

One Utah Center, Suite 2000  
Salt Lake City, Utah 84140-0020  
(801) 220-4616 • FAX (801) 220-4725

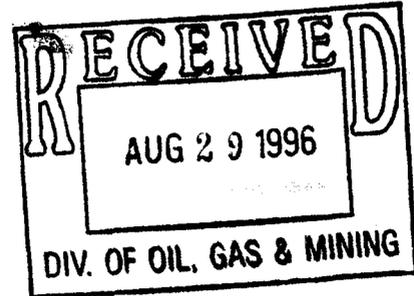


A Subsidiary of PacifiCorp

**HAND DELIVERED**

August 23, 1996

Mr. Doug Koza  
Deputy State Director, Mineral Resources  
United States Department of the Interior  
Bureau of Land Management  
Utah State Office  
324 South State Street, Suite 301  
Salt Lake City, Utah 84111-2303



**RE: Revised Supplemental Information for the Relinquishment of Federal Coal Lease Acreage East Mountain Logical Mining Unit, Manti-LaSal National Forest, Emery County, Utah**

Dear Doug:

In following up with BLM's decision letter of December 14, 1996, wherein partial relinquishment of federal coal lease acreage was accepted, this letter and the enclosed materials are provided to address the remaining issues on the balance of acreage originally sought for relinquishment in 1992.

As previously mentioned to you, we have been working with the Manti-LaSal National Forest Service to address their concerns and provide answers to their deficiency letter to the BLM dated 8-15-95. Over the past few months, we have provided draft responses directly to them and each party has had the opportunity to provide constructive comment in resolving the remaining issues. Therefore, enclosed are three (3) copies of the referenced "Revised Supplemental Information" in its final form. As mentioned, the preparation of this revised information (dated 6-4-96) has been closely coordinated with the Forest Service to meet their acceptance and now awaits a favorable decision by the BLM.

To assist you in updating your loose leaf binders with the revised information, the following listing is provided:

1. Remove the Table of Contents and replace with Table of Contents Revised 6-4-96.
2. Remove Data Summary Report and replace with Data Summary Report Revised 6-4-96.
3. Maps  
Remove "1994 Subsidence Map East Mountain All Areas" and replace with "1995 Subsidence Map East Mountain All Areas."  
Leave Total Subsidence Map - August 1994 - Lease Relinquishment Areas.  
Leave Total Subsidence Map - August 1994 - Lease U-47978.  
Add Lease Relinquishment Topographic Map (11"x17") with Profile Lines.

4. Profiles and Isograms  
Remove "Photogrammetric Files" Index Tab and replace with "Profiles and Isograms" Index Tab.  
Add Figure 5 dated 6-4-96.  
Remove Figure 6 and replace with Figure 6 Revised 6-4-96.  
Remove Figure 7 and replace with Figure 7 Revised 6-4-96.  
Add Figure 10 dated 6-4-96.  
Remove Figure 11 and replace with Figure 11 Revised 6-4-96.  
Remove Figure 12 and replace with Figure 12 Revised 6-4-96.  
Add Figure 13A dated 6-4-96.  
Remove Figure 14 and replace with Figure 14 Revised 6-4-96.  
Add Figure 14T dated 6-4-96.  
Add Figure 28 dated 6-4-96.  
Remove Figure 29 and replace with Figure 29 Revised 6-4-96.  
Add Figure 29T dated 6-4-96.  
Add Figure 32 dated 6-4-96.  
Remove Figure 33 and replace with Figure 33 Revised 6-4-96.  
Add Figure 33T dated 6-4-96.  
Add Figure 41 dated 6-4-96.  
Remove Figure 42 and replace with Figure 42 Revised 6-4-96.  
Add Figure 42T dated 6-4-96.  
Remove Figure 43 and replace with Figure 43 Revised 6-4-96.  
Add Figure 43T dated 6-4-96.  
Add Figure 45 dated 6-4-96.  
Remove Figure 46 and replace with Figure 46 Revised 6-4-96.  
Add Figure 46T dated 6-4-96.  
Remove Figure 47 and replace with Figure 47 Revised 6-4-96.  
Add Figure 47T dated 6-4-96.  
Add Figure 49 dated 6-4-96.  
Remove Figure 50 and replace with Figure 50 Revised 6-4-96.  
Add Figure 50T dated 6-4-96.  
Remove Figure 51 and replace with Figure 51 Revised 6-4-96.  
Add Figure 51T dated 6-4-96.  
Add Figure 53 dated 6-4-96.  
Remove Figure 54 and replace with Figure 54 Revised 6-4-96.  
Add Figure 54T dated 6-4-96.  
Remove Figure 55 and replace with Figure 55 Revised 6-4-96.  
Add Figure 55T dated 6-4-96.  
Add Figure 57 dated 6-4-96.  
Remove Figure 58 and replace with Figure 58 Revised 6-4-96.  
Add Figure 58T dated 6-4-96.  
Remove Figure 59 and replace with Figure 59 Revised 6-4-96.  
Add Figure 59T dated 6-4-96.  
Add Figure LR-15 (4 Sheets) 1992-95 Subsidence dated 6-4-96.
  
5. Survey Target Profiles  
Remove Newberry Canyon PR-1 through PR-10 and replace with Newberry Canyon PR-1 through PR-10 Revised 6-4-96.  
Remove Corncob Wash PR-11 through PR-14 and replace with Corncob Wash PR-11 through PR-14 Revised 6-4-96.  
Remove Miller Canyon PR-1 through PR-5 and replace with Miller Canyon PR-1 through PR-5 Revised 6-4-96.  
Add Grimes Wash PR-1 through PR-4 dated 6-4-96.  
Add Survey Elevations (listing) All Prism Locations dated 6-4-96.

Doug Koza  
August 23, 1996  
Page 3

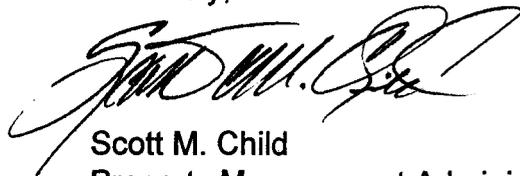
6. Vegetation Monitoring Photographs  
Add Index Tab and Photographs at the end of the binder.

With the submission of this Revised Supplemental Information, we respectfully request the BLM to accept the remaining balance of acreage originally sought for relinquishment. A prompt turn around time is very much appreciated.

In addition, this revised information is submitted as "Confidential Information" in Accordance with 43 CFR 3481.3(b)(1995).

Should you have any questions, please feel free to contact me at 220-4612.

Sincerely,



Scott M. Child  
Property Management Administrator

Enclosures

SMC12UTBLM96.004

cc: IMC w/o copy encl. - D. Baker, J. B. Harvey, D.W. Jense  
IMC w/copy encl. - R. Fry  
EWMC w/o copy encl. - L. LaFrentz, D. Lauriski, C. Pollastro  
EWMC w/copy encl. - V. Payne, C. Semborski  
USFS Manti-LaSal (3 copies submitted under cover letter dated 8-21-96 from EWMC) - C. Reed  
DOGM (1 copy) - P. Grubaugh-Littig  
Stoel Rives w/copy - J. Kirkham, Esq.  
PacifiCorp Federal Affairs, Washington D.C. w/copy encl. - K. Lynch  
Crowell & Moring w/copy encl. - S. Quarles, Esq.

***Table  
of  
Contents***

**Supplemental Information  
for the Relinquishment of Federal Acreage  
East Mountain Logical Mining Unit**

---

**Table of Contents**

	<u>Page</u>
I. <i>Introduction</i> .....	1
II. <i>Statement of Need</i> .....	5
III. <i>Compliance of Lease Terms and Conditions</i> .....	6
IV. <i>PacifiCorp Subsidence Monitoring and Methodology</i> .....	6
V. <i>Lease-Specific Information / Subsidence of Affected Areas / Assessment of Environmental Impacts</i>	
Federal Lease SL-066116 (Area 7) .....	8
Federal Lease SL-064607 / SL-064621 (Area 3) .....	10
Federal Lease SL-070645 / U-02292 .....	13
Federal Lease U-02664 (Areas 8 & 13) .....	15
Federal Lease U-024319 .....	18
Federal Lease U-1358 (Areas 1 & 2) .....	19
Federal Lease U-47979 .....	21
Federal Lease U-47978 (Areas 14, 15, 16 & 17) .....	22

## TABLE OF CONTENTS (cont'd)

	<u>Page</u>
VI. <i>Conclusion</i> .....	28
VII. <i>Professional Certification of Subsidence Data</i> .....	28

### APPENDICES

#### *Maps*

- 1995 Subsidence – East Mountain – All Areas
- Total Subsidence – August 1994 – Lease Relinquishment Areas
- Total Subsidence – August 1994 – Lease U-47978
- Lease Relinquishment Topographic Map with Profile Lines

#### *Profiles and Isograms*

Figure 5	Area 1	Subsidence as of 1995	(Lease U-1358)
Figure 6	Area 1	Subsidence Profile – North-South	(Lease U-1358, 1982-1995)
Figure 7	Area 1	Subsidence Profile – West-East	(Lease U-1358, 1982-1995)
Figure 10	Area 2	Subsidence as of 1995	(Lease U-1358)
Figure 11	Area 2	Subsidence Profile – North-South	(Lease U-1358, 1982-1995)
Figure 12	Area 2	Subsidence Profile – West-East	(Lease U-1358, 1982-1995)
Figure 13A	Area 3	Subsidence as of 1995	(Lease SL-064607/SL-064621)
Figure 14	Area 3	Subsidence Profile – North-South	(Lease SL-064607/SL-064621, 1989-1995)
Figure 14T	Area 3	Topographic Profile – North-South	(Lease SL-064607/SL-064621)
Figure 28	Area 7	Subsidence as of 1995	(Lease SL-066116)
Figure 29	Area 7	Subsidence Profile – SW-NE	(Lease SL-066116, 1982-1995)
Figure 29T	Area 7	Topographic Profile – SW-NE	(Lease SL-066116)
Figure 32	Area 8	Subsidence as of 1995	(Lease U-02664)
Figure 33	Area 8	Subsidence Profile – West-East	(Lease U-02664, 1985-1995)
Figure 33T	Area 8	Topographic Profile – West-East	(Lease U-02664)
Figure 41	Area 13	Subsidence as of 1995	(Lease U-02664)
Figure 42	Area 13	Subsidence Profile – North-South	(Lease U-02664, 1986-1995)
Figure 42T	Area 13	Topographic Profile – North-South	(Lease U-02664)
Figure 43	Area 13	Subsidence Profile – West-East	(Lease U-02664, 1986-1995)
Figure 43T	Area 13	Topographic Profile – West-East	(Lease U-02664)
Figure 45	Area 14	Subsidence as of 1995	(Lease U-47978)
Figure 46	Area 14	Subsidence Profile – North-South	(Lease U-47978, 1987-1995)
Figure 46T	Area 14	Topographic Profile – North-South	(Lease U-47978)
Figure 47	Area 14	Subsidence Profile – West-East	(Lease U-47978, 1987-1995)
Figure 47T	Area 14	Topographic Profile – West-East	(Lease U-47978)
Figure 49	Area 15	Subsidence as of 1995	(Lease U-47978)
Figure 50	Area 15	Subsidence Profile – North-South	(Lease U-47978, 1988-1995)
Figure 50T	Area 15	Topographic Profile – North-South	(Lease U-47978)
Figure 51	Area 15	Subsidence Profile – West-East	(Lease U-47978, 1988-1995)
Figure 51T	Area 15	Topographic Profile – West-East	(Lease U-47978)
Figure 53	Area 16	Subsidence as of 1995	(Lease U-47978)
Figure 54	Area 16	Subsidence Profile – North-South	(Lease U-47978, 1990-1995)
Figure 54T	Area 16	Topographic Profile – North-South	(Lease U-47978)

# TABLE OF CONTENTS (cont'd)

Page

## APPENDICES (cont'd)

### *Profiles and Isograms (cont'd)*

Figure 55	Area 16 Subsidence Profile – West-East	(Lease U-47978, 1990-1995)
Figure 55T	Area 16 Topographic Profile – West-East	(Lease U-47978)
Figure 57	Area 17 Subsidence as of 1995	(Lease U-47978)
Figure 58	Area 17 Subsidence Profile – North-South	(Lease U-47978, 1991-1995)
Figure 58T	Area 17 Topographic Profile – North-South	(Lease U-47978)
Figure 59	Area 17 Subsidence Profile – West-East	(Lease U-47978, 1991-1995)
Figure 59T	Area 17 Topographic Profile – West-East	(Lease U-47978)
Figure LR-15 (4 sheets)	1992-1995 Subsidence	(Lease U-02292)

### *Survey Target Profiles*

Newberry Canyon	PR-1 through PR-10	(Lease U-47978, 1986-1996)
Corn Cob Wash	PR-11 through PR-14	(Lease U-47978, 1990-1995)
Miller Canyon	PR-1 through PR-5	(Lease U-47978, 1988-1992)
Grimes Wash	PR-1 through PR-4	(Lease U-1358, 1982-1993)
Survey Elevations	All Prism Locations	

### *Time Domain Reflectometry*

TDR letter from Bureau of Mines dated November 27, 1991  
TDR letter from Bureau of Mines dated December 16, 1991

### *Bureau of Mines Report*

*Response of Springs to Longwall Coal Mining at the Deer Creek and Cottonwood Mines, Wasatch Plateau, UT, by Liane L. M. Kadnuck, Information Circular/1994*

### *Water Quality Data*

Spring: EMS 84-56 – Post-Mining Data, 34 Samples	(Lease U-47978)
Spring: EMS 84-56 – Pre-Mining Data, 2 Samples	(Lease U-47978)

### *Compliance Spreadsheet*

Evaluation of Lease Terms / Conditions / Stipulations – All Leases

### *Vegetation Monitoring Photos*

TABLE 1 (Total Acreage Applied for Relinquishment) .....	2
FIGURE 1 (Map – Areas Relinquished) .....	3

***Data  
Summary  
Report***

**SUPPLEMENTAL INFORMATION  
FOR THE RELINQUISHMENT OF FEDERAL ACREAGE  
EAST MOUNTAIN LOGICAL MINING UNIT**

**June 12, 1995**  
**(Revised June 4, 1996)**

**I. Introduction**

PacifiCorp has submitted acreage relinquishment applications to the Bureau of Land Management ("BLM") in two separate phases to (1) reduce acreage from its federal coal lease holdings, and (2) effectively manage the leases comprised within the East Mountain Logical Mining Unit ("LMU"). Phase I was submitted on April 22, 1992 and Phase II on October 16, 1992. Both applications have sought to relinquish federal lease acreage which has either been (1) mined out, (2) considered sub-economic due to limited mining access because of inherent faulting and adverse geologic conditions, and/or (3) the remaining unmined areas are burned, and no recoverable reserves remain.

Phase I initially contained 4,221.23 acres, and Phase II included 1,190.00 acres for a total of 5,411.23 acres. Since the applications were filed, there have been some changes which affect the overall acreage sought for relinquishment. These changes are listed below.

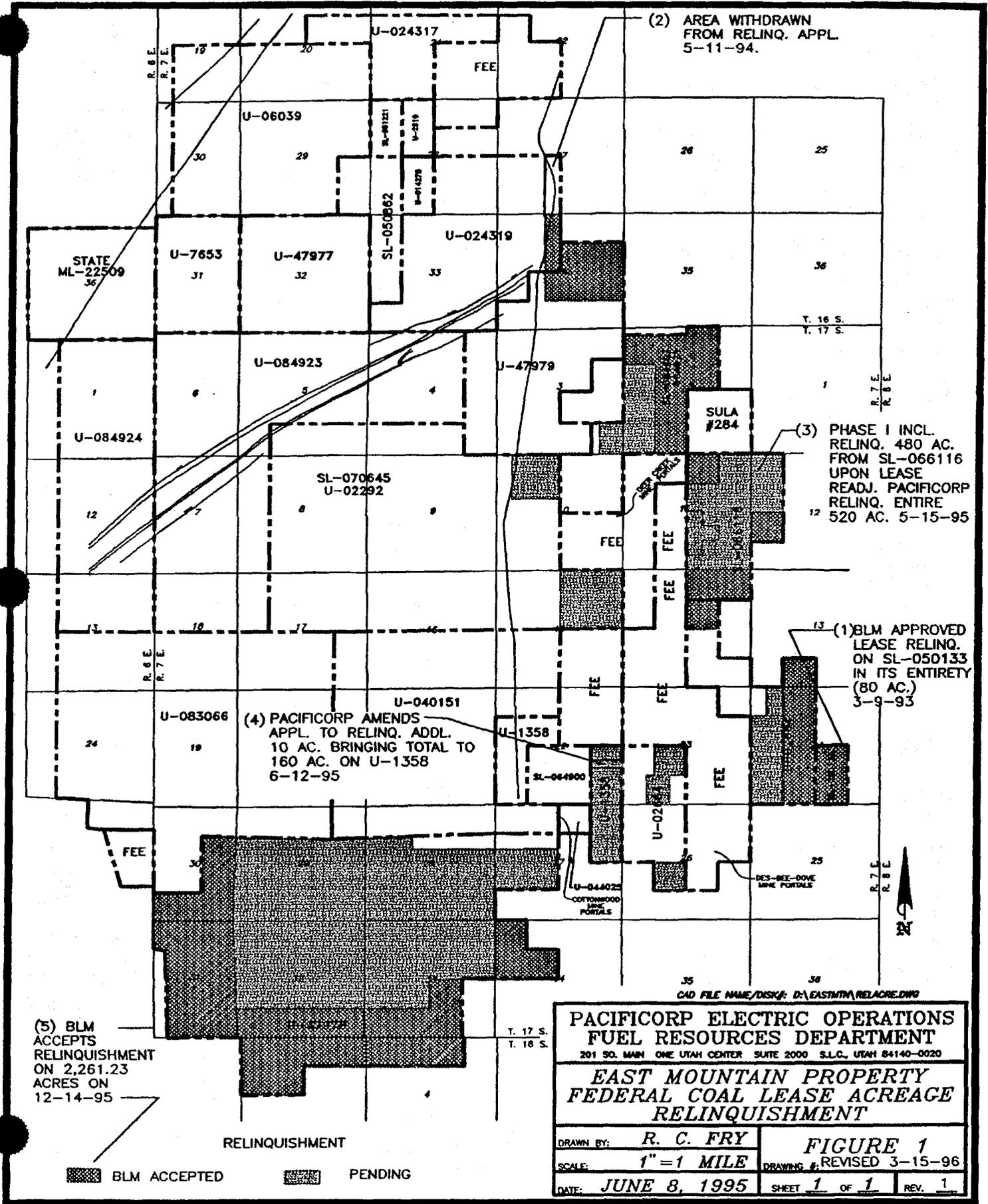
- (1) One individual lease, SL-050133, was ruled upon following the submittal of the original application. Approval was granted by the BLM on March 9, 1993, relinquishing the entire 80 acres.
- (2) On May 11, 1994, PacifiCorp filed a partial withdrawal of the relinquishment as to 40 acres from Lease U-024319 which is to be deleted from the Phase I application.

- (3) Under the Phase I application, PacifiCorp originally sought to relinquish 480 acres of the total 520 acres from Lease SL-066116. Upon BLM's lease readjustment decision dated April 25, 1995, PacifiCorp in turn gave notice to BLM, dated May 15, 1995, that it relinquishes Lease SL-066116 in its entirety (all 520 acres).
  
- (4) Again, under Phase I, PacifiCorp originally sought to relinquish 150 acres from Lease U-1358. Upon further review, it has been determined to relinquish a total of 160 acres. Therefore, this supplemental information amends PacifiCorp's application to relinquish an additional 10 acres from Lease U-1358.
  
- (5) On December 14, 1995, BLM issued a decision accepting the relinquishment of 2,261.23 acres. Refer to *Table 1*

Altogether, the federal lease acreage applied for relinquishment is currently 5,341.23 acres. Refer to *Figure 1* for lease configuration and areas applied for relinquishment. *Table 1* provides an updated listing of each lease and the acreage applied for relinquishment.

**TABLE 1**

Federal Lease Number	Type of Relinquishment	Phase I & II Relinquished Acreage	BLM Accepted Relinquished Acreage 12/14/95	Pending Remaining Acreage
SL-066116	FULL	520.00	160.00	360.00
SL-064607 / SL-064621	PARTIAL	443.92	293.92	150.00
SL-070645 / U-02292	PARTIAL	250.00	0	250.00
U-02664	PARTIAL	490.00	240.00	250.00
U-024319	PARTIAL	40.00	40.00	0
U-1358	PARTIAL	160.00	0	160.00
U-47978	PARTIAL	3,257.31	1,347.31	1,910.00
U-47979	PARTIAL	180.00	180.00	0
<b>Total Acreage Applied for Relinquishment</b>		<b>5,341.23</b>	<b>2,261.23</b>	<b>3,080.00</b>



(2) AREA WITHDRAWN FROM RELINQ. APPL. 5-11-94.

(3) PHASE I INCL. RELINQ. 480 AC. FROM SL-066116 UPON LEASE READJ. PACIFICORP RELINQ. ENTIRE 520 AC. 5-15-95

(1) BLM APPROVED LEASE RELINQ. ON SL-050133 IN ITS ENTIRETY (80 AC.) 3-9-93

(4) PACIFICORP AMENDS APPL. TO RELINQ. ADDL. 10 AC. BRINGING TOTAL TO 160 AC. ON U-1358 6-12-95

(5) BLM ACCEPTS RELINQUISHMENT ON 2,261.23 ACRES ON 12-14-95

CAD FILE NAME/DISK#: D:\EASTMTN\RELACRE.DWG

**PACIFICORP ELECTRIC OPERATIONS  
FUEL RESOURCES DEPARTMENT**  
201 SO. MAIN ONE UTAH CENTER SUITE 2000 S.L.C., UTAH 84140-0020

**EAST MOUNTAIN PROPERTY  
FEDERAL COAL LEASE ACREAGE  
RELINQUISHMENT**

DRAWN BY: <b>R. C. FRY</b>	<b>FIGURE 1</b>
SCALE: <b>1" = 1 MILE</b>	DRAWING #: REVISED 3-15-96
DATE: <b>JUNE 8, 1995</b>	SHEET <b>1</b> OF <b>1</b> REV. <b>1</b>

RELINQUISHMENT  
 BLM ACCEPTED  
 PENDING

Both applications have been in the review process by BLM, with regulatory input from the Manti LaSal National Forest ("Forest Service") and the Utah Division of Oil Gas & Mining ("DOGGM"), for over three years. The following supplemental information is submitted on behalf of PacifiCorp to provide lease-specific information to the regulatory agencies as it relates to the "*substantial completeness*" issues on areas of mining-induced subsidence, together with summary descriptions on hydrologic and vegetative impacts. The term "*substantial completeness*", although undefined by regulation with no mention or reference in BLM guidelines, has put the Lessee, PacifiCorp, in an onerous position of providing information which potentially has no bounds and goes beyond the scope of complying with the terms and conditions of the federal leases. However, in a concerted effort with the regulatory agencies, this supplemental information has been prepared by Interwest Mining Company ("managing agent") and Energy West Mining Company ("mine operator"), both wholly-owned subsidiaries of PacifiCorp, to demonstrate the disposition of subsidence activities within the East Mountain LMU.

It is PacifiCorp's experience, based upon subsidence data collected, evaluated and quantified over the past 16 years from coal mining induced subsidence on East Mountain, that subsidence is "substantially complete" within two to three years following the conclusion of mining. However, the determination of "substantial completeness" will vary from area to area because the factors affecting the occurrence of subsidence will be unique to each given area.

Data collected above areas where longwall mining has taken place demonstrates that subsidence occurs rapidly; generally within six months of mining. Data collected above areas where room-and-pillar methods were used demonstrates that subsidence will occur over a longer period of time. The factors affecting the occurrence of subsidence include: (1) percent of recovery, (2) overburden thickness and geologic composition (burned areas), (3) extent of area mined, (4) multiple seam mining, (5) longwall mining methods versus room-and-pillar mining methods, and (6) disposition of the surface, i.e., flatness, steep rugged terrain and escarpments. (Factor Number 6 affects not only the rate at which

subsidence occurs, but also the accuracy of the methods used in subsidence monitoring).

For purposes of lease relinquishment, subsidence may be considered "substantially complete" when no "measurable subsidence" has occurred during a monitoring period ending two or more years following completion of mining within the area for which relinquishment is sought. The term "measurable subsidence" shall refer to measured subsidence which exceeds the accuracy parameters of the subsidence monitoring methods used for the area (i.e., photogrammetric and/or conventional survey). The term "accuracy parameters" refers to the precision and/or detection limits of applicable surveying methods as applied to the specific site. Where the surface being surveyed is relatively flat the detection limits may be as small as one foot. In areas of steep rugged terrain (including escarpments), the detection limit is generally greater and would be no less than two feet.

## **II. *Statement of Need***

PacifiCorp reiterates its need to relinquish acreage from its East Mountain federal lease holdings to effectively meet increasing challenges associated with managing coal leases and mining reserves which provide secure, high quality, low cost fuel for power generation, while maintaining the environmental integrity of the areas applied for relinquishment. The need is simply two-fold:

- (1) Reduce overall federal acreage holdings by relinquishing mined-out, sub-economic inaccessible and burned areas.
- (2) Provide additional opportunity under the federal acreage threshold limitation to acquire additional federal coal reserves to be used for future power generation.

### **III. *Compliance of Lease Terms and Conditions***

To further assist in the compliance review of PacifiCorp's obligation under the federal coal leases, a spreadsheet (included in the Appendix) has been prepared evaluating each lease term, conditions and stipulations for all the federal leases involved in the relinquishment. From this internal review, PacifiCorp has, to the best of its knowledge, complied with all the lease terms, conditions and stipulations. Notwithstanding the arbitrary nature of the "substantial completeness" issue, PacifiCorp established subsidence and hydrology monitoring systems beginning in 1980 to locate, measure and quantify the effects of underground mining activities. This information has been compiled annually and submitted to DOGM, the mine permit regulatory agency. It is this same information that will be used to demonstrate the results and current disposition on areas of mining-induced subsidence.

### **IV. *PacifiCorp Subsidence Monitoring and Methodology***

PacifiCorp's subsidence monitoring program is primarily based on aerial photogrammetry. A baseline photogrammetric survey was conducted in 1980 which includes over 12,000 elevations measured on a 200-foot spacing grid. These elevations are then compared to elevations measured from photographs taken annually in August. This method has proven to be the best way to collect subsidence data on East Mountain. In flat areas with limited vegetation, the elevations on the photographs can be read with a precision of one-half foot. In steeper areas where cliffs are present, the resolution becomes less reliable, and inaccuracies of greater than 10 feet can occur. In these steep areas, photogrammetric monitoring can, and has been, augmented by conventional survey data. A map depicting the total subsidence on East Mountain is included in the Appendix (1994 Subsidence East Mountain All Areas). This map was also included in the 1994 Annual Subsidence Monitoring Report and can be compared to similar maps contained in previous years' monitoring reports. The map shows large areas where subsidence has occurred above mined out areas. Maps are also included in the Appendix that show the detailed subsidence in the lease relinquishment areas (Total Subsidence August 1994 Lease Relinquishment Areas

and Total Subsidence August 1994 Lease U-47978). In areas where the land surface is flat or gently rolling, the subsidence shown on these maps conforms with the undermined areas, i.e., where longwall panels are present, subsidence is greater than in main entry areas, and subsidence is minimal in areas where barrier pillars are present. In areas where escarpments and steep slopes are present, the subsidence depicted on the maps often fluctuates because of the inaccuracies in the steep topography as can be seen by the numerous "bull's eye" in areas where no mining has occurred in Leases U-47979 and U-47978. It is in these areas that a comparison of conventional survey data and the photogrammetric data reveals that false areas of subsidence are indicated by the photogrammetric data primarily due to the resolution of the steep terrain.

*Please Note: Subsidence profiles contained in the Appendix have been updated to include the 1995 data. These profiles depict yearly subsidence since 1982, with the exception of 1990. The 1990 data (computer files) were damaged rendering them unreadable.*

The U.S. Bureau of Mines completed an independent study (1994) of the mining impacts on the Hydrology of East Mountain (Response of Springs to Longwall Coal Mining at the Deer Creek and Cottonwood Mines, Wasatch Plateau, Ut. Information Circular 9405, U.S. Bureau of Mines). The data in this study was collected by PacifiCorp from springs determined to represent hydrologic conditions on East Mountain. This determination was made by an ad hoc committee including representatives of DOGM and the Forest Service. This document is cited as support in the environmental assessment for Coal Lease Application UTU-67939, Winter Quarters Tract (July 1995). This study failed to find any springs that have been impacted by mining. This report is included in the Appendix.

## **V. Lease-Specific Information Subsidence of Affected Areas Assessment of Environmental Impacts**

Refer to the following tables.

<b>FEDERAL LEASE SL-066116</b> <b>Full Relinquishment (360 Acres Pending)</b>	
<p><b>Mining Activity</b></p>	<p>One seam only (Blind Canyon)</p> <p>Pillar extraction mining in 2nd North of the Beehive Mine was completed in 1983. Mining was completed in a narrow corridor of coal that was present between the Bear Canyon fault and burned coal.</p>
<p><b>Subsidence</b></p> <p><i>Reference Material included herewith:</i></p> <p><i>Figures 28, 29 and 29T, Total Subsidence August 1995 Lease Relinquishment Areas</i></p> <p><i>Additional Reference Material:</i></p> <p><i>Figures 28 in the Annual Subsidence Monitoring Reports for 1991, 1992, 1993 and 1994.</i></p>	<p>This lease is in an area where the topography is very steep and rugged (see topographic map in Appendix). Because of the steep and rugged terrain, the resolution of the photogrammetric monitoring is sometimes diminished causing fluctuating results and/or "noise" which creates anomalies on the computer-generated plots. Where this occurs, each area is inspected on the ground and from a helicopter to either verify or refute any changes in the subsidence data. These subsequent inspections confirm the conclusions that anomalous areas in the data are related to the steep, rugged terrain. No areas of continued subsidence have been observed during the inspections. No conventional (on-the-ground) survey monitoring methods were utilized. After carefully scrutinizing and quantifying the photogrammetric data, <i>Figure 29</i> (Area 7 Subsidence Profile) was developed and is located in the Appendix. <i>Figure 29</i> shows that between 1982 and 1995 subsidence has occurred in some areas. The 1995 data shows less cumulative subsidence than has been measured in one or more of the previous years. Subsidence stability is more clearly illustrated by comparing <i>Figure 28</i> (1995 Subsidence Beehive Mine 2nd North off 8th West), included in the Appendix, with the same figure number included in the 1991, 1992, 1993 and 1994 Annual Subsidence Monitoring Reports. These figures illustrate no measurable subsidence has occurred since 1991.</p> <p><i>The data collected to date shows no areas of continued subsidence and supports the position that subsidence is substantially complete.</i></p>
<p><b>Hydrology</b></p>	<p>This area receives very little groundwater recharge, and the strata above the coal seam is dry. No springs are located in this area. Because of these facts, the subsidence has had no impact on the hydrology of the area.</p>

**FEDERAL LEASE SL-066116**  
**Full Relinquishment (360 Acres Pending)**  
**(continued)**

<p><b>Vegetation</b></p>	<p>The predominant vegetation community associated with this lease is Pinyon-Juniper. Assessment of impacts to vegetation in this lease are made by examining aerial photographs, which are taken annually, and color infra-red (IR) photographs taken on five-year intervals. The photographs are reviewed to identify long-term changes in major vegetation communities. Annual site visits are conducted to confirm information obtained from the aerial photographs and to observe general vegetation conditions. Additionally, during annual monitoring helicopter flights, the area is examined for evidence of changes in vegetation.</p> <p>Examination of recent black and white and color IR aerial photographs (see Appendices) indicate no change in the vegetation since mining has occurred.</p>
<p><b>Wildlife</b></p>	<p>The land within this lease is classed in the Forest Land and Resource Management Plan as Range and General Big Game Winter Range. According to UDWR, the area is rated as high priority summer habitat for deer and critical winter habitat for elk. Because no significant changes to vegetation or the topography of the land surface have been observed, it is concluded that none of the identified uses have been impacted. No raptor nests have been observed in this lease. This area is included in the annual raptor surveys which have been conducted since 1986.</p>
<p><b>Other Land Uses</b></p>	<p>Because of the steepness of the area, additional land uses, other than recreation (hiking and hunting) are not expected to occur. No conditions, resulting from subsidence, have been observed that would affect these uses.</p>

**FEDERAL LEASE SL-064607 / SL-064621  
Partial Relinquishment (150.00 Acres Pending)**

<p><b>Mining Activity</b></p>	<p>One seam only (Blind Canyon)</p> <p>Mining within this lease began in 1973 and was completed in 1979. The coal mining was conducted using room and pillar methods with pillar extraction in the First North and 1½ North sections of the Deer Creek Mine. The workings were mined adjacent to burned coal on both the east and west and the abandoned Paramount mine on the north.</p>
<p><b>Subsidence</b></p> <p><i>Reference Material included herewith:</i></p> <p><i>Figures 13A and 14 and Topographic Map, Total Subsidence August 1995 Lease Relinquishment Areas.</i></p> <p><i>Additional Reference Material:</i></p> <p><i>Figure 13A in the Annual Subsidence Reports for 1993 and 1994.</i></p>	<p>This lease is in an area where the topography is very steep and rugged (see topographic map in Appendix). Because of the steep and rugged terrain, the resolution of the photogrammetric monitoring is sometimes diminished causing fluctuating results and/or "noise" which creates anomalies on the computer-generated plots. Where this occurs, each area is inspected on the ground and from a helicopter to either verify or refute any changes in the subsidence data. This area has been reviewed in the field and from a helicopter annually since 1982, and no changes have been observed. No conventional (on-the-ground) survey monitoring methods were utilized.</p> <p><i>Figure 14, included herein, compares the subsidence profiles that were developed between the years of 1989 and 1995. The area is steep and rugged; therefore, the expected accuracy resulting from photogrammetric methods is no less than two (2) feet. A review of Figure 14 indicates that the profile data for the years 1991 through 1995 are all within the two feet accuracy range. Thus, Figure 14 indicates that subsidence is substantially complete. Figure 13A (1995 Subsidence, Deer Creek Mine, 1st North Area), in the Appendix, depicts 1995 subsidence contours associated with the relinquishment area. Figure 13A was first included in the 1993 Subsidence Monitoring Report. A comparison of Figure 13A from the 1993 and 1994 reports and the 1995 Figure 3A, found in the Appendix of this report, depict similar magnitudes of subsidence in the vicinity of the profile line. The contour information and the profile information presented in Figure 14 indicate that measured subsidence has not varied more than two feet since 1991; thus, the criteria for determining substantially complete are met. However, the 1994 contour data (Figure 13A) indicate significant subsidence in adjacent areas Northeast and Southwest of the profile location. These are some of the most topographically</i></p>

**FEDERAL LEASE SL-064607 / SL-064621**  
**Partial Relinquishment (150.00 Acres Pending)**  
*(continued)*

<p><b><i>Subsidence (cont'd)</i></b></p>	<p>rugged areas in the entire lease. They are characterized by steep (1 vertical:1.25 horizontal) slopes and near vertical escarpments (see Lease Relinquishment Topographic Map and Vegetation Monitoring Photos). It is concluded that these steep, rugged characteristics contributed to the exaggerated subsidence contours depicted on the 1994 <i>Figure 13A</i>. As discussed above, the data depicted in <i>Figure 14</i>, the 1993 through 1995 <i>Figure 13A</i>, and on-the-ground and helicopter inspections confirm that subsidence in this area is substantially complete.</p> <p>Subsidence in this area has caused some small fracturing to appear on the land surface within the Castlegate Sandstone. These fractures were first noted in 1982, and no visible change has occurred since that time.</p> <p><i>No change in subsidence has been measured since 1991. Therefore, subsidence is considered to be substantially complete.</i></p>
<p><b><i>Hydrology</i></b></p>	<p>No springs are present within the relinquishment area, and the coal overburden strata is dry. Therefore, subsidence has had no effect on hydrology.</p>
<p><b><i>Vegetation</i></b></p>	<p>The vegetation community in this lease is Pinyon-Juniper. Assessment of impacts to vegetation in this lease are made by examining aerial photographs, which are taken annually, and color IR photographs taken on five-year intervals. The photographs are reviewed to identify long-term changes in major vegetation communities. Annual site visits are conducted to confirm information obtained from the aerial photographs and to observe general vegetation conditions. Additionally, during annual monitoring helicopter flights, the area is examined for evidence of changes in vegetation.</p> <p>Examination of recent black and white and color IR aerial photographs (see Appendices) indicate no change in the vegetation since mining has occurred. It appears that no impacts to that vegetation have resulted from subsidence or the minor fractures.</p>

**FEDERAL LEASE SL-064607 / SL-064621**  
**Partial Relinquishment (150.00 Acres Pending)**  
**(continued)**

<b>Wildlife</b>	This lease includes high priority deer summer habitat and critical elk winter habitat. No raptor nests exist within the lease. No wildlife uses have been impacted by subsidence or the minor fractures.
<b>Other Land Uses</b>	In addition to wildlife habitat, this lease is within a Range unit. Because of the steepness of the area, utilization appears somewhat limited. No conditions, resulting from subsidence, have been observed that affect these uses or will affect future use of the area.

