CorSTAR

A TEKNEKRON INDUSTRIES AFFILIATE

July 10, 1985

NRC FIN B6985

WM-RES
WM Record File
B6985
CorStar

WM Project 10, 11, 16
Docket No.
PDR ✓
LPDR ✓ (B, D, S)

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x Joan Ticket

Pauline Brooks, Project Officer
Division of Waste Management
MS 623 SS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Contract No. NRC-02-81-026
Benchmarking of Computer Codes and Licensing Assistance
Monthly Letter Progress Report for April 1985

Dear Pauline:

This letter contains a management level summary of progress during the month of April. Attached to the report is a copy of the technical status summary and further discussion of work performed during this period. We are submitting a cost summary under separate cover.

Task 3 - Benchmark Problem Report - Waste Package Codes

We are awaiting the receipt of the NRC's comments on this report.

Tasks 4 & 5 - Siting Codes

On May 10, we met with Mr. Ron Coleman, the NRC contract administrator to discuss the completion of this task area. Mr. Coleman requested that we allow him to review the letter authorizing GeoTrans to complete this work.

Tasks 4 & 5 - Radiological Assessment Codes

During April, a first draft of the benchmark problem results report was completed. This internal draft will be reviewed and modified before submittal to the NRC.

Tasks 4 & 5 - Repository Design Codes

As of the date of this letter, the codes ADINA and ADINAT are still not running at Brookhaven National Laboratory. The lengthly delay in installing these codes has caused us to fall considerably behind schedule.

'85 JUL 17 P3:06
WM DOCKET CONTROL CENTER



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During the month, Problem 6.3 BWIP was run using VISCOT. Unlike MATLOC, VISCOT does not hae the capability of modeling bilinear elastic material properties. As a result, constant elastic material properties were used in this analysis. The summarized results comparing calculated and measured displacements are included with the technical status summary.

During April, we were told that the code STEALTH (which was to be made available to CorSTAR by the NRC) was still not operational at INEL. The targetted availability data of this code is June 1985.

General

Our estimate of costs through the end of April (through April 26, 1985 for CorSTAR) is:

| | |
|---|---|
| Actual costs this month: | 31.5 K |
| Actual costs this fiscal year: | 260.8 K |
| Actual costs to date: | 3035 K |
| Planned costs this month: | 12 K |
| Planned costs this fiscal year: | 184 K |

These estimated costs include labor, labor additive, overhead, subcontractor costs, other direct costs, G&A and fee. These costs have not been confirmed by our accounting department.

Sincerely,

Douglas K. Vogt

Douglas K. Vogt
Project Manager

# TECHNICAL STATUS SUMMARY

TABLE 3

MATRIX OF CODE/PROBLEM COMBINATIONS*
(Revised 2/21/85)

Legend:

x Benchmark Problems by Acres.
O Benchmark Problems by Teknekron.
(1) Requires 2 runs, one for MATLOC and one for VISCOT.
(2) Two-Dimensional Analysis.
(3) Requires 3 runs, one for MATLOC and two for VISCOT.
(4) Requires 2 runs, one for Salt and one for Basalt.
S - Problems run for Salt.
B - Problems run for Basalt.

| | CODES | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ADINA - 3D | ADINAT - 3D | DOT | HEATING | MATLOC | SPECTROM 11 | SPECTROM 41 | VISCOT | COYOTE | SALT 4 | STEALTH |
| **2.0 THERMAL ANALYSIS CASE PROBLEMS** | | | | | | | | | | | |
| 2.6 Transient Temperature Analysis of an Infinite Rectangular Bar With Anisotropic Conductivity (Schneider, 1955, pp. 261) | | (2) | | 0 | | | | | | | 0 |
| 2.8 Transient Temperature Response to the Quench of an Infinite Slab With a Temperature-Dependent Convection Coefficient (Kreith, 1958, pp. 161) | | (2) | | 0 | | | | | | | 0 |
| 2.10 Steady Radiation Analysis of a Infinite Rectangular Opening (Rohsenow and Hartnett, 1973, pp. 15-32) | | x | | 0 | | | | | | | 0 |
| **3.0 GEOMECHANICAL ANALYTICAL PROBLEMS** | | | | | | | | | | | |
| 3.2 Circular Tunnel (Long Cylindrical Hole in An Infinite Medium)<br>a) Unlined in elastic medium - biaxial stress field<br>b) Unlined in plastic medium (Tresca) von Mises | (2) | | | | | | | | | | 0 |
| 3.3 Thick-Walled Cylinder Subjected to Internal and/or External Pressure<br>c) Plane strain - creep | (2) | | | | | | | | | | |
| 3.5 Plane Strain Compression of an Elastic-Plastic Material von Mises; Drucker, Prager | (2) | | | | | | | | | | 0 |
| **5.0 HYPOTHETICAL REPOSITORY DESIGN PROBLEMS** | | | | | | | | | | | |
| 5.1 Hypothetical Very Near Field Problem | x | x | S, B | 0 | B | | | S, B | S | S | |
| 5.2 Hypothetical Near Field Problem | | | (3) | | | | | | | | 0 |
| 5.3 Hypothetical Far Field Problem | (2) | (2) | | | | | | | | x | 0 |
| **6.0 FIELD VALIDATION PROBLEMS** | | | | | | | | | | | |
| 6.1 Project Salt Vault-Thermomechanical Response Simulation Problem | (2) | (2) | | | | | | | | | 0 |
| 6.3 In Situ Heater Test-Basalt Waste Isolation Project | (2) | (2) | (1) | | | | | | | | 0 |

* From NUREG/CR-3636, Benchmark Problems for Repository Design Models, February 1984.

