

ARCO-BLUEWATER MILL TAILINGS SETTLEMENT

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ARCO-BLUEWATER MILL TAILINGS SETTLEMENT

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be brought to the surface and minimize the flow into the foundation in order to protect groundwater and while still maintaining the efficiency of the band drain. The depth of wick penetration, measured from the existing ground surface is given on Figure 10.

6.2 Vertical Drain Installation

Vertical band drains were installed at the locations and to the depths shown on Figure 10. The drains were installed from November 1, 1992 to March 12, 1993. A summary of the wick installation is presented in Table 3.

Table 3: Summary of Wick Installation

Period of Time (months)	Wick Spacing (ft)	Number of Wicks	Total Lineal Footage
6	11	27,456	754,996

7.0 SETTLEMENT MONITORING

Settlement monitoring has been conducted at the Bluewater Mill to observe and document the consolidation of the slimes portion of the Main Tailings Impoundment following the placement of fill from cleanup activities around the site.

7.1 Settlement Monuments and Surveys

A total of 27 settlement monuments were placed and have been monitored. Thirteen of these monuments (1-9, NS8, 11, 16, and 17) have been monitored since September, 1992. The other 14 monuments (19-32) have been monitored since the completion of the vertical band drain installation (February, 1993). These settlement monuments are located as shown on Figure 11. The settlement data from these monuments are presented on Table 4. The settlement versus time and the settlement versus the square root of time curves are plotted and presented in Appendix C.

The settlement monuments consist of a stable point so that repeated surveying does not disturb the point. The monuments are constructed of a one foot square steel plate with a 2-in. steel pipe welded to the plate and the base embedded in 6 inches of concrete. Monuments 1-11 were placed directly on the slime surface prior to loading. The remainder of the monuments were placed approximately 10 feet below the surface after loading occurred. Elevation readings were

taken for the settlement monuments using differential level surveys. These level surveys were tied to a stable survey reference monument located off the slime tailings. The uniformity of survey data indicates good survey precision.

Some settlement readings were taken of the monuments before September, 1992, however, these data were not used in the analysis because most of the monuments were physically damaged at some point during construction.

Two additional elevations for each settlement point were determined in addition to the readings taken from the settlement monuments. These elevations were necessary to develop the initial portion of the settlement curve. These elevations were obtained from topographic surveys of the area and from the piezocone data. The methodology used to determine these two elevations and to adjust the recent settlement data with the two elevations is described below.

Initial Elevations

The initial elevation of the top of the slime tailings was determined from an aerial survey which represents the conditions present in January, 1991, prior to placement of any fill. This survey is presented on Figure 12.

Fill was placed over the slimes during a period from January 1991 through September 1992 with the majority of the fill placed between July 1991 and April 1992. The fill was constructed by first placing a relatively thick lift (approximately 3 to 5 feet) and subsequently placing and compacting one-foot thick lifts until the required subgrade elevations were achieved. Since the fill was placed over a span of several months, it was necessary to determine an average time of placement of the fill for the settlement analysis. January 1, 1992 was approximately the half way point through the cover placement and therefore this date was used as the starting date for the settlement analysis.

Second Elevation Point

The second elevation point used in the analysis was obtained by combining two pieces of information. First, the thickness of the cover was known from the piezocone testing conducted during July and August, 1992 (Appendix A). Second, the elevation of the top of the cover was known in April, 1992 from a field topographic survey shown on Figure 13. Using these two sources of data, the elevation of the top of the slime tailings was determined by subtracting the thickness of the cover as determined from the piezocone testing from the elevation of the cover.

The interface between the fill and the slime tailings was easily determined from the piezocone probes. Both the tip resistance and the side friction is much lower for slime tailings than for the compacted fill. Figure 14 shows a typical piezocone log along with the interpretation of the location of the fill/tailings interface.

The field survey was conducted before the piezocone testing and no fill was placed between April and August 1992.

Elevation points after August 1992

Differential level surveys of the settlement monuments were taken at 13 points (1-9, NS8, 11, 16 and 17) from September 1992 to the present. Those data were added to the first two settlement points determined as described above.

The settlement data for the period from September 1992 to the present were not relative to the top of the slime tailings because the settlement points were not placed directly on top of the slime tailings. Therefore, the settlement readings had to be adjusted to the top of the slime tailings in order to correspond to the first two elevations. To adjust the settlement readings, it was assumed that the elevation of the top of the slime tailings at the time of the settlement reading in September 1992 was the same as the elevation determined for August 1992 using the topographic survey and the piezocone data as discussed above. All survey data after September, 1992 was adjusted accordingly. Figure 14-A depicts the establishment of the initial and second elevation points and the adjustments used for plotting the consolidation graphs.

The remainder of the 27 settlement points (19-32) do not have settlement readings until February, 1993. Therefore, the recent settlement readings could not be adjusted to the first two elevations. For visual presentation, it was assumed that no settlement occurred between August 1992 and February 1993.

7.2 Settlement Results

There are several elements that lead to the conclusion that at least 90% of the primary settlement due to the placement of 10 to 15-feet of fill has occurred. First, the calculated model for both unaided and enhanced consolidation by placement of wick drains indicate that 90% settlement should be complete. Secondly, the settlement data were plotted against the square root of time so that a graphical analysis could be conducted to determine when 90% of the primary consolidation was complete. This is a widely used technique to interpret settlement data (Lambe and Whitman, 1969). The settlement versus square root of time curves indicate that 90% consolidation has occurred. In addition, survey data indicates that any movement occurring now is very minimal and consistent with the curves showing that 90% consolidation is complete.

The survey data for the settlement monuments that have a complete data history (1-9, NS8, 11, 16 and 17) are shown on Figures 15-27. The location of these settlement points is shown on Figure 28. The graphical solution to determine time for 90% consolidation is also shown on the figures. For all cases, the settlement data indicate that 90% consolidation has been achieved.

The remaining settlement monuments (19-32) were not graphically analyzed to determine if 90% of the primary consolidation is complete. These points could not be adequately evaluated as they were not monitored for the time period between September 1992 and February 1993, due to inaccessibility of the monuments or that the monuments had not been installed until after construction of the loading layer was complete. It is difficult to tie the recent settlement data to the initial two points without this interim data. Even though the new settlement points were not evaluated, the graphical presentation of the existing data shown on Figures 29-42 indicates that the general shape of these curves is similar to the curves with interim data and that the majority of the consolidation appears completed.

Settlement over the entire area is determined to be complete since the points that could be analyzed show that at least 90% of the primary consolidation has been achieved and these settlement point adequately cover the area of concern (Figure 28). Additionally, the other settlement points (19-32) show results that are similar to the points that were analyzed. Recent survey readings clearly indicate that any movement occurring in recent months is very minimal and consistent with the curves showing that 90% consolidation is complete. The most recent readings differ by only a few hundredths of a foot.

8.0 CONCLUSION

A comprehensive program was conducted which demonstrates that consolidation of the slime tailings has been achieved and placement of the radon barrier can commence. The program identified areas where consolidation was complete and no action was necessary. It also identified areas where an accelerated consolidation program was necessary. Wicks were installed in these areas and consolidation has now occurred. Monitoring data show that significant settlement (four to eight feet) has occurred and that very little additional settlement is occurring. Further, by using the initial data obtained from the surveys and the piezocone study, the graphical determination of settlement shows that more than 90% of the primary settlement has occurred and therefore, construction of the final radon barrier can begin.

9.0 REFERENCES

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Table 4 - Settlement Data

Date	S1	S2	S3	S4	S5	S6	S7	S8	NS8	S9	S10	S11	S12	S13	S14	S15
JAN-92	6619.8	6615.9	6610	6608	6606	6606	6609	6613.4	6606.6	6617.6	destroyed	6614.8		not set by evaluation period		
AUG-92	6611.9	6610.2	6604.4	6604.6	6600.6	6601.7	6605.8	6606.9	6602	6612	by TMC	6609.5				
15-OCT-92	6612.1	6610.2	6604.9	6604.6	6600.5	6601.7	6605.8	6606.9	6602	6611.9		6609.6				
25-NOV-92	6612	6609.9	6604.9	6604.6	6600.4	6601.5	6605.7	6606.8	6602	6612		6609.6				
03-DEC-92	6611.8	6609.8	6604.6	6604.3	6600.2	6601.4	6605.4	6606.6	6601.7	6611.7		6609.3				
10-DEC-92	6611.7	6609.8	6604.6	6604.3	6600.2	6601.4	6605.4	6606.6	6601.7	6611.7		6609.3				
16-DEC-92	6611.7	6609.8	6604.6	6604.3	6600.1	6601.4	6605.4	6606.5	6601.7	6611.7		6609.3				
23-DEC-92	6611.8	6609.8	6604.6	6604.3	6600.1	6601.4	6605.4	6606.5	6601.7	6611.7		6609.3				
30-DEC-92	6611.8	6609.8	6604.5	6604.2	6600.1	6601.4	6605.3	6606.5	6601.7	6611.7		6609.3				
07-JAN-93	6611.7	6609.9	6604.5	6604.2	6600	6601.3	6605.3	6606.5	6601.6	6611.6		6609.3				
14-JAN-93	6611.8	6609.8	6604.6	6604.3	6600.1	6601.3	6605.3	6606.5	6601.5	6611.6		6609.3				
21-JAN-93	6611.8	6609.9	6604.5	6604.3	6600	6601.3	6605.3	6606.4	6601.4	6611.6		6609.3				
28-JAN-93	6611.8	6609.91	6604.6	6604.3	6600.1	6601.3	6605.3	6606.4	6601.5	6611.7		6609.3				
22-FEB-93	6611.88	6609.92	6604.56	6604.26	6600.04	6601.39	6605.33	6606.49	6601.7	6611.78		6609.31				
11-MAR-93	6611.85	6609.97	6604.48	6604.21	6600	6601.36	6605.29	6606.32	6601.66	6611.72		6609.31				
22-MAR-93	6611.95	6609.91	6604.54	6604.25	6600.09	6601.41	6605.36	6606.28	6601.71	6611.8		6609.34				
07-APR-93	6611.9	6609.91	6604.44	6604.15	6600	6601.34	6605.3	6606.18	6601.64	6611.76		6609.35				
15-APR-93	6611.92	6609.9	6604.42	6604.14	6599.99	6601.33	6605.29	6606.16	6601.63	6611.77		6609.35				
21-APR-93	6611.9	6609.91	6604.4	6604.1	6599.97	6601.31	6605.27	6606.11	6601.61	6611.75		6609.33				
29-APR-93	6611.9	6609.85	6604.37	6604.09	6599.96	6601.31	6605.26	6606.1	6601.6	6611.77		6609.33				
11-MAY-93	6611.87	6609.83	6604.3	6604.02	6599.88	6601.23	6605.19	6606.01	6601.53	6611.7		6609.28				
29-MAY-93	6611.85	6609.87	6604.24	6603.96	6599.84	6601.21	6605.17	6605.94	6601.5	6611.69		6609.25				
10-JUN-93	6611.87	6609.87	6604.25	6603.96	6599.84	6601.22	6605.18	6605.96	6601.51	6611.73		6609.28				
24-JUN-93	6611.89	6609.81	6604.24	6603.96	6599.85	6601.22	6605.16	6605.92	6601.52	6611.72		6609.29				
13-JUL-93	6611.85	6609.84	6604.14	6603.85	6599.75	6601.15	6605.08	6605.84	6601.42	6611.66		6609.21				
27-JUL-93	6611.86	6609.85	6604.12	6603.83	6599.75	6601.15	6605.09	6605.83	6601.41	6611.69		6609.24				
12-AUG-93	6611.89	6609.84	6604.12	6603.83	6599.74	6601.15	6605.1	6605.83	6601.42	6611.68		6609.26				
25-AUG-93	6611.89	6609.79	6604.09	6603.77	6599.71	6601.14	6605.07	6605.8	6601.4	6611.69		6609.25				
08-SEP-93	6611.85	6609.78	6604.01	6603.7	6599.63	6601.08	6605.01	6605.74	6601.32	6611.65		6609.21				
25-SEP-93	6611.86	6609.78	6604.02	6603.71	6599.65	6601.1	6605.03	6605.74	6601.33	6611.66		6609.22				
06-OCT-93	6611.83	6609.77	6603.98	6603.65	6599.57	6601.03	6604.98	6605.7	6601.3	6611.62		6609.17				
18-OCT-93	6611.84	6609.73	6603.95	6603.61	6599.54	6601.01	6604.94	6605.66	6601.25	6611.62		6609.17				
02-NOV-93	6611.83	6609.7	6603.91	6603.6	6599.52	6601	6604.93	6605.66	6601.23	6611.64		6609.18				
15-NOV-93	6611.8	6609.7	6603.86	6603.5	6599.5	6601	6604.89	6605.62	6601.2	6611.61		6609.15				

All values are normalized as explained in Sec. 7.1

Table 4 - Settlement Data (cont)

Date	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	S31	S32
JAN-92	6610.9	6610	not set	6606	6607.7	6607.1	6610	6609.2	6608.7	6608.9	6623	6610.5	6610.9	6609.9	6611.1	6611.8	6611.8
AUG-92	6608.5	6609		6608.8	6602	6602.4	6606	6606	6603.9	6605.4	6609	6604.7	6608	6606.1	6605.9	6607.4	6607.2
15-OCT-92	6608.6	6605															
25-NOV-92	6608.5	6604.9															
03-DEC-92	6606.3	6604.8															
10-DEC-92	6606.25	6604.8															
18-DEC-92	6606.25	6604.8															
23-DEC-92	6606.25	6604.8															
30-DEC-92	6606.2	6604.8															
07-JAN-93	6606.2	6604.8															
14-JAN-93	6606.2	6604.8															
21-JAN-93	6606.2	6604.8															
28-JAN-93	6606.1	6604.8															
22-FEB-93	6606.07	6604.55		6600.8	6602	6602.4	6606	6606	6603.9	6605.4	6609	6604.7	6606	6605.1	6605.9	6607.4	6607.2
1-MAR-93	6605.97	6604.48		6600.56	6601.93	6602.41	6606.01	6605.9	6603.81	6605.4	6608.97	6604.57	6605.9	6606.08	6605.76	6607.25	6607.09
22-MAR-93	6605.94	6604.52		6600.62	6601.99	6602.45	6606.02	6605.91	6603.87	6605.41	6609.1	6604.6	6605.91	6606.08	6605.81	6607.24	6607.06
07-APR-93	6605.88	6604.41		6600.54	6601.88	6602.37	6605.93	6605.8	6603.76	6605.35	6606.05	6604.48	6605.78	6606.01	6605.71	6607.18	6606.96
15-APR-93	6605.84	6604.39		6600.53	6601.89	6602.38	6605.91	6605.79	6603.77	6605.34	6609.07	6604.45	6605.74	6605.99	6605.68	6607.17	6606.92
21-APR-93	6605.78	6604.38		6600.52	6601.88	6602.34	6605.9	6605.75	6603.74	6605.32	6609.06	6604.41	6605.7	6605.95	6605.63	6607.12	6606.83
29-APR-93	6605.75	6604.34		6600.52	6601.85	6602.33	6605.88	6605.74	6603.72	6605.31	6609.06	6604.38	6605.68	6605.94	6605.52	6607.12	6606.84
11-MAY-93	6605.64	6604.28		6600.44	6601.78	6602.24	6605.81	6605.64	6603.64	6605.22	6609.02	6604.28	6605.58	6605.84	6605.51	6607.03	6606.72
20-MAY-93	6605.57	6604.2		6600.42	6601.73	6602.23	6605.75	6605.57	6603.59	6605.22	6609.01	6604.21	6605.51	6605.8	6605.44	6606.99	6606.84
10-JUN-93	6605.55	6604.21		6600.4	6601.74	6602.23	6605.74	6605.58	6603.6	6605.22	6609.03	6604.21	6605.52	6605.8	6605.44	6607.01	6606.83
24-JUN-93	6605.52	6604.18		6600.44	6601.74	6602.24	6605.71	6605.56	6603.6	6605.21	6609.05	6604.17	6605.49	6605.78	6605.39	6607	6606.57
13-JUL-93	6605.4	6604.08		6600.34	6601.66	6602.15	6605.63	6605.45	6603.5	6605.12	6609	6604.06	6605.39	6605.67	6605.28	6606.91	6606.44
27-JUL-93	6605.39	6604.08		6600.35	6601.65	6602.15	6605.63	6605.42	6603.48	6605.13	6609.03	6604.03	6605.37	6605.66	6605.28	6606.92	6606.41
12-AUG-93	6605.37	6604.05		6600.35	6601.65	6602.15	6605.61	6605.41	6603.46	6605.14	6609.05	6604	6605.35	6605.85	6605.23	6606.93	6606.38
25-AUG-93	6605.32	6604.02		6600.34	6601.62	6602.13	6605.59	6605.37	6603.44	6605.11	6609.04	6603.96	6605.31	6605.81	6605.19	6606.9	6606.32
08-SEP-93	6605.24	6603.94		6600.26	6601.54	6602.07	6605.51	6605.28	6603.38	6605.06	6608.98	6603.87	6605.24	6605.53	6605.09	6606.85	6606.24
25-SEP-93	6605.24	6603.93		6600.28	6601.55	6602.08	6605.52	6605.28	6603.37	6605.07	6609	6603.88	6605.23	6605.53	6605.07	6606.87	6606.21
06-OCT-93	6605.19	6603.9		6600.24	6601.49	6602.02	6605.5	6605.23	6603.33	6605.02	6609	6603.81	6605.19	6605.48	6604.99	6606.84	6606.14
18-OCT-93	6605.13	6603.87		6600.2	6601.47	6601.98	6605.47	6605.19	6603.27	6604.98	6609	6603.77	6605.17	6605.42	6604.94	6606.8	6606.09
02-NOV-93	6605.1	6603.83		6600.19	6601.46	6601.99	6605.44	6605.15	6603.25	6604.98	6608.98	6603.72	6605.12	6605.4	6604.93	6606.79	6606.06
15-NOV-93	6605.1	6603.78		6600.18	6601.43	6601.98	6605.4	6605.09	6603.22	6604.94	6608.95	6603.65	6605.06	6605.35	6604.87	6606.77	6606.01

All values are normalized as explained in Sec. 7.1

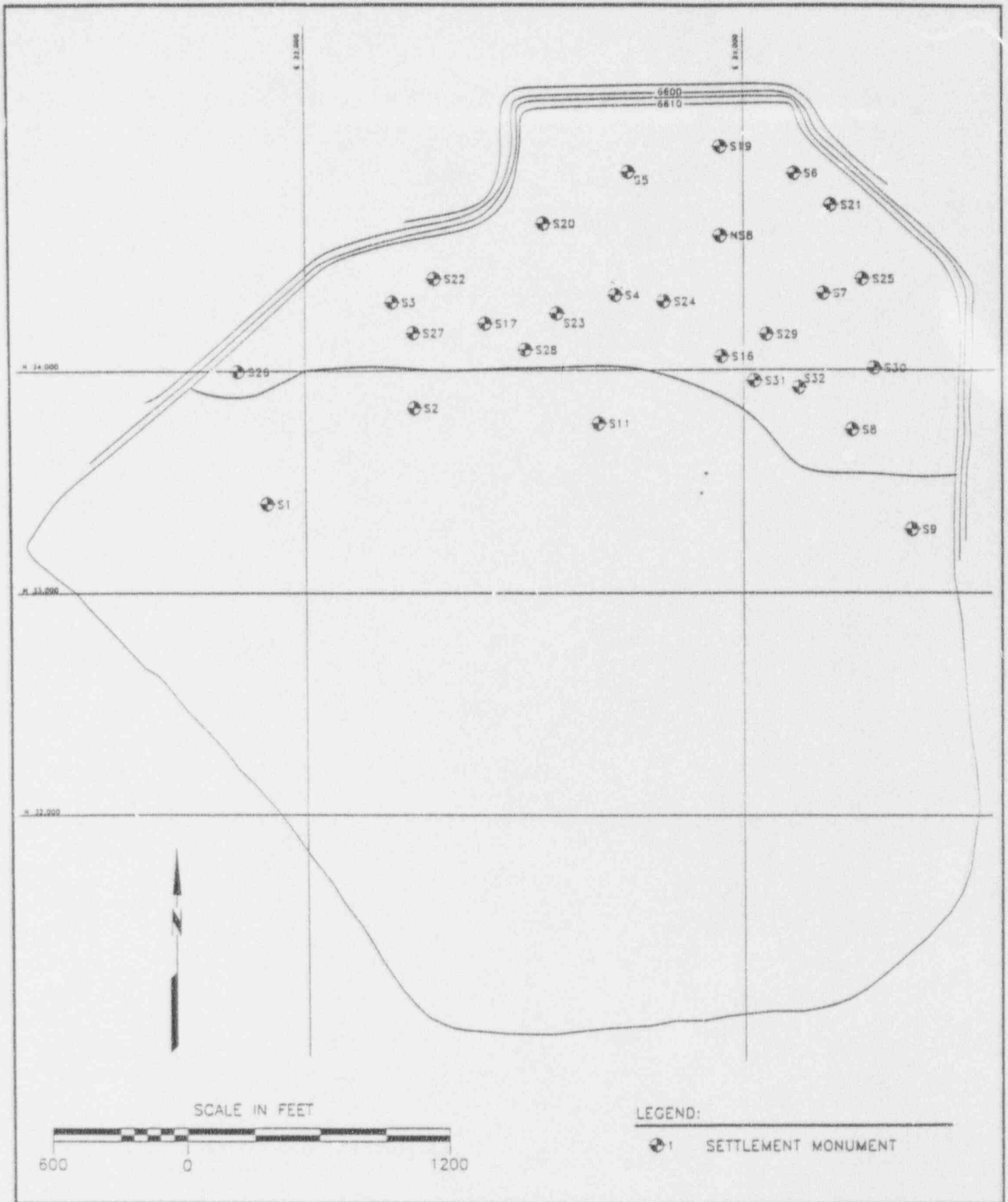


FIGURE 11
SETTLEMENT MONUMENT LOCATIONS

Date:	OCT., 1993
Project:	360
File:	SETLOC

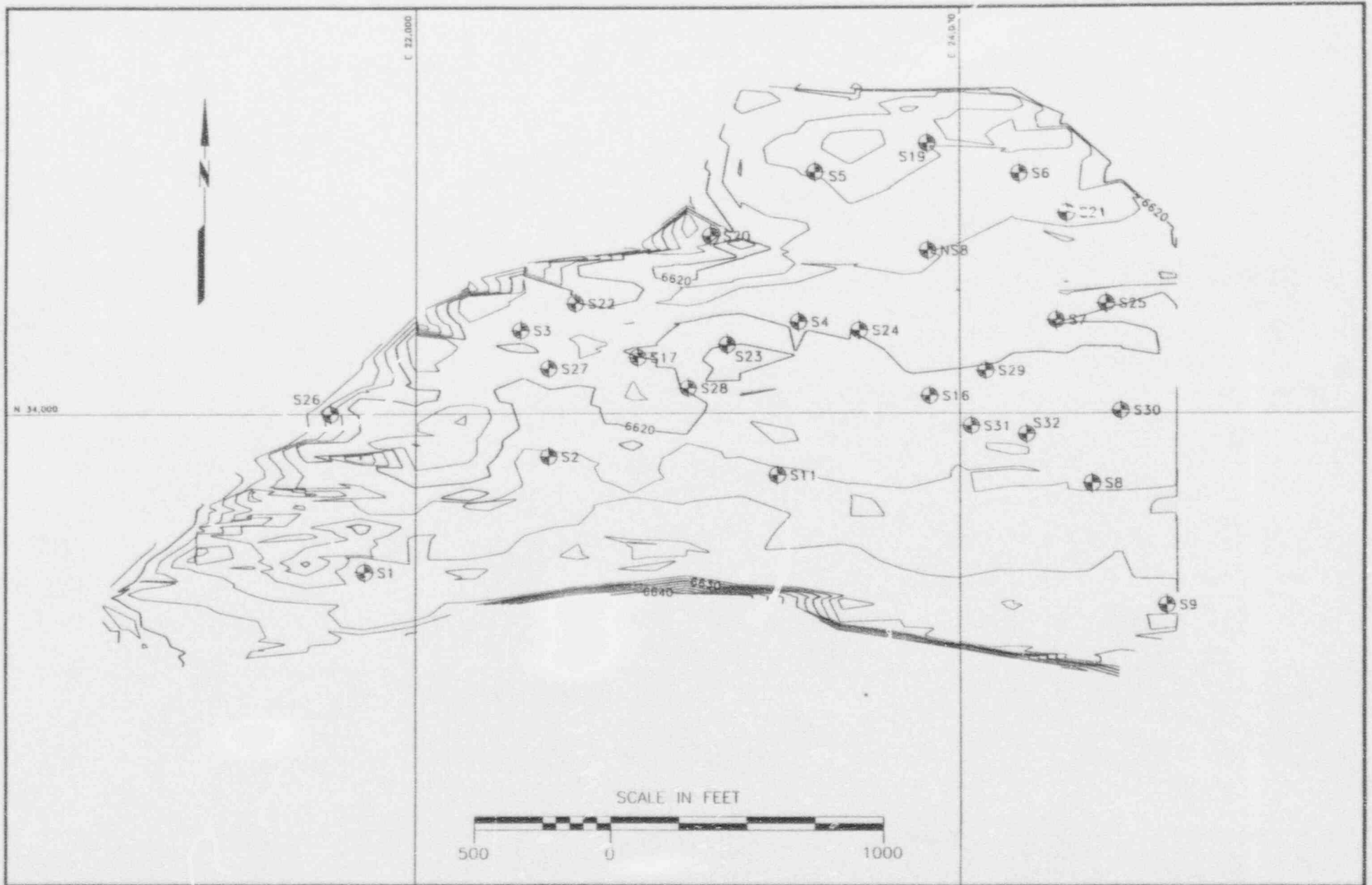
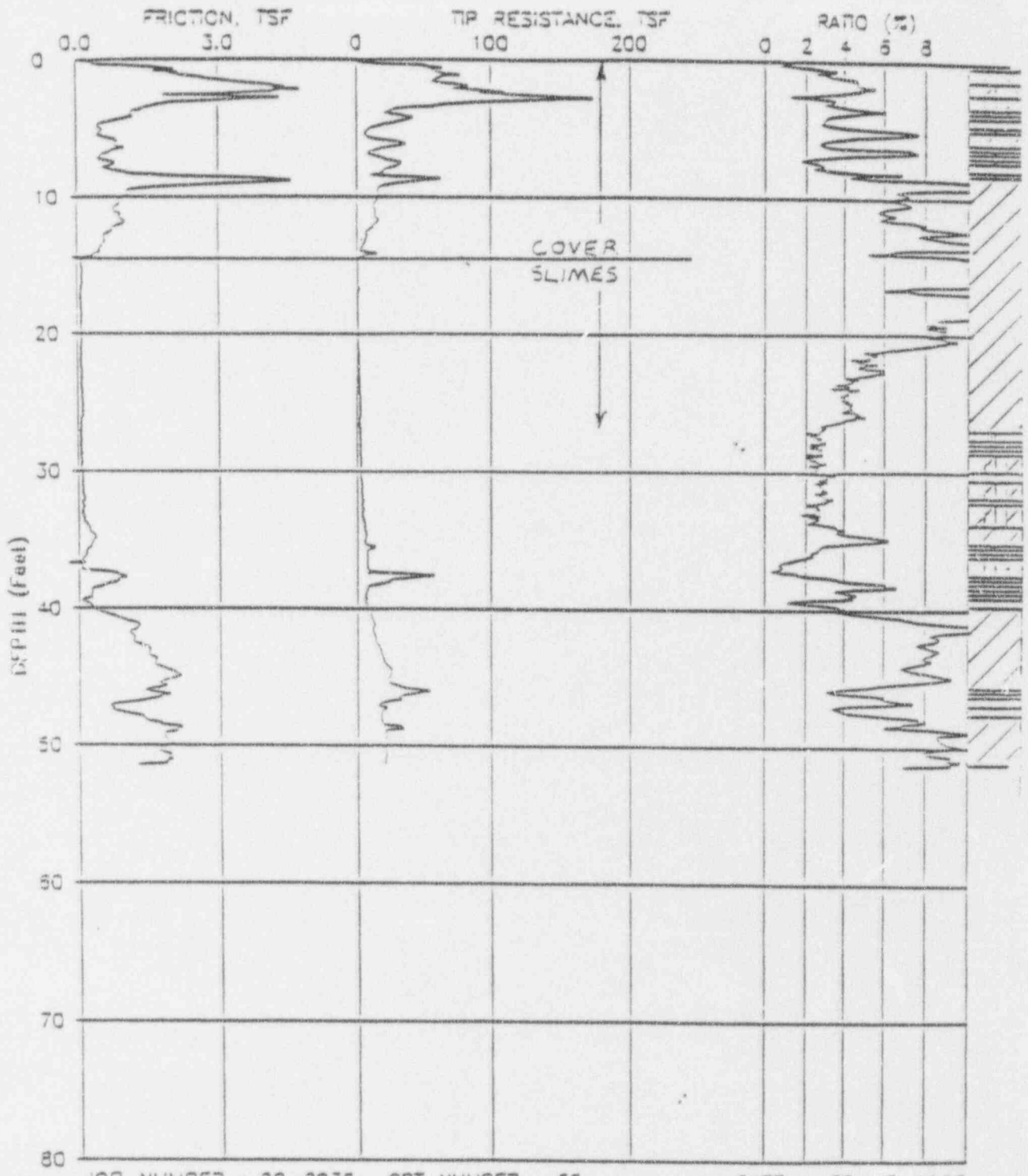


FIGURE 13
COVER ELEVATIONS - APRIL, 1992

Date:	NOV., 1993
Project:	360
File:	SL492



JOB NUMBER : 92-2236 CPT NUMBER : 55 DATE : 08-17-1992
 ELEVATION : 0.00 CONE NUMBER: F7.5CKEV606

FLUID SCIENCES, INC.



