. 3 dated June 5, 1979

g. Issued interim report No. 4 dated February 23, 1979

h. Issued interim report No. 5 dated April 30, 1979

i. Response to NRC 10 CFR 50.54(f) request for information onsitE settlement dated April 24, 1979. Subsequent XXXXXXXXX revision 1 dated May 31, 1979, revision 2 dated July 9, 1979 and revision 3 dated September 13, 1979.

j. Meeting with NRC to discuss site settlement causes and proposed resolution and corrective action taken dated July 18, 1979. Information discussed at this meeting is documented in letter from CPCo to NRC dated August 10, 1979.

k. Issued interim report No. 6 dated August 10, 1979.

l. Issued interim report No. 7 dated September 5, 1979.

2. Review of Quality Documentation to Establish Acceptability of Equipment

The adequacy of engineering evaluation of quality documentation (test reports, etc.) to determine if the documentation establishes that the equipment meets specification and environmental requirements is of concern. The licensee, on November 13, 1978, issued a construction deficiency report (10 CFR 50.55(e)) relative to this matter. An interim report dated November 28, 1978 was received and stated Consumers Power was pursuing this matter not only for Bechtel procured equipment but also for NSS supplied equipment.

3. Source Inspection to Confirm Conformance to Specifications

The adequacy of equipment acceptance inspection by Bechtel shop inspectors has been the subject of several CDN's relative to this matter. Examples of this problem include: (1) Decay Heat Removal Pumps released by the shop inspector and shipped to the site with one pump assembled backwards, (2) electrical penetrations inspected and released by the shop inspector for shipment to the site. Site inspections to date indicate about 25% of the vendor wire terminations were improperly crimped.

Additional inspections will be conducted to determine if CP has thoroughly completed an overview of the Bechtel shop inspectors function.

4. "Q" ~~Test~~ List Equipment

There have been instances wherein safety construction equipment installation activities have not been identified on the "Q" list. This shortcoming could affect the quality of work performed due to the absence of quality controls identified with "Q" list items. Examples of non-"Q" list activities identified which should be "Q" listed include:

Cable Trays

Heating and Ventilation Equipment

~~Spent Fuel Pool Racks~~

The licensee will be advised to review past as well as future construction activities to confirm that they were properly defined as "Q" list work or components.

5. Lessons Learned Items

No determination has yet been made by the region to confirm that CP has incorporated the necessary modifications or corrections resulting from the construction experiences of Davis-Besse or the operating experiences of TMI.

6. Management Controls

a. While subjective, the reaction of Consumers Power Company to inspection findings has been one of challenge and resistence in acknowledging the existence of a problem. This has in part effected the timely disposition of matters brought to the attention

of CP. Some examples of problems in which this reaction has been observed are as follows:

b. There have been many cases wherein nonconformances have been identified, reviewed and accepted "as is." The extent of review given by the licensee prior to resolving problems is currently in progress. In one case dealing with the repair of airlock doors a determination was made that an incomplete engineering review was given the matter.

Inspection History

The construction inspection program for Midland Units 1 and 2 is approximately 60% complete. This is consistent with status of construction of the two units. (Unit 1 - 54%; Unit 2 - 61%).

The routine inspection program has not identified an unusual number of enforcement items. Of the selected major events described above, only one is idrectly attributable to RIII inspection activity (Cadweld splicing). The others were identified by the licensee and reported through the deficiency report system (50.55(e)). The Midland date for 1976 - 1979 is tabulated as follows.

Year	Noncompliances	Inspections	On Site
1976	14	9	646
1977	5	12	648
1978	~~12~~ 18	~~18~~ 23	~~706~~ 1180
* 1979 to date	7	18	429

A resident inspector was assigned to the Midland site in July 1978. The on site inspection hours shown above does not include his inspection time.

The licensee's QA program has repeatedly been subject to in-depth review by IE inspectors. Included are:

1. July 23-26 and August 8-10, 1973, inspection report Nos. 50-329/73-06 and 50-330/73-06: A detailed review was conducted relative to the implementation of the Consumers Power Company's QA manual and Bechtel Corporation's QA program for design activities at the Bechtel Ann Arbor office. The identified concerns were reported as discrepancies relative to the Part 50, Appendix B, criteria requirements.

* This inspection report 79-18

2. September 10-11, 1973, report Nos. 50-329/73-08 and 50-330/73-08: A detailed review of the Bechtel Power Corporation QA program for Midland was performed. Noncompliances involving three separate Appendix B criteria with five different examples, were identified.

3. February 6-7, 1974, reports No. 50-329/74-03 and 50-330/74-03: A followup inspection at the licensee's corporate office, relative to the items identified during the September 1973 inspection (above) along with other followup.

4. June 16-17, 1975, report Nos. 50-329/75-05 and 50-330/75-05: Special inspection conducted at the licensee's corporate office to review the new corporate QA program manual.

5. August 9 through September 9, 1976, report Nos. 50-329/76-08 and 50-330/76-08: Special five-week inspection regarding QA program implementation on site primarily for rebar installation and other civil engineering work.

6. May 24-27, 1977, report Nos. 50-330/77-05 and 50-330/77-08: Special inspection conducted at the site by RIII, IE and RI personnel to examine the QA program implementation onsite by Consumers Power Company and by Bechtel Corporation. Although give examples of noncompliance to Appendix B, Criterion V, were identified, the consensus of the inspectors involved was that the program and its implementation for Midland was considered to be adequate.

7. May 8-11, 1979; a mid-construction QA inspection covering purchase control and inspection of received materials design control and site auditing and surveillance activities was conducted by a team of inspectors. While the items will require resolution, no degradation of the program was concluded from this inspection.

The licensee's Quality Assurance program has under gone a number of revisions ~~x~~ to strengthen ~~XXXXXX~~ it's provisions. Implementation ~~of the program has been and continues to be subject to further review. The mid-construction program review conducted on May 8-11, 1979 did not identify any significant problems of concern. Other inspections however, have identified items of non-compliance which will require resolution by the licensee.~~ A general observation of the inspection staff has been the lack of timeliness of correcting problems.

Consumers Power Company expanded their QA/QC auditing and surveillance coverage to provide extensive overview inspection coverage. This

in 1975 wit[illegible] commitment early in their experience with rebar installation problems and was further committed by the licensee in his letter of June 18, 1976, responding to report Nos. 50-329/76-04 and 50-330/76-04. This overview inspection activity by the licensee has been very effective as a supplement to the constructor's own program, however, currently our inspectors perceived the overview activities cover a small percentage of the work in some disciplines. This has been brought to the licensee's attention who has responded with a revised overview plan. RIII inspectors are reviewing the plan as well as determining it's effectiveness through observation of construction work. A specific area brought to the attention of the licensee was the lack of overview in the instrumental installation area. The licensee has responded to this matter and this item is under review by RIII inspectors.

Enforcement History

Approximately 6 months after restart of construction activities (11 months after CP issuance) an inspection identified four noncompliance items regarding cadwelding activities. This resulted in a show cause order being issued on December 3, 1973. This enforcement action was aired publicly during hearings held by the Atomic Safety Licensing Board in May 1974. The hearing board issued it's decision in September 1974

that concluded that construction could proceed with adequate assurance of quality.

Identification of reinforcing bar problems began in December of 1974 with the licensee reporting improper spacing of rebar in the Unit 2 containment wall. Further reinforcing bar spacing and/or omission of rebar was identified in August 1975 and again in May 1976 with the citations of 5 noncompliances in an inspection report. An IE:HQ notice of violation was issued regarding the citations in addition to the licensee issuing a stop work order. The licensee issued a response letter dated June 18, 1976 committing to 21 items of corrective action. A Bechtel prepared technical assessment for each instance of rebar deficiency was submitted to and review by IE:HQ who concluded that the structures involved will satisfy the SAR criteria and that the function of these structures will be maintained during all design conditions. The RIII office of NRC performed a special five week inspection to assess the corrective action implementation without further citation.

The licensee reported that two hoop tendon sheaths were omitted in concrete placements of Unit 2 containment wall in April 1977. An Immediate Action Letter was issued to the licensee on April 29, 1977 listing six items of licensee commitments to be completed. A special inspection was performed on May 24-27, 1977 with four NRC inspectors (1-EQ, 1-RI, and 2-RIII). Although five items of noncompliance were identified, it was the consensus of the inspectors that the QA/QC program in effect was adequate. The constructors nonconformance report provided an alternate method of installation for the tendon sheaths that was accepted.

Followup of the settlement of the diesel generator building revealed significant quality control deficiencies. Inspection of the plant fill related problems indicated controls dealing with problem identification problem correction procedures implementation and training were not in place and contributed significantly to this plant condition.

The RIII office of inspection and enforcement instituted an augmented onsite inspection coverage program during 1974, this program has continued in effect until the installation of the resident inspector in August 1978. The noncompliance history with this program is essentially the same as the history of other RIII facilities with a comparable status of construction.

The noncompliance history for the Midland Project is provided in the following table.

ENFORCEMENT ACTIONS

Noncompliances

Year	# Total	Criteria (10 CFR 50 Appendix B) ( ) Number of Occurrences
1970	4	V, X, XI, XVI
1971-1972	0	Construction haulted pending CP
1973	9	II, V(5), XIII, XV, XVII
1974	3	V(2), XVI
1975	0	
1976	10	V(4), X, XII, XV, XVI, XVII, XVIII
1977	5	V(5), 10 CFR 50.55(e) item
1978	18	III (2), V(7), VI, VII, VIII, IX(3), X, XVI(2)
1979 to date	7	III, V(2), VII, VIII, IX, XVI

Criteria

II	QA Program
III	Design Control
V	Instrumentation Procedures Drawing Control Work
VI	Document Control
VII	Control of Purchased Material
VIII	Identification and Control of Materials, Parts and Components
IX	Control of Special Processes
X	Inspection
XII	Control Measuring - Test Equipment
XIII	Handling - Storage

Criteria (continued)

XV	Nonconforming Parts
XVI	Corrective Actions
XVII	QA Records
XVIII	Audits

Summary and Conclusions

Since the start of construction Midland has experienced some significant problems resulting in enforcement action. ~~In evaluating these problems they have occurred in clumps:~~ (1) in September 1970 relative to improper placement, sampling and testing of concrete and failure of QA/QC to act on identified deficiencies; (2) in September 1973 relative to drawing control and lack of or inadequate procedures for control of design and procurement activities at the Bechtel Engineering offices; (3) in November 1973 relative to inadequate training, procedures and inspection of cadweld activities; (4) in April, May and June 1976 resulting from a series of RIII in-depth QA inspections and meetings to identify underlying causes of weakness in the Midland QA program implementation relative to embedments. (The noncompliance items identified involved inadequate quality inspection, corrective action, procedures and documentation, all primarily concerned with installation of reinforcement steel); (5) in April 1977 relative to tendon sheath omissions; and (6) in August 1978 concerning plant soil foundations and excessive settlement of the Diesel Generator Building.

Following each of these problem periods (~~excluding the last which is still under investigation~~), the licensee has ~~been responsive and has~~ taken ~~extensive~~ action to ~~evaluate and~~ correct the problem and to upgrade his QA program and QA/QC staff. The most ~~effective~~ of these licensee actions has been an overview program which has been steadily expanded to cover ~~almost all~~ safety related activities.

The evaluation both by the licensee and IE of the structures and equipment affected by these problems (again except the last) has ~~established~~ that they fully meet design requirements.

Looking at the underlying causes of these problems two common threads emerge: (1) ~~Consumers Power~~ historically has tended to over rely on ~~Bechtel,~~ and (2) insensitivity on the part of both Bechtel and Consumers Power to recognize the significance of isolated events or failure to adequately evaluate possible generic application of these events either of which would have led to early identification and avoidance of the problem~~, including the last on plant fill and diesel generator building settlement~~.

Notwithstanding the above, it is our conclusion that the problems experienced are not indicative of a broadbreakdown in the overall quality assurance program. Admittedly, deficiencies have occurred which should have been identified earlier by quality control personnel, but the licensee's program has been effective in the ultimate identification and subsequent correction of these deficiencies. While we cannot dismiss the possibility that problems may have gone undetected by the licensee's overall quality assurance program, our inspection program has not identified significant problems overlooked by the licensee — and this inspection effort has utilized many different inspectors.

identified in this report

The RIIL ~~project~~ inspectors believe that continuation of: (1) resident site coverage, (2) the licensee overview program including its recent expansion into engineering design/review activities, and (3) a continuing inspection program by regional inspectors will provide adequate assurance that construction will be performed in accordance with requirements and that any significant errors and deficiencies will be identified and corrected.

~~Based on discussions with the inspection staff it is felt that only minimal enforcement actions resulted since adequate action at this time.~~

Pre surveillance insp by CPC - called pre-review insp.

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SECOND CORPORATE MEETING

MIDLAND 1/11/80

OPERATIONS

Introductory Comments
Objectives of Inspection Program
Typical Inspection Areas

Licensee Presentation

Pre-operational Program, Staffing, Training

Construction

Introductory Comments
Hardware Concerns
Management Control
Summary and Conclusions

Closing Remarks - NRC

Closing Remarks - CPCO

NAME	ORG	TITLE
SH Howell	CPCo	Sr VP - Nuc
BW Marguglio	"	Dir, QA-Nuc
GS Keeley	"	Project Mgr.
JJ Zabritski	CPCo	Project Licensing En
DB Miller	CPCo	Site Mgr.
RW Montross	CPCo	General Mgr, Midlan
RB DeWitt	CPCo	V P. Nuclear Op.
FW Buckman	CPCo	Dir. Nuclear Activit
RB Cherba	CPCo	Dir Quality Assurance
G B Slade	CPCo	Oper Mo Maint Supt
T. E. Vandel	US NRC RIII	Assigned Project I
R.J. Cook	USNRC RIII	Resident Inspecto
G. Fiorelli	USNRC RIII	Br. Ch. Const.
E R. Swanson	USNRC RIII	Reactor Inspector
J.F. Streeter	USNRC RIII	Chief, Nuclear Support Sectio
R.F. Heishman	USNRC RIII	Opn Br. Chf.
R C Knop	USNRC RIII	Const. Section chief
J.G. Keppler	USNRC RIII	Regional Director
DH Hood	USNRC DPM	Nuc. Proj. Mgr.