Problems completed

Problems attempted, results not analyzed

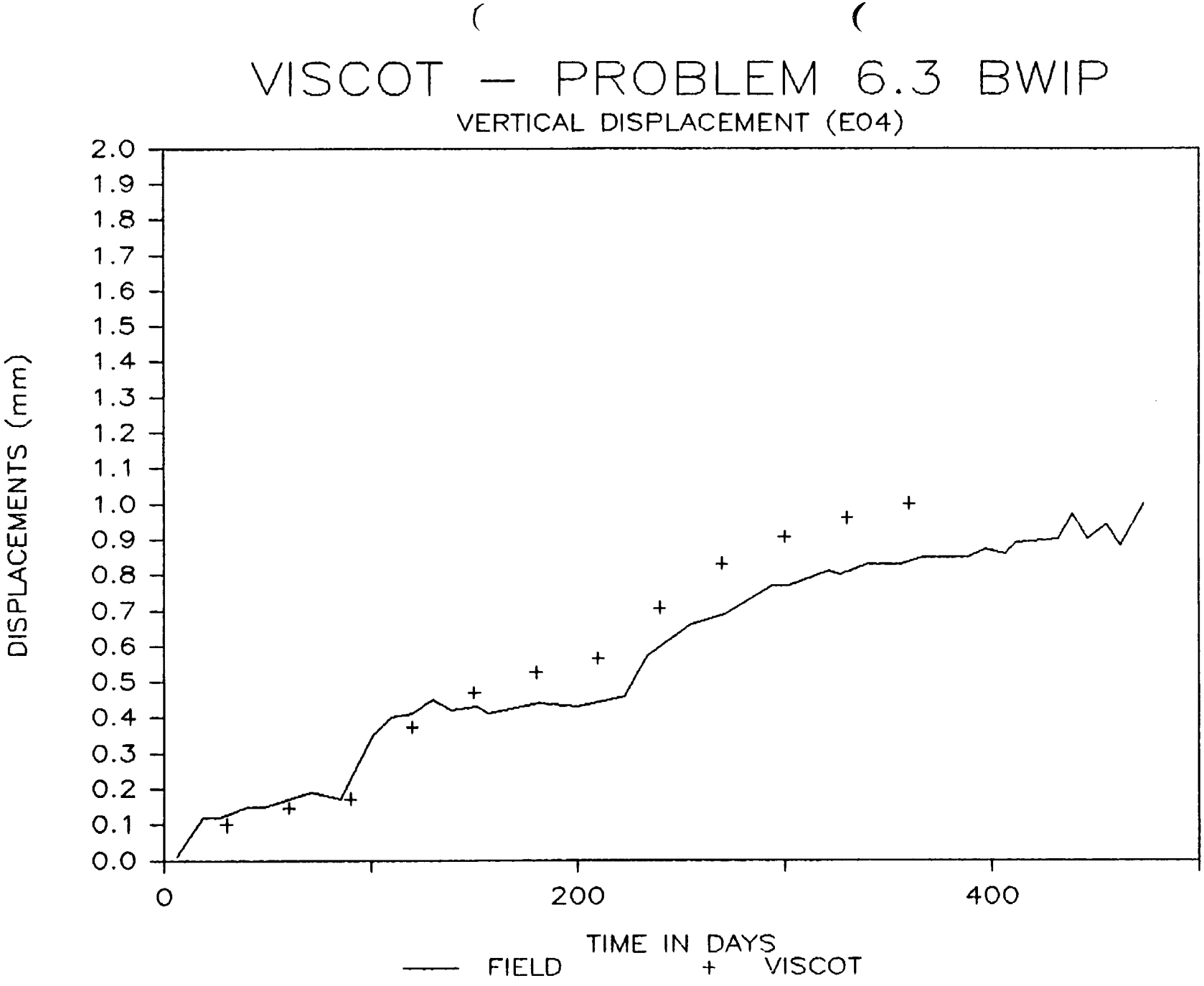



Figure 8.7-2a VISCOT Problem 6.3 BWIP
Vertical Displacements at
Point E04

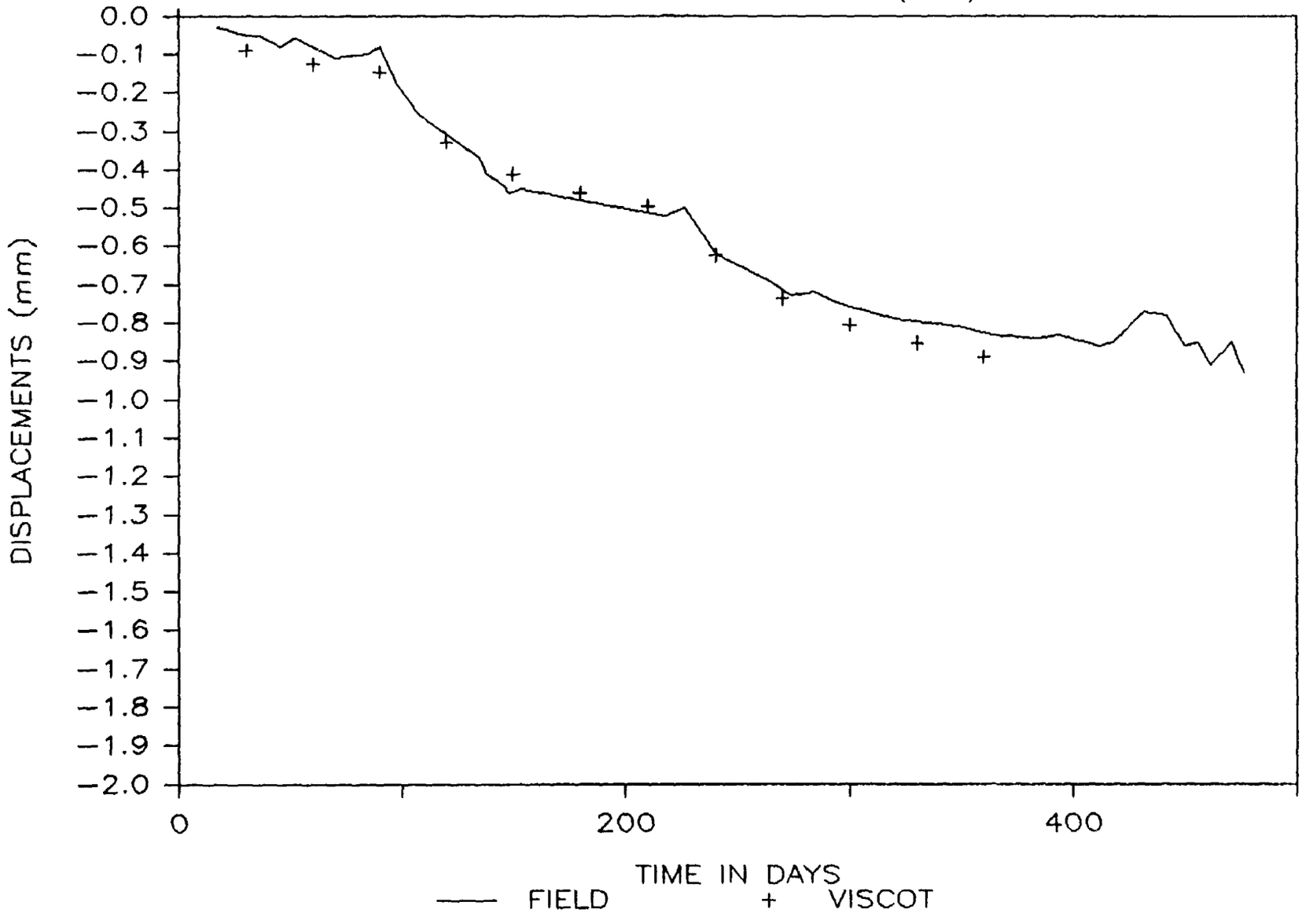



Figure 8.7-2b VISCOT Problem 6.3 BWIP
Vertical Displacements at
Point E02