FIGURE 14
 PIEZOCONE LOG

Date:	NOV., 1993
Project:	Project:
File:	360

SURFACE AS OF APRIL 1992
REPRESENTS AUGUST '92
CONDITION (S_E)

TYPICAL SETTLEMENT MONUMENT

DEPTH OF COVER DETERMINED BY
PIEZOCONE STUDY AUGUST 1992

SURFACE AS OF JANUARY 1991
FROM AERIAL SURVEY TOPO MAP
(INITIAL ELEVATION)

(M_E)—ELEVATION FROM FIELD SURVEYS
SEPTEMBER 1992 TO PRESENT

CONSOLIDATED SURFACE (AUGUST 1992) AS DETERMINED
BY DEPTH TO SLIMES FROM PIEZOCONE STUDY
(SECOND ELEVATION POINT)

ELEVATION DATA (SEPTEMBER 1992 TO PRESENT)
ADJUSTED TO CURRENT CONSOLIDATED SURFACE
AS DETERMINED BY FOLLOWING FORMULA
 $dZ = D - (S_E - M_E)$

DATE	REVISION	BY	DATE	SECTION	NO.



ANDERSON ENGINEERING CO., INC.

Long Beach Salt Lake City Grand
California Utah New Mexico

Telephone (801) 751-4566 Fax (801) 751-7808

CIVIL ENGINEERS

CONSTRUCTION MANAGERS

FIGURE 14A
ESTABLISHMENT OF
RELATIVE ELEVATIONS

ATLANTIC REFINING COMPANY



OWNER: AT
DESIGNER: SA
APPROVER: CS
DATE: 12/01/92
GRID SCALE: NTS
FIELD SCALE: NTS
NOTES:

Settlement Point 1

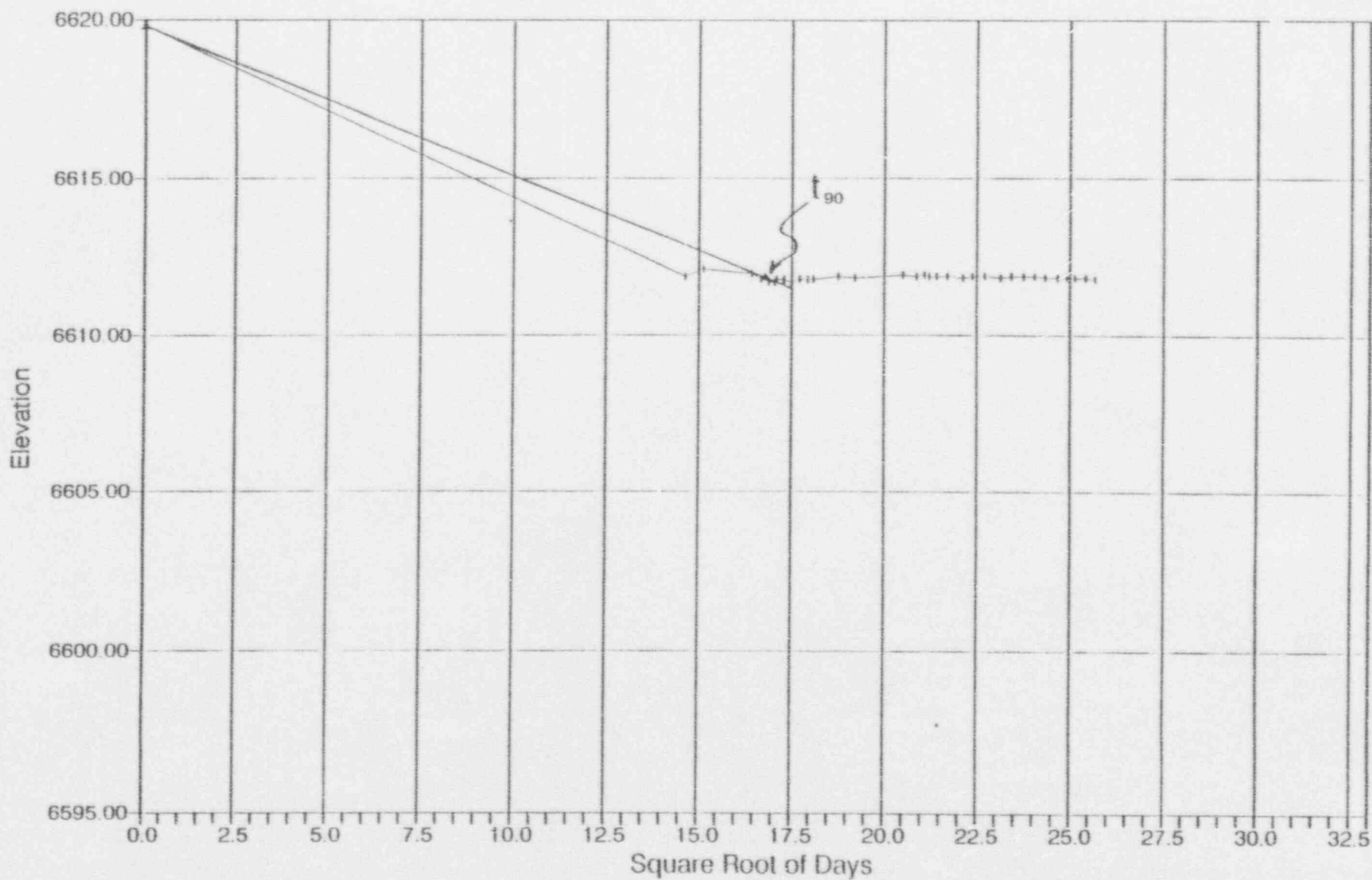


FIGURE 15
Settlement vs Square Root of Time

Settlement Point 2

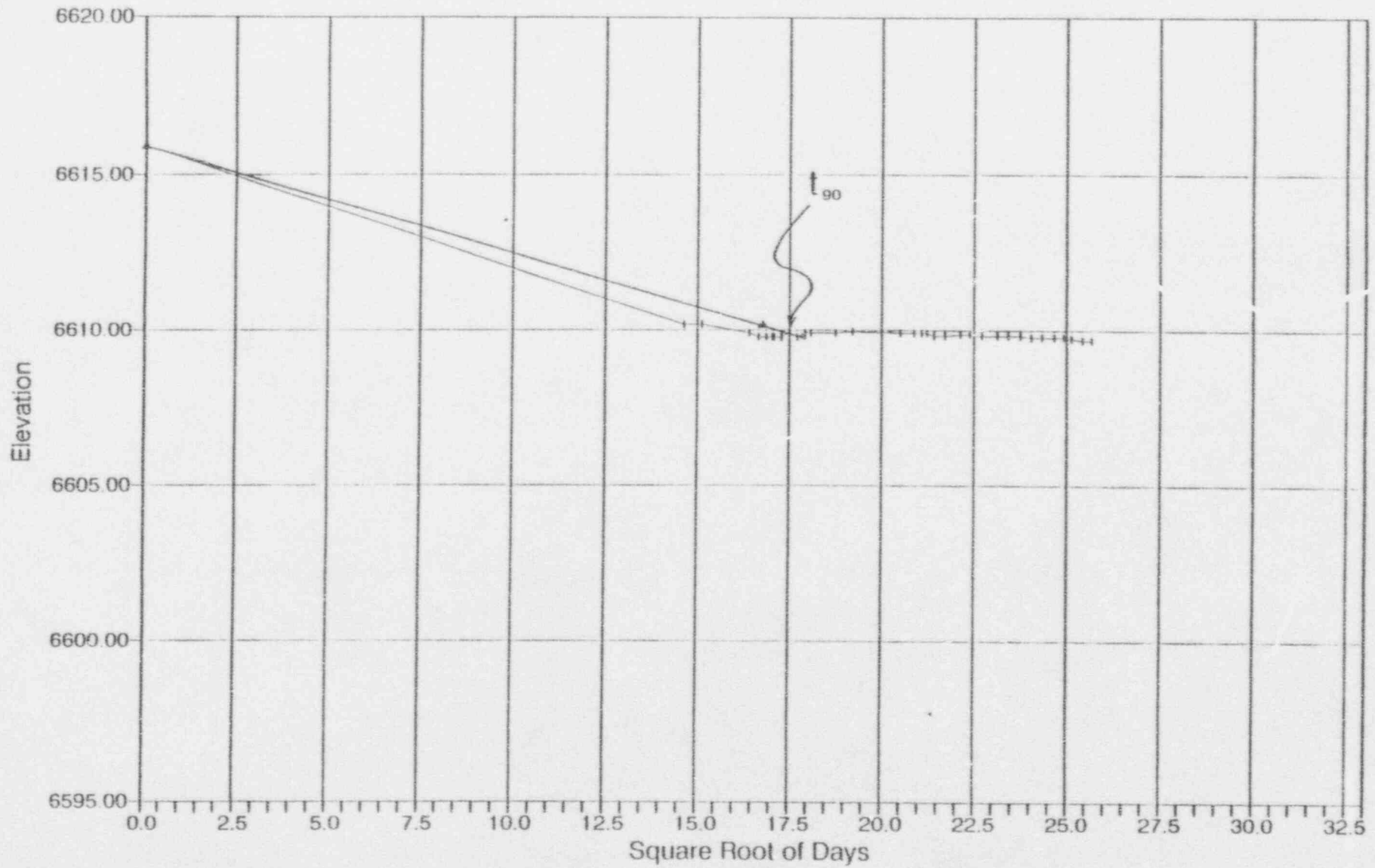


FIGURE 16
Settlement vs Square Root of Time

SMI
SHEPHERD MILLER, INC.

Date: 11/23/93

Project: 360

File:

Settlement Point 3

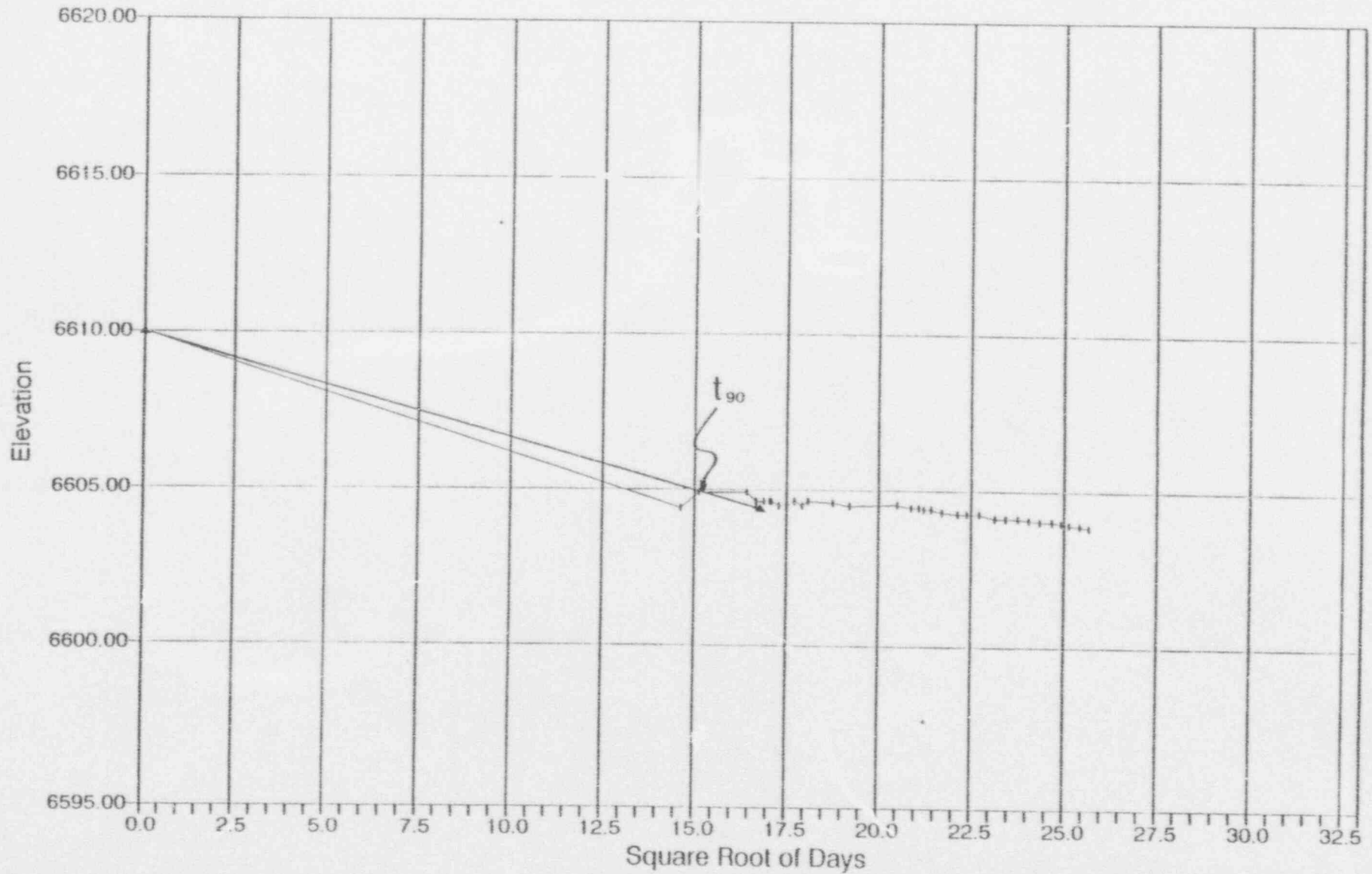


FIGURE 17
Settlement vs Square Root of Time

SMI
SHEPHERD MILLER, INC.

Date: 11/23/93
Project: 360
File:

Settlement Point 4

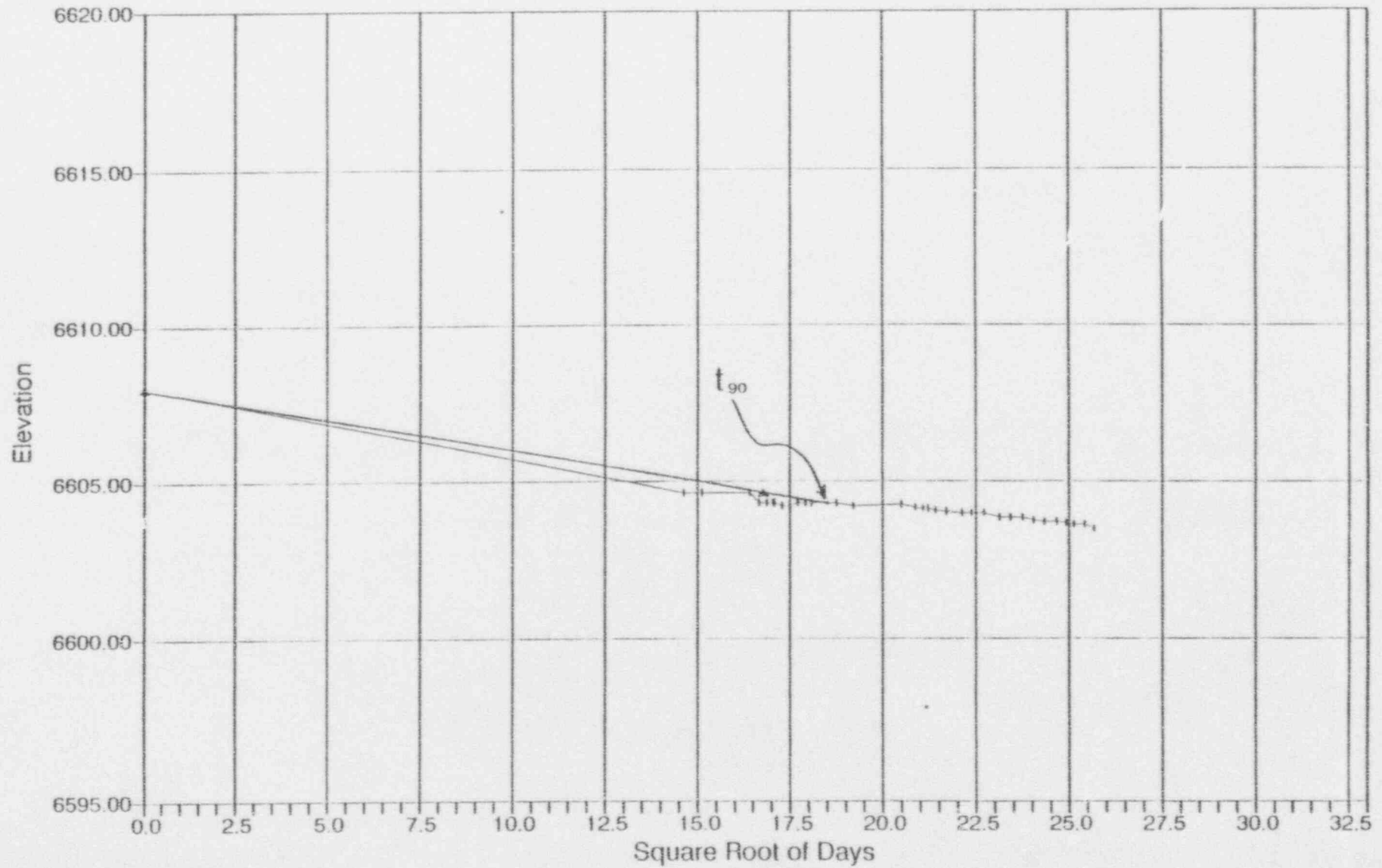


FIGURE 18
Settlement vs Square Root of Time

SMI
SHEPHERD MILITARY, INC.

Date: 11/23/93
Project: 360
File:

Settlement Point 5

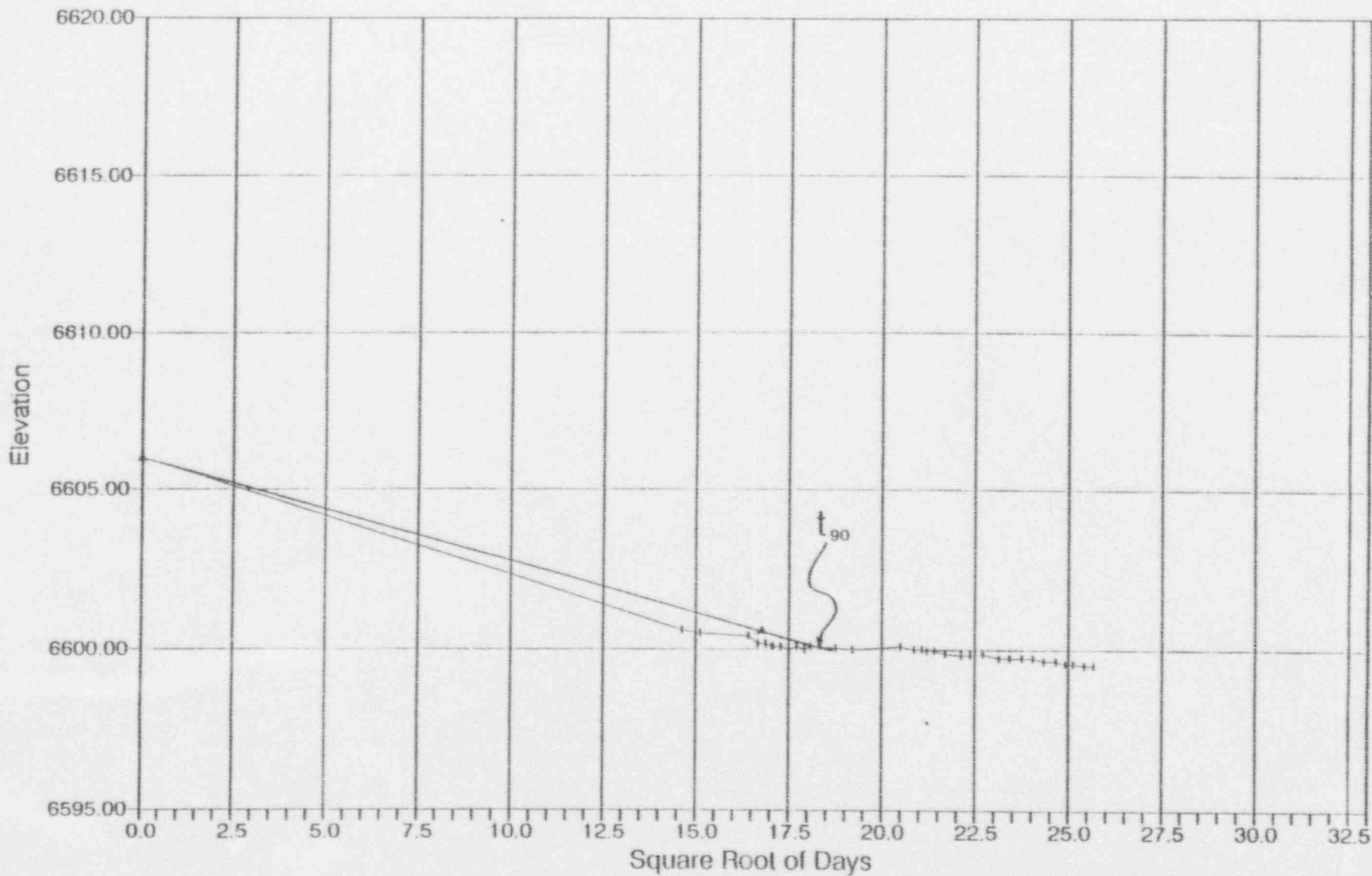
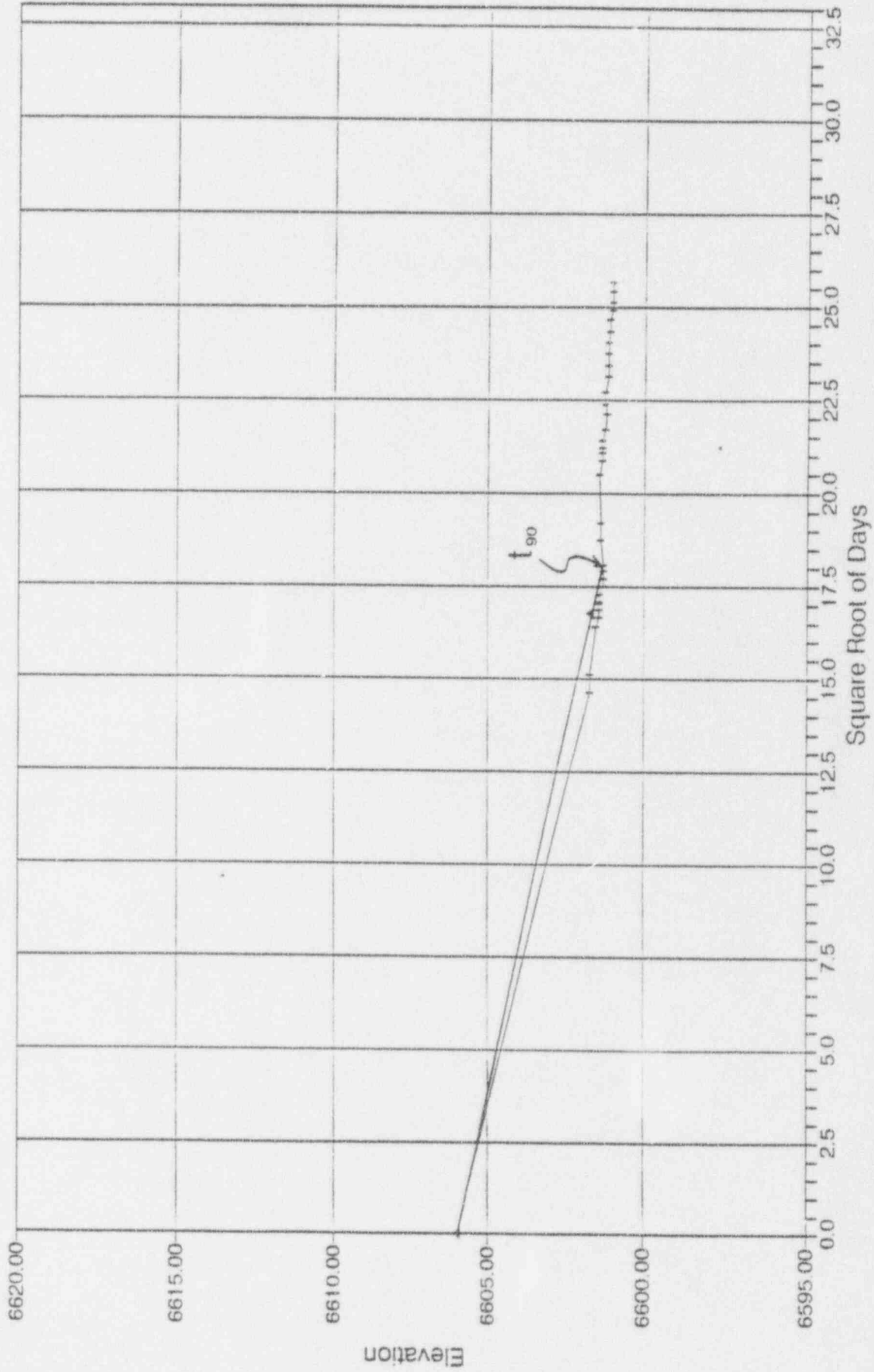


FIGURE 19
Settlement vs Square Root of Time

SMI
SHEPHERD MILLER, INC.

