U.S. DEPARTMENT OF ENERGY

DOE-WIPP-86-010

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WASTE ISOLATION PILOT PLANT

DESIGN VALIDATION
FINAL REPORT

APPENDICES

JOB 12484

OCTOBER 1986

BECHTEL NATIONAL, INC.
SAN FRANCISCO, CALIFORNIA

NOTICE

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APPENDIX A

DOE STIPULATED AGREEMENT WITH STATE OF NEW MEXICO (PARTIAL)

APPENDIX A

STIPULATED AGREEMENT (PARTIAL)

The Department of Energy (DOE) and the State of New Mexico on July 1, 1981, entered into a Stipulated Agreement to perform certain work to validate the design of the WIPP underground facilities. Proposals for performing this work were identified in two parts: 1) tasks necessary to detail plans and rationale for the proposed design validation assessment, and 2) tasks necessary to prepare a report providing data, analysis and interpretation of the results of design validation assessment. The scope of work associated with these two DOE proposals included in the Stipulated Agreement are given below:

DOE Proposal to Prepare the Plan for Design Validation

1. Assumptions

The following assumption was made to define the tasks necessary to fulfill the requirements of this request.

a) The plan will primarily focus on the development of test panels for observing rock mechanics behavior.

2. Proposed Work

The tasks to be completed to provide the required plan include:

a) Review of the current test plans.

b) Establishment of objectives and needs of the test plan, based on past analysis, material property data, uncertainty in design assumptions, the behavior, time period for test, etc.

c) Establishment of the rational behind the test plan.

d) Establishment of priorities for various components of the test.

e) Preparation of the steps in design, analysis, monitoring and review of the test program.

f) Review of the consistency of the proposed plan with the objectives and rationale for the test.

g) DOE will provide an individual to coordinate communications on test planning and experiment progress with the state.

3. Expected Results

The anticipated results include a more detailed test plan with appropriate technical rationale, and justification to perform to construct a test panel within the non-waste experimental area. The test panel may consist of four rooms separated by pillars. The dimensions of each will be similar to those to be used in the WIPP waste storage area. The results from the test should validate key assumptions for design regarding rock mass behavior. The test results will be of particular interest for predicting long term behavior of room closures.

4. Merits of the Proposed Plan

The proposed plan will provide a defensible, rational plan for the design test panel. The actual tests should significantly enhance the level of confidence and credibility in the resulting design.

5. Schedule

The draft of the proposed plan will be submitted to the State of New Mexico by the end of November 1981. [Revised to the end of October 1982 at a joint meeting on September 21, 1982, between DOE, EEG, et al]

DOE Proposal for the Proposed Report

1. Assumptions

The following assumption was made with regard to the proposal to provide the subject report:

a) The impact of SPDV Design Validation Experiment results on basic design assumptions will be the focus of this report, and validity of the actual designs in all its aspects will not be emphasized.

b) If all the tests can not be completed within the present schedule, an interim report summarizing the status of experiments may be provided.

2. Proposed Work

The following tasks will be undertaken as a part of the proposed work.

a) The experimental data will be obtained and deciphered.

b) A basic data package will be prepared.

c) Anaylsis of data for the rock mechanics parameters will be made.

d) The results will be evaluated against the basic design assumptions.

e) An overall evaluation of the impact of any differences between the assumed and observed design parameters will be made.

f) A report summarizing the above steps will be prepared.

3. Work Not Proposed

The proposed work will not include validation/verification of the designs, since the verification/validation would require further steps being carried out separately such as checking of the design calculations and drawings.

4. Expected Results

Results of the experiments will likely demonstrate the validity of the basic design assumptions regarding rock mechanics parameters. It could also possibly suggest a review of these assumptions and their overall impact on the design development.

5. Schedule

A draft of the proposed topical report will be provided by the end of March 1983*. If significant experimental results are not available prior to that time, an interim status report will be provided, and a draft of the entire report will follow as soon as reasonably possible.

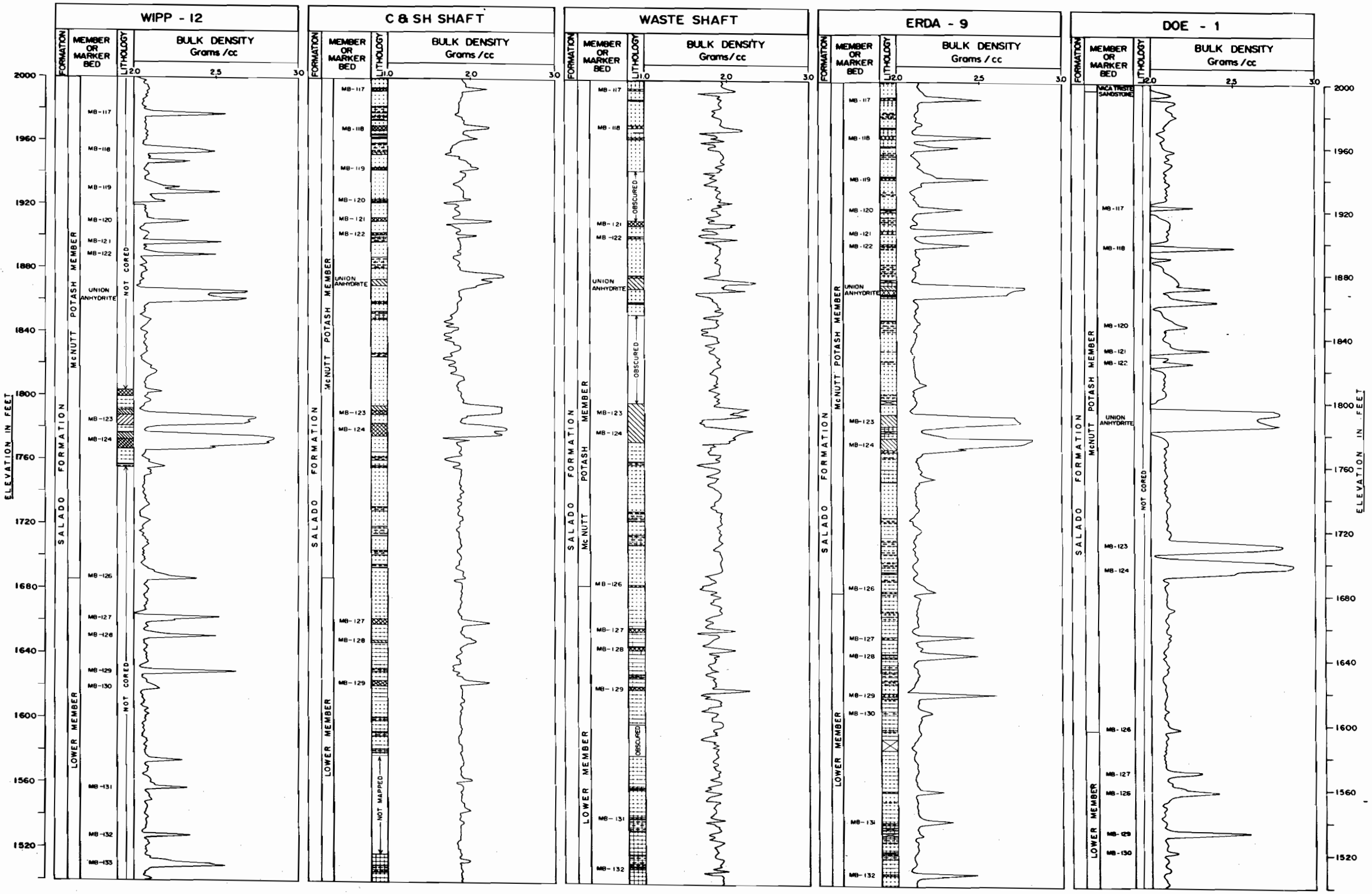
*Revised to the end of March 1983 at a joint meeting on September 21, 1982, between DOE, EEG, et al.

APPENDIX B

GEOLOGIC CORRELATIONS

CONTENTS

Figure No.	Title/Description
B-1	Geologic Correlation WIPP-12 to DOE-1 (5 Sheets)
B-2	Geologic Correlation WIPP-12 to DOE-1 Facility Horizon Area
B-3	Geologic Correlation C & SH Shaft to ERDA-9 Facility Level Area
B-4	Geologic Correlation North-South Section, E140 Drift Station N254 to S3656
B-5	Geologic Correlation North-South Section, E0 Drift Station N146 to N1410
B-6	Geologic Correlation East-West Section, N1100 Drift Station E206 to E1698
B-7	Geologic Correlation East-West Section, N1420 Drift Station E178 to E1698
B-8	Geologic Correlation East-West Section, N1270± Station E0 to W630
B-9	Geologic Correlation East-West Section, N1100 Drift Station W682 to W2782 (2 Sheets)

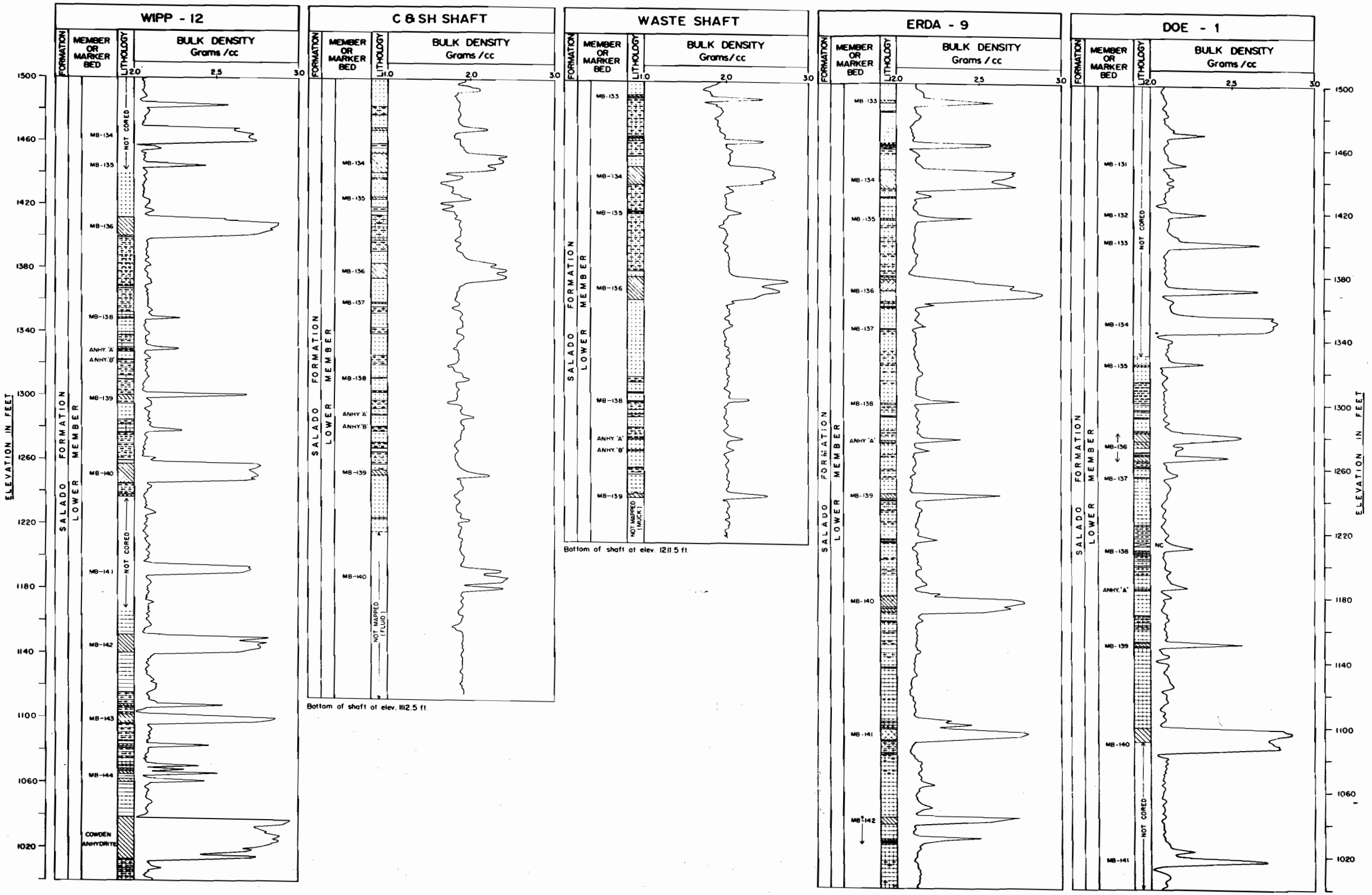


NOTE:
See sheet 1 for explanation and key plan

FIGURE B-1

GEOLOGIC CORRELATION
WIPP-12 TO DOE-1

SHEET 4 OF 5



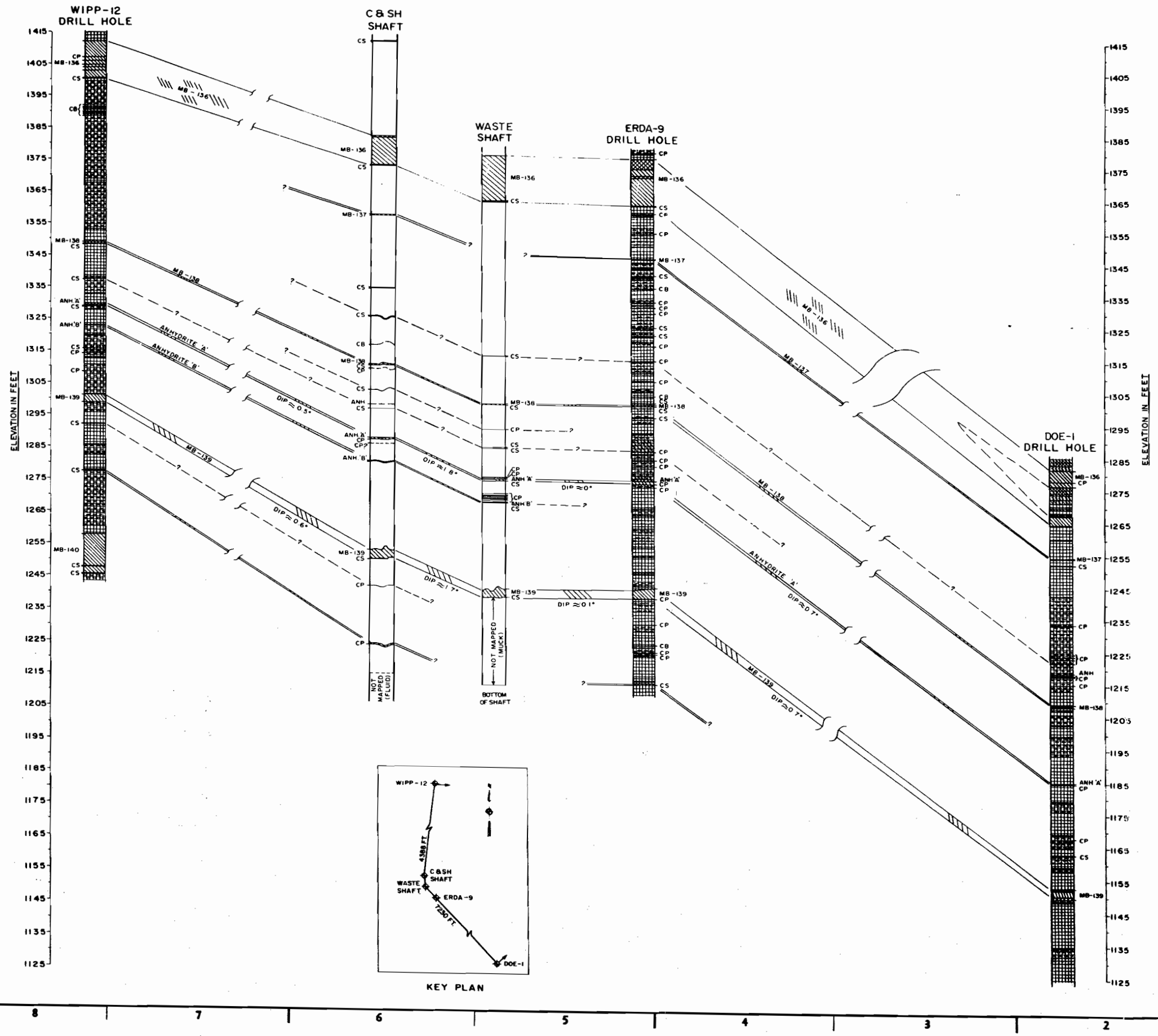
NOTE

See sheet 1 for explanation and key plan.

FIGURE B-1

GEOLOGIC CORRELATION
WIPP-12 TO DOE-1

SHEET 5 OF 5



EXPLANATION

- Halite
- Argillaceous Halite
- Anhydrite
- Polyhalite
- Anhydritic Halite
- Clay Seam (CS)

CP = Clay Parting
CB = Clay Break
MB = Marker Bed
ANH. = Anhydrite

NOTES:

1. Stratigraphic and lithologic descriptions for WIPP-12, ERDA-9, and DOE-1 based on geologic logging of rock core. Descriptions for C & SH and waste shafts based on geologic mapping of shaft walls.
2. See Figure B-3 for detailed lithology of C & SH and waste shafts.
3. Polyhalite content of halite not shown.
4. Dips shown are apparent and not true dips.

REFERENCES:

1. Jones, C. L., Geologic Data for Borehole ERDA-9, 1981.
2. U.S. Dept. of Energy, Basic Data Report for Borehole DOE-1, 1982.

FIGURE B-2

GEOLOGIC CORRELATION WIPP-12 TO DOE-1 FACILITY HORIZON AREA

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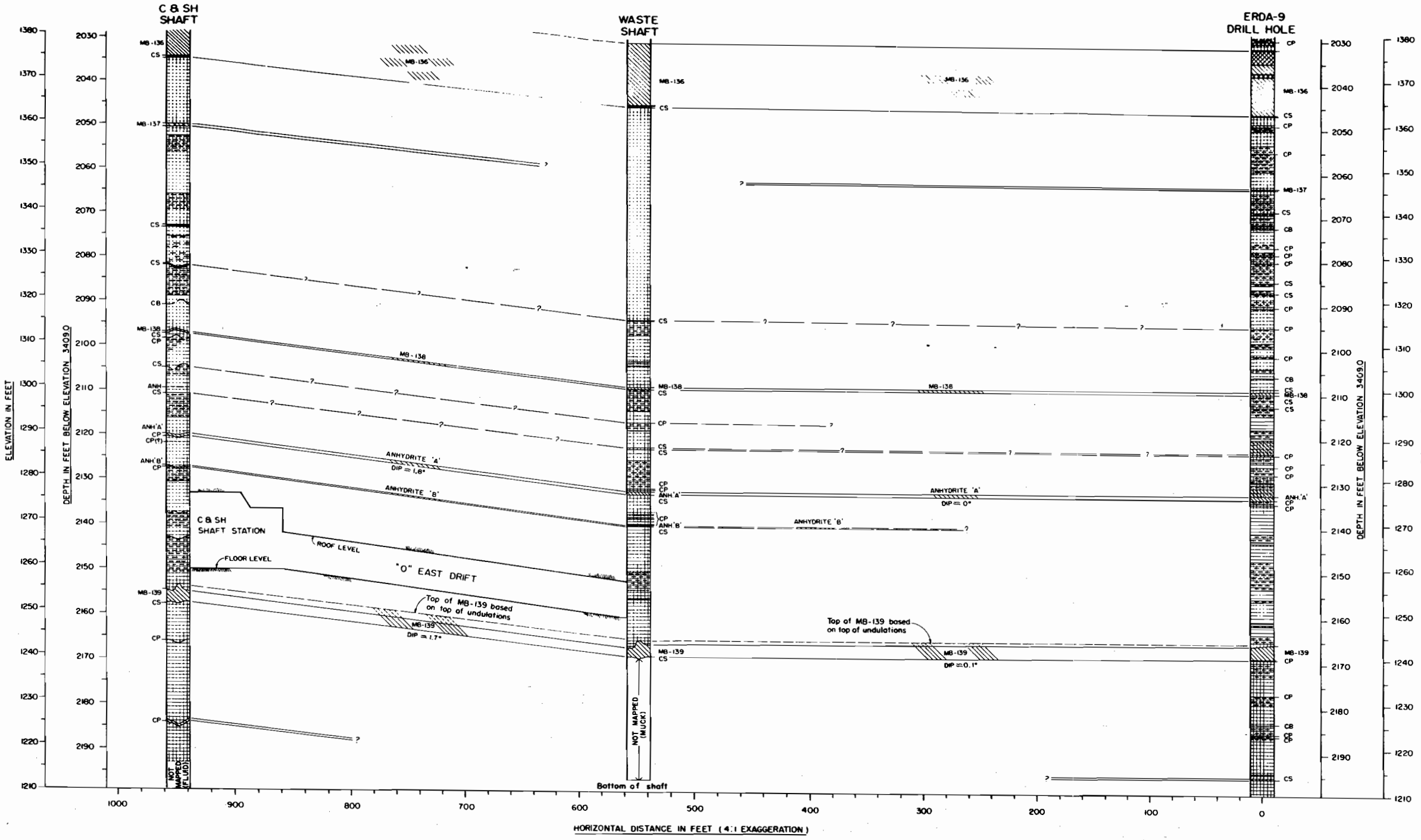
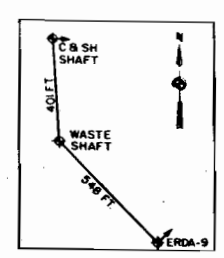




KEY PLAN

NOTES:

1. Stratigraphic and lithologic descriptions for ERDA-9 based on geologic logging of rock core. Descriptions for C & SH and waste shafts based on geologic mapping of shaft walls.
2. See Figure B-2 for explanation of symbols and references.
3. Polyhalite content of halite not shown.
4. Dips shown are apparent and not true dips.

FIGURE B-3

GEOLOGIC CORRELATION
C&SH SHAFT TO ERDA-9
FACILITY LEVEL AREA

The following descriptions pertain to the geologic map units shown in the drifts on Figures B-4, B-5 and B-8:

UNIT DESCRIPTIONS

UNIT 6[1] Halite: colorless with grayish orange-pink (1 OR 8/2)[2] tint; transparent to translucent; coarsely crystalline; trace of dispersed polyhalite; unit extends into the roof; lower contact with Unit 5 is gradational and/or diffuse.

UNIT 5 Halite: colorless; transparent to translucent; coarsely crystalline; trace of bluish-white (5B 9/1) to light bluish-gray (5B 7/1) argillaceous material occurring as pods (1/2-inch diameter) and discontinuous laminations or filling interstices; lower contact with Unit 4 is generally sharp and based on prominent color change in argillaceous material (gray to red-brown) from Unit 5 to Unit 4.

UNIT 4 Argillaceous halite: colorless to moderate reddish-brown (1 OR 4/6), less frequently light bluish-gray (5B 7/1); transparent; coarsely crystalline; trace of dispersed polyhalite; trace to abundant argillaceous material (decreasing downward) consisting of clay containing a trace of silt and fine crystals of halite, occurring as discontinuous laminations in upper half of unit and interstitially in lower half; lower contact with Unit 3 is gradational and based on absence of argillaceous material in Unit 3.

UNIT 3 Halite: colorless to moderate reddish-orange (1 OR 6/6); transparent to translucent; coarsely crystalline; trace of dispersed polyhalite; polyhalite content commonly increases downward; lower contact with Unit 2 is sharp.

UNIT 2 Argillaceous halite: moderate reddish-brown (1 OR 5/5), less frequently light bluish-gray (5B 7/1); medium to coarsely crystalline; argillaceous material primarily occurs interstitially or as discontinuous laminations; lower contact with Unit 1 is generally sharp, less frequently gradational.

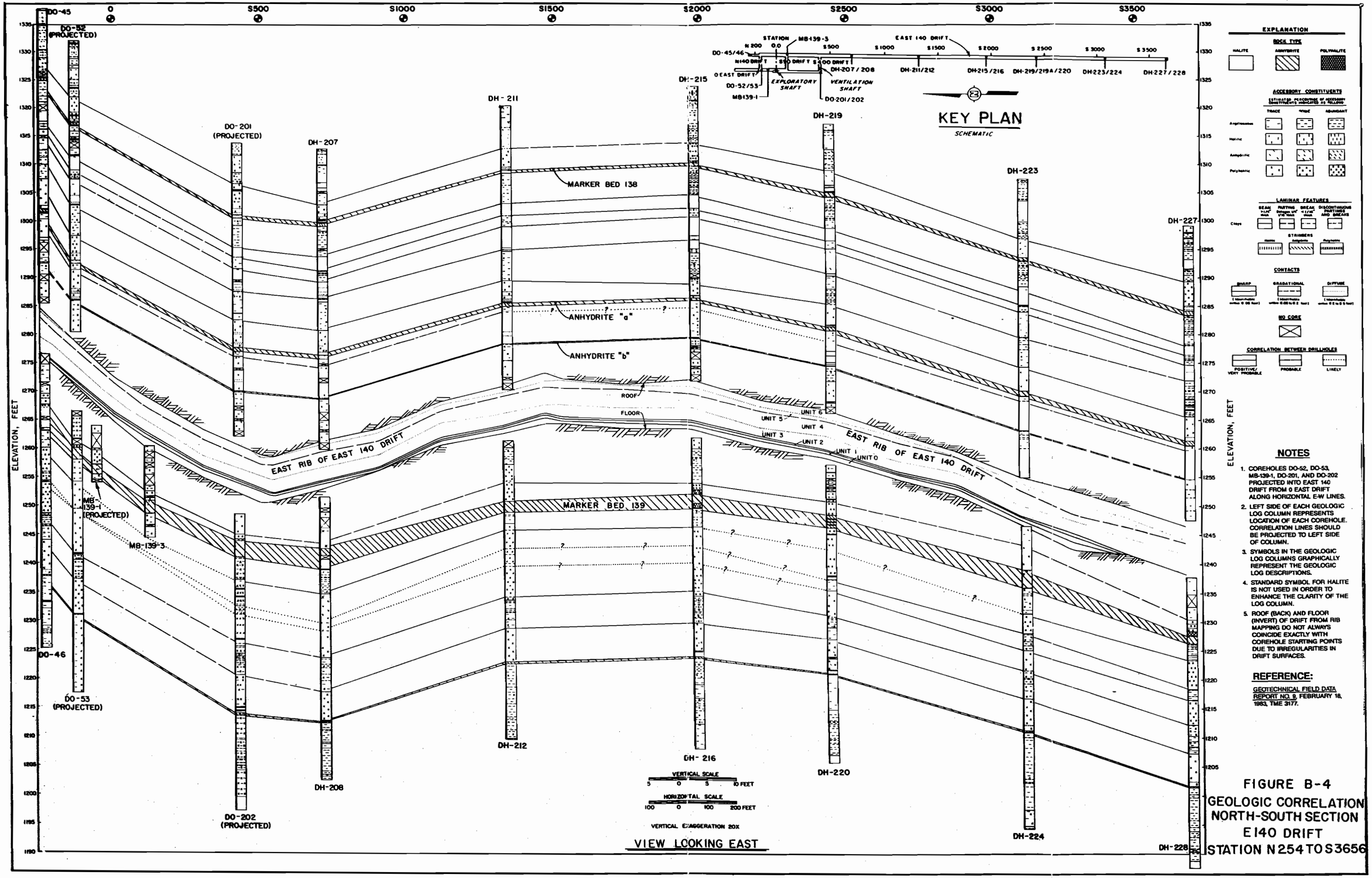
UNIT 1 Halite: light reddish-orange (1 OR 8/6) to moderate reddish-orange (1 OR 6/6), less frequently colorless; translucent to transparent; medium to coarsely crystalline; trace of dispersed polyhalite; lower contact with Unit 0 is sharp.

UNIT 0 Argillaceous halite: colorless to moderate reddish-orange (1 OR 6/6) and moderate reddish-brown (1 OR 4/6); medium to coarsely crystalline; trace of dispersed polyhalite; some argillaceous material occurs as discontinuous laminations and blebs or fills interstices (decreasing downward); contains finely crystalline halite; unit extends into the floor.

NOTES:

(1) Units listed in descending order from roof to floor.

(2) Alpha-numeric color designations are based on Geological Society of America Rock Color Chart.



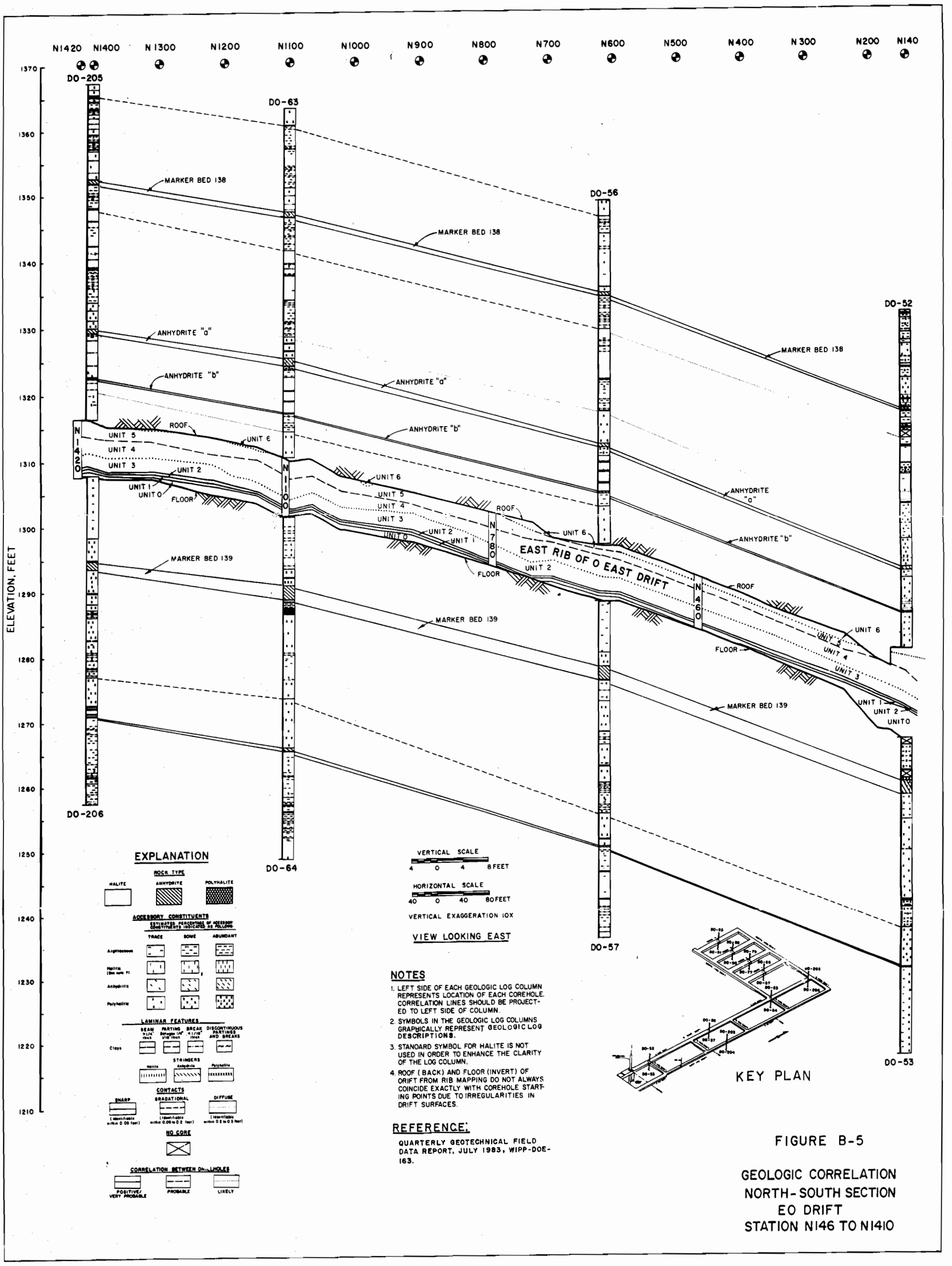
NOTES

1. COREHOLES DO-52, DO-53, MB-139-1, DO-201, AND DO-202 PROJECTED INTO EAST 140 DRIFT FROM 0 EAST DRIFT ALONG HORIZONTAL E-W LINES.
2. LEFT SIDE OF EACH GEOLOGIC LOG COLUMN REPRESENTS LOCATION OF EACH COREHOLE. CORRELATION LINES SHOULD BE PROJECTED TO LEFT SIDE OF COLUMN.
3. SYMBOLS IN THE GEOLOGIC LOG COLUMNS GRAPHICALLY REPRESENT THE GEOLOGIC LOG DESCRIPTIONS.
4. STANDARD SYMBOL FOR HALITE IS NOT USED IN ORDER TO ENHANCE THE CLARITY OF THE LOG COLUMN.
5. ROOF (BACK) AND FLOOR (INVERT) OF DRIFT FROM RIB MAPPING DO NOT ALWAYS COINCIDE EXACTLY WITH COREHOLE STARTING POINTS DUE TO IRREGULARITIES IN DRIFT SURFACES.

REFERENCE:

GEOTECHNICAL FIELD DATA REPORT NO. 9, FEBRUARY 18, 1983, TME 3177.

FIGURE B-4
GEOLOGIC CORRELATION NORTH-SOUTH SECTION E140 DRIFT STATION N254 TO S3656



NOTES

1. LEFT SIDE OF EACH GEOLOGIC LOG COLUMN REPRESENTS LOCATION OF EACH COREHOLE. CORRELATION LINES SHOULD BE PROJECTED TO LEFT SIDE OF COLUMN.
2. SYMBOLS IN THE GEOLOGIC LOG COLUMNS GRAPHICALLY REPRESENT GEOLOGIC LOG DESCRIPTIONS.
3. STANDARD SYMBOL FOR HALITE IS NOT USED IN ORDER TO ENHANCE THE CLARITY OF THE LOG COLUMN.
4. ROOF (BACK) AND FLOOR (INVERT) OF DRIFT FROM RIB MAPPING DO NOT ALWAYS COINCIDE EXACTLY WITH COREHOLE STARTING POINTS DUE TO IRREGULARITIES IN DRIFT SURFACES.

REFERENCE:

QUARTERLY GEOTECHNICAL FIELD DATA REPORT, JULY 1983, WIPP-DOE-163.

FIGURE B-5

GEOLOGIC CORRELATION
NORTH-SOUTH SECTION
EO DRIFT
STATION N146 TO N1410

STATIONS (FEET EAST FROM CENTERLINE OF C&SH SHAFT)

E100 E300 E500 E700 E900 E1100 E1300 E1500 E1700

ELEVATION (FEET)

1380 1370 1360 1350 1340 1330 1320 1310 1300 1290 1280 1270 1260 1250

DH-19 DH-03A DH-23 DH-07 DH-11 DH-15

ANHYDRITE a

ANHYDRITE b

MB-139

CLAY 1

ANHYDRITE

EL.1314.7' EL.1317.4' EL.1328.0' EL.1326.7' EL.1320.5' EL.1308.9'

NORTH RIB OF N1100 DRIFT

EL.1306.2' EL.1309.7' EL.1319.5' EL.1318.0' EL.1311.1' EL.1300.3'

DH-20 DH-04B DH-24A DH-08B DH-12 DH-16

HORIZONTAL SCALE IN FEET 0 50 100 150 200 250

VERTICAL SCALE IN FEET 0 5 10 15 20 25

VIEW LOOKING NORTH

8 7 6 5 4 3 2 1

H G F E D C B A

N1420 DRIFT

N1100 DRIFT

DH-17 DH-19 DH-01 DH-18 DH-03A DH-21 DH-05 DH-02B DH-23 DH-20 DH-04B DH-22 DH-07 DH-09 DH-06 DH-25 DH-24A DH-11 DH-13A,B DH-08B DH-10 DH-26 DH-12 DH-15 DH-14 DH-16

E500 E1000 E1500

KEY PLAN

GEOLOGIC SYMBOLS EXPLANATION

ROCK TYPE

HALITE ANHYDRITE POLYHALITE

ACCESSORY CONSTITUENTS

ARGILLACEOUS

HALITIC

ANHYDRITIC

POLYHALITIC

LAMINAR FEATURES

CLAYS

SEAM >1/4 in. thick

PARTING Between 1/4 in. 1/16 in. thick

BREAK < 1/16 in. thick

DISCONTINUOUS PARTINGS AND BREAKS

STRINGERS

HALITE ANHYDRITE POLYHALITE

CONTACTS (CORRELATION BETWEEN DRILL HOLES)

SHARP (Identifiable within 0.05 ft.)

GRADATIONAL (Identifiable within 0.05 to 0.2 ft.)

DIFFUSE (Identifiable within 0.2 to 0.5 ft.)

NOTES:

1. CENTER OF EACH GEOLOGIC LOG COLUMN REPRESENTS LOCATION OF EACH COREHOLE. CORRELATION LINES SHOULD BE PROJECTED TO CENTER OF COLUMN.
2. SYMBOLS IN THE GEOLOGIC LOG COLUMNS GRAPHICALLY REPRESENT THE GEOLOGIC LOG DESCRIPTIONS.

REFERENCE:

QUARTERLY GEOTECHNICAL FIELD DATA REPORT, AUGUST 1984, WIPP-DOE-200.

FIGURE B-6

GEOLOGIC CORRELATION

EAST-WEST SECTION, N1100 DRIFT

STATION E206 TO E1698

STATIONS (FEET EAST FROM CENTERLINE OF C & SH SHAFT)

E 100 E 300 E 500 E 700 E 900 E 1100 E 1300 E 1500 E 1700

ELEVATION (FEET)

1390 1380 1370 1360 1350 1340 1330 1320 1310 1300 1290 1280 1270 1260 1250 1240

DH-17 DH-01 DH-21 DH-05 DH-09 DH-25 DH-13A,B

MB-138 CLAY I ANHYDRITE a CLAY H ANHYDRITE b CLAY G

EL. 1316.5' EL. 1318.2' EL. 1331.0' EL. 1329.9' EL. 1324.5' EL. 1318.8' EL. 1311.5'

NORTH RIB OF N1420 DRIFT

EL. 1318.8' EL. 1317.9'

EL. 1305.1 EL. 1306.3' EL. 1312.1' EL. 1307.2' EL. 1299.5'

MB-139 CLAY D ANHYDRITE c CLAY B

DH-18 DH-02B DH-22 DH-06 DH-10 DH-26 DH-14

0 50 100 150 200 250
HORIZONTAL SCALE IN FEET

0 5 10 15 20 25
VERTICAL SCALE IN FEET

VIEW LOOKING NORTH

NOTE:
SEE FIGURE B-6 FOR KEY PLAN, NOTES AND EXPLANATION OF GEOLOGIC SYMBOLS.

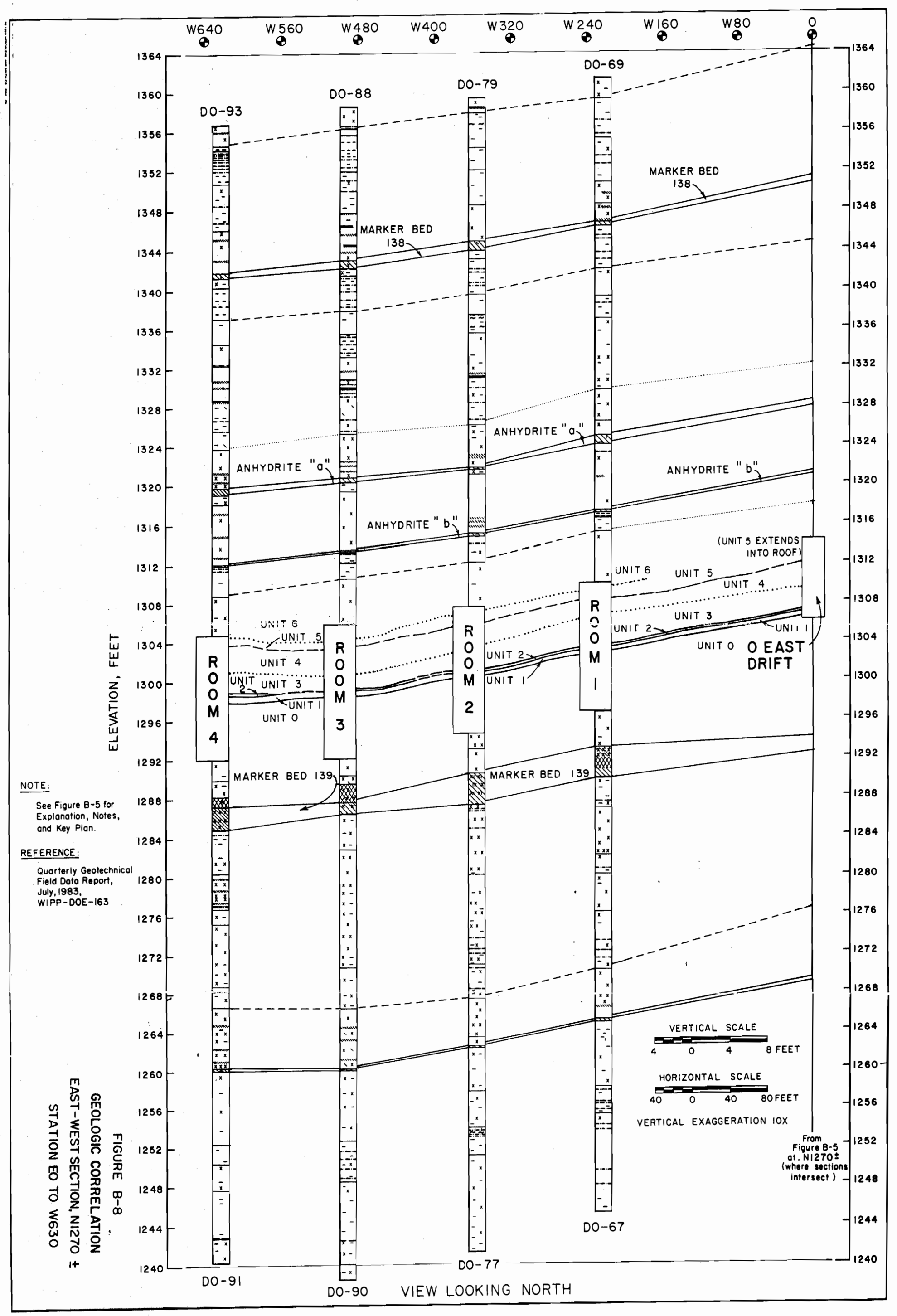
REFERENCE:
QUARTERLY GEOTECHNICAL FIELD DATA REPORT, AUGUST 1984, WIPP-DOE-200.

FIGURE B-7

GEOLOGIC CORRELATION
EAST-WEST SECTION, N1420 DRIFT
STATION E206 TO E1698

8 7 6 5 4 3 2 1

H G F E D C B A



NOTE:

See Figure B-5 for Explanation, Notes, and Key Plan.

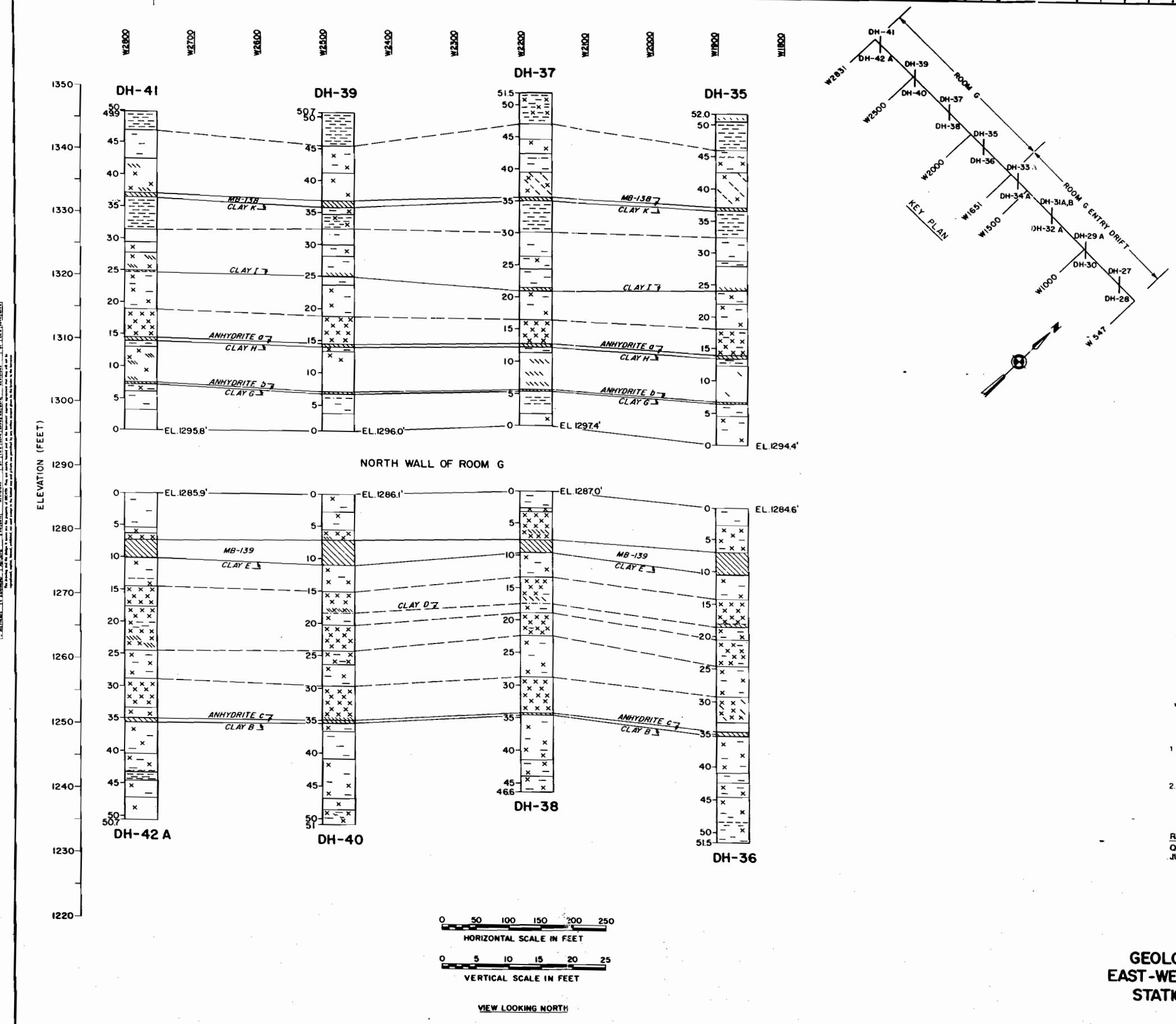
REFERENCE:

Quarterly Geotechnical Field Data Report, July, 1983, WIPP-DOE-163

FIGURE B-8

GEOLOGIC CORRELATION

EAST-WEST SECTION, N1270 ± STATION E0 TO W630



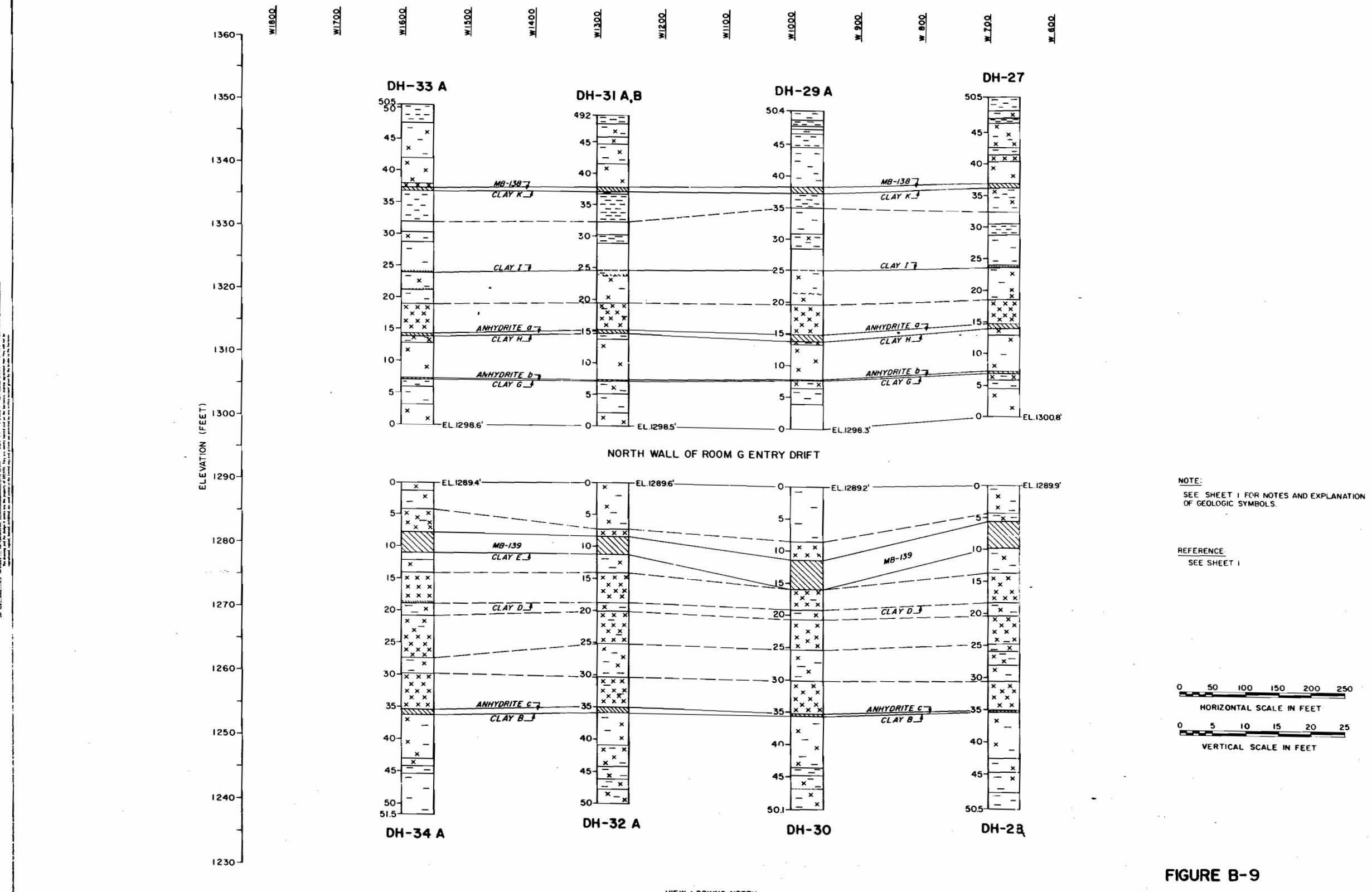
SCALING RULES

SIZE E

FIGURE B-9

GEOLOGIC CORRELATION EAST-WEST SECTION, N 1100 DRIFT STATION W682 TO W2782

SHEET 1 OF 2



NOTE:
SEE SHEET 1 FOR NOTES AND EXPLANATION OF GEOLOGIC SYMBOLS.

REFERENCE
SEE SHEET 1

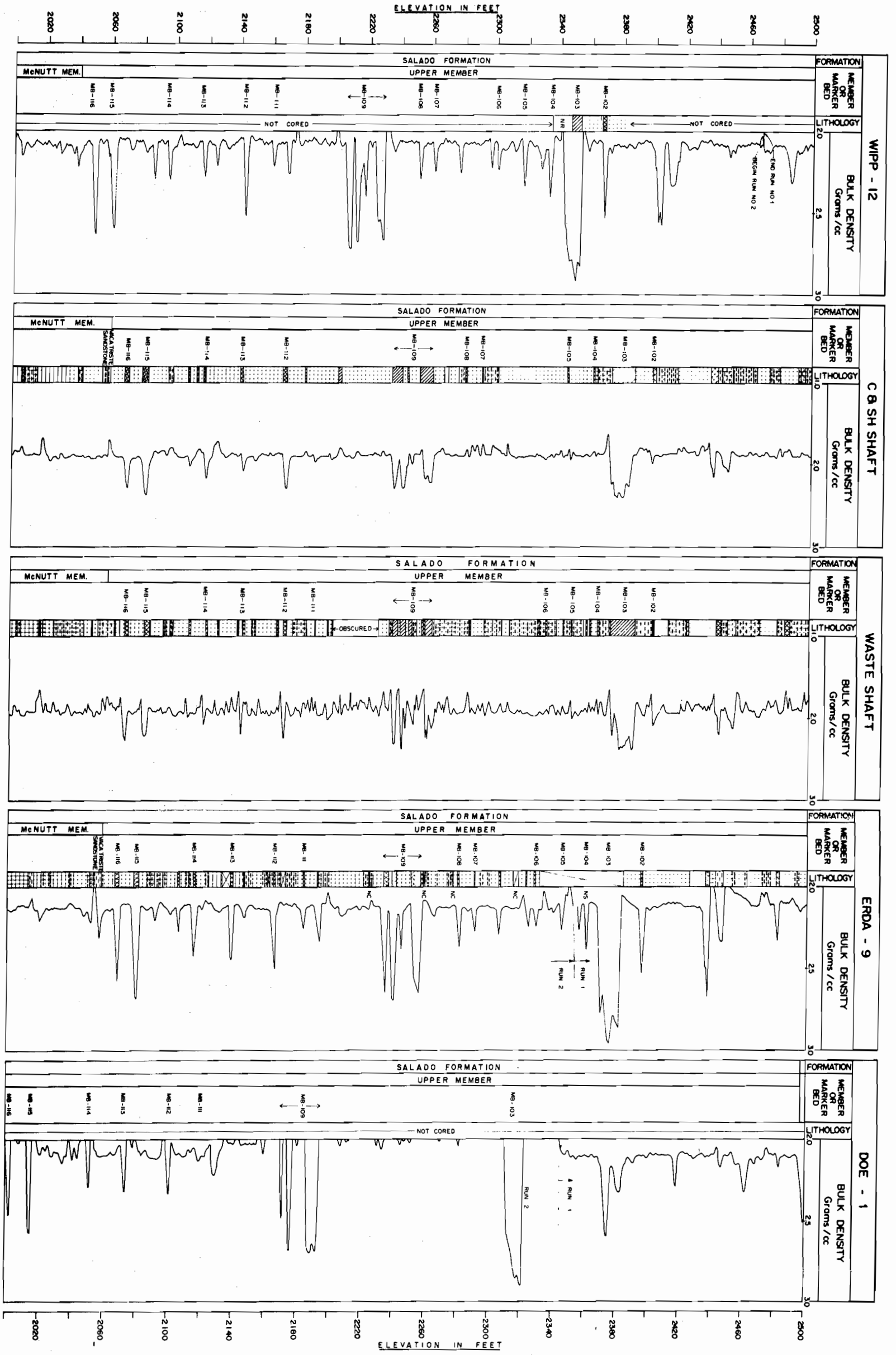
0 50 100 150 200 250
HORIZONTAL SCALE IN FEET

0 5 10 15 20 25
VERTICAL SCALE IN FEET

FIGURE B-9

GEOLOGIC CORRELATION EAST-WEST SECTION, N1100 DRIFT STATION W682 TO W2782

SHEET 2 OF 2



NOTE

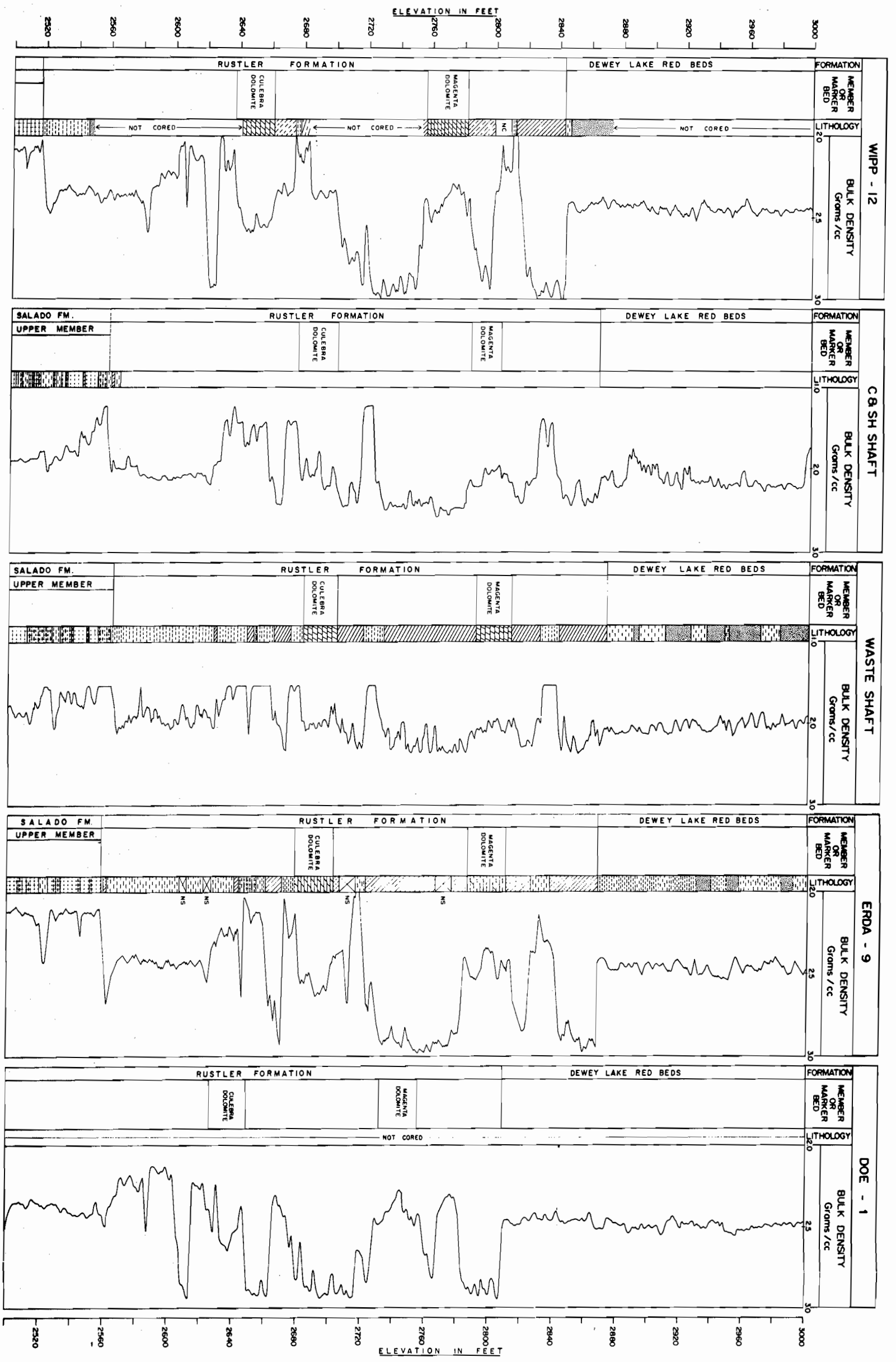
See sheet 1 for explonation and key plan

FIGURE B-1

GEOLOGIC CORRELATION
WIPP-12 TO DOE-1

SHEET 3 OF 5

FINAL DESIGN VALIDATION REPORT
REVISIONS



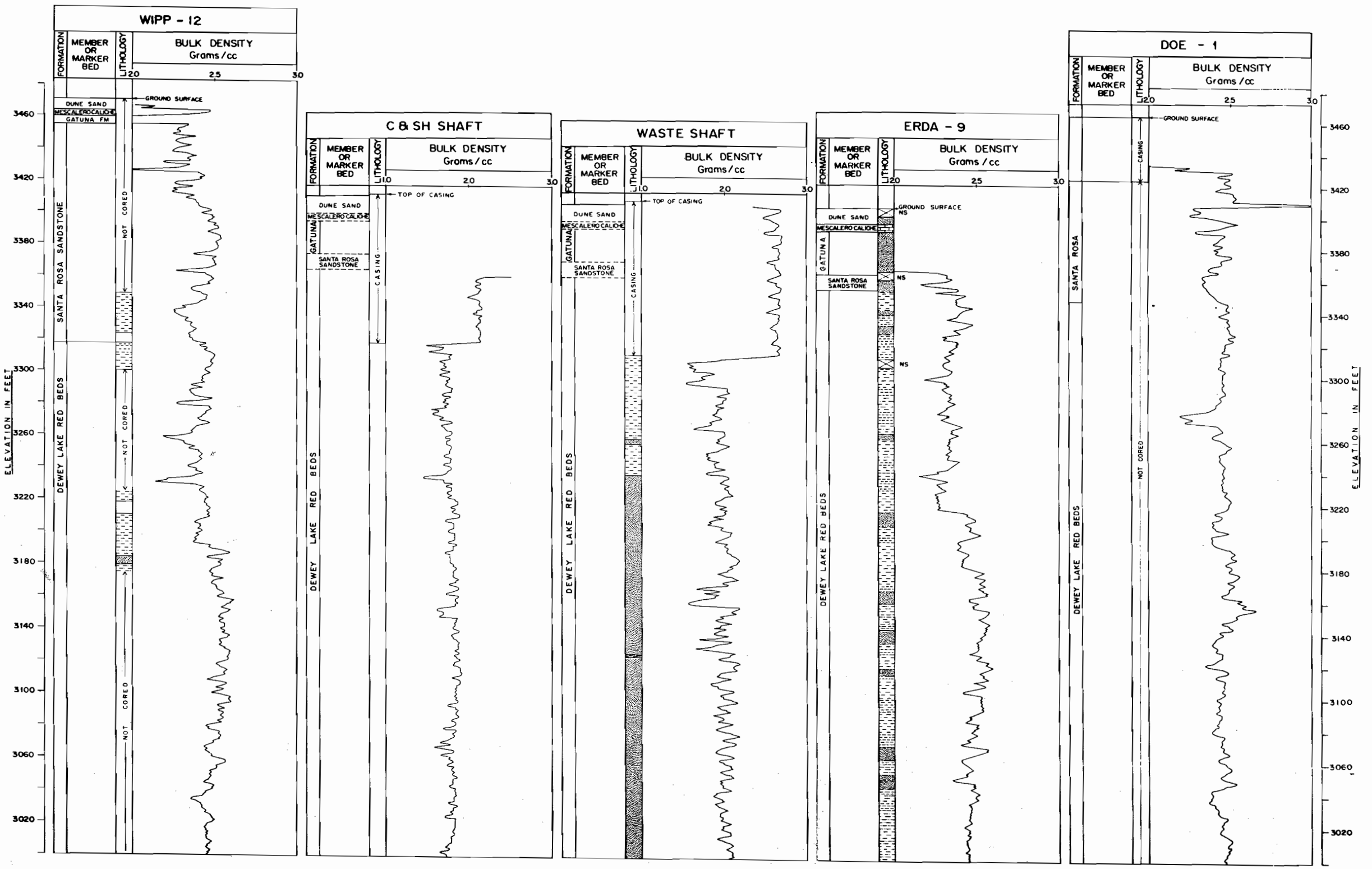
NOTE

See sheet 1 for explanation and key plan

FIGURE B-1

GEOLOGIC CORRELATION
WIPP-12 TO DOE-1

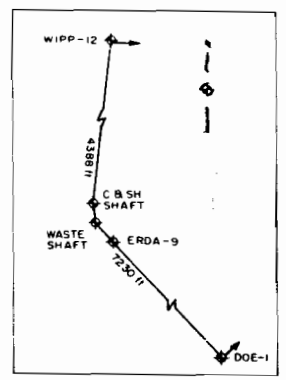
SHEET 2 OF 5



EXPLANATION

- Sandstone
- Caliche
- Siltstone
- Mudstone
- Anhydrite
- Gypsum
- Dolomite
- Halite
- Argillaceous Halite
- Polyhalite

NC = Not Cored
NR = No Recovery
NS = No Sample
MB = Marker Bed



KEY PLAN

FIGURE B-1

GEOLOGIC CORRELATION
WIPP-12 TO DOE-1

SHEET 1 OF 5

APPENDIX C

MATHEMATICAL SIMULATION OF UNDERGROUND IN SITU BEHAVIOR

CONTENTS

Section	Title
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C.2	MATERIAL BEHAVIOR OF HOST ROCKS
C.3	FORMULATION OF GOVERNING EQUATIONS
C.4	NORMALIZATION OF GOVERNING EQUATIONS
C.5	DETERMINATION OF CREEP CONSTANTS
C.6	PREDICTION OF STRUCTURAL BEHAVIOR
C.7	CONCLUSIONS

Figure No.	Title/Description
C-1	Time Response Relationship of the Normalized Creep Analysis Method
C-2	Graphical Representation of Creep Constants Relating Time Domains
C-3	Comparison of Analytical Results and In Situ Responses for Various Data Point Sets
C-4	Comparison of Analytical Results and In Situ Response for Various Instrument Offset Values

APPENDIX C

MATHEMATICAL SIMULATION OF UNDERGROUND IN SITU BEHAVIOR

C.1 INTRODUCTION

The methodology described in the following sections presents analytical techniques for simulating underground behavior in salt formations. Consideration is given to time-dependent non-linear material behavior and incorporation of in situ measurements to predict structural responses. The theoretical background and procedures presented by this methodology are explained.

C.2 MATERIAL BEHAVIOR OF HOST ROCKS

The most significant physical property of halite is that it creeps. Its creep behavior is dependent upon the variations of stress and temperature with respect to time. The creep phenomenon is also affected by the physical properties of the geologic strata adjacent to the halite and by discontinuities in the geologic layers. Therefore, non-halitic interbeds and clay seams should also be considered when modeling and simulating the structural behavior of salt formations. The following subsections summarize the material behavior of various host rocks (ref. C-1).

C.2.1 Halitic Materials

The constitutive equation for halitic materials can be expressed as:

$$\dot{\varepsilon}_{ij} = -\frac{\upsilon}{E}\,\dot{\sigma}_{kk}\,\delta_{ij} + \frac{1+\upsilon}{E}\,\dot{\sigma}_{ij} + \dot{\varepsilon}^{c}_{ij} \qquad \text{(C.2-1)}$$

where: $\dot{\varepsilon}_{ij}$ are the components of the strain tensor;

υ is Poisson's ratio;

E is Young's modulus;

δ_{ij} is the Kronecker delta;

$\dot{\sigma}_{ij}$ are the components of the stress tensor; and

the creep strain rate, $\dot{\varepsilon}^c_{ij}$, is given by:

$$\dot{\varepsilon}^c_{ij} = |\dot{\varepsilon}^c_{kl}| \frac{\sigma'_{ij}}{|\sigma'_{mn}|} \qquad \text{(C.2-2)}$$

where: σ'_{ij} are the components of the deviatoric stress tensor.

The magnitude of the creep strain rate can be expressed in terms of the effective creep strain rate, ε, or the effective stress, σ. Thus,

$$|\dot{\varepsilon}^c_{ij}| = \sqrt{1.5}\ \bar{\dot{\varepsilon}} \qquad \text{(C.2-3)}$$

where the effective strain rate $\bar{\dot{\varepsilon}}$ is defined as:

$$\bar{\dot{\varepsilon}} = \left(\frac{2}{3} \dot{\varepsilon}^c_{ij} \dot{\varepsilon}^c_{ij} \right)^{1/2} \qquad \text{(C.2-4)}$$

which is the sum of the primary and secondary creep strain rates, namely

$$\bar{\dot{\varepsilon}} = \dot{\varepsilon}_p + \dot{\varepsilon}_s \qquad \text{(C.2-5)}$$

where the primary creep strain rate is defined as:

$$\dot{\varepsilon}_p = (A - B\,\varepsilon_p)\,\dot{\varepsilon}_s \qquad \text{for } \dot{\varepsilon}_s \geq \dot{\varepsilon}^*$$

and $$\qquad \text{(C.2-6)}$$

$$\dot{\varepsilon}_p = \left(A - B\,\frac{\dot{\varepsilon}^*}{\dot{\varepsilon}_s}\varepsilon_p\right)\dot{\varepsilon}_s \qquad \text{for } \dot{\varepsilon}_s < \dot{\varepsilon}^*$$

where $\dot{\varepsilon}_s$ can be defined by an exponential law

$$\dot{\varepsilon}_s = D\,\sigma^{-n}\,e^{-Q/R\Theta} \qquad \text{(C.2-7)}$$

and $\bar{\sigma} = \left(\frac{3}{2} \sigma'_{ij} \sigma'_{ij} \right)^{1/2}$ is the effective stress;

$\dot{\varepsilon}^*$, A and B are primary creep constants;

D and n are secondary creep constants;

Θ is temperature in Kelvin;

Q is the effective activation energy in cal/mole; and

R is the universal gas constant, 1.987 cal/mole-K.

C.2.2 Non-halitic Materials

In the underground facility horizon at the WIPP site, certain portions of the rock are non-halitic. The stress-strain relationship for non-halitic materials is assumed to follow the Prandtl-Reuss constitutive equation:

$$\dot{\varepsilon}_{ij} = -\frac{\nu}{E}\dot{\sigma}_{kk}\,\delta_{ij} + \frac{1+\nu}{E}\dot{\sigma}_{ij} + \dot{\varepsilon}^{P}_{ij} \qquad \text{(C.2-8)}$$

The plastic behavior is defined by the two-dimensional Mohr-Coulomb criterion:

$$\sigma_3 - \sigma_1 = 2\Theta_0\cos\beta - (\sigma_3 + \sigma_1)\sin\beta \qquad \text{(C.2-9)}$$

and the Drucker-Prager criterion, which is the generalized form of the Mohr-Coulomb criterion:

$$\sqrt{J_2'} = c - aJ_1 \qquad \text{(C.2-10)}$$

where: σ_3 and σ_1 are the two principal stresses, which are positive in tension;

Θ_0, β, c and a are the plastic constants;

$\sqrt{J_2'}$ is the second deviatoric stress invariant; and

J_1 is the first stress invariant.

The numerical modeling does not include failure criterion for the non-halitic materials. Anhydrite is assumed to be linearly elastic.

C.2.3 Clay Seams

Thin seams of clay are present between some of the rock layers. These clay seams can allow relative slippage and separation of the layers across the clay seams. The slippage of the clay seams follows a dry friction law:

$$\sigma_{12} = \mu \, |\sigma_{11}| \qquad \text{(C.2-11)}$$

where: μ is the frictional coefficient; direction 1 of the stress is normal to the plan of the seam; and direction 2 of the stress is in the direction of motion or incipient motion.

C.3 FORMULATION OF GOVERNING EQUATIONS

The underground behavior of salt can be determined by solving the following governing equations:

(1) Equation of equilibrium:

$$\sigma_{ij,j} + X_i = 0 \qquad \text{(C.3-1)}$$

where: σ_{ij} is the stress tensor; and

X_i is the body force vector.

(2) Strain-rate velocity relation:

$$2\dot{\varepsilon}_{ij} = \dot{u}_{i,j} + \dot{u}_{j,i} \qquad \text{(C.3-2)}$$

where: $\dot{\varepsilon}_{ij}$ is the strain rate tensor;

$\dot{u}_i$ is the velocity vector; and

($\dot{}$) represents the derivative of ( ) with respect to time t.

(3) Stress strain relations:

<u>halitic materials</u>

$$\dot{\varepsilon}_{ij} = -\frac{\nu}{E}\,\dot{\sigma}_{kk}\delta_{ij} + \frac{1+\nu}{E}\,\dot{\sigma}_{ij} + \dot{\varepsilon}^{C}_{ij} \qquad \text{(C.3-3)}$$

where: $\dot{\varepsilon}^{C}$ is defined in subsection C.2.1.

<u>non-halitic materials</u>

$$\dot{\varepsilon}_{ij} = -\frac{\nu}{E}\,\dot{\sigma}_{kk}\,\delta_{ij} + \frac{1+\nu}{E}\,\dot{\sigma}_{ij} + \dot{\varepsilon}^{P}_{ij} \qquad \text{(C.3-4)}$$

(4) Boundary conditions:

$$\dot{u}_i = \dot{U}_i \qquad \text{over } S_u \qquad \text{(C.3-5)}$$

$$\sigma_{ij} n_j = T_i \qquad \text{over } S_\sigma \qquad \text{(C.3-6)}$$

where: S_u is the surface on which $\dot{u}_i$ is specified as U_i and S_σ is the surface on which the traction vector $\sigma_{ij} n_j$ is specified as T_i where n_j is the component of the outward-pointing unit normal vector.

C.4 NORMALIZATION OF GOVERNING EQUATIONS

In order to determine the creep properties of halite, the governing equations in Section C.3 need to be solved before knowing the values of the creep constants. This can be achieved by normalizing the governing equations to the creep function and solving the normalized equations. The creep constants can then be determined by correlating the analytical results with in situ data.

Consider the creep behavior of halitic material follows a power law:

$$\dot{\varepsilon} = F\,\sigma^{-n} \qquad \text{(C.4-1)}$$

where: F is a creep function.

The governing equations in Section C.2 can be normalized to F by transforming to a normalized time domain in terms of time t* such that:

$$dt^* = F\,dt \qquad \text{(C.4-2)}$$

By substituting equation (C.4-2) into equations (C.3-1) through (C.3-6), a system of normalized equations can be formed:

(1) Equation of equilibrium:

$$\sigma_{ij,j} + X_i = 0 \qquad \text{(C.4-3)}$$

(2) Strain-rate velocity relation:

$$2\dot{\varepsilon}^*_{ij} = \dot{u}^*_{i,j} + \dot{u}^*_{j,i} \qquad \text{(C.4-4)}$$

where: $(\dot{}^*)$ represents the derivative of ( ) with respect to the normalized time t*.

(3) Stress strain relations:

halitic materials

$$\dot{\varepsilon}^*_{ij} = -\frac{\upsilon}{E}\,\dot{\sigma}^*_{kk}\,\delta_{ij} + \frac{1+\upsilon}{E}\,\dot{\sigma}^*_{ij} + \dot{\varepsilon}^{*c}_{ij} \qquad \text{(C.4-5)}$$

where: $\dot{\varepsilon}^*_s = \sigma^{-n}$ (C.4-6)

non-halitic materials

$$\dot{\varepsilon}^*_{ij} = -\frac{\upsilon}{E}\,\dot{\sigma}^*_{kk}\,\delta_{ij} + \frac{1+\upsilon}{E}\,\dot{\sigma}^*_{ij} + \dot{\varepsilon}^{*p}_{ij} \qquad \text{(C.4-7)}$$

(4) Boundary conditions:

$$\dot{u}^*_i = \dot{U}^*_i \qquad \text{over } S_u \qquad \text{(C.4-8)}$$

where: $\dot{U}^*_i$ is computed as $\dot{U}^*_i = U_i/F$

$$\sigma_{ij} n_j = T_i \qquad \text{over } S_\sigma \qquad \text{(C.4-9)}$$

The above normalized governing equations are similar to the governing equations before normalization, except that the time derivatives in the normalized equations are taken with respect to normalized time t*, and the creep function F has been eliminated. Since the normalized governing equations have the same form as the governing equations before normalization, a conventional method such as the finite element technique can be used to solve the normalized governing equations for the analytical results in terms of normalized time t*, without knowing the creep function F.

After obtaining the normalized analytical result, the creep function F can be determined for establishing the relationship between the real and the normalized time domains. From Equations (C.2-5) through (C.2-7), the function F can be expressed as:

$$F = [f(\varepsilon_p, \dot{\varepsilon}_s) + 1]C \qquad \text{(C.4-10)}$$

where: $C = D\, e^{-Q/R\Theta}$; A is defined in equation (C.2-6); D, Q, R and Θ are defined in equation (C.2-7); and $f(\varepsilon_p, \varepsilon_s)$ represents the portion inside the parentheses of equation (C.2-6), which is expressed as:

$$f(\varepsilon_p, \dot{\varepsilon}_s) = A - B\, \varepsilon_p \qquad \text{for } \dot{\varepsilon}_s \geq \dot{\varepsilon}^*$$

and (C.4-11)

$$f(\varepsilon_p, \dot{\varepsilon}_s) = A - B\, \frac{\dot{\varepsilon}^*}{\dot{\varepsilon}_s} \varepsilon_p \qquad \text{for } \dot{\varepsilon}_s < \dot{\varepsilon}^*$$

From equation (C.4-11), it can be found that at time $t = 0$, $\varepsilon_p = 0$, which provides an initial condition:

$$f(\varepsilon_p, \dot{\varepsilon}_s) = A \qquad \text{for } t = 0 \qquad \text{(C.4-12)}$$

When the time t approaches the steady state stage t_s, primary creep is no longer active. Therefore:

$$f(\varepsilon_p, \dot{\varepsilon}_s) \to 0 \qquad \text{for } t \to t_s \qquad \text{(C.4-13)}$$

since the primary creep decreases exponentially with time (ref. C-1). Based on the auxiliary conditions (C.4-12) and (C.4-13), the function f can be expressed as an exponential function:

$$f = A\, e^{-zt} \qquad \text{(C.4-14)}$$

By substituting equation (C.4-14) into equation (C.4-1), function F can be written as:

$$F = [A\, e^{-zt} + 1]C \qquad \text{(C.4-15)}$$

where: the constants C, A and z can be determined from in situ data.

The relationship between the real time domain and the normalized time domain can then be obtained by integrating equation (C.4-2):

$$t^* = \int_0^t F\, dt \qquad \text{(C.4-16)}$$

Substituting equation (C.4-15) into equation (C.4-16) and using the initial condition $t^* = 0$, when $t = 0$, equation (C.4-16) becomes:

$$t^* = C\,[t + A/z\,(1 - e^{-zt})] \qquad \text{(C.4-17)}$$

After determining the creep constants, the analytical results can then be mapped from the normalized time domain to the real time domain using equation (C.4-17).

C.5 DETERMINATION OF CREEP CONSTANTS

The computational method can also be considered as a two-phased process which allows structural responses to be determined for any time in question. The first phase is a transformation from the real to the normalized time domain by use of parametric equations containing creep constants. The second phase is relating a structural response to that the normalized time by performing a structural analysis. The fundamental relationship can be represented graphically as shown on Figure C-1. The upper curve indicates the expression relating the two time domains which depends on the creep constants C, A and z. The double vertical axes represent the relationship between the normalized time t* and response as indicated by the results of the structural analysis.

The terms A and z represent primary creep constants that can be viewed in a number of ways. By themselves, 'A' relates the ratio of initial to steady-state creep rates and 'z' corresponds to the primary creep decay constant. A simplified relationship can be used utilizing only the ratio of A to z when the term inside the parentheses in equation (C.4-15) approaches unity in the steady-state period. As Figure C-2 indicates, the value of A/z (also identified as t_o) represents a real time offset such that the following equation can be used:

$$t^* = C\ (t + A/z) \qquad (C.5\text{-}1)$$

A Salt Creep Constant Evaluation computer program (SCCE, Bechtel computer program CE 465) was developed for the purpose of evaluating the creep constants from in situ data.

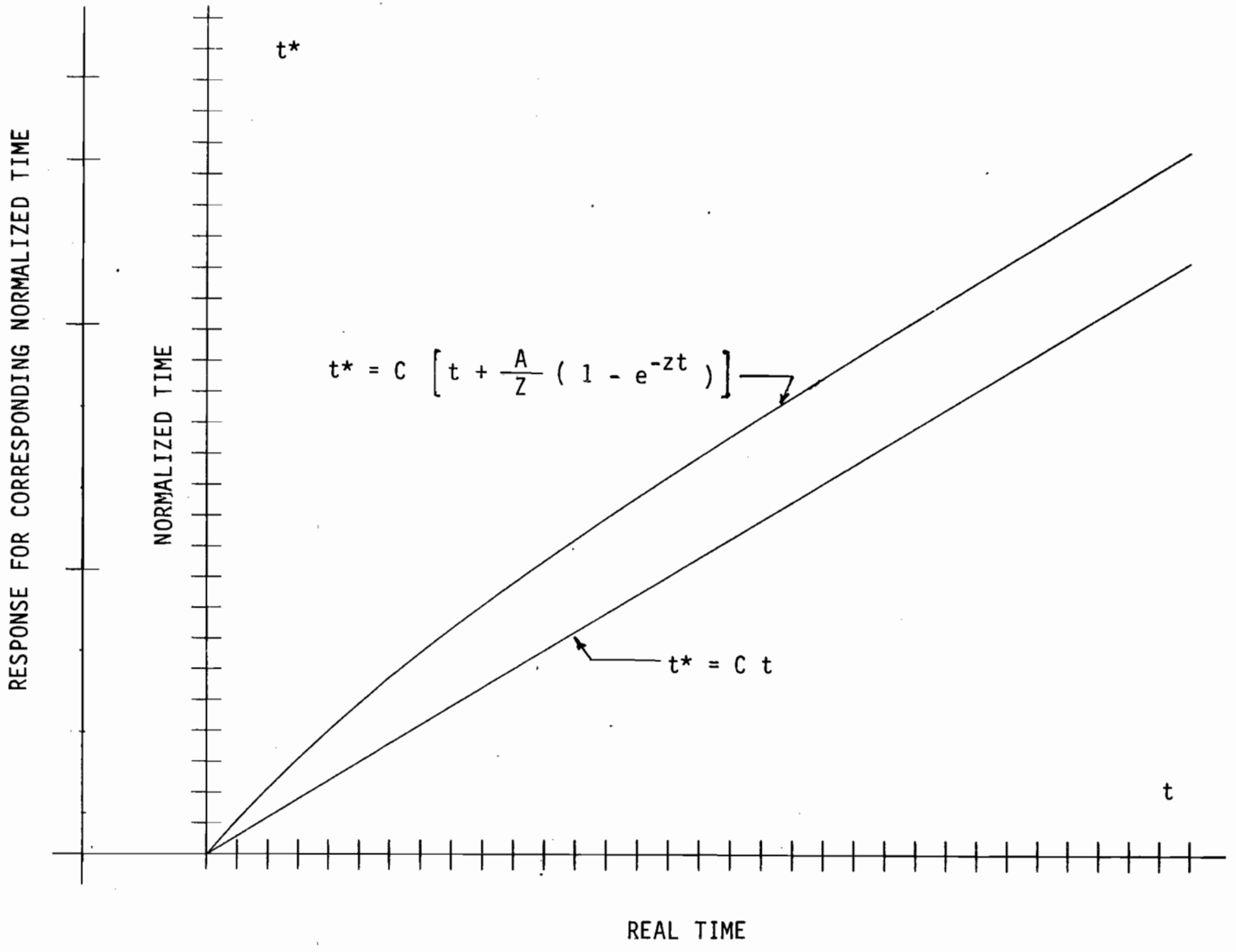

FIGURE C-1

TIME RESPONSE RELATIONSHIP OF THE NORMALIZED CREEP ANALYSIS METHOD

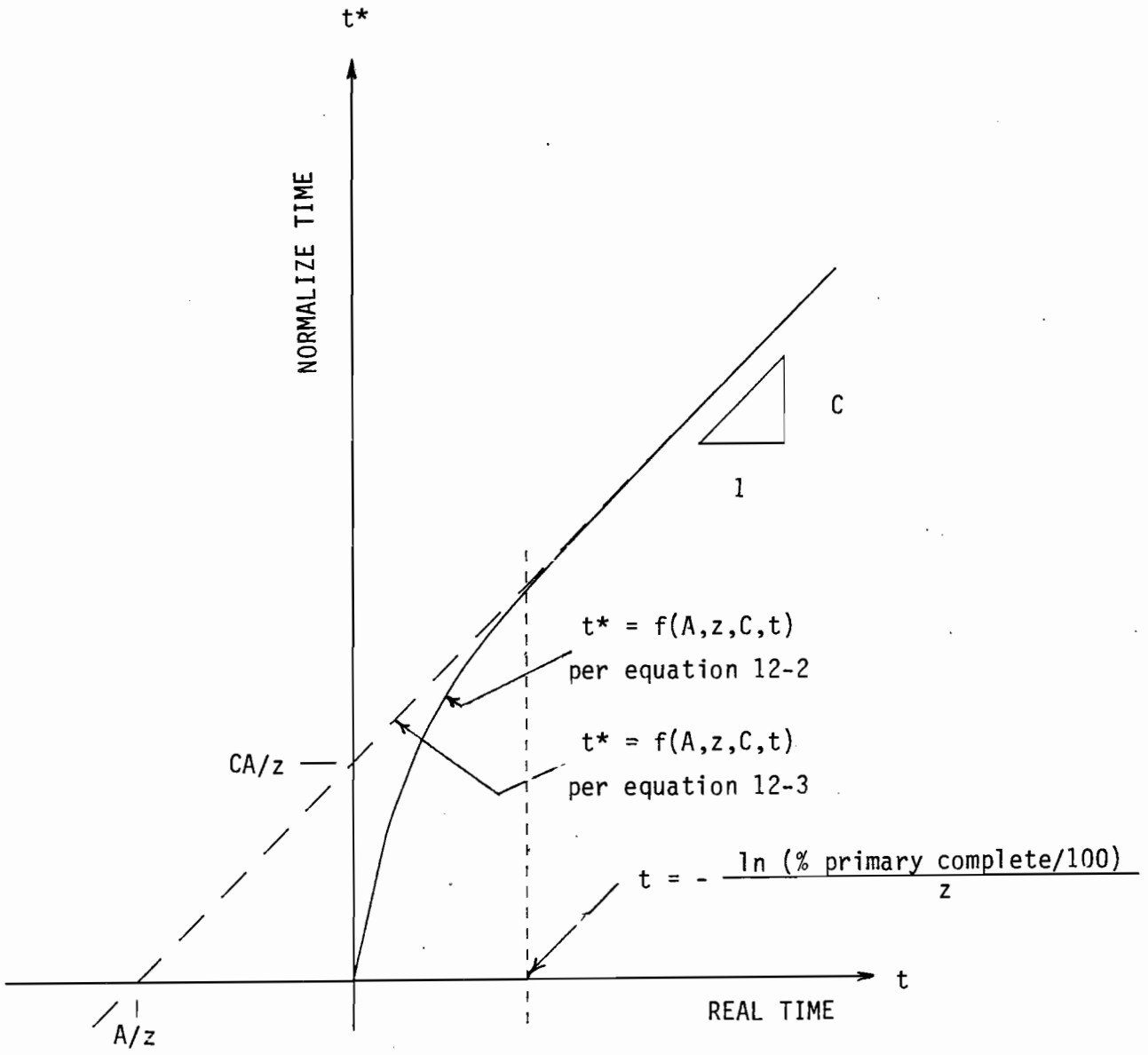

FIGURE C-2

GRAPHICAL REPRESENTATION OF

CREEP CONSTANTS RELATING TIME DOMAINS

The link between real time and response is completed by relating the normalized time to the response determined from the structural analysis. In brief, if the creep constants are known, the normalized time associated with any real time can be determined from equation (C.4-17) and the response corresponding to this time is found from the analysis results. Conversely, if in situ data which relates real time to response is available, this two-phased process can be worked backwards to evaluate the creep constants.

Because the response in both the in situ measurements and the structural analysis must be consistent, the displacements caused by creep are related.

In the analysis, the total response is an accumulation of elastic and creep responses,

$$R_t(t^*) = R_c(t^*) + R_e(t^*) \qquad \text{(C.5-2)}$$

where: R_t is the total response;
R_c is the creep response; and
R_e is the elastic response.

In as much as the total response at time $t^* = 0$ consists of elastic response only, and the elastic response $R_e(t^*)$ is always approximately equal to $R_t(0)$, the following equation can be used in lieu of equation (C.5-2):

$$R_c(t^*) = R_t(t^*) - R_t(0) \qquad \text{(C.5-3)}$$

The in situ readings represent the response relative to the time when the instrument was installed. In order for an actual creep response to be determined, the creep response which takes place between the time the excavation was made and the time when the instrument was installed must be found. Theoretically, if an instrument had been installed very shortly after excavation, this difference between measured and actual creep responses would be negligible. In reality, the excavation of all material contributing to the support of a specific location in an opening cannot be completed within a few days. As a result, the measured response from an instrument installed immediately after excavation would be a combination of initial creep and elastic responses. The term "instrument offset" is introduced to identify the difference between the actual creep response and the measured response starting at time t_1 when nearby excavations no longer introduce initial creep and elastic responses. This relationship is shown below:

$$R_I(t) = R_M(t) + R_I(t_1) \qquad \text{(C.5-4)}$$

where: R_I is the actual in situ response;
R_M is the measured response; and
$R_I(t_1)$ is the instrument offset.

Determination of the constant C, which represents the steady state creep rate, requires that the in situ readings are well into the steady state range. If this is the case, the relationship

$$dt^* = F\, dt \qquad \text{(C.5-5)}$$

can be used to determine the value of C since C equals F at very large values of t. The expression for C is:

$$C = (t^*_n - t^*_m) / (t_n - t_m) \qquad \text{(C.5-6)}$$

If t_m and t_n represent the times at which instrument readings are taken and $R_I(t_m)$ and $R_I(t_n)$ are the actual creep responses at these times, then the values of t^*_m and t^*_n can be found by relating these actual in situ creep responses with the analytical creep responses.

Assuming for the moment that the true value of instrument offset is known, equation (C.4-15) can be written for two time-response situations to produce two simultaneous equations which contain only the two remaining creep constants, A and z. By cancelling out the A term, the solution of the following equation provides the value of z.

$$\frac{1 - e^{-zt_n}}{1 - e^{-zt_m}} - \frac{t^*_n/C - t_n}{t^*_m/C - t_m} = 0 \qquad \text{(C.5-7)}$$

Once the value of z is found to satisfy the expression, A can be found from the following equation:

$$A = z\,(t_m^*/C - t_m) \;/\; (1 - e^{-zt}) \qquad \text{(C.5-8)}$$

Graphically this method determines constants which force the analytical curve to match the in situ data at the two time-response situations used in calculating the constants. Each different set of data points yields different values of A and z. Figure C-3 compares analytical and in situ responses for a few different sets of data points. Whereas creep behavior is history dependent, matching the last available data point is advantageous in predicting future responses. The determination of best values of A and z is done by minimizing the area between in situ and analytic response histories. The least area yields the best values. The SCCE program can be set up to search for this optimal condition.

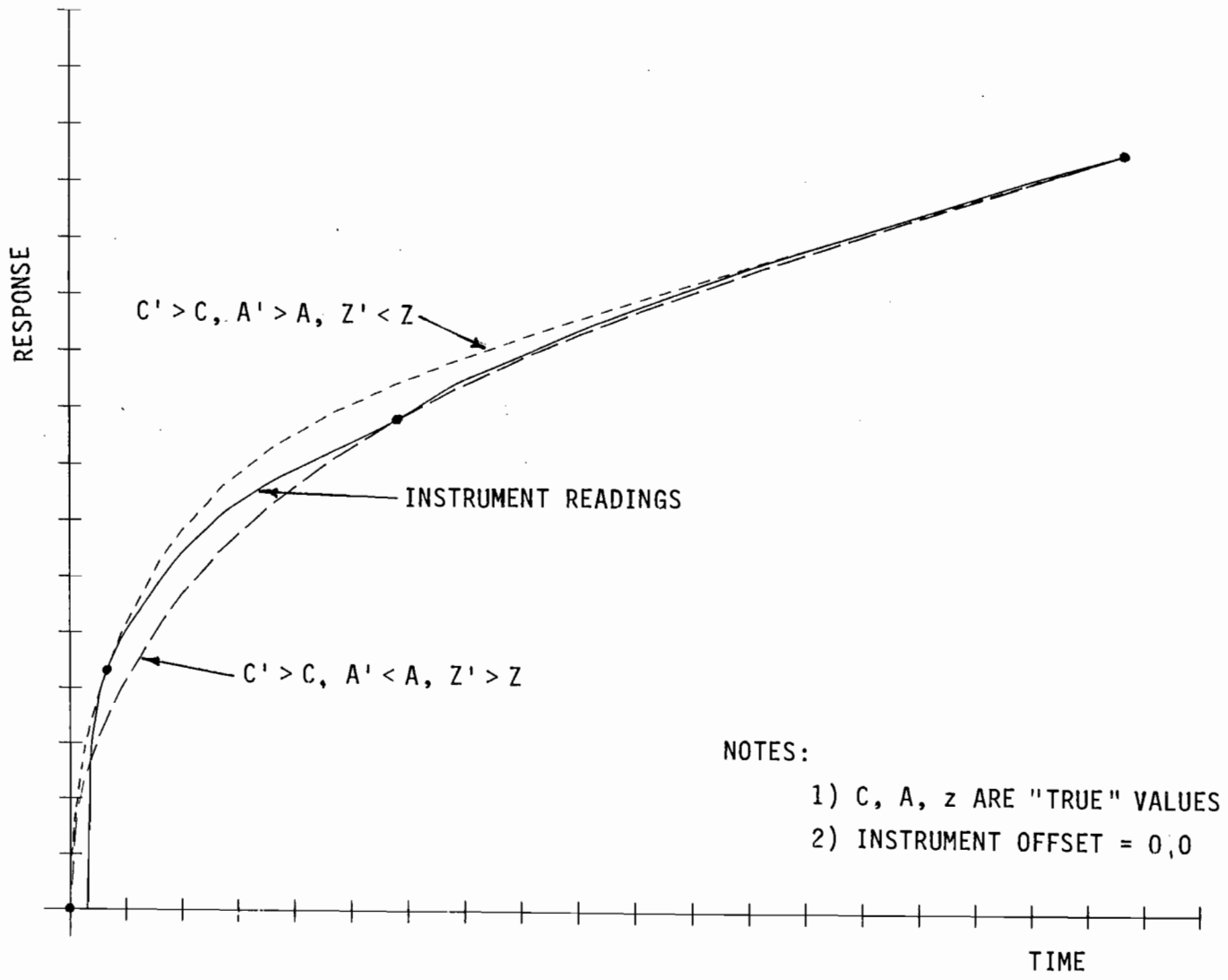

FIGURE C-3

COMPARISON OF ANALYTICAL RESULTS AND IN-SITU RESPONSES FOR VARIOUS DATA POINT SETS

The point which must be kept in perspective is that the determination of the constants A and z are dependent on both the instrument offset and the steady-state creep constant C. The effects of uncertainty in C can be minimized by assuring that no extraneous data are used in the solution of equation (C.5-6). The appropriate value of the instrument offset can only be found from minimizing the response deviation as was described in the previous paragraph. Figure C-4 shows how analytical and in situ responses compare for a few different values of the instrument offset. The curves in Figures C-3 and C-4 were generated through use of the SCCE program.

The SCCE computer program provides an effective means of determining salt creep properties by being able to process the large volume of in situ data and analytical results for design validation.

C.6 PREDICTION OF STRUCTURAL BEHAVIOR

After the creep constants C, A and z are determined, the structural response history can then be mapped from the normalized time domain into the real time domain using equation (C.4-15). Utilizing the in situ creep constants, additional mathematical models can also be used to predict the future structural responses for various facilities.

C.7 CONCLUSIONS

By normalizing the time in the governing equations to the creep function, the structural responses can be computed as functions of normalized time. This computation is performed without knowing the creep constants. After correlating the response history obtained from the analysis to the corresponding one measured from the site, the creep constants can be determined. Consequently, the relationship between the normalized and real time can be established, and the analytical responses can be mapped from the normalized time domain to the real time domain. Predicted results can therefore be provided for validating the adequacy of the underground behavior in the salt formation.

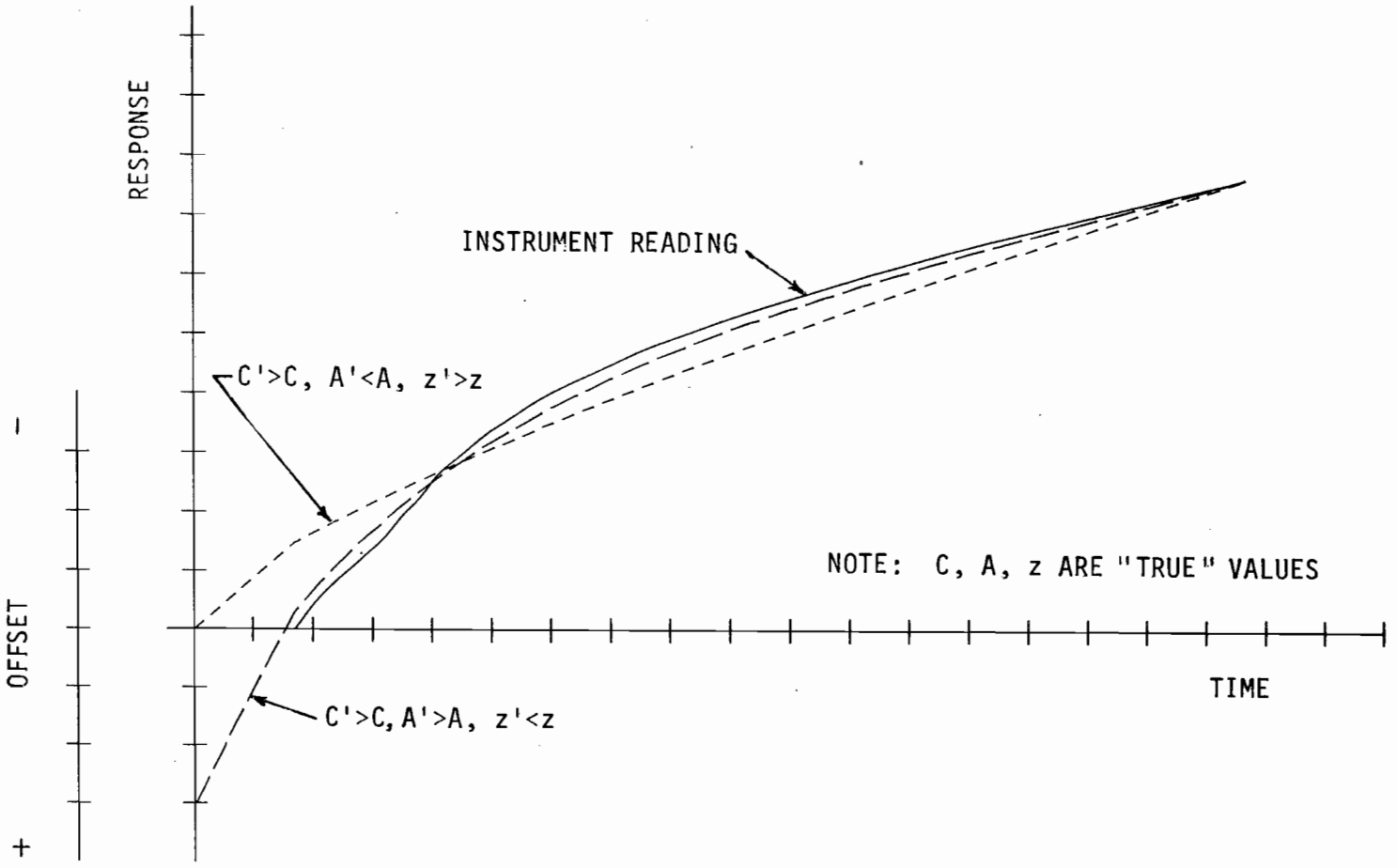

FIGURE C-4

COMPARISON OF ANALYTICAL RESULTS AND IN-SITU RESPONSE FOR VARIOUS INSTRUMENT OFFSET VALUES

REFERENCES

C-1 Krieg, R. D., January 1984, Reference Stratigraphy and Properties for the Waste Isolation Pilot Plant Project, SAND83-1908, Sandia National Laboratories, Albuquerque, New Mexico.

APPENDIX D

C & SH SHAFT
GEOLOGIC LOGS AND MAPS

CONTENTS

Figure No.	Title/Description
D-1	Geologic Drill Log 0 to 850 feet (11 Sheets)
D-2	Key Area Geology Bottom of casing to 920 feet
D-3	Lithologic Log Showing Sample and Instrument Locations Bottom of casing to 2200 feet (3 Sheets)
D-4	Facility Level Area Geology 2080 to 2192 feet

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
WIPP	12484	1 OF 11	EXPLORATORY SHAFT (SPDV)

SITE	COORDINATES	ANGLE FROM HORIZ.	BEARING
WIPP EDDY CO., NEW MEXICO	(PLANT GRID) N 9687.23 E 6894.89	90°	N. A.

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	HOLE SIZE	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FROM G.S.)
7-4-81	10-24-81	CHALLENGER DRILLING CO.	NATIONAL 125	142 IN.	16	2282	2298 FT.

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP OF CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
N. A.	N. A.	172	N.A.	3410.5	NOT DETERMINED	(FROM GROUND SURFACE) 16 FT./3394.5

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
N. A.	180 IN./11FT. 144 IN./93.4 FT. 120 IN./843 FT.	R.M. BEATHARD, R.C. KISER, J.L. MATTHEWS

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE / LENGTH CORE RUN	SAMPLE RECOVERY / CORE RECOVERY	SAMPLE BLOWS "N" / PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M.	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH (FT.) BELOW K. B.	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							3417.5	0			GROUND SURFACE	Rig depths measured from kelly bushing approx. 7 ft. above ground surface.
BACKHOE 168 IN. DIA. AUGER FROM 11 TO 97.5 FT NO SAMPLES TAKEN FROM GROUND SURFACE TO 103 FT.							3410.5	10			0-11' DUNE SAND, Reddish brown	NOTES: 1. Stratigraphic description from 0 to 103 ft. based on geologic log of boring B-25.
							3399.5	20			11-16' CALICHE, White	2. 168 in. dia. pilot hole augered from 0-97.5 ft. by Meredith Drilling Co. prior to setting and cementing 144 in. dia. surface casing.
							3394.5				16-36.5' GATUNA FORMATION, Sandstone, reddish brown, fine to medium grained	3. All depths given are from ground surface except for those shown in depth column.
								30				
								40				
							3374.0				36.5-46.5' SANTA ROSA FORMATION, Sandstone, gray and reddish brown, fine grained	CASING: 0-11 ft. = 180 in. dia CMP 0-93.4 ft. = 144 in. dia. surface casing 0-843 ft. = 120 in. dia. steel liner (installed after completion of shaft drilling)
								50				
							3364.0				46.5-538' DEWEY LAKE FORMATION, Siltstone and sandstone, reddish brown, whitish veins of gypsum interspersed throughout	
								60				
							3347.5	70				

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE: WIPP - EDDY CO., N. M.

HOLE NO.: EXPLORATORY SHAFT

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO
WIPP	12484	2 OF 11	EXPLORATORY SHAFT (SPDV)

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE / LENGTH CORE RUN	SAMPLE RECOVERY / CORE RECOVERY	SAMPLE BLOWS "N" / PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M.	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH (FT.) BELOW K.B.	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							3347.5	70				
168 IN. DIA. AUGER		NO SAMPLES TAKEN						80			DEWEY LAKE FORMATION, Siltstone and sandstone, reddish brown, whitish veins of gypsum interspersed throughout	
								90				
								100				← Horizontal displacement at 99 ft. was 0.01 ft. S27°06'W
142 IN. DIA. ROTARY CUTTER BIT FROM 97.5 TO 2298 FT.		CUTTINGS SAMPLES TAKEN FROM 103 TO 2298 FT.						110		1	Siltstone, dark reddish brown, moderately weak, thinly bedded	Cuttings samples collected from discharge end of blooie-line unless otherwise indicated. Sample depths shown are approximate
								120		2	Sandstone, dark reddish brown, fine grained, well sorted, sub-rounded grains, weakly cemented	
								130		3	Sandstone, silty, very fine grained, grading into siltstone in places	Drilling rate from 122 to 148 ft. was 1.4 ft/hr
								140		4	As above	
							3267.5	150		5	Siltstone, sandy, dark reddish brown	

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE: WIPP - EDDY CO., N. M.

HOLE NO.: EXPLORATORY SHAFT

H&CF 19-2

GEOLOGIC DRILL LOG

PROJECT: WIPP | JOB NO.: 12484 | SHEET NO.: 3 OF 11 | HOLE NO.: EXPLORATORY SHAFT (SPDV)

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLE RECOVERY / CORE RECOVERY	SAMPLE BLOWS "N" / PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M.	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH (FT.) BELOW K.B.	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							3267.5	150			Siltstone, aandy, dark reddish brown, moderately weak, thin bedded, grading into aandstone in places	Horizontal displacement at 143 ft. was 0.02 ft. S 04°07'W
								160		6	Clay, dark reddish brown, some siltstone (dark reddish brown and greenish gray, moderately weak), clay probably occurs aa claystone interbedded with siltstone	Drilling rate from 148 to 158 ft. was 3.3ft./hr.
								170		7	Siltstone, sandy, dark reddish brown, moderately weak, little clay	Drilling rate from 158 to 194 ft. waa 12 ft./hr.
								180		8	As above	
								190		9	Clay and Siltstone, dark reddish brown	← Horizontal diaplacement at 183 ft. was 0.01 ft. S17°47'W
								200		10	Sandstone, dark reddish brown, moderately weak, very fine grained, subrounded, well sorted	Drilling rate from 194 to 203 ft. was 1.3 ft./hr.
								210		11	Siltstone, dark reddish brown, moderately weak, gypsum fragments	Drilling rate from 203 to 217 ft. was 1.2 ft./hr.
								220		12	Sandstone, silty, dark reddish brown, moderately weak, very fine grained, subrounded, well sorted	Drilling rate from 217 to 245 ft. was 1.4 ft./hr.
							3187.5	230		13	Siltstone, dark reddish brown	

142 IN. DIA. ROTARY CUTTER BIT

CUTTINGS SAMPLES

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE: WIPP - EDDY CO., N. M.

HOLE NO.: EXPLORATORY SHAFT

H&CF 19-2

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
WIPP	12484	4 OF 11	EXPLORATORY SHAFT (SPDV)

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE / LENGTH CORE RUN	SAMPLE RECOVERY / CORE RECOVERY	SAMPLE BLOWS "N" / PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M.	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH (FT.) BELOW K.B.	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							3187.5	230			Siltstone, dark reddish brown, moderately weak, gypsum fragments, little clay	← Horizontal displacement at 229 ft. was 0.02 ft. S43° 30'W
								240		14	Sandstone, silty, dark reddish brown, moderately weak, very fine grained, subrounded, well sorted, some siltstone, abundant gypsum fragments	
								250		15	As above, much less gypsum	
										16		S#16 taken from drill bit - no formal description
								260		17	As above (sample No. 14)	Drilling rate from 245 to 262 ft. was 1.9 ft./hr.
								270		18	As above, abundant gypsum and greenish sandstone fragments	Drilling rate from 262 to 276 ft. was 0.6 ft./hr.
								280		19	As above	← Horizontal displacement at 271 ft. was 0.03 ft. S19° 29'W
								290		20	As above	Drilling rate from 276 to 299 ft. was 1.2 ft./hr.
142 IN. DIA. ROTARY CUTTER BIT		CUTTINGS SAMPLES						300		21	Sandstone, silty, dark reddish brown, moderately weak, very fine grained, well sorted, and Siltstone, dark reddish brown, moderately weak, some gypsum fragments	Drilling rate from 299 to 309 ft. was 1.3 ft./hr.
							3107.5	310		22	Sandstone, as above, some lt. green color	

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE: WIPP - EDDY CO., N. M.

HOLE NO.: EXPLORATORY SHAFT

H&CF 19-2

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
WIPP	12484	5 OF 11	EXPLORATORY SHAFT (SPDV)

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE / LENGTH CORE RUN	SAMPLE RECOVERY / CORE RECOVERY	SAMPLE BLOWS "N" / PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M.	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH (FT.) BELOW K.B.	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
142 IN. DIA. ROTARY CUTTER BIT		CUTTINGS SAMPLES					3107.5	310		23		S# 23 taken from drill bit - no formal description
								320		24	Sandstone, silty, dark reddish brown, moderately weak, very fine grained, well sorted, and Siltstone, dark reddish brown, moderately weak	← Horizontal displacement at 313 ft. was 0.04 ft. S 0° 03'E
												Drilling rate from 309 to 322 ft. was 1.9 ft./hr.
								330		25	Sandstone, silty, dark reddish brown, moderately weak, very fine grained, subrounded, well sorted, some gypsum fragments	Drilling rate from 322 to 336 ft. was 1.6 ft./hr.
								340		26	Siltstone, clayey, dark reddish brown, moderately weak, and Sandstone, dark reddish brown, moderately weak, very fine grained, trace of clay	Drilling rate from 336 to 375 ft. was 2.1 ft./hr.
								350		27	Siltstone, sandy, dark reddish brown and greenish gray, moderately weak	
								360		28	Siltstone, sandy, dark reddish brown, moderately weak, grades into Sandstone, dark reddish brown, moderately weak, very fine grained	← Horizontal displacement at 357 ft. was 0.06 ft. S01° 10'E
								370		29	Sandstone, silty, dark reddish brown, moderately weak, very fine grained, subrounded, well sorted	
								380		30	As above, with gypsum fragments	Drilling rate from 375 to 433 ft. was 2.0 ft./hr.
							3027.5	390		31	Sandstone, as above, and Siltstone	

SS = SPLIT SPOON; ST = SHELBY TUBE; O = OENNISON; P = PITCHER; O = OTHER

SITE: WIPP - EDDY CO., N. M.

HOLE NO.: EXPLORATORY SHAFT

H&CF 19-2

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
WIPP	12484	6 OF 11	EXPLORATORY SHAFT (SPDV)

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLE RECOVERY CORE RECOVERY	SAMPLE BLOWS "N" / PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M.	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH (FT.) BELOW K.B.	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
142 IN. DIA. ROTARY CUTTER BIT		CUTTINGS SAMPLES					3027.5	390			Sandstone, as above, and Siltstone, sandy, dark reddish brown, some greenish gray frags., moderately weak, abundant gypsum fragments	
								400		32	As above	
								410		33	Sandstone, as sample No. 29, abundant gypsum fragments	← Horizontal displacement at 401 ft. was 0.08 ft. S08° 13'W
								420		34	As above	
								430		35	As above	
								440		36	As above, some gray green color	Drilling rate from 433 to 464 ft. was 1.6 ft./hr.
								450		37	Sandstone and Siltstone, as sample No. 32	← Horizontal displacement at 445 ft. was 0.10 ft. S18° 50'W
								460		38	As above	
							2947.5	470		39	Sandstone, as sample No. 29	

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE: WIPP - EDDY CO., N. M.

HOLE NO.: EXPLORATORY SHAFT

GEOLOGIC DRILL LOG

PROJECT: WIPP | JOB NO.: 12484 | SHEET NO.: 7 OF 11 | HOLE NO.: EXPLORATORY SHAFT (SPDV)

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLE RECOVERY / CORE RECOVERY	SAMPLE BLOWS "N" / PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M.	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH (FT.) BELOW K.B.	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
142 IN. DIA. ROTARY CUTTER BIT		CUTTINGS SAMPLES					2947.5	470				Drilling rates: 464-490 ft. = 1.5 ft./hr. 490 - 502 ft. = 0.8 ft./hr. 502 - 506 ft. = 0.7 ft./hr.
								480		40	Siltstone, dark reddish brown, moderately weak, gypsum fragments, trace of sandstone	
								490		41	Sandstone, silty, dark reddish brown, moderately strong to moderately weak, very fine grained, abundant greenish gray reduction spots	
												← Horizontal displacement at 489 ft. was 0.14 ft. S28°17'W
								500		42	As above	
								510		43	As above, subrounded, well sorted, gypsum fragments	Drilling rates: 506 - 510 ft. = 1.3 ft./hr. 510 - 513 ft. - 0.5 ft./hr. 513 - 527 ft. = 0.6 ft./hr. 527 - 538 ft. = 0.5 ft./hr. 538 - 548 ft. - 0.4 ft./hr.
								520		44	As above	
								530		45	As above, moderately weak, some greenish gray reduction spots	
								540		46	As above	← Horizontal displacement at 533 ft. was 0.18 ft. S35° 10'W
										47	As above	
							2872.5			48	As above	
											538 - 850' RUSTLER FORMATION, primarily anhydrite, dolomite, and mudstone	
							2867.5	550		49	Anhydrite, white to light brownish gray	

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE: WIPP - EDDY CO., N. M.

HOLE NO.: EXPLORATORY SHAFT

H&CF 19-2

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
WIPP	12484	8 OF 11	EXPLORATORY SHAFT (SPDV)

Column headings: SAMPLER TYPE AND DIAMETER; SAMPLER ADVANCE / LENGTH CORE RUN; SAMPLE RECOVERY / CORE RECOVERY; SAMPLE BLOWS "N"; PERCENT CORE RECOVERY; WATER PRESSURE TESTS (LOSS IN G.P.M.; PRESSURE P.S.I.; TIME IN MINUTES); ELEVATION; DEPTH (FT.) BELOW K.B.; GRAPHIC LOG; SAMPLE; DESCRIPTION AND CLASSIFICATION; NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.

Sampler type and diameter: 142 IN. DIA. ROTARY CUTTER BIT

Sample recovery: CUTTINGS SAMPLES

Elevation	Depth (ft.)	Sample	Description and Classification	Notes
2867.5	550		Anhydrite, white to light brownish gray, hard, finely crystalline, some gypsum fragments	Drilling rates: 548-554 ft. = 0.5 ft./hr. 554-561 ft. = 0.7 ft./hr.
	560	50	As above	
	570	51	As above, light gray to light brownish gray	
	580	52	Clay, dark brown, high plasticity, some silt	Horizontal displacement at 577 ft. was 0.24 ft. S40° 12'W
	590	53	Siltstone, medium gray, moderately weak, some very fine sand and minor clay	
2817.5	600	54	Anhydrite, very lt. gray to med. dk. gray, moderately hard	
			593 - 628' MAGENTA DOLOMITE MEMBER	
	610	55	Siltstone, calcareous, med. olive gray to olive gray, strong, mod. hard, mod. to well cemented, sparse gypsum crystals	
	620	56	As above	
2795.5			? — — — — — — — — — — — — ?	
2787.5	630	57	Dolomite, olive gray	

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SITE: WIPP - EDDY CO., N. M.

HOLE NO.: EXPLORATORY SHAFT

H&CF 19-2

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
WIPP	12484	9 OF 11	EXPLORATORY SHAFT (SPDV)

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE / LENGTH CORE RUN	SAMPLE RECOVERY / CORE RECOVERY	SAMPLE BLOWS "N" / PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M.	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH (FT.) BELOW K.B.	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
142 IN. DIA. ROTARY CUTTER BIT		CUTTINGS SAMPLES					2787.5	630				
							2782.5				Dolomite, olive gray, mod. strong, mod. hard, sugary texture w/small silver blebs (mica?), evidence of lamella, powdered sample reacts slightly w/HCl acid	
								640		58	Anhydrite, very light gray to brownish gray, mod. strong, mod. hard, well cemented, possibly gypsiferous	
								650		59	As above	
								660		60	As above	
								670		61	As above, contains minor amt. of small black grains w/resinous luster, pulverized grains have earthy to sandy appearance & small reaction w/HCl acid	
								680		62	As above (sample No. 58), lighter in overall color and larger fragments	
								690		63	As above, lighter in overall color, smaller fragments than above	
								700		64	Anhydrite, mot. pale yellow brn. overall, some pale reddish brn. frags. (polyhalite), stronger and harder than previous samples, trace translucent to white, fibrous satinspar gypsum, trace gray clay frags.	
							2707.5	710		65	Anhydrite, slightly mot. med. to lt. gray	

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE: WIPP - EDDY CO., N. M.

HOLE NO.: EXPLORATORY SHAFT

H&CF 19-2

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
WIPP	12484	10 OF 11	EXPLORATORY SHAFT (SPDV)

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLE RECOVERY CORE RECOVERY	SAMPLE BLOWS "N" / PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M.	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH (FT.) BELOW K.B.	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
142 IN. DIA. ROTARY CUTTER BIT		CUTTINGS SAMPLES					2707.5	710			Anhydrite, slightly mot. med. to lt. gray overall, trace gypsum	
							2699.5	720		66	711-740' CULEBRA DOLOMITE MEMBER Dolomite, crystalline, lt. olive gray, mod. strong, well cemented, sugary texture, powdered sample reacts slightly w/HCl acid, trace transparent gypsum crystals	
								730		67		
								740		68	As above	
							2670.5	750		69	Anhydrite, crystalline, variegated color (primarily grayish pink, pale red, and light gray), strong, hard, sugary texture, blebs of grayish red (polyhalite?)	
							2658.5	760		70	Halite, pale reddish brn., strong, hard, dissolves slowly in hot water, few transparent frags. exhibiting cleavage faces, trace argillaceous material	← Horizontal displacement at 753 ft. was 0.49 ft. S51° 15'W
								770		71	As above, more abundant crystals, some mudstone (clay to fine sand particles, grayish red, poor to mod. cementation, crumbles easily)	
								780		72	As above, trace anhydrite (yellow gray, strong, mod. hard)	
							2627.5	790		73	Mudstone, moderate brown	

SS = SPLIT SPOON; ST = SHELBY TUBE; O = DENNISON; P = PITCHER; O = OTHER

SITE: WIPP - EDDY CO., N. M.

HOLE NO.: EXPLORATORY SHAFT

H&CF 19-2

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
WIPP	12484	11 OF 11	EXPLORATORY SHAFT (SPDV)

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE / LENGTH CORE RUN	SAMPLE RECOVERY / CORE RECOVERY	SAMPLE BLOWS "N" / PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M.	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH (FT.) BELOW K.B.	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							2627.5	790			Mudstone, primarily silt w/clay and fine sand particles, mod. brn., strong, hard, well cemented, trace transparent halite crystals	
								800		74	As above, less halite, trace anhydrite	
								810		75	Mudstone, primarily silt w/fine sand & minor clay particles, olive gray, strong, hard, mod. cemented, mica flakes present	
								820		76	As above (sample No. 73), trace gypsum crystals and olive gray mudstone	
								830		77	As above (sample No. 75), trace brn. mudstone	
								840		78	As above	
								850		79	As above, larger frags.	← Horizontal displacement at 841 ft. was 0.59 ft. S54°18'W
										80	As above, brown and olive gray, trace anhydrite	
142 IN. DIA. ROTARY CUTTER BIT		CUTTINGS SAMPLES					2560.5	860		81	850-2298' SALADO FORMATION Note: For description of Salado Formation stratigraphy and lithology see geologic map of shaft	
							2547.5	870		82		

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE: WIPP - EDDY CO., N. M.

HOLE NO.: EXPLORATORY SHAFT

H&CF 19-2

NOTES:

1) ELEVATIONS REFER TO BOTTOM OF CONCRETE AT ELEVATION OF 2530.36 WHICH WAS TIED TO CWI BENCHMARK NO. CW-1 (BRASS CAP OUTSIDE THE C & SH SHAFT) AT ELEVATION 3410.060 ON DECEMBER 2, 1982.

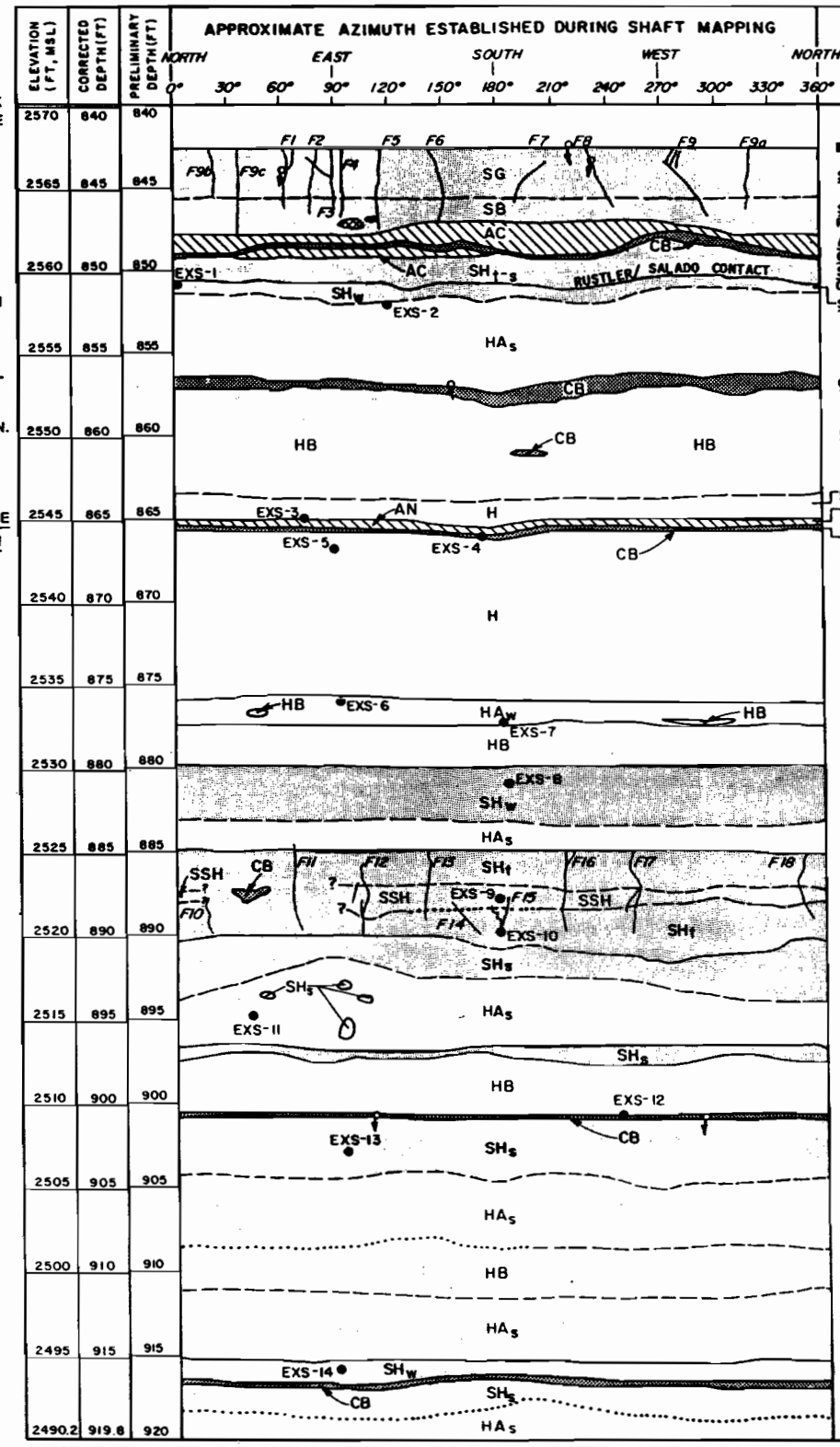
2) DEPTHS ARE RELATED TO THE TOP OF FIRST BUNTON AT ELEVATION 3410.0 FT. MSL.

3) PRELIMINARY DEPTHS WERE CORRECTED BY THE ADDITION OF A -0.2 FT. CORRECTION FACTOR.

4) STANDARD GEOLOGIC SYMBOL FOR HALITE IS NOT USED IN ORDER TO ENHANCE THE CLARITY OF THE LOG COLUMN.

REFERENCE:

GEOTECHNICAL ACTIVITIES IN THE EXPLORATORY SHAFT-SELECTION OF THE FACILITY INTERVAL, MARCH 1983, TME 3178.



REMARKS

BOTTOM OF CASING

SILTSTONE, GRAY, NUMEROUS FRACTURES, SOME FRACTURES SEEPING

SILTSTONE, BROWN, NO HALITE, SEVERAL SPALLED AREAS; SPALLS SHALLOW (0.1' DEEP), WITH REDDISH-BROWN TO BLACK OXIDIZED FRACTURE SURFACE

ANHYDRITE, LIGHT GRAY TO WHITE, UNDULATORY LOWER CONTACT

CLAY, BROWN, 1/2" TO 1 1/2" THICK, SOFT, VERY MOIST

SILTSTONE, BROWN, TRACE TO SOME HALITE, LOCALLY MOTTLED WITH LIGHT OLIVE-GRAY, OCCASIONALLY SPALLED, SEVERAL SEEPS

SILTSTONE, BROWN, WITH ABUNDANT HALITE, WASHED OUT APPROXIMATELY 1' INTO SHAFT WALL

HALITE WITH SOME ARGILLACEOUS MATERIAL, VERY COARSELY CRYSTALLINE, MASSIVE

CLAY, BROWN, WITH TRACE HALITE, MINOR SEEPS ALONG LOWER CONTACT

HALITE, BROWN, WITH SOME POLYHALITE, VERY-COARSELY CRYSTALLINE, CONTAINS BROWN CLAY LENS 1-2" THICK AND 1 1/2' LONG

HALITE, COLORLESS, VERY COARSELY CRYSTALLINE

ANHYDRITE, LIGHT GRAY TO WHITE, FINE-GRAINED, POROUS, MASSIVE AT TOP. UPPER CONTACT OVERLAIN BY THIN (<1") SEAM OF SOFT, SATURATED CLAY

CLAY, BROWN, 2" SEAM SATURATED, VERY SOFT

HALITE, COLORLESS, CONTAINS BANDS (2 1/2"-7" THICK) OF COLORLESS HALITE ALTERNATING WITH BANDS (UP TO 1 1/2" THICK) OF DARK REDDISH-BROWN HALITE; BANDS ARE SLIGHTLY UNDULATORY.

HALITE WITH ABUNDANT ARGILLACEOUS MATERIAL, HALITE CONTENT VARIES FROM BLEBS OF PURE HALITE TO PREDOMINANTLY SILTSTONE, LOCALLY 50% DARK REDDISH-BROWN CLAYEY SILT.

HALITE, BROWN, OCCASIONAL IRREGULAR BLEBS AND LAYERS OF ANHYDRITE

SILTSTONE WITH ABUNDANT HALITE, SILTSTONE CLAYEY, DARK RED, COMPETENT; HALITE MEDIUM CRYSTALLINE (IN BOREHOLE B-25 THIS BED IS AN ARGILLACEOUS HALITE)

HALITE WITH SOME ARGILLACEOUS MATERIAL AS SILTY CLAY

SILTSTONE WITH TRACE HALITE, LIGHT PINKISH-GRAY, NUMEROUS FRACTURES, MOST FRACTURES HALITE FILLED

SILTSTONE, SANDY, MEDIUM REDDISH-ORANGE, VERY FINE-GRAINED, GRADES ABOVE AND BELOW TO HALITIC SILTSTONE, NUMEROUS FRACTURES CONTINUING FROM ABOVE UNIT

SILTSTONE WITH TRACE HALITE, NUMEROUS FRACTURES CONTINUING FROM ABOVE UNIT

SILTSTONE WITH SOME HALITE, HALITE IN LARGE (1/2"-1") CUBES AND BLEBS

HALITE WITH SOME ARGILLACEOUS MATERIAL, HALITE IS VERY COARSELY CRYSTALLINE (1" TO 2" CRYSTALS), CONTAINS IRREGULAR FRAGMENTS OF SILTSTONE UP TO 1.5' LONG

SILTSTONE WITH SOME HALITE, HALITE FINELY TO MEDIUM CRYSTALLINE

HALITE, BROWN, CONTAINS 1/4" THICK DISCONTINUOUS LAYERS OF CLAYEY SILTSTONE, COLOR OF BED BECOMES LIGHTER TOWARD BASE

CLAY, BROWN, 1" TO 3" SEAM, SILTY, CONTAINS THIN LAMINAE OF CRYSTALLINE HALITE, MINOR SEEPS

SILTSTONE WITH SOME HALITE, SOME CLAY, HALITE CONTENT INCREASES DOWNWARD TO TRANSITIONAL CONTACT WITH UNDERLYING HALITE

HALITE, WITH SOME ARGILLACEOUS MATERIAL. IRREGULAR BLEBS (1" TO 2" DIAMETER) OF CLAYEY SILTSTONE

HALITE, BROWN, CONTAINS LESS ARGILLACEOUS MATERIAL THAN ABOVE HALITE, MORE MASSIVE AND LIGHTER IN COLOR THAN ABOVE

HALITE WITH SOME ARGILLACEOUS MATERIAL SIMILAR TO ARGILLACEOUS HALITE AT 904' TO 908.5', UPPER 6" CONTAINS ARGILLACEOUS MATERIAL IN THIN DISCONTINUOUS BANDS

SILTSTONE WITH ABUNDANT HALITE

CLAY, BROWN, 3"-6" SEAM, SOFT

SILTSTONE WITH SOME HALITE, CONTAINS COARSELY CRYSTALLINE HALITE (UP TO 1 1/2" CRYSTALS)

HALITE WITH SOME ARGILLACEOUS MATERIAL, VERY COARSELY CRYSTALLINE

SCALE
5 0 5 10 FT.

FRACTURE NOTES:

FRACTURES DESIGNATED F1 TO F9C REFER TO THOSE IN A SILTSTONE BED AT DEPTHS 842.5 TO 847 FEET. FRACTURES F10 TO F18 ARE IN A SILTSTONE BED AT DEPTHS 875 TO 880 FEET.

- *F1* OPEN TO 1/4-INCH WIDE ABOVE CONTACT, CLOSED BELOW CONTACT; VERY MINOR SEEPAGE.
- *F2* FILLED WITH WHITE PRECIPITATE (SALT?); 1/8-INCH WIDE IN UPPER EXTENT, CLOSED IN LOWER EXTENT.
- *F3* BIFURCATION FORMS POTENTIAL SPALL AREA.
- *F4* VERY MINOR SEEPAGE; OPEN.
- *F5* OXIDIZED MATERIAL IN FRACTURE BELOW CONTACT; 1/8-INCH MAXIMUM WIDTH.
- *F6* TRENDS N20°E; 1/4-INCH WIDE; OPEN.
- *F7* CLOSED ABOVE CONTACT, OPEN TO 1/4-INCH WIDE BELOW CONTACT.
- *F8* OPEN 1/16- TO 1/2-INCH WIDE ABOVE CONTACT, CLOSED BELOW CONTACT; PARTIALLY FILLED WITH SILT; MINOR SEEPAGE.
- *F9* 1/8- TO 1/4-INCH WIDE.
- *F9a* ESTIMATED STRIKE N60°W.
- *F9b* OPEN 1/4-INCH WIDE.
- *F9c* CLOSED TO OPEN 1/4-INCH WIDE.
- *F10* HALITE FILLED, STRIKE E-W.
- *F11* VERTICAL FRACTURE WITH MAXIMUM WIDTH OF 1 INCH; HALITE FILLED; MODERATE REDDISH-BROWN COLOR; ESTIMATED STRIKE N30°E; MATCHES WITH F15.
- *F12* FRACTURE PARTIALLY FILLED WITH HALITE; STRIKE N88°E; MATCHES WITH F17.
- *F13* NO SPECIFIC DATA.
- *F14* ESTIMATED STRIKE N60°W, DIPPING ±40°SW.
- *F15* POSSIBLY MATCHES F11?; STRIKE N30°E.
- *F16* VERTICAL FRACTURE 3/4-INCH WIDE; HALITE FILLED; PROBABLY MATCHES F18; STRIKE N11°E.
- *F17* VERTICAL FRACTURE 1/2-INCH WIDE; HALITE FILLED; MATCHES F12; STRIKE N88°E.
- *F18* ESTIMATED STRIKE N10 TO 20°E; FRACTURE F18 MATCHES F16; HALITE FILLED.

EXPLANATION

ROCK TYPE

SILTSTONE | HALITE (See note 4) | ANHYDRITE

CONTACTS

SHARP (Identifiable within 0.05 feet) | GRADATIONAL (Identifiable within 0.05 to 0.2 feet) | DIFFUSE (Identifiable within 0.2 to 0.5 feet)

F1 FRACTURE

EXS-5 ROCK SAMPLE LOCATION AND NUMBER

SEEP

CLAY LAYER (See note 5)

SPALLED AREA

GEOLOGIC UNIT SYMBOLS AND DESCRIPTIONS *

- A — ARGILLACEOUS MATERIAL, GENERALLY FOUND AS AN INTERGRANULAR ACCESSORY CONSTITUENT, LIGHT GRAY (N7) TO MODERATE REDDISH-BROWN (10R 4/6), SLIGHTLY MOIST TO MOIST, TRACE TO SOME SILT.
- AN — ANHYDRITE, LIGHT GRAY (N7) TO WHITE (N9), MODERATE ORANGE-PINK (10R 7/4) TO PALE REDDISH-BROWN (10R 5/4), FINELY CRYSTALLINE.
- AC — ANHYDRITE, LIGHT GRAY (N7) TO GRAYISH-ORANGE (10YR 7/4) TO WHITE (N9), WITH SEVERAL SOFT 1/2- TO 1 1/2-INCH CLAY STRINGERS WITH TRACE OF SILT.
- CB — CLAY, DARK REDDISH-BROWN (10R 3/4) TO MODERATE REDDISH-BROWN (10R 4/6) WITH TRACE TO SOME SILT, TRACE TO SOME HALITE.
- HA** — HALITE, DARK REDDISH-BROWN (10R 3/4) TO MODERATE REDDISH-BROWN (10R 4/6) TO MODERATE REDDISH-ORANGE (10R 6/6), LOCALLY MEDIUM LIGHT GRAY (N7), MEDIUM TO COARSELY CRYSTALLINE, ARGILLACEOUS.
- HB — HALITE, DARK REDDISH-BROWN (10R 3/4) TO MODERATE REDDISH-BROWN (10R 4/6), SLIGHTLY TRANSLUCENT, MEDIUM TO COARSELY CRYSTALLINE.
- H — HALITE, COLORLESS (TRANSPARENT TO TRANSLUCENT) TO GRAYISH-ORANGE-PINK (5YR 7/2), MEDIUM TO COARSELY CRYSTALLINE, MAY BE BANDED.
- SB — SILTSTONE, DARK REDDISH-BROWN (10R 3/4), TRACE TO NO HALITE, TRACE FINE-GRAINED SAND.
- SG — SILTSTONE, LIGHT OLIVE-GRAY (5Y 6/1), TRACE FINE-GRAINED SAND, TRACE TO NO HALITE.
- SH** — SILTSTONE, DARK REDDISH-BROWN (10R 3/4) TO MODERATE REDDISH-BROWN (10R 4/6), HALITIC, TRACE TO SOME CLAY, LOCALLY CONTAINS VERY FINE TO FINE-GRAINED SAND.
- SSH — SILTSTONE, MODERATE REDDISH-ORANGE (10R 6/6), WITH VERY FINE-GRAINED SAND, TRACE HALITE; LOCALLY GRADES TO A VERY FINE TO FINE-GRAINED SANDSTONE, MODERATE REDDISH-BROWN (10R 4/6) TO MEDIUM LIGHT GRAY (N7), TRACE TO SOME SILT.

* SLIGHT VARIATIONS FROM THESE GENERAL DESCRIPTIONS MAY EXIST. THE EXCEPTIONS ARE NOTED IN THE REMARKS COLUMN.

** ESTIMATED CONTENT OF ACCESSORY CONSTITUENTS IS INDICATED BY A MODIFIER: T = TRACE, S = SOME, W = WITH OR ABUNDANT

FIGURE D-2
C & SH SHAFT
KEY AREA GEOLOGY
BOTTOM CASING TO 920 FEET

NOTES:

1) ELEVATIONS REFER TO BOTTOM OF CONCRETE AT ELEVATION OF 2530.38 WHICH WAS TIED TO CWI BENCHMARK NO. CW-1 (BRASS CAP OUTSIDE THE C & SH SHAFT) AT ELEVATION 3410.080 ON DECEMBER 2, 1982.

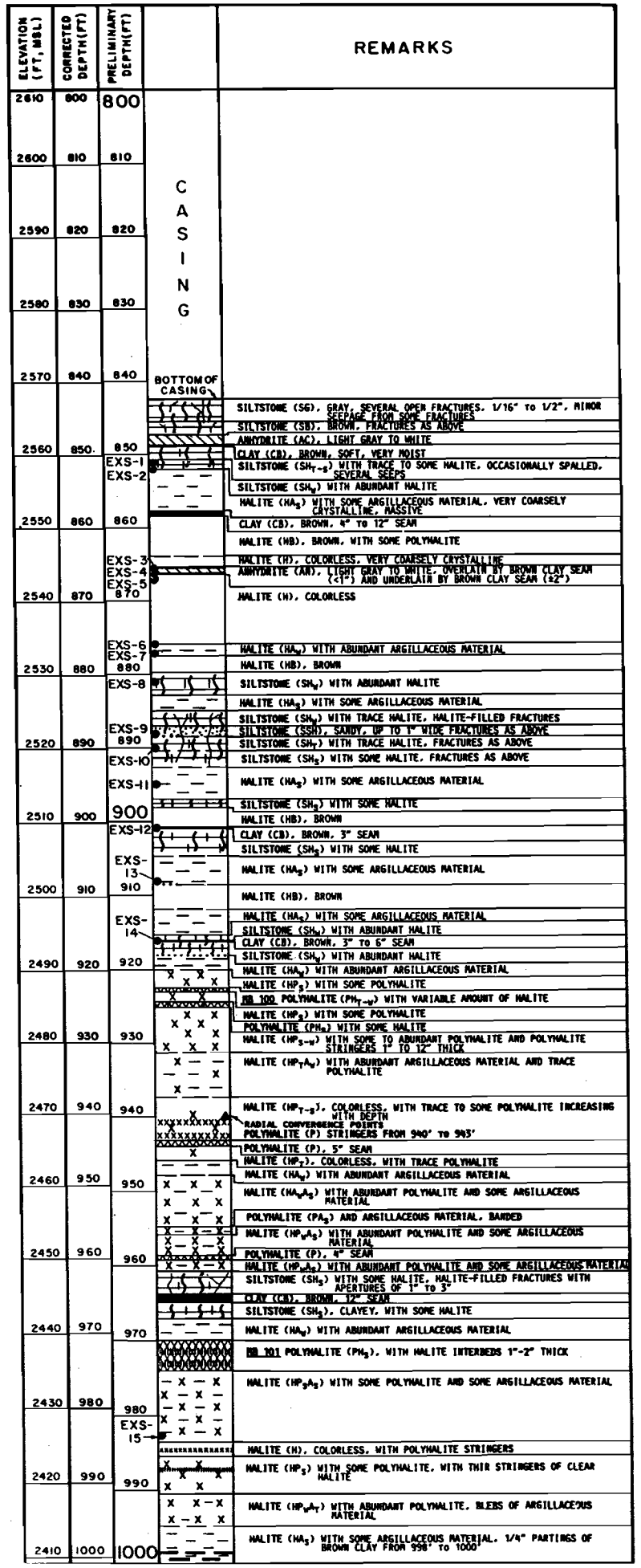
2) DEPTHS ARE RELATED TO THE TOP OF FIRST BUNTON AT ELEVATION 3410.0 FT. MSL.

3) PRELIMINARY DEPTHS WERE CORRECTED BY THE ADDITION OF A CORRECTION FACTOR.

4) STANDARD GEOLOGIC SYMBOL FOR HALITE IS NOT USED IN ORDER TO ENHANCE THE CLARITY OF THE LOG COLUMN.

REFERENCE:

GEOTECHNICAL ACTIVITIES IN THE EXPLORATORY SHAFT-SELECTION OF THE FACILITY INTERVAL, MARCH 1983, TME 3178.



GEOLOGIC UNIT SYMBOLS AND DESCRIPTIONS*

A — **ARGILLACEOUS** MATERIAL, GENERALLY FOUND AS AN INTERGRANULAR ACCESSORY CONSTITUENT, LIGHT GRAY (N7) TO MODERATE REDDISH-BROWN (10R 4/6), SLIGHTLY MOIST TO MOIST, TRACE TO SOME SILT.

AC — **ANHYDRITE**, LIGHT GRAY (N7) TO WHITE (N9) TO GRAYISH-ORANGE (10YR 7/4), FINELY CRYSTALLINE TO MICROCRYSTALLINE, SEVERAL SOFT 1/2- TO 1 1/2-INCH CLAY STRINGERS WITH TRACE SILT.

AN — **ANHYDRITE**, MEDIUM DARK GRAY (N4) TO LIGHT GRAY (N7) TO WHITE (N9), MODERATE ORANGE-PINK (10R 7/4) TO PALE REDDISH-BROWN (10R 5/4), FINELY CRYSTALLINE TO MICROCRYSTALLINE.

CB — **CLAY**, DARK REDDISH-BROWN (10R 3/4), TRACE TO SOME SILT, TRACE TO SOME HALITE.

CG — **CLAY**, MEDIUM LIGHT GRAY (N6) TO MEDIUM DARK GRAY (N4) TO LIGHT OLIVE-GRAY (5Y 6/1), TRACE TO SOME SILT, TRACE TO SOME HALITE.

H — **HALITE**, COLORLESS (TRANSPARENT TO TRANSLUCENT) TO GRAYISH-ORANGE-PINK (5YR 7/2), MEDIUM TO COARSELY CRYSTALLINE, MAY BE BANDED.

HA** — **HALITE**, DARK REDDISH-BROWN (10R 3/4) TO MODERATE REDDISH-BROWN (10R 4/6), MEDIUM TO COARSELY CRYSTALLINE, ARGILLACEOUS.

HB — **HALITE**, DARK REDDISH-BROWN (10R 3/4) TO MODERATE REDDISH-BROWN (10R 4/6), SLIGHTLY TRANSLUCENT.

HP** — **HALITE**, TRANSLUCENT TO MODERATE REDDISH-ORANGE (10R 6/6) TO MODERATE REDDISH-BROWN (10R 4/6), POLYHALITIC.

HPA** — **HALITE**, MODERATE REDISH-ORANGE (10R 6/6) TO MODERATE REDDISH-BROWN (10R 4/6), POLYHALITIC AND ARGILLACEOUS.

P — **POLYHALITE**, MODERATE REDDISH-BROWN (10R 4/6) TO MODERATE REDDISH-ORANGE (10R 6/6), FINELY CRYSTALLINE TO MICROCRYSTALLINE.

PA** — **POLYHALITE**, MODERATE REDDISH-BROWN (10R 4/6), FINELY CRYSTALLINE TO MICROCRYSTALLINE, ARGILLACEOUS.

PH** — **POLYHALITE**, MODERATE REDDISH-BROWN (10R 4/6) TO MODERATE REDDISH-ORANGE (10R 6/6), FINELY CRYSTALLINE TO MICROCRYSTALLINE, HALITIC.

SB — **SILTSTONE**, DARK REDDISH-BROWN (10R 3/4), TRACE HALITE, TRACE FINE SAND.

SG — **SILTSTONE**, LIGHT OLIVE-GRAY (5Y 6/1), TRACE HALITE, TRACE FINE-GRAINED SAND.

SH** — **SILTSTONE**, DARK REDDISH-BROWN (10R 3/4) TO MODERATE REDDISH-BROWN (10R 4/6), HALITIC, TRACE TO SOME CLAY, LOCALLY CONTAINS VERY FINE-GRAINED SAND.

SSH — **SILTSTONE**, MODERATE REDDISH-ORANGE (10R 6/6), WITH VERY FINE-GRAINED SAND, TRACE HALITE; LOCALLY GRADES TO VERY FINE TO FINE-GRAINED SANDSTONE, MODERATE REDDISH-BROWN (10R 4/6) TO MEDIUM LIGHT GRAY (N6) TRACE TO SOME SILT.

* SLIGHT VARIATIONS FROM THESE GENERAL DESCRIPTIONS MAY EXIST. THE EXCEPTIONS ARE NOTED IN THE REMARKS COLUMN.

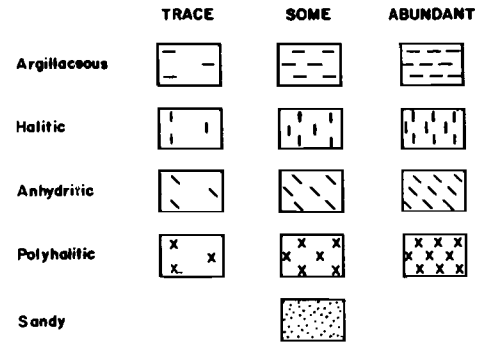
**ESTIMATED CONTENT OF ACCESSORY CONSTITUENTS IS INDICATED BY A MODIFER:
T = TRACE
S = SOME
W = WITH OR ABUNDANT

EXPLANATION

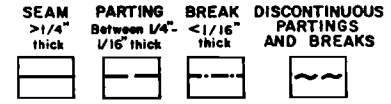
ROCK TYPE

ACCESSORY CONSTITUENTS

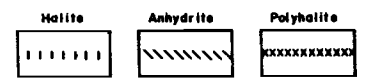
ESTIMATED PERCENTAGE OF ACCESSORY CONSTITUENTS INDICATED AS FOLLOWS:



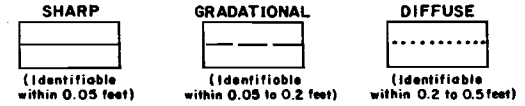
LAMINAR FEATURES



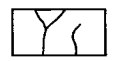
STRINGERS



CONTACTS



FRACTURES



EXS-6 ● ROCK SAMPLE LOCATION AND NUMBER

▲ INSTRUMENT LOCATION

FIGURE D-3

C & SH SHAFT
LITHOLOGIC LOG SHOWING
SAMPLE AND INSTRUMENT LOCATIONS
BOTTOM OF CASING TO 2200 FEET

FIGURE D-3
C & SH SHAFT
LITHOLOGIC LOG SHOWING
SAMPLE AND INSTRUMENT LOCATIONS
BOTTOM OF CASING TO 2200 FEET

SHEET 2 OF 3

ELEVATION (FT, MSL)	CORRECTED DEPTH (FT)	PRELIMINARY DEPTH (FT)	STRATIGRAPHIC COLUMN	REMARKS
		1600		HALITE (H), COLORLESS
				HALITE (HA_N) WITH TRACE ARGILLACEOUS MATERIAL
1800	1610	1610		HALITE (H), COLORLESS, WITH TRACE POLYHALITE IN UPPER 2'
				HALITE (HP_S) WITH SOME POLYHALITE
1790	1620			TOP MB 123 ANHYDRITE (AH)
		1620		BASE MB 123 POLYHALITE (P), WITH SOME MAGNESITE
1780	1630			HALITE (HP_T), COLORLESS, WITH TRACE POLYHALITE
		1630		MB 129 POLYHALITE (P)
				CLAY (CG), GRAY, WASHED OUT 1' INTO WALL
1770	1640			POLYHALITE (PA_N) WITH ABUNDANT GRAY ARGILLACEOUS MATERIAL
		1640		HALITE (HP_{T-S}) WITH TRACE TO SOME POLYHALITE
		EXS-45		HALITE (H), COLORLESS
1760	1650			HALITE (HA_S) WITH SOME ARGILLACEOUS MATERIAL
		1650		HALITE (HP_SA_T) WITH SOME POLYHALITE, SLIGHTLY ARGILLACEOUS
				HALITE (HA_S) WITH SOME ARGILLACEOUS MATERIAL
1750	1660			HALITE (HP_S) WITH SOME POLYHALITE
		1660		CLAY (CG), GRAY, DISCONTINUOUS BREAK
				HALITE (HP_S) WITH SOME POLYHALITE
				CLAY (CG), GRAY, DISCONTINUOUS BREAK
1740	1670			HALITE (HP_S) WITH SOME POLYHALITE
		1670		CLAY (CG), GRAY, DISCONTINUOUS BREAK
				HALITE (HP_SA_T) WITH SOME POLYHALITE, SLIGHTLY ARGILLACEOUS
1730	1680			HALITE (HA_N) WITH ABUNDANT ARGILLACEOUS MATERIAL
		1680		HALITE (HP_T), COLORLESS, WITH TRACE POLYHALITE
1720	1690			MB 125 HALITE ($HP_{T-S}A_T$) WITH TRACE TO SOME POLYHALITE, TRACE ARGILLACEOUS MATERIAL
		1690		CLAY (CG), GRAY, 2" TO 3" SEAM
				HALITE (HP_{T-ST}), TRACE TO SOME POLYHALITE, TRACE ARGILLACEOUS MATERIAL
1710	1700			HALITE (HA_N) WITH ABUNDANT ARGILLACEOUS MATERIAL
		1700		HALITE (HP_TA_S) WITH TRACE POLYHALITE AND SOME ARGILLACEOUS MATERIAL
				HALITE (HP_S) WITH SOME POLYHALITE
1700	1710	EXS-46		HALITE (HA_S) WITH SOME ARGILLACEOUS MATERIAL
		1710		HALITE (HP_S) WITH SOME POLYHALITE
				HALITE (HA_N) WITH ABUNDANT ARGILLACEOUS MATERIAL
1690	1720			HALITE (HP_S) WITH SOME POLYHALITE
		1720		MB 126 CLAY (CG), GRAY
				HALITE (HP_TA_T) WITH TRACE POLYHALITE AND TRACE ARGILLACEOUS MATERIAL
1680	1730			CLAY (CB), BROWN
		1730		HALITE (HP_TA_T) WITH TRACE POLYHALITE AND TRACE ARGILLACEOUS MATERIAL
1670	1740			
		1740		
				HALITE (HP_W) WITH ABUNDANT POLYHALITE
1660	1750			MB 127 POLYHALITE (P) WITH STRINGERS OF HALITE
		1750		CLAY (CG), GRAY, 1" SEAM
				HALITE (HP_T) WITH TRACE POLYHALITE
1650	1760			POLYHALITE (P) STRINGERS, 1" AND 2" THICK
		1760		TOP MB 128 POLYHALITE (PH_S) WITH SOME HALITE
				BASE MB 128 CLAY (CG), GRAY, 1/2" SEAM
1640	1770			HALITE (HB), BROWN, WITH SOME POLYHALITE BANDS
		1770		HALITE (HP_S) WITH SOME POLYHALITE
1630	1780			HALITE (HA_N) WITH ABUNDANT ARGILLACEOUS MATERIAL
		1780		CLAY (CB), BROWN, 1/4" PARTING
		EXS-47		HALITE (HP_{S-T}) WITH SOME POLYHALITE DECREASING DOWNWARDS TO TRACE POLYHALITE
1620	1790			MB 129 POLYHALITE (P)
		1790		CLAY (CB), BROWN
				POLYHALITE (P) WITH SOME HALITE
				HALITE (HP_W) WITH ABUNDANT POLYHALITE, POLYHALITE SEAM IN LOWER 2"
1610	1800	1800		CLAY (CG), GRAY, 1/4" SEAM
				HALITE (HP_S) WITH SOME POLYHALITE, GRADING DOWNWARD TO SOME POLYHALITE WITH TRACE ARGILLACEOUS MATERIAL

ELEVATION (FT, MSL)	CORRECTED DEPTH (FT)	PRELIMINARY DEPTH (FT)	STRATIGRAPHIC COLUMN	REMARKS
		1800		HALITE (HP_S) WITH SOME POLYHALITE
1600	1810	EXS-48		CLAY (CG), GRAY, 1" TO 2" SEAM
		1810		HALITE (HA_S) WITH SOME ARGILLACEOUS MATERIAL
		EXS-49		HALITE (H), COLORLESS
1590	1820			RADIAL CONVERGENCE POINTS
		1820		HALITE (HA_S) WITH SOME ARGILLACEOUS MATERIAL
1580	1830			HALITE (H), COLORLESS
		1830		HALITE (HP_SA_S) WITH ABUNDANT POLYHALITE AND SOME ARGILLACEOUS MATERIAL
1570	1840			HALITE (H), COLORLESS
		1840		NOT MAPPED
1560	1850			POLYHALITE (P) STRINGER, DEPTH AND THICKNESS ESTIMATED
		1850		NOT MAPPED
1550	1860			
		1860		
				MB 131 POLYHALITE (P), THICKNESS ESTIMATED
1540	1870			NOT MAPPED
		1870		
1530	1880			
		1880		
1520	1890			
		1890		
				HALITE (HA_T) WITH TRACE ARGILLACEOUS MATERIAL
1510	1900			
		1900		MB 132 CLAY (CB), BROWN, 6" SEAM
				HALITE (HP_SA_S) WITH SOME POLYHALITE AND SOME ARGILLACEOUS MATERIAL
1500	1910			HALITE (H), COLORLESS
		1910		HALITE (HP_S-HA_S) WITH SOME POLYHALITE AND 1/2" THICK STRINGERS OF ANHYDRITE
1490	1920			CLAY (CB), BROWN
				NOT MAPPED
				CLAY (CB)
		1920		HALITE (HP_S) WITH SOME POLYHALITE
1480	1930			HALITE (HP_T) WITH TRACE POLYHALITE
		1930		HALITE (HA_S-H) WITH SOME ARGILLACEOUS MATERIAL, WITH 4" LAYER CONTAINING DISCONTINUOUS GRAY CLAY NODULES AND INTERSTITIAL FILLING AT 1929'
1470	1940			HALITE (H), COLORLESS
		1940		HALITE (HP_S) WITH SOME POLYHALITE
1460	1950			POLYHALITE (P), 6" THICK
		1950		ANHYDRITE (AH), WITH 3" THICK HALITE SEAM
				CLAY (CG), GRAY, 6" SEAM, WASHED OUT
				HALITE (HA_T) WITH TRACE ARGILLACEOUS MATERIAL
				CLAY (CG), GRAY, 6" SEAM
				HALITE (HA_T) WITH TRACE ARGILLACEOUS MATERIAL
				CLAY (CG), GRAY, 4" SEAM
				HALITE (HA_T) WITH TRACE ARGILLACEOUS MATERIAL
1450	1960			CLAY (CG), GRAY, 4" SEAM
				HALITE (HA_T) WITH TRACE ARGILLACEOUS MATERIAL
				HALITE (HA_N) WITH ABUNDANT ARGILLACEOUS MATERIAL
		1960		HALITE (HA_T) WITH TRACE ARGILLACEOUS MATERIAL
				MB 134 ANHYDRITE (AC), LIGHT GRAY TO WHITE
1440	1970	EXS-50		CLAY (CG), GRAY, 3" TO 4" SEAM
		1970		HALITE (HA_{T-S}) WITH TRACE TO SOME ARGILLACEOUS MATERIAL
				ANHYDRITE (AC), LIGHT GRAY TO WHITE, 2" SEAM
				CLAY (CG), 1/4" PARTING
1430	1980			HALITE (H), COLORLESS
		1980		HALITE (HA_T) WITH TRACE ARGILLACEOUS MATERIAL
				HALITE (H), COLORLESS
		EXS-51		CLAY (CG), GRAY, 2" SEAM
1420	1990			MB 135 ANHYDRITE (AC), LIGHT GRAY TO WHITE
		1990		HALITE (H), COLORLESS
				HALITE (HP_SA_T) WITH SOME POLYHALITE AND TRACE ARGILLACEOUS MATERIAL
				CLAY (CG), GRAY, 4" SEAM, WITH SOME HALITE
				HALITE (HP_TA_T) WITH TRACE POLYHALITE AND SOME ARGILLACEOUS MATERIAL
1410	2000			HALITE (H), COLORLESS
		2000		HALITE (HA_N) WITH SOME ARGILLACEOUS MATERIAL
				CLAY (CB), BROWN, 4" SEAM
				HALITE (HP_TA_N) WITH TRACE POLYHALITE FROM 1997' TO 1998' AND ABUNDANT ARGILLACEOUS MATERIAL
				HALITE (H), COLORLESS

ELEVATION (FT, MSL)	CORRECTED DEPTH (FT)	PRELIMINARY DEPTH (FT)	STRATIGRAPHIC COLUMN	REMARKS
		2000		HALITE (H), COLORLESS
1400	2010			HALITE (HP_TA_N) WITH TRACE POLYHALITE IN LOWER HALF OF UNIT AND ABUNDANT ARGILLACEOUS MATERIAL
		2010		HALITE (HP_T), COLORLESS, WITH TRACE POLYHALITE
				HALITE (HA_N) WITH ABUNDANT ARGILLACEOUS MATERIAL
1390	2020			
		2020		HALITE (HP_{S-W}) WITH SOME POLYHALITE INCREASING WITH DEPTH TO ABUNDANT POLYHALITE
		EXS-52		POLYHALITE (P), 6" THICK
1380	2030			MB 136 ANHYDRITE (AC), LIGHT GRAY TO WHITE, WITH SOME POLYHALITE
		2030		
		EXS-53		CLAY (CB), BROWN, WITH SOME HALITE
1370	2040			
		2040		HALITE (HP_TA_T), COLORLESS, WITH TRACE POLYHALITE AND ARGILLACEOUS MATERIAL
1360	2050			
		2050		MB 137 POLYHALITE (P) AND ANHYDRITE(AH), INTERBEDDED
				HALITE (H), COLORLESS
		EXS-54		HALITE (HBA_S), DARK REDDISH BROWN, WITH SOME ARGILLACEOUS MATERIAL
1350	2060			INSTRUMENT STAYION
		2060		EXTENSOMETER
		EXS-55		RADIAL CONVERGENCE POINTS
				HALITE (HP_T), COLORLESS, WITH TRACE POLYHALITE, LOWER PORTION OF UNIT MOTTLED WITH DARK ARGILLACEOUS MATERIAL AND ANHYDRITE
1340	2070			HALITE (HA_N) WITH ABUNDANT ARGILLACEOUS MATERIAL
		2070		HALITE (H), COLORLESS
				CLAY (CB), BROWN
				HALITE (H), COLORLESS
1330	2080			
		2080		HALITE (HP_WA_{T-S}) WITH ABUNDANT POLYHALITE AND TRACE TO SOME MOTTLED ARGILLACEOUS MATERIAL
		EXS-56		CLAY (CB), BROWN, 1" TO 2" SEAM, WITH SOME HALITE
1320	2090			HALITE (HA_N) WITH ABUNDANT ARGILLACEOUS MATERIAL, DECREASING DOWNWARDS
		2090		HALITE (H), COLORLESS
		EXS-57 & 58		CLAY (CB), BROWN, DISCONTINUOUS BREAK
1310	2100			HALITE (H), COLORLESS, WITH TWO VERY THIN POLYHALITE SEAMS NEAR BASE OF UNIT
		2100		MB 138 ANHYDRITE (AC), LIGHT GRAY TO WHITE
				CLAY (CB), BROWN, 1/2" TO 1 1/2" SEAM
				HALITE (HP_TA_T) WITH TRACE POLYHALITE AND TRACE ARGILLACEOUS MATERIAL
				CLAY (CB), 1/8" DISCONTINUOUS PARTING
1300	2110			HALITE (HA_T) WITH TRACE ARGILLACEOUS MATERIAL
		2110		CLAY (CB), BROWN
				HALITE (HA_N) WITH ABUNDANT ARGILLACEOUS MATERIAL
				HALITE (HA_T) WITH TRACE ARGILLACEOUS MATERIAL
1290	2120			CLAY (CG), GRAY, 1" TO 2" SEAM
		2120		HALITE (HP_TA_T) WITH TRACE POLYHALITE AND SOME ARGILLACEOUS MATERIAL
				HALITE (HP_S) WITH SOME POLYHALITE
				ANHYDRITE "A" ANHYDRITE (AC), LIGHT GRAY TO WHITE, 9" THICK
				CLAY (CG), GRAY, 1" SEAM
1280	2130			HALITE (H), COLORLESS
		2130		ANHYDRITE "B" ANHYDRITE (AC), LIGHT GRAY TO WHITE, 3" THICK
				CLAY (CG), GRAY, 1/8" DISCONTINUOUS PARTING
				HALITE (HA_S) WITH SOME ARGILLACEOUS MATERIAL
1270	2140			HALITE (HP_TA_T), COLORLESS, WITH TRACE POLYHALITE AND TRACE ARGILLACEOUS MATERIAL
		2140		HALITE (HA_S) WITH SOME ARGILLACEOUS MATERIAL
				HALITE (HP_TA_T), COLORLESS, WITH TRACE POLYHALITE AND TRACE ARGILLACEOUS MATERIAL
1260	2150			HALITE (HP_TA_{W-S}) WITH TRACE POLYHALITE AND ABUNDANT ARGILLACEOUS MATERIAL DECREASING DOWNWARDS
		2150		
		EXS-59		HALITE (HP_W) WITH ABUNDANT POLYHALITE INCREASING DOWNWARDS
1250	2160			MB 139 ANHYDRITE (AH), GRAYISH-WHITE, UNDULATORY TOP AND BOTTOM CONTACTS, POLYHALITE NEAR TOP
		2160		CLAY (CG), GRAY, 1/8" TO 3/4" SEAM
				HALITE (HP_S) WITH SOME POLYHALITE
				HALITE (HP_W) WITH ABUNDANT POLYHALITE
1240	2170			CLAY (CG), GRAY, 1/8" TO 1/2" SEAM
		2170		HALITE ($HP_{T-S}A_T$) WITH TRACE TO SOME POLYHALITE, TRACE ARGILLACEOUS MATERIAL
				HALITE (HP_W) WITH ABUNDANT POLYHALITE
				HALITE (HP_TA_T), COLORLESS, WITH TRACE POLYHALITE AND TRACE ARGILLACEOUS MATERIAL
1230	2180			
		2180		HALITE (HP_S) WITH SOME POLYHALITE
				HALITE (H), COLORLESS, WITH FOUR POLYHALITE BANDS 1/4" TO 3" THICK
				ANHYDRITE (AH)
1220	2190			CLAY (CG), GRAY
		2190		HALITE, (HP_T) COLORLESS, WITH TRACE POLYHALITE
				HALITE (HP_T)WITH TRACE POLYHALITE
1210	2200	2200		HALITE (H), COLORLESS
				END OF MAPPING

FIGURE D-3

C & SH SHAFT.
LITHOLOGIC LOG SHOWING
SAMPLE AND INSTRUMENT LOCATIONS
BOTTOM OF CASING TO 2200 FEET

SHEET 3 OF 3

NOTES:

1) ELEVATIONS REFER TO CWI BENCHMARK NO. 62-D (BRASS CAP ON N.W. CORNER OF THE UNDERGROUND POWER CENTER FOUNDATION) AT ELEVATION 1258.59 WHICH WAS TIED TO CWI BENCHMARK NO. CWI (BRASS CAP OUTSIDE THE C & SH SHAFT) AT ELEVATION 3410.080 ON DECEMBER 2, 1982. BENCHMARK NO. 62-D IS WITHIN THE ZONE OF DEFORMATION OF THE STATION AND CANNOT BE CONSIDERED STABLE.

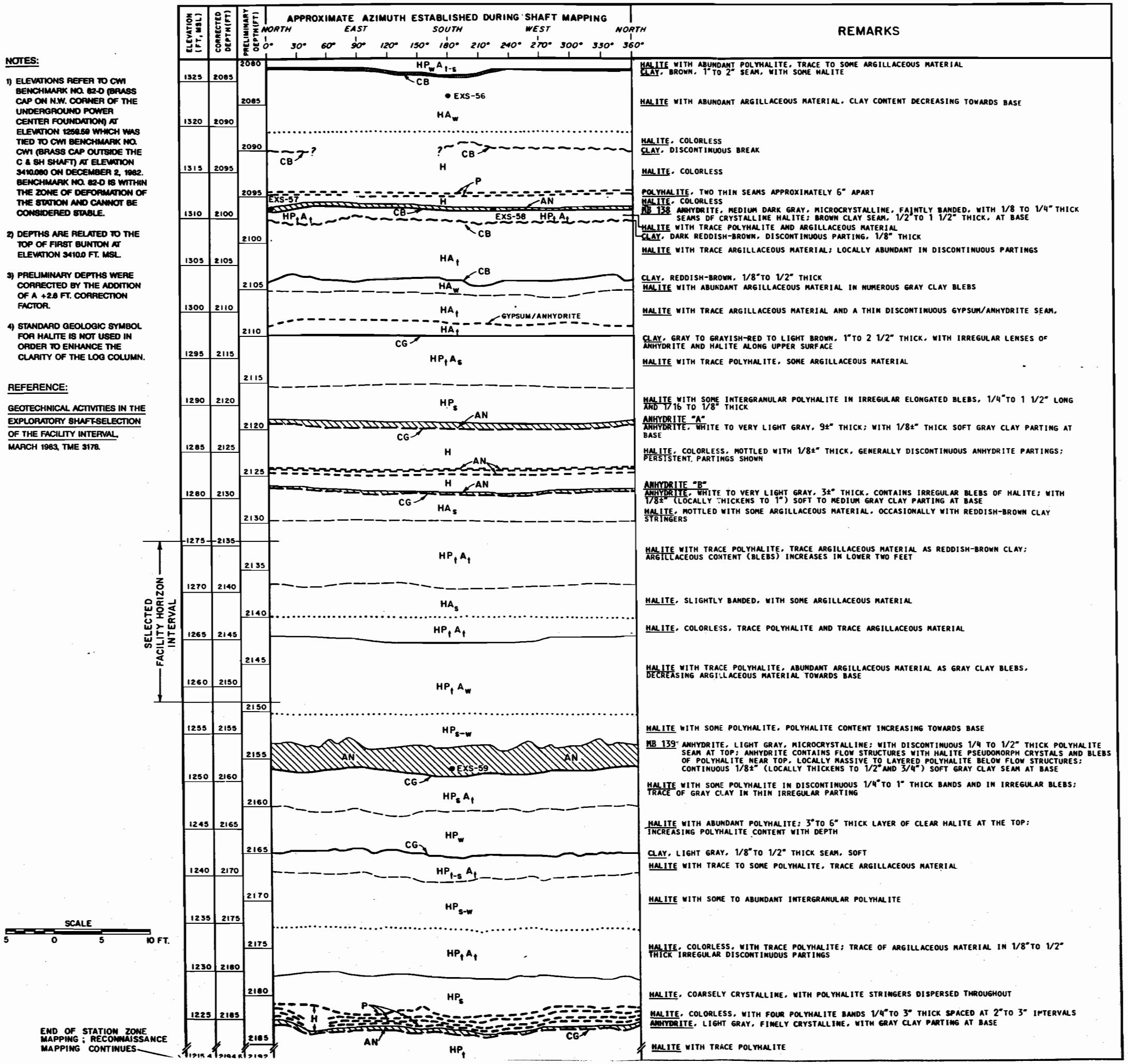
2) DEPTHS ARE RELATED TO THE TOP OF FIRST BUNTON AT ELEVATION 3410.0 FT. MSL.

3) PRELIMINARY DEPTHS WERE CORRECTED BY THE ADDITION OF A +2.8 FT. CORRECTION FACTOR.

4) STANDARD GEOLOGIC SYMBOL FOR HALITE IS NOT USED IN ORDER TO ENHANCE THE CLARITY OF THE LOG COLUMN.

REFERENCE:

GEOTECHNICAL ACTIVITIES IN THE EXPLORATORY SHAFT-SELECTION OF THE FACILITY INTERVAL, MARCH 1983, TME 3178.



EXPLANATION

ROCK TYPE

HALITE — ANHYDRITE

See note 4

LAMINAR FEATURES

MISCELLANEOUS (AS LABELED) — CLAY: SEAM >1/4" thick; PARTING Between 1/4" 1/16" thick; BREAK <1/16" thick; DISCONTINUOUS PARTINGS AND BREAKS

CONTACTS

SHARP (Identifiable within 0.05 feet) — GRADATIONAL (Identifiable within 0.05 to 0.2 feet) — DIFFUSE (Identifiable within 0.2 to 0.5 feet)

EXS-56 ROCK SAMPLE LOCATION AND NUMBER

CLAY LAYER

GEOLOGIC UNIT SYMBOLS AND DESCRIPTIONS*

A** ARGILLACEOUS MATERIAL, GENERALLY FOUND AS AN INTERGRANULAR ACCESSORY CONSTITUENT, LIGHT GRAY (N7) TO MODERATE REDDISH-BROWN (10R 4/6), SLIGHTLY MOIST TO MOIST, TRACE TO SOME S'LT.

AN ANHYDRITE, MEDIUM DARK GRAY (N4) TO LIGHT GRAY (N7) TO WHITE (N9), MODERATE ORANGE-PINK (10R 7/4) TO PALE REDDISH-BROWN (10R 5/4), FINELY CRYSTALLINE TO MICROCRYSTALLINE.

CB CLAY, DARK REDDISH-BROWN (10R 3/4), TRACE TO SOME SILT, TRACE TO SOME HALITE.

CG CLAY, MEDIUM LIGHT GRAY (N6) TO MEDIUM DARK GRAY (N4) TO LIGHT OLIVE-GRAY (5Y 6/1), TRACE TO SOME SILT, TRACE TO SOME HALITE.

HA** HALITE, DARK REDDISH-BROWN (10R 3/4) TO MODERATE REDDISH-BROWN (10R 4/6), MEDIUM TO COARSELY CRYSTALLINE, ARGILLACEOUS.

H HALITE, COLORLESS (TRANSPARENT TO TRANSLUCENT) TO GRAYISH-ORANGE-PINK (5YR 7/2), MEDIUM TO COARSELY CRYSTALLINE, MAY BE BANDED.

HP** HALITE, TRANSLUCENT TO MODERATE REDDISH-ORANGE (10R 6/6) TO MODERATE REDDISH-BROWN (10R 4/6), POLYHALITIC.

HPA** HALITE, MODERATE REDDISH-ORANGE (10R 6/6) TO MODERATE REDDISH-BROWN (10R 4/6), POLYHALITIC AND ARGILLACEOUS.

P POLYHALITE, MODERATE REDDISH-BROWN (10R 4/6) TO MODERATE REDDISH-ORANGE (10R 6/6), FINELY CRYSTALLINE TO MICROCRYSTALLINE.

* SLIGHT VARIATIONS FROM THESE GENERAL DESCRIPTIONS MAY EXIST. THE EXCEPTIONS ARE NOTED IN THE REMARKS COLUMN.

** ESTIMATED CONTENT OF ACCESSORY CONSTITUENTS IS INDICATED BY A MODIFIER: T = TRACE; S = SOME; W = WITH OR ABUNDANT

FIGURE D-4

C & SH SHAFT
FACILITY LEVEL AREA GEOLOGY
2080 TO 2192 FEET

APPENDIX E

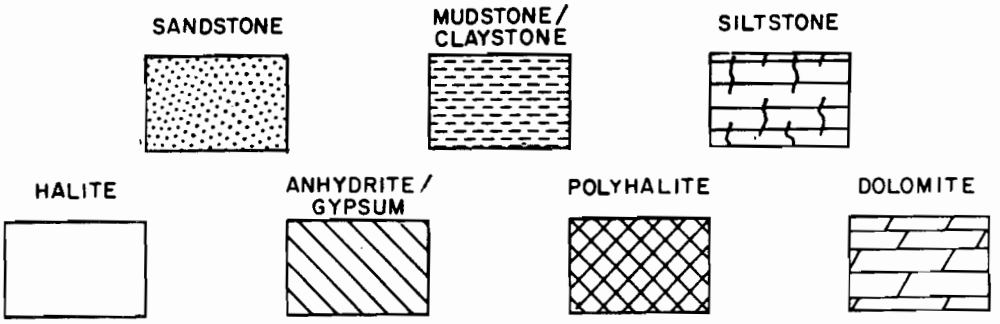
WASTE SHAFT
GEOLOGIC LOGS AND MAPS

CONTENTS

Figure No.	Title/Description
E-1	Lithologic Log 97 to 2286 feet (26 Sheets)
E-2	Magenta Dolomite 597 to 620 feet
E-3	Culebra Dolomite 705 to 727 feet
E-4	Rustler Formation Fracture Zone 779 to 843 feet
E-5	Rustler/Salado Formation Contact 840 to 930 feet (2 Sheets)
E-6	Facility Level Area 2100 to 2170 feet (2 Sheets)

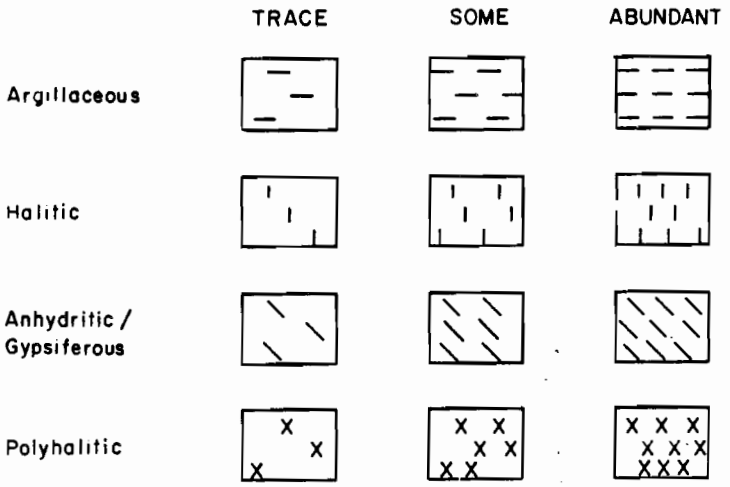
EXPLANATION

ROCK TYPE

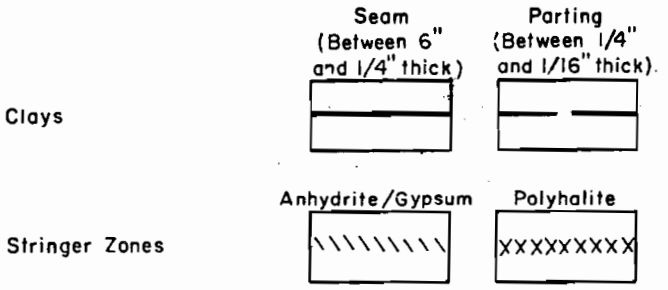


ACCESSORY CONSTITUENTS

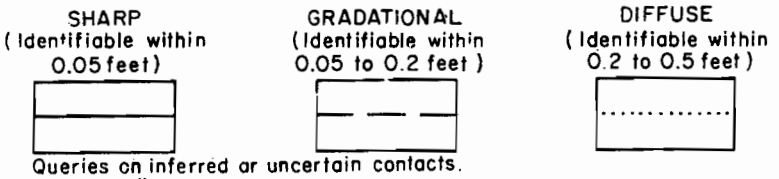
ESTIMATED PERCENTAGE OF ACCESSORY CONSTITUENTS INDICATED AS FOLLOWS



LAMINAR FEATURES



CONTACTS



Queries on inferred or uncertain contacts.
"Obscured" where lithologic and stratigraphic details are uncertain in the interval between contacts shown.
See "remarks" for complete description of units.

REFERENCE:

Geotechnical Activities in the Waste Handling Shaft, October 1984, WSTD-TME-038,

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FIGURE E-1

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 1 OF 26

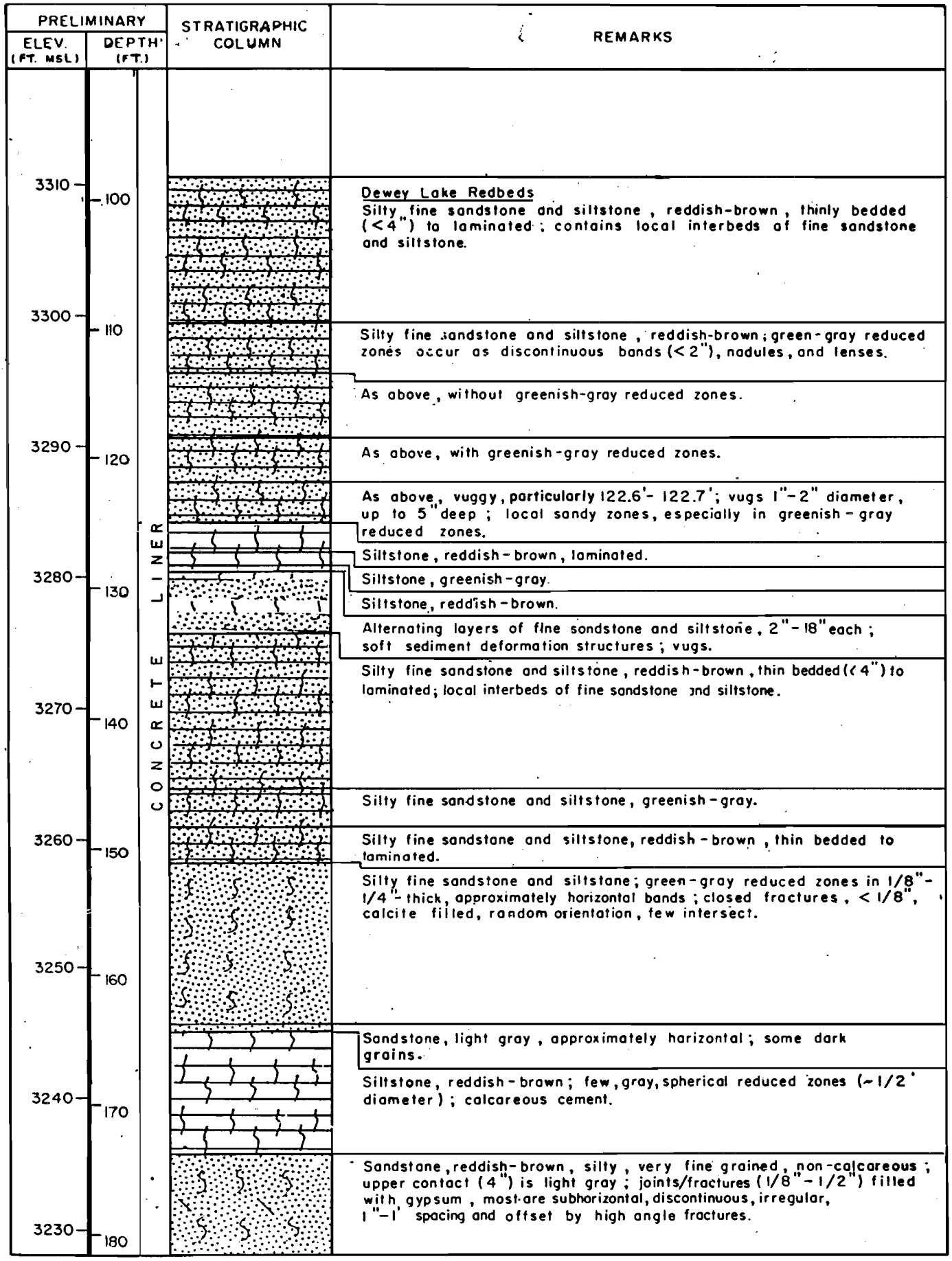

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FIGURE E-1

WASTE HANDLING SHAFT LITHOLOGIC LOG SHEET 2 OF 26

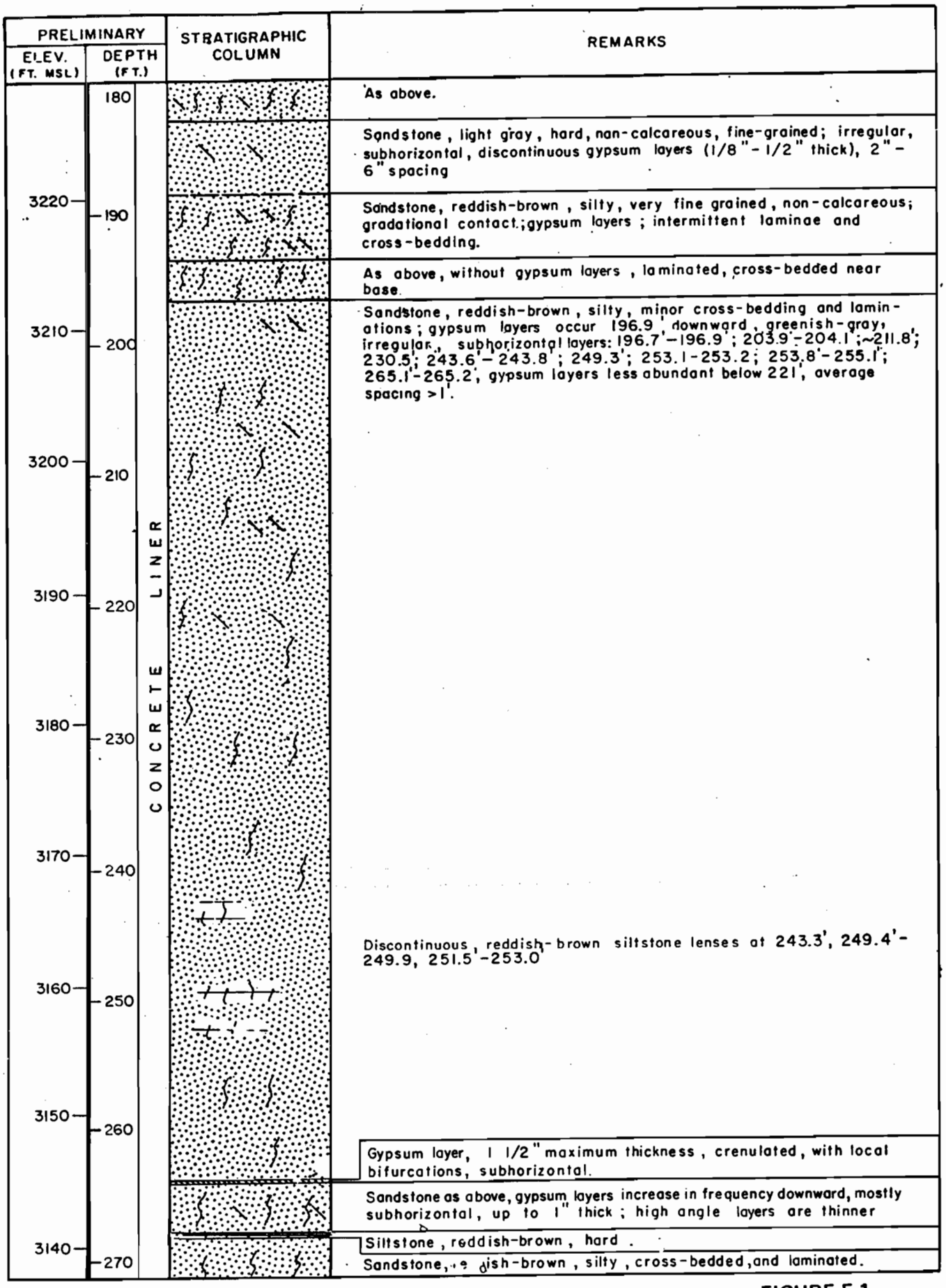

FIGURE E-1

PREPARED BY RDH DATE 6/21/84
CHECKED BY _____ DATE _____

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 3 OF 26

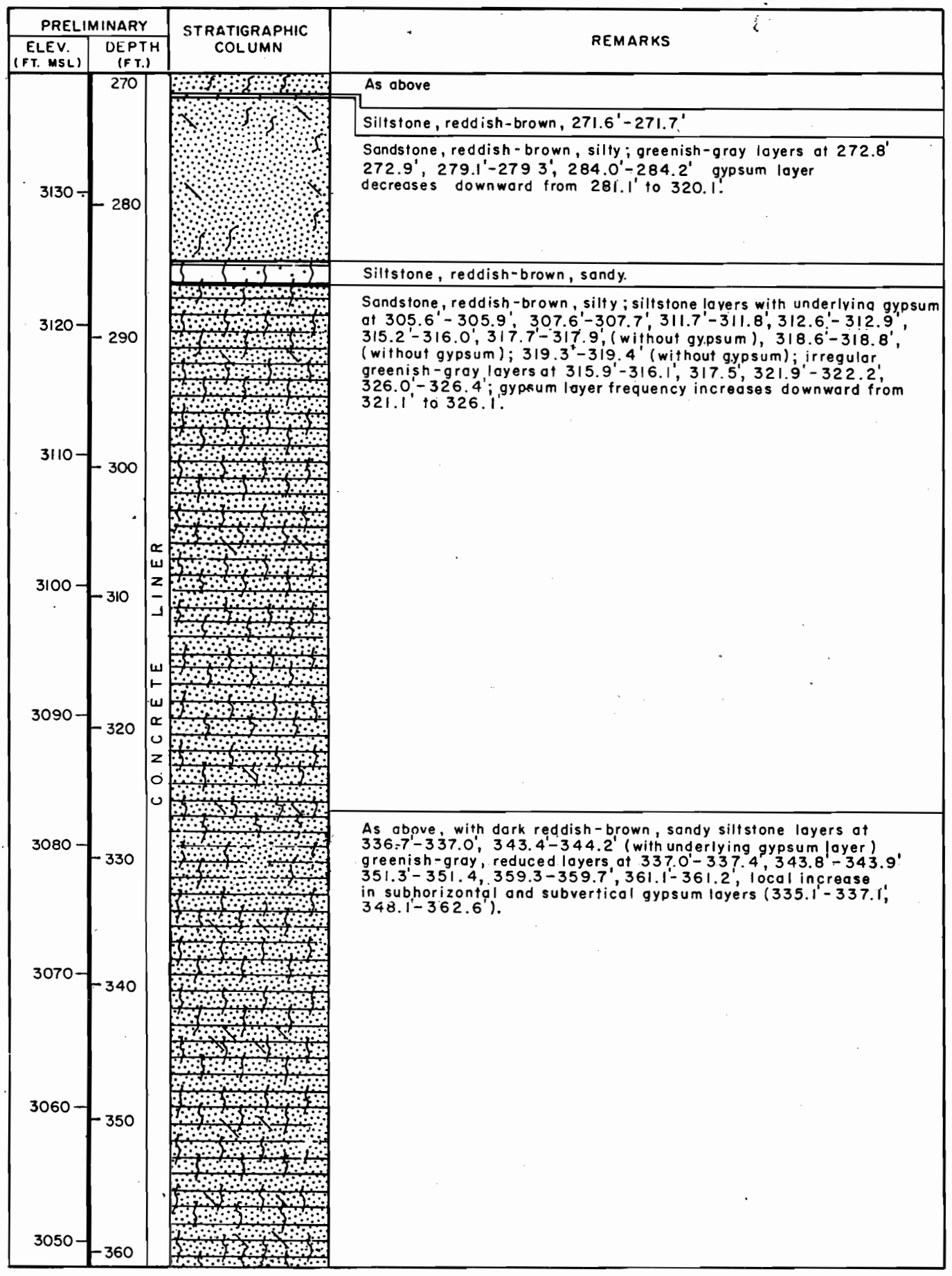

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FIGURE E-1

WASTE HANDLING SHAFT LITHOLOGIC LOG SHEET 4 OF 26

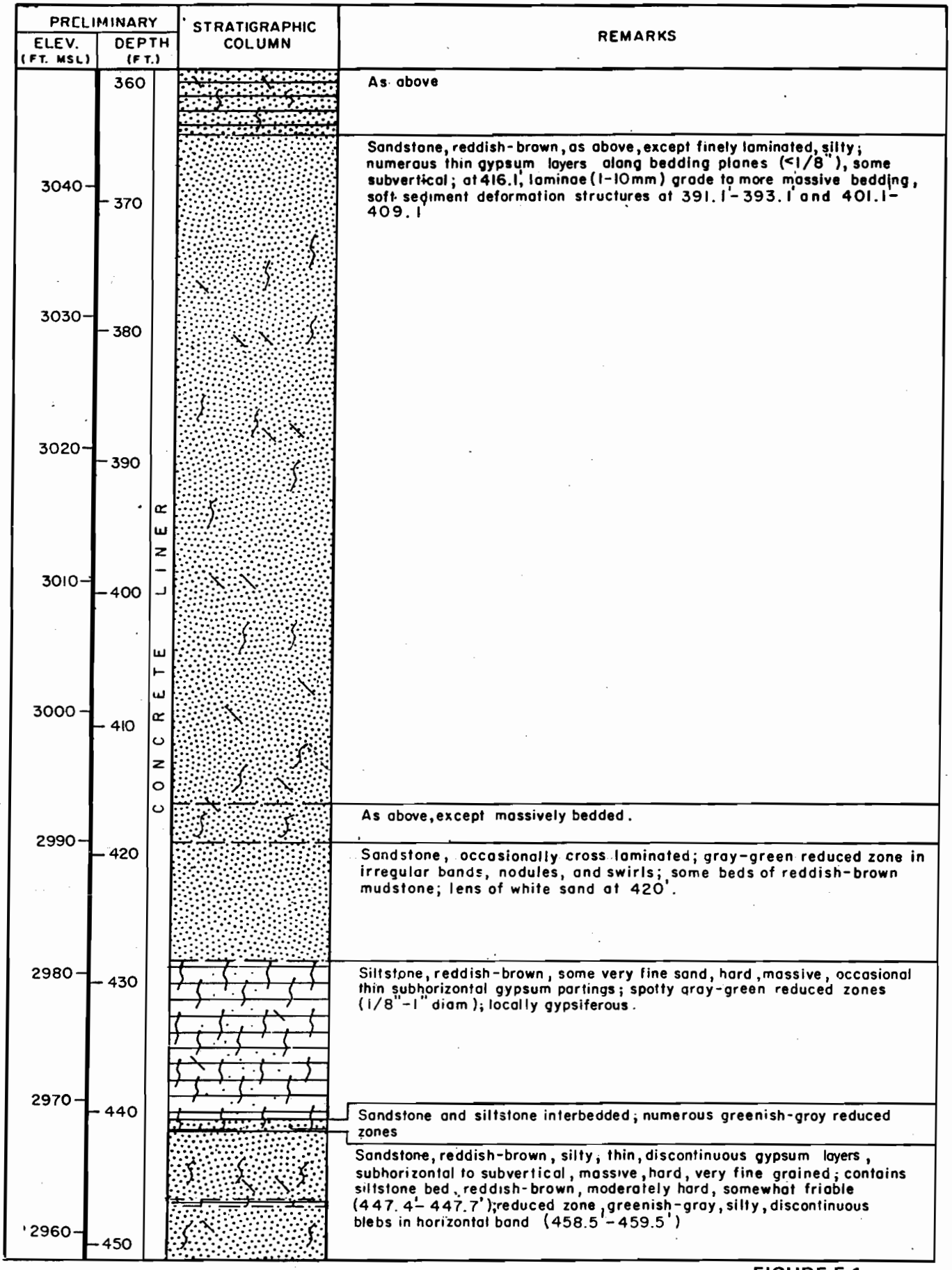

FIGURE E-1

PREPARED BY RMH DATE 6/21/84
CHECKED BY _____ DATE _____

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 5 OF 26

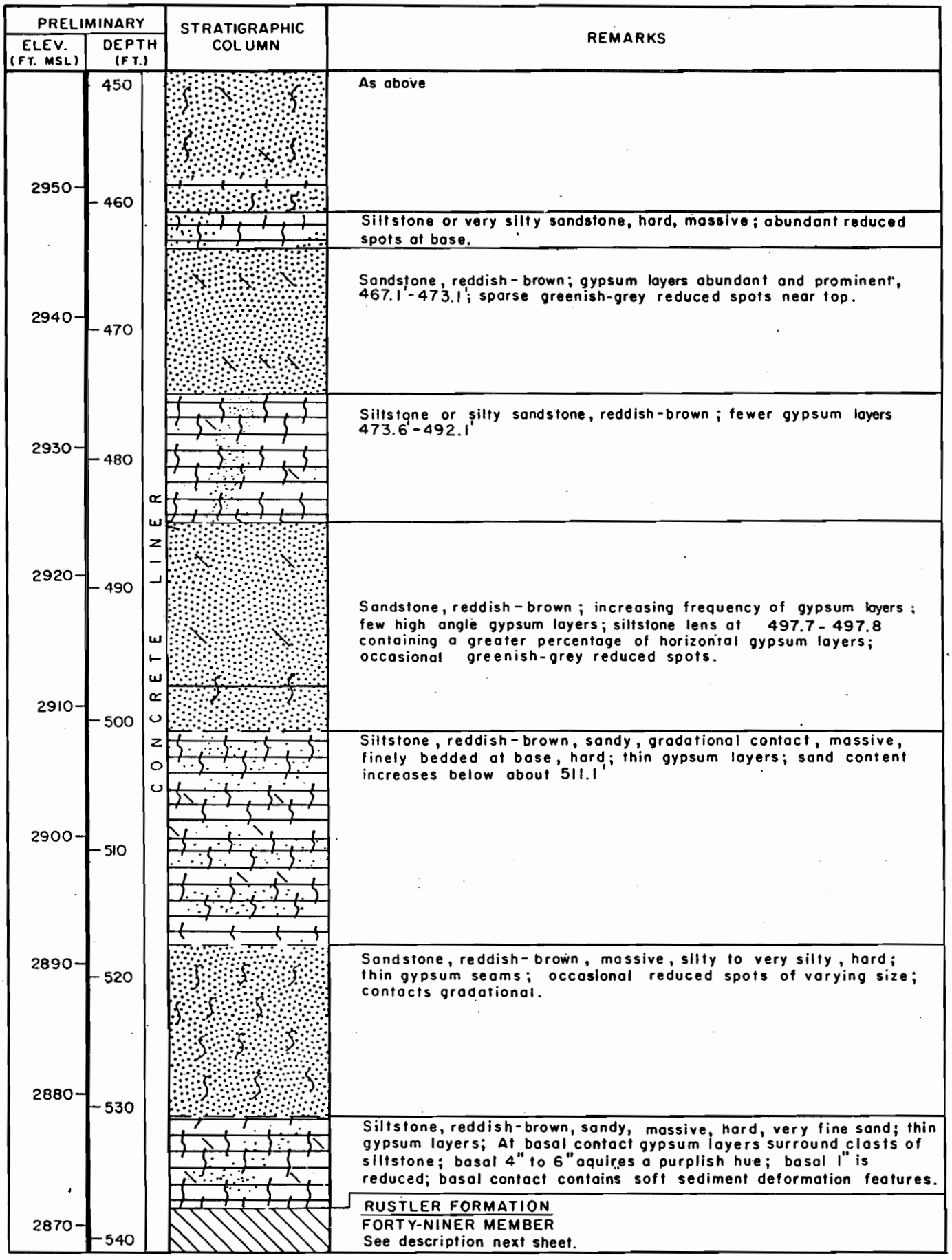

FIGURE E-1

PREPARED BY RMH DATE 6/21/84
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WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 6 OF 26

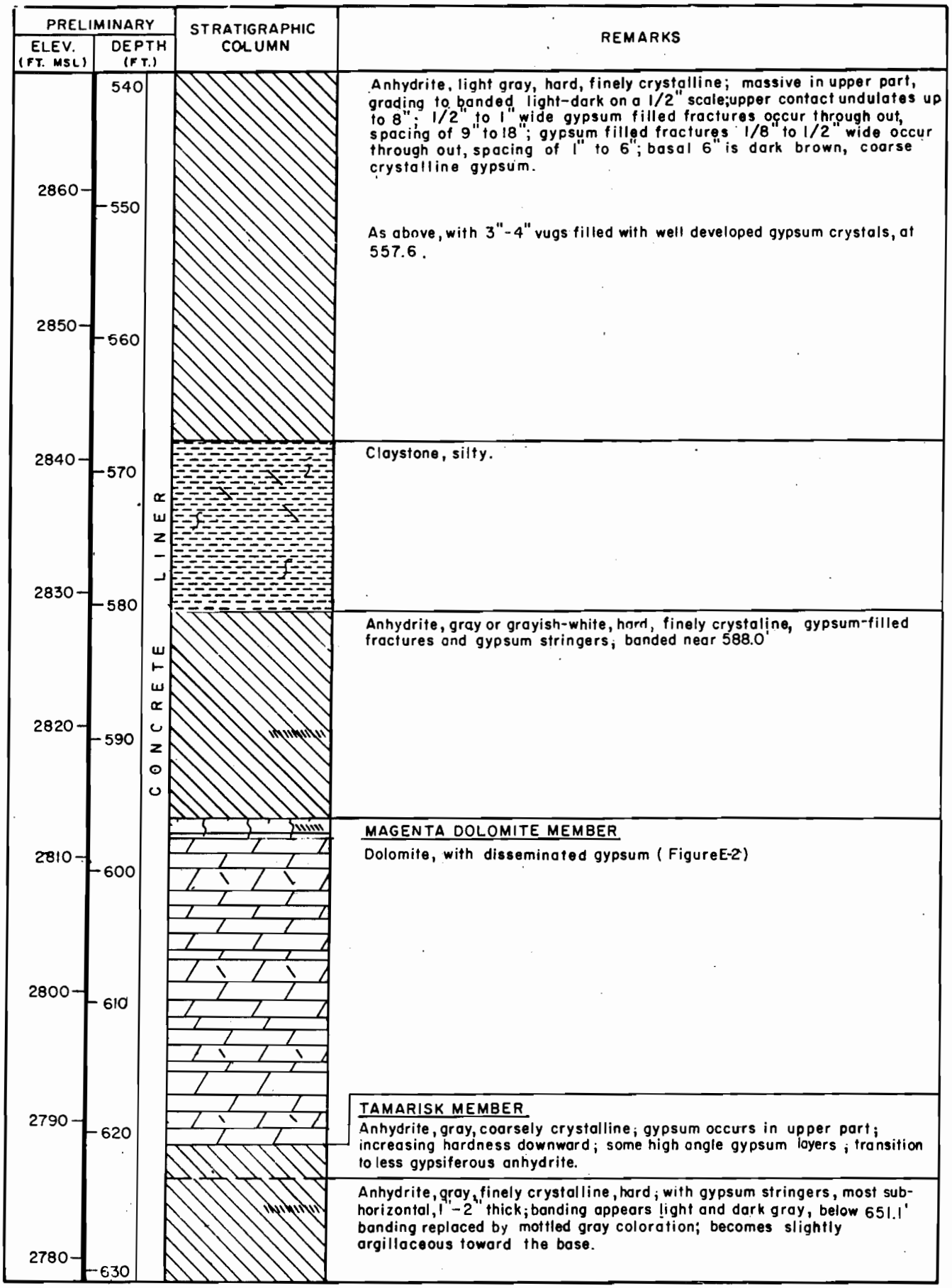


FIGURE E-1

PREPARED BY RMH DATE 6/21/84
CHECKED BY _____ DATE _____

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 7 OF 26

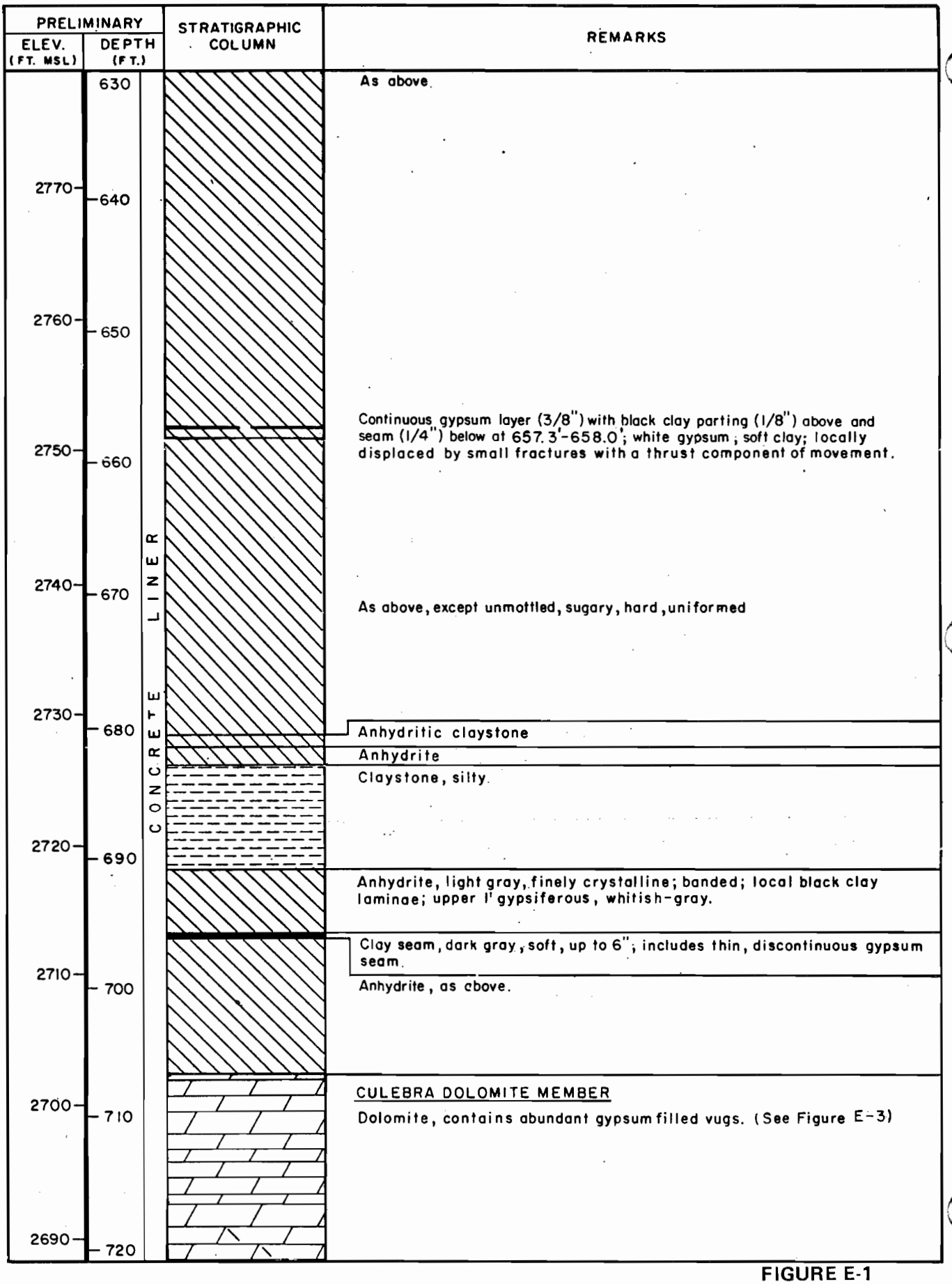
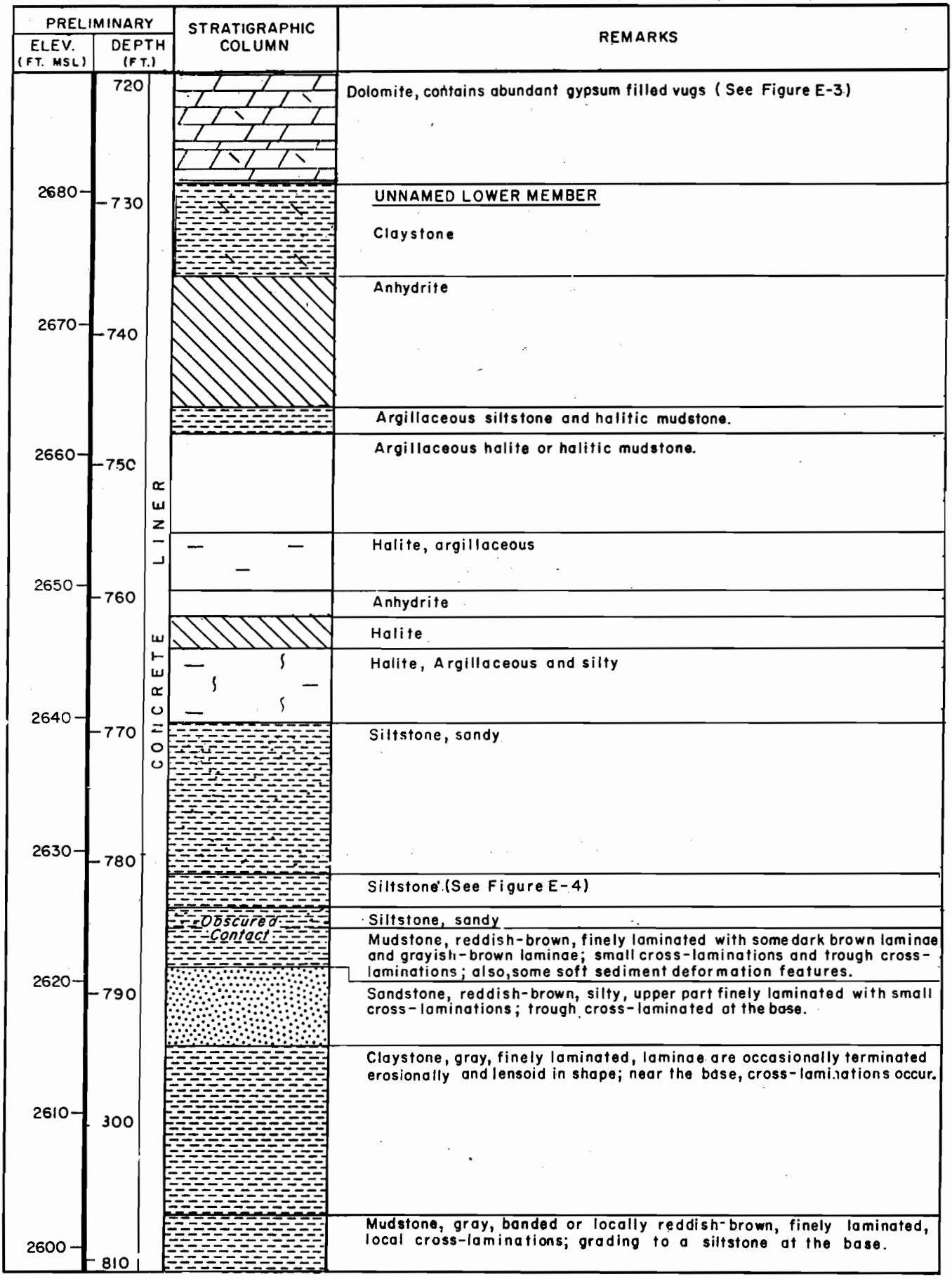


FIGURE E-1

PREPARED BY RMH DATE 6/21/84
CHECKED BY ____ DATE ____

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 8 OF 26



PREPARED BY RMH DATE 6/21/84
CHECKED BY _____ DATE _____

FIGURE E-1

WASTE HANDLING SHAFT LITHOLOGIC LOG SHEET 9 OF 26

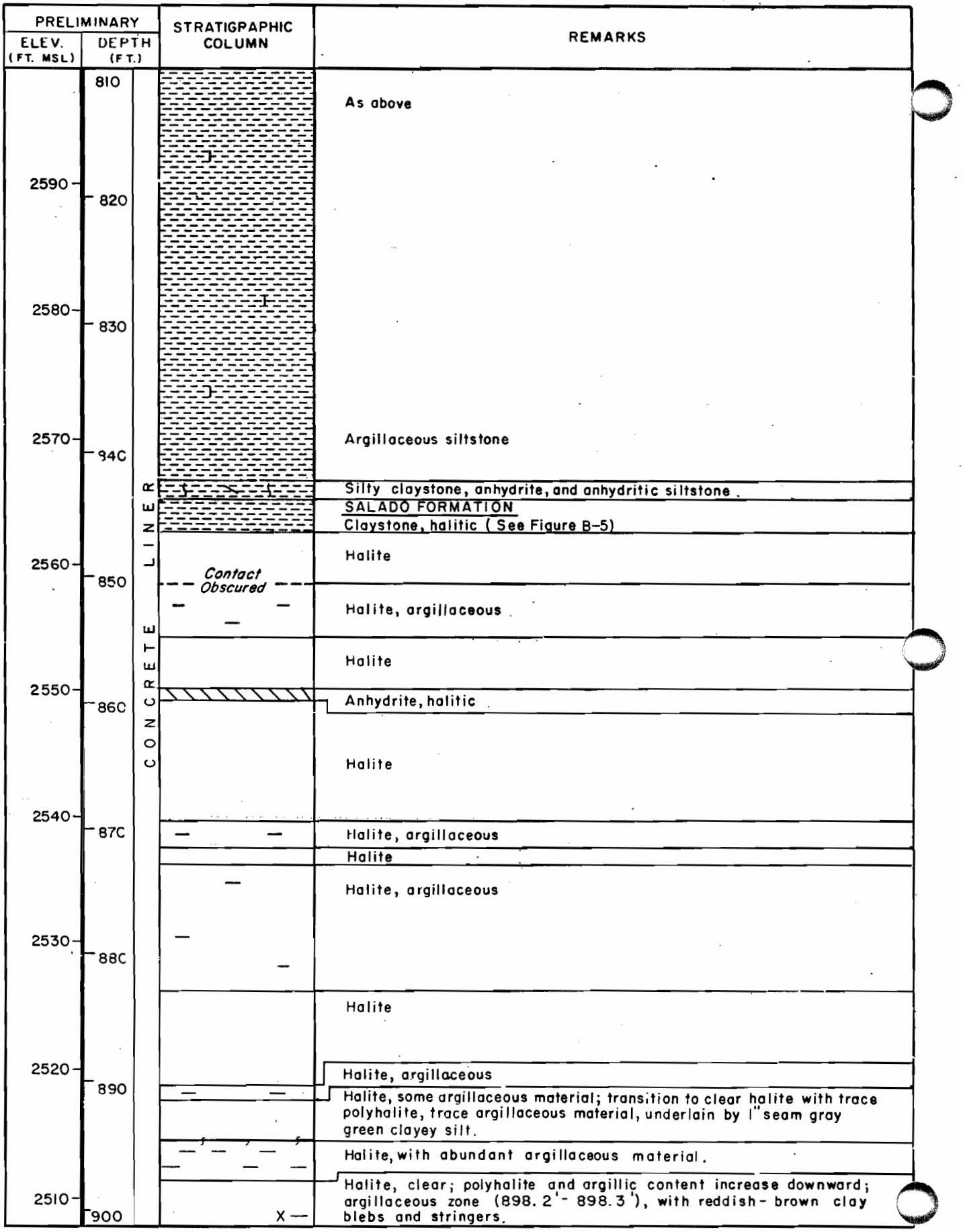


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FIGURE E-1

WASTE HANDLING SHAFT LITHOLOGIC LOG SHEET 10 OF 26

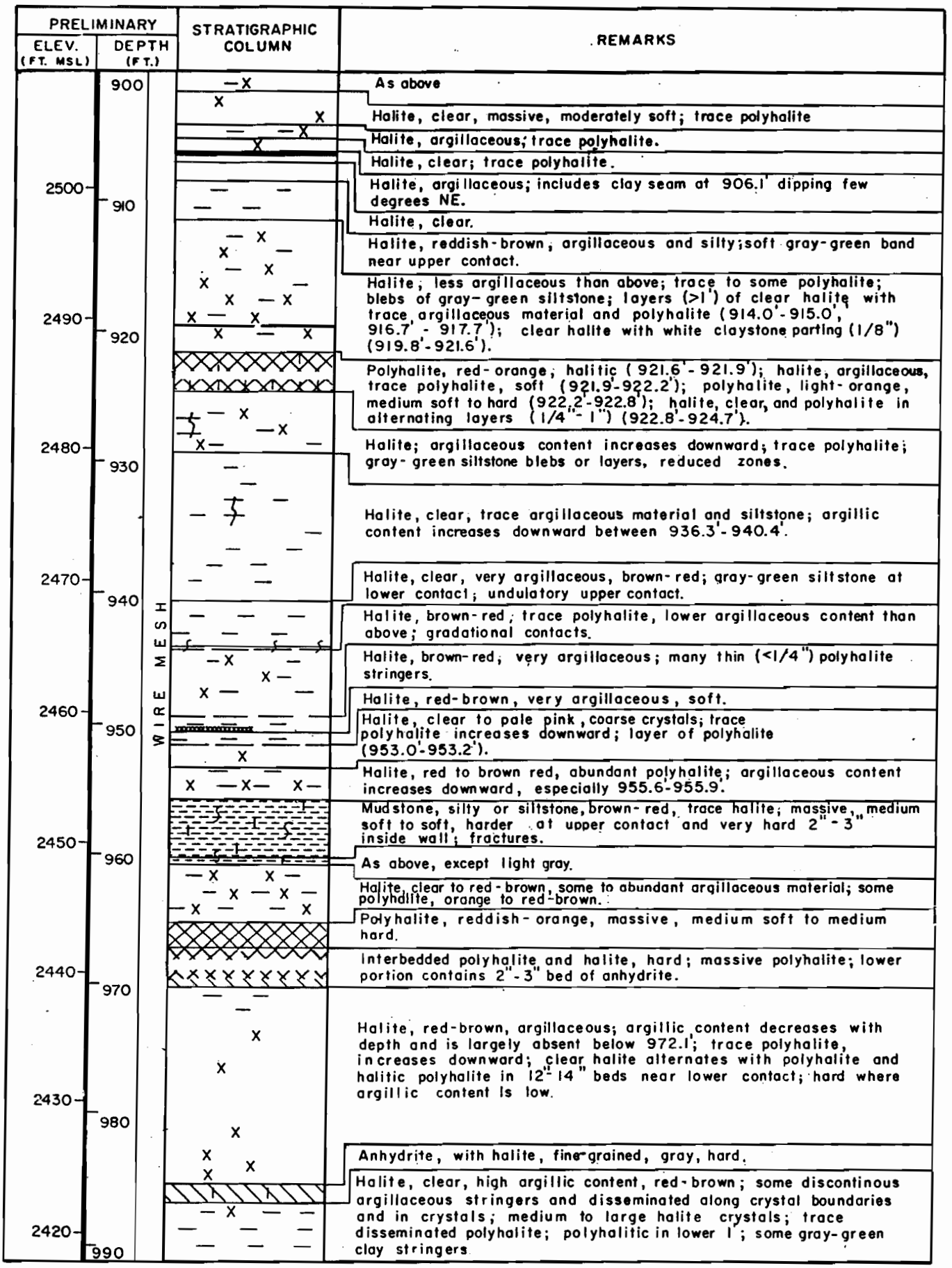

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FIGURE E-1

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 11 OF 26

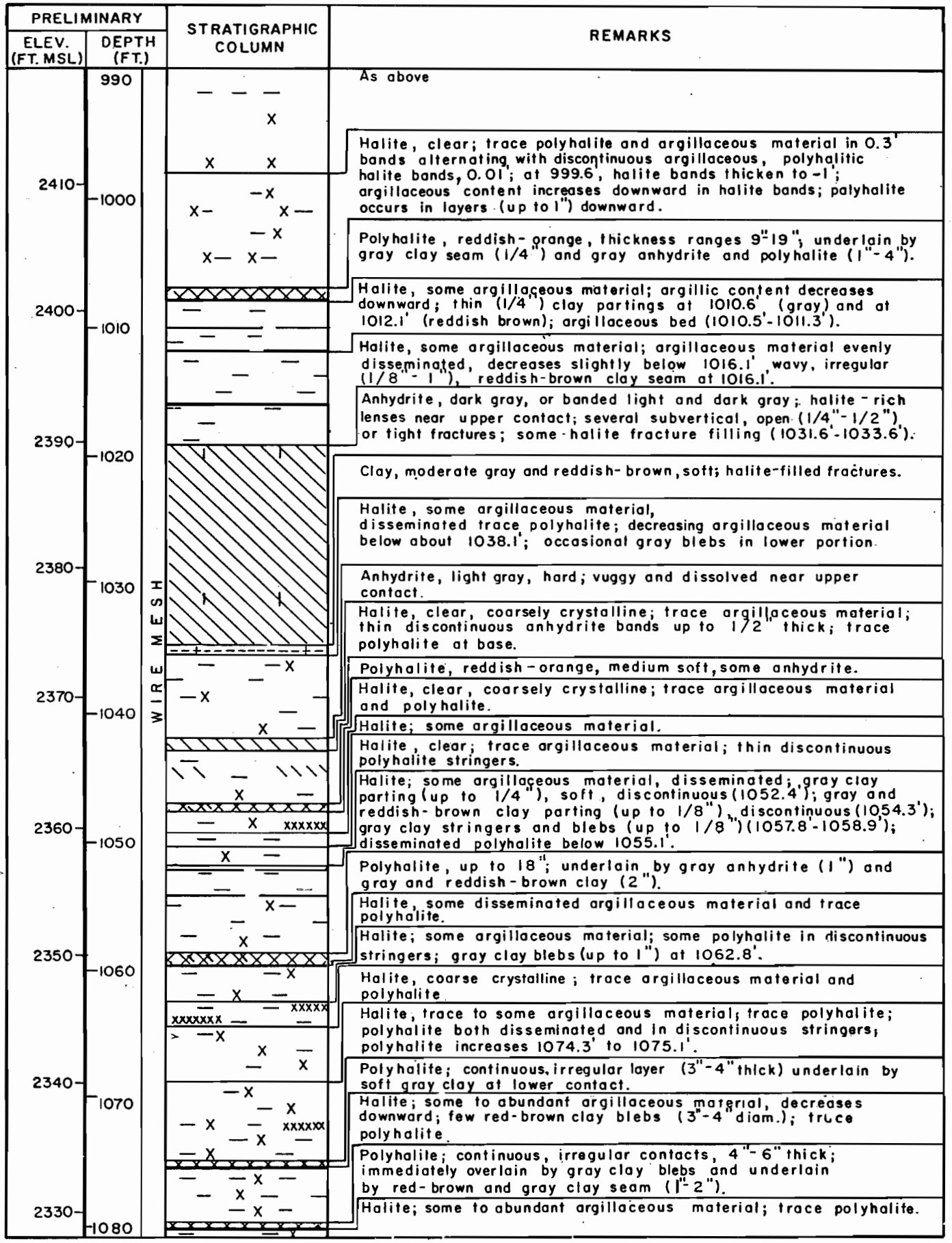

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FIGURE E-1

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 12 OF 26

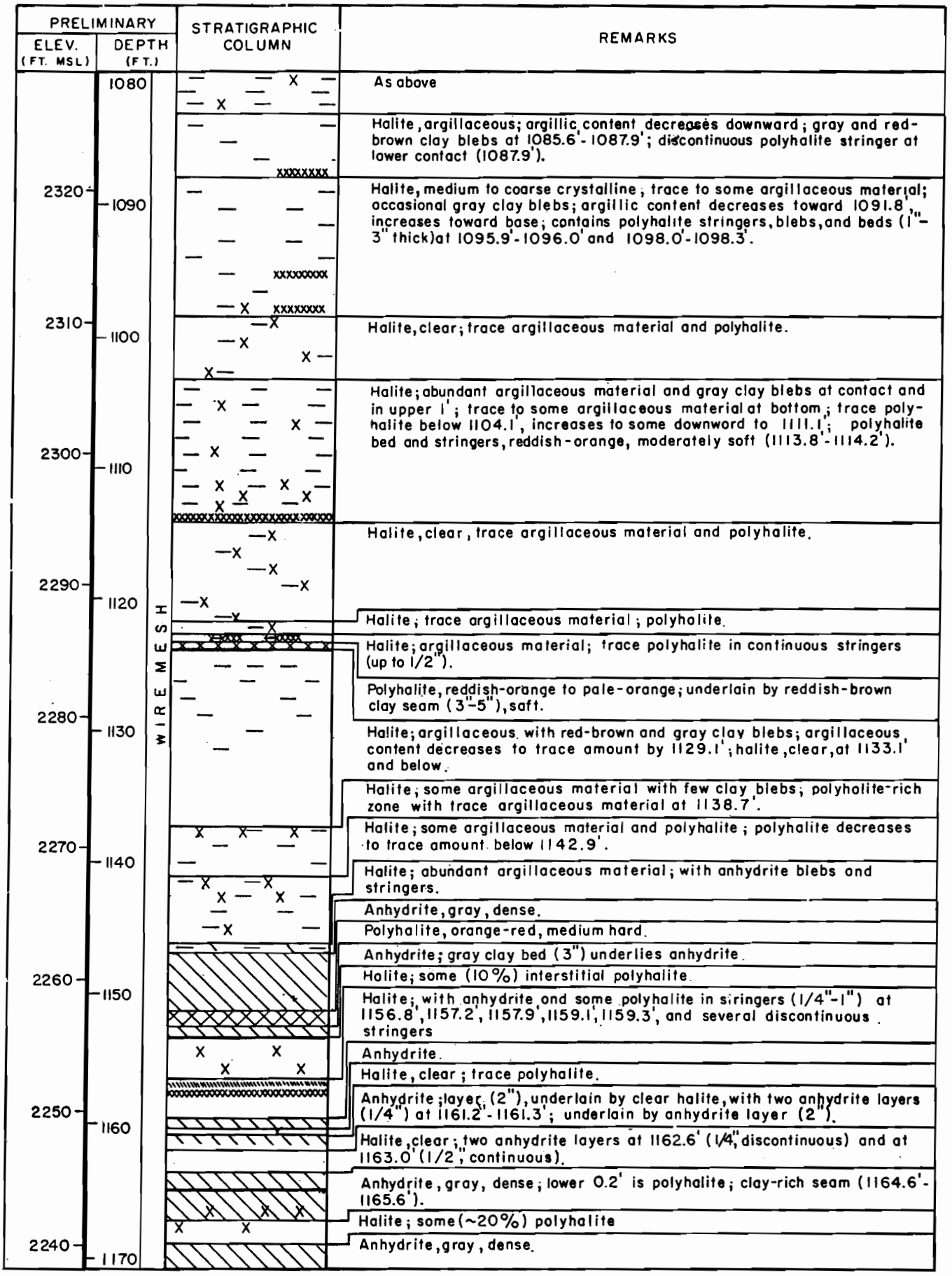

FIGURE E-1

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CHECKED BY _____ DATE _____

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 13 OF 26

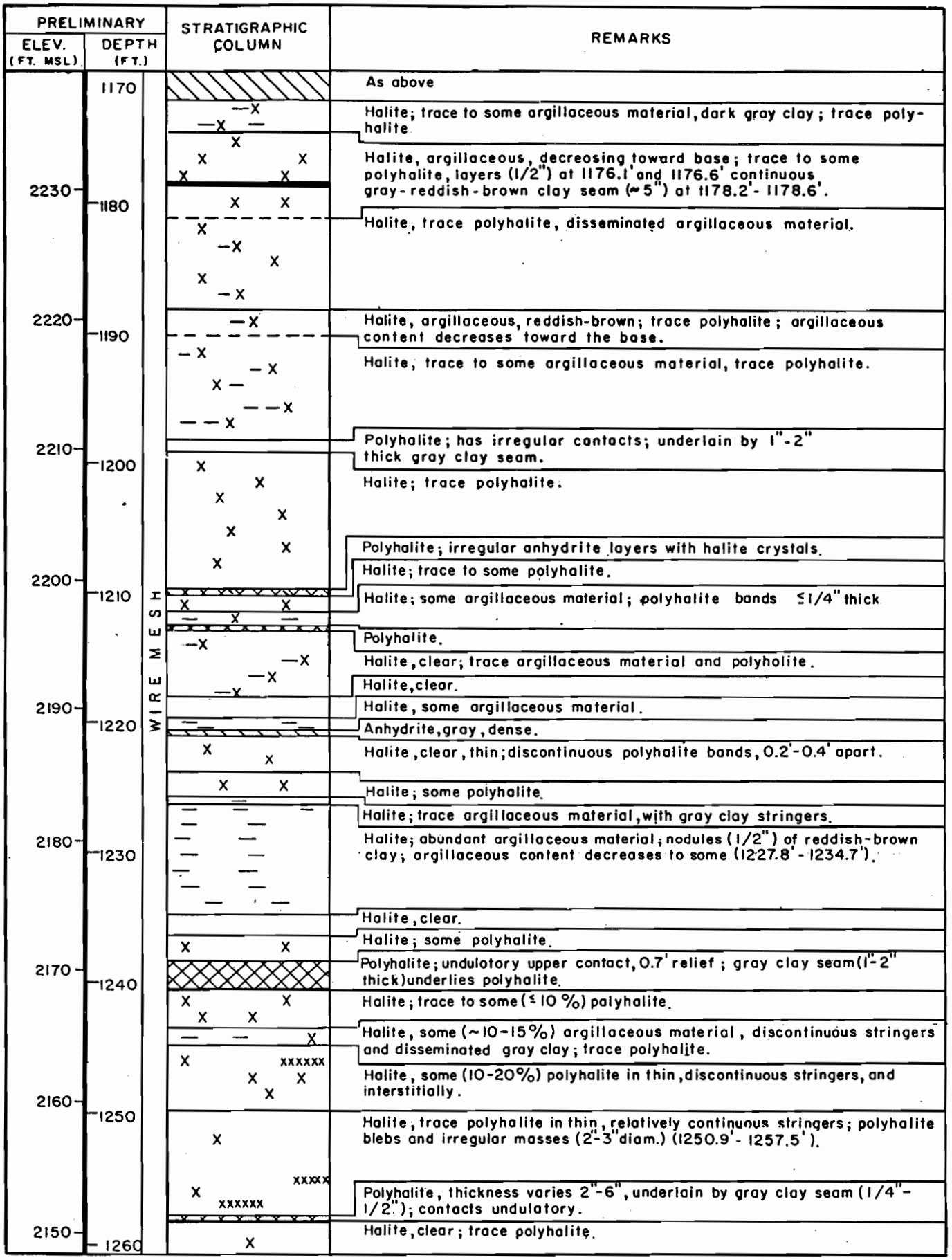

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FIGURE E-1

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 14 OF 26

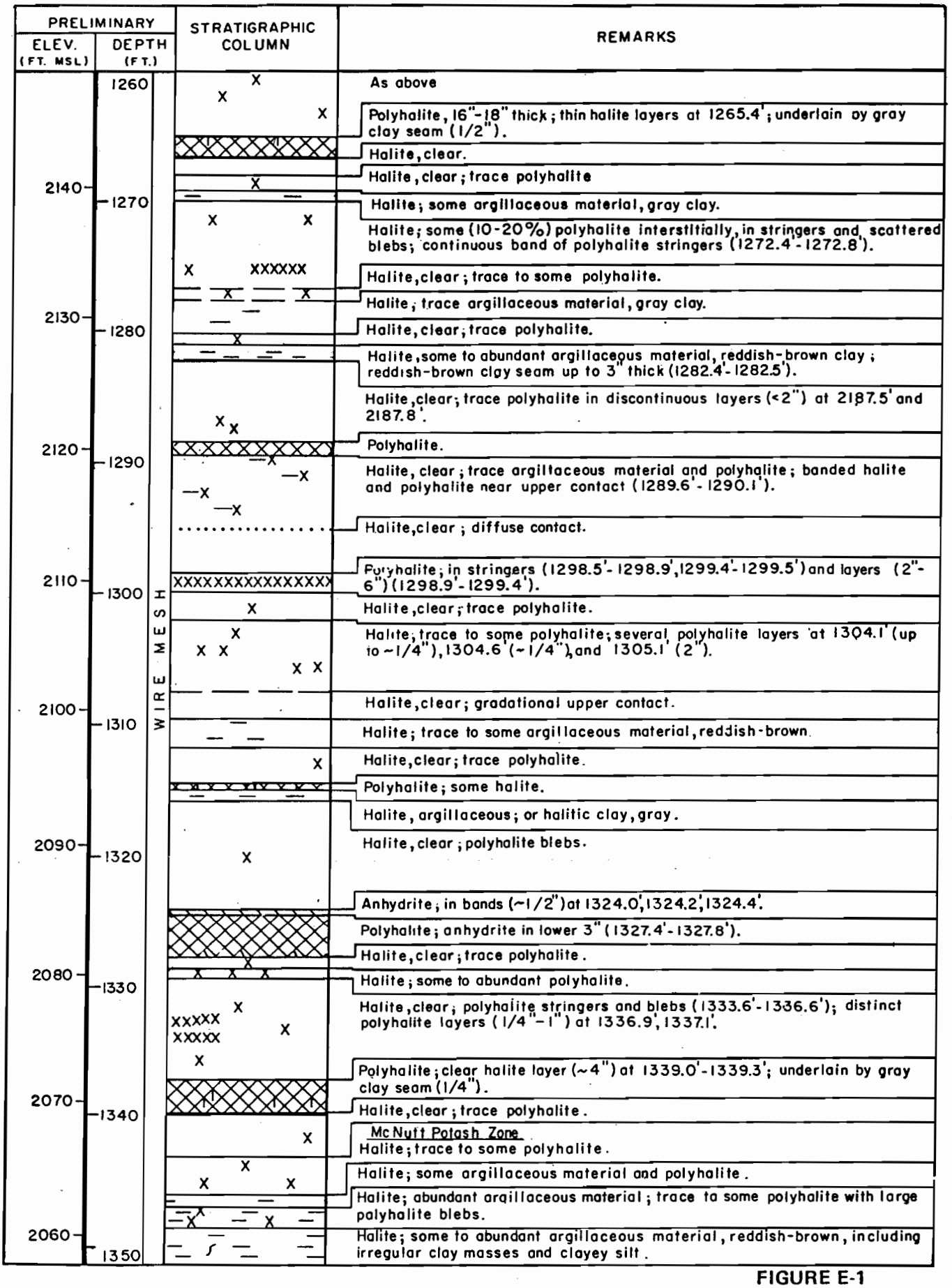

FIGURE E-1

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CHECKED BY _____ DATE _____

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 15 OF 26

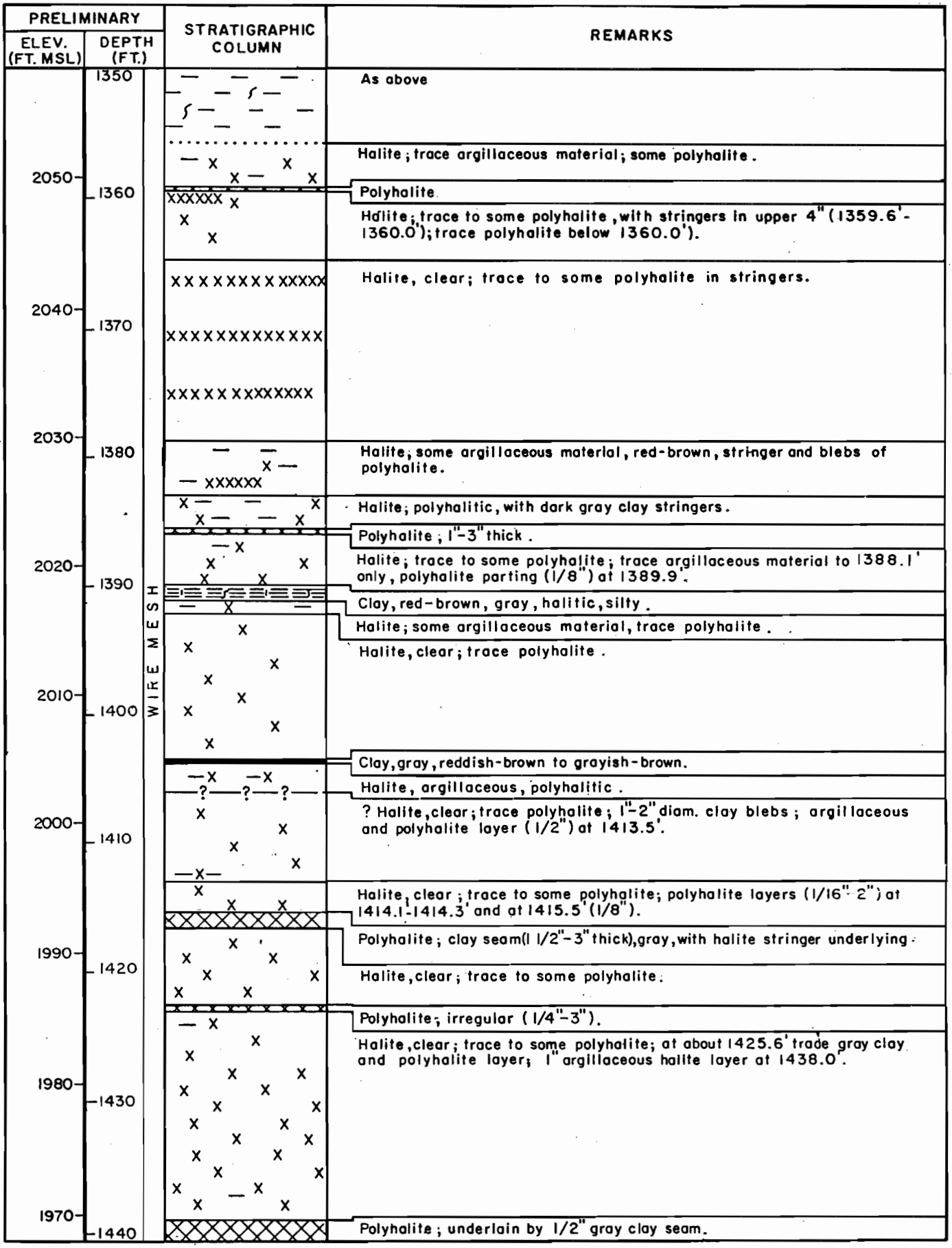

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FIGURE E-1

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 16 OF 26

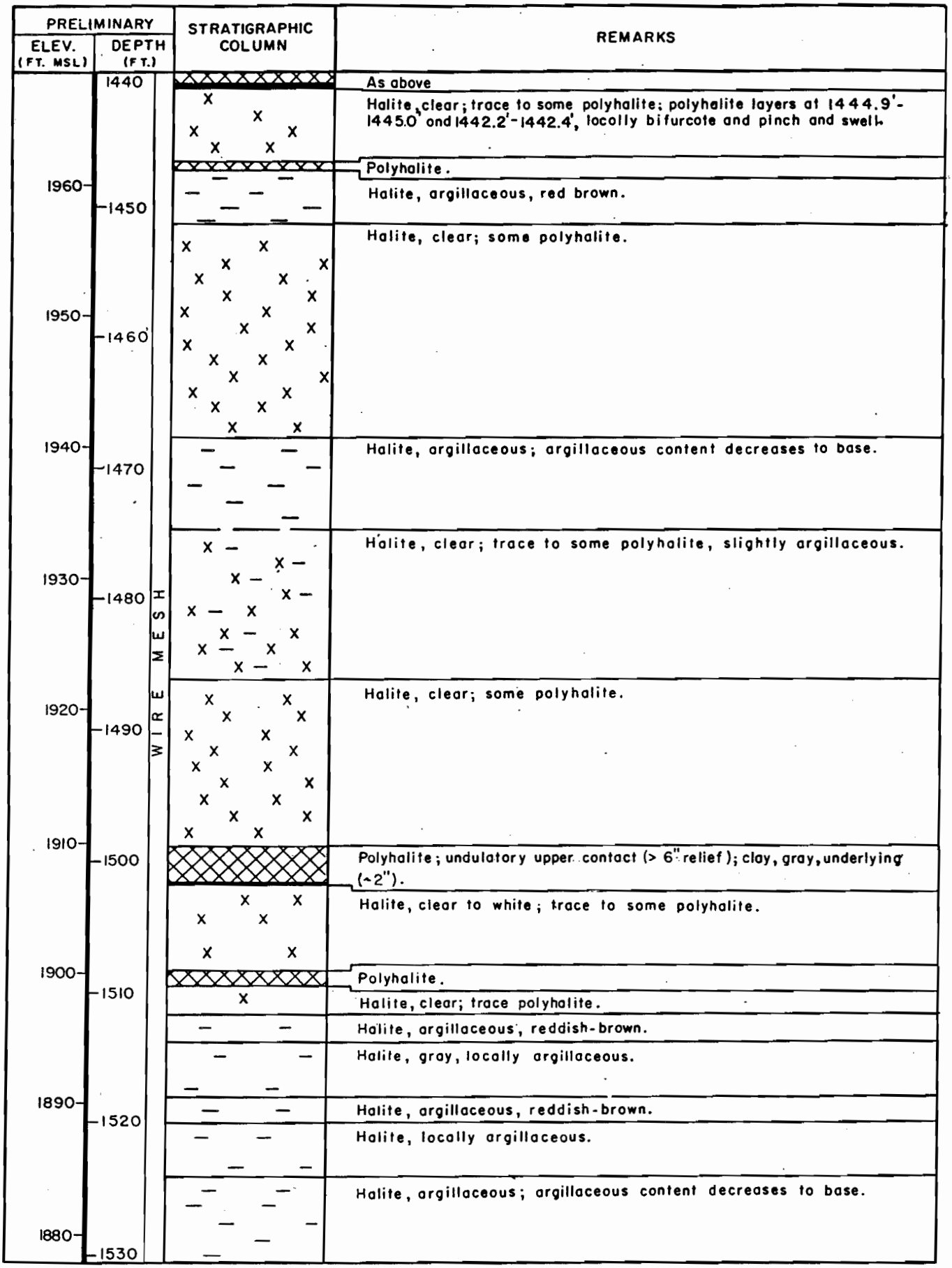

FIGURE E-1

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WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 17 OF 26

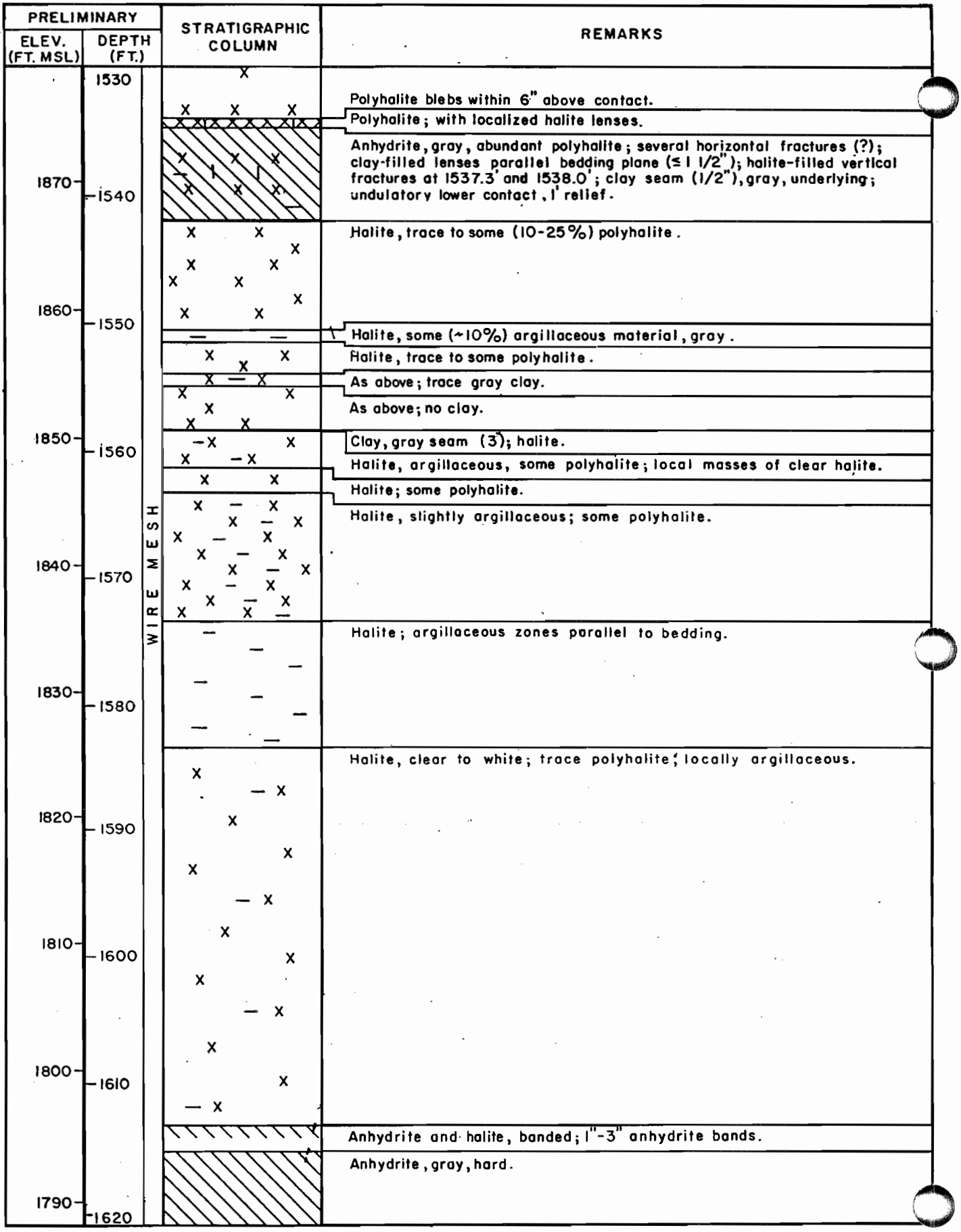

FIGURE E-1

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WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 18 OF 26

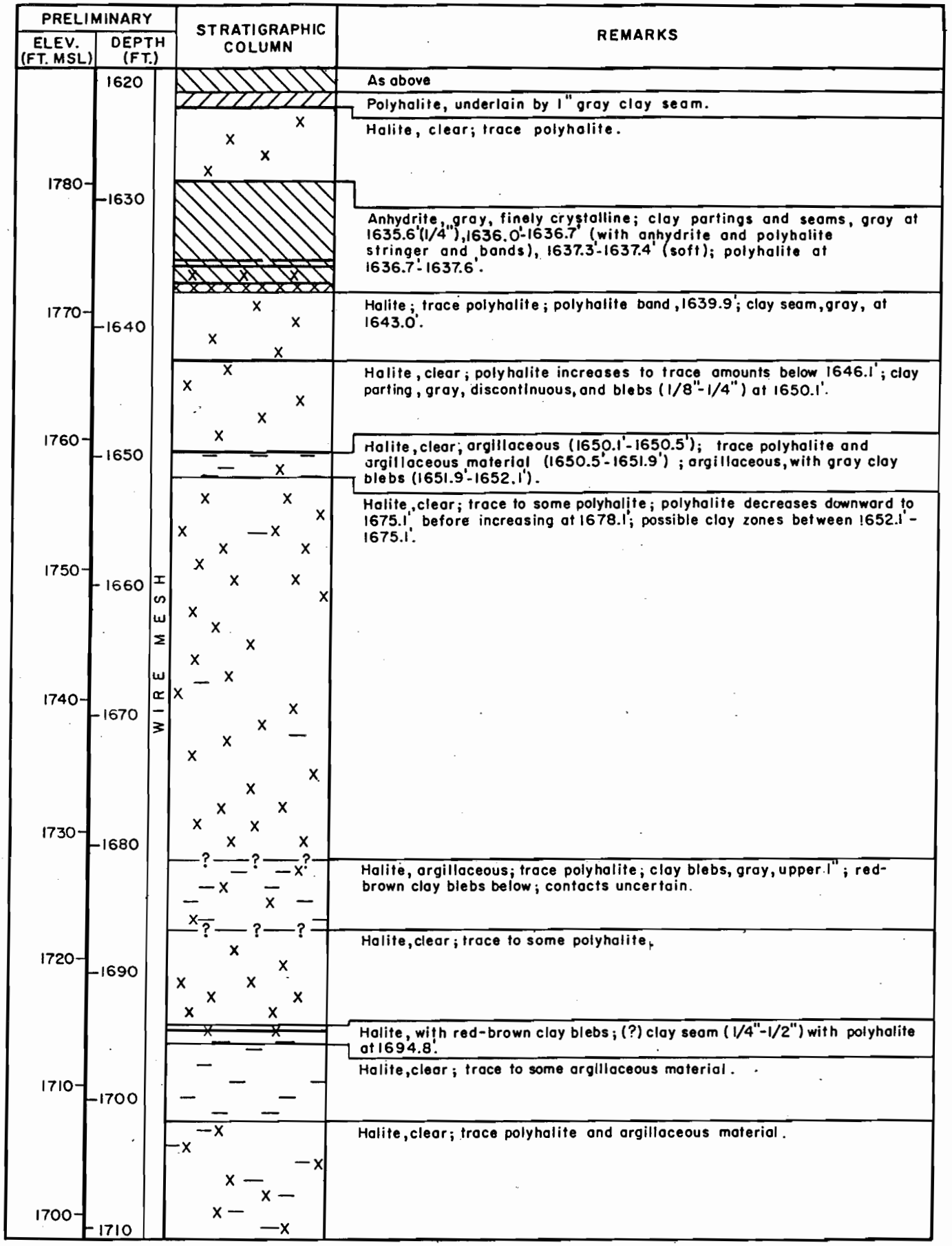

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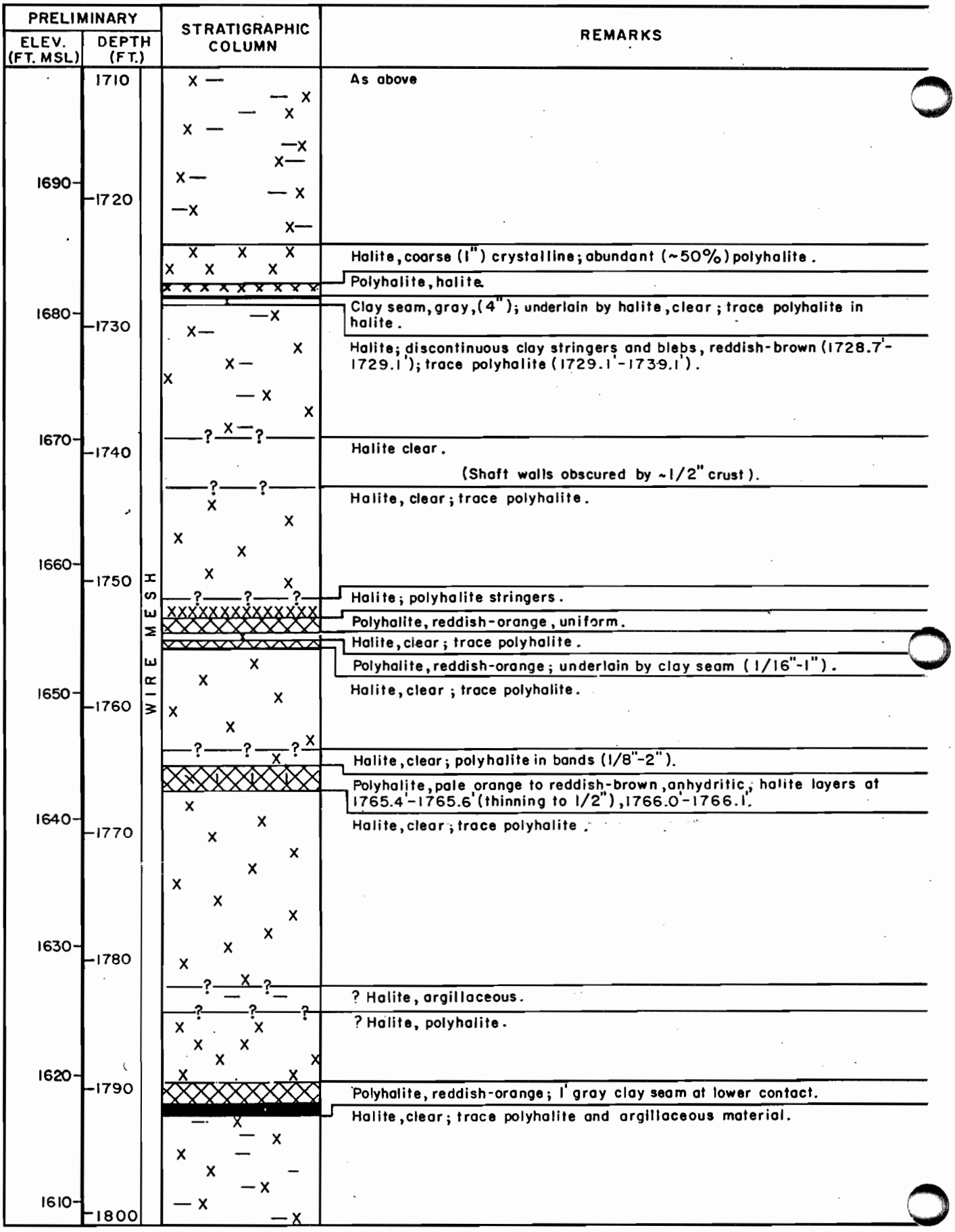
FIGURE E-1

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 19 OF 26



PREPARED BY RMH DATE 6/21/84
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FIGURE E-1

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 20 OF 26

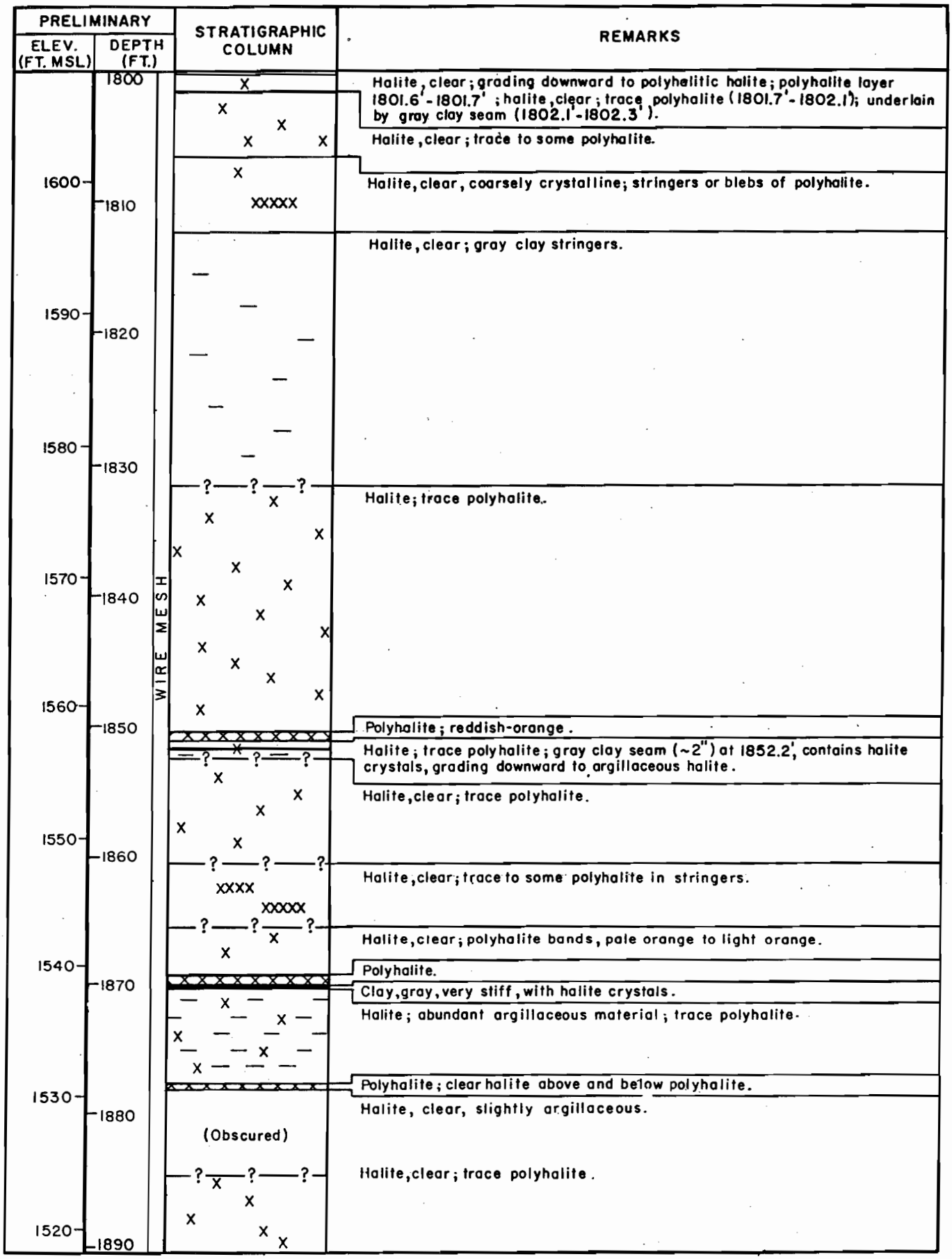

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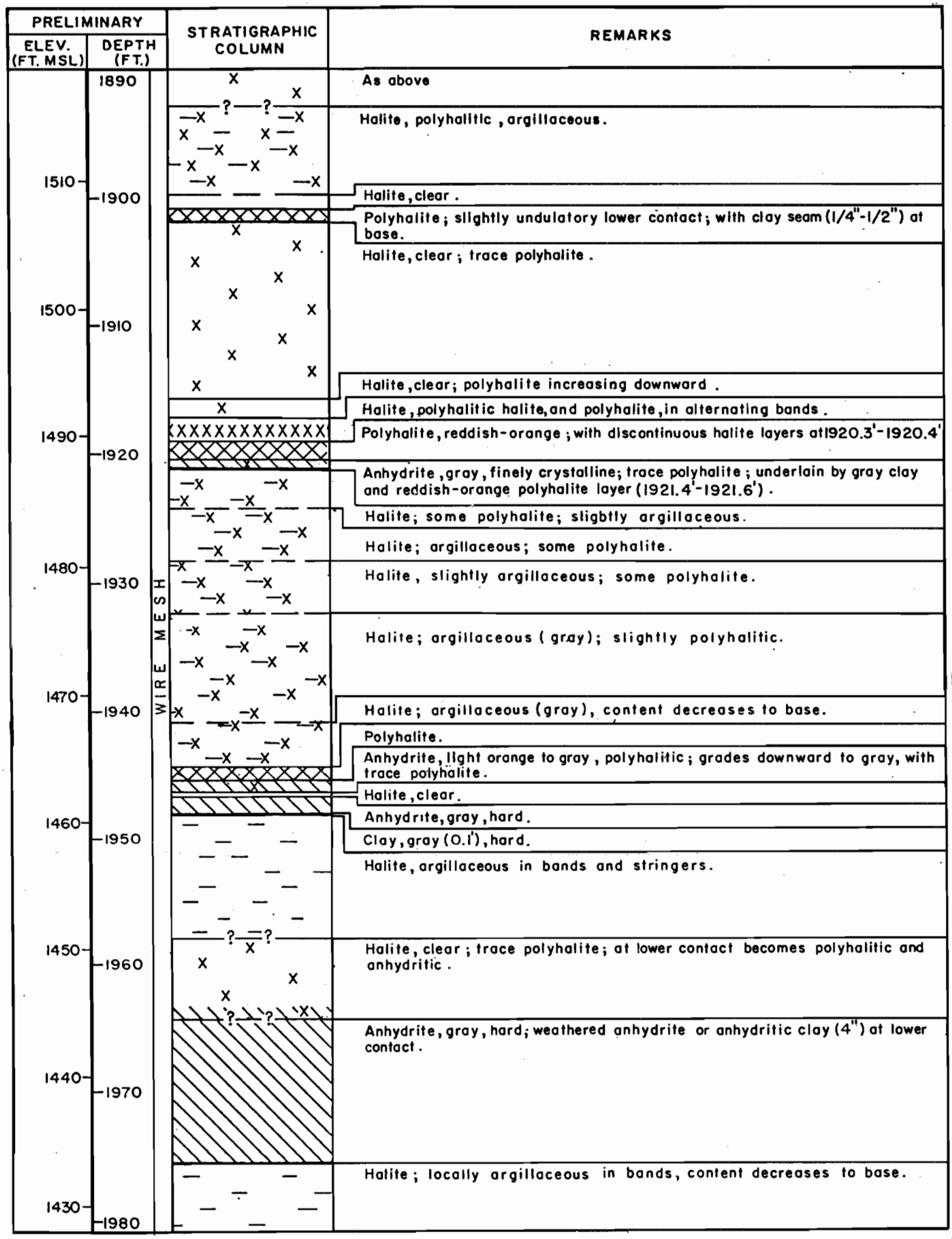
FIGURE E-1

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 21 OF 26



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CHECKED BY _____ DATE _____

FIGURE E-1

WASTE HANDLING SHAFT LITHOLOGIC LOG SHEET 22 OF 26

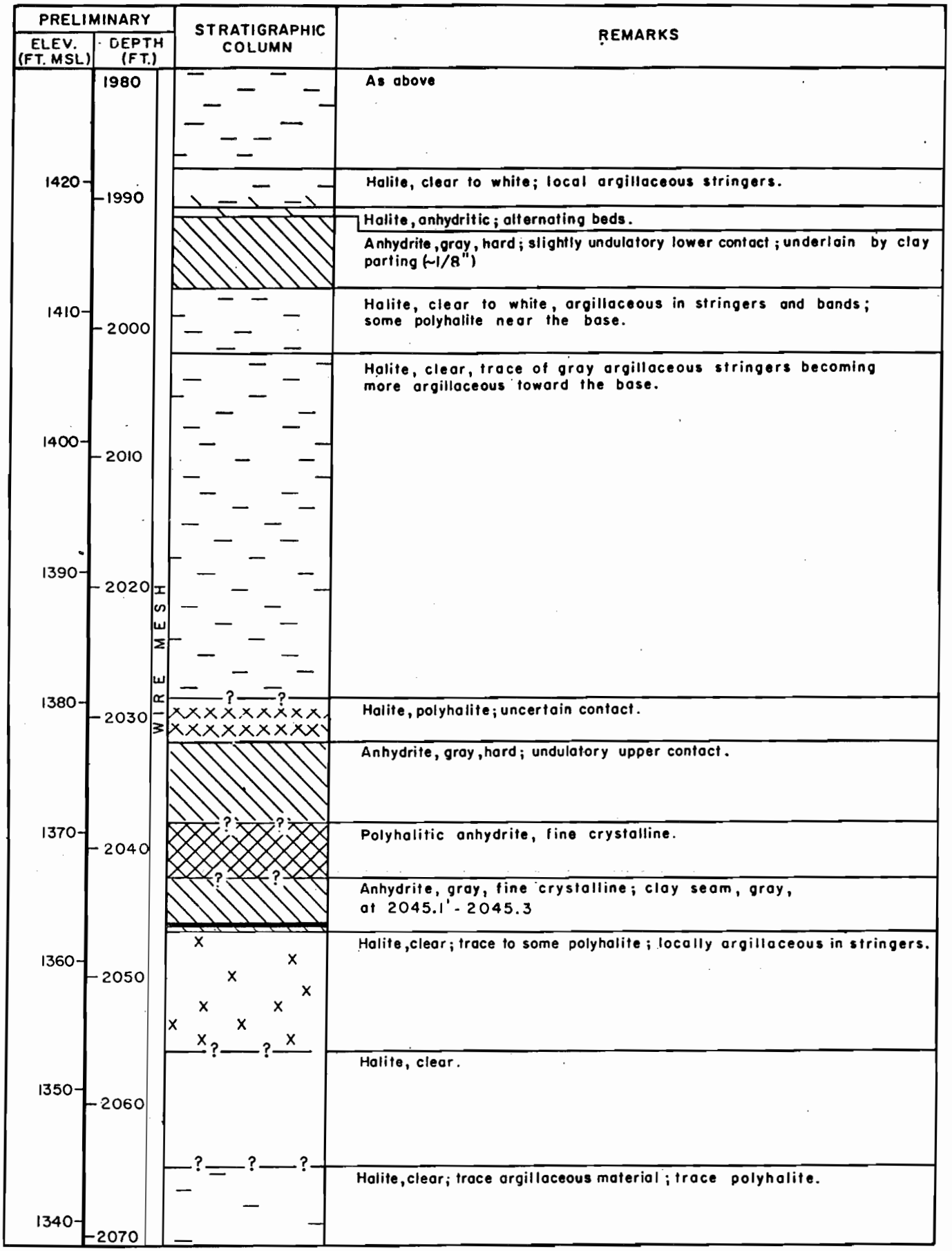

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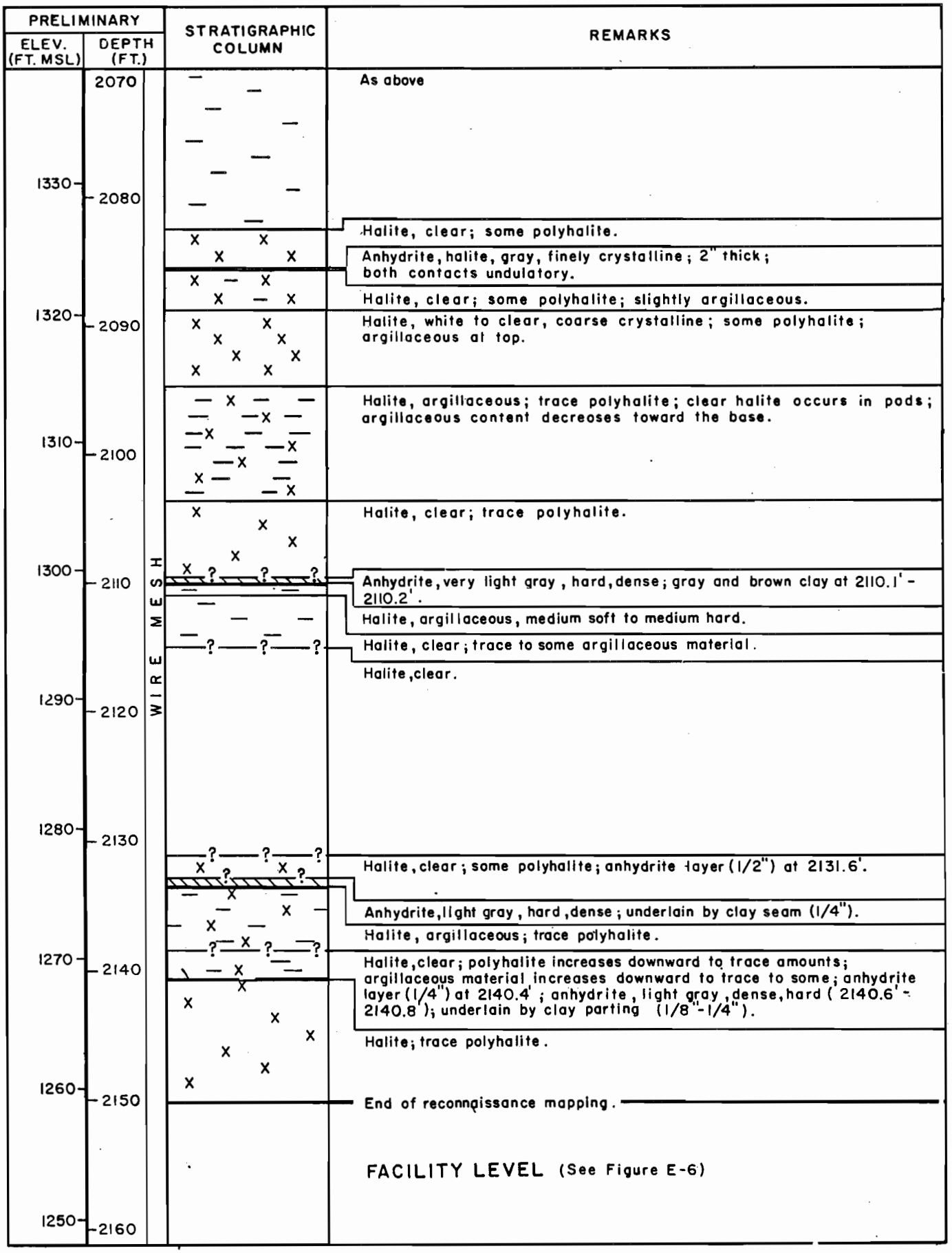
FIGURE E-1

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 23 OF 26



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CHECKED BY _____ DATE _____

FIGURE E-1

WASTE HANDLING SHAFT LITHOLOGIC LOG SHEET 24 OF 26

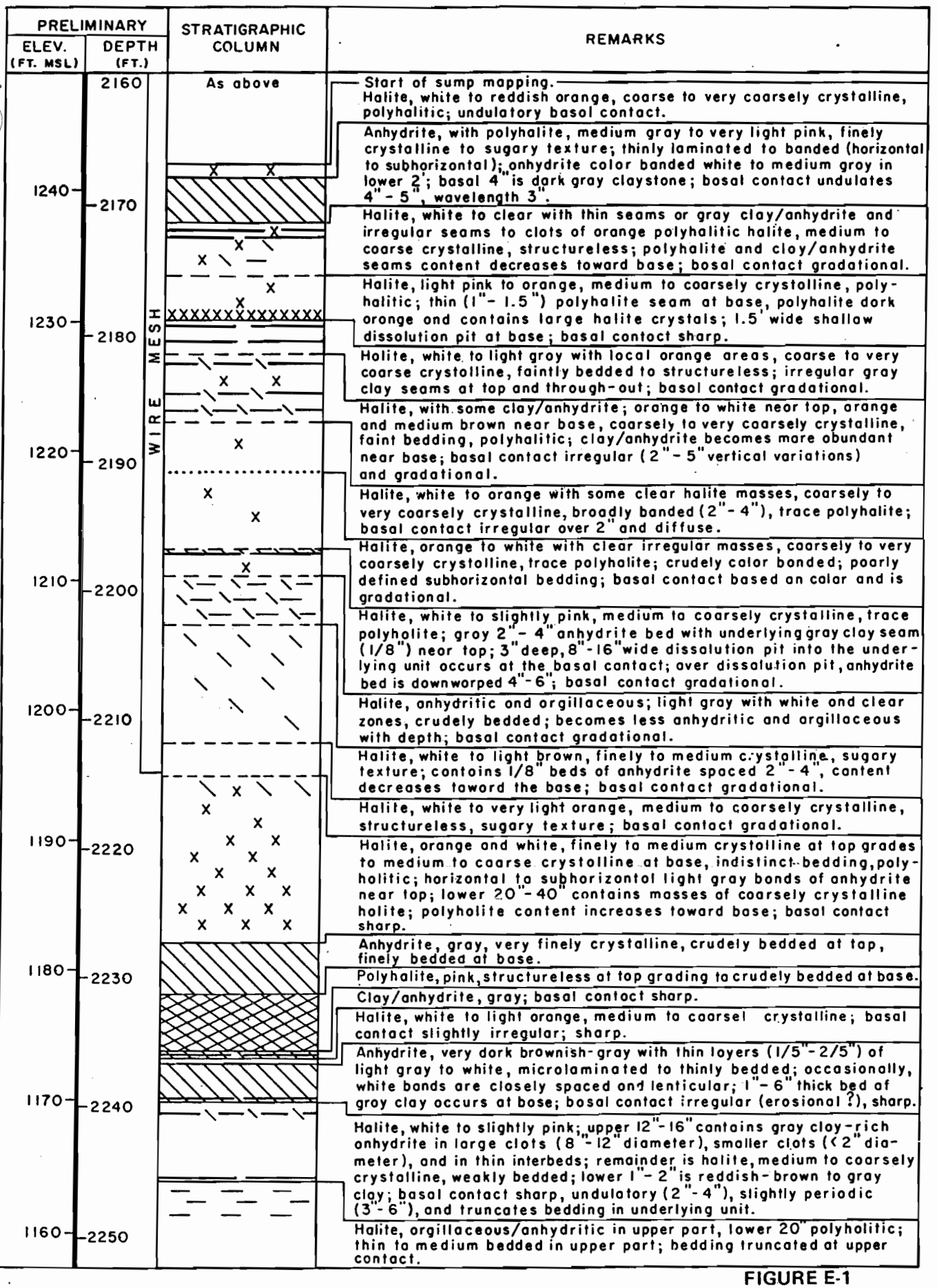

FIGURE E-1

PREPARED BY RMH DATE 9/13/84
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WASTE HANDLING SHAFT LITHOLOGIC LOG SHEET 25 OF 26

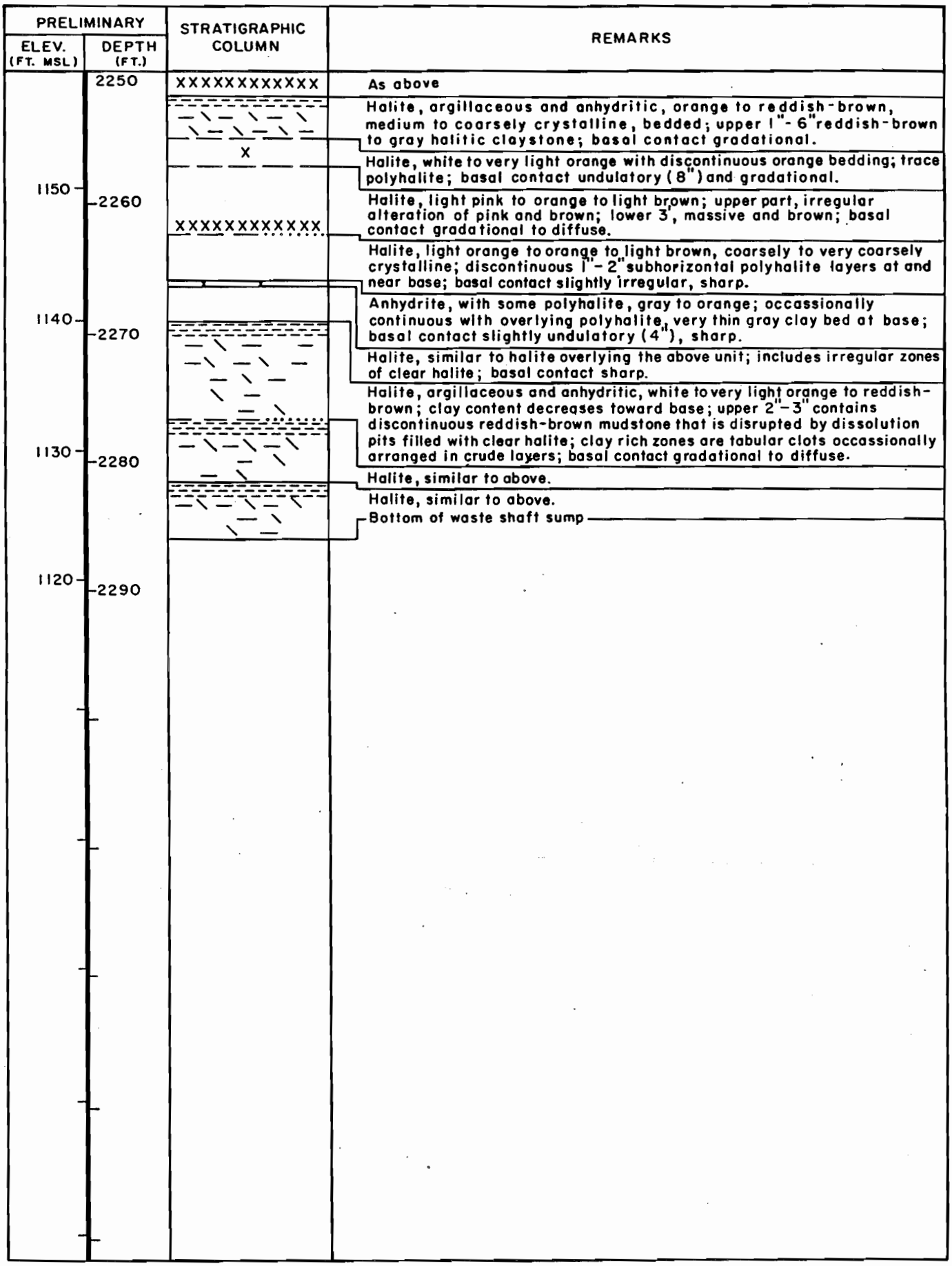
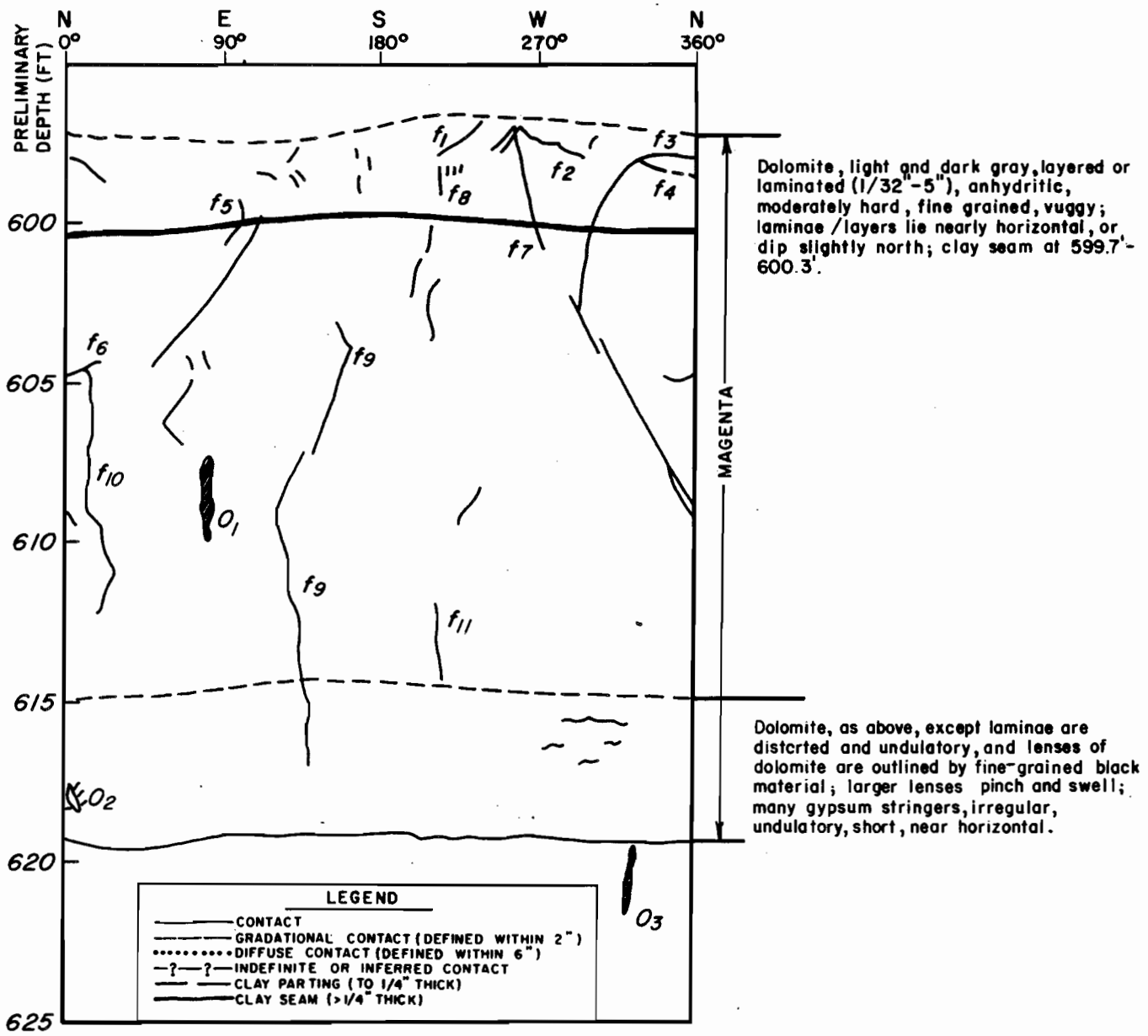


FIGURE E-1

PREPARED BY RMH DATE 9/13/84
CHECKED BY _____ DATE _____

WASTE HANDLING SHAFT
LITHOLOGIC LOG
SHEET 26 OF 26



FRACTURE NOTES

f1 Open.

f2 Open.

f3 Gypsum filled near the north extent, open (1/2") or accompanied by gypsum dissolution on west wall.

f4 Open (1/32").

f5 Open (1/32"); gypsum filled at depth; appears to offset laminae in dolomite.

f6 Open (1/32") near upper terminus; filled near 604'; open (1/16"-1/2") toward lower terminus; composed of several small fractures.

f7 Open (1/16").

f8 Fracture connects vuggy or leached zone to the west.

f9 Open (up to 1/4"), some gypsum fill has been leached.

f10 As *f9*

f11 Open (1/16"); small amount of gypsum fill.

OTHER NOTES

O1 Iron oxide (red) stain.

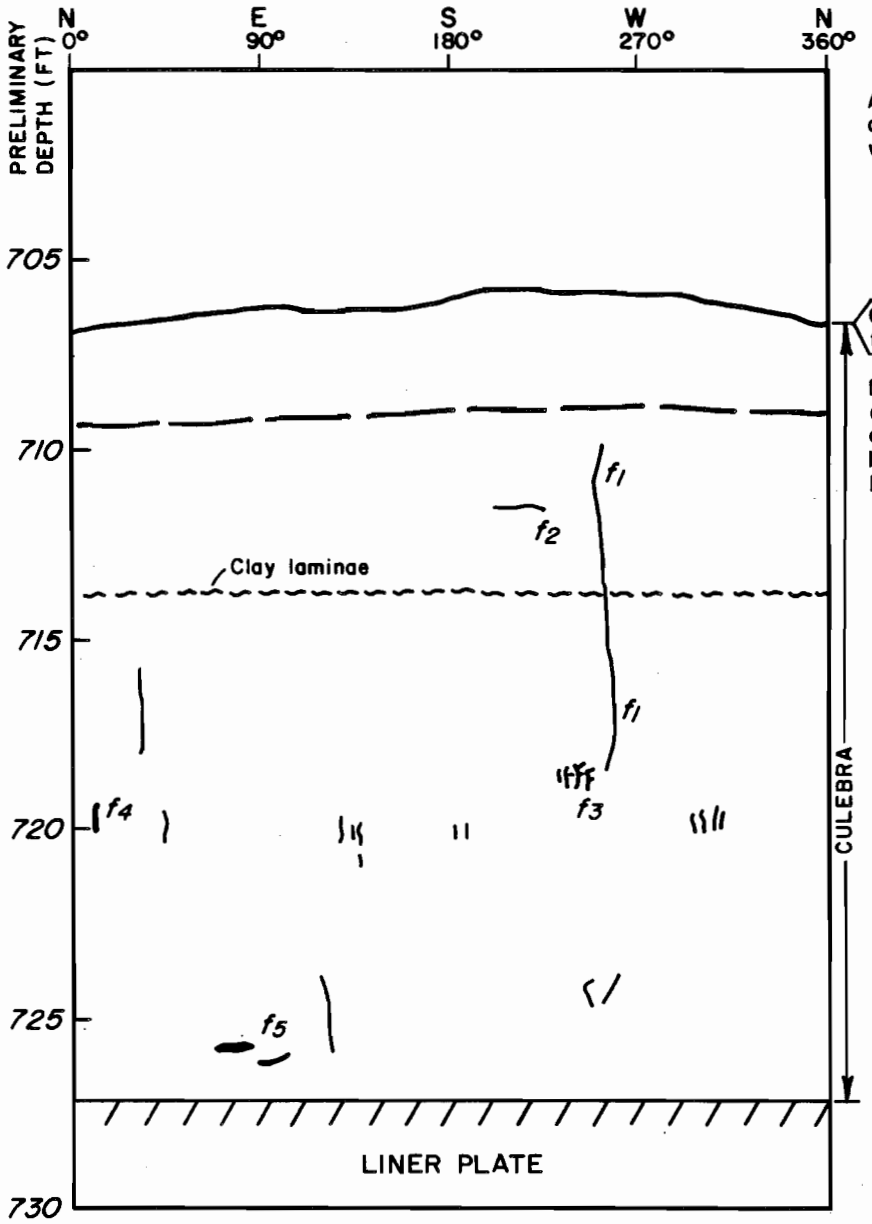
O2 Large dolomite clast embedded in laminated dolomite; laminae distorted downward around clast.

O3 Solution feature in underlying Rustler Formation (anhydrite)

REFERENCE:

Geotechnical Field Data Report No. 4, 1983, Geologic Mapping & Water Inflow Testing in SPDV Ventilation Shaft.

Figure E-2
WASTE SHAFT
MAGENTA DOLOMITE
597 TO 620 FEET



Anhydrite, gray, banded, sandy or silty, calcareous, laminated, with laminae finer downward; near lower contact, laminae are distorted.

Clay, black seam (1"), soft where exposed, stiff to hard, dry inside shaft wall

Dolomite, light gray, hard, fine-grained, vuggy; clay, black-gray parting (1/16") at 709.0', dipping slightly north; large vugs (1"-2" deep) in 1'-2' zone at 712.0'; series of clay laminae, black, dip slightly to north at ~ 714.5'-714.8'.

REFERENCE:

Geotechnical Field Data Report No. 4, 1983, Geologic Mapping and Water Inflow Testing in SPDV Ventilation Shaft.

FRACTURE NOTES

f1 Closed, tight, clay fill.

f2 Closed, tight.

f3 Series of short, hairline fractures; at 718.0' hairline fracture density increases.

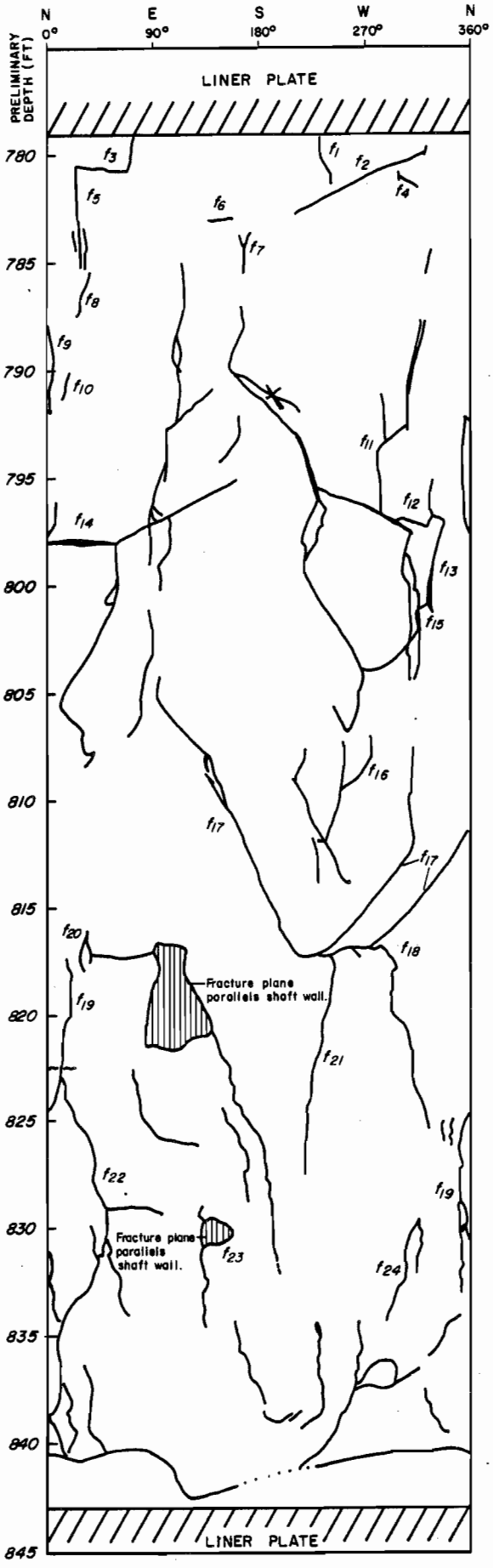
f4 Open, up to 1/8", filled with soft erodable material (clay?).

f5 Sparry calcite or dolomite, may be fracture fill.

LEGEND

- CONTACT
- GRADATIONAL CONTACT (DEFINED WITHIN 2")
- DIFFUSE CONTACT (DEFINED WITHIN 6")
- INDEFINITE OR INFERRED CONTACT
- CLAY PARTING (TO 1/4" THICK)
- CLAY SEAM (>1/4" THICK)

Figure E-3
WASTE SHAFT
CULEBRA DOLOMITE
705 TO 727 FEET



Host rock is dark reddish-brown mudstone.

FRACTURE NOTES

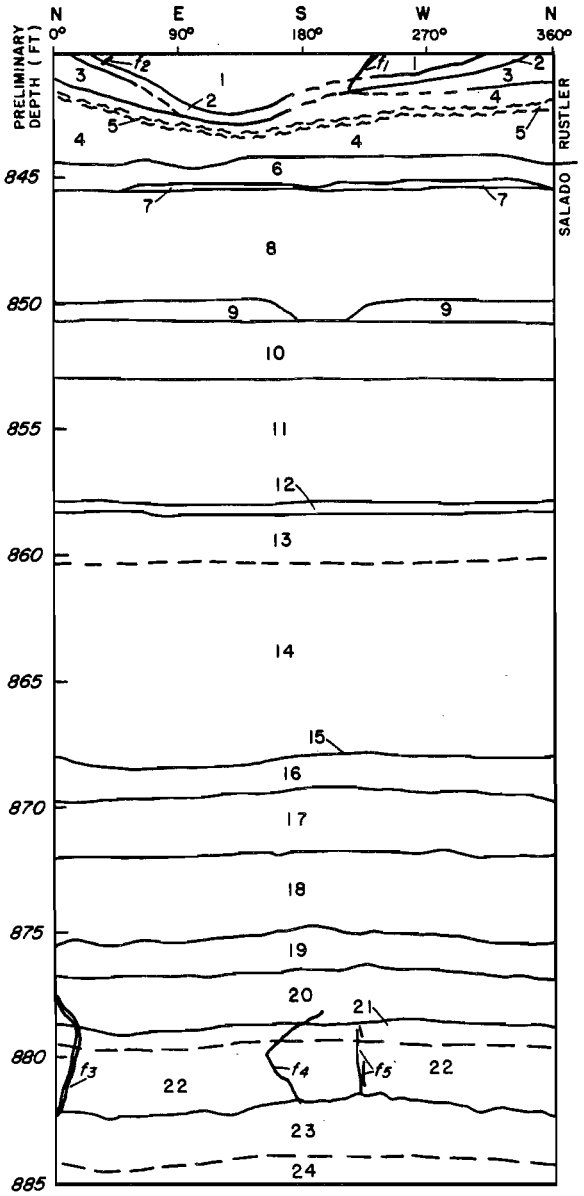
- f_1 Open (1/4"-1").
- f_2 Open (1/4"-1/2").
- f_3 Open (1/4"-1").
- f_4 Open.
- f_5 Open (1/4").
- f_6 Open (1"), 1 1/2" deep into shaft wall.
- f_7 Open (1/4").
- f_8 Open (1/2").
- f_9 Open (1/8"-1"), polyhalitic halite fill.
- f_{10} Open (1/8").
- f_{11} Open (1/16") to closed.
- f_{12} Open (2"); polyhalite and halite fill actively dissolving.
- f_{13} Open (3/4"); polyhalite and halite fill.
- f_{14} Open (1/8"- 2 1/2"), up to 1' deep in shaft wall
- f_{15} Open (1"); polyhalite fill.
- f_{16} Open (1/16").
- f_{17} Open (1/4"-3/4"); halite fill remnants.
- f_{18} Open (1/4") to closed.
- f_{19} Open (1/4") to closed.
- f_{20} Open (1/4"-1"); halite fill remnants; curved fracture strikes S5E to S25E.
- f_{21} Open (1/4") to closed.
- f_{22} Closed; below 830', open (1/8"-1/4"); probable halite fill.
- f_{23} Fracture plane roughly parallels wall, strike N80E.
- f_{24} Closed.

REFERENCE:

GEOTECHNICAL FIELD DATA REPORT NO. 4, 1983, GEOLOGIC MAPPING AND WATER INFLOW TESTING IN SPDV VENTILATION SHAFT.

FIGURE E-4

WASTE SHAFT
RUSTLER FORMATION FRACTURE ZONE
779 TO 843 FEET



LEGEND

- CONTACT
- GRADATIONAL CONTACT (DEFINED WITHIN 2")
- DIFFUSE CONTACT (DEFINED WITHIN 6")
- INDEFINITE OR INFERRED CONTACT
- CLAY PARTING (TO 1/4" THICK)
- CLAY SEAM (>1/4" THICK)

EXPLANATION

1 Mudstone, light gray to reddish-brown, silty.

2 Mudstone, dark reddish-brown, silty (clay siltstone), 3"-6" thick; finer grained than 1; minor deformations due perhaps to dissolution below.

3 Mudstone or siltstone, banded dark and light gray, silty, fine sand.

4 Mudstone or siltstone, reddish-brown, fine-grained, and softer than 3.

5 Anhydrite, light gray; bands (1/8"-1/2") in an ~2" thick zone in unit 4.

6 Dissolution residue, granular, soft, loose material, dark reddish-brown.

7 Polyhalite, moderate reddish-orange; pinch and swell (0-~5"); locally underlain by dissolution residue.

8 Halite, light reddish-brown to reddish-orange; polyhalite disseminated in upper 1', locally rich polyhalite pockets, trace disseminated elsewhere, polyhalite-rich at lower 1'; argillaceous material as surface residue (clay).

9 Clayey mudstone or silty claystone, dark reddish-brown, 0-12" thick.

10 Halite, dark reddish-brown; some argillaceous material.

11 Halite, light reddish-brown to clear; trace polyhalite; argillaceous in upper 1'-11/4'.

12 Anhydrite and polyhalite, light gray to light reddish-orange, fine granular, 6" thick; underlain by seam (1"-2") of clay, dark reddish-brown, soft.

13 Halite, dark to moderate reddish-brown; some polyhalite and argillaceous material.

14 Halite, clear to light reddish-brown, banded; trace polyhalite, in stringers and bands (3"-6").

15 Siltstone or mudstone, gray-green, sandy; anhydrite blebs; variable thickness (1/8"-1").

16 Halite, reddish-brown, argillaceous; clayey residue on shaft wall.

17 Halite, polyhalitic; indistinct banding; polyhalite veinlets along crystal boundaries; polyhalite content increases downward.

18 Halite, argillaceous material, reddish-brown; clayey residuum on shaft surface.

19 Halite; trace polyhalite; trace argillaceous material; irregular upper contact.

20 Mudstone, reddish-brown, gray-green mottling with higher silt content; soft where weathered.

21 Mudstone, gray-green, sandy to silty, hard.

22 Mudstone, reddish-brown, hard.

23 Halite, reddish-brown, argillaceous; clay residuum on shaft surface.

24 As above; transition to lower argillaceous content.

FRACTURE NOTES

f1 Open (up to 1/4") to closed; ends with depth.

f2 Open (up to 1/16") to closed; nearby vertical fractures are general closed and discontinuous.

f3 Strike ~N 45°E; halite fill; 1/2" wide, increases downward to 1-1/2" to 2"

f4 Strike ~N 30°E

f5 Strike N 60°E; uncertain upward extent.

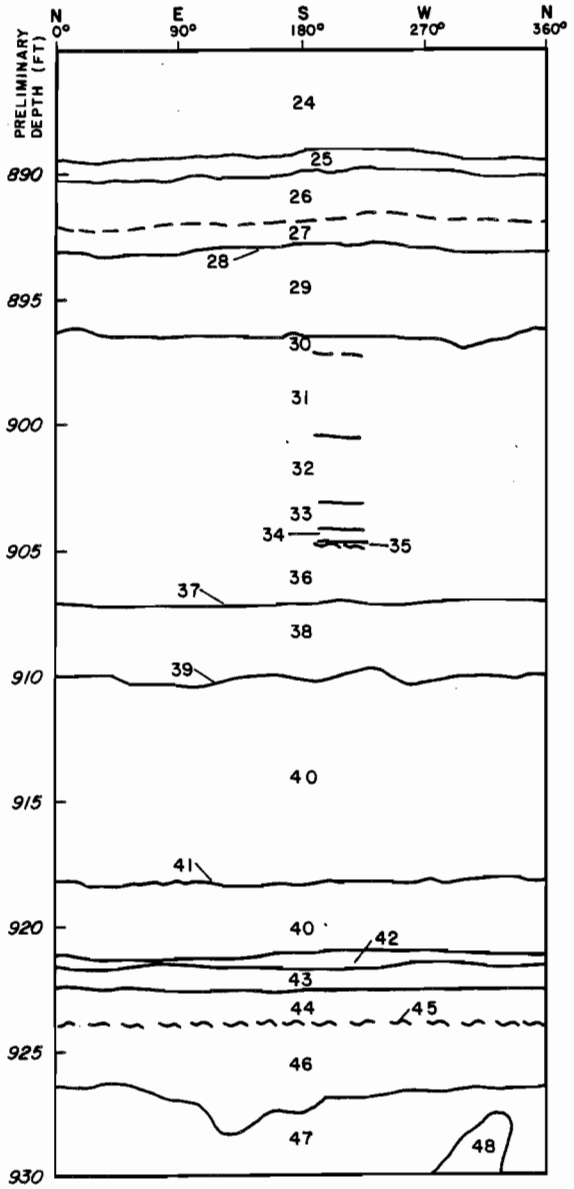
REFERENCE:

GEOTECHNICAL FIELD DATA REPORT NO. 4, 1983, GEOLOGIC MAPPING AND WATER INFLOW TESTING IN SPDV VENTILATION SHAFT.

FIGURE E-5

WASTE SHAFT
RUSTLER/SALADO FORMATION CONTACT
840 TO 930 FEET

SHEET 1 OF 2



EXPLANATION

25 Halite; argillaceous content higher than 24.

26 Halite; some argillaceous material.

27 Halite, clear; trace polyhalite and argillaceous material; transition from 26.

28 Silt, gray-green, clayey, ~1".

29 Halite; some to abundant argillaceous material; clayey residuum on shaft surface.

30 Halite, clear.

31 Halite, polyhalitic.

32 Halite, clear.

33 Halite, polyhalitic, argillaceous.

34 Halite, clear.

35 Clay, gray thin seam (~ 1/8").

36 Halite, polyhalitic, argillaceous.

37 Clay, gray and reddish-brown seam (0.1'-0.3').

38 Mudstone, halite and/or very argillaceous halite; stiff clay; halite crystals up to 1'.

39 Clay, gray and reddish-brown seam (0.1'-0.3').

40 Halite; some argillaceous material.

41 Clay, gray and reddish-brawn; and polyhalite, reddish-orange seam (1/4"-1/2"), soft.

42 Polyhalite, pale orange; underlain by anhydrite, gray, dense, 1/4"

43 Halite, polyhalite; thinly interbedded.

44 Halite, clear; trace polyhalite.

45 Clay parting, gray.

46 Halite; abundant argillaceous material, reddish-brown with gray blebs; grades to halitic mudstone; halite crystals up to 1/2".

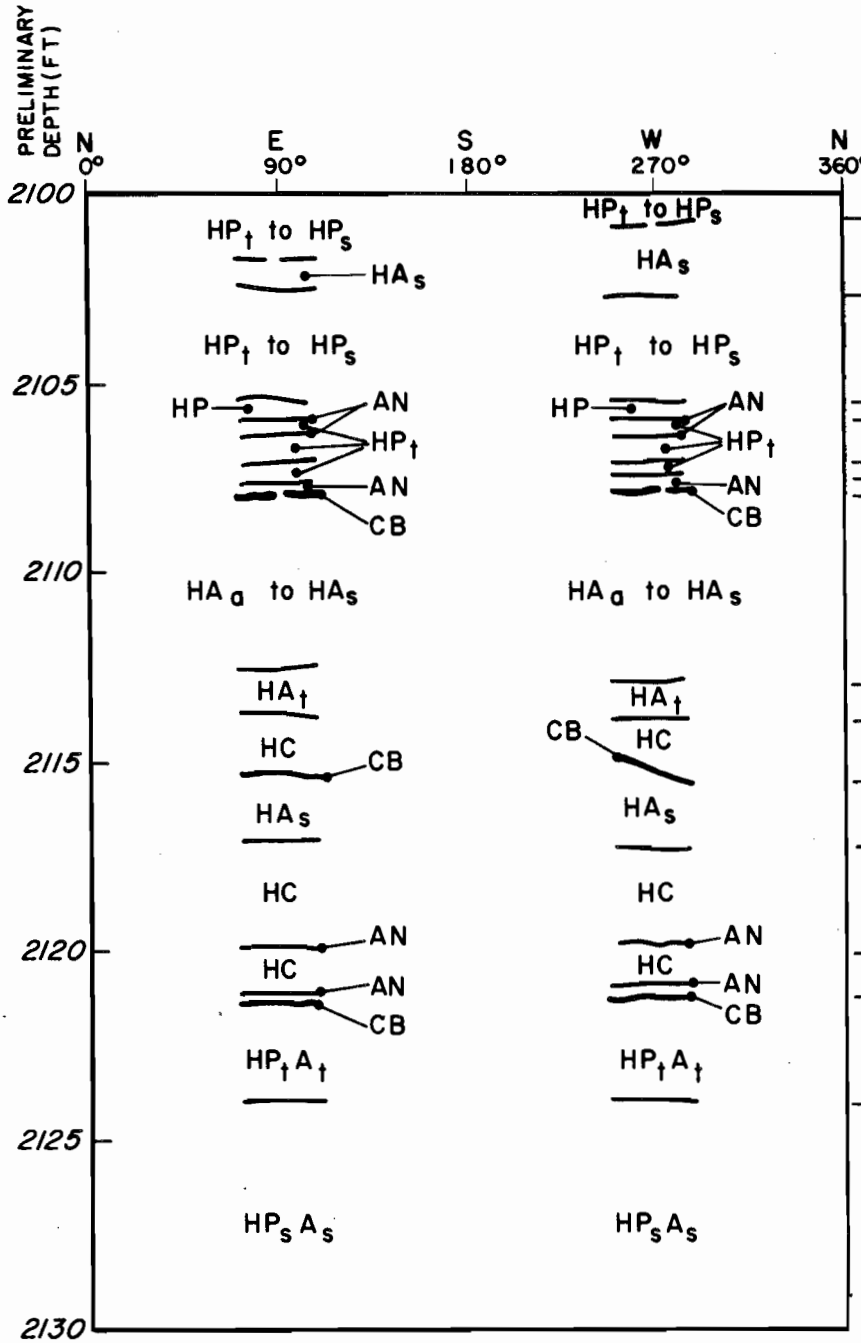
47 Halite; same to abundant argillaceous material.

48 Clay, reddish-brown, few gray blebs; inclusion in 47; disseminated halite.

LEGEND

——— CONTACT
— — — GRADATIONAL CONTACT (DEFINED WITHIN 2")
• • • • • DIFFUSE CONTACT (DEFINED WITHIN 6")
—?—?— INDEFINITE OR INFERRED CONTACT
— — CLAY PARTING (TO 1/4" THICK)
——— CLAY SEAM (>1/4" THICK)

FIGURE E-5
WASTE SHAFT
RUSTLER/SALADO FORMATION CONTACT
840 TO 930 FEET
SHEET 2 OF 2



Halite, clear; trace to some polyhalite in small beds and stringers; trace argillaceous stringers.

Halite; some argillaceous material.

Halite, clear; trace polyhalite increasing downward to some.

Halite; polyhalitic anhydrite band (1/8"-1/4") at 2105.8'.

Halite, clear; trace polyhalite; anhydrite band, gray to white, at 2106.4'.

Halite; trace polyhalite; some anhydrite stringers.

Anhydrite, gray; brown clay parting (1/4") at 2107.9'.

Halite, argillaceous to 2108.3'; argillaceous material decreases to some below 2108.3'.

Halite, clear; trace argillaceous material.

Halite, clear; clay seam, brown at 2115.5'-2116.0'.

Halite, some argillaceous material.

Halite, clear; anhydrite band (1/4"-1/2") at 2120.0'.

Halite, clear; two anhydrite bands (1/4"-1/2" at 2121.1-2121.4; underlain by brown clay seam (1/2").

Halite; trace argillaceous material and occasional gray clay beds; trace polyhalite.

Halite, clear; some argillaceous material; some polyhalite.

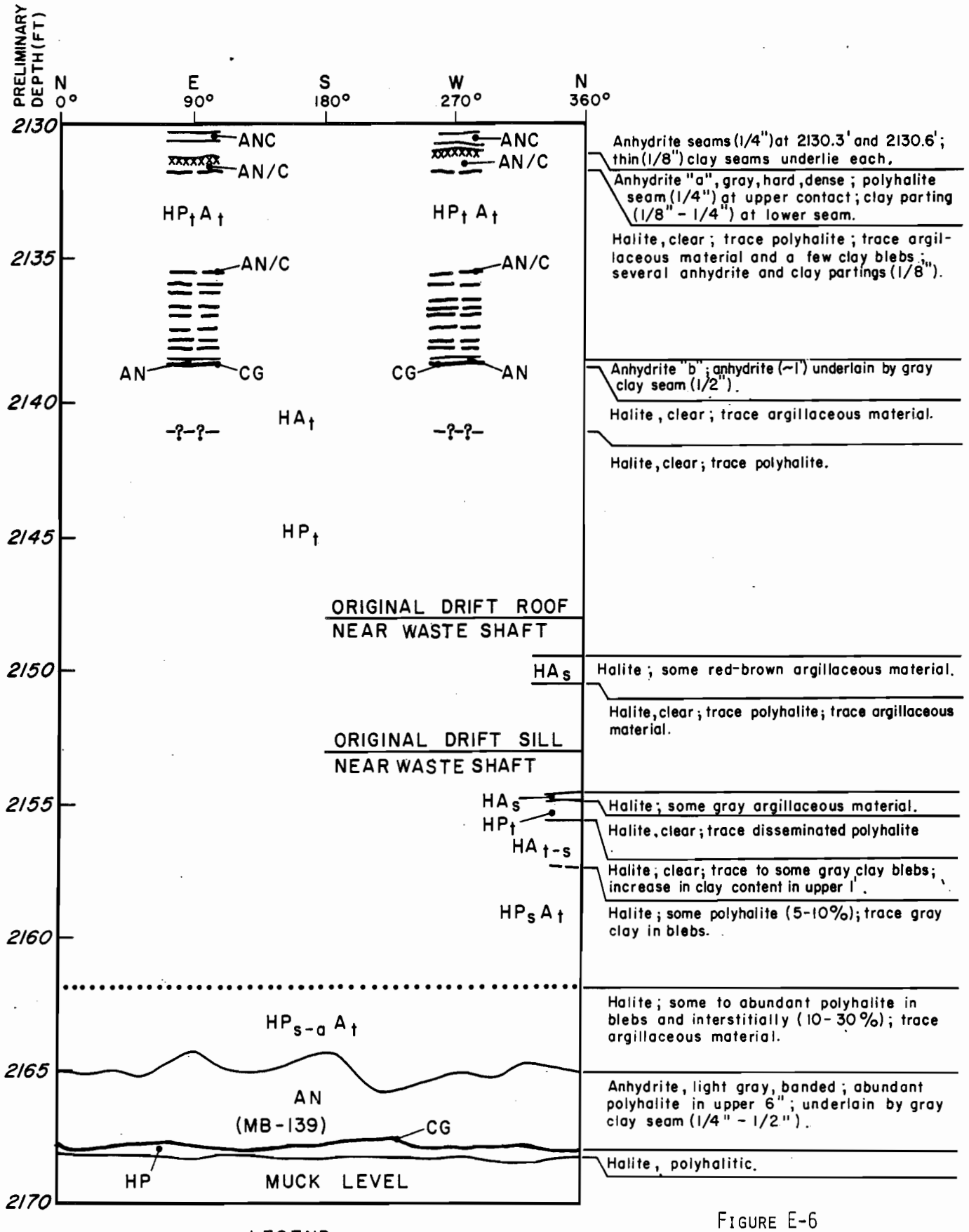
LEGEND

- CONTACT
- GRADATIONAL CONTACT (DEFINED WITHIN 2")
- DIFFUSE CONTACT (DEFINED WITHIN 6")
- INDEFINITE OR INFERRED CONTACT
- CLAY PARTING (1/4" TO 1-1/16" THICK)

REFERENCE:

GEOTECHNICAL FIELD DATA REPORT NO. 4, 1983, GEOLOGIC MAPPING AND WATER INFLOW TESTING IN SPDV VENTILATION SHAFT.