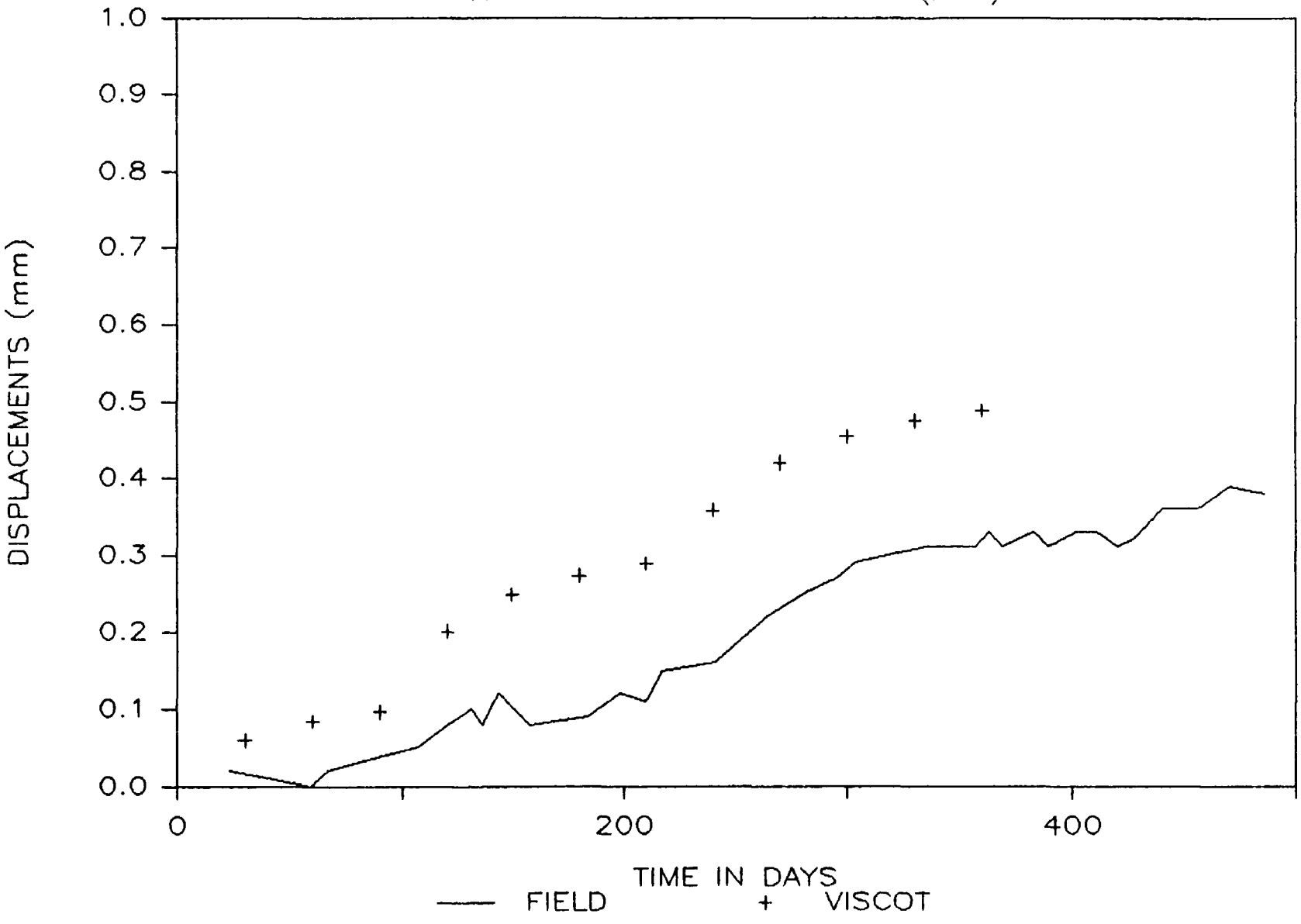



Figure 8.7-2c VISCOT Problem 6.3 BWIP
Horizontal Displacements
at Point E03

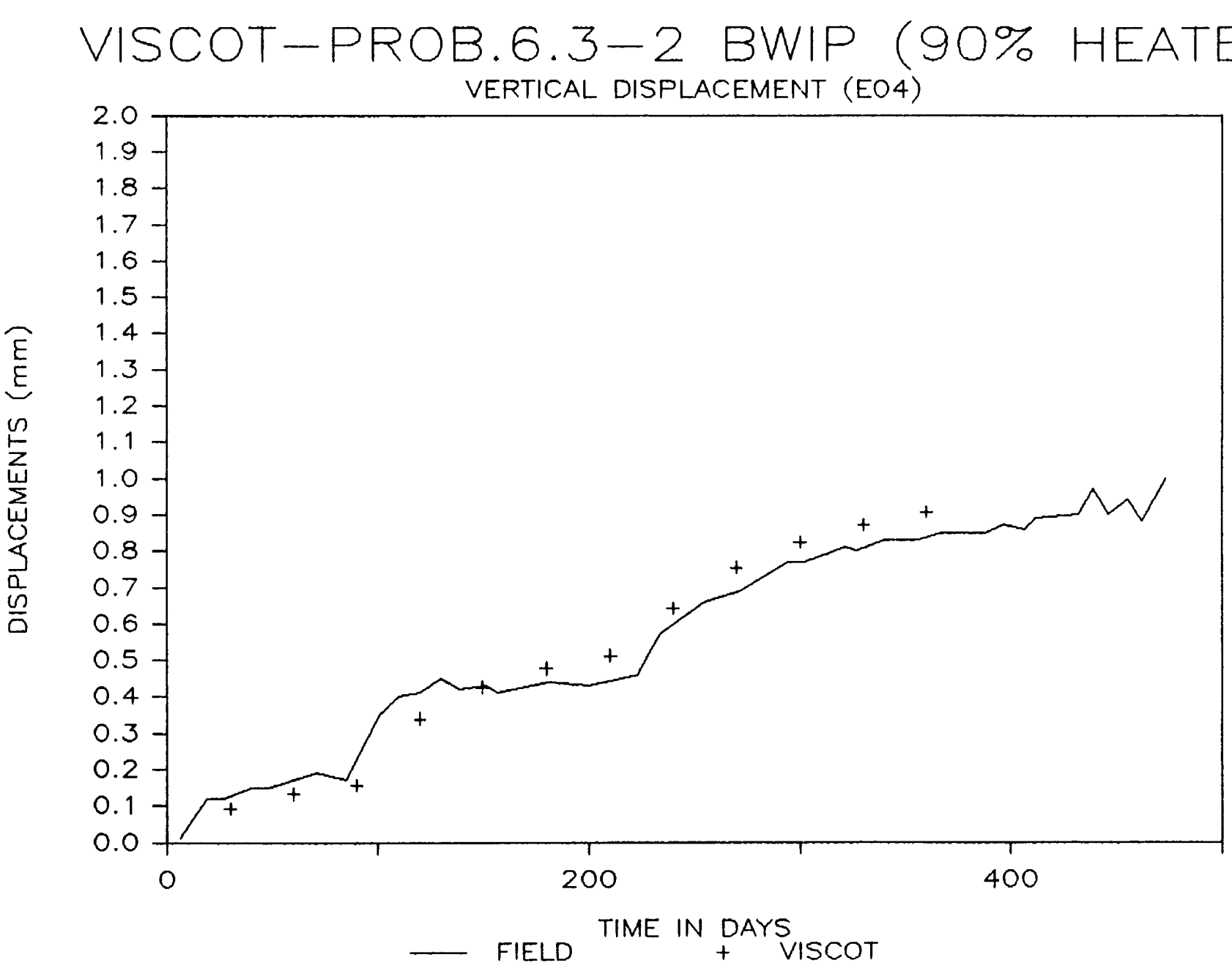



Figure 8.7-3a VISCOT Problem 6.3 BWIP (Run #2)
Vertical Displacements at Point E04 using
90% of the Specified Heater Output in DOT