Date: 11/23/93
Project: 360
File:

Settlement Point 6



Settlement Point 7

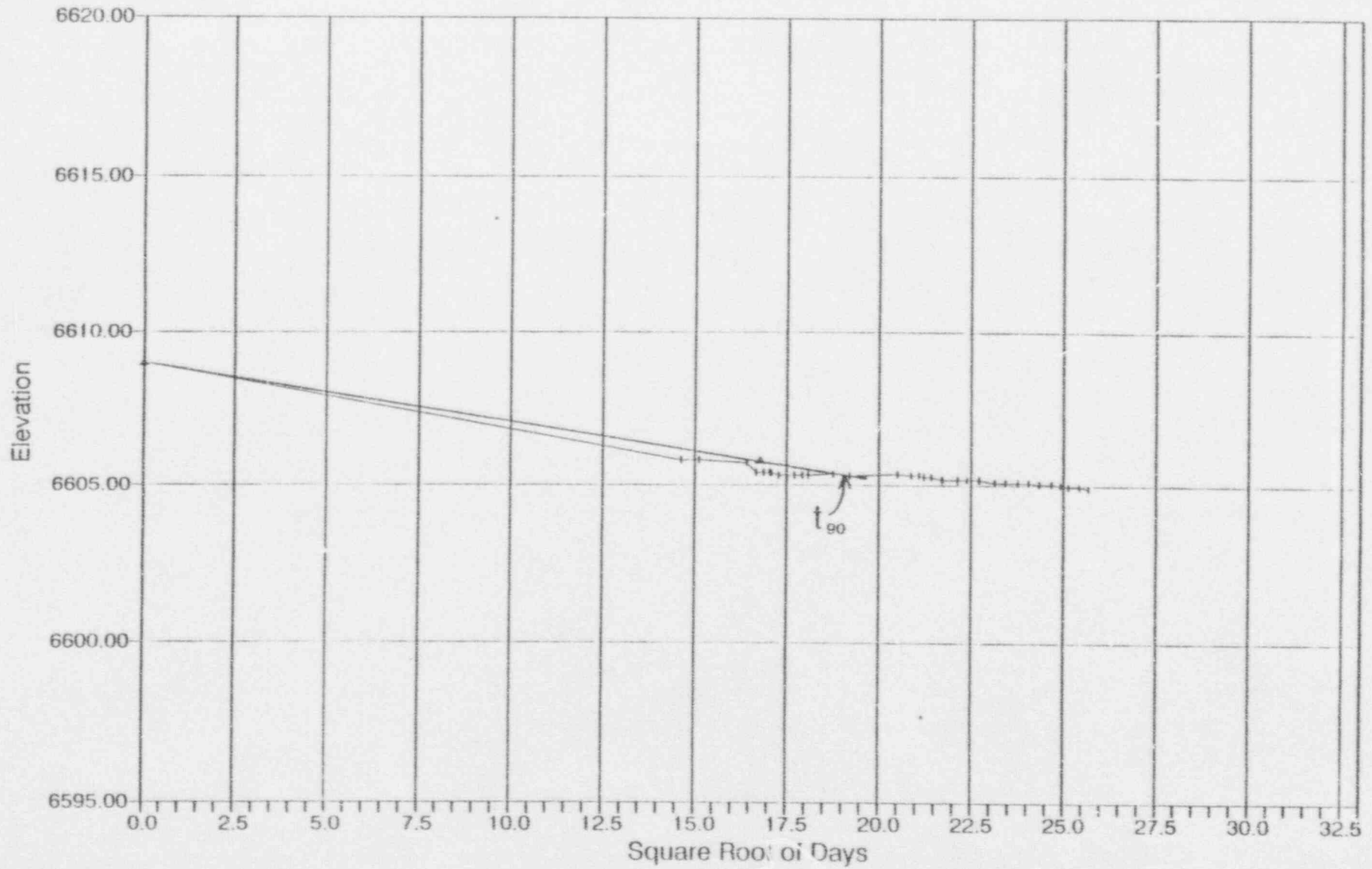


FIGURE 21
Settlement vs Square Root of Time

SMI
SHEPHERD MILLER, INC.

Date: 11/23/93
Project: 360
File:

Settlement Point 8

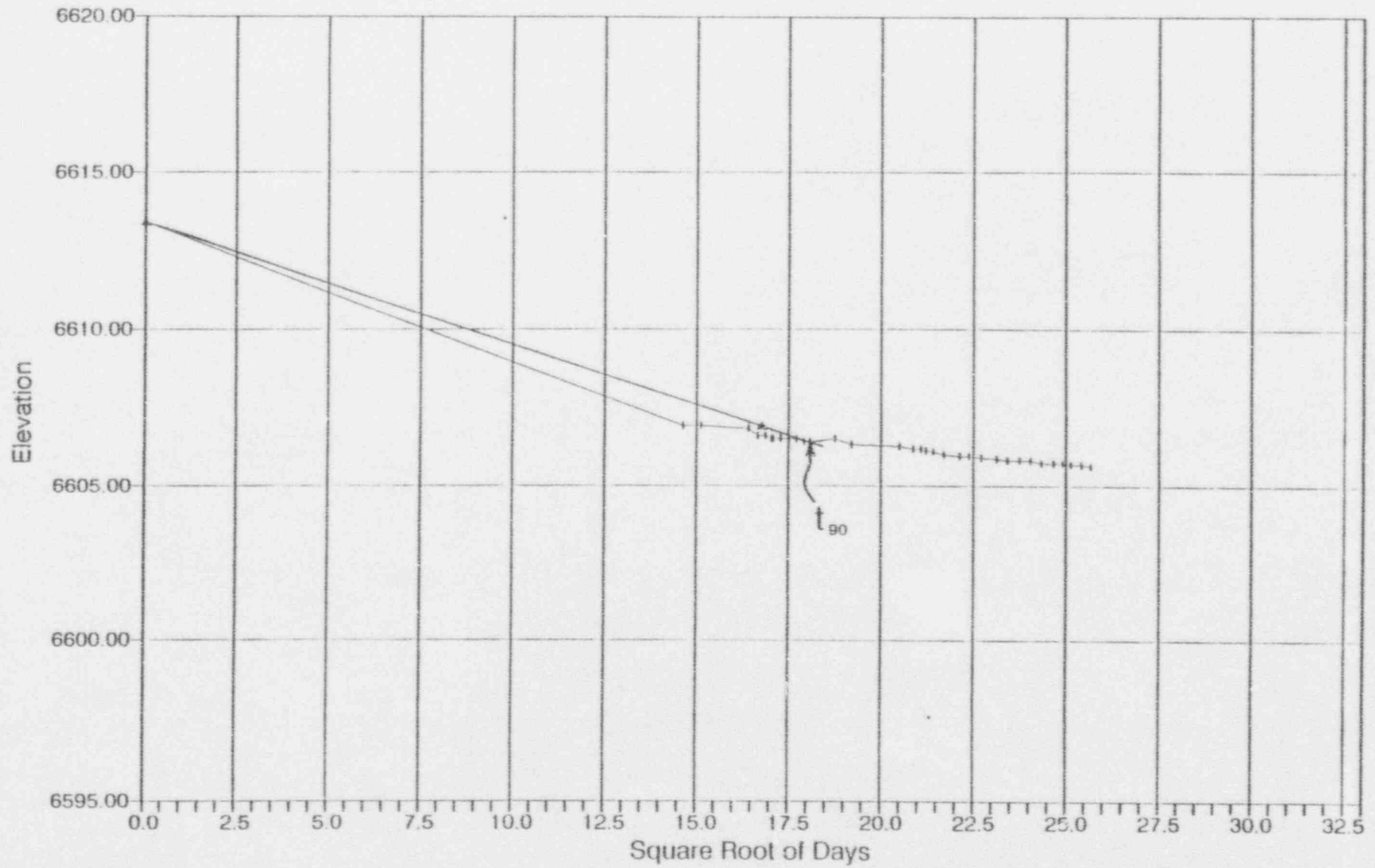


FIGURE 22
Settlement vs Square Root of Time

SMI
SHEPHERD/MILLER, INC.

Date: 11/23/93
Project: 360
File:

Settlement Point NS8

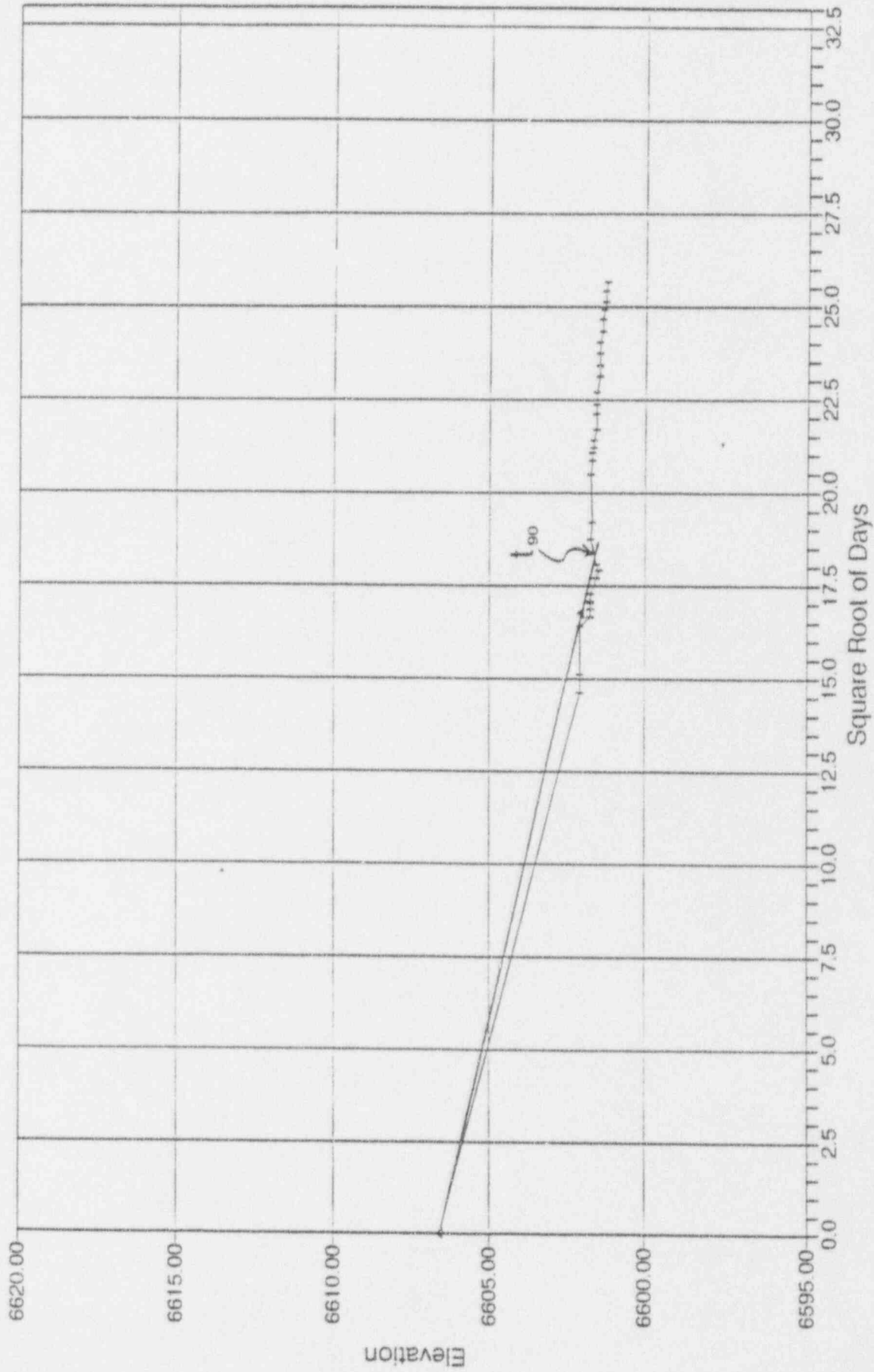


FIGURE 23
Settlement vs Square Root of Time

Date: 11/23/93
Project: 360
File:

Settlement Point 9

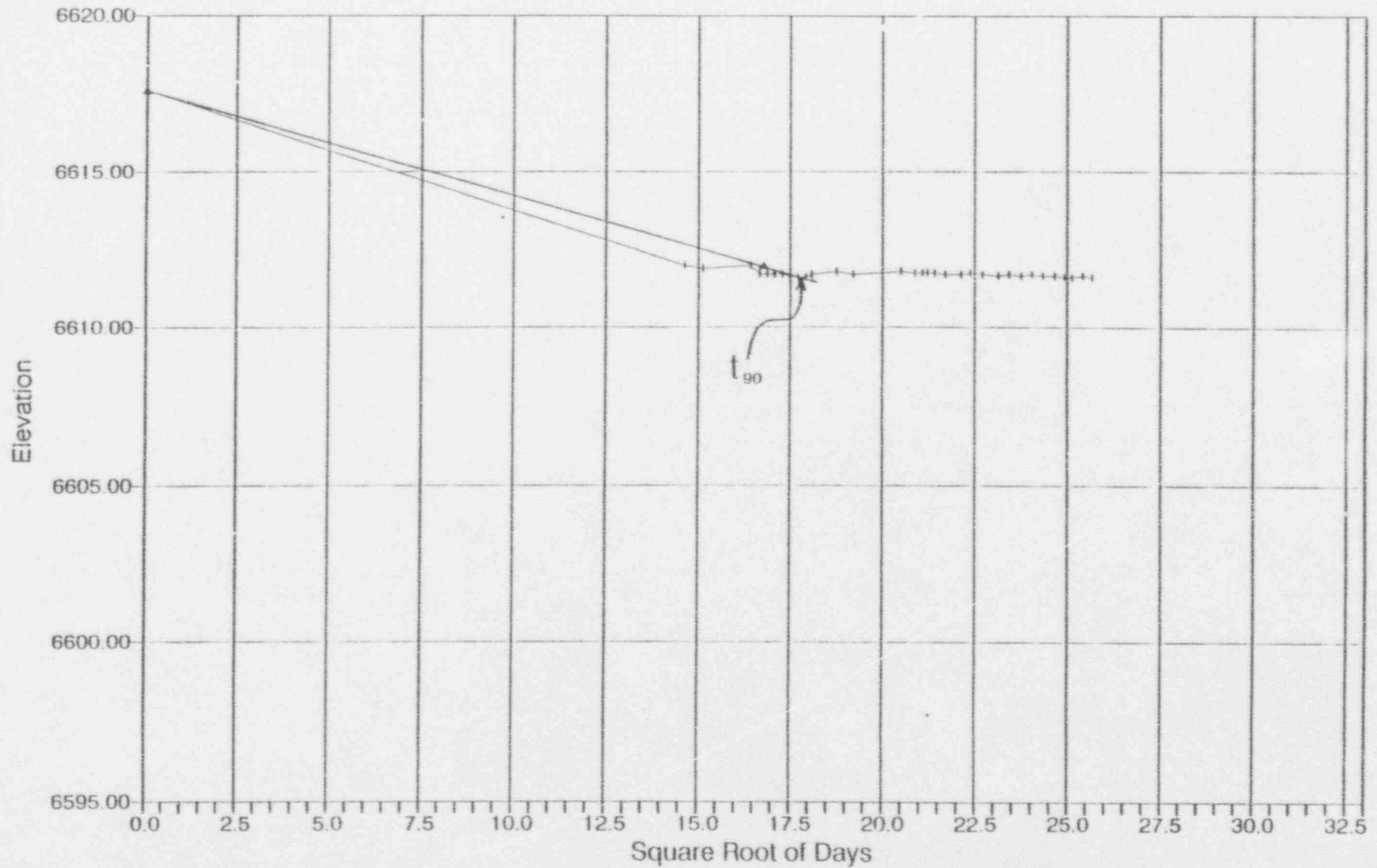


FIGURE 24
Settlement vs Square Root of Time

Settlement Point 11

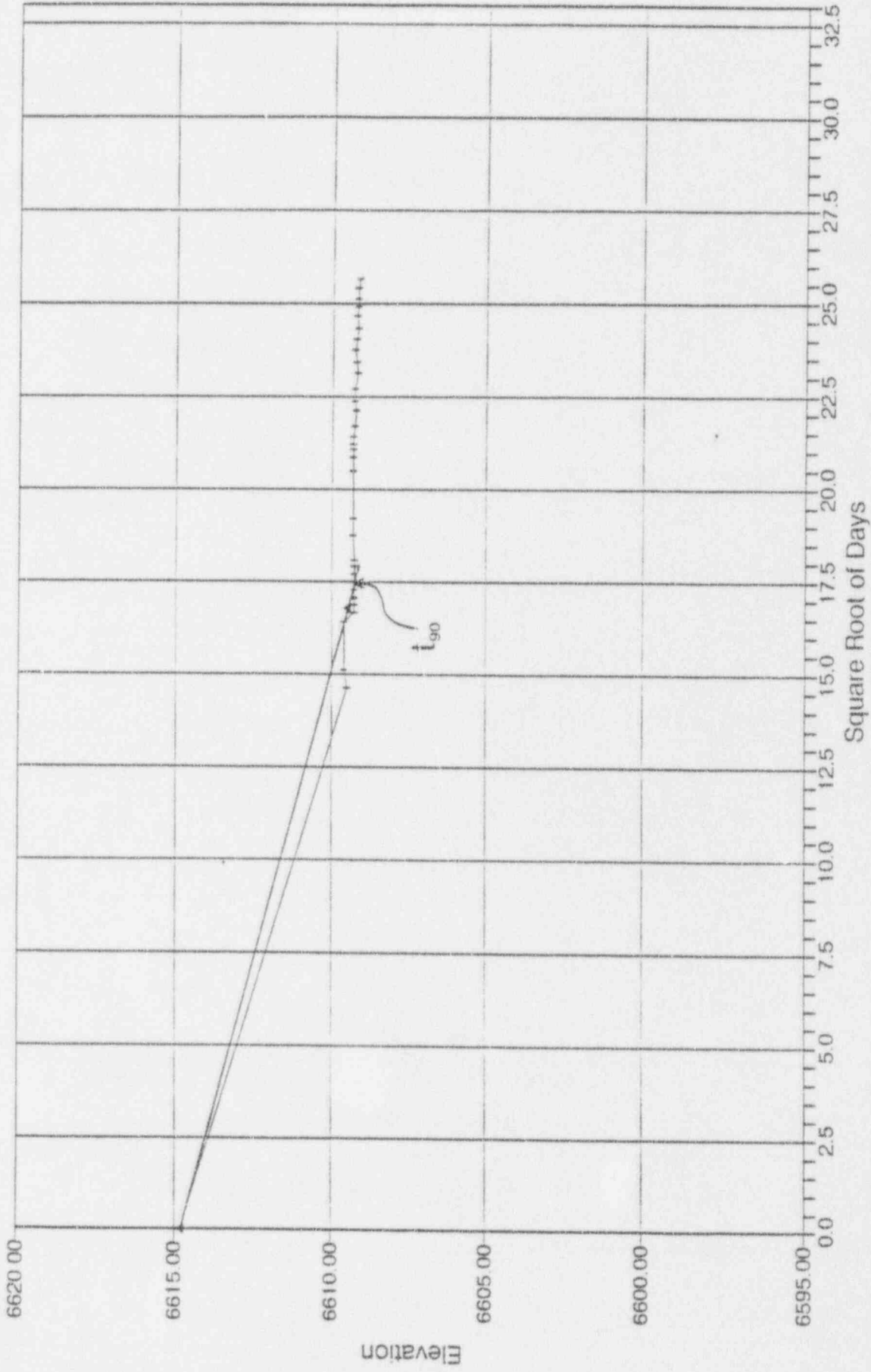


FIGURE 25
Settlement vs Square Root of Time

Date: 11/23/93
Project: 360
File:

Settlement Point 16

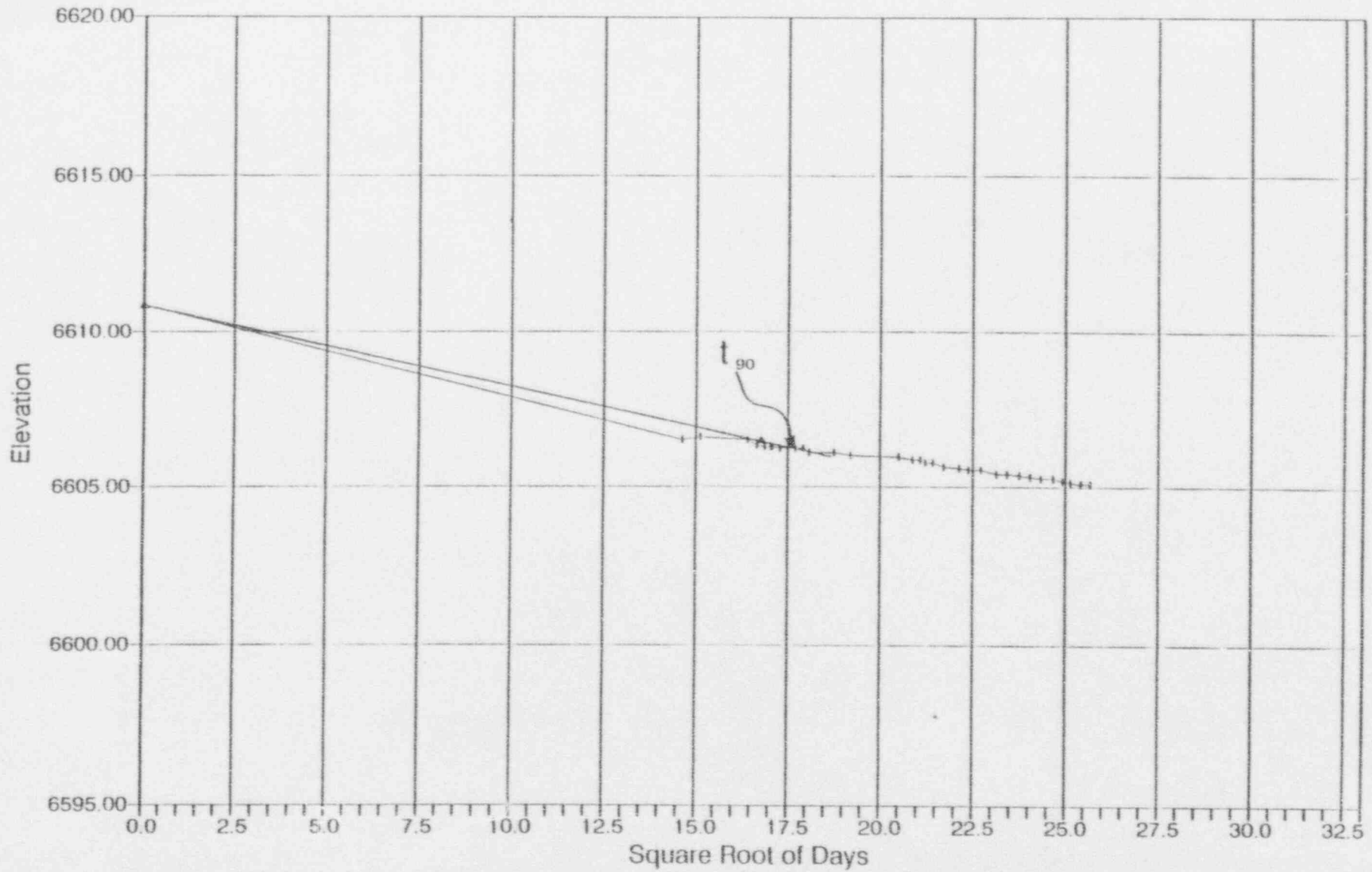


FIGURE 26
Settlement vs Square Root of Time

SMI
SHEPHERD MILLER, INC.

Date: 11/23/93
Project: 360
File:

Settlement Point 17

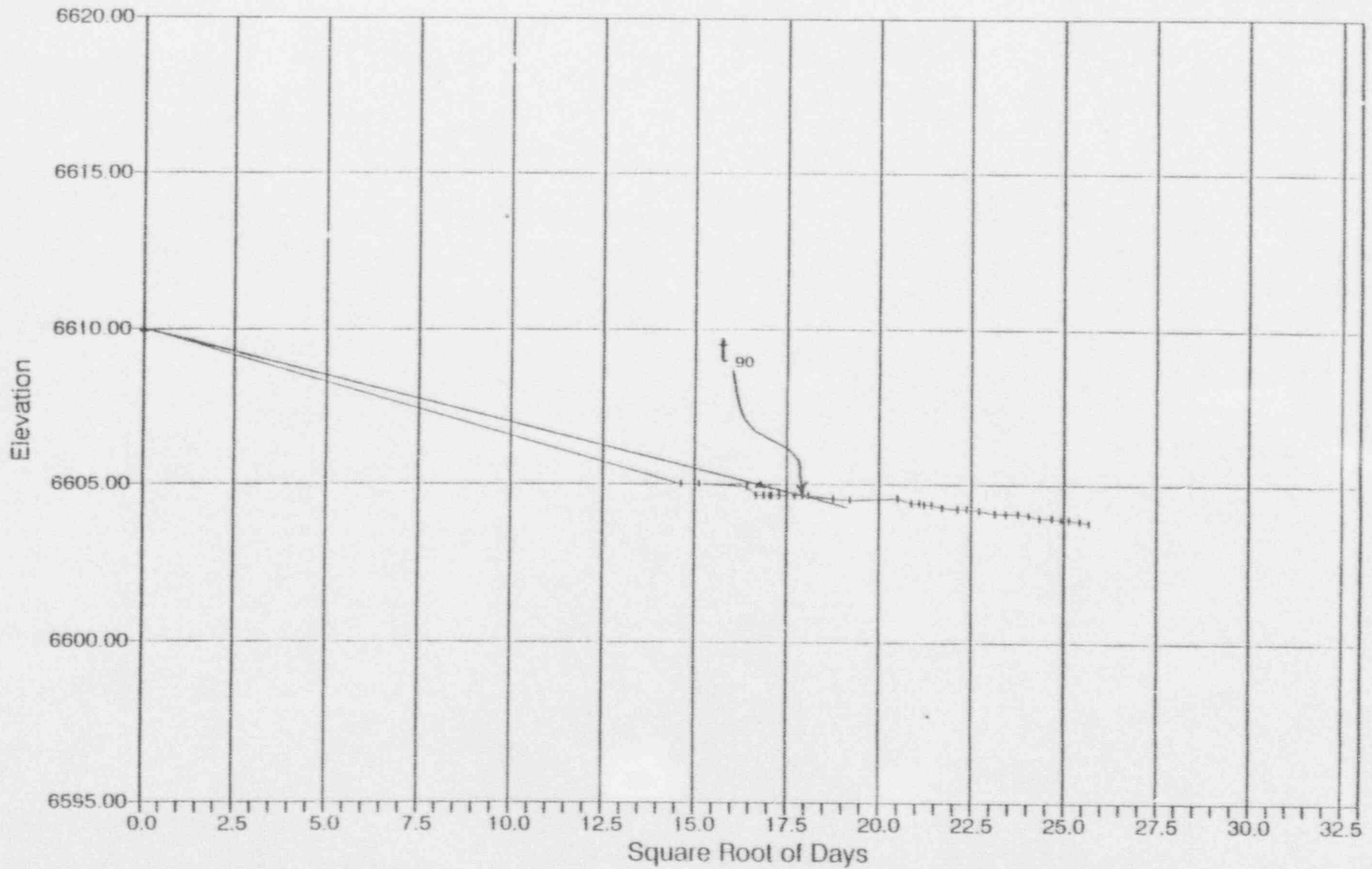
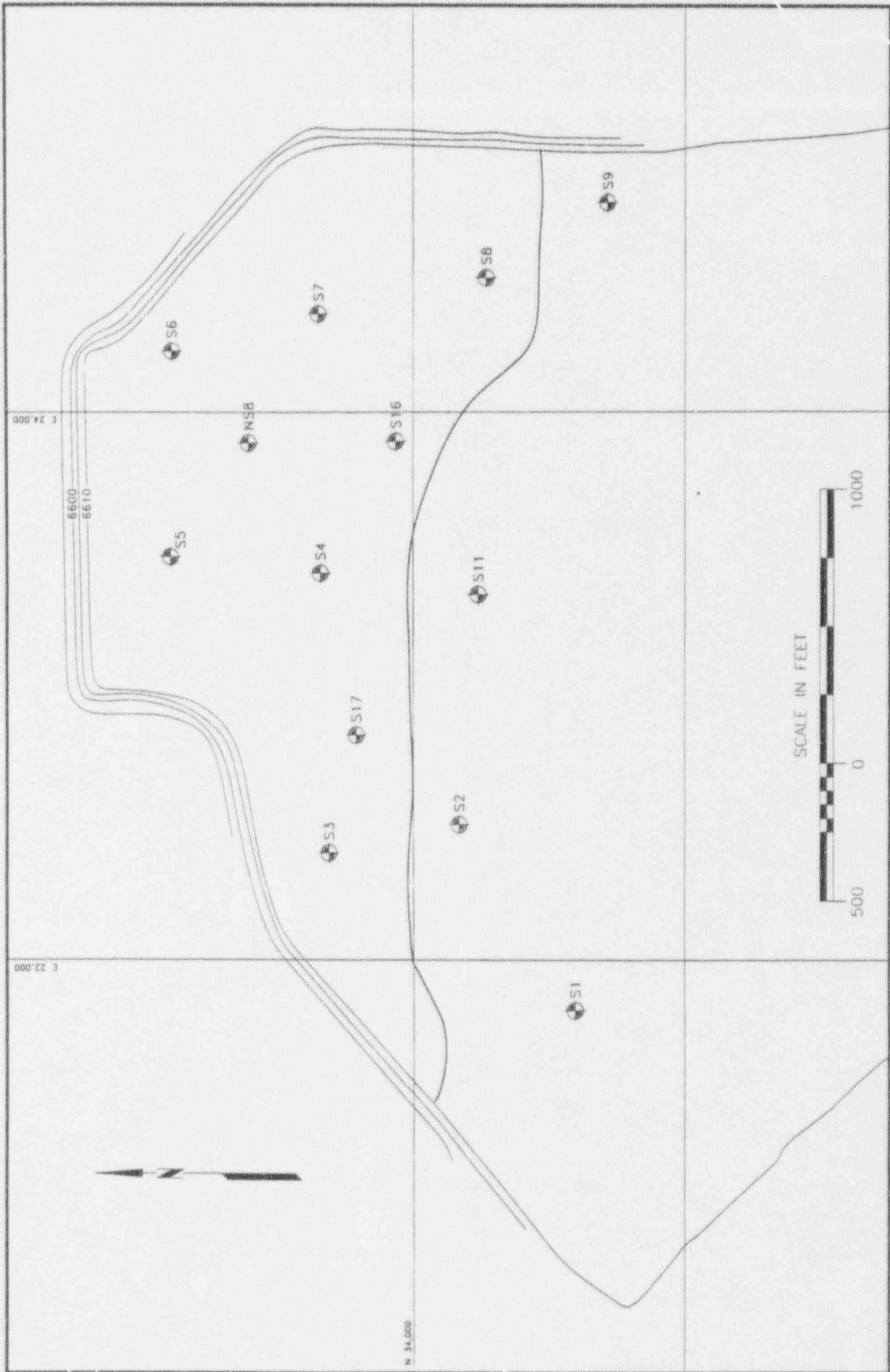