**FEDERAL LEASE SL-070645 / U-02292**  
**Partial Relinquishment (250 Acres Pending)**

<p><b>Mining Activity</b></p>	<p>One seam only (Blind Canyon)</p> <p>The relinquishment within this lease is comprised of two parcels. Parcel 1 is in the area of the 1st, 2nd and 3rd Left Sections off 2nd North in the Deer Creek Mine, which was mined prior to 1979. Parcel 2 is in an area of the original McKinnon Mine workings mined prior to 1973. The 2nd East off 1st South room and pillar section was completed in 1981. Both of these areas were mined using room and pillar mining with pillar extraction.</p>
<p><b>Subsidence</b></p> <p><i>Reference Material included herewith:</i></p> <p><i>Topographic map and Figures LR-15 for 1992, 1993, 1994 and 1995.</i></p>	<p>Mining in Parcel 1 and the northern <math>\frac{3}{4}</math> of Parcel 2 was completed before subsidence monitoring was initiated. The southern <math>\frac{1}{4}</math> of Parcel 2, where mining has occurred (1980-81), has been monitored and included in Area 2 of the annual Subsidence Monitoring Reports within the remaining areas. It is most likely that some subsidence has occurred, but it cannot be quantified. No conventional survey monuments are in these areas.</p> <p>The areas have been photographed annually for subsidence since 1982 annually. Contour maps of subsidence measured in 1992, 1993, 1994 and 1995 have been included in the Appendix (see <i>Figures LR-15</i> for the referenced years).</p> <p>In Parcel 1 of the lease relinquishment area, the terrain is very steep and rugged. Because of this, variability exists in the data from one year to the next. The portion of Parcel 1, wherein the data exhibits the greatest variability (see <i>Figures LR-15</i>, 1992 through 1995 subsidence), is characterized by a series of near vertical escarpments interspersed with steep slopes. The maximum variability in measured subsidence in Parcel 1, 3 feet, is indicated by comparing the 1994 and 1995 data (1992 - 4 feet, 1993 - 5 feet, 1994 - 6 feet, 1995 - 3 feet). Considering the steep and rugged characteristics of this portion of Parcel 1, it seems reasonable to conclude that the observed variability of 3 feet meets the criteria of substantially complete.</p> <p>In Parcel 2 of the relinquishment area of this lease, the maps show subsidence of up to seven feet has occurred since the baseline survey was flown in 1980. This is the result of the adjacent longwall panels to the south in the Deer Creek Mine that were pulled starting in 1979. No change in subsidence can be detected between 1992 and 1995.</p>

**FEDERAL LEASE SL-070645 / U-02292**  
**Partial Relinquishment (250 Acres Pending)**  
*(continued)*

<p><b><i>Subsidence</i></b> <b><i>(cont'd)</i></b></p>	<p>Both parcels have been inspected in the field and using helicopter surveys annually to identify any effects of subsidence.</p> <p><i>No effects have been identified. Therefore, subsidence is considered to be substantially complete.</i></p>
<p><b><i>Hydrology</i></b></p>	<p>No springs are located within the parcels relinquished. The nearest spring to these areas is Sheep Herder Springs (82-52), which is located ¼ mile to the west of Parcel 2. This spring has shown no change in quality or discharge since mining has occurred.</p>
<p><b><i>Vegetation</i></b></p>	<p>The vegetation in this lease is primarily Mixed Conifer with small areas of Pinyon-Juniper in the southern portion of Parcel 1 and small areas of Sagebrush in Parcel 2. Assessment of impacts to vegetation in this lease are made by examining aerial photographs, which are taken annually, and color IR photographs taken on five-year intervals. The photographs are reviewed to identify long-term changes in major vegetation communities. Annual site visits are conducted to confirm information obtained from the aerial photographs and to observe general vegetation conditions. Additionally, during annual monitoring helicopter flights, the area is examined for evidence of changes in vegetation.</p> <p>Examination of recent black and white and color IR aerial photographs (see Appendices) indicate no change in the vegetation since mining has occurred.</p>
<p><b><i>Wildlife</i></b></p>	<p>The area is classified as high priority summer habitat for deer and elk. No impacts to these uses are known to have occurred.</p>
<p><b><i>Other Land Uses</i></b></p>	<p>Land uses in these areas include range, grazing, recreation and forestry. Some commercial timber may occur in Parcel 2. None of these uses appear to have been affected by subsidence.</p>

**FEDERAL LEASE U-02664**  
**Partial Relinquishment (250 Acres Pending)**

<p><b>Mining Activity</b></p>	<p>Two seams (Blind Canyon and Hiawatha)</p> <p>This lease is comprised of two non-contiguous blocks of coal. The eastern block was unmined (with the exception of approximately 600 feet along the west side of the Maple Gulch Fault) because access to the coal in this eastern area is precluded by the fault. No economic recoverable coal remains within this eastern parcel; therefore, the area has been relinquished. Coal from the western block was mined in the Beehive and Little Dove Mines located in the Blind Canyon Seam and in the Deseret Mine located in the Hiawatha Seam. All of the mining was completed prior to 1980 using room and pillar methods.</p>
<p><b>Subsidence</b></p> <p><i>Reference Material included herewith:</i></p> <p><i>Topographic Map and Figures 41 and 42.</i></p> <p><i>Additional Reference Material:</i></p> <p><i>Figure 41 in the 1993 and 1994 Annual Subsidence Monitoring Report.</i></p>	<p>Part of the area is located in a region where the topography is steep and rugged which causes a reduction in the accuracy of the photogrammetric data (see topography sheet included in the Appendix). Subsidence within this area has reached a maximum of two feet. No change in subsidence has occurred since 1992, and the area is stable (see <i>Figures 33, 33T, 42, 42T, 43 and 43T</i> located in the Appendix). Also, the subsidence contour maps (<i>Figures 32 and 41</i>) for 1995, included herein, when compared to the same figures located in the Subsidence Monitoring Reports for 1993 and 1994, show no increase in the amount of subsidence.</p> <p>A field inspection and helicopter survey conducted annually has not identified any visible evidence of subsidence. No conventional methods were used.</p> <p><i>Whereas, no change in subsidence has been measured since 1992, subsidence is considered to be substantially complete.</i></p>
<p><b>Hydrology</b></p>	<p>No springs are located within the relinquishment area. The nearest spring is 82-51 located ½ mile to the west. This spring has shown no change in quality or discharge since mining has occurred.</p>

**FEDERAL LEASE U-02664**  
**Partial Relinquishment (250 Acres Pending)**  
*(continued)*

<b>Vegetation</b>	<p><b>40-Acre Parcel</b> in center of Section 26 with Pinyon-Juniper. Assessment of impacts to vegetation in this portion of the lease are made using aerial photographs and observations made during annual raptor monitoring helicopter flights. No conditions have been observed that have indicated the need for closer examination. Therefore, site visits have been limited to the northern ¼ of the parcel, an area of least extreme topographic relief.</p> <p><b>Eastern Block</b> – Approximately 50% Mixed Conifer and 50% Pinyon-Juniper. There is very little mining in this area. Assessments of impacts to vegetation in this portion of the lease are made using aerial photographs and observations made during annual raptor monitoring helicopter flights. The area is very steep, and no conditions have been observed that have indicated the need for closer examination; therefore, no site visits have been conducted in this area.</p> <p><b>Western Block</b> – Sagebrush only in this area. Assessments of impacts to vegetation in this portion of the lease are made using aerial photographs and annual on-the-ground site visits. During the site visits, the area is observed from a vehicle and on foot. The general condition of the various vegetation types is assessed during the visits. No significant changes in the vegetation have been observed.</p> <p>No subsidence-related impacts have been observed in any of the areas.</p>
<b>Wildlife</b>	<p><b>All Blocks</b> – High priority summer habitat for deer and critical winter habitat for elk.</p> <p><b>40-Acre Parcel</b> – Raptor nests adjacent to area. The area is within active golden eagle territory.</p> <p><b>Eastern Block</b> – Raptor nests within lease and adjacent to lease.</p> <p>No subsidence-related impacts have been observed in any of the areas.</p>

**FEDERAL LEASE U-02664**  
**Partial Relinquishment (250 Acres Pending)**  
**(continued)**

**Other Land Uses**

**40-Acre Parcel** – This area is classed in the Forest Land and Resource Management Plan as General Big Game Winter Range.

**Eastern Block** – This area is classed as Range and General Big Game Winter Range.

**Western Block** – This area is classed as Range.

Observations discussed in the Vegetation section above result in the conclusion that none of these uses in the areas appear to have been affected by subsidence.

<b>FEDERAL LEASE U-024319</b> <b>Partial Relinquishment (0 Acres Pending)</b>	
<b>Mining Activity</b>	None.  Underground access to the coal within the 40 acres designated for relinquishment is blocked by the Pleasant Valley Fault. No mining has been undertaken within this area.
<b>Subsidence</b>	None.
<b>Hydrology</b>	No mining has occurred, and the hydrology is unchanged.
<b>Vegetation</b>	The vegetation is approximately 25% Mixed Conifer and 75% Pinyon-Juniper. No mining has occurred. No subsidence-related impacts have been observed.
<b>Wildlife</b>	The area is classified as high priority summer habitat for deer and critical winter habitat for elk. Raptor nest sites are present. No impacts.
<b>Other Land Uses</b>	The area is steep and rugged. There are no uses other than wildlife habitat.

<b>FEDERAL LEASE U-1358</b> <b>Partial Relinquishment (160 Acres Pending)</b>	
<p><b>Mining Activity</b></p>	<p>Two seams (Blind Canyon and Hiawatha)</p> <p>Mining within this lease occurred between 1979 and 1983. Room and pillar mining, with pillar extraction, was conducted in Deer Creek Mine in the Blind Canyon Seam and in the Wilberg Mine in the Hiawatha Seam. In both mines, the coal was 16 feet thick per seam. When the mines intersected burned coal, pillars were then pulled on retreat.</p>
<p><b>Subsidence</b></p> <p><i>Reference Material included herewith:</i></p> <p><i>Total Subsidence August 1995 Lease Relinquishment Areas, Topographic Map, Figures 6 and 7 and Prism Data for Grimes Wash PR-1 through PR-4.</i></p> <p><i>Additional Reference Material:</i></p> <p><i>Figure 5 from 1984 through 1994 Annual Subsidence Monitoring Report.</i></p>	<p>When the mine pillars were pulled, the collapse of the overlying strata caused a transfer of overburden stress to the adjacent areas. This caused the collapse of the thick burned coal clinker beds and created substantial subsidence outside of the area mined. This subsidence was first noticed in 1982 and reached a maximum of 28 feet. Several large fractures are present on the surface. The subsidence monitoring, including the prism data, in this area has shown no signs of movement since 1990 (see <i>Figures 6 and 7</i> and prism profiles for Grimes Wash PR-1 through PR-4 in the Appendix). The fractures have, for the most part, filled in naturally with soil. A reclamation plan is being formulated by PacifiCorp and the Forest Service to be implemented in the 1996 field season. Even though this area has experienced the most dramatic subsidence on East Mountain, the area is stable.</p> <p>This area has been reviewed in the field and from a helicopter annually since 1982, and no changes have been observed.</p> <p><i>No change in the amount of subsidence has been detected since 1990, and no specific mechanism exists to cause further subsidence. Therefore, subsidence is considered to be substantially complete.</i></p>
<p><b>Hydrology</b></p> <p><i>Additional Reference Material:</i></p> <p><i>1995 Annual Hydrologic Monitoring Report.</i></p>	<p>No springs are located within the acreage being relinquished. The spring nearest this area, 82-51 (located 800 feet east of this lease), has shown no change in quality or discharge since mining has occurred. The graben, formed by the subsidence, has created a topographically low area which traps precipitation. Additionally, it appears this low area may be influenced by subsurface water emerging as a seep at this location. As a result, riparian-type vegetation has become established in a portion of the graben. It is reported that a seep previously existed in the vicinity south of the</p>

**FEDERAL LEASE U-1358**  
**Partial Relinquishment (160 Acres Pending)**  
**(continued)**

<p><b>Hydrology</b> <i>(cont'd)</i></p>	<p>newly formed riparian area. (Personal communication, 1996, with Steve Robison, former Ferron Ranger District Geologist, now Geologist on Caribou National Forest in Pocatello, Idaho). The portion of the graben immediately south of the newly established riparian area has been examined for evidence of a seep area; none was found. Mr. Robison's assessment of the newly created riparian area is that there seems to be more moisture and more extensive vegetation establishment at the new area than existed at the previous site. Flowing water has not been observed in the newly established riparian area; therefore, no water quality data or flow data has been collected.</p>
<p><b>Vegetation</b></p>	<p>Vegetation is sagebrush in the Northern ¼ and Pinyon-Juniper in the Southern ¾. Subsidence has impacted the central portion of the proposed relinquishment area within the Pinyon-Juniper community. Several trees at the perimeter of the subsided area were uprooted. Subsidence formed a graben which has resulted in the growth of riparian type vegetation in some areas due to retention of precipitation.</p>
<p><b>Wildlife</b></p>	<p>The area is rated as high priority summer habitat for deer and critical winter habitat for elk. Subsidence does not appear to have affected these uses. The area was fenced to exclude livestock. The fence may have affected wildlife movement initially, but the deer and elk appear to have adapted to the presence of the fence. The fence does not present a barrier to other wildlife species. No evidence has been found which would indicate the fractures are hazardous to wildlife. The vertical faces at some locations along the fractures provide habitat for burrowing animals.</p>
<p><b>Other Land Uses</b></p>	<p>Land uses associated with the proposed relinquishment include grazing, recreation and forestry in the Northern ¼ of the area. The area impacted by subsidence is primarily steep terrain. Wildlife habitat is the primary land use. However, historically, some grazing occurred in the area which subsided; therefore, the subsided area was fenced to exclude livestock.</p>

<b>FEDERAL LEASE U-47979</b> <b>Partial Relinquishment (0 Acres Pending)</b>	
<b>Mining Activity</b>	Coal within this area is not minable because access to the coal has been blocked by the Pleasant Valley Fault. No mining has occurred within this area.
<b>Subsidence</b>	None.
<b>Hydrology</b>	No impact.
<b>Vegetation</b>	The vegetation community associated with this lease is Pinyon-Juniper. No impacts have been observed.
<b>Wildlife</b>	The area is rated high priority summer habitat for deer and critical winter habitat for elk. Neither of these uses have been impacted. No raptor nests have been observed in this lease.
<b>Other Land Uses</b>	Due to steepness, only wildlife habitat exists.

<b>FEDERAL LEASE U-47978</b> <b>Partial Relinquishment (1,910.00 Acres Pending)</b>	
<p><b>Mining Activity</b></p>	<p>One seam only (Hiawatha)</p> <p>This lease was acquired in 1981. Mining began in 1984 and was completed in 1992. Mining was conducted using longwall methods designed to allow for maximum recovery of the coal and to minimize the effects of subsidence on the surface.</p>
<p><b>Subsidence</b></p> <p><i>Reference Material included herewith:</i></p> <p><i>Total Subsidence August 1995 Lease U-47978 Map, Topographic Map, Figures 45, 46, 46T, 47, 47T, 49, 50, 50T, 51, 51T, 53, 54, 54T, 55, 55T, 57, 58, 58T, 59 and 59T, Prism Survey Profiles PR-1 through PR-10 Newberry Canyon, PR-11 through PR-14 Corncob Wash, PR-1 through PR-5 Miller Canyon.</i></p> <p><i>Additional Reference Material:</i></p> <p><i>Figures 45, 59, 53 and 57 located in the 1993, 1994 and 1995 Annual Subsidence Monitoring Reports.</i></p>	<p>Monitoring of subsidence in this area has shown that the area has subsided up to seven feet. The monitoring has indicated that the subsidence occurs very quickly after mining, with over 90% occurring within the first year. This is documented in the Annual Subsidence Monitoring reports. In these reports, the relinquishment area is divided into four areas monitored for subsidence. These areas are each comprised of a group of two or more parallel longwall panels and are identified as Areas 14, 15, 16 and 17. Areas 15 and 17 are located where the ground is gently rolling or somewhat flat, while Areas 14 and 16 are very rugged with steep cliffs (refer to Topographic Map and Figures 46T, 47T, 50T, 51T, 54T, 55T 58T and 59T).</p> <p>The subsidence within these areas has been monitored using photogrammetry, conventional surveying, time domain reflectometry and visual helicopter reconnaissance.</p> <p>The first area mined was Area 14. This area was mined between September 1986 and March 1987. Subsidence in this area has been shown to be generally between three and five feet. Because this area is very steep and rugged, it is difficult to monitor the subsidence using photogrammetric means. Elevations on the photographs are measured on a 200-foot grid. Because the area is so rugged, the resolution is limited, thereby creating several one-point anomalies shown on the computer generated subsidence map. These anomalies, or "bulls eyes", indicate as much as 30 feet in some areas, which generally indicates errors in reading the photography. A subsidence map with current data collected in August 1995 for Area 14 is in the Appendix (see Figure 45). The profiles created from the photogrammetric data are shown in Figures 46 and 47 in the Appendix.</p>

**FEDERAL LEASE U-47978**  
**Partial Relinquishment (1,910.00 Acres Pending)**  
**(continued)**

***Subsidence***  
***(cont'd)***

Failure (spalling) of the Castlegate escarpment occurred along the north side of Newberry Canyon in association with mining the 6th and 7th East panels. Spalling first occurred in October 1986, approximately one month following start-up of longwall mining in 6th East and continued intermittently during extraction of 6th and 7th East panels. Spalling ceased in mid-September 1987, approximately three months following completion of extraction of the 7th East panel.

In these areas, we have also been monitoring the cliff stability using permanent survey prism targets installed on the cliff. Profiles of the prism survey data collected in the areas of Newberry Canyon are listed as: PR-1, PR-2, PR-3, PR-4, PR-5 and PR-6 located in the Appendix. These surveyed prisms show no movement greater than 0.5 feet, with the exception of PR-4, which showed one foot of movement between 1990 and 1992 but was back to the elevation measured in 1990 when surveyed in 1996. Adjacent prisms, PR-3, confirm that the subsidence is stable and substantially complete even though the photogrammetry has shown various "bulls eyes" of false subsidence caused by inadequate photo resolution of the steep terrain. Additionally, field observations confirm that no significant cliff spalling has occurred since 1987.

The second area mined is Area 15 in the Subsidence Monitoring Report. This area was mined in 1988 through the fall of 1989. Subsidence in this area has reached a little over five feet. For the most part, this area has rolling terrain which can be monitored effectively using photogrammetric means. The most current photogrammetric data is shown on *Figure 49* located in the Appendix. The profiles from this area are shown in *Figures 50 and 51* located in the Appendix. Survey prism targets in Miller Canyon have also been measured and further confirm that subsidence is substantially complete in this rugged area. This data is shown in Profiles PR-1 through PR-5 Miller Canyon located in the Appendix.

**FEDERAL LEASE U-47978**  
**Partial Relinquishment (1,910.00 Acres Pending)**  
**(continued)**

***Subsidence***  
***(cont'd)***

The third area of subsidence in this lease is Area 16. Mining in this area started in June 1989 and was completed in May 1992. Subsidence in this area has reached slightly over five feet. Because most of the area is fairly flat, the subsidence is well documented by the photogrammetric monitoring. Some areas undermined are very steep and, as in Area 14, several "bulls eyes" appear from the photogrammetric monitoring. The most current data (1995 Subsidence Cottonwood Mine 6th and 7th East Longwall Panels) shows only one area where the cumulative subsidence had increased since 1994. This area is located 2,500 feet east of the west end of *Figure 47*. At this location, the 1995 measurement shows less subsidence than was measured in 1989. An inspection of *Figure 47T* shows the topography to be very steep which inhibits the resolution of the data.

The photogrammetric profiles in this area are shown in *Figures 54 and 55* in the Appendix. In the steep area where the photogrammetric monitoring is ineffective, several survey prism targets have been monitored.

Data from these targets, listed as PR-5 through PR-10 in Newberry Canyon and PR-11 through PR-14 in Corn Cob Wash are shown in the Appendix. These profiles show no movement since 1992. The subsidence area appears to be stable and substantially complete.

Minor spalling of the Castlegate escarpment occurred in association with mining of 9th and 10th East panels in Area 16. This spalling occurred along the south side of Newberry Canyon. Significant spalling occurred in association with extraction of the 11th East panel, in an area known as Corn Cob Wash. Spalling occurred in a similar pattern as was observed previously. Spalling began in October 1989 and continued intermittently until December 1990, following completion of mining in 11th East. Field observations confirm that no significant cliff spalling has occurred since 1990.

**FEDERAL LEASE U-47978**  
**Partial Relinquishment (1,910.00 Acres Pending)**  
**(continued)**

***Subsidence***  
***(cont'd)***

The fourth area of subsidence within this lease is Area 17. This area was mined between October 1990 and March 1992. The subsidence has reached a total of slightly over six feet. For the most part, the topography in this area is fairly flat and is well suited for photogrammetric monitoring. The most current photogrammetric data is shown on *Figure 57* located in the Appendix. This area has shown no movement since 1992 as indicated on the photogrammetric profiles, *Figures 58 and 59* located in the Appendix. Additional data regarding the speed at which subsidence occurs was documented in this area using time domain reflectometry. In this method, a drill hole was completed from the surface down through the coal seam and centered in a longwall that was to be mined. A coaxial cable was then cemented in the drill hole. By measuring the electrical properties of this cable from the surface of the ground, it was possible to measure when the cable was sheared and at what depth as the drill hole was undermined by the longwall equipment. When this was done, it was determined that no deformation of the cable occurred until the longwall had reached the cable. Immediately after the cable was undermined, the cable began to be sheared - first near the coal seam, and as time passed, progressively further up the hole. The shearing of the cable reached 85 feet from the surface of the ground within 43 days of it being undermined (see the Appendix, Time Domain Reflectometry). This information strongly supports the other subsidence data collected which suggests that subsidence is rapid in occurring.

The impacts which mining and subsidence have had on the surface within this lease are small. In an area of the Castlegate Cliffs in Area 14, a collapse occurred in 1986 and 1987. The debris that fell from the cliff covered the talus slope below and had some impact on the vegetation in that area. Some fractures are also present along the northern limit of the relinquishment area. The fractures are healing naturally and appear to be stable.

No subsidence movement has been seen since 1992, and subsidence in the area is considered to be substantially complete.

**FEDERAL LEASE U-47978**  
**Partial Relinquishment (1,910.00 Acres Pending)**  
**(continued)**

<p><b><i>Subsidence</i></b> <b>(cont'd)</b></p>	<p><i>Photogrammetric data has effectively shown that subsidence has stabilized in areas where the land surface is flat. The photogrammetric monitoring shows erratic changes in subsidence in steep areas because of limited resolution of the data. In those areas, the conventional survey data shows all areas monitored to be stable. The subsidence above the longwall panels has reached predicted values. Therefore, subsidence within this lease is considered to be substantially complete.</i></p>
<p><b><i>Hydrology</i></b></p>	<p>One spring is located within the relinquishment area. This spring is 84-56 and has been monitored since 1984. It has shown no change in quality or discharge since the mining has occurred (see Appendix, Bureau of Mines Report).</p>
<p><b><i>Vegetation</i></b></p>	<p>The vegetation in this lease is Mixed Conifer, Sagebrush, Pinyon-Juniper, Mountain Brush, Grass and Riparian. Major subsidence-related impact to vegetation in the lease area resulted from cliff failure and deposition of talus materials. This occurred in the Newberry Canyon and Corn Cob Wash areas. Approximately 35 acres of Pinyon-Juniper, Mountain Brush, Grass mixed vegetation community and 0.006 acres (250<sup>2</sup>) of Riparian vegetation were impacted in Newberry Canyon. Approximately 33 acres of Pinyon-Juniper, Mountain Brush, Grass mixed vegetation were impacted in Corn Cob Wash. Grasses and forbs are beginning to re-establish in the impacted areas.</p> <p><i>Hedysarum occidentale</i> var. <i>canone</i>, a sensitive plant species occurs within Lease U-47978. An unknown number of individual plants and several populations in Newberry Canyon have been impacted by talus deposition, which occurred during 1986 and 1987.</p> <p>Monitoring of one impacted population (73 plants) and an adjacent non-impacted population (30 plants) was initiated in 1989 to assess the recovery of the impacted population.</p> <p><i>Hedysarum</i> is known to inhabit disturbed areas. Subsequent monitoring of the Newberry Canyon populations indicated establishment of new plants within the impacted population and continued annual growth of impacted plants similar to that observed in the non-impacted population.</p>

<b>FEDERAL LEASE U-47978</b> <b>Partial Relinquishment (1,910.00 Acres Pending)</b> <b>(continued)</b>	
<b>Vegetation</b> <i>(cont'd)</i>	<p>The overall viability of Hedysarum within this lease area does not appear to have been adversely impacted.</p> <p>The majority of the lease relinquishment area shows no evidence of impacts to vegetation.</p>
<b>Wildlife</b>	<p>The most significant impact to wildlife in Newberry Canyon was the loss of golden eagle nest sites. Three of five nests in Newberry Canyon were destroyed due to cliff failure. However, no adult or young eagles nor any eggs were lost.</p> <p>Annual raptor surveys have been conducted since 1986 at Newberry Canyon, PacifiCorp's mine permit areas and adjacent areas equivalent to approximately a 10-mile radius area surrounding Newberry Canyon. Golden eagle nesting activities have been documented during the surveys. The patterns of reproductive activity observed at Newberry Canyon has been similar to that of other territories observed within the survey area. Mining-related impacts have not negatively affected the golden eagle territory in Newberry Canyon.</p> <p>The lease relinquishment area includes high priority deer winter and summer range and high priority summer and critical winter range for elk. The areas impacted by subsidence related talus deposition are very steep and rugged and receive minimal use by these wildlife species. The areas affected by surface fractures are more heavily used by deer and elk, but the fractures do not appear to have negatively affected these species.</p>
<b>Other Land Uses</b>	<p>Land uses within the lease relinquishment area include recreation, forestry, commercial timber and grazing. In 1987, the Forest Service directed the applicant to place warning signs along roads in the vicinity of the head of Newberry Canyon and at the mouth of the canyon. The signs indicated that active mining was occurring in the area. This potentially impacted recreational use of the area. However, because of the ruggedness of Newberry Canyon, recreation is limited. The warning signs were removed in 1995, as directed by the Forest Service. Land uses within Lease U-47978 were not otherwise affected.</p>

## **VI. Conclusion**

Based upon the extensive monitoring conducted by PacifiCorp and/or its wholly-owned subsidiaries, the independent studies referred to above, the findings and the interpretations quantified in this supplemental information, PacifiCorp concludes that in those areas of mining-induced subsidence, subsidence activities are substantially complete with no significant impact or irreparable damage to the environment inclusive of hydrology, vegetation, wildlife and other land uses. Furthermore, it is hereby demonstrated that the federal acreage applied for relinquishment in Phase I and Phase II applications, and as herein amended in Table 1, will not impair the public interest as all obligations under the regulations and terms of the leases have been met.

PacifiCorp respectfully requests and urges the BLM to take action to approve the remaining relinquishments.

## **VII. Professional Certification of Subsidence Data**

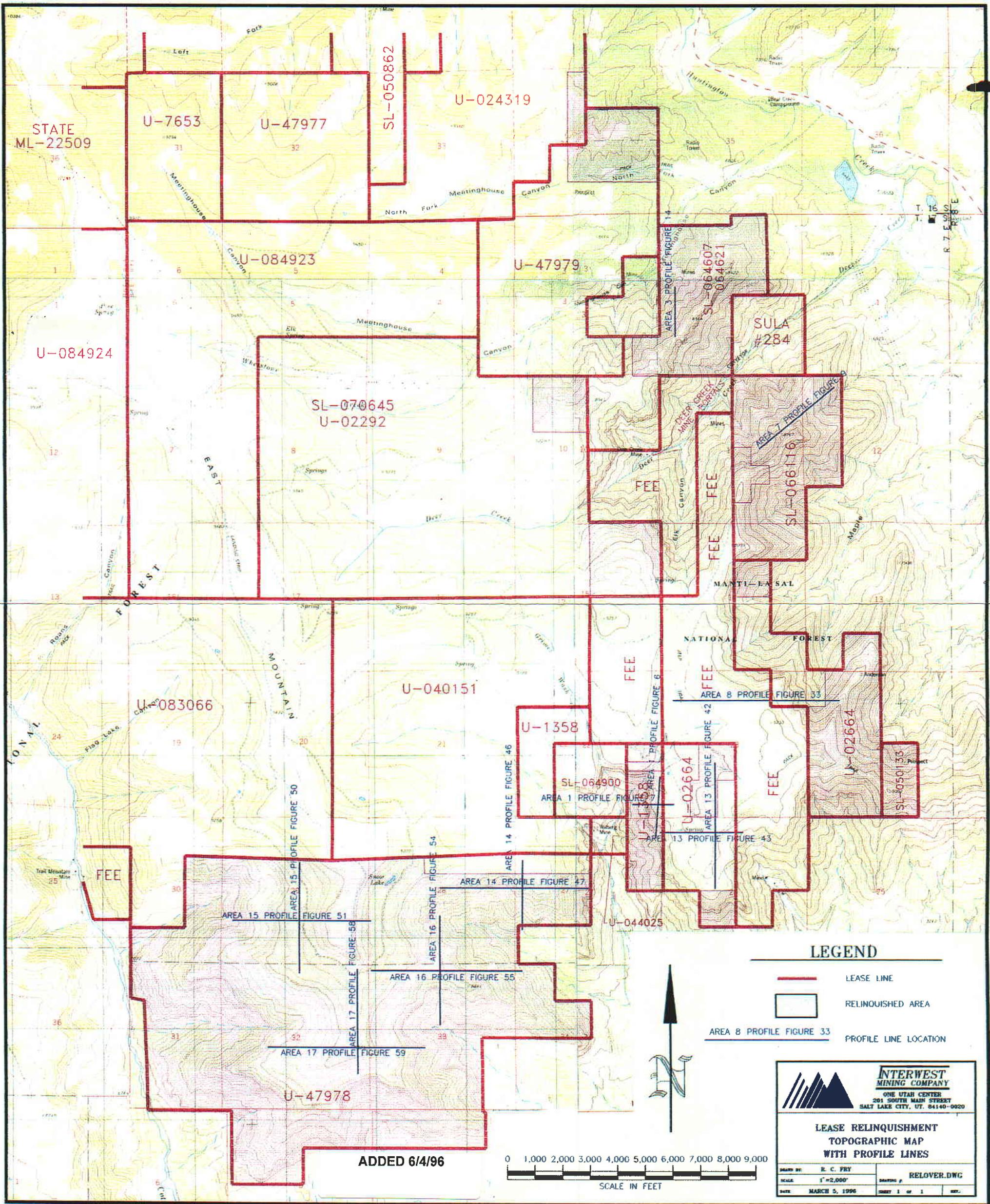
I, Rodger C. Fry, being a Certified Professional Geologist, with significant experience in subsidence monitoring, certify that the subsidence data contained in this document was collected under my direction, and the attached subsidence materials were prepared by me using industry-accepted methods. I further certify that, in my opinion, subsidence within all relinquishment areas referred to in this document is considered to be substantially complete.

Dated this \_\_\_\_ day of \_\_\_\_\_, 1996.

---

Rodger C. Fry  
No. 6603

# ***Maps***



STATE  
ML-22509

U-7653

U-47977

SL-050862

U-024319

U-084923

U-47979

U-084924

SL-070645  
U-02292

SULA  
#284

U-083066

U-040151

U-1358

SL-064900

U-02664

U-02664

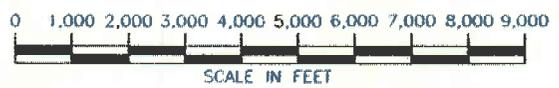
U-044025

U-47978

ADDED 6/4/96

**LEGEND**

-  LEASE LINE
-  RELINQUISHED AREA
-  AREA 8 PROFILE FIGURE 33
-  PROFILE LINE LOCATION



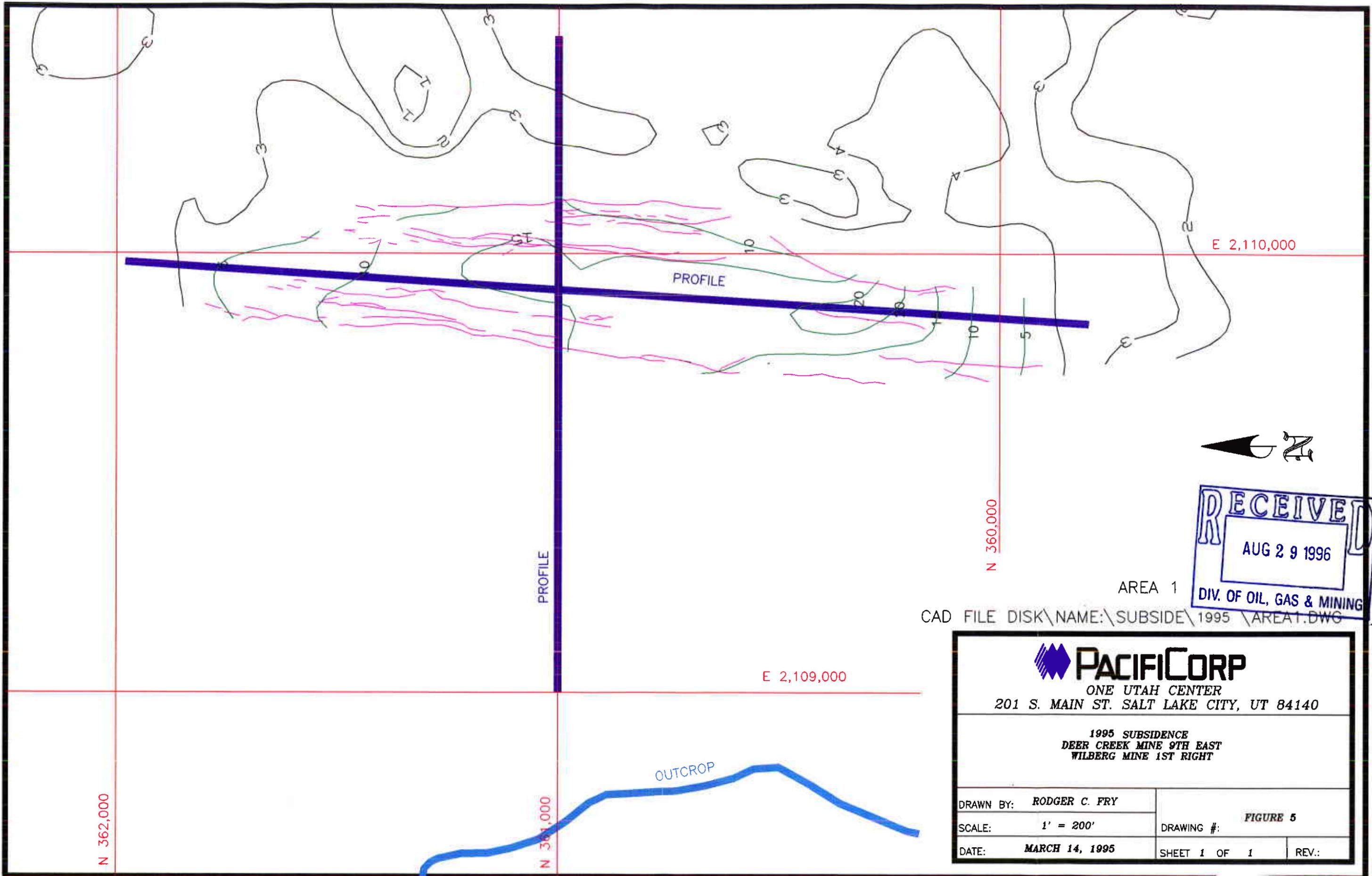


**INTERWEST  
MINING COMPANY**  
ONE UTAH CENTER  
201 SOUTH MAIN STREET  
SALT LAKE CITY, UT. 84140-0020

**LEASE RELINQUISHMENT  
TOPOGRAPHIC MAP  
WITH PROFILE LINES**

DRAWN BY: R. C. FEY	DRAWING #: RELOVER.DWG
SCALE: 1"=2,000'	DATE: MARCH 5, 1996
SHEET 1 OF 1	

***Profiles  
and  
Isograms***



RECEIVED  
 AUG 29 1996  
 DIV. OF OIL, GAS & MINING

AREA 1  
 CAD FILE DISK\NAME:\SUBSIDE\1995\AREAT.DWG

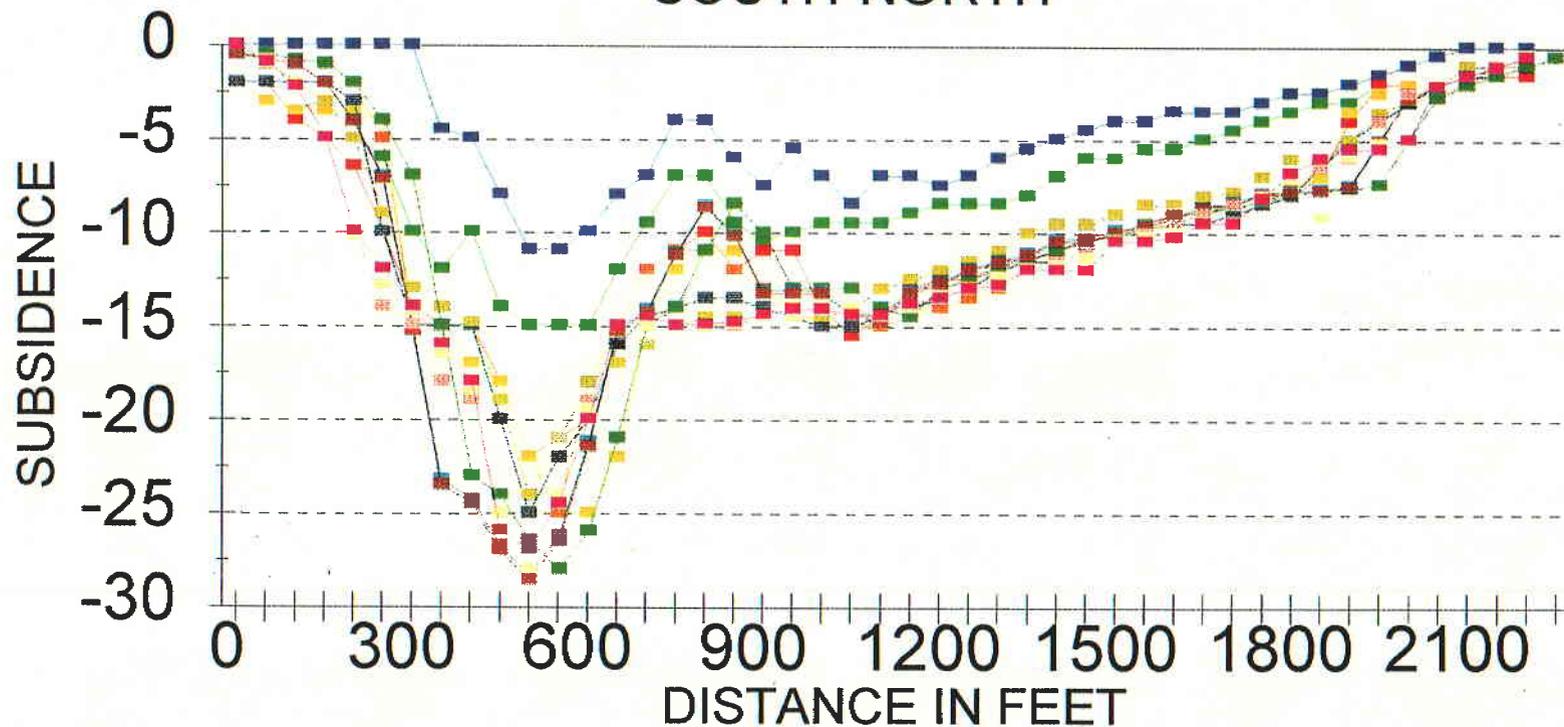
**PACIFICORP**  
 ONE UTAH CENTER  
 201 S. MAIN ST. SALT LAKE CITY, UT 84140

1995 SUBSIDENCE  
 DEER CREEK MINE 9TH EAST  
 WILBERG MINE 1ST RIGHT

DRAWN BY: RODGER C. FRY	DRAWING #: <b>FIGURE 5</b>
SCALE: 1' = 200'	
DATE: MARCH 14, 1995	SHEET 1 OF 1
	REV.:

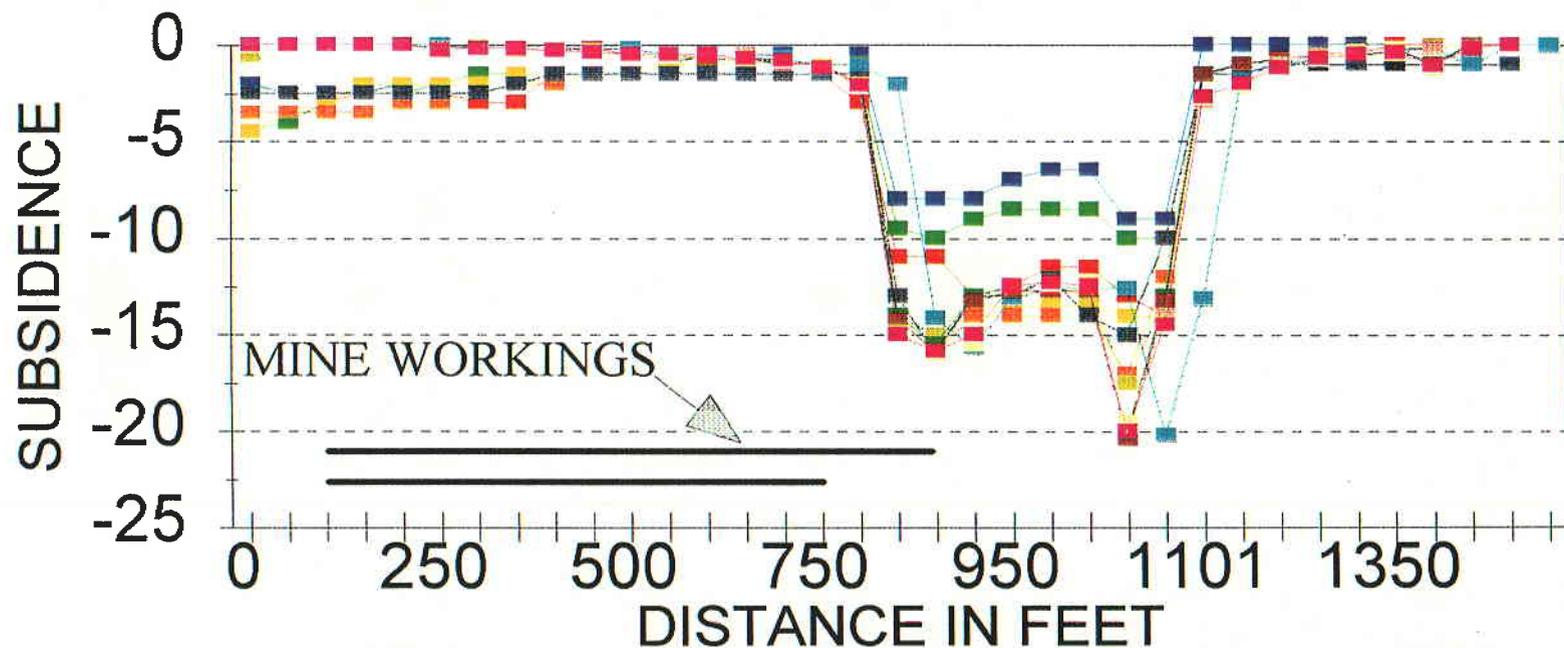
ADDED 6/4/96

FIGURE 6  
**AREA 1 SUBSIDENCE PROFILE**  
SOUTH-NORTH

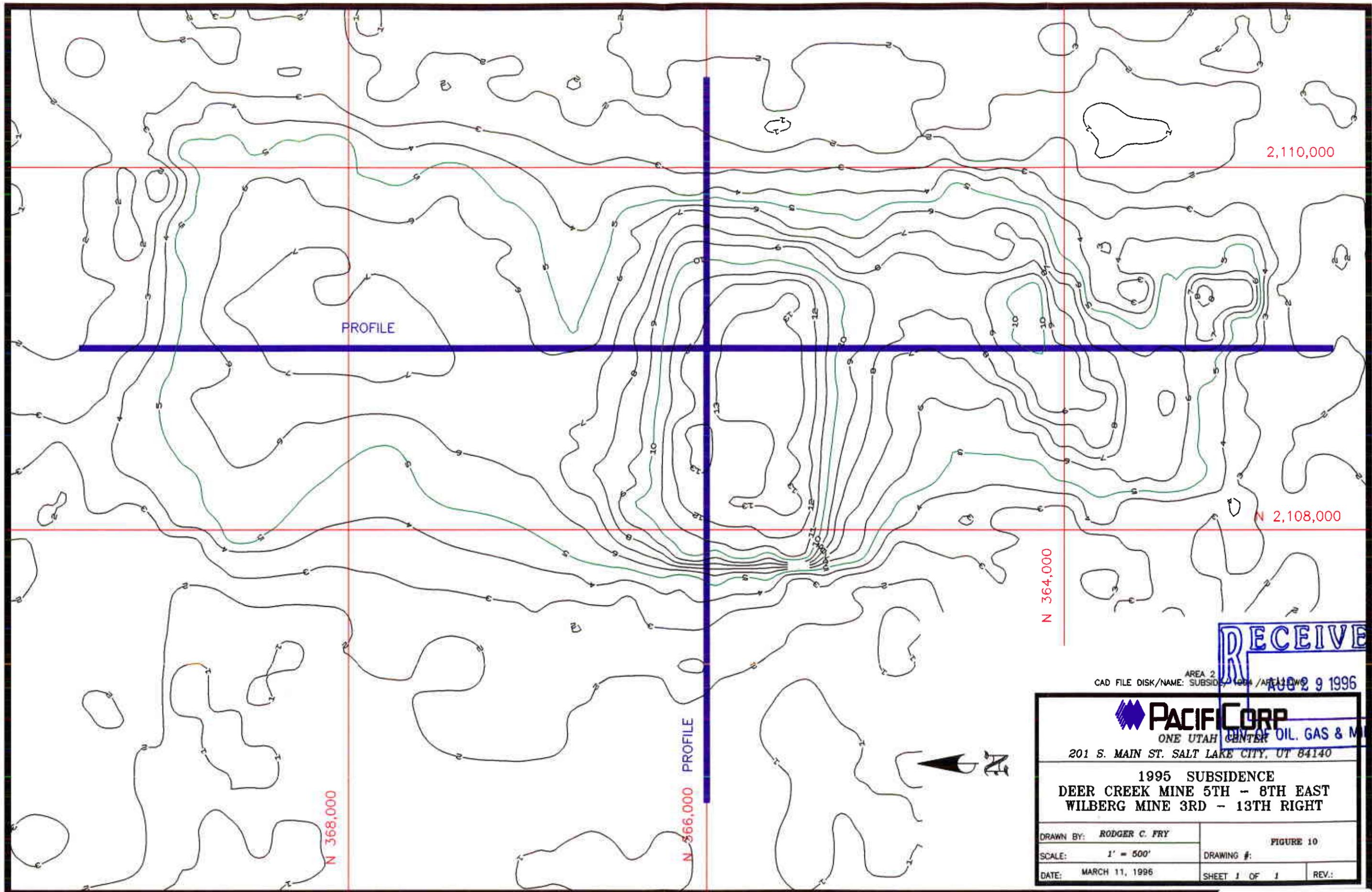


1982	1983	1984	1985	1986
1987	1988	1989	1991	1992
1993	1994	1995		

FIGURE 7  
**AREA 1 SUBSIDENCE PROFILE**  
 WEST-EAST



■ 1982	■ 1983	■ 1984	■ 1985	■ 1986
■ 1987	■ 1988	■ 1989	■ 1991	■ 1992
■ 1993	■ 1994	■ 1995		