FIGURE E-6
WASTE SHAFT
FACILITY LEVEL AREA
2100 TO 2170 FEET



LEGEND

- CONTACT
- GRADATIONAL CONTACT (DEFINED WITHIN 2")
- DIFFUSE CONTACT (DEFINED WITHIN 6")
- INDEFINITE OR INFERRED CONTACT
- CLAY PARTING (TO 1/4" THICK)
- CLAY SEAM (>1/4" THICK)

FIGURE E-6

WASTE SHAFT
FACILITY LEVEL AREA
2100 TO 2170 FEET

SHEET 2 OF 2

APPENDIX F

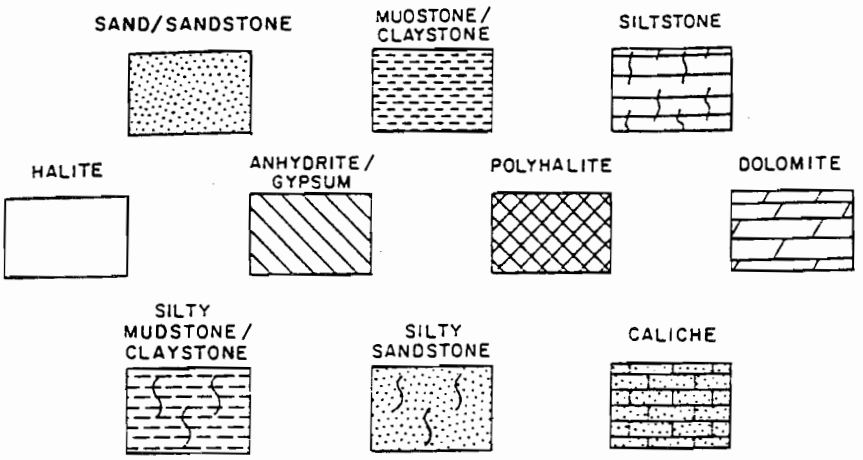
EXHAUST SHAFT
GEOLOGIC LOG

CONTENTS

Figure No.	Title/Description
F-1	Exhaust Shaft Geologic Log (49 Sheets)

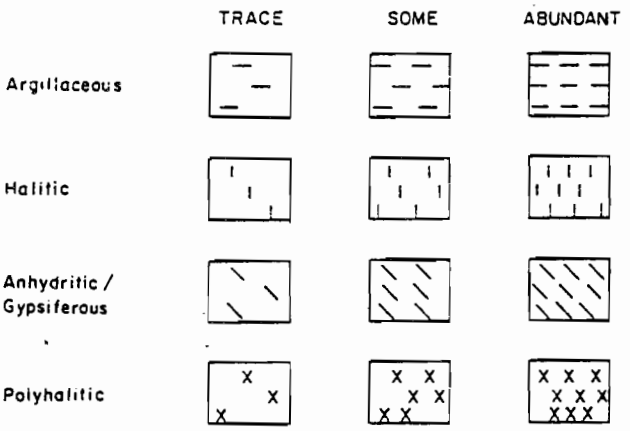
EXPLANATION

ROCK TYPE

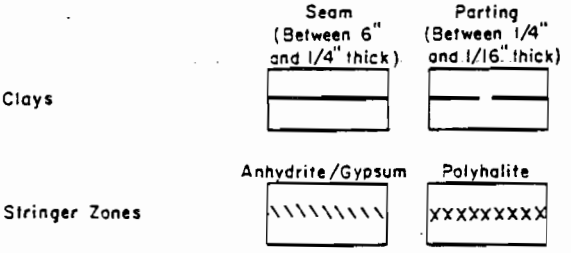


ACCESSORY CONSTITUENTS

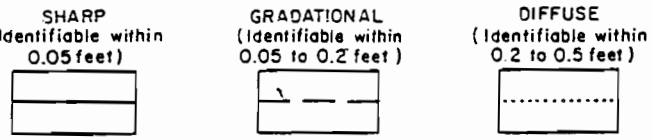
ESTIMATED PERCENTAGE OF ACCESSORY CONSTITUENTS INDICATED AS FOLLOWS



LAMINAR FEATURES



CONTACTS



SALADO MARKER BEDS ARE IDENTIFIED BY NUMBER IN THE STRATIGRAPHIC COLUMN

EXHAUST SHAFT
LITHOLOGIC LOG

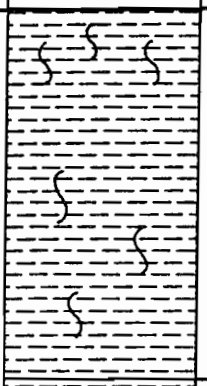
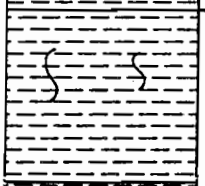
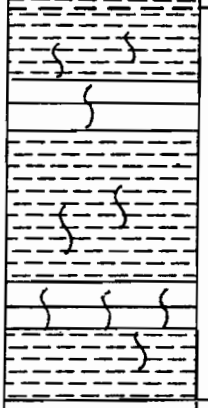
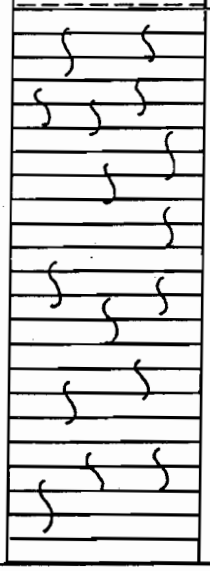
PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
3411.5			
3410			COLLAR PAD
3409	0		QUATERNARY DUNE SAND. SAND, SILTY, REDDISH-BROWN, POORLY SORTED, SUBANGULAR GRAINS, A FEW MAFIC GRAINS (LESS THAN 10%); WEAKLY CONSOLIDATED.
3404	5		
3399	10		MESCALERO CALICHE. CALICHE, WHITE TO TAN, NODULAR, SIZE AND QUANTITY OF NODULES INCREASING WITH DEPTH; CARBONATE CONTENT HIGHEST IN LIGHT COLORED SUBHORIZONTAL STRINGERS; UPPER 1.0' HARD, HARDNESS DECREASING TOWARD BASE; MOIST; CONTAINS LOCAL CONCENTRATIONS OF SILTSTONE AND SANDSTONE; COLOR BECOMES REDDISH-BROWN TOWARD BASE; IRREGULARLY-SHAPED DISCONTINUOUS BEDS OF SILTSTONE, CHERT AND SANDSTONE PEBBLE CONGLOMERATE MIGRATE VERTICALLY AND LATERALLY; THICK DISCONTINUOUS BEDS OF ORANGISH-BROWN SAND OCCUR NEAR BASE; BASAL CONTACT DIFFUSE.
3394	15		
3389	20		GATUNA FORMATION. SANDSTONE, FINE TO VERY FINE GRAINED, REDDISH-BROWN, POORLY SORTED, CALCAREOUS, FRIABLE, DRY; BASAL 1.5' IS SANDSTONE, COARSE TO FINE GRAINED, POORLY SORTED, ROUNDED, CONTAINING ANGULAR DEBRIS FROM UNDERLYING REDBEDS; BASAL CONTACT SHARP, EROSIONAL, SLIGHTLY UNDULATORY.
3384	25		
3379	30		
3374	35		SANTA ROSA FORMATION. SILTSTONE AND VERY FINE GRAINED SANDSTONE, SILT TO VERY FINE SAND-SIZED GRAINS, REDDISH-BROWN, CALCAREOUS, POORLY SORTED, CONTAINS PEBBLES OF CHERT AND MAFIC GRAINS; UPPER 1.0' CONTAINS CALICHE IN SUBHORIZONTAL STRINGERS; BASAL CONTACT DIFFUSE.
3369	40		

EXHAUST SHAFT

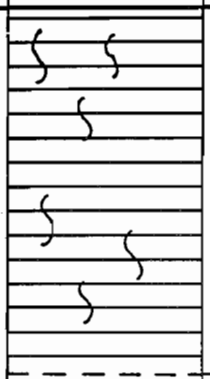
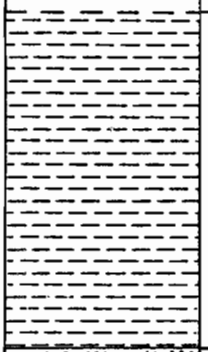
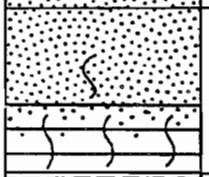
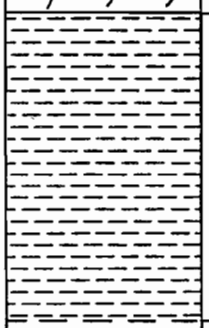
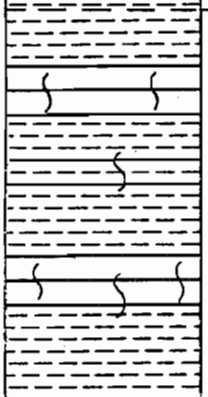
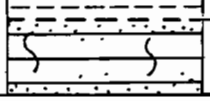
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
3369	40		AS ABOVE
3364	45		
3359	50		
3354	55		DEWEY LAKE REDBEDS MUDSTONE INTERBEDDED WITH ARGILLACEOUS SILTSTONE, REDDISH-BROWN, THINLY LAMINATED TO THINLY BEDDED (1/8" TO 1"), BEDDING SLIGHTLY UNDULATORY, HARD; SEDIMENTARY STRUCTURES INCLUDE: SMALL TABULAR RIP-UP CLASTS (<1/4") ALIGNED IN THIN BEDS, CROSS LAMINATIONS, LOAD STRUCTURES, FILLED DESICCATION CRACKS; OCCASIONAL 1-1/2" INTERBEDS OF GRAY SILTSTONE; RARE GREENISH-GRAY REDUCTION SPOTS (<1/16" DIAMETER); BASAL CONTACT GRADATIONAL.
3349	60		
3344	65		
3339	70		
3334	75		
3329	80		
3324	85		

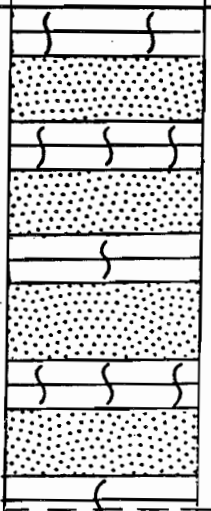
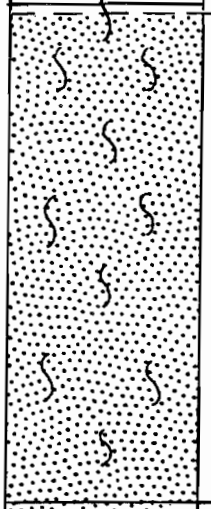
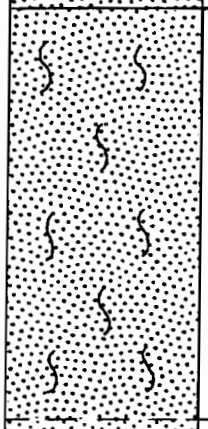
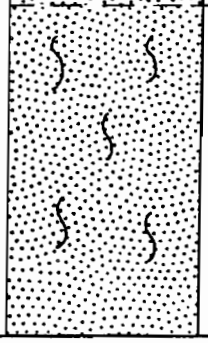
PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
3324	85		AS ABOVE
3319	90		MUDSTONE, REDDISH-BROWN, THINLY LAMINATED TO THINLY BEDDED, HARD; CONTAINS THIN BEDS (1/2" TO 1") OF GRAY SILTY MUDSTONE; FRACTURES PARALLEL TO BEDDING, SPACED 3"; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS (1/4" TO 1/2" DIAMETER); CONTAINS OCCASIONAL LOAD STRUCTURES; BASAL CONTACT DIFFUSE.
3314	95		SILTY MUDSTONE INTERBEDDED WITH ARGILLACEOUS SILTSTONE, REDDISH-BROWN, THINLY LAMINATED TO THINLY BEDDED (<1/32" TO 2-1/2"); OCCASIONAL GREENISH-GRAY SILTSTONE INTERBEDS; OCCASIONAL LOAD STRUCTURES; SMALL OPEN FRACTURES PARALLEL TO BEDDING, SPACED 1" TO 2-1/2"; FEW SUBVERTICAL FRACTURES, SPACED 1' TO 2.5'; BASAL CONTACT DIFFUSE.
3309	100		
3304	105		SANDSTONE, VERY FINE GRAINED, REDDISH-BROWN, THINLY LAMINATED TO CROSS-LAMINATED, HARD TO SOFT, RARE INTERBEDS OF SILTY MUDSTONE (1/2" TO 1" THICK); THIN (<1/32") SUBHORIZONTAL FRACTURES PARALLEL TO BEDDING, SPACED 3" TO 9"; TWO 1/2" THICK PARALLEL HORIZONTAL FRACTURES FILLED WITH CARBONATE OCCUR AT 108.0' AND 108.5'; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS; BASAL CONTACT DIFFUSE.
3299	110		
3294	115		SILTY MUDSTONE INTERBEDDED WITH MUDSTONE, REDDISH-BROWN, THINLY LAMINATED TO CROSS-LAMINATED, HARD; RARE GREENISH-GRAY REDUCTION SPOTS (1/16" TO I/2" DIAMETER); OCCASIONAL 1/4" TO 2" THICK GREENISH-GRAY INTERBEDS; OCCASIONAL SOFT SEDIMENT DEFORMATION FEATURES; HORIZONTAL FRACTURES PARALLEL TO BEDDING, SPACED 1" TO 4"; BASAL CONTACT SHARP.
3289	120		SILTSTONE, REDDISH-BROWN, THINLY LAMINATED TO CROSS-LAMINATED; OCCASIONAL INTERBEDS OF SILTY MUDSTONE; LOAD STRUCTURES, MUDSTONE RIP-UP CLASTS; MODERATELY ABUNDANT GREENISH-GRAY REDUCTION SPOTS (1/16" TO 1/4" DIAMETER); OCCASIONAL GREENISH-GRAY BEDS (1/2" TO 2" THICK); THIN HORIZONTAL FRACTURES (<1/32") WITH GYPSUM FILLING BELOW 121.5', SPACED 2" TO 1.5'; BASAL CONTACT SHARP.
3284	125		
3279	130		

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
3279	130		SILTY MUDSTONE, REDDISH-BROWN, THINLY LAMINATED (<1/32"), LOCALLY INTERBEDDED WITH SILTSTONE; CONTAINS CROSS-LAMINATIONS, FILLED DESICCATION CRACKS; SUBVERTICAL CLAY-FILLED FRACTURES OCCUR NEAR TOP, SPACED 3" TO 4"; LOCALLY, BEDDING MAY BE GREENISH-GRAY IN COLOR; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS (1/16" TO 1" DIAMETER); SUBHORIZONTAL GYPSUM-FILLED FRACTURES, SPACED 3" TO 6"; SUBVERTICAL FRACTURES SPACED 3" TO 12"; IN LOWER 3', 1/8" TO 3" THICK HORIZONTAL GREENISH-GRAY REDUCTION ZONES OCCUR IN GROUPS, INDIVIDUAL ZONES SPACED 1/2", GROUPS SPACED 0.8' TO 1.5'; BASAL CONTACT SHARP, MARKED BY 2" BED OF WHITISH-GRAY SILTSTONE WITH A GREENISH-GRAY REDUCTION ZONE ABOVE AND BELOW.
3274	135		
3269	140		MUDSTONE, DARK REDDISH-BROWN, INTERBEDDED WITH SILTY MUDSTONE, LIGHT REDDISH-BROWN, THINLY LAMINATED TO BEDDED (<1/32" TO 1/2"), LOCALLY FISSILE, OCCASIONALLY CROSS-LAMINATED, BEDDING MAY TERMINATE EROSIONALLY, STRUCTURES BECOMES LESS FINE BELOW 148.0'; RARE SUBVERTICAL TO HIGH ANGLE FRACTURES WITH GRANULAR GYPSUM FILLING (<1/8" THICK); FROM 132.5' TO 147.5', ABUNDANT SUBHORIZONTAL FRACTURES, SPACED 1'; ABUNDANT GREENISH-GRAY REDUCTION SPOTS (1/32" TO 2" DIAMETER); BASAL CONTACT GRADATIONAL.
3264	145		
3259	150		SILTY MUDSTONE, DARK REDDISH-BROWN, INTERBEDDED WITH SILTSTONE, REDDISH-BROWN, THINLY LAMINATED TO BEDDED (1/32" TO 1-1/2"), SOFT; OCCASIONALLY CROSS-LAMINATED, CONTAINS LOAD STRUCTURES, OVERALL SEDIMENTARY STRUCTURES ARE LESS FINE THAN OVERLYING UNIT, GRAIN SIZE COARSENS DOWNWARD; 1" TO 2" THICK HORIZONTAL GREENISH-GRAY REDUCED ZONES, SPACED 3" TO 5"; FRACTURES OCCUR BELOW 154.5', 1/8" THICK, FILLED WITH GYPSUM; SUBVERTICAL FRACTURES SPACED 2' TO 3', SUBHORIZONTAL FRACTURES SPACED 0.5' TO 1.5'; BASAL 2' CONTAINS GREENISH-GRAY AND REDDISH-BROWN INTERBEDDED MUDSTONE; ABUNDANT GREENISH-GRAY REDUCTION SPOTS (1/32" TO 1" DIAMETER); BASAL CONTACT SHARP.
3254	155		
3249	160		
3244	165		SILTSTONE, REDDISH-BROWN, THINLY LAMINATED TO STRUCTURELESS; BEDDING THICKENS AND THINS (1/2" TO 2"); OCCASIONAL GREENISH-GRAY BEDS 1/8" TO 1/2" THICK, SPACED 3.0'; ONLY A FEW HIGH ANGLE FRACTURES 1/8" THICK, GYPSUM-FILLED, STRIKING N60°W; AT 167.5' CHANNEL LAG CONGLOMERATE OCCURS CONTAINING SILTSTONE PEBBLES; THINLY LAMINATED SILTY MUDSTONE FROM 170.5' TO 171.3' WITH GREENISH-GRAY REDUCTION ZONES 1" TO 3" THICK, SPACED 4"; NEAR 171.3' BECOMES POORLY SORTED; THINLY LAMINATED WITH CROSS-LAMINATIONS AND EROSIONAL TERMINATIONS NEAR BASE; CONTAINS GREENISH-GRAY REDUCTION SPOTS UP TO 2" DIAMETER; BASAL CONTACT GRADATIONAL.
3239	170		
3234	175		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
3234	175		AS ABOVE
3229	180		
3224	185		MUDSTONE, REDDISH-BROWN, THINLY LAMINATED TO BEDDED (1/32" TO 1/2" THICK), SOFT; BEDDING INDISTINCT; RARE GREENISH-GRAY REDUCTION SPOTS TO 1" DIAMETER, REDUCTION SPOTS CONCENTRATED AROUND REDUCED, GREENISH-GRAY, 1" WIDE HORIZONTAL BAND AT 191.7', VERY FEW FRACTURES; BASAL 1.5' BECOMES SILTY; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY, OVERLYING BEDS DRAPE OVER CONTACT, EROSIONAL.
3219	190		
3214	195		SANDSTONE, VERY FINE GRAINED, GRAYISH-WHITE, HARD TO SOFT; TROUGH CROSS-BEDDING BECOMES APPARENT NEAR BASE; CONTAINS FIBROUS GYPSUM-FILLED FRACTURES WITH VARIABLE ORIENTATION, 1/4" TO 1" THICK; BASAL CONTACT SHARP.
			SANDSTONE AT TOP GRADING TO SILTSTONE, REDDISH-MAROON, LAMINATED TO BEDDED, OCCASIONALLY CROSS-LAMINATED, HARD; COLOR BECOMES WHITISH-MAROON TOWARD BASE; LOWER 1.3' IS SANDSTONE, STRUCTURELESS EXCEPT FOR OCCASIONAL INTERBEDS OF REDDISH-BROWN SILTSTONE; ABUNDANT FRACTURES, MOST HORIZONTAL TO SUBHORIZONTAL AND SLIGHTLY UNDULATORY, FILLED WITH FIBROUS GYPSUM, THICKNESS 1/16" TO 2", SPACED 1/8" TO 6"; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY.
3209	200		
3204	205		CLAYSTONE, REDDISH-BROWN, THINLY LAMINATED; CROSS-LAMINATED, SETS 1/2" ACROSS, BEDDING EROSIONALLY TERMINATED, CONTAINS SOFT SEDIMENT DEFORMATION FEATURES; BECOMES SILTY TOWARD BASE; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS TO 1/2" DIAMETER, SPOTS OCCASIONALLY BROKEN BY GYPSUM-FILLED FRACTURES; SEE FIGURE 6 FOR FRACTURE NOTES; BASAL CONTACT GRADATIONAL.
3199	210		MUDSTONE WITH INTERBEDDED SILTSTONE, DARK REDDISH-BROWN, THINLY LAMINATED, ABUNDANT CROSS-LAMINATIONS, BEDDING OFTEN TERMINATED EROSIONALLY; ABUNDANT SUBHORIZONTAL GYPSUM-FILLED FRACTURES, SPACED 6", 1/8" TO 3" THICK; VERTICAL AND SUBVERTICAL FRACTURES RARE; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS; BASAL CONTACT GRADATIONAL.
3194	215		
3189	220		

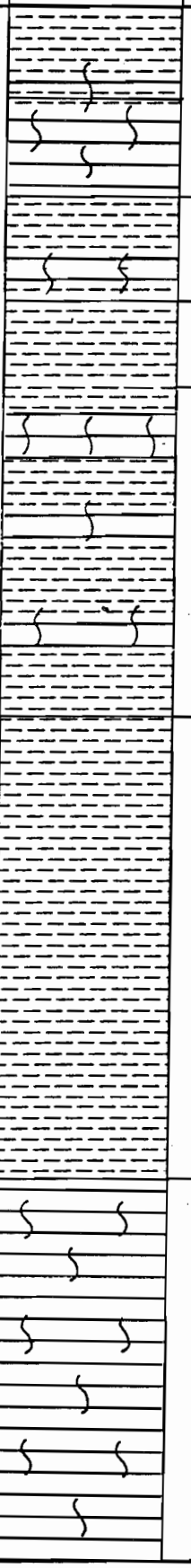
EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
3189	220		SILTSTONE INTERBEDDED WITH VERY FINE SANDSTONE, REDDISH-BROWN, THINLY LAMINATED TO BEDDED, CROSS-LAMINATED, BEDS OFTEN EROSIONALLY TERMINATED, HARD; CROSS-LAMINATIONS INCREASE BELOW 223.0', HORIZONTAL EROSIONAL PLANES OCCUR BELOW 223.0', SPACED 1.0' TO 7.0'; SUBHORIZONTAL GYPSUM-FILLED FRACTURES ABUNDANT, 1/16" TO 1/4" THICK; RARE SUBVERTICAL FRACTURES; BASAL CONTACT GRADATIONAL.
3184	225		
3179	230		
3174	235		SANDSTONE, REDDISH-BROWN, SILTY, THINLY LAMINATED TO BEDDED, OCCASIONALLY CROSS-LAMINATED; ABUNDANT SUBHORIZONTAL GYPSUM-FILLED FRACTURES, 1/16" TO 1" THICK, SPACED 2" TO 1.0', FRACTURES BIFURCATE LOCALLY; RARE SUBVERTICAL GYPSUM-FILLED FRACTURES; BASAL CONTACT SHARP.
3169	240		
3164	245		
3159	250		SANDSTONE, REDDISH-BROWN, SILTY, STRUCTURELESS EXCEPT RARE CROSS-LAMINATIONS AND HORIZONTAL LAMINATIONS; FEWER GYPSUM-FILLED FRACTURES THAN OVERLYING UNIT, FRACTURES TO 2" THICK; BASAL CONTACT GRADATIONAL.
3154	255		
3149	260		SANDSTONE, REDDISH-BROWN, SILTY, LOCALLY LAMINATED AND CROSS-LAMINATED; OCCASIONAL SUBHORIZONTAL GYPSUM-FILLED FRACTURES, 1/4" TO 1/2" THICK, SPACED 2.8' TO 3.4'. FRACTURES BIFURCATE LOCALLY; SUBVERTICAL FRACTURES RARE; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS TO 1" DIAMETER; BASAL 1.0' CONSISTS OF REDDISH-BROWN SILTSTONE; BASAL CONTACT GRADATIONAL.
3144	265		

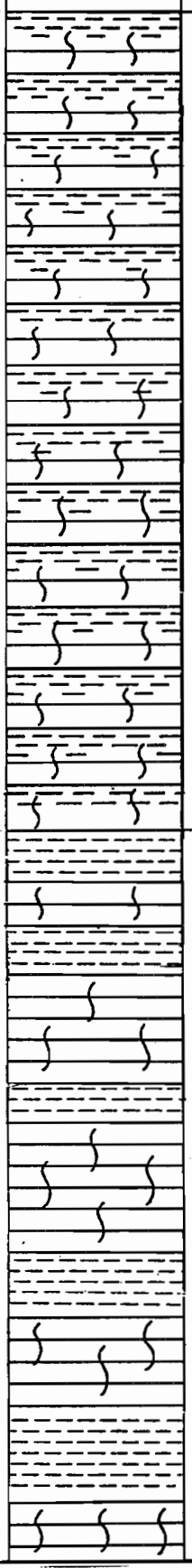
EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
3144	265		AS ABOVE
			SANDSTONE, REDDISH-BROWN, SILTY, MOSTLY MASSIVE WITH SOME LOCAL LAMINATIONS AND CROSS-BEDDING; SUBHORIZONTAL AND SUBVERTICAL GYPSUM-FILLED FRACTURES, SUBHORIZONTAL MORE ABUNDANT, SEE FIGURE 7; BASAL CONTACT GRADATIONAL.
3139	270		
3134	275		
3129	280		
			ARGILLACEOUS SILTSTONE, REDDISH-BROWN, THINLY LAMINATED TO LAMINATED (1/16" TO 1/4" THICK); ABUNDANT SEDIMENTARY STRUCTURES INCLUDING: TROUGH CROSS-LAMINATIONS, EROSIONAL SURFACES TRACEABLE AROUND CIRCUMFERENCE OF SHAFT, SOFT SEDIMENT DEFORMATION FEATURES; CROSS-LAMINATION SETS ARE 1" TO 4" ACROSS, INCREASING TO 2.0' TO 3.0' ACROSS NEAR BASE; LOWER 1.0' CONTAINS 1/4" THICK BEDS OF CLAYSTONE; HORIZONTAL AND SUBHORIZONTAL GYPSUM-FILLED FRACTURES 1/4" TO 1" THICK, SPACED 0.5' TO 2.0'; VERTICAL AND SUBVERTICAL GYPSUM-FILLED FRACTURES 1/8" TO 1/4" THICK, SPACED 3.0' TO 5.0'; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS TO 1" DIAMETER; BASAL CONTACT SHARP, MARKED BY OCCURRENCE OF A MUDSTONE BED.
3124	285		
3119	290		
			MUDSTONE INTERBEDDED WITH SILTY CLAYSTONE, REDDISH-BROWN, THINLY LAMINATED TO VERY THINLY BEDDED (<1/16" TO 1/2" THICK); ABUNDANT SETS OF TROUGH CROSS-LAMINATIONS 1" TO 4" ACROSS, CLAY DRAPE OVER RIPPLE CROSS-LAMINATIONS; OCCASIONAL SOFT SEDIMENT DEFORMATION; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS (1/16" TO 1/2" DIAMETER); UNIT BOUNDED BY HORIZONTAL GYPSUM-FILLED FRACTURES, 1" THICK AT TOP GRADING TO 1/2" THICK AT BASE; BASAL CONTACT SHARP.
3114	295		
			MUDSTONE AT TOP GRADING TO SILTSTONE AT BASE, REDDISH-BROWN, THINLY LAMINATED TO THINLY BEDDED (1/6" TO 1" THICK); ABUNDANT FINE STRUCTURES INCLUDING: FLASER BEDDING, CROSS-LAMINATIONS, TROUGH CROSS-LAMINATIONS, FILLED DESICCATION CRACKS, LOAD STRUCTURES, ABUNDANT EROSIONAL CONTACTS; GYPSUM-FILLED FRACTURES ARE MODERATELY ABUNDANT, 1/16" TO 1-1/2" THICK, HORIZONTAL AND SUBHORIZONTAL FRACTURES SPACED 1.0' TO 4.0', VERTICAL AND SUBVERTICAL FRACTURES SPACED 3.0' TO 5.0'; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS (1/16" TO 1" DIAMETER); RARE 2" THICK, SUBHORIZONTAL, GREENISH-GRAY REDUCED ZONES; BASAL CONTACT SHARP.
3109	300		
3104	305		
			AS BELOW
3099	310		

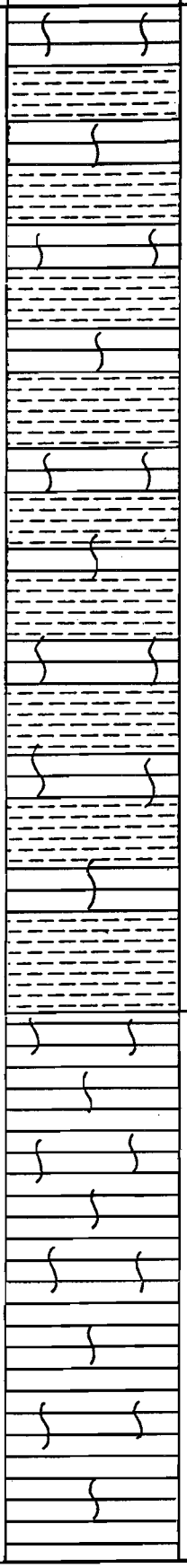
EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
3099	310		MUDSTONE AT TOP, GRADING TO SILTSTONE, DARK REDDISH-BROWN TO REDDISH-BROWN, WITH MINOR INTERBEDDED MUDSTONE, THINLY LAMINATED TO LAMINATED (<1/32" TO 1/8"), HARD; CROSS-LAMINATED, BECOMING MORE ABUNDANT WITH DEPTH; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS (1/16" TO 1/4" DIAMETER); FIBROUS GYPSUM-FILLED FRACTURES BECOME LESS ABUNDANT WITH DEPTH; HORIZONTAL AND SUBHORIZONTAL FRACTURES 1/16" TO 1" THICK, SPACED 2" TO 2.0'; VERTICAL AND SUBVERTICAL FRACTURES 1/16" TO 1/4" THICK, SPACED 2" TO 2.0'; BASAL CONTACT SHARP.
3094	315		MUDSTONE AT TOP, GRADING TO SILTSTONE WITH DEPTH, DARK REDDISH-BROWN TO REDDISH-BROWN, UNIT SIMILAR TO ABOVE EXCEPT FOR A 3" THICK BED OF MUDSTONE WHICH OCCURS AT 316.2' AND HAS A SHARP UPPER CONTACT AND GRADES TO SILTSTONE WITH DEPTH, HARD; MUDSTONE: STRUCTURELESS; SILTSTONE: FINELY LAMINATED TO CROSS-LAMINATED; FRACTURES SIMILAR TO OVERLYING UNIT; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS TO 1" DIAMETER; BASAL CONTACT MARKED BY 3" THICK SUBHORIZONTAL GREENISH-GRAY ZONE AND DARK REDDISH-BROWN MUDSTONE, SHARP.
3089	320		MUDSTONE, REDDISH-BROWN, STRUCTURELESS; FRACTURES SIMILAR TO OVERLYING UNIT; BASAL CONTACT GRADATIONAL.
3084	325		CLAYSTONE, DARK REDDISH-BROWN, INTERBEDDED WITH SILTSTONE, LIGHT REDDISH-BROWN, MICRO-LAMINATED TO VERY THINLY BEDDED (<1/32" TO 1/2"); SILTSTONE: CROSS-LAMINATED; CLAYSTONE: STRUCTURELESS; ABUNDANT GREENISH-GRAY REDUCTION SPOTS; GRADES TO SILTSTONE AT BASE; ALL FRACTURES FILLED WITH FIBROUS GYPSUM; HORIZONTAL AND SUBHORIZONTAL FRACTURES 1/8" TO 1" THICK, SPACED 3" TO 2.0'; VERTICAL AND SUB-VERTICAL FRACTURES 1/16" TO 1/4" THICK, SPACED 2.0' TO 3.0'; BASAL CONTACT SHARP.
3079	330		
			CLAYSTONE, DARK REDDISH-BROWN, MICRO-LAMINATED TO THINLY LAMINATED (<1/32" TO 1/16"), STRUCTURE POORLY DEFINED DUE TO ABUNDANT FRACTURING, OCCASIONAL CROSS-LAMINATIONS, BEDDING OFTEN CONVOLUTED AND EROSIONALLY TERMINATED; ABUNDANT GREENISH-GRAY REDUCTION SPOTS (1/16" TO 1" DIAMETER); ABUNDANT GYPSUM-FILLED FRACTURES, ~90% HORIZONTAL AND SUBHORIZONTAL; TWO SCALES OF SPACING: MINOR - 1/8" TO 2", MAJOR - 2" TO 6". FRACTURE DENSITY INCREASES TOWARD BASE, THICKNESS VARIES FROM 1/16" TO 1.0'; REMAINING ~10% VERTICAL AND SUBVERTICAL FRACTURES, SPACED 2" TO 2.5', THICKNESS 1/16" TO 1/4"; BASAL CONTACT SHARP.
3074	335		
3069	340		
			SILTSTONE, REDDISH-BROWN, LAMINATED TO BEDDED, CROSS-LAMINATED, SOFT SEDIMENT DEFORMATION FEATURES, HARD; ALL FRACTURES FILLED WITH FIBROUS GYPSUM; SUBHORIZONTAL AND HORIZONTAL FRACTURES 1/16" TO 1" THICK, SPACED 1" TO 1.0'; VERTICAL AND SUBVERTICAL FRACTURES 1/8" TO 1/2" THICK, SPACED 6" TO 2.0'; ABUNDANT GREENISH-GRAY REDUCTION SPOTS 1/16" TO 1" DIAMETER; BASAL CONTACT SHARP.
3064	345		
3059	350		
3054	355		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
3054	355		MUDSTONE GRADING TO SILTSTONE IN VERTICAL GRADATIONAL SEQUENCES 1.0' TO 3.0' THICK, REDDISH-BROWN (SILTSTONE) AND DARK REDDISH-BROWN (MUDSTONE), EACH SEQUENCE CONSISTS OF STRUCTURELESS MUDSTONE AT TOP GRADING TO THINLY LAMINATED TO BEDDED SILTSTONE AT BASE; AMOUNT OF SEDIMENTARY STRUCTURES INCREASE TO BASE OF EACH SEQUENCE, THESE STRUCTURES INCLUDE: CROSS-LAMINATIONS, TROUGH CROSS-LAMINATIONS, EROSIONAL SURFACES, OCCASIONAL SOFT SEDIMENT DEFORMATION FEATURES; UPPER CONTACT OF EACH SEQUENCE IS EROSIONAL; OCCASIONAL GREENISH-GRAY REDUCTION SPOTS (1/16" TO 1" DIAMETER); ALL FRACTURES GYPSUM-FILLED; VERTICAL AND HIGH ANGLE FRACTURES APPEAR YOUNGER THAN HORIZONTAL AND SUBHORIZONTAL FRACTURES; SUBHORIZONTAL FRACTURE FILLING OCCASIONALLY SIGMOIDAL AND/OR TILTED; FILLING IN VERTICAL AND HIGH ANGLE FRACTURES HAVE A COMPONENT OF THRUST; THREE TYPES OF HORIZONTAL AND SUBHORIZONTAL FRACTURES; THICK - 1/2" TO 1", SPACED 1.0' TO 2.0'; MODERATELY THIN - 1/8" TO 1/2:, SPACED 1" TO 1.5'; THIN - <1/8", SPACED 1/4" TO 1"; BASAL CONTACT SHARP.
3049	360		
3044	365		
3039	370		
3034	375		
3029	380		SILTSTONE, REDDISH-BROWN, WITH INTERBEDDED CLAYSTONE, DARK REDDISH-BROWN, 1" TO 4" THICK FINING UPWARD SEQUENCES, THINLY LAMINATED TO THINLY BEDDED (1/16" TO 2" THICK), HARD; SEDIMENTARY STRUCTURES INCLUDE: CROSS-LAMINATIONS, SOFT SEDIMENT LOAD STRUCTURES, EROSIONAL CONTACTS AT TOP OF EACH FINING UPWARD SEQUENCE; LOCALLY ABUNDANT GREENISH-GRAY REDUCTION SPOTS (1/16" TO 1" DIAMETER), SOME OCCUR IN ALIGNED ZONES; OVERALL GRAIN SIZE INCREASES TO BASE; ABUNDANT HORIZONTAL, FIBROUS GYPSUM-FILLED FRACTURES OCCUR IN TWO SIZE GROUPS: 0" TO 1/4" THICK, SPACED 1/4" TO 1"; 1/4" TO 1/2" THICK, SPACED 0.5' TO 2.0'; VERTICAL AND HIGH ANGLE FIBROUS GYPSUM-FILLED FRACTURES ARE MODERATELY ABUNDANT, 1/16" TO 1/2" THICK, SPACED 2.5' TO 5'; BASAL CONTACT SHARP, UNDULATORY, POSSIBLY EROSIONAL.
3024	385		
3019	390		
3014	395		
3009	400		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
3009	400		SILTSTONE, REDDISH-BROWN, WITH INTERBEDDED CLAYSTONE, DARK REDDISH-BROWN, 1" TO 4" THICK FINING UPWARD SEQUENCES, THINLY LAMINATED TO THINLY BEDDED (1/16" TO 2" THICK), HARD; SEDIMENTARY STRUCTURES INCLUDE: CROSS-LAMINATIONS, SOFT SEDIMENT LOAD STRUCTURES, EROSIONAL CONTACTS AT TOP OF EACH FINING UPWARD SEQUENCE; LOCALLY ABUNDANT GREENISH-GRAY REDUCTION SPOTS (1/16" TO 1" DIAMETER), SOME OCCUR IN ALIGNED ZONES; OVERALL GRAIN SIZE INCREASES TO BASE; ABUNDANT HORIZONTAL, FIBROUS GYPSUM-FILLED FRACTURES OCCUR IN TWO SIZE GROUPS: 0" TO 1/4" THICK, SPACED 1/4" TO 1"; 1/4" TO 1/2" THICK, SPACED 0.5' TO 2.0'; VERTICAL AND HIGH ANGLE FIBROUS GYPSUM-FILLED FRACTURES ARE MODERATELY ABUNDANT, 1/16" TO 1/2" THICK, SPACED 2.5' TO 5'; BASAL CONTACT SHARP, UNDULATORY, POSSIBLY EROSIONAL.
3004	405		
2999	410		
2994	415		
2989	420		
2984	425		
2979	430		SILTSTONE AT TOP, GRADING TO CLAYSTONE AT BASE, REDDISH-BROWN TO DARK REDDISH-BROWN, TRACE OF BEDDING AT TOP GRADING TO STRUCTURELESS AT BASE, HARD; CONTAINS OCCASIONAL CLAYSTONE CLASTS <1/8" DIAMETER; RARE INTERBEDS OF CLAYSTONE, 1/16" THICK; ABUNDANT GREENISH-GRAY REDUCTION SPOTS (1/16" TO 2" DIAMETER) OCCUR IN ZONES; ABUNDANT HORIZONTAL AND SUBHORIZONTAL FIBROUS GYPSUM-FILLED FRACTURES, MAJORITY 1/16" THICK, SPACED 1" TO 2"; MODERATELY ABUNDANT VERTICAL AND SUBVERTICAL FIBROUS GYPSUM-FILLED FRACTURES UP TO 1/4" THICK, SPACED 1.0' TO 3.0'; BASAL CONTACT OBSCURED.
2974	435		
2969	440		
2964	445		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2964	445		AS ABOVE
2959	450		
2954	455		
		OBSCURED	SLIGHTLY SANDY SILTSTONE, REDDISH-BROWN, INTERBEDDED WITH SILTY-MUDSTONE, DARK REDDISH-BROWN, 1" THICK FINING UPWARDS SEQUENCES, THINLY BEDDED (1"); MINOR EROSIONAL CONTACTS AT TOP OF EACH FINING UPWARD SEQUENCE; HORIZONTAL AND SUBHORIZONTAL FIBROUS GYPSUM-FILLED FRACTURES <1/8" THICK, SPACED 0" TO 6"; SUBVERTICAL AND VERTICAL FIBROUS GYPSUM-FILLED FRACTURES ARE LESS ABUNDANT AND CROSS-CUT HORIZONTAL AND SUBHORIZONTAL FRACTURES; BASAL CONTACT SHARP.
2949	460		
2944	465		SILTSTONE AT TOP GRADING TO CLAYSTONE AT BASE, REDDISH-BROWN TO DARK REDDISH-BROWN, TRACE OF BEDDING AT TOP GRADING TO STRUCTURELESS AT BASE, HARD; ABUNDANT GREENISH-GRAY REDUCTION SPOTS (1/16" TO 2" DIAMETER); HORIZONTAL AND SUBHORIZONTAL FIBROUS GYPSUM-FILLED FRACTURES <1/8" THICK; SUBVERTICAL AND VERTICAL GYPSUM-FILLED FRACTURES ARE LESS ABUNDANT AND CROSS-CUT HORIZONTAL AND SUBHORIZONTAL FRACTURES; BASAL CONTACT SHARP.
2939	470		
2934	475		
2929	480		
2924	485		MUDSTONE, SILTY, DARK REDDISH-BROWN, STRUCTURELESS; NO HORIZONTAL OR SUBHORIZONTAL GYPSUM-FILLED FRACTURES; RARE SUBVERTICAL AND VERTICAL FRACTURES PRESENT, 0" TO 1/2" THICK; BASAL CONTACT GRADATIONAL.
2919	490		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2919	490		AS ABOVE
2914	495		
2909	500		CLAYSTONE GRADING TO SILTSTONE WITH DEPTH, REDDISH-BROWN TO DARK REDDISH-BROWN, THIN 1" TO 3" THICK FINING UPWARDS SEQUENCES, THINLY BEDDED; CONTAINS MINOR EROSIONAL CONTACTS AT TOP OF EACH FINING UPWARDS SEQUENCE; ABUNDANT HORIZONTAL AND SUBHORIZONTAL FIBROUS GYPSUM-FILLED FRACTURES 0" TO 1/8" THICK, SPACED 0" TO 6"; MODERATELY ABUNDANT VERTICAL AND SUBVERTICAL FIBROUS GYPSUM-FILLED FRACTURES 1/8" TO 1/2" THICK; BASAL CONTACT SHARP.
2904	505		
2899	510		
2894	515		
2889	520		
2884	525		SILTSTONE, (FIGURE 9).
2879	530		
2874	535		

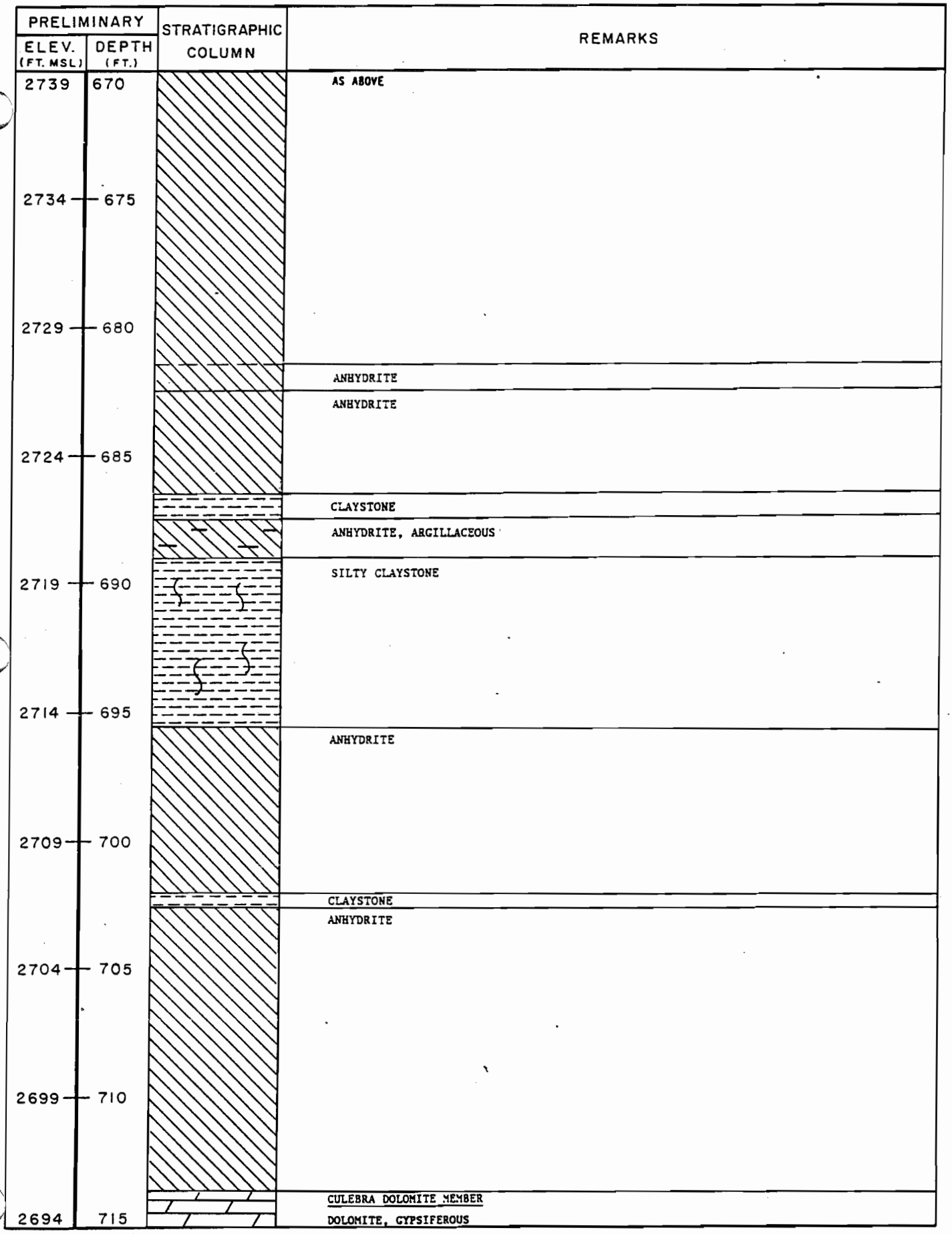
PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2874	535		
2869	540		
2864	545		SILTSTONE
2859	550		RUSTLER FORMATION FORTY-NINER MEMBER ANHYDRITE, FINELY CRYSTALLINE, GRAY TO GRAYISH-BROWN, WHITE AT UPPER CONTACT, BANDED TO OCCASIONALLY LAMINATED, SPACED 1/16" TO 1"; BANDS AND LAMINAE UNDULATORY UP TO 1/4" AND OCCASIONALLY TERMINATE ABRUPTLY, GRAY BANDS USUALLY THICKEST, BECOME STRUCTURELESS WITH DEPTH, LOCALLY NODULAR; UPPER 3.0' CONTAINS INTERBEDDED CLAY LAMINAE, CONTENT DECREASING WITH DEPTH; LOCALLY GYPSIFEROUS IN UPPER 6"; NEAR TOP, HORIZONTAL AND SUBHORIZONTAL GYPSUM-FILLED FRACTURES ARE ABUNDANT, 1/8" TO 1/2" THICK, SPACED 1" TO 3"; BEDDING TERMINATED EROSIONALLY AT UPPER CONTACT; HORIZONTAL AND SUBHORIZONTAL GYPSUM-FILLED FRACTURES SPACED 1" TO 2.0', 1/16" TO 1/4" THICK; RARE VERTICAL AND SUBVERTICAL GYPSUM-FILLED FRACTURES, 1/8" TO 1/4" THICK, SPACED 2.0' TO 6.0'; BASAL CONTACT SHARP.
2854	555		
2849	560		
2844	565		
2839	570		ANHYDRITE
2834	575		SILTY CLAYSTONE
2829	580		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2829	580		
2824	585		
			ANHYDRITE
2819	590		
2814	595		
2809	600		
			MAGENTA DOLOMITE MEMBER DOLOMITE, GYPSIFEROUS
2804	605		
2799	610		
2794	615		
2789	620		
2784	625		

EXHAUST SHAFT
LITHOLOGIC LOG
SHEET 15 OF 49

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2784	625		
			TAMARISK MEMBER ANHYDRITE, FINELY CRYSTALLINE, GRAY TO LIGHT BROWNISH-GRAY TO TAN WITH DEPTH, LAMINATED TO NODULAR, HARD; LOCALLY GYPSIFEROUS AT UPPER CONTACT; CONTAINS INTERBEDS OF LAMINATED CARBONATE LOCALLY AND NEAR BASE; LAMINAE MAY LOCALLY BE TERMINATED EROSIONALLY; 1" TO 2" THICK ORGANIC (?) BLACK CLAYSTONE AT 665.9', CONTAINS FIBROUS GYPSUM-FILLED FRACTURES, FIBERS ORIENTED VERTICALLY, 1/32" TO 1" THICK, DISCONTINUOUS, LOCALLY BIFURCATING; HORIZONTAL FIBROUS GYPSUM-FILLED FRACTURES THROUGHOUT WITH SPACING 0.5' TO 1.5', 1/32" TO 1/16" THICK; RARE SUBVERTICAL FRACTURES; BASAL CONTACT GRADATIONAL.
2779	630		
2774	635		
2769	640		
2764	645		
2759	650		
2754	655		
2749	660		
2744	665		
2739	670		



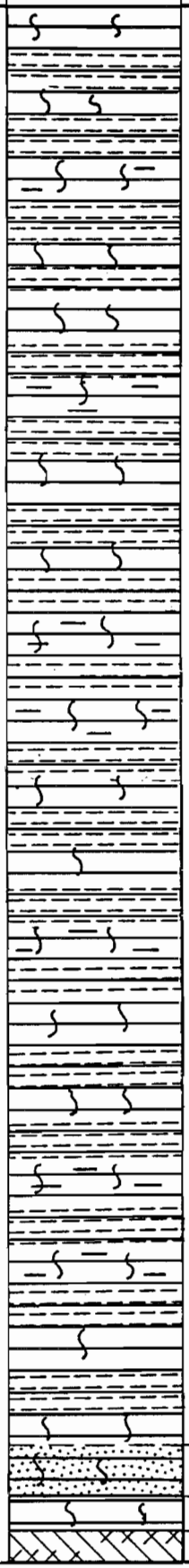
EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2694	715		AS ABOVE
2689	720		
2684	725		
2679	730		
2674	735		
			UNNAMED LOWER MEMBER SILTY CLAYSTONE
2669	740		
2664	745		ANHYDRITE
2659	750		
2654	755		SANDY MUDSTONE
			HALITIC MUDSTONE OR ARGILLACEOUS HALITE
2649	760		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2649	760		AS ABOVE
			HALITE
2644	765		
			ANHYDRITE
			HALITE, ARGILLACEOUS HALITE
2639	770		
			ARGILLACEOUS HALITE AND HALITIC MUDSTONE
2634	775		
			ARGILLACEOUS HALITE AND HALITIC MUDSTONE
2629	780		
2624	785		
			SANDY HALITIC SILTSTONE
2619	790		SILTSTONE AND SANDY SILTSTONE, LIGHT BROWN TO REDDISH-BROWN WITH THIN LAYERS OF MEDIUM GRAY CLAYSTONE AND MUDSTONE, THINLY BEDDED TO LAMINATED, DIVISIBLE INTO UNITS 8" TO 20" THICK; BEDDING AND LAMINATIONS GENERALLY HORIZONTAL TO SUBHORIZONTAL, SOME WAVY BEDDING, SOME MICRO CROSS-LAMINATIONS; FROM 792.0' TO 795.0' LARGER CROSS-CUTTING RELATIONSHIPS WITH SOME UNITS PARTIALLY TO WHOLLY EROSIONALLY REMOVED, UNITS GENERALLY DOWN-CUT TO EAST AND SOUTHEAST; SMALL-SCALE CROSS-BEDDING HAS VARIABLE CURRENT DIRECTIONS WITH DEPTH, MOST SOUTH; AT 794.0' SYMMETRICAL RIPPLES WITH CLAY DRAPE; RIPPLE SETS 1/4" TO 1/2" THICK; MINOR SOFT SEDIMENT DEFORMATION, LOCAL FINING UPWARDS SEQUENCES; BASAL CONTACT GRADATIONAL.
2614	795		
2609	800		
2604	805		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2604	805		SILTSTONE AND ARGILLACEOUS SILTSTONE INTERBEDDED WITH CLAYSTONE, GRAY AND DARK GRAY, THINLY LAMINATED (1/32" TO 1/8"); ABUNDANT FINE STRUCTURES INCLUDING HORIZONTAL LAMINATIONS, LOW-ANGLE CROSS-LAMINATION SETS OF VARYING SIZE (2" TO 3.0'); CURRENT DIRECTIONS IN SMALLER SETS VARY, CURRENT DIRECTIONS IN LARGER SETS MOSTLY NORTHEAST; RARE LOAD STRUCTURES, EROSIONAL SCOUR AND FILL; RARE HIGH-ANGLE HALITE-FILLED FRACTURES; FRACTURE OCCURRENCE INCREASES WITH DEPTH, NEAR BASE RARE HORIZONTAL AND SUBVERTICAL HALITE-FILLED FRACTURES 1/8" TO 3" THICK, SPACED 3.0' TO 8.0'; SOME LARGER SUBHORIZONTAL FRACTURES EXHIBIT AN EAST (TOP) WEST (BOTTOM) SHEAR; CONTAINS DARK GRAY SPOTS AND BLEBS (BIOTURBATION), CONTENT INCREASING WITH DEPTH; BECOMES ARGILLACEOUS SILTSTONE WITH DEPTH; GRAY WITH LOCAL REDDISH-BROWN AREAS, THINLY LAMINATED AND CONTAINS BROWNISH CLASTS OF ANHYDRITE (1/8" TO 1-1/2" DIAMETER) ROUNDED AND OCCASIONALLY FLATTENED PARALLEL TO BEDDING; CLASTS RANDOMLY SCATTERED THROUCHOUT; RARE LOW-ANGLE CROSS-LAMINATION SETS; BASAL CONTACT GRADATIONAL OVER 1/2", IRREGULAR, MAPPED AS DIFFUSE DUE TO EXTREME CONTACT UNDULATIONS.
2599	810		
2594	815		
2589	820		
2584	825		
2579	830		
2574	835		
2569	840		
2564	845		
			SANDY SILTSTONE
			SILTSTONE
2559	850		POLYHALITE, ANHYDRITE, AND ARGILLACEOUS ANHYDRITE

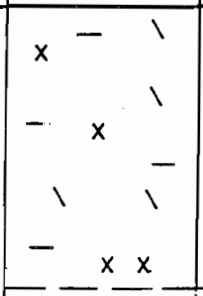
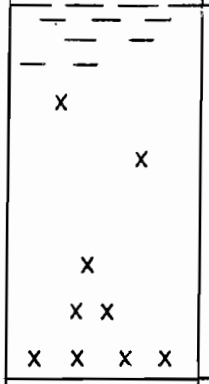
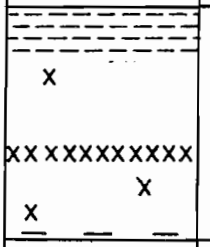
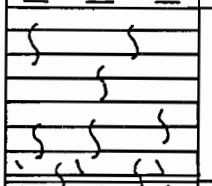
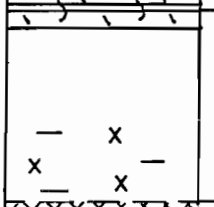
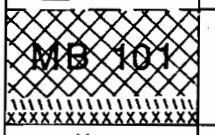
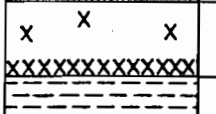
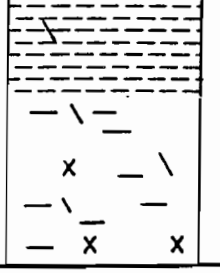
EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2559	850		SALADO FORMATION HALITIC MUDSTONE
			HALITE
2554	855		
2549	860		HALITE
2544	865		
			HALITIC CLAYSTONE
			HALITE
2539	870		
2534	875		
			HALITIC CLAYSTONE
			HALITE
2529	880		
			HALITIC CLAYSTONE
2524	885		ARGILLACEOUS HALITE
			CLAYSTONE, SLIGHTLY HALITIC
2519	890		HALITE, ARGILLACEOUS
2514	895		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2514	895		
			ARGILLACEOUS HALITE
			HALITE
2509	900		
			ARGILLACEOUS HALITE
2504	905		HALITE, SLIGHTLY ARGILLACEOUS
2499	910		
			HALITE, COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE, THINLY BEDDED WITH THIN SUBHORIZONTAL STRINGERS OF ANHYDRITE AND POLYHALITE; SLIGHTLY ARGILLACEOUS IN UPPER 0.5'; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY.
2494	915		
			SILTY CLAYSTONE, BROWNISH-RED, VERY SOFT; HALITIC, HALITE OCCURS AS 1/4" TO 1" DISPLACIVE CRYSTALS; CONTAINS LOCALLY REDUCED CLAYSTONE; BASAL CONTACT DIFFUSE, GENETICALLY GRADATIONAL.
2489	920		HALITE. MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; CONTAINS INTERSTITIAL RED CLAY IN UPPER 3.0', CONTENT DECREASES WITH DEPTH; TRACE RANDOMLY ORIENTED STRINGERS OF POLYHALITE IN REMAINDER OF UNIT; BASAL CONTACT DIFFUSE.
2484	925		HALITE MIXED WITH POLYHALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR; POLYHALITE CONTENT DECREASES WITH DEPTH, CONTENT GREATEST IN UPPER 0.5', OCCURS AS GROUPS OF SUBHORIZONTAL STRINGERS, BECOMING LESS ABUNDANT WITH DEPTH; SUBHORIZONTAL STRINGERS OF ANHYDRITE OCCUR WITH DEPTH, STRINGERS OF POLYHALITE AND ANHYDRITE BECOME RANDOMLY ORIENTED WITH DEPTH; BASAL CONTACT GRADATIONAL.
2479	930		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO ORANGE TO CLEAR; ABUNDANT POLYHALITE IN UPPER 3" TINTS HALITE ORANGE; SUBHORIZONTAL STRINGERS OF POLYHALITE AND ANHYDRITE SPACED 1" TO 3"; BED OF VERY POLYHALITIC HALITE OCCURS BETWEEN 729.4' AND 730.0', UNIDENTIFIED GAS ORIGINATES FROM THIS AREA ALONG FRACTURES; BASAL CONTACT DIFFUSE.
2474	935		ARGILLACEOUS HALITE, ARGILLACEOUS MATERIAL REDDISH-BROWN, HALITE WHITISH-GRAY TO CLEAR; HALITE OCCURS AS DISPLACIVE CRYSTALS AND AGGREGATES OF CRYSTALS; UNIT CONTAINS LOCAL GREENISH-GRAY REDUCTION ZONES; CLAY CONTENT DECREASES WITH DEPTH, DECREASES ABRUPTLY BELOW 937.0'; ROCK BELOW 937.0' CLASSIFIED AS: HALITE, WHITE, MEDIUM TO COARSELY CRYSTALLINE, SLIGHTLY ARGILLACEOUS, CLAY CONTENT DECREASING WITH DEPTH, TRACE POLYHALITE AND ANHYDRITE STRINGERS CONTENT INCREASING WITH DEPTH, STRINGERS RANDOMLY ORIENTED AT TOP, BECOMING SUBHORIZONTAL WITH DEPTH, SPACED 1" TO 3"; BASAL CONTACT GRADATIONAL, MARKED BY 1" THICK ZONE OF GRAYISH-WHITE HALITE.
2469	940		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2469	940		AS ABOVE
2464	945		
2459	950		ARGILLACEOUS HALITE, FINELY TO COARSELY CRYSTALLINE, WHITISH-GRAY TO CLEAR, MASSIVE; HALITE OCCURS AS CRYSTAL AGGREGATES IN ZONES OR PODS; CLAY CONTENT DECREASES ABRUPTLY BELOW 949.0'; TRACE DISSEMINATED POLYHALITE BLEBS, CONTENT INCREASES WITH DEPTH; BECOMES BEDDED IN LOWER 2.0' WITH ALTERNATING POLYHALITIC HALITE AND CLEAR HALITE BEDS 2" TO 3" THICK; BASAL CONTACT SHARP, DISCONFORMABLE.
2454	955		
2449	960		ARGILLACEOUS HALITE IN UPPER 2.0', REDDISH-BROWN, CLAY CONTENT DECREASES WITH DEPTH, GRADES INTO POLYHALITIC HALITE; HALITE IS WHITE TO TINTED ORANGE TO CLEAR, MEDIUM TO COARSELY CRYSTALLINE; POLYHALITE OCCURS AS BLEBS AND STRINGERS, POLYHALITE BED AT 961.5'; CONTAINS LOCAL GREENISH-GRAY REDUCTION SPOTS IN ARGILLACEOUS MATERIAL NEAR THE BASE; BASAL CONTACT SHARP, MARKED BY 3" THICK HORIZONTAL FIBROUS HALITE-FILLED FRACTURE.
2444	965		SILTSTONE, REDDISH-BROWN, TRACE OF BEDDING; CONTAINS SMALL 1/4" IMBAYED DISPLACIVE HALITE CRYSTALS NEAR TOP; CONTAINS RARE SUBVERTICAL HALITE-FILLED FRACTURES; BECOMES ANHYDRITIC (GRAY) IN LOWER 2.0'; CONTAINS DISPLACIVE HALITE CRYSTALS <1/8"; BASAL CONTACT SHARP.
2439	970		ARGILLACEOUS HALITE, ARGILLACEOUS MATERIAL REDDISH-BROWN, HALITE CLEAR; BELOW 969.0' CLAY CONTENT DECREASES ABRUPTLY, UNIT BECOMES SLIGHTLY ARGILLACEOUS AND POLYHALITIC, CLAY AND POLYHALITE OCCUR AS RANDOMLY ORIENTED STRINGERS; OVERALL CLAY CONTENT DECREASES WITH DEPTH; POLYHALITE CONTENT INCREASES WITH DEPTH; BASAL CONTACT GRADATIONAL.
2434	975		POLYHALITE, ANHYDRITIC, FINELY CRYSTALLINE, ORANGE, HARD; HALITIC, HALITE WHITE; ANHYDRITE GRAY; DISCONTINUOUS BEDS OF WHITE FINELY CRYSTALLINE HALITE NEAR TOP; AT 975.0', 1" THICK BED OF THINLY LAMINATED ANHYDRITE OCCURS; UNIT CONTAINS CLEAR DISPLACIVE HALITE CRYSTALS NEAR BASE; BASAL CONTACT SHARP.
			HALITE, POLYHALITIC, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE, THIN TO MEDIUM BEDDED BY SUBHORIZONTAL STRINGERS OF POLYHALITE; BASAL CONTACT SHARP, MARKED BY A 2" THICK BED OF POLYHALITE.
2429	980		ARGILLACEOUS HALITE, REDDISH-BROWN, SLIGHTLY ANHYDRITIC, CLAY CONTENT DECREASES WITH DEPTH; NEAR TOP, HALITE OCCURS AS DISPLACIVE CRYSTALS; BECOMES THE DOMINANT MINERAL TYPE WITH DEPTH, BECOMES MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR, THINLY BEDDED IN LOWER 2.0' WITH STRINGERS OF POLYHALITE SEPARATING BEDS; ARGILLACEOUS MATERIAL OCCURS AS MATRIX IN UPPER PART, STRINGERS IN LOWER PART; SOME GREENISH-GRAY REDUCTION SPOTS OCCUR NEAR TOP; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH; BASAL CONTACT SHARP, DISCONFORMABLE.
2424	985		

EXHAUST SHAFT
LITHOLOGIC LOG
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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2424	985		AS ABOVE
2419	990		ARGILLACEOUS HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE; REDDISH-BROWN CLAY MATRIX IN UPPER 4"; POLYHALITIC; CLAY AND POLYHALITE OCCUR AS SUBHORIZONTAL STRINGERS SPACED 1" TO 4"; BASAL CONTACT SHARP.
2414	995		ARGILLACEOUS HALITE GRADING TO HALITE WITH DEPTH; CLAY OCCURS AS REDDISH-BROWN MATRIX AT TOP, HALITE OCCURS AS DISPLACIVE CRYSTALS AND CRYSTAL AGGREGATES ALIGNED IN ZONES, CLAY IN UPPER 1" GREENISH GRAY; CLAY CONTENT DECREASES WITH DEPTH, OCCURS AS SUBHORIZONTAL STRINGERS; HALITE BECOMES DOMINANT ROCK TYPE WITH DEPTH, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; TRACE POLYHALITE BLEBS AND RANDOMLY ORIENTED TO SUBHORIZONTAL STRINGERS; RARE ANHYDRITE STRINGERS; LOWER 3.0' TINTED ORANGE; BASAL CONTACT SHARP.
2409	1000		
2404	1005		
2399	1010		
2394	1015	MB 102	POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE; 1" THICK GRAY CLAYSTONE BEDS 3" ABOVE AND AT BASAL CONTACT; BASAL CONTACT SHARP.
			HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR TO ORANGE; TRACE POLYHALITE STRINGERS AND DISSEMINATED BLEBS; AT 1017.8', 1" THICK BED OF POLYHALITE OCCURS UNDERLAIN BY A 1/4" THICK BED OF GRAY CLAYSTONE; BASAL CONTACT SHARP, MARKED BY DISSOLUTION TROUGHS.
2389	1020		ARGILLACEOUS HALITE, WHITE TO CLEAR, MEDIUM TO COARSELY CRYSTALLINE; CLAY OCCURS AS BROWN SUBHORIZONTAL STRINGERS, SPACED 1" TO 2"; STRINGERS ARE TERMINATED EROSIONALLY AT UPPER CONTACT, CLAY CONTENT DECREASES WITH DEPTH; TRACE POLYHALITE STRINGERS AND DISSEMINATED BLEBS, CONTENT INCREASES IN LOWER 3.0'; BASAL CONTACT SHARP, EROSIONAL, UNDULATORY UP TO 1.0'.
2384	1025		
2379	1030		AS BELOW

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SHEET 24 OF 40

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2379	1030	MB 103	ANHYDRITE, FINELY CRYSTALLINE, ALTERNATING LIGHT AND DARK GRAY, LAMINATED TO VERY THINLY BEDDED; BEDDING UNDULATES SLIGHTLY, BEDS OFTEN CONTAIN ENTROLITHIC STRUCTURES; LOCAL <1/4" CRYSTALS OF HALITE; LIGHT BROWN CARBONATE (?) INTERBEDS; BASAL CONTACT GRADATIONAL.
2374	1035		CARBONATE (DOLOMITE?), FINELY CRYSTALLINE OR GRAINED, LIGHT BROWN WITH GRAYISH-BROWN LAMINAE, THINLY LAMINATED, LAMINAE OCCUR AS CONCAVE DOWNWARD SETS AVERAGING 4" TO 7" ACROSS; PROBABLE ALGAL STROMATOLITES; DARKER LAMINAE ORGANIC (?); BASAL CONTACT MARKED BY SUBHORIZONTAL GRAYISH-BROWN LAMINAE, GRADATIONAL.
2369	1040	MB 103	DOLOMITE, FINELY CRYSTALLINE, LIGHT BROWN, HINT OF BEDDING; BASAL CONTACT SHARP, EROSIONAL.
			ANHYDRITE, CARBONATE-RICH, FINELY CRYSTALLINE, ALTERNATING LIGHT GRAY AND GRAY, THINLY LAMINATED IN UPPER 0.9', REMAINDER STRUCTURELESS; BASAL CONTACT SHARP, EROSIONAL.
			SILTY CLAYSTONE, GRAY, LOCALLY THINLY LAMINATED; CONTAINS DISPLACIVE HALITE CRYSTALS; BASAL CONTACT SHARP.
2364	1045		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO ORANGE; CLAY MATRIX IN UPPER 1.0', HALITE OCCURS AS DISPLACIVE CRYSTALS, CLAY CONTENT DECREASES WITH DEPTH; CLAY MORPHOLOGY CHANGES FROM MATRIX TO SUBHORIZONTAL STRINGERS SPACED 1" TO 2", BELOW 1047.0' ARGILLACEOUS STRINGERS BECOME DISCONTINUOUS AND ORIENTED RANDOMLY; TRACE DISCONTINUOUS SUBHORIZONTAL STRINGERS AND PODS OF POLYHALITE, CONTENT INCREASES WITH DEPTH; AT 1050.0' A 0.3' THICK LAMINATED BED OF ANHYDRITE OCCURS, BELOW THIS BED CLAY CONTENT DECREASES MARKEDLY AND TRACE AMOUNTS OF POLYHALITE AND ANHYDRITE OCCUR IN DISCONTINUOUS STRINGERS; 2" THICK BED OF ANHYDRITE OCCURS AT 1055.0'; LOWER 1.0' IS VERY POLYHALITIC; BASAL CONTACT SHARP.
2359	1050	MB 104	
2354	1055		
2349	1060		ARGILLACEOUS HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR, CLAY OCCURS IN RANDOMLY-ORIENTED STRINGERS; STRINGERS AND BLEBS OF POLYHALITE; BASAL CONTACT SHARP, UNDULATORY UP TO 1.0'.
2344	1065	MB 105	POLYHALITE, FINELY CRYSTALLINE, ORANGE, STRUCTURELESS EXCEPT NEAR BASE; LOCALLY HALITIC; THIN GRAY ANHYDRITE BED OCCURS AT BASE; BASAL CONTACT SHARP, MARKED BY A THIN BED OF GRAY CLAYSTONE.
2339	1070		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; ARGILLACEOUS AT TOP, REDDISH-BROWN, CONTENT DECREASES WITH DEPTH, CLAY OCCURS IN STRINGERS; TRACE POLYHALITE AS RANDOMLY-ORIENTED STRINGERS WHICH GRADE TO SUBHORIZONTAL WITH DEPTH, CONTENT INCREASES WITH DEPTH; AT 1071.6, 1" THICK BED OF POLYHALITE OCCURS UNDERLAIN BY 1" THICK GRAY CLAYSTONE BED; CLAY CONTENT INCREASES SLIGHTLY BELOW 1071.6', COLOR REDDISH-BROWN TO GRAY; BECOMES VERY POLYHALITIC IN LOWER 1.0'; BASAL CONTACT SHARP.
2334	1075		

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LITHOLOGIC LOG
SHEET 25 OF 49

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2334	1075		AS ABOVE
2329	1080		POLYHALITE, FINELY CRYSTALLINE, ORANGE; UNDERLAIN BY 1/2" THICK GRAY CLAYSTONE BED; BASAL CONTACT SHARP.
2324	1085	MB 106	HALITE, MEDIUM TO COARSELY CRYSTALLINE, CLEAR TO WHITE; UPPER 1.0' ARGILLACEOUS STRINGERS, CONTENT DECREASES WITH DEPTH; POLYHALITE STRINGERS, CONTENT INCREASES WITH DEPTH; BASAL CONTACT SHARP.
			POLYHALITE, FINELY CRYSTALLINE, ORANGE, STRUCTURELESS; UNDERLAIN BY 1" THICK GRAY CLAYSTONE BED; BASAL CONTACT SHARP.
2319	1090		HALITE, MODERATELY ARGILLACEOUS AND POLYHALITIC, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; LOCAL REDDISH-BROWN CLAY MATRIX, HALITE OCCURS AS DISPLACIVE CRYSTALS, LOCAL GREENISH-GRAY REDUCTION ZONES; ARGILLACEOUS STRINGERS ABUNDANT IN UPPER 3.0', CONTENT DECREASES WITH DEPTH, ABSENT BELOW 1103.0'; POLYHALITE OCCURS AS DISSEMINATED BLEBS AND STRINGERS, CONTENT INCREASING WITH DEPTH, 1" THICK POLYHALITE BED AT 1105.2'; BASAL CONTACT SHARP.
2314	1095		
2309	1100		
2304	1105		
2299	1110		HALITE, ARGILLACEOUS AND POLYHALITIC, COARSELY CRYSTALLINE, WHITE TO CLEAR; CLAY OCCURS AS STRINGERS; POLYHALITE OCCURS AS DISSEMINATED BLEBS AND STRINGERS, 6" THICK IRREGULAR BED OF POLYHALITE AT 1120.5', LOWER 6" VERY POLYHALITIC; BASAL CONTACT SHARP.
2294	1115		
2289	1120		

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2289	1120	MB 107	AS ABOVE
2284	1125		POLYHALITE, FINELY CRYSTALLINE, ORANGE, STRUCTURELESS; UNDERLAIN BY 2" THICK GRAY CLAYSTONE BED; BASAL CONTACT SHARP.
			HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; UPPER 4" VERY ARGILLACEOUS, CLAY OCCURS AS REDDISH-BROWN DISCONTINUOUS RANDOMLY-ORIENTED STRINGERS; REMAINDER CONTAINS TRACE CLAY STRINGERS, LOCALLY STRINGERS BECOME SUBHORIZONTAL AND DENSITY MAY INCREASE; CONTAINS TRACE POLYHALITE WITH DEPTH; BASAL CONTACT SHARP, DISCONFORMABLE.
2279	1130	MB 108	
			HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR TO ORANGE; UPPER 1" VERY ARGILLACEOUS, SLIGHTLY ARGILLACEOUS TO 1146.0'; MODERATELY ABUNDANT RANDOMLY-ORIENTED STRINGERS AND LARGE BLEBS OF POLYHALITE, CONTENT INCREASING WITH DEPTH, LOWER 1.5' VERY POLY-HALITIC; BASAL CONTACT SHARP, DISCONFORMABLE.
2274	1135		ARGILLACEOUS HALITE, FINELY TO COARSELY CRYSTALLINE; LOCALLY INTERBEDDED WITH HALITIC MUDSTONE CONTAINING DISPLACIVE HALITE CRYSTALS; REDDISH-BROWN CLAY DISSEMI-NATED THROUGHOUT AS MATRIX, CONTENT INCREASES WITH DEPTH; IRREGULARLY SHAPED ZONES (1.0' x 2.0') OF PURE HALITE RANDOMLY SCATTERED THROUGHOUT UNIT; LOCAL SMALL ZONES OF REDUCED GREENISH-GRAY CLAY; DISSOLUTION PITS THROUGH UNIT FILLED WITH ARGILLA-CEOUS HALITE; POLYHALITIC, CONTENT INCREASES WITH DEPTH, DISCONTINUOUS 1" THICK POLYHALITE BED AT BASAL CONTACT; BASAL CONTACT GRADATIONAL, IRREGULAR WITH UP TO 1.0' OF RELIEF, LOCALLY SHARP, EROSIONAL.
2269	1140		
2264	1145		ANHYDRITE, FINELY CRYSTALLINE, LIGHT GRAY TO LIGHT TANNISH-GRAY, THINLY LAMINATED TO THINLY BEDDED, BEDS SEPARATED BY DARK GRAY THIN LAMINAE; HALITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS BECOME ABUNDANT BELOW 1155.0', 1/16" TO 2" HIGH, BECOME MORE ABUNDANT AND LARGER WITH DEPTH, MOST OCCUR ALONG SUBHORIZONTAL BEDDING PLANES, OCCASIONALLY PSEUDOMORPHS LIE PARALLEL TO BEDDING; AT UPPER CONTACT DISSOLUTION PITS INTO ANHYDRITE OCCUR, FILLED WITH GRAY ARGILLACEOUS HALITE AND HALITIC MUDSTONE, 0.5' TO 2.0' DEEP INTO ANHYDRITE, BEDDING TERMINATED EROSIONALLY AT SIDES OF DISSOLUTION PITS; LOCALLY, POLYHALITE IS INCLUDED IN HALITE FILLING OF HALITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS, POLYHALITE ALSO OCCURS IN IRREGULARLY-SHAPED ZONES (2" x 3") AS REPLACEMENT OF ANHYDRITE; HALITE OCCURS ALONG BEDDING PLANES BELOW 1157.0'; LOWER 1" CONTAINS INTERBEDS OF POLYHALITE; BASAL CONTACT SHARP.
2259	1150		
			POLYHALITE, SLIGHTLY HALITIC, FINELY CRYSTALLINE, REDDISH-ORANGE, HINT OF BEDDING IN UPPER 4", REMAINDER STRUCTURELESS EXCEPT FOR RARE HALITE PSEUDOMORPHS AFTER SWALLOW-TAIL GYPSUM CRYSTALS; CONTAINS ABUNDANT IRREGULARLY-SHAPED CRYSTALS OF HALITE (1/32" TO 1/2"); LOWER 3" IS ANHYDRITIC OR CARBONATE-RICH, COLOR GRADES TO BROWN AT BASE; BASAL CONTACT SHARP, UNDULATORY ON TWO SCALES: MINOR - UP TO 3", MAJOR - UP TO 2.5', EXHIBITS SOFT SEDIMENT DEFORMATION DUE TO LOADING.
2254	1155	MB 109	
			CLAYSTONE, LIGHT GRAY AT TOP TO GRAY AT BASE, STRUCTURELESS EXCEPT FOR FLOWAGE STRUCTURES; THICKNESS RANGES FROM 0.2' TO 1.0'; LOCALLY BROKEN BY 0" TO 2" THICK FRACTURES FILLED WITH CLEAR TO ORANGE HALITE; BASAL CONTACT SHARP, UNDULATORY UP TO 2.0', DISCONFORMABLE.
2249	1160		
			HALITE, COARSELY CRYSTALLINE, CLEAR TO WHITE; CONTAINS GRAY CLAY STRINGERS IN UPPER 2.0', CONTENT DECREASES WITH DEPTH; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS BLEBS, RANDOMLY-ORIENTED STRINGERS, AND AS THICK SUBHORIZONTAL STRINGERS 1/4" THICK; ANHYDRITE OCCURS WITH POLYHALITE STRINGERS, CONTENT INCREASES WITH DEPTH; BASAL CONTACT SHARP, UNDULATORY UP TO 1.0'.
2244	1165	MB 109	

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2244	1165	MB 109	ANHYDRITE, FINELY CRYSTALLINE, GRAY TO LIGHT GRAY, HINT OF THIN LAMINATIONS; CONTAINS 1" THICK ANHYDRITE LOCAL ZONES OF MIXED HALITE AND FINELY CRYSTALLINE; BASAL CONTACT SHARP.
2239	1170		HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR; CONTAINS HORIZONTAL STRINGERS OF ANHYDRITE, 1" TO 3" THICK BEDS OF FINELY CRYSTALLINE ANHYDRITE WITH HALITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS AT 1167.3', 1168.4', 1169.4'; BASAL CONTACT SHARP.
		MB 109	ANHYDRITE, FINELY CRYSTALLINE, LIGHT GRAY TO GRAY, FINELY LAMINATED; CONTAINS HALITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS, 1/4" TO 1-1/2" HIGH, OCCURRING PARALLEL TO BEDDING PLANES; BASAL CONTACT UNDULATORY DUE TO INFILLING OF SHALLOW CHANNEL FORMS IN UNDERLYING UNIT, SHARP, DISCONFORMABLE.
2234	1175		ANHYDRITE AND CLAYSTONE; ANHYDRITE OCCURS AS ISOLATED GRAY NODULES IN A POORLY INDURATED GRAY CLAYSTONE MATRIX; SIZE OF NODULES INCREASES WITH DEPTH; TEXTURE OF BASAL 1.0' DEFINED AS NODULAR; BASAL CONTACT SHARP, DISCONFORMABLE.
		MB 109	ANHYDRITE, HALITIC, FINELY CRYSTALLINE, GRAY TO BROWNISH-GRAY, MICRO TO THINLY LAMINATED, LAMINAE ALTERNATE LIGHT TO DARK; CONTAINS LOCAL HALITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS, < 1/8" HIGH; BASAL CONTACT SHARP, UNDULATORY, LOCALLY DISCONFORMABLE, MARKED BY DISCONTINUOUS 1" THICK POLYHALITE BED.
2229	1180		HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; POLYHALITIC AT TOP, CONTENT DECREASES WITH DEPTH; BASAL CONTACT SHARP, DISCONFORMABLE.
			POLYHALITE, FINELY CRYSTALLINE, PALE ORANGISH-BROWN, LOCALLY MICROLAMINATED TO BANDED (< 1/32" TO 1" THICK); LOCALLY 1/2" TO 1" THICK UNALTERED ANHYDRITE BEDS, NEAR TOP BEDS CONTAIN HALITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS 1/4" TO 1/2" HIGH; BASAL CONTACT SHARP, UNDULATORY UP TO 0.5', DISCONFORMABLE, MARKED BY THE OCCURRENCE OF 1" TO 2" THICK BED OF GRAY CLAYSTONE.
2224	1185		HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; BLEBS AND SUBHORIZONTAL STRINGERS OF POLYHALITE TO 1/2" THICK; LOCAL GRAY SUBHORIZONTAL STRINGERS OF CLAY TERMINATED AT PENECONTEMPORANEOUS DISSOLUTION PITS; BASAL CONTACT SHARP, DISCONFORMABLE, UNDULATORY UP TO 0.4'.
2219	1190		HALITE AND ARGILLACEOUS HALITE; HALITE: WHITE TO CLEAR TO TINTED ORANGE; CLAY: REDDISH-BROWN; UPPER 0.5' VERY ARGILLACEOUS, CONTAINS DISPLACIVE HALITE CRYSTALS (< 1/4") IN MUDSTONE MATRIX, UPPER 3" GREENISH-GRAY IN COLOR, CLAY CONTENT DECREASES WITH DEPTH TO 1189.0', 0.5' THICK REDDISH-BROWN ARGILLACEOUS HALITE BED OCCURS BELOW 1189.0', CLAY CONTENT INCREASES ABRUPTLY, THEN DECREASES WITH DEPTH, CLAY MATERIAL OCCURS AS MATRIX MATERIAL OR AS RANDOMLY-ORIENTED STRINGERS, CLAY CONTENT LOCALLY INCREASES BELOW 1200.0'; TRACE POLYHALITE AT TOP, CONTENT INCREASING WITH DEPTH, AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED DISCONTINUOUS STRINGERS; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY, DISCONFORMABLE.
2214	1195		
2209	1200		
2204	1205		
2199	1210		

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2199	1210		
			HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO ORANGISH-WHITE; UPPER 2.0' REDDISH-BROWN HALITIC MUDTONE CONTAINING DISPLACIVE HALITE CRYSTALS, GRADES INTO SLIGHTLY ARGILLACEOUS HALITE; REMAINDER CONTAINS GRAY CLAY DISSEMINATED THROUGHOUT AS INTER-CRYSTALLINE MATERIAL; POLYHALITE OCCURS AS RANDOMLY-ORIENTED STRINGERS AND DISSEMI-NATED BLEBS, BETWEEN 1217.0' AND 1219.0', 2" THICK POLYHALITE BEDS SPACED 0.5' TO 1.0' OCCUR, 3" THICK DISCONTINUOUS BED OF POLYHALITE UNDERLAIN BY A THIN BED OF GRAY CLAYSTONE OCCURS AT 1219.0', BED OF FINELY CRYSTALLINE ORANGISH-WHITE POLYHALITE OCCURS BETWEEN 1227.1' TO 1227.5'; 1/8" TO 1/4" THICK SUBHORIZONTAL STRINGERS OF POLYHALITE OCCUR IN THE INTERVALS FROM 1225.1' TO 1227.1' AND 1227.5' TO 1229.5'; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY, DISCONFORMABLE.
2194	1215	MB 116	
2189	1220		
2184	1225	MB 115	
2179	1230		
			HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR; CLAY AND POLYHALITE OCCUR AS RANDOMLY-ORIENTED DISCONTINUOUS STRINGERS; UPPER 2.0' ARGILLACEOUS HALITE, HALITE OCCURS IN DISCONTINUOUS ZONES AND PODS OF CRYSTALS IN CLAY AND HALITE MATRIX, CLAY CONTENT DECREASES WITH DEPTH; BASAL CONTACT SHARP, UNDULATORY.
2174	1235		
			HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR; POLYHALITIC AND ARGILLACEOUS; ARGILLACEOUS HALITE OCCURS IN UPPER 0.5', CONTENT DECREASES WITH DEPTH; POLYHALITE OCCURS AS DISCONTINUOUS STRINGERS, BELOW 1243.0' POLYHALITE BECOMES ABUNDANT; BASAL CONTACT SHARP, UNDULATORY UP TO 1.0'.
2169	1240		
2164	1245	MB 112	POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE, CONTAINS ZONES OF LIGHT ORANGE; APPEARS TO HAVE MOUND FORMS AT UPPER CONTACT; CONTAINS IRREGULARLY-SHAPED CRYSTALS OF HALITE (1/16" TO 3/4") DISSEMINATED THROUGHOUT; BASAL CONTACT SHARP, MARKED BY 1" TO 2-1/2" THICK GRAY CLAYSTONE CONTAINING HALITE.
2159	1250		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; TRACE GRAY CLAY, CONTENT DECREASES WITH DEPTH, BETWEEN 1255.8' AND 1257.0' SUBHORIZONTAL STRINGERS OF REDDISH-BROWN CLAY ARE CONTINUOUS AROUND THE CIRCUMFERENCE OF THE SHAFT; DISSEMINATED POLYHALITE BLEBS, CONTENT INCREASES WITH DEPTH; BASAL CONTACT SHARP.
2154	1255		

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2154	1255		AS ABOVE
2149	1260		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; UPPER 0.5' ARGILLACEOUS, CLAY OCCURS WITH HALITE AS MATRIX, BELOW 1260.7' CLAY OCCURS AS STRINGERS, CONTENT DECREASES WITH DEPTH; DISSEMINATED POLYHALITE BLEBS; BASAL CONTACT SHARP.
			POLYHALITE, FINELY CRYSTALLINE, ORANGISH-RED, STRUCTURELESS; UNDERLAIN BY 1" THICK GRAY CLAYSTONE BED; BASAL CONTACT SHARP.
2144	1265		HALITE, WHITE TO CLEAR, COARSELY CRYSTALLINE, SLIGHTLY ARGILLACEOUS; CLAY OCCURS IN STRINGERS, CONTENT DECREASES WITH DEPTH, ABSENT BELOW 1268.0'; TRACE POLYHALITE BLEBS; BASAL CONTACT SHARP.
2139	1270		
		MB 113	POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE, STRUCTURELESS; UNIT SPLIT BY 4" THICK CLEAR HALITE BED, OCCURS 3" BELOW UPPER CONTACT; BASAL CONTACT SHARP, MARKED BY 2" THICK GRAY CLAYSTONE BED.
2134	1275		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO ORANGE TO CLEAR; TRACE POLYHALITE, OCCURS AS DISCONTINOUS RANDOMLY-ORIENTED STRINGERS AND AS DISSEMINATED BLEBS; SLIGHTLY ARGILLACEOUS, GRAY CLAY STRINGERS TO 1276.0', ABSENT BETWEEN 1276.0' AND 1280.0', CLAY STRINGERS IN 1.0' THICK BAND BELOW 1280.0', BELOW 1284.0' CLAY CONTENT INCREASES AS SUBHORIZONTAL STRINGERS; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY.
2129	1280		
2124	1285		
2119	1290		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; ARGILLACEOUS, UPPER 1.5' TO 2.0' ARGILLACEOUS HALITE WITH CLAY AND HALITE MATRIX, HALITE OCCURS AS ZONES AND PODS OF CRYSTALS AND DISPLACIVE CRYSTALS TO 1/2" ACROSS, CLAY CONTENT DECREASES WITH DEPTH; POLYHALITE OCCURS AS SUBHORIZONTAL STRINGERS AND DISSEMINATED BLEBS, CONTENT INCREASES WITH DEPTH; BASAL CONTACT SHARP, UNDULATORY.
			POLYHALITE, FINELY CRYSTALLINE, ORANGISH-RED, STRUCTURELESS EXCEPT FOR 1" THICK INTERBEDS OF HALITE; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY.
2114	1295	MB 114	HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR; CONTAINS SUBHORIZONTAL CONTINUOUS STRINGERS OF POLYHALITE IN UPPER 0.5', IN THE REMAINDER OF THE UNIT POLYHALITE OCCURS AS RARE DISSEMINATED BLEBS; BASAL CONTACT SHARP.
2109	1300		HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR; ARGILLACEOUS AT TOP, CLAY OCCURS AS RANDOMLY-ORIENTED STRINGERS, CONTENT DECREASES WITH DEPTH; BASAL CONTACT GRADATIONAL.

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS.
2109	1300		AS ABOVE
2104	1305		POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE; CONTAINS IRREGULAR CRYSTALS AND BEDS OF HALITE; BASAL CONTACT SHARP, EXTREMELY IRREGULAR.
2099	1310		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; POLYHALITE OCCURS AS IRREGULAR RANDOMLY-ORIENTED AND SUBHORIZONTAL STRINGERS AND AS DISSEMINATED BLEBS, CONTENT INCREASES WITH DEPTH; BETWEEN 1307.0' AND 1308.0' HORIZONTAL AND SUBHORIZONTAL STRINGERS OF CLAY OCCUR; BASAL CONTACT DIFFUSE.
2094	1315		ARGILLACEOUS HALITE, REDDISH-BROWN CLAY, HALITE WHITE TO CLEAR; HALITE OCCURS IN PODS AND IRREGULARLY-SHAPED ZONES AND AS GROUPS OF CRYSTALS DISPERSED THROUGHOUT, BOTH CLAY AND HALITE OCCUR AS MATRIX; BASAL CONTACT GRADATIONAL.
2089	1320		HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR; SLIGHTLY ARGILLACEOUS, REDDISH-BROWN, CLAY CONTENT DECREASES WITH DEPTH; TRACE DISSEMINATED POLYHALITE BLEBS, CONTENT INCREASES WITH DEPTH, FROM 1320.4' TO 1320.9' A REDDISH-ORANGE, FINELY CRYSTALLINE POLYHALITE BED OCCURS; BASAL CONTACT SHARP.
2084	1325		HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR; UPPER 4" ARGILLACEOUS, CLAY OCCURS AS FINE DISCONTINUOUS STRINGERS, CONTENT DECREASES WITH DEPTH, ABSENT BELOW 1326.0'; BECOMES POLYHALITIC BELOW 1326.0', CONTENT INCREASES WITH DEPTH; BASAL CONTACT GRADATIONAL.
2079	1330		ANHYDRITE, FINELY CRYSTALLINE, LIGHT AND MEDIUM GRAY; INTERBEDS OF HALITE IN UPPER PART, CONTENT DECREASES WITH DEPTH; LOWER 1" CONTAINS NO INTERBEDS OF HALITE; BASAL CONTACT SHARP.
		MB 115	POLYHALITE, HALITIC, FINELY CRYSTALLINE, REDDISH-ORANGE; CONTAINS IRREGULAR DISCONTINUOUS BEDS OF CLEAR HALITE AND IRREGULARLY-SHAPED CRYSTALS OF HALITE 1/32" TO 1/8" ACROSS; OCCASIONAL HALITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS IN UPPER 1"; FROM 1331.5' TO 1331.8' OF GRAY FINELY CRYSTALLINE ANHYDRITE BED OCCURS; BASAL CONTACT SHARP, MARKED BY 1" THICK BED OF GRAY CLAYSTONE.
2074	1335		HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR; VERY SLIGHTLY ARGILLACEOUS; TRACE POLYHALITE AND ANHYDRITE, IRREGULAR BLEBS OF POLYHALITE OCCURS ABOVE 1335.0', ANHYDRITE OCCURS AS CONTINUOUS AND DISCONTINUOUS STRINGERS BELOW 1335.0', BASAL 2.0' CONTAINS 1/4" THICK SUBHORIZONTAL STRINGERS OF ANHYDRITE; BASAL CONTACT SHARP.
2069	1340		
		MB 116	POLYHALITE INTERBEDDED WITH ANHYDRITE, FINELY CRYSTALLINE, LIGHT GRAY TO LIGHT GRAYISH-ORANGE, THINLY LAMINATED TO STRUCTURELESS; HALITE BED BETWEEN 1343.1' AND 1343.4'; BASAL CONTACT SHARP, MARKED BY 1" THICK GRAY CLAYSTONE BED.
2064	1345		

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2064	1345		HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR; POLYHALITE OCCURS AS CONTINUOUS HORIZONTAL AND SUBHORIZONTAL STRINGERS AND AS IRREGULARLY-SHAPED BLEBS, CONTENT INCREASES WITH DEPTH; BASAL CONTACT SHARP.
2059	1350		ARGILLACEOUS HALITE, FINELY TO COARSELY CRYSTALLINE, REDDISH-BROWN HALITIC CLAYSTONE MATRIX, HALITE CLEAR TO WHITE; HALITE OCCURS AS IRREGULARLY-SHAPED AGGREGATES OF CRYSTALS; CONTAINS 1/4" TO 2" THICK SUBHORIZONTAL HALITE-FILLED FRACTURES; BASAL CONTACT UNDULATORY UP TO 2.0', GRADATIONAL TO SHARP, DISCONFORMABLE.
2054	1355		McNUTT POTASH ZONE VACA TRISTA MARKER BED HALITIC SILTSTONE, REDDISH-BROWN, THINLY LAMINATED TO STRUCTURELESS; HALITE OCCURS AS ISOLATED DISPLACIVE CRYSTALS UP TO 1-1/2" ACROSS; LOCAL CHANNEL FILL STRUCTURES PRESENT; CONTAINS BOTH SUBVERTICAL AND SUBHORIZONTAL HALITE-FILLED FRACTURES 1/8" TO 2" THICK; CHANNEL INTO UNDERLYING UNIT 3.0' DEEP (EAST SIDE OF SHAFT); NUMEROUS FILLED CHANNELS THROUGHOUT UNIT; OCCASIONAL CROSS-LAMINATIONS; BASAL CONTACT GRADATIONAL TO LOCALLY SHARP, UNDULATORY UP TO 3.0'.
2049	1360		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; ARGILLACEOUS TO 1363.0', CLAY OCCURS AS REDDISH-BROWN MATRIX, CONTENT DECREASES WITH DEPTH, HALITE OCCURS AS IRREGULARLY-SHAPED CRYSTAL MASSES; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH AS SUBHORIZONTAL CONTINUOUS AND DISCONTINUOUS STRINGERS AND THIN BEDS, ALSO AS DISSEMINATED BLEBS; BELOW 1363.0' ARGILLACEOUS MATERIAL OCCURS AS LOCAL SUBHORIZONTAL STRINGERS; 1" THICK BED OF POLYHALITE OCCURS AT 1365.6'; FROM 1373.4' TO 1373.9' ARGILLACEOUS HALITE OCCURS; BASAL CONTACT SHARP, DISCONFORMABLE.
2044	1365		
2039	1370		
2034	1375		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE, CRUDELY THIN TO MEDIUM BEDDED; POLYHALITE OCCURS AS SUBHORIZONTAL PARALLEL STRINGERS GROUPED IN UPPER 2.0', RANDOMLY-ORIENTED STRINGERS BELOW 1380.4', DISSEMINATED BLEBS, CONTENT DECREASES WITH DEPTH; LOCALLY SLIGHTLY ARGILLACEOUS, COLOR WHITISH-GRAY, SUBHORIZONTAL STRINGERS AND LOCAL IRREGULARLY-SHAPED ZONES OF CLAY, CONTENT DECREASES WITH DEPTH; 1/4" TO 1/2" THICK CLAYSTONE BED AT 1383.8'; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY, DISCONFORMABLE.
2029	1380		HALITIC CLAYSTONE AND ARGILLACEOUS HALITE, CLAY REDDISH-BROWN, HALITE WHITE TO CLEAR AND FINELY CRYSTALLINE; HALITE CONTENT INCREASES WITH DEPTH, OCCURS AS DISPLACIVE CRYSTALS (1/8" TO 1/2" ACROSS) AND PODS OF RELATIVELY PURE HALITE; LOCAL PODS OF POLYHALITE; BASAL CONTACT GRADATIONAL.
2024	1385		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; LOCALLY ARGILLACEOUS, REDDISH-BROWN CLAY OCCURS AS RANDOMLY-ORIENTED STRINGERS IN SUBHORIZONTAL ZONES, CONTENT DECREASES WITH DEPTH, DECREASES ABRUPTLY BELOW 1390.1'; TRACE POLYHALITE AS RARE DISSEMINATED RANDOMLY-ORIENTED STRINGERS AND BLEBS, CONTENT INCREASES WITH DEPTH, POLYHALITE BED OCCURS BETWEEN 1390.9' AND 1391.1', CONTENT INCREASES ABRUPTLY NEAR BASE; LOCAL ZONES AND STRINGERS OF ARGILLACEOUS HALITE CONTAINING GRAY CLAY; BASAL CONTACT SHARP, DISCONFORMABLE.
2019	1390		

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
2019	1390		AS ABOVE
2014	1395		HALITIC CLAYSTONE, UPPER 2" GRAY, REMAINDER REDDISH-BROWN, STRUCTURELESS EXCEPT FOR DISPLACIVE CRYSTALS (1/8" TO 1/2"); LOCAL GREENISH-GRAY REDUCTION SPOTS; HINT OF RELICT BEDDING; BASAL CONTACT GRADATIONAL, UNDULATORY.
2009	1400		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; VERY POLYHALITIC TO 1400.0', OCCURRING AS ABUNDANT RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS AND ZONES; BELOW 1400.0' RARE POLYHALITE AND SUBHORIZONTAL GRAY STRINGERS OF CLAY; BASAL CONTACT SHARP, DISCONFORMABLE.
2004	1405		ARGILLACEOUS HALITE; GRAY CLAY IN UPPER 1.0', REMAINDER REDDISH-BROWN; HALITE OCCURS AS WELL-ROUNDED PODS OR COBBLES (?) 1" TO 4" DIAMETER, FINE GRAINED OR CRYSTALLINE COARSENING TOWARD CENTER, WHITE TO CLEAR WITH RARE ORANGE TINT, PODS BREAK IN SPHERICAL PATTERN; LOCALLY HALITE OCCURS AS CLEAR TO WHITE IRREGULARLY SHAPED ZONES, HALITE ALSO OCCURS AS SMALL DISPLACIVE CRYSTALS <1/32" TO 1/8" ACROSS; LOCAL 1/8" TO 1/4" DISCONTINUOUS HALITE-FILLED (FIBROUS) FRACTURES; CONTAINS LOCAL POLYHALITE ZONES; BASAL CONTACT SHARP.
1999	1410		
1994	1415		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; ARGILLACEOUS AT TOP, CONTENT DECREASES WITH DEPTH, LOCAL DISCONTINUOUS IRREGULARLY-SHAPED ZONES OF CLAYSTONE, CLAY ALSO OCCURS AS RANDOMLY-ORIENTED AND SUBHORIZONTAL STRINGERS; MODERATELY ABUNDANT POLYHALITE, OCCURS AS DISSEMINATED BLEBS AND SUBHORIZONTAL DISCONTINUOUS STRINGERS; CLAY ABSENT BELOW 1415.0'; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY UP TO 4".
1989	1420	MB 117	POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE; THIN SUBHORIZONTAL HALITE-FILLED FRACTURES <1/16" THICK; CONTAINS RARE CRYSTALS OF HALITE 1/16" TO 1/4" ACROSS; LOWER 4" CONTAINS BLACK LAMINAE PARALLEL TO LOWER CONTACT; BASAL CONTACT SHARP, UNDULATORY ON TWO SCALES: MAJOR - 0.8', MINOR - 0.1', MARKED BY 1" THICK GREENISH-GRAY CLAYSTONE BED.
1984	1425		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; RARE IRREGULAR DISCONTINUOUS STRINGERS AND BLEBS OF POLYHALITE; LOCAL TRACE AMOUNTS OF GRAY SUBHORIZONTAL STRINGERS OF CLAY; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY, DISCONFORMABLE.
1979	1430		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; MODERATELY ARGILLACEOUS, CLAY REDDISH-BROWN TO GRAY WITH DEPTH, OCCURS AS INTER-CRYSTALLINE MATERIAL AND SUBHORIZONTAL TO RANDOMLY-ORIENTED STRINGERS, CONTENT DECREASES WITH DEPTH; TRACE POLYHALITE BLEBS, CONTENT INCREASES WITH DEPTH, AT 1437.5' A 0.1' THICK BED OF REDDISH-ORANGE POLYHALITE OCCURS; BELOW POLYHALITE BED CLAY CONTENT INCREASES SLIGHTLY THEN DECREASES WITH DEPTH; BASAL CONTACT DIFFUSE, CONFORMABLE.
1974	1435		

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1974	1435		AS ABOVE
1969	1440		
1964	1445	MB 118	POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE, STRUCTURELESS; HALITIC IN UPPER 1.5', HALITE OCCURS AS DISCONTINUOUS THIN BEDS AND IRREGULARLY-SHAPED ZONES, WHITE TO CLEAR; REMAINDER HALITE-FREE; BASAL CONTACT SHARP, MARKED BY 1" TO 2" THICK GREENISH-GRAY CLAYSTONE BED, DISCONFORMABLE.
1959	1450		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS RARE DISSEMINATED BLEBS AND SUBHORIZONTAL STRINGERS; TWO 3/4" THICK BEDS OF POLYHALITE NEAR 1450'; BASAL CONTACT SHARP.
			POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE, STRUCTURELESS EXCEPT FOR RARE SUBHORIZONTAL AND SUBVERTICAL HALITE-FILLED FRACTURES < 1/8" THICK; BASAL CONTACT SHARP.
1954	1455		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE; TRACE SUBHORIZONTAL GRAY CLAY STRINGERS; RARE DISSEMINATED BLEBS AND SUBHORIZONTAL STRINGERS OF POLYHALITE, CONTENT INCREASES WITH DEPTH, INCREASES ABRUPTLY IN LOWER 4"; BASAL CONTACT SHARP.
			ARGILLACEOUS HALITE AND HALITIC CLAYSTONE; UPPER 0.5' TO 1.0' GRAY, REMAINDER REDDISH-BROWN; HALITE OCCURS AS IRREGULARLY-SHAPED ZONES, DISCONTINUOUS BEDS, DISPLACIVE CRYSTALS < 1/8" ACROSS; BASAL CONTACT DIFFUSE.
1949	1460		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; VERY ARGILLACEOUS TO 1459.0', CLAY CONTENT DECREASES WITH DEPTH, OCCURS AS IRREGULARLY-SHAPED ZONES OF HALITIC CLAYSTONE WITH DISPLACIVE HALITE CRYSTALS AND AS MATRIX AND RANDOMLY-ORIENTED STRINGERS OF CLAY IN ARGILLACEOUS HALITE, BELOW 1459.0' CLAY CONTENT DECREASES ABRUPTLY; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS, STRINGERS BECOME HORIZONTAL AND 1/4" THICK SPACED 2" TO 4" IN LOWER 5.0', 0.5' THICK BED OF POLYHALITE OCCURS AT 1469.0'; BASAL CONTACT GRADATIONAL.
1944	1465		POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE TO ORANGISH-RED; UPPER 0.5' CONTAINS DISCONTINUOUS BEDS OF IRREGULARLY-SHAPED PODS OF HALITE; BECOMES LAMINATED WITH CLAY PARTINGS BELOW 1470.0'; BASAL CONTACT SHARP, MARKED BY 1" TO 4" THICK BED OF GRAY CLAYSTONE SPLIT BY BIFURCATING HALITE-FILLED SUBHORIZONTAL FRACTURE, UNDULATORY UP TO 0.5'.
1939	1470	MB 119	HALITE, COARSELY CRYSTALLINE, WHITE, BEDDED WITH SUBHORIZONTAL CONTINUOUS STRINGERS AND BEDS OF POLYHALITE 1/4" TO 3/4" THICK; POLYHALITE CONTENT DECREASES WITH DEPTH, ABSENT BELOW 1475.0'; BEDDED WITH SUBHORIZONTAL STRINGERS OF GRAY CLAY BELOW 1475.0'; BASAL CONTACT SHARP.
1934	1475		HALITE, FINELY TO MEDIUM CRYSTALLINE, WHITE TO CLEAR; GRAYISH-BLACK CLAY OCCURS AS INTERSTITIAL FILLING AND AS DISCONTINUOUS SUBHORIZONTAL STRINGERS; BASAL CONTACT SHARP.
			HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE, BANDED BY ORANGE-TINTED HALITE SPACED 1" TO 2"; 1" THICK BED OF GREENISH-GRAY CLAYSTONE OCCURS 2" ABOVE LOWER CONTACT; BASAL CONTACT SHARP, IRREGULAR, SLIGHTLY UNDULATORY.
1929	1480		HALITIC CLAYSTONE AND ARGILLACEOUS HALITE, REDDISH-BROWN; HALITE OCCURS AS DISPLACIVE CRYSTALS AND SUBHORIZONTAL FRACTURE FILLINGS 1/4" THICK; UPPER 4" GREENISH-GRAY; BASAL CONTACT DIFFUSE.

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1929	1480		AS ABOVE
1924	1485		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; SLIGHTLY ARGILLACEOUS IN UPPER 2.0' AS DISCONTINUOUS RANDOMLY-ORIENTED STRINGERS; TRACE POLYHALITE AT TOP, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND STRINGERS; BASAL CONTACT SHARP.
1919	1490	MB 120	POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE, STRUCTURELESS; BASAL CONTACT SHARP, MARKED BY 1/2" TO 1" THICK GRAY CLAYSTONE BED.
			HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR; CONTAINS SUBHORIZONTAL STRINGERS OF BLACKISH-GRAY CLAY SPACED 2" TO 4"; BASAL CONTACT SHARP.
1914	1495		HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE, BANDED WHITE AND ORANGE, SPACED 1" TO 2", TRACE POLYHALITE; BASAL CONTACT GRADATIONAL.
			ARGILLACEOUS HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR; HALITE OCCURS AS PODS AND IRREGULARLY-SHAPED ZONES OF CRYSTALS SURROUNDED BY REDDISH-BROWN CLAY MATRIX; CLAY CONTENT DECREASES WITH DEPTH; UPPER 4" CONTAINS SUBHORIZONTAL STRINGERS OF BLACKISH-GRAY CLAY SPACED 1"; BASAL CONTACT DIFFUSE.
1909	1500		HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR TO ORANGE; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED STRINGERS; BASAL CONTACT SHARP, IRREGULAR, UNDULATORY UP TO 1", DISCONFORMABLE.
1904	1505	MB 121	POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE; HALITIC, CONTAINS IRREGULARLY-SHAPED PODS OF HALITE TO 4" ACROSS; CONTAINS LOCAL ZONES RICH IN ANHYDRITE OR LANGBENITE (?); BASAL CONTACT SHARP, UNDULATORY, SLIGHTLY IRREGULAR.
1899	1510		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED STRINGERS; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY.
		MB 122	POLYHALITE, FINELY CRYSTALLINE, BROWN TO TAN, STRUCTURELESS; BASAL CONTACT SHARP.
1894	1515		HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR; CONTAINS STRINGERS OF POLYHALITE AND GRAY CLAY SPACED 1" TO 2"; BASAL CONTACT SHARP.
1889	1520		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE; UPPER 0.5' ARGILLACEOUS, REDDISH-BROWN, CONTENT DECREASES WITH DEPTH; TWO 3" THICK BEDS OF REDDISH-BROWN ARGILLACEOUS HALITE OCCUR AT 1519.8' AND 1520.2'; BASAL 0.5' CONTAINS SUBHORIZONTAL GRAY CLAY STRINGERS, SPACED 1" TO 3"; TRACE POLYHALITE, OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY, DISCONFORMABLE.
1884	1525		

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1884	1525		AS ABOVE
			ARGILLACEOUS HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; CLAY REDDISH-BROWN, UPPER 1.0' TO 3.0' GRAY ARGILLACEOUS HALITE WITH RARE SMALL DISPLACIVE HALITE CRYSTALS < 1/16" ACROSS; HALITE OCCURS AS AGGREGATES OF CRYSTALS IN PODS OR ZONES; CLAY OCCURS AS MATRIX IN UPPER PART, OCCURS AS DISSEMINATED IRREGULARLY-SHAPED ZONES AND RANDOMLY-ORIENTED STRINGERS WITH DEPTH, CONTENT DECREASES WITH DEPTH; BASAL CONTACT SHARP.
1879	1530		
1874	1535		UNION ANHYDRITE ANHYDRITE, ALTERNATES WHITISH-GRAY TO DARK GRAY, FINELY CRYSTALLINE, THINLY LAMINATED TO THINLY BEDDED; HALITIC, CONTAINS RARE 1/16" CRYSTALS OF HALITE; UPPER 2" TO 5" POLYHALITIC, DISCONTINUOUS POLYHALITE LENS OCCURS ON NORTHWEST SIDE OF SHAFT BETWEEN 1539.5' AND 1541.6'; LOWER 1.0' TO 2.0' CONTAINS WHITE LAMINAE INTERBEDDED WITH ANHYDRITE, POSSIBLY CARBONATE; BASAL CONTACT GRADATIONAL, ALTERNATION CONTACT, CONFORMABLE.
1869	1540		POLYHALITE, FINELY CRYSTALLINE, ORANGISH-RED TO REDDISH-ORANGE, THINLY LAMINATED TO THINLY BEDDED, LOCALLY STRUCTURELESS, LAMINAE OFTEN SLIGHTLY CONTORTED; LOCALLY ANHYDRITIC, OCCURS AS UNALTERED LAMINAE AND ZONES; BASAL CONTACT SHARP, MARKED BY LOAD CASTS INTO UNDERLYING UNIT (2" DEEP BY 1" TO 3" ACROSS) AND FLAME STRUCTURES.
1864	1545		ANHYDRITIC CLAYSTONE, FINELY LAMINATED, GRAY TO WHITISH-GRAY; CONTAINS LOCAL, SMALL ENTROLITHIC STRUCTURES; BASAL CONTACT GRADATIONAL TO DIFFUSE.
			HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE, SLIGHTLY BEDDED BY DISCONTINUOUS SUBHORIZONTAL STRINGERS OF POLYHALITE AND BANDS OF POLYHALITIC HALITE; BASAL CONTACT SHARP, DISCONFORMABLE.
1859	1550		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE, STRUCTURELESS; SLIGHTLY ARGILLACEOUS, MODERATELY ABUNDANT IN UPPER 1.0', CONTENT DECREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED STRINGERS; BASAL CONTACT GRADATIONAL.
1854	1555		
1849	1560		HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR; ARGILLACEOUS IN UPPER 1.5', GRAY, AS SUBHORIZONTAL STRINGERS AND BEDS, CONTENT DECREASES WITH DEPTH, 1.0' TO 2.0' THICK BED OF GRAY ARGILLACEOUS HALITE AT 1560.2'; BELOW 1560.2' CLAY CONTENT INCREASES AND BECOMES REDDISH-BROWN, OCCURS AS STRINGERS AND DISCONTINUOUS BEDS OF ARGILLACEOUS HALITE, CONTENT DECREASES WITH DEPTH, LOCALLY GRAY, CONTENT DROPS TO TRACE NEAR BASE; SOME POLYHALITE, CONTENT INCREASES TO 1560.2', BELOW WHICH IT DECREASES WITH DEPTH; OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS; BASAL CONTACT SHARP, DISCONFORMABLE.
1844	1565		
1839	1570		

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1839	1570	X —	AS ABOVE
1834	1575	X —	
1829	1580	— X	HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE, STRUCTURELESS; UPPER 0.5' SLIGHTLY ARGILLACEOUS, REDDISH-BROWN, CONTENT DECREASES WITH DEPTH, ABSENT BELOW 1582.0', OCCURS AS DISCONTINUOUS STRINGERS AND AS INTERCRYSTALLINE MATRIX; TRACE DISSEMINATED POLYHALITE BLEBS; BASAL CONTACT GRADATIONAL, HIGHLY IRREGULAR, MARKED BY THE OCCURRENCE OF ARGILLACEOUS HALITE.
1824	1585	X	
1819	1590	— — —	HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; UPPER 0.5' HAS REDDISH-BROWN CLAY MATRIX, CONTENT DECREASES SLIGHTLY WITH DEPTH, CLAY BECOMES BOTH GRAY AND REDDISH-BROWN, OCCURS AS RANDOMLY-ORIENTED STRINGERS; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND AS STRINGERS WITH DEPTH; BASAL CONTACT GRADATIONAL, DISCONFORMABLE.
1814	1595	X — X	
1809	1600	X X XXXXXXXX	
1804	1605	— X X —	HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; SLIGHTLY ARGILLACEOUS, CONTENT DECREASES WITH DEPTH, REDDISH-BROWN, OCCURS AS INTERCRYSTALLINE MATERIAL AND RANDOMLY-ORIENTED STRINGERS, LOCALLY OCCURS IN GREATER CONCENTRATIONS; TRACE POLYHALITE, CONTENT INCREASES SLIGHTLY WITH DEPTH, OCCURS AS DISSEMINATED BLEBS, BLEBS BECOME LARGER WITH DEPTH (UP TO 2" x 1"); BASAL CONTACT SHARP.
1799	1610	— X X	
1794	1615	—	

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1794	1615	— X	
		MB 123	ANHYDRITE, FINELY CRYSTALLINE, BROWNISH-GRAY TO ORANGISH-TAN, THINLY LAMINATED; LOCALLY ALTERED TO POLYHALITE; LAMINAE OFTEN CONTORTED AND SLIGHTLY HALITIC, LOCALLY NODULAR, STRUCTURE OFTEN ENTROLITHIC; BASAL CONTACT GRADATIONAL.
1789	1620		
		X XXXXXXXXXXXXXXX X	HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE; 3" THICK BED OF ORANGISH-RED POLYHALITE AT 1624.2'; TRACE POLYHALITE, OCCURS AS RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS AND AS DISSEMINATED BLEBS; THIN 1" THICK IRREGULAR BED OF ANHYDRITE AT 1628.3'; BASAL CONTACT SHARP, DISCONFORMABLE (?).
1784	1625		
1779	1630	MB 124	ANHYDRITE, FINELY CRYSTALLINE, BROWNISH-GRAY TO TANNISH-GRAY, ENTROLITHIC TO NODULAR TO 1633.0', BELOW 1633.0', BECOMES LAMINATED TO THINLY BEDDED, LOCALLY CONTAINS ANHYDRITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS; LOCALLY POLYHALITIC; BASAL CONTACT SHARP, MARKED BY 2.0" TO 4.0" THICK GRAY THINLY LAMINATED CLAYSTONE BED CONTAINING SEVERAL SUBHORIZONTAL FIBROUS HALITE-FILLED FRACTURES 1/8" TO 1/4" THICK, SPACED 1" TO 2"; BASAL CONTACT GRADATIONAL.
1774	1635		
		MB 124	ARGILLACEOUS POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE; POLYHALITE OCCURS AS REPLACEMENT OF ANHYDRITE OR GYPSUM NODULES IN GRAY CLAYSTONE MATRIX; NODULE CONCENTRATION INCREASES WITH DEPTH UNTIL MATRIX IS POLYHALITE; NODULE DIAMETER 1/8" TO 1/2"; UNDERLAIN BY 1" TO 2" GRAY CLAYSTONE BED; BASAL CONTACT SHARP, UNDULATORY, IRREGULAR.
1769	1640	X X X	HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE; POLYHALITIC, OCCURS AS DISSEMINATED BLEBS AND AS RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS; GRAY CLAYSTONE BED OCCURS AT 1644.0'; POLYHALITE CONTENT TRACE BELOW 1644.0'; LOWER 1.5' CONTAINS TRACE AMOUNT OF CLAY STRINGERS; BASAL CONTACT SHARP, IRREGULAR WITH DISSOLUTION PITS 0.3' DEEP, MARKED BY 2" TO 3" THICK GRAY CLAYSTONE BED.
1764	1645	X X X	
1759	1650	—	
1754	1655	X X —	HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO ORANGE; POLYHALITIC, OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS; TRACE DISSEMINATED GRAY CLAY; BASAL CONTACT SHARP.
1749	1660	— X	AS BELOW

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1749	1660		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; TRACE REDDISH-BROWN AND GRAY CLAY, OCCURRING AS STRINGERS AND AS LOCALLY DISSEMINATED MATRIX, CLAY CONTENT INCREASES ABRUPTLY BELOW 1662.0' AS REDDISH-BROWN STRINGERS, CONTENT DECREASES WITH DEPTH, ARGILLACEOUS HALITE BED OCCURS WITH CLAY AS STRINGERS AND MATRIX BETWEEN 1673.0' AND 1673.8', LOWER 2.5' CONTAINS DISCONTINUOUS HORIZONTAL AND SUBHORIZONTAL STRINGERS OF GRAY CLAY; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS WITH SIZE INCREASING WITH DEPTH (1" DIAMETER); BASAL CONTACT SHARP, IRREGULAR, UNDULATORY TO 0.5'.
1744	1665		
1739	1670		
1734	1675		
1729	1680		
1724	1685		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; ARGILLACEOUS HALITE OCCURS BETWEEN 1681.4' AND 1682.6', GRAY CLAY; REDDISH-BROWN ARGILLACEOUS HALITE OCCURS BETWEEN 1682.6' AND 1684.1', CLAY OCCURS AS RANDOMLY-ORIENTED STRINGERS AND AS MATRIX; CLAY CONTENT DECREASES ABRUPTLY BELOW 1684.1'; TRACE POLYHALITE BELOW 1686.4', CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND AS RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS; BASAL CONTACT SHARP.
1719	1690		
1714	1695		ARGILLACEOUS HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; VERY ARGILLACEOUS IN UPPER 0.5', CLAY REDDISH-BROWN, CONTENT DECREASES WITH DEPTH, OCCURS AS INTERCRYSTALLINE MATRIX AND RARE STRINGERS, CONTENT DECREASES ABRUPTLY BELOW 1704.0'; TRACE POLYHALITE, OCCURS AS DISSEMINATED BLEBS; BASAL CONTACT SHARP, IRREGULAR, DISCONFORMABLE.
1709	1700		
1704	1705		

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1704	1705		AS ABOVE
1699	1710		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; UPPER 0.3' TO 0.4' AND LOWER 0.7' PURE HALITE, REMAINDER SLIGHTLY ARGILLACEOUS, CLAY REDDISH-BROWN, BECOMING GRAY WITH DEPTH; BASAL CONTACT SHARP, IRREGULAR, DISCONFORMABLE.
1694	1715		
1689	1720		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; UPPER 1.0' ARGILLACEOUS, CONTENT DECREASES WITH DEPTH; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED STRINGERS. LOWER 1.0' VERY POLYHALITIC; BASAL CONTACT SHARP, IRREGULAR, UNDULATORY.
1684	1725		
			POLYHALITE, FINELY CRYSTALLINE, ORANGISH-RED, STRUCTURELESS; UNIT VERY UNDULATORY; BASAL 0.4' CONSISTS OF GREENISH-GRAY CLAYSTONE; BASAL CONTACT SHARP, UNDULATORY, DISCONFORMABLE.
1679	1730		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; LOCALLY ARGILLACEOUS, CLAY REDDISH-BROWN, CONTENT DECREASES WITH DEPTH; TRACE POLYHALITE, OCCURS AS DISSEMINATED BLEBS; BASAL CONTACT SHARP, IRREGULAR WITH DISSOLUTION PITS 1.0' DEEP INTO UNDERLYING UNIT.
1674	1735		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; UPPER 2.0' SLIGHTLY ARGILLACEOUS, CLAY REDDISH-BROWN, OCCURS AS RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS AND DISSEMINATED INTERCRYSTALLINE MATERIAL; TRACE POLYHALITE AT TOP, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED STRINGERS; BASAL CONTACT GRADATIONAL.
1669	1740		
1664	1745		
1659	1750		

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1659	1750	X	AS ABOVE
		MB 127	POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE, TRACE THIN LAMINATIONS; LOCALLY ANHYDRITIC; BASAL CONTACT SHARP.
		XXXXXXX MB 127	HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE OCCASIONALLY TINTED ORANGE; SUBHORIZONTAL POLYHALITE STRINGERS, 1/8" THICK; BASAL CONTACT SHARP, IRREGULAR.
1654	1755	X	POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE; BASAL CONTACT SHARP, MARKED BY 1" THICK GRAY CLAYSTONE BED.
		X	HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; POLYHALITIC, CONTENT DECREASES WITH DEPTH, OCCURS AS STRINGERS AND BLEBS; 0.1' TO 0.4' THICK ANHYDRITE BED OCCURS AT 1761.9'; BASAL CONTACT SHARP.
1649	1760	X	
		MB 128	POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE, THINLY LAMINATED; 0.3' THICK HALITE BED AT 1763.9', LOWER 0.1' TO 0.2' HALITIC GRAY CLAYSTONE; BASAL CONTACT SHARP.
1644	1765	— — —	HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE OCCASIONALLY TINTED ORANGE, HINT OF BEDDING FROM SUBHORIZONTAL STRINGERS OF POLYHALITE SPACED 0.2'; 0.1' THICK BED OF ARGILLACEOUS HALITE OCCURS AT 1767.3'; POLYHALITE CONTENT INCREASES ABRUPTLY NEAR BASE; BASAL CONTACT SHARP, DISCONFORMABLE.
1639	1770	X X	
		— — —	ARGILLACEOUS HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; GRAY CLAY OCCURS AS MATRIX AND INTERCRYSTALLINE MATERIAL, CLAY BECOMES REDDISH-BROWN BELOW 1773.8', CLAY CONTENT DECREASES WITH DEPTH; CLAY-FREE POLYHALITIC HALITE OCCURS BETWEEN 1773.3' AND 1773.8'; POLYHALITE CONTENT INCREASES WITH DEPTH; BASAL CONTACT SHARP, IRREGULAR.
		X X X	
1634	1775	— —	
		—	
1629	1780	—	
		—	HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; ARGILLACEOUS TO 1782.4', CONTENT DECREASES ABRUPTLY BELOW, CLAY OCCURS AS MATRIX; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED STRINGERS; BASAL CONTACT GRADATIONAL.
		—	
1624	1785	X	
		MB 129	POLYHALITE, FINELY CRYSTALLINE, DARK REDDISH-ORANGE, HINT OF THIN LAMINATIONS; TRACE HALITE; BASAL CONTACT SHARP, MARKED BY 1" THICK GRAY CLAYSTONE BED, SLIGHTLY UNDULATORY, DISCONFORMABLE.
1619	1790	— —	ARGILLACEOUS HALITE, FINELY TO COARSELY CRYSTALLINE, CLEAR; GRAY CLAY AT TOP, GRADING TO REDDISH-BROWN WITH DEPTH, CONTENT DECREASES WITH DEPTH UNTIL ABSENT AT 1792.3'; CLAY CONTENT INCREASES AS INTERCRYSTALLINE MATERIAL AND STRINGERS BELOW 1792.3', CONTENT DECREASES WITH DEPTH, ABSENT BELOW 1794.0'; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS; BASAL CONTACT SHARP, MARKED BY 0.1' THICK BED OF POLYHALITE UNDERLAIN BY 1/4" THICK GRAY CLAYSTONE BED.
		—	
		X	
1614	1795	—	

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PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1614	1795		AS ABOVE
1609	1800	MB 138	HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; CONTAINS SUBHORIZONTAL GRAY CLAY STRINGERS TO 1804.3', ABSENT BELOW 1804.3'; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND SUBHORIZONTAL STRINGERS; BASAL CONTACT SHARP, MARKED BY 3" ZONE OF GRAYISH HALITE UNDERLAIN BY 1" THICK GRAY CLAYSTONE.
1604	1805		
1599	1810		
1594	1815		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; UPPER 1.8' ARGILLACEOUS, REDDISH-BROWN, CONTENT DECREASES WITH DEPTH; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS, BLEBS ALIGNED IN ZONES AND STRINGERS OCCUR BELOW 1817.6'; CONTAINS GRAY CLAY AS STRINGERS AND DISSEMINATED INTER-CRYSTALLINE MATERIAL BETWEEN 1819.2' AND 1819.9'; BASAL CONTACT SHARP, IRREGULAR, DISCONFORMABLE.
1589	1820		
1584	1825		HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; ARGILLA-CEOUS, REDDISH-BROWN, CLAY OCCURS AS INTERCRYSTALLINE MATRIX AND STRINGERS, CONTENT DECREASES WITH DEPTH, CONTENT DECREASES ABRUPTLY BELOW 1823.0'; TRACE POLYHALITE, OCCURS AS DISSEMINATED BLEBS; BASAL CONTACT GRADATIONAL.
1579	1830		
1574	1835		HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; SLIGHTLY ARGILLACEOUS IN UPPER 4.0', CONTENT DECREASES WITH DEPTH, CLAY OCCURS AS STRINGERS AND INTERCRYSTALLINE MATRIX, CONTAINS RARE SMALL (<1/16") DISPLACIVE HALITE CRYSTALS; TRACE POLYHALITE, OCCURS AS DISSEMINATED BLEBS; BASAL CONTACT SHARP, MARKED BY DISSOLUTION PITS 6" TO 8" DEEP INTO UNDERLYING UNIT, IRREGULAR, UNDU-LATORY.
1569	1840		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; ARGILLACEOUS TO 1839.8', OCCURS AS GRAY STRINGERS; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS BLEBS AND RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS; BASAL CONTACT GRADATIONAL, HIGHLY IRREGULAR, SLIGHTLY UNDULATORY.

PRELIMINARY ELEV. (FT. MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1569	1840		AS ABOVE
1564	1845		POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE; HALITIC; BASAL CONTACT GRADATIONAL, VERY IRREGULAR, UNDULATORY.
			HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; ARGILLACEOUS, GRAY AT TOP GRADING TO REDDISH-BROWN WITH DEPTH, CONTENT DECREASES WITH DEPTH, CLAY OCCURS AS SUBHORIZONTAL STRINGERS AND AS MATRIX MATERIAL IN IRREGULARLY-SHAPED ZONES OF ARGILLACEOUS HALITE; POLYHALITIC, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND RANDOMLY-ORIENTED DISCONTINUOUS STRINGERS; CONTAINS LARGE IRREGULAR ZONES (SEVERAL SQUARE FOOT AREA) OF PURE WHITE HALITE WHICH ARE CONTINUOUS INTO UNDERLYING UNIT (DISSOLUTION PITS ?); BASAL CONTACT SHARP, IRREGULAR, DISCONFORMABLE.
1559	1850		
1554	1855		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; ARGILLACEOUS AT TOP, CONTENT DECREASES WITH DEPTH, OCCURS AS RANDOMLY-ORIENTED STRINGERS; TRACE POLYHALITE, OCCURS AS DISSEMINATED BLEBS; CONTAINS DISSOLUTION PITS 2.0' TO 3.0' DEEP, FILLED WITH WHITE COARSELY CRYSTALLINE HALITE; BASAL CONTACT SHARP TO ABSENT, MARKED BY 1" THICK GRAY CLAYSTONE BED.
1549	1860		HALITE, COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE; POLYHALITIC, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND SUBHORIZONTAL 1/4" THICK STRINGERS; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY.
1544	1865		
		MB 131	POLYHALITE, FINELY CRYSTALLINE, DARK REDDISH-ORANGE, STRUCTURELESS; HALITIC; UNDERLAIN BY 4" THICK BED OF GRAY HALITIC CLAYSTONE; BASAL CONTACT GRADATIONAL.
1539	1870		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; SLIGHTLY ARGILLACEOUS, CONTENT DECREASES WITH DEPTH, OCCURS AS SUBHORIZONTAL STRINGERS; POLYHALITIC, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND SUBHORIZONTAL STRINGERS, POLYHALITE BED 0.1' THICK AT 1875.7'; BASAL CONTACT SHARP, IRREGULAR, SLIGHTLY UNDULATORY.
1534	1875		ARGILLACEOUS HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR; CLAY REDDISH-BROWN TO GRAY, OCCURS AS IRREGULAR SUBHORIZONTAL STRINGERS; HALITE OCCURS IN PODS OR ZONES OF CRYSTALS; TRACE POLYHALITE; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY.
			HALITE, COARSELY CRYSTALLINE, WHITE; BECOMES SLIGHTLY ARGILLACEOUS WITH DEPTH; POLYHALITIC, OCCURS AS BLEBS AND SUBHORIZONTAL STRINGERS; BASAL CONTACT SHARP, IRREGULAR, SLIGHTLY UNDULATORY.
1529	1880		ARGILLACEOUS HALITE, REDDISH-BROWN WITH TRACE OF GRAY; HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR, OCCURS AS IRREGULARLY-SHAPED BEDS AND PODS, LOCALLY POLYHALITIC AND FREE OF CLAY; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND IRREGULAR RANDOMLY-ORIENTED STRINGERS; 1/4" THICK BED OF POLYHALITE UNDERLAIN BY 1/4" THICK DISCONTINUOUS BED OF GRAY CLAYSTONE OCCURS AT 1898.2'; BASAL CONTACT SHARP, IRREGULAR, SLIGHTLY UNDULATORY.
1524	1885		

EXHAUST SHAFT

LITHOLOGIC LOG

PRELIMINARY ELEV. (FT MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1524	1885		AS ABOVE
1519	1890		
1514	1895		
		MB 132	POLYHALITE, FINELY CRYSTALLINE, DARK REDDISH-ORANGE, STRUCTURELESS; UNDERLAIN BY 1" THICK GREENISH-GRAY CLAYSTONE; BASAL CONTACT SHARP.
1509	1900		HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE; TRACE ARGILLACEOUS MATERIAL BELOW 1901.0', CONTENT DECREASES WITH DEPTH, TOTALLY ABSENT BELOW 1904.8', OCCURS AS RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS BECOMING BLEBS WITH DEPTH; 1/4" THICK SUBHORIZONTAL STRINGERS OF ANHYDRITE OCCUR BELOW 1914.0'; AT 1916.5', A 0.2' THICK PINKISH-RED POLYHALITE BED OCCURS; BASAL CONTACT SHARP, SLIGHTLY IRREGULAR AND UNDULATORY.
1504	1905		
1499	1910		
1494	1915		
1489	1920	MB 133	POLYHALITE, FINELY CRYSTALLINE, DARK RED, STRUCTURELESS AT TOP GRADING TO LAMINATED AT BASE; HALITIC, BASAL CONTACT SHARP TO GRADATIONAL, MARKED BY 0.1' TO 0.2' THICK GRAY CLAYSTONE BED.
			HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR, SLIGHTLY ARGILLACEOUS, OCCURS AS RANDOMLY-ORIENTED STRINGERS; ABUNDANT POLYHALITE, OCCURS AS DISSEMINATED BLEBS; CONTAINS LOCAL ZONES OF PURE HALITE; BASAL CONTACT GRADATIONAL, IRREGULAR.
1484	1925		HALITE, MEDIUM TO COARSELY CRYSTALLINE, CLEAR TO WHITE; RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS OF BLACK CLAY OCCUR BETWEEN 1923.5' AND 1926.4'; POLYHALITIC, CONTENT INCREASES ABRUPTLY BELOW 1926.8', THEN DECREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS; BASAL CONTACT DIFFUSE.
1479	1930		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1479	1930		HALITE, FINELY TO COARSELY CRYSTALLINE, CLEAR TO WHITE; MODERATELY ARGILLACEOUS, CONTENT DECREASES WITH DEPTH, OCCURS AS BLACK BLEBS AND STRINGERS; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH, OCCURS AS DISCONTINUOUS IRREGULAR RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS AND DISSEMINATED BLEBS; CONTAINS LOCAL BEDS AND ZONES OF CLAY-FREE HALITE; POLYHALITE CONTENT INCREASES ABRUPTLY NEAR BASE; BASAL CONTACT SHARP.
1474	1935		
1469	1940		
			ANHYDRITE, FINELY CRYSTALLINE, LIGHT TO DARK GRAY, THINLY LAMINATED TO LAMINATED; UPPER 0 TO 0.5' POLYHALITIC; LOCALLY HALITIC, OCCURS AS DISCONTINUOUS BEDS AND PODS; SOME LAMINAE ORGANIC-RICH (?); LAMINAE UNDULATE SLIGHTLY; UNDERLAIN BY 0.1' TO 0.3' THICK GRAY HALITIC CLAYSTONE; BASAL CONTACT SHARP, IRREGULAR, SLIGHTLY UNDULATORY.
1464	1945		HALITE, COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE, STRUCTURELESS; SLIGHTLY ARGILLACEOUS IN UPPER 5.0', OCCURS AS GRAY DISCONTINUOUS SUBHORIZONTAL STRINGERS, BELOW 1952.3' CONTENT INCREASES SHARPLY, THEN DECREASES WITH DEPTH, DISCONTINUOUS 1" TO 2" THICK IRREGULAR GRAY CLAYSTONE BED OCCURS AT 1952.3'; TRACE POLYHALITE, OCCURS AS LIGHT ORANGISH-WHITE DISSEMINATED BLEBS; IN BASAL 1.0' POLYHALITE AND ANHYDRITE OCCUR AS DISCONTINUOUS SUBHORIZONTAL STRINGERS; BASAL CONTACT SHARP, IRREGULAR.
1459	1950		
1454	1955		
1449	1960		
		MB 134	ANHYDRITE, FINELY CRYSTALLINE, GRAY ALTERNATING WITH DARK GRAY, THINLY LAMINATED; LOCALLY CONTAINS PODS OF HALITE AND HALITE-RICH LAMINAE; BASAL CONTACT SHARP, CONFORMABLE.
1444	1965	MB 134	ANHYDRITE, FINELY CRYSTALLINE, GRAY; HALITIC, OCCURS AS ABUNDANT HALITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS ALIGNED PARALLEL TO BEDDING, 1/8" TO 2" HIGH, MAJORITY ORIENTED VERTICALLY; LOCALLY, ANHYDRITE IS FREE OF PSEUDOMORPHS AND THINLY LAMINATED, LAMINAE ALTERNATE FROM LIGHT TO DARK GRAY; HALITE PSEUDOMORPHS ABSENT BETWEEN 1966.6' AND 1967.5'; BASAL CONTACT GRADATIONAL TO DIFFUSE.
1439	1970	MB 134	ANHYDRITE, FINELY CRYSTALLINE, ALTERNATING LIGHT AND DARK GRAY, THINLY LAMINATED TO LAMINATED; LAMINAE OFTEN CONTAIN INSIPIENT ENTROLITHIC STRUCTURES AND ANHYDRITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS; UNDERLAIN BY 0.4' TO 0.5' THICK BED OF MICROLAMINATED TO THINLY LAMINATED GRAY CLAYSTONE CONTAINING SUBHORIZONTAL BIFURCATING 0 TO 1" THICK HALITE-FILLED FRACTURES; BASAL CONTACT SHARP, IRREGULAR, UNDULATORY, DISCONFORMABLE.
1434	1975		

EXHAUST SHAFT

LITHOLOGIC LOG

PRELIMINARY ELEV. (FT MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1434	1975		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR, STRUCTURELESS; MODERATELY ARGILLACEOUS, GRAY, CONTENT DECREASES WITH DEPTH, OCCURS AS DISSEMINATED RANDOMLY-ORIENTED DISCONTINUOUS STRINGERS AND BLEBS; TRACE POLYHALITE BLEBS; CONTAINS INTER-UNIT DISSOLUTION PITS FILLED WITH RELATIVELY PURE HALITE; FREE OF GRAY CLAY FROM 1985.0' TO 1989.0'; THIN (<1/8") SUBHORIZONTAL STRINGERS OF ANHYDRITE OCCUR BELOW 1986.0'; IRREGULAR BED OF HALITIC ANHYDRITE IN LOWER 1" TO 3" OVERLIES HIGHLY UNDULATORY BASAL CONTACT, CONTACT MARKED BY GRAY CLAYSTONE IN CHANNEL TROUGHS, CONTACT EROSIONALLY TERMINATES UNDERLYING UNIT AT THE WEST SIDE OF SHAFT; BASAL CONTACT SHARP.
1429	1980		
1424	1985		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE; CONTAINS DISCONTINUOUS SUBHORIZONTAL STRINGERS OF ANHYDRITE, <1/4" THICK; UNIT THICKNESS VARIES FROM 0 TO 1.5' AS IT IS EROSIONALLY TERMINATED AT UPPER CONTACT; SHAPE LENTICULAR (0 TO 1.5' X 6'); BASAL CONTACT SHARP.
1419	1990	MB 135	ANHYDRITE, FINELY CRYSTALLINE, LIGHT GRAY, LOCALLY THINLY LAMINATED; CONTAINS ABUNDANT HALITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS; BASAL CONTACT SHARP, MARKED BY 1/4" TO 1/2" THICK GRAY CLAYSTONE BED.
1414	1995		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED GRAY, BANDED, SPACED 1/2" TO 4", TRACE GRAY CLAY; CONTAINS CONTINUOUS IRREGULAR SUBHORIZONTAL STRINGERS OF GRAY CLAY; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY UP TO 4".
1409	2000		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED GRAY, BANDED ON 1/2" TO 2" SCALE, SLIGHTLY ARGILLACEOUS, OCCURS AS SUBHORIZONTAL STRINGERS AND LOCAL RANDOMLY-ORIENTED STRINGERS; TRACE POLYHALITE, OCCURS AS DISSEMINATED BLEBS, CONTENT INCREASES WITH DEPTH; BASAL CONTACT SHARP.
1404	2005		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR, STRUCTURELESS; SLIGHTLY ARGILLACEOUS IN UPPER PART, CONTENT DECREASES WITH DEPTH, OCCURS AS REDDISH-BROWN RANDOMLY-ORIENTED STRINGERS; TRACE POLYHALITE, CONTENT INCREASES WITH DEPTH; BASAL CONTACT SHARP, SLIGHTLY IRREGULAR, SLIGHTLY UNDULATORY (3").
1399	2010		ARGILLACEOUS HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE; CLAY REDDISH-BROWN, CONTENT DECREASES WITH DEPTH, OCCURS AS INTERCRYSTALLINE MATRIX, GRADES TO SUBHORIZONTAL STRINGERS WITH DEPTH; HALITE OCCURS AS DISCONTINUOUS BEDS AND ALIGNED PODS; BASAL CONTACT SHARP, IRREGULAR, UNDULATORY.
1394	2015		
1389	2020		

EXHAUST SHAFT
LITHOLOGIC LOG

PRELIMINARY ELEV. (FT MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1389	2020	—	AS ABOVE
1384	2025	— X — X —	HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE, OCCURS AS IRREGULAR DISCONTINUOUS BEDS 1/2" TO 2" THICK AT TOP, BECOMES MASSIVE WITH DEPTH; VERY ARGILLACEOUS AT TOP, CONTENT DECREASES WITH DEPTH, OCCURS AS INTERCRYSTALLINE MATRIX; ABUNDANT POLYHALITE AT TOP, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS AND RARE SUBHORIZONTAL STRINGERS; CONTAINS ABUNDANT VERTICALLY-ORIENTED ELONGATE ZONES OF PURE AND POLYHALITIC HALITE WITH IRREGULAR EDGES, 1.0' TO 2.0' ACROSS, UP TO 3.0' DEEP; BASAL CONTACT EXHIBITS CHANNEL FORM, WITH HIGH SIDE OCCURRING ON WEST SIDE OF SHAFT AT 2032.0' AND LOW POINT OCCURRING ON EAST SIDE OF SHAFT AT 2036.3'; CHANNEL FILL CONSISTS OF HALITE AND POLYHALITIC HALITE BELOW 2032.0', A 0.5' THICK BED OF FINELY CRYSTALLINE ANHYDRITE OCCURS AT 2032.3' AND TERMINATES AGAINST UNDERLYING UNIT AT WEST SIDE OF SHAFT, FILL CONTAINS ABUNDANT SUBHORIZONTAL STRINGERS OF ANHYDRITE THAT TERMINATE AGAINST UNDERLYING UNIT AT WEST SIDE OF SHAFT; BASAL CONTACT SHARP.
1379	2030	— X	
1374	2035	—	
1369	2040	MB 136	POLYHALITE, FINELY CRYSTALLINE, REDDISH-ORANGE, STRUCTURELESS EXCEPT FOR LOCAL ZONES CONTAINING HALITE PSEUDOMORPHS AFTER GYPSUM SWALLOWTAIL CRYSTALS AND LOCAL ZONES WITH NODULAR STRUCTURE, LOCALLY THINLY LAMINATED NEAR BASE; UPPER 2.0' ON WEST SIDE OF SHAFT CONSISTS OF THINLY LAMINATED ANHYDRITE; BASAL CONTACT GRADATIONAL, UNDULATORY.
1364	2045	MB 136	ANHYDRITE, FINELY CRYSTALLINE, ALTERNATING LIGHT AND DARK GRAY, THINLY LAMINATED, LAMINAE UNDULATE SLIGHTLY; 0.3' ABOVE LOWER CONTACT, 0 TO 1" THICK DISCONTINUOUS PURE HALITE BED OCCURS, CONTAINS ONE DISCONTINUOUS STRINGER OF POLYHALITE; BASAL CONTACT SHARP.
		—	HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; SLIGHTLY ARGILLACEOUS, CONTENT DECREASES WITH DEPTH, OCCURS AS REDDISH-BROWN TO GRAY RANDOMLY-ORIENTED TO SUBHORIZONTAL STRINGERS WHICH BECOME SUBHORIZONTAL WITH DEPTH; TRACE POLYHALITE, OCCURS AS DISSEMINATED BLEBS AND SUBHORIZONTAL STRINGERS NEAR BASE; 1" TO 2" THICK BED OF ANHYDRITE (NORTHWEST SIDE OF SHAFT) AND POLYHALITE (SOUTHEAST SIDE OF SHAFT) AT 2059.3'; SUBHORIZONTAL STRINGERS OF ANHYDRITE IN LOWER 5.0'; NO CLAY OCCURS BELOW 2059.3'; BASAL CONTACT SHARP, UNDULATORY TO 0.4', DISCONFORMABLE.
1359	2050	—	
		X —	
1354	2055	—	
		\ — \	HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR TO TINTED ORANGE AND GRAY, THINLY BEDDED TO GRAY ARGILLACEOUS HALITE WITH CLAY-FREE HALITE, BEDDING TERMINATED AT UPPER CONTACT; TRACE POLYHALITE AT TOP, CONTENT INCREASES WITH DEPTH, OCCURS AS DISSEMINATED BLEBS; ARGILLACEOUS, CONTENT DECREASES WITH DEPTH, GRAY AT TOP GRADING TO GRAYISH-BROWN WITH DEPTH, OCCURS AS DISCONTINUOUS RANDOMLY-ORIENTED STRINGERS AND LOCAL ZONES OF INTERCRYSTALLINE MATERIAL, BECOMES REDDISH-BROWN BELOW 2070.2', CONTENT DECREASES ABRUPTLY BELOW 2079.0', BASAL 2.0' SLIGHTLY ARGILLACEOUS; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY, IRREGULAR, MARKED BY DISCONTINUOUS IRREGULAR 2" THICK BED OF HALITIC ANHYDRITE.
1349	2060	MB 137	
		— X	
1344	2065	— X	

EXHAUST SHAFT

LITHOLOGIC LOG

PRELIMINARY ELEV. (FT MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1344	2065		AS ABOVE
1339	2070		
1334	2075		
1329	2080		
1324	2085		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; TRACE POLYHALITE, OCCURS AS DISSEMINATED BLEBS; ARGILLACEOUS IN UPPER 1.2', OCCURS AS REDDISH-BROWN DISCONTINUOUS SUBHORIZONTAL STRINGERS AND MASSES OF HALITIC MUDSTONE, CONTENT DECREASES WITH DEPTH; BASAL CONTACT SHARP.
1319	2090		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; TRACE DISSEMINATED BLEBS AND RANDOMLY-ORIENTED STRINGERS OF POLYHALITE; ARGILLACEOUS IN UPPER 1.0', CONTENT DECREASES WITH DEPTH; LOCAL ANHYDRITE STRINGERS OCCUR NEAR BASAL CONTACT; BASAL CONTACT SHARP, SLIGHTLY IRREGULAR AND UNDULATORY.
1314	2095		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; RARE DISSEMINATED POLYHALITE BLEBS; ARGILLACEOUS AT TOP, CONTENT DECREASES WITH DEPTH EXCEPT FOR LOCAL INCREASES, CONTENT DECREASES ABRUPTLY BELOW 2101.5', OCCURS AS DISCONTINUOUS SUBHORIZONTAL STRINGERS; THIN DISCONTINUOUS STRINGERS OF ANHYDRITE AND POLYHALITE OCCUR IN LOWER 2.0'; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY.
1309	2100		
1304	2105	MB 138	ANHYDRITE, FINELY CRYSTALLINE, ALTERNATING LIGHT AND DARK GRAY, THINLY LAMINATED; UNDERLAIN BY 1/2" THICK GRAYISH-BROWN CLAYSTONE BED; BASAL CONTACT SHARP.
1299	2110		HALITE, FINELY TO COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE, BEDDED AT TOP WITH REDDISH-BROWN ARGILLACEOUS HALITE, SPACED 1" TO 2"; ARGILLACEOUS, CONTENT DECREASES WITH DEPTH, OCCURS AS INTERCRYSTALLINE MATRIX IN ARGILLACEOUS HALITE BANDS AT TOP AND RANDOMLY-ORIENTED STRINGERS WITH DEPTH, CONTENT DECREASES ABRUPTLY BELOW 2111.3'; RARE DISSEMINATED BLEBS OF POLYHALITE; BASAL CONTACT DIFFUSE.

EXHAUST SHAFT
LITHOLOGIC LOG
SHEET 48 OF 49

PRELIMINARY ELEV. (FT MSL)	PRELIMINARY DEPTH (FT.)	STRATIGRAPHIC COLUMN	REMARKS
1299	2110		AS ABOVE
1294	2115		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; RARE STRINGERS OF CLAY IN UPPER 1.7'; TRACE SUBHORIZONTAL TO HORIZONTAL CONTINUOUS STRINGERS OF ANHYDRITE BELOW 2117.0'; BASAL CONTACT SHARP.
1289	2120		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO TINTED ORANGE, RARE RANDOMLY-ORIENTED CLAY STRINGERS TO 2125.2'; UPPER CONTACT MARKED BY ANHYDRITIC CLAYSTONE CONTAINING DISPLACIVE HALITE CRYSTALS (<1/4"); TRACE POLYHALITE BLEBS; ANHYDRITE STRINGERS OCCUR BETWEEN 2128.1' AND 2128.5'; BASAL CONTACT SHARP, SLIGHTLY UNDULATORY, IRREGULAR.
1284	2125		
1279	2130		ANHYDRITE (A), FINELY CRYSTALLINE, LIGHT GRAY, THINLY LAMINATED, LAMINAE SLIGHTLY CONTORTED; LOCALLY CONTAINS SMALL HALITE CRYSTALS (<1/16"); BASAL CONTACT SHARP, SLIGHTLY UNDULATORY.
			HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; RARE CLAY STRINGERS TO 2131.5'; SUBHORIZONTAL STRINGERS OF ANHYDRITE SPACED 2" TO 4" OCCUR BELOW 2134.0'; BASAL CONTACT SHARP.
1274	2135		
			ANHYDRITE (B), FINELY CRYSTALLINE, LIGHT GRAY, HINT OF THIN LAMINATIONS; HALITIC, BASAL CONTACT SHARP, IRREGULAR, SLIGHTLY UNDULATORY.
1269	2140		HALITE, MEDIUM TO COARSELY CRYSTALLINE, WHITE TO CLEAR; RARE SUBHORIZONTAL CLAY STRINGERS AT TOP, CONTENT DECREASES WITH DEPTH; VERY RARE BLEBS OF POLYHALITE; BASAL CONTACT NOT OBSERVED.
1264	2145		
	2146.4	FACILITY LEVEL	

EXHAUST SHAFT

LITHOLOGIC LOG

APPENDIX G

TEST ROOMS
GEOLOGIC MAPS AND SECTIONS

CONTENTS

Figure No.	Title/Description
G-1	Test Room 1 - Instrument Array Geologic Strip Map
G-2	Test Room 2 - Instrument Array Geologic Strip Map
G-3	Test Room 3 - Instrument Array Geologic Strip Map
G-4	Test Room 4 - Instrument Array Geologic Strip Map
G-5	Section Through Test Room 1
G-6	Section Through Test Room 2
G-7	Section Through Test Room 3
G-8	Section Through Test Room 4
G-9	Room T Large Diameter Drill Hole Location Plan
G-10	Geologic Map of Drill Hole TV-01
G-11	Geologic Map of Drill Hole TV-02
G-12	Geologic Map of Drill Hole TV-03
G-13	Geologic Map of Drill Hole TV-04
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G-30	Geologic Map of Drill Hole TV-21
G-31	Geologic Map of Drill Hole TV-22
G-32	Section A Through Room T
G-33	Section B Through Room T
G-34	Geologic Map of Drill Hole P4X-84

The following descriptions pertain to the geologic map units shown on Figures G-1 through G-4:

UNIT DESCRIPTIONS

UNIT 6[1] Halite: colorless with grayish orange-pink (1 OR 8/2)[2] tint; transparent to translucent; coarsely crystalline; trace of dispersed polyhalite; unit extends into the roof; lower contact with Unit 5 is gradational and/or diffuse.

UNIT 5 Halite: colorless; transparent to translucent; coarsely crystalline; trace of bluish-white (5B 9/1) to light bluish-gray (5B 7/1) argillaceous material occurring as pods (1/2-inch diameter) and discontinuous laminations or filling interstices; lower contact with Unit 4 is generally sharp and based on prominent color change in argillaceous material (gray to red-brown) from Unit 5 to Unit 4.

UNIT 4 Argillaceous halite: colorless to moderate reddish-brown (1 OR 4/6), less frequently light bluish-gray (5B 7/1); transparent; coarsely crystalline; trace of dispersed polyhalite; trace to abundant argillaceous material (decreasing downward) consisting of clay containing a trace of silt and fine crystals of halite, occurring as discontinuous laminations in upper half of unit and interstitially in lower half; lower contact with Unit 3 is gradational and based on absence of argillaceous material in Unit 3.

UNIT 3 Halite: colorless to moderate reddish-orange (1 OR 6/6); transparent to translucent; coarsely crystalline; trace of dispersed polyhalite; polyhalite content commonly increases downward; lower contact with Unit 2 is sharp.

UNIT 2 Argillaceous halite: moderate reddish-brown (1 OR 5/5), less frequently light bluish-gray (5B 7/1); medium to coarsely crystalline; argillaceous material primarily occurs interstitially or as discontinuous laminations; lower contact with Unit 1 is generally sharp, less frequently gradational.

UNIT 1 Halite: light reddish-orange (1 OR 8/6) to moderate reddish-orange (1 OR 6/6), less frequently colorless; translucent to transparent; medium to coarsely crystalline; trace of dispersed polyhalite; lower contact with Unit 0 is sharp.

UNIT 0 Argillaceous halite: colorless to moderate reddish-orange (1 OR 6/6) and moderate reddish-brown (1 OR 4/6); medium to coarsely crystalline; trace of dispersed polyhalite; some argillaceous material occurs as discontinuous laminations and blebs or fills interstices (decreasing downward); contains finely crystalline halite; unit extends into the floor.

NOTES:

(1) Units listed in descending order from roof to floor.

(2) Alpha-numeric color designations are based on Geological Society of America Rock Color Chart.

The following legend and notes pertain to the geologic maps shown on Figures G-1 through G-4:

LEGEND:

CONTACTS

——————————— SHARP (LESS THAN 0.05 FEET)

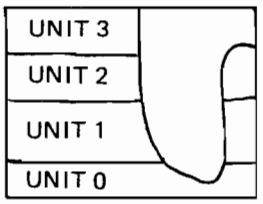
——— ——— ——— GRADATIONAL (0.05 TO 0.2 FEET)

. . . . . DIFFUSE (0.2 TO 0.5 FEET)

WEEP

DAMP AREA WITH 1/4" TO 3/4" DIAMETER KNOBS AND INCRUSTATIONS OF FINELY-CRYSTALLINE HALITE.

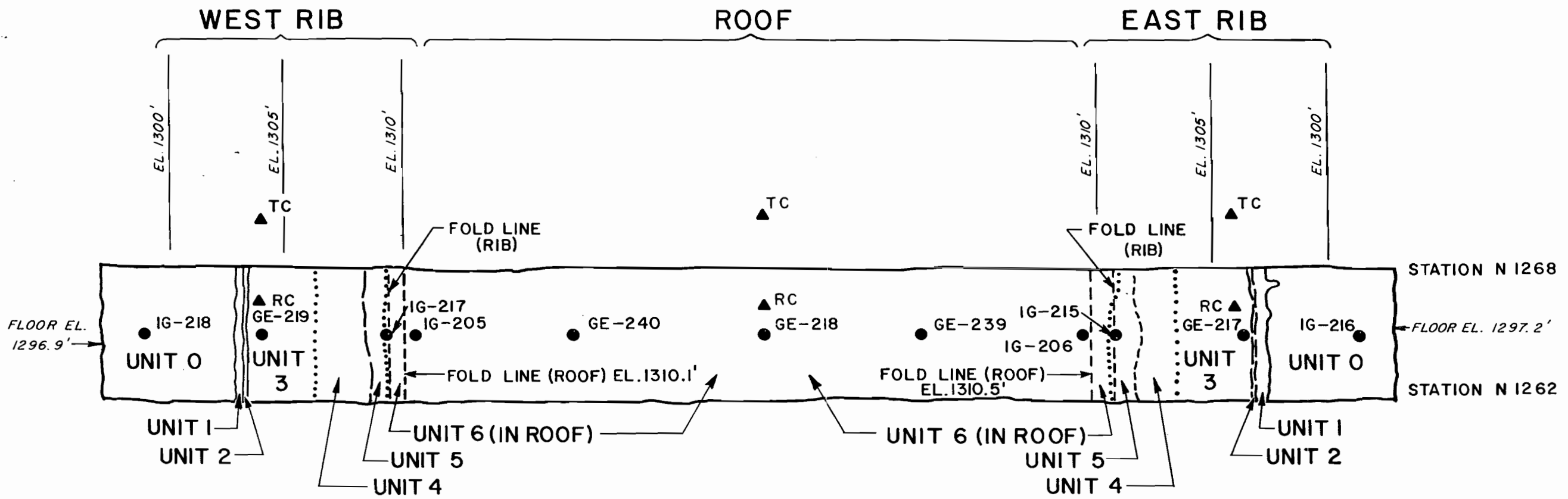
BREAKS IN BED CONTINUITY

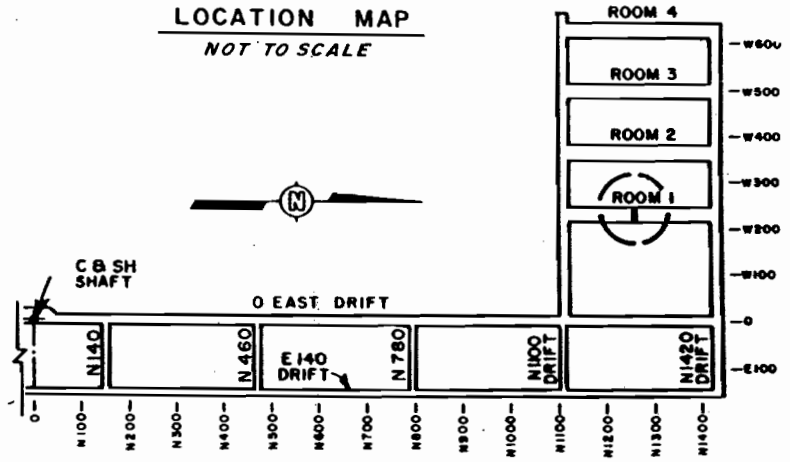


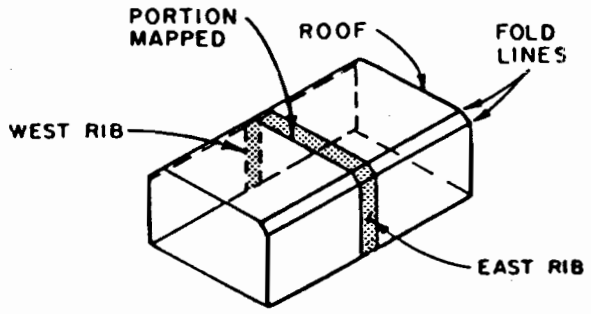
SYN- OR IMMEDIATELY POST-DEPOSITIONAL DISSOLUTION OR SCOUR CHANNELS FILLED WITH SEDIMENT FROM OVERLYING UNIT. (TYPICAL)

NOTES:

1. VERTICAL CONTROL FOR MAPPING IS MEAN SEA LEVEL (MSL) REFERENCED TO UNDERGROUND SURVEY POINTS ESTABLISHED BY CEMENTATION WEST, INC.
2. HORIZONTAL CONTROL FOR MAPPING REFERENCED TO ZERO POINT AT CENTER-LINE OF C&SH SHAFT.







SCHEMATIC SECTION

NOT TO SCALE

EXPLANATION

FOR UNIT DESCRIPTIONS, LEGEND AND NOTES SEE FRONT OF THIS APPENDIX.

● IG-217 INCLINOMETER

● GE-218 BOREHOLE EXTENSOMETER

▲ RC/TC CONVERGENCE POINTS

5 0 5 FEET

SCALE

REFERENCE:

QUARTERLY GEOTECHNICAL FIELD DATA REPORT, JULY 1983, WIPP-DOE-163.

FIGURE G-1

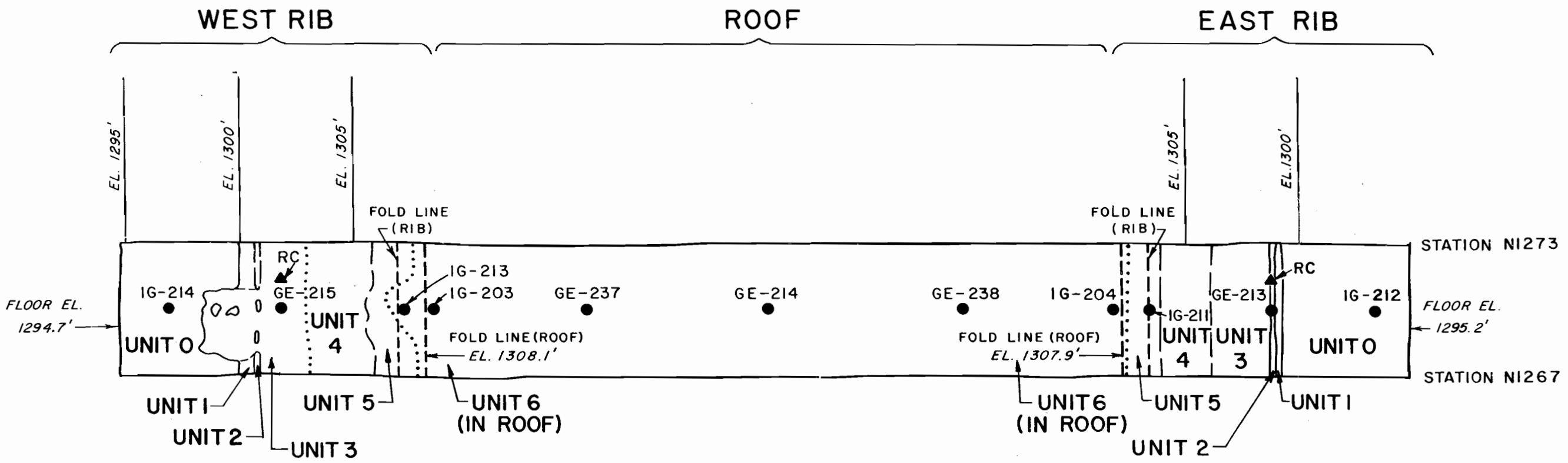
TEST ROOM 1

INSTRUMENT ARRAY GEOLOGIC STRIP MAP

DRAWN BY | CHECKED BY | APPROVED BY | DRAWING NUMBER

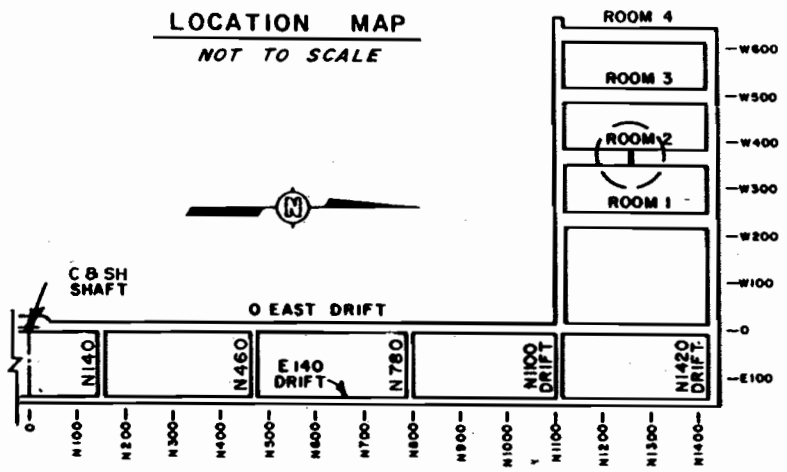
21

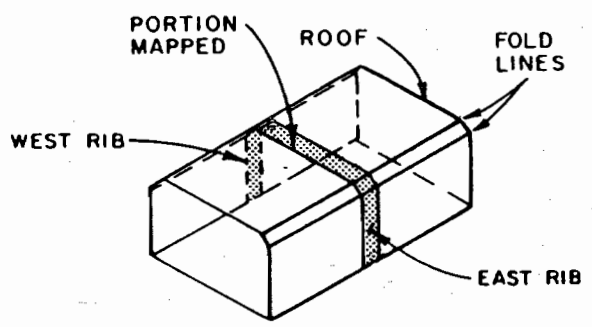
DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
[illegible] 7-28-83	[illegible] 7-28-83	BJH 7-28-83	[illegible]



LOCATION MAP

NOT TO SCALE





SCHEMATIC SECTION

NOT TO SCALE

EXPLANATION

FOR UNIT DESCRIPTIONS, LEGEND AND NOTES SEE FRONT OF THIS APPENDIX.

EAST RIB - MAPPING UNIT CONTACTS ARE OBSCURED BY GROUT TO 2' SOUTH AND 4' NORTH OF INSTRUMENT LINE. INDICATED CONTACTS ARE PROJECTED FROM THESE POINTS.

- ● IG-215 INCLINOMETER
- ● GE-214 BOREHOLE EXTENSOMETER
- ▲ RC/TC CONVERGENCE POINTS

5 0 5 FEET

SCALE

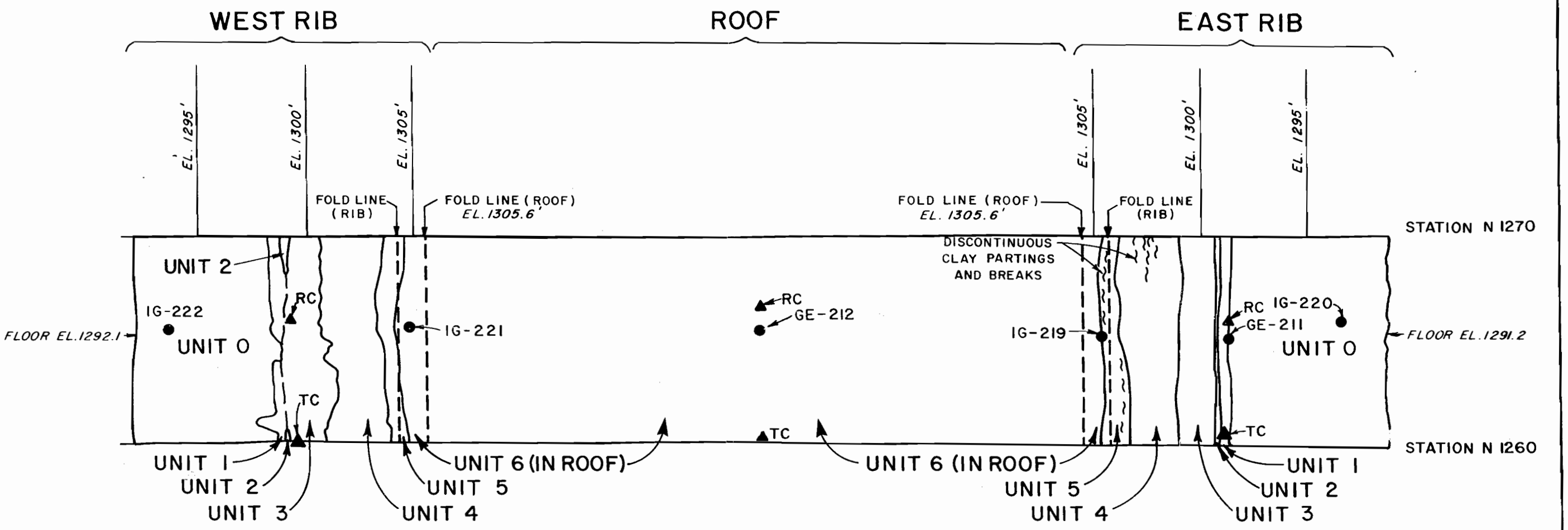
REFERENCE:

QUARTERLY GEOTECHNICAL FIELD DATA REPORT, JULY 1983, WIPP-DOE-163.

FIGURE G-2

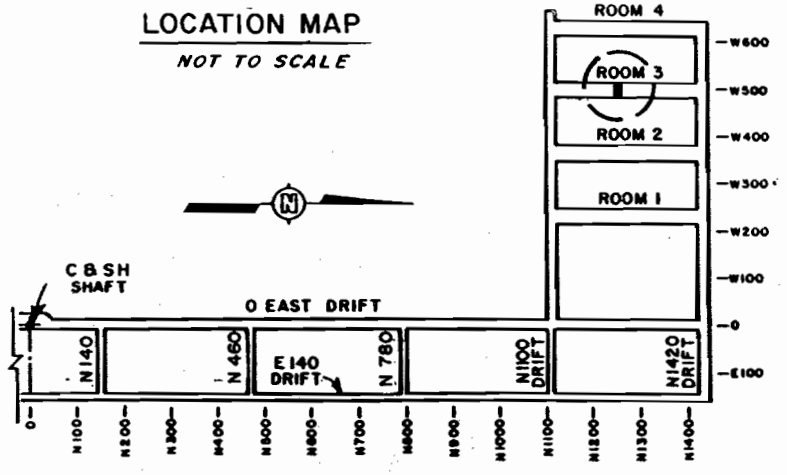
TEST ROOM 2

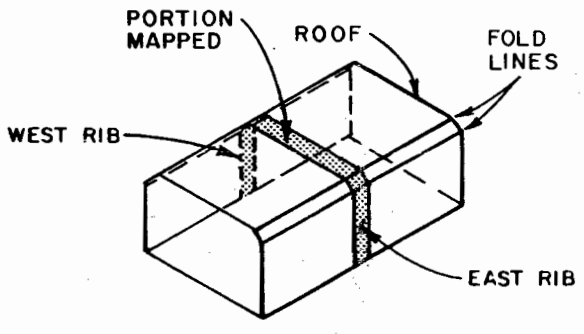
INSTRUMENT ARRAY GEOLOGIC STRIP MAP



LOCATION MAP

NOT TO SCALE





SCHEMATIC SECTION

NOT TO SCALE

EXPLANATION

FOR UNIT DESCRIPTIONS, LEGEND AND NOTES SEE FRONT OF THIS APPENDIX.

- ● IG-221 INCLINOMETER
- ● GE-211 BOREHOLE EXTENSOMETER
- ▲ RC/TC CONVERGENCE POINTS

5 0 5 FEET

SCALE

REFERENCE:

QUARTERLY GEOTECHNICAL FIELD DATA REPORT, JULY 1983, WIPP-DOE-163.

FIGURE G-3

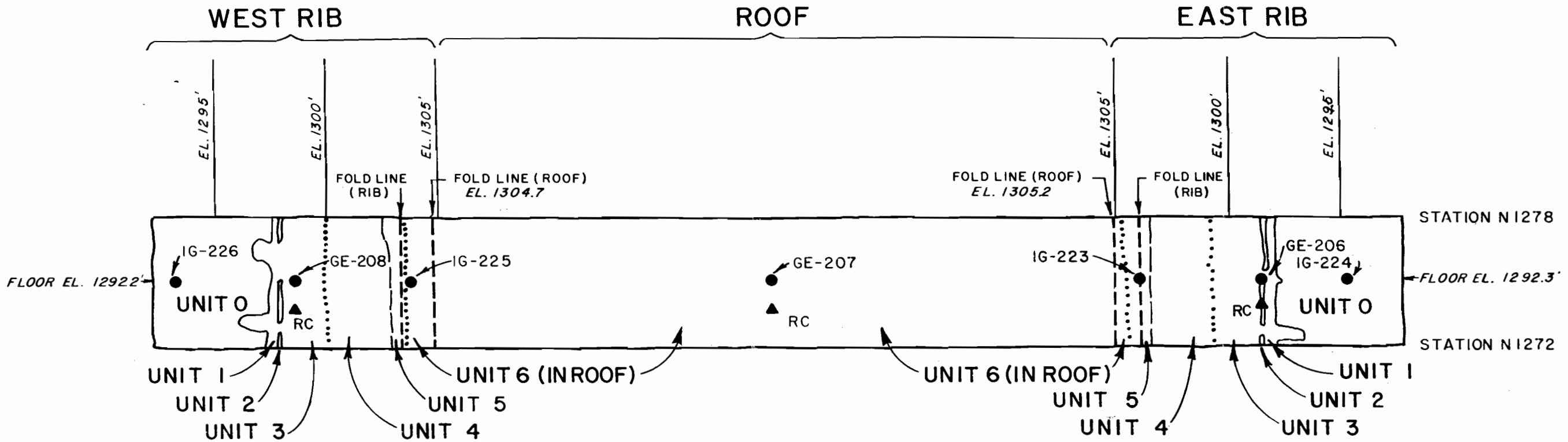
TEST ROOM 3

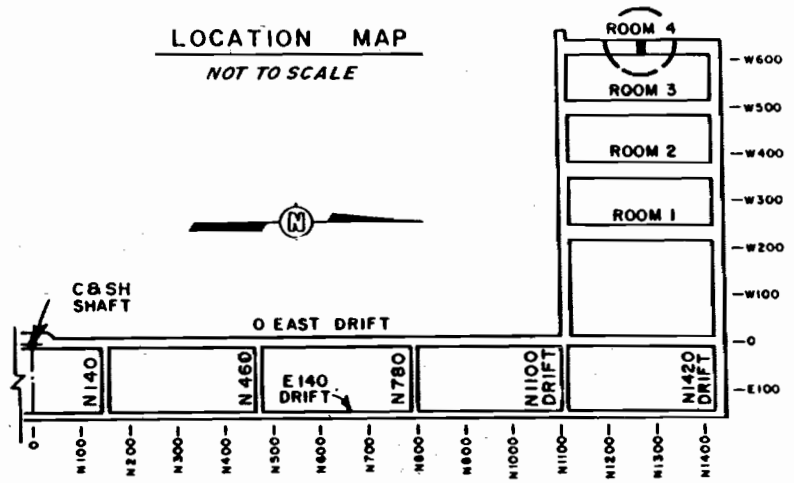
INSTRUMENT ARRAY GEOLOGIC STRIP MAP

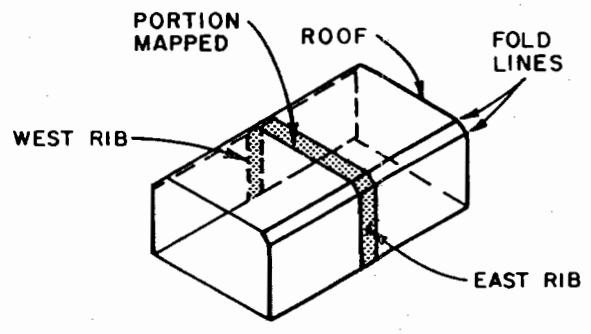
DRAWN BY 7-28-83 | CHECKED BY 7/28/83 | APPROVED BY 7-28-83 | DRAWING NUMBER

080-B

DRAWN BY		CHECKED BY		DRAWING NUMBER
L A	5/19/83	APPROVED BY		NM78-648-B







SCHEMATIC SECTION

NOT TO SCALE

EXPLANATION

FOR UNIT DESCRIPTIONS, LEGEND AND NOTES SEE FRONT OF THIS APPENDIX.

- ● IG-225 INCLINOMETER
- ● GE-207 BOREHOLE EXTENSOMETER
- ▲ RC/TC CONVERGENCE POINTS

5 0 5 FEET

SCALE

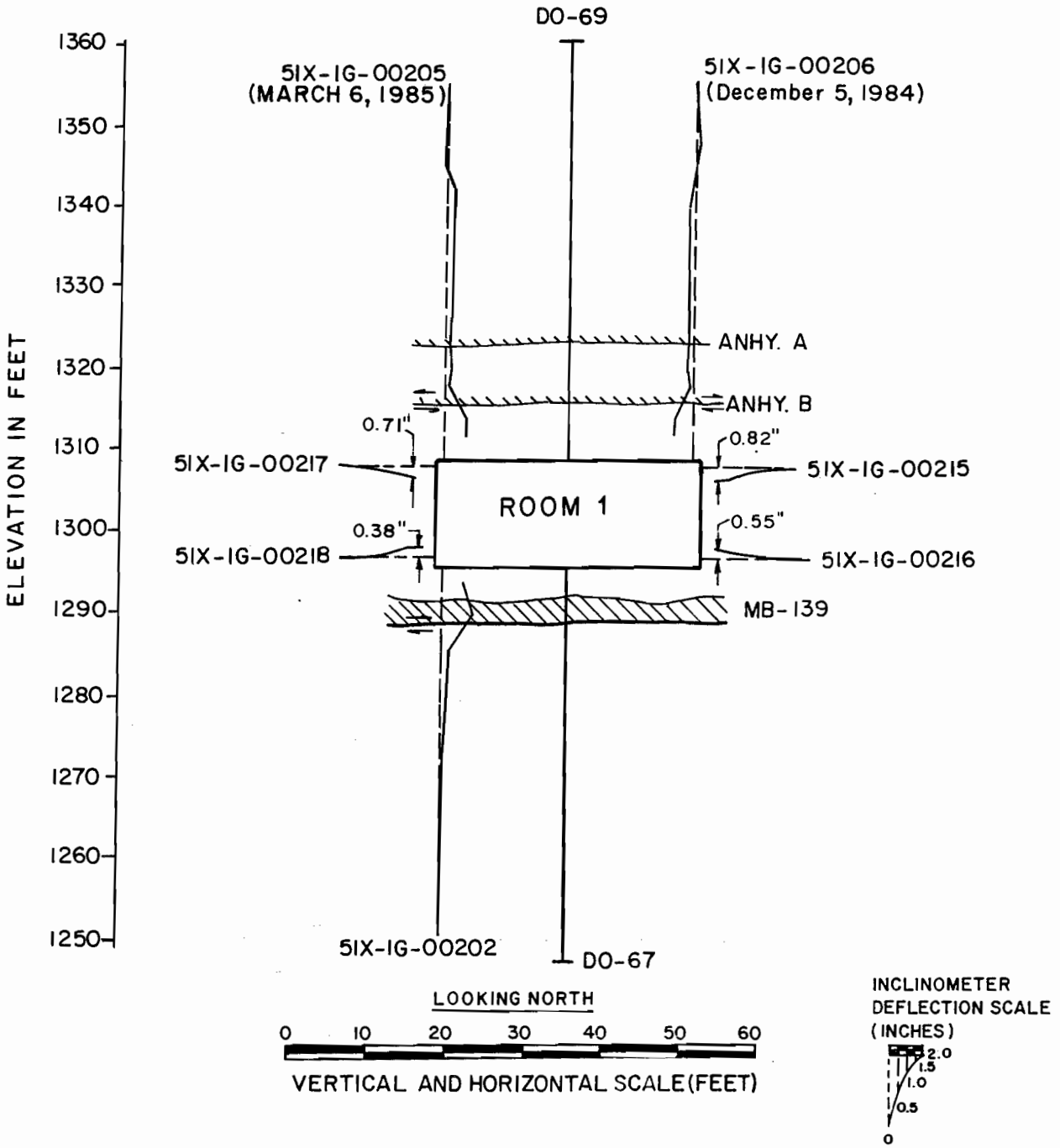
REFERENCE:

QUARTERLY GEOTECHNICAL FIELD DATA REPORT, JULY 1983, WIPP-DOE-163.

FIGURE G-4

TEST ROOM 4

INSTRUMENT ARRAY GEOLOGIC STRIP MAP



EXPLANATION

ANHYDRITE UNIT

CLAY, AT LOWER CONTACT OF MB-139.

ORIGINAL (DASHED LINE) AND DEFLECTED (SOLID LINE) POSITIONS OF INCLINOMETER, EXAGGERATED SCALE AS SHOWN.

BOREHOLE WITH OBSERVED OFFSET (NOT TO SCALE), SHOWING RELATIVE MOVEMENTS.

VERTICAL COREHOLE

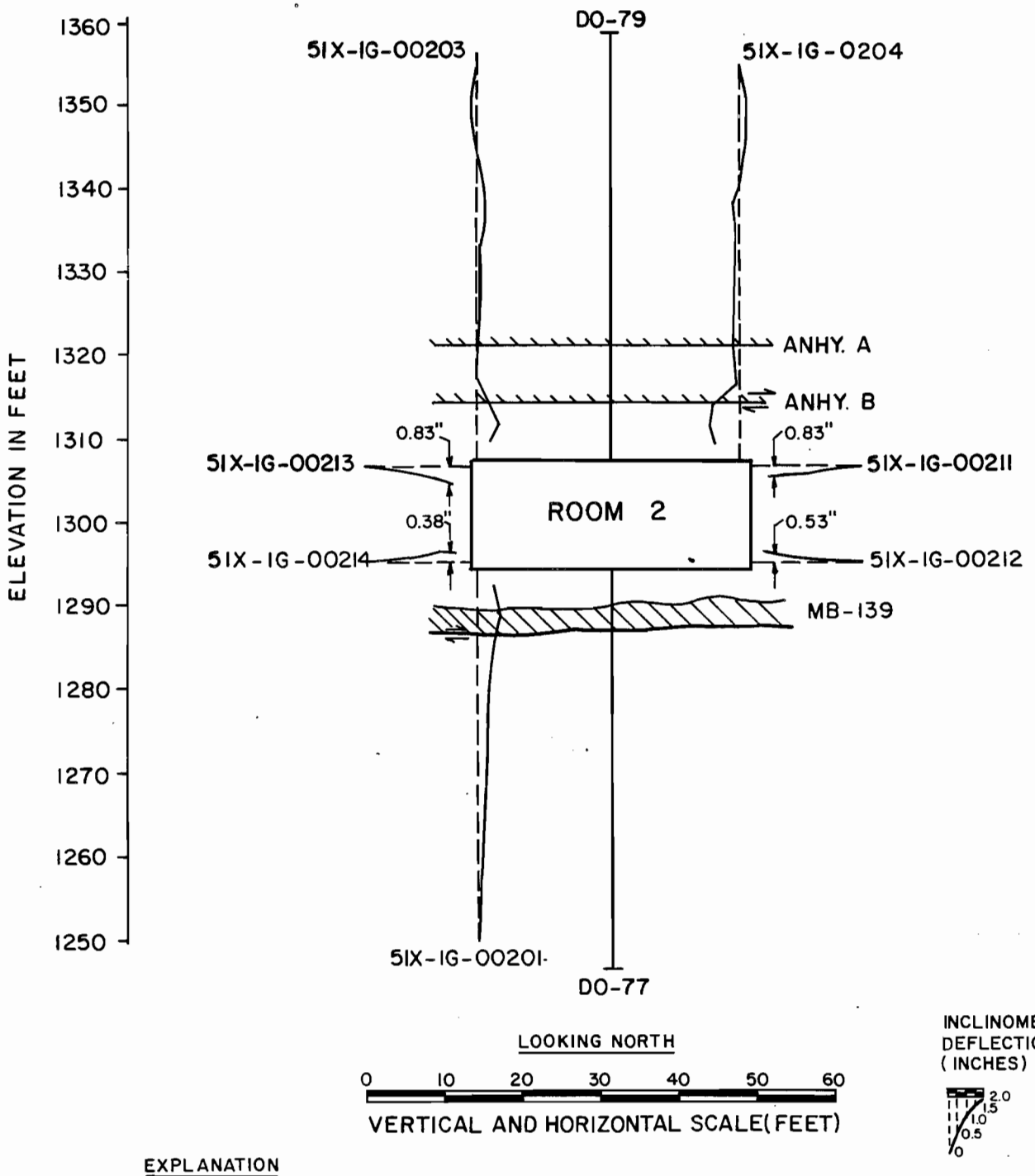
DO-67

NOTES

1. INCLINOMETER DATA AS OF AUG. 20, 1985 UNLESS NOTED OTHERWISE.
2. OFFSETS IN BOREHOLES ARE NOT DRAWN TO SCALE; ONLY RELATIVE MOVEMENTS ARE SHOWN.

FIGURE G-5

SECTION THROUGH TEST ROOM 1



EXPLANATION

ANHYDRITE UNIT

CLAY, AT LOWER CONTACT OF MB-139.

ORIGINAL (DASHED LINE) AND DEFLECTED (SOLID LINE) POSITIONS OF INCLINOMETER. EXAGGERATED SCALE AS SHOWN.

BOREHOLE WITH OBSERVED OFFSET (NOT TO SCALE), SHOWING RELATIVE MOVEMENTS.

VERTICAL COREHOLE

DO-77

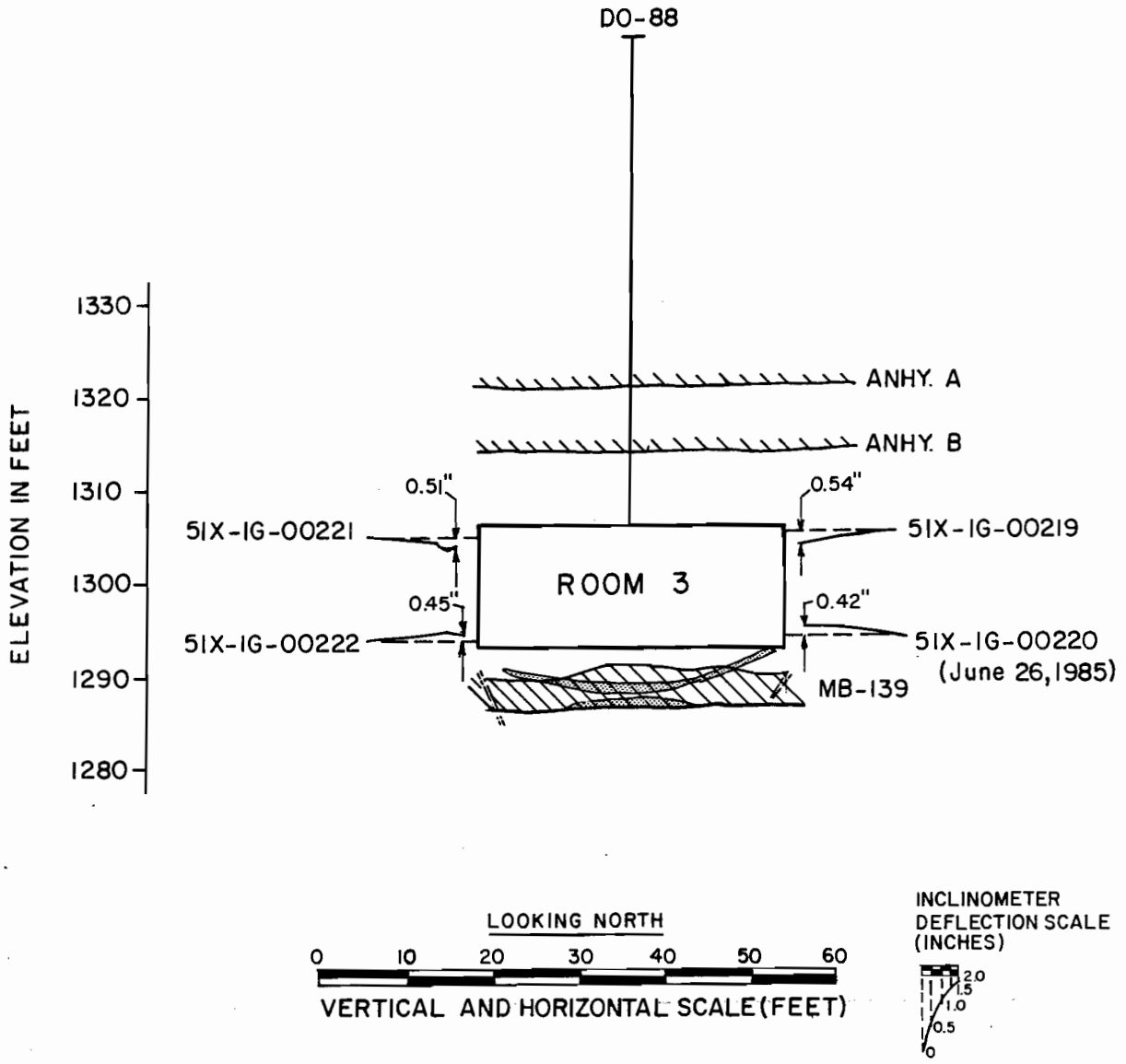
NOTES

1. INCLINOMETER DATA AS OF AUG. 20, 1985 UNLESS NOTED OTHERWISE.

2. OFFSETS IN BOREHOLES ARE NOT DRAWN TO SCALE; ONLY RELATIVE MOVEMENTS ARE SHOWN.

FIGURE G-6

SECTION THROUGH TEST ROOM 2



EXPLANATION

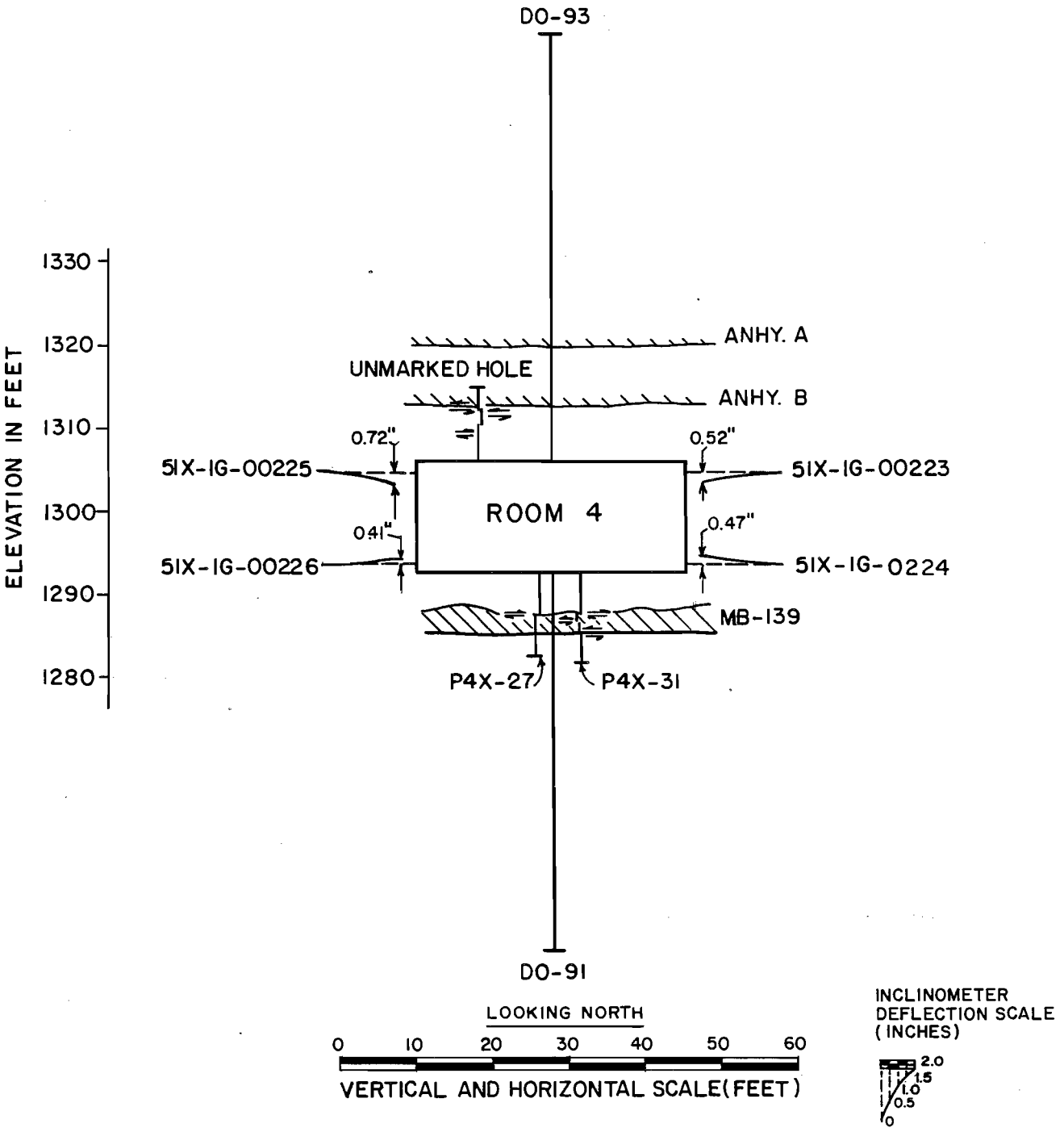
- ANHYDRITE UNIT
- FRACTURE ZONE
- CLAY, AT LOWER CONTACT OF MB-139.
- OPEN FRACTURE
- ORIGINAL (DASHED LINE) AND DEFLECTED (SOLID LINE) POSITIONS OF INCLINOMETER. EXAGGERATED SCALE AS SHOWN.
- BOREHOLE WITH OBSERVED OFFSET (NOT TO SCALE), SHOWING RELATIVE MOVEMENTS.
- DO-88 VERTICAL COREHOLE

NOTES

1. OPEN FRACTURES AND FRACTURE ZONES SHOWN BELOW ROOM 3 ARE GENERALIZED FROM GEOLOGIC MAPPING OF LARGE (36-INCH) DIAMETER BOREHOLES. INFORMATION ON FRACTURES BELOW OTHER ROOMS IS INCOMPLETE.
2. INCLINOMETER DATA AS OF AUG. 20, 1985 UNLESS NOTED OTHERWISE.
3. OFFSETS IN BOREHOLES ARE NOT DRAWN TO SCALE; ONLY RELATIVE MOVEMENTS ARE SHOWN.

FIGURE G-7

SECTION THROUGH TEST ROOM 3



EXPLANATION

- ANHYDRITE UNIT
- CLAY, AT LOWER CONTACT OF MB-139.
- ORIGINAL (DASHED LINE) AND DEFLECTED (SOLID LINE) POSITIONS OF INCLINOMETER. EXAGGERATED SCALE AS SHOWN.
- BOREHOLE WITH OBSERVED OFFSET (NOT TO SCALE), SHOWING RELATIVE MOVEMENTS.
- VERTICAL COREHOLE

DO-91

NOTES

1. INCLINOMETER DATA AS OF AUG. 20, 1985 UNLESS NOTED OTHERWISE.
2. OFFSETS IN BOREHOLES ARE NOT DRAWN TO SCALE; ONLY RELATIVE MOVEMENTS ARE SHOWN.

FIGURE G-8

SECTION THROUGH TEST ROOM 4

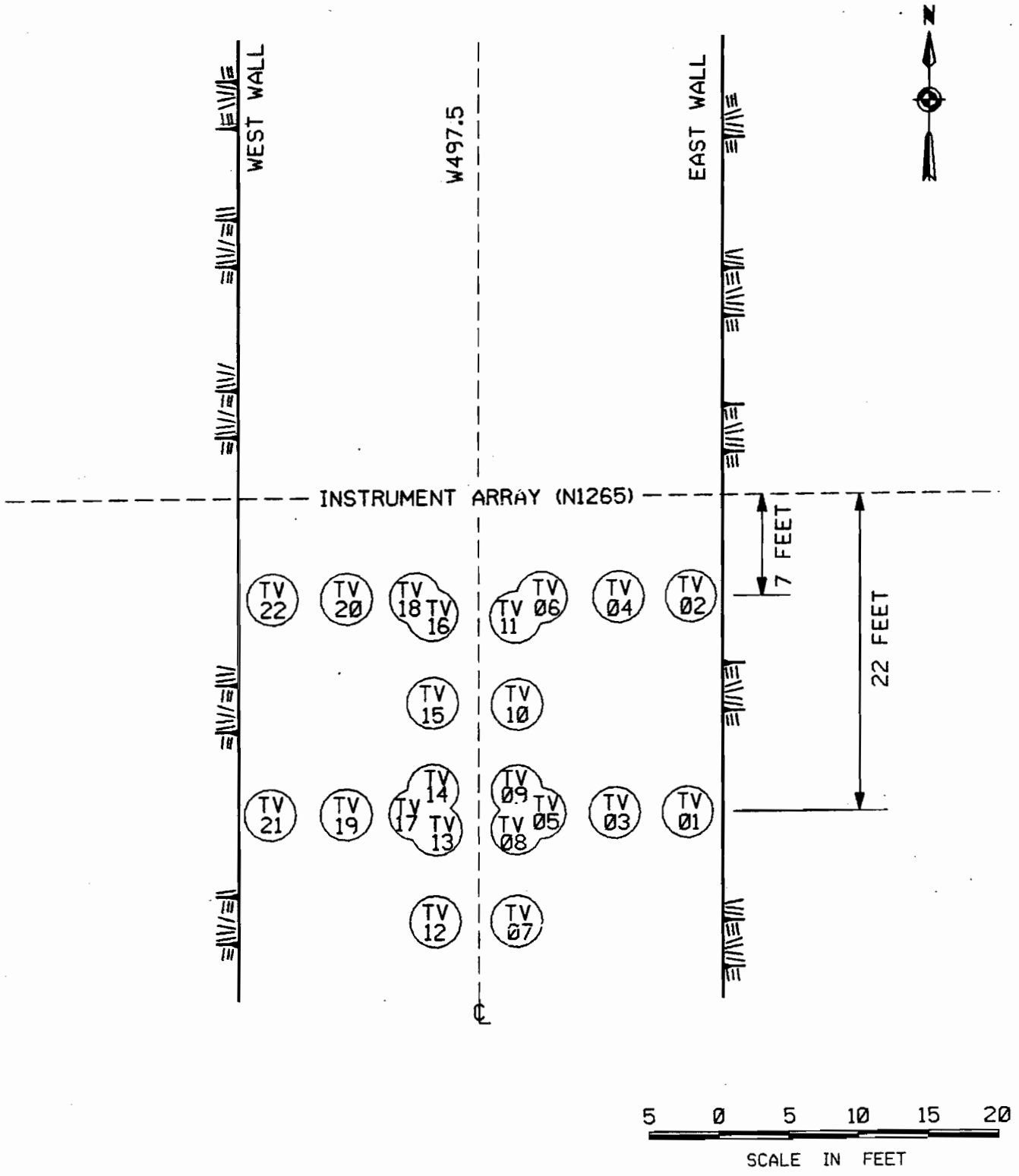
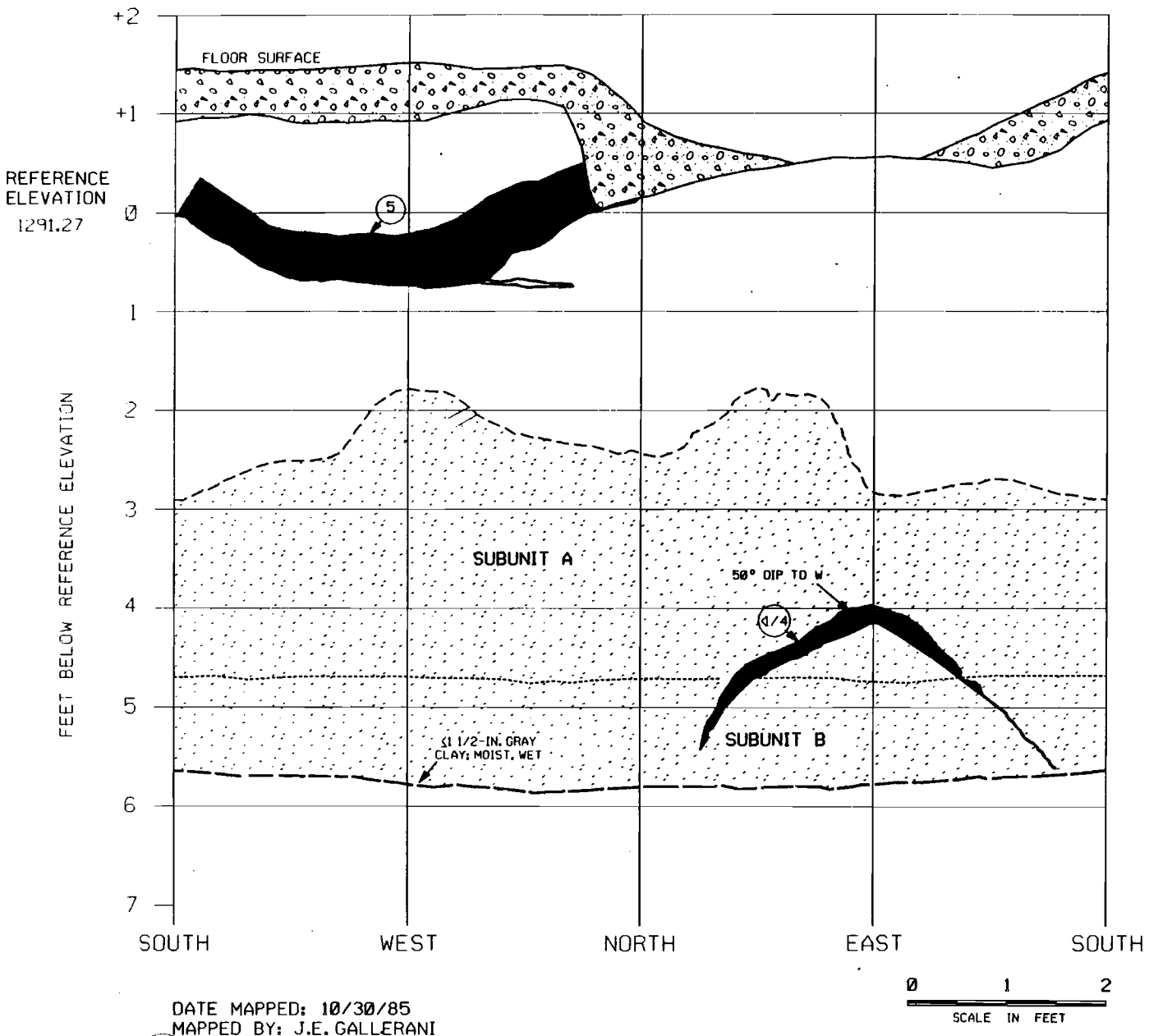


FIGURE G-9

ROOM T
LARGE DIAMETER DRILL HOLES
LOCATION PLAN



DATE MAPPED: 10/30/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

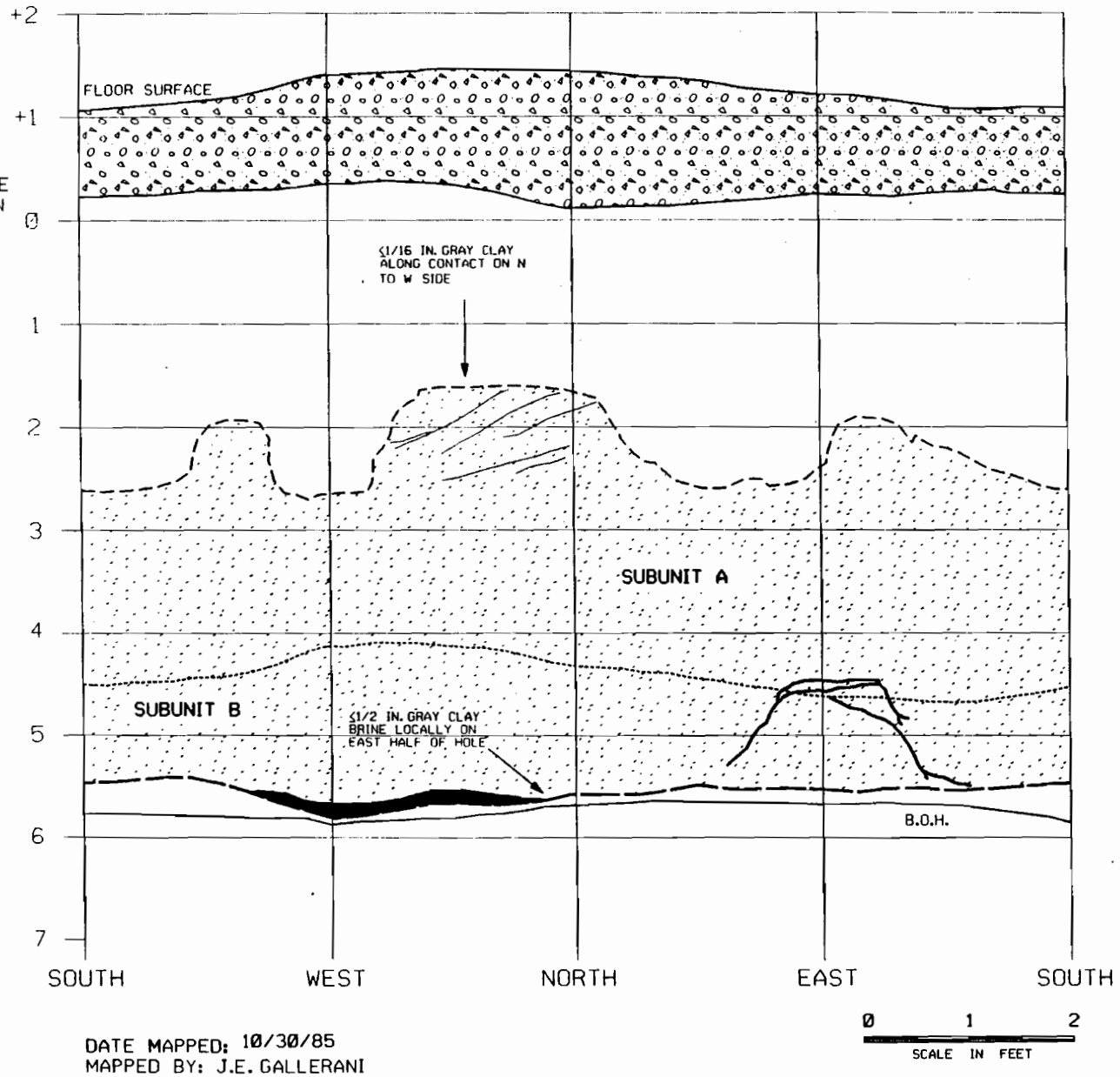
- MINEO SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E (LOWER CONTACT OF MB-139)
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY OISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-10

GEOLOGIC MAP OF DRILL HOLE TV-01



DATE MAPPED: 10/30/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

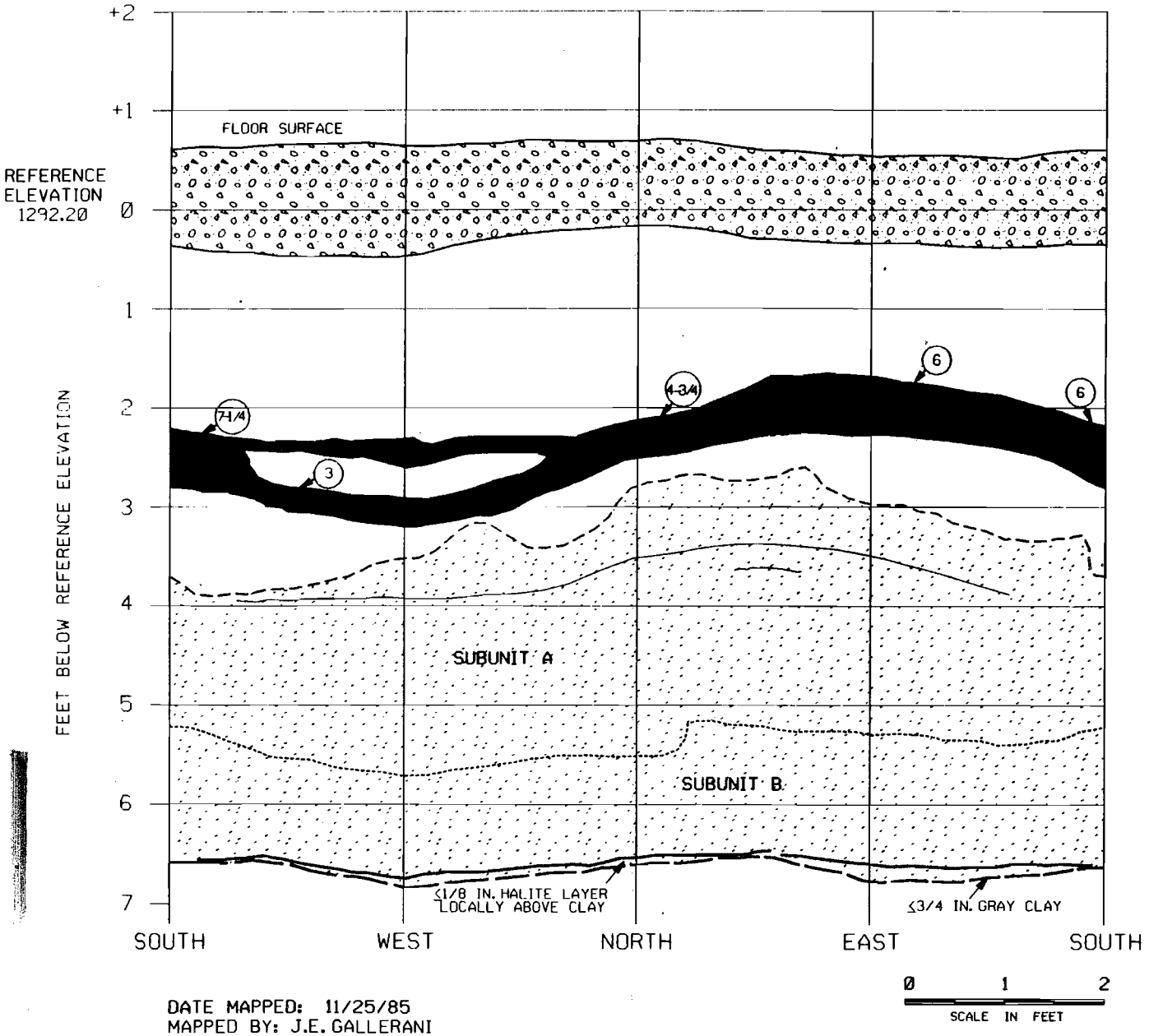
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E (LOWER CONTACT OF MB-139)
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-11

GEOLOGIC MAP OF DRILL HOLE TV-02



DATE MAPPED: 11/25/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

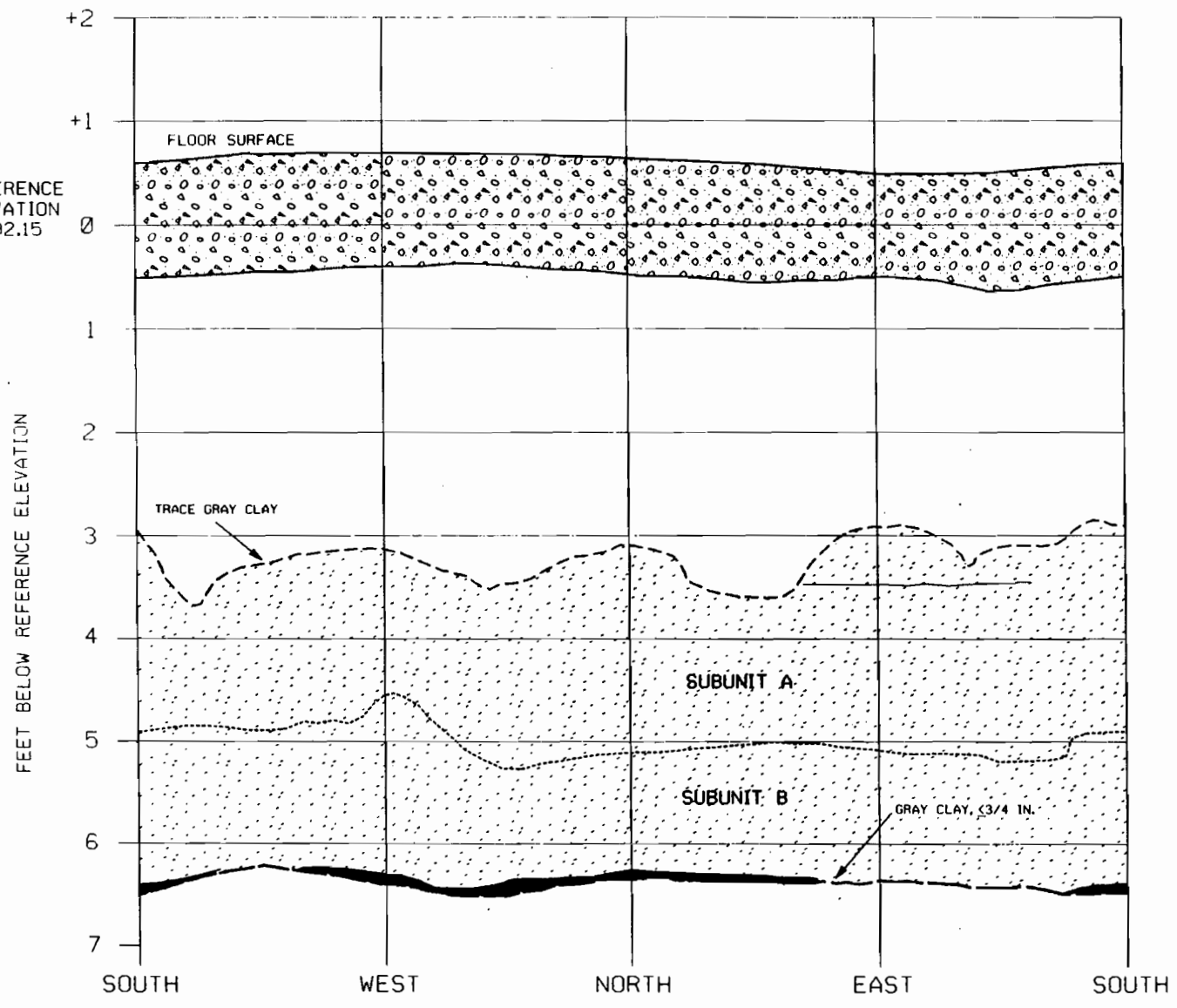
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E (LOWER CONTACT OF MB-139)
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-12

GEOLOGIC MAP OF DRILL HOLE TV-03



EXPLANATION

- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E (LOWER CONTACT OF MB-139)
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

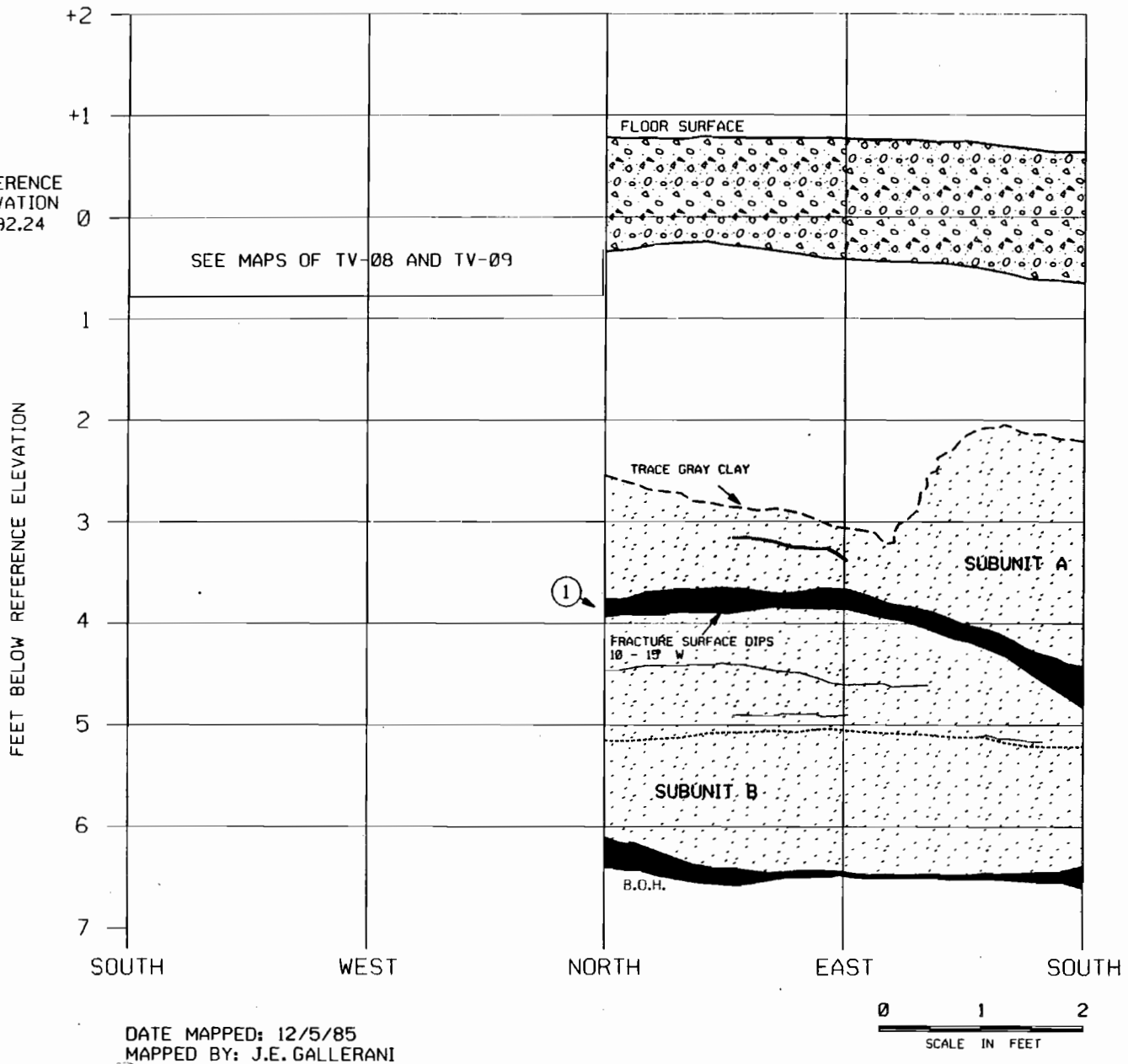
1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

0 1 2
SCALE IN FEET

DATE MAPPED: 11/20/85
MAPPED BY: J.E. GALLERANI

FIGURE G-13

GEOLOGIC MAP OF DRILL HOLE TV-04



DATE MAPPED: 12/5/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

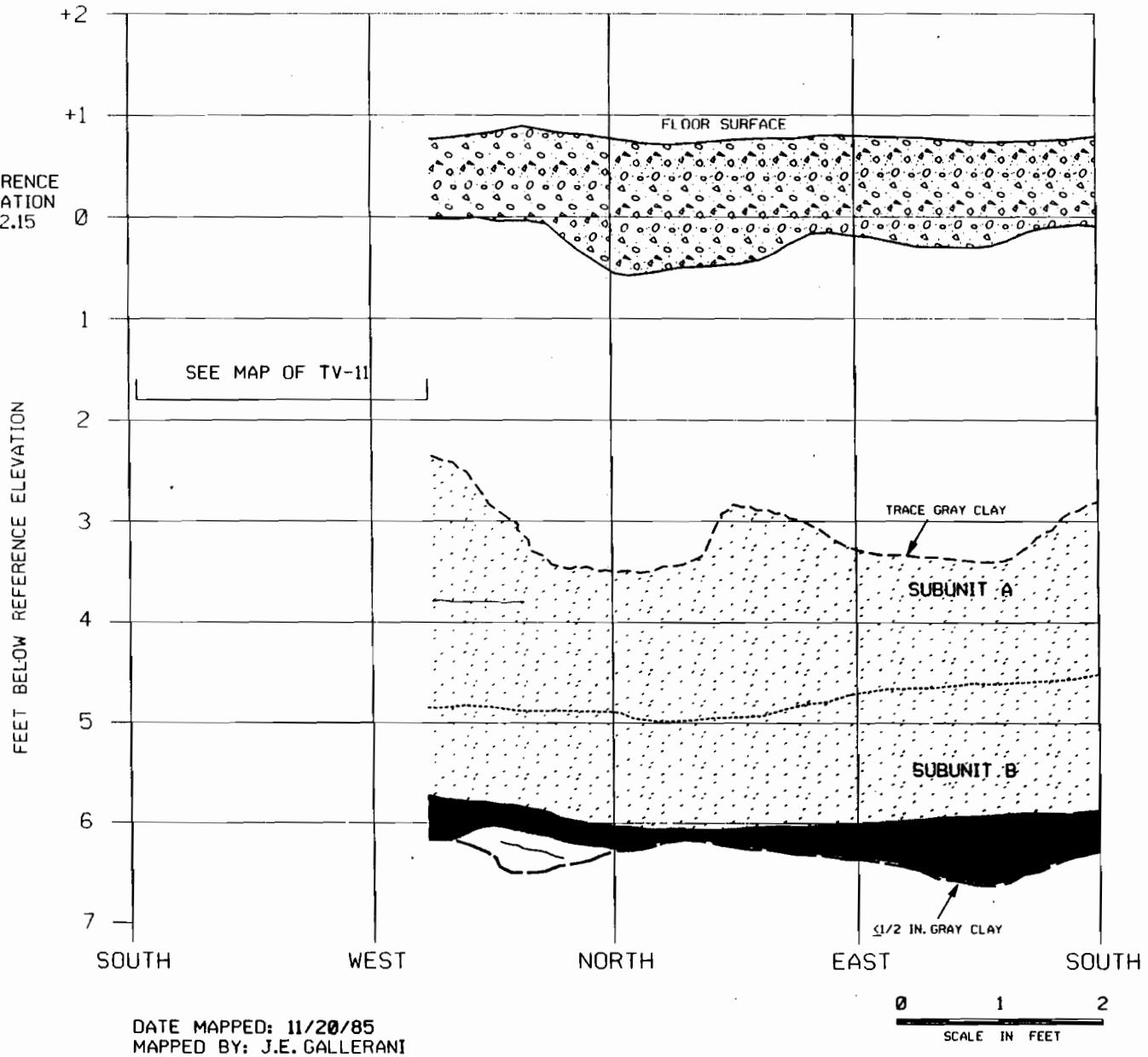
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E (LOWER CONTACT OF MB-139)
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-14

GEOLOGIC MAP OF DRILL HOLE TV-05



DATE MAPPED: 11/20/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E (LOWER CONTACT OF MB-139)
- FRACTURE TRACE

  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE

  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE

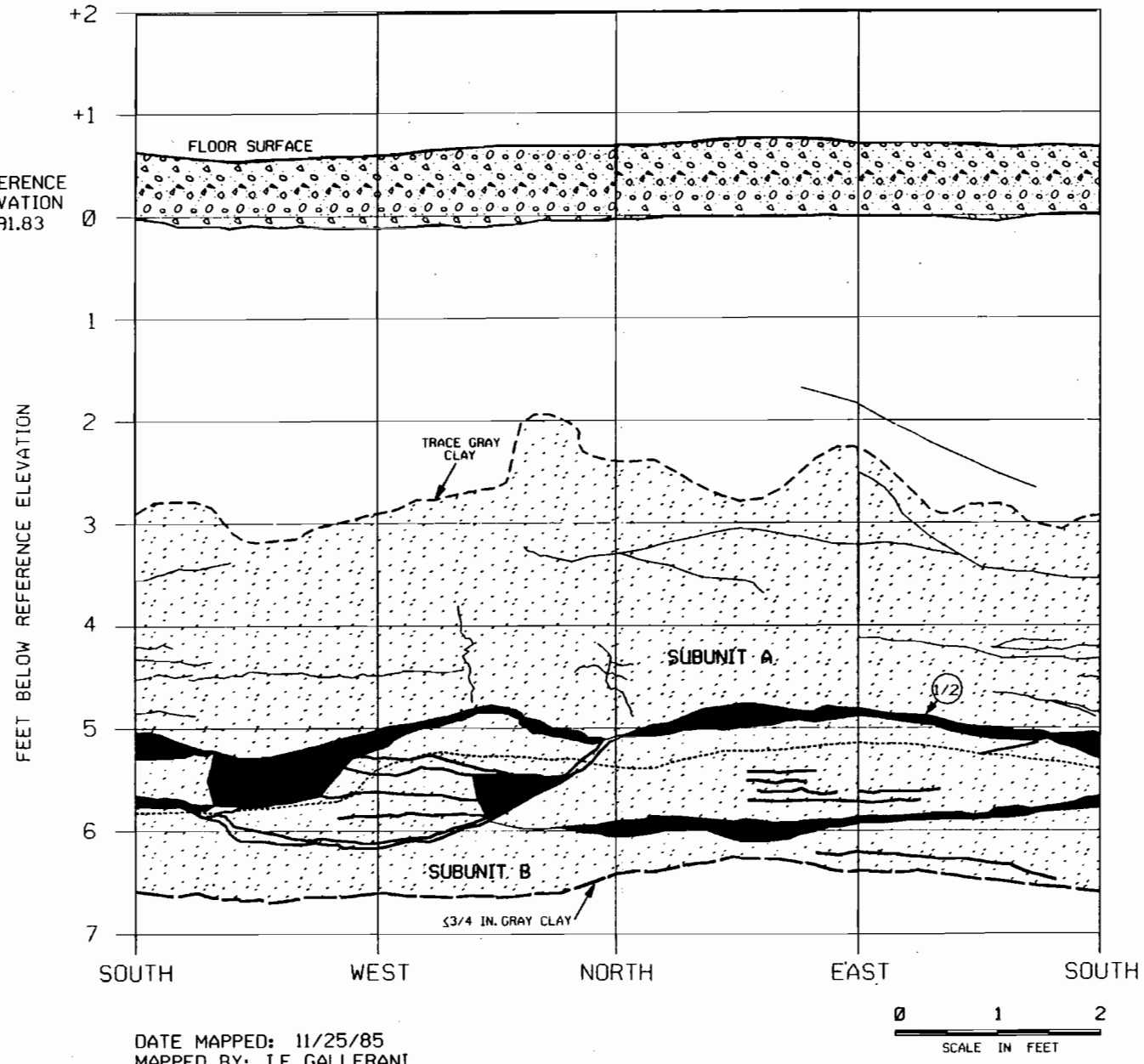
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.D.H.) COINCIDES WITH CLAY E.

FIGURE G-15

GEOLOGIC MAP OF DRILL HOLE TV-06



DATE MAPPED: 11/25/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

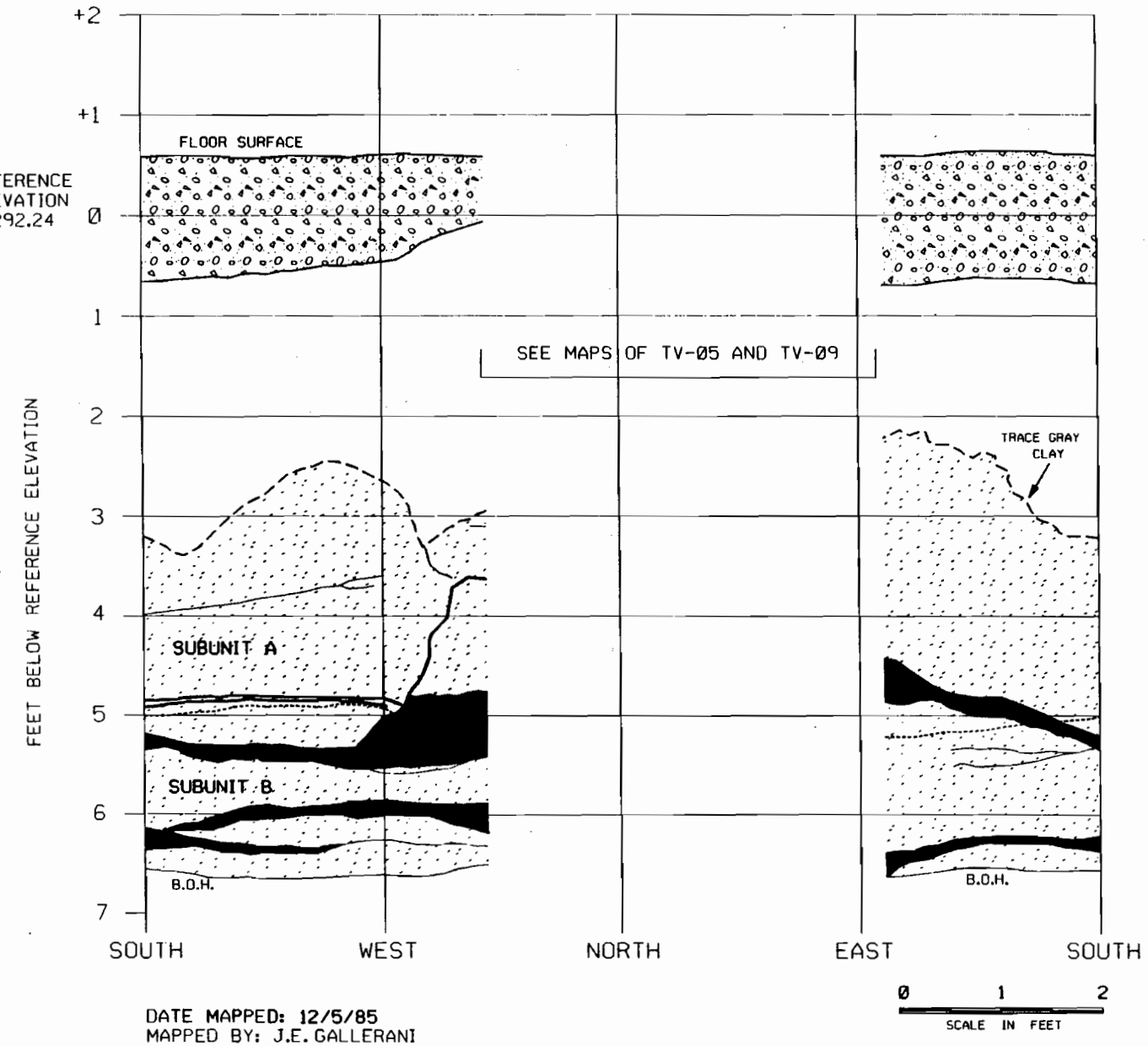
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E (LOWER CONTACT OF MB-139)
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-16

GEOLOGIC MAP OF DRILL HOLE TV-07



EXPLANATION

- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E (LOWER CONTACT OF MB-139)
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

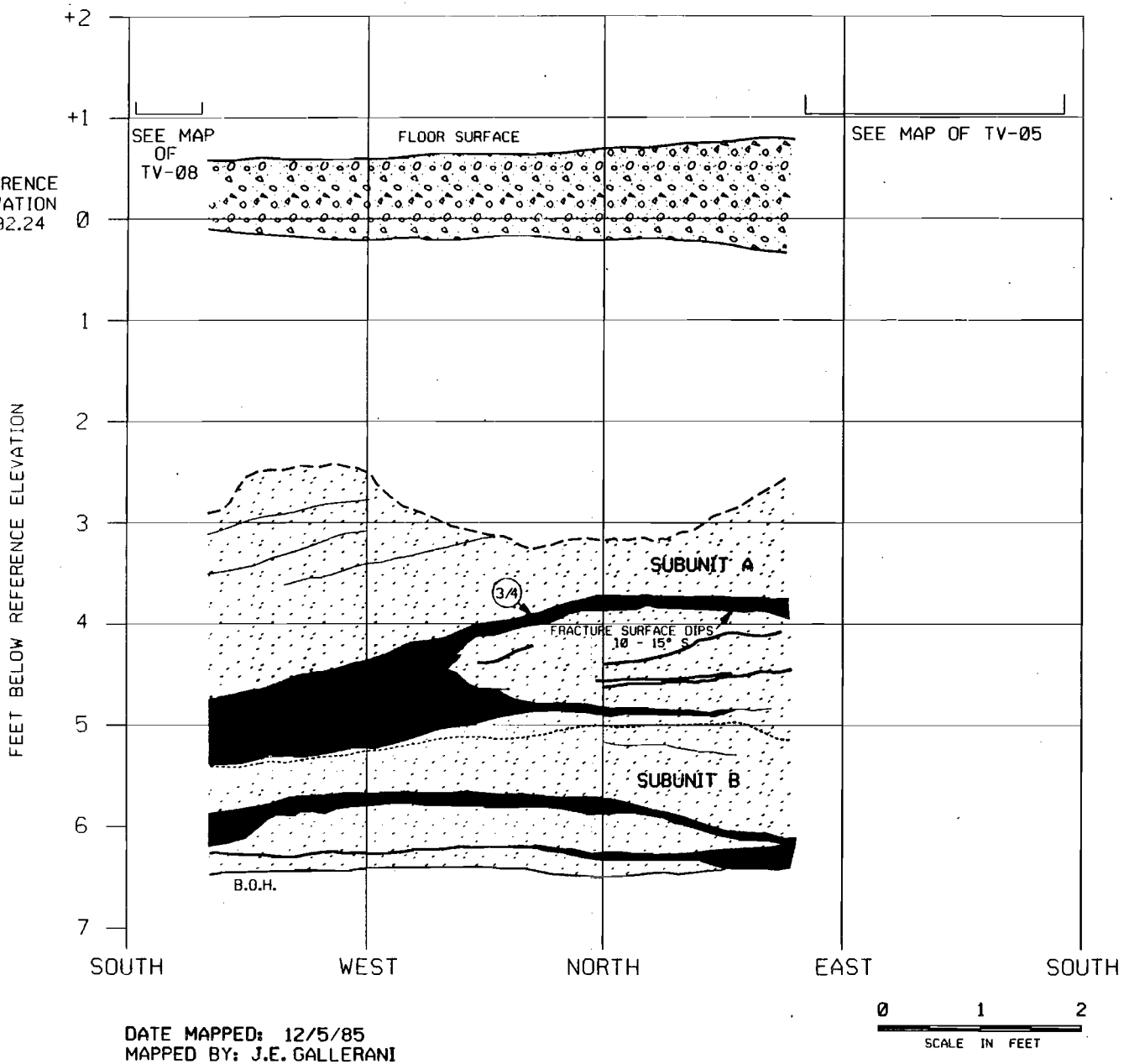
1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

0 1 2
SCALE IN FEET

DATE MAPPED: 12/5/85
MAPPED BY: J.E. GALLERANI

FIGURE G-17

GEOLOGIC MAP OF DRILL HOLE TV-08



EXPLANATION

- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

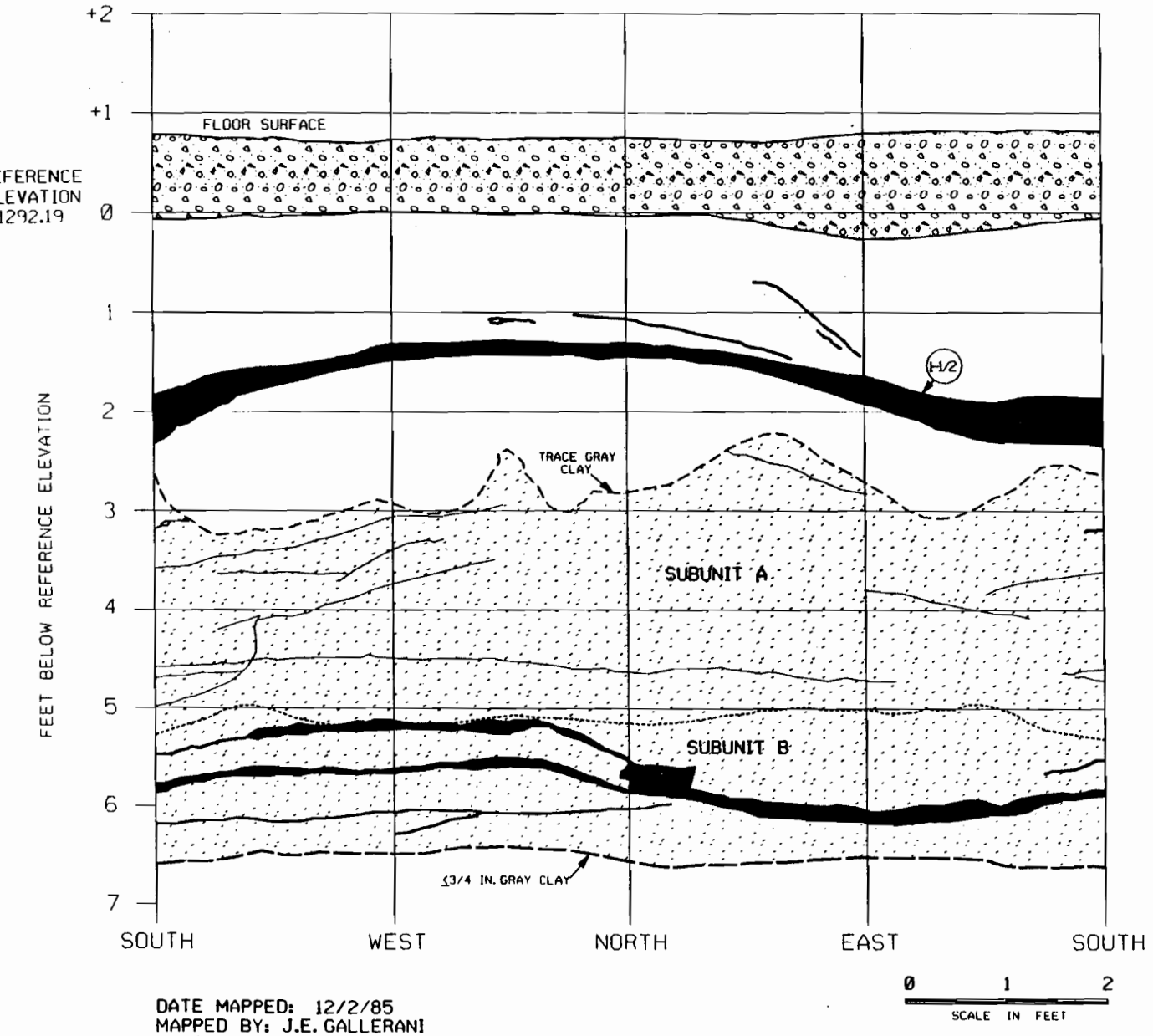
NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

DATE MAPPED: 12/5/85
MAPPED BY: J.E. GALLERANI

FIGURE G-18

GEOLOGIC MAP OF DRILL HOLE TV-09



EXPLANATION

- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE — DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE — ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE — CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

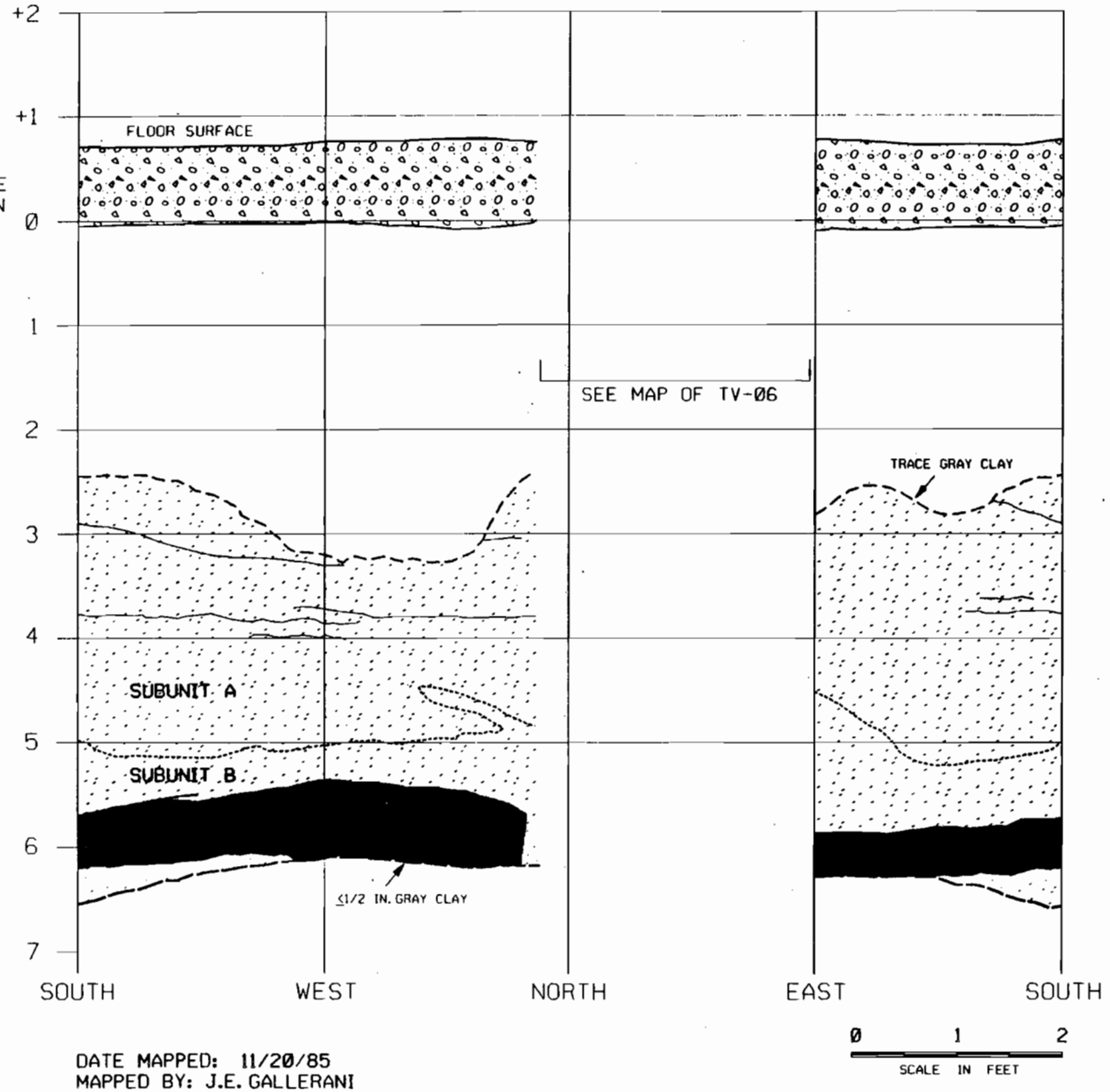
NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

DATE MAPPED: 12/2/85
MAPPED BY: J.E. GALLERANI

FIGURE G-19

GEOLOGIC MAP OF DRILL HOLE TV-10



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SCALE IN FEET

DATE MAPPED: 11/20/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

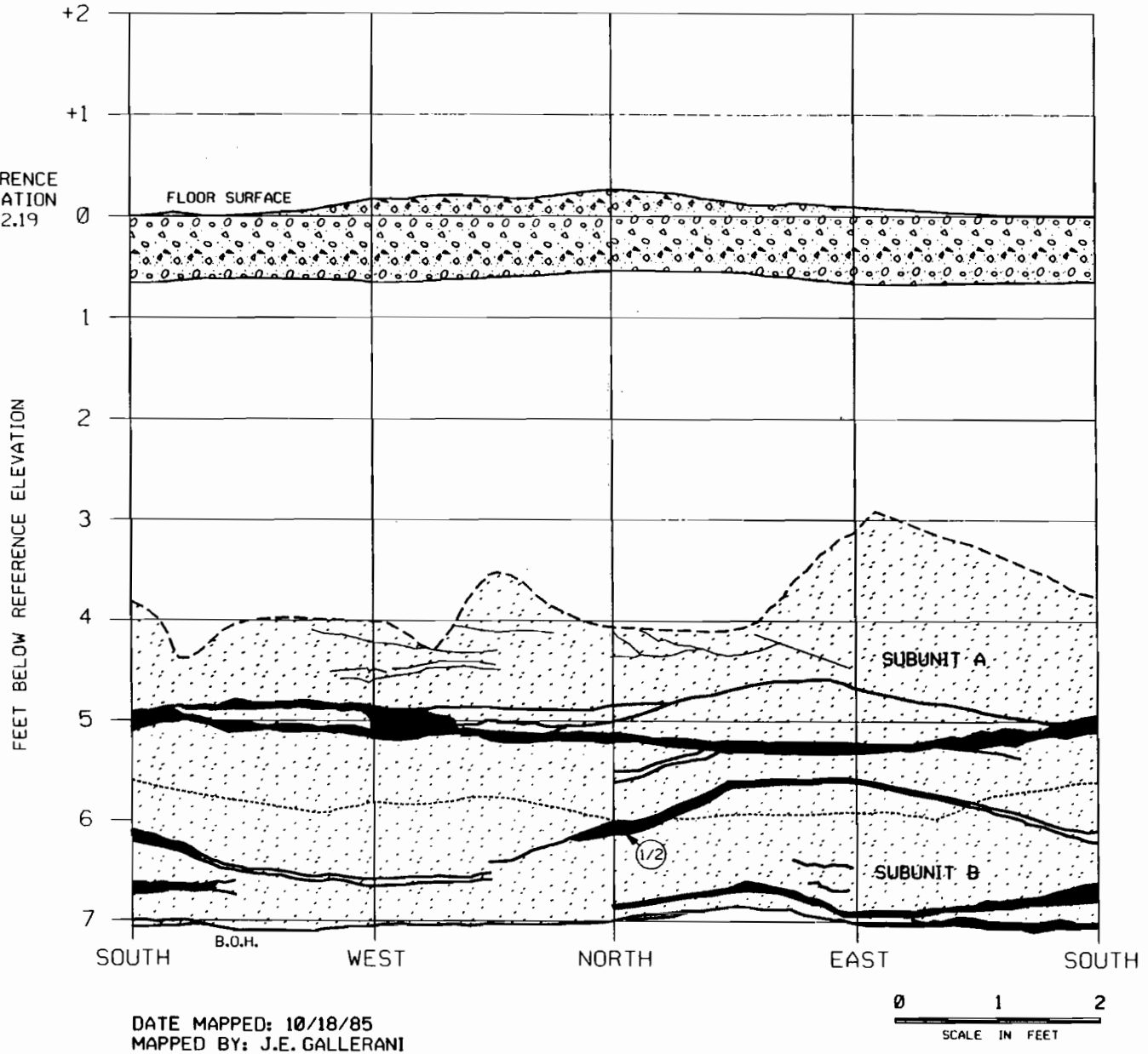
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-20

GEOLOGIC MAP OF DRILL HOLE TV-11



DATE MAPPED: 10/18/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

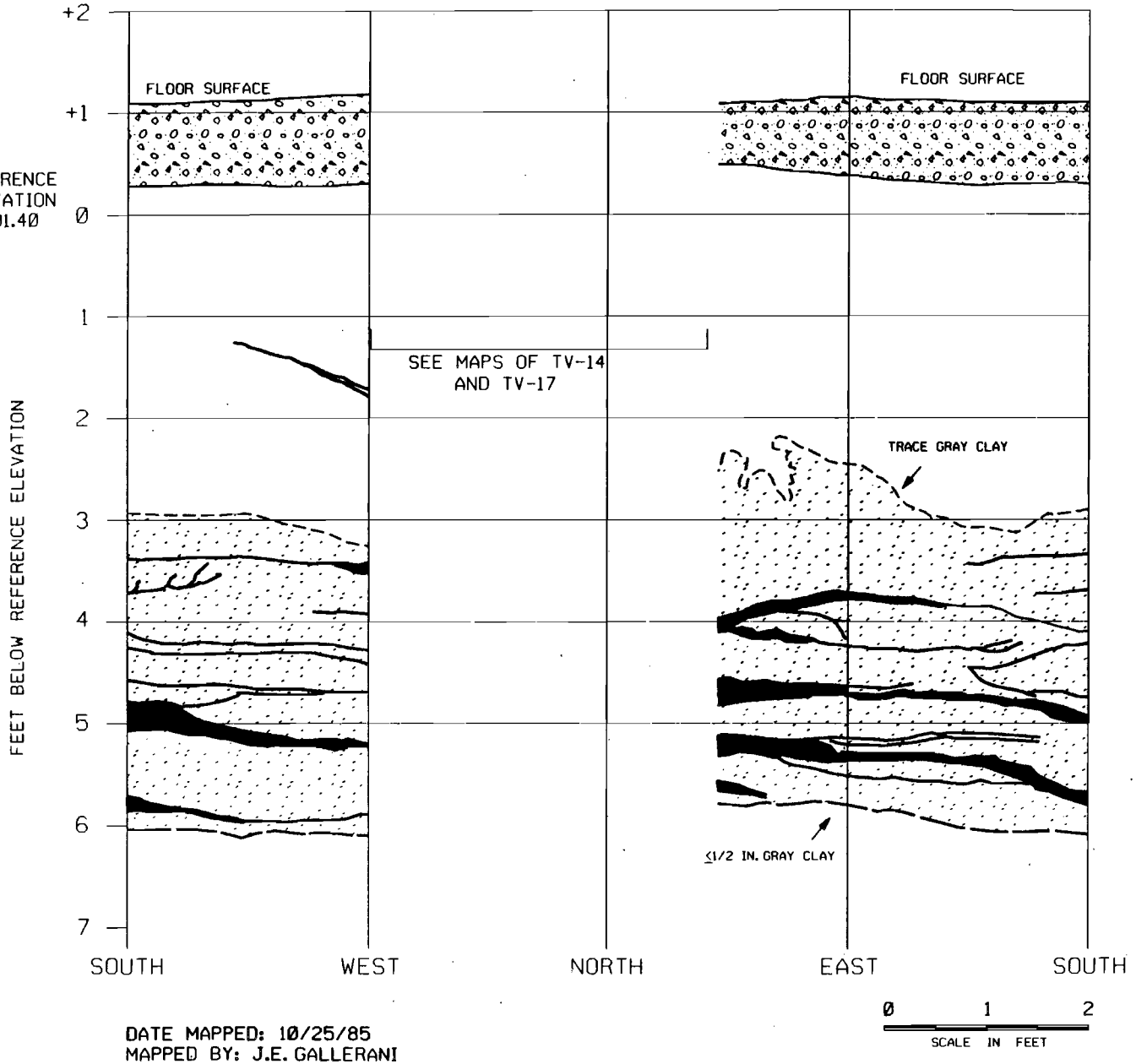
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-21

GEOLOGIC MAP OF DRILL HOLE TV-12



DATE MAPPED: 10/25/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

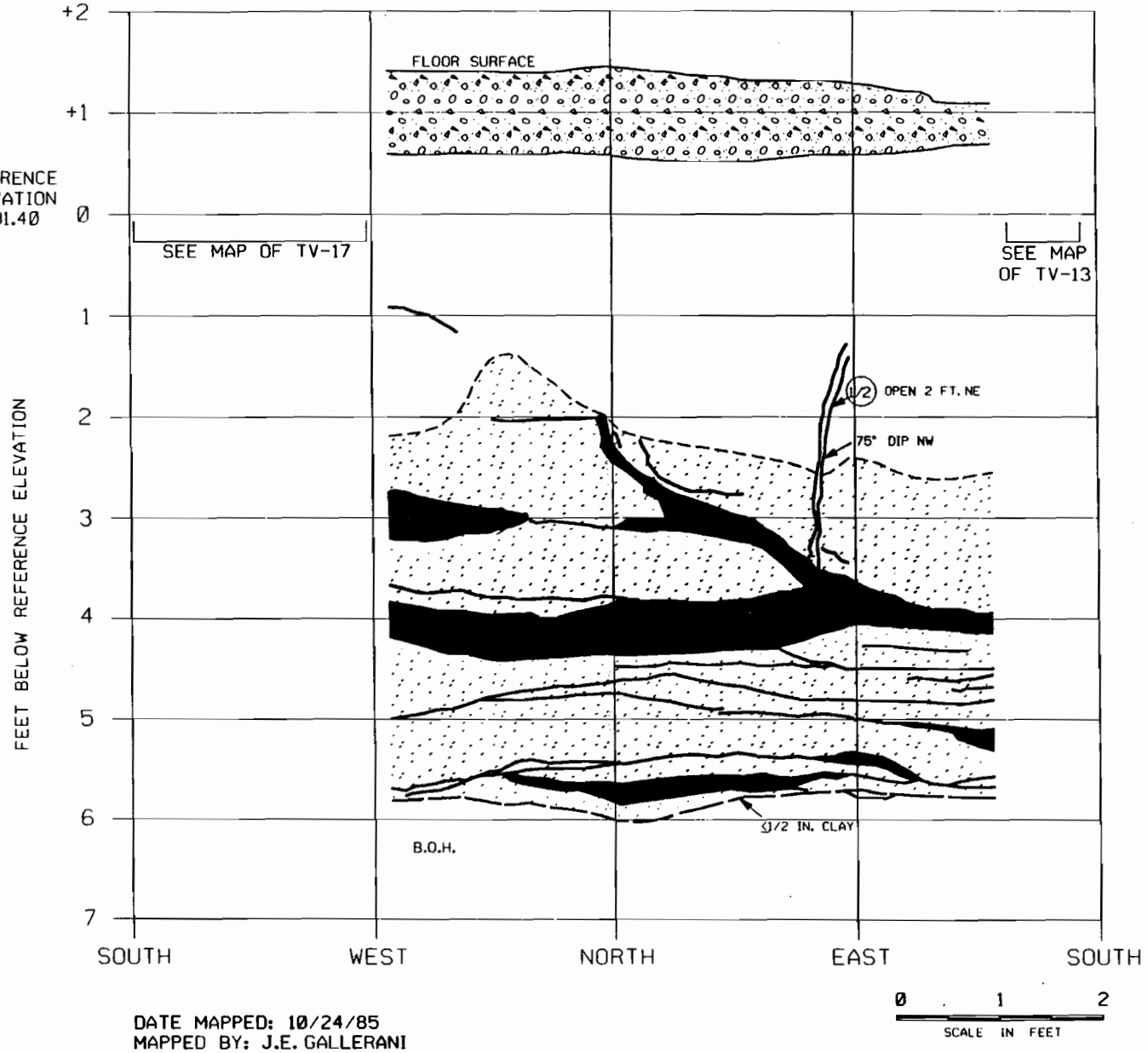
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-22

GEOLOGIC MAP OF DRILL HOLE TV-13



DATE MAPPED: 10/24/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

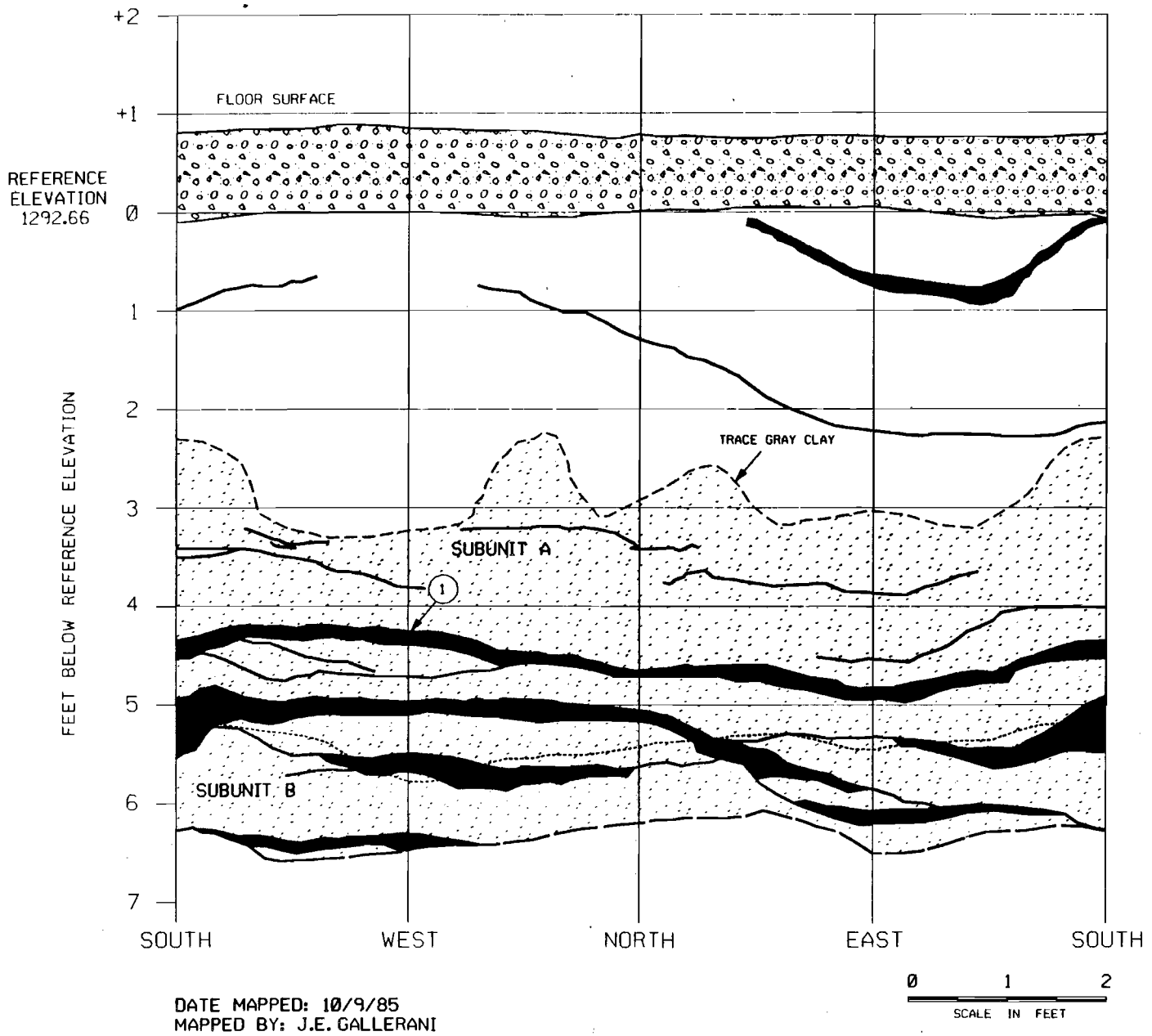
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
  - UPPER CONTACT OF MB-139
  - UPPER CONTACT OF SUBUNIT B
  - CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-23

GEOLOGIC MAP OF DRILL HOLE TV-14



DATE MAPPED: 10/9/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

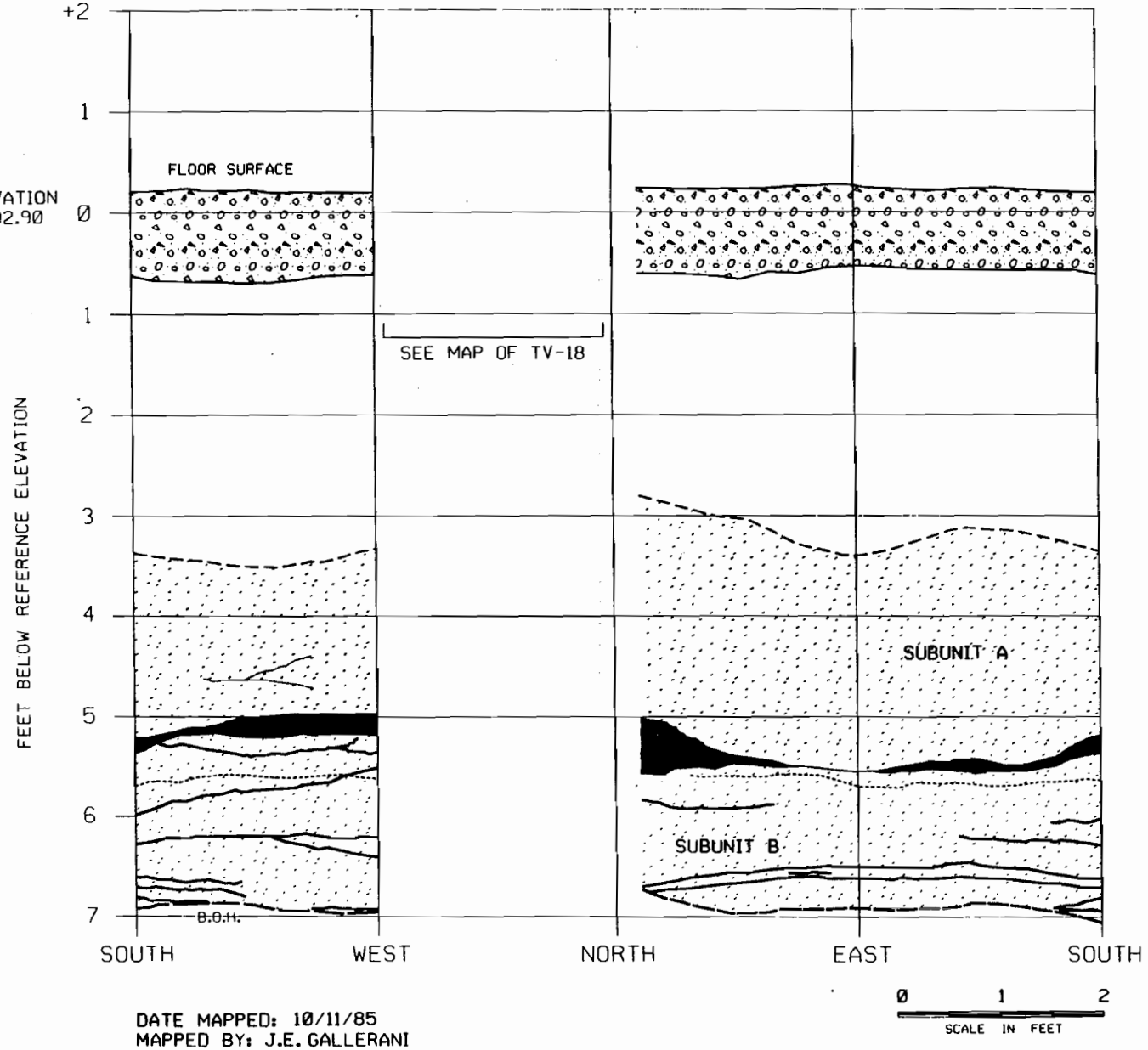
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS NOTED OTHERWISE, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-24

GEOLOGIC MAP OF DRILL HOLE TV-15



EXPLANATION

- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139 AND SUBUNIT A
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE

  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE

  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE

  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

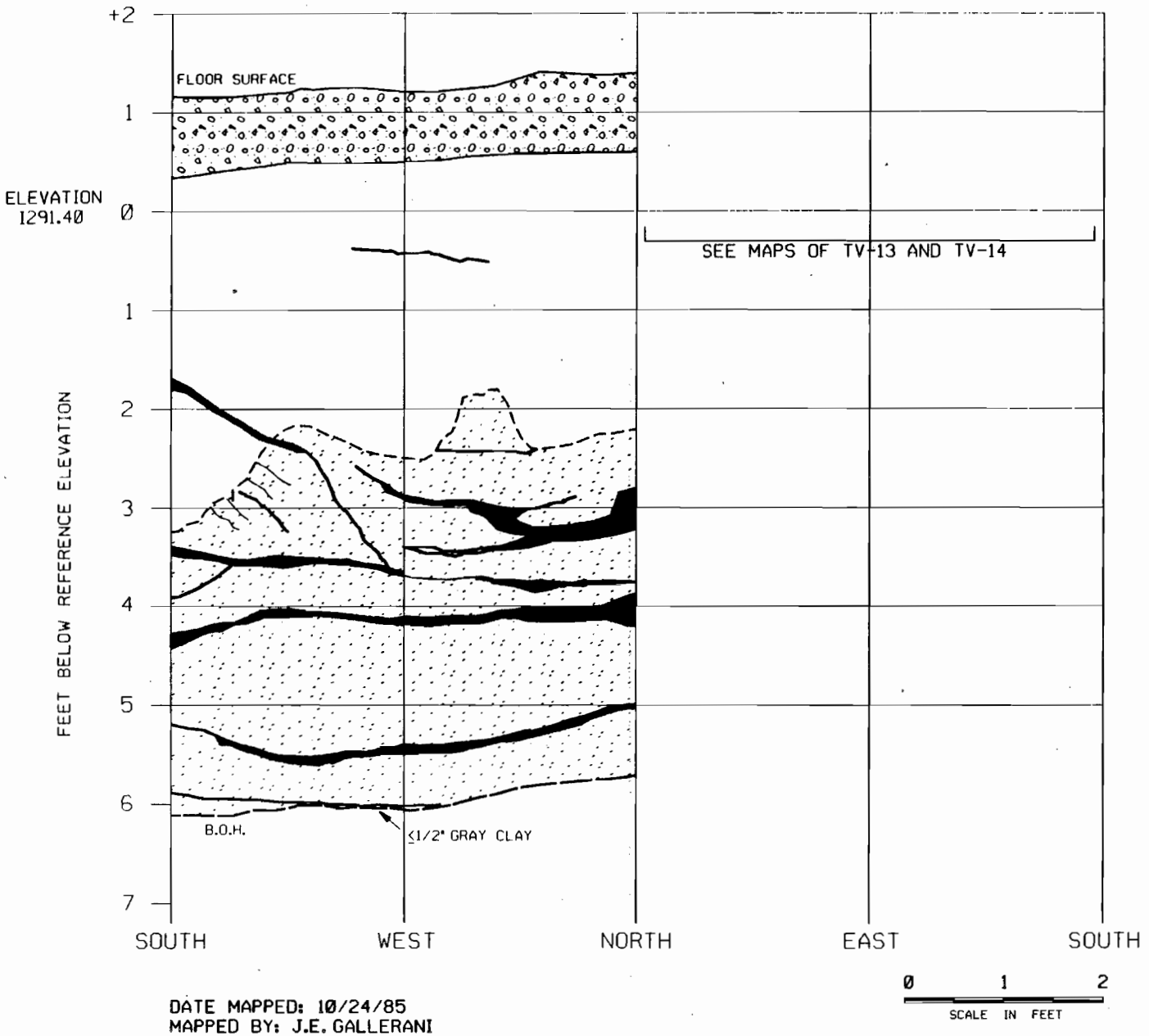
1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE EACH HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS OTHERWISE NOTED, THE BOTTOM OF EACH DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

Ø 1 2
SCALE IN FEET

DATE MAPPED: 10/11/85
MAPPED BY: J.E. GALLERANI

FIGURE G-25

GEOLOGIC MAP OF DRILL HOLE TV-16



DATE MAPPED: 10/24/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

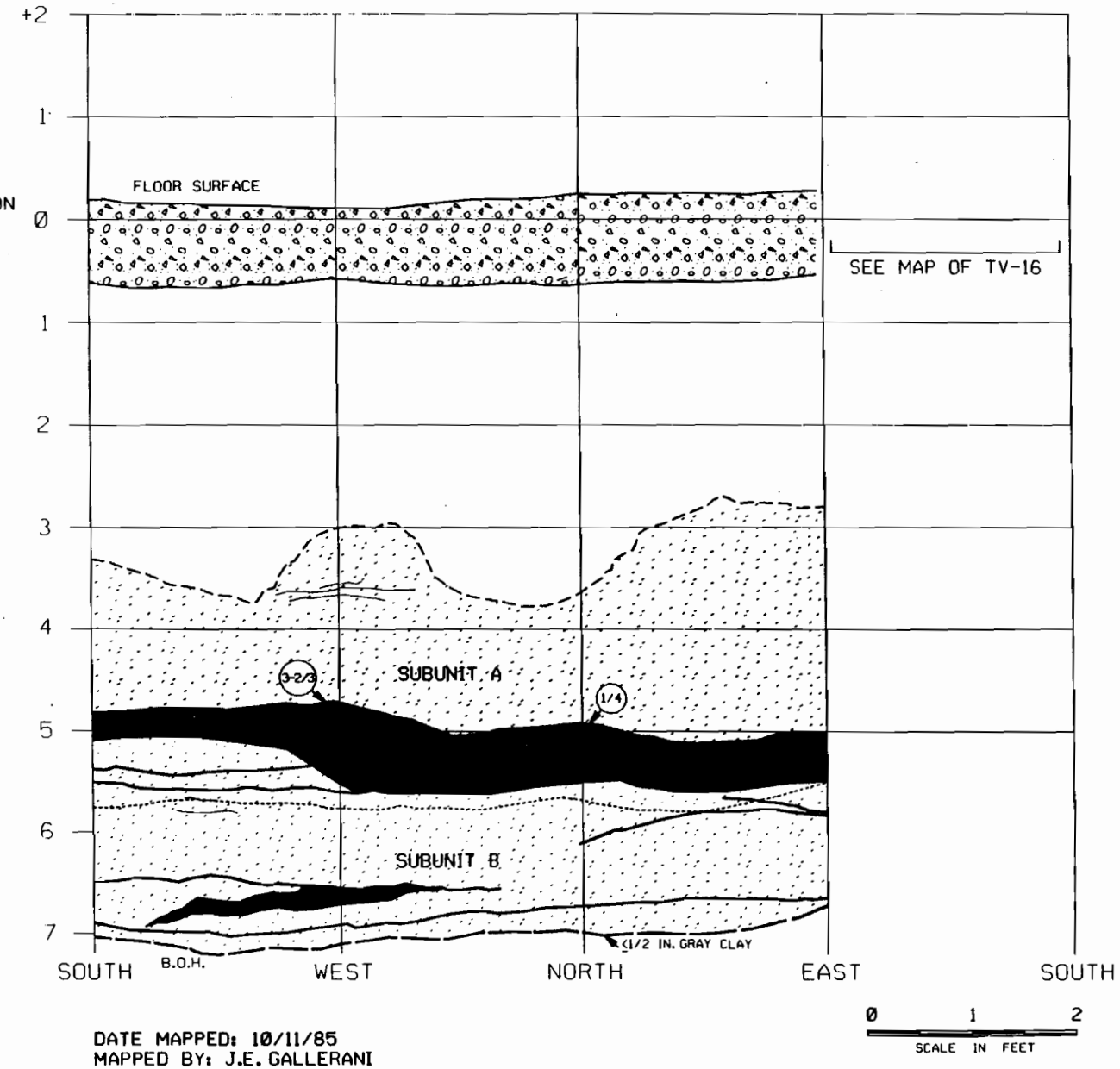
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139 AND SUBUNIT A
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE EACH HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS OTHERWISE NOTED, THE BOTTOM OF EACH DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-26

GEOLOGIC MAP OF DRILL HOLE TV-17



EXPLANATION

- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139 AND SUBUNIT A
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE

  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE

  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE

  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE EACH HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS OTHERWISE NOTED, THE BOTTOM OF EACH DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

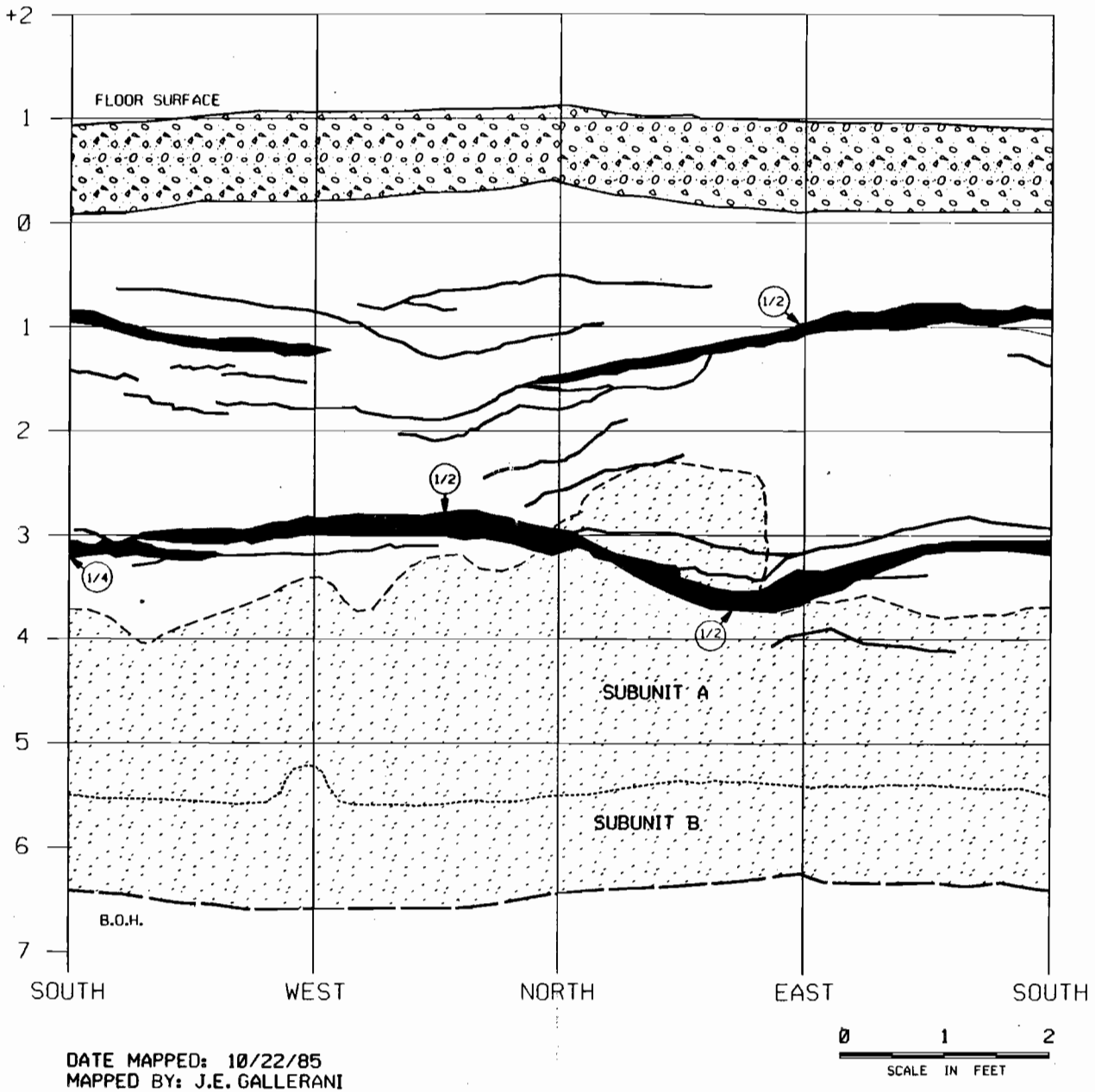
0 1 2

SCALE IN FEET

DATE MAPPED: 10/11/85
MAPPED BY: J.E. GALLERANI

FIGURE G-27

GEOLOGIC MAP OF DRILL HOLE TV-18



DATE MAPPED: 10/22/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

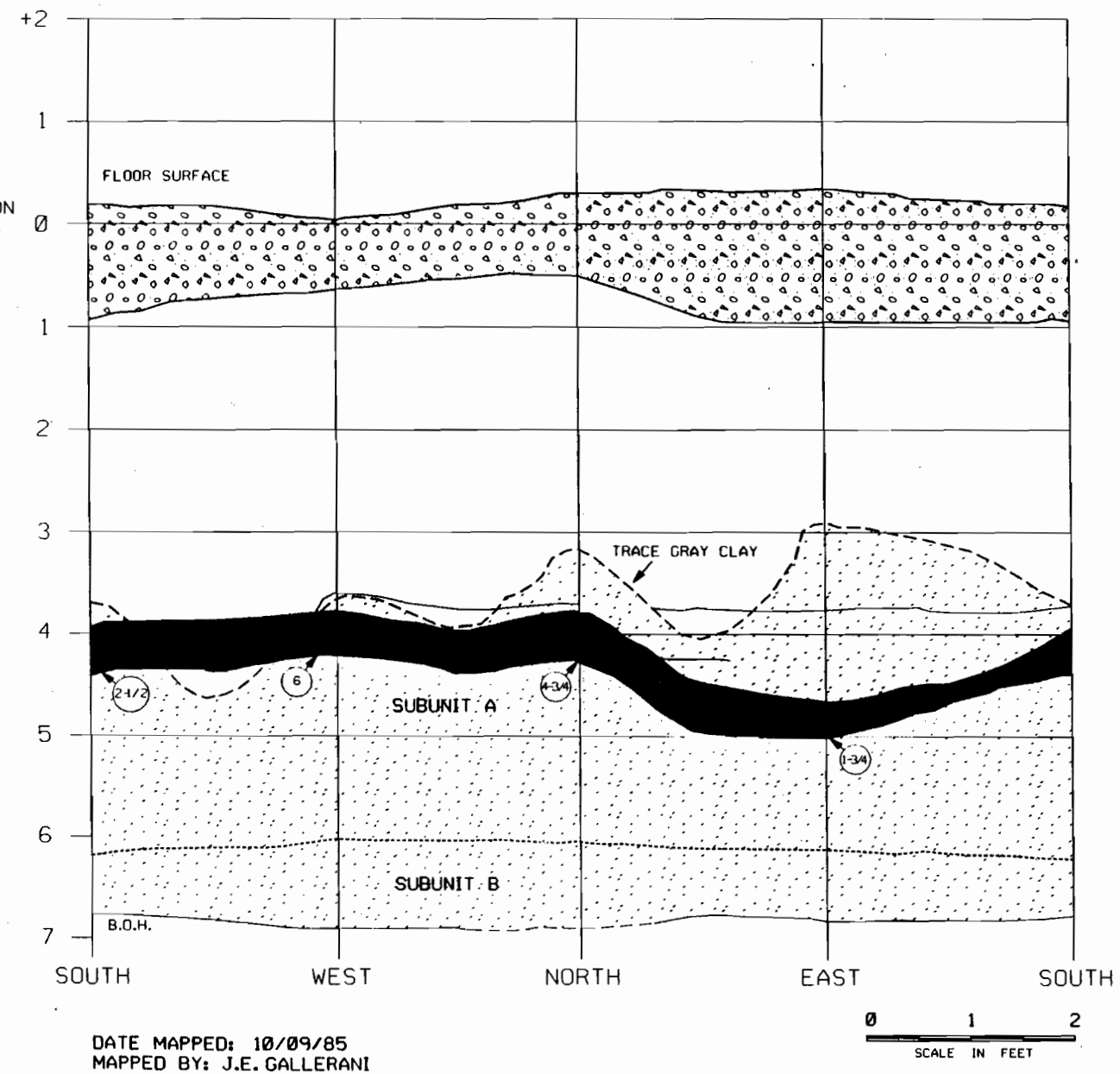
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139 AND SUBUNIT A
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE EACH HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS OTHERWISE NOTED, THE BOTTOM OF EACH DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-28

GEOLOGIC MAP OF DRILL HOLE TV-19



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293.06

FEET BELOW REFERENCE ELEVATION

DATE MAPPED: 10/09/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

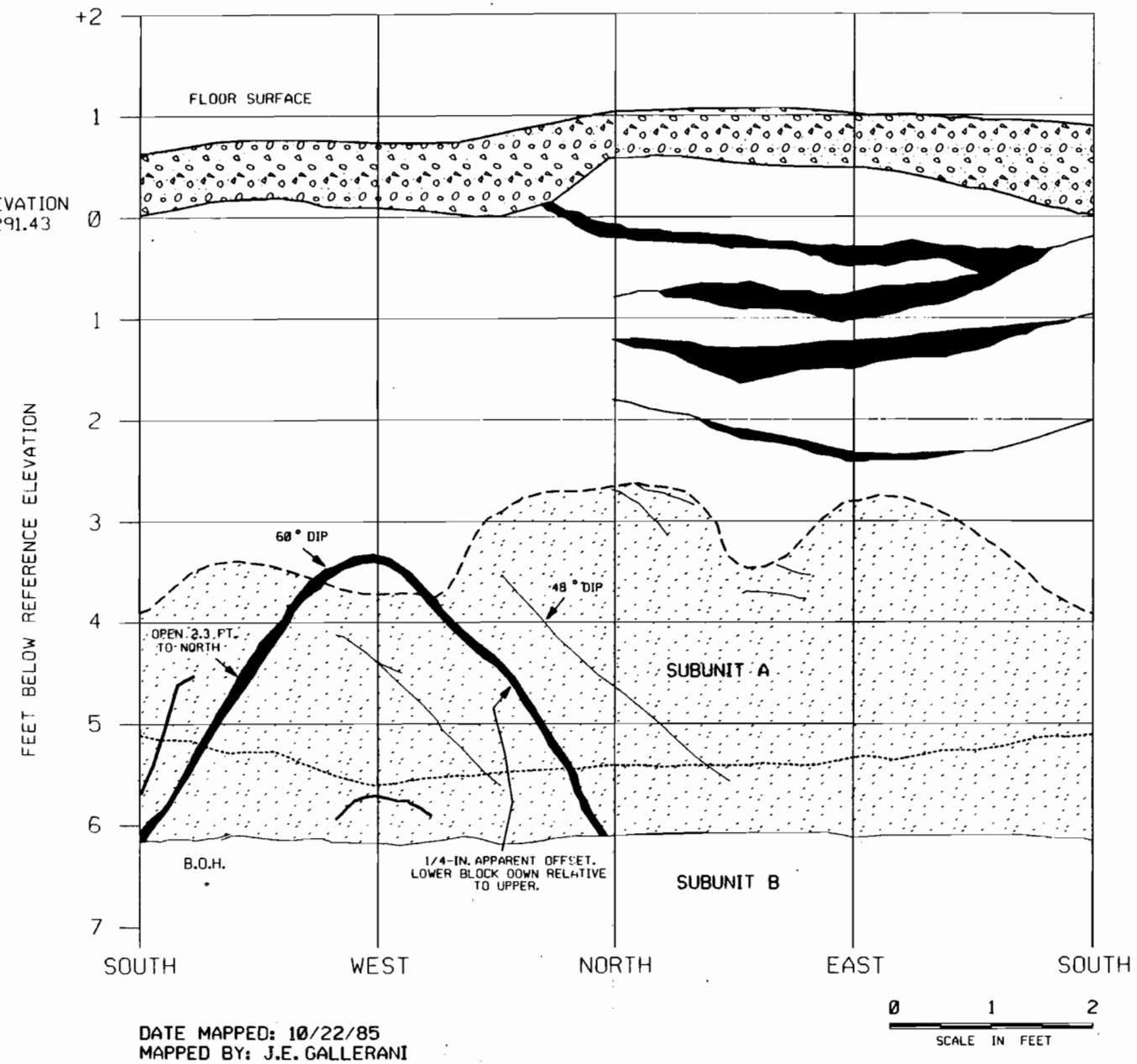
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139 AND SUBUNIT A
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE EACH HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS OTHERWISE NOTED, THE BOTTOM OF EACH DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-29

GEOLOGIC MAP OF DRILL HOLE TV-20



DATE MAPPED: 10/22/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

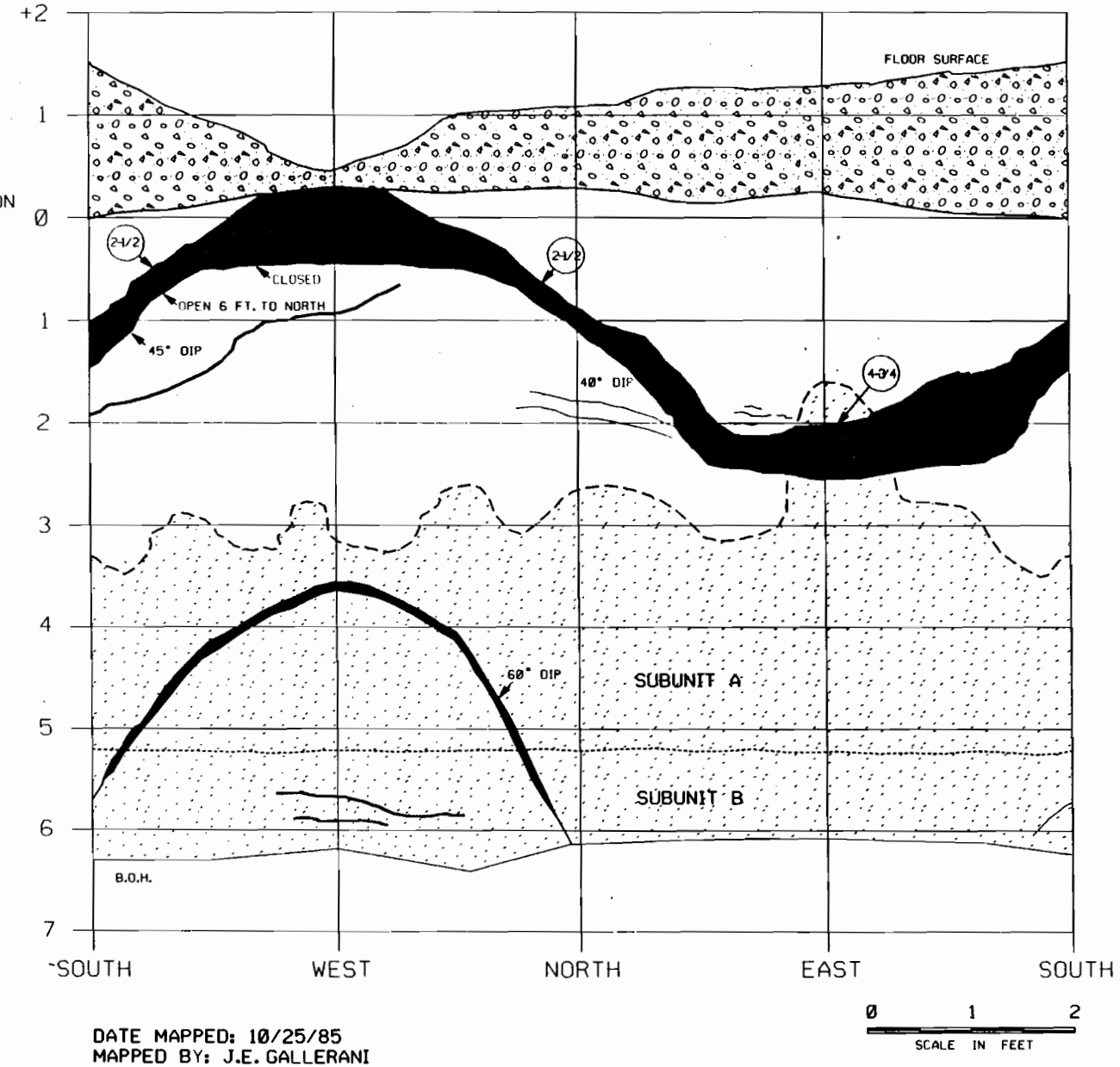
- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139 AND SUBUNIT A
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE EACH HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS OTHERWISE NOTED, THE BOTTOM OF EACH DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-30

GEOLOGIC MAP OF DRILL HOLE TV-21



0 1 2
SCALE IN FEET

DATE MAPPED: 10/25/85
MAPPED BY: J.E. GALLERANI

EXPLANATION

- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139 AND SUBUNIT A
- UPPER CONTACT OF SUBUNIT B
- CLAY E/LOWER CONTACT OF MB-139
- FRACTURE TRACE
  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE
  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE
  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN THE FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

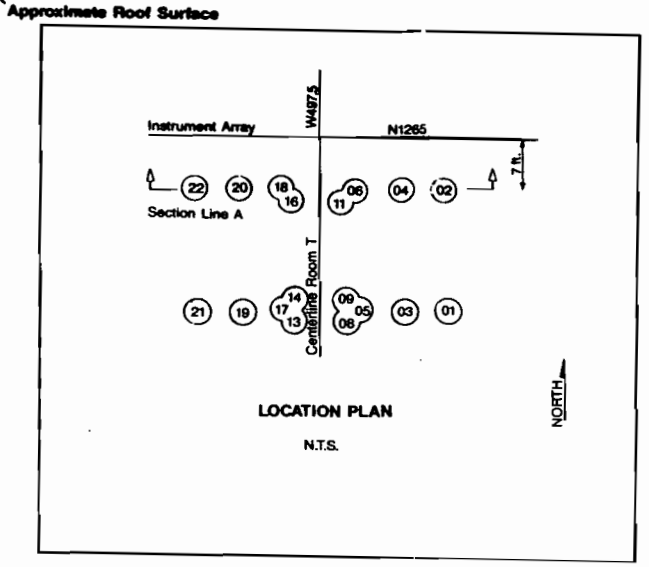
1. DRILL HOLE IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE EACH HOLE. ALL FEATURES WERE MEASURED FROM A SURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS OTHERWISE NOTED, THE BOTTOM OF EACH DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.

FIGURE G-31

GEOLOGIC MAP OF DRILL HOLE TV-22

EXPLANATION

- **SALT FILL**
- **HALITE**
- **MB-139**
- **FRACTURE TRACE**
- **FRACTURE ZONE**
  Zone of rock bounded by distinct fracture surfaces. Rock within the zone is broken by numerous small fractures spaced less than one inch. Locally the zone is open.
- **UPPER CONTACT OF MB-139**
  Tightly closed, undulating. Locally contains trace of gray clay.
- **CONTACT BETWEEN SUBUNITS A AND B WITHIN MB-139 (DIFFUSE)**
  Subunit A is above Subunit B and includes zones I, II, and III, as described in Borns, 1985, Marker Bed 139: A Study of Drillcore from a Systematic Array, SAND 85-0023 report. Subunit B includes zones IV and V from the same report.



WEST WALL

EAST WALL

ROOM T

TV- 22 TV-20 TV-18 TV- 16 TV- 11 TV-06 TV-04 TV-02

Floor Surface

Fill/In Situ salt contact (Typ.)

Open Fracture

Clay

ELEVATION (Feet above M.S.L.)

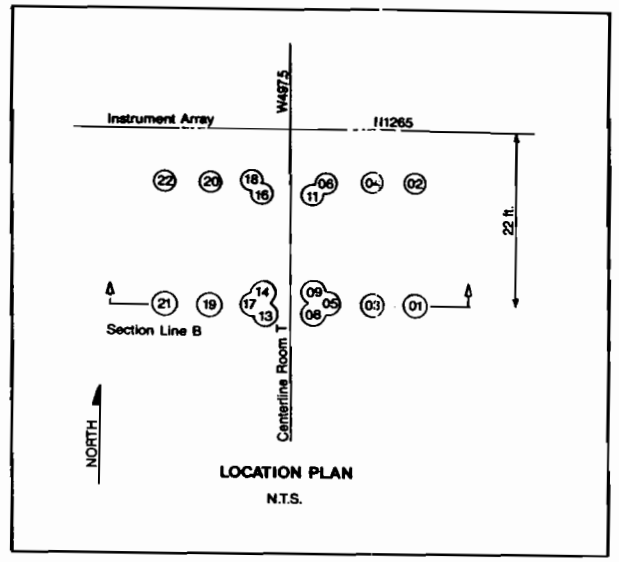
1304 1302 1300 1298 1296 1294 1292 1290 1288 1286 1284

0 1.0 Feet
SCALE

FIGURE G-32
SECTION A THROUGH ROOM T

EXPLANATION

- SALT FILL
- HALITE
- MB-139
- FRACTURE TRACE
- **FRACTURE ZONE** — Zone of rock bounded by distinct fracture surfaces. Rock within the zone is broken by numerous small fractures spaced less than one inch. Locally the zone is open.
- **UPPER CONTACT OF MB-139** — Tightly closed, undulating. Locally contains trace of gray clay.
- **CONTACT BETWEEN SUBUNITS A AND B WITHIN MB-139 (DIFFUSE)** — Subunit A is above Subunit B and includes zones I, II, and III as described in Borns, 1985, Marker Bed 139: A Study of Drillcore from a Systematic Array, SAND 85-0023 report. Subunit B includes zones IV and V from the same report.



Approximate Roof Surface

WEST WALL

EAST WALL

ROOM T

TV-21 TV-19 TV-17 TV-14 TV-09 TV-05 TV-03 TV-01

Floor Surface

Fill/In Situ salt contact (Typ.)

Open Fracture

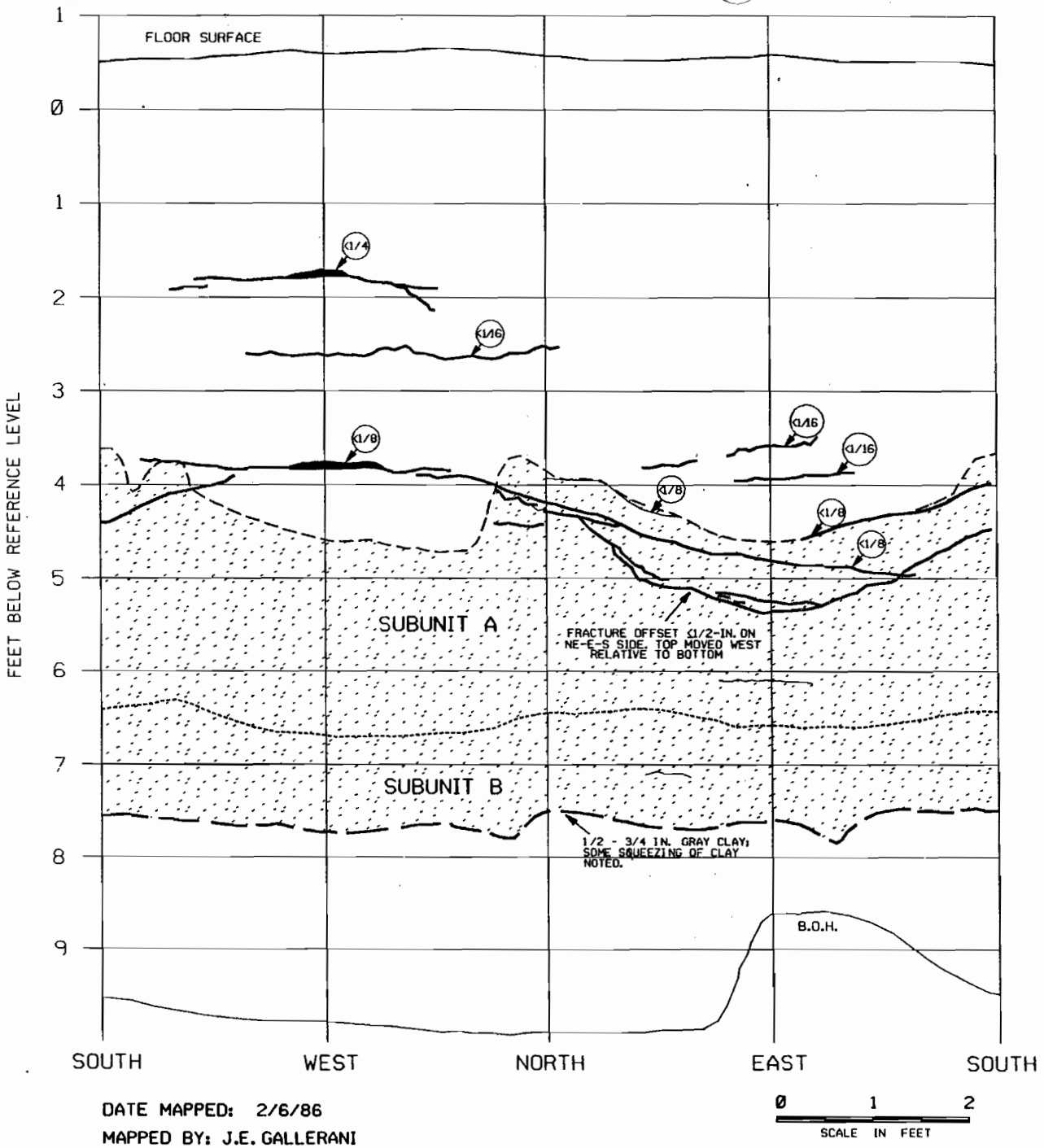
Clay

ELEVATION (Feet above M.S.L.)

1304 1302 1300 1298 1296 1294 1292 1290 1288 1286 1284

0 1.0 Feet
SCALE

FIGURE G-33
SECTION B THROUGH ROOM T



DATE MAPPED: 2/6/86

MAPPED BY: J.E. GALLERANI

EXPLANATION

- MINED SALT BACKFILL
- HALITE
- MARKER BED 139
- UPPER CONTACT OF MB-139
- UPPER CONTACT OF SUBUNIT B
- CLAY E (LOWER CONTACT OF MB-139)
- FRACTURE TRACE

  DISTINCT FRACTURES, USUALLY CLOSED WITHIN A FEW INCHES OF THE DRILL HOLE SIDE.
- FRACTURE ZONE

  ZONE OF FRACTURED ROCK BOUNDED BY DISTINCT FRACTURES.
- SMALL FRACTURE

  CLOSED HAIRLINE FRACTURES, USUALLY FORMING FRACTURE ZONES LESS THAN ONE INCH WIDE.
- (1/2) APPROXIMATE FRACTURE SEPARATION, IN INCHES. SEPARATIONS ARE MEASURED WITHIN FRACTURE OR ZONE 12 INCHES IN FROM DRILL HOLE WALL.

NOTES:

1. DRILL HOLE IS IN SOUTHWEST CORNER OF TEST ROOM 4 AND IS 36 INCHES IN DIAMETER.
2. MAPPING WAS PERFORMED FROM INSIDE THE HOLE. ALL FEATURES WERE MEASURED FROM AN UNSURVEYED REFERENCE LINE.
3. ORIGINAL MAPPING WAS PERFORMED AT A SCALE OF ONE INCH TO ONE FOOT.
4. UNLESS OTHERWISE NOTED, THE BOTTOM OF THE DRILL HOLE (B.O.H.) COINCIDES WITH CLAY E.
5. HOLE CONTAINS SALT FILL AT BOTTOM.

FIGURE G-34

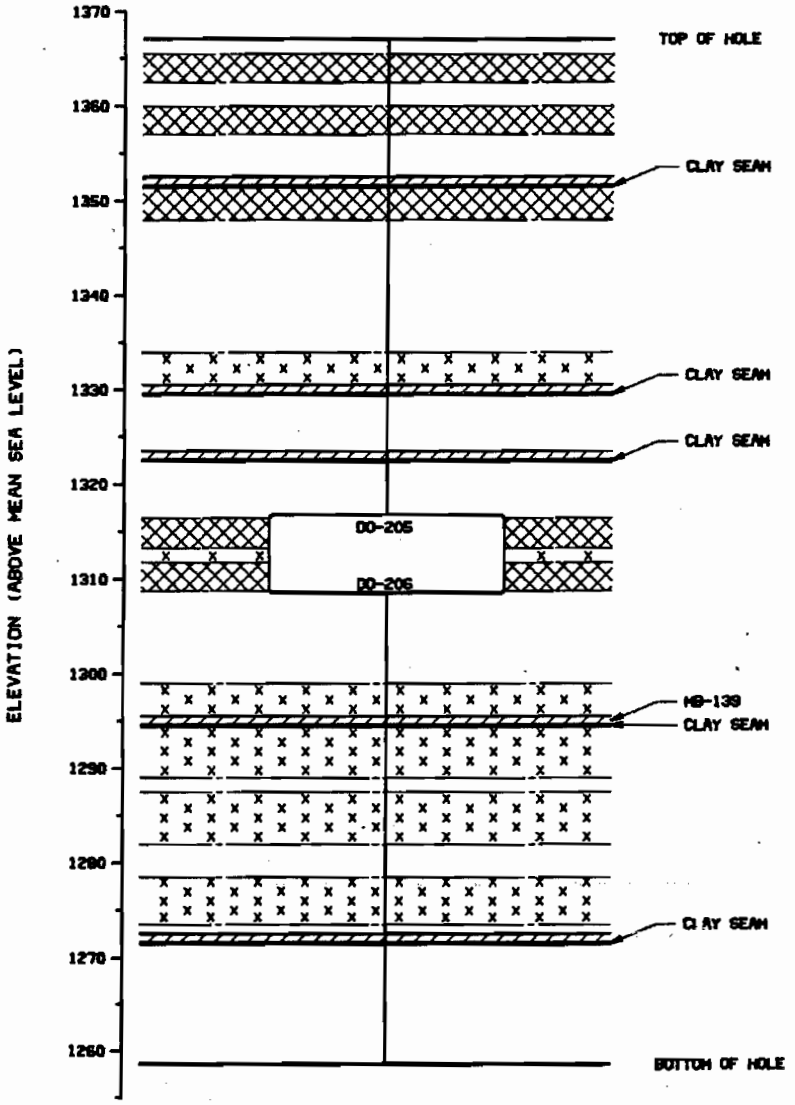
GEOLOGIC MAP OF DRILL HOLE P4X-84

APPENDIX H

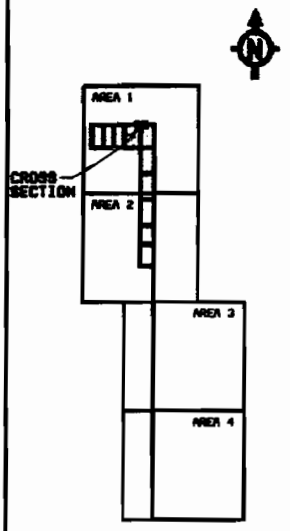
DRIFT CROSS SECTIONS

CONTENTS

Figure No.	Title/Description
H-1	East-West Cross Section - E0 Drift at N1410
H-2	East-West Cross Section - E0 Drift at N1110
H-3	East-West Cross Section - E0 Drift at N621
H-4	East-West Cross Section - E0 Drift at N146
H-5	East-West Cross Section - W30 Drift at S406
H-6	East-West Cross Section - E140 Drift at S1320
H-7	East-West Cross Section - E140 Drift at S1960
H-8	East-West Cross Section - E140 Drift at S2421
H-9	East-West Cross Section - E140 Drift at S3079
H-10	East-West Cross Section - E140 Drift at S3656



KEY PLAN



NOTES

LEGEND

INSTRUMENTS

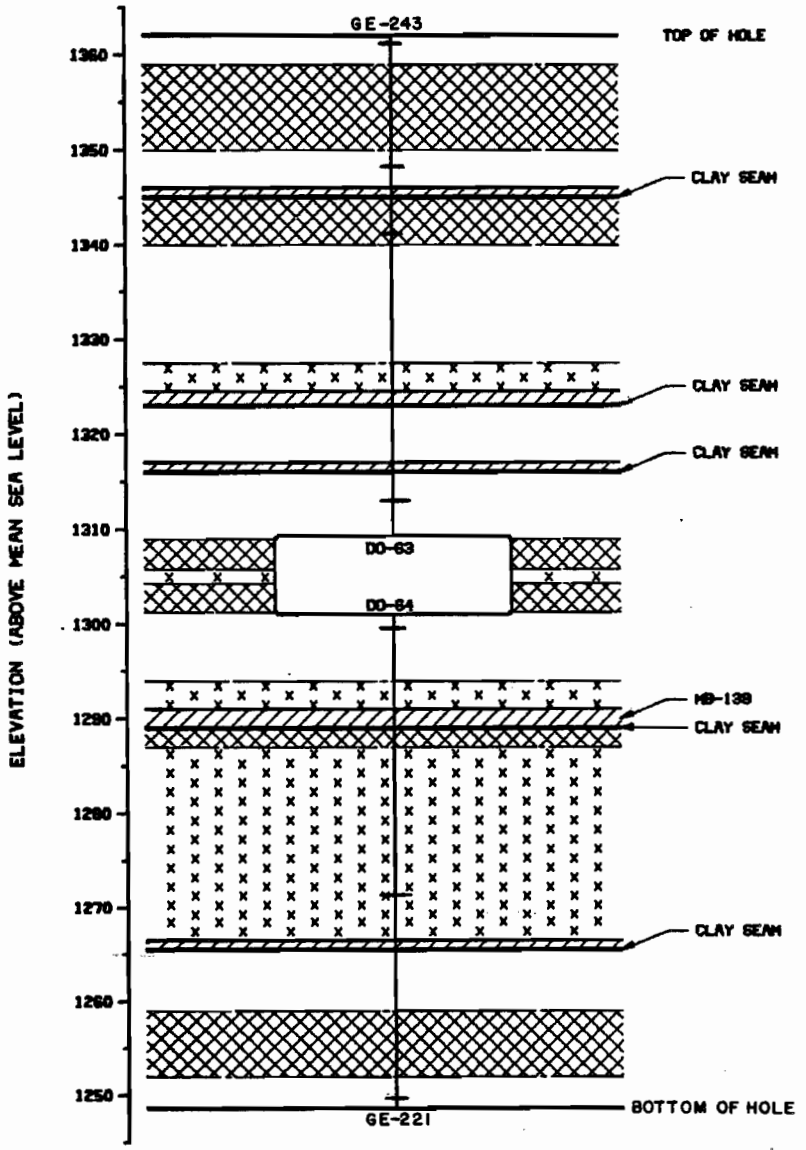
- GE - EXTENSOMETER (MULTIPLE POINT)
- DO - CORE DRILL HOLE
- RC - RADIAL CONVERGENCE POINT
- TC - TEMPORARY CONVERGENCE POINT
- WG - ROCK BOLT LOAD CELL

GEOLOGY

- CLEAR HALITE
- ANHYDRITE
- ARGILLACEOUS HALITE
- POLYHALITIC HALITE
- POLYHALITE

EAST-WEST CROSS SECTION EO DRIFT AT N1410

FIGURE H-1



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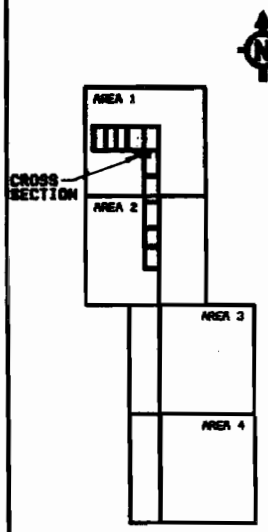


NOTES

LEGEND

INSTRUMENTS

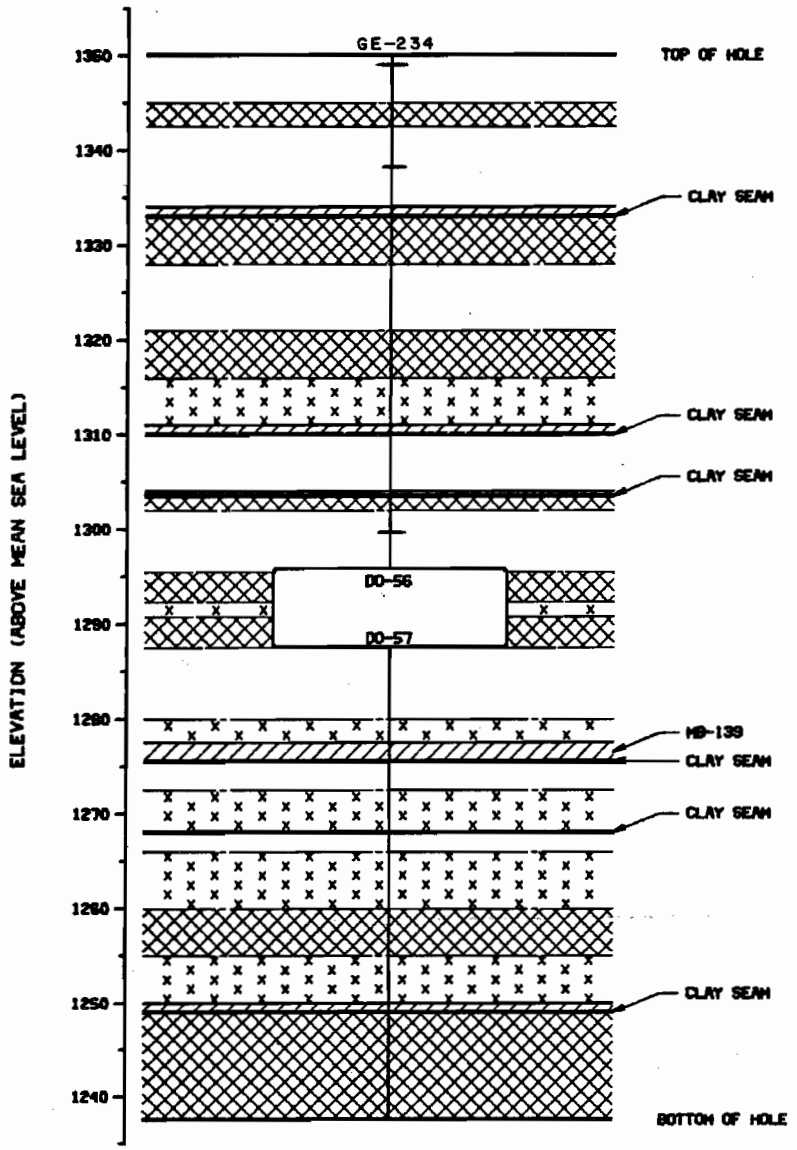
- GE - EXTENSOMETER (MULTIPLE POINT)
- DO - CORE DRILL HOLE
- RC - RADIAL CONVERGENCE POINT
- TC - TEMPORARY CONVERGENCE POINT
- WG - ROCK BOLT LOAD CELL

GEOLOGY

- CLEAR HALITE
- ANHYDRITE
- ARGILLACEOUS HALITE
- POLYHALITIC HALITE
- POLYHALITE

EAST-WEST CROSS SECTION EO DRIFT AT N1110

FIGURE H-2



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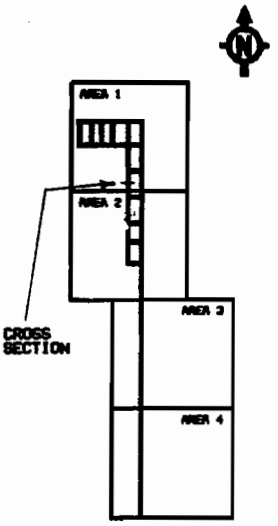


NOTES

LEGEND

INSTRUMENTS

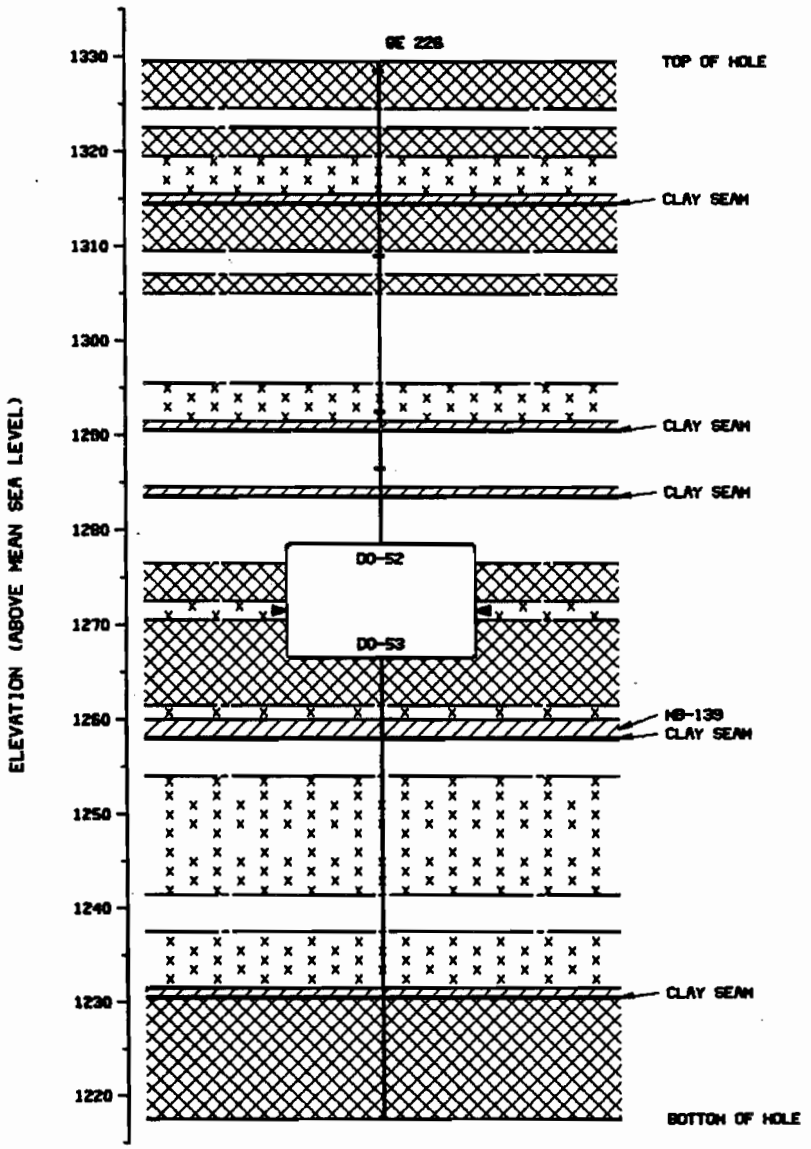
- GE - EXTENSOMETER (MULTIPLE POINT)
- DO - CORE DRILL HOLE
- RC - RADIAL CONVERGENCE POINT
- TC - TEMPORARY CONVERGENCE POINT
- WG - ROCK BOLT LOAD CELL

GEOLOGY

- CLEAR HALITE
- ANHYDRITE
- ARGILLACEOUS HALITE
- POLYHALITIC HALITE
- POLYHALITE

EAST-WEST CROSS-SECTION EO DRIFT AT N621

FIGURE H-3



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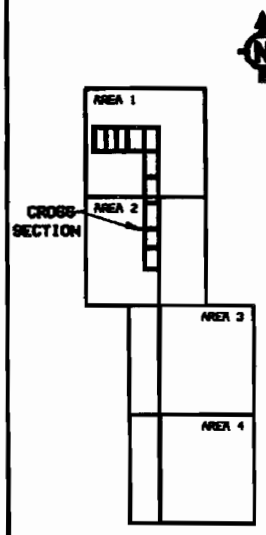


NOTES

LEGEND

INSTRUMENTS

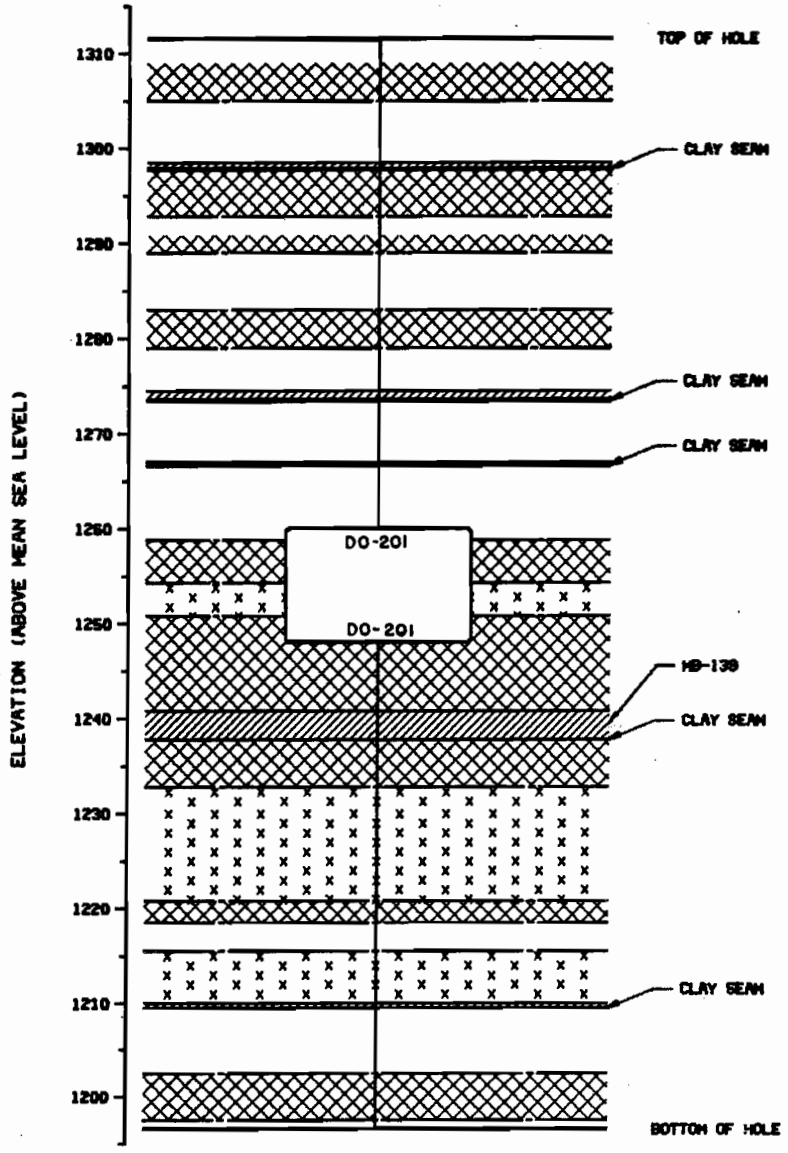
- GE - EXTENSOMETER (MULTIPLE POINT)
- DO - CORE DRILL HOLE
- RC - RADIAL CONVERGENCE POINT
- TC - TEMPORARY CONVERGENCE POINT
- WG - ROCK BOLT LOAD CELL

GEOLOGY

- CLEAR HALITE
- ANHYDRITE
- ARGILLACEOUS HALITE
- POLYHALITIC HALITE
- POLYHALITE

EAST-WEST CROSS SECTION EO DRIFT AT N146

FIGURE H-4



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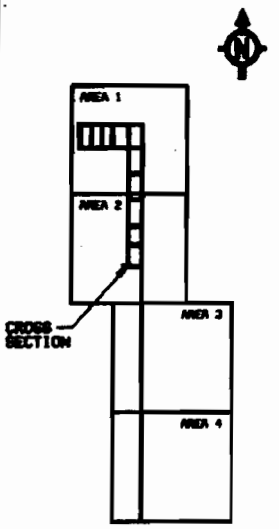


NOTES

LEGEND

INSTRUMENTS

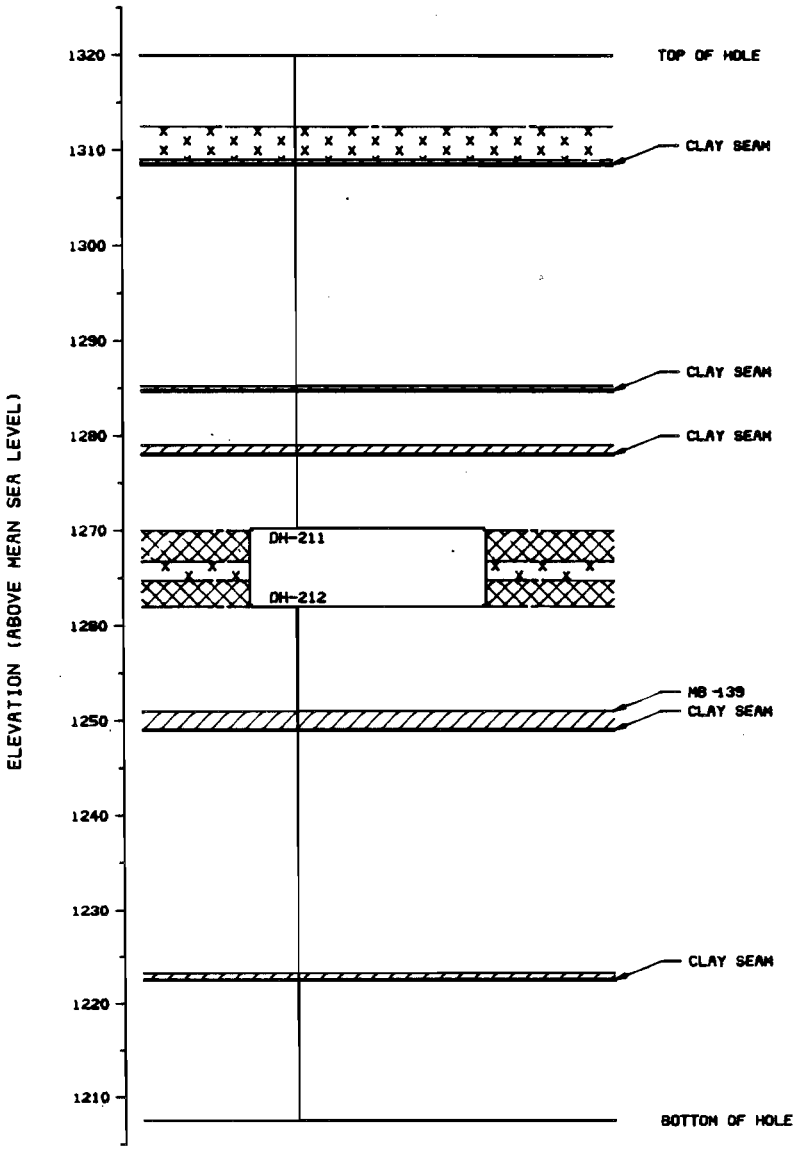
- GE - EXTENSOMETER (MULTIPLE POINT)
- DO - CORE DRILL HOLE
- RC - RADIAL CONVERGENCE POINT
- TC - TEMPORARY CONVERGENCE POINT
- WG - ROCK BOLT LOAD CELL

GEOLOGY

- CLEAR HALITE
- ANHYDRITE
- ARGILLACEOUS HALITE
- POLYHALITIC HALITE
- POLYHALITE

EAST–WEST CROSS SECTION W30 DRIFT AT S406

FIGURE H-5



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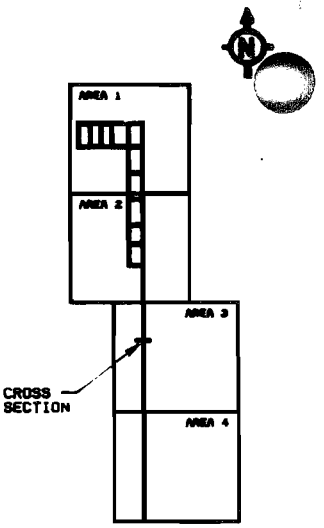


NOTES

LEGEND

INSTRUMENTS

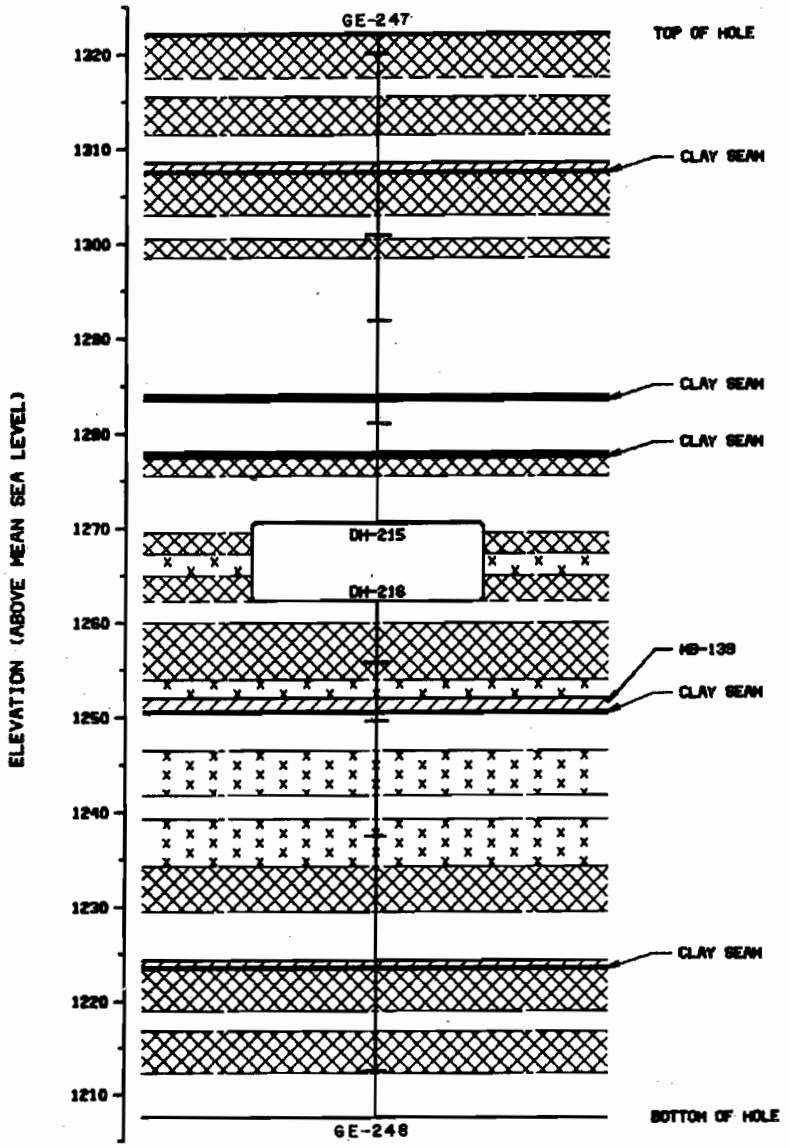
- GE - EXTENSOMETER (MULTIPLE POINT)
- DH - CORE DRILL HOLE
- RC - RADIAL CONVERGENCE POINT
- TC - TEMPORARY CONVERGENCE POINT
- WG - ROCK BOLT LOAD CELL

GEOLOGY

- CLEAR HALITE
- ANHYDRITE
- ARGILLACEOUS HALITE
- POLYHALITIC HALITE
- POLYHALITE

EAST–WEST CROSS SECTION E140 DRIFT AT S1320

FIGURE H-6



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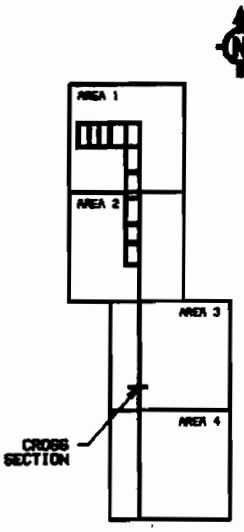


NOTES

LEGEND

INSTRUMENTS

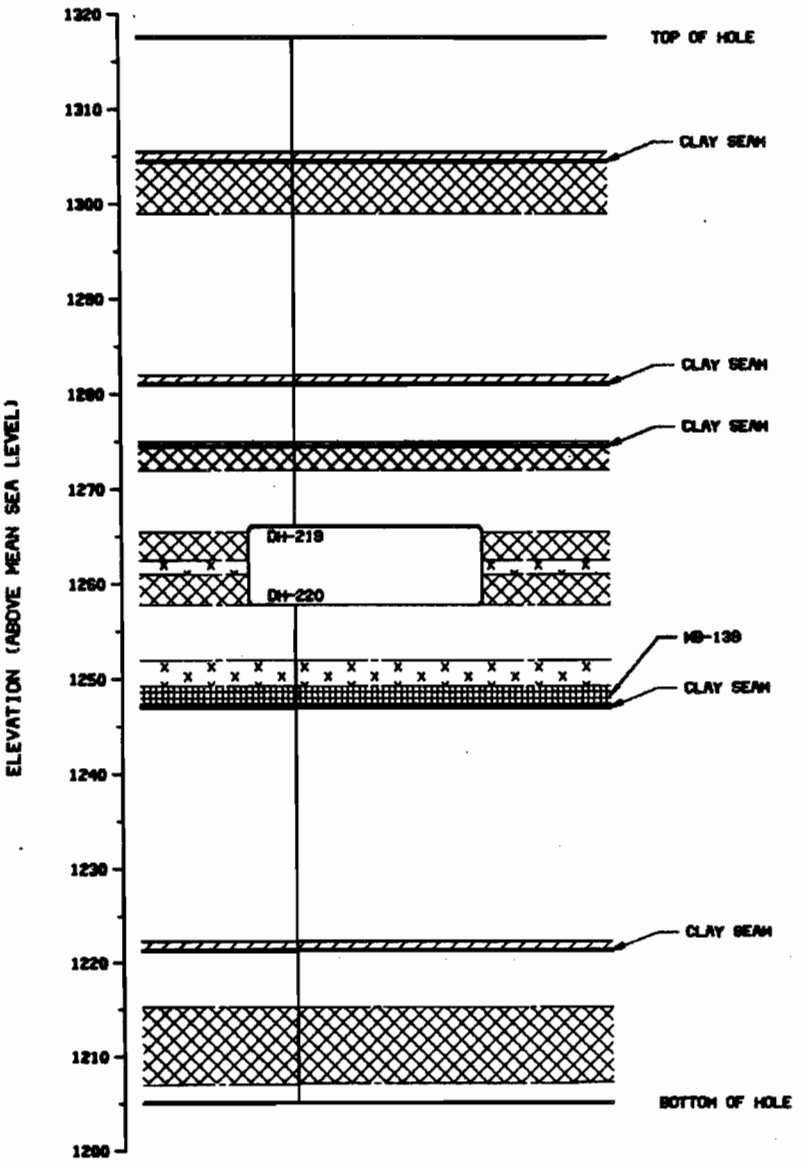
- GE - EXTENSOMETER (MULTIPLE POINT)
- DH - CORE DRILL HOLE
- RC - RADIAL CONVERGENCE POINT
- TC - TEMPORARY CONVERGENCE POINT
- WG - ROCK BOLT LOAD CELL

GEOLOGY

- CLEAR HALITE
- ANHYDRITE
- ARGILLACEOUS HALITE
- POLYHALITIC HALITE
- POLYHALITE

EAST–WEST CROSS SECTION E140 DRIFT AT S1960

FIGURE H-7



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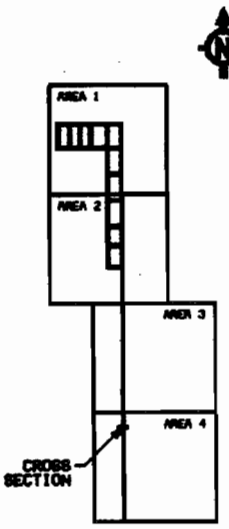


NOTES

LEGEND

INSTRUMENTS

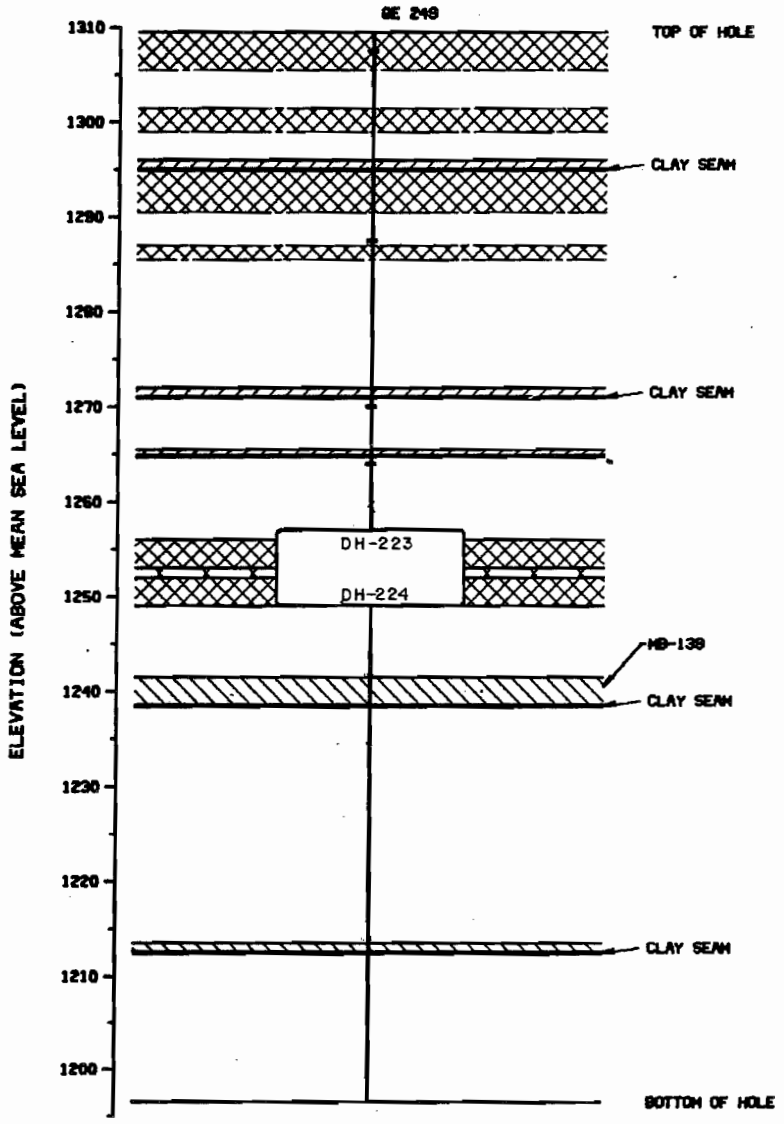
- GE - EXTENSOMETER (MULTIPLE POINT)
- DH - CORE DRILL HOLE
- RC - RADIAL CONVERGENCE POINT
- TC - TEMPORARY CONVERGENCE POINT
- WG - ROCK BOLT LOAD CELL

GEOLOGY

- CLEAR HALITE
- ANHYDRITE
- ARGILLACEOUS HALITE
- POLYHALITIC HALITE
- POLYHALITE

EAST–WEST CROSS SECTION E140 DRIFT AT S24

FIGURE H-8



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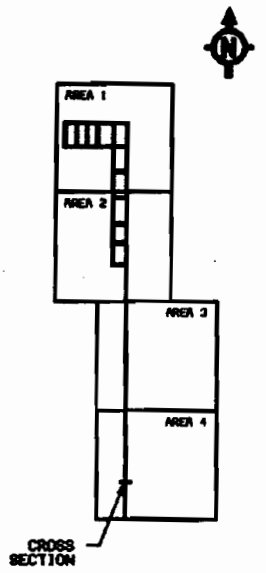


NOTES

LEGEND

INSTRUMENTS

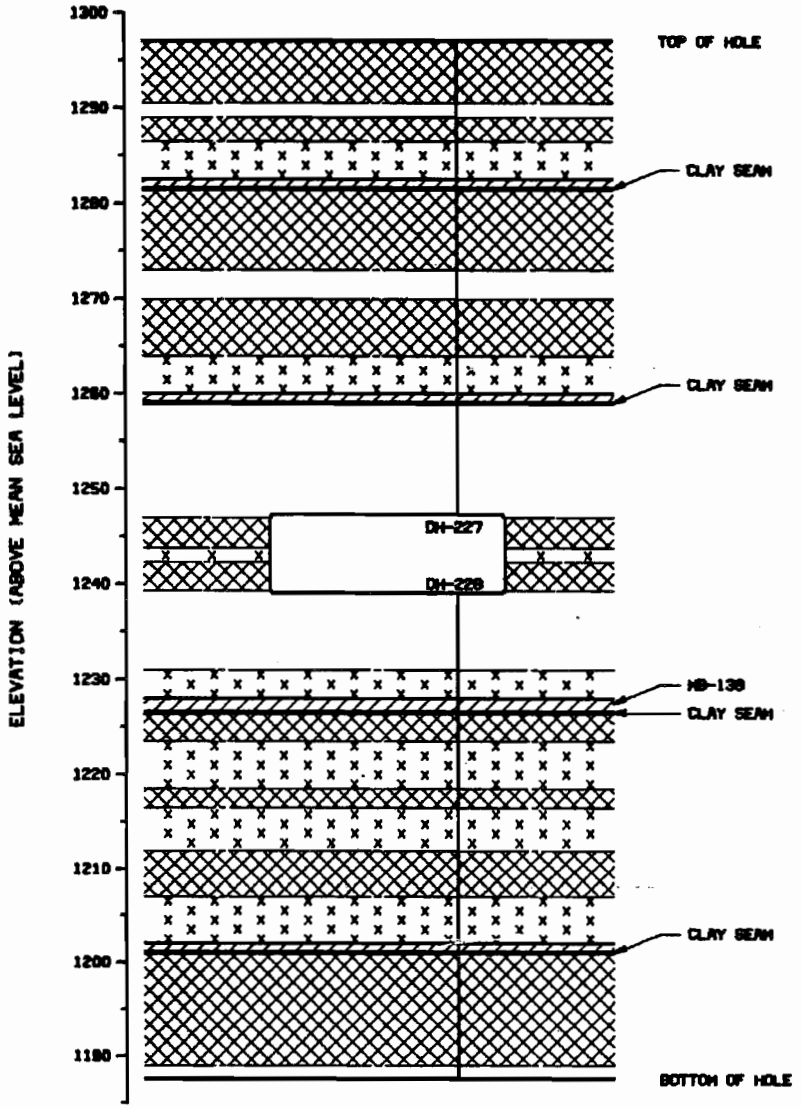
- GE - EXTENSOMETER (MULTIPLE POINT)
- DH - CORE DRILL HOLE
- RC - RADIAL CONVERGENCE POINT
- TC - TEMPORARY CONVERGENCE POINT
- WG - ROCK BOLT LOAD CELL

GEOLOGY

- CLEAR HALITE
- ANHYDRITE
- ARGILLACEOUS HALITE
- POLYHALITIC HALITE
- POLYHALITE

EAST–WEST CROSS SECTION E140 DRIFT AT S3079

FIGURE H-9



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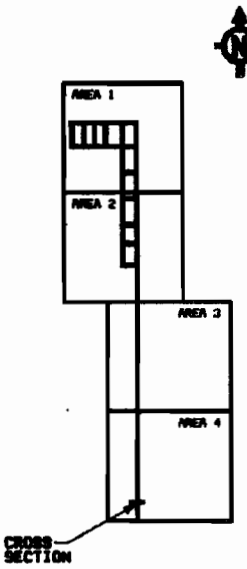


NOTES

LEGEND

INSTRUMENTS

- GE - EXTENSOMETER (MULTIPLE POINT)
- DH - CORE DRILL HOLE
- RC - RADIAL CONVERGENCE POINT
- TC - TEMPORARY CONVERGENCE POINT
- WG - ROCK BOLT LOAD CELL

GEOLOGY

- CLEAR HALITE
- ANHYDRITE
- ARGILLACEOUS HALITE
- POLYHALITIC HALITE
- POLYHALITE

EAST–WEST CROSS SECTION E140 DRIFT AT S3656

FIGURE H-10

APPENDIX I

FACILITY LEVEL
GEOLOGIC CORE HOLE LOGS

CONTENTS

Table No.	Title/Description
I-1	Summary of Core Hole Data

Core Hole Logs

See Table I-1 for listing of enclosed logs.

Table I-1

SUMMARY OF CORE HOLE DATA

Core Hole No.	Direction	Collar Elevation (Ft-MSL)	Approximate Station (Ft)		Facility Coordinates (Ft)		Depth/ Penetration (Ft)	Instrument Designation
MB-139-1	Down	1264.1	N79	W6	N9766	E6888	10.0	None
MB-139-2	Down	1251.2	S410	E150	N9277	E7044	15.7	None
MB-139-3	Down	1260.5	S101	E157	N9586	E7051	16.0	None
MB-139-4	Down	1258.7	S99	W17	N9588	E6877	16.2	None
DH-01	Up	1318.2	N1424	E439.5	N11110.9	E7335.5	50.8	None
DH-02(1)	Down		N1424	E440	N11110.9	E7336.06	50.2	None
DH-02A(1)	Down		N1424	E435	N11110.9	E7331.29	49.2	None
DH-02B	Down	1306.3	N1424	E442	N11110.9	E7331.29	53.0	None
DH-03	Up	1318.1	N1112	E444	N10799.2	E7335.4	48.8	None
DH-03A	Up	1317.4	N1112	E450.5	N10779.2	E7341.92	49.9	None
DH-04	Down	1309.6	N1112.5	E444	N10799.2	E7335.4	45.8	None
DH-04A(1)	Down	1309.6	N1113	E446			11.2	None
DH-04B	Down	1309.7	N1112	E450.5	N10799.70	E7341.85	51.4	None
DH-05	Up	1329.9	N1463	E972	N11149.6	E7865.0	51.0	None
DH-06	Down	1317.9	N1463	E972	N11149.7	E7864.9	49.75	None
DH-07	Up	1326.7	N1112	E976.5	N10799.3	E7870.8	49.8	None
DH-08	Down	1318.8	N1112	E976.5	N10799.4	E7870.9	38.3	None
DH-08A(1)	Down	1318.7	N1112	E975			50.7	None
DH-08B	Down	1318.0	N1112	E979.5	N10799.47	E7866.66	51.4	None
DH-09	Up	1324.5	N1432	E1332.5	N11108.71	E8227.11	51.1	None
DH-10	Down	1312.1	N1432	E1332.5	N11108.70	E8227.09	52.0	None
DH-11	Up	1320.5	N1112	E1332.5	N10799.8	E8227.3	50.9	None
DH-12	Down	1311.1	N1112	E1332.5	N10799.4	E8227.2	51.3	None
DH-13	Up	1311.4	N1424	E1690	N11112	E8585	13.8	None
DH-13A	Up	1311.5	N1424.5	E1691	N11112	E8586	49.0	None
DH-13B	Up	1311.4	N1425	E1695	N11112.6	E8590.1	21.0	None
DH-14	Down	1299.5	N1425	E1695	N11112.6	E8590.1	49.1	None
DH-15	Up	1308.9	N1104	E1688.5	N10793.26	E8589.96	51.0	None
DH-16	Down	1300.3	N1104	E1688	N10792.89	E8589.39	51.0	None
DH-17	Up	1316.5	N1427	E178	N11114.2	E7071.8	52.0	None
DH-18	Down	1305.1	N1429	E181	N11114.2	E7071.8	50.8	None
DH-19	Up	1314.7	N1107	E206.5	N10794.2	E7101.7	51.6	None
DH-20	Down	1306.2	N1109	E206	N10794.2	E7101.7	51.1	None
DH-21	Up	1331.0	N1421	E786	N11109.1	E7680.9	50.4	None
DH-22	Down	1318.8	N1421.5	E785.5	N11109.2	E7680.9	51.0	None
DH-23	Up	1328.0	N1112	E781	N10799.2	E7679.9	51.0	None
DH-24	Down	1319.5	N1112	E781	N10799.2	E7679.8	49.4	None
DH-24A	Down	1319.5	N1112	E780	N10799.08	E7678.59	50.4	None
DH-25	Up	1318.8	N1422	E1510	N11109.7	E8403.8	51.8	None
DH-26	Down	1307.2	N1427	E1510	N11114.3	E8403.8	53.0	None
DH-27	Up	1300.8	N1107	W682	N10793.7	E6218.4	50.5	None
DH-28	Down	1289.9	N1107	W682	N10793.8	E6218.3	50.5	None
DH-29	Up	1298.3	N1099	W982	N10785.4	E5932.4	50.4	None
DH-29A	Up	1298.1	N1099	W987	N10786.1	E5927.3	35.0	None
DH-30	Down	1289.2	N1099	W982	N10785.5	E5932.2	50.1	None
DH-31	Up	1298.5	N1099	W1282	N10784.9	E5632.3	50.5	None
DH-31A	Up	1298.5	N1099	W1280	N10784.8	E5630.5	49.2	None
DH-31B	Up	1298.5±	N1099	W1261	N10786.7	E5652.2	4.9	None
DH-32	Down	1289.6	N1099	W1282	N10784.9	E5632.2	50.0	None
DH-32A	Down	1289.5	N1099	W1261	N10786.7	E5652.2	5.5	None
DH-33	Up	1298.6	N1099	W1582	N10786.0	E5331.1	50.5	None
DH-33A	Up	1297.4	N1099	W1570	N10786.8	E5342.0	4.1	None
DH-34	Down	1289.4	N1099	W1582	N10786.5	E5331.7	51.5	None
DH-34A	Down	1289.2	N1099	W1570	N10786.8	E5341.9	3.6	None
DH-35	Up	1294.4	N1102	W1882	N10789.4	E5032.2	52.0	None
DH-36	Down	1284.6	N1102	W1882	N10789.4	E5032.2	51.5	None
DH-37	Up	1297.4	N1101	W2182	N10788.9	E4732.0	51.5	None
DH-38	Down	1287.0	N1101	W2182	N10788.8	E4731.9	47.5	None
DH-39	Up	1296.0	N1101	W2482	N10789.2	E4430.7	50.7	None
DH-40	Down	1286.1	N1101	W2482	N10789.2	E4431.0	51.0	None
DH-41	Up	1295.8	N1101	W2782	N10789.0	E4132.6	49.9	None
DH-42	Down	1285.9	N1101	W2782	N10789.0	E4132.4	51.2	None
DH-42A	Down	1285.7	N1101	W2789	N10789.2	E4125.5	40.5	None

(1) Survey data not available.

Table I-1 (continued)

SUMMARY OF CORE HOLE DATA

Core Hole No.	Direction	Collar Elevation (Ft-MSL)	Approximate Station (Ft)		Facility Coordinates (Ft)		Depth/ Penetration (Ft)	Instrument Designation
DH-207	Up	1259.8	S697	E155	N8989.7	E7049.1	53.0	GE-246
DH-208	Down	1251.6	S698	E150	N8988.8	E7044.0	49.2	None
DH-211	Up	1270.5	S1320	E163	N8366.5	E7057.1	50.0	None
DH-212	Down	1261.7	S1320	E163	N8366.5	E7057.1	52.1	None
DH-215	Up	1272.0	S1960	E153	N7727.2	E7046.9	52.0	GE-247
DH-216	Down	1262.6	S1960	E153	N7727.2	E7046.9	54.2	GE-248
DH-219	Up	1266.3	S2422	E162	N7264.9	E7056.6	51.0	None
DH-219A	Up	1266.1	S2418	E162	N7268.5	E7056.2	11.3	None
DH-220	Down	1257.4	S2421	E162	N7265.5	E7055.9	51.8	None
DH-223	Up	1255.1	S3079	E154	N6607.2	E7048.5	52.6	GE-249
DH-224	Down	1246.6	S3079	E154	N6607.5	E7048.5	52.5	None
DH-227	Up	1247.0	S3656	E147	N6030.7	E7041.2	51.7	None
DH-228	Down	1237.8	S3656	E147	N6030.7	E7041.2	50.4	None
DH-301	Up	1276.9	N150	W170	N9830.5	E6724.5	50.75	None
DH-302	Down	1264.9	N150	W170	N9830.5	E6724.5	50.6	None
DH-303	Up	1267.2	S400	W170	N9282.3	E6726.1	51.4	None
DH-304	Down	1254.3	S400	W170	N9282.5	E6726.1	50.5	None
DH-306	Down	1244.1	S400	E140	N9287.3	E7049.9	52.0	None
DH-306A	Down	1244.0	S400	E125	N9287.9	E7034.6	8.5	None
DH-307	Up	1262.6	S400	E300	N9286.7	E7194.2	52.0	GE-263
DH-309	Up	1259.8	S700	E220	N8987.1	E7123.0	52.3	GE-265
DH-311	Up	1264.4	S1000	E300	N8686.3	E7194.9	52.0	GE-264
DH-313	Up	1270.6	S1300	E300	N8385.9	E7190.6	19.6	None
DH-313A	Up	1270.9	S1300	E299	N8386.6	E7189.5	50.2	None
DH-314	Down	1258.3	S1300	E300	N8386.5	E7189.5	50.75	None
DH-315	Up	1272.1	S1300	W170	N8387.3	E6725.5	50.3	None
DH-316	Down	1259.9	S1300	W170	N8387.2	E6725.3	50.1	None
DH-317	Up	1271.3	S1600	W33	N8077.4	E6875.9	50.1	None
DH-317A	Up	1271.2	S1600	W30	N8077.5	E6879.5	5.0	None
DH-317B	Up	1271.2	S1597	W30	N8080.3	E6881.0	51.0	None
DH-318	Down	1258.5	S1600	W30	N8077.3	E6876.1	50.0	None
DH-319	Up	1260.0	S700	E300	N8988.1	E7191.6	51.05	None
DH-321	Up	1261.4	S400	E0	N9792.0	E6891.8	52.0	GE-268
DH-323	Up	1261.2	S400	E55	N9291.7	E6952.5	52.5	GE-267
DO-45	Up	1285.5	N254	E147	N9941.0	E7041.3	52.4	GE-230
DO-46	Down	1276.5±	N254	E147	N9941.0	E7041.3	51.5	None
DO-52	Up	1280.4	N146	W4	N9832.5	E6890.5	51.6	GE-226
DO-53	Down	1266.6	N146	W4	N9832.5	E6890.5	49.2	None
DO-56	Up	1296.8	N621	E0	N10311.8	E6892.3	52.1	GE-234
DO-57	Down	1288.1	N621	E0	N10311.8	E6892.4	52.1	None
DO-63	Up	1310.6	N1110	E0	N10796.0	E6891.9	52.8	GE-243
DO-64	Down	1301.5	N1110	E0	N10796.0	E6891.6	52.8	GE-221
DO-67	Down	1296.8	N1265	W231.5	N10952.1	E6662.9	51.7	GE-220
DO-69	Up	1310.1	N1265	W231.5	N10951.9	E6662.5	51.4	GE-218
DO-77	Down	1294.6	N1270	W364.5	N10962.5	E6529.6	53.4	GE-216
DO-79	Up	1307.7	N1270	W364.5	N10962.6	E6529.5	51.8	GE-214
DO-88	Up	1305.9	N1265	W497.5	N10952.8	E6396.5	52.7	GE-212
DO-90	Down	1292.1	N1265	W497.5	N10952.6	E6396.4	53.6	GE-210
DO-91	Down	1292.1	N1275	W630.5	N10961.5	E6263.9	51.8	GE-209
DO-93	Up	1304.9	N1275	W630.5	N10961.1	E6263.9	52.0	GE-207
DO-201	Up	1262.2	S406	W19	N9280.6	E6874.9	51.7	None
DO-202	Down	1248.6	S406	W19	N9280.6	E6874.9	51.4	None
DO-203	Up	1298.2	N624	E140	N10308.6	E7041.7	52.0	GE-235
DO-204	Down	1290.5	N640	E140	N10308.5	E7041.5	51.6	None
DO-205	Up	1316.5	N1410	E0	N11095	E6892	50.7	None
DO-206	Down	1308.0	N1410	E0	N11095	E6892	50.6	None
DO-229	Up	1259.8	S401	E153	N9287	E7049	50.6	None
OH-9	Up	1310	N1433	W231.5	N11125.6	E6662.9	15.4	None
OH-11	Up	1308	N1433	W364.5	N11125.6	E6529.6	19.7	None
OH-13	Down	1298	N1433	W231.5	N11125.6	E6662.9	9.5	None
OH-14	Down	1296	N1433	W364.5	N11125.6	E6529.6	9.7	None

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. MB-139-1 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 79' N of Exploratory Shaft centerline, midspan

STATION N79,W6 COLLAR ELEV. 1264.1' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9766, E6888 DEPTH OF BOREHOLE 10.0'

DRILLING METHOD Air & Brine DRILL MAKE/MODEL Longyear 38

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/26/83

SHEET 1 OF 1

RUN NUMBER	DEPTH (ft)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0	1.5	100	–		0.0' – 4.4' **HALITE:** clear halite, coarsely crystalline, 1-2% moderate reddish-orange (10R 6/6) polyhalite, 1-2% brown clay, ~1% gray clay, all in discrete blebs.	Hole was cored on 27 October 1982. The first 5' interval was drilled with air. Recovery was poor, and the core was covered with oil. At 5', drilling with brine commenced and continued to 10'. At 10', the water pump failed and the rods became stuck in the hole. Rods were pulled and drilling halted at 10'.
2		0.8	24	–			
	5					4.4' – 6.8' **POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) halite, coarsely crystalline, 5% polyhalite in blebs above 6.0', in blebs and disseminated below 6.0', clay absent, 10-50% anhydrite from 6.7'-6.8'.	
3		1.0	100	–			
4		3.5	88	–		6.8' – 8.6' **ANHYDRITE:** (Marker Bed 139) light gray (N7), microcrystalline anhydrite, 5-50% polyhalitic halite from 6.8'-8.1' decreasing downward, gray clay parting at 8.6'.	
	10					8.6' – 9.5' **HALITE:** clear to moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, 1-2% mostly disseminated polyhalite, ~1% gray clay.	Total depth = 10.0'.
	15						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. MB-139-2 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION Intersection of South 400 and East 140 Drifts, 14.5' N of S rib of South 400 Drift, 18' W of E rib of East 140 Drift

STATION S410, E150 COLLAR ELEV. 1251.2' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9277, E7044 DEPTH OF BOREHOLE 15.7'

DRILLING METHOD Air and Brine DRILL MAKE/MODEL Longyear D-65

PREPARED BY RMB/Bechtel DATE 11/27/82

SHEET 1 OF 1

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0	1.6	89	-		0.0' - 1.1' **HALITE:** clear halite, medium to coarsely crystalline, trace polyhalite, gray clay break at 0.4'.	Coring started at 12:00 hours on 27 November 1982.
2		1.9	90	-		1.1' - 2.8' **HALITE:** medium reddish-orange (10R 5/6), translucent halite, medium crystalline, moderately hard, 2 - 5% clay, ~5% polyhalite, gray clay parting at 1.1', brown clay parting at 1.4'.	
3	5	0.6	27	-		2.8' - 6.5' **HALITE:** predominantly clear halite, coarsely crystalline, trace polyhalite in places, trace gray clay blebs in places.	From ground surface to 8.7', core was recovered directly into drill rod without use of inner barrel. Inner barrel was used below 8.7'.
4		1.3	100	-		6.5' - 8.1' **HALITE:** medium reddish-orange (10R 5/6), translucent halite, medium crystalline, ~2% polyhalite, trace gray clay blebs in places, polyhalite absent from 7.4' - 8.1'.	
5		1.3	100	-			
6	10	4.9	98	-		8.1' - 9.7' **POLYHALITIC HALITE:** medium reddish-orange (10R 5/6), translucent halite, medium to coarsely crystalline, moderately hard, 20 - 25% polyhalite.	
						9.7' - 12.9' **ANHYDRITE:** (Marker Bed 139) medium light (N6) to very light gray (N8) to light brownish-gray (5YR 6/1) anhydrite, hard, dense, up to 50% halite from 9.7' - 10.5' in "mesh" network with anhydrite, some halite from 10.5' - 12.9', polyhalite band 9.7' - 9.75', 10.5' - 12.9' mostly broken into "poker chips".	At ~11'-12', brine drilling fluid started bubbling back out of hole. Hit trace pressurized gas.
7	15	1.9	95	-		12.9' - 13.7' **HALITE:** light gray (N7) mottled with medium reddish-orange (10R 5/6) translucent halite, clay occurs predominantly as closely-spaced breaks, 1" gray clay seam at 12.9', gray clay breaks at 13.1', 13.2', and 13.3'.	
						13.7' - 15.7' **HALITE:** brownish-gray and medium reddish-orange (10R 5/6) translucent halite, medium to coarsely crystalline, ~1% gray clay, trace polyhalite in places, especially 15.3' - 15.7', gray clay breaks at 13.9', 14.3', and 14.7'.	Finished coring at 14:15 hours, gas still evident in hole. Total depth = 15.7'.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. MB-139-3 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION Intersection of South 90 and East 140 Drifts, 1' N of S rib of the South 90 Drift, 14.5' E of W rib of the East 140 Drift

STATION S101,E157 COLLAR ELEV. 1260.5' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9586, E7051 DEPTH OF BOREHOLE 16.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JAK,RLB/TSC DATE 1/26/83 SHEET 1 OF 1

RUN NUMBER	DEPTH (ft.)	RECOVERY (ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0	1.1	49	-		**0.0' - 7.9' HALITE:** clear to moderate reddish-orange (10R 6/6) to moderate brown (5YR 3/4) halite, medium to coarsely crystalline, 1-5% polyhalite, 1-3% gray clay predominantly at top, 1-3% brown clay predominantly at bottom, 0.0'-0.6' has <1% polyhalite, ~1% disseminated polyhalite and no clay from 4.2'-4.8', otherwise polyhalite is in discrete blebs.	Hole cored on 28 December 1982.
2		0.75	45	-			
3	5	1.2	39	-			
4		1.8	83	-		**7.9' - 9.6' POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) halite, 2-5% polyhalite disseminated and in blebs, <1% gray clay, brown clay absent.	
5	10	4.6	92	-		**9.6' - 11.9' ANHYDRITE:** (Marker Bed 139) light gray (N7) microcrystalline anhydrite, trace halite from 9.6'-11.2', gray clay seam at 11.9'.	Gas encountered while drilling through MB 139.
						11.9' - 16.0' HALITE: clear to moderate reddish-brown (10R 4/6) halite, finely to coarsely crystalline, 1-2% disseminated polyhalite, 1-2% gray clay above 14.3', 1-3% brown clay below 14.8', clay absent elsewhere, 14.3'-14.8' is relatively pure halite. pure halite.	
6	15	1.8	100	-			Total depth = 16.0'.
	20						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. MB-139-4 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION Intersection of O East and South 90 Drifts, 5' E of W rib of O East Drift, 3' N of S rib of South 90 Drift

STATION S99,W17 COLLAR ELEV. 1258.7' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9588, E6877 DEPTH OF BOREHOLE 16.2'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/26/83 SHEET 1 OF 1

RUN NUMBER	DEPTH (ft)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0	0.5	25	–			Hole cored on 29 November 1982.
2	5	3.5	95	–		0.0' – 5.6' **HALITE:** mottled white to clear to dark reddish-brown (10R 3/4) halite, coarsely crystalline, 1 – 5% polyhalite and 1 – 5% brown clay, both concentrated in discrete blebs within otherwise clear halite.	Run 1 recovery seems to be from bottom of run.
3		3.5	95	–		5.6' – 8.5' **POLYHALITIC HALITE:** clear halite, coarsely crystalline, 5 – 10% moderate reddish-brown (10R 5/6) polyhalite in discrete blebs, <1% gray clay.	
4	10	4.6	97	–		8.5' – 11.9' **ANHYDRITE:** (Marker Bed 139) light gray (N7) anhydrite, 30 – 40% halite from 8.5' – 10.7, 5 – 10% halite from 10.7' – 11.1', gray clay seam at 11.9'.	Drilled with solution of vent shaft water and added salt.
5	15	2.1	100	–		11.9' – 16.2' **HALITE:** clear to moderate reddish-brown (10R 4/6) to light gray (N7) halite, finely to coarsely crystalline, 1 – 5% polyhalite and 1 – 2% gray clay in bands, ~1% brown clay.	Most core shows signs of dissolution by drilling fluid. Smooth, rounded features of halite, polyhalite and clay stand out in relief.
	20						Total depth = 16.2'.

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NX CORE BORING NO. DH-01

LOCATION N 1420 DRIFT: ROOF

STATION N 1424 ± E 439.5 ± COLLAR ELEV. 1318.2 DIRECTION OF DRILLING VERTICAL-UP

MINE COORDINATES N 11,110.9 E 7335.5 DEPTH OF BOREHOLE 50.8 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 2/9/84 (SWING) DATE COMPLETED 2/10/84 (SWING) SHEET

LOGGED BY: J.E. GALLERANI DATE: 3/5/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		3.2	3.2	100	X	0.0'-4.4' HALITE: Clear with scattered moderate reddish orange (10R 6/6) polyhalite, coarsely crystalline with some fine to medium locally. (1,2)	Watson drill; AW rods, NX double tube core barrel. Run 1. Broken zone 2.5'-2.8' ±.
	3.2				X	4.4'-7.05' HALITE: Clear to light gray (N7) medium to coarsely crystalline. ≤1% gray clay and < 1/2% polyhalite. (11)	Drilling Time: 7 hrs ±.
2		4.8	4.8	100	X	7.05'-7.2' ANHYDRITE b: Light gray (N7) to medium gray (N5) microcrystalline. ≤ 3/16" gray clay at 7.05'.	No gas; dry hole. Run 2. Broken up last 15" ± of run 2.
	8.0				X	7.2'-11.8' HALITE: Clear, fine to coarsely crystalline to 8', then predominantly clear, coarsely crystalline. Slight moderate reddish orange color to 8'. (1,2)	Run 3. Broken last 6".
3		4.0	4.0	100			
	12.0					11.8'-13.25' HALITE: Clear with some light moderate reddish brown (10R 4/6) and light gray (N7) medium to coarsely crystalline with fine locally. < 1/2% gray gray and dispersed polyhalite. (9)	
4	13.0	1.0	1.0	100	X		
5		4.2	4.2	100	X	13.25'-13.85' ANHYDRITE a: White to medium gray (N5) microcrystalline. Scattered halite growths especially from 13.5'. Trace of gray clay at 13.25': Some core grinding noted here.	Run 5. Broken up 16.0'-16.8' ±.
	17.2				X	13.85'-17.6' HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 2% locally, polyhalite blebs. (2,3)	Run 6. Broken up last 4" of run.
6		4.8	4.8	100			
	22.0					17.6'-22.9' HALITE: Clear, some light gray (N7); medium to coarsely crystalline. < 1% gray intercrystalline clay. Break at 20.1'. Gray clay break, trace of anhydrite at 22.9'. (1,9)	
7		5.3	4.9	92.5		22.9'-27.3' HALITE: Clear, coarsely crystalline, some medium. Scattered white anhydrite/magnesite? stringers. (1)	Run 7. Broken zones from 25'-27.3' within core.

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-01

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
7	25	5.3	5.3	92.5		27.3'-28.6' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4), fine to coarsely crystalline. < 1 to 3% clay, predominantly brown with trace of gray. Breaks at 27.9' and 28.35'. ≤5% brown clay from 28.35' to 28.6'. (17)	
27.3							
8		4.7	4.7	100		28.6'-31.5' HALITE: Clear, coarsely crystalline ≤ 1/2% gray clay and polyhalite locally. (1)	Run 8. Broken up 30.2'- 32' ±.
	30					31.5'-34.0' ARGILLACEOUS HALITE: Clear to medium brown (5YR 4/4) and dark reddish brown (10R 3/4) medium to coarsely crystalline. < 1 to 4% brown clay. Scattered breaks at 33.2'-34'. (10)	
32.0							
9		5.0	5.0	100		34.0'-35.0' HALITE: Clear, coarsely crystalline. < 1/2% brown clay. (1,8)	Run 9. Broken up discs 33.8'-35' ±.
	35					35.0'-35.85' ANHYDRITE: Very light gray (N8) to medium gray (N5) microcrystalline anhydrite: partially laminated. Scattered halite growths, especially 35.55'-35.85'. ≤1/4" brown clay at 35.0'.	
37.0							
10		4.3	4.3	100		35.85'-37.2' HALITE: Clear, coarsely crystalline. <1% polyhalite blebs and patches up to 1/2" white anhydrite layer at 36.7'. (1,2)	Run 10. Broken zones in core 38'-39.5' ±.
	40					37.2'-39.9' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline < 1 to 3% polyhalite blebs and patches. < 1/2% gray clay. (3,4,7)	
41.3							
11		4.7	4.7	100		39.9'-42.3' HALITE: Clear to light brown (5YR 5/6), medium to coersely crystalline. ≤ 1% brown intercrystalline clay. 1/2" brown clay seam at 41.3'. < 1% polyhalite. Argillaceous halite at 41.8' to 42.3'. (8,10)	Run 11. Small broken zones in core 45'-46' ±.
	45					42.3'-45.4' HALITE: Clear, coarsely crystalline. < 1% polyhalite and < 1/2% gray clay. (1,7)	
46.0							
12		4.8	4.8	100		45.4'-47.0' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4) (5YR 3/4) medium to coarsely crystalline. < 1 to 5% brown clay, intercrystalline and breaks. Breaks from 46.5' to 46.9'. (12)	
	50					47.0'-49.0' HALITE: Clear to medium brown (5YR 4/4) to moderate yellowish brown (10R 5/4) medium to coarsely crystalline, some fine. ≤ 1 to 2% brown clay. Up to 4% clay from 48.7'-49.0'. Scattered breaks here, 3/8" brown clay seam at 49.0'. (12,17)	
50.8							
	55					49.0'-50.8' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite blebs and patches. < 1/2% gray clay. (4,7)	

BORING NO. DH-01

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-02

LOCATION N1420 DRIFT - FLOOR

STATION N1424 ± E440 ± COLLAR ELEV. ____ DIRECTION OF DRILLING VERTICAL - DOWN

MINE COORDINATES N11,110.9 E7336.06 DEPTH OF BOREHOLE 50.2'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 2/7/84 (SWING) DATE COMPLETED 2/8/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/5/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		4.5	4.5	100		0.0'-4.8' HALITE: Clear with some light gray (N7); coarsely crystalline, some medium. ≤1% gray intercrystalline clay and < 1/2% polyhalite blebs.	Watson drill NX double tube barrel, AW rods. Total time: 3-1/2 hours. Had to bolt machine to floor. Vibration of track boom is considerable No gas; dry hole. Contacts below run 2 not able to be determined accurately due to core loss.
	4.5					4.8'-5.3' POLYHALITIC HALITE: Clear to moderate reddish orange; coarsely crystalline. < 1 to 3% polyhalite.	
2	5	5.0	4.5	90		5.3'-8.5' MB-139: Moderate reddish orange anhydrite mixed with halite to 5.4', then predominantly white to medium light gray (N6) anhydrite. Some "swallowtail" pattern in upper part. Scattered halite growths throughout. Abundant polyhalitic halite mixed with the anhydrite from 7.25'-8.0'. < 1/4" gray clay at 8.5'.	Run 2. Core loss probably upper 1-1/2'.
	9.5					8.5'-11.8' HALITE: Clear, medium to coarsely crystalline. <1% gray clay and polyhalite.	
3	10	5.3	4.6	86.8		11.8'-15.7' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 2% polyhalite. <1/2% gray clay. Some anhydrite at 15.5 to 15.7'. Gray clay parting at 15.7'.	
	14.8					15.7'-16.4' HALITE: Clear, medium to coarsely crystalline. <1% gray clay and dispersed polyhalite.	
4	15	5.2	3.3	63.5		16.4'-25.0' ± POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite. <1/2% gray clay below 22.5' ±.	
	20.0					25.0'-30.0' ± HALITE: Clear, fine to coarsely crystalline. <1/2% clay and polyhalite.	
5	20	5.0	4.0	80			
	25.0						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-02

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25.0						
6	30	5.0	2.7	54		30.0'-33.9' ± HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1/2% dispersed polyhalite. 1/2" anhydrite layer at 30'.	Run 7. Poor core recovery. Run 8. Poor core recovery. Took apart core barrel. Air ports were plugged. Cleaned up but still poor recovery.
	30.0						
7		3.9	1.0	25.6		33.9'-45.8' ± HALITE: Clear to light gray (N7) and medium light gray (N6); medium to coarsely crystalline, some fine. < 1% clay and < 1/2% dispersed polyhalite.	
	33.9						
8	35	5.6	1.2	21.4		45.8'-50.2' HALITE: Clear, medium to coarsely crystalline. None to < 1% gray clay. < 1/2% polyhalite from 49.3' to 50.2'.	
	39.5						
9	40	5.1	1.2	23.5		Note: Core recovery from 4.5' is below 95%. Unable to accurately determine contacts. Hole was redrilled twice. Refer to logs for DH-02A and DH-02B.	
	44.6						
10	45	5.6	4.5	80.4			
	50.2						
	50						

BORING NO. DH-02

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-02A

LOCATION N1420 DRIFT FLOOR

STATION N1424 ± E435 ± COLLAR ELEV. ____ DIRECTION OF DRILLING VERTICAL - DOWN

MINE COORDINATES N11,110.9 E7331.29 DEPTH OF BOREHOLE 49.2'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 2/8/84 (SWING) DATE COMPLETED 2/9/84 (DAY) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/5/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		5.0	5.0	100		0.0'-2.75' HALITE: Clear to light gray (N7) coarsely crystalline. <1% gray clay. <1/2% polyhalite.	Watson drill with NX double tube barrel. AW rods. Drilling time: 6 hours and 45 minutes. No gas/brine.
						2.75'-5.6' HALITE: Clear with some moderate reddish orange (10R 6/6); coarsely crystalline. <1% polyhalite.	
	5.0						
2	5	5.0	4.3	86		5.6'-8.2' MB-139: "Swallowtail" pattern of halite and anhydrite from 5.6' to 7.5'. 1" layer of clear halite at 7.2'. From 7.5' to 8.2' predominantly light gray anhydrite with scattered halite growths. Some irregular laminated present. No clay at 8.2' but core grinding evident.	Run 2. Loss appears to be at top of run. Run 4. Core looks good in run; loss possibly throughout.
	10.0					8.2'-11.8' HALITE: Clear with some light moderate reddish orange and light gray (N7). Medium to coarsely crystalline. <1% gray clay. Breaks at 10.75' to 11.05'.	
3	10	4.8	4.7	97.9		11.8'-13.0' HALITE: Clear, coarsely crystalline. <1% polyhalite. <1/2% gray clay.	
	14.8					13.0'-17.2' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite. 1-1/2" anhydrite layer at 17'±. Core loss makes contacts ±8".	
4	15	5.3	3.8	71.7		17.2'-20.1' HALITE: Clear to moderate reddish orange (10R 6/6); medium to coarsely crystalline. <1% dispersed polyhalite. <1/2% gray clay.	
	20.1					20.1'-25.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline, some medium. <1 to 3% polyhalite. <1% gray intercrystalline clay at 22.4' to 25'.	
5	20	4.9	4.9	100		25.0'-28.6' HALITE: Clear, medium to coarsely crystalline. None to <1/2% dispersed polyhalite and gray clay.	
	25.0						
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-02A

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25.0						
6	25–30	5.0	5.0	100		28.6'–33.6' HALITE: Clear to moderate reddish orange; coarsely crystalline. < 1 to 2% polyhalite. Scattered anhydrite stringers. < 1/2% gray clay locally.	Run 8. Broken zone 37.4'–37.7', ±
	30.0						
7	30–35	5.0	5.0	100		33.6'–34/3' HALITE: Clear, coarsely crystalline. None to < 1/2% polyhalite.	Run 10. Broken up last 8" of Run 10. Core loss probably here.
						34.3'–34.6' ANHYDRITE: V. light (N8) to medium light gray (N6) anhydrite. Faintly laminated scattered halite growths. Clay break at 34.6'.	Beyond 35', core is more broken up with evidence of more vibration damage.
	35.0					34.6'–41.4' HALITE: Clear, some light to medium light gray (N7 to N6); coarsely crystalline. < 1% gray clay. Core loss Runs 8, 9 make contact at 41.4' approximate.	Contacts at 5.6', 17.2'; 41.4' and 45.9' are approximate due to core loss.
8	35–40	4.2	1.5	35.7		41.4'–45.9' HALITE: Clear to moderate brown some fine. < 1 to 3" brown clay, intercrystalline and scattered breaks. Contacts approximate, due to core loss.	
	39.2						
9	40–44.2	5.0	3.8	76		45.9'–49.2' HALITE: Clear with some light gray (N7) and medium light gray (N6); medium to coarsely crystalline, some fine. < 1% gray clay.	
	44.2						
10	45–49.2	5.0	4.2	84		Note: Average core recovery for hole is less than 95% Some contacts not able to be determined accurately. Replacement hole DH-2B drilled. Refer to log for this hole.	
	49.2						
	50						

BORING NO. DH-02A

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-02B

LOCATION N1420 DRIFT - FLOOR

STATION N1424 ± E442 ± COLLAR ELEV. 1306.3 DIRECTION OF DRILLING VERTICAL - DOWN

MINE COORDINATES N11110.9 E7331.29 DEPTH OF BOREHOLE 53.0'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 3/22/84 (SWING) DATE COMPLETED 3/23/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/30/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1	2.1	2.1	2.1	100		0.0'-2.7' HALITE: Clear, trace of light gray (N7); coarsely crystalline. <1/2% gray clay and scattered polyhalite blebs. [1, 2]	Watson post mounted drill NW split tube barrel. AW rods. Drilling Time: 5 hours
2	3.6	1.5	1.4	93		2.7'-5.7' HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline, some medium. 1/2% gray clay locally. <1% polyhalite. (2-4)	Core condition fair. Some discing and vibration damage noted.
3	5.3	1.7	0.4	24			
4	6.6	1.3	1.3	100		5.7'-8.3' MB-139: From 5.7' to 6.5' is a mixture of halite and anhydrite. Some "Swallowtail" pattern present. Below 6.5' mostly light gray (N7) to medium light gray (N6) anhydrite. Scattered halite growths. 3/16" halite layer at 8.15'. 3/8" hard gray clay at lower contact.	
5	8.1	1.5	1.5	100			
6	10	4.7	4.7	100		8.3'-11.7' HALITE: Clear to medium light gray (N6) and moderate reddish orange (10R 6/6); medium to coarsely crystalline <1% gray clay and <1/2% dispersed polyhalite. [2, 9]	
7	12.8 15	5.1	5.1	100		11.7'-16.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1% to 3% polyhalite. Scattered anhydrite. 1/2" anhydrite layer with irregular gray clay parting at 16.35-16.4'. [3, 4, 7]	
8	17.9 20	5.0	5.0	100		16.4'-20.3' HALITE: Clear to light gray (N7) and light bluish gray (5B 7/1); trace of moderate reddish orange. Coarsely crystalline, some medium <1% gray clay and <1% polyhalite grades into unit below. [2, 9]	
	22.9 25					20.3'-24.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline, some medium. <1 to 3% polyhalitic. <1% gray clay locally. [2-4, 7]	
						24.0'-27.9' HALITE: Clear to light moderate reddish orange (10R 6/6); medium to coarsely crystalline. <1/2% dispersed polyhalite and light gray clay. Break at 24.05'. [2, 9]	

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-02B

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
9	25	5.0	4.9	98		27.9'-33.9' HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 2% polyhalite blebs and patches. Scattered anhydrite from 31'. Predominantly anhydrite at 33.05 to 33.2' with dark gray along core break in anhydrite. [2, 4]	
27.9							
10	30	5.0	5.0	100		33.9'-34.3' ANHYDRITE: White to medium light gray (N6) microcrystalline. Scattered halite growths. Trace of gray clay at 34.4'.	
						34.3'-41.2' HALITE: Clear with some medium light gray (N6), light bluish gray (5B 7/1) and moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1% gray intercrystalline clay. <1/2% dispersed polyhalite. [2, 9, 11]	
32.9							
11	35	5.0	5.0	100		41.2'-44.75' HALITE: Clear to moderate brown (5YR 4/4) and moderate reddish brown 10R 4/6). Medium to coarsely crystalline. <1 to 2% brown clay, trace of gray. <1/2% dispersed polyhalite. [13, 17]	
37.9							
12	40	5.0	5.0	100		44.75'-47.9 HALITE: Clear, some medium light gray (N6); coarsely crystalline. ≤1% gray clay. <1/2% polyhalite. [2, 11]	
						47.9'-49.6 HALITE: Clear, coarsely crystalline. <1/2% gray clay at 48.9' ±. [1]	
42.9							
13	45	5.0	5.0	100		49.6'-53.0' HALITE: Clear to light moderate reddish orange (10R 6/6); coarse, some medium crystalline. ≤1% polyhalite. <1/2% gray clay to 52.4', then increases to 1% clay. [2, 9 from 52.4'-53.0']	
47.9							
14	50	5.1	5.0	98			
53.0							

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ - _____ HOLE TYPE/SIZE NX CORE BORING NO. DH-03

LOCATION N1100 DRIFT - FLOOR

STATION N 1112 ± E 444 ± COLLAR ELEV. 1318.14 DIRECTION OF DRILLING UP-VERTICAL

MINE COORDINATES N 10,799.2 E 7335.4 DEPTH OF BOREHOLE 48.8 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL CP-65

DATE STARTED 2/6/84 (DAY) DATE COMPLETED 2/7/84 (DAY 11AM) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/5/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		1.3	1.3	100		0.0'-4.5' HALITE: Clear, coarsely crystalline, some medium from 3.9 to 4.5'. < 1% polyhalite blebs.	CP-65 drill, EW rods.
	1.3				X		No gas or brine.
2		1.4	1.0	71			Run 1. 6" diameter core from 0-0 to 1.3'.
	2.7						
3		1.2	1.1	92		4.5'-8.2' HALITE: Clear to light gray medium to coarsely crystalline. ≤ 1% gray intercrystalline clay. < 1/2% polyhalite.	
	3.9				X		
4	5	2.7	2.1	78	X –	8.2'-8.4' ANHYDRITE h: white to light gray (N7) microcrystalline anhydrite with scattered halite growths. Trace of gray clay at 8.2'. < 1/2" halite layer, then trace of gray clay at 8.4'.	
	6.6				– X –		Because of poor core recovery, contacts at 4.8'; 22.9'; 26.0'; 30.75'; and 44.9' are approximate only.
5		4.1	4.1	100	▨	8.4'-12.0' HALITE: Clear, coarsely crystalline. Scattered white anhydrite/magnesite? Stringers.	
	10						
	10.7						
6		5.1	4.9	96	X –	12.0'-13.6' HALITE: Clear, some light moderate reddish orange, fine to medium, some coarsely crystalline. < 1% dispersed polyhalite and <1/2% gray intercrystalline clay.	Run 6. Core broken up below anhydrite zone.
					▨		
	15				X X	13.6'-14.3' ANHYDRITE a: White to light gray (N7) microcrystalline anhydrite. Scattered halite growths, especially common 13.95'-14.3'. Thin halite layer at 13.85'-13.9'. Trace of gray clay at 13.6'. Core grinding evident.	
	15.8				X X		
7		5.2	4.9	94	X	14.3'-18.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 3% polyhalite.	Run 8. Broken core zones.
	20				X –		
	21.0				– X	18.4'-22.9' HALITE: Clear with local zones of medium brown (5YR 3/4) medium to coarsely crystalline. 1% predominantly brown clay. Local zones of ≤ 2% clay at 19.8'-20.7'±; 21.0'-21.4'± < 1/2% polyhalite. Brown clay break at 22.9'±. No anhydrite.	
8		5.0	3.1	62	–		
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-03

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
8	25	5.0	3.1	62		22.9'-26.0' HALITE: Clear, coarsely crystalline. Scattered white anhydrite/magnesite stringers.	Run 10. Broken up core last 1/2 of run.
9		1.5	1.3	87			Run 12. Borrowed SNL stabilizer for EW rods. Tried it on Run 12.. Core much better.
10		2.5	1.0	40		26.0'-30.75' HALITE: Clear to medium brown (5YR 3/4), medium to coarsely crystalline. < 1/2% dispersed polyhalite <1 to 2% brown clay. Some core grinding noted.	Run 13. Discs of clear halite, some broke up.
11	30	3.0	1.5	50		30.75'-34.0' ARGILLACEOUS HALITE: Clear to medium brown (5YR 3/4), medium to coarsely crystalline. < 1 to 3% brown clay. Break at 34'.	Run 14. Moved stabilizer 15' from barrel. Core broken up in clear halite and lower 6" of run. Drilling going slow. Much trouble with rod chatter.
12		2.1	2.0	95		34.0'-35.05' HALITE: Clear with some grayish brown, medium to coarsely crystalline. <1% brown clay, some gray.	
13	35	4.0	4.0	100		35.05'-35.7' ANHYDRITE: Light gray to medium gray (N5) anhydrite with scattered halite growths. Increase of halite from 35.5'-35.7'. ≤1/16" brown clay at 35.05'. Some core grinding evident.	Run 15. Core broken. Rods measured 48.8'. May have lost core in bottom of hole.
14	40	4.4	4.4	100		35.7'-39.9' HALITE: Clear, coarsely crystalline, none to ≤1% moderate reddish orange polyhalite blebs and patches. Scattered white stringers.	
15	45	5.3	4.5	85		39.9'-41.0' HALITE: Clear to moderate reddish brown (10R 4/6) coarsely crystalline ≤1% brown clay and polybalite.	
						41.0'-41.6' ARGILLACEOUS HALITE: Clear to medium brown (5YR 3/4) coarsely crystalline <1 to 4% brown clay. Break at 41.5' ±.	
						41.6'-44.9' HALITE: Clear to moderate reddish brown (10R 4/6) coarsely crystalline. None to 2% polyhalite and < 1/2% clay.	
	50					44.9'-48.8' ARGILLACEOUS HALITE: Clear to medium brown (5YR 3/4), medium to coarsely crystalline. < 1 to 4% brown intercrystalline clay. Breaks at 47.1'; 47.6' ±. Predominantly fine to medium crystalline at 47.8'-48.8'.	Measurements on Run 15 made from top of run.
						NOTE: Because of poor recovery, replacement hole DH-03A drilled later. Refer to log for DH-03A.	