FIGURE 27
Settlement vs Square Root of Time



Date: NOV., 1993
 Project: 360
 File: 1-17

FIGURE 28
 ELEVATION MARKERS 1 - 17



Settlement Point 19

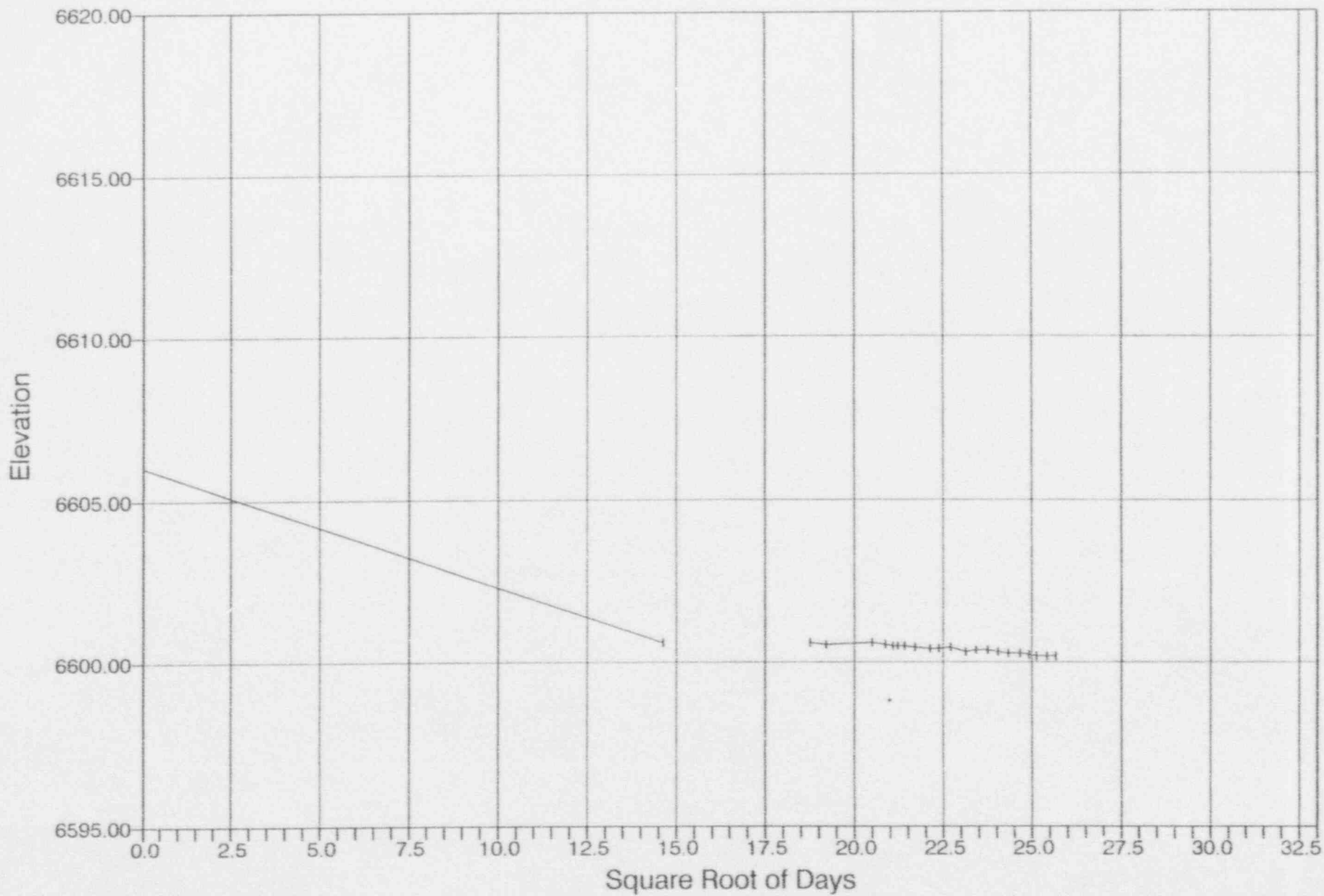
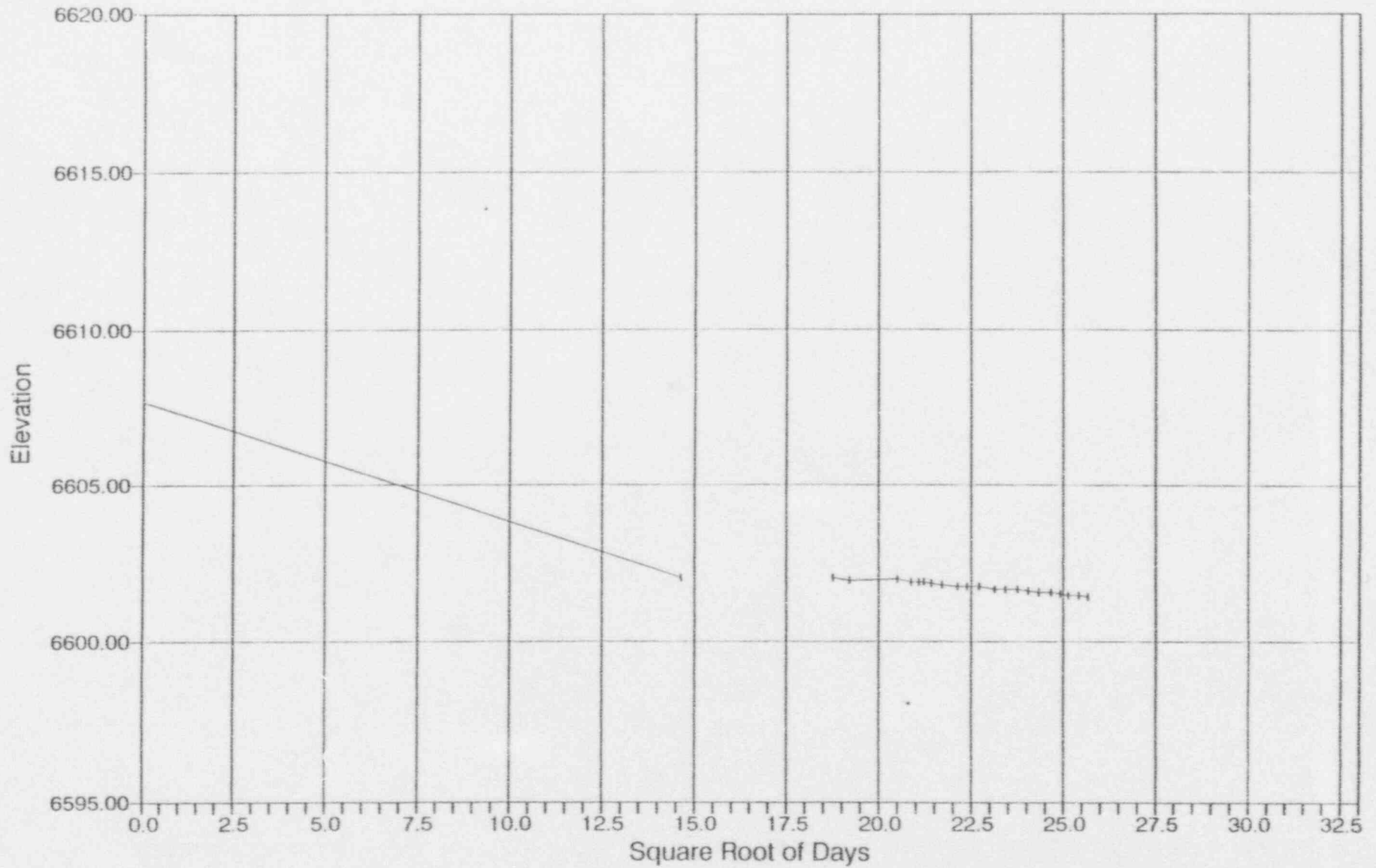


FIGURE 29
Settlement vs. Time

Settlement Point 20



Settlement Point 21

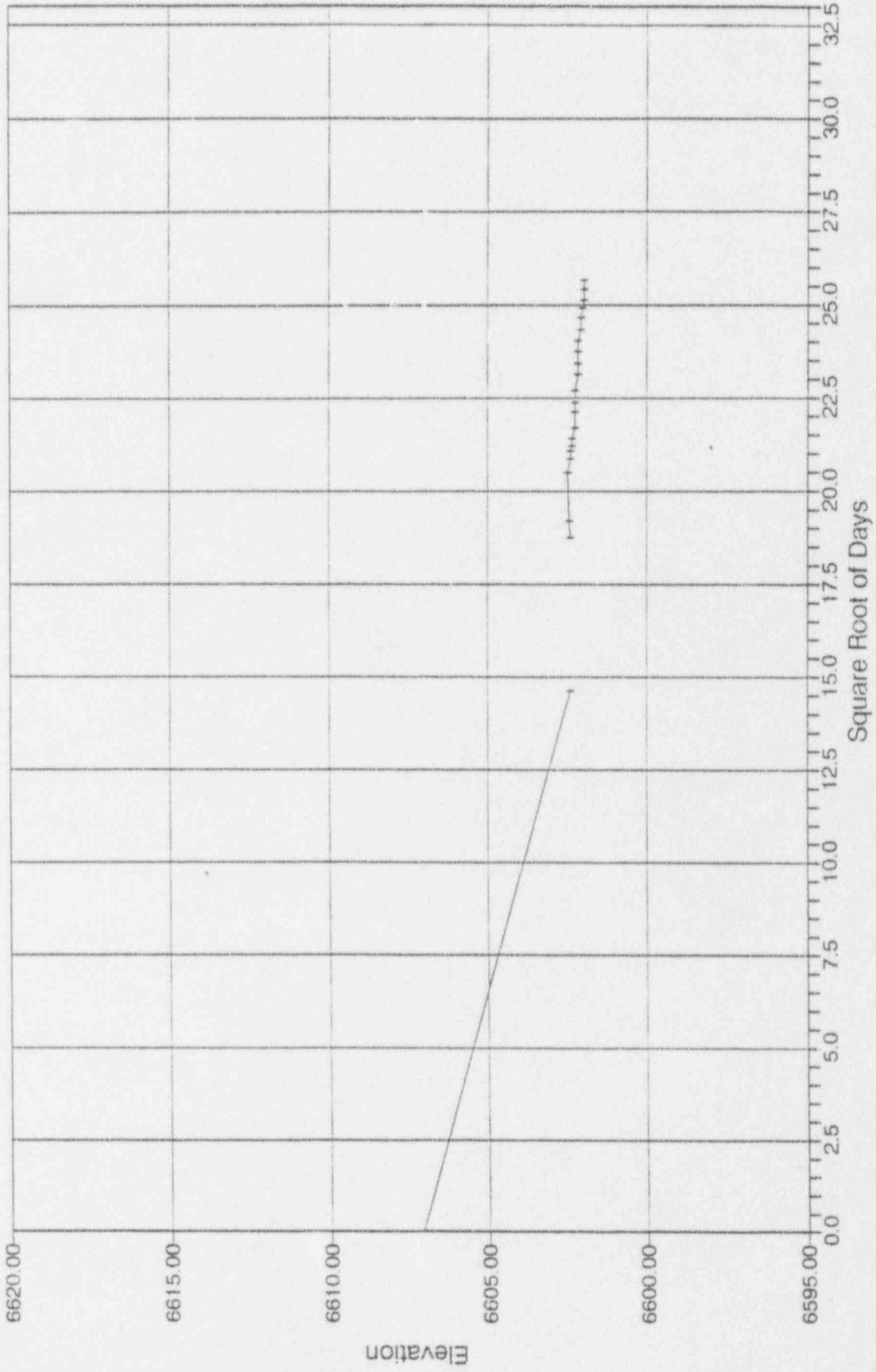
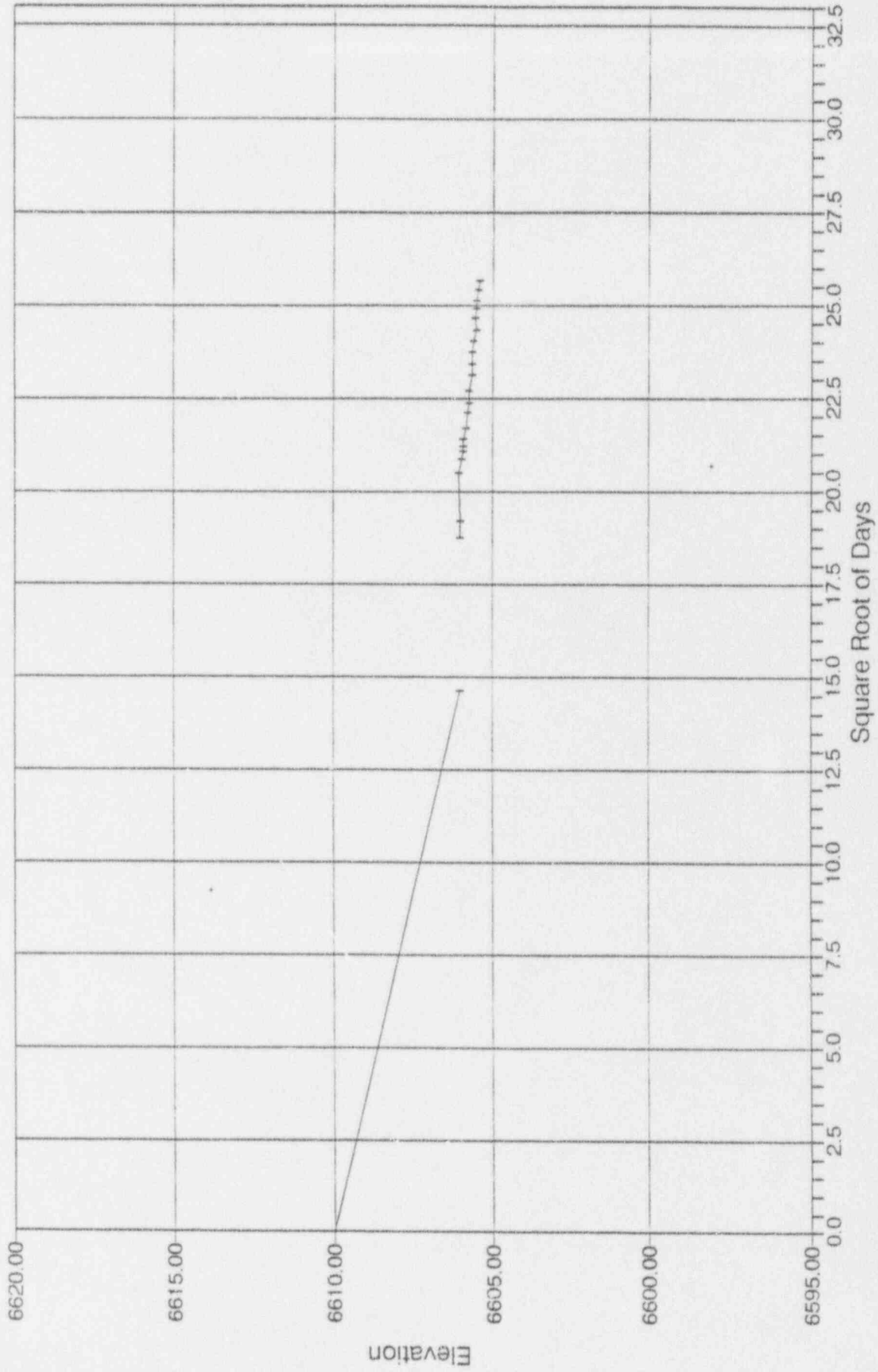


FIGURE 31
Settlement vs Square Root of Time

Date: 11/23/93
Project: 360
File:

Settlement Point 22



Settlement Point 23

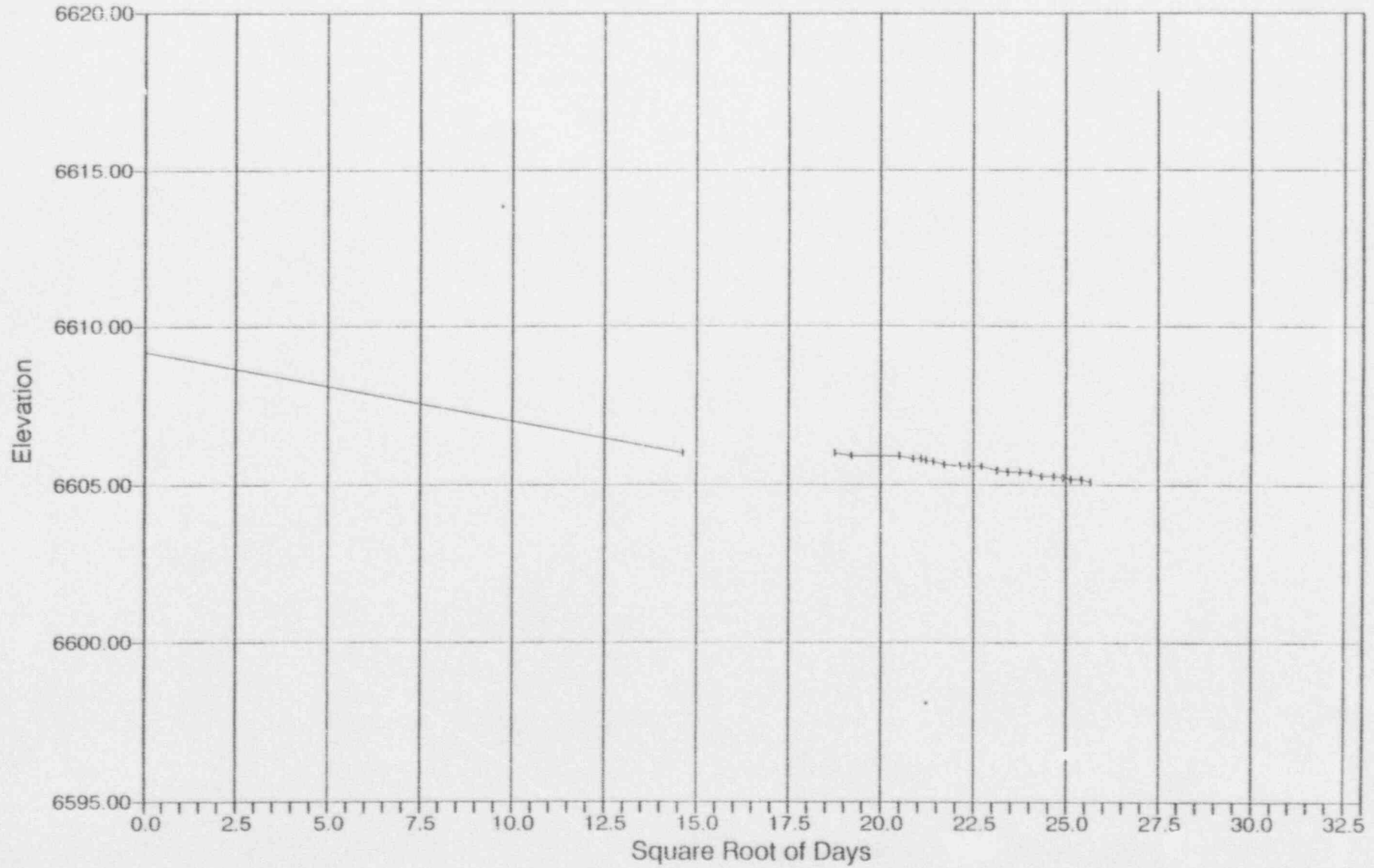
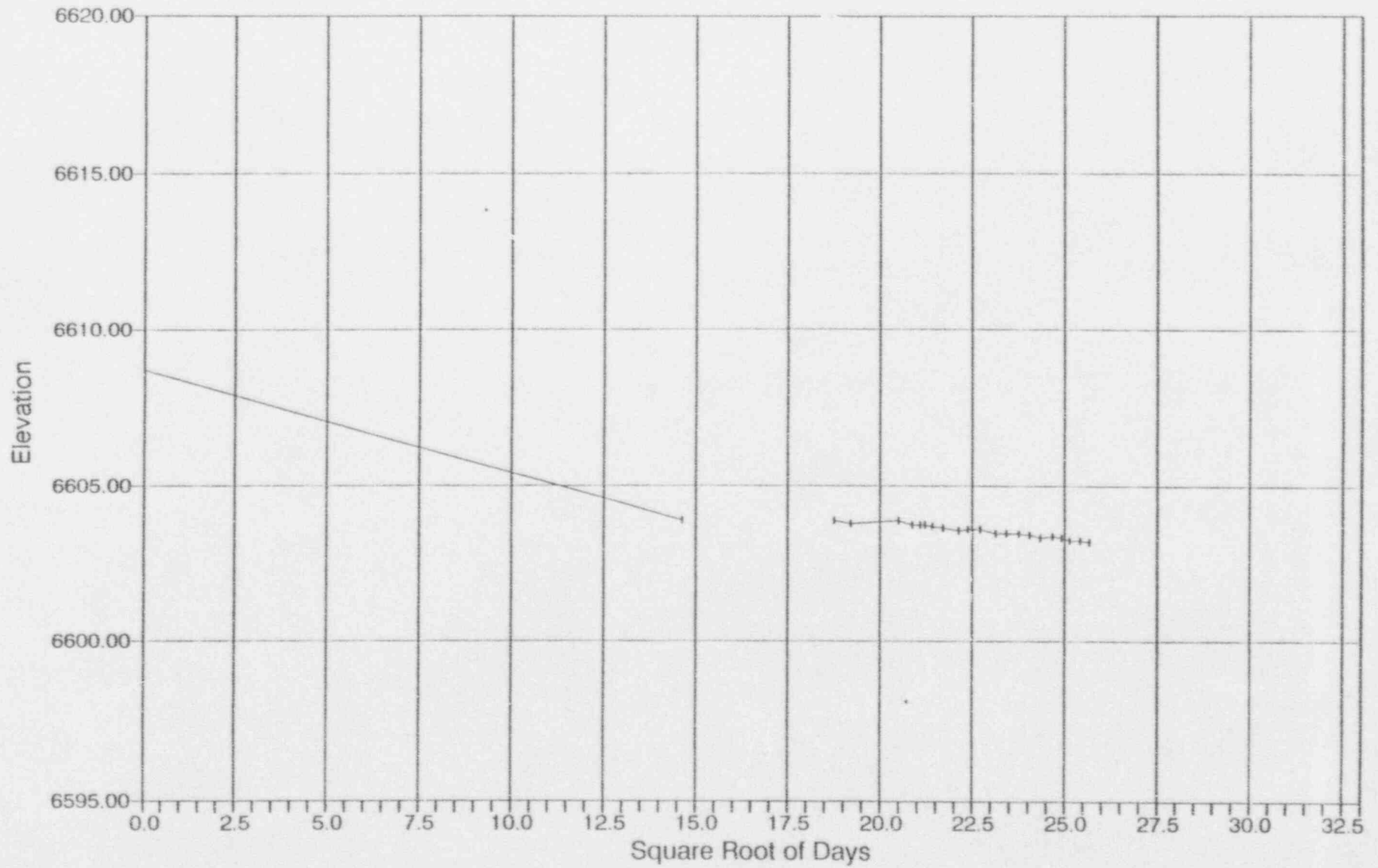


FIGURE 33
Settlement vs Square Root of Time

Settlement Point 24



Settlement Point 25

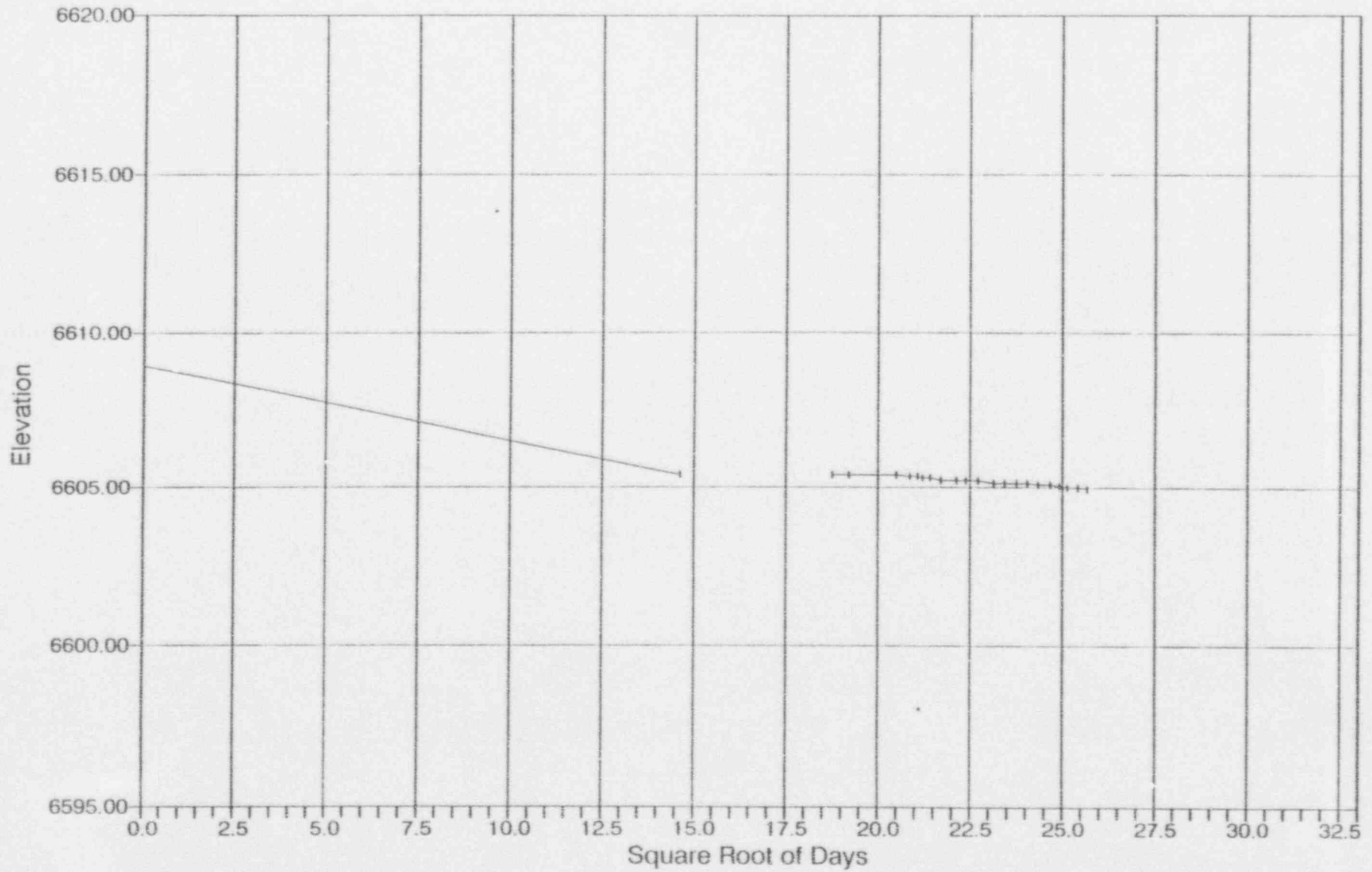
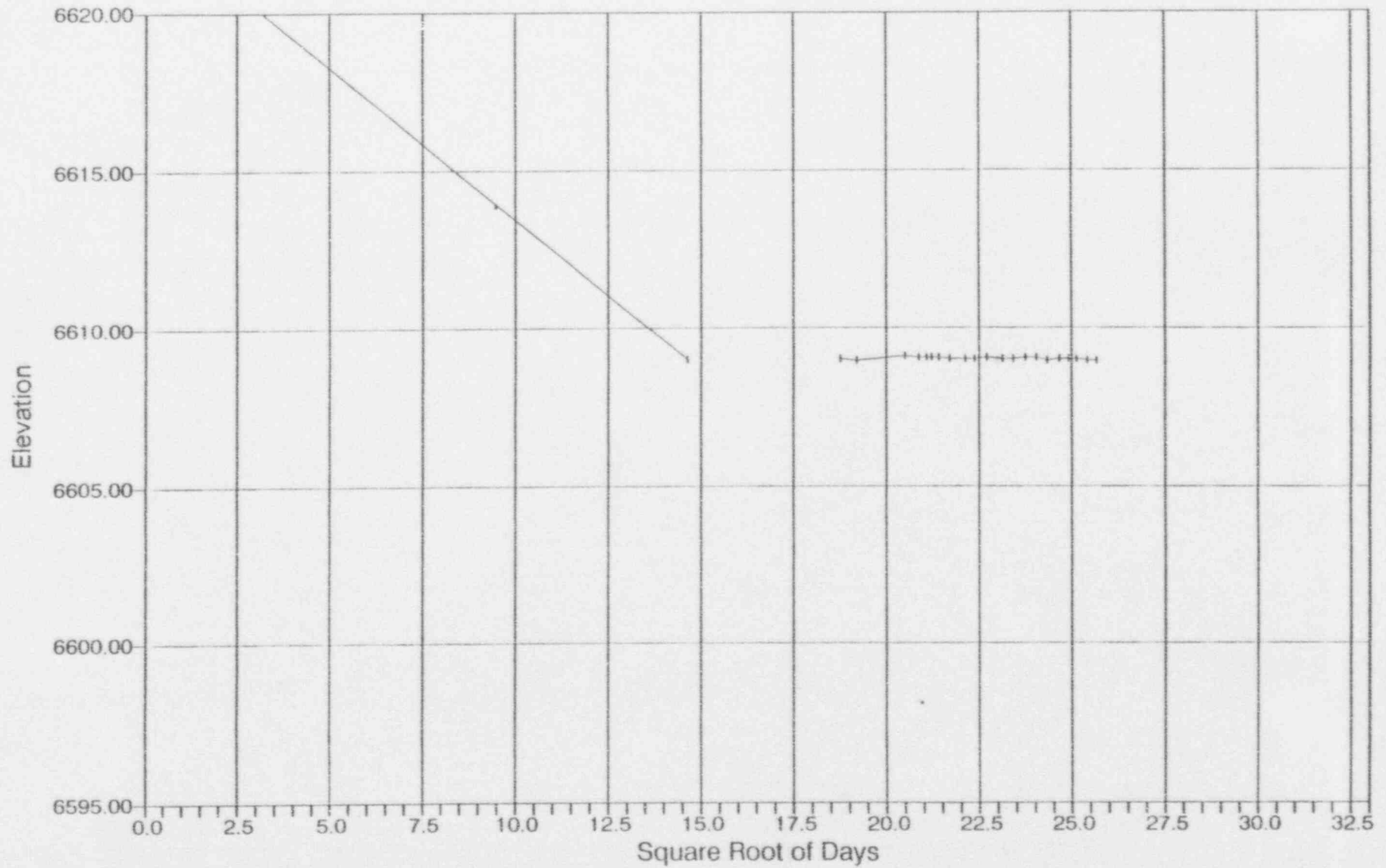


FIGURE 35
Settlement vs Square Root of Time

Settlement Point 26



SMI
SHEPHERD MILLER, INC.