RECEIVED  
AUG 29 1996

AREA 2  
CAD FILE DISK/NAME: SUBSID/1004/AREA1.DWG

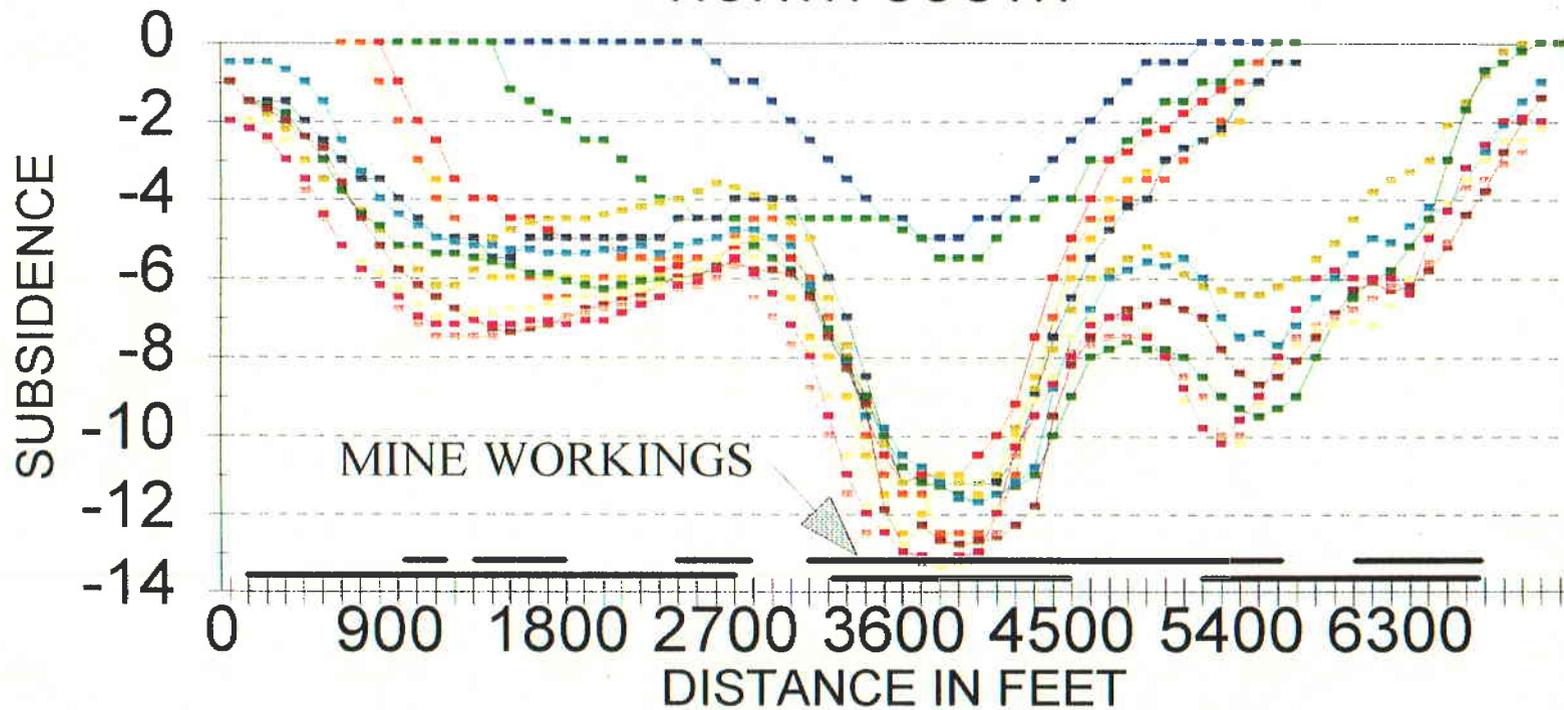
**PACIFIC CORP**  
DIV OF OIL, GAS & MINING  
ONE UTAH CENTER  
201 S. MAIN ST. SALT LAKE CITY, UT 84140

1995 SUBSIDENCE  
DEER CREEK MINE 5TH - 8TH EAST  
WILBERG MINE 3RD - 13TH RIGHT

DRAWN BY: RODGER C. FRY	FIGURE 10
SCALE: 1" = 500'	DRAWING #:
DATE: MARCH 11, 1996	SHEET 1 OF 1 REV.:

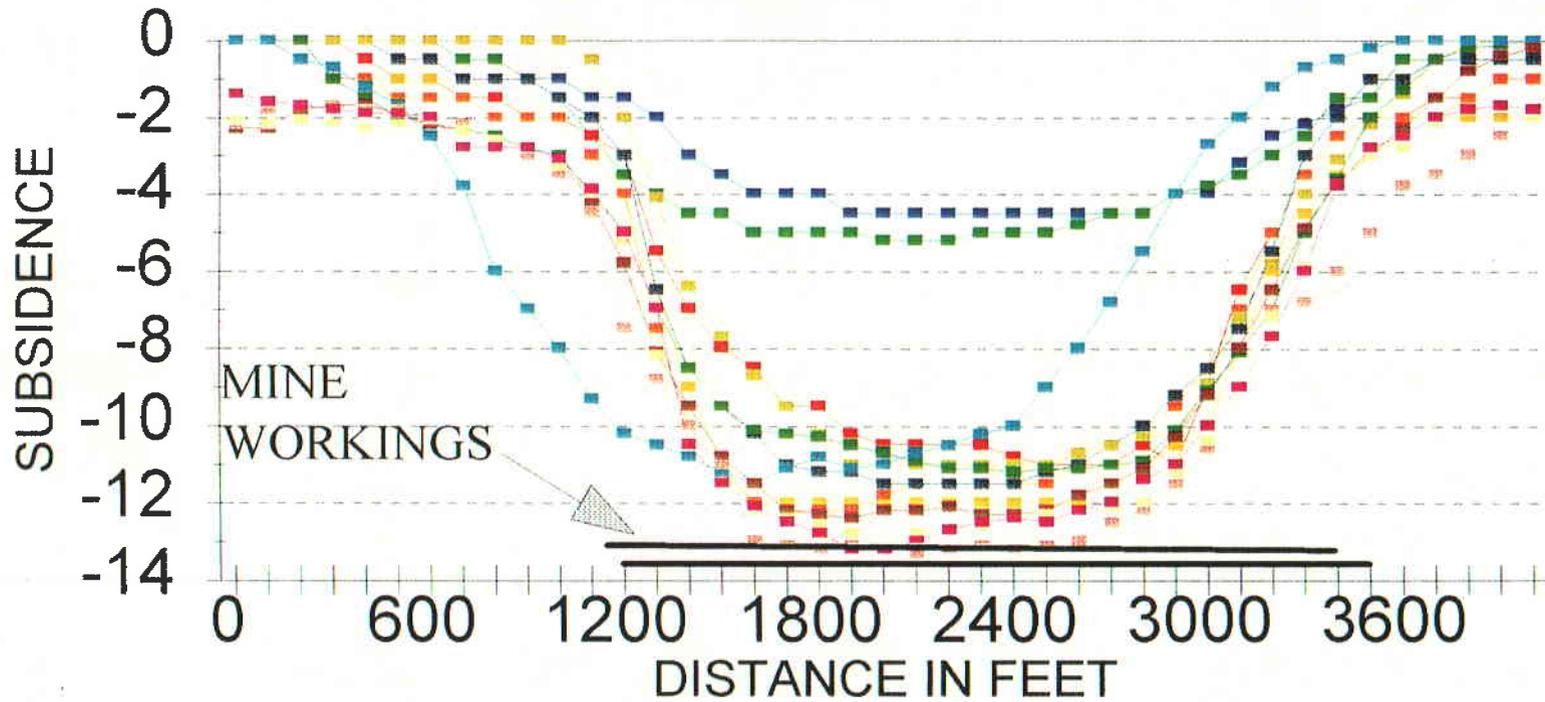
ADDED 6/4/96

FIGURE 11  
**AREA 2 SUBSIDENCE PROFILE**  
 NORTH-SOUTH

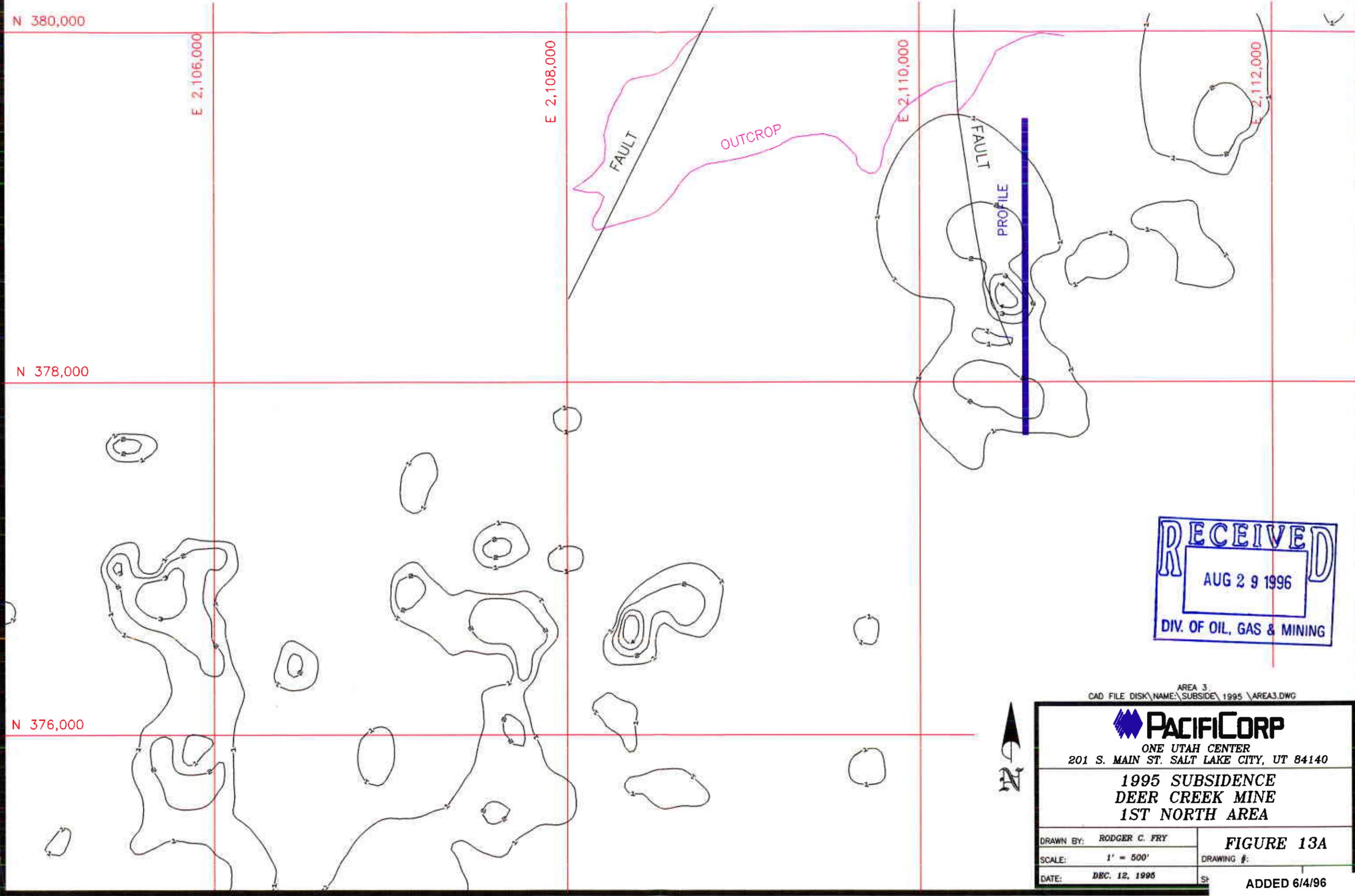


1982	1983	1984	1985	1986
1987	1988	1989	1991	1992
1993	1994	1995		

FIGURE 12  
**AREA 2 SUBSIDENCE PROFILE**  
 WEST-EAST



■ 1982	■ 1983	■ 1984	■ 1985	■ 1986
■ 1987	■ 1988	■ 1989	■ 1991	■ 1992
■ 1993	■ 1994	■ 1995		



**RECEIVED**  
 AUG 29 1996  
 DIV. OF OIL, GAS & MINING

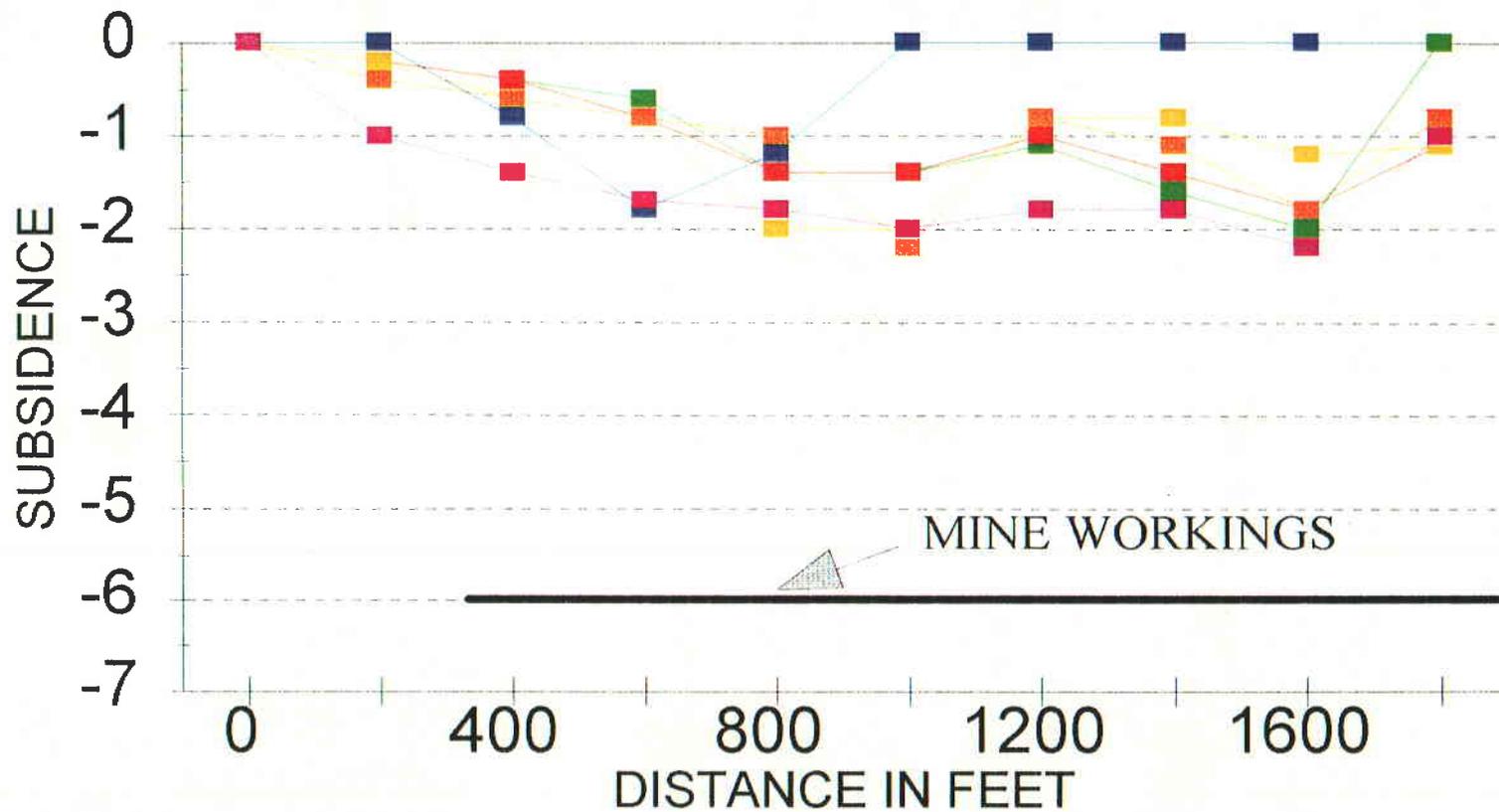
AREA 3  
 CAD FILE DISK\NAME:\SUBSIDE\1995\AREA3.DWG

 <b>PACIFICORP</b> ONE UTAH CENTER 201 S. MAIN ST. SALT LAKE CITY, UT 84140	
<b>1995 SUBSIDENCE          DEER CREEK MINE          1ST NORTH AREA</b>	
DRAWN BY: RODGER C. FRY	<b>FIGURE 13A</b>
SCALE: 1" = 500'	DRAWING #:
DATE: DEC. 12, 1995	S: <b>ADDED 6/4/96</b>



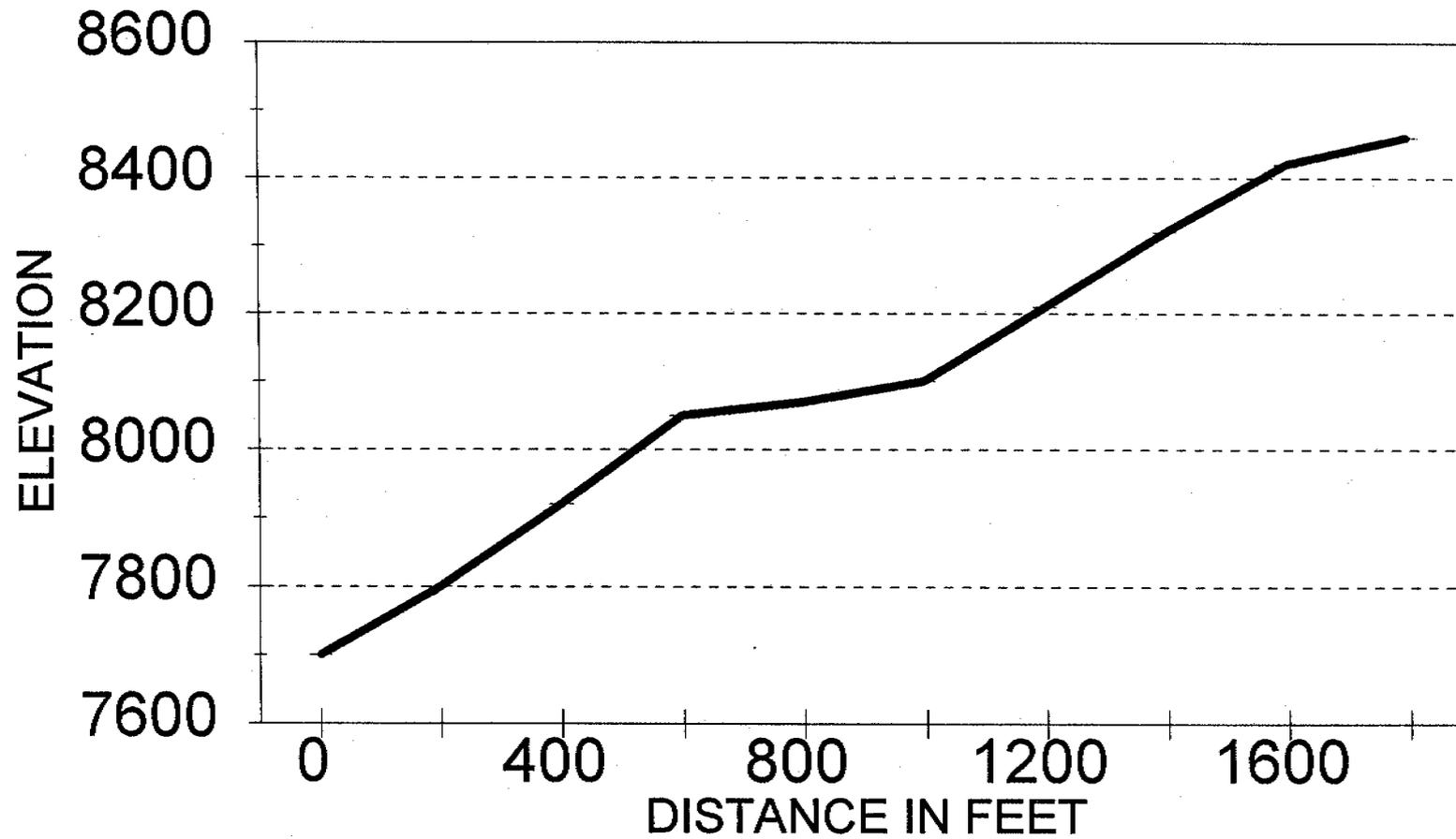
FIGURE 14

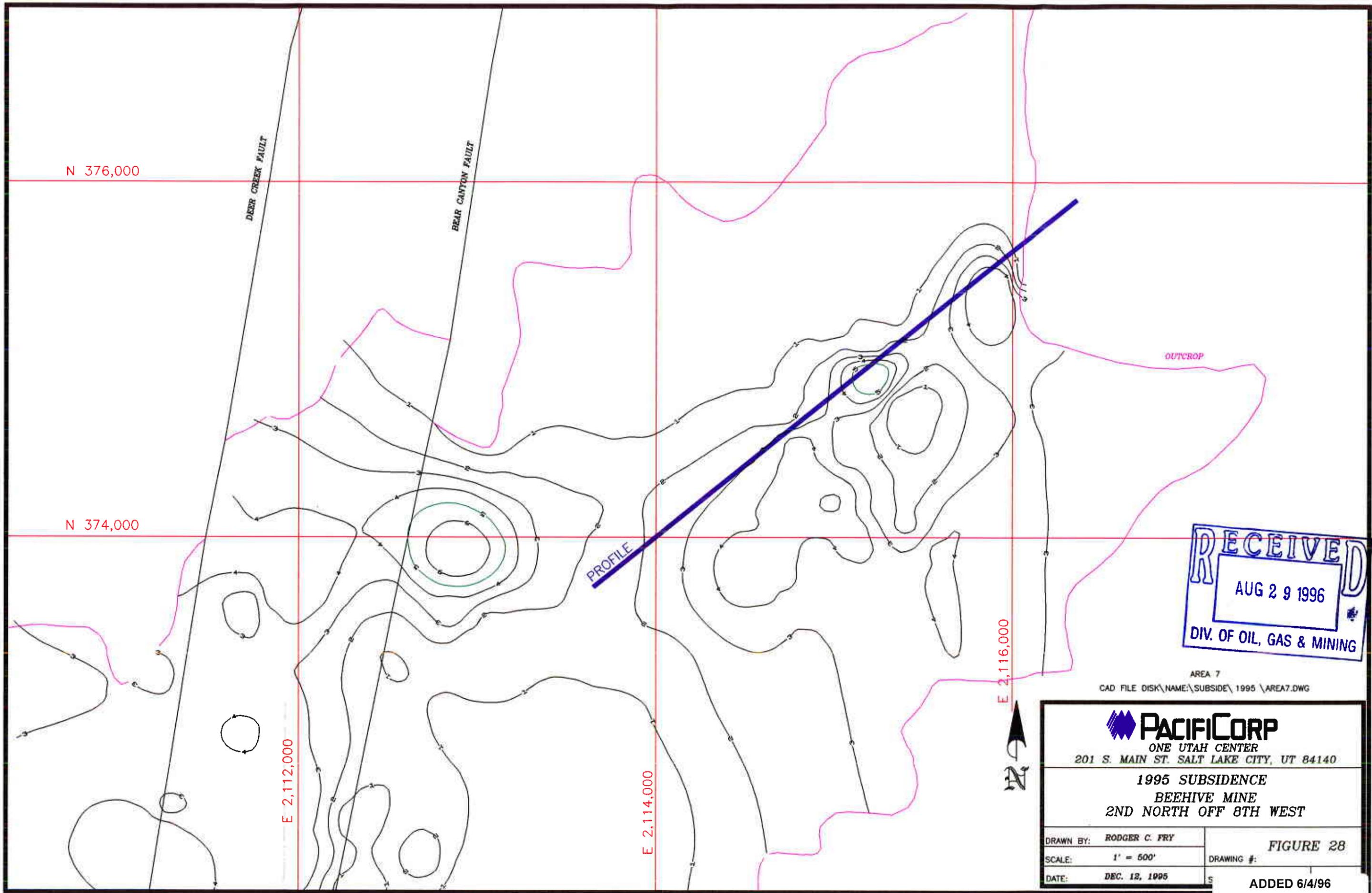
# AREA 3 SUBSIDENCE PROFILE NORTH-SOUTH



■ 1989 ■ 1991 ■ 1992 ■ 1993 ■ 1994 ■ 1995

FIGURE 14T  
**AREA 3 TOPOGRAPHIC PROFILE**  
NORTH-SOUTH





**RECEIVED**  
 AUG 29 1996  
 DIV. OF OIL, GAS & MINING

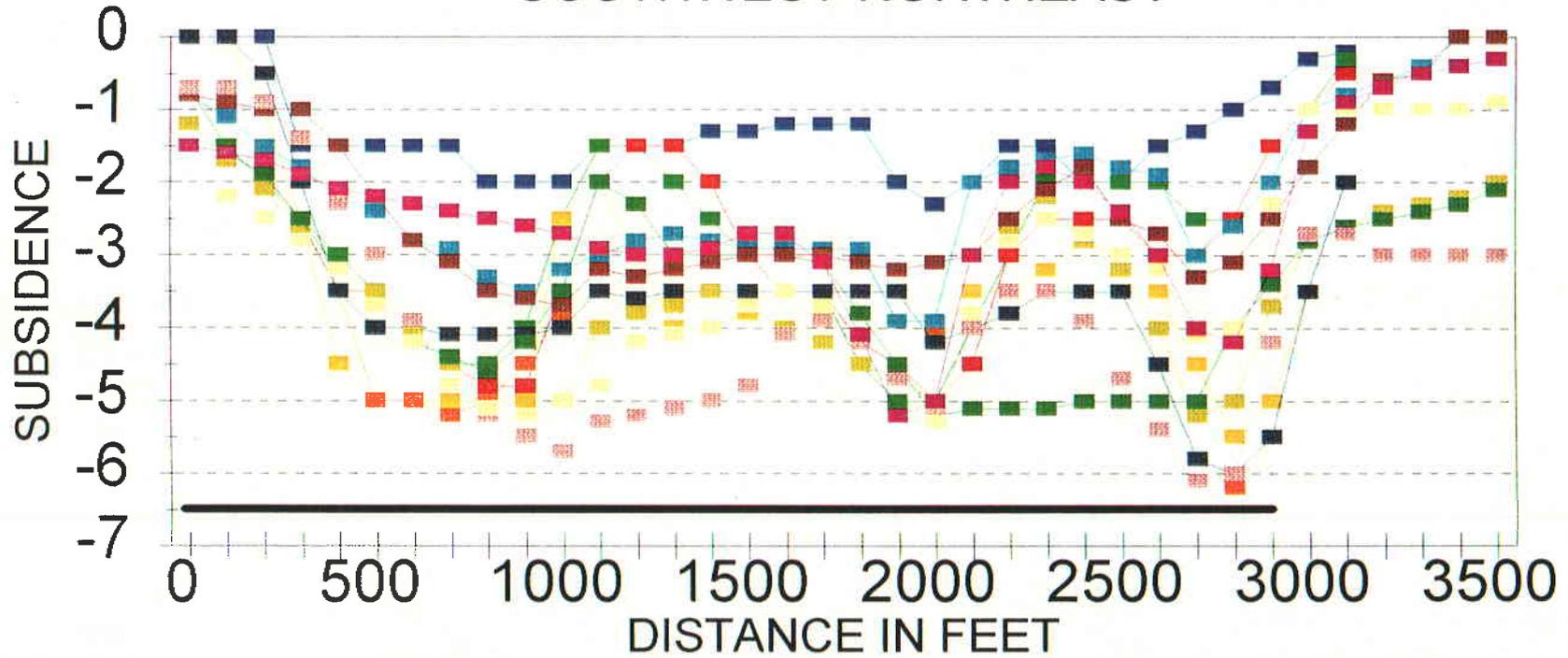
AREA 7  
 CAD FILE DISK\NAME:\SUBSIDE\1995\AREA7.DWG

 <b>PACIFICORP</b> ONE UTAH CENTER 201 S. MAIN ST. SALT LAKE CITY, UT 84140	
<b>1995 SUBSIDENCE</b> <b>BEEHIVE MINE</b> <b>2ND NORTH OFF 8TH WEST</b>	
DRAWN BY: RODGER C. FRY SCALE: 1" = 500' DATE: DEC. 12, 1995	DRAWING #: <b>FIGURE 28</b> S ADDED 6/4/96



FIGURE 29

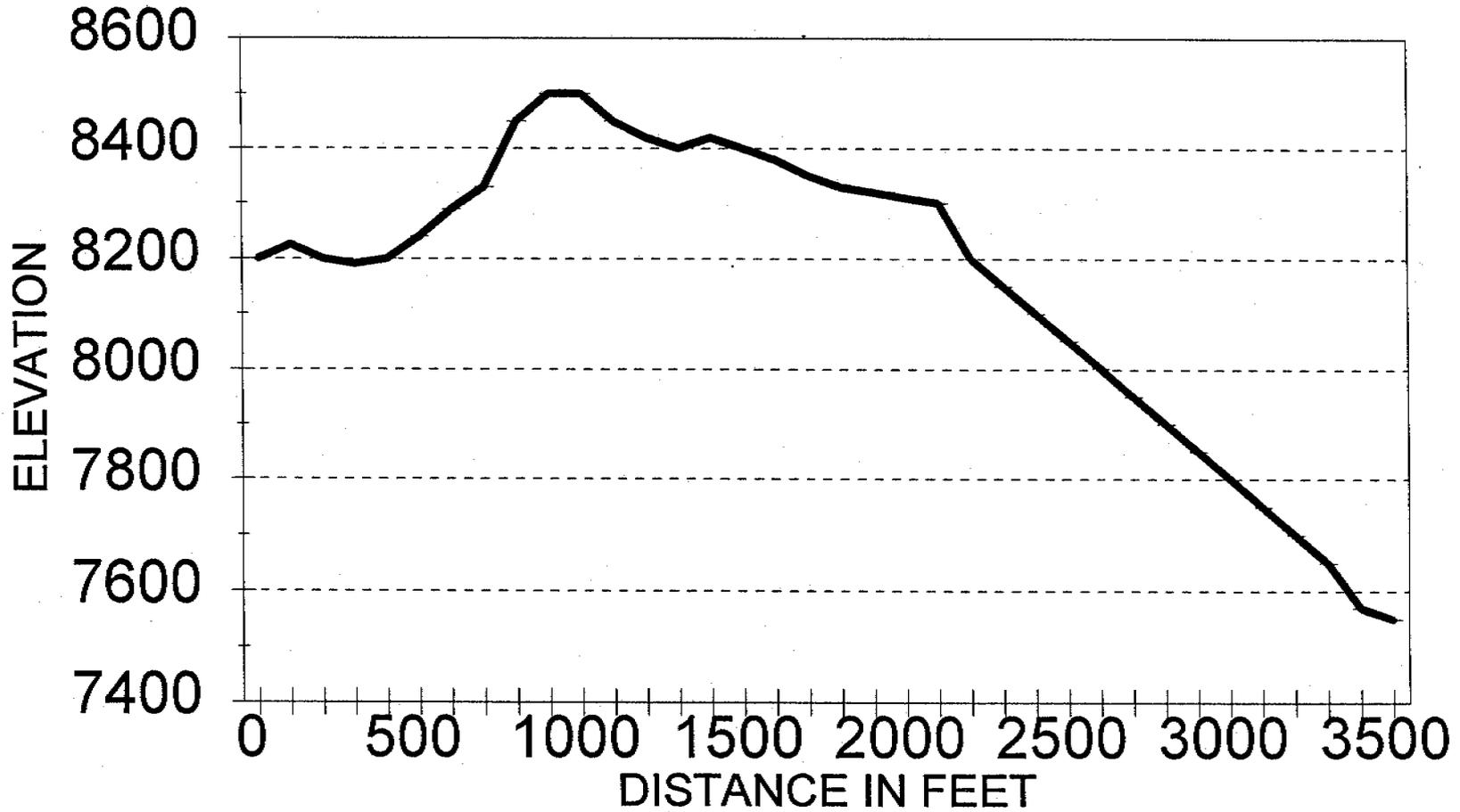
# AREA 7 SUBSIDENCE PROFILE SOUTHWEST-NORTHEAST

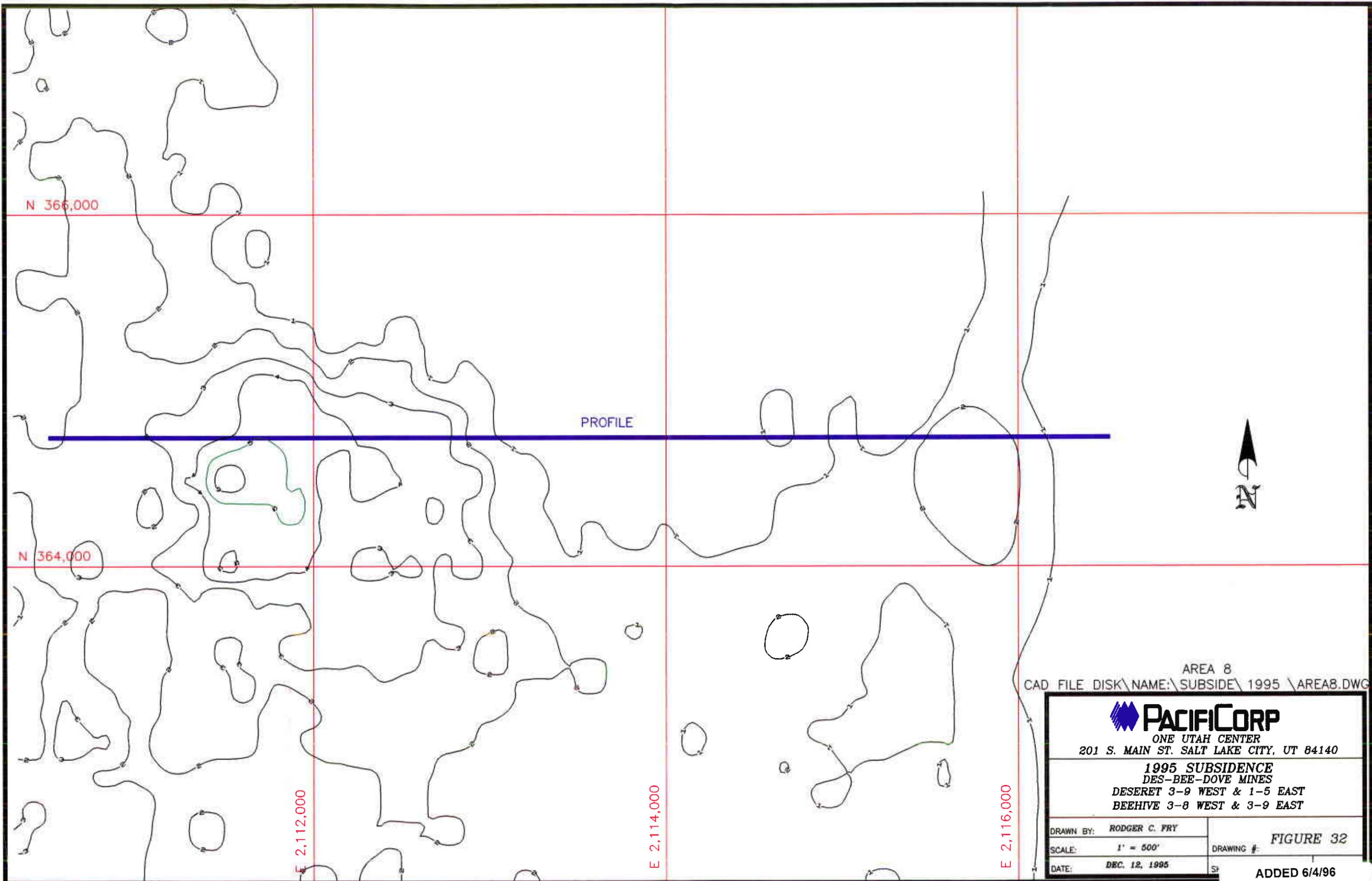


■ 1982	■ 1983	■ 1984	■ 1985	■ 1986
■ 1987	■ 1988	■ 1989	■ 1991	■ 1992
■ 1993	■ 1994	■ 1995	— WORKINGS	

FIGURE 29T

# AREA 7 TOPOGRAPHIC PROFILE SOUTHWEST-NORTHEAST





PROFILE



AREA 8  
CAD FILE DISK\NAME:\SUBSIDE\1995\AREA8.DWG



ONE UTAH CENTER  
201 S. MAIN ST. SALT LAKE CITY, UT 84140

**1995 SUBSIDENCE**  
DES-BEE-DOVE MINES  
DESERET 3-9 WEST & 1-5 EAST  
BEEHIVE 3-8 WEST & 3-9 EAST

DRAWN BY: RODGER C. FRY

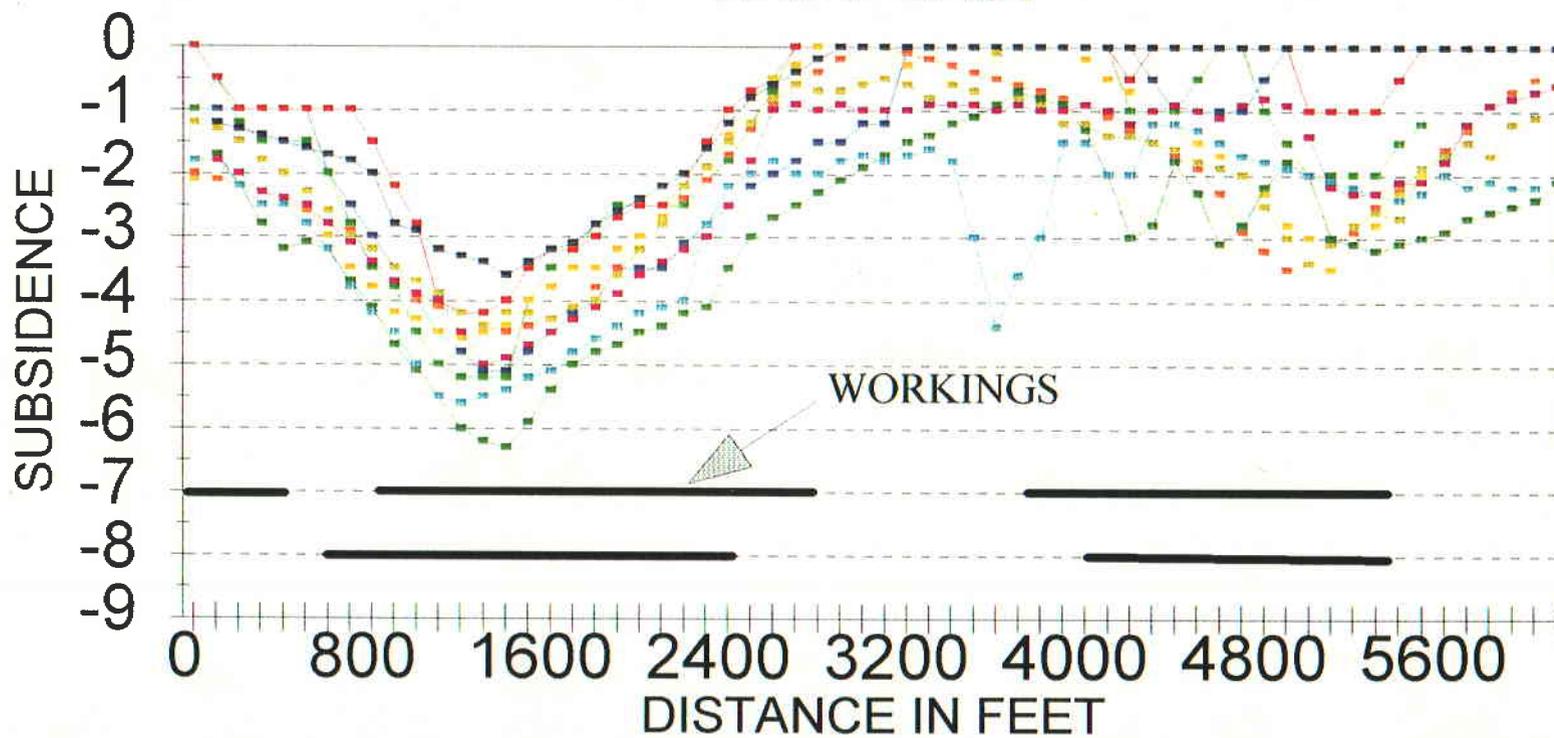
SCALE: 1" = 500'