207 1/11/82
Jackson

(2)

Overview

Acknowledge have test program

Overview (hopefully) insures plant built to last plant life.

~~Some~~ Your overviews have found some concrete findings - some have not
1) I&C
2) Electrical
3) Documents.

~~[illegible]~~ Const. activities increasing - kinds of activities (internal assembly, large pump assembly, hangers, etc.)

Your overview may be adequate - NRC puts lot of credance in your overview program.

If have lot of concrete findings increase
If have some - may be adequate
If no finding - your looking in wrong area or something not good with program.

Weld spread rom/ heat separation

H/F Acknowledge have a change in overview procedure where can get piece-meal into system - good

1/11/80
Jackson

Surveillance seems to yield good results towards insure that plant lasts 40yrs. - at least to identify not good const. practices.

Can identify in Process deficiency

NRC feels these in process deficiency should receive management attention & subsequent actions

(Hydro - 2T-87) (3Φ hose)
(Hold Tag Violations) (Decay Pumps)

NCR's

CPCo Identifies goes to Bechtel -
Memo states CPCo given credit.

NRC Concern that CPC doing Bechtel QC work without the "statistics" accurately identifying management deficiency

Use-as-is NCR's

Some NRC has reviewed and use-as-is justified but not on NCR

(Decay heat temp)
(3Φ hose)
(electrical)
(welds in spreadroom)

Caution against using use as is justification based on warantee — base on 40 yr dependable life.

1/11/80
Jackson

(3)

Trends

Subcontracts not really getting into trends

Addressed at mid QA on weld -

1/11/00
Jackson

Inspectors have expressed - "symptomatic" concerns to at least one site management member.

Resolve NCR's - not by warantee backing
decay ht. pump
Rx Coolant Pump.

Definition of Construction Civil Penalty

1) If item/system/system component gets completely installed wrong/unsafely/poorly (subj) in violation or without sound eng. review without any of the many layers of QC/QA "catching" the defect – then civil penalty – no questions asked.

2) If licensee does not appear receptive to NRC explicitly explaining regulatory requirements then auto-civil ~~penalty~~ penalty

Philosophy to utility

If won't pay to do it right – then pay piper plus pay to do it right.

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

FEB 12 1982

PRINCIPAL STAFF			
DIR		[illegible]	
D/D		[illegible]AD	
A/D		[illegible]LD	
ER&PI			
DE&TI			
DSP&QS		File	VLC

Docket Nos.: 50-329/330 OM,OL

LANDSMAN

Mr. J. W. Cook
Vice President
Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

Dear Mr. Cook:

Subject: Staff Concurrence for Activation of Freezewall

My letter of November 24, 1981 expressed NRC Staff concurrence for installation of freezewall hardware in preparation for the underpinning planned for the Midland Auxiliary Building and Feedwater Isolation Valve Pits. However, that letter noted that Staff concurrence did not include activation since the effects of operation of the freezewall involved submittal of additional information.

Your letter of January 6, 1982 described the measures planned for the protection of underground utilities and structures due to the effects of ground heave and resettlement, and the associated monitoring program. Other information was provided in your letters of November 16 and November 24, 1981 and in the hearing testimony of your consultant, J. P. Gould. This information was discussed with the NRC Staff during a meeting on January 20, 1982 and during the underpinning design audit of February 3-5, 1982.

Your letter of January 6, 1981 proposes to eliminate the inducement of any stresses to the conduits and piping because of heaving by excavating the soil directly beneath affected utilities within the projected area of influence of the freezewall before ground freezing begins. The NRC Staff agrees that this proposed solution would eliminate the effect of ground heaving on involved utilities and is acceptable.

The Staff review has also identified that it may be several months, once the thawing begins before recompression of soils is completed and long term foundation support for the piping is assured. Because of this concern, you have committed to demonstrate to the NRC Staff's satisfaction that recompression of the foundation soils beneath the piping has been completed before backfilling the excavation.

Our concurrence is contingent upon the successful audit by the NRC Regional Office of the implementation procedures for excavation and monitoring. We are advised that Region III plans this audit in the near future and prior to activation of the freezewall.

FEB 18 1982

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III

Staff concurrence is further discussed in the testimony of Mr. Joseph Kane regarding the effects of foundation support for seismic Category I underground piping. This testimony will be discussed during the OM, OL hearing session scheduled to begin February 16, 1982.

On the basis of the information provided and your commitment to monitor for an acceptable period for recompression effects, and subject to the above audit, the Staff concurs with your plans to activate the freezewall.

Sincerely,

Robert L. Tedesco, Assistant Director
for Licensing
Division of Licensing

cc: See next page

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UNITED STATES
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WASHINGTON, D. C. 20555

FEB 5 1982

PRINCIPAL			
DIR			
D/D			
A/D			
DR&TI			
DE&TI			
DEP&OS		File	

Docket Nos.: 50-329
and 50-330 OM, OL

APPLICANT: Consumers Power Company

FACILITY: Midland Plant, Units 1 and 2

SUBJECT: SUMMARY OF OCTOBER 1, 1981 MEETING ON REMEDIAL MEASURES FOR THE MIDLAND AUXILIARY BUILDING

On October 1, 1981 the NRC staff met in Bethesda, Maryland with Consumers Power Company, Lechtel, and consultants, to discuss the design and construction aspects of the underpinning planned beneath the Auxiliary Building at Midland Plant, Units 1 and 2. Because the underpinning scheme presented was a significant change from the previously proposed remedial measure, a briefing was also provided to NRC management. Enclosure 1 is a summary of the meeting and includes a compilation of the handouts and visual aids used in the course of the meeting.

Darl S. Hood, Project Manager
Licensing Branch No. 4
Division of Licensing

Enclosure:
As stated

cc: See next page

8203040338

FEB 18 1982

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To File

From GSKeeley, P-14-113B

Date October 27, 1981

CONSUMERS POWER COMPANY

Subject MIDLAND PROJECT
DISCUSSION WITH STAFF ON -
REMEDIAL FIXES FOR AUXILIARY BUILDING -
ON OCTOBER 1, 1981
FILE 0485.16 SERIAL 14705

Internal Correspondence

CC JWCook, P-26-336B w/o att
WRBird, P-14-418A w/att
JBrunner, M-1079 w/att
ABoos, Bechtel 4 copies w/att
DMBudzik/TJSullivan, P-24-624A w/att
DBMiller, Midland w/att
RSevo, Midland w/o att
TRThiruvengadam, P-14-400 3 att
RZamarin, IL&B w/o att
RHuston, copies w/att

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1. Introduction -

A. Purpose - To explain the design and construction aspects of the underpinning scheme for the Auxiliary Building including methods to be used to assure minimal effects on structures in place. The proposed schedule for preparatory work and starting of underpinning will also be discussed.

Also make staff aware of the interfacing of the various groups involved in performing the work.

We will have a technical report which we will pass out at end of meeting which will be in format requested by SRP and we will be verbally presenting today what's in the report to enable staff to ask question. (Technical Report and drawings transmitted by JWC to Denton letter dated September 30, 1981.)

We will be talking about the design aspects, dewatering, underpinning methods, instrumentation and geo tech aspects of the work. After this, we will also discuss the QA to be applied on the job which will be under the CP Co and Bechtel QA programs. We will present a list of activities which will come under the QA program and a matrix of who is responsible for the various activities under design, procurement and construction slides used are not in tech report but will be passed out.

B. Parties Involved -

CP Co - Setting policy, licensing, review

Bechtel - design of structures

Mueser - Rutledge - advisor on construction methods including instrumentation, review of tech spec, and geo tech advice during design and construction.

Mergentime - Construction

2. Design and Construction Schedule (See attachment)

44 Permanent Wells - Complete before underpinning starts January 1, 1982. Can't develop wells during underpinning since have to dewater. Can be used to support underpinning.

3. (a) Presented and explained slides. Mentioned that prestressed tendons for temporary support of wing walls during dewatering and FW Valve Pit is being supported by beams. Will analyze structure to account for underpinning activities at critical points during construction. New structure analyzed for 50% additional seismic load. Will monitor cracks in area effected by jacking and construction.

(b) Gould discussed their experience including that in Washington area. Freeze wall practically eliminates problem of water in pits to improve working conditions and therefore gets rid of fines removal during work activities.

Use rotary drill for casing installation. Use brine for cooling. Ethelyne Glycol has been used. Freeze wall layout may not be exactly as shown along admin building side.

(c) Gould discussed construction details as provided in technical report.

(d) Gould discussed instrumentation. Closing loop of relative measurements has temperature correction to it.

On jacking, acceptance criterion are 0.01"/1 hr to reach 90 day settlement point. This is monitored on a continuous basis. Carlson stress meters show load gain or decrease, but have at least a day to arrest movement.

Monitoring - discussed what's in tech write up.

(e) Jim Gould - Discussed sample pictures of borings taken by WCC and that it is very uniform fill (COE 17 & 18) and some samples. Feels it's a black and white case of knowing you're in good fill and it's a common sense decision. It's not a sensitive material to being disturbed. Application of load by jacking will be basic proof test. Consolidation tests for fill shows 30-80 kips/ft^2. Feels 80 is more applicable. 6 - 7 UU kips/ft^2 (shear strength). Feels its insensitive plastic material. Not as firm as at SWPS but are using low bearing pressure. To monitor - penetrometer is only a device to help make a judgement evaluation. Will also use torvane device.

Is pleased that site is being ringed to prevent water from going to fill. Load of 6.8 and 8.8 kips/ft^2 for elec pen and control tower. 5 to 8 factor of safety and 4 to 4.5 on elec pen and control tower. They estimate settlement values of 0.6" with 0.4" on jacking to 0.9" with 0.6" jacking so 0.2" and 0.3" for penetration area and control tower.

Showed estimate of Aux Bldg settlement versus time. Most settlement in 10 days (0.5) with concrete shrinkage from 10 to 90 days of (0.1). T/G Building piers more heavily loaded and estimate 1" settlement.

Landsman wanted data that was taken every 8 hours to be reviewed instead of waiting until 24 hours. Told him we'd evaluate.

(f) Bob Sevo presented QA program. (See attachments) QA will be obtaining a person with underpinning experience.

BQAM controls procurement, design and construction. CP Co Topical controls MPQAD QA Activities.

EDPI has to show input from on-site geo tech to Eng and then to AA geo tech. Gilray - wants to make sure that administrative procedures show control of review by geo tech Bechtel engineering review of what consultants do.

After this meeting with the staff, Hood asked that Keeley and Chuck Gould discuss with NRC management the high points of the previous presentation to the staff and include the schedule of when we propose the various activities would commence. This presentation was made to Hood, Adensam, Tedesco, Heller, Lehr, Kane, Singh and Schauer.

Attendees
1/11/81

Name	Organization
Paul Hirad	LB#4 / NRR
Lyman Heller	NRC - HGEB (Pipeline Standards)
JOHN GRUNDSTROM	CORPS OF ENGINEERS, DETROIT
Joseph Kane	NRC, HGEB, GES
Hari N. Singh	U.S. Army Engineers Division (NCD) Chicago
ROSS B. LANDSMAN	NRC - RIII - IE
Wm D PATON	NRC - Midland Counsel
Edmund Burke	Mueser, Rutledge, Johnston & DeSimone
ROBERT SEVO	CPCO - MIQAD
MALAY DASGUPTA	BECHTEL - ANN ARBOR
FREDERICK WILLIAMS	ISHAM, LINCOLN + BEALE, WASHINGTON
Alan Farnell	Isham, Lincoln + Beale, Chicago
Don Eccleston	Hanson Engineers, Springfield, Ill
CHARLES GOULD	MORGENTINE WAR, FLEMINGTON NJ
AL BOOS	BECHTEL - ANN ARBOR
T.E. JOHNSON	" " "
G.S. Keeley	Consumers Power Co.
Kabir Razban	"
Bimal Dhar	Bechtel
FRANK RINALDI	NRC / SEB
THIRU THIRUVENGADAM	CONSUMERS POWER
Ann Hodgdon	OELD, NRC
JOHN P MATRA VA	NRC - CONSULTANT
W. Hazen	RAB / NRR
J. Kilroy	QAB / NRR

AUX BLDG REMEDIAL ACTIVITIES

1. Introduction
   - A) Purpose of meeting
   - B) Parties envolved in Remedial Activities
2. Design and Construction Schedule
3. Presentation of Technical Report
   - A) Structural considerations (Post tensioning and Temporary Supports)
   - B) Dewatering (effects to date on structure)
   - C) U/P Method
   - D) Instrumentation
   - E) Geo Technical Discussion
   - F) Quality Program
4. General Discussion