FIGURE 36
Settlement vs Square Root of Time

Date: 11/23/93

Project: 360

File:

Settlement Point 27

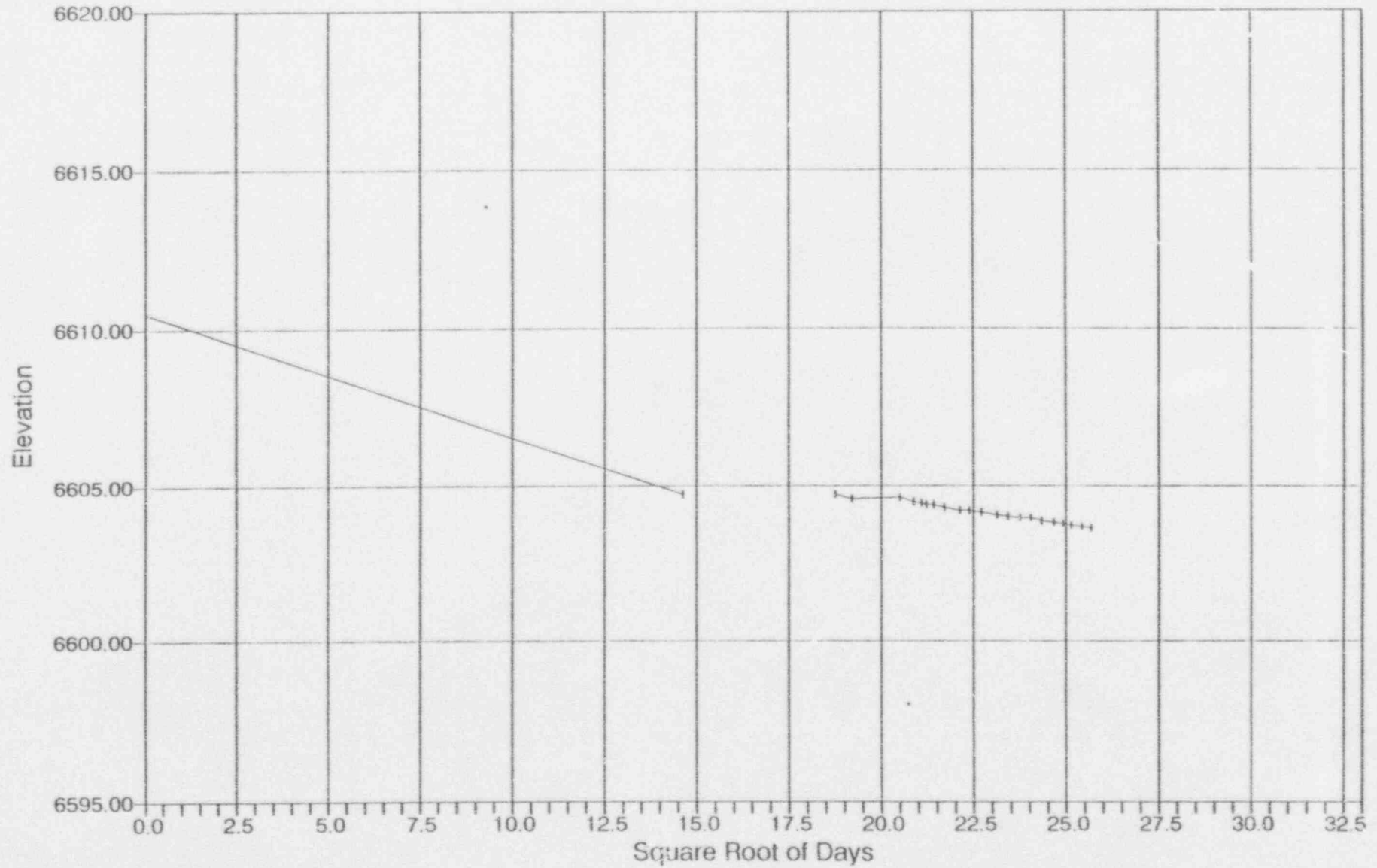
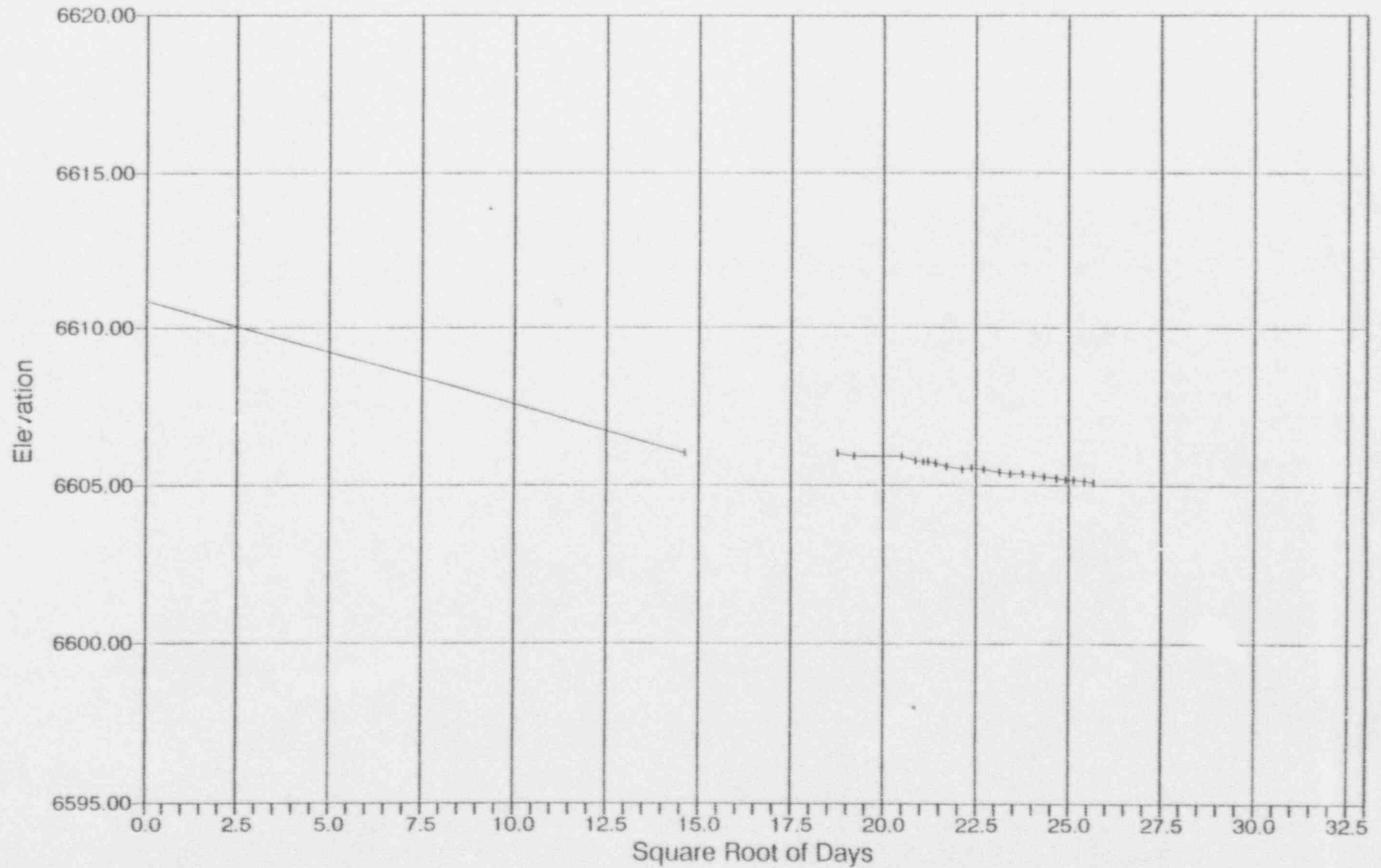


FIGURE 37
Settlement vs Square Root of Time

SMI
SHEPHERD MILLER, INC.

Date: 11/23/93
Project: 360
File:

Settlement Point 28



Settlement Point 29

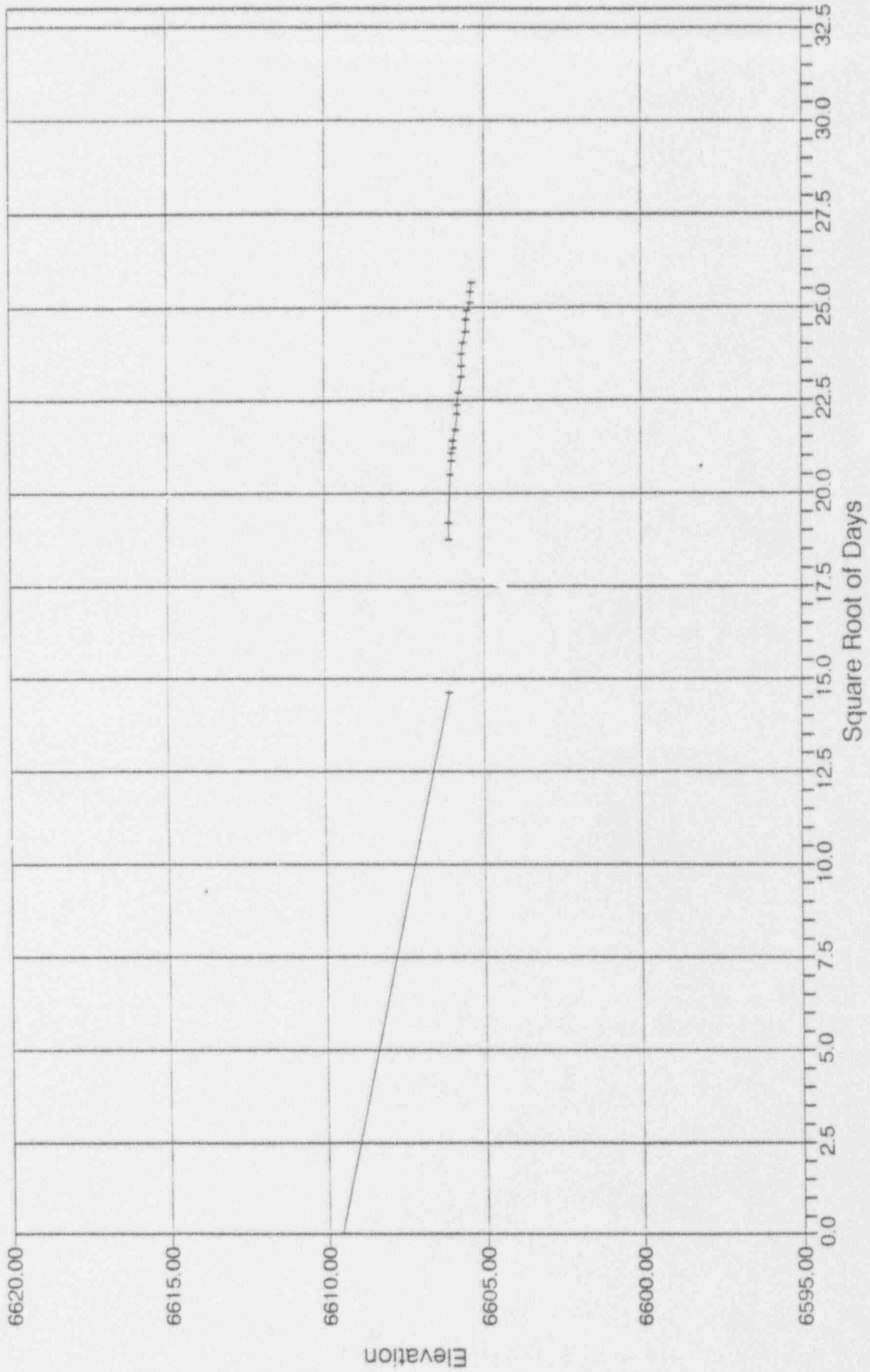


FIGURE 39
Settlement vs Square Root of Time

Date: 11/23/93
Project: 360
File:

Settlement Point 30

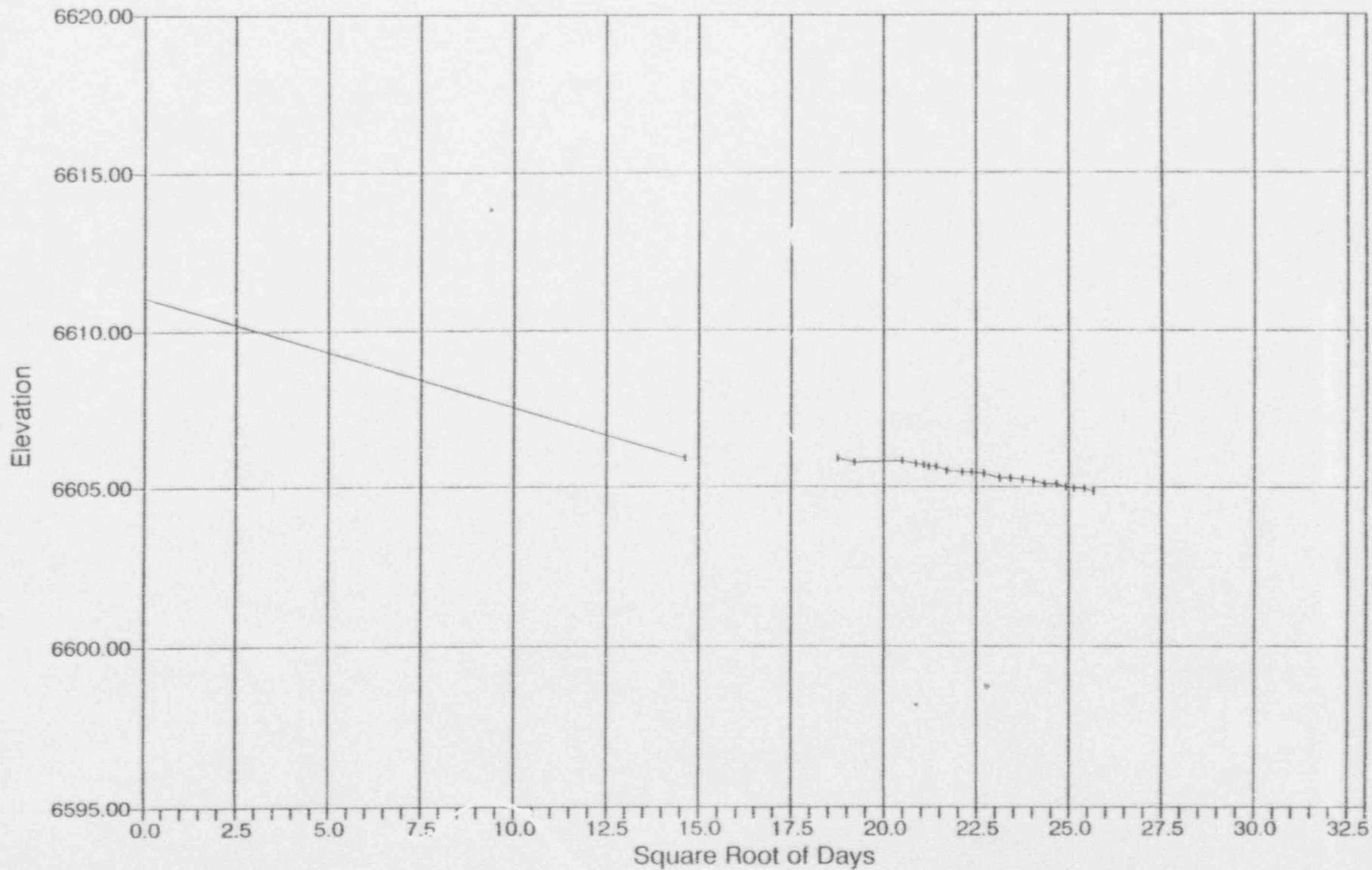
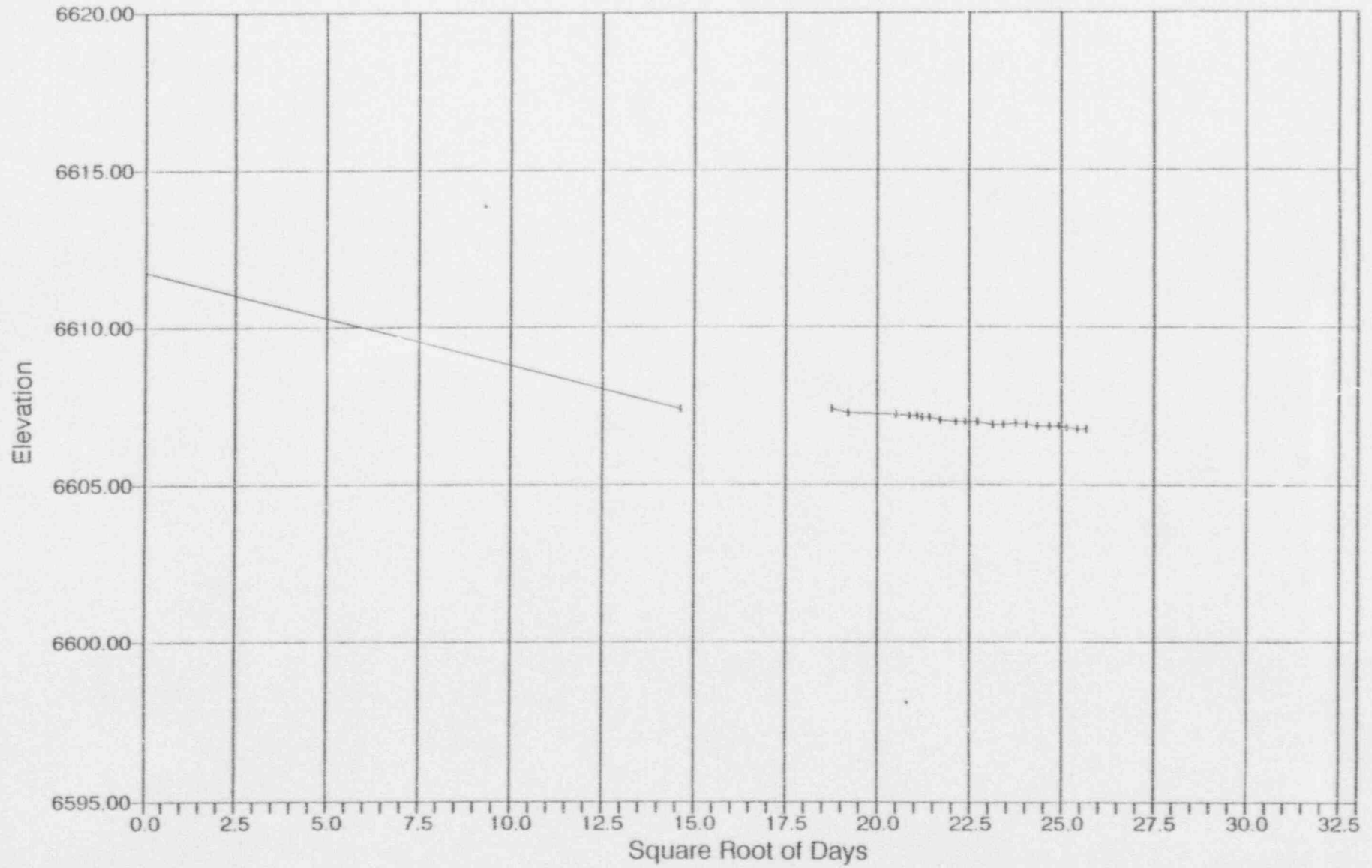
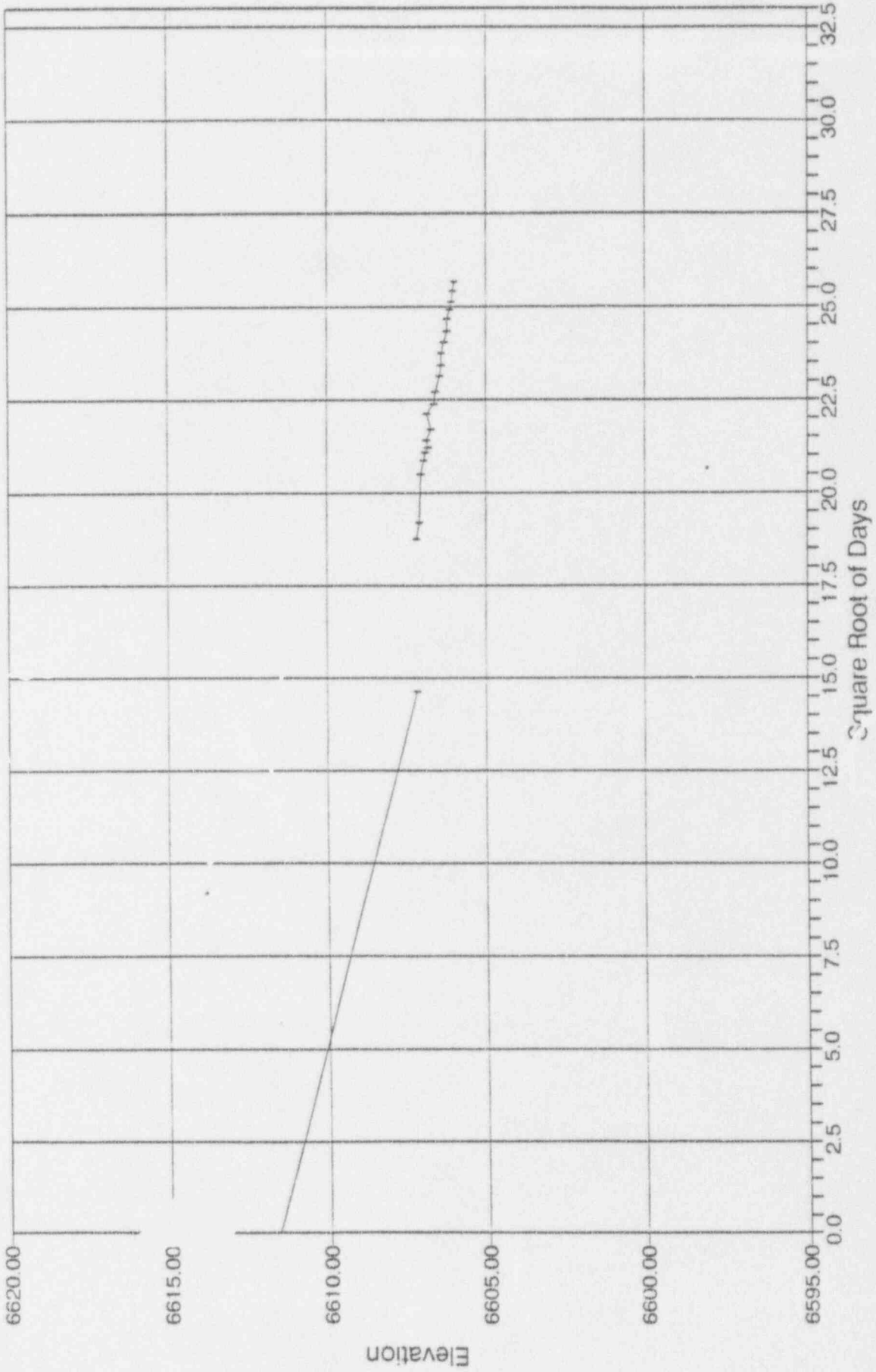