DATE: DEC. 12, 1995

DRAWING #: **FIGURE 32**

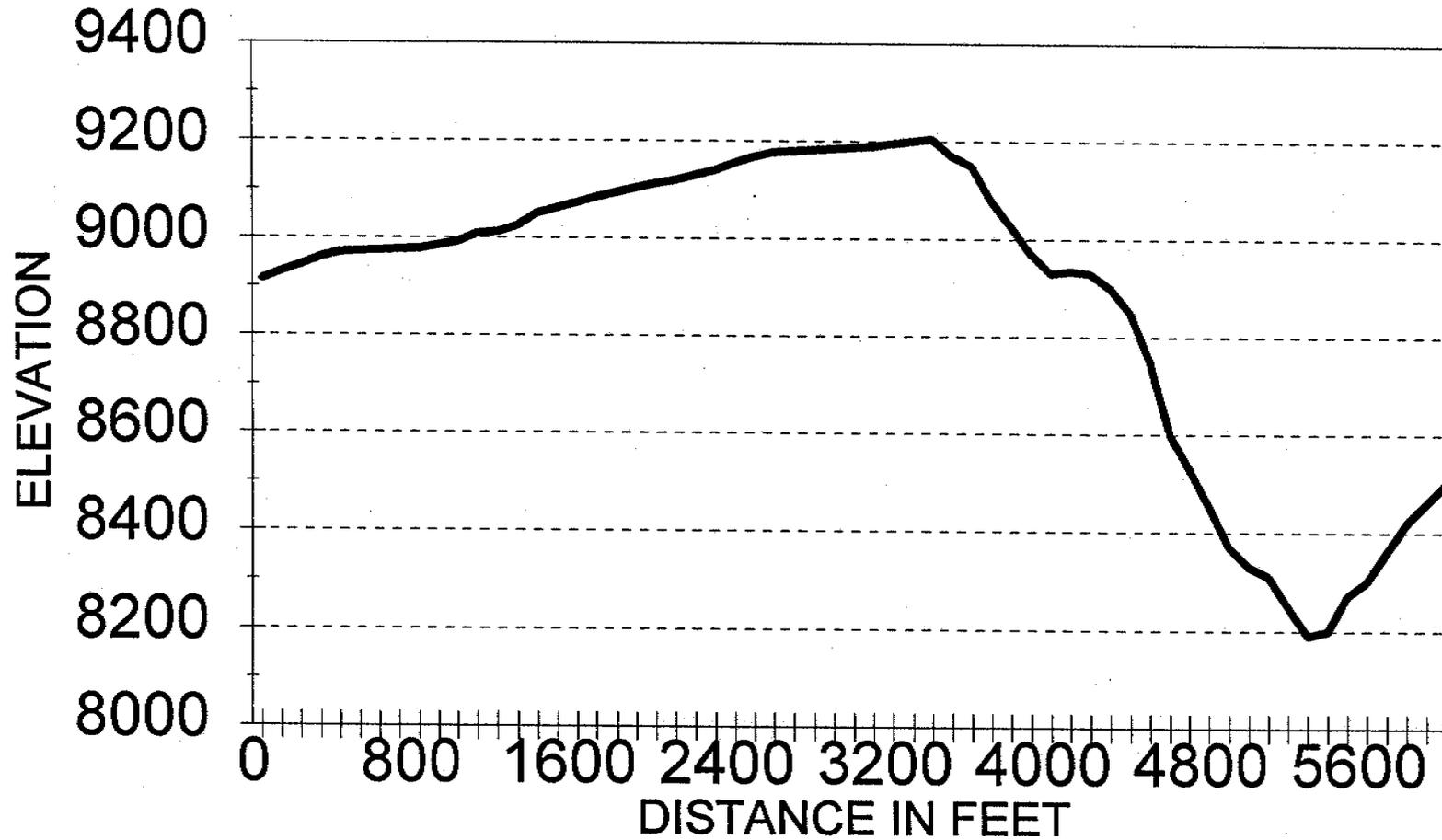
ADDED 6/4/96

FIGURE 33  
**AREA 8 SUBSIDENCE PROFILE**  
 WEST- EAST



- 1985	- 1986	- 1987	- 1988	- 1989
- 1991	- 1992	- 1993	- 1994	- 1995

FIGURE 33T  
**AREA 8 TOPOGRAPHIC PROFILE**  
WEST - EAST



N 362,000

SEE AREA 1

AREA OF COMPLEX SUBSIDENCE

PROFILE

PROFILE

N 360,000

E 2,116,000

E 2,110,000

N 358,000

E 2,112,000

E 2,114,000



92

AREA 13  
CAD FILE : \SUBSIDE\ 1995 \AREA13.DWG

**PACIFICORP**

ONE UTAH CENTER  
201 S. MAIN ST. SALT LAKE CITY, UT 84140

**1995 SUBSIDENCE  
DES-BEE-DOVE MINES  
SOUTHERN AREAS**

DRAWN BY: RODGER C. FRY

FIGURE 41

SCALE: 1" = 500'

DRAWING #:

DATE: DEC. 12, 1995

SHEET 1 OF 1

REV.:

FIGURE 42

# AREA 13 SUBSIDENCE PROFILE NORTH-SOUTH

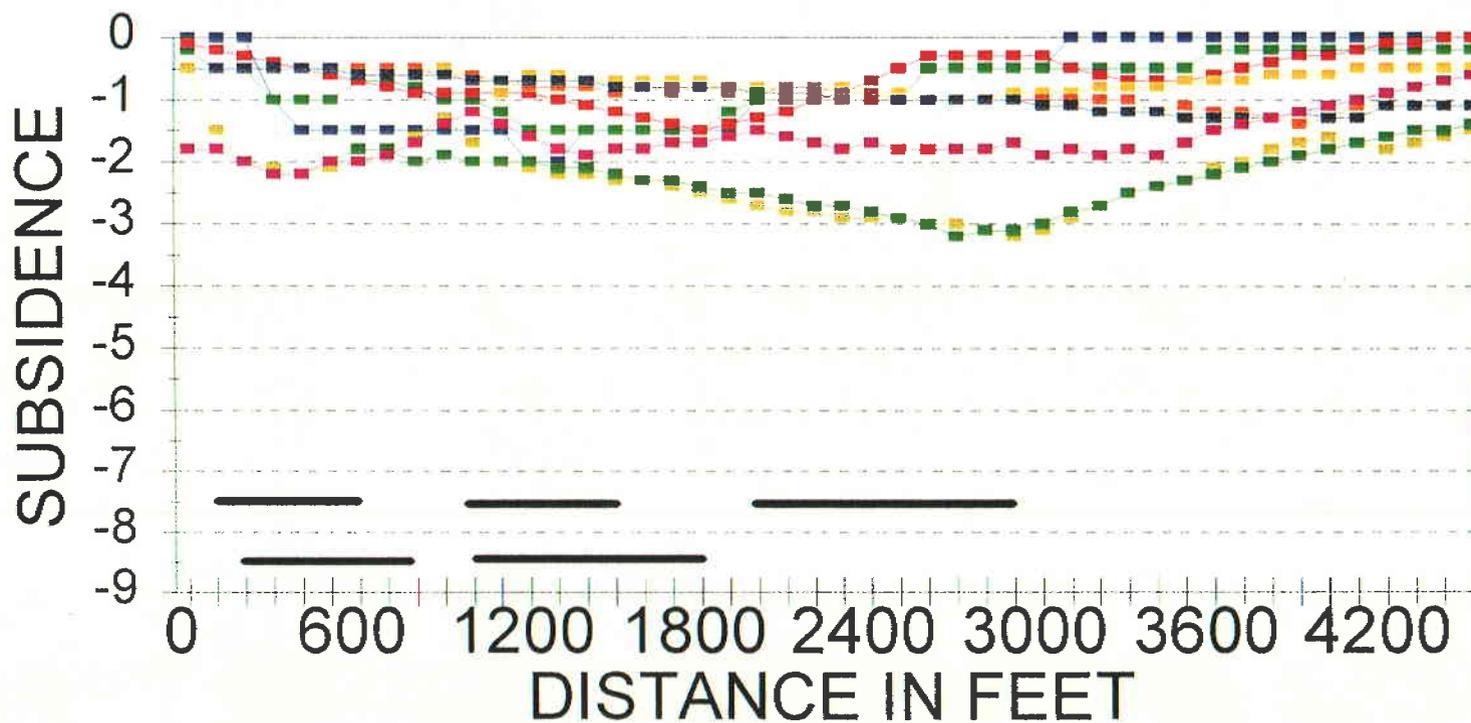


FIGURE 42T

**AREA 13 TOPOGRAPHIC PROFILE**  
NORTH-SOUTH

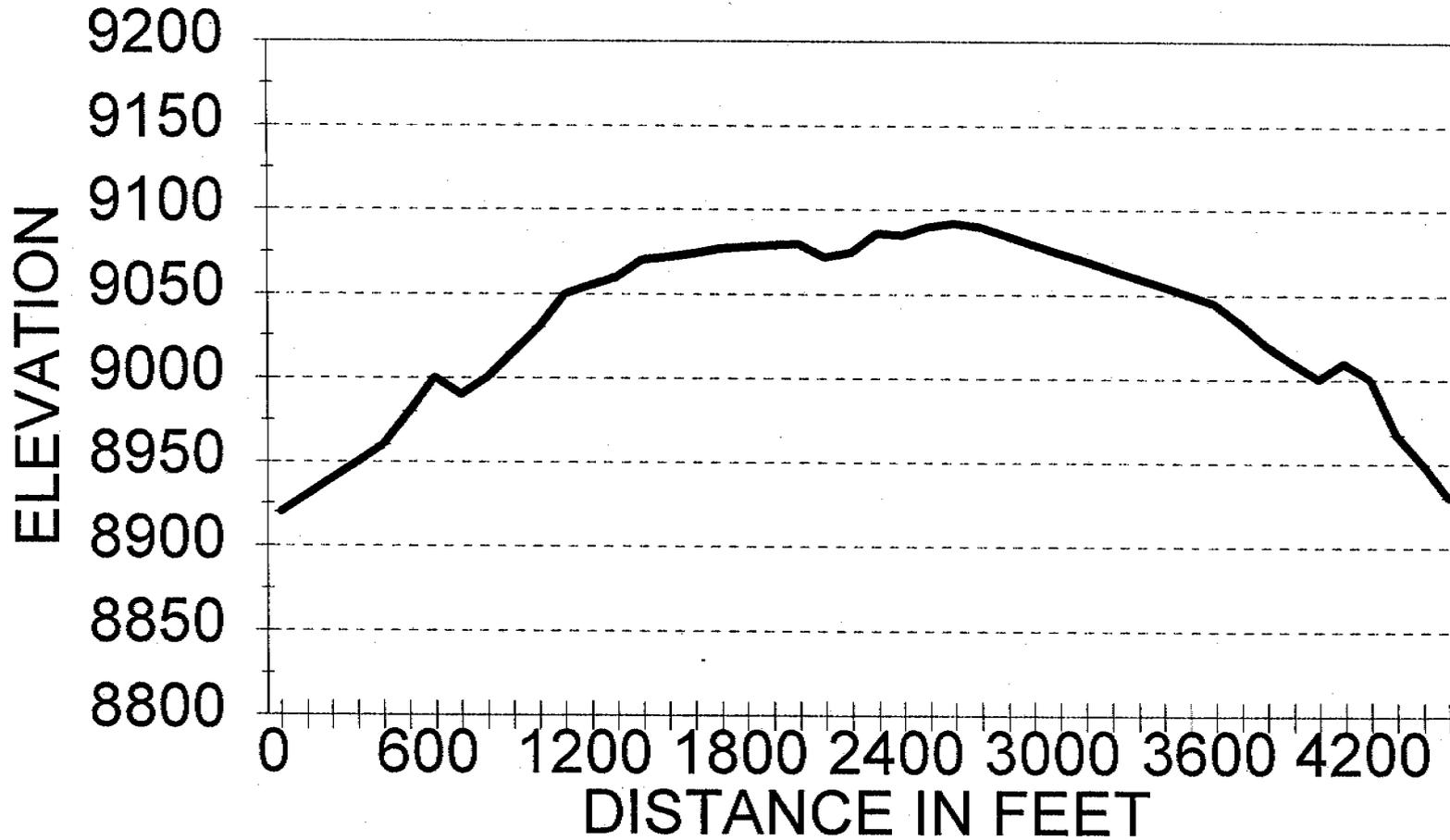
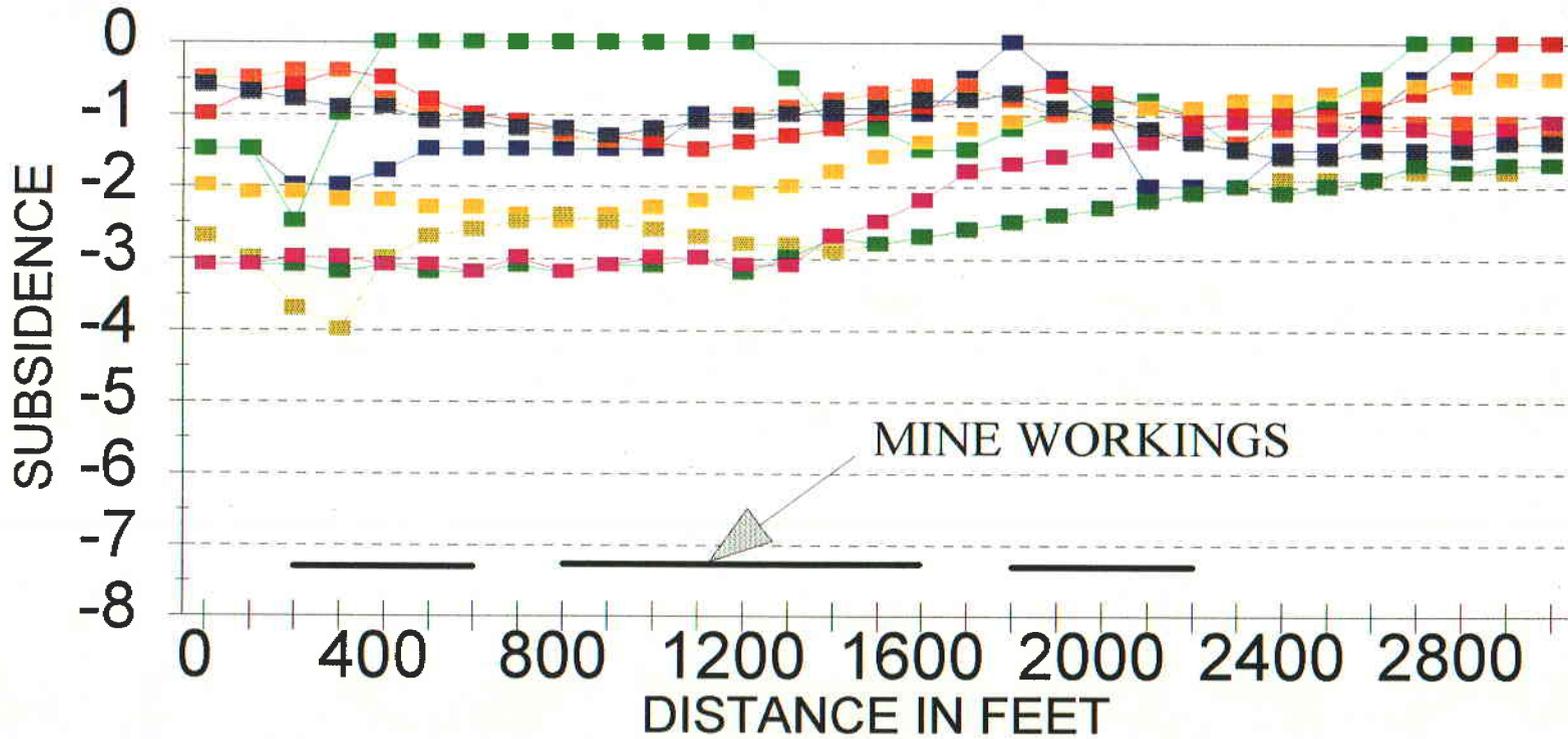
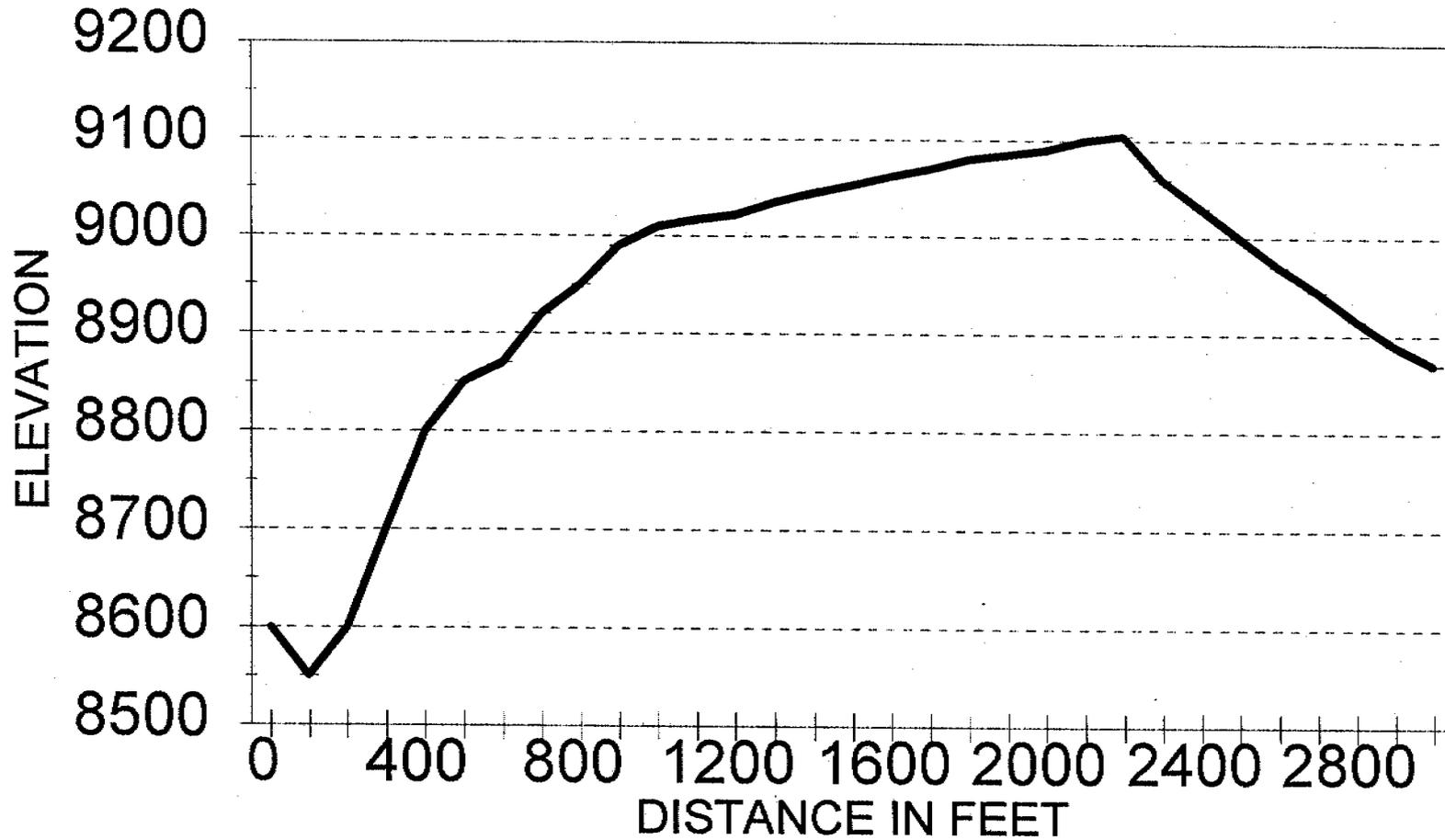


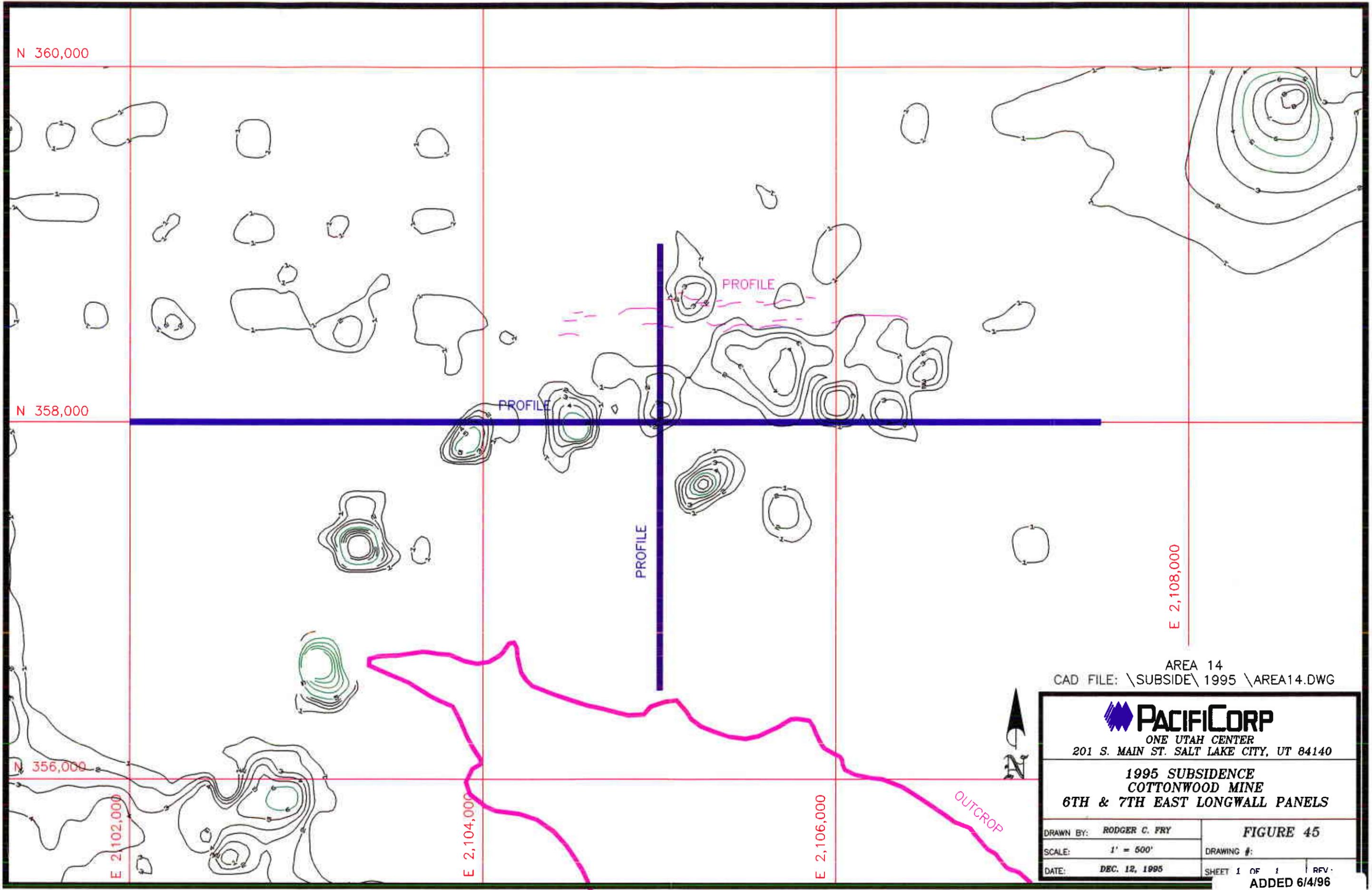
FIGURE 43  
**AREA 13 SUBSIDENCE PROFILE**  
 WEST-EAST



1986	1987	1988	1989	1991
1992	1993	1994	1995	

FIGURE 43T  
**AREA 13 TOPOGRAPHIC PROFILE**  
WEST-EAST





AREA 14  
 CAD FILE: \SUBSIDE\1995\AREA14.DWG

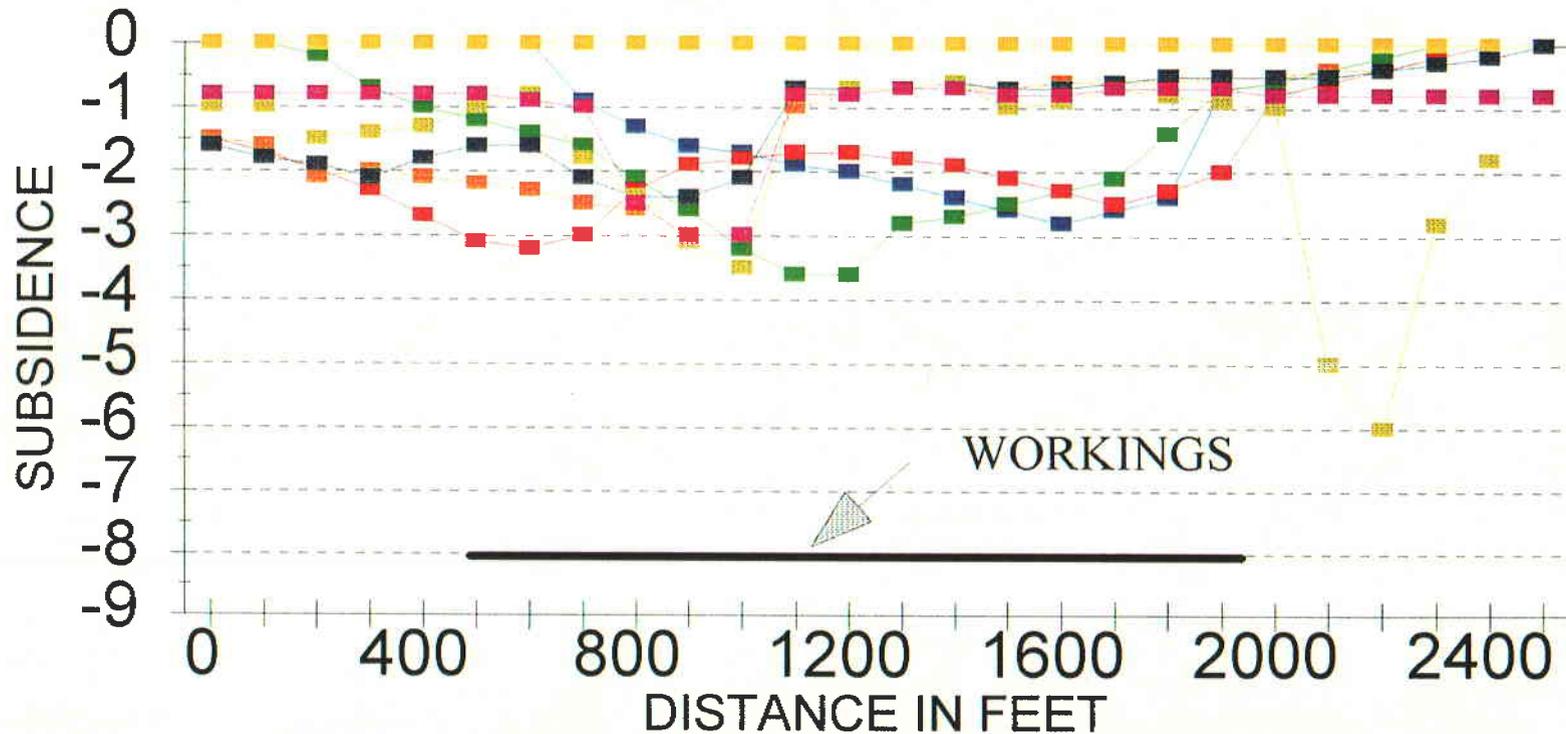
**PACIFICORP**  
 ONE UTAH CENTER  
 201 S. MAIN ST. SALT LAKE CITY, UT 84140

**1995 SUBSIDENCE  
 COTTONWOOD MINE  
 6TH & 7TH EAST LONGWALL PANELS**

DRAWN BY: RODGER C. FRY	<b>FIGURE 45</b>
SCALE: 1" = 500'	DRAWING #:
DATE: DEC. 12, 1995	SHEET 1 OF 1

RVV - ADDED 6/4/96

FIGURE 46  
**AREA 14 SUBSIDENCE PROFILE**  
 NORTH-SOUTH



■ 1987	■ 1988	■ 1989	■ 1991
■ 1992	■ 1993	■ 1994	■ 1995

FIGURE 46T  
**AREA 14 TOPOGRAPHIC PROFILE**  
NORTH-SOUTH

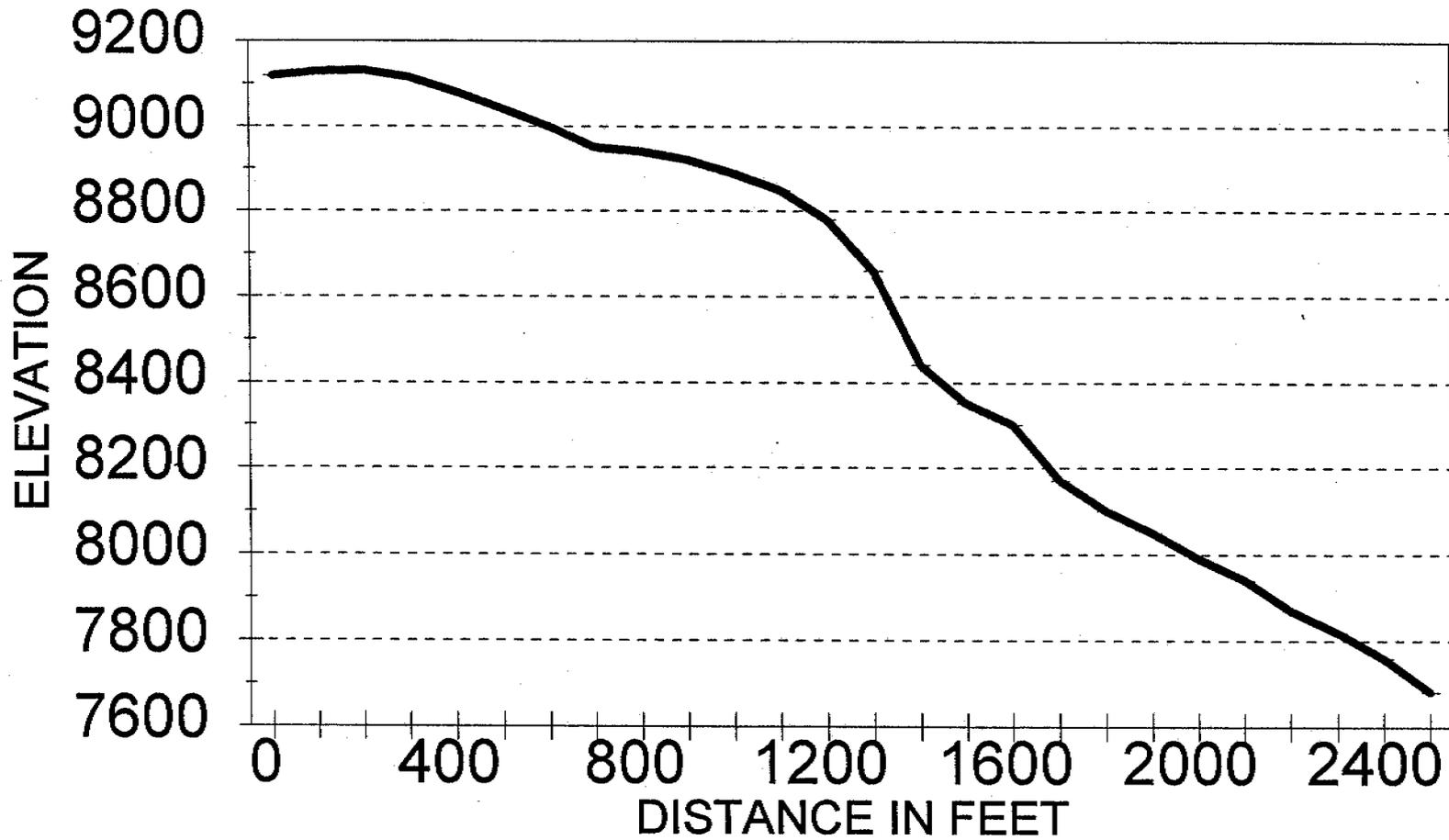
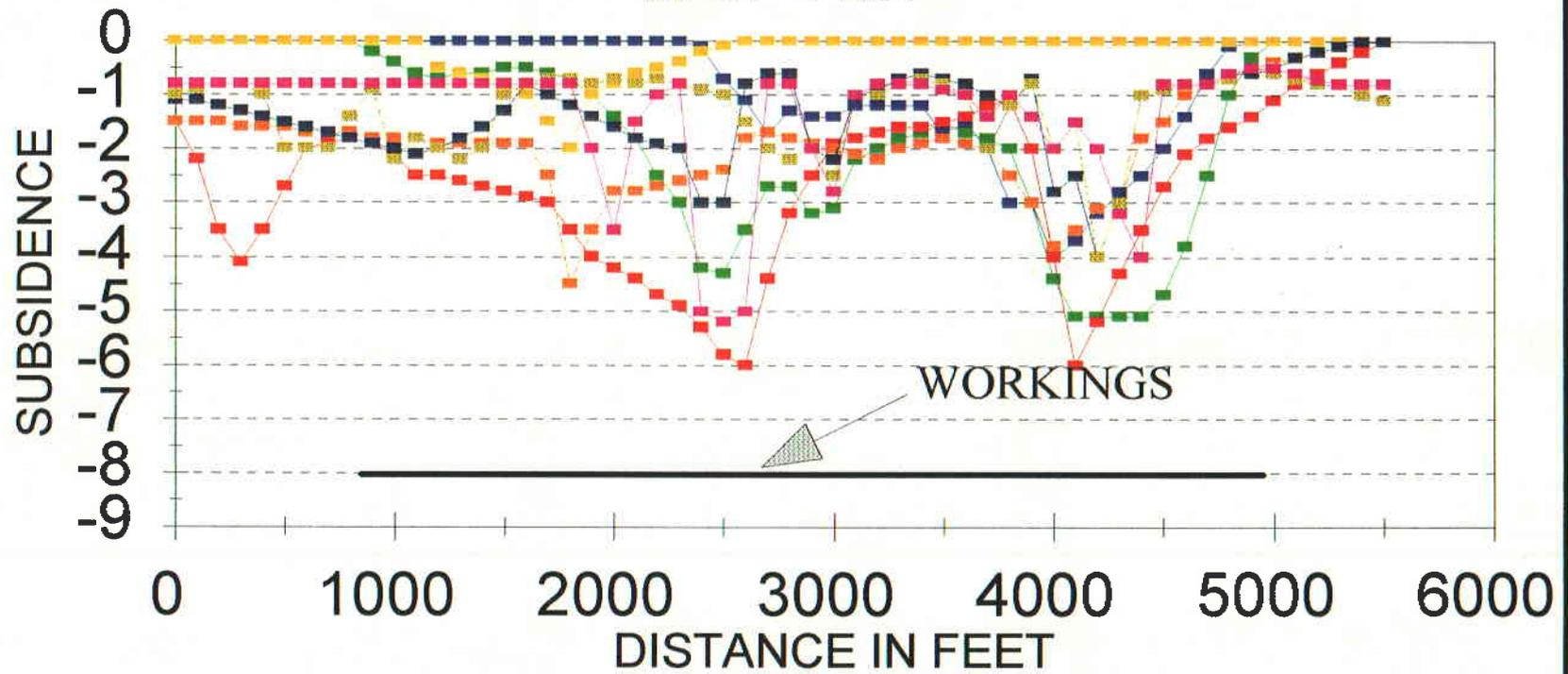