26.0 / 27.5 / 30.0 / 33.0 / 35.1 / 39.1 / 43.5 / 48.8

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ - _____ HOLE TYPE/SIZE NX CORE BORING NO. DH-03A

LOCATION N1100 DRIFT - ROOF

STATION N1112± E450.5± COLLAR ELEV. 1317.4 DIRECTION OF DRILLING VERTICAL-UP

MINE COORDINATES N10,779.20 E7341.92 DEPTH OF BOREHOLE 49.9 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 3-10-84 (SWING) DATE COMPLETED 3-12-84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3-12-84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0						
	1		2.1	2.1	100	X	0.0'-4.9' HALITE: Clear, coarsely crystalline, some medium. < 1% polyhalite. [2]	Watson drill post mounted. AW rods. Used 2' double tube barrel to start hole. NW split tube core barrel from Run 2.
2.1								
	2		3.5	3.5	100	X	4.9'-7.3' HALITE: Clear to light gray (N7) and light bluish gray (5B 7/1); medium to coarsely crystalline < 1% gray clay. < 1% polyhalite at 6.6'-7.3'. [9, 11]	Drill time: 6 hours.
		5						
5.6						—	7.3'-7.55' ANHYDRITE b - White to light gray (N7) anhydrite with growths of halite trace of gray clay at 7.3'. Upper contact irregular tightly welded.	Run 3. Broken up 7.6'-10'.
	3		4.4	4.4	100	X		Run 4. Broken core.
							7.55'-12.8' HALITE: Clear, coarsely crystalline. ≤ 1% polyhalite at 11.8'-12.8'. [1, 2]	
10.0		10						
	4		0.9	0.9	100		12.8'-13.7' HALITE: Clear to light gray (N7), some moderate reddish orange (10R 6/6) and moderate brown (5YR 4/4). Medium crystalline, some coarse. < 1% polyhalite and gray clay. [9]	Used piece of foam rubber in barrel to keep core from falling down in barrel. Drill has jerky motion.
10.9						X		
	5		4.6	4.6	100	X —	13.7'-14.3' ANHYDRITE a: White to light gray (N7) anhydrite. Faintly laminated. Couple of very thin anhydrite layers at 13.9'-14'. Scattered halite growtbs increasing from 14.0'-14.3'. Trace of gray clay at 13.7'.	Core broken up. Vibration damage evident.
		15				X		Discing and broken up zones.
15.5						X X		
	6		5.0	5.0	100	X X	14.3'-18.65' POLYHALITIC HALITE: Clear to moderate reddish orange/brown (10R 6/6; 4/6). Coarsely crystalline. <1 to 3% polyhalite. Scattered white anhydrite stringers. [3, 4, 7]	Jerky drill motion is cause of core damage.
						X X		No gas; dry hole.
						—		Run 5. Broken zone 14.3'-15'.
		20				X	18.65'-23.4' HALITE: Clear some light brownish gray (5YR 6/1); moderate reddish orange (10R 6/6) and moderate brown (5YR 4/4) fine to coarsely crystalline. < 1% brown clay, some gray. < 1/2% polyhalite. Brown clay at 23.35' with anhydrite layer above it. [13, 17]	
20.5						—		
	7		4.4	4.4	100	— X		Run 8. Broken up measured core in run rods.
							23.4'-27.7' HALITE: Clear, coarsely crystalline. < 1% brown clay from 27.0'. [1]	
		25						
24.9								

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-03A

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
		25						
	8		2.7	2.7	100		27.7'-28.9' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline. < 1 to 3% brown clay. Scattered breaks. Parting at 28.85'. [12]	Run 9. Core broken up recovery difficult to measure.
27.6								
	9	30	4.0	4.0	100		28.9'-35.05' HALITE: Clear to moderate brown (5YR 4/4); coarsely crystalline. ≤ 1% brown clay, both intra and intercrystalline. Locally argillaceous. Scattered breaks. Clear halite at 34.7' to 35.05'. [1, 10]	Run 10. Broken zones of core.
31.6								
	10		3.5	3.5	100		35.05'-35.95' ANHYDRITE: White to light gray (N7), partially laminated. Scattered growths of halite 35.1' to 35.6' ±. Then becomes a mixture of anhydrite and polyhalitic halite grading upwards to less amount of anhydrite. 1/2" ± brown clay at 35.05'.	Run 11. Broken core last 3' of run. Run 12. Broken up last 2' of run.
35.1		35						
	11		4.9	4.9	100	X	35.95'-40.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite scattered white anhydrite to 37.3'. [2-4, 7]	
							40.0'-43.1' HALITE: Clear to moderate brown (5YR 4/4), some moderate reddish orange. Medium to coarsely crystalline, some fine ≤ 1% brown clay and < 1/2% dispersed polyhalite. [17]	Run 13. Some broken core.
40.0		40						
	12		4.9	4.9	100	X	43.1'-43.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 3% polyhalite. [3, 4, 7]	
						X X	43.6'-46.1' HALITE: Clear, some moderate brown (5YR 4/4). Coarsely crystalline. ≤ 1% brown clay blebs and patches. [8]	
44.9		45						
	13		5.0	5.0	100		46.1'-48.9' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4) to moderate red (5R 4/6) and light moderate reddish orange (10R 6/6). Fine to coarsely crystalline. < 1 to 3% brown clay. Clear halite at 47.4'-47.7' ± 1" brown clay seam at 48.7'. Halite crystals within. [10, 12]	
						X X X		
49.9		50					48.9'-49.9' POLYHALITIC HALITE: Clear to moderate reddish orange/brown (10R 6/6; 4/6). Coarsely crystalline. < 1 to 3% polyhalite. [3, 4]	
		55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-04

LOCATION N1100 DRIFT - FLOOR

STATION N1112.5 ± E444 ± COLLAR ELEV. 1309.56 DIRECTION OF DRILLING VERTICAL - DOWN

MINE COORDINATES N10,799.2 E7335.4 DEPTH OF BOREHOLE 45.8'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL CP-65

DATE STARTED 2/2/84 (DAY) DATE COMPLETED 2/4/84 (DAY) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/5/84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0.0						
1.0	1		1.0	1.0	100		0.0'-4.5' HALITE: Clear to light gray (N7) coarsely crystalline. ≤1% gray intercrystalline clay. <1/2% polyhalite.	NW drill rods. 2' lengths. No gas. Dry hole. Good core to 33.8' Then core recovery poor. Quality not good. Grinding, broken up core. Core barrel problems and rod chatter during drilling.
2.8	2		1.8	1.8	100			
4.8	3		2.0	2.0	100		4.5'-8.1' HALITE: Clear, medium to coarsely crystalline. <1/2% polyhalite blebs and <1/2% gray clay locally.	
6.8	4	5	2.0	2.0	100		8.1'-9.25' POLYHALITIC HALITE: Clear to mod. reddish orange (10R 6/6) coarsely blebs and patches.	
8.8	5		2.0	2.0	100		9.25'-11.65' MB-139: Mixture of moderate reddish orange polyhalitic halite and anhydrite to 9.85'. Then predominantly white to light gray, microcrystalline anhydrite. Scattered halite growths. Some laminae in anhydrite. Up to 3/4" hard, dry gray clay at lower contact.	Run 1. 6" single tube 0.0' to 1.0' because 8-1/2' back of drift too low to start with NX barrel.
	6	10	5.0	5.0	100			
13.8							11.65'-13.6' HALITE: Clear to moderate reddish orange (10R 6/6) and some moderate brown (5YR 3/4), fine to coarsely crystalline. ≤1% brown clay and dispersed polyhalite.	
	7	15	5.0	5.0	100		13.6'-15.35' HALITE: Clear to light gray (N7), some moderate reddish orange, fine to coarsely crystalline. ≤1% gray intercrystalline clay. Breaks at 14.1; 15.35'. <½% polyhalite.	
18.8							15.35'-19.9' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. 1 to 3% polyhalitic. Scattered anhydrite in core mixture of anhydrite and halite at 19.75'-19.9'. Trace of gray clay at 19.9'.	
	8	20	5.0	5.0	100		19.9'-21.1' HALITE: Clear to moderate reddish orange (10R 6/6), fine to medium crystalline. <1/2% dispersed polyhalite.	
23.8								Run 9. Broken zones within polyhalitic halite. Core barrel stuck at 27' ± from 11:30 am to 2:10 pm. broken up 23.8'-26.3'.
	9	25	5.0	5.0	100			

BORING NO. DH-04

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-04

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
9	25	5.0	5.0	100	X X X X X	21.1'-27.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. Clay break at 21.55'. < 1/2% gray intercrystalline clay from 25'-27.6'.	
28.8							
10	30	5.0	4.9	98	X X X X X X	27.6'-30.2' HALITE: Clear to light gray (N7) to moderate reddish orange (10R 6/6), fine to coarsely crystalline. ≤ 1% gray clay. Breaks at 28.2', 28.45'. < ½% polyhalite.	Run 10. Core grinding.
33.8						30.2'-35.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 3% polyhalite.	Run 11. Core grinding throughout run. 0.8' of core left in hole at end of run.
11	35	4.2	2.5	60	X	35.0'-35.6' ANHYDRITE: Moderate reddish orange to medium gray from 35'-35.3 ±. Then very light to medium gray. No clay at lower contact but core grinding evident.	Runs 12, 13, 14. Broken up core. Contacts from 35' are approximate due to core loss.
38.0						35.6'-43' HALITE: Clear mottled with some light gray (N7) and moderate reddish orange, medium to coarsely crystalline. < 1/2% gray clay and polyhalite.	Note: Hole beyond 33' not able to be logged accurately because of poor core recovery and quality. Replacement hole DH-04B drilled at later date. Refer to log for hole DH-04B.
12	40	5.0	1.4	28	X	43.0'- 45.8': Not able to classify due to poor quality and poor recovery of core.	
43.0							
13		1.8	0.4	22	NO LOG		
44.8							
14	45	1.0	0.3	30			
45.8	50						

WIPP

WASTE ISOLATION PILOT PLANT

GEOLOGIC DRILL LOG

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-4A

LOCATION N1100 DRIFT; FLOOR

STATION N1113 ± E446 ± COLLAR ELEV. 1309.6± DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES _____ DEPTH OF BOREHOLE 11.2 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL BOYLES JVA

DATE STARTED 3-8-84 (SWING) DATE COMPLETED 3-9-84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3-9-84 1 OF 1

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0								
0.6	0							
	1		1.7	1.5	88	X —	0.0' - 7.0' HALITE: Clear to moderate reddish orange; coarsely crystalline. ≤ 1% polyhalite. < 1% gray clay.	Used Boyles JVA screw feed drill. Used roller bit to 0.6', then NX double tube core barrel.
2.3								
	2		1.8	1.5	83	X	7.0' - 8.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) to light brown (5YR 5/6). Coarsely crystalline. < 1 to 3% polyhalite.	No gas. Dry hole.
4.1								
	3	5	2.3	2.3	100	— X	8.6' - 11.2' MB-139: From 8.6 to 9.6', mixture of halite and anhydrite. "Swallowtail" patterns. Then predominantly medium gray to very light gray (N8) anhydrite with scattered halite growths.	Driller stopped hole at 11.2' because of core loss. Drilled replacement hole DH-4B using Watson drill. Refer to log for DH-4B.
6.4								
	4		4.8	3.5	73	X X X X X X		
		10						
11.2								
		15						

BORING NO. DH-4A

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NX CORE BORING NO. DH-04B

LOCATION N1100 DRIFT; FLOOR

STATION N1112 ± E450.5 ± COLLAR ELEV. 1309.7 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N10,799.70 E7341.85 DEPTH OF BOREHOLE 51.4 FT

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 3-9-84 (SWING) DATE COMPLETED 3-10-84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3-24-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		2.0	2.0	100		0.0'-7.9' HALITE: Clear, some moderate reddish orange (10R 6/6) and medium bluish gray (5B 5/1) coarsely crystalline. <1% gray clay and polyhalite blebs. [2, some 9]	Watson drill. Post mounted NW split tube core barrel. AW rods.
	2.0						
2		3.2	3.2	100		7.9'-8.55' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1 to 2% polyhalite. [3, 7]	Drilling time: 3-1/2 hours. No brine or gas. Core coming out good.
	5.2						
3		2.7	1.0	37		8.55'-11.6' MB-139: From 8.55' to 9.85'± is a mixture of halite and anhydrite. From 9.85' is predominantly white to light gray (N7) anhydrite with growths of halite. Anhydrite is irregularly laminated. Upper contact is tightly closed and dips 25°±. Several tightly closed hairline fractures at 10.9' to 11.0'±. Gray clay at 11.6'.	NW core barrel has stepped diamond bit. Barrel made by Christensen. No gas; dry hole.
	7.9						
4		3.1	3.1	100		11.6'-15.45' HALITE: Clear to light gray (N7), moderate brown (5YR 4/4) and moderate reddish orange (10R 6/6); medium to coarsely crystalline, some fine. ≤ 1% gray clay, trace of brown. ≤ 1% polyhalite. Gray clay breaks at 12.5', 14.35', 14.6". [9]	
	11.0						
5	11.7	0.7	0.7	100			
6		4.3	4.3	100		15.45'-19.85' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) and brown (10R 4/6); coarsely crystalline. <1 to 3% polyhalite. <1/2% gray intercrystalline clay to 15.9'. Moderate reddish orange/brown anhydrite and some halite at 19.75' to 19.85'. Gray clay parting at 19.85'. [7]	
	16.0						
7		5.0	5.0	100		19.85'-21.0' HALITE: Clear to moderate reddish orange (10R 6/6); medium to coarsely crystalline. ≤1% polyhalite and <1% gray clay. [5, 9]	
	21.0						
8		5.1	5.1	100		21.0'-26.1' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), moderate reddish brown (10R 4/6); coarsely crystalline, some medium. <1 to 3% polyhalite. <1% brown clay at 21.0-21.6'. <1/2% gray clay locally below 21.6'. [7]	

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-04B

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
8	25	5.1	5.1	100		26.1'-27.8' HALITE: Clear with some light gray (N7) and moderate reddish orange (10R 6/6); coarsely crystalline with some medium. <1/2% polyhalite. <1% gray clay. Some of clay is medium plastic, moist. [9]	
26.1							
9		5.1	5.1	100		27.8'-29.3' HALITE: Clear to moderate reddish orange (10R 6/6), brownish gray (5YR 4/1) and moderate brown (5YR 3/4). Medium to coarsely crystalline. < 1 to 2% brown clay, trace gray. Break at 28.95'. < 1% polyhalite. [12]	
	30						
31.2							
10		5.0	5.0	100		29.3'-31.6' HALITE: Clear to moderate reddish orange (10R 6/6); medium to coarsely crystalline. < 1% gray clay and polyhalite. Break at 29.55'. [9, 17]	
						31.6'-36.1' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite. Scattered anhydrite stringers. [3, 4, 7]	
	35						
36.2							
11		5.0	5.0	100		36.1'-36.8' HALITE: Clear, some moderate reddish orange; medium to coarsely crystalline. < 1/2% polyhalite. Anhydrite stringers from 36.55' to 36.8'. [1]	
	40					36.8'-37.0' ANHYDRITE: Very light (N8) to light gray (N7) anhydrite. Scattered halite growths, especially last 0.5'. Trace gray clay at 37.0'. Core grinding evident here. [8]	
41.2							
12		5.1	5.1	100		37.0'-49.35' HALITE: Clear with light bluish gray (5B 7/1), light gray (N7), moderate brown (5YR 4/4) and moderate reddish orange/brown (10R 6/6-10R 4/6). Medium to coarsely crystalline. ≤ 1% brown and gray clay. < 1% polyhalite. Clear halite at 41.2' to 41.9'. Predominantly brown clay (≤ 1%) from 44.3' to 45.3' and 47.0' to 48.5'. [9, 11, 17]	
	45						
46.3							
13		5.1	5.1	100		49.35'-51.4' HALITE: Clear, coarsely crystalline <1/2% gray clay locally. [1, 8]	Several pieces in Run 13 are up to 1-1/2' long before taking out of tube.
	50						
51.4							
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE 4" CORE BORING NO. DH-05

LOCATION N1420 DRIFT IN ALCOVE AT RM. B INTERSECTION

STATION N1463 E972 COLLAR ELEV. 1329.9 DIRECTION OF DRILLING VERTICAL - UP

MINE COORDINATES N11149.6 E7865.0 DEPTH OF BOREHOLE 51.0'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL LONGYEAR 65

DATE STARTED 3/3/84 (DAY) DATE COMPLETED 3/9/84 (DAY) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/14/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		3.3	3.2	97		0.0'-0.35' HALITE: Clear, some light moderate reddish orange (10R 6/6), medium-coarsely crystalline. < 1/2% dispersed polyhalite.	Hole drilled by SNL. Longyear 65 drill with 4" dia. masonary single thin wall core barrel. Diamond bit.
	3.3					0.35'-1.25' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline < 1 to 2% polyhalite.	Run 2. Core grinding at anhydrite-clay layer.
2	5	3.35	3.35	100		1.25'-5.05' HALITE: Clear to light gray (N7), medium-coarsely crystalline. ≤ 1% intercrystalline gray clay. < 1/2% dispersed polyhalite. Breaks at 1.35', 4.8'. Very light gray anhydrite stringer at 2.6', 1/2" anhydrite, trace of clay at 5.0'. Some core grinding noted.	Some difficulty removing core from barrel. Possibly due to moisture in air line. This occurred to 23'±. Core trays hit by passing muck truck. Core partly disturbed in Runs 3, 4, 5.
	6.65						
3		2.70	2.4	89			
	9.35					5.05' -9.3' HALITE: Clear, coarsely crystalline. Scattered white magnesite? stringers.	
4	10	3.65	3.65	100		9.3'-9.95' HALITE: Clear with some light gray intercrystalline clay (≤ 1%). Medium-coarsely crystalline.	Run 5. Loss at 13'-14', some grinding.
	13.0						
5	15	4.15	3.95	95		9.95'-11.0' ARGILLACEOUS HALITE: Clear to medium brown (5YR 3/4) to moderate reddish orange (10R 6/6), fine-medium, some coarsely crystalline. < 1 to 3% brown clay. < 1/2% dispersed polyhalite coloration. Gray clay along tightly closed irregular upper contact.	
	17.15					11.0'-14.1' HALITE: Clear, coarsely crystalline. No clay to 12.9', From 12.9'-14.1', < 1/2% gray and brown clay.	Core quality improves beyond 10' depth; some grinding on ends of core pieces.
6	20	4.0	4.0	100			
	21.15					14.1'-17.15' ARGILLACEOUS HALITE: Clear to moderate reddish orange (10R 6/6) medium brown, fine to medium, some coarsely crystalline. < 1 to 4% brown clay, trace of gray. Irregular break at 16.35'.	
7		3.15	3.10	98			
	24.3						
	25						

BORING NO. DH-05

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-05

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	8		2.3	2.3	100		17.15'-17.75' ANHYDRITE: Very light (N8) to light gray (N7) anhydrite to 17.4'. Then mixed with growths of halite. Tight welded irregular upper contact. Brown clay along lower contact. Core grinding evident here.	Run 8. Some grinding on core ends.
26.6								
	9		3.9	3.6	92		17.75'-22.7' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1% dispersed polyhalite and scattered blebs. White very light gray anhydrite stringer up to 1/2" thick at 19.25'.	
		30						
30.5								
	10		3.2	3.2	100		22.7'-26.6' HALITE: Clear, some moderate reddish brown (10R 4/6), coarsely crystalline with zones of fine-medium. < 1% polyhalite. ≤ 1% brown clay. Breaks at 23.15', 24.3', 26.1. Some core grinding evident.	Broken core 24' -25'.
33.7								
	11	35	3.2	3.2	100		26.6'-28.8' ARGILLACEOUS HALITE: Clear to medium brown (5YR 3/4), coarsely crystalline. < 1 to 3% brown clay. Core broken 26.6'-27.9'.	Core barrel plugged off with clay at 26.6'. Driller stopped hole here on 3/8/84 continued with 4-½" ϕ roller bit to 26.6'. Then continued coring with 4" barrel.
36.9								
	12		3.7	3.7	100		28.8'-30.1' HALITE: Clear, coarsely crystalline. < 1/2% polyhalite.	
		40					30.1'-32.5' POLYHALITIC HALITE: Clear mottled with moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 3% polyhalite. < 1/2% gray clay.	
40.6								
	13		3.4	3.4	100		32.5'-35.4' HALITE: Clear mottled with moderate brown (5YR 3/4) to dark reddish brown, coarsely crystalline. < 1 to 2% patches of brown clay. < 1/2% polyhalite. Parting at 35.4' ± dipping 30° ±.	
44.0								
	14	45	3.75	3.75	100		35.4'-36.8' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 2%, locally of dispersed polyhalite.	
47.75								
	15	50	3.25	3.25	100		38.6'-40.9' HALITE: Clear, some moderate reddish orange (10R 6/6), coarsely crystalline ≤ 1% polyhalite. Moderate reddish brown, polyhalitic at 38.6'-39.0'. Anhydrite stringers at 38.7'-38.8'.	
51.0								
							40.9'-51.0' HALITE: Clear to moderate reddish brown (10R 4/6) to medium brown (5YR 3/4) medium-coarsely crystalline. < 1 to 3% brown clay, intergranular and in patches. < 1/2% polyhalite. Breaks at 41.85', 44.0'-44.2'.	

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE 4 INCH CORE BORING NO. DH-06

LOCATION I-3 ALCOVE - FLOOR

STATION N 1463 ± E 972 COLLAR ELEV. 1317.9 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N 11,149.7 E 7864.9 DEPTH OF BOREHOLE 49.75 FT

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL LONGYEAR 65

DATE STARTED 3-4-84 (DAY) DATE COMPLETED 3-7-84 (DAY) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3-10-84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0						
	1		2.1	2.1	100		0.0'-4.2' HALITE: Clear, coarsely crystalline. < 1/2% polyhalite from 3.4' ±.	Longyear 65 drill, EW rods; 4" diameter, 2' long core barrel with core catcher used.
2.1								
	2		2.05	2.05	100	X	4.2'-5.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6): coarsely crystalline. <1 to 2% polyhalite.	Some grinding noted on ends of core in most runs. Lengths of core pieces generally 1" to 11". Average 3" ±.
4.15								
	3	5	2.1	2.1	100	X X	5.6'-7.8' HALITE: Clear with trace of light gray (N7). Coarsely crystalline. < 1/2% gray intercrystalline clay. < 1/2% polyhalite.	
6.25						X		
	4		1.75	1.75	100	—		Run 4. Grinding on some core ends.
8.0							7.8'-9.0' HALITE: Clear to light gray (N7); medium to coarsely crystalline, trace fine. ≤ 1% gray intercrystalline clay. ≤ 1/4" gray clay seam at 7.8' and 1/8" clay seam at 8.45' ±.	
	5		1.85	1.85	100	— —		Run 5. Some grinding at 9.3'.
9.85		10				— X		
	6		2.1	2.1	100	X X X	9.0'-10.8' HALITE: Clear, coarsely crystalline locally some medium. < 1/2% gray clay and polyhalite.	
11.95								
	7		1.65	1.65	100	X X X	10.8'-13.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite. No clay to 12.35'; then < 1% gray clay.	
13.6								
	8		1.6	1.6	100	— X		
15.2		15						
	9		1.65	1.65	100	—	13.6'-18.65' HALITE: Clear to light gray (N7); coarsely crystalline. ≤ 1% gray intercrystalline clay. None to < 1% polyhalite.	
16.85								
	10		1.8	1.8	100	X		Run 10, 11, 12. Some grinding on core ends.
18.65							18.65'-20.6' HALITE: Clear, some moderate reddish orange (10R 6/6); coarsely crystalline. ≤ 1% polyhalite. < 1/2% gray clay.	
	11	20	1.85	1.85	100	X — X		No gas; dry hole.
20.5								
	12		2.5	2.5	100	X X X X	20.6'-22.3' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline ≤ 1% to 3% polyhalite. < 1/2% gray clay.	
23.0								
	13		2.0	1.9	95			
25.0		25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-06

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
14	25	1.2	1.2	100		22.3'–26.1' MB-139: "Swallowtail" pattern of halite and anhydrite from 22.3' to 24.2'. Then predominantly very light (N8) to light gray (N7) and some moderate reddish orange (10R 6/6) anhydrite mixed with growths of halite. No clay at lower contact but some core grinding on ends of core throughout MB-139.	
26.2							
15		1.3	1.3	100			
27.5							
16		1.6	1.6	100			
29.1						26.1'–29.4' HALITE: Clear to light moderate reddish orange (10R 6/6); medium to coarsely crystalline. < 1% dispersed polyhalite and < 1/2% gray clay.	
17	30	1.9	1.9	100			
31.0							
18		2.0	2.0	100		29.4'–33.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite. Anhydrite mixed with halite at 33.2'–33.5'. Gray clay at 33.5'.	
33.0							
19		2.0	2.0	100			
35.0	35					33.5'–35.6' HALITE: Clear to light gray (N7) and moderate reddish orange (10R 6/6); medium to coarsely crystalline. ≤ 1% gray clay and < 1/2% dispersed polyhalite.	
20		1.7	1.7	100			
36.7							
21		1.8	1.8	100		35.6'–39.1' POLYHALITIC HALITE: Clear to moderate reddish orange/brown (10R 6/6; 4/6); coarsely crystalline. < 1 to 4% polyhalite.	
38.5							
22		1.5	1.5	100			
40.0	40					39.1'–46.2' HALITE: Clear to moderate reddish orange/ brown (10R 6/6; 4/6) and grayish brown (5YR 3/2). Medium to coarsely crystalline. ≤ 1% brown clay, some gray. < 1% polyhalite. Core loss 42'–45'.	
23		2.0	2.0	100			
42.0							
24		3.0	0	0		46.2'–49.75' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite. Scattered white stringers of anhydrite/magnesite.	
45.0	45						
25		2.0	2.0	100			
47.0							
26		2.75	2.75	100			
49.75							
	50						
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-07

LOCATION N1100 DRIFT AT RM. B INTERSECTION; ROOF

STATION N1112 E976.5 COLLAR ELEV. 1326.7 DIRECTION OF DRILLING VERTICAL - UP

MINE COORDINATES N10,799.3 E7870.8 DEPTH OF BOREHOLE 49.8'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 2/21/84 (SWING) DATE COMPLETED 2/22/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/4/84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0								
0.9	1		0.9	0.9	100	X	0.0'-4.6' HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline ≤ 1% polyhalite blebs and patches. Up to 2% polyhalite from 3.1'-4.6'. [1,3]	Watson drill.AW rods. NX double tube core barrel. Drill Time: 9 hours ±.
2.9	2		2.0	2.0	100	X		
	3	5	2.9	2.9	100	X	4.6'-9.0' HALITE: Clear to light gray (N7), some moderate reddish orange (10R 6/6). Medium to coarsely crystalline, some fine. ≤ 1% gray clay. < 1/2% polyhalite. 1/2" gray clay at 8.85'. Anhydrite and halite 8.9'-9.0'. [9, 11]	Run 2. Some discing. No gas. Dry hole.
5.8						X		
	4		5.0	5.0	100	X	9.0'-13.2' HALITE: Clear, coarsely crystalline, none to < ½% intercrystalline gray clay. [1]	Run 5. Broken up last 0.4'.
		10					13.2'-14.7' HALITE: Clear to moderate brown (5YR 3/4; 4/4). Medium-coarsely crystalline, some fine. < 1 to 3% brown clay. Locally zones of argillaceous halite. [12, 17]	
10.8	5		4.3	4.3	100		14.7'-16.5' HALITE: Clear with some moderate brown (5YR 4/4); coarsely crystalline. None to ≤ 1% brown clay. [1, 8]	
15.1		15					16.5'-20.85' ARGILLACEOUS HALITE: Clear to moderate brown, medium to coarsely crystalline. < 1 to 4% brown intercrystalline clay, trace of gray. Breaks at 20.0', 20.5'. [10, 15]	Run 7. Broken zones in clear halite.
	6		4.5	4.5	100		20.85'-21.55' ANHYDRITE: White to light gray (N8), microcrystalline anhydrite with scattered halite growths. Up to 3/4" brown clay at 20.85'.	Run 8. Broken zones last 1.5'.
19.6		20					21.55'-24.9' HALITE: Clear, coarsely crystalline, < 1% polybalite. [1]	
	7		4.4	4.4	100	X	24.9'-26.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1% intercrystalline clay. < 1 to 3% polyhalite. [4,5]	Runs 9-11. Discing of core throughout.Discs 3/8-1" size.
24.0		25				X		

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-07

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
8	28.6	4.6	4.6	100		26.4'-27.5' HALITE: Clear to moderate brown (5YR 4/4); medium-coarsely crystalline. < 1 to 3% brown clay. Break at 27.2' ±. [17]	
9	30	4.0	4.0	100		27.5'-29.35' HALITE: Clear mottled with moderate reddish orange (10R 6/6) polyhalite blebs, coarsely crystalline. ≤ 1% polyhalite. [1-3]	Run 12. Broken and discing entire run. Core quality to 27' is fair. Able to determine depth to to clay/anhydrite at 8.85' accurately. Below 27', core is in discs 3/8 to 1" size. Scattered broken zones. Difficult to measure recovery accurately.
						29.35'-30.85 HALITE: Clear mottled with moderate brown (5YR 4/4); coarsely crystalline. ≤ 1% brown intercrystalline, intracrystalline blebs, pockets of brown clay. [8, 10]	
10	32.6 35	4.5	4.5	100		30.85'-32.3' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4) coarsely crystalline. Brown clay < 1 to 5%, locally. 3/4" brown clay seam at 32.25'. [10, 15]	Run 13. Longest piece is 2".
11	37.1 40	4.0	4.0	100		32.3'-45.0' HALITE: Clear mottled with moderate reddisb orange/brown (10R 6/6; 4/6) and moderate brown (5YR 3/4; 4/4). Coarsely crystalline. Core varies from zones containing mostly blebs and patches of modern reddish orange polyhalite, < 1 to 3%, to zones containing blebs and patches of brown clay < 1 to 2%. Reddish orange color, in part, probably due to iron staining. [3, 4, 10]	
12	41.1 45	4.3	4.3	100		45.0'-47.8' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4); medium-coarsely crystalline. < 1 to 3% intercrystalline brown clay. Breaks at 45.6'; 46.4'. [15]	
13	45.4 50	4.4	4.4	100		47.8'-49.8' HALITE: Clear with some moderate brown (10R 4/6); medium to coarsely crystalline. ≤ 1% brown clay, trace of gray. [17]	
	49.8 55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ HOLE TYPE/SIZE NX CORE BORING NO. DH-08

LOCATION N1100 DRIFT AT RM. B INTERSECTION - FLOOR

STATION N1112 ± E976.5 ± COLLAR ELEV. 1318.80 DIRECTION OF DRILLING DOWN-VERTICAL

MINE COORDINATES N10,799.4 E 7870.9 DEPTH OF BOREHOLE 38.3 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 2/22/84 (SWING) DATE COMPLETED 2/23/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/6/84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0						
	1		2.2	2.2	100		0.0'-2.6' HALITE: Clear to light gray (N7) coarsely crystalline. < 1% intergranular gray clay. < 1/2% polyhalite blebs locally.	Watson post mounted, air drill; AW rods.
2.2								NX double tube core barrel.
	2		2.4	2.4	100		2.6'-5.85' HALITE: Clear, some moderate reddish orange (10R 6/6), coarsely crystalline. < 1% polyhalite blebs and dispersed polyhalite.	Drilling time: 8 hours and 15 minutes. Mining while drilling.
4.6								
	3	5	1.1	1.0	90.9			Core condition is pretty good. Only a few broken up zones.
5.7							5.85'-10.1' HALITE: Clear to light gray (N7) medium to coarsely crystalline. ≤ 1% intergranular gray clay. < 1% polyhalite blebs.	
	4		3.3	2.0	60.6			Run 4. Loss throughout. Core grinding bottom of run.
9.0							10.1'-12.8' HALITE: Clear, some moderate reddish orange (10R 6/6), coarsely crystalline, some fine to medium. < 1% polyhalite except 12.3'-12.5', where core is polyhalitic, up to 3% polyhalite. Contact at 12.8' approximate due to core loss.	
	5	10	1.8	1.7	94.4			
10.8								
	6		5.0	4.5	90		12.8'-19.5' HALITE: Clear to light bluish gray (5B 7/1), light gray (N7) and light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. ≤ 1% gray clay. Break at 14.7'.	Run 6. Broken up about 12.4' in run. Loss possibly here
		15					19.5'-23.0' HALITE: Clear mottled with some moderate reddish orange (10R 6/6) < 1% polyhalite. < 1/2% gray clay 23.0' contact measured from bottom of run 8.	
15.8								
	7		4.7	4.7	100		23.0'-26.6' MB-139: Upper 1.5' of MB-139 shows "swallowtail" pattern, a mixture of anhydrite and halite. Below this is light gray to white anhydrite with scattered halite growths. Some laminae within. Hairline, tightly closed low angle fractures. Trace gray clay at 26.6'.	Run 7. Broken top of run and at 18.5'-19.5' ±.
		20						
20.5								
	8		4.7	3.8	80.9			Run 8. Some grinding, broken up top of run. Most lost probably here. Some grinding at top and bottom of MB-139 also.
25.2		25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-08

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
25.2							
9		5.2	4.1	78.8		26.6'-30.4' HALITE: Clear to moderate reddish orange 10R 6/6, some light gray, medium to coarsely crystalline. < 1% dispersed polyhalite and gray clay.	Run 9. Grinding at top of run.
	30					30.4'-33.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), some light gray, medium to coarsely crystalline. <1 to 3% polyhalite.	
30.4							
10		3.0	3.0	100		33.4'-35.8' HALITE: Clear to light gray (N7), medium to coarsely crystalline. ≤ 1% gray clay. < 1/2% dispersed polyhalite. Clay break at 34.6' ±.	
33.4							
11	35	4.9	3.9	79.6		35.8'-38.3' HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline, some medium. ≤ 1% polyhalite. < 1/2% gray clay. Polyhalitic (1 to 3%) from 36.8'-38.3' ±.	Run 11. Loss throughout. Some grinding at top of run.
38.3						Note: Hole stopped at 38.3' due to core loss. Replacement holes DH-8A and DH-8B drilled in same vacinity. Refer to these drill logs.	Following contacts are approximate due to core loss: 12.8' 23.0' -measured from bottom of run 8. 26.6' -assumed most loss was in MB-139. 35.8'-is ± 0.5'.
	40						
	45						
	50						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-08A

LOCATION N 1100 DRIFT; FLOOR

STATION N1112 ± E 975 ± COLLAR ELEV. 1318.7± DIRECTION OF DRILLING DOWN - VERTICAL

MINE COORDINATES _____ DEPTH OF BOREHOLE 50.7 FT

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 2/24/84 (SWING) DATE COMPLETED 2/29/84 (SWING) SHEET

LOGGED BY: J.E. GALLERANI DATE: 3/6/84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0								
	1		1.6	1.6	100		0.0'-6.6'± 0.4' HALITE: Clear to light (N7) gray coarsely crystalline. None to ≤ 1% gray clay. < 1/2% polyhalite locally. Clear 3.4'-4.2'. Gray clay break at 6.6'.	Watson post mounted. AW rods. NX double tube core barrel.
1.6								
2.1	2		0.5	0.3	60			Drilling Time: 10 hours.
	3		2.1	2.1	100		6.6'-9.65' HALITE: Clear to light bluish gray (5B 7/1) and light gray (N7), medium-coarsely crystalline. ≤ 1% intergranular gray clay. < 1/2% dispersed polyhalite.	
4.2								No gas; dry hole.
	4	5	3.6	2.8	78		9.65'-13.1' HALITE: Clear with some light moderate reddish orange (10R 6/6), coarsely crystalline. < 1% polyhalite. < 1/2% gray clay.	
7.8								
	5		2.9	2.9	100		13.1'-15.8' HALITE: Clear to light gray (N7), coarsely crystalline. ≤ 1% gray intergranular clay and < 1% polyhalite blebs.	
10.7		10						
	6		4.6	4.6	100		15.8'-20.95' HALITE: Clear to light bluish gray (5B 7/1) and light moderate, reddish orange (10R 6/6) medium-coarsely crystalline; scattered fine. <1/2% intergranular gray clay and < 1/2% dispersed polyhalite. Clay break at 20.8'.	
15.3		15					20.95'-23.15' HALITE: Clear, coarsely crystalline. < 1% polyhalite blebs.	
	7		4.9	4.7	96		23.15'-26.4' MB-139: Very light gray (N7) to white anhydrite mixed with halite growths to 25.6'. Then mostly microcrystalline anhydrite partially laminated. Gray clay ≤ 1/8" at 26.4'.	Run 7. Loss probably top of run.
20.2		20						
	8		4.9	4.9	100			
25.1		25						

BORING NO. DH-08A

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-08A

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
25.1		25						
	9		5.1	5.1	100		26.4'-29.5' HALITE: Clear to light bluish gray (5B 7/1) and light gray, medium to coarsely crystalline. < 1% dispersed gray clay. < 1/2% dispersed polyhalite. Break at 29.05'.	
							29.5'-33.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. Anhydrite mixed with halite from 33.4'-33.6'. Gray clay break at 33.6'.	Overall core condition is fair. Scattered broken zones and discing shows vibration stress.
30.2		30						
	10		1.7	1.0	59			
31.9							33.6'-35.6' HALITE: Clear, some moderate reddish orange (10R 6/6), coarsely crystalline. < 1/2% gray clay. < 1% polyhalite.	Contact at 33.6' is ±0.35' due to core loss.
	11		3.7	3.0	81		35.6'-40.1' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite.	
35.6		35						
	12		3.3	3.0	91		40.1'-44.5' HALITE: Clear with some moderate reddish orange and light gray (N7), medium to coarsely crystalline. ≤ 1% polyhalite and gray clay.	
38.9								
	13	40	2.1	1.1	52		44.5'-48.75' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite.	Run 13. Broken up at top.
41.0								
	14		4.7	4.7	100		48.75'-50.0' HALITE: Clear coarsely crystalline. < 1/2% polyhalite.	
							50.0'-50.3' ANHYDRITE: Very light (N8) to medium light gray (N6) to white microcrystalline anhydrite with scattered halite growths. Up to 1/2" halite layer at 50.1'. No clay at lower contact but possibly ground up.	
		45						
45.7								
	15		5.0	5.0	100		50.3'-50.7' HALITE: Clear to light gray (N7), medium to coarsely crystalline. < 1% gray intercrystalline clay.	Contact at 40.1' is ±0.5' due to core loss.
		50					Note: Core recovery is below 95%. Replacement hole DH-08B drilled later. Refer to log for DH-08B.	Run 15. Discing in run 15.
50.7								

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-08B

LOCATION N1100 DRIFT - FLOOR

STATION N1112± E979.5± COLLAR ELEV. 1318.00 DIRECTION OF DRILLING VERTICAL-DOWN

MINE COORDINATES N 10,799.47 E 7866.66 DEPTH OF BOREHOLE 51.4 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 3-16-84 (SWING) DATE COMPLETED 3-17-84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3-23-84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0.0						
0.9	0		0.9	0.0	0	—	0.0'-6.4' HALITE: Clear; medium to coarsely crystalline. <1/2% polyhalite blebs and <1/2% gray clay locally. (1,2)	Watson drill: post mounted. AW rods. NW split tube barrel.
1.3	1		0.4	0.3	75	X		
	2		2.7	2.7	100	—	6.4'-11.4' HALITE: Clear to medium bluish gray (5B 5/1) and medium gray (N5). Coarsely crystalline, some medium ≤1% gray clay. 1/4" ± gray clay seam at 8.9'. (11)	Drilling time: 6 hours ±.
4.0								
4.9	3		0.9	0.6	67			Core is fair. Some discing of coarse crystalline polyhalitic halite and chipping of outer surface of core due to vibration but pieces tend to fit together fairly well in barrel.
	4	5	1.5	1.5	100	X	11.4'-13.15' HALITE: Clear, some moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 2% polyhalite blebs and dispersed. (2,3)	
6.4						—		
	5		2.8	2.8	100	—	13.15'-21.75' HALITE: Clear to medium bluish gray (5B 5/1) and some moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1/2% dispersed polyhalite. ≤1% gray intercrystalline clay. (9)	Run 0. Salt loose and broke up, cased to 0.9'. No core.
9.2								Runs 2 & 3. Some discing of core.
	6	10	5.0	5.0	100	X	21.75'-23.75' HALITE: Clear, coarsely crystalline. None increasing to <1% polyhalite with depth. (1,2,)	
						X		
14.2						—		
	7	15	5.0	5.0	100	X	23.75'-26.9' MB-139: "Swallowtail" pattern of halite and anhydrite to 24.55'. Then predominantly very light (N8) to light gray (N7) to white, partially laminated, anhydrite with scattered halite growths. Several tightly closed hairline fractures at 26.7' to 26.9'. <1/8" gray clay along lower contact.	Run 7. Some chipping of outer surface of core due to vibration last 3' of the run.
						—		
19.2						X		
	8	20	5.1	5.1	100	—		
						X		
24.3		25						

BORING NO. DH-08B

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-08B

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
9	25	2.6	2.6	100		26.9'-29.6' HALITE: Clear to light gray (N7); light bluish gray (5B 7/1), and moderate reddish orange (10R 6/8). Medium to coarsely crystalline ≤1% gray clay and <1/2% dispersed. (9)	
26.9							
10	30	4.5	4.5	100		29.6'-33.8' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline with some fine to 30.15'. <1 to 3% polyhalite. Anhydrite with halite from 33.75 to 33.8'. Clay break at 33.8'. (2-5,7)	Runs 10 thru 12. Discing in polyhalitic halite.
31.4							
11	35	5.0	5.0	100		33.8'-35.8' HALITE: Clear to light gray (N7) and light bluish gray (5B 7/1). Medium to coarsely crystalline. <1% gray clay. <1/2% polyhalite. (9)	
						35.8'-39.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) and some moderate reddish brown (10R 4/6). Coarsely crystalline. <1 to 3% polyhalite. (3,4,7)	
36.4							
12	40	5.0	5.0	100		39.0'-45.2' HALITE: Clear to moderate reddish orange (10R 6/6); light gray (N7) and light bluish gray (5B 7/1). Medium to coarsely crystalline. ≤1% gray clay and <1 to 2% polyhalite. (2,9)	
41.4						45.2'-50.2' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite 1" anhydrite/halite layer at 49.7'. (3,4,7)	
13	45	5.0	5.0	100		50.2'-50.5' HALITE: Clear, coarsely crystalline, some medium. Scattered white anhydrite stringers at 50.2'-50.25' ±. (1)	
46.4						50.5'-50.8' ANHYDRITE: Very light gray (N8) to white anhydrite with scattered halite growths. ≤3/8" gray clay at 50.8'.	
14	50	5.0	5.0	100		50.8'-51.4' HALITE: Clear to light gray (N7) and light bluish gray (5B 7/1) with some moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1/2% dispersed polyhalite. ≤1% gray clay. Break at 51.1'. (9)	Run 14. Discing, chipping of core most of run.
51.4	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-09

LOCATION N1420 DRIFT; ROOF

STATION N1432± E1332.5± COLLAR ELEV. 1324.5 DIRECTION OF DRILLING VERTICAL-UP

MINE COORDINATES N11,108.71 E8227.11 DEPTH OF BOREHOLE 51.1'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 3-14-84 (SWING) DATE COMPLETED 3/14/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3-15-84 1 OF 3

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1	0.0	2.75	2.75	100		0.0'-4.1' HALITE: Clear to light gray (N7) and medium light gray (N6), medium to coarsely crystalline. ≤1% gray clay. <1/2% polyhalite. 3/8" gray clay at 4.1'. Trace of anhydrite associated. [9,11]	Watson drill. AW rods. NW split tube barrel. Drill Time: 7 hours ±.
2	2.75	2.75	2.65	96		4.1'-7.7' HALITE: Clear, coarsely crystalline. Trace anhydrite at 4.6'. Scattered white stringers. [1]	No gas; dry hole.
3	5.5	2.9	2.2	76		7.7'-9.1' HALITE: Clear to light gray (N7); medium light gray (N6). Coarsely crystalline. ≤1% gray clay, trace brown. [11]	All core shows varying degrees of vibration damage. Jerky drill feed is cause for much of this.
4	8.4	4.6	3.8	83		9.1'-10.3' HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline. <1 to 3% brown clay. [13, 14] 10.3'-12.3' HALITE: Clear, some light gray (N7) coarsely crystalline. None to <1% gray, some brown clay. [1, some 9]	Run 3. Much of core broken up. Run 4. Broken up badly last 2' ±.
5	13.0	3.1	3.1	100		12.3'-16.1' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline. <1 to 4% brown clay. Intercrystalline and scattered breaks. Parting at 14.75'. 1/2" brown clay seam at 16.05'. [14]	Run 6. Core loss probably above anhydrite. Run 7 thru 13. Broken zones and discing especially in the coarsely crystalline, polyhalitic halite.
6	16.1	4.3	3.8	88		16.1'-16.75' ANHYDRITE: White to light gray anhydrite mixed with halite to 16.45'. Then mostly laminated anhydrite. 16.75'-20.9' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite. <1% from 18.4'-20.4'. [2-4,7]	
7	20.4	4.8	4.8	100		20.9'-21.9' HALITE: Clear to light gray (N7); coarsely crystalline. ≤1% gray clay. [11]	
	25.2						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 3 — BORING NO. DH-09

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25.0						
25.2							
8		3.6	3.6	100		21.9'-23.5' HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline, some fine. < 1 to 2% brown clay. [12, 13]	
28.8						23.5'-26.7' HALITE: Clear, some moderate brown (5YR 4/4), coarsely crystalline. < 1% brown clay. <1/2% polyhalite blebs. Increasing clay content from 26.1'. [2, 10]	
9	30	4.8	4.8	100		26.7'-29.9' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4) and moderate reddish brown (10R 4/6), medium to coarsely crystalline. < 1 to 4% brown clay. Scattered partings. Breaks at 27.5';27.6'. 1/2" clay mixed with halite seam at 29.9' < 1 to 2% clay from 27.8'-29.1'. [10, 16]	
33.6							
10	35	2.5	2.5	100		29.9'-35.1' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite. [3, 4, 7]	
36.1							
11		5.0	5.0	100		35.1'-36.2' HALITE: Clear to moderate brown (5YR 4/4) to moderate reddish brown (10R 4/6). Coarsely crystalline. < 1 to 2% brown clay. 3/8" clay seam at 35.2'. Breaks at 35.85' and 36.2'. [10]	
	40					36.2'-38.7' POLYHALITIC HALITE: Clear mottled with moderate reddish orange/brown (10R 6/6; 4/6). Coarsely crystalline. < 1 to 3% polyhalite blebs and patches. < 1/2% blebs of brown clay. [3, 4, 7]	
41.1							
12	45	5.1	5.1	100		38.7'-39.7' HALITE: Clear mottled with moderate brown (5YR 4/4) and moderate reddish brown (10R 4/6) clay. Coarsely crystalline. ≤ 1 to 2% clay. 1/2" seam at 39.5'. 3/4" anhydrite mixed with halite at 39.65'. [10]	
46.2						39.7'-41.3' HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 2% polyhalite. Polyhalite from 39.7' to 40.1'. [1-3]	
13	50	4.9	4.9	100		41.3'-42.3' HALITE: Clear to moderate brown (5YR 4/4), coarsely crystalline. < 1 to 2% brown clay. [8, 10]	
51.1						42.3'-45.1' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline. < 1 to 3% brown clay. Scattered breaks. [10, 15]	
	55						

WIPP

WASTE ISOLATION PILOT PLANT 3 SHEET 3 OF 3 BORING NO. DH-09

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
						45.1-48.6' HALITE: Clear mottled with moderate brown (5YR 4/4), coarsely crystalline. ≤ 1% brown clay, trace gray. Locally up to 2% clay. Scattered breaks last 1". [10, 12]	
						48.6'-51.1' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) and moderate reddish brown (10R 4/6); coarsely crystalline. < 1 to 3% polyhalite. [3, 4, 7]	

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-10

LOCATION N1420 DRIFT - FLOOR

STATION N1432± E1332.5± COLLAR ELEV. 1312.1 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N 11,108.70 E 8227.09 DEPTH OF BOREHOLE 52.0 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 3-15-84 (SWING) DATE COMPLETED 3-15-84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3-17-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1	0.5	0.5	0.5	100		0.0'-6.1' HALITE: Clear; coarsely crystalline, some fine. < 1% gray clay and 1/2% polyhalite locally. [1]	Watson drill. AW rods. 2' barrel for 1st run, then 5' NW split tube barrel used. No gas; dry hole. Drill Time: 5-1/2 hours
2	3.6	3.1	3.1	100		6.1'-10.6' HALITE: Clear mottled with medium dark gray (N4); coarsely crystalline, some medium locally. ≤ 1% gray clay. Dark gray clay break at 8.0'. < 1/2% polyhalite. [11]	Core is brittle and will break with low hand pressure into smaller discs and pieces. Jerky, surging feed on drill. Core shows chipping on surface.
3	8.2	4.6	4.6	100		10.6'13.5' POLYHALITIC HALITE: Clear mottled with moderate reddish orange (10R 6/6). Coarsely crystalline. < 1 to 2% polyhalite blebs and patches. < 1/2% gray clay. [3, 4, 7]	Runs 2, 3. Some broken core, discing, vibration fractures.
4	13.3	5.1	5.1	100		13.5'-19.4' HALITE: Clear, some light gray (N7) and medium light gray (N6). Medium to coarsely crystalline. ≤ 1% gray intercrystalline clay. Breaks at 15.2'-15.3'. < 1/2% polybalite. [2, 11]	Run 4. Good core.
5	15.9	2.6	2.6	100		19.4'-22.6' HALITE: Clear mottled witb some moderate reddish orange (10R 6/6); coarsely crystalline; some medium. ≤ 1% polyhalite blebs and patches. < 1/2% gray clay. [2, 5]	
6	20.9	5.0	5.0	100		22.6'-24.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite. [3, 4]	
7		5.2	5.2	100		24.0'-26.65' MB-139: Moderate reddish orange (10R 6/6) to white anhydrite mixed witb halite to 25.4'. Then predominantly light gray (N7) to white anhydrite with scattered halite growths faintly laminated. 1/2" clay seam at lower contact.	Runs 2, 3. Some broken core, discing, vibration fractures. Run 4. Good core.
						26.65'- 29.3' HALITE: Clear to medium light gray (N6) and moderate reddish orange (10R 6/6) medium to coarsely crystalline. ≤ 1% gray clay and dispersed polyhalite. Clay break at 27.95' and 29.3'. [2, 11]	

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-10

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
7	25	5.2	5.2	100		29.3' -34.8' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline line. < 1 to 3% polyhalite. 1/2" anhydrite with gray clay break at 34.75'-34.8'. [3-5, 7]	Run 8. Barrel plugged because of clay seam. Run 9 thru 13. Core quality fair. Discing in some runs.
26.1 8		0.7	0.7	100			
26.8 9	30	4.7	4.7	100		34.8'-37.0' HALITE: Clear to moderate reddish orange (10R 6/6); some light gray (N7) and light bluish gray (5B 7/1). Medium to coarsely crystalline. ≤ 1% gray clay. < 1 to 2% polyhalite. [2, 11]	
31.5 10	35	5.1	5.1	100		37.0'-42.5' POLYHALITIC HALITE: Clear to moderate reddish orange/brown (10R 6/6; 4/6) coarsely crystalline. < 1 to 3% polyhalite. Trace brown and gray clay locally. [2-5]	
36.6 11	40	5.2	5.2	100		42.5'-46.75 HALITE: Clear to moderate reddish orange/brown (10R 6/6; 4/6) with some medium light gray (N6). Medium to coarsely crystalline. Up to 2% brown clay with some gray clay and polyhalite to 43.3'. Below this is < 1% clay and polyhalite. [1, 17]	
41.8 12	45	5.1	5.1	100		46.75'-51.8' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite. Moderate reddish orange anhydrite at 51.5' to 51.6' ±. [2-4, 7]	
46.9 13	50	5.1	5.1	100		51.8'-52.0' HALITE: Clear, coarsely crystalline. [1]	
52.0	55						

BORING NO. DH-10

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NX CORE BORING NO. DH-11

LOCATION N1100 DRIFT AT ROOM A-2 CENTERLINE; ROOF

STATION N1112± E1332.5± COLLAR ELEV. 1320.5 DIRECTION OF DRILLING UP-VERTICAL

MINE COORDINATES N10,799.8 E8227.3 DEPTH OF BOREHOLE 50.9 FT

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 3/5/84 (SWING) DATE COMPLETED 3/6/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/6/84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0						
0.4	1		0.4	0.4	100	X		
	2		1.5	1.5	100	X X	0.0'-0.5' HALITE: Clear, trace of moderate reddish orange. Coarsely crystalline. <1/2% polyhalite. [2]	Watson drill. AW rods
1.9								NX double tube core barrel.
	3		1.9	1.7	90	X X	0.5'-4.1' POLYHALITIC HALITE: Clear to moderate reddish orange; coarsely crystalline. <1 to 3% polyhalite. [3]	Drilling Time: 7 hours. ±
3.8						X X		Throughout hole much discing and broken core. Quality poor.
	4	5	1.9	1.9	100	—		
5.7							4.1'-8.8' HALITE: Clear to light gray (N7) and medium light gray (N6), some moderate brown (5YR 4/4) medium to coarsely crystalline, some fine. ≤ 1% clay. [2,9]	No gas; dry hole.
	5		4.5	4.5	100	—		
							8.8'-13.1' HALITE: Clear, coarsely crystalline. 1/2" ± gray anhydrite layer at 9.3' with trace of gray clay anhydrite stringers to 10.5' ±. [1]	
10.2		10						
	6		2.1	2.1	100			
12.3							13.1'-15.2' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4); fine to medium, some coarsely crystalline. <1 to 3% brown clay. [12]	
	7		3.3	3.0	91	— — —		
		15				— — —	15.2'-17.0' HALITE: Clear, trace of light brown (5YR 6/4). Coarsely crystalline. [1]	
15.6								
	8		1.5	1.5	100	—		
17.1							17.0'-20.6' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline. <1 to 3% brown clay, intercrystalline and breaks. ≥10% clay at 20.5'-20.6'. [10, 15]	
	9		3.5	3.5	100	— — —		
		20				— — —		
20.6							20.6'-21.2' ANHYDRITE: White to light gray (N7) microcrystalline, partially laminated anhydrite. Scattered halite growths. 1/2" brown clay seam at 20.6'.	Run 10. Some core grinding evident here.
	10		1.1	1.1	100	X		
21.7								
	11		2.1	2.1	100	X		
23.8								
		25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-11

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	12	25	3.4	3.4	100		21.2'-24.9' HALITE: Clear, some light moderate reddish orange; coarsely crystalline. ≤ 1% polyhalite. [1,3]	
27.2								
	13		2.5	2.5	100	X	24.9'-30.7' HALITE: Clear, some moderate brown (5YR 4/4); coarsely crystalline except medium at 25.5' to 26.1'. < 1 to 2%, locally, brown clay. < 1/2% dispersed polyhalite. [2, 10]	
29.7		30						
	14		2.4	2.4	100		30.7'-33.5' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline. < 1 to 3% brown clay. Breaks at 31.5', 32.8'. [12, 14]	
32.1								
	15		3.9	3.9	100	X	33.5'-50.9' HALITE: Clear to moderate brown (5YR 3/4; 4/4) and mottled with moderate reddish orange/brown (10R 6/6; 4/6). Coarsely crystalline. < 1 to 3% brown clay with trace of gray. < 1 to 2% polyhalite blebs and patches. Core varies from zones containing polyhalite blebs with no clay to zones with mixed clay and polyhalite and zones containing only patches of clay. [5, 10] Zones with polyhalite blebs and patches and only trace of clay are the following approximate depths: 33.5' -33.7', 40.4' -41.3', 43.1' -44.9', 49.2' -49.7'.	
		35						
36.0	16		4.5	4.5	100	X		
						X		
		40						
40.5	17		2.4	2.4	100	X		
42.9								
	18	45	4.7	4.7	100	X		
						X		
47.6								
	19		3.3	3.3	100	X		
		50						
50.9								

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-12

LOCATION N1100 DRIFT AT ROOM A-2 INTERSECTION, FLOOR

STATION N1112 ± E1332.5 ± COLLAR ELEV. 1311.1 DIRECTION OF DRILLING VERTICAL - DOWN

MINE COORDINATES N10,799.4 E 8227.2 DEPTH OF BOREHOLE 51.3'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 3-7-84 (SWING) DATE COMPLETED 3-7-84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3-24-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1	0.0–1.8	1.8	1.8	100	X	0.0–4.25' HALITE: Clear to light gray (N7) and light bluish gray (5B 7/1); coarsely crystalline. <1% gray intercrystalline clay. < 1/2% polyhalite. [11]	Watson Drill. NW split tube core barrel.
2	1.8–5.8	4.0	4.0	100	—	4.25'–5.55' HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1% polyhalite. [3]	AW rods. Drill Time: 6-1/2 hours ±.
3	5.8–11.1	5.3	5.3	100	X	5.55'–10.0' HALITE: Clear to light gray (N7) and medium light gray (N6); some moderate reddish orange and brown. Coarsely crystalline, some medium. <1% gray clay. Partings at 7.4' and 8.55'. <1% polyhalite. [11,2]	Core quality shows significant improvement over previously drilled core.
					—		
					X	10.0'–12.65' HALITE: Clear to moderate reddish orange, (10R 6/6) coarsely crystalline. ≤1% polyhalite. Gray clay break at 12.25'. [2]	
4	11.1–16.1	5.0	5.0	100	X	12.65'–19.8' HALITE: Clear to light bluish gray (5B 7/1) and moderate reddish orange (10R 6/6) medium to coarsely crystalline. ≤1% gray clay; trace brown < 1% polyhalite. [11.2]	
					—		
					X	19.8'–20.9' HALITE: Clear, some moderate reddish orange (10R 6/6). Coarsely crystalline. < 1% polyhalite. [1]	
5	16.1–21.2	5.1	5.1	100	—		
					X	20.9'–21.45' HALITE: Clear to light gray (N7) medium to coarsely crystalline. ≤ 1% gray clay. [11]	
					—		
					X	21.45'–22.75' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline <1 to 2% polyhalite blebs and patches. [1-3]	
6	21.2–25	5.1	5.1	100	X X		

BORING NO. DH-12

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-12

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
6	25					22.75'-25.9' MB-139: From 22.75' to 23.85' is a "swallowtail" pattern of halite and anhydrite. Below this is predominantly white to light gray (N7) to medium light gray (N6) microcrystalline anhydrite with scattered halite growths. Anhydrite is partially laminated. < 1/2" moist gray clay at lower contact.	
26.3							
7	30	5.0	5.0	100		25.9'-29.0' HALITE: Clear to moderate reddish orange (10R 6/6) and light gray (N7). Medium to coarsely crystalline. ≤ 1% gray clay and < 1% dispersed polyhalite. [9,11]	
31.3							
8	35	5.0	5.0	100		29.0'-32.2' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 4% polyhalite. None to < 1% gray clay. [4-6]	
36.3						33.2'-35.35' HALITE: Clear to moderate reddish orange (10R 6/6); medium to coarsely crystalline. < 1% gray clay and dispersed polyhalite. [1,2]	
9	40	5.0	5.0	100		35.35'-39.9' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite blebs and patches. < 1/2% gray clay locally. [2-4]	
41.3						39.9'-44.8' HALITE: Clear, some moderate reddish orange (10R 6/6), coarsely crystalline, some medium. ≤ 1% gray clay and ≤ 1% polyhalite, locally up to 2%. [1, 10]	
10	45	5.0	5.0	100		44.8'-49.5' POLYHALITIC HALITE: Clear to moderate reddish orange/brown (10R 6/6; 4/6); coarsely crystalline. < 1 to 4% polyhalite average ≤1 to 2%. < 1% gray clay. Moderate reddish orange/brown microcrystalline anhydrite/polyhalite at 49.1' to 49.3'. Lower surface is irregular and slightly polished. [2-4, 7]	
46.3							
11	50	5.0	5.0	100		49.5'-49.8' ANHYDRITE: White to light gray (N7); microcrystalline, faintly laminaed anhydrite. Scattered halite growths. Trace of gray clay at 49.8'.	
51.3						49.8'-51.3' HALITE: Clear, some light bluish gray (5B 7/1) and moderate reddish orange (10R 6/6). Medium to coarsely crystalline. ≤ 1% gray clay. < 1/2% polyhalite. [9, locally 2]	
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NX CORE BORING NO. DH-13

LOCATION N1420 DRIFT @ ROOM D INTERSECTION

STATION N 1424, E1690 COLLAR ELEV. 1311.4 DIRECTION OF DRILLING VERTICAL ~~UP~~

MINE COORDINATES N11 112, E8585 DEPTH OF BOREHOLE 13.8 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON MODEL 750

DATE STARTED 3/28/84 (SWING) DATE COMPLETED 3/28/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/30/84 1 OF 1

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
1	0.0	2.4	2.4	100	X	0.0'-3.9'HALITE: Clear to moderate reddish orange (10R 6/6); medium to coarsely crystalline. <1% dispersed polyhalite. <1/2% gray clay. 1/2" anhydrite at 3.9'±. Gray clay below.	Watson drill, AW rods, NW split-tube barrel.
2	2.4	5.5	3.6	65.5	X	3.9'-8.7' HALITE: Clear, coarsely crystalline. None to <1% gray clay.	Set-up time: 7 hrs. Drilling time: 2-1/2 hrs.
3	7.9	0.8	0.8	100		8.7'-9.4' HALITE: Clear to moderate brown (5YR 4/4); some light gray (N7). Medium to coarsely crystalline. ≤ 1% brown and gray clay.	No gas. Dry hole.
4	8.7	5.1	4.1	80.4		9.4'-13.8' HALITE: Clear, some light gray (N7); coarsely crystalline. <1% dispersed gray clay.	Contacts approximate due to core loss.
	13.8					Note: This hole was stopped at 13.8' due to core loss. Refer to drill logs for replacement holes DH-13A and DH-13B.	Run 2. Core broken-up much of run.

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ HOLE TYPE/SIZE NX CORE BORING NO. DH-13A

LOCATION 6" N.E. OF DH-13; N1420 DRIFT AT ROOM D INTERSECTION

STATION N 1424.5, E1691 COLLAR ELEV. 1311.5± DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N11112, E8586 DEPTH OF BOREHOLE 49.0 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON MODEL 750

DATE STARTED 3/28/84 (SWING) DATE COMPLETED 3/29/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/30/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		2.5	2.5	100		0.0'-4.25' HALITE: Clear, some light gray (N7), medium to coarsely crystalline. < 1% dispersed gray clay. < 1/2% dispersed polyhalite. Break at 4.25'.	Watson drill, AW rods. Used NW double-tube barrel and split-tube barrel.
	2.5						
2		0.7	0.65	93		4.25'-6.3' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. 1/4" anhydrite layar at 4.55'.	Drilling time: 5 hrs. ±
	3.2						Run 2. Barrel plugged.
3		2.9	2.9	100			
	5					6.3'-10.6' HALITE: Clear to light moderate reddish orange (10R 6/6); some light bluish gray (5B 7/1). Medium to coarsely crystalline. < 1/2% dispersed polyhalite and gray clay.	
	6.1						Contacts at 6.3' and 10.6' are approximate due to core loss.
4		2.8	0.6	21		10.6'-13.4' HALITE: Clear to light gray (N7) and medium light gray (N6). Coarsely crystalline. None to < 1% gray clay. Upper 12" of recovered core is clear.	
	8.9						
5	10	2.0	2.0	100		13.4'-16.55' ARGILLACEOUS HALITE: Clear to medium brown (5YR 4/4); medium to coarsely crystalline. < 1 to 3% brown clay. Scattered breaks.	
	10.9						
6		2.0	1.0	50		16.55'-17.25' ANHYDRITE: Light gray, microcrystalline; faintly laminated. Scattered halite growths, especially 16.75'-16.95'±. 2-1/2" gray clay seam at 16.55'-16.75', medium plastic. Contains scattered halite crystals.	Run 6. Much of core broken-up.
	12.9						
7		2.2	2.2	100			Run 7. Tried 3' NX double-tube barrel. Core OK.
	15.1					17.25'-22.2' HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 2% polyhalite. Scattered anhydrite.	
8	15	1.6	1.6	100			Run 8. NW split-tube plugged-off at clay seam.
	16.7						
9		4.0	3.3	83		22.2'-24.5' HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline. < 1 to 2% brown clay. Breaks at 22.4' and 23.25'. [12,17]	Run 9. Core broken-up in polyhalitic halite.
	20					24.5'-26.7' HALITE: Clear mottled with some moderate reddish orange (10R 6/6); coarsely crystalline. < 1/2% gray clay and < 1% polyhalite. [2 - 4, some 9]	
	20.7						
10		3.3	3.3	100		26.7'-28.3' HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline. < 1 to 2% brown clay. [8, 10]	Runs 10-15. Used Sprague and Henwood double-tube core barrel. A piece of foam rubber was used inside barrel to prevent core from falling in barrel.
	24.0						
11	25	5.0	5.0	100			

BORING NO. DH-13A

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-13A

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
11	25	5.0	5.0	100		28.3'-30.6' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline. < 1 to 3% brown clay. Break at 28.4'. 1-1/2" brown clay mixed with halite at 30.4'-30.6'±. [12]	
						30.6'-35.55' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite. 1/2" gray clay seam at 33.9'. [2 - 5]	
29.0							
12	30	4.9	4.9	100		35.55'-36.8' HALITE: Clear with some moderate brown (5YR 4/4); coarsely crystalline. < 1/2% polyhalite. ≤ 1% brown clay patches. Irregular break at 35.55'. [10, 17]	
						36.8'-39.0' HALITE: Clear mottled with some moderate reddish orange (10R 6/6) and moderate brown (5YR 4/4). Coarsely crystalline < 1% brown clay blebs. ≤ 1 to 2% polyhalite blebs. [1 - 3, 8]	
33.9							
13	35	5.0	5.0	100		39.0'-39.9' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4; 3/4); medium to coarsely crystalline. Brown clay < 1 to 3%. Break at 39.6' and 1/2" seam at 39.85'. [12]	
						39.9'-41.7' HALITE: Clear mottled with moderate reddish orange; coarsely crystalline. ≤ 1% polyhalite. 1-1/2" anhydrite and halite at 39.9'-40.0'. [1, 2]	
38.9							
14	40	5.1	5.1	100		41.7-43.3' HALITE: Clear with some moderate brown (5YR 4/4); coarsely crystalline, some medium. ≤ 1% brown clay. [8, 10]	
						43.3'-46.9' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4; 3/4); medium to coarsely crystalline. < 1 to 3% brown clay. Parting at 43.3'. Breaks at 45.5'; 45.6'. [10]	
44.0							
15	45	5.0	5.0	100		46.9'-49.0' HALITE: Clear to moderate reddish brown (10R 4/6) and moderate brown (5YR 4/4). Medium to coarsely crystalline. ≤ 1% brown clay, trace of gray. < 1% polyhalite. [10]	
49.0							
	50						
	55						

BORING NO. DH-13A

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-13B

LOCATION N1420 DRIFT; ROOF AT RM. D INTERSECTION

STATION N1425, E1695 COLLAR ELEV. 1311.4 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N11112.62, E8590.14 DEPTH OF BOREHOLE 21.0 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON MODEL 750

DATE STARTED 4-5-84 (SWING) DATE COMPLETED 4-5-84 (SWING) SHEET

LOGGED BY: J. F. GALLERANI DATE: 4-5-84 1 OF 1

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0							
1		2.7	2.7	100		0.0'-2.7' HALITE: Clear to medium light gray (N6) and some light moderate reddish orange (10R 6/6). Coarsely crystalline. ≤ 1% gray clay. [9]	AW rods, S&H NX double-tube core barrel. Drilling time: 1 hr. ±
2.7							
2	5	4.8	4.8	100		2.7'-5.5' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. < 1/4" gray clay seam at 5.5' with some anhydrite just above. [1] 5.5'-9.9' HALITE: Clear, trace of light gray (N7), medium to coarsely crystalline. < 1/2% clay. [1, 9]	
						9.9'-12.1' HALITE: Clear, coarsely crystalline. [1]	
7.5							
3	10	4.9	4.9	100		12.1'-15.8' HALITE: Clear with some medium light gray (N6) and medium brown (5YR 4/4). Medium to coarsely crystalline, trace fine locally. < 1/2% dispersed polyhalite and ≤ 1% gray clay, some brown. Scattered discontinuous breaks. [9, 17] 15.8'-16.8' HALITE: Clear, coarsely crystalline. [1]	
12.4							
4	15	4.5	4.5	100		16.8'-17.5' ANHYDRITE: Light gray (N7) to medium light gray (N6) microcrystalline anhydrite with scattered halite growths. Partially laminated. 1/2" layer of mostly halite at 17.4'. Tightly closed upper contact. Up to 1-1/4" hard gray clay at 16.8'-16.9'. 17.5'-18.3' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. [7]	
16.9							
5	20	4.1	4.1	100		18.3'-21.0' HALITE: Clear with some moderate reddish orange. < 1% polyhalite locally. ≤ 1/2" white anhydrite layer at 18.9'±. [1, 2]	
21.0							
	25						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ HOLE TYPE/SIZE NX CORE BORING NO. DH-14

LOCATION N1420 DRIFT, FLOOR AT INTERSECTION OF RM. D

STATION N 1425, E 1695 COLLAR ELEV. 1299.5 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N11112.62, E8590.14 DEPTH OF BOREHOLE 49.1 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON MODEL 750

DATE STARTED 4/6/84 DATE COMPLETED 4/6/84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 4/27/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		3.2	3.2	100		0.0'-5.8' HALITE: Clear with some light gray (N7), coarsely crystalline. < 1% gray clay and polyhalite. [1, 11]	Watson drill, AW rods, NX double-tube core barrel.
	3.2					5.8'-13.15' HALITE: Clear to medium light gray (N6), coarsely crystalline, some medium. ≤ 1% gray clay. < 1/2% dispersed polyhalite. [9, 11]	No gas. Dry hole.
2	5	4.9	4.9	100		13.15'-16.2' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1% polyhalite. [1-3]	Core shows some discing and surface vibration damage.
	8.1					16.2'-21.3' HALITE: Clear to light moderate reddish orange (10R 6/6) and light gray (N7), medium to coarsely crystalline. < 1/2% dispersed polyhalite. < 1% gray clay. [9, 11]	
3	10	5.0	5.0	100		21.3'-23.7' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), medium to coarsely crystalline. < 1 to 2% polyhalite. Scattered anhydrite. [3, 7]	
	13.1					23.7'-26.45' MB-139: Light gray to moderate reddish orange mixture of predominantly anhydrite with some polyhalitic halite to 25.55'. Then light gray anhydrite with scattered halite growths and laminae. Trace of gray clay at 26.45'.	
4	15	5.0	5.0	100		26.45'-29.5' HALITE: Clear to moderate reddish orange (10R 6/6) and some light gray (N7). Medium to coarsely crystalline. < 1/2% dispersed polyhalite and < 1% gray clay. [9]	
	18.1					29.5'-33.9' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. Anhydrite mixed with some halite from 33.75'-33.9'. Gray clay at 33.9'. [7]	
5	20	5.0	5.0	100		33.9'-36.25' HALITE: Clear to light moderate reddish orange (10R 6/6) and some light gray (N7). Medium to coarsely crystalline. < 1/2% dispersed polyhalite. < 1% gray clay. [9]	
	23.1						
6	25	5.0	5.0	100			

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-14

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
6		5.0	5.0	100		36.25'-41.1' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. < 1/2% gray clay with up to 1% clay at 39.5'-40.3'. Break at 39.5'. [3, 4, 7]	
28.1						41.1'-44.7' HALITE: Clear to moderate reddish orange (10R 6/6) and some light gray (N7). Medium to coarsely crystalline, some fine. < 1/2% dispersed polyhalite. < 1% gray clay. [9]	
7	30	5.0	5.0	100		44.7'-49.1' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. [3, 7]	
33.1							
8	35	5.0	5.0	100			
38.1							
9	40	5.0	5.0	100			
43.1							
10	45	5.0	5.0	100			
48.1							
11		1.0	1.0	100			
49.1	50						
	55						

BORING NO. DH-14

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ - _____ HOLE TYPE/SIZE NX CORE BORING NO. DH-15

LOCATION N1100 DRIFT; ROOF

STATION N1104± E1688.5± COLLAR ELEV. 1308.9 DIRECTION OF DRILLING VERTICAL - UP

MINE COORDINATES N10,793.26 E8589.96 DEPTH OF BOREHOLE 51.0'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 3/20/84 (SWING) DATE COMPLETED 3/21/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/25/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		2.4	2.4	100	X	0.0'-4.5' HALITE: Clear, coarsely crystalline. < 1% polyhalite from 3.7'-4.5' ±. Scattered white anhydrite/magnesite? Stringers. [1 2]	Watson post mounted drill. AW rods. NW split tube barrel. Drilling Time: 6-1/2 hours.
	2.4						
2		3.9	3.9	100	X	4.5'-9.2' HALITE: Clear to light gray (N7) medium to coarsely crystalline. ≤ 1% gray clay. < 1/8" clay seam at 9.1'. From 9.1' to 9.2' anhydrite mixed with halite. [2,11]	Core generally all together in split tube. Tends to break up some when put in box.
	5						
	6.3						
3		1.2	1.2	100		9.2'-13.0' HALITE: Clear, coarsely crystalline. Scattered white stringers. [1]	
	7.5						
4		4.2	4.2	100		13.0'-14.7' HALITE: Clear to light gray (N7) and moderate brown (5YR 4/4); medium to coarsely crystalline, some fine. < 1% brown clay with trace gray. Sugary texture 14.1'-14.7'. [9,17]	Run 4. Discing of core in clear halite.
	10						
	11.7						
5		4.9	4.9	100		14.7'-18.1' HALITE: Clear, coarsely crystalline none to ≤ 1% gray clay. [1, some 11]	Run 5. Some broken core.
	15					18.1'-20.85' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4) and grayish red (10R 4/2) medium to coarsely crystalline. < 1 to 3% brown clay. 1/2" ± brown clay seam at 19.6'. (12,16)	
	16.6						
6		4.3	4.3	100		20.85'-21.35' ANHYDRITE: Light (N7) to medium gray (N5) to white anhydrite. Scattered halite growths up to 1/2" brown clay seam at 20.85'.	
	20						
	20.9						
7		4.5	4.5	100		21.35'-26.0' HALITE: Clear, coarsely crystalline. Stringers of anhydrite mixed with halite 21.35'-21.75'. Scattered white stringers throughout core. [1,2]	
	25						
	25.4						

BORING NO. DH-15

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-15

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
25.4							
8		4.5	4.5	100		26.0'-31.2' **HALITE**: Clear to dark reddish brown and moderate brown (5YR 4/4). Predominantly coarse with zones of fine-medium from 26.5'-26.9' ± and 28.0'-28.5' ±. < 1 to 2% brown clay. [8, 10, 12]	
29.9	30						
9		4.9	4.9	100		31.2'-34.75' **ARGILLACEOUS HALITE**: Clear to moderate brown (5YR 4/4) and moderata reddish brown (10R 4/6); medium to coarsely crystalline. < 1 to 5% brown clay intercrystalline and breaks. From 34.45' to 34.65' clay ≥ 10%. (10,12) 34.75'-43.2' **POLYHALITIC HALITE**: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite. 1" anhydrite layer at 37.25'. < 1 to 3% brown clay at 40.25' -41.45. [3, 4, 7]	
34.8	35						
10		5.0	5.0	100		43.2'-44.1' **HALITE**: Clear mottled with dark reddisb brown and moderate brown (5YR 4/4). Coarsely crystalline. ≤ 1% brown clay. [8, 10]	Run 10. Some discing of core.
39.8	40						
11		4.8	4.8	100		44.1"-44.6' **ARGILLACEOUS HALITE**: Clear to moderate brown (5YR 4/4); fine to medium crystalline, some coarse. < 1 to 3% brown clay, intercrystalline and breaks. Anhydrite/halite at 44.4'-44.6'. [12, 17] 44.6'-47.1' **POLYHALITIC HALITE**: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite. [3, 4, 7]	
44.6	45						
12		1.4	1.4	100		47.1'-51.0' **ARGILLACEOUS HALITE**: Clear to moderate brown (5YR 3/4); medium to coarsely crystalline. < 1 to 3% brown clay. [10, 12]	
46.0							
13	50	5.0	5.0	100			
51.0							
	55						

BORING NO. DH-15

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ - _____ HOLE TYPE/SIZE NX CORE BORING NO. DH-16

LOCATION N1100 DRIFT - FLOOR

STATION N1104 ± E1688 ± COLLAR ELEV. 1300.3 DIRECTION OF DRILLING VERTICAL - DOWN

MINE COORDINATES N10792.89 E8589.39 DEPTH OF BOREHOLE 51.0'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 3/19/84 (SWING) DATE COMPLETED 3/19/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/20/84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0.0						
	1		2.0	2.0	100	X	0.0'-6.1' HALITE: Clear, coarsely crystalline, some medium. < 1/2% polyhalite and gray clay. [1, 2]	Watson drill.
2.0								Post mounted AW rods.
	2		0.3	0.1	33			
2.3	3		1.1	1.1	100			NW split tube barrel.
3.4							6.1'-10.4' HALITE: Clear to light gray (N7); coarsely crystalline, some medium. ≤ 1% gray clay. < 1/2% dispersed polyhalite. [11]	Drilling Time: 4-1/2 hours.
	4	5	2.6	2.5	96	X		No gas. Dry hole.
6.0							10.4'-12.35' HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline, some medium. < 1 to 2% polyhalite. < 1% gray clay at 11.85'-11.95'. [1-3]	Overall core quality is satisfactory. Can fit ends together fairly well. Some discing of core, especially in coarsely crystalline material.
	5		5.1	5.1	100	X		
		10					12.35'-16.0' HALITE: Clear to light gray (N7); light bluish gray (5B 7/1) and moderate reddish orange (10R 6/6) medium to coarsely crystalline. ≤ 1% polyhalite and gray clay. [9]	Runs 4 and 5.
11.1						X		Some discing of core.
	6		4.9	4.9	100	X	16.0'-20.1' HALITE: Clear to light bluish gray (5B 7/1) and light gray (N7); coarsely crystalline. ≤ 1% gray clay. [11]	
		15				X		
							20.1'-21.5' HALITE: Clear, scattered moderate reddish orange polyhalite blebs. Coarsely crystalline. < 1/2% polyhalite. [2, 3]	
16.0								
	7		5.1	5.1	100		21.5'-25.2' MB-139: Mixture of halite and anhydrite in "swallowtail" pattern from 21.5'-23.6'. From 23.6', predominantly anhydrite with some halite growths. Some laminae, especially noted from 24.5'. 1/2" ± clay at lower contact.	
		20						
21.1						X	25.2'-29.6' HALITE: Clear, some moderate reddish orange (10R 6/6) and light gray (N7). Medium to coarsely crystalline. < 1/2% polyhalite and gray clay. Coarsely crystalline with no clay from 29.2-29.6'. [9]	
	8		4.9	4.9	100			
		25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-16

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
8	25	4.9	4.9	100			
26.0						29.6'-33.05' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite. 1/2" hard gray clay. Seam at lower contact. [3, 4, 7]	
9		5.0	5.0	100		33.05'-34.9' HALITE: Clear mottled with some moderate reddish orange polyhalite blebs. Coarsaly crystalline, some medium. <1/2% polyhalite and gray clay. [2]	
31.0	30					34.9'-40.35' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline except some medium at 39.65' to 40.35'. < 1 to 3% polyhalite <1/2% gray clay. [2-5, 9]	
10		5.0	5.0	100		40.35'-42.1' HALITE: Clear, coarsely crystalline. None to 1% gray clay and<1/2% dispersed polyhalite. [1, 2]	
36.0	35					42.1'-46.3' HALITE: Clear to moderate reddish orange/ brown (10R 6/6;4/6) with some light gray (N7). Coarsely crystalline. ≤1% gray intercrystalline clay. <1 to 2% polyhalite. Locally polyhalitic. [9]	
11		5.0	5.0	100		46.3'-49.15' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite. Moderate reddish orange anhydrite mixed with some halite at 48.95'-49.05' ±. [2-4, 7]	
41.0	40					49.15'-49.45' ANHYDRITE: White to light gray (N7), microcrystalline. Scattered halite growths. ≤1/16" gray clay at 49.45'.	
12		5.1	5.1	100		49.45'-51.0' HALITE: Clear, medium to coarsely crystalline. <1/2% clay at 50.8' to 51.0'. [2]	
46.1	45						
13		4.9	4.9	100			
51.0	50						
	55						

BORING NO. DH-16

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-17

LOCATION N 1420 DRIFT: ROOF

STATION N1427 ± E178 ± COLLAR ELEV. 1316.45 DIRECTION OF DRILLING UP-VERTICAL

MINE COORDINATES N11114.2 E7071.8 DEPTH OF BOREHOLE 52.0 FT

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 1/18/84 (DAY) DATE COMPLETED 1/19/84 (DAY) SHEET

LOGGED BY: J.E. GALLERANI DATE: 3/6/84 1 OF 3

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		3.7	3.7	100		0.0'-4.2' HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline, some medium. Scattered polyhalite < 1%, < 1/2% gray clay. [3,9)	Watson drill. AW rods. NX double tube core barrel.
	3.7					4.2'-7.2' HALITE: Clear to light gray (N7) coarsely crystalline. ≤ 1% gray intercrystalline clay. < 1/2% polyhalite. [9,11)	Drilling time: 5 hours. Dry hole; no gas.
2	5	5.0	5.0	100		7.2'-7.4' ANHYDRITE b: Very light (N8) to light gray (N7) microcrystalline anhydrite. Trace of dry gray clay at 7.2'. Some core grinding noted. Tightly closed irregular upper contact. Some halite growths 7.3'-7.4'.	Overall core condition good. Only several small broken up zones.
	8.7					7.4'-12.8' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. ≤ 1% polyhalite 7.3'-7.7' and 12.0'-12.6'. [1,2)	
3	10	4.9	4.9	100		12.8'-14.1' HALITE: Clear to light bluish gray (5B 7/1), fine to medium crystalline. ≤ 1% gray intercrystalline clay. Trace of dispersed polyhalite. (9)	
	13.6					14.1'-14.8' ANHYDRITE a: White to medium light (N6) and very light (N8) gray microcrystalline anhydrite some laminae. Growths of halite present. < 1/32" halite laminate at 14.4'. Trace of gray clay at 14.1'.	Run 4. Core broken up last 6" of run.
4	15	4.8	4.8	100		14.8'-19.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 3% polyhalite blebs, patches. [3,4,7]	
	18.4					19.0'-21.0' HALITE: Clear to light gray (N7), fine to medium crystalline with some coarse. < 1 to 2% gray clay. < 1/2% dispersed polyhalite. [1,2,9)	
5	20	5.0	5.0	100			
	23.4						
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 3 — BORING NO. DH-17

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
6		4.8	4.8	100		21.0'-23.6' HALITE: Clear, coarsely crystalline. Trace <1% gray clay, fine-medium crystalline 22.4'-22.9'. <1/2% polyhalite blebs. Clay parting at 23.5'. 3/4" anhydrite layer above this. [2,9)	
28.2							
7	30	5.0	5.0	100		23.6'-28.3' HALITE: Clear, coarsely crystalline. Scattered white anhydrite/magnesite stringers from 23.6'-25.6'. [1)	Run 7. Core broken up zone 32.2'-32.7' ±
						28.3'-29.6' ARGILLACEOUS HALITE: Clear to grayish brown, fine to medium crystalline. <1 to 2% brown and gray clay. Scattered breaks. [12,15)	
33.2							
8	35	4.0	4.0	100		29.6'-32.0' HALITE: Clear, coarsely crystalline. [1,8)	Run 8. Bit plugged off went only 4' and pulled barrel.
						32.0'-36.3' HALITE: Clear to moderate brown (5YR 4/4) and grayish brown, coarsely crystalline, some medium. <1% brown and gray clay to 33.1' ±. Core is argillaceous, 1 to 3% brown clay, from 32.9-35.2'. Clear from 35.8'-36.3'. [8,10)	
37.2							
9	40	5.0	5.0	100	X X	36.3'-37.2' ANHYDRITE: Very light (N8) to light gray (N7) microcrystalline anhydrite. Halite growths within 1" brown clay seam at 36.2'. Slightly plastic, low moisture.	
42.2							
10	45	4.8	4.8	100	X X _	37.2'-40.7' HALITE: Clear mottled with moderate reddish orange (10R 6/6), coarsely crystalline. <1% polyhalite blebs anhydrite mixed with halite from 37.2' to 37.6'. [2-4)	
						40.7'-41.5 HALITE: Clear to moderate brown (5YR 4/4) coarsely crystalline. ≤ 1% brown intercrystalline clay. [2,8]	
47.0							
11	50	5.0	5.0	100	X	41.5'-43.4' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4) coarsely crystalline. < 1 to 3% brown intercrystalline clay. Trace of Gray. Breaks at 41.5', 42.2'. (10,16)	
						43.4'-45.4' HALITE: Clear, coarsely crystalline. 1% polyhalite at 43.4'-44.0'. [2)	
52.0							
	55						

WIPP

WASTE ISOLATION PILOT PLANT SHEET 3 OF 3 BORING NO. DH-17

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
						45.4'-47.05' HALITE: Clear, coarsely crystalline. < 1% brown intercrystalline clay. < 1/2% polyhalite blebs. [8]	
						47.05'-50.3' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4) medium to coarsely crystalline. < 1 to 5% brown clay, intercrystalline and breaks. 1" brown clay mixed with halite crystals at 50.2'. [16)	
						50.3'-52.0 POLYHALITIC HALITE: Clear mottled with moderate reddish orange (10R 6/6) coarsely crystalline. < 1%, locally 2% polyhalite. < 1/2% gray clay. [4, 7]	

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-18

LOCATION N1420 DRIFT - FLOOR

STATION N1429± E181± COLLAR ELEV. 1305.1 DIRECTION OF DRILLING VERTICAL - DOWN

MINE COORDINATES N11,114.2 E7071.8 DEPTH OF BOREHOLE 50.8'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 1/19/84 (SWING) DATE COMPLETED 1/20/84 (DAY) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/5/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		5.1	5.1	100		0.0'-4.7' HALITE: Clear, coarsely crystalline, < 1% gray clay locally. < 1/2% polyhalite blebs. [1]	Watson drill. AW rods, NX double tube barrel. Drilling time: 5-1/2 hours. Dry hole. No Gas.
	5.1					4.7'-5.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1% to 3% polyhalite. [7]	
2	5	4.0	3.1	78		5.6'-9.1' MB-139: From 5.6' to 6.7' is light gray (N7) to moderate reddish orange (10R 6/6) mixture of halite, polyhalite and anhydrite. Shows "swallowtail" pattern. From 6.1' to 9.1' ± is white to medium gray (N5) anhydrite with scattered halite growths. Very thin layers of halite lower part of unit. Lower contact approximate because of core loss.	Run 1. Small broken zone 2.2'-2.4' ±. Run 2. Left some core in hole. Ground up in run 3.
	9.1						
3	10	4.5	4.5	100		9.1'-12.1' HALITE: Clear to light bluish gray (5B 7/1) and moderate reddish orange (10R 6/6) medium to coarsely crystalline. ≤ 1% polyhalite and intercrystalline gray clay. [9]	
	13.6					12.1'-18.2' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. ≤ 1% polyhalite, locally 2%. 1" anhydrite layer at 15.6'. 1/2" clay and anhydrite at 15.8'. Dips at 10°±. < 1% gray clay at 15.8'-16.8'. < 1/2% polyhalite from 15.8'-18.2'. [7, 2]	
4	15	4.7	4.7	100		18.2'-22.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline, scattered medium < 1 to 4%. [3, 4, 7]	
	18.3						
5	20	4.8	4.8	100		22.4'-27.9' HALITE: Clear to light gray (N7) and moderate reddish orange (10R 6/6) medium to coarsely crystalline. < 1% polyhalite and dispersed gray clay.	
	23.1						
6	25	5.2	5.2	100			

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-18

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
6		5.2	5.2	100	X X	27.9'-33.7' HALITE: Clear mottled with moderate reddish orange, coarsely crystalline. < 1 to 2% polyhalite with most concentration at 27.9' to 30.0'. 1" anhydrite layer at 33.0'. [7, 1]	
28.3							
7	30	4.8	4.8	100	X X X	33.7'-34.05' ANHYDRITE: Very light (N8) to medium gray (N5) microcrystalline anhydrite with scattered halite growths. Trace of dry gray clay at 34.05'.	
						34.05'-41.2' HALITE: Clear mottled with some light gray, fine to coarsely crystalline. ≤ 1% gray intercrystalline clay and polyhalite. Clear, fine to medium crystalline from 35.2' to 36.1'. [9, 4]	
33.1							
8	35	5.0	5.0	100	— X —	41.2'-44.6' HALITE: Clear to medium brown (54R 4/4) to grayish brown (5YR 3/2) medium to coarsely crystalline. <1 to 2% brown, trace gray. [10]	
38.1					X	44.6'-47.2' HALITE: Clear to light gray (N7) coarsely crystalline. < 1% gray intercrystalline clay. < 1/2% dispersed polyhalite. [11]	
9	40	5.0	5.0	100	—	47.2'-50.1' HALITE: Clear, coarsely crystalline. 1/2% gray clay at 48.6' to 48.7'. < 1% dispersed polyhalite at 48.7' to 50.1'. [2]	Run 9. Small broken zone. 38.1'-38.4' ±.
43.1					— —	50.1'-50.8' HALITE: Clear, with some light gray (N7), coarsely crystalline. < 1% gray intercrystalline clay. Break at 50.5'. [11]	Run 10-11. Time to put rods in hole, drill, and come out of hole and empty barrel and put rods back in hole: 43 minutes.
10	45	4.6	4.6	100	— X		
47.7					—		
11	50	3.1	3.1	100	X —		
50.8							

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-19

LOCATION N1100 DRIFT - ROOF

STATION N 1107 ± E 206.5 ± COLLAR ELEV. 1314.7 DIRECTION OF DRILLING UP-VERTICAL

MINE COORDINATES N 10,794.2 E 7101.7 DEPTH OF BOREHOLE 51.6 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 1/20/83 (DAY) DATE COMPLETED 1/21/84 (DAY) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/5/84 1 OF 3

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1	0.6	0.6	0.6	100			
						0.0'-4.0' HALITE: Clear, coarsely crystalline. < 1/2% gray intercrystalline clay and < 1% polyhalite blebs. (2)	Watson drill. AW Rods; NW double tube barrel 6" diameter barrel used to start hole. Roof only 8-1/2' high so unable to get NX core barrel on drill.
2		4.4	4.4	100			
	5.0					4.0'-7.55' HALITE: Clear with some light gray (N7), medium to coarse crystalline. ≤ 1% gray, intercrystalline clay < 1/2% dispersed polyhalite. (2,9)	Drill Time: 7-1/2 hours. Dry hole; no gas.
3		4.6	4.6	100		7.55'-7.75' ANHYDRITE b: Very light (N8) to medium gray (N5) microcrystalline anhydrite. Scattered halite growths. Several near-horizontal hairline fractures with anhydrite. Trace clay at 7.55'.	
	9.6					7.75'-8.2' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. 1 to 2% polyhalite. (7)	
4		3.6	3.6	100		8.2'-12.1' HALITE: Clear, coarsely crystalline. <1/2% dispersed polyhalite locally. Very clear at 8.2' to 8.7' ±. (1)	
	13.2						
5		3.8	3.8	100		12.1'-13.9' HALITE: Clear to light gray (N7) coarsely crystalline to 13'; then fine to medium <1% gray intercrystalline clay. < 1% polyhalite to 13'. (2,9)	Run 5. Core broken in discs from 14.5 to 17' ±.
	17.0					13.9'14.5' ANHYDRITE a: Very light (N8) to medium gray (N5) microcrystalline anhydrite. Scattered halite growths. Thin, irregular halite layer at 14.3' ±.	
6		4.6	4.6	100		14.5'-18.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. Scattered anhydrite to 16' ±. <1 to 3% polyhalite, dispersed and blebs. (3,4,7)	
	21.6						
7		4.4	4.4	100			Run 7. Core broken up last 2' of run in clear halite.

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 3 — BORING NO. DH-19

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
		25						
26.0	7		4.4	4.4	100		18.5'-23.8' HALITE: Clear to grayish brown (5YR 3/2) fine to coarsely crystalline. ≤1% clay, predominantly brown with some gray. Brown break at 19.8' ±. Coarse crystalline from 22.9'. 3/4" anhydrite layer with grayish-brown clay break at 23.2'. Trace of dispersed polyhalite. (17)	
	8		4.4	4.4	100	X	23.8'-27.5' HALITE: Clear, coarsely crystalline. Scattered irregular anhydrite laminae. (1, 8)	Run 8. Broken up last 3".
30.4		30						
	9		4.7	4.7	100		27.5'-29.2' ARGILLACEOUS HALITE: Clear to medium brown (5YR 4/4) fine to coarsely crystalline. <1 to 3% brown intercrystalline clay. <1/2% dispersed polyhalite. Trace of gray clay. (12)	Run 9. Core broken up last 2' of run but within one unit.
35.1		35					29.2'-31.4' HALITE: Clear, coarsely crystalline. (1)	
	10		4.2	4.2	100	X	31.4'-32.4' HALITE: Clear with some moderate brown (5YR 4/4, 3/4) coarsely crystalline <1% brown clay. (8)	Run 10 & 11. Core broken up 38'-39.6'± all in clear halite.
39.3		40				X	32.4'-35.3' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4; 3/4) medium to coarsely crystalline. <1 to 4% brown clay. (10,16)	
	11		4.8	4.8	100	X	35.3'-36.4' HALITE: Clear to moderate reddisb orange 10R 6/6 and light gray (N7) fine to medium crystalline <1/2% dispersed polyhalite and <1% gray clay. (9)	
44.1		45					36.4'-37.1' ANHYDRITE: Very light to light gray microcrystalline anhydrite. Scattered halite growths. Some horizontal laminae 1/2" brown clay seam at 36.4'.	
	12		3.0	3.0	100	X		Run 12. Some broken core last 1.5'.
47.1							37.1'-40.6' HALITE: Clear mottled with moderate reddish orange (10R 6/6) coarsely crystalline. ≤1% polyhalite blebs. Scattered white very light gray anhydrite/magnesite? (1,2)	
	13	50	4.5	4.5	100		40.6'-43.0' HALITE: Clear with some moderate brown (5YR 3/4; 4/4) and mottled with moderate reddish orange (10R 6/6) fine to coarsely crystalline. <1% polyhalite. <1% clay. (2,17)	
51.6						X		
		55						

WIPP

WASTE ISOLATION PILOT PLANT SHEET 3 OF 3 BORING NO. DH-19

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
						43.0'-44.4' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4; 4/4) coarsely crystalline. <1 to 3% brown intercrystalline clay. (10)	
						44.4'-46.0' HALITE: Clear, coarsely crystalline. < 1% polyhalite blebs. (2)	
						46.0'-51.35' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4; 4/4) fine to coarsely crystalline. <1 to 3% brown clay, intercrystalline and scattered breaks. 3/8" brown clay seam at 51.0'. (12,16)	
						51.35'-51.6' HALITE: Clear, coarsely crystalline. ≤1% polyhalite blebs. (2)	

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NX CORE BORING NO. DH-20

LOCATION N1100 DRIFT; FLOOR

STATION N110$9^{\pm}$ E$206^{\pm}$ COLLAR ELEV. 1306.2 DIRECTION OF DRILLING VERTICAL - DOWN

MINE COORDINATES N10,794.2 E7101.7 DEPTH OF BOREHOLE 51.1'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 1/31/84 (DAY) DATE COMPLETED 1/31/84 (DAY) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/5/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1	2.3	2.3	2.3	100		0.0'-2.05' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline. < 1 to 4% brown clay, intercrystalline. Break at 0.7'. [10]	Watson Drill. AW Rods. 3' single tube barrel to start hole from 0.0' to 4.6'. Then 5' NX double tube barrel.
2	4.6	2.3	2.3	100		2.05'-8.15' HALITE: Clear, medium to coarsely crystalline. ≤ 1% clay. Brown clay to 2.4', then gray. < 1/2% polyhalite. [2, 8]	Drill time: 5 hours.
3	8.6	4.0	4.0	100		8.15'-10.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 4% polyhalite. [7]	Dry; No gas.
4	13.6	5.0	5.0	100		10.4'-13.0' MB-139: From 10.4'-11.15' mixture of moderate reddish orange halite and anhydrite. From 11.15', predominantly white to light gray (N7) to medium gray (N5) microcrystalline anhydrite, some halite intergrowths. Tightly welded upper contact. Up to 1/2" gray, hard clay at lower contact dipping 15° ±. Halite laminae just above clay. Anhydrite is laminated. Near-horizontal, irregular tightly closed hairline fractures in core 12.2'-12.5'.	Core locally, broken up, disturbed due to drilling.
5	18.0	4.4	4.1	93.2		13.0'-17.15' HALITE: Clear to moderate reddish orange (10R 6/6) medium to coarsely crystalline. ≤ 1% polyhalite ≤ 1% gray and some brown clay. Break at 15.3'. [9, 17]	
6	22.9	4.9	4.5	91.8		17.15'-20.7' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 4% polyhalite increasing content 18.0'-20.7'. Gray clay < 1/16" at 20.7'. Some anhydrite mixed with halite 20.4'-20.7'. [3, 4, 7]	
7		5.0	4.9	98		20.7'-22.85' HALITE: Clear mottled with moderate reddish orange and gray medium to coarsely crystalline. ≤ 1% polyhalite. ≤ 1% gray intercrystalline clay. Clear from 21.5'-21.9'. [9]	

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-20

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
7		5.0	4.9	98		22.85'-29.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 3% polyhalite. < 1% gray intercrystalline clay. Some anhydrite 28.35'-28.55'±. [3, 4, 7]	
27.9							
8	30	4.9	4.9	100		29.0'-32.2' HALITE: Clear with some moderate reddish orange (10R 6/6) medium to coarsely crystalline. < 1/2% gray intercrystalline clay. < 1/2% dispersed polyhalite. [2,9]	
						32.2'-36.8' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 3% polyhalite. < 1% polyhalite from 34'-35.05'. Scattered anhydrite stringers below 35'. [3, 4, 7]	
32.8							
9	35	4.8	4.8	100		36.8'-37.8' HALITE: Clear, coarsely crystalline. ≤ 1% polyhalite. Scattered anhydrite stringers. Mixture of halite and some anhydrite at 37.1' to 37.25'. [2]	
37.6						37.8'-38.3' ANHYDRITE: White to light gray (N7), microcrystalline. Growths of halite especially common to 37.95'. Hard gray clay parting at 38.3'.	
10	40	5.0	5.0	100		38.3'-42.6' HALITE: Clear, some light gray (N7) to medium with some coarsely crystalline. ≤ 1% gray clay, locally up to 2%. Some brown clay present. Gray break at 39.25'. Brown colored break at 39.8'. [9, 11]	
42.6							
11	45	5.0	5.0	100		42.6'-45.8' HALITE: Clear, coarsely crystalline. <1/2% gray intercrystalline clay and polyhalite blebs. Break at 45.45'. [2, 11]	
						45.8'-47.6' HALITE: Clear to grayish brown, medium to coarsely crystalline. ≤ 1% brown clay, trace of gray. < 1% polyhalitic. [17]	
47.6							
12	50	3.5	3.5	100		47.6'-51.1' HALITE: Clear medium to coarsely crystalline. ≤ 1% dispersed gray clay and polyhalite. [9]	
51.1							
	55						

BORING NO. DH-20

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NX CORE BORING NO. DH-21

LOCATION N1420 DRIFT; ROOF

STATION N1421 ± E786 ± COLLAR ELEV. 1331.0 DIRECTION OF DRILLING VERTICAL-UP

MINE COORDINATES N11,109.1 E7680.9 DEPTH OF BOREHOLE 50.4'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 2/26/84 (SWING) DATE COMPLETED 2/27/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/6/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		2.3	2.3	100		0.0'-6.7' HALITE: Clear with some moderate reddish orange (10R 6/6); medium to coarsely crystalline. < 1% polyhalite and < 1/2% intercrystalline gray clay. 1/2" gray clay seam at 6.7'. [3, 9]	Watson drill: AW rods; NX double tube core barrel. Drilling time: 8 hrs±
	2.3						No gas. Dry hole.
2	5	4.7	4.6	98		6.7'-11.0' HALITE: Clear, coarsely crystalline. Scattered white stringers of anhydrite/magnesite. [1]	Core shows discing, broken zones throughout.
						11.0'-11.8' HALITE: Clear to light gray (N7) coarsely crystalline, < 1% intercrystalline gray clay. [11]	
	7.0						
3	10	4.6	4.3	94		11.8'-13.1' HALITE: Clear, medium to coarsely crystalline. < 1/2% dispersed polyhalite and gray clay. [1, 9]	Run 2. Some broken core.
	11.6					13.1'-17.9' HALITE: Clear to light gray (N7) and locally grayish brown. Coarsely crystalline. None to ≤ 1% intercrystalline gray clay. Trace brown clay at 17.3'-17.5'±. Clear halite at 13.1'-14.4' and 17.7'-17.9' ±. [11]	Run 3. Broken core, discing. Run 4. Discing throughout. Run 5. Broken core much of run.
4	15	4.1	4.1	100		17.9'-19.2' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline. < 1 to 3% intercrystalline brown clay, trace of gray. Break at 18.95'. [12, 17]	Run 6. Discing below anhydrite in this run.
	15.7						
5		3.0	2.7	90		19.2'-19.8' ANHYDRITE: White to light gray (N7) microcrystalline anhydrite to 19.6'. Then mixture of polyhalitic halite and anhydrite. Irregular laminae in some of the anhydrite. Up to 3/4" hard brown clay at 19.2'. Some core grinding noted.	
	18.7						
6	20	4.6	4.6	100		19.8'-26.0' POLYHALITIC HALITE: Clear to moderate reddish orange/brown (10R 6/6 ; 10R 4/6). Coarsely crystalline. < 1/2% clay and anhydrite locally. [3-5, 7]	Contact at 26.0' is approximate due to broken up core.
	23.3						
	25						

BORING NO. DH-21

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-21

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
7		4.7	4.2	89		26.0'-27.0' HALITE: Clear to light moderate reddish orange (10R 6/6). Fine to medium, some coarsely crystalline. < 1% dispersed polyhalite.	Run 7. Much of the core is broken up.
28.0						27.0'-29.3' HALITE: Clear, mottled with moderate brown (5YR 3/4), and dark reddish brown (10R 3/4). Coarsely crystalline. < 1/2% polyhalite and < 1% brown clay. [2, 8]	Run 8. Discing, broken core in part of run.
8	30	5.0	4.7	94		29.3'-31.1' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4) and dark reddish brown (10R 3/4). Medium to coarsely crystalline. < 1 to 4% brown clay, intercrystalline and breaks throughout. [15]	Run 9. Discing, broken core in most of run.
33.0							Runs 10, 11, 12. Discing in coarse crystalline halite.
9	35	4.7	4.7	100		31.1'-33.0' HALITE: Clear to moderate brown (5YR 4/4) and light moderate reddish orange (10R 6/6). Fine to coarsely crystalline. < 1/2% dispersed polyhalite. < 1% intercrystalline brown clay. Mostly brown clay mixed with some halite at 32.7-32.9'. Break at 33.0'. [12, 17]	
37.7						33.0'-41.35' POLYHALITIC HALITE: Clear mottled with moderate reddish orange (10R 6/6), moderate reddish brown (10R 4/6), and moderate brown (5YR 3/4). Coarsely crystalline. < 1 to 3% polyhalite blebs and patches. < 1/2% brown intercrystalline and intracrystalline clay. [4, 5, 7]. Mostly brown clay with some halite at 37.7-37.95'. ≥ 5% clay at 38.45-38.65'±. [10]	
10	40	4.3	4.3	100			
42.0						41.35'-42.0' ARGILLACEOUS HALITE: Moderate brown (5YR 3/4; 4/4) to reddish brown (10R 3/4), medium crystalline. < 3 to 10% brown clay. [10, 16]	
11	45	4.0	4.0	100		42.0'-44.9' HALITE: Clear mottled with moderate reddish orange/brown (10R 6/6; 4/6) polyhalite blebs and patches. Coarsely crystalline. ≤ 1% polyhalite. 1/2" anhydrite layer at 42.2'. No clay. This core is similar to some found from 33-35' but less polyhalite. [2-4]	
46.0							
12	50	4.4	4.4	100		44.9'-48.6' HALITE: Clear to moderate brown (5YR 3/4; 4/4), coarsely crystalline. < 1 to 2% brown intercrystalline and intracrystalline clay. > 10% brown clay at 46.0-46.3'±. Break at 46.4'±. [10]	
50.4						48.6'-50.4' HALITE: Clear, some moderate brown (5YR 4/4), medium to coarsely crystalline. < 1% brown, trace gray, intercrystalline clay. < 1/2% polyhalite. [8]	
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NX CORE BORING NO. DH-22

LOCATION N1420 DRIFT - FLOOR

STATION N 1421.5 ± E 785.5 COLLAR ELEV. 1318.8 DIRECTION OF DRILLING VERTICAL - DOWN

MINE COORDINATES N 11,109.2 E 7680.9 DEPTH OF BOREHOLE 51.0'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 2/27/84 (SWING) DATE COMPLETED 2/29/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/6/84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0	1	5	4.8	4.8	100		0.0'-5.1' HALITE: Clear, coarsely crystalline. < 1% gray intercrystalline clay locally. < 1/2% polyhalite. [1)	Watson drill AW rods. NX double tube core barrel. Drilling time: 8-1/2 hours ± Overall core quality is good. Only a couple of broken zones. No gas. Dry hole.
4.8	2		4.0	4.0	100		5.1'-9.5' HALITE: Clear to light and medium gray (N7, N5) coarsely crystalline. ≤ 1% gray intercrystalline clay. Steeply dipping, irregular break at 7.65'-7.8'. [11)	
8.8	3	10	1.7	1.7	100		9.5'-11.7' HALITE: Clear to light moderate reddish orange (10R 6/6), coarsely crystalline. ≤ 1% polyhalite, blebs and dispersed. [3)	
10.5	4		4.6	4.6	100		11.7'-15.0' HALITE: Clear to light gray (N7), some moderate reddish orange (10R 6/6), coarsely crystalline. ≤ 1% gray intercrystalline clay and < 1/2% dispersed polyhalite. [9)	
15.1	5	15	2.0	2.0	100		15.0'-21.55' HALITE: Clear, coarsely crystalline. None to < 1% polyhalite blebs. < 1/2% gray intercrystalline clay locally. [1.2)	Run 4. Broken up top 0.2' of run.
17.1	6		3.9	3.1	79		21.55'-24.3' MB-139: From 21.55' to 23.10' core shows "swallowtail" pattern a mixture of anhydrite and halite. Slight trace of gray clay on upper contact which dips 35°±. Predominantly halite from 23.10'-23.2'. Then mostly it gray (N7) to white anhydrite with scattered halite growths irregular laminae. Several hairline, tightly closed fractures at 23.9'-24.15' ±. Horizontal halite laminae at 23.2' ±. Trace of gray clay at 24.3'.	Run 5. Core spring worn out. Left 3' of core in hole.
21.0	7	20	4.1	4.1	100		24.3'-28.0' HALITE: Clear to light gray (N7), medium to coarsely crystalline. ≤ 1% gray intercrystalline clay. < 1/2% polyhalite. Break at 25.2'. [9)	Run 6. Broken up 17.5' - 18.5'.
25.1		25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-22

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
8	25.1	4.7	4.7	100		28.0'-32.25' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 3% polyhalite. Anhydrite mixed with halite at 32.0'-32.25'. (7)	
9	29.8	4.7	4.7	100		32.25'-34.5' HALITE: Clear with some light gray (N7), coarsely crystalline. ≤1% gray clay. Breaks at 33.85', 34.3'. (9,11)	
10	34.5	4.1	4.1	100		34.5'-40.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1% gray intercrystalline clay. Breaks at 38.0', 38.25'. <1 to 3% polyhalite. (3,4,7)	
11	38.6	5.1	5.1	100		40.5'-43.7' HALITE: Clear, medium to coarsely crystalline. <1% gray clay and<1/2% dispersed polyhalite. Break at 41.3'. (9)	
12	43.7	2.0	2.0	100		43.7'-47.85' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 4% polyhalite. < 1/2% gray clay locally. (7)	
13	45.7	4.3	4.3	100		47.85'-48.4' ANHYDRITE: mixed halite and moderate reddish brown (10R 4/6) anhydrite to 48.1'. From 48.1', mostly very light gray (N8) to white and moderate reddish brown (10R 4/6) anhydrite with scattered halite growths. <1/8" clay seam at 48.4'.	Run 13. Broken up upper part of run.
	50.0					48.4'-50.0' HALITE: Clear, coarsely crystalline. <1% gray intercrystalline clay. Break at 49.75'. (11)	

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ - _____ HOLE TYPE/SIZE NX CORE BORING NO. DH-23

LOCATION N1100 DRIFT; ROOF

STATION N1112± E781± COLLAR ELEV. 1328.03 DIRECTION OF DRILLING VERTICAL - UP

MINE COORDINATES N10,799.2 E7679.9 DEPTH OF BOREHOLE 51.0'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 2/13/84 (SWING) DATE COMPLETED 2/15/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/5/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1	0.0	2.1	2.1	100		0.0'-1.2' HALITE: Clear to light moderate reddish orange (10R 6/6), fine to coarsely crystalline. < 1/2% gray clay. Break at 0.25'. [2, 9]	NX Double tube core barrel. AW Rods. Watson drill mounted on single post jacked to floor/roof. Drilling time: 7 hours ±.
2	2.1	2.2	2.2	100		1.2'-1.9' ANHYDRITE a: White to medium light gray (N6) microcrystalline anhydrite. Growths of halite within. Gray clay seam < 1/16" at 1.2'.	No gas. Dry hole.
3	4.3	2.0	2.0	100		1.9'-6.25' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. [3]	Core recovery difficult to measure because core is sometimes broken up into 1/2" to 1-1/2" discs and gravel size pieces.
4	6.3	1.7	1.7	100			
5	8.0	1.75	1.75	100		6.25'-11.05' HALITE: Clear, some moderate brown (5YR 4/4), coarsely crystalline, some fine to medium. Brown and gray clay < 1%. Brown clay seam ≤ 1/16" with some anhydrite at 11.05'. [9, 17]	
6	9.75	4.5	4.5	100		11.05'-14.25' HALITE: Clear, coarsely crystalline. Scattered white stringers of anhydrite/magnesite?. [1]	Run 2. Broken up last 0.6'. Run 3. Broken up some/ discing. Run 6. Broken up 12-14'±.
7	14.25	1.45	1.45	100		14.25'-19.3' HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline. None to 2% brown clay. < 1 to 2% clay from 14.25-15.7' and 18.5-19.3'. Clear from 17.0-18.5'. [8, 10]	Run 7. Zones of broken core. Run 8. Broken up last 0.6' of run.
8	15.7	2.0	2.0	100			
9	17.7	3.0	3.0	100		19.3'-23.5' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4), coarsely crystalline. Some fine to medium. < 1 to 4% brown clay. [8, 10]	Run 10. Some broken zones above and below anhydrite.
10	20.7	4.75	4.75	100		23.5'-24.4' ANHYDRITE: White to very light gray (N8) microcrystalline anhydrite. Scattered polyhalitic halite growths, especially common 24-24.4'±. 3/4" brown clay seam at 23.5'.	
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-23

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
25.45	10	25	4.75	4.75	100			
	11		4.3	4.3	100		24.4'-28.15' HALITE: Clear, some moderate reddish orange, coarsely crystalline. < 1% polyhalite blebs. 1/2" white anhydrite layer at 25.1'±. Up to 3% polyhalite with trace gray clay at 27.45-27.95'. [2]	Run 11. Broken zones beyond 26.7'. Run 15. Broken up last 12"± of run.
29.75	12	30	4.25	4.25	100		28.15'-31.45' HALITE: Clear to moderate brown (5YR 4/4) and moderate reddish orange (10R 6/6), coarsely crystalline, some fine. Brown clay < 1 to 2%, locally. < 1 to 2% polyhalite blebs and patches. [17]	Contact at 28.15 is approximate due to broken core in Run 11.
							31.45'-33.2' HALITE: Clear, coarsely crystalline. < 1% brown clay blebs. [8]	
34.0	13	35	4.4	4.4	100		33.2'-36.5' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4) and some moderate reddish orange (10R 6/6). Coarsely crystalline. < 1 to 3% brown clay, intercrystalline and breaks. 1/4"± brown clay seam at 33.8'±. ≤ 1/16" clay partings at 35.4' and 36.5'. [10]	
							36.5'-38.1' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. ≤ 1% polyhalite blebs and patches. Scattered anhydrite stringers. [2, 3]	
38.4	14	40	5.0	4.9	98		38.1'-41.65' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite blebs and patches. < 1/2% gray clay. Trace brown clay at 41.65'. [4, 5]	
							41.65'-42.9' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4), coarsely crystalline, some medium. < 1 to 5% brown clay. 1" brown clay seam with some halite at 42.7'. [12, 17]	
43.4	15	45	4.4	4.4	100		42.9'-44.3' ANHYDRITE: Clear, some moderate reddish orange (10R 6/6), coarsely crystalline. ≤ 1% polyhalite. [2, 5]	
47.8	16	50	3.2	3.2	100		44.3'-46.2' HALITE: Clear to moderate reddish orange (10R 6/6) and moderate brown (5YR 4/4). Coarsely crystalline to 44.9', then fine to medium. ≤ 1% brown and gray clay. < 1% dispersed polyhalite. < 1/4" brown clay seam at 46.05'. Anhydrite at 46.05-46.2'. [9, 17]	
51.0		55					46.2'-48.25' HALITE: Clear, coarsely crystalline. < 1% moderate reddish orange polyhalite blebs. [1]	
							48.25'-51.0' HALITE: Clear to moderate reddish brown (10R 4/6) coarsely crystalline. < 1 to 2% brown clay and ≤ 1% polyhalite blebs. [8, 10]	

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-24

LOCATION N1100 DRIFT; FLOOR

STATION N 1112 ± E 781 ± COLLAR ELEV. 1319.51 DIRECTION OF DRILLING DOWN - VERTICAL

MINE COORDINATES N10,799.2 E7679.8 DEPTH OF BOREHOLE 49.4'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 2/15/84 (SWING) DATE COMPLETED 2/16/84 (DAY) SHEET

LOGGED BY: J.E. GALLERANI DATE: 3/5/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0	0.0					
1		1.6	1.5	94	X	0.0'-3.3' HALITE: Clear, coarsely crystalline. < 1/2% polybalite blebs.	Watson drill. AW rods. NX double tube core barrel mounted on post jacked to floor/roof. Still vibration from drill motor, but post is stable.
	1.6						
2		1.5	1.5	100	X	3.3'-5.2' HALITE: Clear, coarsely crystalline. < 1/2% gray clay and polybalite blebs.	
	3.1						
3	5	2.9	2.9	100	X	5.2'-7.15' HALITE: Clear to light gray (N7) medium to coarsely crystalline. ≤1% gray clay, locally up to 2%. Breaks and intercrystalline. Breaks at 6.05'; 6.85'. < 1/2% polyhalite.	
	6.0				X		
4		4.5	4.5	100	X	7.15'-10.7' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline < 1% to 2% polyhalite blebs and dispersed increasing content from 9.1' to 10.7'. Gray clay break at 10.35'.	Run 5. Several broken zones in core. Loss throughout. Contacts at 10.7'; 12.6' approximate only.
	10				X		
	10.5						
5		5.3	3.6	68		10.7'-12.6' HALITE: Clear to light gray (N7) and light bluish gray (5B 7/1) medium to coarsely crystalline. ≤ 1% gray intercrystalline clay. Break at 10.9'.	
					X	12.6'-20.8' HALITE: Clear, coarsely crystalline. 1/2% polyhalite blebs. None to < 1% gray intercrystalline clay. Break at 20.75'.	
	15						
	15.8						
6		5.0	5.0	100		20.8'-24.0' MB-139: From 20.8' to 22.4' is mixture of anbydrite and balite. "Swallowtail" pattern. From 22.4 to 24.0' is white to medium gray (N5) microcrystalline anhydrite. Scattered halite growths. Irregular laminae in core. Tightly closed hairline fractures in core from 23.5' to 24.0'. Up to 3/4" gray clay.	
	20				X		
	20.8						
7		5.0	5.0	100		24.0'-28.3' HALITE: Clear with some moderate reddish orange (10R 6/6) and light gray (N7), medium to coarsely crystalline, some fine. < 1/2% dispersed polyhalite and < 1% gray intercrystalline clay. Breaks at 24.4'; 24.8'.	
	25				X		

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-24

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
		25						
25.8	7		5.0	5.0	100			
	8		4.9	4.9	100		28.3'-31.8' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. Up to 1" anhydrite layer in core.	Run 9. Broken up last 1/2 of core. Probable loss from 32.1'-34.2'.
		30					31.8'-34.2' HALITE: Clear with some light gray (N7), medium to coarsely crystalline < 1% gray intercrystalline clay. < 1/2% dispersed polyhalite. Core broken up in this section. Some core loss.	
30.7	9		3.5	3.5	100		34.2'-35.2' HALITE: Clear, coarsely crystalline. < 1% polyhalite blebs.	
34.2	10		5.2	5.2	100		35.2'-38.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), some medium light gray (N6), coarsely crystalline. < 1 to 3%, locally to 5%, polyhalite. < 1/2% gray clay.	Run 11. Measured rods 42.4". Probable loss within last 2" of run.
		35					38.4'-43.0' HALITE: Clear with some light moderate reddish orange (10R 6/6) fine to coarsely crystalline. < 1/2% dispersed polyhalite and gray clay. 0.5' core loss within this zone.	
39.4	11		3.0	2.5	83		43.0'-44.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. < 1 to 5% polyhalite.	
42.4	12		5.3	5.3	100		44.4'-48.25' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. ≤ 1% polyhalite blebs, patches and dispersed. Predominantly polyhalite 47.35'-47.45'.	
		45					48.25'-48.6' ANHYDRITE: Very light gray (N8) to medium light gray (N6) microcrystalline anhydrite. Scattered halite growths. Up to 1" clear, coarsely crystalline halite from 48.3'-48.4' ±. < 1/16" gray clay at 48.6'. Some core grinding evident.	
47.7	13		1.7	1.7	100			
49.4							48.6'-49.4' HALITE: Clear to light gray (N7); medium to coarsely crystalline. < 1 to 2% gray clay. Breaks at 48.7' and 49.0'.	
		50					Note: Overall recovery below 95%. Replacement hole DH-24A drilled later. Refer to the drill log for DH-24A.	
		55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-24A

LOCATION N1100 DRIFT - FLOOR

STATION N1112 ± E780 ± COLLAR ELEV. 1319.49 DIRECTION OF DRILLING VERTICAL - DOWN

MINE COORDINATES N10799.08 E7678.59 DEPTH OF BOREHOLE 50.4'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL WATSON

DATE STARTED 3/21/84 (SWING) DATE COMPLETED 3/22/84 (SWING) SHEET

LOGGED BY: J. E. GALLERANI DATE: 3/23/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		2.2	2.0	91	X	0.0'-0.1' FILL:	Watson Drill AW rods.
	2.2					0.1'-3.3' HALITE: Clear to light moderate reddish orange (10R 6/6); coarsely crystalline. < 1/2% dispersed polyhalite. [1, 2]	Run 1. Used 3' double tube barrel first run to start hole.
2		2.8	2.8	100	—		NW split tube barrel used after first run.
	5.0					3.3'-7.4' HALITE: Clear to medium gray (N5); coarsely crystalline. ≤ 1% gray clay. [1, 11]	Drill Time: 5 hours ±.
3		5.1	5.1	100	—		
					X X X	7.4'-10.2' HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. ≤ 1% polyhalite, increasing content 9.2' to 10.2'. [2, 3]	
	10.1					10.2'-15.9' HALITE: Clear to medium light gray (6); light bluish gray (5B-7/1) and light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. ≤ 1% gray clay. Breaks at 10.95'; 11.85'. < 1/2% polyhalite. [11]	
4		5.1	5.1	100	— X — X		
	15.2					15.9'-21.3' HALITE: Clear with some light moderate reddish orange; coarsely crystalline, some medium. < 1/2% gray clay and polyhalite. [2]	
					—		
5		5.1	4.9	96	— X	21.3'-23.95' MB-139: From 21.3' to 22.5' is mixture of anhydrite and halite partially in a "swallowtail" pattern. Upper contact dips 20° ± with tightly closed fracture along base. Below 22.5' is white to light gray (N7) to moderate reddish orange anhydrite scattered halite growths. 1/2" gray clay at lower contact.	
	20.3					23.95'-28.6' HALITE: Clear to light moderate reddish orange 10R 6/6 and trace of light gray (N7) medium to coarsely crystalline. < 1% dispersed polyhalite and < 1/2% gray clay. [2, 3, 9]	
6		5.1	5.1	100	— X		
	25.4						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-24A

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
25.4							
7		5.0	5.0	100		28.6'-32.1' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. Irregular gray clay break at 32.1'. [2, 4, 7]	
	30					32.1'-34.4' HALITE: Clear to medium light gray (N6) and light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. < 1/2% dispersed polyhalite and < 1/2% gray clay. [9]	
30.4							
8		5.0	5.0	100		34.4'-40.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline with some medium. None to 3% polyhalite. < 1/2% gray clay locally. [2-5, 7]	
	35					40.5'-43.7' HALITE: Clear to medium light gray (N6) and some light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. ≤ 1% gray intercrystalline clay and < 1/2% dispersed polyhalite. [9]	Run 9. Driller increased RPM's on last 2' of run.
35.4							
9		5.0	3.0	60		43.7'-48.55' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite. < 1/2% gray clay locally. [3, 4, 7]	
	40						
40.4							
10		4.9	4.9	100		48.55'-49.2' HALITE: Clear, coarsely crystalline, some medium. Scattered white anhydrite stringers. [1, 2]	
						49.2'-49.5' ANHYDRITE: White to medium light gray (N6), microcrystalline. Scattered halite growths. Trace of gray clay at 49.5'.	
45.3	45						
11		5.1	5.1	100		49.5'-50.4' HALITE: Clear with some moderate reddish orange (10R 6/6); medium to coarsely crystalline. < 1% polyhalite. < 1/2% gray clay. [1, 9]	
50.4	50						
	55						

BORING NO. DH-24A

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ HOLE TYPE/SIZE NX BORING NO. DH-25

LOCATION N1420 Drift at Room C-2 Intersection

STATION N 1422, E 1510 COLLAR ELEV. 1318.8 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N 11109.72, E 8403.78 DEPTH OF BOREHOLE 51.8'

DRILLING METHOD Rotary/Air DRILL MAKE/MODEL Watson Model 750

DATE STARTED 3/29/84 (swing) DATE COMPLETED 3/30/84 (swing) SHEET

LOGGED BY: J. F. Gallerani DATE: 4/18/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		2.5	2.5	100		0.0'-4.6' HALITE: Clear to light gray (N7) and light moderate reddish orange (10R 6/6), medium to coarsely crystalline. < 1% gray clay. < 1/2% dispersed polyhalite. [1, 9]	Watson drill, post-mounted, AW rods, S&H NX double-tube.
	2.5						Drilling time: 5 hrs. ±
2		4.4	4.4	100		4.6'-7.0' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. 1/2" gray anhydrite layer at 4.85'. Trace of gray clay at 4.85'. [1]	
	6.9					7.0'-9.3' HALITE: Clear to light gray (N7) and some moderate brown (5YR 4/4). Fine to coarsely crystalline. ≤1% gray clay. ≤ 1% brown clay from 8.5'-8.85'. Clay break at 8.6'. [11]	
3		4.0	4.0	100		9.3'-12.4' HALITE: Clear, coarsely crystalline. [1]	
	10.9					12.4'-15.4' HALITE: Clear to light gray (N7), medium light gray (N6), and locally some moderate reddish orange (10R 6/6). Medium to coarsely crystalline. ≤ 1% gray clay. 1/2" clay and halite seam at 15'. < 1/2% dispersed polyhalite. [11]	
4		5.0	5.0	100		15.4'-16.9' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline. < 1 to 3% brown clay, trace gray. [12, 16]	
	15.9						
5		1.0	1.0	100		16.9'-17.4' HALITE: Clear, coarsely crystalline. < 1/2% dispersed polyhalite. [2]	
	16.9						
6		3.6	3.6	100		17.4'-18.15' ANHYDRITE: White to medium light gray (N6), microcrystalline anhydrite. Faintly laminated. Growths of halite within. Trace of brown clay at 17.4'. Some polyhalite along upper contact.	Run 6: Broken-up last 12" of run.
	20.5					18.15'-21.6' HALITE: Clear mottled with moderate reddish orange (10R 6/6), coarsely crystalline. None to 2% polyhalite. [1, 2]	Run 7. Discing of core.
7		5.4	5.4	100			
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-25

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
25.9	7	25	5.4	5.4	100		21.6'-27.4' HALITE: Clear to moderate brown (5YR 4/4), fine to coarsely crystalline. < 1 to 2% brown clay, locally argillaceous. Breaks at 21.8'±, 23.6'±,24.0'±. Brown clay seam at 24.05'. Coarsely crystalline 24.1'-27.4'. [8, 10, 12]	
	8	30	5.0	5.0	100		27.4'-29.6' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline, some fine. < 1 to 4% brown clay, intergranular and scattered breaks. [12]	
30.9	9		4.4	4.4	100		29.6'-34.3' POLYHALITIC HALITE: Clear to moderate reddish orange, coarsely crystalline. < 1 to 3% polyhalite. Average <2%. [3, 4]	Run 9. Broken-up core, discing.
							34.3'-35.3' HALITE: Clear, coarsely crystalline. < 1/2% polyhalite blebs. [1]	
35.3		35					35.3'-48.5' HALITE: Clear with patches of moderate brown (5YR 3/4; 4/4) and traces of moderate reddish orange (10R 6/6). Coarsely crystalline, some medium to 36.4'. < 1 to 2% brown clay. 1/2" brown clay seam with some halite at 36.25'. Mostly brown clay mixed with halite from 38.9-39.2'. >30% clay here. ≤ 1% polyhalite blebs and patches. Clay breaks at 46.6'±, 46.8'±, 47.2'±, 48.5'. Argillaceous halite at 46.35'-47.2'. [1, 8, 10]	
36.2	10		0.9	0.9	100			Run 10. Broken-up core.
	11		4.6	4.6	100		48.5'-49.7' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. [3, 4]	
40.8	12	40	1.3	1.3	100		49.7'-51.8' HALITE: Clear with some light gray (N7) and moderate reddish orange (10R 6/6). Coarsely crystalline. ≤ 1% gray clay and polyhalite blebs and patches. [9, 11]	Run 12. Broken-up core.
42.1	13		4.7	4.7	100			
46.8	14	45	5.0	5.0	100			
51.8		50						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ HOLE TYPE/SIZE NX Core BORING NO. DH-26

LOCATION N1420 Drift at Room C-2 Intersection

STATION N 1427, E 1510 COLLAR ELEV. 1307.2 DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N 11114.32, E 8403.78 DEPTH OF BOREHOLE 53.0 Ft.

DRILLING METHOD Rotary/Air DRILL MAKE/MODEL Watson Model 750

DATE STARTED 3/30/84 (swing) DATE COMPLETED 3/30/84 (swing) SHEET

LOGGED BY: J. E. Gallerani DATE: 4/18/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0						
1	0.0	4.2	4.2	100		0.0'-6.2' HALITE: Clear, coarsely crystalline, some medium. < 1/2% gray intercrystalline clay. < 1/2% polyhalite. [1, 2]	Watson drill, AW rods, NX double-tube core barrel, except run 4 where NW split-tube barrel was used.
						6.2'-9.8' HALITE: Clear to medium light gray (N6), coarsely crystalline. ≤ 1% gray clay. Breaks at 7.75', 8.1', 9.6'. [11]	Drill time: 4 hrs. No gas. Dry hole.
2	4.2	3.3	3.3	100		9.8'-12.5' HALITE: Clear to light moderate reddish orange (10R 6/6), coarsely crystalline. ≤ 1% polyhalite [1, 2]	Overall core is fair with some broken zones and discing.
3	7.5	4.6	4.6	100		12.5'-19.3' HALITE: Clear to medium light gray (N6) and light moderate reddish orange (10R 6/6). Fine to coarsely crystalline. ≤ 1% gray clay. < 1/2% polyhalite. [1, 9]	Run 2. Discing of core.
						19.3'-21.8' HALITE: Clear with some moderate reddish orange (10R 6/6), coarsely crystalline. None to < 1% polyhalite. [1, 2]	
4	12.1	1.4	0.85	61		21.8'-23.3' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. Scattered anhydrite. < 1/2% gray clay. [4, 6]	Run 4. Tried split-tube core barrel but barrel plugged-off while drilling.
5	13.5	4.7	4.7	100		23.3'-25.9' MB-139: Very light gray (N8) to medium light gray (N6) anhydrite with scattered halite growths. Anhydrite is partly lamlnated. 1-1/2" hard gray clay seam at lower contact .	
						25.9'-29.8' HALITE: Clear to moderate reddish orange (10R 6/6) and light gray (N7). Medium to coarsely crystalline. ≤ 1% gray clay and < 1% polyhalite. [2, 9]	
6	18.2	5.0	5.0	100		29.8'-33.3' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. Gray clay break at 33.3'. Anhydrite mixed with halite from 33.05'-33.3'. [7]	
						33.3'-36.0' HALITE: Clear with some moderate reddish orange (10R 6/6) and light gray (N7). Medium to coarsely crystalline. < 1/2% dispersed polyhalite. < 1% gray intercrystalline clay. [9]	
	23.2						
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-26

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
7		5.0	5.0	100		36.0'-41.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline to 39.6', then medium to coarse. < 1 to 3% polyhalite blebs and dispersed. < 1/2% gray clay locally. Scattered anhydrite 39.6'-40.0'±. [3, 7]	
28.2							
						41.0'-44.0' HALITE: Clear to light bluish gray (5B 7/1) and light gray (N7) and some moderate reddish orange, medium to coarsely crystalline. ≤ 1/4" gray clay seams at 36.1'± and 41.7'±. ≤ 1% clay. [9]	
8	30	4.8	4.8	100		44.0'-48.8' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. < 1 to 3% polyhalite. [7]	
33.0							
9	35	5.0	5.0	100		48.8'-49.6' ANHYDRITE: Moderate reddish orange anhydrite to 49'. Then halite with some anhydrite from 49'-49.1'. Then medium light gray (N6) to light gray (N7) anhydrite. Trace of gray clay at 49.6'.	
						49.6'-53.0' HALITE: Clear to medium light gray (N6), medium to coarsely crystalline. ≤ 1% gray clay. < 1/2% dispersed polyhalite. [1, 9]	
38.0							
10	40	5.0	5.0	100			
43.0							
11	45	5.0	3.6	72			Run 11. Discing of core.
48.0							Run 12. Broken-up in upper one foot. Considerable chipping of core surface below the anhydrite.
12	50	5.0	5.0	100			
53.0							
	55						

BORING NO. DH-26

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-27

LOCATION ROOM G ACCESS DRIFT - ROOF

STATION N1107, W682 COLLAR ELEV. 1300.8 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10,793.7, E6218.4 DEPTH OF BOREHOLE 50.5'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 7-26-84 DATE COMPLETED 7-27-84 SHEET

LOGGED BY: J. GALLERANI DATE: 7-28-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
1		3.0	2.8	93		0.0'-4.5' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% polyhalite. [1, 2]	NC double tube wireline core barrel. NC rods.
	3.0					4.5'-5.8' HALITE: Clear to moderate brown (5YR 3/4), coarsely crystalline, some medium ≤1% to 2% locally, brown clay.. Parting @ 5.5'. [8, 10]	Note: Drilled 0.0-3.0' with 2-5/8" inside diameter single tube core barrel. Total drilling time: 13 hrs.
2		3.3	3.3	100		5.8'-6.95' HALITE: Clear to moderate reddish brown (10R 4/6), grayish red (10R 4/2), medium to coarsely crystalline, some fine ≤1% to 2% dispersed polyhalite and <1% gray and brown clay.	
	6.3					6.95'-7.20' ANHYDRITE b: Light (N7) to medium light gray (N6), microcrystalline anhydrite. Halite growths within, most common in middle of unit.	
3		2.2	2.2	100		7.20'-12.95' HALITE: Clear, coarsely crystalline, scattered white stringers of anhydrite. <1/2% polyhalite. Trace of gray clay @ 12.3'. [1]	
	8.5					12.95'-13.95' HALITE: Clear to moderate reddish orange (10R 6/6), fine to coarsely crystalline. ≤1% polyhalite and <1% gray clay. [9]	
4		4.5	4.5	100		13.95'-14.55' ANHYDRITE a: Very light (N8) to medium light gray (N6), microcrystalline anhydrite, irregular laminae. Scattered halite growths most common from 14.25 to 14.55'. Pinkish gray color here. Trace of gray clay @ 13.95'.	
	13.0					14.55'-18.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline, <1% to 3% polyhalite. [4, 7]	
5		5.0	5.0	100		18.4'-23.9' HALITE: Clear to moderate brown (10R 4/6), some moderate reddish orange (10R 6/6), coarsely crystalline, some medium. None to 2% brown clay. ≤1% polyhalite from 22.1'-22.9' ±. Scattered anhydrite to 19.4' [8, 10]. ≤3/8" brown clay seam at 23.7'. 1/2" anhydrite above @ 23.85'.	
	18.0					23.9'-28.6' HALITE: Clear, coarsely crystalline, trace brown clay from 27.2'± and some medium crystalline. [1] [8 from 27.2']	Runs 7-12: Broken core zones in coarsely crystalline, clear halite.
6		3.2	3.2	100			
	21.2						
7		4.8	4.3	90			

BORING NO. DH-27

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-27

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
7	25	4.8	4.3	90		28.6'–30.5' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4), fine to medium, some coarsely crystalline. <1% to 3% brown clay. [12]	
26.0							
8		4.8	3.5	73		30.5'–32.4' HALITE: Clear, trace of light moderate brown, coarsely crystalline. <1/2% brown clay. Core broken up @ 30.8'–31.4'. [1, 8]	39% of core recovered was ≥2 inches in length.
	30					32.4'–36.2' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4), some light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1% to 3% brown clay. <1/2% dispersed polyhalite. Scattered breaks. [10, 12]	
30.8							
9		3.8	3.7	97		36.2'–36.95' ANHYDRITE: Very light (N8) to light gray (N7), some moderate reddish orange anhydrite. Scattered halite growths within. 3/4" hard brown clay @ 36.2'.	
34.6							
	35					36.95'–40.3' HALITE: Clear, some moderate reddish orange (10R 6/6), coersely crystalline <1%, locally 2%, polyhalite, scattered white anhydrite stringers. [1, 3]	
10		3.4	2.9	85			
38.0						40.3'–41.4' POLYHALITIC HALITE: Clear, to moderate reddish orange (10R 6/6), coersely crystalline, <1% to 3% polyhalite. [4, 7]	
11	40	4.5	3.9	87		41.4'–42.55' HALITE: Clear, some moderate brown (5YR 4/4) coarsely crystalline, some medium, <1% brown clay, break @ 42.5'. [1, 8]	
42.5						42.55'–46.4' HALITE: Clear to moderate reddish orange (10R 6/6), some moderate brown (5YR 4/4). Coarsely crystalline, some medium. ≤2% polyhalite to 43'±; then <1% [1, 2]. ≤2% brown clay at 43.65'–43.9' [12]. Break @ 44.3'.	
12		4.7	4.7	100		46.4'–47.2' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4), coarsely crystalline, <1% to 3% brown clay. Mixture of brown clay and halite seam at 47.1'–47.2'. [10]	
	45						
47.2						47.2'–48.3' HALITE: Clear to moderate reddish orange/brown (10R 6/6, 4/6), medium to coarsely crystalline. ≤1% brown clay, <1% polyhalite. [17]	
13		3.3	3.3	100		48.3'–50.5' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline, some fine <2% to 5% brown clay. Scattered clay breaks [10, 15].	
50.5	50						
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ - _____ HOLE TYPE/SIZE NC-CORE BORING NO. DH-28

LOCATION ROOM G ACCESS DRIFT - FLOOR

STATION N1107, W682 COLLAR ELEV. 1289.9 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N10793.8, E6218.3 DEPTH OF BOREHOLE 50.5'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 7-25-84 DATE COMPLETED 7-26-84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 7-27-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		3.0	2.7	90		0.0'-4.2' HALITE: Clear, coarsely crystalline, some medium. <1% polyhalite, <1% clay, predominantly gray with trace of brown. [1, 2]	NC double tube wire-line core barrel with NC rods, Used 2-5/8" core bit, single tube barrel from 0.0'-3.0', Total drilling time: 4.5 hrs. Core quality good, 75% of core recovered is ≥ 2" lengths.
	3.0						
2	5	4.8	4.75	98		4.2'-5.6' HALITE: Clear, mottled with some moderate reddish orange (10R 6/6). Coarsely crystalline. ≤1% polyhalite blebs. Trace of anhydrite. [2, 4]	
						5.6'-9.9' MB-139: Mixture of polyhalitic halite and anhydrite to 7.6'. Some "swallowtail" pattern. Then predominantly anhydrite with scattered halite growths. Light gray and moderate reddish orange to 8.4', then predominantly light (N7) to medium light (N6) gray. <1/8" gray clay at 9.9'.	
	7.8						
3		5.2	5.1	98		9.9'-13.65' HALITE: Clear to medium light gray (N6) and light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1% dispersed polyhalite. <1% gray clay. [9]	
	10						
						13.65'-18.3' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. Scattered anhydrite. Anhydrite/halite @ 18.05'-18.25'. Irregular gray clay break at 18.3'. [4, 7]	
	13.0						
4		5.0	5.0	100		18.3'-20.4' HALITE: Clear to light gray (N7) and light moderate reddish orange (10R 6/6), medium to coarsely crystalline. ≤1% dispersed polyhalite and gray clay. [9]	
	15						
						20.4'-24.9' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite, trace of gray clay at 23.85'. [3, 4, 7]	
	18.0						
5		5.0	5.0	100		24.9'-25.9' HALITE: Clear to light moderate reddish orange (10R 6/6), medium to coarsely crystalline, ≤1% dispersed polyhalite. [2]	
	20						
						25.9'-28.1' HALITE: Clear to moderate reddish brown (10R 4/6) and medium brown (5YR 3/4), medium to coarsely crystalline. <1% to 2% brown clay. ≤1% polyhalite. [17]	
	23.0						
6		5.1	5.1	100			
	25						

WIPP

WASTE ISOLATION PILOT PLANT SHEET 2 OF 2 BORING NO. DH-28

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
6		5.1	5.1	100		28.1'–30.6' HALITE: Clear, medium to coarsely crystalline, <1/2% dispersed polyhalite, trace of gray clay locally. [2]	
28.1							
7	30	5.0	4.9	98		30.6'–35.1' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline, <1% to 3% polyhalite [7]. Moderate reddish orange to light gray anhydrite, some halite, at 34.65'–34.9'.	
						35.1'–35.35' ANHYDRITE: Light (N7) to medium light (N6) gray, microcrystalline. Scattered halite growths. ≤3/8" hard gray clay layer at lower contact.	
33.1						35.35'–42.55' HALITE: Clear to light moderate reddish orange (10R 6/6) and medium gray (N5). Medium to coarsely crystalline. <1% dispersed polyhalite, ≤1% gray clay. [9, 11]	
8	35	5.0	5.0	100		42.55'–44.6' HALITE: Clear to moderate reddish brown (10R 4/6) and moderate brown (5YR 3/4). Medium to coarsely crystalline, <1% to 2% brown clay, some gray, <1% polyhalite dispersed. [17, some 9]	
38.1						44.6'–47.9' HALITE: Clear to moderate reddish orange (10R 6/6), some medium gray (N5). Medium to coarsely crystalline, ≤1% polyhalite and ≤1/2% gray clay. [9]	
9	40	4.9	4.6	94		47.9'–50.5' HALITE: Clear, coarsely crystalline. [1]	
43.0							
10	45	5.0	5.0	100			Core broken up at 39.6'–39.8'±.
48.0							
11	50	2.5	2.5	100			
50.5							

BORING NO. DH-28

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC-CORE BORING NO. DH-29

LOCATION ROOM G ACCESS DRIFT - ROOF

STATION N1099, W982 COLLAR ELEV. 1298.3 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10785.4, E5932.4 DEPTH OF BOREHOLE 50.4'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 7-23-84 DATE COMPLETED 7-25-84 SHEET

LOGGED BY: J. F. GALLERANI DATE: 7-25-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		2.2	2.2	100		0.0'-3.9' HALITE: Clear, coarsely crystalline. [1]	NC double tube wire line core barrel, NC stepped diamond bit. Used 2 ft starter barrel (2-5/8" core) from 0'-6.1' Total drilling time: 13± hrs.
	2.2					3.9'-6.3' HALITE: Clear to moderate brown (5YR 3/4), coarsely crystalline, <1% to 2% brown clay.	
2		1.8	1.8	100			
	4.0					6.3'-7.55' HALITE: Clear to moderate brown (5YR 4/4) and grayish red. Fine to medium, some coarse, ≤1% clay, brown and gray. <1/2% dispersed polyhalite.	
3		2.1	2.1	100			
	6.1					7.55'-7.75' ANHYDRITE b: Light gray (N7), micro-crystalline, scattered halite growths. Trace of gray clay at 7.55'.	Run 4: 6.1'-10.0', core not good, discing in clear halite.
4		4.6	4.6	100		7.75'-13.25' HALITE: Clear, coarsely crystalline. <1/2% polyhalite, scattered white stringers.	Run 5: core not good, average length ~1" (discing).
	10.7					13.25'-14.3 HALITE: Clear to moderate reddish orange (10R 6/6), medium to coarsely crystalline. <1% gray clay. ≤1% to 2% polyhalite dispersed.	
5		4.1	4.1	100		14.3'-14.8' ANHYDRITE a: Light gray to medium light gray microcrystalline anhydrite. Scattered halite growths. Trace of gray clay at 14.2'.	
	14.8					14.8'-19.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline, <1% to 3% polyhalite.	
6		4.7	4.7	100		19.6'-22.5' HALITE: Clear, some moderate brown, coarsely crystalline, some fine and medium. ≤1% brown clay. <1/2% dispersed polyhalite. Breaks at 20.75', 21.5'.	
	19.5					22.5'-24.4' HALITE: Clear, to moderate brown, fine to medium, some coarsely crystalline. <1% brown clay. <1/2% dispersed polyhalite.	
7		4.9	4.9	100		24.4'-27.7' HALITE: Clear, coarsely crystalline. Scattered white anhydrite.	Run 7: bottomed in brown clay seam. Vibrated and broke core.
						27.7'-29.9' HALITE: Clear, mottled with moderate brown, coarsely crystalline, some medium. ≤1% to 2% brown clay. Core broken up to 29.2'.	
	24.4						

BORING NO. DH-29

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-29

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					29.9'-31.7' HALITE: Clear, coarsely crystalline.	
8		4.8	4.8?	100?		31.7'-32.4 HALITE: Clear, some light moderate brown. Coarsely crystalline. <1/2% brown clay.	
						32.4'-37.35' ARGILLACEOUS HALITE: Clear to moderate brown, medium to coarsely crystalline. <1% to 3% brown clay, scattered breaks.	Run 9: Very bad core 29.2'-33.0'.
29.2							
9	30	5.0	5.0	100		37.35'-38.25 ANHYDRITE: Light gray to medium light gray, microcrystalline anhydrite. Scattered halite growths. 1" hard brown clay layer at 37.35".	
						38.25'-44.4' HALITE: Clear, coarsely crystalline. None to <1% brown clay. Scattered white stringers. [1], [2]. Brown clay parting at 44.4'.	
34.2							Circulation blocked @ 37.3'. Hit mud seam.
10	35	5.0	5.0	100		44.4'-46.65 HALITE: Clear to moderate brown, coarsely crystalline, some zones of medium. <1% to 3%, locally, brown clay. Breaks at 46.35', 46.5' Argillaceous 44.4'-45.0' and 46.35'-46.5'.	
						46.65'-47.4' HALITE: Clear, coarsely crystalline.[1]	
						47.4'-47.9' HALITE: Cleer, some moderate brown. Coarsely crystalline, ≤1% brown clay.	
39.2							Run 11: Some discing, broken in clear halite.
11	40	3.5	3.5	100		47.9'-48.9' ARGILLACEOUS HALITE: Clear to moderate brown, medium crystalline, some coarse. 3% brown clay. 1" halite and brown clay seam @ 47.9'.	
						48.9'-50.4' HALITE: Clear, mottled with moderate brown clay, coarse, some medium. <1% to 2% brown clay, <1/2% dispersed polyhalite.[10]	
42.7							
12	45	4.7	4.7	100			39% of recovered core was ≥2 inch length.
47.4							Interval from 20 to 35' was replaced with corehole DH-29A.
13		3.0	3.0	100	X		
50.4	50						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC-CORE BORING NO. DH-29A

LOCATION ROOM G ACCESS DRIFT - ROOF

STATION N1099, W987 COLLAR ELEV. 1298.1 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10,786.1 E5927.3 DEPTH OF BOREHOLE 35.0'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL CP-65

DATE STARTED 9-12-84 DATE COMPLETED 9-12-84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 9-29-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0					0.0'-20.0' NON-CORE: Refer to log for DH-29.	NC double tube core barrel used. This hole was drilled to replace 20'-35' zone of poor quality core in DH-29. Refer to log for DH-29 for core descriptions at 0'-20' and 35'-50'
						20.0'-25.0' HALITE: Clear to moderate brown (5YR 4/4), some moderate reddish orange (10R 6/6). Medium to coarsely crystalline, some fine. <1% to 2% brown clay. <1% polyhalite locally. Anhydrite seam at 25'±. ≤1/4" hard brown clay associated. [12, 17]	
	5					25.0'-28.4' HALITE: Clear, coarsely crystalline. Scattered anhydrite stringers. [1]	
						28.4'-30.9' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4, 4/4), medium to coarsely crystalline. <1% to 3% brown clay. <1/2% dispersed polyhalite. [10, 15, 17]	
	10					30.9'-35.0' HALITE: Clear, some moderate brown (5YR 3/4, 4/4), coarsely crystalline, some medium. ≤1% brown clay. [10]	
	15						
20.0	20						
1		5.0	4.6	92	X		
25.0	25						

WIPP

WASTE ISOLATION PILOT PLANT SHEET 2 OF 2 BORING NO. DH-29A

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25.0						
2		5.0	4.7	94			
	30.0						
3		5.0	4.5	90			
	35.0						

BORING NO. DH-29A

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ HOLE TYPE/SIZE NC CORE BORING NO. DH-30

LOCATION ROOM G ACCESS DRIFT - FLOOR

STATION N1099, W982 COLLAR ELEV. 1289.2 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N10785.5, E5932.3 DEPTH OF BOREHOLE 50.1'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 7-25-84 DATE COMPLETED 7-25-84 SHEET

LOGGED BY: L. GALLERANI DATE: 7-26-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		1.7	1.7	100		0.0'-8.6' HALITE: Clear, some light medium gray. Coarsely crystalline, some medium. ≤1% gray clay. Trace of brown at 1.0'-1.7'. [1, 11]	NC double tube wire-line core barrel. Used 2 ft single tube barrel from 0'-5.8'. Had to ream hole to 5.8 ft to accommodate NC core barrel. Total drilling time 5.5 hrs.
	1.7						
2		4.1	4.1	100		8.6'-11.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% polyhalite. [7]	
	5					11.5'-16.0' MB-139: Mixture of halite and anhydrite to 13'. Then predominantly very light to medium light gray anhydrite with scattered halite growths. Irregular hairline fracture at 14'±. Gray clay at lower contact.	
	5.8						
3		4.1	4.1	100		16.0'-19.2' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. ≤1% gray clay. <1% to 3% polyhalite. Scattered anhydrite. [some 5]	
	9.9					19.2'-20.7' HALITE: Clear, some light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1% dispersed polyhalite. <1/2% gray clay.	
	10						
4		5.0	5.0	100		20.7'-25.45' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. [5, 7]	
	14.9					25.45'-30.1' HALITE: Clear to light moderate reddish orange (10R 6/6), medium to coarsely crystalline. <1% polyhalite dispersed. ≤1% gray clay. [9]	66% of core recovered is ≥2 inch length.
	15						
5		5.0	5.0	100		30.1'-35.2' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. Scattered anhydrite [5, 7]. Anhydrite/halite layer at 34.9'-35.1'±.	
						35.2'-35.6' ANHYDRITE: Light gray (N7) to medium light gray (N6), microcrystalline. Scattered halite growths. No clay.	
	19.9						
	20						
6		5.1	5.1	100		35.6'-43.75' HALITE: Clear to light moderate reddish orange (10R 6/6), medium to coarsely crystalline. <1% dispersed polyhalite and gray clay [9]. Polyhalitic at 42.9'-43.5'±.	
	25.0						
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-30

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
25.0							
7		5.1	5.1	100		43.75'-44.8' HALITE: Clear to moderate reddish orange (10R 6/6), some moderate brown (10R 4/6). Medium to coarsely crystalline. <1% to 2% brown clay, some gray. Breeks at 44.35' and 45.10'± [14, 17].	Runs 7, 8, 9: Some breakage in medium to coarsely crystalline halite.
	30					44.8'-46.9' HALITE: Clear to light moderate reddish orange (10R 6/6), some bluish gray. Medium to coarsely crystelline. <1/2% dispersed polyhalite. <1% gray clay.	
30.1							
8		5.1	5.1	100		46.9'-50.1' HALITE: Clear, some moderate reddish orange (10R 6/6), coarsely crystelline. <1% polyhalite. <1/2% gray clay. 1% to 2% polyhalite at 46.9' to 47.7'±. [1, 2, 11]	
35.1	35						
9		5.1	5.1	100			
40.1	40						
10		5.1	5.1	100			
45.1	45						
11		5.1	5.1	100			
50.1	50						

BORING NO. DH-30

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ HOLE TYPE/SIZE NC-CORE BORING NO. DH-31

LOCATION ROOM G ACCESS DRIFT - ROOF

STATION N1099, W1282 COLLAR ELEV. 1298.5 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10,784.9, E5632.3 DEPTH OF BOREHOLE 50.5'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 7-18-84 DATE COMPLETED 7-19-84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 7-20-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0 / 0					0.0'-5.0' NON-CORE.	NC double tube wire line core barrel, NC stepped diamond bit. 2 ft starter barrel with impregnated bit caused too much vibration. Went to plugged diamond bit from 0.0 ft to 5.0 ft. Total drilling time 11.5 hrs.
0		Non-Core			Non-Core	5.0'-7.25' HALITE: Clear to moderate brown (5YR 4/4), coarsely crystalline, some medium, ≤1% to 2% brown clay.	
						7.25'-7.5' ANHYDRITE b: Light gray microcrystalline anhydrite. Scattered halite growths. ≤1/4" gray clay at 7.25'.	
	5.0 / 5						
1		2.7	2.65	98		7.5'-13.6' HALITE: Clear, some light moderate reddish orange, coarsely crystalline. <1/2% polyhalite. Scattered white stringers.	
	7.7						
2	10	5.0	4.9	98		13.6'-14.4' HALITE: Clear to moderate reddish brown, medium to coarsely crystalline. ≤1% brown clay, some gray, and dispersed polyhalite.	
						14.4'-15.1' ANHYDRITE a: Light gray to medium light gray. Scattered halite growths. Trace gray clay at 14.4'. Core grinding evident.	
	12.7					15.1'-19.05' POLYHALITIC HALITE: Clear to moderate reddish orange, coarsely crystalline. ≤1% to 2% polyhalite.	
3	15	4.8	4.8	100		19.05'-21.4' ARGILLACEOUS HALITE: Clear to moderate brown, medium to coarsely crystalline, <1% to 3% brown clay. <1% dispersed polyhalite.	28% of core recovered was ≥2 inch length.
	17.5					21.4'-23.95' HALITE: Clear to light moderate reddish orange, medium to coarsely crystalline. <1% polyhalite. <1/2% brownish gray clay. Brown clay seam at 23.9' with associated anhydrite to 23.95.	
4	20	4.0	4.0	100		23.95'-27.9' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. [1]	
						27.9'-29.65' HALITE: Clear to moderate brown, medium to coarsely crystalline. None to 3% brown clay.	
	21.5					29.65'-31.1' HALITE: Clear, coarsely crystalline.	
5	25	4.5	4.2	95			

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-31

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
	26.0					31.1'–32.7' HALITE: Clear, medium to coarsely crystalline. <1/2% brown clay.	Run 6: Core broken up. Difficult to measure recovery.
6		4.5	4.1	91		32.7'–33.6' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4, 4/4), medium to coarsely crystalline. <1% to 3% brown clay. [10]	
	30					33.6'–34.5' HALITE: Clear, coarsely crystalline. <1/2% brown clay.	Run 7: Discing, some broken core.
	30.5					34.5'–36.55' ARGILLACEOUS HALITE: Clear to moderate brown, medium to coarsely crystalline. <1% to 3% brown clay.	
7		5.0	4.7	94		36.55'–37.35' ANHYDRITE: Very light gray to medium light gray, scattered halite growths and irregular laminae. ≤1/8" brown clay at 36.55'.	Run 8: 1'± core is broken up.
	35					37.35'–41.5' HALITE: Clear to moderate reddish orange, coarsely crystalline. <1% to 2% polyhalite. Locally polyhalitic.	
	35.5						
8		5.0	4.8	96		41.5'–44.3' ARGILLACEOUS HALITE: Clear to moderate brown, medium to coarsely crystalline. <1% to 3%, locally, brown clay, scattered breaks.	
	40					44.3'–45.5' HALITE: Clear, coarsely crystalline. <1% polyhalite. <1/2% clay.	
	40.5					45.5'–47.0' HALITE: Clear, mottled with moderate brown (5YR 4/4), coarsely crystalline. <1% to 2% brown clay.	
9		5.0	5.0	100	X X	47.0'–50.5' ARGILLACEOUS HALITE: Clear to moderate brown, medium to coarsely crystalline. <1% to 3% brown clay. Breaks from 47.5' to 50.5'.	
	45						
	45.5						
10		5.0	5.0	100		Note: Hole redrilled due to poor core quality. See log for hole DH-31A.	
	50						
	50.5						

BORING NO. DH-31

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ HOLE TYPE/SIZE NC-CORE BORING NO. DH-31A

LOCATION ROOM G ACCESS DRIFT - ROOF

STATION N1099 W1280 COLLAR ELEV. 1298.5 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10784.8, E5630.5 DEPTH OF BOREHOLE 49.2'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 7-20-84 DATE COMPLETED 7-24-84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 7-24-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0					0.0'-5.1' NON-CORE: Used plugged diamond bit.	NC double tube wireline core barrel. Wireline rod and stepped diamond bit. Total drilling time: 10.5± hrs. 46% of core recovered was ≥2 inch length.
0		Non-Core				5.1'-7.15' HALITE: Clear to moderate brown, some light to moderate reddish orange. Medium to coarsely crystalline. ≤1% brown clay with trace of gray. <1/2% dispersed polyhalite. [8, 17]	
	5.1					7.15'-7.35' ANHYDRITE b: Light gray (N7), microcrystalline, partially laminated. Scattered halite growths. Gray clay at 7.15'. Contact dips 10°±.	Upper 4.9' of hole was replaced with corehole DH-32B.
1		4.9	4.8	97		7.35'-13.85' HALITE: Clear, some light to moderate reddish orange. Coarsely crystalline. <1/2% polyhalita. Scattered whita stringers. [1, 2]	
	10.0					13.85'-14.65' HALITE: Clear to moderata brown. Fine to medium crystalline, some coarsely crystalline. ≤1% brown clay. [12]	
2		5.2	5.2	100		14.65'-15.3' ANHYDRITE a: Light to medium light gray microcrystalline. Scattered halite growths. ≤3/16" gray clay at 14.65. Vertical fracture noted from 14.35' to 14.85'.	
	15.2					15.3'-19.5' POLYHALITIC HALITE: Clear to moderately reddish orange, (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. <1/2% gray clay locally. [5, 7]	Run 2: Several broken zones in clear halite.
3		5.1	5.1	100		19.5'-24.75' HALITE: Clear, some lightly moderate reddish orange. Medium to coarsely crystalline with with some fine crystalline. <1% brown with some gray clay and polyhalite dispersed. 1/2" grayish brown hard clay at 24.7'. Scattered halite within. [12, 17]	
	20.3					24.75'-28.8' HALITE: Clear, coarsely crystalline. Scattered white anhydrite. 3/4" anhydrite layer at 26.4'±. Appears to be vertical fracture at 24.75'-25.15'±. Probably caused when banging end piece of core from barrel. [1]	
4		5.0	5.0	100		28.8'-30.3' ARGILLACEOUS HALITE: Clear to moderate brown. Fine to medium crystalline with some coarsely crystalline. ≤1% to 3% brown clay. Break at 30.3'. [12]	
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-31A

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
25.3						30.3'-32.4' HALITE: Clear, coarsely crystalline. [1]	Run 5: Badly broken by drilling.
5		4.8	4.8	100		32.4'-36.7' ARGILLACEOUS HALITE: Clear to moderately brown, medium to coarsely crystalline. ≤1% to 3% brown clay. Scattered breaks. [15]	
30.1	30					36.7'-37.1' HALITE: Clear to coarsely crystalline. ≤1% brown clay. [8, 10]	Run 6: Badly broken to 33.3' in very coarse halite.
6		4.7	4.7	100		37.1'-37.85' ANHYDRITE: Light to medium light gray, microcrystalline anhydrite. Partly laminated. Scattered halite growths. ≤3/4" hard brown clay seam at 37.1'.	
						37.85'-41.5' HALITE: Clear, coarsely crystalline, scattered medium. ≤1/2% polyhalite. [1]	
34.8	35					41.5'-44.6' HALITE: Clear to moderate brown. Medium to coarsely crystalline. <1% to 2% brown clay. <1% polyhalite blebs. Irregular 1" brown clay and halite seam at 44.5'±. [8, 17]	
7		4.7	4.7	100		44.6'-45.8' HALITE: Clear, coarsely crystalline. <1% polyhalite blebs. [2]	
39.5	40					45.8'-47.8' HALITE: Clear, mottled with moderate brown, coarsely crystalline. ≤1% brown clay blebs. <1/2% polyhalite blebs. [8, 10]	
8		4.9	4.9	100		47.8'-49.2' ARGILLACEOUS HALITE: Clear to moderate brown. Fine to medium crystalline, some coarsely crystalline. <1% to 3% brown clay with scattered breaks. [12]	Run 9: Core disced from 45.5' to 48'.
44.4	45						
9		4.8	4.8	100			
49.2	50						

BORING NO. DH-31A

WIPP

WASTE ISOLATION PILOT PLANT

GEOLOGIC DRILL LOG

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE 2 3/4" CORE BORING NO. DH-31B

LOCATION ROOM G ACCESS DRIFT - ROOF

STATION N1099, W1261 COLLAR ELEV. 1298.5± DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10786.7 E5652.2 DEPTH OF BOREHOLE 4.9 FT.

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL CP-65

DATE STARTED 9-12-84 DATE COMPLETED 9-12-84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 9-29-84 1 OF 1

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		4.9	4.9	100	X X	0.0'-2.4' HALITE: Clear, some moderate reddish orange (10R 6/6), coarsely crystalline. ≤1% to 2% polyhalite. Scattered anhydrite stringers. [2]	Single tube barrel used.
					— —	2.4'-4.9' HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline. ≤1% brown clay, trace of gray. [8, some 10].	
	4.9						This hole drilled to replace non-core section of DH31A.
	5						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER: -
HOLE TYPE/SIZE: NC-CORE
BORING NO.: DH-32
LOCATION: ROOM G ACCESS DRIFT - FLOOR

STATION: N1099, W1282
COLLAR ELEV.: 1289.6
DIRECTION OF DRILLING: VERTICAL DOWN
MINE COORDINATES: N10784.9, E5632.2
DEPTH OF BOREHOLE: 50.0'
DRILLING METHOD: ROTARY AIR
DRILL MAKE/MODEL: CP-65
DATE STARTED: 7-19-84
DATE COMPLETED: 7-20-84
SHEET
LOGGED BY: J. E. GALLERANI
DATE: 7-20-84
1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0					0.0'-5.3' NON-CORE: Used plugged bit.	NC double tube wire-line core barrel, NC rods and stepped diamond bit. Total drilling time: 6± hrs.
0		Non-Core				5.3'-7.4' HALITE: Clear, mottled with some moderate reddish orange and brown. Coarsely crystalline. <1% polyhalite. <1/2% brown and gray clay 6.75'-7.05'. [3]	
	5					7.4'-8.5' POLYHALITIC HALITE: Clear to moderate reddish orange to coarsely crystalline. <1% to 2% polyhalite [3, 4].	Upper 5.5' of hole replaced with corehole DH-32A.
5.3 1		5.0	4.9	98		8.5'-11.3' MB-139: (upper contact dips 40°±). Mixture of halite and anhydrite to 9.6± with some "swallowtail" structure. From 9.6'±, predominently Light to light medium gray anhydrite with scattered halite growths @ 9.15' to 10.75'. Clear halite layers at 10.3'-10.4'. ≤3/16" gray clay @ 11.3'. Core grinding evident here.	
	10					11.3'-14.2' HALITE: Clear, some moderate reddish orange (10R 6/6), moderate brown, medium to coarse. ≤1% clay, gray to 12.7', then brown clay. Irregular brownish gray break @ 14.2'. <1/2% dispersed polyhalite. [9, 17]	
10.3 2		4.8	4.2	95		14.2'-18.85' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. Scattered anhydrite. Gray clay parting @ 18.85'. [3, 5, 7]	56% of recovered core was ≥2 inch length.
15.1 3	15	5.0	4.8	96		18.85'-20.1' HALITE: Clear to light moderate reddish orange (10R 6/6), medium to coarsely crystalline. <1% dispersed polyhalite. <1/2% gray clay. [9]	
						20.1'-25.25' POLYHALITIC HALITE: Clear to moderate reddish orange and brown (10R 6/6, 4/6), coarse, some medium. <1% to 3% polyhalite. <1/2% brown and gray clay. Vertical fracture in core at 23.4'-23.8'. Looks like stress fracture. [4, 6, 7]	
20.1 4	20	4.9	4.9	100		25.25'-30.4' HALITE: Clear to moderate reddish orange (10R 6/6), medium to coarsely crystalline. <1% to 2% polyhalite. <1% gray clay, locally. <1% brown clay at 28.3'-29.9'. Vertical fractures in core at 27.35'-27.55' and 28.6'-29.2'±. [9, some 17]	Run 4: Vertical fracture at 20.1', 23.5' and 26.0'. Probably caused by overshot tool impact on barrel.
	25						

25

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-32

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
5		5.2	4.9	94.5		30.4'–35.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. <1% gray clay to 31'. [7]	
						35.0'–35.9' ANHYDRITE: Moderate reddish orange (10R 6/6) to medium light gray (N6), microcrystalline anhydrite with scattered halite growths. Gray clay at 35.9'. Contact irregular, low angle here.	
30.2	30						
6		5.0	5.0	100		35.9'–40.8' HALITE: Clear to light moderate brown (5YR 4/4) and light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1/2% dispersed polyhalite. <1% clay, predominently gray. Brown clay at 37.3'–37.9' [9, 11, some 17]	
						40.8'–44.2' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 2% polyhalite, locally 3% from 43.0'–43.9'±. <1% gray clay [4, 9].	
35.2	35						
7		4.8	4.7	97		44.2'–46.1' HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline. <1% brown clay. <1/2% dispersed polyhalite [17].	
						46.1'–47.75' HALITE: Clear, some medium light gray. Medium to coarsely crystalline. <1% gray clay and <1/2% polyhalite [9].	
40.0	40					47.75'–50.0' HALITE: Clear mottled with moderate reddish orange (10R 6/6). Coarsely crystalline. <1% polyhalite. <1/2% gray clay locally. [2]	
8		5.1	5.1	100			
45.1	45						
9		4.9	4.9	100			
50.0	50						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE 2 3/4" CORE BORING NO. DH-32A

LOCATION ROOM G ACCESS DRIFT - FLOOR

STATION N1099, W1261 COLLAR ELEV. 1289.5 DIRECTION OF DRILLING VERTICAL ~~DOWN~~

MINE COORDINATES N10 786.7 E5652.2 DEPTH OF BOREHOLE 5.5 FT

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL CP-65

DATE STARTED 9-13-84 DATE COMPLETED 9-13-84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 9-29-84 1 OF 1

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
1	0.0 5 5.5	5.5	5.5	100	X X X	0.0'-5.5' HALITE: Clear, some moderate reddish orange, coarsely crystalline, some fine and medium, <1% to 2% locally polyhalite. <1% clay, gray except at 1.7'-2.6'± where it is brown. [2, 9]	Single tube barrel used. 45% of core recovered was ≥2 inch length. This hole was drilled to replace non-core section of DH-32.

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC-CORE BORING NO. DH-33

LOCATION ROOM G ACCESS DRIFT - ROOF

STATION N1099, W1582 COLLAR ELEV. 1298.6 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10786.0, E5331.1 DEPTH OF BOREHOLE 50.5'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 7-16-84 DATE COMPLETED 7-18-84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 7-18-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0						
0		Non-core				0.0'-4.0' NON-CORE: Roller bit to 4' in order to accommodate long core barrel.	NC double tube wire-line core barrel, NC rods and stepped diamond bit used from 4.0' depth. Upper 4.0' of hole replaced with corehole DH-33A. Total drilling time: 16± hrs.
						4.0'-5.9' HALITE: Clear with some moderate brown (5YR 4/4). Coarsely crystalline with some medium crystalline. <1% brown clay. [8, 13]	
4.0							
1	5	5.0	4.9	98		5.9'-7.15' HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline, <1% to 2% brown clay. Irregular break at 6.0'. [10]	
						7.15'-7.25' ANHYDRITE b: Light gray to medium gray (N7, N6). Microcrystalline. Gray clay ≤3/16" at 7.15'.	
9.0						7.25'-12.9' HALITE: Clear with some light to moderate reddish orange (10R 6/6). Coarsely crystalline. Scattered white stringers of anhydrite and/or magnesite. None to <1/2% polyhalite. [1]	
2	10	4.0	4.0	100		12.9'-13.1' HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline, ≤1% polyhalite, ≤1% brown clay. [17]	40% of recovered core was ≥2 inch length.
13.0						13.1'-13.85' HALITE: Clear to light moderate brown (5YR 4/4). Fine to medium crystalline with some coarse crystalline. <1/2% polyhalite and <1% clay, brown with some gray. [9]	
3	15	5.0	5.0	100		13.85'-14.4' ANHYDRITE a: Light gray to light medium gray (N7, N6), microcrystalline anhydrite with scattered halite growths. ≤1/8" gray clay at lower contact.	
18.0						14.4'-19.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite with scattered anhydrite. [4, 7]	
4	20	5.0	5.0	100		19.0'-21.25' HALITE: Clear with some lightly moderate brown (5YR 3/4), medium to coarsely crystalline with some fine crystalline. ≤1% brown clay and some gray clay with ≤1/8" anhydrite at 21.2'-21.25'. [9, 12]	
23.0						21.25'-24.1' HALITE: Clear with some moderate brown (5YR 4/4), coarsely crystalline, some fine to medium crystalline, <1% brown clay, <1/2% polyhalite. 1/2" brown clay seam at 23.95' with associated halite/anhydrite to 24.1'. [8]	
5	25	5.0	5.0	100			

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-33

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					24.1'-28.7' HALITE: Clear, coarsely crystalline, trace of brown clay locally. [1]	
28.0						28.7'-30.3' HALITE: Clear to moderate brown (5YR 4/4). Fine to medium crystalline with some coarse crystalline. <1/2% dispersed polyhalite. <1% to 2% brown clay, some gray. [12]	
6	30	5.0	4.8	96		30.3'-32.0' HALITE: Clear, coarsely crystalline. [1]	
						32.0'-36.8' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4). Medium to coarsely crystalline. <1% to 3% brown clay. Scattered breaks. [15, 16]	
33.0						36.8'-37.3' ANHYDRITE: Light gray to light medium gray (N7, N6), microcrystalline anhydrite. Scattered halite growths. Brown clay at 36.8'. Core grinding here.	
7	35	4.0	4.0	100		37.3'-38.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline, <1% to 3% polyhalite. [5, 7]	
37.0						38.0'-42.0' HALITE: Clear with some light to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% polyhalite. [1, 2]	
8	40	5.0	5.0	100		42.0'-47.5' HALITE: Clear to lightly moderate reddish orange and moderate brown (5YR 3/4, 4/4). Medium to coarsely crystalline. Some fine crystalline locally. ≤1% brown clay. <1% polyhalite. Fairly clear, coarsely crystalline between 45.3' and 46.3'±. [1] [10, 17]	
42.0						47.5'-50.5' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4, 3/4), medium to coarsely crystalline. <1% to 3% brown clay with scattered breaks. [10, 14]	
9	45	5.0	4.8	96			
47.0							
10	50	3.5	3.5	100			
50.5							

BORING NO. DH-33

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE 2 3/4" CORE BORING NO. DH-33A

LOCATION ROOM G ACCESS DRIFT - ROOF

STATION N1099, W1570 COLLAR ELEV. 1297.4 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10786.8 E5342.0 DEPTH OF BOREHOLE 4.1

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 9-13-84 DATE COMPLETED 9-13-84 SHEET

LOGGED BY: J. F. GALLERANI DATE: 9-29-84 1 OF 1

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0							
1	0.0	4.1	4.1	100	X	0.0'-3.2' HALITE: Clear, some moderate reddish orange (10R 6/6), coarsely crystalline, some medium from 2.3'±. ≤1% polyhalite. [1, 3]	Single tube barrel used.
					X	3.2'-4.1' HALITE: Clear, some moderate brown (5YR 4/4), coarsely crystalline. <1% brown clay. [8]	
4.1	4.1				—		
	5						
	10						51% of core recovered was ≥2 inch length.
							This hole was drilled to replace non-core section of DH-33.

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-34

LOCATION ROOM G ACCESS DIRFT - FLOOR

STATION N1099, W1582 COLLAR ELEV. 1289.4 DIRECTION OF DRILLING ~~DOWN~~ VERTICAL

MINE COORDINATES N10786.5, E5331.7 DEPTH OF BOREHOLE 51.5±

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 7-16-84 DATE COMPLETED 7-17-84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 7-18-84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0						
	0		Non-core				0.0'-3.5' NON-CORE.	CP65 mounted on scissor lift. NW split tube core barrel, NW rods used plugged diamond bit to 3.5' because of low drift back. Unable to use longer core barrel. Upper 3.5' of hole replaced with corehole DH-34A. Total drill time: 13 hrs ±.
3.5								
	1	5	2.5	2.3	92		3.5'-4.2- HALITE: Clear, some moderate brown (5YR 4/4) and moderate reddish orange (10R 6/6). Coarsely crystalline. <1% brown clay, some gray. Trace polyhalite. [8]	
5.9							4.2'-7.8' POLYHALITIC HALITE: Clear, mottled with moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite blebs and patches. ≤1% gray clay to 6.1', then no clay. Scattered anhydrite. [5, 7]	
	2		3.4	3.4	100		7.8'-11.05' MB-139: Mixture of anhydrite and halite ("swallowtail" pattern) from 7.8' to 8.6'±. Then becomes mostly anhydrite. Moderate reddish orange with irregular patches of white and light gray to 9.7'±. Increase in halite content 9.8'-10.3'±. Below 10.3' is light gray anhydrite. Trace of gray clay at 11.05'. Core grinding evident.	
9.3		10						
	3		4.7	4.7	100		11.05'-12.1' HALITE: Clear, medium to coarsely crystalline. [1]	
							12.1'-14.2' HALITE: Clear to light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. [1]	
14.0								
	4	15	5.0	5.0	100		14.2'-18.9' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. [5, 6, 7] Moderate reddish orange anhydrite mixed with halite from 18.65'-18.9'±. Break at 14.45'±.	40% of core recovered was ≥2 inch length.
19.0							18.9'-20.95' HALITE: Clear to light moderate reddish orange (10R 6/6), some moderate brown (5YR 4/4). Medium to coarsely crystalline. ≤1% brown clay, trace of gray. ≤1% dispersed polyhalite. Break @ 20.75'. [17]	
	5	20	5.0	4.75	95		20.95'-27.45' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. Medium to coarsely crystalline from 25.2'±. Anhydrite-halite from 24.1'-24.2', ≤1% gray clay from 26.5'-26.8'±. [7]	
24.0	6		5.0	5.0	100			

BORING NO. DH-34

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-34

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					27.45'-29.9' HALITE: Clear, some moderate brown (5YR 4/4) and light moderate reddish orange (10R 6/6), medium to coarsely crystalline, some fine. ≤1% brown clay, some gray from 29.4'-29.9'. <1/2% dispersed polyhalite. [17, some 9]	
						29.9'-35.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. 2" anhydrite/halite layer at 35.15'-35.3'. [4, 7]	Run 7: Some vibration this run. Tightened tie down bolts and feed beam.
29.0							
7	30	5.0	5.0	100		35.4'-36.15' ANHYDRITE: Light gray (N7) to moderate reddish orange (10R 6/6), microcrystalline. Halite growths within. Trace of gray clay at 36.15'.	
						36.15'-43.0' HALITE: Clear, coarsely crystalline, some medium. <1/2% dispersed polyhalite. <1% gray clay. [9]	
34.0							
8	35	5.1	5.1	100		43.0'-44.2' HALITE: Clear, some moderate reddish orange, coarsely crystalline. <1/2% polyhalite. [2]	
						44.2'-45.4' HALITE: Clear with some moderate brown (5YR 4/4), coarsely crystalline. <1% brown clay. Break at 45.4'. [8, some 10]	
						45.5'-51.5' HALITE: Clear, coarsely crystalline, some medium, <1% gray clay, trace brown. [8, 11]	Run 9: Core barrel blocked up this run. Some brown clay on inner tube.
39.1							
9	40	3.9	1.8	46			
43.0							
10	45	5.0	5.0	100			Run 11: Dropped core barrel 4" when pulling rods. Day shift driller drilled over this run. Core broken up because of this.
48.0							
11	50	3.5	3.5	100			
± 51.5							

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE 2 3/4" CORE BORING NO. DH-34A

LOCATION ROOM G ACCESS DRIFT - FLOOR

STATION N1099, W1570 COLLAR ELEV. 1289.2 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N10 786.8 E5341.9 DEPTH OF BOREHOLE 3.6'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 9-13-84 DATE COMPLETED 9-13-84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 9-29-84 1 OF 1

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		3.6	3.6	100	X	0.0'-1.3' HALITE: Clear, coarsely crystalline, some medium, <1/2% polyhalite blebs. [1]	Used single tube starter barrel.
						1.3'-3.6' HALITE: Clear, some moderate brown (5YR 4/4), coarsely crystalline. ≤1% brown clay. [8, 10]	
	3.6						94% of recovered core was ≥2 inch length.
							This hole was drilled to replace non-core section of DH-34.

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-35

LOCATION ROOM G - ROOF

STATION N1102, W1882 COLLAR ELEV. 1294.4 FT DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10789.4, E5032.2 DEPTH OF BOREHOLE 52.0 FT.

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 1-26-85 DATE COMPLETED 1-27-85 SHEET

LOGGED BY: J. E. GALLERANI DATE: 2-13-85 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0						
	1		2.2	2.0	91		0.0'-4.4' HALITE: clear to moderate brown (5YR 4/4), coarsely crystalline. <1% brown clay. Scattered polyhalite blebs. [1,8]	NC single-tube barrel used for run 1. NC double-tube wireline barrel used for remainder of hole.
2.2								
	2		5.0	4.5	90		4.4'-6.2' HALITE: Clear to moderate brown (5YR 4/4; 3/4); fine to medium crystalline, some coarse. ≤1% brown clay, trace of gray. [8,10,12]	Partially broken core upper 2' of Run 2.
		5						26% of core recovered was ≤ 2-inch lengths.
							6.2'-6.4' ANHYDRITE "b": Light medium to medium gray microcrystalline anhydrite with polyhalitic halite growths. Trace of hard gray clay at 6.2'. Anhydrite is laminated close to clay contact, low angle.	Dry hole. No gas detected.
7.2								
	3		5.0	4.8	96		6.4'-12.1' HALITE: Clear, coarsely crystalline. Trace of anhydrite stringers. [1]	
		10					12.1'-13.2' HALITE: Clear to light moderate reddish orange (10R 6/6); fine to medium crystalline. < 1/2% dispersed polyhalite. ≤ 1% clay, brown and gray. Brown break at 12.35'. [9,12]	
12.2							13.2'-13.85' ANHYDRITE "a": Very light to medium gray microcrystalline anhydrite. Irregular laminae. Scattered halite growths. From 13.6'. Up to 1/4" hard gray clay at 13.2'. Core grinding evident.	
	4	15	5.0	4.9	98		13.85'-18.0' POLYHALITIC HALITE: Clear to moderate reddish orange/brown (10R 6/6; 4/6), coarsely crystalline. <1 to 3% polyhalite. [4,7]	
							18.0'-21.9' HALITE: Clear to moderate reddish orange/brown (10R 6/6; 4/6); fine to coarsely crystalline. ≤1% gray clay, some brown. < 1% polyhalite. [9, some 12]	Run 6 partially broken in clear halite.
17.2								Run 7 broken most of run.
	5	20	5.3	4.7	89		21.9'-24.05' HALITE: Clear, scattered moderate brown (5YR 4/4). Coarsely crystalline, some medium, <1/2% polyhalite. ≤1% brown clay. Up to 3/8" hard brown clay at 24.0'. Trace of anhydrite above. Near horizontal, irregular. [8,10]	
2.5								
	6		5.0	3.5	70			
		25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-35

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					24.05'-27.8' HALITE: Clear, coarsely crystalline. [1]	
6		5.0	3.5	70		27.8'-28.7' HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline. ≤1 to 2% brown clay. [10]	Broken core in Run 9.
27.5							
7	30	5.0	3.3	66		28.7'-32.5' HALITE: Clear, coarsely crystalline. None to <1% brown clay. [1, some 10]	
						32.5'-36.5' ± 0.3' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4): medium to coarsely crystalline. <1 to 3% brown clay, trace brownish-gray locally scattered breaks. [10,15]	Broken zones throughout Run 10.
32.5							
8	35	5.0	4.3	86		36.5'-37.1' ANHYDRITE: Very light to light medium gray, microcrystalline anhydrite. Scattered small polyhalitic halite growths. Up to 1/2" hard brown clay at 36.5'. Near horizontal. Core grinding evident.	Broken zones, especially last 18" of Run 11.
						37.1'-42.6' HALITE: Clear, coarsely crystalline. <1/2% scattered polyhalite blebs. Scattered white anhydrite. [1]	
37.5							
9	40	5.0	3.2	64		42.6'-46.1' HALITE: Clear, some moderate brown (5YR 4/4), coarsely crystalline, except fine to medium from 43.7' to 44.5'. <1/2% moderate reddish orange polyhalite here. <1% brown clay. Irregular break at 44.55'±.	
						46.1'-50.6' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4; 3/4); medium to coarsely crystalline. <1 to 3% brown clay, up to 5% locally. Seam of clay mixed with halite crystals from 50.4' to 50.6'. [10,12,15]	
42.5							
10	45	5.0	5.0	100		50.6'-52.0' POLYHALITIC HALITE: Clear to moderate reddish orange/brown (10R 6/6; 4/6); coarsely crystalline. <1 to 3% polyhalite. Moderate reddish brown polyhalite/anhydrite at 50.75' to 50.95'±.	
47.5							
11	50	4.5	4.5	100			
52.0							
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC-CORE BORING NO. DH-36

LOCATION ROOM G - FLOOR

STATION N1102, W1882 COLLAR ELEV. 1284.6 FT DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N10789.4, E5032.2 DEPTH OF BOREHOLE 51.5 FT

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 1-26-85 DATE COMPLETED 1-26-85 SHEET

LOGGED BY: J. E. GALLERANI DATE: 1-27-85 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0						
1		2.0	2.0	100		0.0'-2.7' HALITE: Clear, some moderate brown, coarsely crystalline. <1% brown clay.	NC single-tube core barrel used for Runs 1 and 2. For remaining runs, NC double-tube wireline core barrel used.
	2.0						
2		1.5	1.4	93		2.7'-7.0' ± 0.2' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1 to 3% polyhalite. Trace clay. [2,5,7]	
	3.5						
3	5	4.5	4.2	93		7.0'-10.4' ± 0.3' MB-139: Moderate reddish orange and medium gray to 8.7'±. From 8.7', predominantly light to medium gray anhydrite with halite growths. Gray clay, up to 1/2" at 10.4'.	Total drilling time: 6 hrs.
							43% of core recovered was ≥ 2-inch lengths.
						10.4'-14.3' HALITE: Clear to light bluish gray; medium to coarsely crystalline. < 1/2% dispersed polyhalite. ≤1% gray clay. [9,11]	In salt, used second gear (74 rev./inch).
	8.0						In anhydrite, used third gear (100 rev./inch).
4	10	3.2	2.5	78		14.3'-18.6' POLYHALITIC HALITE: Clear to moderate reddish orange/brown, coarsely crystalline. <1 to 3% polyhalite. Gray clay, some anhydrite at 18.3'-18.6'±. Irregular gray seam at 18.6'.	Dry hole. No gas detected.
	11.2						
5		5.0	5.0	100		18.6'-20.6' HALITE: Clear to light moderate reddish orange (10R 6/6), medium to coarsely crystalline. <1% gray clay and polyhalite. [9]	
						20.6'-24.7' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. <1 to 3% polyhalite. Average is <2%. [2,4,7]	
	15						
	16.2					24.7'-29.4' HALITE: Clear, some moderate reddish orange (10R 6/6); coarsely crystalline. ≤1% polyhalite. Locally polyhalitic. <1% gray clay. [9]	
6		5.0	5.0	100		29.4'-33.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite. Trace anhydrite.	
	20						
	21.2					33.4'-34.9' HALITE: Clear, some light moderate reddish orange; coarsely crystalline. <1% polyhalite.	Core partly broken in Run 10.
7		5.3	5.3	100			
	25						

WIPP

WASTE ISOLATION PILOT PLANT SHEET 2 OF 2 BORING NO. DH-36

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
7	25					**34.9'-35.5' ANHYDRITE:** Moderate reddish orange microcrystalline anhydrite mixed with halite growths to 35.15'±. Very irregular upper contact. Consists of anhydrite intermixed with halite. From 35.15', light to light medium gray anhydrite with scattered halite growths. Some "swallowtail" pattern noted. 1/2" hard gray clay at lower contact. Dips 10°±.	
26.5							
8	30	5.0	4.8	96		**35.5'-41.2' HALITE:** Clear, some light medium gray. Coarsely crystalline, some medium. <1% gray clay and <1/2% polyhalite blebs. [1,11]	
31.5						**41.2'-42.7' HALITE:** Clear, some moderate reddish orange. Coarsely crystalline. <1% gray clay. [9]	
9	35	5.0	5.0	100		**42.7'-44.9' HALITE:** Clear to moderate reddish orange/ brown (10R 6/6; 4/6); medium to coarsely crystalline. <1 to 2% polyhalite, locally polyhalitic. ≤1% brown clay. [17]	
36.5						**44.9'-51.5' HALITE:** Clear, coarsely crystalline, some medium. <1/2% dispersed polyhalite locally. <1% gray clay at 47'-47.3' and 48.5'-49.3'. Scattered breaks at 50.5'-51.2'. [1,11]	
10	40	5.0	5.0	100			
41.5							
11	45	5.0	4.5	90			
46.5							
12	50	5.0	4.6	92			
51.5							
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-37

LOCATION ROOM G - ROOF

STATION N1101, W2182 COLLAR ELEV. 1297.4 FT DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10788.9, E4732.0 DEPTH OF BOREHOLE 51.5 FT.

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 1-25-85 DATE COMPLETED 1-26-85 SHEET

LOGGED BY: J. E. GALLERANI DATE: 1-26-85 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
1	0	2.2	2.2	100	X	0.0'-1.8' HALITE: Clear, some light moderate reddish orange (10R 6/6), coarsely crystalline. <1/2% polyhalite. [1]	NC single-tube core barrel used for Run 1. NC double-tube core barrel used for remainder of hole.
	2.2						
2	5	5.8	5.3	91	—	1.8'-5.3' ± 0.15' HALITE: Clear to moderate brown (5YR 3/4), medium to coarsely crystalline. None to 1% brown clay, some gray. Scattered breaks at 3.7', 4.0', 5.1'±.	42% of core recovered was was ≥ 2" lengths.
						5.3'-5.5' ANHYDRITE "b". Light to medium gray, microcrystalline anhydrite. Partially laminated. Trace of gray clay along irregular, low-angle surface at 5.3'. Core broken along this.	Dry hole. No gas detected.
	8.0					5.5'-11.3' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. [1]	
3	10	3.5	3.2	91		11.3'-12.2' HALITE: Clear, some moderate brown (5YR 4/4). Fine to medium crystalline, some coarse. ≤1% brown clay.	Run 4: Some broken core.
	11.5						
4	15	5.0	4.8	96	X	12.2'-12.7' ANHYDRITE "a": Light to medium gray microcrystalline anhydrite. Up to 1/8" brown clay along low-angle, smooth surface at 12.2'. Some core grinding evident.	First 1' of Run 5 broken.
						12.7'-16.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite.	
	16.5					16.5'-21.6' HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline. ≤1% brown clay, trace of gray. <1/2% dispersed polyhalite. Up to 1/2" hard brown clay seam at 21.35'. Low-angle, irregular. Some anhydrite associated to 21.6'. [10, 17]	First 1' of Run 6 broken.
5	20	5.0	5.0	100		21.6'-24.5' HALITE: Clear, coarsely crystalline. <1/2% brown clay to 23'. [8 to 23'; then 1]	Broken zones through Run 7, especially first 18".
	21.5					24.5'-26.5' HALITE: Clear to light moderate reddish orange (10R 6/6) and moderate brown (5YR 4/4). Fine to medium, crystalline, some coarse. <1% brown clay, trace gray. <1/2% dispersed polyhalite. [12]	
6	25	5.0	4.2	84			

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-37

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
6	25					26.5'-30.2' HALITE: clear, coarsely crystalline. <1/2% brown clay to 28'. [8,1]	Broken clear halite in Run 9.
26.5							
7	30	5.0	5.0	100		30.2'-35.15' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline, some fine. ≤1% brown clay to 31.5'; then 1 to 3%. Scattered breaks. [10,15]	
						35.15'-35.85' ANHYDRITE: Light to medium gray, microcrystalline anhydrite with scattered halite growths. Up to 1" hard brown clay at 35.15'. Low angle.	
31.5							
8	35	5.0	4.5	90		35.85'-39.7' ± 0.7' HALITE: Clear, coarsely crystalline. <1/2% polyhalite. Scattered white anhydrite stringers.	
						39.7'-42.6' HALITE: Clear, some moderate brown (5YR 4/4); coarsely crystalline. ≤1% brown clay. Irregular break at 41.7'±. [10]	
36.5						42.6'-44.9' HALITE: Clear with <1% moderate reddish orange polyhalite blebs. Coarsely crystalline. [1]	
9		1.5	1.5	100			
38.0						44.9'-47.25' HALITE: Clear to moderate brown (5YR 4/4); coarsely crystalline. ≤1% brown clay. [10]	
10	40	3.5	2.1	60		47.25'-51.5' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline, some fine. <1 to 3% brown clay, locally up to 5% from 49.8'-50.9'. Scattered breaks at 47.6'; 50.9', 51.2'±. <1/2% polyhalite. [15]	
41.5							
11	45	4.5	4.5	100			
46.0							
12	50	5.5	5.5	100			
51.5							
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NC CORE BORING NO. DH-38

LOCATION ROOM G - FLOOR

STATION N1101, W2182 COLLAR ELEV. 1287.0 FT DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N10788.8, E4731.9 DEPTH OF BOREHOLE 47.5 FT

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 1-25-85 DATE COMPLETED 1-26-85 SHEET

LOGGED BY: J. E. GALLERANI DATE: 1-26-85 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
1	0	2.4	2.3	96		0.0'-2.5' HALITE: Clear to moderate brown (5YR 3/4); coarsely crystalline, some medium. ≤1% brown clay. [8,10]	NC double-tube wireline core barrel, except Run 1 where NC single-tube barrel was used
	2.4					2.5'-3.1' HALITE: Clear, coarsely crystalline. <1/2% polyhalite blebs. [1,2]	47% of core recovered was ≥ 2-inch lengths.
2	5	5.0	4.9	98		3.1'-7.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite. Anhydrite mixed with halite from 5.4' to 7.4'. Some "swallowtail" structure evident. [4,7 to 5.4']	Dry hole. No gas detected.
	7.4					7.4'-9.45' MB-139: Gray anhydrite mixed with growths of polyhalitic halite/halite to 9'; then predominantly light to light medium gray anhydrite. Scattered halite growths. Gray clay at lower contact. Core grinding evident.	
3	10	4.1	3.9	95		9.45'-13.2' HALITE: Clear to light moderate reddish orange (10R 6/6), medium to coarsely crystalline. ≤1% polyhalite and gray clay. [9]	
	11.5					13.2'-17.35' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite. Some anhydrite and gray clay from 17.05' to 17.3'±. [7]	
4	15	5.0	4.2	84		17.35'-18.8' HALITE: Clear to light moderate reddish orange (10R 6/6); coarsely crystalline, some medium. <1% polyhalite. < 1/2% clay, brown and gray. [8,9]	
	16.5					18.8'-22.3' POLYHALITIC HALITE: Clear to moderate reddish orange/brown (10R 6/6; 4/6); coarsely crystalline. <1 to 3% polyhalite. Trace gray clay at 21.5'. [7]	
5	20	5.0	4.7	94		22.3'-28.7' HALITE: Clear to moderate reddish orange/brown (10R 6/6, 4/6). Coarsely crystalline, some medium. ≤1 to 2% polyhalite locally. ≤1% light bluish gray clay, slight trace of brown.	
	21.5					28.7'-34.3' POLYHALITIC HALITE: Clear to moderate reddish orange/brown (10R 6/6; 4/6), coarsely crystalline. <1 to 3% polyhalite. Clear halite 34-34.3'. [7]	
6	25	5.0	5.0	100			

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-38

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
6	25					**34.3'-34.6' ANHYDRITE:** Very light to light medium gray microcrystalline anhydrite. Scattered small halite growths common from 34.45'± with larger growths present above this. Some irregular laminae within anhydrite. 1/4" hard dry gray clay at lower contact. Low angle.	Dropped core barrel on last run. After retrieving barrel, did not continue drilling.
26.5							
7	30	5.0	5.0	100		**34.6'-41.55' HALITE:** Clear to moderate reddish orange/brown (10R 6/6; 4/6). Medium to coarsely crystalline with zones of fine to medium, sugary-textured halite. None to ≤1% polyhalite. <1% gray clay, some brown. Polyhalitic 41.2'-41.55'. [9, some 17]	Total time on hole was 12 hrs ±.
31.5							
8	35	5.0	5.0	100		**41.55'-44.1' HALITE:** Clear to moderate brown (5YR 4/4; 3/4), coarsely crystalline, some medium. <1 to 2% brown clay. Trace of polyhalite. [10]	
36.5							
9	40	5.0	5.0	100		**44.1'-47.5' HALITE:** Clear to light moderate reddish orange (10R 6/6); medium to coarsely crystalline, some fine. <1% polyhalite. ≤ gray clay. [2,9]	
41.5							
10	45	6.0	5.1	85			
47.5	50						
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NC CORE BORING NO. DH-40

LOCATION ROOM G - FLOOR

STATION N1101, W2482 COLLAR ELEV. 1286.1 FT DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N10789.2, E4431.0 DEPTH OF BOREHOLE 51.0 FT

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 1-24-85 DATE COMPLETED 1-25-85 SHEET

LOGGED BY: J. E. GALLERANI DATE: 1-25-85 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0						
1		2.0	1.9	95		0.0'-2.6' HALITE: Clear, some moderate brown (5YR 4/4), coarsely crystalline, some medium. <1/2% polyhalite. ≤1% brown clay, trace of gray. [8,10]	NC double-tube wireline core barrel, except for Runs 1 and 2 where NC single-tube barrel used.
	2.0						
2	2.7	0.7	0.7	100		2.6'-5.4' HALITE: Clear, some moderate reddish orange (10R 6/6), coarsely crystalline. ≤1% polyhalite blebs. Trace gray clay locally. [2,4]	Total drilling time: 8 hrs. ±.
3	5	3.8	3.7	97		5.4'-7.05' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline, except fine to medium from 5.4' to 5.8'±. <1 to 3% polyhalite. Trace anhydrite from 6.55'. [4,7]	Dry hole. No gas detected.
	6.5						
4	10	5.0	5.0	100		7.05'-10.95' MB-139: Moderate reddish orange to light gray anhydrite and polyhalitic halite to 9.5'±. Then light to light medium gray anhydrite with scattered growths of halite within. 3/4" hard, gray, dry clay at lower contact.	74% of core recovered was ≥2-inch lengths. Good core.
	11.5					10.95'-15.1' HALITE: Clear with some light moderate reddish orange (10R 6/6), medium to coarsely crystalline. <1/2% dispersed polyhalite. <1/2% gray clay. [9]	
5	15	5.0	5.0	100		15.1'-18.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1 to 3% polyhalite. Average 2%. 1-1/2" polyhalite/anhydrite at 18.25'. Gray clay parting at 18.4'. [7]	
	16.5					18.4'-20.2' HALITE: Clear to light moderate reddish orange (10R 6/6). Some light gray (N7). Medium to coarsely crystalline. <1% gray clay. <1/2 % polyhalite. [9]	
6	20	5.0	5.0	100		20.2'-24.3' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1 to 3% polyhalite. [4,7]	
	21.5					24.3'-26.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline, some medium. <1 to 3% polyhalite. ≤1% gray clay.	
7	25	5.1	5.1	100			

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-40

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
7	25	5.1	5.1	100		26.4'-29.7' HALITE: Clear, some light moderate reddish orange (10R 6/6), medium to coarsely crystalline. <1/2% dispersed polyhalite and brown clay. Trace gray clay locally. [17, locally 9]	
26.6							
8	30	4.9	4.9	100		29.7'-35.05' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1 to 3% polyhalite. Moderate reddish orange polyhalite/ anhydrite from 34.7'-34.95'. [4,7]	
31.5						35.05'-35.4' ANHYDRITE: Light to very light (N7, N8) gray anhydrite to 35.15'. Then anhydrite with scattered halite growths throughout. 1/4" hard, dry gray clay at lower contact.	
9	35	4.5	4.5	100		35.4'-36.75' HALITE: Clear to light moderate reddish orange, fine to medium crystalline. <1/2% dispersed polyhalite and gray clay. [2,9]	
36.0						36.75'-41.0' HALITE: Clear, trace of moderate brown, coarsely crystalline. <1% brown clay. [8]	
10	40	5.0	5.0	100		41.0'-47.0' HALITE: Clear to moderate reddish orange/ brown (10R 6/6, 4/6). Coarsely crystalline, some medium. ≤1 to 2% polyhalite. <1% gray clay, some brown. Locally polyhalite. [2,4,6]	
41.0						47.0'-48.8' HALITE: Clear to light moderate reddish orange (10R 6/6), coarsely crystalline. <1% polyhalite. [1,2]	
11	45	5.0	5.0	100		48.8'-51.0' HALITE: Clear to light moderate reddish orange (10R 6/6). Medium to coarsely crystalline, some fine. <1/2% polyhalite and gray clay locally. Break at 50.6'± which dips 45°±. Trace of gray clay along contact of fine-medium crystalline and coarse crystalline halite at 49'-50.5'±. [1,9]	
46.0							
12	50	5.0	5.0	100			
51.0							
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NC CORE BORING NO. DH-39

LOCATION ROOM G - ROOF

STATION N1101, W2482 COLLAR ELEV. 1296.0 FT DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10789.2, E4430.7 DEPTH OF BOREHOLE 50.7 FT

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 1-24-85 DATE COMPLETED 1-24-85 SHEET

LOGGED BY: J. E. GALLERANI DATE: 2-9-85 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0						
1		3.7	3.0	81		0.0'-3.6' HALITE: Clear, coarsely crystalline, some medium. [1]	Run 1 made with NC single-tube barrel. Remainder of hole with NC double-tube wireline core barrel.
						3.6'-6.6' ± 0.3' HALITE: Clear, some moderate brown (5YR 3/4), coarsely crystalline to 5', then medium to coarse. ≤ 1% clay, increasing content from 5'. Brown, some gray. Break at 5.9'±.	Dry hole. No gas detected.
3.7							
2	5	5.0	4.3	86		6.6'-6.8' ANHYDRITE "b": Medium gray, microcrystalline. Gray clay at 6.6'. Core broken. Halite growths especially within 0.05' of lowar contact.	30% of core recovered was ≥ 2-inch lengths. Core broken in parts of Runs 3 and 4.
						6.8'-13.2' HALITE: Clear, coarsely crystalline. <1/2% polyhalite from 12.2'. [1]	
8.7							
3	10	5.0	4.8	96		13.2'-13.9' HALITE: Clear to moderate brown (5YR 3/4) and light moderate reddish orange. Fine to medium crystalline. ≤1% brown clay. <1/2% dispersed polyhalite. [9,17]	
						13.9'-14.45' ANHYDRITE "a": Light gray to light medium gray, microcrystalline anhydrite. Near-horizontal laminae. Scattered halite growths. 3/8" gray clay at 13.9'.	Last 0.2' of Run 5 broken.
13.7							
4	15	5.0	5.0	100		14.45'-18.75' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1 to 3% polyhalite, average 2%. Anhydrite stringer at 15.8'. [2,3,5]	Run 6: Core broken; discing throughout.
						18.75'-23.7' HALITE: Clear to moderate brown (5YR 4/4) and some moderate reddish orange (10R 6/6). Medium to coarsely crystalline. ≤1% brown clay, locally up to 2%. <1% polyhalite, dispersed and blebs. [10,17]	Run 8: Mostly broken zones. Run 9: Discing of core. Run 10: Several broken zones.
18.7							
5	20	5.0	4.8	96		23.7'-28.2' HALITE: Clear, coarsely crystalline. <1/2% brown clay to 25'. <1/4" brown clay at 25.0' with associated anhydrite layer to 25.15'. [1]	Runs 11 and 12: Broken core.
						28.2'-30.0' HALITE: Clear to moderate brown, some moderate reddish orange. Fine to medium, some coarse. ≤1 brown clay. <1/2% dispersed polyhalite. [12]	Run 13: Core is badly broken.
23.7							
6	25	4.7	4.7	100			

BORING NO. DH-39

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-39

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
6		4.7	4.7	100		30.0'-32.6' HALITE: Clear, some moderate brown (5YR 4/4), coarsely crystalline. None to <1% brown clay. [1,8]	
28.4							
7		1.8	1.8	100		32.6'-34.9' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4; 4/4). Medium to coarsely crystalline. <1 to 3% brown clay. Trace of dispersed polyhalite.	
30.2	30						
8		1.5	1.5	100		34.9'-35.9' HALITE: Clear to light moderate reddish orange; medium to coarsely crystalline. <1/2% dispersed polyhalite and gray clay [2,9].	
31.7							
9		1.4	1.4	100		35.9'-36.5' ANHYDRITE: Light gray to medium gray microcrystalline anhydrite. Some halite growth. Trace brown clay at 35.9'. Core grinding evident.	
33.1							
10	35	2.8	2.8	100		36.5'-41.4' HALITE: Clear, some light moderate reddish orange (10R 6/6) coarsely crystalline. <1/2% polyhalite. [1,2]	
35.9							
11		2.0	1.7	85		41.4'-45.7' ± 0.6' HALITE: Clear with some moderate brown and moderate reddish orange. Fine to medium crystalline to 43.5'±, then coarsely crystalline. <1/2% dispersed polyhalite. <1% brown clay.	
37.9							
12	40	5.0	5.0	100		45.7'-50.7' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4). Medium to coarsely crystalline, some fine. <1 to 5% brown clay.	
42.9							
13	45	4.0	2.5	62			
46.9							
14		3.8	2.5	66			
50.7	50						
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ - _____ HOLE TYPE/SIZE NC CORE BORING NO. DH-41

LOCATION ROOM G - ROOF

STATION N1101, W2782 COLLAR ELEV. 1295.8 FT DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N10789.0, E4132.6 DEPTH OF BOREHOLE 49.9 FT

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 1-23-85 DATE COMPLETED 1-24-85 SHEET

LOGGED BY: J. E. GALLERANI DATE: 1-24-85 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0						
1		3.0	1.1	37		0.0'-3.0' HALITE: Clear, coarsely crystalline, some medium. [1]	NC single-tube core barrel for Run 1. All other runs used NC double-tube wireline core barrel.
	3.0					3.0'-5.9' HALITE: Clear, some light moderate brown, coarsely crystalline. <1/2% brown clay. [8]	Total drilling time: 8 hrs ±.
2	5	4.0	3.3	82	— —	5.9'-7.0' HALITE: Clear to moderate brown (5YR 4/4), fine to medium, some coarse crystalline. ≤1%, locally 2%, brown clay with trace of gray. <1/2% dispersed polyhalite.	Dry hole. No gas detected.
	7.0				— X —	7.0'-7.3' ANHYDRITE "b": Light to light medium gray (N7, N6), microcrystalline anhydrite. Laminated to 7.1'. Scattered halite growths. ≤1/2" gray clay at 7.0'. Some core grinding evident.	31% of recovered core was ≥2-inch lengths. Run 1: Some broken core. Run 3: Broken last 1/2'.
3		4.0	2.8	70	X	7.3'-12.9'± 0.4' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. <1/2% polyhalite locally. [1]	Much of Run 5 broken.
	10						
	11.0				X	12.9'-13.8'± 0.4' HALITE: Clear to moderate brown (5YR 4/4), medium to coarsely crystalline. ≤1% brown clay, some gray. Only 0.4' core recovered.	
4		5.0	4.2	84	— —	13.8'± -14.4' ANHYDRITE "a": Light to light medium gray (N7, N6); microcrystalline anhydrite. Irregular dark/light laminae. Trace of brown clay at 13.8'. Low-angle contact.	Run 8: Zones of broken core.
	15				X X X X X	14.4'-18.8'± POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1 3% polyhalite. [5,7]	
	16.0				X X X X X X X X X		
5		5.0	3.4	68		18.8'-25.0' HALITE: Clear to moderate brown (5YR 4/4), some moderate reddish orange. Medium to coarsely crystalline, some fine. ≤1% brown clay, trace of gray. <1/2% of polyhalite locally. Irregular, low-angle brown clay seam at 24.8'. Up to 1/4". Associated anhydrite to 25'. Core broken. [1,10]	Run 10: Some broken zones.
	20				— X		
	21.0						
6		5.0	5.0	100	— X — X	25.0'-27.7' HALITE: Clear, coarsely crystalline. Scattered polyhalite and anhydrite stringers.	Run 12: Partially broken last 3'.
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-41

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
6	25	5.0	5.0	100		27.7'-29.4' HALITE: Clear, some moderate brown (5YR 4/4) and moderate reddish orange (10R 6/6). Medium to coarsely crystalline, some fine. ≤1% brown clay and <1/2% dispersed polyhalite locally. [12]	
26.0							
7		1.5	1.5	100			
27.5						29.4'-31.4' HALITE: Clear, coarsely crystalline. [1]	
8	30	5.0	5.0	100		31.4'-36.5' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4; 3/4), fine to coarsely crystalline. <1 to 3% brown clay. Scattered breaks. [10,15]	
32.5						36.5'-37.25' ANHYDRITE: Light to medium gray (N7,N5), microcrystalline anhydrite. Laminae most noticeable from 37.0'. Prominent halite growtha to 36.75'. Up to 1/4" brown clay at 36.5' but core broken here.	
9	35	4.0	4.0	100		37.25'-42.55' HALITE: Clear, coarsely crystalline. None to 2% polyhalite. Scattered anhydrite. [1,2] ≤2% polyhalite from 38.9-41.1'. [4]	
36.5						42.55'-47.0' HALITE: Clear, some moderate brown (5YR 4/4), coarsely crystalline, some fine to medium locally. <1% brown clay. [8,10]	
10	40	4.6	4.6	100		47.0'-49.9' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4; 4/4). Medium to coarsely crystalline, some fine. <1 to 3% brown clay, locally up to 5%. Scattered breaks. [10,15]	
41.1							
11		1.4	1.4	100			
42.5							
12	45	4.4	4.4	100			
46.9							
13		3.0	3.0	100			
49.9	50						
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-42

LOCATION ROOM G - FLOOR

STATION N1101, W2782 COLLAR ELEV. 1285.9 FT DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N10789.0, E4132.4 DEPTH OF BOREHOLE 51.2 FT

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 1-23-85 DATE COMPLETED 1-23-85 SHEET 1 OF 2

LOGGED BY: J. E. GALLERANI DATE: 2-14-85

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED
	1	0	3.6	3.6	100
3.6	2	5	5.0	5.0	100
8.6	3	10	4.6	4.6	100
13.2	4	15	5.0	5.0	100
18.2	5	20	4.8	4.8	100
23.0	6	25	5.3	4.4	83

DESCRIPTION

0.0'-5.3' HALITE: Clear, some light moderate brown (5YR 4/4) and light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1% brown clay. [1,2,8]

5.3'-6.2' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% polyhalite from 5.6'±. [1,2]

6.2'-7.3' POLYHALITIC HALITE: Clear to moderate reddish orange/brown (10R 6/6, 4/6). Coarsely crystalline. <1 to 3% polyhalite. [7]

7.3'-10.1' MB-139: Mixture of halite/anhydrite with "swallowtail" pattern from 7.3' to 8.9'. Then predominantly light to medium gray (N7, N5) microcrystalline anhydrite. Scattered halite growths. Up to 1/2" dry gray clay at lower contact. Contact dips 20°±.

10.1'-14.5' HALITE: Clear to light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1% dispersed polyhalite. <1/2% gray clay. Brown clay at 12.9'-13.3'. [9]

14.5'-17.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1 to 3% polyhalite. [7]

17.6'-24.5'± 0.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. 1 to 3% polyhalite. ≤1% gray clay to 20.8'. Scattered anhydrite. [5,7]

24.5'-28.3' HALITE: Clear, some light moderate reddish orange (10R 6/6) and moderate brown (5YR 4/4). Medium to coarsely crystalline. ≤1% brown clay. <1/2% dispersed polyhalite.

28.3'-39.8' Unable to log due to poor recovery and quality.

REMARKS

2-3/4" I.D. single-tube barrel used for Run 1. NC rods and NC double-tube core barrel used from Run 2.

Dry hole. No gas detected.

Total drilling time: 8 hrs ±.

45% of core recovered was ≥2-inch length.

Interval 20'-40.5' replaced with hole DH-42A.

Barrel plugged during Run 6.

No core recovery in Run 7.

Poor core quality in Runs 8 and 9.

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-42

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
6		5.3	4.4	83	X	39.8'± -43.3' HALITE: Clear, some moderate brown (5YR 4/4); medium gray (N5) and moderate reddish orange. Coarsely crystalline. ≤1% clay, gray with some brown. ≤1% polyhalite. Bluish-gray break at 43.3'.	
28.3							
7	30	5.0	0.0	0	Unable to log due to poor core recovery and quality.	43.3'-44.65' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4), fine to medium crystalline, some coarse. <1/2% polyhalite. <1 to 3% brown clay. Scattered breaks.	
33.3						44.65'-47.2' HALITE: Clear, some moderate reddish orange (10R 6/6). Coarsely crystalline, some fine to medium. <1% gray clay. Predominantly brown clay to 46'. <1% polyhalite. [9,11, some 17]	
8	35	3.5	2.0	57		47.2'-51.2' HALITE: Clear, coarsely crystalline. <1/2% polyhalite. [1]	
36.8							
9		3.0	0.4	13			
39.8							
10	40	3.1	3.1	100	X X		
42.9							
11	45	5.1	5.0	98	X		
48.0							
12	50	3.2	2.0	63	X		
51.2							
	55						

WIPP

WASTE ISOLATION PILOT PLANT

GEOLOGIC DRILL LOG

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-42A

LOCATION ROOM G - FLOOR

STATION N1101, W2789 COLLAR ELEV. 1285.7 FT DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N10789.2, E4125.5 DEPTH OF BOREHOLE 40.5 FT

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 1-25-85 DATE COMPLETED 1-25-85 SHEET

LOGGED BY: J. E. GALLERANI DATE: 1-25-85 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0					0.0'-20.0' No core. Refer to DH-42 log.	Replacement hole for portion of core hole DH-42.
						20.0'-25.7' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6) coarsely crystalline. <1 to 3% polyhalite. <1% gray clay from 24.7-25.7'. Some brown clay. [7, some 9]	NC double-tube wireline barrel used. NC rods 20.0'-40.5'.
	5					25.7'-28.9' HALITE: Clear, some moderate reddish orange (10R 6/6) and moderate brown (5YR 4/4). Medium to coarsely crystalline, some fine. ≤1% polyhalite and brown clay. Scattered breaks from 26.8'. [17]	58% of core recovered was ≥2-inch length.
						28.9'-33.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1 to 3%, average 2%, polyhalite. [4,7]	Total drilling time: 5 1/2 hrs ±.
	10	No Core				33.4'-35.0' HALITE: Clear, some light moderate reddish orange (10R 6/6), coarsely crystalline. ≤1% polyhalite, locally 2%. Small moist vug in core. Gradational contact at 33.4'. [1,2,4]	Dry hole. No gas detected.
						35.0'-35.7' ANHYDRITE: Moderate reddish orange/brown (10R 6/6, 4/6), intermixed with polyhalitic halite to 35.3'. Then moderate reddish orange to light gray anhydrite. Scattered halite growths. Up to 3/4" gray clay at 35.7'. Irregular, low-engle contact.	Very good core.
	15					35.7'-40.5' HALITE: Clear to light moderate reddish orange (10R 6/6), medium to coarsely crystalline. <1/2% polyhalite. 0 to <1% gray clay. Breaks at 37.2' and 37.55'±. [9,11]	
	20						
1	20.0	1.5	1.5	100	X X X X X		
2	21.5	5.0	5.0	100	X X X X X X X X X X		
	25						

BORING NO. DH-42A

WIPP

WASTE ISOLATION PILOT PLANT 2 SHEET OF 2 BORING NO. DH-42A

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
2	25	5.0	5.0	100			
26.5							
3	30	5.0	5.0	100			
31.5							
4	35	5.0	5.0	100			
36.5							
5	40	4.0	3.6	90			
40.5							
	45						
	50						
	55						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-207 INSTRUMENT TYPE & NUMBER Extensometer GE-246 HOLE SIZE NX

LOCATION East 140 Drift, 300' S of centerline of South 400 Drift, near E rib

STATION S697, E155 COLLAR ELEV. 1259.8' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N8989.7, E7049.1 BOREHOLE PENETRATION 53.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/26/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	ROD	PROFILE	DESCRIPTION	REMARKS
9	25	5.0	100	—			
8	20	5.0	100	—		20.7' - 25.8' **HALITE:** mottled colorless to moderate reddieh-orange (10R 6/6) to moderate brown (5YR 3/4) halite, medium to coarsely crystalline, 0-1% polyhalite, 0-7% brown clay, banded clay/polyhalite appearance.	
7	15	4.7	92	—		16.4' - 20.7' **POLYHALITIC HALITE:** colorless to moderate reddish-orange (10R 5/6) halite, medium to coarsely crystalline, 10-20% polyhalite from 16.4'-17.2', 1-5% from 17.2'-20.7', clear, pure halite from 16.9'-17.0,' anhydrite stringer (~1/2") at 17.0', no clay, discontinuous anhydrite stringer (~1/16") at 18.1'.	
						15.7' - 16.4' **ANHYDRITE:** (Anhydrite "a") light gray (N7) microcrystalline anhydrite, 0-5% halite, no basal clay but core is badly broken and chipped up at bottom of anhydrite—clay may be washed away.	
6	10	4.2	84	—		8.9' - 15.7' **HALITE:** clear to colorless halite, medium to coarsely crystalline, <1% polyhalite from 8.8'-10.0' and 13.9'-15.3', absent elsewhere, ~1% gray clay from 13.9'-15.3', clay absent elsewhere, anhydrite stringer (1/16") at 9.0',	Pressurized gas encountered at 11.9' pushad drill rods back slightly and blew water out of hole.
5		040	80	—		8.75' - 8.9' **ANHYDRITE:** (Anhydrite "b") light gray (N7), microcrystalline anhydrite, 8.8'-8.9' core lost.	Gas encountered at ~8.8'.
4	5	2.0	59	—		3.3' - 8.75' **HALITE:** colorless to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, fining upwards, 0-1% polyhalite, 1-5% brown clay locally concentrated, few blebs of gray clay, gray clay break at 8.75'.	Core runs 1 through 4 were drilled without inner barrel.
3		1.7	85	—			
2		0.7	88	—		0.0' - 3.3' **HALITE:** clear halite, coarsely crystalline, <1% polyhalite, <1% gray clay, <1% brown clay increasing upward, grades into next higher unit.	0' - 1' drilled with 6" single-tube core barrel.
1		0.8	67	—			Drilling started at 09:30 hours on 10 December 1982.
	0						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-207 INSTRUMENT TYPE & NUMBER Extensometer GE-246 HOLE SIZE NX

LOCATION East 140 Drift, 300' S of centerline of South 400 Drift, near E rib

STATION S697, E155 COLLAR ELEV. 1259.8' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N8989.7, E7049.1 BOREHOLE PENETRATION 53.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/26/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
14	50	4.0	100	—		(see description on next sheet)	
13	45	4.6	92	—	X	**46.9' - 49.0'** **HALITE:** colorless halite, coarsely crystalline, <1% polyhalite, few blebs of clay 46.9'-48.0', increasing to 1-2% (total brown and gray) from 48.0'-49.0', grades into unit above.	
						43.0' - 46.9' **HALITE:** mottled colorless to moderate brown (5YR 3/4) halite, medium to coarsely crystalline, <1% polyhalite, 1-5% brown clay locally concentrated, brown clay parting at 43.5', 45.3'-46.6' is relatively pure halite with one brown clay seam impossible to locate because of condition of core.	
12	40	4.7	94	—	X X X X	**39.9' - 43.0'** **HALITE:** colorless to moderate reddish-orange (10R 6/6) halite, coarsely crystalline, 1-3% disseminated polyhalite, several anhydrite stringers but core too broken to locate.	
						39.1' - 39.9' **ANHYDRITE:** (Marker Bed 138) light gray (N7) microcrystalline anhydrite, moderate (10R 4/6) to dark reddish-brown (10R 3/4) polyhalite band from 39.8'-39.9', 30-40% halite in upper 0.2'.	
11	35	4.6	92	—	X	**33.9' - 39.1'** **HALITE:** mottled colorless to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, fining upward, few blebs of polyhalite except for 1-2% at 38.2', 5% brown clay, <1% gray clay, brown clay seams at 38.3' and 39.1', brown clay break at 37.6', 0.1' of clear halite with trace gray clay at top of unit.	
10	30	5.0	100	—	X	**31.4' -33.9'** **HALITE:** colorless halite, coarsely cryetalline, <1% polyhalite.	
						29.4' - 31.4' **ARGILLACEOUS HALITE:** colorless to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, few blebs of polyhalite, 1-2% brown and gray clay 29.4'-30.0', 10-20%, brown clay 30.0'-31.4', brown clay partings at 30.6', 30.8', 31.0', and 31.3', anhydrite stringer (<1/16") at 31.2'.	
9	25	5.0	100	—		**25.8'-29.4'** **HALITE:** colorless halite, coarsely crystalline, few blebs of polyhalite, brown clay parting at 26.3', clay absent elsewhere, anhydrite stringer zone 26.3'-26.7', anhydrite stringers (<1/16") at 26.9', 27.2', 27.6', and 28.3'.	
						(as below)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-207 INSTRUMENT TYPE & NUMBER Extensometer GE-246 HOLE SIZE NX

LOCATION East 140 Drift, 300' S of centerline of South 400 Drift, near E rib

STATION S697, E155 COLLAR ELEV. 1259.8' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N8989.7, E7049.1 BOREHOLE PENETRATION 53.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RLB/TSC //DGK/Bechtel DATE 1/26/83

SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	55						Total penetration = 53.0'.
14	50	4.0	100	—		49.0' - 53.0' **ARGILLACEOUS HALITE:** mottled colorless to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, fining upward, <1% polyhalite, 1-20% brown clay, increasing upward, brown clay partings at 50.1', 51.9', 52.6', and 52.9', brown clay seam at 50.2'.	Drilling completed on 11 December 1982.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-208 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 300' S of centerline of South 400 Drift, near E rib

STATION S698, E150 COLLAR ELEV. 1251.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N8988.8, E7044.0 DEPTH OF BOREHOLE 49.2'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12 B

PREPARED BY DGK, JPS/Bechtel DATE 1/26/83

RUN NUMBER	DEPTH (ft)	RECOVERY (ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0	1.5	75	—	X		Drilling started 10:00 hours, 10 December 1982 RUN 1 - unclear where core loss occurred. No inner barrel used.
2	5	1.5	38	—	X	0.0' - 9.1' **HALITE:** clear to moderate reddish-orange (10R 6/6) and moderate reddish-brown (10R 4/6) halite, moderately hard, medium to coarsely crystalline, scattered blebs of orange polyhalite throughout. Trace (<1/2%) of brown interstitial clay. Polyhalite content increases to ~2% below 8.0'. Clear halite from 6.5' to 8.0'.	RUN 2 - no inner barrel used.
3	10	4.2	100	—	X		
4	15	4.4	88	—	X	9.1' - 12.6' **ANHYDRITE:** (Marker Bed 139) light gray (N7) anhydrite, moderately hard, very finely crystalline, core broken into 1/4" to 3/4" pieces. 12.6' - 12.7' **CLAY:** medium light gray (N6) clay seam, stiff, moderately plastic. 12.7' - 16.9' **HALITE:** clear to mottled medium gray (N5) to pale reddish-brown (10R 5/4) halite, moderately hard, finely to coarsely crystalline. Clay comprises 3-5% with trace (2-3%) interstitial polyhalite and scattered polyhalite blebs. Clay breaks at 13.6', 13.9', 14.0', 14.4', 14.7', 15.5', 16.1', and 16.7'.	RUN 4 - MB 139 is broken up--core loss probably from this bed.
5	20	5.1	100	—	X		
6	25	4.9	98	—	X	16.9' - 28.1' **HALITE:** clear halite with some moderate reddish-orange (10R 6/6) polyhalite zones, finely to coarsely crystalline, moderately hard. Trace (<1%) interstitial, light gray (N7) clay from 21.5'-23.8'. Polyhalite content ranges from 0 to 2% throughout and increases to 2-3% from 26.5'-28.1'. Clear halite from 24.7' to 26.0'.	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-208 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 300' S of centerline of South 400 Drift, near E rib

STATION S698, E150 COLLAR ELEV. 1251.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N8988.8, E7044.0 DEPTH OF BOREHOLE 49.2'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY DGK, JPS/Bechtel DATE 1/26/83 SHEET 2 OF 2

RUN NUMBER	DEPTH (ft)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	25					(as above)	
7		5.1	100	—			
	30					28.1' - 34.0' **HALITE:** clear to very light gray (N8) to light brownish-gray (5YR 6/1) halite, moderately hard, medium to coarsely crystalline, clay in part comprises up to 3% of core. Few polyhalite blebs throughout. Very light gray (N8) halite from 29.3'-30.2'. Clay breaks at 28.4', 29.3', 29.8', 30.9', and 32.0'.	Averaging 1 in approximately 2 1/2 minutes of drilling.
8		4.8	96	—			
	35					34.0' - 39.2' **HALITE:** polyhalitic, clear to moderate reddish-orange (10R 6/6) halite, moderately hard, coarsely crystalline. Polyhalite occurs as interstitial layers and scattered blebs and comprises 2-5% of core. Polyhalite lens from 38.5'-39.0'.	
9		3.9	98	—			
	40					39.2' - 39.4' **ANHYDRITE:** very light gray (N8) anhydrite, dense, hard, very finely crystalline, few blebs of clear halite.	
10		5.0	100	—		39.4' - 49.2' **ARGILLACEOUS HALITE:** clear to mottled medium dark gray (N4) to pale yellowish-brown (10YR 6/2), to pale red (10R 6/2) halite, modarataly hard, finely to coarsely crystalline, clay content ranges from 0 to 10%. Scattered, near-horizontal clay breaks at 40.5', 40.7', 42.7', 42.9', 43.7', 47.6', 48.2', and 48.5'. Finely crystalline below 46.5'.	
	45						
11		4.8	96	—			Drilling finished 14:30 hours, 10 December 1982. Total depth = 49.2'. Hole slowly discharging gas on 13 December 1982.
	50						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-211 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 930' S of South 400 Drift centerline, near E rib

STATION S1320, E163 COLLAR ELEV. 1270.5' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N8366.5, E7057.1 BOREHOLE PENETRATION 50.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/26/83 SHEET 1 OF 2

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	25					(see description on next sheet)	
8		5.0	100	–		19.0' – 24.2' **HALITE:** mottled colorless to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, fining upward, ≤ 1% polyhalite, 1–5% brown clay locally concentrated, <1% gray clay.	
7	20	4.6	100	–		15.1' – 19.0' **HALITE:** colorless to moderate reddish-orange (10R 6/6) halite, coarsely crystalline, 1–2% polyhalite, polyhalite stringers at 15.1'; anhydrite stringer zone from 15.1'–15.8', anhydrite stringers at 16.3' and 17.1'.	
						14.5' – 15.1' **ANHYDRITE:** (Anhydrite "a") light gray (N7) microcrystalline anhydrite.	
6	15	4.9	98	–		13.7' – 14.5' **HALITE:** mottled colorless to grayish-orange-pink (5YR 7/2) to moderate brown (5YR 3/4) halite, medium to finely crystalline, <1% polyhalite, 2–5% disseminated brown clay, <1% gray clay, gray clay parting at 14.5'.	Advancing 5' in 0.5 hr.
5	10	3.4	97	–		7.9' – 13.7' **HALITE:** colorless halite, coarsely crystalline, <1% polyhalite and clay, anhydrite stringers at 9.3' (0.5") and 10.0' (0.1"), gray clay increases from 0–1% from 13.3' – 13.7', grades into unit above.	
						7.8' – 7.9' **ANHYDRITE:** (Anhydrite "b") light gray (N7), microcrystalline anhydrite, mixed with halite at upper contact.	Gas at about 8'. Flow rate measured for 30 seconds = 11.8 cfm.
4		1.5	100	–			
3		2.0	100	–		5.0' – 7.8' **HALITE:** colorless to mottled moderate reddish-orange (10R 6/6) to medium light gray (N6) halite, medium to coarsely crystalline, <1–3% polyhalite locally concentrated, ~1% gray clay, gray clay break at 7.8'.	Gas at moderate pressure at just under 8'.
2	5	0.7	35	–		0.0' – 5.0' **HALITE:** colorless halite, coarsely crystalline, ≤ 1% polyhalite, few blebs of gray clay.	CORE LOSS: Run #1, at 1.6'–2.1' Run #2, throughout run
1		1.5	75	–			0' – 1.0' drilled with 6" single-tube core barrel. Drilling started at 13:45 hours on 18 December 1982.
	0						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-211 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 930' S of South 400 Drift centerline, near E rib

STATION S1320, E163 COLLAR ELEV. 1270.5' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N8366.5, E7057.1 BOREHOLE PENETRATION 50.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/26/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
13	50	3.0	100	–		**48.1' – 50.0' HALITE:** mottled, clear/colorless to moderate brown (5YR 3/4) halite, coarsely to finely crystalline, fining upward, 1-2% disseminated polyhalite from 49.6'-50.0', few blebs elsewhere, 1-5% brown clay locally concentrated.	Total penetration = 50.0'. Finished at 15:00 hours on 19 December 1982.
12	45	5.1	100	–		**46.2' – 48.1' HALITE:** clear to colorless halite, coarsely crystalline, <1% polyhalite and brown and gray clay, brown clay increases upward to 1% as unit grades into unit above. **42.3' – 46.2' HALITE:** mottled colorless to moderate brown (5YR 3/4) halite, medium to coarsely crystalline, <1% polyhalite except 45.5'-45.9' where 1-2% disseminated, 1-5% brown clay locally concentrated, brown clay break at 46.0'.	
11	40	4.6	92	–		**38.5' – 42.3' POLYHALITIC HALITE:** colorless to moderate reddish-orange (10R 6/6) halite, coarsely crystalline, 2-5% polyhalite with localized elongate blebs of polyhalite, anhydrite stringers 38.5'-38.7', 38.9', and 39.1', few blebs of clay, grades into unit above. **38.0' – 38.5' ANHYDRITE:** (Marker Bed 138) light gray (N7) microcrystalline anhydrite.	
10	35	5.1	100	–		**32.7' – 38.0' HALITE:** mottled whitish to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, <1% polyhalite except 1-2% from 36.8'-37.1', 5% brown clay locally concentrated, brown clay break at 35.9', brown clay seam at 38.0'.	
9	30	5.2	100	–		**30.5' – 32.7' HALITE:** clear halite, coarsely crystalline, <1% polyhalite and clay. **28.5' – 30.5' HALITE:** mottled whitish to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, fining upward, <1% polyhalite, 1-5% brown clay locally concentrated, <1% gray clay, brown clay break at 29.4', brown clay parting at 30.5'.	
8	25	5.0	100	–		**24.2' – 28.5' HALITE:** colorless halite, coarsely crystalline, <1% polyhalite and clay, anhydrite/gray clay parting at 24.6', anhydrite parting at 24.8', both ~0.5".	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-212 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 930' S of South 400 Drift centerline, near E rib

Vertical

STATION S1320, E163 COLLAR ELEV. 1261.7' DIRECTION OF DRILLING Down

MINE COORDINATES N8366.5, E7057.1 DEPTH OF BOREHOLE 52.1'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY DGK,JPS/Bechtel DATE 1/26/83

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0	5.6	80	–		0.0' – 4.3' **HALITE:** clear to medium gray (N5) halite, moderately hard, coarsely crystalline, 5% clay in part. Gray clay breaks at 2.0', 2.8', and 3.3'. Trace (<1/2%) polyhalite at 1.9'.	Started at 14:00 hours on 17 December 1982.
	5					4.3' – 10.7' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6) halite, moderately hard, finely to coarsely crystalline with trace of moderate brown (5YR 3/4) clay bands. 1% clay from 7.1'-7.7'. Polyhalite occurs as blebs and intarstitially and rangea from <1% to 10%.	Drilling rate is 20' per hour. Core loss in Run #1 from 0.0'-1.4'. Brine saturation measured at 100%. Trace of gas detected in first 7'.
2	10	5.1	100	–		10.7' – 12.6' **ANHYDRITE:** (Marker Bed 139) banded, medium gray (N5) and very light gray (N8) anhydrite, hard, dense, finely crystalline. Core is broken into 1/4"-1/2" chips from 12.1' to 12.6'. Medium light gray (N6) clay seam at 12.6', moderately soft and plastic, ±1/2" thick.	
3	15	5.0	100	–		12.6' – 14.5' **HALITE:** clear, coarsely crystalline halita, moderately hard, <1% clay throughout. Medium light gray (N6) clay breaks at 13.0' and 13.2'.	
4	20	5.3	100	–		14.5' – 27.9' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6) halite, moderately hard, medium to coarsely crystalline. Polyhalite is interstitial and occurs as blebs and ranges from 0% to 10%. Discontinuous, very thin clay breaks at 15.6', 18.8', 19.9', 21.6', 22.0', and 27.4'.	
5	25	5.1	100	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-212 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 930' S of South 400 Drift centerline, near E rib

STATION S1320, E163 COLLAR ELEV. 1261.7' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N8366.5, E7057.1 DEPTH OF BOREHOLE 52.1'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY DGK, JPS/Bechtel DATE 1/26/83

RUN NUMBER	DEPTH (ft)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
5	25	5.1	100	–		(as above)	Drilling on 18 December 1982 started at 08:45 hours.
6	30	5.3	100	–		**27.9' – 32.8' HALITE:** argillaceous in part, clear to mottled grayish-red (5R 4/2) and medium light gray (N6) halite, moderately hard, finely to medium crystalline. Clay is interstitial and comprises up to 5%. Few medium light gray (N6) and moderate brown (5YR 3/4) clay breaks at 28.2', 28.4', 29.4', 29.7', 30.0', 30.1', and 31.3'. Trace (<1/2%) orange polyhalite blebs scattered from 31.2' to 32.8'.	
7	35	4.7	94	–		**32.8' – 38.6' HALITE:** polyhalitic, clear and moderate reddish-orange (10R 6/6) halite, slightly banded in part, moderately hard, finely to coarsely crystalline. Polyhalite is interstitial and occurs as blebs and ranges from 2-5%.	Drilling stopped at 09:30 due to electrical problems with drill motor. Resumed at 11:30.
						38.6' – 38.9' ANHYDRITE: light gray (N7) anhydrite, dense, hard, very finely crystalline. At 38.9', trace of light gray (N7) clay on anhydrite fragments.	
8	40	4.1	100	–			
9	45	5.2	100	–		**38.9' – 51.9' ARGILLACEOUS HALITE:** clear to medium gray (N5) and pale yellowish-brown (10YR 6/2) halite, moderately hard, medium to coarsely crystalline, clay content from <1% to 10%. Few orange polyhalite blebs scattered throughout. Clay breaks at 43.0', 45.9', 48.1', 48.6', and 50.3'.	
10	50	4.8	96	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-212 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 930" S of South 400 Drift centerline, near E rib

STATION S1320, E163 COLLAR ELEV. 1261.7' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N8366.5, E7057.1 DEPTH OF BOREHOLE 52.1'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY DGK,JPS/Bechtel DATE 1/26/83

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
10	50	4.8	96	-		(as above)	Finished hole at 12:45 hours on 18 December 1982.
					X	51.9' - 52.1' HALITE: clear halite, moderately hard, coarsely crystalline.	Total depth = 52.1'.
	55						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-215 INSTRUMENT TYPE & NUMBER Extensometer GE-247 HOLE SIZE NX

LOCATION East 140 Drift, 1960' S of Exploratory Shaft centerline, 13' from E rib

STATION S1960, E153 COLLAR ELEV. 1272.0' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N7727.2, E7046.9 BOREHOLE PENETRATION 52.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY BWH/TSC//RMB,JPS/Bechtel DATE 1/5-6/83

SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
7	25	4.9	98	-		23.2' - 28.8' **HALITE:** clear, fine to coarsely crystalline halite, moderately hard, few white enhydrite seams. At 24.7', anhydrite seam, 0.1' with brown clay parting. At 25.6', 1/2" white anhydrite seam, near horizontal and irregular.	
						22.4' - 23.2' **HALITE:** clear, medium to coarsely crystalline halite. 1% to 2% polyhalite blebe. Trace of interstitial brown clay.	
6	20	4.3	86	-		18.0' - 22.4' **HALITE:** clear halite with 10-15% brown clay, coarsely crystalline. Clay breaks at 19.2', 19.7', and 20.3'. 2% interstitial polyhalite from 20.0' to 20.3'. At 20.6', anhydrite bleb.	
						14.5' - 18.0' **HALITE:** clear, coarsely crystalline halite, 5% polyhalite in blebs. At 14.8', 1/2" thick anhydrite seam, sub-horizontal, irregular surface. From 15.1' - 17.0' polyhalite reduced to 1%. From 17.0' - 18.0' trace of gray clay.	
5	15	5.0	100	-		14.0' - 14.5' **ANHYDRITE:** (Anhydrite "a") gray brown (5YR 3/2) to light gray, microcrystalline anhydrite.	
						7.6' - 14.0' **HALITE:** clear to light brown (10YR 4/2), coarsely crystalline halite. Less than 5% polyhalite, trace (<5%) of interstitial light gray clay. Gray clay seam at 14.0'.	
4	10	4.9	98	-		7.4' - 7.6' **ANHYDRITE:** (Anhydrite "b") gray (N4), hard anhydrite, gray halite, clay seam at 7.4'.	From 7.0' - 8.0', hit trace of pressurized gas.
3		1.7	85	-		5.5' - 7.4' **ARGILLACEOUS HALITE:** dark gray (N4) to brown (5YR 5/2), coarsely crystalline halite, 5-10% interstitial brown clay, trace of polyhalite.	
2	5	0.7	35	-		0.0' - 5.5' **HALITE:** clear coarsely crystalline halite, from less than 5% to 10% polyhalite.	0' - 1.0' drilled with 6" single-tube core barrel.
1		1.5	75	-			Set casing to 4.5" at 09:00 hr. Began NX coring with brine at 09:30 hrs, 5 January 1983.
	0						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-215 INSTRUMENT TYPE & NUMBER Extensometer GE-247 HOLE SIZE NX

LOCATION East 140 Drift, 1960' S of Exploratory Shaft centerline, 13' from E rib

STATION S1960, E153 COLLAR ELEV. 1272.0' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N7727.2, E7046.9 BOREHOLE PENETRATION 52.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY BWH/TSC//RMB,JPS/Bechtel DATE 1/5-6/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
12	50	5.0	100	–		**42.0' - 52.0' ARGILLACEOUS HALITE:** halite with trace polyhalite, mottled grayish brown and reddish orange (10YR 6/5). From 42.0' - 45.4', 20-30% brownish clay, coarsely crystalline with less than 1% polyhalite. Clay breaks at: 42.6', 42.9', 44.0', 44.2', 44.5', and 45.3'. From 45.4' - 47.4', clear, medium to coarsely crystalline, trace of gray clay, less than 1% polyhalite. From 47.4' - 52.0', argillaceous with 10-15% clay, fine to coarsely crystalline, moderately hard. Clay breaks at: 48.2', 48.8', 49.3', 49.4', 49.5', 50.4', 50.7', 50.9', 51.1', and 51.4'. From 51.2' - 52.0', finely crystalline with less than 2% interstitial polyhalite.	Stopped coring on 5 January 1983 at 15:30 hrs. at 42.0 ft.
11	45	5.0	100	–		**38.4' - 42.0' HALITE:** polyhalitic (5-10%) halite, clear and mottled reddish-orange, polyhalite as blebs in part. Moderately hard, medium crystalline. Trace of gray clay throughout. At 38.7', thin <1/4" anhydrite stringer.	
10	40	5.0	100	–		**37.8' - 38.4' ANHYDRITE:** (Marker Bed 138) light grey (N5) anhydrite, hard, dense, with light and dark gray banding. At 37.8', 0.1' thick brown clay seam, moderately stiff.	
						36.6' - 37.8' HALITE: polyhalitic (25%) halite to 37.0', finely crystalline, mottled grey, brown, and reddish orange, moderately hard. Argillaceous (10-15%) to 37.8', finely to medium crystalline, gray brown.	
9	35	5.0	100	–		**32.8' - 36.6' ARGILLACEOUS HALITE:** dark grayish brown (5YR 3/2) halite with some clear halite. Moderately hard, medium to coarsely crystalline. Clay breaks at 33.2', 33.3', 34.1', 34.4', 34.6', 34.9', 35.0', 35.4', 35.8', 36.3', and 36.6'.	
						30.4' - 32.8' HALITE: clear halite, moderately hard, finely to medium crystalline.	
8	30	5.0	100	–		**28.8' - 30.4' ARGILLACEOUS HALITE:** brownish gray (5YR 4/1), finely to coarsely crystalline halite, moderately hard. Clay (10-20%) is dark brown with trace of grey. Polyhalite (1%) from 30.2' to 30.4'. At 29.6', brown clay break.	
7	25	4.9	98	–		(As below)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-215 INSTRUMENT TYPE & NUMBER Extensometer GE-247 HOLE SIZE NX

LOCATION East 140 Drift, 1960' S of Exploratory Shaft centerline, 13' from E rib

STATION S1960, E153 COLLAR ELEV. 1272.0' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N7727.2, E7046.9 BOREHOLE PENETRATION 52.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY BWH/TSC//RMB,JPS/Bechtel DATE 1/5-6/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
12	50	5.0	100	–	X X X	(As below)	Total penetration = 52.0'. Completed hole at 10:00 hours on 6 January 1983.

75
70
65
60
55

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-216 INSTRUMENT TYPE & NUMBER Extensometer GE-248 HOLE SIZE NX

LOCATION East 140 Drift, 1960' S of Exploratory Shaft centerline, 13' from E rib

STATION S1960, E153 COLLAR ELEV. 1262.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N7727.2, E7046.9 DEPTH OF BOREHOLE 54.2'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB, JPS/Bechtel DATE 1/8-10/83

RUN NUMBER	DEPTH (ft.)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
0	0	0.7	70	-	X X X X	0.0' - 2.0' **HALITE:** clear, fine to coarsely crystalline halite, trace of polyhalite.	NX coring began at 10:00 hours on 6 January 1983. From 0-7', core loss due to grinding throughout runs 0 & 1. 0' - 1' drilled with 6" single-tube core barrel.
1	5	4.8	80	-		2.0' - 8.0' **ARGILLACEOUS HALITE:** clear and medium gray (N5) halite, moderately hard, 10-20% gray interstitial clay throughout, medium to coarsely crystalline. Clay breaks at 3.5' and 3.6'. At 4.2', blebs and trace of polyhalite.	
2	10	4.0	100	-	X X X X X X	8.0' - 9.2' **POLYHALITIC HALITE:** clear and medium reddish-orange (10R 6/5) halite, coarsely crystalline, hard, brittle. 30-50% finely crystalline polyhalite. 9.2' - 9.9' **POLYHALITE:** medium reddish-orange (10R 6/5) polyhalite, hard, finely crystalline, with 20-30% clear halite. 9.9' - 11.5' **ANHYDRITE:** (Marker Bed 139) light gray to pale brown (5YR 5/2) anhydrite, banded, hard, dense.	
3	15	5.2	100	-		11.5' - 12.3' **POLYHALITE:** medium reddish-orange (10R 6/5) polyhalite, trace of light gray anhydrite partings. 12.3' - 12.5' **CLAY:** brownish-gray (5YR 4/1) clay seam, stiff to firm, subhorizontal with irregular lower contact. 12.5' - 15.6' **HALITE:** medium reddish-orange (10R 6/5) and mottled brownish-gray (5YR 4/1) halite, finely to coarsely crystalline, moderately hard, argillaceous in part (< 2%). 5% polyhalite in part. Clay breaks at 12.7', 13.1', 13.8', 14.8', 15.5'.	Trace of gas at 11.0'.
4	20	5.3	100	-	X X X X X X X X	15.6' - 27.8' **POLYHALITIC HALITE:** clear and medium reddish-orange (10R 6/5) halite, moderately crystalline, hard. 5-30% blebs of polyhalite. Polyhalite < 1% from 20.5'-23.0'. Gray clay break at 26.9'.	
5	25	5.2	100	-	X X X X X X X		

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-216 INSTRUMENT TYPE & NUMBER Extensometer GE-248 HOLE SIZE NX

LOCATION East 140 Drift, 1960' S of Exploratory Shaft centerline, 13' from E rib

STATION S1960, E153 COLLAR ELEV. 1262.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N7727.2, E7046.9 DEPTH OF BOREHOLE 54.2'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB, JPS/Bechtel DATE 1/8-10/83

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
5	25	5.2	100	–		(As above)	
6	30	5.3	100	–		27.8' – 32.4' **ARGILLACEOUS HALITE:** mottled brownish-gray (5YR 4/1) halite with trace of orange polyhalite. Moderately hard, finely to coarsely crystalline. Abundant interstitial clay at 30.9'. Clay breaks at 27.85', 28.1', 28.5', 29.2', 29.3', 29.9', 30.2', 30.6', 31.4'.	
7	35	5.2	100	–		32.4' – 38.2' **HALITE:** clear and medium reddish orange (10R 6/5) halite, finely to coarsely crystalline, moderately hard, few blebs of polyhalite throughout. Polyhalite generally less than 5%. At 37.2', sub-horizontal polyhalite seam.	
8	40	5.1	100	–		38.2' – 38.4' **ANHYDRITE:** medium light gray (N6) anhydrite, hard, dense, underlain by light gray clay parting of unknown thickness. 38.4' – 42.9' **ARGILLACEOUS HALITE:** mottled medium gray (N5) halite, finely to medium crystalline, 10% gray clay throughout. Clay breaks at: 39.4', 39.6', 40.2', 40.6', 41.8'. From 40.9' to 41.8', trace of polyhalite.	
9	45	5.3	100	–		42.9' – 45.2' **HALITE:** clear to moderate reddish-orange (10R 6/6) halite, finely to medium crystalline, trace of interstitial gray clay throughout. 45.2' – 49.7' **ARGILLACEOUS HALITE:** light grayish-brown halite, finely to medium crystalline, moderately hard, brown clay 2-5%. Clay breaks at: 45.7', 46.3', 46.7', 47.5', 49.0'. Trace of polyhalite.	
10	50	5.1	100	–		(see description on next sheet)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-216 INSTRUMENT TYPE & NUMBER Extensometer GE-248 HOLE SIZE NX

LOCATION East 140 Drift, 1960' S of Exploratory Shaft centerline, 13' from E rib

STATION S1960, E153 COLLAR ELEV. 1262.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N7727.2, E7046.9 DEPTH OF BOREHOLE 54.2'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB,JPS/Bechtel DATE 1/8-10/83

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
10	50	5.1	100	-		49.7' - 54.2' HALITE: clear, medium to coarsely crystalline halite, moderately hard. Trace of gray clay throughout.	Hole completed on 6 January 1983 at 15:00 hours. Total depth = 54.2'.
11		1.5	100	-			
	55						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-219 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 2422' S of Exploratory Shaft centerline, 5' from E rib

STATION S2422, E162 COLLAR ELEV. 1266.3' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N7264.9, E7056.6 BOREHOLE PENETRATION 51.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/18/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY (ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
8	25	5.1	100	—		24.0' - 28.8' **HALITE:** clear, medium to coarsely crystalline halite, moderately hard, few scattered white anhydrite blebs. At 24.3', 1/2" thick medium gray (N5) clay seam, dense, highly plastic.	
7	20	5.0	100	—		21.7' - 24.0' **HALITE:** clear to light brownish-gray (5YR 4/1) halite, finely crystalline, moderately hard. Trace (< 1%) of brown, interstitial argillaceous meterial throughout.	
						19.0' - 21.7' **HALITE:** argillaceous, clear to mottled brownish-gray (5YR 4/1) and moderate brown (5YR 3/4) halite, finely to medium crystalline, moderately hard. Light and dark brown interstitial argillaceous zonee (5%) throughout. Clay breaks at: 19.0', 19.4', 19.9', 20.5', 20.7' and 21.5'.	
6	15	5.0	100	—		15.1' - 19.0' **HALITE:** clear, medium to coarsely crystalline halite, moderately hard. At 15.7', 45° dipping very light gray (N8) anhydrite seam, 1" thick. Few blebs of reddish-orange (10R 5/6) polyhalite throughout. Polyhalite content increases to 1/2% below 18.2'.	Trace of pressurized gas encountered at 15.0'.
						14.5' - 15.1' **ANHYDRITE:** (Anhydrite "a") banded light (N7) to dark (N3) gray anhydrite, hard, dense, trace of clear interstitial halite throughout.	
						14.4' - 14.5' **CLAY:** very light gray (N8) clay seam, subhorizontal, moderately soft.	
5	10	4.8	96	—		8.0' - 14.4' **HALITE:** clear to very pale orange (10YR 8/2) halite, finely to coarsely crystalline, moderately hard. From 13.0' to 14.4', argillaceous content up to 1%. Few polyhalite blebs at 14.2'.	
4		0.7	70	—			
						5.8' - 8.0' **HALITE:** argillaceous, clear to mottled brownish-gray (5YR 4/1) to moderate brown (5YR 3/4) halite, moderately hard, slightly brittle, finely to coarsely crystalline.	
3	5	2.1	52	—			
						0.0' - 5.8' **HALITE:** clear halite, medium to coarsely crystalline, moderately hard, trace (<1%) of interstitial polyhalite and few scattered blebs of medium reddish-orange (10R 5/6) polyhalite throughout.	
2		2.1	95	—			
1	0	1.1	85	—			

CORE LOSS:

RUN	WHERE LOST
1	0.0' - 0.2'
3	4.1' - 4.8'
	5.2' - 6.0'
	6.5' - 6.9'
4	7.9' - 8.2'

NX coring began at 13:00 hours on 13 January 1983.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-219 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 2422' S of Exploratory Shaft centerline, 5' from E rib

STATION S2422, E162 COLLAR ELEV. 1266.3' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N7264.9, E7056.6 BOREHOLE PENETRATION 51.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/18/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
13	50	4.0	100	—		(see description on next sheet)	
12	45	3.1	100	—		42.8' - 49.9' **HALITE:** argillaceous, clear to mottled grayish-brown (5YR 3/2) halite, moderately hard, finely to coarsely crystalline. Numerous scattered, brown clay breeks throughout. Argillaceous content rangee from 0% to 2%. Raduction in clay content from 46.8'-48.0'. Clay breaks at: 43.2', 43.8', 44.8', 44.9', 45.4', 45.9', 46.4', 46.5', 49.0', and 49.6'.	
11	40	5.0	100	—		38.9' - 42.8' **HALITE:** clear, medium to coarsely crystalline halite, moderate hard. Few scattered stringers of light gray (N7) anhydrite throughout. Irregular anhydrite partings at: 39.0', 39.1', 39.7', and 40.2'.	
10	35	4.8	96	—	-X-	38.1' - 38.9' **ANHYDRITE:** (Marker Bed 138) white (N9) to very light gray (N8) anhydrite, dense, hard, finely crystalline. 38.0' - 38.1' **CLAY:** moderate brown (5YR 3/4) clay seam, moderately soft and plastic, subhorizontal contact with overlying anhydrita. 32.5' - 38.0' **ARGILLACEOUS HALITE:** clear to mottled grayish-brown (5YR 3/2) halite, finely to medium crystalline, moderately hard. Argillaceous content 10-20%, but less than 5% from 32.5'-33.5'. From 37.3'-38.0', trace of interstitial dark yellowish-orange (10YR 6/6) polyhalite. Clay breaks at 34.0', 34.2', 34.4', 35.6', 36.2', 36.3', and 36.9'	Trace of pressurized gas at 37.0'.
9	30	5.3	100	—		30.3' - 32.5' **HALITE:** clear, medium to coarsely crystalline halite, moderately hard.	
8	25	5.1	100	—		28.8' - 30.3' **HALITE:** argillaceous, clear to brownish-gray (5YR 4/1) halite, finely crystallina. Argillaceous content 2-3% from 28.8' to 29.3' and < 1% from 29.3' to 30.3'. (As below)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-219 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 2422' S of Exploratory Shaft centerline, 5' from E rib

STATION S2422, E162 COLLAR ELEV. 1266.3' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N7264.9, E7056.6 BOREHOLE PENETRATION 51.0'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/18/83 SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	55						
13	50	4.0	100	—	— —	49.9' – 51.0' **HALITE:** argillaceous, clear, moderate brown (5YR 3/4) halite, very finely crystalline, sugary texture in part, moderately hard, 2-5% argillaceous content. Irregular,. moderate brown (5YR 3/4) clay breaks at 50.0' and 50.2'.	Total penetration = 51.0'. Hole completed at 15:15 hours on 14 January 1983.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-219A INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 2418' S of Exploratory Shaft centerline, 5' from E rib

STATION S2418, E162 COLLAR ELEV. 1266.1' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N7268.5, E7056.2 BOREHOLE PENETRATION 11.3'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/18/83 SHEET 1 OF 1

RUN NUMBER	PENETRATION (ft.)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	10						
5		5.3	100	—		8.2' – 11.3' **HALITE:** clear halite, moderately hard, medium to coarsely crystalline. Few scattered hairline stringers of very light gray (N8) anhydrite at: 8.5', 8.8', 9.8', 10.0', 10.8' and 11.1'.	Total penetration = 11.3'.
						8.2' **ANHYDRITE:** (Anhydrita "b") light gray (N7), very finely crystalline anhydrite, hard, dense, 3/8" thick.	Hole cored to determine exact location, thickness, and character of clay parting and anhydrite lens at 8.2' not recovered in DH-219.
4		0.3	100	—		5.5' – 8.2' **ARGILLACEOUS HALITE:** clear to mottled moderate brown (5YR 3/4) halite, medium to coarsely crystalline, moderately hard. Interstitial argillaceous material comprises 20% of core. Trace of grayish-orange (10YR 7/4) polyhalite (< 1%) from 7.0' to 7.3'. Brown clay break at 7.3' and gray clay parting at 8.2'.	
3	5	2.0	100	—			0' – 1.0' drilled with 6" single-tube core barrel.
2		1.7	100	—		0.0' – 5.5' **HALITE:** clear halite, finely to coarsely crystalline, moderately hard, trace of medium reddish-orange (10R 5/6) polyhalite and scattered polyhalite blebs.	**RUN** 1 core lost between 1.7' – 2.0'.
1		0.7	70	—			**NX** coring began at 10:00 hours and ended at 11:15 hours on 17 January 1983.
	0						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-220 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 2421' S of Exploratory Shaft centerline, 5' from E rib

STATION S2421, E162 COLLAR ELEV. 1257.4' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N7265.5, E7055.9 DEPTH OF BOREHOLE 51.8'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/19/83

RUN NUMBER	DEPTH (ft.)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0 – 5	4.1	68	–		**0.0' - 6.5' HALITE:** clear, finely to coarsely crystalline halite, moderately hard. Trace (< 1%) of reddish-orange (10R 5/6) polyhalite blebs throughout. Few grayish-brown argillaceous zones, < 1%.	NX coring began at 08:30 hours on 15 January 1983.
2		0.9	90	–		**6.5' - 8.8' POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) halite, moderately hard, medium to coarsely crystalline. Polyhalite (5-10%) occurs as blebs and interstitial layers.	CORE LOSS:
3	10	5.2	100	–		**8.8' - 11.0' ANHYDRITE:** (Marker Bed 139) polyhalitic, pale reddish-brown (10R 5/4) and medium gray (N5) anhydrite, dense, finely crystalline, hard, numerous polyhalite seams and partings comprise up to 50% of core, slightly banded. Medium gray (N5) clay parting at 11.0'.	RUN / WHERE LOST 1: 1.3' - 1.4'; 2.3' - 2.8'; 3.3' - 4.0'; 4.1' - 4.7' 2: 6.0' - 6.1' 4: 12.2' - 12.3' 8: 33.4' - 33.7'
4	15	4.9	98	–		**11.0' - 19.9' HALITE:** polyhalitic in part, clear halite, light gray (N7) and moderate reddish-orange (10R 6/6). Finely to coarsely crystalline, moderately hard. Interstitial gray clay at 12.2'. Polyhalite content 2% (3-5% from 16.0' to 19.9'). Scattered polyhalite blebs at 14.0', seam at 19.3'.	
5	20	5.3	100	–		**19.9' - 22.0' HALITE:** clear to light gray (N7) halite, medium to coarsely crystalline, moderately hard, trace clay (< 1%) in part. Gray clay break at 20.0'.	
						22.0' - 28.4' HALITE: polyhalitic, clear to moderate reddish-orange (10R 6/6) and light brownish-gray (5YR 6/1) halite, finely to coarsely crystalline, moderately hard, 2-3% polyhalite and trace (< 1%) clay from 26.8'-28.4'. Finely crystalline from 24.9'-27.0'. Polyhalite occurs as interstitial layers and irregular blebs. Below 26.8', 5% interstitial gray clay, with clay breaks at 26.8', 27.0' and 27.4'.	
6	25	5.0	100	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-220 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 2421' S of Exploratory Shaft centerline, 5' from E rib

STATION S2421, E162 COLLAR ELEV. 1257.4' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N7265.5, E7055.9 DEPTH OF BOREHOLE 51.8'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/19/83 SHEET 2 OF 3

RUN NUMBER	DEPTH (ft.)	RECOVERY (ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.0	100	-		(as above)	
7	30	5.0	100	-		28.4' - 30.4' **HALITE:** clear to light gray (N7) halite, medium to coarsely crystalline, soft* to moderately hard. Clay content < 1%.	*From 28.3' to 29.5' core is broken into very small 1/8"-1/16" fragments.
8	35	4.7	94	-		30.4' - 36.3' **HALITE:** polyhalitic, clear to moderate reddish-orange (10R 6/6) halite, moderately to coarsely crystalline, moderately hard. Blebs and interstitial polyhalite comprise 3-5% of core. Few scattered, discontinuous hairline breaks of white anhydrite. At 35.7', light gray horizontal anhydrite parting with irregular surfaces.	
						36.3' - 36.5' **ANHYDRITE:** light (N7) and dark (N3) gray anhydrite bands, dense, hard, very finely crystalline. At 36.5' light gray (N7) clay seam, firm to stiff, moderately plastic.	
9	40	5.3	100	-		36.5' - 42.6' **HALITE:** clear to light gray (N7) to light brownish-gray (5YR 6/1) halite, moderately to coarsely crystalline, moderately hard. Trace (< 1%) clay in part.	
10	45	5.1	100	-		42.6' - 50.5' **ARGILLACEOUS HALITE:** mottled medium light gray (N6) to grayish-brown (5YR 3/2) and clear, finely to coarsely crystalline halite, moderately hard. Clay content 10-20% with clay breaks at: 44.5', 44.6', 45.1', 45.4', 47.4', 47.8', 48.2' and 48.9'.	
11	50	3.9	100	-			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-220 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 2421' S of Exploratory Shaft centerline, 5' from E rib

STATION S2421, E162 COLLAR ELEV. 1257.4' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N7265.5, E7055.9 DEPTH OF BOREHOLE 51.8'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/19/83

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	3.9	100	–		(As above) 50.5' – 51.8' HALITE: clear halite, moderately hard, moderately to coarsely crystalline.	Hole completed at 15:00 hours on 15 January 1983. Trace of gas encountered after completion of hole. Total depth = 51.8'.
	55						

WIPP-SPDV
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-223 INSTRUMENT TYPE & NUMBER Extensometer GE-249 HOLE SIZE NX

LOCATION East 140 Drift, 3079' S of Exploratory Shaft centerline, 13' from E rib

STATION S3079, E154 COLLAR ELEV. 1255.1' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N6607.2, E7048.5 BOREHOLE PENETRATION 52.6'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB, JPS/Bechtel DATE 1/26/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
8	25	5.0	100	-		**19.2' - 28.9'** **HALITE:** argillaceous and polyhalitic in part; clear to mottled light gray (N7) and moderate brown (5YR 3/4) halite, moderately hard, finely to coarsely crystalline. Clay content <2%. Polyhalite <1% from 20.8' to 21.1'. Clay breaks at 19.3', 22.3', 23.1', 23.8', clay parting at 24.3'. At 24.3', anhydrite stringer, 1/8" thick, bluish-white (5B 9/1), hard, dense.	
7	20	5.2	100	-	X		
					X	**15.2' - 19.2'** **HALITE:** clear halite, medium to coarsely crystalline, moderately hard, trace (<1%) moderate reddish-orange (10R 5/6) polyhalite blebs throughout.	
6	15	4.9	98	-	X	**14.2' - 15.2'** **ANHYDRITE:** (Anhydrite "a") very light (N8) to light gray (N7) anhydrite, dense, hard, finely crystalline, faintly banded in part. Some interstitial clear halite from 14.8' to 15.2'.	Pressurized gas at 15' blew return line out of reserve pond.
5	10	5.3	100	-		**0.0' - 14.2'** **HALITE:** clear to medium gray (N5) halite, medium to coarsely crystalline, moderately hard. Core is moderately fractured and broken from 1.0' to 4.5'. Trace clay (<1%) from 5.0' to 8.3' and from 13.5' to 14.2'. Clay breaks at 5.0', 6.7', 6.9', 7.3', 8.1', and 13.4'. 1/4" clay seams at 8.2' and 14.2'. 1/2"-thick, hard, dense, medium dark gray (N4) anhydrite (Anhydrite "b") lens at 8.2'.	Trace of gas between 8' and 9'.
4	5	1.1	58	-			CORE LOSS:
3		1.2	80	-			RUN / WHERE LOST 2 1.0' - 1.3' 3 Throughout run 4 Throughout run
2		1.7	85	-			Core Run #1 was a 1' run with a 6" O.D. core barrel.
1	0	1.0	100	-			Drilling started 09:30 hours on 22 January 1983

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-223 INSTRUMENT TYPE & NUMBER Extensometer GE-249 HOLE SIZE NX

LOCATION East 140 Drift, 3079' S of Exploratory Shaft centerline, 13' from E rib

STATION S3079, E154 COLLAR ELEV. 1255.1' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N6607.2, E7048.5 BOREHOLE PENETRATION 52.6'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB, JPS/Bechtel DATE 1/26/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
13	50	5.2	100	-		(see description on next sheet)	
						44.9' - 48.6' **HALITE:** clear halite, moderately hard, coarsely crystalline. Trace interstitial dark reddish-brown (10R 3/4) clay from 44.9' - 45.4'.	
12	45	5.0	100	-		42.0' - 44.9' **ARGILLACEOUS HALITE:** clear and dark reddish-brown (10R 3/4) halite, finely to coarsely crystalline, moderately hard. Clay content up to 30%, clay breaks at 42.0', 42.5', 42.9', 43.0', 43.25', 43.6', and 44.7'.	
11	40	5.2	100	-	X X	38.6' - 42.0' **HALITE:** clear halite, medium to coarsely crystalline, moderately hard, trace interstitial moderate reddish-orange (10R 6/6) polyhalite and medium gray (N5) clay. Very light gray (N8) anhydrite stringers at 39.0' and 39.5'.	
						37.9' - 38.6' **ANHYDRITE:** (Marker Bed 138) light gray (N7) anhydrite, dense, hard, very finely crystalline.	
10	35	5.1	100	-		33.5' - 37.9' **ARGILLACEOUS HALITE:** brownish-gray (5YR 4/1) to grayish-brown (5YR 3/2) halite, finely to coarsely crystalline, moderately hard, 15-30% interstitial clay with clear halite. Clay breaks at 34.6', 35.1', 35.5', 35.7', 35.9', 36.3', 37.0', 37.2', 37.3', and 37.8'. At 37.9', 3/4"-thick clay seam, grayish-brown (5YR 3/2), stiff, moderately plastic.	
						30.3' - 33.5' **HALITE:** clear halite, coarsely crystalline, moderately hard, trace (<1/2%) clay from 32.7' to 33.5'.	Pressurized gas encountered at ±30'.
9	30	5.2	100	-		28.9' - 30.3' **ARGILLACEOUS HALITE:** clear to moderate brown (5YR 3/4) halite, moderately hard, finely to moderately crystalline, 10-15% clay. Clay breaks at 29.1', 29.9', 30.0'. Core is slightly vesicular at 30.0'. Clay seam, 1/4" thick, medium light gray (N6), stiff and moderately plastic at 30.2'.	
8	25	5.0	100	-		(as below)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-223 INSTRUMENT TYPE & NUMBER Extensometer GE-249 HOLE SIZE NX

LOCATION East 140 Drift, 3079' S of Exploratory Shaft centerline, 13' from E rib

STATION S3079, E154 COLLAR ELEV. 1255.1' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N6607.2, E7048.5 BOREHOLE PENETRATION 52.6'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB,JPS/Bechtel DATE 1/26/83

SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	55						
13	50	5.2	100	-		48.6' - 52.6' **ARGILLACEOUS HALITE:** clear to moderate brown (5YR 3/4) halite, moderately hard, finely to coarsely crystalline. Clay comprises 20-35% in part. Finely crystalline from 50.8'-52.6'. Clay breaks at 48.8', 49.0', 50.1', 52.0', 52.3', and 52.6'.	Total penetration = 52.6'. Completed hole at 08:30 hours on 23 January 1983.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-224 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 3079' S of Exploratory Shaft centerline, 13' from E rib

STATION S3079, E154 COLLAR ELEV. 1246.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N6607.5, E7048.5 DEPTH OF BOREHOLE 52.5'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/25/83

RUN NUMBER	DEPTH (ft)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0	1.0	100	–			Coring began at 08:40 hours on 23 January 1983. Core Run #1, from 0.0' to 1.0', using 6" single-tube core barrel.
2		1.7	40	–		0.0' – 7.6' **HALITE:** clear halite, moderately hard, medium to coarsely crystalline, trace clay (<1/2%) from 1.0'-3.0', few moderate reddish-orange (10R 6/6) polyhalite blebs.	
3	5	5.2	100	–		7.6' – 10.7' **ANHYDRITE:** (Marker Bed 139), banded light bluish-gray (5B 7/1) to medium light gray (N6) to moderate reddish-brown (10R 4/6) anhydrite, very finely crystalline, hard, dense slightly halitic and polyhalitic. Medium gray (N5) clay seam, moderately soft and plastic, ±1/2" thick at 10.7'.	CORE LOSS: RUN 2 Throughout run; RUN 4 10.2' – 10.3'
4	10	0.9	90	–			
5		5.3	100	–		10.7' – 15.2' **HALITE:** clear and mottled moderate reddish-orange (10R 6/6) to light gray (N7) to grayish-orange (10YR 7/4) halite, moderately hard, finely to medium crystalline. Polyhalite and clay content varies throughout from <1% to 3%. Polyhalite is interstitial with some blebs. Medium light gray (N6) clay breaks at 11.7', 12.0', and 14.5'.	
6	15	5.0	100	–		15.2' – 18.6' **POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) halite, moderately hard, medium to coarsely crystalline, polyhalite content ranges from <1% to 10% in blebs and interstitially, clay-filled fracture at 15.25'.	
	20					18.6' – 21.7' **HALITE:** clear and brownish-gray (5YR 4/1) halite with trace of moderate reddish-orange (10R 6/6), moderately hard, medium to coarsely crystalline, trace (<2%) clay in part with trace (<5%) interstitial polyhalite throughout, clay breaks at 18.75', 19.9', and 20.75'.	
7	25	5.2	100	–		21.7' – 25.0' **HALITE:** polyhalitic, clear and moderate reddish-orange (10R 6/6) halite, moderately hard, coarsely crystalline, polyhalite occurs as blebs and interstitial layers, ranging from 3-5%.	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-224 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 3079' S of Exploratory Shaft centerline, 13' from E rib

STATION S3079, E154 COLLAR ELEV. 1246.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N6607.5, E7048.5 DEPTH OF BOREHOLE 52.5'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/25/83

RUN NUMBER	DEPTH (ft)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
7	25	5.2	100	-			
8	30	5.0	100	-		25.0' - 30.0' **HALITE:** clear to mottled pale reddish-brown (10R 5/4) to pale brown (5YR 5/2) halite, finely to medium crystalline, slightly argillaceous and polyhalitic in part, clay content about 2% with breaks at 25.1', 26.5', 26.7', and 27.4'.	
9	35	5.3	100	-		30.0' - 35.4' **HALITE:** clear and moderate reddish-orange (10R 6/6) halite, moderately hard, medium to coarsely crystalline. Polyhalite (<3%) is interstitial or occurs as blebs. At 34.6', medium light gray (N6) anhydrite stringer 3/8" thick.	
						35.4' - 35.7' **ANHYDRITE:** banded very light gray (N8) and dark gray (N1) anhydrite, hard, dense, very finely crystalline.	
						35.7' - 35.8' **CLAY:** medium dark gray (N4) clay seam, moist, soft, near horizontal.	
10	40	5.0	100	-			
11	45	5.3	100	-		35.8' - 49.1' **ARGILLACEOUS HALITE:** clear to medium dark gray (N4) halite, finely to coarsely crystalline, moderately hard. Clay content ranges from <1% to 10% with few orange polyhalite blebs at 43.7'. Clay breaks at 36.6', 43.8', 44.3', and 44.4'.	
12	50	5.2	100	-			
						(see description on next sheet)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-224 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 3079' S of Exploratory Shaft centerline, 13' from E rib

STATION S3079, E154 COLLAR ELEV. 1246.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N6607.5, E7048.5 DEPTH OF BOREHOLE 52.5'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/25/83

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
12	50	5.2	100	–	— X	49.1' – 52.5' HALITE: clear and mottled pale raddish-brown (10R 5/4) to light gray (N7) halite, finely to coarsely crystalline, moderately hard. Trace (<1/2%) polyhalite and clay throughout. At 52.0', 3/8"-thick, light gray (N7) clay seam, firm, moderately plastic. Thin clay break at 52.3'.	Hole completed at 14:30 hours on 23 January 1983. Total depth = 52.5'.
	55						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-227 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 3656' S of Exploratory Shaft centerline, 5' from W rib

STATION S3656, E147 COLLAR ELEV. 1247.0' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N6030.7, E7041.2 BOREHOLE PENETRATION 51.7'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/28/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	25					(see description on next sheet)	
7		5.3	100	-		18.0' - 24.3' **ARGILLACEOUS HALITE:** clear and medium light gray (N6) halite with isolated bands of moderate reddish-orange (10R 6/6) polyhalite, finely to coarsely crystalline, moderately hard. Argillaceous content 5-10% with clay breaks at 18.1', 18.5', 19.0', 19.6', 20.2', 20.5', 21.5', 22.4', 22.6, and 23.3'. Isolated bands of polyhalite at 19.2', 19.9', and 20.9'.	
	20						
6		5.0	100	-			
					X X X X	14.5' - 18.0' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, moderately hard. Polyhalite generally <2% and occurs as scattered blebs or interstitially.	
						13.8' - 14.5' **HALITE:** clear halite, coarsely crystalline, moderately hard. At 14.5', very light gray (N8) anhydrite lens.	
	15						
5		5.1	100	-	X	13.0' - 13.8' **ANHYDRITE:** (Anhydrite "a") banded very light gray (N8) and medium gray (N5) anhydrite, hard, dense, microcrystalline.	
						12.9' - 13.0' **CLAY:** light gray (N7) clay, moderately soft, moist.	
						7.1' - 12.9' **HALITE:** clear halite, medium to coarsely crystalline, moderately hard. From 12.1'-12.9', few interstitial argillaceous and polyhalitic zones. Clay content about 1-2% from 12.1'-12.5', and polyhalite about 1% from 12.5'-12.9'.	Trace of gas at 7.0'.
4	10	5.0	100	-			
					X		
3		1.0	100	-		0.0' - 7.1'. **HALITE:** clear to medium gray (N5) halite, moderately hard, coarsely crystalline, slightly (<1/2%) argillaceous in part. Few discontinuous clay breaks throughout. Few orange polyhalitic blebs from 6.0'-6.5'. At 7.1', olive gray (5Y 4/1) anhydrite stringer (Anhydrite "b"), hard, dense, with trace of medium gray (N5) clay.	Core Loss: Run 1 — Throughout Run Run 2 — Throughout Run Run 12 — 46.7'-46.8' 0' - 1.0' drilled with 6" single-tube core barrel. Hole began at 13:00 hours on 28 January 1983.
	5						
2		0.5	25	-			
1		0.6	30	-			
0	0	1.0	100	-			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-227 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 3656' S of Exploratory Shaft centerline, 5' from W rib

STATION S3656, E147 COLLAR ELEV. 1247.0' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N6030.7, E7041.2 BOREHOLE PENETRATION 51.7'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/28/83 SHEET 2 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
12	50	4.9	98	–		45.6' – 50.4' **ARGILLACEOUS HALITE:** clear to grayish-brown (5YR 3/2) halite, finely to coarsely crystalline, moderately hard, finely crystalline from 49.8'-50.6'. Clay content generally 0-15% and about 1% from 45.6'-47.4'. Clay breaks at 47.1', 47.4', 47.5', 47.8', 48.3', 48.5', 48.7', 49.3', 49.4', 49.5', and 50.2'. From 50.4' – 50.6', grayish-red (10R 4/2) clay seam, moderately soft, highly plastic.	
11	45	5.1	100	–		44.0' – 45.6' **HALITE:** clear halite, coarsely crystalline, moderately hard. 41.7' – 44.0' **ARGILLACEOUS HALITE:** clear to grayish-brown (5YR 3/2) halite, finely to coarsely crystalline, moderately hard. Argillaceous content ranges from 0-15% with clay breaks at 42.0', 42.9', 43.5', 43.7, and 43.9'.	
10	40	5.0	100	–		37.5' – 41.7' **POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) halite, polyhalite occurs as isolated blebs or interstitially, and comprises about 5-8% of core. 36.6' – 37.5' **HALITE:** clear halite, coarsely crystalline, moderately hard, few isolated stringers of gray anhydrite.	
9	35	5.2	100	–		35.9' – 36.6' **ANHYDRITE:** (Marker Bed 138) olive gray (5Y 4/1) anhydrite, hard, dense, microcrystalline, core broken into 1/4" chips. 35.8' – 35.9' **CLAY:** pale brown (5YR 5/2) clay, moist, moderately soft, moderately plastic.	
8	30	5.0	100	–		27.0' – 35.8' **ARGILLACEOUS HALITE:** clear to mottled pale brown (5YR 5/2) and moderate brown (5YR 4/4) halite, moderately hard, finely to coarsely crystalline. Argillaceous content ranges from 0 to 10%. Clear and clay-free from 29.0'-30.2'. Brown and gray clay partings and breaks at 27.9', 28.0', 28.2', 28.5', 28.8', 30.5' (gray), 30.6' (gray), 30.8' (gray), 32.4' 32.5', 33.0', 33.1', 33.5', 33.8', 34.4', 34.7', 34.9', 35.5', and 35.6'.	
7	25	5.3	100	–		24.3' – 27.0' **HALITE:** clear halite, moderately hard, medium to coarsely crystalline, few scattered hairline breaks of light gray (N7) anhydrite.	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DH-227 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 3656' S of Exploratory Shaft centerline, 5' from W rib

STATION S3656, E147 COLLAR ELEV. 1247.0' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N6030.7, E7041.2 BOREHOLE PENETRATION 51.7'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 1/28/83 SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	55						
12	50	4.9	98	-	X	50.6' - 51.7' HALITE: clear and moderate reddish-orange (10R 6/6) halite, moderately hard, coarsely crystalline. Polyhalite occurs as isolated blebs and comprises 2-3% of core.	Total penetration = 51.7'.
						(as below)	Hole completed at 17:30 hours on 28 January 1983.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-228 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 3656' S. of Exploratory Shaft centerline, 5' from W rib

STATION S3656, E147 COLLAR ELEV. 1237.8' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N6030.7, E7041.2 DEPTH OF BOREHOLE 50.4'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/2/83

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0 – 5	3.0	58	—		0.0' - 7.3' **HALITE:** clear and medium gray (N5) halite, coarsely crystalline, moderately hard with numerous gray clay-filled hairline breaks. Slightly (<1%) argillaceous in part. Few (1%) polyhalitic blebs and interstitial layers from 5.9'-6.2'.	Coring began at 17:45 hours on 28 January 1983 Hole cored from 0' to 5.2' without inner tube in drill rod. From 5.2' to 50.4', hole cored using NX double tube core barrel.
2	5 – 10	5.3	100	—		7.3' - 9.4' **POLYHALITIC HALITE** clear and moderate reddish-orange (10R 6/6) halite, moderately hard, medium to coarsely crystalline, few grayish-pink (5R 8/2) anhydrite stringers. Polyhalite comprises up to 15% of rock.	
						9.4' - 10.2' **POLYHALITE:** pale reddish-brown (10R 5/4) to moderate reddish-orange (10R 6/6) polyhalite, microcrystalline, moderately hard, grades into underlying anhydrite.	
3	10 – 15	5.2	100	—		10.2' - 11.5' **ANHYDRITE:** (Marker Bed 139) light gray (N7) anhydrite, dense, hard, microcrystalline, banded medium dark gray (N4) in part, core broken into 1/8"-1/16" chips. At 11.5', medium gray (N5) clay seam, 1/4" thick, soft, moist.	
						11.5' - 14.4' **ARGILLACEOUS HALITE:** clear and medium light gray (N6) halite, finely to coarsely crystalline with 5-15% argillaceous material. Gray clay breaks at 11.7', 12.0', 12.4', 13.5', 13.8', 14.2', and 14.4'.	
4	15 – 20	5.3	100	—		14.4' - 19.4' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, moderately hard. Polyhalite comprises 10-15% of core and occurs as blebs or interstitial zones.	
						19.4' - 21.4' **ARGILLACEOUS HALITE:** clear and brownish-gray (5YR 4/1) halite, finely to coarsely crystalline, moderately hard, few clay breaks throughout. Clay content ranges from 0 to 5%. At 19.4', 1/2"-thick, very light gray (N8) anhydrite seam. At 19.5', medium gray (N5) clay parting, subhorizontal. Clay breaks at 20.7' and 21.3'.	
5	20 – 25	5.0	100	—		(see description on next sheet)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-228 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 3656' S of Exploratory Shaft centerline, 5' from W rib

STATION S3656, E147 COLLAR ELEV. 1237.8' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N6030.7, E7041.2 DEPTH OF BOREHOLE 50.4'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/2/83

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
5	25	5.0	100	–	X	21.4' – 25.7' **POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, moderately hard. Polyhalite content ranges from 0–10% and occurs as interstitial layers and scattered blebs.	
6	30	5.3	100	–	X	25.7' – 30.7' **HALITE:** argillaceous, clear and light gray (N7) halite, moderately hard, finely to coarsely crystalline. Clay content ranges from 2–5% with clay breaks at 27.7', 28.6', 29.5', 29.6', and 30.1'. Some (5%) interstitial polyhalite from 26.2' to 27.4' and at 28.8'.	
7	35	4.9	100	–	X	30.7' – 36.3' **HALITE:** polyhalitic, clear and moderate reddish-orange (10R 6/6) halite, moderately hard, coarsely crystalline, 0–3% polyhalite. At 35.5', light gray (N7) 1/2" horizontal anhydrite seam.	
8	40	5.2	100	–		36.3' – 36.5' **ANHYDRITE:** banded medium dark grey (N4) and very light gray (N8) anhydrite, hard, dense, microcrystalline.	
9	45	5.0	100	–		36.5' – 49.1' **ARGILLACEOUS HALITE:** clear and medium light gray (N6) to grayish-orange (10YR 7/4) halite, finely to coarsely crystalline, moderately hard. Clay content about 5–10%, and clay breaks at 37.7', 38.2', 42.1', 43.3', 44.0', 45.0', and 47.0'. Finely crystalline from 44.1'–46.4'.	
10	50	4.0	85	–		49.1' – 50.4' **HALITE:** clear halite, moderately hard, coarsely crystalline.	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DH-228 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 3656' S of Exploratory Shaft centerline, 5' from W rib

STATION S3656, E147 COLLAR ELEV. 1237.8' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N6030.7, E7041.2 DEPTH OF BOREHOLE 50.4'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/2/83 SHEET 3 OF 3

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
10	50	4.0	85	-		(as above)	Hole completed at 22:00 hours on 28 January 1983. Total depth = 50.4'.
	55						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NC CORE BORING NO. DH-301

LOCATION INTERSECTION N150, W170 DRIFTS - ROOF

STATION N150, W170 COLLAR ELEV. 1276.9 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N9830.5, E6724.5 DEPTH OF BOREHOLE 50.75'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 8-29-84 DATE COMPLETED 8-30-84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 8-31-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0						
1		2.0	2.0	100		0.0'-5.3' HALITE: Clear, mottled with blebs of moderate reddish orange polyhalite. Coarsely crystalline. ≤1% polyhalite. [1, 2]	NC double tube wireline core barrel. NC rods. Total drill time: 26 hrs ±.
	2.0						
2		5.0	5.0	100		5.3'-8.0' HALITE: Clear, some moderate brown (5YR 3/4, 4/4). Coarsely crystalline, ≤1% brown clay. [8, 17]	
	5					8.0'-8.9' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% polyhalite and gray clay. [9]	No gas. Dry hole.
	7.0					8.9'-9.15' ANHYDRITE b: Light gray (N7), microcrystalline, faintly laminated. Halite growths within. Trace of gray clay at 8.9'.	
3		5.0	5.0	100		9.15'-14.3' HALITE: Clear, some light moderate reddish orange (10R 6/6). Coarsely crystalline. Scattered anhydrite. [1]	
	10					14.3'-15.65' HALITE: Clear to light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1% dispersed polyhalite and gray clay, trace of brown clay. [9]	39% of core recovered was ≥2 inch length.
	12.0					15.65'-16.45' ANHYDRITE a: Light (N7) to medium light (N6), microcrystalline. Faintly laminated. Scattered halite growths, especially at 15.95'-16.45'. Trace of gray clay at 15.65'.	
4		4.6	4.6	100		16.45'-20.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. [7]	
	15						
	16.6					20.4'-25.7' HALITE: Clear to moderate brown and reddish orange (10R 4/6, 6/6). Medium to coarsely crystalline. <1% brown clay. ≤1/2% polyhalite except at 20.4'-21.9' where polyhalite is 1% to 2%. [17]. 3/4" hard grayish-brown clay seam at 25.65'. Trace of associated anhydrite.	
5		5.0	5.0	100			
	20					25.7'-29.4' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers.[1]	
	21.6					29.4'-32.1' HALITE: Clear, some moderate brown (5YR 4/4), coarsely crystalline, some fine to medium. ≤1% brown clay. [8, some 10]	
6		5.0	5.0	100			
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-301

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					32.1'–34.05' HALITE: Clear, coarsely crystalline. [1]	
26.6							
7		2.0	2.0	100		34.05'–39.2' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4, 4/4), medium to coarsely crystalline. <1% to 3% brown clay. Clear halite 36.0'–36.2'±. [10, 15]	
28.6							
8	30	3.7	3.7	100		39.2'–39.7' ANHYDRITE: Light (N7) to medium light (N6) gray anhydrite, laminated. Scattered halite growths. Trace of grayish-brown clay at 39.2'.	
32.3						39.7'–46.75' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline, locally some fine to medium, <1% to 3% polyhalite to 40.5', <1% polyhalite at 40.5'–41.95' and 42.85' to 44.85'. Trace brown clay at 44.6'± [2, 5].	
9	35	5.0	4.9	98		46.75'–47.55' HALITE: Clear to moderate brown, some moderate reddish orange (5YR 4/4, 6/6). Medium to coarsely crystalline. ≤1% brown clay. Parting at 47.55'. [17]	
37.3						47.55'–49.75' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline, <1% to 3% polyhalite. [3, 5, 7]	
10	40	4.45	4.45	100		49.75'–50.75' HALITE: Clear mottled with moderate brown (5YR 4/4), coarsely crystalline. ≤1% brown clay. [8, 10]	
41.75							
11		2.0	2.0	100			
43.75							
12	45	4.0	4.0	100			
47.75							
13	50	3.0	2.9	97			
50.75							

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER ____ - ____ HOLE TYPE/SIZE NC CORE BORING NO. DH-302

LOCATION INTERSECTION N150, W170 DRIFTS - FLOOR

STATION N150, W170 COLLAR ELEV. 1264.9 DIRECTION OF DRILLING VERTICAL ~~DOWN~~

MINE COORDINATES N9830.5, E6724.5 DEPTH OF BOREHOLE 50.6'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 8-30-84 DATE COMPLETED 8-30-84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 8-31-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
1	0	1.7	0.6	35.3		0.0'-2.8' HALITE: Clear, coarsely crystalline. <1/2% gray clay to 1.7'. <1/2% polyhalite from 1.7' to 2.8'. [1]	NC double tube core barrel. Set up time: 30 minutes. Total drill time: 6 hrs±. Run 1: Bit plugged. Core broken up badly.
1.7							
2						2.8'-7.3' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. [7]	
	5	4.9	4.8	97.9		7.3'-9.6' MB-139: Mixture of halite and anhydrite to 8.1'±. Light gray to light moderate reddish orange. Some "swallowtail" pattern. From 8.1', very light (N8) to medium light (N6) gray anhydrite with scattered halite growths. Faintly laminated. Trace of gray clay at 9.6'.	No gas. Dry hole.
6.6							
3						9.6'-12.9' HALITE: Clear to light moderate reddish orange (10R 6/6), medium to coarsely crystalline, some fine. <1% gray clay and dispersed polyhalite. [9]	82% of core recovered is ≥2 inch length.
	10	5.0	5.0	100		12.9'-17.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite [7]. Anhydrite/halite layer at 16.8'-17.0' with ≤1/4" gray clay @ 17'.	
11.6							
4						17.0'-19.3' HALITE: Clear, some moderate reddish orange (10R 6/6), medium to coarsely crystalline. <1% gray clay and dispersed polyhalite [9].	
	15	5.0	5.0	100		19.3'-25.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline to 23.5' then medium to coarse. <1% to 3% polyhalite locally up to 5%. ≤1% gray clay from 22.2'±. [5, 6, 7]	
16.6							
5						25.6'-29.6' HALITE: Clear, some light bluish gray, medium to coarsely crystalline. ≤1% gray clay. <1% polyhalite dispersed. [9, some 11]	
	20	5.0	5.0	100		29.6'-34.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite [3, 7]. Anhydrite layers up to 3/4" thick at 34.4'-34.6'.	
21.6							
6						34.6'-35.7' HALITE: Clear, some light moderate reddish orange, coarsely crystalline. ≤1% polyhalite. Scattered anhydrite. [2]	
	25	5.0	5.0	100			

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-302

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25				X X	35.7'-35.9' ANHYDRITE: Light (N7) to very light (N8) gray microcrystalline anhydrite. Scattered small halite growths. Trace of gray clay at 35.9'.	
26.6					X		
7					—	35.9'-43.3' HALITE: Clear, some moderate reddish orange (10R 6/6) and medium light gray (N6). Coarsely crystalline, some medium and fine. ≤1% dispersed polyhalite to 38.2', then <1/2% dispersed and blebs. ≤1% gray clay. Low angle gray clay parting at 43.3'. [9, some 11]	
					X		
	30	5.0	4.9	98	X X		
					X	43.3'-47.4' HALITE: Clear to moderate reddish orange (10R 6/6). Some moderate brown (5YR 4/4) from 44.8'-45.5'±. Medium to coarsely crystalline. <1% to 2% polyhalite. <1% gray clay except 1% to 2% brown clay at 44.8' to 45.5'.	
31.6					X X		
8					X X		
					X	47.4'-50.6' HALITE: Clear, coarsely crystalline. <1% gray clay. Trace of polyhalite blebs. [1, 11]	
	35	5.0	5.0	100	X X X		
36.6					X		
9					—		
					X		
	40	5.0	5.0	100	—		
41.6					X		
10					X		
					—		
	45	5.0	5.0	100	X		
					—		
46.6					X		
11					—		
	50	4.0	4.0	100	X		
50.6							

BORING NO. DH-302

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-303

LOCATION W170 DRIFT - ROOF

STATION S400, W170 COLLAR ELEV. 1267.2 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N9282.3, E6726.1 DEPTH OF BOREHOLE 51.4'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 9-4-84 DATE COMPLETED 9-4-84 SHEET

LOGGED BY: J. E. GALLERANI DATE: 9-4-84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0						
1		2.5	2.5	100		0.0'-5.45' HALITE: Clear, coarsely crystalline. <1/2% scattered polyhalite blebs. [1]	NC double tube wireline core barrel. NC rods.
2.5							
2	5	5.0	5.0	100		5.45'-8.6' HALITE: Clear with some moderate brown (5YR 4/4). Medium to coarsely crystalline. <1% brown clay [8]. Break at 6.75'. <1/2% dispersed polyhalite at 7.5'-8.6'. [17]	No gas. Dry hole.
						8.6'-8.8' ANHYDRITE b: Light to light medium gray (N7, N6). Microcrystalline with scattered halite growths. Trace of gray clay at 8.6'.	
7.5						8.8'-14.5' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. [1]	48% of recovered core is ≥2 inch length.
3	10	4.7	4.7	100		14.5'-15.75' HALITE: Clear with some light moderate reddish orange (10R 6/6), medium to coarsely crystalline. <1% dispersed polyhalite. <1% gray clay. [9]	
12.2						15.75'-16.45' ANHYDRITE a: Very light to light medium gray (N8, N6). Microcrystalline. Partially laminated, scattered halite growths. Trace of gray clay at 15.75'.	
4	15	5.0	5.0	100		16.45'-20.65' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3%, average 2% polyhalite. Scattered anhydrite. [2, 3, 5]	Run 4: Core broken last 6" of run.
17.2						20.65'-26.4' HALITE: Clear to light moderate reddish orange (10R 6/6), some medium brown (5YR 4/4). Medium to coarsely crystalline with some fine crystalline. <1/2% disparsed polyhalite. ≤1% brown clay. <1/2" hard, dry brown clay seam at 26.3' with anhydrite associated to 26.4'. [8, 17]	
5	20	4.8	4.8	100		26.4'-30.7' HALITE: Clear, coasrsely crystalline with scattered anhydrite. [1]	Run 5: Some broken core in polyhalitic halite.
22						30.7'-37.7' HALITE: Clear with some medium brown (5YR 3/4). Medium to coarsely crystalline with some fine. None to ≤1% brown clay with traces of gray. <1/2% polyhalite. [1, 8] with [12] at 30.7'-32.1'.	
6	25	5.0	5.0	100			

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-303

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					37.7'-39.5' ARGILLACEOUS HALITE: Clear to moderate brown 5YR 4/4, 3/4). Medium to coarsely crystalline with <1/2% dispersed polyhalite. <1% to 3% brown clay with a trace of gray clay. Brown break at 38.3'. [15, 17]	
27							
7	30	4.9	4.9	100		39.5'-40.15' ANHYDRITE: Very light to medium light gray (N8, N6). Scattered halite growths with irregular low angle laminae. ≤1/2" hard, dry brown clay at 39.5'.	
						40.15'-44.2' HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline with scattered white anhydrite. ≤1% polyhalite [2, 3] except at 41.3'-42.9' where there is >1% to 3% polyhalite. [7]	Run 8: isolated broken zones.
31.9							
8	35	5.0	5.0	100		44.2'-47.3' HALITE: Clear to moderate brown (5YR 4/4, 3/4). Coarsely crystalline with locally fine to medium crystalline. ≤ 1% brown clay with trace gray locally. Break at 47.2' with some thin anhydrite stringers at 47.2'-47.3'. [8, 10]	Run 9: Some broken core 39.5'-41.9 ft.
36.9						47.3'-49.6' HALITE: Clear, coarsely crystalline with < 1/2% polyhalite. Slight trace of very small brown clay blebs from 49'±.	
9	40	5.0	4.9	98		49.6'-51.4' ARGILLACEOUS HALITE: Clear to moderate brown ((5YR 3/4, 4/4). Coarsely crystalline with fine to medium crystalline from 51.3'. <1% to 3% brown clay, averaging 1% to 2%. Scattered clay breaks. [12, 15]	
41.9							
10	45	5.0	5.0	100			
46.9							
11	50	4.5	4.5	100			
51.4							

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER _____ HOLE TYPE/SIZE NC CORE BORING NO. DH-304

LOCATION S 400, W 170 DRIFT INTERSECTION - FLOOR

STATION S 400, W 170 COLLAR ELEV. 1254.3 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N 9282.5, E6726.1 DEPTH OF BOREHOLE 50.5'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 08/31/84 DATE COMPLETED 08/31/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 08/31/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
1	0	5.0	4.9	98		0.0'-4.0' HALITE: Clear to light moderate reddish orange (10R 6/6), coarsely crystalline. <1% gray clay. <1/2% dispersed polyhalite. [9]	NC double tube wireline core barrel. NC rods. Total drill time: 6 hrs± 81% of core recovered is ≥2 inch length.
						4.0'-6.1' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. [5, 7]	
5.0 2	5	1.9	1.9	100		6.1'-8.75' MB-139: Mixture of moderate reddish orange (10R 6/6) halite and anhydrite to 7.15'±. Then predominently light gray, microcrystalline anhydrite with scattered halite growths. Some near-horizontal lighter-darker gray laminae. Gray clay at 8.75'.	No gas. Dry hole.
6.9 3	10	5.0	5.0	100		8.75'-12.4' HALITE: Clear to light moderate reddish orange (10R 6/6), some light gray (N7). Medium to coarsely crystalline. <1/2% dispersed polyhalite. <1% gray clay. [9]	
						12.4'-16.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. Scattered anhydrite. <1% to 3% polyhalite. [5, 7] 1/4" gray clay seam at 16.5', dipping 40°±.	
11.9 4	15	5.0	5.0	100		16.5'-18.6' HALITE: Clear to light moderate reddish orange (10R 6/6), some light gray (N7). Medium to coarsely crystalline, some fine. <1% dispersed polyhalite and gray clay. [9]	
						18.6'-25.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. Scattered anhydrite. <1% to 3% polyhalite [3, 7]. <1% gray clay, some medium crystalline at 23.5'-25.5'.	
16.9 5	20	5.0	5.0	100		25.5'-29.05' HALITE: Clear, some light moderate reddish orange (10R 6/6) and light gray (N7). Medium to coarsely crystalline, some fine. <1/2% polyhalite and <1% gray clay. Scattered anhydrite. [9]	
						29.05'-34.7' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. Scattered anhydrite from 33.8'. [3, 5, 7]	
21.9 6	25	5.0	5.0	100		34.7'-35.15' ANHYDRITE: Very light gray (N8) to light gray (N7) anhydrite with scattered halite growths. Gray clay parting at 35.15'.	

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-304

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					35.15'-48.2' HALITE: Clear, some light moderate reddish orange (10R 6/6) and light medium bluish gray. Medium to coarsely crystalline, some fine to 37.7', then predominently coarse, <1/2% dispersed polyhalite. ≤1% gray clay. [9, 11]	
26.9							
7		5.0	5.0	100			
	30					48.2'-50.5' HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline, ≤1% polyhalite and gray clay. [2, 9]	
31.9							
8		5.1	5.1	100			
	35						
37.0							
9		5.0	5.0	100			
	40						
42.0							
10		4.8	4.8	100			
	45						
46.8							
11		3.7	3.7	100			
	50						
50.5							

BORING NO. DH-304

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-306

LOCATION S 400, E 140 DRIFT INTERSECTION - FLOOR

STATION S 400, E 140 COLLAR ELEV. 1244.1 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N9287.3 E7049.9 DEPTH OF BOREHOLE 52.0'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL CP-65

DATE STARTED 09/11/84 DATE COMPLETED 09/12/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 09/12/84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0								
	1		4.9	3.2	65		0.0'-1.9' HALITE: Some moderate reddish orange (10R 6/6). <1/2% gray clay and polyhalite. Recovery poor.	NW Split Tube Core Barrel. Total drill time: 13 hrs. Probed hole with "scratcher rod." Separation at 3.9' and 5' depth in hole.
							1.9'-2.9' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 2% polyhalite. [3, 4]	
4.9		5					2.9'-5.0'± MB-139: Mixture of some halite with anhydrite to 4'±. Then light gray to light medium gray (N7, N6) microcrystalline anhydrite. Scattered halite growths. Core moist from 4.6'±.	
	2		3.5	2.5	71		5.0'±-8.7' HALITE: Clear to moderate reddish orange (10R 6/6), some light gray (N7). Medium to coarsely crystalline, some fine. <1/2% dispersed polyhalite. <1% gray clay, some brown locally.	
8.4								
	3	10	2.2	2.2	100		8.7'-10.2' HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline, ≤1% polyhalite. [2, 3]	Water encountered in hole at 2' ± depth. Noted inflow of water at 5' depth. Water level rose to 4'± from surface immediately after completing each drill run to 20' depth. Flow of water decreased significantly by 9-12-84. Source of this water appears to be simply from water dumped in area by contractor and is not natural brine water.
10.6								
	4		5.0	4.2	84		10.2'-15.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline to 14'±, then medium to coarsely crystalline, some fine. <1% to 3% polyhalite. [3, 5, 7] <1/2% gray clay from 14'±.	
		15					15.6'-17.5' HALITE: Clear to lightly moderate reddish orange (10R 6/6). Coarsely crystalline. ≤1% polyhalite blebs. [2, 3] Grades into unit below.	
15.6								
	5		4.9	4.7	96		17.5'-20.7' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% polyhalite. [3, 5, 7]	
							20.7'-25.2' HALITE: Clear to light moderate reddish orange (10R 6/6). Coarsely crystalline with some medium. <1% dispersed polyhalite. <1% gray clay. Clear between 23.0' and 24.7'±. [1, 9]	
20.5		20						
	6		4.0	4.0	100		25.2'-30.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3%, average <2% polyhalite. [3, 5, 7]. Moderate reddish orange polyhalite/anhydrite at 30.2'-30.5'±.	
24.5		25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-306

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
7		5.0	5.0	100	X X X X X X X	30.6'-31.0' ANHYDRITE: Very light to light gray (N8, N7), microcrystalline. Scattered halite growths especially below 30.75'. No clay evident. 31.0'-39.7'± HALITE: Clear to lightly moderate reddish orange (10R 6/6). Coarsely crystalline, some medium. <1/2% dispersed polyhalite and gray clay. Anhydrite runs down to 31.5' within halite. [1, some 9, 11]	
29.5					X X		
8	30	5.0	4.6	92		39.7'-42.3' HALITE: Clear, some moderate brown (5YR 4/4). Coarsely crystalline. ≤1% brown clay. [8, 10] 42.3'-44.9' HALITE: Clear, coarsely crystalline. <1% light bluish gray clay.	Had problems with core recovery in some runs. Core spring not holding core probably due to water in the hole. Had to adjust spring.
34.5					X	44.9'-48.0' HALITE: Clear, coarsely crystalline. Slight trace of brownish clay to 45.5'±. [1]	
9	35	4.0	1.9	48	—	48.0'-49.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% polyhalite. Trace of anhydrite. [5]	35% of core recovered was ≥2 inch length.
38.5					X	49.6'-52.0' HALITE: Clear to lightly moderate reddish orange and some light bluish gray. Coarsely crystalline, some medium. <1/2% polyhalite dispersed and ≤1% bluish gray clay. [9]	
10	40	3.0	1.8	60	—		
41.5					—		
11		1.5	1.5	100	—		
43.0					—		
12	45	5.0	5.0	100	—		Note: Drilled hole DH-306A approximately 15' west of DH-306 to replace upper 8.5' of DH-306 and to check for brine here. DH-306A was a dry hole drilled to 8.5' depth.
48.0					X X X		
13	50	4.0	4.0	100	X —		
52.0							

BORING NO. DH-306

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-306A

LOCATION S 400 DRIFT - FLOOR

STATION S 400, E125 COLLAR ELEV. 1244.0 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N9287.9 E7034.6 DEPTH OF BOREHOLE 8.5

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL CP-65

DATE STARTED 09/12/84 DATE COMPLETED 09/12/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 09/12/84 1 OF 1

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		4.6	4.6	100		0.0'-0.7' HALITE: Clear to light moderate reddish orange (10R 6/6), coarsely crystalline. <1/2% dispersed polyhalite. [1, 2]	NC double tube wireline core barrel. NC rods.
						0.7'-2.1' POLYHALITIC HALITE: Clear to light moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite, average 2%. [3, 7]	No gas. Dry hole.
	4.6						
2		3.9	3.9	100		2.1'-5.45' MB-139: Very light to medium light (N8, N6) gray microcrystalline anhydrite to 3.9'. Some "swallowtail" pattern in upper 1'. From 3.9' is partially laminated anhydrite. 1 in. hard gray clay seam at lower contact. Contact dips 10°±. Slight moisture along contact.	
	8.5					5.45'-8.5' HALITE: Clear to light moderate reddish orange (10R 6/6), medium to coarsely crystalline, <1% dispersed polyhalite. ≤1% clay, predominently gray with some brown locally at 6.9'-7.5'±. [9]	This is replacement hole for upper 8.5' of DH-306.

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER GE-263 HOLE TYPE/SIZE NX CORE BORING NO. DH-307

LOCATION INTERSECTION OF E 300; S 400 DRIFTS - ROOF

STATION S 400, E 300 COLLAR ELEV. 1262.6 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N9286.7 E7194.2 DEPTH OF BOREHOLE 52.0'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 08/21/84 DATE COMPLETED 08/21/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 08/27/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1	4	5.0	1.3	26		0.0'-4.7'± (Core Loss) HALITE: Clear, coarsely crystalline. [1]	NW split tube core barrel. NW rods.
						4.7'-7.5' HALITE: Clear with some light moderate brown (5YR 4/4). Coarsely crystalline with fine to medium crystalline between 7'-7.5'± [9]. <1% brown clay with some gray clay at 7'-7.5'. [8]	No gas. Dry hole.
2	5.0	3.0	3.0	100		7.5'-7.7' ANHYDRITE b: Very light to light gray (N8, N7). Microcrystalline with scattered halite. Gray clay at 7.5'.	Overall core quality not too good. Box #2 is good. Most other boxes show much discing. 21% of core recovered is ≥2 inch length.
	8.0					7.7'-12.95' HALITE: Clear, coarsely crystalline with scattered anhydrite. <1/2% gray clay locally. [1]	
3	9.0	1.0	1.0	100		12.95'-14.05' HALITE: Clear to lightly moderate reddish orange (10R 6/6) and light medium brown (5YR 4/4). Medium to coarsely crystalline. <1/2% dispersed polyhalite and <1% brown, gray clay. [9, 17]	
4	10	2.5	1.1	44			
	11.5					14.05'-15.0' ANHYDRITE a: Light to very light gray (N7, N8), microcrystalline anhydrite with scattered irregular laminae in light to darker gray. Halite growths common at 14.5'-15.0'. Trace of clay at 14.05'.	
5	15	5.0	5.0	100		15.0'-19.3' POLYHALITIC HALITE: Clear to moderate reddish orange, coarsely crystalline, <1% to 3% polyhalite, averaging <2%. Scattered anhydrite.	
	16.5					19.3'-24.7' HALITE: Clear to moderate brown (5YR 3/4, 4/4) with light moderately reddish orange (10R 6/6). Medium to coarsely crystalline with some fine crystalline. <1/2% dispersed polyhalite. ≤1% brown clay with trace of gray locally. At 24.5'-24.7' hard, grayish brown clay associated with anhydrite. Core broken up here. [9, 17]	
6	20	5.0	5.0	100			
	21.5					24.7'-27.1' HALITE: Clear, coarsely crystalline with scattered anhydrite stringers. [1]	
7	25	5.0	5.0	100		27.1'-30.0'± HALITE: Clear to medium brown (5YR 4/4). Coarsely crystalline, ≤2% brown clay to 27.9'± then <1%. [8, 10]	

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-307

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
		25					30.0'-32.7' HALITE: Clear, coarsely crystalline. [1] (much discing)	
26.5								
	8	30	5.0	5.0	100		32.7'-37.75'± HALITE: Clear to medium brown (5YR 4/4, 3/4) with some light moderate reddish orange (10R 6/6). Medium to coarsely crystalline with some fina. Average ≤1% brown clay to 36.7'±, then gray. Argillaceous halite with 1% to 3% brown clay from 35'-36.8'±. [9, 12, 17]	
31.5							37.75'-38.5' ANHYDRITE: Light to very light gray (N7, N8). Microcrystalline with scattered halite growths. Up to 1" of hard brown clay at 37.75'.	
	9	35	4.5	4.5	100		38.5'-40.1'± POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% polyhalite with some anhydrite [4, 5]. Much discing.	
36.0							40.1'-42.0'± HALITE: Clear, coarsely crystalline with <1% moderate reddish orange polyhalite blebs. Much discing. [1, 2]	
	10		2.5	2.5	100		42.0'-45.5'± POLYHALITIC HALITE: Clear, mottled with some moderate reddish orange (10R 6/6). Coarsely crystalline with some localized medium and fine crystelline. <1% to 3% polyalite blebs/patches. <1/2% gray clay locally. Brown clay parting at 44.5'± with some anhydrite above. [2, 3, 5]	
38.5								
	11	40	4.9	4.9	100		45.5'-47.7' HALITE: Clear with some light to moderate brown (5YR 4/4). Coarsely crystalline. <1% brown clay. [8]	
43.4							47.7'-51.7' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4, 3/4). Medium to coarsely crystalline. <1% to 3% brown clay with scattered breaks and <1/2% dispersed polyhalite. [15, 17]	
	12	45	4.8	4.8	100		51.7'-52.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. 1% to 3% polyhalite. [5]	
48.2								
	13	50	3.8	3.8	100			
52.0								

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER GE-265 HOLE TYPE/SIZE NX CORE BORING NO. DH-309

LOCATION INTERSECTION OF E 300, S 700 DRIFTS - ROOF

STATION S 700, E 220 COLLAR ELEV. 1259.8 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N 8987.1, E7123.0 DEPTH OF BOREHOLE 52.3'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 08/23/84 DATE COMPLETED 08/23/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 08/28/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1	4.0	4.0	3.4	85		0.0'-2.5' HALITE: Clear to light, moderately reddish orange (10R 6/6). Coarsely crystalline with some medium crystalline. <1/2% dispersed polyhalite. [1]	NW split tube core barrel. NW rods.
						2.5'-8.95' HALITE: Clear to moderate brown (5YR 4/4) with some moderate reddish orange (10R 6/6). Coarsely crystalline with some medium crystalline. ≤1% brown clay. <1/2% polyhalite dispersed. [8, 17]	18% of recovered core is ≥2 inch length. Overall core quality is poor.
2	6.5	2.5	2.5	100		8.95'-9.1' ANHYDRITE b: Light to medium light gray (N7, N6). Microcrystalline with halite growths common between 9.0'-9.1'. Trace of gray clay at 8.95'.	
3	11.5	5.0	5.0	100		9.1'-14.7' HALITE: Clear, coarsely crystalline with scattered anhydrite. [1]	
						14.7'-15.75' HALITE: Cleer to moderate brown (5YR 4/4). Medium with some coarse crystalline. ≤1% brown clay with a trace of gray. <1/2% dispersed polyhalite. Break at 15.05'±.	
						15.75'-16.35' ANHYDRITE a: Light to medium light gray (N7, N6), with scattered laminae. Scattered halite growths. Trace of gray clay at 15.75'.	
4	16.0	4.5	4.4	98		16.35'-20.7' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% (average ≤1%) polyhalite. Core broken up, disced. [3, 4]	Runs 4 to 11: Shows much discing between 12' and 45'±.
5	21.0	5.0	5.0	100		20.7'-25.5' HALITE: Clear to light moderate brown (5YR 4/4) with some light moderately reddish orange (10R 6/6). Medium to coarsely crystalline with some fine. ≤1% brown clay. <1/2% dispersed polyhalite. 3/4" brown clay seam at 25.45' with some anhydrite stringers above. [8, 10, 17]	Accurate logging was difficult where core was badly disced.
						25.5'-28.8' HALITE: Clear, coarsely crystalline with scattered anhydrite. [1]	
6		5.0	5.0	100		28.8'-35.7' HALITE: Clear, some moderate brown (5YR 4/4). Coarsely crystalline with locally medium crystalline. ≤1% brown clay. Clear 32.1'-33'±. [1, 8, locally 10]	

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-309

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
26.0		25				X —	35.7'–39.1' HALITE: Clear to moderate brown (5YR 4/4, 3/4). Medium to coarsely crystalline. ≤1% brown clay locally argillaceous where 1% to 3% clay at 35.7'–37.3'±.	
	7		5.0	4.5	90	—	39.1'–39.65' ANHYDRITE: Very light to light gray (N8, N7). Microcrystalline with scattered halite growths and light to dark laminae. Brown hard clay seam at 39.1'.	* Six gas flows were encountered during drilling at the following depths: 15.6', 20.6', 25.0', 25.6', 31.9' and 39.1'. Gas flows varied in duration from about 10 seconds to 5 minutes and smelled sweet. Dry hole.
31.0		30				—	39.65'–44.4' HALITE: Clear with some lightly moderate reddish orange (10R 6/6). Coarsely crystalline. <1/2% polyhalite. [1]	
	8		5.0	3.2	64	—	44.4'–47.0' HALITE: Clear with some moderate brown (5YR 4/4). Coarsely crystalline ≤1% brown clay. Breaks at 45.4'–45.5'±. [8, some 10]	
36.0		35				— —	47.0'–48.4' HALITE: Clear to lightly moderate reddish orange (10R 6/6) with some moderate brown (5YR 4/4). Medium to coarsely crystalline. ≤1% brown clay. <1/2% dispersed polyhalite [17] Irregular break at 47.9'.	
37.1	9		1.1	1.1	100	— —		
	10		3.6	3.6	100	—	48.4'–50.5' HALITE: Clear, mottled with some light moderate brown. Coarsely crystalline. <1% brown clay. [8]	
40.7		40				X	50.5'–52.3' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4, 3/4). Coarse with some medium crystalline. <1% to 3% brown clay. >5% brown clay between 51.6' and 51.85'±. [10, 15]	
	11		3.4	2.8	82	X		
44.1		45				—		
	12		4.9	4.3	88	X —		
49.0		50				—		
	13		3.3	3.3	100	— —		
52.3								

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER GE-264 HOLE TYPE/SIZE NX CORE BORING NO. DH-311

LOCATION E 300 DRIFT - ROOF

STATION E 300; S 1000 COLLAR ELEV. 1264.4 DIRECTION OF DRILLING VERTICAL DP

MINE COORDINATES N 8686.3, E7194.9 DEPTH OF BOREHOLE 52.0'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 08/24/84 DATE COMPLETED 08/24/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 08/27/84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0						
	1		1.6	1.6	100	—	0.0'-2.5' HALITE: Clear, coarsely crystalline. <1/2% gray clay. [1]	NW split tube core barrel. NW rods.
1.6						—		
	2		4.1	3.0	73	—	2.5'-8.4' HALITE: Clear to moderate brown (5YR 4/4), coarsely crystalline. <1% to 2% brown clay. Becomes medium crystalline at 7.7'-8.4' with trace of polyhalite dispersed. [8, 10]	No gas. Dry hole.
5.7		5				—	8.4'-8.8' ANHYDRITE b: Very light gray (N8) to medium light gray (N6). Microcrystalline with scattered halite growths especially last 0.2'. Trace gray clay at 8.4'.	
	3		3.1	3.1	100	—	8.8'-14.1' HALITE: Clear and coersely crystalline with scattered white anhydrite/magnesite. [1]	Overall core is poor quality. Much discing in halite. Only 8% of recovered core is ≥2 inch length.
8.8						X		
	4	10	2.2	1.6	73		14.1'-15.1' HALITE: Cleer to moderate brown and moderate yellowish brown (10YR 5/4).. Medium crystalline. <1% brown with a trace of gray clay. <1/2% dispersed polyhalite. [17]	
11.0								
	5		4.8	4.2	88		15.1'-15.8' ANHYDRITE a: Very light to medium light gray (N8, N6). Microcrystalline anhydrite, partially laminated. More halite pinkish color between 15.4'-15.8'. Trace of gray clay at 15.1'.	
		15				— X	15.8'-19.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. <1/2% gray clay locally. Traces of anhydrite locally. [3, 5, 7]	
15.8								
	6		2.3	2.3	100	X X X —	19.5'-25.4' HALITE: Clear to moderate brown (5YR 3/4, 4/4) and light moderate reddish orange. Medium to coarsely crystalline with some fine. <1/2% dispersed polyhalite. ≤1% brown clay with trace of gray locally. Gray clay seam at 25.2'. Anhydrite laminae mixed with halite to 25.4'. [10, 17] - some [8]	
18.1								
18.4	7		.3	.3	100	X X X		
	8	20	3.1	3.1	100	— X	25.4'-29.7' HALITE: Clear, coarsely crystalline. [1]	
21.5								
	9		5.0	5.0	100	— X —	29.7'-31.5' HALITE: Clear with some moderately brown (5YR 3/4). Coarsely crystalline with some medium to fine. <1% brown clay except at 30.2'-30.6'± where ≤2% brown clay. Break at 30.6'. [8, 17]	
		25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-311

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					31.5'-33.8' HALITE: Clear, coarsely crystalline with <1% brown clay. [1, 8]	
26.5							
10	30	5.0	5.0	100		33.8'-38.65' ARGILLACEOUS HALITE: Clear to moderately brown (5YR 3/4). Coarsely crystalline with scattered medium. <1% to 2%, locally 3% brown clay. [10, 15]	
31.5						38.65'-39.3' ANHYDRITE: Very light to light gray (N8, N7), microcrystalline. Scattered lighter to darker gray laminae and scattered halite growths. 1" brown hard clay seam at 38.65'.	
11	35	5.0	5.0	100		39.3'-43.7' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite with scattered anhydrite. [3, 5]	
						43.7'-48.6'± HALITE: Clear to light moderate brown and some moderate reddish orange (10R 6/6). Coarsely crystalline. ≤1% brown clay. <1% polyhalite. [10] <1% to 2% polyhalite blebs at 46.7'-47.7'. No clay. [3]	
36.5							
12		2.8	2.8	100		48.6'-51.2' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4, 4/4). Medium to coarsely crystalline. <1% to 3% brown clay. [10, 15]	
39.3						51.2'-52.0' HALITE: Clear to moderate brown (5YR 3/4, 4/4), fine to medium crystalline. <1% to 2% brown clay. Trace of dispersed polyhalite. [12]	
13	40	2.8	2.8	100			
42.1							
14	45	5.0	4.0	80			
47.1							
15	50	4.9	4.5	92			
52.0							

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NW CORE BORING NO. DH-313

LOCATION INTERSECTION OF E 300; S 1300 DRIFTS - ROOF

STATION S 1300, E 300 COLLAR ELEV. 1270.6 DIRECTION OF DRILLING VERTICAL DP

MINE COORDINATES N 8385.9, E 7190.6 DEPTH OF BOREHOLE 19.6'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 07/09/84 DATE COMPLETED 07/10/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 07/10/84 1 OF 1

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		5.0	3.7	74		0.0'-7.9' (±0.6') HALITE: Clear and coarsely crystalline. <1/2% gray clay and polyhalite locally. From 6.5' (±0.6') ≤1% clay with some medium crystalline.	NW split tube core barrel and rods with diamond stepped bit.
						7.9'-8.1' ANHYDRITE b: Light gray (N7), microcrystalline. Halite growths with a trace of clay at lower contacts.	No gas. Dry hole.
	5.0					8.1'-13.1' HALITE: Clear, coarsely crystalline.	
2		5.0	3.8	76		13.1'-14.0' HALITE: Clear, fine to medium crystalline with some coarsely crystalline. <1/2% light gray clay.	
						14.0'-14.85' ANHYDRITE a: Light gray (N7), microcrystalline with scattered halite growths. Trace of clay at 14.0'.	
	10.0						
3		2.1	2.0	95		14.85'-19.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% polyhalite.	
	12.1					Stopped hole at 19.6 ft due to core loss and poor core quality. Refer to log for replacement hole DH-313A.	
4		3.2	3.2	100			
	15.3						
5		4.3	3.3	77			14% of core recovered was ≥2 inch length.
	19.6						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NW CORE BORING NO. DH-313A

LOCATION INTERSECTION OF E 300; S 1300 DRIFTS - ROOF

STATION S 1300, E 299 COLLAR ELEV. 1270.9 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N 8386.6, E 7189.5 DEPTH OF BOREHOLE 50.2'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL CP-65

DATE STARTED 07/10/84 DATE COMPLETED 07/12/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 07/12/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		1.8	1.8	100		0.0'-5.2' HALITE: Clear, coarsely crystalline with some fine to medium crystalline locally. <1/2% polyhalite blebs and gray clay. [1, 11]	NW split tube core barrel. NW rods.
	1.8						
2		1.6	1.6	100		5.2'-7.9' HALITE: Clear to moderate brown (5YR 4/4). Medium to coersely crystalline <1% to 2% brown clay to 7.3', then <1% gray clay. [8, 10, 12]	
	3.4						
3	5	2.1	2.1	100		7.9'-8.05' ANHYDRITE b: Light gray microcrystalline. Trace of gray clay at 7.9'.	Total drill time: 12 hrs. Total down time: 5 hrs.
	5.5						
4		3.0	3.0	100		8.05'-13.3' HALITE: Clear and coarsely crystalline. <1/2% polyhalite with scattered white stringers of anhydrite/magnesite. [1]	No gas. Dry hole.
	8.5						
5	10	2.4	1.9	79		13.3'-14.0' HALITE: Clear with medium to coarsely crystalline. <1/2% gray clay. Gray break at 13.3'.	Down time due to power outage.
	10.9					14.0'-15.0' ANHYDRITE a: Light gray microcrystalline anhydrite. Partially laminated. Halite growths increasing in percent from 14.4'. Trace of gray clay at 14.0'.	
6		1.6	1.6	100			
	12.5					15.0'-19.0' POLYHALITIC HALITE: Clear to moderately reddish orange. Coarsely crystalline. <1% to 3% polyhalite. Scattered anhydrite mixed with halite to 15.65'-15.85'. [3, 4]	Broken core, discing between 8.5' and 30.0'.
7	15	3.35	3.0	90			
	15.85					19.0'-24.5' HALITE: Clear to moderate brown (5YR 4/4). Medium to coarsely crystalline. ≤1% brown clay. <1/2% dispersed polyhalite. Clear halite at 21.9' to 22.35'±. [8, 17]	22% of total core recovered was ≥2 inch length.
8		2.15	1.9	88			
	18.0					24.5'-27.3' HALITE: Clear and coarsely crystalline with scattered anhydrite. [1]	
9	20	2.85	2.85	100		27.3'-32.35' HALITE: Clear with some moderate brown (5YR 4/4). Coarsely crystalline except fine to medium crystalline between 29.2'-30.3'. <1% brown clay except 29.2'-30.3' where clay is ≤1%. [1, 8, 10] Greditional upper contact.	
	20.85						
10		2.65	2.65	100			
	23.5						
11	25	2.35	1.7	72			

BORING NO. DH-313A

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-313A

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
25.85						32.35'-37.5' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4). Medium to coarsely crystalline with some fine. <1% to 2% brown clay with trace of gray clay <1/2% dispersed polyhalite. [10, 15]	
	12	2.65	2.1	79			
28.5						37.5'-38.2' ANHYDRITE: Light to medium gray, micro-crystalline anhydrite. Scattered halite growths especially common to 37.9'. 1/2" brown clay seam at 37.5'.	
	13	2.35	1.75	74			
	30						
30.85						38.2'-42.25' HALITE: Clear to light moderate reddish orange. Coarsely crystalline. ≤1% polyhalite with scattered anhydrite to 39.2'±. [2, 3]	
	14	2.65	2.65	100			
						42.25'-45.7' HALITE: Clear to moderate brown (5YR 4/4). Coarsely crystalline. ≤1% brown clay with ≤2% between 45.25'-45.7'±. [10]	
33.5							
	15	2.35	2.35	100		45.7'-47.15' HALITE: Clear coarsely crystalline 0% to 1/2% brown clay. [1, 8]	
	35						
35.85						47.15'-48.7' HALITE: Clear and coarsely crystalline with some medium. <1% brown clay. [10, 17]	
	16	2.65	2.65	100			
38.5						48.7'-50.2' HALITE: Clear to moderate reddish orange (10R 6/6) and moderate brown (5YR 4/4). Medium to coarsely crystalline with some fine. <1/2% dispersed polyhalite. <1% to 2% locally brown clay. [12, 17]	
	17	2.35	2.35	100			
	40						
40.85							
	18	2.65	2.65	100			
43.5							
	19	2.35	2.1	89			
	45						
45.85							
	20	2.65	2.65	100			
48.5							
	21	1.7	1.7	100			
	50						
50.2							

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NW CORE BORING NO. DH-314

LOCATION INTERSECTION OF S 1300, E 300 DRIFTS - FLOOR

STATION S1300, E 300 COLLAR ELEV. 1258.3 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N 8386.5, E 7189.5 DEPTH OF BOREHOLE 50.75'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 07/12/84 DATE COMPLETED 07/13/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 07/13/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1	0	3.75	3.1	83		0.0'-1.5' HALITE: Clear, some moderate reddish orange (10R 6/6). Coarsely crystalline. <1/2% polyhalite. [1, 2]	NW split tube core barrel with NW rods.
	3.75					1.5'-4.55' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% polyhalite. <1/2% gray clay locally. [3, 6, 7]	
2	5	2.0	2.0	100		4.55'-7.6' MB-139: "Swallowtail" pattern to 5.45'±. Mixture of halite and anhydrite. Moderate reddish orange (10R 6/6) to light gray color. Then light to medium gray anhydrite with scattered halite growths. Scattered laminae. Trace of gray clay at 7.6'. Some grinding evident.	Total drill time: 7 hrs.
	5.75						No gas. Dry hole.
3		4.95	4.95	100		7.6'-10.3' HALITE: Clear to light moderate reddish orange (10R 6/6), some light gray (N7). Fine to medium crystalline with some coarse. <1% dispersed polyhalite. <1/2% gray clay. [9]	Core quality good.
	10						
	10.7					10.3'-11.8' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), some moderate brown (5YR 4/4). Coarsely crystalline. <1% to 3% polyhalite. <1% brown clay. [some 17]	
4		5.1	5.1	100		11.8'-16.1' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. Anhydrite mixed with halite at 15.8'-16.1'. [7]	
	15						
	15.8					16.1'-18.2' HALITE: Clear to lightly moderate reddish orange (10R 6/6). Medium to coarsely crystalline, some fine. ≤1% brown and gray clay. <1% dispersed polyhalite. [9, 17]	46% of core recovered was ≥2 inch length.
5		5.1	5.1	100		18.2'-22.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. [7]	
	20						
	20.9					22.5'-28.3' HALITE: Clear to lightly moderate reddish orange (10R 6/6), some light gray. Fine to coarsely crystalline, ≤1% dispersed polyhalite and gray clay. Some scattered anhydrite. [9]	
6		5.1	5.1	100			
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-314

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
26.0						28.3'-33.2' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% polyhalite, generally dispersed. Moderate reddish orange (10R 6/6) anhydrite mixed with halite at 32.85'-33.05'. [7]	
						33.2'-33.65' ANHYDRITE: Very light to light gray (N8, N7). Microcrystalline anhydrite. Scattered halite growths throughout. No clay.	
	30					33.65'-39.25' HALITE: Clear medium to coarsely crystalline. <1% gray clay. [9, 11]	
31.0						39.25'-41.15' HALITE: Clear, some lightly moderate reddish orange (10R 6/6). Coarsely crystalline with some fine to medium. <1% gray clay and dispersed polyhalite.	
						41.15'-43.45' HALITE: Clear, some lightly moderate reddish orange (10R 6/6). Medium to coarsely crystalline, some fine. ≤1% brown clay and 1/2% dispersed polyhalite.[17]	
36.0						43.45'-48.25' HALITE: Clear, coarsely crystalline with some medium. <1% gray clay. Trace of polyhalite locally.[11]	
						48.25'-50.75' HALITE: Clear, coarsely crystalline. <1/2% polyhalite. Gray clay break at 50.25'.[1]	
40.85	40						
45.95	45						
50.75	50						
7		5.0	5.0	100			
8		5.0	4.9	98			
9		4.85	4.7	97			
10		5.1	5.1	100			
11		4.8	4.8	100			

BORING NO. DH-314

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-315

LOCATION INTERSECTION OF W 170, S 1300 DRIFTS - ROOF

STATION S 1300, W 170 COLLAR ELEV. 1272.1 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N 8387.3, E 6725.5 DEPTH OF BOREHOLE 50.3'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 09/05/84 DATE COMPLETED 09/06/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 09/06/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1	0	1.5	1.1	73		0.0'-7.0' HALITE: Clear, coarsely crystalline with some medium. <1/2% polyhalite. <1/2% gray clay locally. [1]	NC double tube wireline core barrel with NC rods. Run 1: Broken core.
	1.5						
2		5.0	4.5	90		7.0'-8.4' HALITE: Clear, some moderate brown (5YR 4/4) and light moderate reddish orange. Medium to coarsely crystalline. <1/2% dispersed polyhalite. <1% brown clay to 7.7'±, then gray. [9, 17]	Run 2: Broken zones within run.
	5					8.4'-8.6' ANHYDRITE b: Very light to medium light gray (N8, N6) microcrystalline anhydrite. Scattered halite within. Hard, dry, gray clay at 8.4'	No gas. Dry hole.
	6.5						
3		5.0	5.0	100		8.6'-14.3' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. [1]	
	10					14.3'-15.1' HALITE: Clear to lightly moderate brown (5YR 4/4), some lightly moderate reddish orange (10R 6/6). Fine to medium crystalline. <1/2% dispersed polyhalite. <1% brown clay.	
	11.5					15.1'-15.95' ANHYDRITE a: Very light to medium light gray (N8, N6), microcrystalline. Partially laminated. Scattered halite growths especially from 15.5'±. <1/4" gray clay at 15.1'.	
4		5.0	5.0	100		15.95'-20.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% polyhalite, average <1% to 2%. [2, 4, 7]	
	15						
	16.5					20.0'-25.1' HALITE: Clear to light moderate reddish orange (10R 6/6), some moderate brown (5YR 4/4). Medium to coarsely crystalline, some fine. ≤1% brown clay. <1/2% dispersed polyhalite. Some scattered breaks. [8, 17] <1/4" hard, dry, brown clay at 25.0' with associated anhydrite stringers to 25.1'	39% of recovered core was ≥2 inch length.
5		5.0	5.0	100		25.1'-29.8' HALITE: Clear, coarsely crystalline. Scattered anhydrite stringers.[1]	
	20						
	21.5					29.8'-31.5' ARGILLACEOUS HALITE: Clear to medium brown (5YR 4/4), fine to medium crystalline, some coarse. <1% to 3% brown clay.[12]	
6		4.8	4.8	100			
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-315

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					31.5'-34.7' HALITE: Clear, some moderate brown (5YR 4/4). Coarsely crystalline, <1% brown clay. [1, 8]	
26.3							
7	30	5.0	5.0	100		34.7'-39.0' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4, 3/4), some light moderate reddish orange (10R 6/6). Fine to medium crystalline, some coarse. <1% to 3% brown clay. <1/2% dispersed polyhalite locally. Scattered breaks. [12, 15]	
31.3						39.0'-39.45' ANHYDRITE: Very light gray to light medium gray (N8, N6). Microcrystalline, faintly laminated. Scattered small halite growths. 1/2" hard, dry, brown clay seam at 39.0'.	
8	35	4.8	4.8	100		39.45'-40.6' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% polyhalite. [2, 7]	
36.1						40.6'-43.7' HALITE: Clear, coarsely crystalline. Locally <1/2% polyhalite. Very clear to 41.6'±. [1]	
9	40	5.0	5.0	100		43.7'-49.1' HALITE: Clear to moderate brown (5YR 4/4), scattered lightly moderate reddish orange (10R 6/6). Coarsely crystalline, some medium. Generally <1% brown clay with zones 1% to 3%. Break at 44.0'±; parting at 44.15±. Predominantly brown clay mixed with halite at 45.8'-46.0'±. Broken up here. [1, 8, 10, locally 12]. Trace of polyhalite.	Run 9: Broken between 40.0'-41.1'. Scattered broken zones throughout.
41.1							
10	45	4.9	4.9	100		49.1'-50.3' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4). Medium to coarsely crystalline. <1% to 5% brown clay. Break at 50.3' [15]	
46.0							
11	50	4.3	4.3	100			
50.3							

BORING NO. DH-315

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-316

LOCATION INTERSECTION S 1300, W 170 DRIFTS - FLOOR

STATION S 1300, W 170 COLLAR ELEV. 1259.9 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N 8387.2, E6725.3 DEPTH OF BOREHOLE 50.1'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 09/06/84 DATE COMPLETED 09/06/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 09/06/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		1.6	1.6	100		0.0'-1.7' HALITE: Clear with some moderate reddish orange. (10R 6/6) Coarsely crystalline. <1/2% polyhalite and gray clay locally. [1, 2]	NC double tube wireline core barrel. NC rods. Total drill time: 7 hrs.
	1.6						
2		4.9	4.9	100		1.7'-5.0' POLYHALITIC HALITE: Clear to moderate reddish orange. (10R 6/6) Coarsely crystalline. <1% to 3% polyhalite with scattered anhydrite. [3, 7]	
	5					5.0'-7.65' MB-139: Mixture of very light to light medium gray anhydrite and moderate reddish orange halite (10R 6/6) to 6.25'±. Then predominently light gray and moderate reddish orange anhydrite mixed with some halite. Low angle irregular layering and laminae throughout. Dry hard gray clay at 7.65'.	No gas. Dry hole.
	6.5						
3		5.0	5.0	100		7.65'-11.85' HALITE: Clear to lightly moderate reddish orange (10R 6/6). Medium to coarsely crystalline with some fine. <1/2% polyhalite dispersed and gray clay except locally at 9.2'-10.7' whare polyhalite is 1% to 2%. [9]	
	10						
	11.5					11.85'-24.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline with some medium crystalline locally. Scattered anhydrite. <1% to 3% polyhalite, locally up to 5%. <1% gray clay below 15.8'. [3, 5, 7]	
4		5.0	5.0	100		24.0'-25.2' HALITE: Clear to moderate reddish brown (10R 6/6). Coarsely crystalline. ≤1% polyhalite and brown clay with a trace of gray.	79% of core recovered was ≥ 2 inch length.
	15						
	16.5					25.2'-26.95' HALITE: Clear with some moderate brown (5YR 4/4). Fine to medium, some coarsely crystalline. <1% brown clay. Breaks at 25.2' and 25.25', parting at 25.55'±. [8, 10]	
5		5.0	5.0	100		26.95'-33.05' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3%polyhalite with scattered anhydrite. 1"± irregular anhydrite layer at 33'±.	
	20						
	21.5					33.05'-34.0' HALITE: Clear coarsely crystalline Scattered white anhydrite stringers. [1]	
6		5.0	5.0	100			
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-316

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	%RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					34.0'-34.4' ANHYDRITE: Very light to light medium gray microcrystalline anhydrite. Scattered halite growths and pods, especially below 34.2'±. <1/4" gray clay at 34.4'.	
26.5							
7	30	5.0	5.0	100		34.4'-39.1' HALITE: Clear to light moderate reddish orange (10R 6/6). Medium to coarsely crystalline with some fine. <1/2% dispersed polyhalite and gray clay. [1, 9]	
31.5						39.1'-46.1' HALITE: Clear to moderate brown (5YR 4/4) with some lightly moderate reddish orange. Medium to coarsely crystalline. <1% brown clay. <1/2% polyhalite. [8, 10, 17]	
8	35	5.0	5.0	100		46.1'-47.5' HALITE: Clear with some light bluish gray. Coarsely crystalline, some medium. <1/2% gray clay. <1/2% scattered polyhalite blebs.	
						47.5'-49.7' HALITE: Clear, coarsely crystalline. <1/2% polyhalite blebs. [1]	
36.5						49.7'-50.1' POLYHALITIC HALITE: Clear to moderate reddish-orange. Coarsely crystalline. <1% to 3% polyhalite.[7]	
9	40	5.0	5.0	100			Run 9: First 2' of run contained locally broken zones.
41.5							
10	45	5.0	5.0	100			
46.5							
11		3.6	3.6	100			
50.1	50						

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-317

LOCATION INTERSECTION OF S 1600, W 30 DRIFTS - ROOF

STATION S 1600, W 33 COLLAR ELEV. 1271.3 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N 8077.4, E 6875.9 DEPTH OF BOREHOLE 50.1'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 07/05/84 DATE COMPLETED 07/06/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 07/06/84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0						
	1		4.8	3.2	66	X —	0.0'-7.3' HALITE: Clear, coarsely crystalline to 5.0', then medium to coarsely crystalline. <1/2% polyhalite and gray clay locally. [1, 11]	NW split tube core barrel and NW rods. Total drill time: 11 hrs. Runs 1, 6, 7, 8, 10 and 11 contain broken zones.
							7.3'-8.4' HALITE: Clear to moderate reddish orange (10R 6/6), some medium brown (5YR 4/4). Medium to coarsely crystalline. <1% brown/gray clay and polyhalite [17]	
4.8		5						
	2		5.0	5.0	100	X — — X	8.4'-8.7' ANHYDRITE b: Very light to medium light gray (N8, N6). Microcrystalline anhydrite. Scattered halite growths. Trace of gray clay at 8.4'	No gas. Dry hole.
							8.7'-11.8' (±0.15') HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. [1]	
9.8		10						
	3		1.0	1.0	100		11.8'-12.65' HALITE: Clear, some medium brown (5YR 3/4) and moderate reddish orange (10R 6/6). Medium crystalline, some coarse. <1% brown to gray clay. <1% polyhalite. [9, 17]	
10.8								
	4		5.0	4.7	94	X — X	12.65'-13.15' ANHYDRITE a: Light gray to medium light gray (N7, N6). Microcrystalline. Scattered halite growths, trace of clay at 12.65'.	Runs 4 and 5 contain discing.
							13.15'-19.2' HALITE: Clear, trace of medium reddish orange (10R 6/6). Coarsely crystalline. <1/2% polyhelite. [1, 2]	
		15						
15.8							19.2'-22.9' (±0.5') HALITE: Clear, some moderate brown (5YR 4/4) to moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1% dispersed polyhalite and brown clay. [17]	18% of core recovered was ≥2 inch length.
	5		5.0	5.0	100	X	22.9'-28.6' (±0.6') HALITE: Clear, coersely crystalline. [1] <1/8" brown clay seam at 24.7' ±0.45'. 3/4" anhydrite at 24.75±.	
		20						
20.8						X —	28.6'±-30.6'± HALITE: Clear to moderate brown (5YR 4/4). Medium to coarsely crystalline. <1% to 2% brown clay. <1% polyhalite. [10] ≤1/4" brown clay seam at 30.6', some anhydrite associated.	
	6		5.0	4.1	82		30.6'-35.6' HALITE: Clear, coarsely crystalline. <1% brown clay. [8, some 10]	
		25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-317

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					35.6'-38.2' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4). Medium to coarsely crystalline. <1% to 3% brown clay, trace gray. [15]	
25.8							
7		5.0	3.9	78		38.2'-38.8' ANHYDRITE: Light gray (N7). Microcrystalline. Scattered halite growths. Trace brown clay at 38.2'.	
	30					38.8'-40.1' HALITE: Clear, coarsely crystalline. <1% polyhalite. [1]	
30.8							
8		4.8	4.0	83		40.1'-42.4' HALITE: Clear, some moderate reddish orange (10R 6/6). Coarsely crystalline. ≤1% polyhalite blebs, locally 2%. Gray clay break at 42.4'. [2, 4]	
	35					42.4'-44.0' HALITE: Clear, some moderate brown (5YR 4/4). Coersely crystalline. <1% brown clay. [8, 10]	
35.6						44.0'-44.7' HALITE: Clear to moderate brown (5YR 3/4). Medium crystalline. <1% to 2% brown clay. <1/2% dispersed polyhalite. [17]	
9		5.0	5.0	100		44.7'-49.2' HALITE: Clear, some medium brown (5YR 4/4). Coarsely crystelline. ≤1% brown clay. Locally <1/2% polyhalite blebs. [10]	
	40					49.2'-50.1' HALITE: Cleer to moderate reddish orange (10R 6/6), medium brown, medium to coarsely crystalline. ≤1% brown clay and polyhalite. [17]	
40.6							
10		5.0	5.0	100			Because of poor quality and recovery of core, holes DH-317A, 317B were drilled. Refer to logs for these holes.
	45						
45.6							
11		4.5	4.5	100			
50.1	50						

BORING NO. DH-317

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NW CORE BORING NO. DH-317A

LOCATION INTERSECTION OF S 1600, W 30 DRIFTS - ROOF

STATION S 1600, W 30 COLLAR ELEV. 1271.2 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N 8077.5, E 6879.5 DEPTH OF BOREHOLE 5.0'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL CP-65

DATE STARTED 07/06/84 DATE COMPLETED 07/06/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 07/06/84 1 OF 1

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
1	0.0	2.0	2.0	100	—	0.0'-5.0' HALITE: Clear, coarsely crystalline. <1/2% polyhalite and gray clay. [1, 2]	NW split tube core barrel and NW rods. Drill time: 45 minutes. This hole was drilled to replace first run of hole 317.
2	2.0	3.0	2.9	97	X		
	5.0						No gas. Dry hole.