FIGURE 40
Settlement vs Square Root of Time

Settlement Point 31



Settlement Point 32



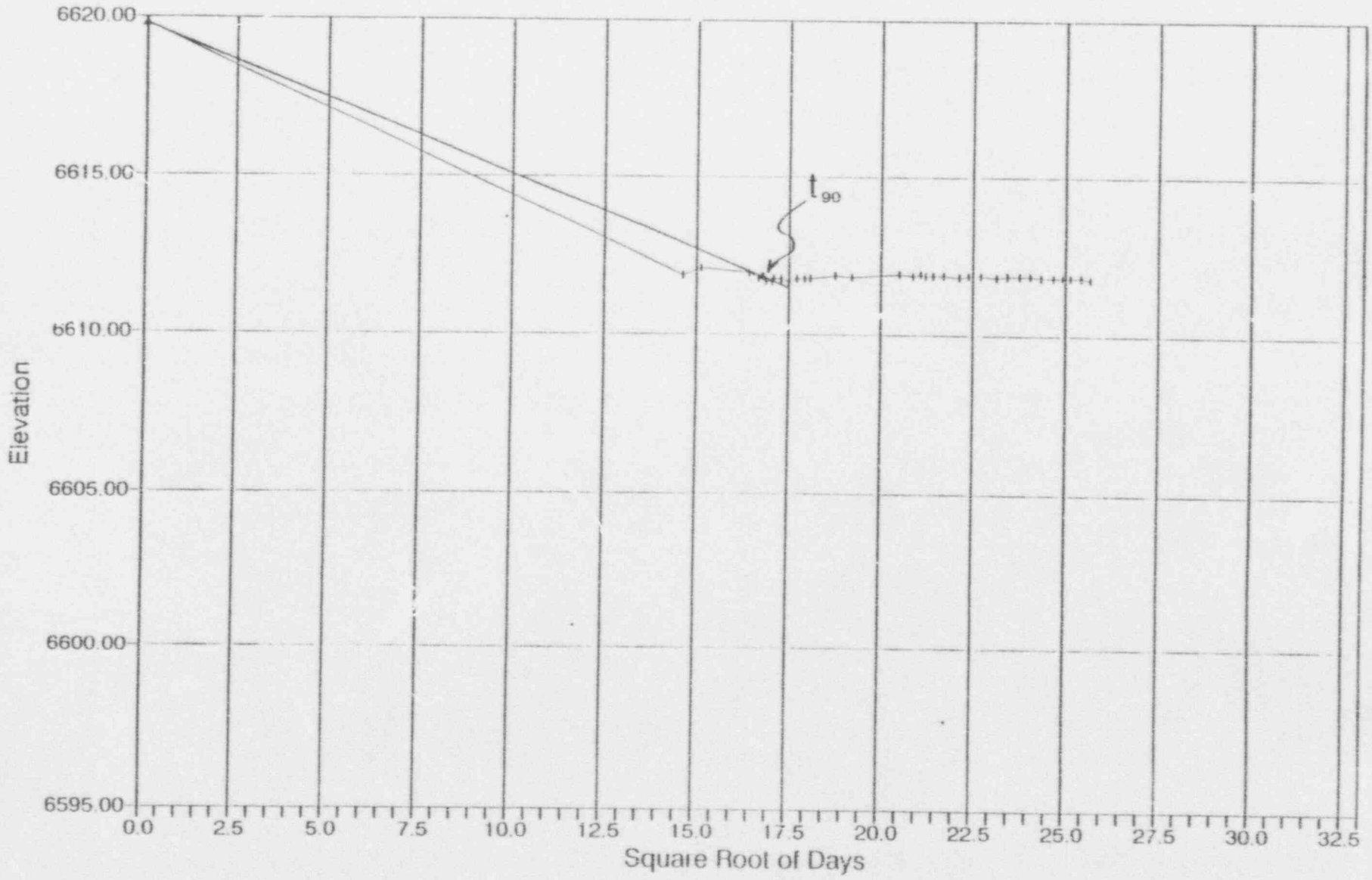
Date: 11/23/93
Project: 360
File:

FIGURE 42
Settlement vs Square Root of Time



APPENDIX C
SETTLEMENT MONITORING

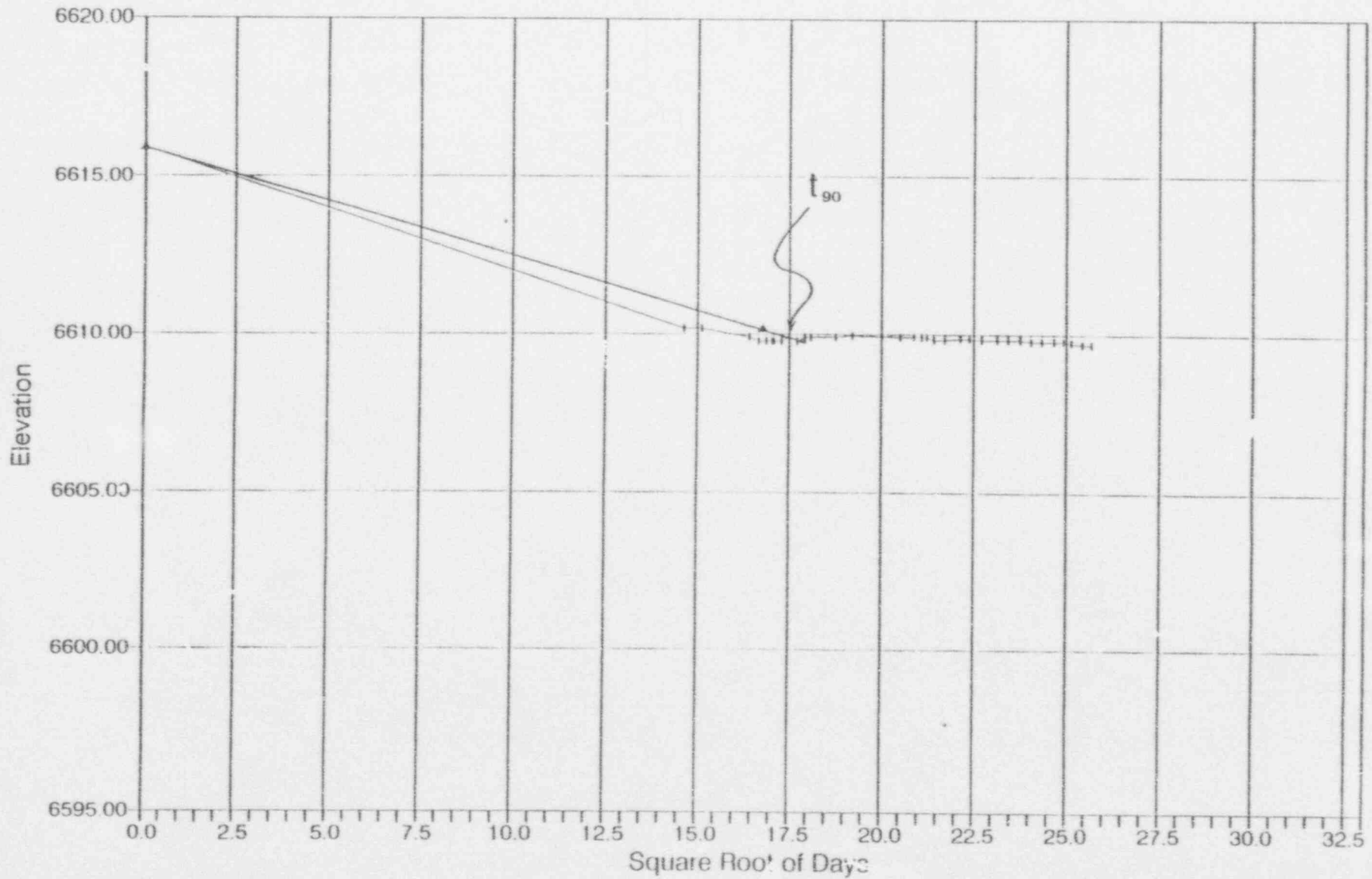
Settlement Point 1



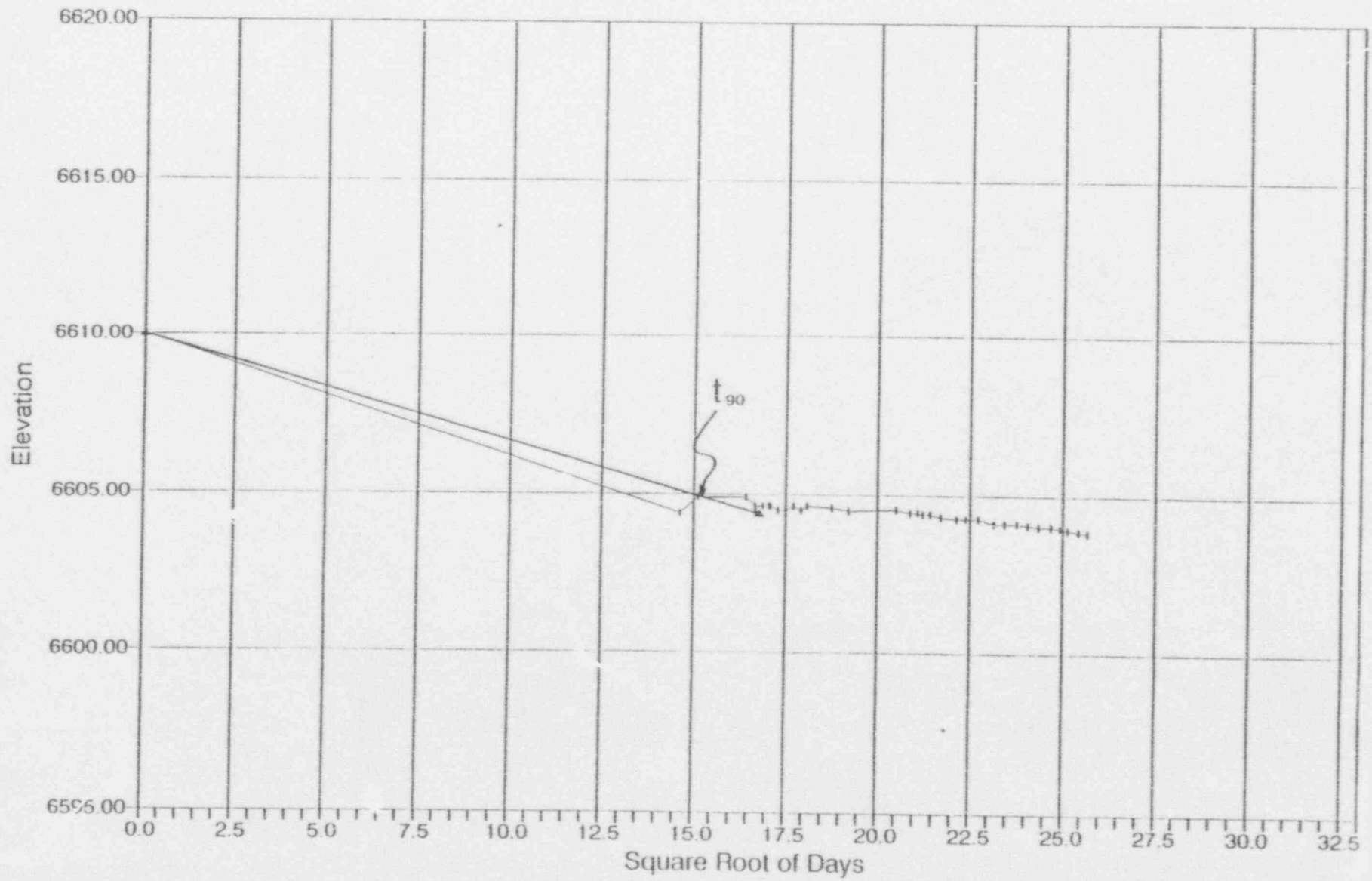
Settlement vs Square Root of Time

Date: 11/23/93
Project: 360
File:

Settlement Point 2



Settlement Point 3



SMI
SHEPHERDMILLER, INC.

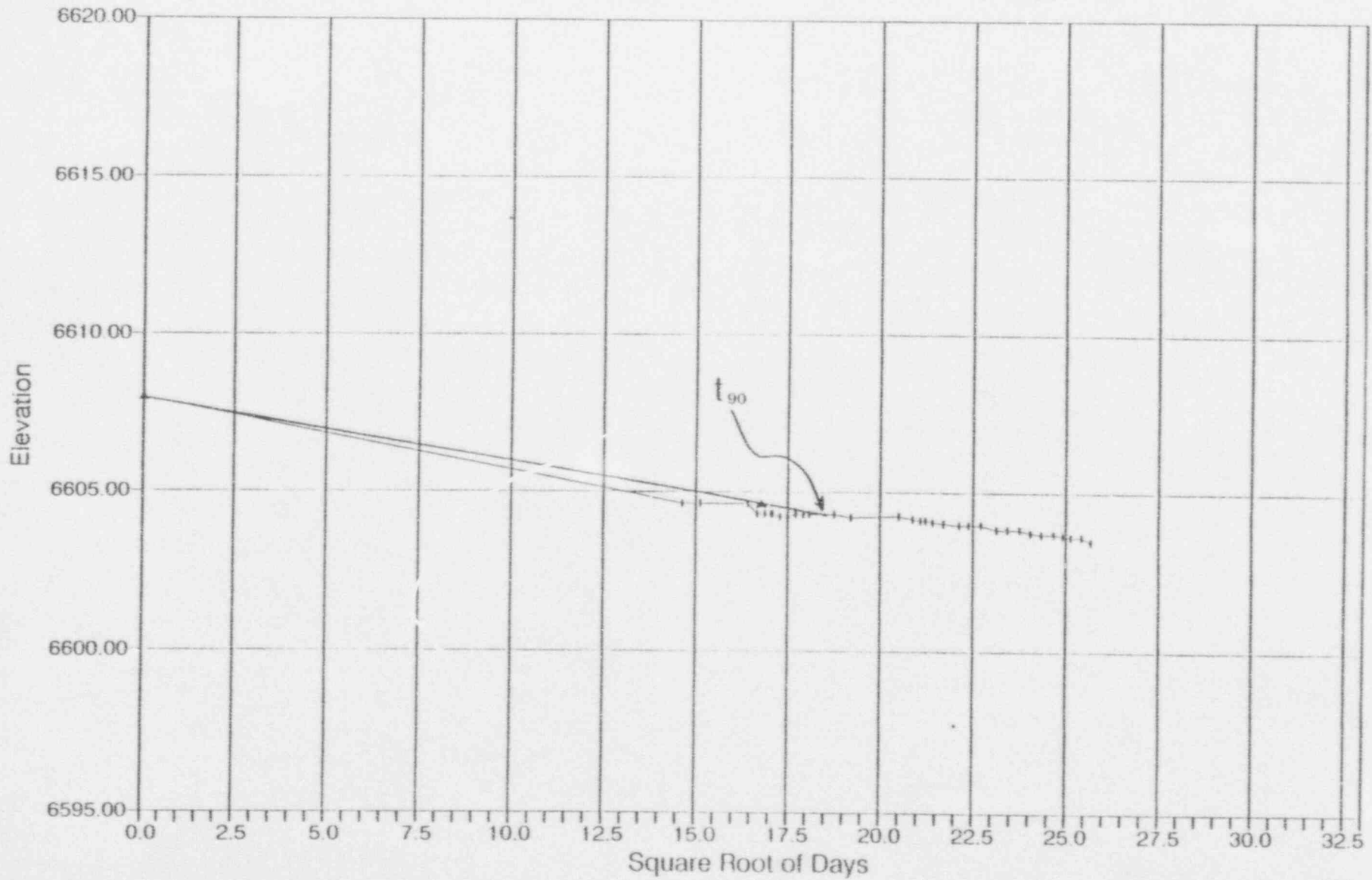
Settlement vs Square Root of Time

Date: 11/23/93

Project: 360

File:

Settlement Point 4



SMI
SHEPHERD MILLER, INC.

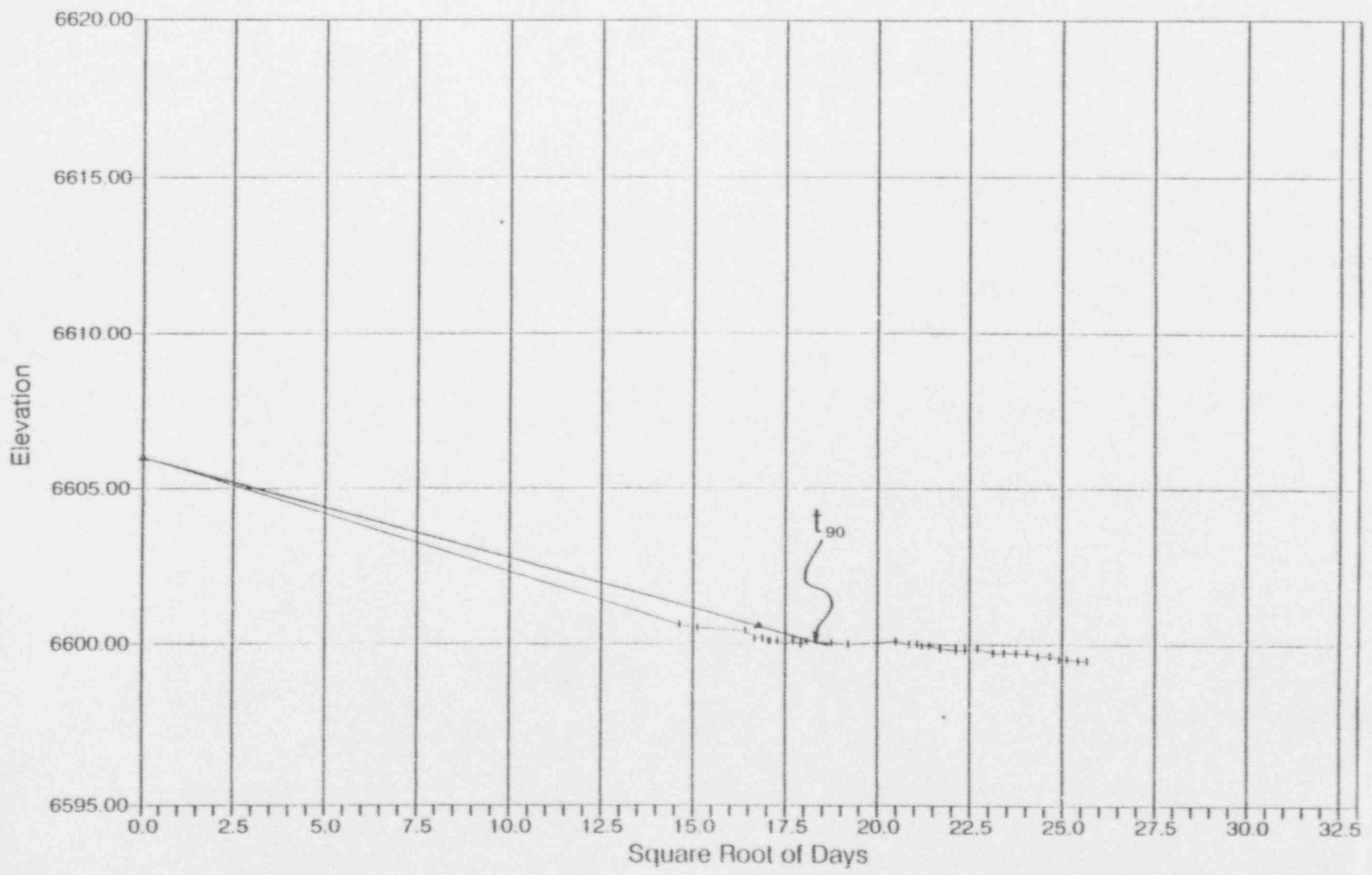
Settlement vs Square Root of Time

Date: 11/23/93

Project: 360

File:

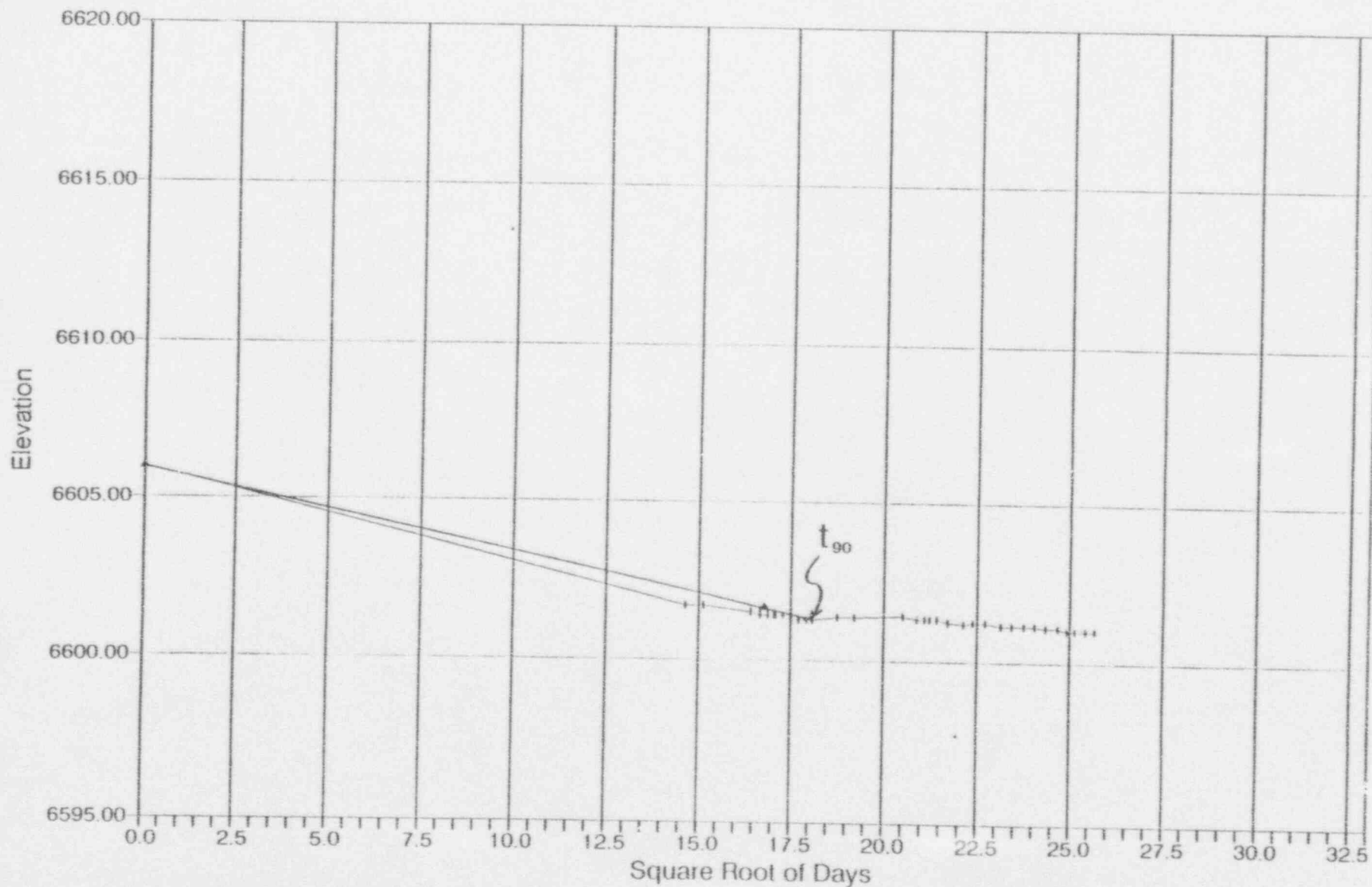
Settlement Point 5



Settlement vs Square Root of Time

Date: 11/23/93
Project: 360
File:

Settlement Point 6



SMI
SMITH AND MILLER, INC.

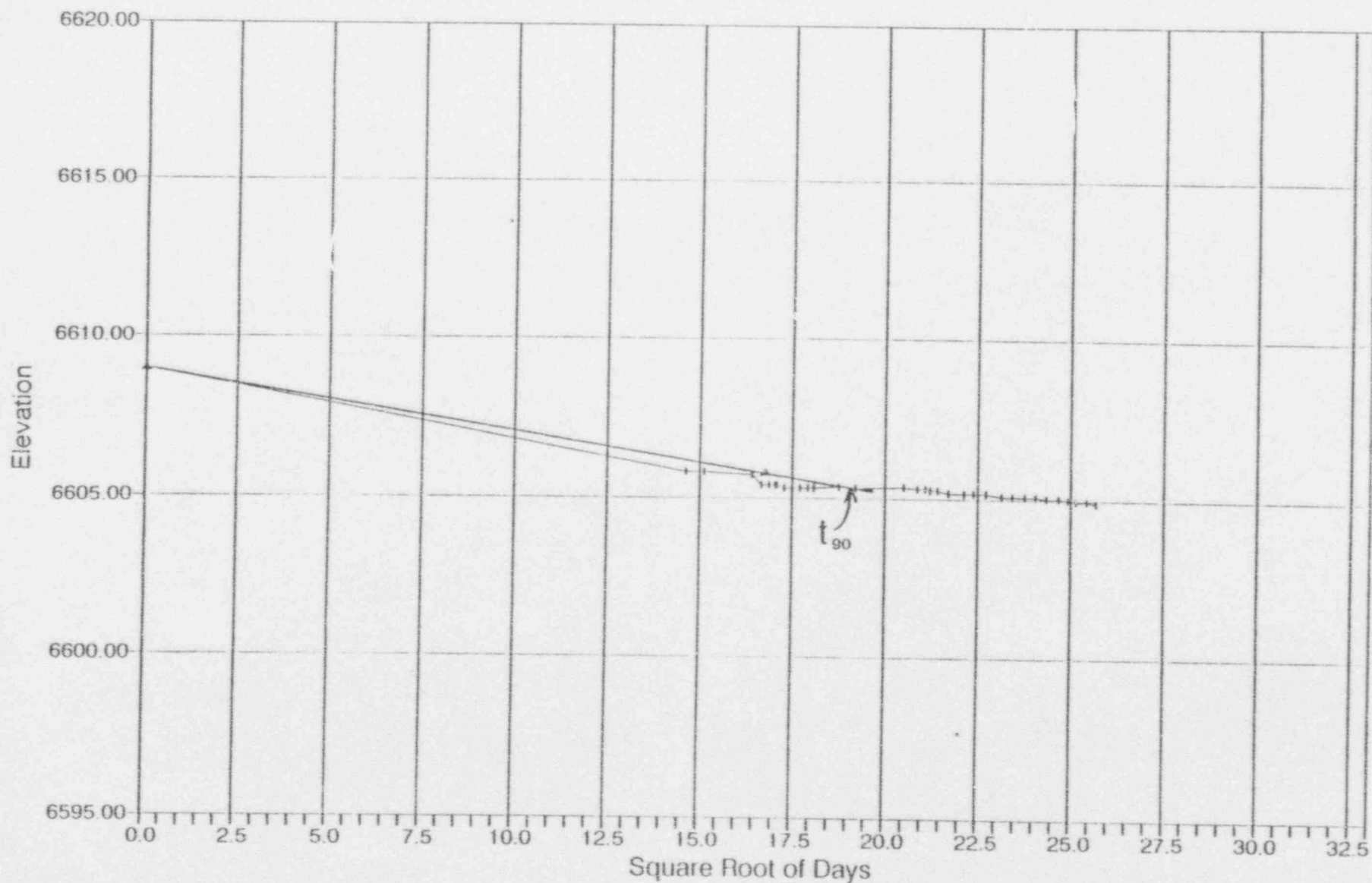
Settlement vs Square Root of Time

Date: 11/23/93

Project: 360

File:

Settlement Point 7



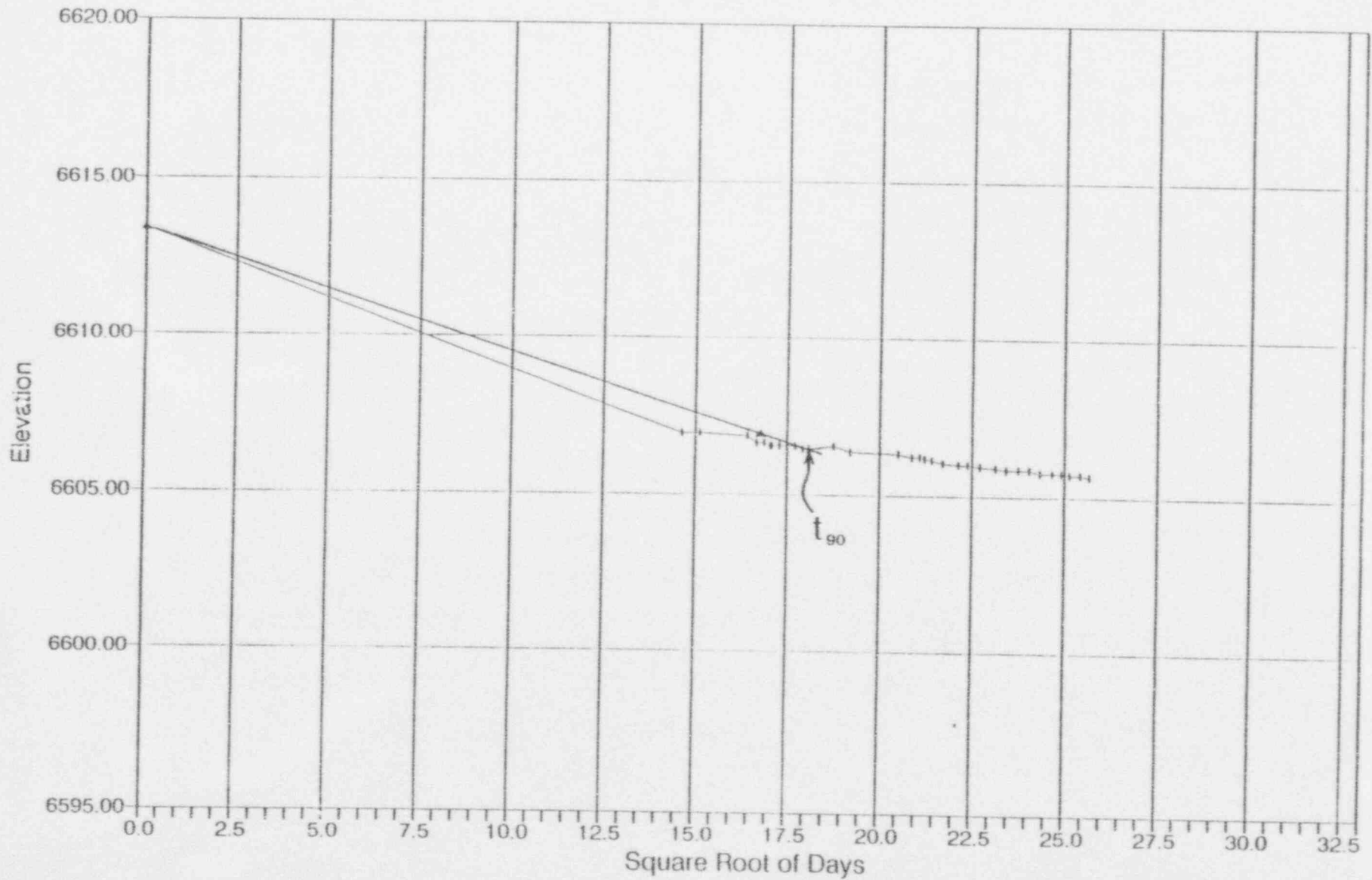
Settlement vs Square Root of Time

Date: 11/23/93

Project: 360

File:

Settlement Point 8



SMI
SHEPHERD MILLER, INC.