September 29, 1981

SCHEDULE FOR AUX BUILDING
UNDERPINNING & SUPPORT ACTIVITIES

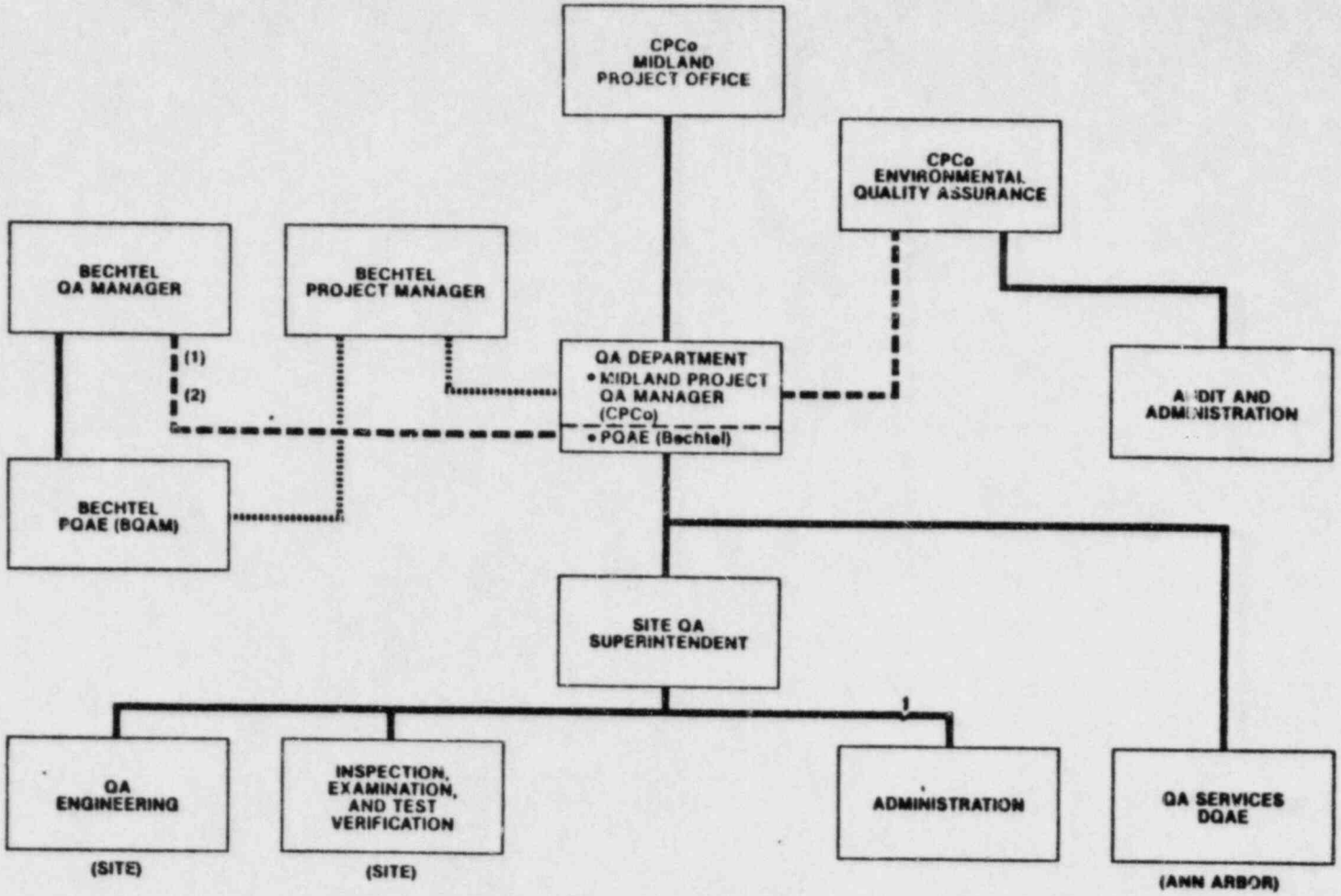
10/15/81	Drill & Develop Additional 44 Permanent Plant Dewatering Wells. (Memo to Denton 9/16/81)
11/ 1/81	Start Recharge Test (2 Months Duration)
11/ 1/81	Start Holes & Installation of Freeze Piping (5 Weeks)
12/ 1/81	Mobilize & Start Installation of Access Ramps or Shafts
12/ 7/81	Start Freezing Ground (3 Weeks)
1/ 1/82	Start Excavation Work, Construct Underpinning, Transfer Load, Etc. (61 Weeks)

September 29, 1981

REMEDIAL SOILS WORK QUALITY PROGRAM

- CPCo QUALITY ASSURANCE PROGRAM MANUAL FOR NUCLEAR POWER PLANTS
  - Volume I - Policies (Topical CPC-1-A)
  - Volume II - Procedures for Design and Construction
- BQ-TOP-1, REVISION 1A
  - Bechtel Nuclear Quality Assurance Manual

MIDLAND PROJECT
QUALITY ASSURANCE ORGANIZATION



LEGEND

TECHNICAL & ADMINISTRATIVE DIRECTION

QUALITY COORDINATION

QUALITY POLICY

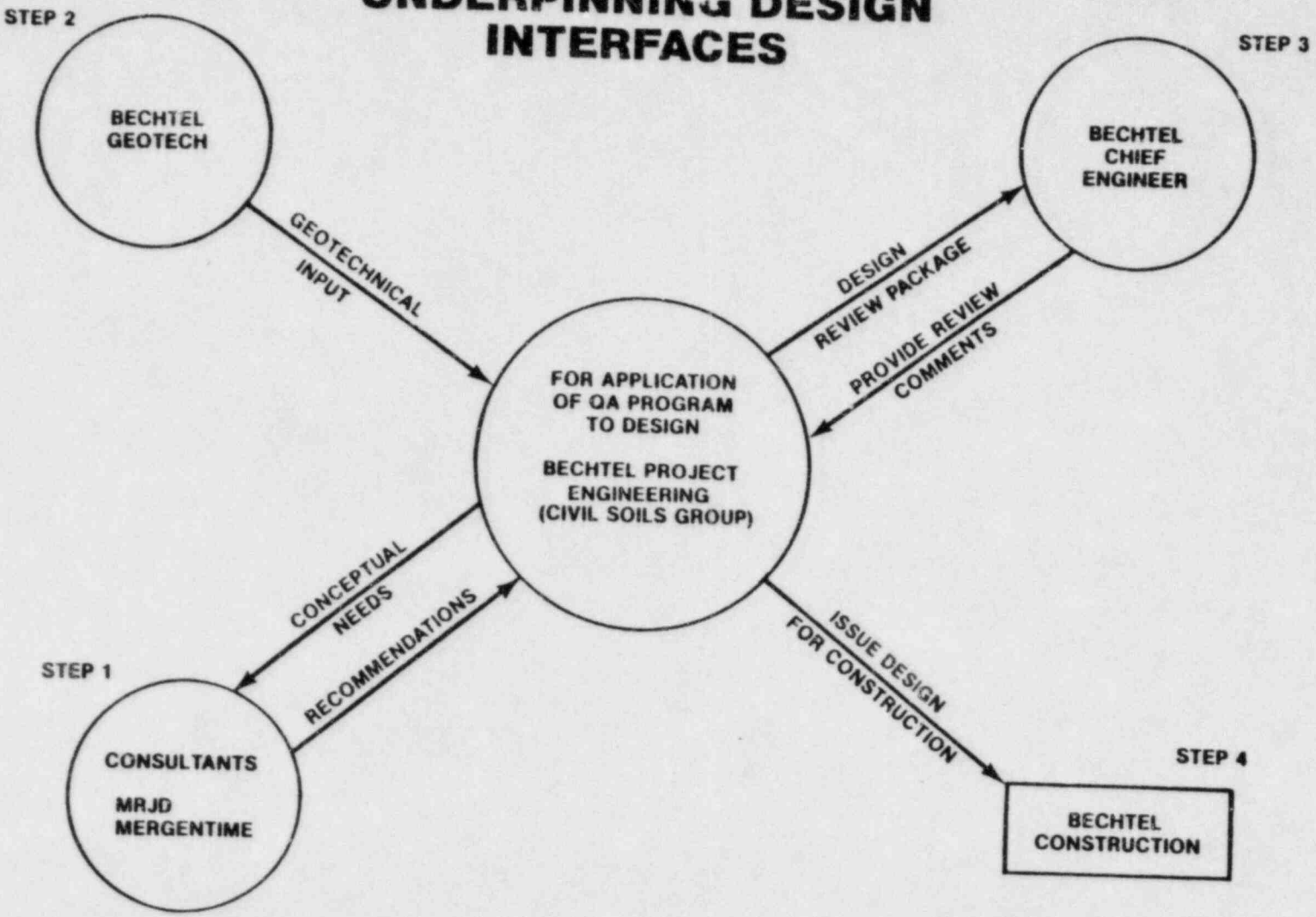
NOTES (1) INCLUDES ADMINISTRATION OF BECHTEL PERSONNEL ON LOAN

(2) INCLUDES TECHNICAL SUPPORT

MIDLAND UNITS 1 AND 2
REMEDIAL SOILS WORK 9-25-81

G 1884 03

UNDERPINNING DESIGN INTERFACES



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4-A

QUALITY RELATED ACTIVITIES

- DESIGN CONTROL
  - Temporary Underpinning Supports and Load Transfer
  - Permanent Underpinning Supports and Load Transfer
- DETECTION OF MOVEMENT OF STRUCTURES AND LOAD MEASUREMENTS
  - Instrument Calibration
  - Procedures
- CONSTRUCTION PRE-DRAINAGE
  - Fines Monitoring
- EXCAVATION
  - Location, Size, Sequence, Protection of Utilities

QUALITY RELATED ACTIVITIES
(cont'd)

- SUBGRADE INSPECTION
- PROCUREMENT (Q list items)
  - Structural Concrete and Grout
  - Rebar/Connectors
  - Miscellaneous Steel
  - Dowels
  - Weld Rod

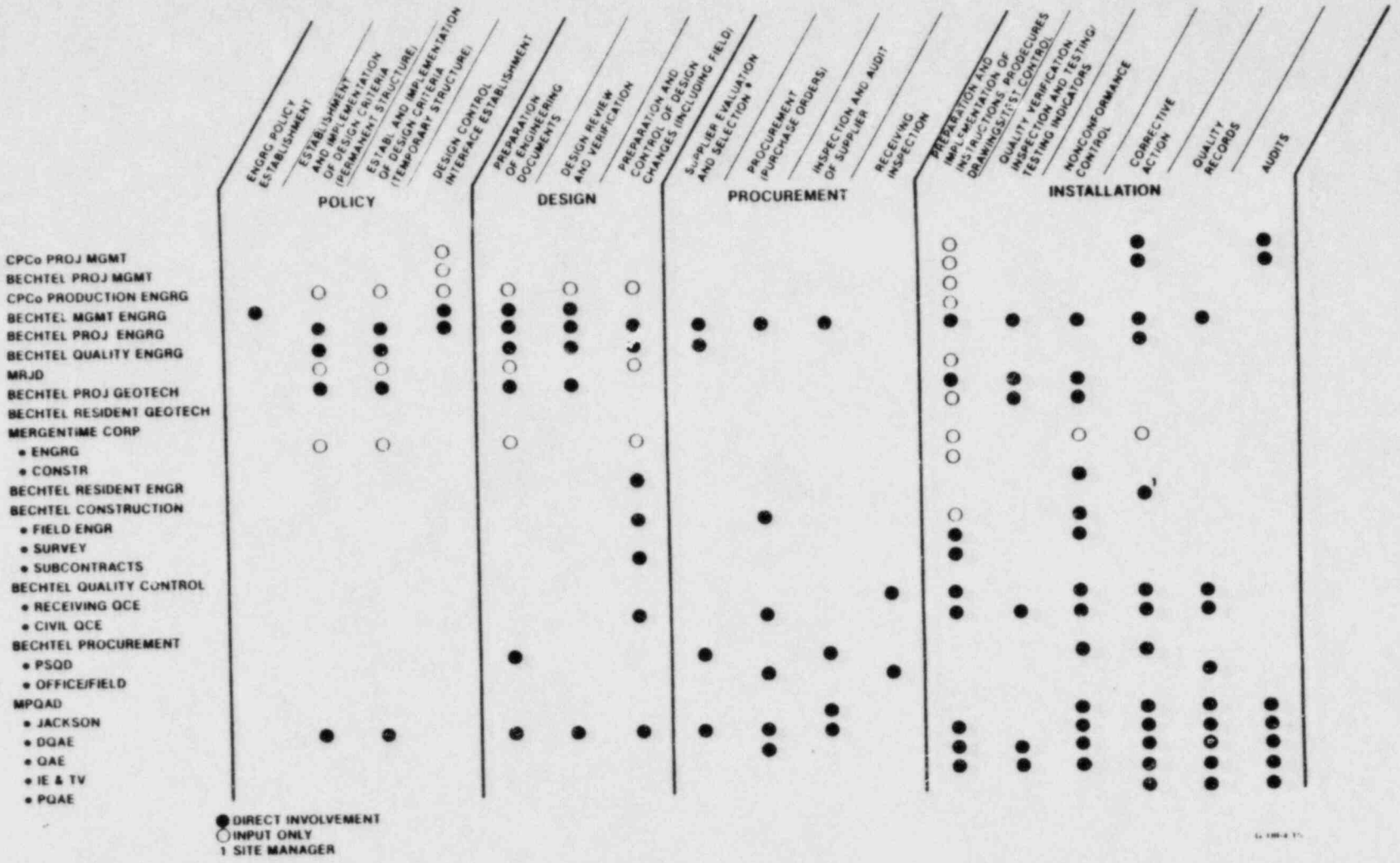
QUALITY RELATED ACTIVITIES
(cont'd)

- INSTALLATION OF TEMPORARY AND PERMANENT UNDERPINNING SUPPORTS
  - Forming (location, size, sequence)
  - Structural Concrete (production, placement)
  - Rebar/Connectors
  - Welding
  - Miscellaneous Steel
  - Joint Preparation
  - Drypack
  - Dowels

QUALITY RELATED ACTIVITIES
(cont'd)

- LOAD TRANSFER
  - Calibration of Jacking System
  - Procedures
- QA INDOCTRINATION

PROJECT FUNCTIONAL MATRIX



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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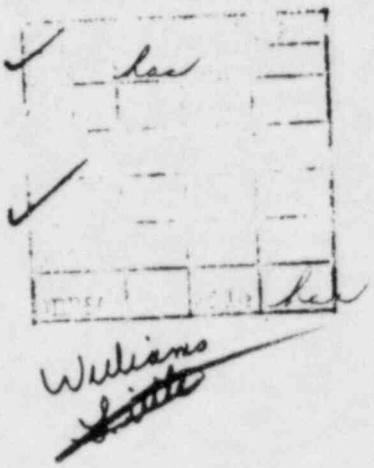
FEB 5 1982



Docket Nos.: 50-329
and 50-330 OM, OL

APPLICANT: Consumers Power Company

FACILITY: Midland Plant, Units 1 and 2

SUBJECT: SUMMARY OF DECEMBER 10, 1981 MEETING ON CRACKS IN MIDLAND BUILDINGS ON PLANT FILL

On December 10, 1981, the NRC staff met in Bethesda, Maryland with Consumers Power Company, Bechtel, and consultants to discuss concrete cracks in the Auxiliary Building, Service Water Pump Structure and Diesel Generator Building at Midland Plant, Units 1 and 2. Enclosure 1 is a summary of the meeting and includes a list of meeting attendees.