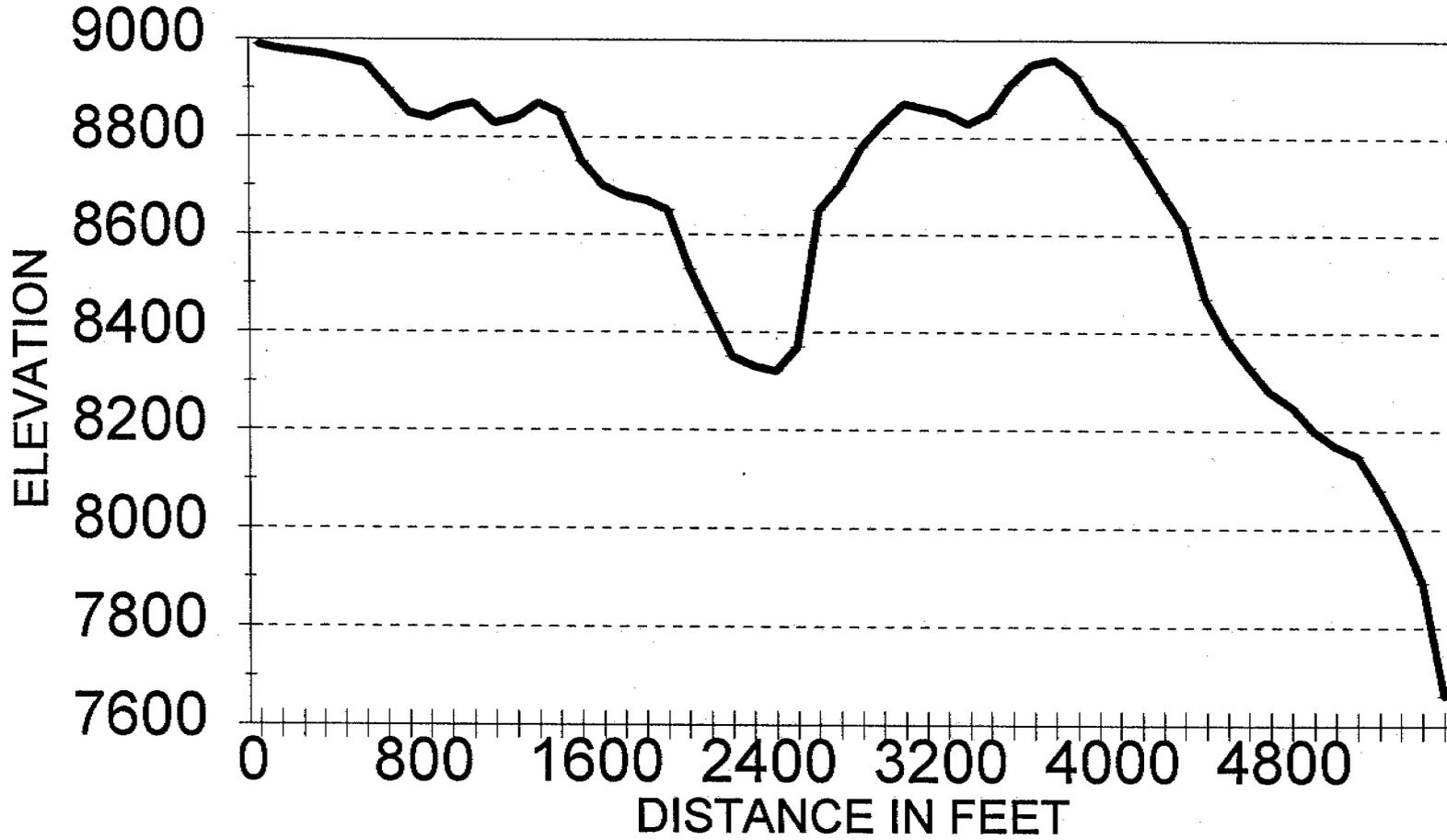
FIGURE 47  
**AREA 14 SUBSIDENCE PROFILE**  
WEST - EAST

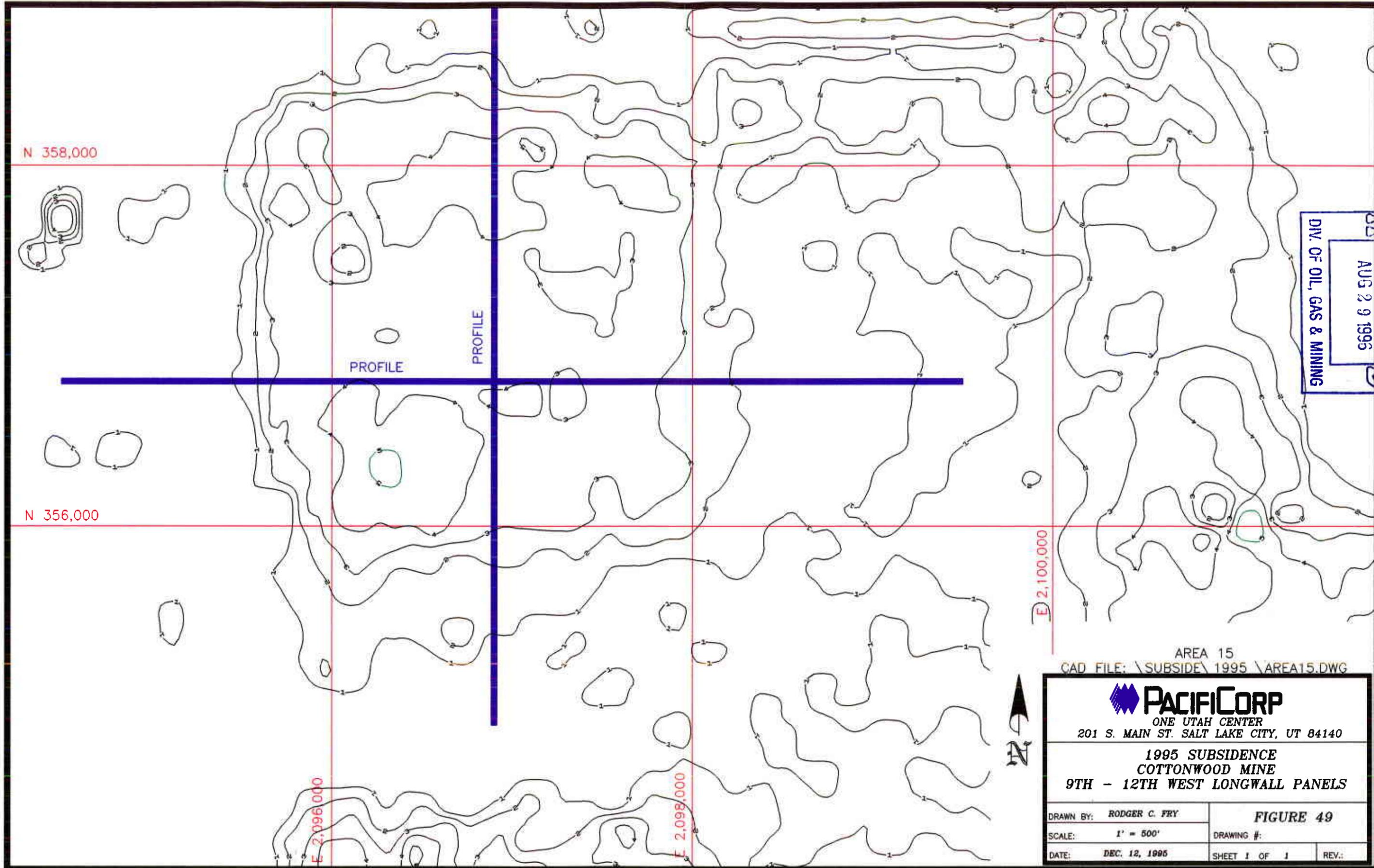


1987	1988	1989	1991
1992	1993	1994	1995

FIGURE 47T

**AREA 14 TOPOGRAPHIC PROFILE**  
WEST - EAST





**RECEIVED**  
 AUG 29 1995  
 DIV. OF OIL, GAS & MINING

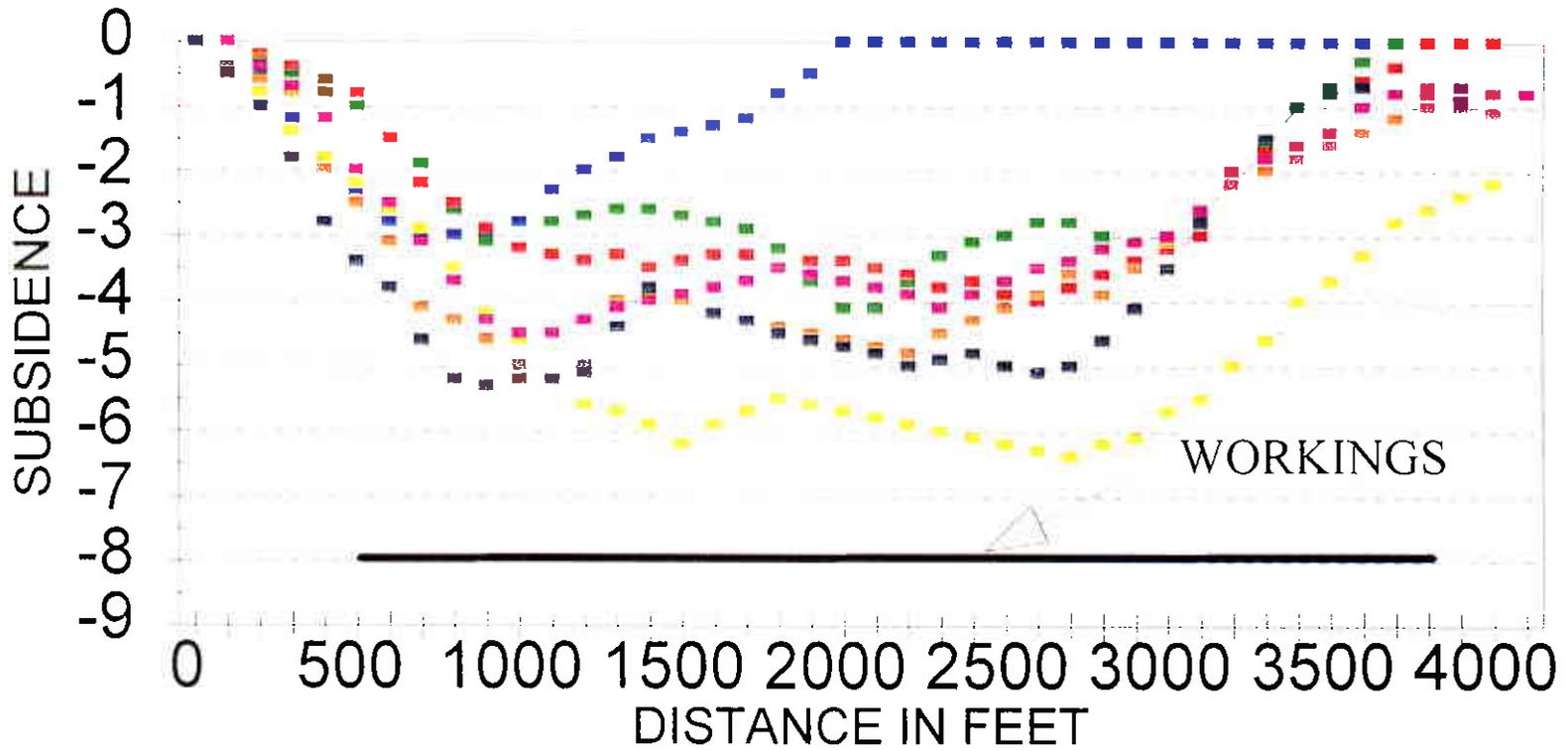
AREA 15  
 CAD FILE: \SUBSIDE\ 1995 \AREA15.DWG



 <b>PACIFICORP</b> ONE UTAH CENTER 201 S. MAIN ST. SALT LAKE CITY, UT 84140	
<b>1995 SUBSIDENCE          COTTONWOOD MINE          9TH - 12TH WEST LONGWALL PANELS</b>	
DRAWN BY: RODGER C. FRY	<b>FIGURE 49</b>
SCALE: 1" = 500'	DRAWING #:
DATE: DEC. 12, 1995	SHEET 1 OF 1    REV.:

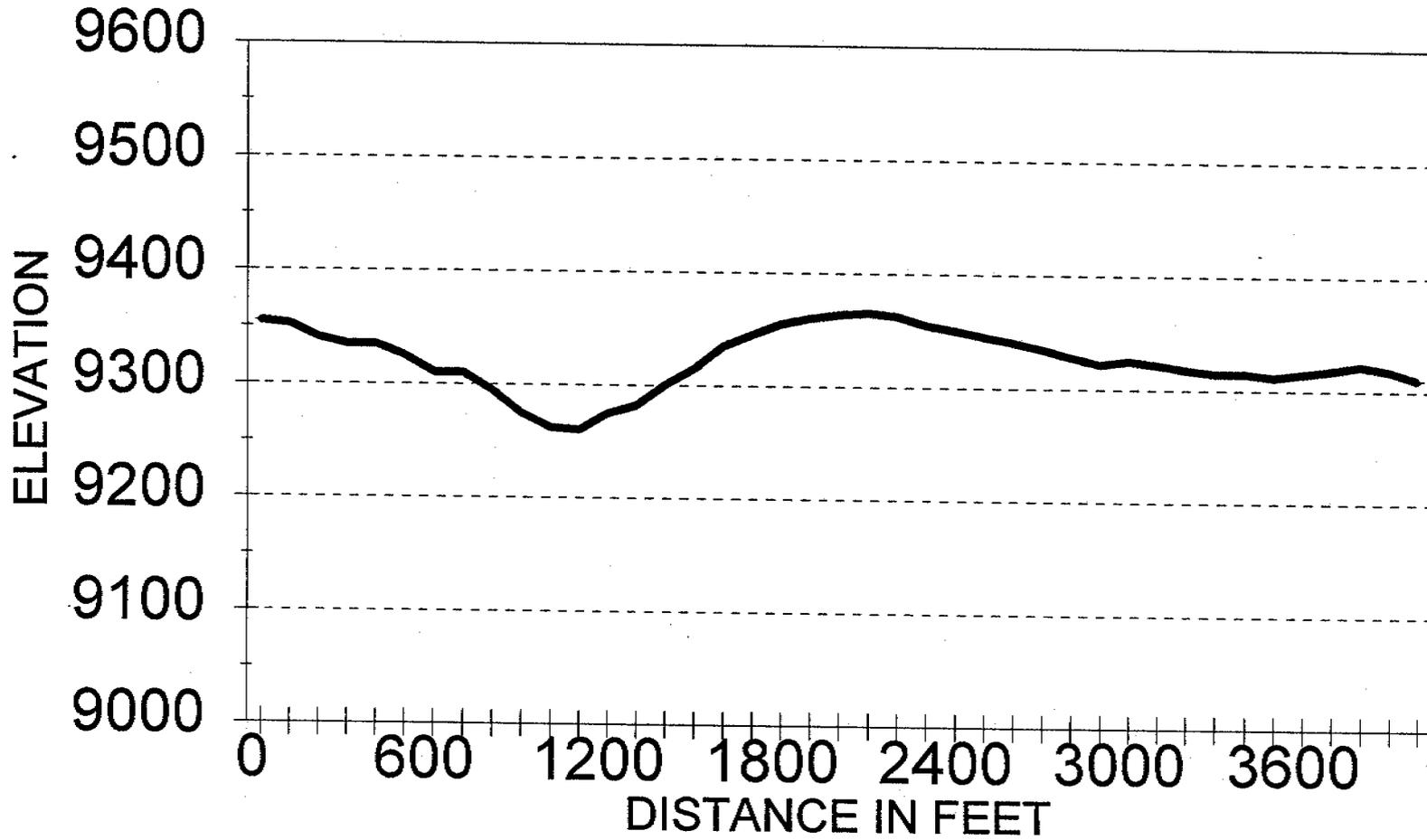
ADDED 6/4/96

FIGURE 50  
AREA 15 SUBSIDENCE PROFILE  
NORTH-SOUTH



■ 1988	■ 1989	■ 1991	■ 1992
■ 1993	■ 1994	■ 1995	

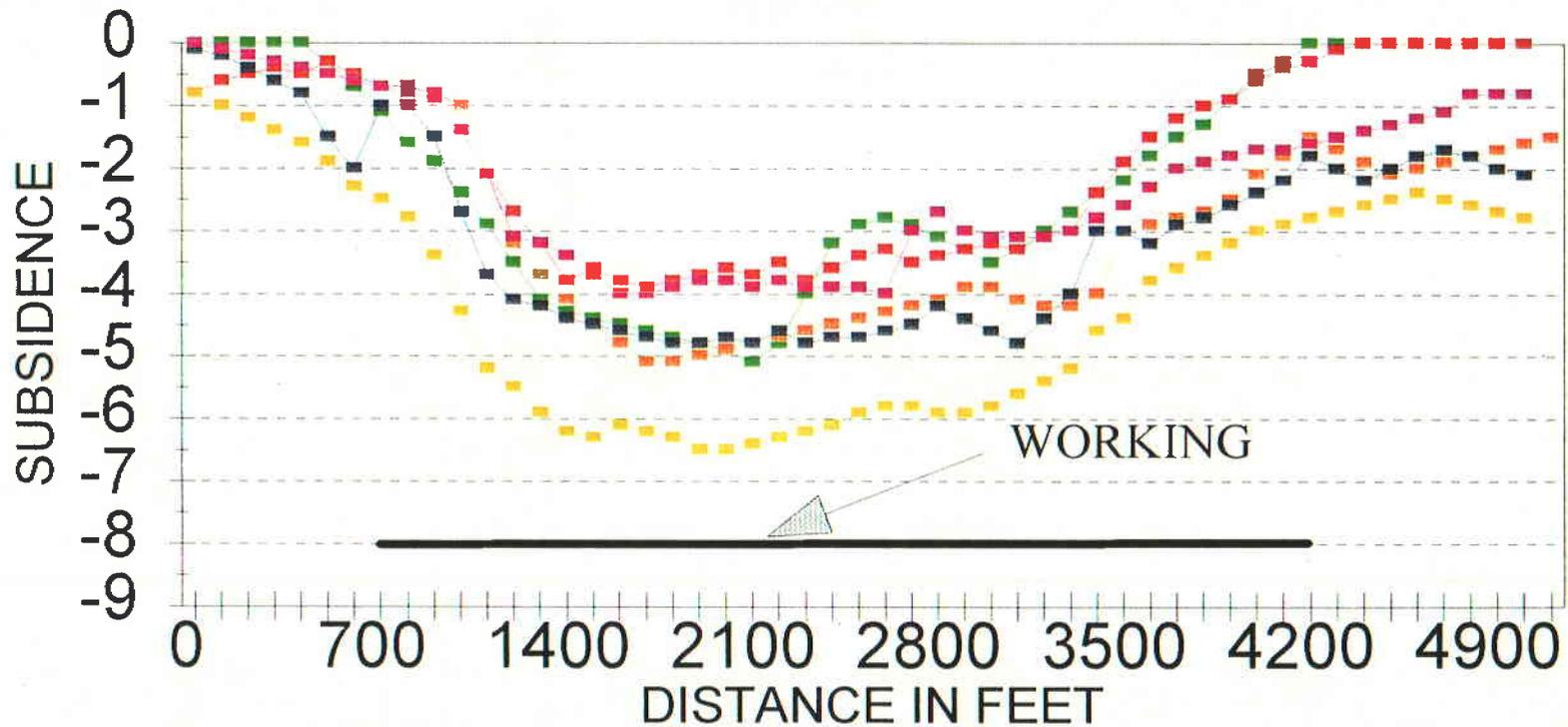
FIGURE 50T  
**AREA 15 TOPOGRAPHIC PROFILE**  
NORTH-SOUTH



ADDED 6/4/96

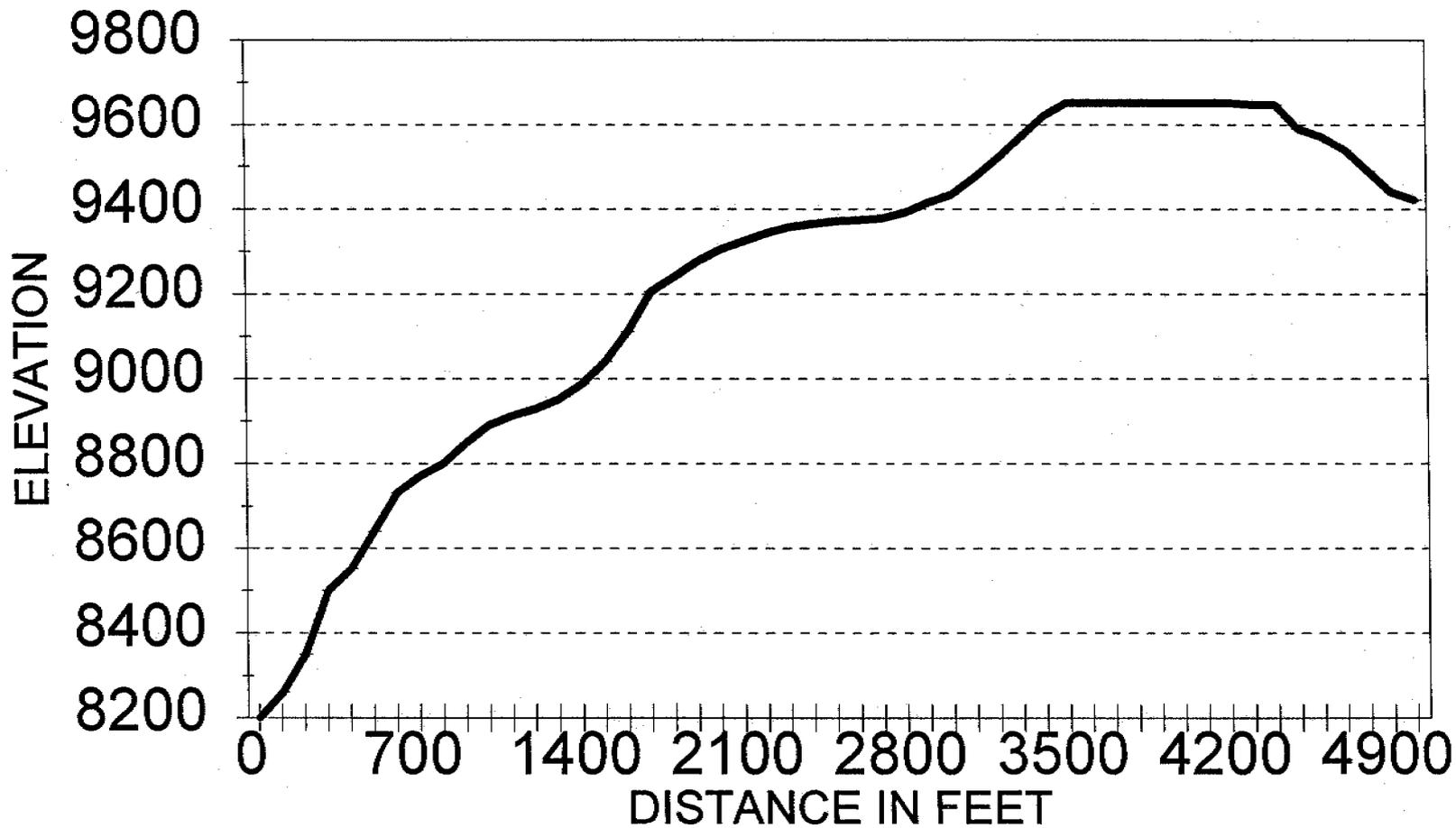
ADDED 6/4/96

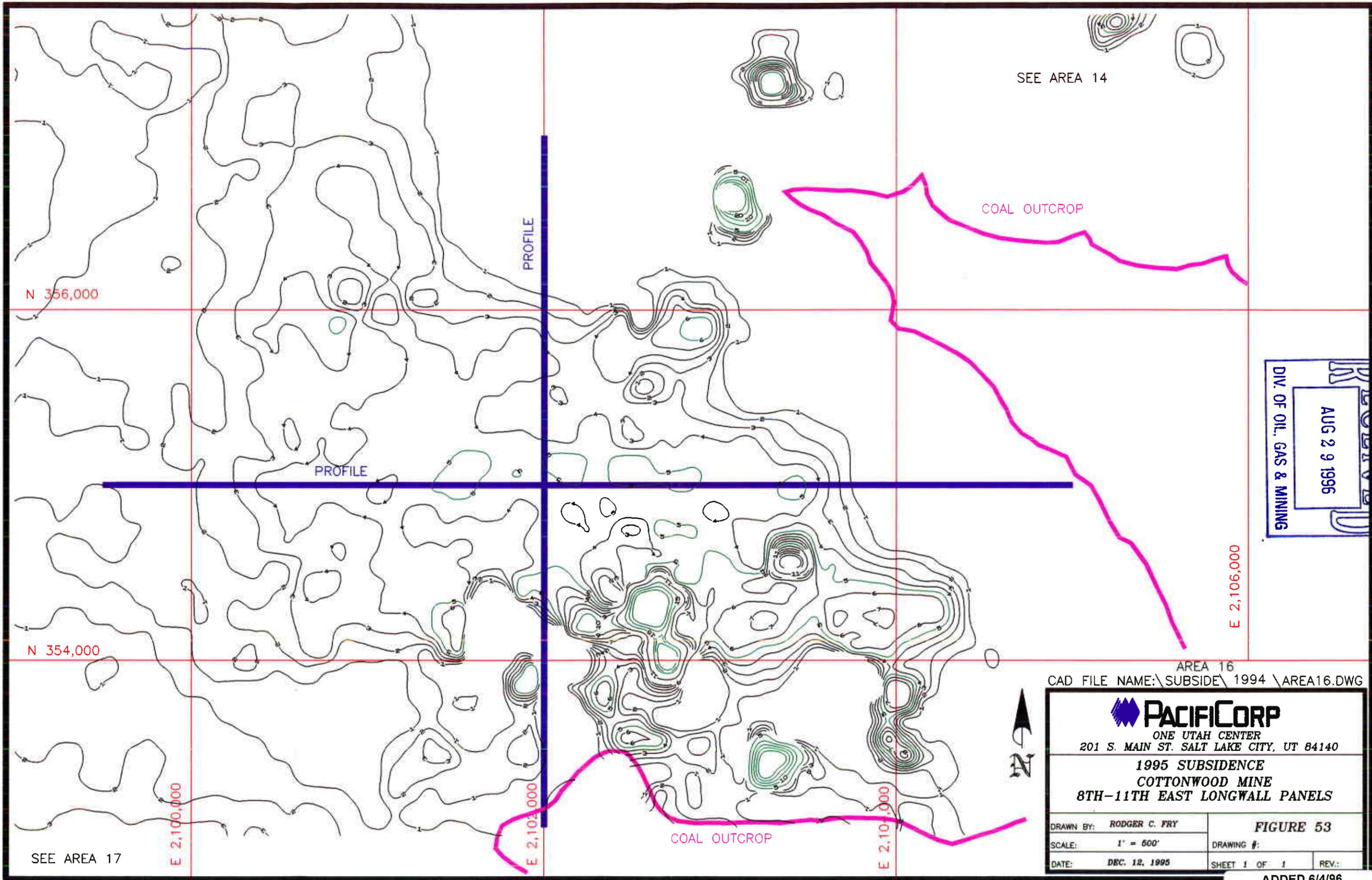
FIGURE 51  
**AREA 15 SUBSIDENCE PROFILE**  
 WEST-EAST



1988	1989	1991	1992
1993	1994	1995	

FIGURE 51T  
**AREA 15 TOPOGRAPHIC PROFILE**  
WEST-EAST





SEE AREA 14

COAL OUTCROP

PROFILE

PROFILE

N 356,000

N 354,000

E 2,100,000

E 2,102,000

E 2,104,000

E 2,106,000

COAL OUTCROP

SEE AREA 17

RECEIVED  
 AUG 29 1996  
 DIV. OF OIL, GAS & MINING

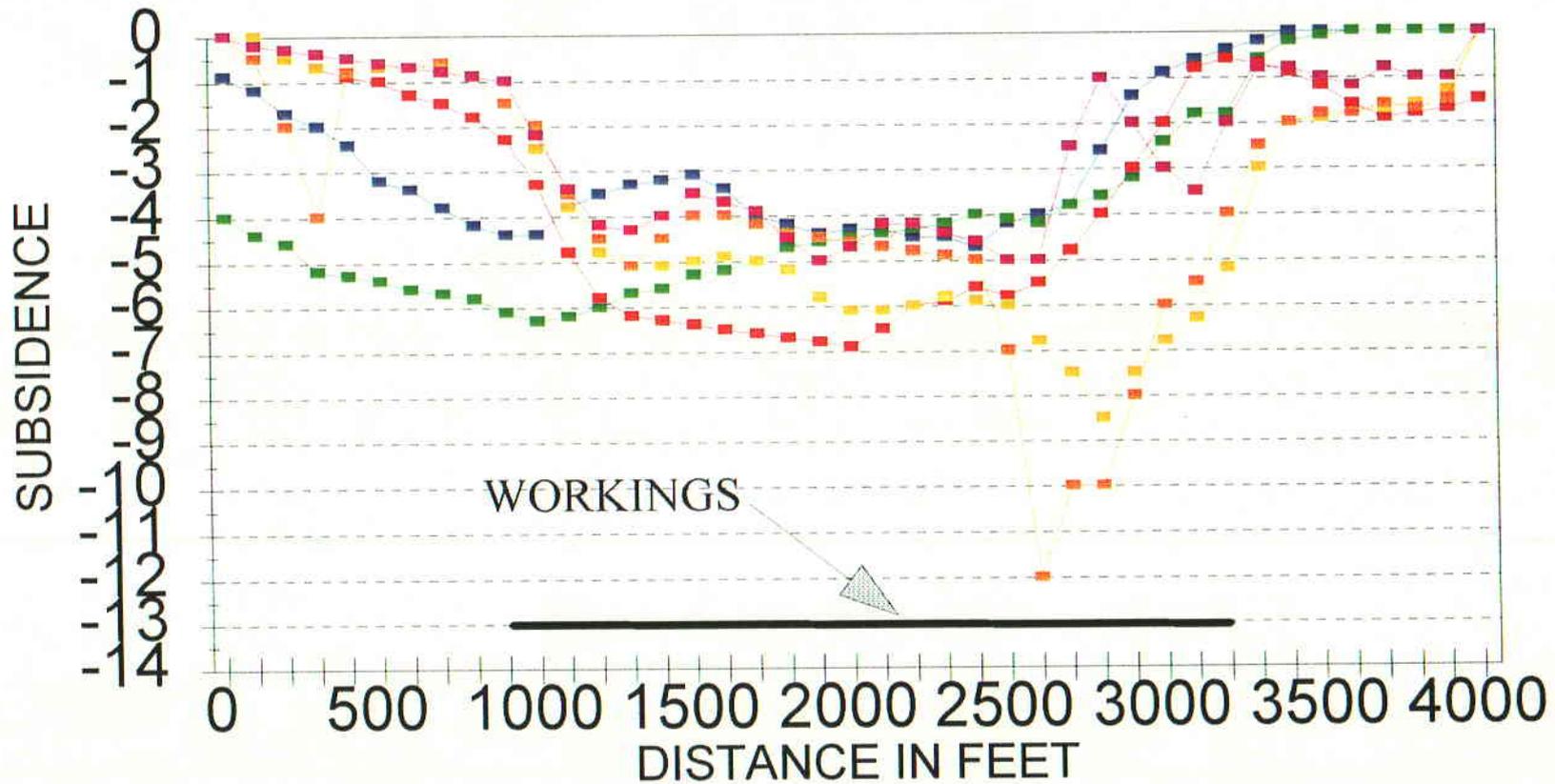
AREA 16  
 CAD FILE NAME: \SUBSIDE\ 1994 \AREA16.DWG

 ONE UTAH CENTER 201 S. MAIN ST. SALT LAKE CITY, UT 84140			
1995 SUBSIDENCE COTTONWOOD MINE 8TH-11TH EAST LONGWALL PANELS			
DRAWN BY:	RODGER C. FRY	FIGURE 53	
SCALE:	1" = 600'	DRAWING #:	
DATE:	DEC. 12, 1995	SHEET 1 OF 1	REV.:

ADDED 6/4/96

FIGURE 54

# AREA 16 SUBSIDENCE PROFILE NORTH-SOUTH



■ 1990 ■ 1991 ■ 1992 ■ 1993 ■ 1994 ■ 1995

FIGURE 54T

# AREA 16 TOPOGRAPHIC PROFILE NORTH-SOUTH

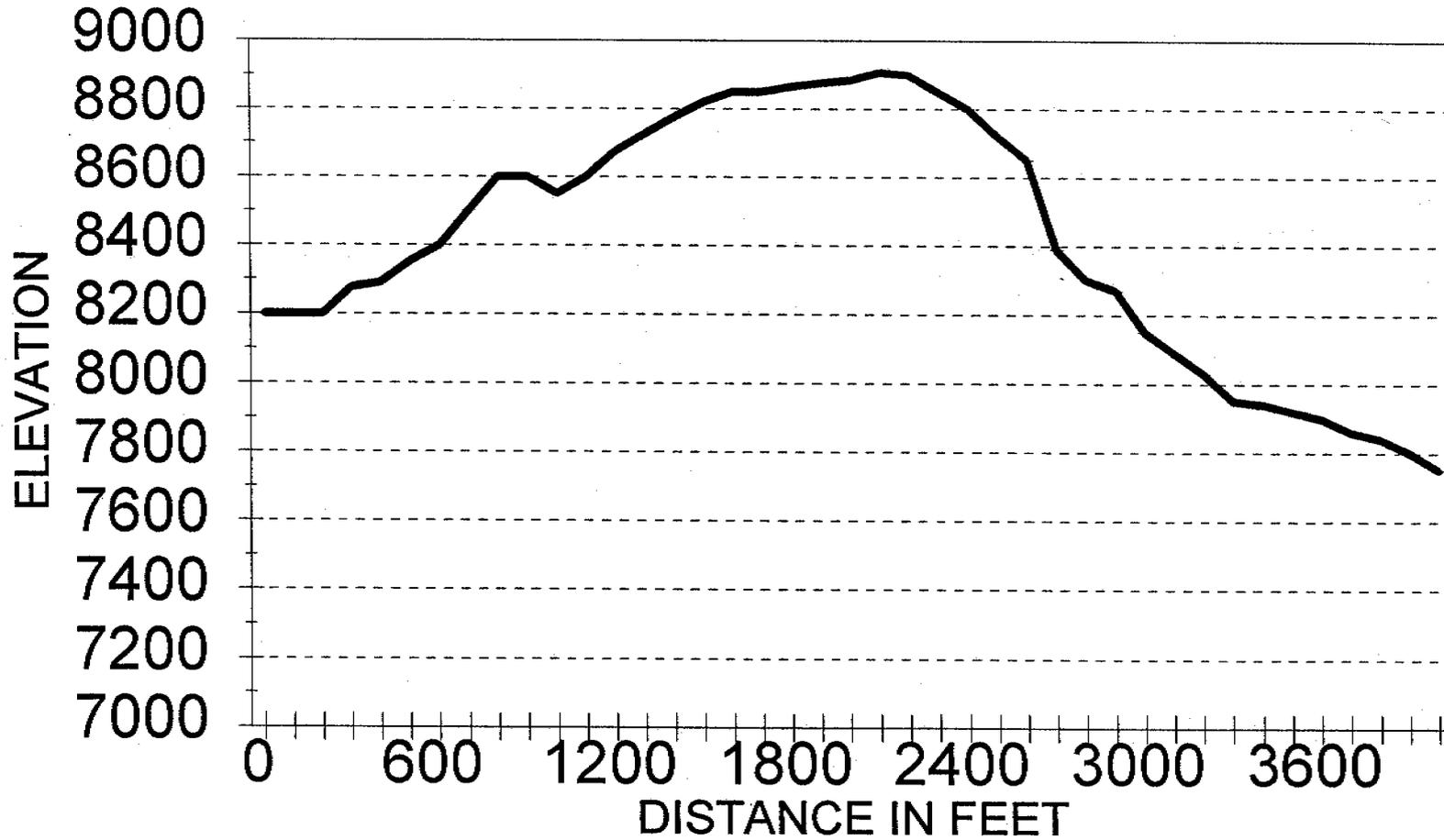
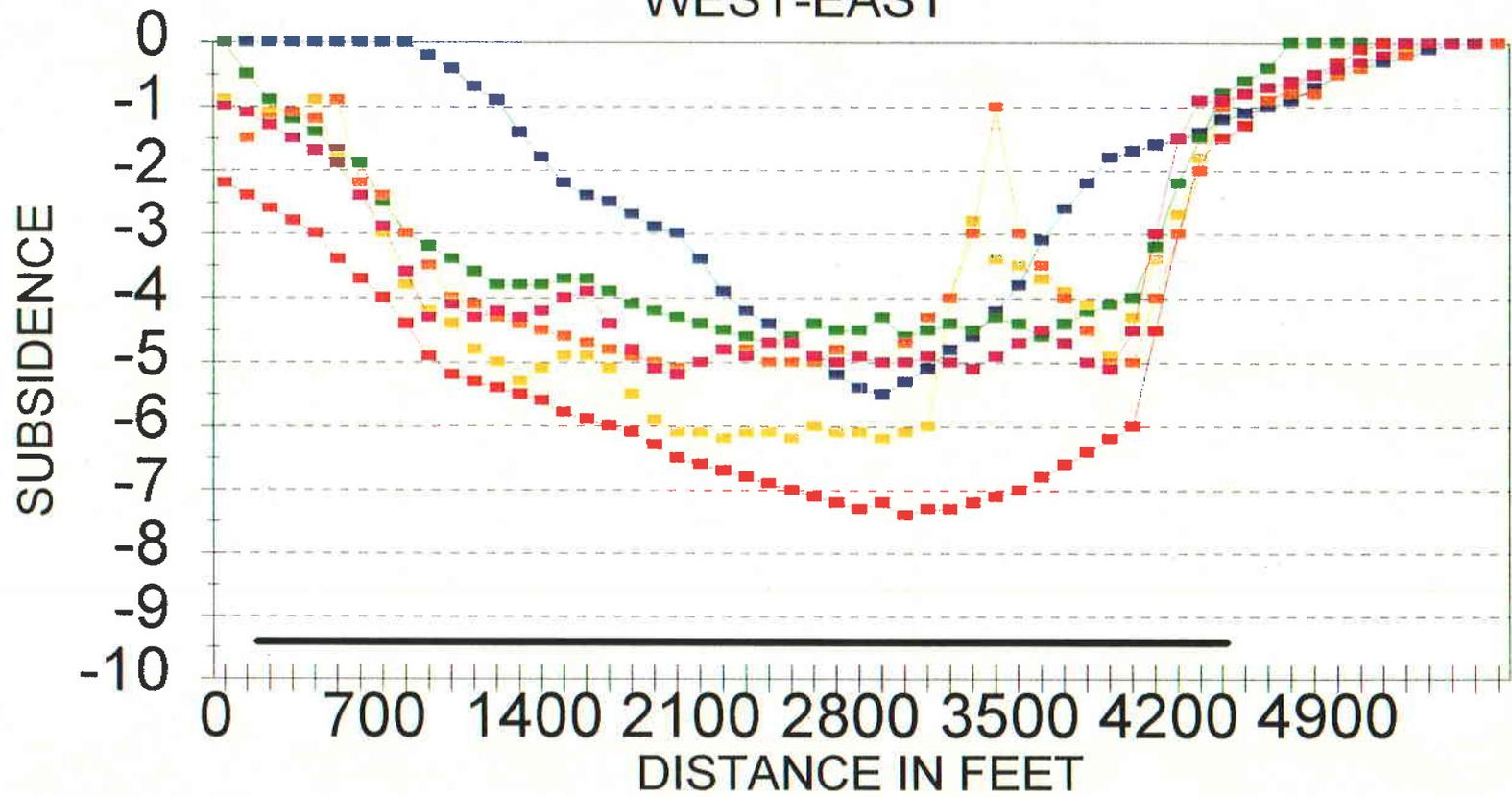
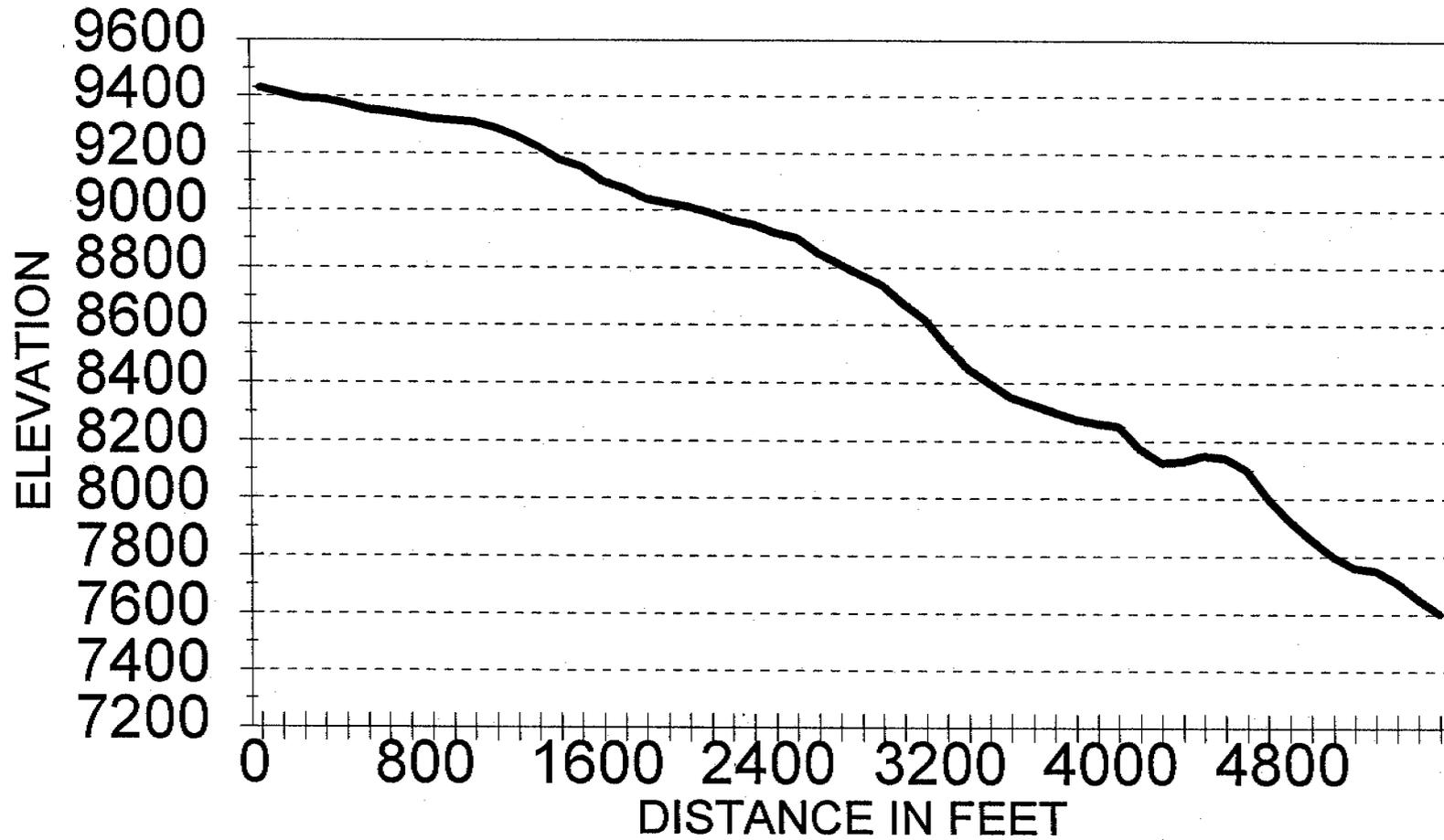