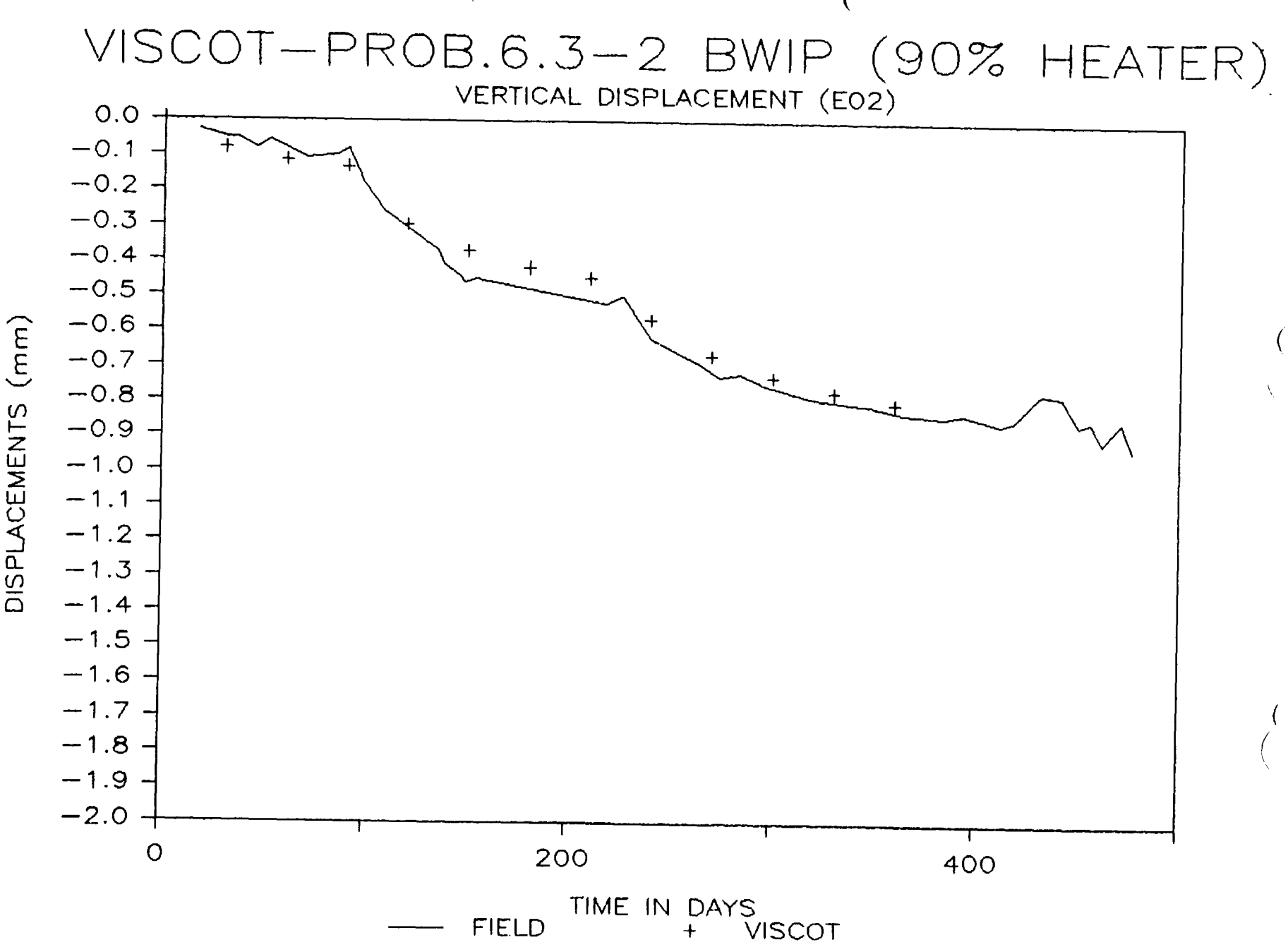



Figure 8.7-3b VISCOT Problem 6.3 BWIP (Run #2)
Vertical Displacements at Point E02 using
90% of the Specified Heater Output in DOT

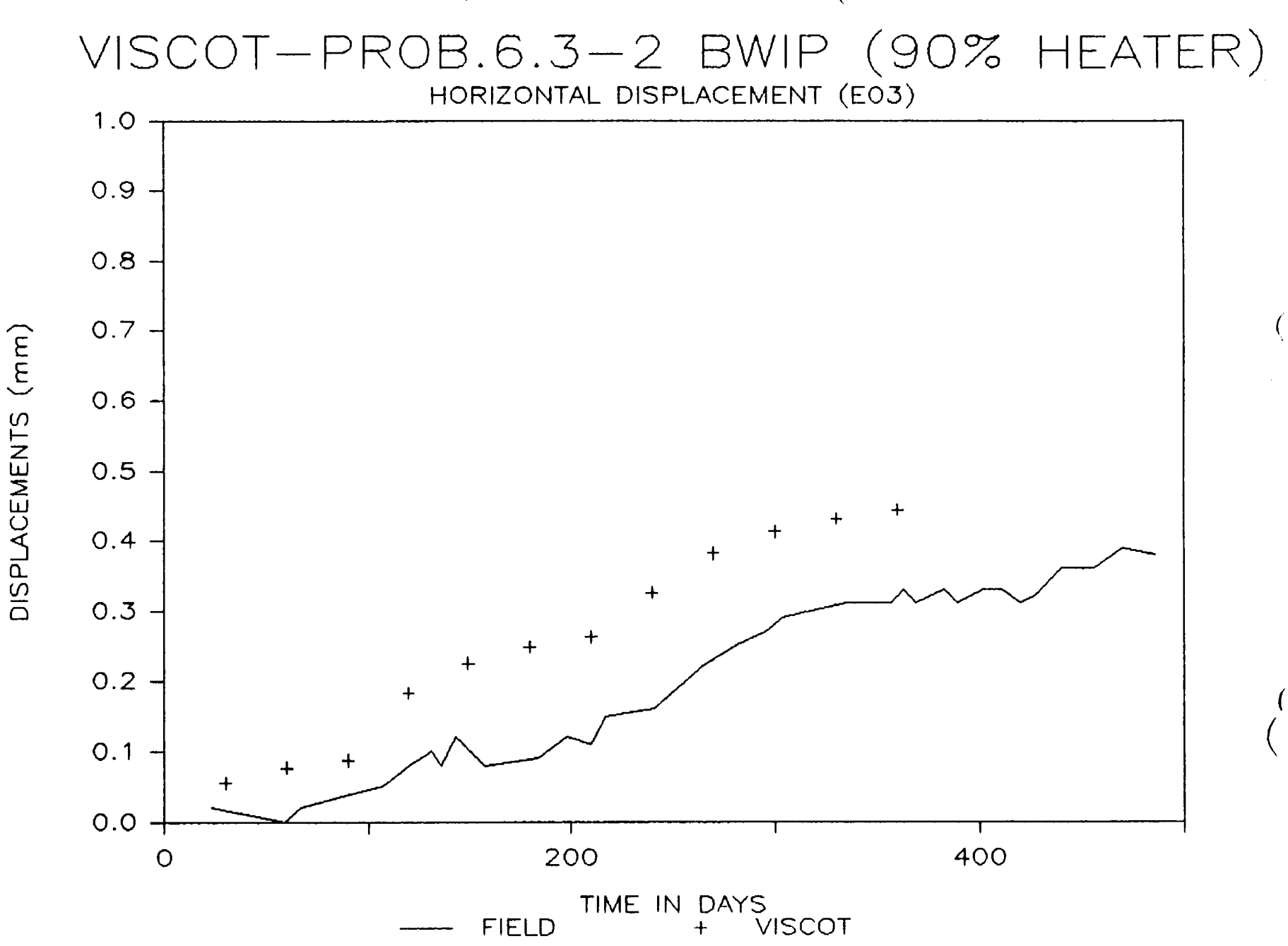



Figure 8.7-3c VISCOT Problem 6.3 BWIP (Run #2)
Horizontal Displacements at Point E03 using
90% of the Specified Heater Output in DOT