Darl S. Hood, Project Manager
Licensing Branch No. 4
Division of Licensing

Enclosure:
As stated

cc: See next page

8202170346

FEB 11 1982

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ATTENDEES

December 10, 1981

Name	Organization
Darl S. Hood	LB#4/ NRR
F. Rinaldi	SEB/NRR
F. Schaver	SEB/NRR
J. Haarstad	NRC/Consultant
Pao Huang	NRC/Consultant
John P. Matra, Jr.	NRC/Consultant
Joseph D. Kane	NRC/DOE/HGEB
H. Kuo	NRC
T. E. Johnson	Bechtel
N. Swanberg	Bechtel
Dennis Budzik	Consumers Power Company
Fernando Villalta	Consumers Power Company
W. Corley	PCA (LPCo Consultant)
M. Sozen	Bechtel (Consultant)

DARL
THESE GOT TIED UP IN THE MAIL
COPIES ARE FOR YOU, JUDY + FRANK
Roger

To File 0485.21

From FVillalta, P-14-421 F.V

Date December 28, 1981

CONSUMERS
POWER
COMPANY

Internal
Correspondence

Subject MIDLAND PROJECT -
MEETING W/NRC STAFF TO DISCUSS EXISTING
CONCRETE CRACKS IN AUX BUILDING, SWPH AND
DG BUILDINGS ON DECEMBER 10, 1981 -
FILE 0485.21 SERIAL 15416

CC JWCook, P-26-336B (w/o) MIMiller, IL&B-Chicago
RCBauman, P-14-314B (w/o) PSteptoe, IL&B-Chicago
JEBrunner, M-1079 TRThiruvengadam, P-14-400
DMBudzik, P-24-517A FWilliams, IL&B-Washington
DBMiller, Midland RWHuston, Washington (4)

1.0 Dr William G Corley - Presentation. Dr Corley showed slides of a water tank structure, 2 feet thick wall resting on a rock till foundation. Concrete was placed on 60 feet long pours resulting in through cracks due to volumetric changes by temperature and shrinkage. Cracks were mapped from 2 to 20 mills (0.002"-0.020") to check water leakage in the tank.

2.0 Dr Mete Sozen - Presentation. Professor Sozen showed slides of an experimental cyclic loading behavior of a reinforced concrete box structure that was observed and reported by Umemura of the University of Tokyo. Lateral load developed flexural and shear cracks in both directions in the walls.

The test results demonstrate that cracks in concrete structures with adequate amount of anchored reinforcement crossing the cracks do not affect the strength of the system.

3.0 Significance of Existing Concrete Cracks:

3.1 Auxiliary Building

Dr Corley stated that the cracks observed in this building are due to volumetric changes in the concrete by temperature and shrinkage. Some flexural cracks were observed on floor slabs. The crack pattern does not indicate they are due to settlement.

3.2 Service Water Pump Building

Dr Corley and Dr Sozen stated that the cracks in this building are a combination of settlement and volumetric changes in the concrete as the case in the Auxiliary Building.

3.3 Diesel Generator Building

Dr Corley and Dr Sozen stated that the crack pattern can be associated with settlement due to the cracks fanning out in the wall near the top of the duct banks, before their isolation from the walls. The construction of the walls at different time pours of concrete also contributes to the cracking of the wall.

4.0 NRC Concerns

4.1 Darl Hood stated the purpose of this meeting is to establish an acceptance criteria for existing cracks in the buildings.

4.2 Frank Rinaldi is concerned on how to evaluate a crack and the behavior of reversible stresses on cracks going from tension into compression.

4.3 F Schaver is concerned of a wall designed for a vertical "P" tension load. The wall was cracked for an additional "P" horizontal load. Will the wall take the vertical "P" load?

4.4 F Schaver asked what is the criteria for mapping cracks.

4.5 J D Kane would like to make sure that settlement is not a concern for cracks.

4.6 P Huang is concerned on multiple cracking for reversible loads or change of load application as mentioned in Question 4.3.

5.0 Answers to NRC Concerns

Answer to 4.1 is addressed in Item 6.

Answer to 4.2 - Dr Corley outlined the following nine steps to evaluate a crack:

1. Type of member (structural or nonstructural)
2. Type of loads and direction
3. Type of reinforcing
4. Type of construction and sequence of construction
5. Location of the crack
6. Length of the crack
7. Ratio width/length of the crack
8. Direction of the crack
9. Multiple crack pattern

Dr Sozen addressed reversible stresses in his presentation in Item 2.0 for cyclic loading behavior.

Answer to 4.3 - Dr Sozen stated that if horizontal reinforcement is adequate to cross the cracks then the wall can take the vertical load "P" in tension or compression.

Answer to 4.4 - Dr Corley stated that a skilled technician from the PCA laboratory would be able to map a two or three mills crack. A 5 mills (0.005") crack is hard to read with a magnifying instrument.

Answer to 4.5 - Dr Sozen and Dr Corley stated that settlement is not a concern because of the crack pattern existing on the walls.

Answer to 4.6 - Consultants Dr Sozen and Dr Corley will provide engineering information in regards to change of load application.

6.0 Future Crack Monitoring and Acceptance Criteria

Consultants Dr Sozen and Dr Corley will review each structure to evaluate the present strength for the existing cracks.

Dr Sozen proposed to use the following criteria: The ratio of reinforcement times its yield strength should be larger or equal than four times the square root of the strength of concrete ($\rho fy \geq 4\sqrt{f'c}$). If this requirement is not met, a limit analysis for a subsection of the structure with its membrane forces should be done.

Underpinning of the Auxiliary Building will take care of the concern of cracking caused by differential settlement.

T E Johnson stated that Bechtel Power Corporation is working on the structural analysis to simulate the jacking loads due to the construction sequence during the underpinning operation.

The consultants will reevaluate the crack width limits for acceptance as proposed by Bechtel Power Corporation as follows:

a. Evaluate any new or existing crack width larger than 10 mills (0.010").

b. Stop construction for crack widths larger than 30 mills (0.030").

An "on call" evaluation and monitoring of cracks by the consultants was suggested for the future serviceability and durabilility of the buildings.

Dr Sozen stated is not a need to seal cracks for water leakage when the water is not corrosive.

T E Johnson stated that Bechtel will seal cracks larger than 0.013".

FV/mo

ATTENDEES
December 10, 1981

Name	Organization
Darl S Hood	LBA4/NRR
F Rinaldi	SEB/NRR
F Schaver	SEB/NRR
J Haarstad	NRC/Consultant
Pao Huang	NRC/Consultant
John P Matra, Jr	NRC/Consultant
Joseph D Kane	NRC, DOE, HGEB
H Kuo	NRC
T E Johnson	Bechtel
N Swanberg	Bechtel
Dennis Budzik	Consumers Power Co
Fernando Villalta	Consumers Power Co

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

FEB 5 1982

Docket Nos: 50-329/330 OM, OL

APPLICANT: Consumers Power Company

FACILITY: Midland Plant, Units 1 and 2

SUBJECT: SUMMARY OF JANUARY 26, 1982 TELEPHONE DISCUSSION REGARDING SURCHARGE RESULTS FOR THE BWST FOUNDATIONS

On January 26, 1982, Messrs. J. Kane and D. Hood of the NRC staff received a telephone call from Consumers Power Company and Bechtel, to discuss the settlement measurements obtained since the valve pits for the Borated Water Storage Tank were filled with water on October 28, 1981. Participants in the call are listed by Enclosure 1. As a basis for this discussion, Enclosures 2 and 3 were delivered just prior to the call by Consumers' Bethesda Licensing Representative. These enclosures plot the settlement for one point on each of the two valve pits since the time of initial filling.

Consumer's discussion of the enclosures included the following points:

1. The criteria for maximum settlement is 0.5". Although the curve for marker D-41 on January 12, 1982 reads 0.5", Consumers does not consider this to be an accurate reading, as demonstrated by the January 18, 1982 reading which shows about 0.4".
2. Other measured points also show the dip which occurred on January 12, 1982. Consumers speculates that survey inaccuracies may be at fault for the January 12, 1982 readings.
3. Consumers feels the current data demonstrate that the fill beneath the BWST foundations is now in secondary consolidation. The secondary consolidation rate for the tanks has been estimated to be 1/2" per decade.

Mr. Kane replied that the settlement data for markers D-29 and D-41 do not clearly indicate that the foundation soils beneath the valve pit are in secondary consolidation. If the questionable readings of January 12, 1982 are excluded, and average smooth settlement curve through the plotted points could be drawn since November 24, 1981 (the date for placing the third and final surcharge load increment) which would indicate the foundation soils are still in primary consolidation. Mr. Kane requested that the settlement data for the other markers be provided for review.