BORING NO. DH-317A

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-317B

LOCATION INTERSECTION OF W 30, S 1600 DRIFTS - ROOF

STATION S 1597, W 30 COLLAR ELEV. 1271.2 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N8080.3, E6881.0 DEPTH OF BOREHOLE 51.0'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 09/07/84 DATE COMPLETED 09/07/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 09/08/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
1	0.0	1.75	1.4	80		0.0'-5.1' HALITE: Clear with some lightly moderate reddish orange (10R 6/6). Coarsely crystalline with some medium. <1/2% polyhalite.[1]	NC double tube wireline core barrel with NC rods. Total drilling time: 12 hrs ±. This is a replacement hole for 317 and 317A. Runs1, 2: broken core.
2	1.75	4.65	4.65	100		5.1'-7.1' HALITE: Clear, medium to coarsely crystalline. <1% gray clay and dispersed polyhalite.[1, 11]	
3	6.4	4.9	4.9	100		7.1'-8.1' HALITE: Clear to moderate brown (5YR 4/4) with some light moderate reddish orange (10R 6/6). Medium to coarsely crystalline. <1% brown clay. Trace of polyhalite.	
						8.1'-8.7' HALITE: Clear, some lightly moderate reddish orange (10R 6/6). <1/2% gray clay and poiyhalite. [9]	
						8.7'-8.9' ANHYDRITE b: Very light to medium light gray. microcrystalline anhydrite with growths of halite. ≤1/4" dry gray clay at 8.7'.	
	11.3					8.9'-13.9' HALITE: Clear, coarsely crystalline with scattered white anhydrite stringers. [1]	
4		5.0	5.0	100		13.9'-15.1' HALITE: Clear to lightly moderate reddish orange (10R 6/6). Medium crystalline with some fine and coarsely crystalline. <1/2% polyhalite with ≤1% between 14.9' and 15.1'. ≤1% gray clay.	
						15.1'-15.85' ANHYDRITE a: Very light to lightly medium gray (N8, N6) anhydrite. Scattered halite growths. Trace of moist gray clay at 15.1'.	Run 4: Water seepage from hole after rods were broken at end of run. Probably from anhydrite a.
	16.3					15.85'-20.1' HALITE: Clear to lightly moderate reddish orange (10R 6/6). Coarsely crystalline anhydrite mixed with halite between 16'-16.2'. Scattered white anhydrite stringers throughout core. ≤1% polyhalite blebs. [1, 2] Core broken up between 15.85'-16.05'±. Very clear.	
5		5.0	5.0	100			
	21.3					20.1-26.0' HALITE: Clear, some moderate brown (5YR 4/4). Medium to coarsely crystalline, some fine. ≤1% brown clay. <1/2% dispersed polyhalite. 1/4" brown hard clay seam at 25.8' with associated anhydrite stringers to 26.0'.	
6		5.0	4.7	94			

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-317B

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25						
	26.3					26.0'-30.1' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. [1]	
7		5.0	4.5	90		30.1'-33.8' HALITE: Clear with zones of moderate brown. Coarsely crystalline with some medium. ≤1% brown clay. [1, 8, some 10]	
	30					33.8'-39.6' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4, 4/4). Coarsely crystalline, some medium. <1% to 3% brown clay. <1/2% dispersed polyhalite. Scattered breaks. [8, 10, 15, 17]	Run 8: Broken zones of core.
	31.3						
8		5.0	4.6	92		39.6'-40.2' ANHYDRITE: Very light to light medium gray (N8, N6), microcrystalline anhydrite. Faintly laminated, low angle. Scattered very small halite growths. ≤3/8" brown clay seam at 39.6'. Dips 15°±.	
	35					40.2'-44.3' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% polyhalite, average <2%. [3, 7]	
	36.3						
9		5.0	4.6	92		44.3'-51.0' HALITE: Clear, some moderate brown (5YR 4/4). Coarsely crystalline, locally fine to medium. ≤1% brown clay. <1/2% polyhalite patches, blebs, locally up to 2%. Scattered brown clay breaks 47.1'-47.7±. Clear halite, scattered polyhalite blebs at 48'-49.1'±. [1, 8, 10]	
	40						
	41.3						Run 10: Broken core beyond 43 ft. Hit gas pocket at 45.9'. No reading on methane detection meter. No sound of gas leak. 34% of recovered core is ≥2 inch length.
10		5.0	5.0	100			
	45						
	46.3						
11		4.7	4.7	100			
	50						
	51.0						

BORING NO. DH-317B

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NX CORE BORING NO. DH-318

LOCATION INTERSECTION OF S 1600, W 30 DRIFTS - FLOOR

STATION S 1600, W 30 COLLAR ELEV. 1258.5 DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N 8077.3, E 6876.1 DEPTH OF BOREHOLE 50.0'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 07/02/84 DATE COMPLETED 07/03/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 07/03/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		4.2	4.2	100		0.0'-4.75' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. Scattered anhydrite. ≤1% to 3% polyhalite. [7]	NW split tube core barrel. NW rods. Scissor lift.
						4.75'-7.3' MB-139: From 4.75'-5.75'± is mixture of anhydrite and halite. Then predominently anhydrite with scattered halite growths. Light gray with some moderate reddish orange. Gray clay parting at 7.3'.	
	4.2						Total drill time: 7 hrs.
2	5	5.3	5.3	100		7.3'-11.0' HALITE: Clear to light gray (N7) and light moderate reddish orange. Medium to coarsely crystalline. ≤1% gray clay. <1% dispersed polyhalite. Gray clay break at 9'. ≤3% polyhalite to 7.8'±. [9]	No gas. Dry hole.
						11.0'-15.45' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 2% polyhalite dispersed. Scattered anhydrite. 3/4" anhydrite layer at 15.35'. Gray clay parting at 15.45'. [4, 7]	
	9.5						33% of core recovered is ≥2 inch length.
3	10	5.2	5.2	100		15.45'-17.2' HALITE: Clear, some light gray (N7) and moderate reddish orange (10R 6/6). Medium to coarsely crystalline. ≤1% gray clay. <1/2% dispersed polyhalite. [9]	
						17.2'-20.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. ≤1% to 3% polyhalite. [5, 6, 7]	
	14.7						
4	15	5.0	5.0	100		20.5'-27.0' HALITE: Clear (some light gray (N7) to lightly moderate reddish orange (10R 6/6). Medium to coarsely crystalline. ≤1% gray clay, some brown. <1% polyhalite dispersed. Breaks at 21.5' and 21.9'±. [9, 17]	
						27.0'-32.7' HALITE: Clear to moderate reddish orange (10R 6/6). coarsely crystalline. <1% to 2% dispersed polyhalite. Trace of gray clay at 27.1'. Up to 1" anhydrite at 32.6'. Scattered anhydrite stringers between 31.6'-32.6'. [2, 4]	
	19.7						
5	20	5.1	5.1	100		32.7'-33.65' HALITE: Clear, medium to coarsely crystalline. <1/2% dispersed polyhalite. [1]	
	24.8						
	25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-318

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25				X	33.65'–33.95' ANHYDRITE: Very light to light gray (N8, N7). Microcrystalline. Scattered halite growths. 1/2" halite layer just below upper contact. ≤1/8" gray clay seam at lower contact. Core grinding here.	
6		5.2	5.2	100	— X	33.95'–40.3' HALITE: Clear, some moderate reddish orange (10R 6/6). <1/2% polyhalite. <1% gray clay to 34.95'±, then 0 – <1/2%. [2], [some 9]	
30.0	30				X		
					X	40.3'–44.2' HALITE: Clear, some medium brown (5YR 4/4). Coarsely crystalline, some medium. ≤1% brown clay. <1/2% polyhalite. [8, 10]	
7		5.0	5.0	100	X	44.2'–50.0' HALITE: Clear, coarsely crystalline, some medium. Zero to <1% gray clay. <1/2% polyhalite. [1, 11]	
35.0	35				— X		
8		5.0	5.0	100	X —		
40.0	40				—		
9		5.0	5.0	100	X —		
45.0	45				—		
10		5.0	3.0	60	X —		
50.0	50						

BORING NO. DH-318

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE NC CORE BORING NO. DH-319

LOCATION INTERSECTION OF S 700, E 300 DRIFTS -- ROOF

STATION S 700, E 300 COLLAR ELEV. 1260.0 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N8988.1 E7191.6 DEPTH OF BOREHOLE 51.05'

DRILLING METHOD ROTARY AIR DRILL MAKE/MODEL CP-65

DATE STARTED 09/10/84 DATE COMPLETED 09/10/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 09/10/84 1 OF 2

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0		0						
	1		2.0	2.0	100	X	0.0'-5.4' HALITE: Clear to lightly moderate reddish orange (10R 6/6). Coarsely crystalline, some medium locally. <1/2% polyhalite. Trace brown clay from 4.7'. [1]	NC double tube wireline core barrel. NC rods.
2.0								
	2	5	4.6	4.6	100	X	5.4'-8.45' HALITE: Clear to moderate brown (5YR 4/4). Coarsely crystalline. ≤1% brown clay, locally up to 2%. Gray clay from 5.05'. Scattered polyhalite. Some anhydrite close to contact at 8.45'. [8, 10]	No gas. Dry hole.
6.6						X	8.45'-8.65' ANHYDRITE b: Very light to light medium gray (N8, N6). Microcrystalline. Trace gray clay at 8.45'.	
	3		5.1	5.1	100		8.65'-14.3' HALITE: Clear, coarsely crystalline. Scattered white anhydrite. [1]	
		10					14.3'-15.65' HALITE: Clear, some lightly moderate reddish orange and moderate brown (5YR 4/4). Fine to coarsely crystalline. ≤1% polyhalite and gray, brown clay. [17]	
11.7								
	4		5.0	5.0	100		15.65'-16.35' ANHYDRITE a: Very light to medium light gray anhydrite. Scattered halite growths, especially from 16.15'. Trace gray clay at 15.65'. Core grinding evident here.	
		15				X	16.35'-20.85' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline. <1% to 3% polyhalite. Average 1% to 2%. [3, 4]	
16.7						X X X	20.85'-25.35' HALITE: Clear to moderate brown (5YR 4/4). Medium to coarsely crystalline. ≤1% brown clay, some gray. Trace dispersed polyhalite. [10, 17, some 12] 1/4" hard brown grayish clay seam at 25.3'± with associated anhydrite/halite to 25.35'.	
	5		5.0	4.9	98	X X X	25.35'-30.9' HALITE: Clear, coarsely crystalline. Slight trace clay. [1]	
		20						
27							30.9'-32.7' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4, 3/4). Medium to coarsely crystalline. Scattered breaks. <1% to 3% brown clay. [10, 15]	Run 5: Some broken core.
	6		4.7	4.7	100	X	32.7'-33.9' HALITE: Clear, coarsely crystalline. [1]	
		25						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-319

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	25					33.9'-36.55' HALITE: Clear, some moderate brown (5YR 4/4). Coarsely crystalline. ≤1% brown clay. [8, 10]	
26.4							
7		4.9	4.9	100		36.55'-40.05' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4, 4/4). Medium to coarsely crystalline. <1% to 3% brown clay. Scattered breaks. [15]	Run 7: Broken core.
	30					40.05'-40.6' ANHYDRITE: Very light to light medium gray (N8, N6). Microcrystalline. Scattered halite growths. Partially laminated. 1/2" halite layer at 40.4'±.	
31.3							Run 8: Broken zones within run.
8		4.75	4.75	100		40.6'-48.3' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6). Coarsely crystalline, some fine to medium between 45.8'-46.8'±. <1% to 3% polyhalite, locally 5%. Scattered anhydrite. Scattered brown clay 45.8'-46.8'±.	
	35					48.3'-51.05' HALITE: Clear mottled with moderate brown (5YR 4/4). Coarsely crystalline. ≤1%, locally 2% brown clay. <1/2% polyhalite blebs.	
36.05							
9		5.0	5.0	100			
	40						
41.05							40% of core recovered was ≥2 inch length.
10		5.0	5.0	100			
	45						
46.05							
11		5.0	5.0	100			
	50						
51.05							

BORING NO. DH-319

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER GE-268 HOLE TYPE/SIZE NX CORE BORING NO. DH-321

LOCATION S 400 DRIFT JUST WEST OF WASTE SHAFT - ROOF

STATION S 400 EO COLLAR ELEV. 1261.4 DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N9792.0 E6891.8 DEPTH OF BOREHOLE 52.0'

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL CP-65

DATE STARTED 09/14/84 DATE COMPLETED 09/14/84 SHEET

LOGGED BY: J.E. GALLERANI DATE: 09/29/84 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0.0						
1		5.0	5.0	100		0.0'-4.3' HALITE: Clear, coarsely crystalline. <1/2% polyhalite and gray clay. [1]	NW split tube core barrel with NW rods. Overall core quality good.
						4.3'-6.6' HALITE: Clear to moderate brown (5YR 4/4), coarsely crystalline. ≤1% brown clay [10]	
	5.0					6.6'-7.8' HALITE: Clear to medium light gray (N6) and light moderate reddish orange (10R 6/6). Fine to medium, some coarsely crystalline. <1/2% dispersed polyhalite. ≤1% gray clay.	
2		5.0	5.0	100		7.8'-8.05' ANHYDRITE b: Light gray (N7) microcrystalline, some laminae. Scattered halite growths. Trace of gray clay at 7.8'.	
						8.05'-14.0' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. [1]	
	10.0					14.0'-14.65' HALITE: Clear to moderate brown (5YR 4/4) and light moderate reddish orange (10R 6/6), medium crystalline. ≤1% brown clay. <1% dispersed polyhalite.	
3		5.0	5.0	100		14.65'-15.5' ANHYDRITE a: Light to medium gray (N7, N5) microcrystalline anhydrite. Irregular laminae Scattered halite growths especially from 15.1'. Trace of gray clay at 14.65'.	
	15.0					15.5'-19.9' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite, average ≤2% scattered anhydrite. [3, 4, 7]	
4		5.0	5.0	100		19.9'-22.4' HALITE: Clear to moderate reddish orange (10R 6/6). Some moderate brown. Medium to coarsely crystalline. ≤1% polyhalite and brown clay. [17]	
	20.0					22.4'-24.3' HALITE: Clear to light moderate reddish orange and some light bluish gray. Medium to coarsely crystalline. <1/2% polyhalite. <1% gray clay. [9]	
5		5.0	5.0	100		24.3'-29.6' HALITE: Clear, coarsely crystalline. Scattered anhydrite. Up to 1/2" hard brown clay seam at 25.1' with trace of associated anhydrite. <1/2% polyhalite locally. [1]	
	25.0						

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-321

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
6	30	5.0	5.0	100		29.6'-31.2' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4, 4/4), medium to coarsely crystalline, some fine. <1% to 3% brown clay. [12]	
						31.2'-33.3' HALITE: Clear, coarsely crystalline. [1]	
30.0						33.3'-35.2' HALITE: Clear, some moderate reddish brown (10R 4/6), coarsely crystalline. None to ≤2% brown clay [1, 10]	
7	35	5.0	5.0	100		35.2'-38.7' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4, 3/4), medium to coarsely crystalline. <1% to 3% brown clay, trace gray. 1/2" brown clay seam at 37.45'. <1/2% polyhalite dispersed. [14, 17].	
						38.7'-39.4' ANHYDRITE: Light to medium light gray (N7, N6) microcrystalline anhydrite. Partially laminated. 3/4" hard brown clay seam at 38.7'.	
35.0						39.4'-40.2' HALITE: Clear, coarsely crystalline. <1/2% polyhalite, scattered anhydrite. [1]	
8		5.0	5.0	100		40.2'-43.0' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6), coarsely crystalline. <1% to 3% polyhalite. [7]	
40.0	40					43.0'-47.0' HALITE: Clear to moderate reddish orange (10R 6/6), some moderate brown (5YR 4/4). Coarsely crystalline with zones of fine-medium. <1% to 2% brown clay. <1% polyhalite. [8, 12]	
9		5.0	5.0	100		47.0'-48.9' HALITE: Clear mottled with some moderate reddish orange (10R 6/6), coarsely crystalline. ≤1% polyhalite. <1/2% gray clay. [1, 3]	
45.0	45					48.9'-52.0' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 3/4, 4/4), medium to coarsely crystalline. <1% to 3% brown clay. [10, 15]	
10		5.0	5.0	100			
50.0	50						
11		2.0	2.0	100			
52.0	52						
	55						

BORING NO. DH-321

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER: GE-267 | HOLE TYPE/SIZE: NX | BORING NO.: DH-323

LOCATION: WASTE SHAFT STATION - ROOF - EAST OF WASTE SHAFT

STATION: S400, E55 | COLLAR ELEV.: 1261.2 | DIRECTION OF DRILLING: VERTICAL UP

MINE COORDINATES: N9291.7, E6952.5 | DEPTH OF BOREHOLE: 52.5 FT

DRILLING METHOD: ROTARY AIR | DRILL MAKE/MODEL: CP-65

DATE STARTED: 2-22-85 | DATE COMPLETED: 2-22-85 | SHEET

LOGGED BY: J. E. GALLERANI | DATE: 2-28-85 | 1 OF 2

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
	0						
1		3.0	0.9	30		0.0'-3.6' HALITE: Clear, medium to coarsely crystalline. [1]	NX split-tube core barrel.
	3.0					3.6'-8.0' HALITE: Clear, some moderate brown (5YR 4/4); medium to coarsely crystalline. <1% brown clay. [8]	
2		1.3	1.2	92			8.7% of core recovered was ≥ 2-inch lengths.
	4.3					8.0'-8.3' ANHYDRITE "b": Very light to medium gray anhydrite. Scattered halite growths. Up to 1/2" dark gray clay at 8.0'. Irregular, low angle.	
3		2.7	2.7	100			
	7.0					8.3'-14.5' HALITE: Clear, coarsely crystalline. Scattered white anhydrite stringers. [1]	Poor core quality.
4		5.0	5.0	100		14.5'-15.6'± HALITE: Clear to moderate brown (5YR 4/4); fine to medium crystalline. ≤ 2% brown clay, some gray. <1/2% dispersed polyhalite. [12]	
						15.6'-16.25'± ANHYDRITE "a": Light to light medium gray anhydrite. 1/4" gray clay at 15.6'. Low angle.	
	12.0					16.25'±-20.5' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 3% polyhalite. Scattered anhydrite. [5,7]	
5		5.0	3.5	70		20.5'-23.5' HALITE: Clear, some moderate brown (5YR 4/4); medium to coarsely crystalline, some fine. ≤1% brown clay. Trace polyhalite. Up to 1" brown clay seam at 23.25'. Irregular, low angle. Some hairline halite-filled fractures in clay. Some associated anhydrite to 23.5'. [8,10]	
	17.0					23.5'-30.4' HALITE: Clear, coarsely crystalline, some medium. [1]	
6		2.0	1.1	55			
	19.0					30.4'-35.4' HALITE: Clear to moderate brown (5YR 4/4); medium to coarsely crystalline, some fine. ≤1% brown clay, locally 2%. Break at 31.7'±. [8,10]	
7		2.5	2.5	100			
	21.5					35.4'-37.8' ± 0.5' ARGILLACEOUS HALITE: Clear to moderate brown (5YR 4/4; 3/4), fine to medium crystalline. <1 to 3% brown clay. [12,15]	
8		1.5	0.9	60			
	23.0					37.8'-38.8' ANHYDRITE: Light to medium gray, microcrystalline anhydrite. Up to 1" brown clay at 37.8'. Irregular, undulating surfaced core is disced.	
9		3.4	1.2	35			

BORING NO. DH-323

WIPP

WASTE ISOLATION PILOT PLANT — SHEET 2 OF 2 — BORING NO. DH-323

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
9	25	3.4	1.2	35		**38.8'-42.0' POLYHALITIC HALITE:** Clear to moderate reddish orange/brown (10R 6/6; 4/6). Coarsely crystalline. <1 to 3% polyhalite blebs and patches. Core broken.	Note: Core is badly disced from about Run 10. It is broken from about 33' to 52.5'. Difficult to log hole due to broken core and core loss.
26.4							
10		0.8	0.6	75			
27.2							
11		3.2	1.2	38		**42.0'-50.5'± HALITE:** Clear to moderate brown (5YR 4/4), coarsely crystalline. ≤1% patches of brown clay, increasing to ≤2% beyond 48'±. Core badly disced. [8,10]	
30.4	30						
12		5.0	2.6	52		**50.5'-52.5' ARGILLACEOUS HALITE:** Clear to moderate brown, fine to medium crystalline, some coarse. <1 to 3% brown clay.	
35.4	35						
13		3.4	2.3	68			
38.8							
14	40	3.2	2.0	62			
42.0							
15		3.0	1.5	50			
45.0	45						
16		2.5	1.0	40			
47.5							
17	50	5.0	3.5	70			
52.5							
	55						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-45 INSTRUMENT TYPE & NUMBER Extensometer GE-230 HOLE SIZE NX

LOCATION East 140 Drift, 114' N of N rib of North 140 Drift, midspan

STATION N254,E147 COLLAR ELEV. 1285.5' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N9941.0, E7041.3 BOREHOLE PENETRATION 52.4'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/25/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY (ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
8	25	5.0	100	–		21.8' – 26.9' **HALITE:** colorless to moderate reddish-orange (10R 6/6) to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, 1-2% polyhalite, 1-5% brown and gray clay. Clay is largely interstitial from 21.8'-24.0', in discontinuous partings and breaks from 24.0'-26.9', brown clay break at 25.9'.	Run 8 from 24.0'-29.0' is broken and separated along clay seams. Clay may be washed out.
7	20	5.0	100	–		16.6' – 21.8' **HALITE:** colorless to moderate reddish-orange (10R 6/6) halite, coarsely crystalline, ~2% dispersed polyhalite, two undulatory anhydrite stringers (~1/8") at 17.2'.	
6	15	4.0	78	–		16.0' – 16.6' **ANHYDRITE:** (Anhydrite "a") very light (N8) to medium gray (N5) microcrystalline anhydrite, 10-20% halite from 16.3'-16.6', light gray (N7) clay parting at 16.0'. 14.8' – 16.0' **HALITE:** mottled colorless to moderate brown (5YR 3/4) halite, medium crystalline, 5% brown (and gray) clay, polyhalite band at 15.8'-15.9', otherwise polyhalite absent.	
5	10	3.3	66	–		7.9' – 14.8' **HALITE:** clear, colorless to moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, trace (1-2%) polyhalite from 7.9'-10.8' and 12.1'-14.8', undulatory very light gray (N8) anhydrite stringers at 11.1' (~1/16"), 11.35' (~1/16"), and 11.55' (<1/16"). 7.0' – 7.9' **HALITE:** mottled colorless to medium gray (N5) to moderate reddish-orange (10R 6/6) halite, finely to medium crystalline, 5% gray and brown clay, 7.0'-7.1' is pure, medium to coarsely crystalline halite, brown clay break at 7.2', brown and gray clay break at 7.9', 1% polyhalite.	
4		2.0	100	–		6.9' – 7.0' **ANHYDRITE:** (Anhydrite "b") light (N7) to very light gray (N8) microcrystalline anhydrite, dense, ~20% halite.	
3	5	1.8	95	–		5.0' – 6.9' **HALITE:** mottled colorless to grayish-brown (5YR 3/2) halite, medium to coarsely crystalline, 2-3% interstitial grayish-brown and medium light gray (N6) clay, <1% polyhalite.	
2		0.8	40	–		3.8' – 5.0' Core lost.	
1		1.8	86	–		0.0' – 3.8' **HALITE:** colorless to clear halite, medium to coarsely crystalline, 0-3% moderate reddish-orange (10R 6/6) polyhalite dispersed, trace (1%) brown and gray clay from 3.0'-3.8'.	Runs 1 – 4 were not cored with the inner barrel. 0' – 0.9' drilled with 6" single-tube core barrel. Drilling started 09:45 hours, 3 December 1982.
	0						

WIPP-SPDV
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-45 INSTRUMENT TYPE & NUMBER Extensometer GE-230 HOLE SIZE NX

LOCATION East 140 Drift, 114' N of N rib of North 140 Drift, midspan

STATION N254,E147 COLLAR ELEV. 1285.5' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N9941.0, E7041.3 BOREHOLE PENETRATION 52.4'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/25/83

SHEET 2 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
13	50	3.2	100	–		(see description on next sheet)	
12	45	5.0	100	–		**44.8' - 49.3' HALITE:** clear to moderate reddish-orange (10R 6/6) to moderate brown (5YR 3/4) halite, medium to coarsely crystalline, <1-3% polyhalite, concentration (5-10%) of brown clay at 46.25'-46.5', brown clay break at 46.6', discontinuous break at 48.4', trace to absent clay elsewhere.	
						43.4' - 44.8' ARGILLACEOUS HALITE: clear to moderate brown (5YR 3/4) halite, medium to coarsely crystalline, 5% brown clay locally concentrated, 1-2% polyhalite, brown clay parting at 43.4', break at 44.7'.	
11	40	4.8	100	–		**40.0' - 43.4' POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) halite, coarsely crystalline, 5-10% polyhalite, clay is absent to 43.0', trace above, anhydrite stringers decreasing in frequency from 40.0'-41.0'.	
						39.4' - 40.0' ANHYDRITE: (Marker Bed 138) very light (N8) to medium gray (N5) microcrystalline anhydrite, 5-10% halite increasing upwards, grades into anhydritic halite above.	
10	35	4.5	83	–		**35.6' - 39.4' ARGILLACEOUS HALITE:** clear to moderate brown (5YR 3/4) halite, coarsely to medium crystalline, fining upwards, 5-10% brown clay locally concentrated, <1% polyhalite, clay is ~1% from 38.7'-39.4' and polyhalite is ~2%, pale brown (5YR 5/2) clay parting at 39.4'.	Run 10 (34.0'-39.4') Bottom (around 34.0'-35.0') is more broken up. Core loss was assumed to be at 34.0'-35.0'.
						32.1' - 35.6' HALITE: clear, coarsely crystalline halite, few blebs of polyhalite, clay is absent 32.1'-33.0', ~1% from 33.0'-35.6', increasing upsection.	
9	30	4.4	88	–		**30.6' - 32.1' ARGILLACEOUS HALITE:** clear to moderate brown (5YR 3/4) halite, coarsely crystalline at base, fining upwards to sugary texture, 5-10% clay (mostly brown), brown clay parting at 30.7', break at 32.1', trace polyhalite.	Run 9 (29.0'-34.0') is also very broken and clay may have been lost at breaks.
						26.9' - 30.6' HALITE: clear, coarsely crystalline halite, few blebs of polyhalite, discontinuous anhydrite stringers (<1/16") at 27.1' and 28.1'.	
8	25	5.0	100	–		(as below)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-45 INSTRUMENT TYPE & NUMBER Extensometer GE-230 HOLE SIZE NX

LOCATION East 140 Drift, 114' N of N rib of North 140 Drift, midspan

STATION N254,E147 COLLAR ELEV. 1285.5' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N9941.0, E7041.3 BOREHOLE PENETRATION 52.4'

DRILLING METHOD Wet (Brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/25/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	55					52.2' - 52.4' **HALITE:** clear, coarsely crystalline halite, 1% polyhalite.	
13	50	3.2	100	—	X – X – – X – – X –	**49.3' - 52.2' ARGILLACEOUS HALITE:** mottled clear to moderate brown (5YR 3/4) to moderate reddish-brown (10R 4/6) halite, finely to coarsely crystalline, 5-10% brown clay, 1-5% polyhaiite, pale (10R 5/4) to moderate reddish-brown (10R4/6) clay seam at 52.1', brown clay break at 49.4'.	Total penetration = 52.4'. Hole finished at 15:00 hours, 4 December 1982.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-46 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 114' N of N rib of North 140 Drift, midspan

STATION N254, E147 COLLAR ELEV. ~1276.5' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9941.0, E7041.3 DEPTH OF BOREHOLE 51.5'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY DGK,JPS/Bechtel DATE 1/26/83

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0	3.2	64	—		0.0' - 7.0' **HALITE:** clear to brownish-gray (5YR 4/1) halite, medium to coarsely crystalline, trace (<1/2%) of moderate reddish-orange (10R 6/6) polyhalite. Clay content up to 5% occurring as diffuse zones or interstitially.	Drilling started 15:20 hours, 4 December 1982. Stopped at 15:40 houra, with 5.0' drilled.
2	5	0.4	40	—			Run 1 - core loss seems to have occurred at top of core.
3		5.0	100	—		7.0' - 8.9' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6) halite, coarsely crystalline, moderately hard. Polyhalite occurs interstitially and as scattered blebs from 0 to 10%. Light gray (N7) clay parting (1/8") at 7.8'.	
	10					8.9' - 13.0' **ANHYDRITE:** (Marker Bed 139) light gray (N7) anhydrite, microcrystalline, hard, zones of moderate reddish-orange (10R 6/6) polyhalite from 8.9'-9.5', hairline anhydrite breaks in clear halite matrix at top. Core broken into 1/2" chips from 11.0'-13.0'. Light gray (N7) clay seam, stiff, at 13.0'.	
4		4.3	86	—		13.0' - 16.4' **HALITE:** clear, medium to coarsely crystalline halite, with clay and polyhalite in discrete bands and interstitially. Several brown clay partings (1/16") at 13.4'-13.5', and a brown clay break (1/32") at ~15.2'. Light gray (N7) clay is less abundant and occurs interstitially. Clay content ranges from 0 to 3% and polyhalite content to 2%.	
	15						
5		5.1	100	—		16.4' - 27.9' **POLYHALITIC HALITE:** clear, medium to coarsely crystalline halite, with 5-10% moderate reddish-orange (10R 6/6) polyhalite, brown clay break (1/32") at 20.6', trace interstitial gray clay from 20.6'-21.8' and at 26.7'.	
	20						
6		4.7	94	—			
	25						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-46 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 114' N of N rib of North 140 Drift, midspan

STATION N254, E147 COLLAR ELEV. ~1276.5' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9941.0, E7041.3 DEPTH OF BOREHOLE 51.5'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY DGK, JPS/Bechtel DATE 1/26/83 SHEET 2 OF 3

RUN NUMBER	DEPTH (ft.)	RECOVERY (ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	4.7	94	–		(as above)	
7	30	5.2	100	–		27.9' – 32.6' **HALITE:** clear, mottled light gray (N7), light brown (5YR 6/4) to moderate reddish-orange (10R 6/6) halite, moderately hard, finely to coarsely crystalline. Orange interstitial polyhalite represents about 2% of unit, gray and brown clay about 2-3%. Brown clay breaks at 28.8', 29.2', 30.2', and 30.3'. Gray clay breaks at 27.9', 28.0', 28.3', 28.5', 29.8', and 30.0'.	
8	35	5.0	100	–		32.6' – 38.7' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6) halite, coarsely crystalline, with 2-5% polyhalite. Polyhalite is generally interstitial but also occurs as thin layers (1/16"-1/8"). Anhydrite layer (1/16") at 37.8'.	
9	40	5.1	100	–		38.7' – 38.9' **ANHYDRITE:** light biuish-gray (5B 7/1), microcrystalline anhydrite, with light gray (N7) clay parting (1/8") at 38.9'.	
10	45	4.7	94	–		38.9' – 51.5' **HALITE:** argillaceous, clear to mottled medium gray (N5) and pale yellowish-brown (10YR 6/2) halite, finely to coarsely crystalline, moderately hard. Clay content ranges from 0 to +5%, with <1% interstitial polyhalite, clay breaks at 44.5', 47.5', 48.2', 48.4', 48.7', 48.8', and 50.8'. Clear halite lenses from 43.1'-43.7' and 48.9'-49.5'.	
11	50	5.1	100	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-46 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 114' N of N rib of North 140 Drift, midspan

STATION N254, E147 COLLAR ELEV. ~1276.5' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9941.0, E7041.3 DEPTH OF BOREHOLE 51.5'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY DGK,JPS/Bechtel DATE 1/26/83

SHEET 3 OF 3

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	5.1	100	—	— X —	(as above)	Hole finished at 13:30 hours, 5 December 1982. Total depth = 51.5'.
	55						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-52 INSTRUMENT TYPE & NUMBER Extensometer GE-226 HOLE SIZE NX

LOCATION 0 East Drift, 146' N of Exploratory Shaft centerline, midspan

STATION N146; W4 COLLAR ELEV. 1280.4' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N9832.5, E6890.5 BOREHOLE PENETRATION 51.6'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/25/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
5	25	5.0	100	–		22.3' – 26.8' **HALITE:** clear to colorless halite, medium to coarsely crystalline, few blebs of polyhalite, trace disseminated clay at 25.9'–26.0', anhydrite stringers (~0.1") at 22.7' and 23.9'.	
4	20	6.0	100	–		16.8' – 22.3' **HALITE:** colorless to moderate reddish-orange (10R 6/6) to moderate brown (5YR 3/4) halite, medium to coarsely crystalline, 5% brown and gray clay (mostly brown) locally concentrated, ~1% polyhalite, brown clay break at 19.2', anhydrite/clay zone at 22.2'–22.3'.	
						12.5' – 16.8' **POLYHALITIC HALITE:** colorless to moderate reddish-orange (10R 6/6) halite, coarsely crystalline, 2–10% polyhalite in bands, anhydrite stringer, somewhat diffuse, at 13.7'.	
3	15	5.0	100	–		12.0' – 12.5' **ANHYDRITE:** (Anhydrite "a") light to very light gray (N7–8), microcrystalline anhydrite, 30–50% halite from 12.4'–12.5'.	
						10.8' – 12.0' **HALITE:** mottled clear to moderate reddish-orange (10R 6/6) to moderate brown (5YR 3/4) halite, medium crystalline, 5% brown clay, 0–3% polyhalite increasing upward, light gray (N7) clay parting at 12.0'.	
2	10	4.9	98	–		5.5' – 10.8' **HALITE:** clear to moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, 0–2% polyhalite, anhydrite stringers (<1/16") at 5.6', 5.9', 6.7', 6.9', and 7.4'.	
						5.3' – 5.5' **ANHYDRITE:** (Anhydrite "b") light gray (N7), microcrystalline anhydrite, undulatory bedding, 20–30% halite.	Most core shows circumferential scoring.
1	5	5.0	100	–		0.0' – 5.3' **HALITE:** colorless to clear halite, medium to coarsely crystalline, 1–3% polyhalite, 0–5% brown clay increasing upward, light gray (N7) clay parting at 5.3'.	Drilling water was recycled through the drill in such a manner that previous cuttings are pushed back into the hole.
	0						Hole was cored from 2 – 4 November 1982.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-52 INSTRUMENT TYPE & NUMBER Extensometer GE-226 HOLE SIZE NX

LOCATION 0 East Drift, 146' N of Exploratory Shaft centerline, midspan

STATION N146, W4 COLLAR ELEV. 1280.4' DIRECTION OF DRILLING Up Vertical

MINE COORDINATES N9832.5, E6890.5 BOREHOLE PENETRATION 51.6'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12 B

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/25/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	5.0	100	–		46.6' – 51.1' **ARGILLACEOUS HALITE:** colorless to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, 1-2% polyhalite, 1-10% brown clay locally concentrated, brown clay partings at 47.2', 48.3', 48.7', 50.5' and 51.0', coarsely crystalline halite with <1% clay and polyhalite from 49.0'-49.3'.	
10	45	5.1	100	–		44.5' – 46.6' **HALITE:** colorless to moderate reddish-orange (10R 6/6) halite, coarsely crystalline, 1-3% polyhalite, few blebs of gray and brown clay. 41.5' – 44.5' **ARGILLACEOUS HALITE:** mottled colorless to moderate brown (5YR 3/4) halite, medium to coarsely crystalline, ~1% polyhalite, 2-10% brown clay locally concentrated, 41.5'-41.9' is purer halite, with only trace brown and gray clay, brown clay partings at 43.0', 43.5', and 44.5', brown clay seam at 43.2'.	
9	40	5.0	100	–		36.9' – 41.5' **POLYHALITIC HALITE:** colorless to moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, 1-10% polyhalite locally concentrated, polyhalite stringer zone from 38.15'-38.35', anhydrite stringers at 36.95', 37.2', 37.6', and 38.8'.	
8	35	3.9	78	–		36.5' – 36.9' **ANHYDRITE:** (Marker Bed 138) light gray (N7), microcrystalline anhydrite, undulatory, halitic upper contact. 31.0' – 36.5' **ARGILLACEOUS HALITE:** mottled colorless to moderate brown (5YR 3/4) halite, medium to coarsely crystalline, <1% polyhalite, 2-10% brown clay locally concentrated, brown clay partings at 33.8', 34.1', 34.5', and 36.3', brown clay break at 35.4', gray clay seam at 36.5'.	
7		0.2	40	–			
6	30	5.0	100	–		28.5' – 31.0' **HALITE:** colorless halite, coarsely crystalline, few blebs of polyhalite, clay is absent to 30.0', increasing to 2% interstitial brown blebs at 31.0'. 26.8' – 28.5' **ARGILLACEOUS HALITE:** colorless to moderate brown (5YR 3/4) halite, medium to coarsely crystalline, <1% polyhalite in 1/8"-1/2" blebs, 5-10% brown clay, brown clay breaks at 27.1', 27.7', 27.8', and 28.4'.	Drill rods stuck at ~30' after being left in the hole overnight.
5	25	5.0	100	–		(as below)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-52 INSTRUMENT TYPE & NUMBER Extensometer GE-226 HOLE SIZE NX

LOCATION 0 East Drift, 146' N of Exploratory Shaft centerline, midspan

STATION N146, W4 COLLAR ELEV. 1280.4' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N9832.5, E6890.5 BOREHOLE PENETRATION 51.6'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RLB/TSC//DGK/Bechtel DATE 1/25/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	55					51.1' - 51.6' HALITE: colorless to moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, 1-2% polyhalite, <1% gray and brown clay, anhydrite stringer (0.1") at 51.25'.	Total penetration = 51.6'.
11	50	5.0	100	–		(as below)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-53 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 146' N of Exploratory Shaft centerline, midspan

STATION N146, W4 COLLAR ELEV. 1266.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9832.5, E6890.5 DEPTH OF BOREHOLE 49.2'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Longyear 38

PREPARED BY DGK,JPS/Bechtel DATE 1/26/83

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	0						
1		3.1	78	-		0.0' - ~4.9' **ARGILLACEOUS HALITE:** clear, coarsely crystalline halite, with some moderate reddish-orange (10R 6/6) to moderate reddish-brown (10R 4/6) polyhalite, and some light gray (N7) clay that occurs in small patches, especially around 3.2'.	0' - 1.0' was drilled with 6" single-tube core barrel.
2	5	1.0	50	-		~4.9' - 6.5' **POLYHALITIC HALITE:** clear, coarsely crystalline halite, with abundant polyhalite.	**RUN** 1 core broken. Impossible to determine location of core loss.
3		5.0	100	-		6.5' - 8.6' **ANHYDRITE:** (Marker Bed 139) very light gray (N8), microcrystalline anhydrite, with clear, fine-grained halite. Anhydrite becomes purer with depth. Light gray (N7) clay parting (1/8"-1/4") at base of anhydrite.	
	10					8.6' - 12.4' **HALITE:** clear, white, and mottled pale red (10R 6/2) coarsely crystalline halite, with approximately 1% moderate reddish-orange (10R 6/6) polyhalite, and trace (<5%) moderate brown (5YR 4/4) interstitial clay.	Drilling was very slow due to problems with the Longyear drill. The first 7 core runs were relatively easy (relative to the last 4 runs). All later cores were completed with great difficulty. The vertical control for the drill was broken so there was no mechanical means of pulling the core barrel. The drilling brine is not filtered.
4		5.0	100	-			
	15						
5		4.9	100	-		12.4' - 25.2' **POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, moderately hard. Polyhalite represents 3-5% of core and occurs as scattered blebs or interstitially. Gray clay parting (1/8"-1/4") at 17.1'. Light gray (N7) clay seams at 24.8'-25.2'.	
	20						
6		5.0	100	-			
	25						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-53 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 146'N of Exploratory Shaft centerline, midspan

STATION N146, W4 COLLAR ELEV. 1266.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9832.5, E6890.5 DEPTH OF BOREHOLE 49.2'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Longyear 38

PREPARED BY DGK,JPS/Bechtel DATE 1/26/83

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.0	100	-		(as above)	
7	30	4.8	98	-		25.2' - 29.5' **HALITE:** clear, coarsely crystalline halite, with some (10-15%) interstitial moderate brown (5YR 4/4) clay, a light gray (N7) clay seam at 26.2', and some (10-15%) polyhalite. Laminations at 26.2' dip about 10°.	RUN 7 core lost from 26.8' - 26.9'.
8	35	5.0	100	-		29.5' - 35.5' **POLYHALITIC HALITE:** clear, coarsely crystalline halite, with 5-10% moderate reddish-orange (10R 6/6) polyhalite. Polyhalite occurs as discontinuous breaks, blebs or interstitially. Clear halite from 35.0'-35.5'.	
						35.5' - 35.7' **ANHYDRITE:** very light gray (N8), microcrystalline anhydrite, with gray clay parting (1/8") at base.	
9	40	5.0	100	-		35.7' - 49.2' **ARGILLACEOUS HALITE:** clear halite, finely to medium crystalline, moderately hard, with interbedded brown clay (5%) and polyhalite (1-5%). Color ranges from medium gray (N5) to light brown (5YR 6/4). Polyhalite occurs as interstitial layers.	
10	45	4.5	100	-			
11		2.9	100	-			Total depth = 49.2'.
	50						

WIPP-SPDV
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-56 INSTRUMENT TYPE & NUMBER Extensometer Ge-234 HOLE SIZE NX

LOCATION 0 East Drift, 621.3' N of Exploratory Shaft Centerline, 12.5' from E rib

STATION N621, E0 COLLAR ELEV. 1296.8 DIRECTION OF DRILLING Vertical up

MINE COORDINATES N10311.8 E6892.3 BOREHOLE PENETRATION 52.1'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/4/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.1	100	–		20.2'-25.1' **ARGILLACEOUS HALITE:** clear to mottled pale brown (5YR 5/2) and brownish-gray (5YR 4/1), medium to coarsely crystalline and moderately hard. Clay occurs interstitially with some clay breaks and partings and represents from 0-10% of core. From 23.3'-24.1', zone of moderate reddish-orange (10R 6/6) interstitial polyhalite. Clay breaks at: 20.3', 20.5', 21.3', 22.0', and 24.5'. At 24.9', 1/4" thick brownish-gray (5YR 4/1) clay partings.	
5	20	5.0	100	–		15.3'-20.2' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), finely to coarsely crystalline, moderately hard. Finely crystalline from 19.5'-20.0'. Polyhalite occurs as isolated blebs or interstitially and comprises 5-10% of core.	
						14.7'-15.3' **ANHYDRITE:** banded, very light gray (N8) and medium dark gray (N4), microcrystalline, hard, dense. Core broken into 1/2" chips.	
4	15	5.0	100	–		13.5'-14.7' **HALITE:** argillaceous and polyhalite in part. Mottled pale brown (5YR 4/2) and moderate reddish-brown (10R 4/6) and brownish-gray (5YR 4/1). Finely crystalline, moderately hard. Clay and polyhalite comprise 5-10% of core.	Core Loss: Run 2 Where Lost 2.0'-6.0' 3 11.6'-11.7' 11 47.1'-47.2'
3	10	4.9	98	–		8.0'-13.5' **HALITE:** clear, medium to coarsely crystalline, moderately hard, few scattered, very light gray (N8) anhydrite stringers throughout.	
						7.8'-8.0' **ANHYDRITE:** medium gray (N5), hard, dense, microcrystalline.	
						5.8'-7.8' **ARGILLACEOUS HALITE:** clear and brownish-gray (5YR 4/1), medium to coarsely crystalline, moderately hard. Argillaceous content up to 10%.	
2	5	2.7	47	–		0.0'-5.8' **HALITE:** polyhalitic, clear and moderate reddish-orange (10R 6/6), coarsely crystalline, moderately hard. Polyhalite occurs as isolated blebs and comprises up to 3% core.	Hole begun at 13:00 hours on 2 February 1983. Cored from 0 to 1.0' using 6" diameter single tube barrel. Cored from 1.0'-52.1' using NX core barrel with brine.
1		1.0	100	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-56 INSTRUMENT TYPE & NUMBER Extensometer GE-234 HOLE SIZE NX

LOCATION 0 East Drift, 621.3' N of Exploratory Shaft Centerline, 12.5' from E rib

STATION N621, E0 COLLAR ELEV. 1296.8 DIRECTION OF DRILLING Vertical up

MINE COORDINATES N10311.8 E6892.3 BOREHOLE PENETRATION 52.1'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/4/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	5.1	100	–		47.0'-49.5' **ARGILLACEOUS HALITE:** clear and moderate brown (5YR 3/4), finely to coarsely crystalline, moderately hard. Clay content ranges from 0 to 15%. Clay breaks at: 47.9', 48.5', 48.7', and 49.0'.	
10	45	5.0	100	–	X	38.0'-47.0' **HALITE:** clear with trece of moderate reddish-orange (10R 6/6) polyhalite blebs throughout. Finely to coarsely crystalline, moderately hard. Polyhalite occurs interstitially or as scattered blebs and comprises up to 5% of core. Anhydrite stringer, 1/2"-3/4" thick at 39.0'. Finely crystalline, sugary texture from 44.3'-45.0', and argillaceous (2-5%). Brown clay breaks at: 44.6', and 44.9'.	
9	40	5.0	100	–	X	37.5'-38.0' **ANHYDRITE:** light gray (N7) to medium dark gray (N4), dense, hard, microcrystalline.	
						37.5' **CLAY:** pale brown (5YR 5/2), moderately plastic, moderately soft, moist, 1/2" thick seam.	
8	35	5.1	100	–		32.5'-37.5' **ARGILLACEOUS HALITE:** clear to grayish-brown (5YR 3/2), finely to coarsely crystalline, moderately hard. Clay content ranges from 2-10% with clay breaks at: 33.0', 33.5', 33.7', 33.9', 34.2', 34.4', 35.0', 35.6', 36.0', 36.6', and 37.1'. Finely crystalline from 35.2'-37.5'.	
7	30	5.2	100	–		25.1'-32.5' **HALITE:** clear and slightly argillaceous in part. Finely to coarsely crystalline, moderately hard. From 29.0'-31.0' clay content ranges from 0 to 2% with brown clay breaks at: 29.1', 29.9', 30.0', 30.7', and 30.8'.	
6	25	4.9	98	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-56 INSTRUMENT TYPE & NUMBER Extensometer GE-234 HOLE SIZE NX

LOCATION O East Drift, 621.3' N of Exploratory Shaft Centerline, 12.5' from E rib

STATION N621, EO COLLAR ELEV. 1296.8 DIRECTION OF DRILLING Vertical up

MINE COORDINATES N10311[illegible]6892.3, BOREHOLE PENETRATION 52.1'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/4/83 SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	55						
	50				X X X	49.5'-52.1' **HALITE:** polyhalite, clear and mottled reddish-orange (10R 6/6) and grayish-red (5R 4/2). Finely to medium crystalline, moderately hard. Polyhalite occurs interstitially and as blebs and comprises 0-10% of core. Sugary texture from 50.5'-51.2'.	Hole completed at 22:00 hours on 2 February 1983. Total Penetration = 52.1'

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-57 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 621.3' N of Exploratory Shaft centerline, 12.5' from E rib

STATION N621, E0 COLLAR ELEV. 1288.1 DIRECTION OF DRILLING vertical down

MINE COORDINATES N10311.8 E6892.4 DEPTH OF BOREHOLE 52.1'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/4/83 SHEET 1 OF 3

RUN NUMBER	DEPTH (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	5	1.2	17	-		0.0'-7.9' **HALITE:** clear to pale brown (5YR 5/2). Coarsely crystalline, moderately hard, trace of gray and brown clay throughout.	Hole begun at 09:30 hours on 3 February 1983. Hole cored from 0' to 7' using NX size drill rods without inner barrel.
2	10	4.7	94	-	X X X X	7.9'-10.1' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), moderately hard, coarsely crystalline.	
						10.1'-12.2' **ANHYDRITE:** banded light gray (N7) to olive gray (5YR 4/1), hard, dense, microcrystalline.	
						12.2'-12.3' **CLAY:** medium gray (N5) moist, moderately soft, highly plastic.	
3	15	5.1	100	-	- X - X	12.3'-15.5' **HALITE:** clear and mottled pale brown (5YR 5/2) and pale reddish-brown (10R 5/4), finely crystalline, moderately hard. Trace of clay and polyhalite throughout, up to 5%, locally. Brown clay break at 13.8'.	Core Loss: Run — Where Lost 1 — Throughout Run 2 — 7.0'-7.3' 7 — 33.6-33.7' 9 — 43.0'-43.1'
					X X X X	15.5'-20.2' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), coarsely crystalline, moderately hard.	
4	20	5.3	100	-		20.2' **CLAY:** medium gray (N5), moist, highly plastic, moderately soft, 1/2"-3/4" thick, sub-horizontal.	
						20.2'-22.1' **HALITE:** argillaceous, coarsely crystalline, moderately hard. Clay content is 3-5% and occurs interstitially. Clay breaks at: 21.0' and 21.4'. Halite is clear and pale brown (5YR 5/2).	
5	25	5.1	100	-	X X X	22.1'-28.0' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), medium to coarsely crystalline, moderately hard. Polyhalite comprises up to 10% of core and occurs as scattered blebs or interstitially. Few isolated seams of polyhalite throughout.	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-57 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 621.3' N of Exploratory Shaft centerline, 12.5' from E rib

STATION N621, E0 COLLAR ELEV. 1288.1 DIRECTION OF DRILLING vertical down

MINE COORDINATES N10311.8 E6892.4 DEPTH OF BOREHOLE 52.1'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/4/83

RUN NUMBER	DEPTH ( )	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
5	25	5.1	100	–		(as above)	
6	30	5.3	100	–		**28.0'-32.8' ARGILLACEOUS HALITE:** clear and mottled pale-reddish-brown (10R 5/4) and medium light gray (N6), finely to coarsely crystalline, moderately hard. Clay content up to 10% with trace amounts of orange polyhalite throughout. Clay breaks at: 28.0', 28.4', 28.7', 29.2', 29.4', 29.7', 31.5', 32.0', and 32.4'.	
7	35	4.9	98	–		**32.8'-37.8' POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), finely to coarsely crystalline, moderately hard. Polyhalite comprises up to 15% of core and occurs as isolated blebs or interstitial layers. Polyhalite seem from 36.7'-36.9'.	
8	40	5.2	100	–		**37.8'-38.1' ANHYDRITE:** light gray (N7), hard, dense, microcrystalline. **38.1'-51.3' ARGILLACEOUS HALITE:** clear and mottled medium gray (N5), pale brown (5YR 5/2) and grayish-orange (10YR 7/4). Finely to coarsely crystalline, moderately hard, clay content varies from < 1% up to 10%. Clay breaks at: 38.5', 47.2', 47.3', 47.7', 48.2', 48.6', 50.0', and 50.6'. Few seams of interstitial, orange polyhalite. Clear halite from 42.6'-45.0'.	
9	45	4.9	98	–			
10	50	4.1	100	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-57 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 621.3' N of Exploratory Shaft centerline, 12.5' from E rib

STATION N621, E0 COLLAR ELEV. 1288.1 DIRECTION OF DRILLING vertical down

MINE COORDINATES N10311.8 E6892.4 DEPTH OF BOREHOLE 52.1'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/4/83 SHEET 3 OF 3

RUN NUMBER	DEPTH (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	50						
10		4.1	100	-		(as above)	Hole completed at 14:30 hours on 3 February 1983.
						51.3'-52.1' HALITE: clear, coarsely crystalline, moderately hard.	Total Depth = 52.1'
	52.1						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-63 INSTRUMENT TYPE & NUMBER Extensometer GE-243 HOLE SIZE NX

LOCATION 0 East Drift, 1110' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1110, E0 COLLAR ELEV. 1310.6' DIRECTION OF DRILLING vertical up

MINE COORDINATES N10796.0, E6891.9 BOREHOLE PENETRATION 52.8'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/12/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
7	25	5.0	100	–		(see description on next sheet)	
6	20	5.0	100	–		**17.9'-23.4' HALITE:** argillaceous, moderately hard, finely to coarsely crystalline, clear to mottled grayish-brown (5YR 3/2) and pale yellowish-brown (10YR 6/2). Clay content up to 20% in part. Clay breaks at: 18.5', 19.2', 19.9', 20.2', 22.7', and 23.0'.	
5	15	5.2	100	–	X X X X X X	**14.8'-17.9' POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), moderately hard, coarsely crystalline. Polyhalite content ranges from 2-15% with few polyhalite stringers and isolated blebs. **13.6'-14.8' ANHYDRITE:** very light gray (N8) to pinkish-gray (5YR 8/1) hard, dense microcrystalline with some interstitial clear halite.	
4		2.6	100	14		**12.0'-13.6' HALITE:** argillaceous, clear to mottled brownish-gray (5YR 4/1) to light gray (N7). Finely to coarsely crystalline, moderately hard. Clay content up to 15% and gray clay breaks at 13.0' and 13.1'. Trace of orange polyhalite from 13.3'-13.6'. Gray clay parting, moderately plastic at 13.6'.	
3	10	4.6	92	–		**6.7'-12.0' HALITE:** clear, moderately hard, medium to coarsely crystalline, few white (N9) anhydrite stringers. **6.5'-6.7' ANHYDRITE:** very light gray (N8), hard, dense, microcrystalline. Core broken into 1/4" chips.	Core Loss: Run 2: 3.0'-3.2', 4.2'-4.5', 5.1'-5.5' Run 3: 6.9'-7.0', 7.5'-7.7', 8.0'-8.1'
2	5	1.9	68	–	X X	**3.8'-6.5' HALITE:** argillaceous, medium light gray (N6) to light brownish-gray (5YR 6/1), moderately hard, finely to medium crystalline. Clay content ranges from 2-8%, with clay breaks at 4.4', 5.2', and 6.1'. Trace of interstitial polyhalite at 6.0'. Gray clay parting at 6.5'.	
1		2.0	100	–	X X	**0.0'-3.8' HALITE:** polyhalitic in part, clear and moderate reddish-orange (10R 6/6) interstitial polyhalite. Moderately hard and medium to coarsely crystalline.	Began coring at 08:30 hours on 10 February 1983. Cored to 5.8' without inner barrel.
0	0	.85	83	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-63 INSTRUMENT TYPE & NUMBER Extensometer GE-243 HOLE SIZE NX

LOCATION 0 East Drift, 1110' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1110, E0 COLLAR ELEV. 1310.6' DIRECTION OF DRILLING vertical UP

MINE COORDINATES N10796.0, E6891.9 BOREHOLE PENETRATION 52.8'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/12/83 SHEET 2 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
12	50	4.0	100	60		**40.6'-50.3' ARGILLACEOUS HALITE:** clear to mottled medium gray (N5), moderate brown (5YR 3/4) to pale yellowish-brown (10YR 6/2), moderately hard, finely to coarsely crystalline. Finely crystalline from 41.6'-42.5' and from 47.0'-48.3'. Clear halite from 44.0'-45.3'. Clay content ranges from 0-20% with numerous clay breaks throughout. Clay breaks at: 41.4', 42.4', 43.3', 43.8', 46.5', 46.6', 47.0', and 49.5'. Brown clay parting, moist, highly plastic at 50.3'.	
11	45	5.1	100	-			
10	40	5.0	100	-	X	**36.8'-40.6' HALITE:** clear, moderately hard, medium to coarsely crystalline, few stringers of white anhydrite throughout. Slightly polyhalitic in part from 38.5'-40.0'.	
					X	**36.1'-36.8' ANHYDRITE:** light gray (N7) to medium dark gray (N4), hard, dense, microcrystalline, slightly banded in part. Trace of polyhalite at 36.5'.	
9	35	5.1	100	-	X	**36.0'-36.1' CLAY:** pale brown (5YR 5/2), moderately soft, moist, highly plastic near horizontal.	
					X	**31.1'-36.0' ARGILLACEOUS HALITE:** clear to grayish-brown (5YR 3/2), and moderate brown (5 YR 3/4), moderately hard, finely to coarsely crystalline; clay content ranges from 0 to 10%. Numerous clay breaks and partings and trace of polyhalitic halite at 35.5'. Clay breaks at: 32.0', 33.1', 33.3', 33.8', 34.2', and 35.0'. Brown clay parting at 34.4'.	
8	30	5.0	100	-			
					X	**23.4'-31.1' HALITE:** clear, coarsely crystalline, moderately hard, trace of white anhydrite in hairline stringers. From 27.3'-29.3' slightly argillaceous in part, finely crystalline and grayish-brown (5YR 3/2). Brown clay breaks at: 27.4', 27.6', and 29.1'. Trace of orange polyhalite from 28.6'-29.0'	
7	25	5.0	100	-			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-63 INSTRUMENT TYPE & NUMBER Extensometer GE-243 HOLE SIZE NX

LOCATION 0 East Drift, 1110' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1110, E0 COLLAR ELEV. 1310.6' DIRECTION OF DRILLING vertical up

MINE COORDINATES N10796.0, E6891.9 BOREHOLE PENETRATION 52.8'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/12/83 SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	55						Hole completed at at 14:45 hours on 10 February 1983.
12	50	4.0	100	–	X X X	50.3'-52.8' **HALITE:** polyhalitic, clear and moderate reddish-orange (10R 6/6), coarsely crystalline, moderately hard. Polyhalite, which comprises about 0-10% of core, occurs interstitially and as isolated blebs.	Total Penetration = 52.8'

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-64 INSTRUMENT TYPE & NUMBER Extensometer GE-221 HOLE SIZE NX

LOCATION 0 East Drift, 1110' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1110, E0 COLLAR ELEV. 1301.5' DIRECTION OF DRILLING vertical down

MINE COORDINATES N10796.0, E6891.6 DEPTH OF BOREHOLE 52.8'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/12/83

RUN NUMBER	DEPTH ( )	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
0		1.0	100	-			
1	5	6.0	100	-		**0.0'-8.0' HALITE:** argillaceous and polyhalitic in part; clear to medium gray (N5) and moderate reddish orange (10R 6/6); moderately hard, finely to coarsely crystalline with few clay breaks. Clay and polyhalite up to 5% locally. Clay breaks at 1.5', 2.2', 2.5', 3.3', 3.7', 6.3', and 7.5'.	Hole began at 15:00 hours on 10 February 1983. Hole cored from 0' to 1' using a 6" core barrel. From 1' to 7' hole cored without inner core barrel.
2	10	4.9	98	-		**8.0'-10.6' POLYHALITIC HALITE:** clear and moderate reddish orange (10R 6/6). Polyhalite occurs as dense isolated stringers and blebs and comprises 15% of core. From 10.0'-10.6' polyhalite is finely crystalline, hard and comprises up to 100% of core.	
						10.6'-12.8' ANHYDRITE: light gray (N7) to light olive-gray (5Y 6/1), moderately hard, microcrystalline, highly fractured. Core broken into 1/4'-1/2' chips.	Core Loss: Run 2 — Where Lost 9.3'-9.4' Run 8 — Where Lost 40.8'-41.0'
3	15	5.1	100	-		**12.8'-15.0' ARGILLACEOUS HALITE:** light gray (N7) to medium dark gray (N4), finely crystalline, moderately hard with clay content up to 20%. Gray clay breaks at 13.2', 13.3', and 13,7'. Numerous interstitial clay layers from 14.0'-15.0'. Gray clay parting at 12.8'.	
4	20	5.0	100	-		**15.0'-35.6' POLYHALITIC HALITE:** clear and moderate reddish orange (10R 6/6), moderately hard, medium to coarsely crystalline. Polyhalite ranges from 0-15% with polyhalite blebs and interstitial zones. Slightly gray and argillaceous from 20.9'-21.9' and from 27.9'-28.2'. Clay breaks at: 20.9', 21.3', and 28.0'. Clear halite from 29.2'-29.9' and from 31.5'-32.4'.	
5	25	5.2	100	-			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-64 INSTRUMENT TYPE & NUMBER Extensometer GE-221 HOLE SIZE NX

LOCATION 0 East Drift, 1110' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1110, E0 COLLAR ELEV. 1301.5' DIRECTION OF DRILLING vertical down

MINE COORDINATES N10796.0, E6891.6 DEPTH OF BOREHOLE 52.8'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/12/83 SHEET 2 OF 3

RUN NUMBER	DEPTH ( )	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
5	25	5.2	100	–		(as above)	
6	30	5.1	100	–			
7	35	5.2	100	–		35.6'-36.2' **ANHYDRITE:** olive gray (5Y 4/1) highly fractured and broken, dense, microcrystalline. Core broken into 1/2" pieces. Gray clay seam 1/2" thick at 36.2'.	
8	40	4.8	96	–		36.2'-43.3' **HALITE:** argillaceous in part, clear and mottled medium gray (N5) to pale yellowish brown (10YR 6/2). Interstitial clay content up to 10% locally. Clay breaks at: 39.9' and 40.0'. Few zones of orange interstitial polyhalitic halite at: 37.5', 39.0', 40.1' and 42.7'.	
9	45	5.2	100	–		43.3'-50.0' **ARGILLACEOUS HALITE:** clear and mottled grayish brown (5YR 3/2) and medium gray (N5) moderately hard, finely to coarsely crystalline. Clay content ranges from <1% to 25%. Clay breaks at: 44.0', 44.7', 45.9', 46.5', 47.0', 47.3', 48.1', 48.6', and 49.4'. Few polyhalite stringers at 44.5' and 45.6'.	
10	50	5.2	100	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-64 INSTRUMENT TYPE & NUMBER Extensometer GE-221 HOLE SIZE NX

LOCATION 0 East Drift, 1110' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1110, E0 COLLAR ELEV. 1301.5' DIRECTION OF DRILLING vertical down

MINE COORDINATES N10796.0, E6891.6 DEPTH OF BOREHOLE 52.8'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/12/83 SHEET 3 OF 3

RUN NUMBER	DEPTH ( )	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
10	50	5.0	100	–	X	50.0'-52.8' **HALITE:** clear, coarsely crystalline, moderately hard. Core broken into 1/4" pieces from 51.5'-52.0'. Slightly polyhalitic from 52.5'-52.8'.	Hole completed at 19:00 hours on 10 February 1983 Total Depth = 52.8'
	55						

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-67 INSTRUMENT TYPE & NUMBER Extensometer GE-220 HOLE SIZE NX

LOCATION Test Room 1, Centerline of Room at Station N1265, in Floor 16.5' From E and W Ribs.

STATION N1265, W231.5 COLLAR ELEV. 1296.8 DIRECTION OF DRILLING Down Vertical

MINE COORDINATES N10952.1, E6662.9 DEPTH OF BOREHOLE 51.7'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY IFG DATE 5/5/83 SHEET 1 OF 3

RUN NUMBER	DEPTH (Ft)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
0	0	1.0	1.0	–		**0.0' – 3.7' POLYHALITIC HALITE:** Clear mottled with moderate reddish-orange (10R 6/6), coarsely crystalline, medium hard. Blebs of polyhalite <1 to 5%. Trace (<1%) gray clay.	Started Drilling at 09:45 hours on 18 April 1983. 5 1/2" single-tube barrel used to core 0.0 to 1.0'. NX single tube barrel used 1.0' to 4.8'. NX double tube barrel used 4.8' to 51.7'.
1		3.3	87	–		**3.7' – 6.8' ANHYDRITE:** (Marker Bed 139) Very light gray (N8) anhydrite mixed with moderate reddish- orange (10R 6/6), and reddish-brown (10R 4/6) polyhalite and polyhalitic halite from 3.7' to 6.0', core hard. From 5.0 to 6.0', core is predominantly moderate reddish-brown (10R 4/6) polyhalite. Core broken into "disc-like" pieces as thin as 0.01'. Core medium hard. From 6.0' to 6.8', core is all anhydrite, microcrystalline; hard gray clay at 6.7' to 6.8'.	
2	5	1.8	85	–			
3		4.8	100	–		**6.8' – 9.8' HALITE:** Clear to moderate reddish-orange (10R 6/6) and grayish-brown (5YR 4/1) medium to coarsely crystalline, medium hard. <1 to 3% polyhalite. <1 to 3% gray clay to 8.6', turning to brown clay. Clay parting at 9.1'. Numerous breaks throughout core.	Moderate gas flow at 6' to 7'. Flow for 3 to 4 minutes, then slowed down appreciably. Methane 3 to 4 1/2% at collar.
4	10	5.1	100	–		**9.8' – 14.7' POLYHALITIC HALITE:** Clear to moderate reddish-orange (10R 6/6), coarsely crystalline, hard polyhalite generally <1 to 5% with local zones >5%. From 14.3' to 14.7' polyhalite 20 to 60%.	
5	15	4.8	100	–		**14.7' – 16.6' HALITE:** Clear to brownish-gray (5YR 4/1) with some moderate reddish-brown (10R 4/6), medium to coarsely crystalline, medium hard, trace (< 1%) of gray and brown clay. Trace (<1%) polyhalite. Clay breaks at 14.7' and 16.0'.	
6	20	5.1	100	–		**16.6' – 20.5' POLYHALITIC HALITE:** Clear to moderate reddish-orange (10R 6/6), coarsely crystalline, hard. <1 to 5% polyhalite. <1% grey clay.	
	25					**20.5' – 26.5' HALITE:** Clear to moderate reddish-orange (10R 6/6) and moderate reddish-brown (10R 4/6), medium to coarsely crystalline, medium hard. <1 to 2% polyhalite and 1 to 2% clay. Clay breaks at 20.5', 23.4', 24.4' and 25.2'.	

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-67 INSTRUMENT TYPE & NUMBER Extensometer GE-220 HOLE SIZE NX

LOCATION Test Room 1, Centerline of Room at Station N1265, in Floor 16.5' From E and W Ribs.

STATION N1265, W231.5 COLLAR ELEV. 1296.8 DIRECTION OF DRILLING Down Vertica

MINE COORDINATES N10952.1, E6662.9 DEPTH OF BOREHOLE 51.7'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 5/5/83 SHEET 2 OF 3

RUN NUMBER	DEPTH (FT)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.1	100	–		As Above	
7	30	4.8	100	–		26.5' – 31.6' **HALITE**: Clear to moderate reddish-orange (10R 6/6), coarsely crystalline, hard blebs and patches of polyhalite <1 to 3%. Polyhalitic from 29.4' to 30.5'. Anhydrite stringers from 30.5' to 30.9'	
						31.6' – 31.9' **ANHYDRITE**: Very light (N8) to medium dark gray (N4), laminated, micro-crystalline, hard. Trace of clay at 31.9'. Some core grinding evident.	
8	35	4.95	99	–		31.9' – 38.7' **HALITE**: Clear to grayish brown (5Y 3/2) and moderate reddish-orange, fine to coarsely crystalline, medium hard. Contains <1 to 3% clay and <1% polyhalite. Argillaceous halite from 32.7' to 33.7'.	
9	40	5.0	100	–		38.7' – 41.5' **ARGILLACEOUS HALITE**: Clear to brownish gray (5YR 4/1), coarsely crystalline, medium hard. Gray and brown clay <1 to 5%. Breaks at 39.0', 40.3', 40.5' and 41.0'.	
10	45	5.2	100	–		41.5' – 51.7' **HALITE**: Clear to brownish-gray (5YR 4/1) to moderate reddish-orange, medium to coarsely crystalline, medium hard, <1% poly-halite. Clay, generally <1%. Zones from 42.4' to 43.3', 47.3' – 47.6' and 49.1' – 49.3' containing clay breaks and up to 5% clay. Core broken up at 46.8' to 47.1' due to extraction from core barrel. Core clear from 44.9' to 47.2'.	
11	50	4.8	96	–			

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO DO-67 INSTRUMENT TYPE & NUMBER Extensometer GE-220 HOLE SIZE NX

LOCATION Test Room 1, Centerline of Room at Station N1265, in Floor 16.5' From E and W Ribs.

STATION N1265, W231.5 COLLAR ELEV. 1296.8 DIRECTION OF DRILLING Down Vertical

MINE COORDINATES N10952.1, E6662.9 DEPTH OF BOREHOLE 51.7'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 5/5/83 SHEET 3 OF 3

RUN NUMBER	DEPTH (FT)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	4.8	96	–		As Above	Completed drilling at 15:25 hours on 18 April 1983.
	55						Total penetration = 51.7 feet.

WIPP
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-69 INSTRUMENT TYPE & NUMBER Extensometer GE-218 HOLE SIZE NX

LOCATION Test Room 1, Centerline of Room at Station N1265, in Roof 16.5 Feet From E and W Ribs.

STATION N1265, W231.5 COLLAR ELEV. 1310.1 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10951.9, E6662.5 BOREHOLE PENETRATION 51.4'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 5/6/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.1	100	–	X X	19.6' – 27.0' **HALITE:** Clear to brownish gray (5YR 4/1), medium to coarsely crystalline, medium hard to hard. Trace of polyhalite 20.6' to 20.8' and 22.4' to 23.0'. Trace (1-2%) gray clay at 19.6' to 22.4'. Brown clay (<3%) mixed with halite at 23.8' to 24.0'. Core broken up.	
5	20	4.9	100	–	X X	16.4' – 19.6' **POLYHALITIC HALITE:** Clear mottled with moderate reddish orange (10R 6/6) and moderate reddish brown (10R 4/6) polyhalite, coarsely crystalline, medium hard to hard polyhalite <1 to 5%. Trace (<1%) clay.	
4	15	5.1	100	–	X	14.9' – 16.4' **HALITE:** Clear mottled with moderate reddish orange (10R 6/6) polyhalite, coarsely crystalline, medium hard. Polyhalite <1%.	Light to moderate gas flow at 14'±. 1 to 3% methane at return line. Flow for approximately 10 minutes. Smell of "rotten egg" noted.
						14.0' – 14.9' **ANHYDRITE:** (Anhydrite "a") white, very light (N8) to medium gray (N5), microcrystalline, hard. Trace of halite. Trace of clay at 14.0'.	
3	10	4.9	100	–	X	7.27' – 14.0' **HALITE:** Clear, medium to coarsely crystalline, hard. Contains minute traces (<1%) of polyhalite, scattered irregular anhydrite stringers. Gray clay break at 13.25'.	
					X	7.0' – 7.27' **ANHYDRITE:** (Anhydrite "b") Light gray (N7), microcrystalline, hard anhydrite mixed with some halite. Trace of gray clay at 7.0'.	Light-moderate gas flow at 7'±. Faint smell. Flow lasted several minutes. No methane measured at return line.
2	5	5.0	100	–	X	6.5' – 7.0' **ARGILLACEOUS HALITE:** Clear to grayish brown (5YR 3/2), medium crystalline, medium hard. Clay predominantly gray with some brown (<5%), clay breaks at 6.7' and 6.8'.	NX double-tube barrel used from 1.6' to 51.4'.
						5.1' – 6.5' **HALITE:** Clear to brownish gray (5YR 4/1) and medium gray (N5), medium to coarsely crystalline, medium hard. Trace of gray clay (<1% to 2%) throughout.	NX single-tube barrel used from 1.0' to 1.6'.
1		.33	60	–			5 1/2" single-tube barrel used from 0.0' to 1.0'.
0	0	1.0	100	–	X	0.0' – 5.1' **HALITE:** Clear to mottled with scattered medium reddish orange (10R 6/6) blebs of polyhalite, coarsely crystalline, medium hard to hard, polyhalite <1%.	Coring started at 11:45 hours, 12 April 1983.

WIPP
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-69 INSTRUMENT TYPE & NUMBER Extensometer GE-218 HOLE SIZE NX

LOCATION Test Room 1, Centerline of Room at Station N1265, in Roof 16.5 Feet From E and W Ribs

STATION N1265, W231.5 COLLAR ELEV. 1310.1 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10951.9, E6662.5 BOREHOLE PENETRATION 51.4'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 5/6/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	50				X	As Above	
11		5.1	100	–	—	**45.2' – 49.3' ARGILLACEOUS HALITE:** Clear to dark reddish brown (10R 3/4), medium to coarsely crystalline, medium hard. Brown clay <1 to 10%. Clay breaks throughout.	
					—	**40.7' – 45.2' HALITE:** Clear to grayish brown (5YR 3/2) to moderate reddish brown (10R 4/6) and dark reddish brown (10R 3/4), fine to coarsely crystalline, medium hard. Trace (1%) polyhalite. Predominantly brown clay (<1%) with locally >3%. Clay breaks at 42.7' and 43.4'. Broken up at 42.3' to 42.6' probably during removal from barrel.	
10	45	4.8	100	–	— X		
					—	**38.5' – 40.7' POLYHALITIC HALITE:** Clear mottled with moderate reddish orange (10R 6/6) and reddish brown (10R 4/6), coarsely crystalline, medium hard to hard. Polyhalite <1 to 5%. Scattered anhydrite stringers.	
9	40	5.0	100	–	X	**36.7' – 38.5' HALITE:** Clear to dark reddish brown (10R 3/4), coarsely crystalline, hard. Contains trace of polyhalite, generally <1% but locally >5%. Irregular anhydrite stringers scattered within core. Anhydrite >40% from 36.7' to 37.1'.	
					X X		
						36.3' – 36.7' ANHYDRITE: (Marker Bed 138) : White to very light (N8) and medium gray (N5), microcrystalline, hard.	
8	35	5.0	100	–	—	**32.1' – 36.3' ARGILLACEOUS HALITE:** Clear to dark reddish brown (10R 3/4), medium to coarsely crystalline, medium hard. Brown clay 2 to 10%. Clay breaks throughout. 1" brown clay seam at 36.3'.	
					— X	**29.3' – 32.1' HALITE:** Clear, medium to coarsely crystalline, medium hard to hard. Trace (<1%) clay and polyhalite from 31.6'.	
7	30	4.9	100	–	—	**27.0' – 29.3' ARGILLACEOUS HALITE:** Clear to grayish brown (5YR 3/2), predominantly coarsely crystalline; fine-medium crystalline from 28.6' to 29.3', medium hard. Predominantly brown clay <1 to 5%. Clay breaks at 28.6' and 29.3'.	
					X		
6	25	5.1	100	–	—	As Below	

WIPP
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-69 INSTRUMENT TYPE & NUMBER Extensometer GE-218 HOLE SIZE NX

LOCATION Test Room 1, Centerline of Room at Station N1265, in Roof 16.5 Feet From E and W Ribs.

STATION N1265, W231.5 COLLAR ELEV. 1310.1 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10951.9, E6662.5 BOREHOLE PENETRATION 51.4'

DRILLING METHOD Rotary W/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 5/6/83 SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50–55	5.1	100	–	X	49.3' – 51.4' **POLYHALITIC HALITE:** Clear mottled with moderate reddish orange (10R 6/6) polyhalite, coarsely crystalline, medium hard to hard. Polyhalite averages 1 to 3%, locally up to 5%. Trace (<1%) gray clay.	Total penetration = 51.4'. Drilling completed at 12:30 hours, 13 April 1983.

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO DO-77 INSTRUMENT TYPE & NUMBER Extensometer GE-216 HOLE SIZE NX

LOCATION Test Room 2, Centerline of Room at Station N1270 in Floor 16.5 Feet From E and W Ribs.

STATION N1270, W364.5 COLLAR ELEV. 1294.6 DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N10962.5, E6529.6 DEPTH OF BOREHOLE 53.4'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 3/31/83

RUN NUMBER	DEPTH (Ft)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
0		0.8	100	—	X X	**0.0' - 1.7'** **POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) to moderate reddish brown (10R 4/6), coarsely crystalline, hard. Polyhalite comprises <5% to 15% of rock.	Started drilling 27 March 1983 at 9:10 a.m. 5 1/2" diameter single-tube core barrel used from 0.0' to 0.8'. NX single-tube core barrel used from 1.0' to 5.6'. NX double-tube core barrel used from 5.6' to 53.4'.
1		1.0	50	—	X X X	**1.7' - 4.1'** **HALITE:** clear, coarsely crystalline, moderately hard. Core is broken up, possible core loss. Trace (<2%) polyhalite blebs.	
2	5	1.9	68	—	X X	**4.1' - 7.25'** **ANHYDRITE (Marker Bed 139):** moderate reddish-orange (10R 6/6) to moderate reddish-brown (10R 4/6) polyhalitic halite, medium to coarsely crystalline, mixed with very light (N8) to light gray (N7) anhydrite from 4.1' to 6.4'. Grades into medium (N5) to very light gray (N8) anhydrite at approximately 6.4'. Microcrystalline, hard, dense. Trace of gray clay at 7.25'. Core grinding evident within this zone.	
3		0.9	64	—	X X		
4	10	5.0	100	—	X X X X	**7.25' - 23.6'** **POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6), fine to medium crystalline, hard. Polyhalite averages <5% to 10% with <2% from 14.7' to 17.3'. Gray clay breaks at 7.8', 8.0', 9.8' and 14.5'. Scattered clay breaks at 21.0' to 22.5'. Core contains gray clay (2% to 4%) from 14.4' to 23.6'.	Possible Core Loss Zones: Run 1: Throughout Run 2: From 2.8' to 4.1'. Run 3: Throughout
5	15	5.3	100	—	X X — X		
6	20	5.2	100	—	X X X X —X		
7	25	5.2	100	—	X X — X	**23.6' - 27.2'** **HALITE:** clear and brownish gray (5YR 4/1) to moderate reddish-brown (10R 4/6), fine to coarsely crystalline, hard. Gray clay (<1% to 4%). Polyhalite content <1% to 5%, generally increasing with depth from 26.0'. Scattered clay breaks within core.	

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING - LOG

BORING NO. DO-77 INSTRUMENT TYPE & NUMBER Extensometer GE-216 HOLE SIZE NX

LOCATION Test Room 2, Centerline of Room at Station N1270 in Floor 16.5 Feet from E and W Ribs.

STATION N1270, W364.5 COLLAR ELEV. 1294.6 DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N10962.5, E6529.6 DEPTH OF BOREHOLE 53.4'

DRILLING METHOD ~~Rotary w/Brine~~ DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 3/31/83 SHEET 2 OF 3

RUN NUMBER	DEPTH (Ft)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
7	25	5.2	100	—		(as above)	
8	30	5.2	100	—		**27.2' - 31.2'** **POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) to moderate reddish brown (10R 4/6), coarsely crystalline, hard. Polyhalite occurs as blebs and irregular patches, generally <1% to 5% but locally >15%.	
						31.2' - 32.1' **HALITE:** clear, medium to coarsely crystalline, hard. Trace of polyhalite.	
9	35	5.2	100	—		**32.1' - 32.3'** **ANHYDRITE:** very light gray (N8) to medium light gray (N6), microcrystalline, banded. Trace of clear halite. Trace of clay at 32.3'. Some core grinding evident.	
						32.3' - 36.9' **HALITE:** clear to brownish gray (5YR 4/1), medium to coarsely crystalline, hard. Gray clay <1% to 3% scattered throughout. Trace of moderate reddish-orange (10R 6/6) polyhalite.	
10	40	5.1	100	—		**36.9' - 43.5'** **ARGILLACEOUS HALITE:** clear to brownish-gray (5YR 4/1), fine to coarsely crystalline, hard. Brown clay seam ($\frac{1}{4}$") at 40.8' and clay parting at 41.3'. Moderate reddish-orange (10R 6/6) polyhalite constitutes 1% to 2% of core. Several clay breaks from 41.0' to 41.7'.	
11	45	5.1	100	—		**43.5' - 53.4'** **HALITE:** clear to grayish red (10R 4/2), medium to coarsely crystalline, hard. Trace of gray clay and trace of polyhalite blebs. 1% to 2% gray clay from 51.0' to 52.15' and 52.75' to 53.1'.	
12	50	5.1	100	—			

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-77 INSTRUMENT TYPE & NUMBER Extensometer GE-216 HOLE SIZE NX

LOCATION Test Room 2, Centerline of Room at Station N1270 in Floor 16.5 Feet From E and W Ribs.

STATION N1270, W364.5 COLLAR ELEV. 1294.6 DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N10962.5, E6529.6 DEPTH OF BOREHOLE 53.4'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 3/31/83 SHEET 3 OF 3

RUN NUMBER	DEPTH (Ft)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
12	50	5.1	100	—	X	43.5' - 53.4' **HALITE:** clear to grayish red (10R 4/2), medium to coarsely crystalline, hard. Trace of gray clay and trace of polyhalite blebs. 1% to 2% gray clay from 51.0' to 52.15' and 52.75' to 53.1'.	Completed drilling 27 March 1983 at 2:00 p.m. Total Depth = 53.4'
	55						

WIPP-SPDV
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-79 INSTRUMENT TYPE & NUMBER Extensometer GE-214 HOLE SIZE NX

LOCATION Test Room 2. Centerline of Room at Station N1270 in Roof 16.5 Feet From E and W Ribs.

STATION N1270, W364.5 COLLAR ELEV. 1307.7 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10962.6, E6529.5 BOREHOLE PENETRATION 51.8'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 3/24/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.3	100	—	X	23.4'-27.9' **HALITE:** clear, medium crystalline, moderately hard. Obscure traces of polyhalite and argillaceous material. Core broken up from 27.4' to 27.6'. Irregular white anhydrite stringers at 23.7'.	
5	20	4.8	96	—	X	18.4'-23.4' **ARGILLACEOUS HALITE:** moderate brown (5YR 3/4) to moderate reddish-orange (10R 6/6) with some clear halite, medium to coarsely crystalline, hard. Scattered brown clay breaks. 1/4" brown clay seam at 23.3'. Trace polyhalite blebs (<1%) found locally. Argillaceous content varies from <1% to 5%.	
						14.1'-18.4' **POLYHALITIC HALITE:** clear to mottled with moderate reddish-orange (10R 6/6) and moderate reddish-brown (10R 4/6) blebs of polyhalite. Medium to coarsely crystalline, hard. White anhydrite stringers from 15' to 15.1' and 15.2' to 15.3'. Polyhalite content varies from <2% to 5%. Scattered traces of argillaceous material from 17.1' to 18.4'.	
4	15	5.1	100	—	X	13.8'-14.1' **ANHYDRITE:** (Anhydrite "a") light gray (N7) to white, microcrystalline, hard, dense. Trace of gray clay at 13.8'. Some evidence of core grinding.	Trace of gas at 14'±. No methane at end of return line.
					X	13.3'-13.8' **HALITE:** grayish-red (5R 4/2) to clear, fine to medium crystalline, hard. Contains few gray clay breaks and trace of polyhalite.	
3	10	4.8	96	—		7.35'-13.3' **HALITE:** clear with scattered zones of moderate reddish-orange (10R 6/6) and moderate reddish-brown (10R 4/6), medium to coarsely crystalline, moderately hard to hard. Thin, very light gray (N8) to white anhydrite stringers at 8.0', 8.5' and 8.8'.	Possible Core Loss Zones: Run 2: throughout Run 5: throughout Run 7: 27.9' to 29.8'.
						7.1'-7.35' **ANHYDRITE:** (Anhydrite "b") light gray (N7) to medium gray (N5), banded, microcrystalline, hard, dense. Trace of brown clay.	
2	5	4.5	96	—	X	4.5'-7.1' **ARGILLACEOUS HALITE:** grayish-brown (5YR 3/2), predominantly medium crystalline ranging to coarsely crystalline, moderately hard to hard. Trace of reddish-orange polyhalite throughout. Clay content <5%, predominantly gray ranging to brown. Gray clay break at 6.3'. Trace of gray clay at 7.1', with evidence of core grinding.	Hit gas at 7'. Measured < 2% methane at end of return line. Moderate gas flow. NX double-tube core barrel used from 2.4' to 51.8'. NX single-tube core barrel used from 1.0' to 2.4'.
1		1.4	100	—		0.0'-4.5' **HALITE:** clear to moderate reddish-orange (10R 6/6), medium to coarsely crystalline, moderately hard. Trace of polyhalite blebs and brown argillaceous material found throughout.	0' - 1.0' drilled with 5 1/2" single-tube core barrel. Drilling began at 11:35 a.m. on 21 March 1983
0	0	1.0	100	—	X		

WIPP-SPDV
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-79 INSTRUMENT TYPE & NUMBER Extensometer GE-214 HOLE SIZE NX

LOCATION Test Room 2. Centerline of Room at Station N1270 in Roof 16.5 Feet From E and W Ribs.

STATION N1270, W364.5 COLLAR ELEV. 1307.7 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10962.6, E6529.5 BOREHOLE PENETRATION 51.8'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 3/24/83 SHEET 2 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	5.2	100	—	—	As Above	
10	45	5.1	100	—	—	**44.4'-46.7'** **HALITE:** clear mottled with some moderate reddish-brown (10R 4/6), medium to coarsely crystalline, hard. Trace of brown argillaceous material (<1%).	
					—	**40.8'-44.4'** **HALITE:** moderate reddish-brown (10R 4/6) to dark brown (10R 3/4) with some clear halite, fine to coarsely crystalline, moderately hard. Scattered zones of brown clay. Argillaceous content averages <2% but locally >5%.	
9	40	5.1	100	—	—	**37.3'-40.8'** **HALITE:** clear from 37.4' to 38.4'. Clear, mottled with moderate reddish-orange (10R 6/6) and moderate reddish-brown (10R 4/6) comprises remaining portion of section; medium to coarsely crystalline, hard. Trace (2%) of polyhalite from 37.3' to 38.4' and 38.4' to 40.8'. Core broken up from 37.4' to 37.9' and 38.1' to 38.2'.	
					X	**36.3'-37.3'** **ANHYDRITE:** (Marker Bed 138) very light gray (N8) to medium dark gray (N4) to white, banded, microcrystalline, hard. Clear to reddish-orange (10R 6/6) halite is mixed with anhydrite from 36.9' to 37.3'.	
8	35	4.1	100	—	—	**35.4'-36.3'** **HALITE:** clear, coarsely crystalline, hard. Several scattered blebs of grayish-brown argillaceous material.	
					—	**31.8'-35.4'** **ARGILLACEOUS HALITE:** clear to dark reddish-brown (10R 3/4) to moderate brown (5YR 3/4) to brownish-gray (5YR 4/1) mottled, medium to coarsely crystalline, moderately hard. Brown and gray clay generally <2%. Numerous clay breaks.	
7	30	4.7	94	—	—	**29.8'-31.8'** **HALITE:** clear, medium to coarsely crystalline, moderately hard. Traces of brown clay (<1%).	
					—	**27.9'-29.8'** **HALITE:** clear to moderate brown (5YR 3/4), medium to coarsely crystalline, moderately hard. Trace of argillaceous material throughout. Contains thin (F 1/8 ") brown clay partings at 28.6', 29.5', and 29.8'.	
6	25	5.3	100	—	—	As Below	**Air bubbles in return water continuously to 37'±. No methane at end of return line.**

WIPP
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-79 INSTRUMENT TYPE & NUMBER Extensometer GE-214 HOLE SIZE NX

LOCATION Test Room 2, Centerline of Room at Station N1270 in Roof 16.5 Feet From E and W Ribs

STATION N1270, W364.5 COLLAR ELEV. 1307.7 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10962.6, E6529.5 BOREHOLE PENETRATION 51.8'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 3/24/83 SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	55					**50.3'-51.8' POLYHALITIC HALITE:** clear mottled with moderate reddish-orange (10R 6/6) and moderate reddish-brown (10R 4/6) polyhalite blebs and stringers; medium to coarsely crystalline, hard. Polyhalite content ≤5%.	
						46.7'-50.3' ARGILLACEOUS HALITE: clear to moderate reddish-orange (10R 6/6) mixed with moderate reddish-brown (10R 4/6), fine to coarsely crystalline, moderately hard. Argillaceous content typically < 3% but >5% from 46.7' to 47.8'; color of core through this interval mottled dark reddish brown (10R 3/4). Zone of fine crystalline halite mixed with argillaceous material from 49.7' to 50.0'. Clay breaks/partings from 49.1' to 49.2'.	Total Penetration = 51.8' Hole completed at 5:30 p.m. on 21 March 1983.
11	50	5.2	100	—	X		

WIPP
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-88 INSTRUMENT TYPE & NUMBER Extensometer GE-212 HOLE SIZE NX

LOCATION Test Room 3, Centerline of Room at Station N1265, in Roof 16.5 Feet From E and W Ribs.

STATION N1265, W497.5 COLLAR ELEV. 1305.9 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10952.8, E6396.5 BOREHOLE PENETRATION 52.7'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 4/14/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.0	100	–	X	See Above	
5	20	5.2	100	–	X	19.3' – 24.1' **ARGILLACEOUS HALITE:** clear to moderate brown (5YR 3/4), medium to coarsely crystalline, hard. Trace of polyhalite. Anhydrite stringers at 23.4', 24.0' to 24.1' and scattered traces of anhydrite from 21.5' to 22.2'. Clay partings from 23.9' to 24.1'; clay breaks throughout. Clay content <3 to >5%.	
4	15	4.8	100	–	X X	14.8' – 19.3' **POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) and moderate reddish-brown (10R 4/6), medium to coarsely crystalline, hard. Blebs and irregular patches of polyhalite, up to 5%. Scattered anhydrite stringers from 15.4' to 16.6'.	
						14.3' – 14.8' **ANHYDRITE:** (Anhydrite "a") very light (N7) to medium gray (N5), micro-crystalline, hard. Trace of gray clay at 14.3'.	Gas hit again while drilling Anhydrite "a" (14.3' to 14.8'); 3 to 4% methane at end of return line. Strong flow to 15'± then slowed appreciably.
						13.4' – 14.3' **HALITE:** clear to dark reddish brown (10R 3/4), fine to medium crystalline, hard. Contains trace of brown and gray clay, locally up to 3%.	
3	10	5.3	100	–	X X	7.55' – 13.4' **HALITE:** clear, medium to coarsely crystalline, hard, trace of polyhalite (<1%).	
						7.33' – 7.55' **ANHYDRITE:** (Anhydrite "b") very light (N7) to medium gray (N5), micro-crystalline, hard. Contains scattered polyhalitic halite. Gray clay parting at 7.33'.	Gas hit at 7.33'. 2% to 4% methane at end of return line. Moderate to strong gas flow for 3 to 4 minutes, decreasing to light flow with 1 1/2% methane. Gas gave off foul odor.
2		1.5	100	–		6.25' – 7.33' **ARGILLACEOUS HALITE:** clear to grayish-brown (5YR 3/2), fine to medium crystalline, hard. Contains brown and gray clay, up to 5%. Clay breaks at 6.3', 7.2', and 7.25'.	Drilled in low gear entire hole to minimize rod vibration.
1	5	5.3	100	–	X	4.7' – 6.25' **HALITE:** brownish-gray (5YR 4/1) to medium gray (N5), medium to coarsely crystalline, hard. Trace of gray clay scattered throughout.	NX double-tube core barrel used from 0.95' to 52.70'.
0	0	0.9	100	–	X	0.0' – 4.7' **HALITE:** clear to moderate reddish-orange (10R 6/6), medium to coarsely crystalline, moderately hard. Contains trace (<1%) polyhalite blebs. Slightly more polyhalite from 0.0' to 1.4'.	Drilling begun: 4 April 1983 at 11:00 a.m. 5 1/2" diameter single-tube core barrel used to core from 0.0' to 0.95'.

WIPP
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-88 INSTRUMENT TYPE & NUMBER Extensometer GE-212 HOLE SIZE NX

LOCATION Test Room 3, Centerline of Room at Station N1265, in Roof, 16.5 Feet From E and W Ribs.

STATION N1265, W497.5 COLLAR ELEV. 1305.9 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10952.8, E6396.5 BOREHOLE PENETRATION 52.7'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 4-14-83 SHEET 2 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	4.4	100	—		**46.0' - 49.8'** **ARGILLACEOUS HALITE:** clear to dark reddish-brown (10R 3/4), fine to coarsely crystalline, moderately hard. Brown argillaceous material generally <1% up to 5%. Clay seams and soft clay/halite mixture (clay >50%) from 47.6' to 47.7' and 49.5' to 49.8'. Scattered clay breaks throughout.	
10	45	5.0	100	—	X	**41.8' - 46.0'** **HALITE:** clear to grayish-brown (5YR 3/2) to moderate reddish-brown (10R 4/6) and dark reddish-brown (10R 3/4) fine to coarsely crystalline, hard. Predominantly brown argillaceous material <1% with >5% locally. Argillaceous halite from 41.8' to 42.7' and 43.8' to 44.6'. Brown clay partings from 44.0' to 44.2' and clay breaks at 44.2' to 46.0'. Trace of polyhalite.	
9	40	5.0	100	—	XXXXXXX	**37.15' - 41.8'** **HALITE:** clear with moderate reddish-orange (10R 6/8) blebs and irregular stringers of polyhalite. Coarsely crystalline, hard. Polyhalite <1% to 2%. Trace of argillaceous material (<1%) from 41.1' to 41.8'. Scattered irregular anhydrite stringers from 38.0' to 41.8'.	
8	35	5.2	100	—	X	**36.3' - 37.15'** **ANHYDRITE:** (Marker Bed 138) very light (N8) to medium gray (N6), micro-crystalline, hard. Trace (<1%) polyhalite.	
					X	**35.5' - 36.3'** **HALITE:** clear, coarsely crystalline, moderately hard. Trace of polyhalite blebs and trace of clay (<1%) from 36.1'. Brown clay parting at 36.3'.	
						31.9' - 35.5' **ARGILLACEOUS HALITE:** clear to moderate brown (5YR 3/4) coarsely crystalline, moderately hard. Generally 1 to 3% brown clay with some gray, but locally >5% clay. Clay breaks throughout.	
7	30	5.0	100	—		**29.6' - 31.9'** **HALITE:** clear, coarsely crystalline, hard. Trace (<1%) argillaceous material from 31.1'.	
						27.2' - 29.6' **ARGILLACEOUS HALITE:** dark reddish-brown (10R 3/4) to brownish-gray (5YR 4/1). Fine to medium crystalline, hard. Numerous clay breaks. Clay content <2 to >5%. Predominantly brown clay to 29.1', then mixed brown & gray.	
6	25	5.0	100	—	X	**24.1' - 27.2'** **HALITE:** clear, coarsely crystalline, hard. Slight trace of polyhalite. Anhydrite stringers from 24.3' to 25.0', and 25.8' to 25.85'.	

WIPP
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-88 INSTRUMENT TYPE & NUMBER Extensometer GE-212 HOLE SIZE NX

LOCATION Test Room 3, Centerline of Room at Station N1265, in Roof
16.5 Feet From E and W Ribs

STATION N1265, W497.5 COLLAR ELEV. 1305.9 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10952.8, E6396.5 BOREHOLE PENETRATION 52.7

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 4/14/83 SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	55					50.55' - 52.70' **POLYHALITIC HALITE:** clear mottled with moderate reddish-orange polyhalite, coarsely crystalline, hard. Polyhalite <1% to 5%. Brown clay breaks from 50.55' to 50.75'.	Drilling completed: 5 April 1983 at 1:10 p.m.
11	50	4.4	100	-	X X	49.8' - 50.55' **HALITE:** clear, coarsely crystalline, hard.	Total Drilling Time: 8 hrs Total Penetration = 52.70'

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-90 INSTRUMENT TYPE & NUMBER Extensometer GE-210 HOLE SIZE NX

LOCATION Test Room 3, Centerline of Room at Station N1265, in Floor 16.5' From E and W Ribs.

STATION N1265, W497.5 COLLAR ELEV. 1292.1 DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N10952.6, E6396.4 DEPTH OF BOREHOLE 53.6'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 4/14/83

RUN NUMBER	DEPTH (Ft)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
0	0	0.85	100	–	X	**0.0' – 1.8'** **HALITE:** clear, coarsely crystalline, hard. Trace (<1%) polyhalite.	Started drilling 5 April 1983 at 1:50 p.m. 5 ½" diameter single-tube core barrel used to drill 0.0' – 0.85'.
1		1.3	100	–	X X	**1.8' – 2.65'** **POLYHALITIC HALITE:** clear, mottled with moderate reddish-orange (10R 6/6), coarsely crystalline, hard. Blebs of polyhalite <1% to 5%. Trace of anhydrite from 2.25' to 2.65'.	
2		1.35	100	–			
3		0.95	100				
4	5	0.90	82	–		**2.65' – 4.45'** **POLYHALITE:** moderate reddish brown (10R 4/6) polyhalite mixed with very light gray (N8) anhydrite. Fine to micro-crystalline, hard, dense.	NX single-tube core barrel used from 0.85' – 5.55'.
5		5.2	100	–	X –	**4.45' – 5.7'** **ANHYDRITE:** (Marker Bed 139) very light (N8) to medium gray (N6), micro-crystalline, hard, dense. Mixed with some polyhalite to 5'. Gray clay seam at 5.7'.	
					– X		
					X –		
	10				X X	**5.7' – 9.25'** **HALITE:** clear with scattered moderate reddish-orange (10R 6/6) medium crystalline, hard. Scattered polyhalite (<1%) and trace (<1%) gray clay.	
6		5.3	100	–	X	**9.25' – 21.35'** **POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6) and grayish-brown (5YR 4/1), medium to coarsely crystalline, hard. Irregular patches and blebs of polyhalite 1% to 5%, locally >10%. Gray clay 1% to 2% from 13.7' to 16.0' and 20.35' to 21.35'.	
					X X		
					X –		
	15				X –		
					X –		
7		5.3	100	–	X		
					X X		
	20				X		
					X –		
					X –		
8		5.3	100	–	X –	**21.35' – 25.75'** **HALITE:** clear to grayish-red (5R 4/2) medium to coarsely crystalline, moderately hard. Trace of polyhalite. 1% to 2% gray clay with lesser amounts of brown clay.	
	25				– X		

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-90 INSTRUMENT TYPE & NUMBER Extensometer GE-210 HOLE SIZE NX

LOCATION Test Room 3, Centerline of Room at Station N1265, in Floor 16.5' From E and W Ribs.

STATION N1265, W497.5 COLLAR ELEV. 1292.1 DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N10952.6, E6396.4 DEPTH OF BOREHOLE 53.6'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 4/14/83

RUN NUMBER	DEPTH (Ft)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
8	25	5.3	100	—	X —	See Above	
9	30	5.2	100	—	X / X / X / X	25.75' - 31.95' **POLYHALITIC HALITE:** clear mottled with moderate reddish-orange (10R 6/6), coarsely crystalline, hard. 1% to 5% polyhalite. Scattered irregular blebs and stringers of very light gray (N8) anhydrite from 27.05' to 31.95', one-half inch wide irregular anhydrite seam at 31.0'.	
					/ X	31.95' - 32.10' **ANHYDRITE:** very light gray (N8) to medium gray (N6), microcrystalline, hard, dense. Trace of gray clay at 32.1'.	
10	35	5.1	100	—	X — / — X / X —	32.10' - 39.5' **HALITE:** clear to medium gray (N6), fine to coarsely crystalline, hard. Contains trace (<1%) polyhalite locally. Breaks and patches of gray clay <1% to 3%. Core clear with no argillaceous material from 36.65' to 37.05' and from 39.0' to 39.5'.	
11	40	5.2	100	—	— X		
					— / — / — X	39.5' - 43.65' **ARGILLACEOUS HALITE:** clear to brownish-gray (5YR 4/1) medium to coarsely crystalline, moderately hard to hard. Contains <1% to 5% clay (average 2%), predominantly gray in color with lesser amounts of brown. Clay breaks throughout. Trace of polyhalite (<1%).	
12	45	5.25	100	—	— / X / — / —	43.65' - 49.50' **HALITE:** clear, coarsely crystalline, moderately hard. Trace of gray clay (<1%). Trace polyhalite from 44.45' to 44.65'.	
13	50	5.3	100	—	— / — / X =	See below	

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-90 INSTRUMENT TYPE & NUMBER Extensometer GE-210 HOLE SIZE NX

LOCATION Test Room 3, Centerline of Room at Station N1265, in Floor 16.5' From E and W Ribs.

STATION N1265, W497.5 COLLAR ELEV. 1292.1 DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N10952.6, E6396.4 DEPTH OF BOREHOLE 53.6'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 4/14/83 SHEET 3 OF 3

RUN NUMBER	DEPTH (Ft)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
13	50	5.3	100	—	X —	**49.50' - 52.10'** **HALITE:** clear to moderate reddish-orange (10R 6/6) and brownish-gray (5YR 4/1). Contains trace of polyhalite (<1%) and <1% to 3% gray clay. Clay parting at 49.5' and scattered breaks within core.	
14		0.9	100	—	— X	**52.10' - 53.6'** **POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6), medium to coarsely crystalline, hard. Polyhalite 1% to 3%. Trace (<1%) of gray clay.	Drilling completed 7 April 1983 at 11:10 a.m. Total drilling time: 5.5 hours. Total Depth = 53.60'
	55						

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-9i INSTRUMENT TYPE & NUMBER Extensometer GE-209 HOLE SIZE NX

LOCATION Test Room 4, Centerline of Room at Station N1275, in Floor 16.5' From E and W Ribs.

STATION N1275, W630.5 COLLAR ELEV. 1292.1 DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N10961.5, E6263.9 DEPTH OF BOREHOLE 51.8'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 5/5/83

RUN NUMBER	DEPTH (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
0	0	1.0	100	—	X	**0.0' - 2.1' HALITE:** Clear, coarsely crystalline, medium hard. Contains <1% polyhalite blebs and trace (<1%) gray clay.	Drilling started at 15:05 hours, 28 April 1983. 5 1/2" single tube barrel used 0.0' to 1.0'. NX single tube barrel used 1.0' to 5.2'. NX double tube barrel used 5.2' to 51.8'. Note: Run #3 originally drilled to 4.5'±. Core stayed in hole after pulling barrel. Had to redrill to 5.2' and retrieve core. Run #6 - core stayed in hole after barrel pulled. Had to return barrel, drill and pull core. Small gas flow at 7'±. Low flow. No methane. Very slight flow continued until entire hole was drilled. Core Loss: Run 1, Throughout Run 3, Probably from 2.9' to 3.8'.
1		0.6	50	—	—		
2		0.7	100	—	X —	**2.1' - 3.8' POLYHALITIC HALITE:** Clear mottled with moderate reddish orange (10R 6/6) polyhalite. Polyhalite <1 to 5%. Trace (<1%) gray clay.	
3		1.75	76	—	X	**3.8' - 4.8' POLYHALITE:** Moderate reddish brown (10R 4/6), very fine to microcrystalline, hard. Trace of anhydrite.	
4	5	1.75	100	—	X X X	**4.8' - 7.2' ANHYDRITE:** (Marker Bed 139) Very light gray (N8), medium gray (N5) to moderate reddish brown (10R 4/6) and moderate reddish orange (10R 6/6) to approximately 6.5', with about 50% polyhalite. Then predominantly very light to medium gray anhydrite mixed with some polyhalite and polyhalitic halite. <1/8" gray clay parting at 7.2'. Core broken into disc-like pieces 5.2' to 6.2'.	
5	10	4.6	100	—	— — — — X X —	**7.2' - 11.6' HALITE:** Clear to moderate reddish orange (10R 6/6) to light gray (N7), fine to coarsely crystalline, medium hard. Contains <1% gray clay with up to 5% locally. Polyhalite <1% to 2%. Polyhalitic halite at 10.0' to 10.3'. Clay break at 7.7'.	
6	15	5.2	100	—	X X X X X X —	**11.6' - 15.3' POLYHALITIC HALITE:** Clear to moderate reddish orange (10R 6/6), medium to coarsely crystalline, medium hard to hard. Polyhalite 3% to >5%. Gray clay breaks at 14.9' and 15.0'. Irregular anhydrite stringers throughout.	
7	20	5.0	100	—	X — X X X — X —	**15.3' - 16.8' HALITE:** Clear to light gray (N7) to moderate reddish orange (10R 6/6), medium to coarsely crystalline, medium hard. Polyhalite <1% to 2%. Gray clay <2%. **16.8' - 23.2' POLYHALITIC HALITE:** Clear to moderate reddish orange (10R 6/6), coarsely crystalline, hard. Polyhalite average <1 to 3%, locally up to 5%. Trace gray clay at 20.8' to 23.2'. Scattered clay breaks.	
8	25	5.1	100	—	— X	**23.2' - 25.4' HALITE:** Clear, coarsely crystalline, hard. Trace (<1%) polyhalite and trace gray clay. Clay break at 23.7'.	

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-91 INSTRUMENT TYPE & NUMBER Extensometer GE-209 HOLE SIZE NX

LOCATION Test Room 4, Centerline of Room at Station N1275, in Floor 16.5' From E and W Ribs.

STATION N1275, W630.5 COLLAR ELEV. 1292.1 DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N10961.5, E6263.9 DEPTH OF BOREHOLE 51.8'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 5/5/83 SHEET 2 OF 3

RUN NUMBER	DEPTH (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	25					As Above	
8		5.1	100	—	X X	**25.4' - 31.8' POLYHALITIC HALITE:** Clear to moderate reddish orange (10R 6/6) on moderate reddish brown (10R 4/6), coarsely crystalline, hard. Trace (<1%) gray clay. Polyhalite blebs and patches <1 to <5%, locally >5%. Scattered irregular anhydrite stringers from 27.2'. Polyhalite > 90% from 31.6' to 31.8'.	
9	30	4.9	100	—	X X X X X X		
					X X X	**31.8' - 32.1' ANHYDRITE:** Very light (N8) to medium gray (N5), microcrystalline, hard. Mixed with some halite from 31.8'. Trace of clay at 32.1'.	
10	35	4.9	100	—	X — X —	**32.1' - 39.7' HALITE:** Clear to medium gray (N5) to grayish red (10R 4/2), medium to coarsely crystalline, medium hard. Gray clay <1 to 3%. Trace (<1%) polyhalite. Core broken up at 37.2' to 37.3'.	
11	40	5.1	100	—	— —	**39.7' - 41.8' ARGILLACEOUS HALITE:** Clear to medium gray (N5), medium to coarsely crystalline, medium hard to soft. Some core can be broken in hand with low pressure. Gray clay 1 to 5%. Core broken up at 41.5' to 41.6'.	
12	45	5.1	100	—	X — X	**41.8' - 44.4' POLYHALITIC HALITE:** Clear to moderate reddish orange (10R 6/6), coarsely crystalline, medium hard. Polyhalite blebs and patches <1 to 5%. Trace of gray clay at 43.3'.	
					— —	**44.4' - 49.3' HALITE:** Clear, coarsely crystalline, medium hard to hard. Trace (<1%) gray clay. Core broken up with trace of clay at 45.5' - 45.8'. Clay parting at 49.3' with up to 3% clay at 48.9' to 49.3'.	
13	50	4.9	100	—	—		
					— X	As Below	

WIPP

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-91 INSTRUMENT TYPE & NUMBER Extensometer GE-209 HOLE SIZE NX

LOCATION Test Room 4. Centerline of Room at Stations N1275. in Floor 16.5' From E and W Ribs.

STATION N1275, W630.5 COLLAR ELEV. 1292.1 DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N10961.5, E6263.9 DEPTH OF BOREHOLE 51.8'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 5/5/83 SHEET 3 OF 3

RUN NUMBER	DEPTH (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
13	50	4.9	100	–	– X	49.3' - 51.8' **HALITE:** Clear to moderate reddish orange (10R 6/6), medium to coarsely crystalline, medium hard. Trace (<1%) gray clay. Polyhalite <1 to 3% dispersed throughout.	Hole completed at 14:50 hours, 29 April 1983. Total depth = 51.8'.
	55						

WIPP
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-93 INSTRUMENT TYPE & NUMBER Extensometer GE-207 HOLE SIZE NX

LOCATION Test Room 4, Centerline of Room at Station N1275, in Roof 16.5 Feet From East and West Ribs

STATION N1275, W630.5 COLLAR ELEV. 1304.9 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10961.1, E6263.9 BOREHOLE PENETRATION 52.0'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 5/5/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	25					As Above	
6		5.2	100	—		**18.9' - 24.0' ARGILLACEOUS HALITE:** Clear to dark reddish brown (10R 3/4) medium to coarsely crystalline, medium hard. Scattered traces of anhydrite. 1/4" layer anhydrite at 23.9'. Brown clay <1 to >5%. Scattered clay breaks. Parting at 23.9'.	
5	20	5.0	100	—	X	**14.9' - 18.9' POLYHALITIC HALITE:** Clear mottled with medium reddish orange (10R 6/6) and medium reddish brown (10R 4/6) coarsely crystalline, hard. Scattered white anhydrite stringers to 16.4'. Polyhalite blebs and irregular patches average 1 to 5% with locally >10% from 14.9' to 16.7'.	
4	15	5.1	100	—	X X	**14.2' - 14.9' ANHYDRITE:** (Anhydrite "a") Very light (N8) to medium gray (N5), microcrystalline, hard. Some laminations noted. Some very finely crystalline halite mixed with anhydrite.	
					X	**13.3' - 14.2' ARGILLACEOUS HALITE:** Clear to medium reddish orange (10R 6/6) and dark reddish brown (10R 3/4), fine to medium crystalline, medium hard to hard. Brown clay <1 to >5%. Trace (<1%) polyhalite. Trace gray clay at 14.2'.	Drilling begun at 11:00 hours, 27 April 1983.
3	10	4.9	97	—	X	**7.3' - 13.3' HALITE:** Clear, coarsely crystalline, hard. Scattered white anhydrite stringers. 1/8" anhydrite layer at 7.7'. Trace (<1%) polyhalite.	Core loss: Run #1, Throughout #3, Throughout #8, Throughout
						7.15' - 7.3' ANHYDRITE: (Anhydrite "b") Medium light (N6) to medium gray (N5), microcrystalline, hard.	Moderate gas flow at 7'±. Flow for 5-10 minutes, H_2S - 0% and methane 1 to 3 1/2% measured at end of return line. Slight smell to gas. Low flow of gas to 16'±. No H_2S recorded.
2	5	4.95	100	—		**4.05' - 7.15' HALITE:** Clear to medium brown (5YR 4/4) to medium gray (N5), medium to coarsely crystalline, medium hard. Trace (1 to 2%) brown and gray clay. Breaks at 6.6' and 7.1'. Trace clay at 7.2'.	
.1		0.65	81	—	X	**0.0' - 4.05' HALITE:** Clear with some grayish red (5R 4/2), coarsely crystalline, medium to medium hard. Trace (<1%) polyhalite blebs and clay.	5 1/2" single tube barrel used to core 0.0' to 1.0'.
0	0	1.0	100	—	X		NX single tube barrel used 1.0' to 1.8'. NX double tube barrel used 1.8' to 52.0'.

WIPP
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-93 INSTRUMENT TYPE & NUMBER Extensometer GE-207 HOLE SIZE NX

LOCATION Test Room 4, Centerline of Room at Stations N1275, in Roof 16.5 Feet From E and W Ribs

STATION N1275, W630.5 COLLAR ELEV. 1304.9 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10961.1, E6263.9 BOREHOLE PENETRATION 52.0'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEG DATE 5/5/83 SHEET 2 OF 3

As Above

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	4.8	100	–		**45.9' – 49.8' ARGILLACEOUS HALITE:** Clear to medium brown (5YR 3/4), medium to coarsely crystalline, medium hard. Brown clay <1 to >5%. Clay breaks at 47.2', 47.4', 47.7', 48.3', 48.5', 48.9' and 49.3' to 49.4'. 3/4" clay seam at 49.7'.	
10	45	5.1	100	–	X	**41.3' – 45.9' HALITE:** Clear to dark reddish brown (10R 3/4), medium to coarsely crystalline, medium hard to hard. Trace polyhalite. Brown clay averages 1% with local zones >5%. Clay breaks at 41.9' and 43.7'. Argillaceous halite at 41.9' to 42.1', 42.4' to 43.0' and 44.1' to 44.3'.	
9	40	5.1	100	–	X X	**37.0' – 41.3' HALITE:** Clear, coarsely crystalline, hard. Scattered white anhydrite stringers. Trace (<1%) moderate reddish orange polyhalite blebs from 39.4' to 41.3'.	
						36.3' – 37.0' ANHYDRITE: (Marker Bed 138) Very light (N8) to medium gray (N5), microcrystalline, hard. Some <20% halite mixed with anhydrite 36.4' to 36.6'. Brown clay seam 36.3' to 36.4'.	
8	35	5.0	100	–	X	**35.5' – 36.3' HALITE:** Clear to medium reddish orange (10R 6/6), fine to medium crystalline, some coarse, medium hard. Trace polyhalite (<1%) and trace brown clay.	
						32.3' – 35.5' ARGILLACEOUS HALITE: Clear to medium brown (5YR 3/4), fine to medium crystalline, with some coarse. Soft to medium hardness. Core broken up approximately 32.6' to 33.2'. Brown clay generally 5 to 10% with zones <1%. Argillaceous >40% at 34.5' to 34.8'.	Can be combined in hand with low to moderate pressure due to grain size and clay content.
7	30	4.8	100	–	X	**29.7' – 32.3' HALITE:** Clear, coarsely crystalline, medium hard to hard. Trace (<1%) brown clay from 31.6'.	
						27.5' – 29.7' HALITE: Clear to medium brown (5YR 3/4) fine to coarsely crystalline, medium hard. Brown argillaceous <1 to 4%. Clay break at 27.6'. Trace (<1%) polyhalite from 29.2'-29.6'. Core medium reddish orange.	
6	25	5.2	100	–		**24.0' – 27.5' HALITE:** Clear, coarsely crystalline, hard. Few scattered white anhydrite stringers to 26.0'.	

WIPP
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-93 INSTRUMENT TYPE & NUMBER Extensometer GE-207 HOLE SIZE NX

LOCATION Test Room 4, Centerline of Room at Stations N1275, in Roof 16.5 Feet From E and W Ribs

STATION N1275, W630.5 COLLAR ELEV. 1304.9 DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N10961.1, E6263.9 BOREHOLE PENETRATION 52.0'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JEC DATE 5/5/83 SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50–55	4.8	100	—	X / X	49.8' – 52.0' **HALITE:** Clear to medium reddish orange (10R 6/6). Coarsely crystalline, hard. Polyhalite blebs and patches <1 to 4%. Highest percentage is from 49.8' to 51.0'. A few scattered anhydrite stringers and blebs from 51.0' to 52.0'.	Hole completed at 11:15 hours, 28 April 1983. Total penetration = 52.0'.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-201 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 406' S of Exploratory Shaft centerline, midspan

STATION S406, W19 COLLAR ELEV. 1262.2' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N9280.6, E6874.9 BOREHOLE PENETRATION 51.7'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JBM,RFM,RLB/TSC//DGK,RMB/Bechtel DATE 1/25/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY (ft.)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
8	25	5.0	100	-		20.3' - 25.4' **HALITE:** mottled colorless to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, ~1% polyhalite, 1-5% brown and gray (mostly brown) clay, 5-10% polyhalite from 24.3'-24.5', anhydrite/clay zone 25.3'-25.4'.	Hole begun 23 November 1982.
7	20	4.9	98	-		15.5' - 20.3' **POLYHALITIC HALITE:** colorless to moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, 1-5% polyhalite, few blebs of clay, anhydrite stringers (<1/16") at 16.1', 16.3', 17.8', and 18.1'.	
						14.8' - 15.5' **ANHYDRITE:** (Anhydrite "a") light to very light gray (N7-8), microcrystalline anhydrite, 20-30% halite in upper 0.1', trace polyhalite near upper contact.	
6	15	4.6	92	-		14.0' - 14.8' **HALITE:** mottled colorless to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, 1-2% polyhalite, ~1% gray clay, 1-5% brown clay, gray clay parting at 14.8'.	
5	10	2.0	100	-		7.9' - 14.0' **HALITE:** colorless to moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, 0-1% polyhalite, clay absent below 13.5', ~1% gray clay from 13.5'-14.0', anhydrite stringers (~1/16") at 9.5' and 9.8'.	
						7.7' - 7.9' **ANHYDRITE:** (Anhydrite "b") light to very light gray (N7-8), microcrystalline anhydrite, 30-40% halite.	
4	5	4.3	86	-		0.0' - 7.7' **HALITE:** clear to mottled colorless and moderate reddish-orange (10R 6/6) halite, medium to coarsely crystalline, 2% polyhalite, <1% gray clay, brown clay absent to 4.0', 1-2% from 4.0'-7.7', light gray (N7) clay seam at 7.7'.	
3		1.5	79	-			
2		1.15	96	-			0' - 0.85' drilled with 6" single-tube core barrel.
1		.55	92	-			
	0						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-201 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 406' S of Exploratory Shaft centerline, midspan

STATION S406, W19 COLLAR ELEV. 1262.2' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N9280.6, E6874.9 BOREHOLE PENETRATION 51.7'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JBM,RFM,RLB/TSC//DGK,RMB/Bechtel DATE 1/25/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	50					(see description on next sheet)	
13		5.0	100	–		46.3' – 49.4' **HALITE:** colorless to moderate reddish-orange (10R 6/6) halite, coarsely crystalline, 1-3% polyhalite, locally in blebs, <1% clay.	
12	45	5.0	96	–		44.4' – 46.3' **HALITE:** colorless to moderate brown (5YR 3/4) halite, medium to coarsely crystalline, ~1% polyhalite, 1-5% brown clay, brown clay break at 44.8'.	
						38.9' – 44.4' **HALITE:** colorless to moderate reddish-orange (10R 6/6) halite, coarsely crystalline, 1-7% polyhalite, 0-1% clay, anhydrite stringers at 39.0', 39.3', and 40.0'.	
11	40	5.0	100	–		38.3' – 38.9' **ANHYDRITE:** (Marker Bed 138) medium to light gray (N5-7), microcrystalline anhydrite, 10-20% halite in upper 0.05'.	
						33.2' – 38.3' **ARGILLACEOUS HALITE:** mottled colorless to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, <1% polyhalite, 1-10% brown clay locally concentrated, brown clay parting at 37.1', brown clay seam at 38.3'.	
10	35	5.0	100	–		31.4' – 33.2' **HALITE:** clear halite, coarsely crystalline, <1% polyhalite, <1% brown and gray clay.	
9	30	4.6	92	–		29.4' – 31.4' **ARGILLACEOUS HALITE:** colorless to moderate brown (5YR 3/4) halite, finely to coarsely crystalline, <1% polyhalite, 1-5% clay (mostly brown), anhydrite stringer (<1/16") at 31.4'.	
						25.4' – 29.4' **HALITE:** clear halite, medium to coarsely crystalline, <1% polyhalite, <1% brown and gray clay from 29.3'-29.4', absent elsewhere, anhydrite stringers at 25.6'-25.7', 26.0', and 26.6'.	
8	25	5.0	100	–		(as below)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-201 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 406' S of Exploratory Shaft centerline, midspan

STATION S406, W19 COLLAR ELEV. 1262.2' DIRECTION OF DRILLING Vertical Up

MINE COORDINATES N9280.6, E6874.9 BOREHOLE PENETRATION 51.7'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY JBM,RFM,RLB/TSC//DGK,RMB/Bechtel DATE 1/25/83 SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
13	50–55	5.0	100	—	X	49.4' – 51.7' **ARGILLACEOUS HALITE:** colorless to moderate brown (5YR 4/6) halite, coarsely crystalline, 1-2% polyhalite, 1-5% brown clay to 50.7', 5-10% from 50.7'-51.7', brown clay breaks at 49.7', 50.6', 51.1', and 51.7'.	Total penetration = 51.7'. Hole finished at 13:30 hours, 24 November 1982.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-202 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 406' S of Exploratory Shaft centerline, midspan

STATION S406, W19 COLLAR ELEV. 1248.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9280.6, E6874.9 DEPTH OF BOREHOLE 51.4'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB, JPS/Bechtel DATE 11/24/82

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0	1.4	70	—	X	**0.0' – 3.7'** **HALITE:** clear, medium to coarsely crystalline halite, with trace (<1%) polyhalite, and trace (<0.5%) gray clay blebs from 0'-2.0'.	Drilling started 14:00 hours, 24 November 1982. Coring with brine. Core Run #1 - broken in small pieces and partially dissolved. Longest piece = 0.2'.
2	5	4.5	90	—	X X	**3.7' – 4.8'** **POLYHALITIC HALITE:** moderate reddish-orange (10R 5/6), translucent, coarsely crystalline, medium hard halite. Gradational lower contact. Clay parting at 4.5' (washed out by drilling).	
						4.8' – 7.6' **ANHYDRITE:** (Marker Bed 139) light gray (N7) hard, dense, very thinly bedded to laminated anhydrite. Core is broken "poker-chip" fashion along bedding. Medium light gray (N6), moderately stiff, anhydritic clay seam (~1/2") at 7.6'.	
3	10	4.9	98	—	X X X	**7.6' – 11.5'** **ARGILLACEOUS HALITE:** moderate reddish-orange (10R 6/6) translucent, medium crystalline halite, with some polyhalite (10-20%), some to abundant (about 25-30%) clay, and localized trace light gray (N7) clay blebs. Clay break at 7.8'. Clay parting at 11.1'.	Hit pressurized gas around 10'-12'. Drilling fluid bubbled at collar. Drilling stopped at 16:00 hours and 12.0' 24 November 1982 for Thanksgiving Holiday. Resumed coring at 08:20 hours, 26 November 1982.
4	15	4.9	98	—	X X X	**11.5' – 24.3'** **POLYHALITIC HALITE:** clear, coarsely crystalline halite, with 35-40% polyhalite. Polyhalite bands at 13.1', 14.4', 21.8'. Relatively clear halite from 11.5'-12.1' and 15.5'-17.0' with some (10-15%) clay.	From 12' to 32', drilling averaged 0.2 ft./min.
5	20	5.1	100	—	X X X	Argillaceous zone at 15.7'-15.85' Gray clay parting at 15.95' Gray clay break at 16.55' Brown clay break at 16.7' Argillaceous zone at 17.5' Gray clay break at 22.6' Gray clay parting at 23.0' Gray argillaceous zone (30-40% clay) at 23.1'-23.3'.	
6	25	5.1	100	—	X X X		Run 6 - longest piece = 1.3'.
					X	(see description on next sheet)	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-202 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 406' S of Exploratory Shaft centerline, midspan

STATION S406, W19 COLLAR ELEV. 1248.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9280.6, E6874.9 DEPTH OF BOREHOLE 51.4'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB,JPS/Bechtel DATE 11/24/82

RUN NUMBER	DEPTH (ft)	RECOVERY (ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.1	100	—		24.3' - 28.0' **ARGILLACEOUS HALITE:** halite, with 20-25% clay, and 15-20% polyhalite. Gray-brown argillaceous zone at 24.4'-26.4', with clay breaks at 24.7', 25.1', 25.4', 25.6', 26.3'.	
7	30	5.2	100	—		28.0' - 34.6' **POLYHALITIC HALITE:** moderate reddish-orange (10R 6/6), translucent, medium crystalline halite, with 1% to 20% polyhalite, and localized trace gray clay blebs. Clear halite at 31.2'-31.7', 32.6'-32.7', and 33.8'-34.6'. Polyhalite bands at 33.6'-33.8' and 34.2'.	
8	35	5.0	100	—		34.6' - 35.0' **ANHYDRITE:** light gray (N7), hard, dense, halitic anhydrite. Gray clay parting at 35.0'.	Run 8 - Longest piece = 1.1'; average = 0.3'.
9	40	4.9	100	—		35.0' - 49.0' **ARGILLACEOUS HALITE:** translucent, finely to medium crystalline, medium hard halite, mottled light brown with some (10%) moderate reddish-orange (10R 6/6) polyhalite, and some (10-15%) light gray (N7) and moderate brown (5YR 3/4) clay as blebs. Clay breaks at 38.9', 39.2' (gray), 40.7' (gray), 41.1' (gray), 42.5' (gray), 42.7' (brown), 43.6' (brown), 43.7' (brown), 44.3' (brown), brown clay parting at 43.2', and trace polyhalite from 43.2' to 44.8'.	
10	45	5.0	100	—			
11	50	4.1	100	—		49.0' - 51.4' **HALITE:** clear halite, moderately hard and coarsely crystalline.	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-202 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 406' S of Exploratory Shaft centerline, midspan

STATION S406, W19 COLLAR ELEV. 1248.6' DIRECTION OF DRILLING Vertical Down

MINE COORDINATES N9280.6, E6874.9 DEPTH OF BOREHOLE 51.4'

DRILLING METHOD Wet (brine) DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB,JPS/Bechtel DATE 11/24/82

RUN NUMBER	DEPTH (ft.)	RECOVERY(ft)	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	4	100	—		(as above)	Run 11 - pulled at 12:30 hours, 26 November 1982. Total depth = 51.4'.
	55						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-203 INSTRUMENT TYPE & NUMBER Extensometer GE-235 HOLE SIZE NX

LOCATION East 140 Drift, 624' N of Exploratory Shaft centerline, 6.8' from W rib

STATION N624, E140 COLLAR ELEV. 1298.2 DIRECTION OF DRILLING vertical up

MINE COORDINATES N10308.6, E7041.7 BOREHOLE PENETRATION 52.0'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/23/83 SHEET 1/ OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.2	100	–		(see description on next sheet)	Began coring at 10:15 hours on 23 February 1983. Cored from 0'-1.0' using 6" single tube barrel. Cored from 1.0'-5.8' without inner core tube.
5	20	5.1	100	–		20.6'-24.0' **HALITE:** argillaceous, clear to pale brown (5YR 5/2) and medium gray (N5), finely to coarsely crystalline, moderately hard. Clay content 0-5% and occurs interstitially. Clay breaks at 20.8', 22.2', 22.7', 23.4', and 23.9'. Irregular light gray (N7) anhydrite seam (1/2") at 24.0'.	
					X	15.0'-20.6' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), medium to coarsely crystalline, moderately hard. Polyhalite occurs as blebs and stringers and represents 0-5% of core. Clear halite from 19.8'-20.6'.	Core loss in Run #1 occurred throughout core run.
4	15	5.2	100	–	X	14.2'-15.0' **ANHYDRITE:** medium gray (N5) to very light gray (N8), hard, dense, microcrystalline.	
					X	13.1'-14.2' **HALITE:** argillaceous, mottled light brownish-gray (5YR 6/1) and pale yellowish brown (10YR 6/2), finely crystalline, moderately hard. Clay content 3-8%. Brown clay breaks at 13.5' and 14.2'.	Encountered trace of gas at 14.5'.
3		2.0	100	–	X	8.2'-13.1' **HALITE:** clear, medium to coarsely crystalline, moderately hard, trace of scattered blebs of orange polyhalite. Few hairline stringers of white (N9) anhydrite.	
2	10	5.2	100	–	X	8.0'-8.2' **ANHYDRITE:** medium gray (N5), hard, dense, microcrystalline.	
					X	5.5'-8.0' **HALITE:** argillaceous, clear to pale yellowish-brown (10YR 6/2) to brownish-gray (5YR 4/1). Finely to medium crystalline, moderately hard. Interstitial clay comprises 2-10% of core. Brown clay breaks at: 6.9', 7.1', 7.3'. Thin parting of gray clay at 8.0'.	
1	5	1.7	35	–	X	0.0'-5.5' **HALITE:** clear with trace of moderate reddish-orange (10R 6/6) polyhalite. Coarsely crystalline, moderately hard. Few isolated blebs of polyhalite.	
0	0	.9	90	–	X		

WIPP-SPDV
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-203 INSTRUMENT TYPE & NUMBER Extensometer GE-235 HOLE SIZE NX

LOCATION East 140 Drift, 624' N of Exploratory Shaft centerline, 6.8' from W rib

STATION N624, E140 COLLAR ELEV. 1298.2 DIRECTION OF DRILLING vertical up

MINE COORDINATES N10308.6, E7041.7 BOREHOLE PENETRATION 52.0'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/23/83 SHEET 2 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	2.9	100	–			
10	45	5.2	100	–		42.4'-50.1' **ARGILLACEOUS HALITE:** clear and mottled pale brown (5YR 5/2), pale yellowish-brown (10 YR 6/2) and brownish-gray (5YR 4/1). Finely to coarsely crystalline, moderately hard. Clay content from 0 to 25% with brown clay breaks at: 42.5', 43.0', 45.3', 45.8', 46.2', 47.0', 47.2', 48.9', 49.3', and 49.6'. At 49.9', 1/2" thick, moist, brown clay seam.	
9	40	5.0	100	–		37.6'-42.4' **HALITE:** clear, medium to coarsely crystalline, moderately hard. Trace of moderate reddish-orange (10R 6/6) polyhalite stringers from 39.5'-42.0'.	
8	35	5.2	100	–		36.9'-37.6' **ANHYDRITE:** medium light gray (N6), very hard, dense, microcrystalline. Few clear halite stringers at 37.6'. 32.0'-36.9' **ARGILLACEOUS HALITE:** clear and mottled medium gray (N5), brownish-gray (5YR 4/1) and pale yellowish-brown (10YR 6/2). Finely to coarsely crystalline, moderately hard. Finely crystalline from 35.9'-36.9'. Clay content ranges from 0-15% with numerous discontinuous clay breaks throughout. Clay breaks at: 33.0', 33.5', 35.1', 35.6', 35.7'. At 36.9', 1/2" thick, grayish-brown (5YR 3/2) soft, moist clay seam.	
7	30	5.2	100	–		29.8'-32.0' **HALITE:** clear, coarsely crystalline, moderately hard.	
6	25	5.2	100	–		28.2'-29.8' **ARGILLACEOUS HALITE:** clear and light brownish-gray (5YR 6/1), moderately hard, medium crystalline. Clay content ranges from 0 to 15% with clay breaks at: 29.0', 29.3' and 29.7'. 24.0'-28.2' **HALITE:** clear, coarsely crystalline, moderately hard. Few scattered, white (N9) anhydrite stringers.	

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-203 INSTRUMENT TYPE & NUMBER Extensometer GE-235 HOLE SIZE NX

LOCATION East 140 Drift, 624' N of Exploratory Shaft centerline, 6.8' from W rib

STATION N624, E140 COLLAR ELEV. 1298.2 DIRECTION OF DRILLING vertical up

MINE COORDINATES N10308.6, E7041.7 BOREHOLE PENETRATION 52.0'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/23/83 SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	55						Total Penetration = 52.0'
11	50	2.9	100	–	XXXXXXXXX X	50.1'-52.0' **HALITE**: clear to moderate reddish-orange (10R 6/6), coarsely crystalline, moderately hard. Trace of orange polyhalite occurs as blebs and stringers	Hole completed at 19:00 hours on 23 February 1983.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. D0-204 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 624' N of Exploratory Shaft centerline 6.8' from W rib

STATION N640, E140 COLLAR ELEV. 1290.5 DIRECTION OF DRILLING vertical down

MINE COORDINATES N10308.5, E7041.5 DEPTH OF BOREHOLE 51.6'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/24/83 SHEET 1 OF 3

RUN NUMBER	DEPTH ( )	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0	.7	35	–	—	0.0'-7.1' **HALITE:** argillaceous, clear and pale brown (5YR 5/2), coarsely crystalline, moderately hard. Interstitial brown clay content ranges from 0-3%. Clay breaks at: 3.0' and 5.0'.	Began coring at 18:45 hrs. on 23 February 1983. Cored from 0 to 0.3' with 6" single tube core barrel. Cored without inner tube from 0.3' to 6.4'.
2	5	1.9	46	–	—		
3	10	4.7	100	–	X	7.1'-8.9' **HALITE:** polyhalitic, clear and moderate reddish-orange (10R 6/6), coarsely crystalline, moderately hard. Polyhalite occurs as scattered stringers and blebs and represents from 0-3% of core. Dense polyhalite seam (1/4") at 8.9'.	
4	15	5.0	100	–	— X —	8.9'-11.5' **ANHYDRITE:** very light gray (N8) to medium light gray (N6), hard to very hard, dense, microcrystalline. Core broken into 1/8"-1/4" chips throughout; slightly banded in part.	Core Loss:
					— X —	11.5'-11.6" **CLAY:** medium gray (N5), moist, soft, highly plastic.	Run / Where Lost: 1 Throughout Run; 2 Throughout Run; 3 0.7' lost between 32.0' to 33.0'
					— X —	11.6'-15.3' **HALITE:** argillaceous, clear and light gray (N7) to grayish orange-pink (5YR 7/2). Trace of polyhalite throughout. Medium to coarsely crystalline, moderately hard. Clay content ranges from 0 to 15% with gray clay breaks at: 11.7', 12.0', 13.0', 13.5', and 14.0'	
5	20	5.1	100	–	X X	15.3'-27.9' **HALITE:** polyhalitic, clear and moderate reddish-orange (10R 6/6), and grayish-orange (10YR 7/4). Medium to coarsely crystalline, moderately hard, polyhalite content ranges from 0 to 20% locally and occurs interstitially and as isolated blebs and stringers. Trace of argillaceous halite from 19.0'-21.0'. Clay breaks at: 19.6', 19.7', and 20.0'.	
6	25	5.2	100	–	X X		

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-204 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 624' N of Exploratory Shaft centerline 6.8' from W rib

STATION N640, E140 COLLAR ELEV. 1290.5 DIRECTION OF DRILLING vertical down

MINE COORDINATES N10308.5, E7041.5 DEPTH OF BOREHOLE 51.6'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/24/83

RUN NUMBER	DEPTH ( )	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.2	100	–		(as above)	
7	30	4.9	100	–		27.9'-31.3' **HALITE:** argillaceous, clear and light gray (N7) to light brownish-gray (5YR 6/1), fine to medium crystalline, moderately hard. CTay content up to 5% with few isolated blebs of orange polyhalitic halite throughout. Gray clay breaks at 28.3', 30.0', and 31.1'.	
8	35	4.3	86	–		31.3'-37.2' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), medium to coarsely crystalline, moderately hard. Polyhalite occurs as dense stringers and isolated blebs and represents 0-10% of core. At 35.7', 1/2" thick, hard, dense polyhalite seam.	
9	40	5.2	100	–		37.2'-37.4' **ANHYDRITE:** medium light gray (N6), very hard, dense microcrystalline. At 37.4', medium gray (N5) clay parting.	
10	45	4.8	100	–		37.4'-49.8' **ARGILLACEOUS HALITE:** clear and mottled light gray (N7), to light brownish-gray (5YR 6/1) to pale yellowish-brown (10YR 6/2). Finely to coarsely crystalline, moderately hard. Clay content ranges from 0-25% with trace of interstitial orange polyhalite below 43.9'. Numerous brown and gray clay breaks throughout. Dominant clay breaks at: 37.6', 38.0', 40.1', 44.3', 45.4', 45.5', 45.7', 46.4', 47.0', and 48.9'.	
11	50	5.3	100	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-204 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 624' N of Exploratory Shaft centerline, 6.8' from W rib

STATION N640, E140 COLLAR ELEV. 1290.5 DIRECTION OF DRILLING vertical down

MINE COORDINATES N10308.5, E7041.5 DEPTH OF BOREHOLE 51.6'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/24/83 SHEET 3 OF 3

RUN NUMBER	DEPTH ( )	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	5.3	100	–	—	49.8'-51.6' **HALITE:** clear, coarsely crystalline, moderately hard, with trace gray clay in part.	Hole completed at 10:00 hours on 24 February 1983. Total Depth = 51.6'
	55						

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-205 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 1410' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1410, E0 COLLAR ELEV. 1316.5' DIRECTION OF DRILLING vertical up

MINE COORDINATES N11095, E6892 BOREHOLE PENETRATION 50.7'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/19/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.0	100	-		22.5'-31.5' **HALITE:** clear, coarsely crystalline, moderately hard, few isolated stringers of white (N9), anhydrite. At 22.7', 1/2" thick medium gray (N5) moist clay seam. From 27.5'-28.7', moderate brown (5YR 4/4), slightly argillaceous zone, medium crystalline. At 28.7' gray clay parting.	
5	20	5.2	100	-	X X	17.4'-22.5' **HALITE:** argillaceous, clear to mottled dark gray (N4) to pale yellowish-brown (10YR 6/2). Finely to medium crystalline, moderately hard. Clay content renges from 0 to 15%. Trace of orange polyhalitic halite from 19.3'-20.0'. Clay breaks at 18.3', 19.7', 20.0', 20.5', 21.0', 21.3', 21.9' and 22.3'.	
					X	13.5'-17.4' **POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), moderately hard, coarsely crystalline. Few very light gray (N8) hard, anhydrite stringers throughout. 1/8" thick anhydrite stringer at 14.7'. Polyhalite occurs interstitially and in isolated blebs in 5-8% of core.	
4	15	4.8	100	-	X X X X	12.8'-13.5' **ANHYDRITE:** medium gray (N5) to very light gray (N8); hard, dense, microcrystalline, slightly banded in part. Moist, gray clay parting at 12.8'.	At 12.9' encountered gas. No detectable gas after 5 minutes.
						6.3'-12.8' **HALITE:** clear, coarsely crystalline, moderately hard, few white (N9), hairline anhydrite stringers throughout. Trace polyhalite from 6.3'-7.1'. Finely crystalline above 12.0'. Trace of light gray (N7) interstitial clay above 12.0'. Gray clay breaks at 12.5' and 12.7'.	
3	10	3.0	97	-	X X	6.1'-6.3' **ANHYDRITE:** very light gray (N8), hard, dense, microcrystalline, broken into 1/8" chips. Soft, gray clay parting at 6.1'.	
2	5	3.0	97	-	X	0.0'-6.1' **HALITE:** argillaceous and polyhalitic in part. Clear to moderate reddish-orange (10R 6/6) to light brown (5 YR 6/4) to medium gray (N5). Finely to coarsely crystalline, moderately hard. Finely crystalline above 4.6'. Few gray clay breaks at 4.4', 5.4' and 5.9'. Clay and polyhalite represent from 0-3% of core.	Coring began at 09:00 hours on 18 February 1983.
1		2.0	100	-	X		Cored from 0'-1.0' with 6" core barrel. From 1.0'-6.1' cored without use of inner core barrel.
0	0	.9	90	-			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-205 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 1410' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1410, E0 COLLAR ELEV. 1316.5' DIRECTION OF DRILLING vertical up

MINE COORDINATES N11095, E6892 BOREHOLE PENETRATION 50.7'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/19/83 SHEET 2 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	50	4.1	100	-		46.1'-49.1' **ARGILLACEOUS HALITE:** clear to mottled brownish-gray (5YR 4/1) to medium light gray (N6) to moderate brown (5YR 3/4). Finely to coarsely crystalline, moderately hard. Numerous clay breaks and partings with clay composing 0-20% of core. Finely crystalline from 47.8'-48.9'. Brown clay breaks at 46.4', 46.7', 46.9', 47.4', 47.9', 48.0', 48.1', 48.5' and 48.7'. Clay partings at 46.8', 48.8' and 48.9'.	
10	45	5.0	100	-	X	43.1'-46.1' **HALITE:** clear, medium to coarsely crystalline, moderately hard, numerous blebs and stringers of very light gray (N7) anhydrite. Trace of orange polyhalite at 43.6'. Trace of brownish-gray (5YR 4/1) clay from 45.6'-45.8'.	
9	40	5.1	100	-	X	40.4'-43.1' **ARGILLACEOUS HALITE:** clear to mottled grayish-brown (5YR 3/2), pale yellowish-brown (10YR 6/2) and moderately reddish-orange (10R 6/6), finely to coarsely crystalline, moderately hard. Finely crystalline from 41.0'-43.0'. Clay content ranges from 0-15% with trace of interstitial polyhalite from 42.5'-43.0'. Clay breaks at 40.7', 40.8', 41.2', 41.4', 41.8', 42.0', 42.3' and 43.0'.	
8	35	5.1	100	-		36.2'-40.4' **HALITE:** clear, coarsely crystalline, moderately hard. Trace of polyhalite throughout. Some isolated stringers of very light gray (N8) anhydrite.	
						35.4'-36.2' **ANHYDRITE:** light gray (N7) to medium gray (N5), very hard, dense.	
						35.3'-35.4' **CLAY:** grayish brown (5YR 3/2), moist, firm to stiff, highly plastic, dense. Horizontal contact with anhydrite above.	
7	30	5.2	100	-		31.5'-35.3' **ARGILLACEOUS HALITE:** clear to pale yellowish-brown (10Y/R 6/2) and medium gray (N5), finely to coarsely crystalline, moderately hard, numerous brown clay breaks throughout; clay represents about 3-10% of core. Clay breaks at 31.5', 31.6', 32.9', 33.4', 33.6' and 34.0'.	
6	25	5.0	100	-			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-205 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 1410' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1410, E0 COLLAR ELEV. 1316.5' DIRECTION OF DRILLING vertical up

MINE COORDINATES N11095, E6892 BOREHOLE PENETRATION 50.7'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/19/83 SHEET 3 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11		4.1	100	17	X	49.1'-50.7' **HALITE:** polyhalitic, clear and moderate reddish orange (10R 6/6), coarsely crystalline, moderately hard. Polyhalite comprises 0-3% of core and occurs as isolated blebs and stringers.	Total Penetration = 50.7' Completed hole at 15:00 hours on 18 February 1983.

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-206 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 1410' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1410, E0 COLLAR ELEV. 1308.0' DIRECTION OF DRILLING vertical down

MINE COORDINATES N11095, E6892 DEPTH OF BOREHOLE 50.6'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/22/83 SHEET 1 OF 3

RUN NUMBER	DEPTH (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
1	0–5	3.3	55	–		**0.0'-9.5' HALITE:** argillaceous and polyhalitic in part. Clear to moderate reddish-orange (10R 6/6) and light gray (N7), finely to coarsely crystalline, moderately hard. Interstitial clay composes up to 1% of core as does isolated blebs and stringers of orange polyhalite. Clear halite from 8.5'-9.5'.	Hole began at 09:30 hours on 21 February 1983. Cored from 0' to 6.0' without inner core barrel.
2	5–10	5.3	100	–			
3	10–15	1.7	55	–		**9.5'-13.2' POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), coarsely crystalline, moderately hard. Polyhalite is interstitial and locally represents up to 25% of core. Hard polyhalite seam at 13.1'.	Core Loss: Run 1 Throughout Run; Where Lost 3 11.3'-13.2'
						13.2'-14.4' ANHYDRITE: light gray (N7) to very light gray (N8), hard, dense, microcrystalline.	Encountered gas at 13.2'.
4	15–20	2.1	100			**14.4'-20.6' POLYHALITIC HALITE:** clear to moderate reddish-orange (10R 6/6), medium to coarsely crystalline, moderately hard. Polyhalite ranges from 0-20% and occurs as blebs and stringers throughout. At 18.0', hard, dense, 1/4" thick polyhalite seam. Trace of clay from 19.5'-19.9' with 1/2" thick gray clay seam at 19.5'.	
5	20–25	5.0	100	–			
6	25	5.2	100	–		**20.6'-21.8' HALITE:** argillaceous, clear and medium gray (N5), medium to coarsely crystalline, moderately hard. Clay content ranges from 0-5% and occurs interstitially. Gray clay breaks at 20.9', 21.1', 21.2' and 21.5'.	

(see description on next sheet)

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-206 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 1410' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1410, E0 COLLAR ELEV. 1308.0' DIRECTION OF DRILLING vertical down

MINE COORDINATES N11095, E6892 DEPTH OF BOREHOLE 50.6'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/22/83

RUN NUMBER	DEPTH (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
6	25	5.2	100	–		**21.8'-27.3' POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), medium to coarsely crystalline, moderately hard. Polyhalite comprises up to 25% of core in dense stringers and blebs with some interstitial halite. Trace of clay at 25.3' and 25.9' with gray clay parting at 25.3'.	
7	30	5.1	100	–		**27.3'-30.9' HALITE:** argillaceous and polyhalitic, clear and mottled medium gray (N5) to light gray (N7) to moderate reddish-orange (10R 6/6). Finely to medium crystalline, moderately hard. Gray clay represents 3-5% of core and orange polyhalite 1-2%. Clay and polyhalite occur interstitially throughout. Gray clay breaks at 27.3', 27.5', 27.8', 28.4', 29.5', 29.7', 30.0' and 30.7'.	
8	35	5.2	100	–		**30.9'-35.9' POLYHALITIC HALITE:** clear and moderate reddish-orange (10R 6/6), medium crystalline, moderately hard. Polyhalite occurs interstitially and as isolated blebs and represents from 0-10% of core. 1/2" thick polyhalite seams at 35.4' and 35.8'.	
9	40	5.3	100	–		**35.9'-36.9' HALITE:** clear, medium to coarsely crystalline, moderately hard; very thin, hairline stringers of anhydrite at 36.5'.	
						36.9'-37.1' ANHYDRITE: light gray (N7), hard, dense, microcrystalline, with medium gray (N5) 1/8" thick, soft, moist, clay parting at 37.1'.	
10	45	5.3	100	–		**37.1'-50.6' HALITE:** argillaceous, clear to mottled brownish-gray (5YR 4/1), light gray (N7) and light brown (5YR 6/4). Medium to coarsely crystalline, moderately hard, trace polyhalitic halite from 45.2' to 46.3'. Clay content ranges from 0-15% and occurs interstitially. Clear halite from 37.5'-38.4', 41.0'-42.0', and 50.3'-50.6'. Gray or brown clay breaks at 38.9', 39.7', 44.3', 45.7', 46.0', 46.3', 46.4', 46.5', 47.3' and 49.0'.	
11	50	3.0	100	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG

BORING NO. DO-206 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION 0 East Drift, 1410' N of Exploratory Shaft centerline, 12½' from E rib

STATION N1410, E0 COLLAR ELEV. 1308.0' DIRECTION OF DRILLING vertical down

MINE COORDINATES N11095, E6892 DEPTH OF BOREHOLE 50.6'

DRILLING METHOD Rotary w/brine DRILL MAKE/MODEL Joy 12B

PREPARED BY JPS/Bechtel DATE 2/22/83 SHEET 3 OF 3

RUN NUMBER	DEPTH (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
11	55	3.0	100	–	— —		Total Depth = 50.6' Hole completed at 14:30 hours on 21 February 1983

WIPP-SPDV
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-229 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 401' S of Exploratory Shaft Centerline, 13.7' from E rib

STATION S 401, E 153 COLLAR ELEV. 1259.8 DIRECTION OF DRILLING Vertical up

MINE COORDINATES N9287 E7049 BOREHOLE PENETRATION 50.6'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB/Bechtel DATE 3/4/83 SHEET 1 OF 3

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	25					(see description on next sheet)	
8		4.0	80	–	– X	20.8'-23.2' **ARGILLACEOUS HALITE:** (lower contact approximate) pale brown (5YR 5/2) to moderate brown (5YR 3/4), mottled, medium to coarsely crystalline, moderately hard. Contains 2-5% brown clay, trace only from 20.8'-21.5'. Contains several clay breaks.	**Core Loss:** Run 1 - at 1.4' Run 2 - throughout Run 6 - throughout Run 7 - intermittently between 16.4'-20.0' Run 8 - throughout
7	20	4.5	88	–	X X X X	16.6'-20.8' **POLYHALITIC HALITE:** clear, mottled with moderate reddish-orange (10R 6/6) polyhalite, medium to coarsely crystalline. Polyhalite content varies from 1 to 5% and occurs as discrete blebs and stringers. Also contains 1-2% very light gray (N8), blebs and thin anhydrite stringers. Polyhalite absent from 18.6' to 19.3'.	
						15.9'-16.6' **ANHYDRITE:** (Anhydrite "a") medium light gray (N6) to white, banded, microcrystalline, hard, dense. Trace of gray clay at 15.9'.	
6	15	4.3	86	–	X X	8.6-15.9' **HALITE:** clear, medium to coarsely crystalline, moderately hard. 8.7'-8.9': light gray anhydrite stringers and reddish-orange polyhalite blebs. Very thin light gray anhydrite stringers at 9.6'. 1/8" light gray anhydrite stringer at 10.4'. Light gray anhydrite bleb and small polyhalite blebs at 14.7' and at 15.5'-15.6'.	Stuffing box blown out of collar three times during Run #6, at approximately 12', 15', and 15.9'. Gas has high pressure but low volume. Flow lasted for about one minute in each case.
						8.5'-8.6' **ANHYDRITE:** (Anhydrite "b") medium gray (N5), banded, hard, dense, microcrystalline. Trace of gray clay at 8.5'.	
5	10	5.1	100	–	X	5.3'-8.5' **ARGILLACEOUS HALITE:** brownish-gray (5YR 4/1), medium crystalline, moderately hard. ≤2% clay from 5.3' to 6.8'. ±5% clay 6.8' to 8.5'. Brown clay breaks at 6.9', 7.1', 7.8', 7.9', 8.2', 8.3'.	Brief flow of gas at moderate pressure at 8.5'. Inner core barrel was used after 6.3'.
4		1.3	100	–	–		
3	5	2.4	100	–	X	0.0'-5.3' **HALITE:** clear to moderate reddish-orange (10R 6/6), locally light brownish-gray (5YR 6/1), medium to coarsely crystalline, moderately hard. Trace polyhalite blebs throughout. Argillaceous (±2%) from 0.0' to 0.5'.	Run #3 was dropped by drillers. Core was not necessarily boxed in order. Core Run #0 is a 5.5" diameter plug 1.0' long drilled out for stuffing box. Coring began at 10:00 hours, 2 March 1983.
2		0.6	50	–	X		
1		0.3	75	–			
0	0	1.0	100	–	–		

WIPP-SPDV
WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-229 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 401' S of Exploratory Shaft Centerline, 13.7' from E rib

STATION S 401, E 153 COLLAR ELEV. 1259.8 DIRECTION OF DRILLING Vertical up

MINE COORDINATES N9287 E7049 BOREHOLE PENETRATION 50.6'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB/Bechtel DATE 3/4/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
	50					(see description on next sheet)	
13		4.0	100	–		**45.2'-48.1' HALITE:** clear, mottled locally with moderate brown (5YR 3/4) clay, medium to coarsely crystalline, moderately hard. Clay content increases upward: trace brown clay 45.2'-47.0'; 2%± 47.0'-47.6'; 10%± with clay breaks 47.6'-48.0'. Trace polyhalite blebs 45.2'-47.0'.	
12	45	5.0	100	–		**40.4'-45.2' HALITE:** clear, mottled with moderate reddish-orange (10R 6/6) polyhalite, medium to coarsely crystalline, moderately hard. Contains 1-4% polyhalite as discrete blebs and stringers. Also contains trace very light gray anhydrite blebs.	
11	40	5.1	100	–		**39.9'-40.4' ANHYDRITE:** medium gray (N5), banded with very light gray (N8), microcrystalline, hard, dense. Underlain by 1/2" thick brown clay seam.	Hit strong flow of pressurized gas at about 38'. Flow continued at moderate rate until about 41.5' (approximate 5 minute duration).
						30.4'-39.9' ARGILLACEOUS HALITE: pale brown (5YR 5/2) to moderate brown (5YR 3/4), locally clear mottled with moderate reddish-orange polyhalite, fine to coarsely crystalline, moderately hard. Clay content about 2-5%. Numerous brown clay breaks. Trace polyhalite without clay from 31.7'-32.2' and 38.8'-39.5'. Clear halite from 32.4'-34.0'.	
10	35	4.0	80	–			Core Loss: Run 9 - intermittently between 26.5'-28.0' Run 10 -throughout.
9	30	4.8	96	–		**23.2'-30.4' HALITE:** clear, medium to coarsely crystalline, moderately hard. Traces of polyhalite and brown clay 23.2'-26.5'. Light gray anhydrite seam underlain by brown clay partings 26.5'-26.6'. Very light gray anhydrite seam, 1/8"-1/4", at 27.6', and a few hairline anhydrite stringers throughout.	Violent bursts of pressurized gas at about 20', and again at about 31'. Stuffing box blown out of collar both times. Very high flow for 30± seconds, then diminished to a strong flow for 2-5 minutes, then dissipated.
8	25	4.0	100	–			

WIPP-SPDV

WASTE ISOLATION PILOT PLANT

ROCK CORING LOG
UPWARD CORING

BORING NO. DO-229 INSTRUMENT TYPE & NUMBER None HOLE SIZE NX

LOCATION East 140 Drift, 401' S of Exploratory Shaft Centerline, 13.7' from E rib

STATION S 401, E 153 COLLAR ELEV. 1259.8 DIRECTION OF DRILLING Vertical up

MINE COORDINATES N9287 E7049 BOREHOLE PENETRATION 50.6'

DRILLING METHOD Rotary w/Brine DRILL MAKE/MODEL Joy 12B

PREPARED BY RMB/Bechtel DATE 3/4/83

RUN NUMBER	PENETRATION (ft.)	RECOVERY	% RECOVERED	RQD	PROFILE	DESCRIPTION	REMARKS
13	50 55	4.0	100	–	X –	48.1'-50.6' **HALITE:** predominately clear, locally mottled with moderate brown clay and moderate reddish-orange polyhalite, medium to coarsely crystalline, moderately hard. Contains trace polyhalite blebs throughout and trace brown clay 50.4'-50.6'. Possible clay break at 48.4'.	Hole completed at 11:30 hours on 3 March 1983.

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE 4" CORE BORING NO. OH-9

LOCATION CENTERLINE OF ROOM L-1; TEST ROOM 1 INTERSECTION; ROOF

STATION N1433 W231.5 COLLAR ELEV. 1310 ± DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N11,125.6 E6662.9 DEPTH OF BOREHOLE 15.4 FT

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL LONGYEAR 65

DATE STARTED 2-27-84 (DAY) DATE COMPLETED 2-28-84 (DAY) SHEET

LOGGED BY: J. E. GALLERANI DATE: 2-28-84 1 OF 1

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0								
	1		1.85	1.85	100	X	0.0' - 4.2' HALITE: Clear, coarsely crystalline. < 1% polyhalite. 1% from 1.0 to 2.0'±.	4" dia. thin wall masonry core barrel. Used with EW rods.
1.85								
	2	5	3.7	3.7	100	X	4.2' - 7.3' HALITE: Clear, coarsely crystalline to 6.3'. Then medium to coarse. ≤ 1% gray intercrystalline clay. < 1/2% dispersed polyhalite.	Hole drilled by SNL.
5.55						— X —	7.3' - 7.45' ANHYDRITE b: Gray, microcrystalline anhydrite. Up to 1/2" halite layer at 7.4'. Trace of gray clay at 7.3'. Upper contact tightly welded. Intact core.	Dry hole. No gas. Core broken in several pieces at lower contact of anhydrite b. Unable to determine if any separation exists.
	3		3.75	3.75	100		7.45' - 13.15' HALITE: Clear; coarsely crystalline. Scattered white stringers.	
9.3								
	4	10	3.05	3.05	100		13.15' - 13.95' HALITE: Clear to light gray (N7); medium to coarsely crystalline. ≤ 1% gray clay. < 1/2% dispersed polyhalite.	
12.35								
	5		3.05	3.05	100	— X	13.95' - 14.45' ANHYDRITE a: Light gray to white anhydrite with scattered halite growths from 14.15'. Upper contact tightly welded. Lower contact has < 1/16" gray clay.	Core broken at 13.95'. Smooth, horizontal break. Unable to determine any separation from core here.
		15				X X X	14.45' - 15.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. < 1 to 3% polyhalite.	
15.4								

BORING NO. OH-9

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE 4" CORE BORING NO. OH-11

LOCATION CENTERLINE OF ROOM L-2 AND TEST ROOM 2 INTERSECTION; ROOF

STATION N1433 W364.5 COLLAR ELEV. 1308 ± DIRECTION OF DRILLING VERTICAL UP

MINE COORDINATES N11,125.6 E6529.6 DEPTH OF BOREHOLE 19.7 FT

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL LONGYEAR 65

DATE STARTED 2-15-84 (DAY) DATE COMPLETED 2-16-84 (DAY) SHEET

LOGGED BY: J. E. GALLERANI DATE: 2-16-84 1 OF 1

	RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0								
	1		1.5	1.5	100		0.0' - 2.3' HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 2% polyhalite blebs and patches.	Used 4" thin wall masonry core barrel with EW rods.
1.5								
	2		3.1	3.1	100		2.3' - 5.2' HALITE: Clear, some moderate reddish orange (10R 6/6); medium to coarsely crystalline. <1% polyhalite. Clay break at 3.0 - 3.2'.	Hole drilled by SNL. Drilling time: 8-1/2 hrs. ±.
4.6								
	3	5	3.0	3.0	100		5.2' - 7.6' HALITE: Clear mixed with medium light gray (N6); medium to coarsely crystalline. <1% gray clay and polyhalite.	
7.6								
	4		2.85	2.85	100		7.6' - 7.8' ANHYDRITE b: White to light gray (N7) anhydrite with scattered halite growths. Slight trace clay at 7.6'. Upper contact is tightly welded. Core intact.	Lower contact of anhydrite b shows some core grinding. Trace of gray clay.
10.45		10						
	5		3.65	3.65	100		7.8' - 13.0' HALITE: Clear; coarsely crystalline. Scattered white stringers.	
							13.0' - 14.1' HALITE: Clear to moderate reddish orange (10R 6/6); medium to coarsely crystalline. <1/2% dispersed polyhalite and gray clay.	
14.1								
	6	15	3.7	3.7	100		14.1' - 14.8' ANHYDRITE a: White to light gray (N7) microcrystalline anhydrite with scattered halite growths, especially common from 14.6 - 14.8'. <1/32" gray clay at 14.1'. Upper contact is irregular; tightly welded. Core intact. Grades into polyhalitic halite above.	Core broken at lower contact of anhydrite a but pieces fit together fairly well.
17.8								
	7		1.9	1.9	100		14.8' - 18.4' POLYHALITIC HALITE: Clear to moderate reddish orange; coarsely crystalline. <1 to 3% polyhalite. Anhydrite stringers at 15.9 and 16.05'.	
19.7		20					18.4' - 19.7' HALITE: Clear, medium to coarsely crystalline. <1% dispersed gray clay. Break at 18.4'.	

BORING NO. OH-11

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE 4" CORE BORING NO. OH-13

LOCATION CENTERLINE ROOM L-1 AND TEST ROOM 1 INTERSECTION; FLOOR

STATION N1433 W231.5 COLLAR ELEV. 1298 ± DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N11125.6 E6662.9 DEPTH OF BOREHOLE 9.5 FT

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL LONGYEAR 65

DATE STARTED 2-28-84 (DAY) DATE COMPLETED 2-28-84 (DAY) SHEET

LOGGED BY: J. E. GALLERANI DATE: 2-28-84 1 OF 1

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
1	0	2.5	2.5	100		0.0'-0.15' FILL	4" dia. wall masonry core barrel used with EW rods.
	2.5				X	0.15'-1.5' HALITE: Clear, coarsely crystalline. <1% gray intercrystalline clay.	
2		3.15	3.15	100	X	1.5'-4.4' HALITE: Clear with some moderate reddish orange (10R 6/6); coarsely crystalline. <1% polyhalite blebs and patches. Gray clay break at 2.5'.	Hole drilled by SNL.
	5						
	5.65						
3		3.85	3.85	100		4.4'-4.6'± POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1% gray clay. 1 to 3% polyhalite. Some anhydrite present.	
	9.5				X		
	10					4.6'-8.1' MB-139 : Upper contact, core is broken at 15°±, <1/32" gray clay along it. Mixture of anhydrite and halite to 7.3'. From 7.3' - 7.8' is light gray (N7) to white anhydrite. Irregular pattern of white and gray color. Near-horizontal laminae present. Hard, dry gray clay 7.8 to 8.1'± (lower contact dips from 7.95 to 8.1'). <1/16"halite layer at 7.85'.	20°± break in core at 5.65' but core pieces fit together very well. Core is broke at 7.9'± but core ends fit together. Below clay at lower contact, core is intact, and contact is tightly welded.
						8.1' - 8.6' HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline, some medium. <1/2% polyhalite. Steeply dipping, clean fracture extends from center of core at 8.0' to outer edge at 8.5'. Core not broken completely along this.	
						8.6' - 9.5' HALITE: Clear to light gray (N7), medium to coarsely crystalline, some fine. <1/2% polyhalite. ≤1% gray intercrystalline clay. Several steeply dipping, clean fractures in core. Core not broken completely along any fractures. Clay breaks at 8.6' and 9.3'.	

WIPP

GEOLOGIC DRILL LOG

WASTE ISOLATION PILOT PLANT

INSTRUMENT TYPE & NUMBER - HOLE TYPE/SIZE 4" CORE BORING NO. OH-14

LOCATION CENTERLINE OF ROOM L-2 AND TEST ROOM 2 INTERSECTION; FLOOR

STATION N1433 W364.5 COLLAR ELEV. 1296 ± DIRECTION OF DRILLING VERTICAL DOWN

MINE COORDINATES N11,125.6 E6529.6 DEPTH OF BOREHOLE 9.7 FT

DRILLING METHOD ROTARY/AIR DRILL MAKE/MODEL LONGYEAR 65

DATE STARTED 2-16-84 (DAY) DATE COMPLETED 2-17-84 (DAY) SHEET

LOGGED BY: J. E. GALLERANI DATE: 2-17-84 1 OF 1

RUN NUMBER	DEPTH (ft.)	LENGTH CORE RUN	RECOVERY	% RECOVERED	PROFILE	DESCRIPTION	REMARKS
0.0							
1		1.7	1.7	100		0.0' - 1.9' HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline with zones of fine to medium. ≤1% polyhalite. <1/2% gray intercrystalline clay.	4-inch thin wall masonry core barrel used with EW rods.
1.7							
2		1.8	1.8	100		1.9' - 4.4' POLYHALITIC HALITE: Clear to moderate reddish orange (10R 6/6); coarsely crystalline. <1 to 4% polyhalite. Scattered anhydrite from 3.8 to 4.4'. Clean, irregular break in core at 3.55'.	Hole drilled by SNL. Dry hole. No gas. Separation noted in walls of hole at 3.55'.
3.5							
3	5	3.45	3.45	100		4.4' - 6.95' MB-139: White to medium light gray (N6) with some moderate reddish orange (10R 6/6). Microcrystalline anhydrite from 4.4 - 5.4'. ≤1/16" halite layer at 6.75 - 6.8'. Continuous through core there is a hairline fracture 1/2" below this halite where core is broken along. Upper contact of MB-139 is tightly closed and dips 15°±. Less than 1/2" below is a parallel break in core. Core pieces fit tightly along this though 1/2 to 3/4" gray clay along lower contact.	While drilling hole, just below top of MB-139, had some air and drill cuttings coming out of 51X-GE-00262 hole. Coming out of extensometer hole at 4.8' depth. Core at lower contact of MB-139 is broken here. Difficult to determine any separation from looking at core.
6.95							
4		2.75	2.75	100		6.95' - 9.7' HALITE: Clear to light moderate reddish orange (10R 6/6); coarsely crystalline, some medium. <1% dispersed polyhalite. <1% gray clay, intercrystalline and scattered breaks.	Put water in OH-14 and it came out in 51X-GE-00262 at 4.8' depth.
9.7	10						

APPENDIX J

GEOMECHANICAL INSTRUMENTATION DATA PLOTS

CONTENTS

Table No.	Title/Description
J-1	Index of Instrumentation Data Plots
J-2	Schematic Symbols for Data Plots
J-3	Description of Instrument Identification

Figures

See Table J-1 for listing of enclosed figures.

Table J-1

GEOMECHANICAL INSTRUMENTATION DATA

Figure No.	Title
J-1	Piezometer 31X-PE-00201 - Waste Shaft
J-2	Piezometer 31X-PE-00202 - Waste Shaft
J-3	Piezometer 31X-PE-00203 - Waste Shaft
J-4	Piezometer 31X-PE-00204 - Waste Shaft
J-5	Piezometer 31X-PE-00205 - Waste Shaft
J-6	Piezometer 31X-PE-00206 - Waste Shaft
J-7	Piezometer 31X-PE-00207 - Waste Shaft
J-8	Piezometer 31X-PE-00208 - Waste Shaft
J-9	Piezometer 31X-PE-00209 - Waste Shaft
J-10	Piezometer 31X-PE-00210 - Waste Shaft
J-11	Piezometer 31X-PE-00211 - Waste Shaft
J-12	Piezometer 31X-PE-00212 - Waste Shaft
J-13	Piezometer 35X-PE-00201 - Exhaust Shaft
J-14	Piezometer 35X-PE-00202 - Exhaust Shaft
J-15	Piezometer 35X-PE-00203 - Exhaust Shaft
J-16	Piezometer 35X-PE-00204 - Exhaust Shaft
J-17	Piezometer 35X-PE-00205 - Exhaust Shaft
J-18	Piezometer 35X-PE-00206 - Exhaust Shaft
J-19	Piezometer 35X-PE-00207 - Exhaust Shaft
J-20	Piezometer 35X-PE-00208 - Exhaust Shaft
J-21	Piezometer 35X-PE-00209 - Exhaust Shaft
J-22	Piezometer 35X-PE-00210 - Exhaust Shaft
J-23	Piezometer 35X-PE-00211 - Exhaust Shaft
J-24	Piezometer 35X-PE-00212 - Exhaust Shaft
J-25	Piezometer 35X-PE-00213 - Exhaust Shaft
J-26	Piezometer 35X-PE-00214 - Exhaust Shaft
J-27	Piezometer 35X-PE-00215 - Exhaust Shaft
J-28	Piezometer 35X-PE-00216 - Exhaust Shaft
J-29	Piezometer 35X-PE-00217 - Exhaust Shaft
J-30	Piezometer 35X-PE-00218 - Exhaust Shaft
J-31	Piezometer 35X-PE-00219 - Exhaust Shaft
J-32	Piezometer 35X-PE-00220 - Exhaust Shaft
J-33	Piezometer 35X-PE-00221 - Exhaust Shaft
J-34	Piezometer 37X-PE-00201 - C & SH Shaft
J-35	Piezometer 37X-PE-00202 - C & SH Shaft
J-36	Piezometer 37X-PE-00203 - C & SH Shaft
J-37	Piezometer 37X-PE-00204 - C & SH Shaft
J-38	Piezometer 37X-PE-00205 - C & SH Shaft
J-39	Piezometer 37X-PE-00206 - C & SH Shaft
J-40	Piezometer 37X-PE-00207 - C & SH Shaft
J-41	Piezometer 37X-PE-00208 - C & SH Shaft
J-42	Piezometer 37X-PE-00209 - C & SH Shaft
J-43	Piezometer 37X-PE-00210 - C & SH Shaft
J-44	Piezometer 37X-PE-00211 - C & SH Shaft

Table J-1 (continued)

J-45	Piezometer 37X-PE-00212 - C & SH Shaft
J-46	Pressure Cell 31X-WE-00201 - Waste Shaft
J-47	Pressure Cell 31X-WE-00202 - Waste Shaft
J-48	Pressure Cell 31X-WE-00203 - Waste Shaft
J-49	Pressure Cell 31X-WE-00204 - Waste Shaft
J-50	Pressure Cell 35X-WE-00201 - Exhaust Shaft
J-51	Pressure Cell 35X-WE-00202 - Exhaust Shaft
J-52	Pressure Cell 35X-WE-00203 - Exhaust Shaft
J-53	Pressure Cell 35X-WE-00204 - Exhaust Shaft
J-54	Pressure Cell 37X-WE-00201 - C & SH Shaft
J-55	Pressure Cell 37X-WE-00202 - C & SH Shaft
J-56	Pressure Cell 37X-WE-00203 - C & SH Shaft
J-57	Pressure Cell 37X-WE-00204 - C & SH Shaft
J-58	Welded Strain Gauge 37X-ZE-00201 - C & SH Shaft
J-59	Welded Strain Gauge 37X-ZE-00202 - C & SH Shaft
J-60	Welded Strain Gauge 37X-ZE-00203 - C & SH Shaft
J-61	Welded Strain Gauge 37X-ZE-00204 - C & SH Shaft
J-62	Welded Strain Gauge 37X-ZE-00205 - C & SH Shaft
J-63	Welded Strain Gauge 37X-ZE-00206 - C & SH Shaft
J-64	Welded Strain Gauge 37X-ZE-00207 - C & SH Shaft
J-65	Welded Strain Gauge 37X-ZE-00208 - C & SH Shaft
J-66	Embedment Strain Gauge 37X-ZE-00209 - C & SH Shaft
J-67	Embedment Strain Gauge 37X-ZE-00210 - C & SH Shaft
J-68	Embedment Strain Gauge 37X-ZE-00211 - C & SH Shaft
J-69	Embedment Strain Gauge 37X-ZE-00212 - C & SH Shaft
J-70	Embedment Strain Gauge 37X-ZE-00213 - C & SH Shaft
J-71	Embedment Strain Gauge 37X-ZE-00214 - C & SH Shaft
J-72	Embedment Strain Gauge 37X-ZE-00215 - C & SH Shaft
J-73	Embedment Strain Gauge 37X-ZE-00216 - C & SH Shaft
J-74	Welded Strain Gauge 37X-ZE-00217 - C & SH Shaft
J-75	Welded Strain Gauge 37X-ZE-00218 - C & SH Shaft
J-76	Welded Strain Gauge 37X-ZE-00219 - C & SH Shaft
J-77	Welded Strain Gauge 37X-ZE-00220 - C & SH Shaft
J-78	Welded Strain Gauge 37X-ZE-00221 - C & SH Shaft
J-79	Welded Strain Gauge 37X-ZE-00222 - C & SH Shaft
J-80	Welded Strain Gauge 37X-ZE-00223 - C & SH Shaft
J-81	Welded Strain Gauge 37X-ZE-00224 - C & SH Shaft
J-82	Embedment Strain Gauge 37X-ZE-00225 - C & SH Shaft
J-83	Embedment Strain Gauge 37X-ZE-00226 - C & SH Shaft
J-84	Embedment Strain Gauge 37X-ZE-00227 - C & SH Shaft
J-85	Embedment Strain Gauge 37X-ZE-00228 - C & SH Shaft
J-86	Embedment Strain Gauge 37X-ZE-00229 - C & SH Shaft
J-87	Embedment Strain Gauge 37X-ZE-00230 - C & SH Shaft
J-88	Embedment Strain Gauge 37X-ZE-00231 - C & SH Shaft
J-89	Embedment Strain Gauge 37X-ZE-00232 - C & SH Shaft
J-90	Embedment Strain Gauge 37X-ZE-00235 - C & SH Shaft
J-91	Embedment Strain Gauge 37X-ZE-00236 - C & SH Shaft
J-92	Embedment Strain Gauge 37X-ZE-00237 - C & SH Shaft
J-93	Embedment Strain Gauge 37X-ZE-00238 - C & SH Shaft
J-94	Embedment Strain Gauge 37X-ZE-00239 - C & SH Shaft
J-95	Embedment Strain Gauge 37X-ZE-00240 - C & SH Shaft
J-96	Embedment Strain Gauge 37X-ZE-00241 - C & SH Shaft
J-97	Embedment Strain Gauge 37X-ZE-00242 - C & SH Shaft

Table J-1 (continued)

J-98	Multiple-Point Extensometer 31X-GE-00201 - Waste Shaft
J-99	Multiple-Point Extensometer 31X-GE-00202 - Waste Shaft
J-100	Multiple-Point Extensometer 31X-GE-00203 - Waste Shaft
J-101	Multiple-Point Extensometer 31X-GE-00204 - Waste Shaft
J-102	Multiple-Point Extensometer 31X-GE-00205 - Waste Shaft
J-103	Multiple-Point Extensometer 31X-GE-00206 - Waste Shaft
J-104	Multiple-Point Extensometer 31X-GE-00207 - Waste Shaft
J-105	Multiple-Point Extensometer 31X-GE-00208 - Waste Shaft
J-106	Multiple-Point Extensometer 31X-GE-00209 - Waste Shaft
J-107	Multiple-Point Extensometer 35X-GE-00201 - Exhaust Shaft
J-108	Multiple-Point Extensometer 35X-GE-00202 - Exhaust Shaft
J-109	Multiple-Point Extensometer 35X-GE-00203 - Exhaust Shaft
J-110	Multiple-Point Extensometer 35X-GE-00204 - Exhaust Shaft
J-111	Multiple-Point Extensometer 35X-GE-00205 - Exhaust Shaft
J-112	Multiple-Point Extensometer 35X-GE-00206 - Exhaust Shaft
J-113	Multiple-Point Extensometer 35X-GE-00207 - Exhaust Shaft
J-114	Multiple-Point Extensometer 35X-GE-00208 - Exhaust Shaft
J-115	Multiple-Point Extensometer 35X-GE-00209 - Exhaust Shaft
J-116	Multiple-Point Extensometer 37X-GE-00201 - C & SH Shaft
J-117	Multiple-Point Extensometer 37X-GE-00202 - C & SH Shaft
J-118	Multiple-Point Extensometer 37X-GE-00203 - C & SH Shaft
J-119	Multiple-Point Extensometer 37X-GE-00204 - C & SH Shaft
J-120	Multiple-Point Extensometer 37X-GE-00205 - C & SH Shaft
J-121	Multiple-Point Extensometer 37X-GE-00206 - C & SH Shaft
J-122	Multiple-Point Extensometer 37X-GE-00207 - C & SH Shaft
J-123	Multiple-Point Extensometer 37X-GE-00208 - C & SH Shaft
J-124	Multiple-Point Extensometer 37X-GE-00209 - C & SH Shaft
J-125	Double-Point Extensometer 51X-GE-00206
J-126	Double-Point Extensometer 51X-GE-00207
J-127	Double-Point Extensometer 51X-GE-00208
J-128	Double-Point Extensometer 51X-GE-00209
J-129	Double-Point Extensometer 51X-GE-00210
J-130	Double-Point Extensometer 51X-GE-00211
J-131	Double-Point Extensometer 51X-GE-00212
J-132	Multiple-Point Extensometer 51X-GE-00213
J-133	Multiple-Point Extensometer 51X-GE-00214
J-134	Multiple-Point Extensometer 51X-GE-00215
J-135	Multiple-Point Extensometer 51X-GE-00216
J-136	Multiple-Point Extensometer 51X-GE-00217
J-137	Multiple-Point Extensometer 51X-GE-00218
J-138	Multiple-Point Extensometer 51X-GE-00219
J-139	Multiple-Point Extensometer 51X-GE-00220
J-140	Double-Point Extensometer 51X-GE-00221
J-141	Multiple-Point Extensometer 51X-GE-00222
J-142	Multiple-Point Extensometer 51X-GE-00223
J-143	Multiple-Point Extensometer 51X-GE-00224
J-144	Multiple-Point Extensometer 51X-GE-00225
J-145	Multiple-Point Extensometer 51X-GE-00226
J-146	Multiple-Point Extensometer 51X-GE-00227
J-147	Multiple-Point Extensometer 51X-GE-00228
J-148	Multiple-Point Extensometer 51X-GE-00229
J-149	Multiple-Point Extensometer 51X-GE-00230
J-150	Multiple-Point Extensometer 51X-GE-00231
J-151	Multiple-Point Extensometer 51X-GE-00232

Table J-1 (continued)

J-152	Double-Point Extensometer 51X-GE-00233
J-153	Double-Point Extensometer 51X-GE-00234
J-154	Double-Point Extensometer 51X-GE-00235
J-155	Double-Point Extensometer 51X-GE-00236
J-156	Multiple-Point Extensometer 51X-GE-00237
J-157	Multiple-Point Extensometer 51X-GE-00238
J-158	Multiple-Point Extensometer 51X-GE-00239
J-159	Multiple-Point Extensometer 51X-GE-00240
J-160	Multiple-Point Extensometer 51X-GE-00241
J-161	Multiple-Point Extensometer 51X-GE-00242
J-162	Multiple-Point Extensometer 51X-GE-00243
J-163	Single-Point Extensometer 51X-GE-00244
J-164	Multiple-Point Extensometer 51X-GE-00245
J-165	Multiple-Point Extensometer 51X-GE-00246
J-166	Multiple-Point Extensometer 51X-GE-00247
J-167	Multiple-Point Extensometer 51X-GE-00248
J-168	Multiple-Point Extensometer 51X-GE-00249
J-169	Multiple-Point Extensometer 51X-GE-00250
J-170	Multiple-Point Extensometer 51X-GE-00251
J-171	Double-Point Extensometer 51X-GE-00252
J-172	Double-Point Extensometer 51X-GE-00253
J-173	Single-Point Extensometer 51X-GE-00254
J-174	Multiple-Point Extensometer 51X-GE-00255
J-175	Multiple-Point Extensometer 51X-GE-00256
J-176	Multiple-Point Extensometer 51X-GE-00257
J-177	Multiple-Point Extensometer 51X-GE-00258
J-178	Multiple-Point Extensometer 51X-GE-00259
J-179	Multiple-Point Extensometer 51X-GE-00260
J-180	Multiple-Point Extensometer 51X-GE-00261
J-181	Multiple-Point Extensometer 51X-GE-00262
J-182	Multiple-Point Extensometer 51X-GE-00263
J-183	Multiple-Point Extensometer 51X-GE-00264
J-184	Multiple-Point Extensometer 51X-GE-00265
J-185	Multiple-Point Extensometer 51X-GE-00267
J-186	Multiple-Point Extensometer 51X-GE-00268
J-187	Multiple-Point Extensometer 51X-GE-00269
J-188	Multiple-Point Extensometer 51X-GE-00270
J-189	Double-Point Extensometer 51X-GE-00271
J-190	Convergence Meter 51X-CE-00201
J-191	Convergence Meter 51X-CE-00202
J-192	Rockbolt Load Cell 51X-WG-00201
J-193	Rockbolt Load Cell 51X-WG-00202
J-194	Rockbolt Load Cell 51X-WG-00203
J-195	Rockbolt Load Cell 51X-WG-00204
J-196	Rockbolt Load Cell 37X-WG-00206
J-197	Rockbolt Load Cell 37X-WG-00207
J-198	Rigid Stressmeter 51X-NG-00252
J-199	Rigid Stressmeter 51X-NG-00254
J-200	Rigid Stressmeter 51X-NG-00255
J-201	Rigid Stressmeter 51X-NG-00256
J-202	Convergence Points - Waste Shaft - El. 2338

Table J-1 (continued)

J-203	Convergence Points - Waste Shaft - El. 1843
J-204	Convergence Points - Waste Shaft - El. 1350
J-205	Convergence Points - C & SH Shaft - El. 3114
J-206	Convergence Points - C & SH Shaft - El. 2956
J-207	Convergence Points - C & SH Shaft - El. 2825
J-208	Convergence Points - C & SH Shaft - El. 2680
J-209	Convergence Points - C & SH Shaft - El. 2596
J-210	Convergence Points - C & SH Shaft - El. 2470
J-211	Convergence Points - C & SH Shaft - El. 2337
J-212	Convergence Points - C & SH Shaft - El. 2135
J-213	Convergence Points - C & SH Shaft - El. 1846
J-214	Convergence Points - C & SH Shaft - El. 1353
J-215	Convergence Points - E0 Drift, North 1266 Ft
J-216	Convergence Points - E0 Drift - N1100 Drift Intersection
J-217	Convergence Points - E0 Drift, North 940 Ft
J-218	Convergence Points - E0 Drift, North 626 Ft
J-219	Convergence Points - E0 Drift, North 290 Ft
J-220	Convergence Points - E0 Drift - N140 Crosscut Intersection
J-221	Convergence Points - 39 Ft North of C & SH Shaft
J-222	Convergence Points - 15 Ft North of C & SH Shaft
J-223	Convergence Points - 12 Ft West of C & SH Shaft
J-224	Convergence Points - 18 Ft South of C & SH Shaft
J-225	Convergence Points - 18.5 Ft South of C & SH Shaft
J-226	Convergence Points - 30 Ft South of C & SH Shaft
J-227	Convergence Points - 65 Ft South of C & SH Shaft
J-228	Convergence Points - W30 Drift, South 250 Ft
J-229	Convergence Points - W30 Drift, South 500 Ft
J-230	Convergence Points - W30 Drift - S700 Crosscut Intersection
J-231	Convergence Points - W30 Drift, South 850 Ft
J-232	Convergence Points - W30 Drift - S1000 Crosscut Intersection
J-233	Convergence Points - W30 Drift, South 1141 Ft
J-234	Convergence Points - E140 Drift, North 1266 Ft
J-235	Convergence Points - E140 Drift, North 626 Ft
J-236	Convergence Points - E140 Drift, North 240 Ft
J-237	Convergence Points - E140 Drift, North 5 Ft
J-238	Convergence Points - E140 Drift - S400 Crosscut Intersection
J-239	Convergence Points - E140 Drift, South 460 Ft
J-240	Convergence Points - E140 Drift, South 550 Ft
J-241	Convergence Points - E140 Drift, South 850 Ft
J-242	Convergence Points - E140 Drift, South 1150 Ft
J-243	Convergence Points - E140 Drift, South 1246 Ft
J-244	Convergence Points - E140 Drift, South 1450 Ft
J-245	Convergence Points - E140 Drift, South 1879 Ft
J-246	Convergence Points - E140 Drift, South 2066 Ft
J-247	Convergence Points - E140 Drift, South 2350 Ft
J-248	Convergence Points - E140 Drift, South 2625 Ft
J-249	Convergence Points - E140 Drift, South 2950 Ft
J-250	Convergence Points - E140 Drift, South 3250 Ft
J-251	Convergence Points - E140 Drift, South 3614 Ft
J-252	Convergence Points - E140 Drift, South 3639 Ft
J-253	Convergence Points - E140 Drift, South 3664 Ft
J-254	Convergence Points - E300 Drift - S700 Crosscut Intersection
J-255	Convergence Points - E300 Drift, South 850 Ft
J-256	Convergence Points - E300 Drift - S1000 Crosscut Intersection

Table J-1 (continued)

J-257	Convergence Points - E300 Drift, South 1150 Ft
J-258	Convergence Points - E520 Drift, South 1775 Ft
J-259	Convergence Points - W170 Drift - S700 Crosscut Intersection
J-260	Convergence Points - W170 Drift, South 850 Ft
J-261	Convergence Points - W170 Drift - S1000 Crosscut Intersection
J-262	Convergence Points - W170 Drift, South 1150 Ft
J-263	Convergence Points - N1100 Drift, West 1347 Ft
J-264	Convergence Points - N1100 Drift, West 1159 Ft
J-265	Convergence Points - N1100 Drift, West 951 Ft
J-266	Convergence Points - N1100 Drift, West 783 Ft
J-267	Convergence Points - N1100 Drift - Test Room 2 Intersection
J-268	Convergence Points - N1100 Drift, East 80 Ft
J-269	Convergence Points - N1100 Drift, East 319 Ft
J-270	Convergence Points - N1100 Drift, East 691 Ft
J-271	Convergence Points - N1100 Drift, East 846 Ft
J-272	Convergence Points - N1100 Drift, East 1135 Ft
J-273	Convergence Points - N1100 Drift, East 1582 Ft
J-274	Convergence Points - N1420 Drift, West 391 Ft
J-275	Convergence Points - N1420 Drift - Test Room 2 Intersection
J-276	Convergence Points - N1420 Drift, West 258 Ft
J-277	Convergence Points - N1420 Drift - Test Room 1 Intersection
J-278	Convergence Points - N1420 Drift, East 304 Ft
J-279	Convergence Points - N1420 Drift, East 716 Ft
J-280	Convergence Points - N1420 Drift, East 1106 Ft
J-281	Convergence Points - N1420 Drift, East 1547 Ft
J-282	Convergence Points - Substation 2A
J-283	Convergence Points - Test Room 1
J-284	Convergence Points - Test Room 2
J-285	Convergence Points - Test Room 3
J-286	Convergence Points - Test Room 4
J-287	Convergence Points - Room L1, North 1455 Ft
J-288	Convergence Points - Room L2, North 1455 Ft
J-289	Convergence Points - S90 Crosscut, East 91 Ft
J-290	Convergence Points - 17 Ft East of Waste Shaft
J-291	Convergence Points - 20 Ft West of Waste Shaft
J-292	Convergence Points - S700 Crosscut, East 205 Ft
J-293	Convergence Points - S1600 Drift, East 311 Ft
J-294	Convergence Points - S1600 Drift, East 332 Ft
J-295	Convergence Points - S1600 Drift, East 357 Ft
J-296	Convergence Points - S1600 Drift, East 382 Ft
J-297	Convergence Points - S1600 Drift, East 407 Ft
J-298	Convergence Points - S1600 Drift, East 432 Ft
J-299	Convergence Points - S1600 Drift, East 457 Ft
J-300	Convergence Points - S1600 Drift, East 482 Ft
J-301	Convergence Points - S1600 Drift, East 507 Ft
J-302	Convergence Points - S1600 Drift, East 520 Ft
J-303	Convergence Points - S1950 Drift, East 311 Ft
J-304	Convergence Points - S1950 Drift, East 332 Ft
J-305	Convergence Points - S1950 Drift, East 357 Ft
J-306	Convergence Points - S1950 Drift, East 382 Ft
J-307	Convergence Points - S1950 Drift, East 407 Ft
J-308	Convergence Points - S1950 Drift, East 432 Ft
J-309	Convergence Points - S1950 Drift, East 457 Ft
J-310	Convergence Points - S1950 Drift, East 482 Ft
J-311	Convergence Points - S1950 Drift, East 503 Ft

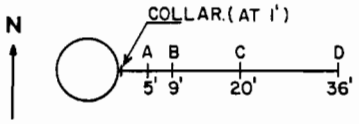
Table J-1 (continued)

J-312	Convergence Points - S1950 Drift, East 523 Ft
J-313	Convergence Points - S1950 Drift, East 586 Ft
J-314	Inclinometer 51X-IG-00201
J-315	Inclinometer 51X-IG-00202
J-316	Inclinometer 51X-IG-00203
J-317	Inclinometer 51X-IG-00204
J-318	Inclinometer 51X-IG-00205
J-319	Inclinometer 51X-IG-00206
J-320	Inclinometer 51X-IG-00211
J-321	Inclinometer 51X-IG-00212
J-322	Inclinometer 51X-IG-00213
J-323	Inclinometer 51X-IG-00214
J-324	Inclinometer 51X-IG-00215
J-325	Inclinometer 51X-IG-00216
J-326	Inclinometer 51X-IG-00217
J-327	Inclinometer 51X-IG-00218
J-328	Inclinometer 51X-IG-00219
J-329	Inclinometer 51X-IG-00220
J-330	Inclinometer 51X-IG-00221
J-331	Inclinometer 51X-IG-00222
J-332	Inclinometer 51X-IG-00223
J-333	Inclinometer 51X-IG-00224
J-334	Inclinometer 51X-IG-00225
J-335	Inclinometer 51X-IG-00226

Table J-2

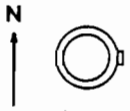
SCHEMATIC SYMBOLS FOR DATA PLOTS

NOT TO SCALE

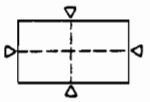


SHAFT IN PLAN, SHOWING EXTENSOMETER AND INSTRUMENT ANCHORS A, B, C, D AT DEPTHS 5, 9, 20, 36 FT., RESPECTIVELY.

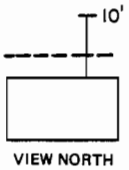
SHAFT IN PLAN, SHOWING LOCATION OF STRAIN GAUGE.



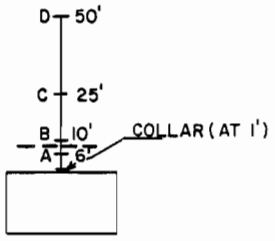
SHAFT IN PLAN, SHOWING PRESSURE CELL LOCATION.



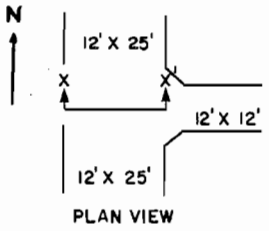
OPENING CROSS SECTION, SHOWING CONVERGENCE POINTS.



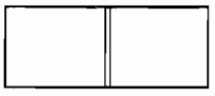
OPENING CROSS SECTION, SHOWING ROCK BOLT LOCATION AND DEPTH IN FT. CLAY PARTING SHOWN AT 3 FT.



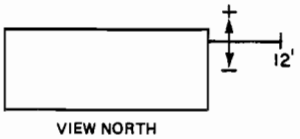
OPENING CROSS SECTION, SHOWING EXTENSOMETER IN ROOF AND INSTRUMENT ANCHORS A, B, C, AND D AT DEPTHS 6, 10, 25, AND 50 FT., RESPECTIVELY. CLAY PARTING SHOWN AT 8FT.



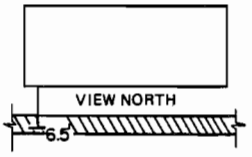
DRIFT INTERSECTION IN PLAN, SHOWING LOCATION OF DRIFT CROSS SECTION X-X' AND DIMENSIONS (HEIGHT x WIDTH) OF DRIFTS.



TEST ROOM CROSS SECTION, SHOWING LOCATION OF CONVERGENCE METER.



TEST ROOM CROSS SECTION, SHOWING INCLINOMETER LOCATION AND DEPTH IN FT. POSITIVE VALUE ON PLOT DENOTES UPWARD MOVEMENT.



TEST ROOM CROSS SECTION, SHOWING STRESSMETER LOCATION AND DEPTH IN FT. ANHYDRITE BED SHOWN AT 4 TO 7 FT.

Table J-3

DESCRIPTION OF INSTRUMENT IDENTIFICATION

Field Designation (assigned in Bechtel contract packages)

IJX	-	AB	-	002	NO	
>		>		>	>	
>		>		>	>	
>		>		>	>_____	Instrument number (01, 02, ...)
>		>		>		
>		>		>_____		Bechtel Drawing No. for contractors which illustrates item (37X-002, 51X-002, ...)
>		>				
>		>				
>		>_____				Notation for type of instrument (PE, GE, ...) listed below
>						
>						
>_____						General instrument location (31X, ...)

General instrument location:

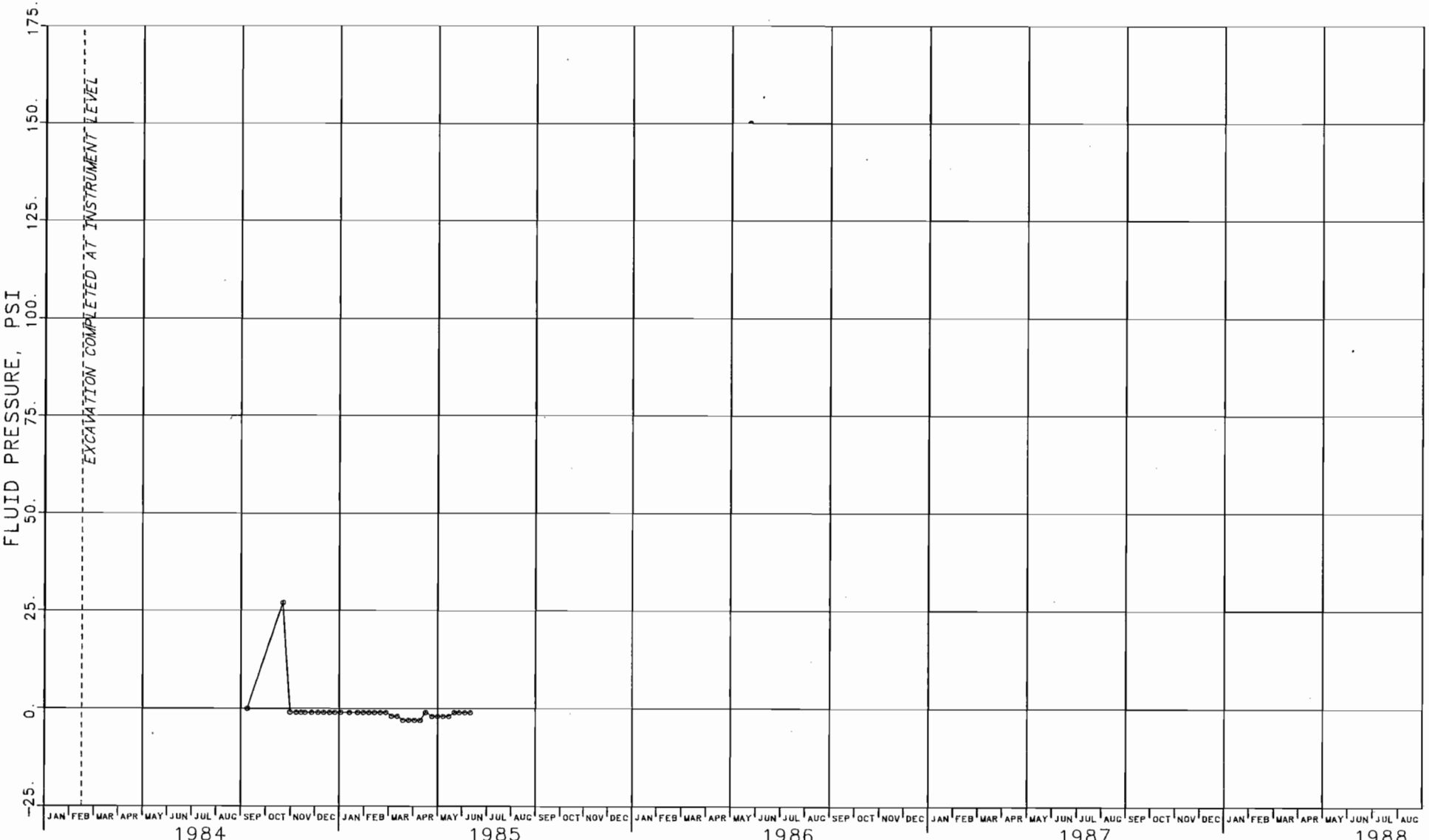
31X	Waste shaft
35X	Exhaust shaft
37X	C & SH shaft
51X	Drift level

Type of instrument:

CE	Convergence meter
GE	Extensometer
IG	Inclinometer
NG	Rigid-inclusion stressmeter
PE	Piezometer
RC	Permanent convergence points
TC	Temporary convergence points
RS	Wall shortening points
WE	Pressure cell
WG	Rockbolt load cell
ZE	Strain gauge

Example Field Designation

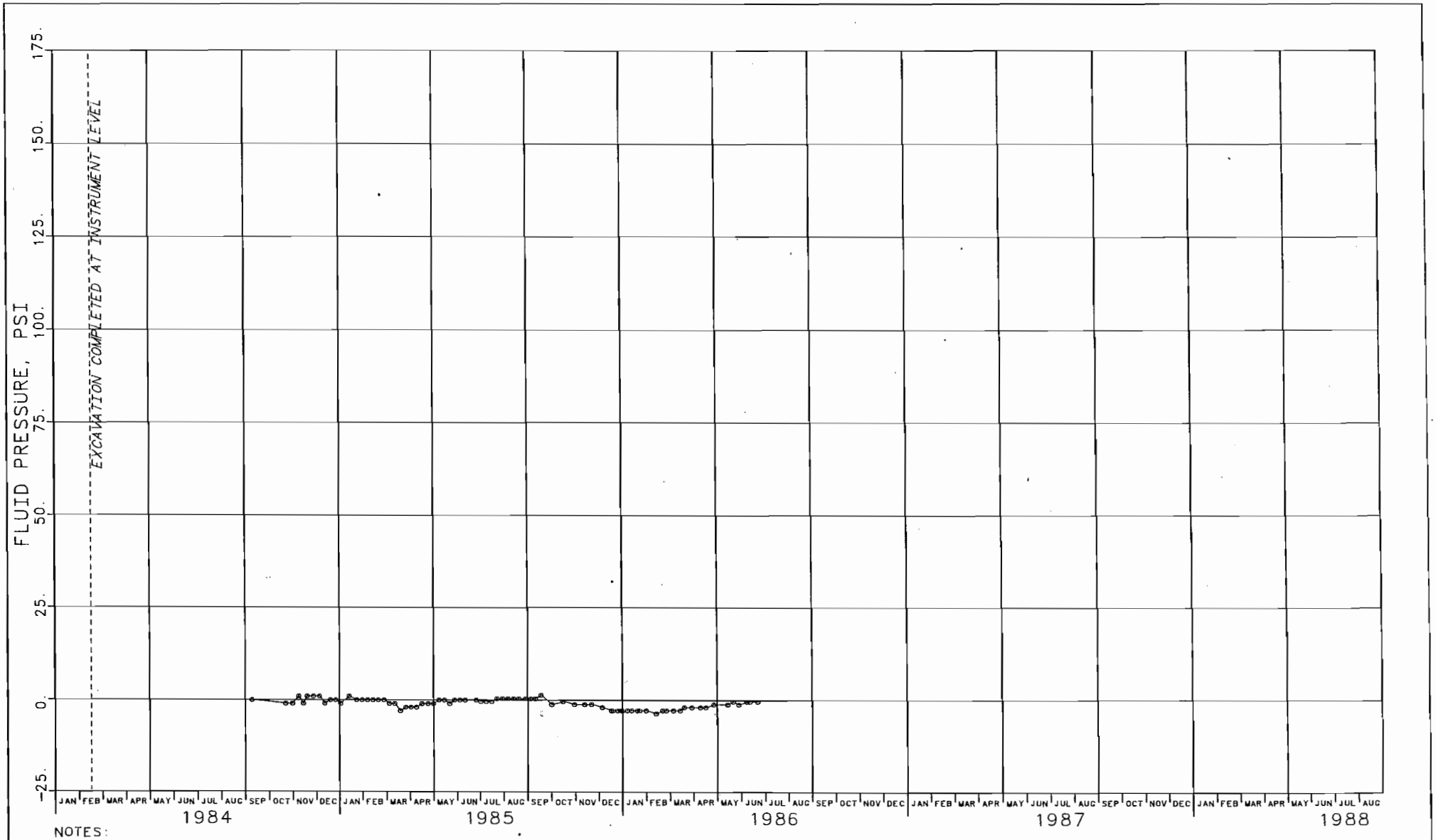
51X-GE-00246 is a drift level (51X) extensometer (GE) which may also be referred to as GE-246 on figures and tables in this report. However, convergence points are designated by approximate shaft depth or drift station.



NOTES:

1. CONCRETE LINER WAS PLACED NOV. 1983 THROUGH APR. 3, 1984.
2. INSTRUMENT IS CURRENTLY NOT ACCESSIBLE FOR REPAIR.

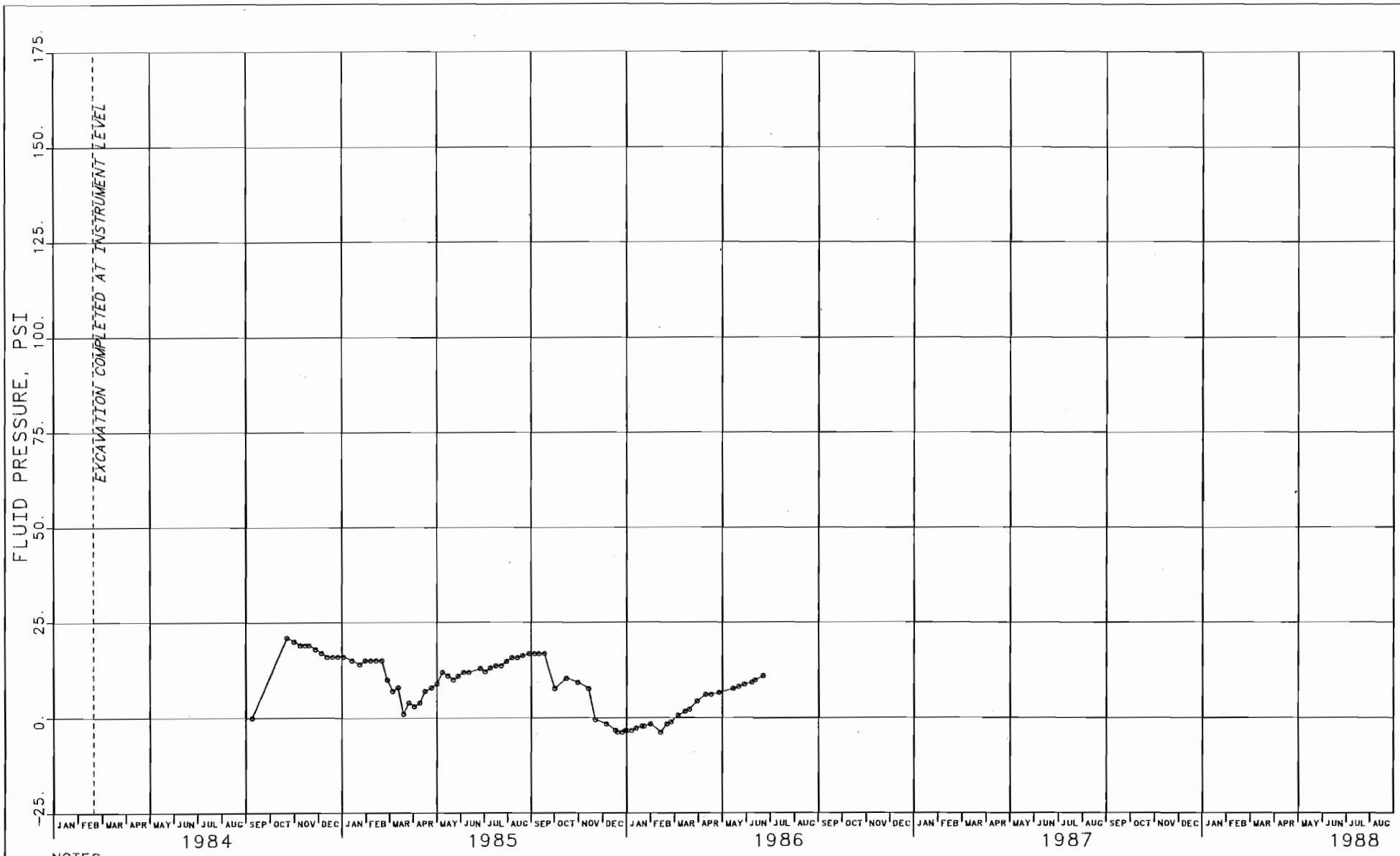
FIGURE J-1
PIEZOMETER 31X-PE-00201
WASTE SHAFT - EL 2877
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED NOV. 1983 THROUGH APR. 3, 1984.

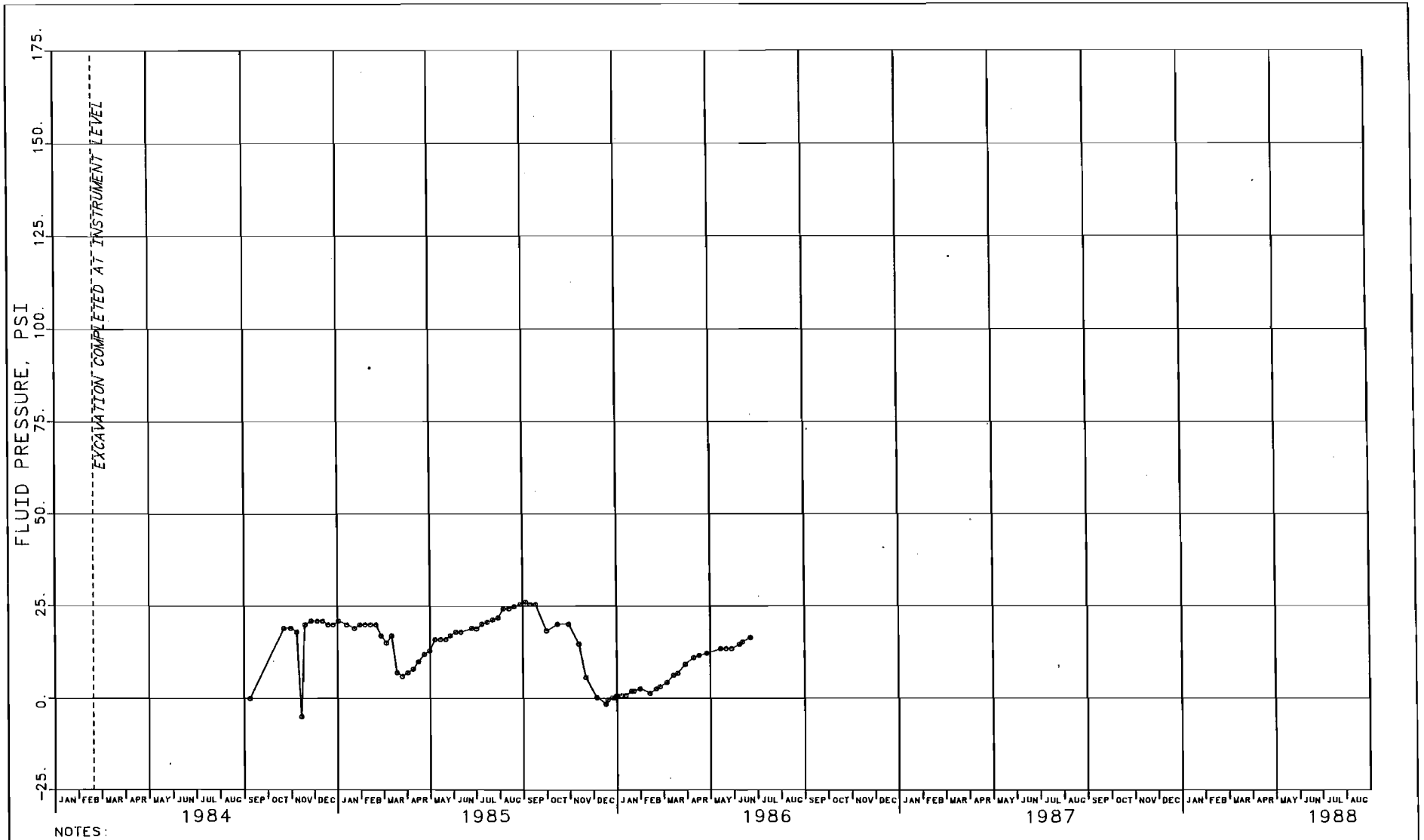
FIGURE J-2
PIEZOMETER 31X-PE-00202
WASTE SHAFT - EL 2877
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED NOV. 1983 THROUGH APR. 3, 1984.

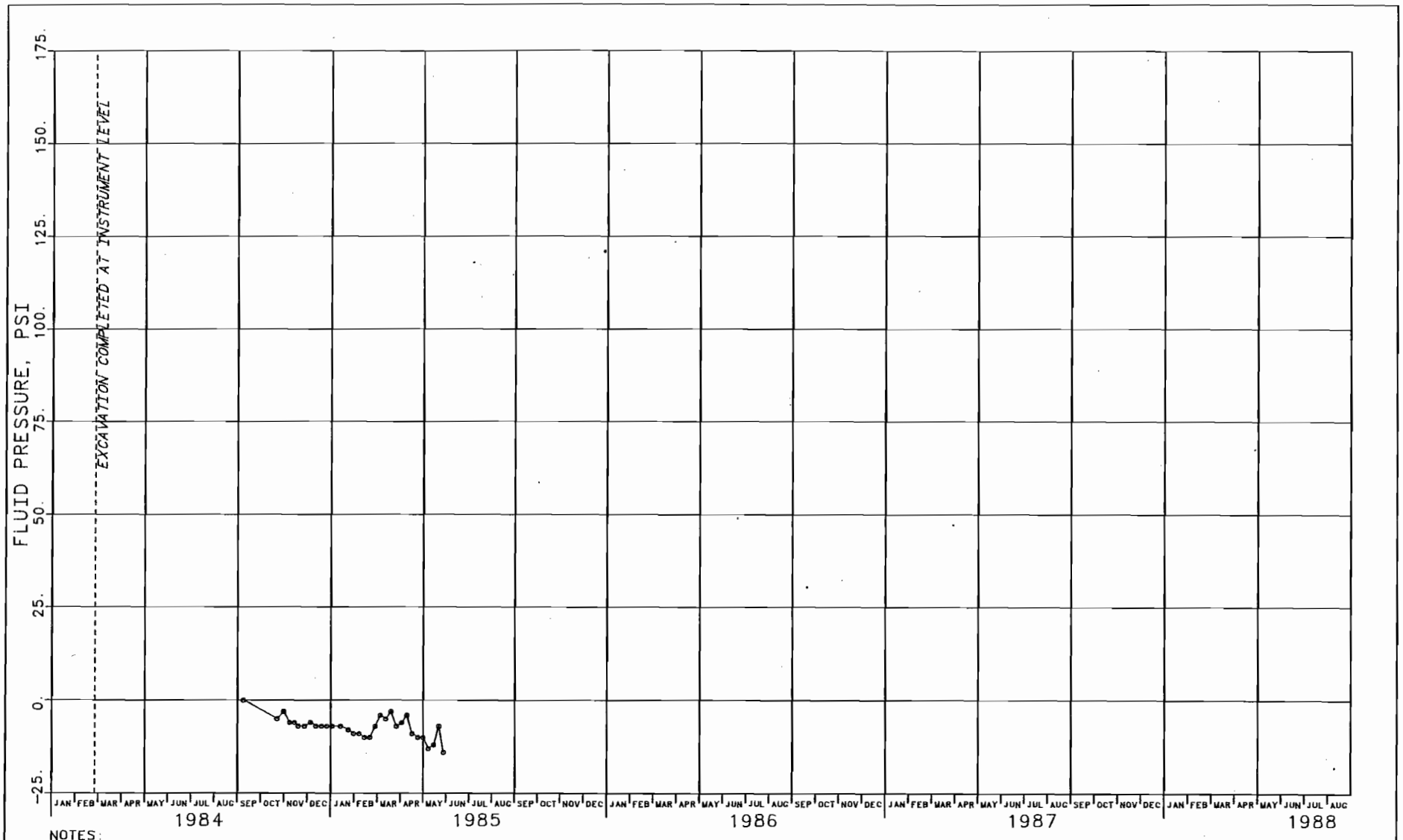
FIGURE J-3
PIEZOMETER 31X-PE-00203
WASTE SHAFT - EL 2798 (MAGENTA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED NOV. 1983 THROUGH APR. 3, 1984.

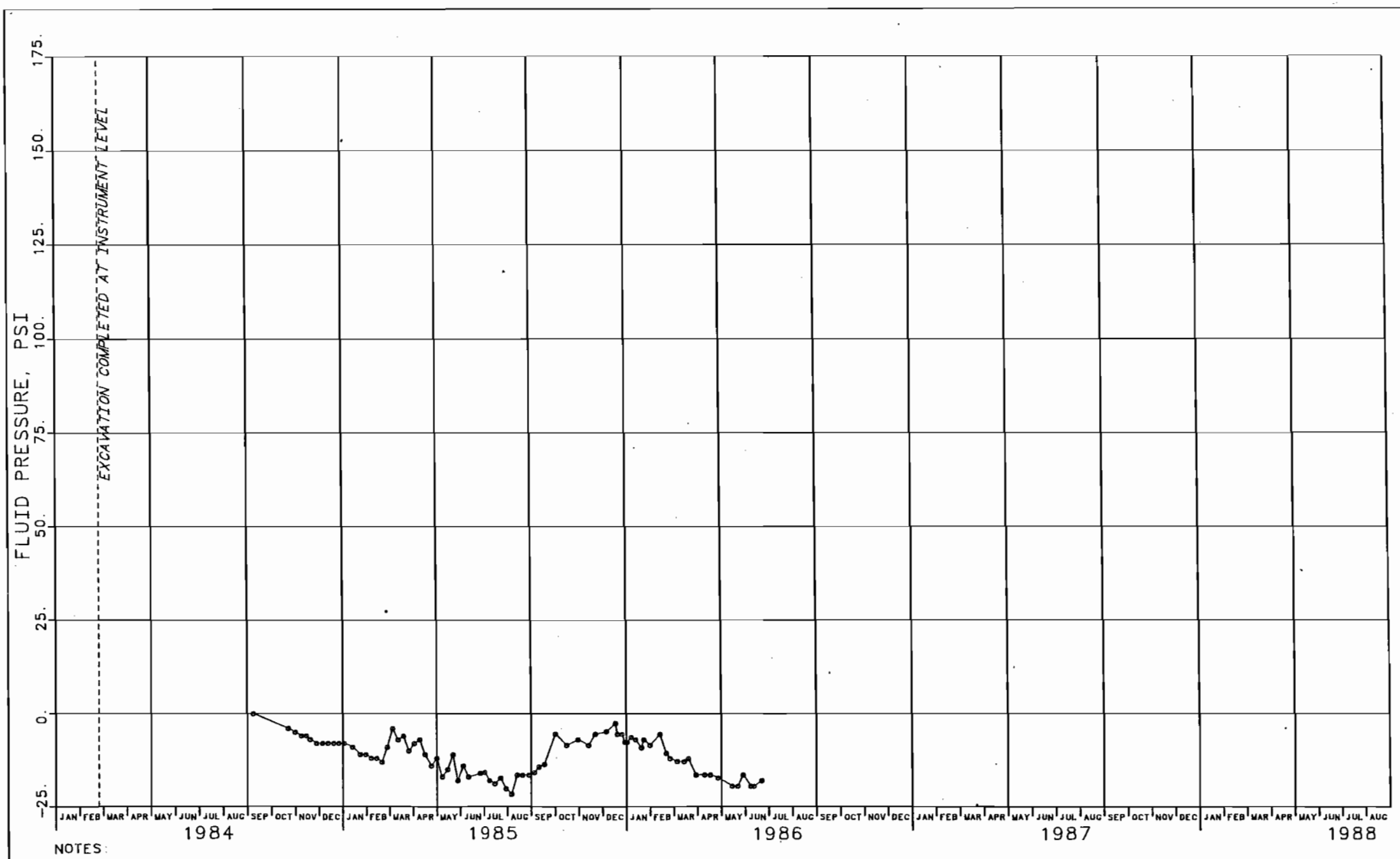
FIGURE J-4
PIEZOMETER 31X-PE-00204
WASTE SHAFT - EL 2798 (MAGENTA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED NOV. 1983 THROUGH APR. 3, 1984.
2. INSTRUMENT IS CURRENTLY NOT ACCESSIBLE FOR REPAIR.

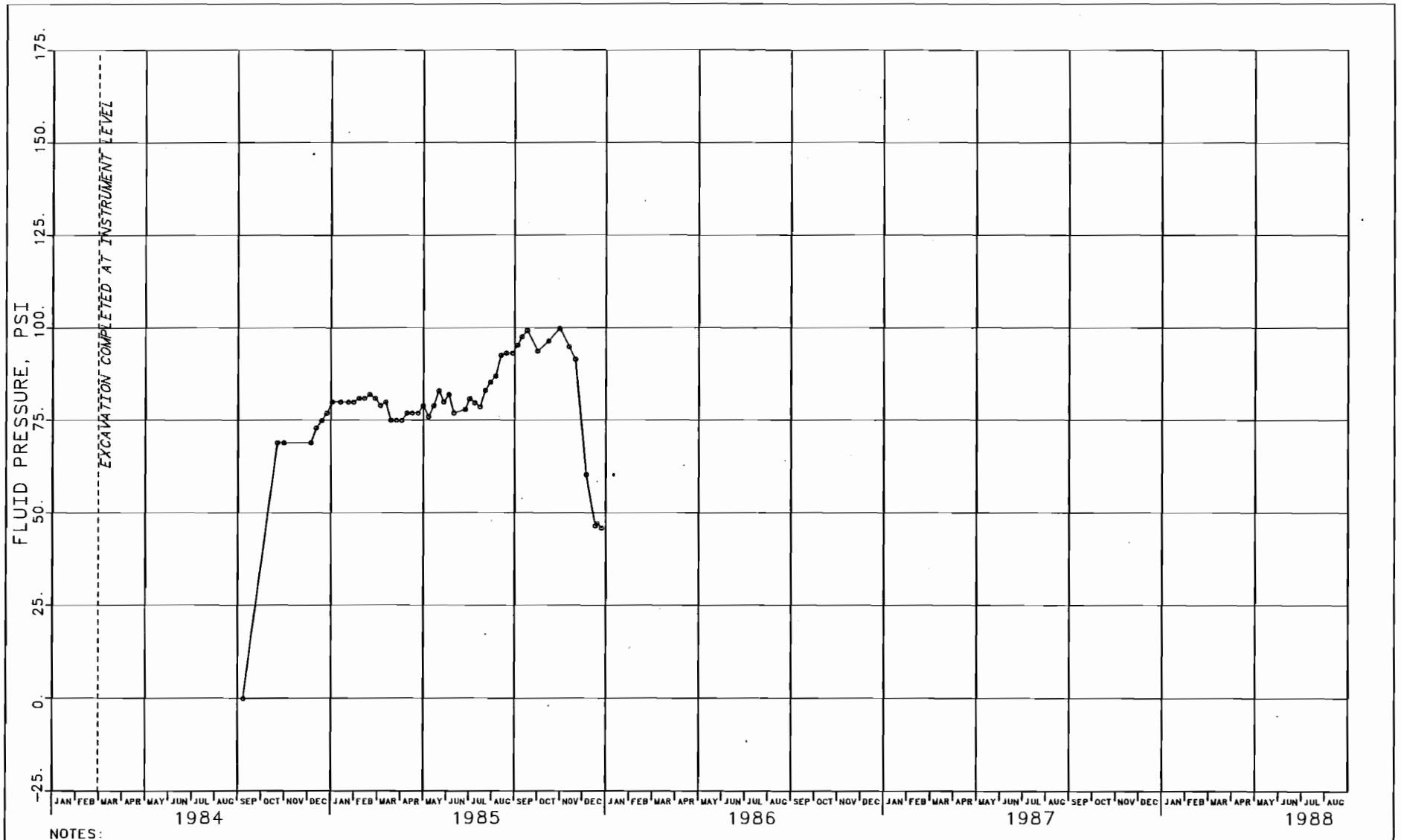
FIGURE J-5
PIEZOMETER 31X-PE-00205
WASTE SHAFT - EL 2740
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED NOV. 1983 THROUGH APR. 3, 1984.

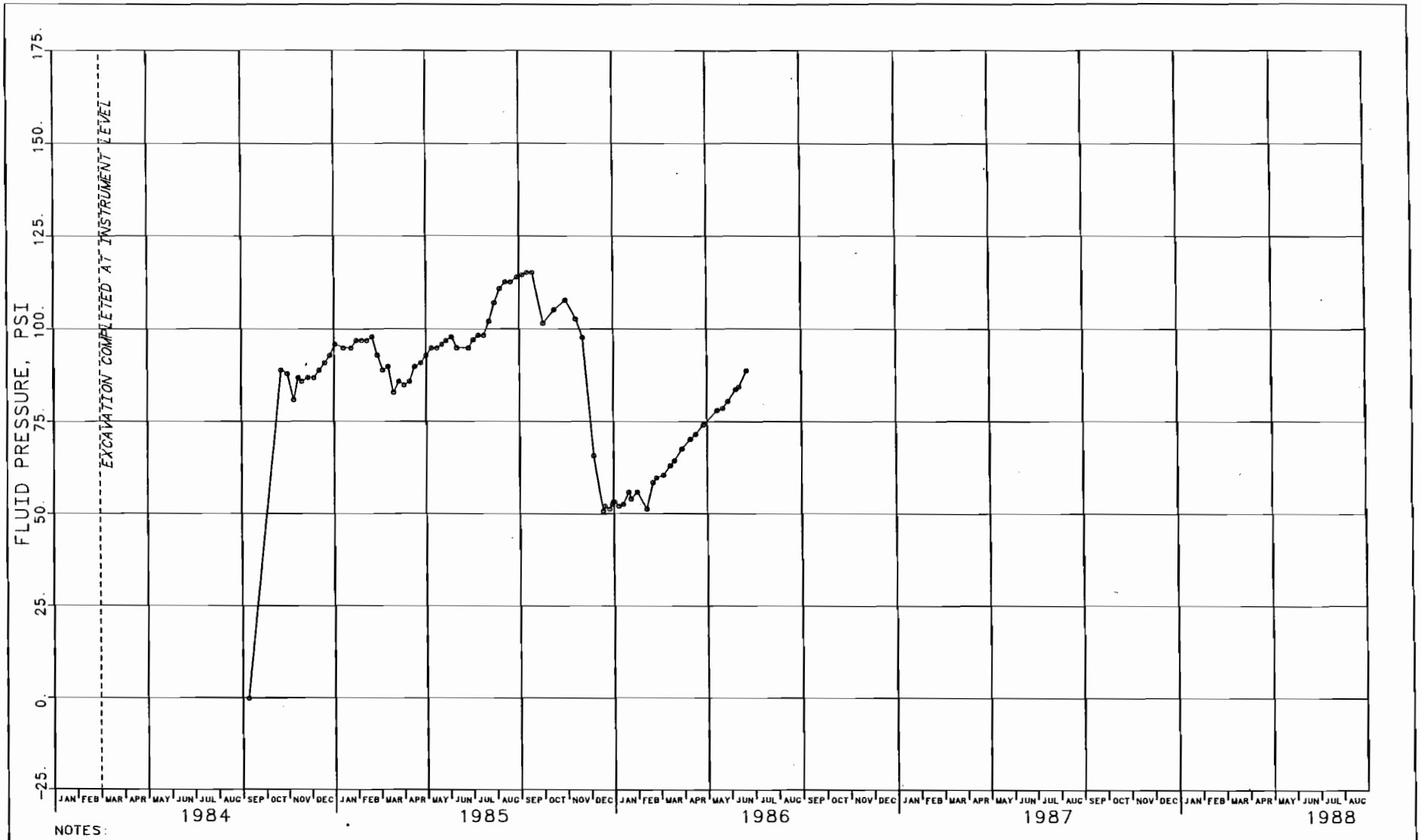
FIGURE J-6
PIEZOMETER 31X-PE-00206
WASTE SHAFT - EL 2740
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED NOV. 1983 THROUGH APR. 3, 1984.
2. INSTRUMENT IS CURRENTLY NOT ACCESSIBLE FOR REPAIR.

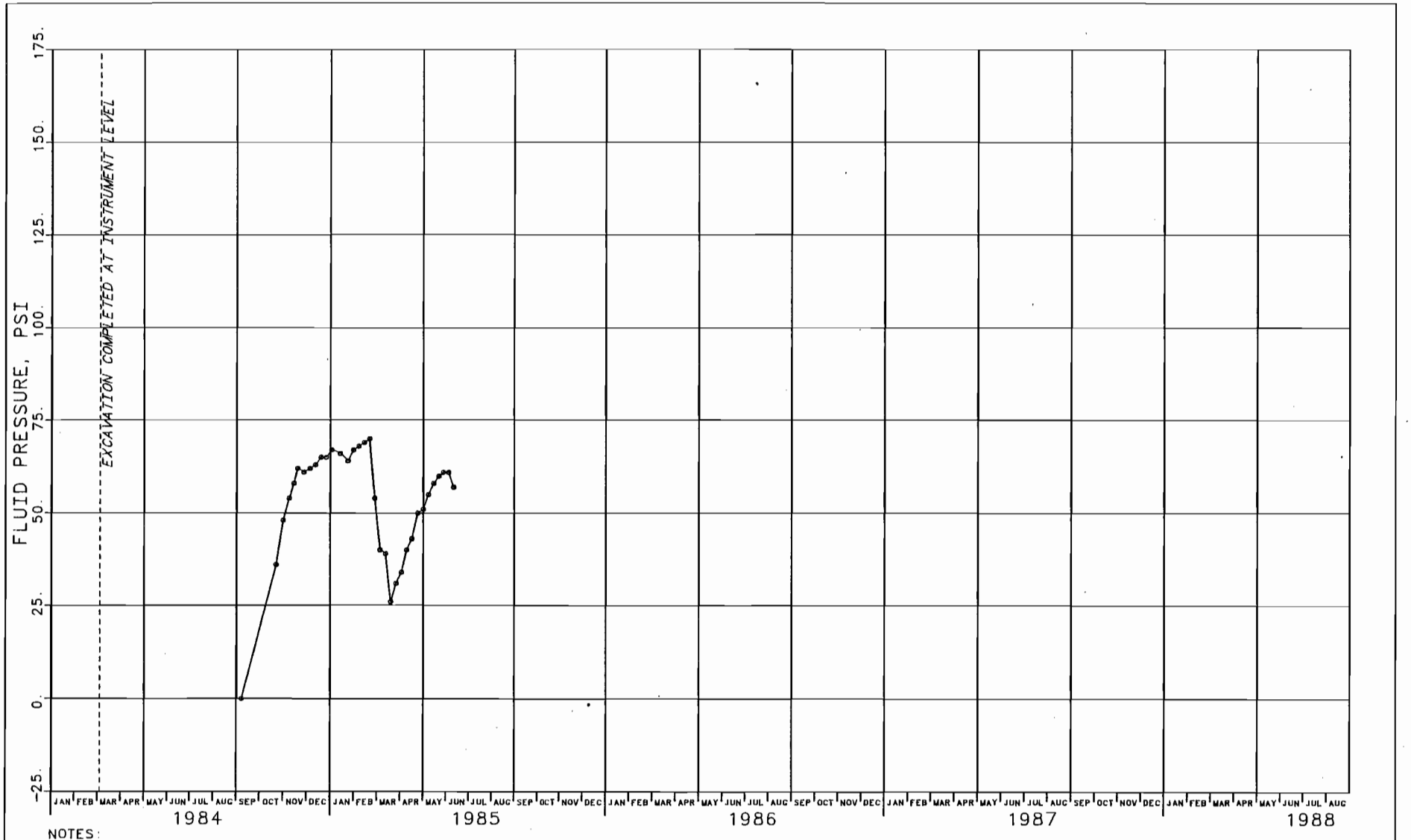
FIGURE J-7
PIEZOMETER 31X-PE-00207
WASTE SHAFT - EL 2692 (CULEBRA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED NOV. 1983 THROUGH APR. 3, 1984.

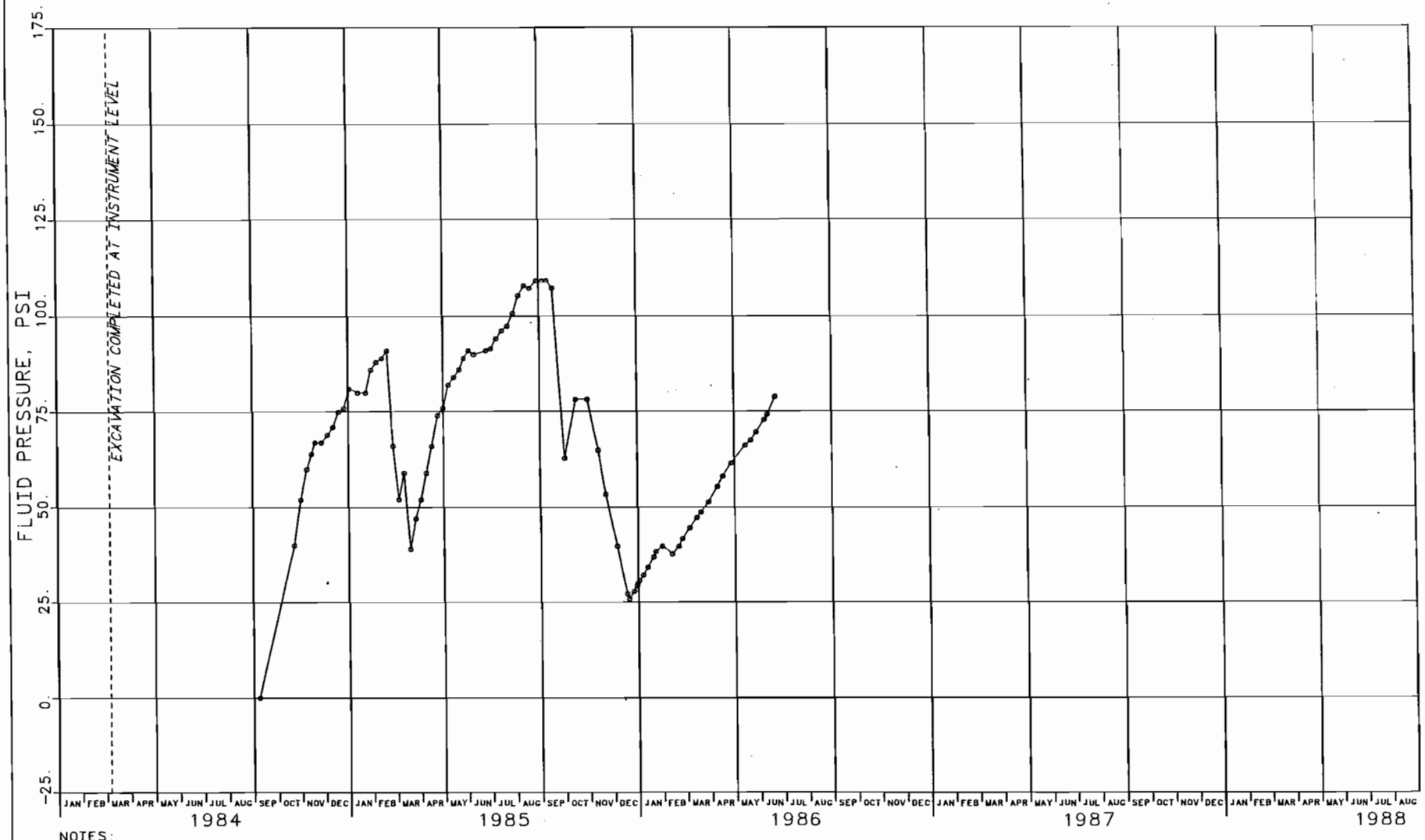
FIGURE J-8
PIEZOMETER 31X-PE-00208
WASTE SHAFT - EL 2692 (CULEBRA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED NOV. 1983 THROUGH APR. 3, 1984.
2. INSTRUMENT IS CURRENTLY NOT ACCESSIBLE FOR REPAIR.

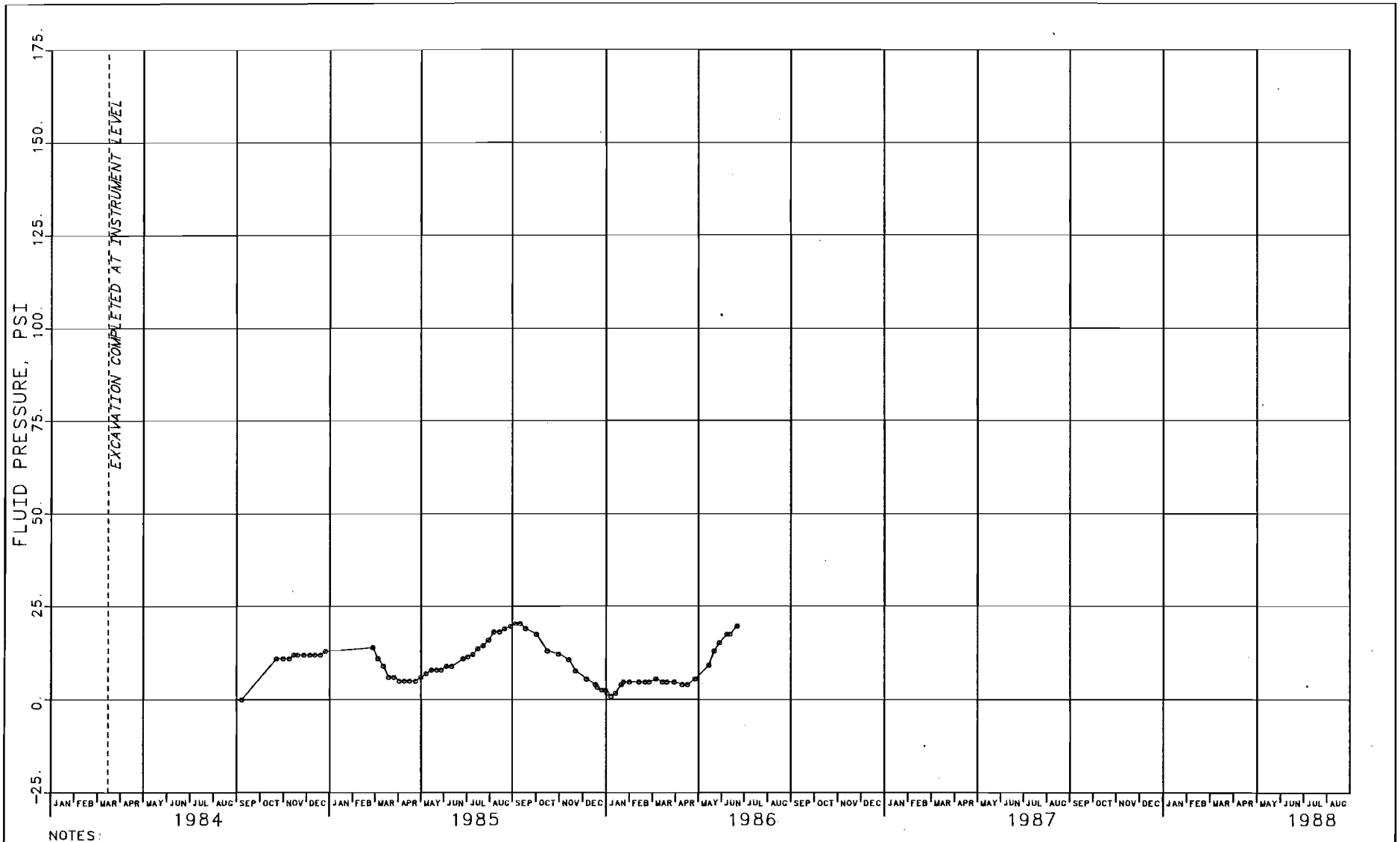
FIGURE J-9
PIEZOMETER 31X-PE-00209
WASTE SHAFT - EL 2651
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED NOV. 1983 THROUGH APR. 3, 1984.

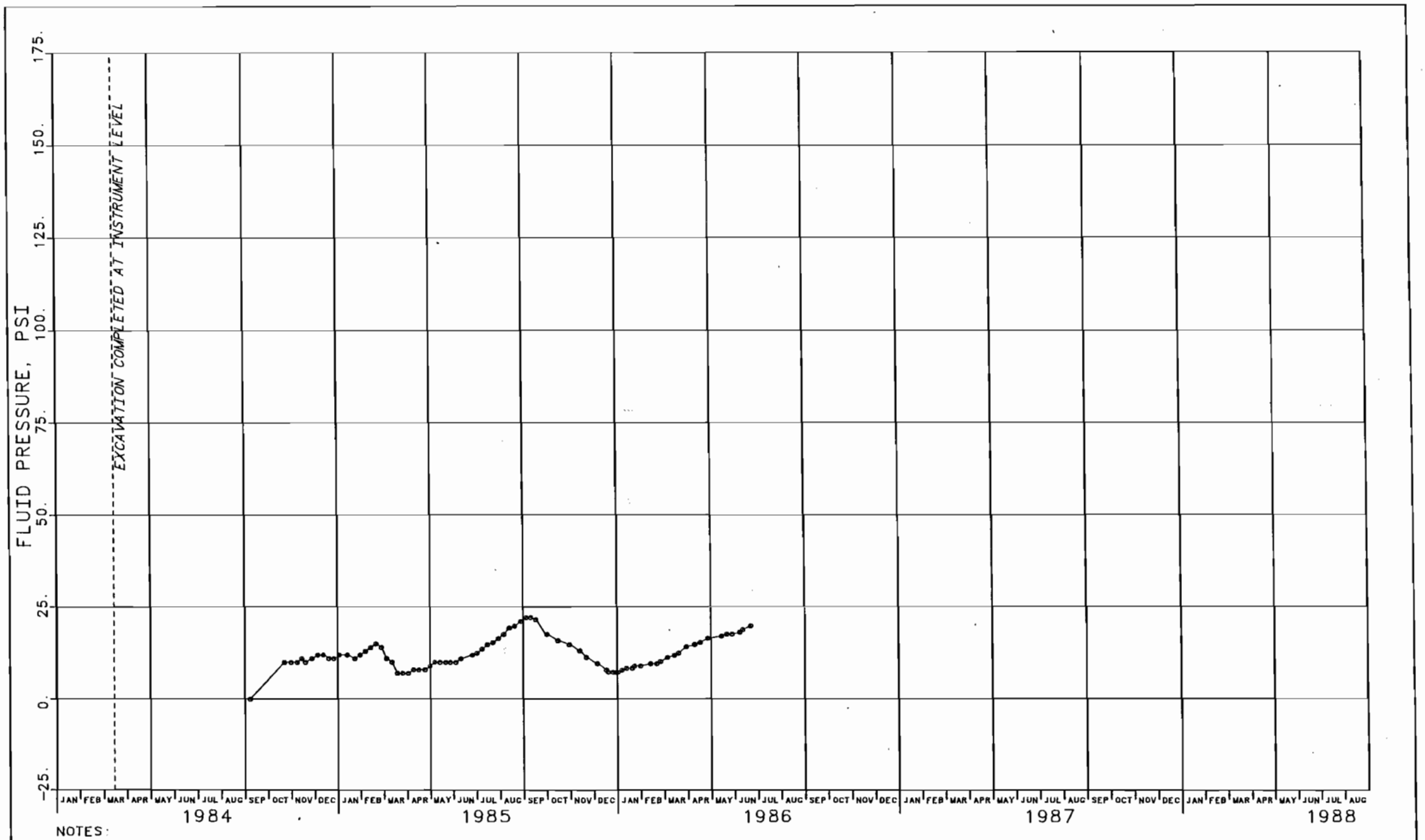
FIGURE J-10
PIEZOMETER 31X-PE-00210
WASTE SHAFT - EL 2651
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED MARCH 23 THROUGH APRIL 3, 1984.

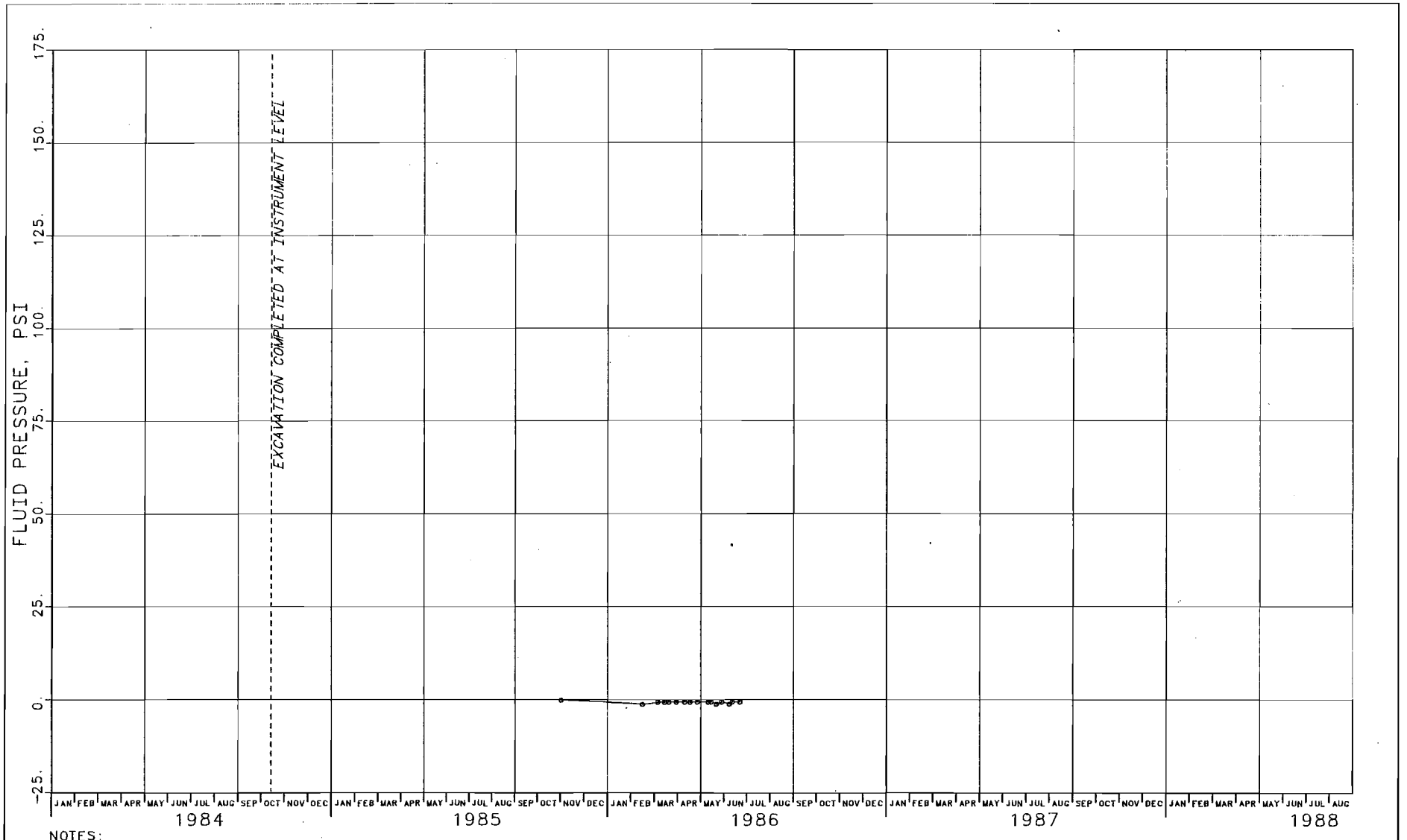
FIGURE J-11
PIEZOMETER 31X-PE-00211
WASTE SHAFT KEY - EL 2564
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED MARCH 23 THROUGH APRIL 3, 1984.

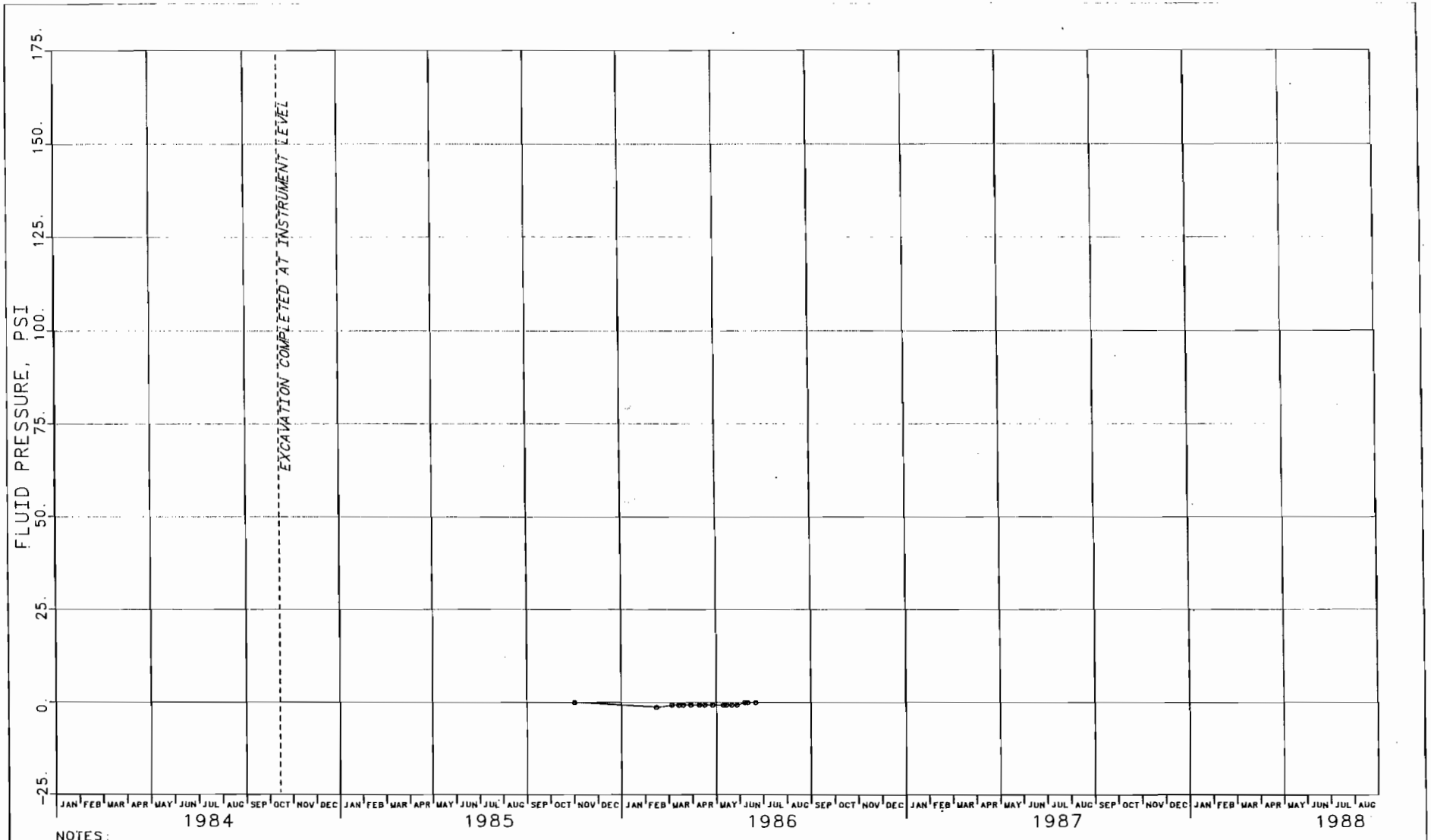
FIGURE J-12
PIEZOMETER 31X-PE-00212
WASTE SHAFT KEY - EL 2564
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

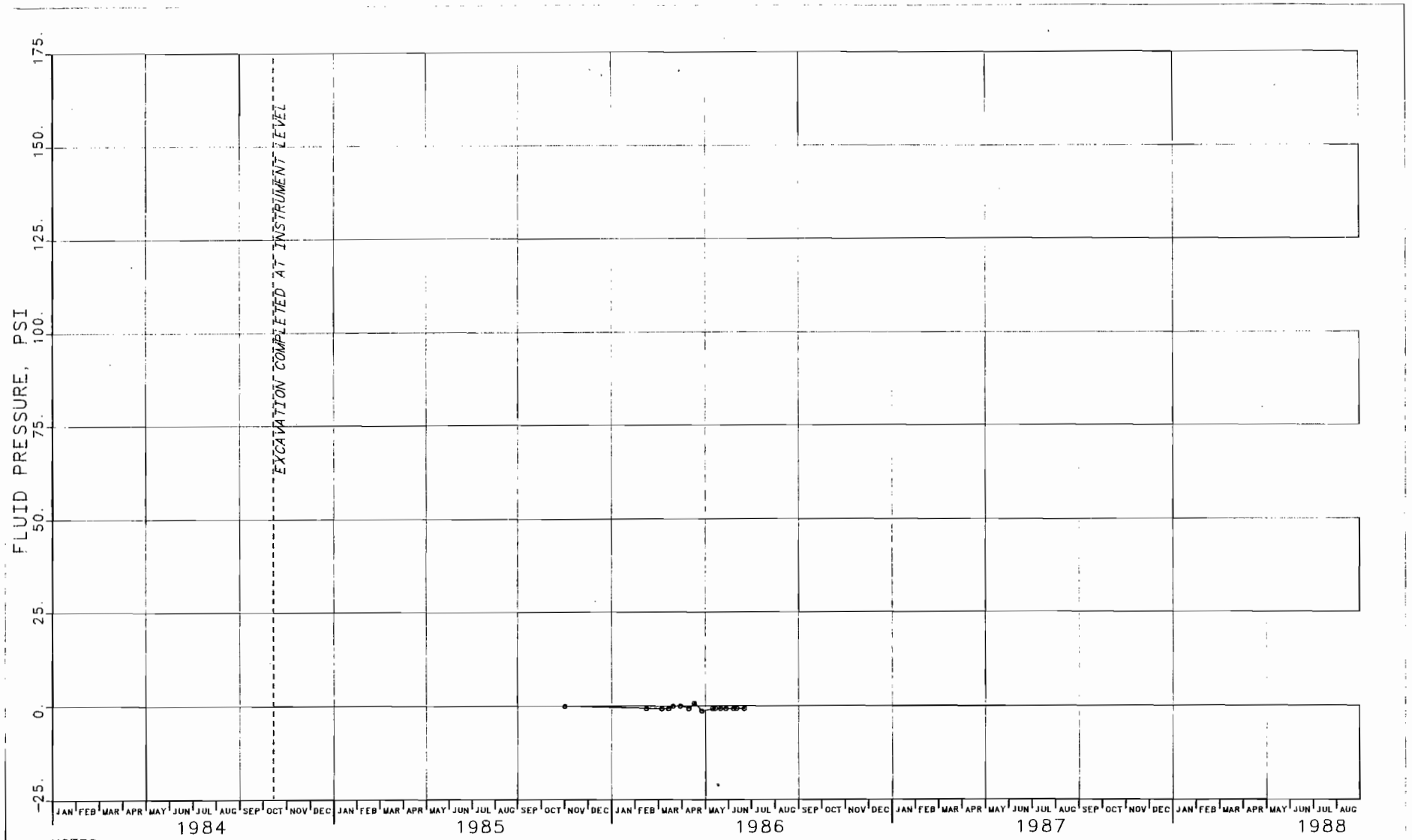
FIGURE J-13
PIEZOMETER 35X-PE-00201
EXHAUST SHAFT - EL 2865
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

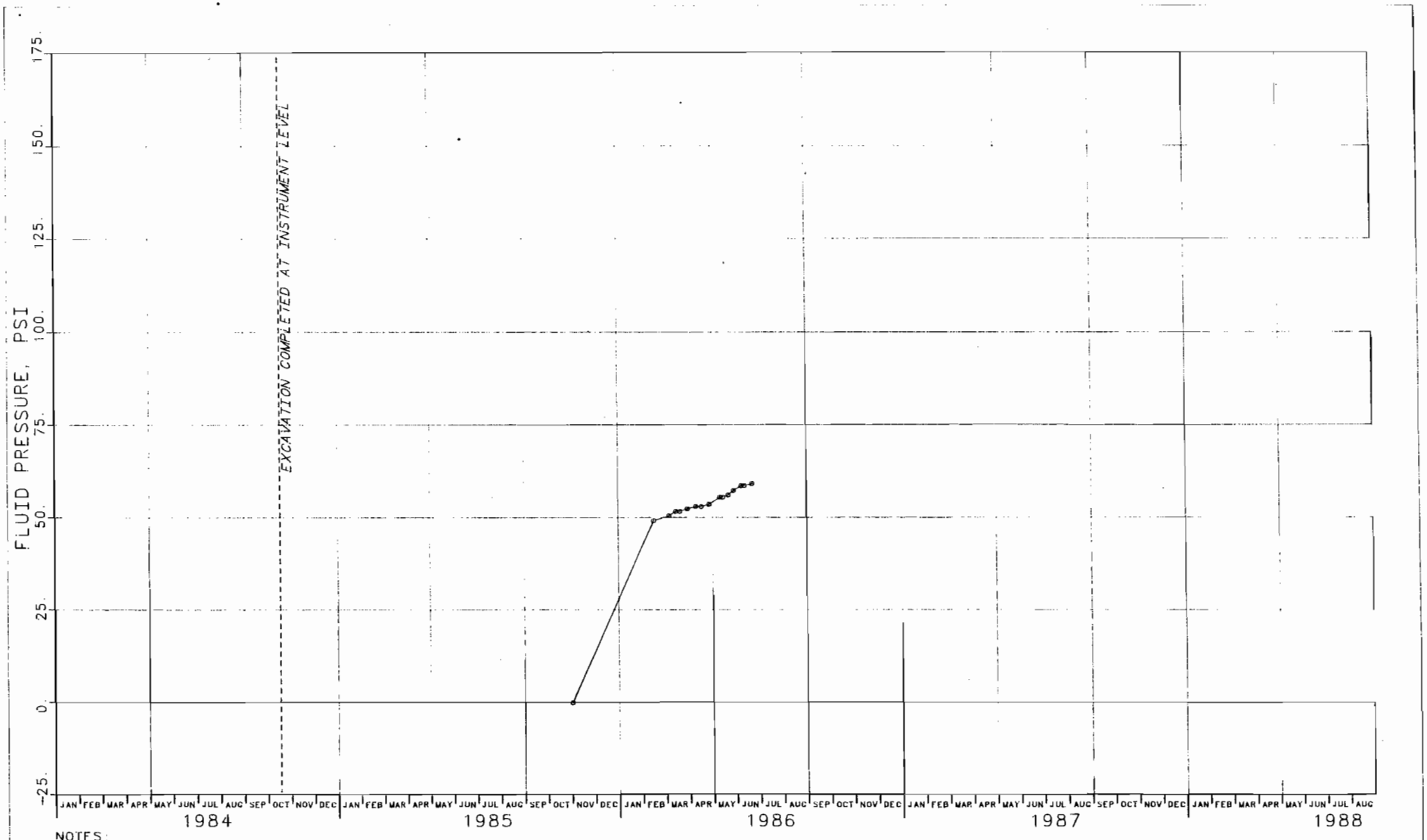
FIGURE J-14
PIEZOMETER 35X-PE-00202
EXHAUST SHAFT - EL 2865
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

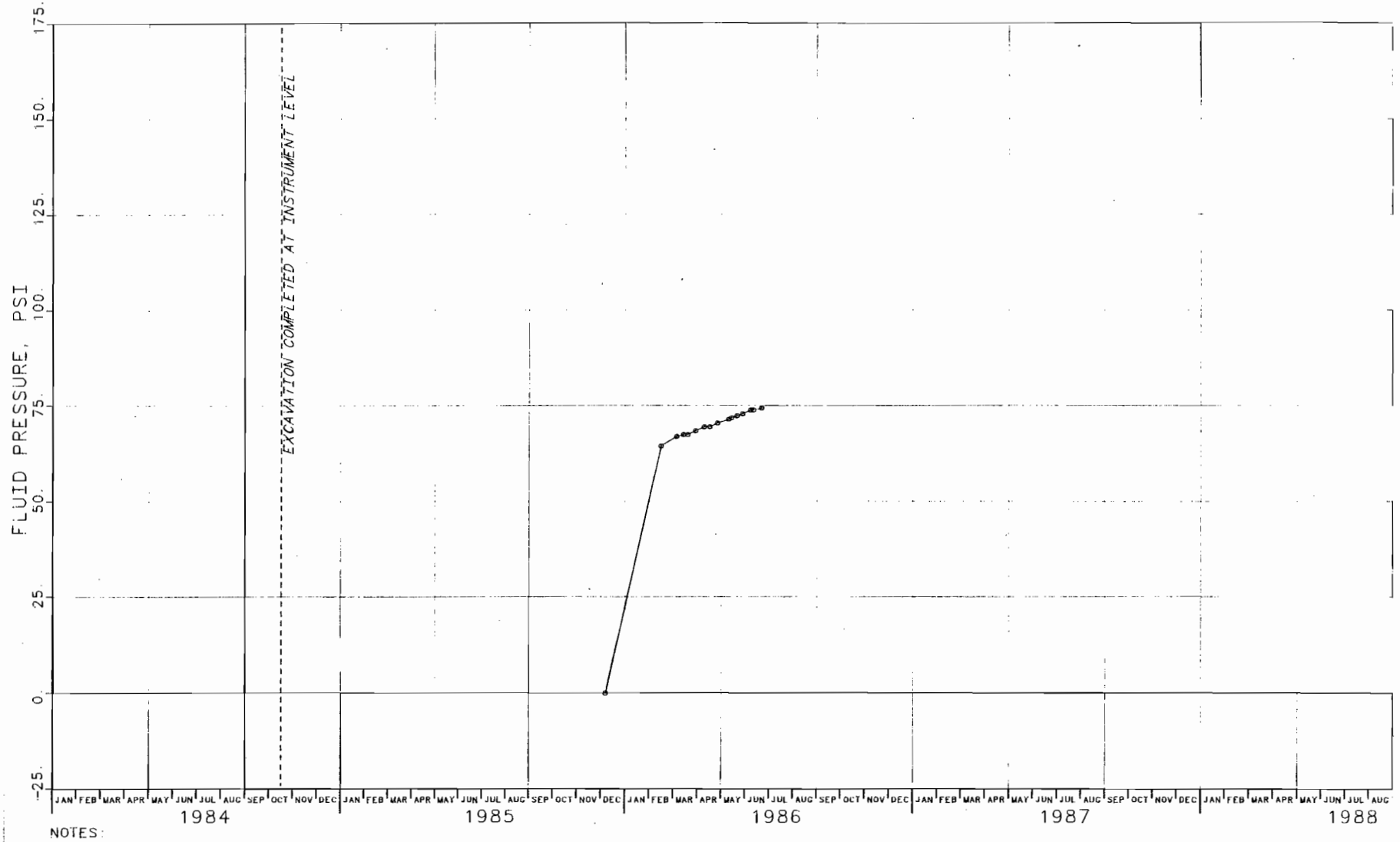
FIGURE J-15
PIEZOMETER 35X-PE-00203
EXHAUST SHAFT - EL 2865
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

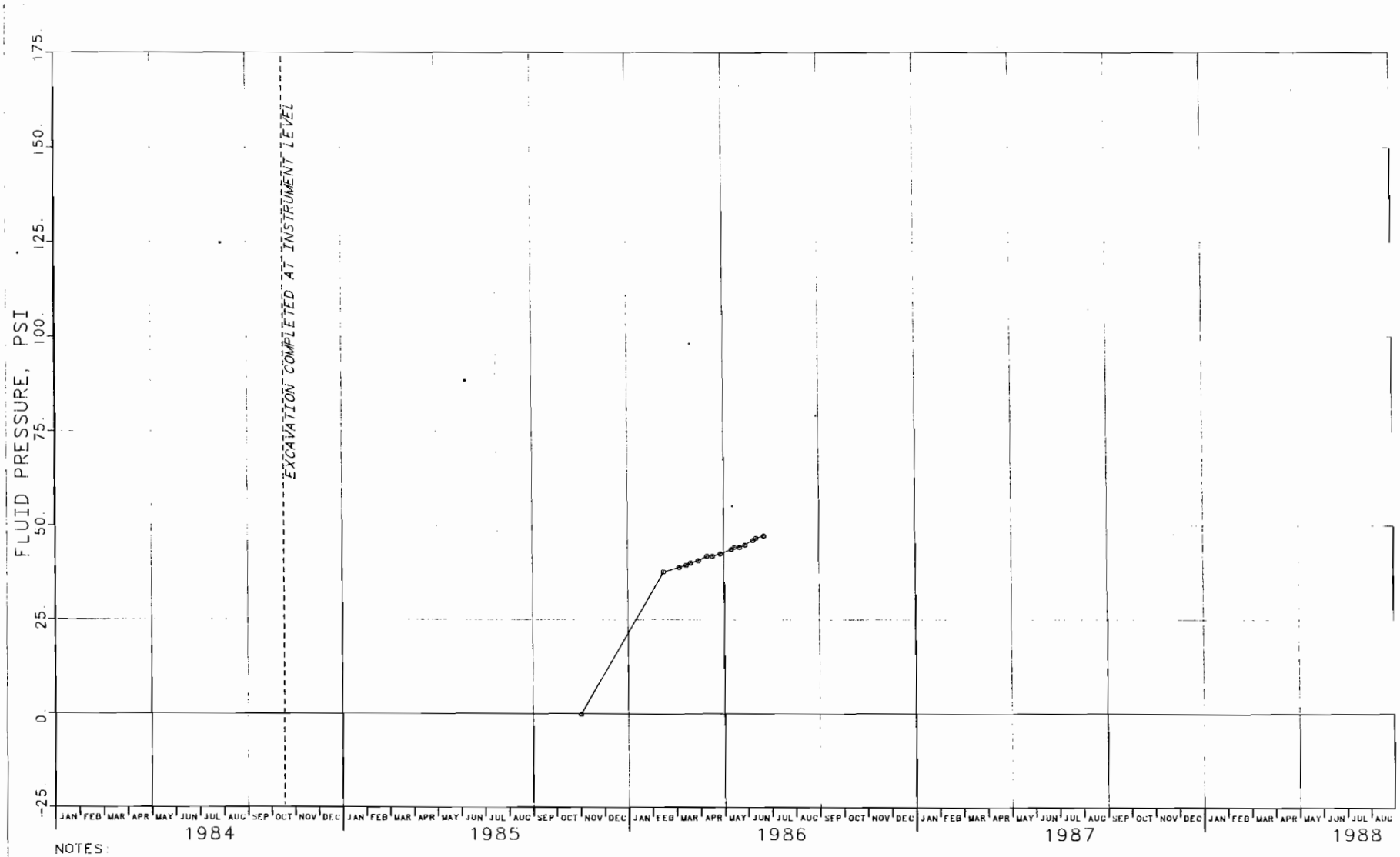
FIGURE J-16
PIEZOMETER 35X-PE-00204
EXHAUST SHAFT - EL 2794 (MAGENTA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

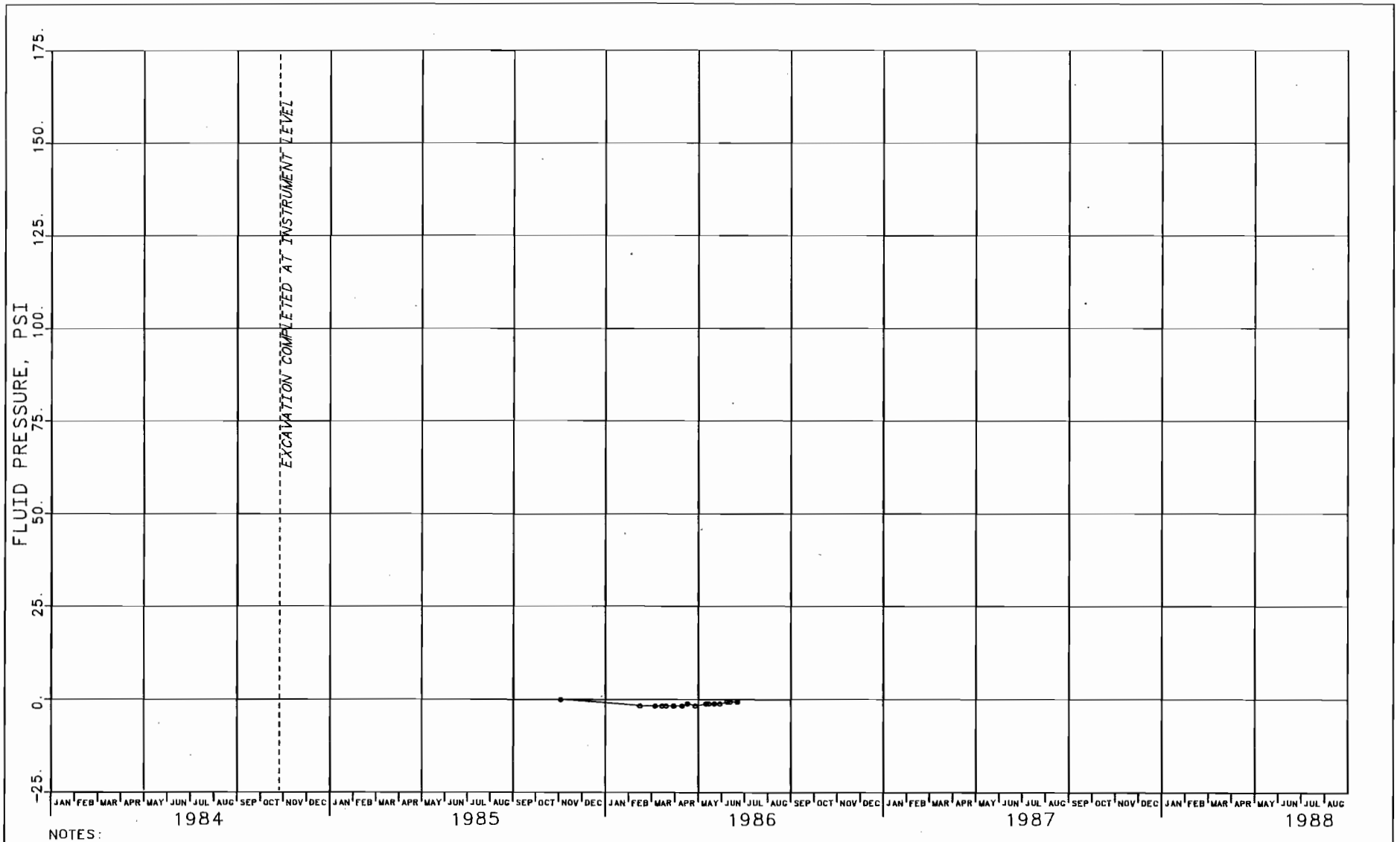
FIGURE J-17
PIEZOMETER 35X-PE-00205
EXHAUST SHAFT - EL 2794 (MAGENTA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

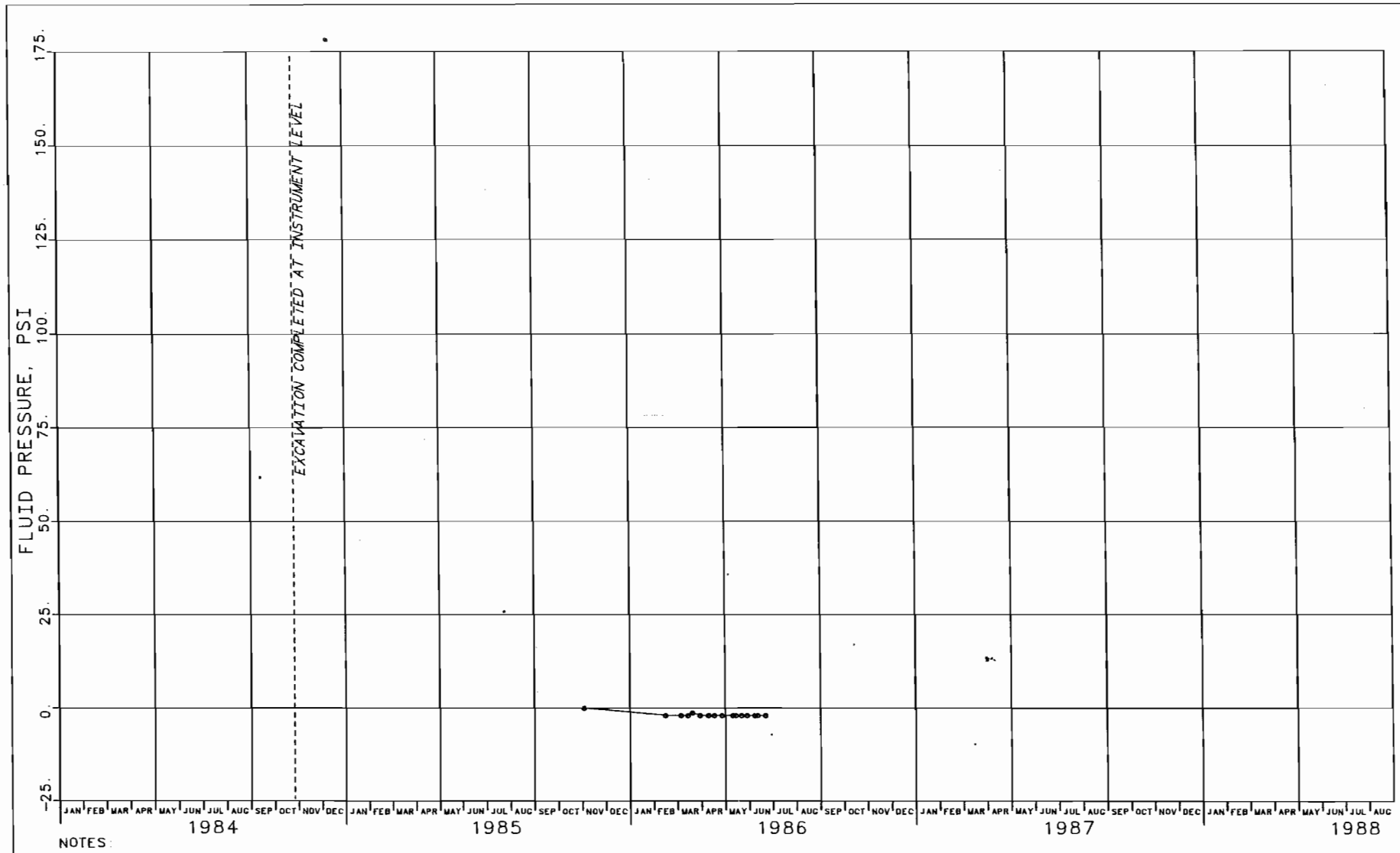
FIGURE J-18
PIEZOMETER 35X-PE-00206
EXHAUST SHAFT - EL 2794 (MAGENTA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

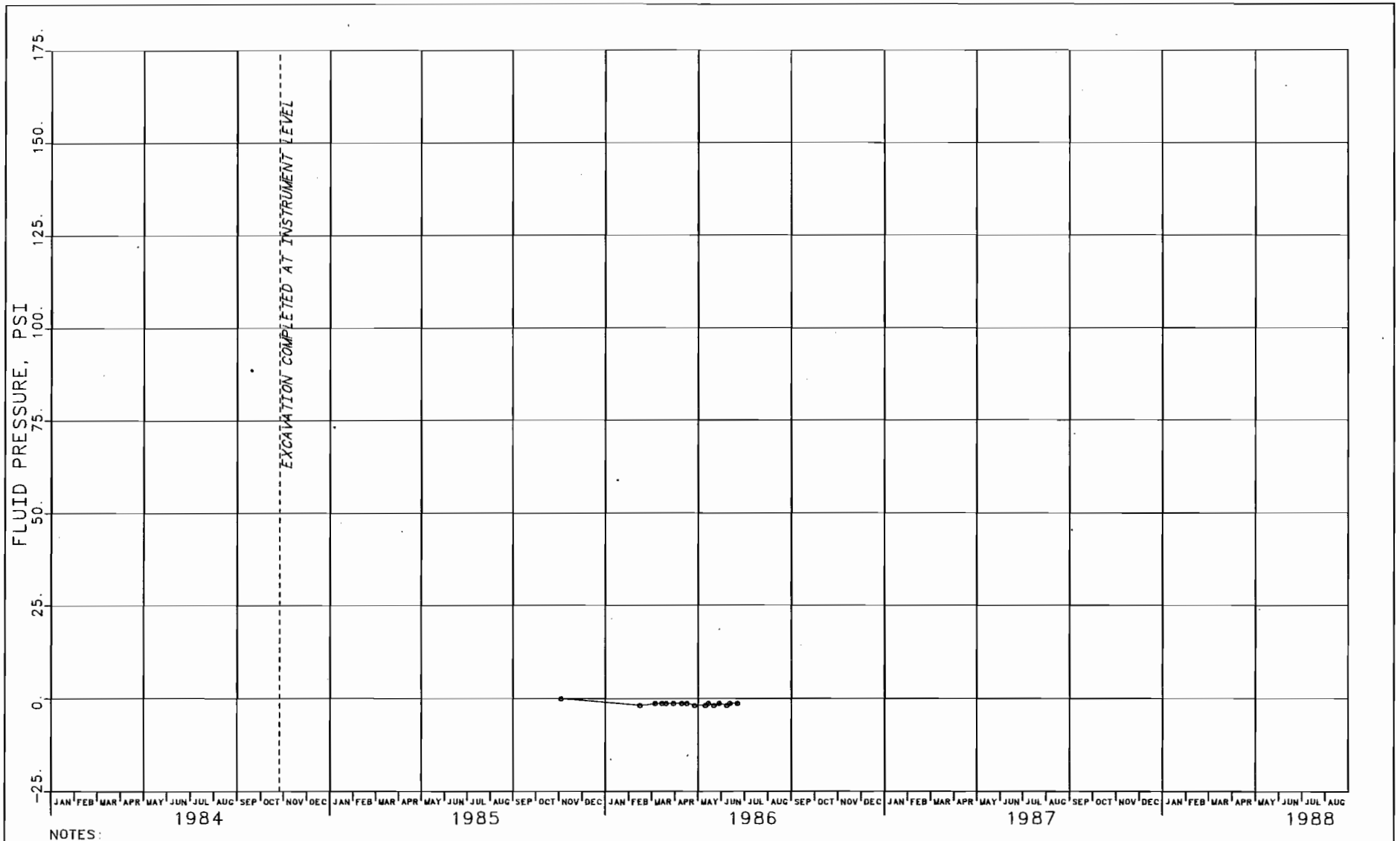
FIGURE J-19
PIEZOMETER 35X-PE-00207
EXHAUST SHAFT - EL 2736
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

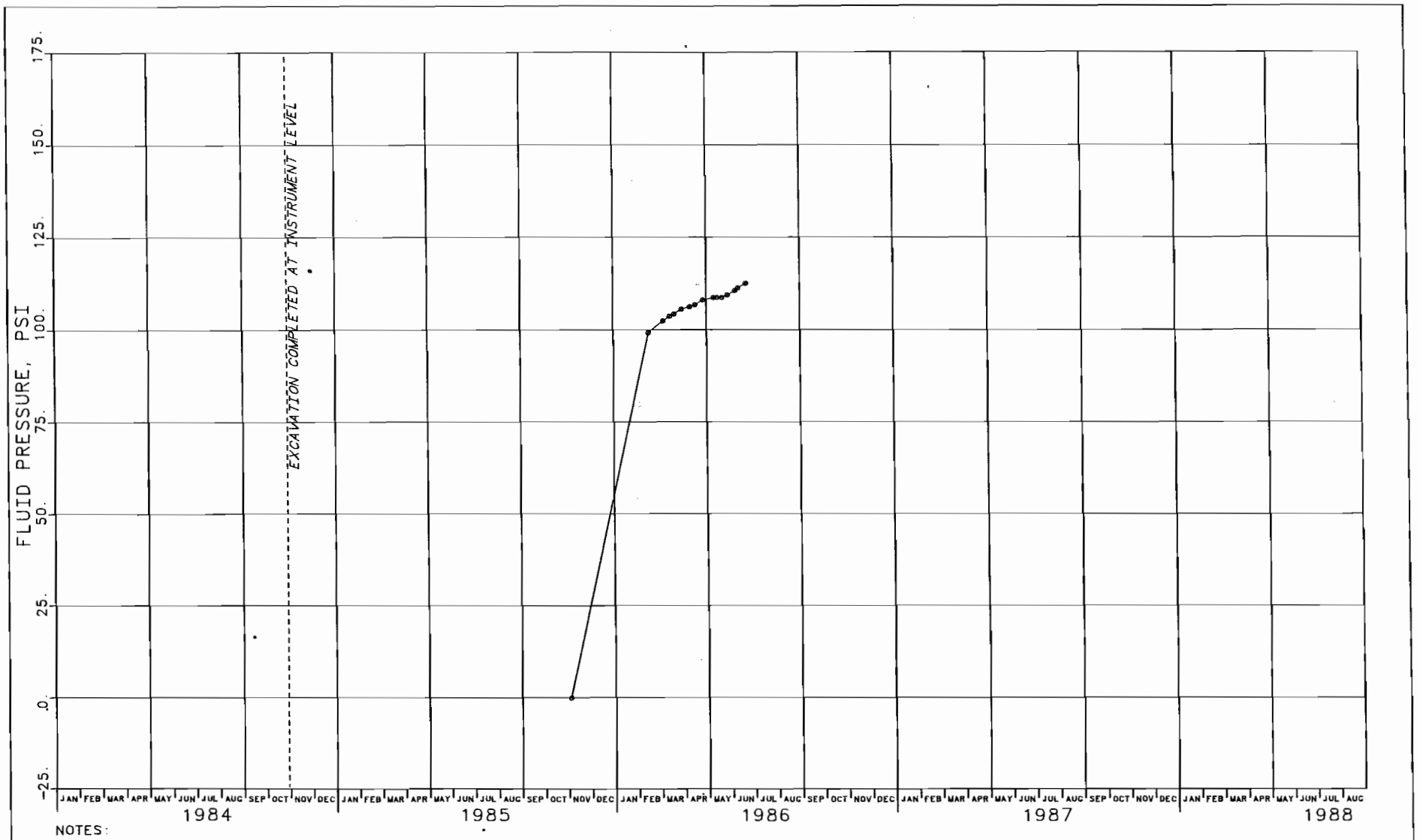
FIGURE J-20
PIEZOMETER 35X-PE-00208
EXHAUST SHAFT - EL 2736
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

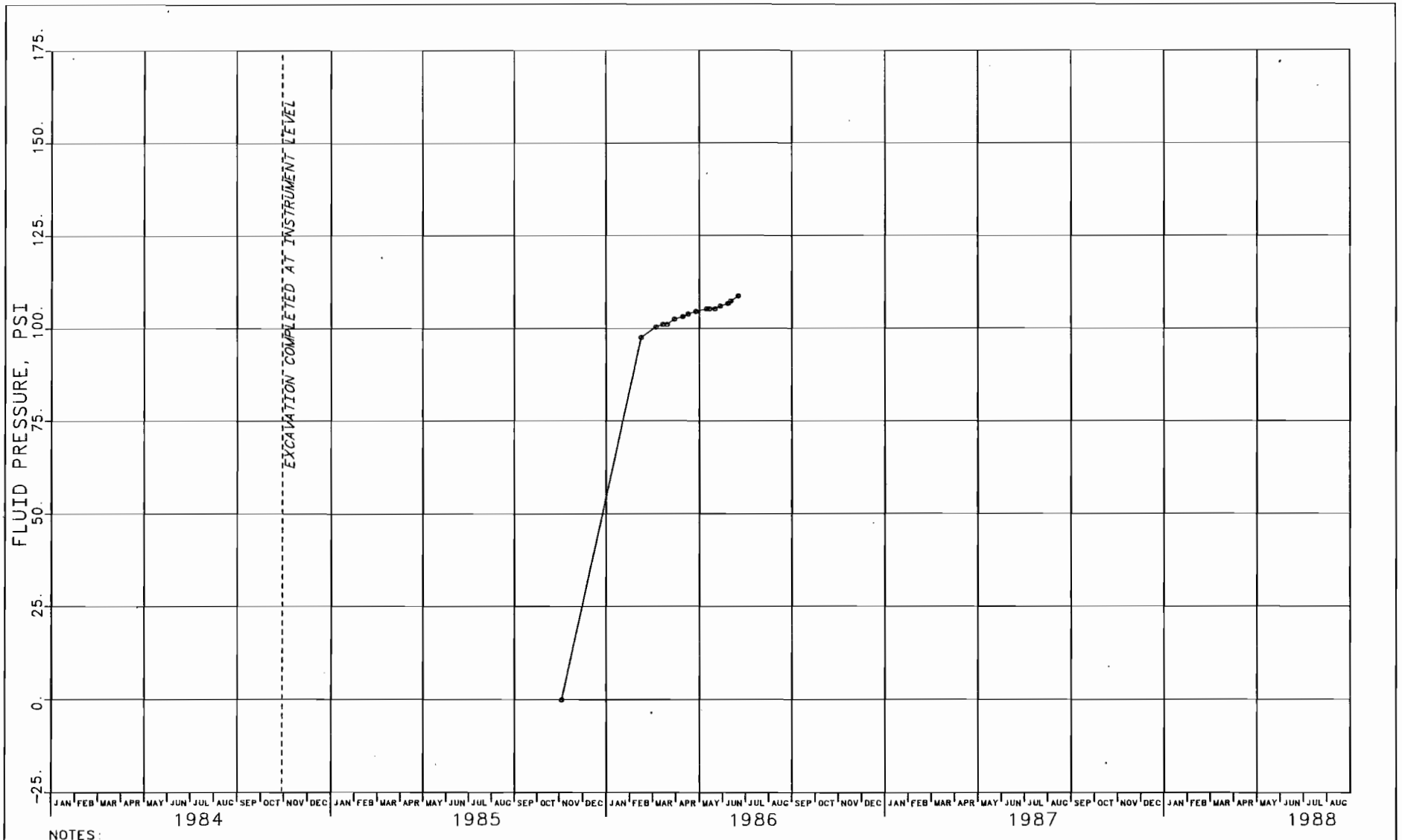
FIGURE J-21
PIEZOMETER 35X-PE-00209
EXHAUST SHAFT - EL 2736
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

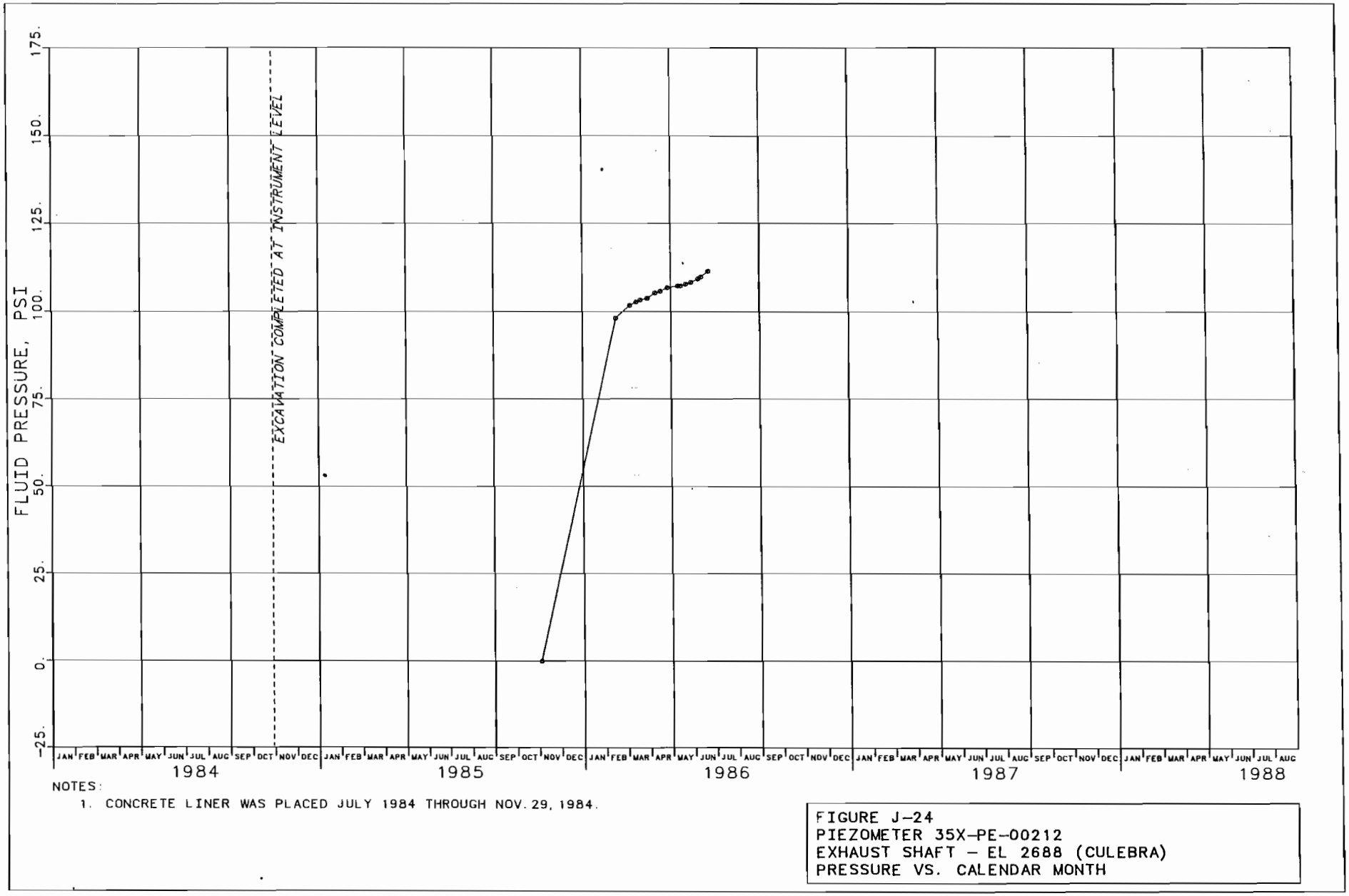
FIGURE J-22
PIEZOMETER 35X-PE-00210
EXHAUST SHAFT - EL 2688 (CULEBRA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

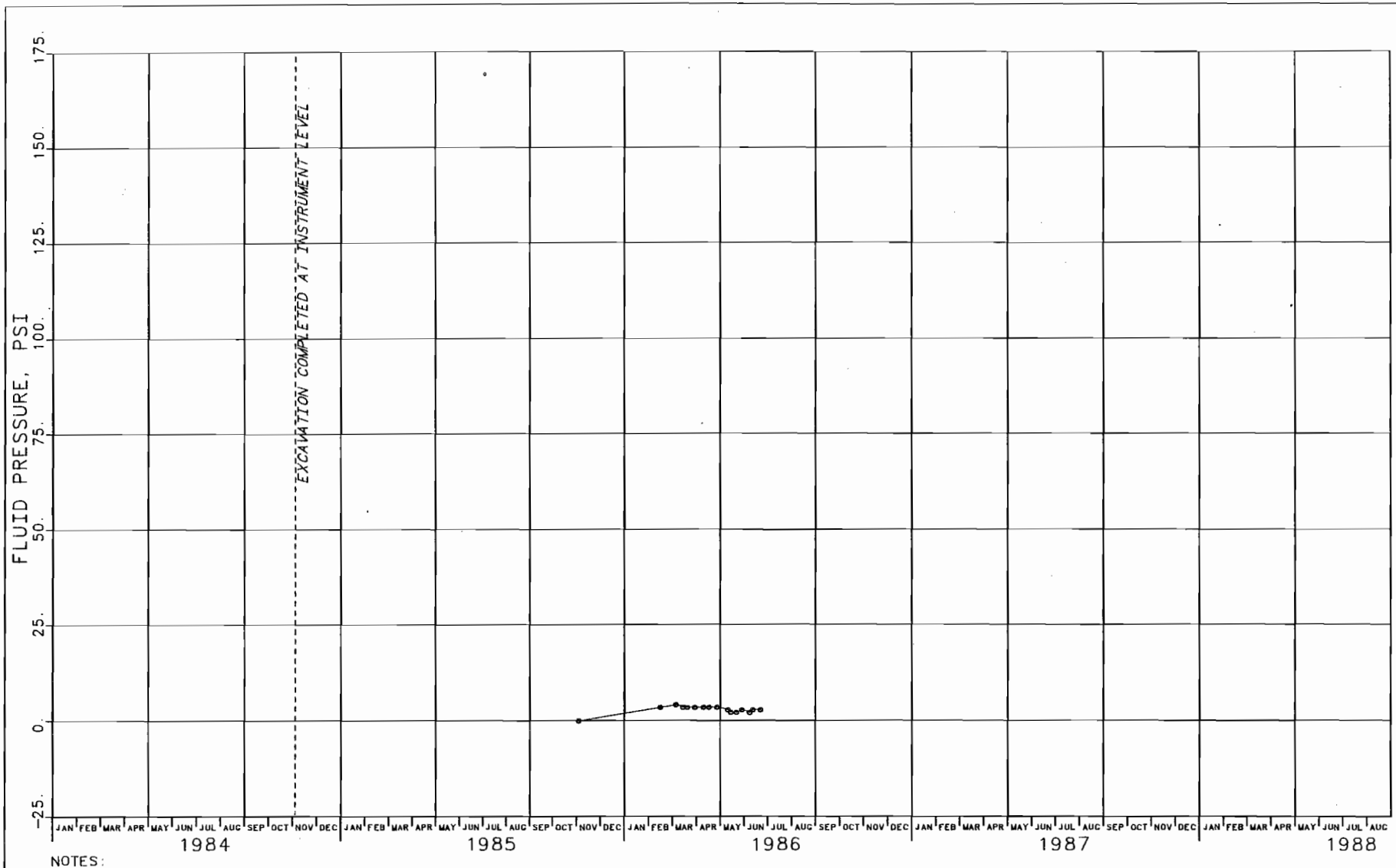
FIGURE J-23
PIEZOMETER 35X-PE-00211
EXHAUST SHAFT - EL 2688 (CULEBRA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

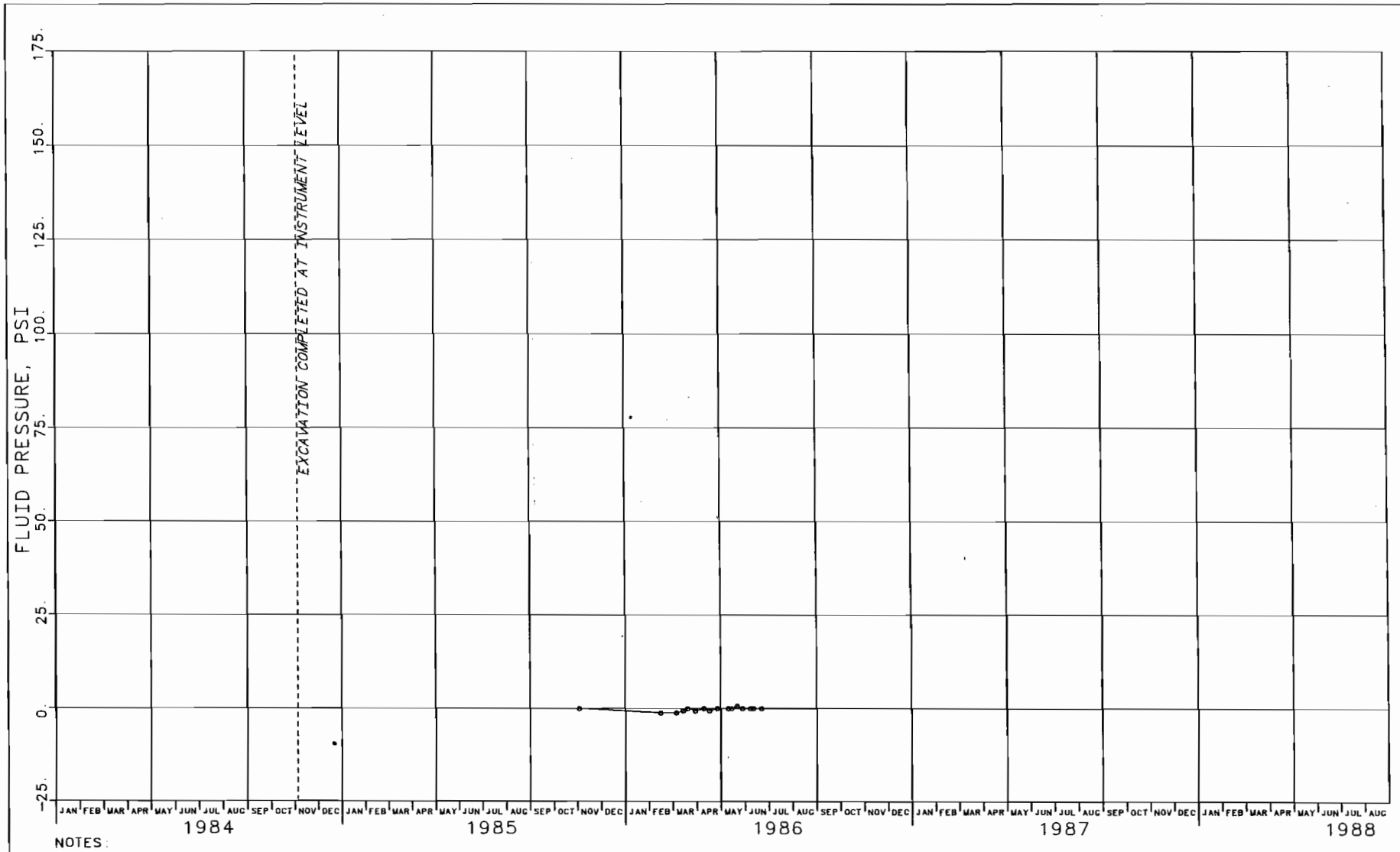
FIGURE J-24
PIEZOMETER 35X-PE-00212
EXHAUST SHAFT – EL 2688 (CULEBRA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

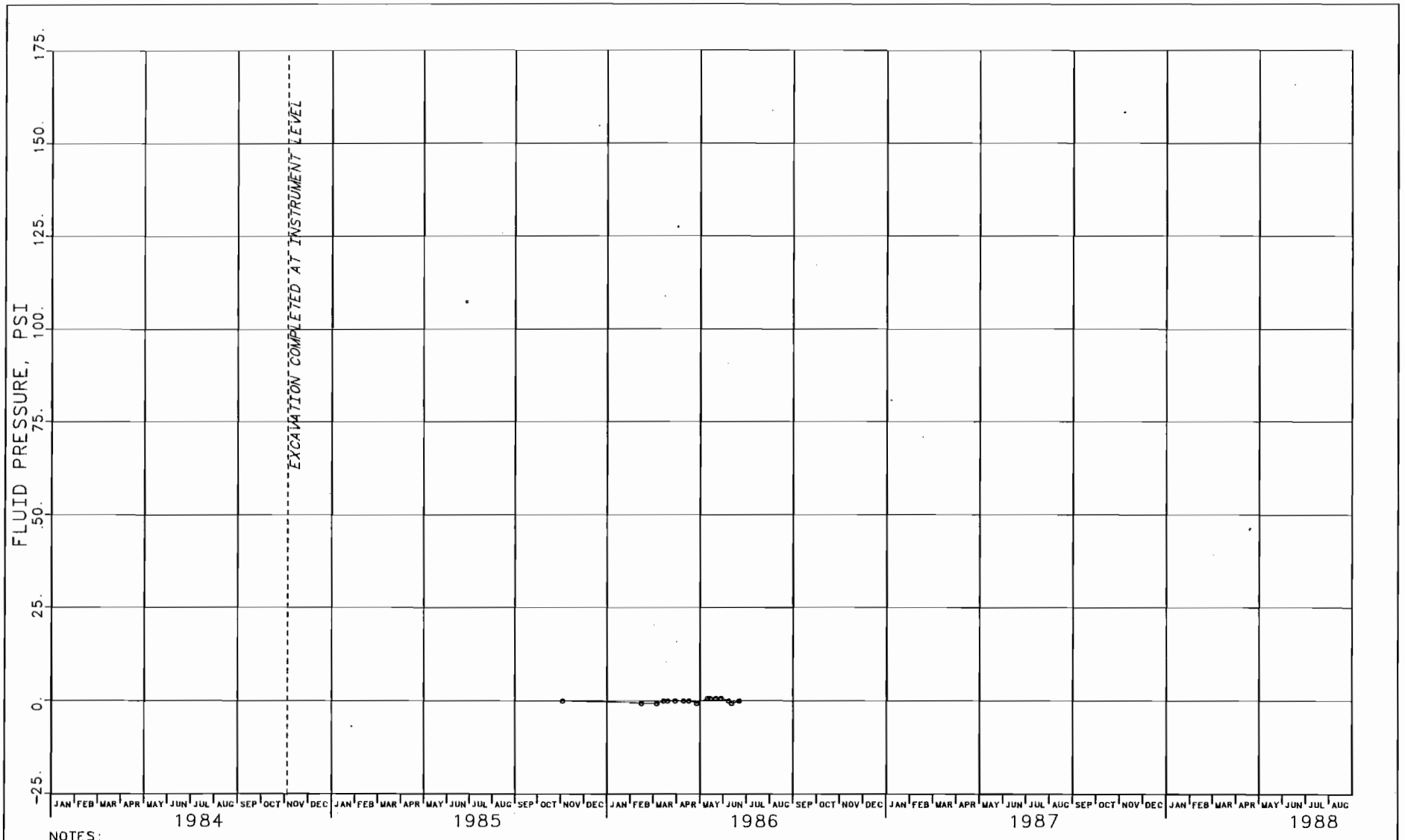
FIGURE J-25
PIEZOMETER 35X-PE-00213
EXHAUST SHAFT - EL 2641
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

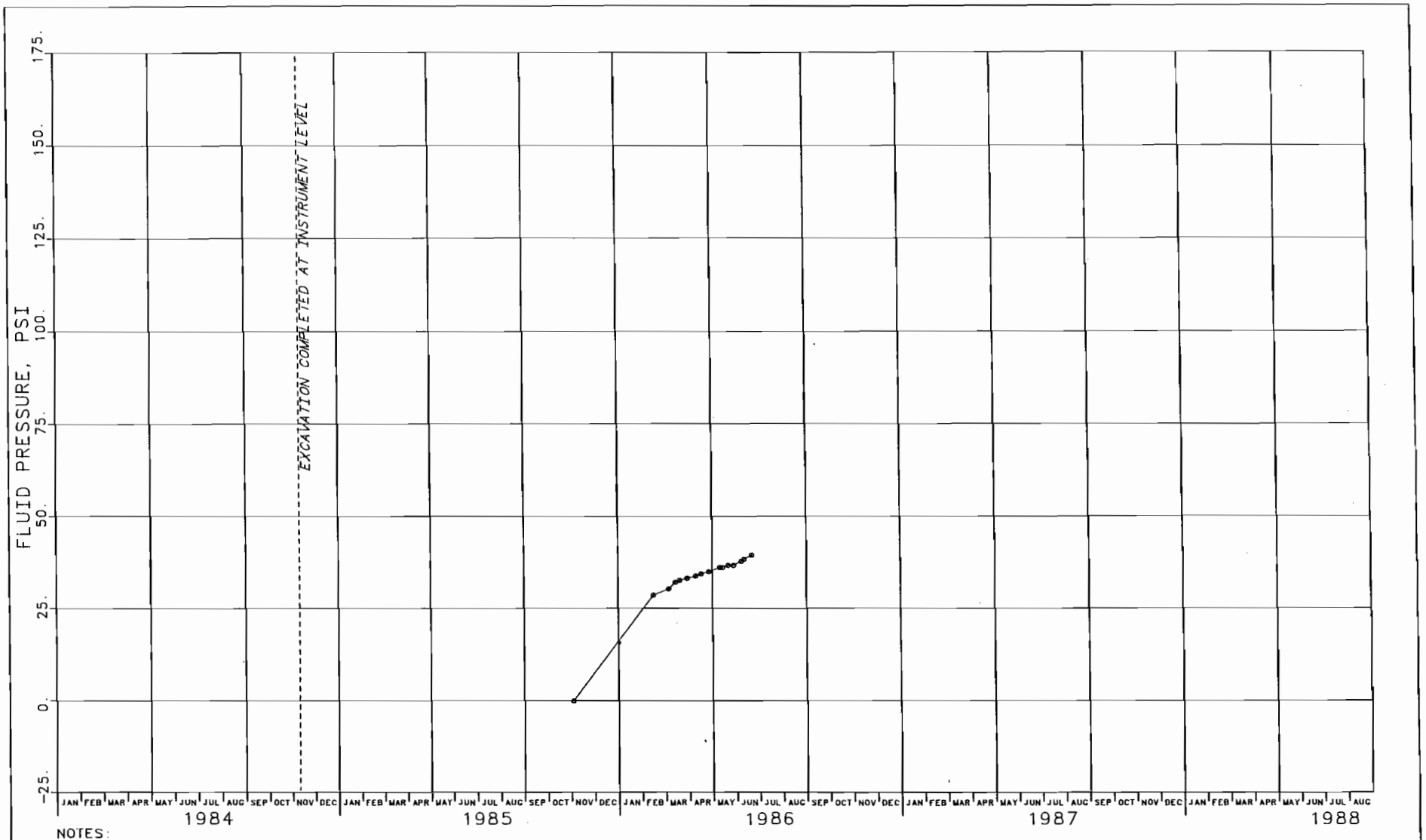
FIGURE J-26
PIEZOMETER 35X-PE-00214
EXHAUST SHAFT - EL 2641
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE LINER WAS PLACED JULY 1984 THROUGH NOV. 29, 1984.

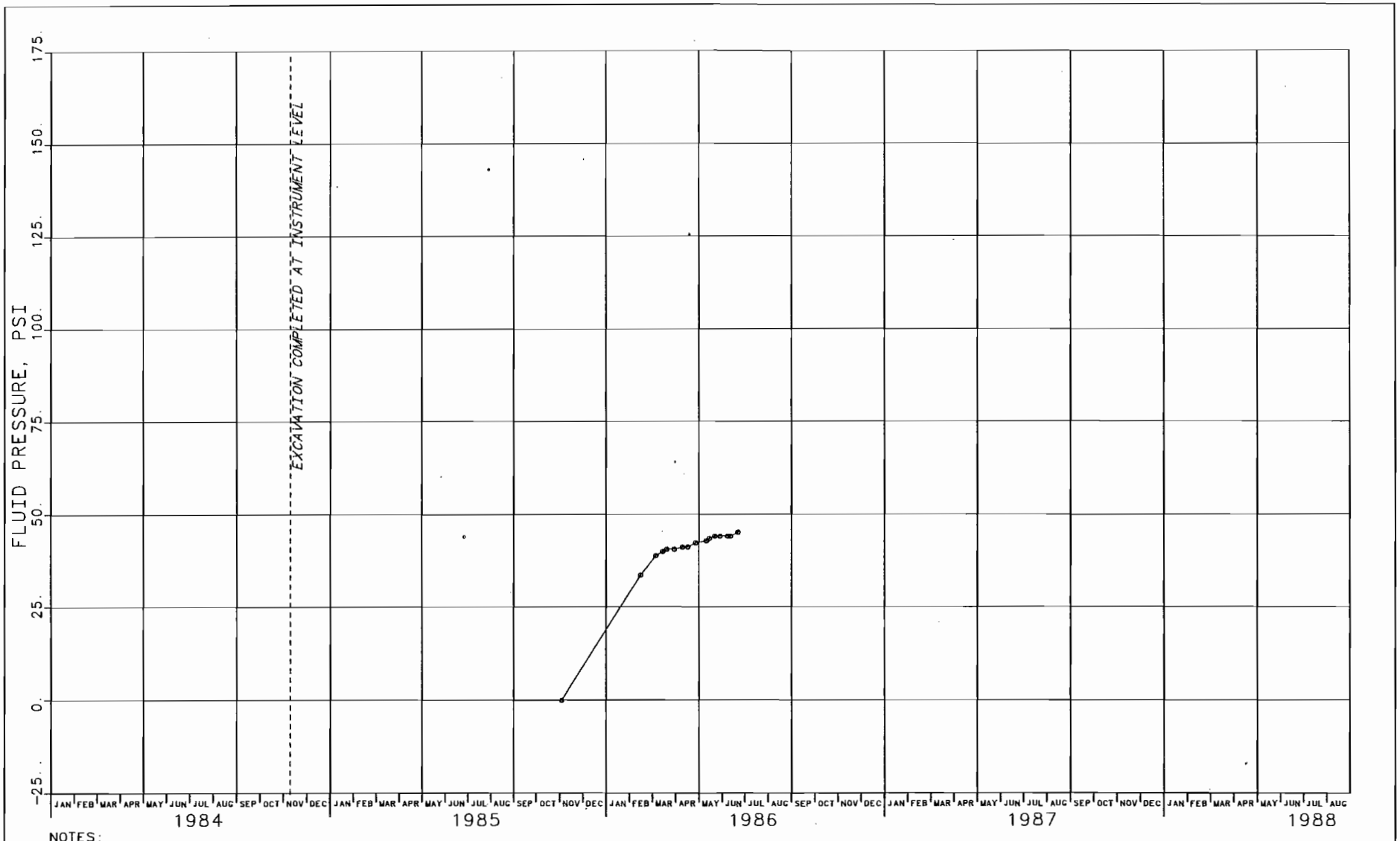
FIGURE J-27
PIEZOMETER 35X-PE-00215
EXHAUST SHAFT - EL 2641
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED NOV. 19 THROUGH NOV. 29, 1984.

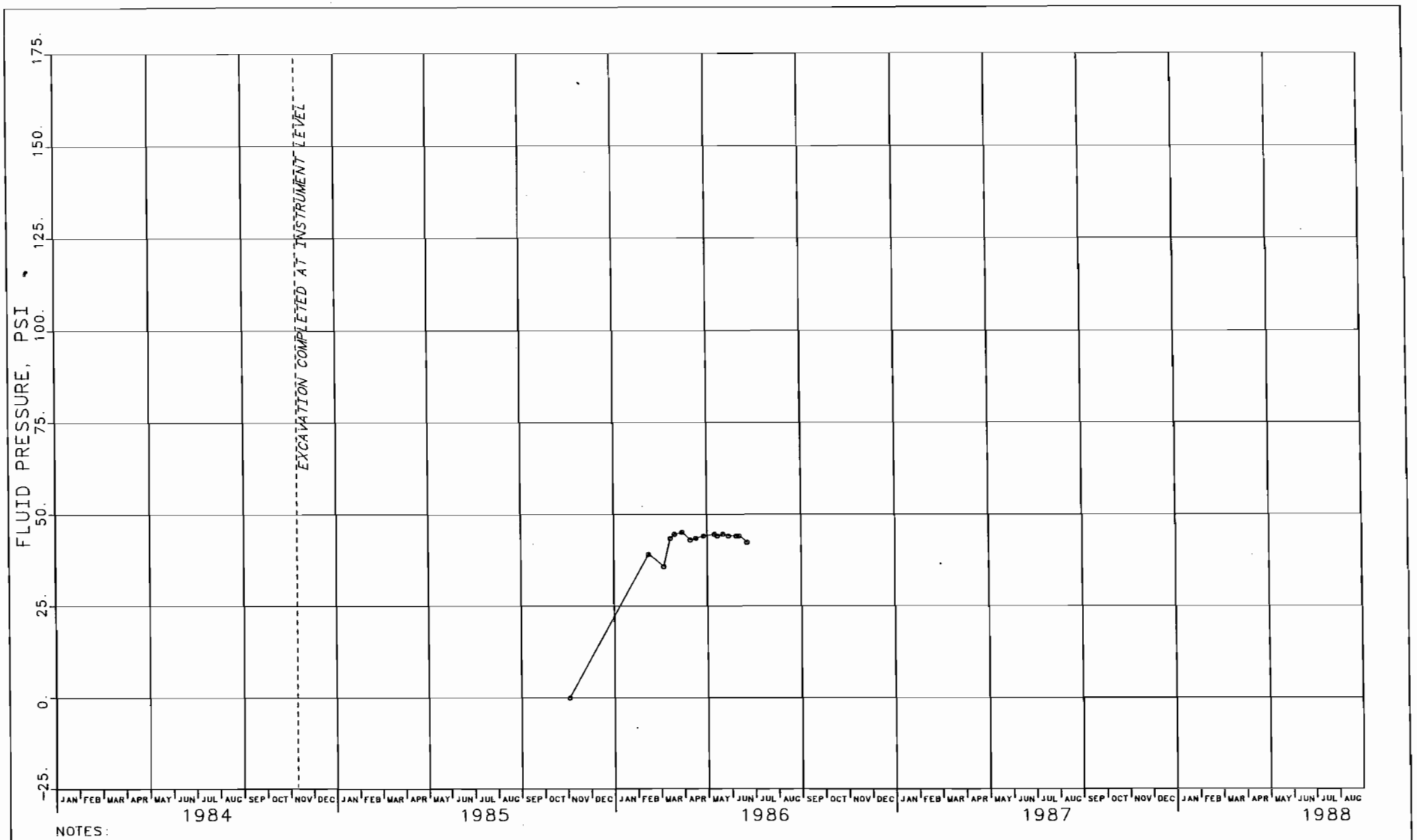
FIGURE J-28
PIEZOMETER 35X-PE-00216
EXHAUST SHAFT KEY - EL 2559
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED NOV. 19 THROUGH NOV. 29, 1984.

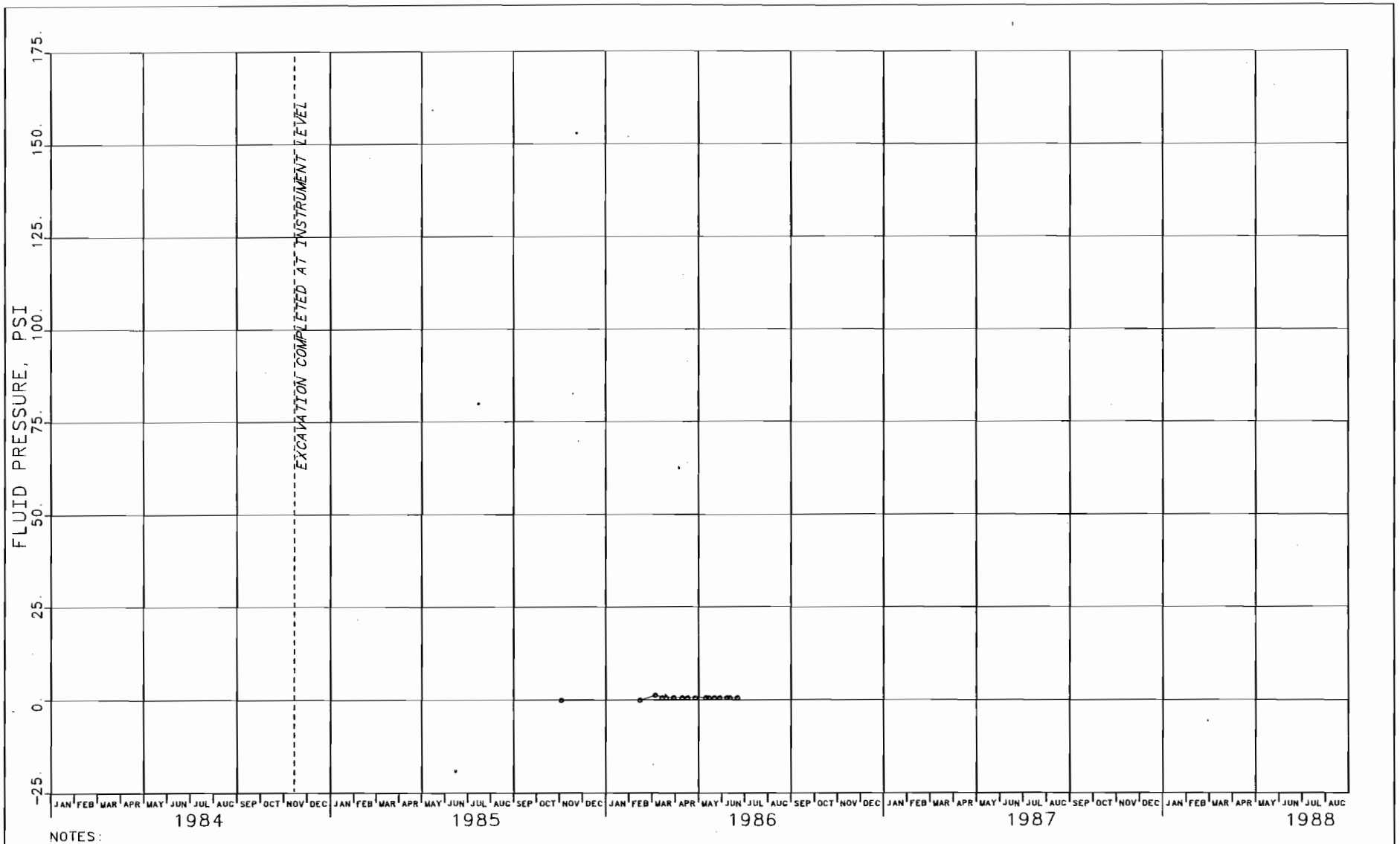
FIGURE J-29
PIEZOMETER 35X-PE-00217
EXHAUST SHAFT KEY - EL 2559
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED NOV. 19 THROUGH NOV. 29, 1984.

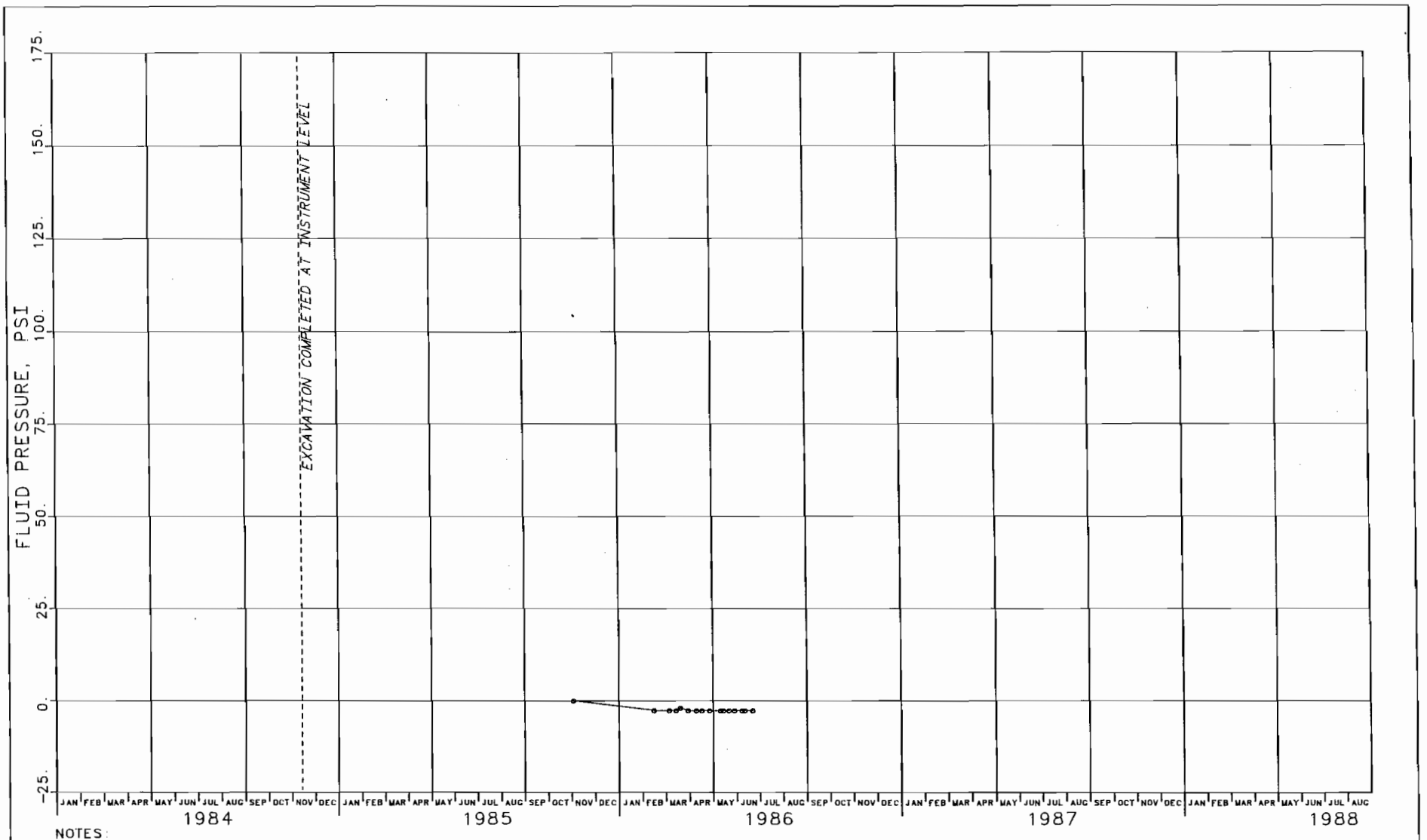
FIGURE J-30
PIEZOMETER 35X-PE-00218
EXHAUST SHAFT KEY - EL 2559
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED NOV. 19 THROUGH NOV. 29, 1984.

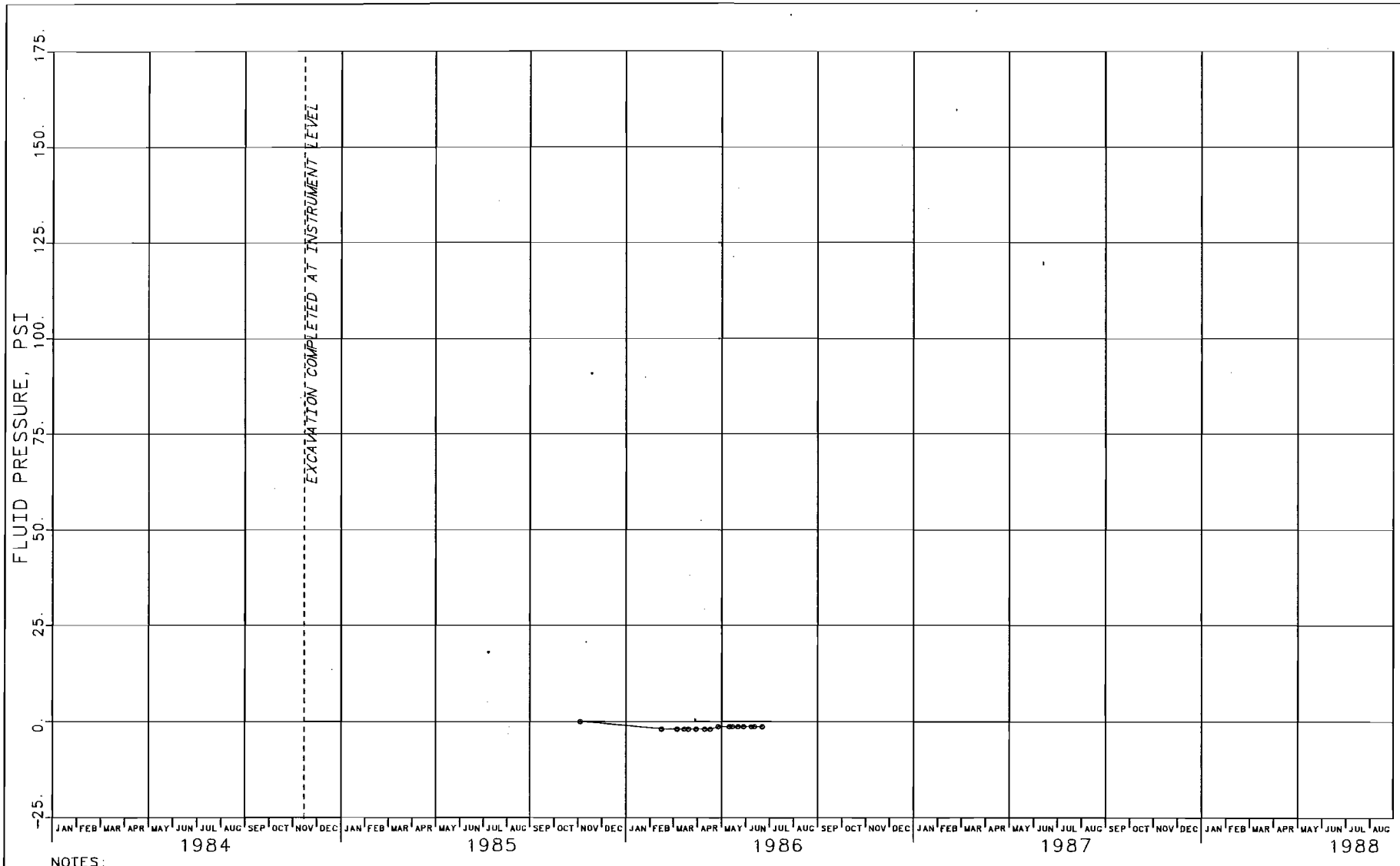
FIGURE J-31
PIEZOMETER 35X-PE-00219
EXHAUST SHAFT KEY - EL 2522
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED NOV. 19 THROUGH NOV. 29, 1984.

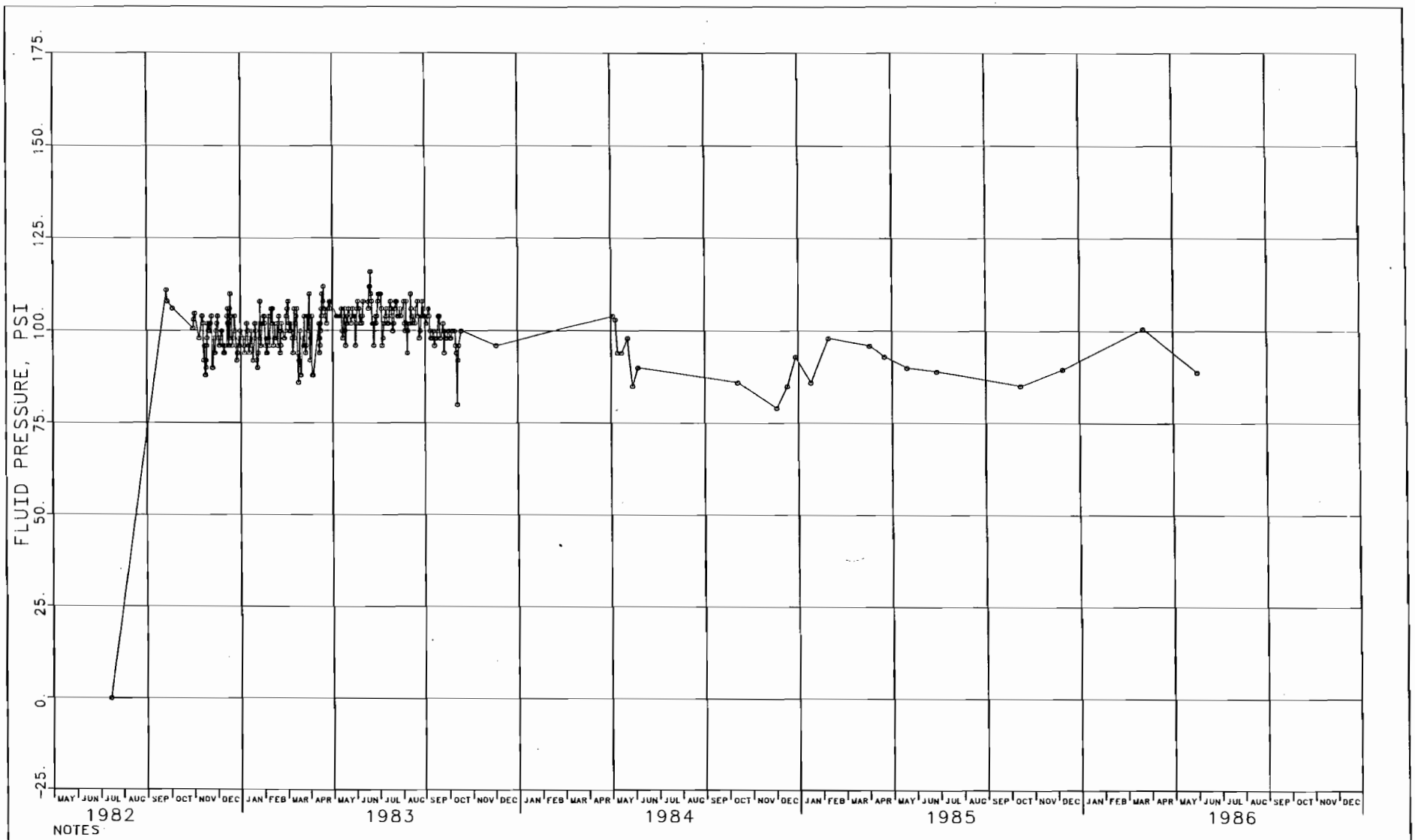
FIGURE J-32
PIEZOMETER 35X-PE-00220
EXHAUST SHAFT KEY - EL 2522
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED NOV. 19 THROUGH NOV. 29, 1984.

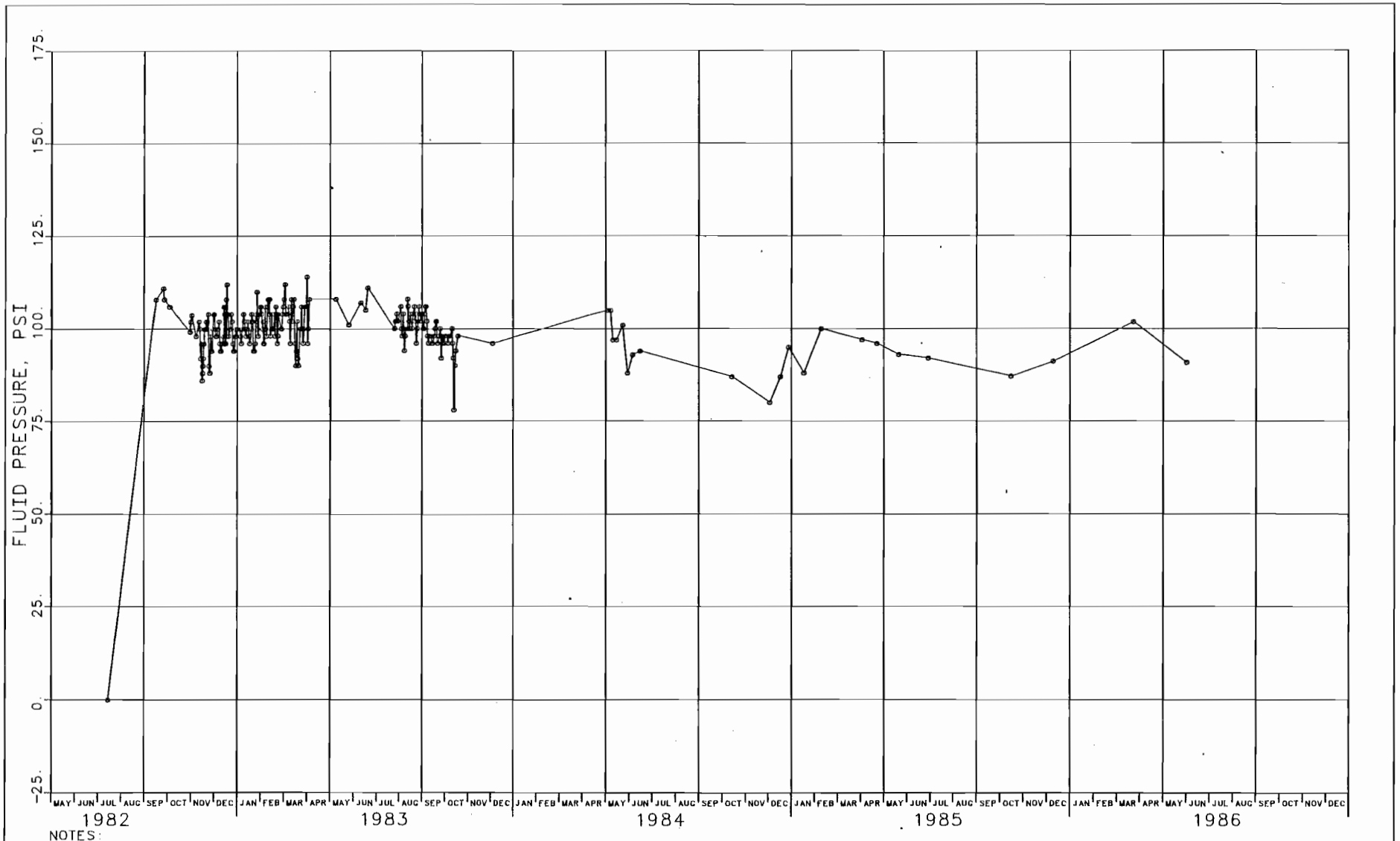
FIGURE J-33
PIEZOMETER 35X-PE-00221
EXHAUST SHAFT KEY - EL 2522
PRESSURE VS. CALENDAR MONTH



NOTES

1. STEEL LINER WAS INSTALLED IN NOVEMBER AND DECEMBER 1981.

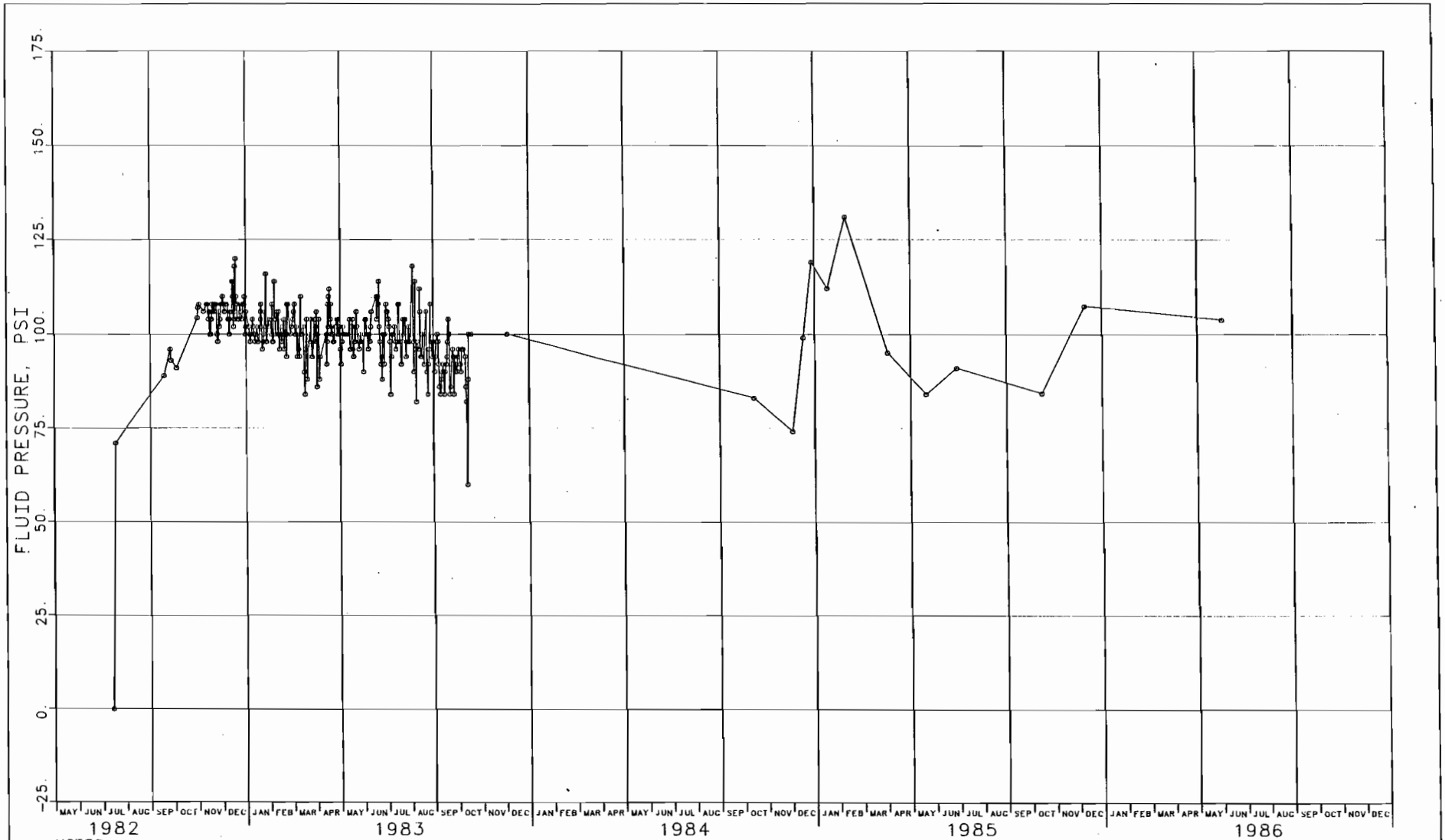
FIGURE J-34
PIEZOMETER 37X-PE-00201
C & SH SHAFT - EL 2830
PRESSURE VS. CALENDAR MONTH



NOTES:

1. STEEL LINER WAS INSTALLED IN NOVEMBER AND DECEMBER 1981.

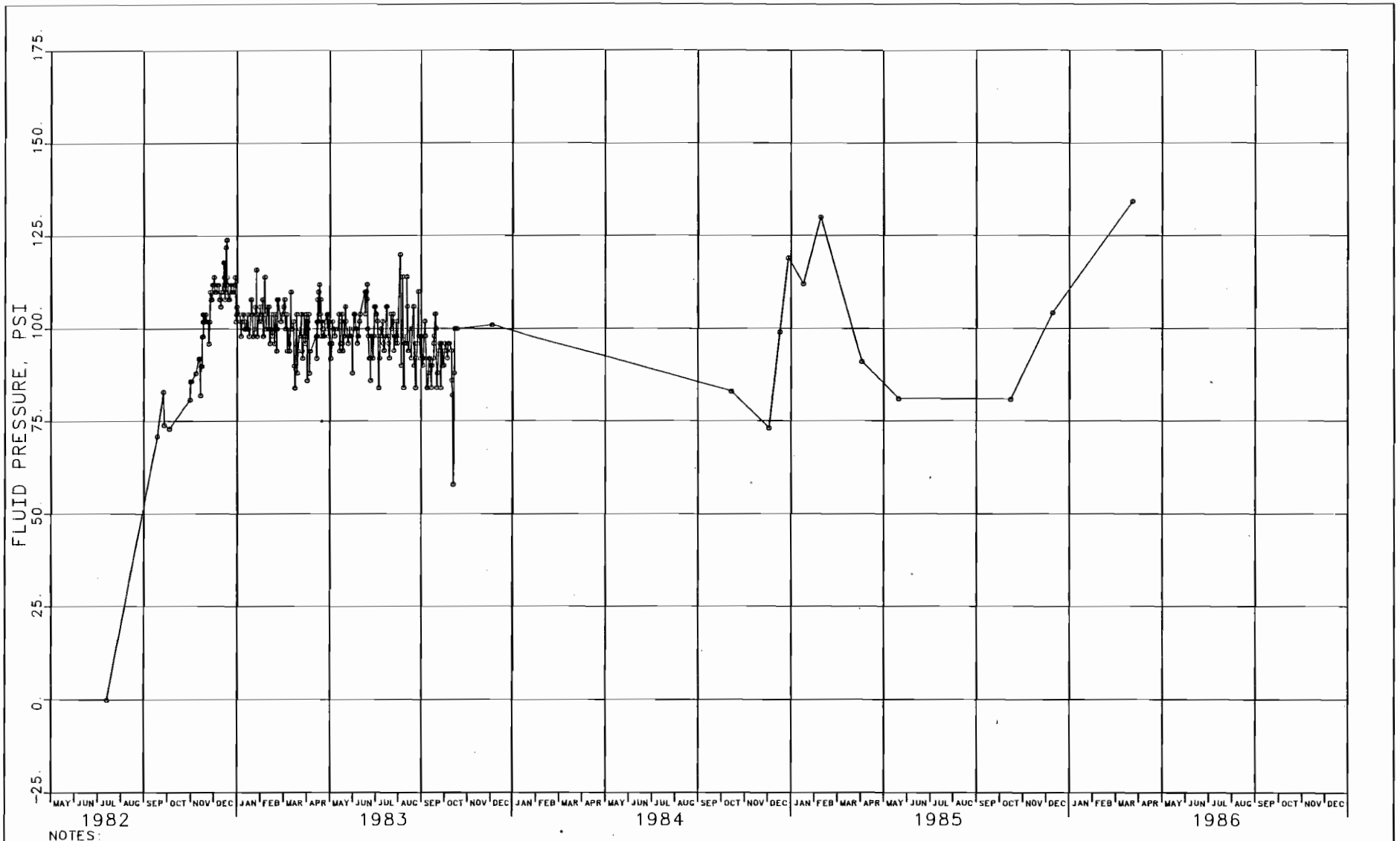
FIGURE J-35
PIEZOMETER 37X-PE-00202
C & SH SHAFT - EL 2830
PRESSURE VS. CALENDAR MONTH



NOTES:

1. STEEL LINER WAS INSTALLED IN NOVEMBER AND DECEMBER 1981.

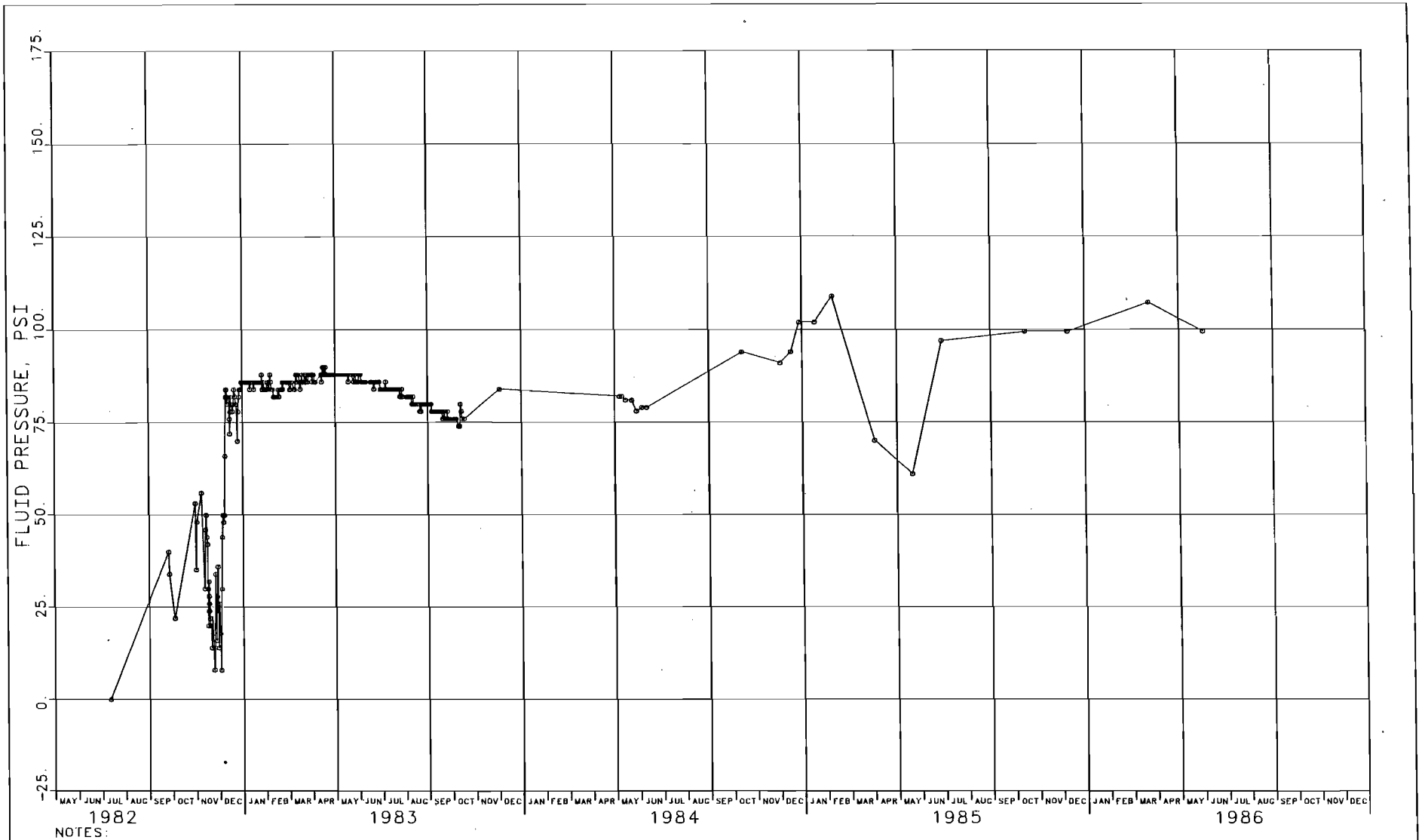
FIGURE J-36
PIEZOMETER 37X-PE-00203
C & SH SHAFT - EL 2790 (MAGENTA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. STEEL LINER WAS INSTALLED IN NOVEMBER AND DECEMBER 1981.
2. INSTRUMENT IS CURRENTLY NOT FUNCTIONING.

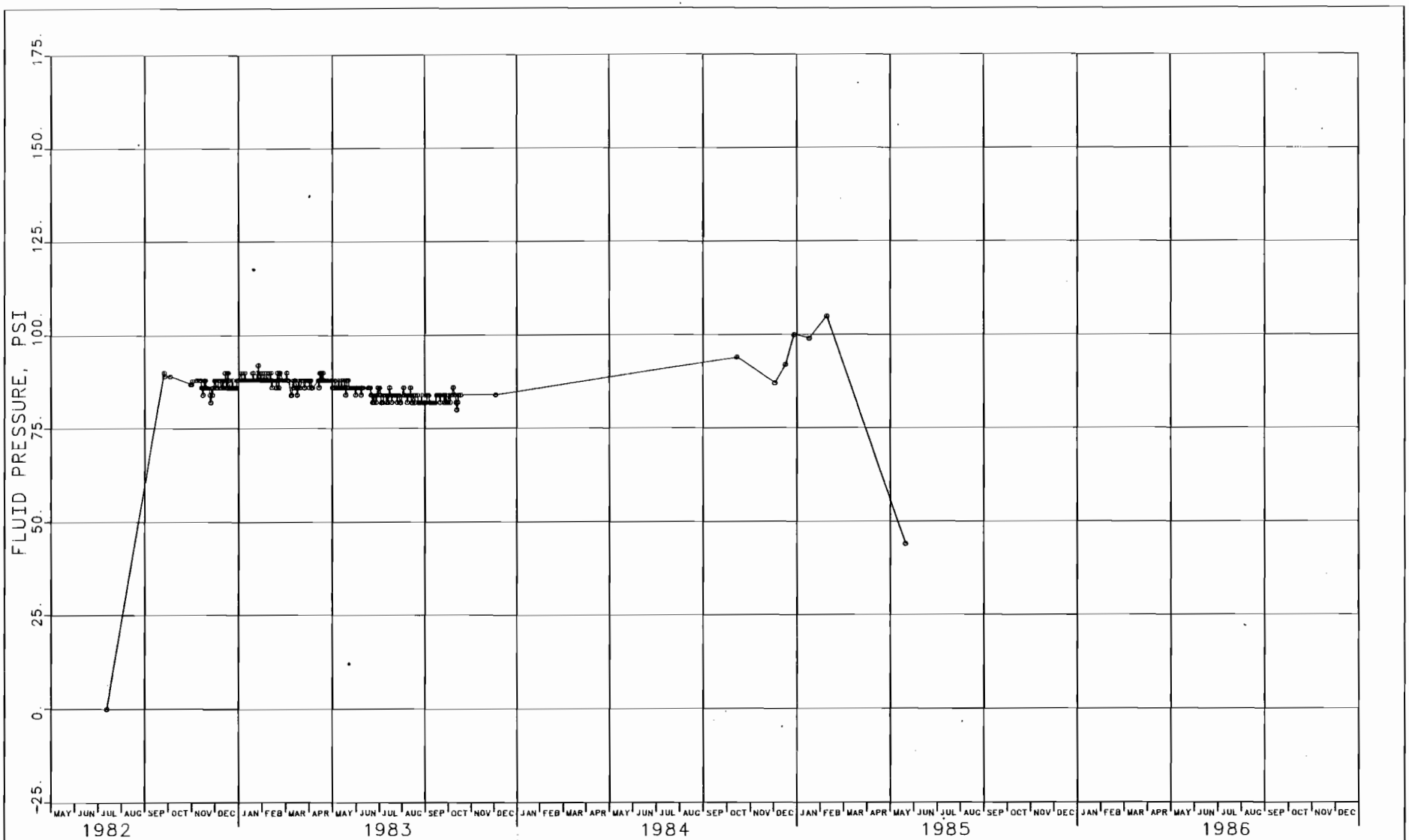
FIGURE J-37
PIEZOMETER 37X-PE-00204
C & SH SHAFT - EL 2790 (MAGENTA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. STEEL LINER WAS INSTALLED IN NOVEMBER AND DECEMBER 1981.

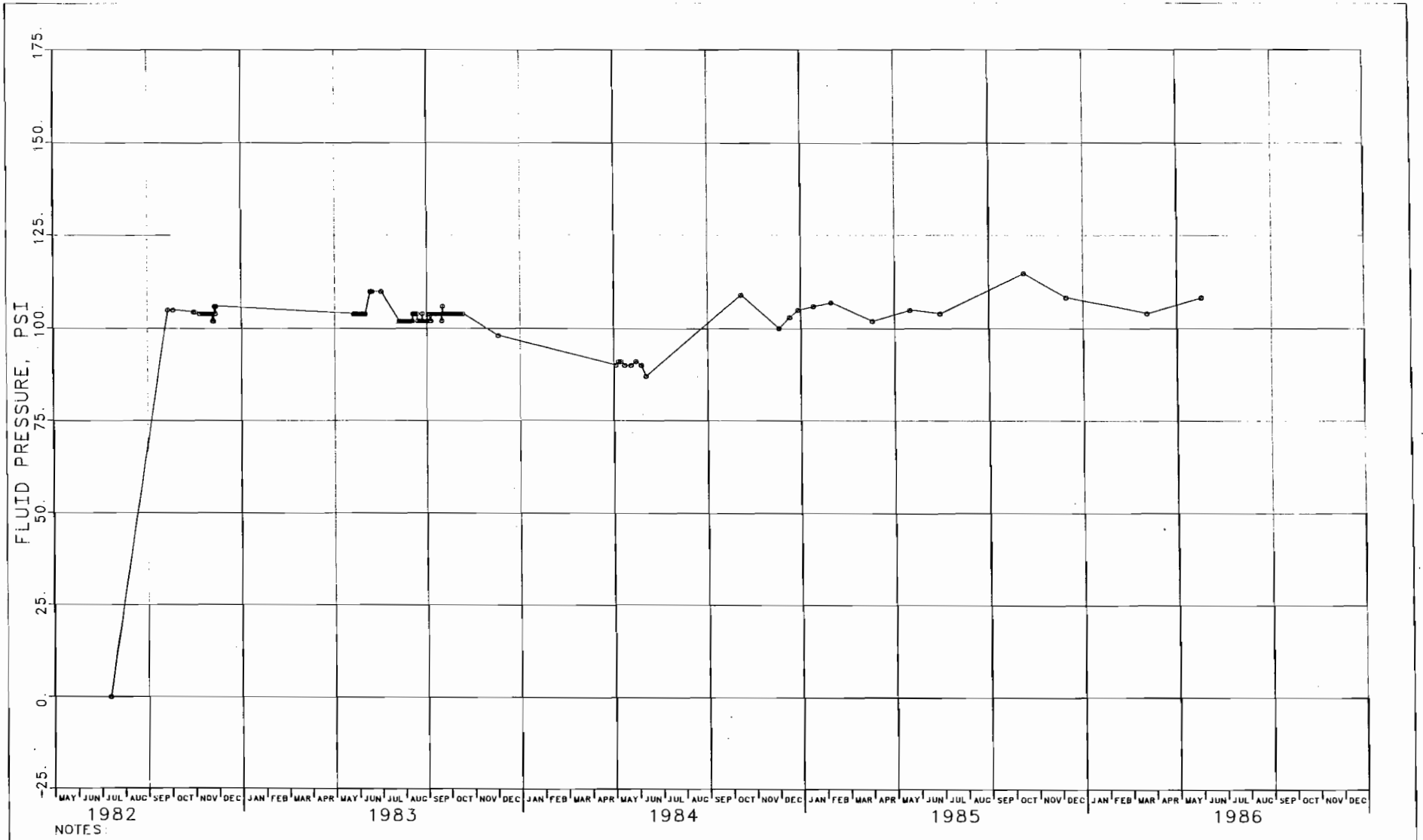
FIGURE J-38
PIEZOMETER 37X-PE-00205
C & SH SHAFT - EL 2719
PRESSURE VS. CALENDAR MONTH



NOTES:

1. STEEL LINER WAS INSTALLED IN NOVEMBER AND DECEMBER 1981.
2. INSTRUMENT HAS BEEN REMOVED FOR REPAIR.

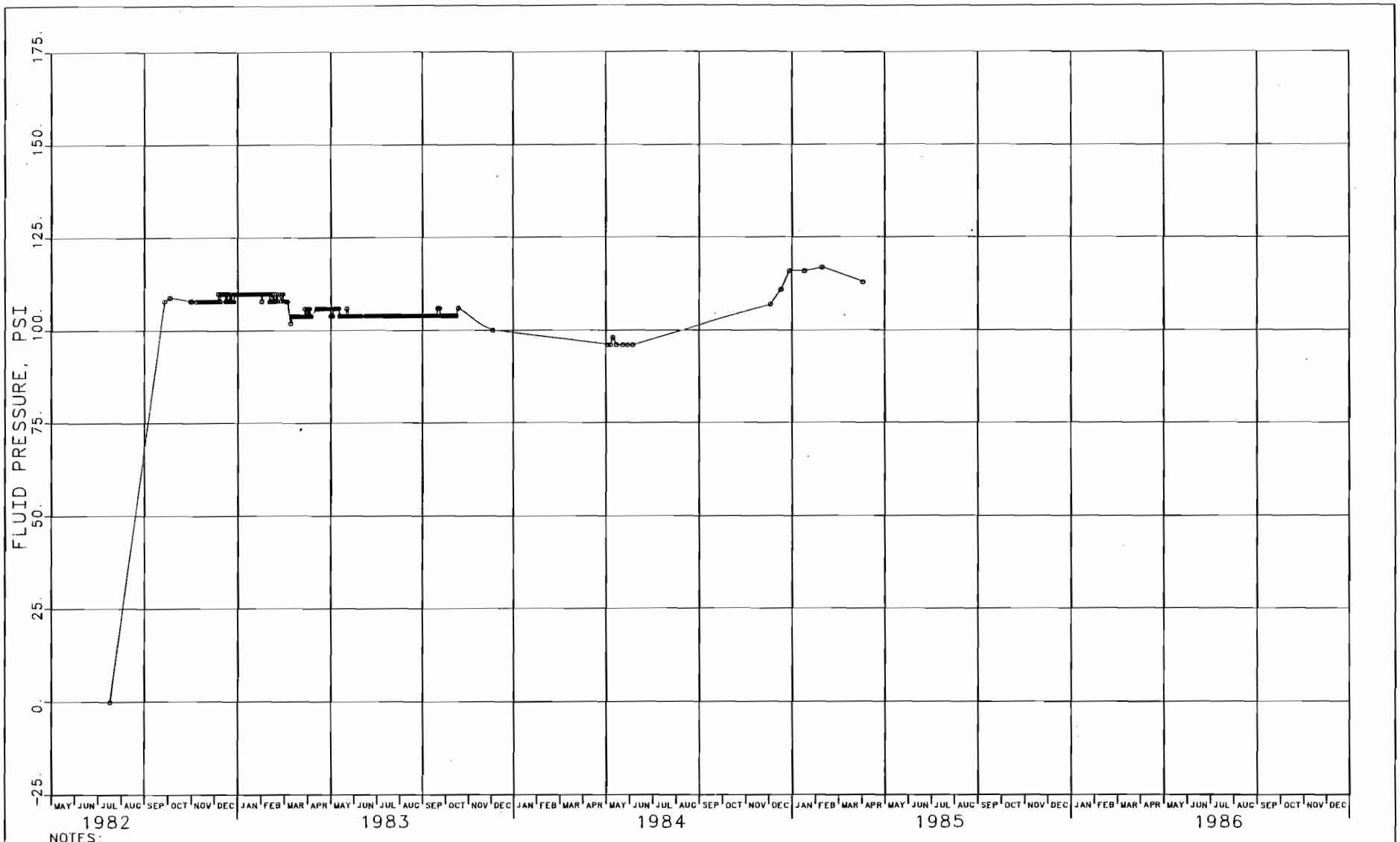
FIGURE J-39
PIEZOMETER 37X-PE-00206
C & SH SHAFT - EL 2719
PRESSURE VS. CALENDAR MONTH



NOTES:

1. STEEL LINER WAS INSTALLED IN NOVEMBER AND DECEMBER 1981.

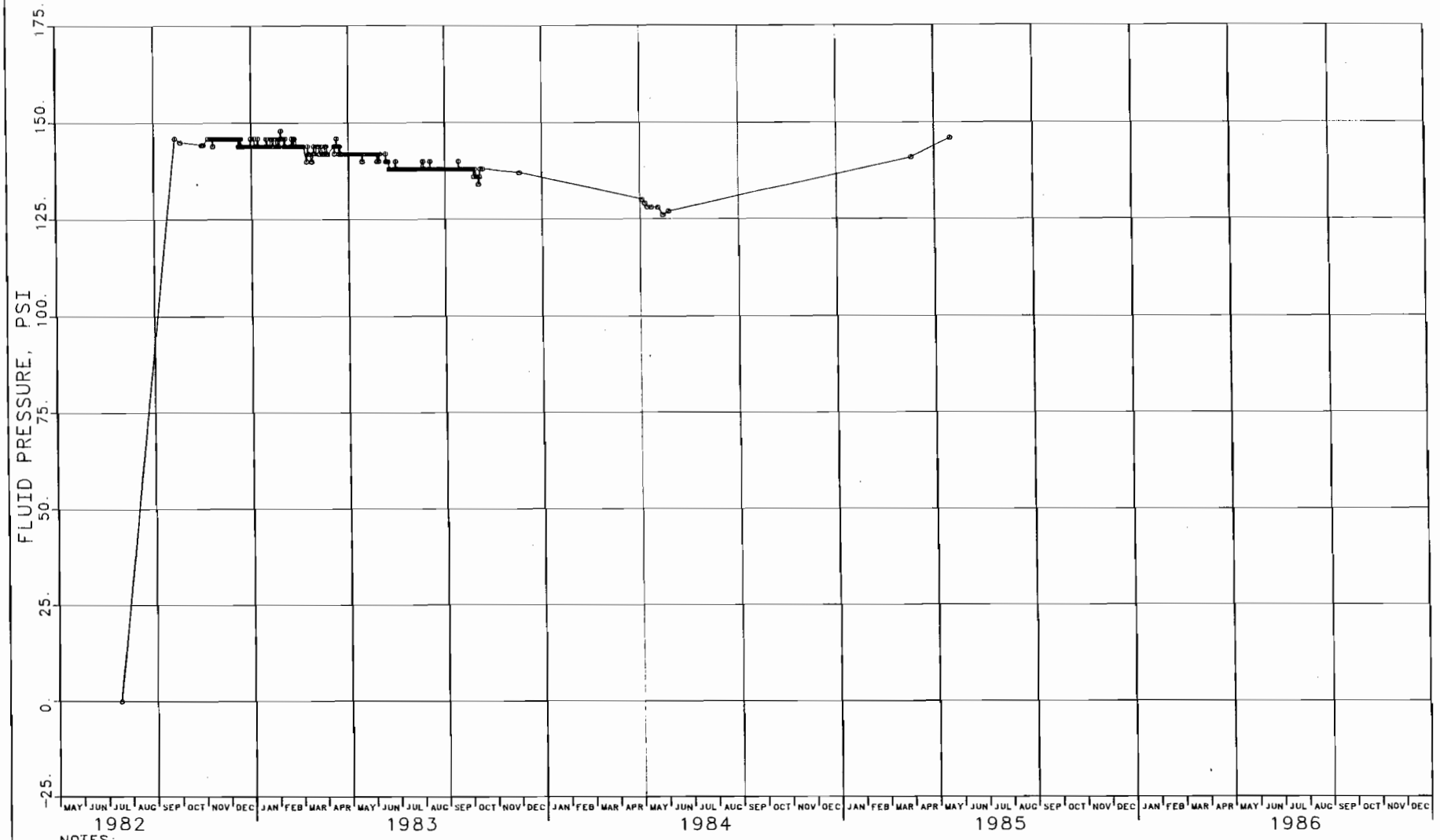
FIGURE J-40
PIEZOMETER 37X-PE-00207
C & SH SHAFT – EL 2684 (CULEBRA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. STEEL LINER WAS INSTALLED IN NOVEMBER AND DECEMBER 1981.
2. INSTRUMENT HAS BEEN REMOVED FOR REPAIR.