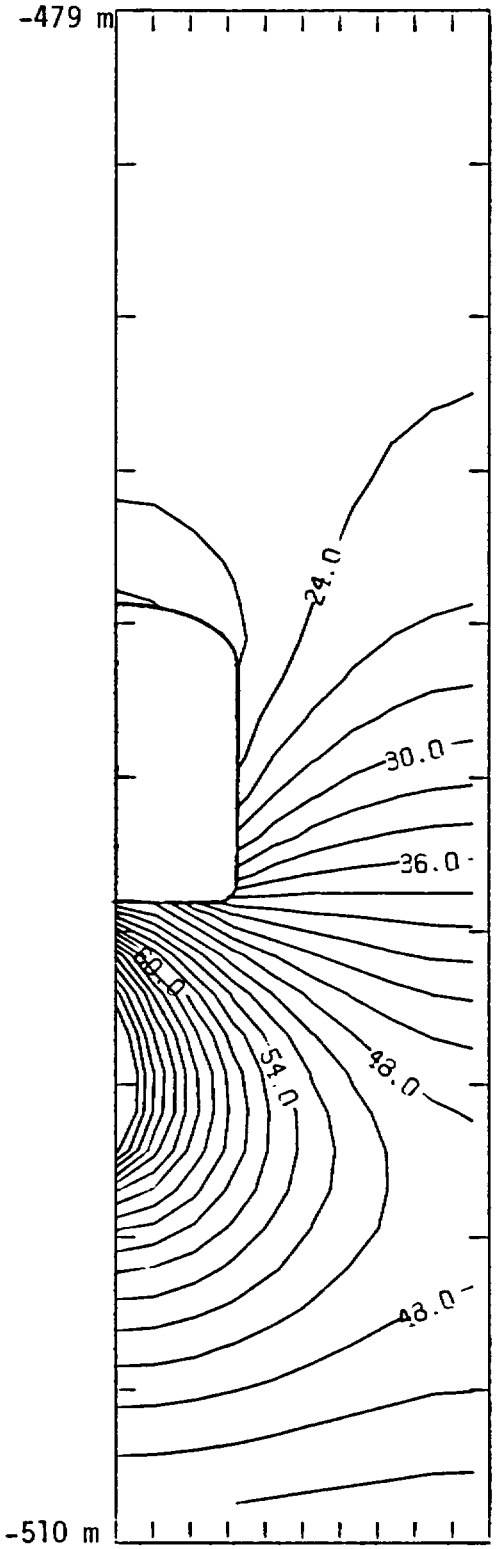



Figure 6.3-5a DOT Problem 5.2 - Basalt
Temperature Contours
at Time = 10 years

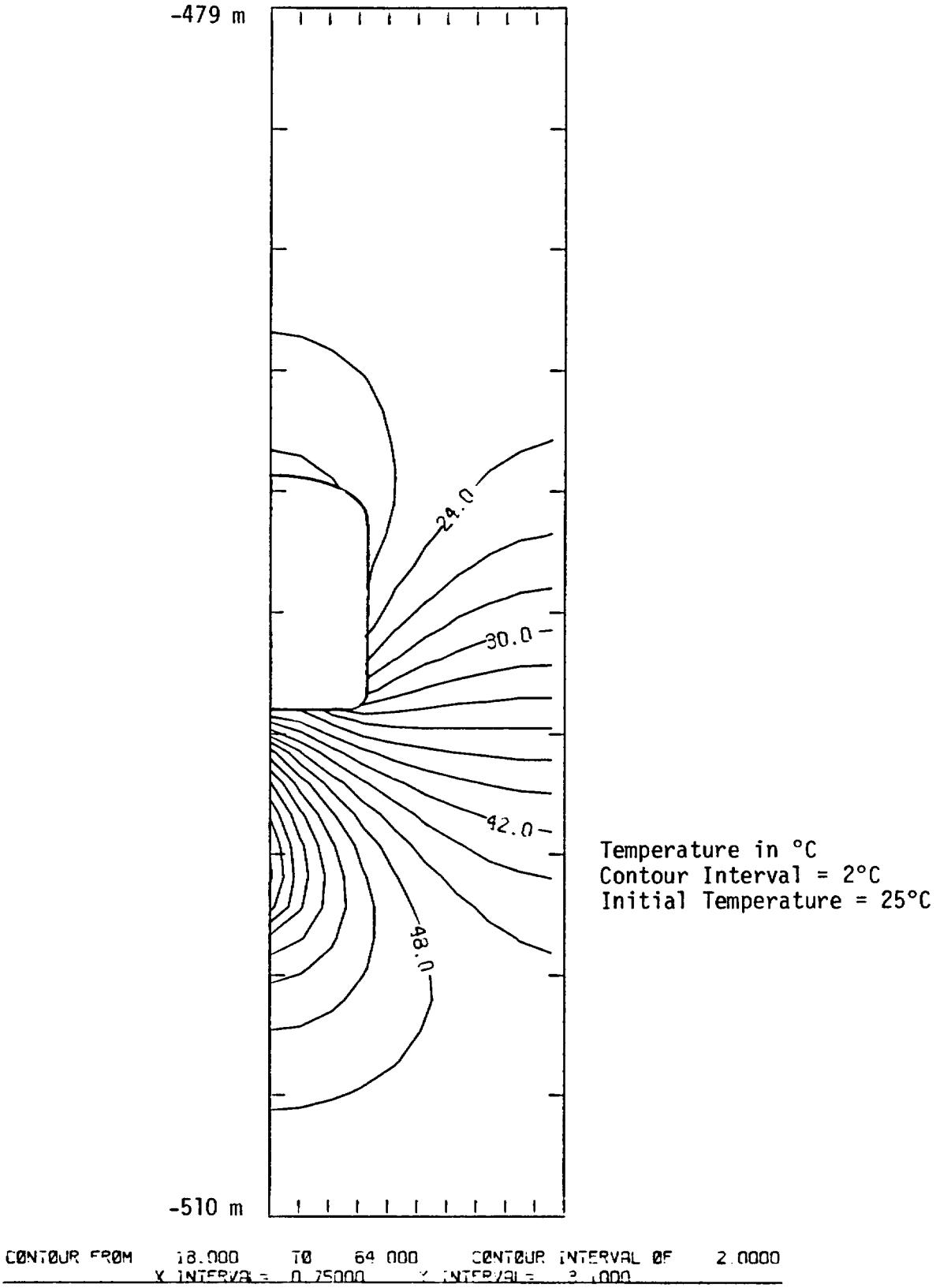



Figure 6.3-5b DOT Problem 5.2 - Basalt
Temperature Contours