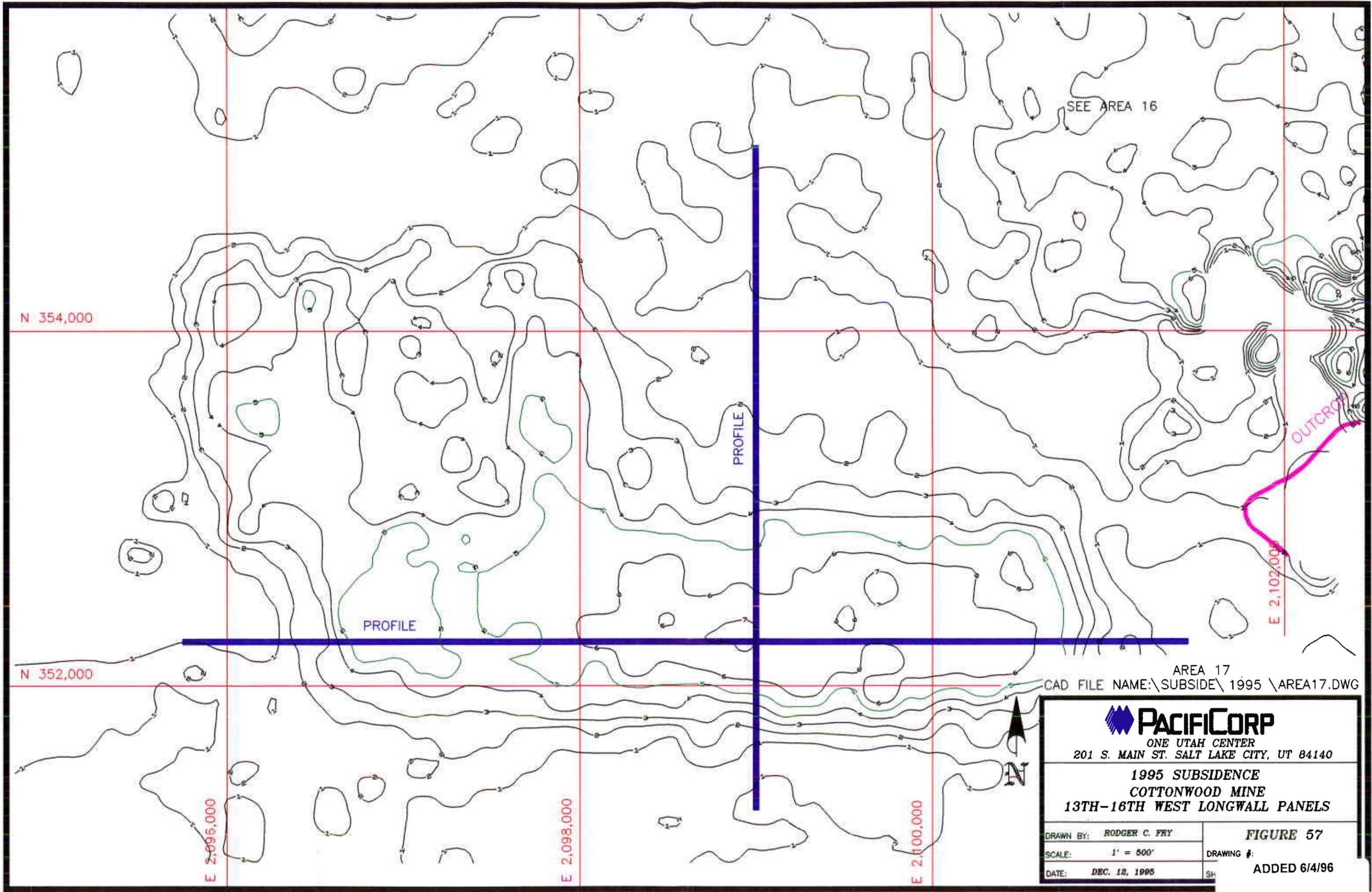
FIGURE 55  
AREA 16 SUBSIDENCE PROFILE  
WEST-EAST



■ 1990 ■ 1991 ■ 1992 ■ 1993 ■ 1994 ■ 1995

FIGURE 55T  
**AREA 16 TOPOGRAPHIC PROFILE**  
WEST-EAST





SEE AREA 16

N 354,000

N 352,000

E 2,096,000

E 2,098,000

E 2,100,000

E 2,102,000

PROFILE

PROFILE

OUTCROP

AREA 17

CAD FILE NAME: \SUBSIDE\ 1995 \AREA17.DWG

**PACIFICORP**

ONE UTAH CENTER  
201 S. MAIN ST. SALT LAKE CITY, UT 84140

**1995 SUBSIDENCE  
COTTONWOOD MINE  
13TH-16TH WEST LONGWALL PANELS**

DRAWN BY: RODGER C. FRY

SCALE: 1" = 500'

DATE: DEC. 12, 1995

**FIGURE 57**

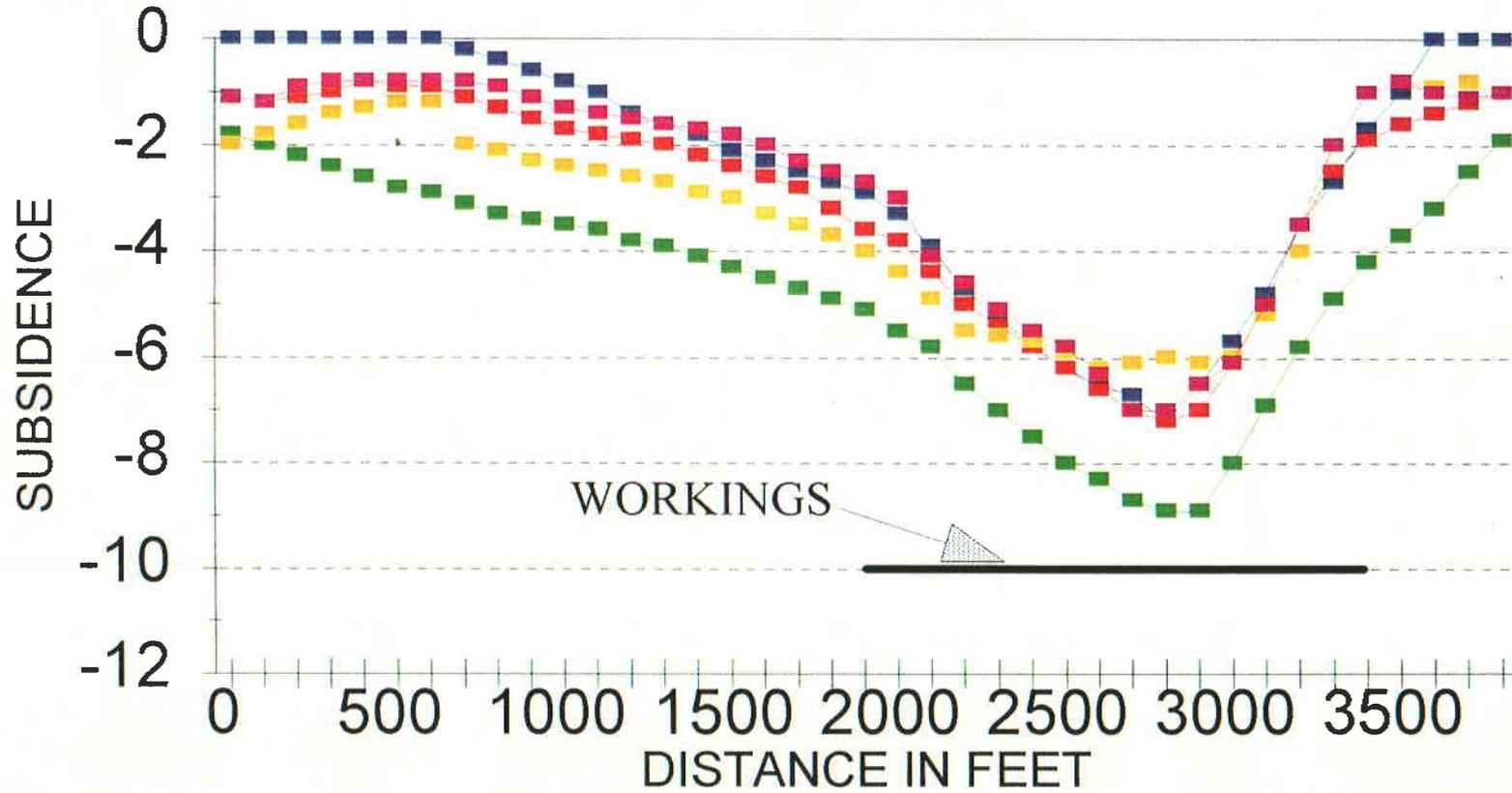
DRAWING #:

SH

ADDED 6/4/96

FIGURE 58

# AREA 17 SUBSIDENCE PROFILE NORTH-SOUTH



■ 1991 ■ 1992 ■ 1993 ■ 1994 ■ 1995

FIGURE 58T  
**AREA 17 TOPOGRAPHIC PROFILE**  
NORTH-SOUTH

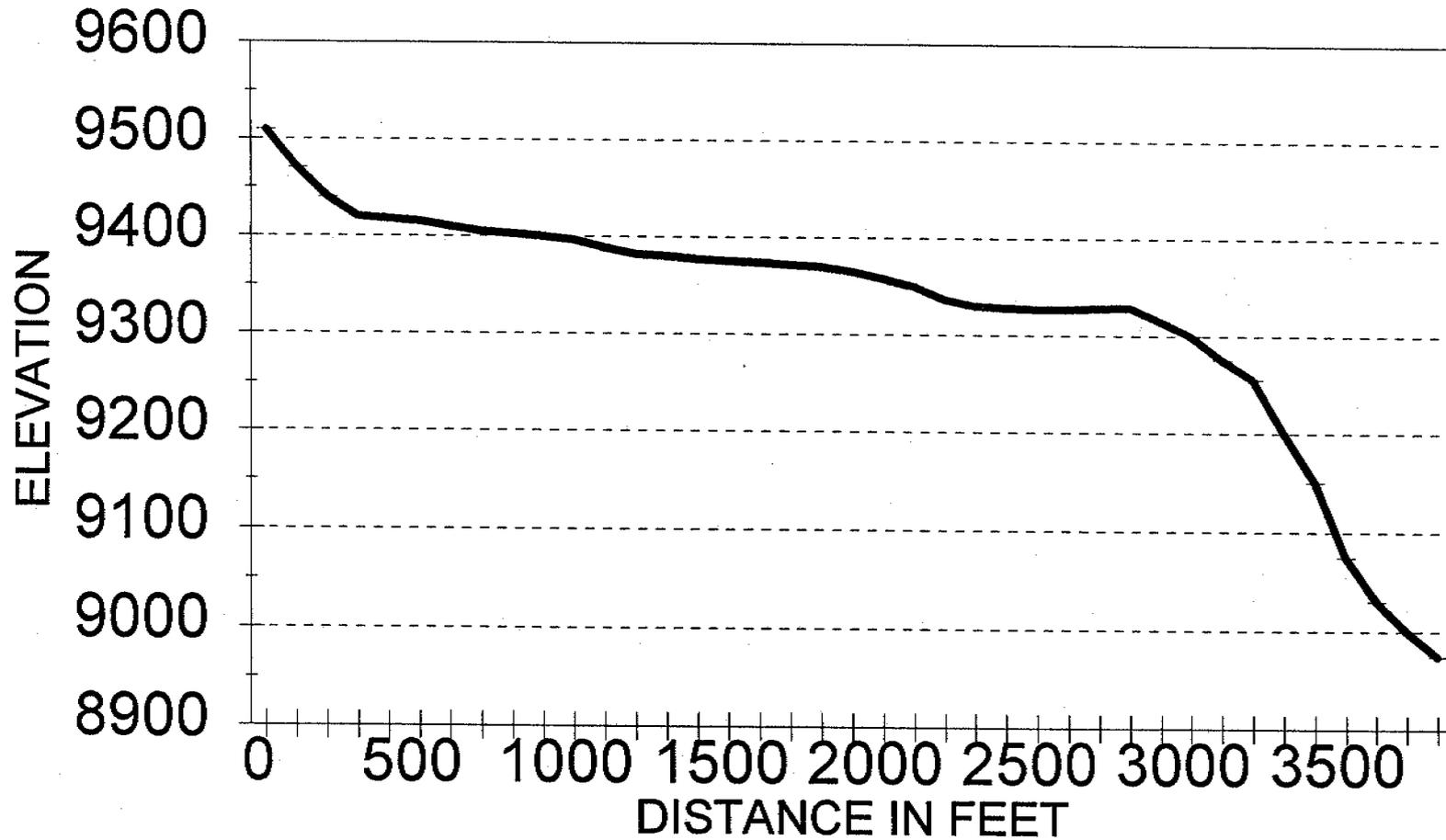
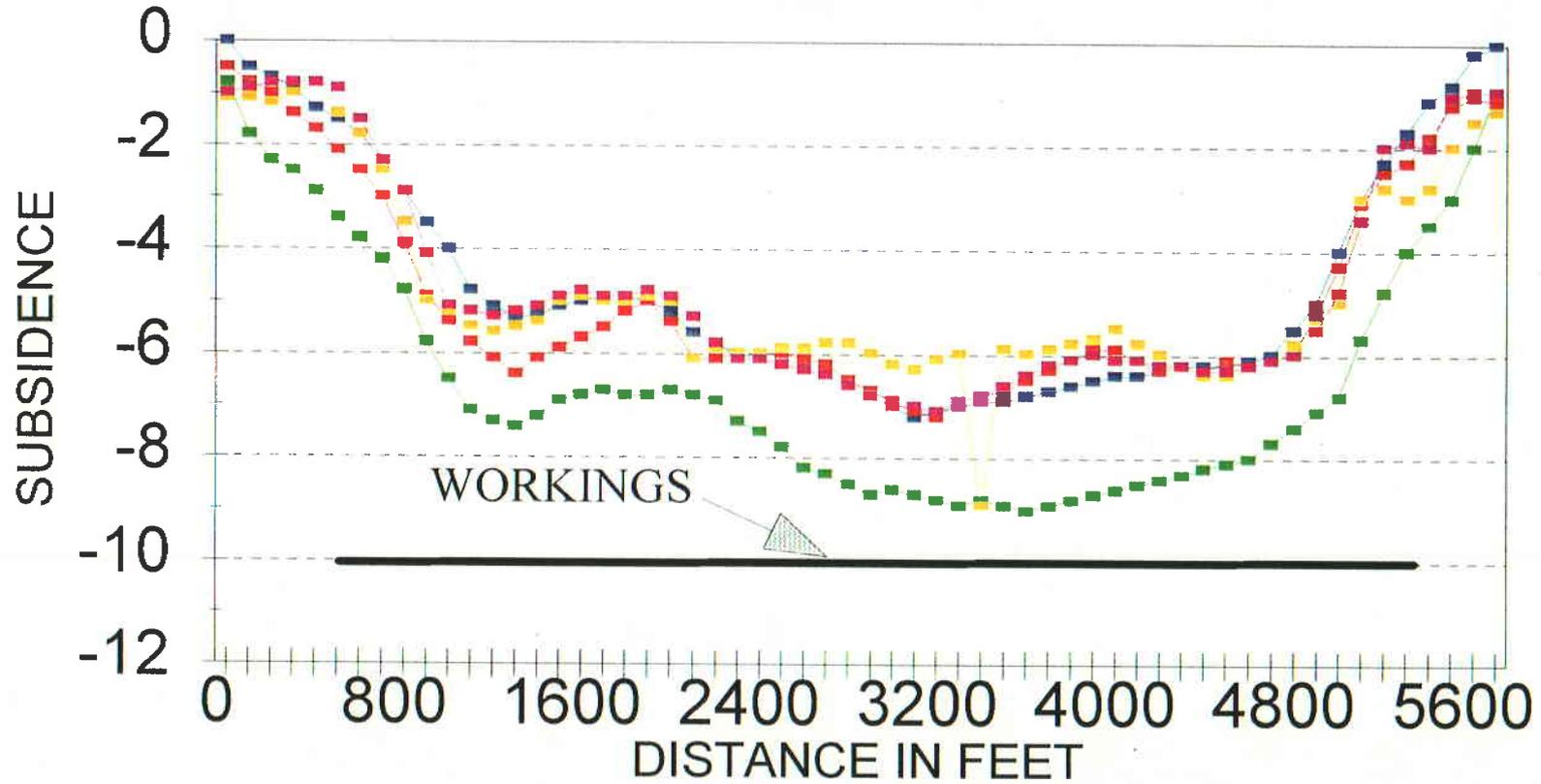


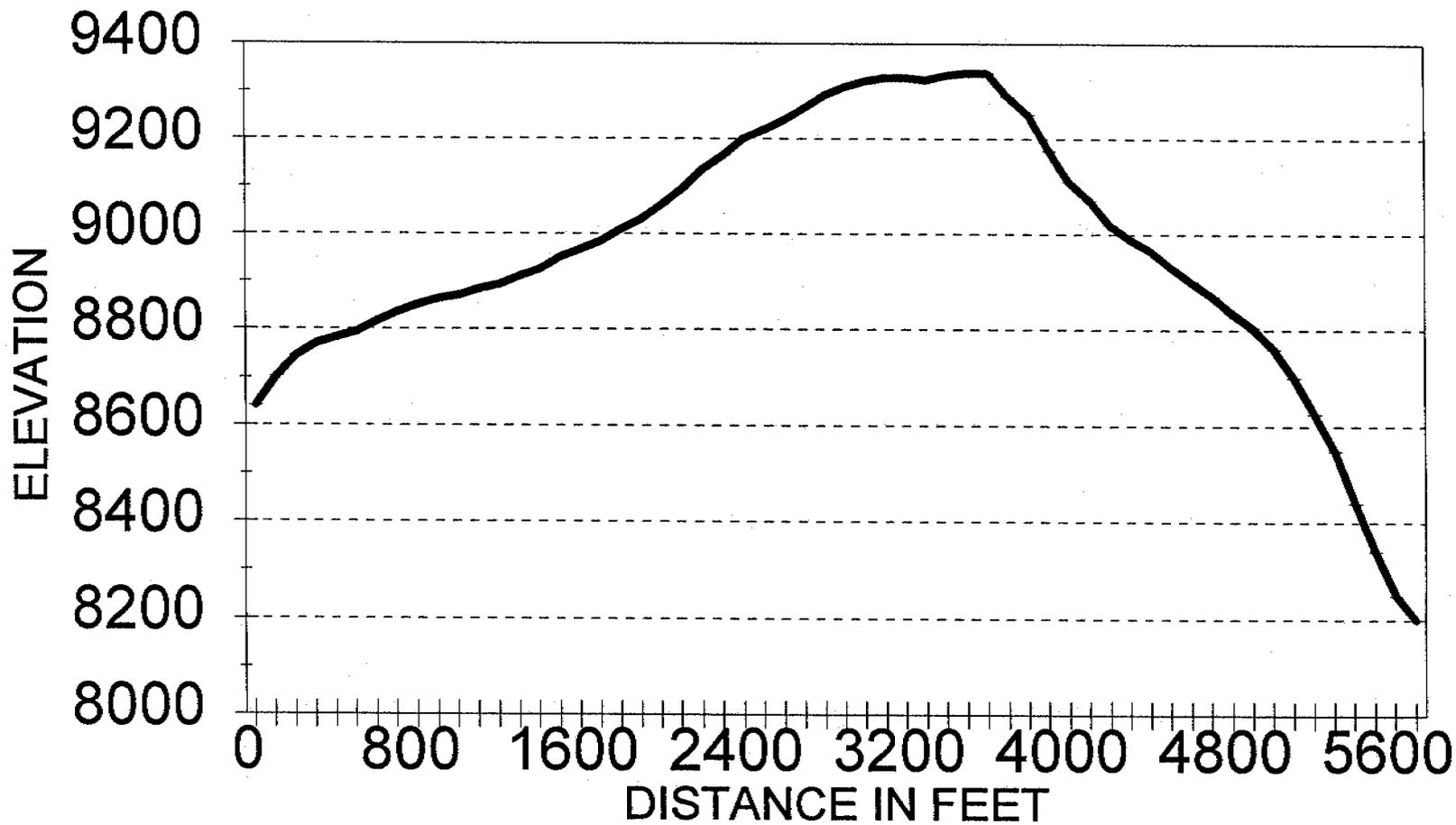
FIGURE 59

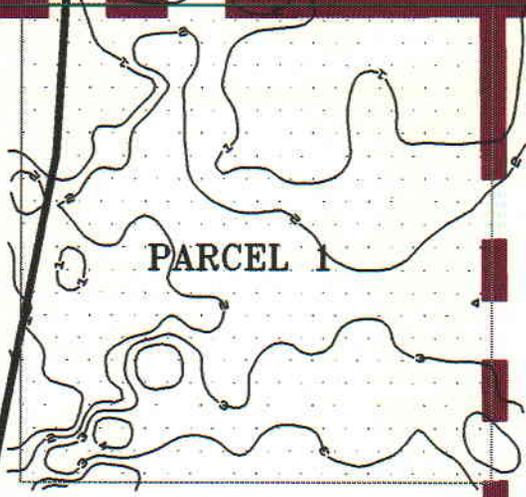
# AREA 17 SUBSIDENCE PROFILE WEST-EAST



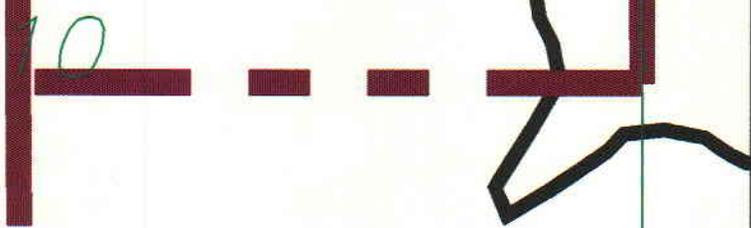
■ 1991   ■ 1992   ■ 1993   ■ 1994   ■ 1995

FIGURE 59T  
**AREA 17 TOPOGRAPHIC PROFILE**  
WEST-EAST





SL-070645  
U-02292



FEE

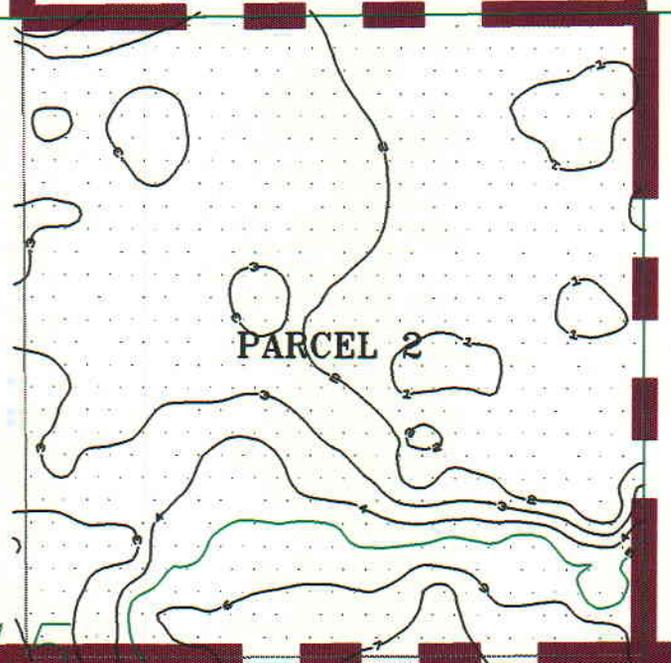
ADDED 6/4/96

CAD FILE NAME/DISK#: D:\EASTMTN\LRBASE

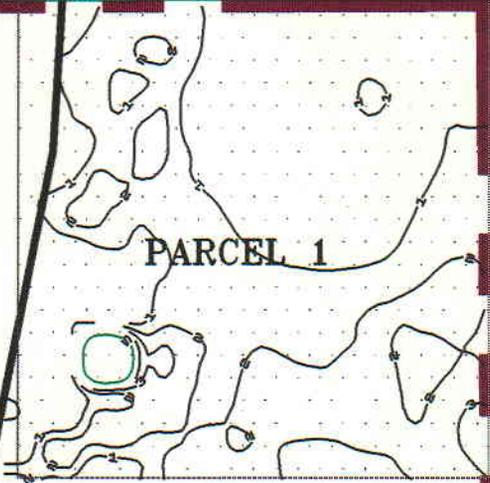
PACIFICORP ELECTRIC OPERATIONS  
FUEL RESOURCES DEPARTMENT  
201 SO. MAIN ONE UTAH CENTER SUITE 2000 S.L.C., UTAH 84140-0020

*EAST MOUNTAIN PROPERTY  
FEDERAL COAL LEASE U-02292  
1992 SUBSIDENCE*

DRAWN BY: R. C. FRY	FIGURE LR-15
1"=800'	DRAWING #:
DATE: DEC. 29, 1995	SHEET 1 OF 1 REV. _____



115



SL-070645  
U-02292

10  
FEE

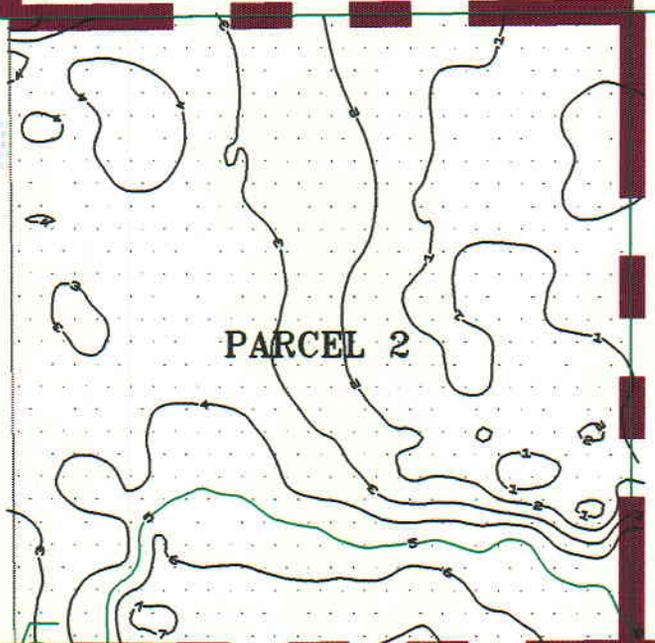
ADDED 6/4/96

CAD FILE NAME/DISK#: D:\EASTMTN\LRBASE

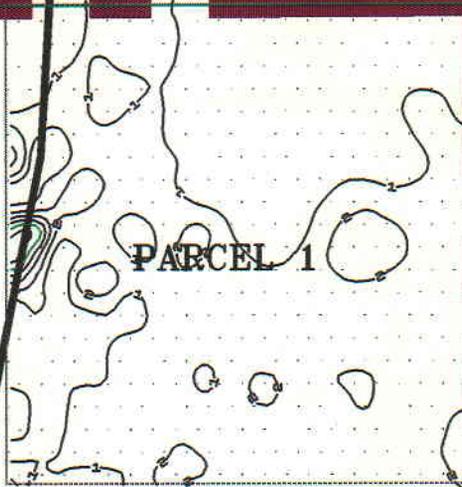
PACIFICORP ELECTRIC OPERATIONS  
FUEL RESOURCES DEPARTMENT  
201 SO. MAIN ONE UTAH CENTER SUITE 2000 S.L.C., UTAH 84140-0020

EAST MOUNTAIN PROPERTY  
FEDERAL COAL LEASE U-02292  
1993 SUBSIDENCE

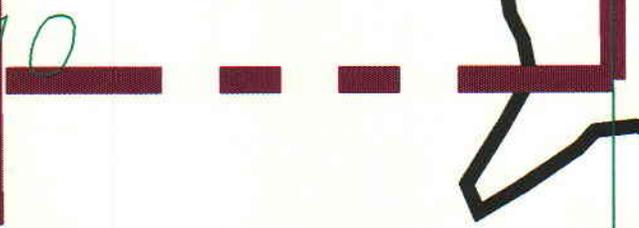
DRAWN BY: R. C. FRY	FIGURE LR-15
SCALE: 1" = 800'	DRAWING #:
DATE: DEC. 29, 1995	SHEET 1 OF 1 REV. _____



15



SL-070645  
U-02292



FEE

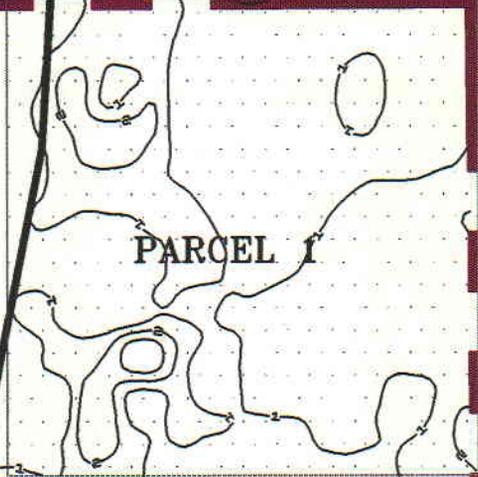
ADDED 6/4/96

CAD FILE NAME/DISK#: D:\EASTMTN\LRBASE

PACIFICORP ELECTRIC OPERATIONS FUEL RESOURCES DEPARTMENT 201 SO. MAIN ONE UTAH CENTER SUITE 2000 S.L.C., UTAH 84140-0020	
EAST MOUNTAIN PROPERTY FEDERAL COAL LEASE U-02292 1994 SUBSIDENCE	
DRAWN BY: R. C. FRY	FIGURE LR-15
SCALE: 1"=800'	DRAWING #:
DATE: DEC. 29, 1995	SHEET 1 OF 1 REV. _____



15



PARCEL 1

SL-070645

U-02292

FEE

ADDED 6/4/96

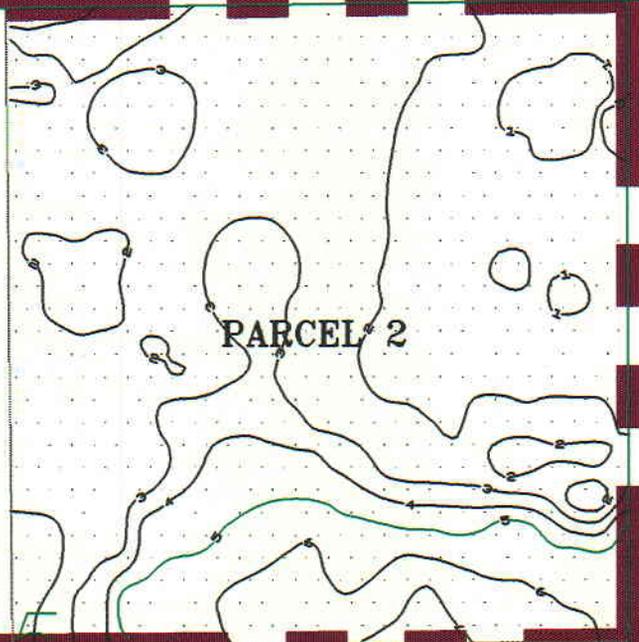
CAD FILE NAME/DISK#: D:\EASTM\LRBASE

PACIFICORP ELECTRIC OPERATIONS  
FUEL RESOURCES DEPARTMENT  
201 SO. MAIN ONE UTAH CENTER SUITE 2000 S.L.C., UTAH 84140-0020