Darl S. Hood, Project Manager
Licensing Branch No. 4
Division of Licensing

Enclosures:
As stated

cc: See next page

FEB 10 1982

8202240292 XA

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ENCLOSURE 1

TELEPHONE CONFERENCE CALL PARTICIPANTS

January 20, 1992

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J. Mesenheimer
J. Anderson

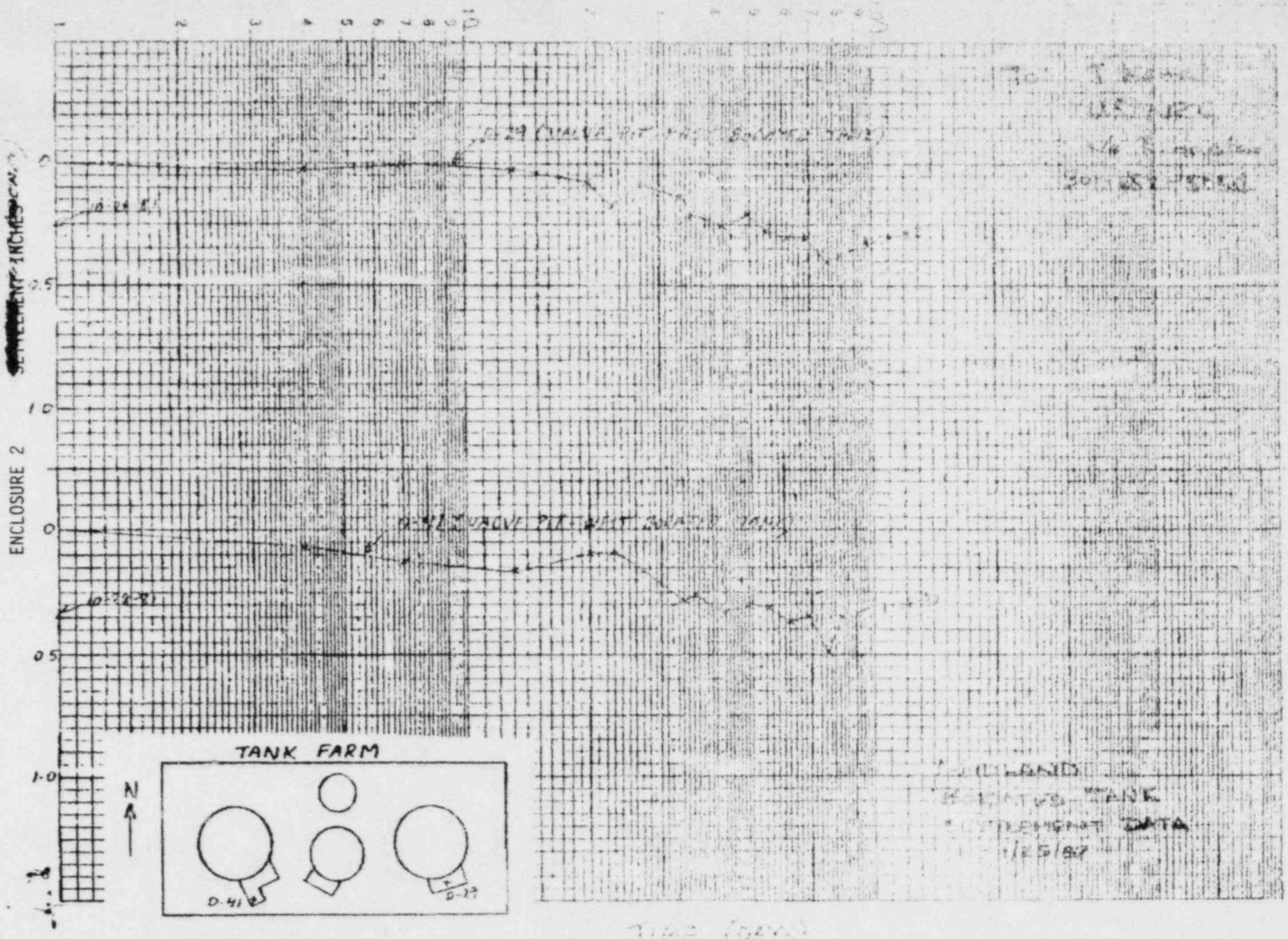
Bechtel

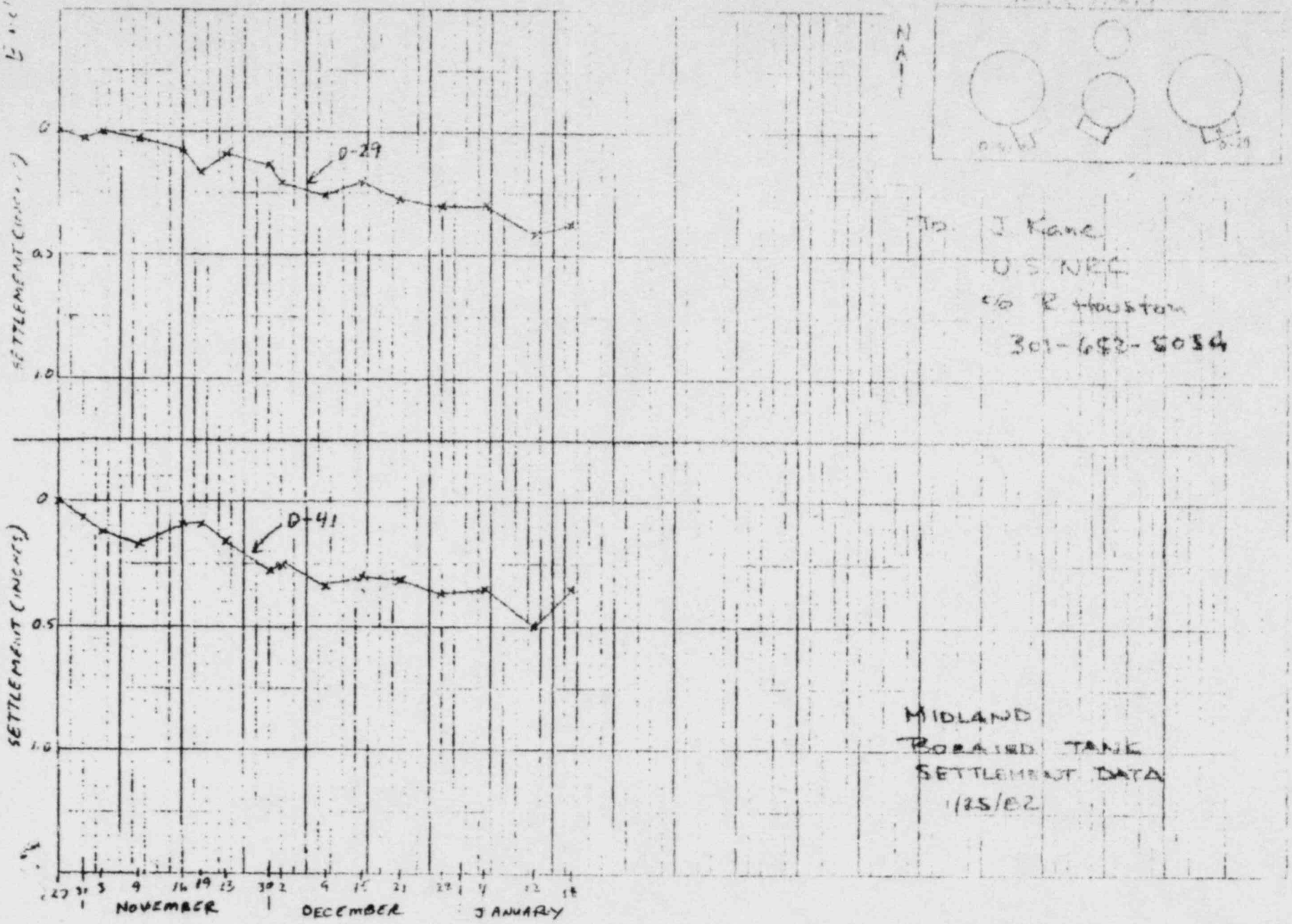
N., Swanberg
S. Lo
A. Boos

NRC

J. Kane
D. Hood

ENCLOSURE 2




SETTLEMENT (INCHES)
0
0.5
1.0
D-29
D-41
27
31
3
9
16
19
23
30
2
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16
23
30
7
14
21
28
4
11
18
NOVEMBER
DECEMBER
JANUARY
N
TANK FARM
D-29
TO J Kane
U.S NRC
c/o R Houston
301-492-8054
MIDLAND
BORATED TANK
SETTLEMENT DATA
1/25/82

FROM: J. ANDERSON

23

Bechtel Power Corporation
Ann Arbor Power Division

TELECOPIER MESSAGE

TO BE COMPLETED BY ORIGINATOR	DO NOT WRITE IN THIS SPACE
SEND TO: J. KANE U.S. NRC c/o R. Houston Bethesda, Maryland 301-652-5034	RECEIVED ANN ARBOR '82 JAN 25 PM 4 24 TELECOMMUNICATIONS
ORGANIZATION CODE: 7HE-2192 CHARGE TO: 7220-101	
AUTHORIZED BY: Bogie Trotter DATE: 1/25/82	

TELECOMMUNICATIONS CENTER USE ONLY

To: U.S. NRC c/o R Houston

Attn: J Kane

Date: 1/25 Time: _____ No. of Pages: 2/C

Verified with: _____

Note:

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Sent

NO. PAGES	CHG PAGE	SUPPORT	UNION CHG	

OPERATOR'S INITIALS: DJ

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Dicke/DuFake/Foss
KENT

Landsman

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

FEB 5 1982

DIR	
D/D	
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D&RI	
DE&TI	
DEP&OS	File

Docket Nos.: 50-329
and 50-330 OM, OL

APPLICANT: Consumers Power Company

FACILITY: Midland Plant, Units 1 and 2

SUBJECT: SUMMARY OF OCTOBER 7, 1981 MEETING ON DIESEL GENERATOR BUILDING

On October 7, 1981, the NRC staff met in Bethesda, Maryland with Consumers Power Company, Bechtel, and consultants, to discuss soil consolidation test data and analyses for the Diesel Generator Building for Midland Plant, Units 1 and 2. Meeting attendees are listed by Enclosure 1. Enclosure 2 is a summary of the meeting with a compilation of the handouts and visual aids used in the course of the meeting.

Darl S. Hood, Project Manager
Licensing Branch No. 4
Division of Licensing

Enclosures:
As stated

cc: See next page

FEB 22 1982

8202260315

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ENCLOSURE 1

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F. Cherney	NRC/DE/MEB
H. Brammer	NRC/DE/MEB
M. Hartzman	NRC/DE/MEB
J. Kane	NRC/DE/HGEB
H. Singh	Army Corps of Engineers
A. Hodgdon	Attorney, NRC
M. Blume	Attorney, NRC
D. Hood	NRC/DL
W. Paton	Attorney, NRC
L. Heller	NRC/HGEB

ENCLOSURE 2

To File 0485.16 (w/a)

From GSKeeley, P-14-113B

Date October 26, 1981

CONSUMERS POWER COMPANY

Internal Correspondence

Subject MIDLAND PROJECT
DISCUSSION WITH STAFF AND LAWYERS
ON D/G(SOILS AND STRUCTURAL)
ON 10/7/81
FILE 0485.16 SERIAL 14585

CC JWCook, P-26-336B (w/o)
SAfifi, Bechtel (w/a)
ABoos, Bechtel (w/o)
JBrunner, M-1079 (w/a)
RHuston, Bethesda (w/a)
NRamanujam, P-14-100 (w/a)
DMBudzik/TJSullivan, P-24-624A (w/o)
TRThiruvengadam, P-14-400 (w/o)
RZamarin, IL&B (w/o)

Discussed D/G samples. Discussed DGB consolidation test data. Ram indicated that CP Co and consultants had reviewed existing literature and did not find any problems with the max load of 64 Tsf. ASTM and corps of Engineers Manual clearly indicates that the loading can be higher so that one can be in the virgin portion of the consolidation curve. Woodward-Clyde Consultants and Dr Peck independently decided that they should go to 64 Tsf to define the virgin part of the curve. Based on the above fact CP Co feels that the maximum load of 64 Tsf in more applicable to define preconsolidation Pressure, Pc' for this kind of material that has been compacted and surcharged. Kane - agrees on review of data that 8 hours was adequate, but 16 Tons/ft^2 would be more adequate for preconsolidation. Sherif - load for testing has to be large enough for compacted, surcharged soil. Kane - says we're out of range of virgin curve because void ratios are too low. Agrees that lab data shows the soil to be very dense. Staff discussed with COE Ohio River and they have never run tests up to 64 T/ft^2. But H Singh said that he has seen tests up to 128 Tsf and higher.

Using new 16 T/ft^2 plots, staff picked out borings and levels where they suggested that settlement should be calculated. Will have to compute new [illegible] by same person who computed Cc from 64 T/ft^2 curve. If this calculation shows that its only slightly more than settlement shown by actual dewatering settlement readings, would they accept readings as being proper? They want range of settlement and not force us to use this calculated settlement for structural analysis.

Structural (Navy) needs what it is for soil springs (for settlement) and can compute stresses and then add to it what is estimated to occur. Have to model soil under footing and this has to be based on results of estimated settlement from preconsolidation tests. Kane - would agree to force the calculated settlement numbers by a percentage(50%)for jacking up measured numbers which are based on stiffness of structures. Use dewatering values to adjust calculated values from consolidation tests.

After CP Co Caucus - Met with Staff and Legal.

1. Use structural analysis model using soil springs. (Staff needs dynamic and static soil springs used and basis for them.)

2. Geo Tech input modified as discussed previous to handle consolidation test data.

We want to talk to J W Cook on this before making a commitment.

Zam - on not providing staff testimony on October 30, 1981 is it strictly soils.

Patton - have problem on crack analysis.

Rinaldi - D/G structure is not a typical structure. Feels its a research type problem. NRC is still reviewing crack analysis info given them last week and addendum given them yesterday. Can't assume text book type design analysis. Also, have to resolve monitoring scheme for cracks for lifetime of plant. Also, have to factor in new analysis for Geo Tech input. All they're ready to do is give status report to board.

DMB - Crack report is our report and all we're talking about today is modifying spring constants and reruning model. Presented Model in April.

Rinaldi - Still have to decide whether crack analysis justifies structural adequacy.

DMB - our letter says no more crack analysis. Appendix J (white paper was presented to staff in April).

Rinaldi - Can't make decision until after discussing with management.

DMB - We used NUREG, which handles simply the cracks and we have run sophisticated computer program. Effects of cracks based on NUREG have been factored into structural calculations. Margin review program for SSRS will be during OL.

Patton - D/G building has to be analyzed for new SSRS. Kane - structural has been affected by surcharge and board could ask for adequacy of surcharge and effect it had on D/G building at new SSRS.

DMB - everything we've said is how other dockets have been done.

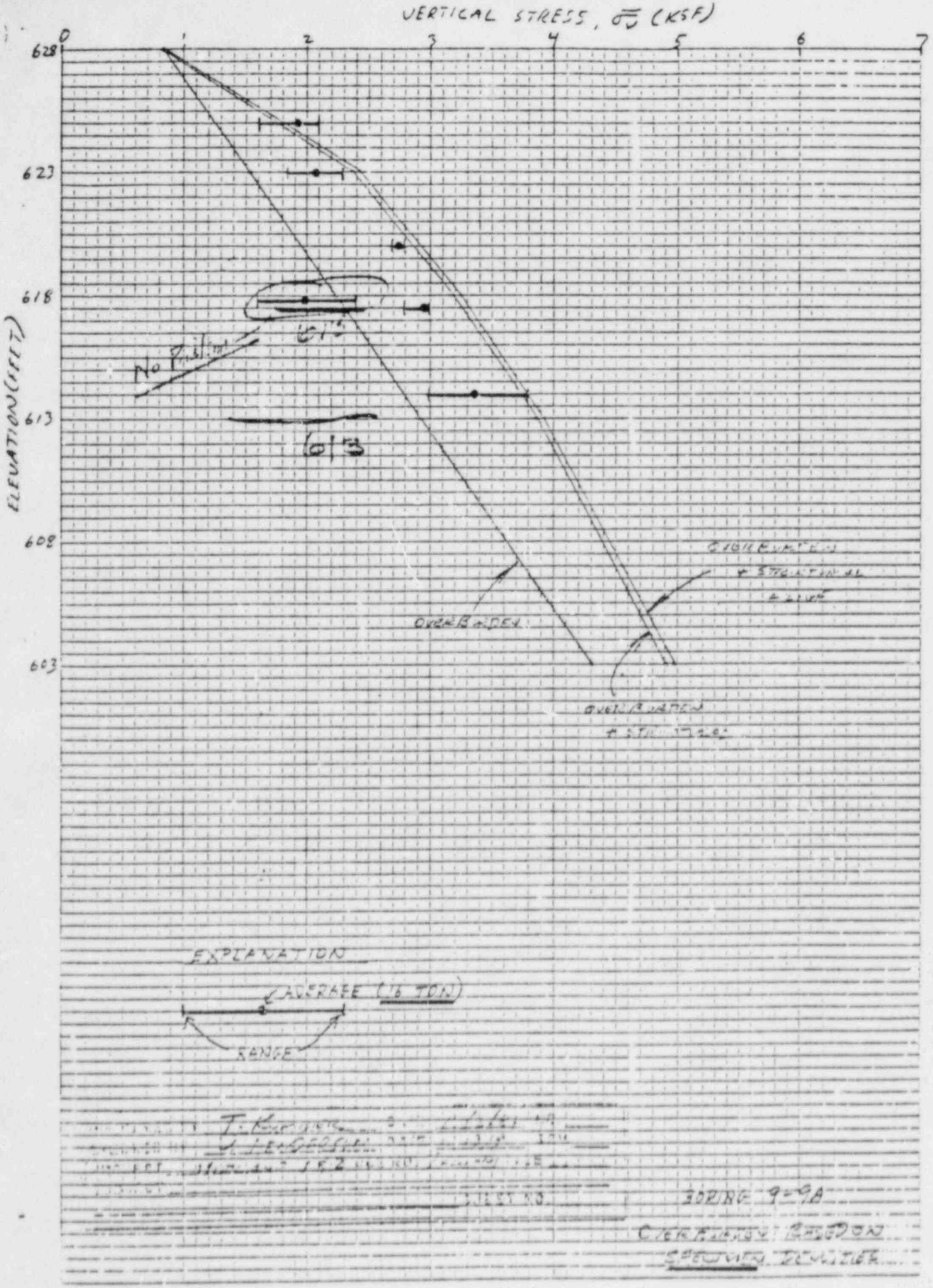
Zam - We don't have figures yet on SSRS and board will have to make decision based on fact that margin check won't come until OL. If we decide to do additional calc on consolidation tests and if we complete it by October 16, 1981, then staff has agreed this should handle Geo Tech.