at Time = 30 years

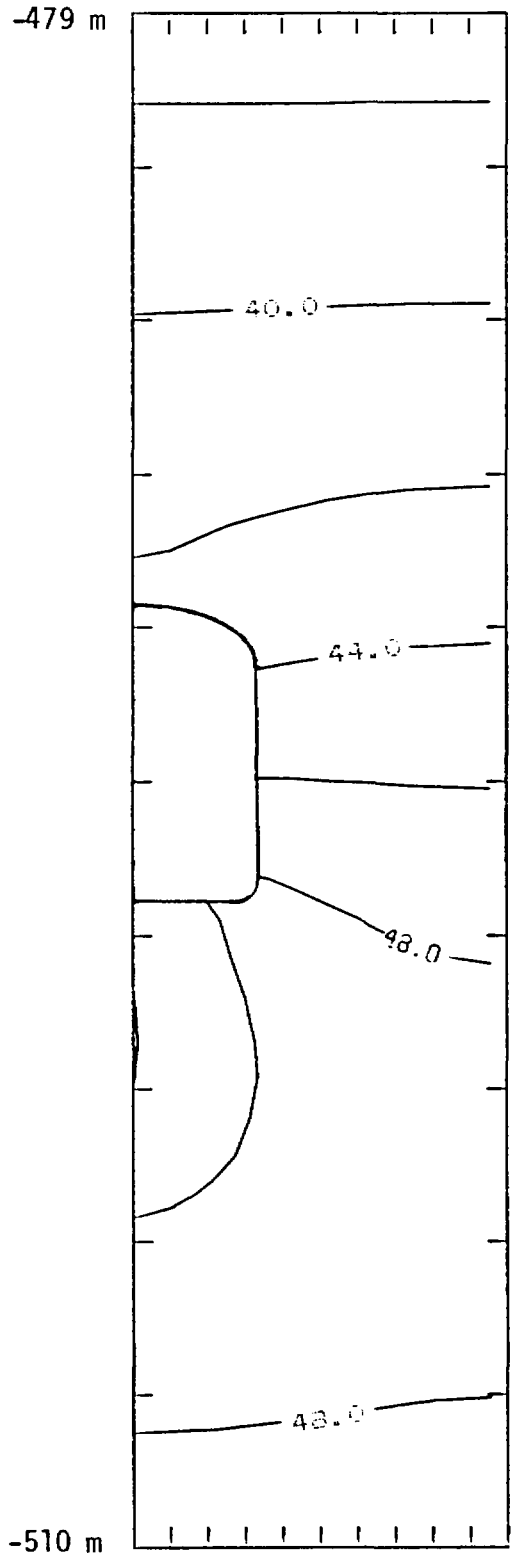



Figure 6.3-5c DOT Problem 5.2 - Basalt
Temperature Contours
at Time = 100 years

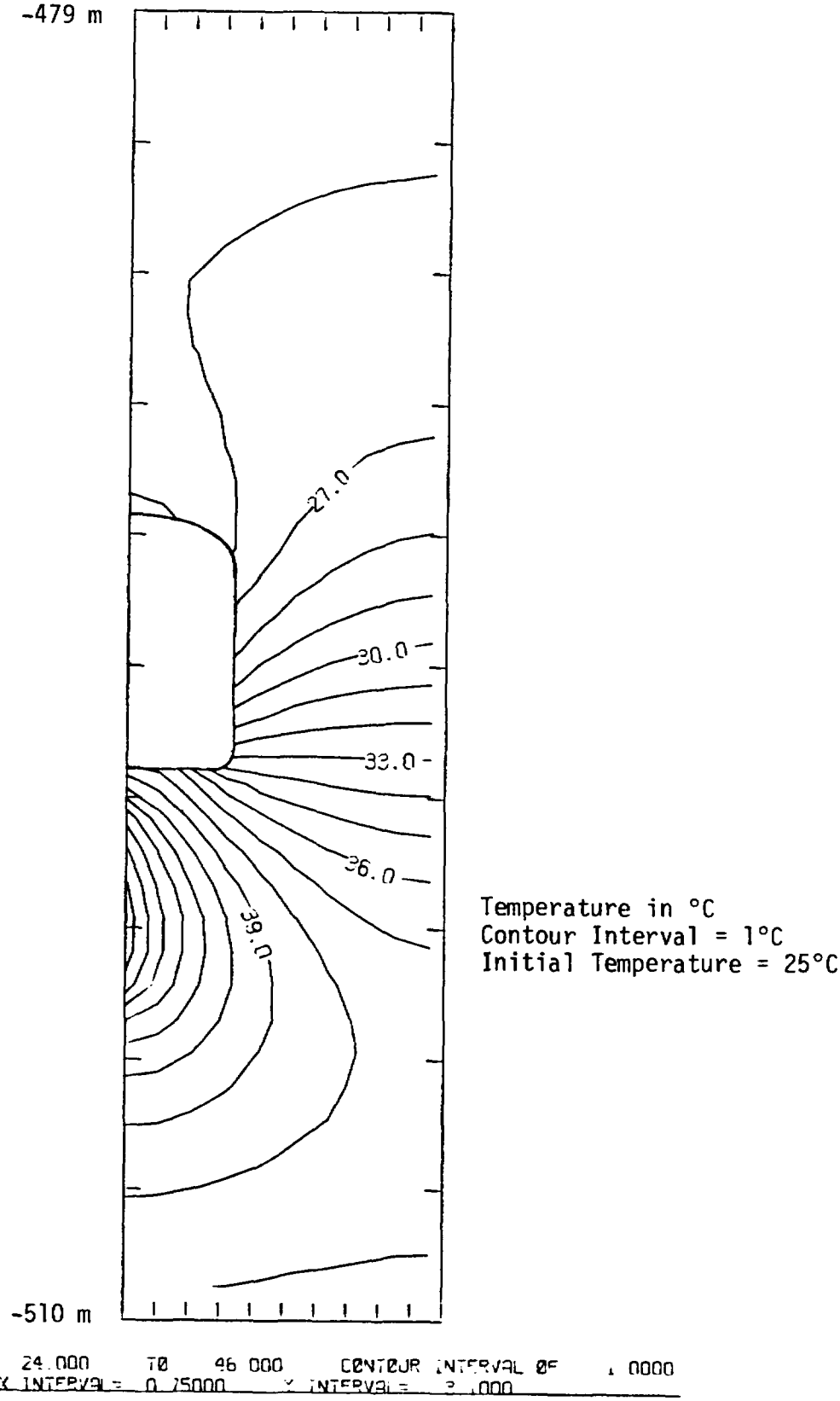



Figure 6.4-4a DOT Problem 5.2 - Salt
Temperature Contours