EAST MOUNTAIN PROPERTY  
FEDERAL COAL LEASE U-02292  
1995 SUBSIDENCE

DRAWN BY: R. C. FRY  
SCALE: 1"=800'  
DATE: DEC. 29, 1995

FIGURE LR-15  
DRAWING #:  
SHEET 1 OF 1 REV. \_\_\_\_\_



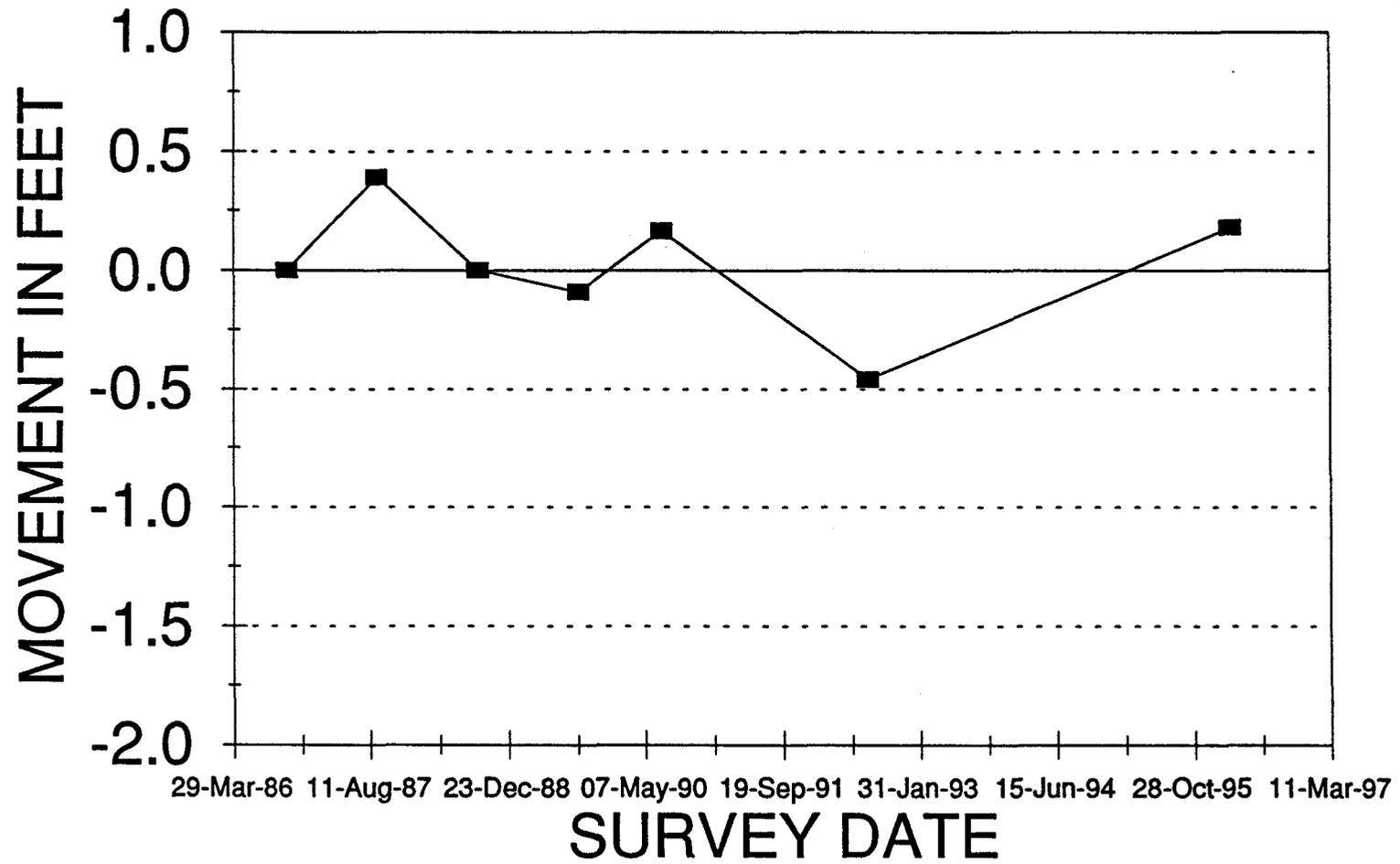
PARCEL 2

15

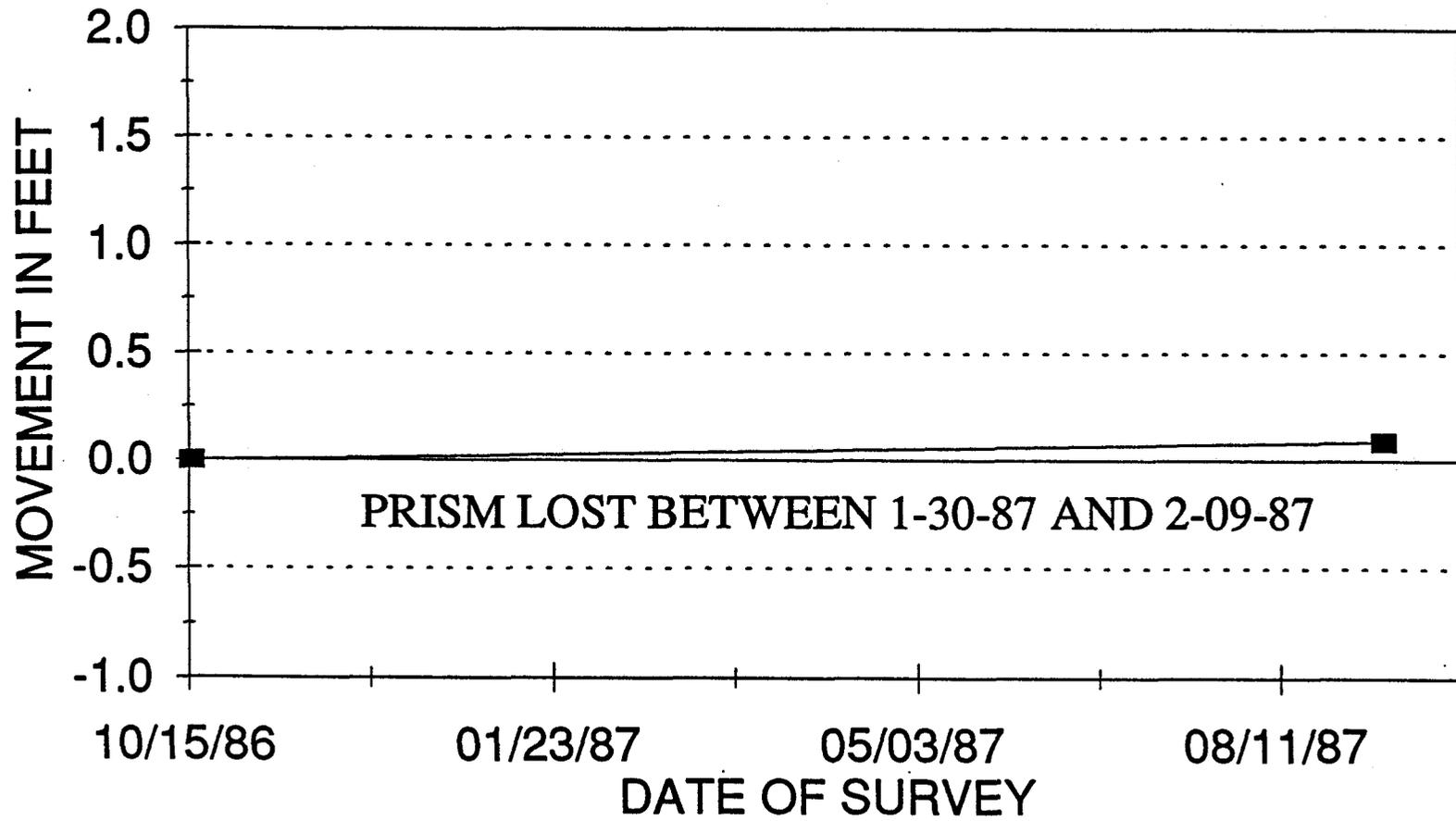
***Survey  
Target  
Profiles***

# NEWBERRY CANYON

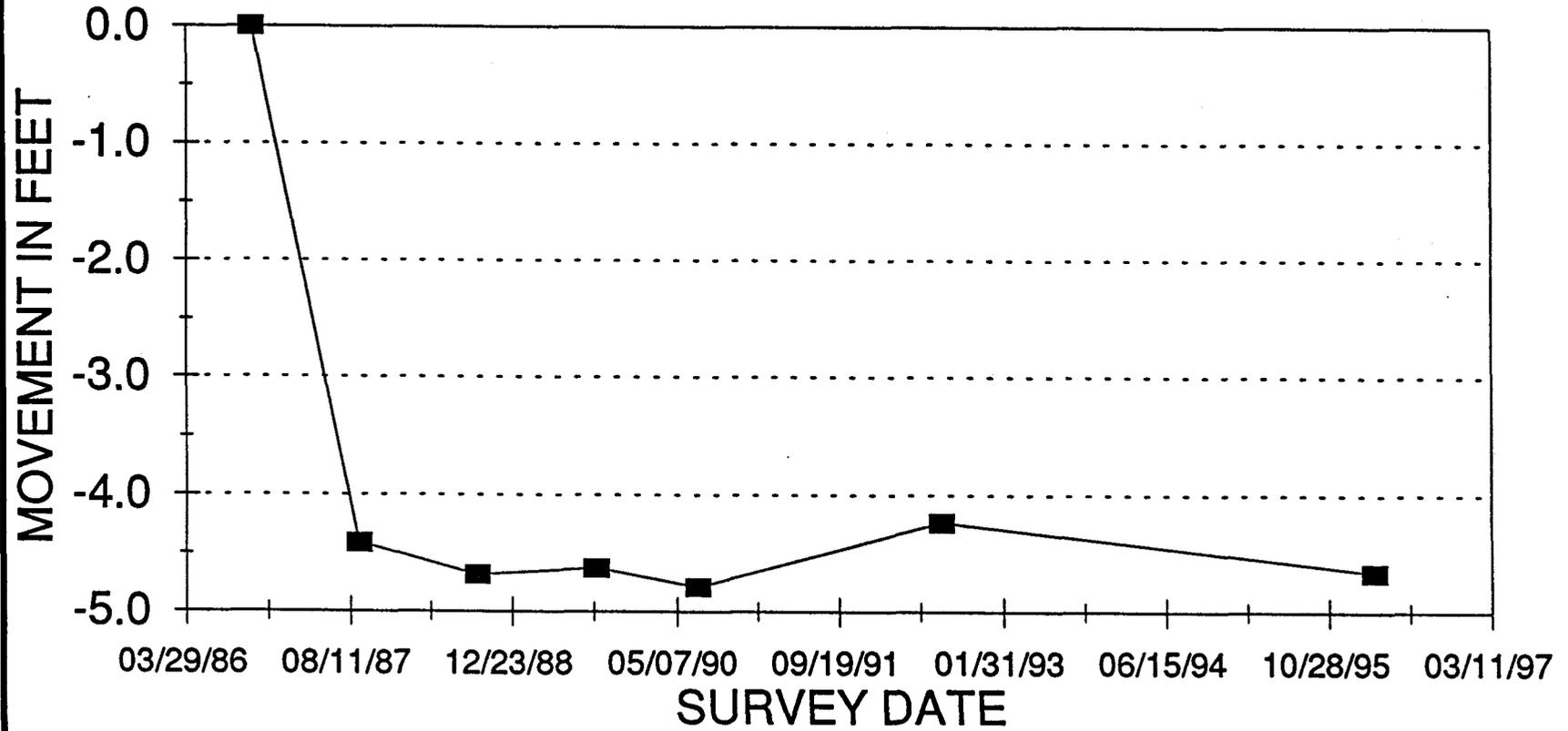
## PR-1



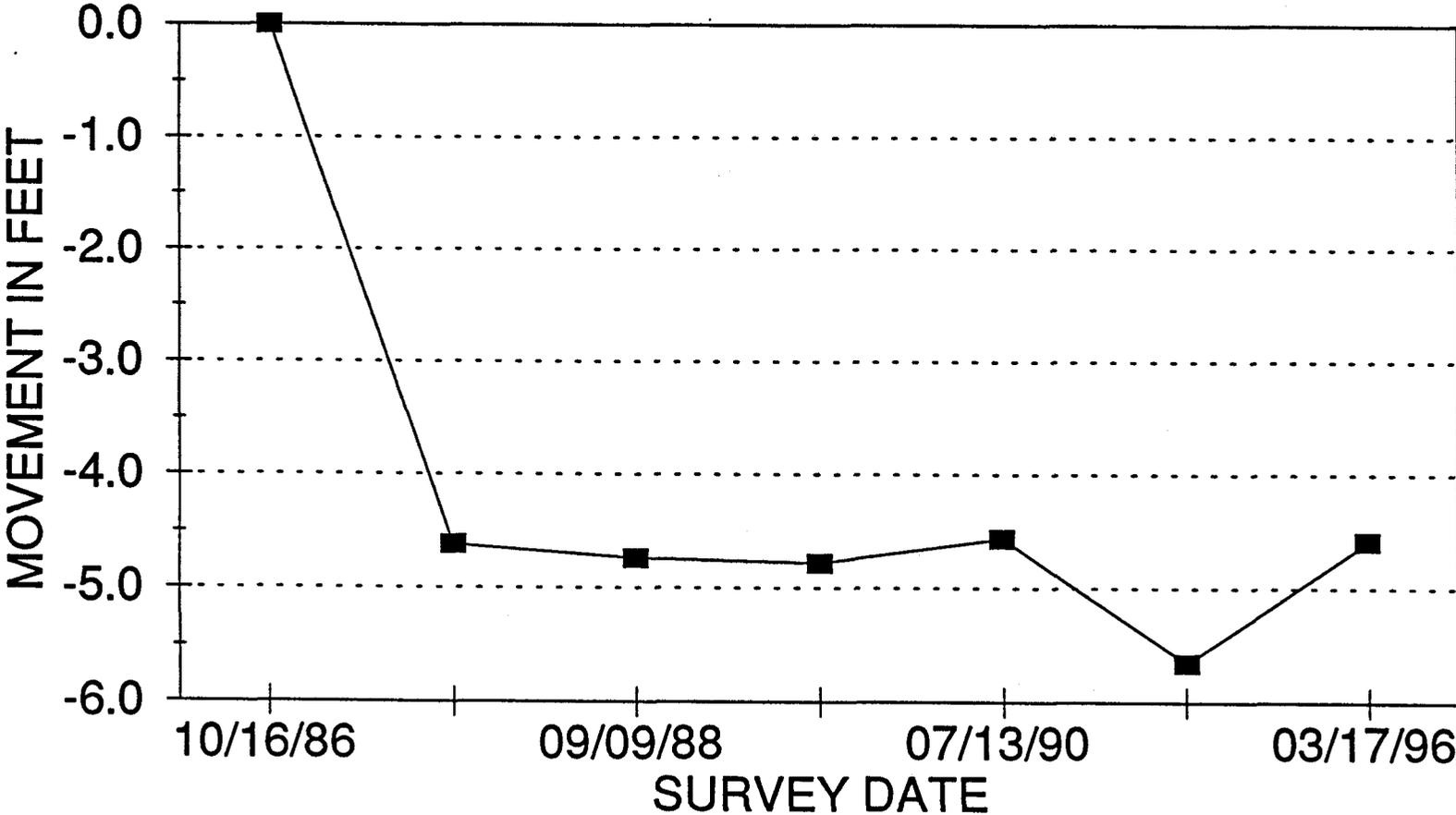
# NEWBERRY CANYON PR-2



# NEWBERRY CANYON PR-3

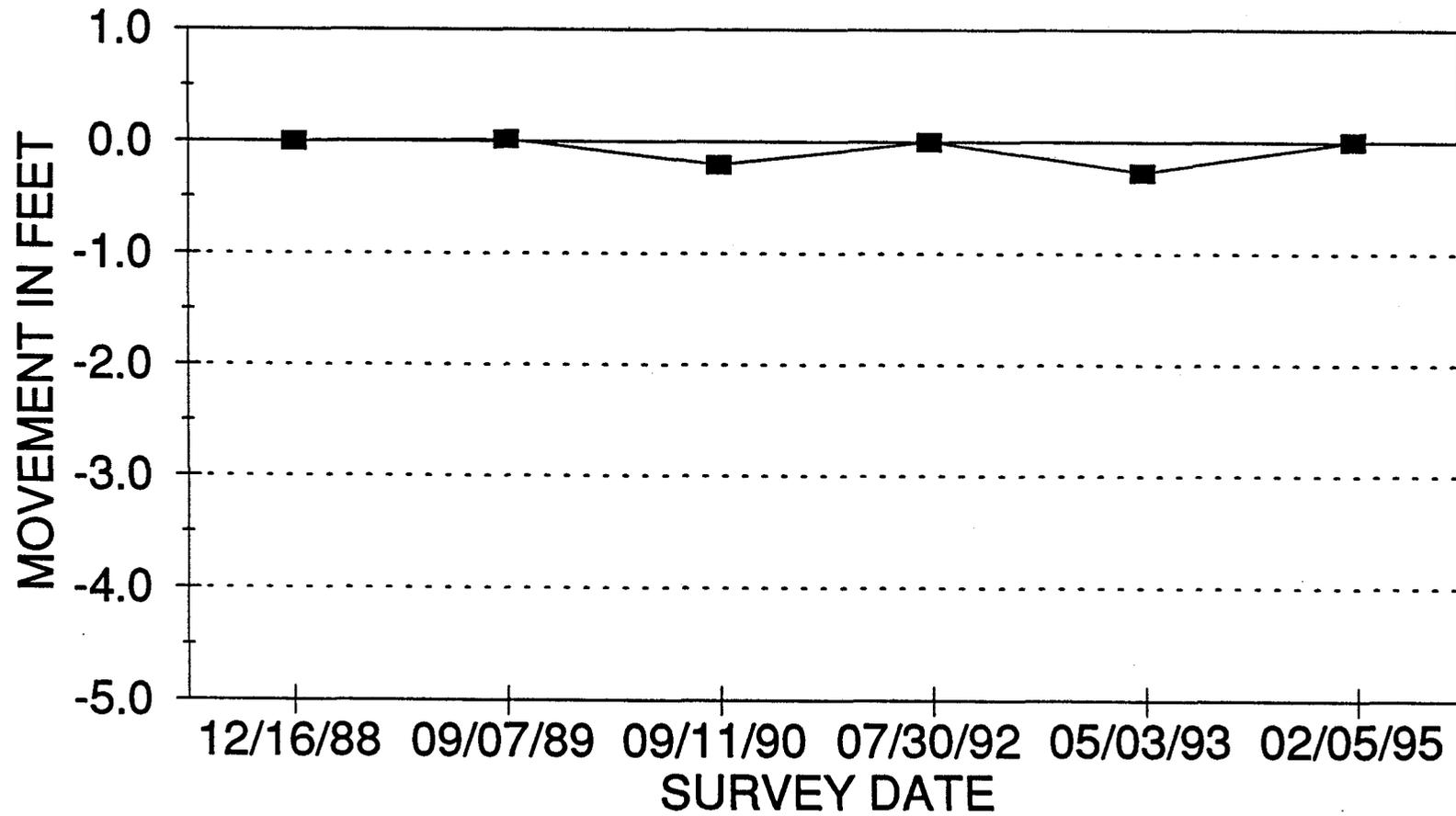


# NEWBERRY CANYON PR-4



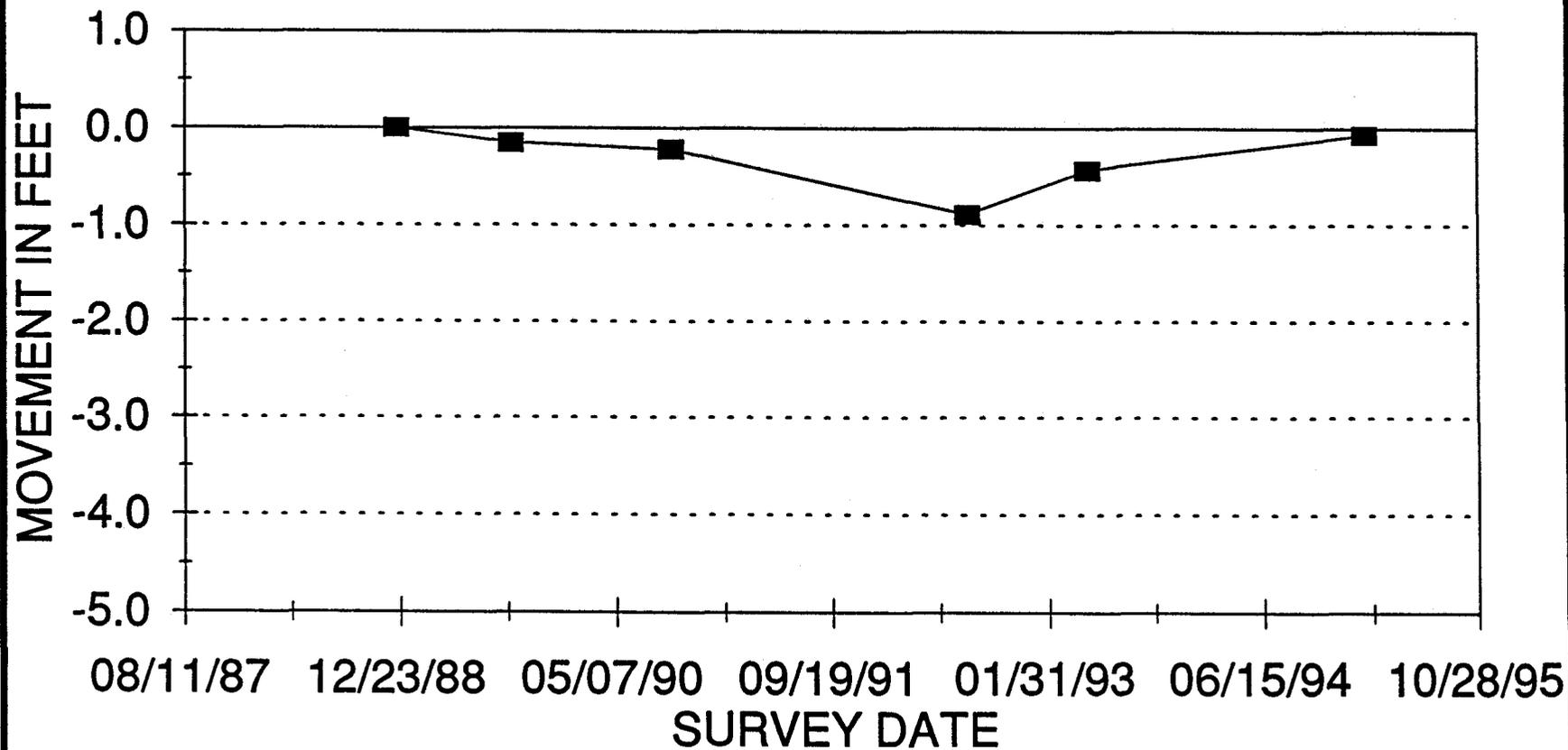
REVISED 6/4/96

# NEWBERRY CANYON PR-5

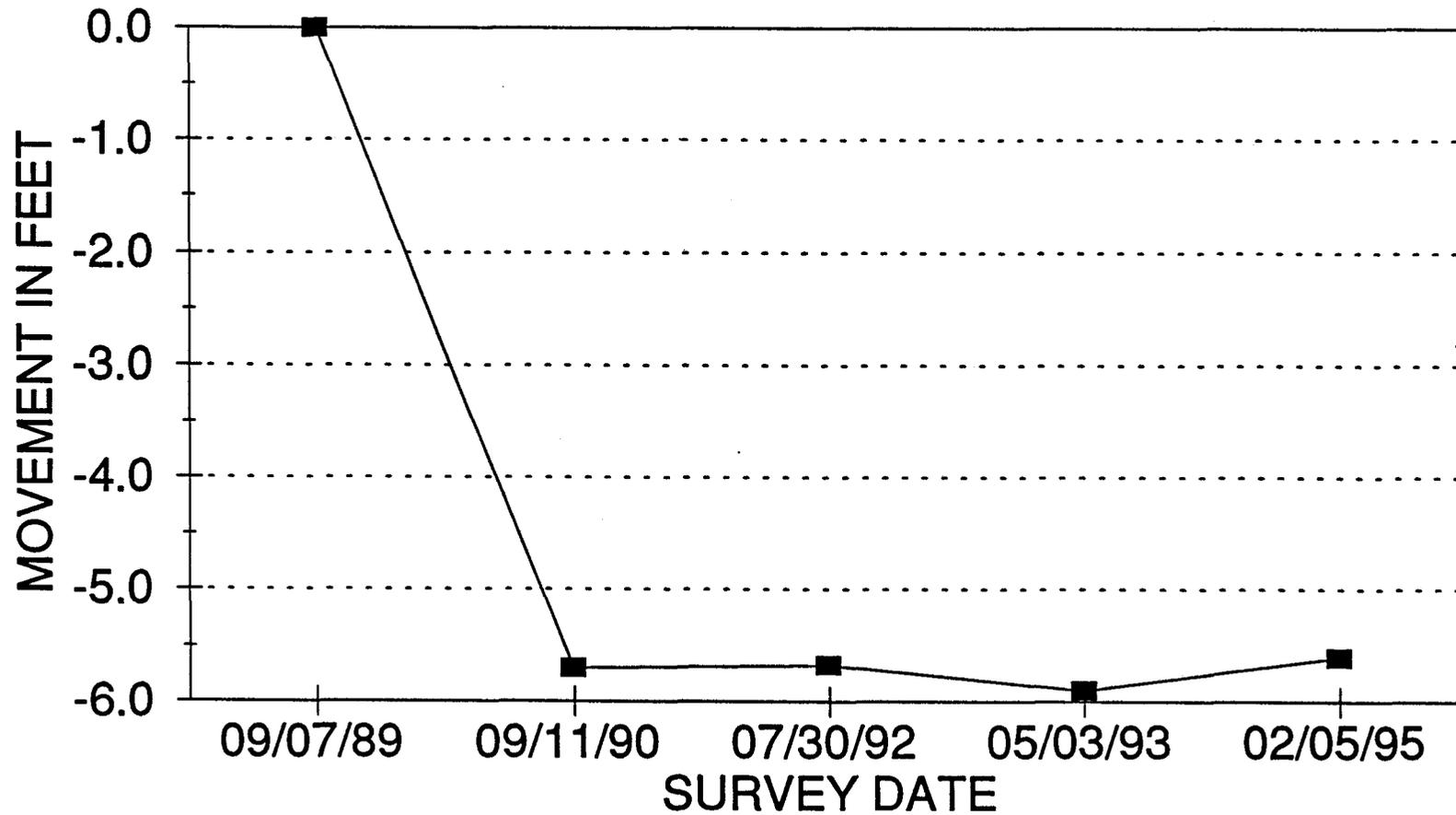


# NEWBERRY CANYON

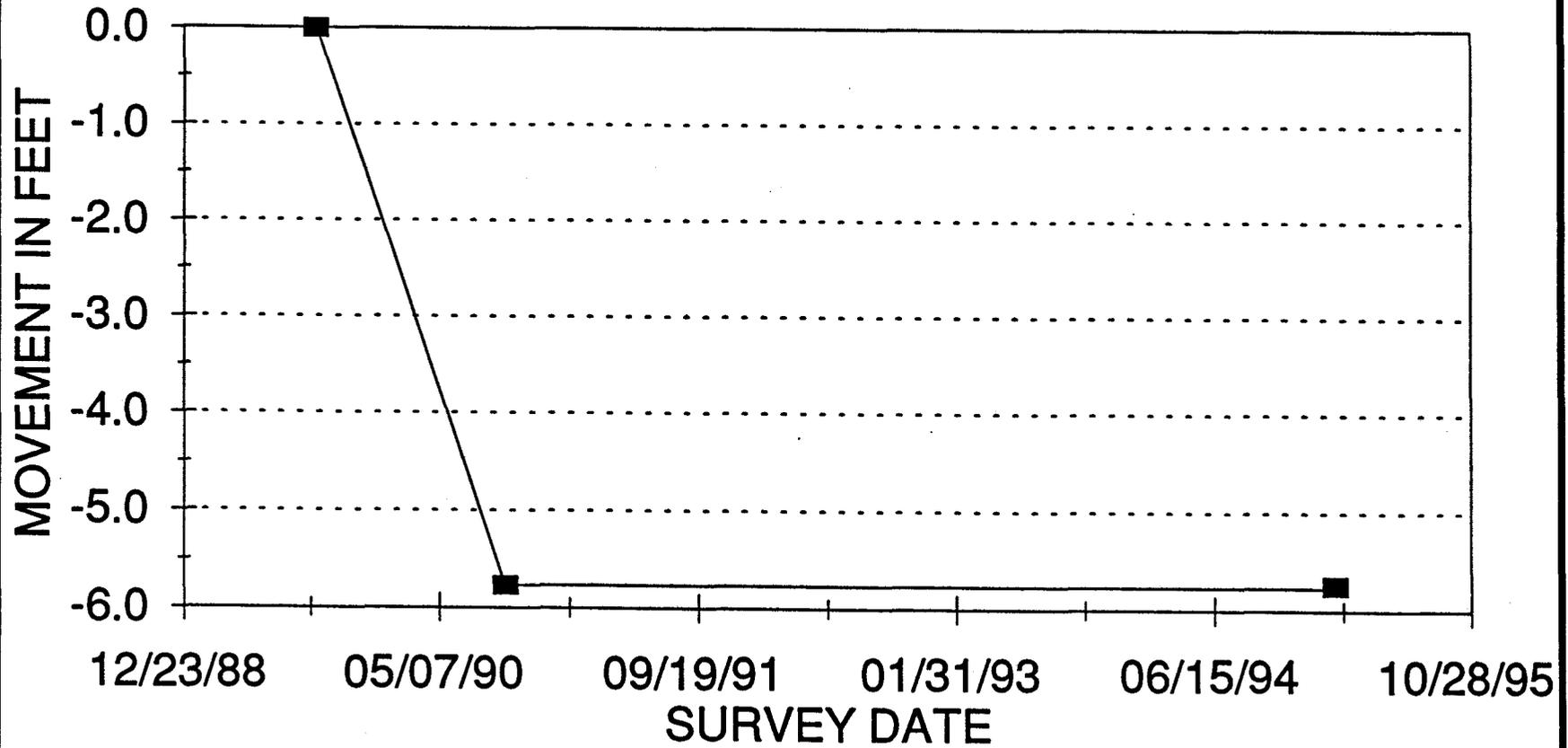
PR-6



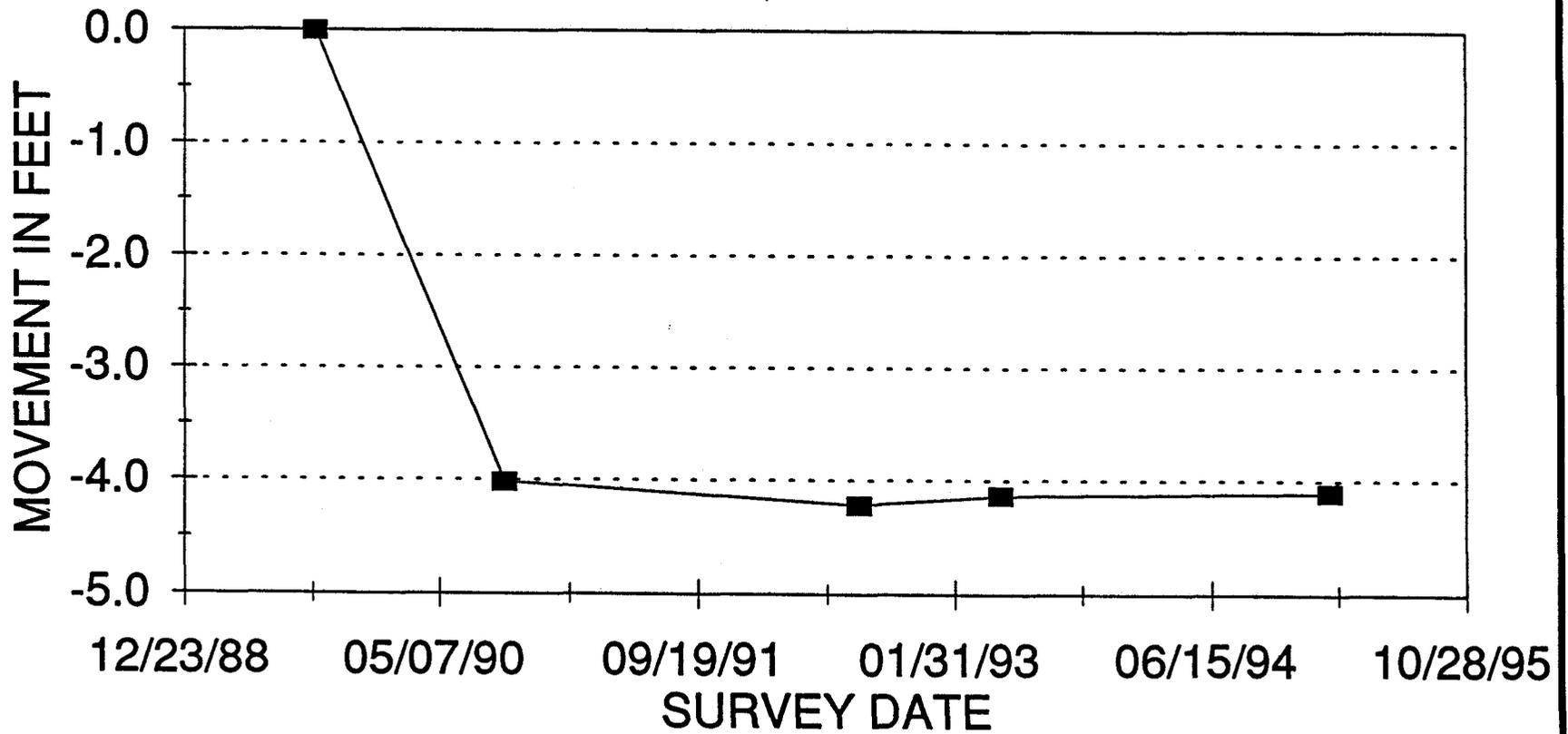
# NEWBERRY CANYON PR-7



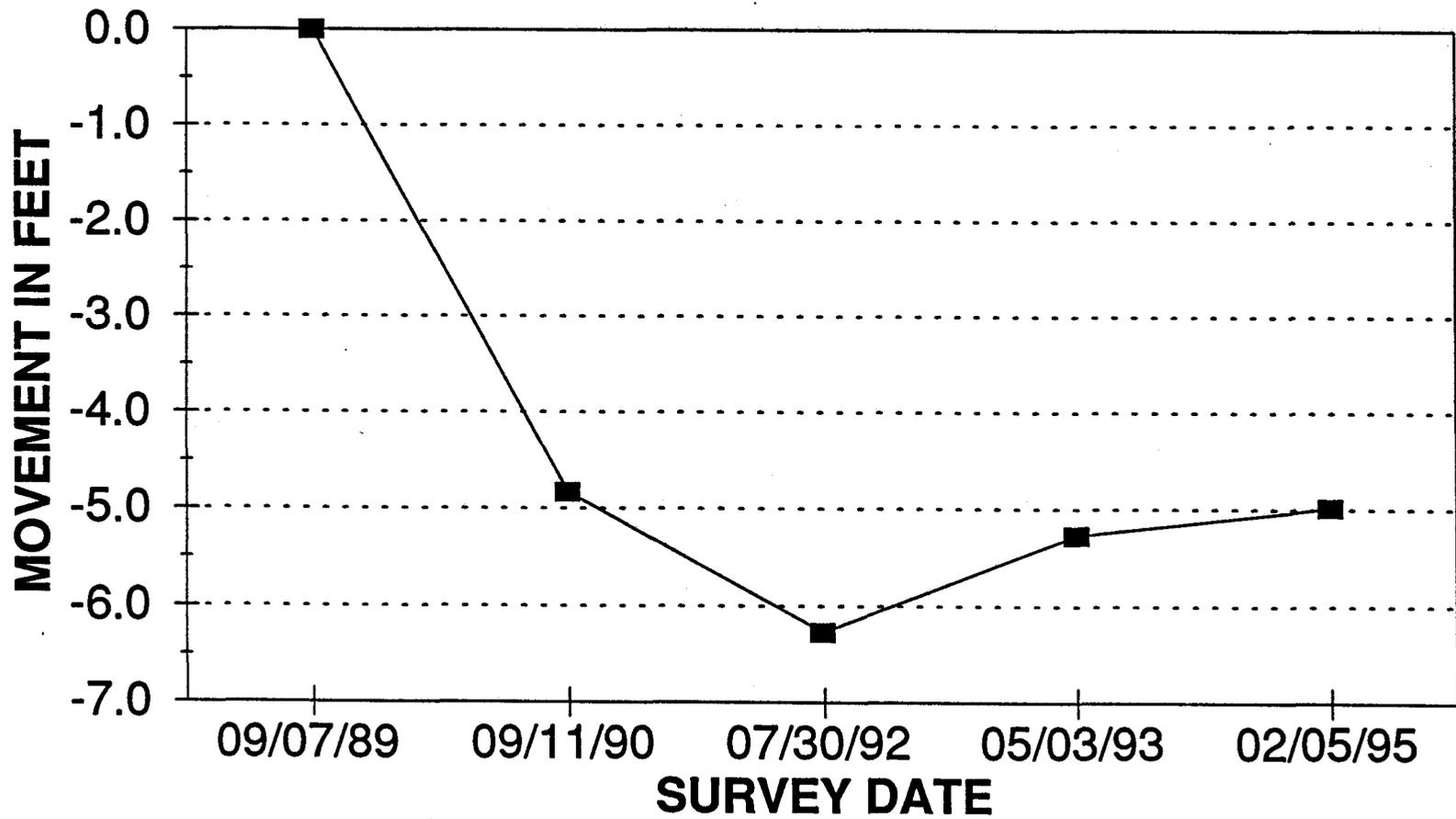
# NEWBERRY CANYON PR-8



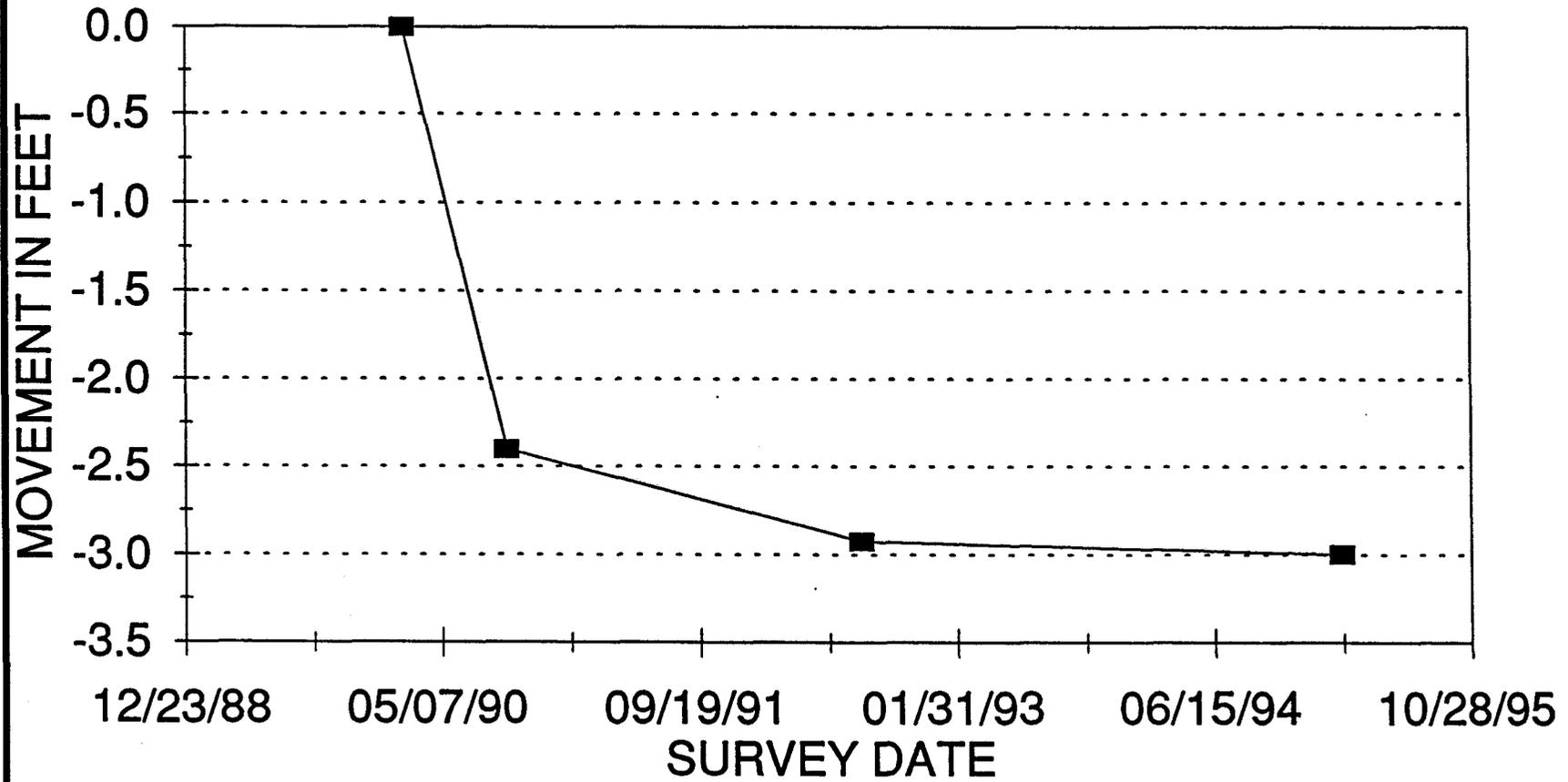
# NEWBERRY CANYON PR-9



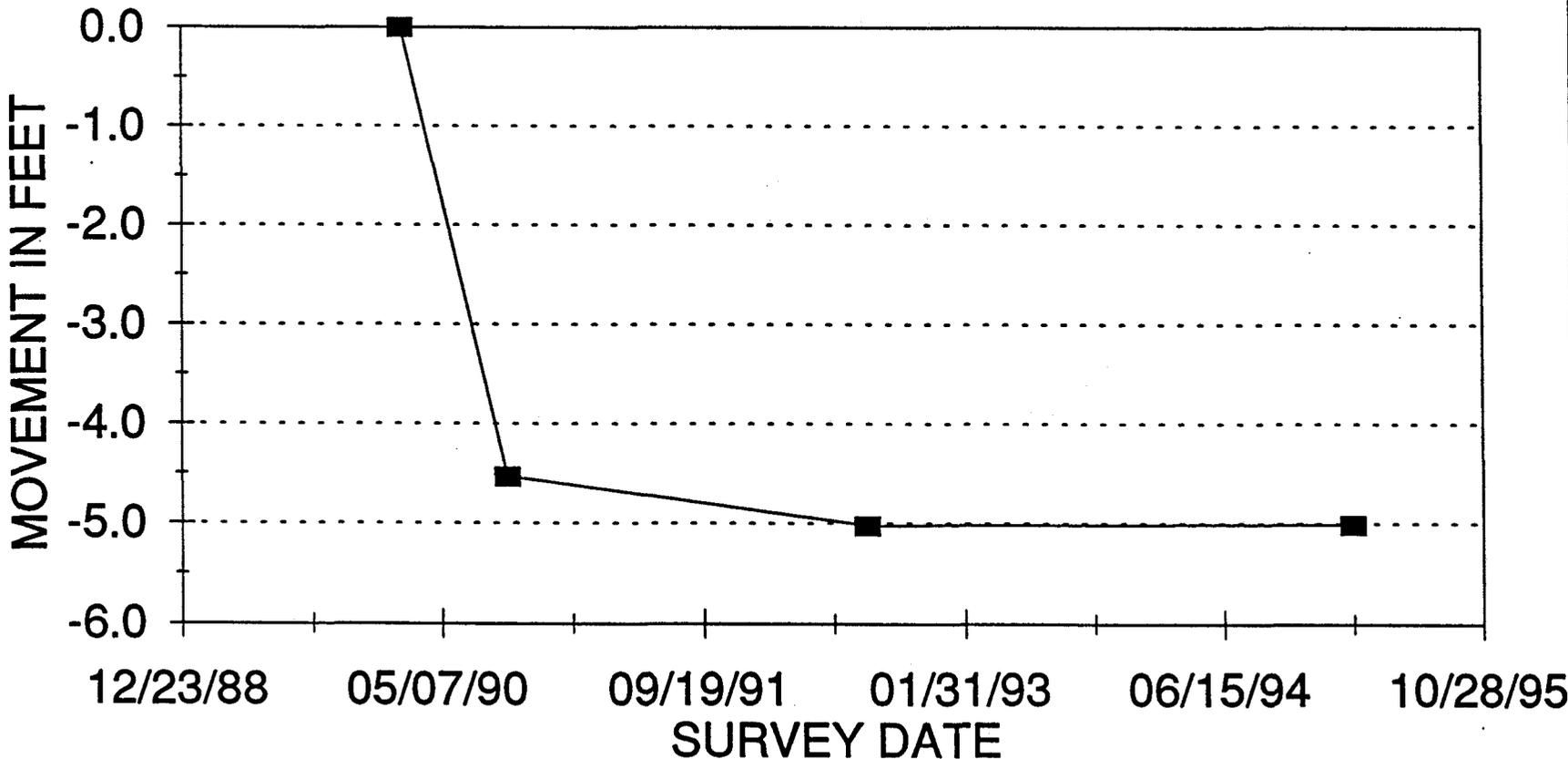
# NEWBERRY CANYON PR-10



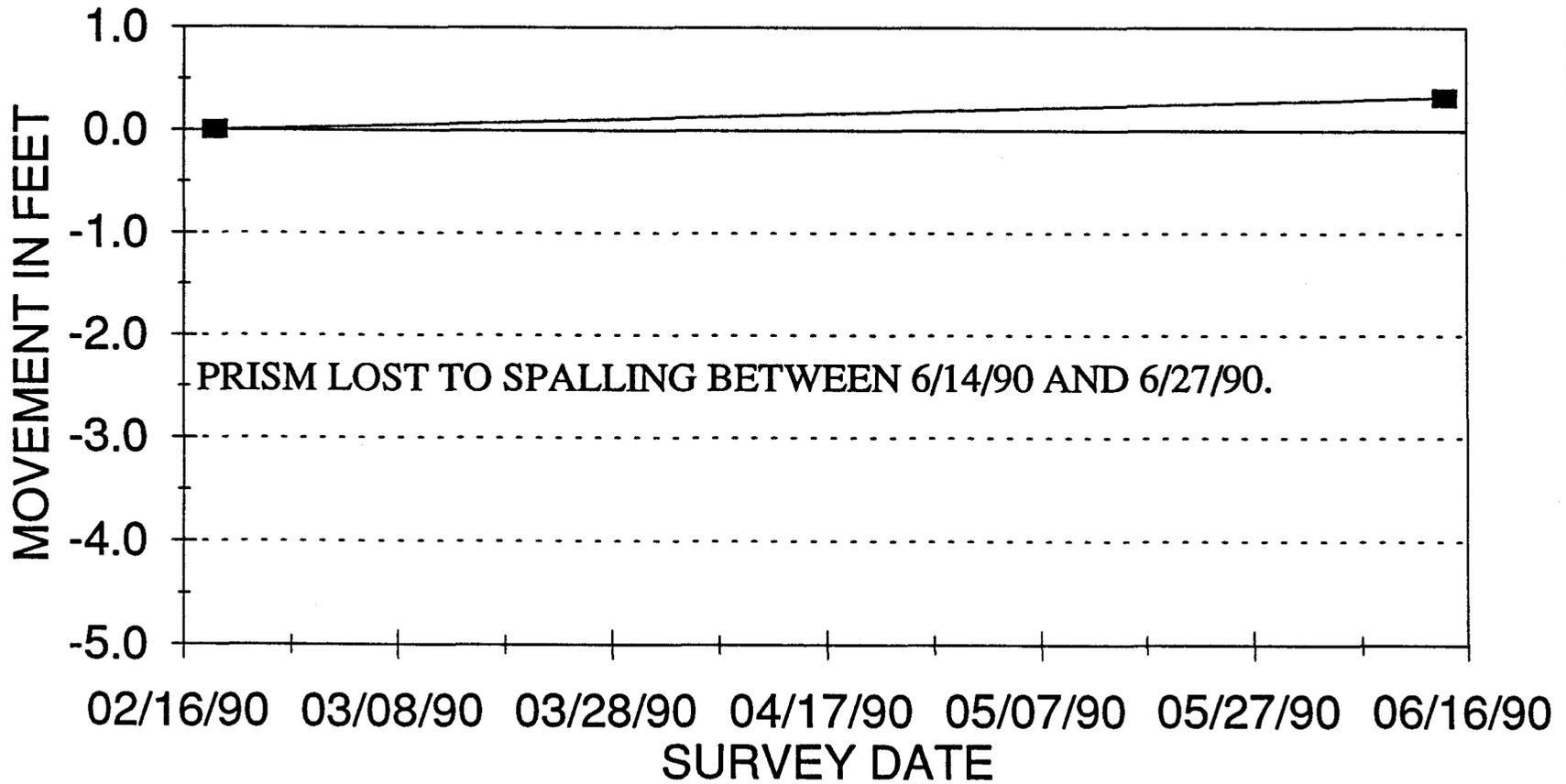
# CORNCOB WASH PR-11



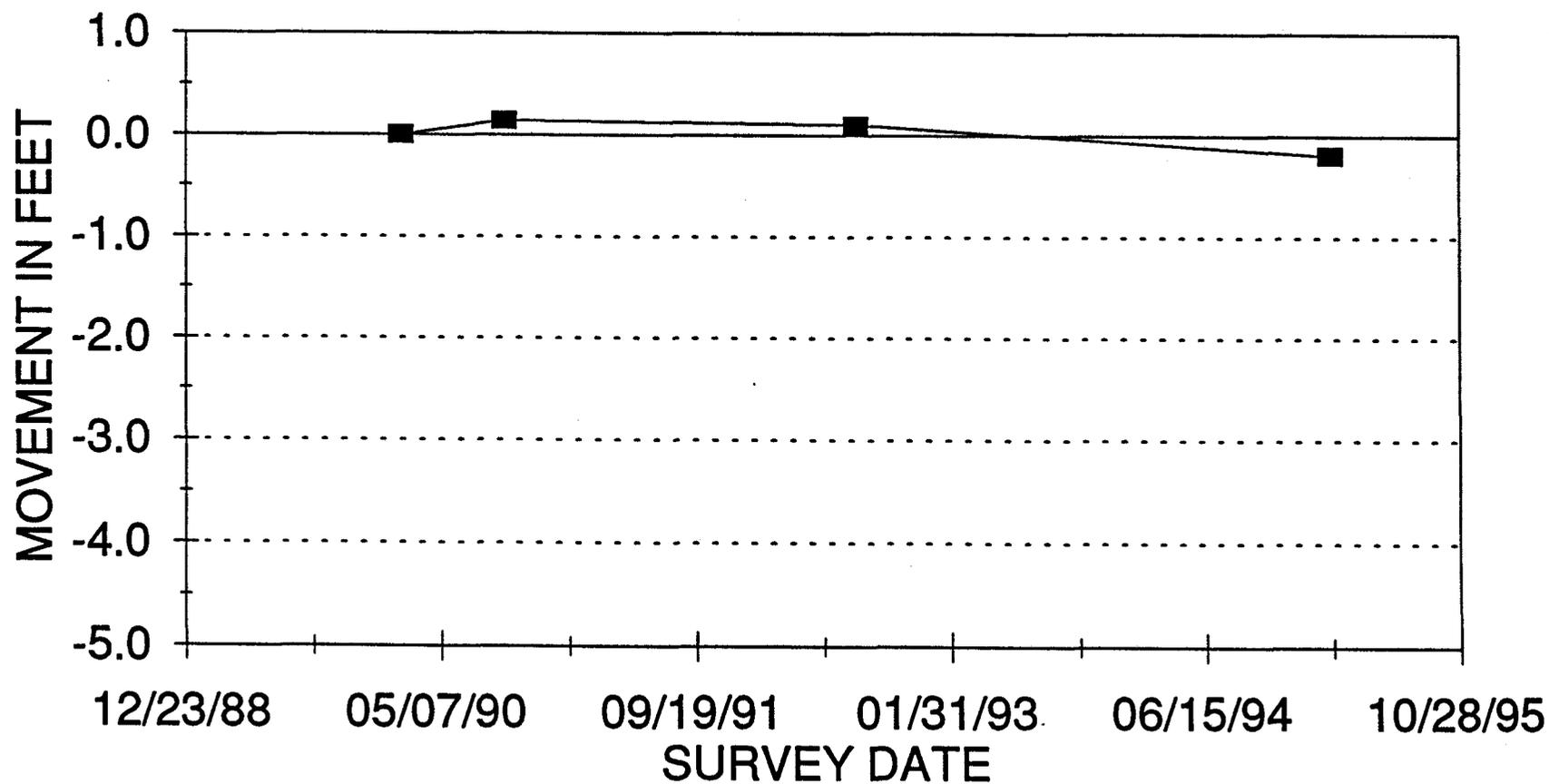
# CORNCOB WASH PR-12



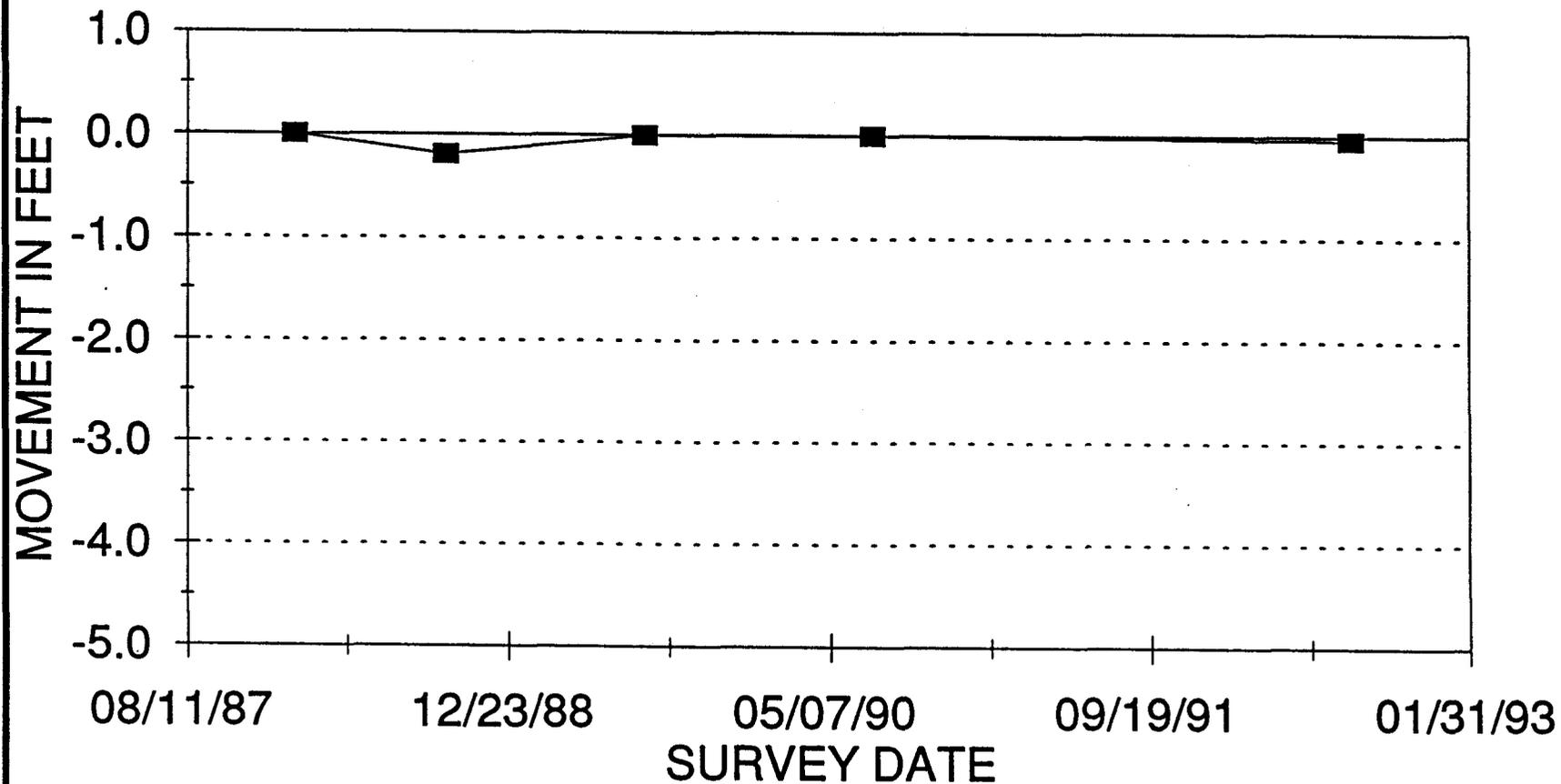
# CORNCOB WASH PR-13



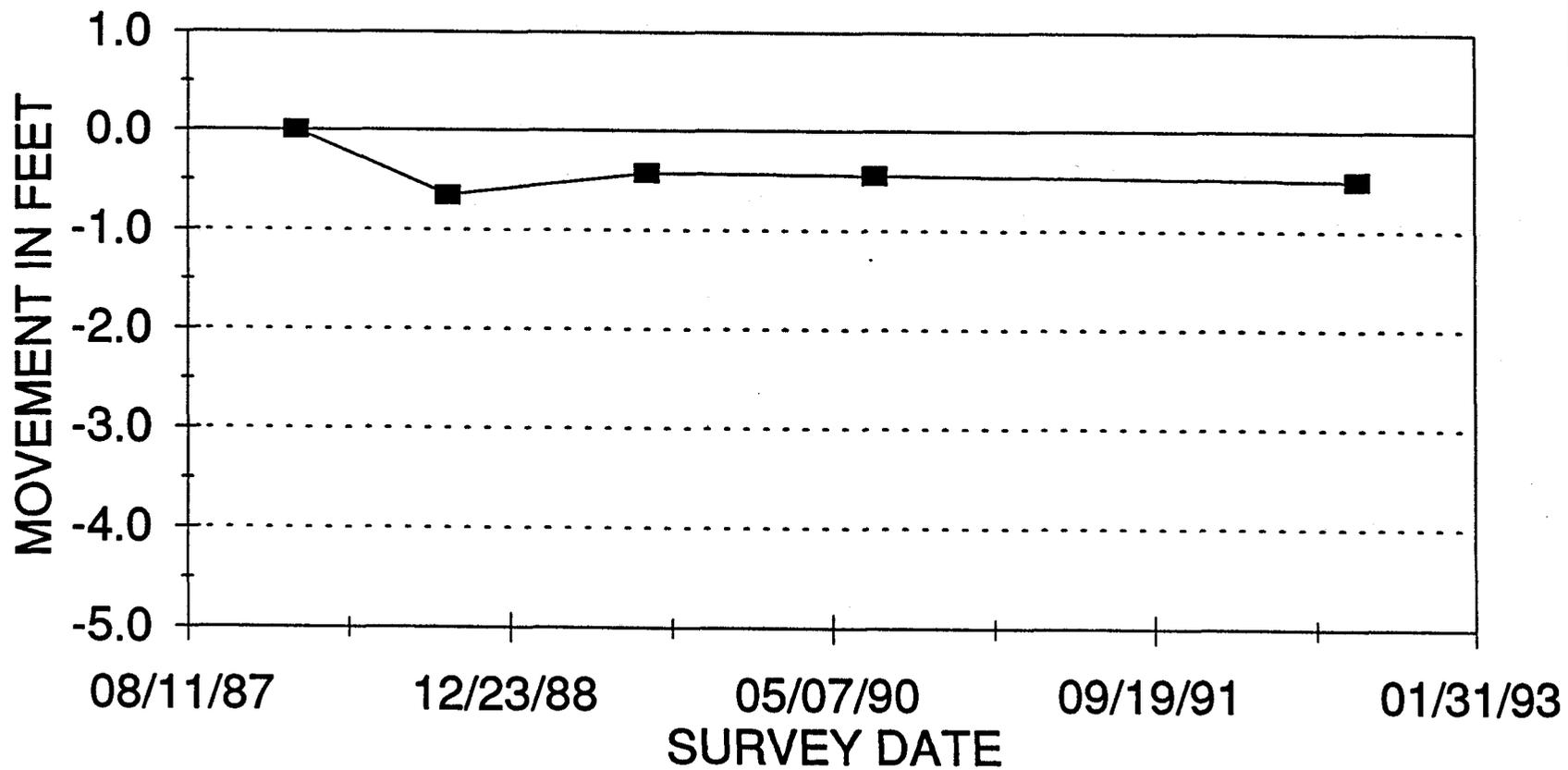
# CORNCOB WASH PR-14



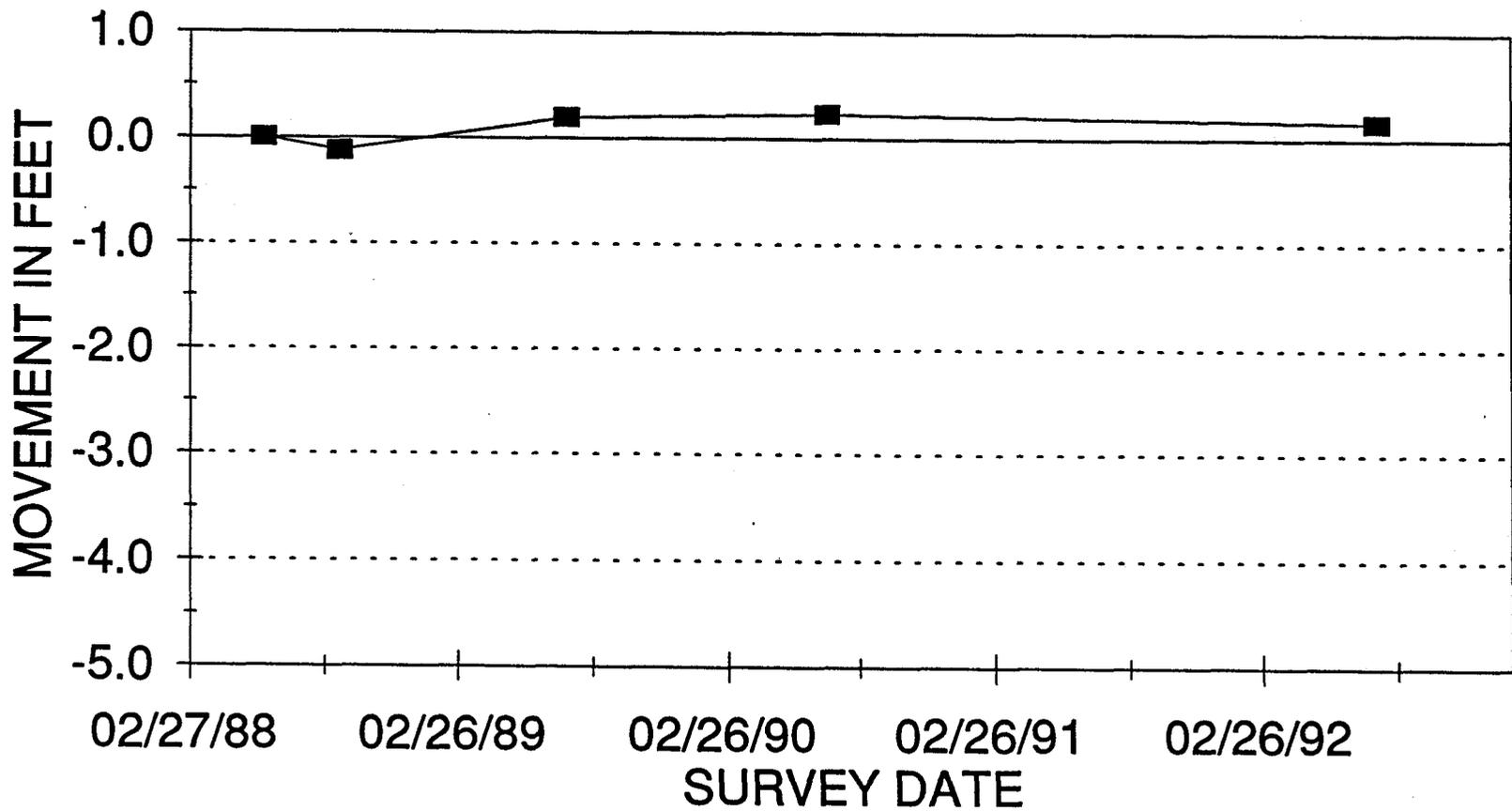
# MILLER CANYON PR-1



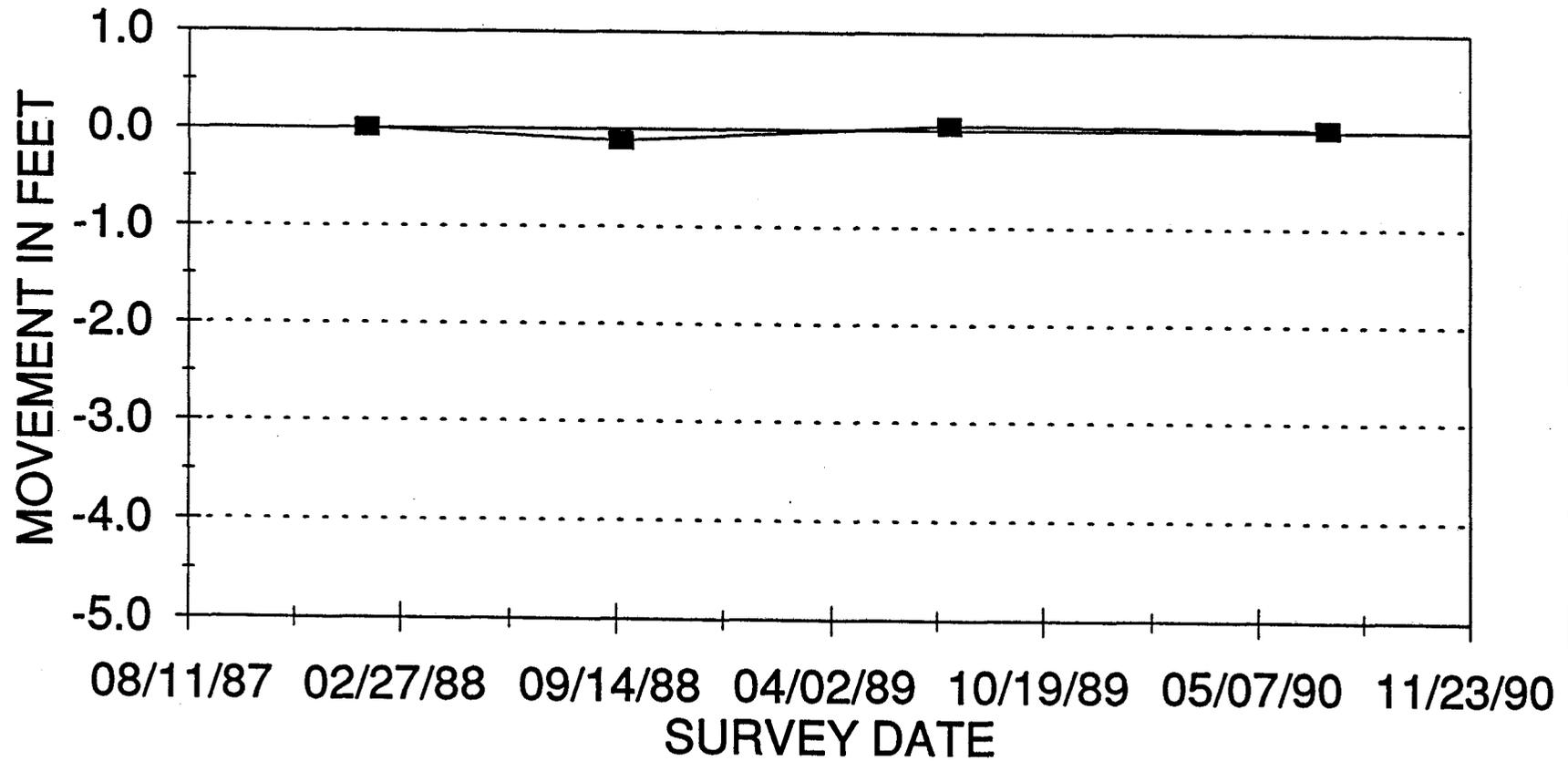
# MILLER CANYON PR-2



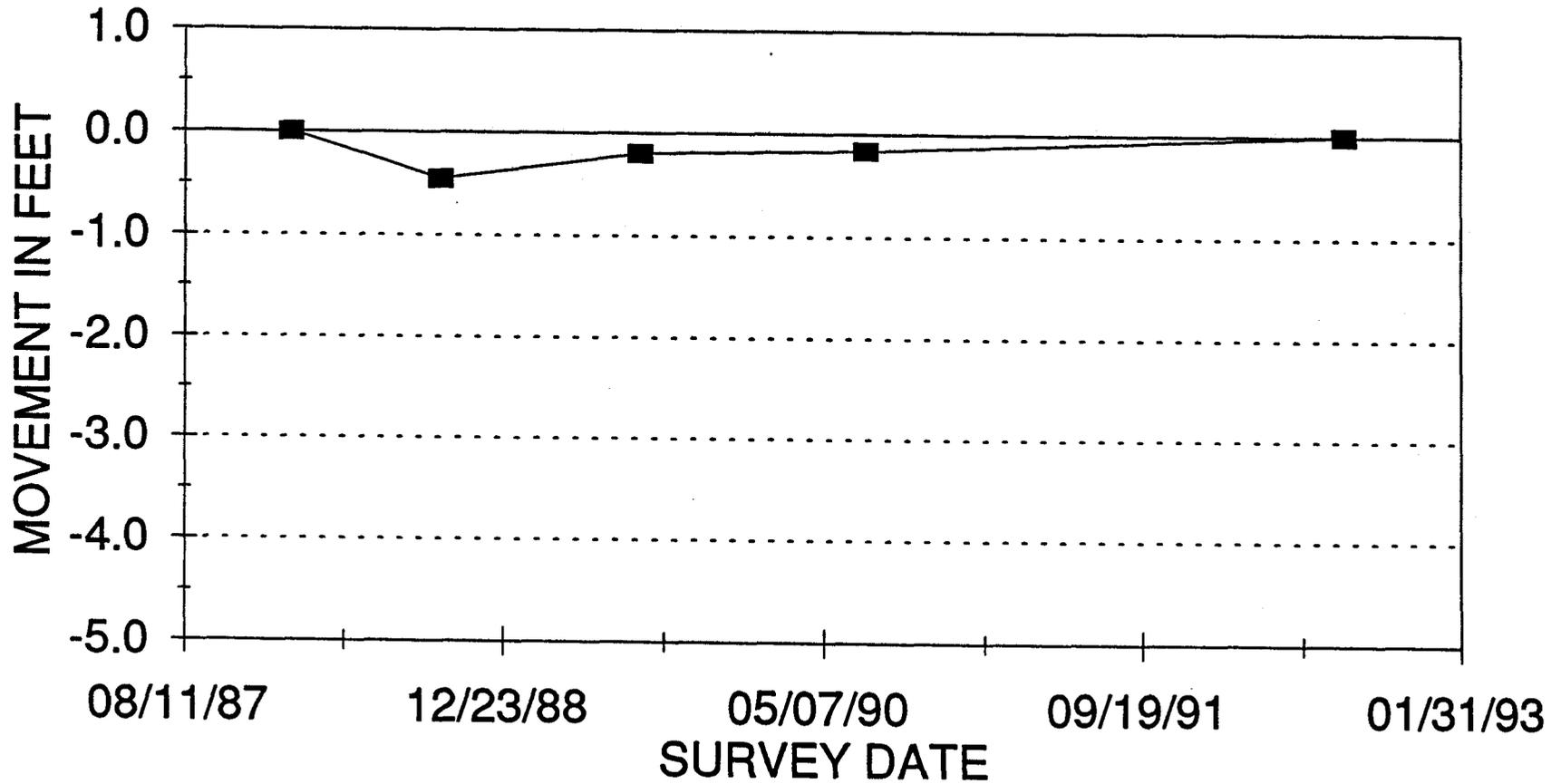
# MILLER CANYON PR-3



# MILLER CANYON PR-4

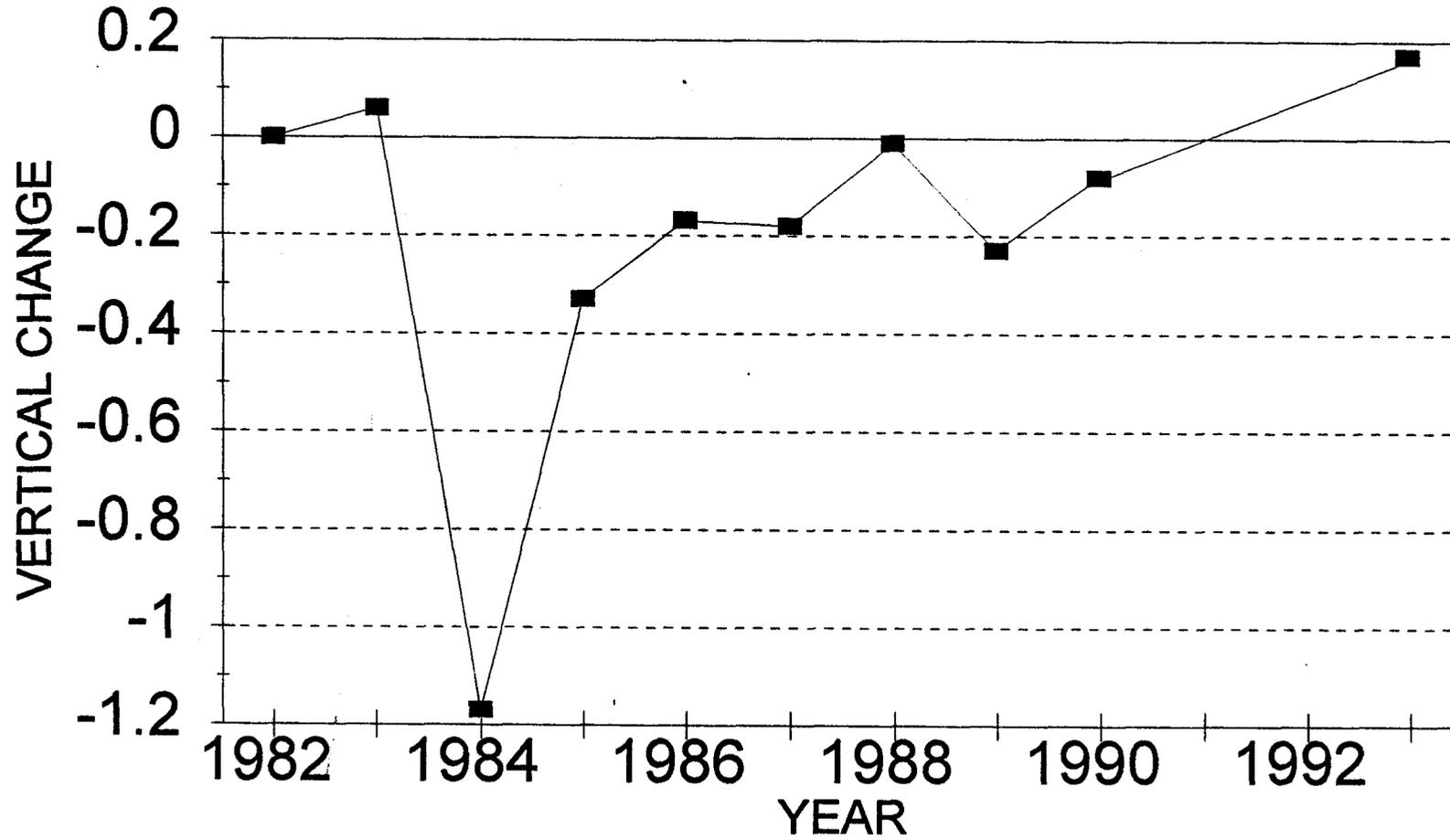


# MILLER CANYON PR-5

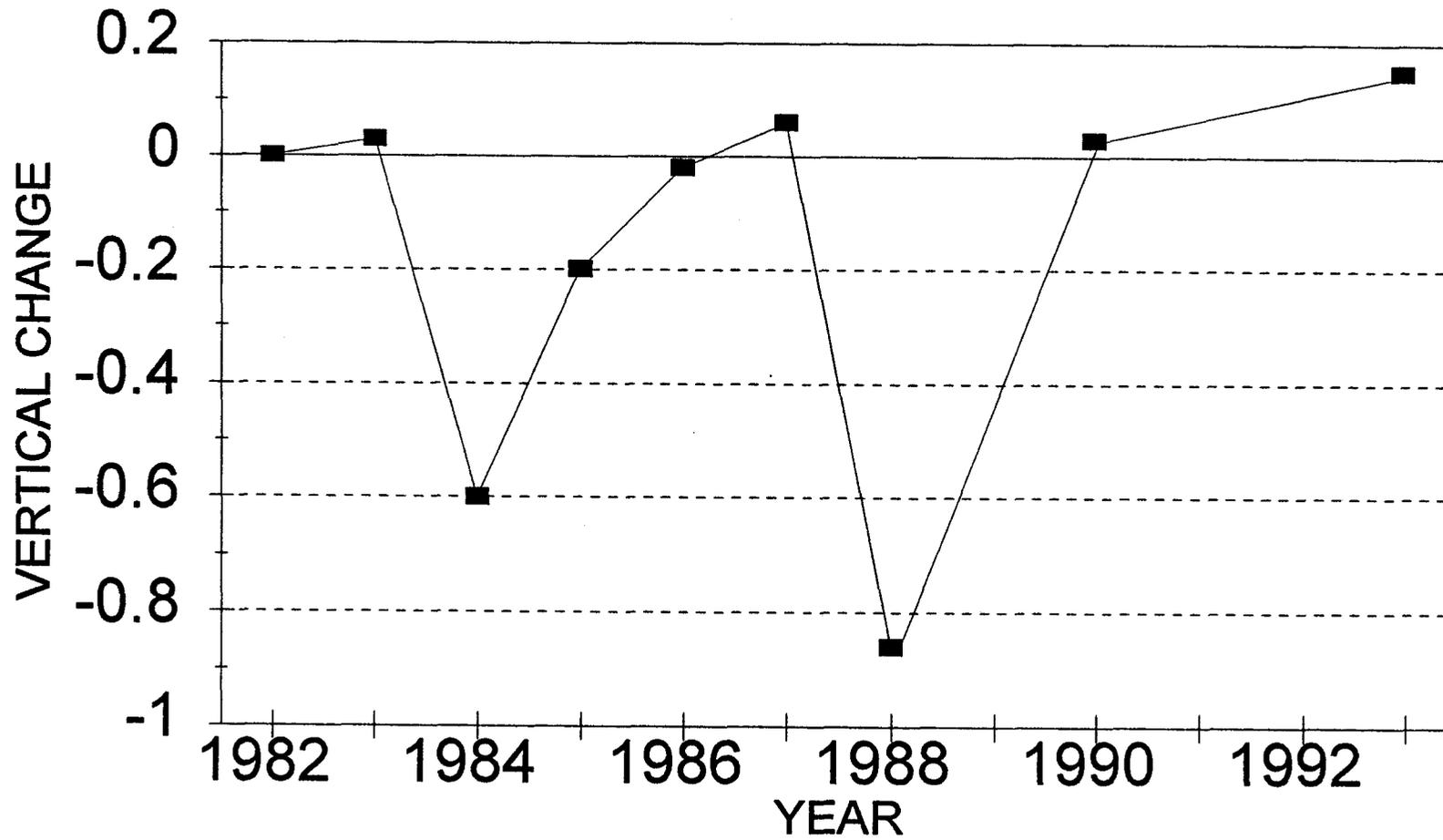


# GRIMES WASH

PRISM 1

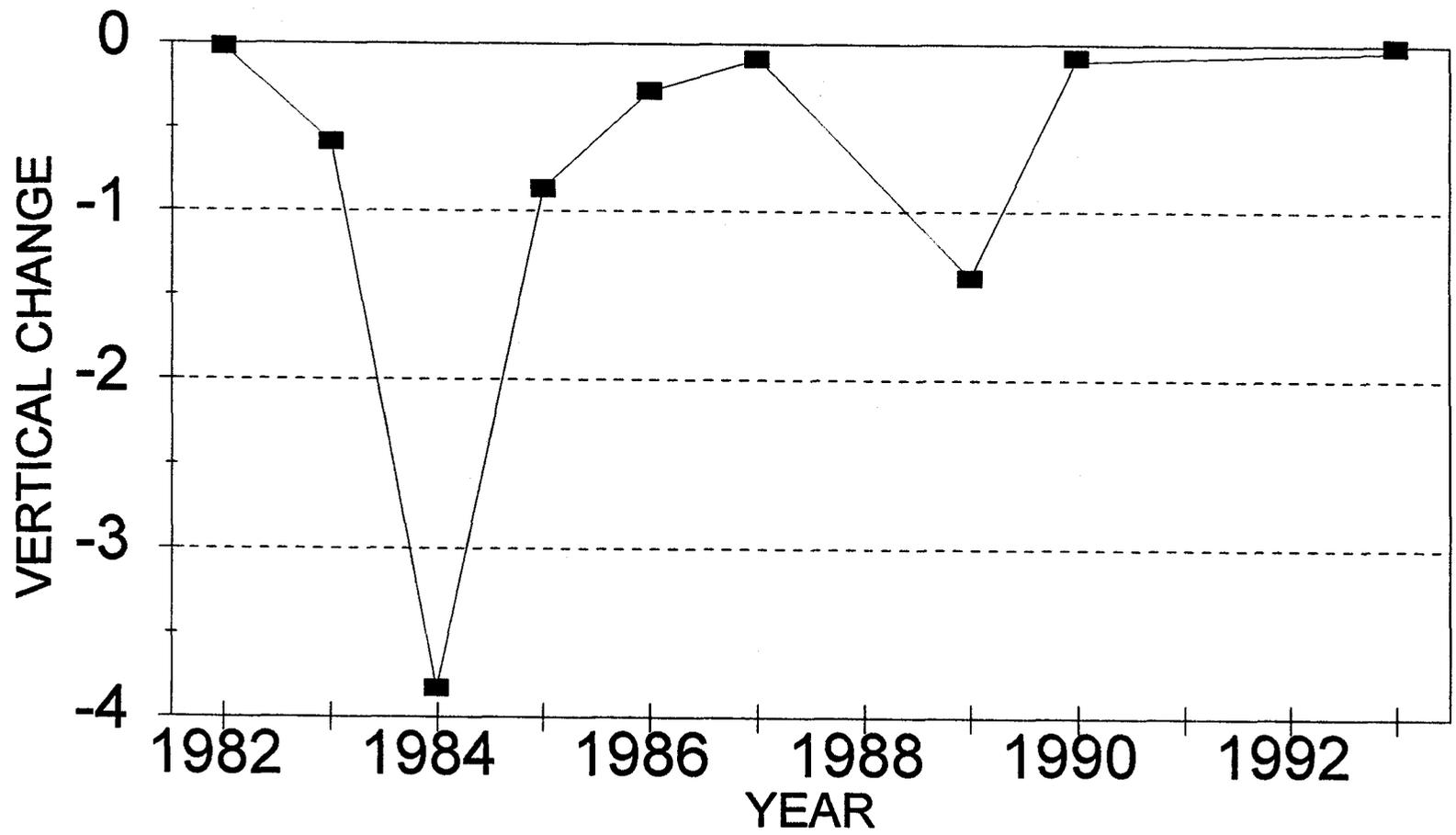


# GRIMES WASH PRISM 2



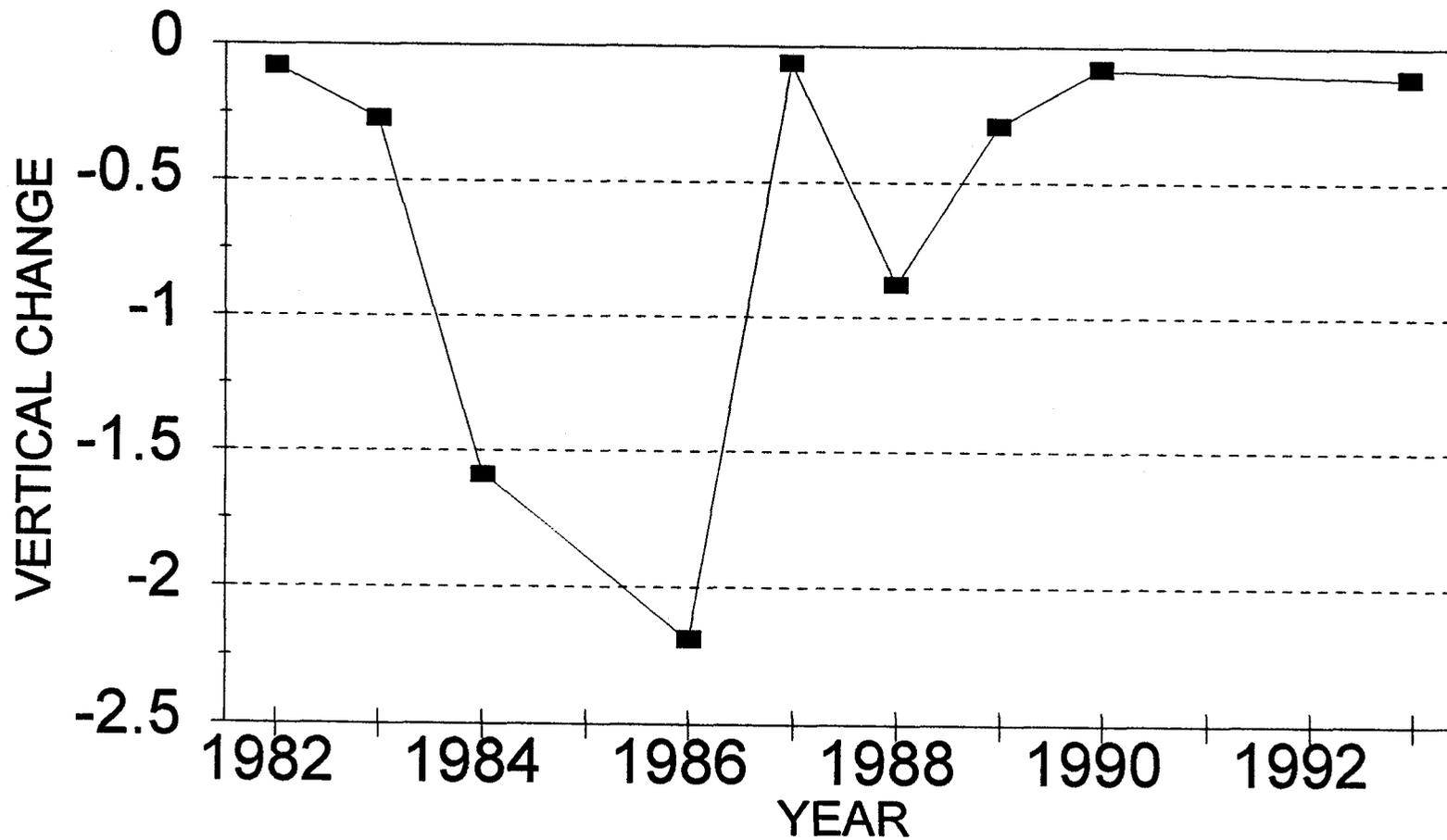
# GRIMES WASH

## PRISM 3



ADDED 6/4/96

# GRIMES WASH PRISM 4



NEWBERRY CANYON PRISMS      ELEV.      CHANGE

PR-1			
BASE	10/16/86	8661.51	0.00
	09/09/87	8661.90	0.39
	09/09/88	8661.51	0.00
	09/09/89	8661.42	-0.09
	07/13/90	8661.68	0.17
	07/31/92	8661.05	-0.46
	03/17/96	8661.69	0.18

PR-2			
BASE	16-Oct-86	8661.20	0.00
	09-Sep-87	8661.29	0.09

PRISM LOST DUE TO SPALLING BETWEEN 1-30-87 AND 2-09-87

PR-3			
BASE	10/16/86	8884.18	0.00
	09/09/87	8879.77	-4.41
	09/09/88	8879.50	-4.68
	09/09/89	8879.55	-4.63
	07/13/90	8879.39	-4.79
	07/31/92	8879.95	-4.23
	03/17/96	8879.52	-4.66

PR-4			
BASE	10/16/86	8679.50	0.00
	09/09/87	8674.88	-4.62
	09/09/88	8674.76	-4.74
	09/09/89	8674.72	-4.78
	07/13/90	8674.94	-4.57