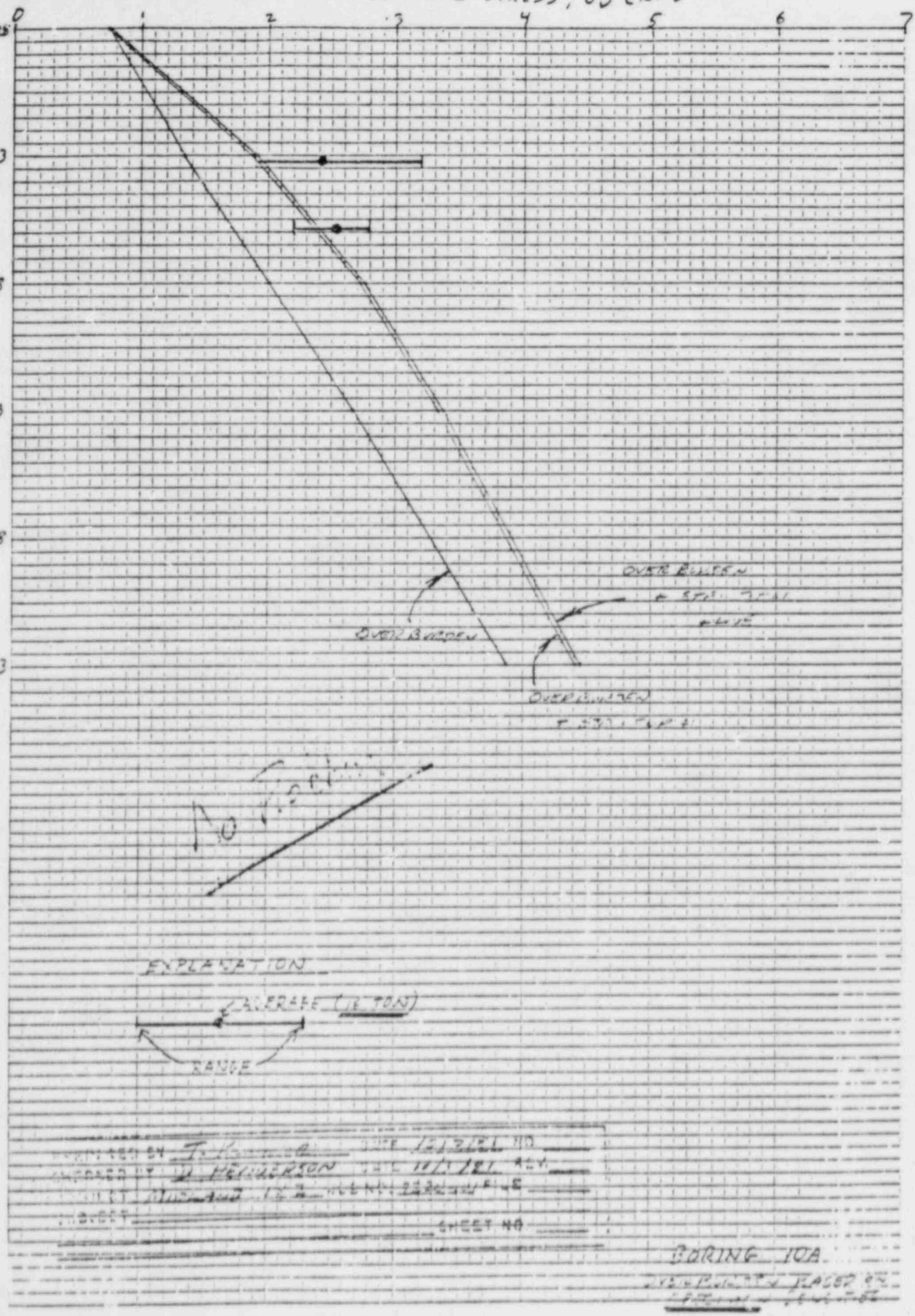
Agreed to provide staff input and results of analysis done todate. They want new springs used. Will try to get this by October 16, 1981 and if they have this, they may be able to be ready for hearing on November 16, 1981.

Kane - thinks we will have settlement resolved by hearing date, but may not agree on crack analysis and use of SSRS.

Attachments:

Replots of load vs estimated preconsolidations pressure at 16 and 64 Tons/ft^2 with actual densities at sample location.


VERTICAL STRESS, $\bar{\sigma}_3$ (KSF)
0
1
2
3
4
5
6
7
628
623
618
613
608
603
ELEVATION (FEET)
OVERBURDEN
OVERBURDEN
EXPLANATION
AVERAGE (IN TON)
RANGE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1
2
3
4
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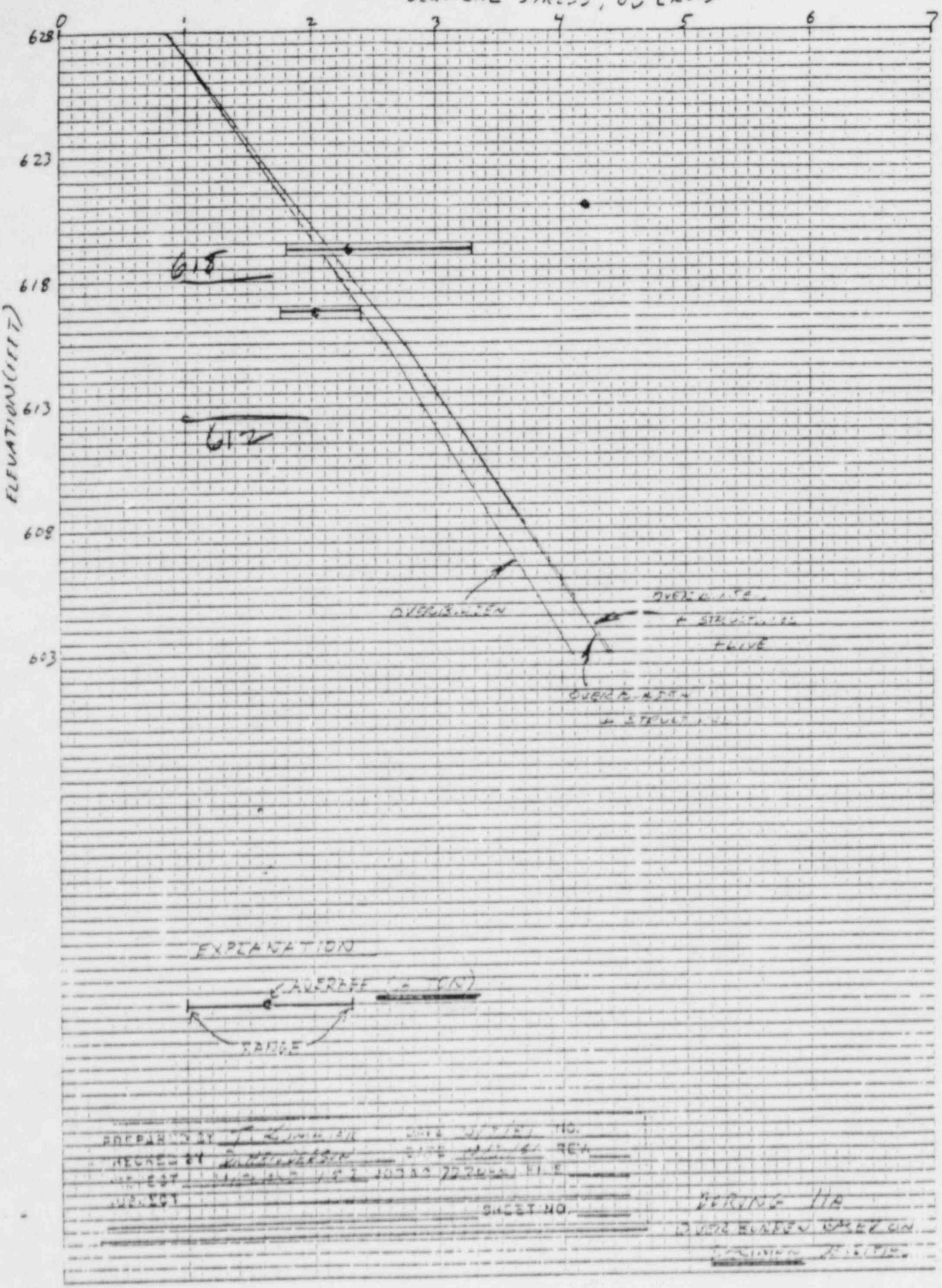
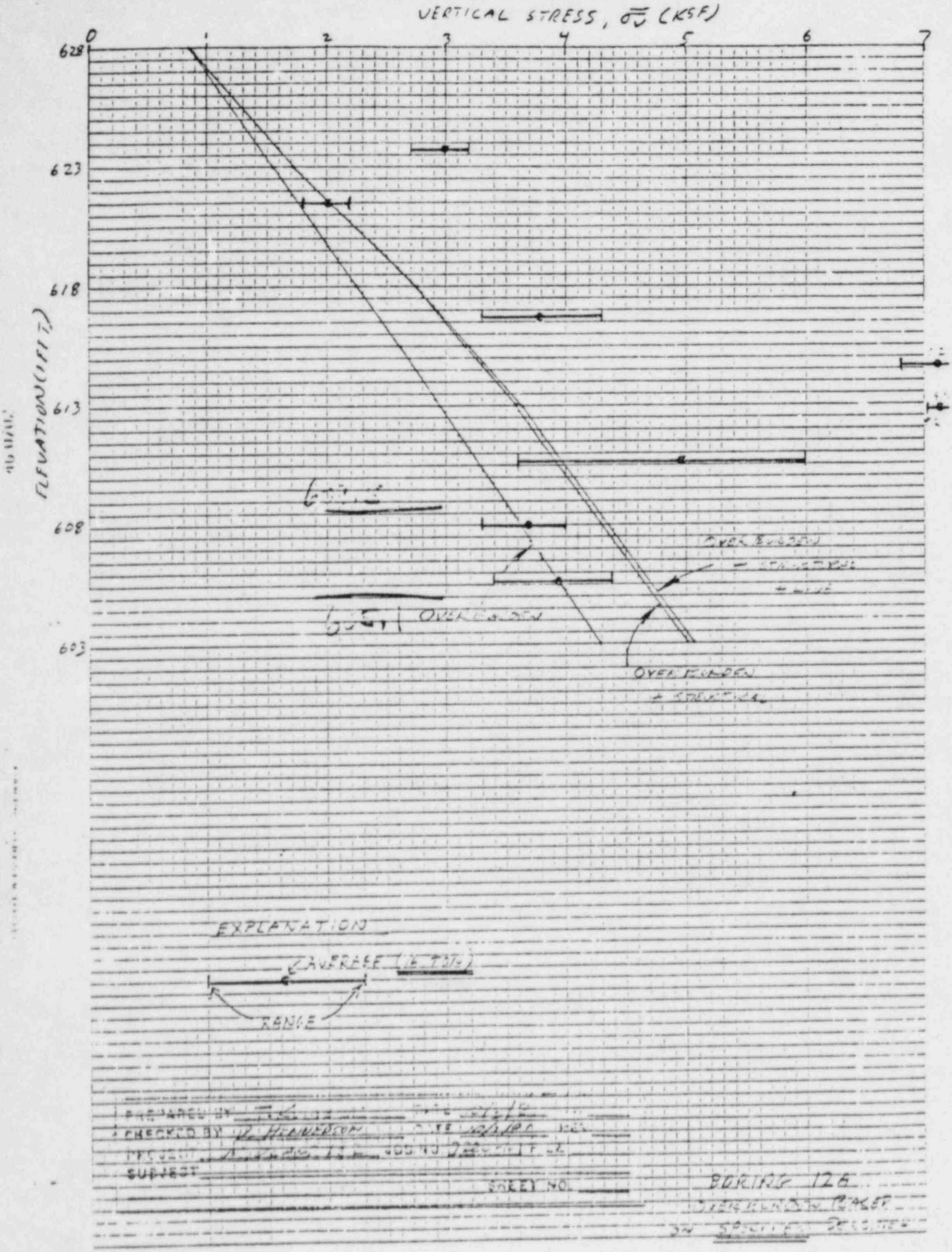
6
7
625
623
618
613
608
603
ELEVATION (FEET)
OVERBURDEN
OVERBURDEN + STEEL PLATE
EXPLANATION
AVERAGE (IN TON)
RANGE

BORING 10A


VERTICAL STRESS, $\bar{\sigma_v}$ (KSF)
0
1
2
3
4
5
6
7
628
623
618
613
608
603
ELEVATION (FEET)
618
617
OVERBURDEN
OVERBURDEN + STRUCTURE + LIVE
OVERBURDEN + STRUCTURE
EXPLANATION
AVERAGE (= 7 KSF)
RANGE