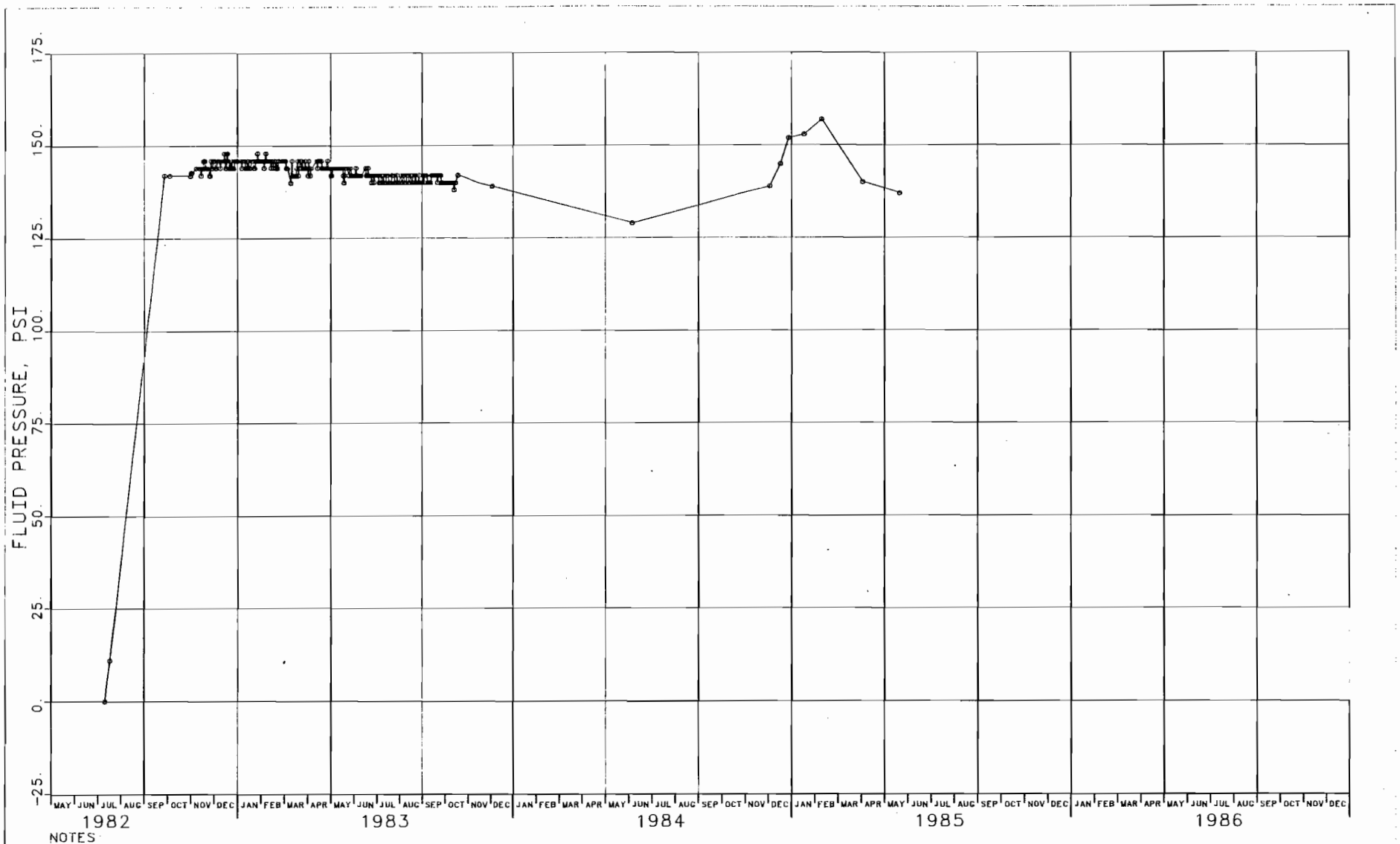
FIGURE J-41
PIEZOMETER 37X-PE-00208
C & SH SHAFT - EL 2684 (CULEBRA)
PRESSURE VS. CALENDAR MONTH



NOTES:

1. STEEL LINER WAS INSTALLED IN NOVEMBER AND DECEMBER 1981.
2. INSTRUMENT HAS BEEN REMOVED FOR REPAIR.

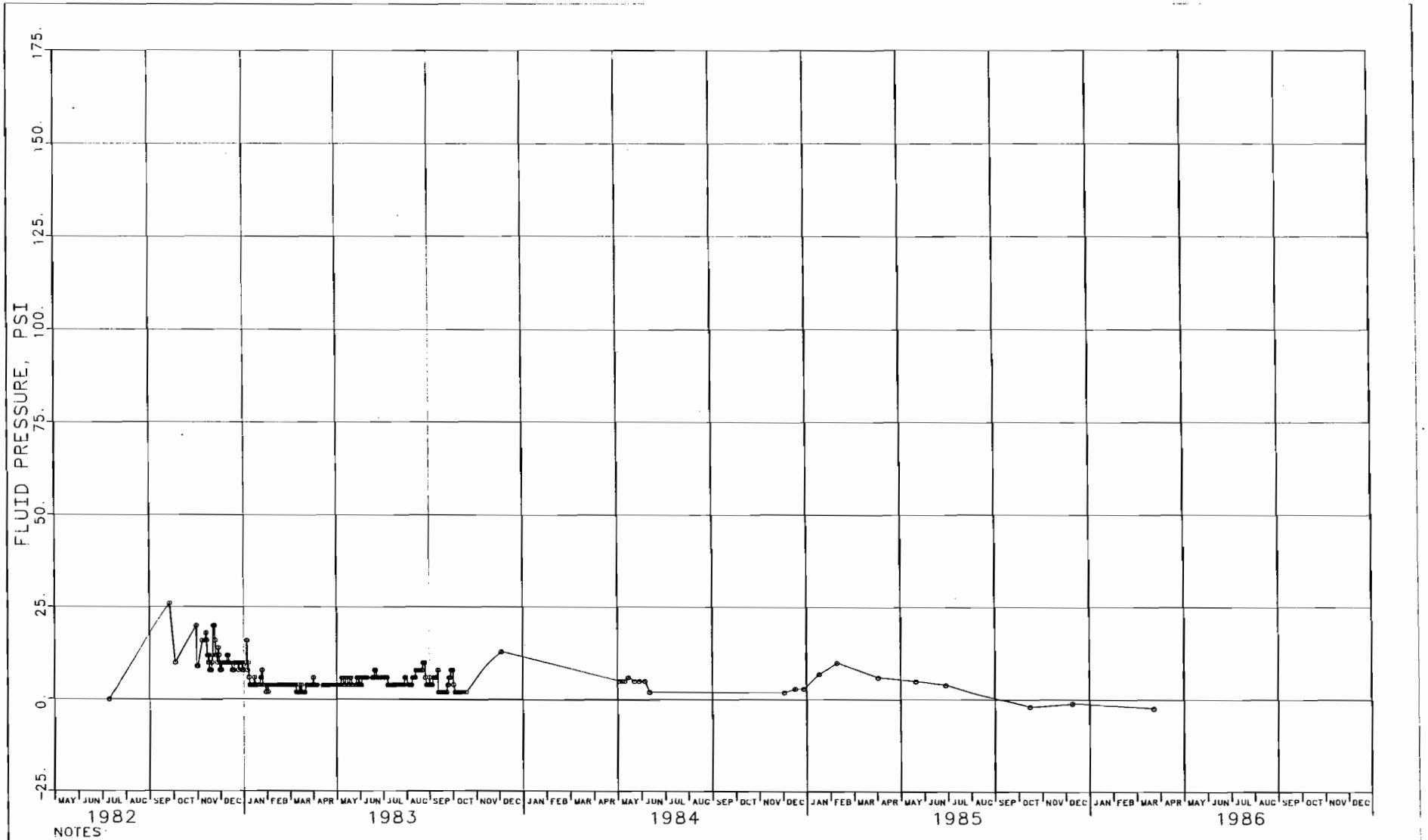
FIGURE J-42
PIEZOMETER 37X-PE-00209
C & SH SHAFT - EL 2608
PRESSURE VS. CALENDAR MONTH



NOTES

1. STEEL LINER WAS INSTALLED IN NOVEMBER AND DECEMBER 1981.
2. INSTRUMENT HAS BEEN REMOVED FOR REPAIR.

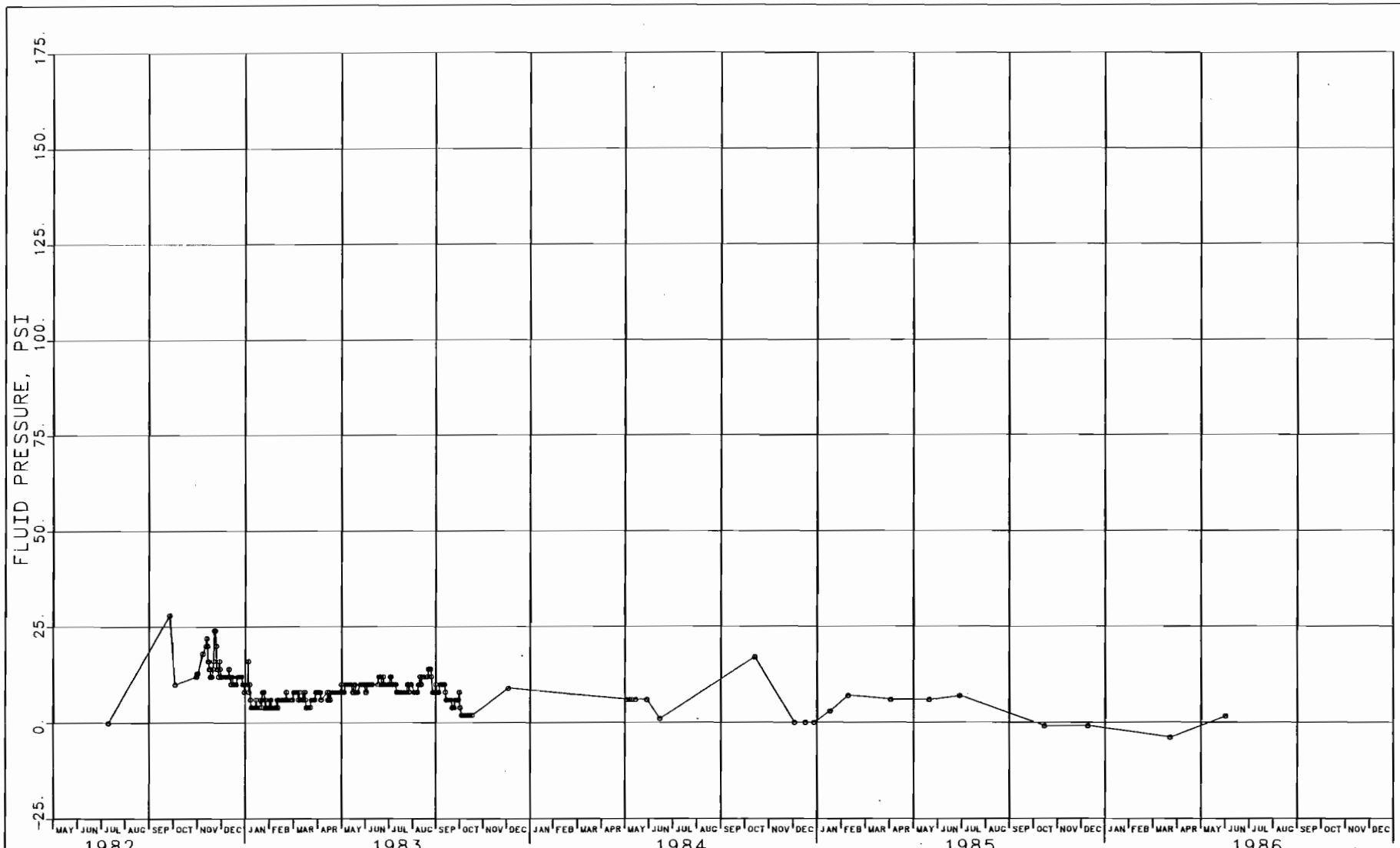
FIGURE J-43
PIEZOMETER 37X-PE-00210
C & SH SHAFT - EL 2608
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. INSTRUMENT IS CURRENTLY NOT FUNCTIONING.

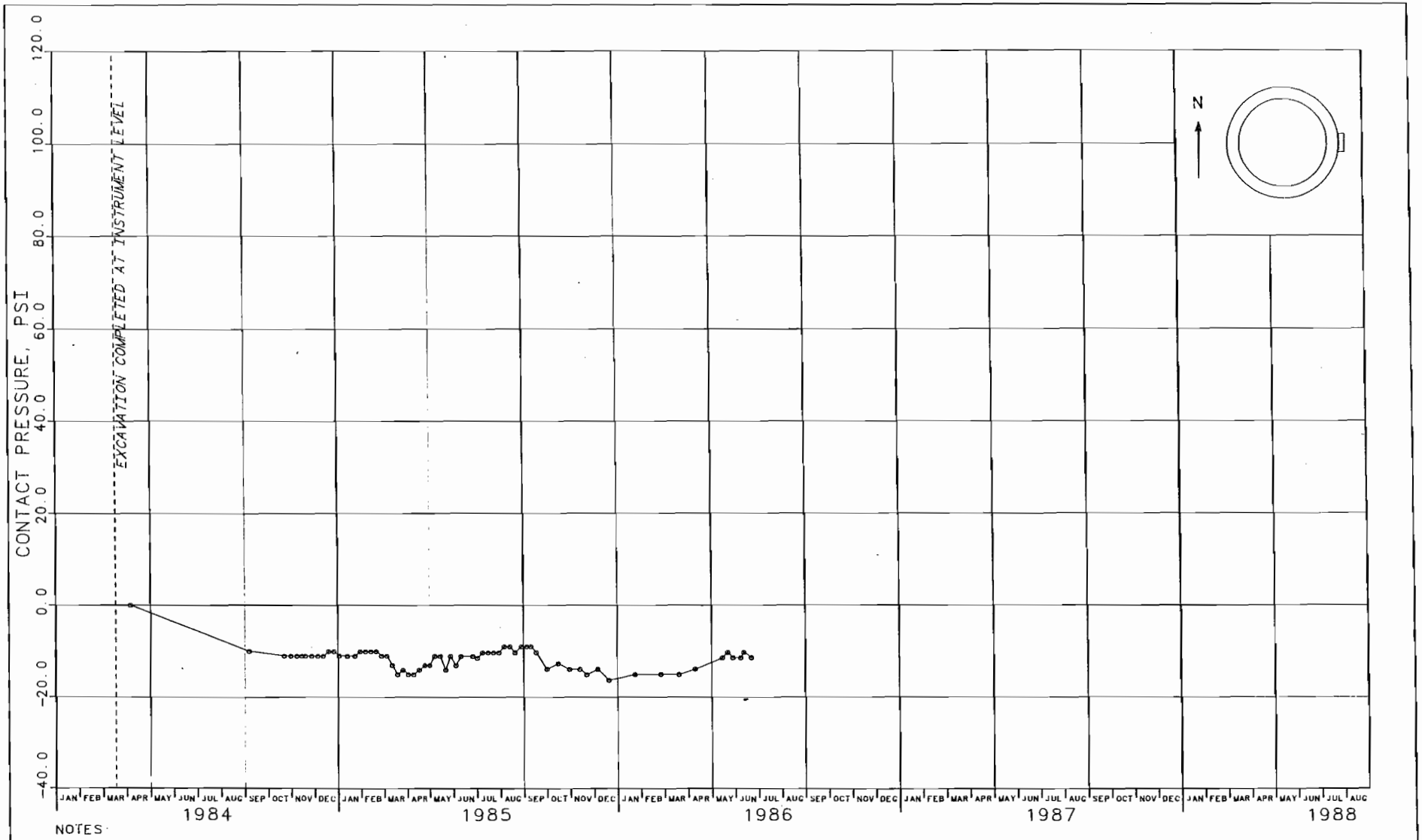
FIGURE J-44
PIEZOMETER 37X-PE-00211
C & SH SHAFT KEY - EL 2560
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.

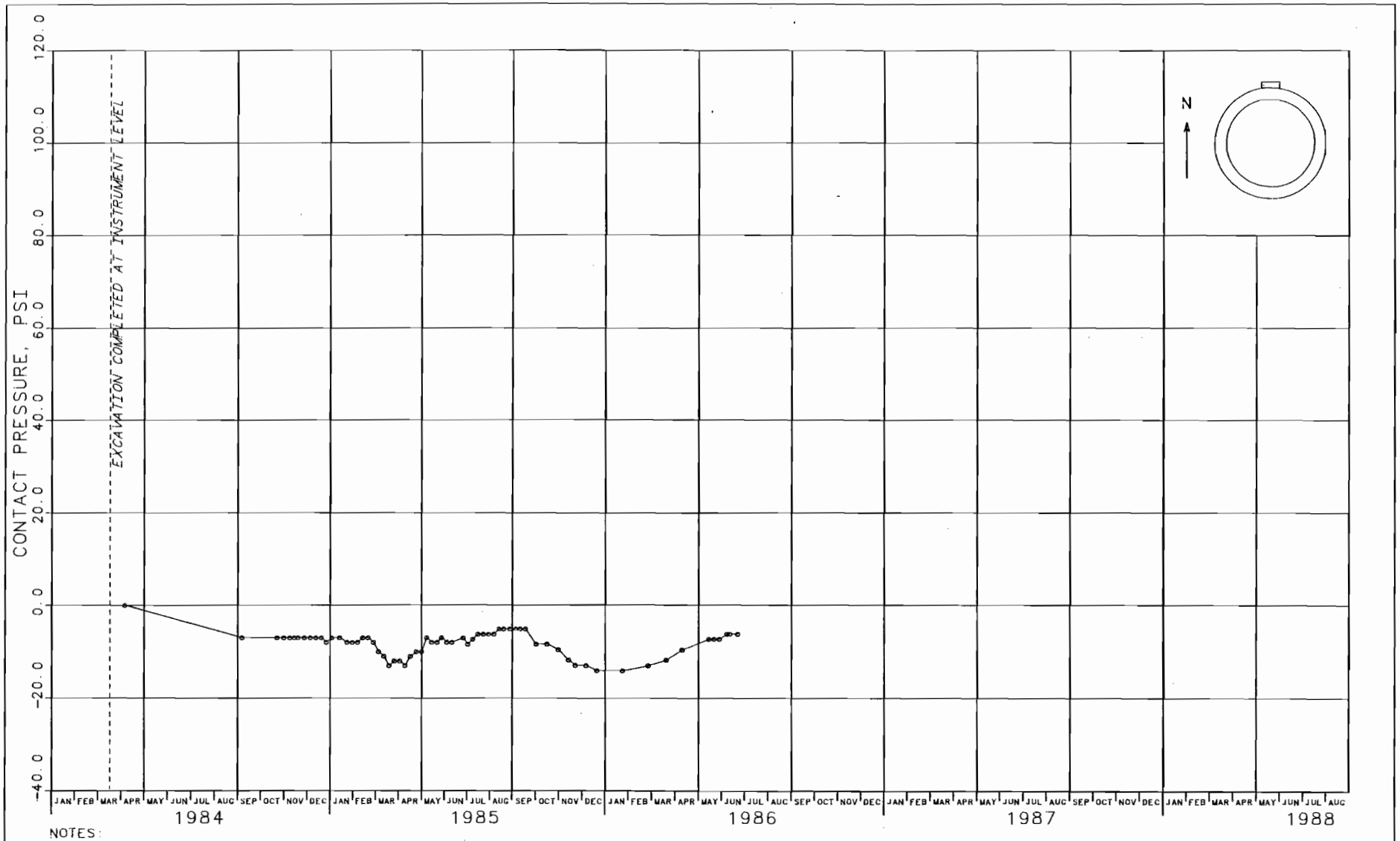
FIGURE J-45
PIEZOMETER 37X-PE-00212
C & SH SHAFT KEY - EL 2560
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED MARCH 23 THROUGH APRIL 3, 1984.
2. SIZE OF EXCAVATION: 24 FT DIAM.

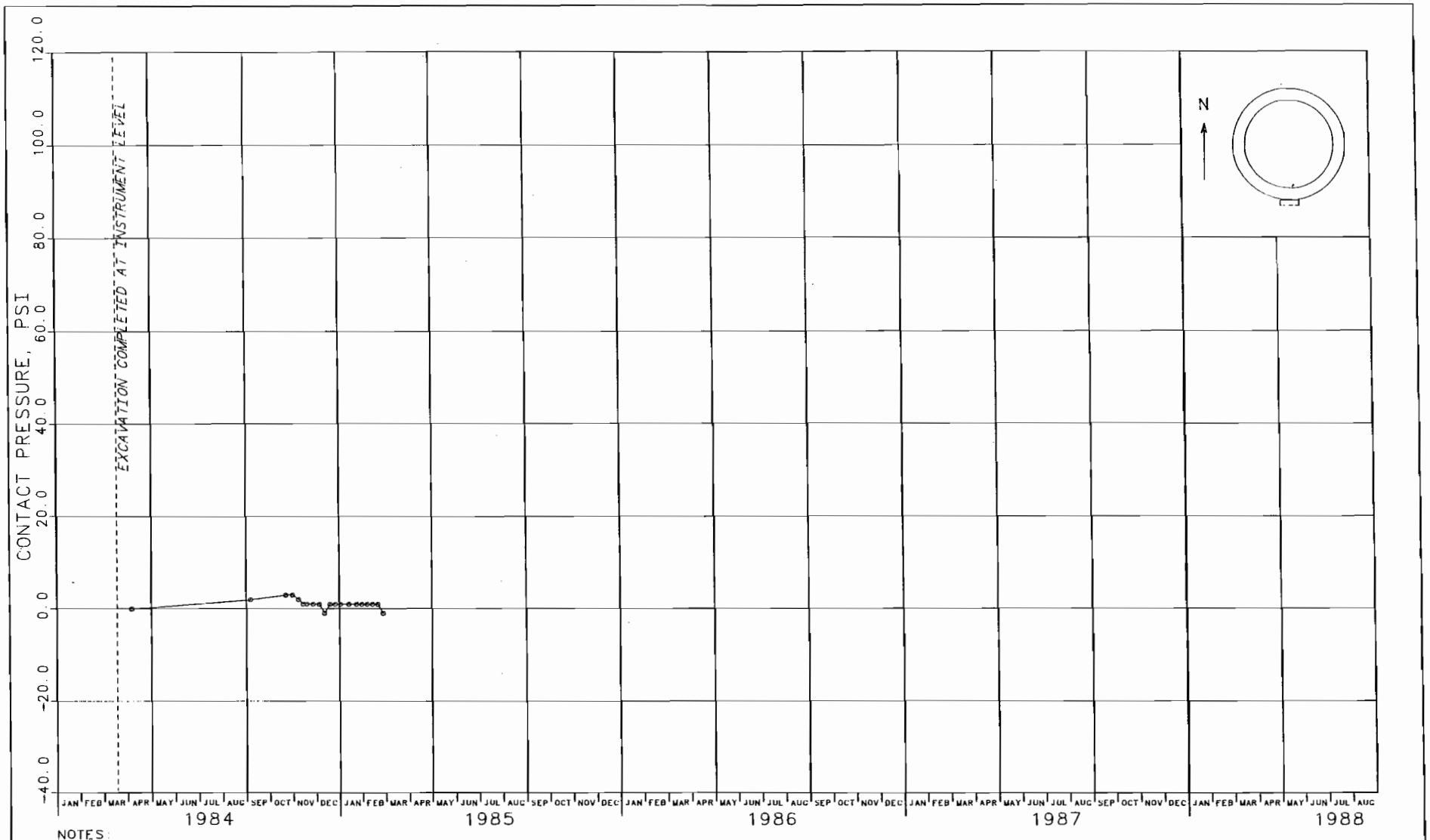
FIGURE J-46
PRESSURE CELL 31X-WE-00201
WASTE SHAFT - EL 2543 - EAST SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED MARCH 23 THROUGH APRIL 3, 1984.
2. SIZE OF EXCAVATION: 24 FT DIAM.

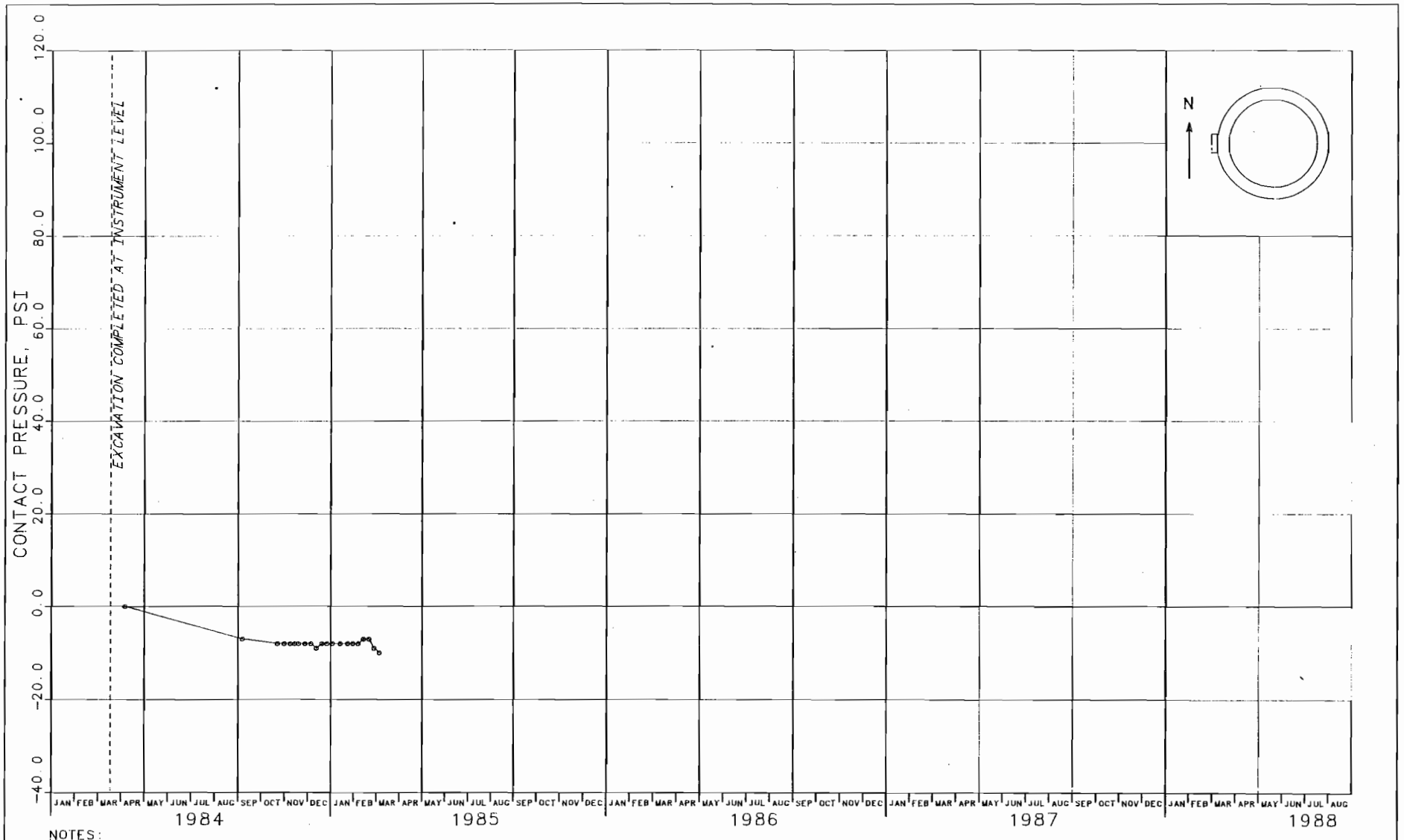
FIGURE J-47
PRESSURE CELL 31X-WE-00202
WASTE SHAFT - EL 2543 - NORTH SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED MARCH 23 THROUGH APRIL 3, 1984.
2. SIZE OF EXCAVATION: 24 FT DIAM.
3. INSTRUMENT IS CURRENTLY NOT FUNCTIONING

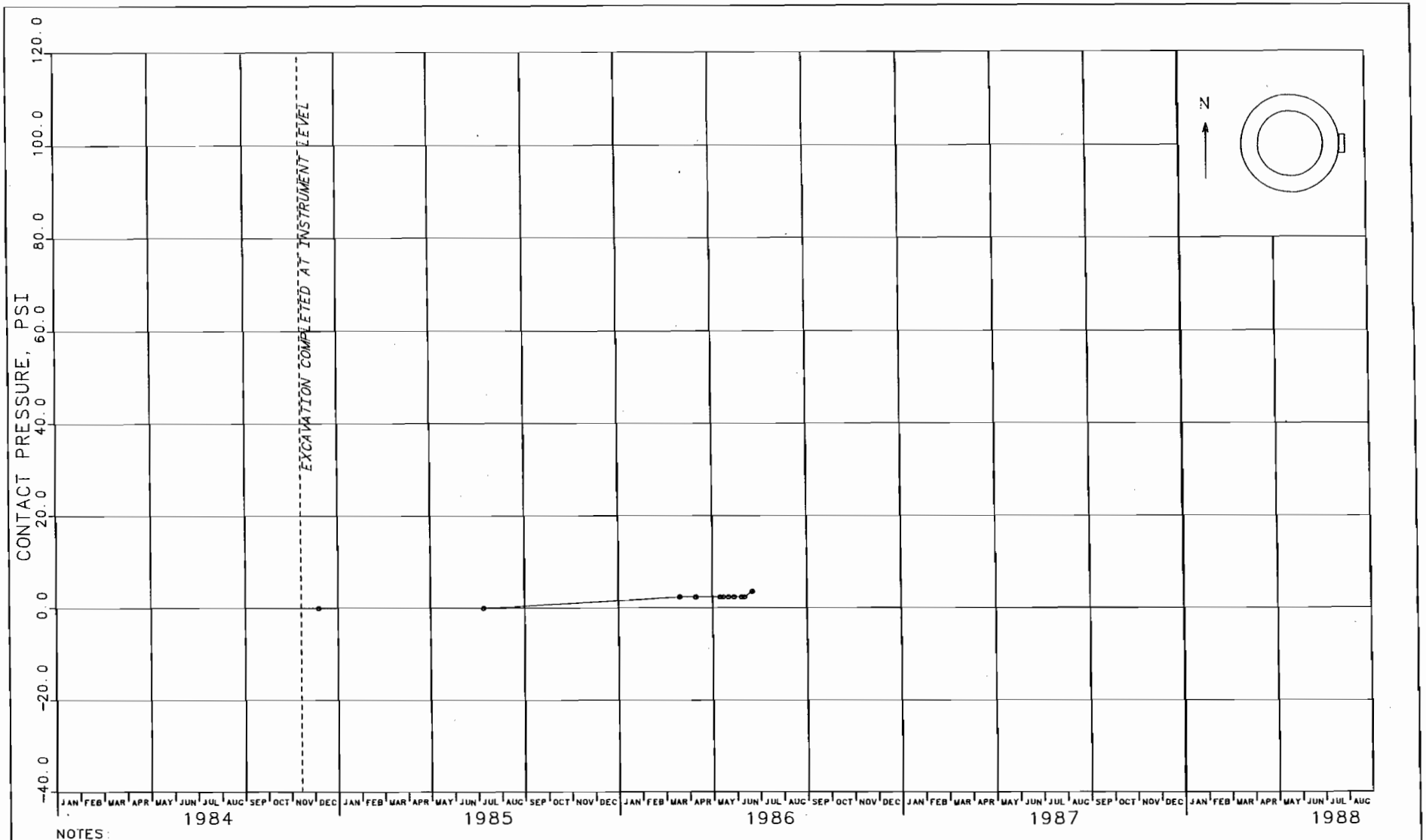
FIGURE J-48
PRESSURE CELL 31X-WE-00203
WASTE SHAFT - EL 2543 - SOUTH SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED MARCH 23 THROUGH APRIL 3, 1984.
2. SIZE OF EXCAVATION 24 FT DIAM.
3. INSTRUMENT IS CURRENTLY NOT FUNCTIONING.

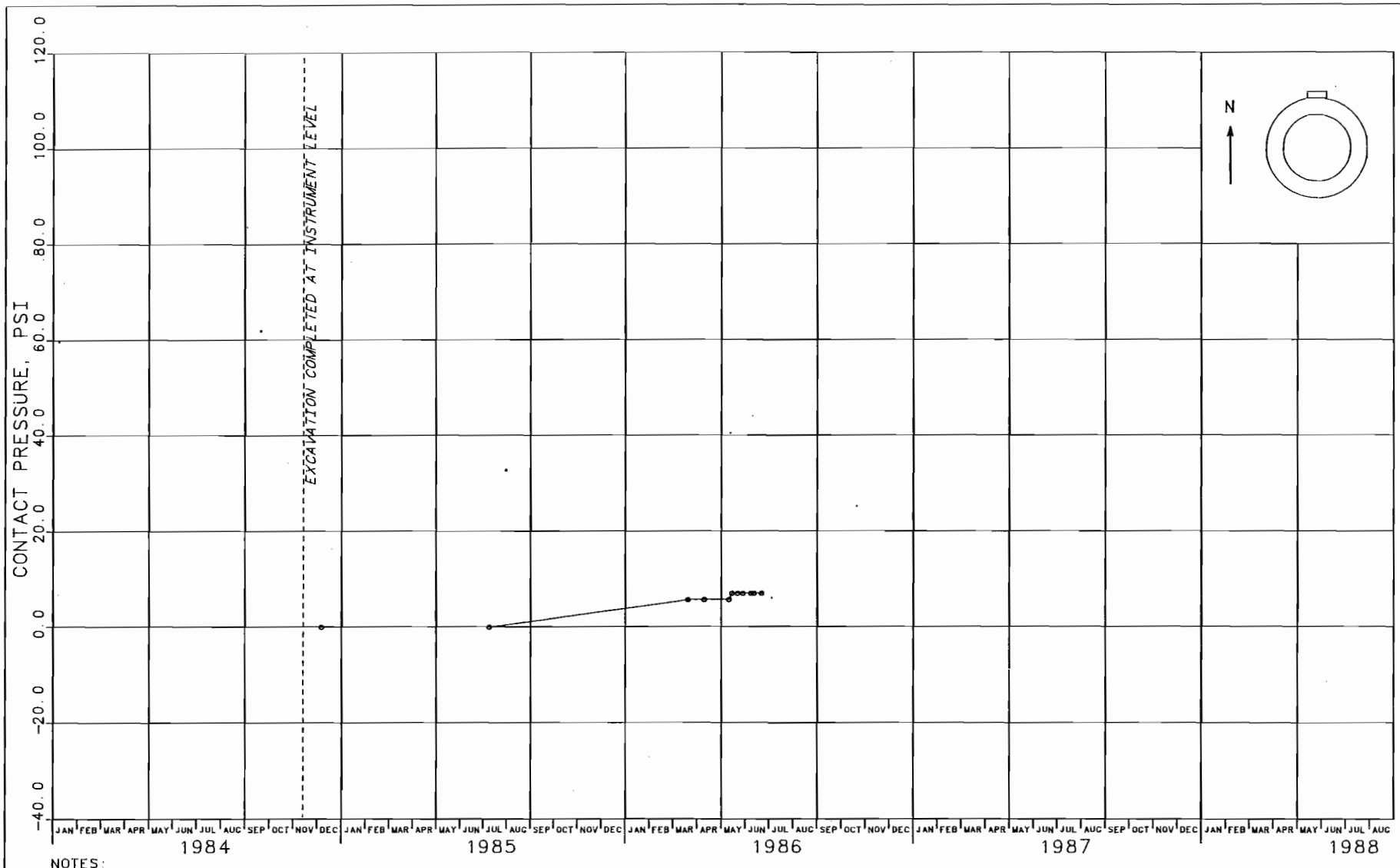
FIGURE J-49
PRESSURE CELL 31X-WE-00204
WASTE SHAFT - EL 2543 - WEST SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED NOV. 19 THROUGH NOV. 29, 1984.
2. SIZE OF EXCAVATION: 21 FT DIAM.

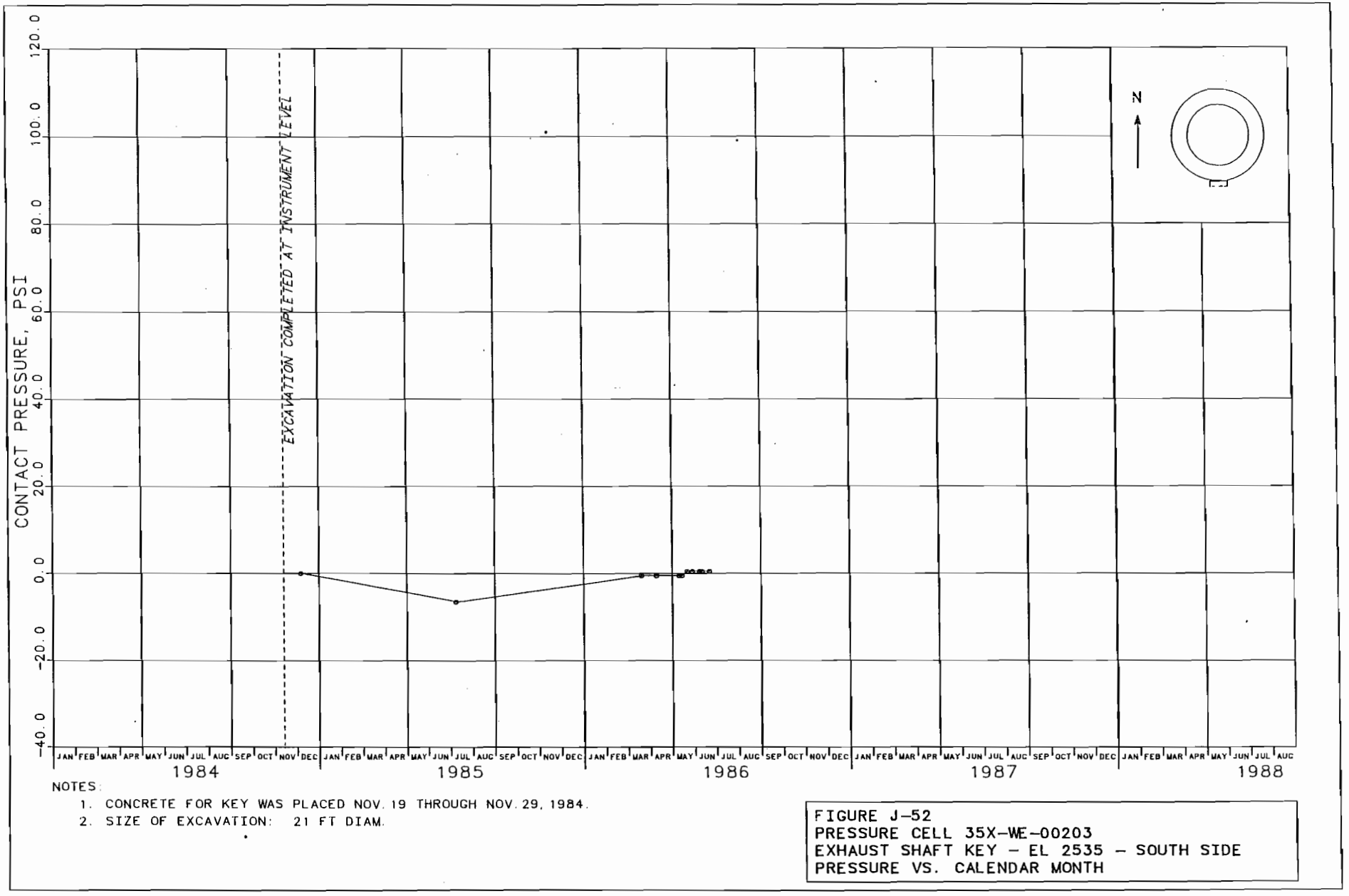
FIGURE J-50
PRESSURE CELL 35X-WE-00201
EXHAUST SHAFT KEY - EL 2535 - EAST SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED NOV. 19 THROUGH NOV. 29, 1984.
2. SIZE OF EXCAVATION: 21 FT DIAM.

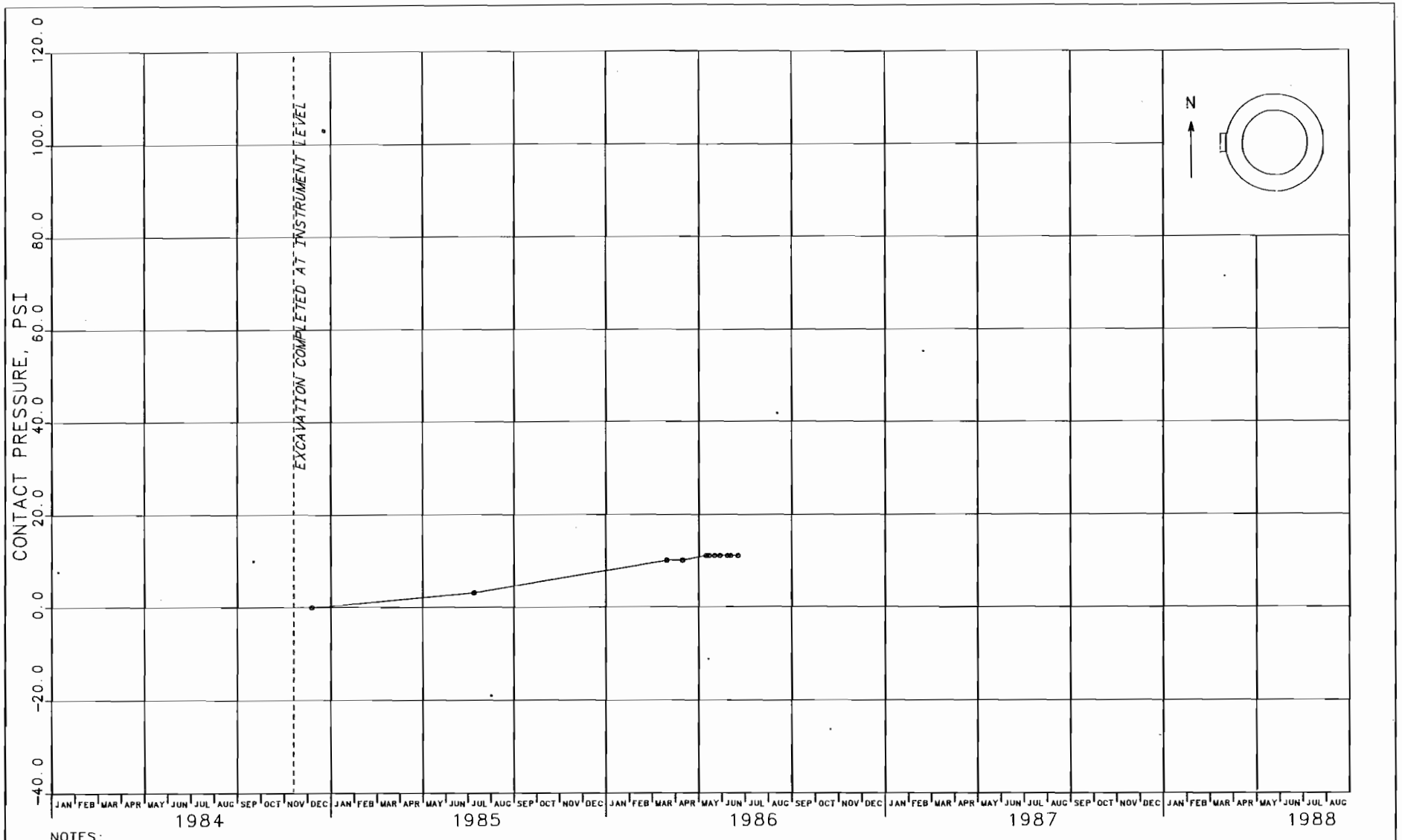
FIGURE J-51
PRESSURE CELL 35X-WE-00202
EXHAUST SHAFT KEY – EL 2535 – NORTH SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED NOV. 19 THROUGH NOV. 29, 1984.
2. SIZE OF EXCAVATION: 21 FT DIAM.

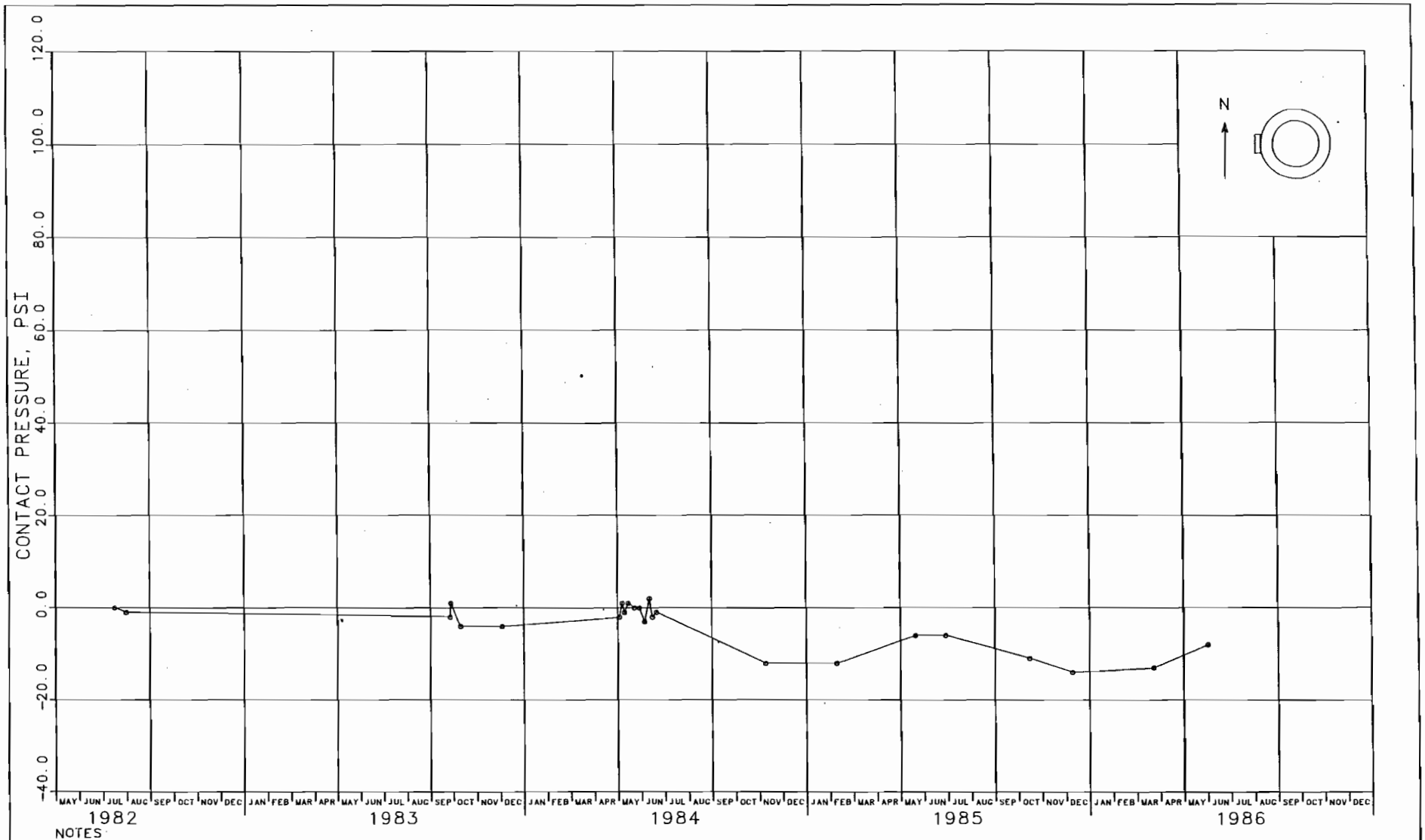
FIGURE J-52
PRESSURE CELL 35X-WE-00203
EXHAUST SHAFT KEY - EL 2535 - SOUTH SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED NOV. 19 THROUGH NOV. 29, 1984.
2. SIZE OF EXCAVATION: 21 FT DIAM.

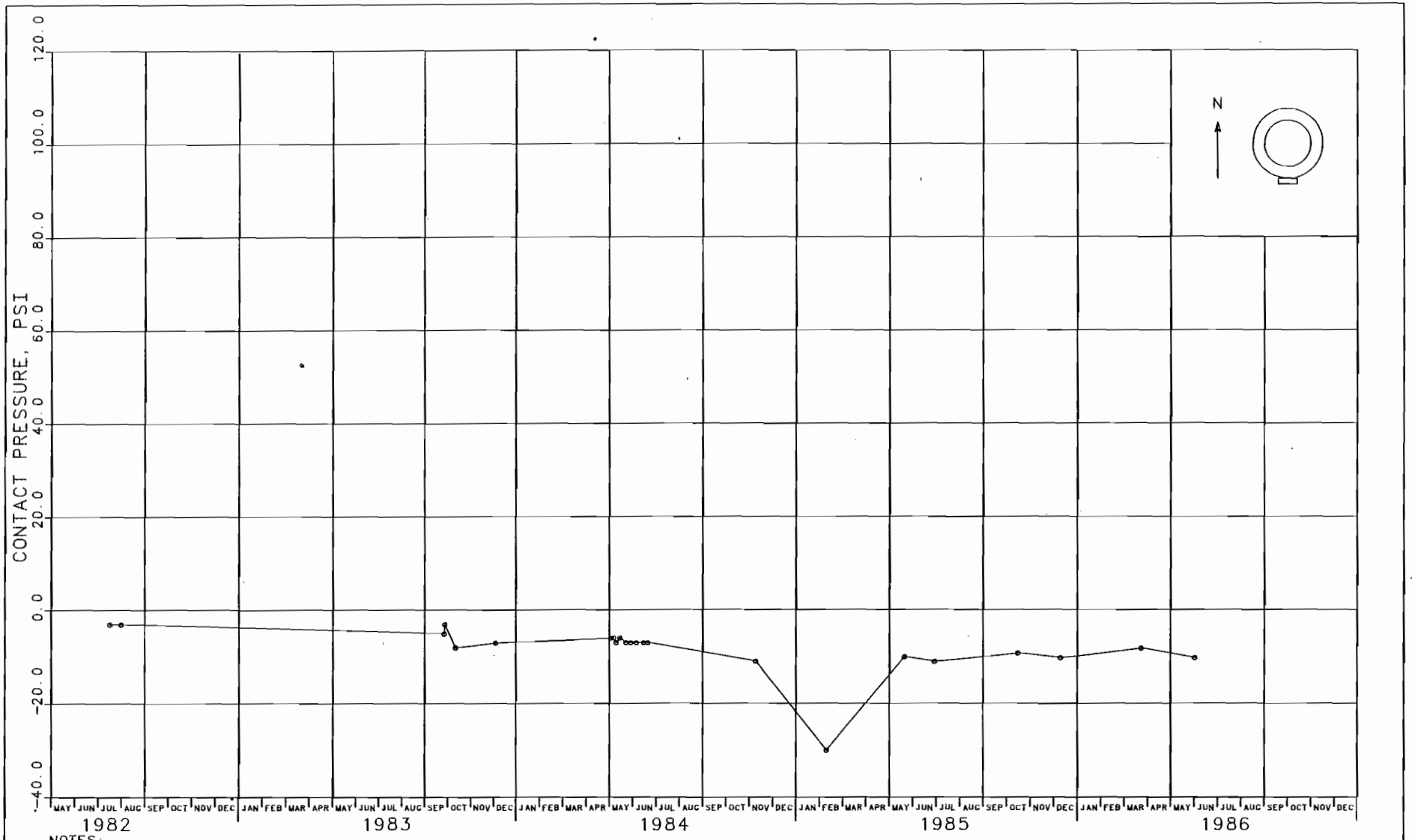
FIGURE J-53
PRESSURE CELL 35X-WE-00204
EXHAUST SHAFT KEY – EL 2535 – WEST SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. SIZE OF EXCAVATION: 15 FT DIAM.

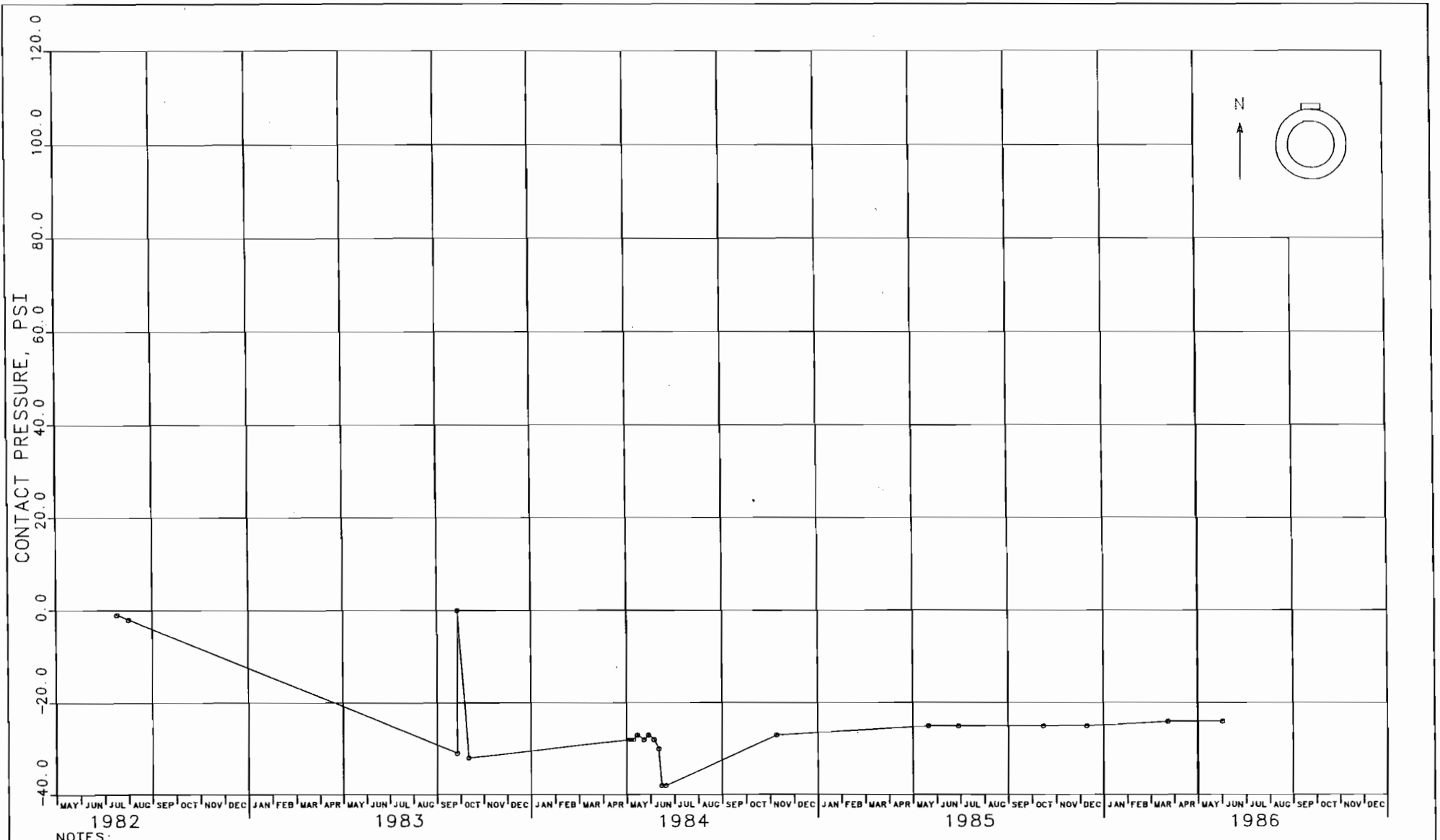
FIGURE J-54
PRESSURE CELL 37X-WE-00201
C & SH SHAFT KEY - EL 2550 - WEST SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. SIZE OF EXCAVATION: 15 FT DIAM.

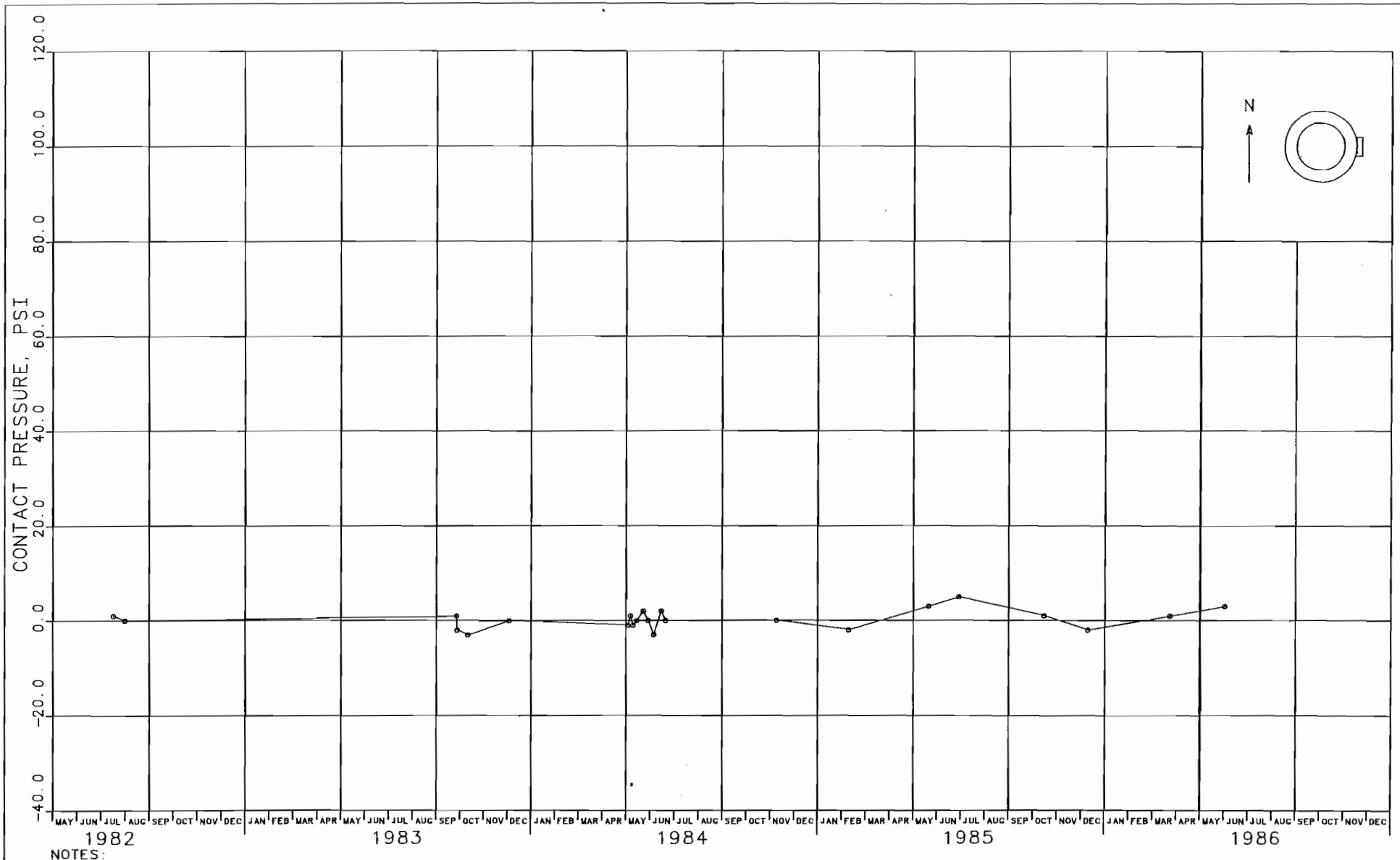
FIGURE J-55
PRESSURE CELL 37X-WE-00202
C & SH SHAFT KEY - EL 2550 - SOUTH SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. SIZE OF EXCAVATION: 15 FT DIAM.

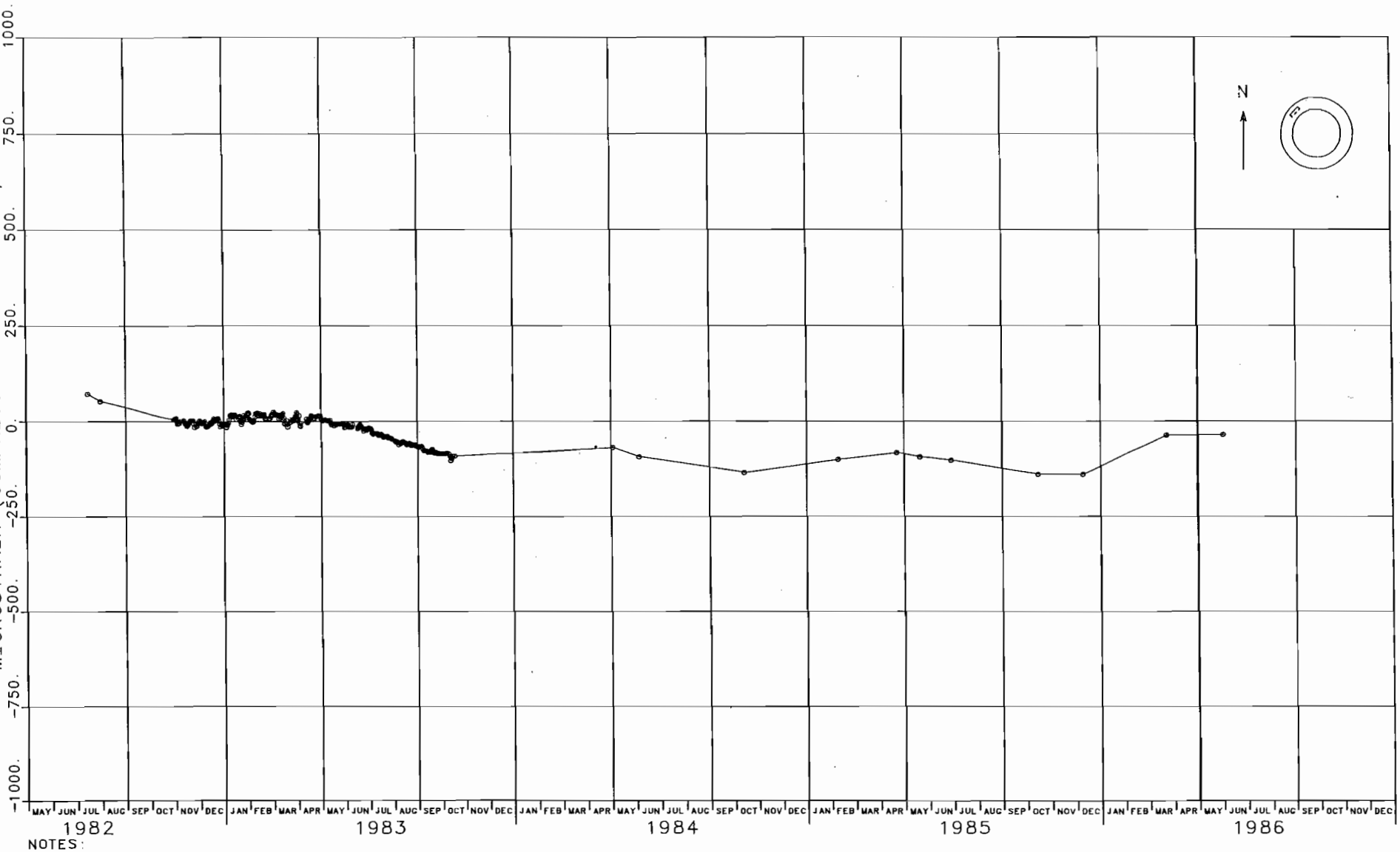
FIGURE J-56
PRESSURE CELL 37X-WE-00203
C & SH SHAFT KEY - EL 2550 - NORTH SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. SIZE OF EXCAVATION: 15 FT DIAM.

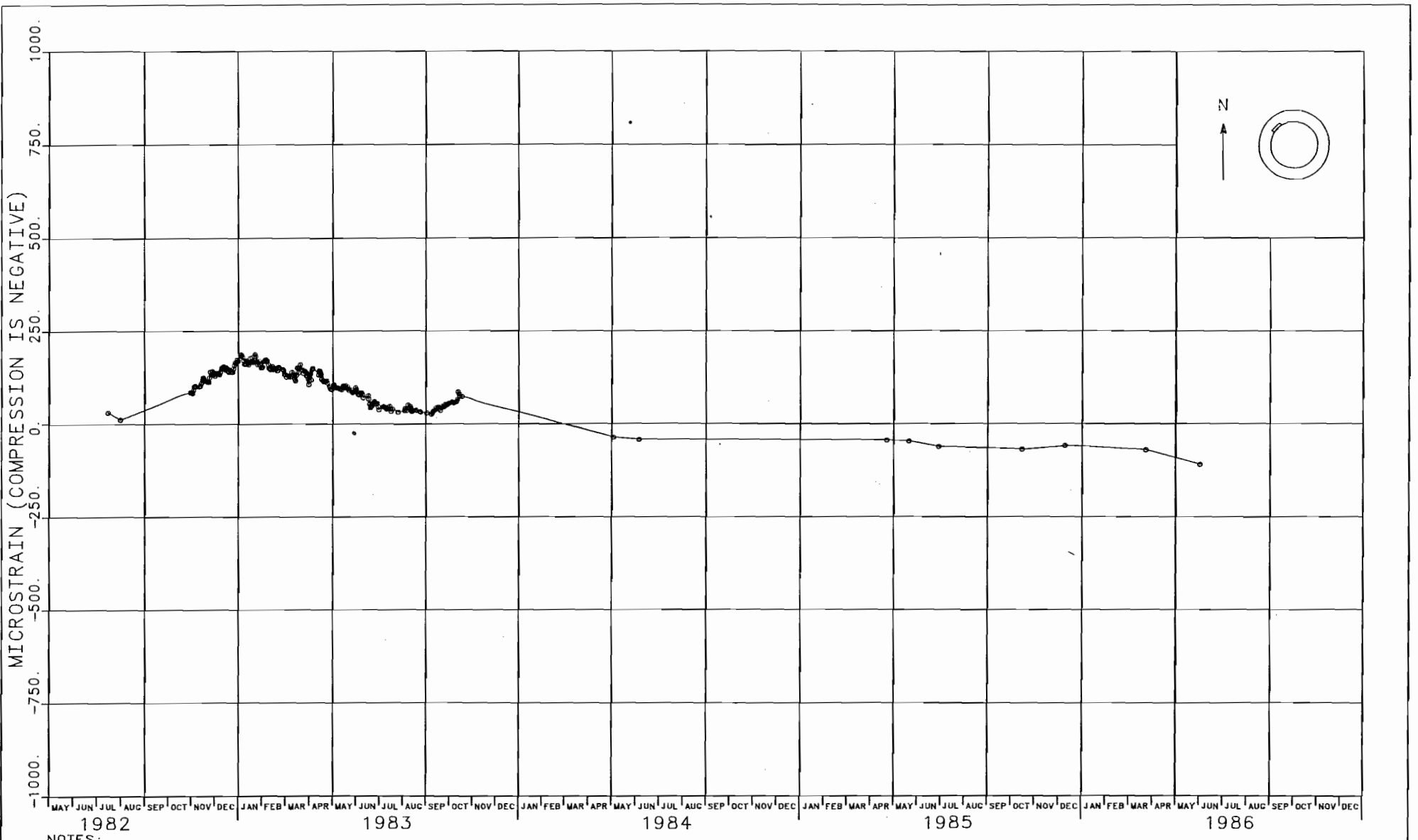
FIGURE J-57
PRESSURE CELL 37X-WE-00204
C & SH SHAFT KEY - EL 2550 - EAST SIDE
PRESSURE VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 15 IN. FROM INNER FACE ON NW SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

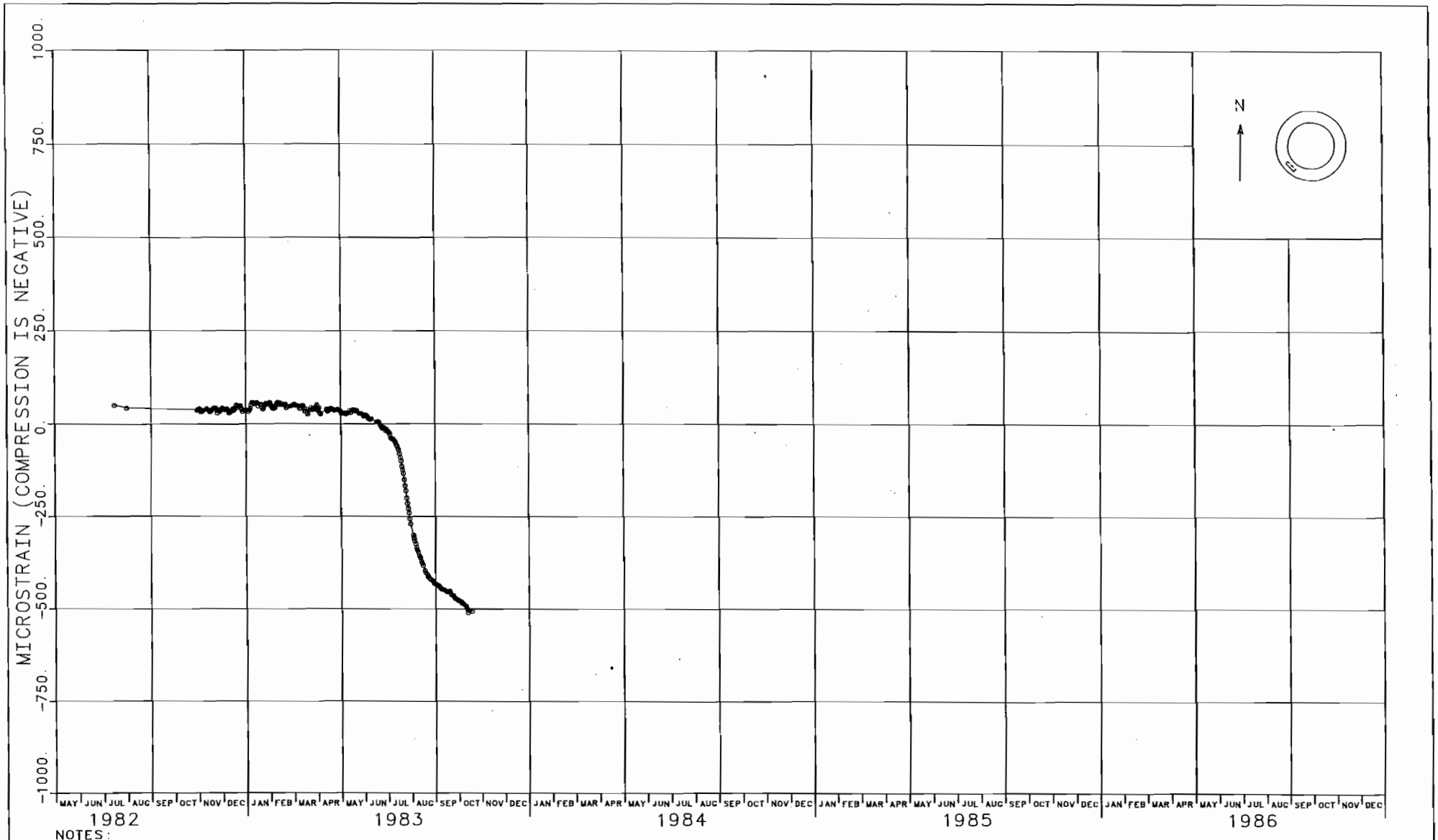
FIGURE J-58
WELDED STRAIN GAUGE 37X-ZE-00201
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3 IN. FROM INNER FACE ON NW SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

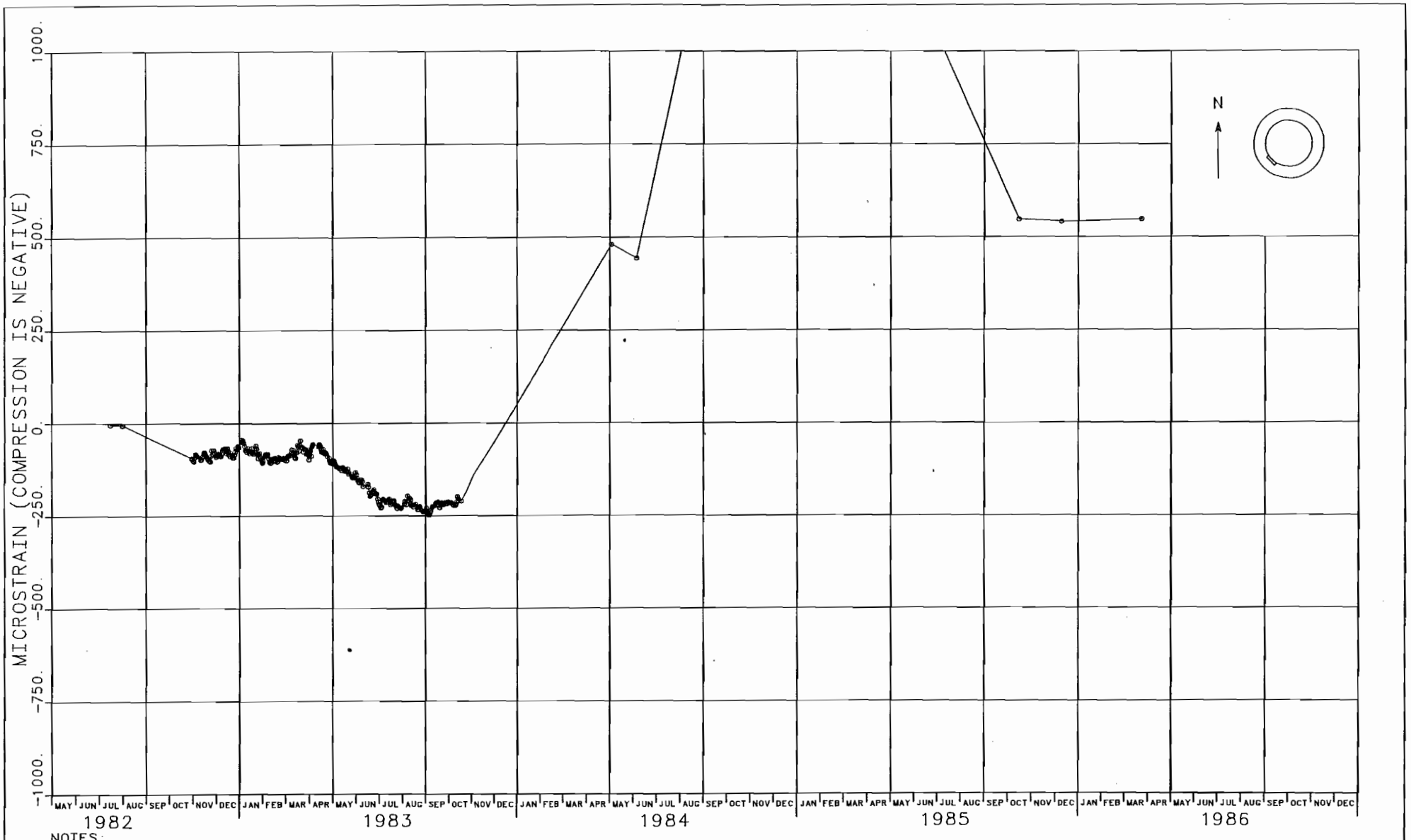
FIGURE J-59
WELDED STRAIN GAUGE 37X-ZE-00202
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 15 IN. FROM INNER FACE ON SW SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.
5. INSTRUMENT HAS PERMANENTLY FAILED.

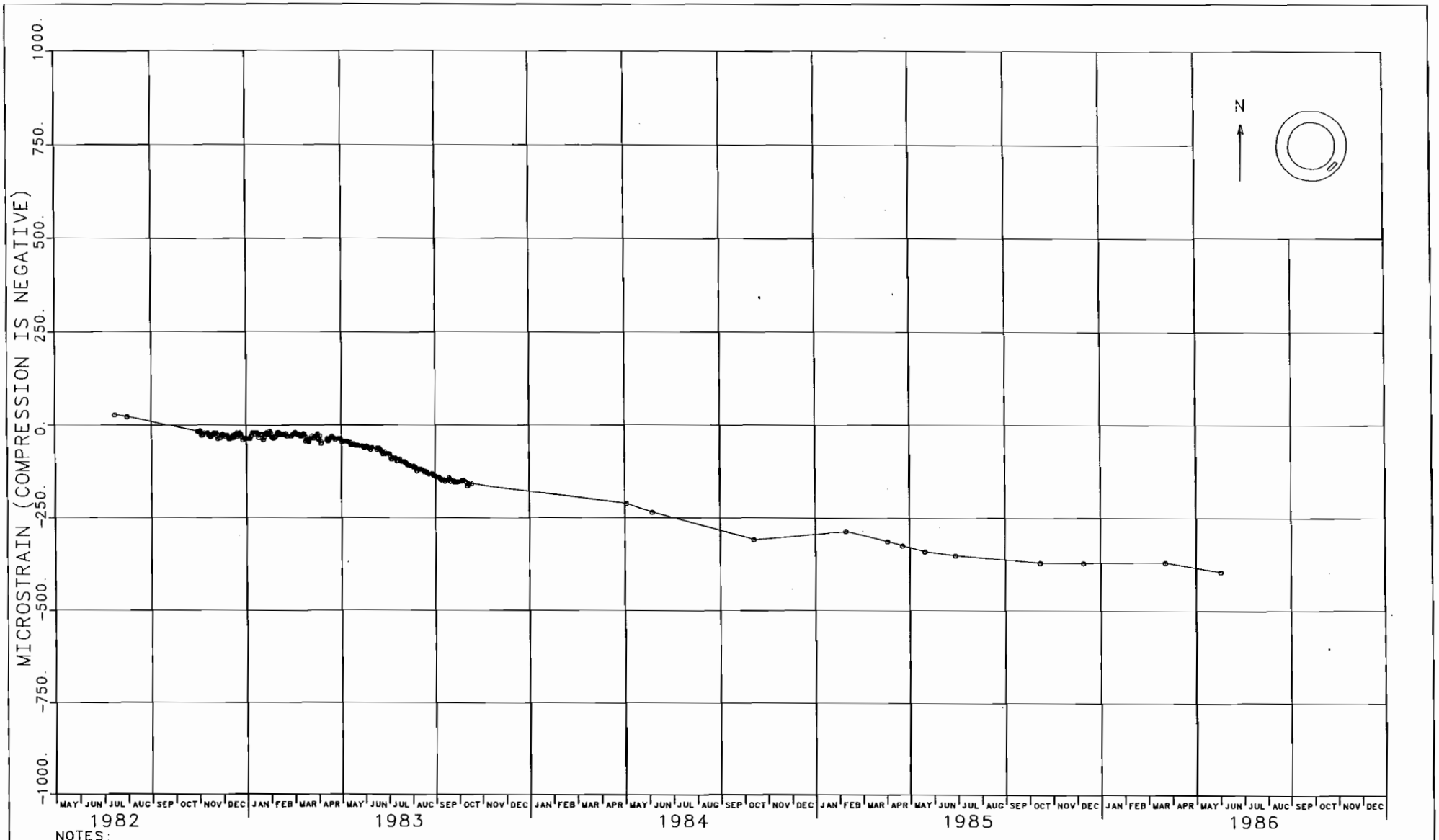
FIGURE J-60
WELDED STRAIN GAUGE 37X-ZE-00203
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3 IN. FROM INNER FACE ON SW SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.
5. INSTRUMENT IS CURRENTLY NOT FUNCTIONING.

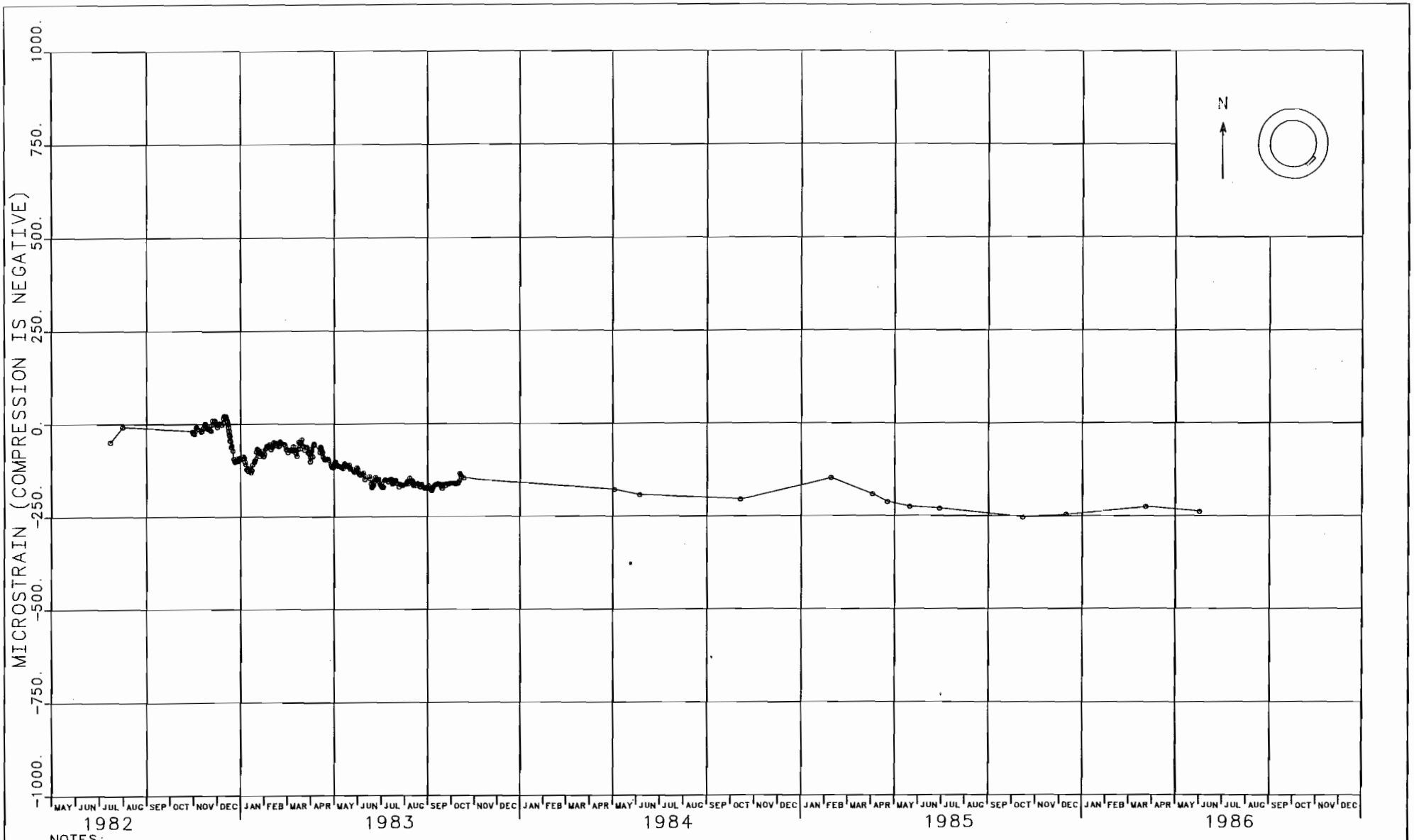
FIGURE J-61
WELDED STRAIN GAUGE 37X-ZE-00204
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 15 IN. FROM INNER FACE ON SE SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

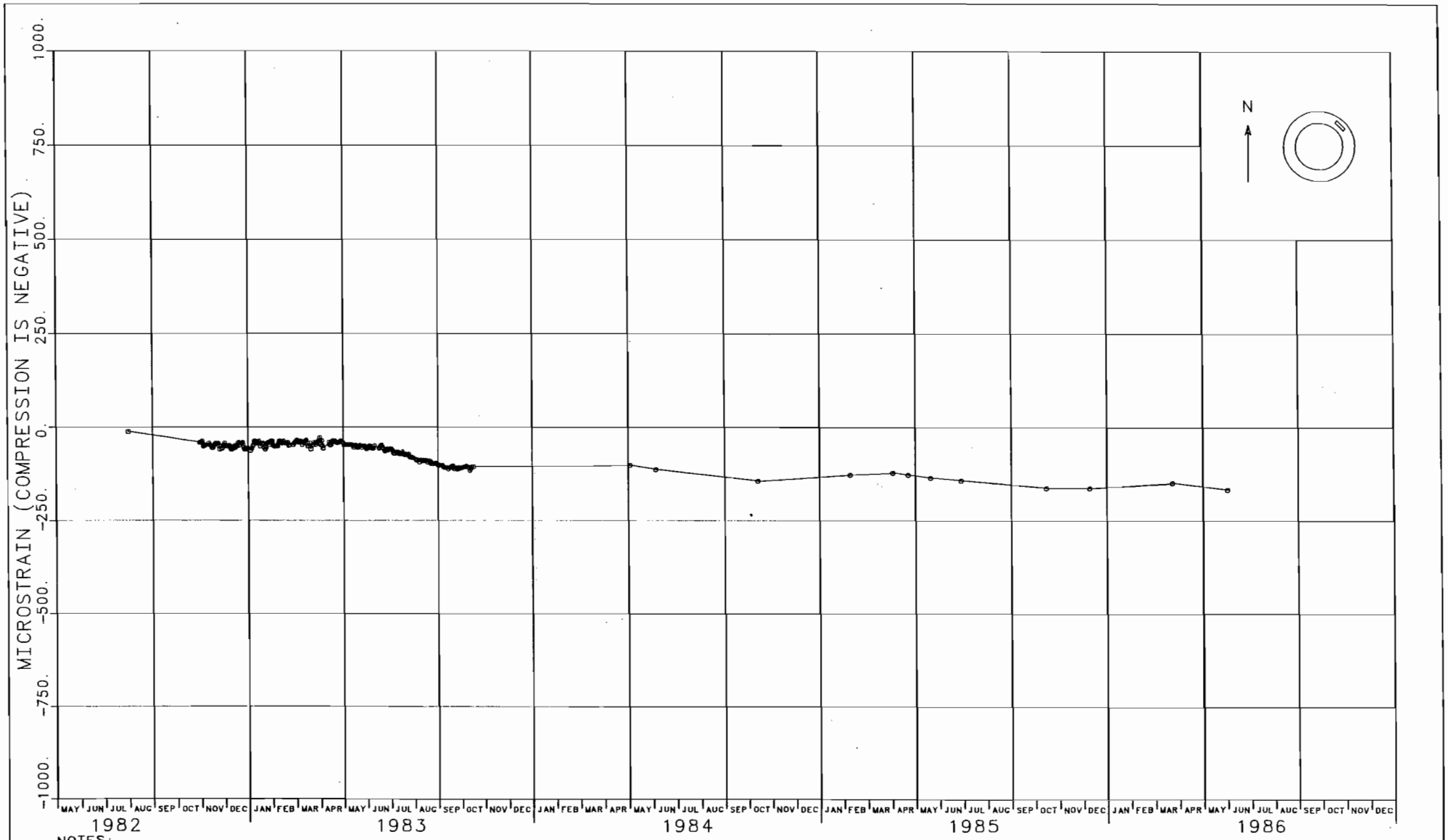
FIGURE J-62
WELDED STRAIN GAUGE 37X-ZE-00205
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3 IN. FROM INNER FACE ON SE SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

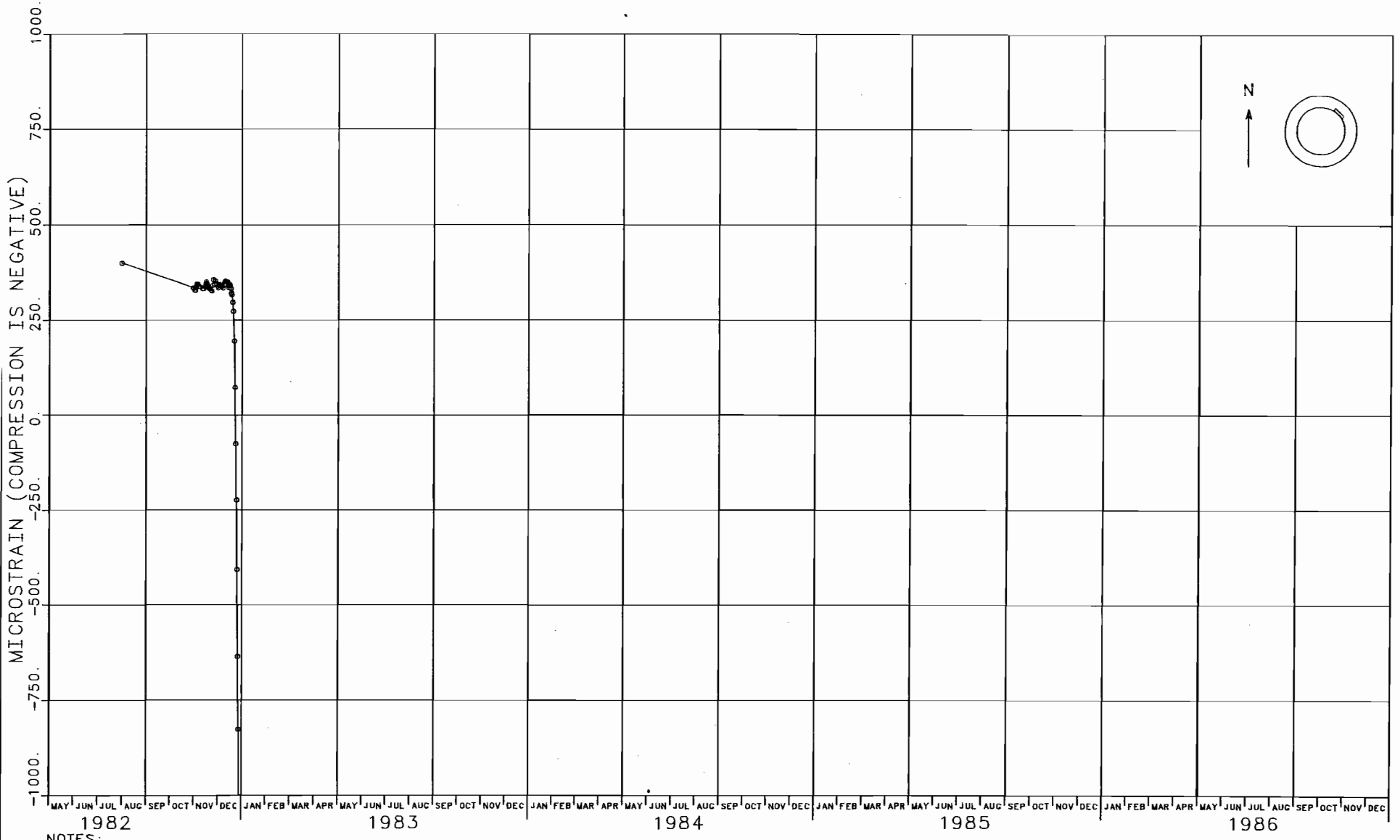
FIGURE J-63
WELDED STRAIN GAUGE 37X-ZE-00206
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 15 IN. FROM INNER FACE ON NE SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

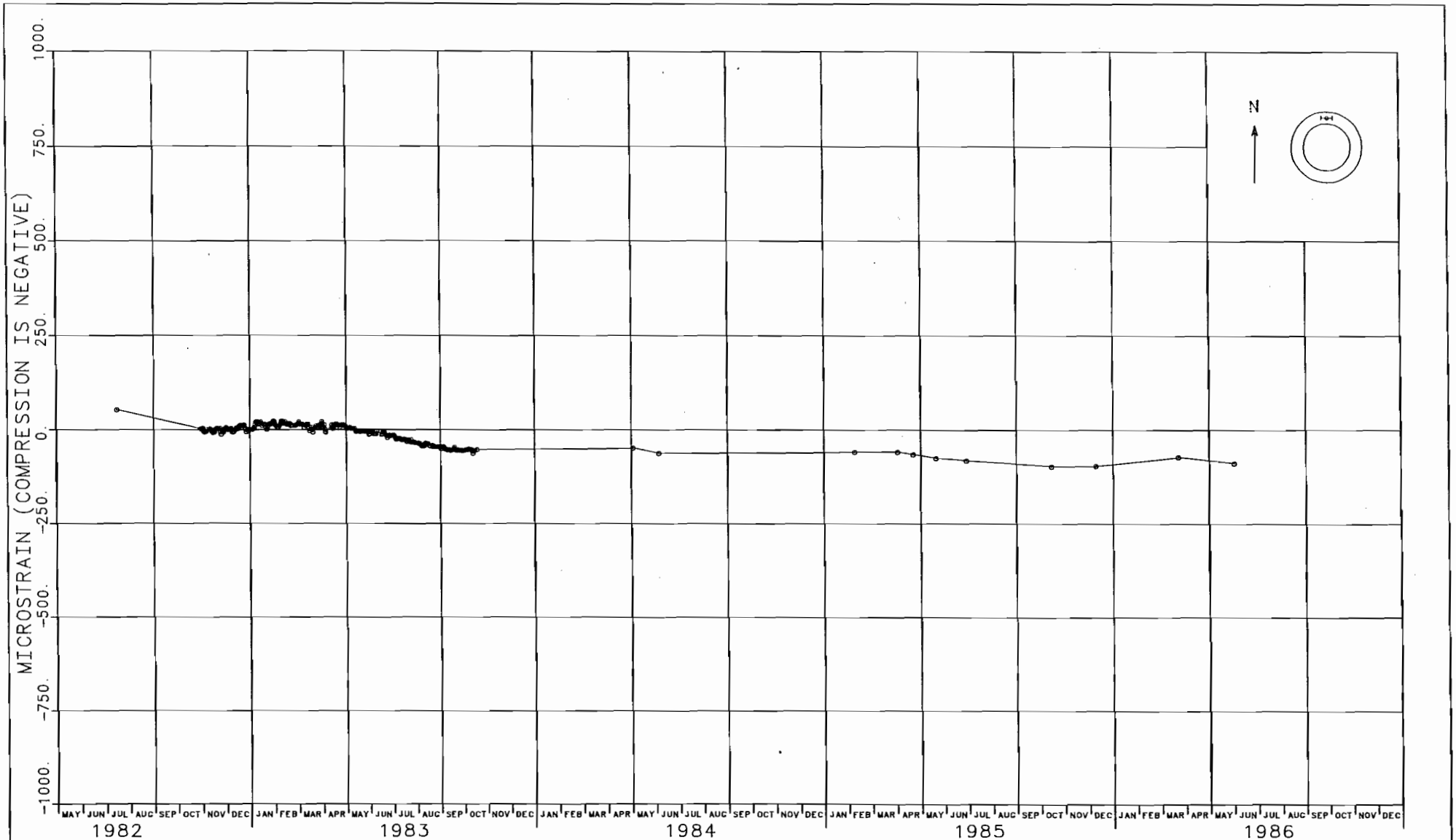
FIGURE J-64
WELDED STRAIN GAUGE 37X-ZE-00207
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3 IN. FROM INNER FACE ON NE SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.
5. INSTRUMENT HAS PERMANENTLY FAILED.

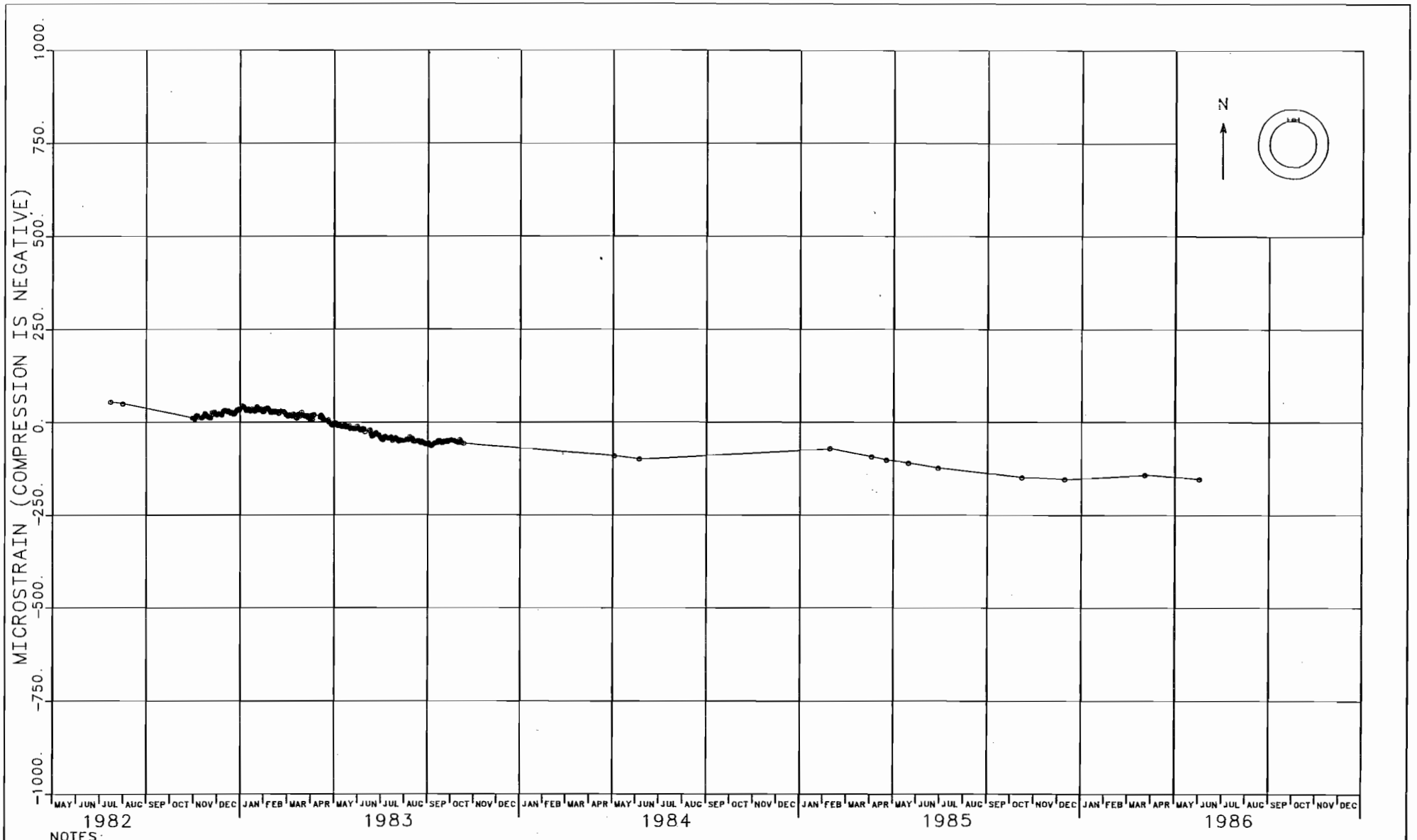
FIGURE J-65
WELDED STRAIN GAUGE 37X-ZE-00208
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 14.5 IN. FROM INNER FACE ON NORTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

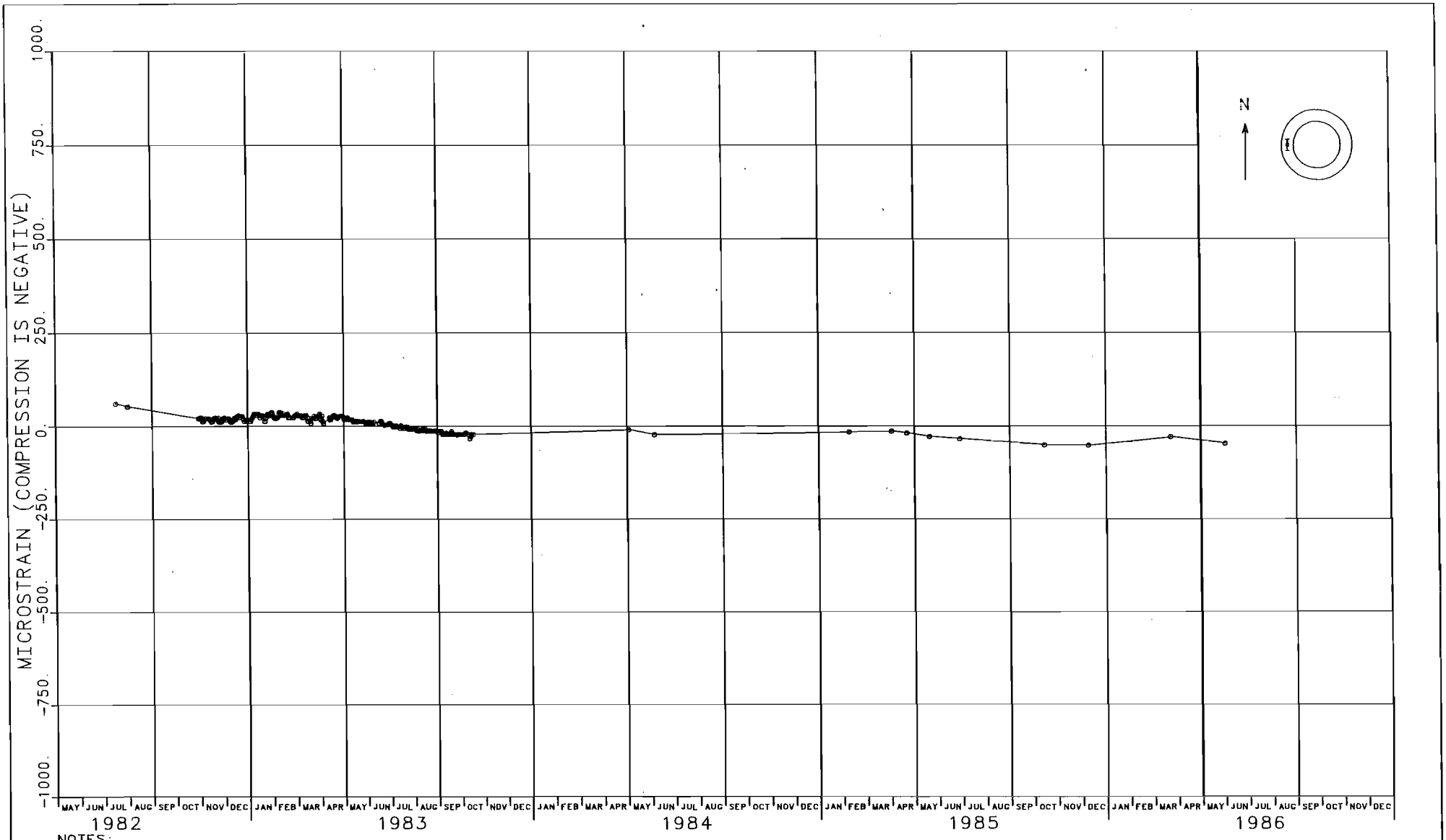
FIGURE J-66
EMBEDMENT STRAIN GAUGE 37X-ZE-00209
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3.5 IN. FROM INNER FACE ON NORTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

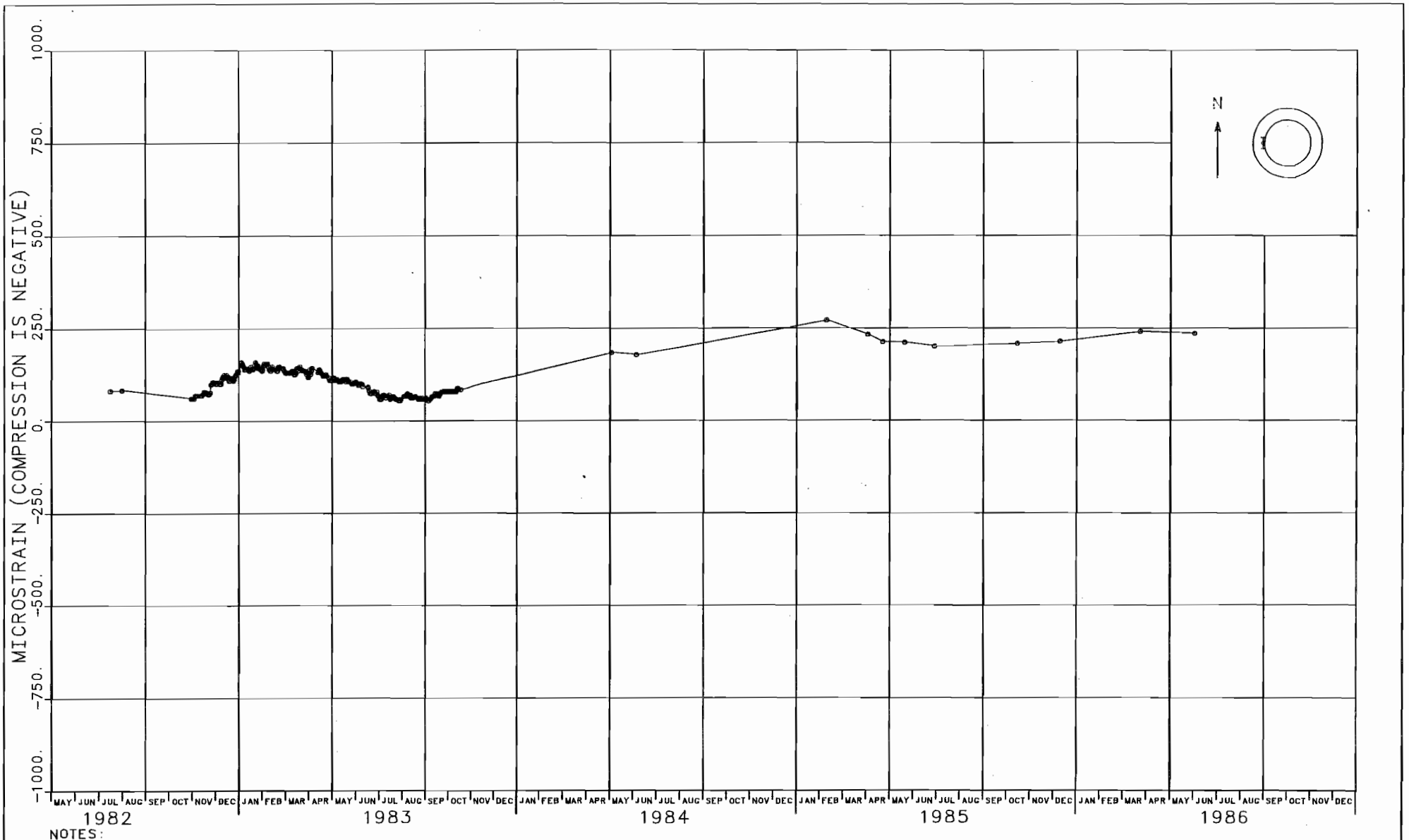
FIGURE J-67
EMBEDMENT STRAIN GAUGE 37X-ZE-00210
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 14.5 IN. FROM INNER FACE ON WEST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

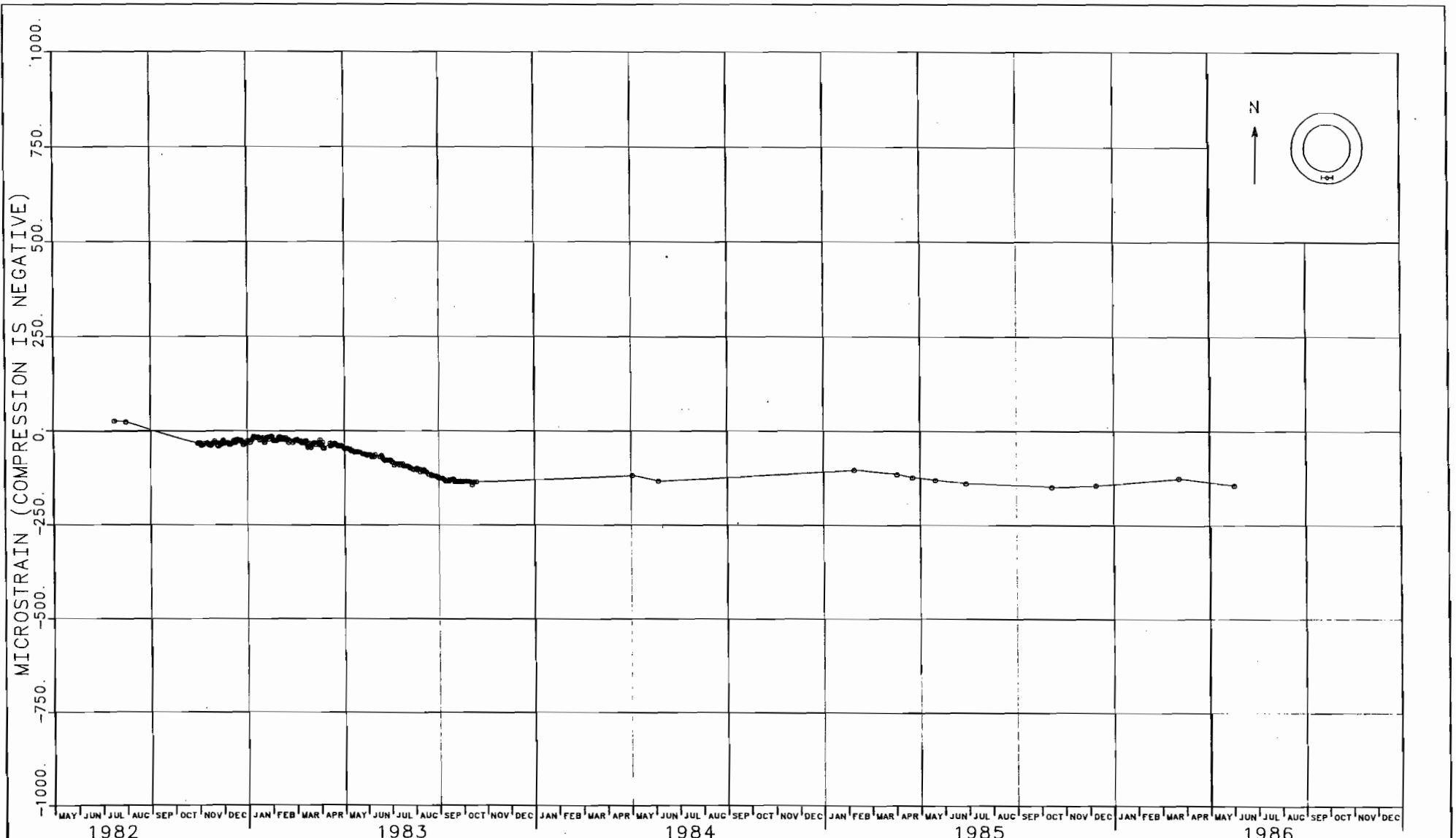
FIGURE J-68
EMBEDMENT STRAIN GAUGE 37X-ZE-00211
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3.5 IN. FROM INNER FACE ON WEST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

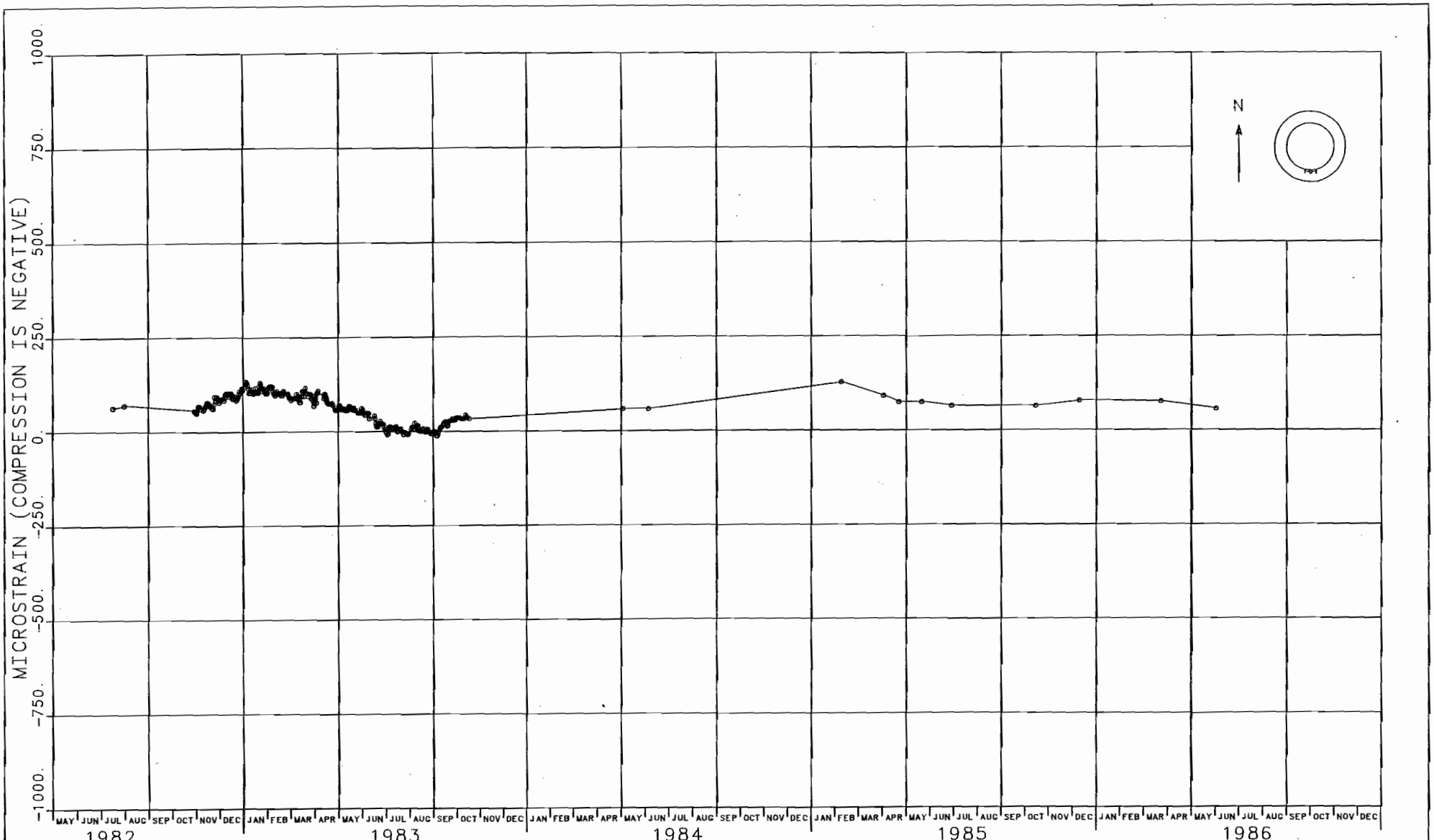
FIGURE J-69
EMBEDMENT STRAIN GAUGE 37X-ZE-00212
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 14.5 IN. FROM INNER FACE ON SOUTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

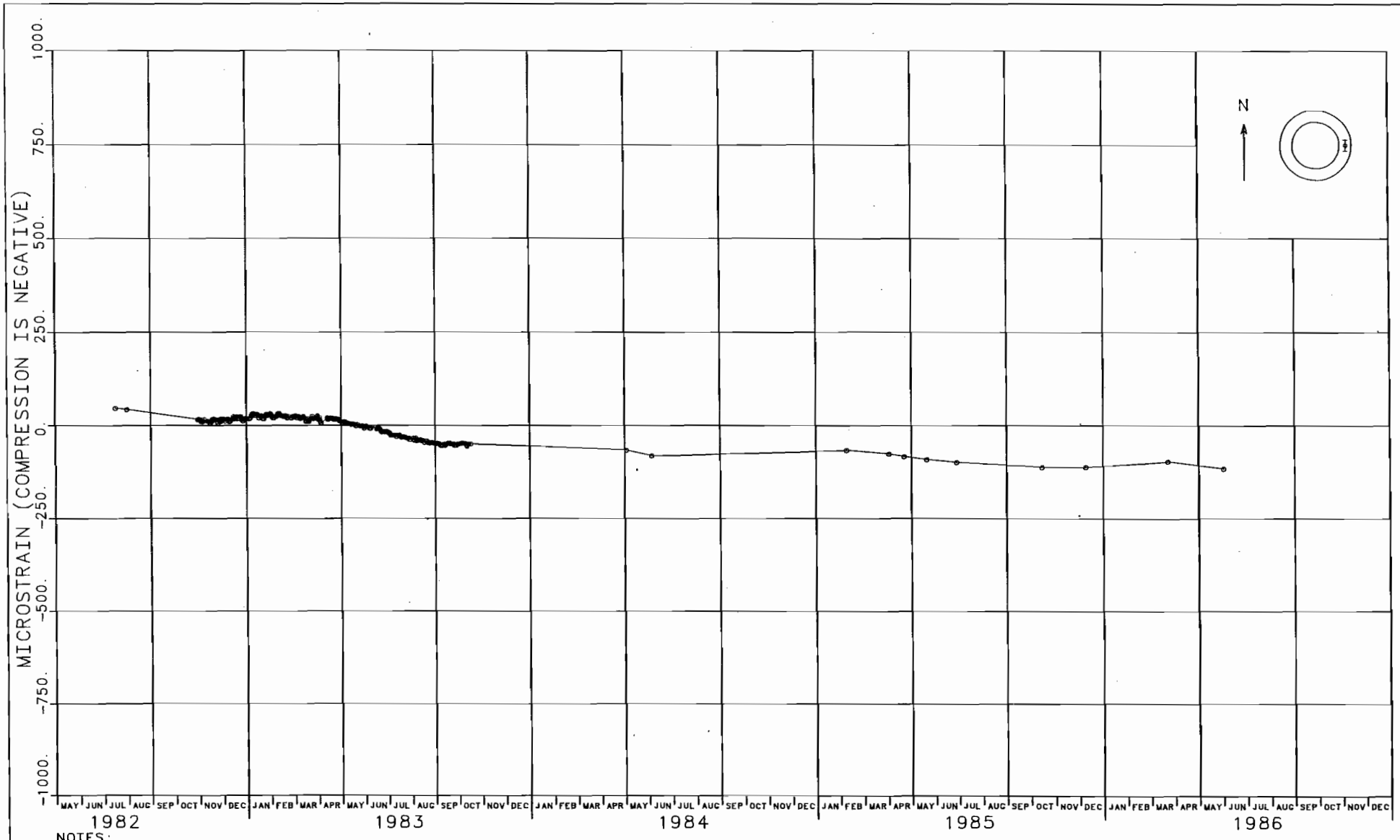
FIGURE J-70
EMBEDMENT STRAIN GAUGE 37X-ZE-00213
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3.5 IN. FROM INNER FACE ON SOUTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

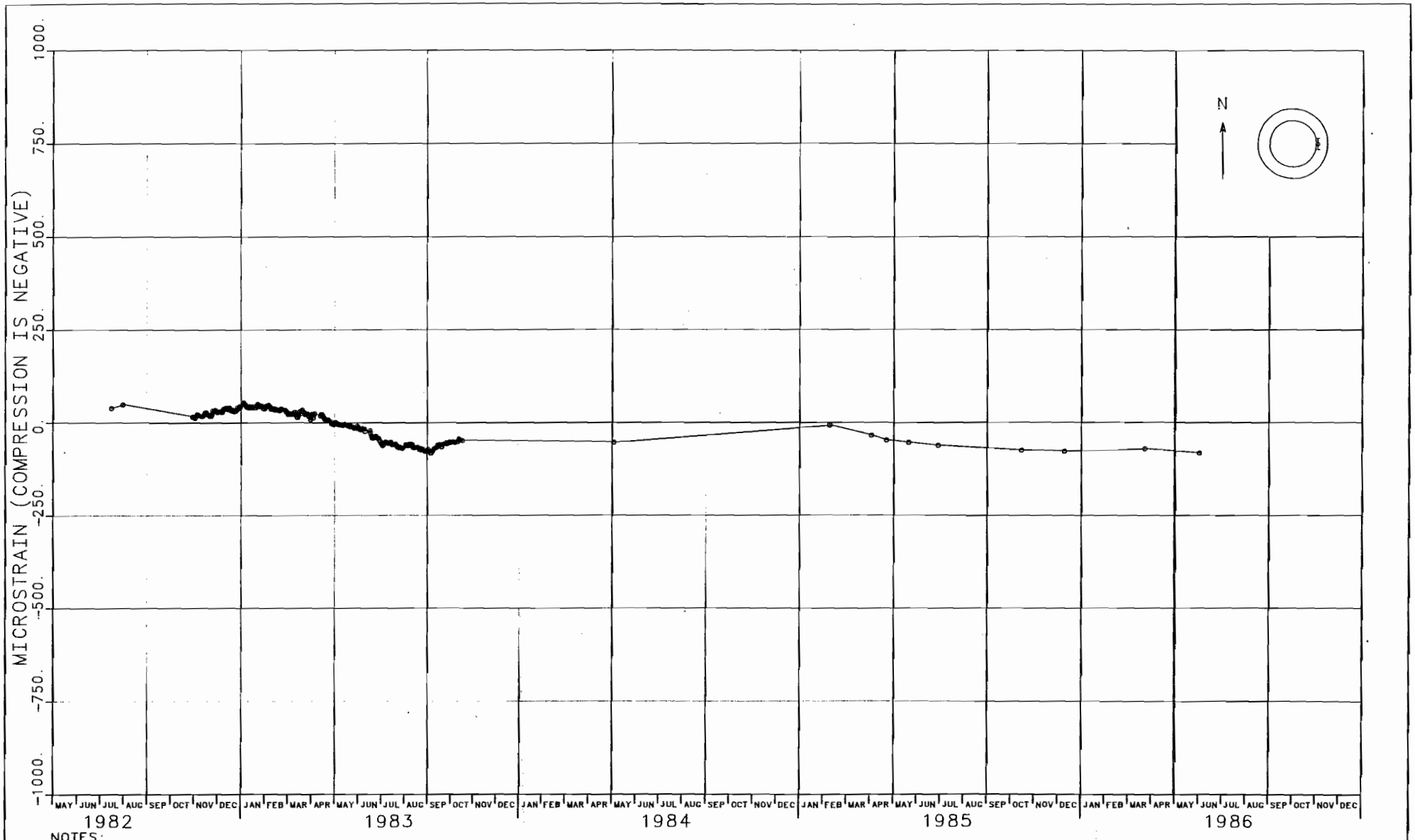
FIGURE J-71
EMBEDMENT STRAIN GAUGE 37X-ZE-00214
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 14.5 IN. FROM INNER FACE ON EAST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

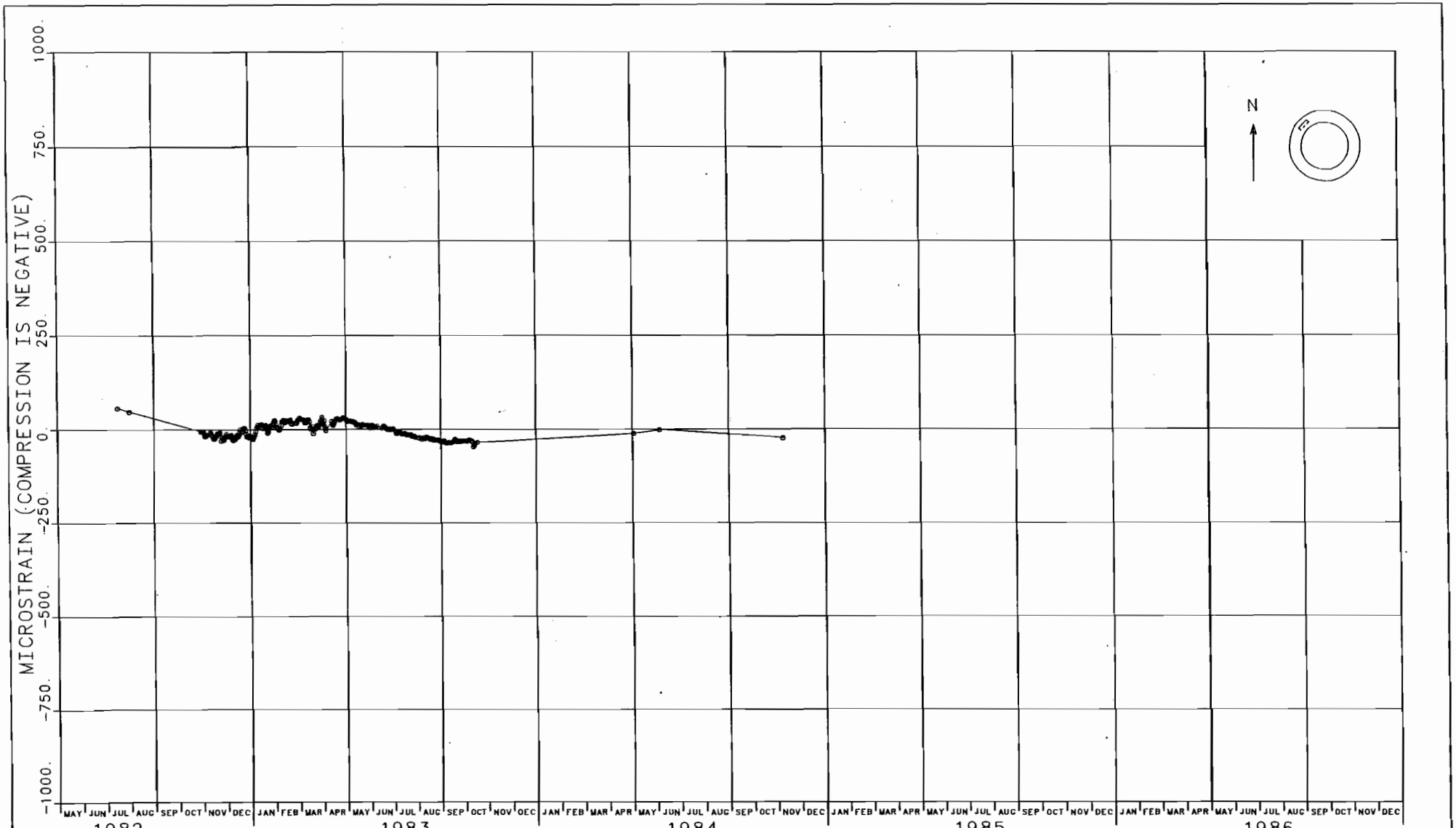
FIGURE J-72
EMBEDMENT STRAIN GAUGE 37X-ZE-00215
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3.5 IN. FROM INNER FACE ON EAST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

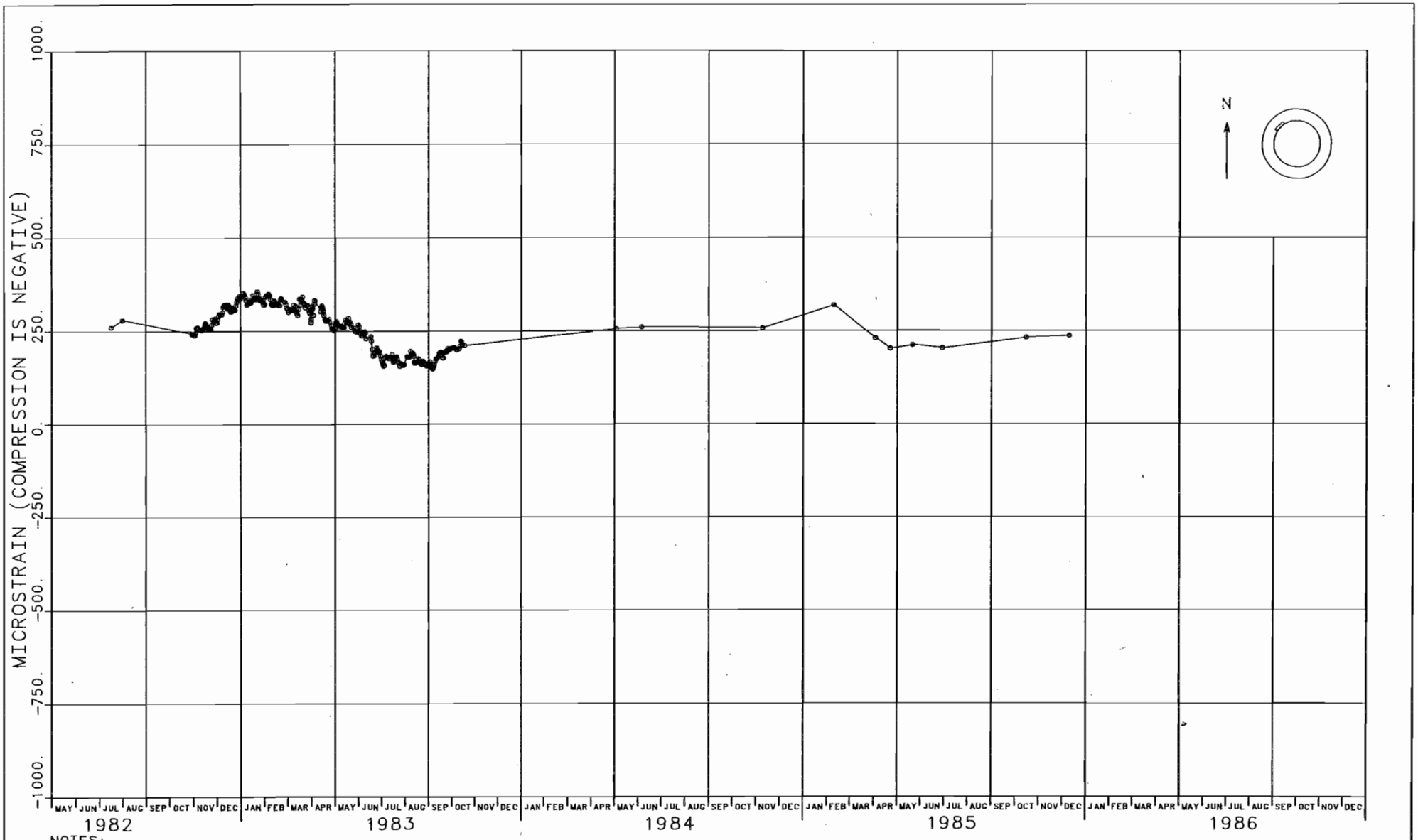
FIGURE J-73
EMBEDMENT STRAIN GAUGE 37X-ZE-00216
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 15 IN. FROM INNER FACE ON NW SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.
5. INSTRUMENT IS CURRENTLY NOT FUNCTIONING.

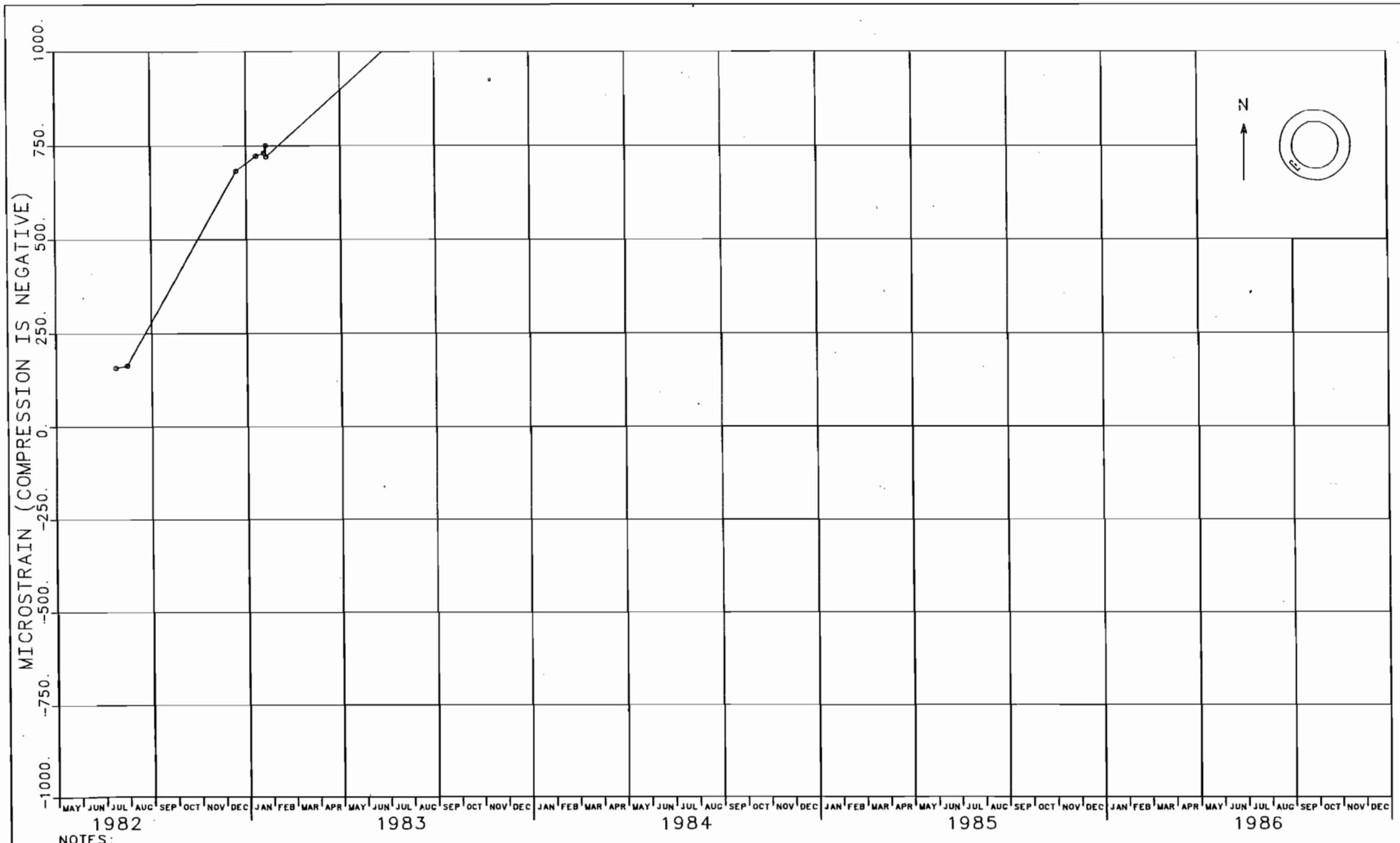
FIGURE J-74
WELDED STRAIN GAUGE 37X-ZE-00217
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3 IN. FROM INNER FACE ON NW SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.
5. INSTRUMENT IS CURRENTLY NOT FUNCTIONING.

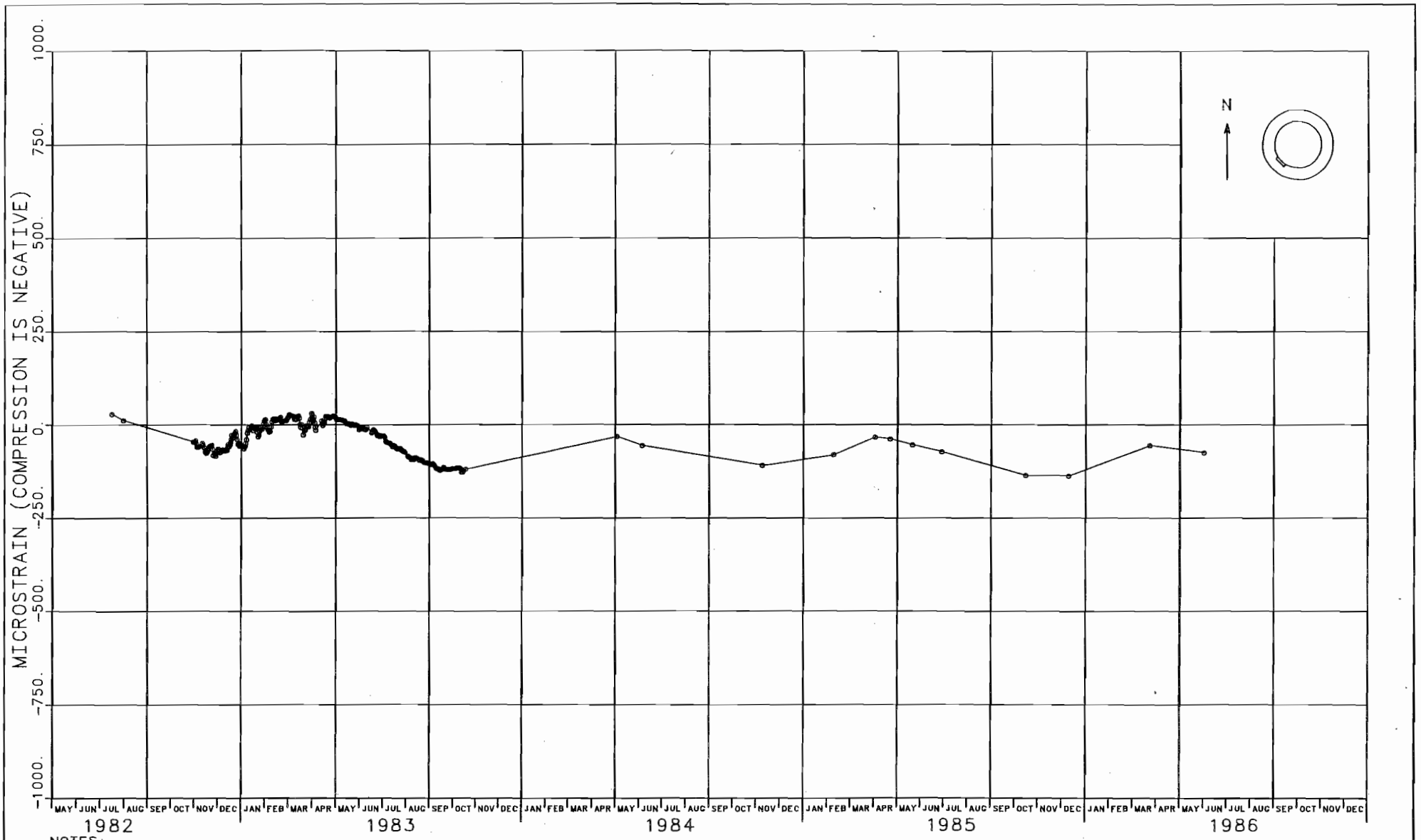
FIGURE J-75
WELDED STRAIN GAUGE 37X-ZE-00218
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 15 IN. FROM INNER FACE ON SW SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.
5. INSTRUMENT HAS PERMANENTLY FAILED.

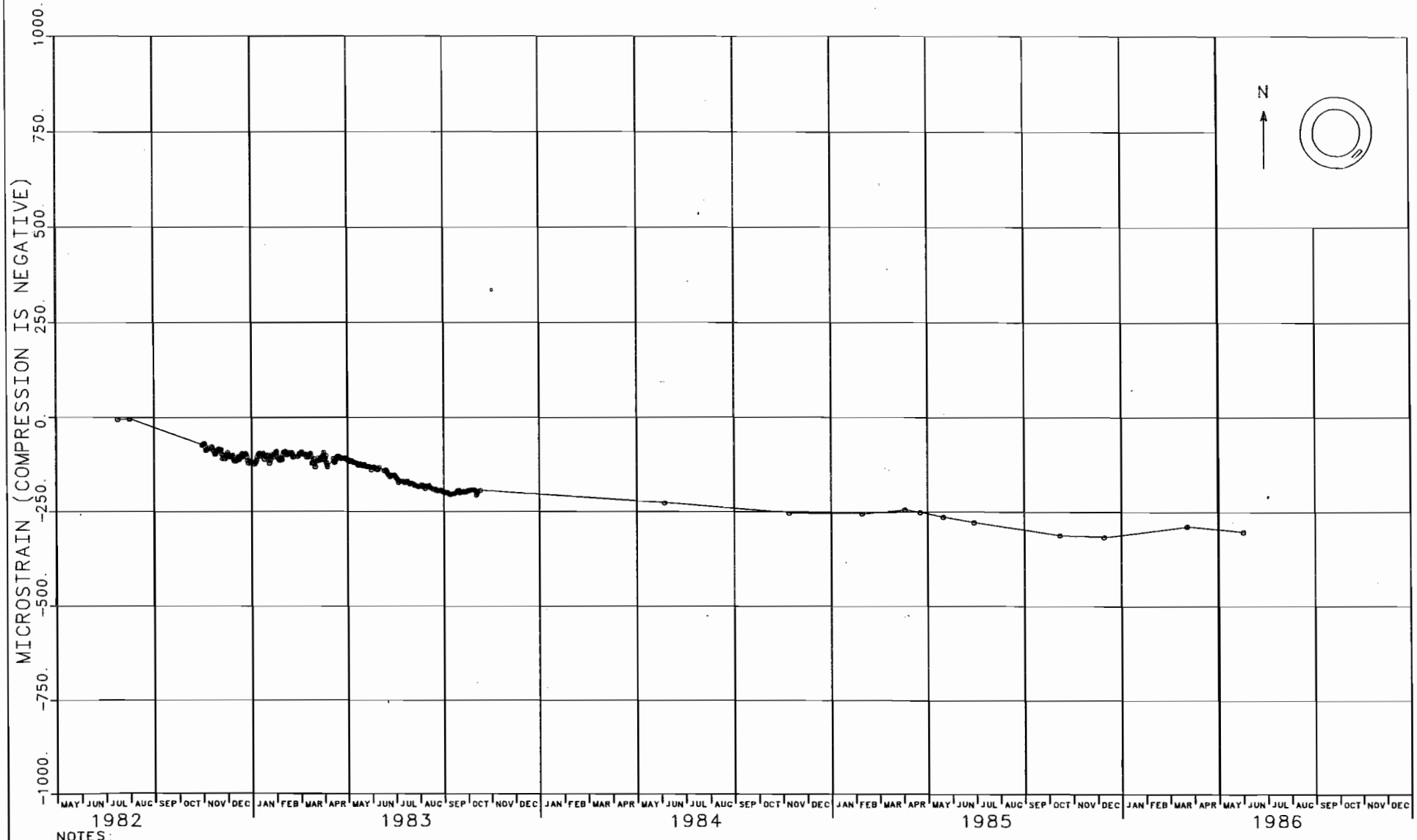
FIGURE J-76
WELDED STRAIN GAUGE 37X-ZE-00219
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3 IN. FROM INNER FACE ON SW SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

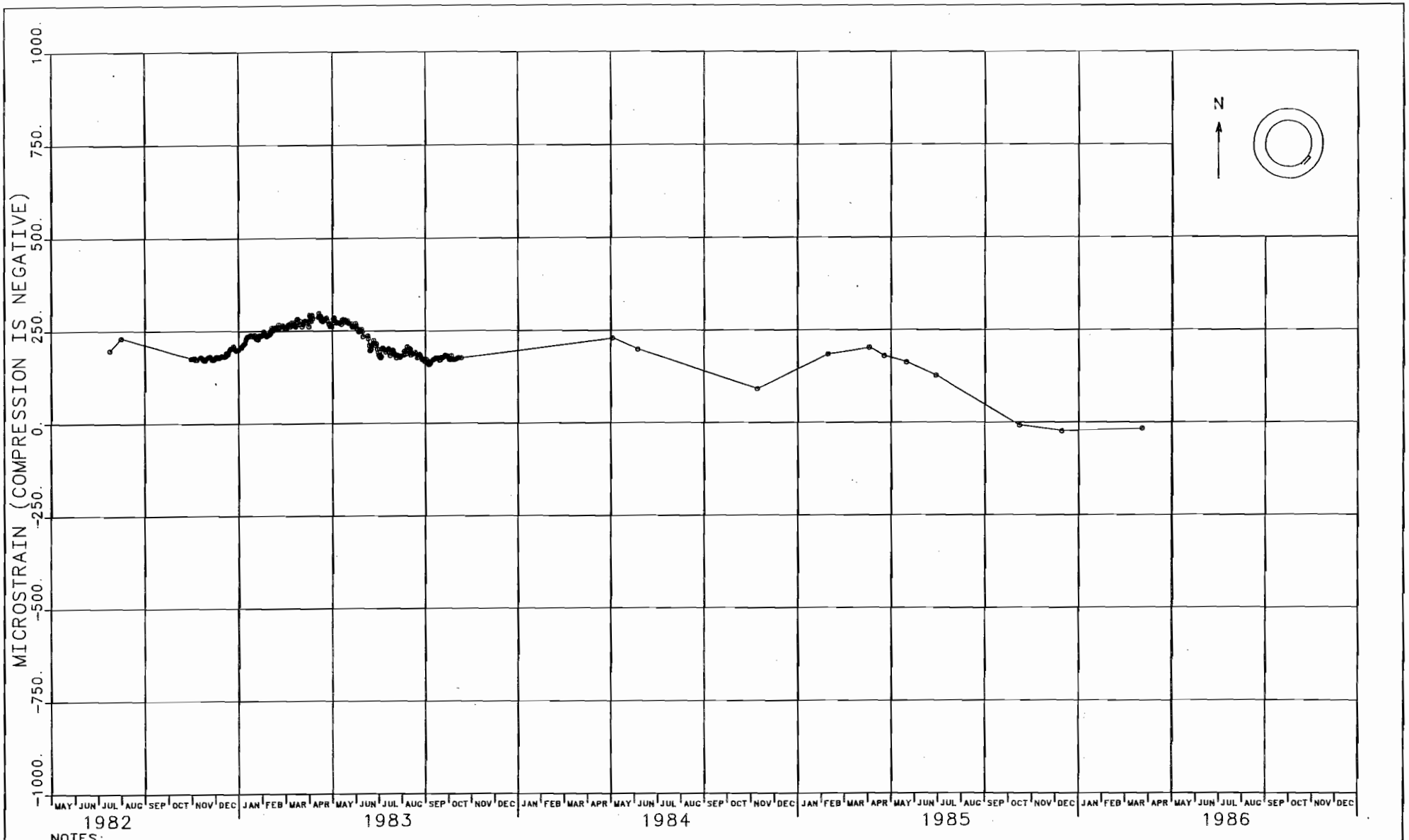
FIGURE J-77
WELDED STRAIN GAUGE 37X-ZE-00220
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 15 IN. FROM INNER FACE ON SE SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

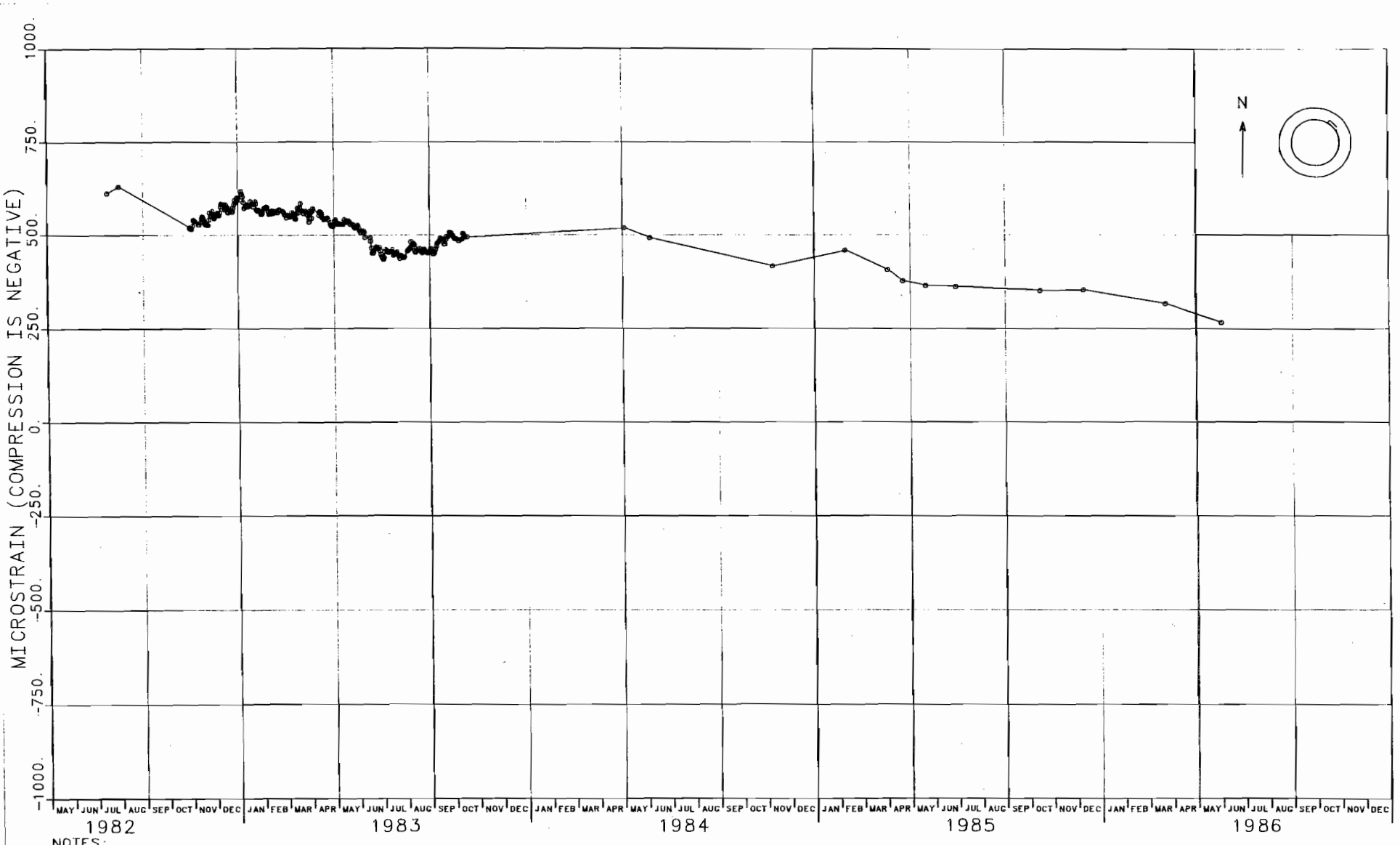
FIGURE J-78
WELDED STRAIN GAUGE 37X-ZE-00221
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3 IN. FROM INNER FACE ON SE SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.
5. INSTRUMENT IS CURRENTLY NOT FUNCTIONING.

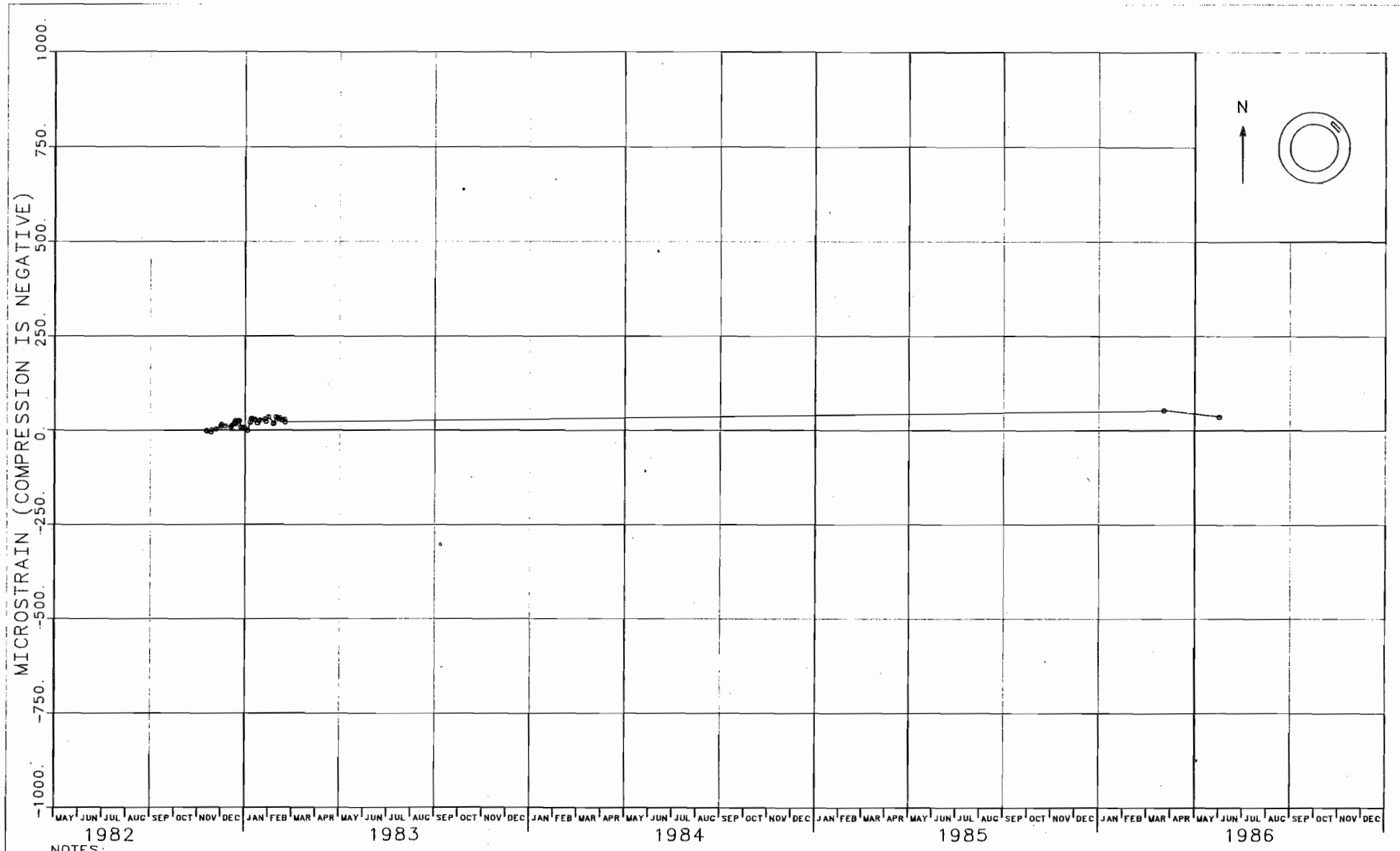
FIGURE J-79
WELDED STRAIN GAUGE 37X-ZE-00222
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3 IN. FROM INNER FACE ON NE SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

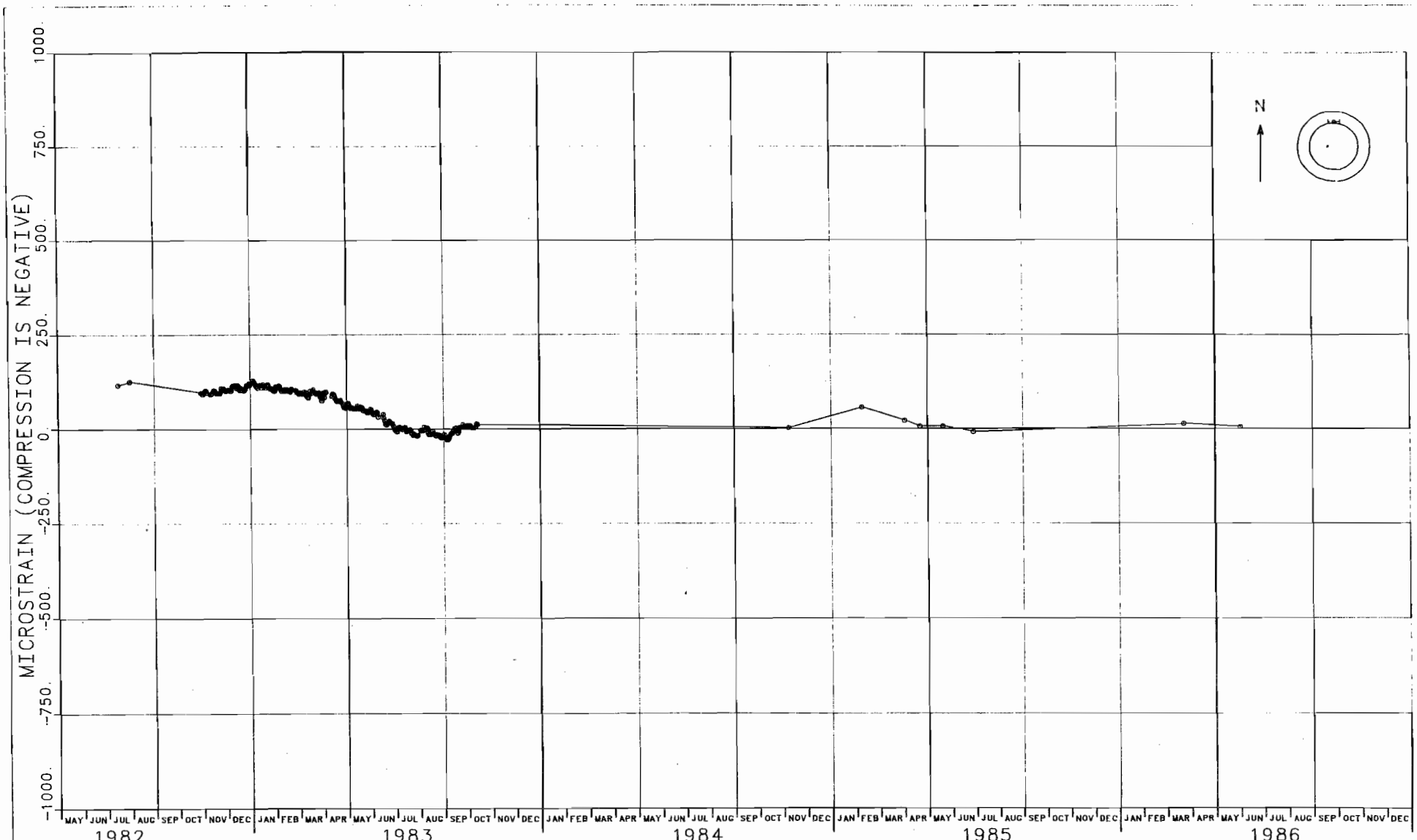
FIGURE J-81
WELDED STRAIN GAUGE 37X-ZE-00224
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON NOV. 11, 1982.
3. GAUGE IS LOCATED 15 IN. FROM INNER FACE ON NE SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

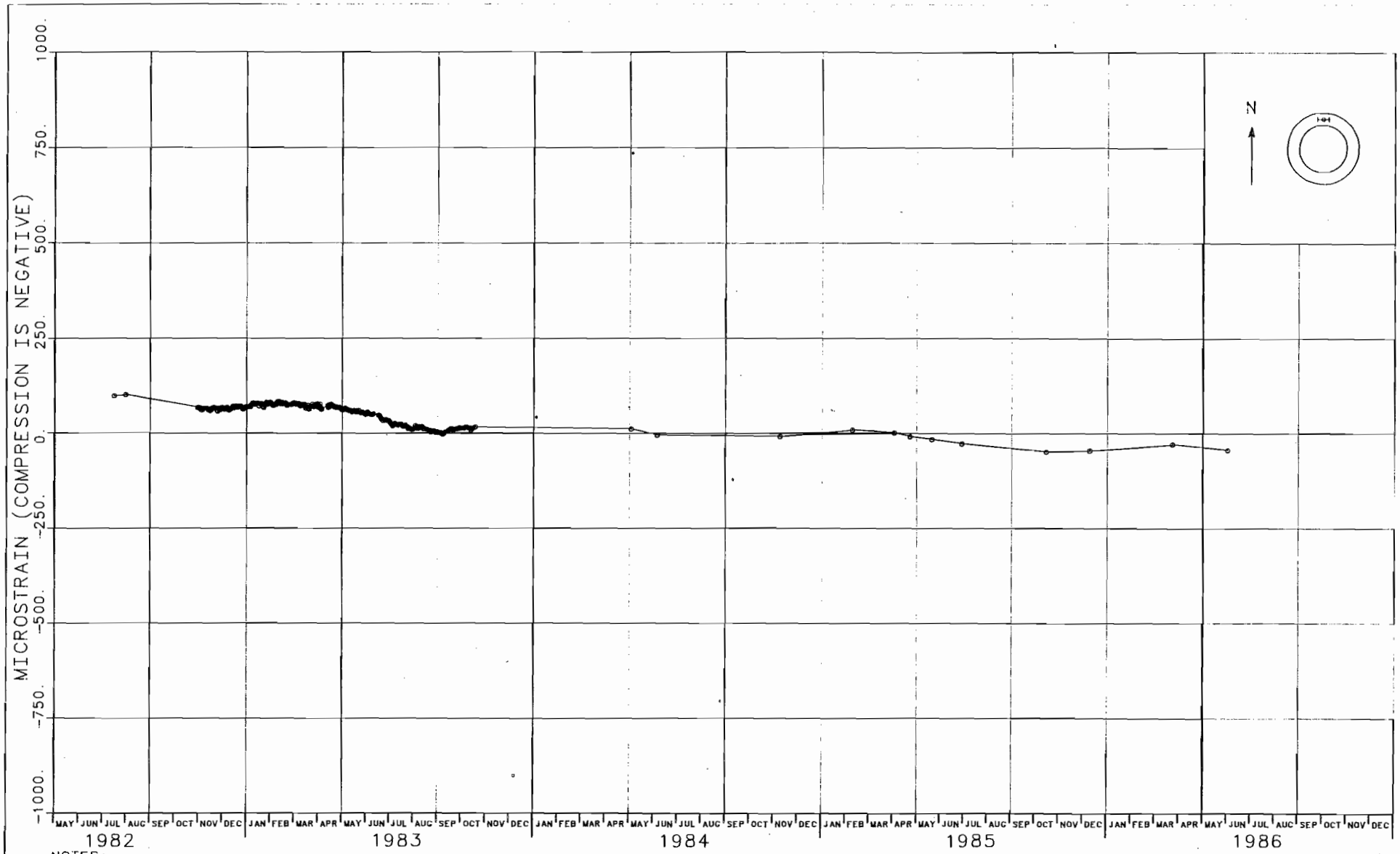
FIGURE J-80
WELDED STRAIN GAUGE 37X-ZE-00223
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3.5 IN. FROM INNER FACE ON NORTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

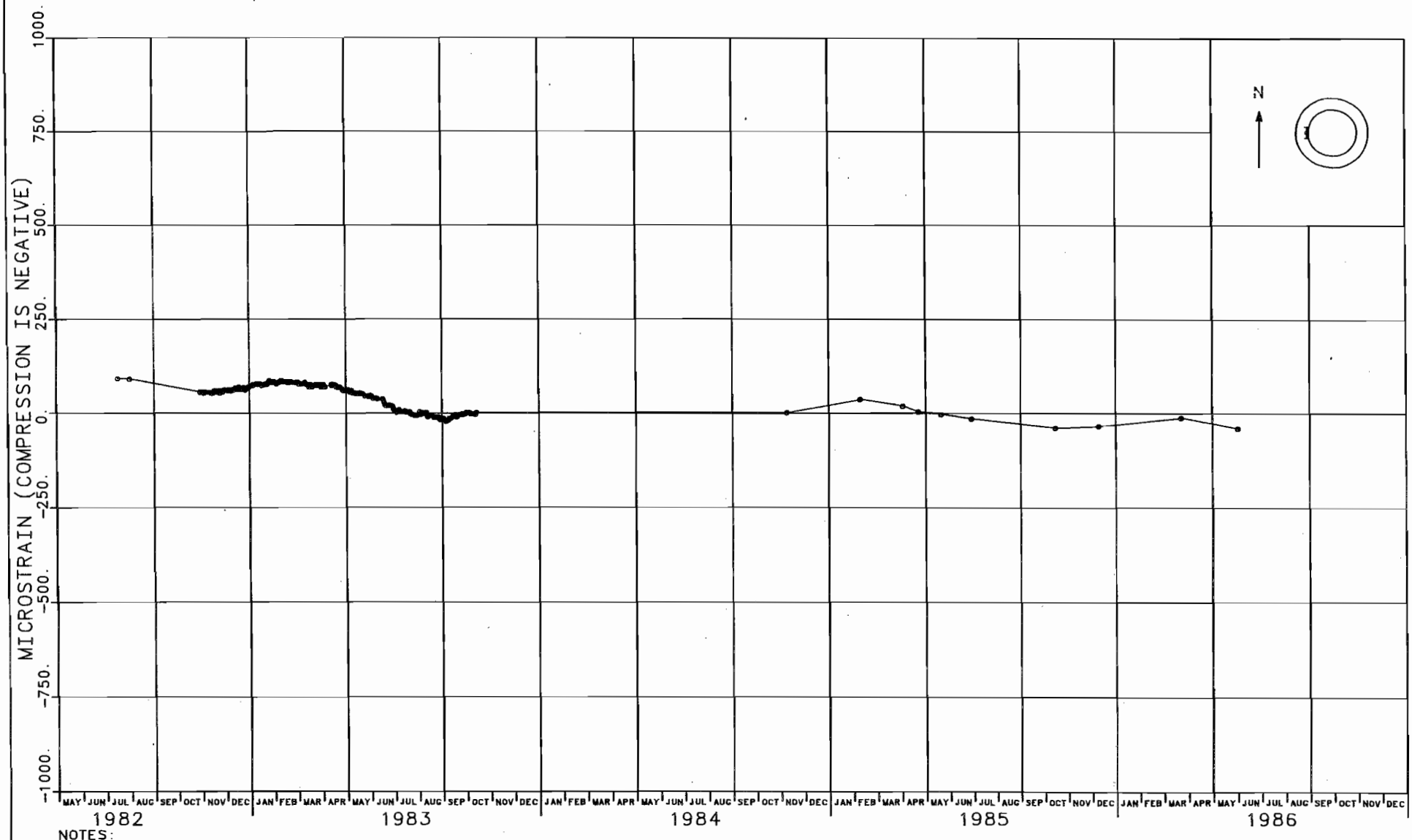
FIGURE J-83
EMBEDMENT STRAIN GAUGE 37X-ZE-00226
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 14.5 IN. FROM INNER FACE ON NORTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

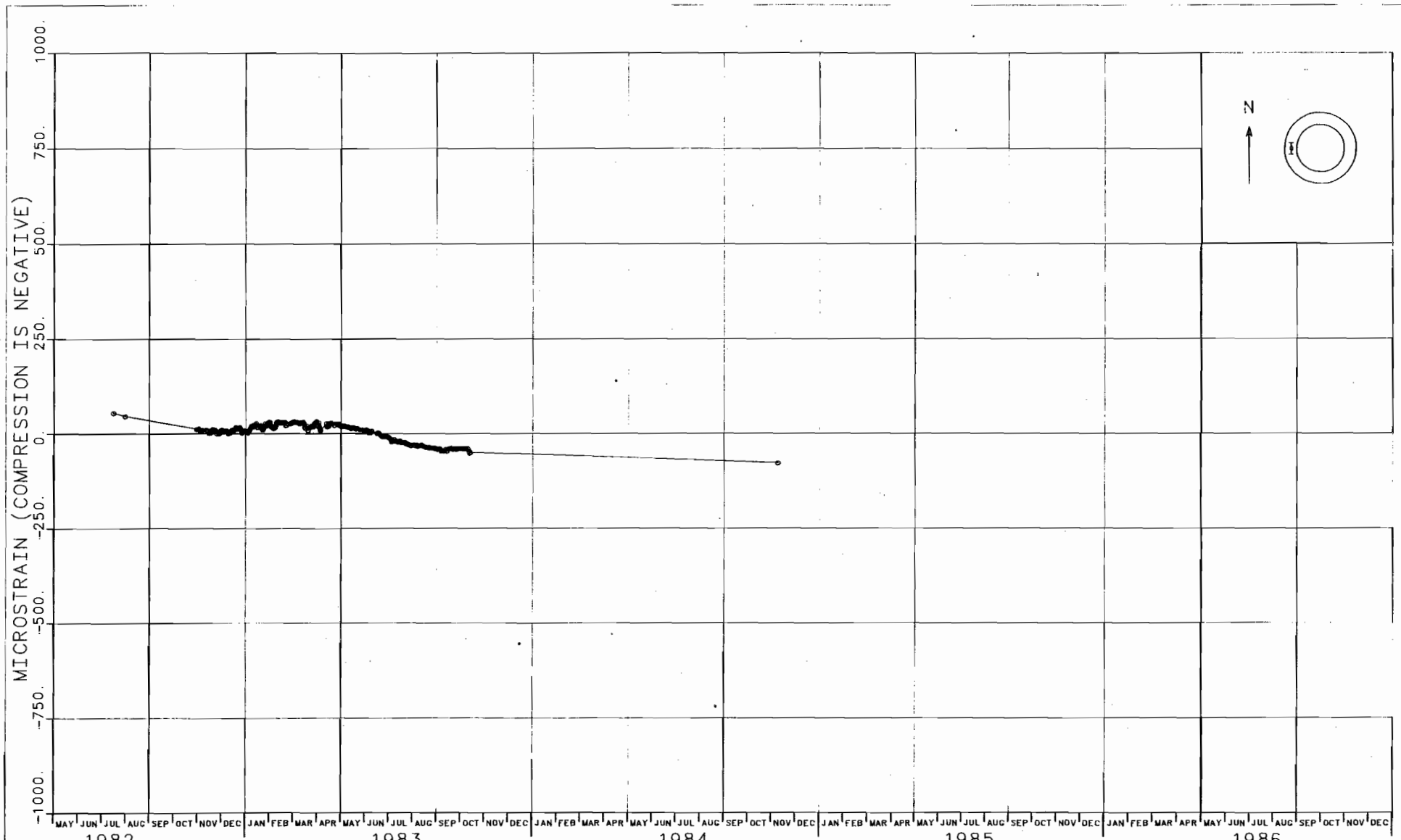
FIGURE J-82
EMBEDMENT STRAIN GAUGE 37X-ZE-00225
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3.5 IN. FROM INNER FACE ON WEST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

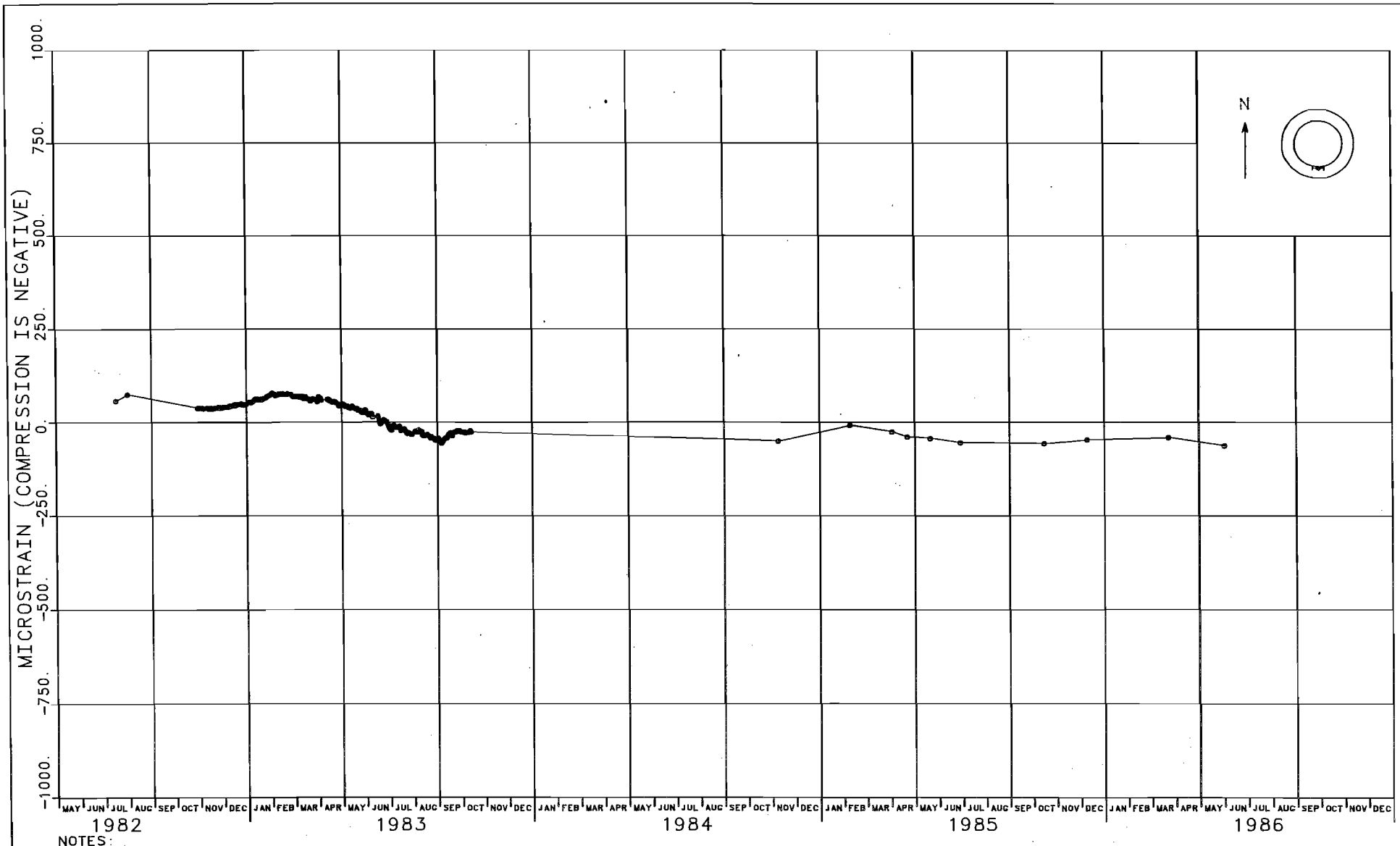
FIGURE J-85
EMBEDMENT STRAIN GAUGE 37X-ZE-00228
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 14.5 IN. FROM INNER FACE ON WEST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.
5. INSTRUMENT IS CURRENTLY NOT FUNCTIONING.

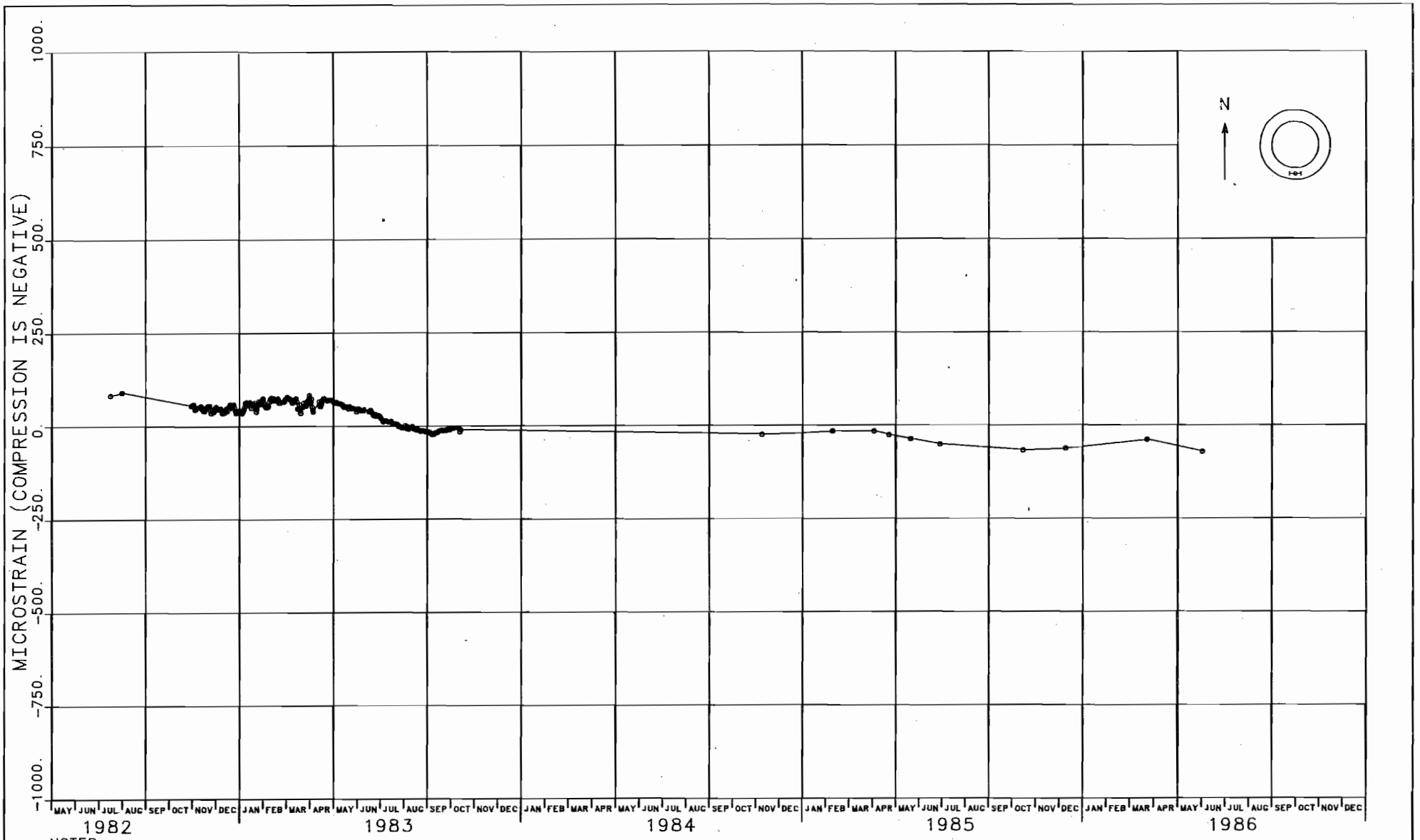
FIGURE J-84
EMBEDMENT STRAIN GAUGE 37X-ZE-00227
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3.5 IN. FROM INNER FACE ON SOUTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

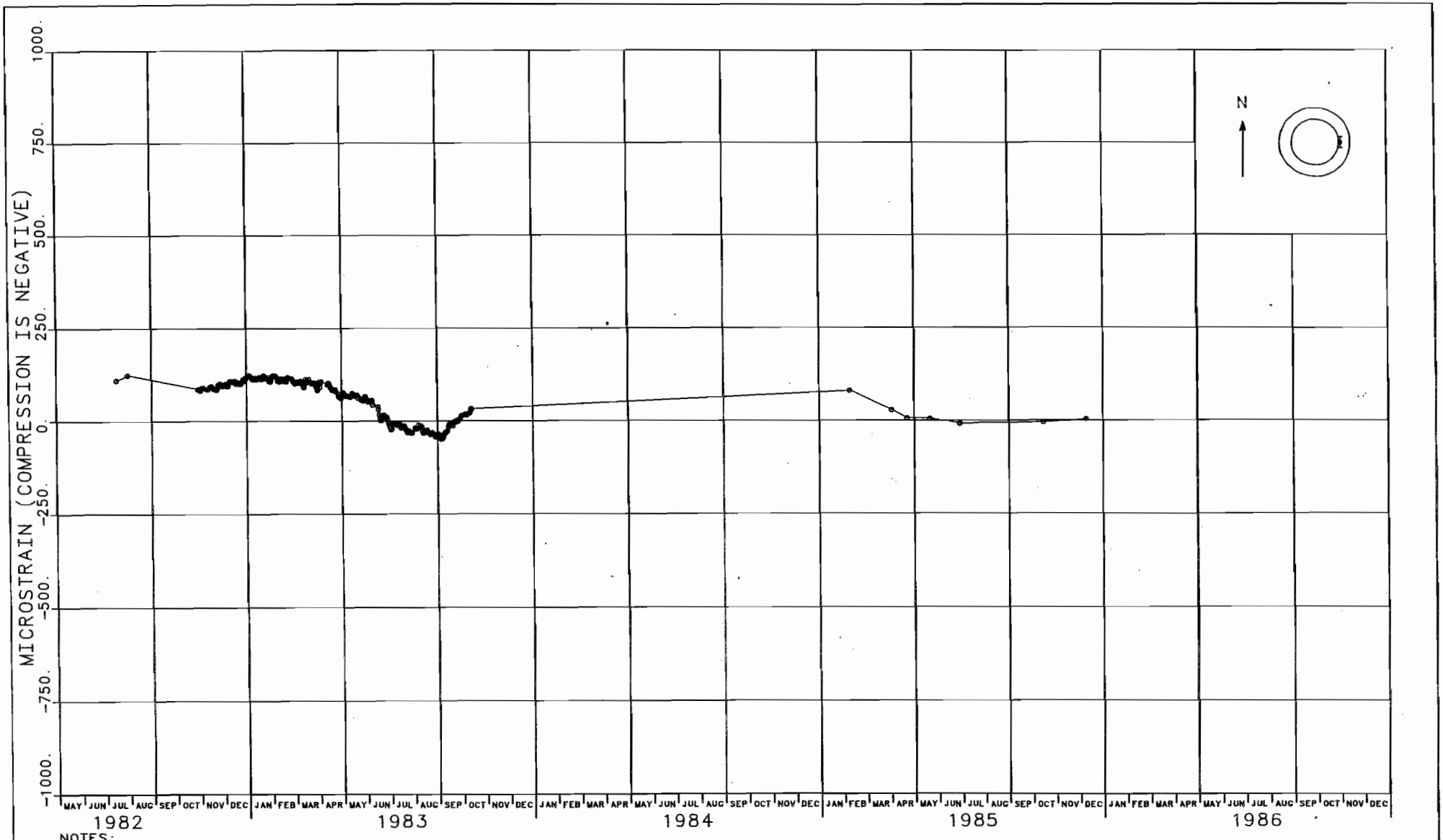
FIGURE J-87
EMBEDMENT STRAIN GAUGE 37X-ZE-00230
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 14.5 IN. FROM INNER FACE ON SOUTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

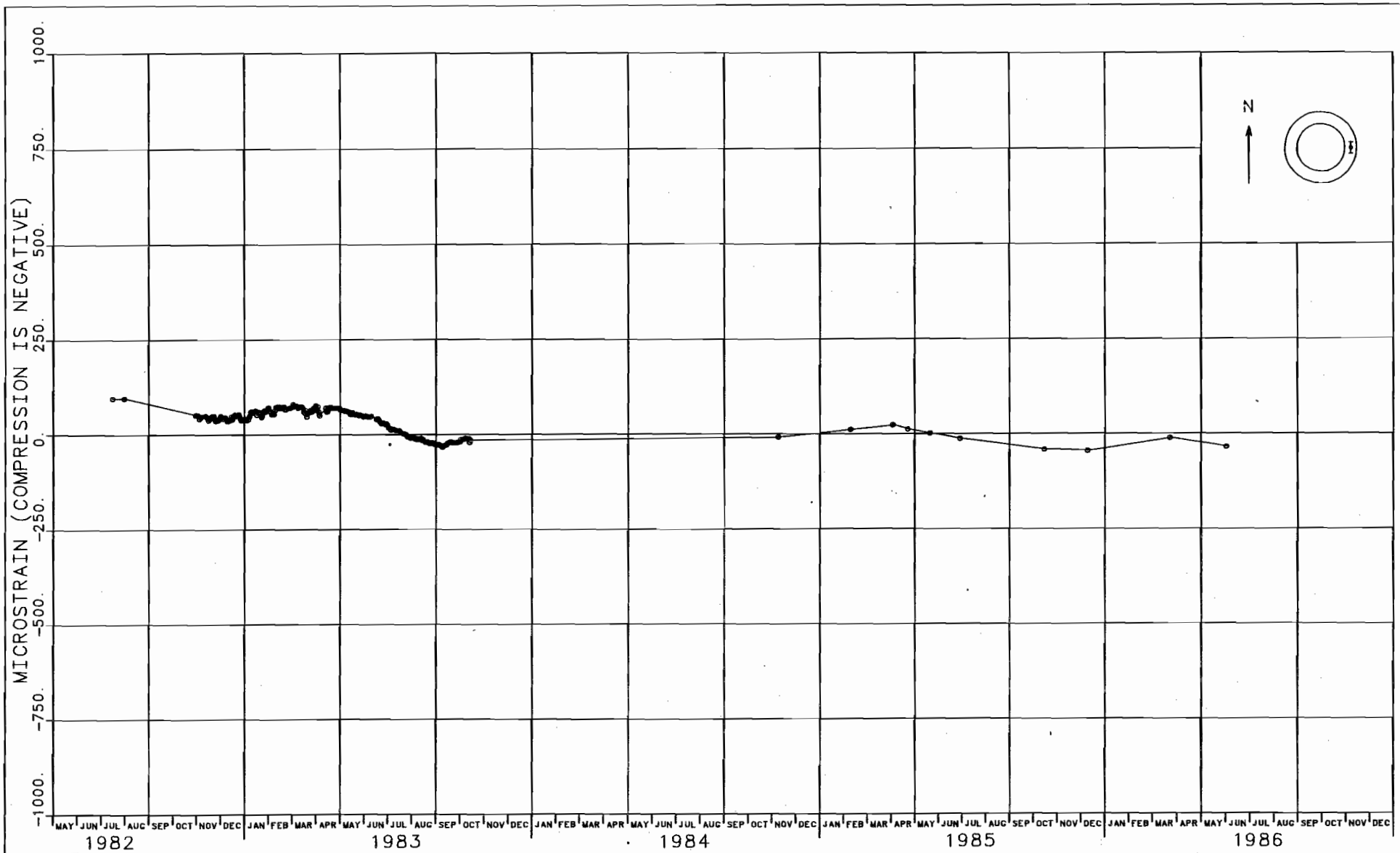
FIGURE J-86
EMBEDMENT STRAIN GAUGE 37X-ZE-00229
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 3.5 IN. FROM INNER FACE ON EAST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.
5. INSTRUMENT IS CURRENTLY NOT FUNCTIONING.

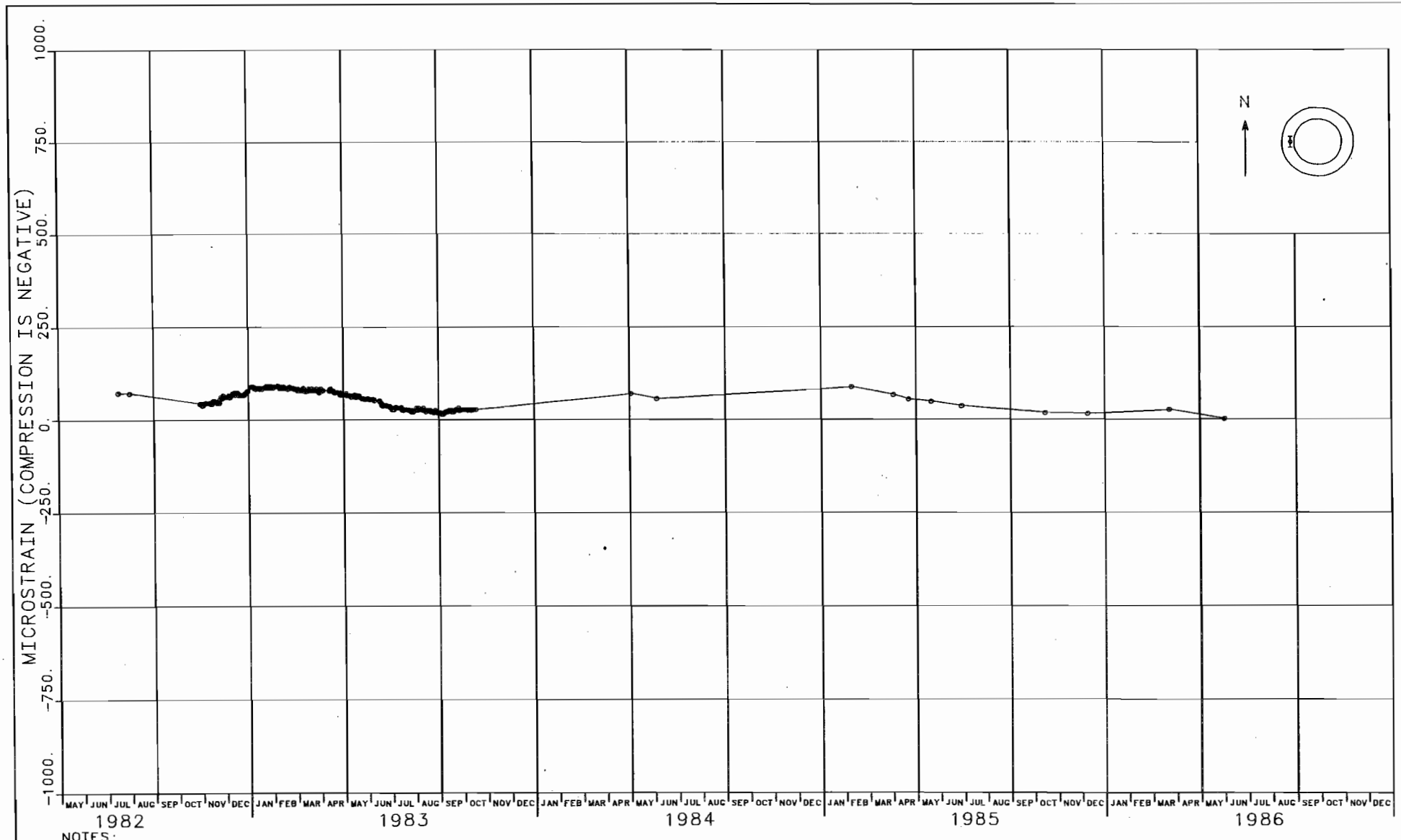
FIGURE J-89
EMBEDMENT STRAIN GAUGE 37X-ZE-00232
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 14.5 IN. FROM INNER FACE ON EAST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

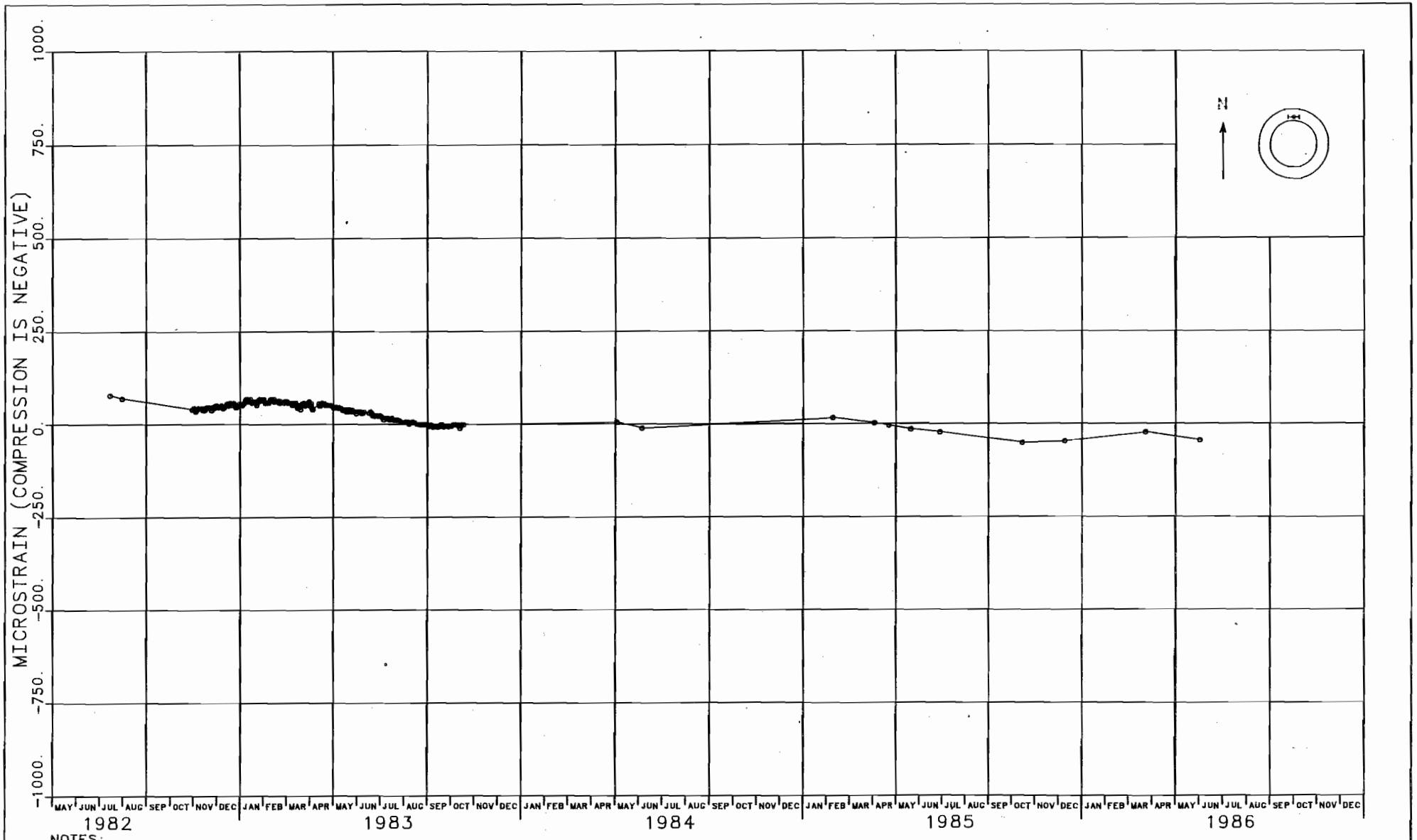
FIGURE J-88
EMBEDMENT STRAIN GAUGE 37X-ZE-00231
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 9 IN. FROM INNER FACE ON WEST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

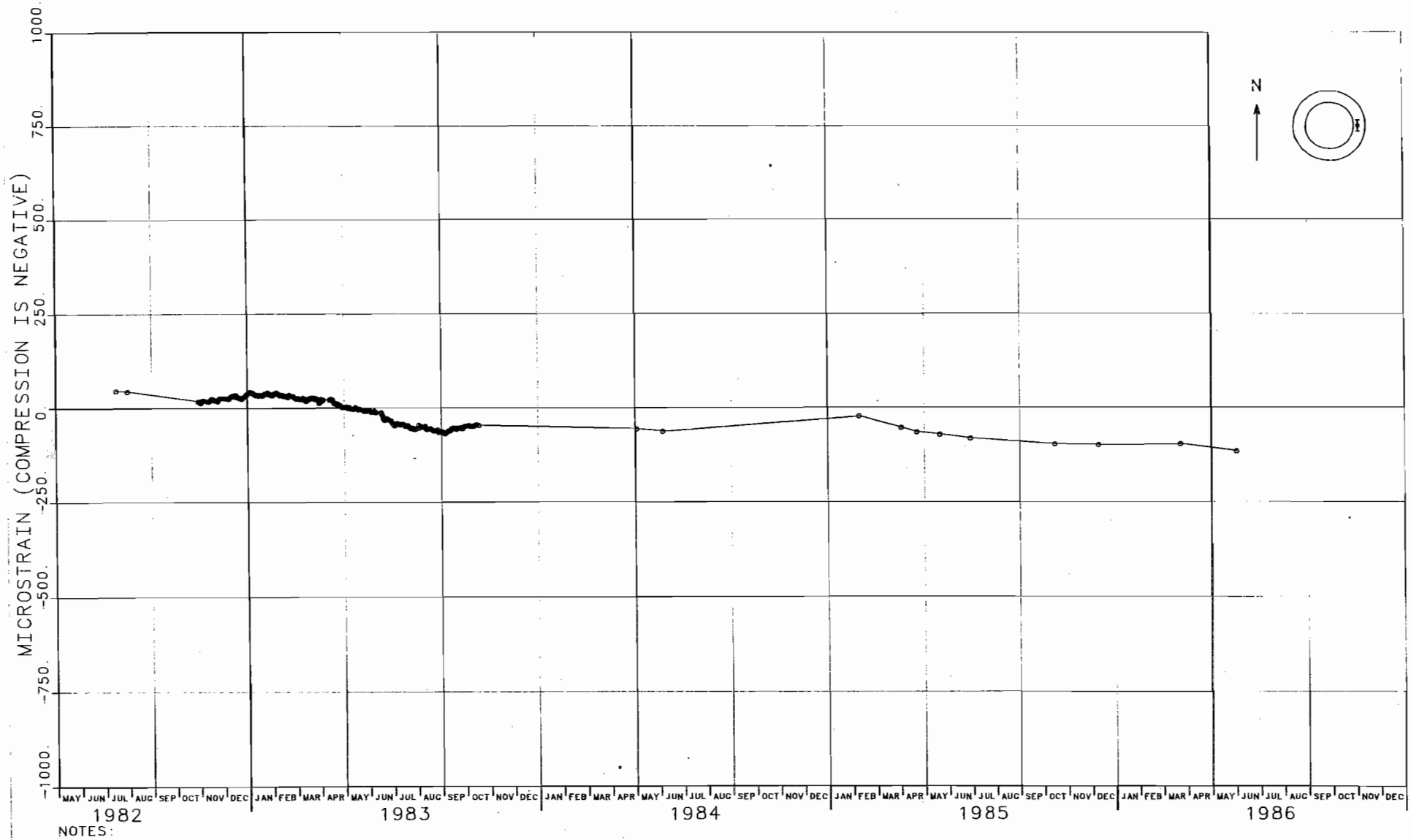
FIGURE J-91
EMBEDMENT STRAIN GAUGE 37X-ZE-00236
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 9 IN. FROM INNER FACE ON NORTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

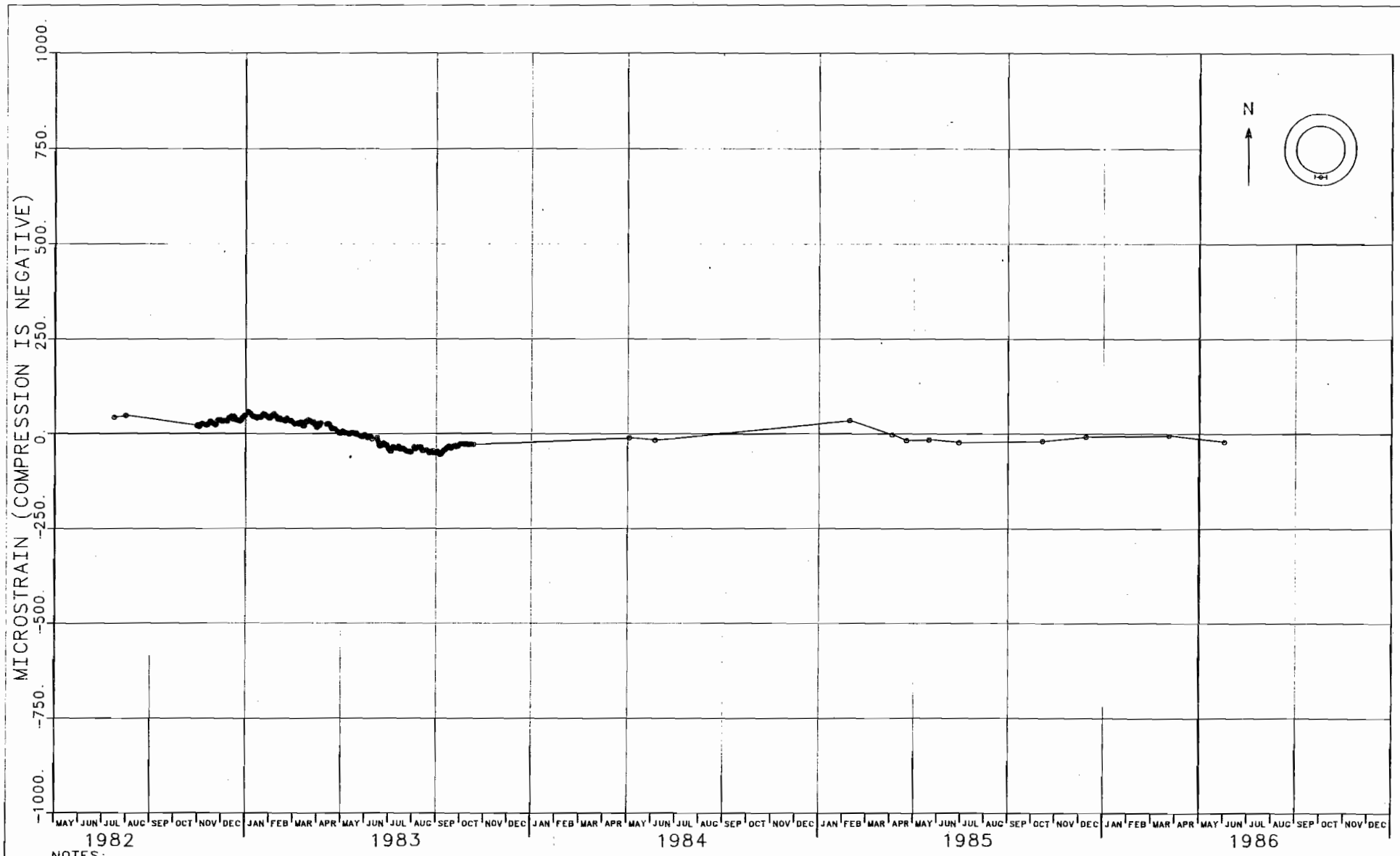
FIGURE J-90
EMBEDMENT STRAIN GAUGE 37X-ZE-00235
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 9 IN. FROM INNER FACE ON EAST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

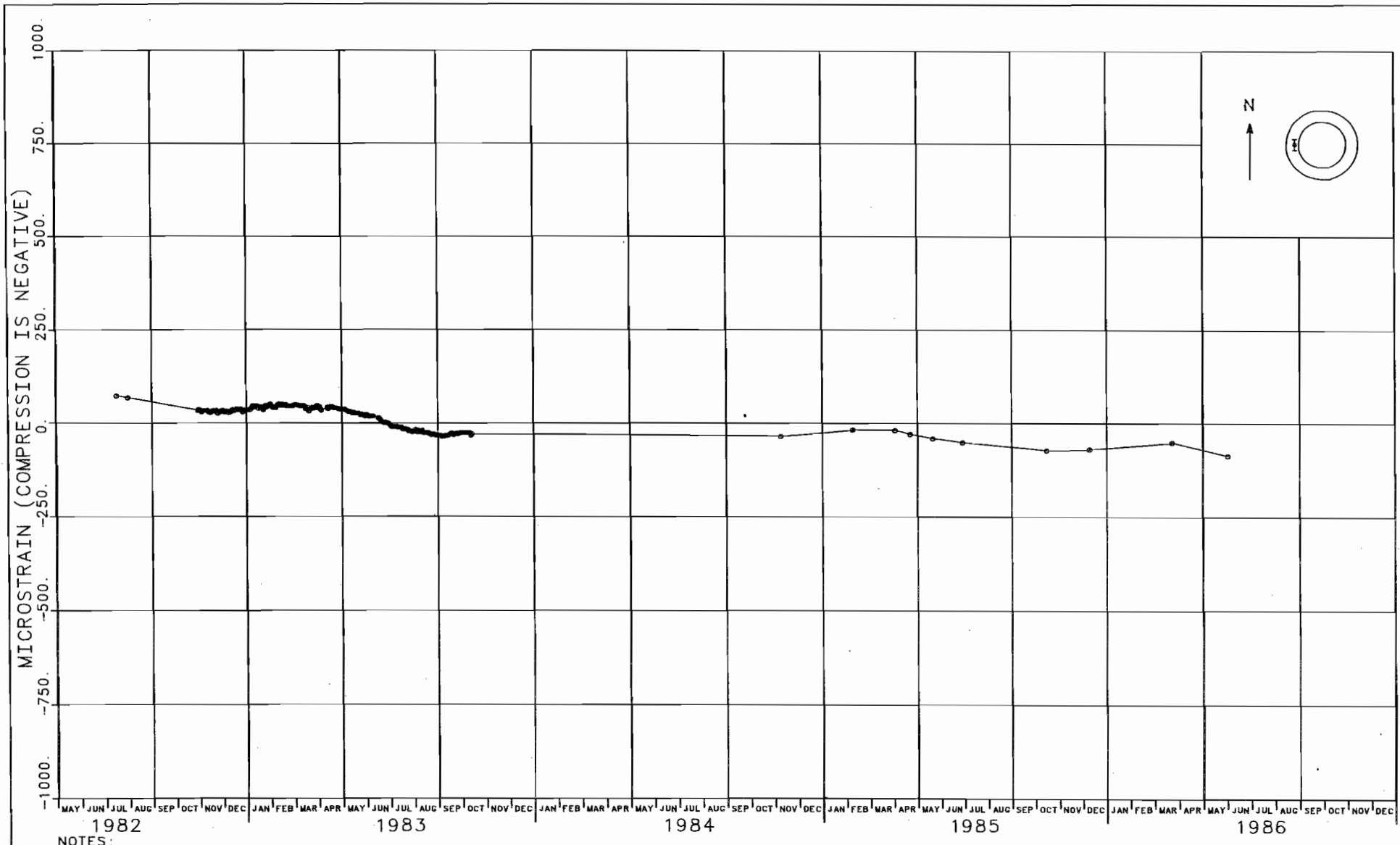
FIGURE J-93
EMBEDMENT STRAIN GAUGE 37X-ZE-00238
C & SH SHAFT KEY - EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 9 IN. FROM INNER FACE ON SOUTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

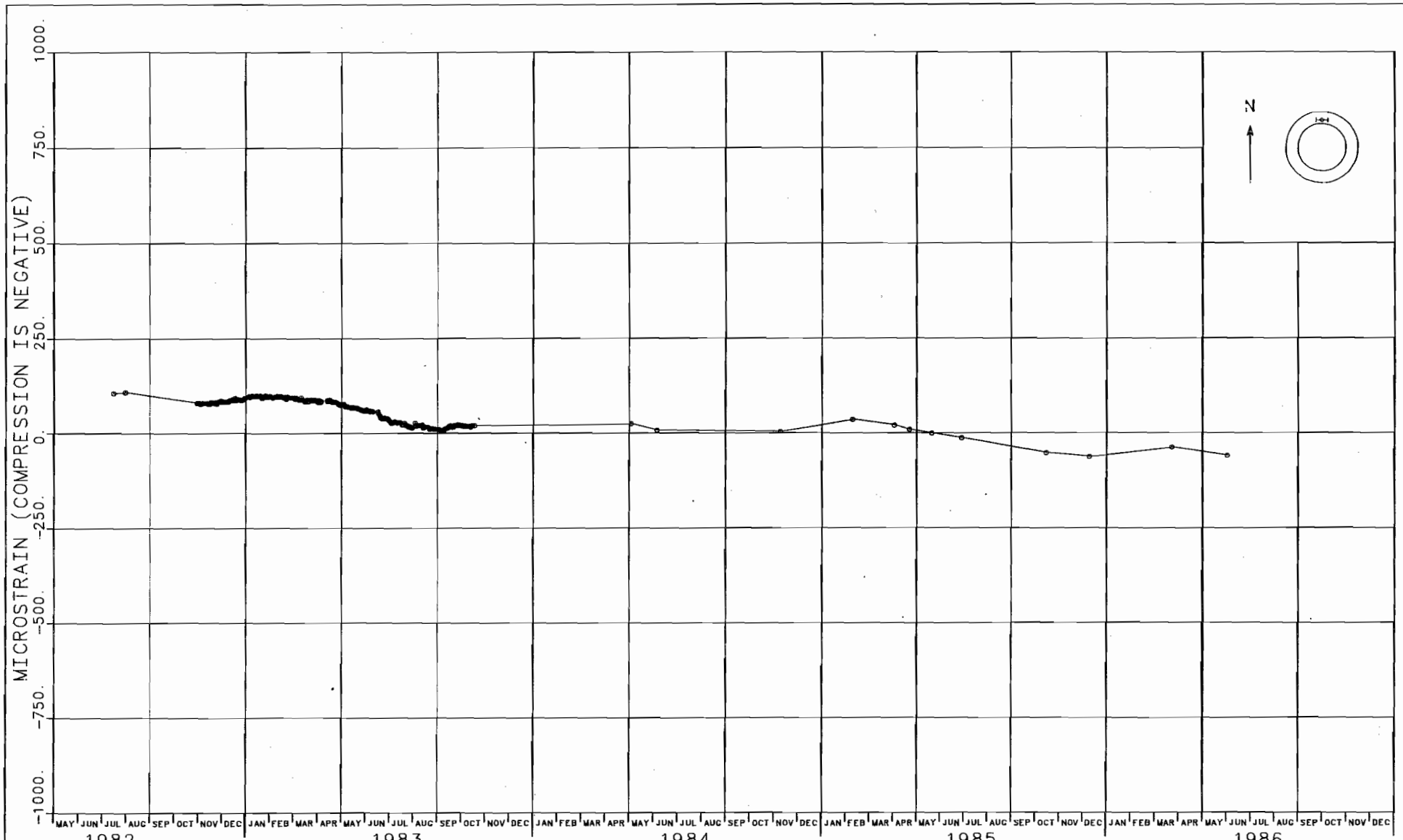
FIGURE J-92
EMBEDMENT STRAIN GAUGE 37X-ZE-00237
C & SH SHAFT KEY – EL 2553.7
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 9 IN. FROM INNER FACE ON WEST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

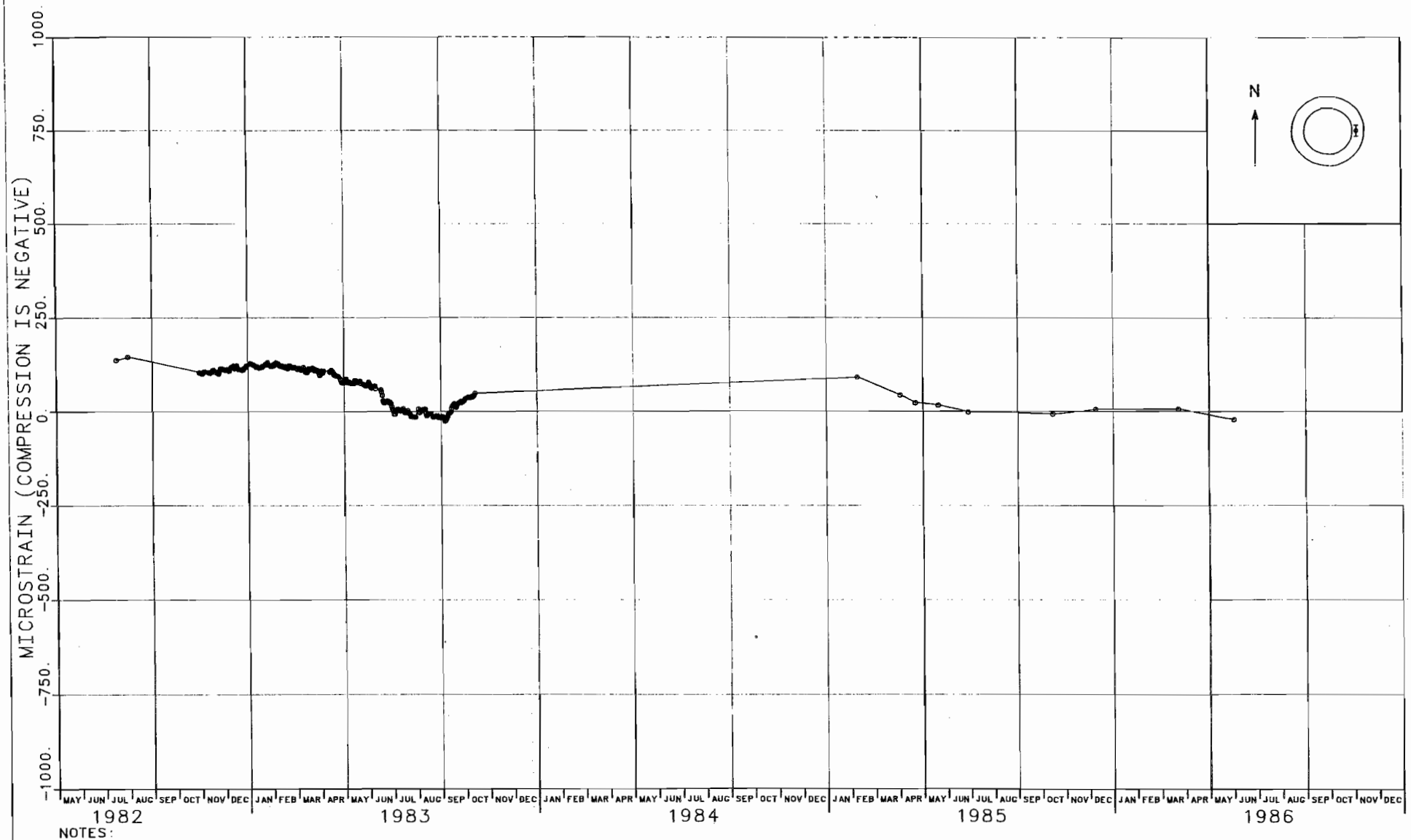
FIGURE J-95
EMBEDMENT STRAIN GAUGE 37X-ZE-00240
C & SH SHAFT KEY – EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 9 IN. FROM INNER FACE ON NORTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

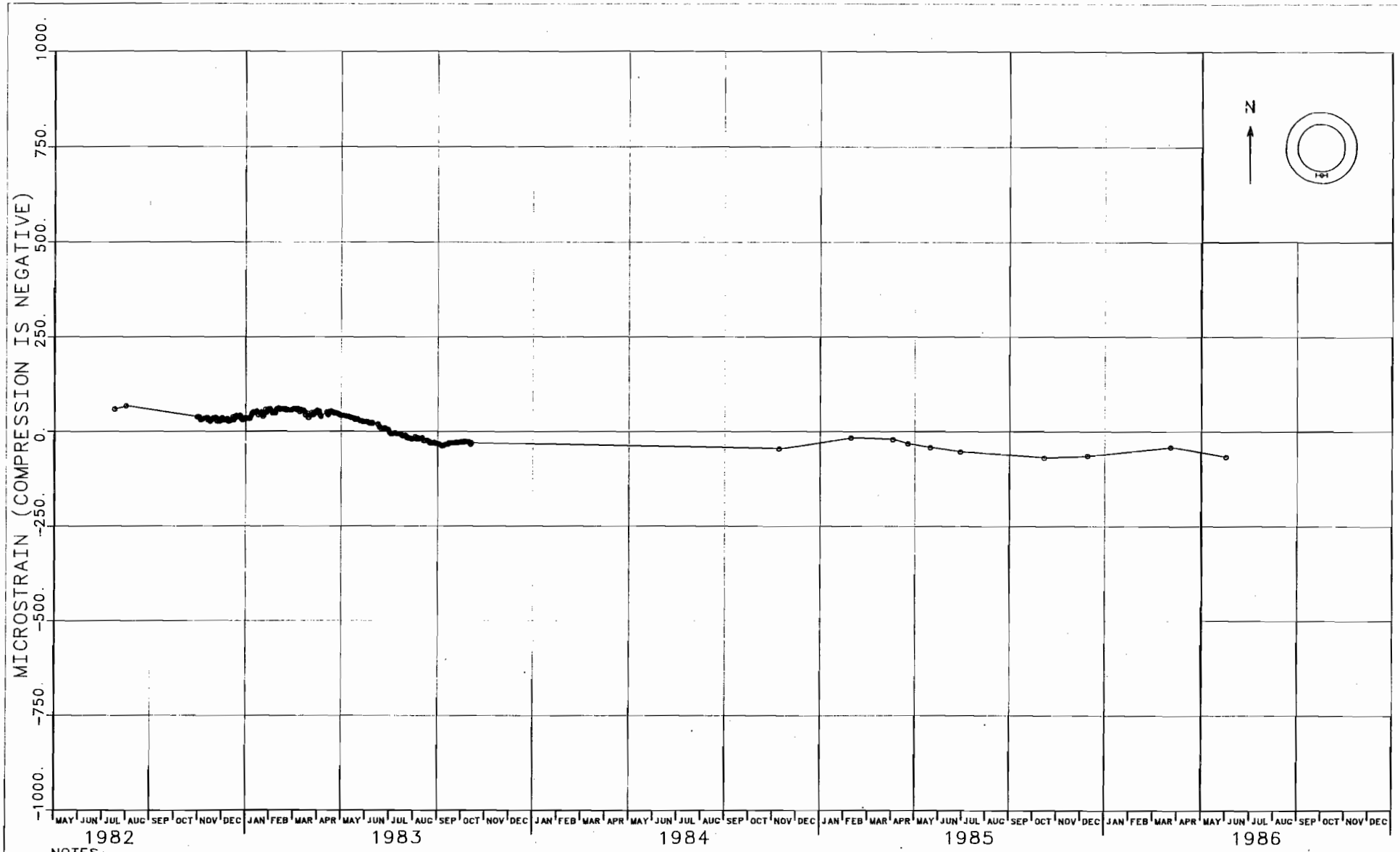
FIGURE J-94
EMBEDMENT STRAIN GAUGE 37X-ZE-00239
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 9 IN. FROM INNER FACE ON EAST SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

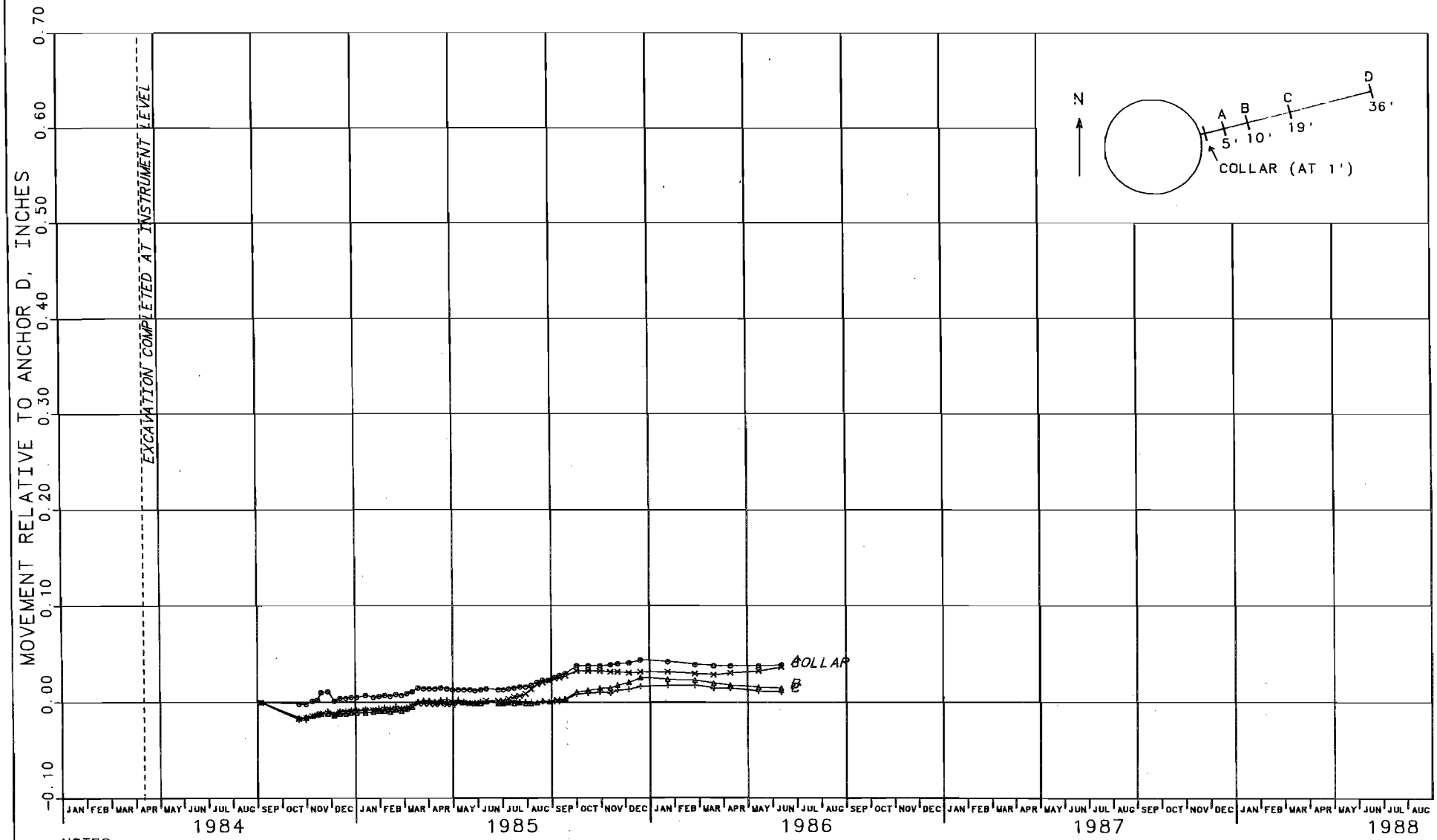
FIGURE J-97
EMBEDMENT STRAIN GAUGE 37X-ZE-00242
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. CONCRETE FOR KEY WAS PLACED IN APRIL 1982.
2. STRAIN SINCE READING ON APR. 22, 1982.
3. GAUGE IS LOCATED 9 IN. FROM INNER FACE ON SOUTH SIDE OF CONCRETE KEY.
4. SIZE OF EXCAVATION: 15 FT DIAM.

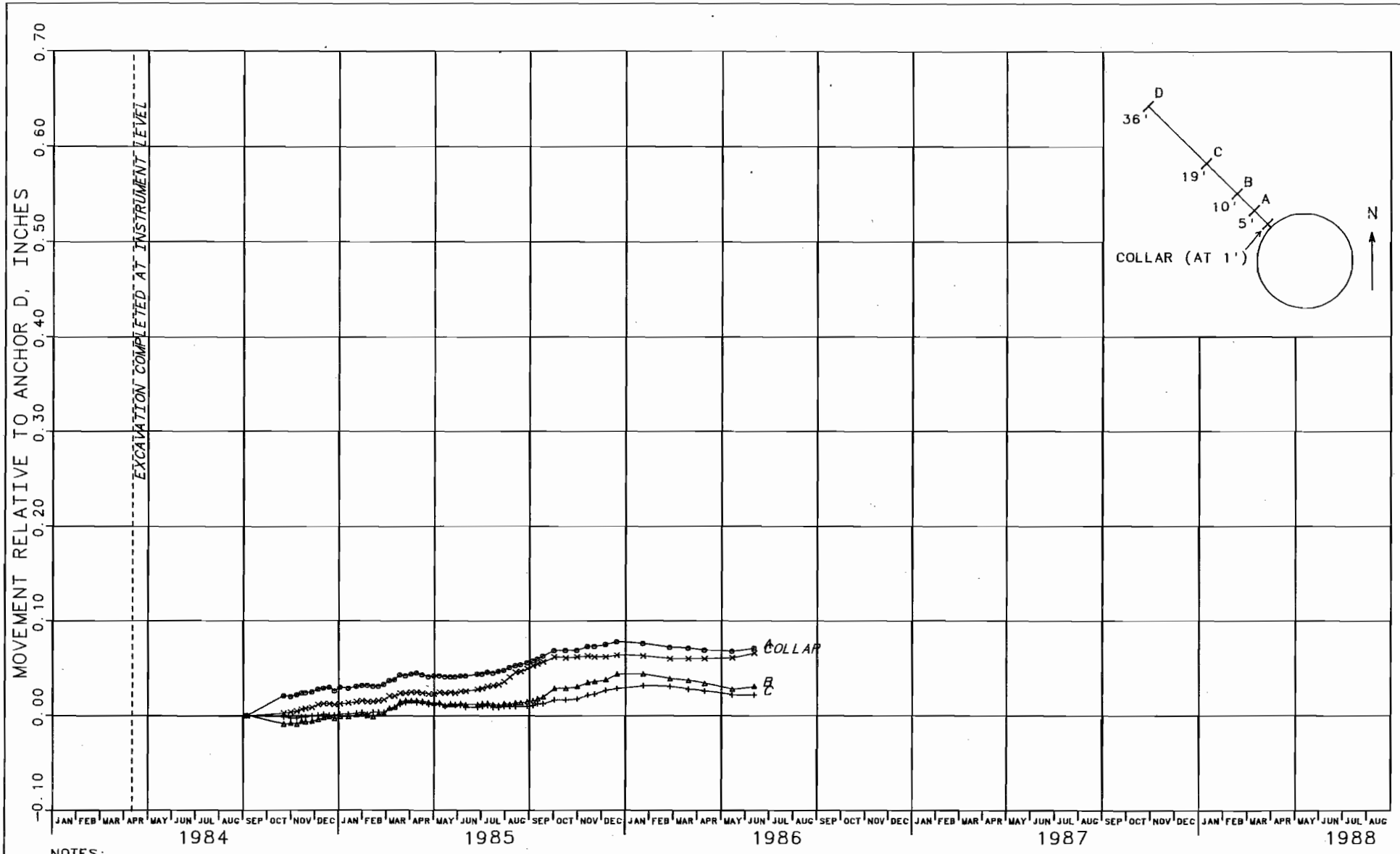
FIGURE J-96
EMBEDMENT STRAIN GAUGE 37X-ZE-00241
C & SH SHAFT KEY - EL 2547.6
STRAIN VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.

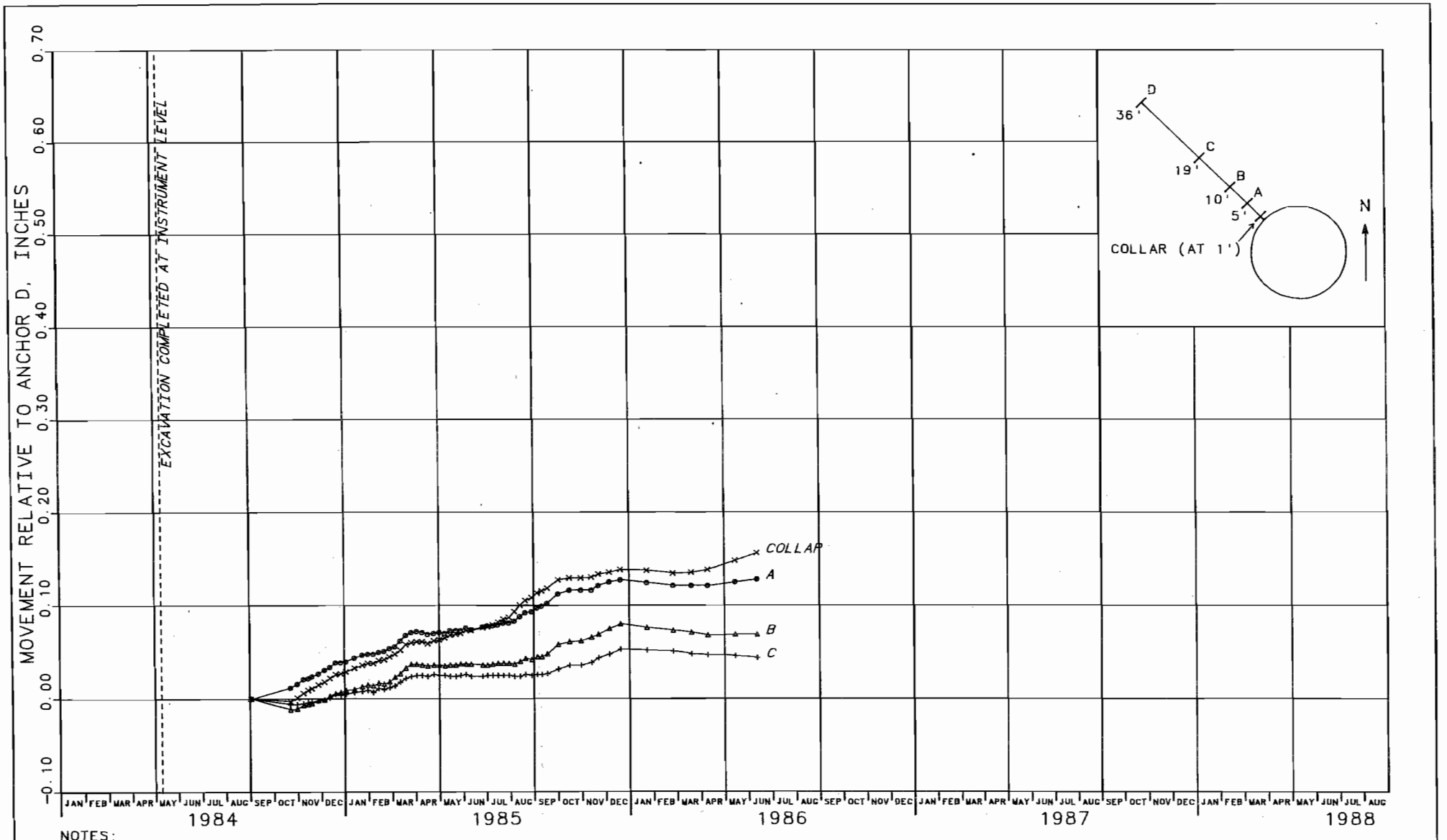
FIGURE J-99
MULTIPLE-POINT EXTENSOMETER 31X-GE-00202
WASTE SHAFT - EL 2338 - N 75 E
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.

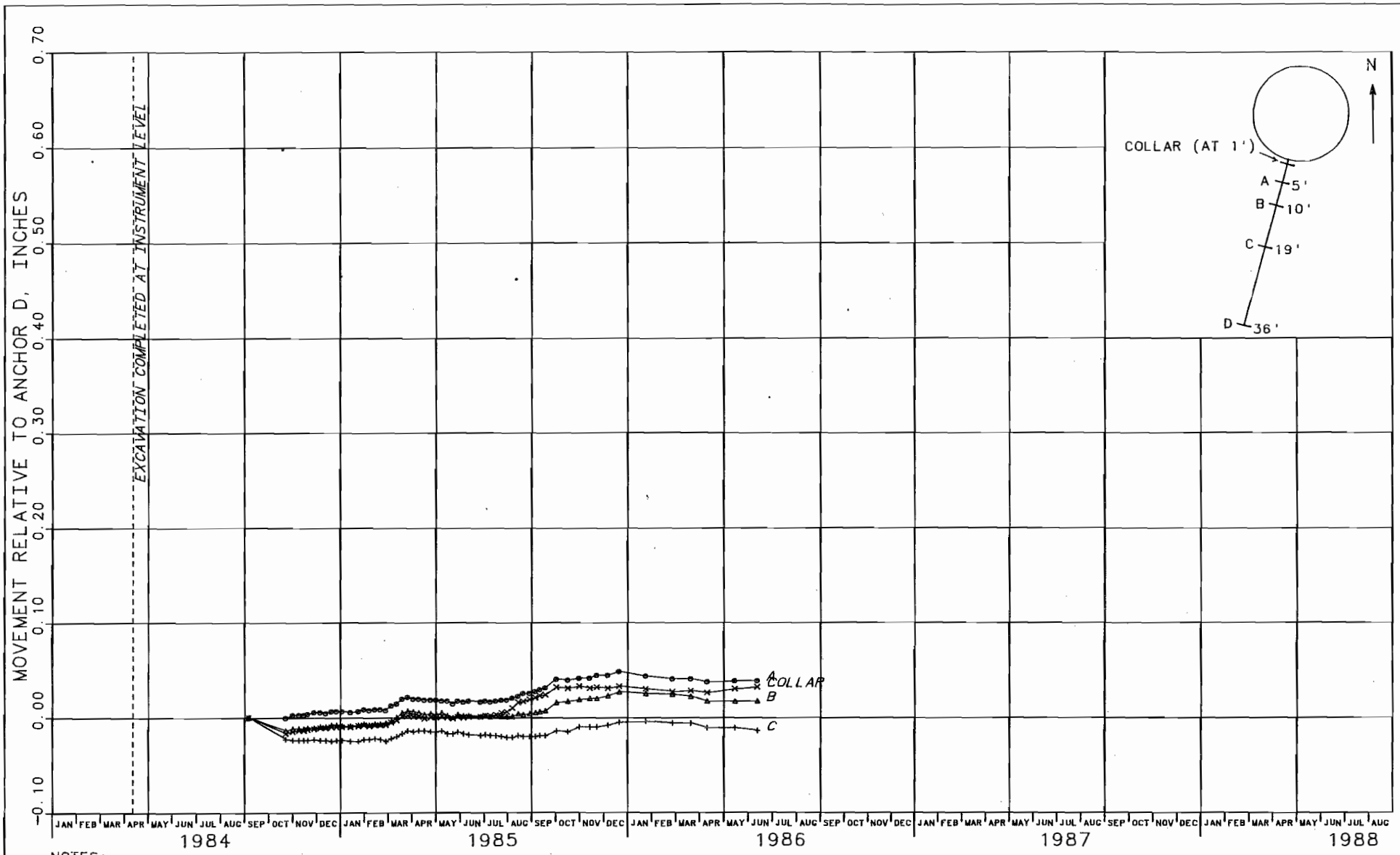
FIGURE J-98
MULTIPLE-POINT EXTENSOMETER 31X-GE-00201
WASTE SHAFT - EL 2338 - N 45 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.

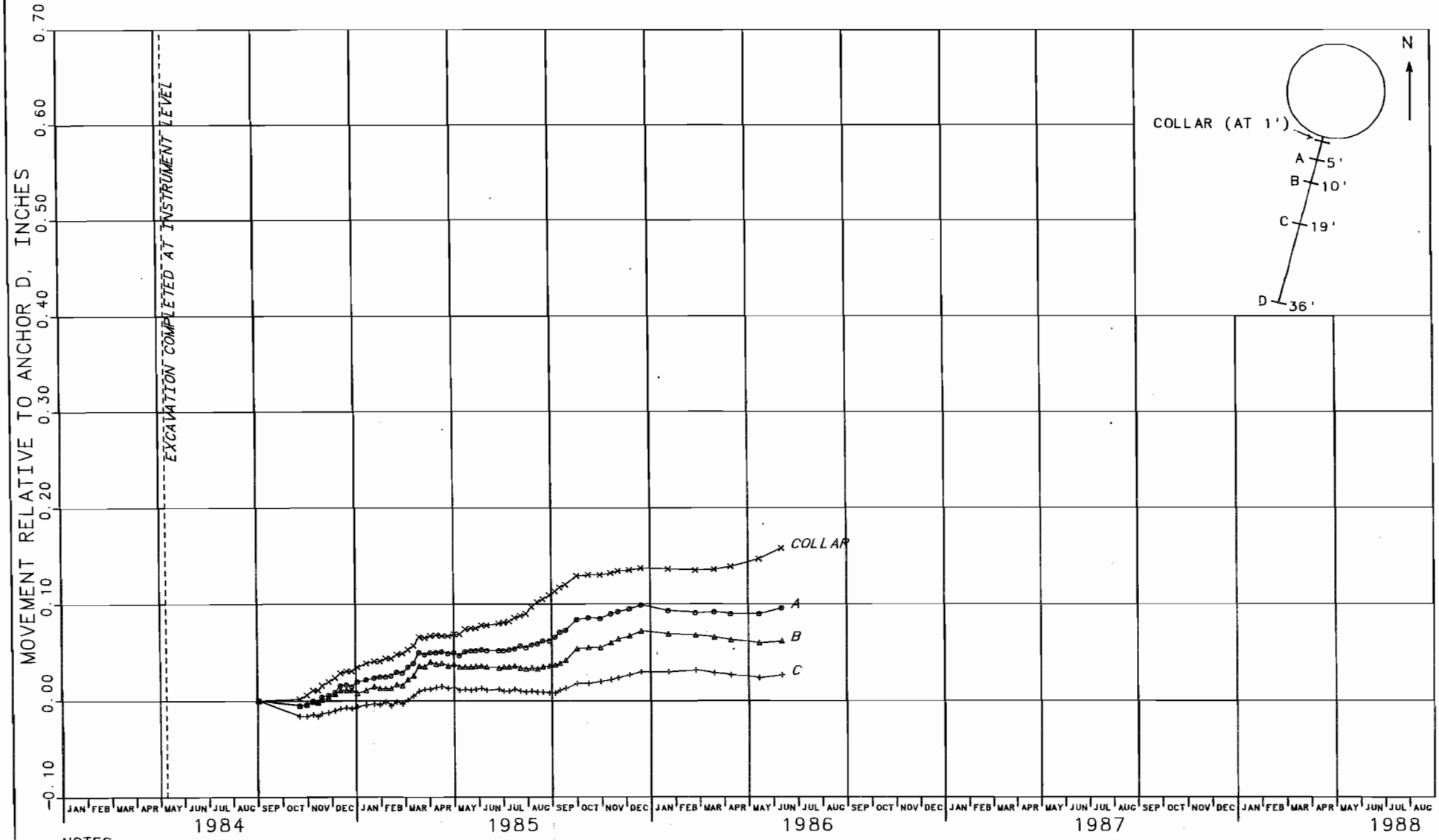
FIGURE J-101
MULTIPLE-POINT EXTENSOMETER 31X-GE-00204
WASTE SHAFT – EL 1843 – N 45 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.

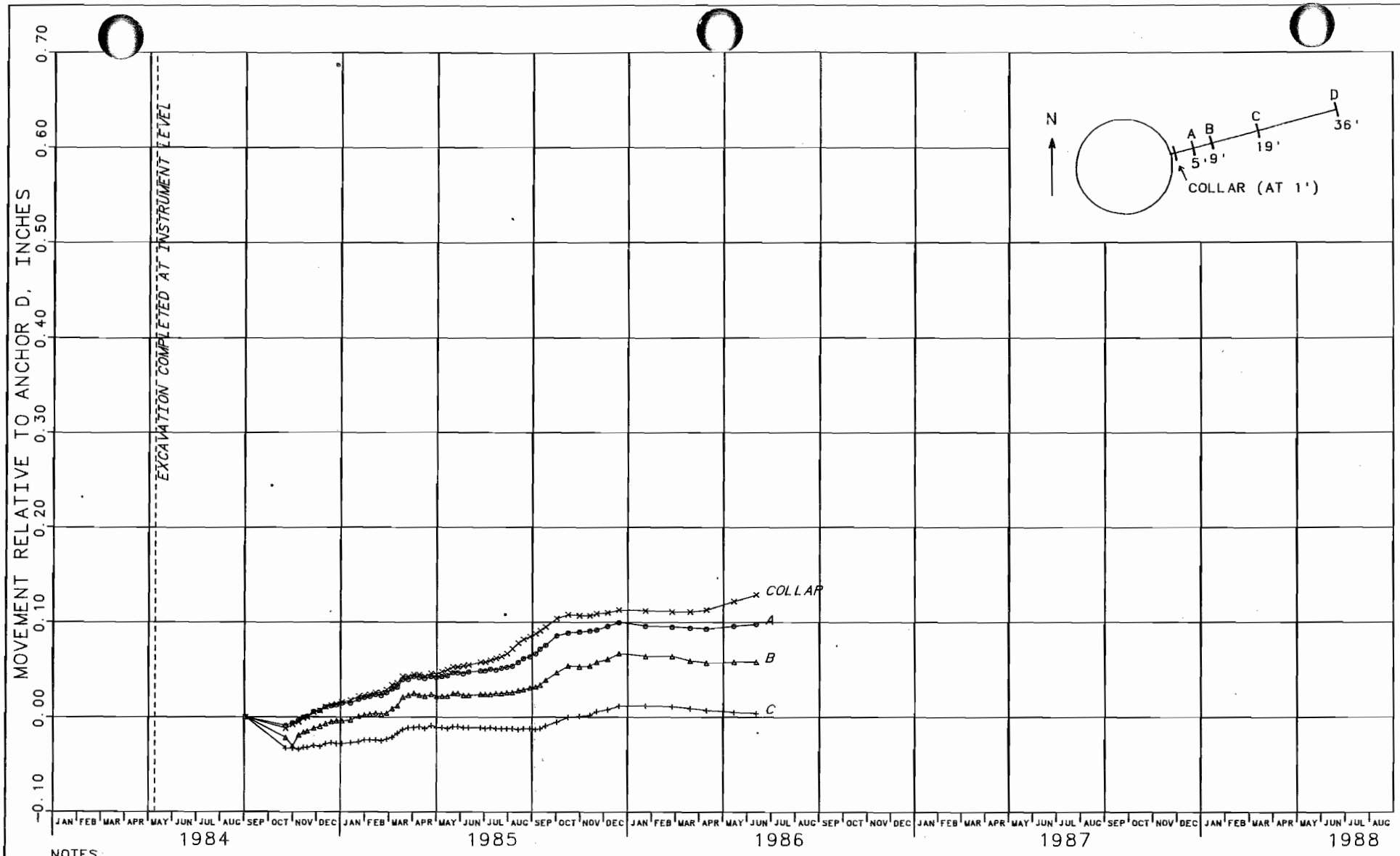
FIGURE J-100
MULTIPLE-POINT EXTENSOMETER 31X-GE-00203
WASTE SHAFT - EL 2338 - S 15 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.

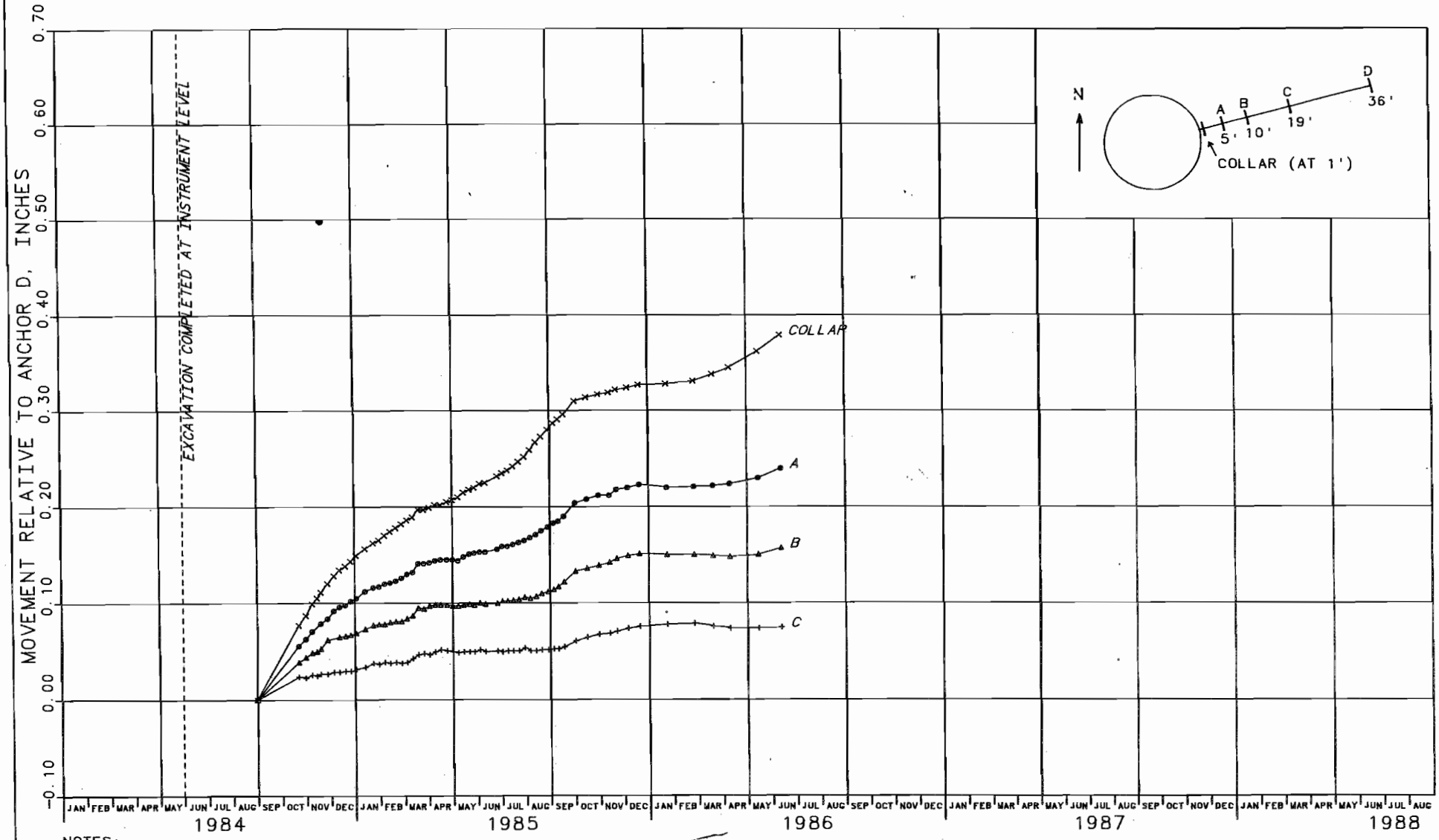
FIGURE J-103
MULTIPLE-POINT EXTENSOMETER 31X-GE-00206
WASTE SHAFT - EL 1843 - S 15 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.

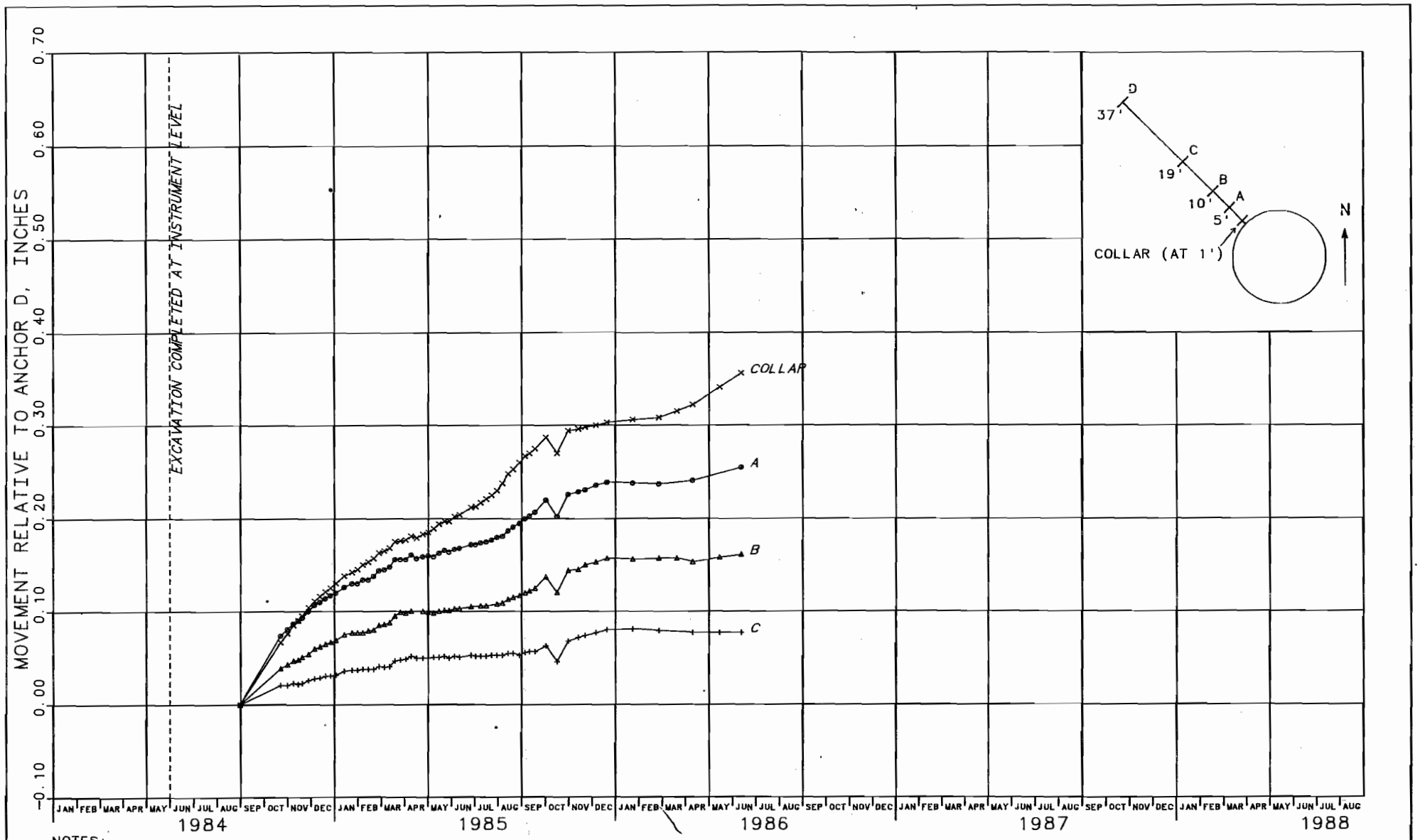
FIGURE J-102
MULTIPLE-POINT EXTENSOMETER 31X-GE-00205
WASTE SHAFT - EL 1843 - N 75 E
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.

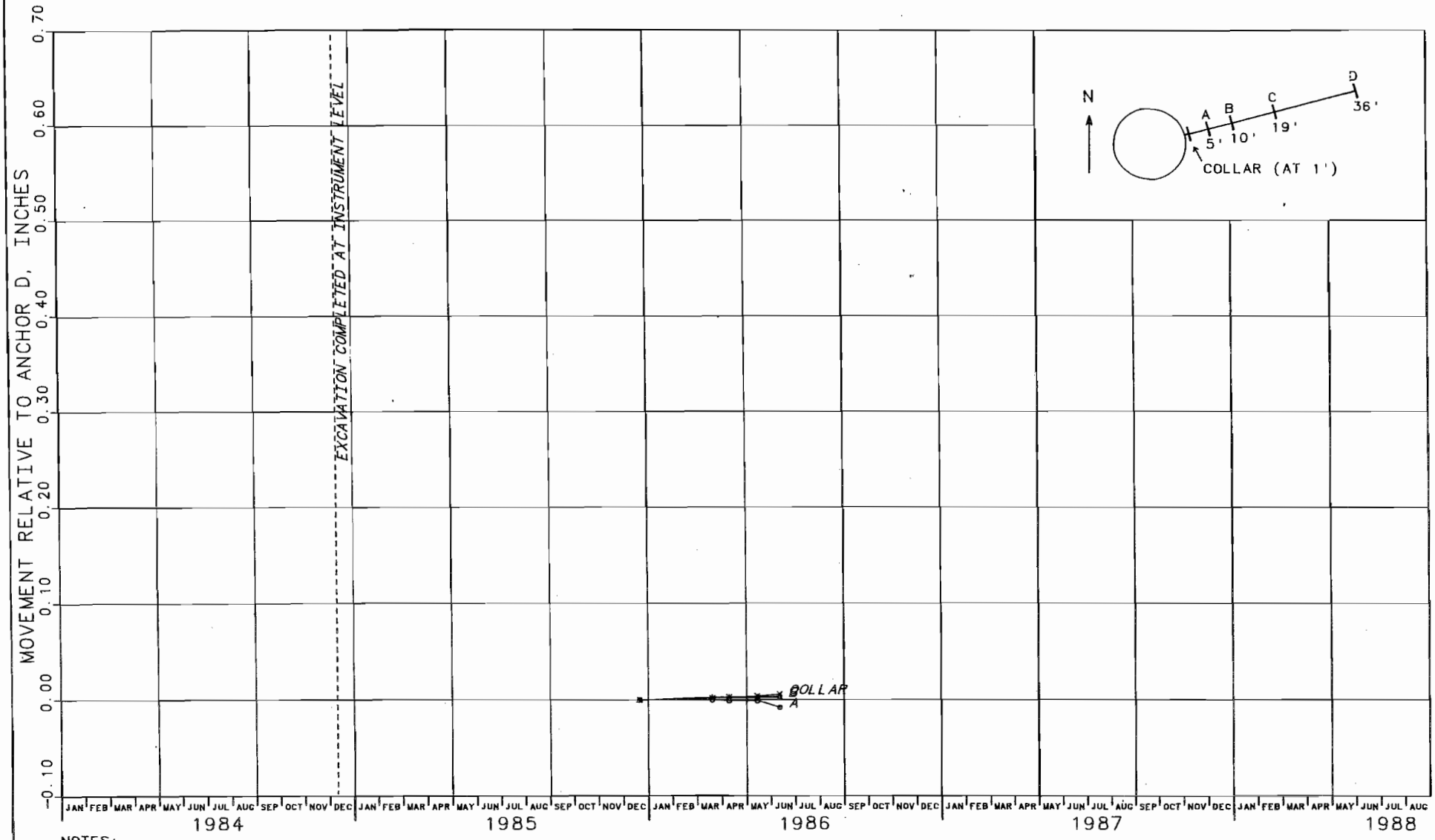
FIGURE J-105
MULTIPLE-POINT EXTENSOMETER 31X-GE-00208
WASTE SHAFT - EL 1350 - N 75 E
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.

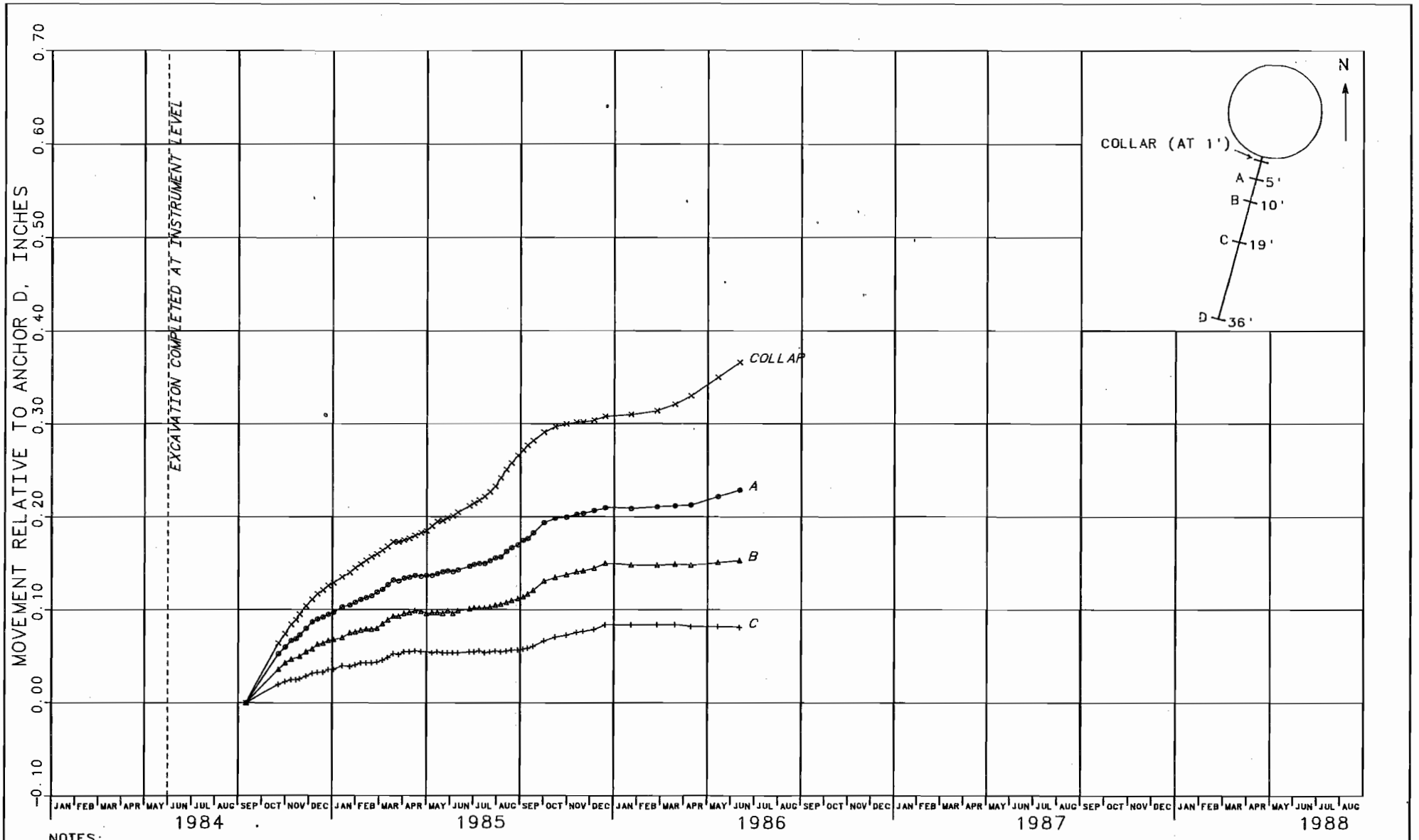
FIGURE J-104
MULTIPLE-POINT EXTENSOMETER 31X-GE-00207
WASTE SHAFT - EL 1350 - N 45 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 15 FT DIAM.

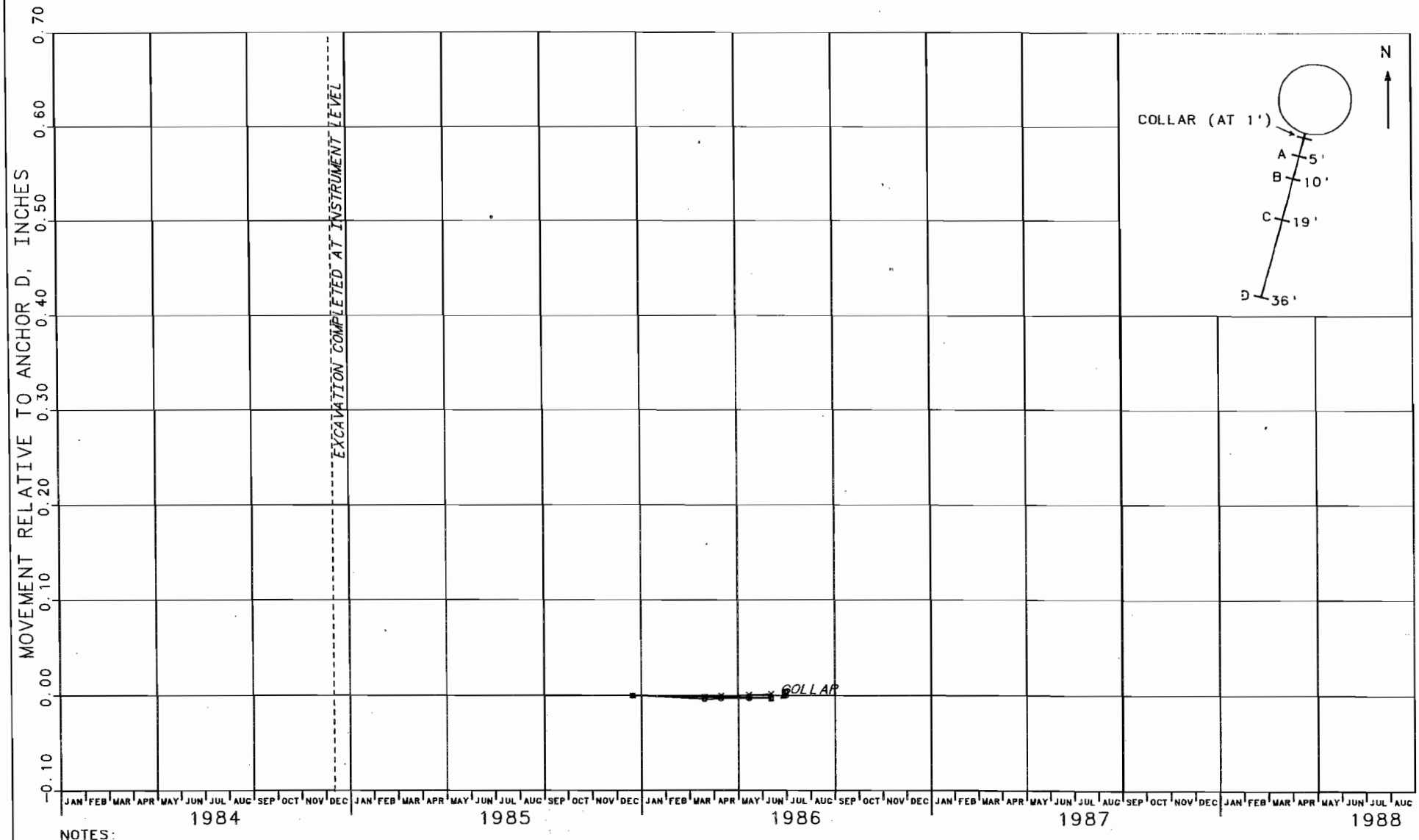
FIGURE J-107
MULTIPLE-POINT EXTENSOMETER 35X-GE-00201
EXHAUST SHAFT - EL 2331 - N 76 E
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.

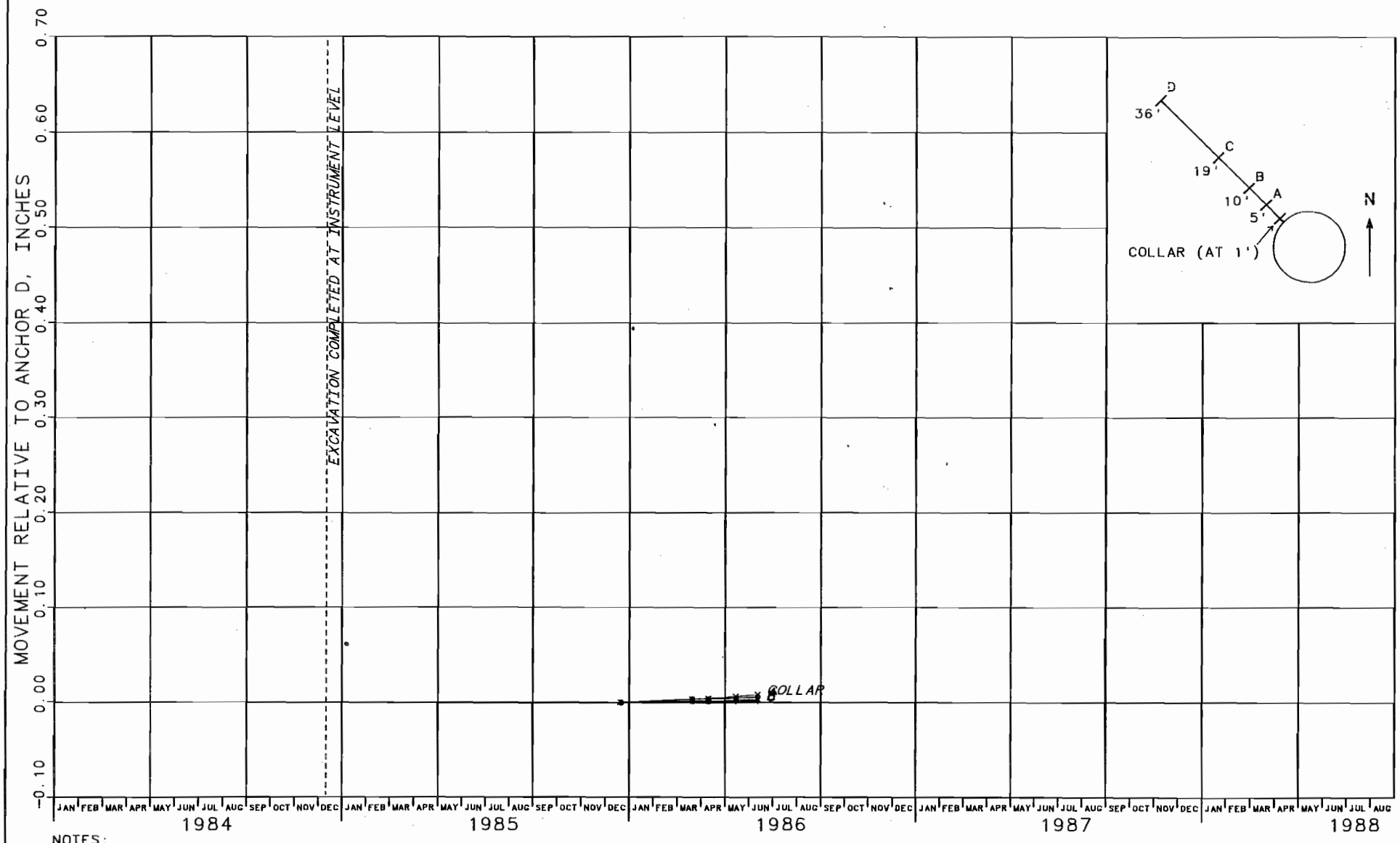
FIGURE J-106
MULTIPLE-POINT EXTENSOMETER 31X-GE-00209
WASTE SHAFT - EL 1350 - S 15 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 15 FT DIAM.

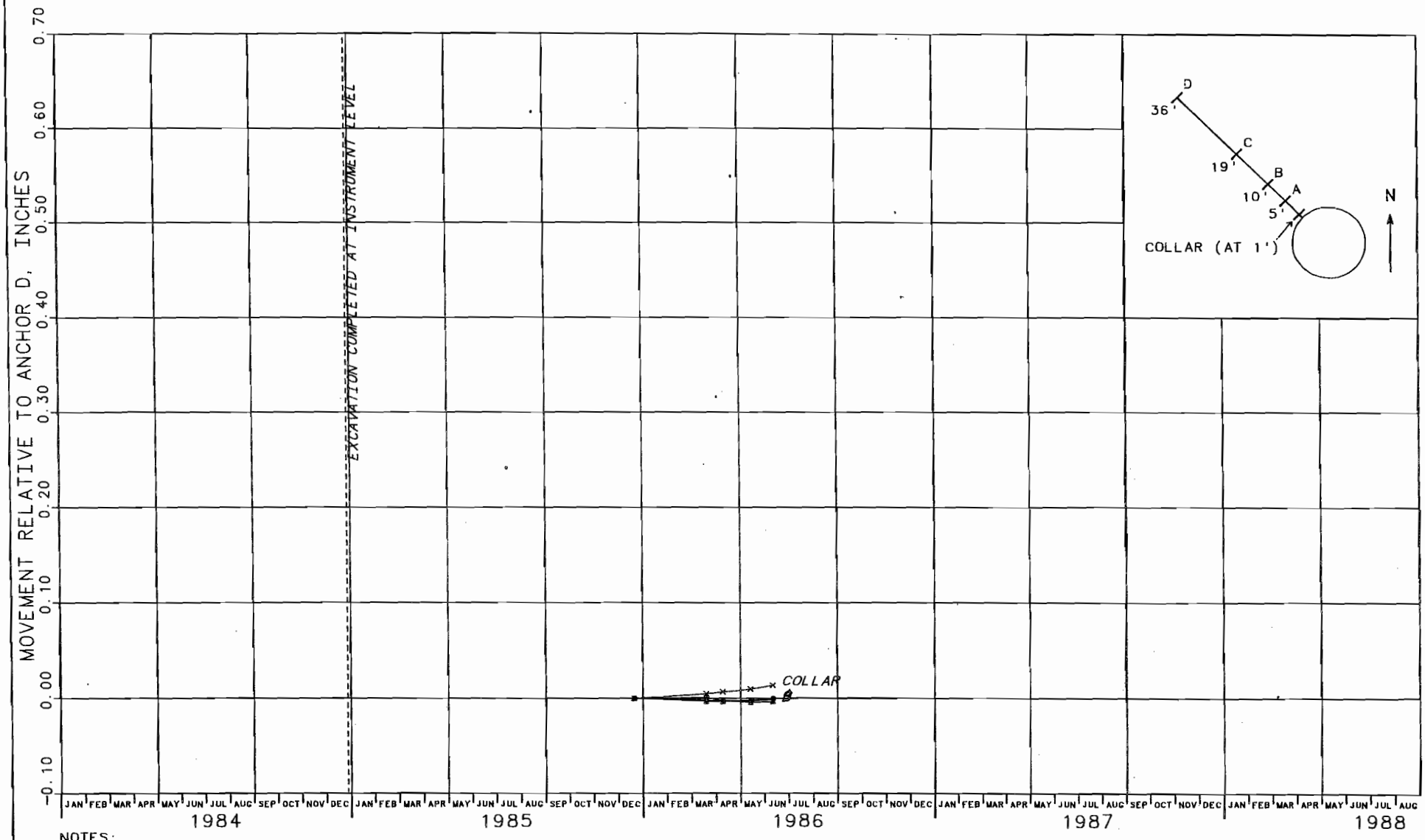
FIGURE J-109
MULTIPLE-POINT EXTENSOMETER 35X-GE-00203
EXHAUST SHAFT - EL 2331 - S 15 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 15 FT DIAM.

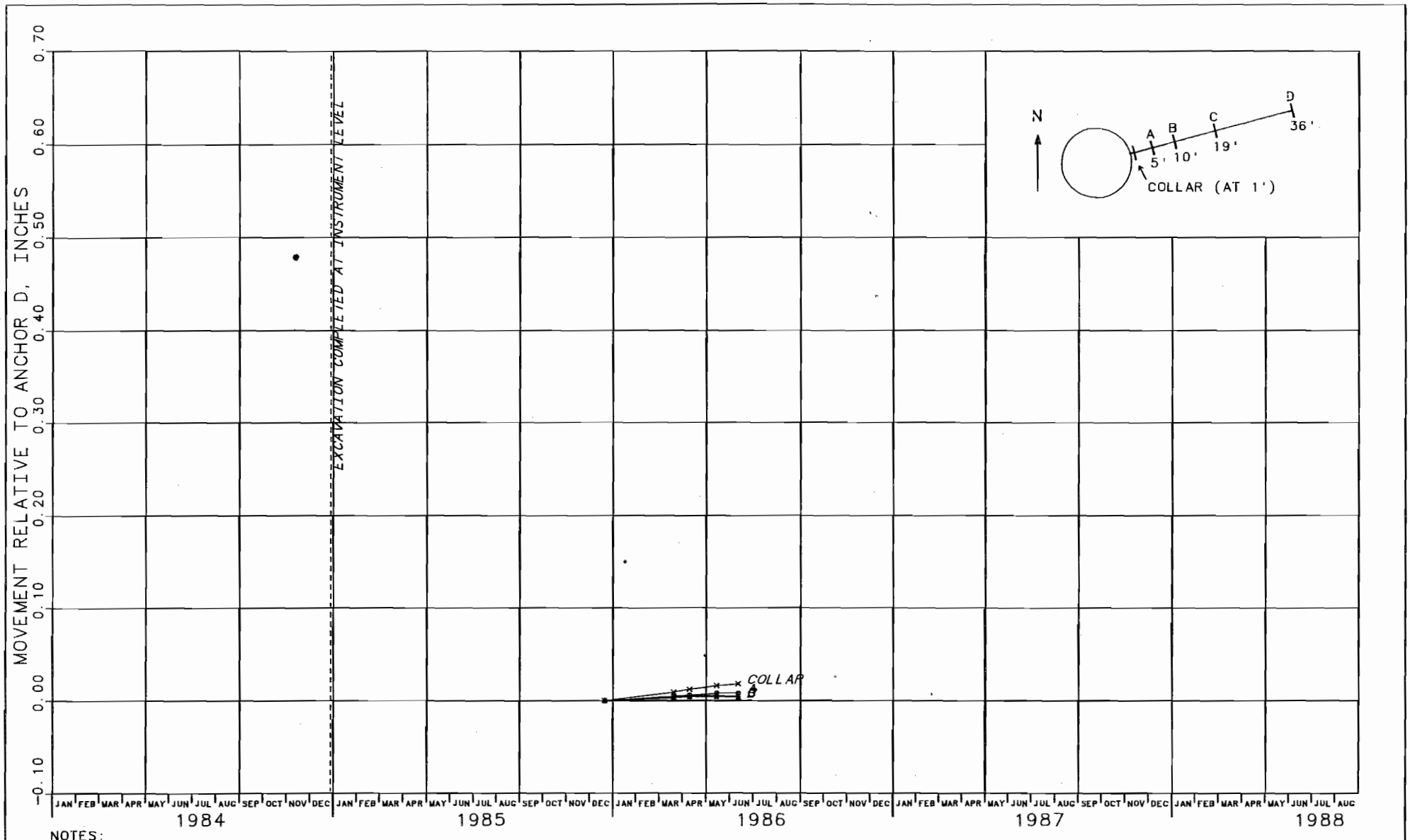
FIGURE J-108
MULTIPLE-POINT EXTENSOMETER 35X-GE-00202
EXHAUST SHAFT - EL 2331 - N 45 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 15 FT DIAM.

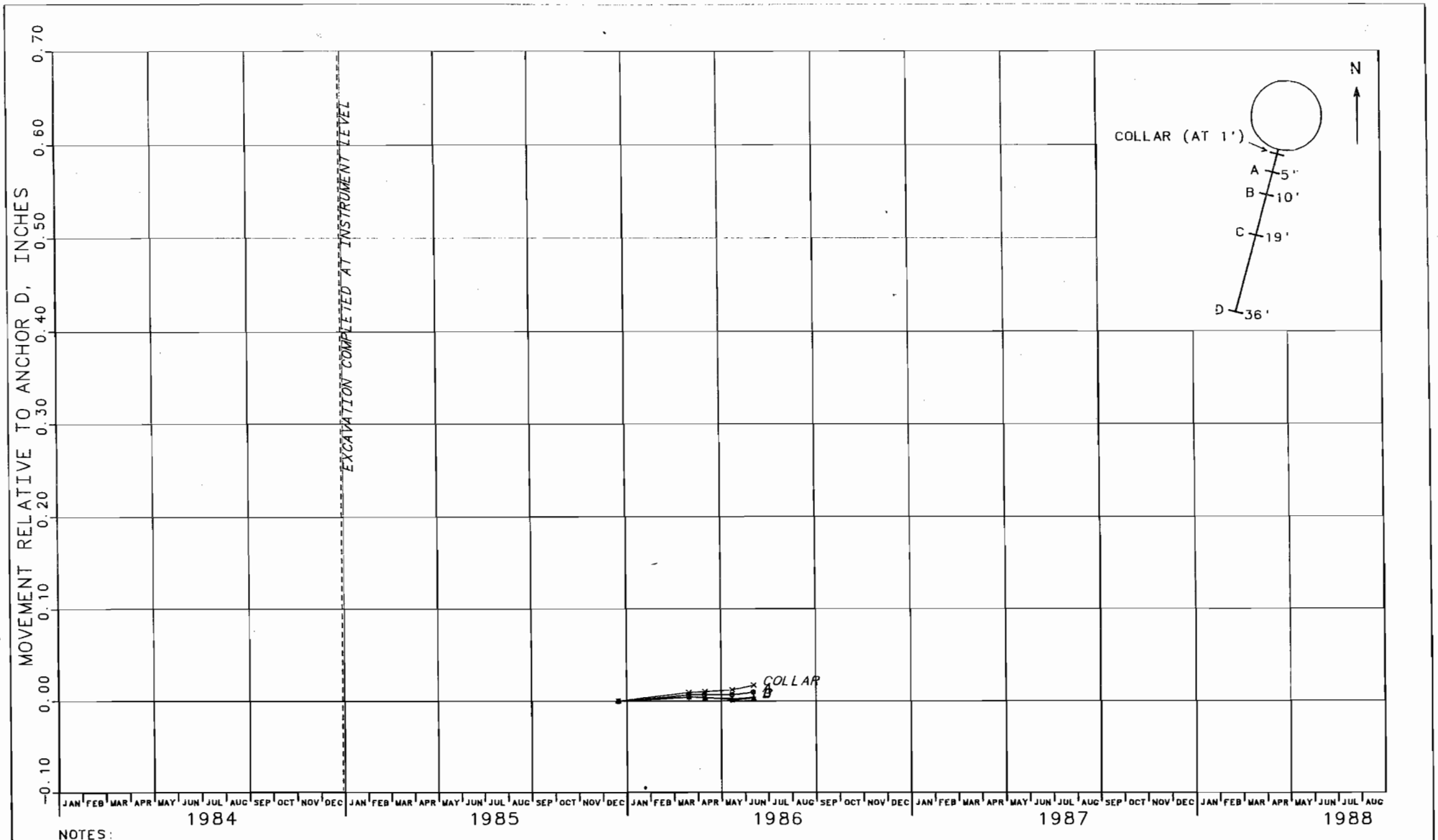
FIGURE J-111
MULTIPLE-POINT EXTENSOMETER 35X-GE-00205
EXHAUST SHAFT - EL 1835.5 - N 45 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 15 FT DIAM.

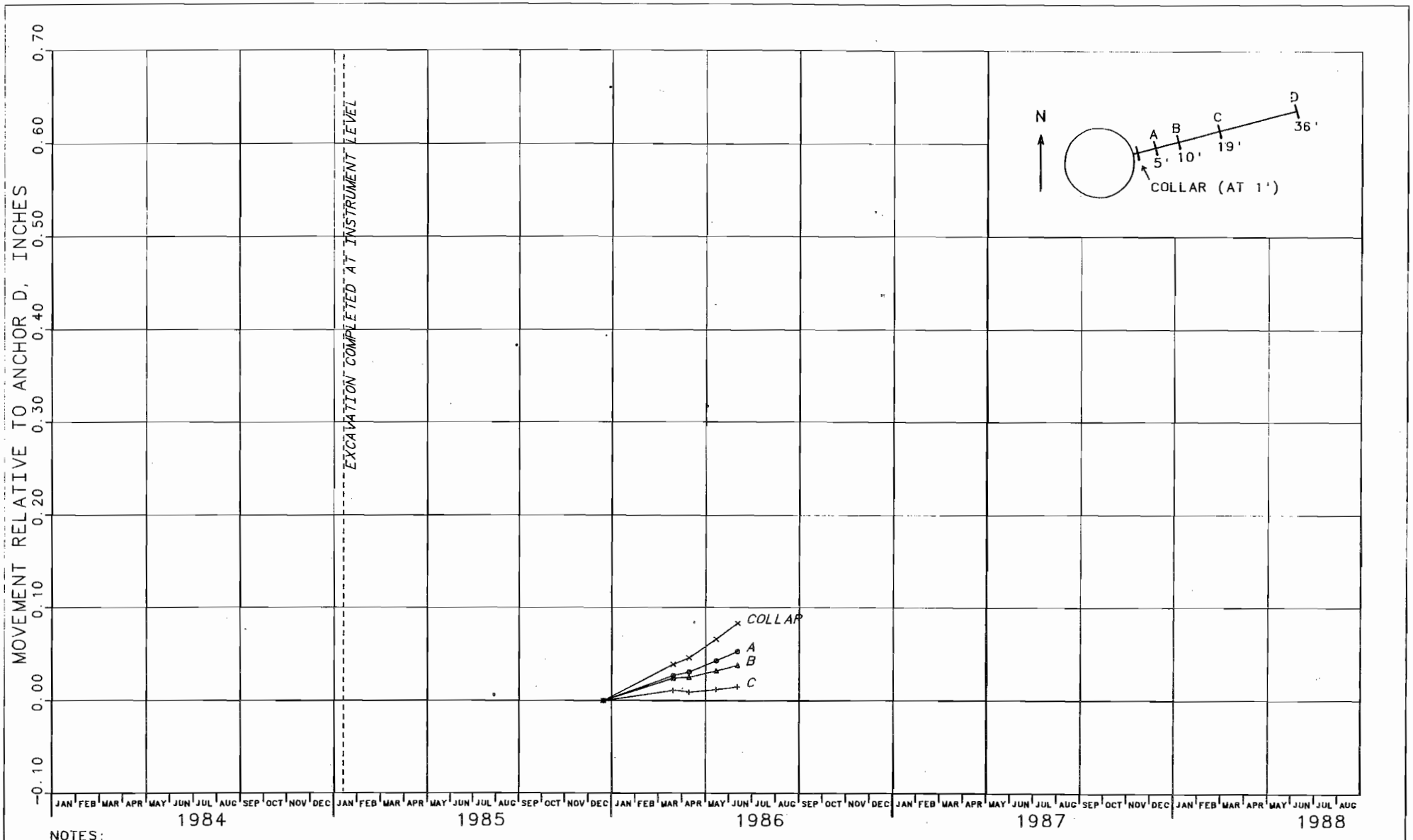
FIGURE J-110
MULTIPLE-POINT EXTENSOMETER 35X-GE-00204
EXHAUST SHAFT - EL 1835.5 - N 76 E
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 15 FT DIAM.

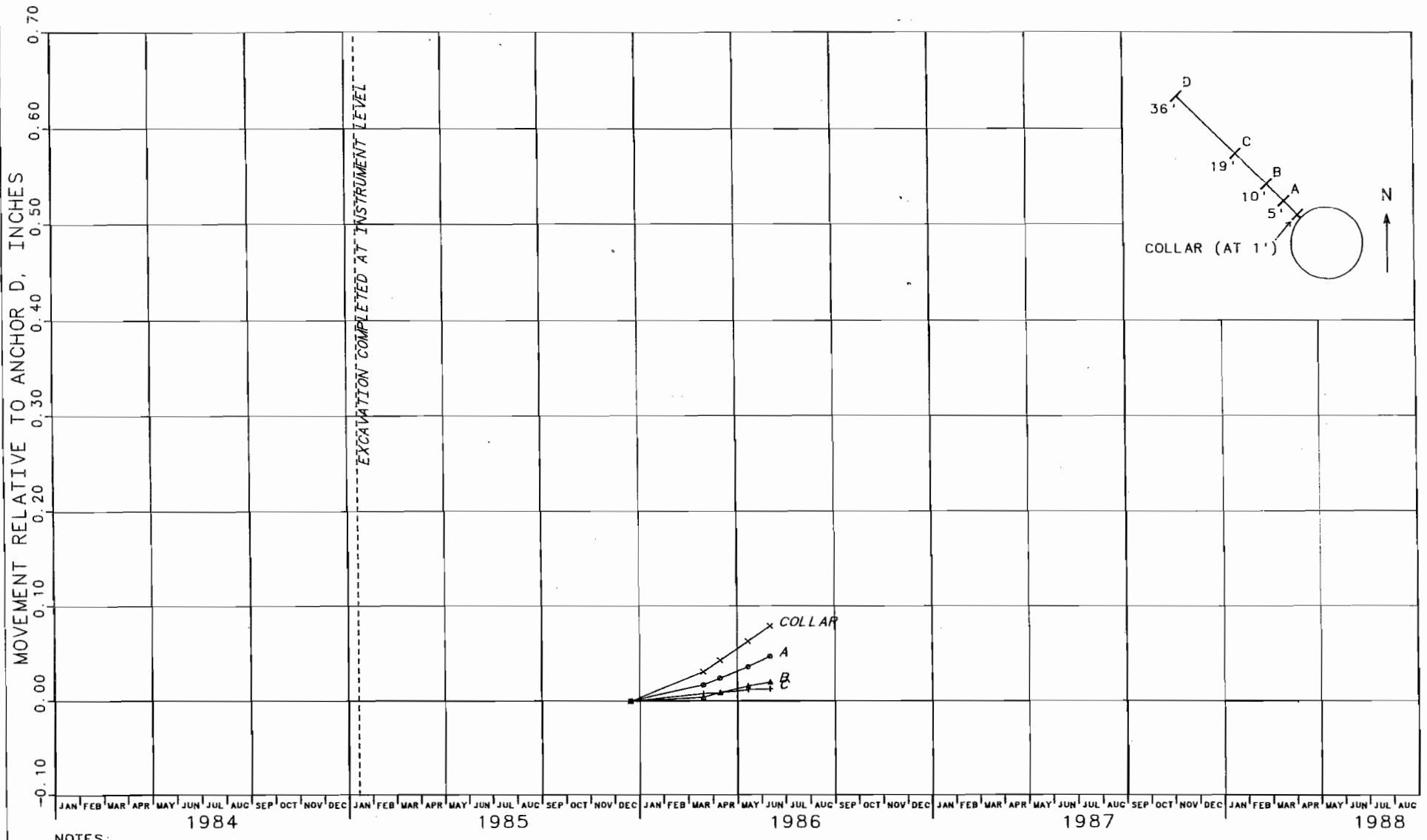
FIGURE J-112
MULTIPLE-POINT EXTENSOMETER 35X-GE-00206
EXHAUST SHAFT - EL 1835.5 - S 15 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 15 FT DIAM.

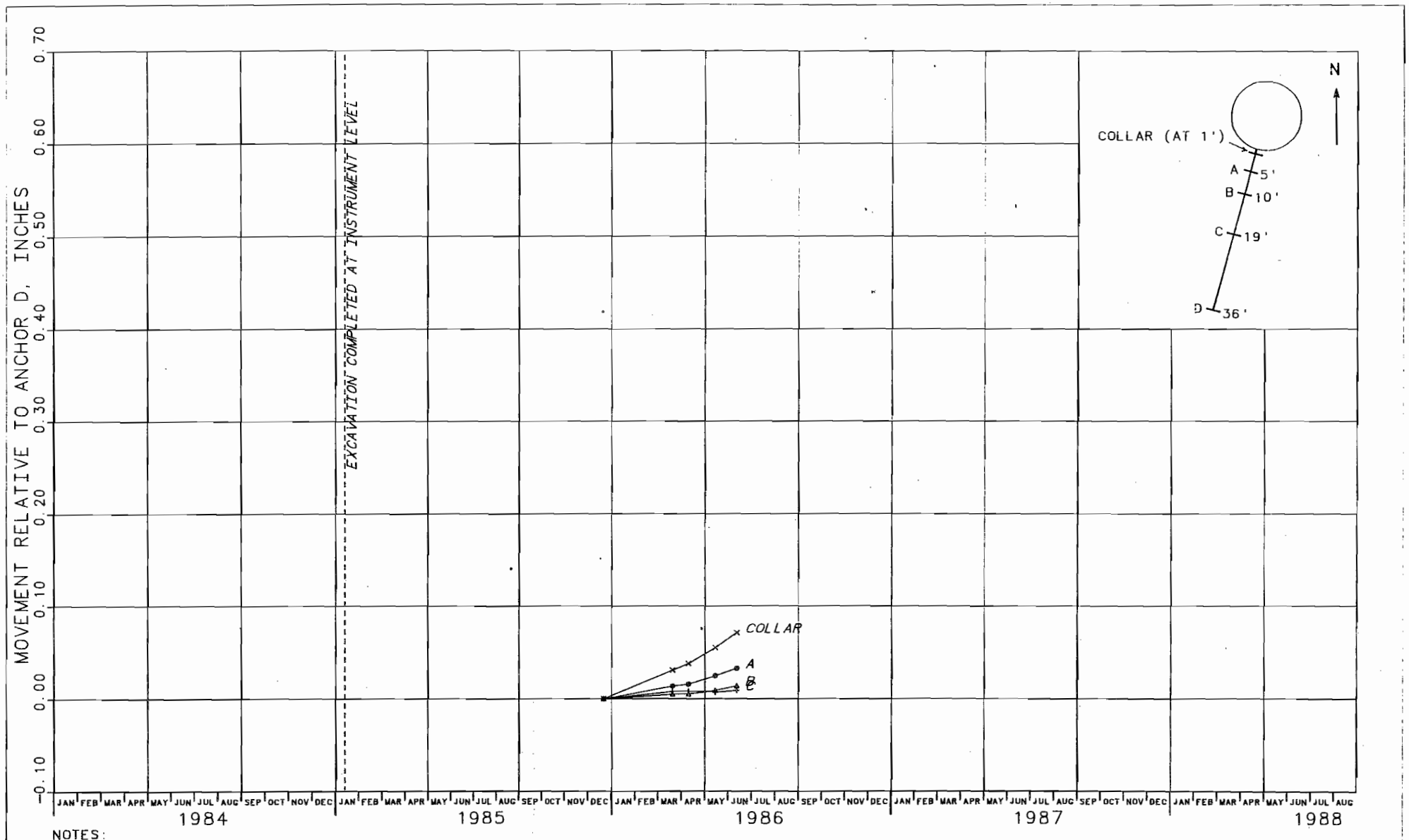
FIGURE J-113
MULTIPLE-POINT EXTENSOMETER 35X-GE-00207
EXHAUST SHAFT - EL 1343 - N 76 E .
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 15 FT DIAM.

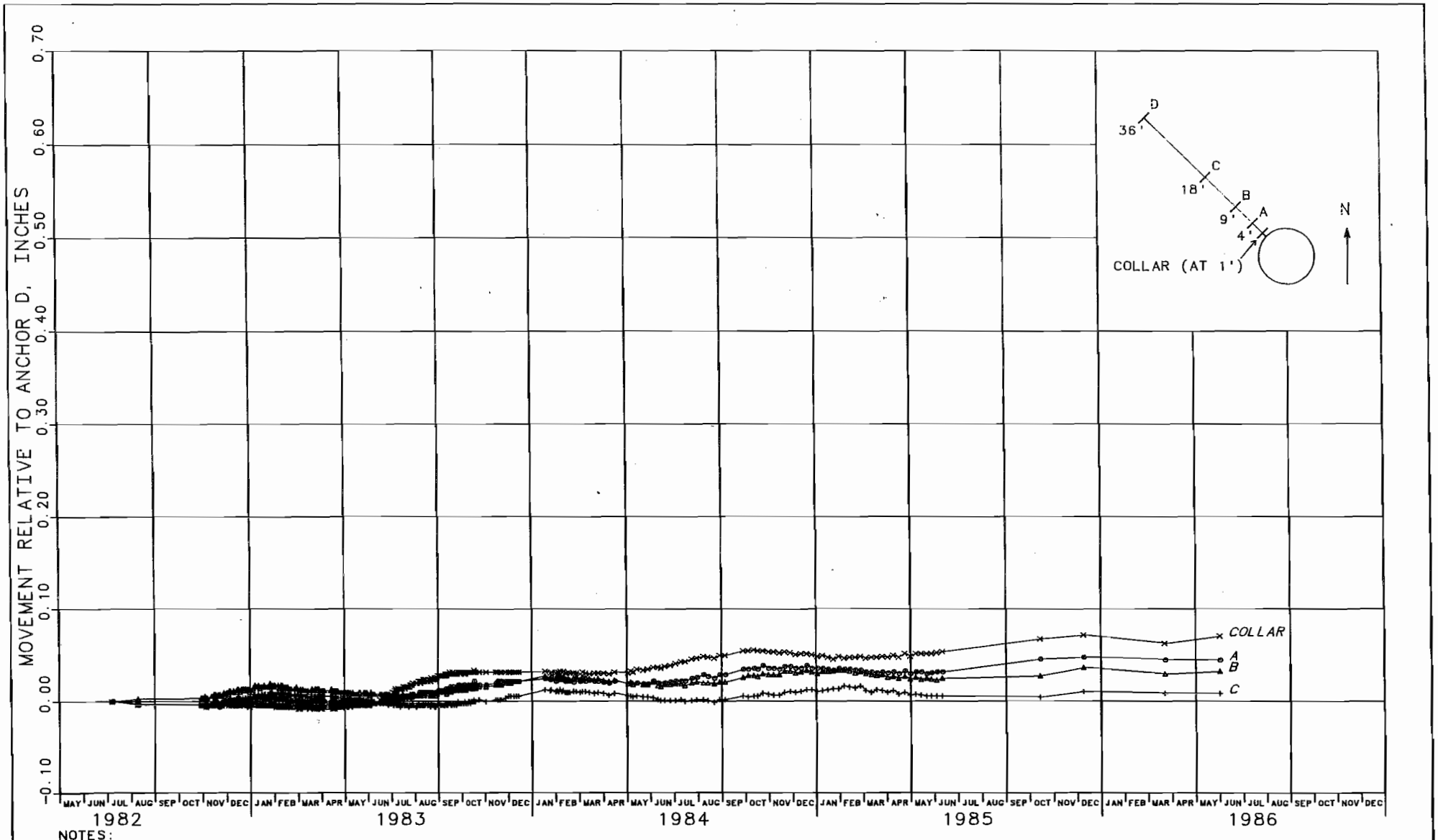
FIGURE J-114
MULTIPLE-POINT EXTENSOMETER 35X-GE-00208
EXHAUST SHAFT - EL 1343 - N 45 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 15 FT DIAM.

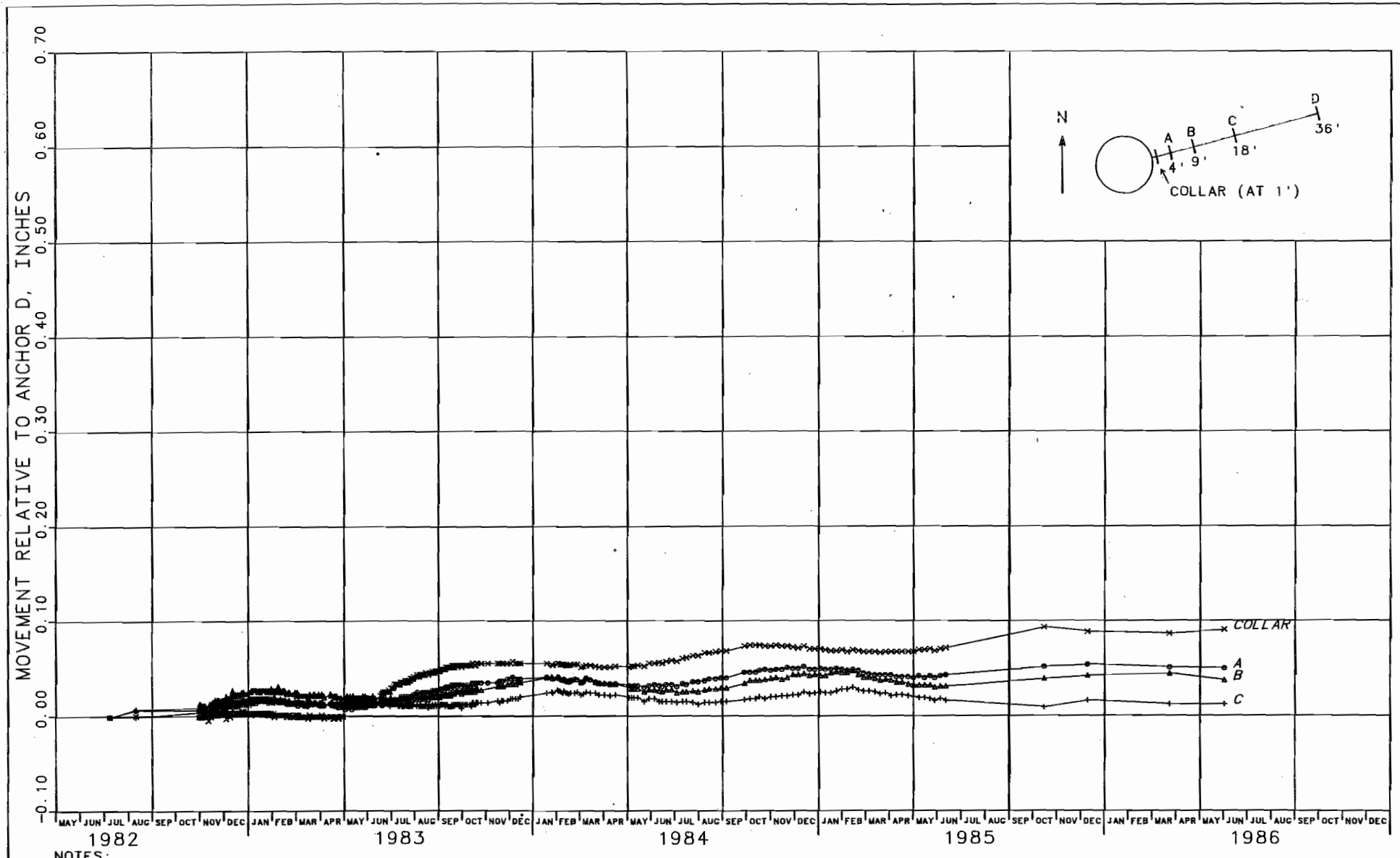
FIGURE J-115
MULTIPLE-POINT EXTENSOMETER 35X-GE-00209
EXHAUST SHAFT - EL 1343 - S 15 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 314 DAYS AFTER EXCAVATION STARTED ON AUG. 28, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

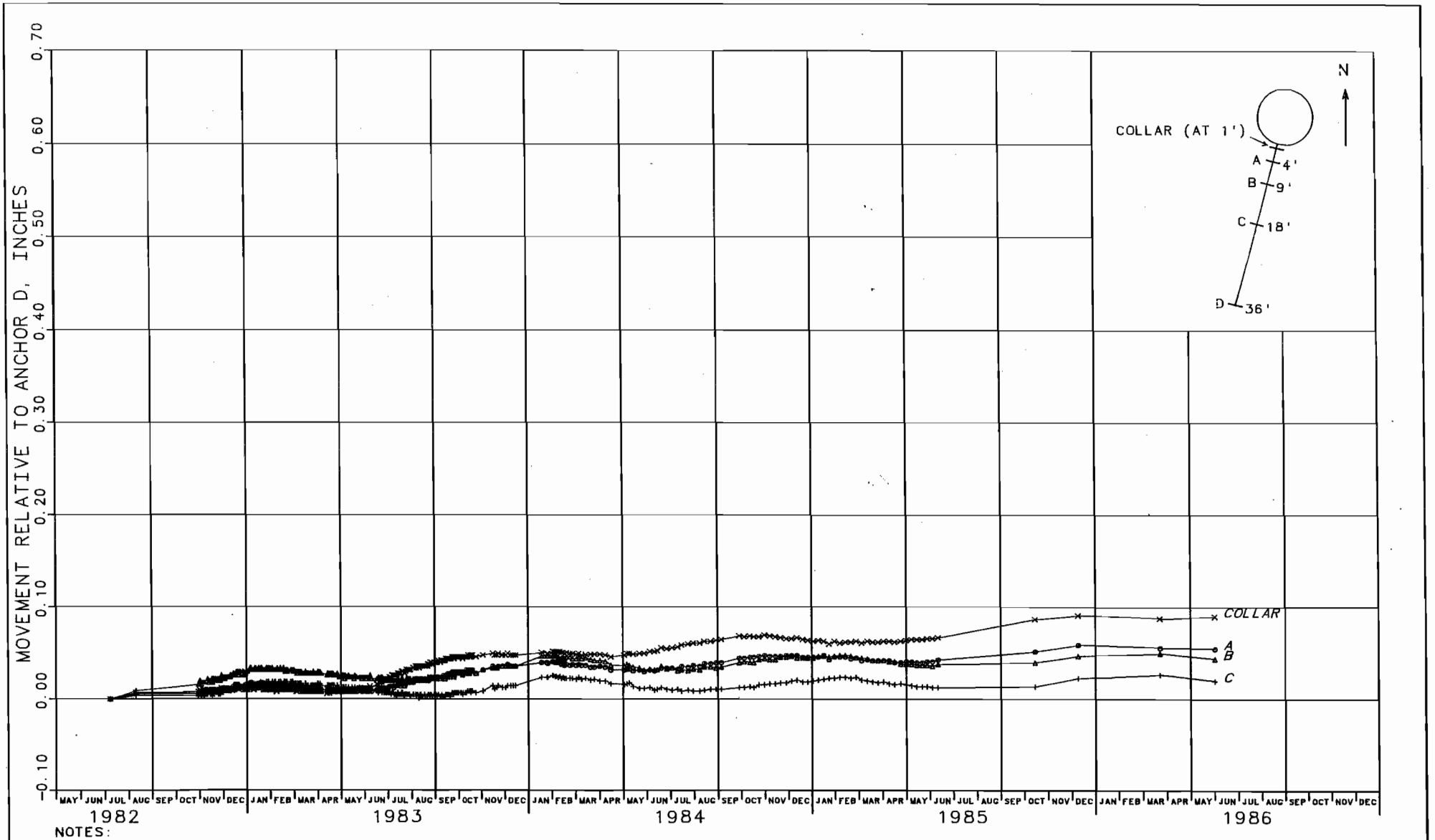
FIGURE J-116
MULTIPLE-POINT EXTENSOMETER 37X-GE-00201
C & SH SHAFT - EL 2337 - N 45 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 314 DAYS AFTER EXCAVATION STARTED ON AUG. 28, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

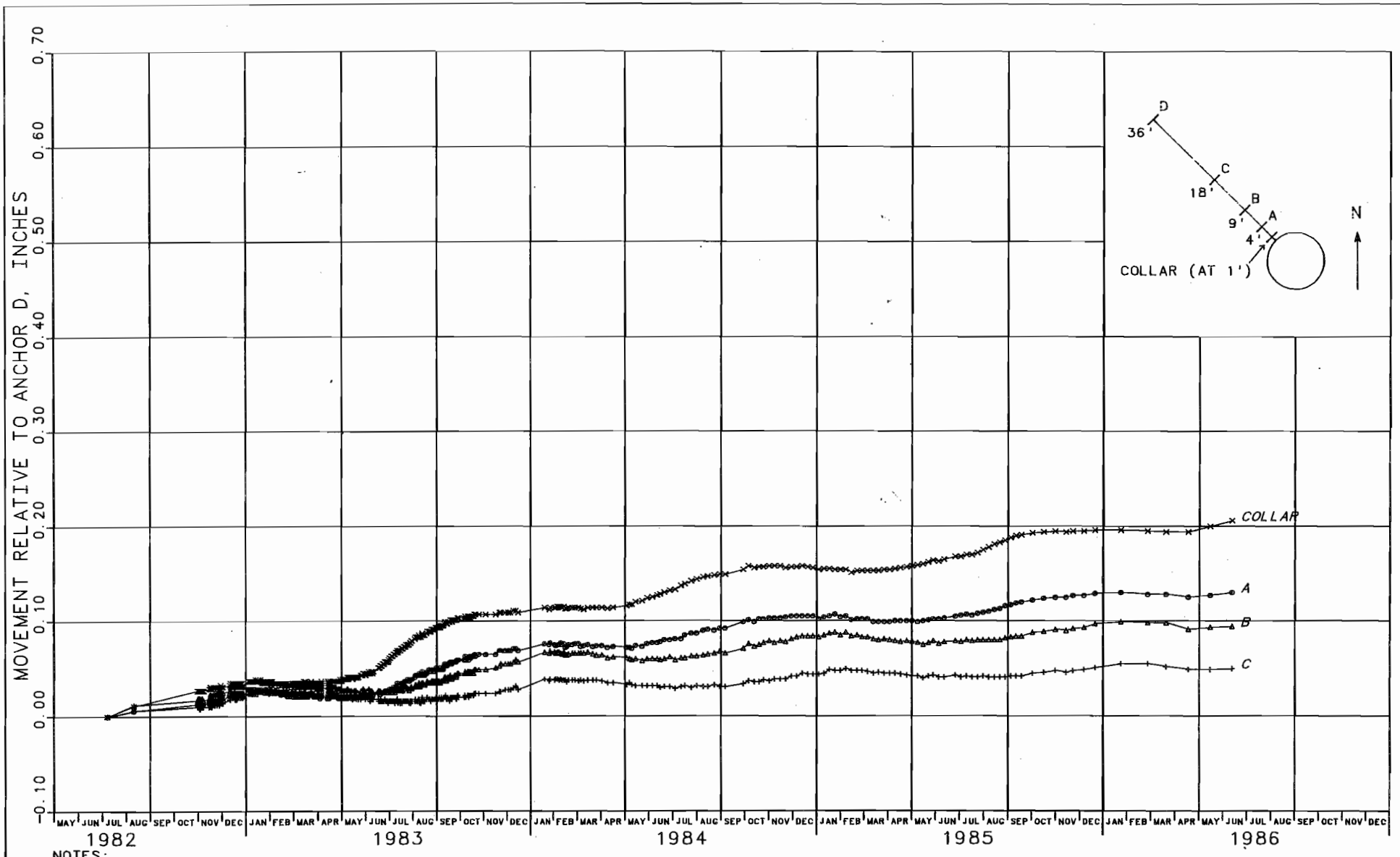
FIGURE J-117
MULTIPLE-POINT EXTENSOMETER 37X-GE-00202
C & SH SHAFT - EL 2337 - N 75 E
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 314 DAYS AFTER EXCAVATION STARTED ON AUG. 28, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

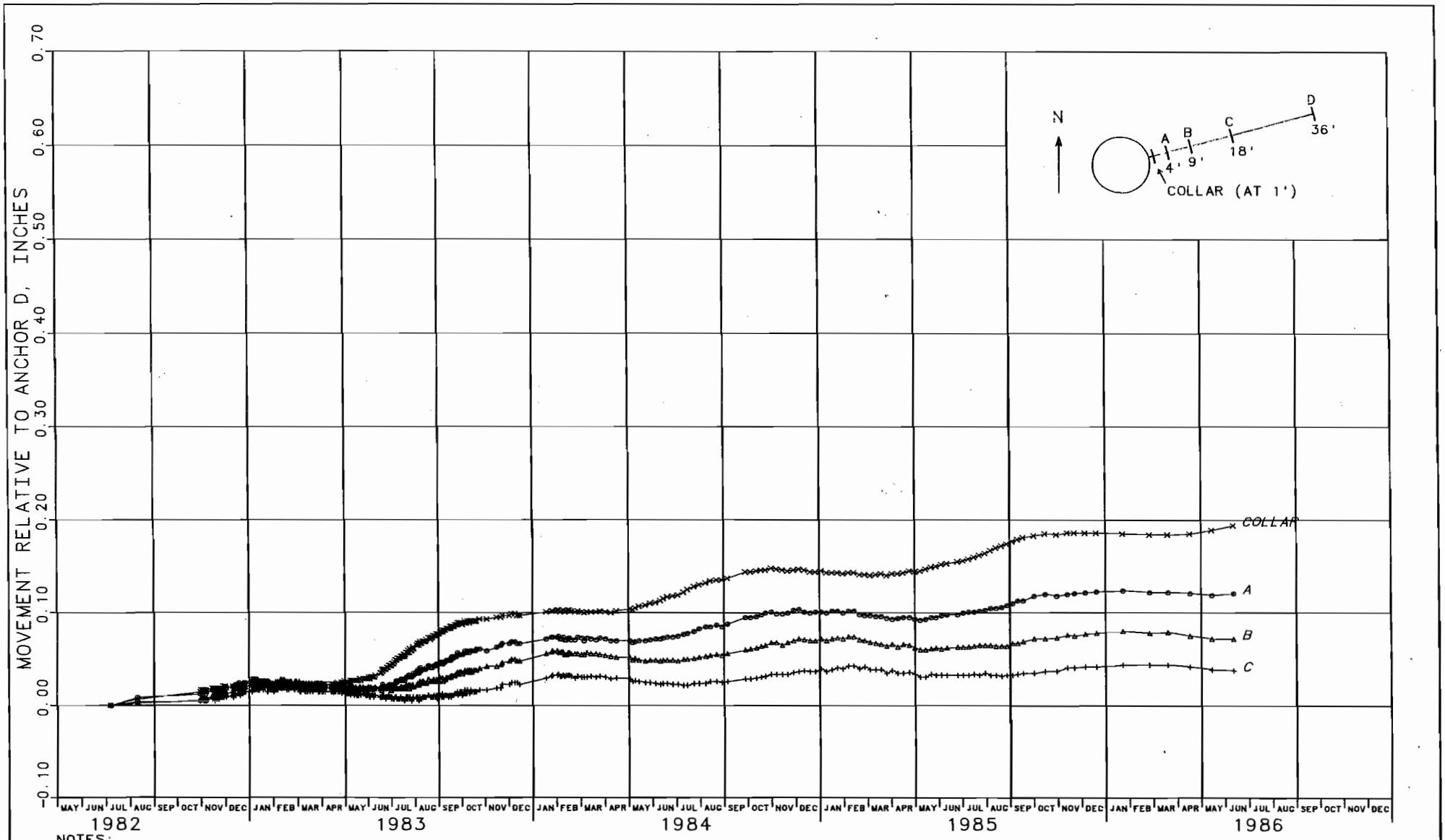
FIGURE J-118
MULTIPLE-POINT EXTENSOMETER 37X-GE-00203
C & SH SHAFT - EL 2337 - S 15 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 292 DAYS AFTER EXCAVATION STARTED ON SEP. 18, 1981.
2. ADJUSTMENT APPLIED TO ALL CURVES ON JAN 19, 1983.
3. SIZE OF EXCAVATION: 12 FT DIAM.

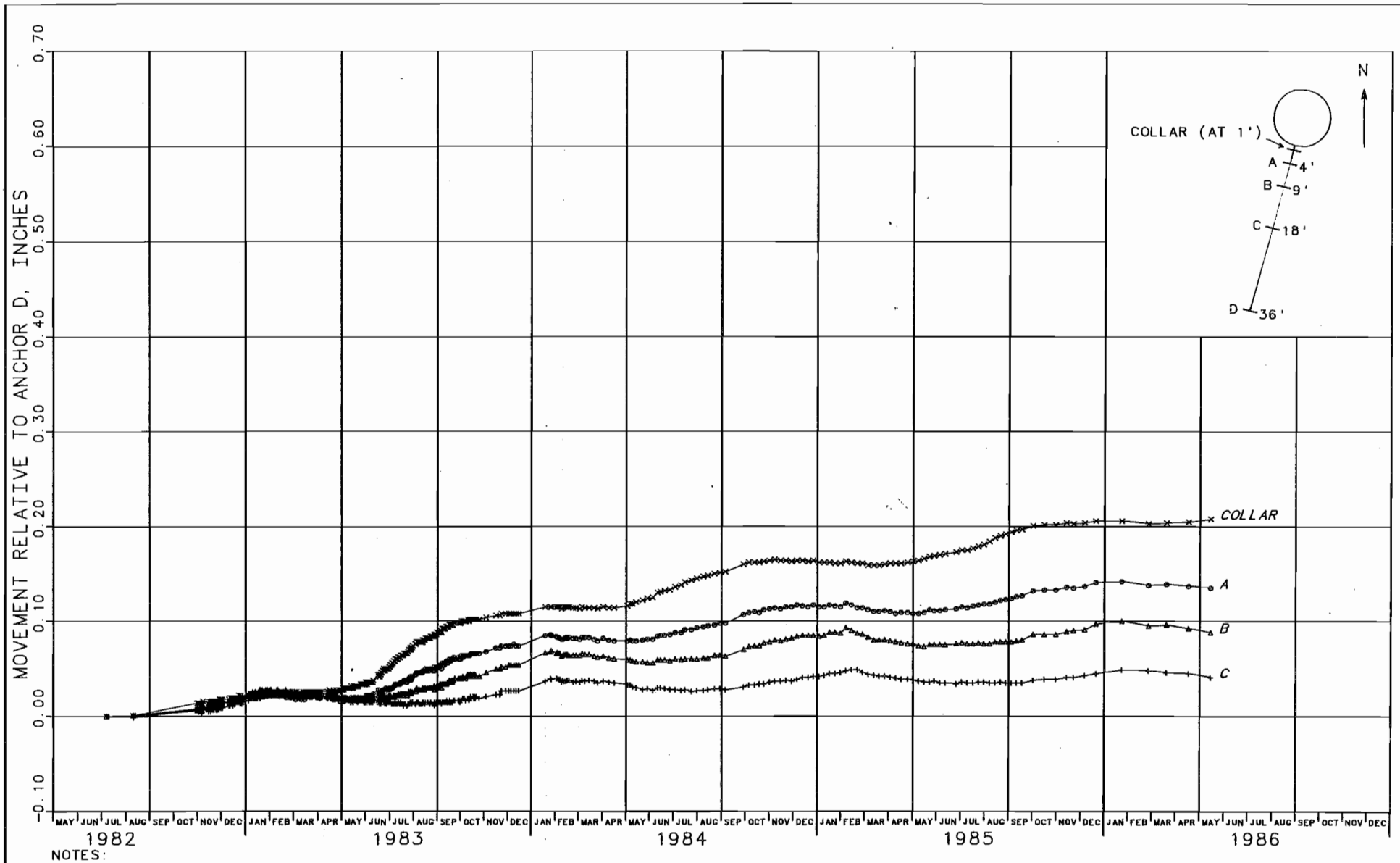
FIGURE J-119
MULTIPLE-POINT EXTENSOMETER 37X-GE-00204
C & SH SHAFT - EL 1844 - N 45 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 292 DAYS AFTER EXCAVATION STARTED ON SEP. 18, 1981.
2. ADJUSTMENT APPLIED TO ALL CURVES ON JAN 23, 1983.
3. SIZE OF EXCAVATION: 12 FT DIAM.

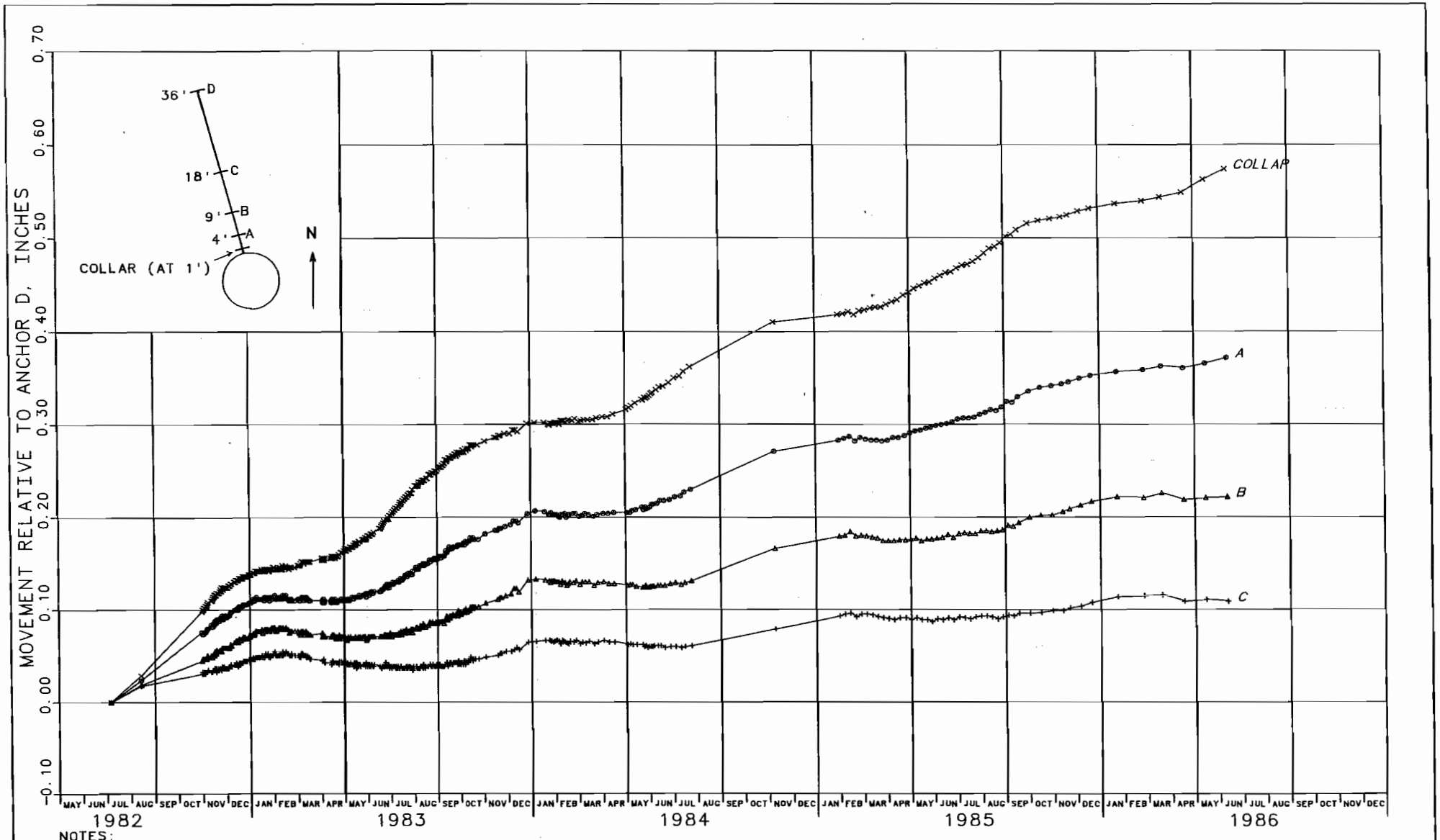
FIGURE J-120
MULTIPLE-POINT EXTENSOMETER 37X-GE-00205
C & SH SHAFT - EL 1844 - N 75 E
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 292 DAYS AFTER EXCAVATION STARTED ON SEP. 18, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

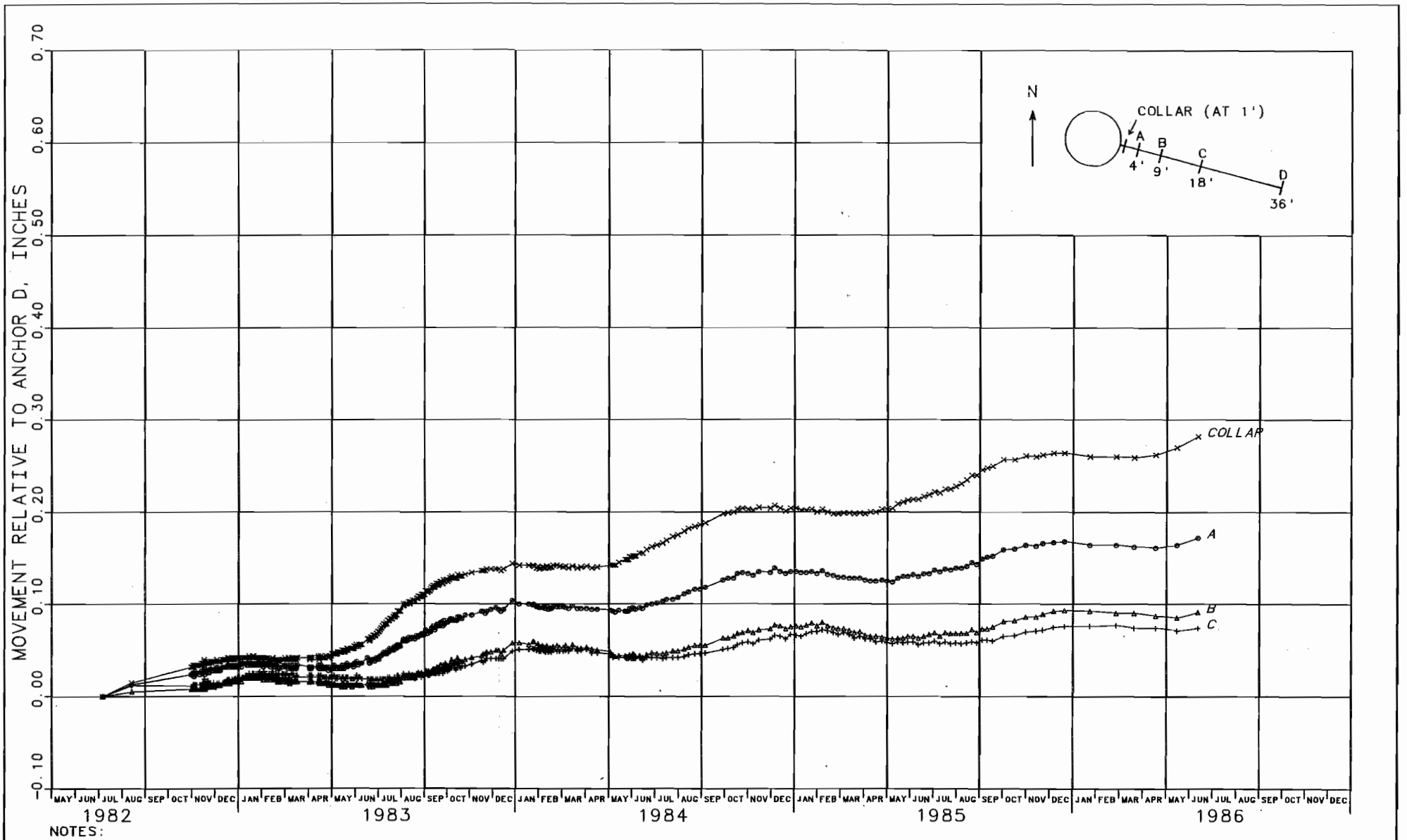
FIGURE J-121
MULTIPLE-POINT EXTENSOMETER 37X-GE-00206
C & SH SHAFT - EL 1844 - S 15 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 268 DAYS AFTER EXCAVATION STARTED ON OCT. 11, 1981.
2. ADJUSTMENT APPLIED TO ALL CURVES ON MAR 18, 1983.
3. SIZE OF EXCAVATION: 12 FT DIAM.

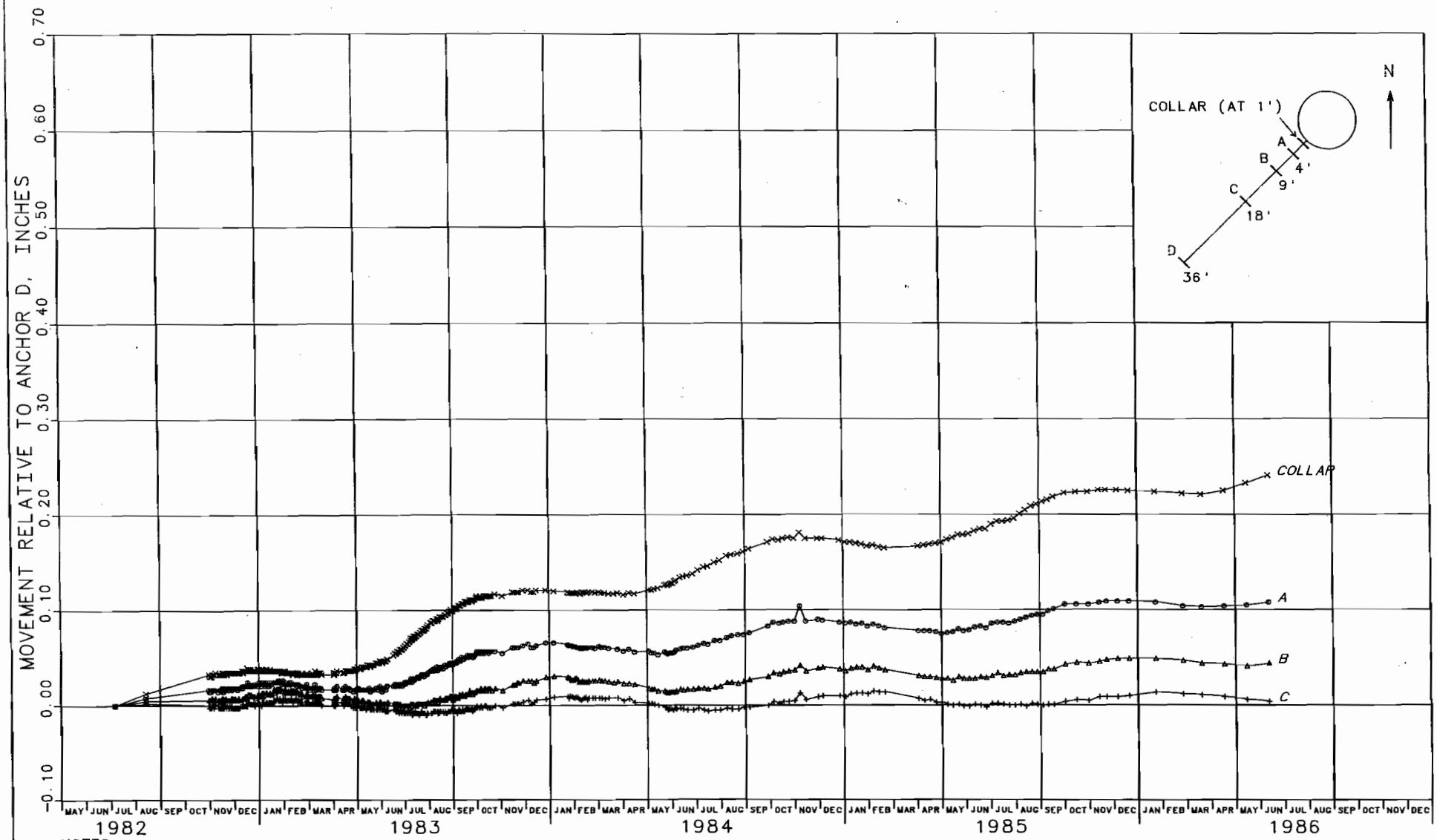
FIGURE J-122
MULTIPLE-POINT EXTENSOMETER 37X-GE-00207
C & SH SHAFT - EL 1351 - N 15 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 268 DAYS AFTER EXCAVATION STARTED ON OCT. 11, 1981.
2. ADJUSTMENT APPLIED TO ALL CURVES ON NOV 25, 1982.
3. SIZE OF EXCAVATION: 12 FT DIAM.

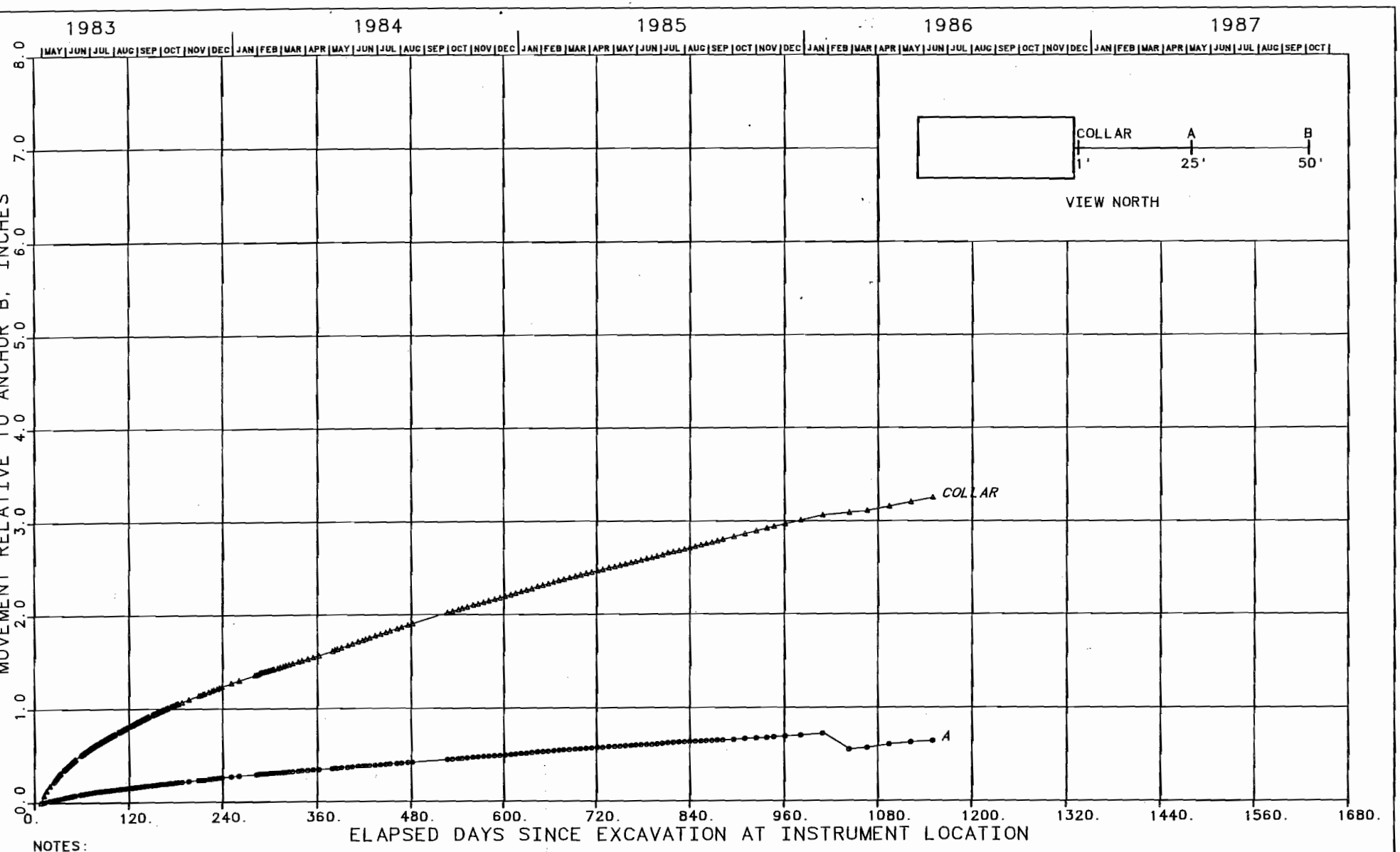
FIGURE J-123
MULTIPLE-POINT EXTENSOMETER 37X-GE-00208
C & SH SHAFT - EL 1351 - S 75 E
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 268 DAYS AFTER EXCAVATION STARTED ON OCT. 11, 1981.
2. ADJUSTMENT APPLIED TO ALL CURVES ON JAN 18, 1983.
3. SIZE OF EXCAVATION: 12 FT DIAM.