at Time = 10 years

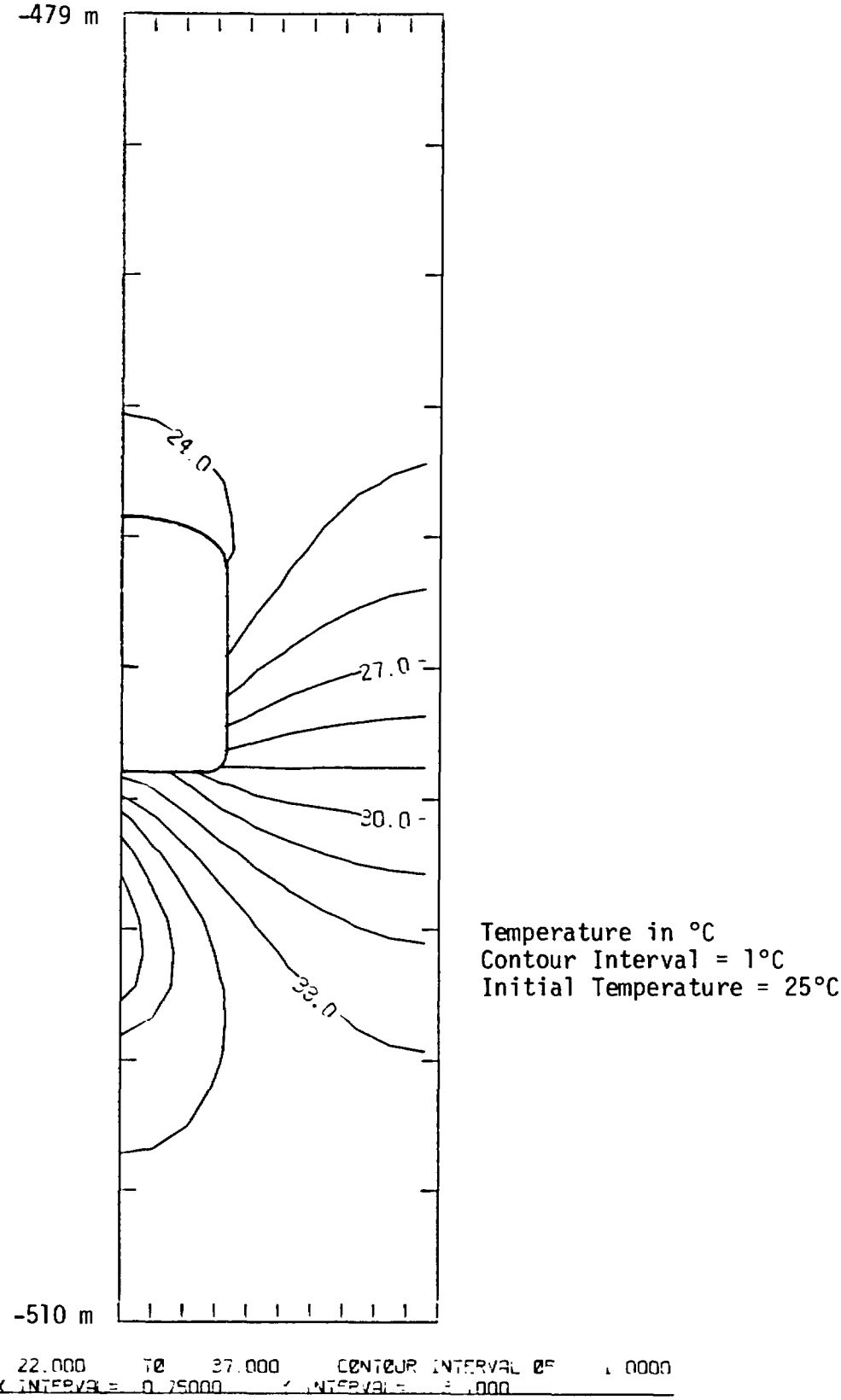



Figure 6.4-4b DOT Problem 5.2 - Salt
Temperature Contours
at Time = 30 years

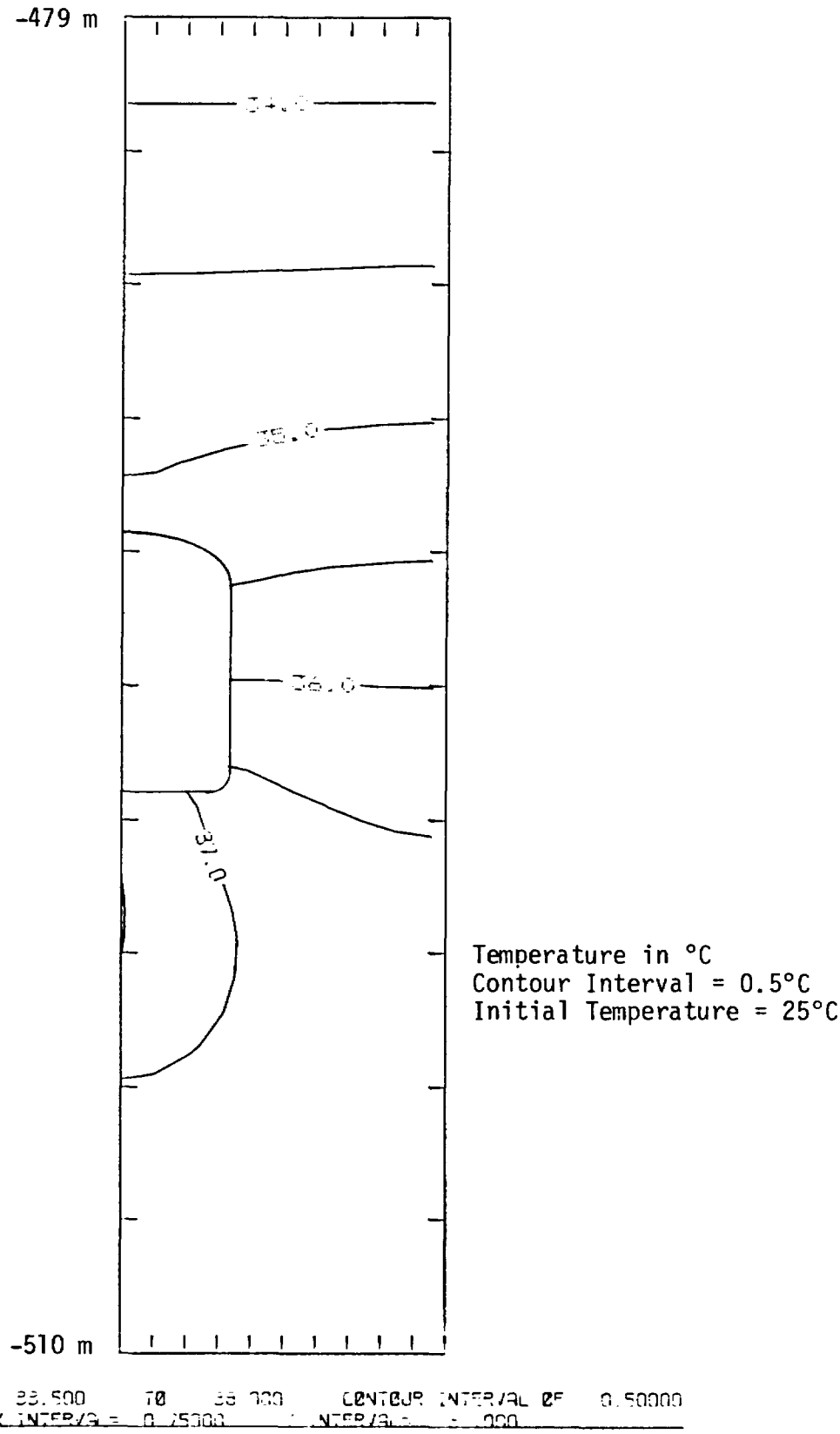
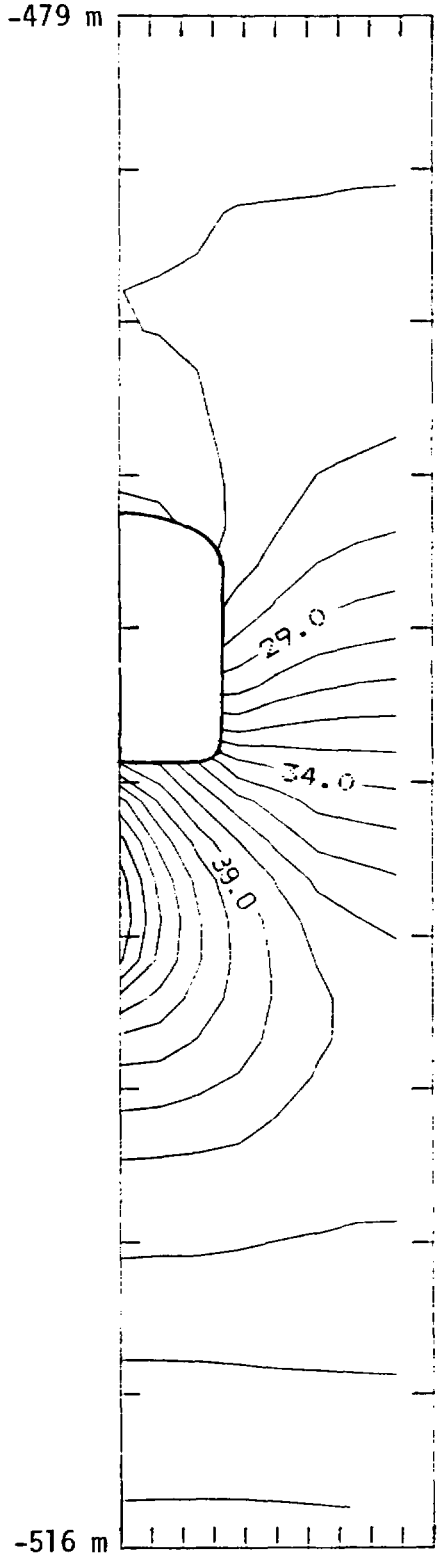