VERTICAL STRESS, σv (KSF)
0
1
2
3
4
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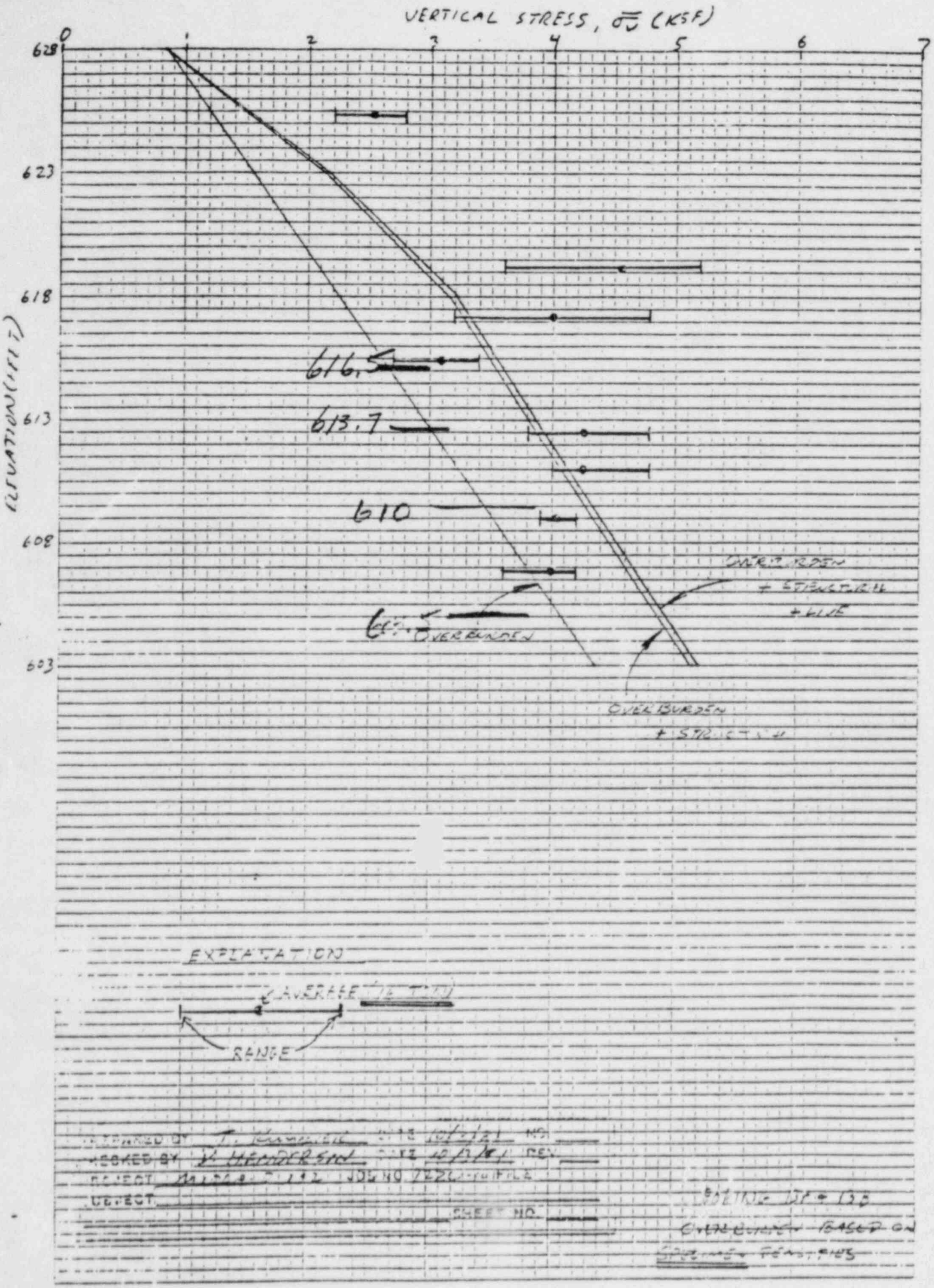
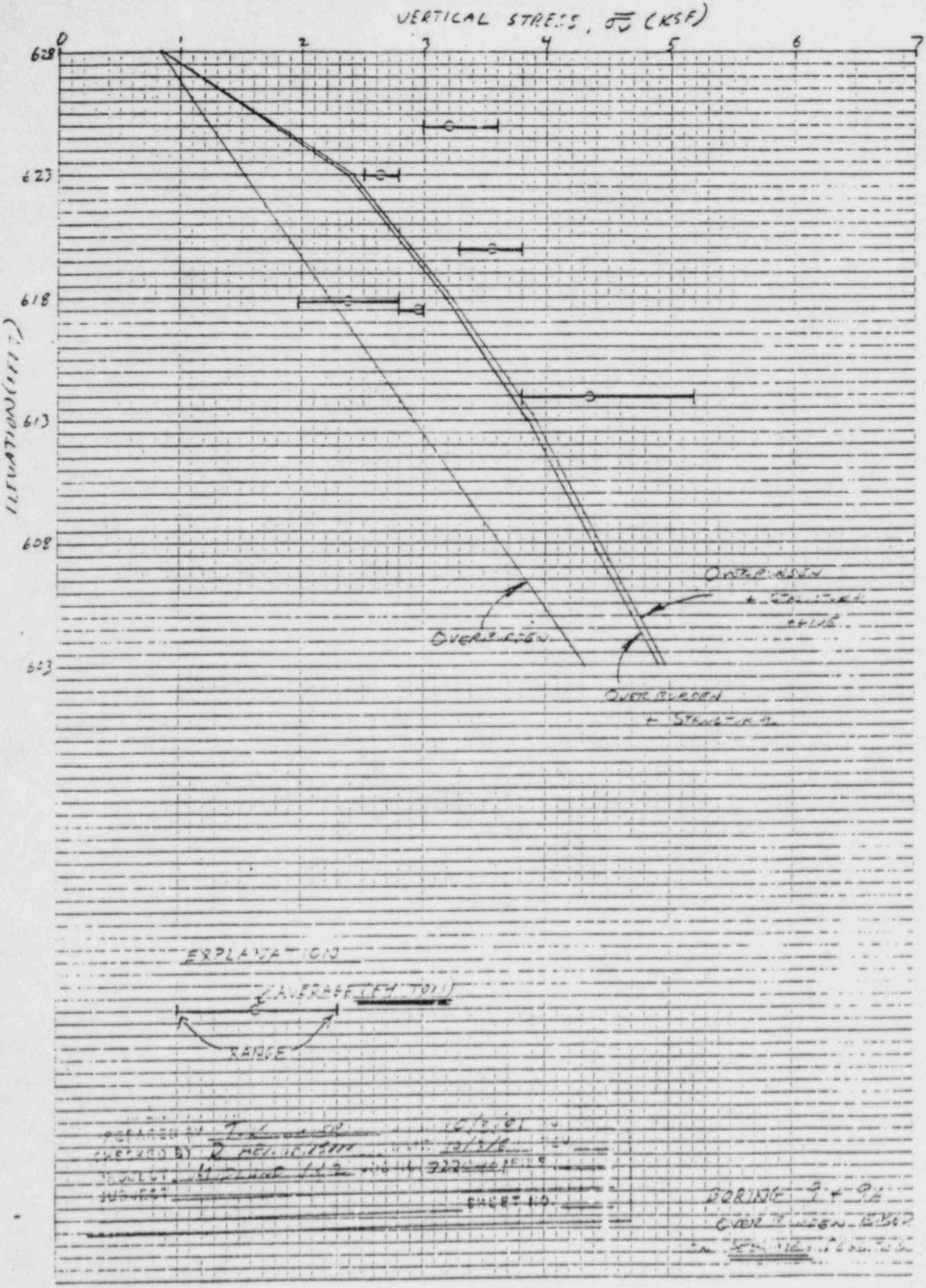
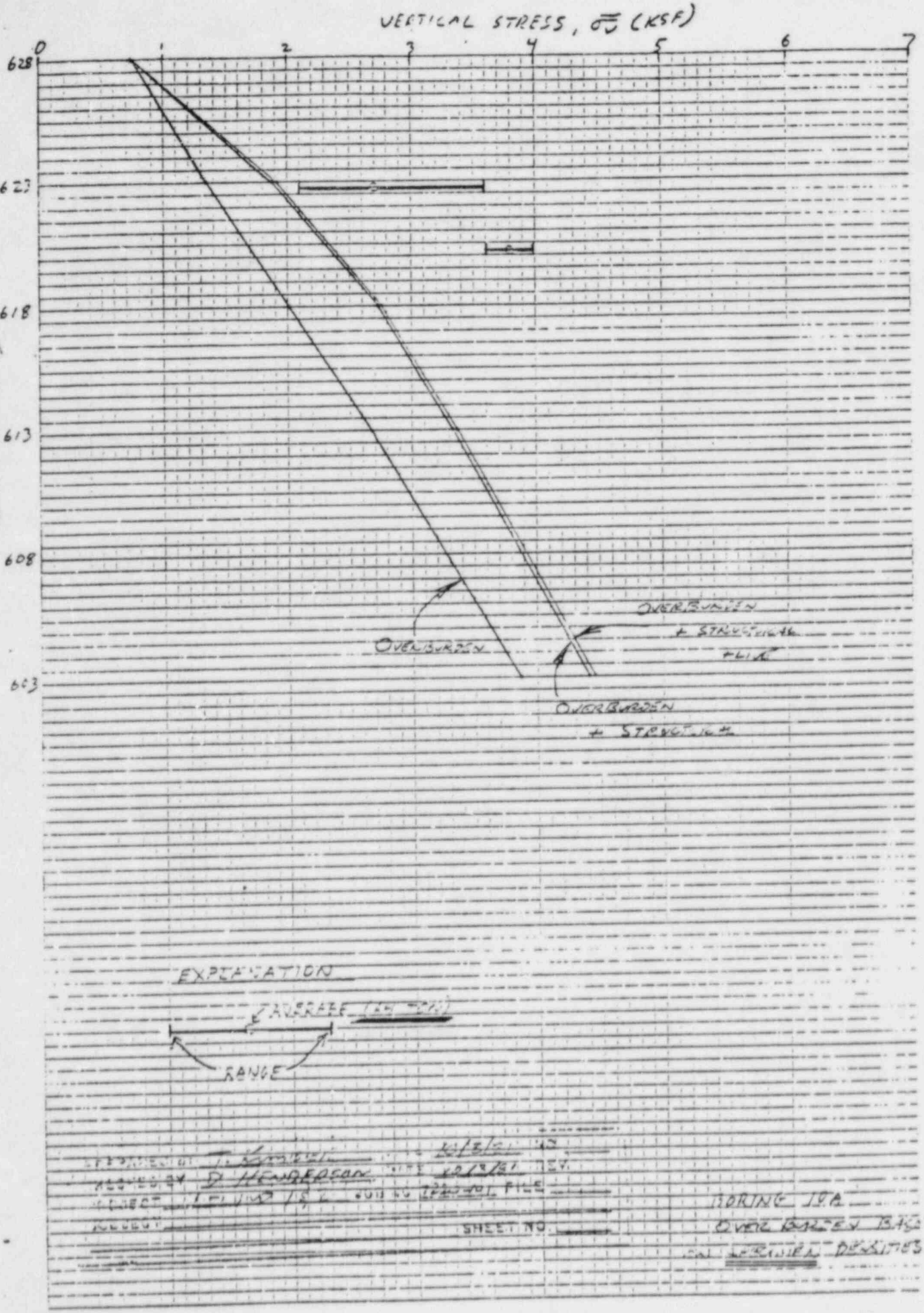
6
7
628
623
618
613
608
603
ELEVATION (FEET)
OVERBURDEN + STRUCTURAL + LIVE
OVERBURDEN + STRUCTURAL
OVERBURDEN
EXPLANATION
AVERAGE
RANGE
PREPARED BY
CHECKED BY
PROJECT
SUBJECT
SHEET NO.
BORING 126


VERTICAL STRESS, $\bar{\sigma_v}$ (KSF)
0
1
2
3
4
5
6
7
628
623
618
613
608
603
ELEVATION (FT)
616.5
613.7
610
OVERBURDEN
OVERBURDEN + STRUCTURE + FILL
OVERBURDEN + STRUCTURE
EXPLANATION
AVERAGE
RANGE


VERTICAL STRESS, $\bar{\sigma}_v$ (KSF)
0
1
2
3
4
5
6
7
628
623
618
613
608
603
ELEVATION (FT.)
OVERBURDEN
OVERBURDEN + STRUCTURE
OVERBURDEN + STRUCTURE + LIVE
EXPLANATION
AVERAGE (FROM TO)
RANGE