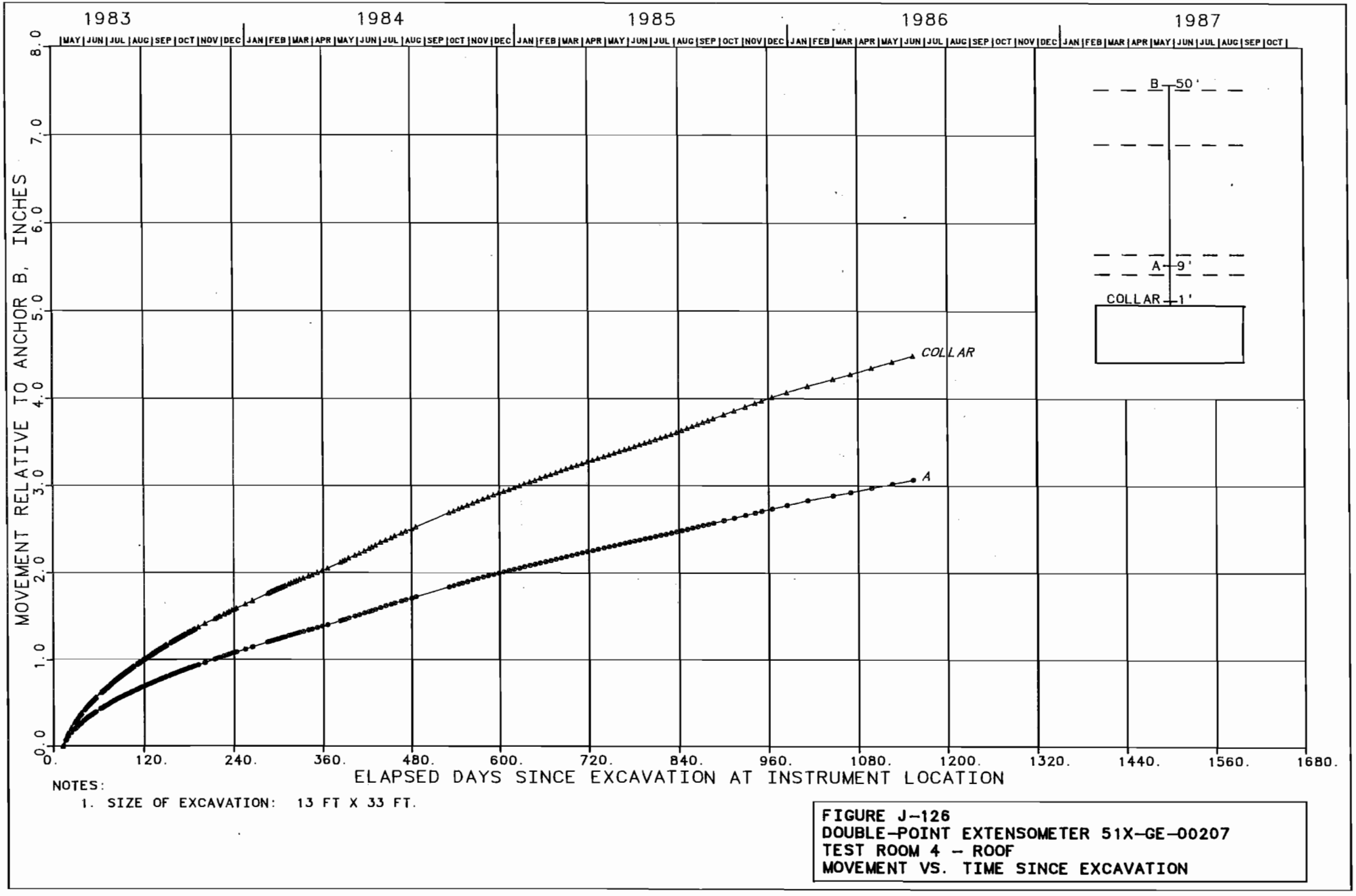
FIGURE J-124
MULTIPLE-POINT EXTENSOMETER 37X-GE-00209
C & SH SHAFT - EL 1351 - S 45 W
MOVEMENT VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

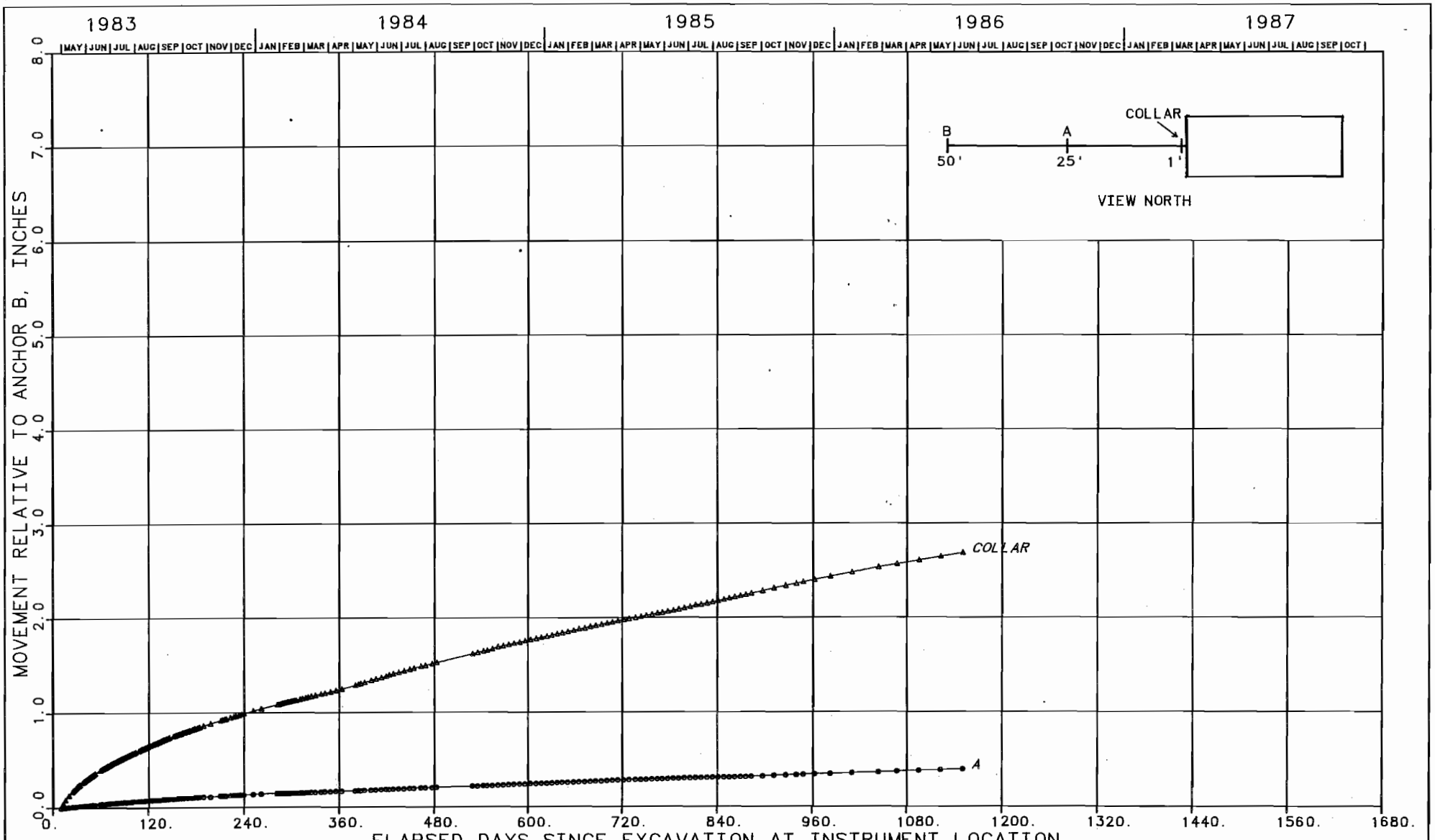
FIGURE J-125
DOUBLE-POINT EXTENSOMETER 51X-GE-00206
TEST ROOM 4 - E WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

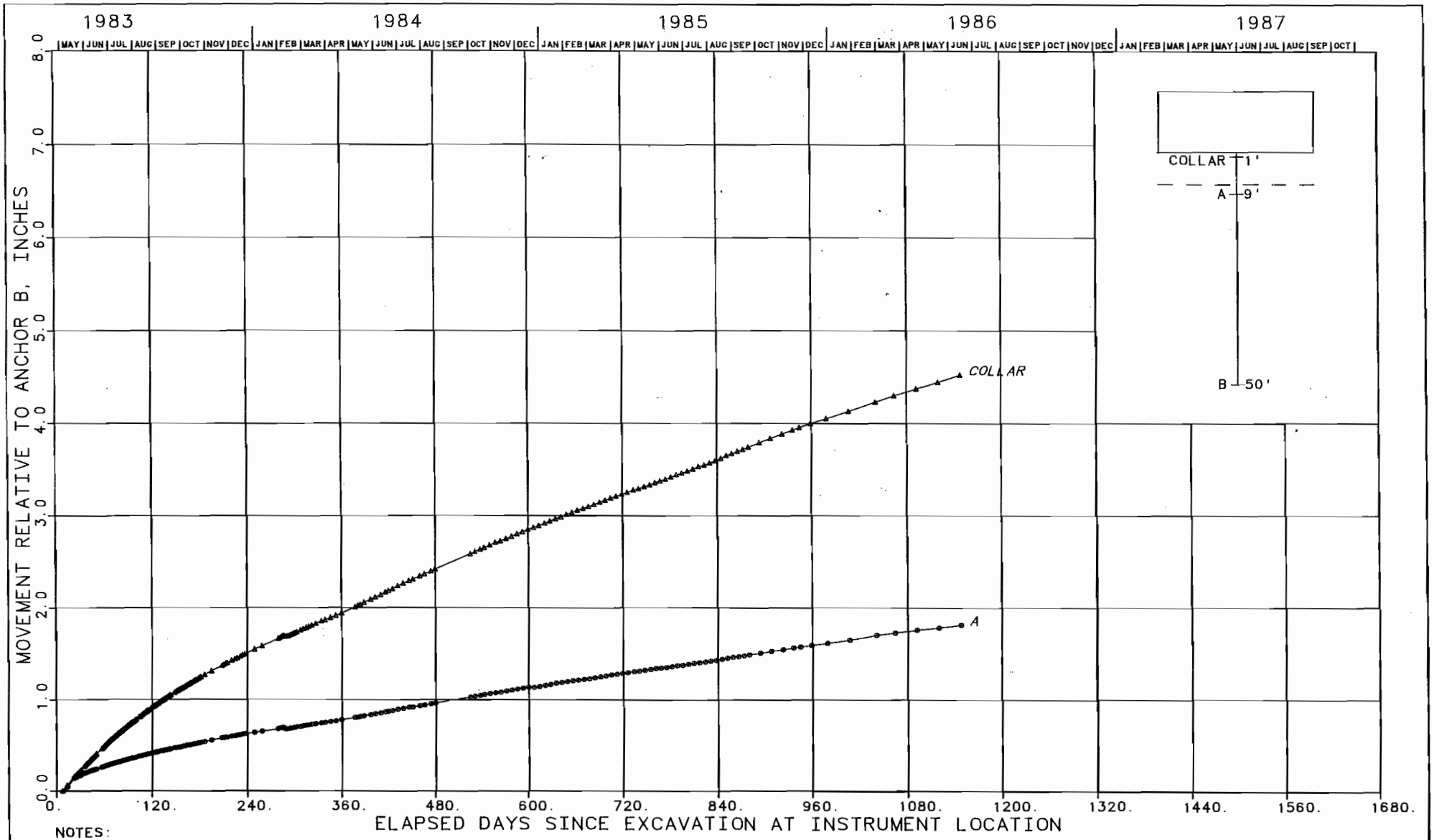
FIGURE J-126
DOUBLE-POINT EXTENSOMETER 51X-GE-00207
TEST ROOM 4 - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

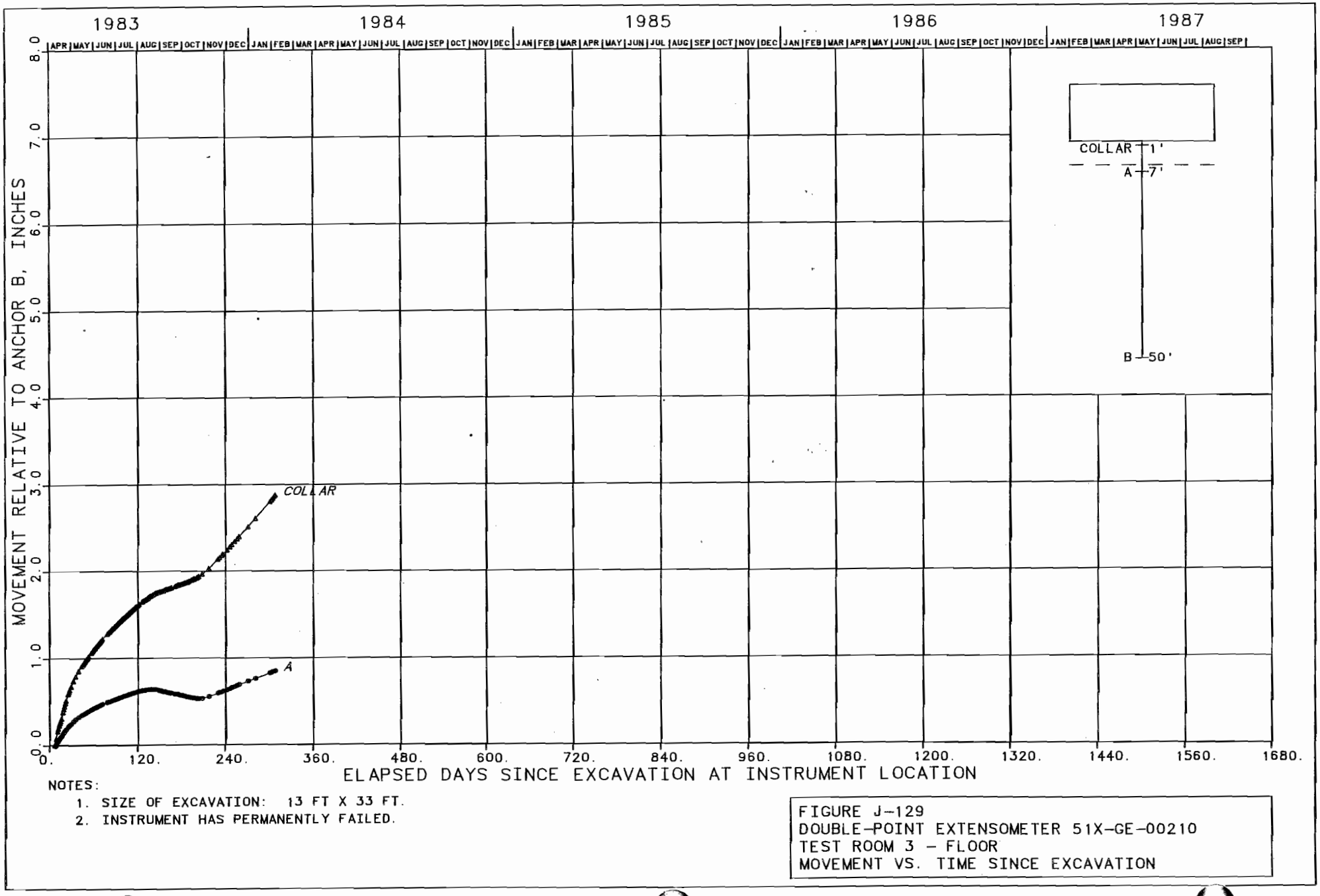
FIGURE J-127
DOUBLE-POINT EXTENSOMETER 51X-GE-00208
TEST ROOM 4 - W WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

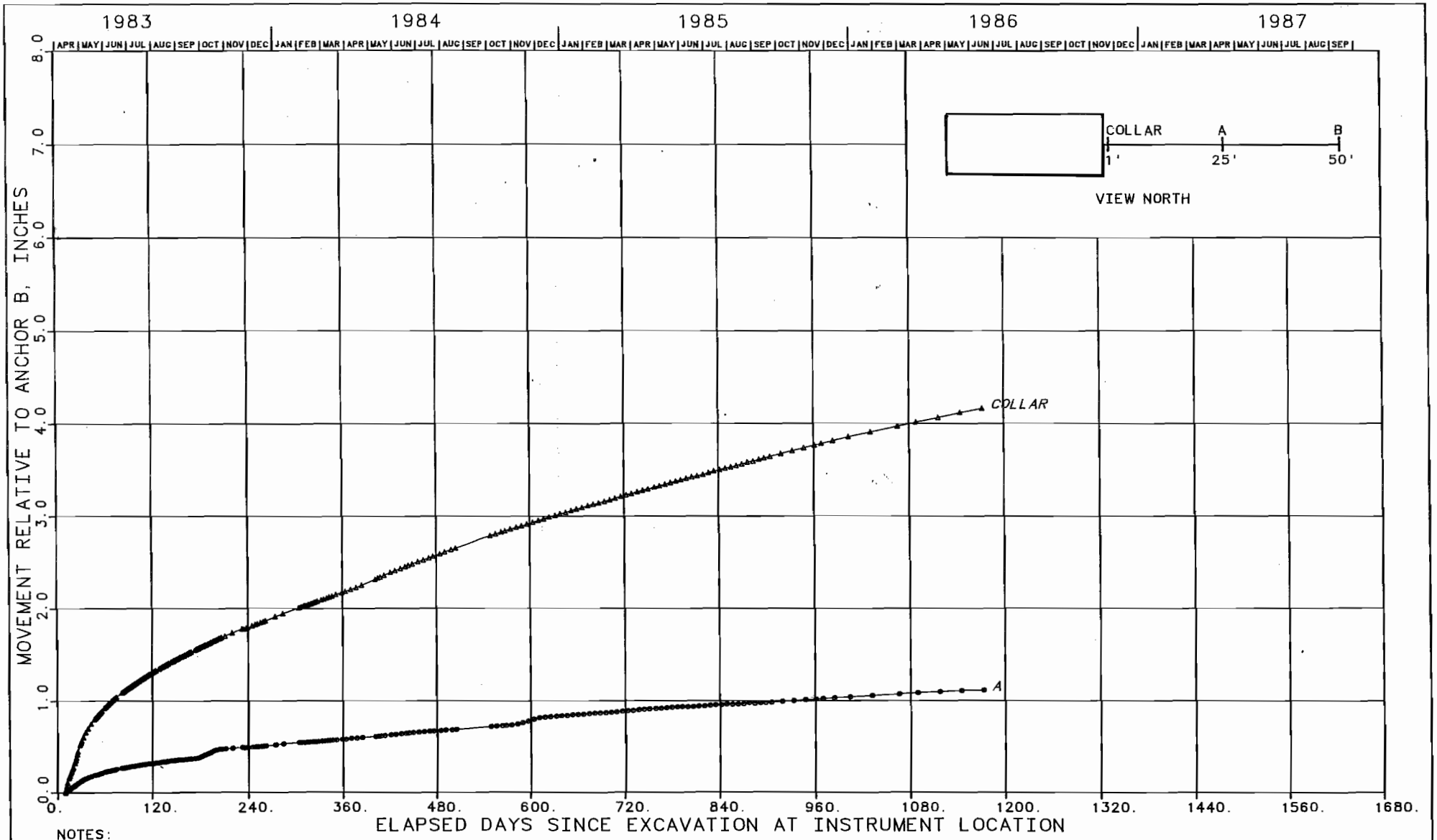
FIGURE J-128
DOUBLE-POINT EXTENSOMETER 51X-GE-00209
TEST ROOM 4 - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.
2. INSTRUMENT HAS PERMANENTLY FAILED.

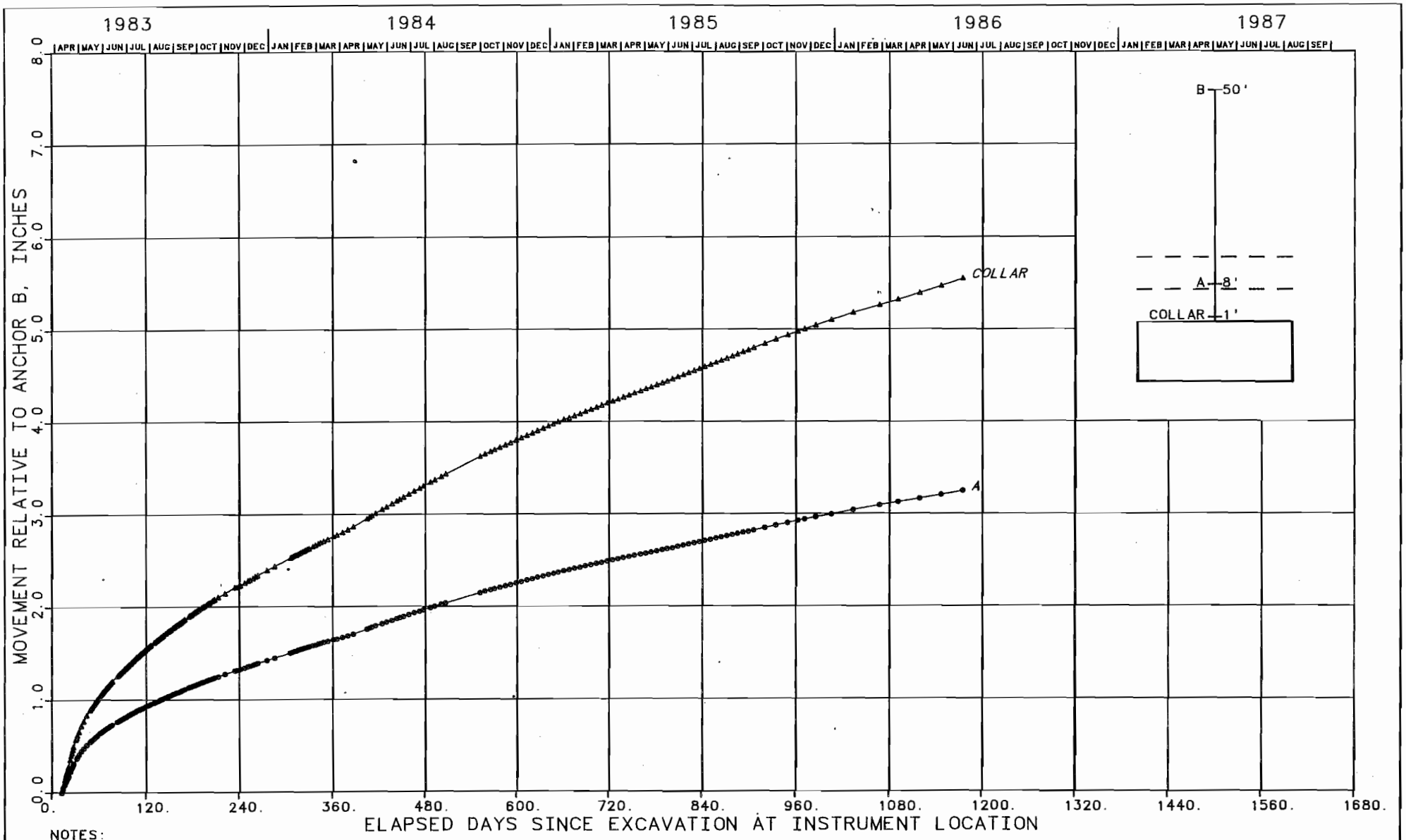
FIGURE J-129
DOUBLE-POINT EXTENSOMETER 51X-GE-00210
TEST ROOM 3 - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

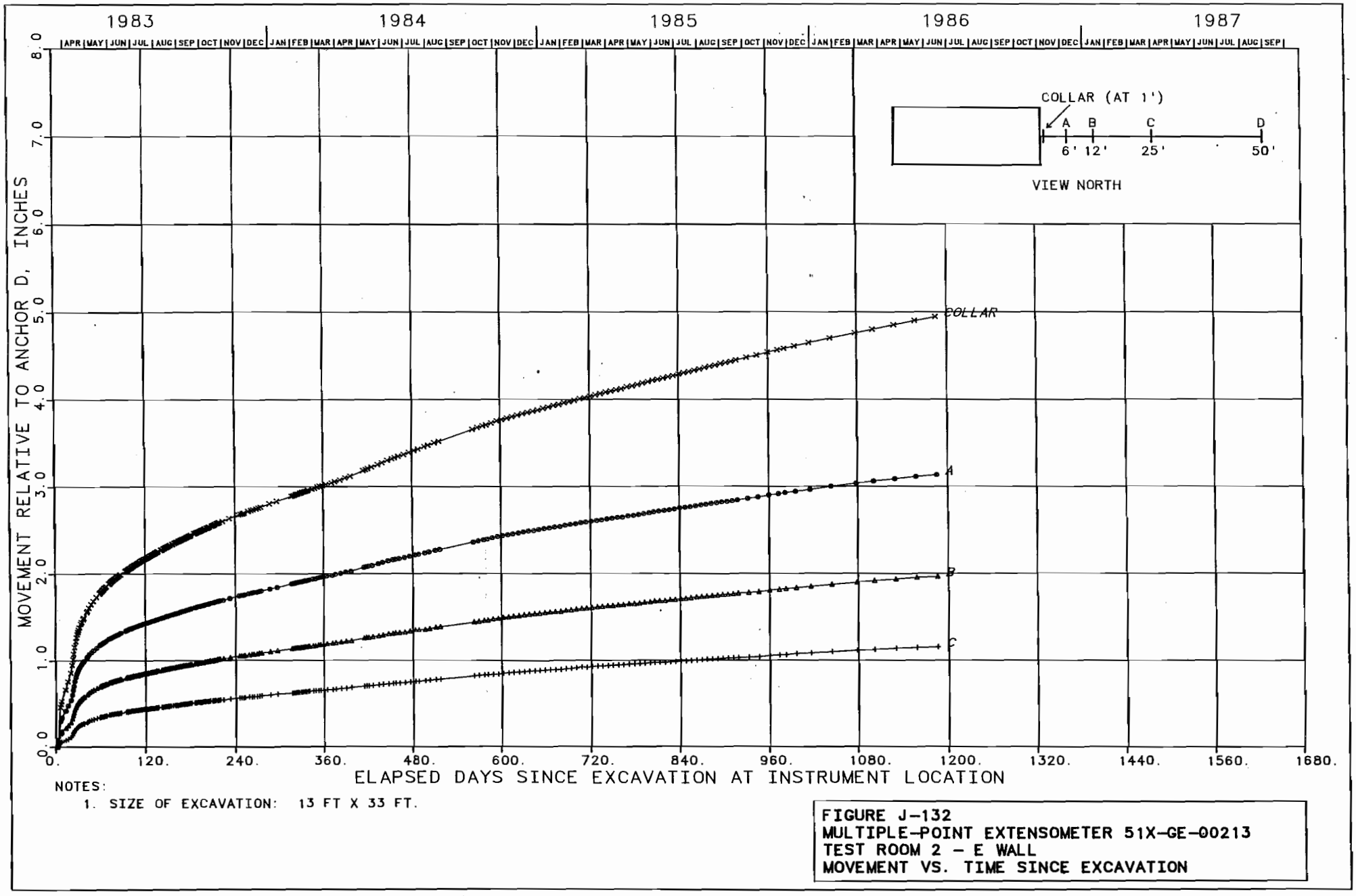
FIGURE J-130
DOUBLE-POINT EXTENSOMETER 51X-GE-00211
TEST ROOM 3 - E WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

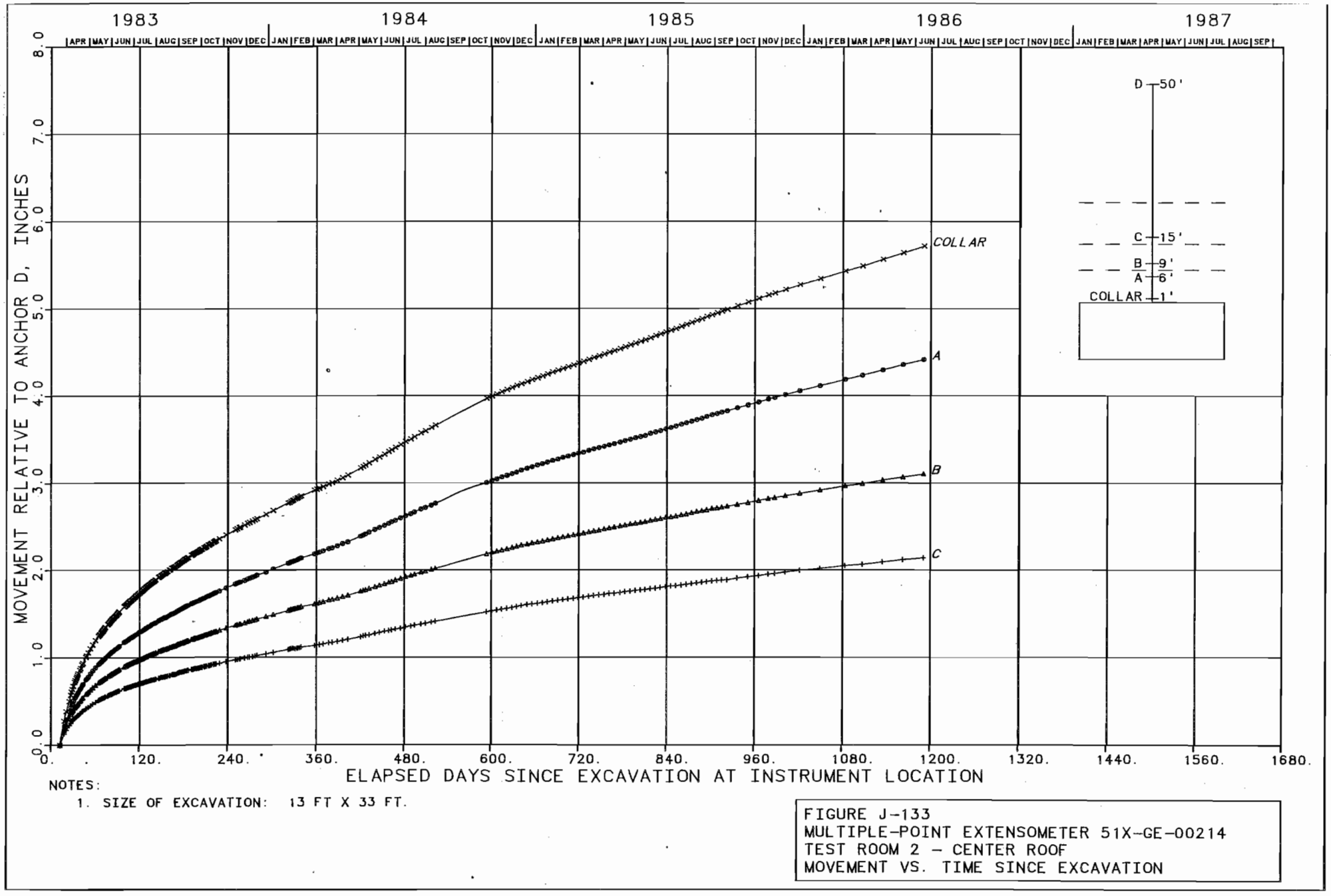
FIGURE J-131
DOUBLE-POINT EXTENSOMETER 51X-GE-00212
TEST ROOM 3 - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

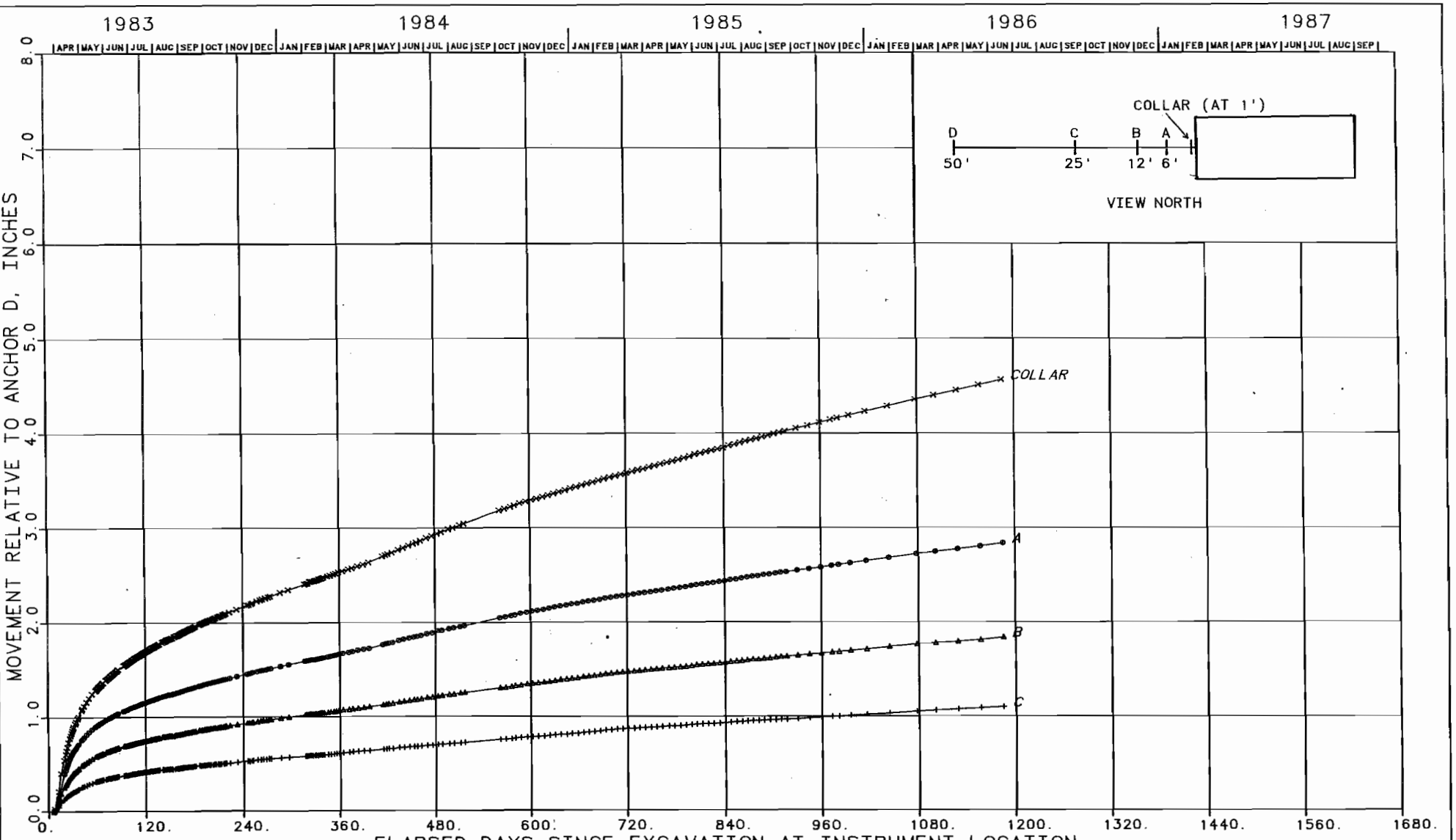
FIGURE J-132
MULTIPLE-POINT EXTENSOMETER 51X-GE-00213
TEST ROOM 2 - E WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

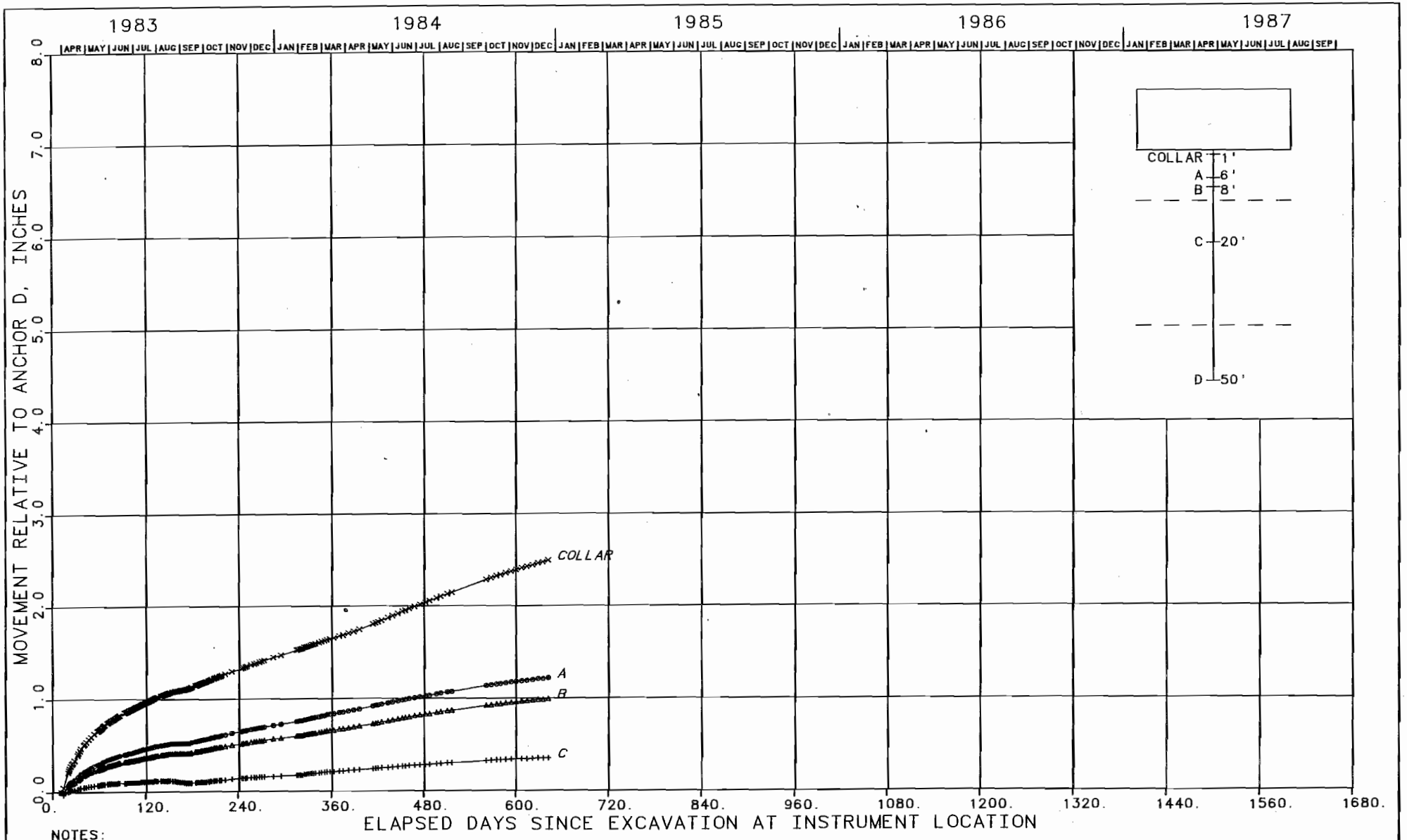
FIGURE J-133
MULTIPLE-POINT EXTENSOMETER 51X-GE-00214
TEST ROOM 2 – CENTER ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

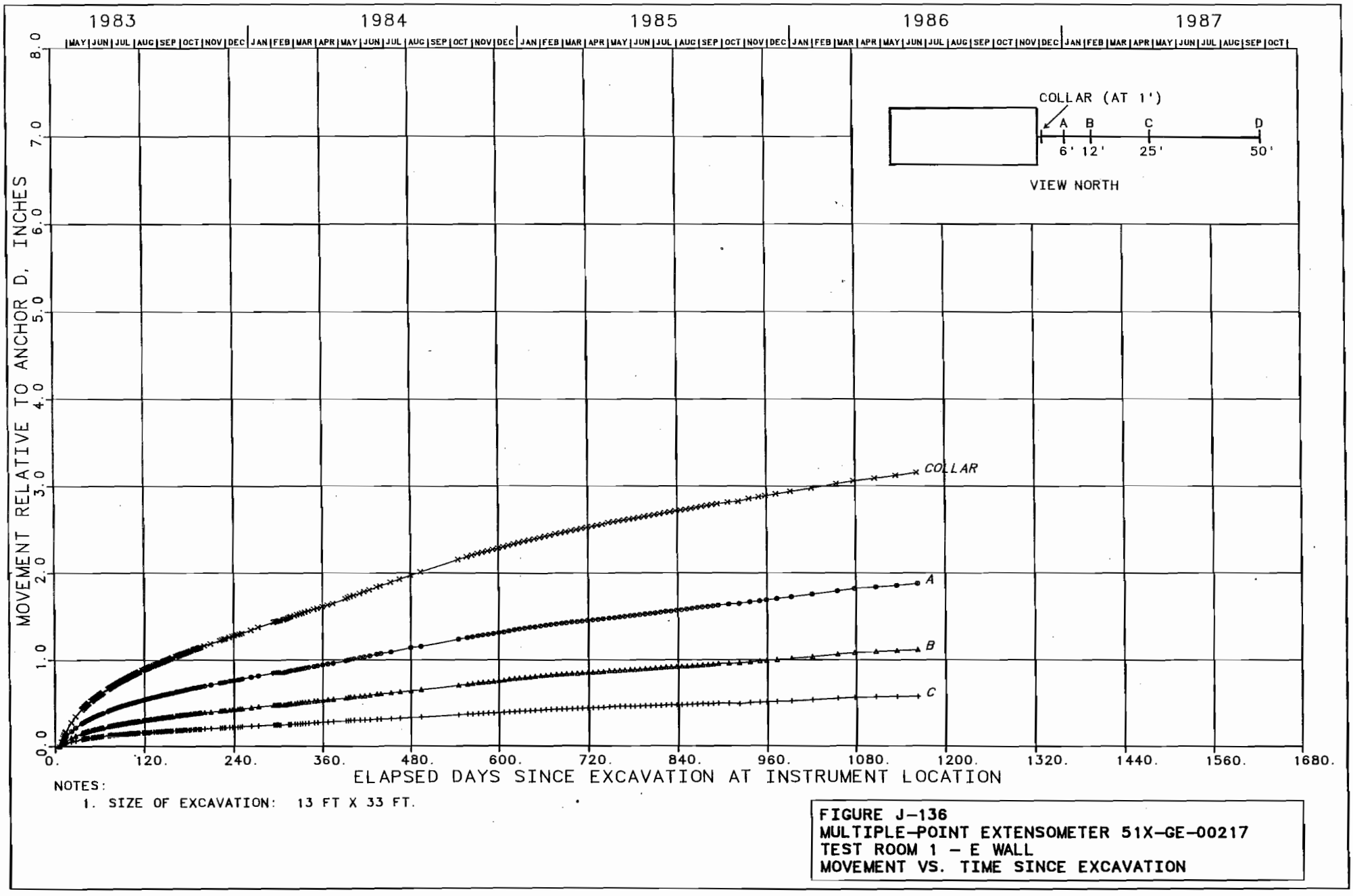
FIGURE J-134
MULTIPLE-POINT EXTENSOMETER 51X-GE-00215
TEST ROOM 2 - W WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.
2. INSTRUMENT HAS PERMANENTLY FAILED.

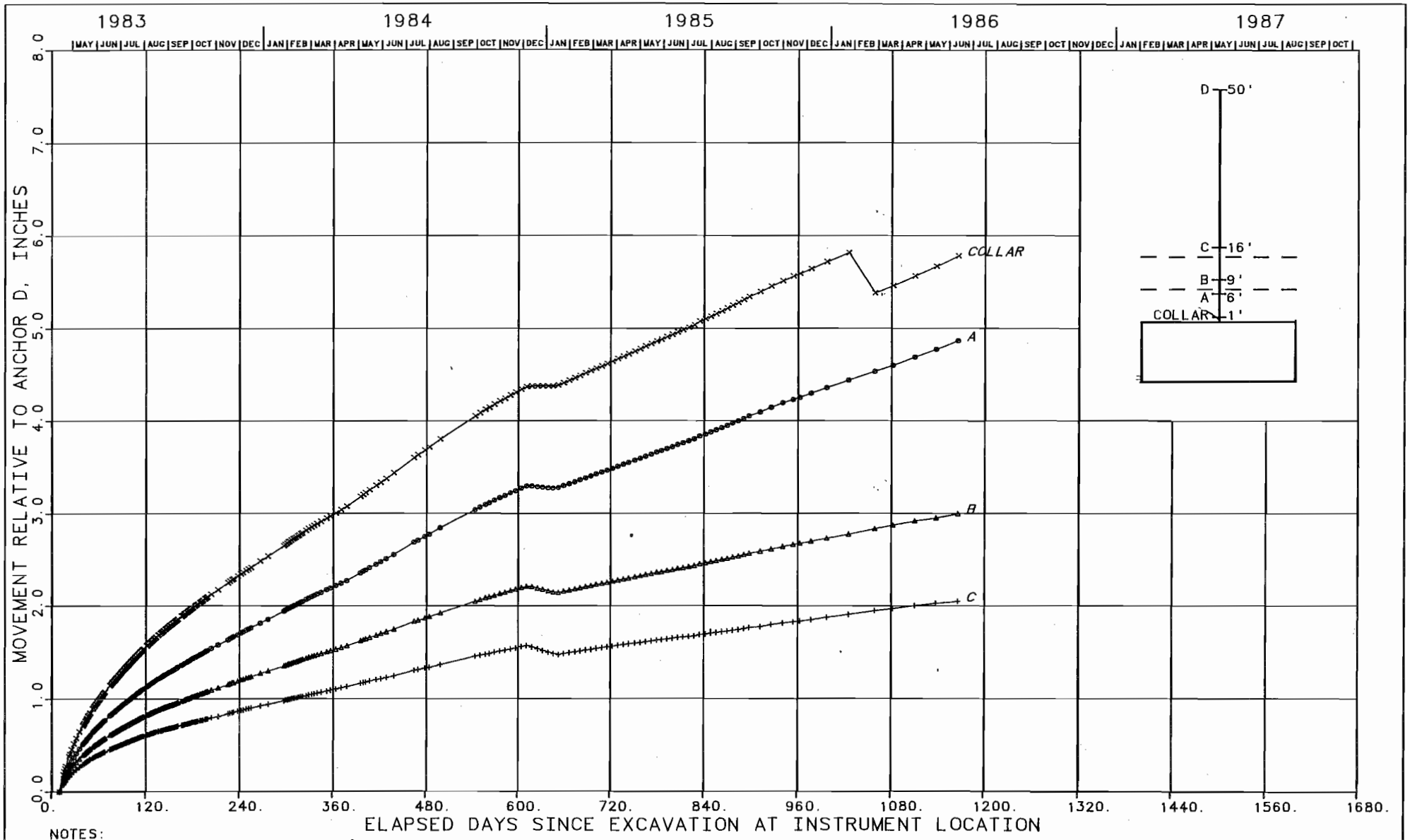
FIGURE J-135
MULTIPLE-POINT EXTENSOMETER 51X-GE-00216
TEST ROOM 2 - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

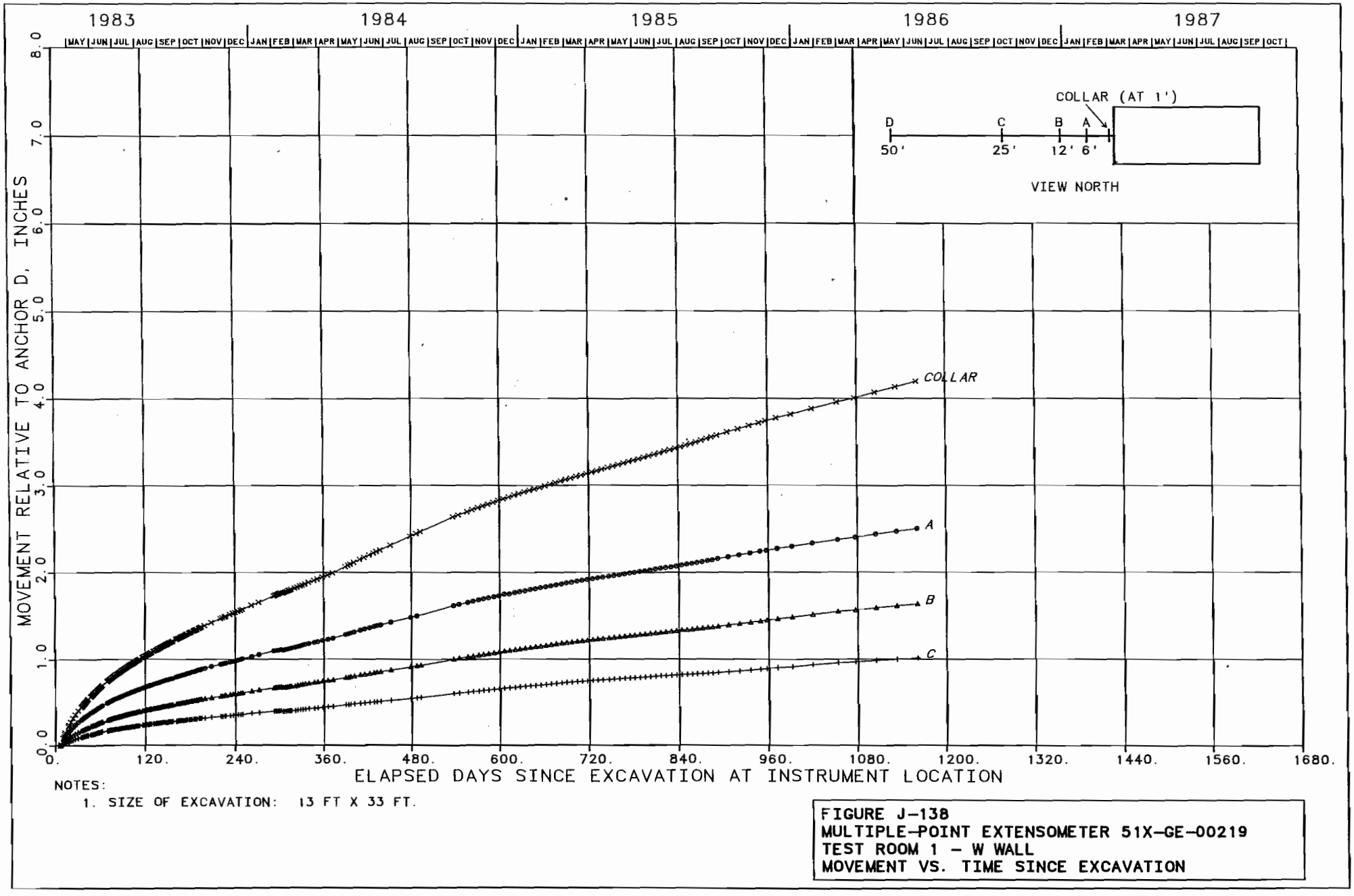
FIGURE J-136
MULTIPLE-POINT EXTENSOMETER 51X-GE-00217
TEST ROOM 1 - E WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

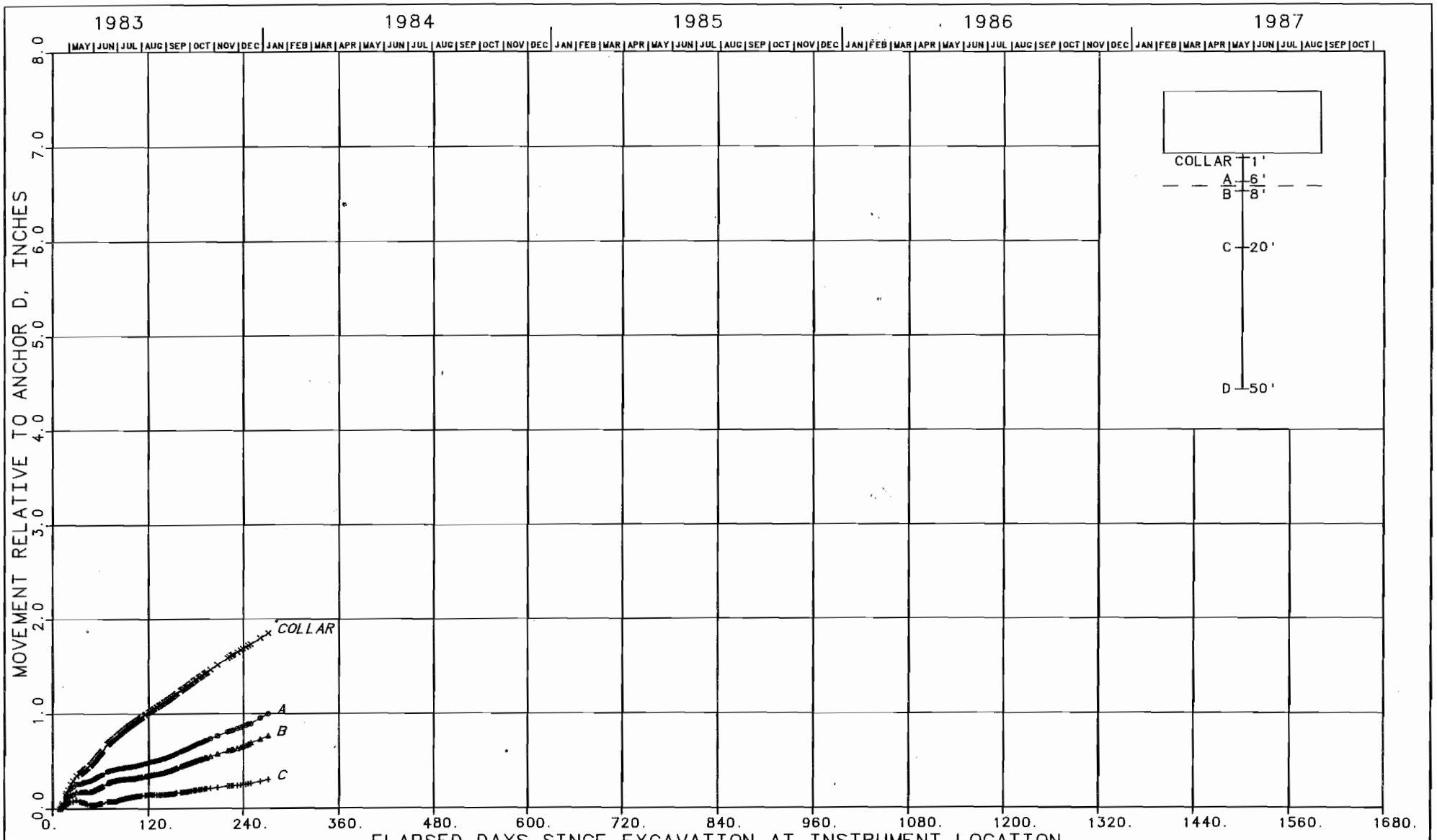
FIGURE J-137
MULTIPLE-POINT EXTENSOMETER 51X-GE-00218
TEST ROOM 1 - CENTER ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

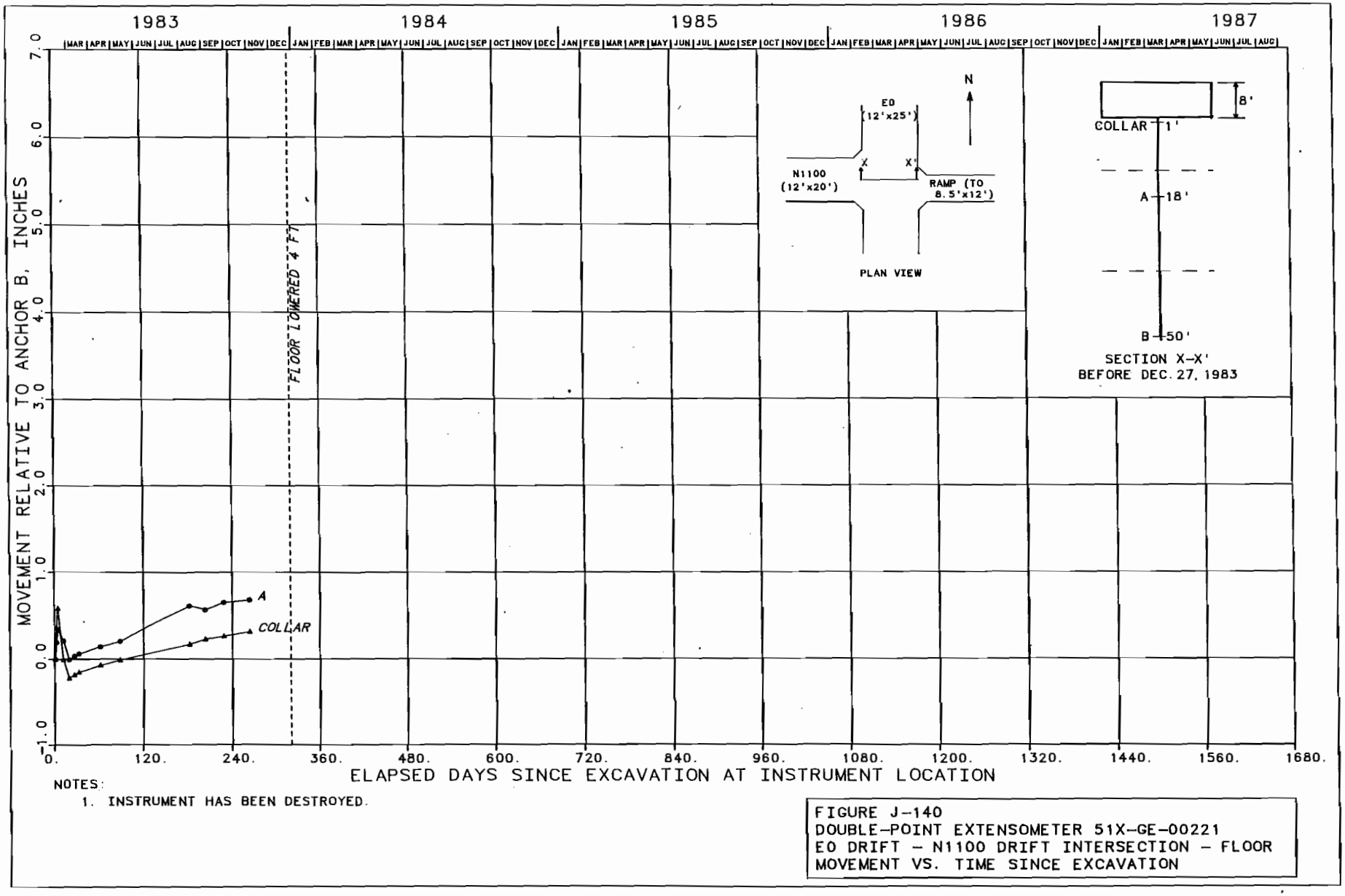
FIGURE J-138
MULTIPLE-POINT EXTENSOMETER 51X-GE-00219
TEST ROOM 1 - W WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.
2. INSTRUMENT HAS PERMANENTLY FAILED.

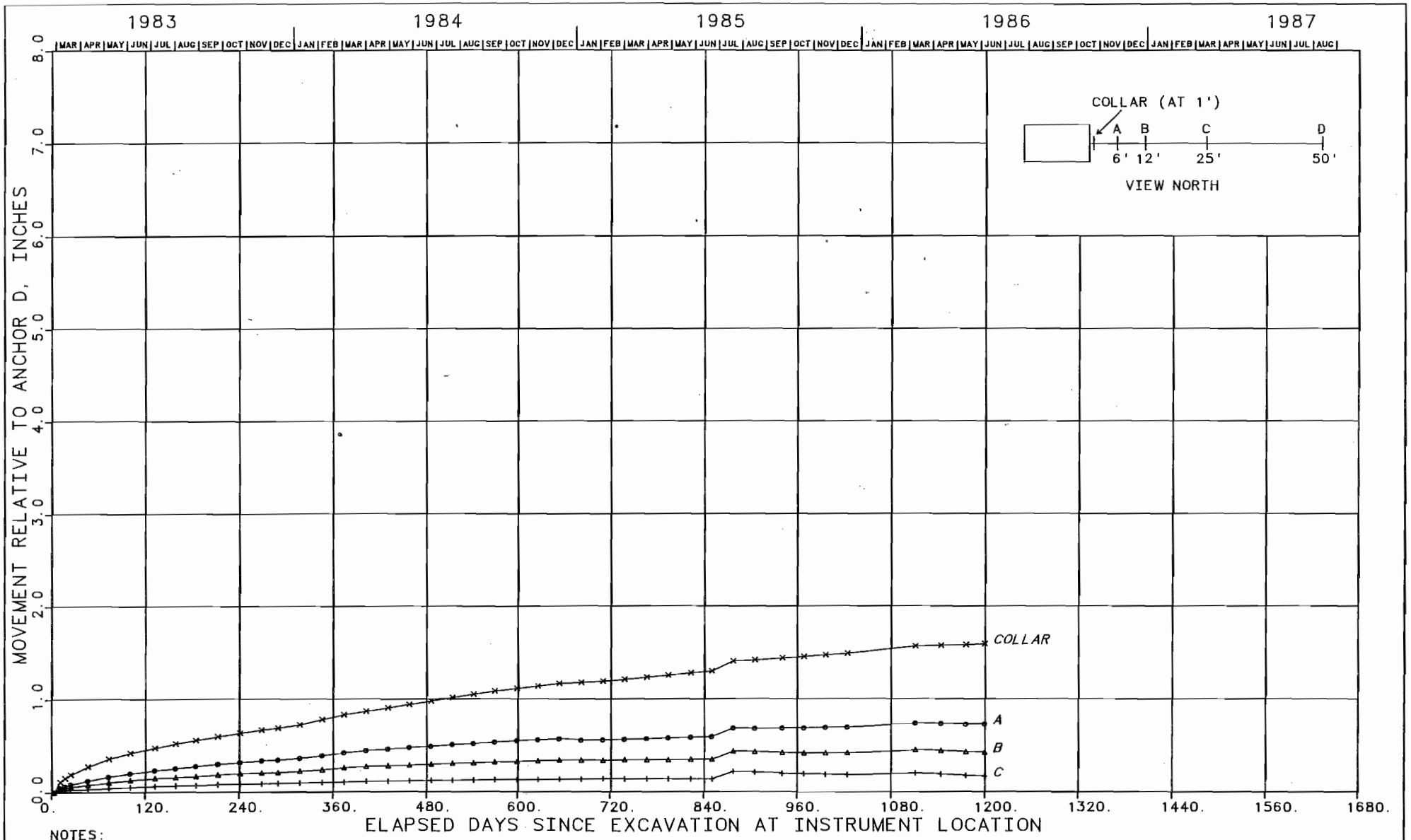
FIGURE J-139
MULTIPLE-POINT EXTENSOMETER 51X-GE-00220
TEST ROOM 1 - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. INSTRUMENT HAS BEEN DESTROYED.

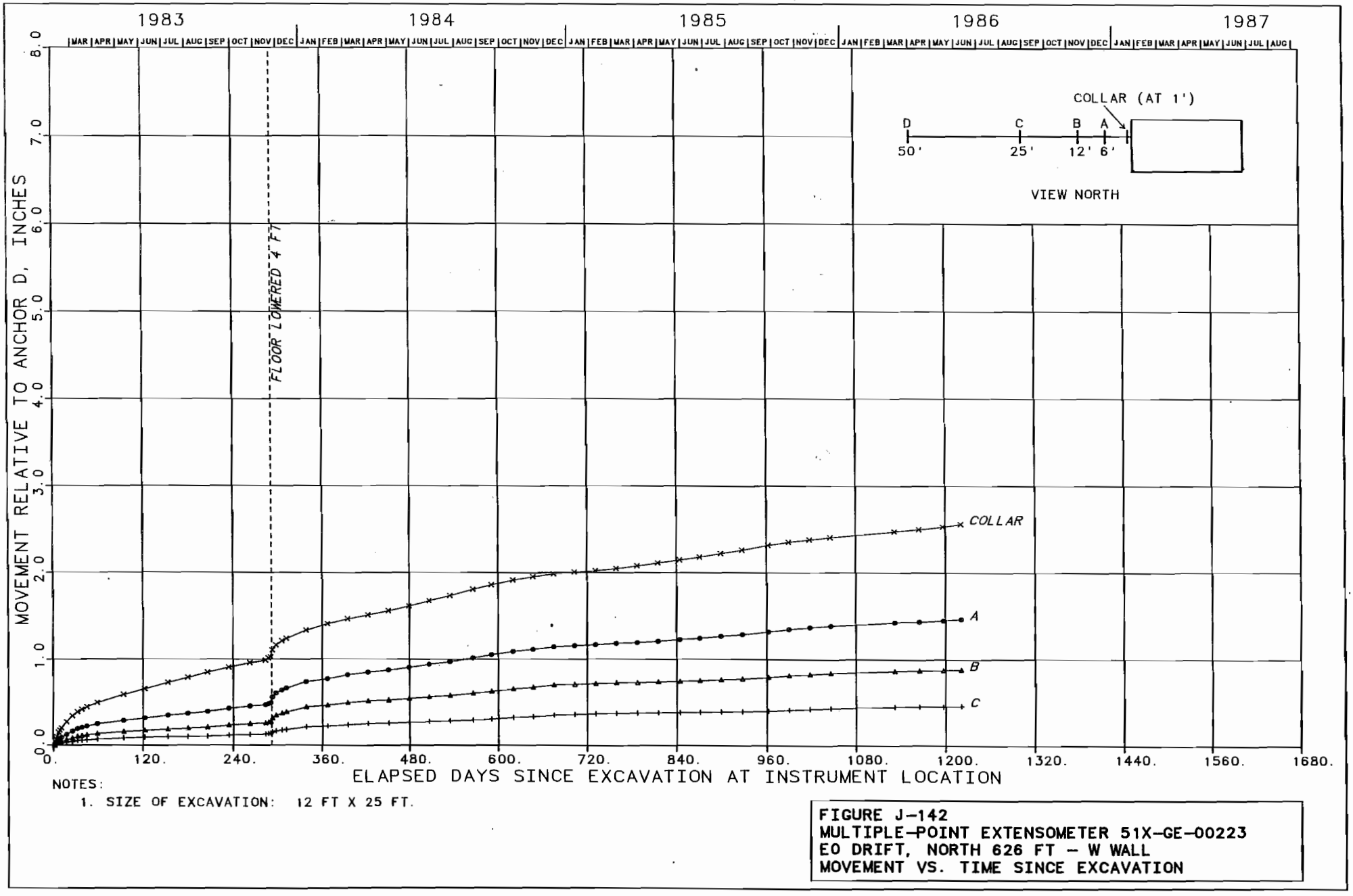
FIGURE J-140
DOUBLE-POINT EXTENSOMETER 51X-GE-00221
EO DRIFT - N1100 DRIFT INTERSECTION - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 14 FT.

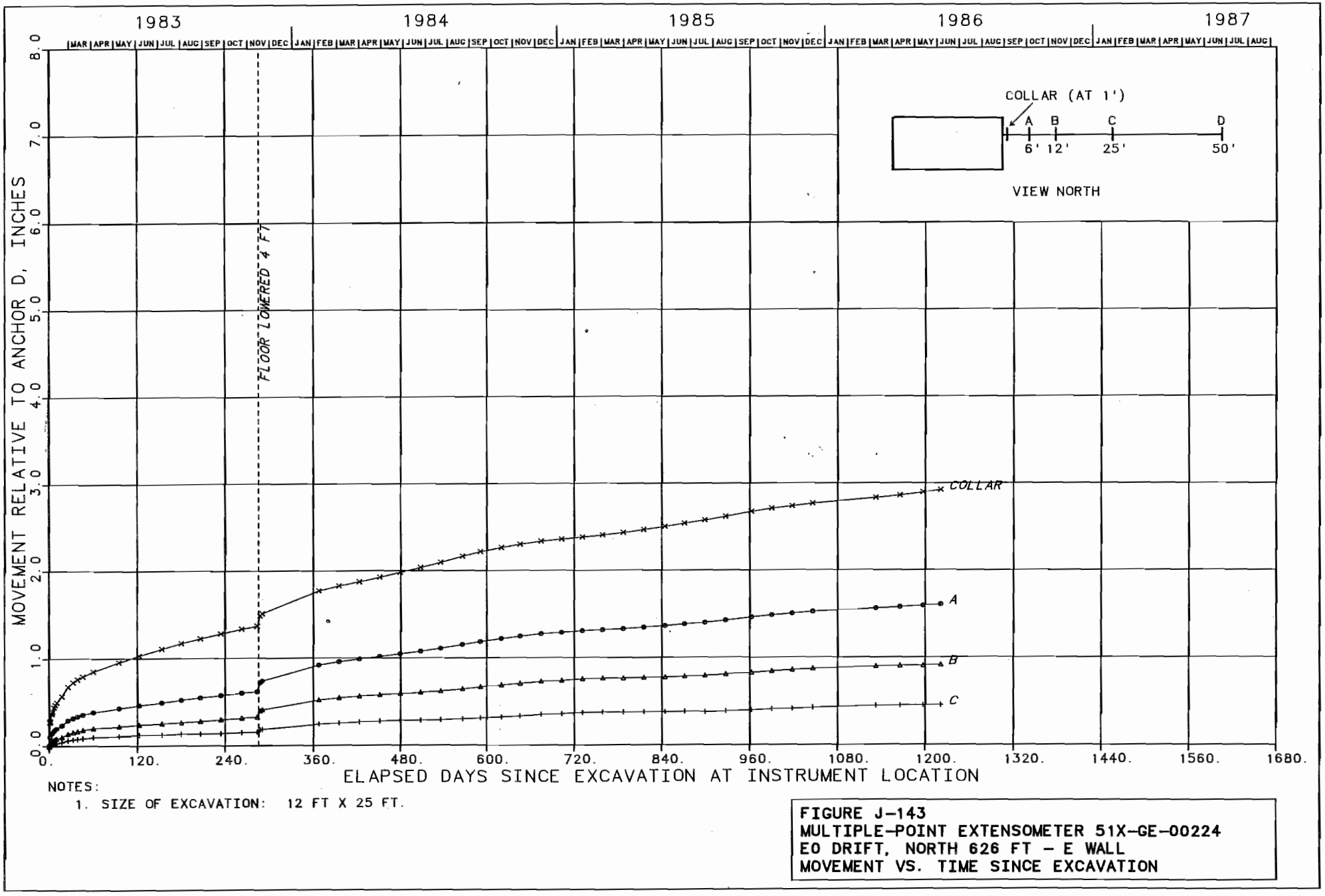
FIGURE J-141
MULTIPLE-POINT EXTENSOMETER 51X-GE-00222
E140 DRIFT, NORTH 1266 FT - E WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

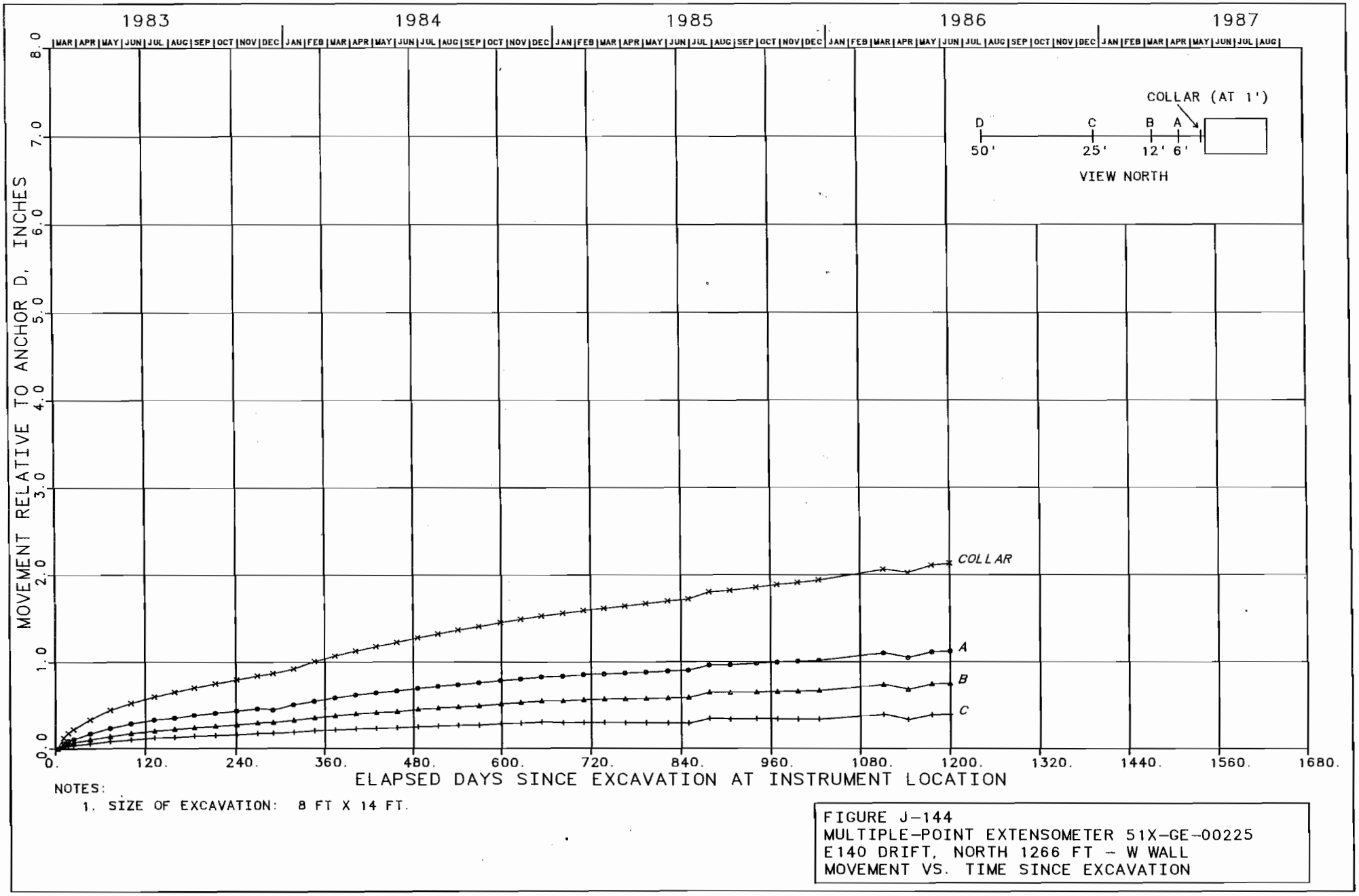
FIGURE J-142
MULTIPLE-POINT EXTENSOMETER 51X-GE-00223
EO DRIFT, NORTH 626 FT – W WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

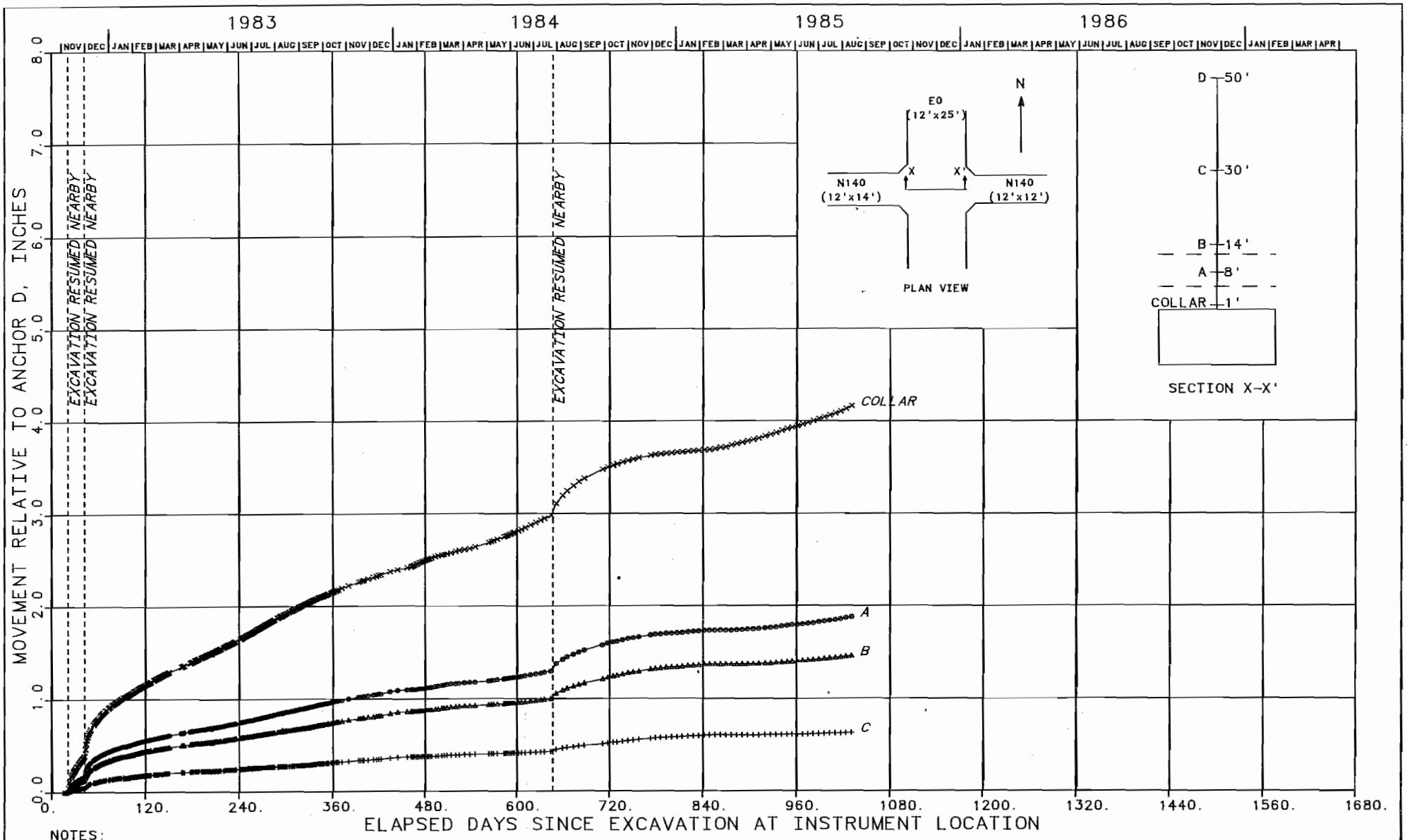
FIGURE J-143
MULTIPLE-POINT EXTENSOMETER 51X-GE-00224
EO DRIFT, NORTH 626 FT - E WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 14 FT.

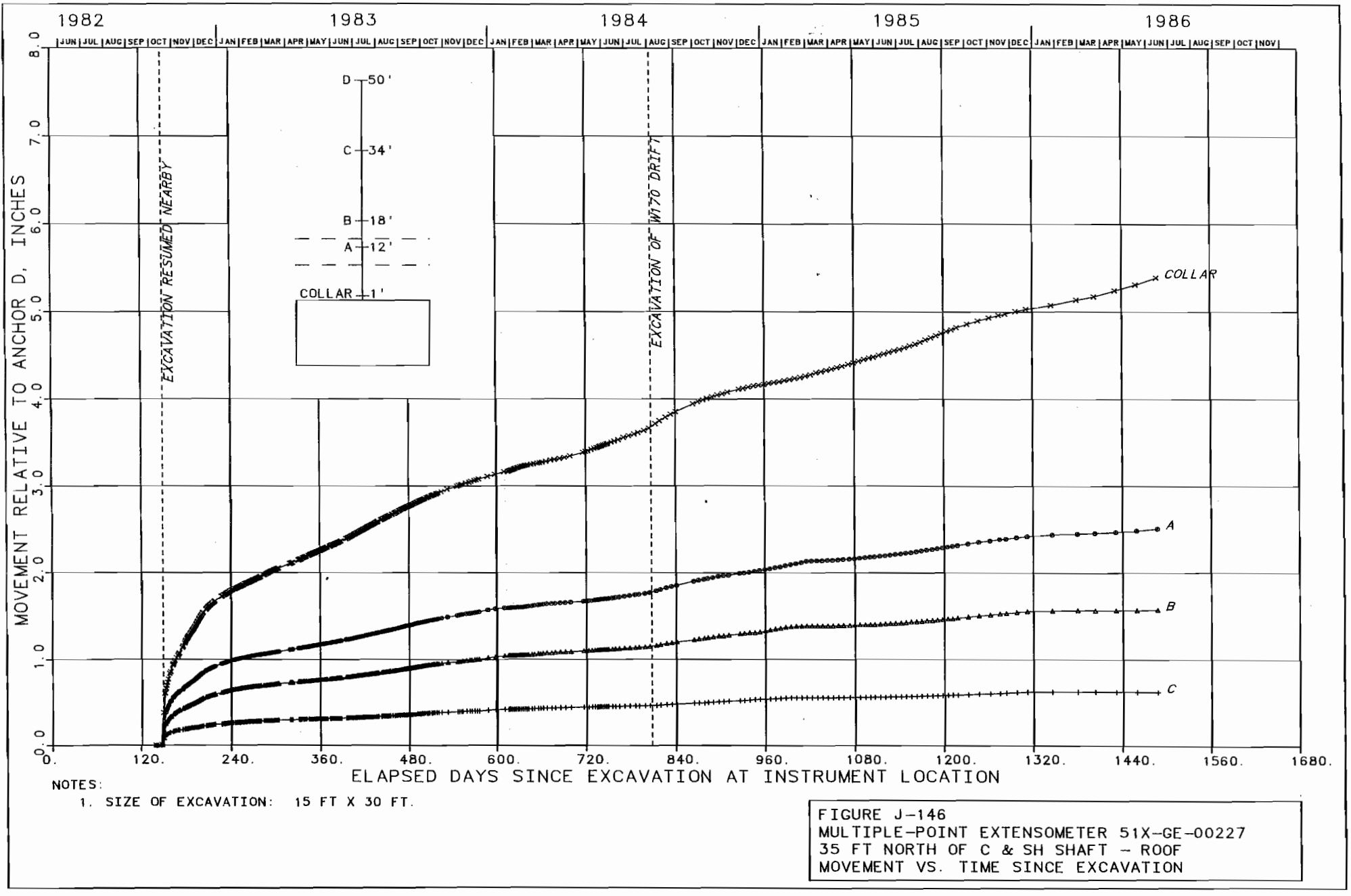
FIGURE J-144
MULTIPLE-POINT EXTENSOMETER 51X-GE-00225
E140 DRIFT, NORTH 1266 FT - W WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. INSTRUMENT HAS BEEN DESTROYED.

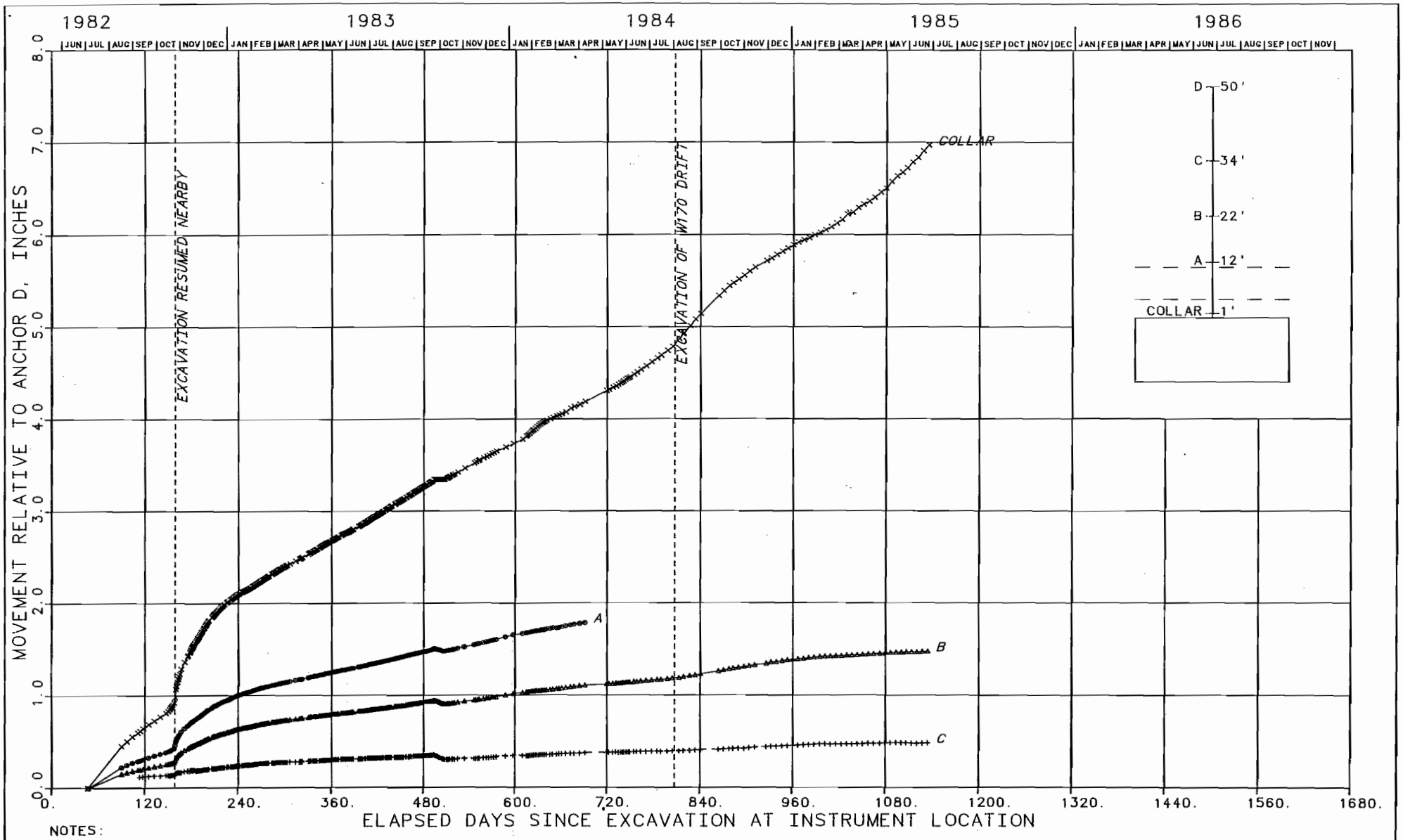
FIGURE J-145
MULTIPLE-POINT EXTENSOMETER 51X-GE-00226
EO DRIFT – N140 CROSSCUT INTERSECTION – ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 15 FT X 30 FT.

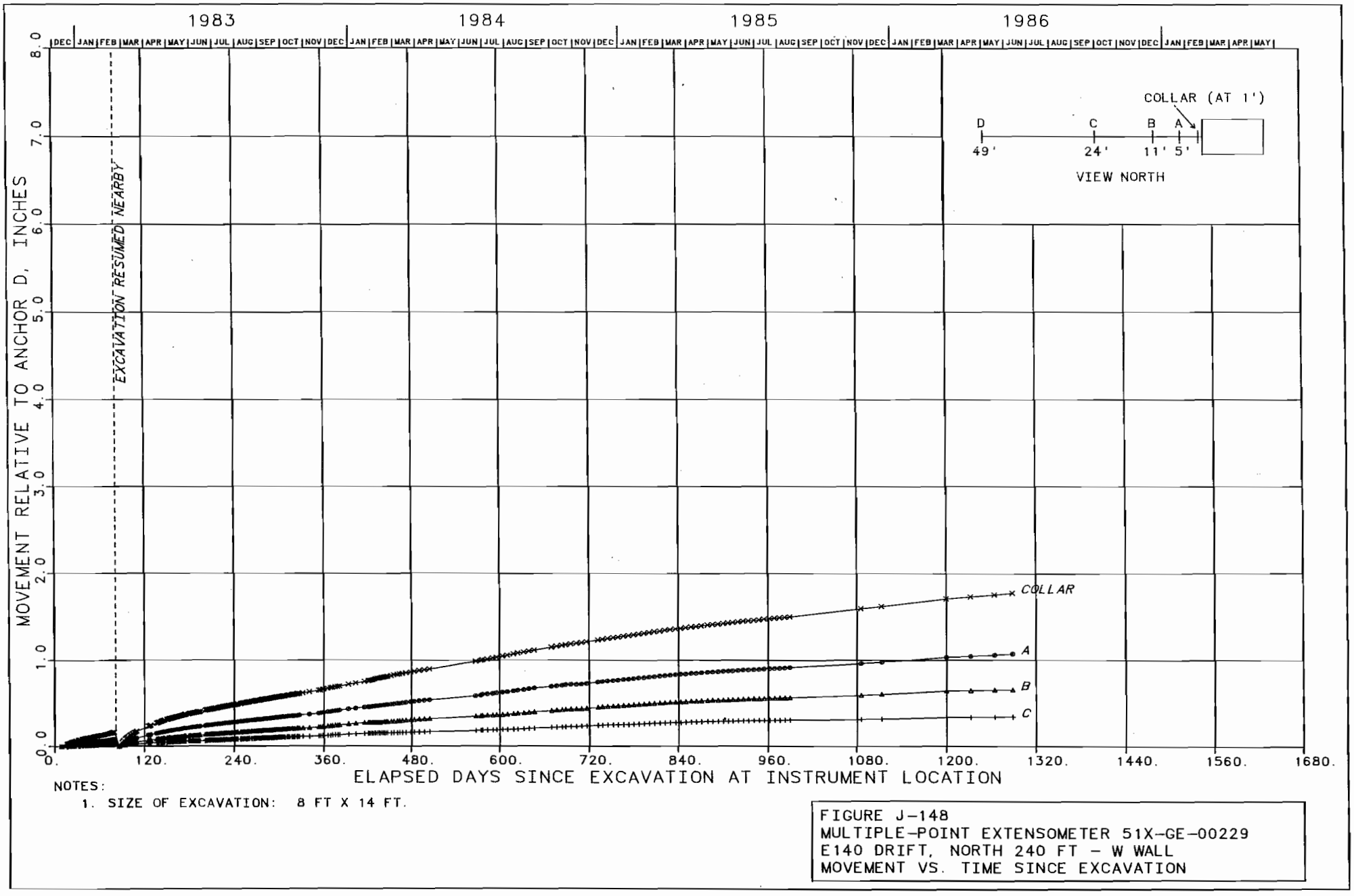
FIGURE J-146
MULTIPLE-POINT EXTENSOMETER 51X-GE-00227
35 FT NORTH OF C & SH SHAFT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 14 FT X 33 FT.
2. INSTRUMENT HAS BEEN DESTROYED.
3. DASHED LINE INDICATES ADJUSTED DATA.

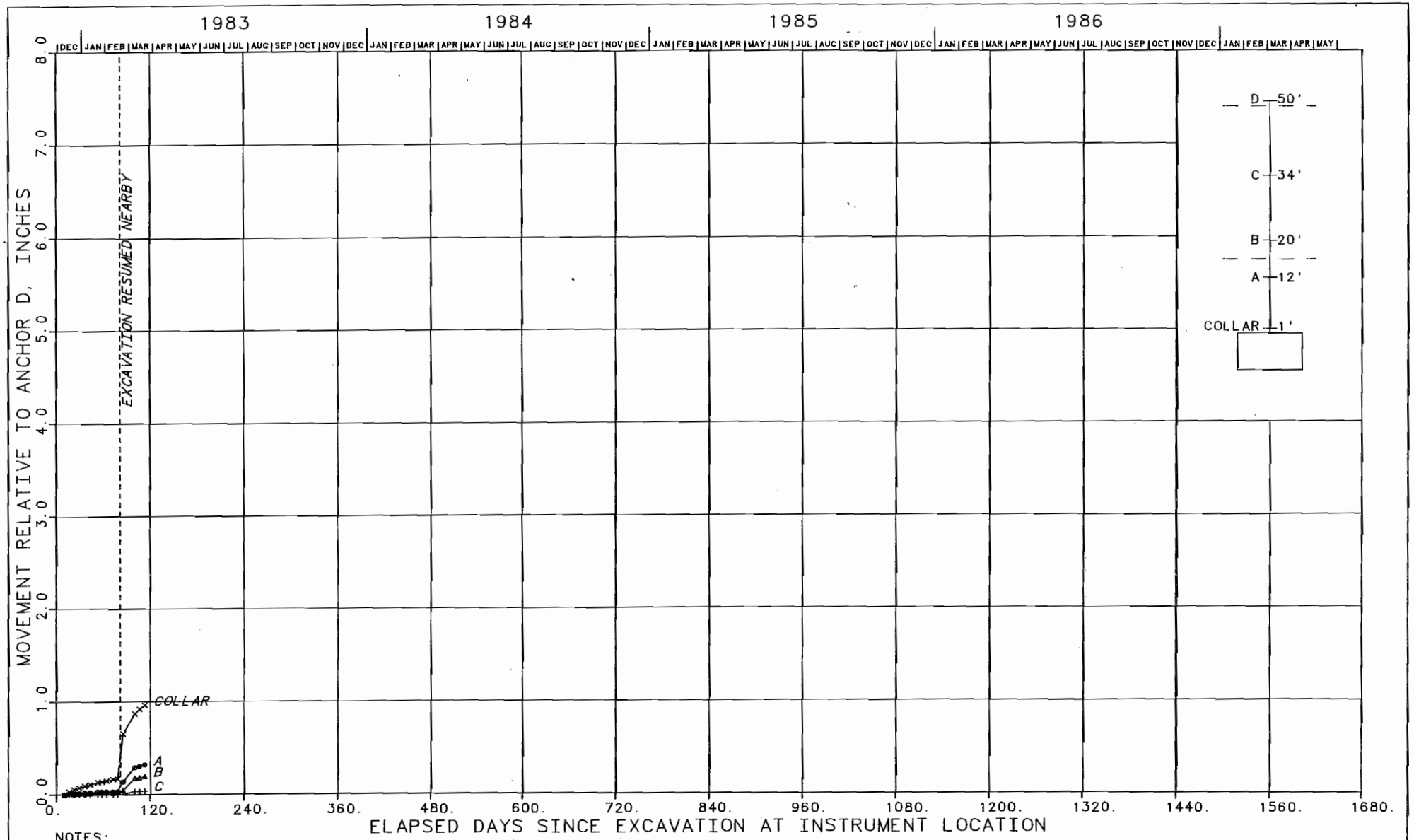
FIGURE J-147
MULTIPLE-POINT EXTENSOMETER 51X-GE-00228
65 FT SOUTH OF C & SH SHAFT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 14 FT.

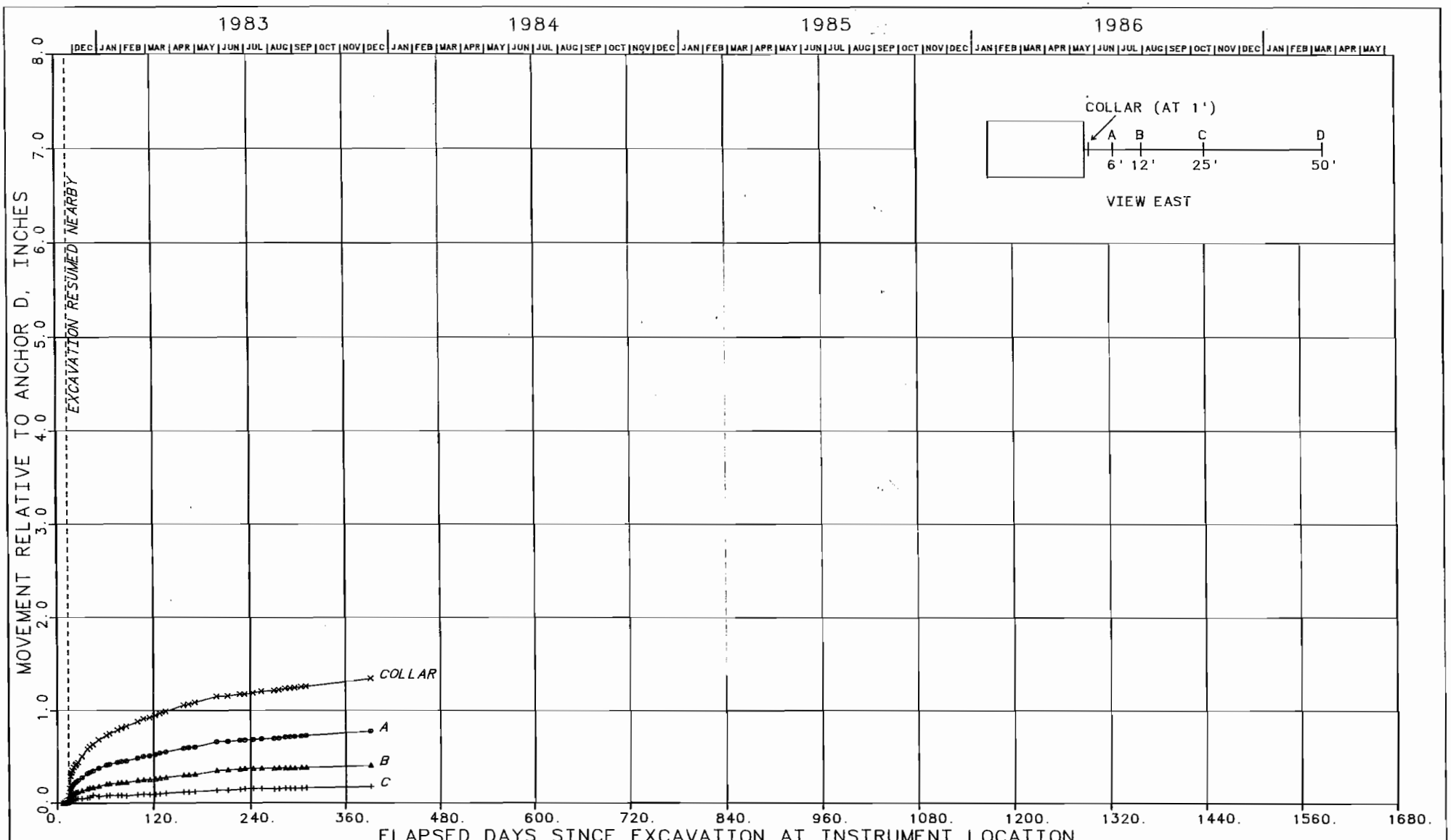
FIGURE J-148
MULTIPLE-POINT EXTENSOMETER 51X-GE-00229
E140 DRIFT, NORTH 240 FT - W WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 14 FT.
2. INSTALLATION REJECTED. INSTRUMENT REPLACED BY 51X-GE-00255.

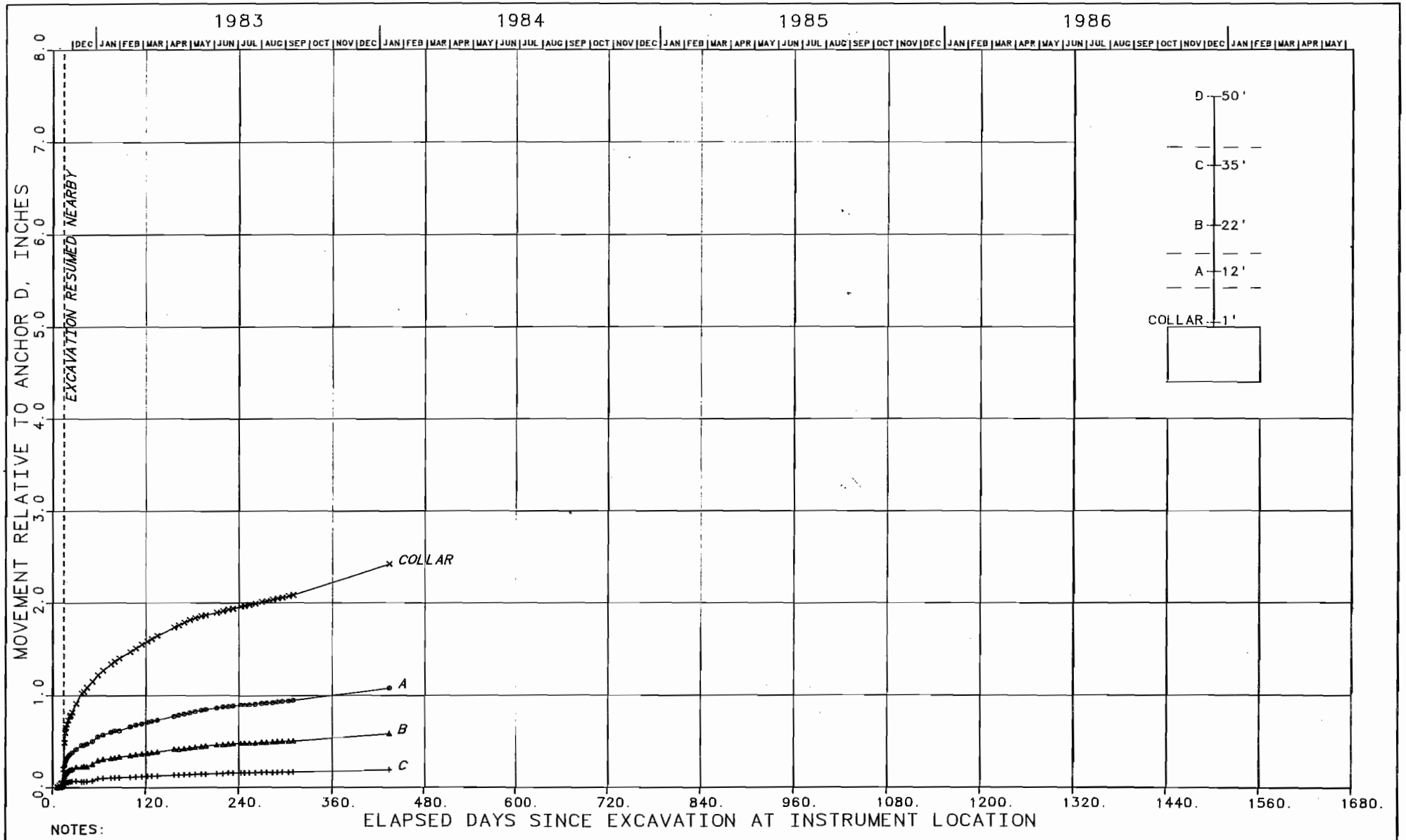
FIGURE J-149
MULTIPLE-POINT EXTENSOMETER 51X-GE-00230
E140 DRIFT, NORTH 240 FT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

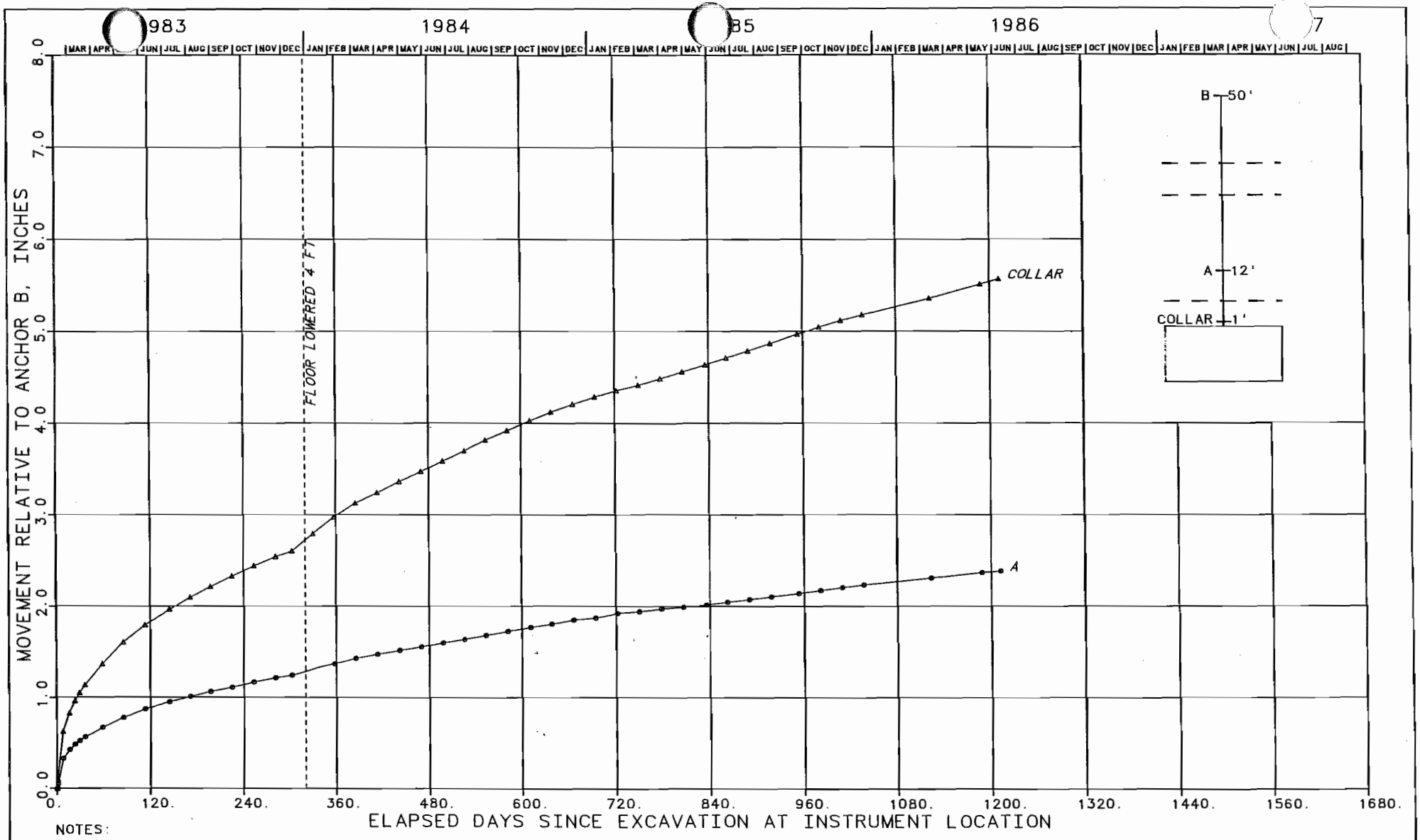
FIGURE J-150
MULTIPLE-POINT EXTENSOMETER 51X-GE-00231
7 FT EAST OF WASTE SHAFT - S WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

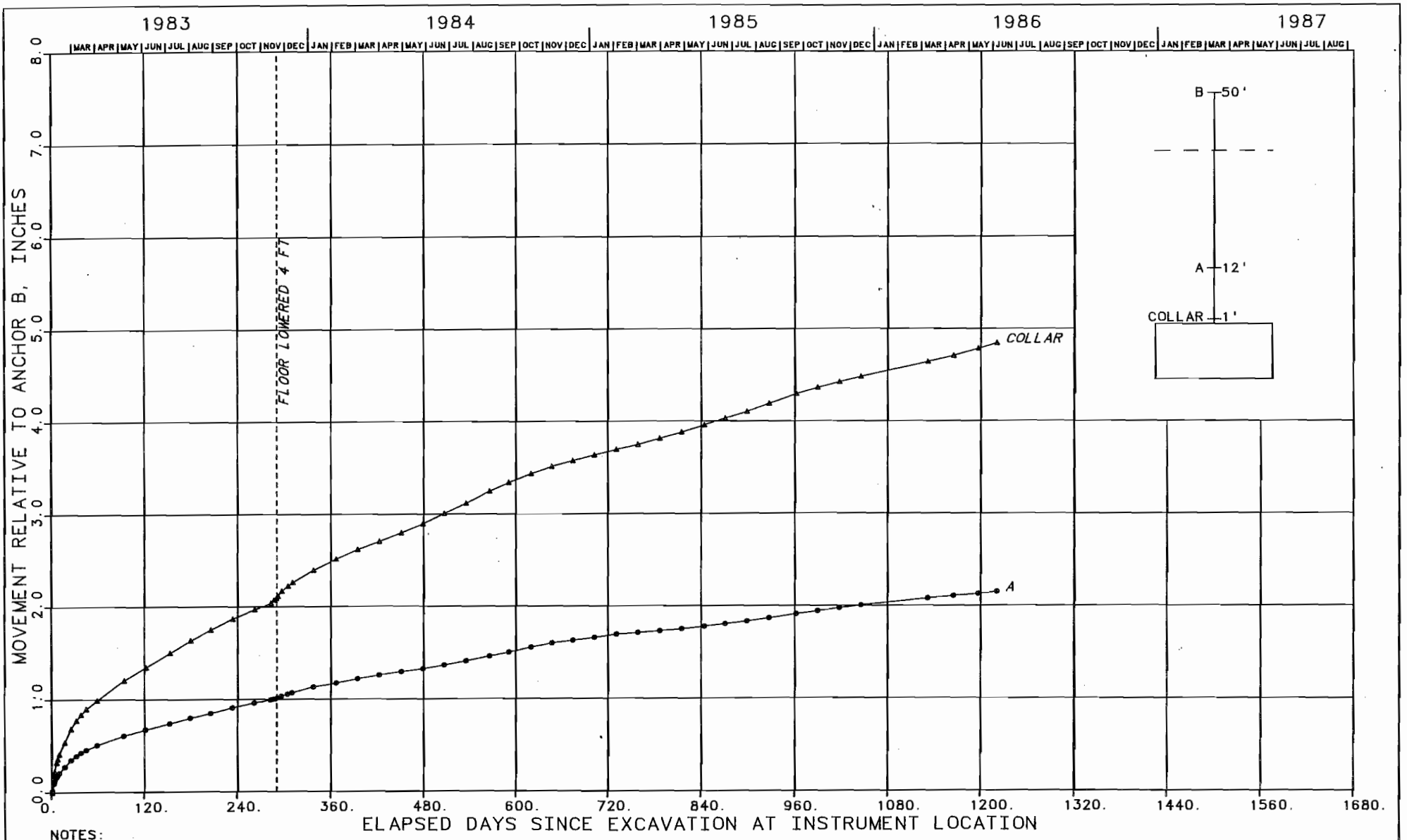
FIGURE J-151
MULTIPLE-POINT EXTENSOMETER 51X-GE-00232
17 FT EAST OF WASTE SHAFT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

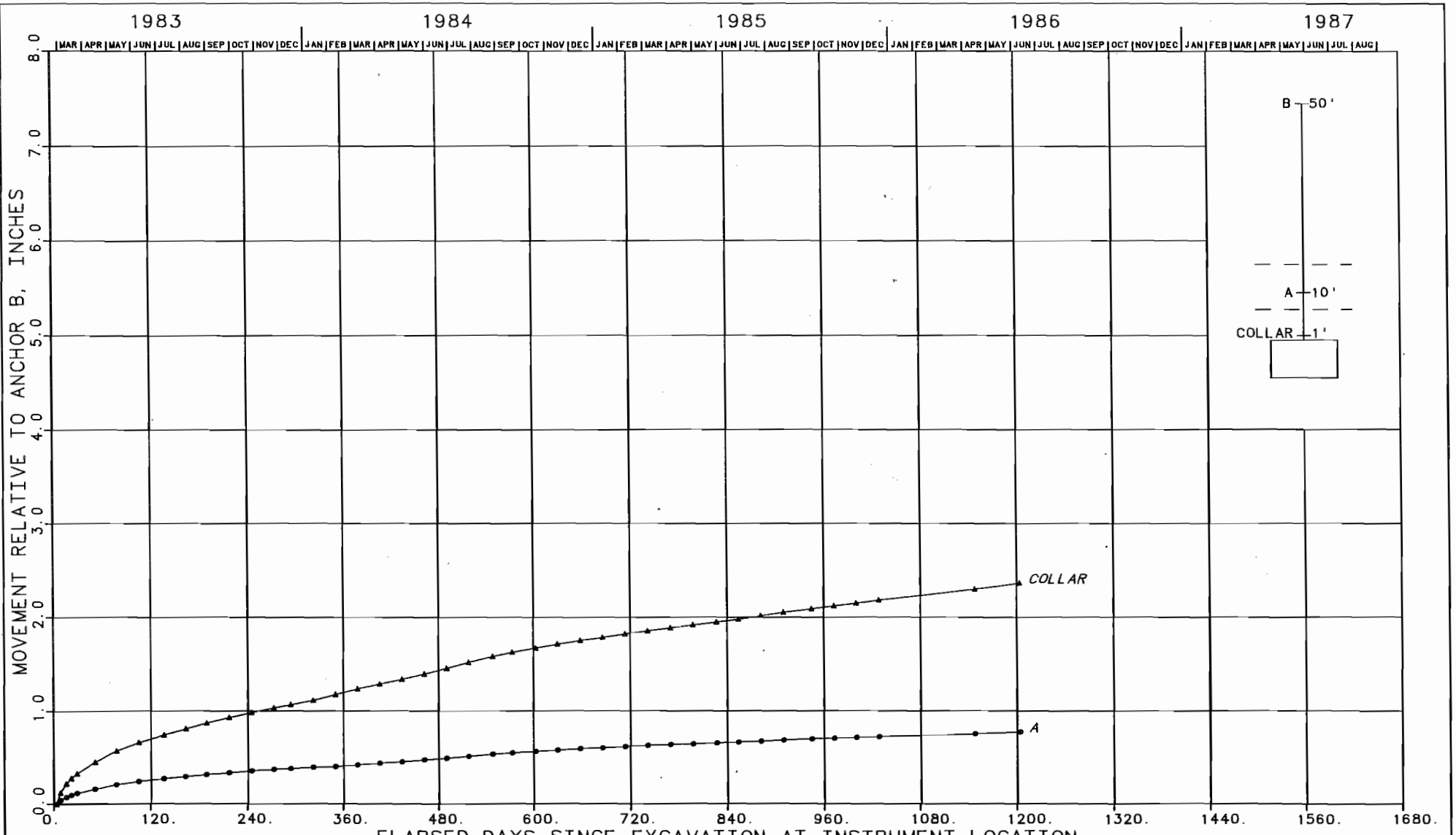
FIGURE J-152
DOUBLE-POINT EXTENSOMETER 51X-GE-00233
E0 DRIFT, NORTH 1266 FT – ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

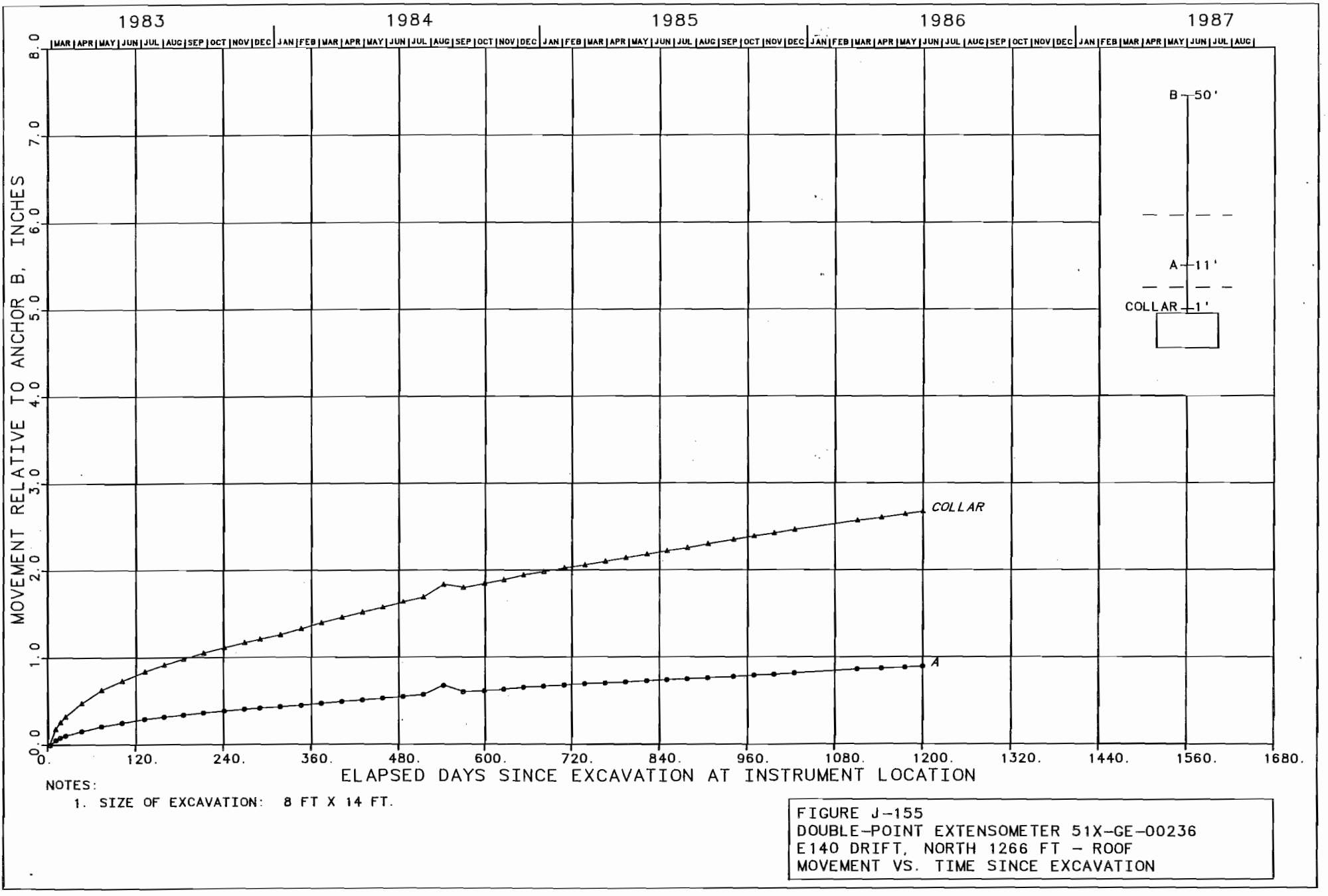
FIGURE J-153
DOUBLE-POINT EXTENSOMETER 51X-GE-00234
E0 DRIFT, NORTH 626 FT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 14 FT.

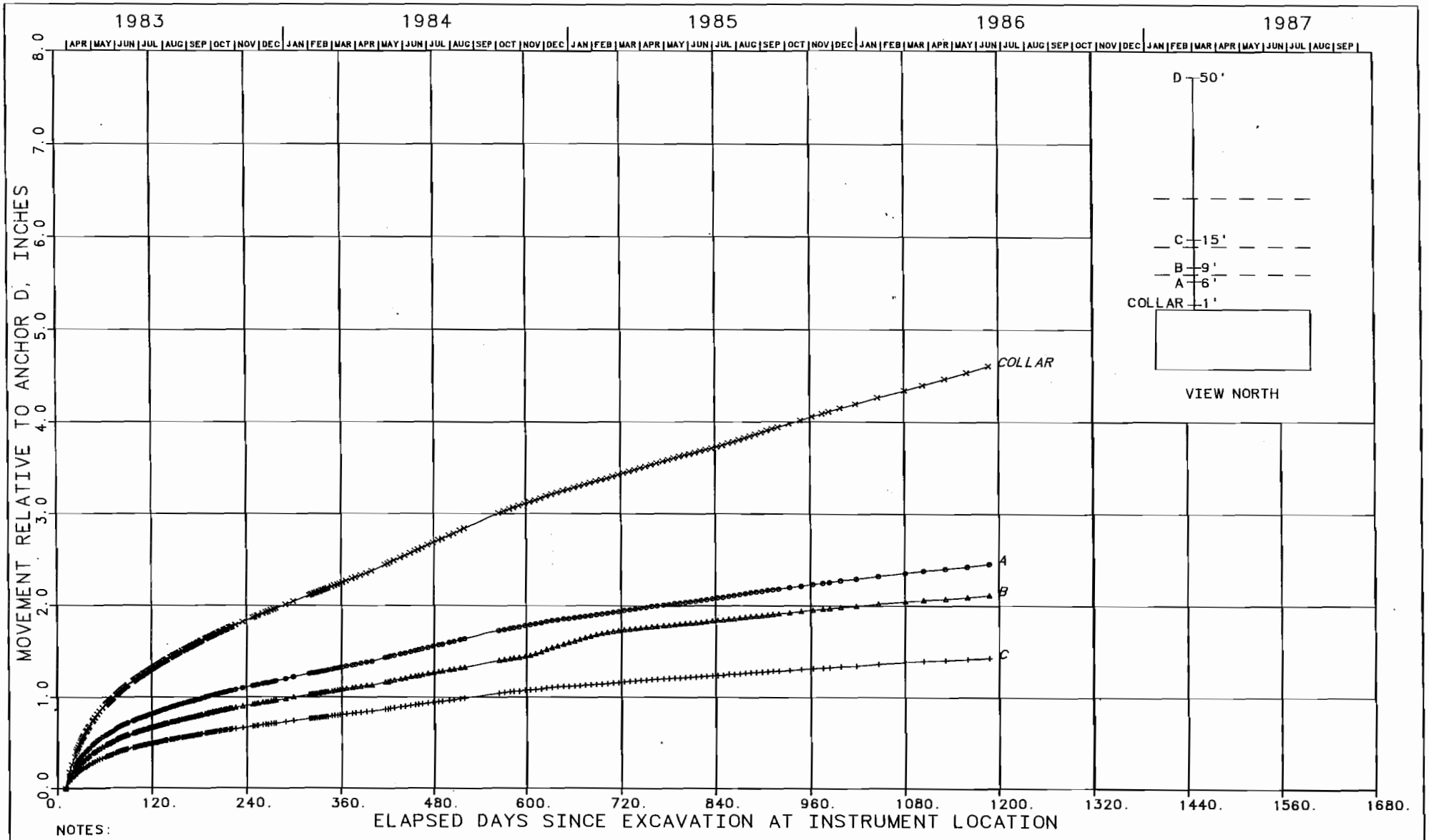
FIGURE J-154
DOUBLE-POINT EXTENSOMETER 51X-GE-00235
E140 DRIFT, NORTH 624 FT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 14 FT.

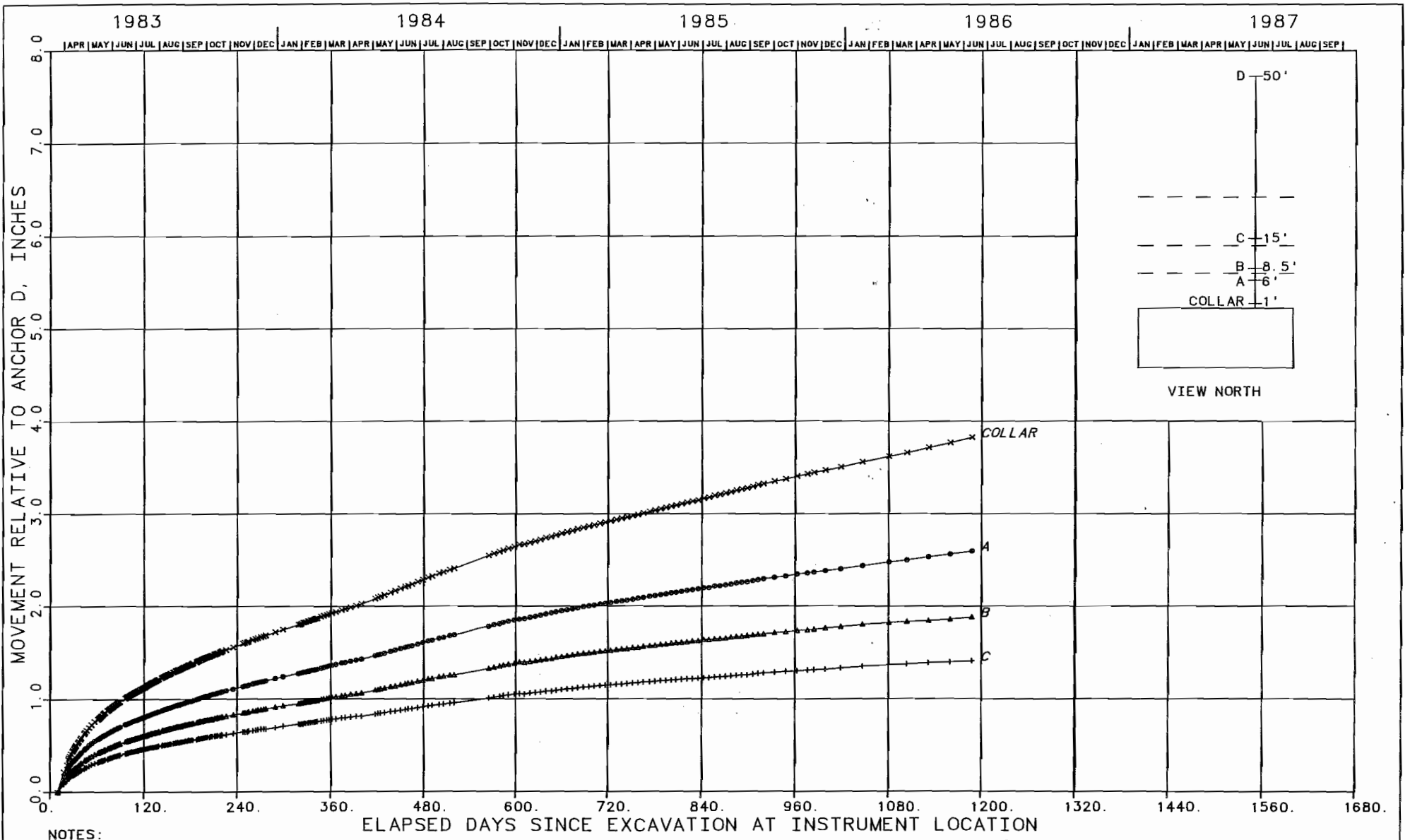
FIGURE J-155
DOUBLE-POINT EXTENSOMETER 51X-GE-00236
E140 DRIFT, NORTH 1266 FT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

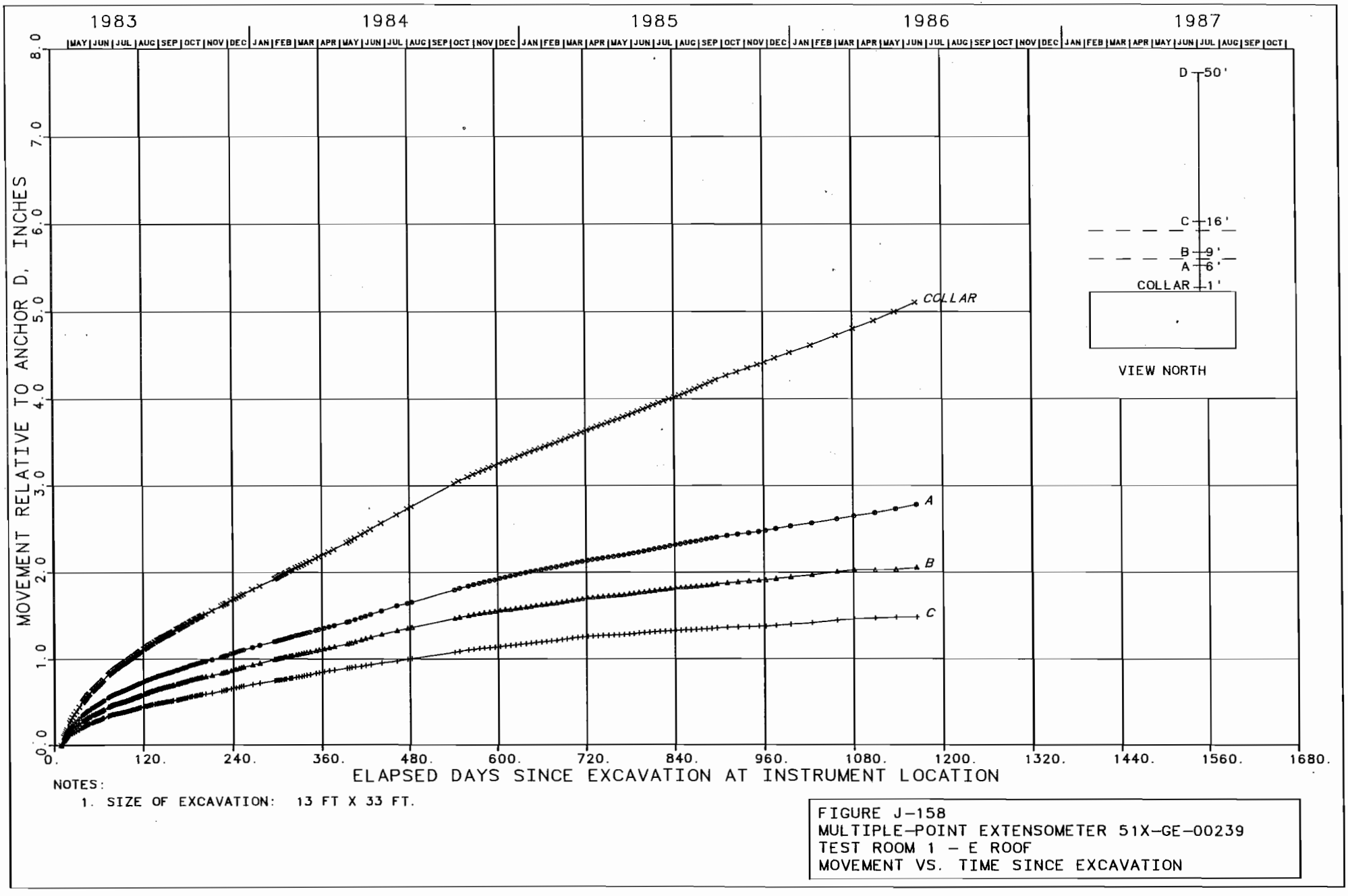
FIGURE J-156
MULTIPLE-POINT EXTENSOMETER 51X-GE-00237
TEST ROOM 2 - W ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

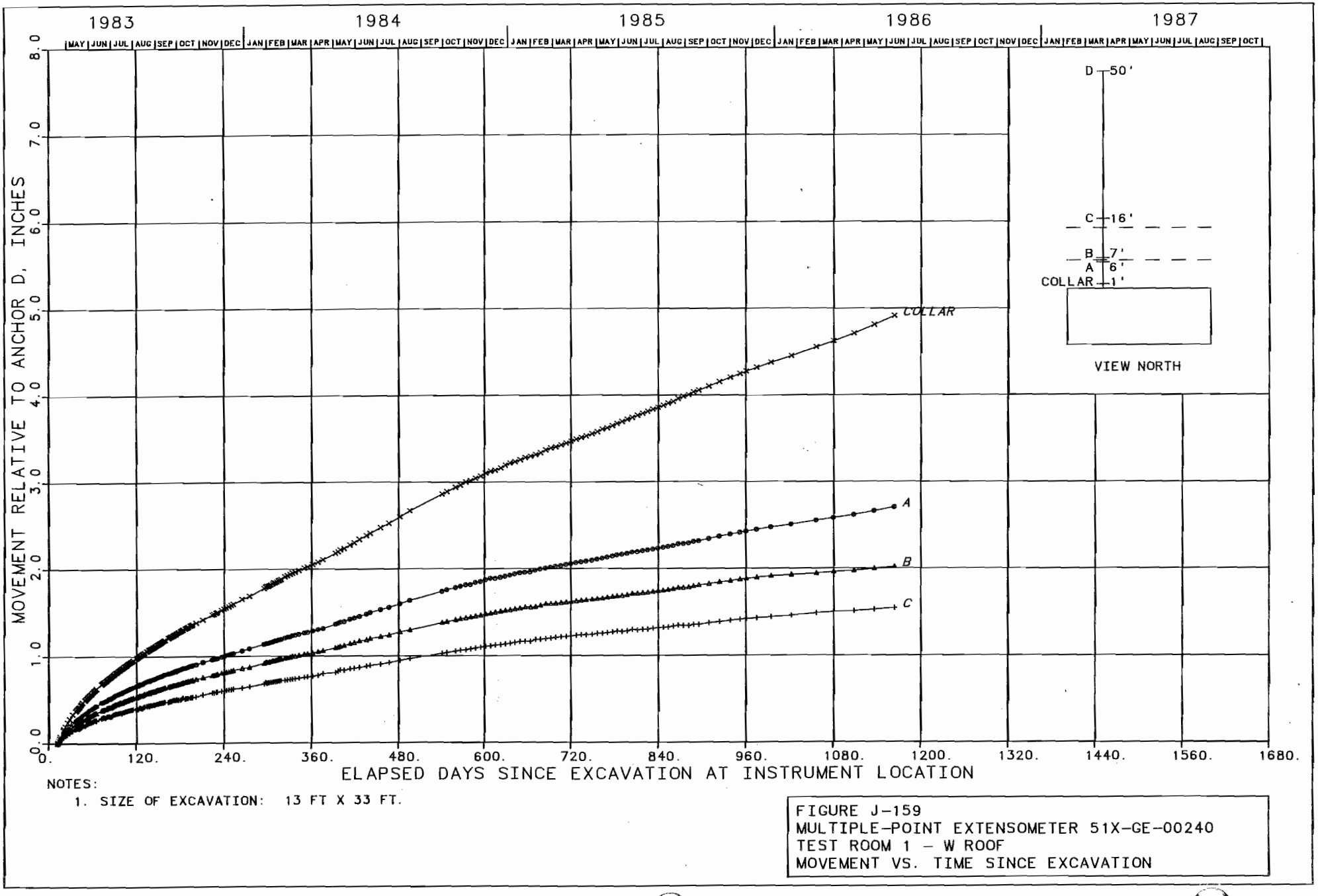
FIGURE J-157
MULTIPLE-POINT EXTENSOMETER 51X-GE-00238
TEST ROOM 2 - E ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

FIGURE J-158
MULTIPLE-POINT EXTENSOMETER 51X-GE-00239
TEST ROOM 1 - E ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

FIGURE J-159
MULTIPLE-POINT EXTENSOMETER 51X-GE-00240
TEST ROOM 1 - W ROOF
MOVEMENT VS. TIME SINCE EXCAVATION

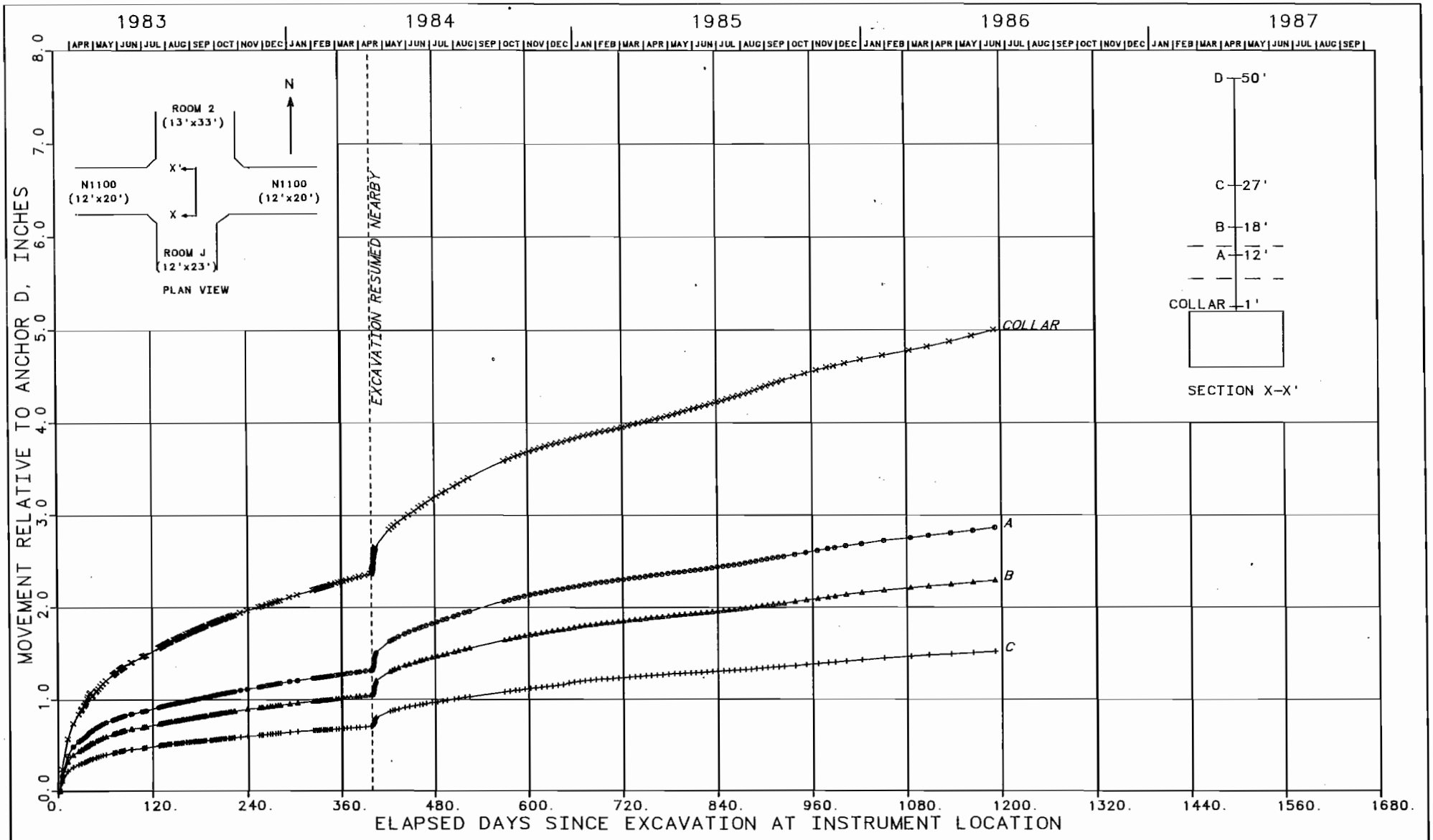


FIGURE J-160
MULTIPLE-POINT EXTENSOMETER 51X-GE-00241
N1100 - TEST ROOM 2 INTERSECTION - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION

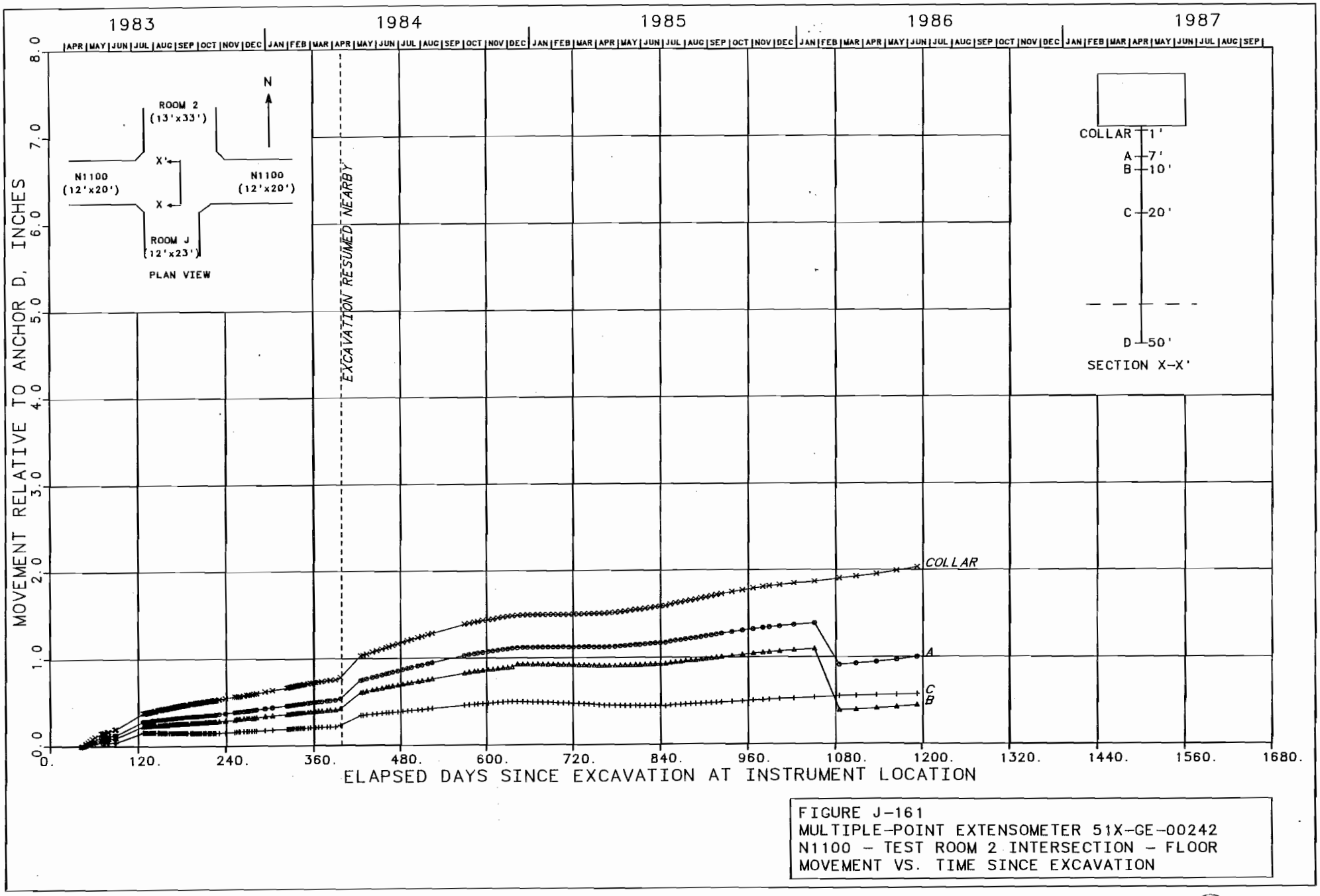


FIGURE J-161
MULTIPLE-POINT EXTENSOMETER 51X-GE-00242
N1100 - TEST ROOM 2 INTERSECTION - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION

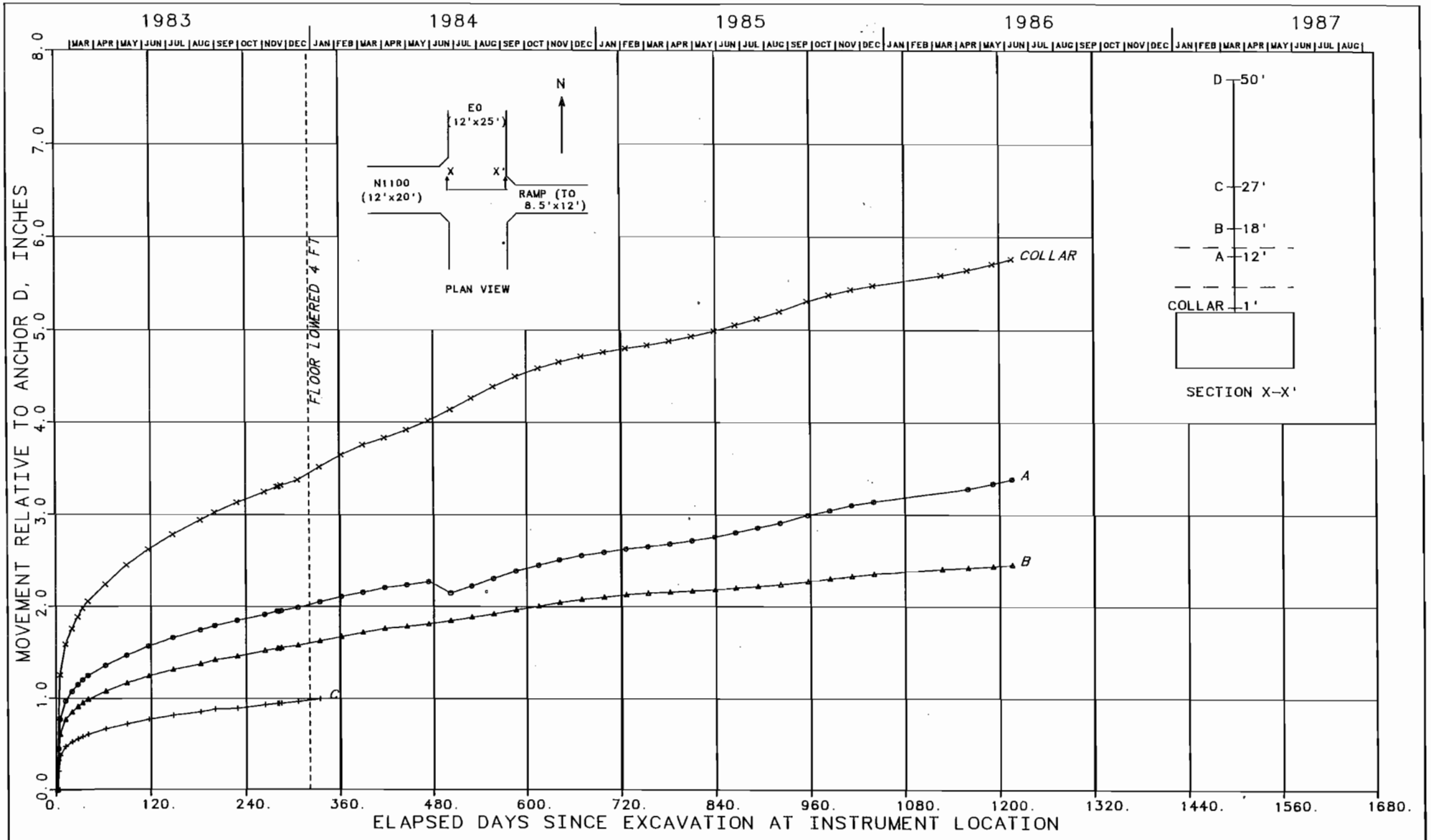
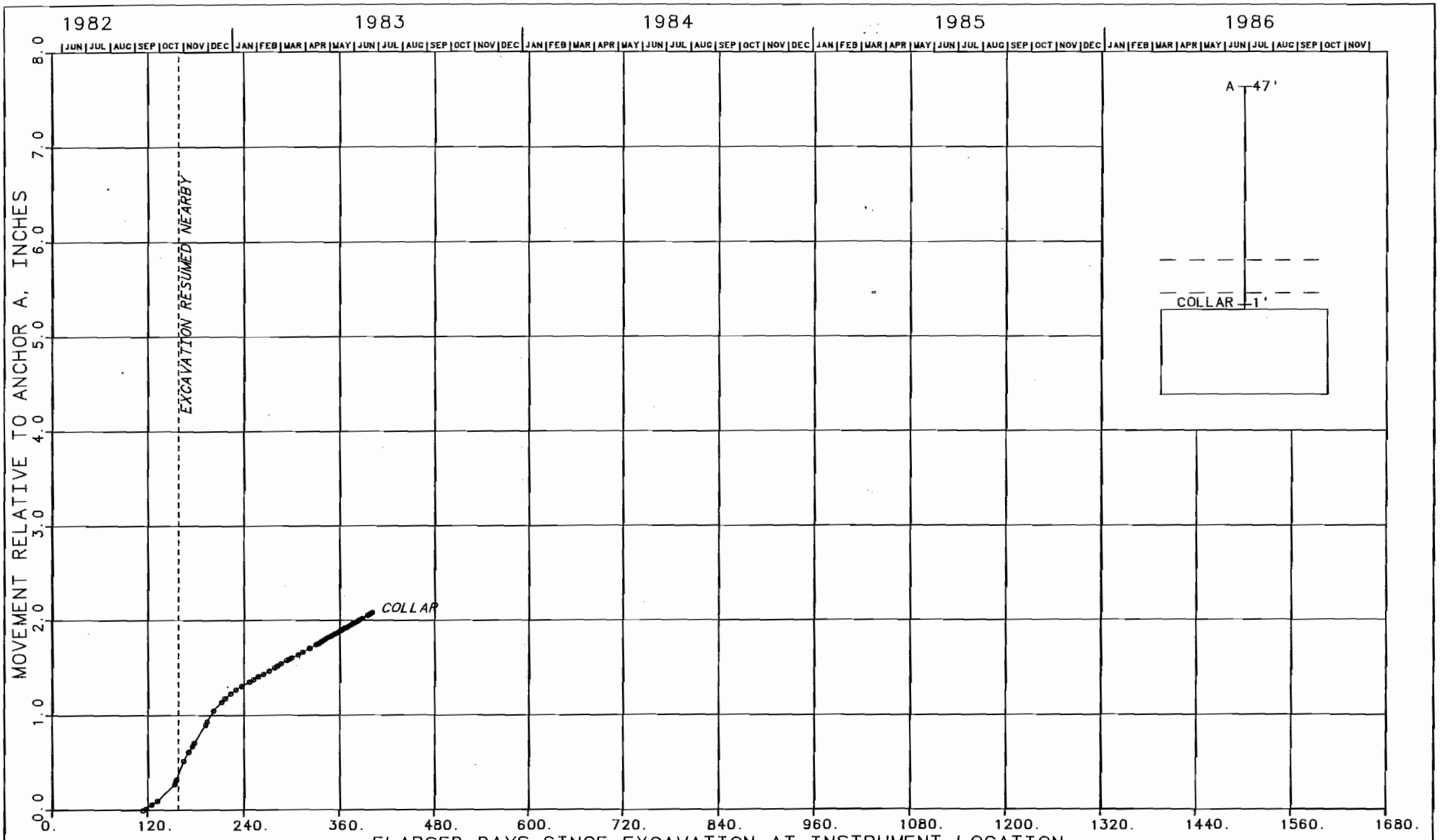


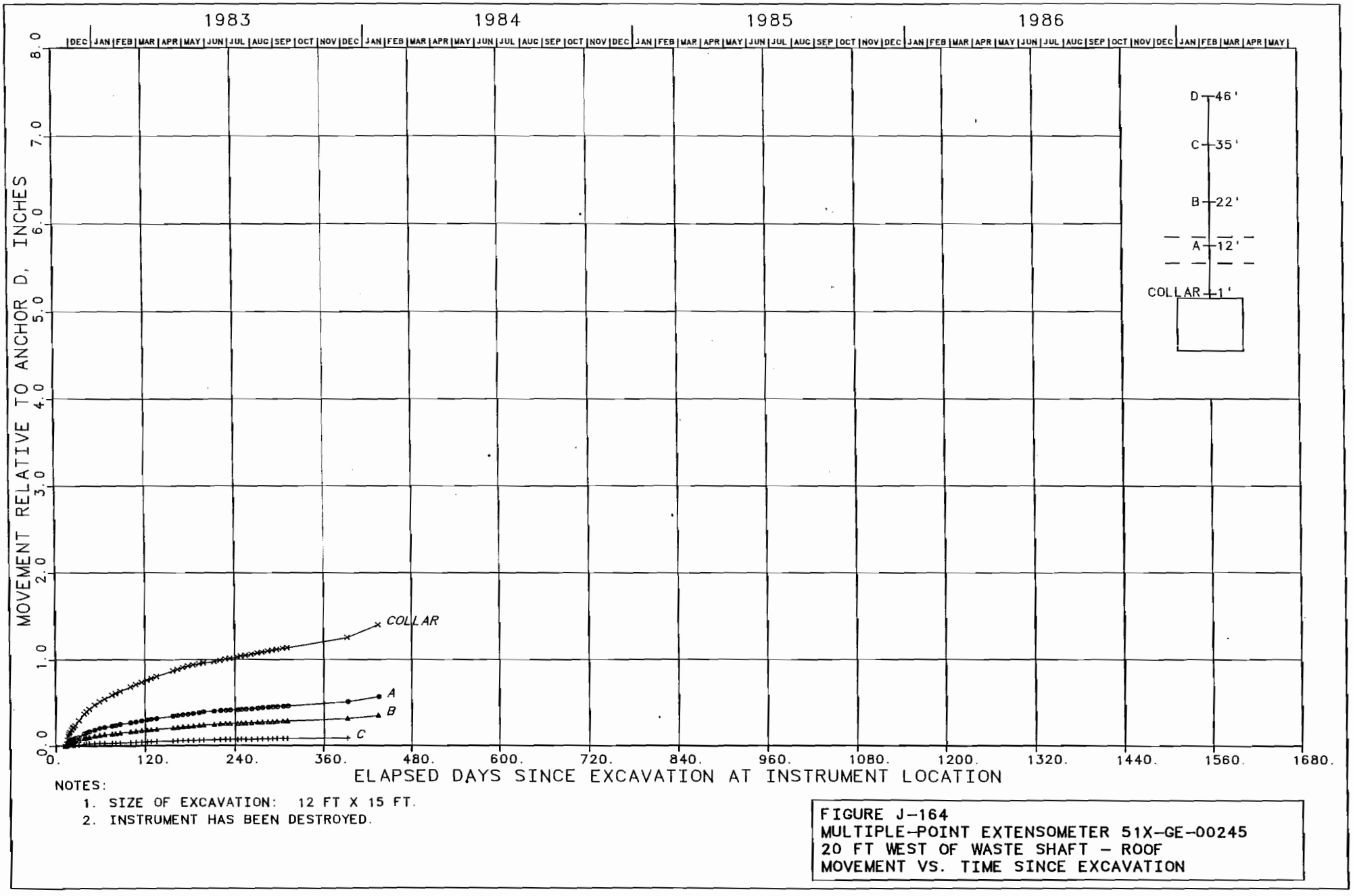
FIGURE J-162
MULTIPLE-POINT EXTENSOMETER 51X-GE-00243
E0 DRIFT - N1100 DRIFT INTERSECTION - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 18 FT X 35 FT.
2. INSTRUMENT HAS PERMANENTLY FAILED.

FIGURE J-163
SINGLE-POINT EXTENSOMETER 51X-GE-00244
30 FT SOUTH OF C & SH SHAFT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 15 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

FIGURE J-164
MULTIPLE-POINT EXTENSOMETER 51X-GE-00245
20 FT WEST OF WASTE SHAFT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION

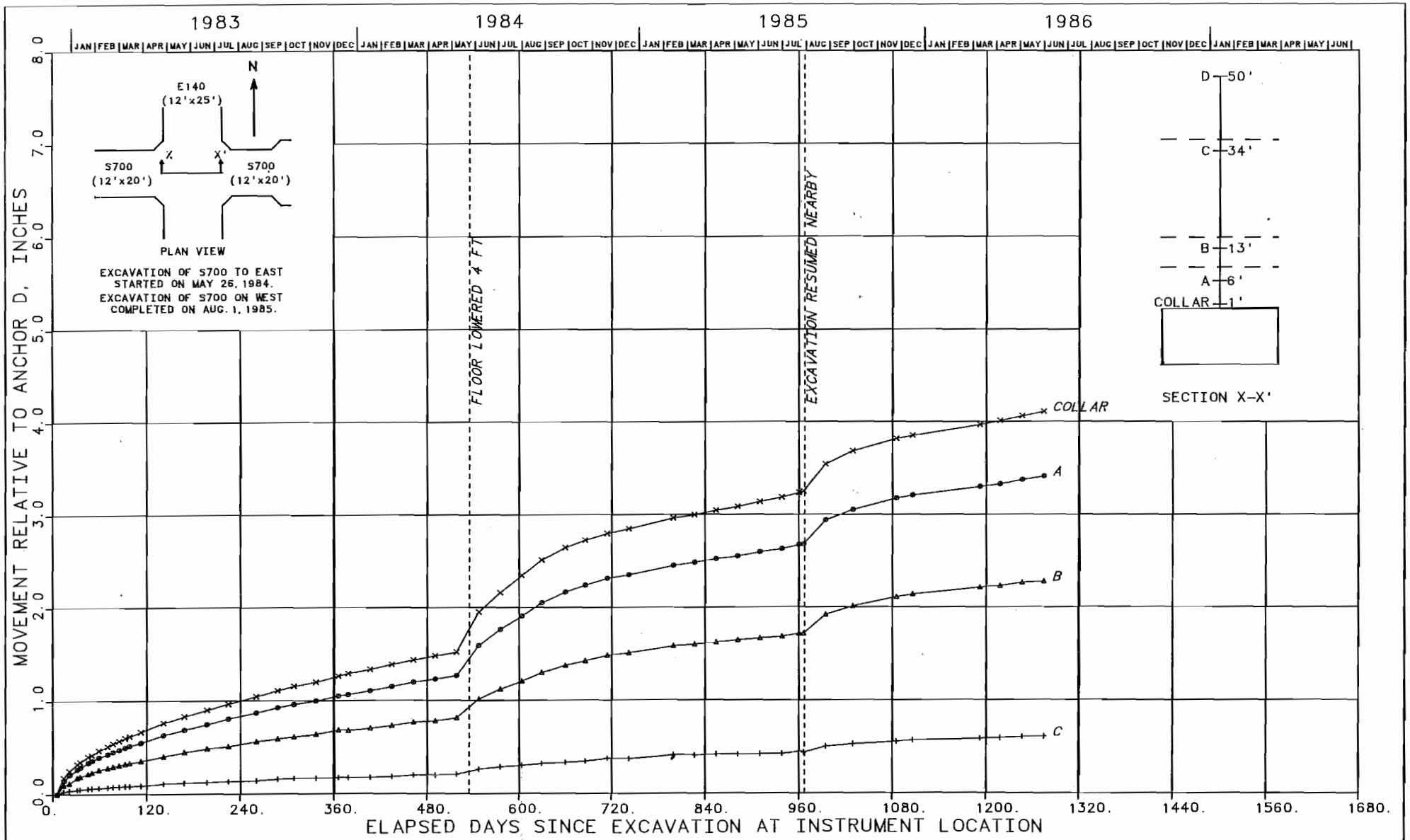
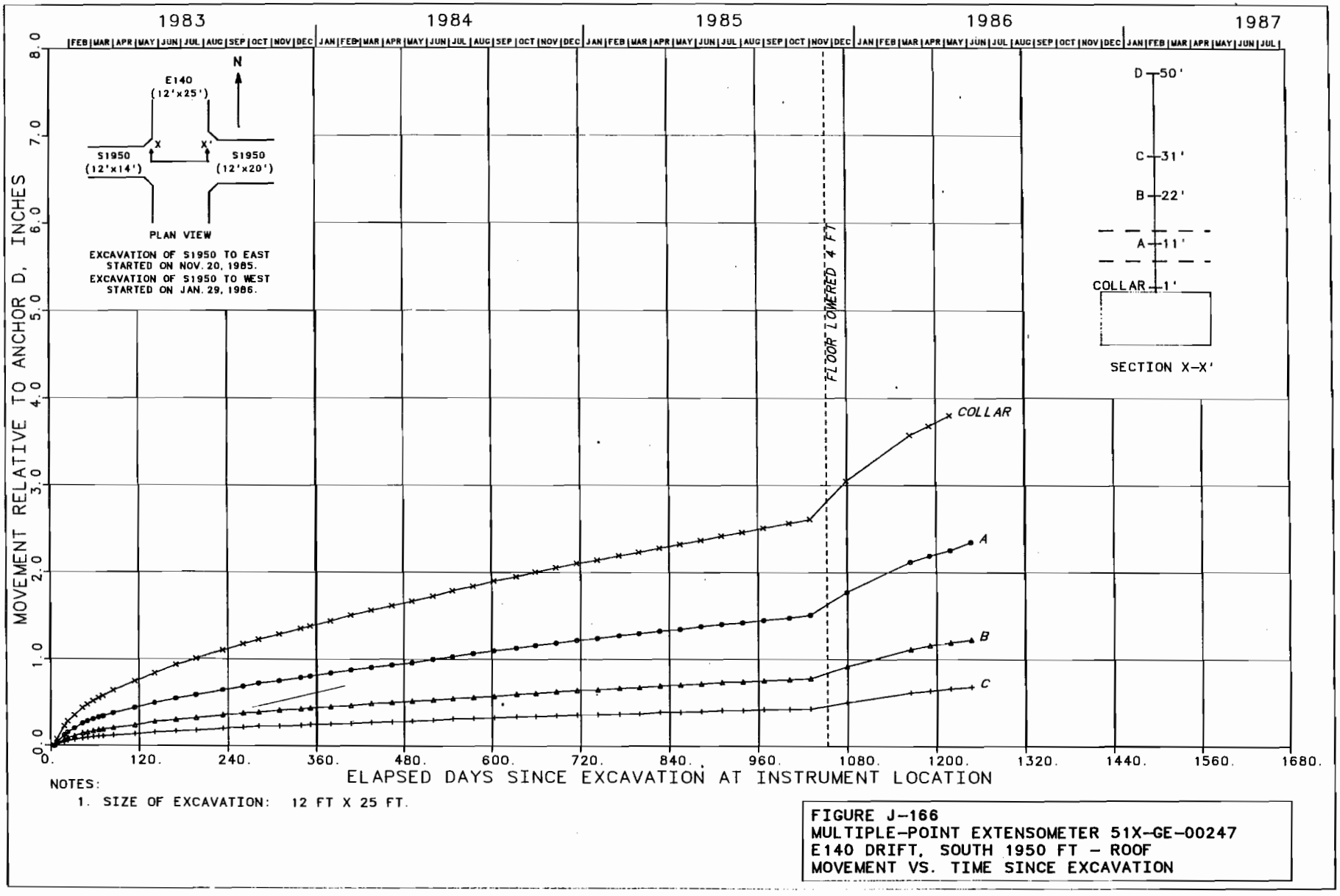


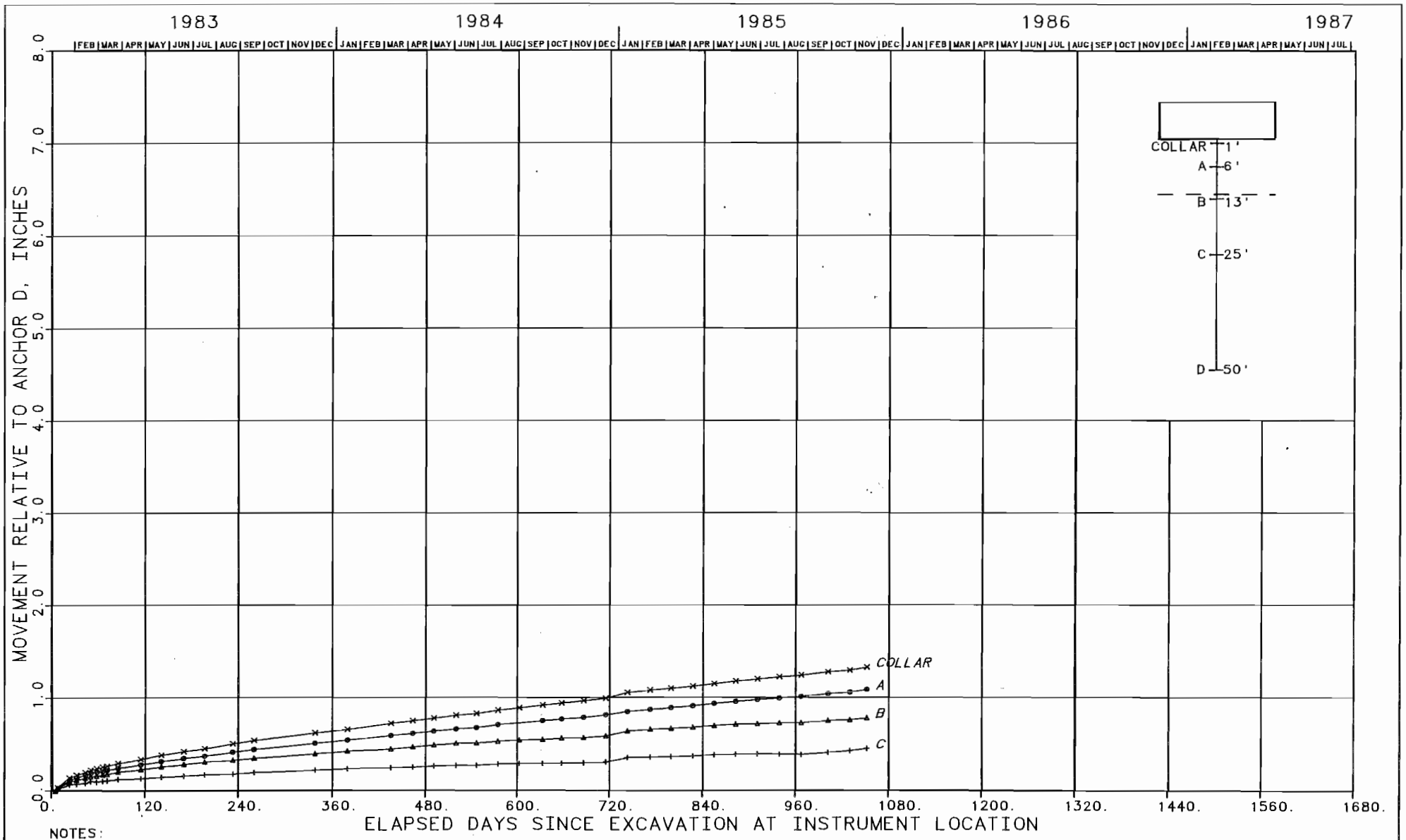
FIGURE J-165
MULTIPLE-POINT EXTENSOMETER 51X-GE-00246
E140 DRIFT - S700 INTERSECTION - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

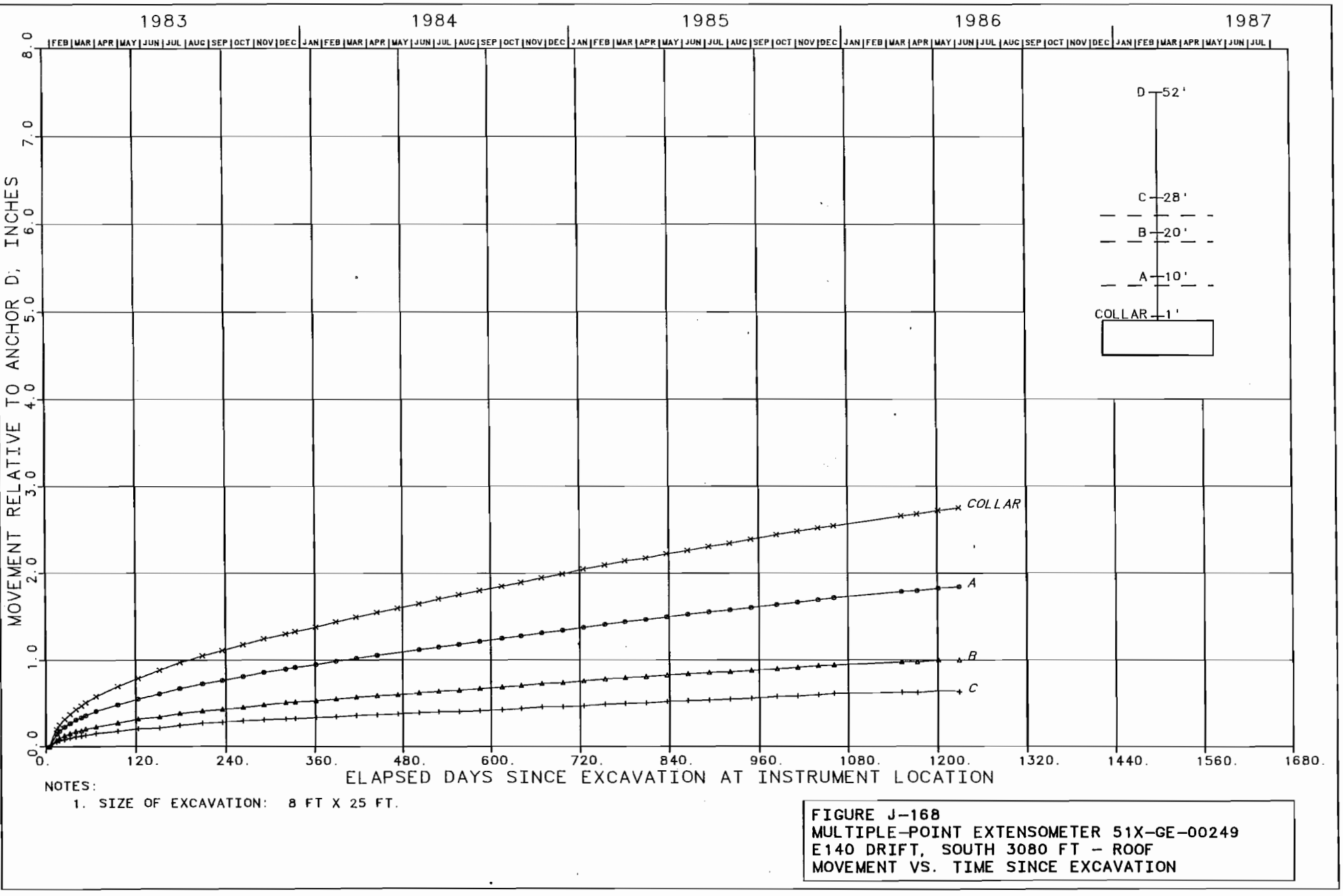
FIGURE J-166
MULTIPLE-POINT EXTENSOMETER 51X-GE-00247
E140 DRIFT, SOUTH 1950 FT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

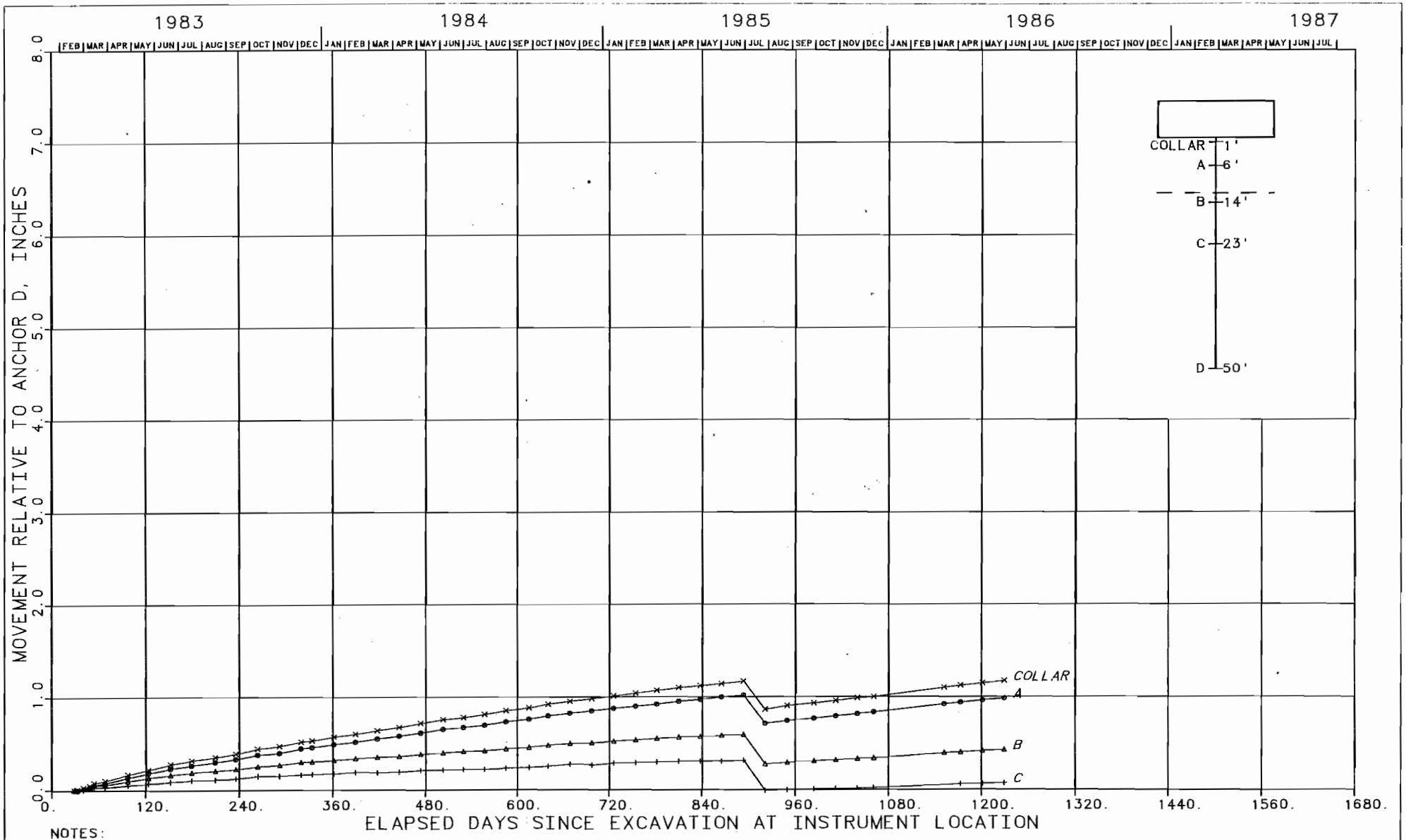
FIGURE J-167
MULTIPLE-POINT EXTENSOMETER 51X-GE-00248
E140 DRIFT, SOUTH 1950 FT - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.

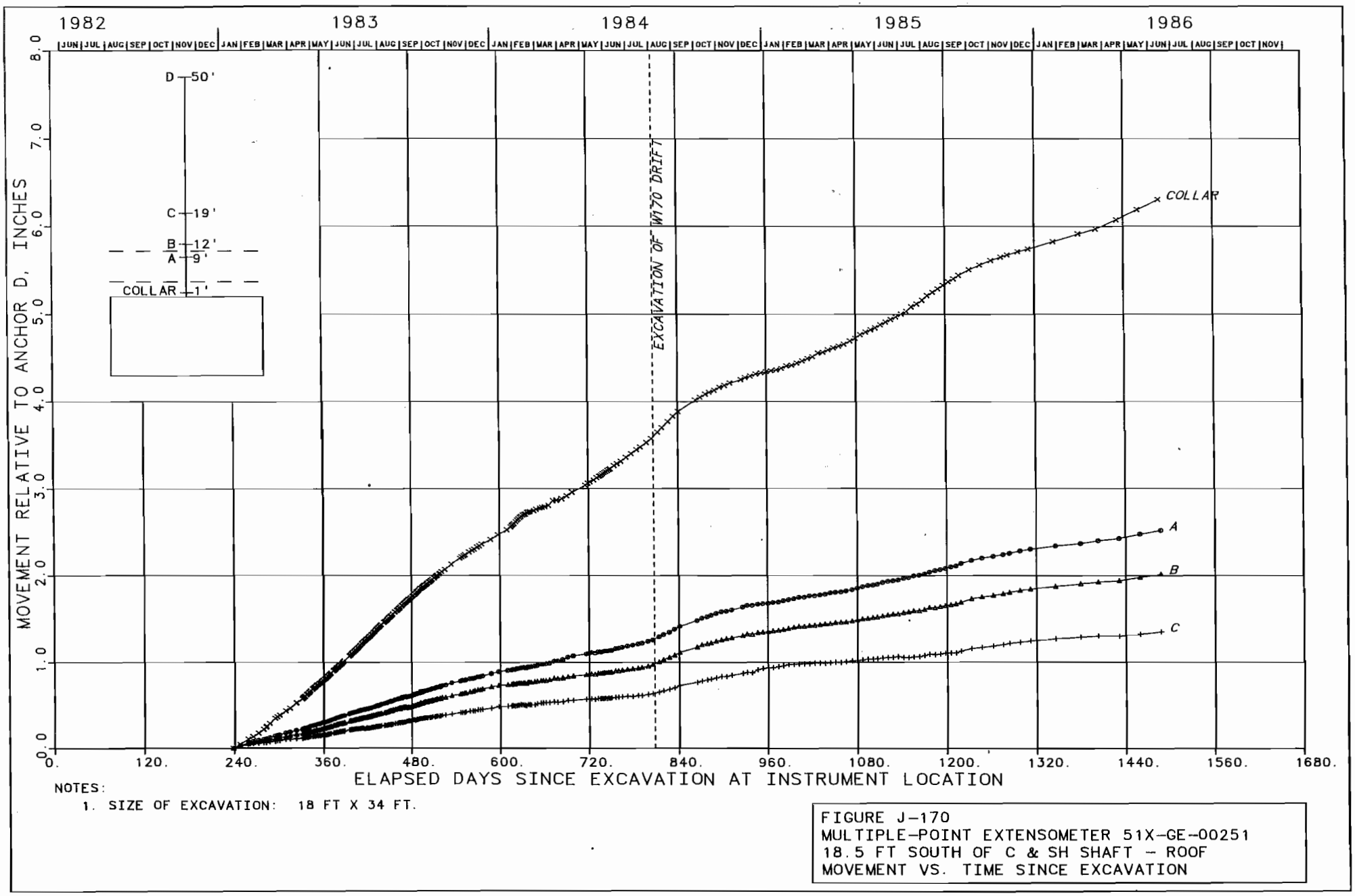
FIGURE J-168
MULTIPLE-POINT EXTENSOMETER 51X-GE-00249
E140 DRIFT, SOUTH 3080 FT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.

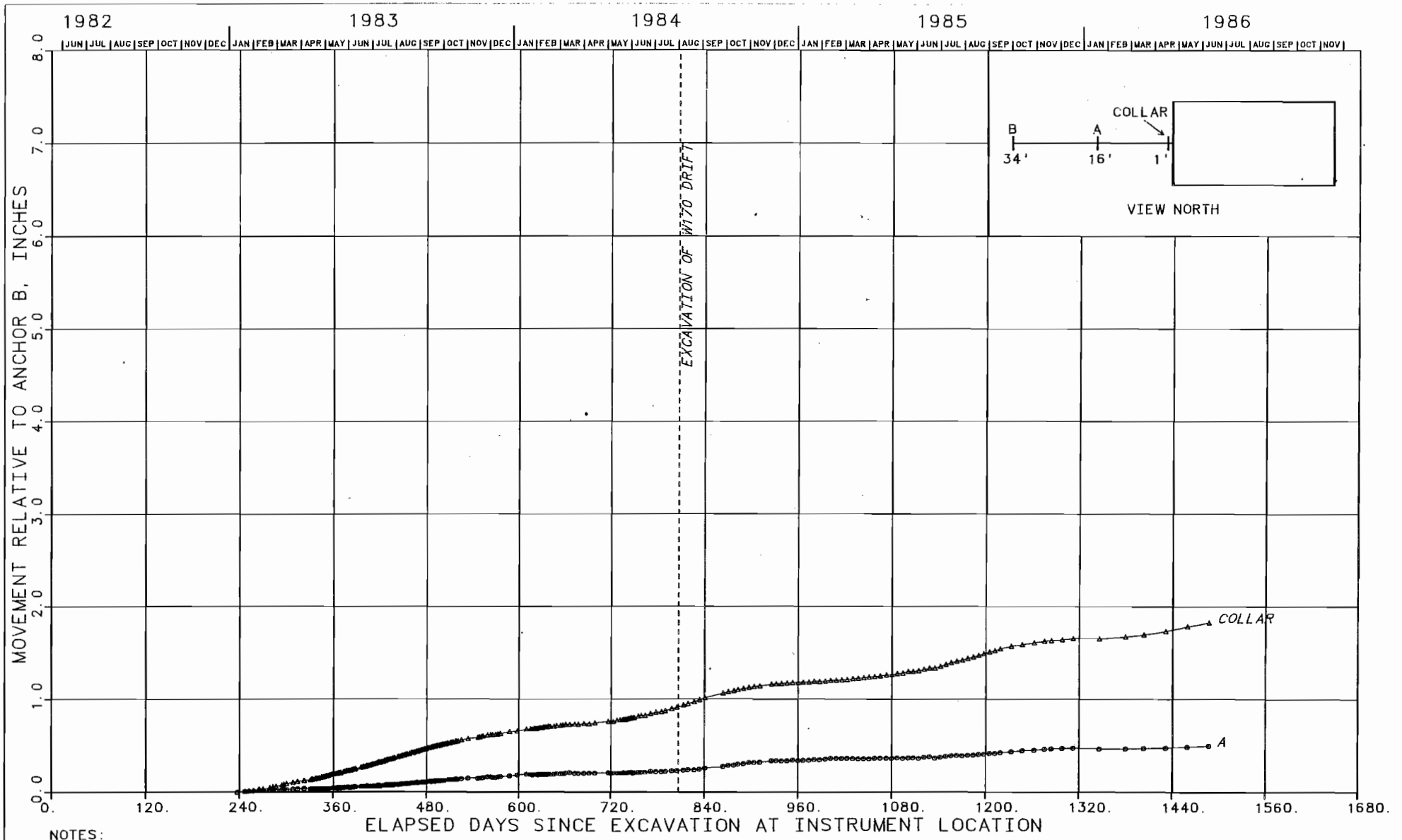
FIGURE J-169
MULTIPLE-POINT EXTENSOMETER 51X-GE-00250
E140 DRIFT, SOUTH 3045 FT - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 18 FT X 34 FT.

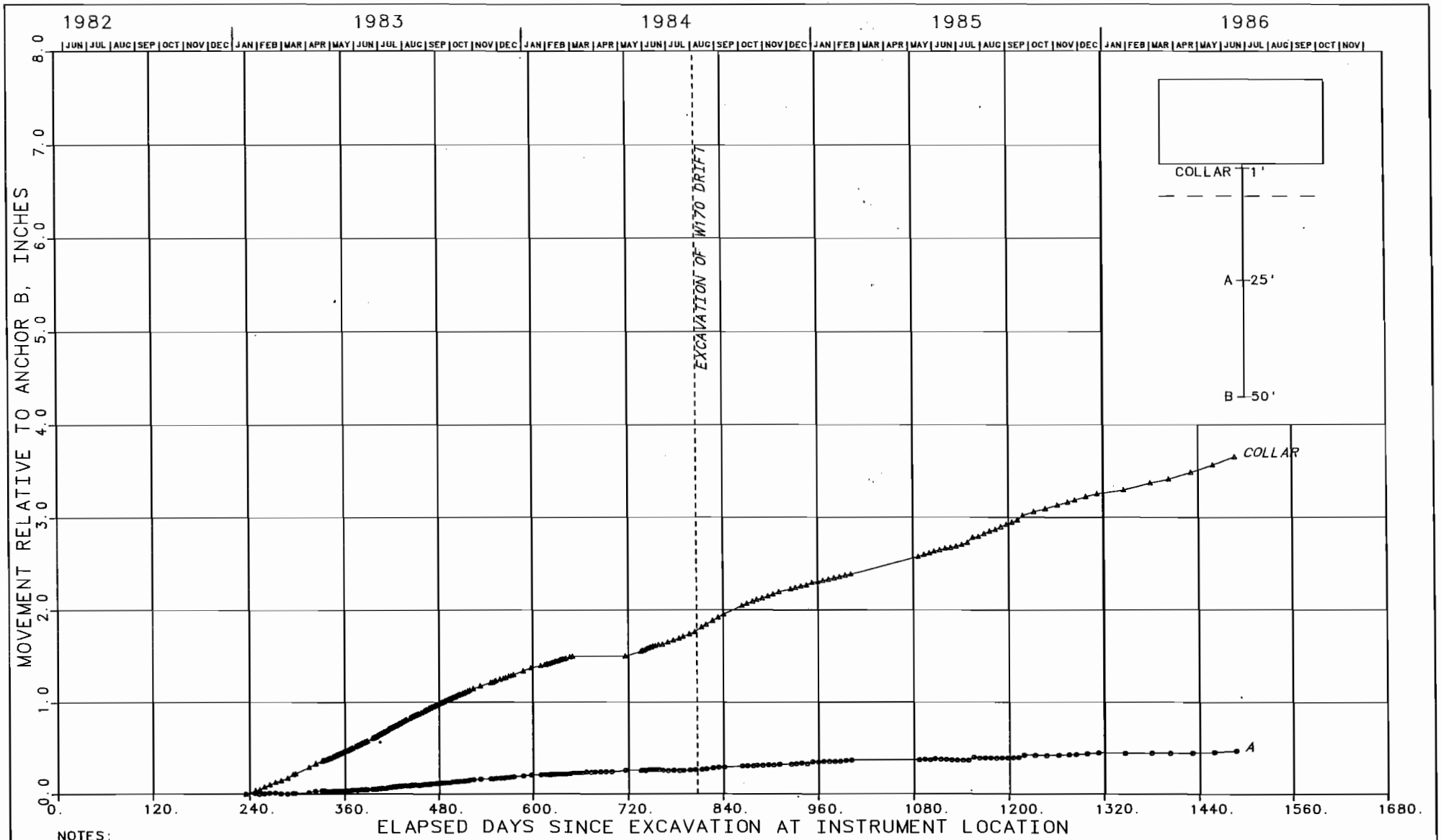
FIGURE J-170
MULTIPLE-POINT EXTENSOMETER 51X-GE-00251
18.5 FT SOUTH OF C & SH SHAFT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 18 FT X 35 FT.

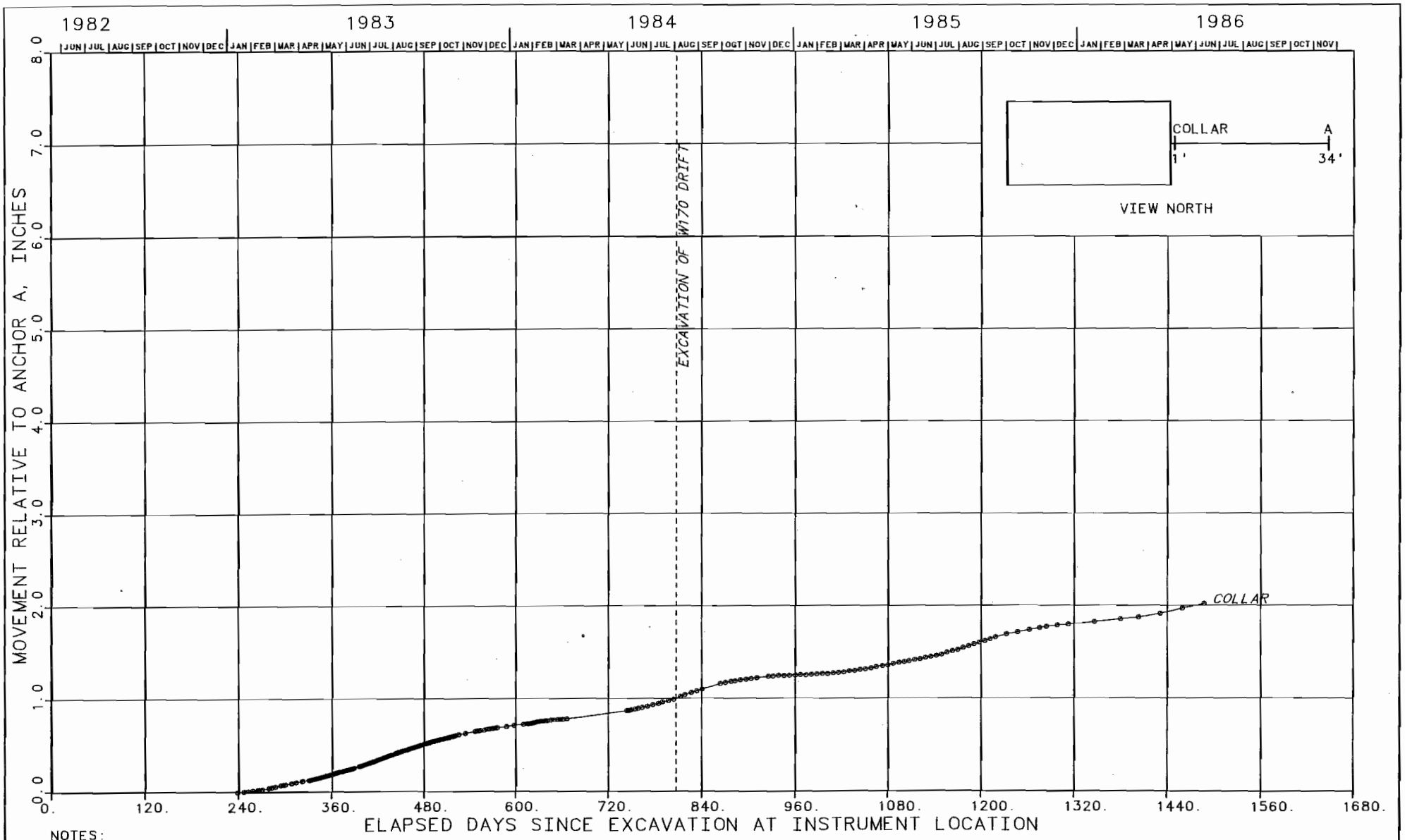
FIGURE J-171
DOUBLE-POINT EXTENSOMETER 51X-GE-00252
30 FT SOUTH OF C & SH SHAFT - W WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 18 FT X 35 FT.

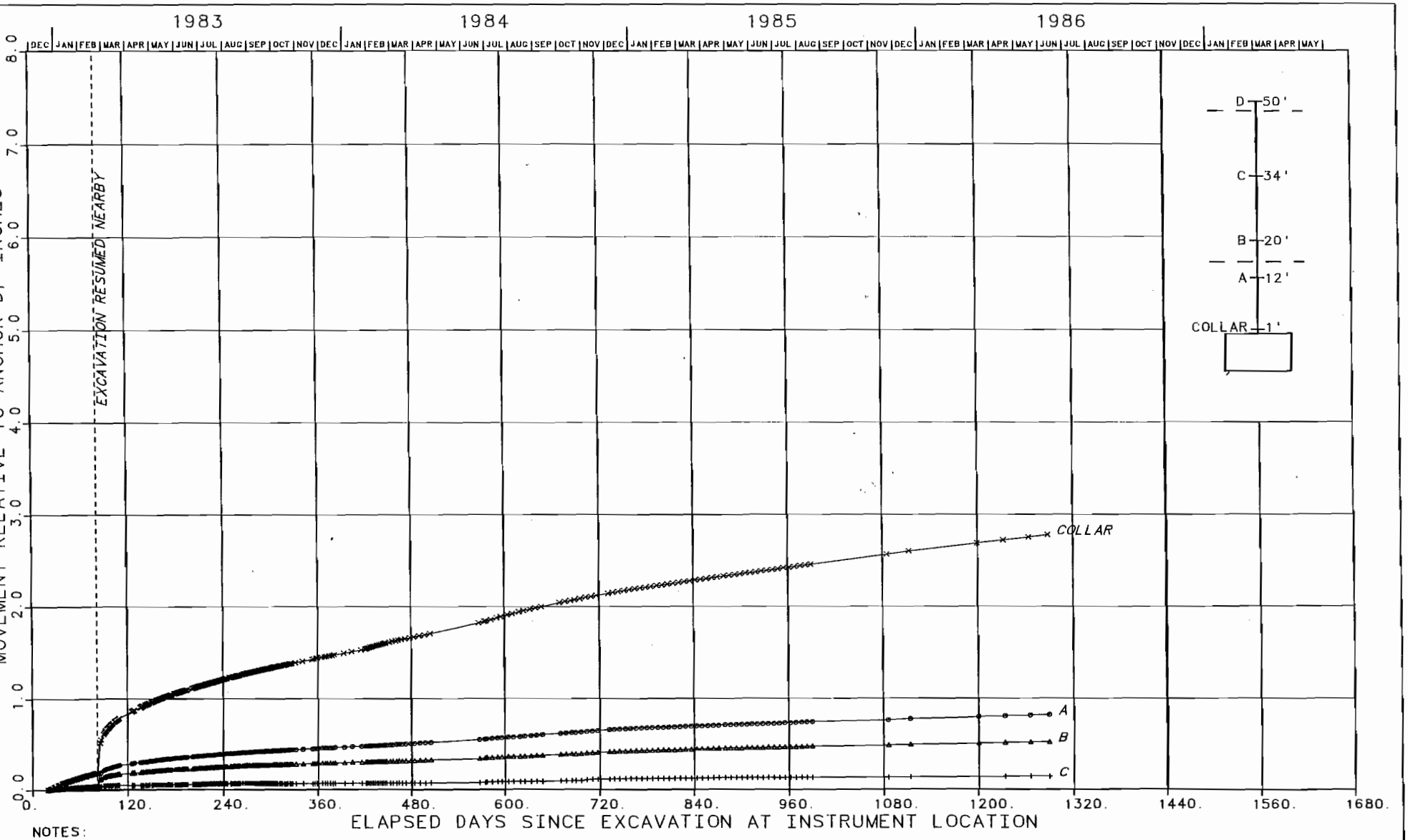
FIGURE J-172
DOUBLE-POINT EXTENSOMETER 51X-GE-00253
30 FT SOUTH OF C & SH SHAFT - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 18 FT X 35 FT.

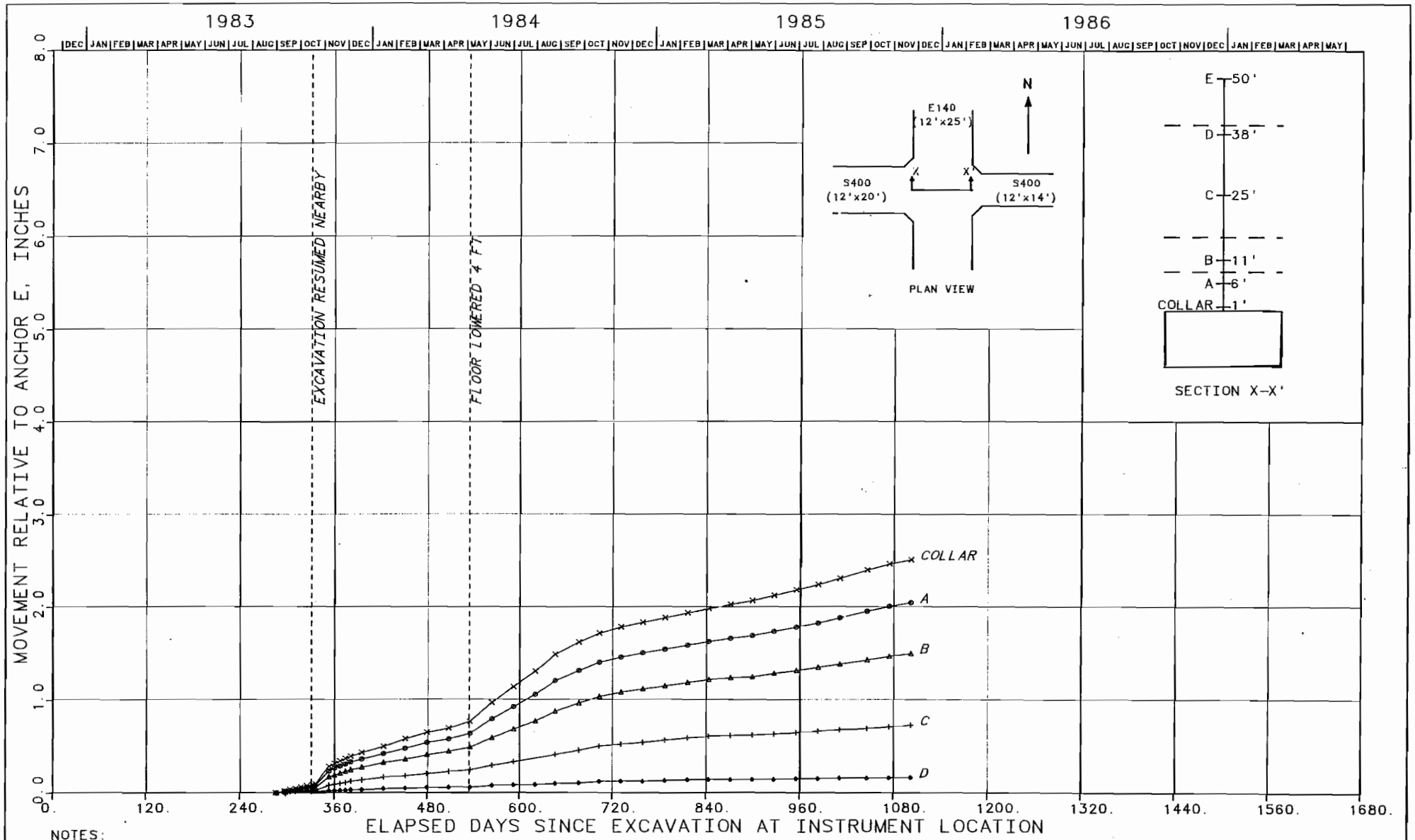
FIGURE J-173
SINGLE-POINT EXTENSOMETER 51X-GE-00254
30 FT SOUTH OF C & SH SHAFT – E WALL
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 14 FT.

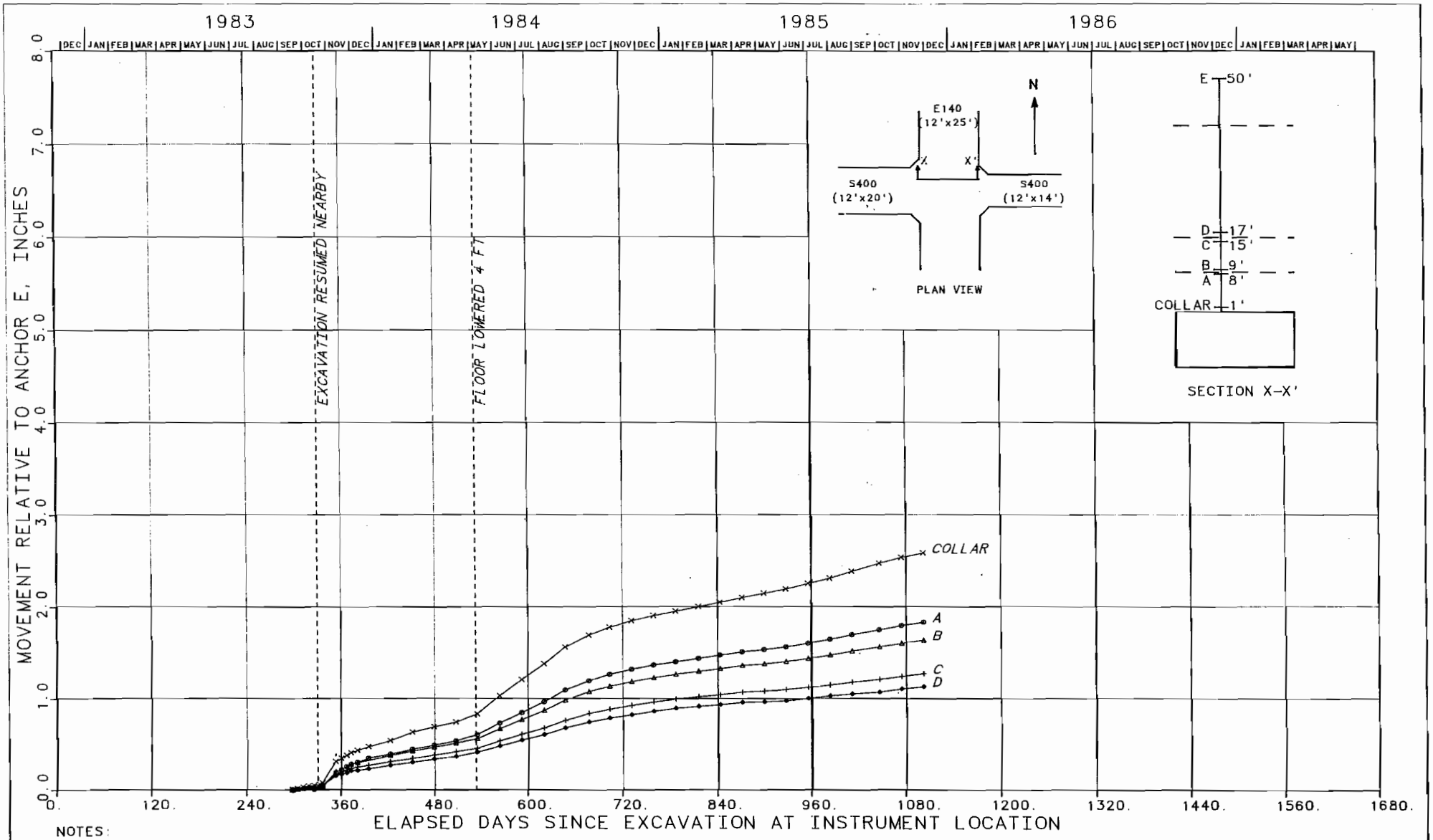
FIGURE J-174
MULTIPLE-POINT EXTENSOMETER 51X-GE-00255
E140 DRIFT, NORTH 240 FT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. INSTRUMENT HAS BEEN DESTROYED.

FIGURE J-175
MULTIPLE-POINT EXTENSOMETER 51X-GE-00256
E140 DRIFT - S400 INTERSECTION - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. INSTRUMENT HAS BEEN DESTROYED.

FIGURE J-176
MULTIPLE-POINT EXTENSOMETER 51X-GE-00257
E140 DRIFT - S400 INTERSECTION - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION

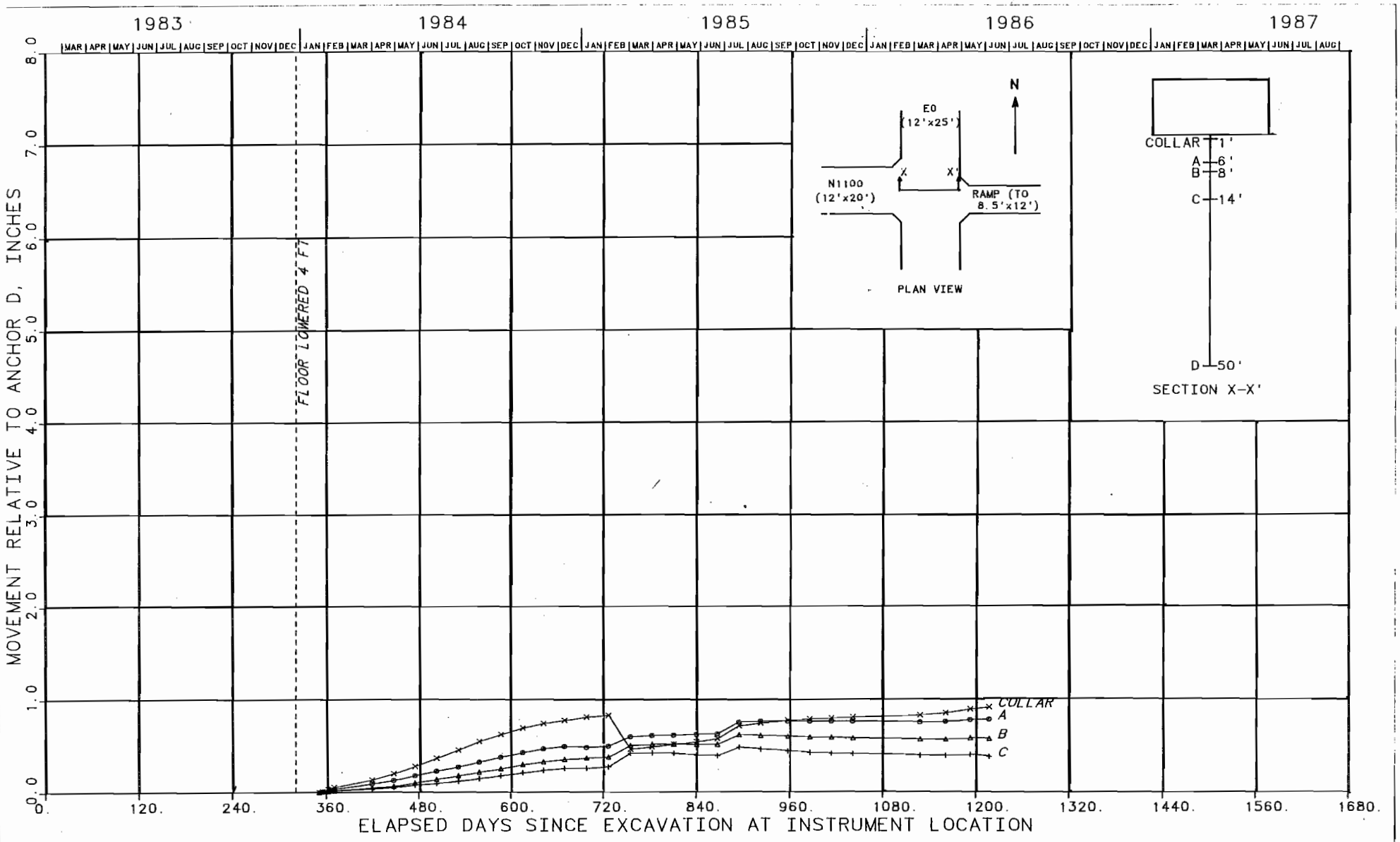


FIGURE J-177
MULTIPLE-POINT EXTENSOMETER 51X-GE-00258
E0 DRIFT - N1100 DRIFT INTERSECTION - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION

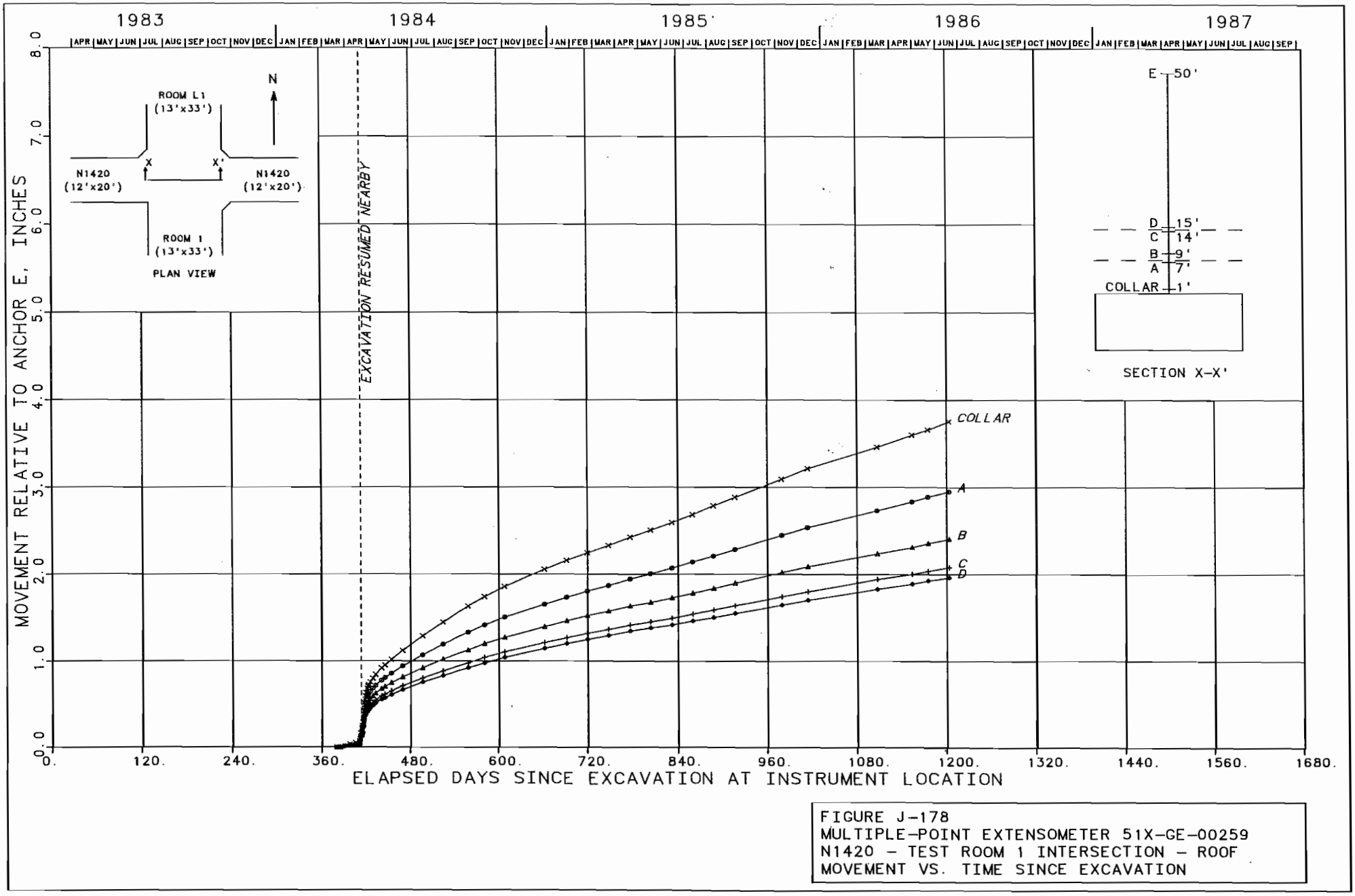


FIGURE J-178
MULTIPLE-POINT EXTENSOMETER 51X-GE-00259
N1420 - TEST ROOM 1 INTERSECTION - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION

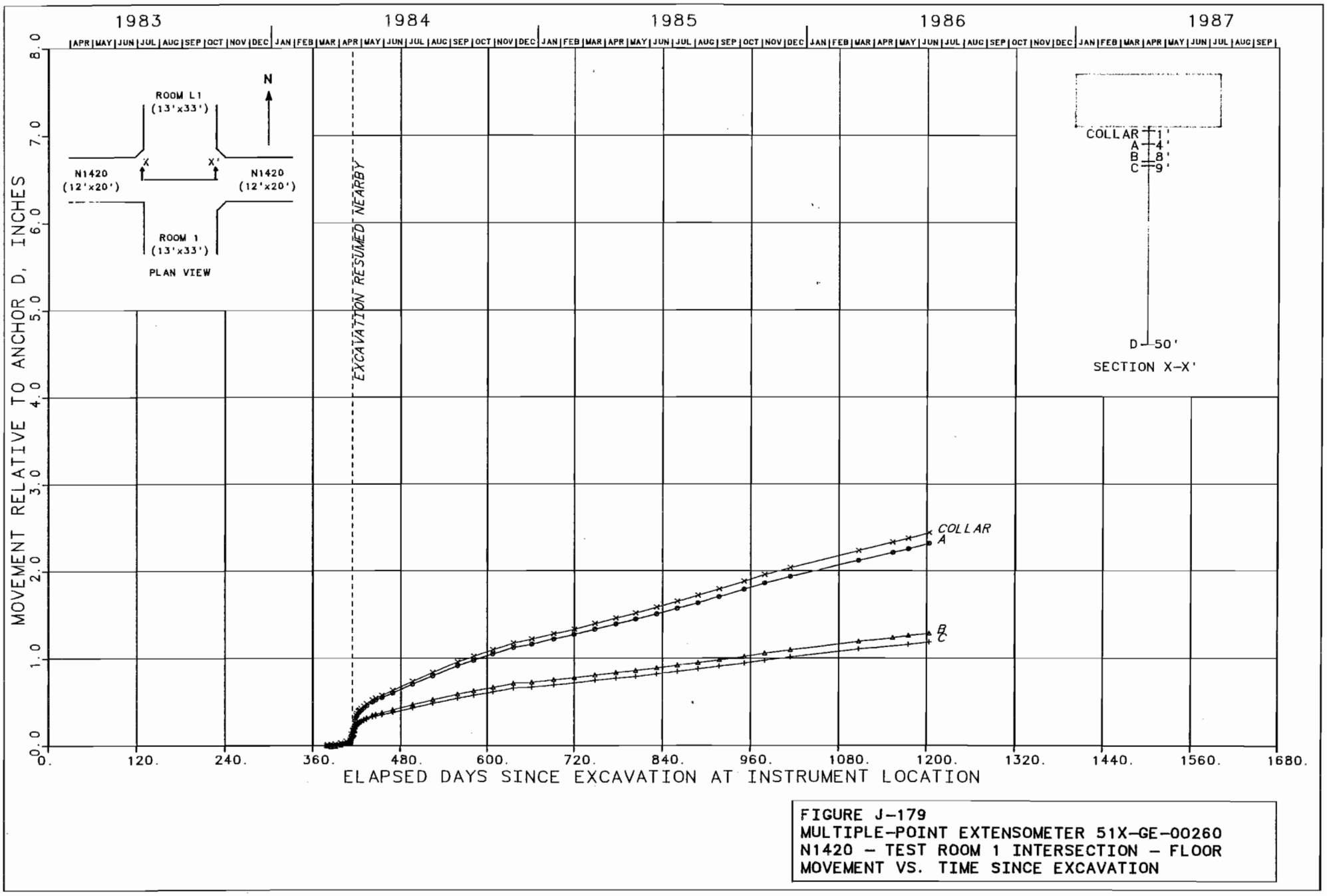


FIGURE J-179
MULTIPLE-POINT EXTENSOMETER 51X-GE-00260
N1420 - TEST ROOM 1 INTERSECTION - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION

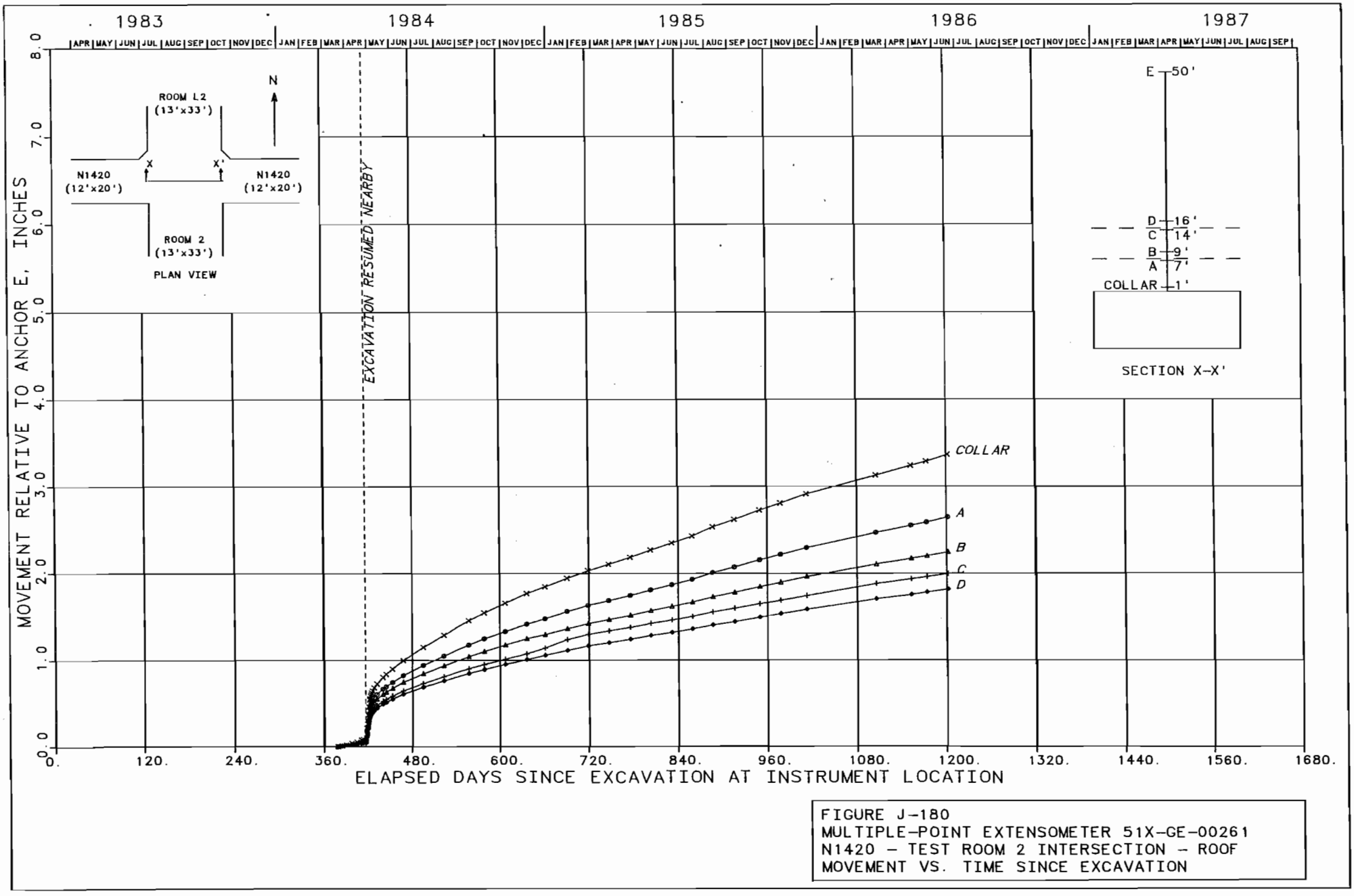


FIGURE J-180
MULTIPLE-POINT EXTENSOMETER 51X-GE-00261
N1420 - TEST ROOM 2 INTERSECTION - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION

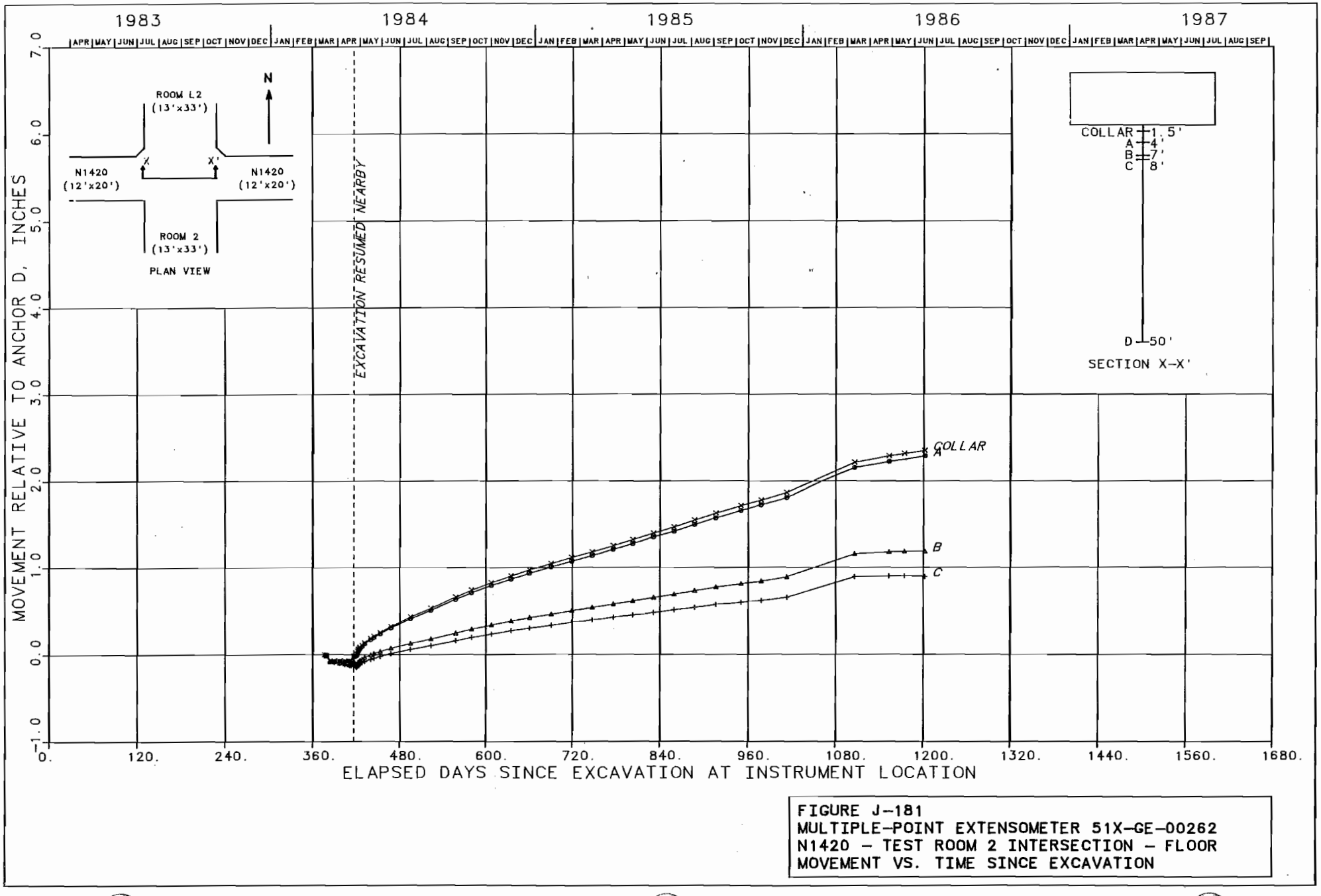


FIGURE J-181
MULTIPLE-POINT EXTENSOMETER 51X-GE-00262
N1420 - TEST ROOM 2 INTERSECTION - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION

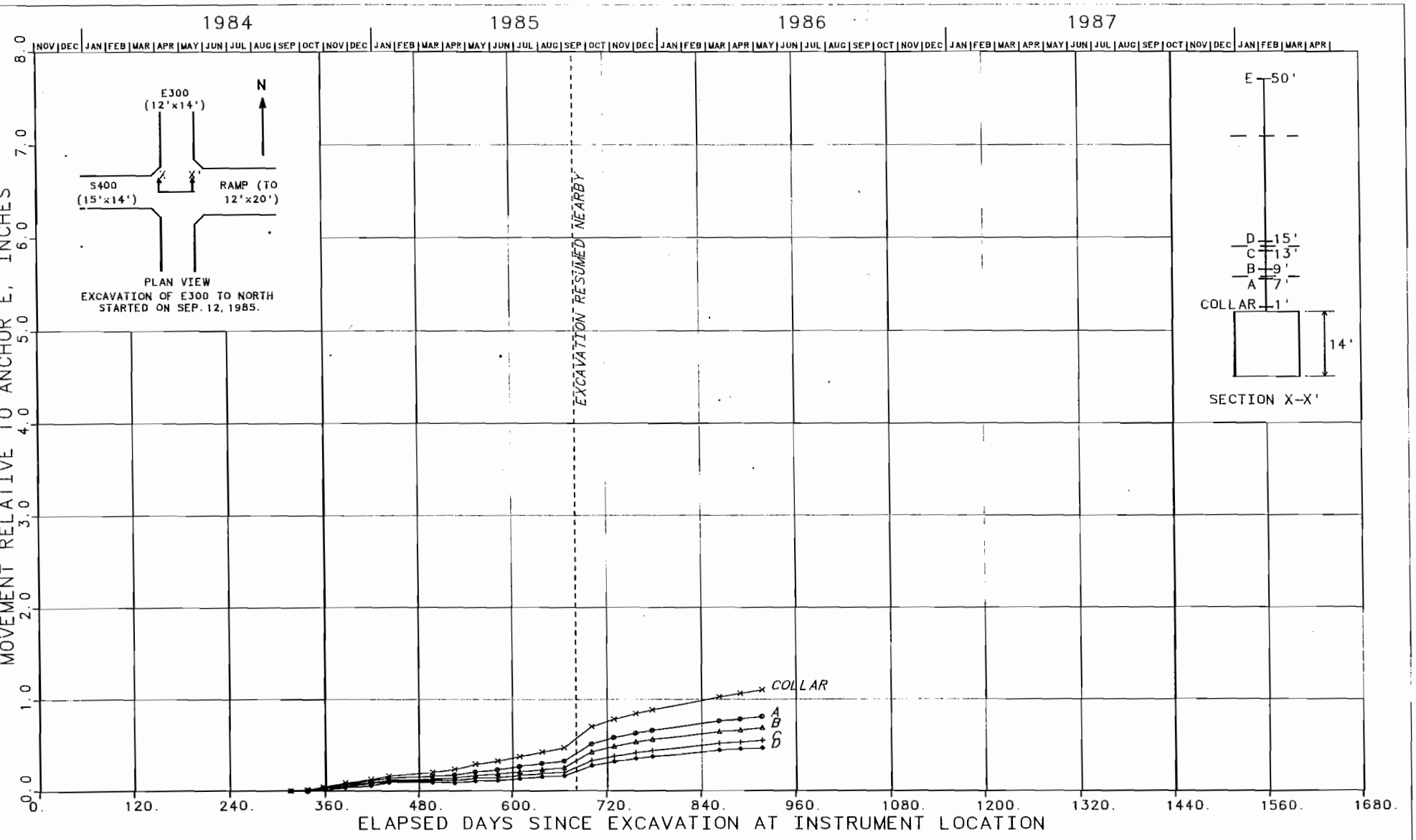
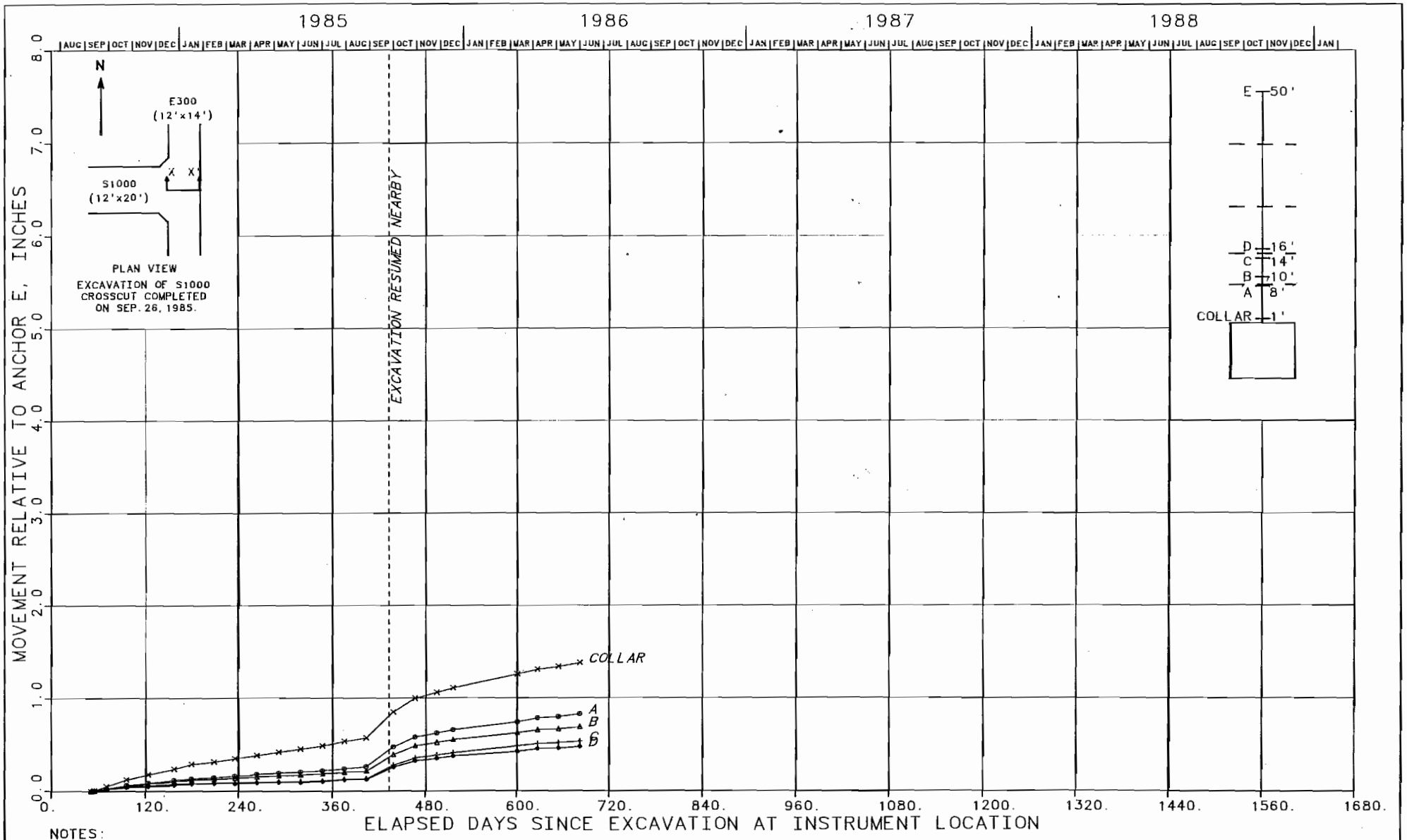


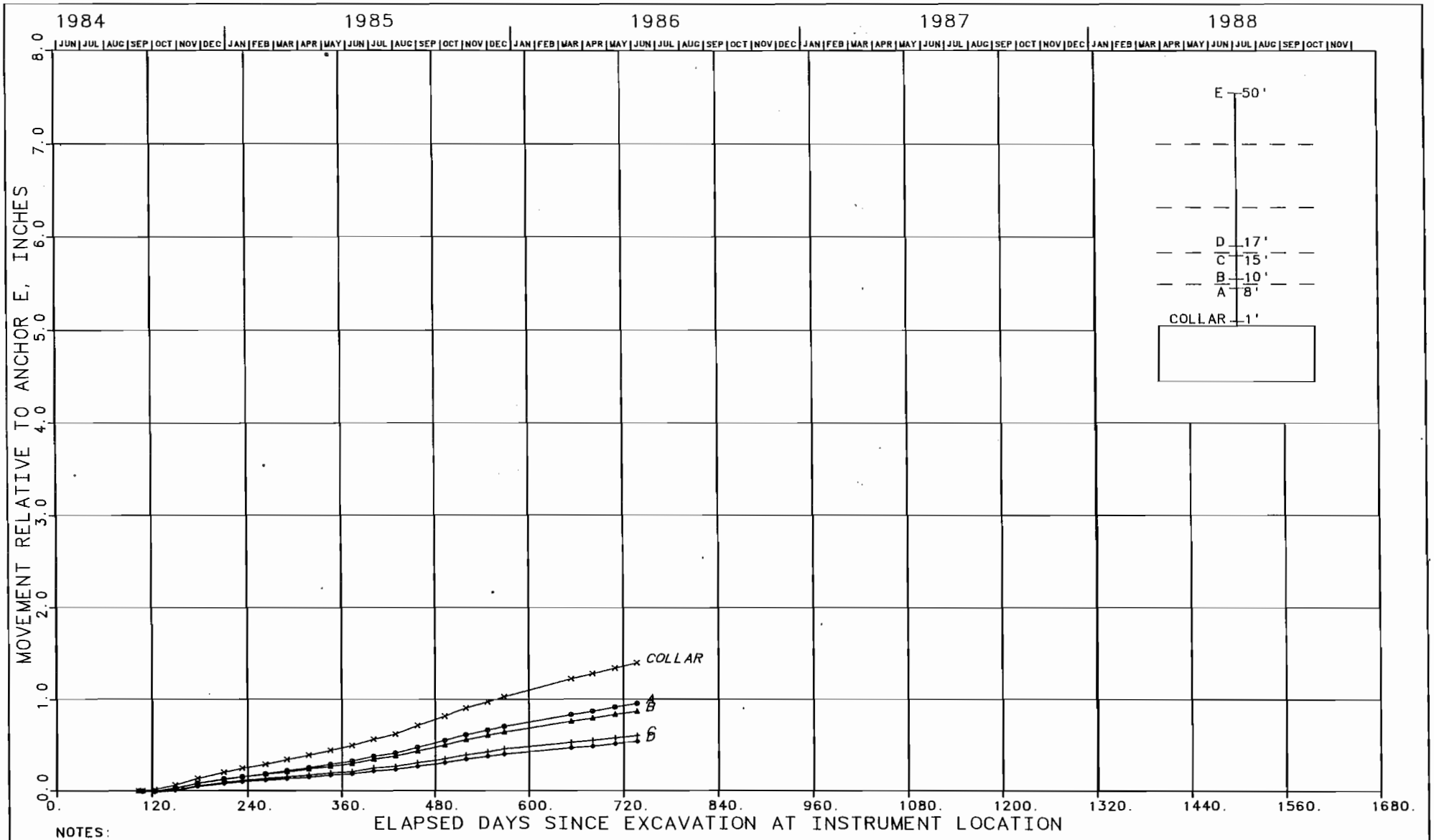
FIGURE J-182
MULTIPLE-POINT EXTENSOMETER 51X-GE-00263
E300 DRIFT - S400 INTERSECTION - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

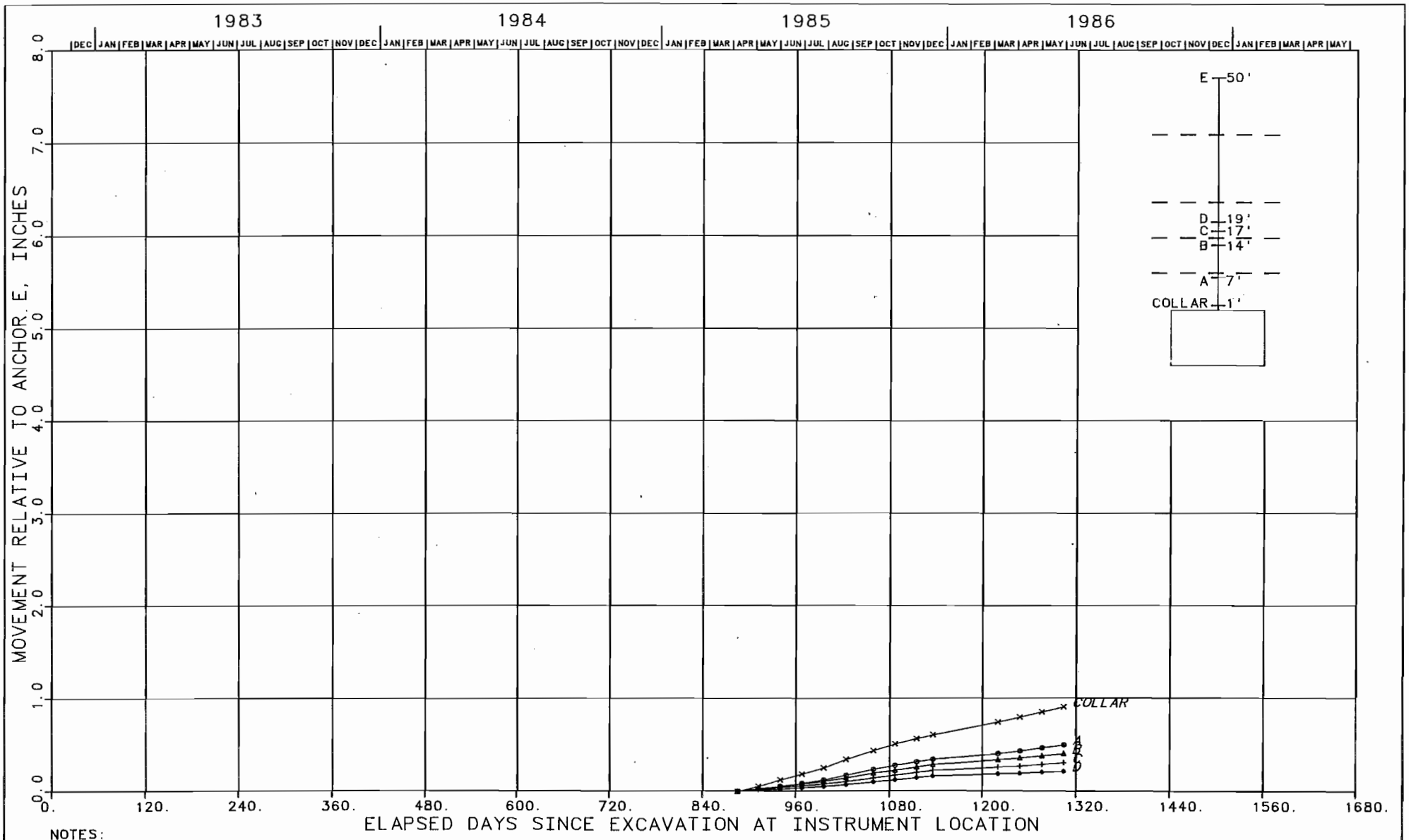
FIGURE J-183
MULTIPLE-POINT EXTENSOMETER 51X-GE-00264
E300 DRIFT – S1000 INTERSECTION – ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 33 FT.

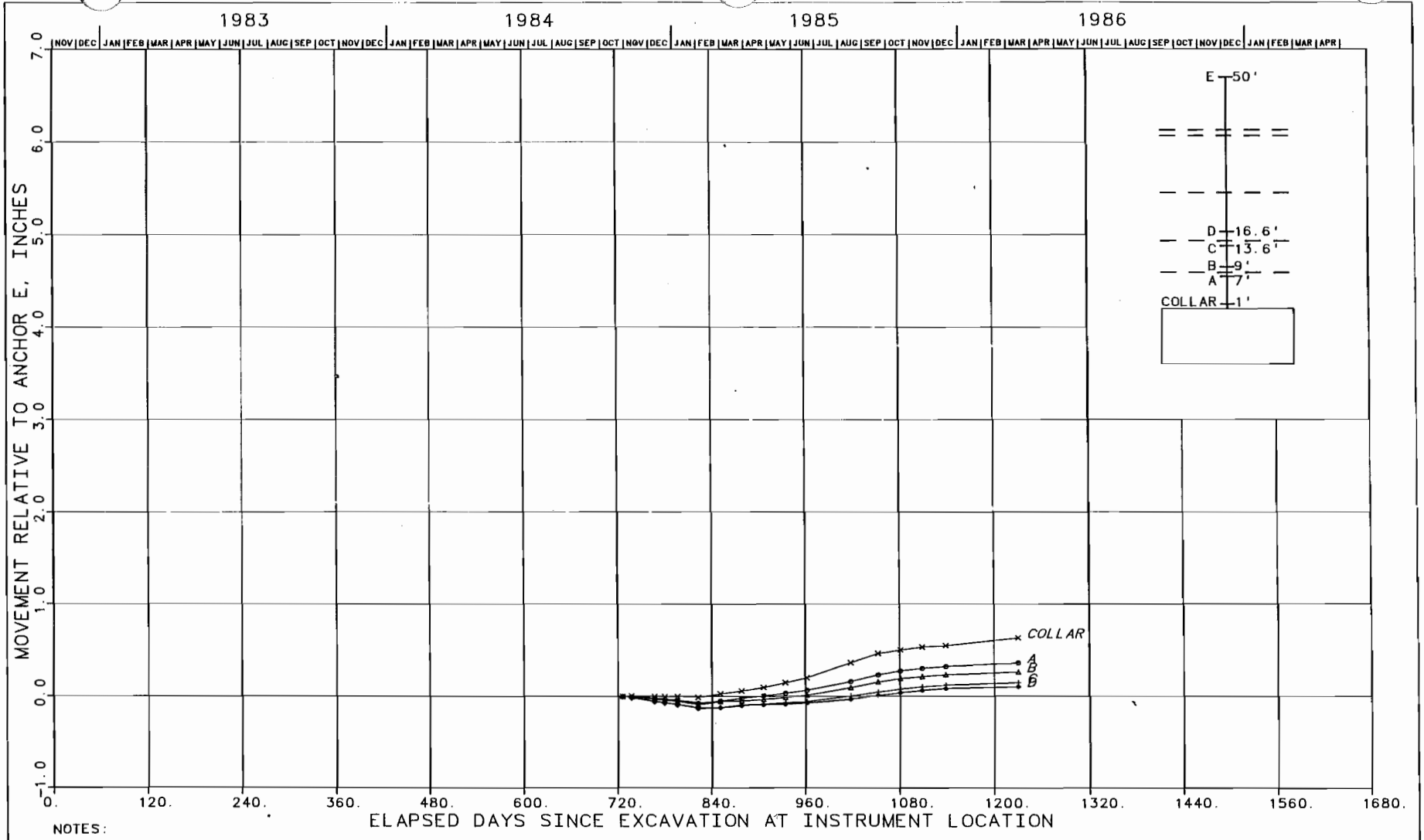
FIGURE J-184
MULTIPLE-POINT EXTENSOMETER 51X-GE-00265
S700 CROSSCUT, EAST 220 FT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

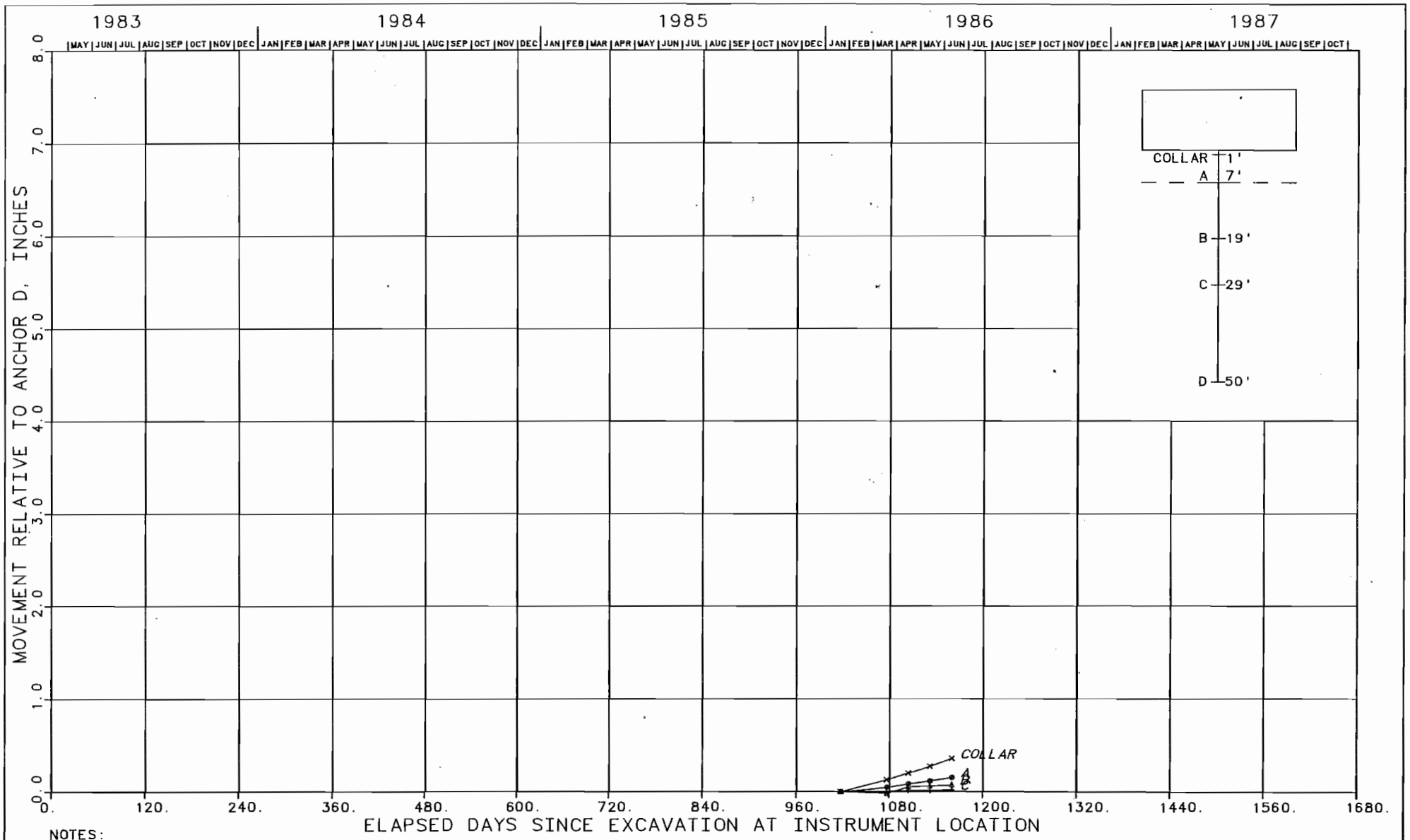
FIGURE J-185
MULTIPLE-POINT EXTENSOMETER 51X-GE-00267
30 FT EAST OF WASTE SHAFT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 28 FT.
2. INSTRUMENT IS CURRENTLY NOT ACCESSIBLE FOR READING.

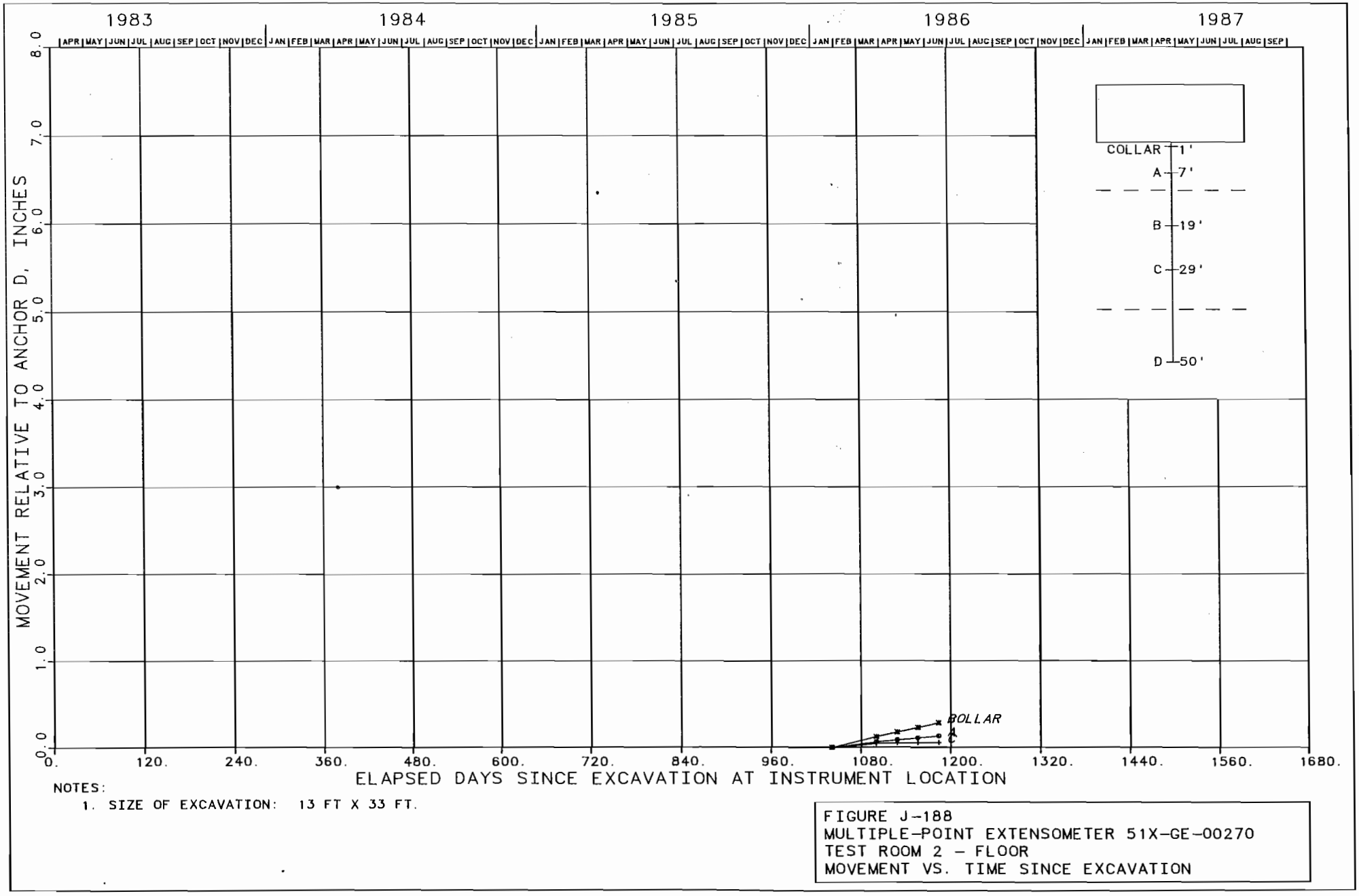
FIGURE J-186
MULTIPLE-POINT EXTENSOMETER 51X-GE-00268
30 FT WEST OF WASTE SHAFT - ROOF
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

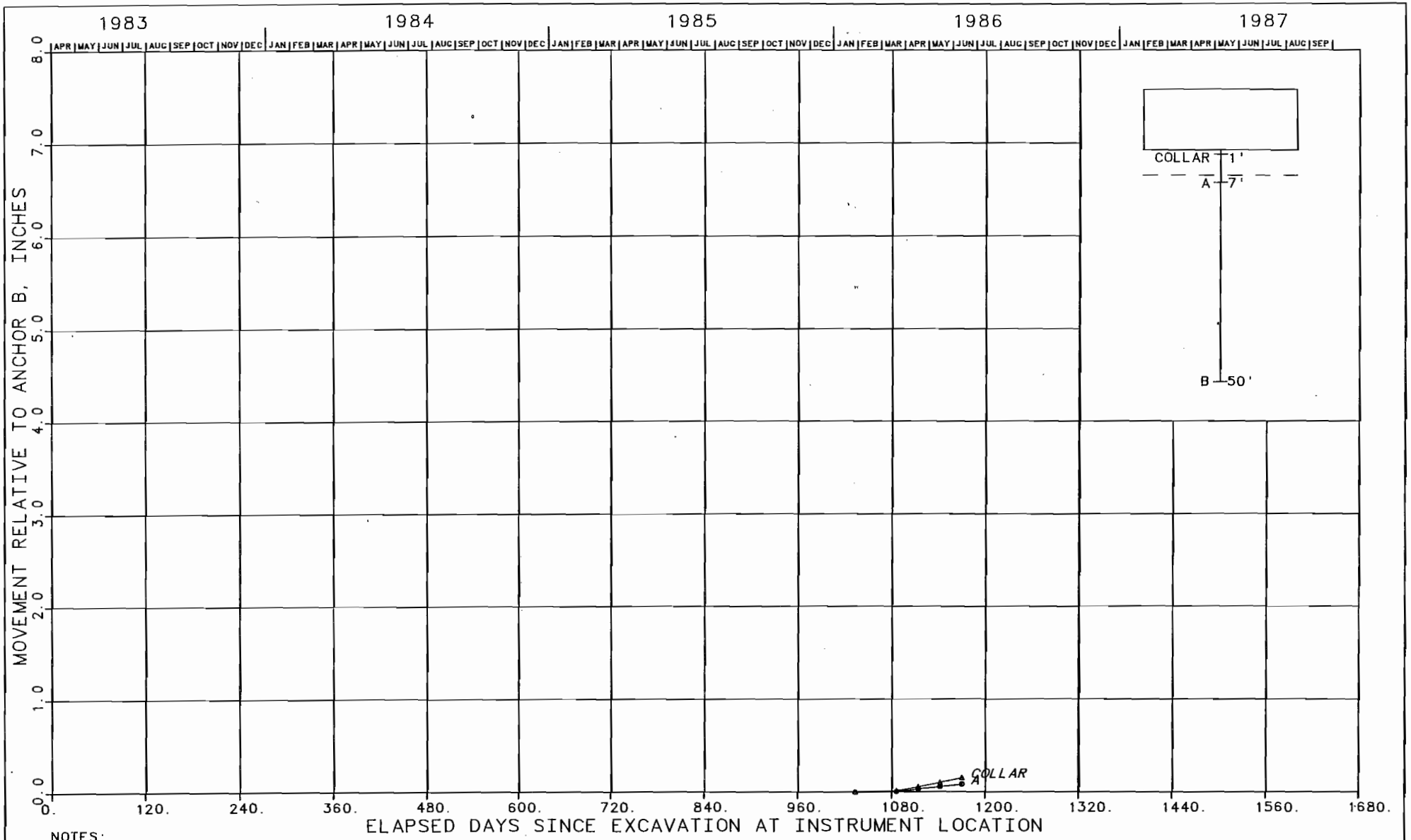
FIGURE J-187
MULTIPLE-POINT EXTENSOMETER 51X-GE-00269
TEST ROOM 1 - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

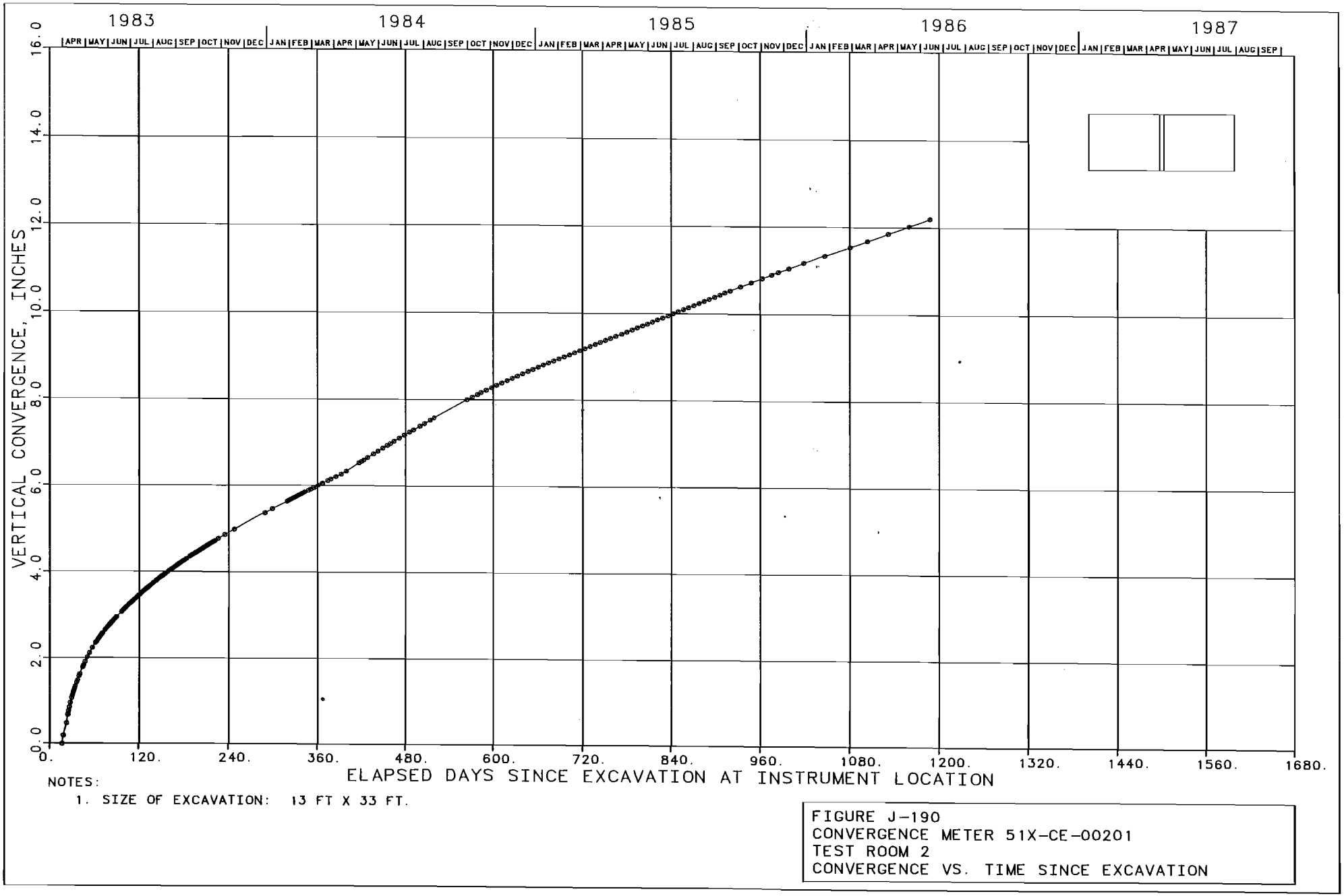
FIGURE J-188
MULTIPLE-POINT EXTENSOMETER 51X-GE-00270
TEST ROOM 2 - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

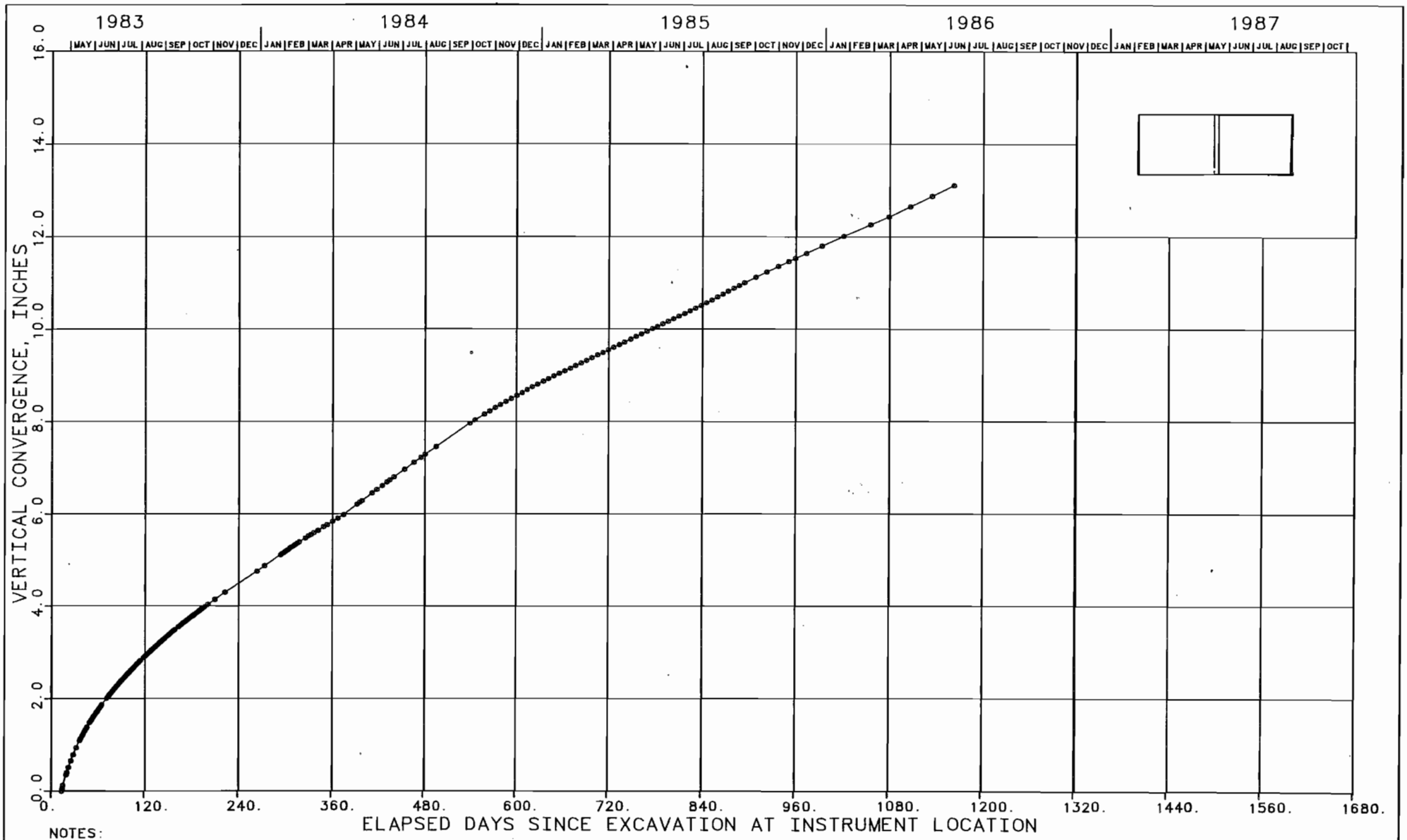
FIGURE J-189
DOUBLE-POINT EXTENSOMETER 51X-GE-00271
TEST ROOM 3 - FLOOR
MOVEMENT VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

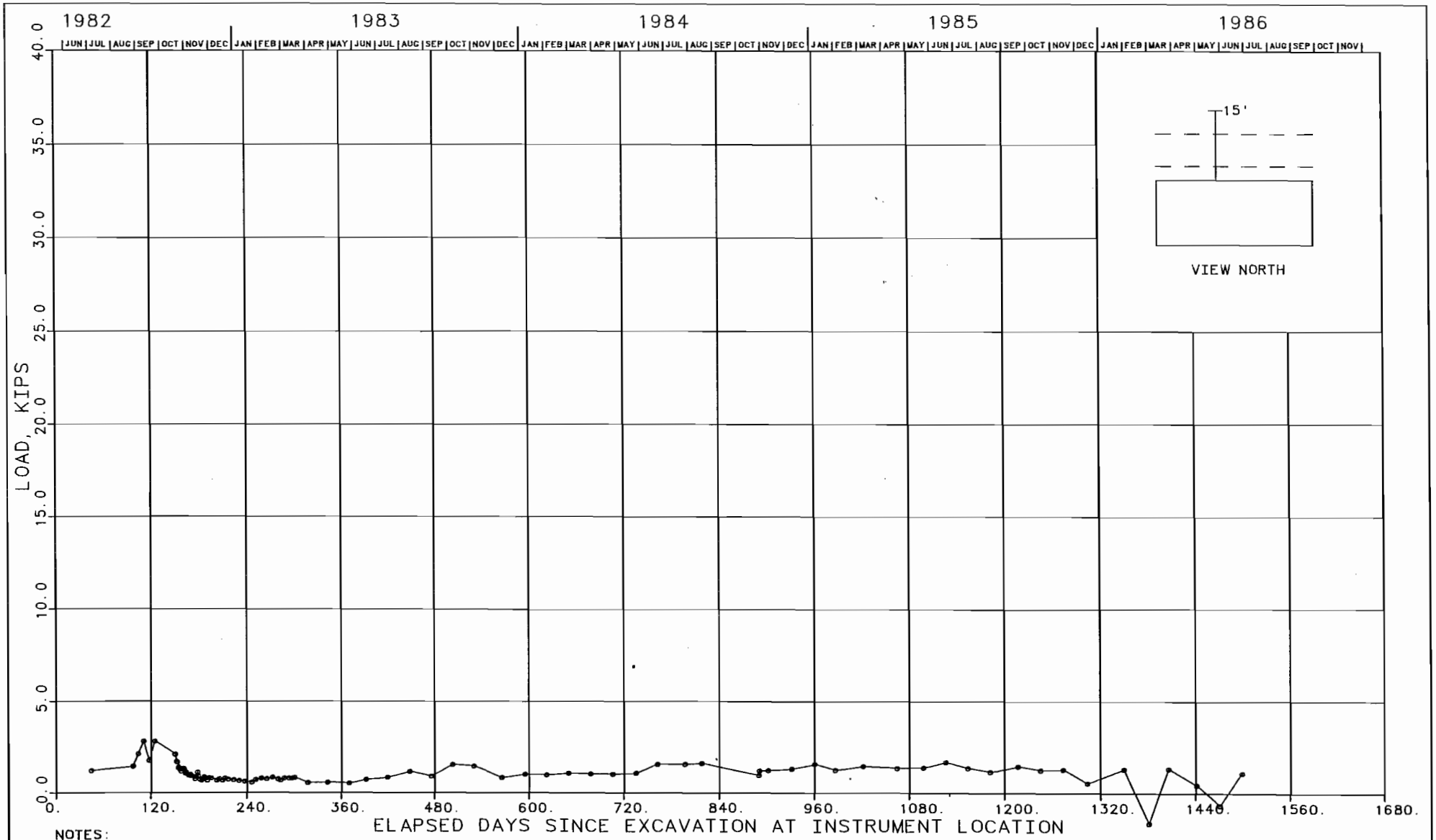
FIGURE J-190
CONVERGENCE METER 51X-CE-00201
TEST ROOM 2
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

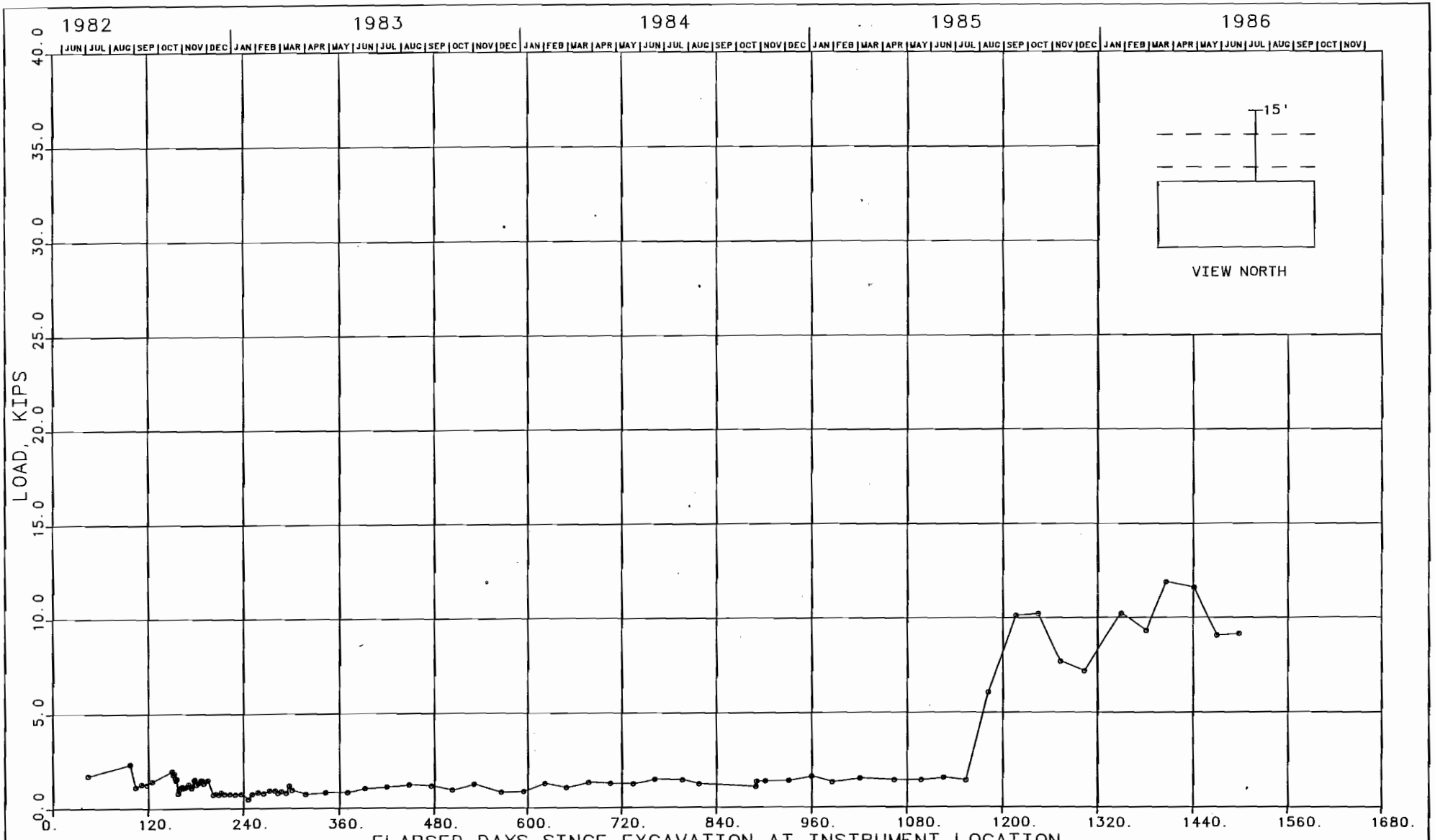
FIGURE J-191
CONVERGENCE METER 51X-CE-00202
TEST ROOM 1
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. ROCKBOLT LENGTH: 15 FT.
2. SIZE OF EXCAVATION: 18 FT X 35 FT.

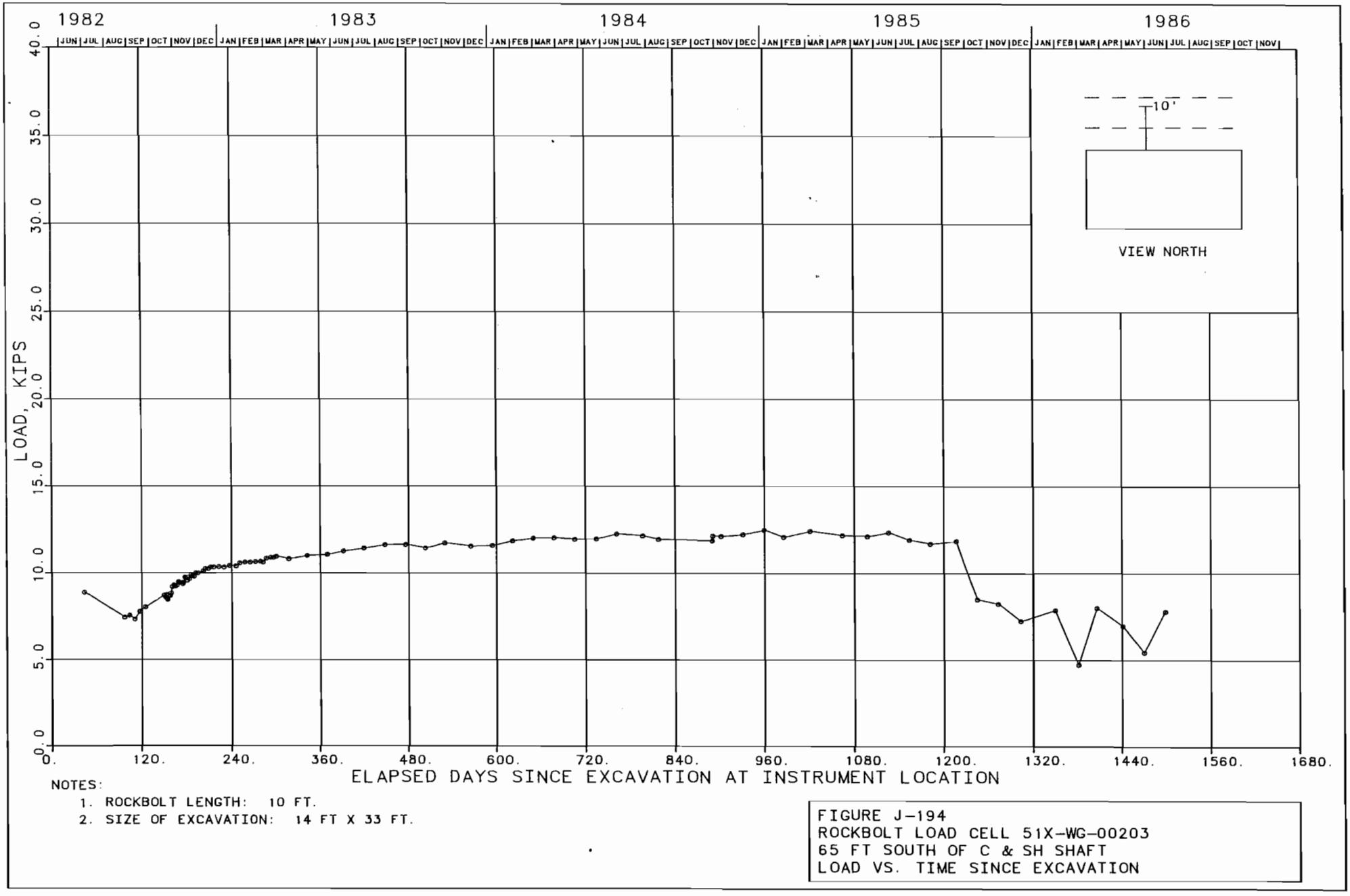
FIGURE J-192
ROCKBOLT LOAD CELL 51X-WG-00201
30 FT SOUTH OF C & SH SHAFT
LOAD VS. TIME SINCE EXCAVATION



NOTES:

1. ROCKBOLT LENGTH: 15 FT.
2. SIZE OF EXCAVATION: 18 FT X 35 FT.

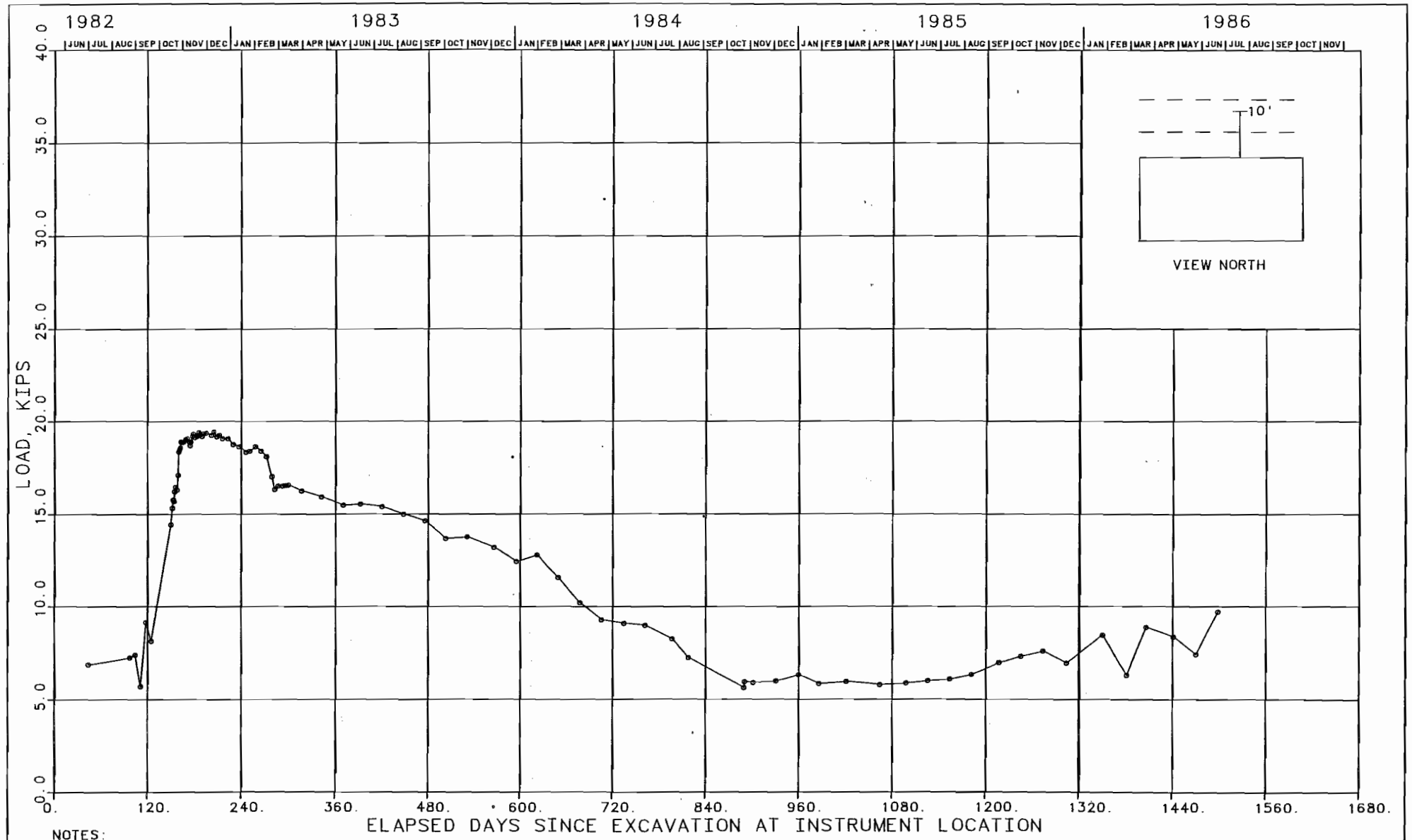
FIGURE J-193
ROCKBOLT LOAD CELL 51X-WG-00202
30 FT SOUTH OF C & SH SHAFT
LOAD VS. TIME SINCE EXCAVATION



NOTES:

1. ROCKBOLT LENGTH: 10 FT.
2. SIZE OF EXCAVATION: 14 FT X 33 FT.

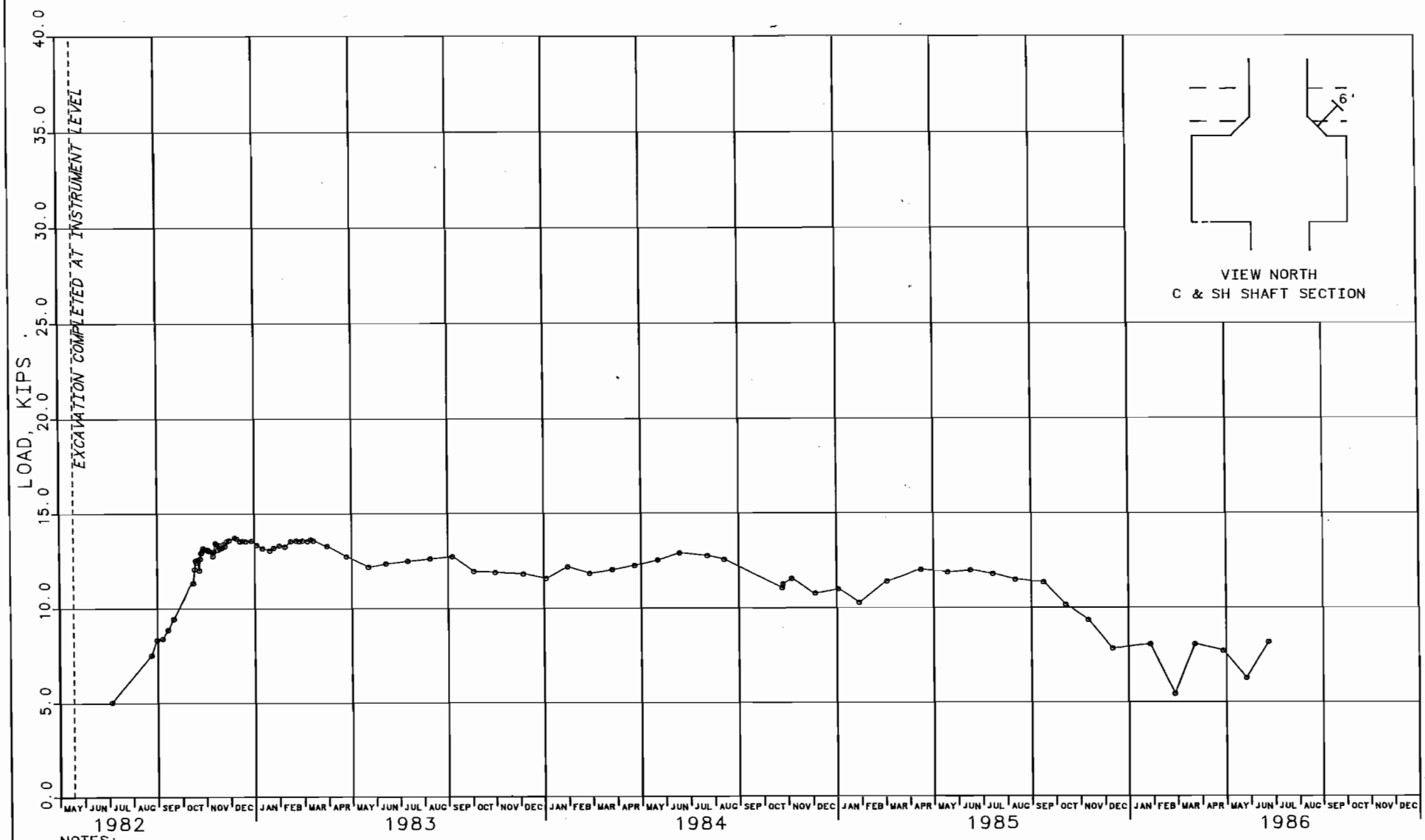
FIGURE J-194
ROCKBOLT LOAD CELL 51X-WG-00203
65 FT SOUTH OF C & SH SHAFT
LOAD VS. TIME SINCE EXCAVATION



NOTES:

1. ROCKBOLT LENGTH: 10 FT.
2. SIZE OF EXCAVATION: 14 FT X 33 FT.

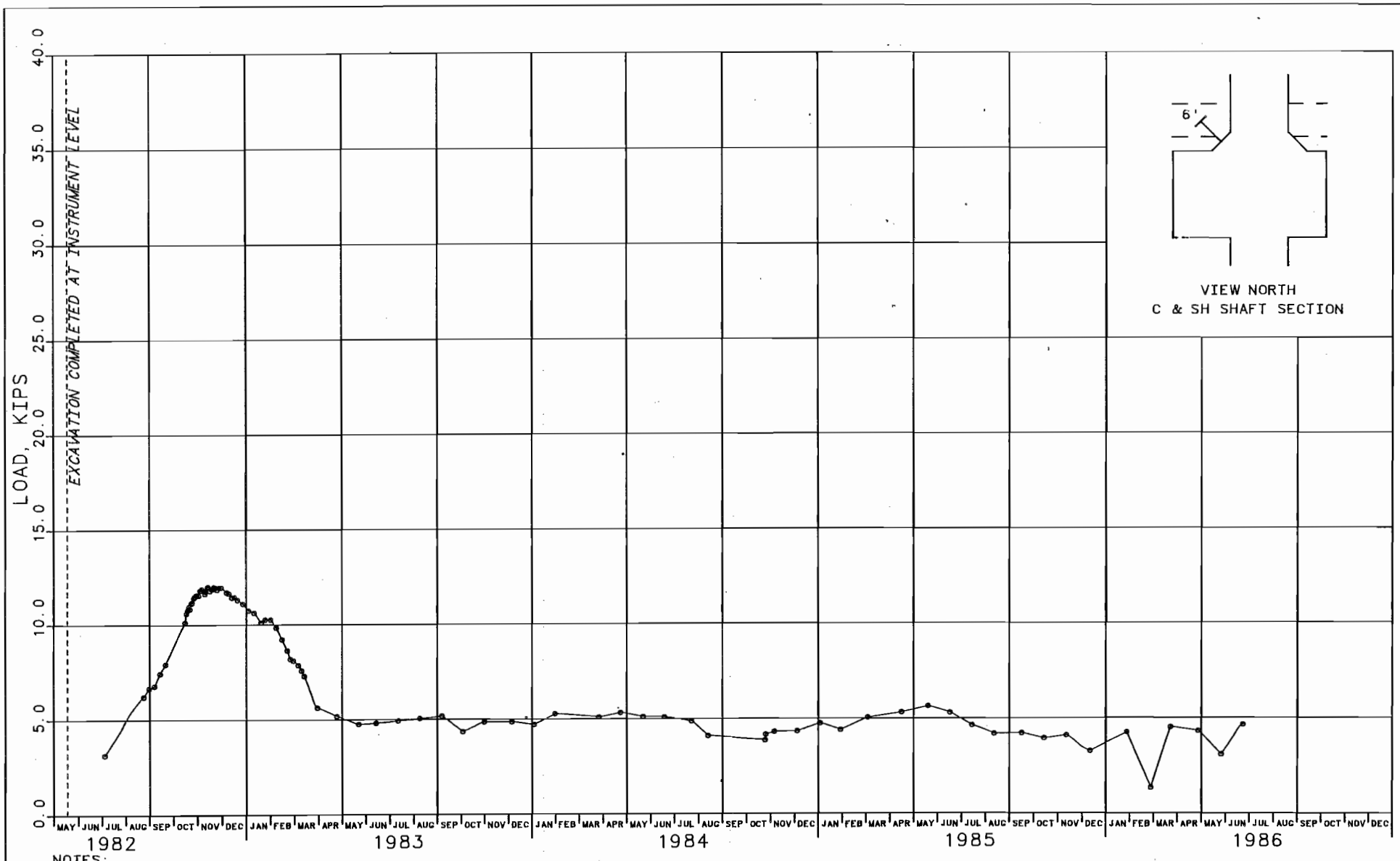
FIGURE J-195
ROCKBOLT LOAD CELL 51X-WG-00204
65 FT SOUTH OF C & SH SHAFT
LOAD VS. TIME SINCE EXCAVATION



NOTES:

1. ROCKBOLT LENGTH: 6 FT.
2. SIZE OF EXCAVATION: 12 FT DIAM.

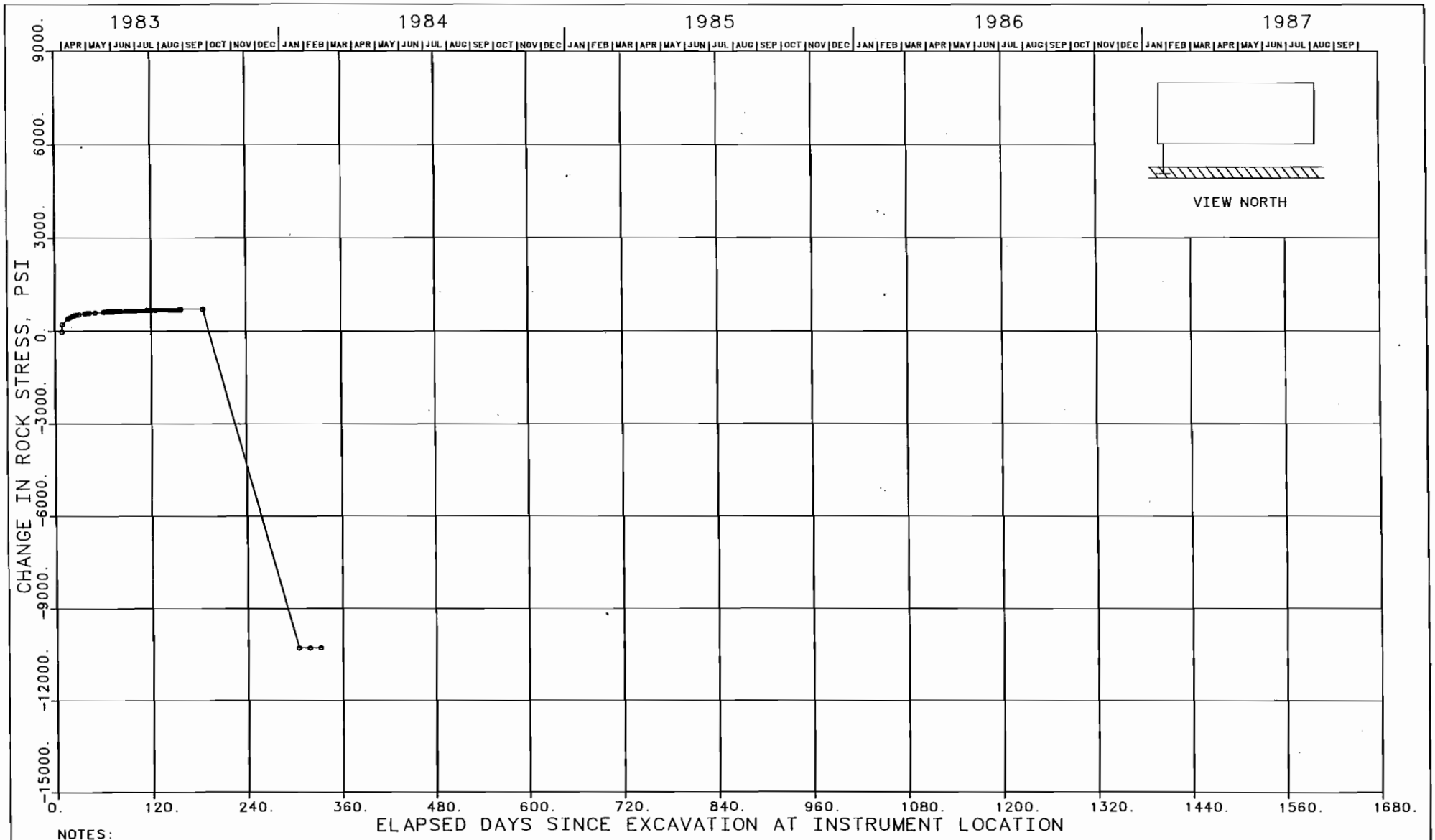
FIGURE J-196
ROCKBOLT LOAD CELL 37X-WG-00206
EAST BROW OF C & SH SHAFT
LOAD VS. CALENDAR MONTH



NOTES:

1. ROCKBOLT LENGTH: 6 FT.
2. SIZE OF EXCAVATION: 12 FT DIAM.

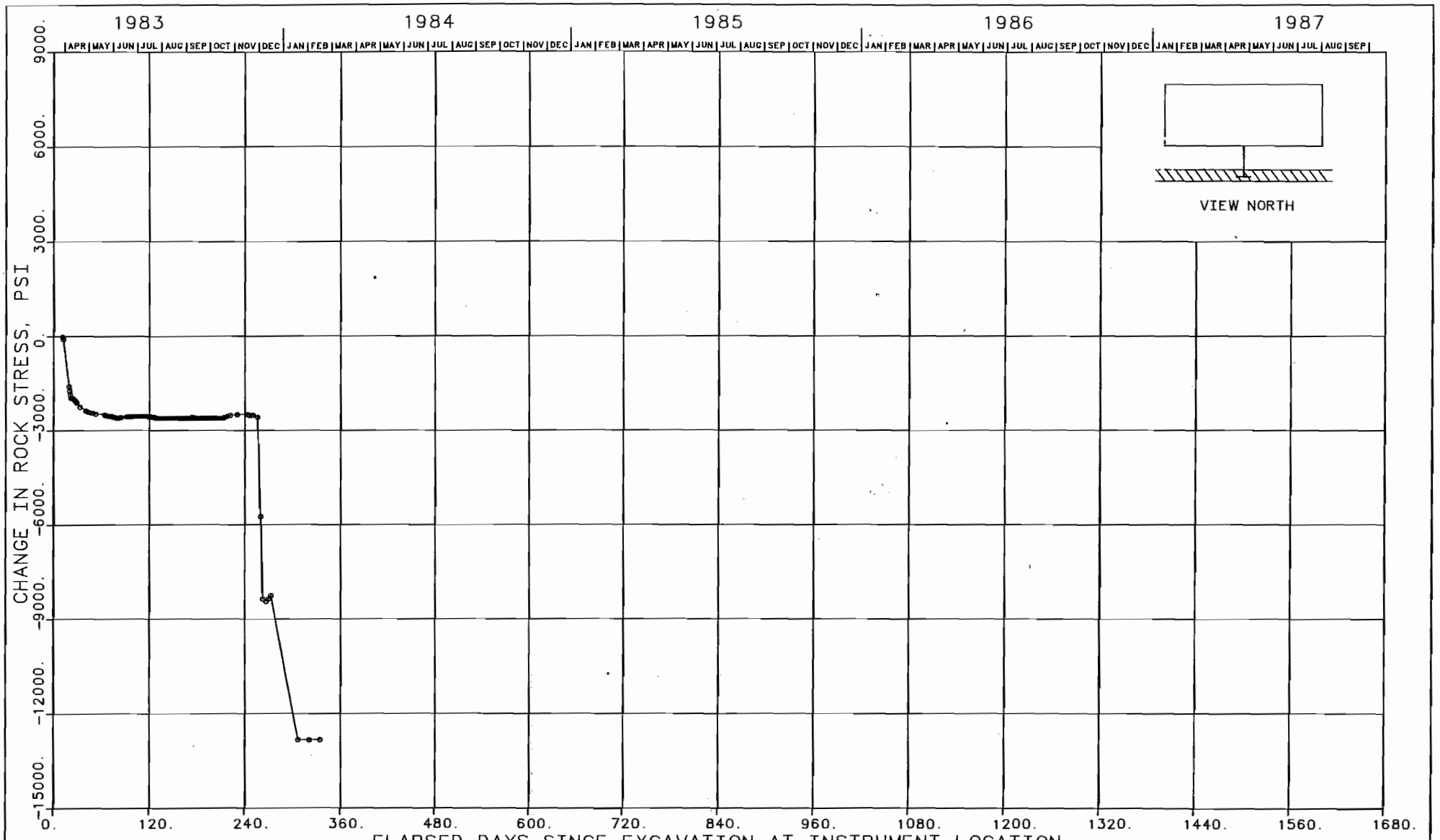
FIGURE J-197
ROCKBOLT LOAD CELL 37X-WG-00207
WEST BROW OF C & SH SHAFT
LOAD VS. CALENDAR MONTH



NOTES:

1. BASED ON WIRE STRESS DIVIDED BY 4.0 (E = 10,900,000 PSI).
2. STRESSMETER DEPTH: 6.5 FT.
3. SIZE OF EXCAVATION: 13 FT X 33 FT.
4. INSTRUMENT HAS PERMANENTLY FAILED.

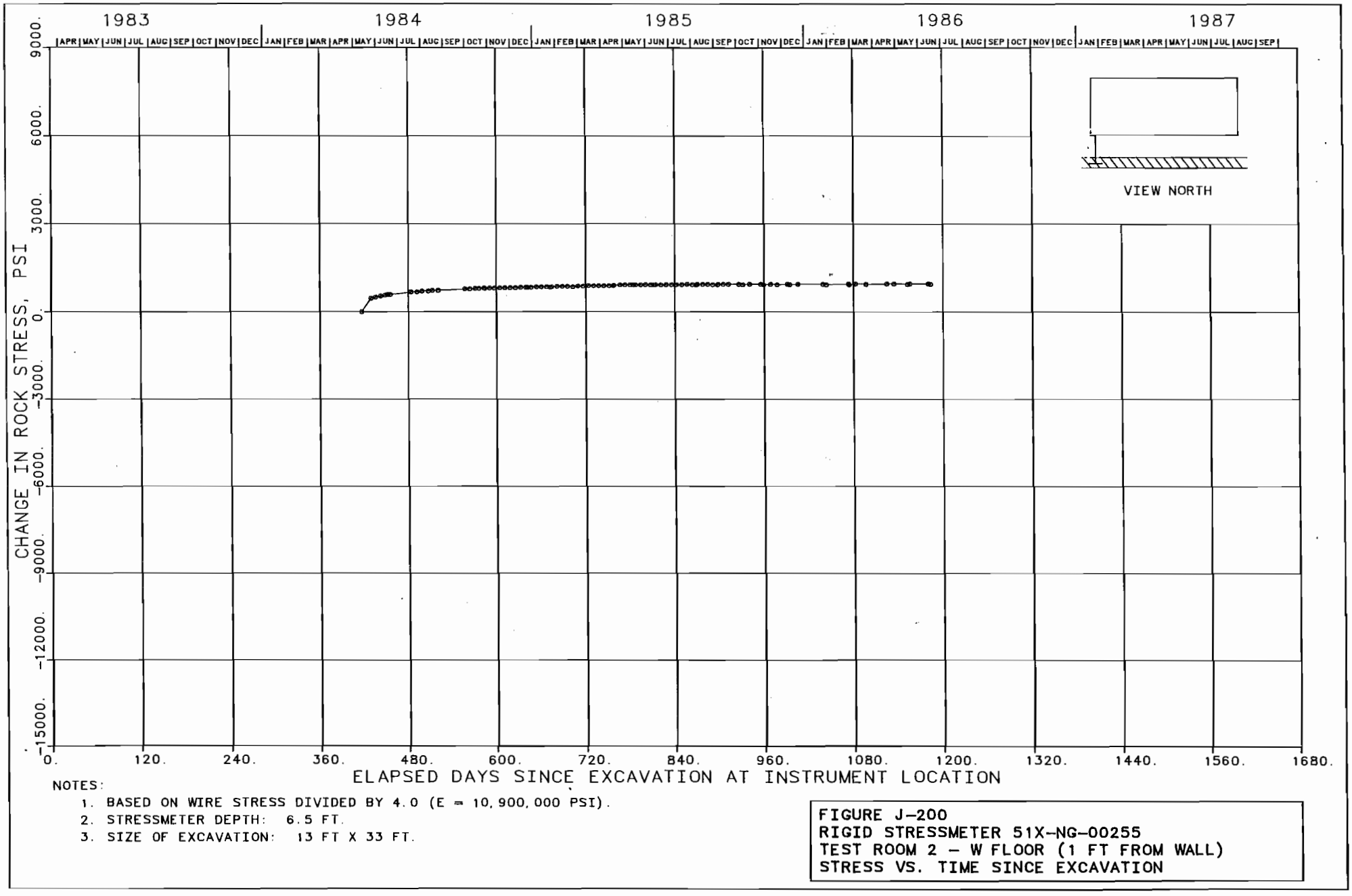
FIGURE J-198
RIGID STRESSMETER 51X-NG-00252
TEST ROOM 2 - W FLOOR (1 FT FROM WALL)
STRESS VS. TIME SINCE EXCAVATION



NOTES:

1. BASED ON WIRE STRESS DIVIDED BY 4.0 (E = 10,900,000 PSI).
2. STRESSMETER DEPTH: 6.5 FT.
3. SIZE OF EXCAVATION: 13 FT X 33 FT.
4. INSTRUMENT HAS PERMANENTLY FAILED.

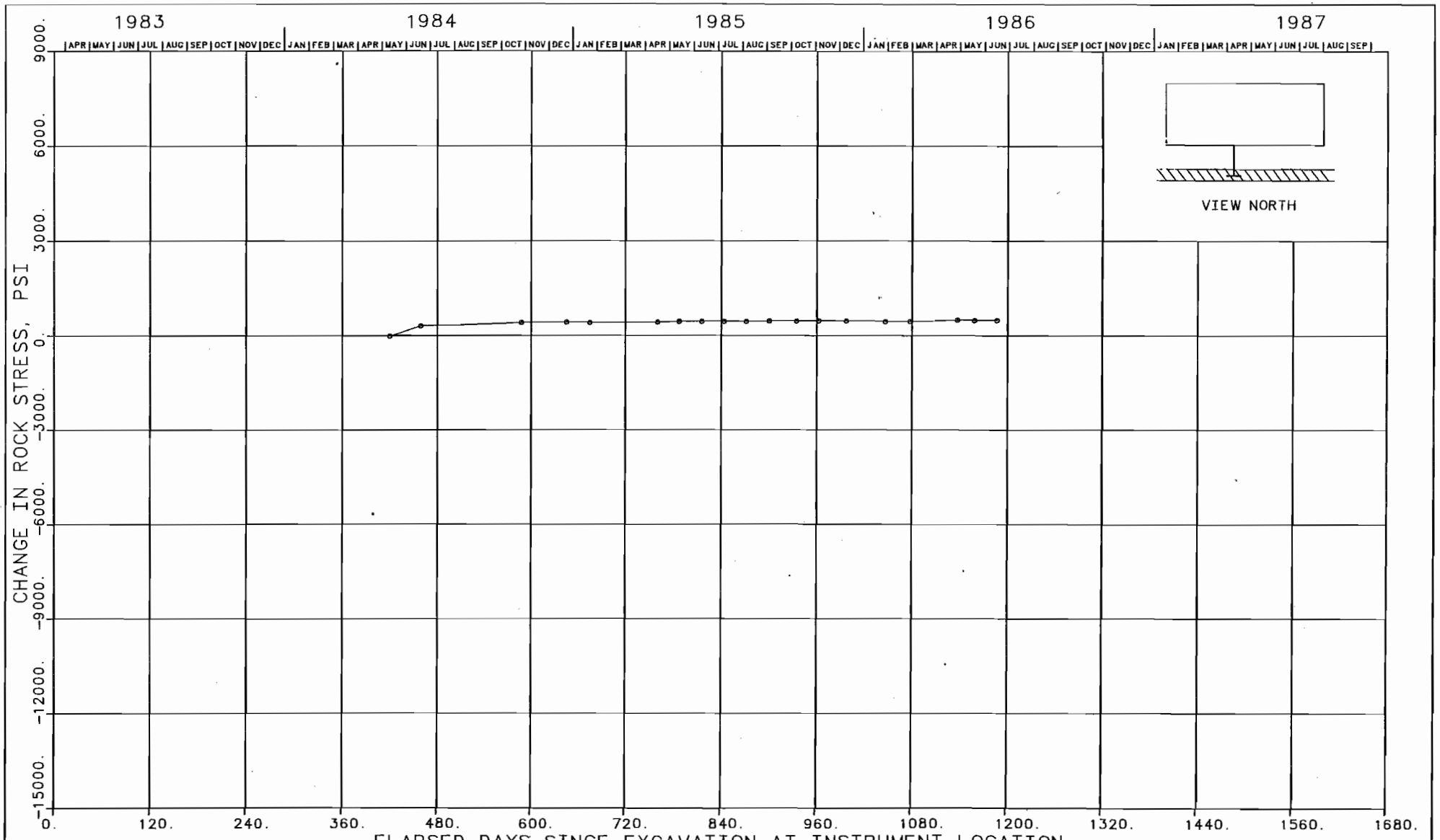
FIGURE J-199
RIGID STRESSMETER 51X-NG-00254
TEST ROOM 2 - CENTER FLOOR
STRESS VS. TIME SINCE EXCAVATION



NOTES:

1. BASED ON WIRE STRESS DIVIDED BY 4.0 (E = 10,900,000 PSI).
2. STRESSMETER DEPTH: 6.5 FT.
3. SIZE OF EXCAVATION: 13 FT X 33 FT.

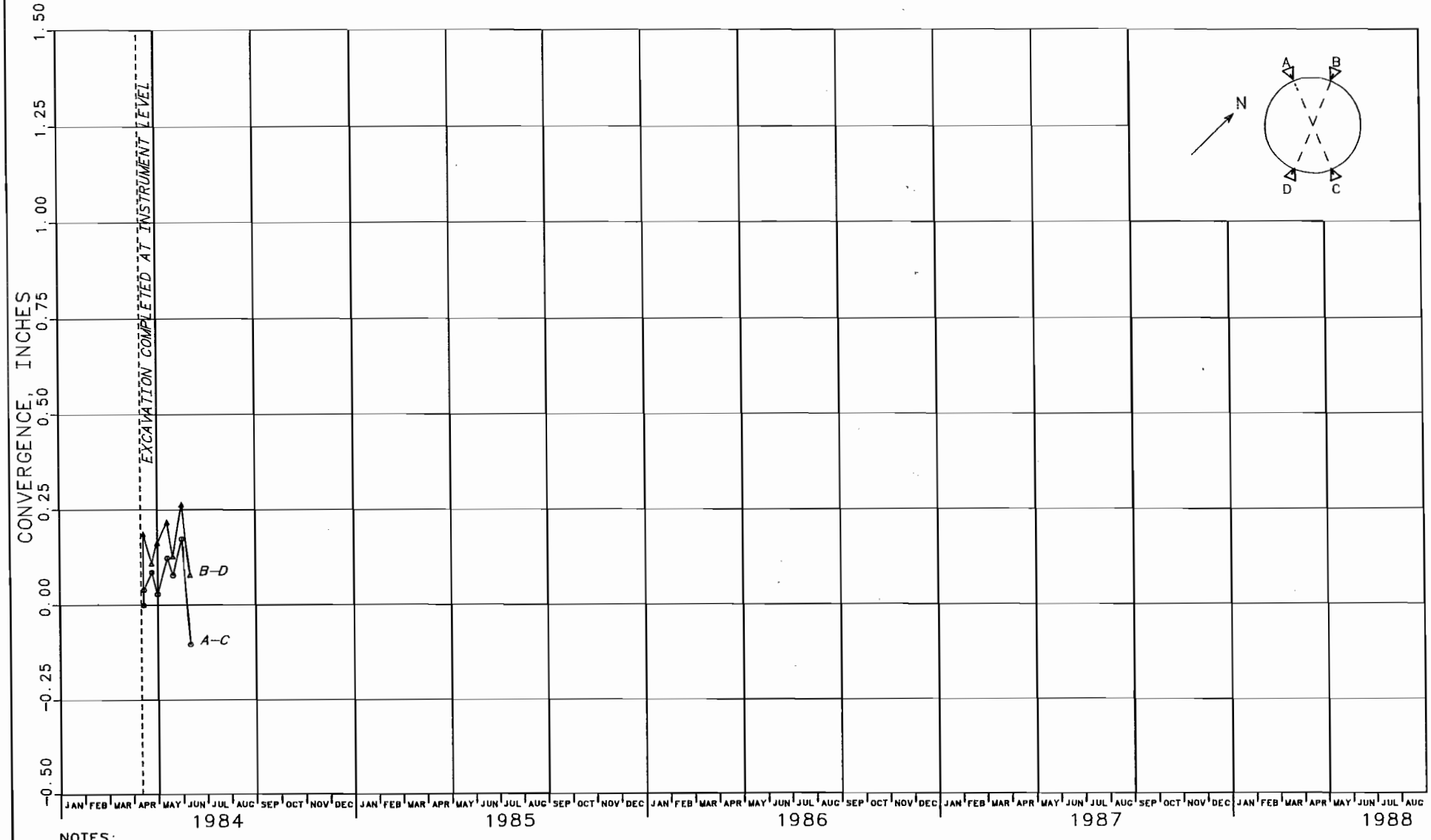
FIGURE J-200
RIGID STRESSMETER 51X-NG-00255
TEST ROOM 2 - W FLOOR (1 FT FROM WALL)
STRESS VS. TIME SINCE EXCAVATION



NOTES:

1. BASED ON WIRE STRESS DIVIDED BY 4.0 (E = 10,900,000 PSI).
2. STRESSMETER DEPTH: 6.5 FT.
3. SIZE OF EXCAVATION: 13 FT X 33 FT.

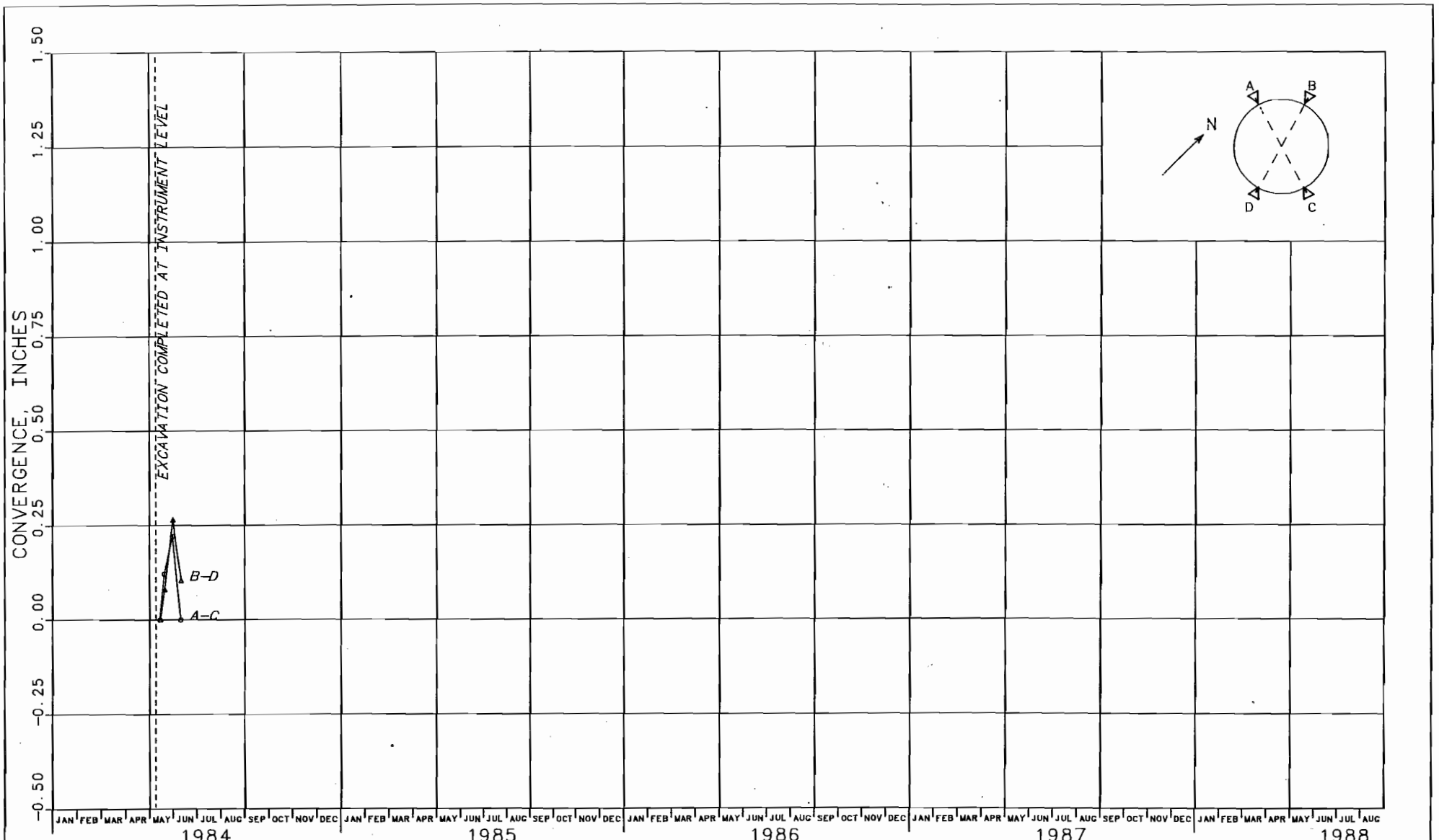
FIGURE J-201
RIGID STRESSMETER 51X-NG-00256
TEST ROOM 2 - FLOOR (2.5 FT WEST OF CENTER)
STRESS VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.
2. INSTRUMENT IS CURRENTLY NOT ACCESSIBLE FOR READING.

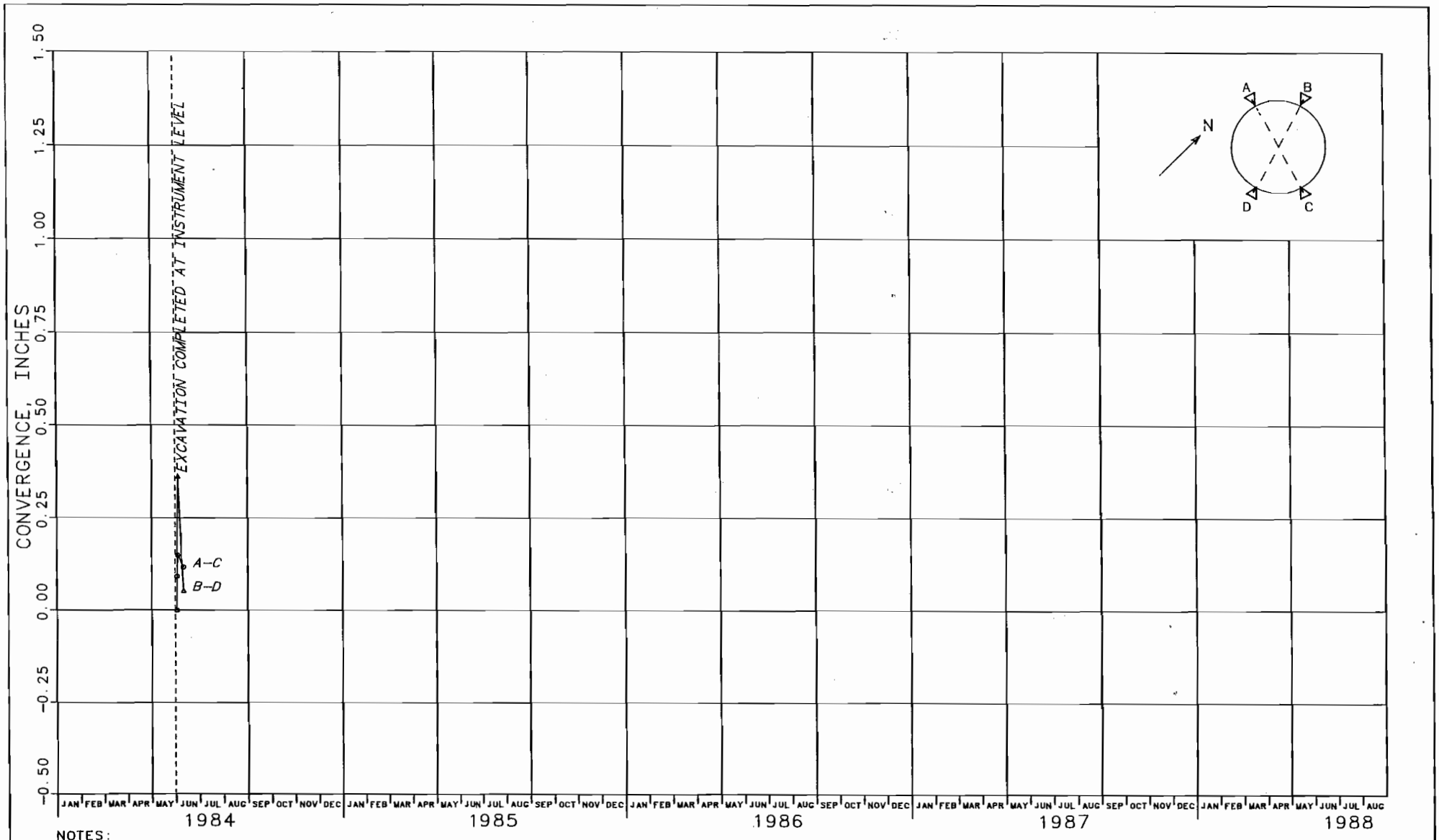
FIGURE J-202
CONVERGENCE POINTS
WASTE SHAFT – EL 2338 – BELOW KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.
2. INSTRUMENT IS CURRENTLY NOT ACCESSIBLE FOR READING.

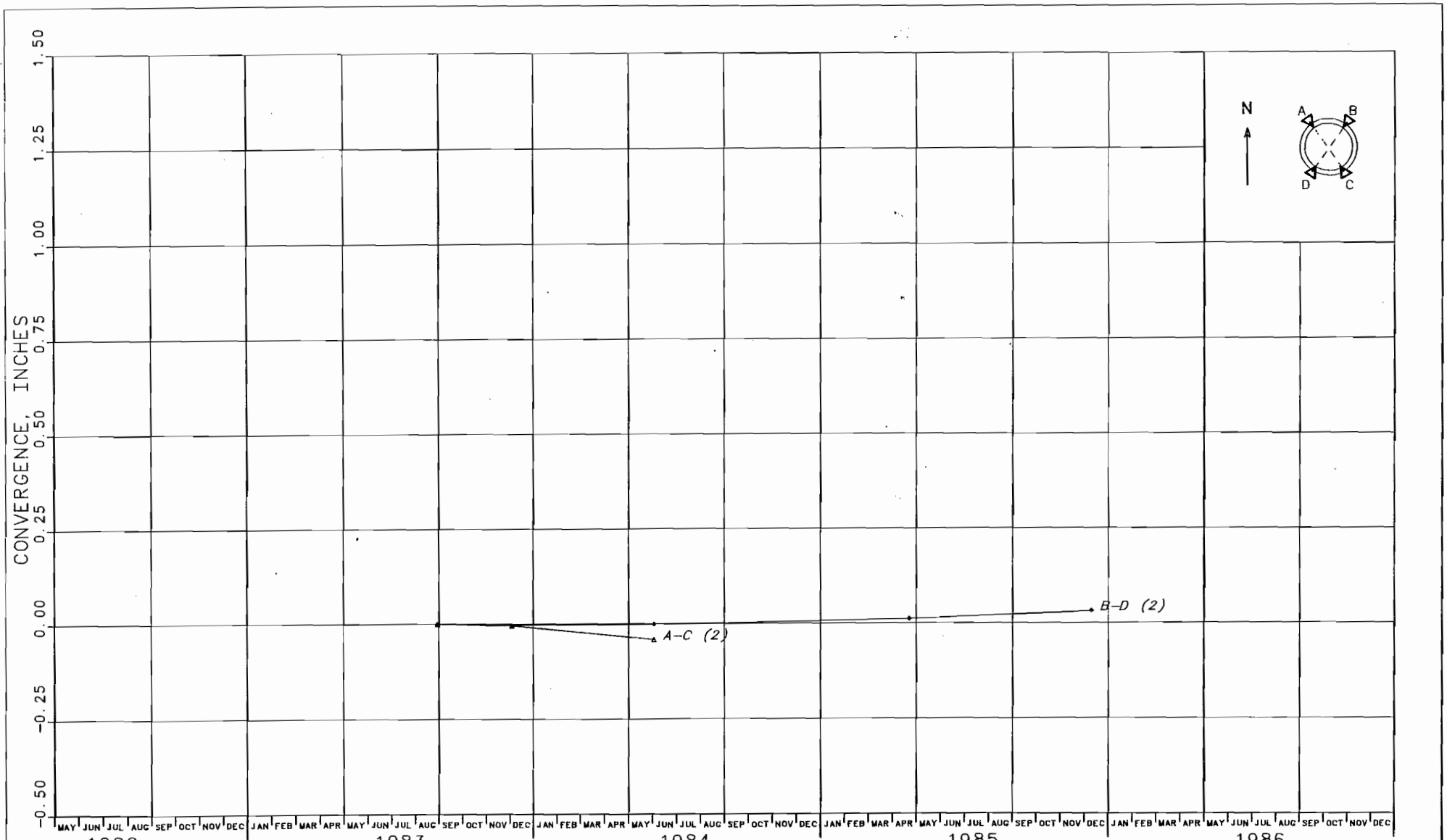
FIGURE J-203
CONVERGENCE POINTS
WASTE SHAFT - EL 1843 - BELOW KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 20 FT DIAM.
2. INSTRUMENT IS CURRENTLY NOT ACCESSIBLE FOR READING.

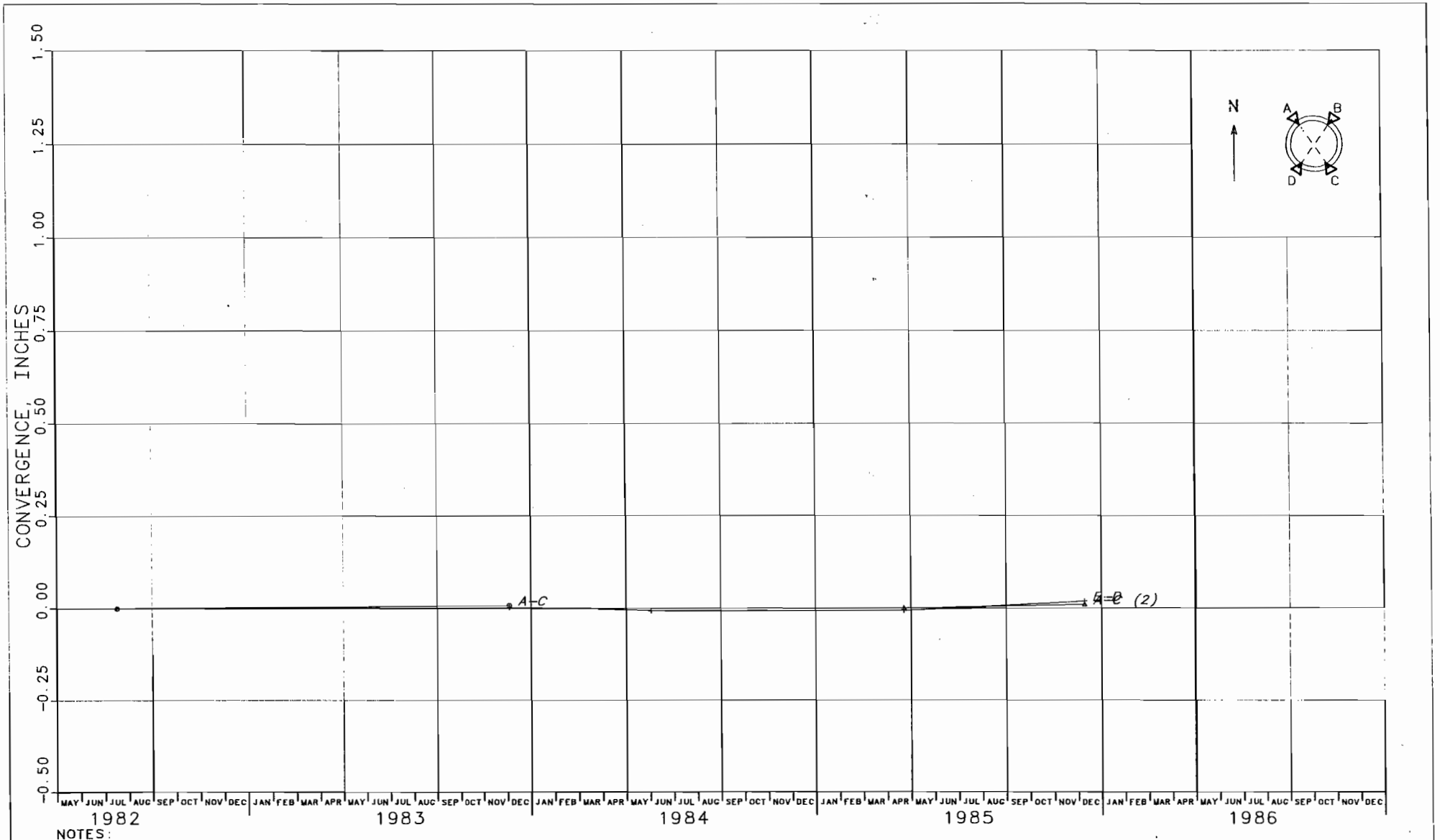
FIGURE J-204
CONVERGENCE POINTS
WASTE SHAFT – EL 1350 – BELOW KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 778 DAYS AFTER EXCAVATION STARTED ON JUL. 12, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

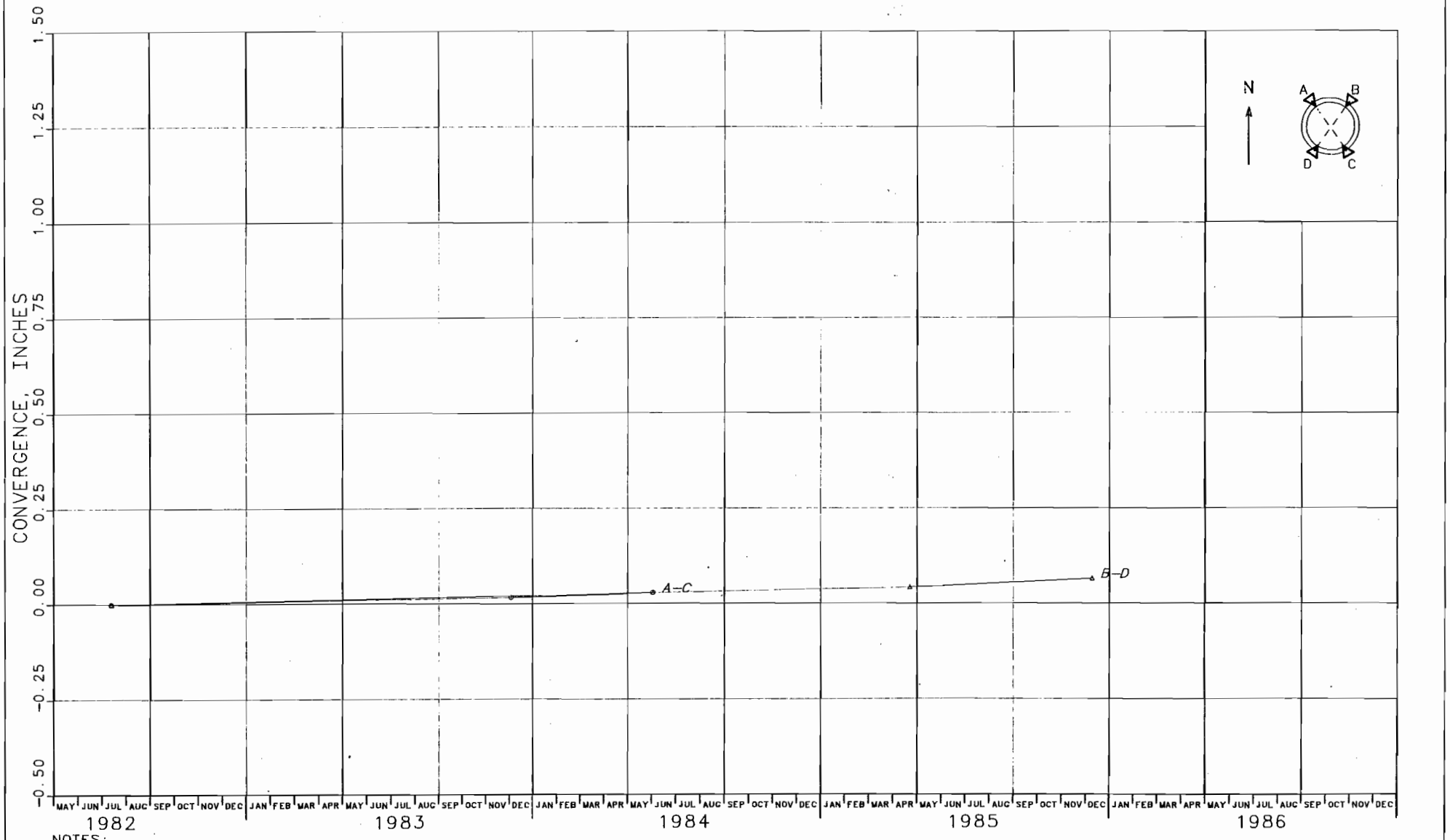
FIGURE J-205
CONVERGENCE POINTS
C & SH SHAFT - EL 3114 - ABOVE KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 362 DAYS AFTER EXCAVATION STARTED ON JUL. 19, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

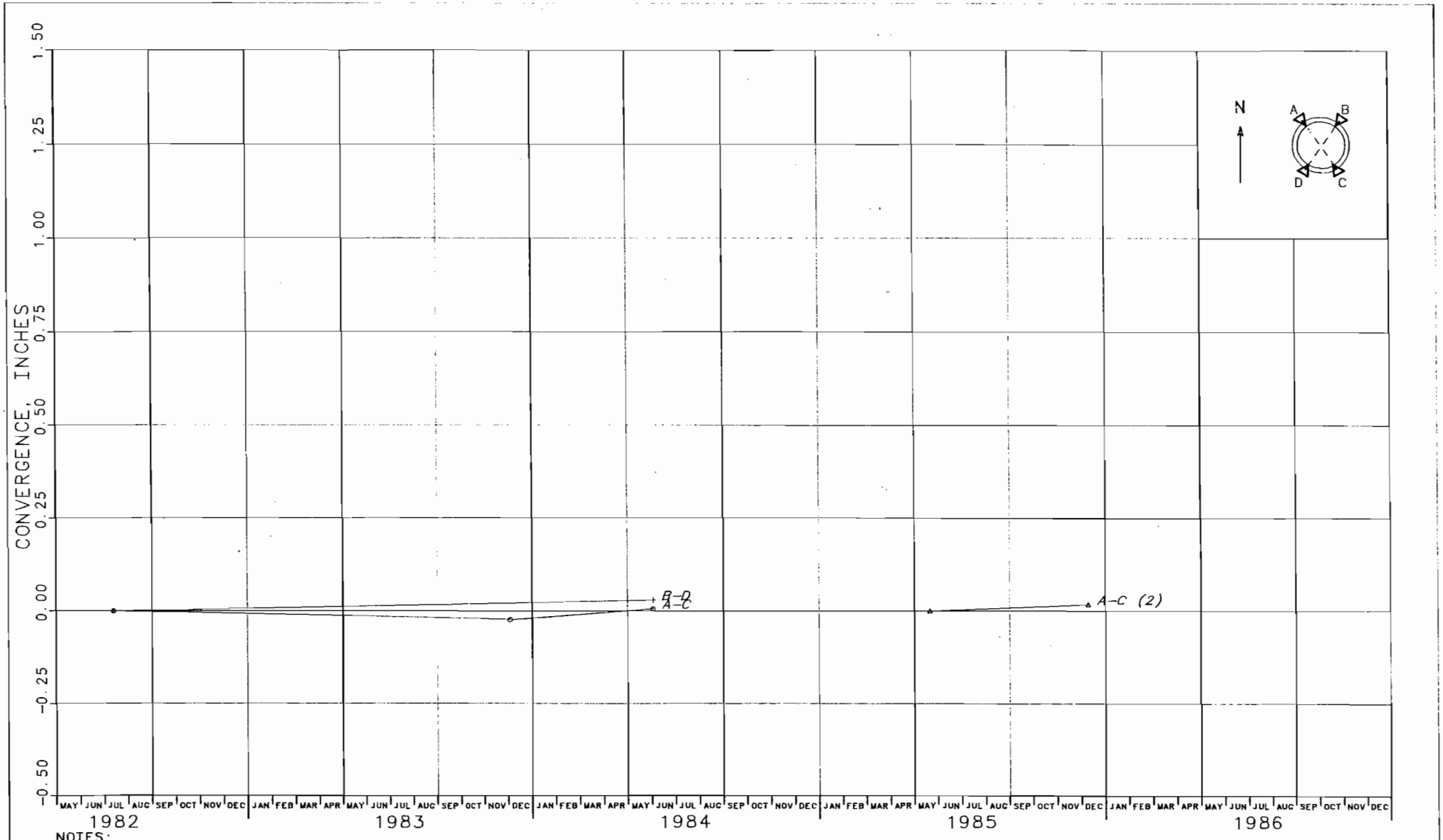
FIGURE J-206
CONVERGENCE POINTS
C & SH SHAFT – EL 2956 – ABOVE KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 351 DAYS AFTER EXCAVATION STARTED ON JUL. 27, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

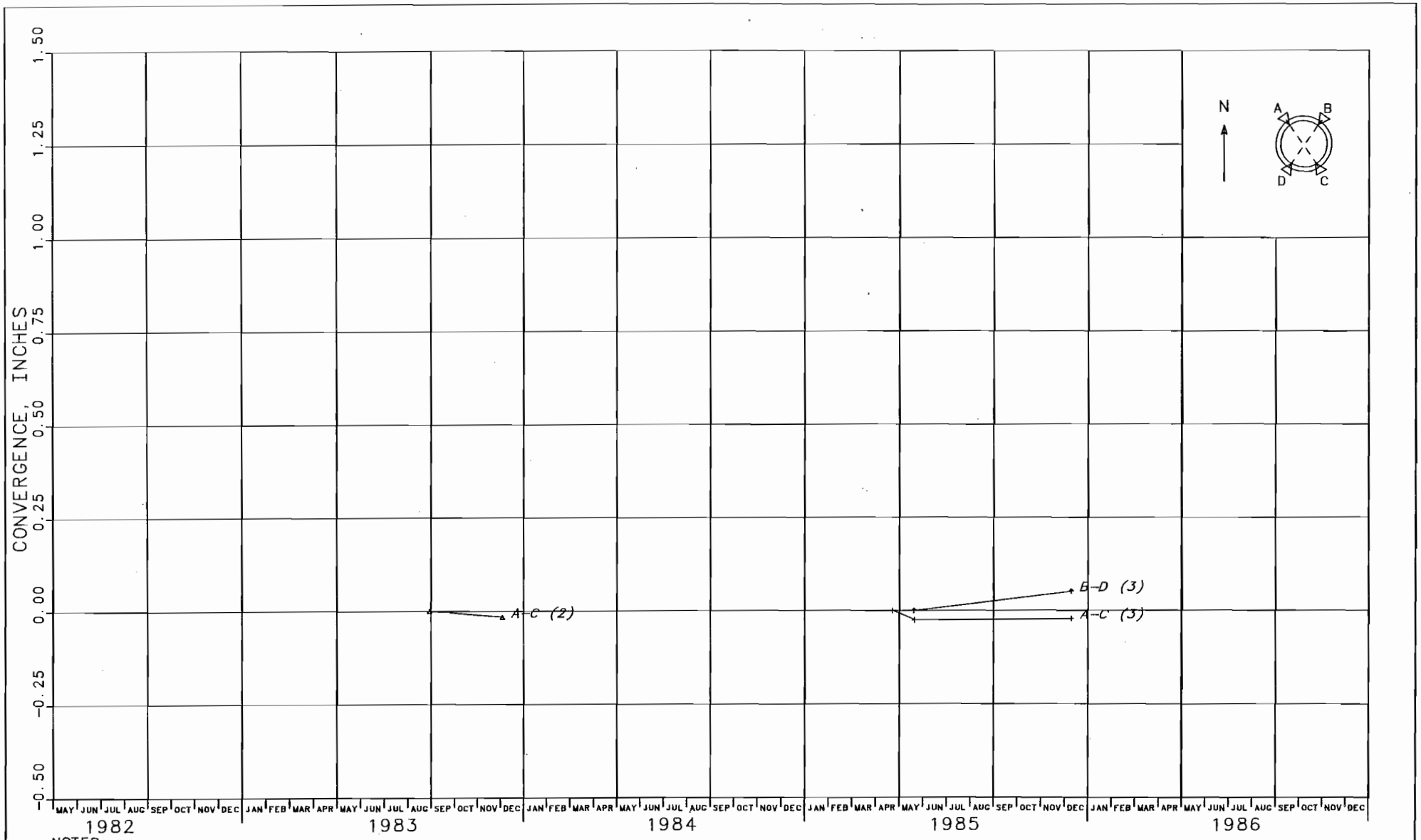
FIGURE J–207
CONVERGENCE POINTS
C & SH SHAFT – EL 2825 – ABOVE KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 338 DAYS AFTER EXCAVATION STARTED ON AUG. 9, 1981 .
2. SIZE OF EXCAVATION: 12 FT DIAM.

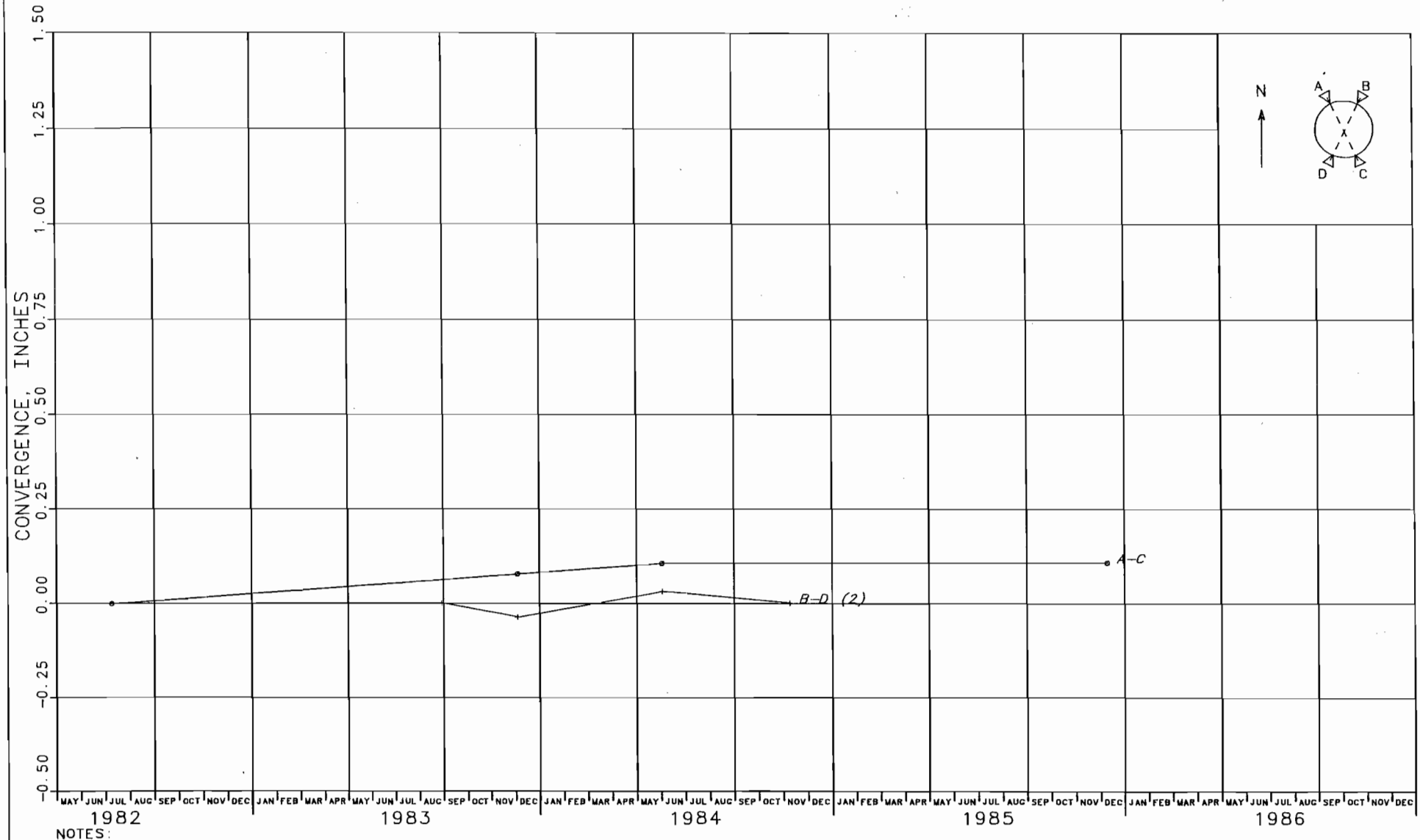
FIGURE J-208
CONVERGENCE POINTS
C & SH SHAFT - EL 2680 - ABOVE KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 745 DAYS AFTER EXCAVATION STARTED ON AUG. 14, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

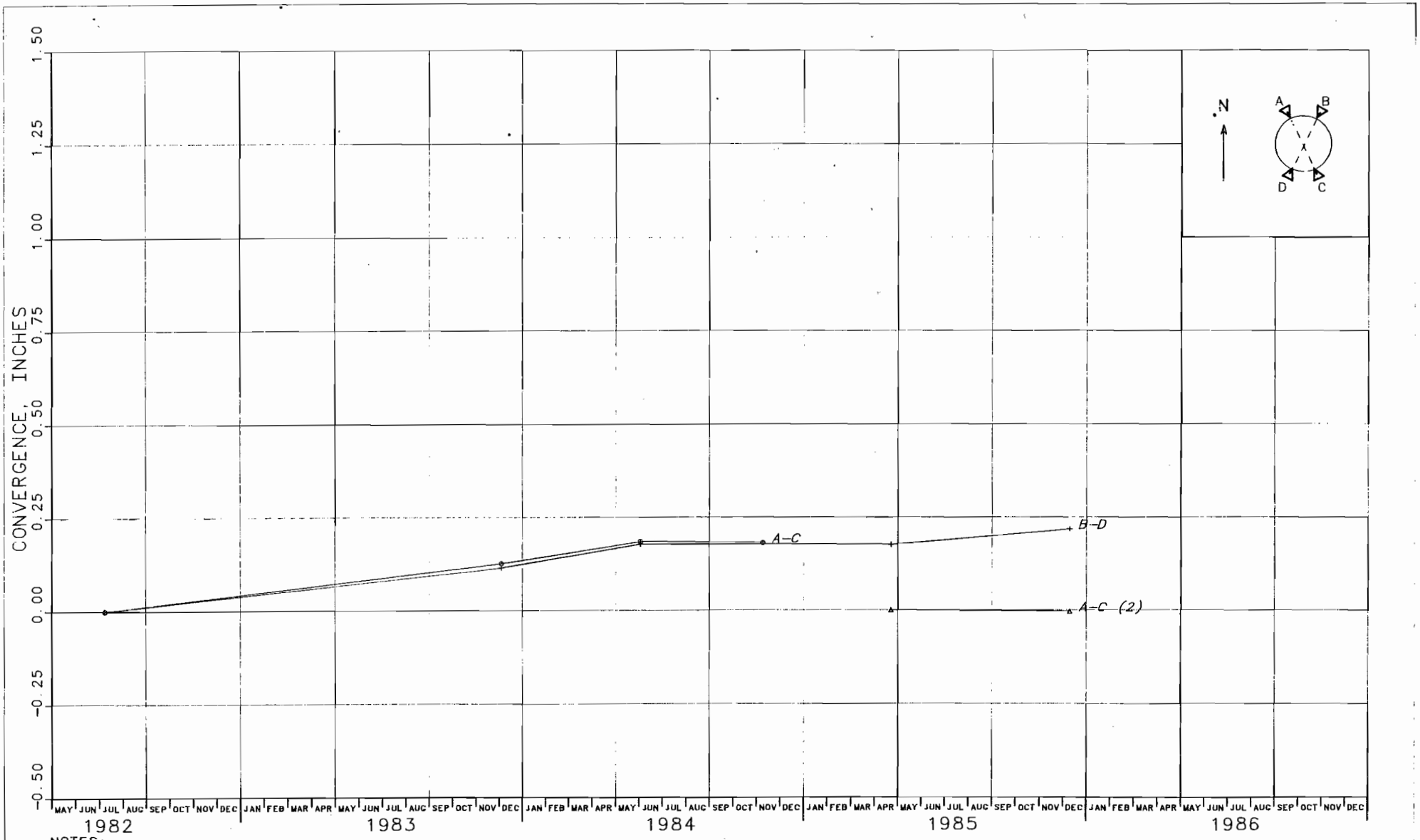
FIGURE J-209
CONVERGENCE POINTS
C & SH SHAFT - EL 2596 - ABOVE KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 322 DAYS AFTER EXCAVATION STARTED ON AUG. 21, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

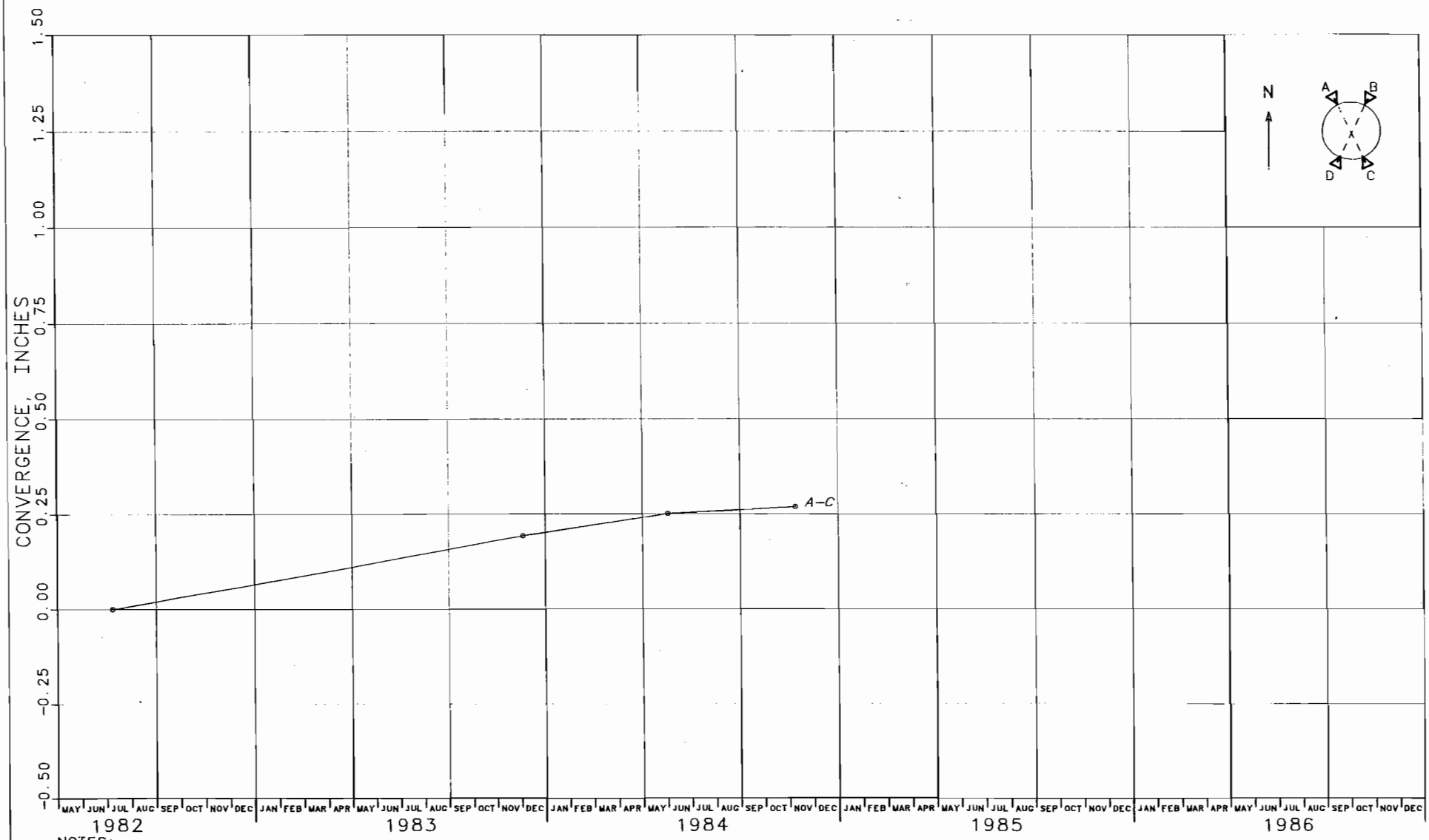
FIGURE J-210
CONVERGENCE POINTS
C & SH SHAFT - EL 2470 - BELOW KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 314 DAYS AFTER EXCAVATION STARTED ON AUG. 28, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

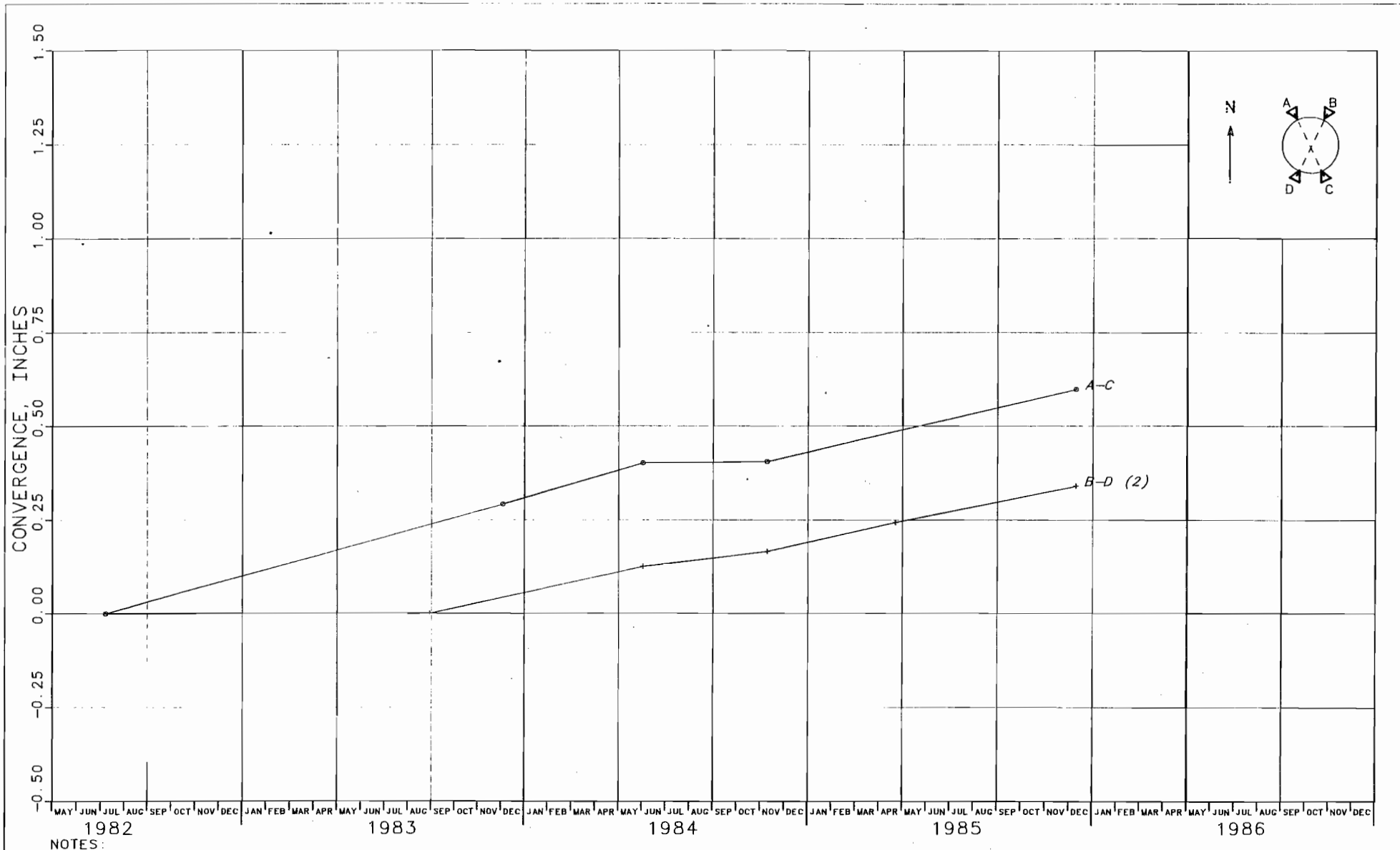
FIGURE J-211
CONVERGENCE POINTS
C & SH SHAFT - EL 2337 - BELOW KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 306 DAYS AFTER EXCAVATION STARTED ON SEP. 5, 1981 .
2. SIZE OF EXCAVATION: 12 FT DIAM.
3. INSTRUMENT HAS BEEN DESTROYED.