Figure 6.4-4c DOT Problem 5.2 - Salt Temperature Contours at Time = 100 years




Temperature in °C
Contour Interval = 1°C
Initial Temperature = 24.7°C

CØNTØUR FRØM 24.000 TØ 46.000 CØNTØUR INTERVAL ØF 1.0000
X INTERVAL= 0.75000 Y INTERVAL= 3.7000

Figure 10.5-6a COYOTE Problem 5.2 - Salt Temperature Contours at Time = 10 years

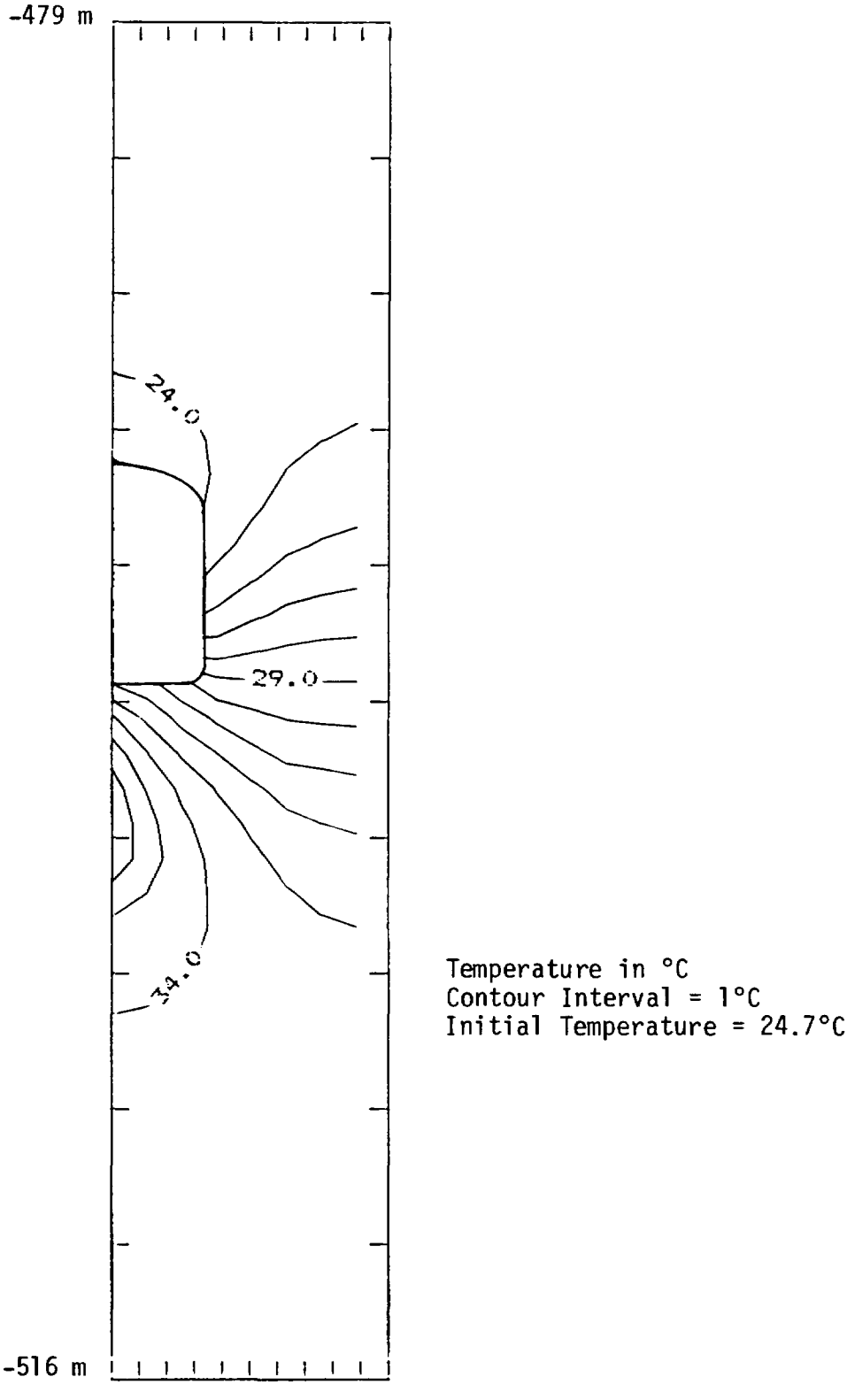
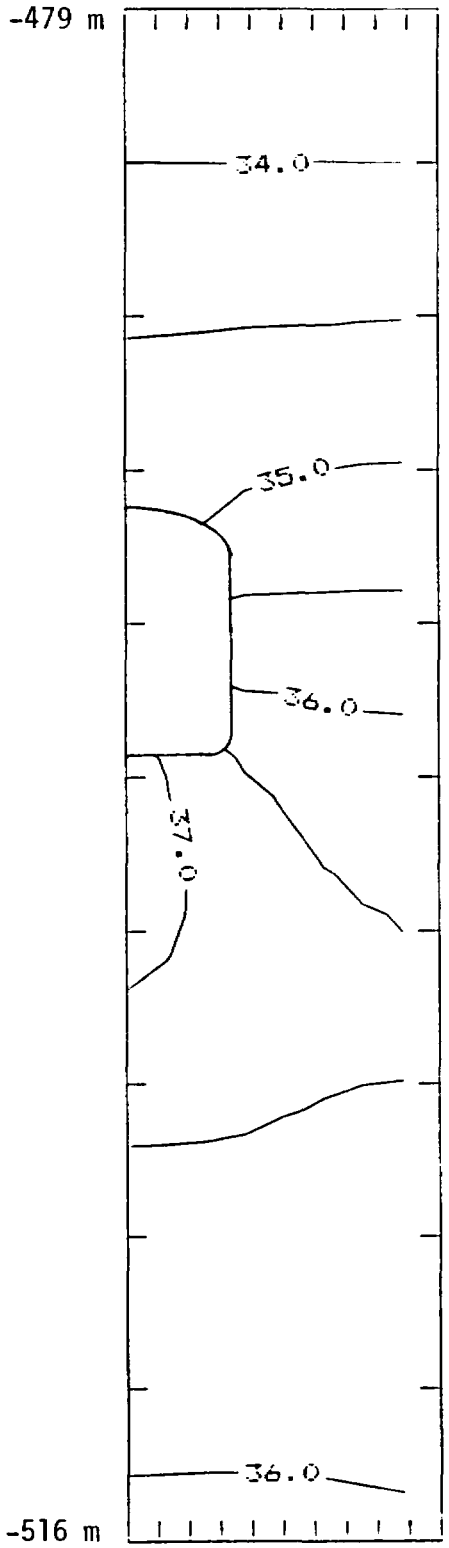



Figure 10.5-6b COYOTE Problem 5.2 - Salt Temperature Contours at Time = 30 years




Temperature in °C
Contour Interval = 0.5°C
Initial Temperature = 24.7°C

CONTOUR FROM 33.000 TO 38.000 CONTOUR INTERVAL OF 0.50000
X INTERVAL= 0.75000 Y INTERVAL= 3.7000

Figure 10.5-6c COYOTE Problem 5.2 - Salt Temperature Contours at Time = 100 years