VERTICAL STRESS, $\bar{\sigma}_v$ (KSF)
0
1
2
3
4
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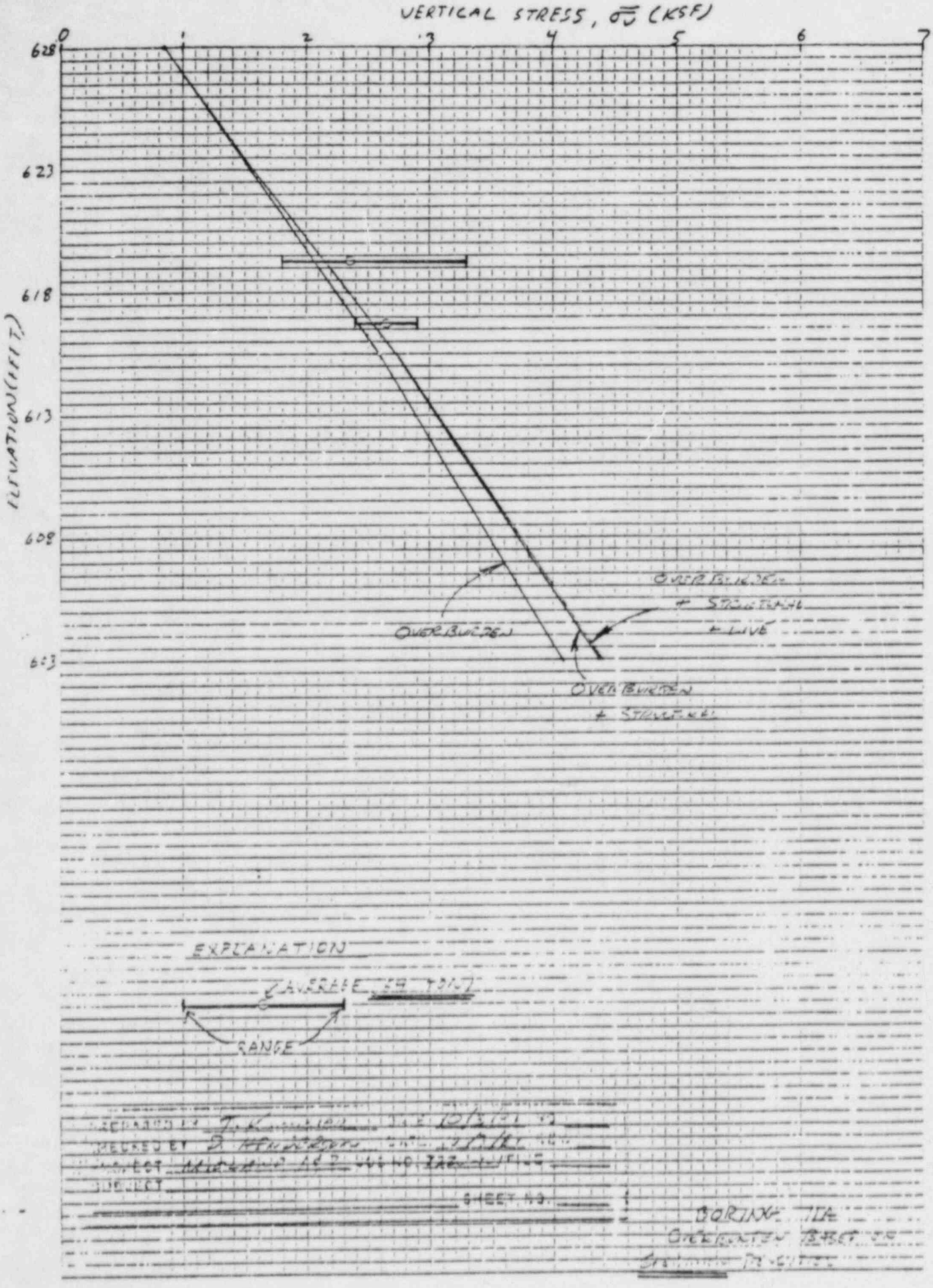
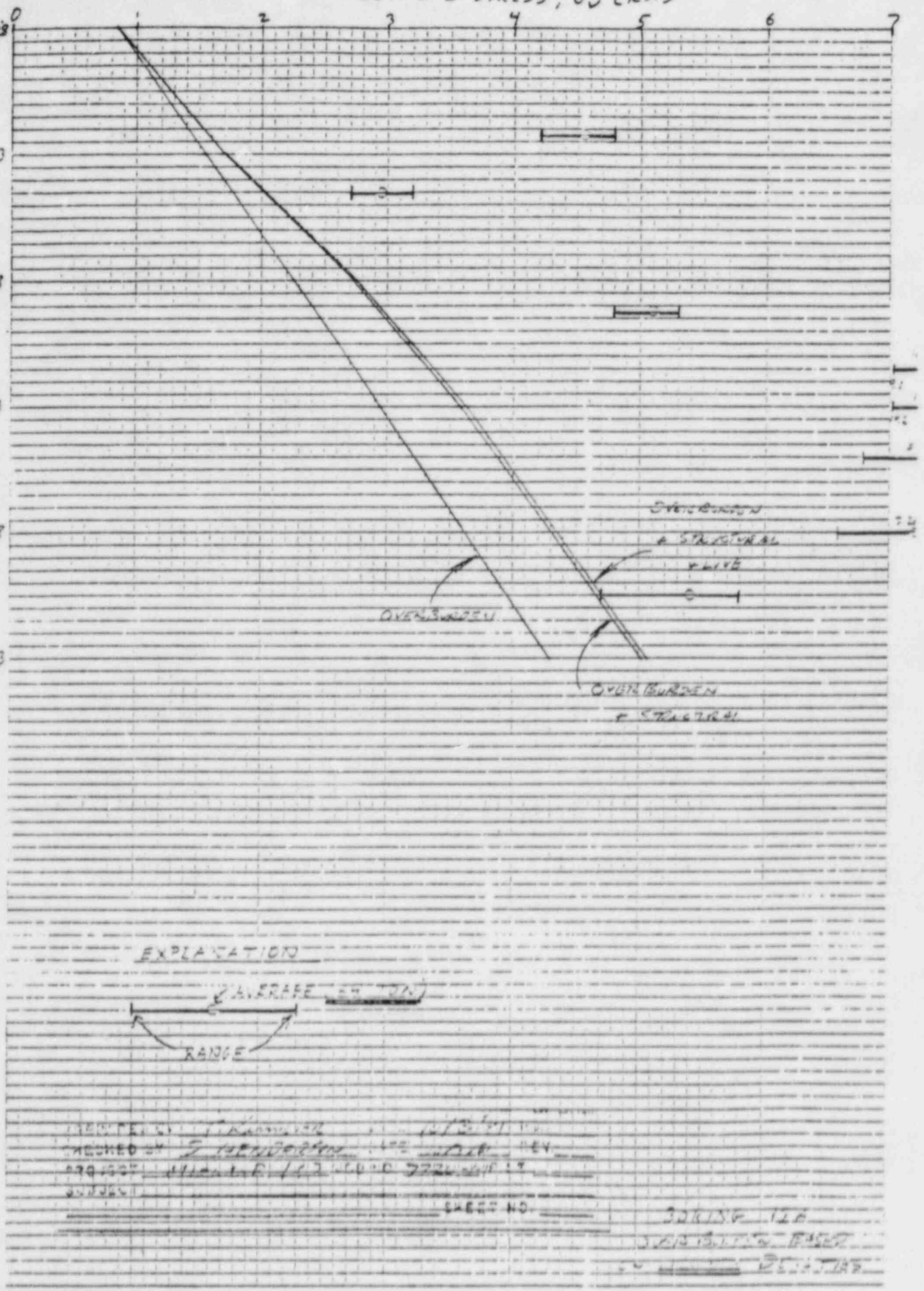
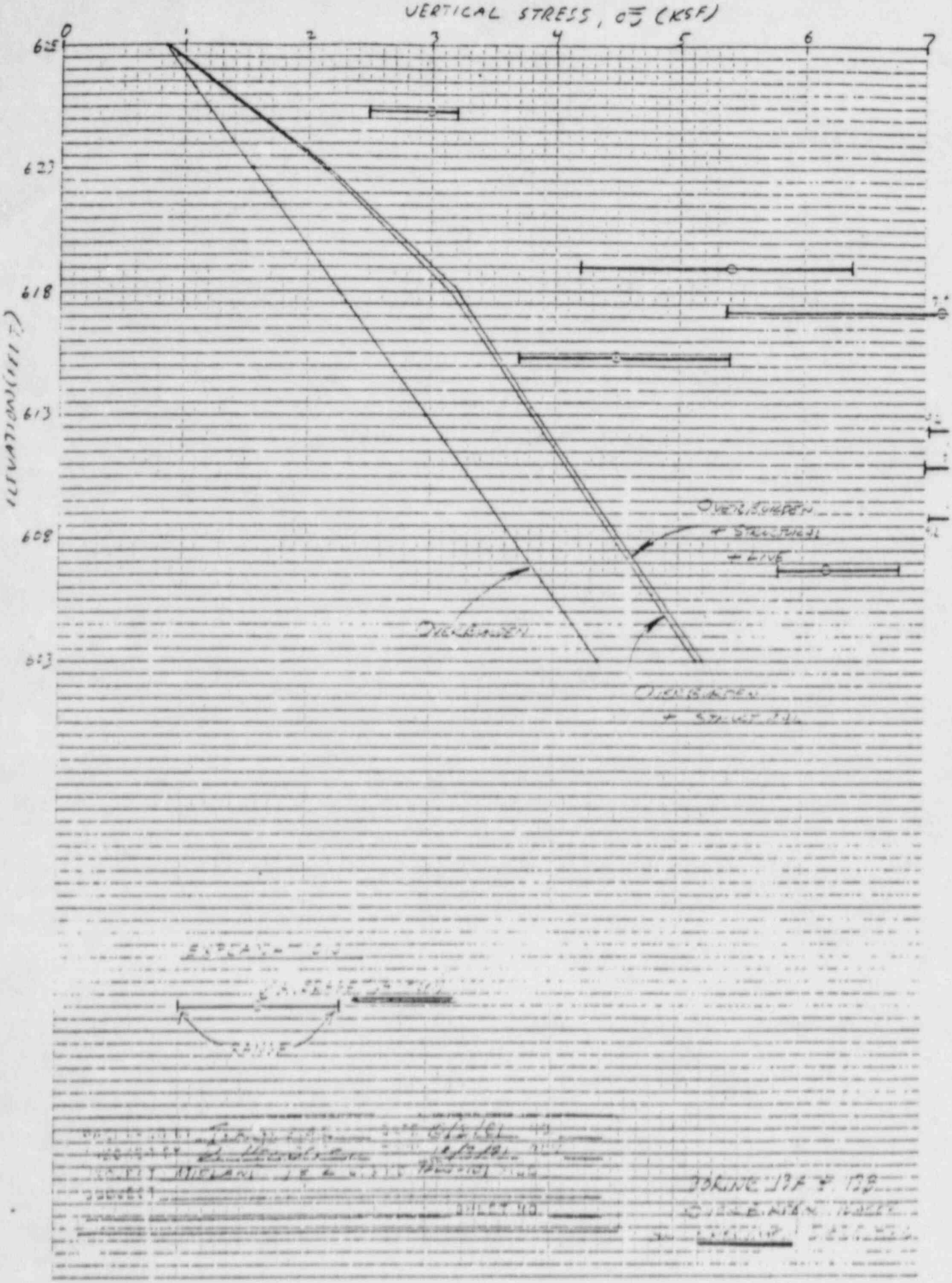
6
7
628
623
618
613
608
603
ELEVATION (FEET)
OVERBURDEN
OVERBURDEN + STRUCTURE + FILL
OVERBURDEN + STRUCTURE
EXPLANATION
AVERAGE (AT EOP)
RANGE
BORING 104
OVERBURDEN BASED ON LACUSTRINE DEPOSITS


VERTICAL STRESS, $\bar{\sigma_v}$ (KSF)
0
1
2
3
4
5
6
7
628
623
618
613
608
603
ELEVATION (FEET)
OVERBURDEN
OVERBURDEN + STRUCTURE + LIVE
OVERBURDEN + STRUCTURE
EXPLANATION
AVERAGE
RANGE


VERTICAL STRESS, $\bar{\sigma_v}$ (KSF)
0
1
2
3
4
5
6
7
628
623
618
613
608
603
ELEVATION (FT)
OVERBURDEN
OVERBURDEN & STRUCTURAL LOAD
EXPLANATION
AVERAGE
RANGE


VERTICAL STRESS, σ3 (KSF)
0
1
2
3
4
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6
7
625
623
618
613
608
603
ELEVATION (FT)
OVERBURDEN
+ STRUCTURE
+ FILL
OVERBURDEN
OVERBURDEN
+ STRUCTURE
RAISE

CONFIRMATORY ACTION LETTER

Gardner
Landsman

SEP 2 4 1982

8. b September

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

Consumers Power Company
ATTN: Mr. James W. Cook
Vice President
Midland Project
1945 West Parnall Road
Jackson, MI 49201

Gentlemen:

This letter confirms the telephone discussion on September 24, 1982, between Messrs. Warnick and Shafer of this office and Mr. D. Miller and others of your staff regarding the problems in the remedial soils QC requalification program identified by Messrs. Gardner and Landsman.

The purpose of this letter is to document our understanding of the actions you have taken or plan to take.

As a result of our discussion, we understand that you have initiated or plan to initiate the following actions:

(1) All work on remedial soils has been stopped with the exception of those continuous activities such as maintaining the freeze wall and well pumping.

(2) All examinations related to remedial soils QC requalification have stopped and all QC personnel previously certified have been decertified.

(3) A retraining program will be established and conducted for all QC personnel who failed and for future failures.

(4) A written examination will be developed for all QC requalification examinations in the area of remedial soils.

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OFFICE ▶						
SURNAME ▶						
DATE ▶						

CONFIRMATORY ACTION LETTER

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We also understand that you will meet with our staff on September 29, 1982, to describe what measures you will establish to accelerate the requalification and certification of the QC personnel involved in the balance of plant quality program.

If our understanding of your actions is not in accordance with the above, please contact this office immediately.

Sincerely,

James G. Keppler
Regional Administrator

cc: DMB/Document Control Desk (RIDS)
Resident Inspector, RIII
The Honorable Charles Bechhoefer, ASLB
The Honorable Jerry Harbour, ASLB
The Honorable Frederick P. Cowan, ASLB
The Honorable Ralph S. Decker, ASLB
Michael Miller
Ronald Callen, Michigan
Public Service Commission
Myron M. Cherry
Barbara Stamiris
Mary Sinclair
Wendell Marshall
Colonel Steve J. Gadler (P.E.)
William Paton, ELD

OFFICE	RIII	RFW	Davis for	Keppler for			
SURNAME	Shafer/ls	Warnick	9/24	9/24			
DATE	9/24/82	9/24/82					

NRC FORM 0240 OFFICIAL RECORD COPY

USGPO 1980—3