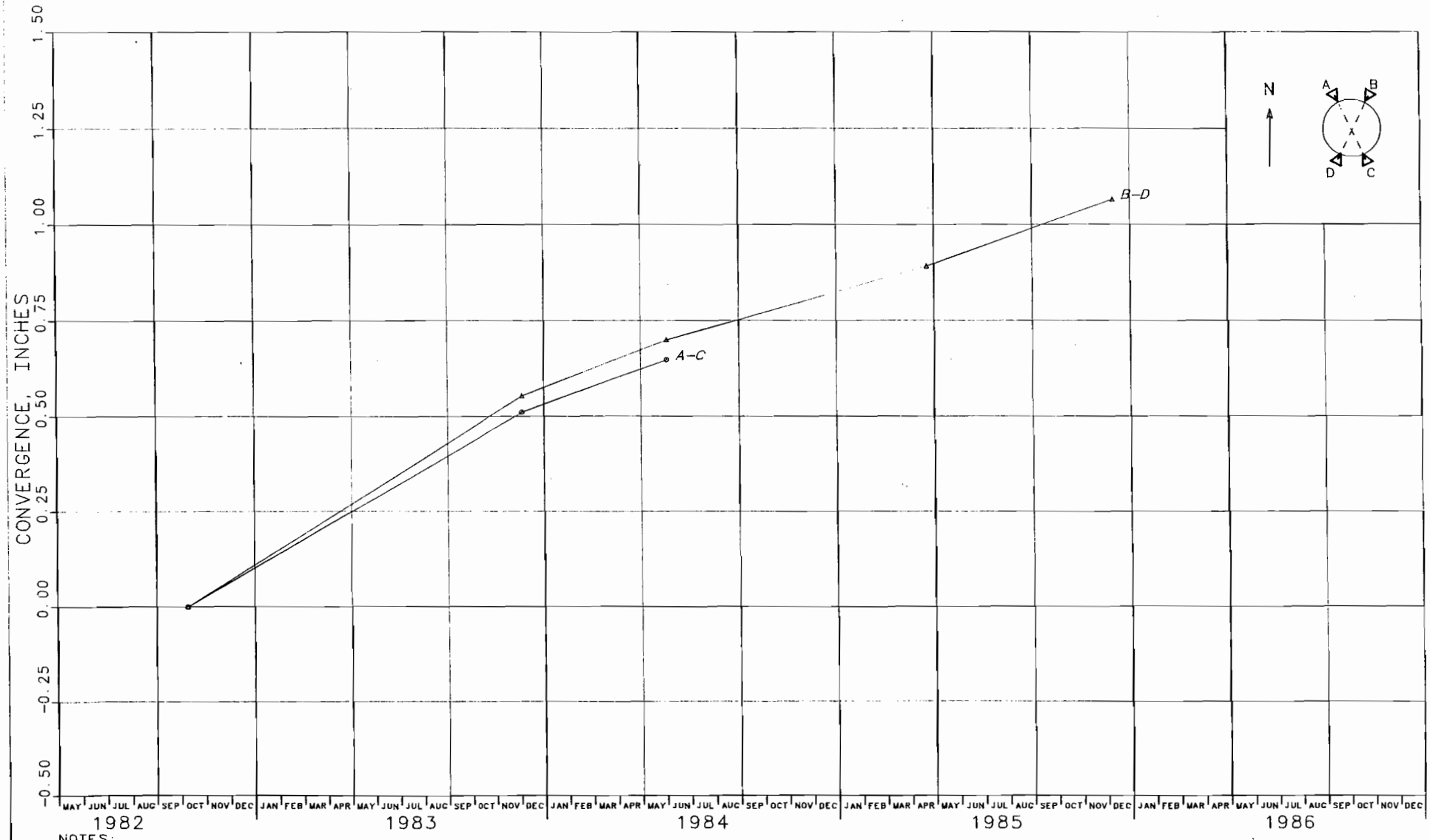
FIGURE J-212
CONVERGENCE POINTS
C & SH SHAFT - EL 2135 - BELOW KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 292 DAYS AFTER EXCAVATION STARTED ON SEP. 18, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

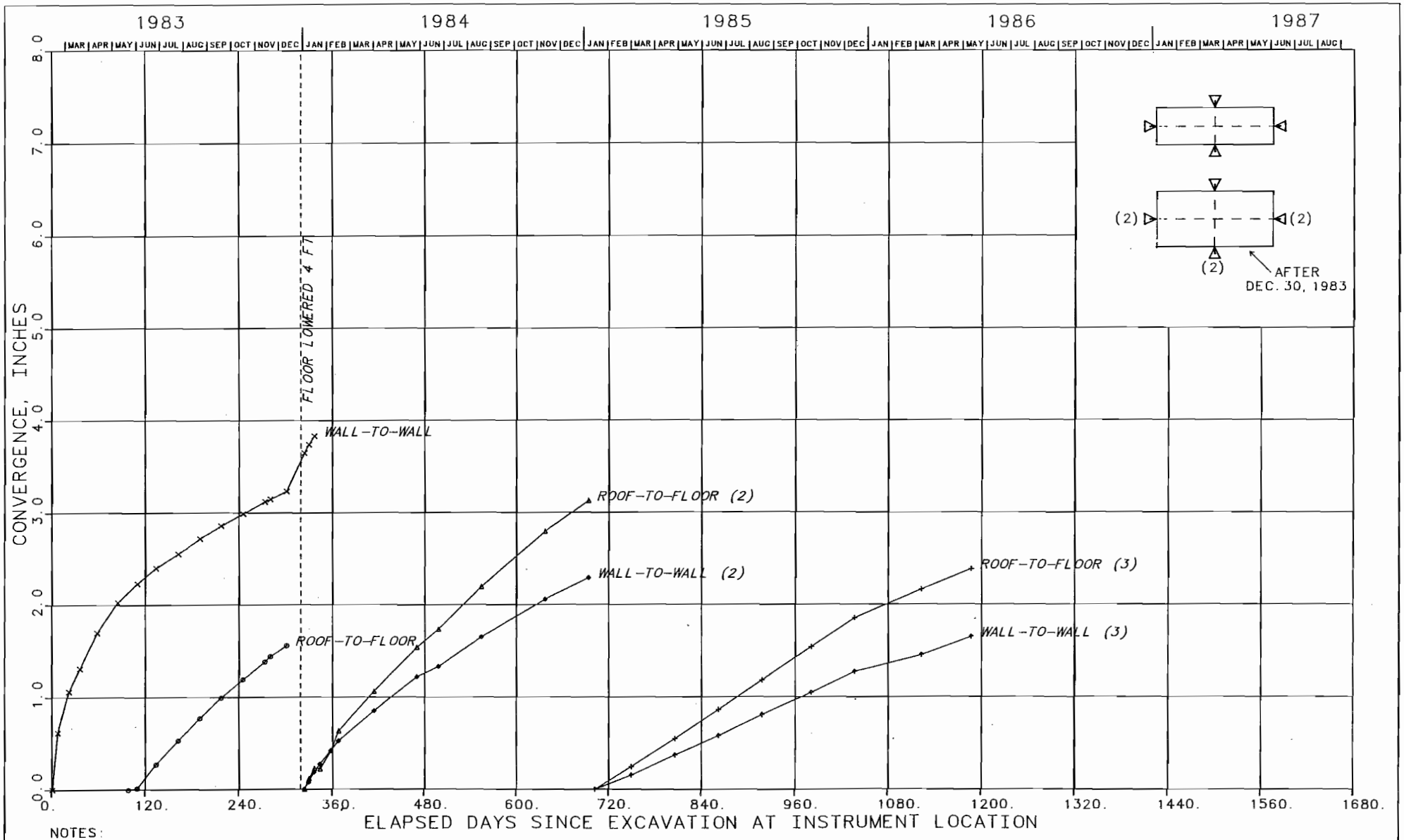
FIGURE J-213
CONVERGENCE POINTS
C & SH SHAFT - EL 1846 - BELOW KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. INSTRUMENT WAS INSTALLED 362 DAYS AFTER EXCAVATION STARTED ON OCT. 11, 1981.
2. SIZE OF EXCAVATION: 12 FT DIAM.

FIGURE J-214
CONVERGENCE POINTS
C & SH SHAFT – EL 1353 – BELOW KEY
CONVERGENCE VS. CALENDAR MONTH



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

FIGURE J-215
CONVERGENCE POINTS
EO DRIFT, NORTH 1266 FT
CONVERGENCE VS. TIME SINCE EXCAVATION

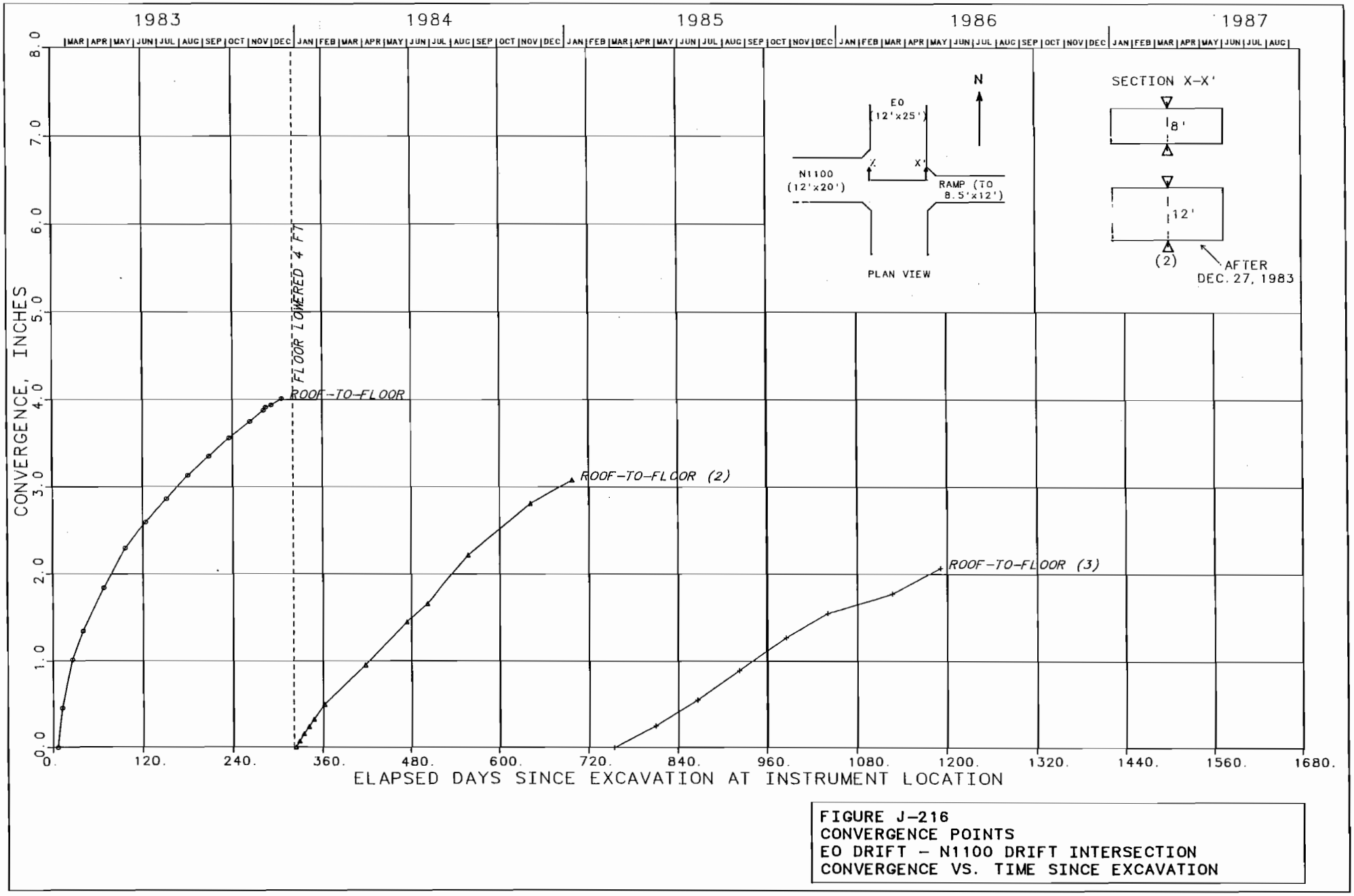
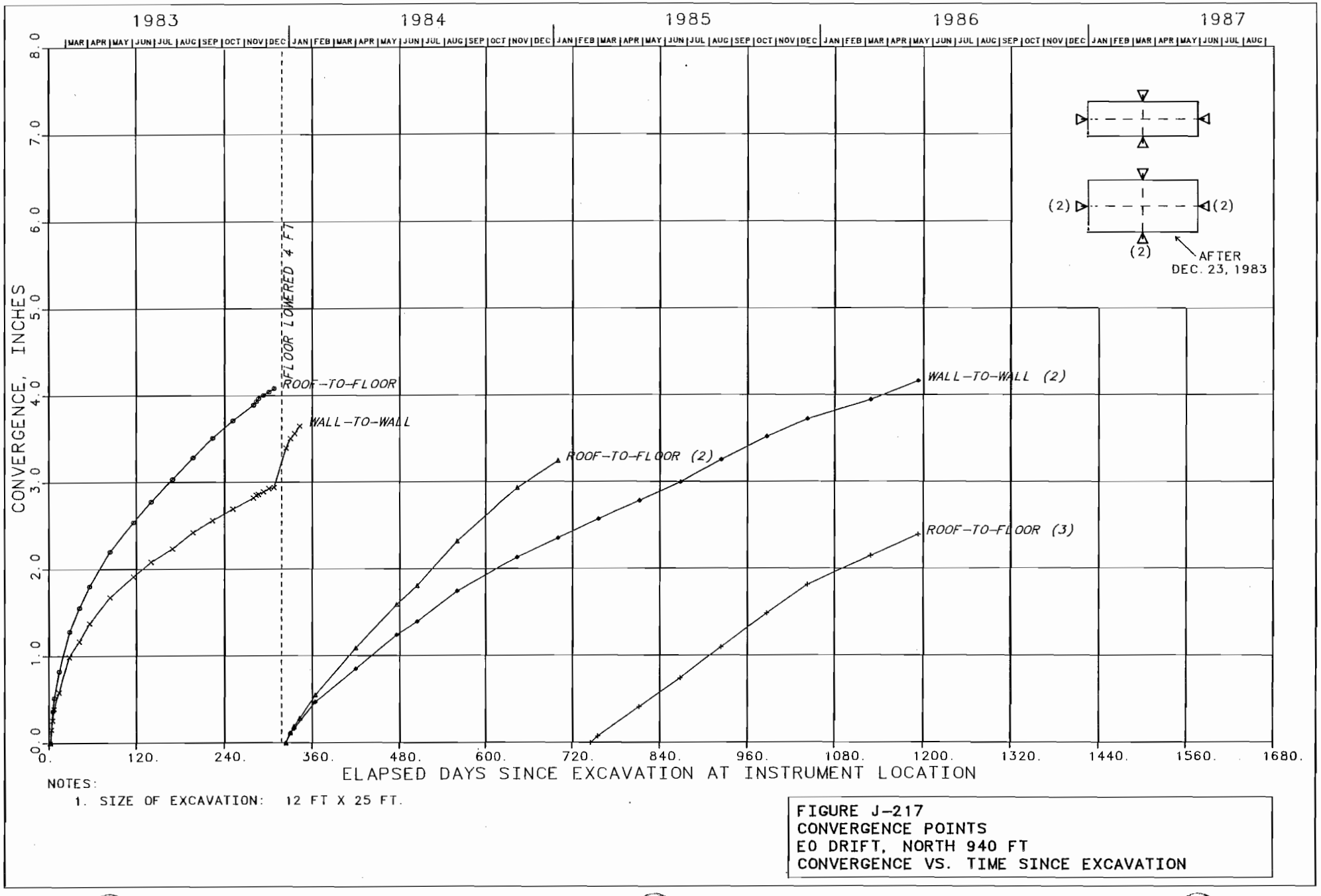


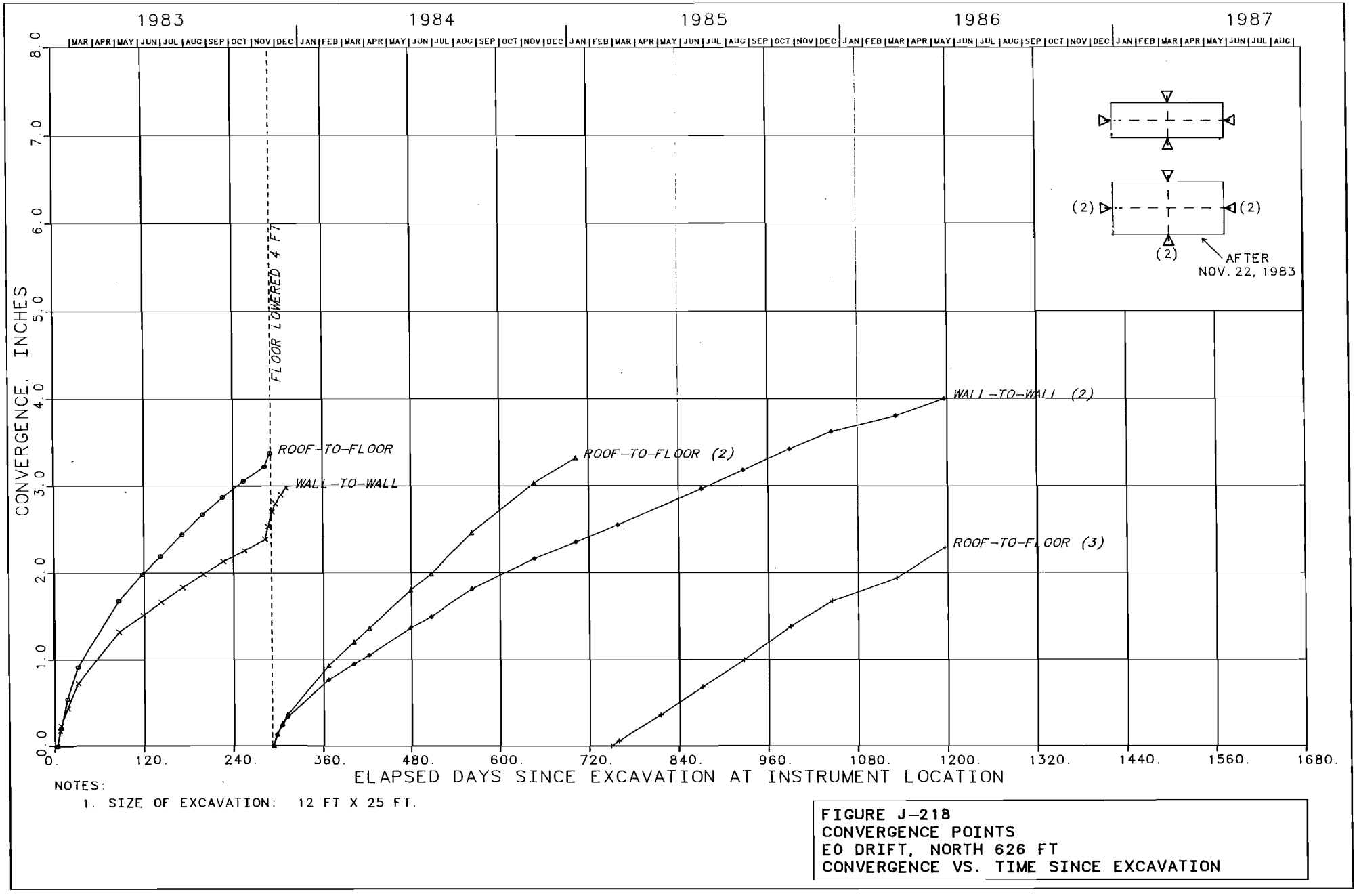
FIGURE J-216
CONVERGENCE POINTS
EO DRIFT - N1100 DRIFT INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

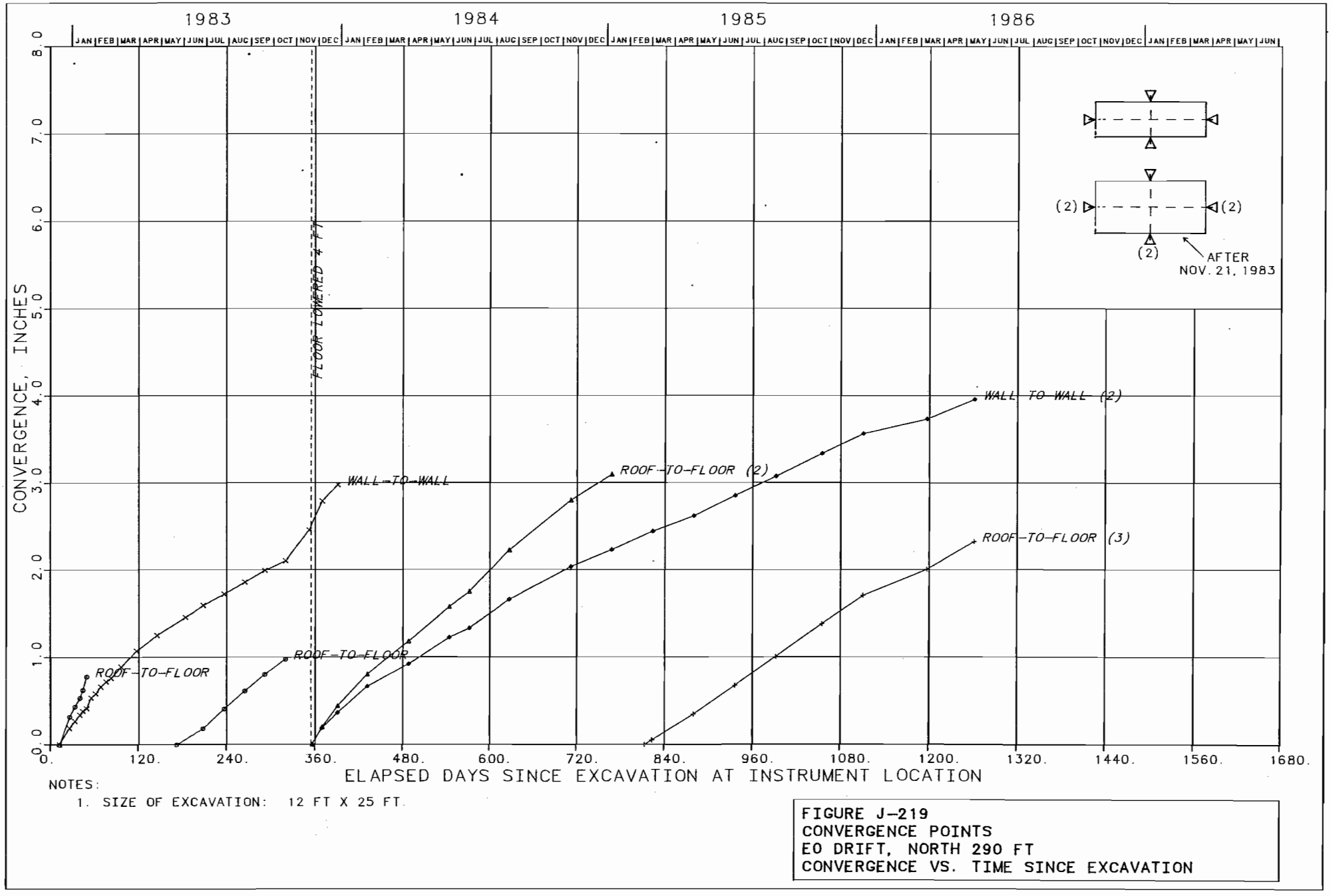
FIGURE J-217
CONVERGENCE POINTS
E0 DRIFT, NORTH 940 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

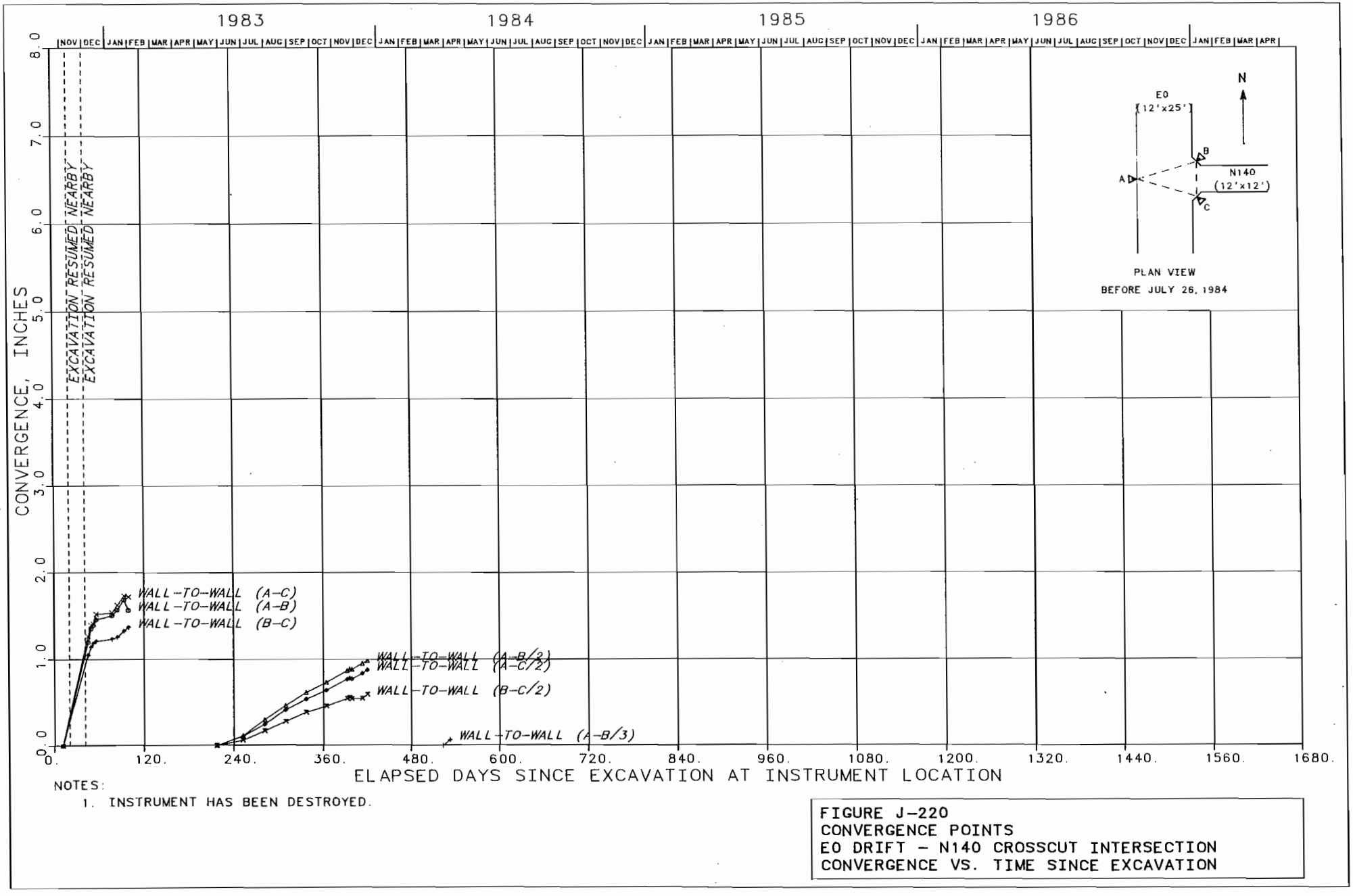
FIGURE J-218
CONVERGENCE POINTS
EO DRIFT, NORTH 626 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

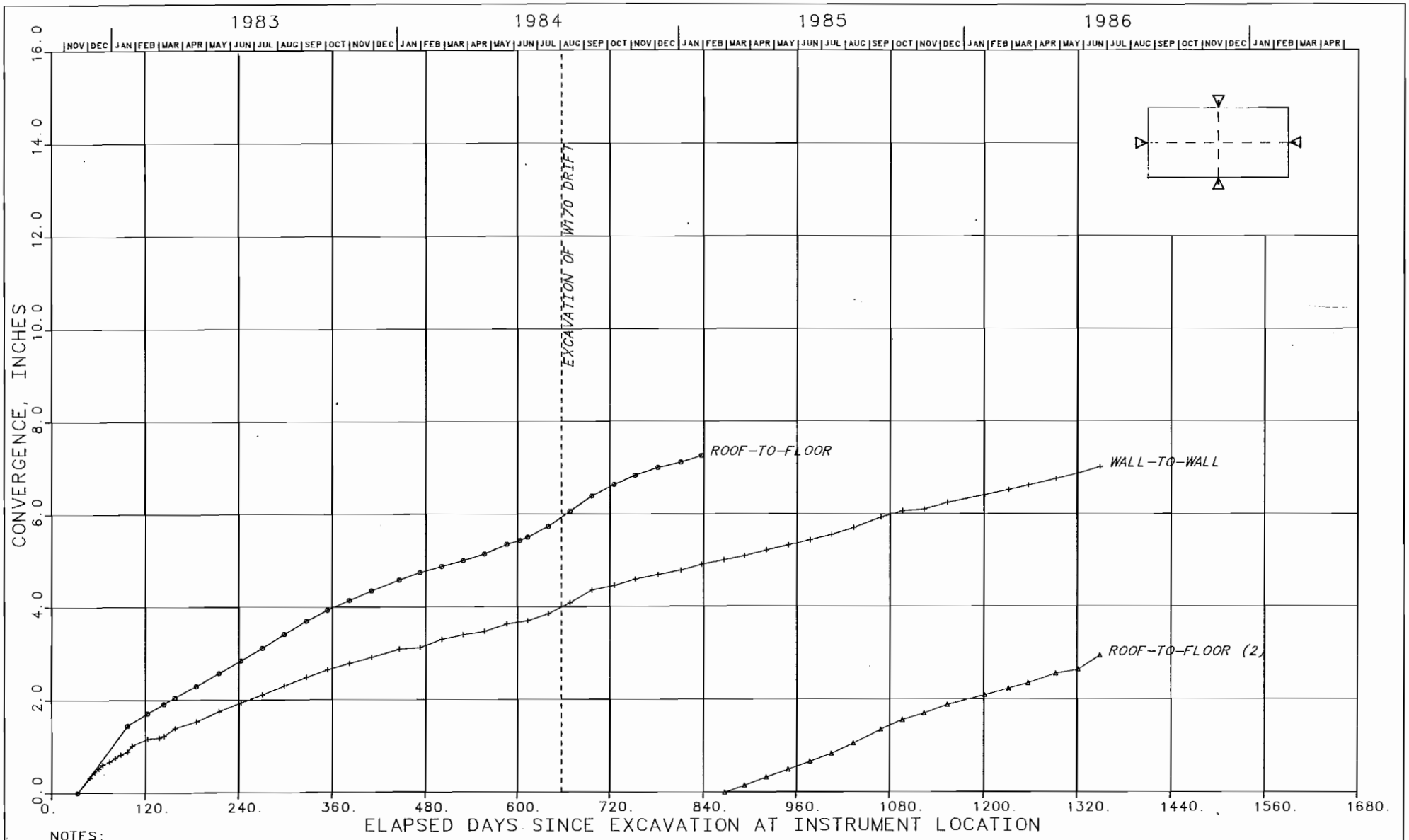
FIGURE J-219
CONVERGENCE POINTS
EO DRIFT, NORTH 290 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. INSTRUMENT HAS BEEN DESTROYED.

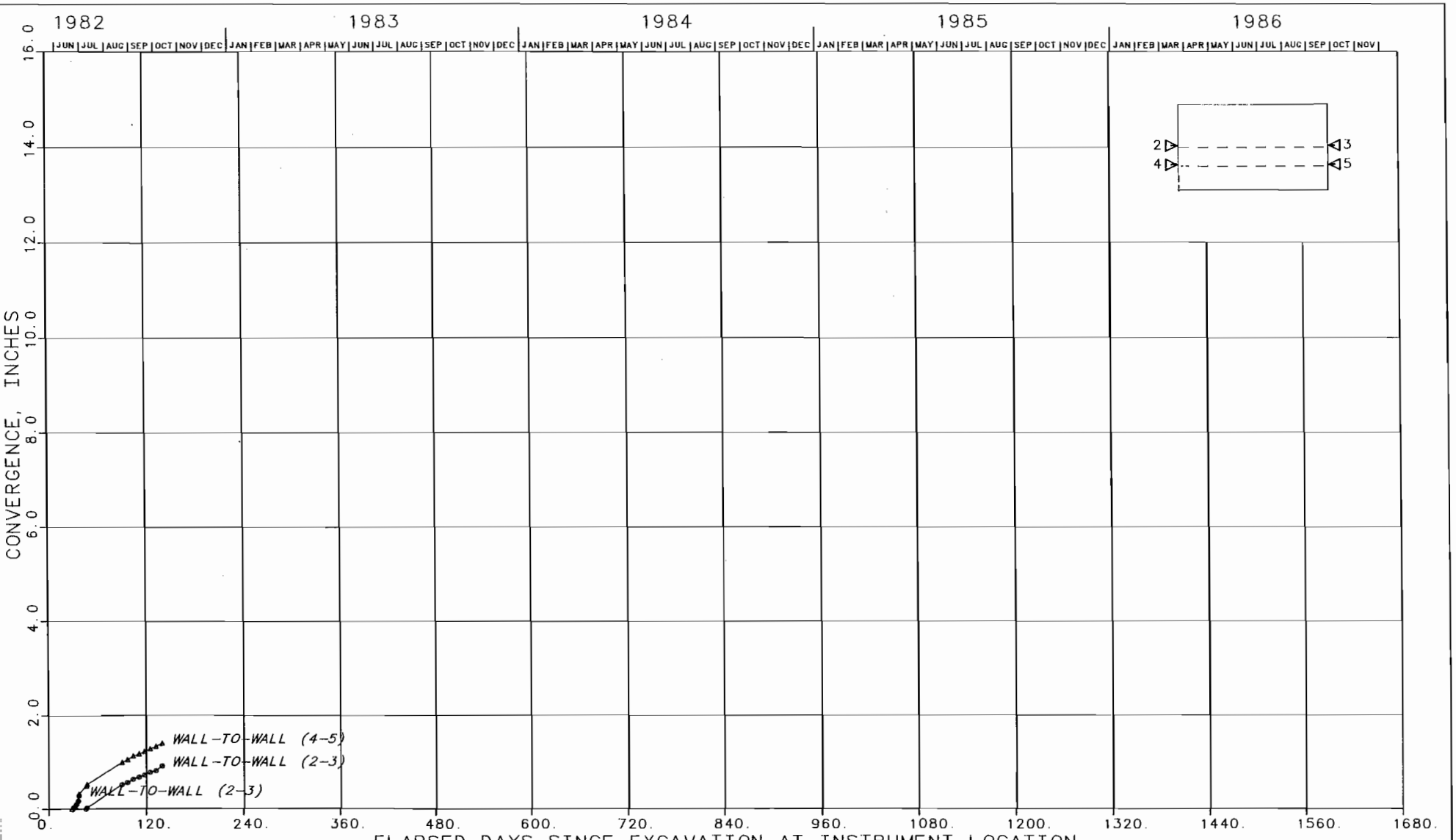
FIGURE J-220
CONVERGENCE POINTS
E0 DRIFT - N140 CROSSCUT INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 15 FT X 30 FT.

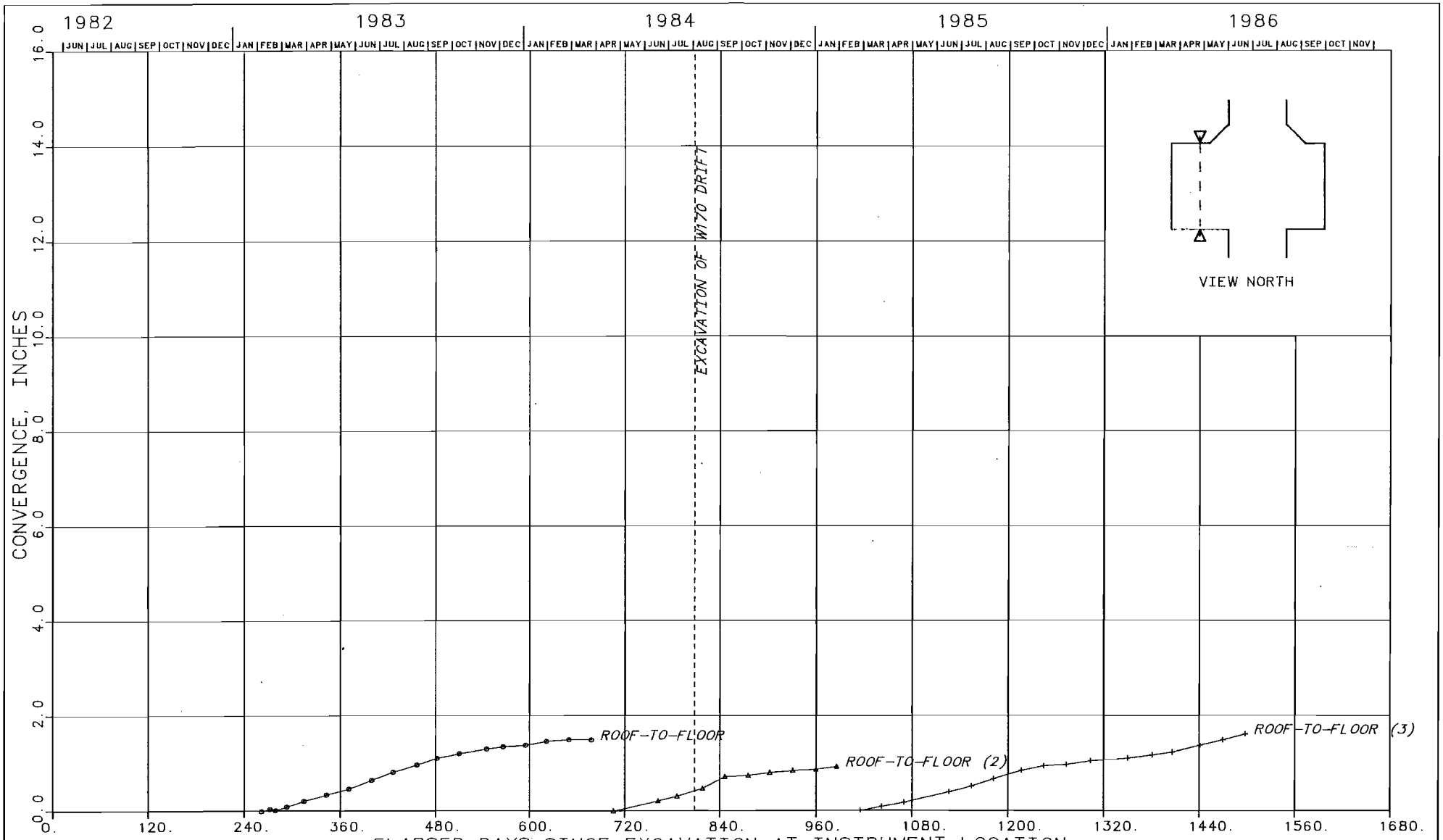
FIGURE J-221
CONVERGENCE POINTS
39 FT NORTH OF C & SH SHAFT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 18 FT X 31 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

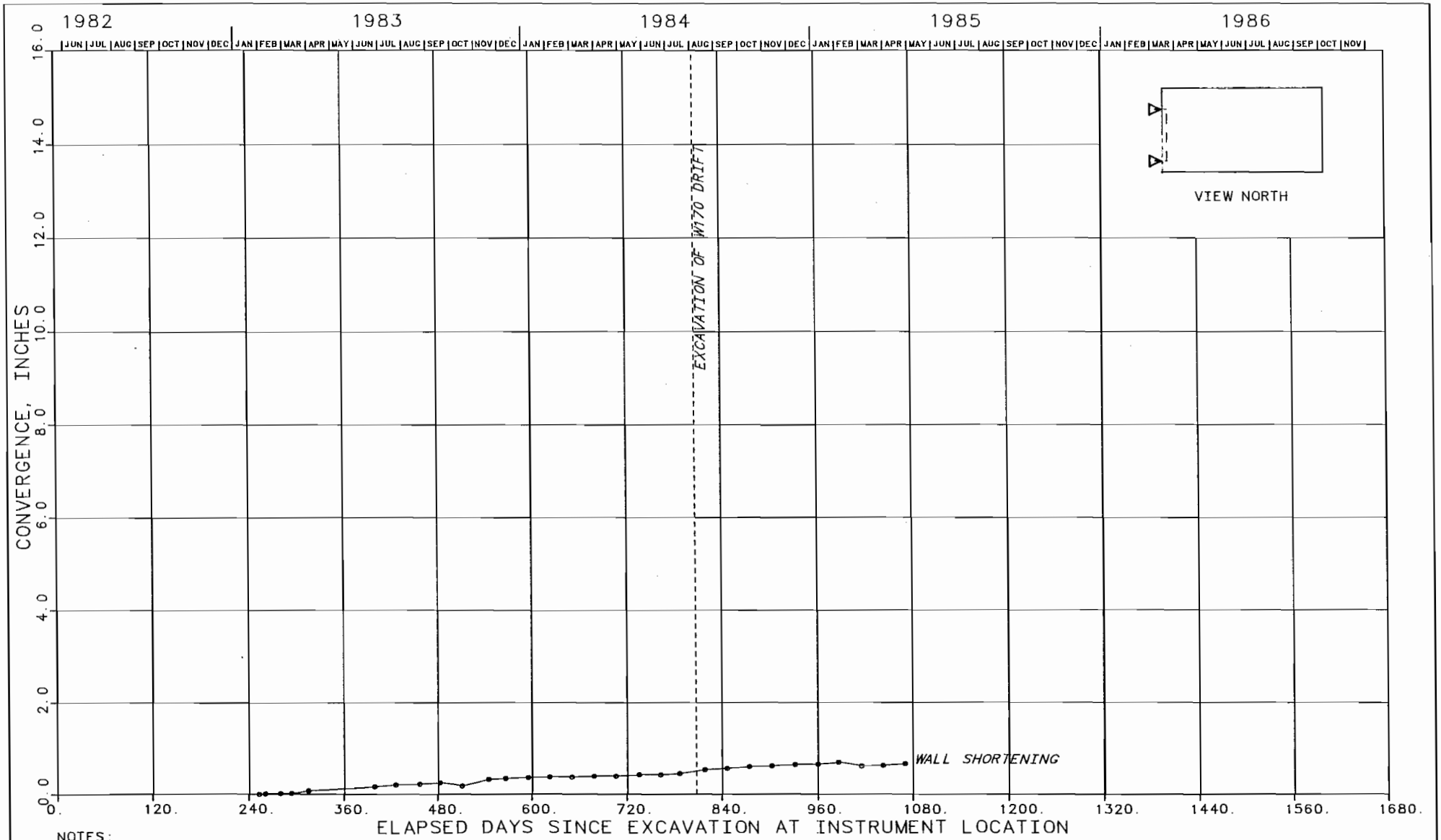
FIGURE J-222
CONVERGENCE POINTS
15 FT NORTH OF C & SH SHAFT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 18 FT X 32 FT.

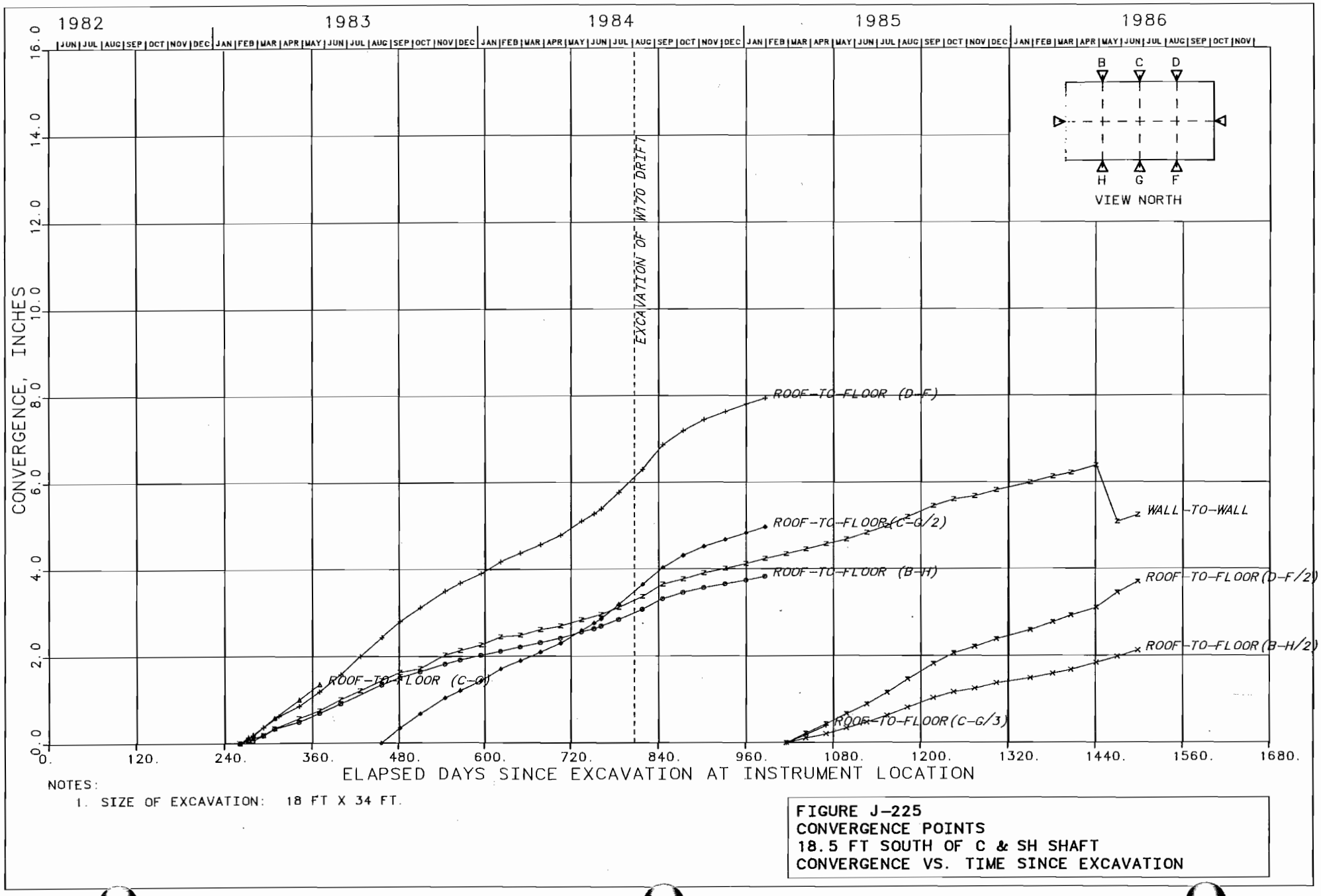
FIGURE J-223
CONVERGENCE POINTS
12 FT WEST OF C & SH SHAFT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 18 FT X 34 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

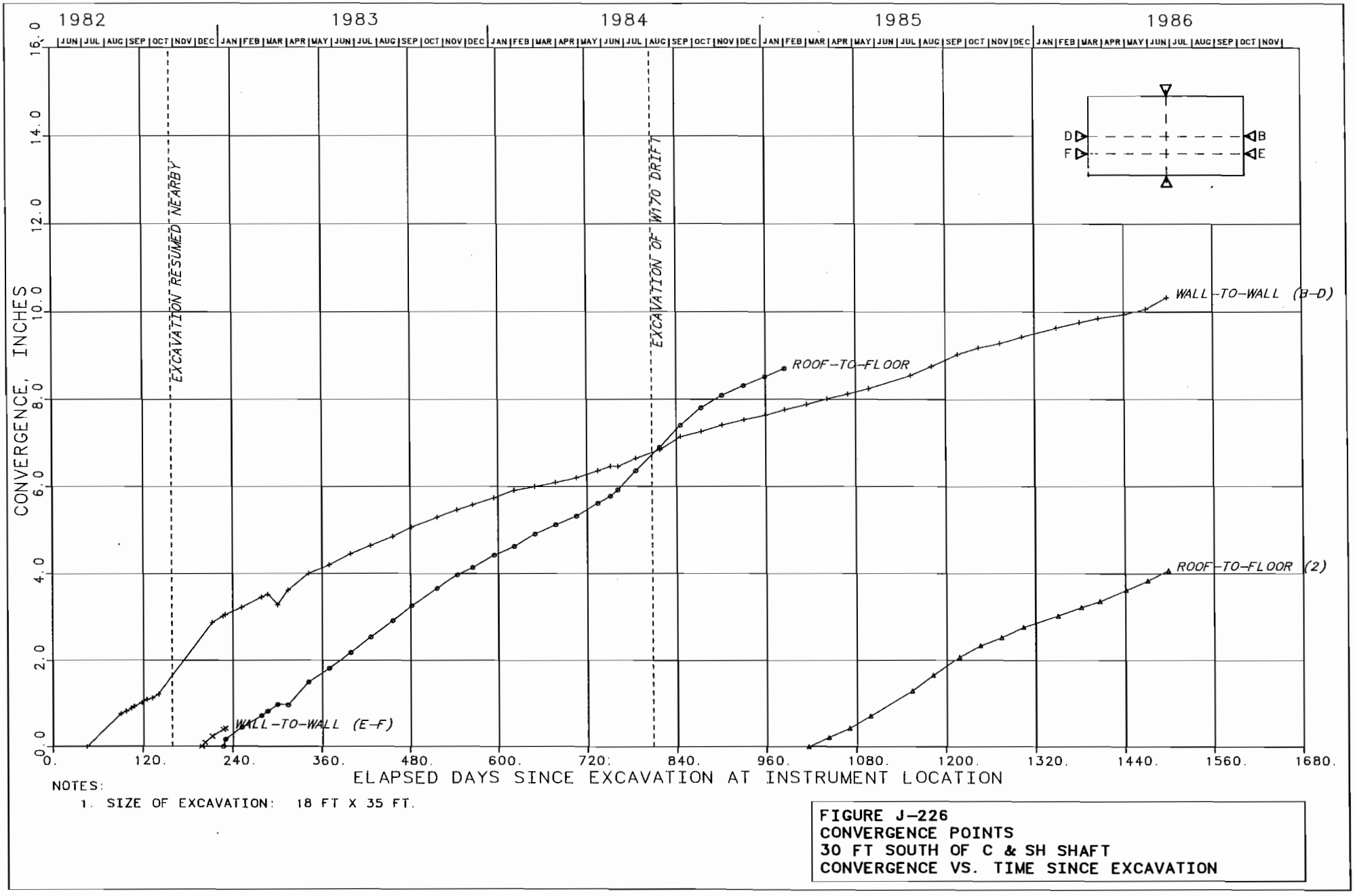
FIGURE J-224
CONVERGENCE POINTS
18 FT SOUTH OF C & SH SHAFT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 18 FT X 34 FT.

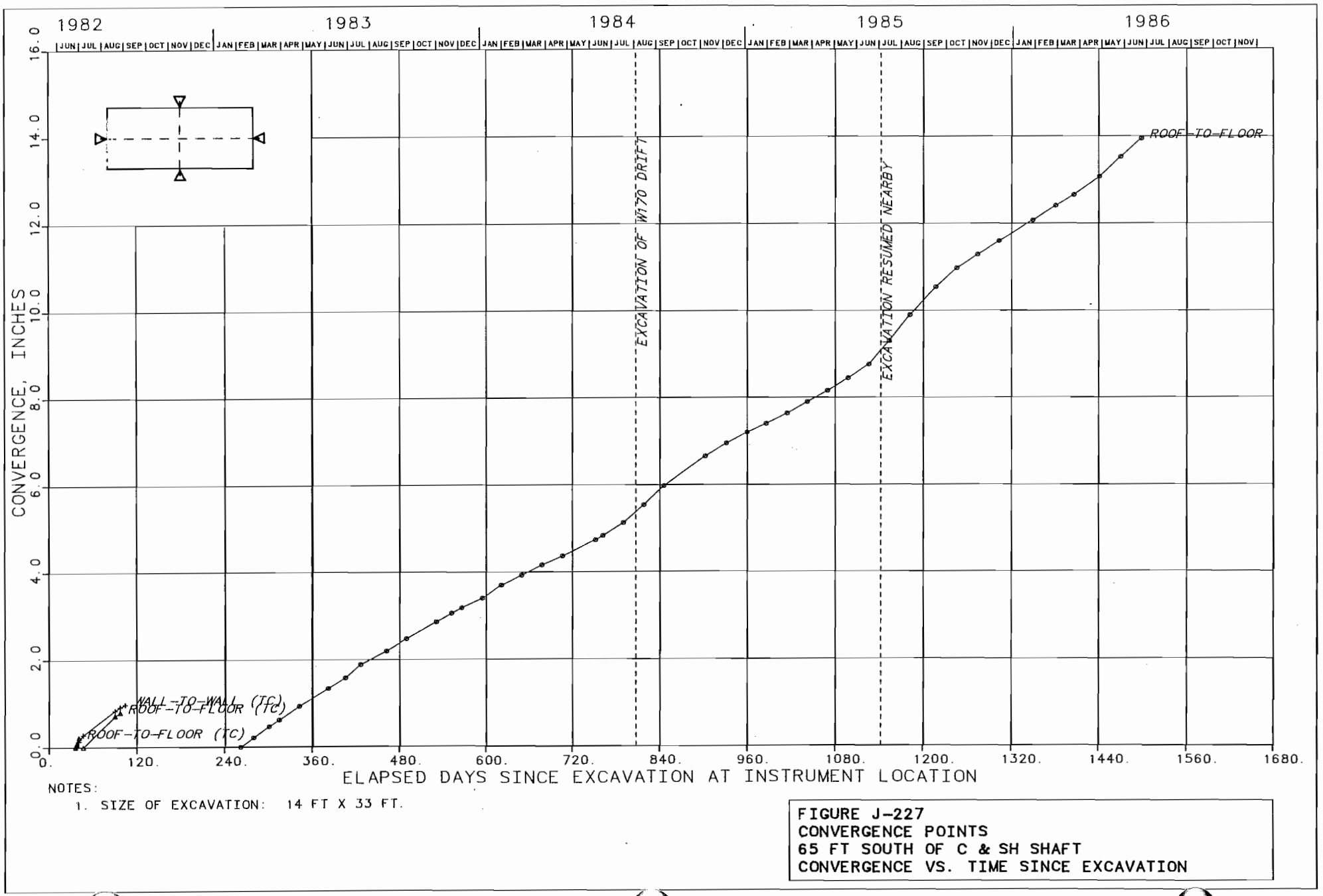
FIGURE J-225
CONVERGENCE POINTS
18.5 FT SOUTH OF C & SH SHAFT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 18 FT X 35 FT.

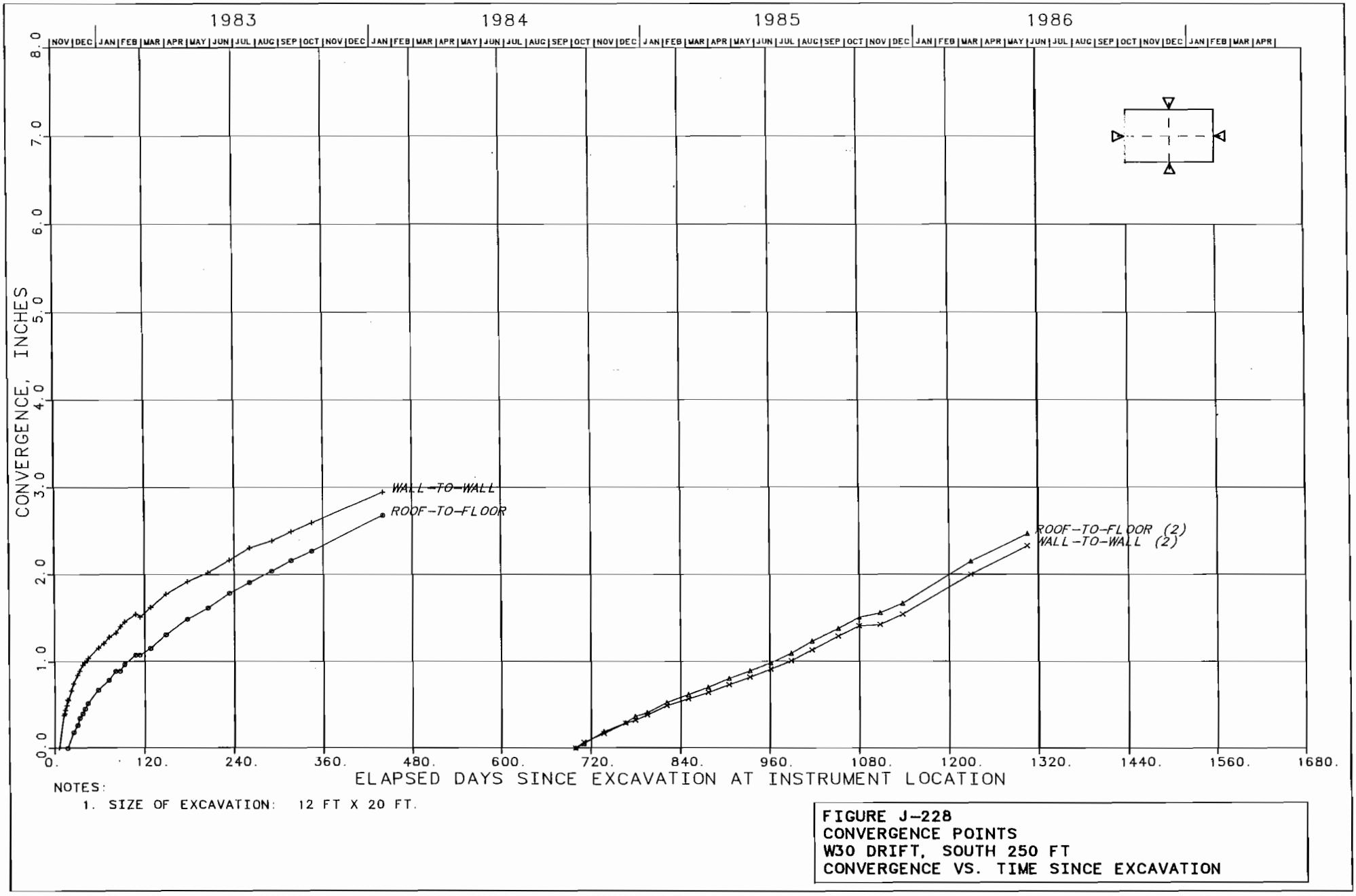
FIGURE J-226
CONVERGENCE POINTS
30 FT SOUTH OF C & SH SHAFT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 14 FT X 33 FT.

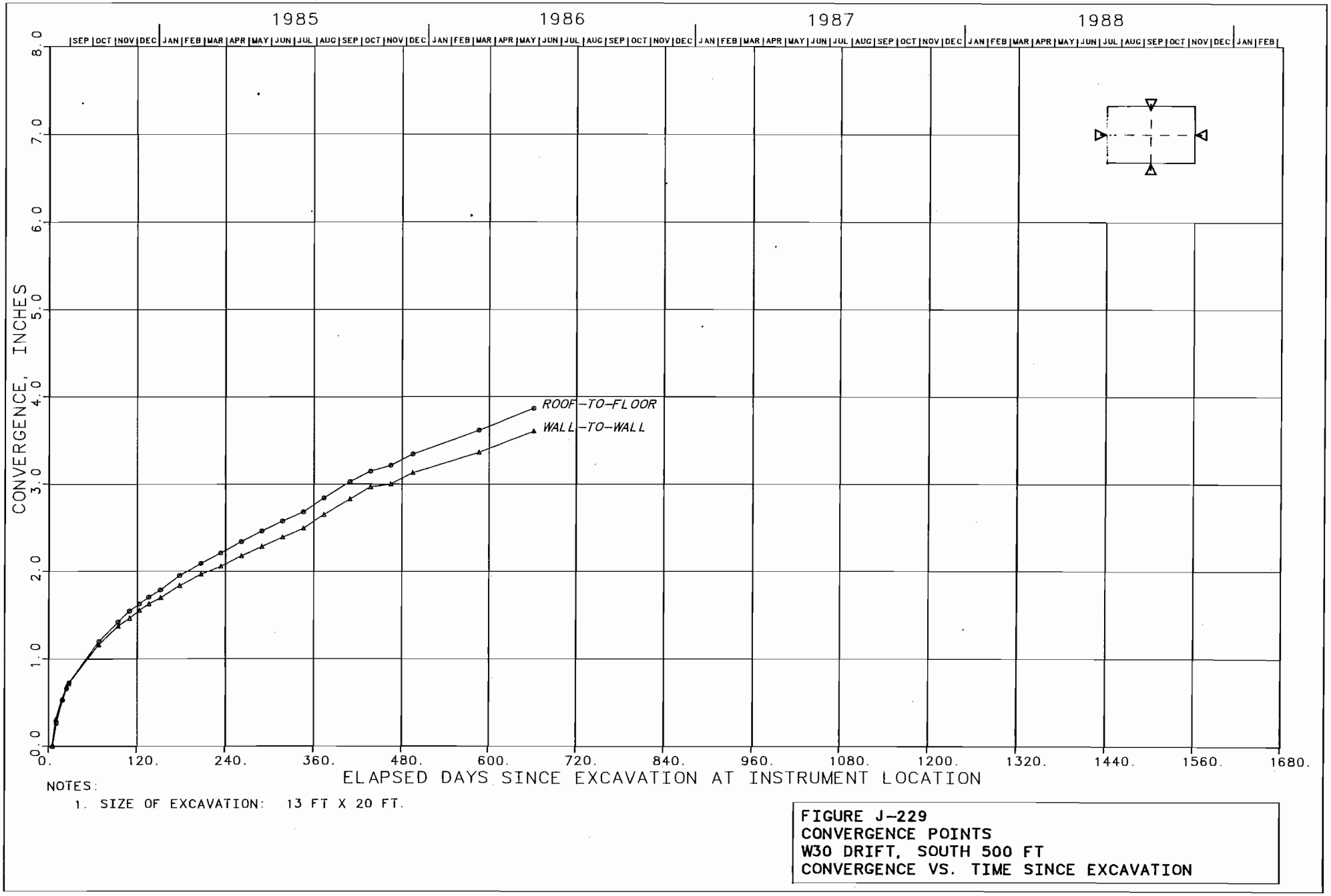
FIGURE J-227
CONVERGENCE POINTS
65 FT SOUTH OF C & SH SHAFT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

FIGURE J-228
CONVERGENCE POINTS
W30 DRIFT, SOUTH 250 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 20 FT.

FIGURE J-229
CONVERGENCE POINTS
W30 DRIFT, SOUTH 500 FT
CONVERGENCE VS. TIME SINCE EXCAVATION

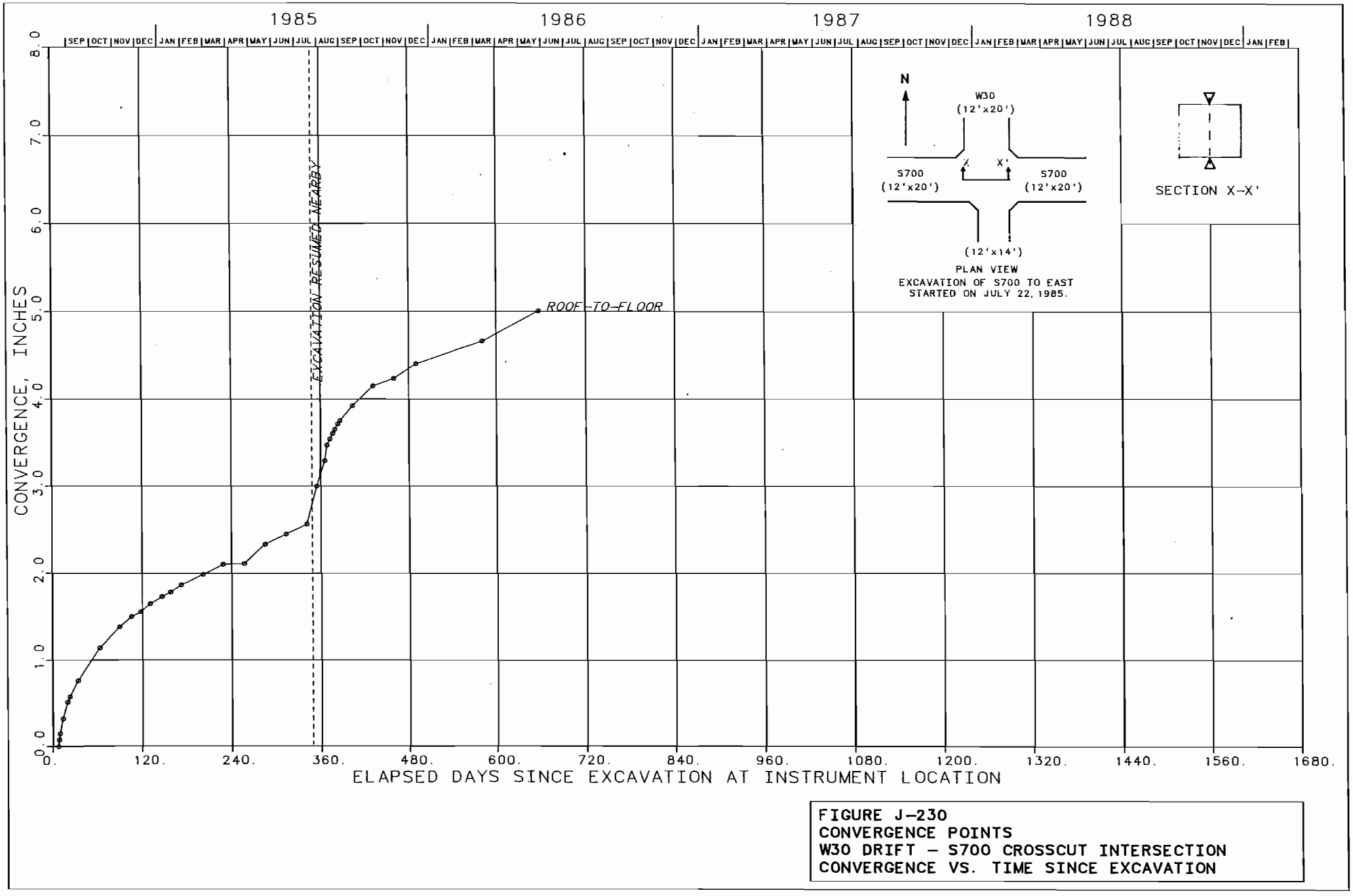
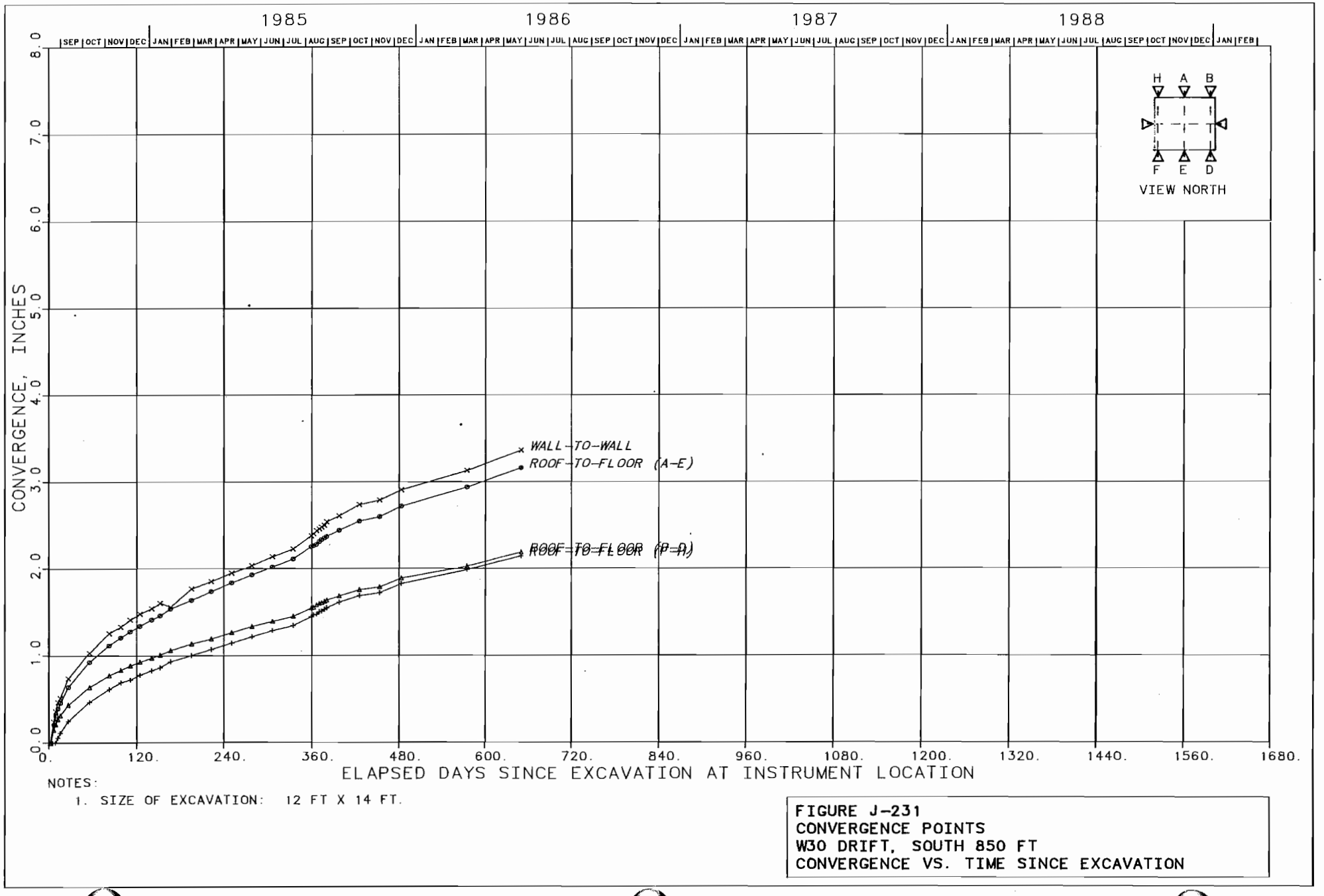


FIGURE J-230
CONVERGENCE POINTS
W30 DRIFT – S700 CROSSCUT INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

FIGURE J-231
CONVERGENCE POINTS
W30 DRIFT, SOUTH 850 FT
CONVERGENCE VS. TIME SINCE EXCAVATION

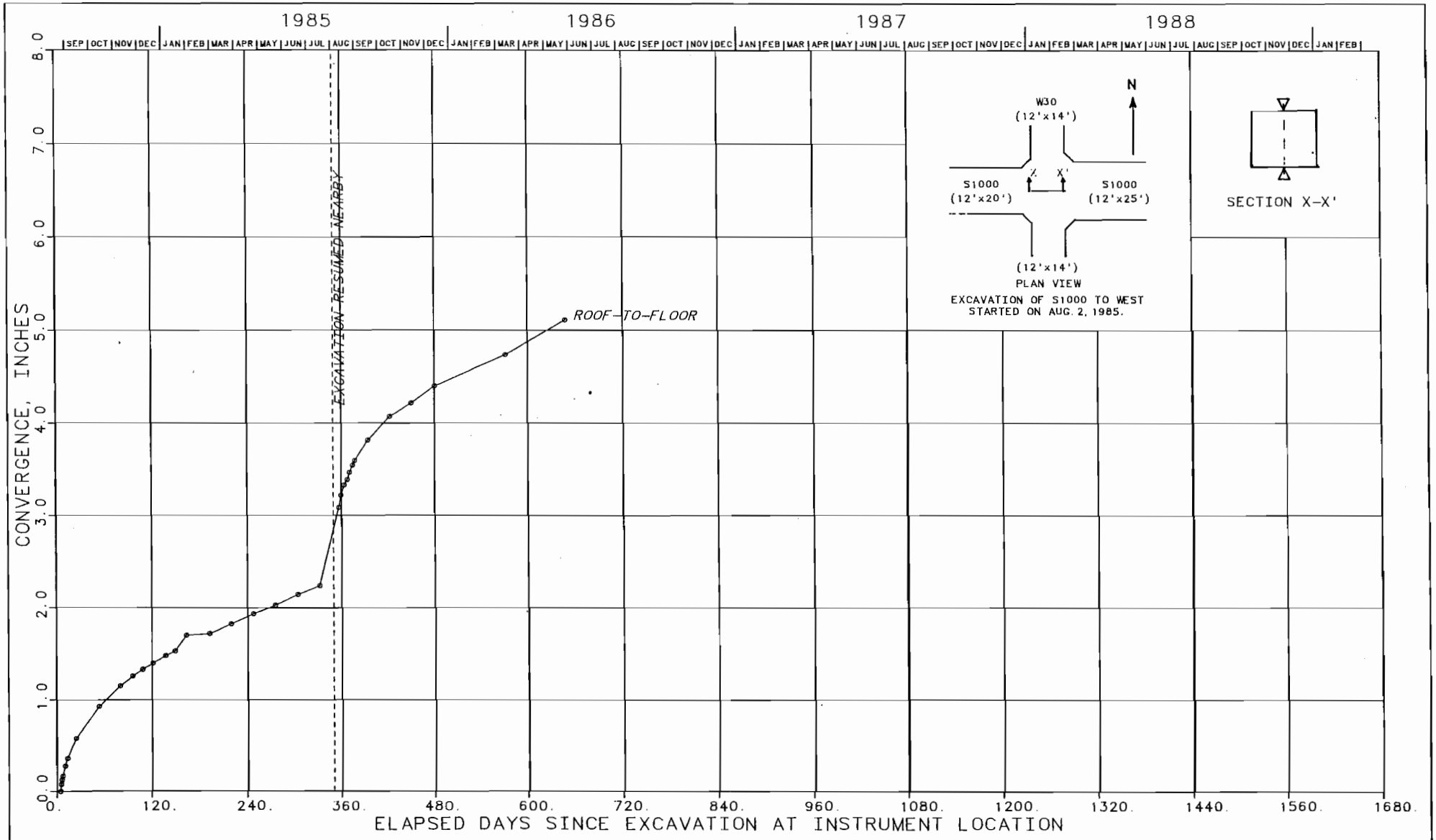
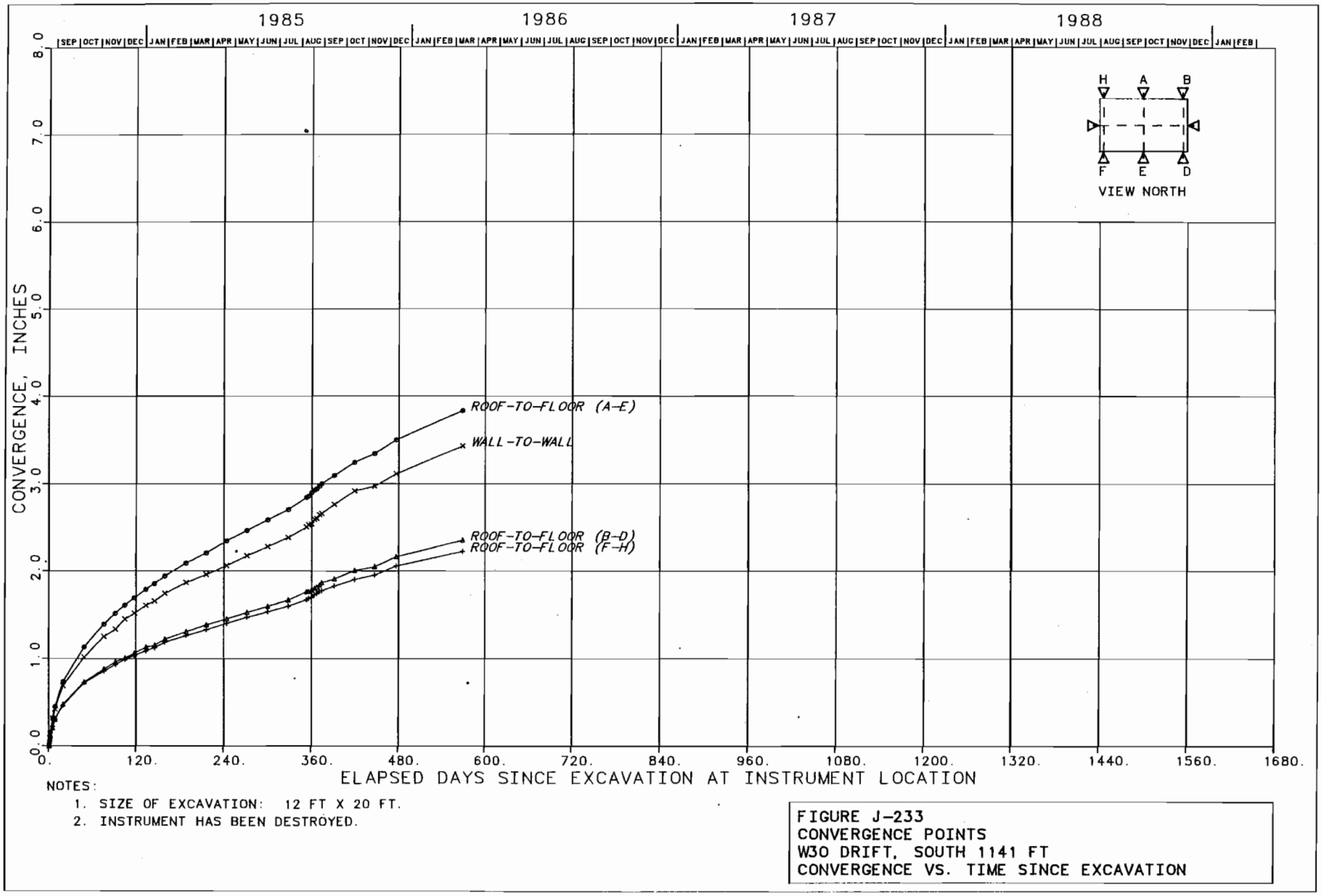


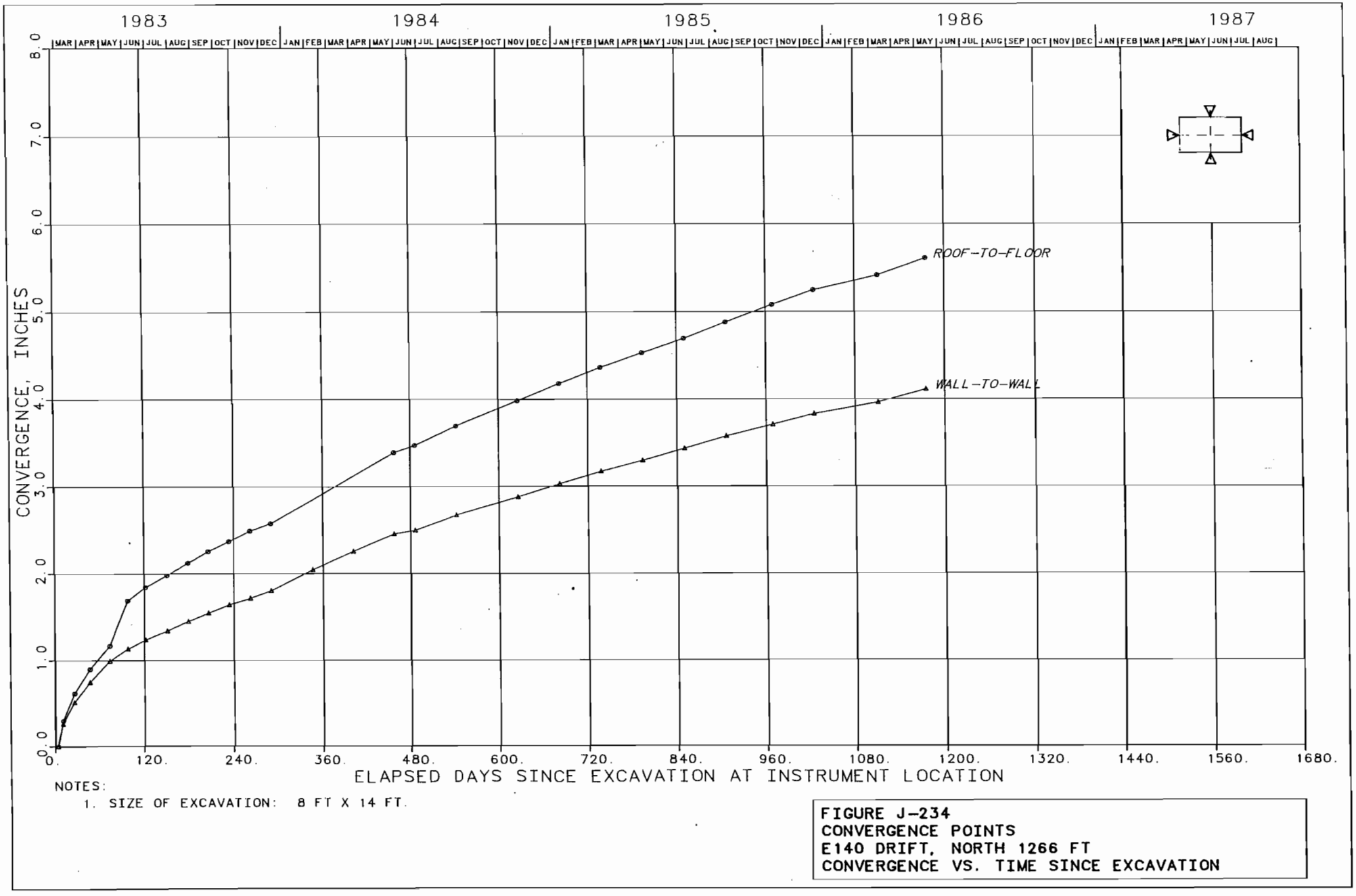
FIGURE J-232
CONVERGENCE POINTS
W30 DRIFT - S1000 CROSSCUT INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

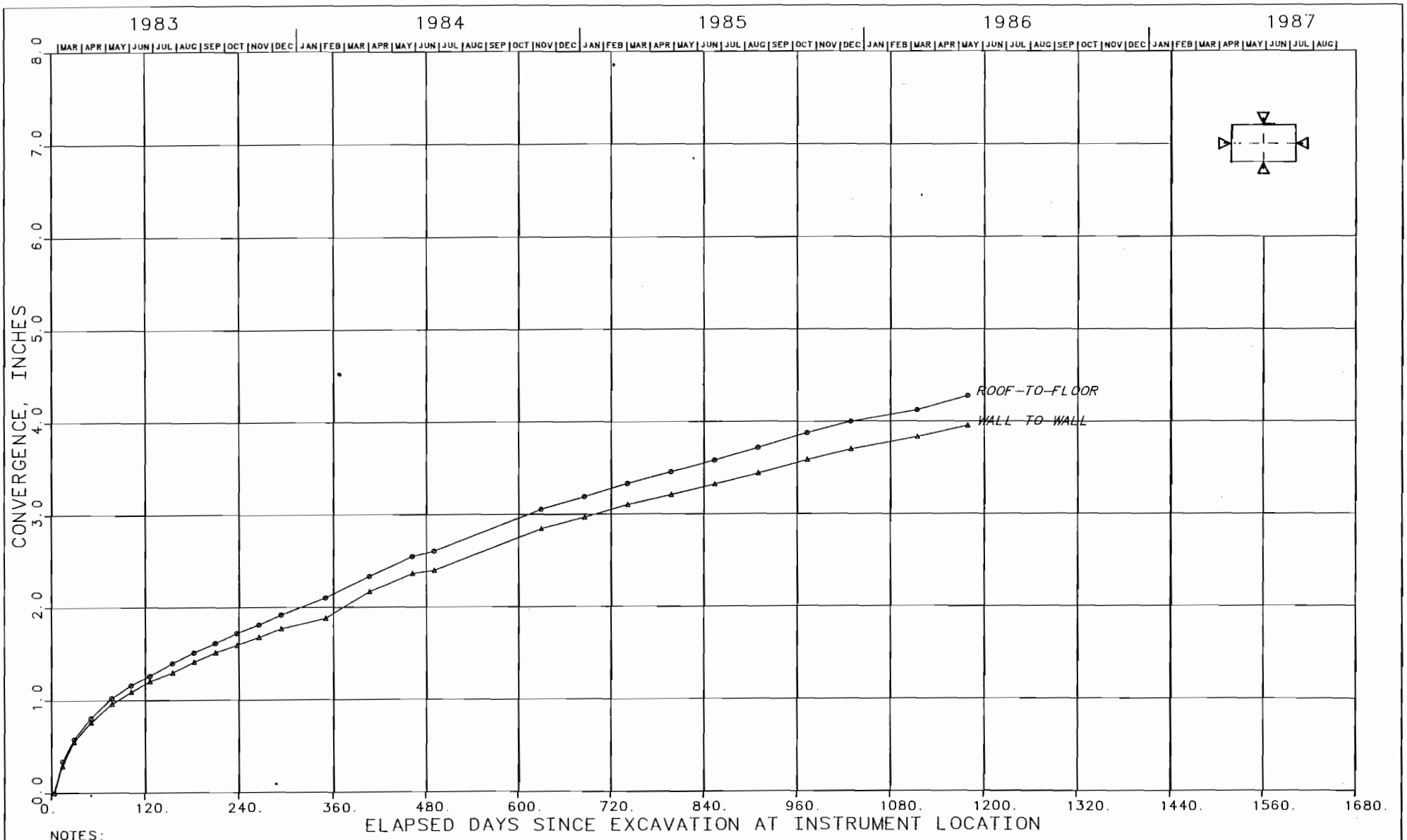
FIGURE J-233
CONVERGENCE POINTS
W30 DRIFT, SOUTH 1141 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 14 FT.

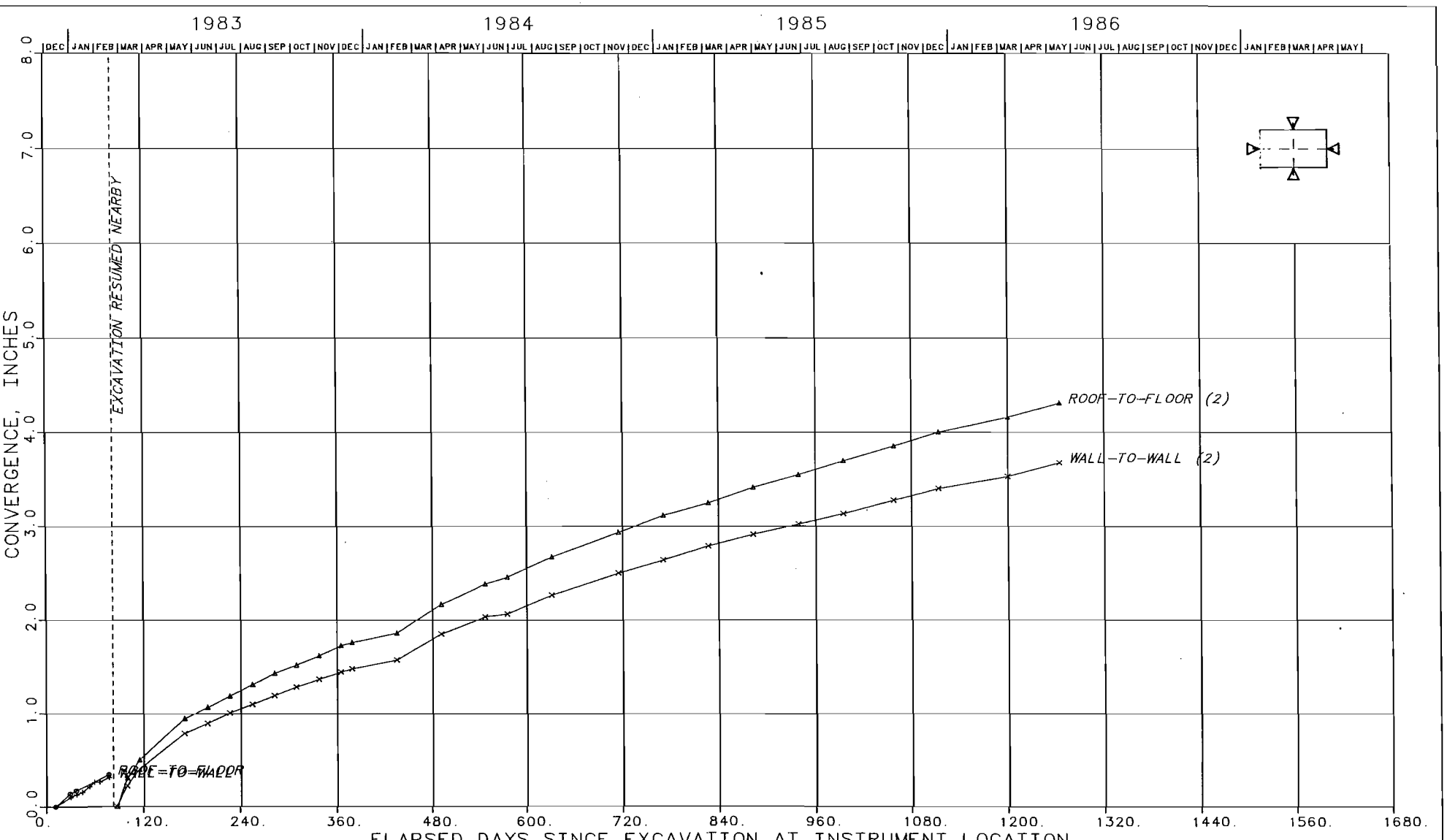
FIGURE J-234
CONVERGENCE POINTS
E140 DRIFT, NORTH 1266 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 14 FT.

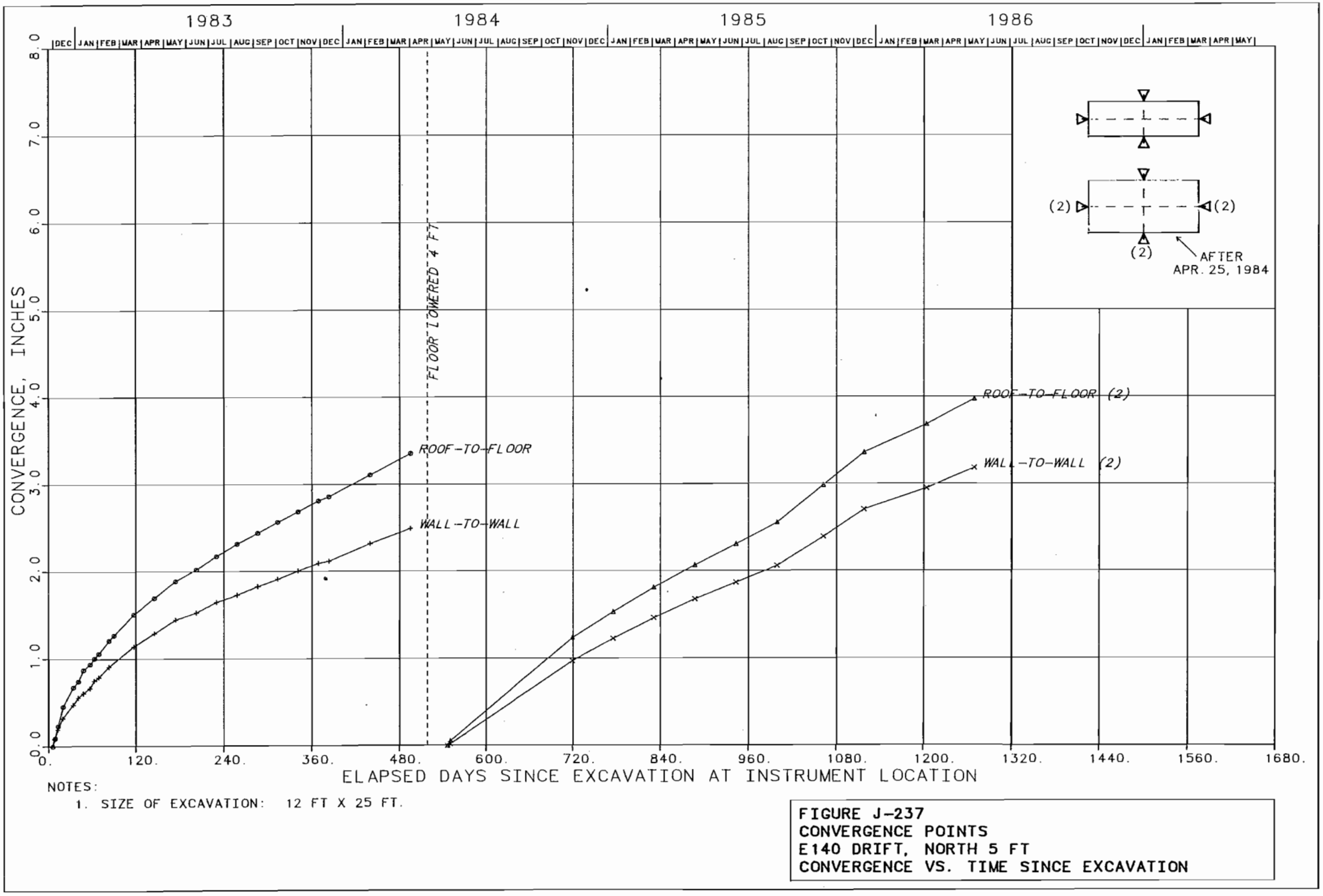
FIGURE J-235
CONVERGENCE POINTS
E140 DRIFT, NORTH 626 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 14 FT.

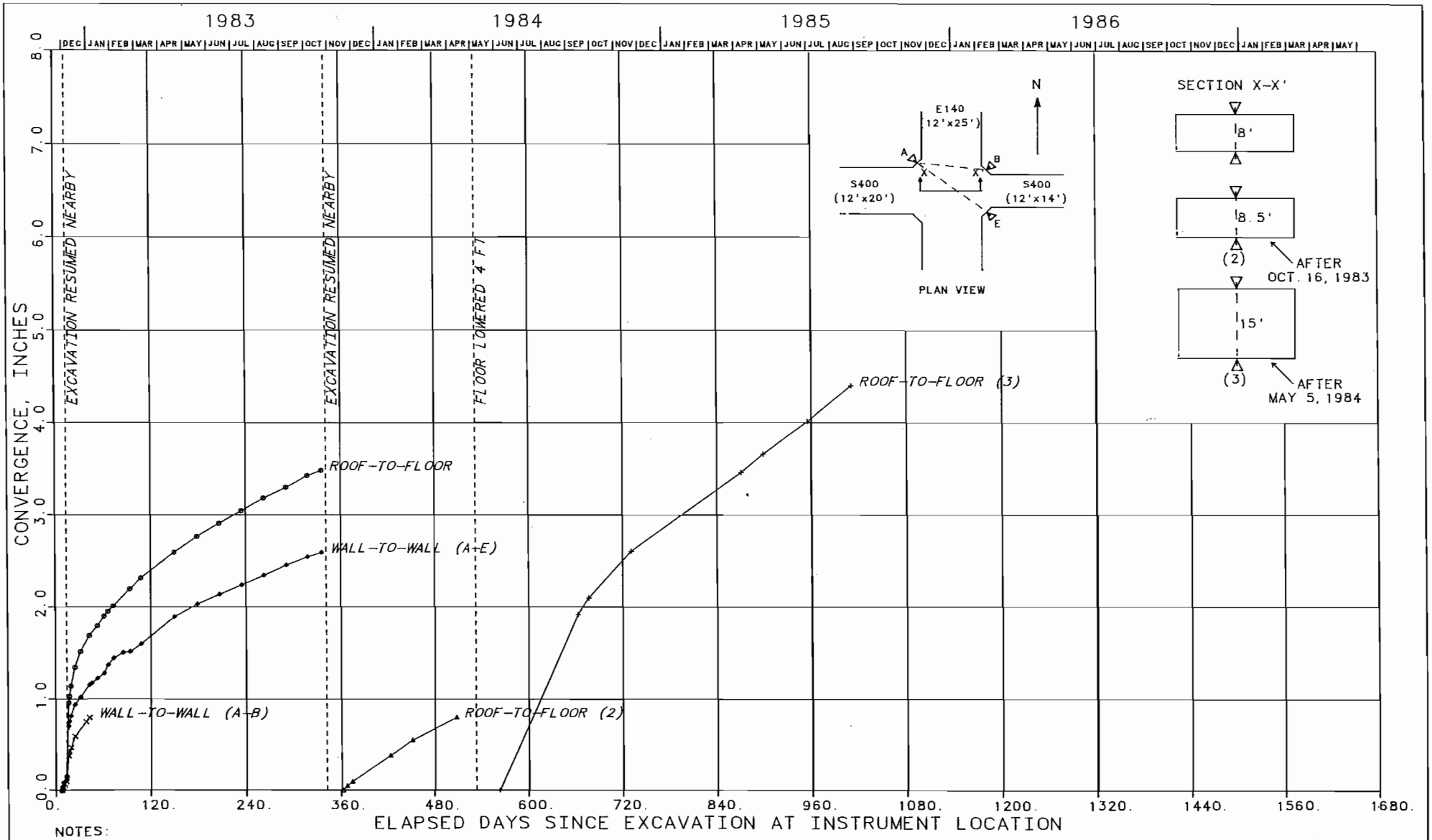
FIGURE J-236
CONVERGENCE POINTS
E140 DRIFT, NORTH 240 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

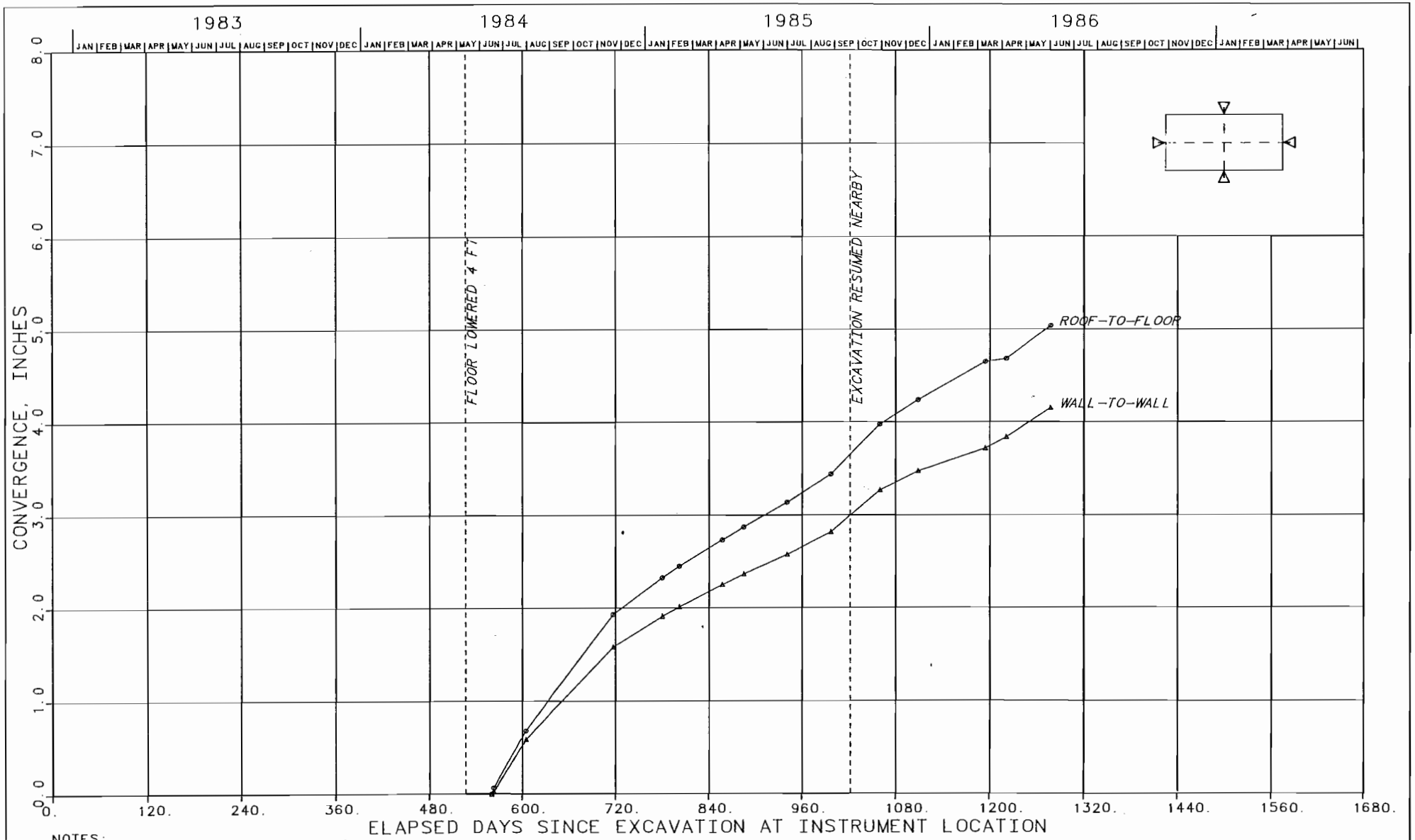
FIGURE J-237
CONVERGENCE POINTS
E140 DRIFT, NORTH 5 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. INSTRUMENT HAS BEEN DESTROYED.

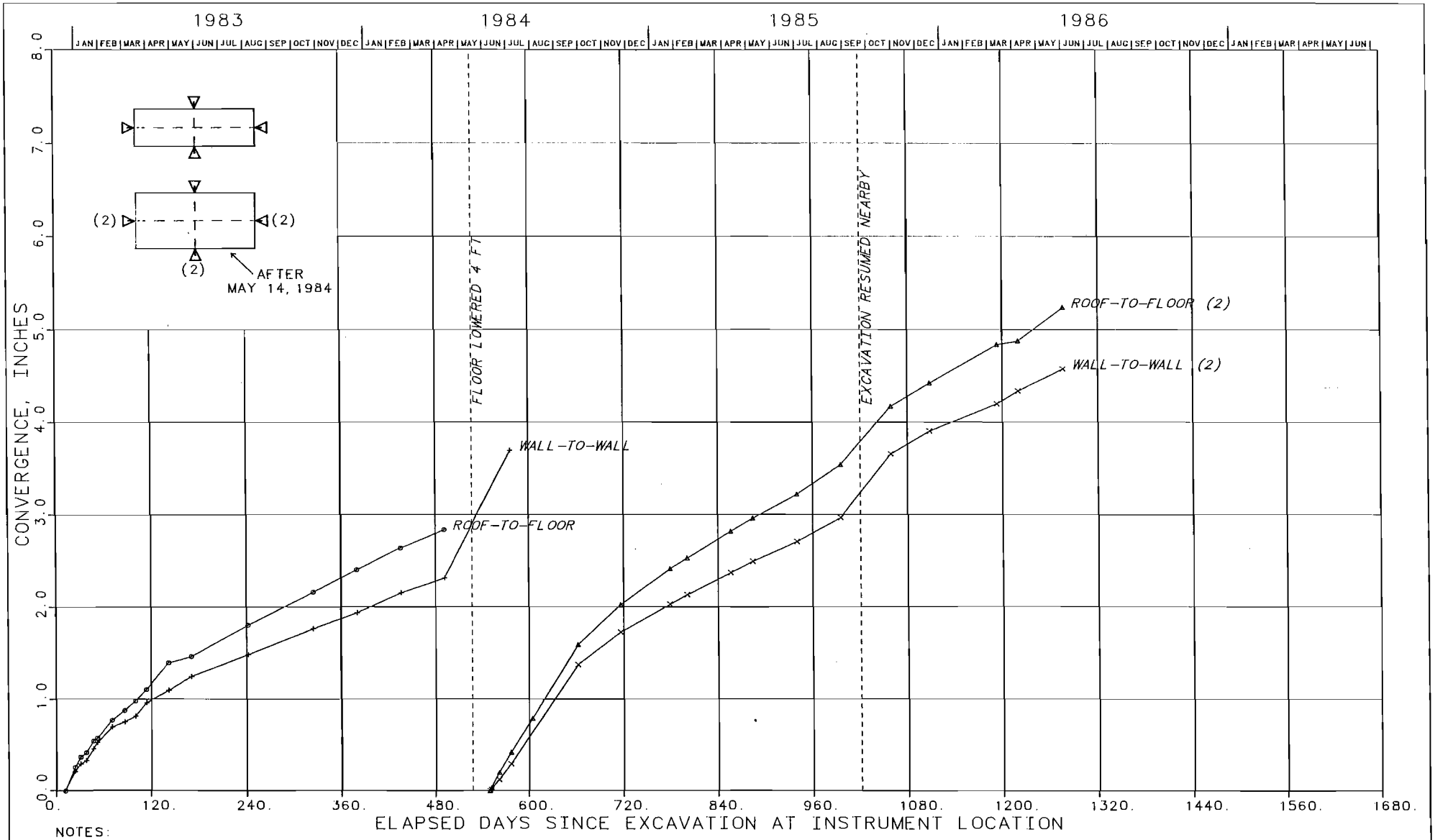
FIGURE J-238
CONVERGENCE POINTS
E140 DRIFT - S400 CROSSCUT INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

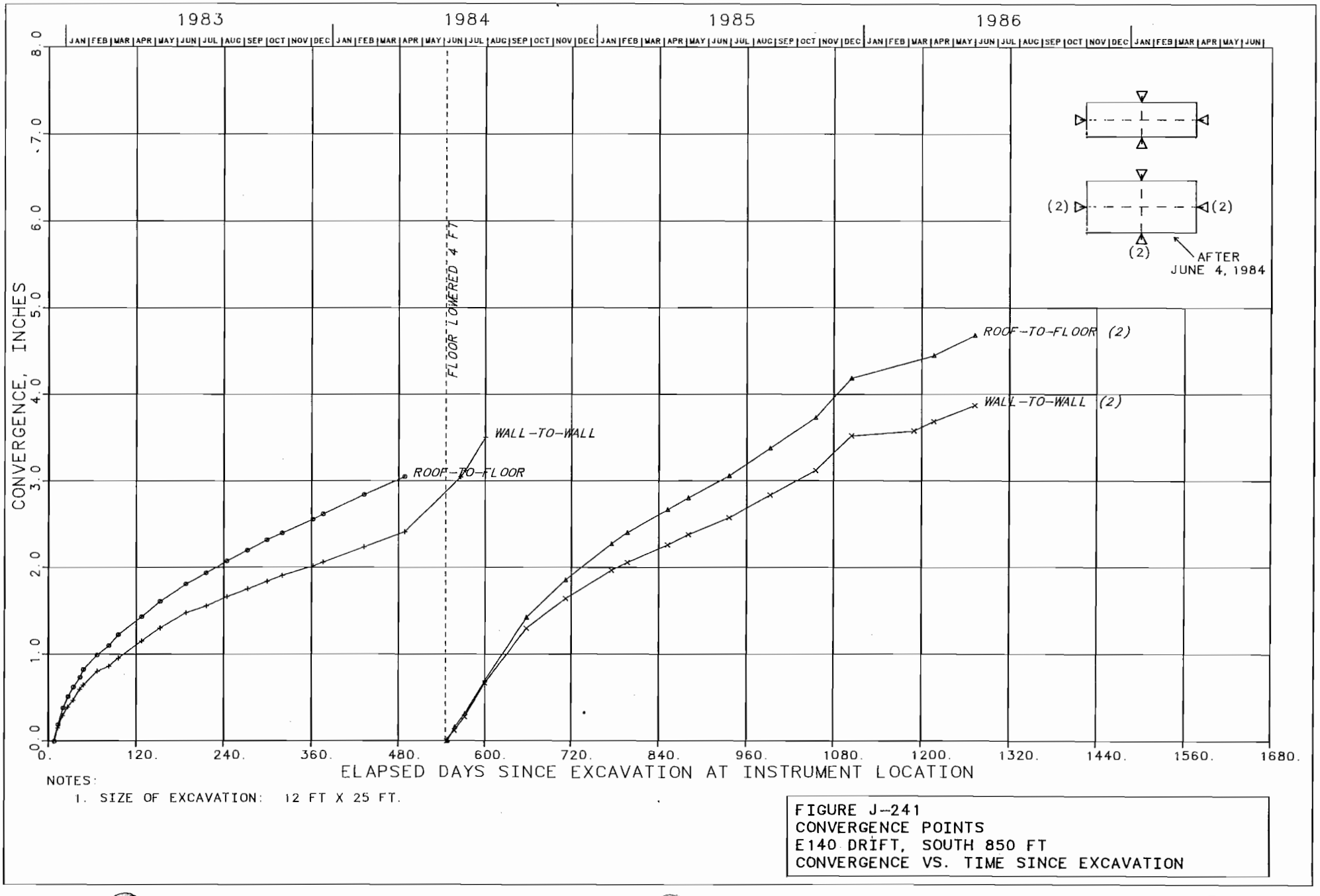
FIGURE J-239
CONVERGENCE POINTS
E140 DRIFT, SOUTH 460 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

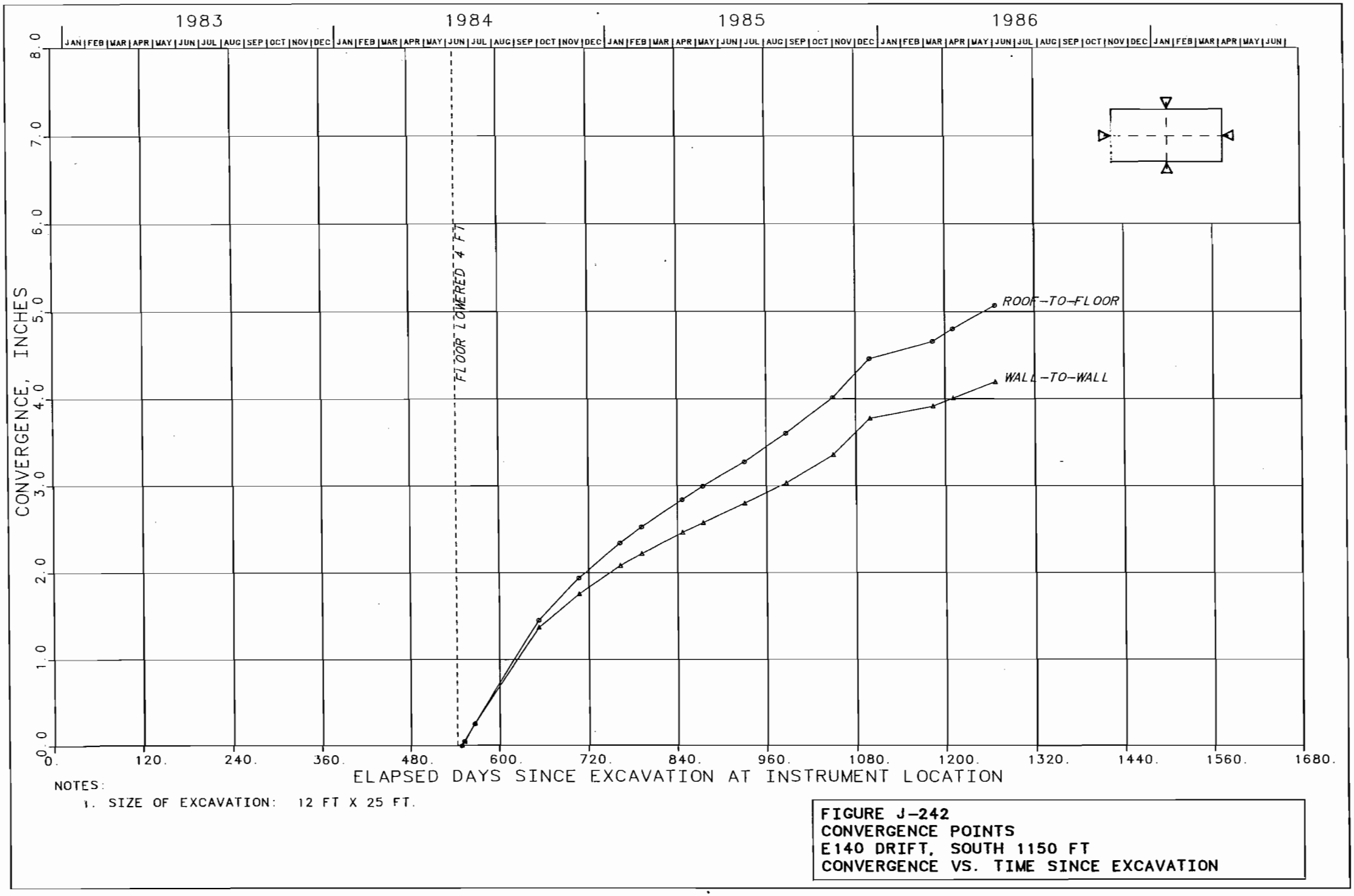
FIGURE J-240
CONVERGENCE POINTS
E140 DRIFT, SOUTH 550 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

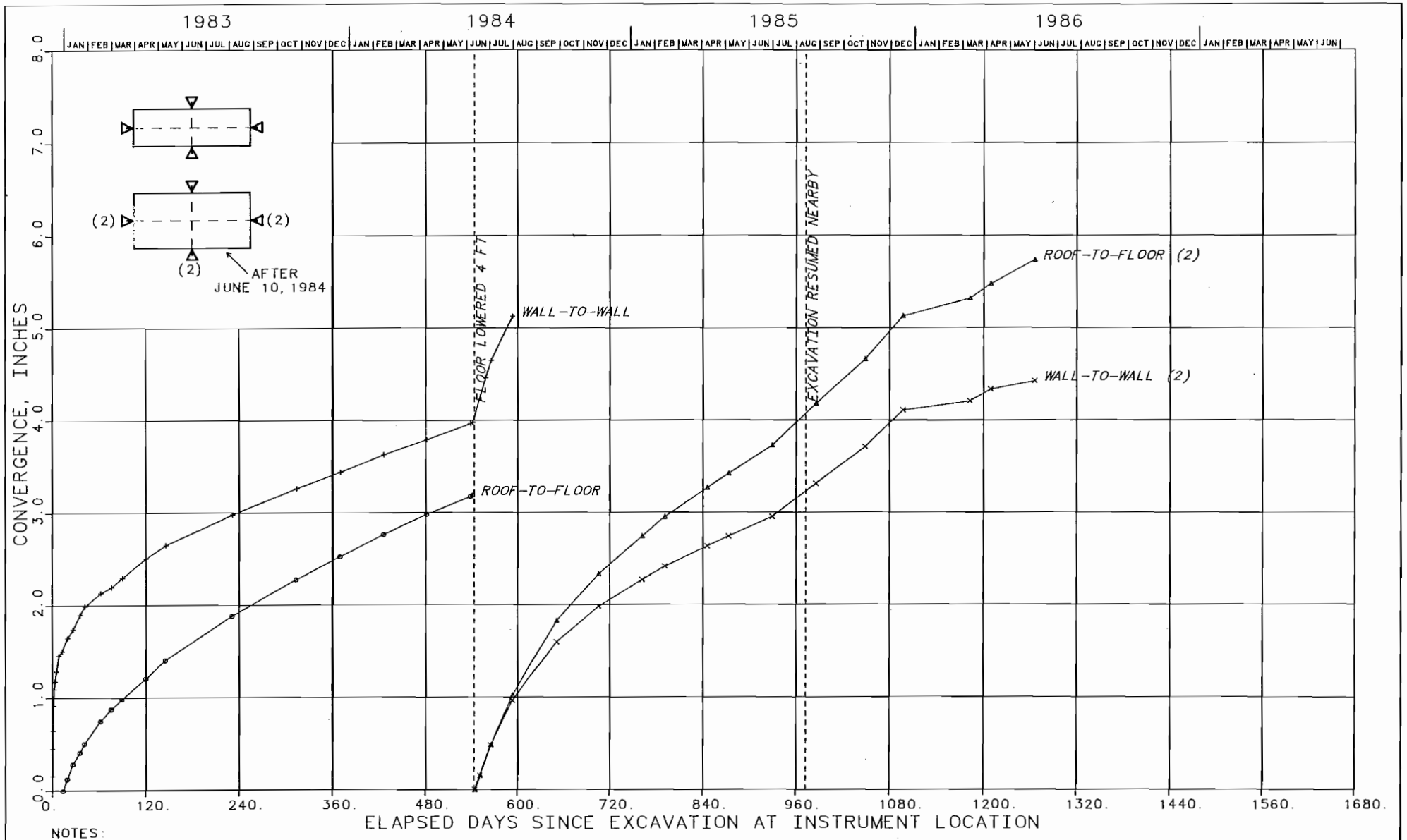
FIGURE J-241
CONVERGENCE POINTS
E140 DRIFT, SOUTH 850 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

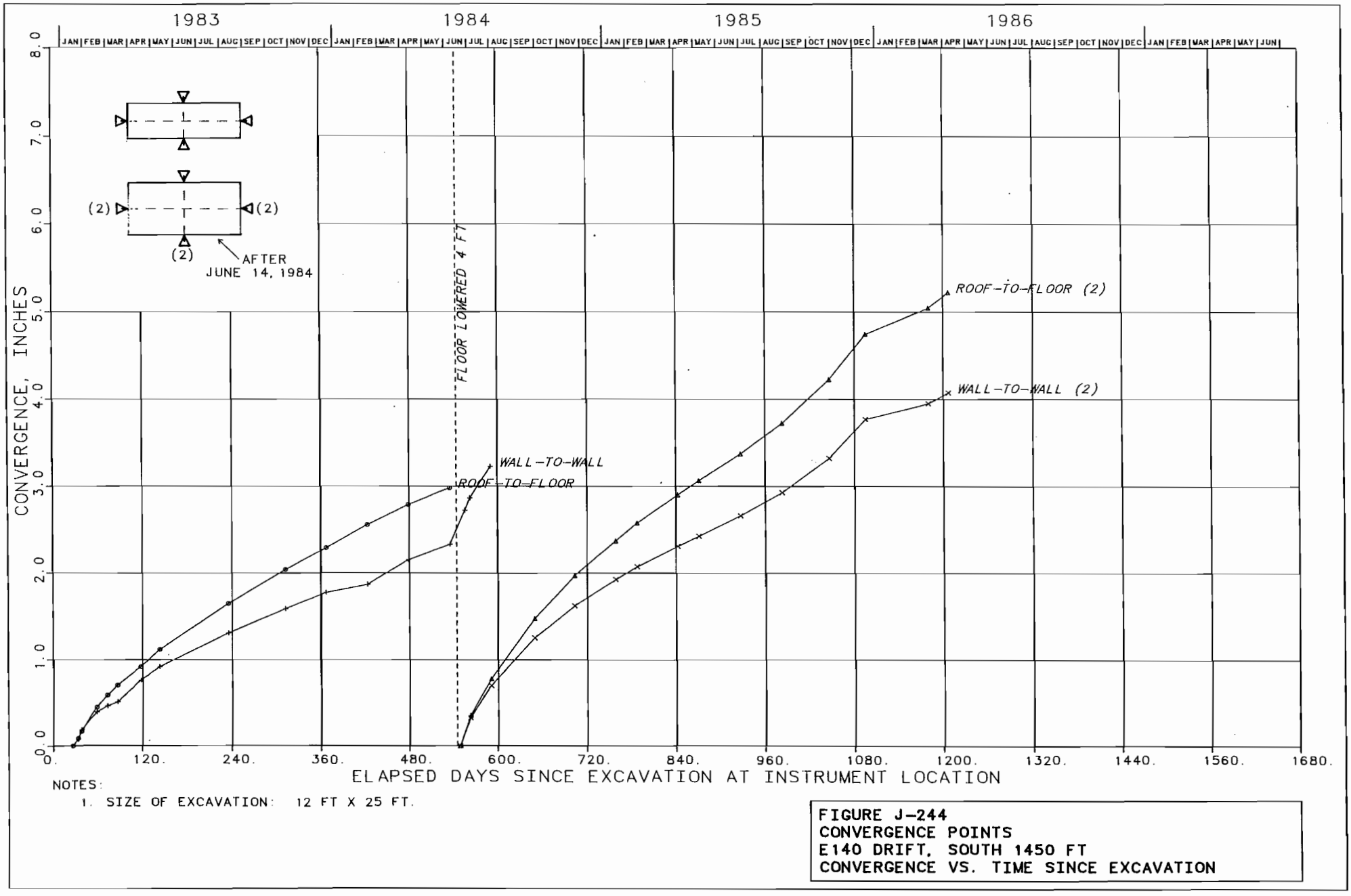
FIGURE J-242
CONVERGENCE POINTS
E140 DRIFT, SOUTH 1150 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT

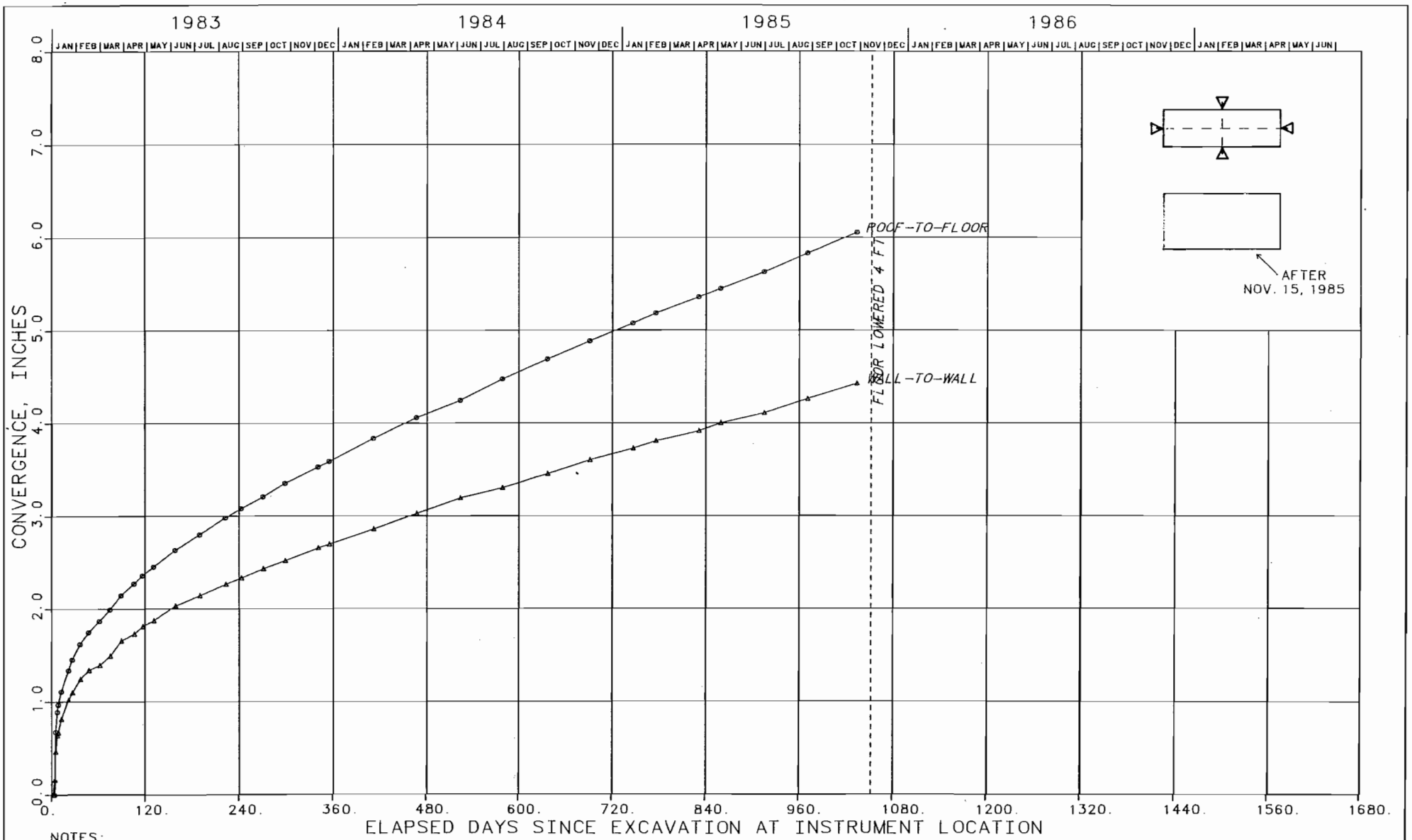
FIGURE J-243
CONVERGENCE POINTS
E140 DRIFT, SOUTH 1246 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

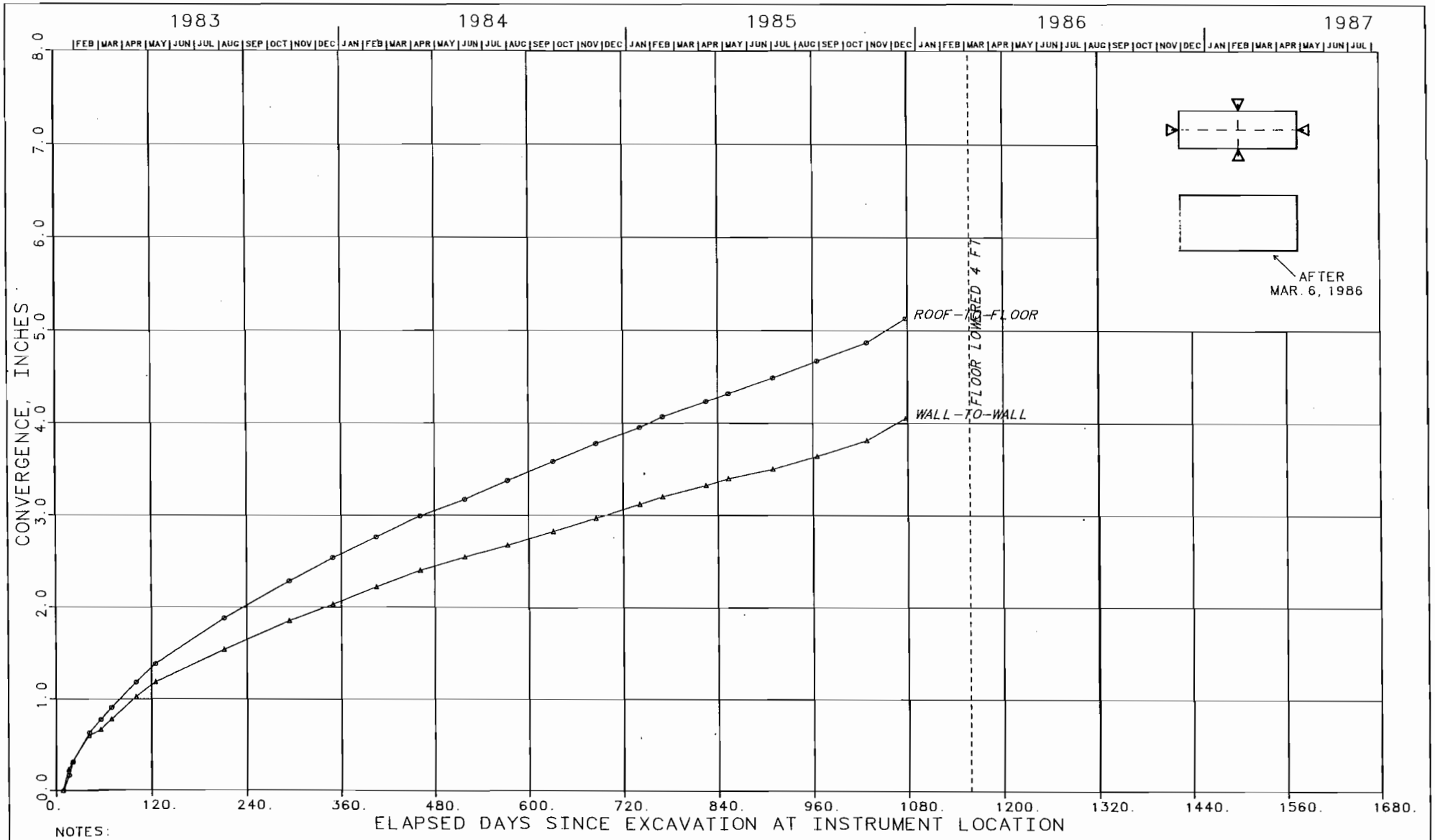
FIGURE J-244
CONVERGENCE POINTS
E140 DRIFT, SOUTH 1450 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

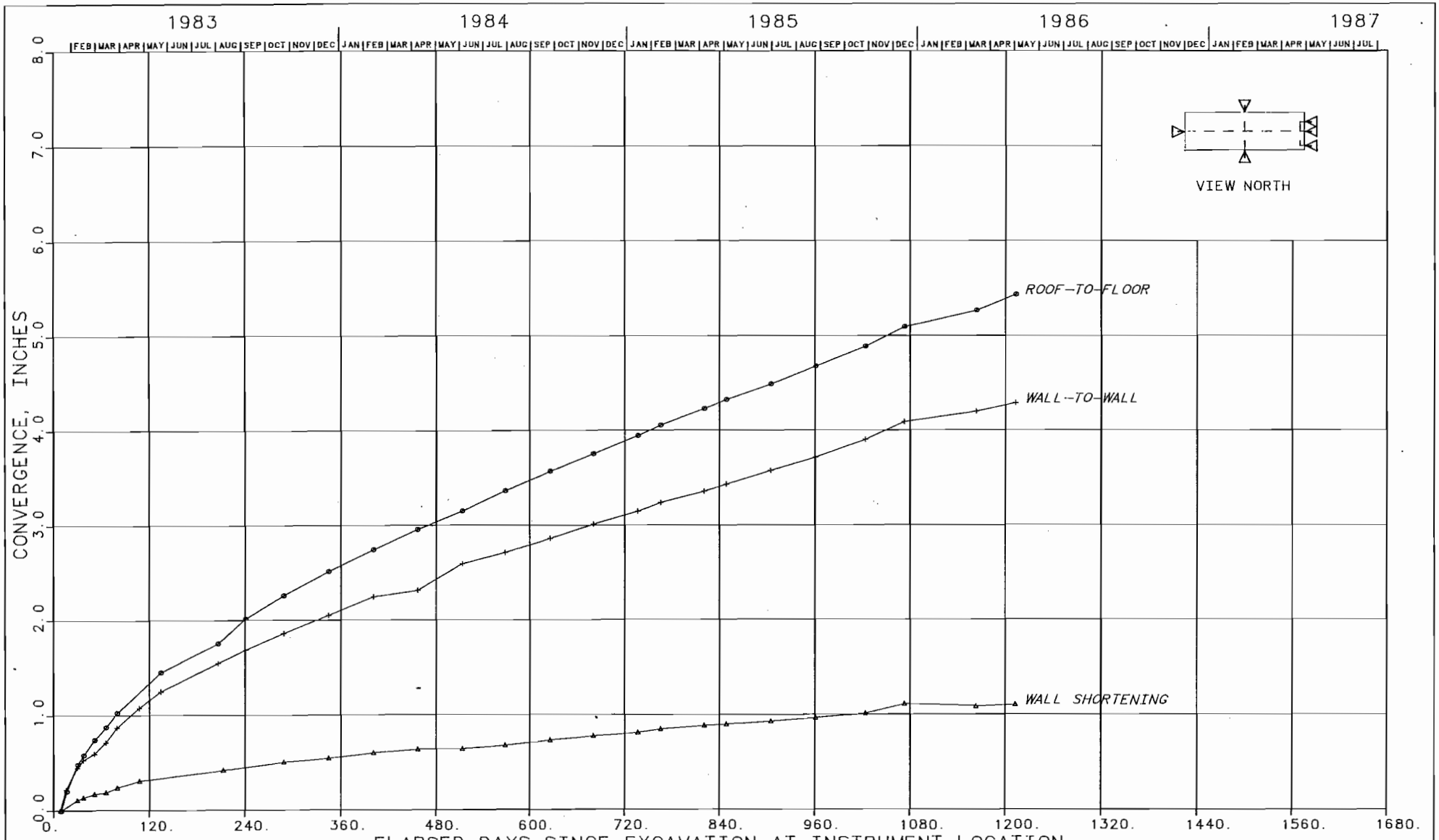
FIGURE J-245
CONVERGENCE POINTS
E140 DRIFT, SOUTH 1879 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

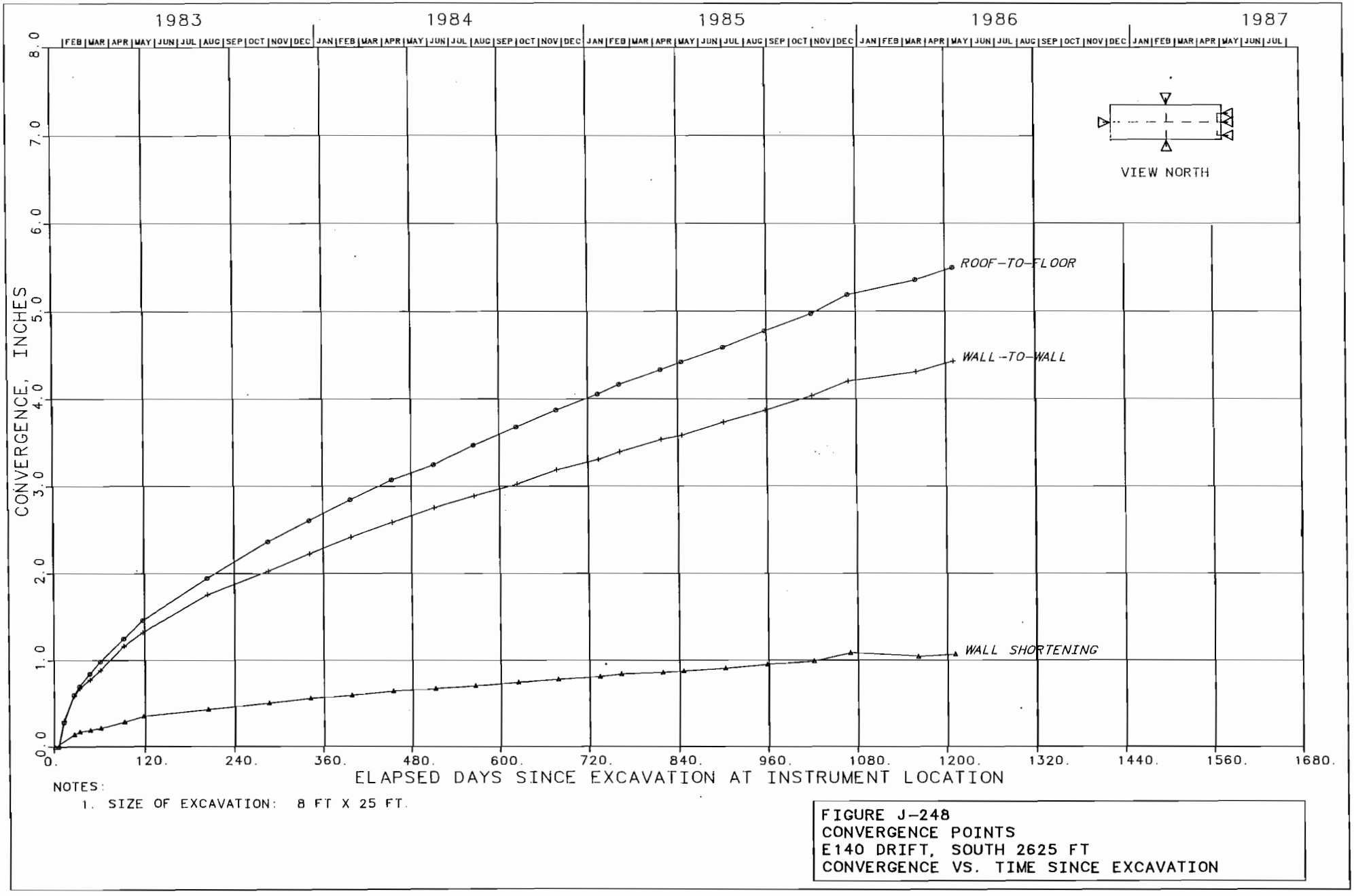
FIGURE J-246
CONVERGENCE POINTS
E140 DRIFT, SOUTH 2066 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.

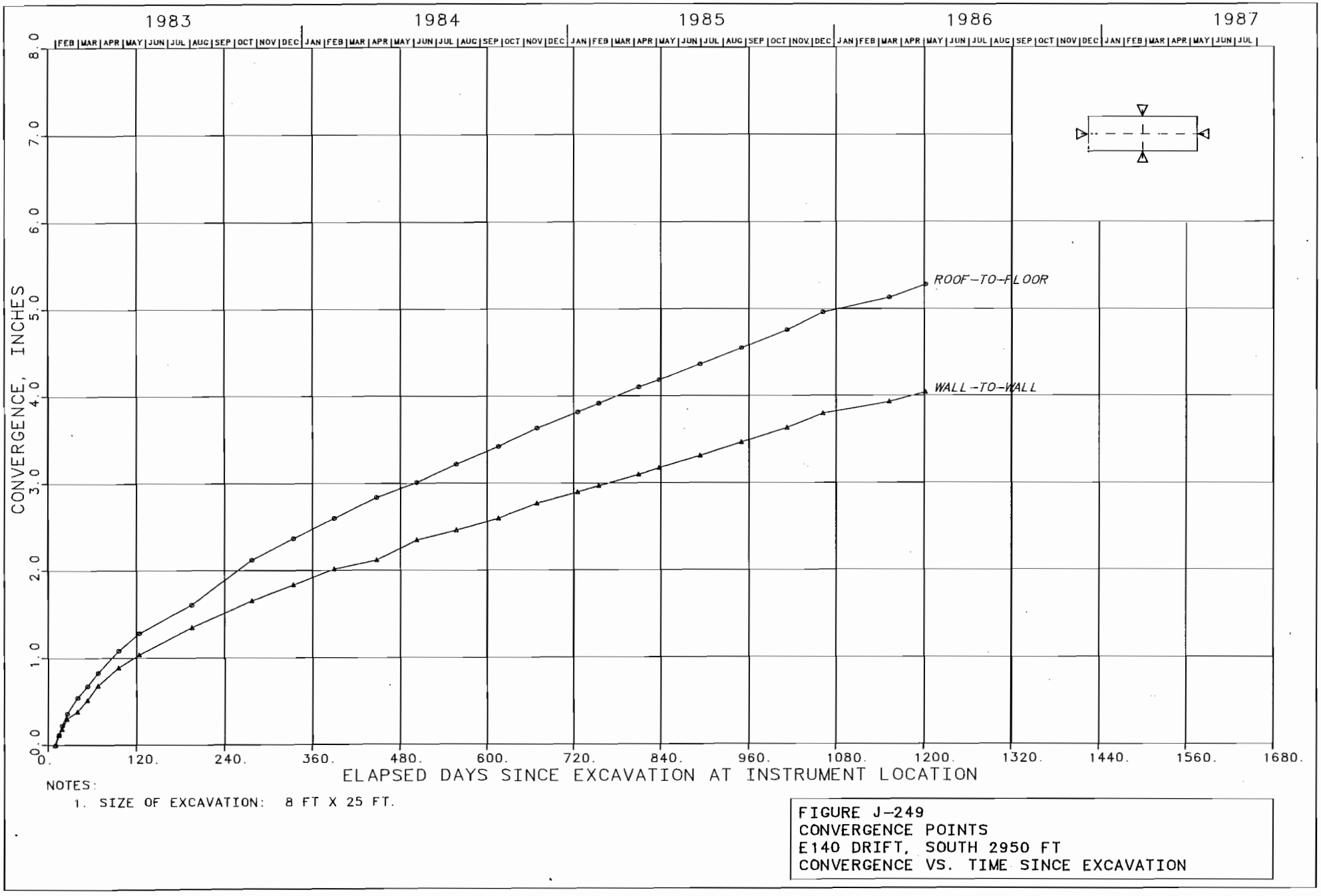
FIGURE J-247
CONVERGENCE POINTS
E140 DRIFT, SOUTH 2350 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.

FIGURE J-248
CONVERGENCE POINTS
E140 DRIFT, SOUTH 2625 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

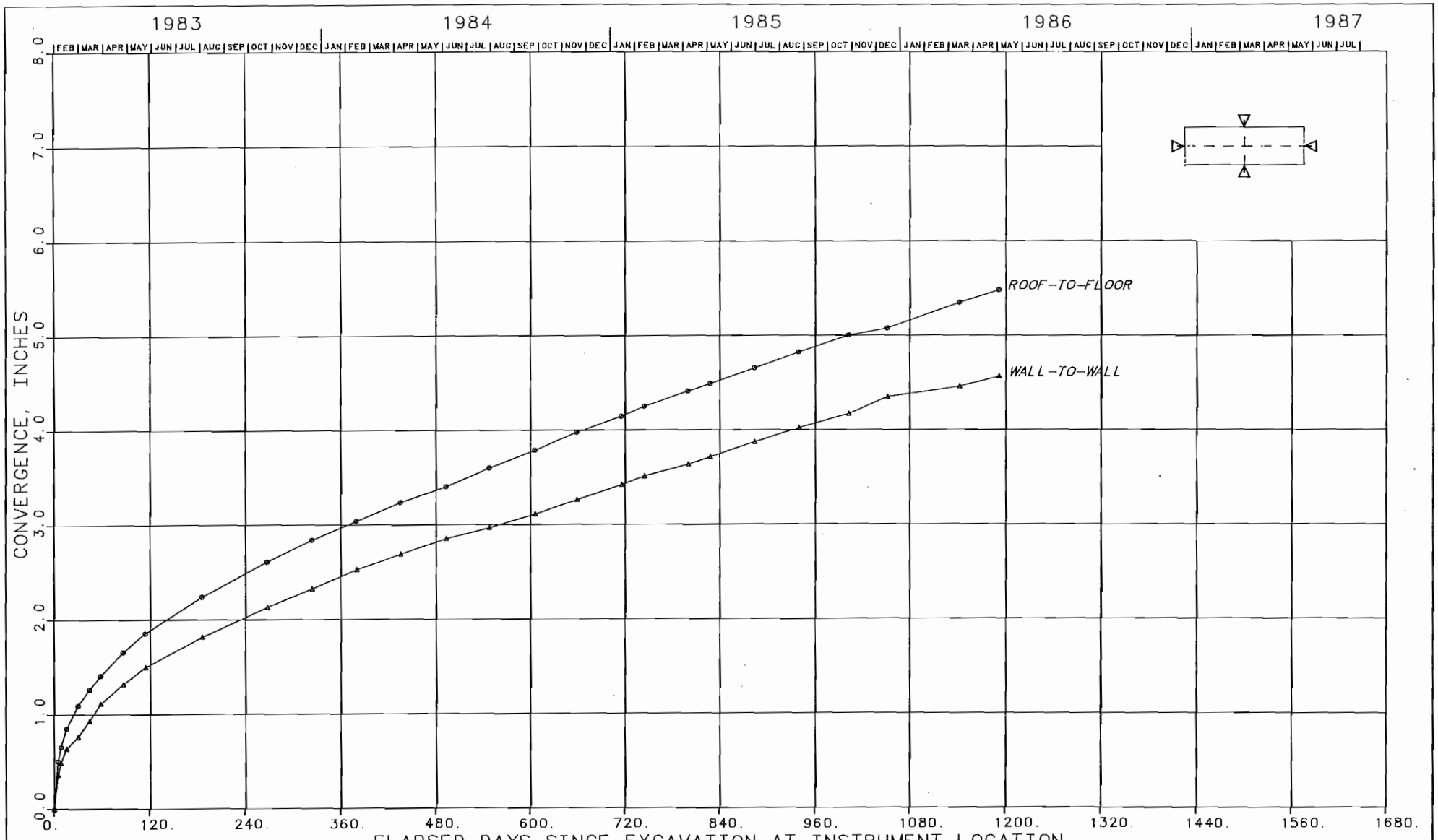
1. SIZE OF EXCAVATION: 8 FT X 25 FT.

FIGURE J-249
CONVERGENCE POINTS
E140 DRIFT, SOUTH 2950 FT
CONVERGENCE VS. TIME SINCE EXCAVATION

NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.

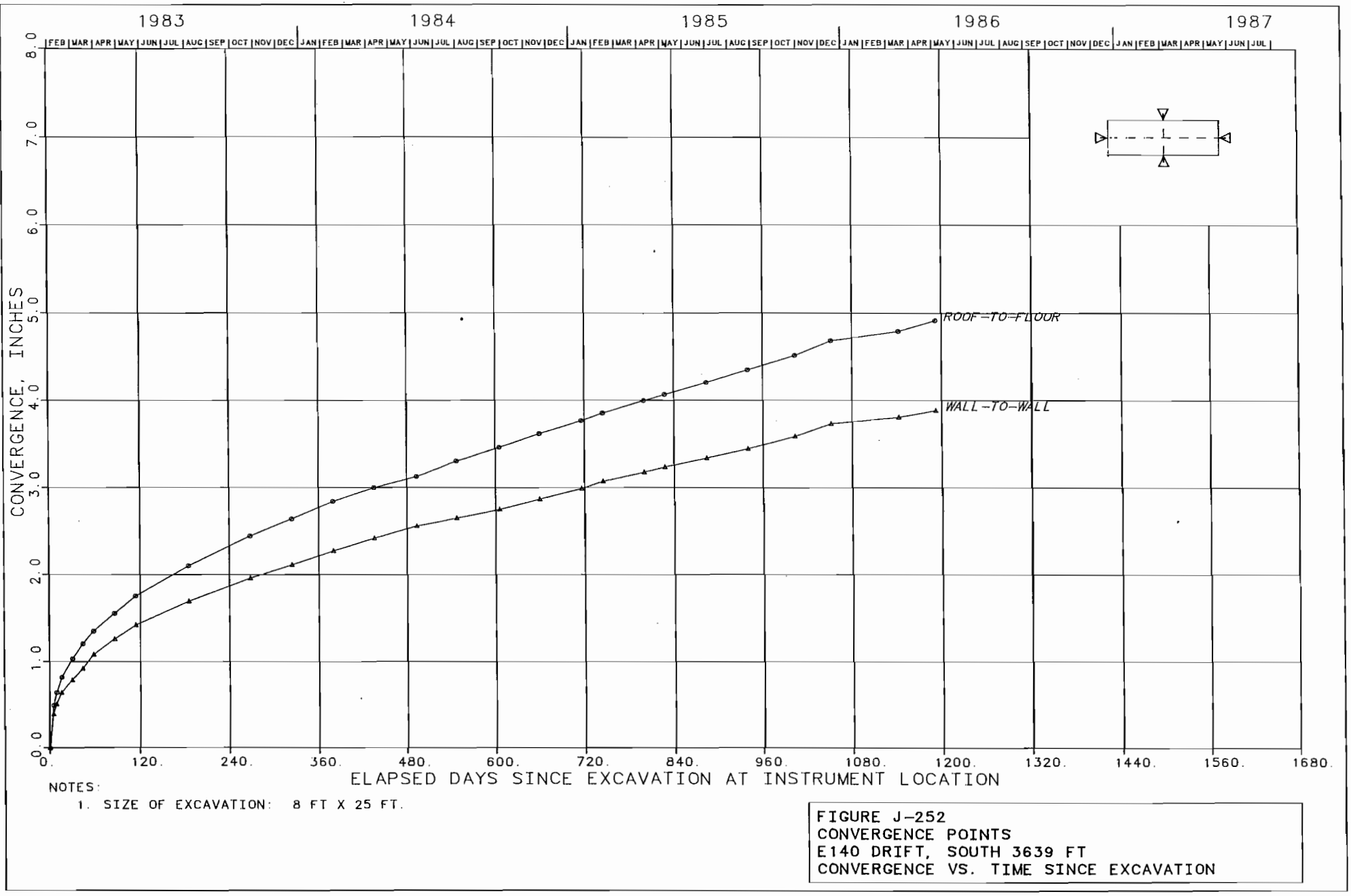
FIGURE J-250
CONVERGENCE POINTS
E140 DRIFT, SOUTH 3250 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.

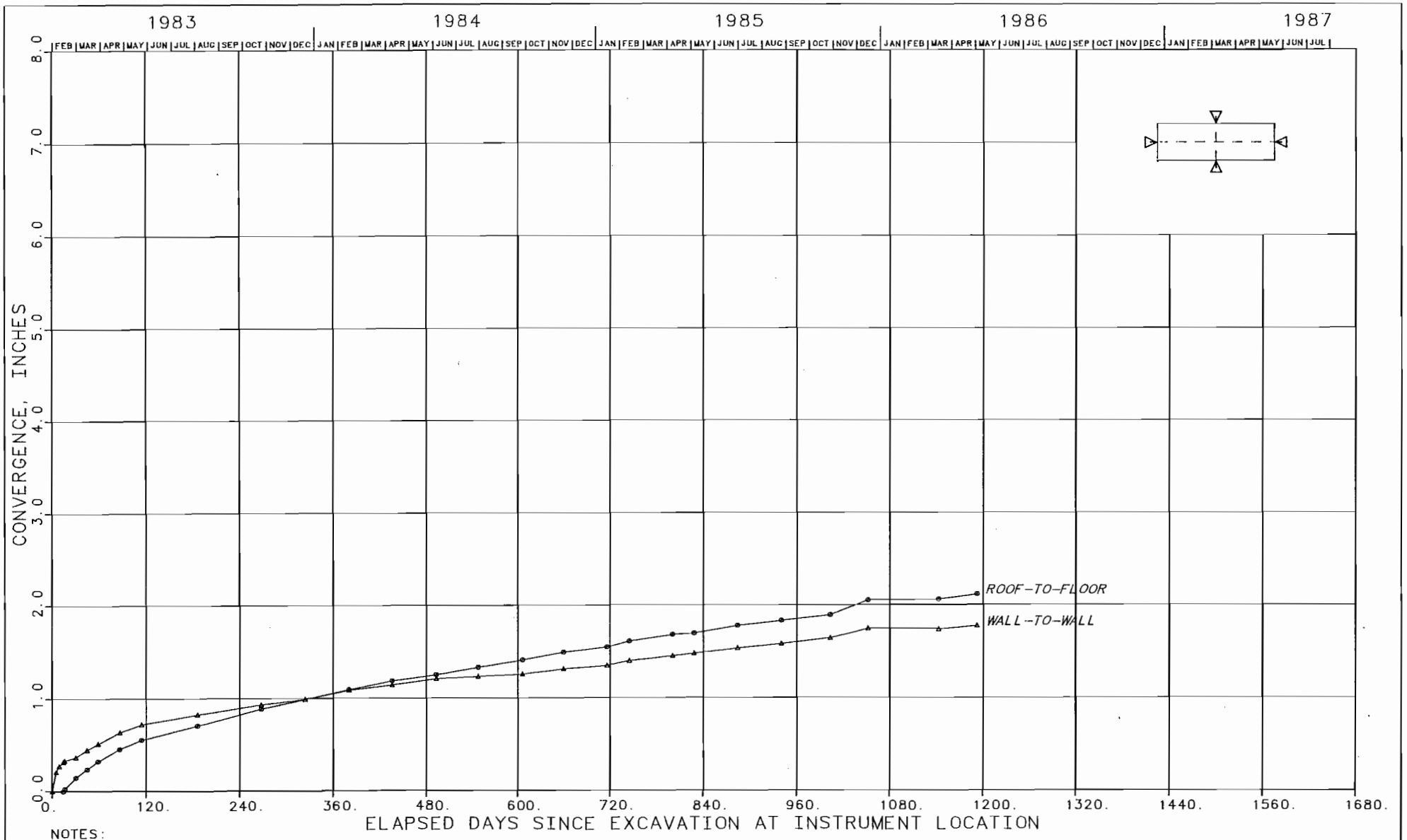
FIGURE J-251
CONVERGENCE POINTS
E140 DRIFT, SOUTH 3614 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.

FIGURE J-252
CONVERGENCE POINTS
E140 DRIFT, SOUTH 3639 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.

FIGURE J-253
CONVERGENCE POINTS
E140 DRIFT, SOUTH 3664 FT
CONVERGENCE VS. TIME SINCE EXCAVATION

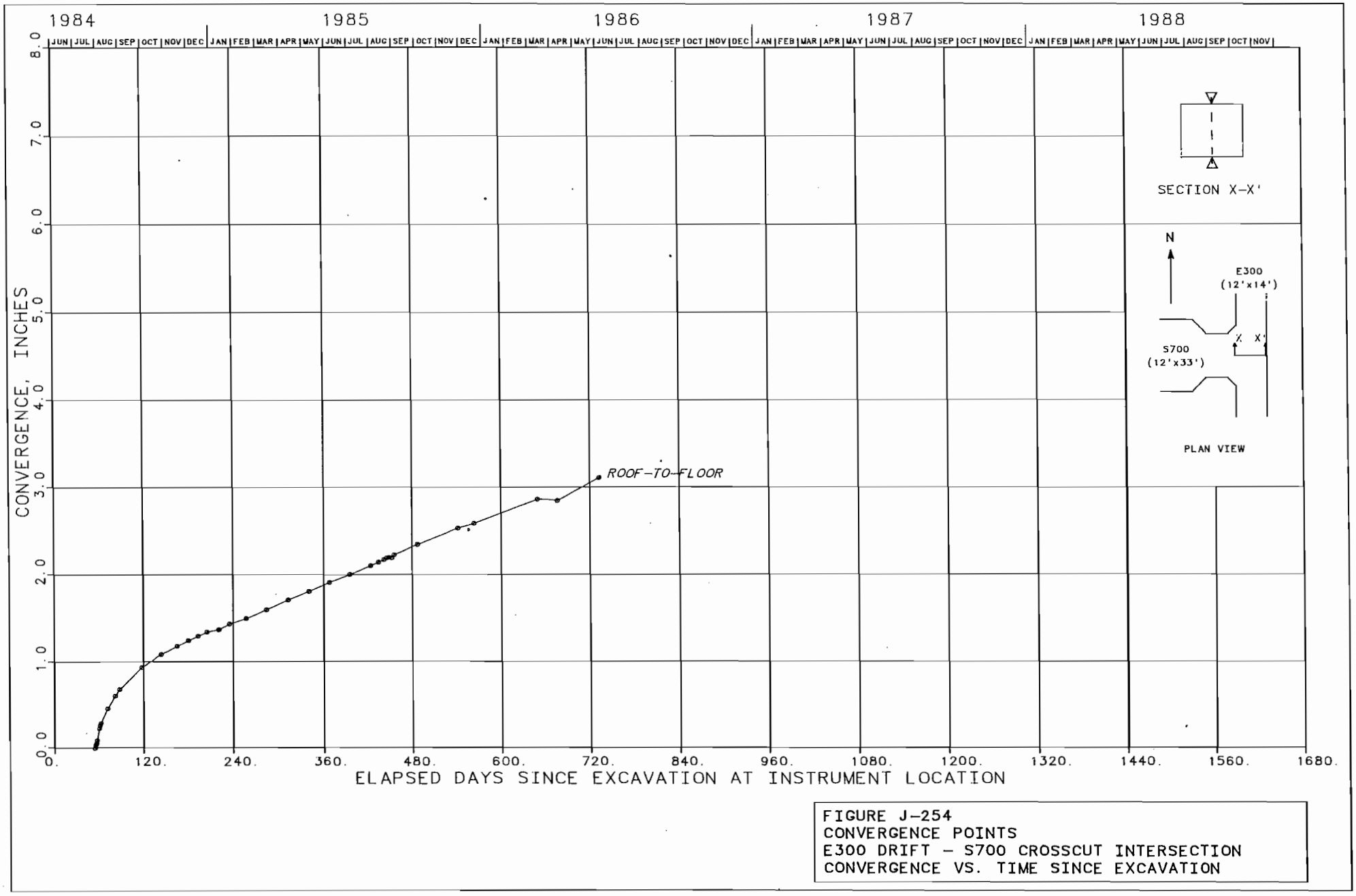
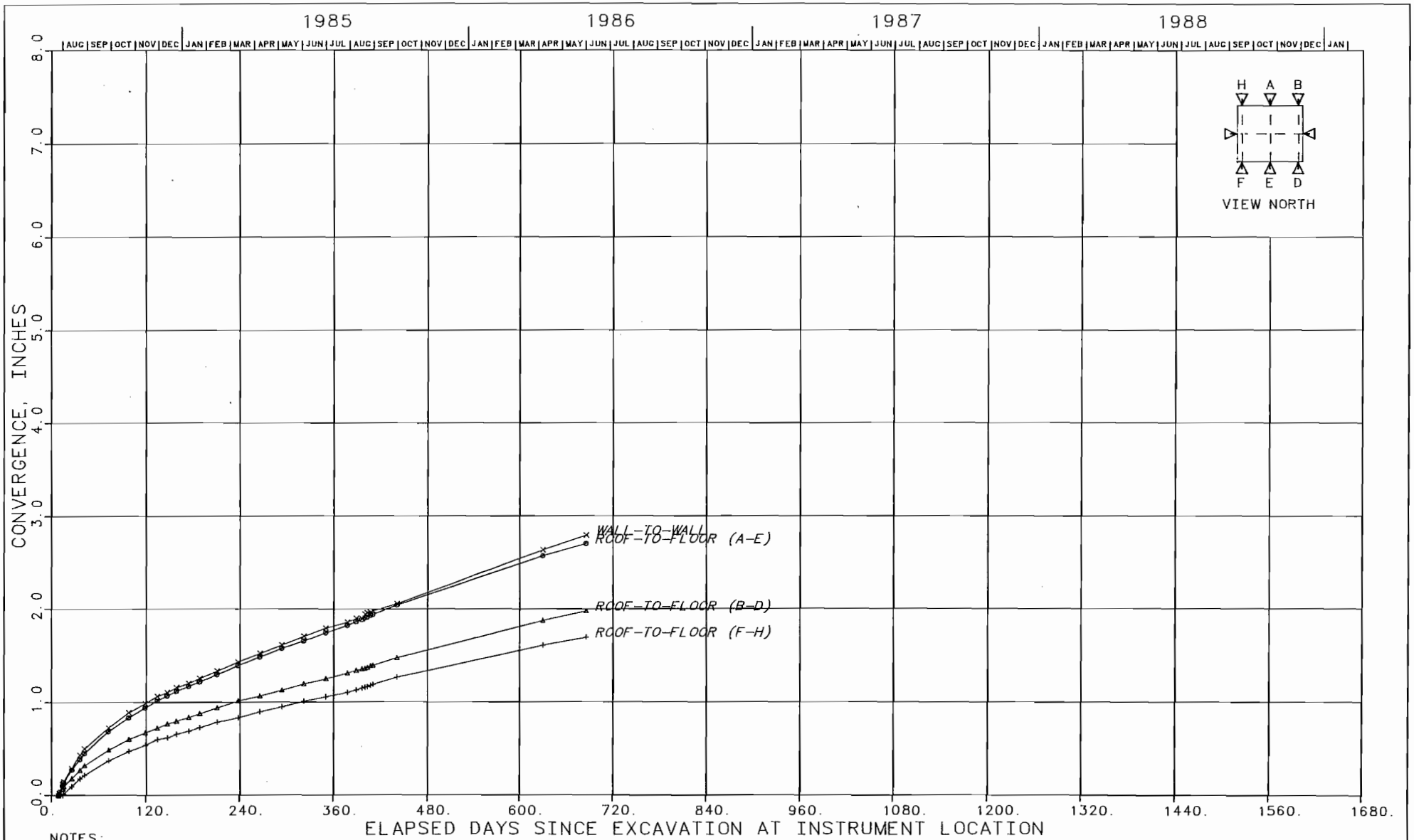


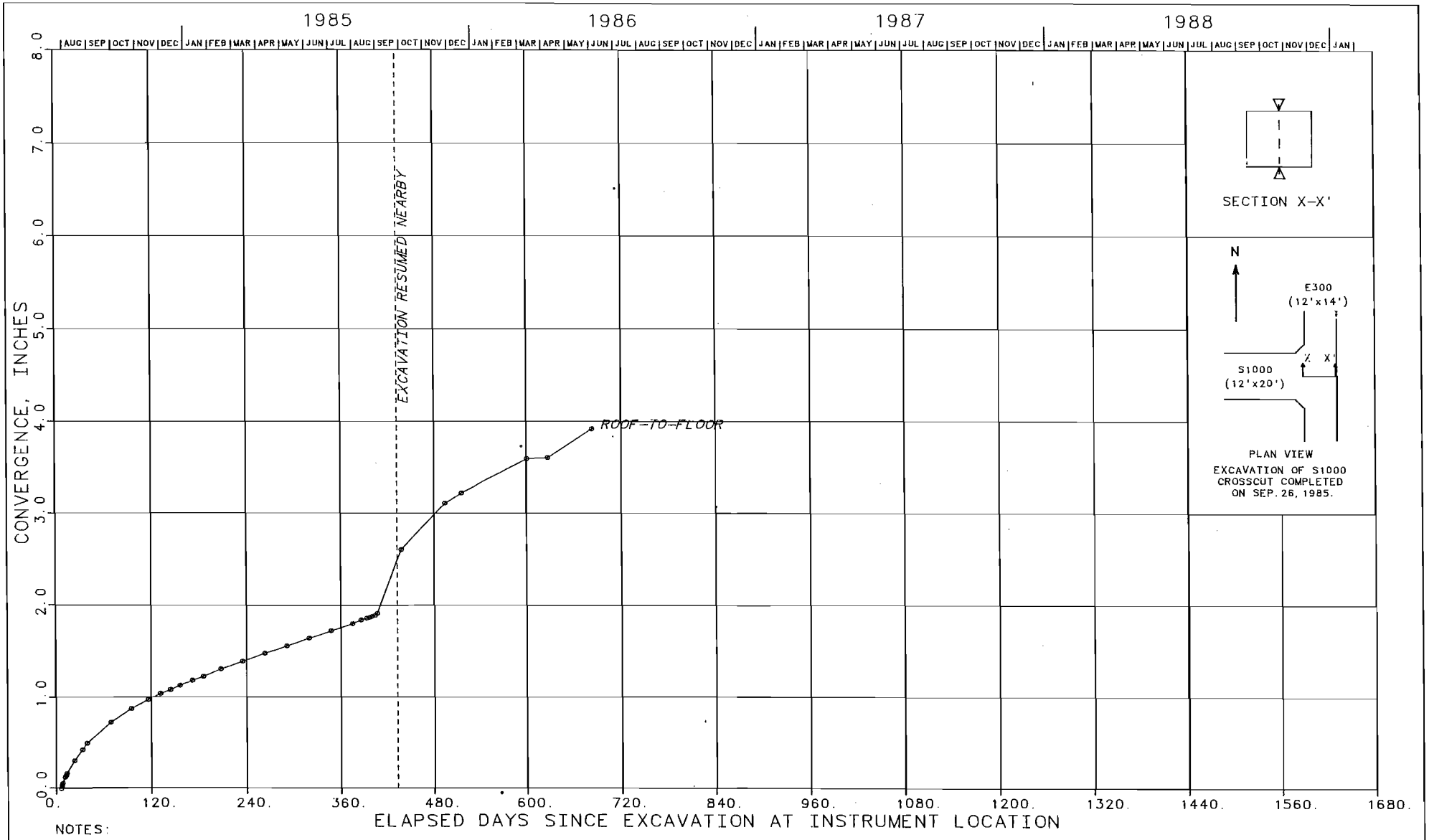
FIGURE J-254
CONVERGENCE POINTS
E300 DRIFT - S700 CROSSCUT INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

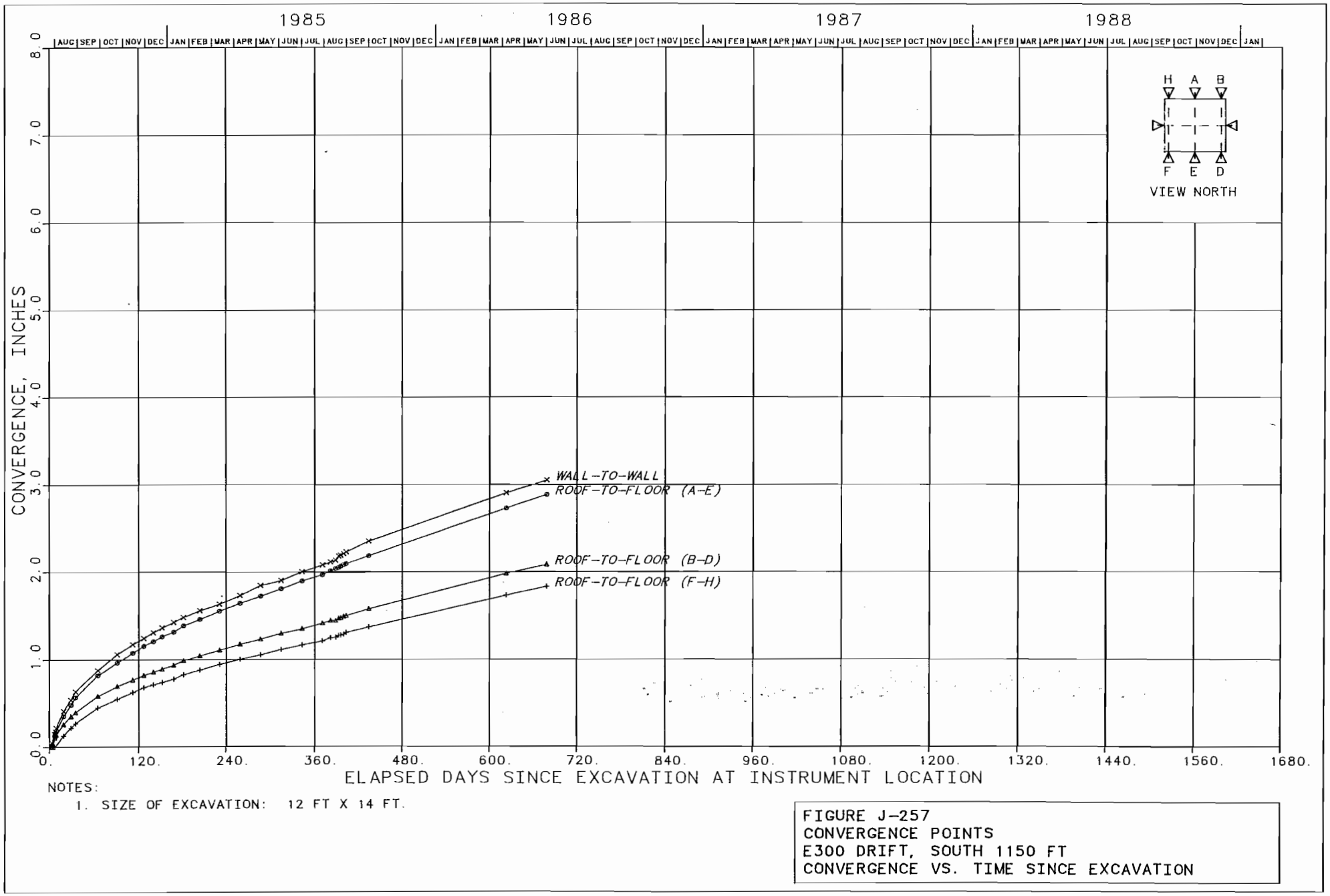
FIGURE J-255
CONVERGENCE POINTS
E300 DRIFT, SOUTH 850 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

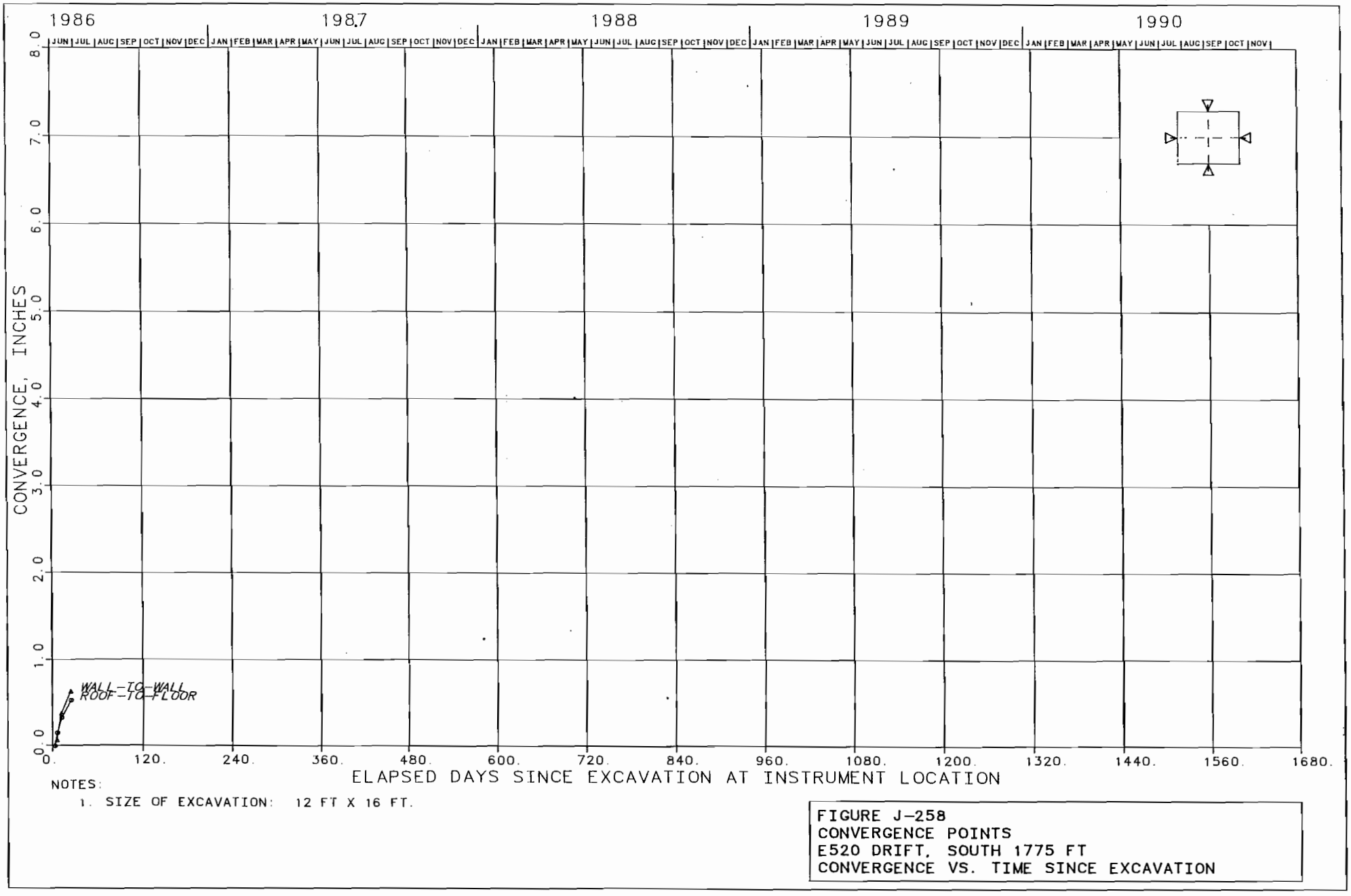
FIGURE J-256
CONVERGENCE POINTS
E300 DRIFT - S1000 CROSSCUT INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

FIGURE J-257
CONVERGENCE POINTS
E300 DRIFT, SOUTH 1150 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 16 FT.

FIGURE J-258
CONVERGENCE POINTS
E520 DRIFT, SOUTH 1775 FT
CONVERGENCE VS. TIME SINCE EXCAVATION

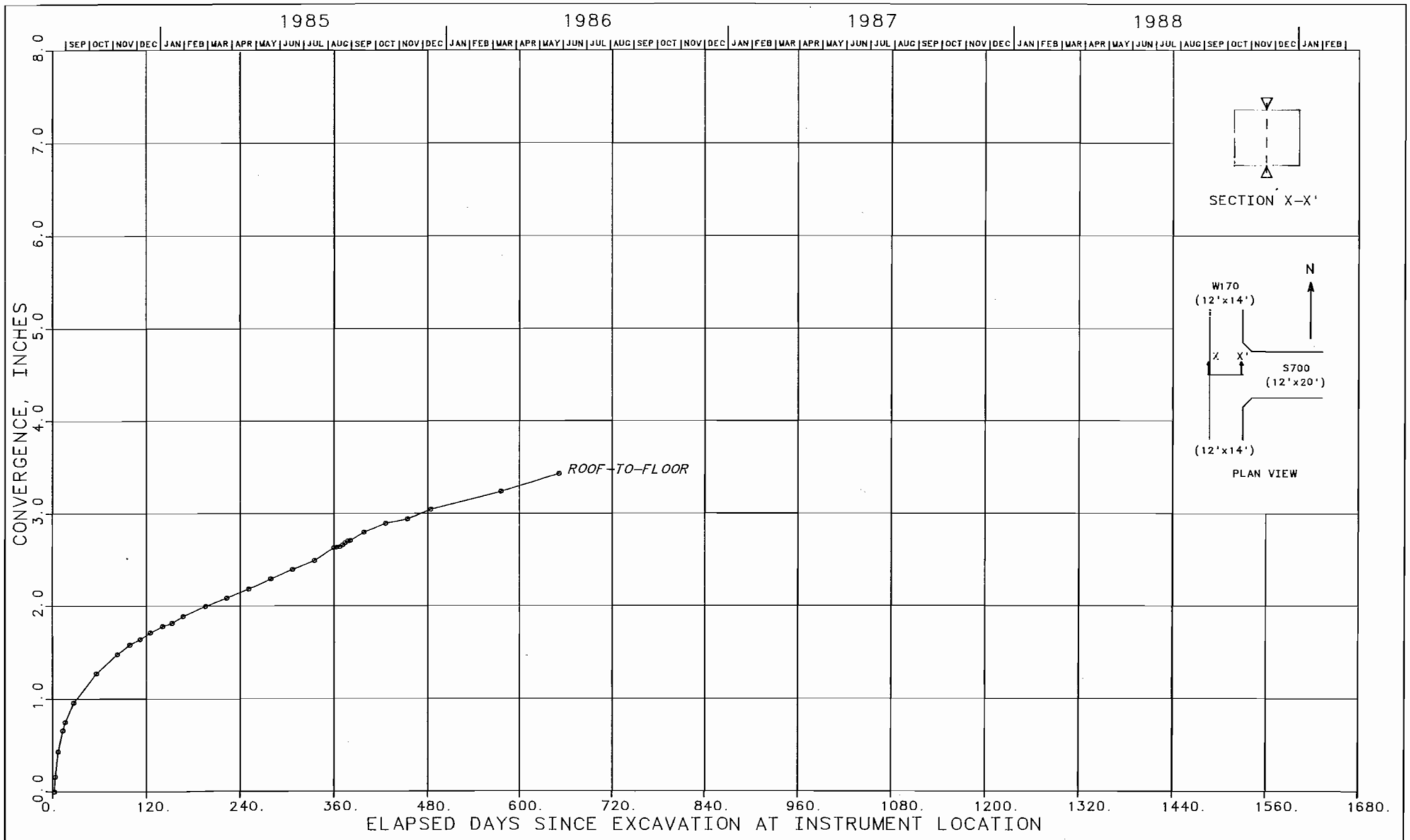
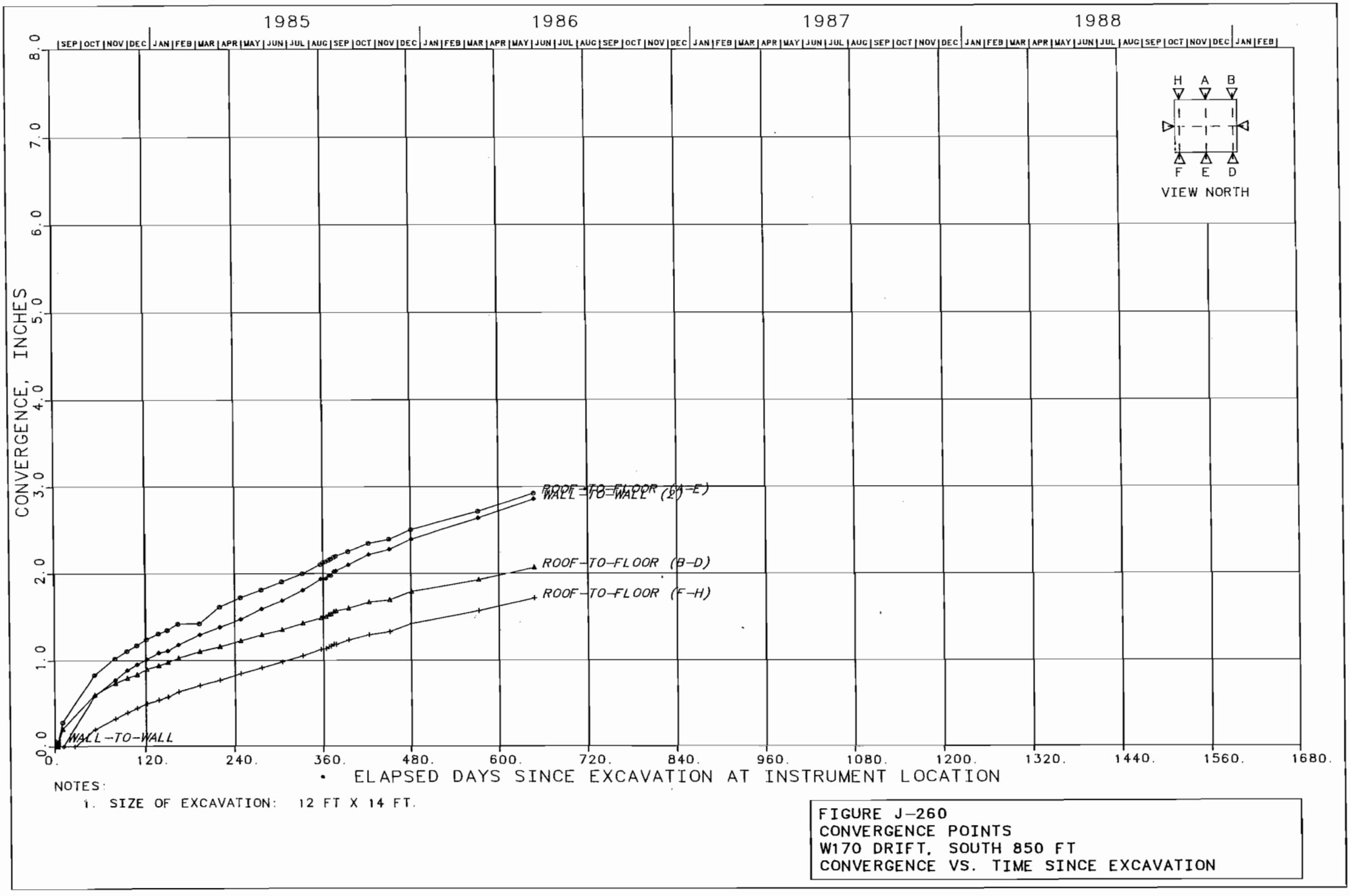


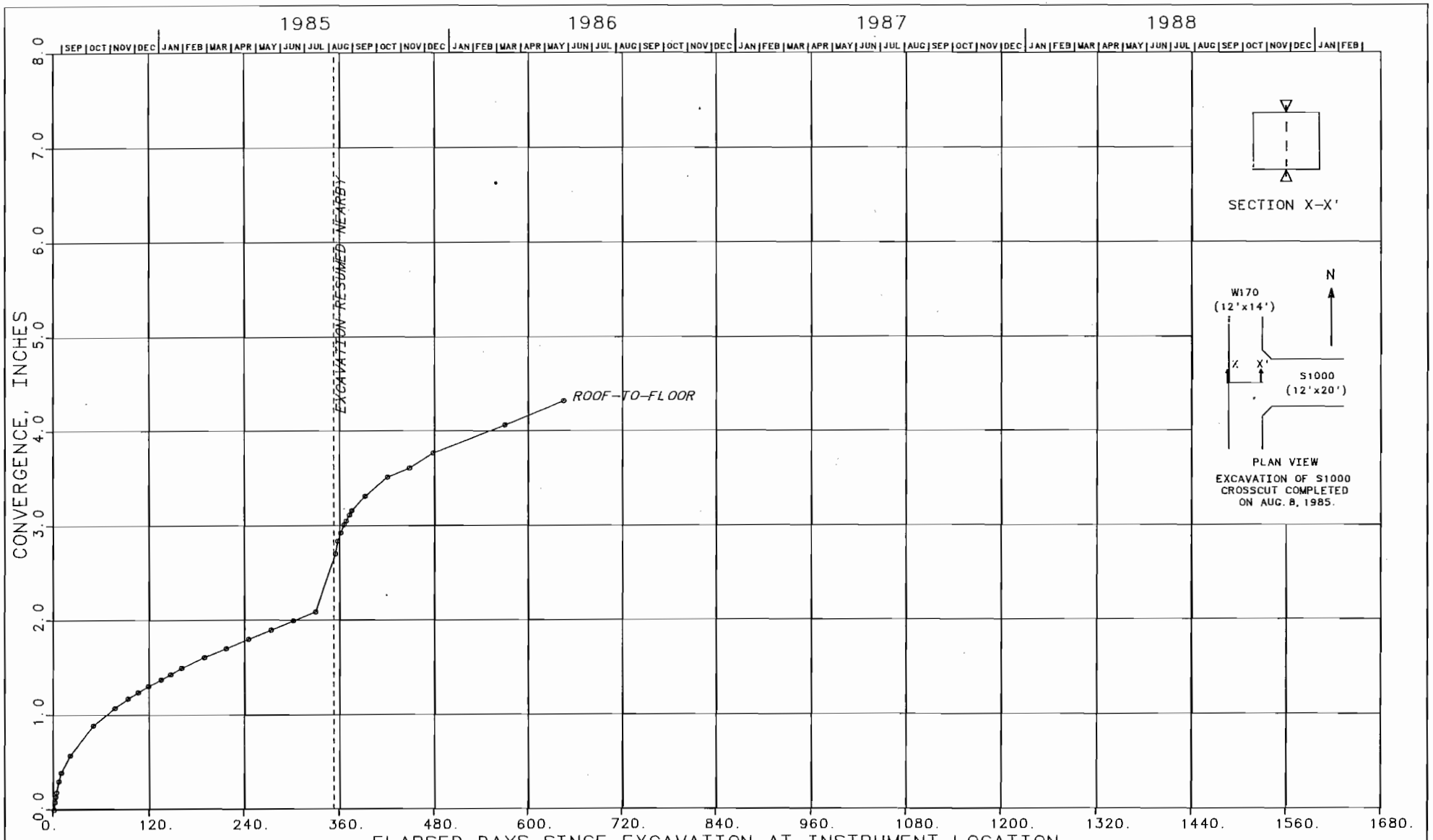
FIGURE J-259
CONVERGENCE POINTS
W170 DRIFT - S700 CROSSCUT INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

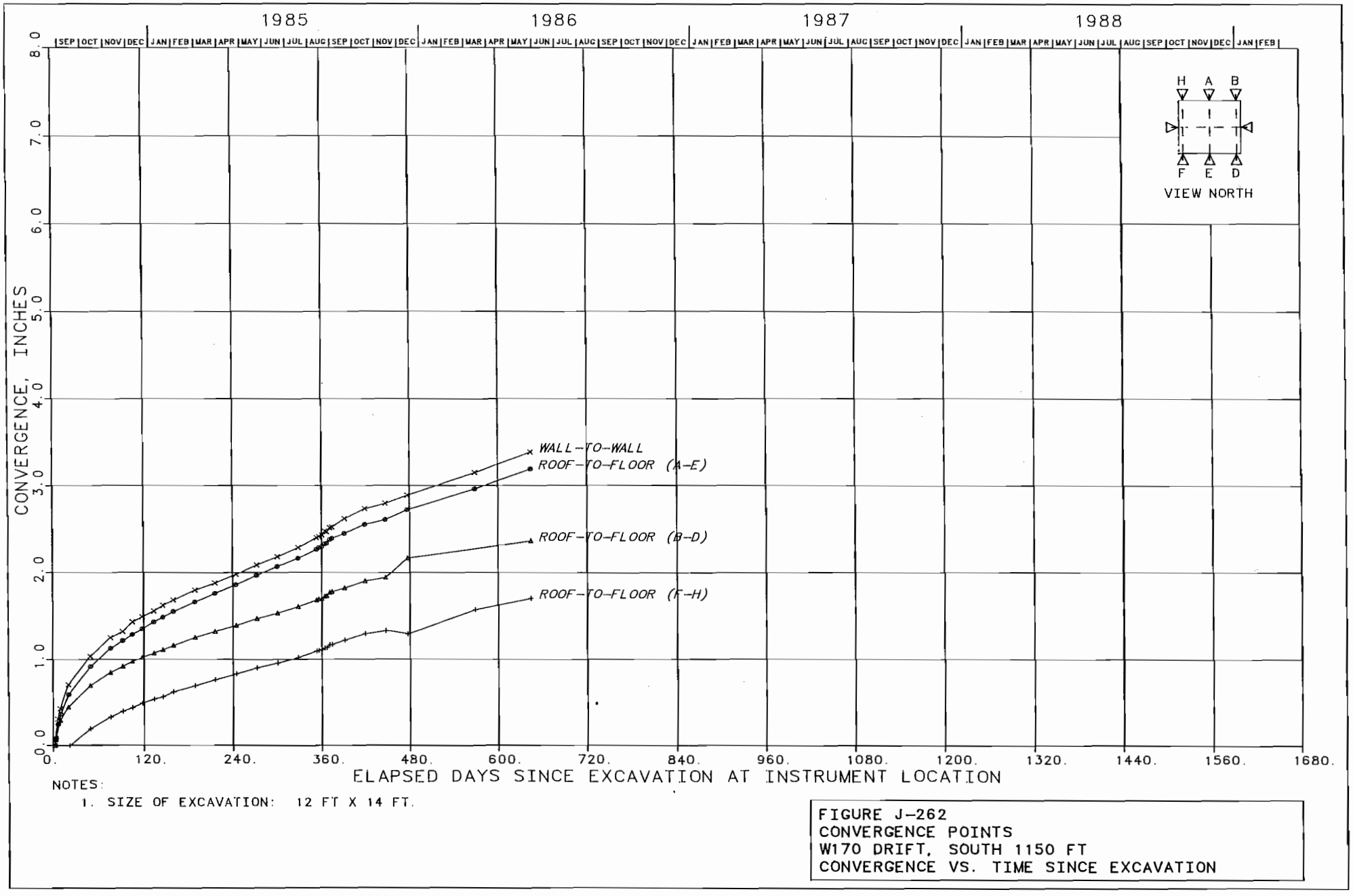
FIGURE J-260
CONVERGENCE POINTS
W170 DRIFT, SOUTH 850 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

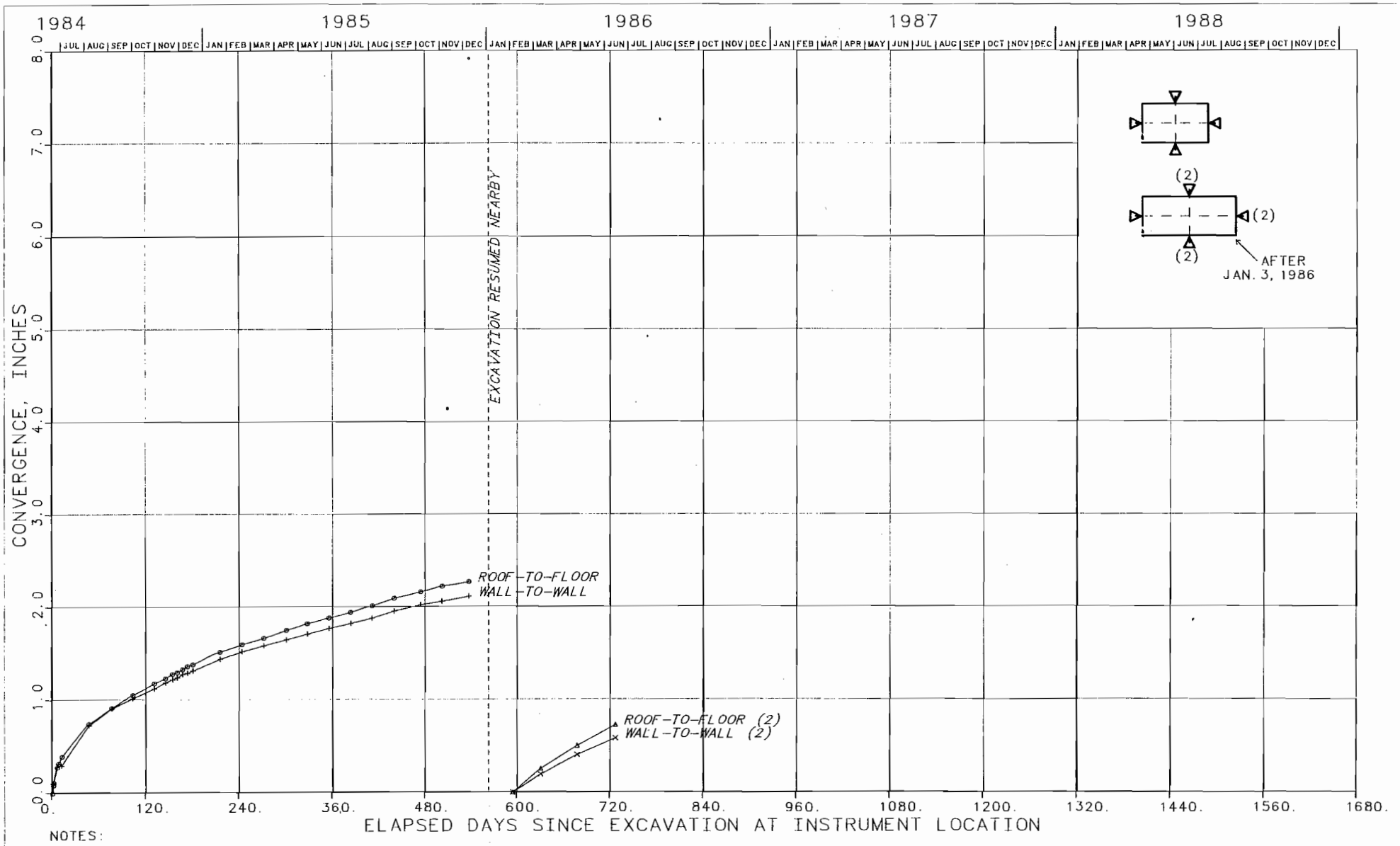
FIGURE J-261
CONVERGENCE POINTS
W170 DRIFT - S1000 CROSSCUT INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

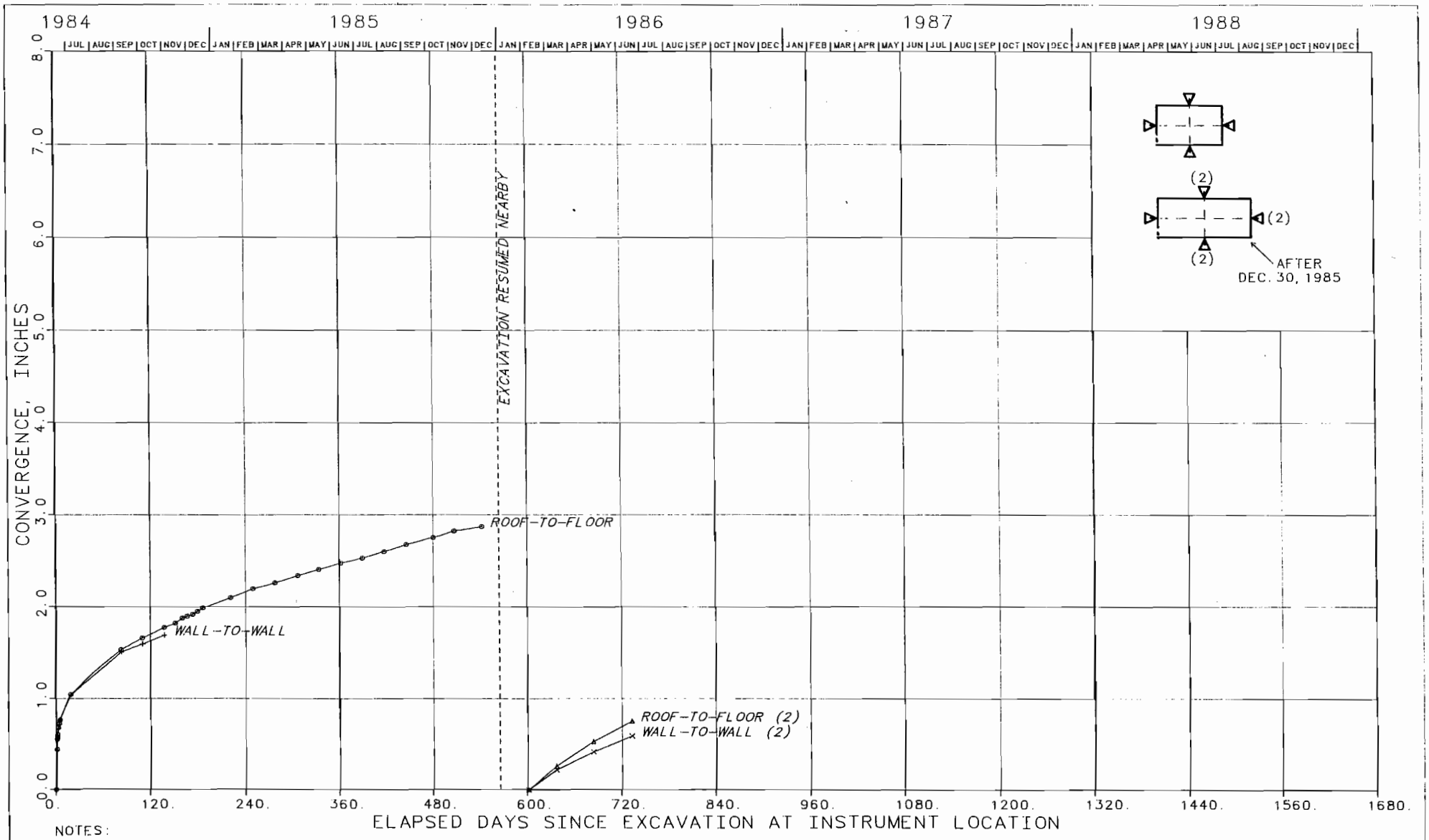
FIGURE J-262
CONVERGENCE POINTS
W170 DRIFT, SOUTH 1150 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8.5 FT X 20 FT.

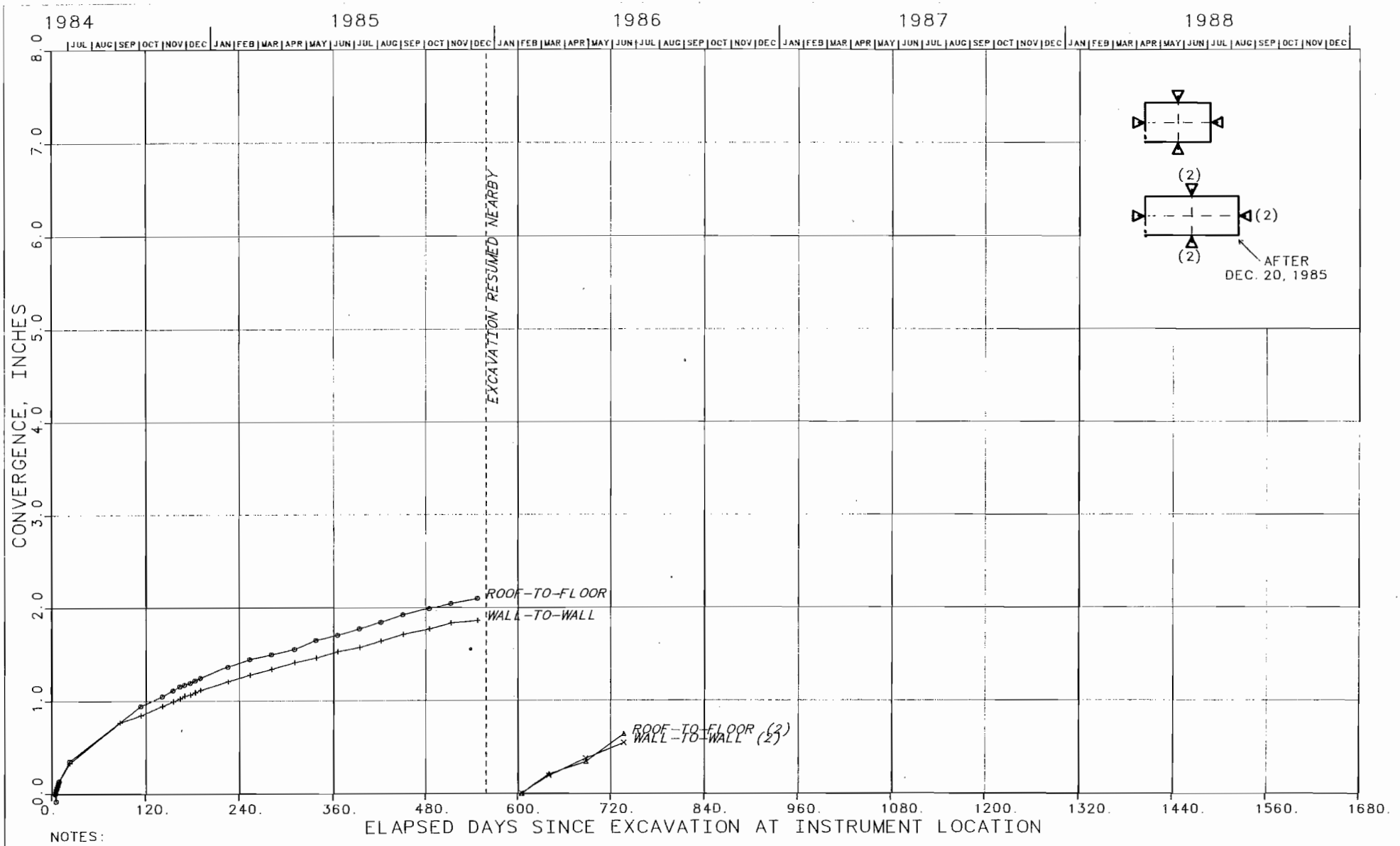
FIGURE J-263
CONVERGENCE POINTS
N1100 DRIFT, WEST 1347 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8.5 FT X 20 FT.

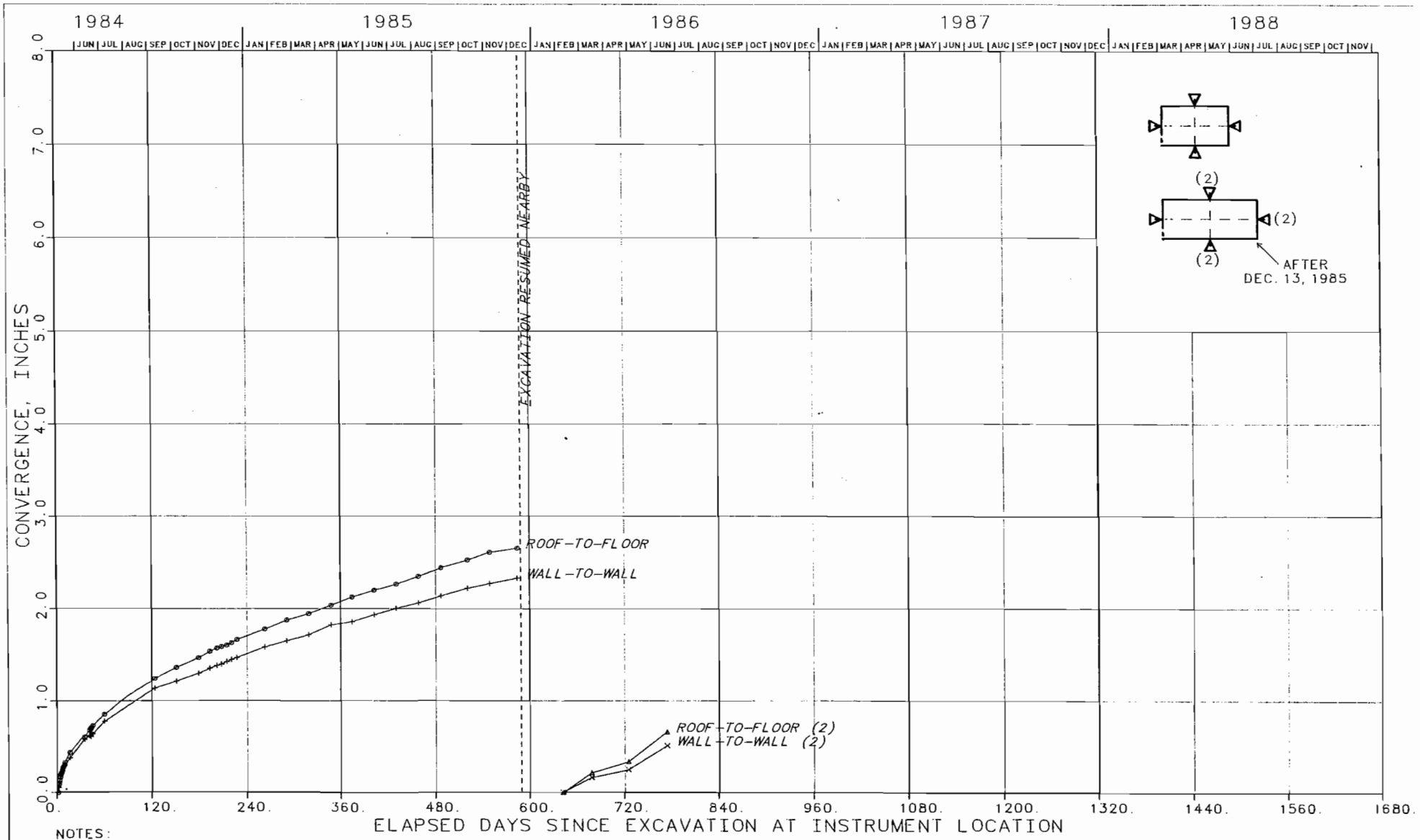
FIGURE J-264
CONVERGENCE POINTS
N1100 DRIFT, WEST 1159 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8.5 FT X 20 FT.

FIGURE J-265
CONVERGENCE POINTS
N1100 DRIFT, WEST 951 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8.5 FT X 20 FT.

FIGURE J-266
CONVERGENCE POINTS
N1100 DRIFT, WEST 783 FT
CONVERGENCE VS. TIME SINCE EXCAVATION

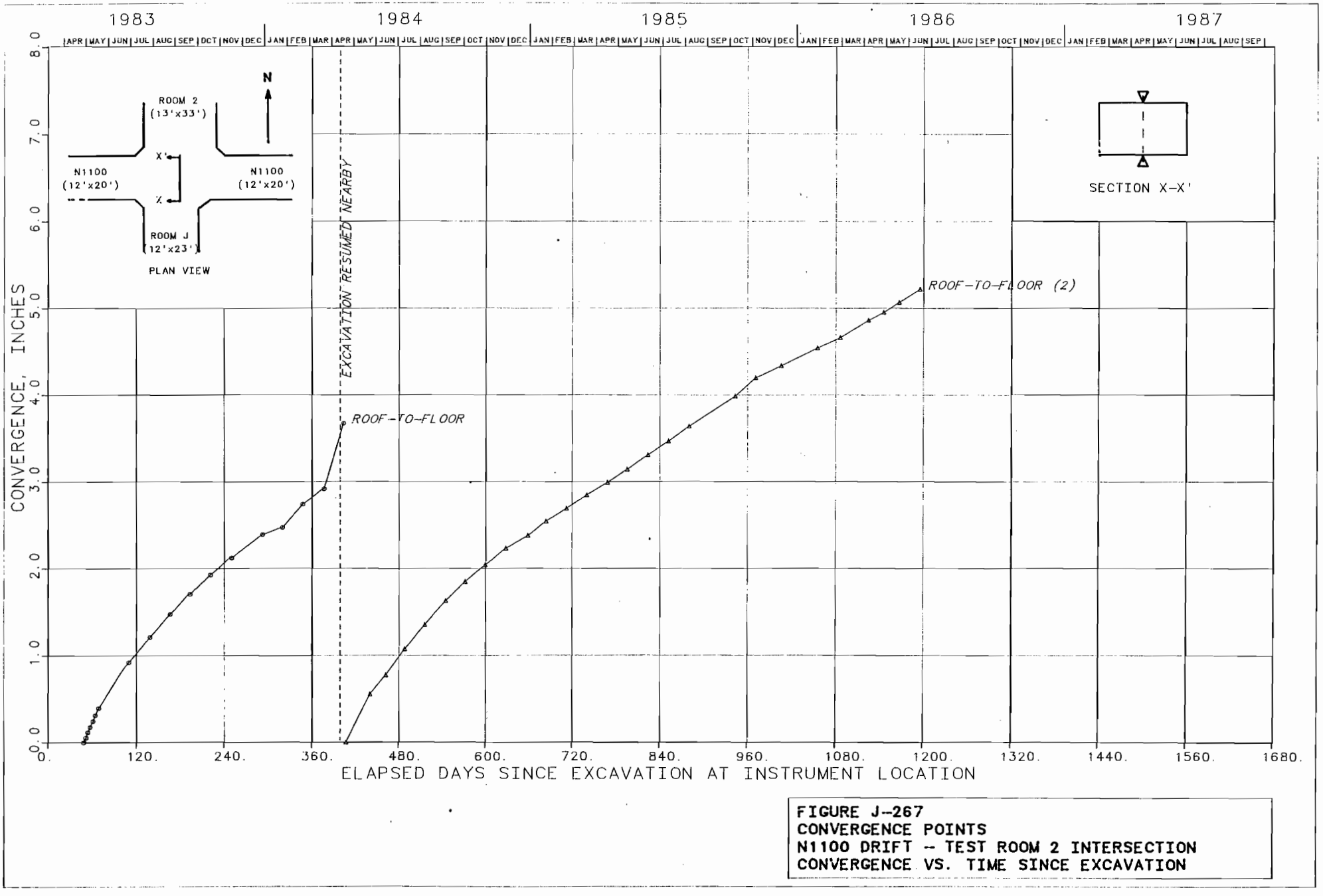
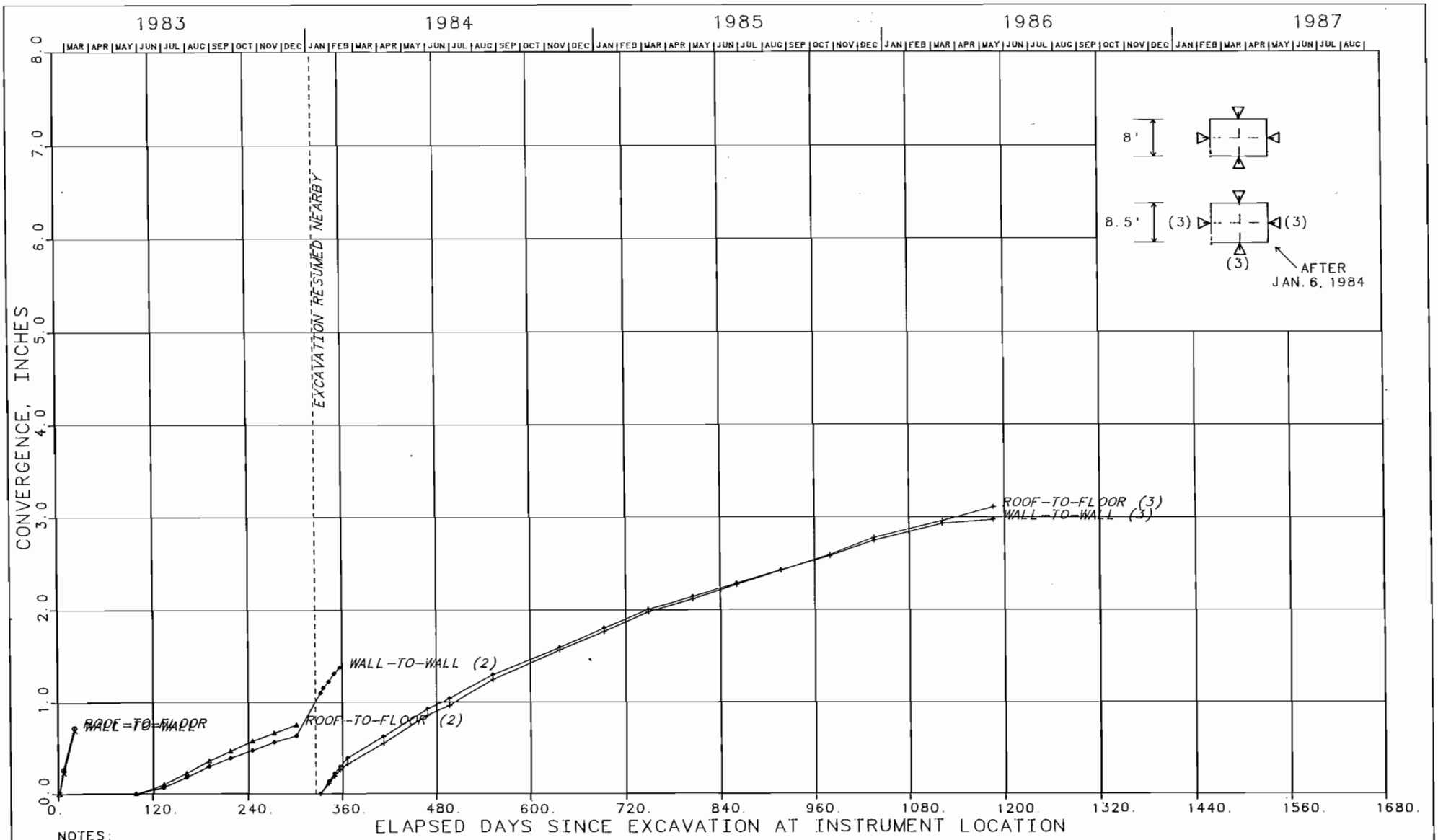


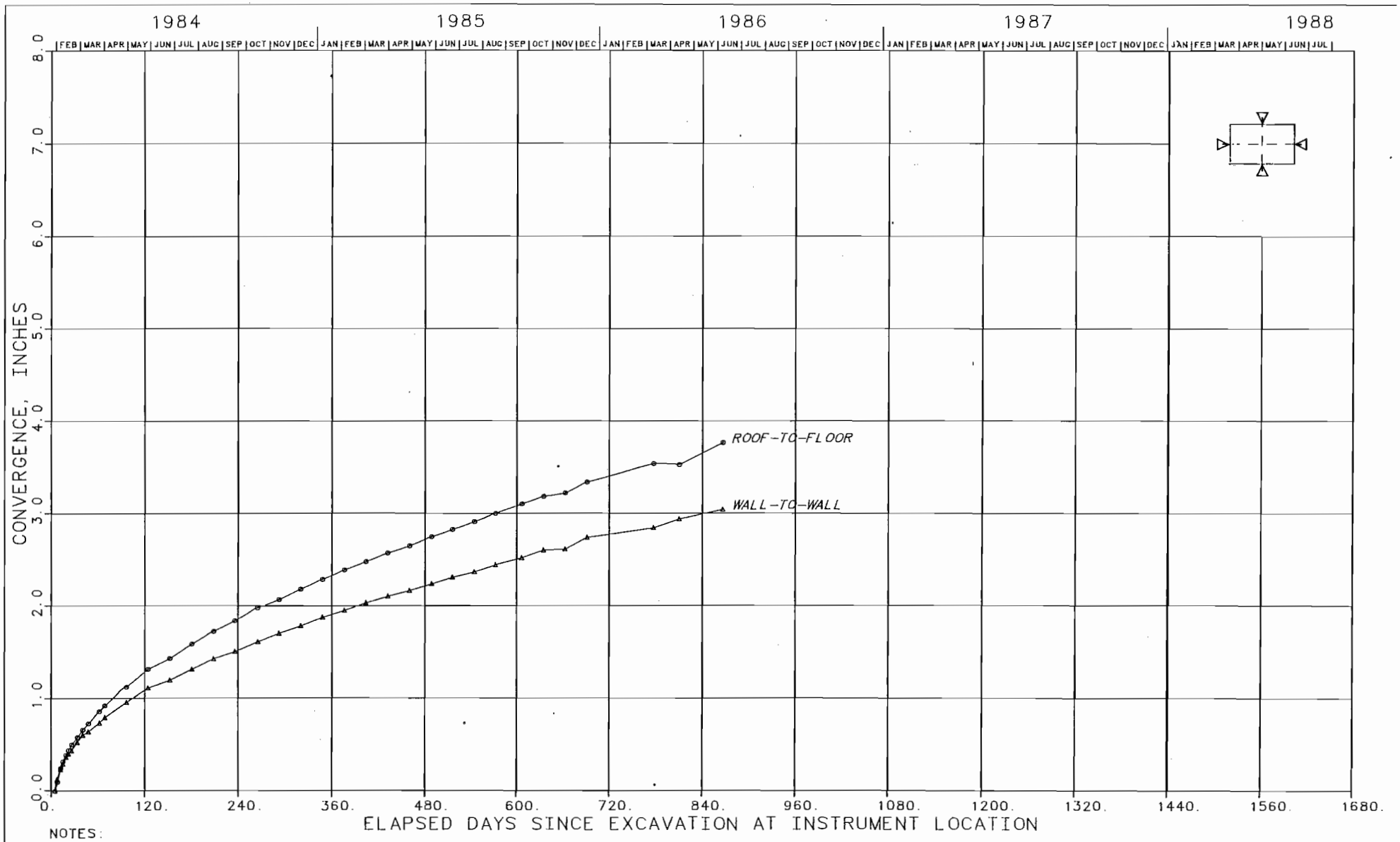
FIGURE J-267
CONVERGENCE POINTS
N1100 DRIFT -- TEST ROOM 2 INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8.5 FT X 12 FT.

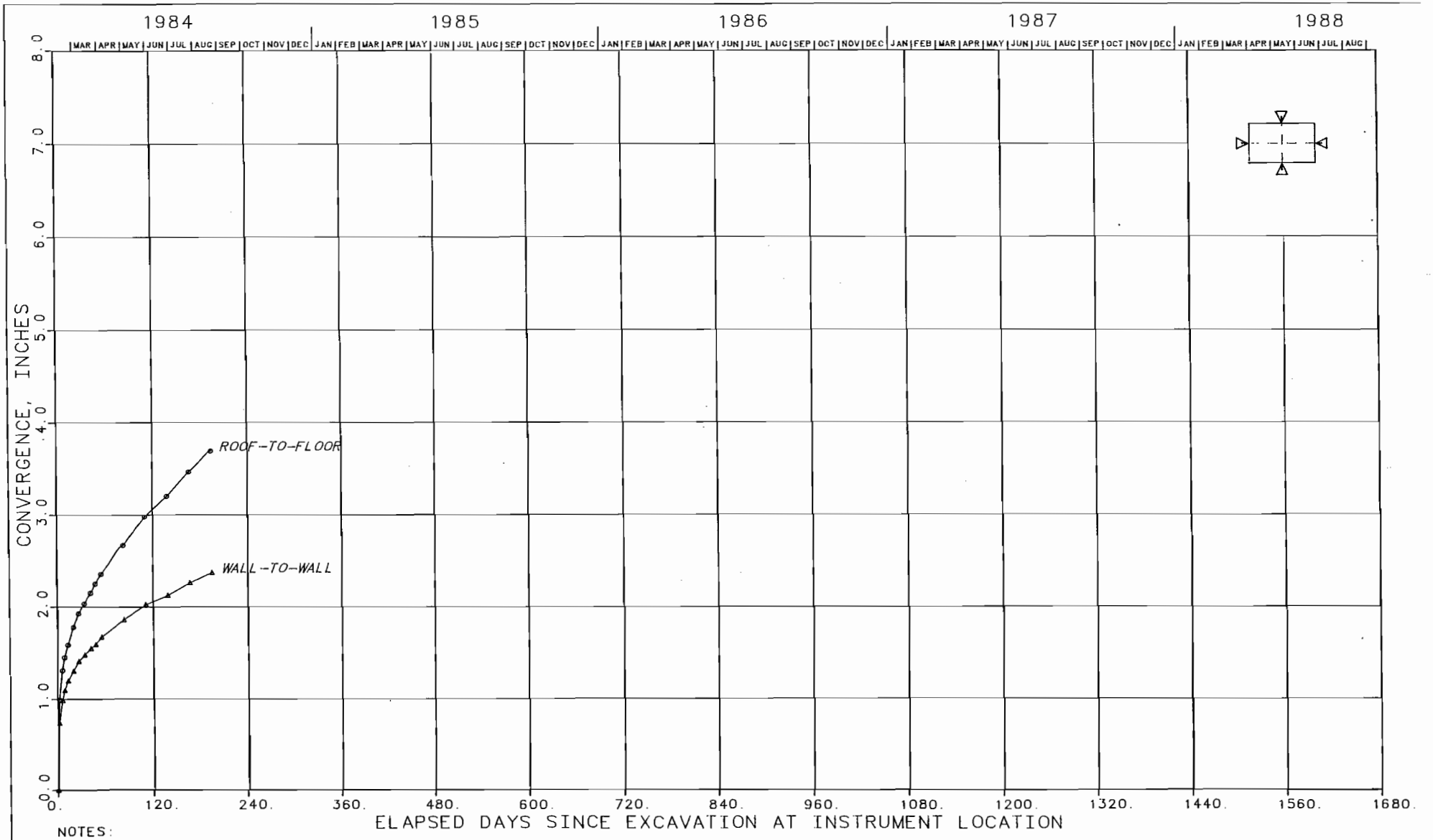
FIGURE J-268
CONVERGENCE POINTS
N1100 DRIFT, EAST 80 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8.5 FT X 14 FT.

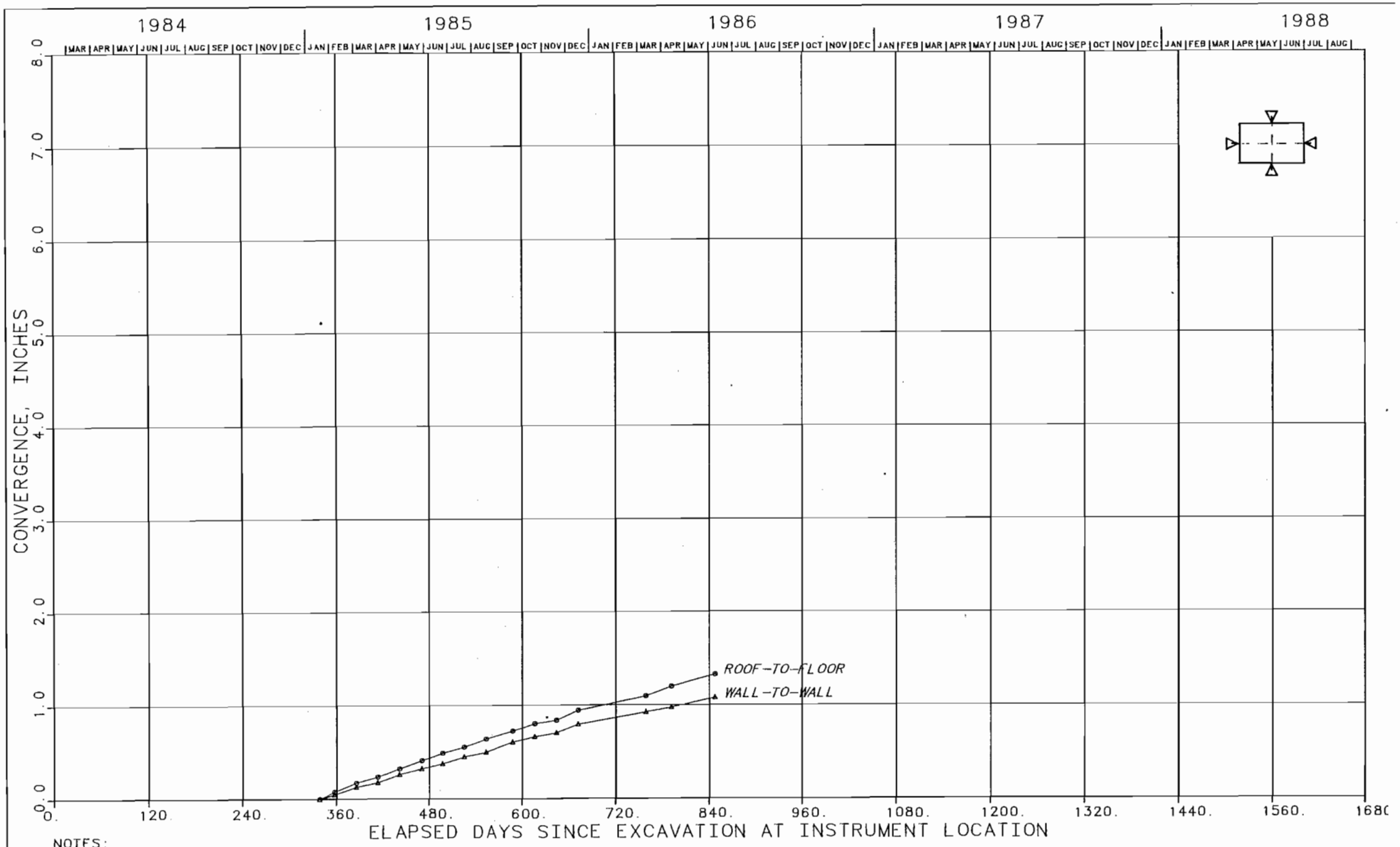
FIGURE J-269
CONVERGENCE POINTS
N1100 DRIFT, EAST 319 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8.5 FT X 14 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

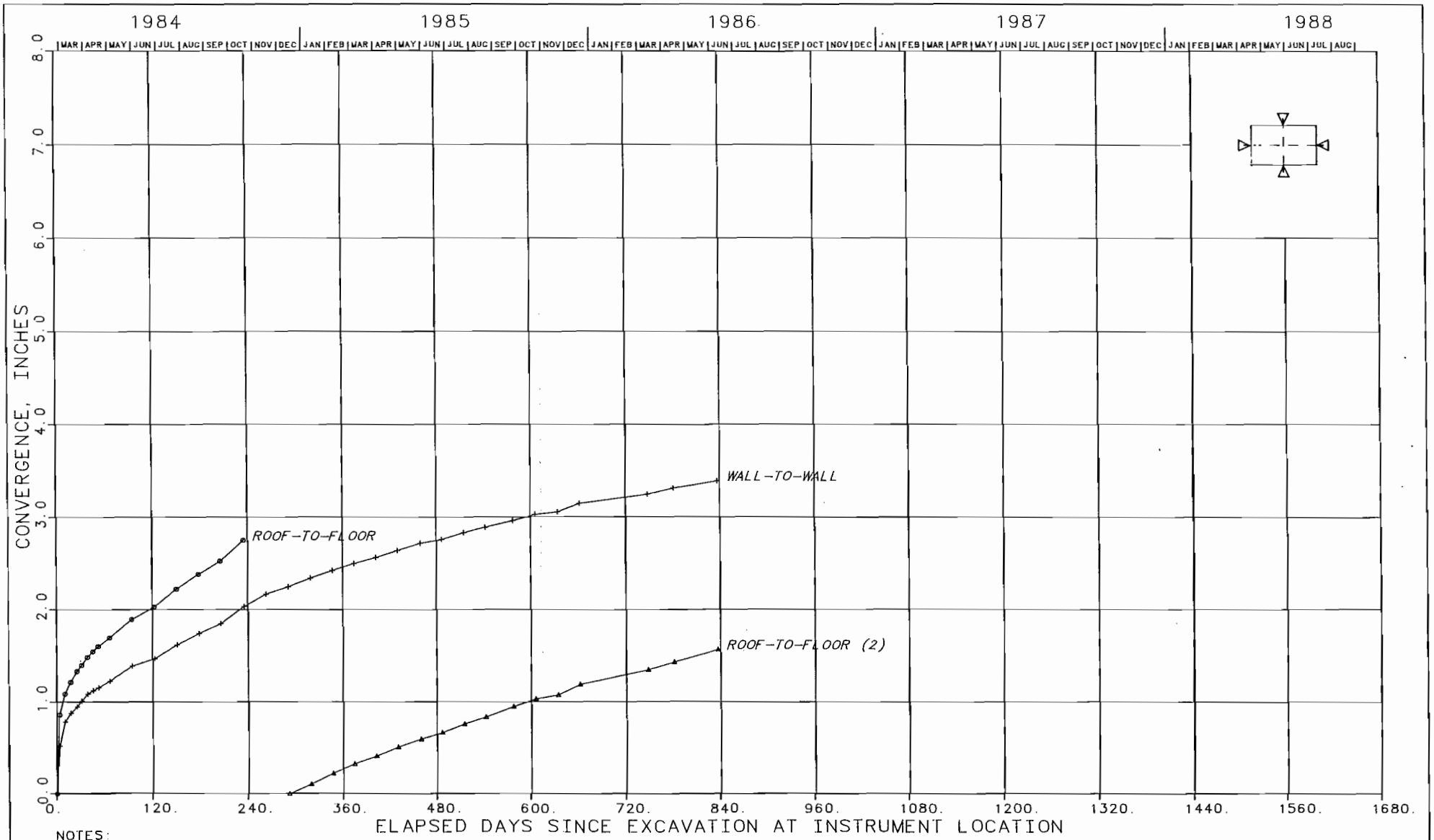
FIGURE J-270
CONVERGENCE POINTS
N1100 DRIFT, EAST 691 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8.5 FT X 14 FT.

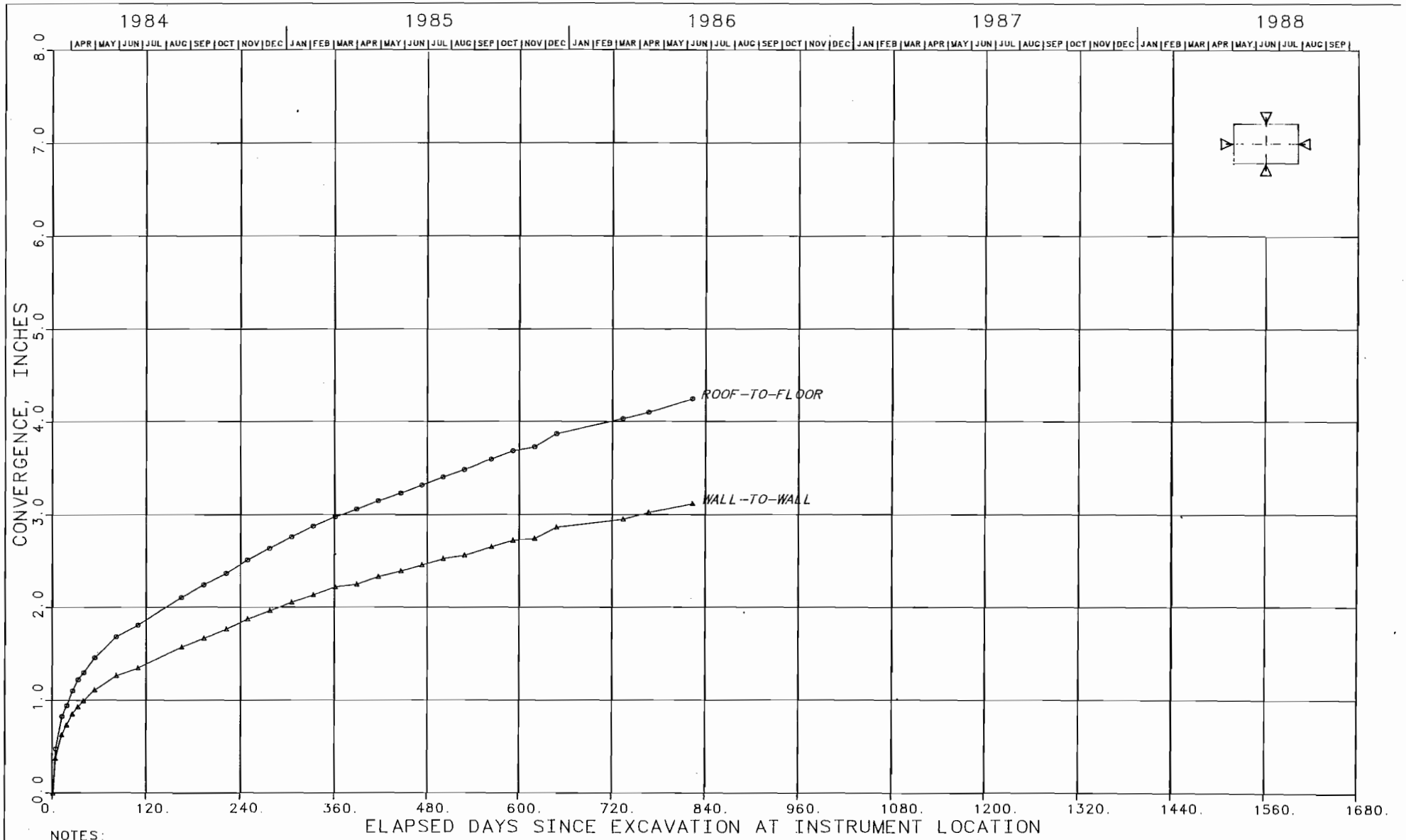
FIGURE J-271
CONVERGENCE POINTS
N1100 DRIFT, EAST 846 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8.5 FT X 14 FT.

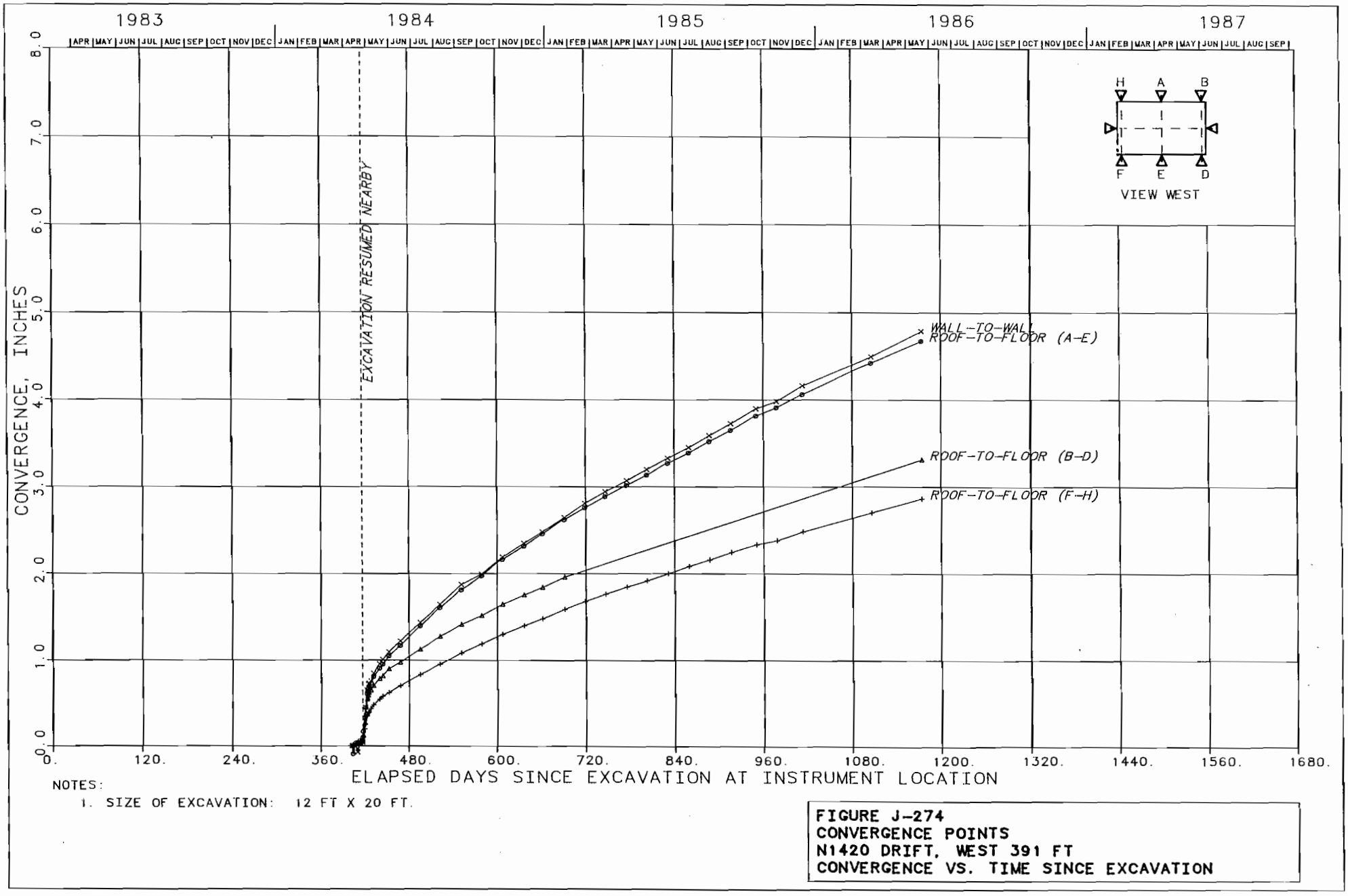
FIGURE J-272
CONVERGENCE POINTS
N1100 DRIFT, EAST 1135 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8.5 FT X 14 FT.

FIGURE J-273
CONVERGENCE POINTS
N1100 DRIFT, EAST 1582 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

FIGURE J-274
CONVERGENCE POINTS
N1420 DRIFT, WEST 391 FT
CONVERGENCE VS. TIME SINCE EXCAVATION

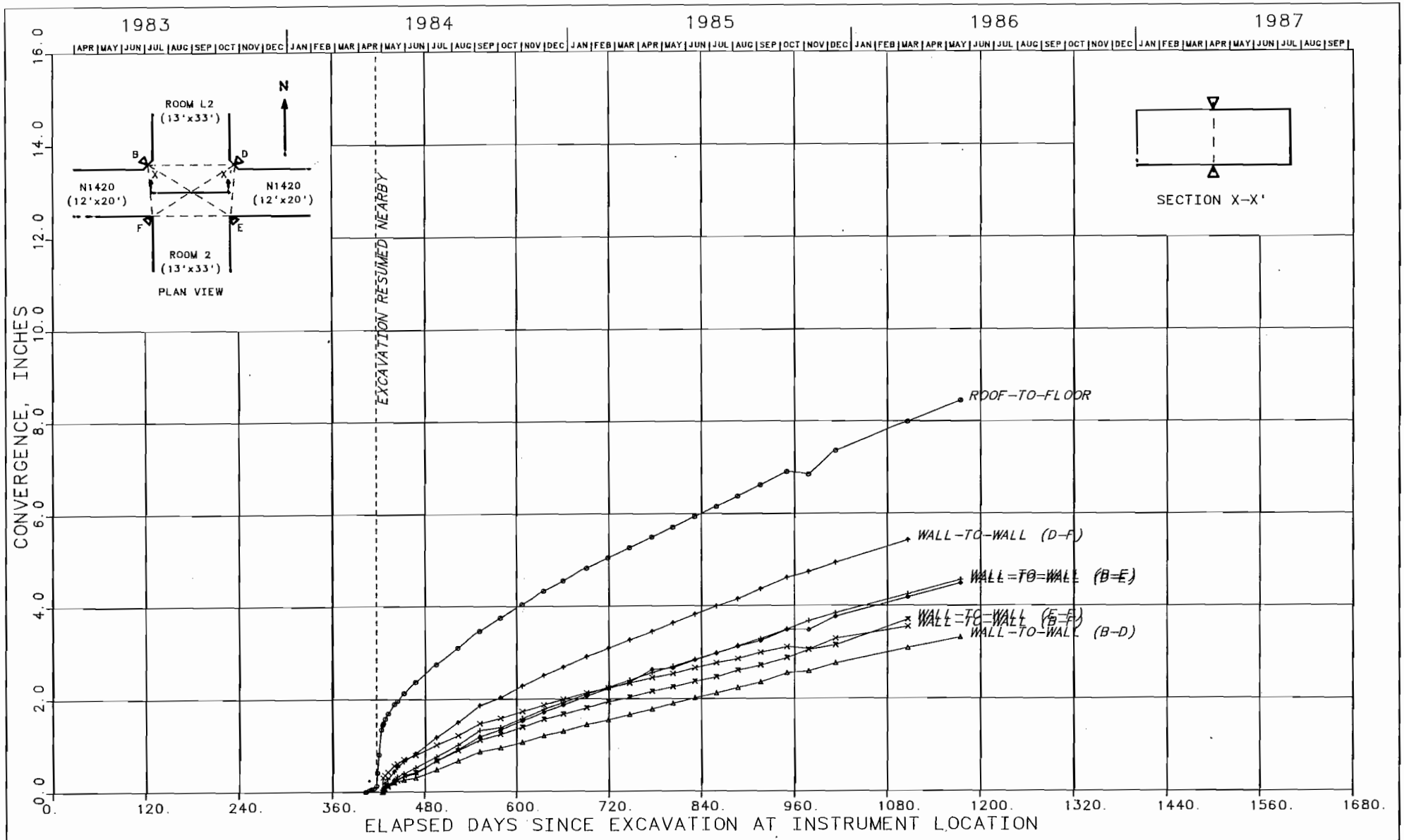
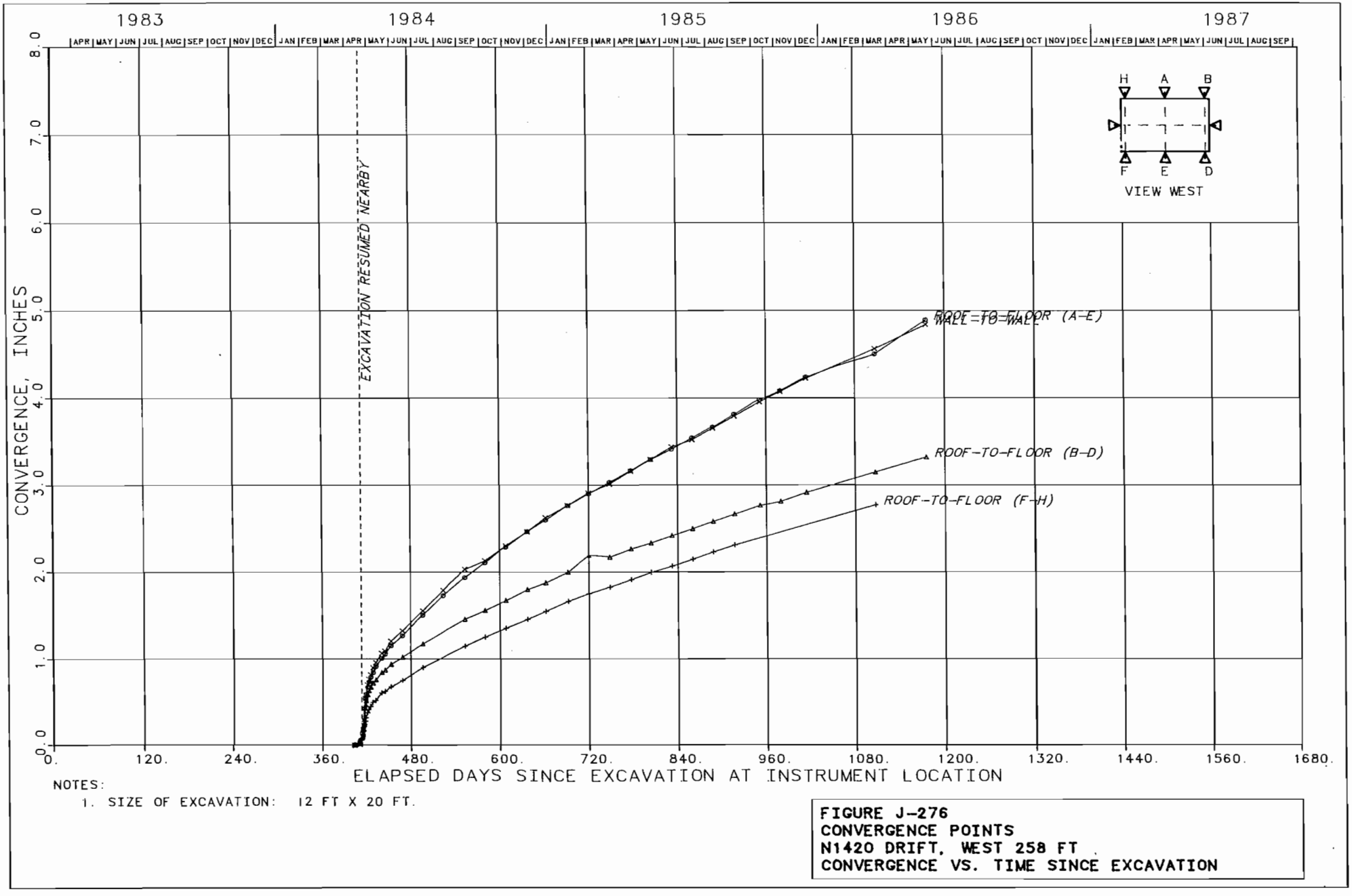


FIGURE J-275
CONVERGENCE POINTS
N1420 DRIFT - TEST ROOM 2 INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

FIGURE J-276
CONVERGENCE POINTS
N1420 DRIFT, WEST 258 FT
CONVERGENCE VS. TIME SINCE EXCAVATION

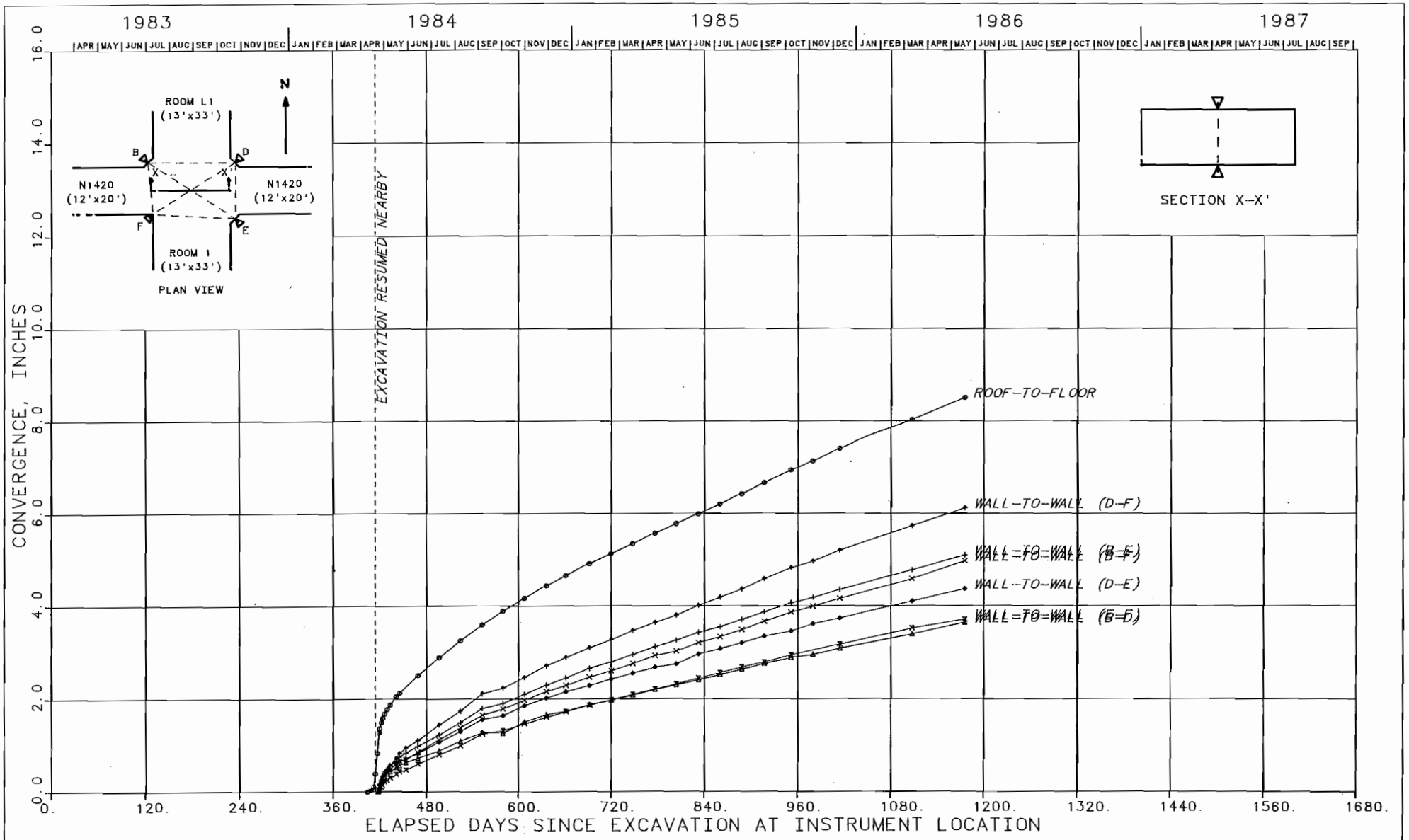
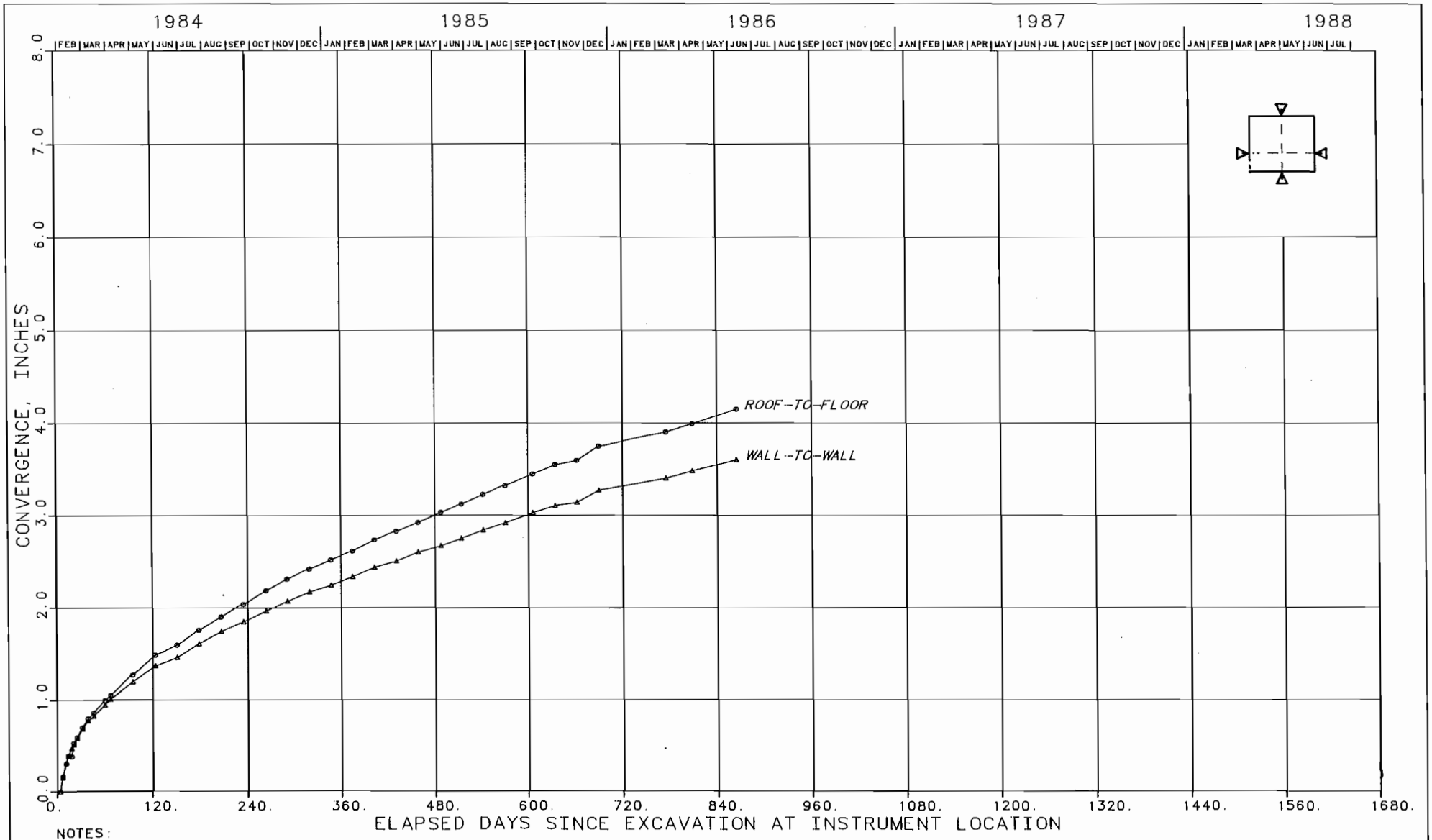


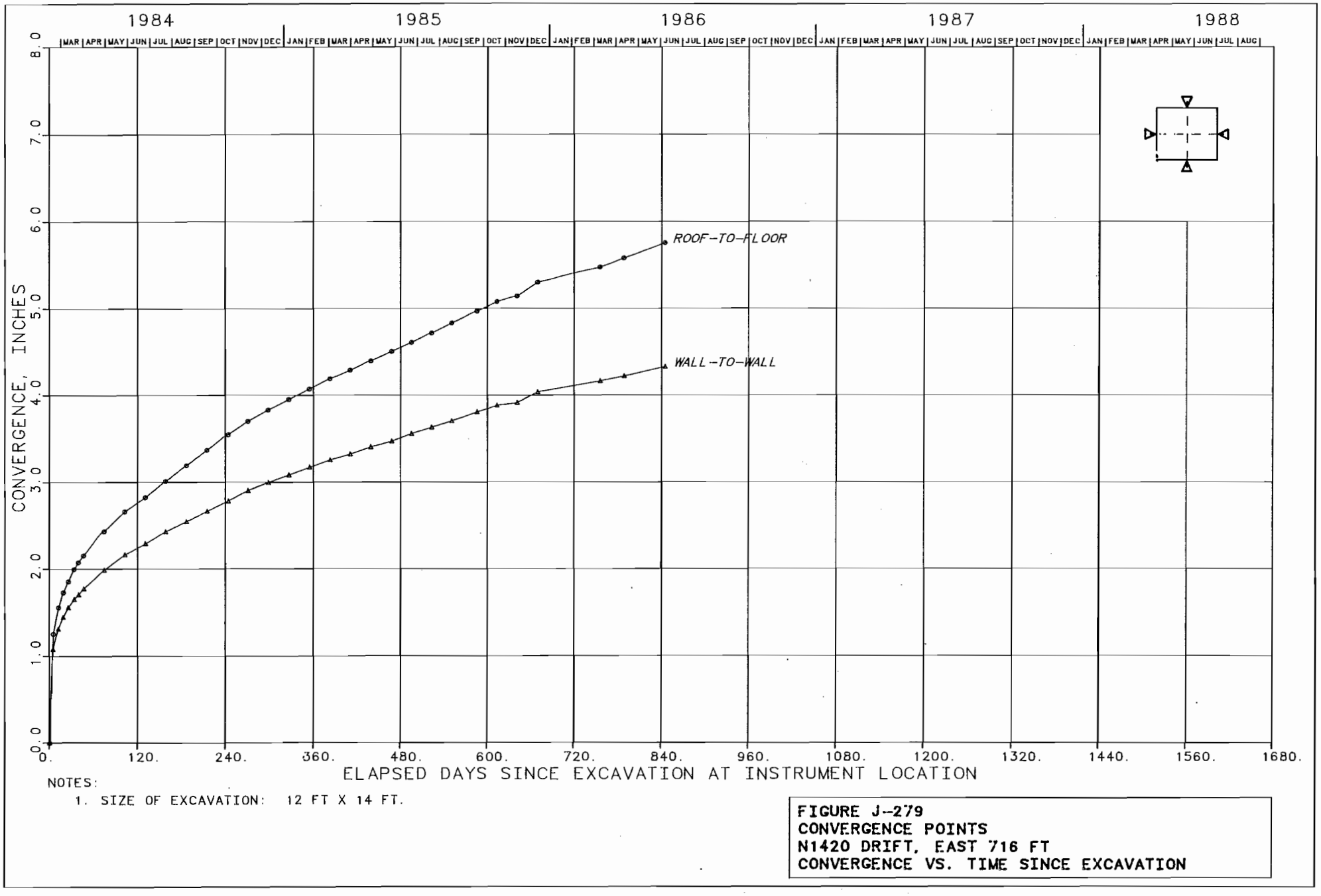
FIGURE J-277
CONVERGENCE POINTS
N1420 DRIFT - TEST ROOM 1 INTERSECTION
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

FIGURE J-278
CONVERGENCE POINTS
N1420 DRIFT, EAST 304 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

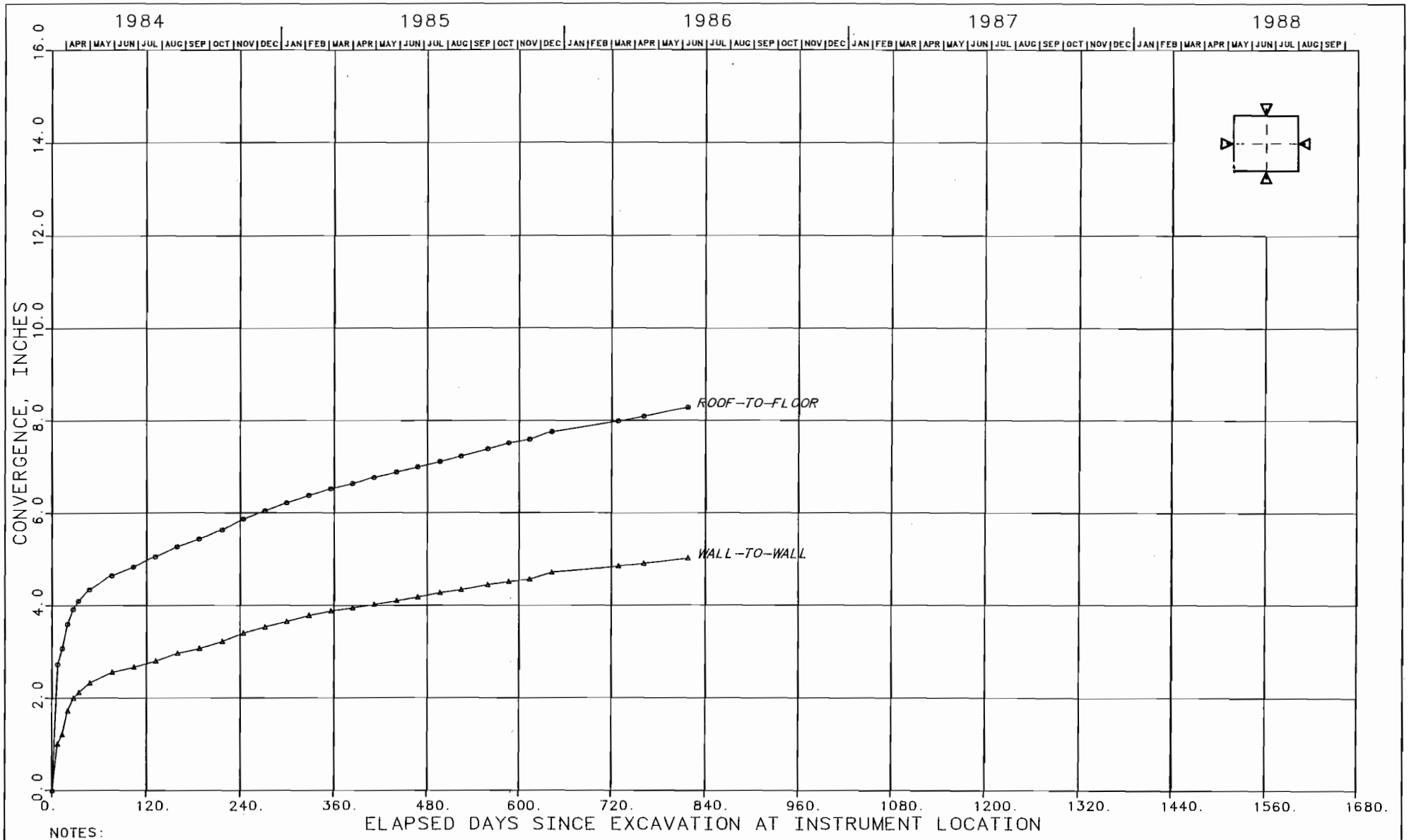
1. SIZE OF EXCAVATION: 12 FT X 14 FT.

FIGURE J-279
CONVERGENCE POINTS
N1420 DRIFT, EAST 716 FT
CONVERGENCE VS. TIME SINCE EXCAVATION

NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

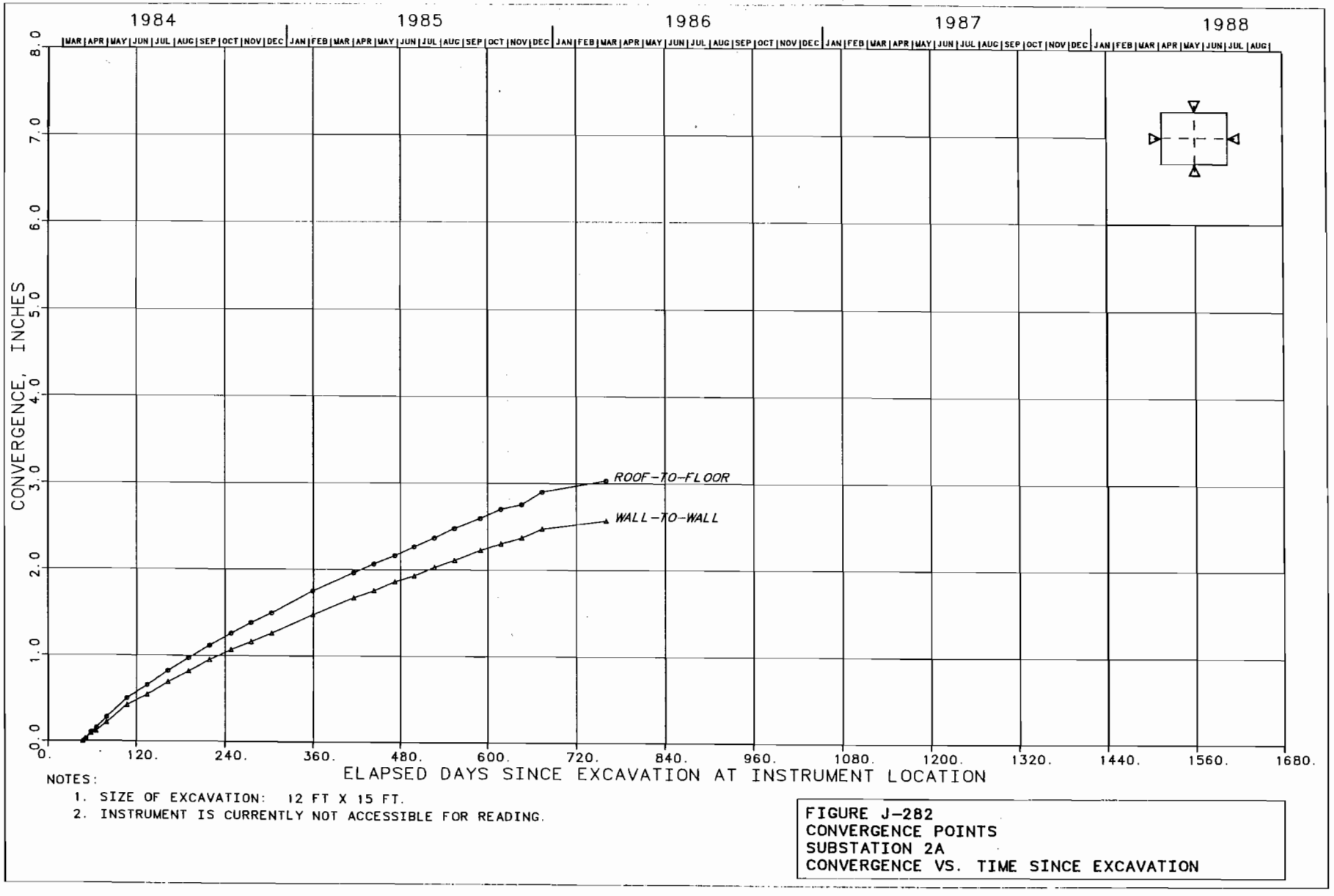
FIGURE J-280
CONVERGENCE POINTS
N1420 DRIFT, EAST 1106 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

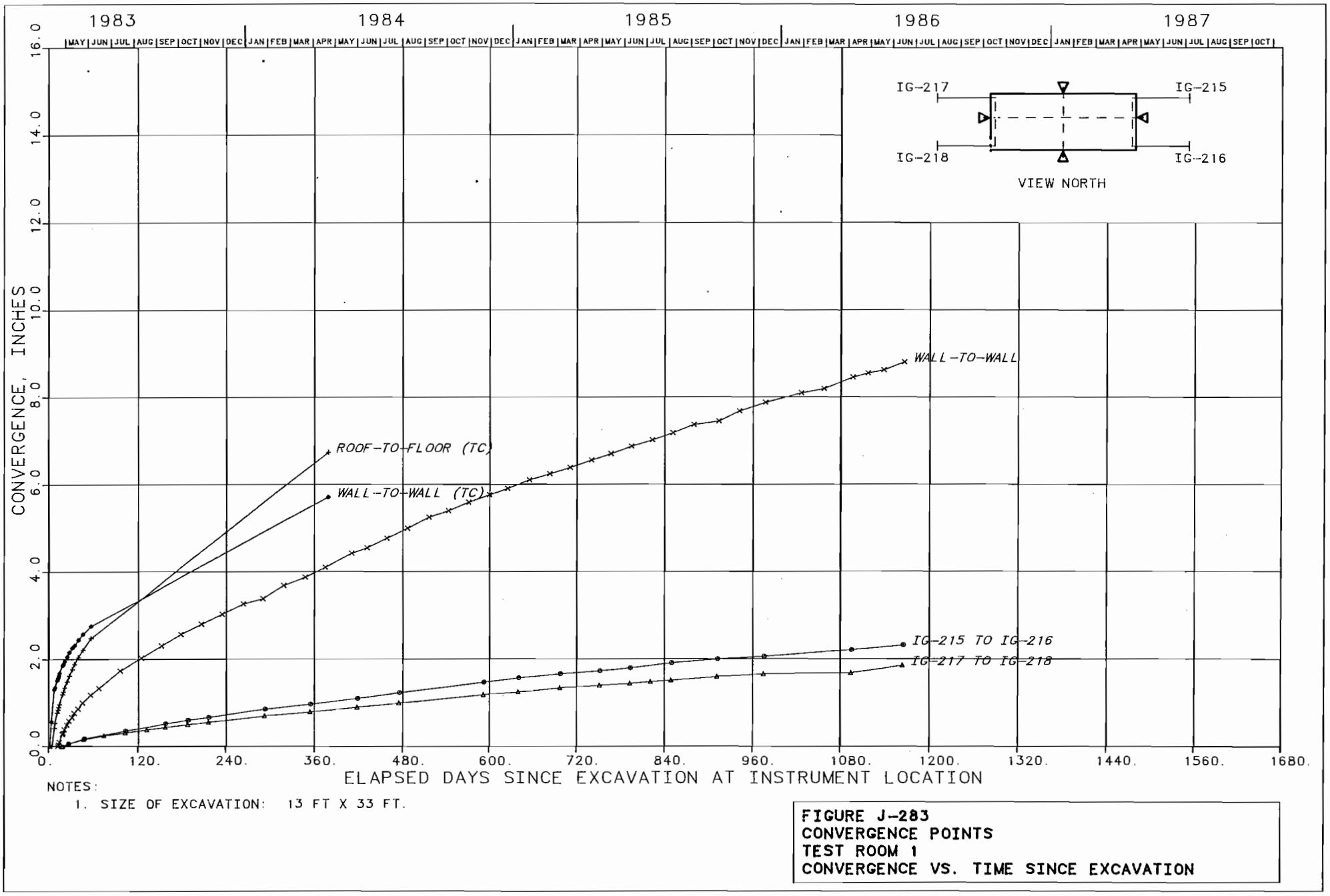
FIGURE J-281
CONVERGENCE POINTS
N1420 DRIFT, EAST 1547 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 15 FT.
2. INSTRUMENT IS CURRENTLY NOT ACCESSIBLE FOR READING.

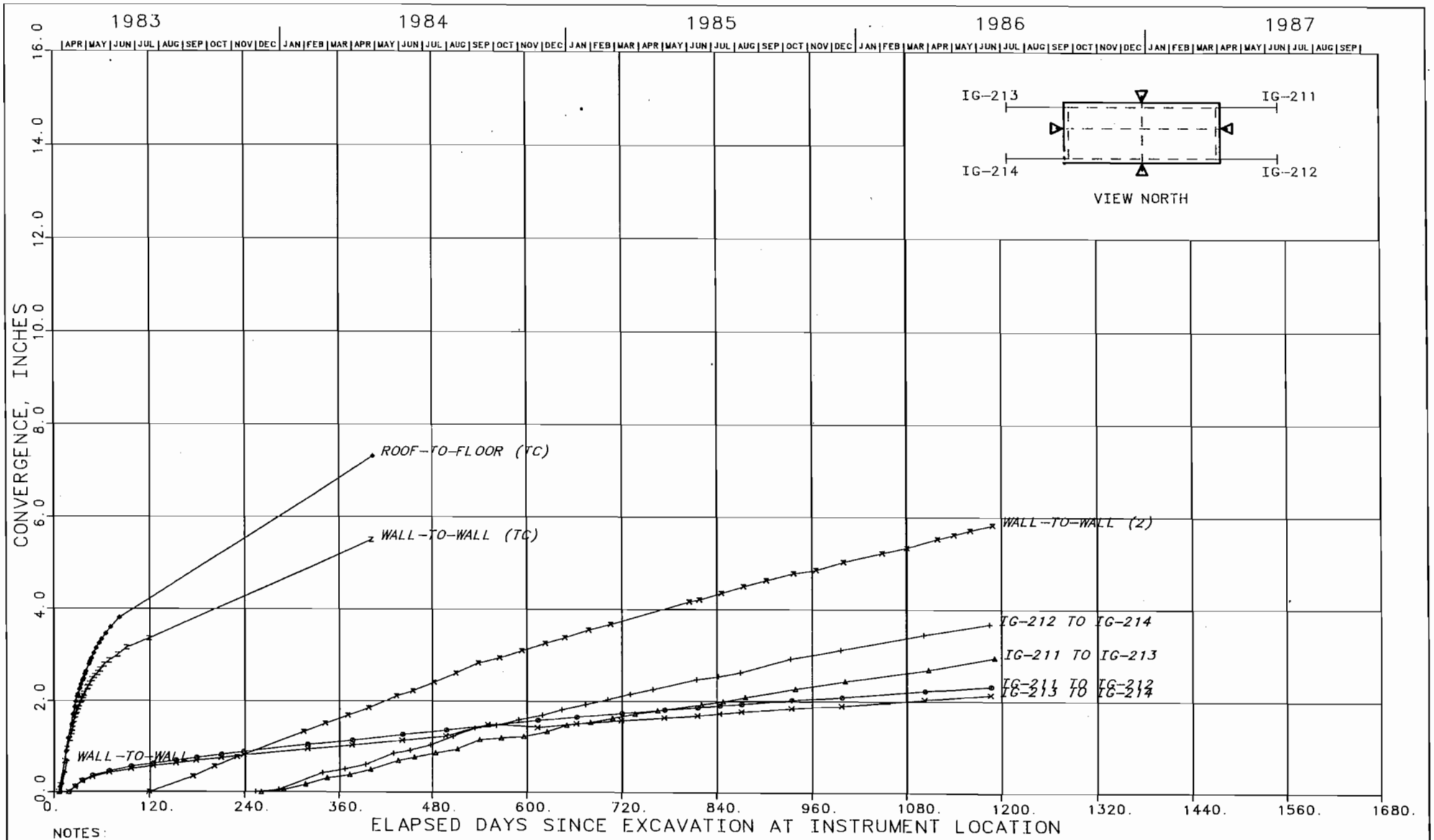
FIGURE J-282
CONVERGENCE POINTS
SUBSTATION 2A
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

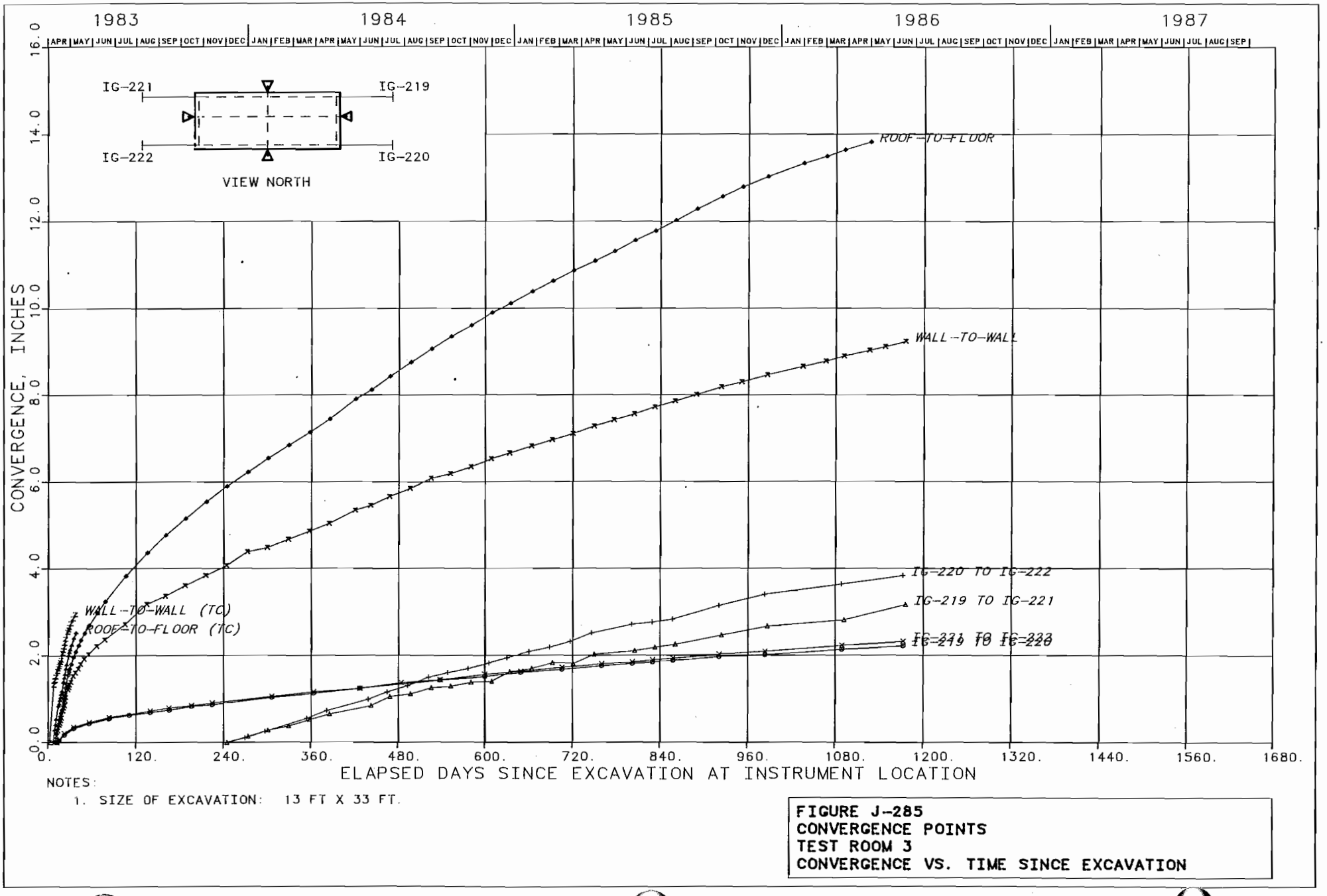
FIGURE J-283
CONVERGENCE POINTS
TEST ROOM 1
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

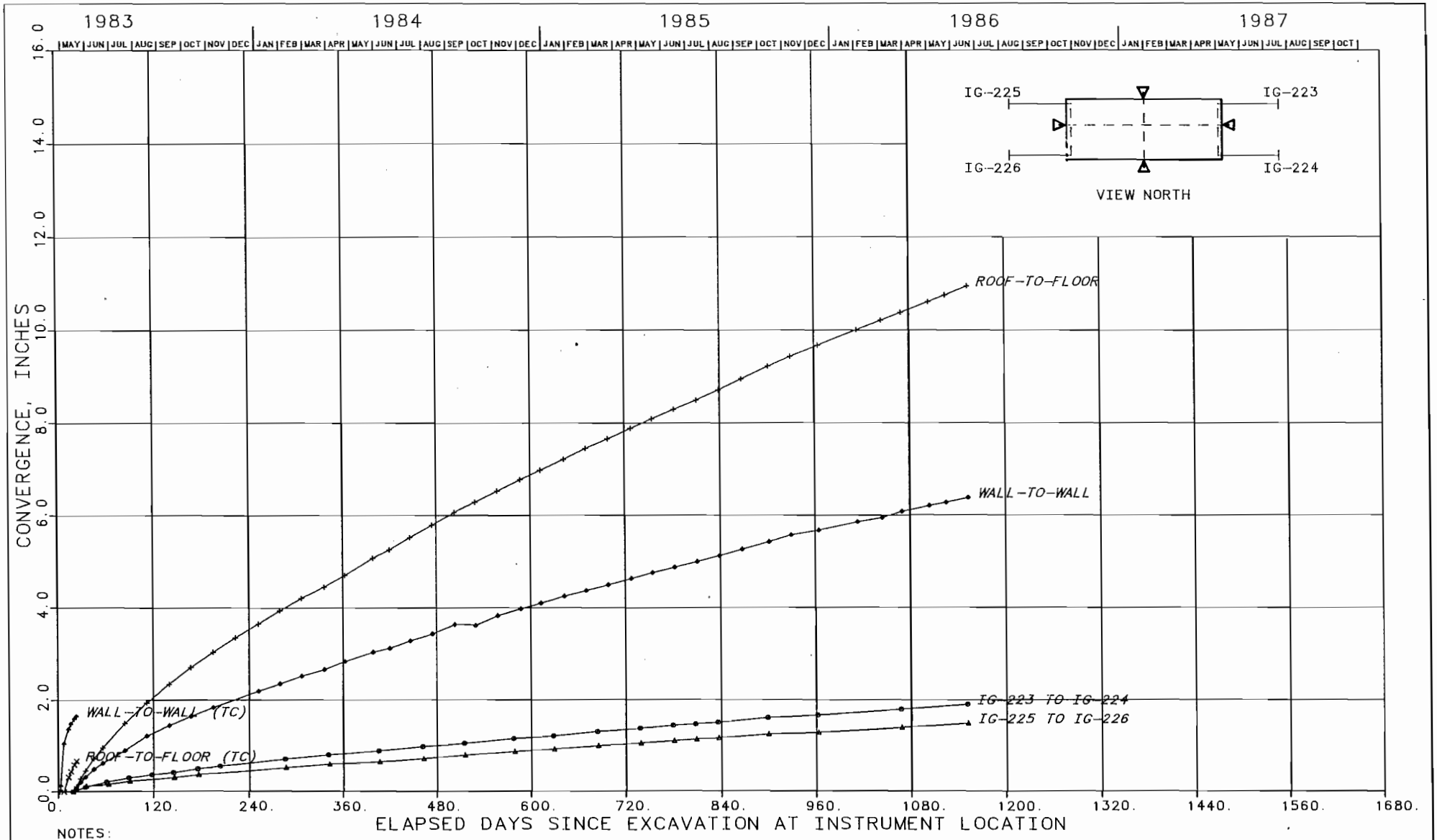
FIGURE J-284
CONVERGENCE POINTS
TEST ROOM 2
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

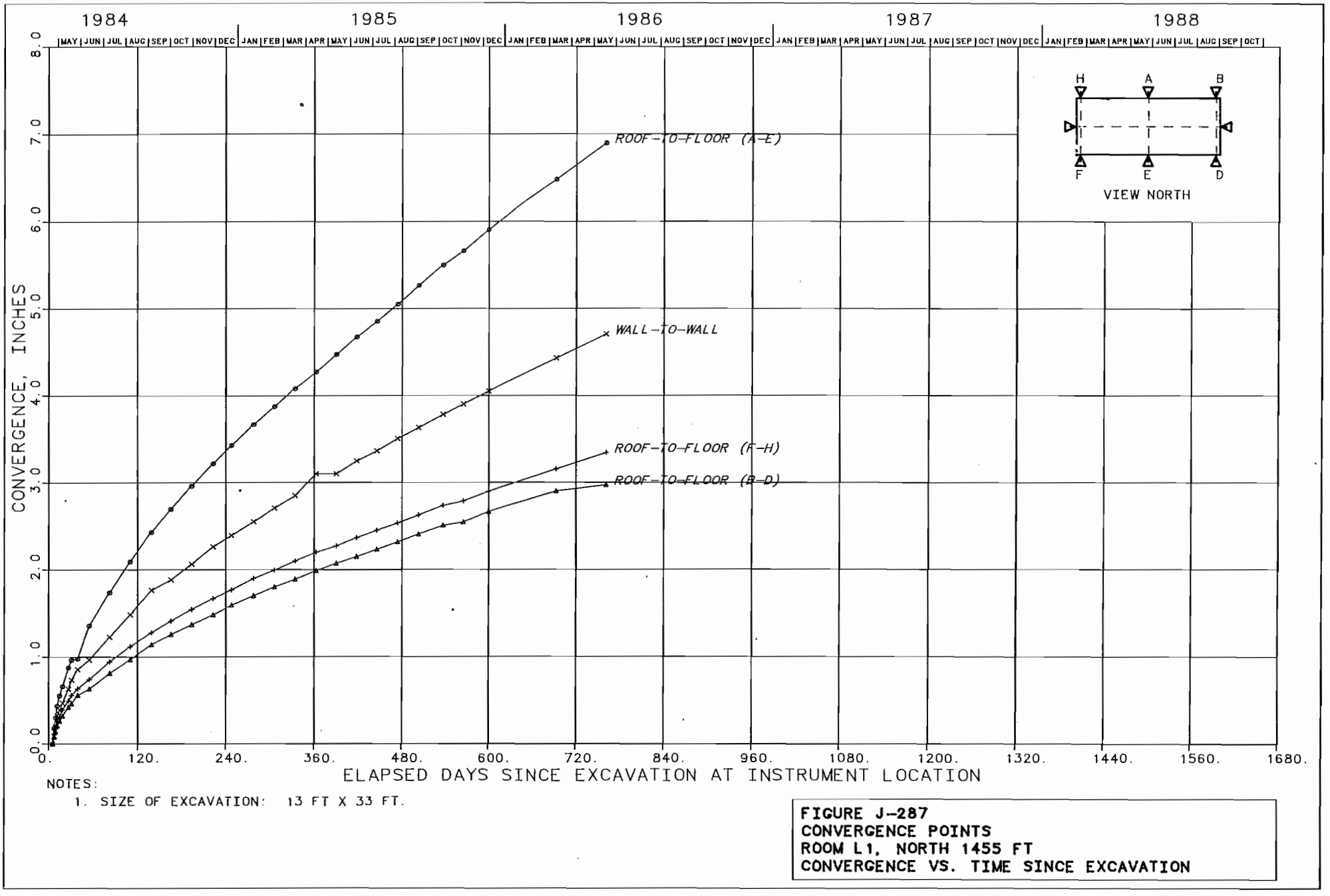
FIGURE J-285
CONVERGENCE POINTS
TEST ROOM 3
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

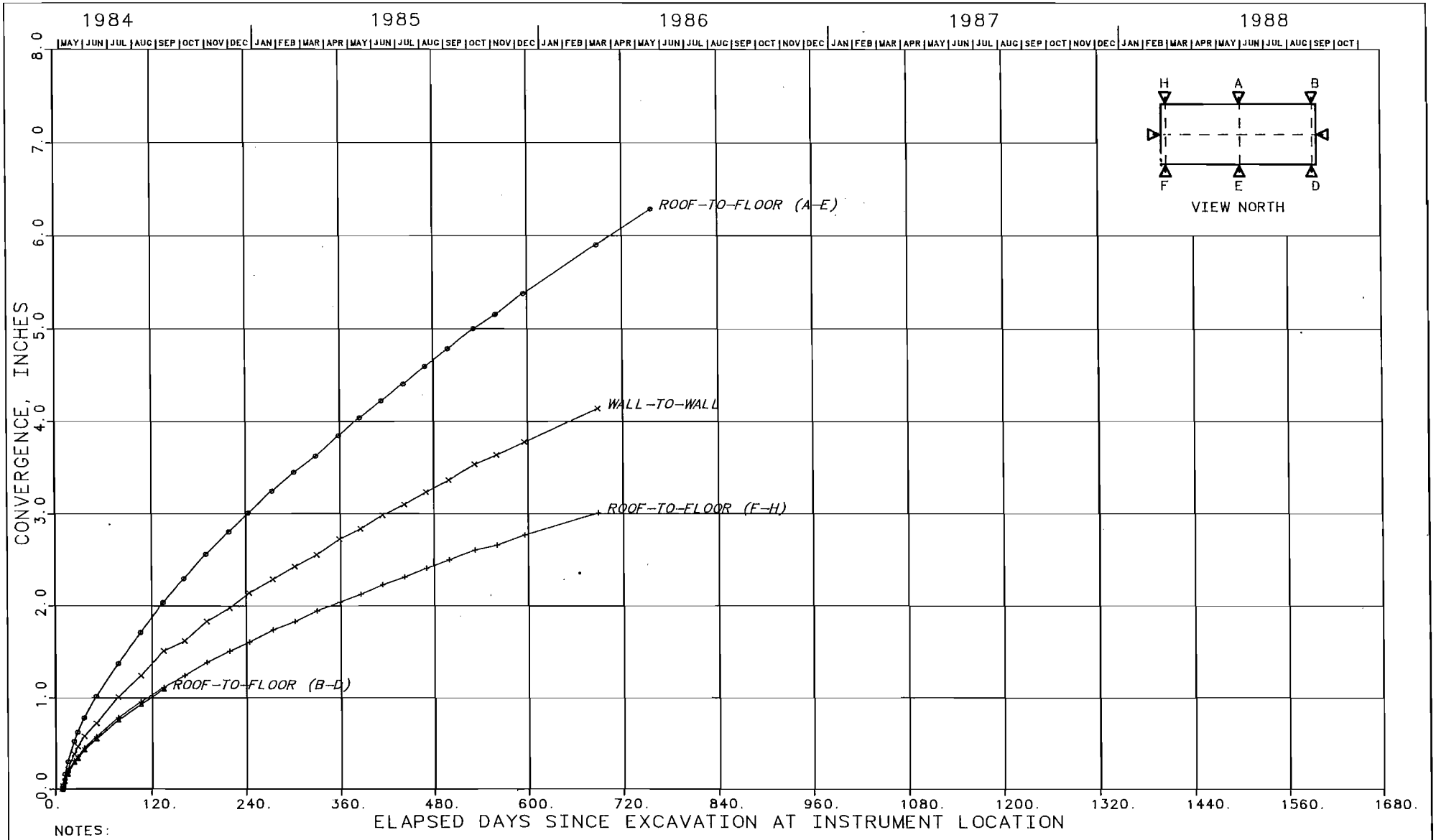
FIGURE J-286
CONVERGENCE POINTS
TEST ROOM 4
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

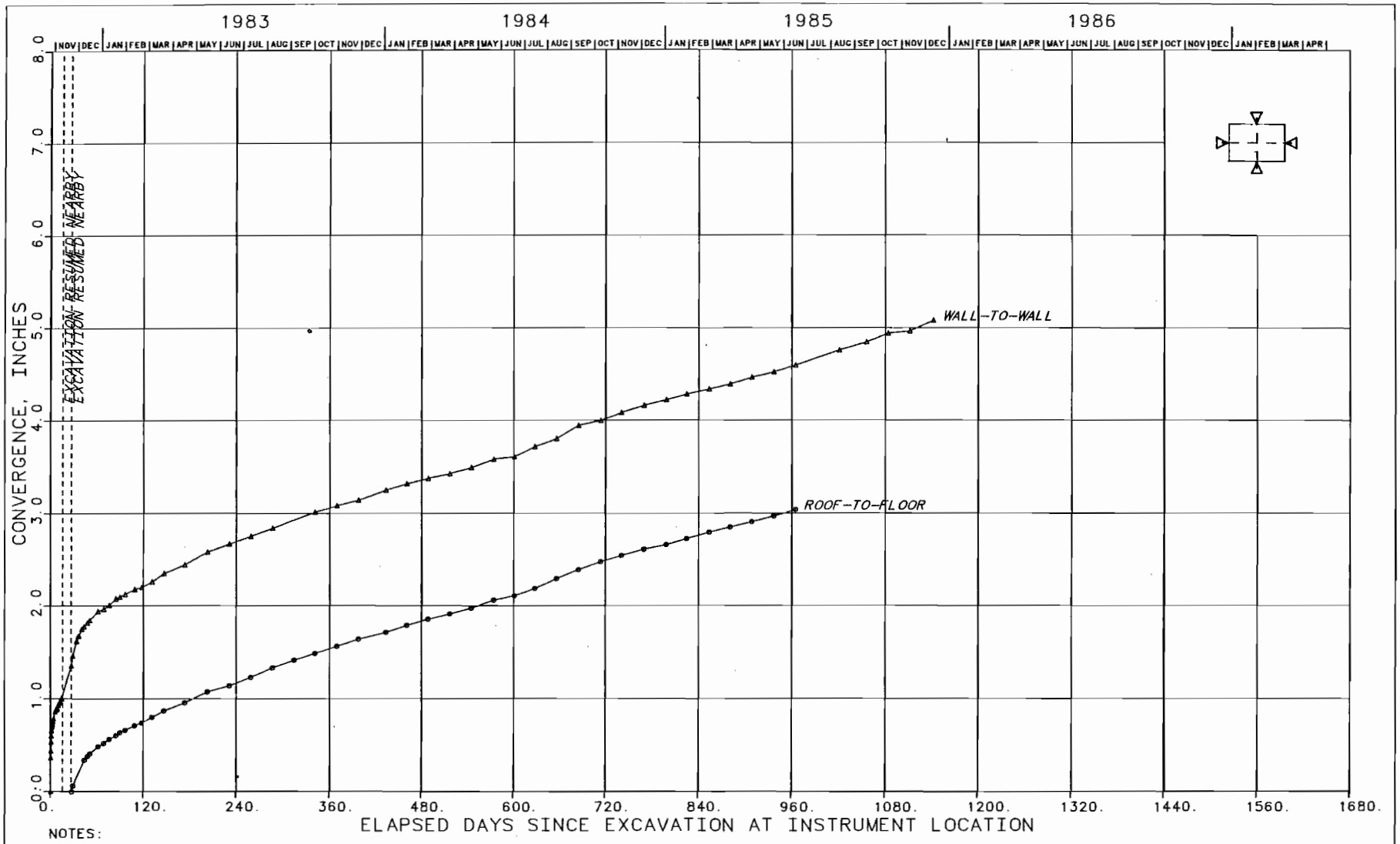
FIGURE J-287
CONVERGENCE POINTS
ROOM L1, NORTH 1455 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 13 FT X 33 FT.

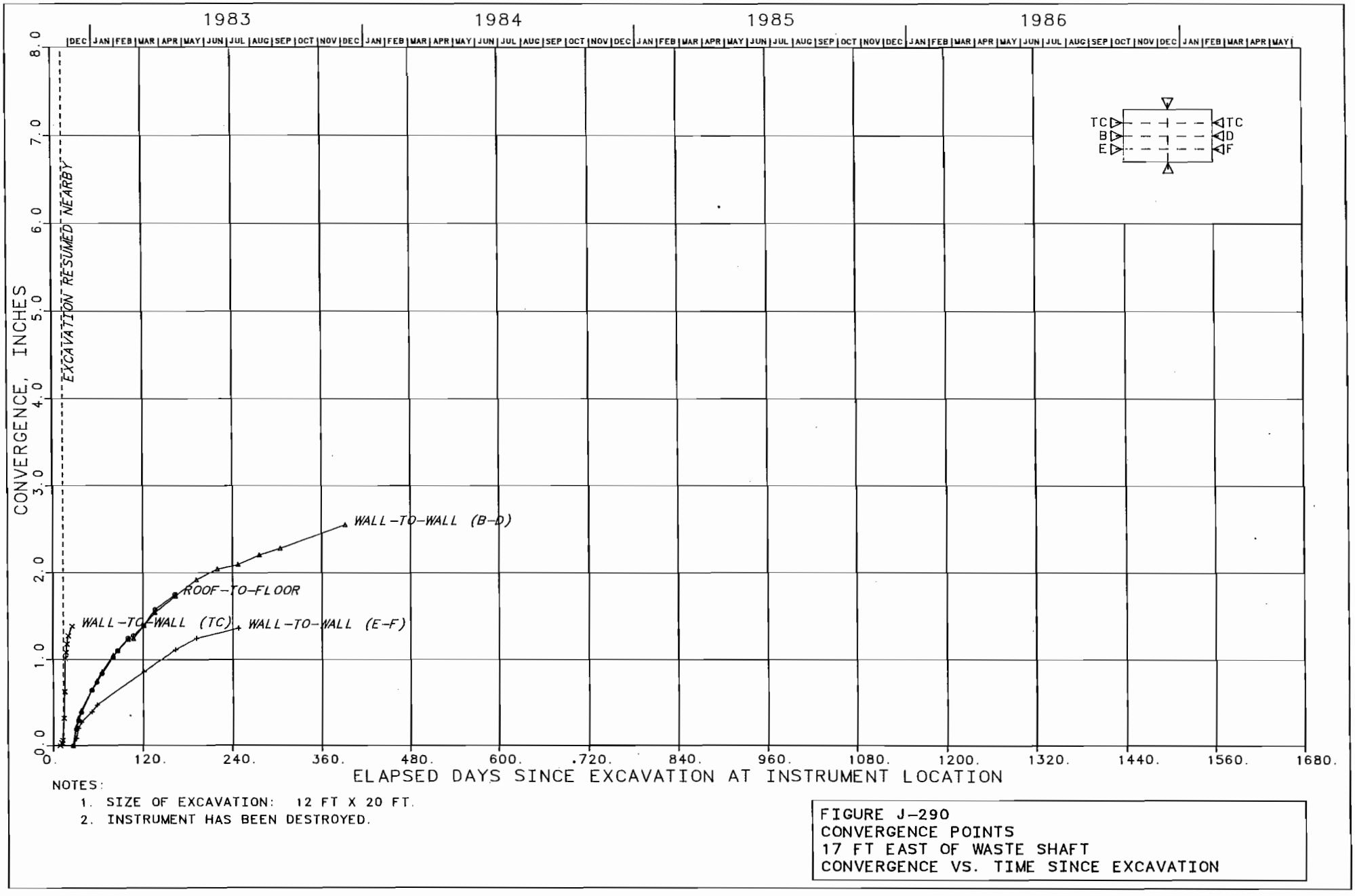
FIGURE J-288
CONVERGENCE POINTS
ROOM L2, NORTH 1455 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 12 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

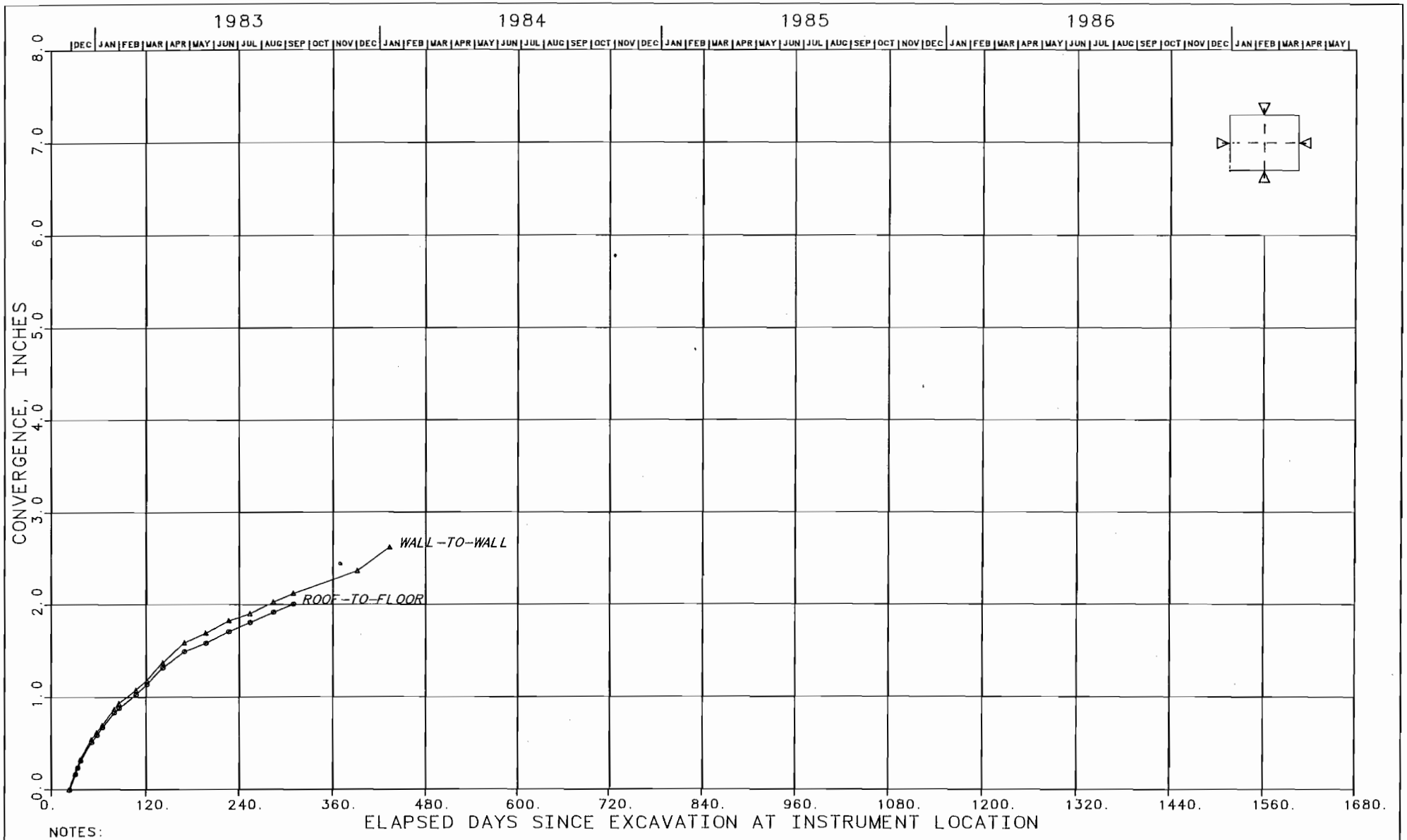
FIGURE J-289
CONVERGENCE POINTS
S90 CROSSCUT, EAST 91 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

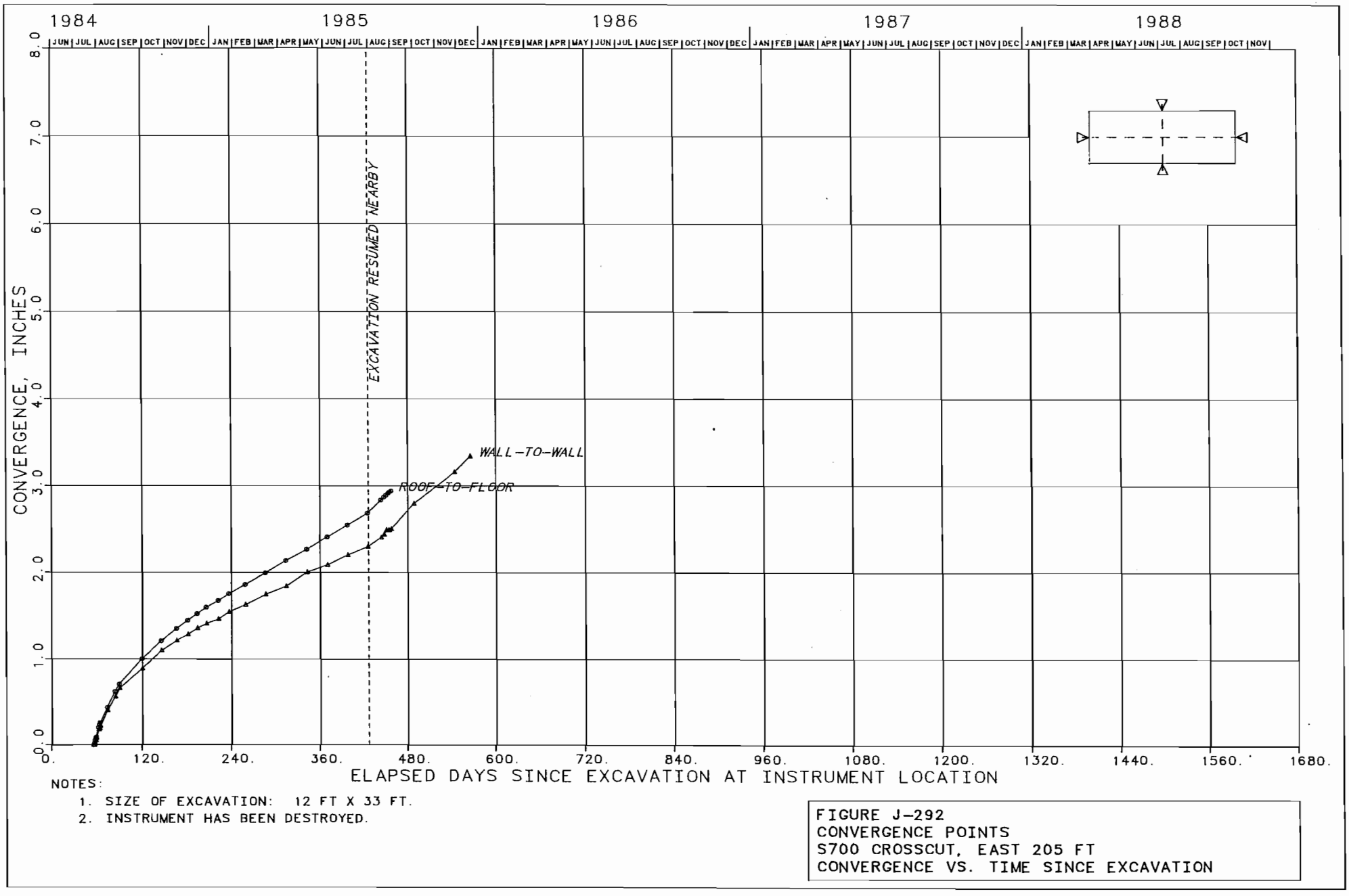
FIGURE J-290
CONVERGENCE POINTS
17 FT EAST OF WASTE SHAFT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 15 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

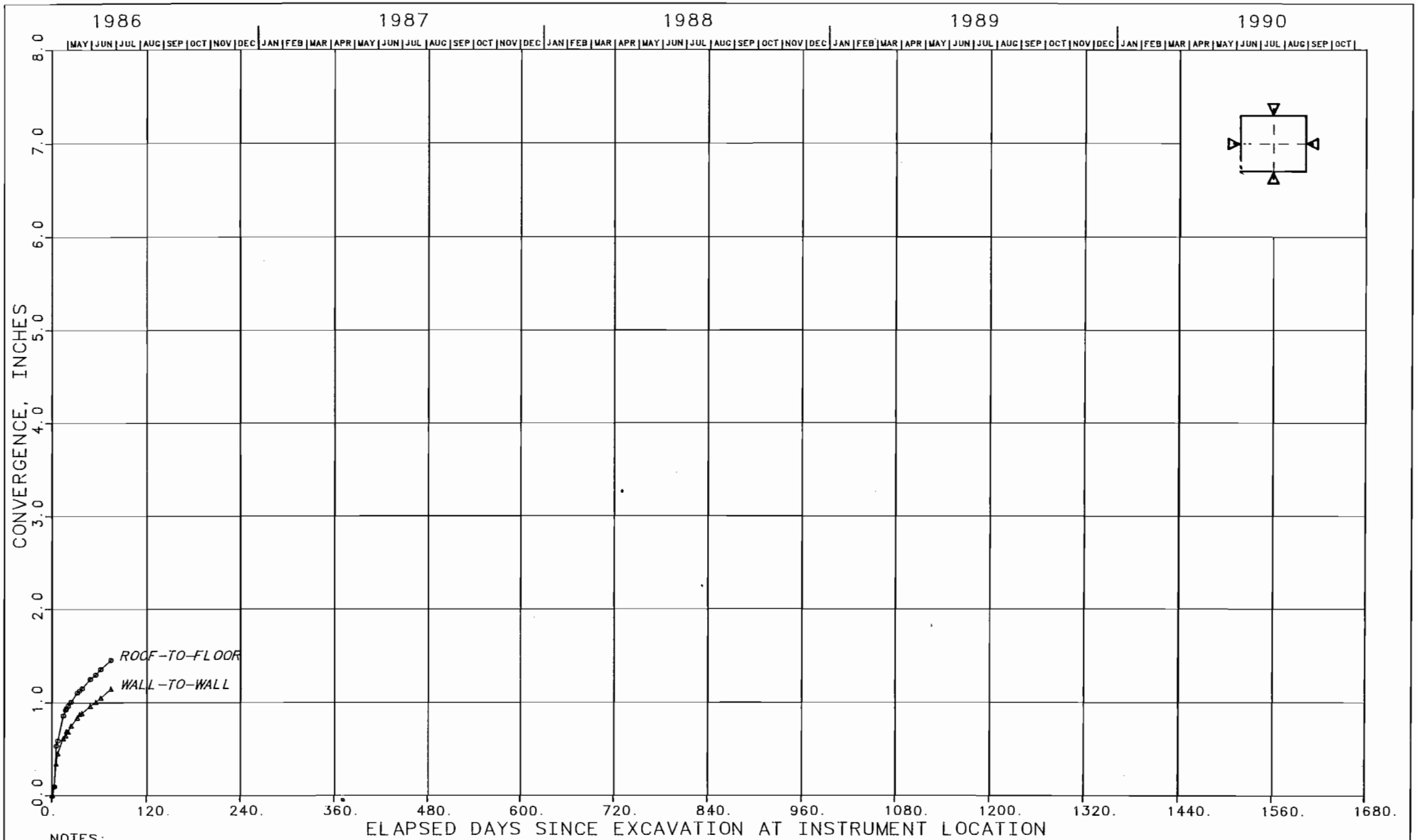
FIGURE J-291
CONVERGENCE POINTS
20 FT WEST OF WASTE SHAFT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 33 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

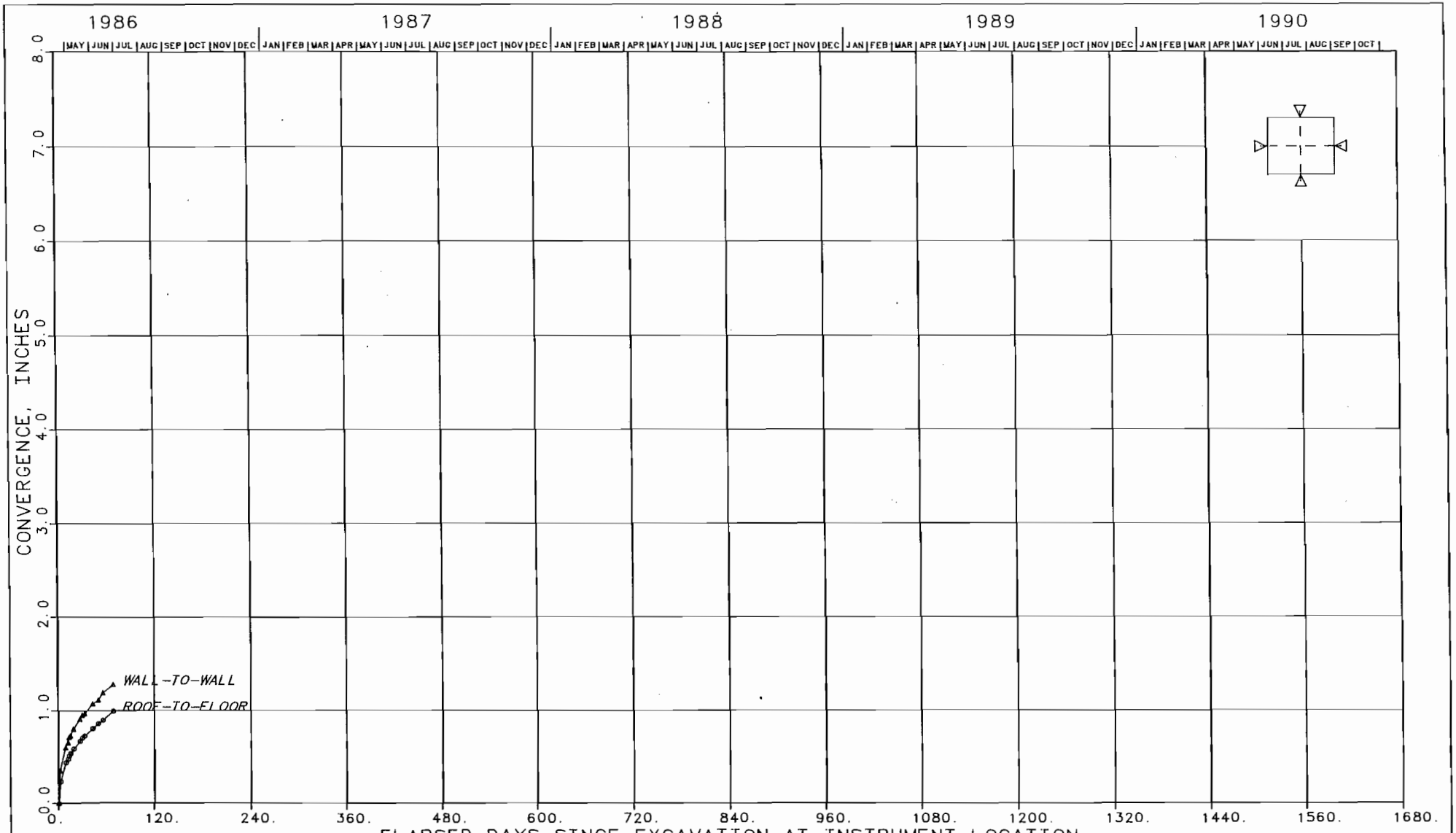
FIGURE J-292
CONVERGENCE POINTS
S700 CROSSCUT, EAST 205 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

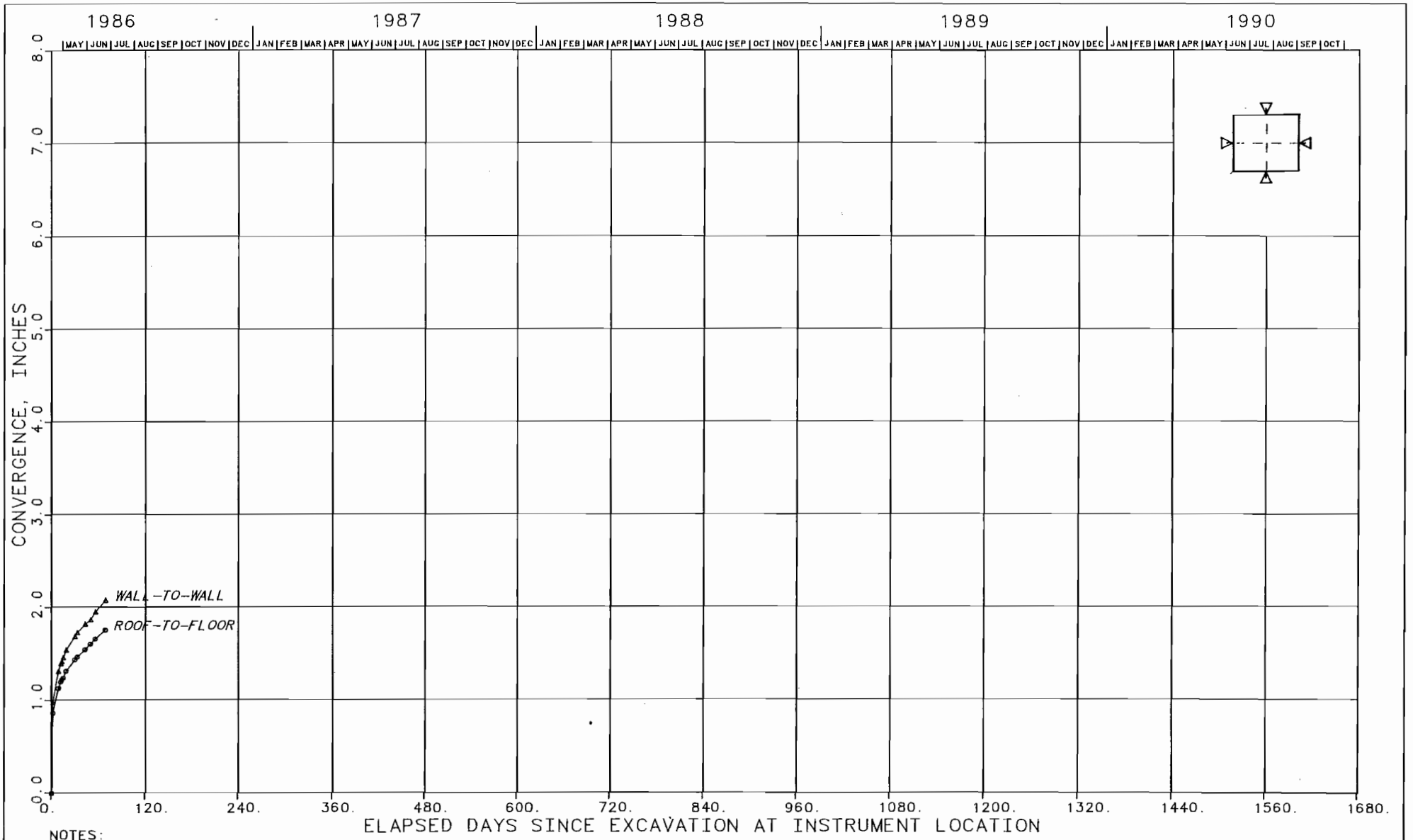
FIGURE J-293
CONVERGENCE POINTS
S1600 DRIFT, EAST 311 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

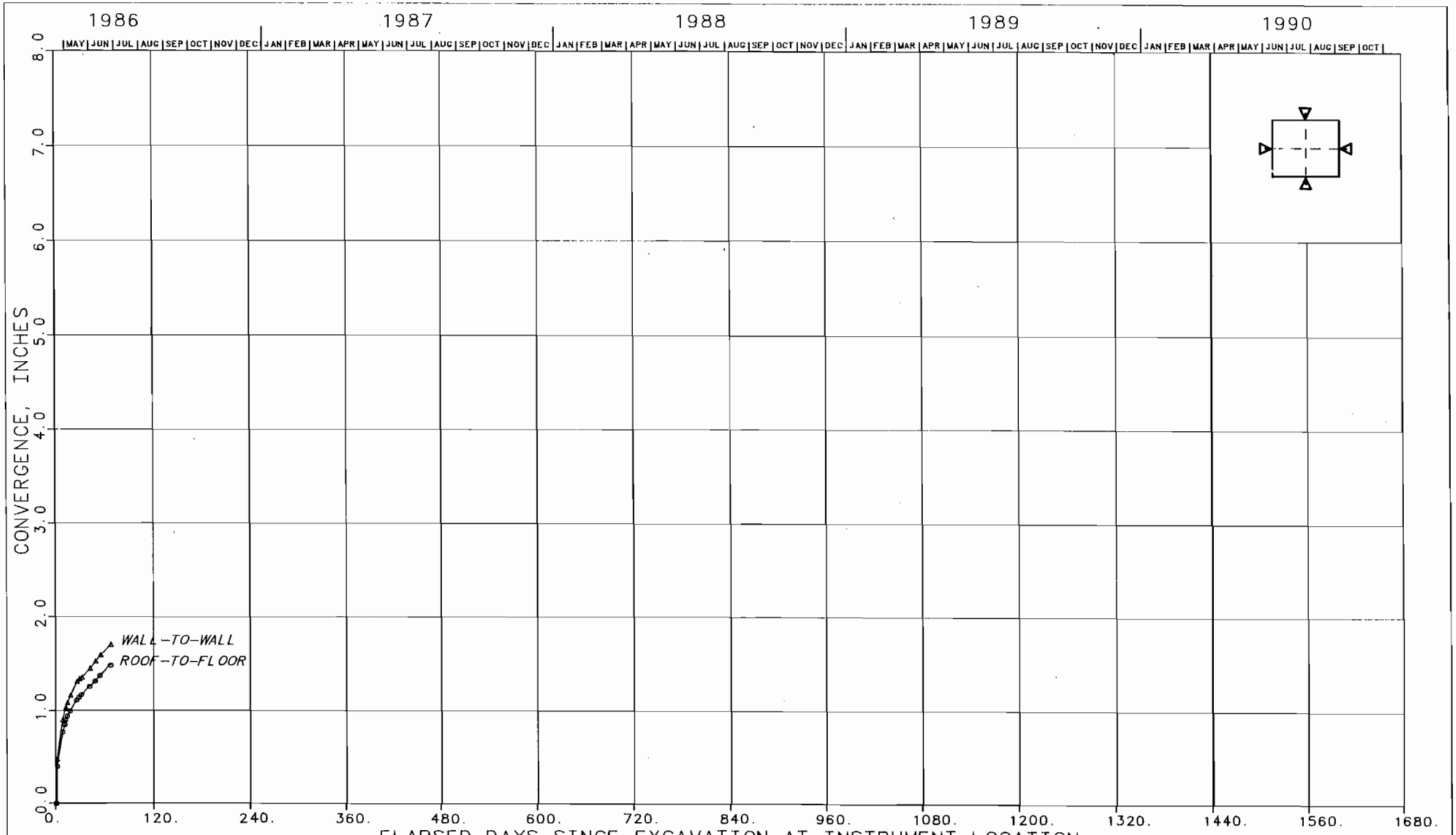
FIGURE J-294
CONVERGENCE POINTS
S1600 DRIFT, EAST 332 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

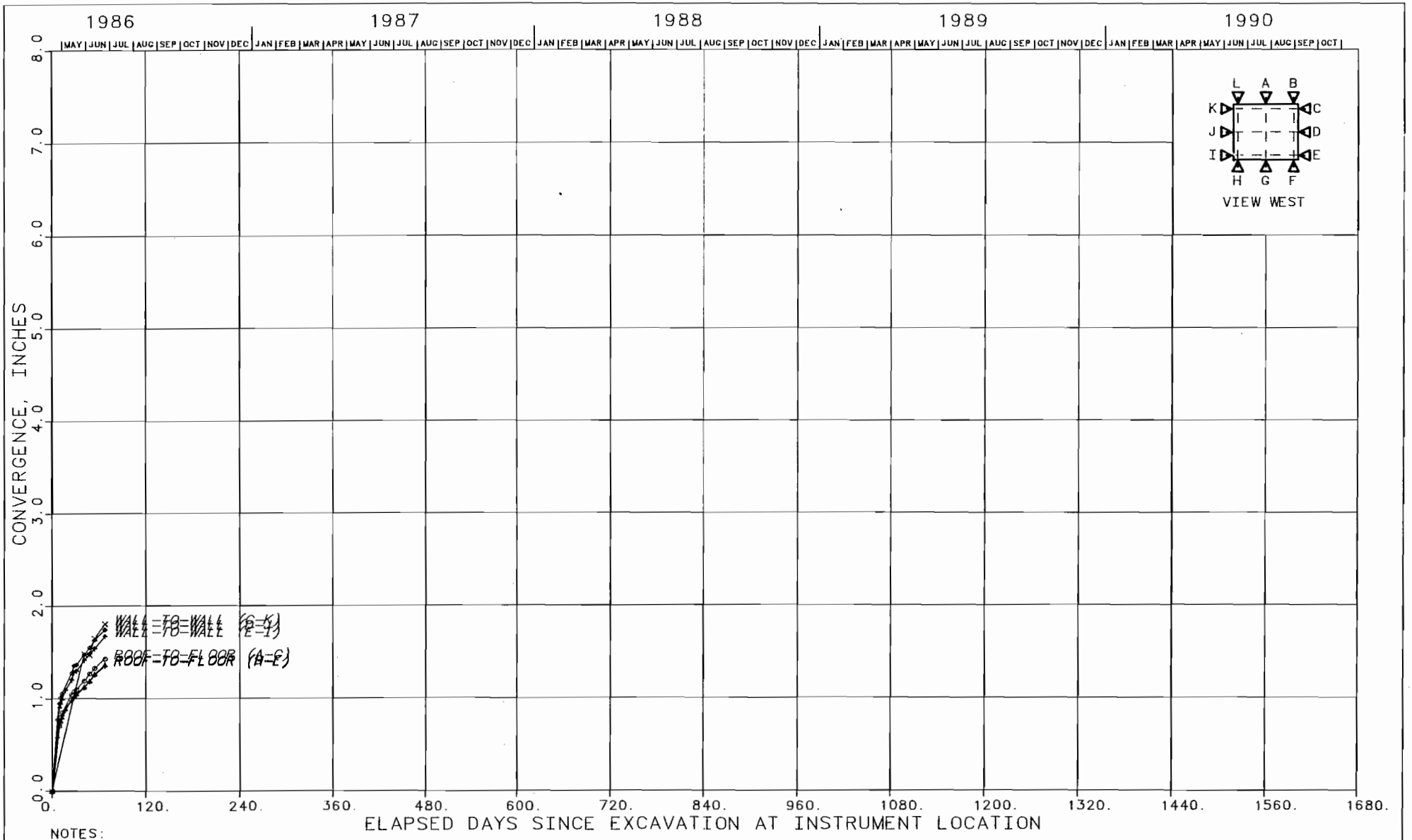
FIGURE J-295
CONVERGENCE POINTS
S1600 DRIFT, EAST 357 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

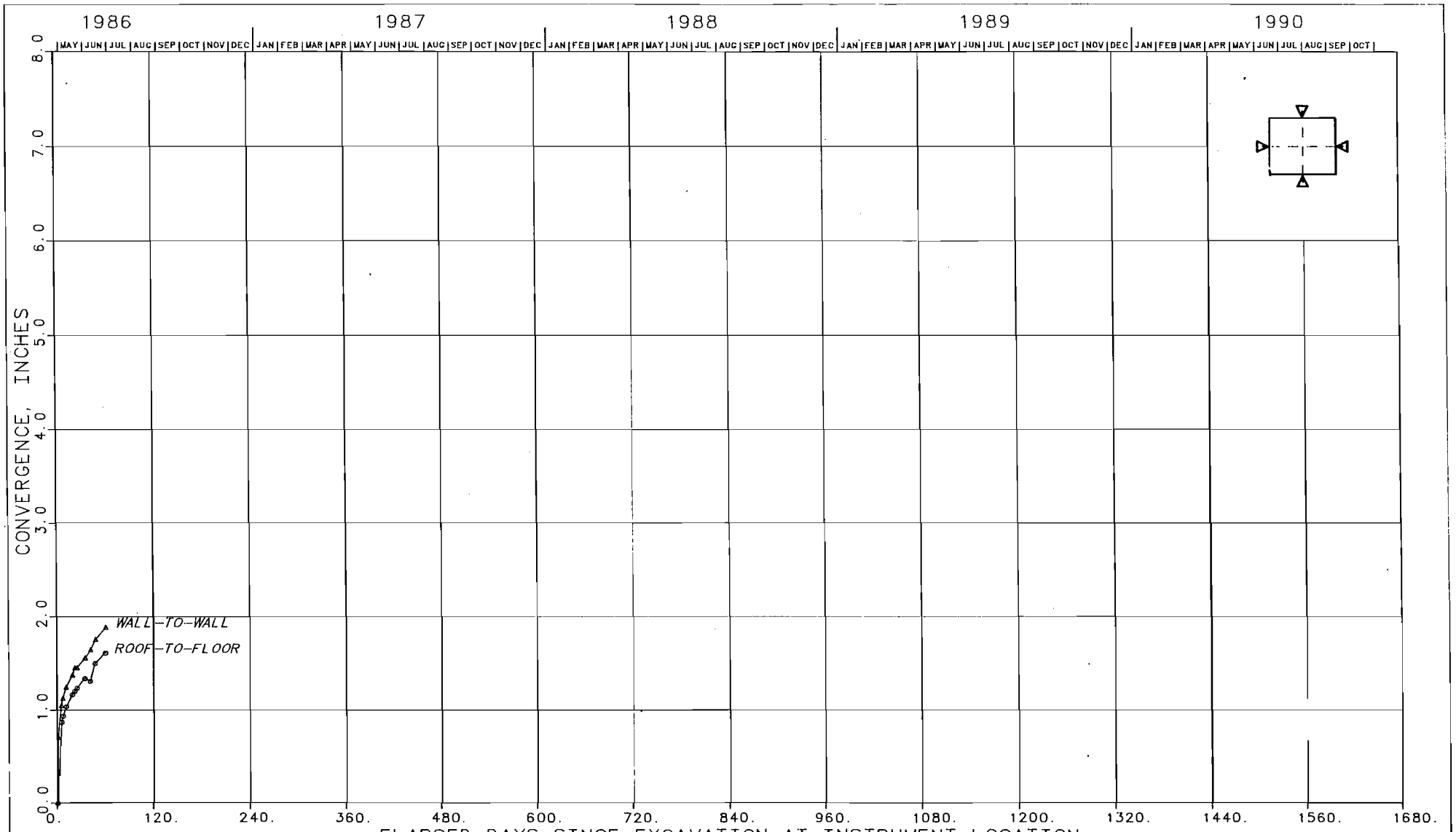
FIGURE J-296
CONVERGENCE POINTS
S1600 DRIFT, EAST 382 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

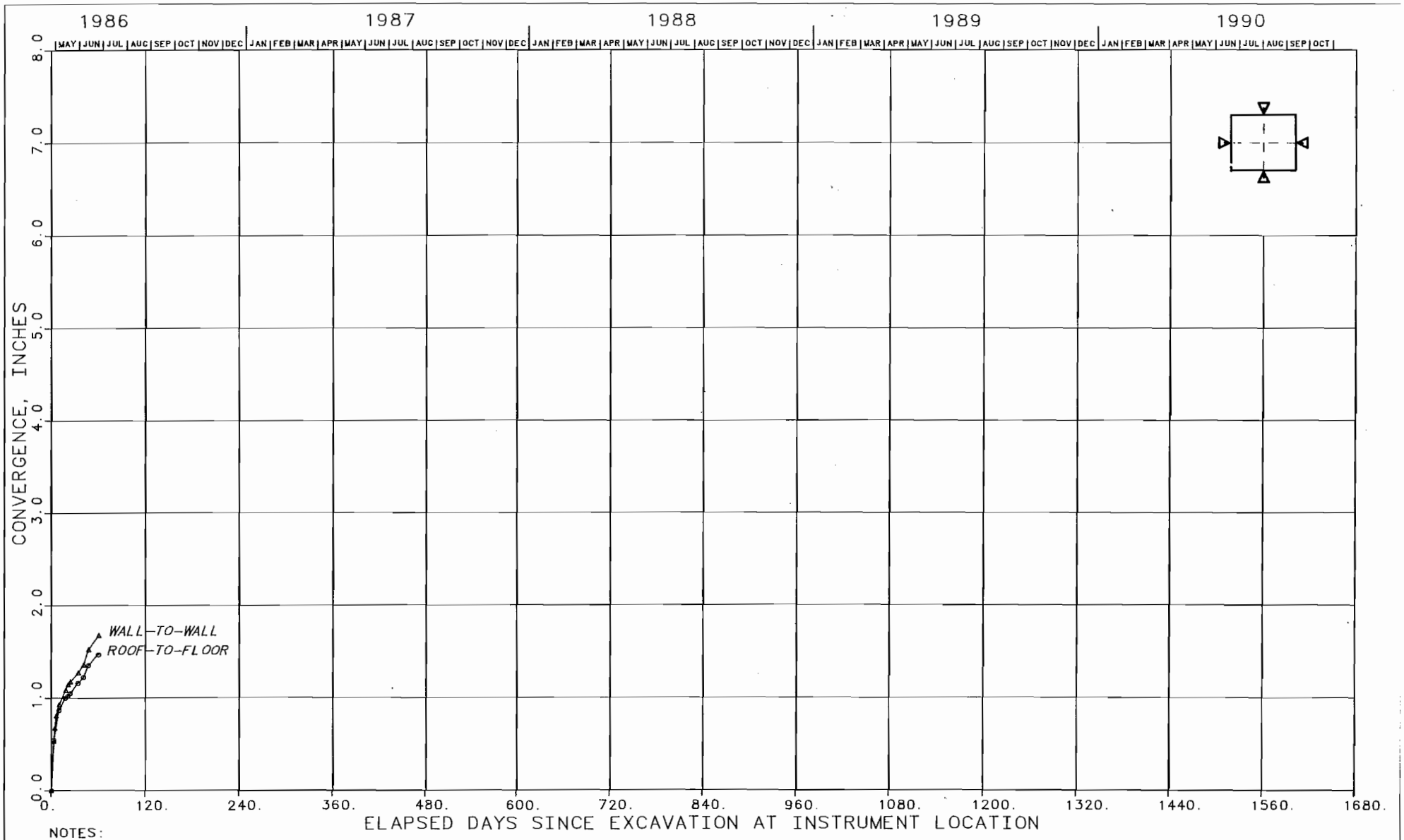
FIGURE J-297
CONVERGENCE POINTS
S1600 DRIFT, EAST 407 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

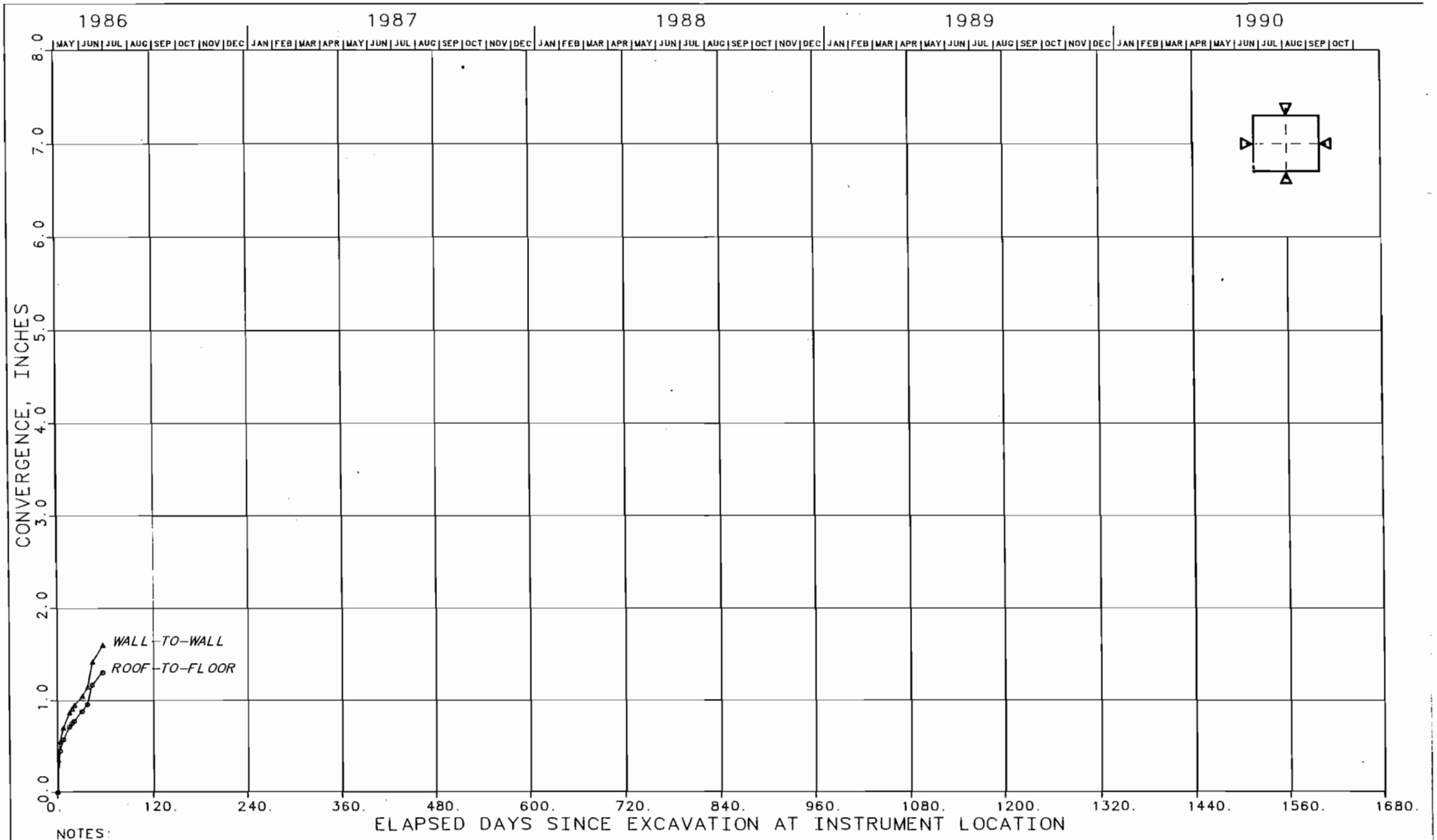
FIGURE J-298
CONVERGENCE POINTS
S1600 DRIFT, EAST 432 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

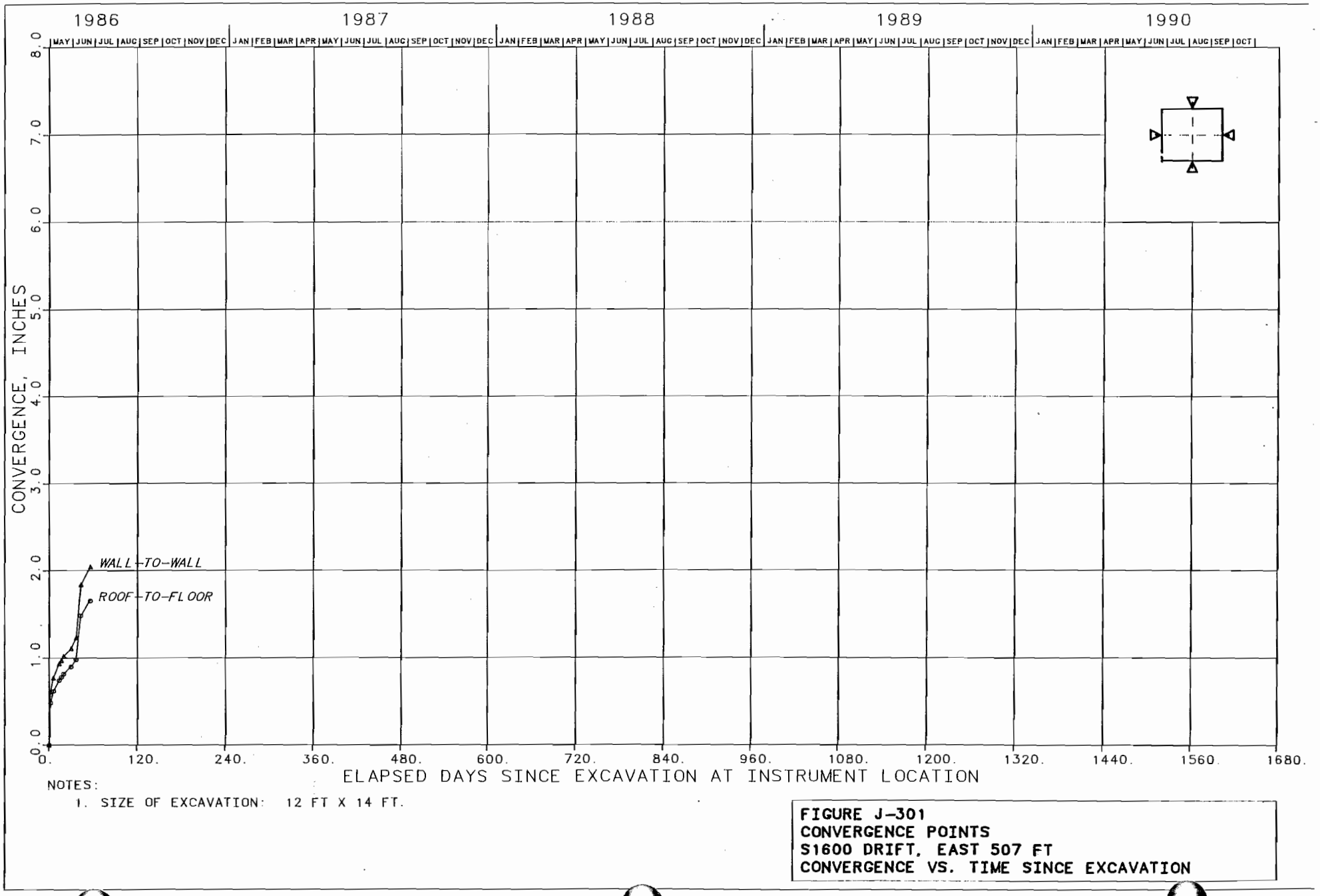
FIGURE J-299
CONVERGENCE POINTS
S1600 DRIFT, EAST 457 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

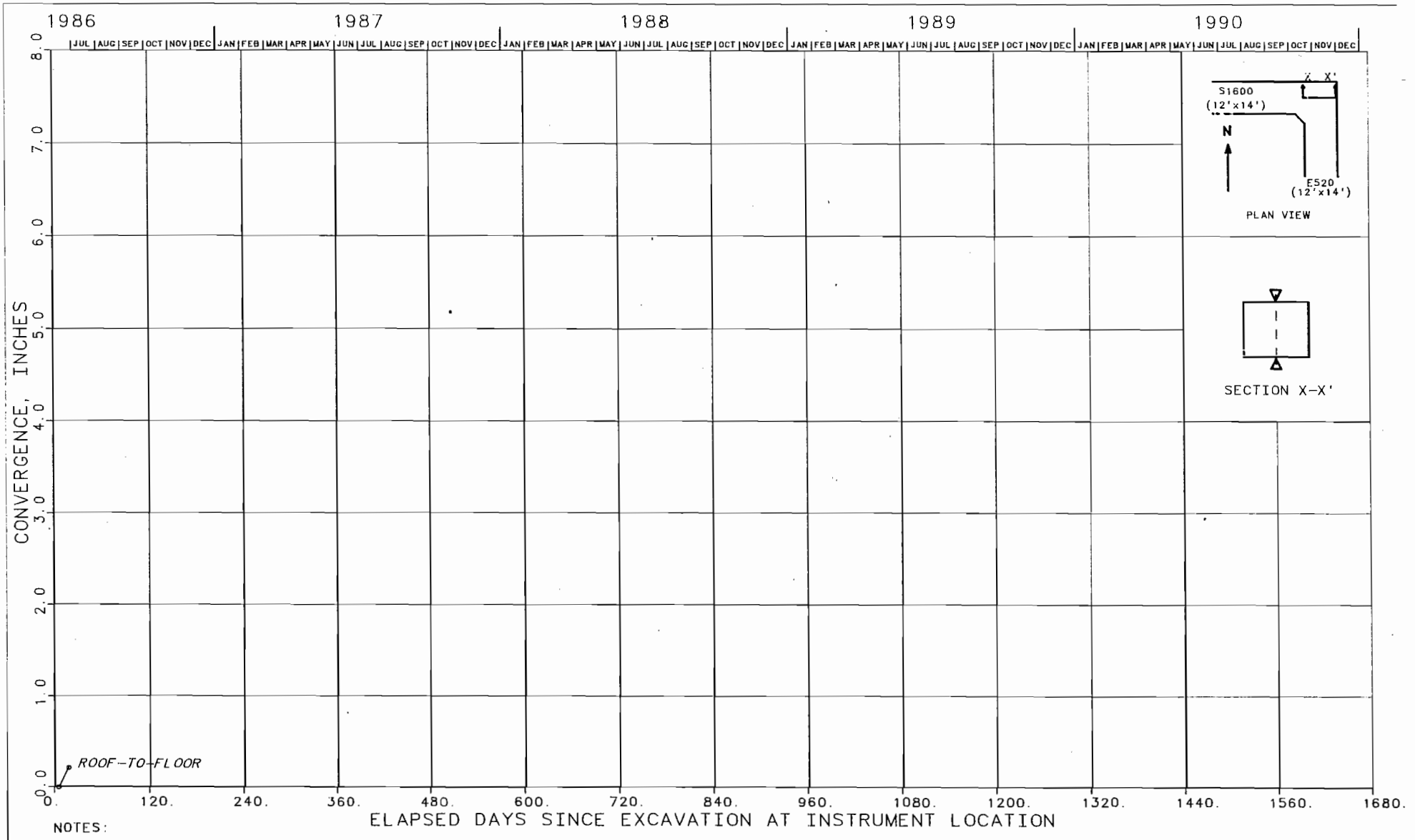
FIGURE J-300
CONVERGENCE POINTS
S1600 DRIFT, EAST 482 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

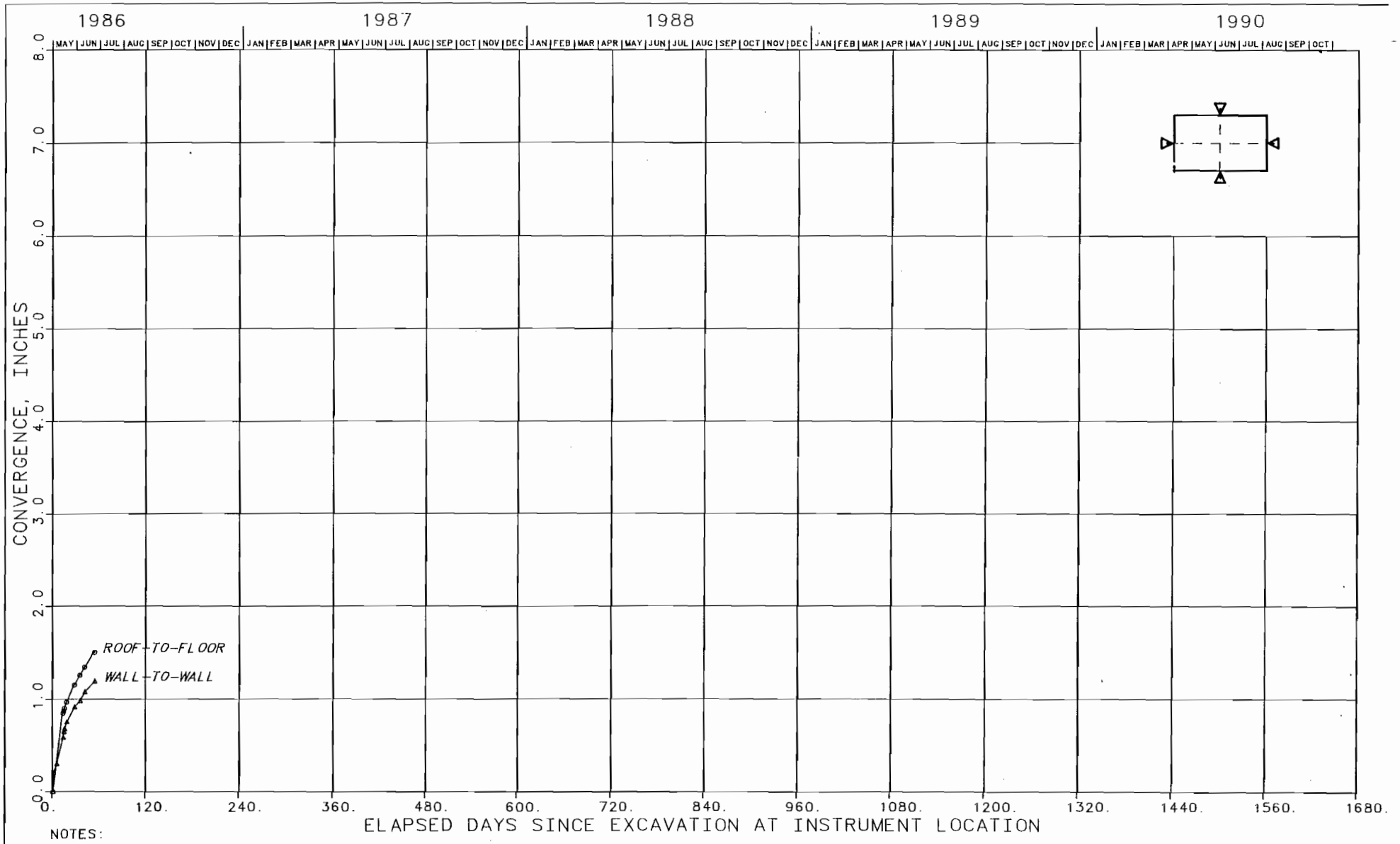
FIGURE J-301
CONVERGENCE POINTS
S1600 DRIFT, EAST 507 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 14 FT.