	07/31/92	8673.84	-5.66
	03/17/96	8674.91	-4.59

PR-5			
BASE	12/16/88	8682.62	0.00
	09/07/89	8682.63	0.01
	09/11/90	8682.41	-0.21
	07/30/92	8682.62	0.00
	05/03/93	8682.34	-0.28
	02/05/95	8682.63	0.01

PR-6			
BASE	12/16/88	8636.87	0.00
	09/07/89	8636.72	-0.15
	09/11/90	8636.65	-0.22
	07/30/92	8635.98	-0.89
	05/03/93	8636.44	-0.43
	02/05/95	8636.81	-0.06

PR-7			
BASE	09/07/89	8649.78	0.00
	09/11/90	8644.08	-5.70

07/30/92	8644.11	-5.67
05/03/93	8643.88	-5.90
02/05/95	8644.18	-5.60

PR-8  
BASE

09/10/89	8653.62	0.00
09/11/90	8647.85	-5.76
07/30/92	NO DATA COLLECTED	
05/03/93	NO DATA COLLECTED	
02/05/95	8647.88	-5.74

PR-9  
BASE

09/07/89	8666.49	0.00
09/11/90	8662.47	-4.01
07/30/92	8662.27	-4.22
05/03/93	8662.36	-4.13
02/05/95	8662.38	-4.11

PR-10  
BASE

09/07/89	8670.71	0.00
09/11/90	8665.87	-4.84
07/30/92	8664.43	-6.27
05/03/93	8665.43	-5.28
02/05/95	8665.72	-4.98

CORN COB WASH

PR-11  
BASE

02/19/90	8708.98	0.00
09/11/90	8706.58	-2.40
07/30/92	8706.05	-2.93
02/19/95	8705.98	-3.00

PR-12  
BASE

02/19/90	8698.60	0.00
09/11/90	8694.06	-4.53
07/30/92	8693.57	-5.02
02/19/95	8693.59	-5.01

PR-13  
BASE

02/19/90	8654.05	0.00
06/14/90	8654.38	0.32

PRISM LOST TO SPALLING BETWEEN 6/14/90 AND 6/27/90

PR-14  
BASE

02/19/90	8730.70	0.00
09/11/90	8730.84	0.14
07/30/92	8730.80	0.10
02/19/95	8730.51	-0.19

FLY CANYON PRISMS

PR-1  
BASE

01/27/88	8536.54	0.00
----------	---------	------

09/19/88	8536.35	-0.19
07/24/89	8536.54	-0.00
07/13/90	8536.54	-0.01
07/31/92	8536.51	-0.04

PR-2  
BASE

01/27/88	8832.17	0.00
09/19/88	8831.52	-0.65
07/24/89	8831.74	-0.43
07/13/90	8831.72	-0.45
07/31/92	8831.68	-0.49

PR-3  
BASE

06/08/88	8426.19	0.00
09/19/88	8426.07	-0.12
07/24/89	8426.39	0.20
07/13/90	8426.43	0.24
07/31/92	8426.35	0.16

PR-4  
BASE

01/27/88	8781.43	0.00
09/19/88	8781.31	-0.12
07/24/89	8781.48	0.05
07/13/90	8781.45	0.02
07/31/92	NO DATA COLLECTED	

PR-5  
BASE

01/27/88	8481.41	0.00
09/19/88	8480.95	-0.46
07/24/89	8481.21	-0.20
07/31/92	8481.41	0.00

# GRIMES WASH PRISMS

LEASE U-1358	CHANGE FROM BASE ELEVATION			
YEAR	PR-1	PR-2	PR-3	PR-4
1982	0.00	0.00	-0.02	-0.08
1983	0.06	0.03	-0.59	-0.27
1984	-1.17	-0.60	-3.83	-1.59
1985	-0.33	-0.20	-0.87	
1986	-0.17	-0.02	-0.28	-2.19
1987	-0.18	0.06	-0.09	-0.06
1988	-0.01	-0.86		-0.88
1989	-0.23		-1.40	-0.29
1990	-0.08	0.03	-0.08	-0.08
1991	NO DATA COLLECTED			
1992	NO DATA COLLECTED			
1993	0.17	0.15	-0.01	-0.11
1994	NO DATA COLLECTED			
1995	NO DATA COLLECTED			