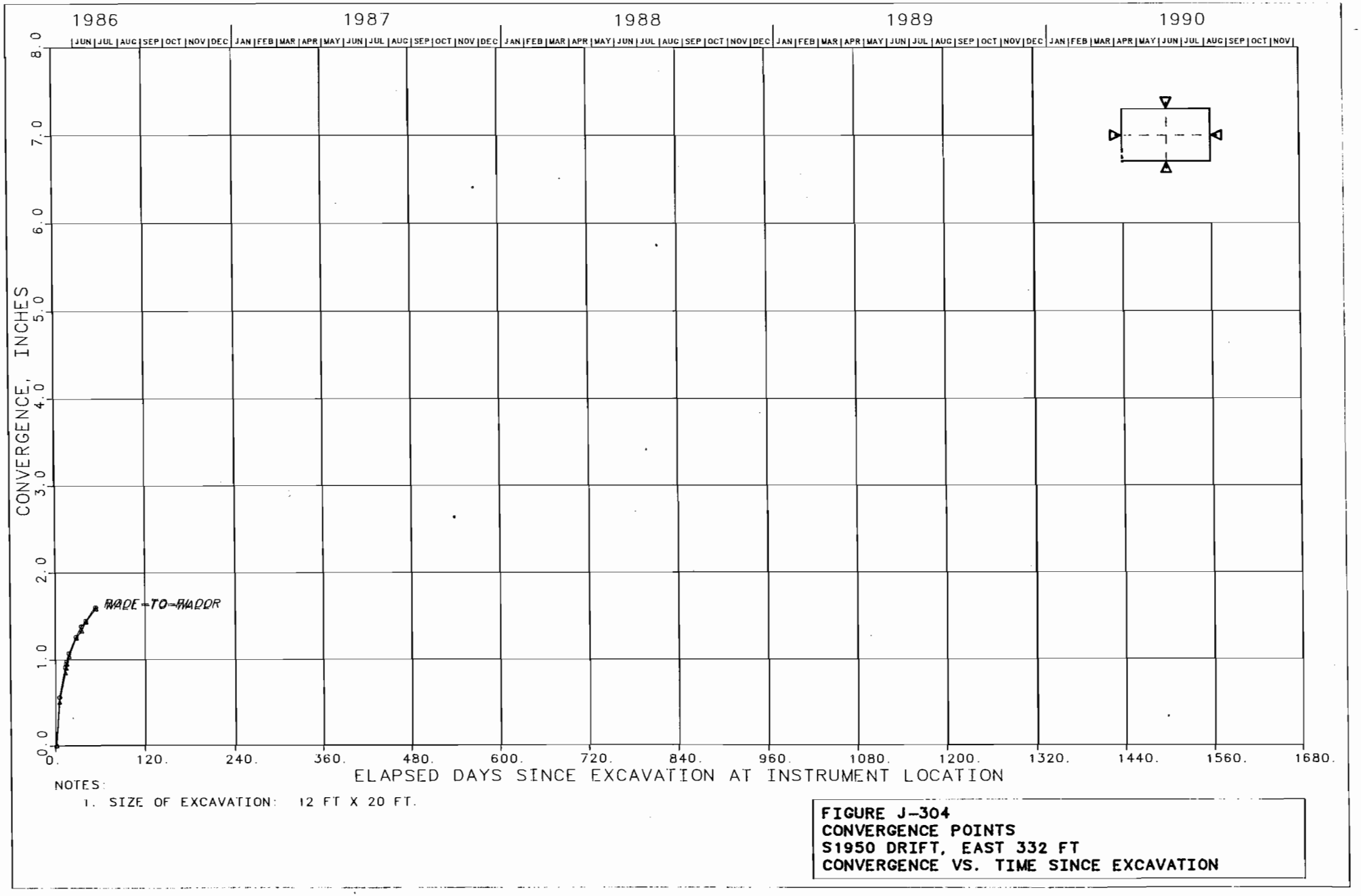
FIGURE J-302
CONVERGENCE POINTS
S1600 DRIFT, EAST 520 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

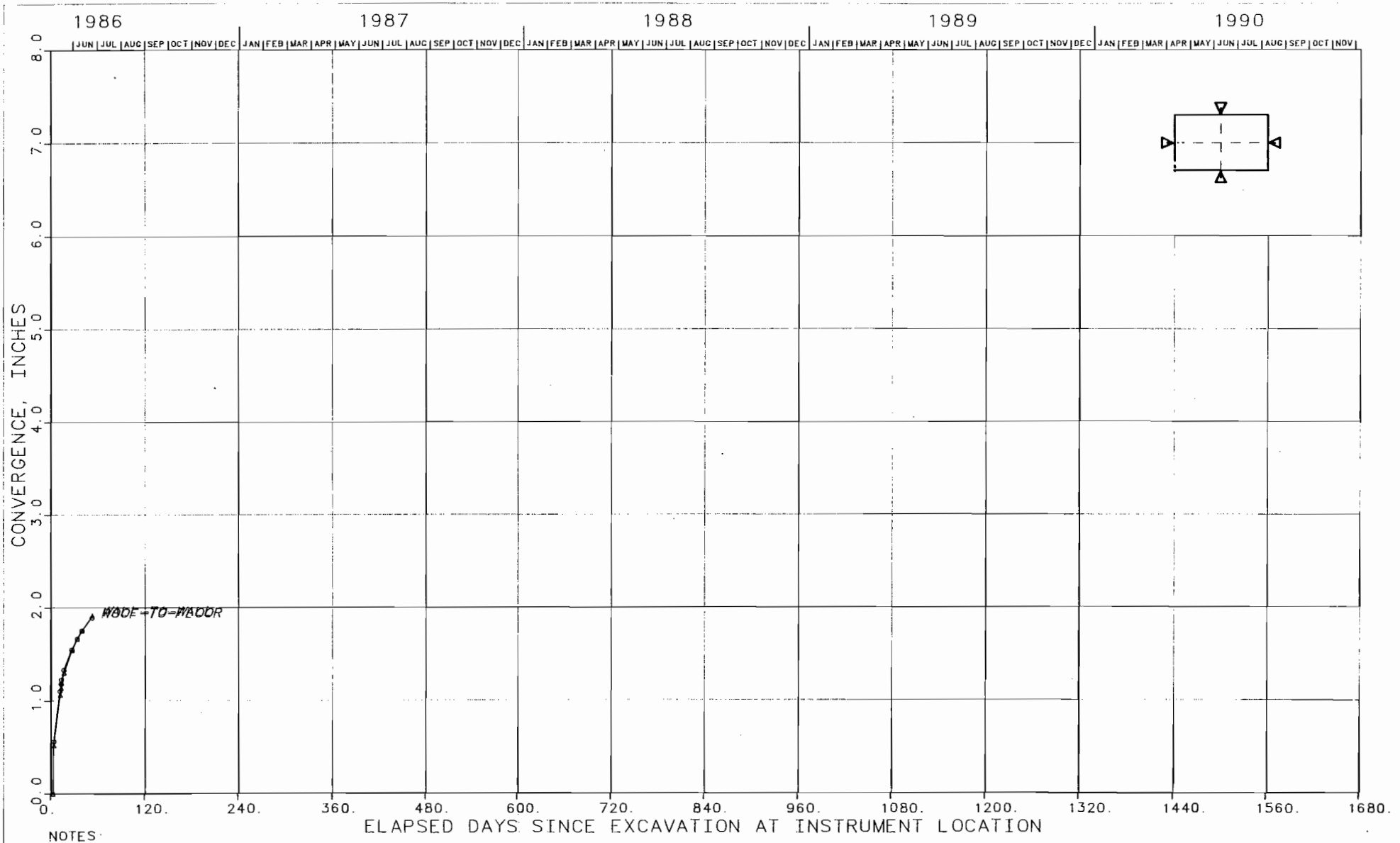
FIGURE J-303
CONVERGENCE POINTS
S1950 DRIFT, EAST 311 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

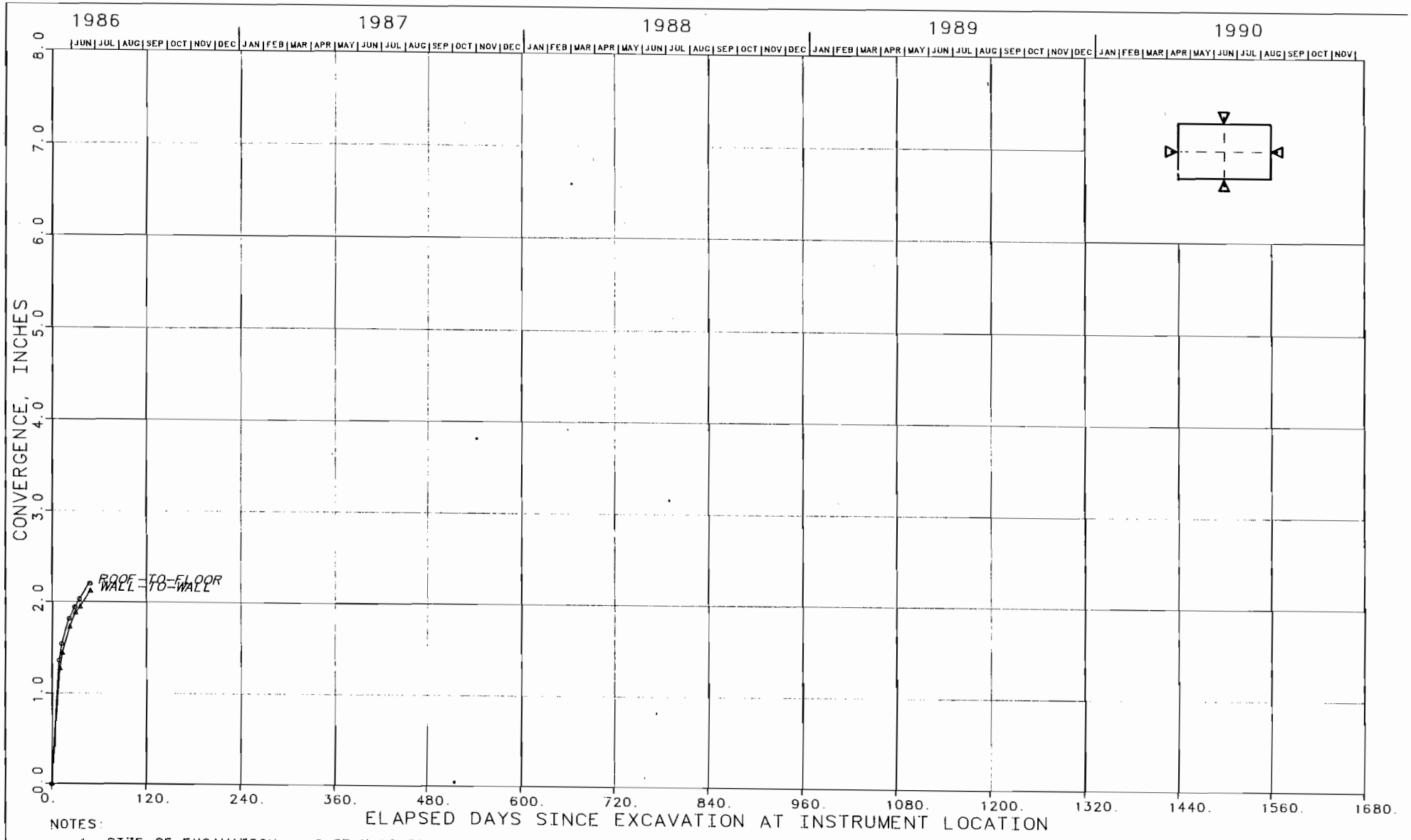
FIGURE J-304
CONVERGENCE POINTS
S1950 DRIFT, EAST 332 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

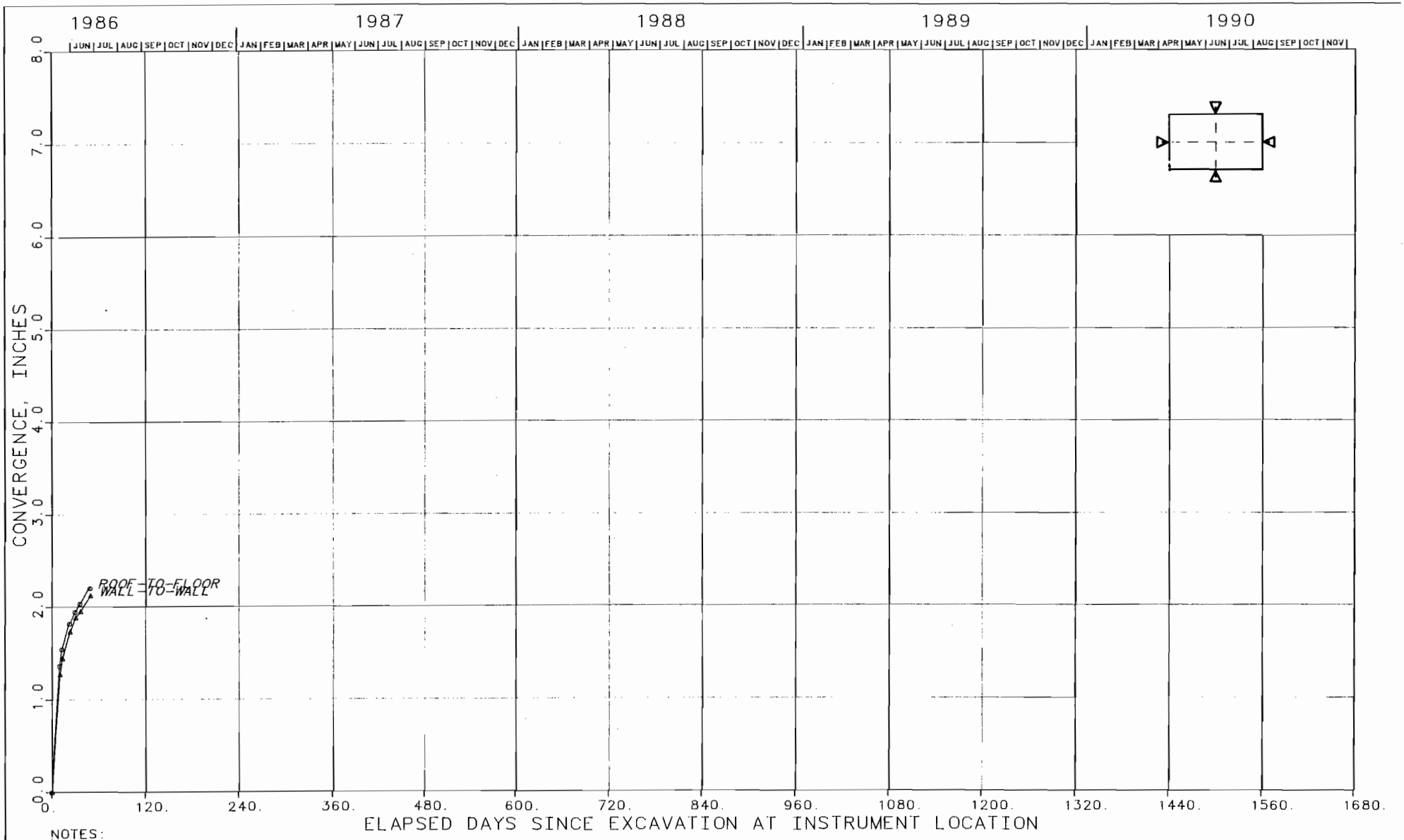
FIGURE J-305
CONVERGENCE POINTS
S1950 DRIFT, EAST 357 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

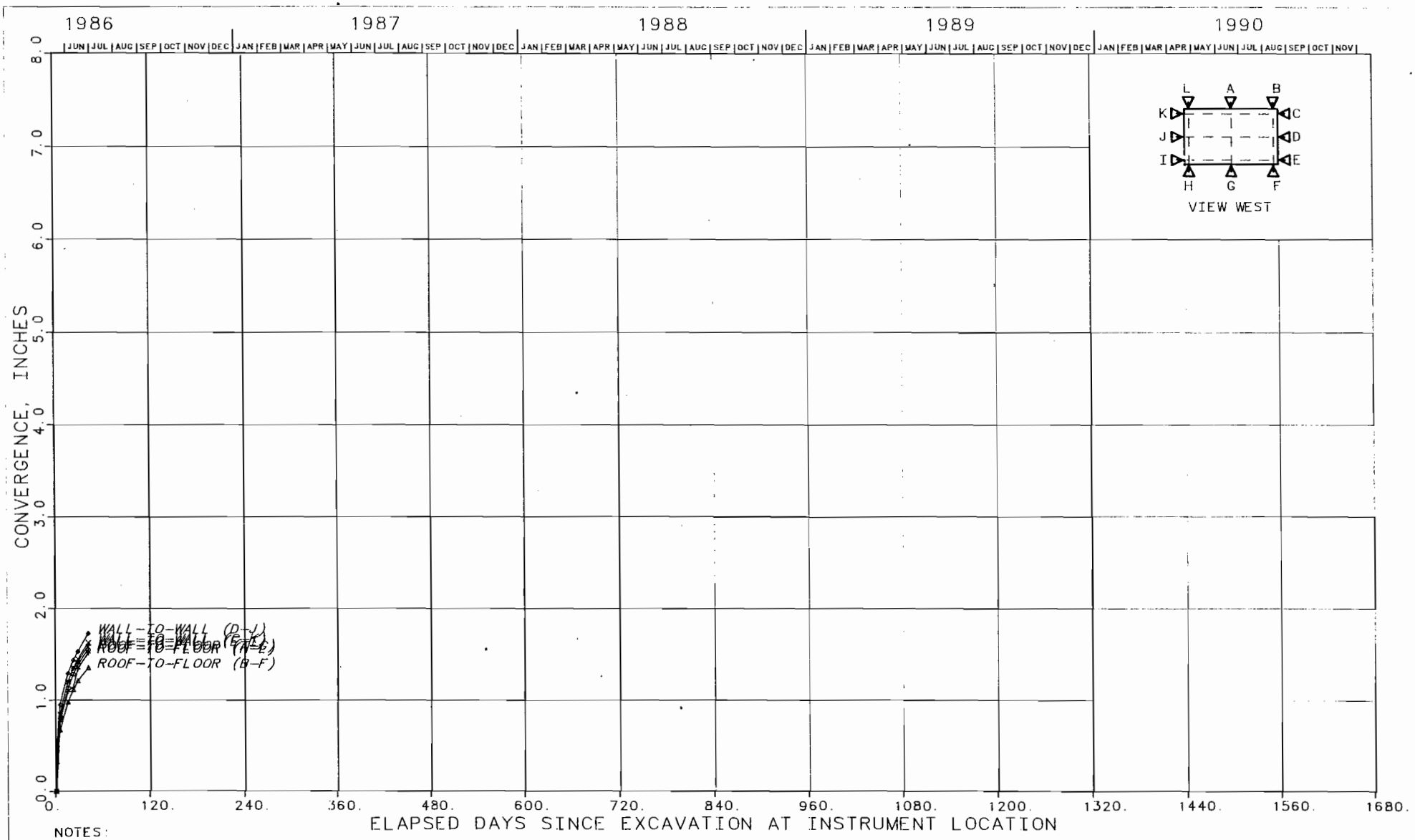
FIGURE J-306
CONVERGENCE POINTS
S1950 DRIFT, EAST 382 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

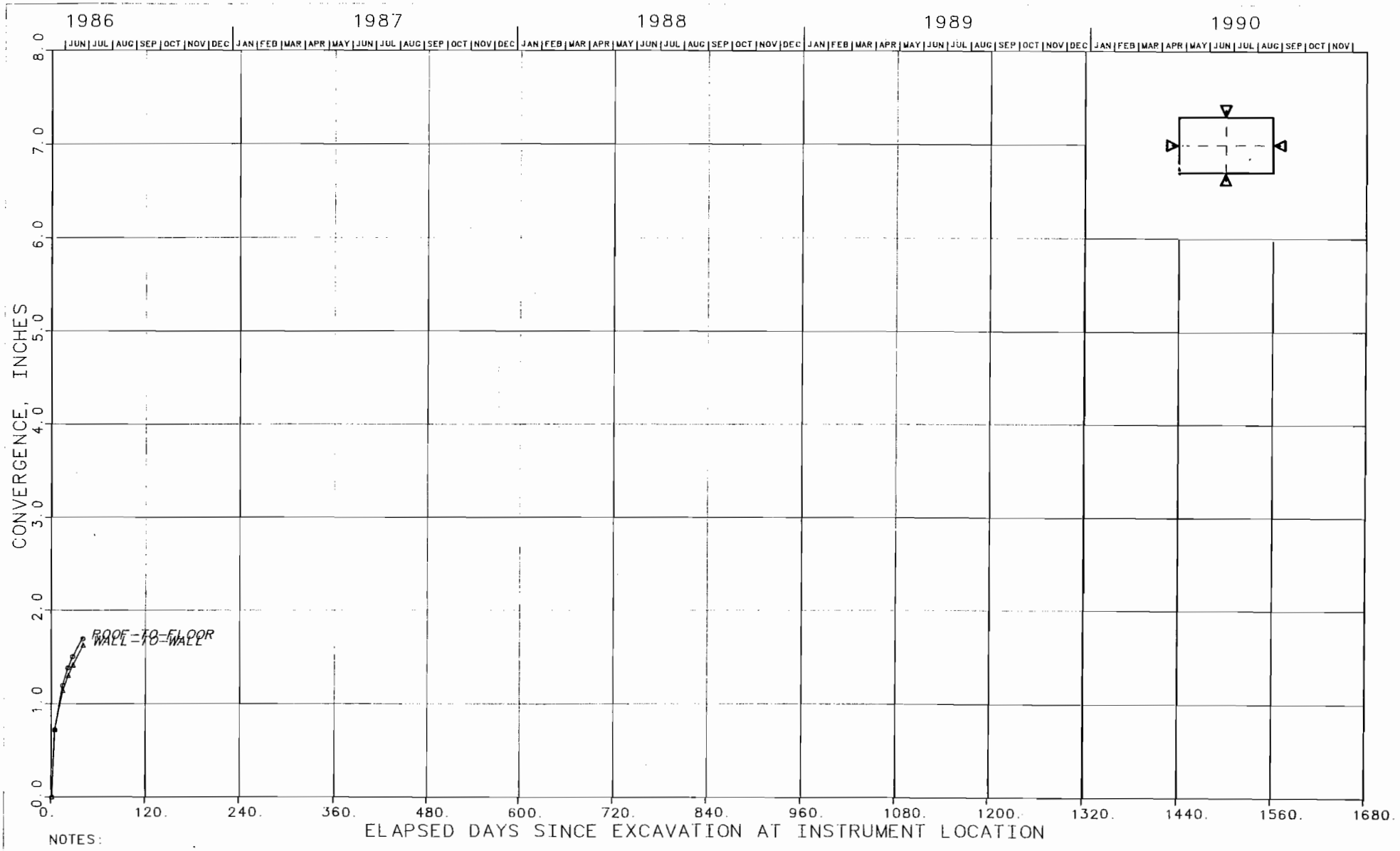
FIGURE J-306
CONVERGENCE POINTS
S1950 DRIFT, EAST 382 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

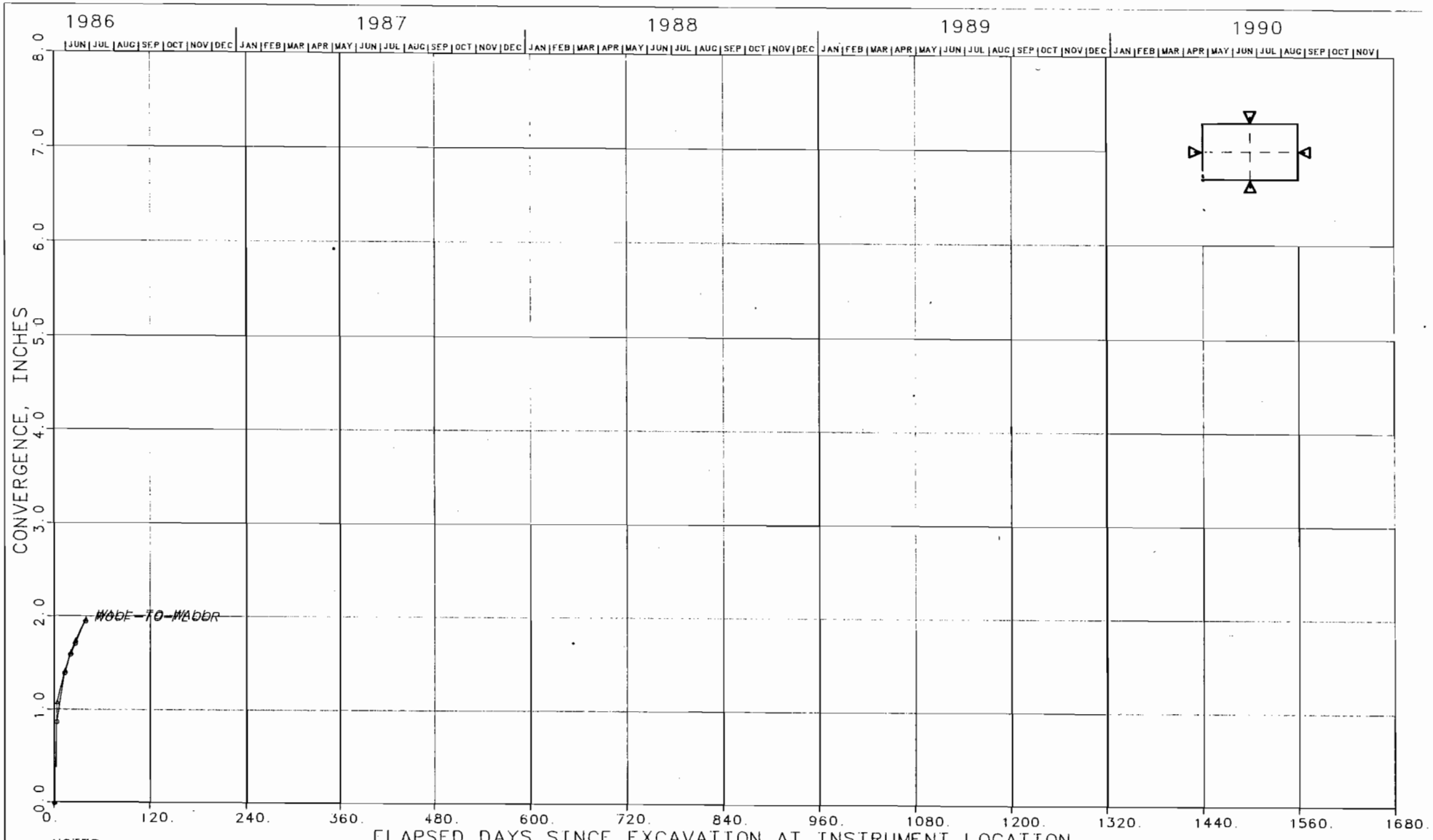
FIGURE J-307
CONVERGENCE POINTS
S1950 DRIFT, EAST 407 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

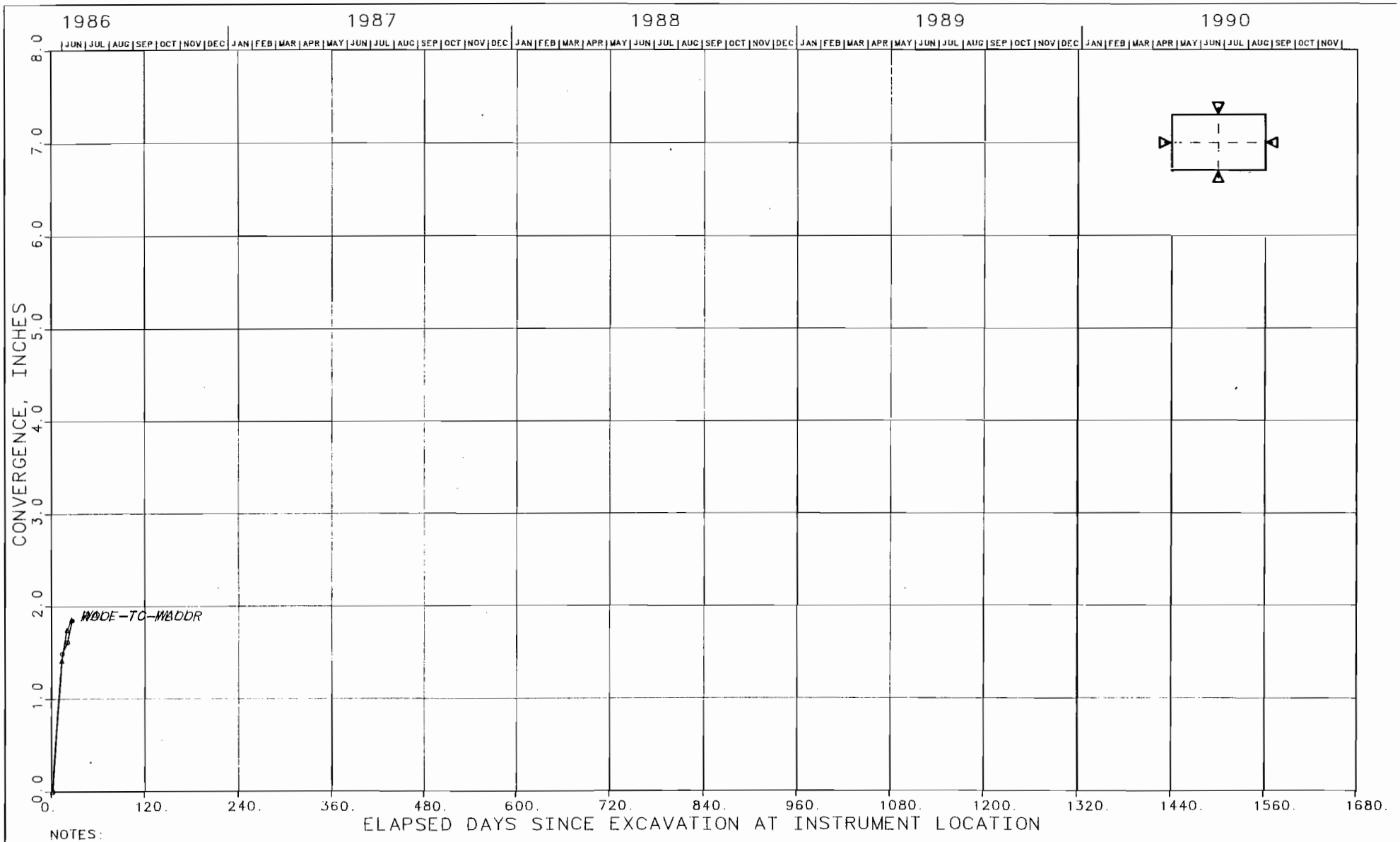
FIGURE J-308
CONVERGENCE POINTS
S1950 DRIFT, EAST 432 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

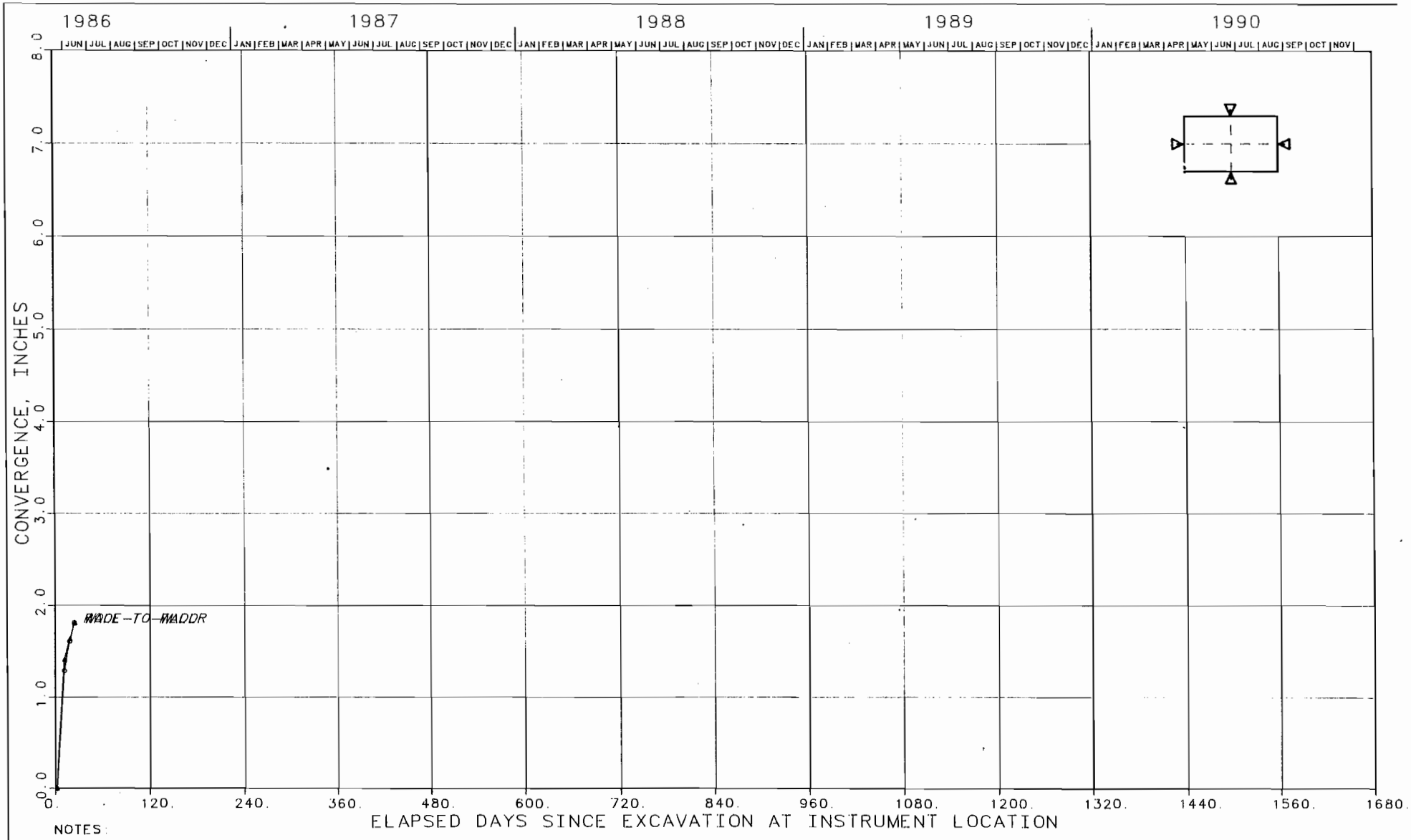
FIGURE J-309
CONVERGENCE POINTS
S1950 DRIFT, EAST 457 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

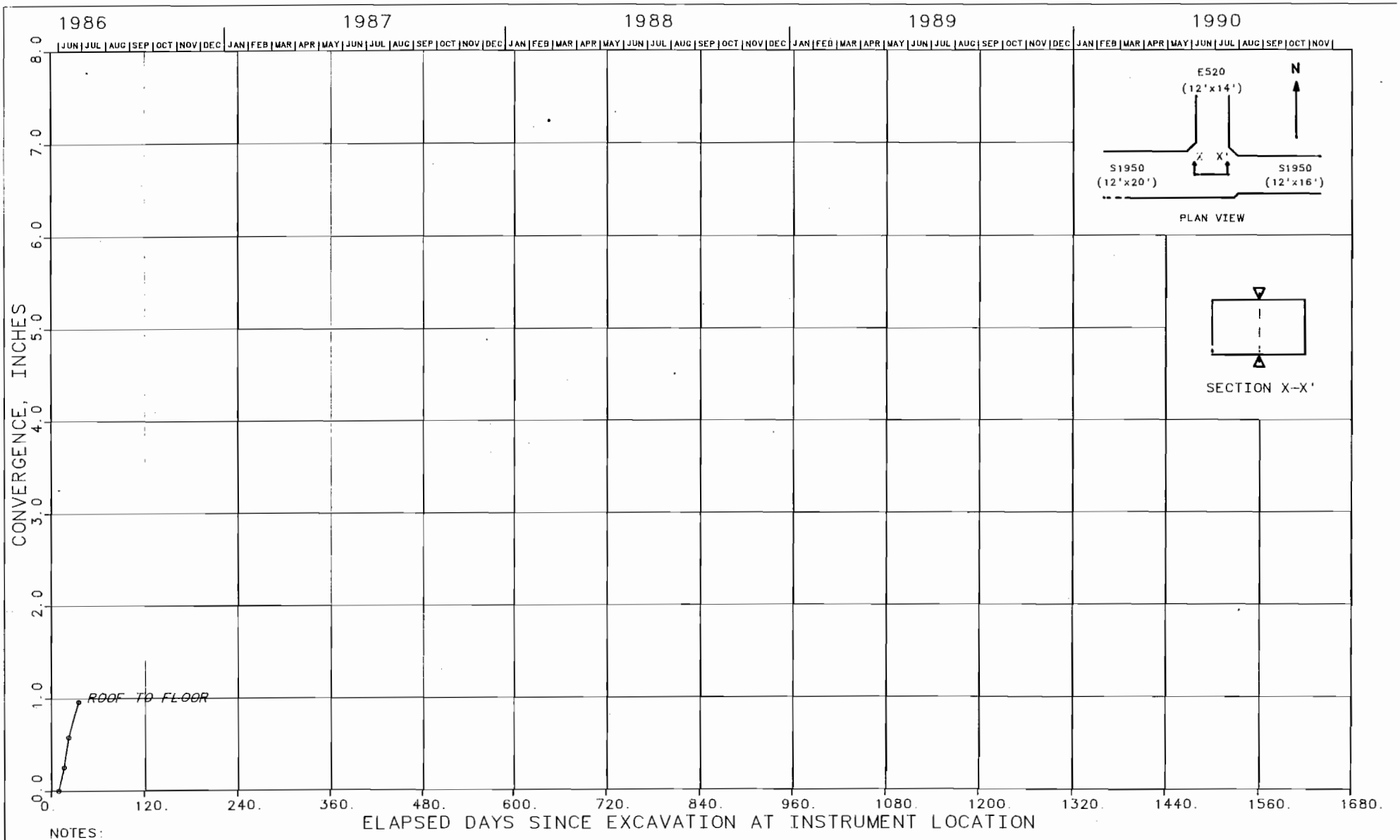
FIGURE J-310
CONVERGENCE POINTS
S1950 DRIFT, EAST 482 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

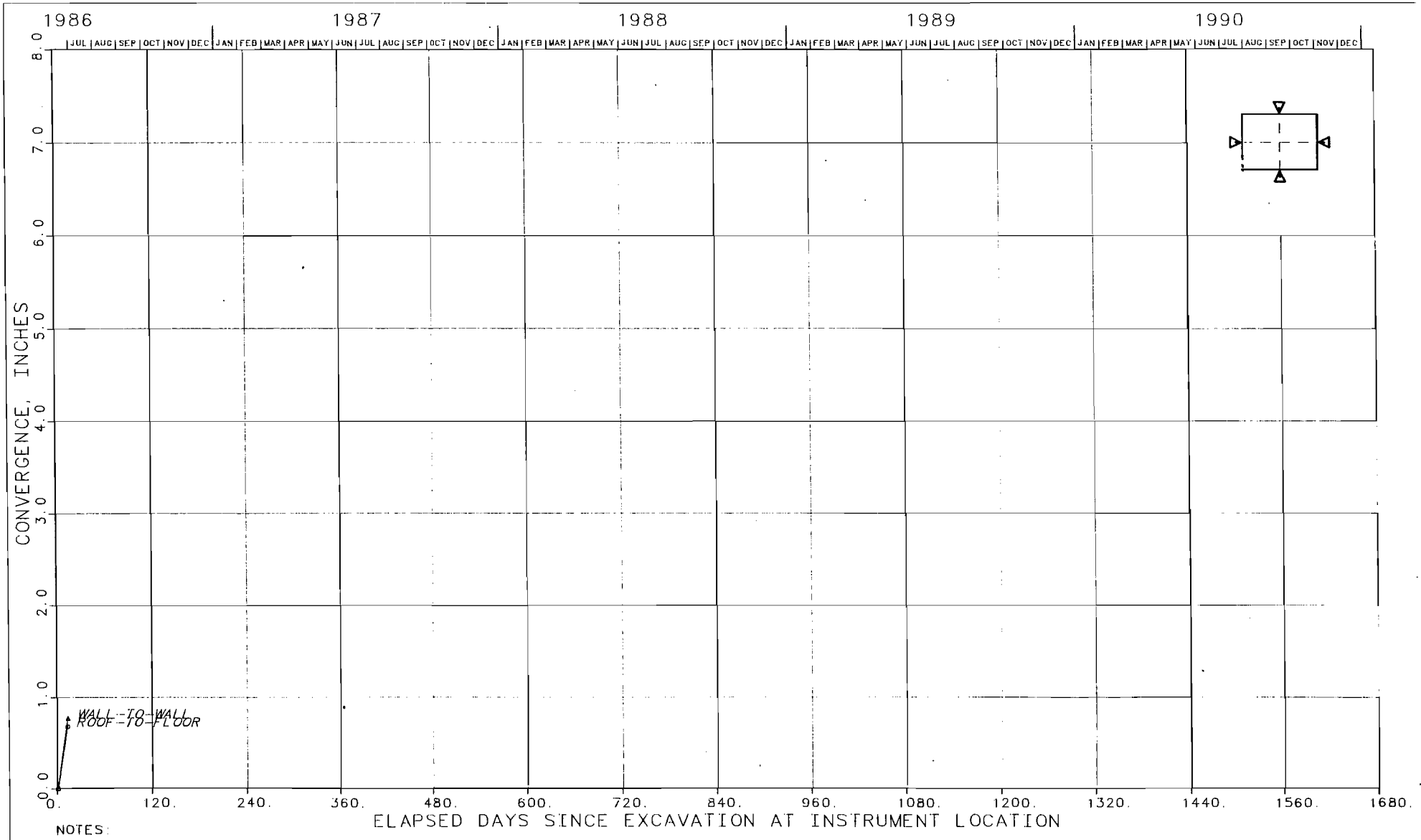
FIGURE J-311
CONVERGENCE POINTS
S1950 DRIFT, EAST 503 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 20 FT.

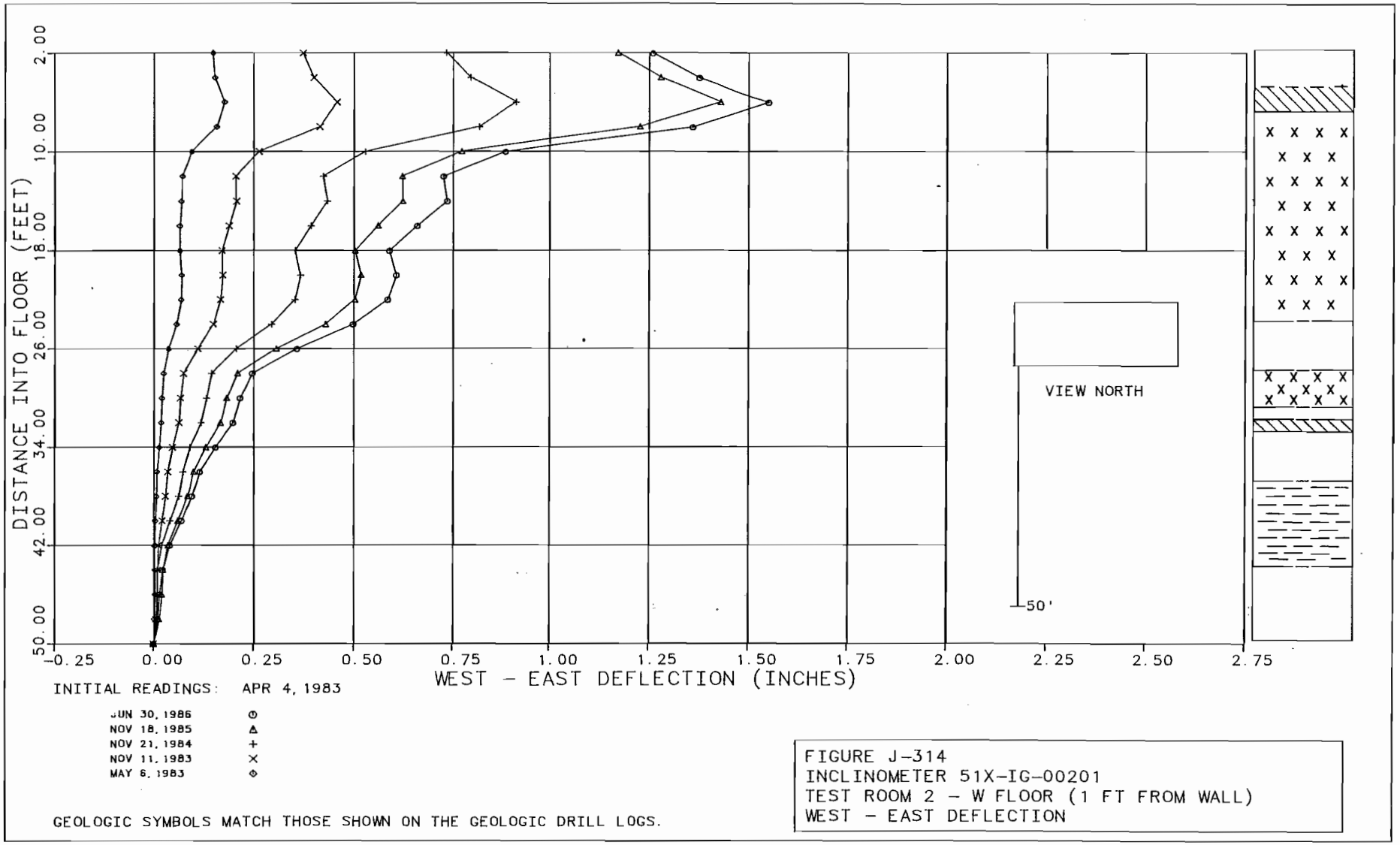
FIGURE J-312
CONVERGENCE POINTS
S1950 DRIFT, EAST 523 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



NOTES:

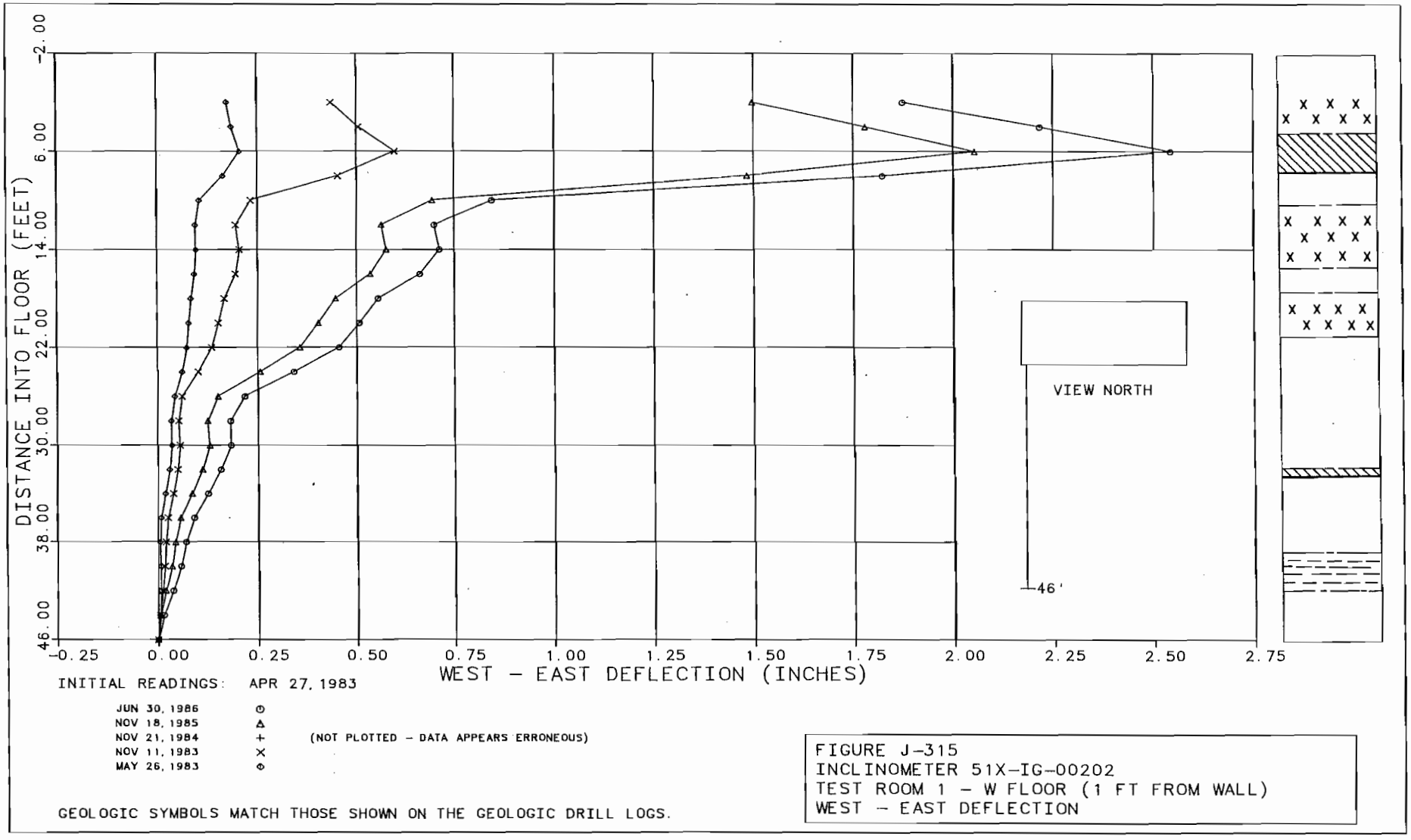
1. SIZE OF EXCAVATION: 12 FT X 20 FT.

FIGURE J-313
CONVERGENCE POINTS
S1950 DRIFT, EAST 586 FT
CONVERGENCE VS. TIME SINCE EXCAVATION



GEOLOGIC SYMBOLS MATCH THOSE SHOWN ON THE GEOLOGIC DRILL LOGS.

FIGURE J-314
INCLINOMETER 51X-IG-00201
TEST ROOM 2 - W FLOOR (1 FT FROM WALL)
WEST - EAST DEFLECTION



INITIAL READINGS: APR 27, 1983

JUN 30, 1986	⊙
NOV 18, 1985	△
NOV 21, 1984	+
NOV 11, 1983	×
MAY 26, 1983	⊕

(NOT PLOTTED - DATA APPEARS ERRONEOUS)

GEOLOGIC SYMBOLS MATCH THOSE SHOWN ON THE GEOLOGIC DRILL LOGS.

FIGURE J-315
INCLINOMETER 51X-IG-00202
TEST ROOM 1 - W FLOOR (1 FT FROM WALL)
WEST - EAST DEFLECTION

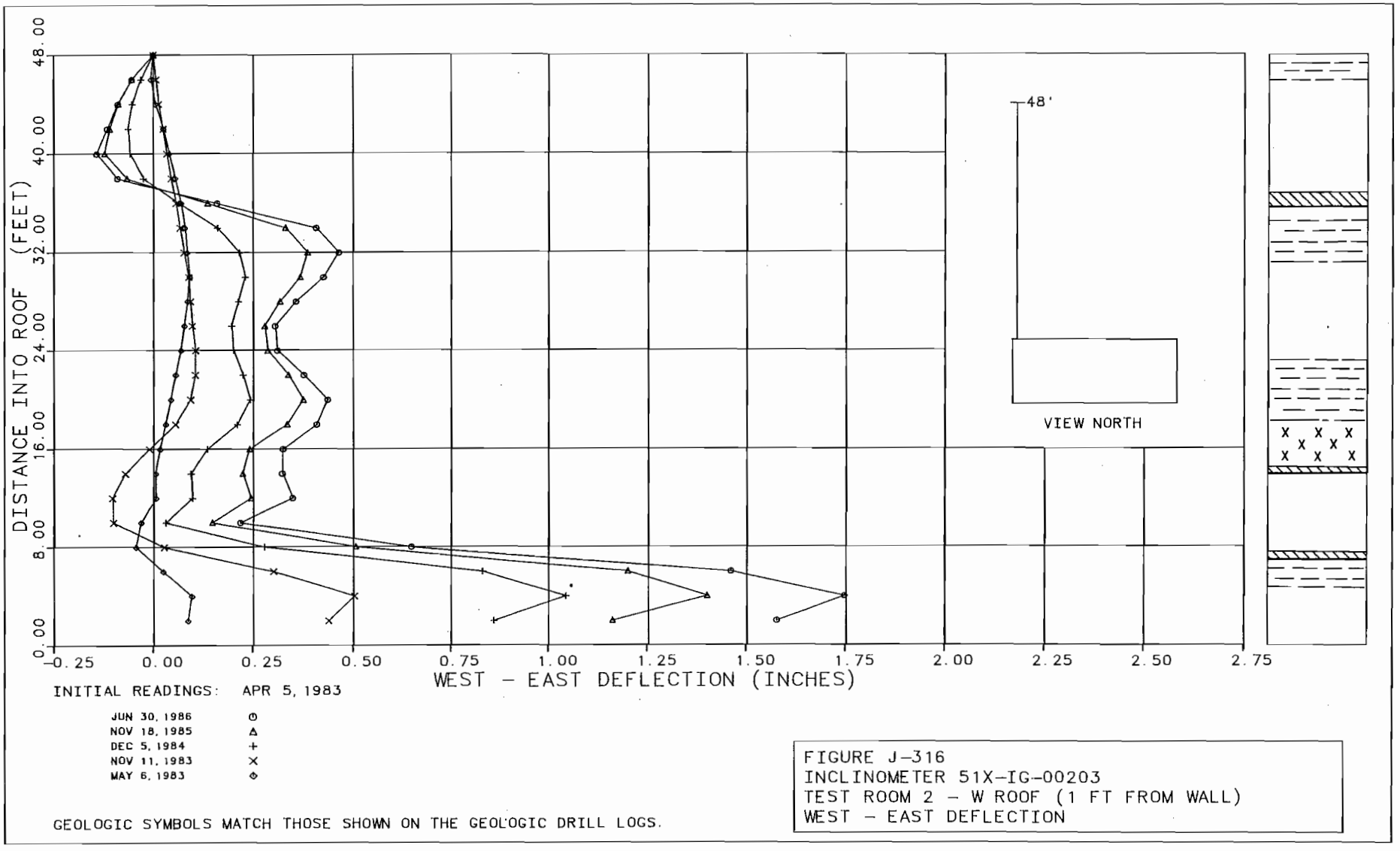


FIGURE J-316
INCLINOMETER 51X-IG-00203
TEST ROOM 2 - W ROOF (1 FT FROM WALL)
WEST - EAST DEFLECTION

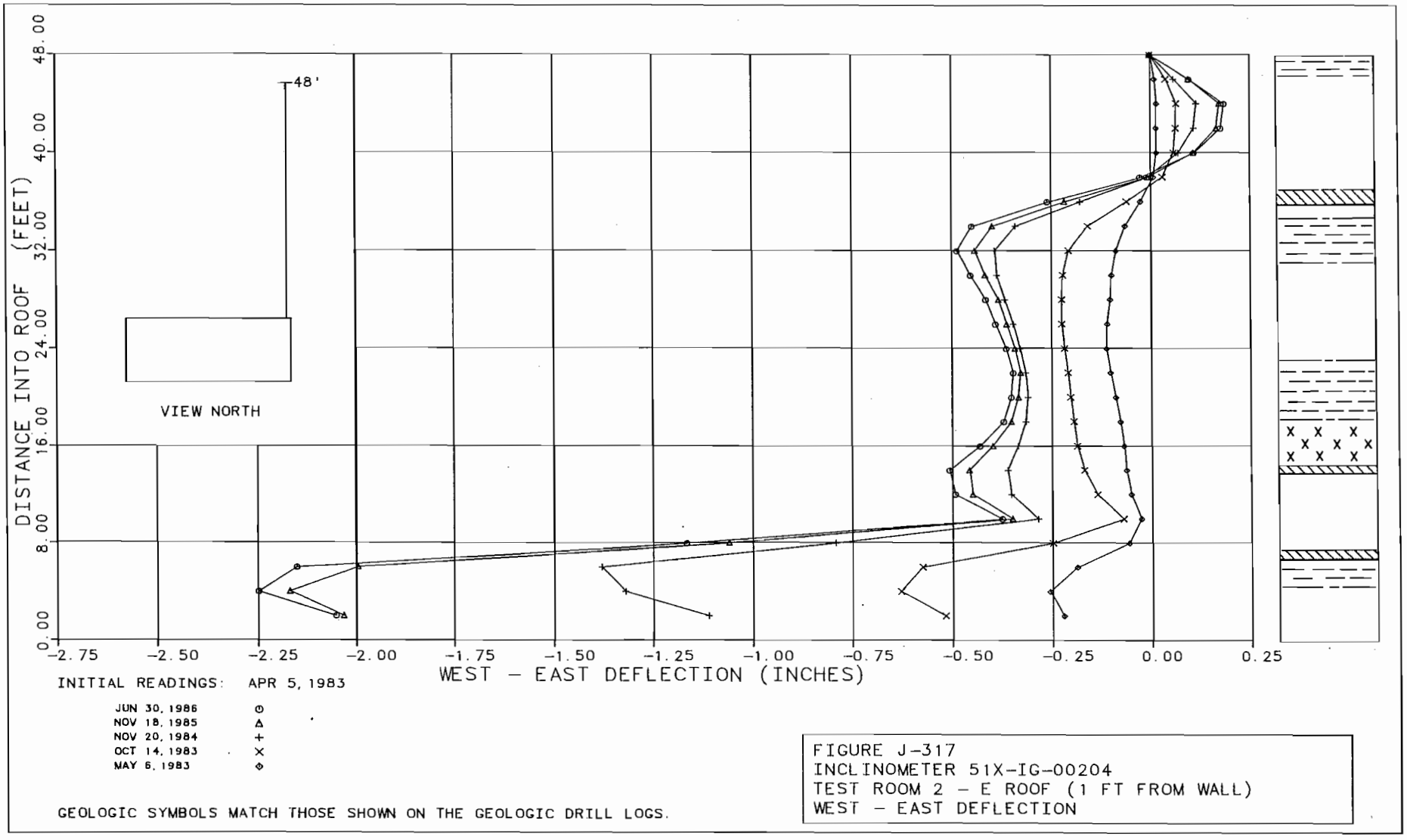
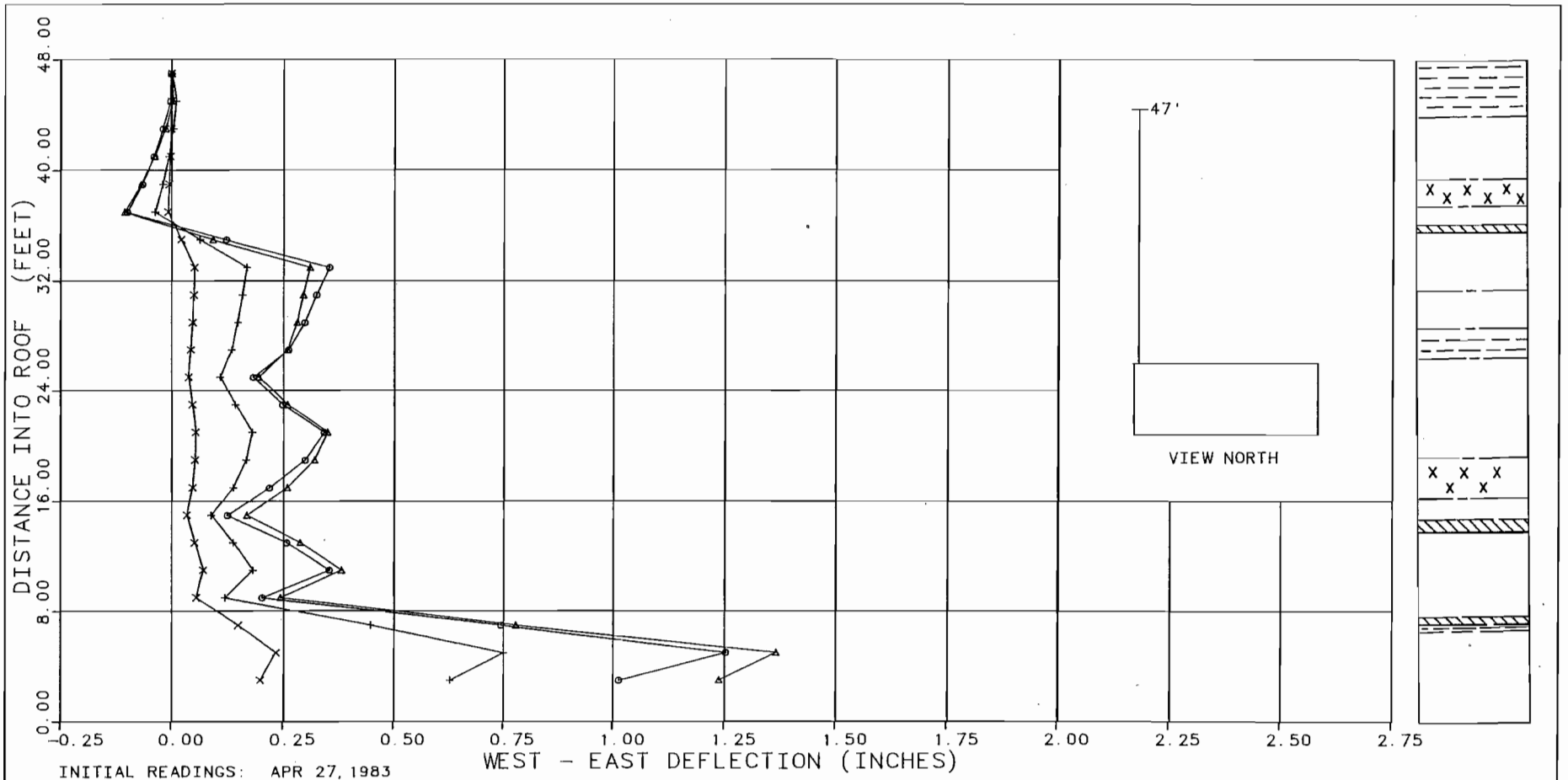


FIGURE J-317
INCLINOMETER 51X-IG-00204
TEST ROOM 2 - E ROOF (1 FT FROM WALL)
WEST - EAST DEFLECTION



GEOLOGIC SYMBOLS MATCH THOSE SHOWN ON THE GEOLOGIC DRILL LOGS.

FIGURE J-318
INCLINOMETER 51X-IG-00205
TEST ROOM 1 - W ROOF (1 FT FROM WALL)
WEST - EAST DEFLECTION

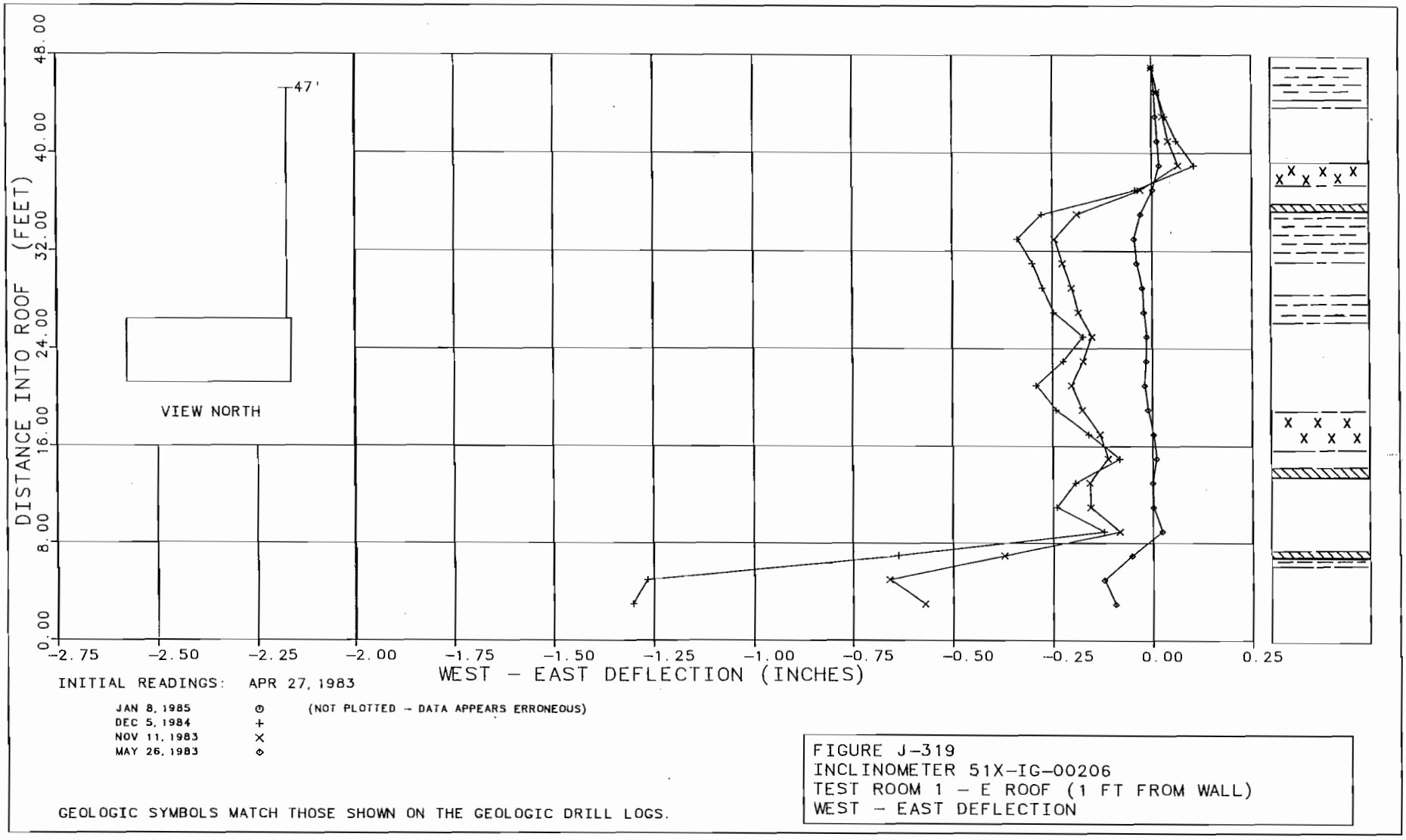


FIGURE J-319
INCLINOMETER 51X-IG-00206
TEST ROOM 1 - E ROOF (1 FT FROM WALL)
WEST - EAST DEFLECTION

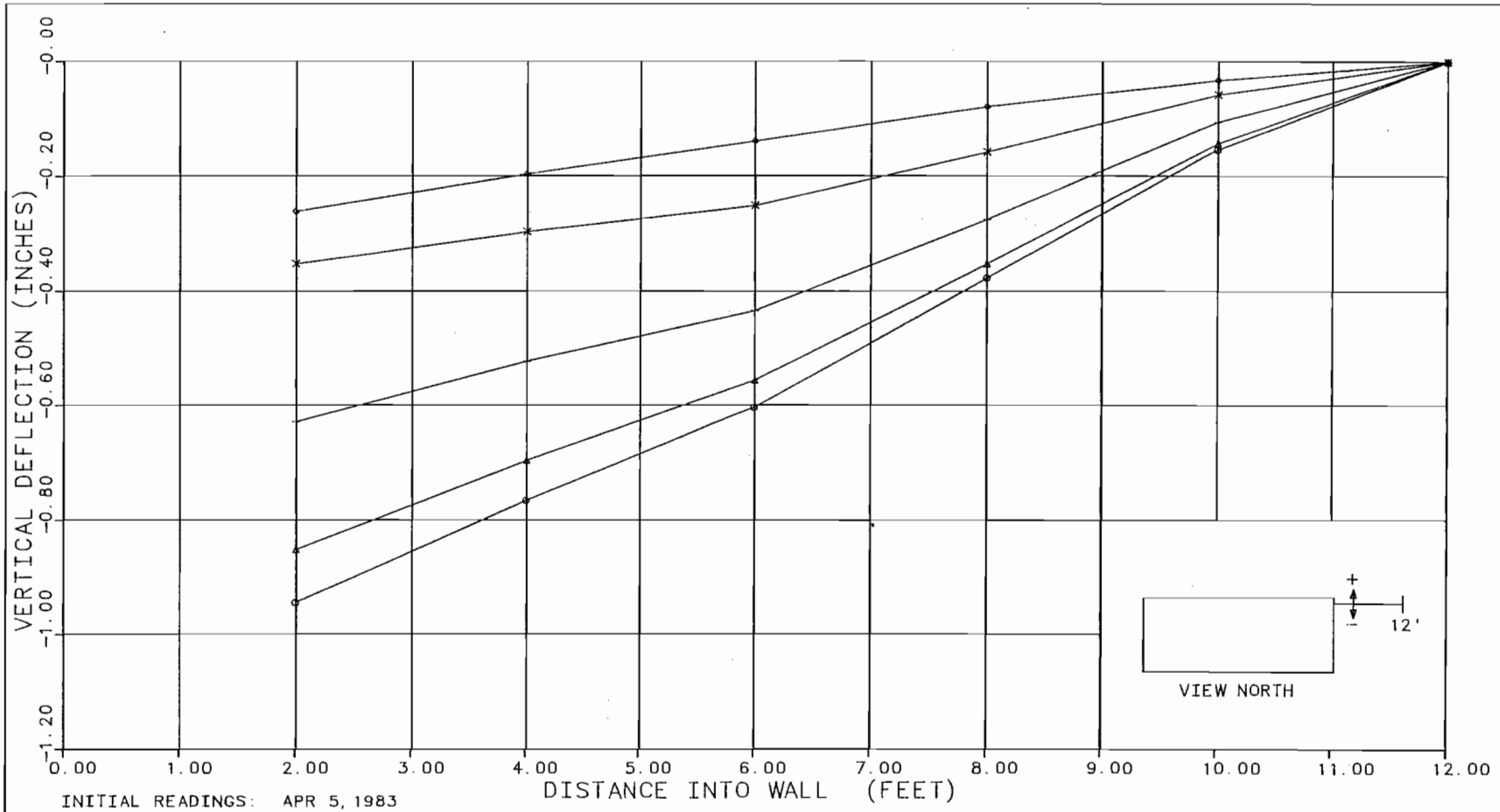


FIGURE J-320
INCLINOMETER 51X-IG-00211
TEST ROOM 2 - E WALL (1 FT FROM ROOF)
VERTICAL DEFLECTION

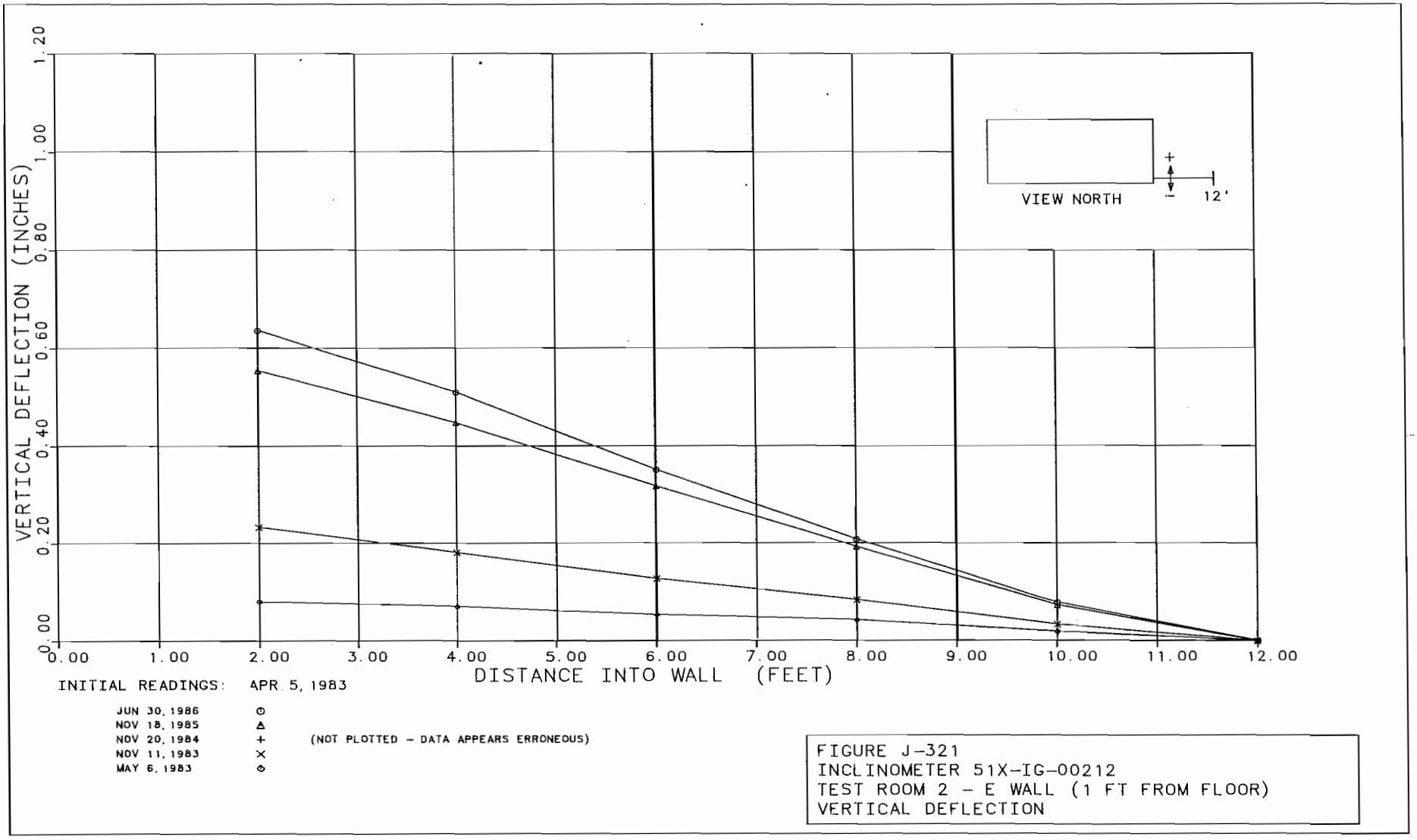


FIGURE J-321
INCLINOMETER 51X-IG-00212
TEST ROOM 2 – E WALL (1 FT FROM FLOOR)
VERTICAL DEFLECTION

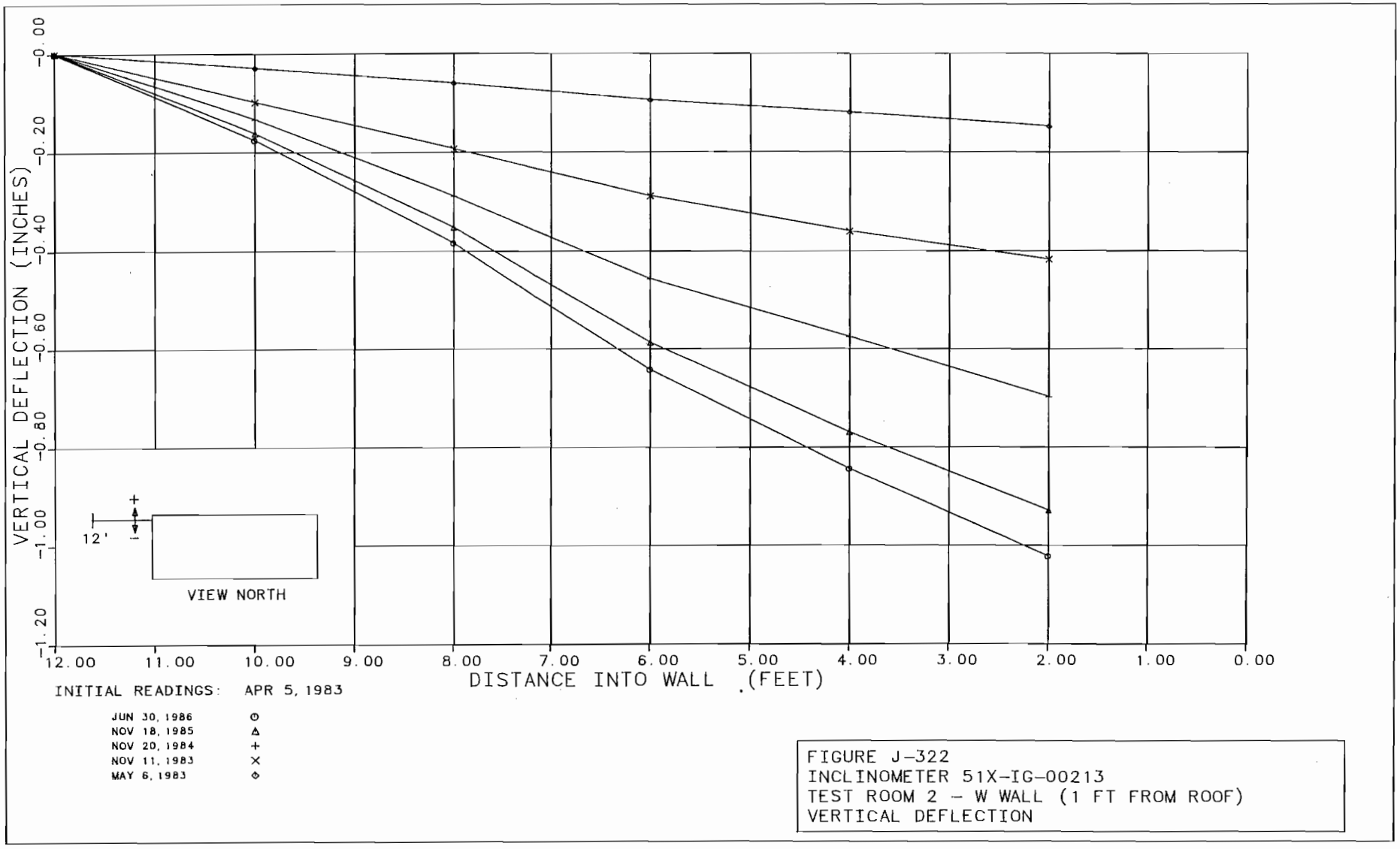


FIGURE J-322
INCLINOMETER 51X-IG-00213
TEST ROOM 2 - W WALL (1 FT FROM ROOF)
VERTICAL DEFLECTION

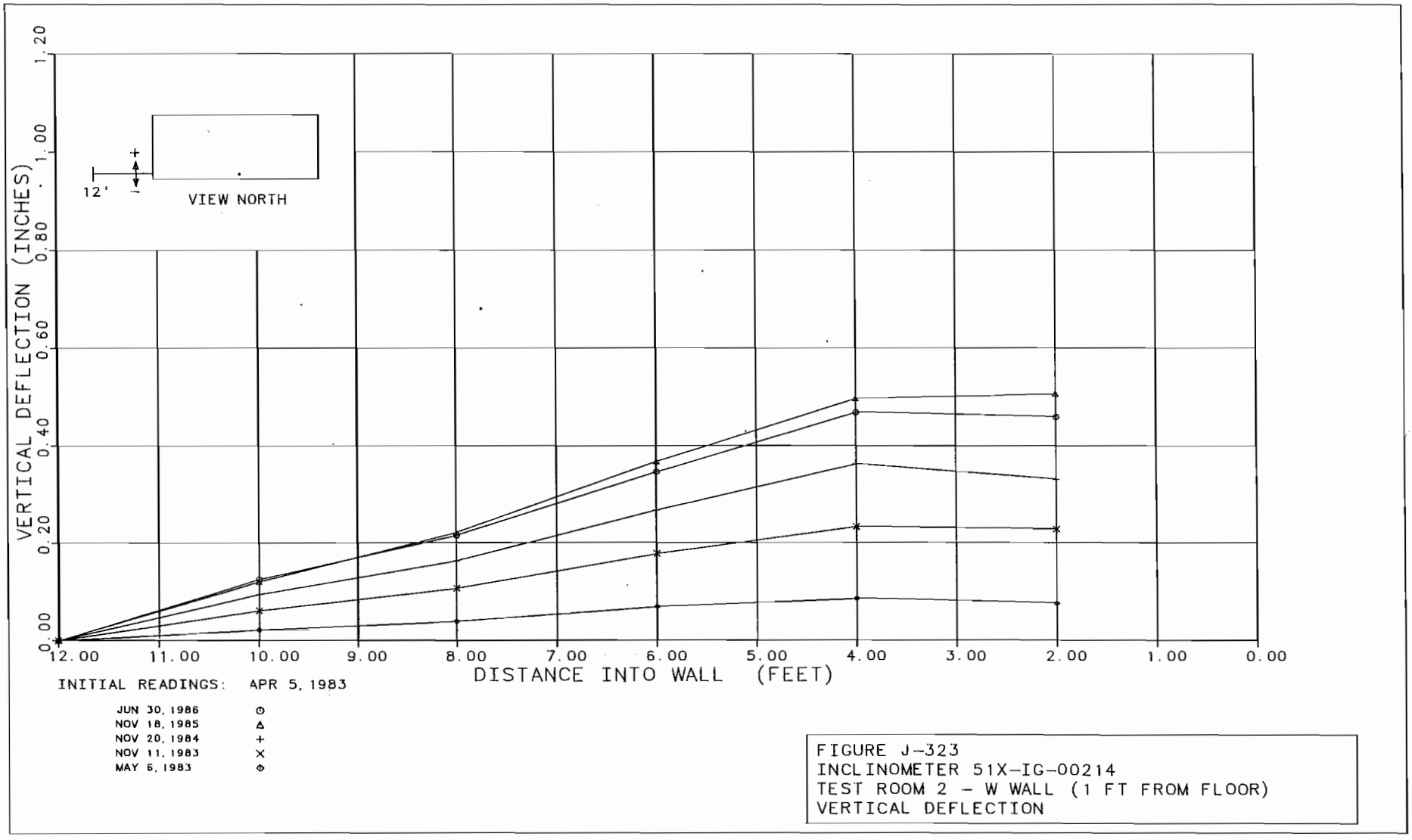


FIGURE J-323
INCLINOMETER 51X-IG-00214
TEST ROOM 2 - W WALL (1 FT FROM FLOOR)
VERTICAL DEFLECTION

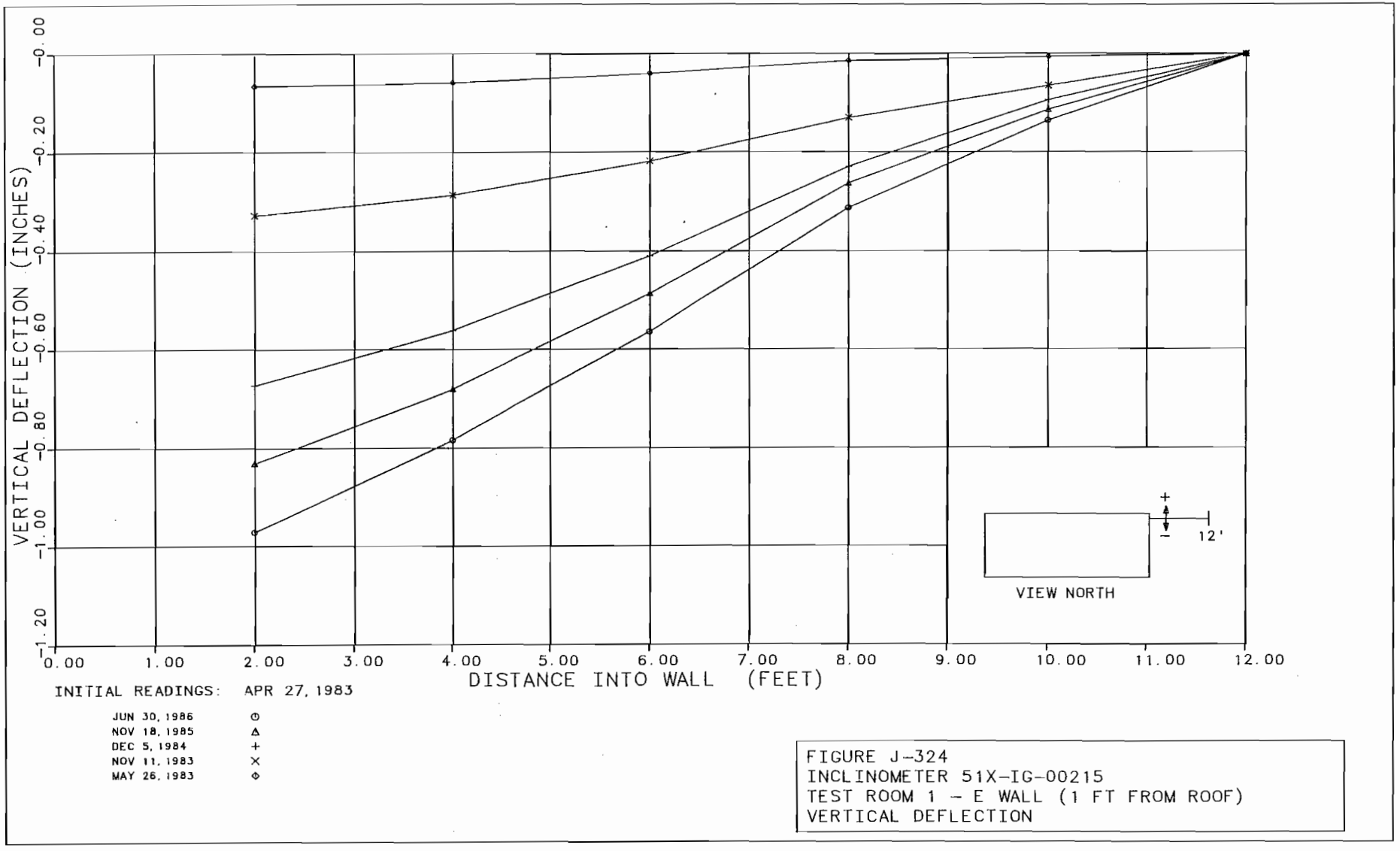


FIGURE J-324
INCLINOMETER 51X-IG-00215
TEST ROOM 1 - E WALL (1 FT FROM ROOF)
VERTICAL DEFLECTION

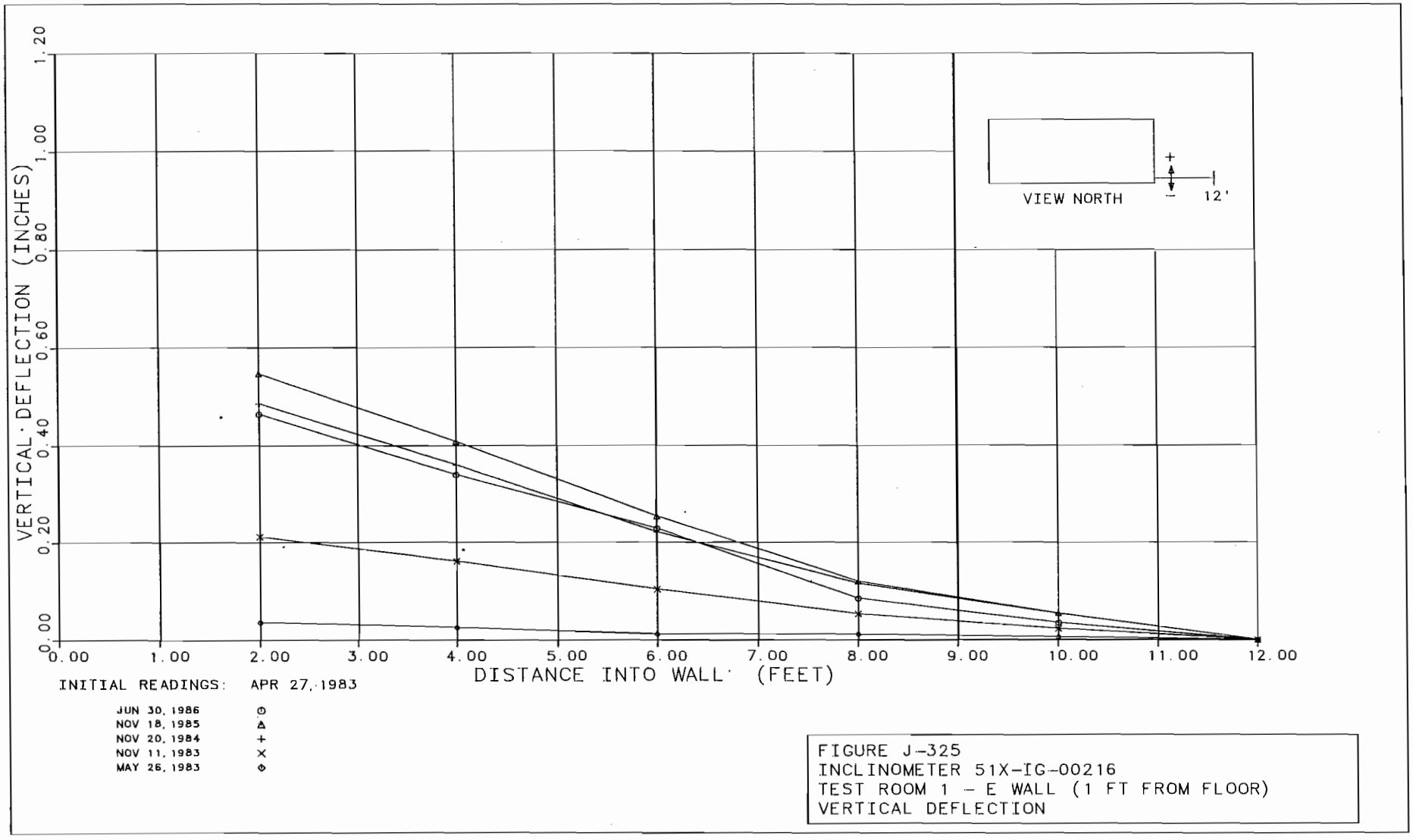


FIGURE J-325
INCLINOMETER 51X-IG-00216
TEST ROOM 1 - E WALL (1 FT FROM FLOOR)
VERTICAL DEFLECTION

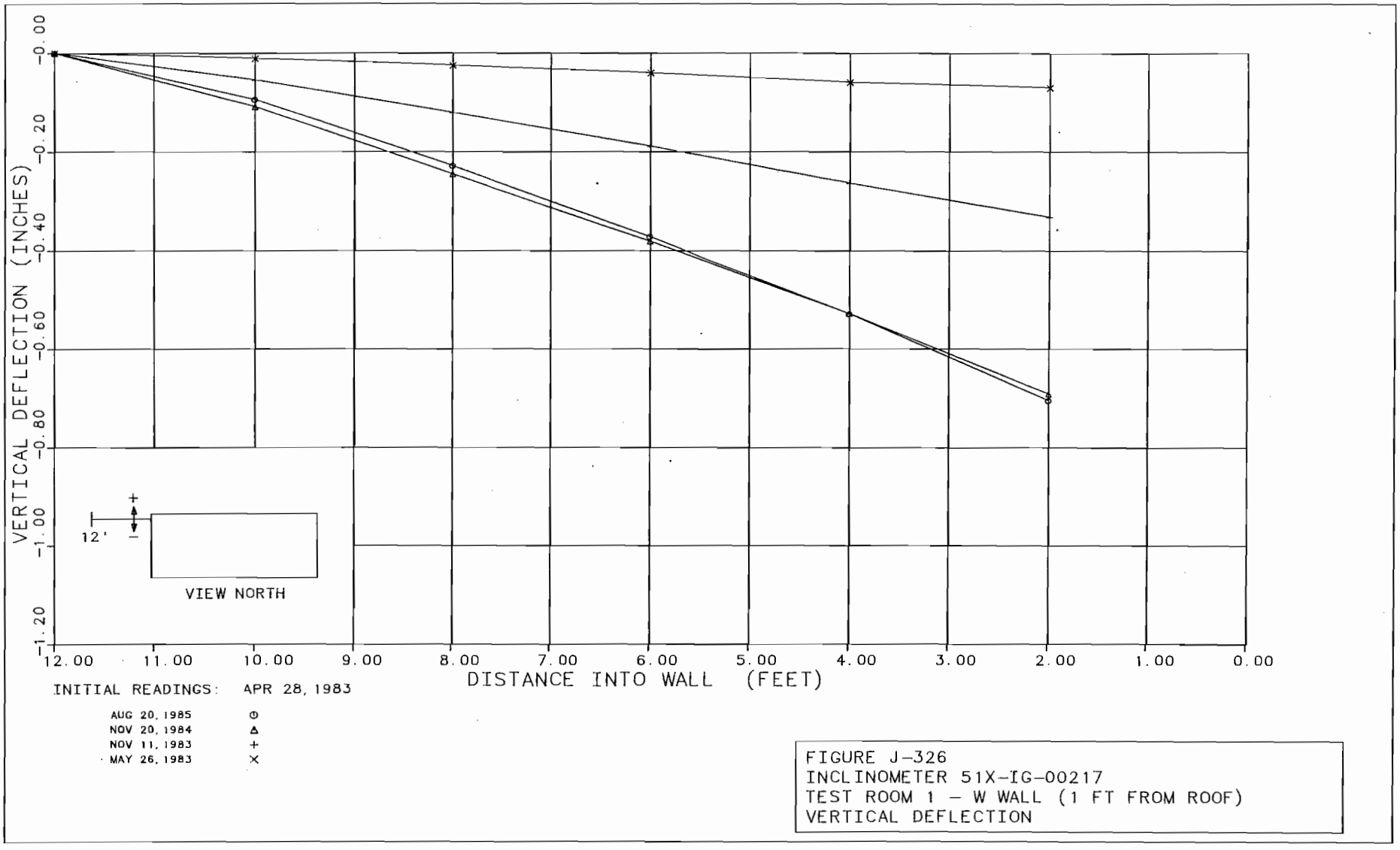


FIGURE J-326
INCLINOMETER 51X-IG-00217
TEST ROOM 1 - W WALL (1 FT FROM ROOF)
VERTICAL DEFLECTION

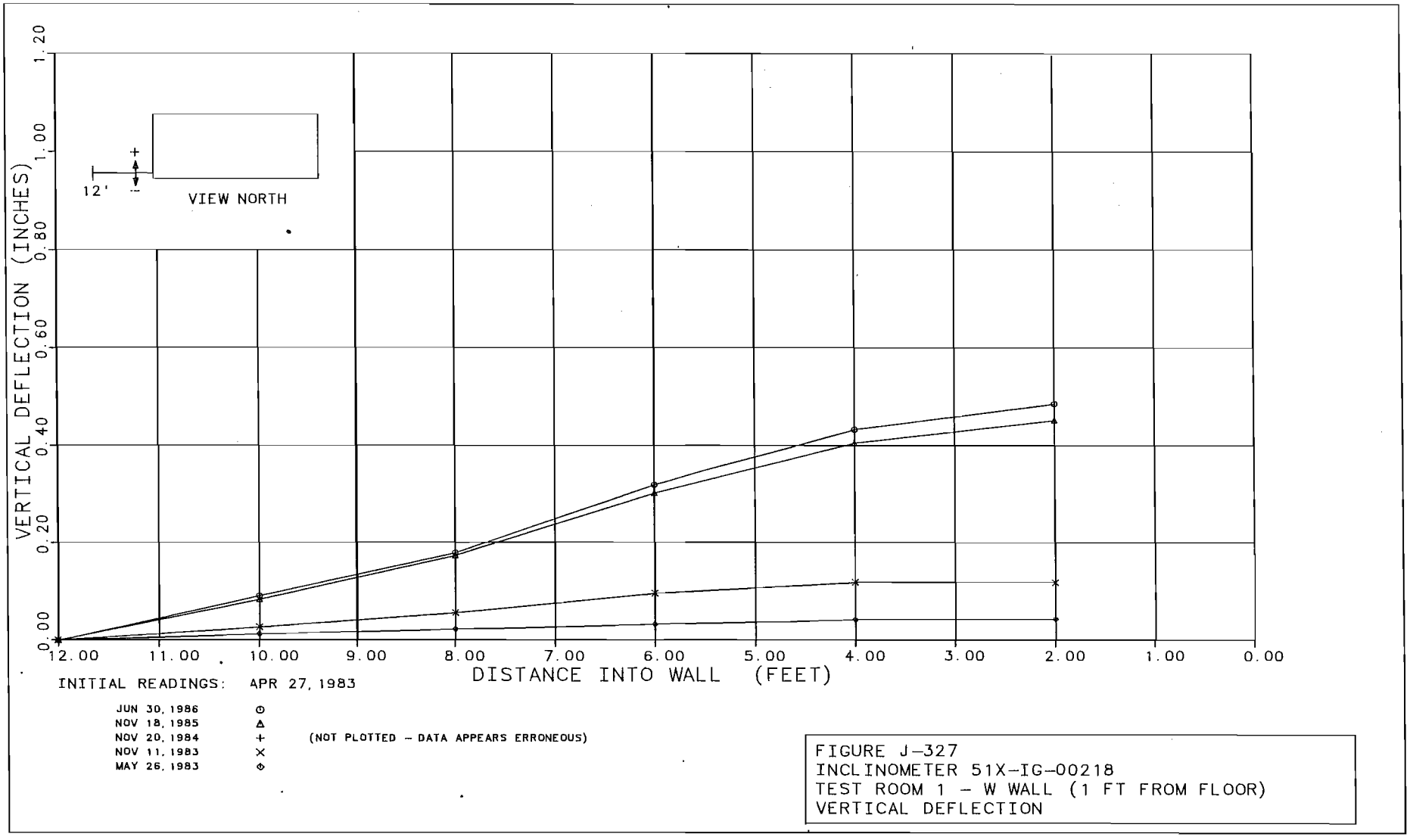


FIGURE J-327
INCLINOMETER 51X-IG-00218
TEST ROOM 1 - W WALL (1 FT FROM FLOOR)
VERTICAL DEFLECTION

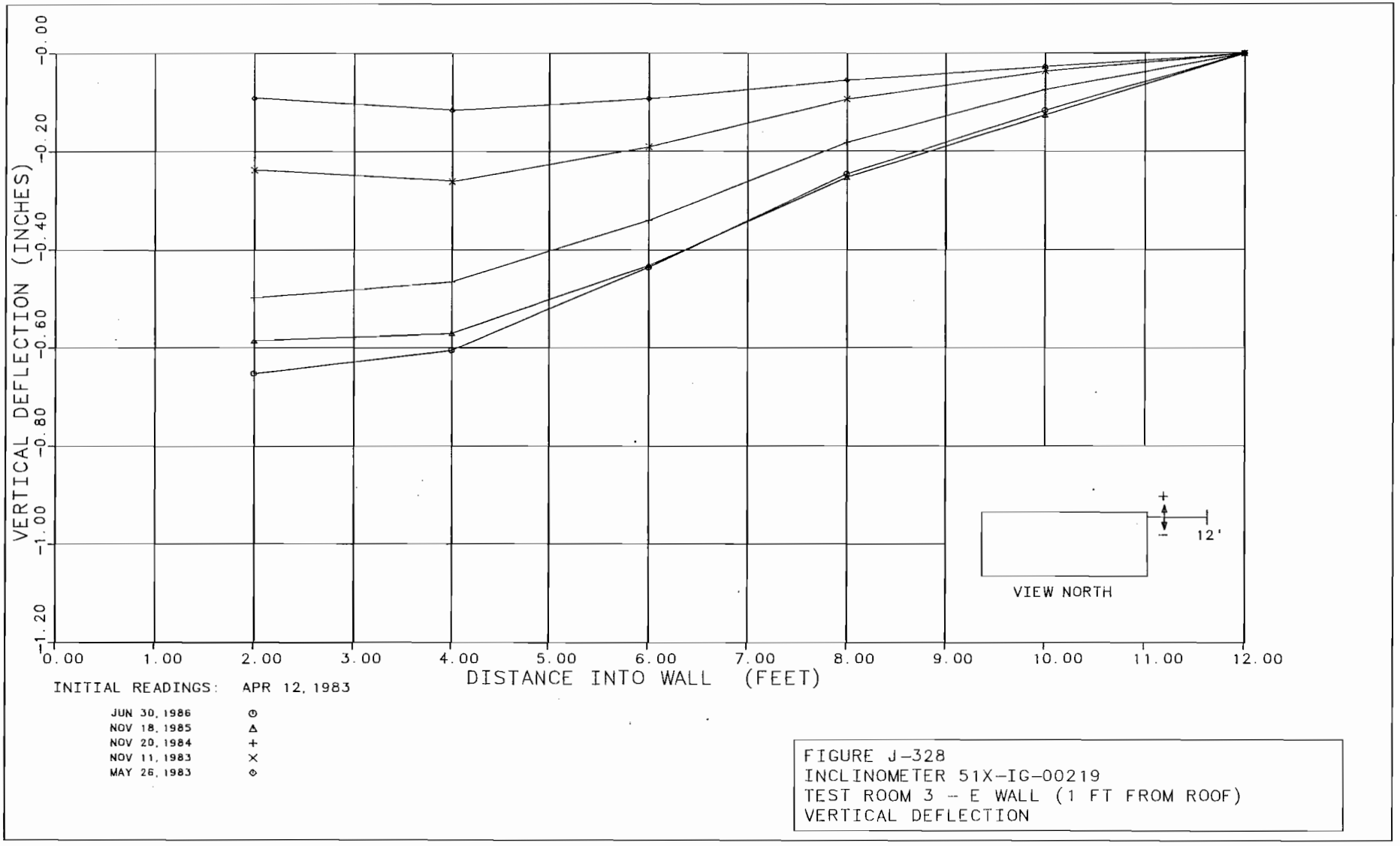


FIGURE J-328
INCLINOMETER 51X-IG-00219
TEST ROOM 3 -- E WALL (1 FT FROM ROOF)
VERTICAL DEFLECTION

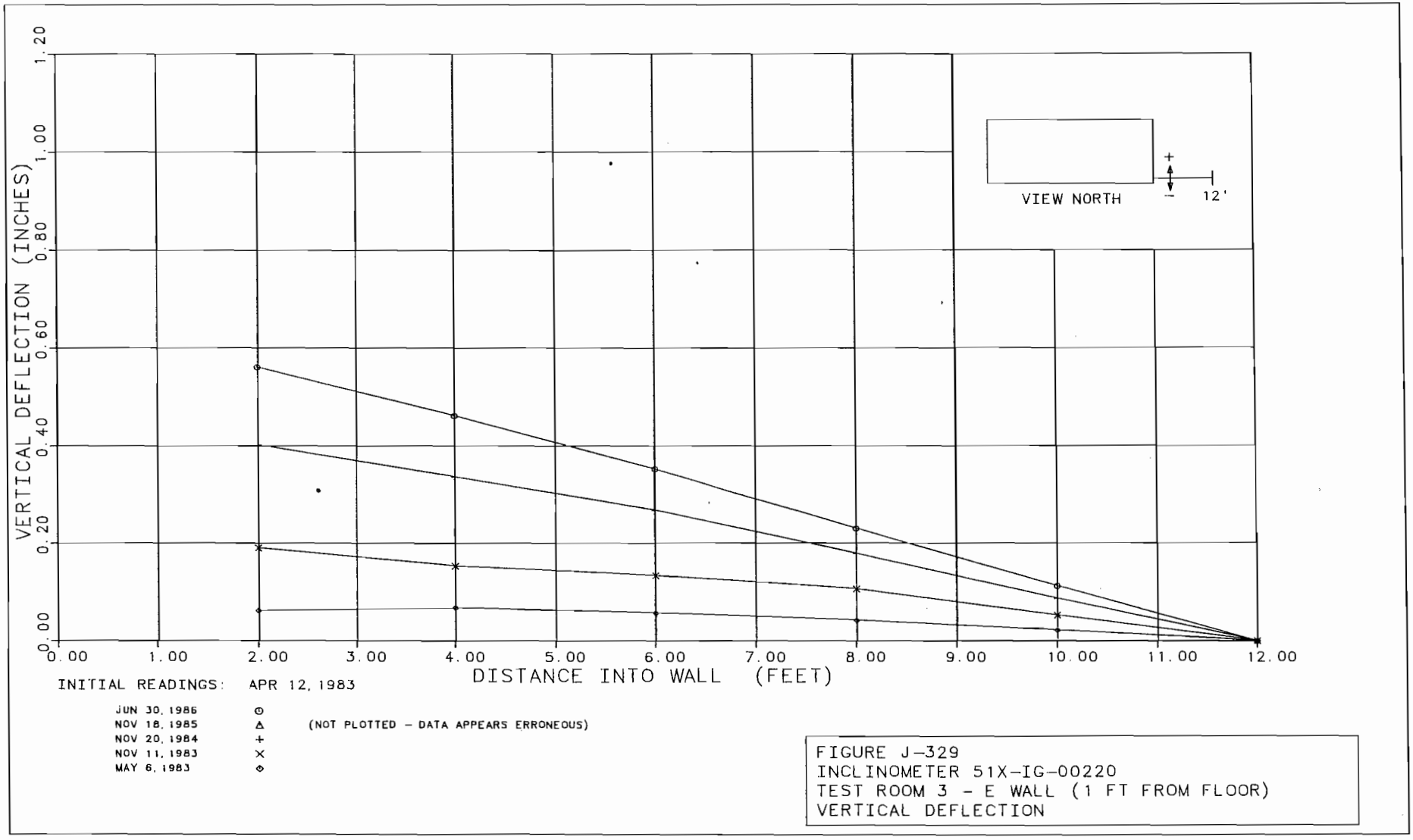


FIGURE J-329
INCLINOMETER 51X-IG-00220
TEST ROOM 3 - E WALL (1 FT FROM FLOOR)
VERTICAL DEFLECTION

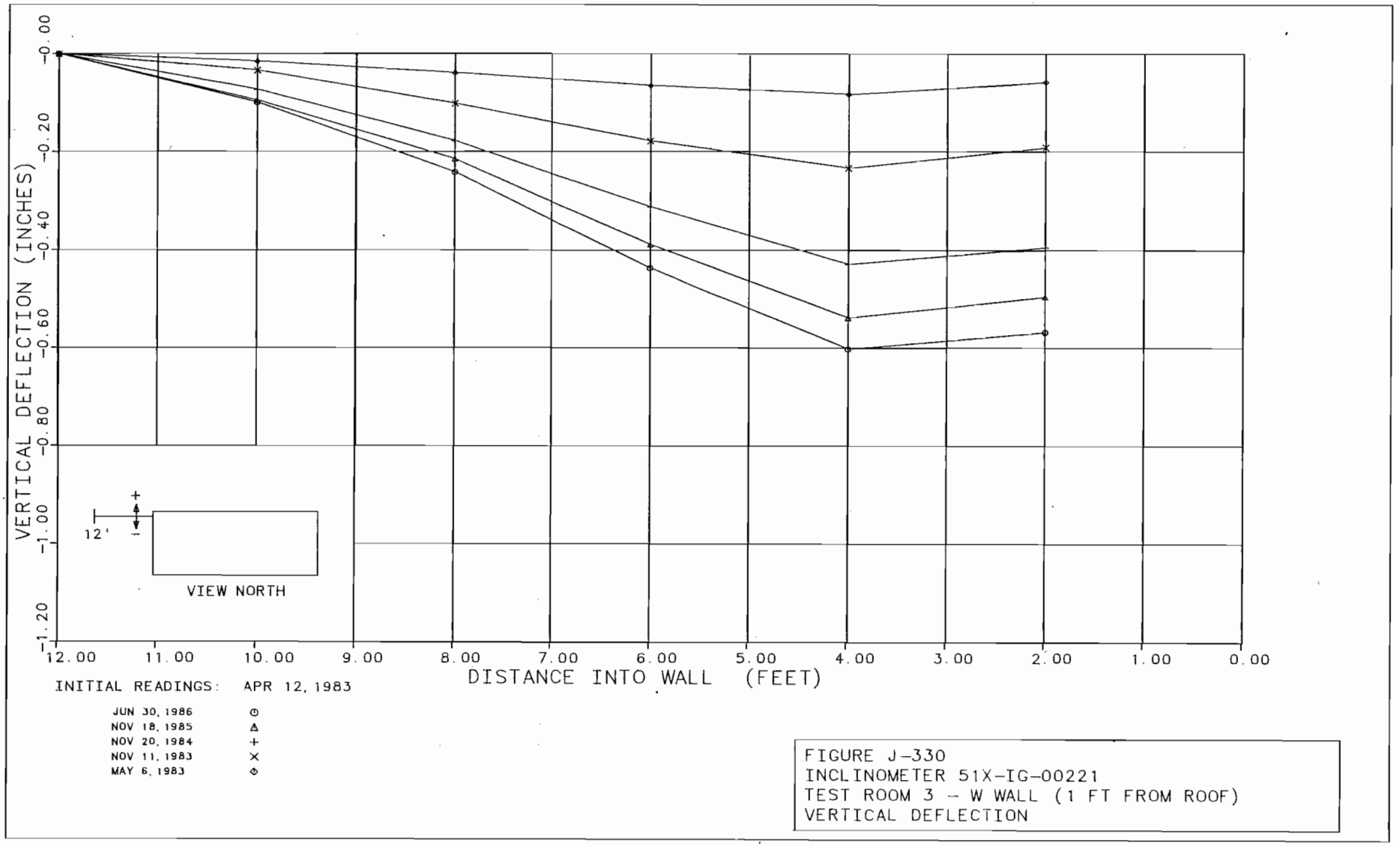


FIGURE J-330
INCLINOMETER 51X-IG-00221
TEST ROOM 3 - W WALL (1 FT FROM ROOF)
VERTICAL DEFLECTION

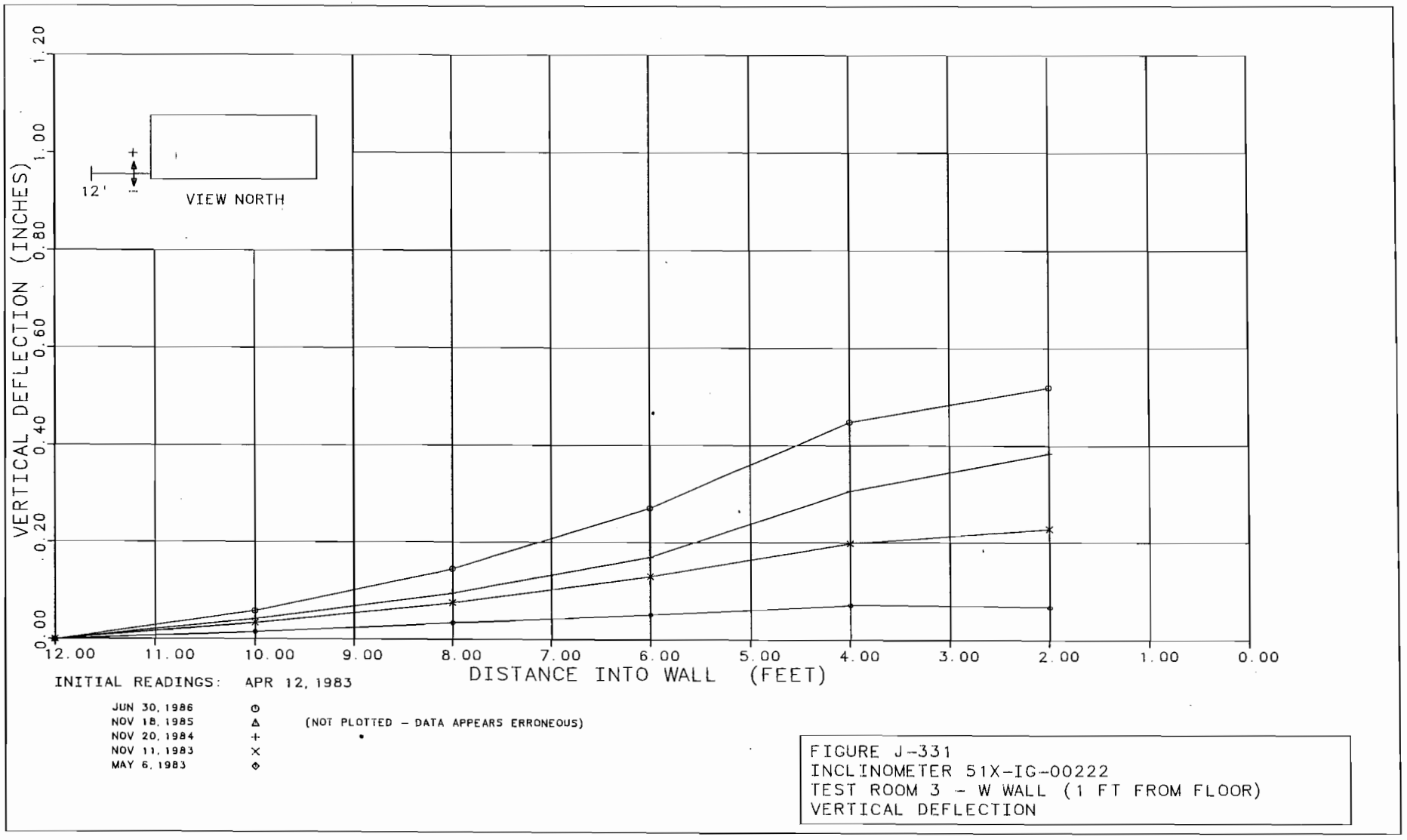


FIGURE J-331
INCLINOMETER 51X-IG-00222
TEST ROOM 3 - W WALL (1 FT FROM FLOOR)
VERTICAL DEFLECTION

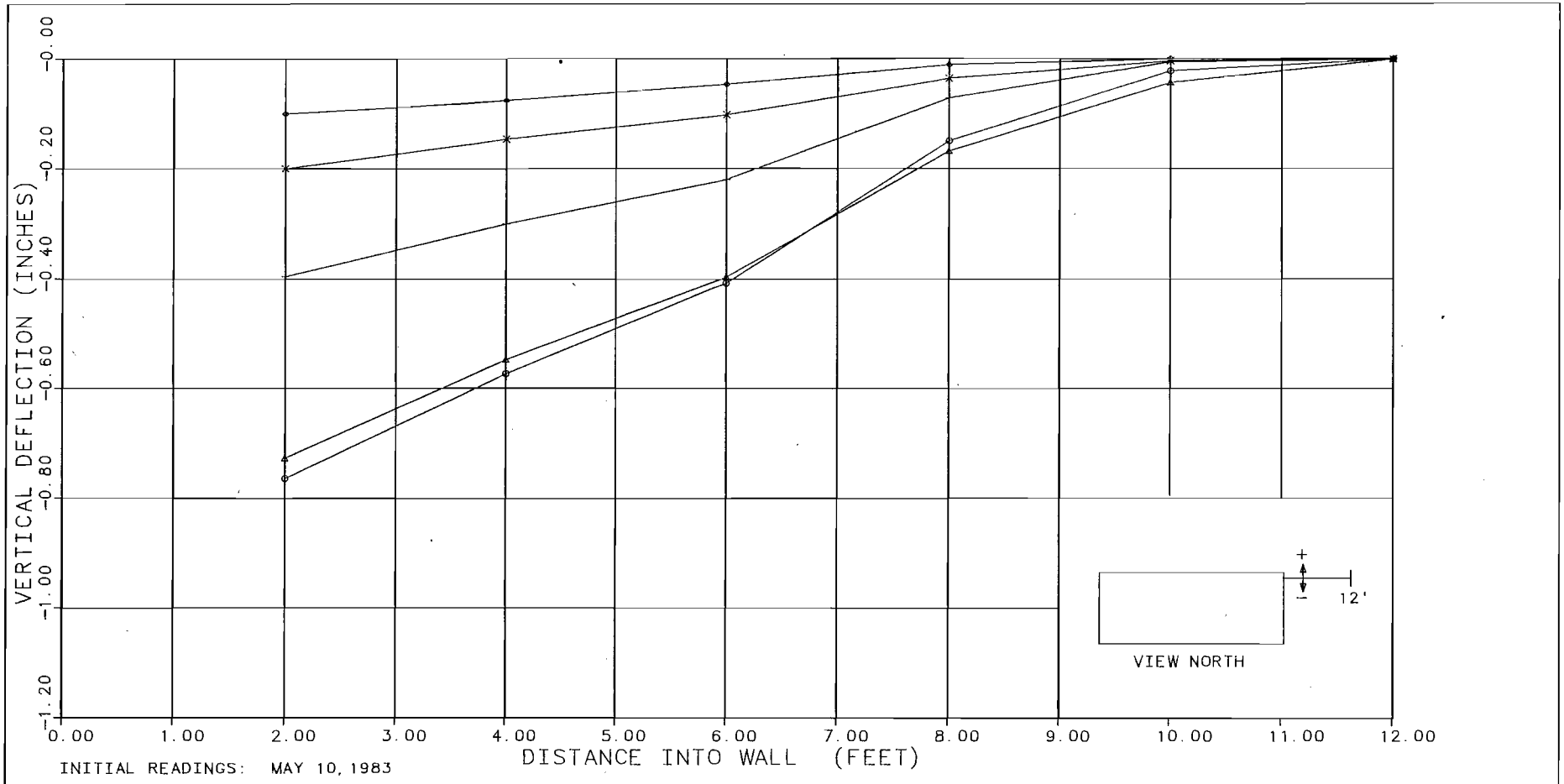


FIGURE J-332
INCLINOMETER 51X-IG-00223
TEST ROOM 4 - E WALL (1 FT FROM ROOF)
VERTICAL DEFLECTION

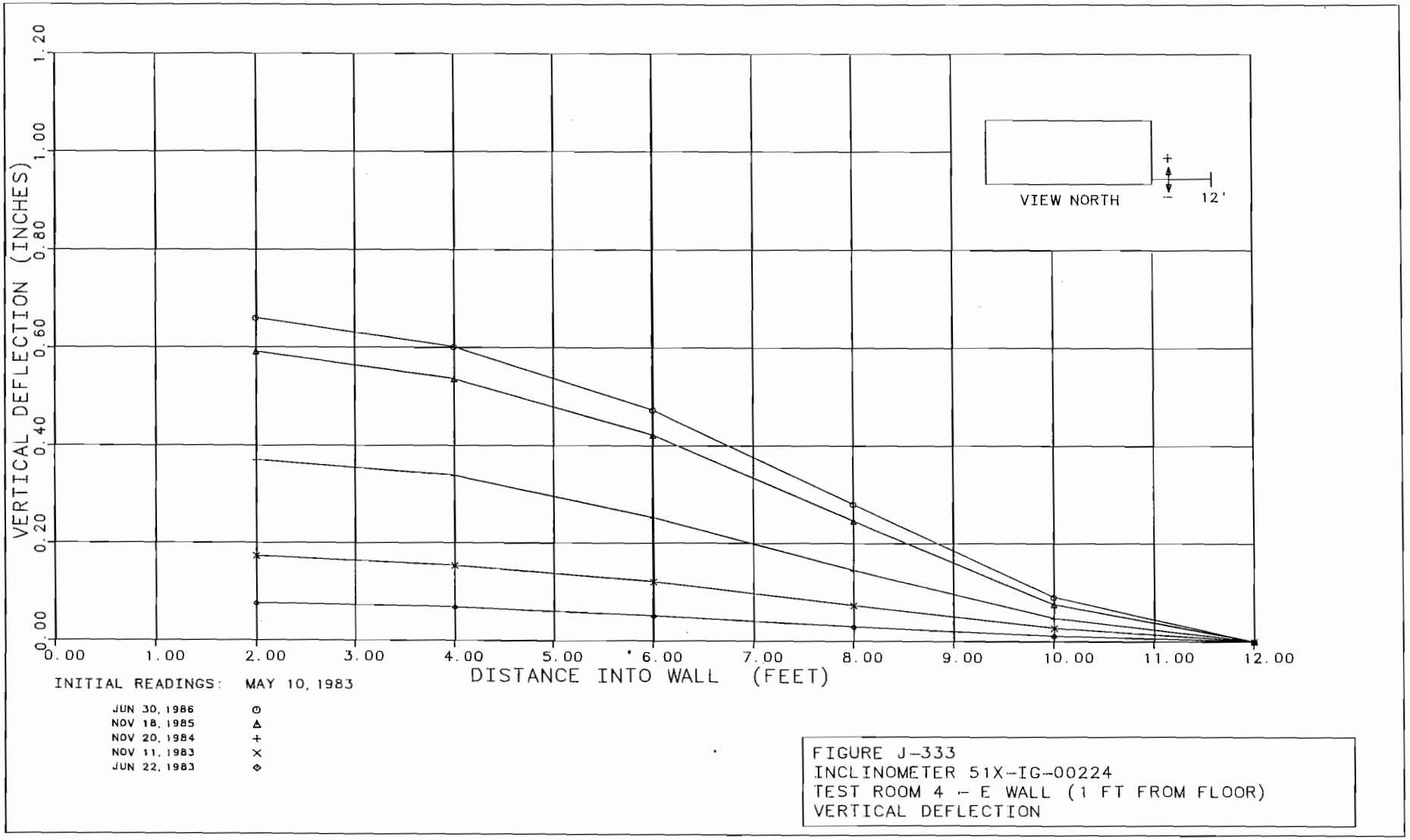


FIGURE J-333
INCLINOMETER 51X-IG-00224
TEST ROOM 4 - E WALL (1 FT FROM FLOOR)
VERTICAL DEFLECTION

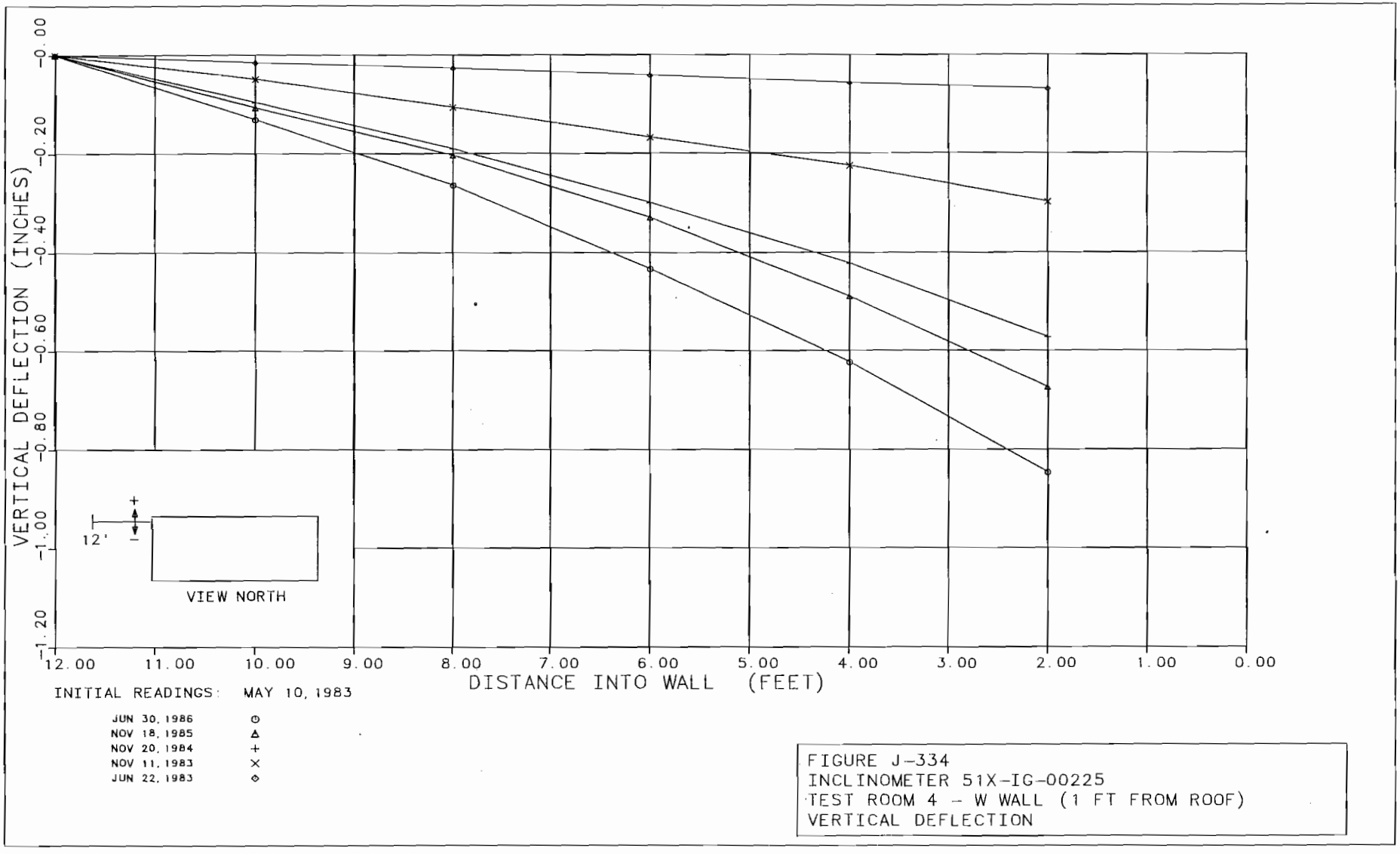


FIGURE J-334
INCLINOMETER 51X-IG-00225
TEST ROOM 4 - W WALL (1 FT FROM ROOF)
VERTICAL DEFLECTION

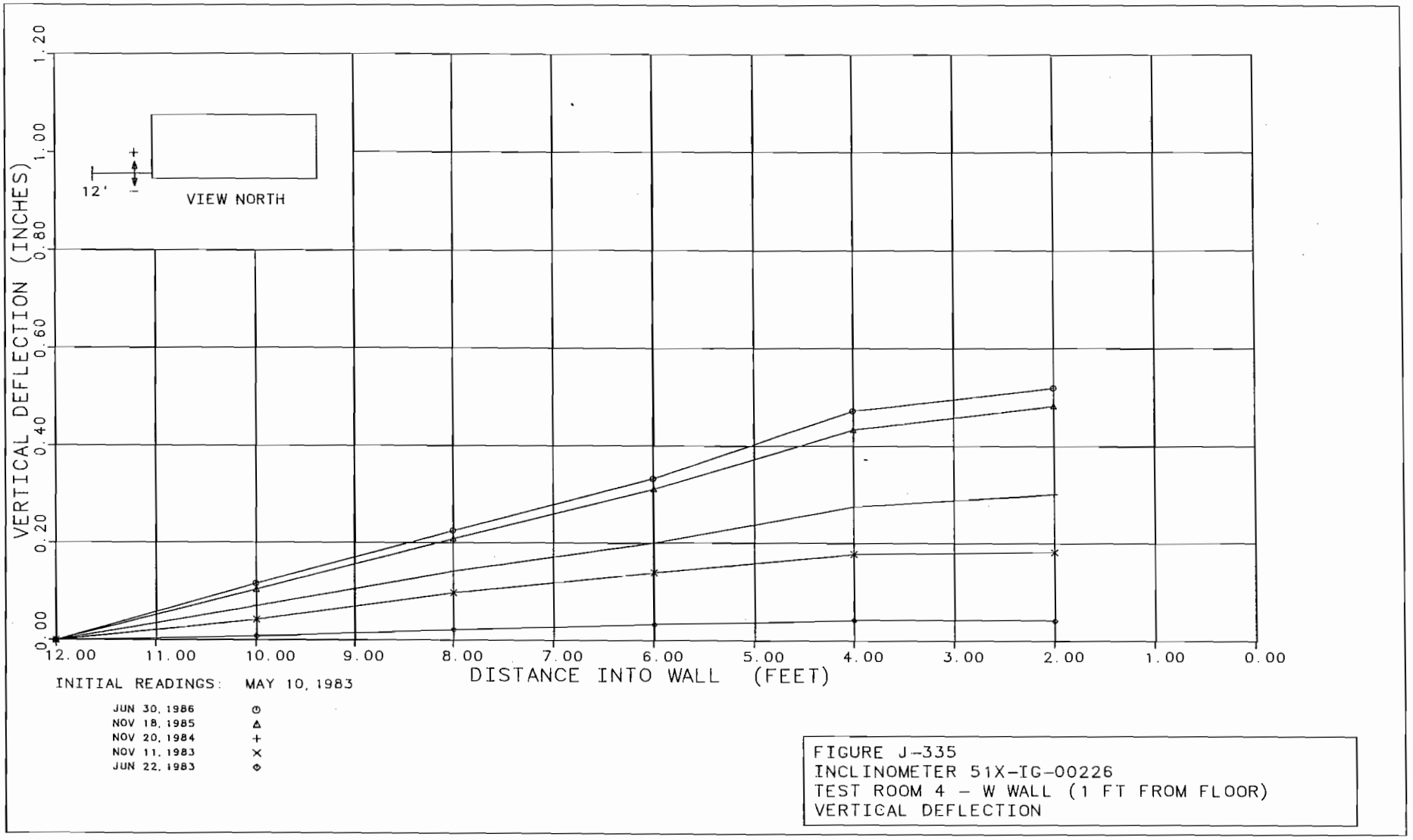


FIGURE J-335
INCLINOMETER 51X-IG-00226
TEST ROOM 4 - W WALL (1 FT FROM FLOOR)
VERTICAL DEFLECTION

APPENDIX K

ANALYTICAL DATA PLOTS

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K-8	E0/N290
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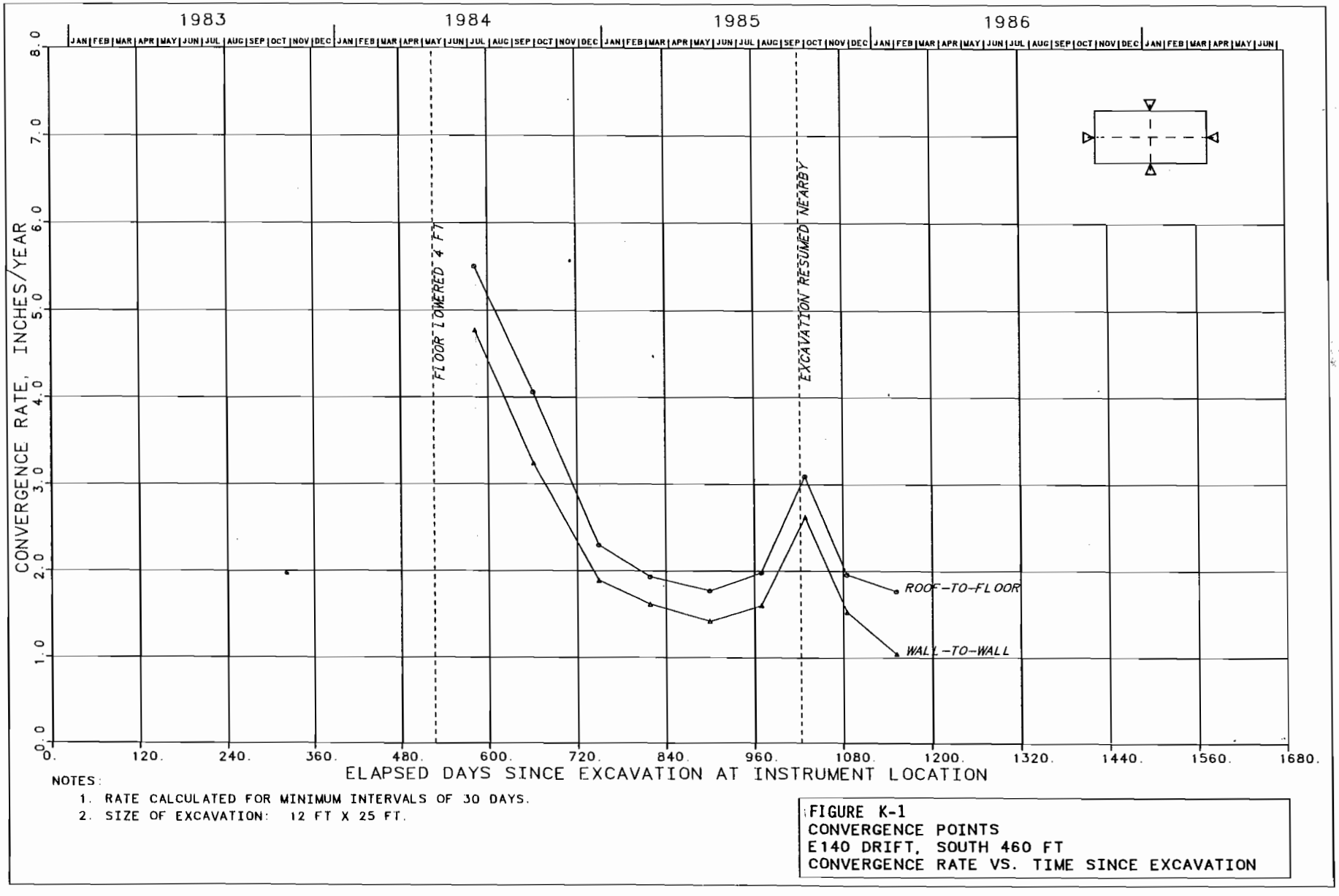
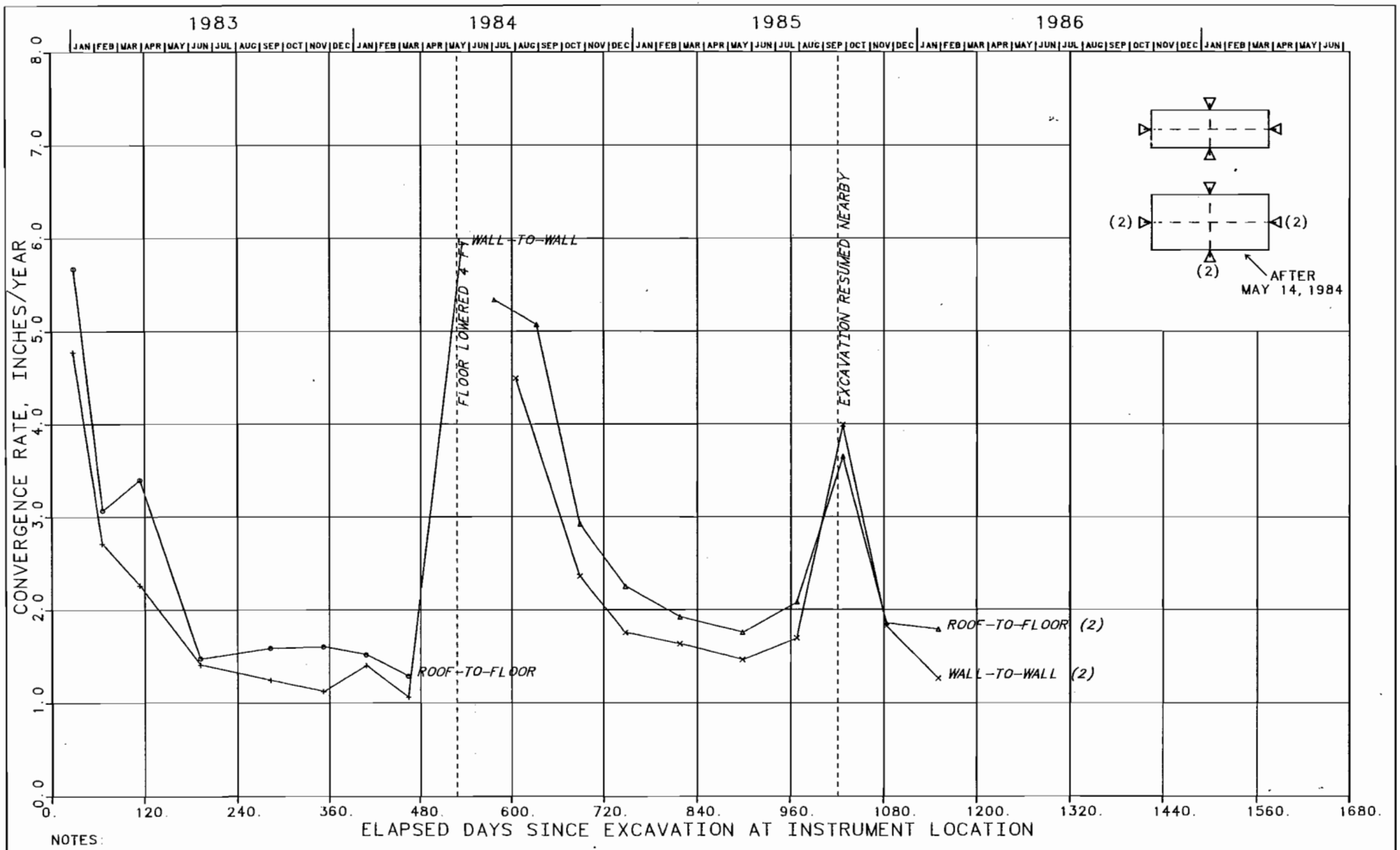


NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

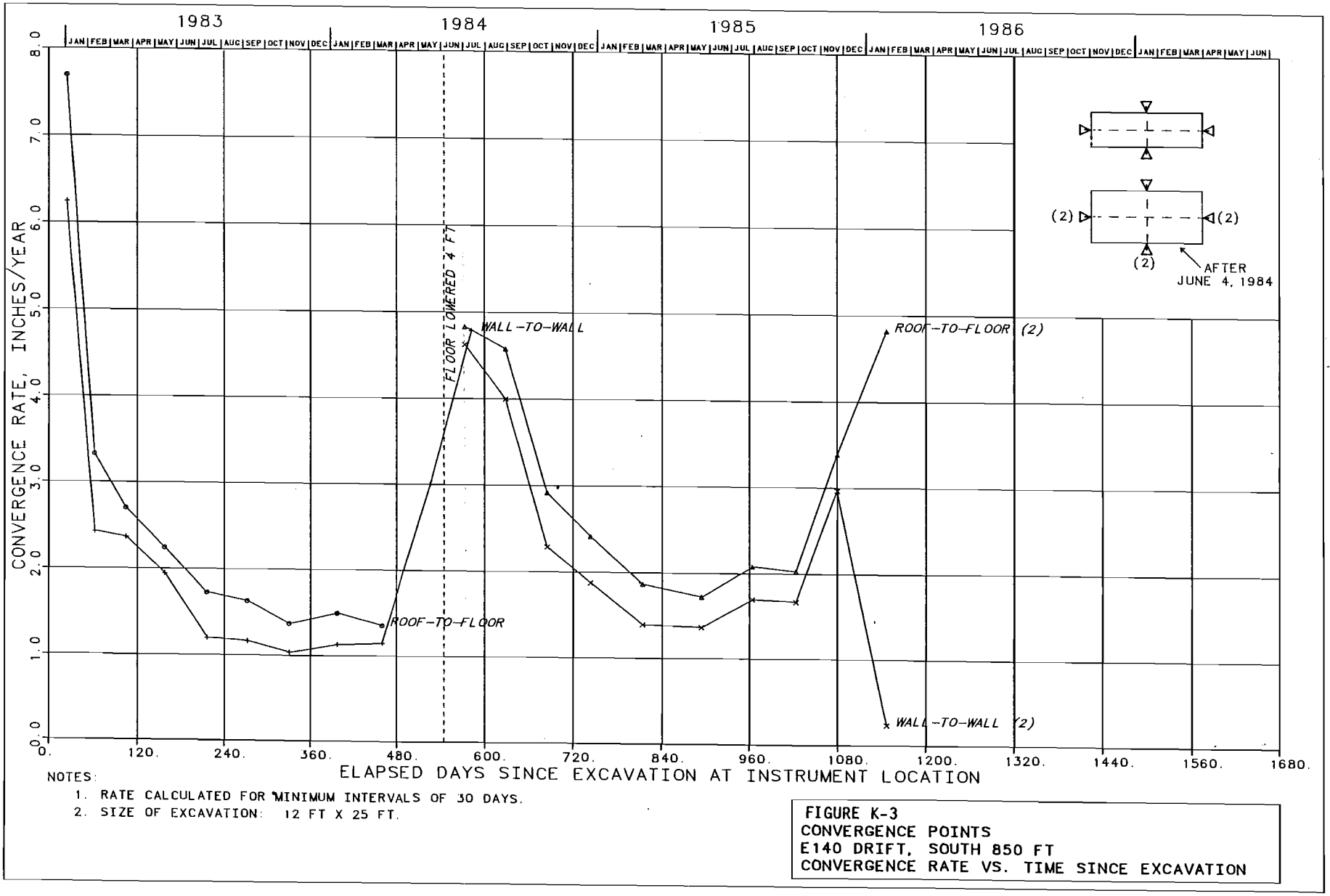
FIGURE K-1
CONVERGENCE POINTS
E140 DRIFT, SOUTH 460 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

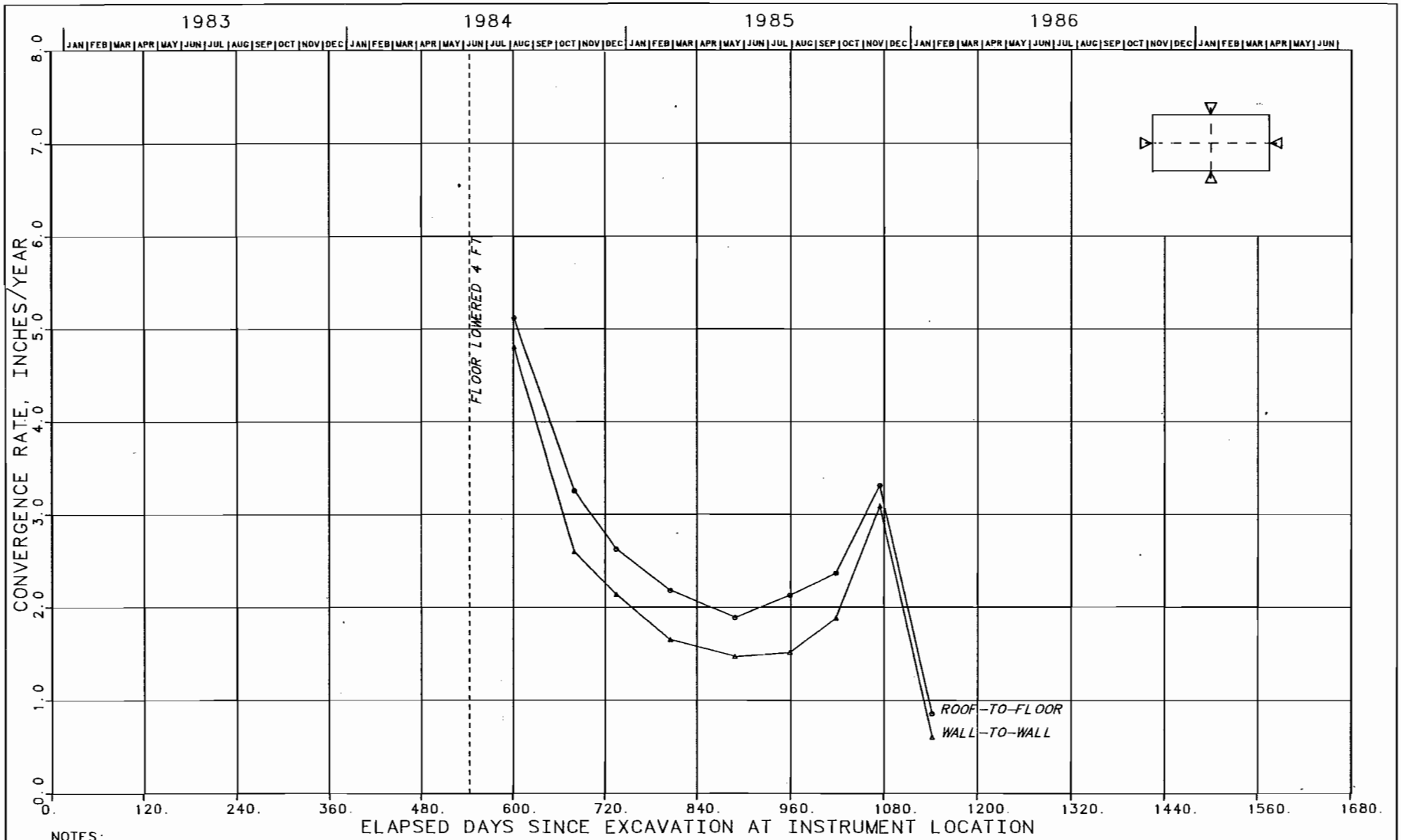
FIGURE K-2
CONVERGENCE POINTS
E140 DRIFT, SOUTH 550 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

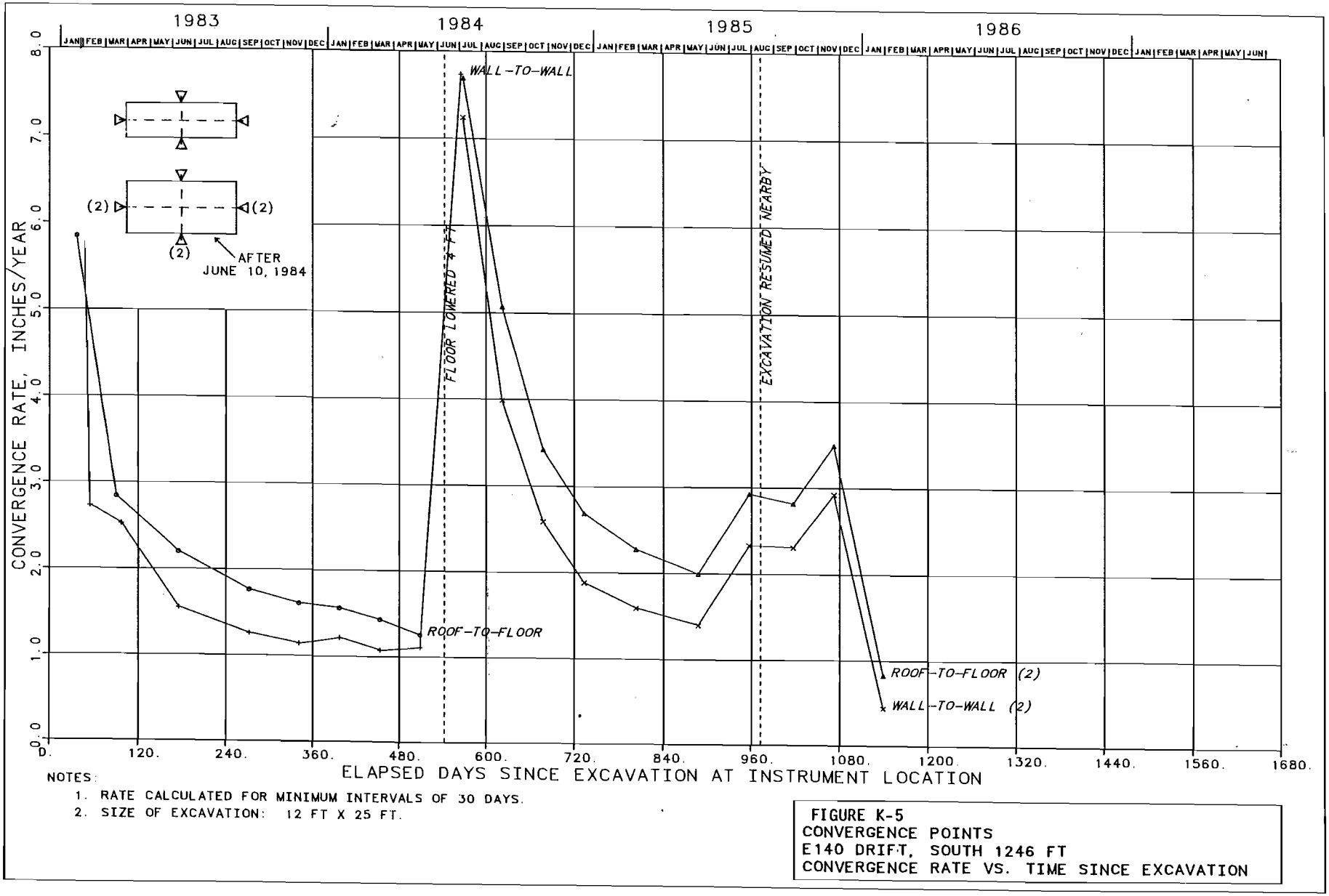
FIGURE K-3
CONVERGENCE POINTS
E140 DRIFT, SOUTH 850 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

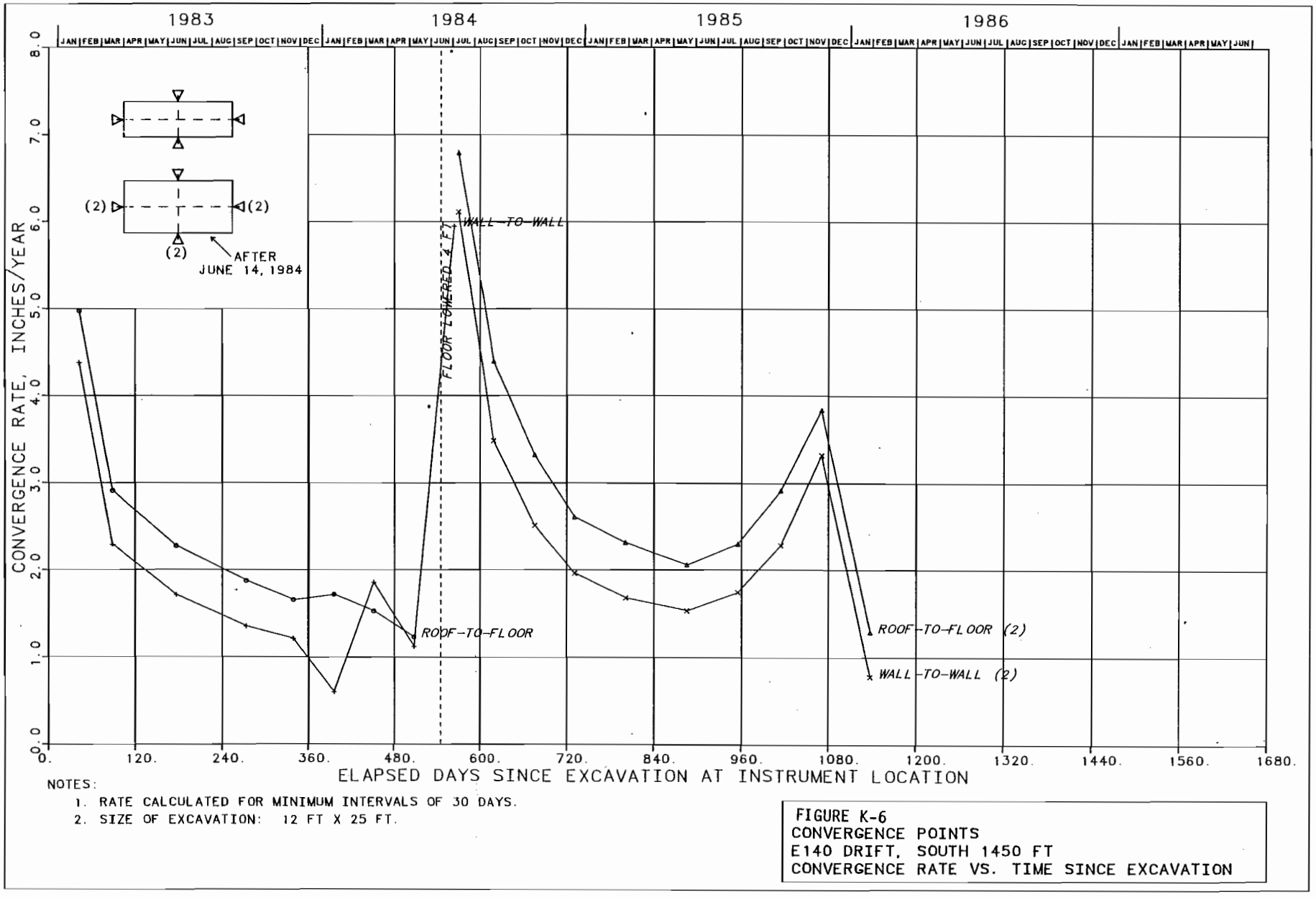
FIGURE K-4
CONVERGENCE POINTS
E140 DRIFT, SOUTH 1150 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

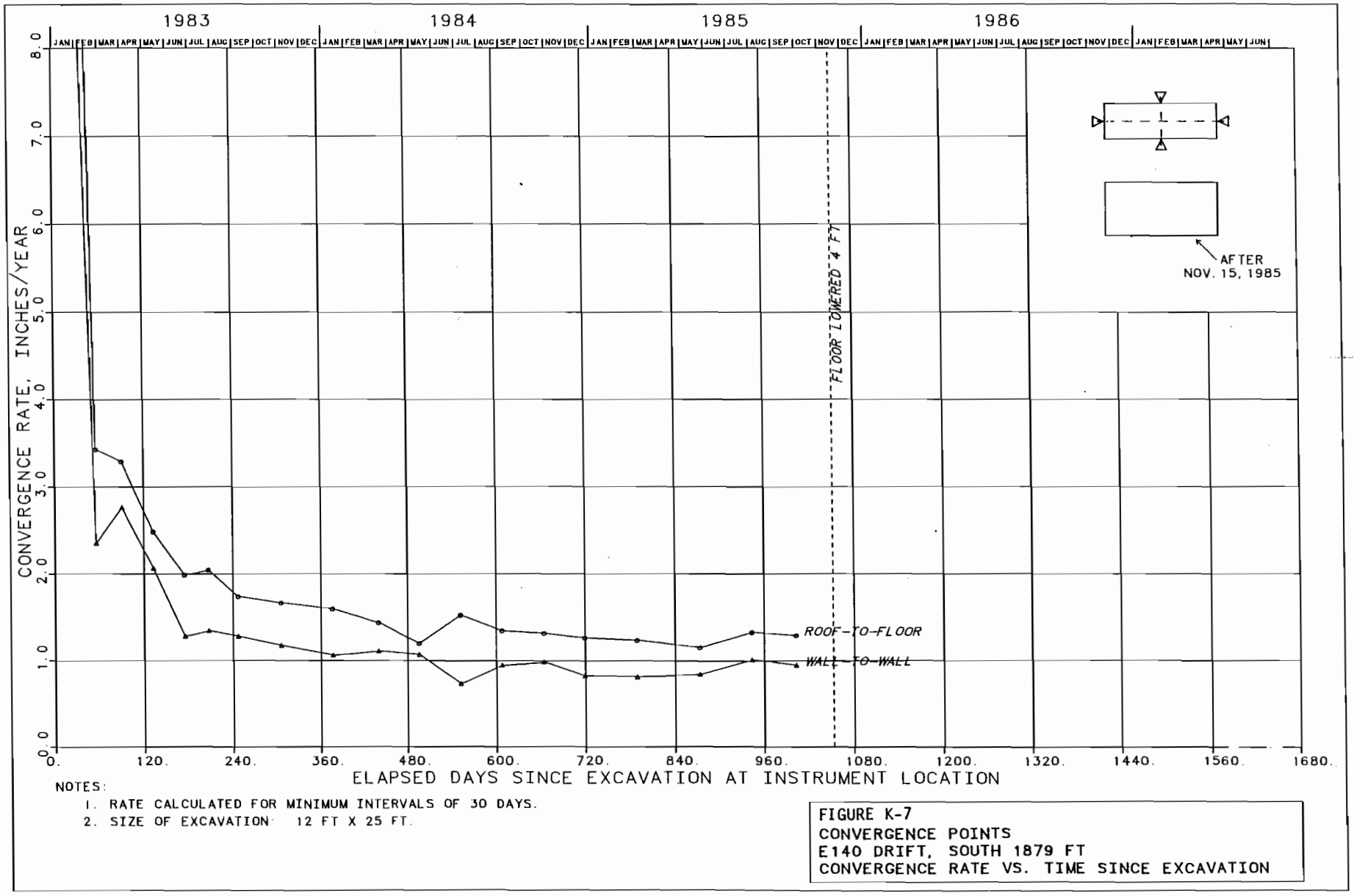
FIGURE K-5
CONVERGENCE POINTS
E140 DRIFT, SOUTH 1246 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

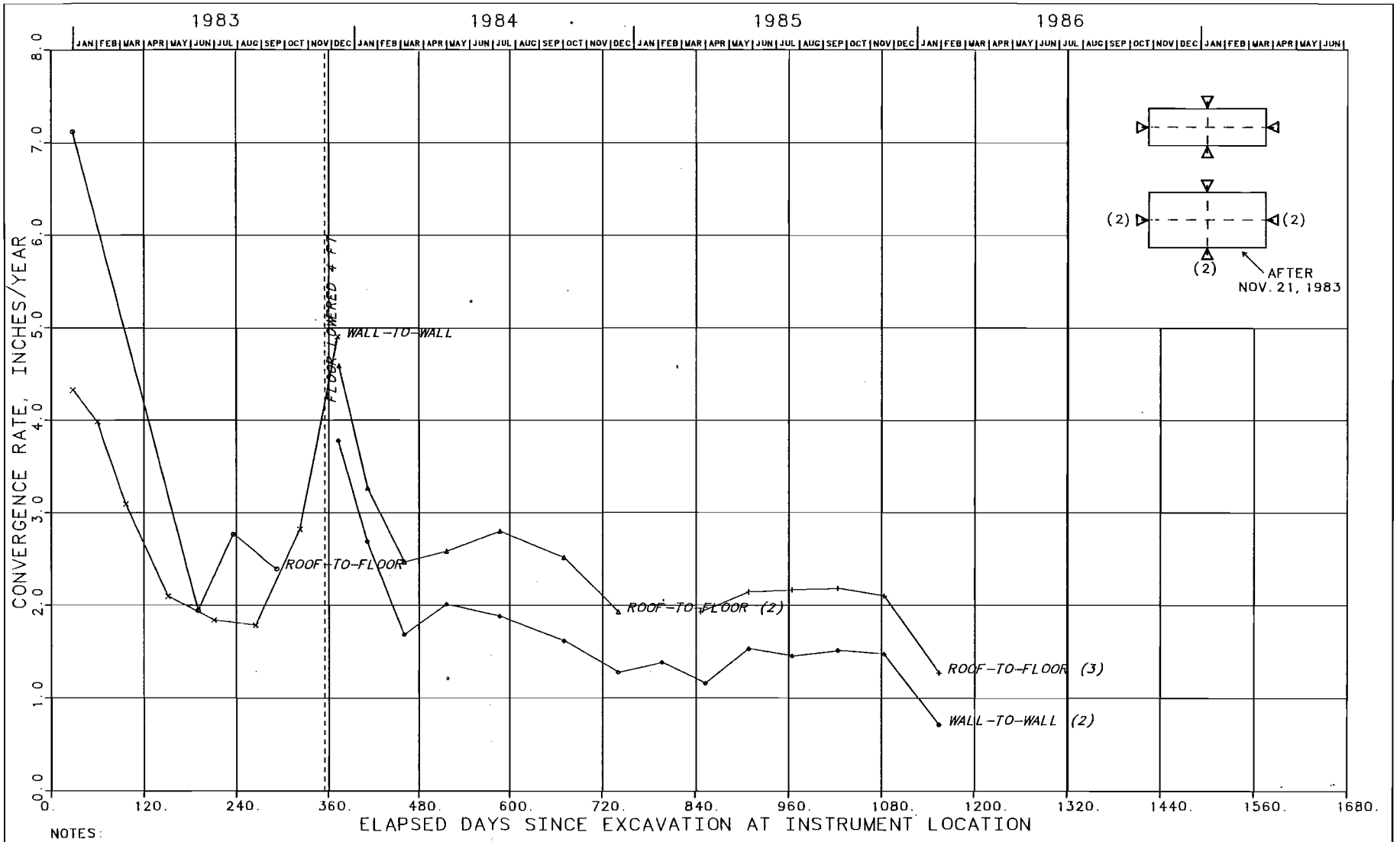
FIGURE K-6
CONVERGENCE POINTS
E140 DRIFT, SOUTH 1450 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION 12 FT X 25 FT.

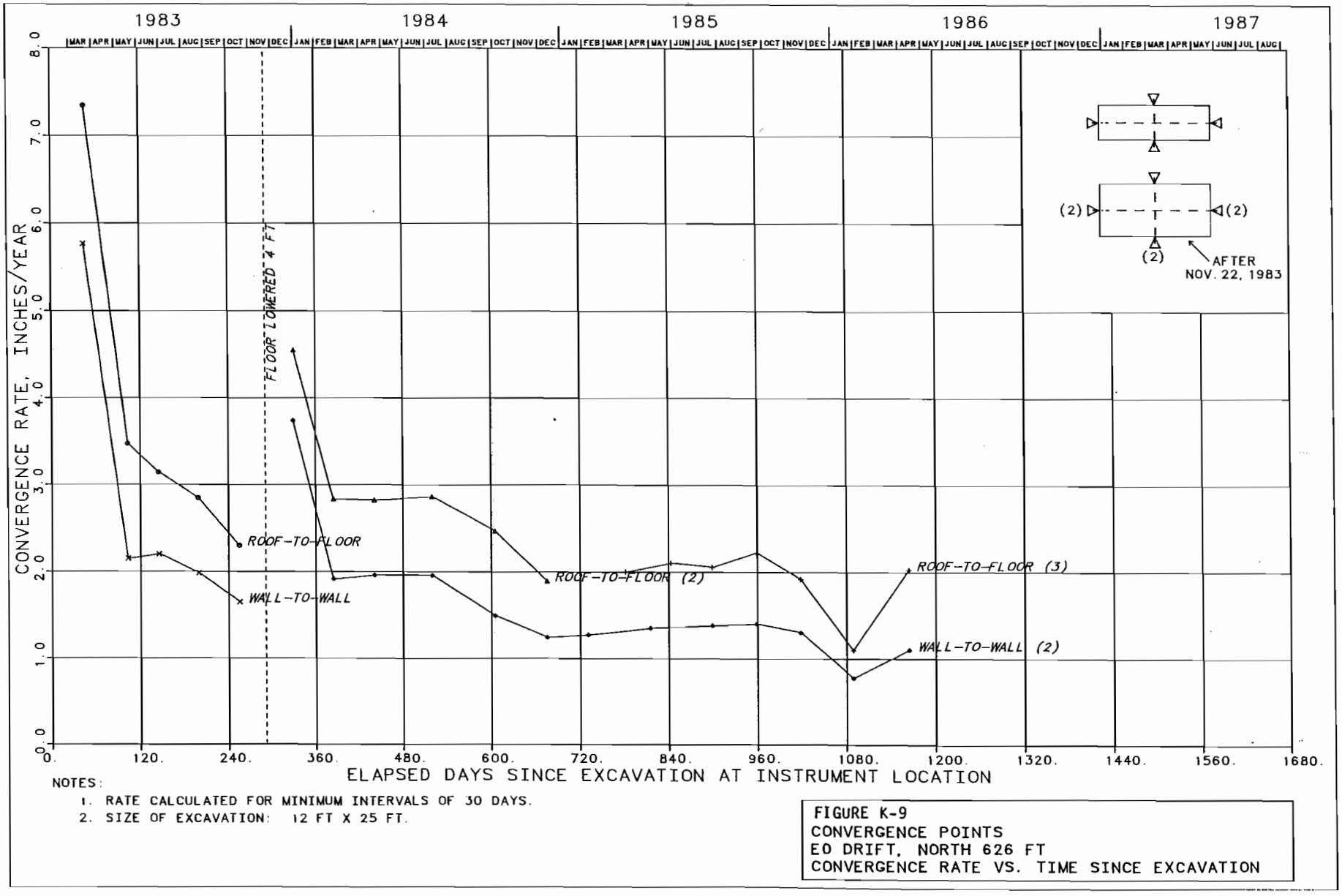
FIGURE K-7
CONVERGENCE POINTS
E140 DRIFT, SOUTH 1879 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

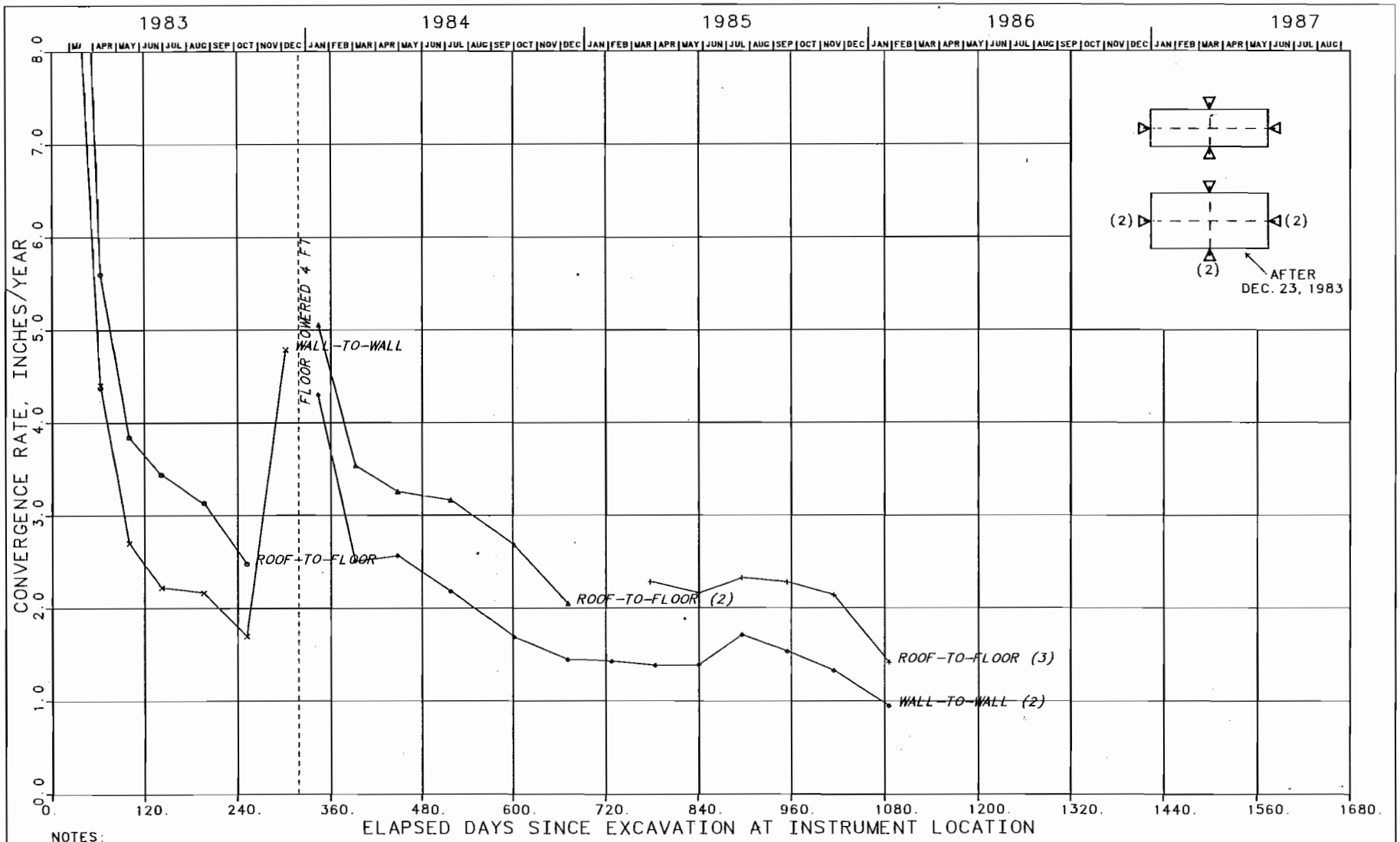
FIGURE K-8
CONVERGENCE POINTS
EO DRIFT, NORTH 290 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

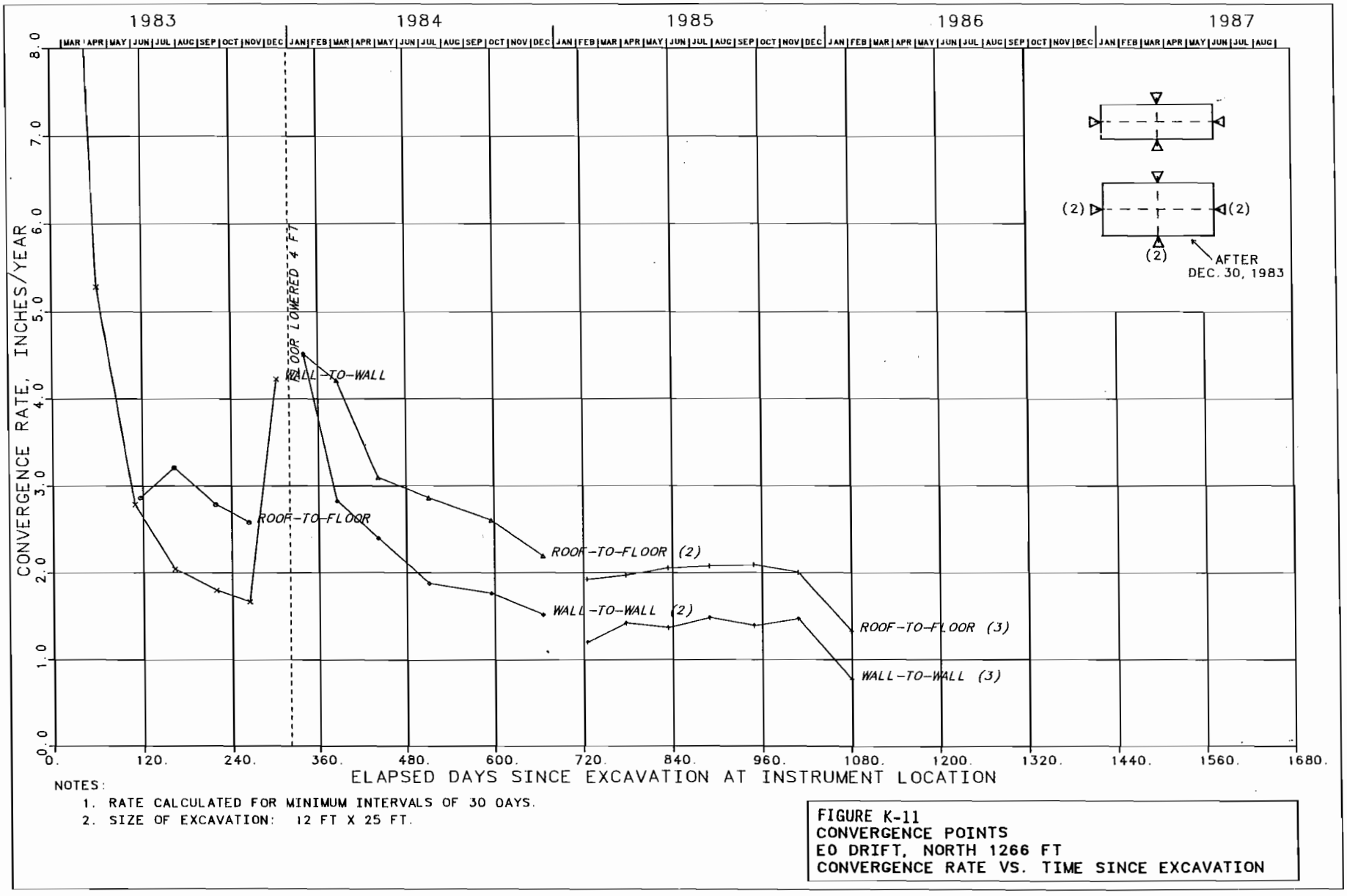
FIGURE K-9
CONVERGENCE POINTS
EO DRIFT, NORTH 626 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

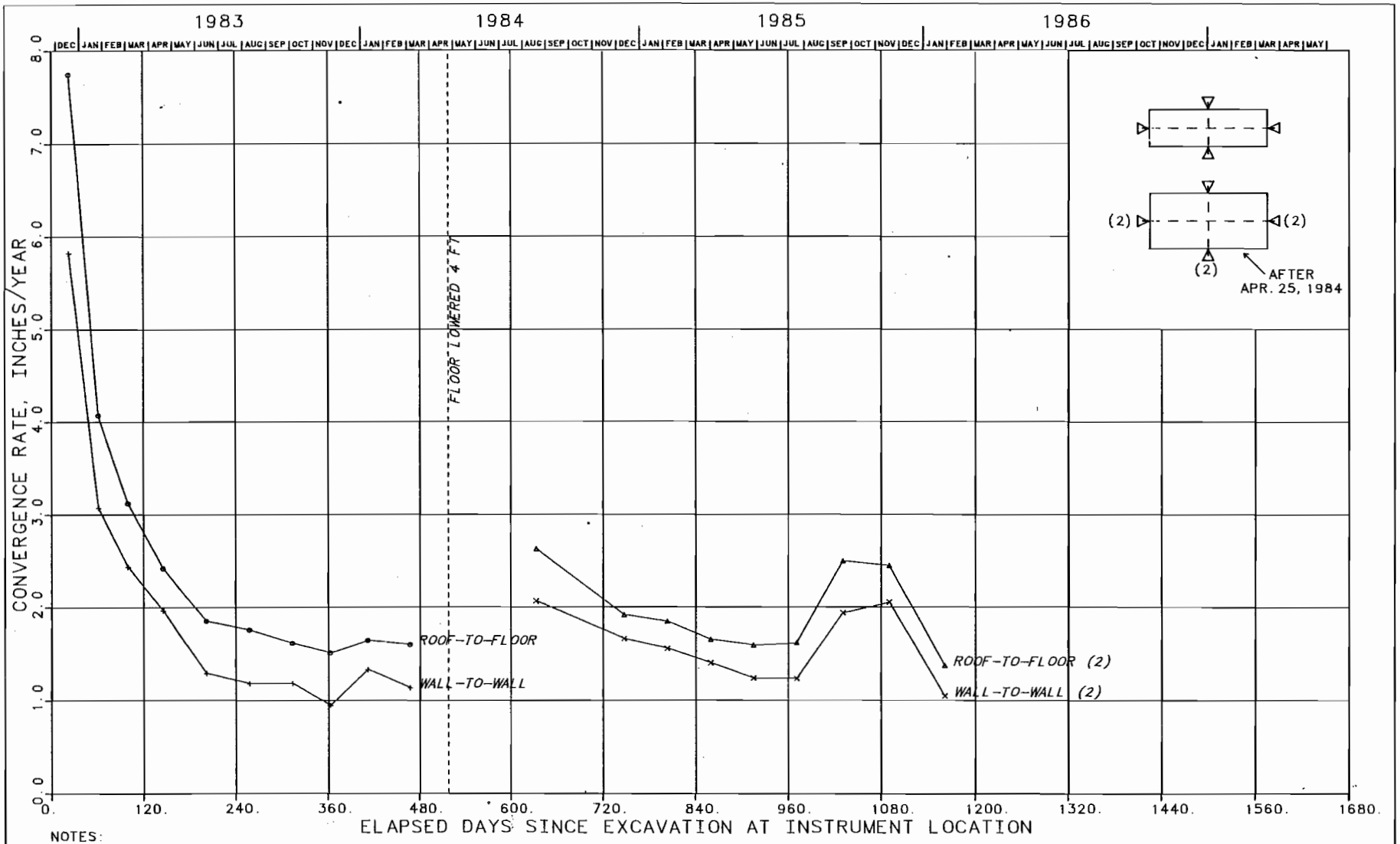
FIGURE K-10
CONVERGENCE POINTS
EO DRIFT, NORTH 940 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

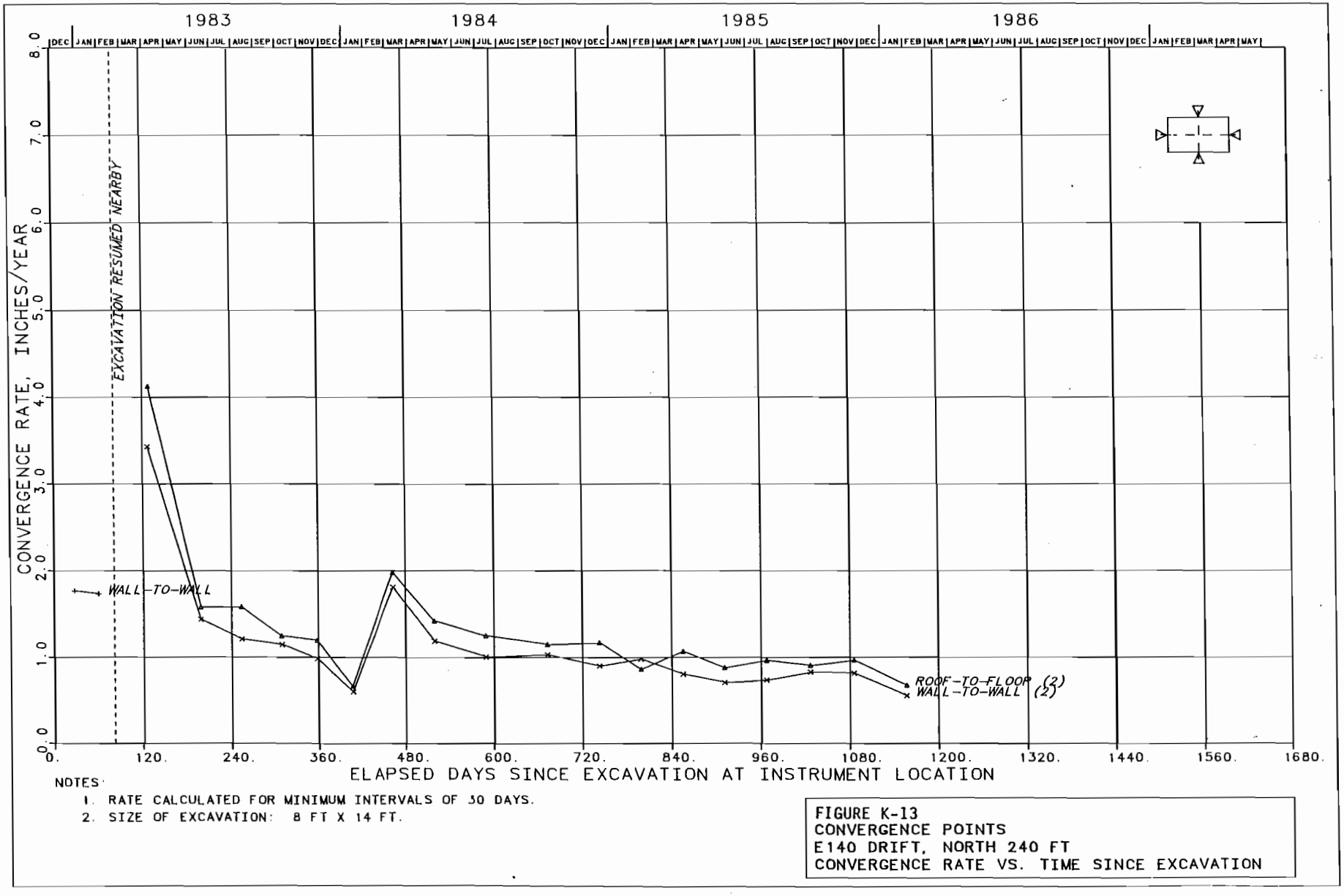
FIGURE K-11
CONVERGENCE POINTS
EO DRIFT, NORTH 1266 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

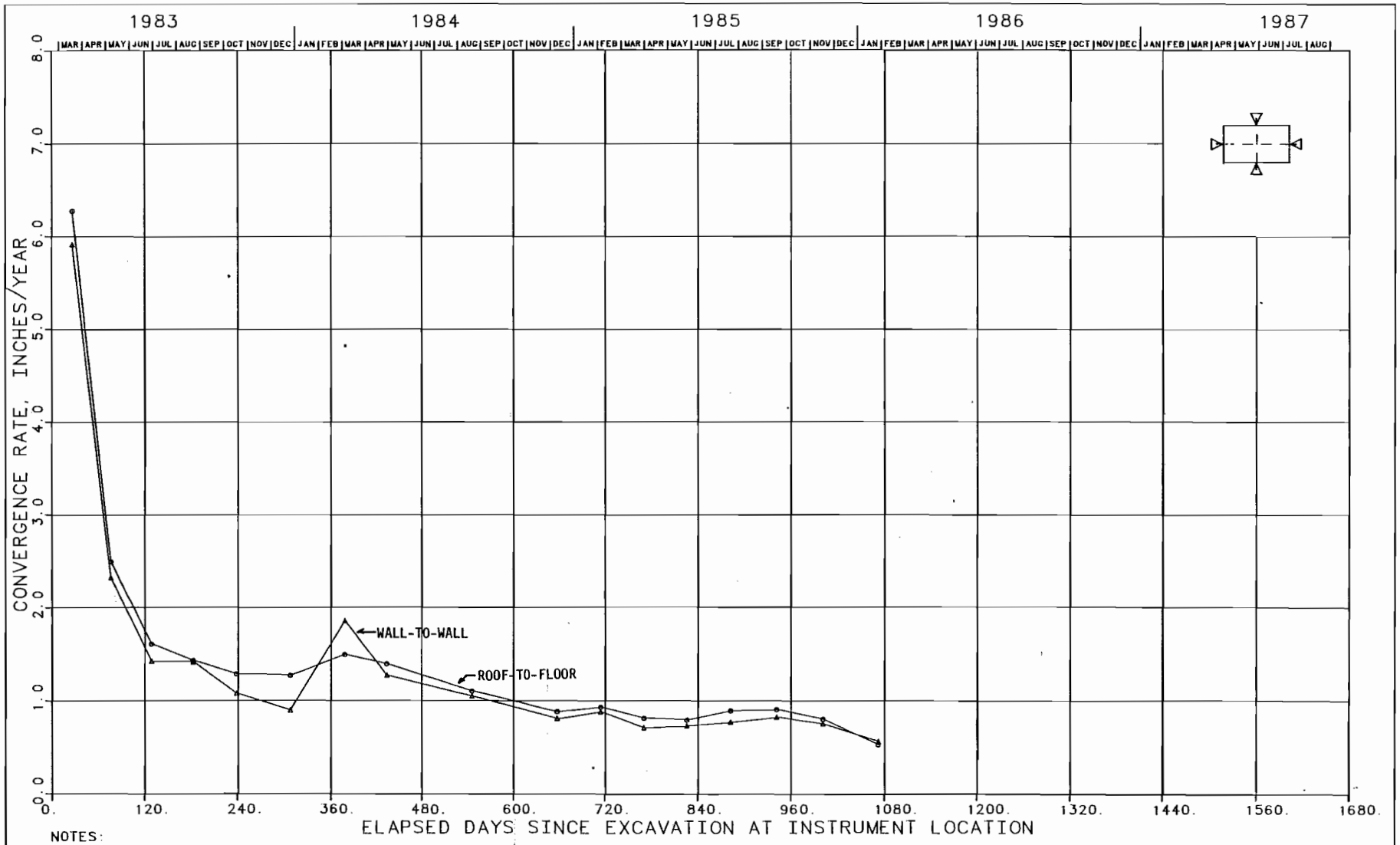
FIGURE K-12
CONVERGENCE POINTS
E140 DRIFT, NORTH 5 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 8 FT X 14 FT.

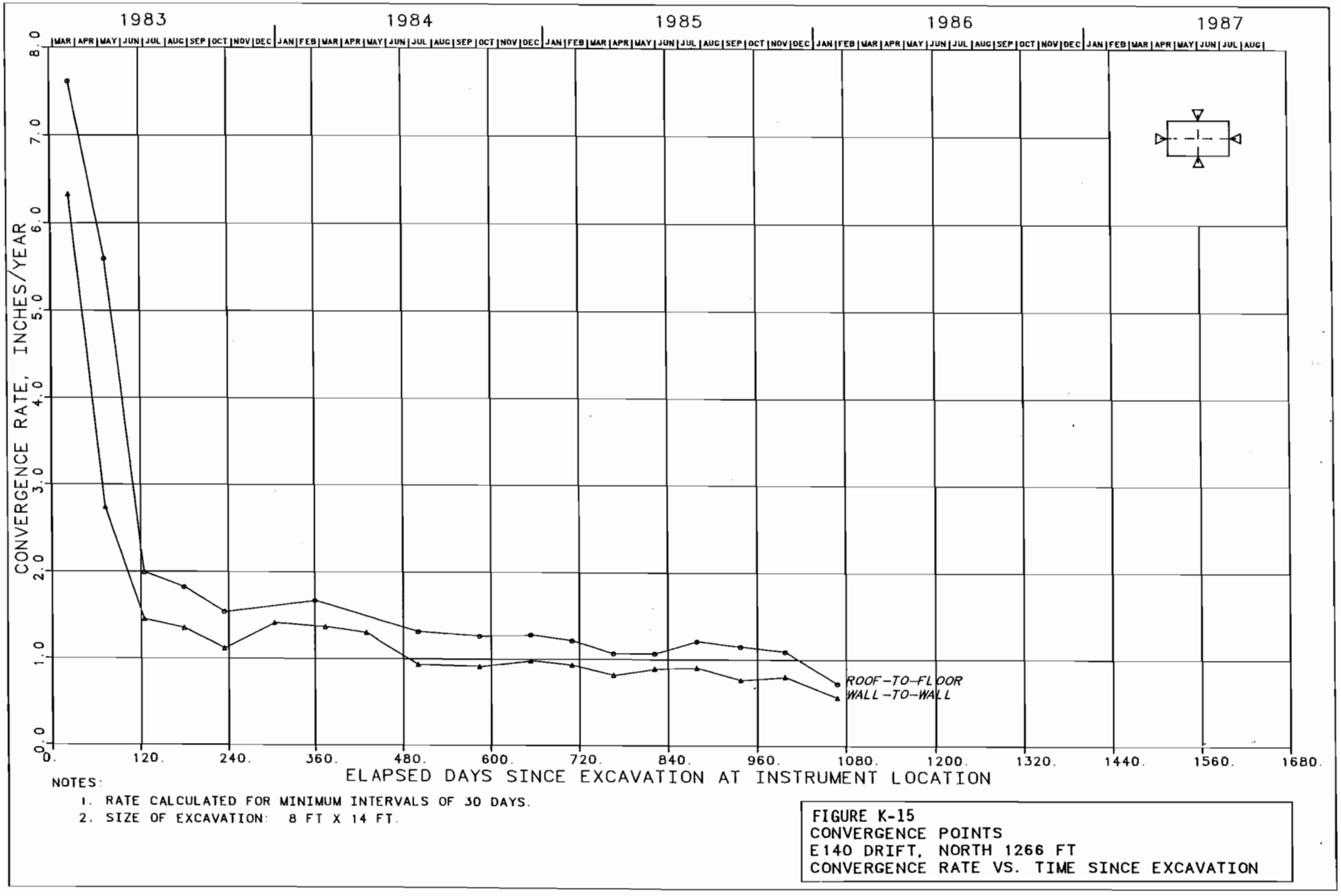
FIGURE K-13
CONVERGENCE POINTS
E140 DRIFT, NORTH 240 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 8 FT X 14 FT.

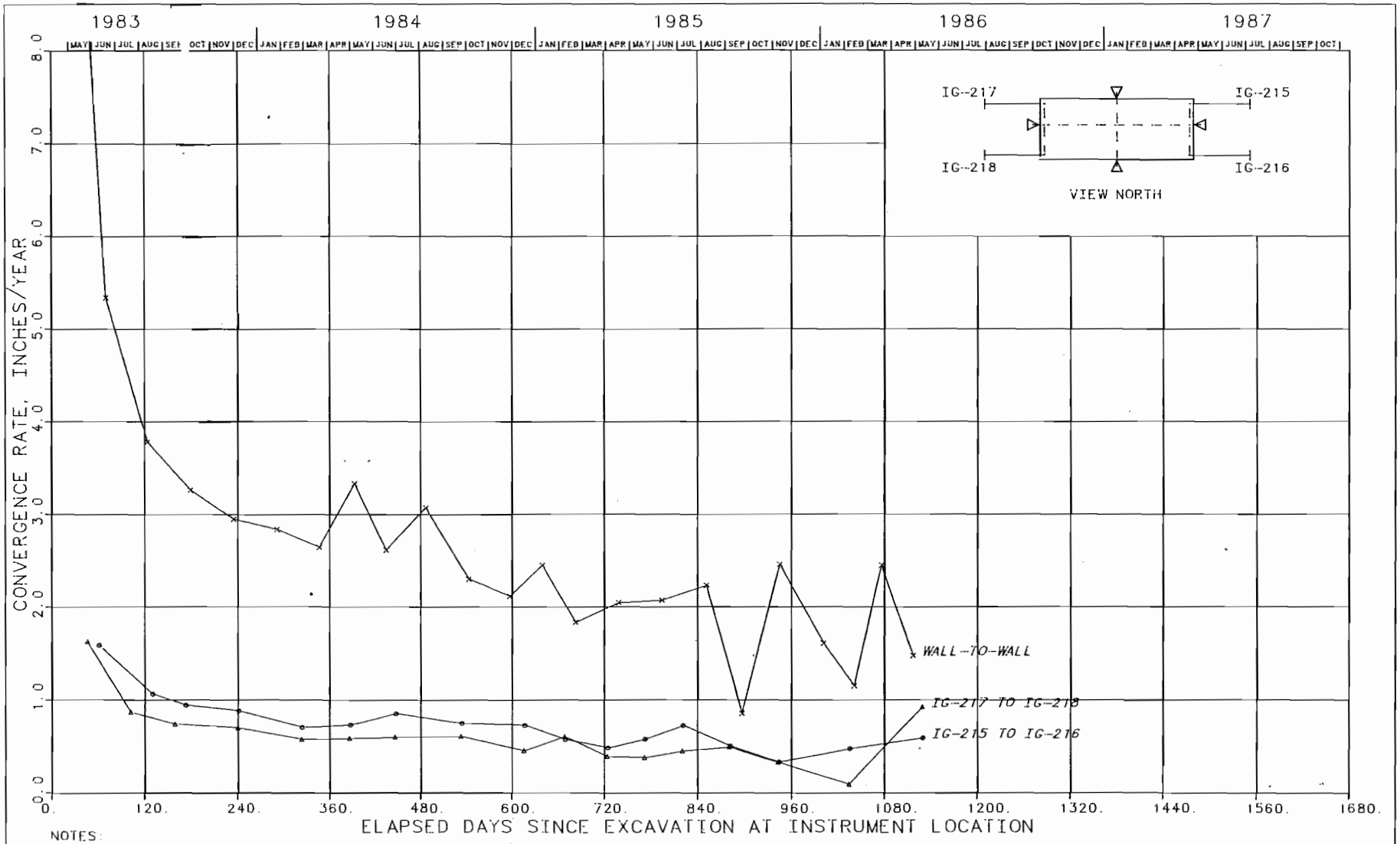
FIGURE K-14
CONVERGENCE POINTS
E140 DRIFT, NORTH 626 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 8 FT X 14 FT.

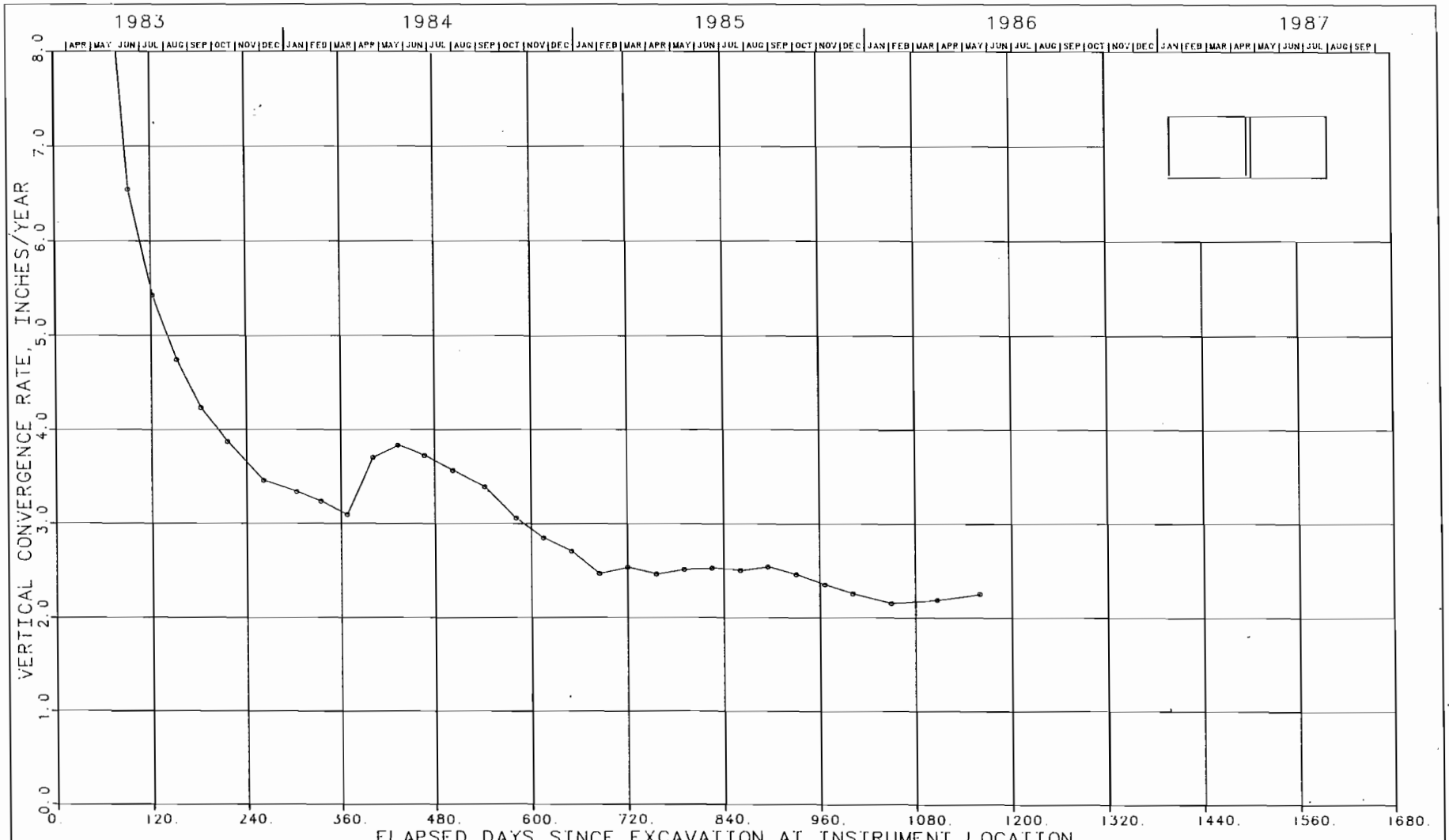
FIGURE K-15
CONVERGENCE POINTS
E140 DRIFT, NORTH 1266 FT
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 13 FT X 33 FT.

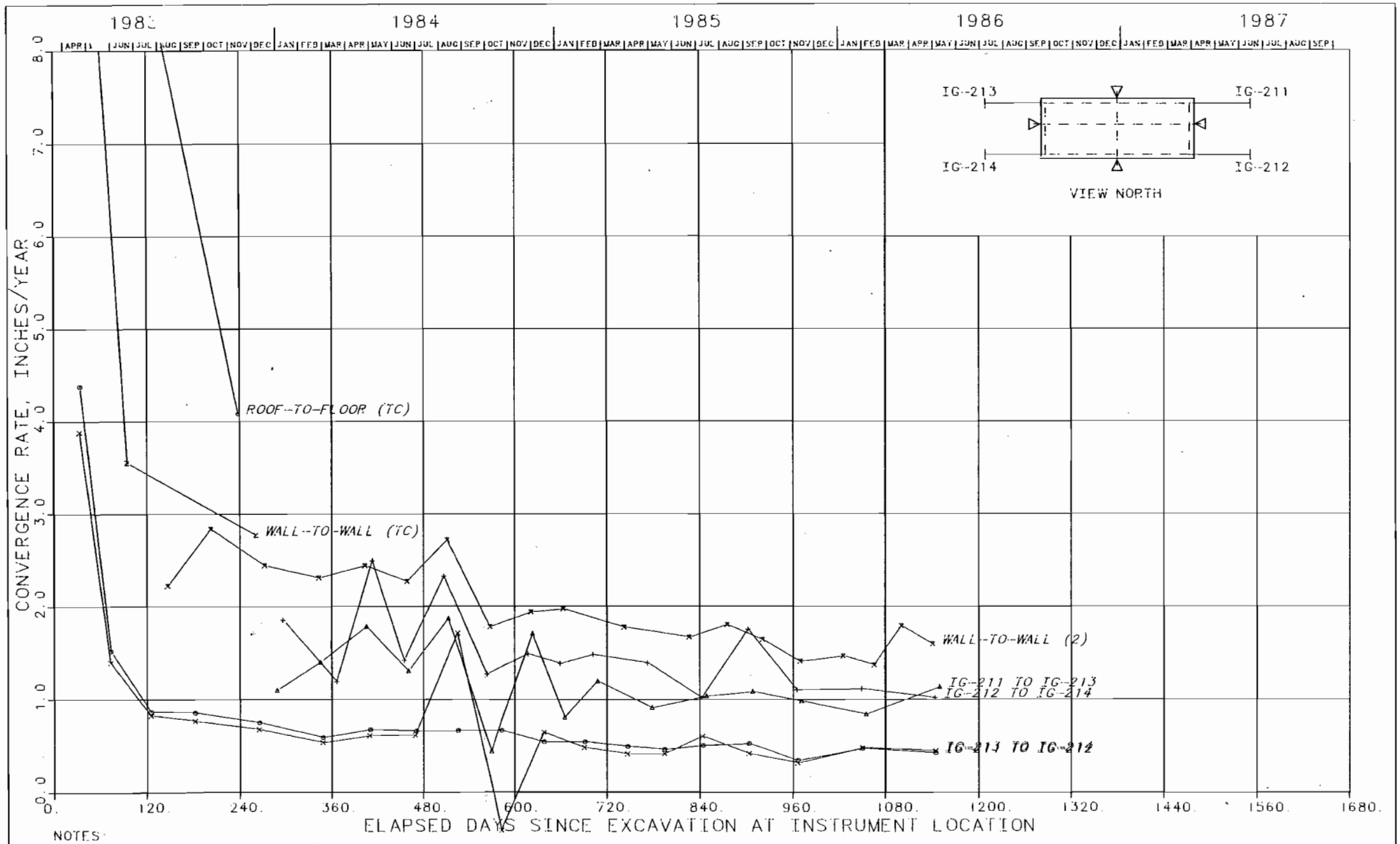
FIGURE K-16
CONVERGENCE POINTS
TEST ROOM 1
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 13 FT X 33 FT.

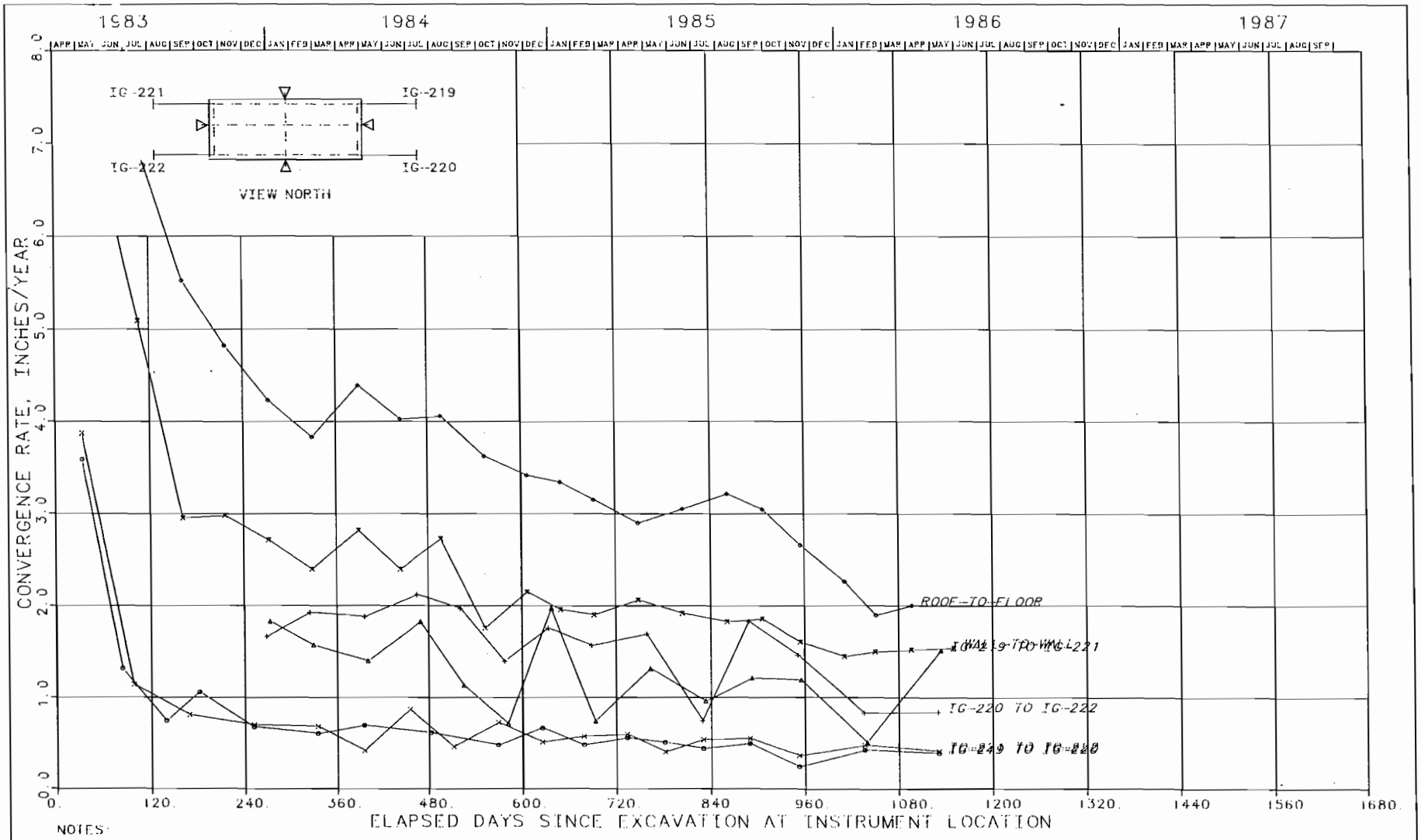
FIGURE K-17
CONVERGENCE METER 51X-CE-00201
TEST ROOM 2
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 13 FT X 33 FT.

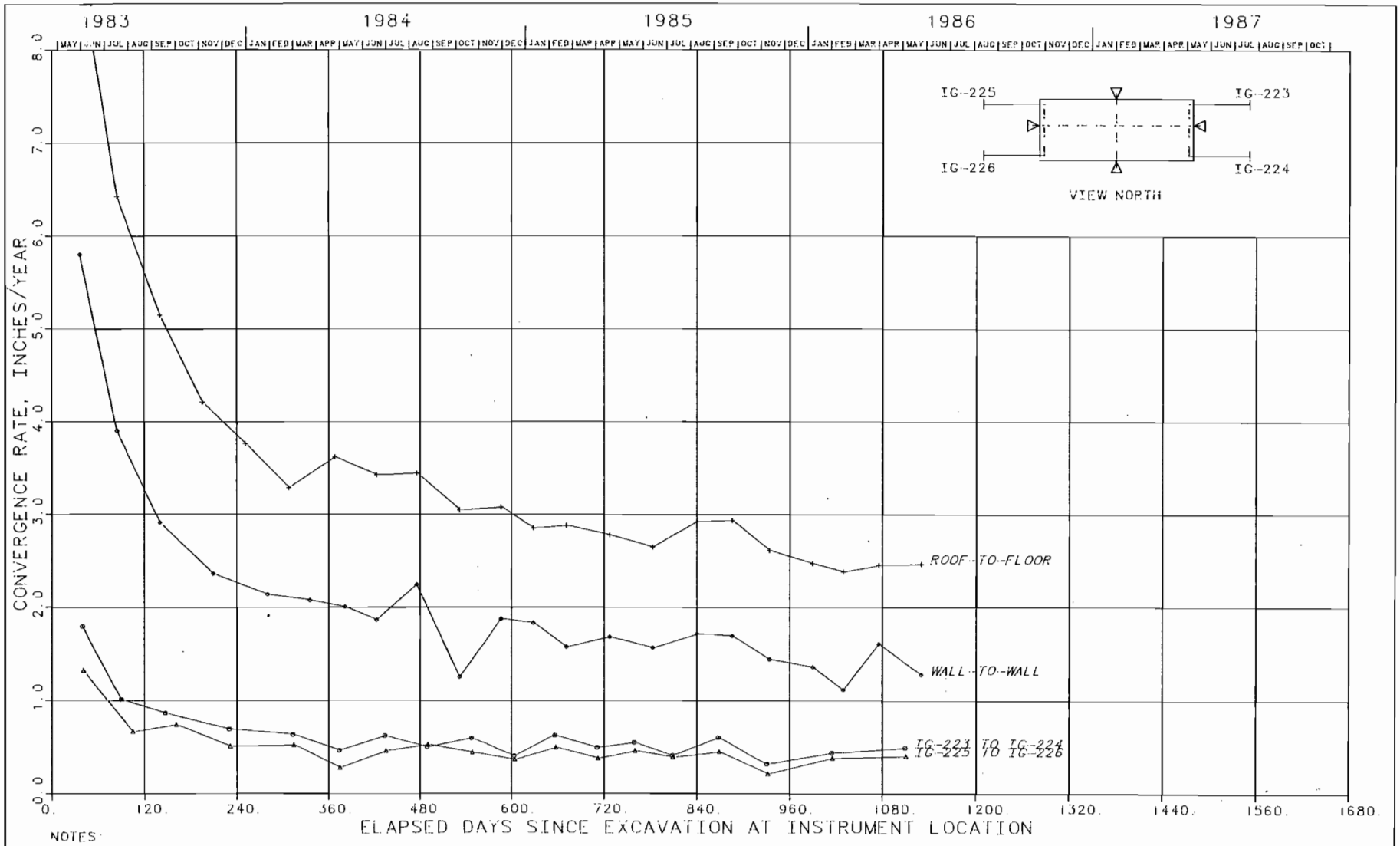
FIGURE K-18
CONVERGENCE POINTS
TEST ROOM 2
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION - 13 FT X 33 FT

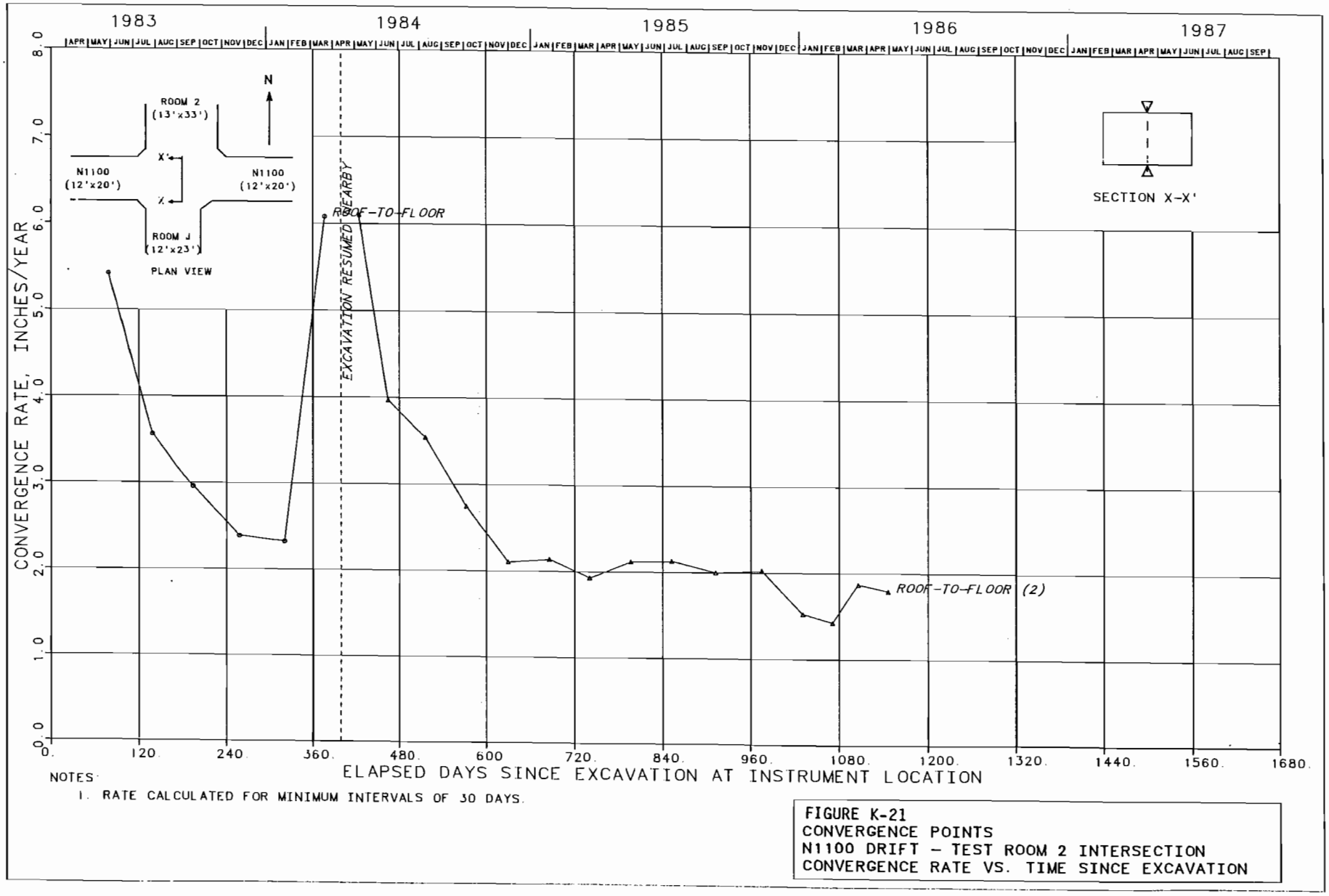
FIGURE K-19
CONVERGENCE POINTS
TEST ROOM 3
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 13 FT X 33 FT.

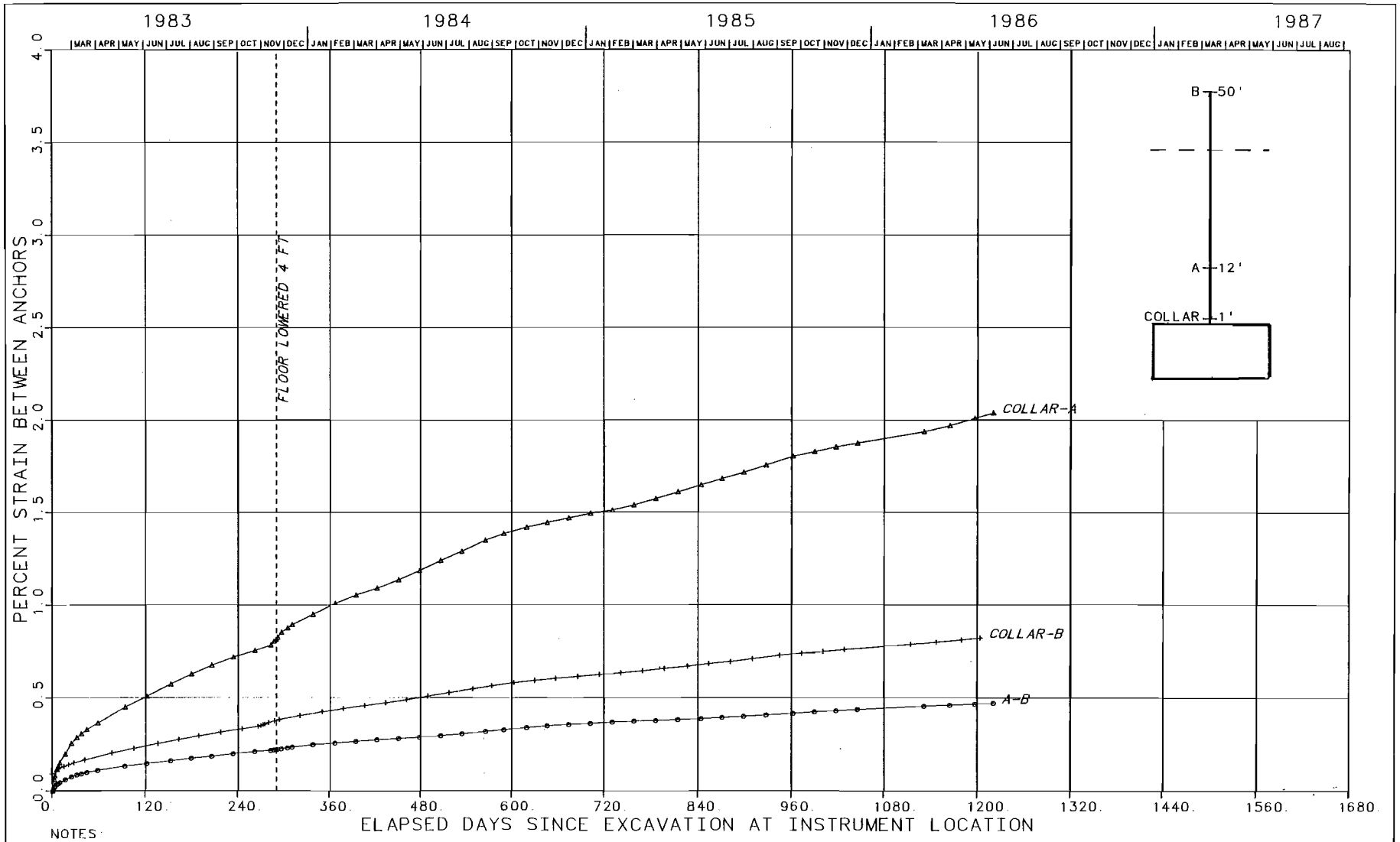
FIGURE K-20
CONVERGENCE POINTS
TEST ROOM 4
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

FIGURE K-21
CONVERGENCE POINTS
N1100 DRIFT – TEST ROOM 2 INTERSECTION
CONVERGENCE RATE VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT.

FIGUREK-22
DOUBLE-POINT EXTENSOMETER 51X-GE-00234
EO DRIFT, NORTH 626 FT - ROOF
STRAIN VS. TIME SINCE EXCAVATION

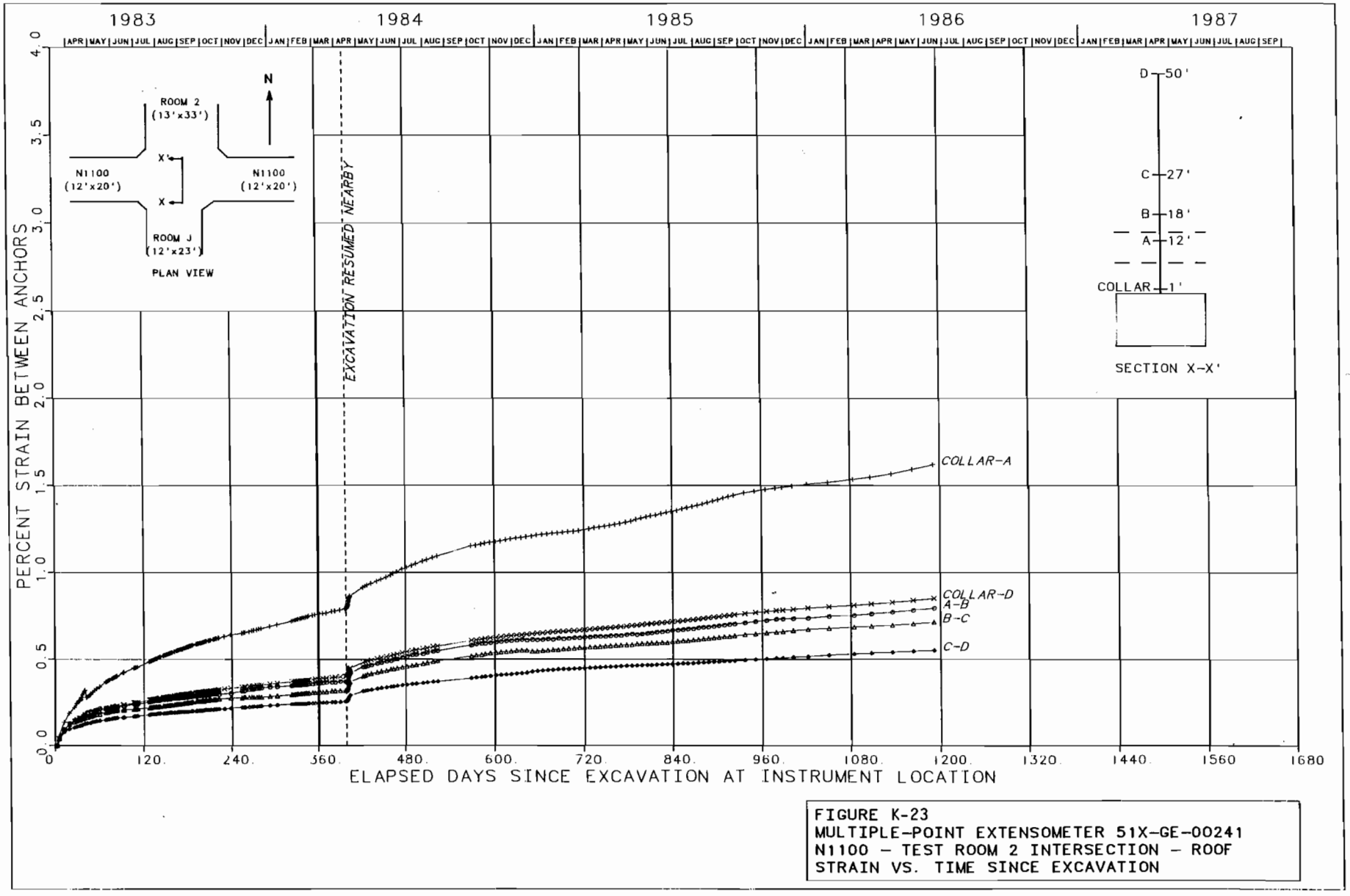


FIGURE K-23
MULTIPLE-POINT EXTENSOMETER 51X-GE-00241
N1100 – TEST ROOM 2 INTERSECTION – ROOF
STRAIN VS. TIME SINCE EXCAVATION

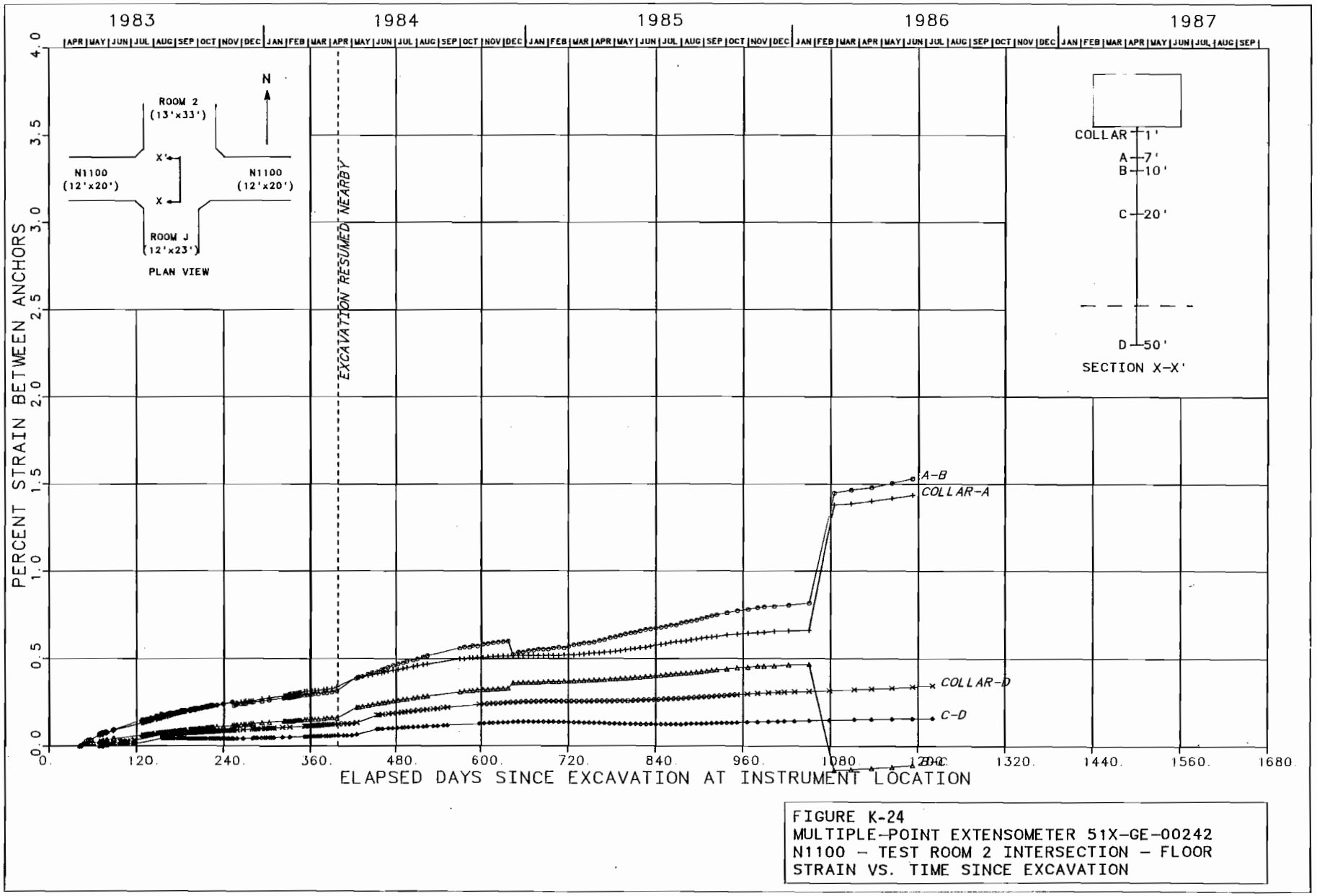
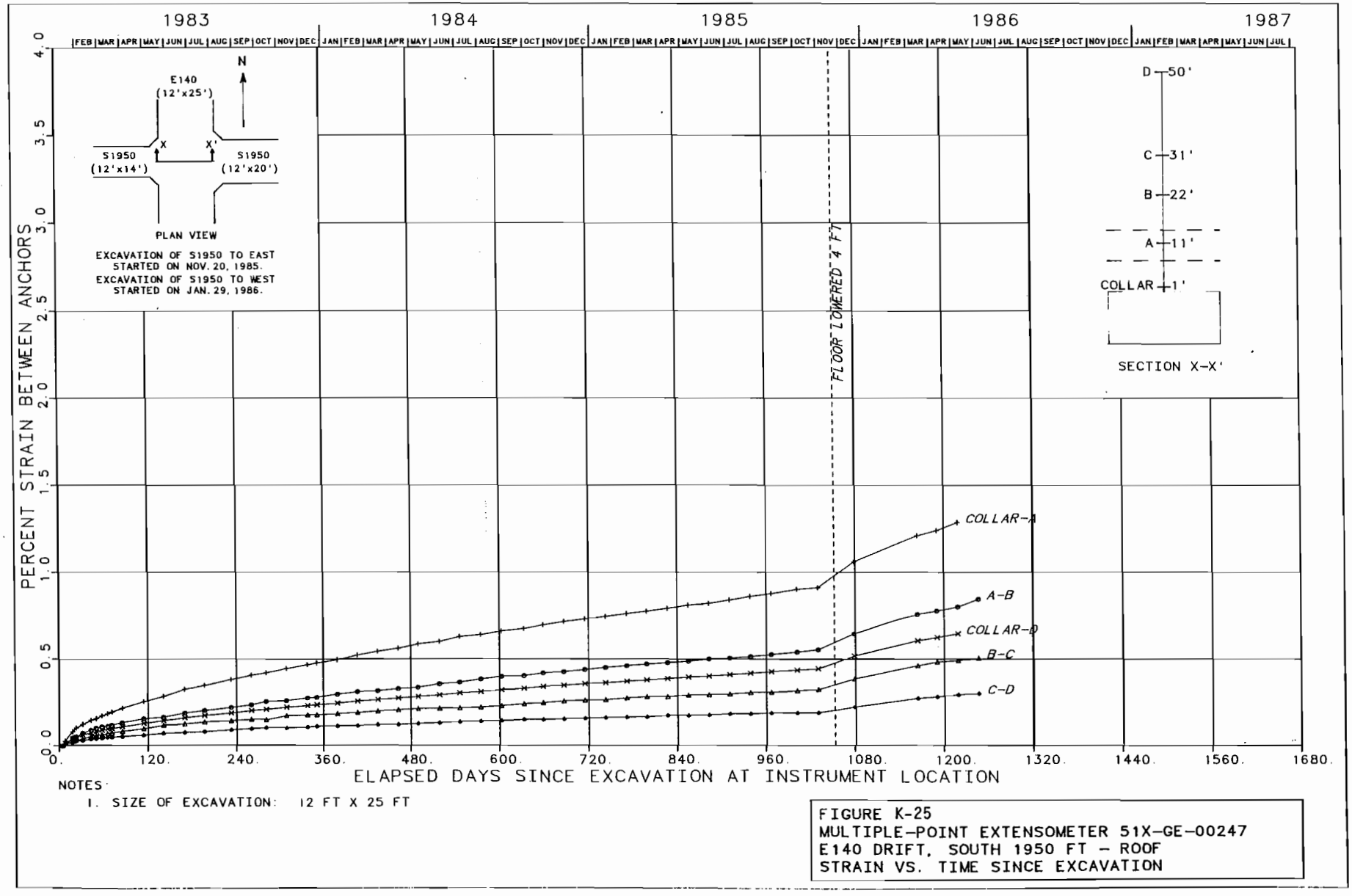


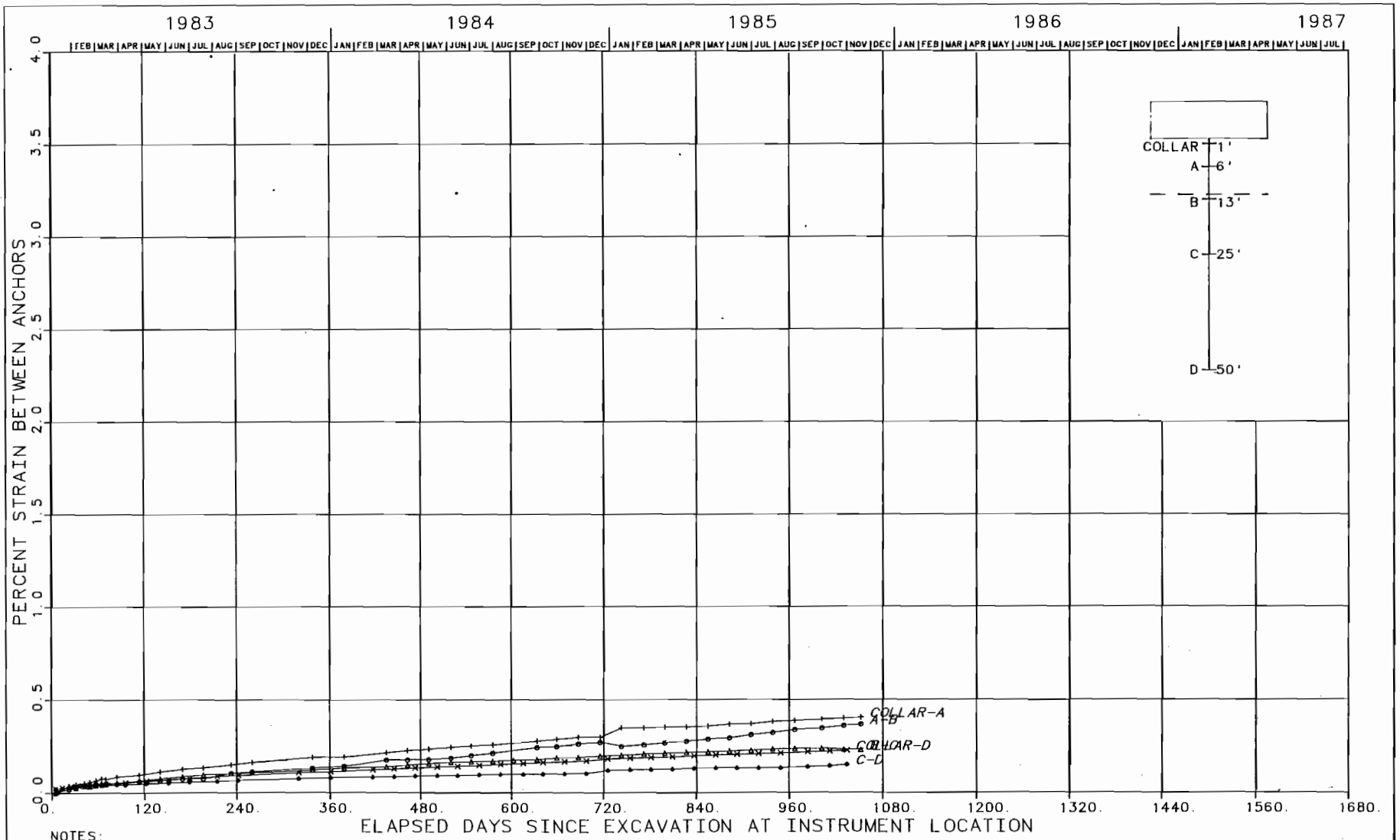
FIGURE K-24
MULTIPLE-POINT EXTENSOMETER 51X-GE-00242
N1100 – TEST ROOM 2 INTERSECTION – FLOOR
STRAIN VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 12 FT X 25 FT

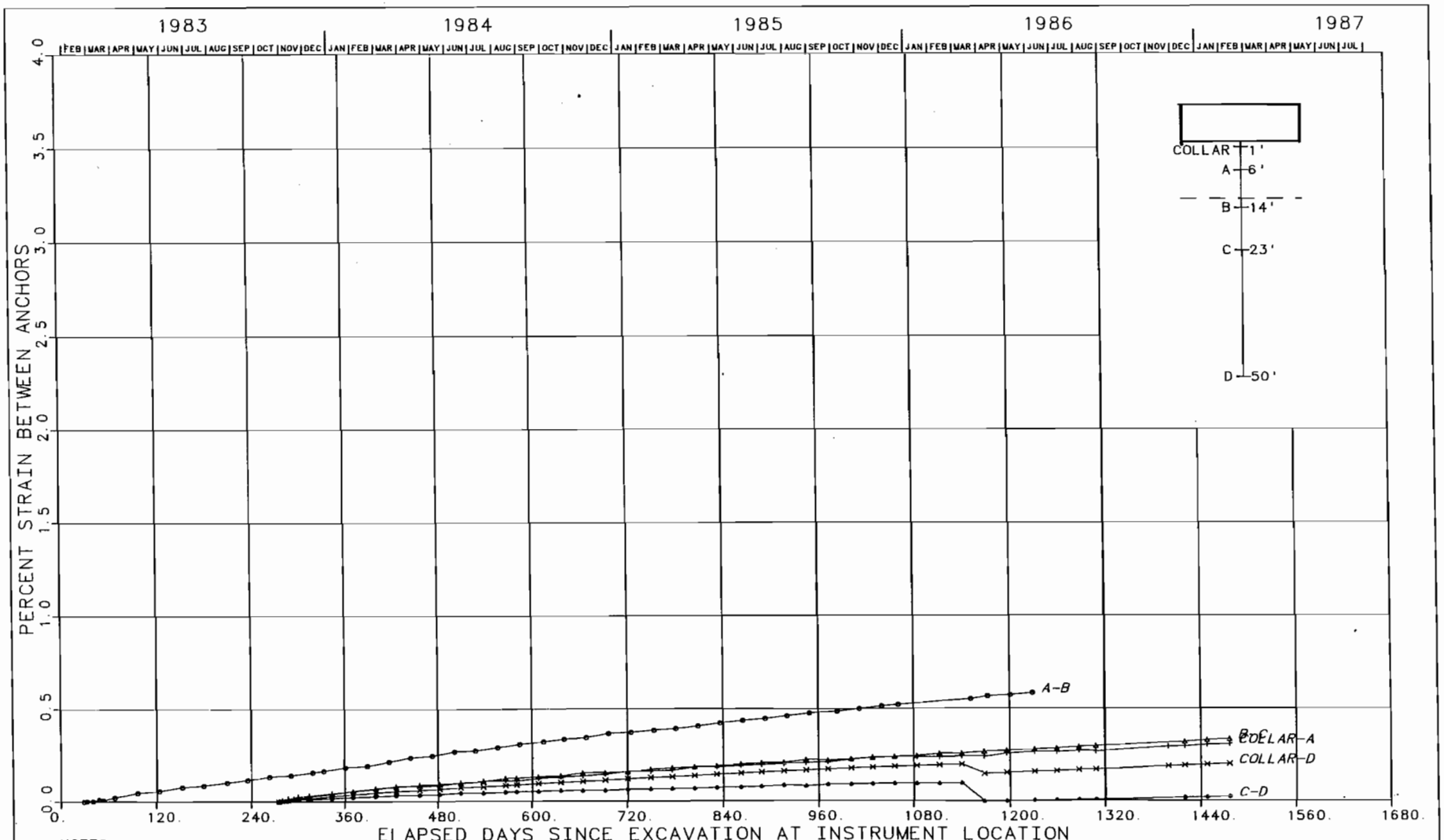
FIGURE K-25
MULTIPLE-POINT EXTENSOMETER 51X-GE-00247
E140 DRIFT, SOUTH 1950 FT - ROOF
STRAIN VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.
2. INSTRUMENT HAS BEEN DESTROYED.

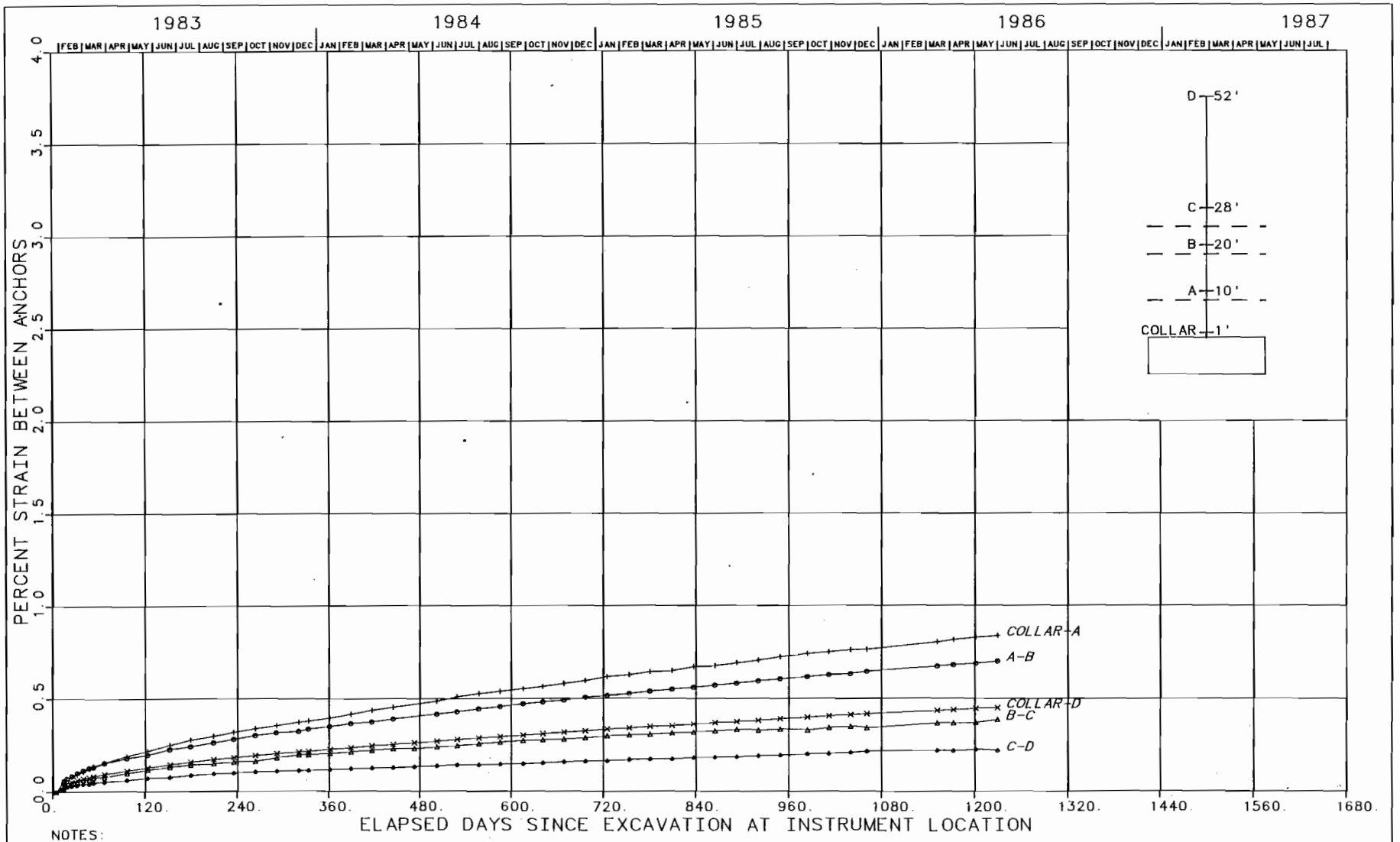
FIGURE K-26
MULTIPLE-POINT EXTENSOMETER 51X-GE-00248
E140 DRIFT, SOUTH 1950 FT - FLOOR
STRAIN VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.

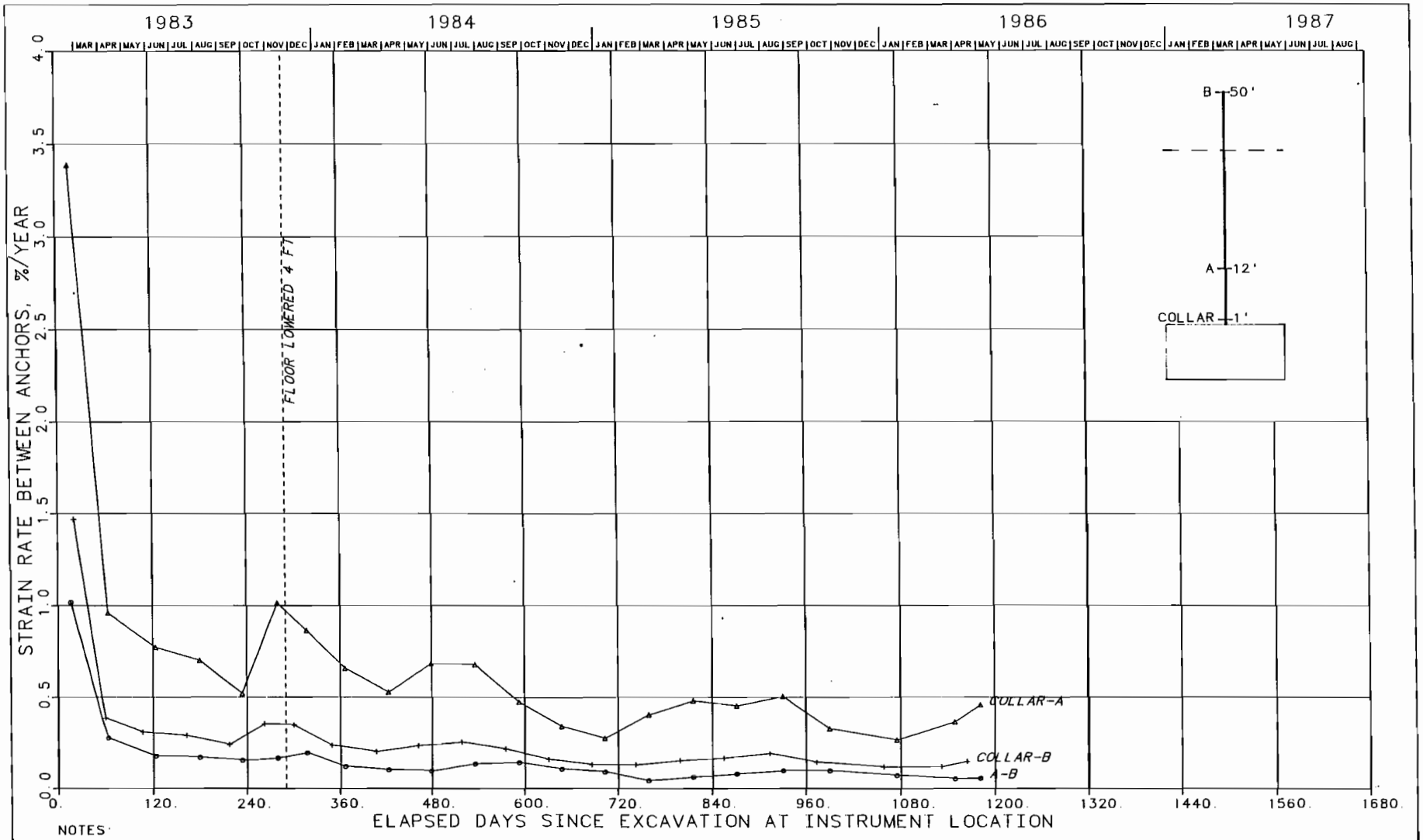
FIGURE K-27
MULTIPLE-POINT EXTENSOMETER 51X-GE-00250
E140 DRIFT, SOUTH 3045 FT - FLOOR
STRAIN VS. TIME SINCE EXCAVATION



NOTES:

1. SIZE OF EXCAVATION: 8 FT X 25 FT.

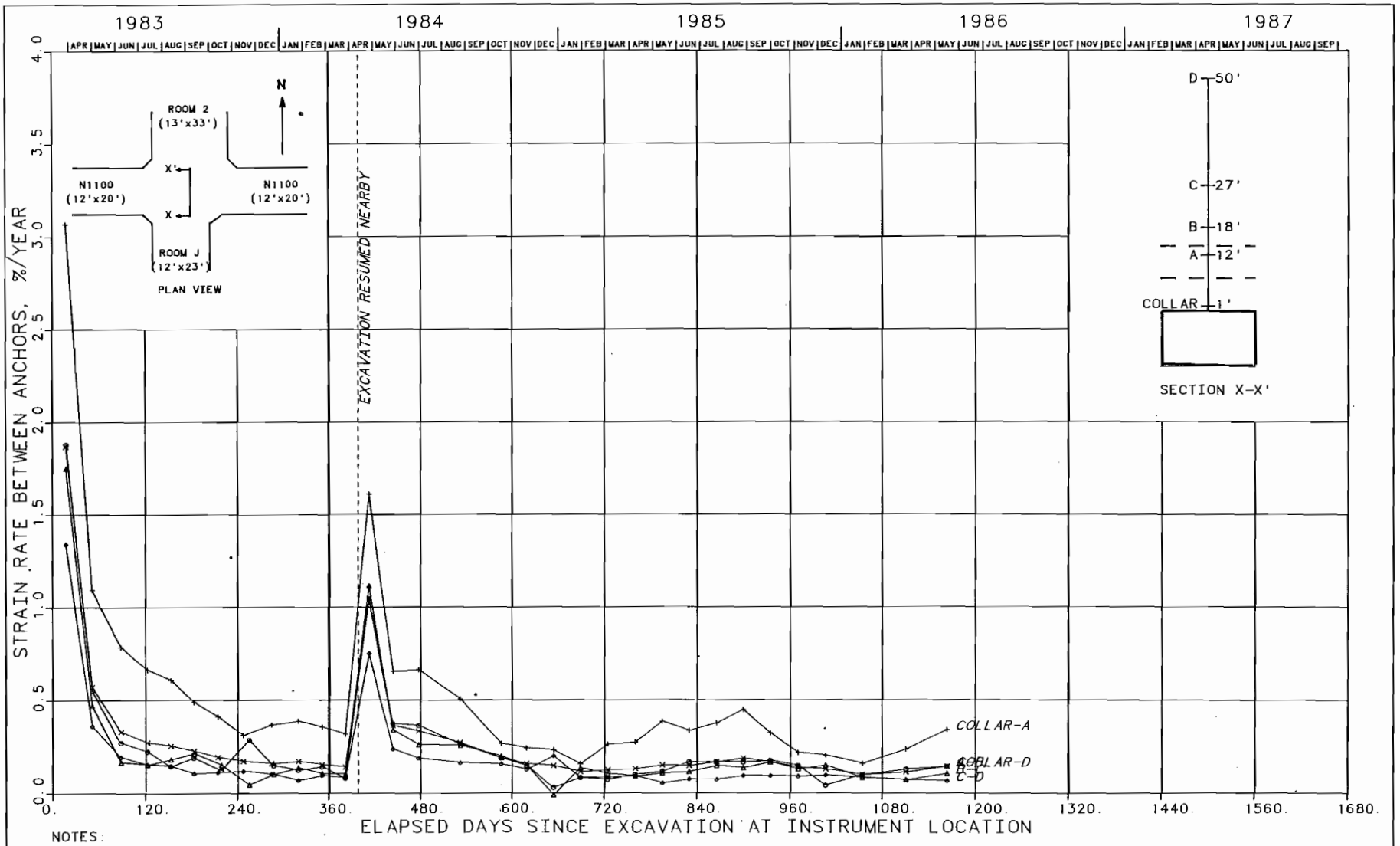
FIGURE K-28
MULTIPLE-POINT EXTENSOMETER 51X-GE-00249
E140 DRIFT, SOUTH 3080 FT - ROOF
STRAIN VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

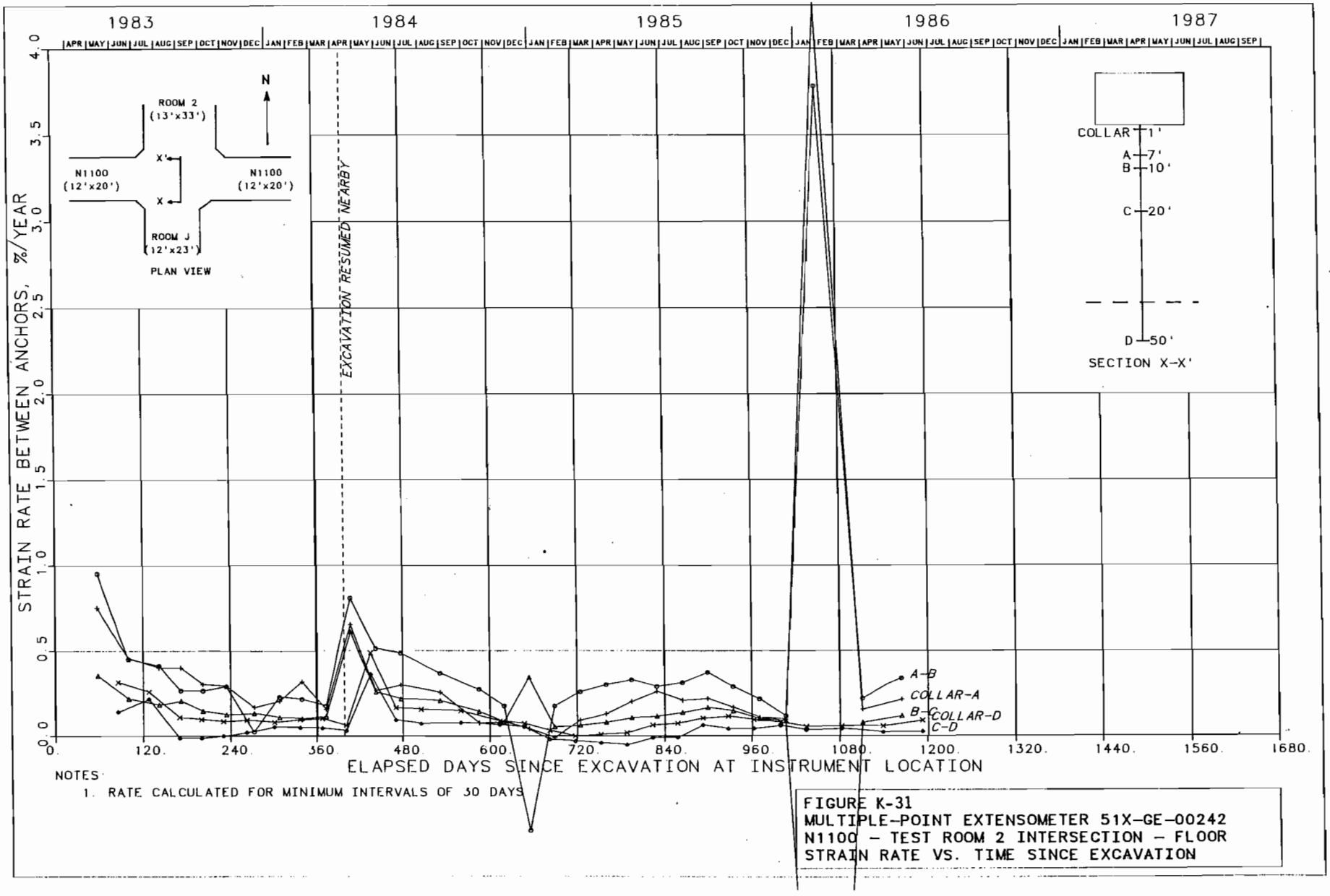
FIGURE K-29
DOUBLE-POINT EXTENSOMETER 51X-GE-00234
EO DRIFT, NORTH 626 FT - ROOF
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

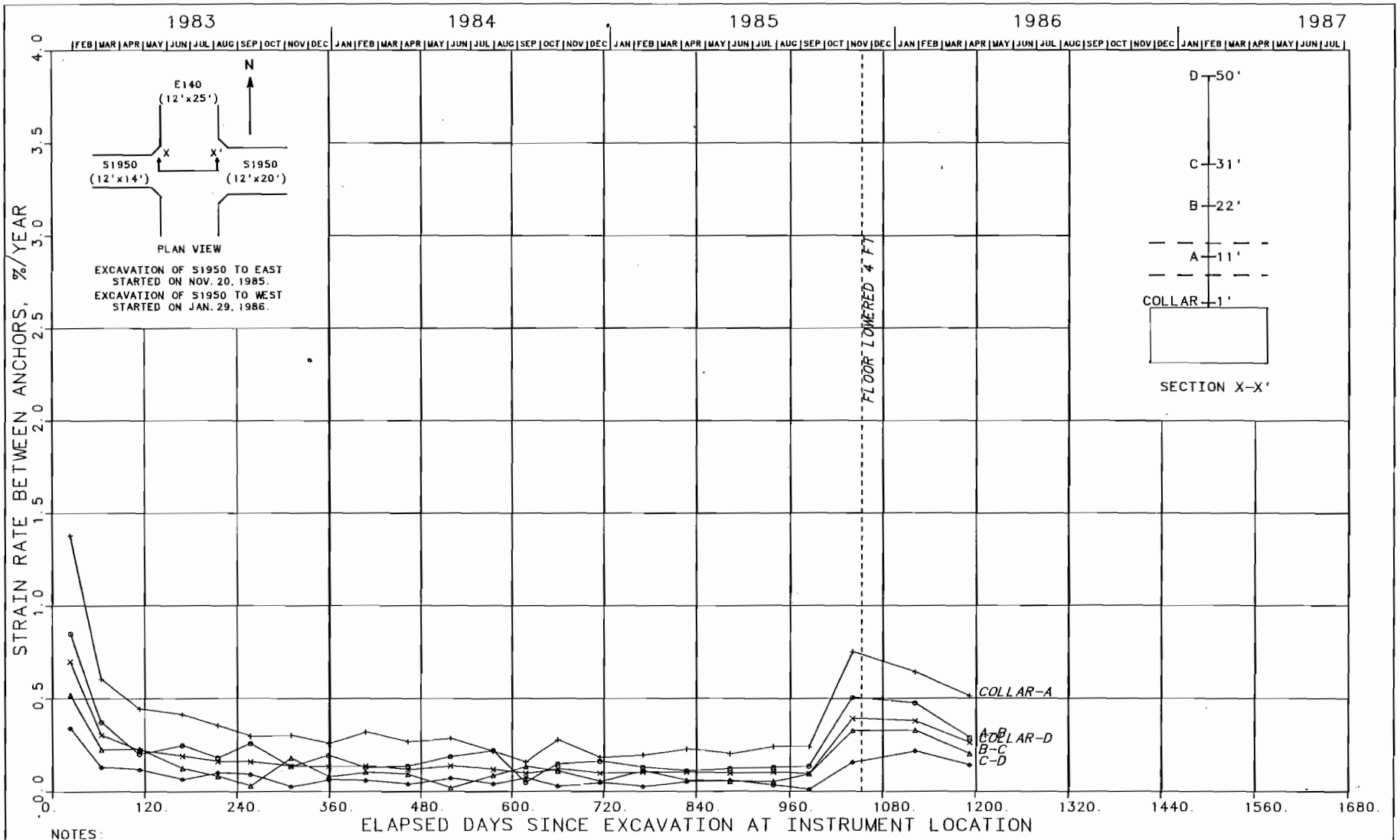
FIGURE K-30
MULTIPLE-POINT EXTENSOMETER 51X-GE-00241
N1100 - TEST ROOM 2 INTERSECTION - ROOF
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS

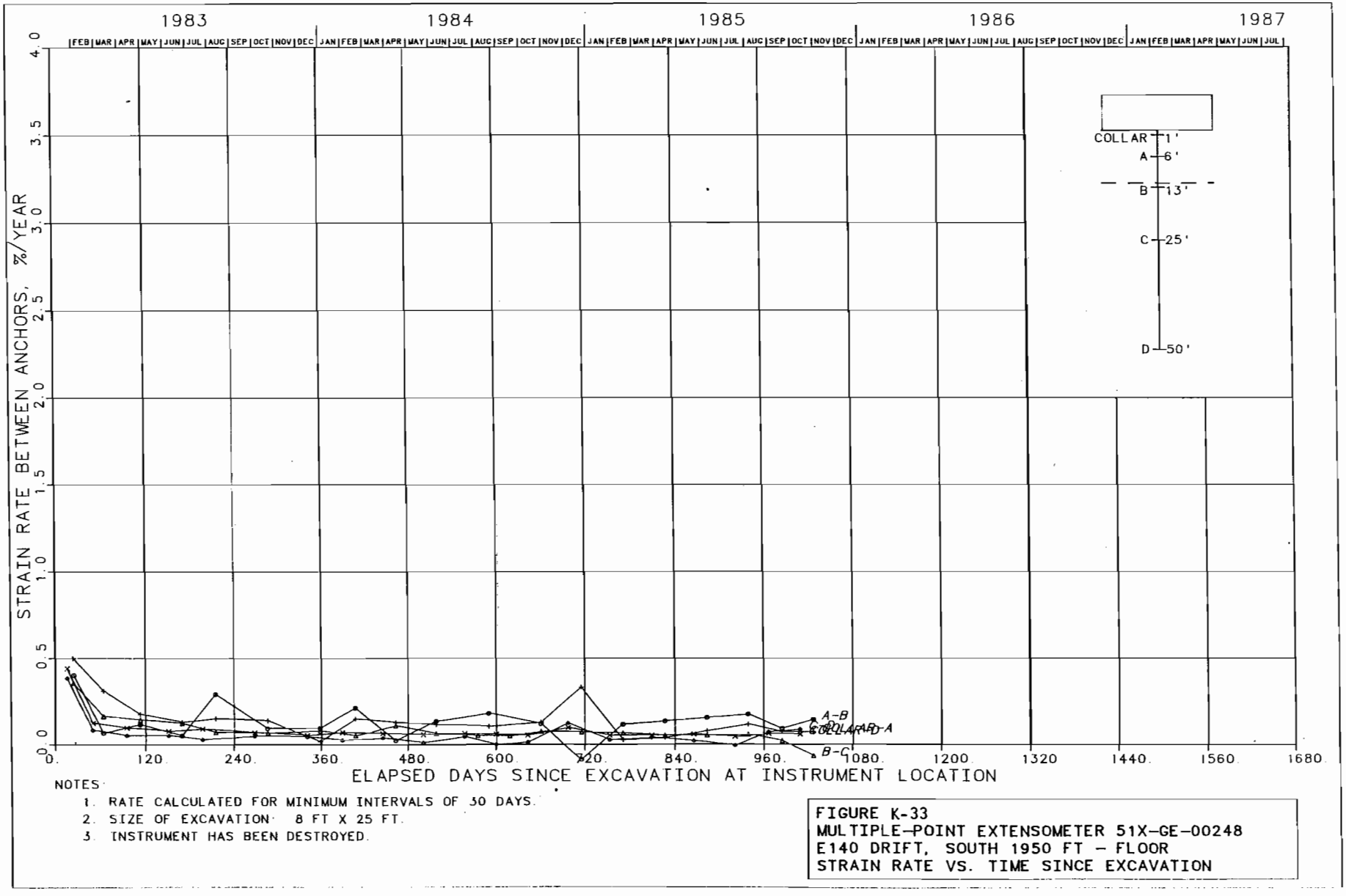
FIGURE K-31
MULTIPLE-POINT EXTENSOMETER 51X-GE-00242
N1100 - TEST ROOM 2 INTERSECTION - FLOOR
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 12 FT X 25 FT.

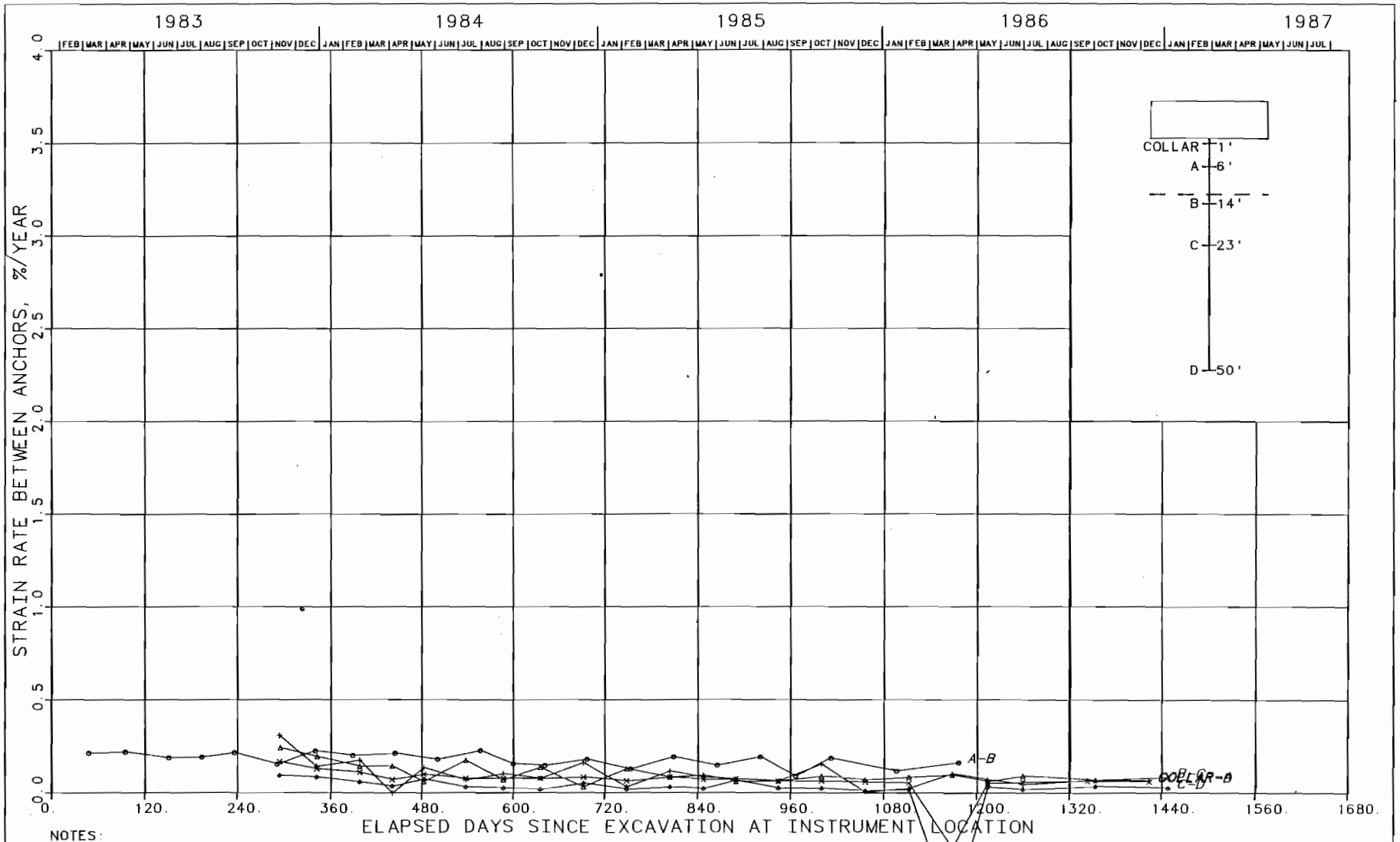
FIGURE K-32
MULTIPLE-POINT EXTENSOMETER 51X-GE-00247
E140 DRIFT, SOUTH 1950 FT - ROOF
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 8 FT X 25 FT.
3. INSTRUMENT HAS BEEN DESTROYED.

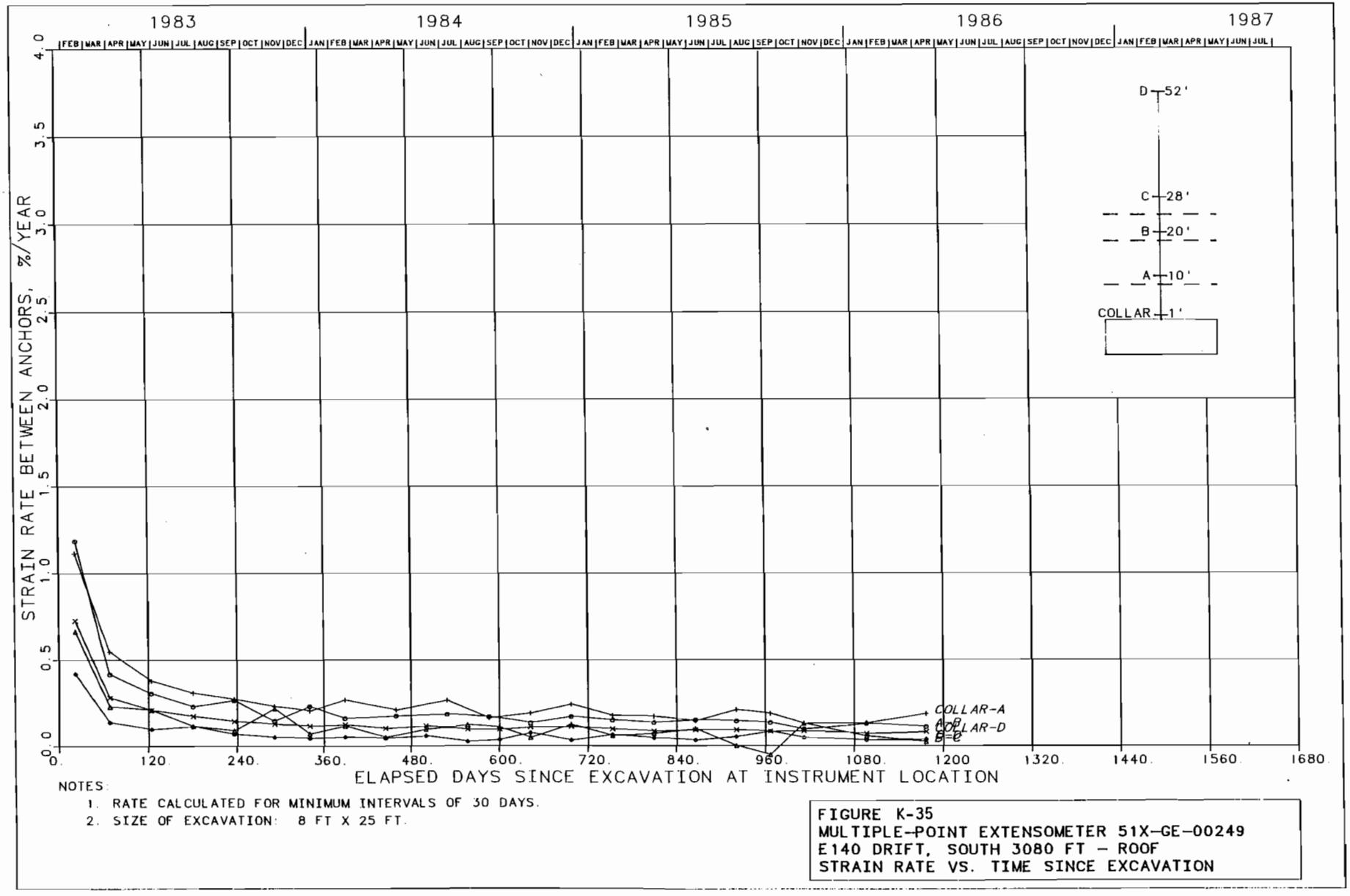
FIGURE K-33
MULTIPLE-POINT EXTENSOMETER 51X-GE-00248
E140 DRIFT, SOUTH 1950 FT - FLOOR
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 8 FT X 25 FT.

FIGURE K-34
MULTIPLE-POINT EXTENSOMETER 51X-GE-00250
E140 DRIFT, SOUTH 3045 FT - FLOOR
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.
2. SIZE OF EXCAVATION: 8 FT X 25 FT.

FIGURE K-35
MULTIPLE-POINT EXTENSOMETER 51X-GE-00249
E140 DRIFT, SOUTH 3080 FT - ROOF
STRAIN RATE VS. TIME SINCE EXCAVATION

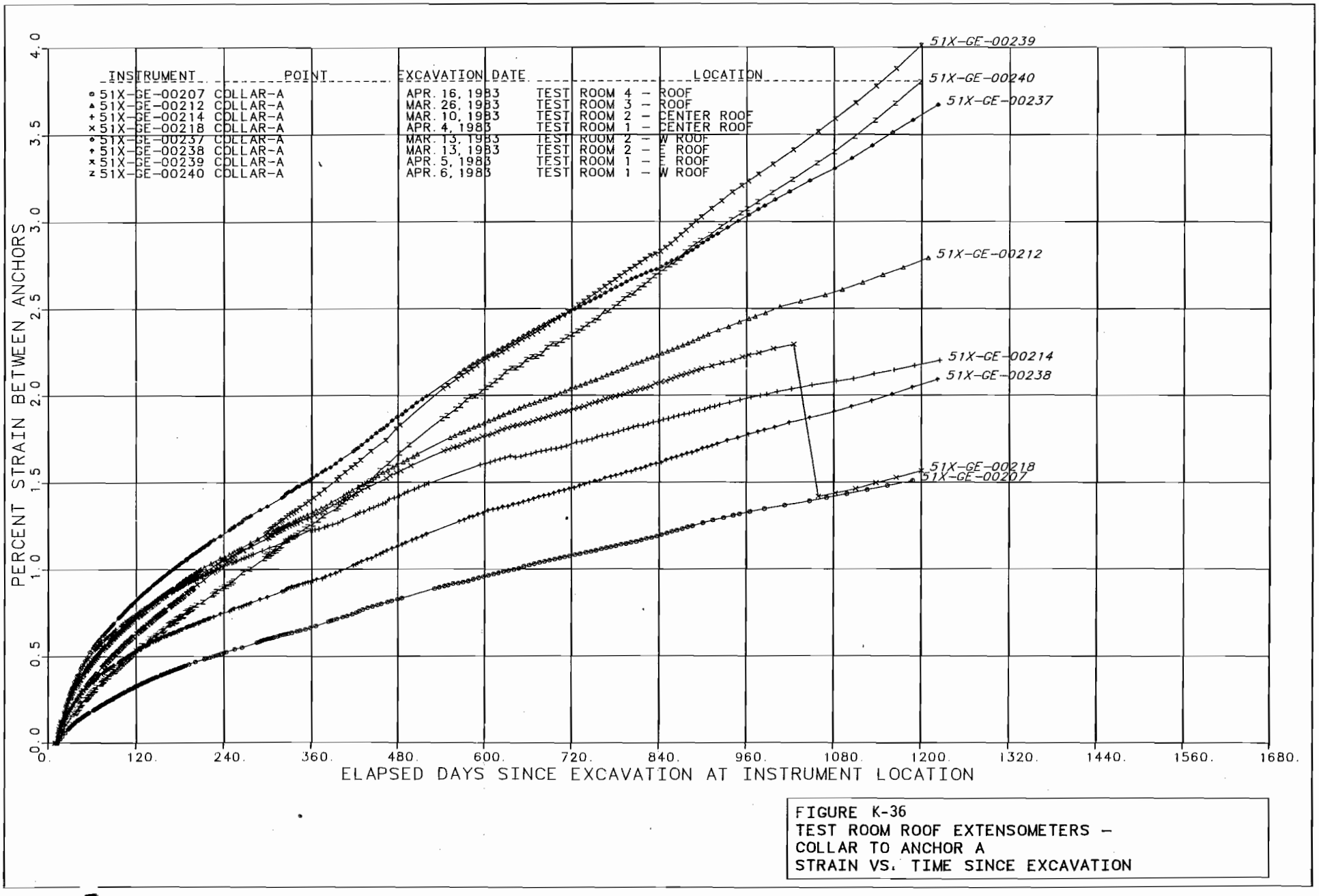


FIGURE K-36
TEST ROOM ROOF EXTENSOMETERS -
COLLAR TO ANCHOR A
STRAIN VS. TIME SINCE EXCAVATION

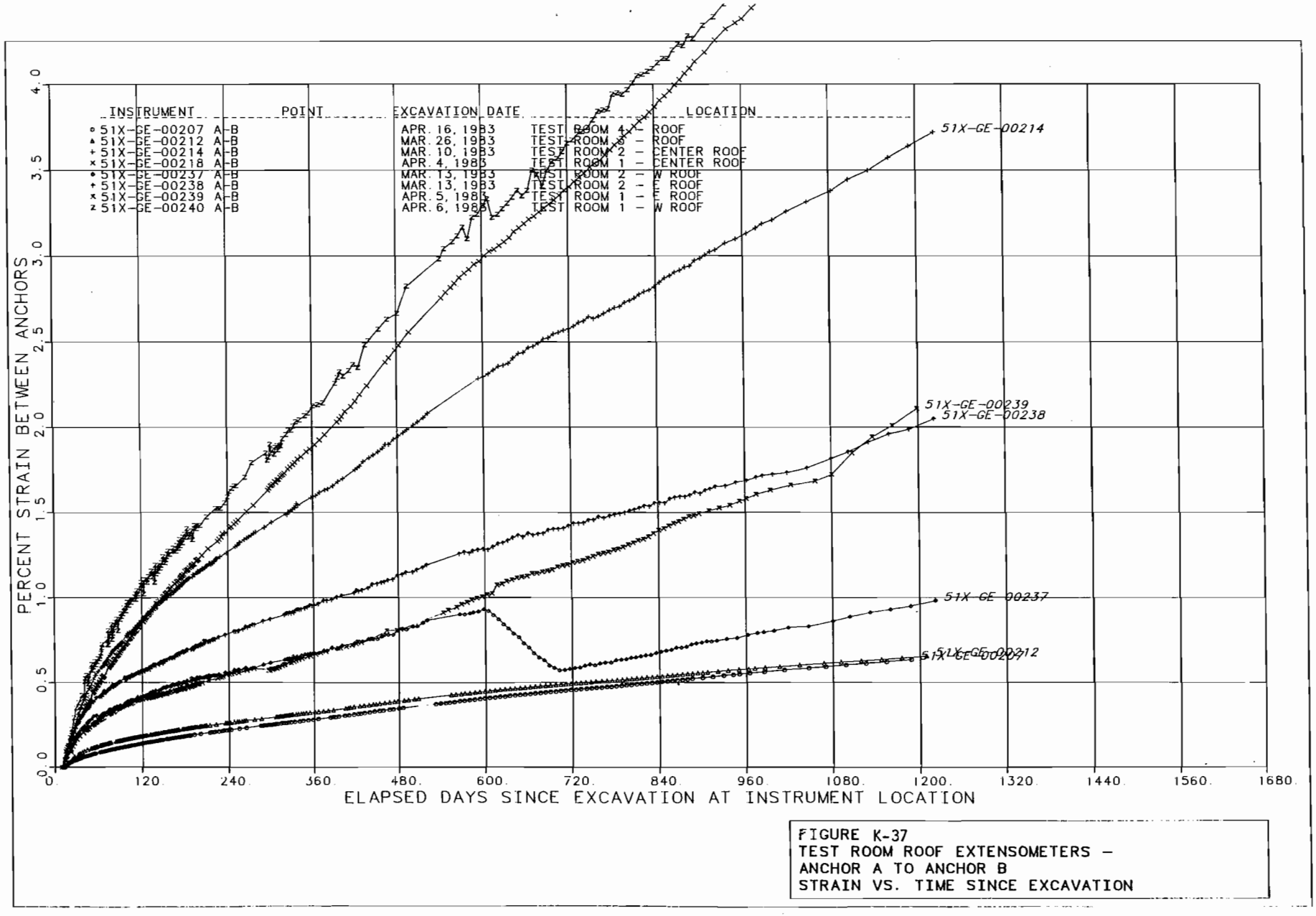


FIGURE K-37
TEST ROOM ROOF EXTENSOMETERS -
ANCHOR A TO ANCHOR B
STRAIN VS. TIME SINCE EXCAVATION

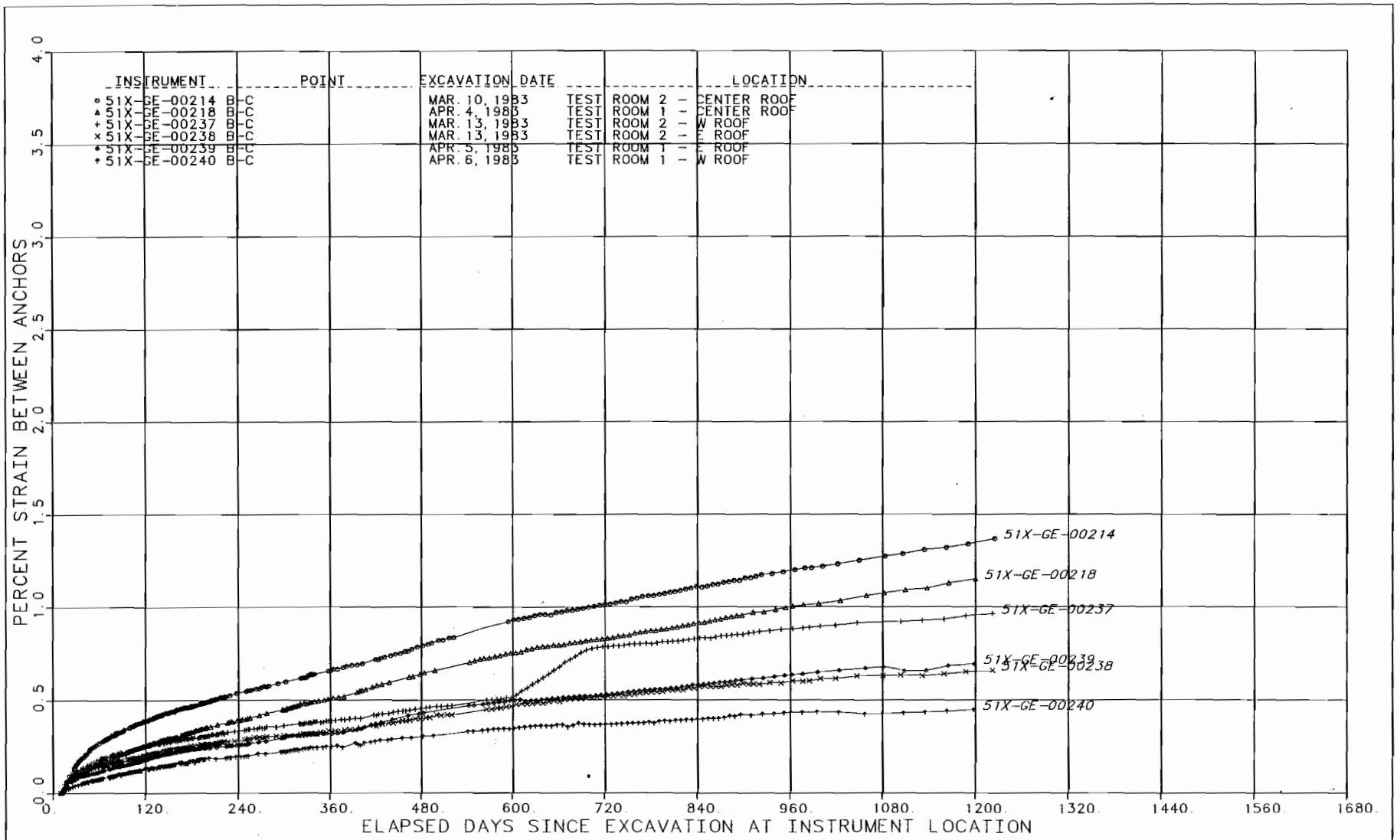


FIGURE K-38
TEST ROOM ROOF EXTENSOMETERS -
ANCHOR B TO ANCHOR C
STRAIN VS. TIME SINCE EXCAVATION

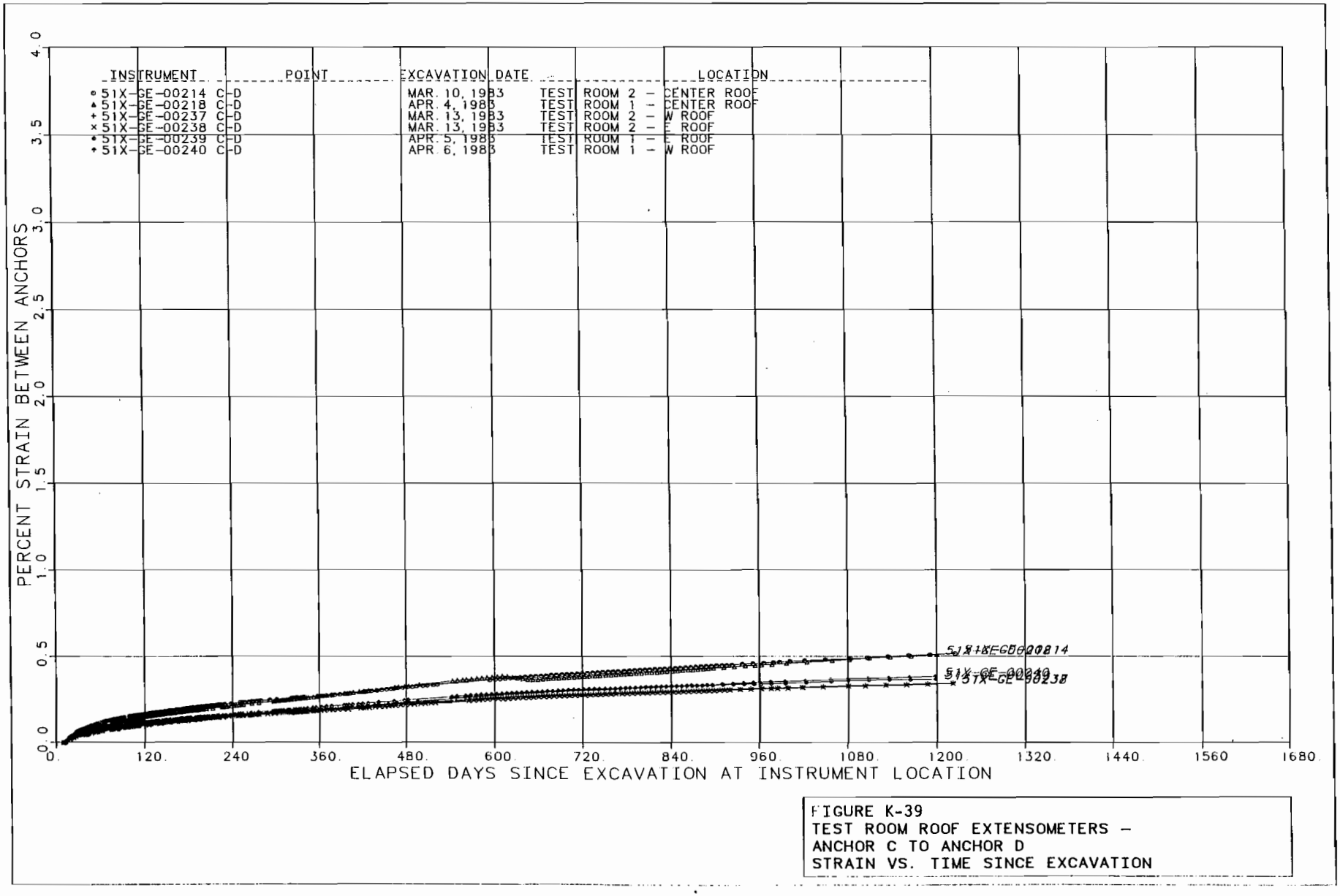


FIGURE K-39
TEST ROOM ROOF EXTENSOMETERS –
ANCHOR C TO ANCHOR D
STRAIN VS. TIME SINCE EXCAVATION

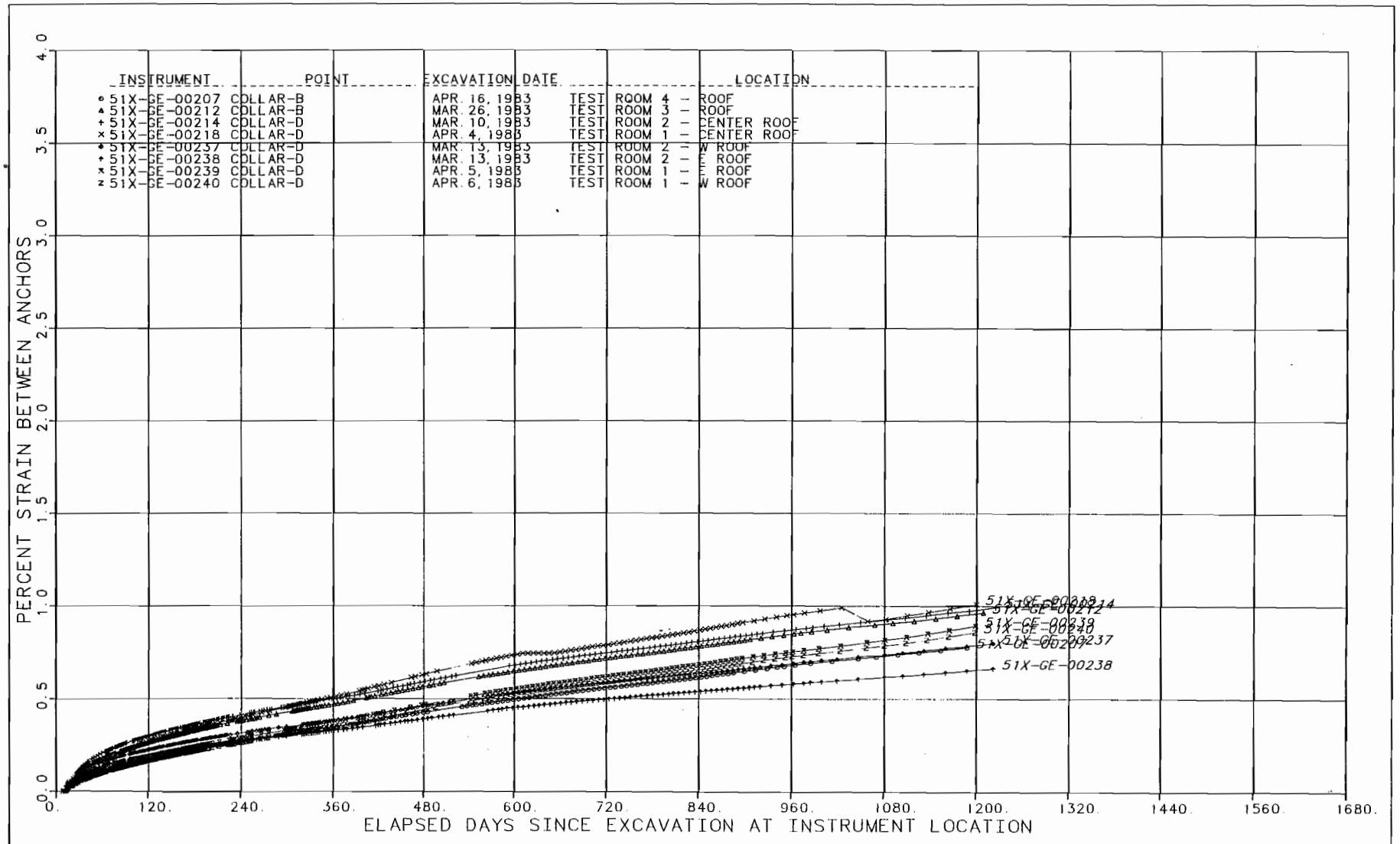


FIGURE K-40
TEST ROOM ROOF EXTENSOMETERS -
COLLAR TO DEEPEST ANCHOR
STRAIN VS. TIME SINCE EXCAVATION

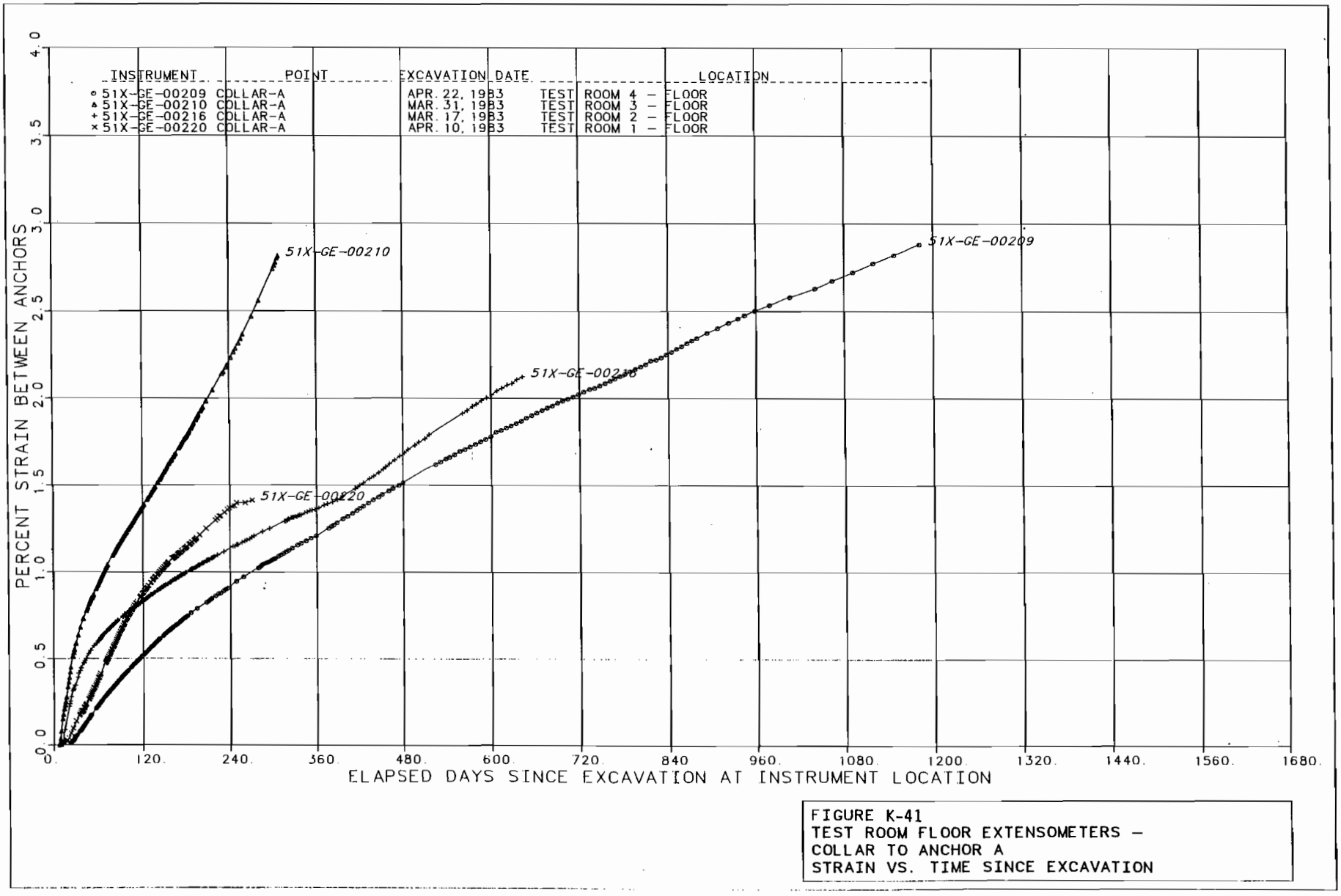


FIGURE K-41
TEST ROOM FLOOR EXTENSOMETERS -
COLLAR TO ANCHOR A
STRAIN VS. TIME SINCE EXCAVATION

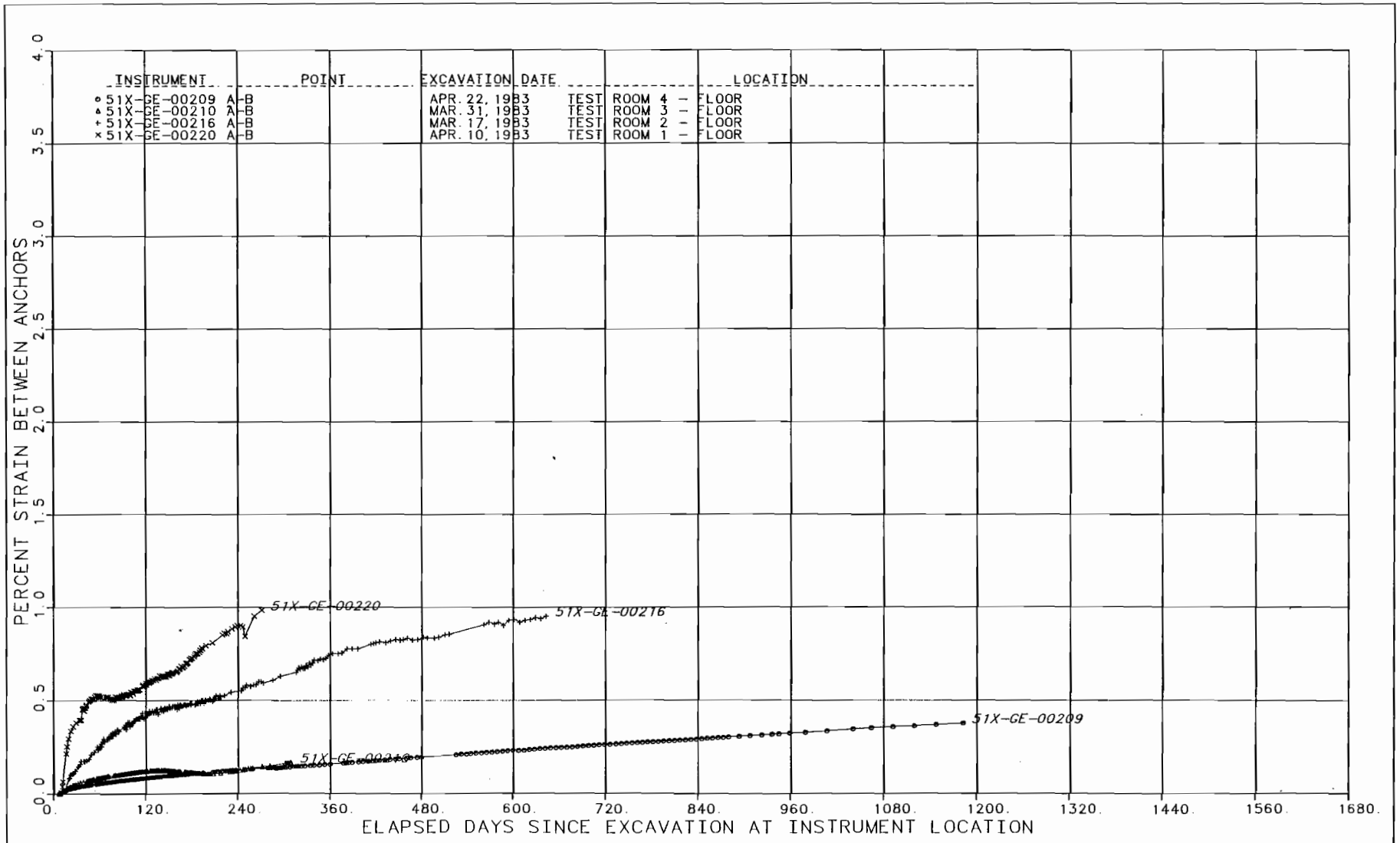


FIGURE K-42
TEST ROOM FLOOR EXTENSOMETERS -
ANCHOR A TO ANCHOR B
STRAIN VS. TIME SINCE EXCAVATION

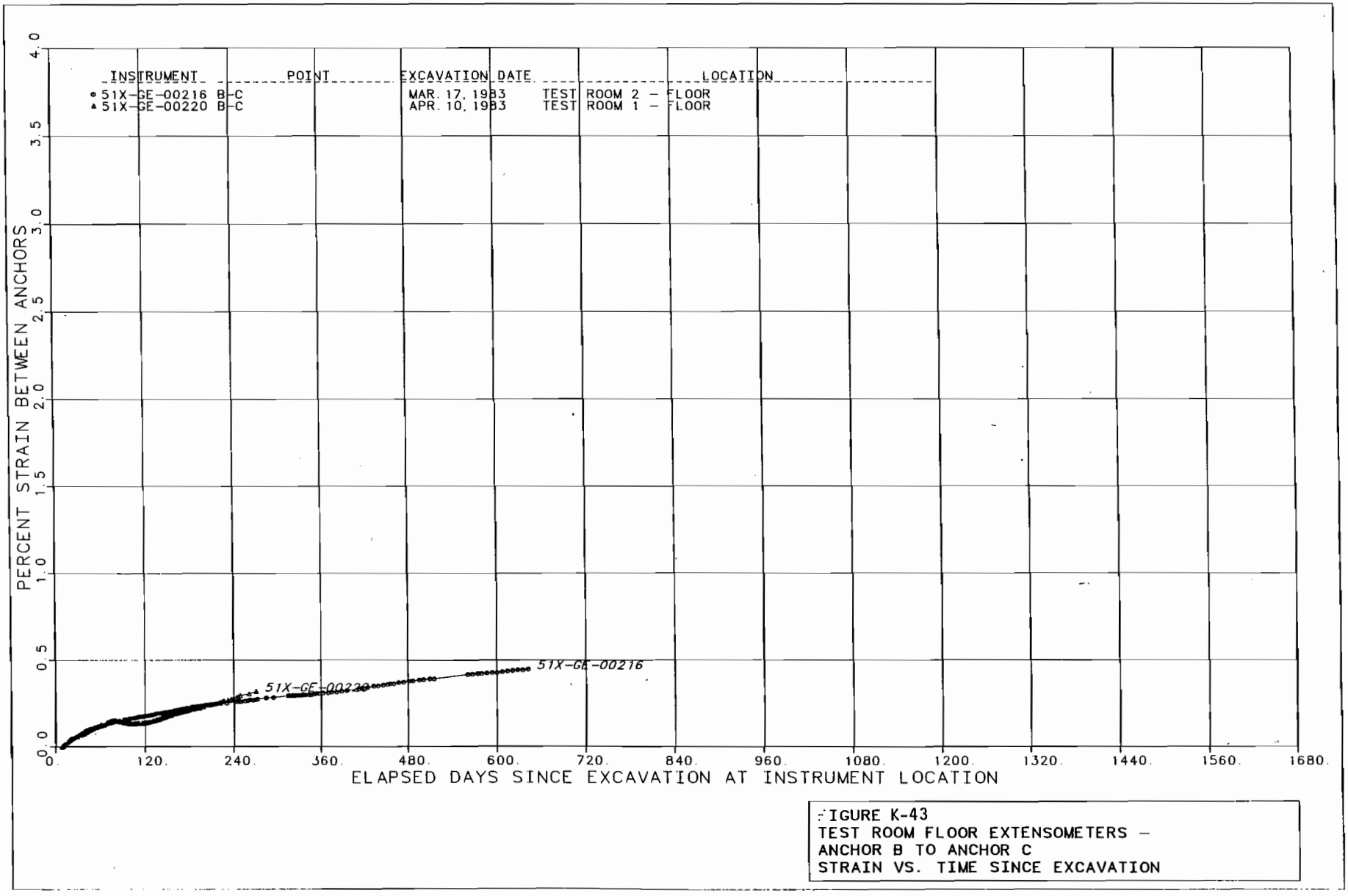


FIGURE K-43
TEST ROOM FLOOR EXTENSOMETERS –
ANCHOR B TO ANCHOR C
STRAIN VS. TIME SINCE EXCAVATION

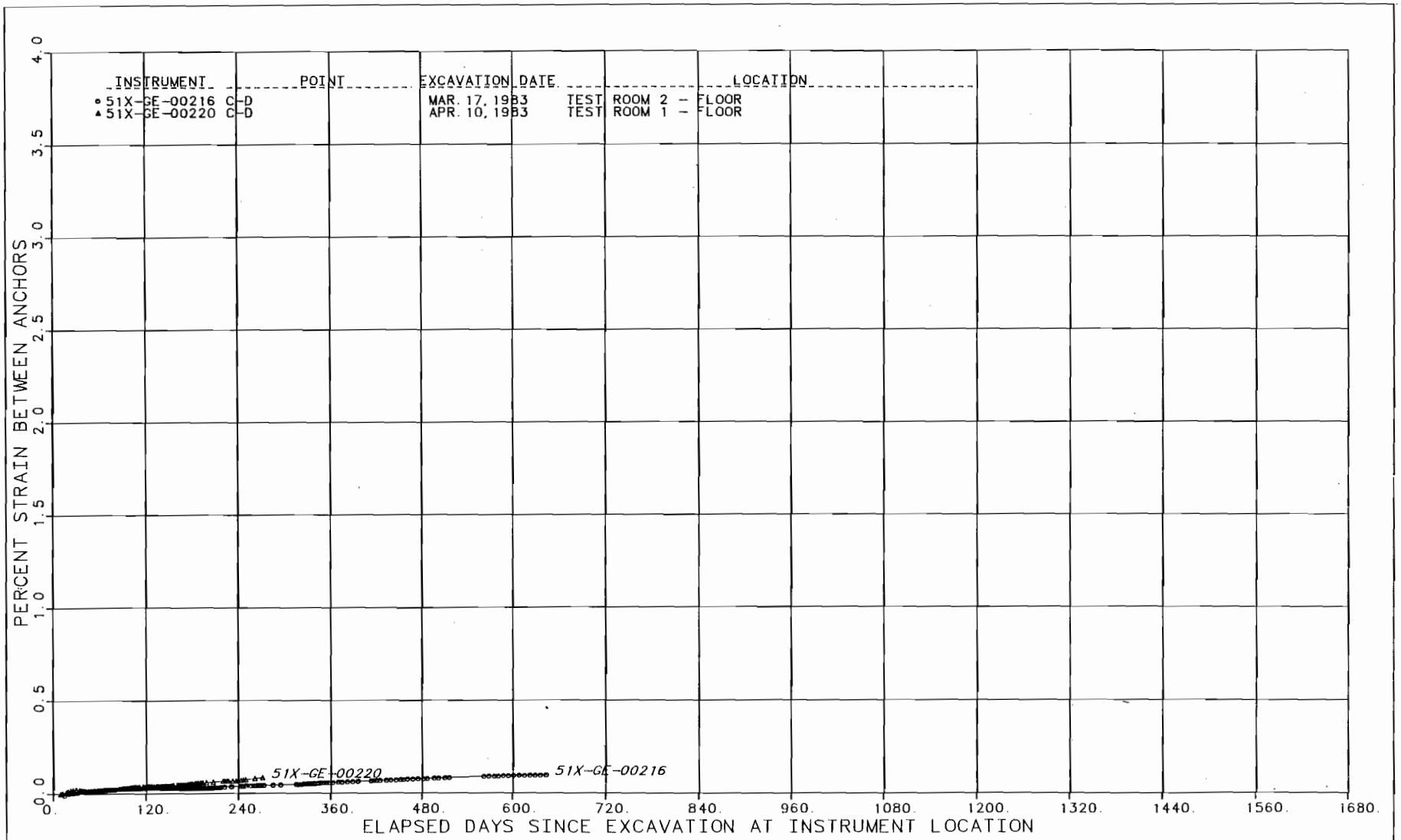


FIGURE K-44
TEST ROOM FLOOR EXTENSOMETERS -
ANCHOR C TO ANCHOR D
STRAIN VS. TIME SINCE EXCAVATION

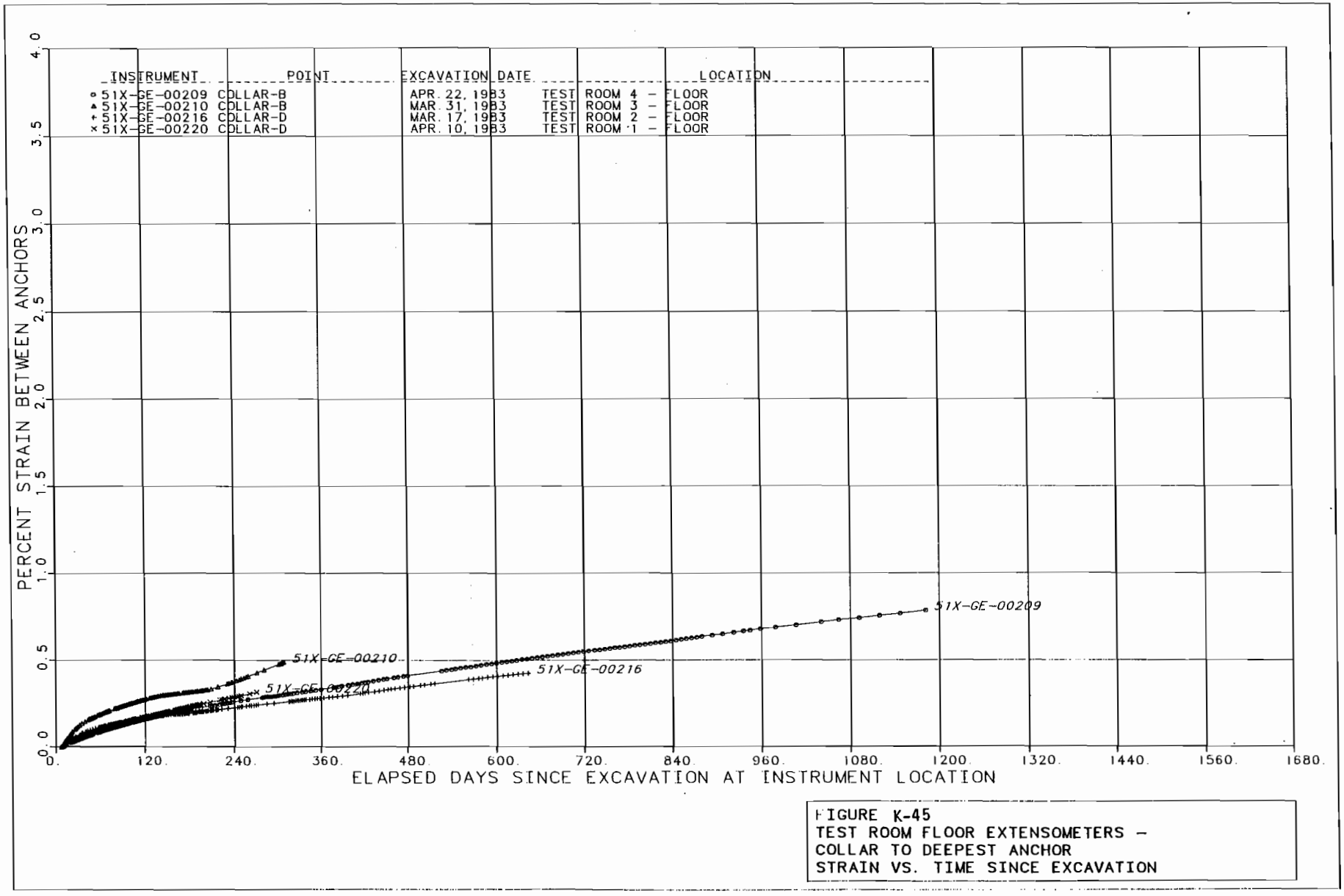
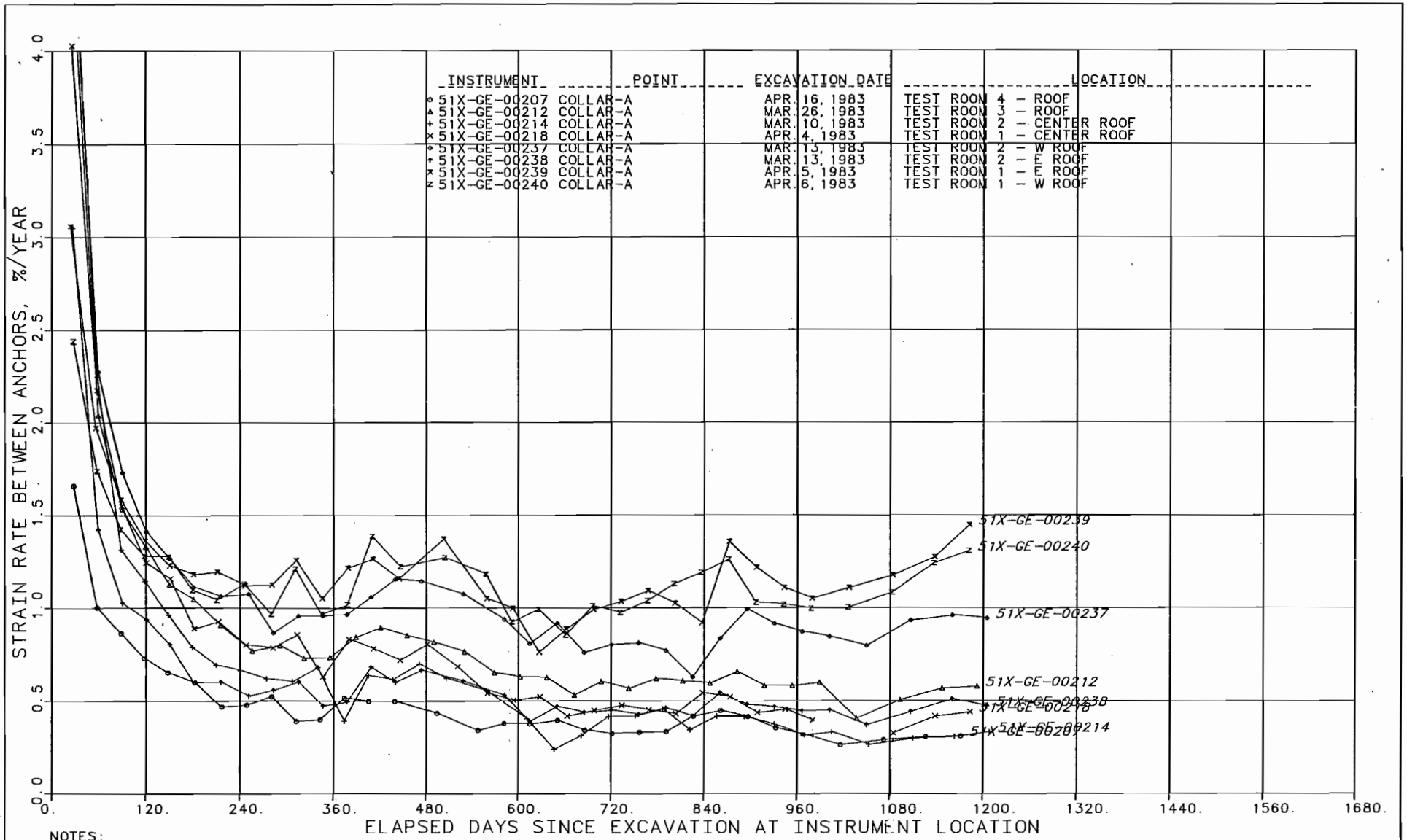


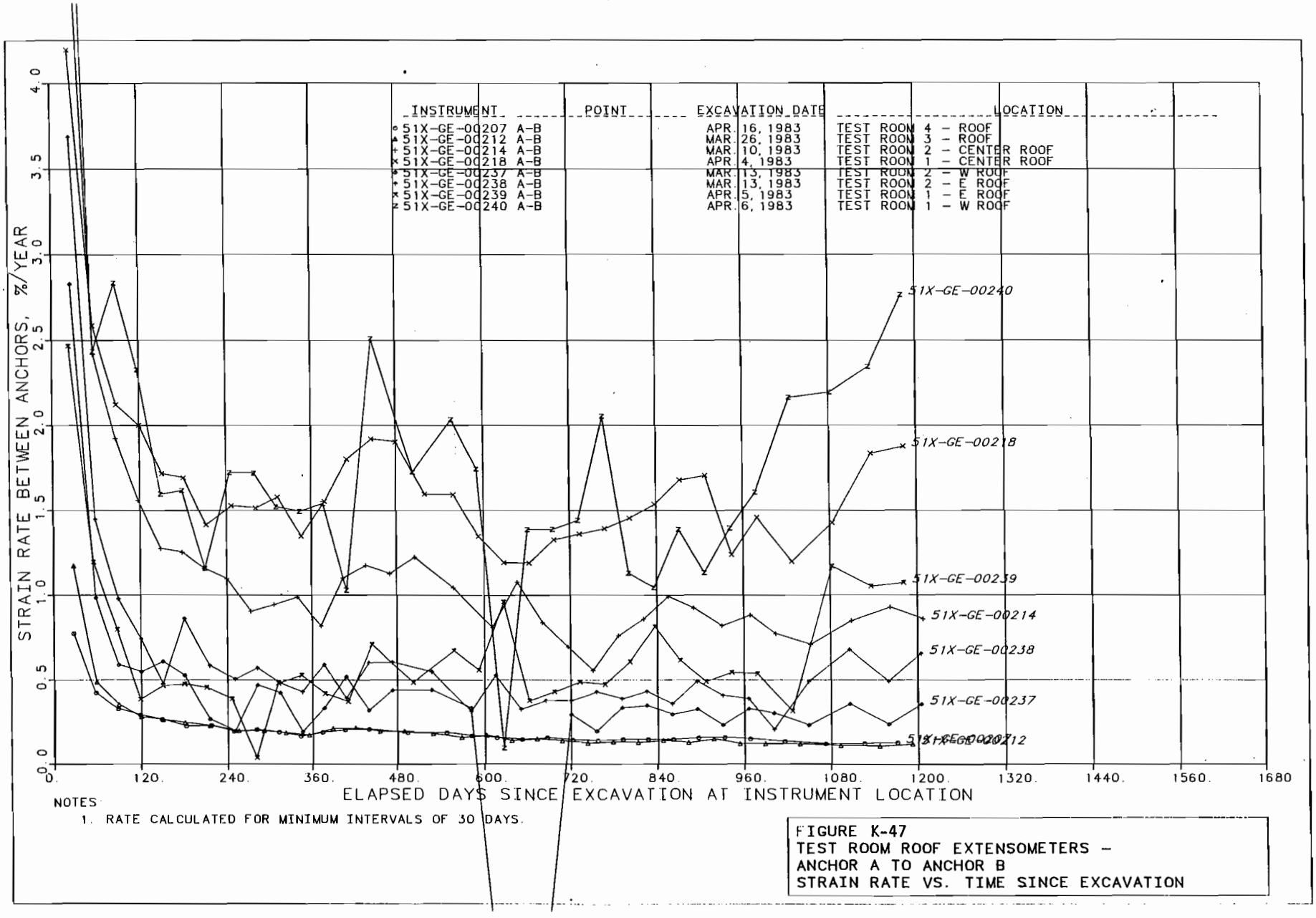
FIGURE K-45
TEST ROOM FLOOR EXTENSOMETERS -
COLLAR TO DEEPEST ANCHOR
STRAIN VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

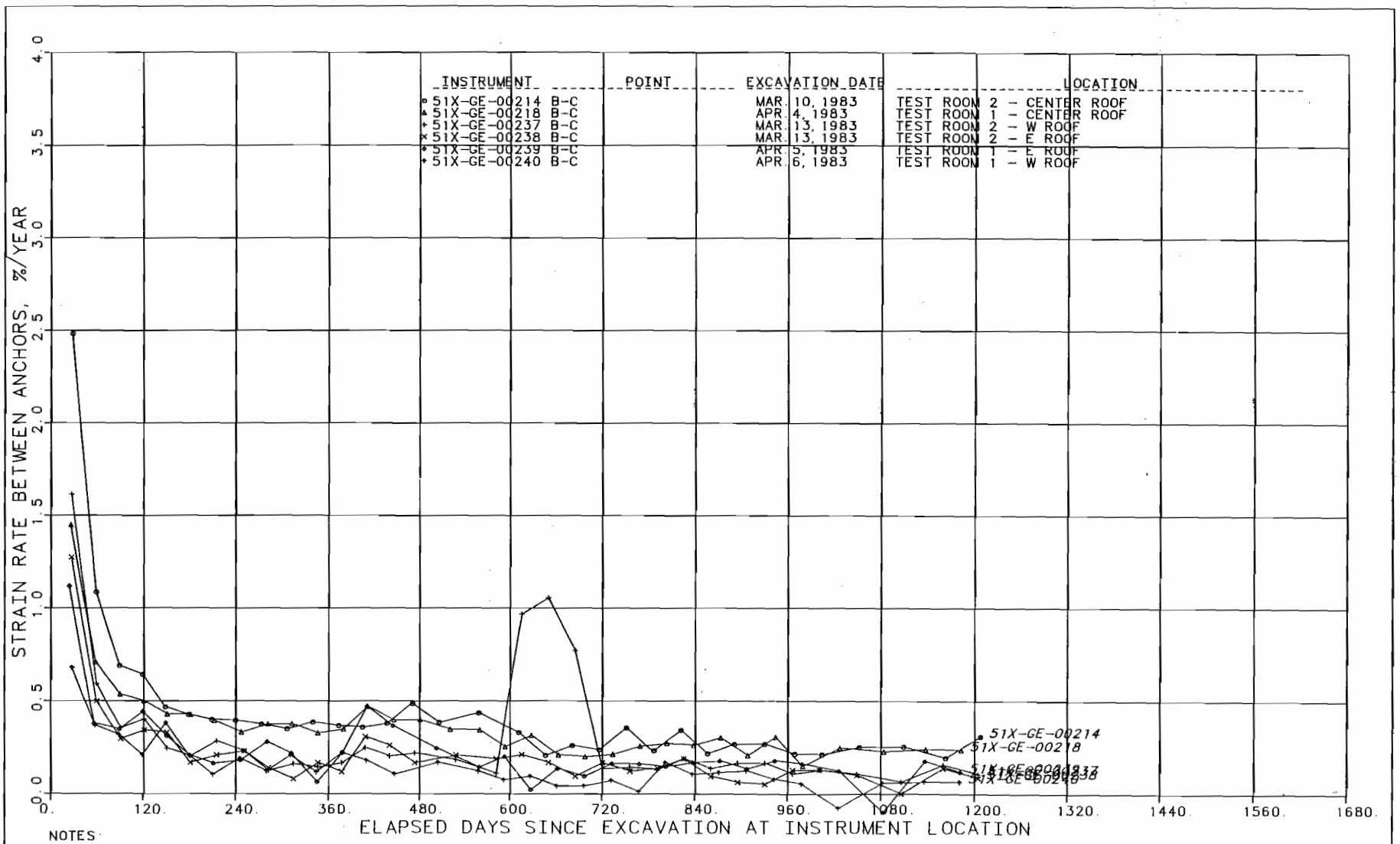
FIGURE K-46
TEST ROOM ROOF EXTENSOMETERS -
COLLAR TO ANCHOR A
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

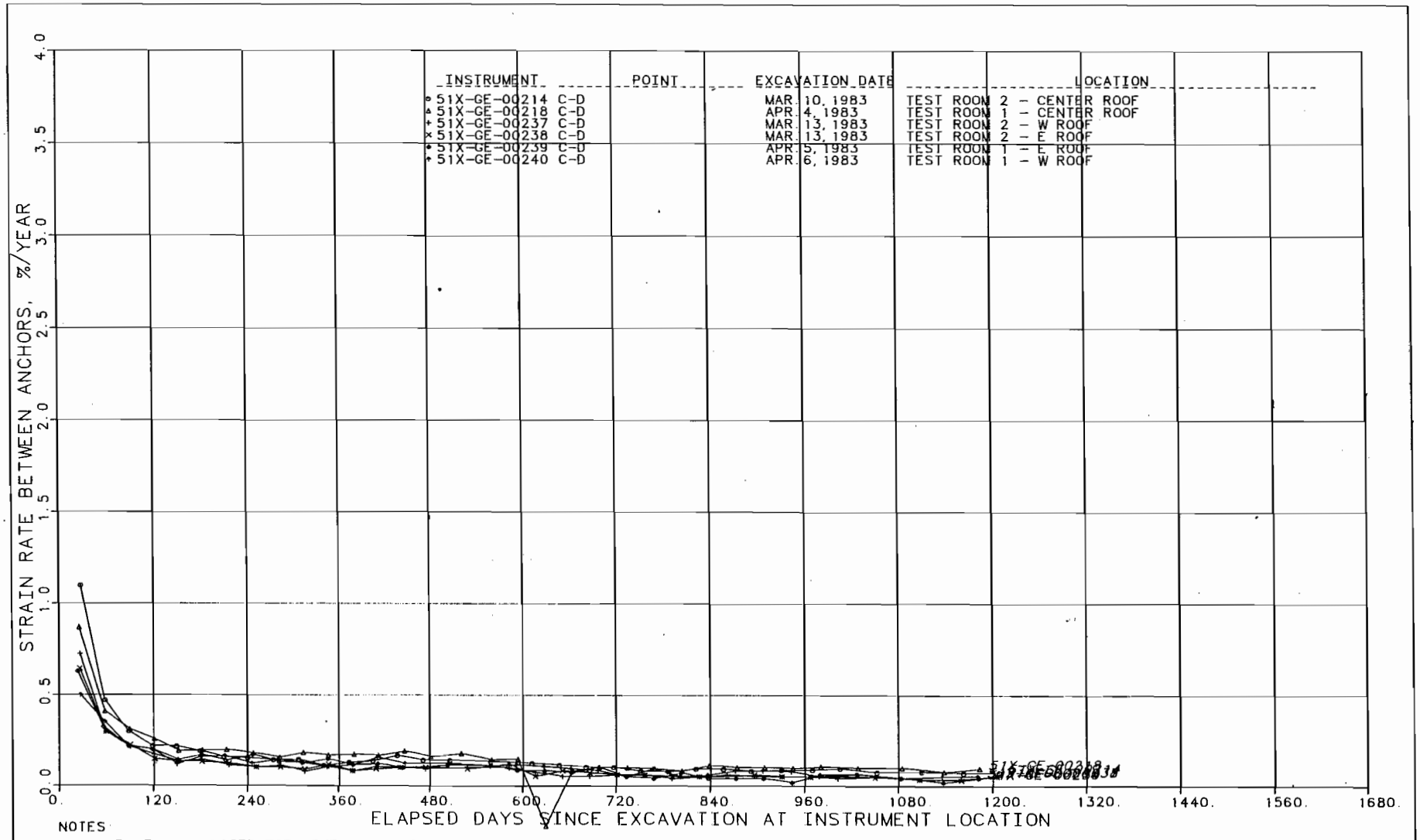
FIGURE K-47
TEST ROOM ROOF EXTENSOMETERS -
ANCHOR A TO ANCHOR B
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

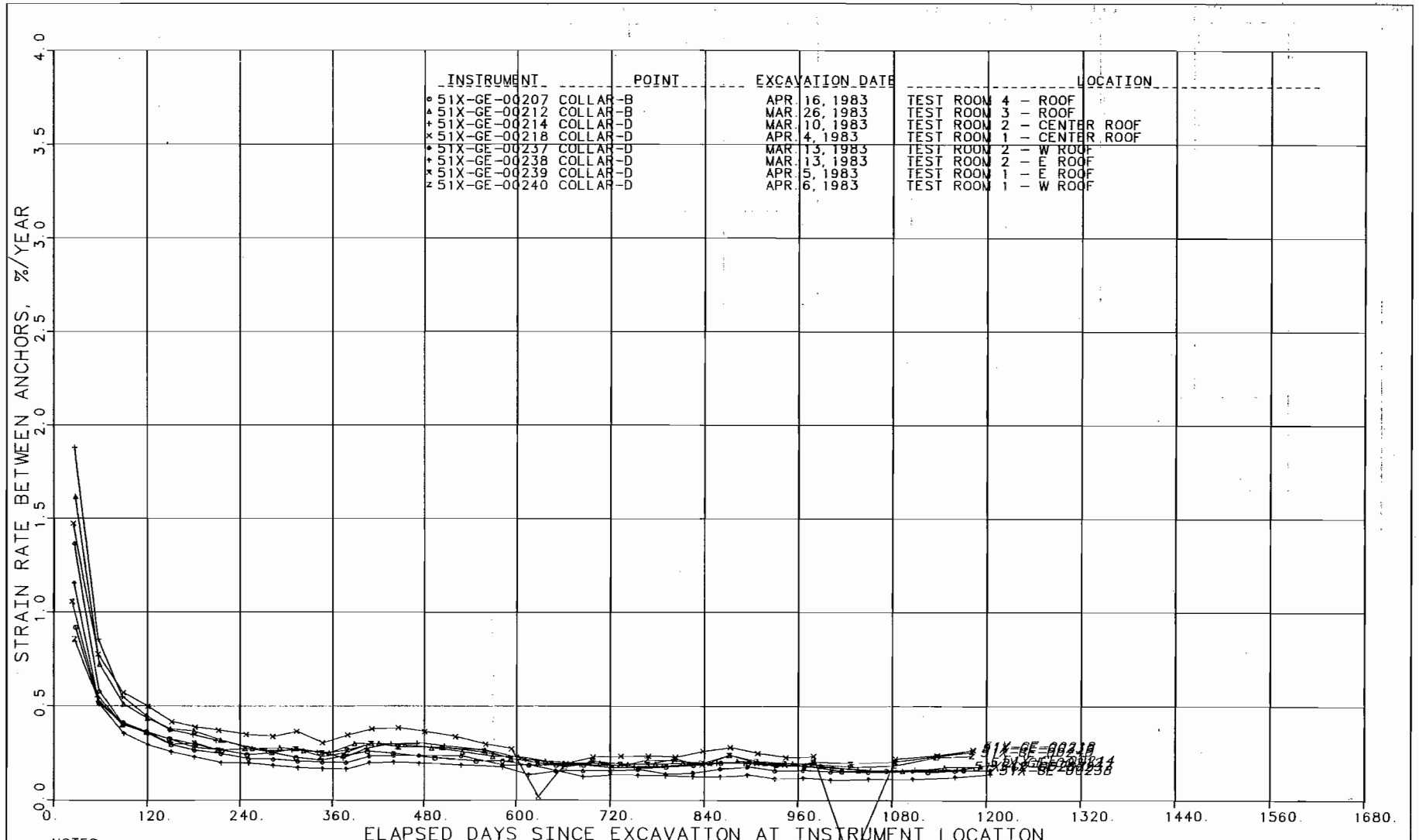
FIGURE K-48
TEST ROOM ROOF EXTENSOMETERS -
ANCHOR B TO ANCHOR C
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

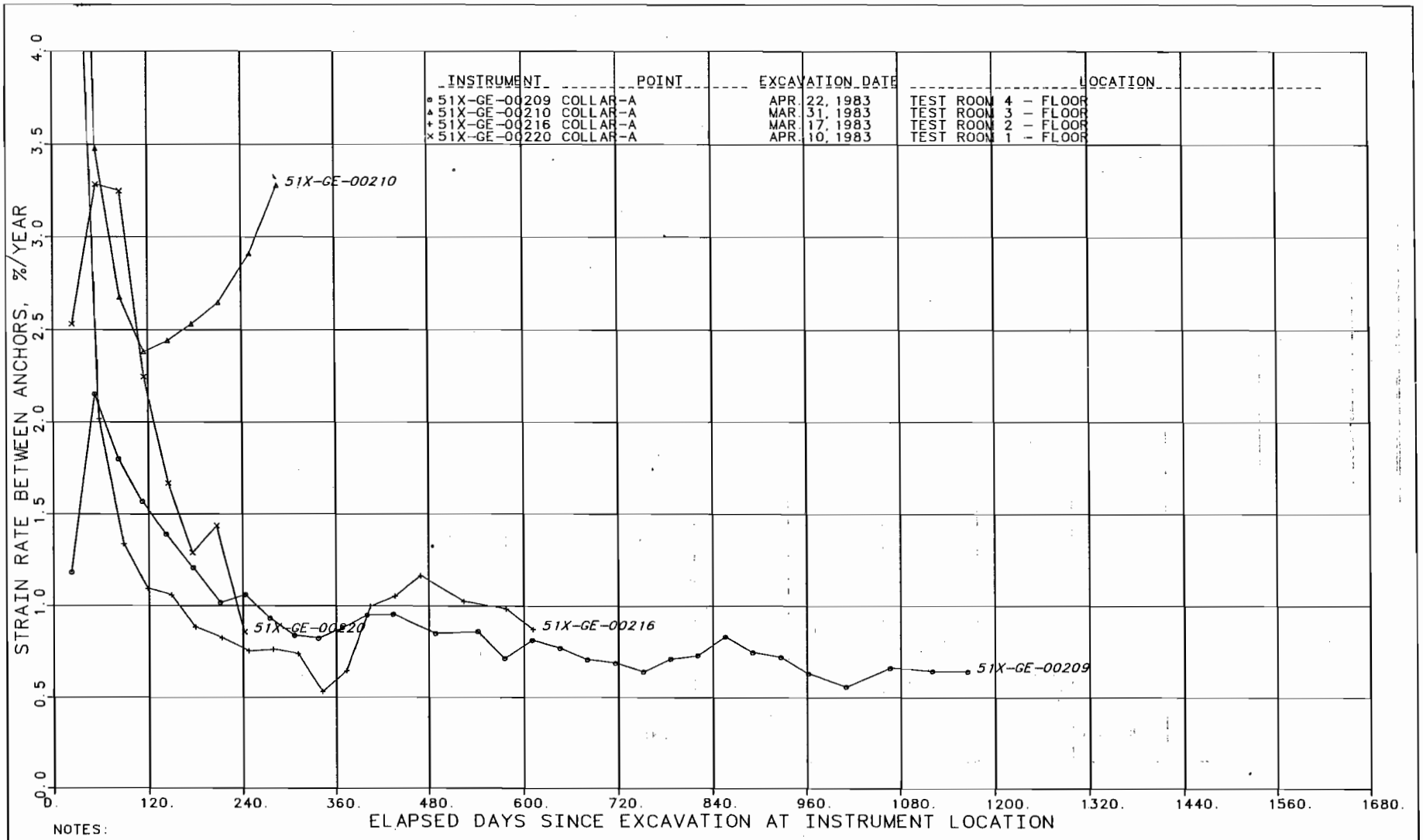
FIGURE K-49
TEST ROOM ROOF EXTENSOMETERS -
ANCHOR C TO ANCHOR D
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

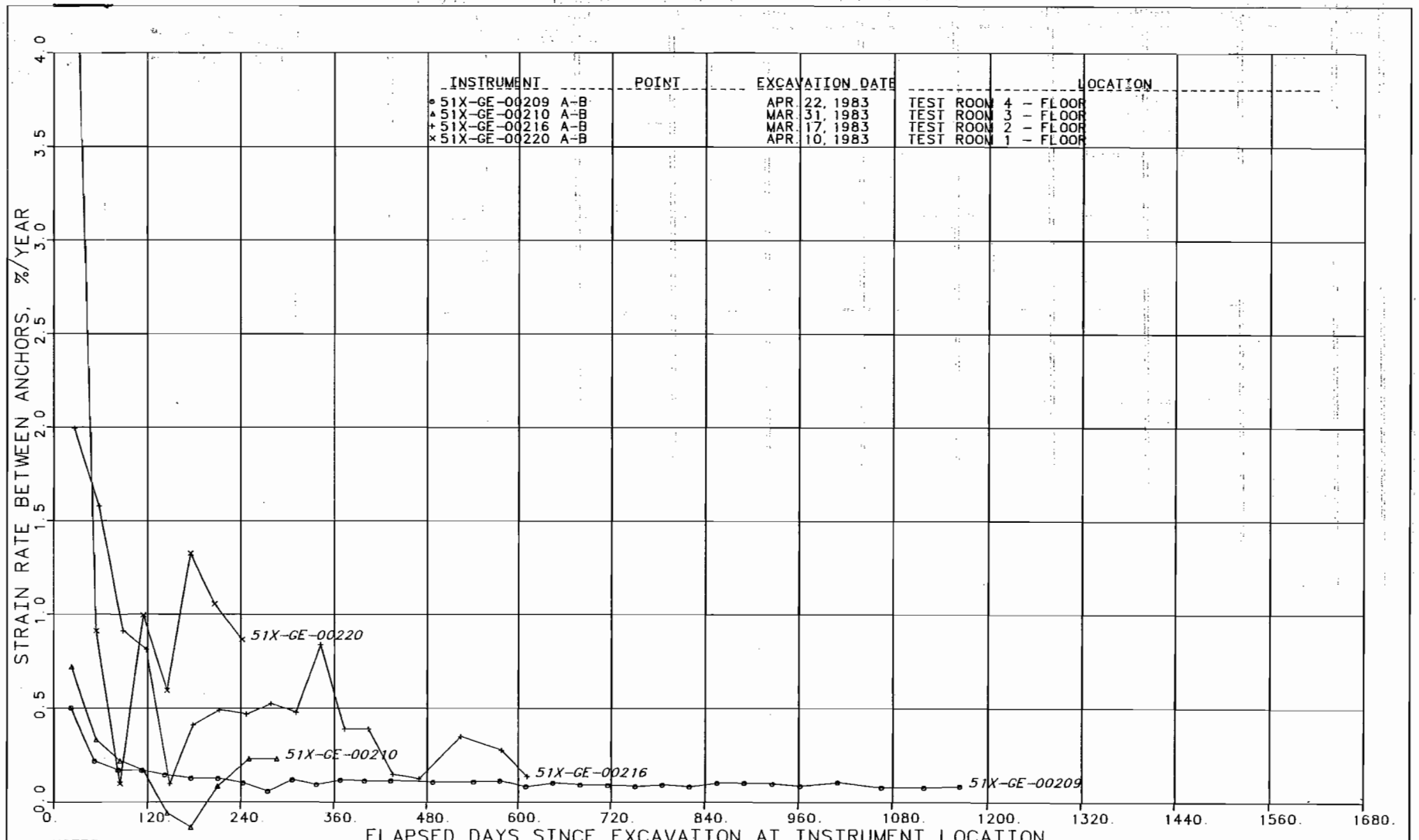
FIGURE K-50
TEST ROOM ROOF EXTENSOMETERS
COLLAR TO DEEPEST ANCHOR
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

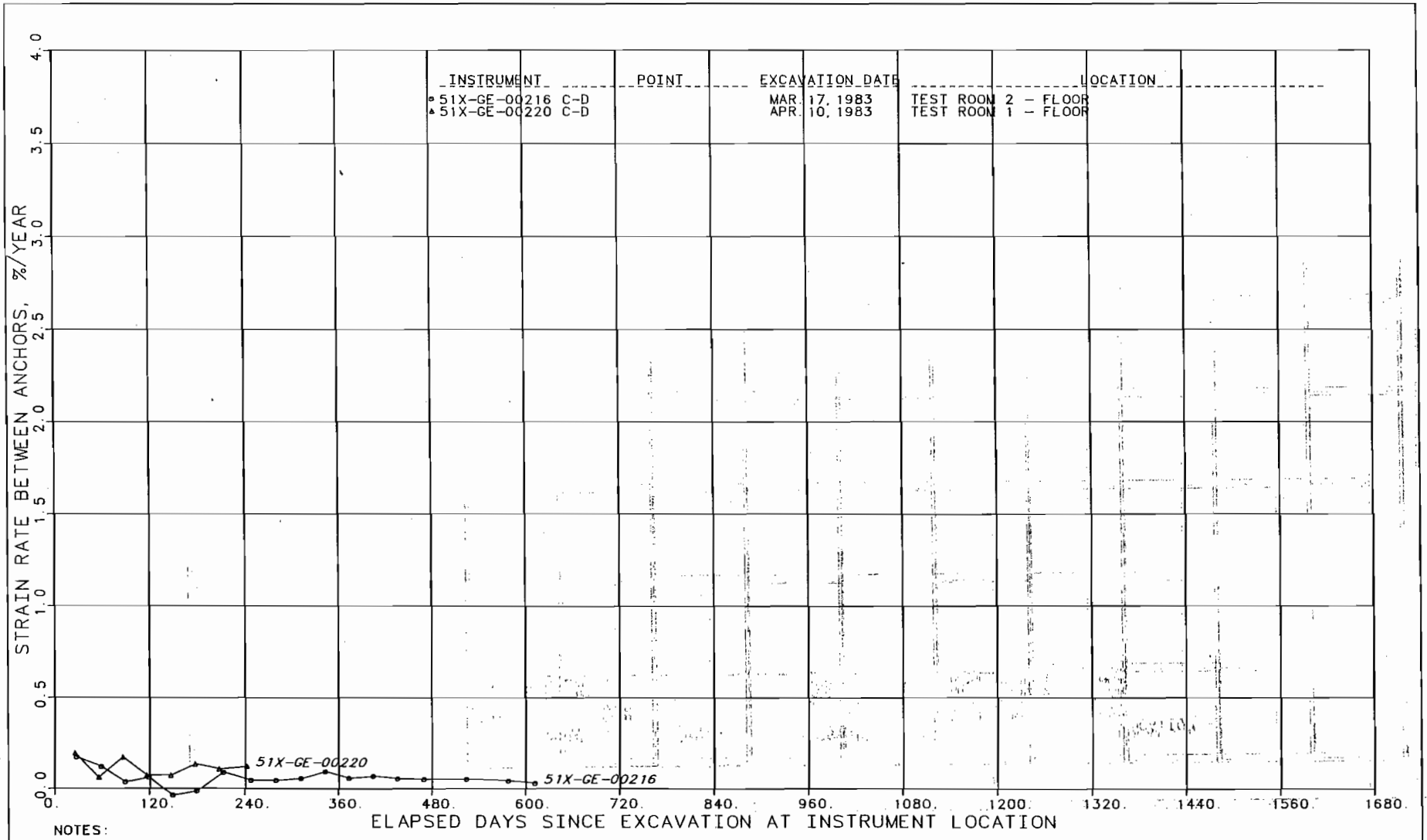
FIGURE K-51
TEST ROOM FLOOR EXTENSOMETERS –
COLLAR TO ANCHOR A
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

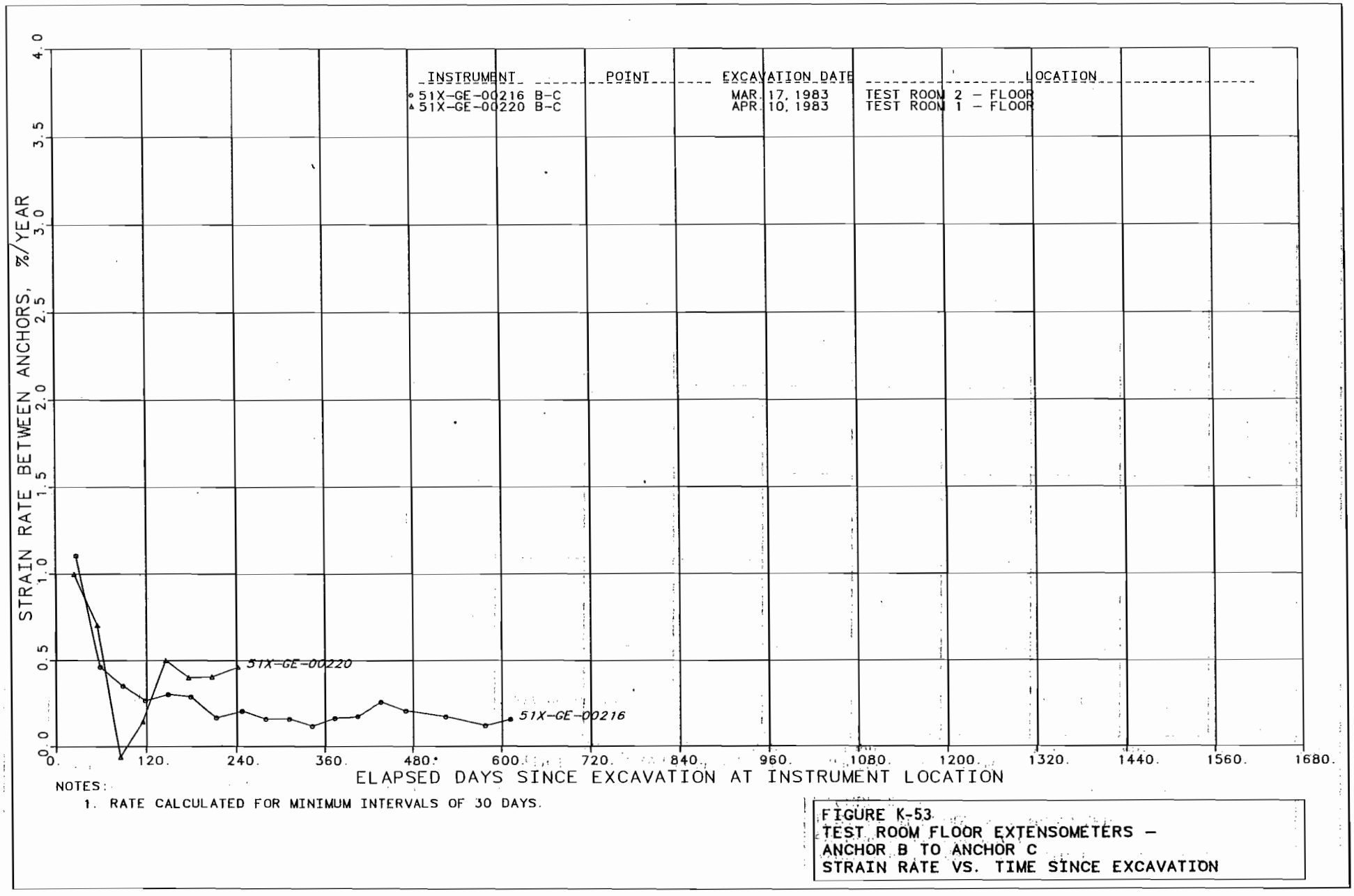
FIGURE K-52
TEST ROOM FLOOR EXTENSOMETERS -
ANCHOR A TO ANCHOR B
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

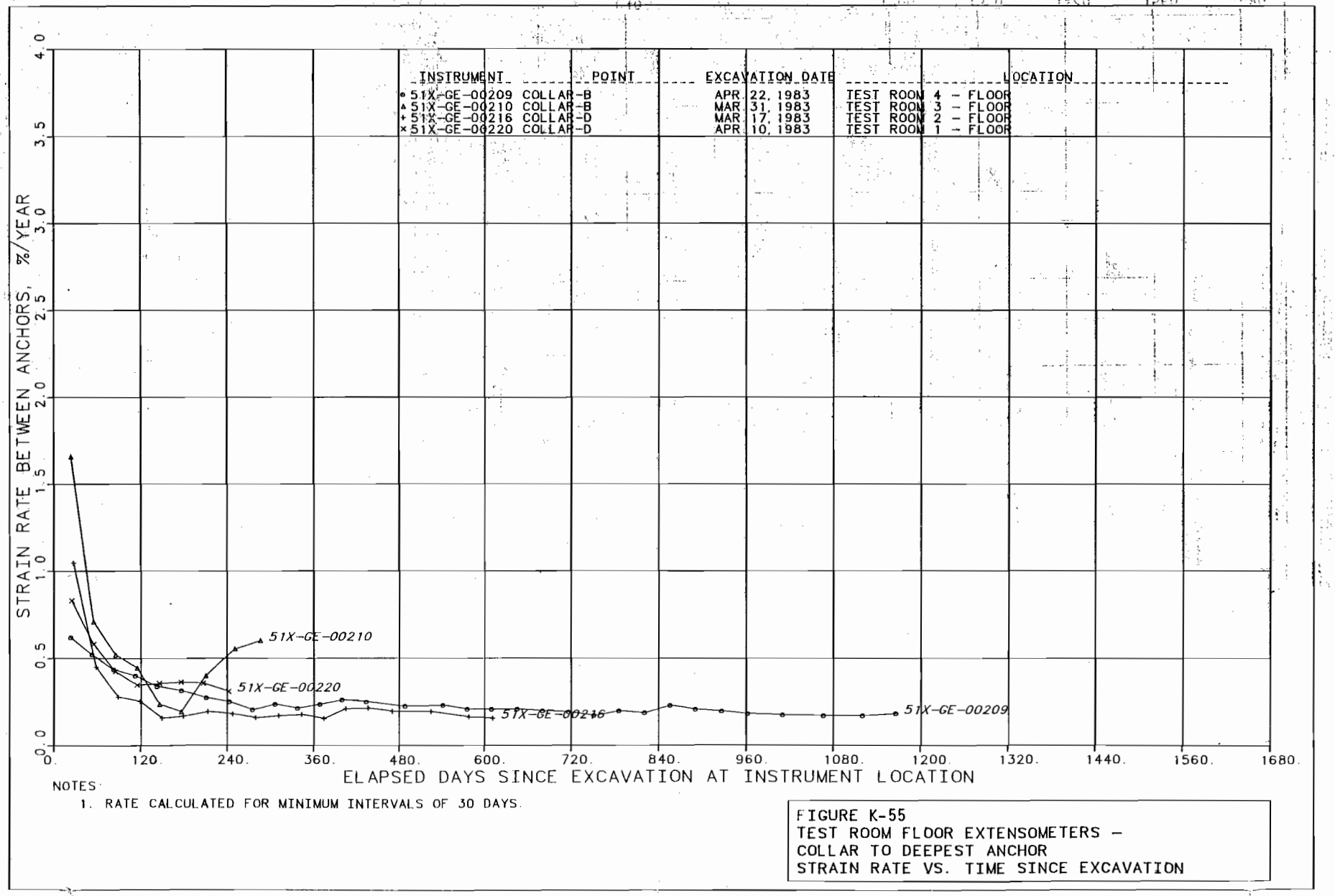
FIGURE K-54
TEST ROOM FLOOR EXTENSOMETERS –
ANCHOR C TO ANCHOR D
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES:

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

FIGURE K-53
TEST ROOM FLOOR EXTENSOMETERS –
ANCHOR B TO ANCHOR C
STRAIN RATE VS. TIME SINCE EXCAVATION



NOTES

1. RATE CALCULATED FOR MINIMUM INTERVALS OF 30 DAYS.

FIGURE K-55
TEST ROOM FLOOR EXTENSOMETERS -
COLLAR TO DEEPEST ANCHOR
STRAIN RATE VS. TIME SINCE EXCAVATION