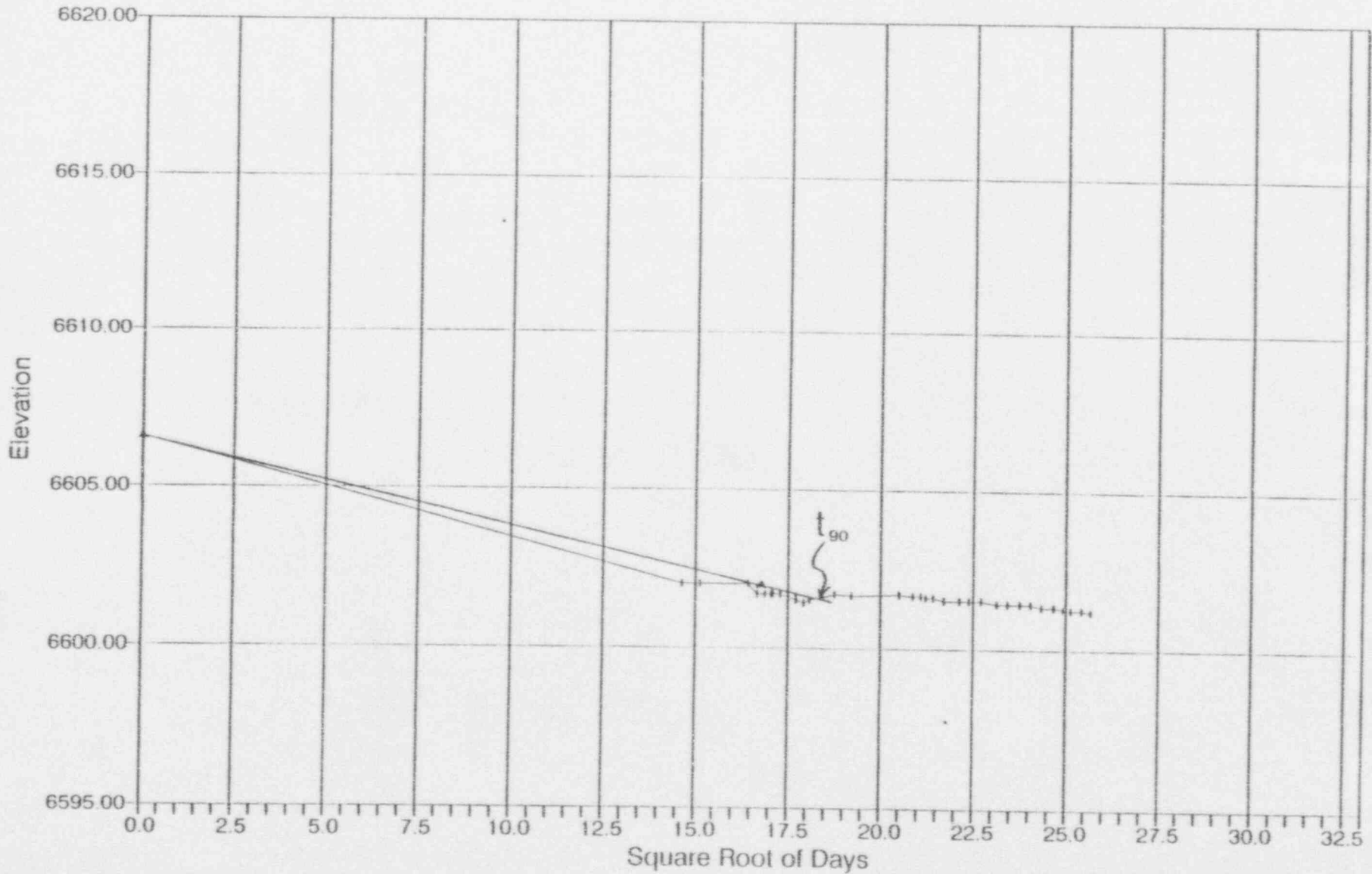
Settlement vs Square Root of Time

Date: 11/23/93

Project: 360

File:

Settlement Point NS8



SMI
SHEPHERD MILLER, INC.

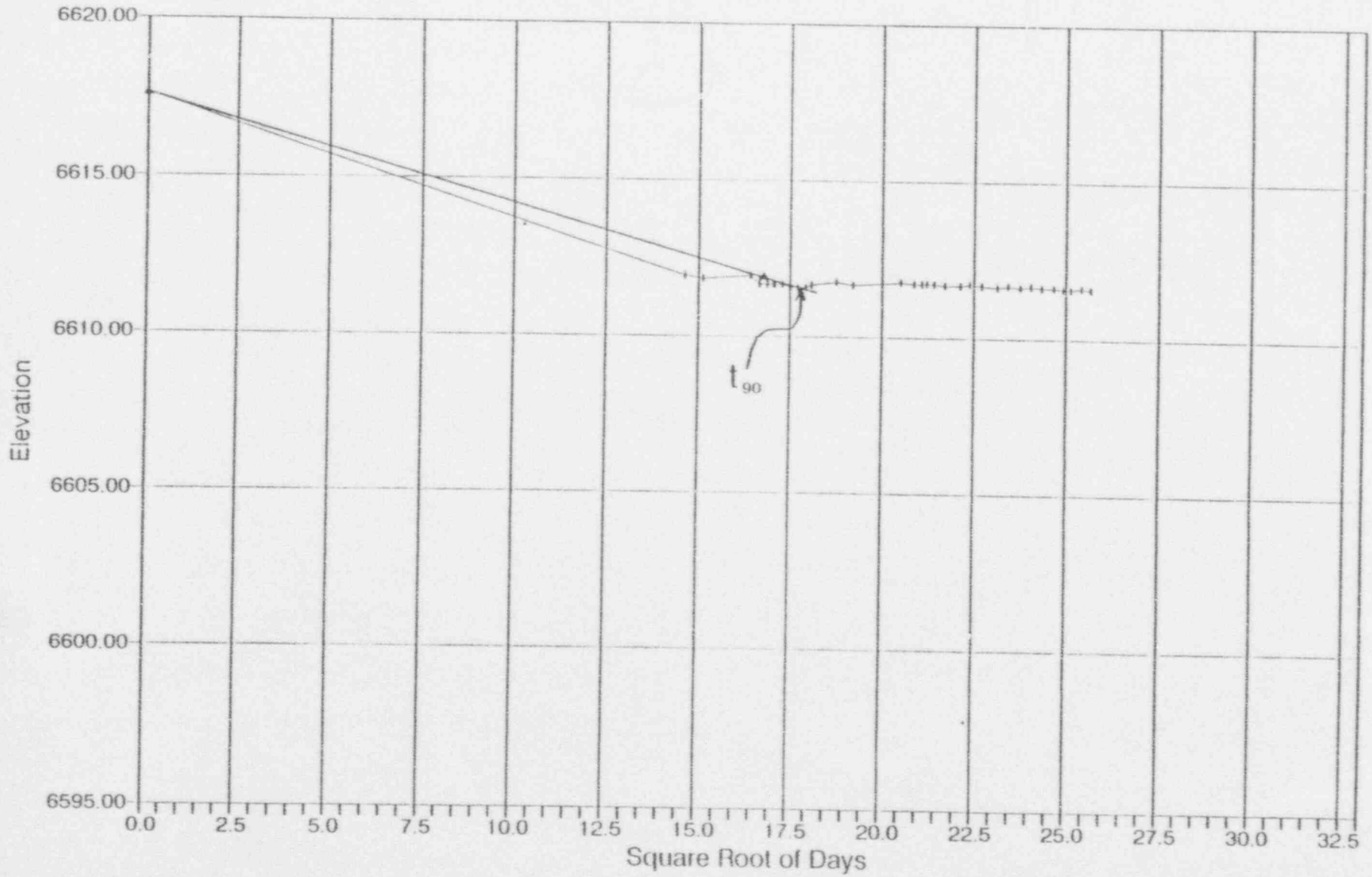
Settlement vs Square Root of Time

Date: 11/23/93

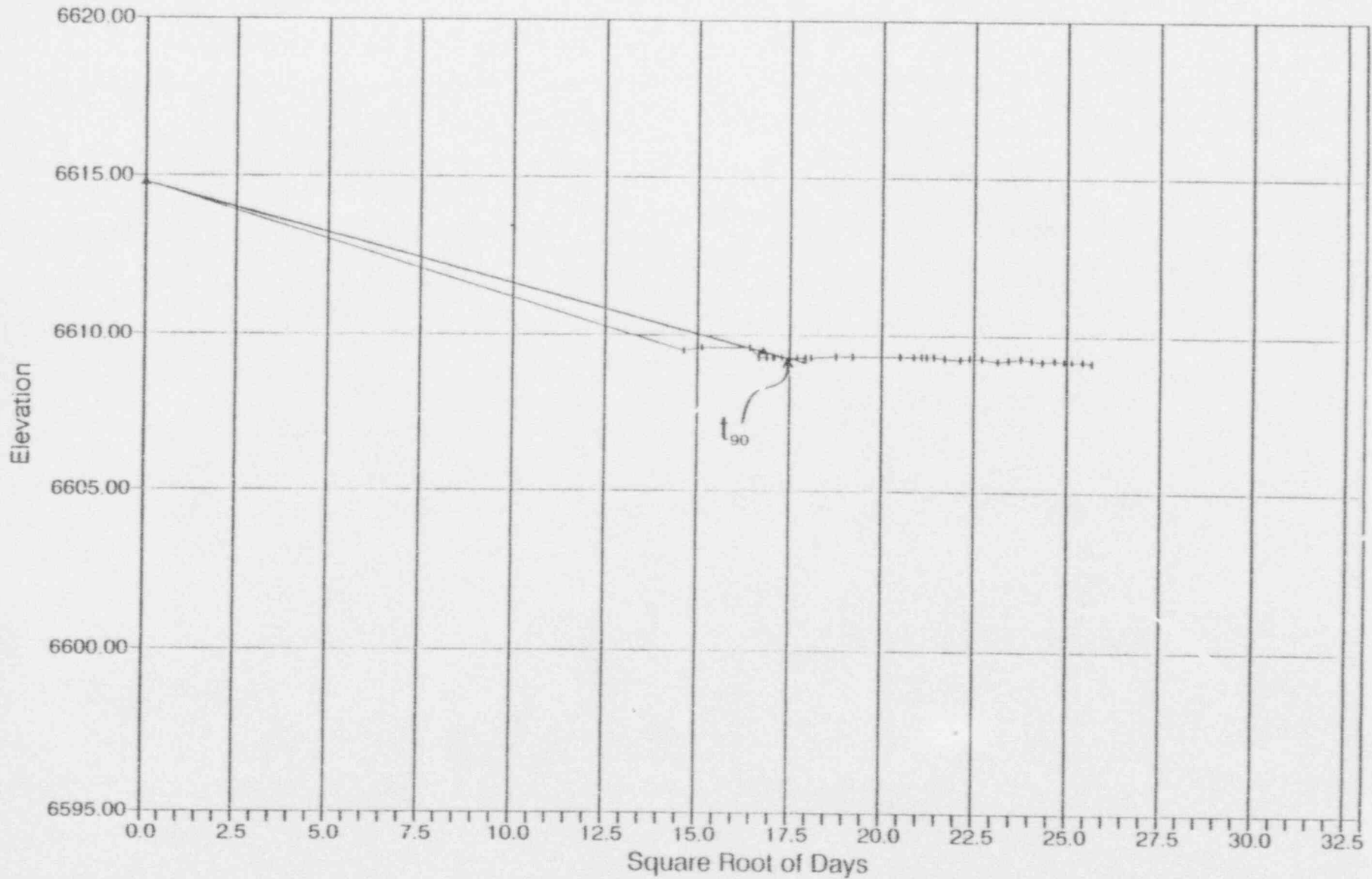
Project: 360

File:

Settlement Point 9



Settlement Point 11



SMI
SHEPHERD MILLER, INC.

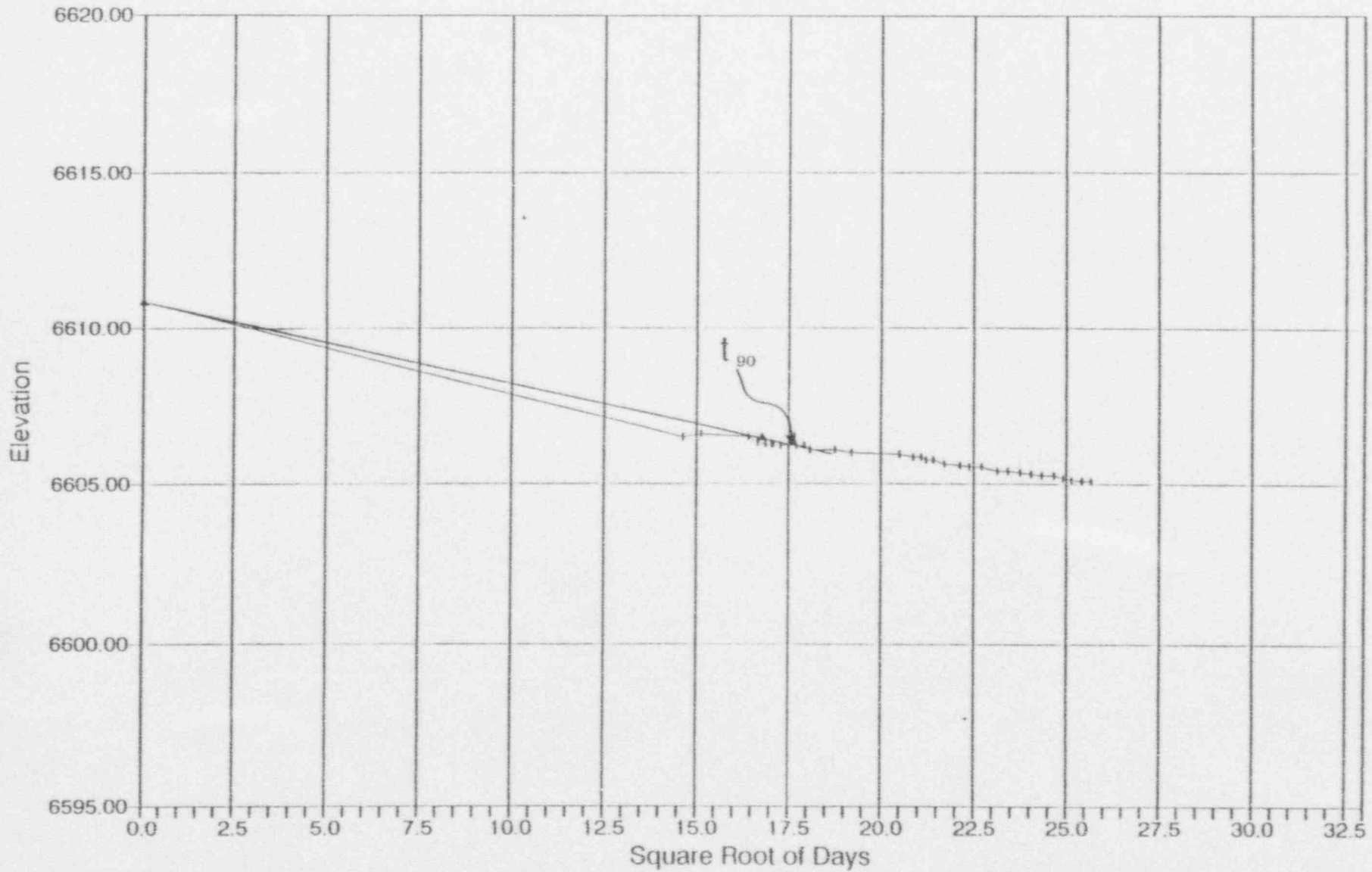
Settlement vs Square Root of Time

Date: 11/23/93

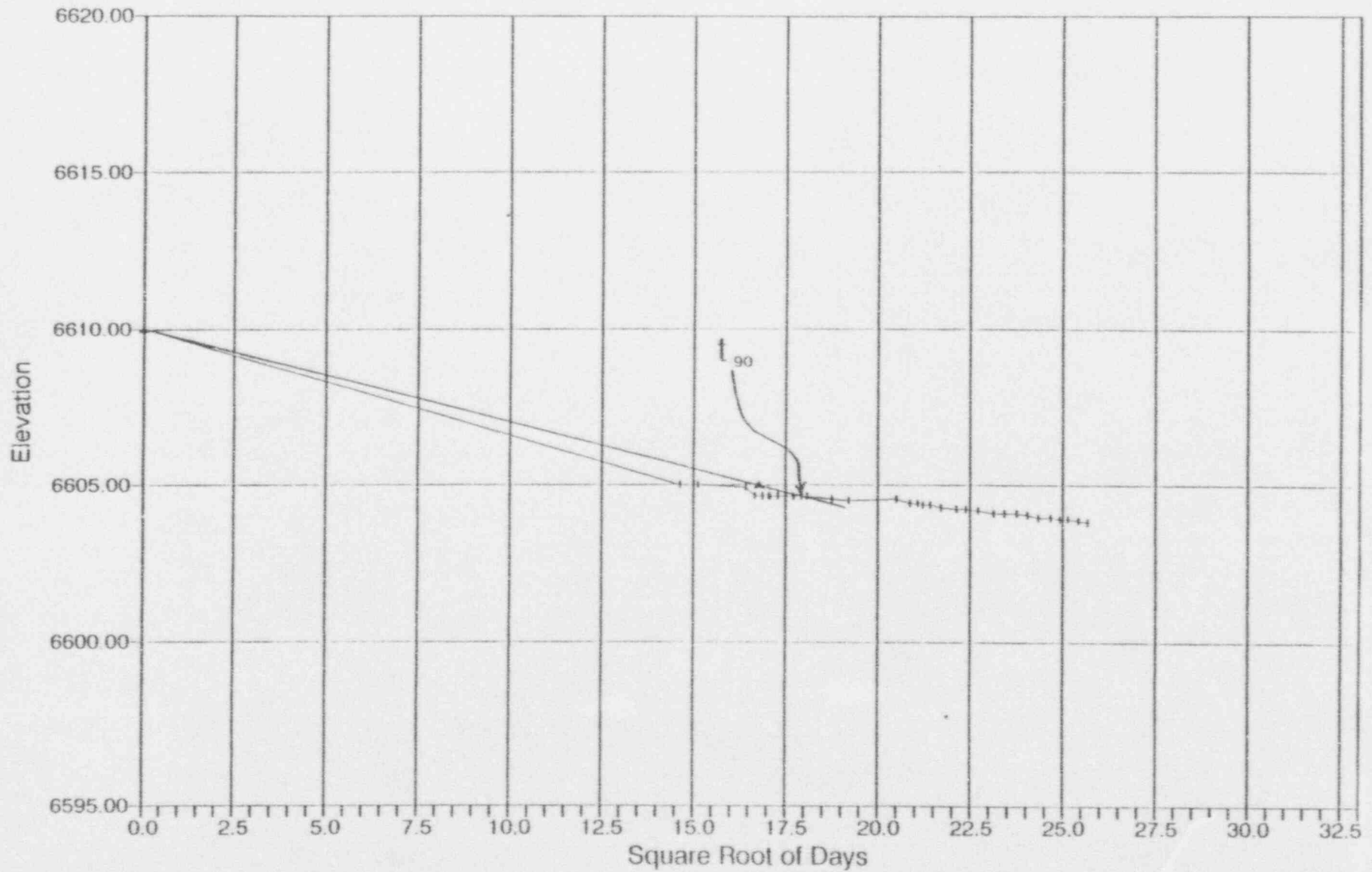
Project: 360

File:

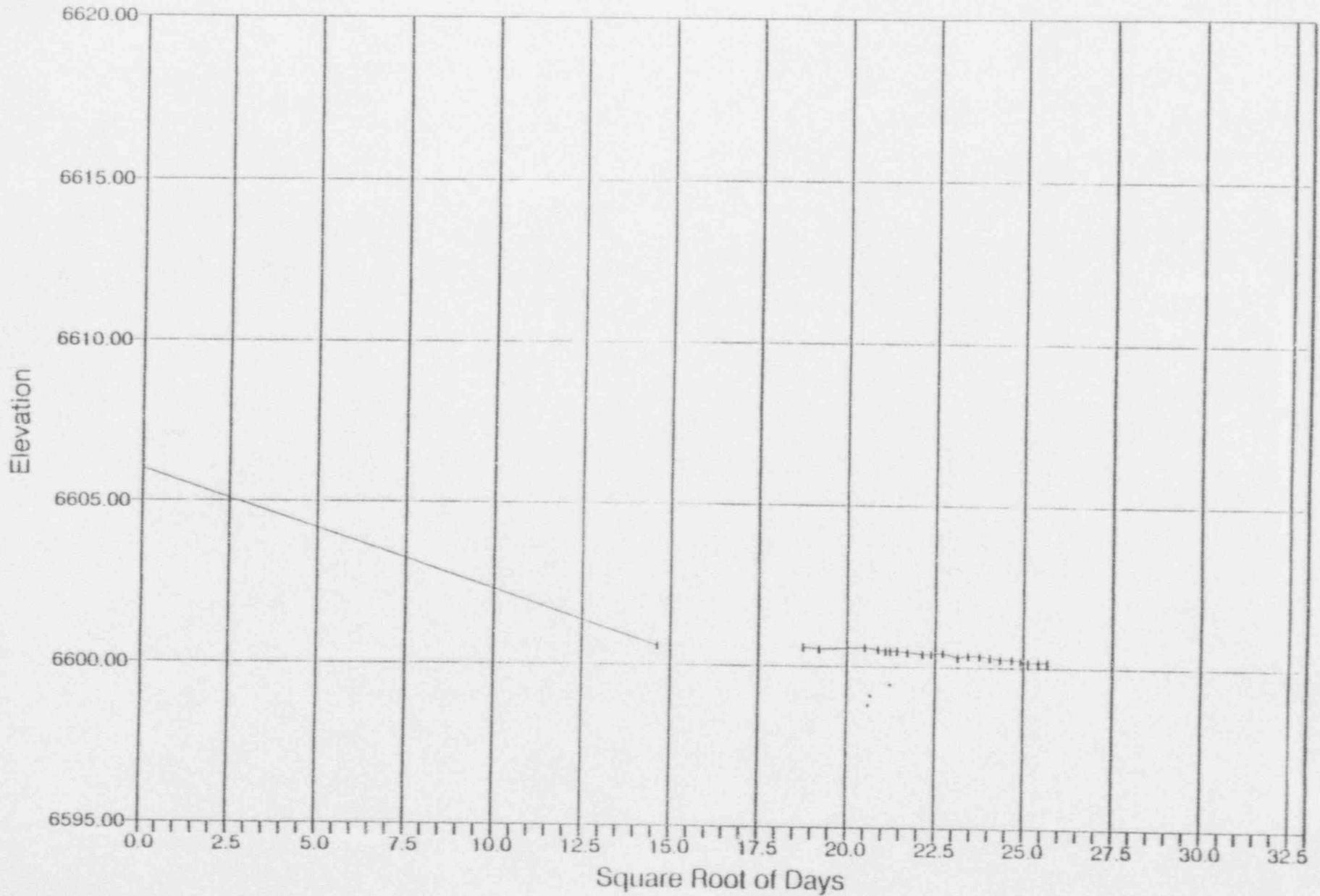
Settlement Point 16



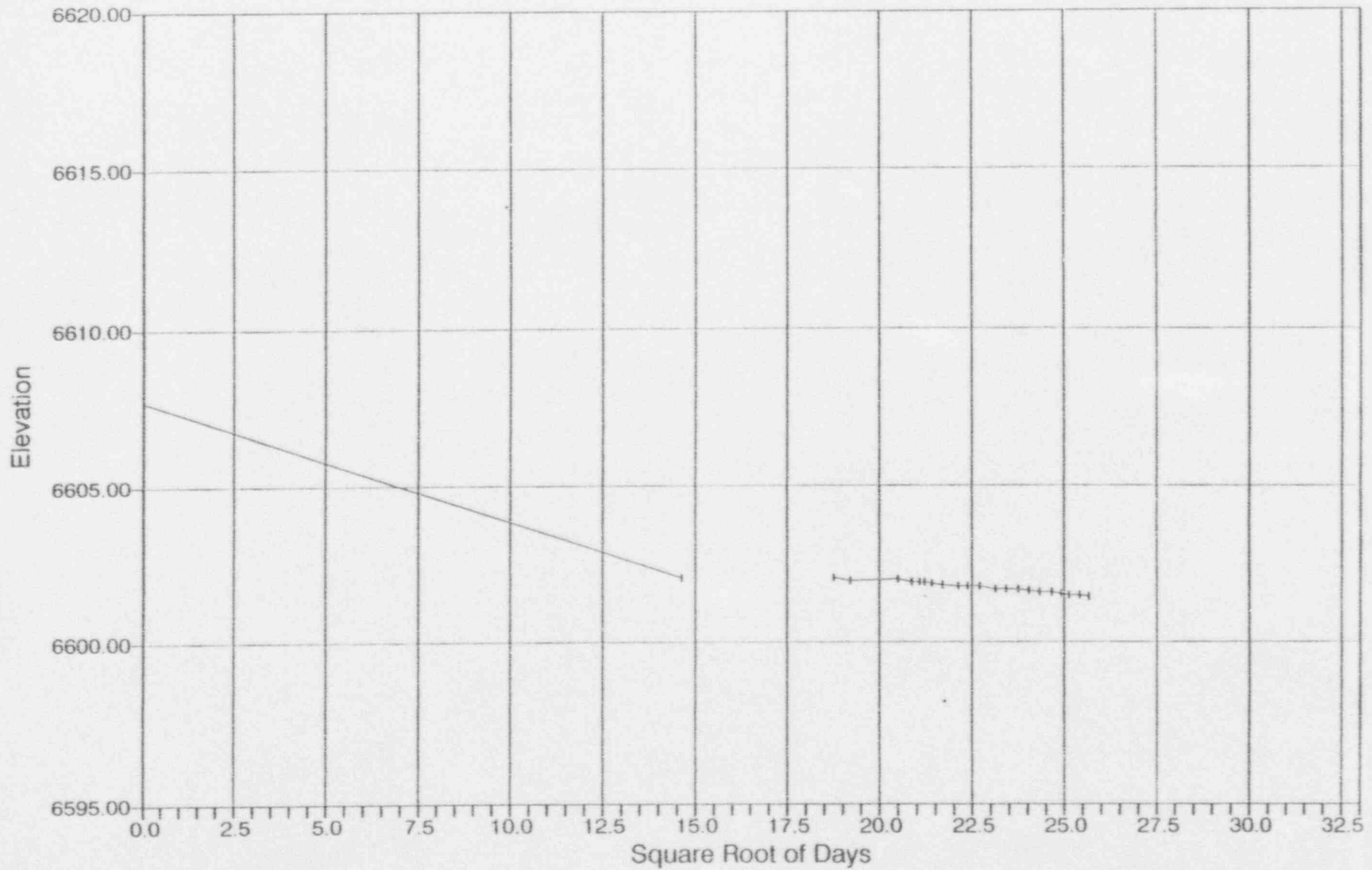
Settlement Point 17



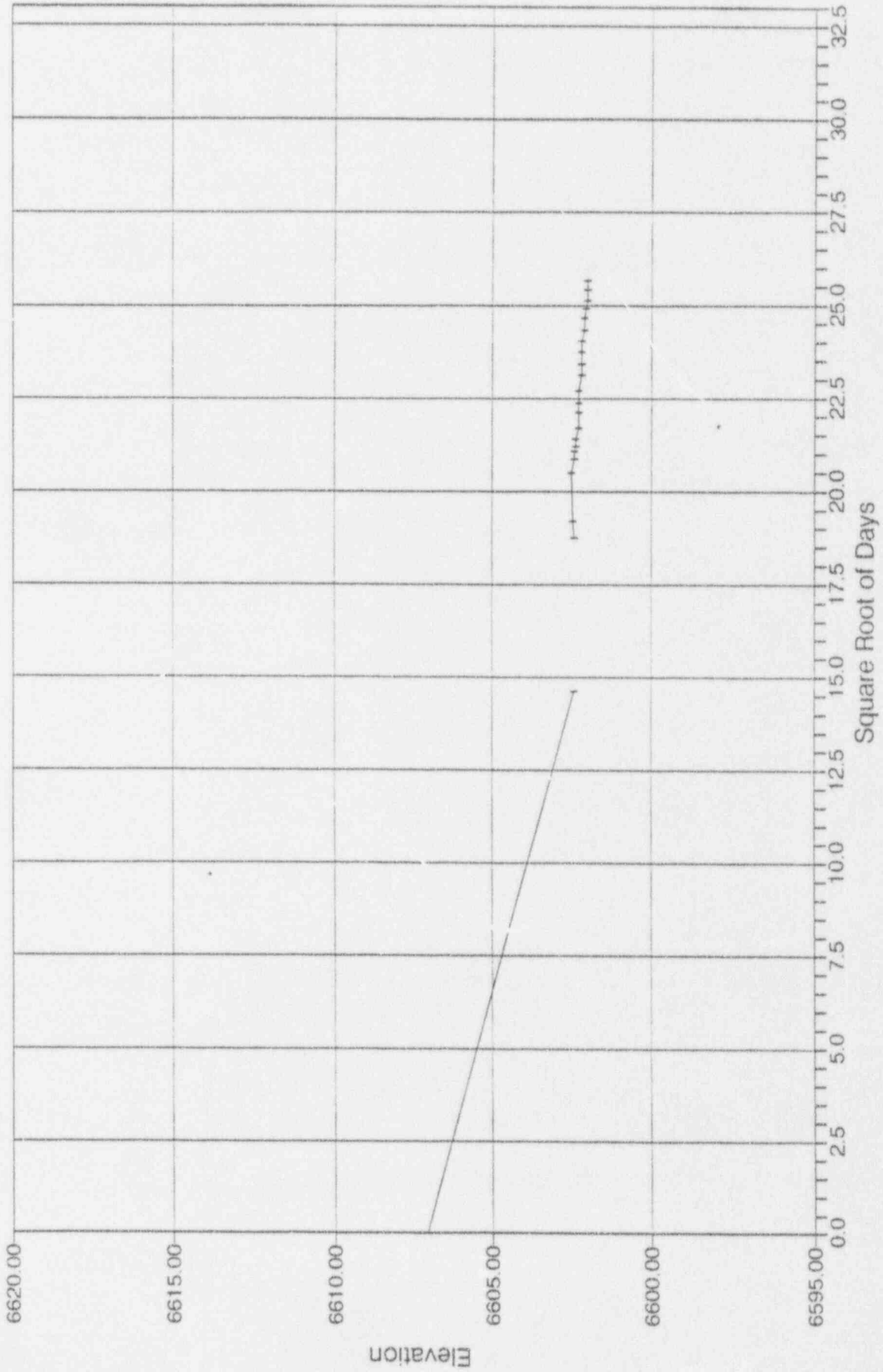
Settlement Point 19



Settlement Point 20



Settlement Point 21

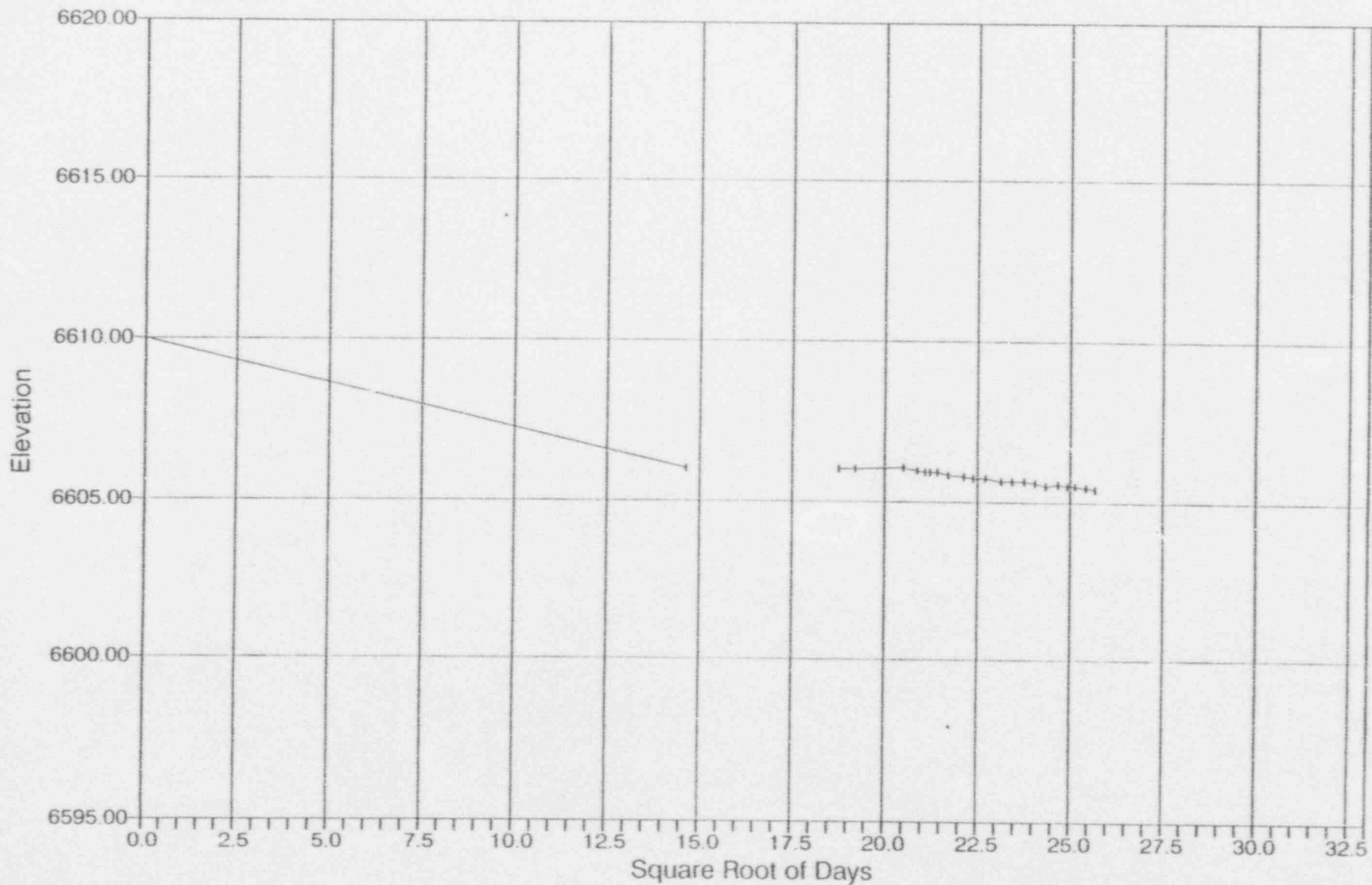


Date: 11/23/93
Project: 360
File:

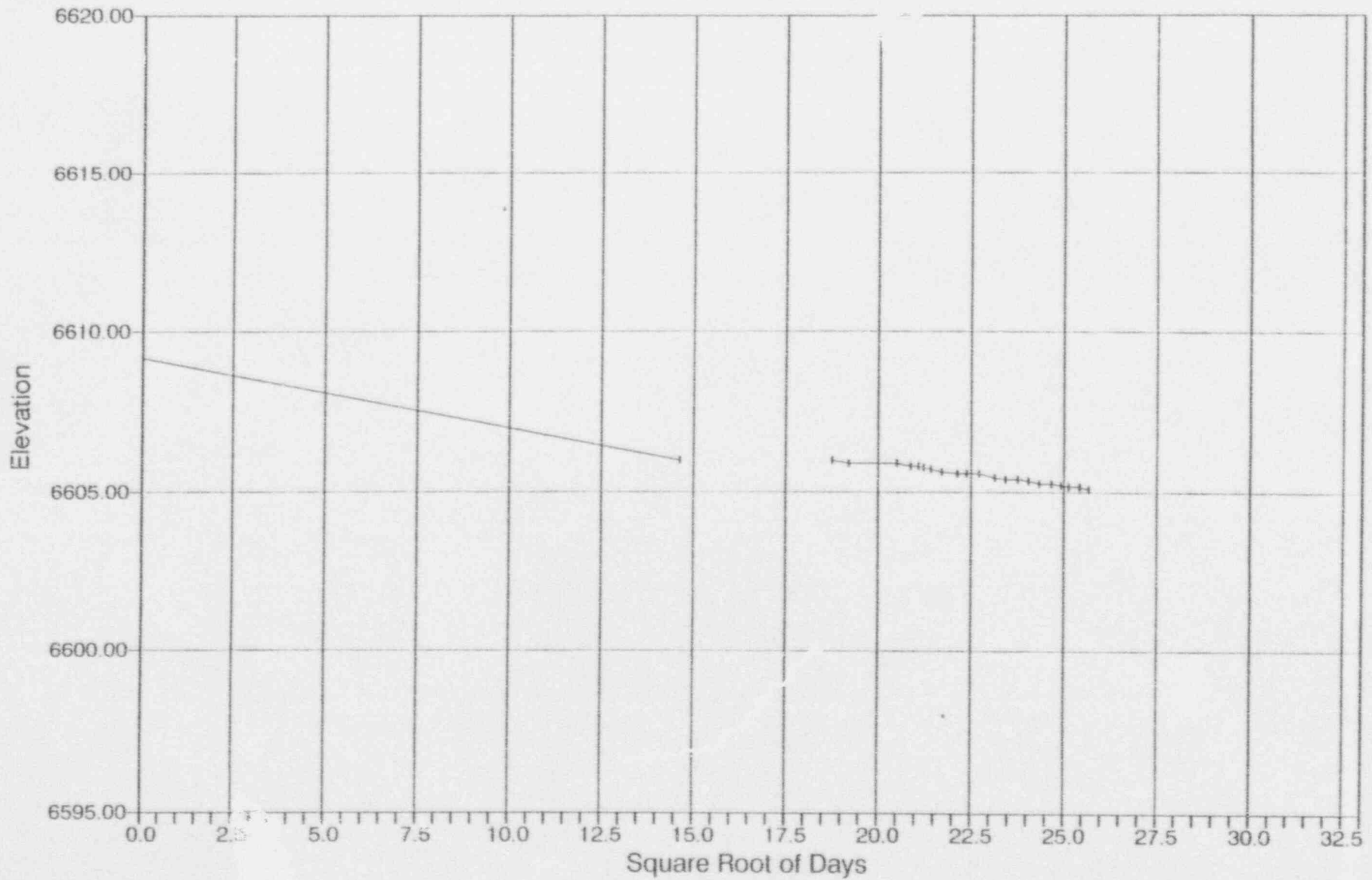
Settlement vs Square Root of Time



Settlement Point 22



Settlement Point 23



SMI
SHEPHERD MILLER, INC.

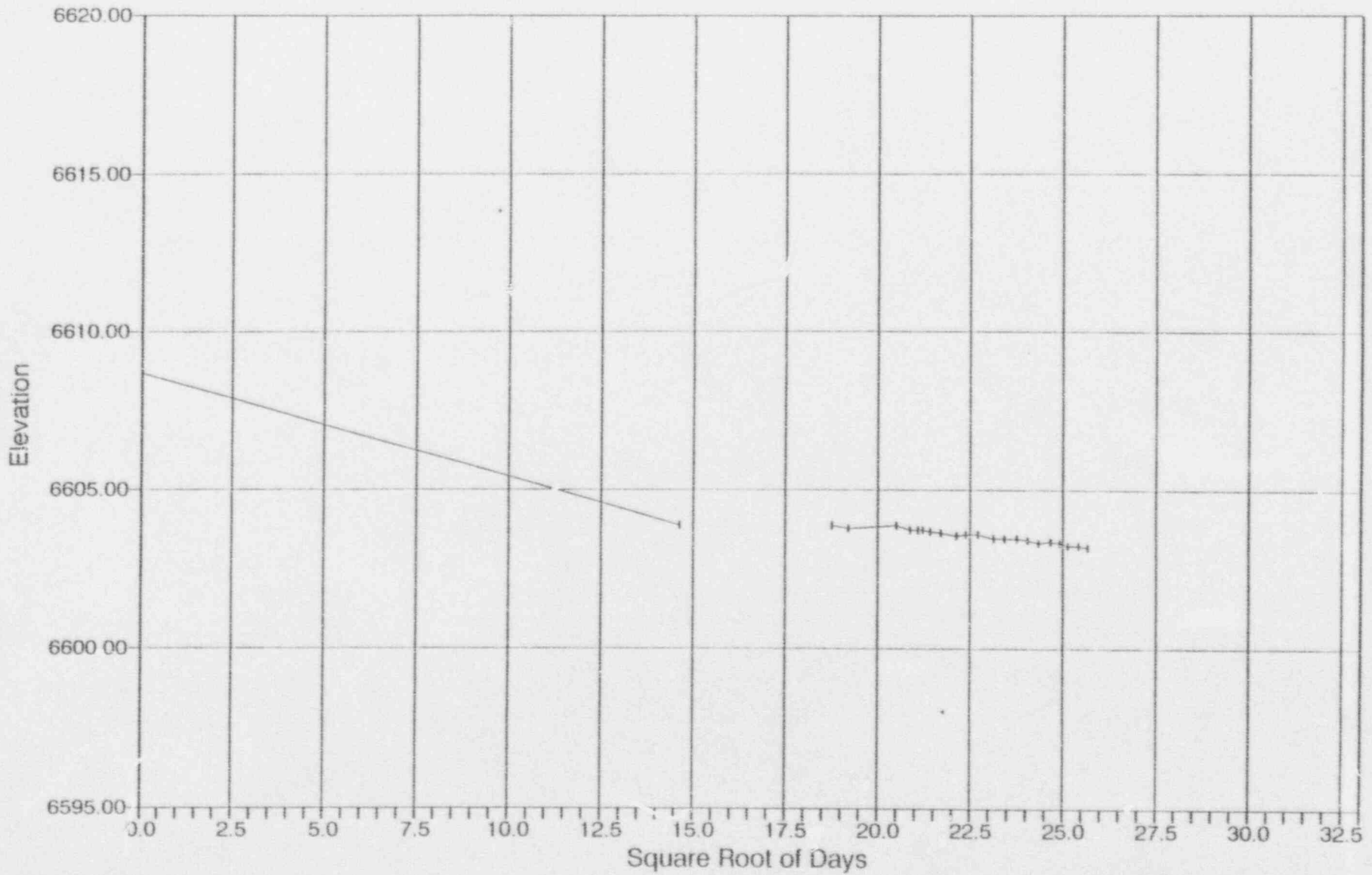
Settlement vs Square Root of Time

Date: 11/23/93

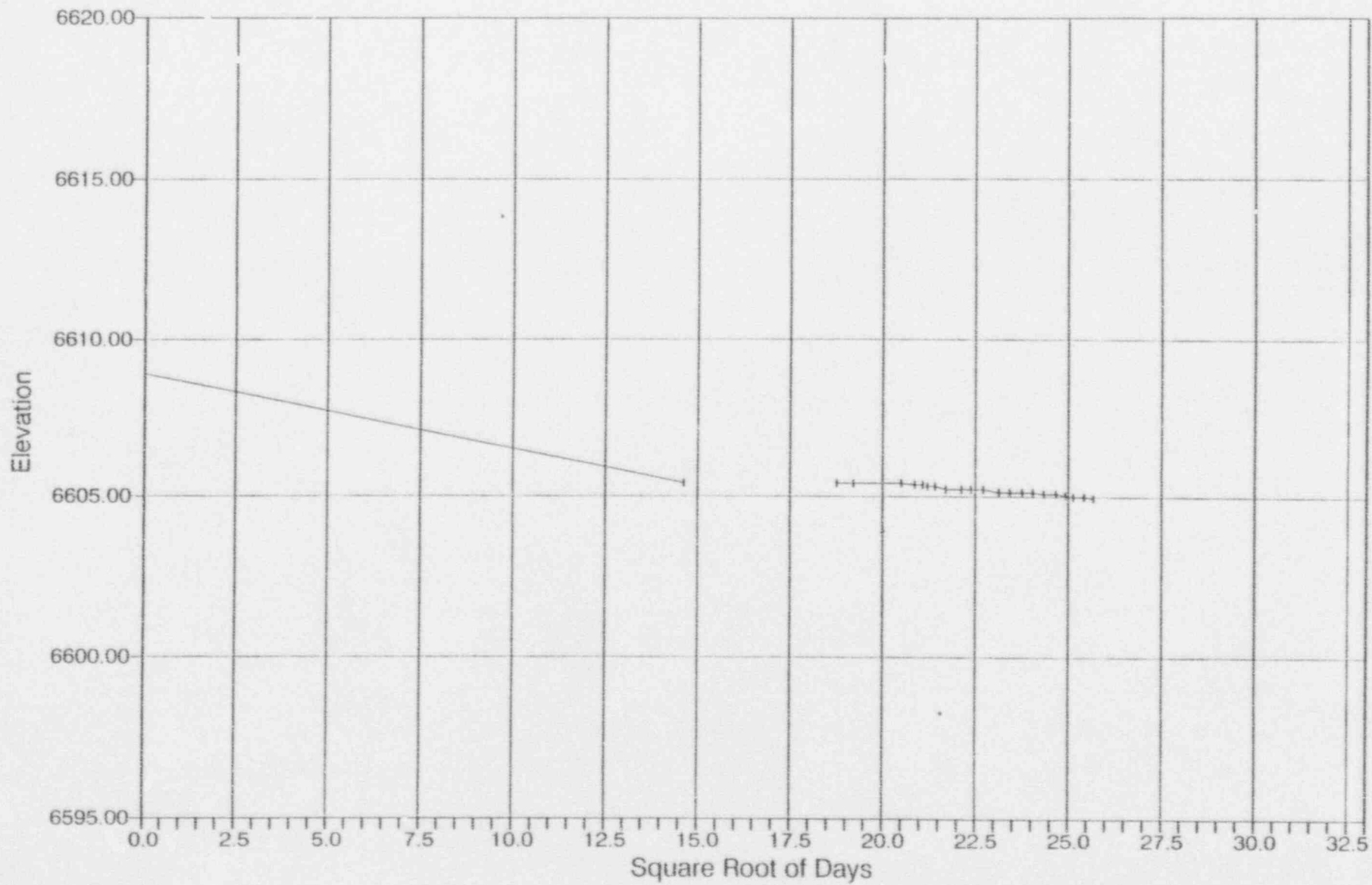
Project: 360

File:

Settlement Point 24



Settlement Point 25



SMI
SHEPHERD MILFER, INC.

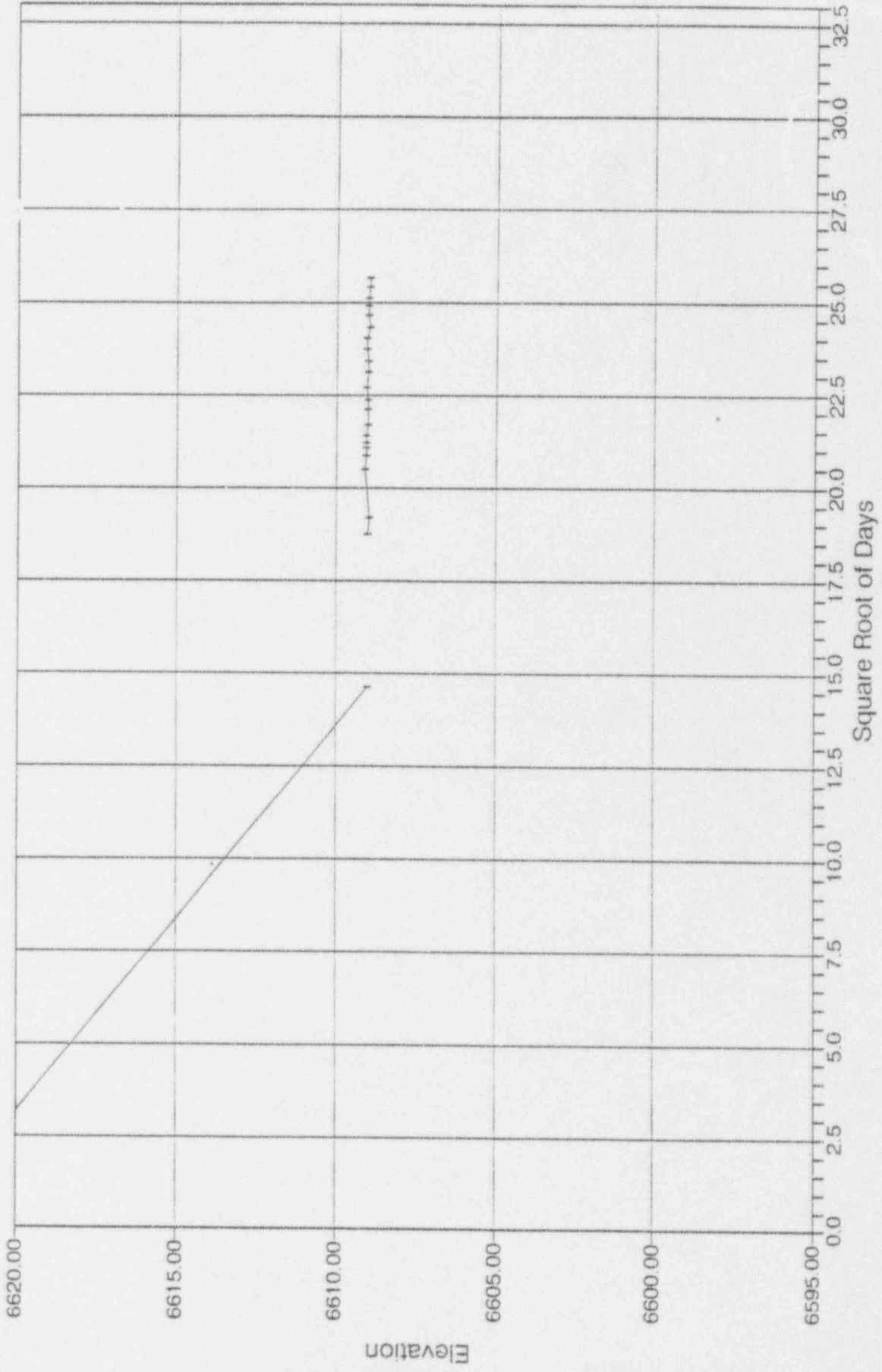
Settlement vs Square Root of Time

Date: 11/23/93

Project: 360

File:

Settlement Point 26

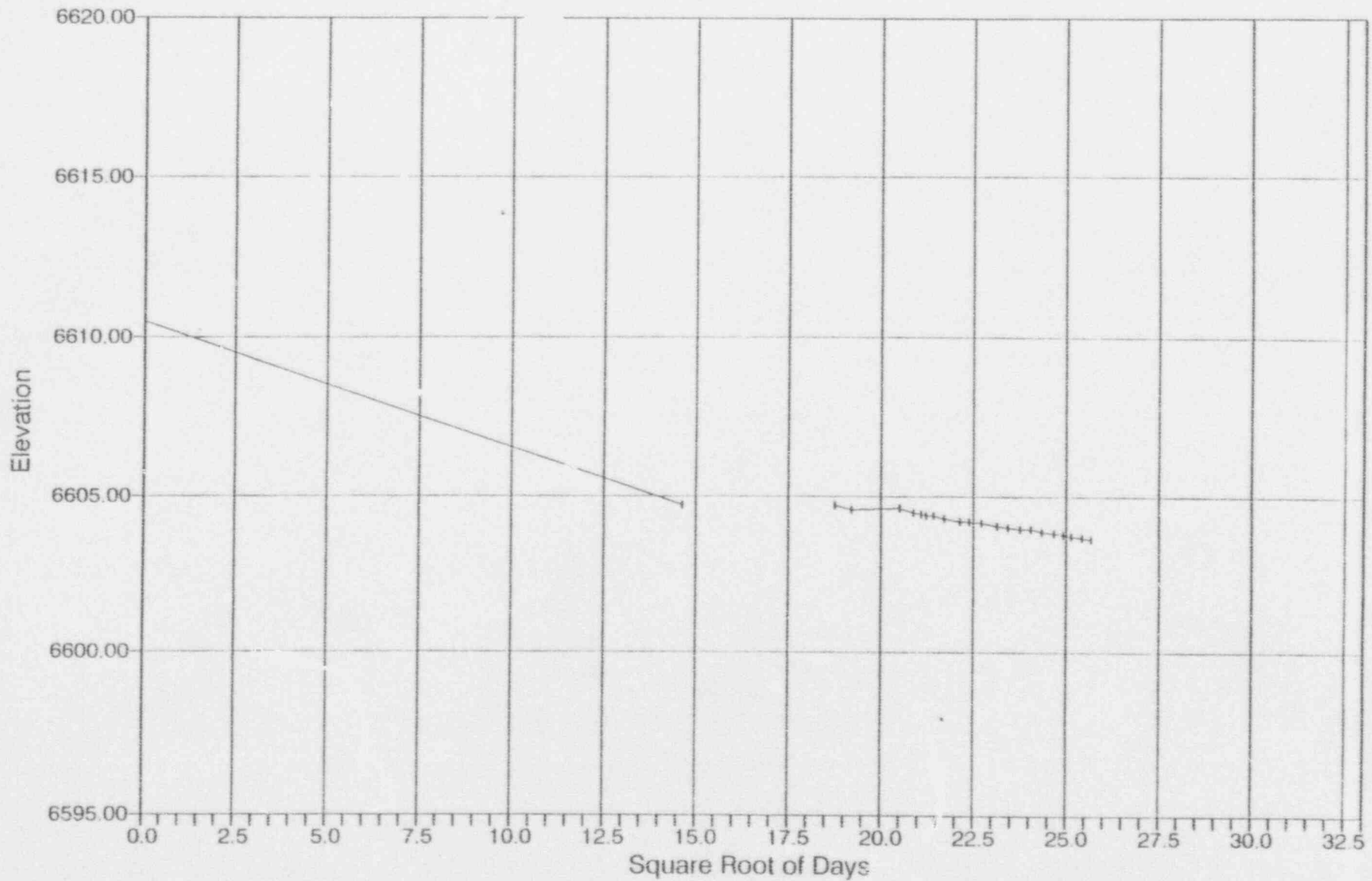


Date: 11/23/93
Project: 360
File:

Settlement vs Square Root of Time



Settlement Point 27



SMI
SHEPHERD MILLER, INC.

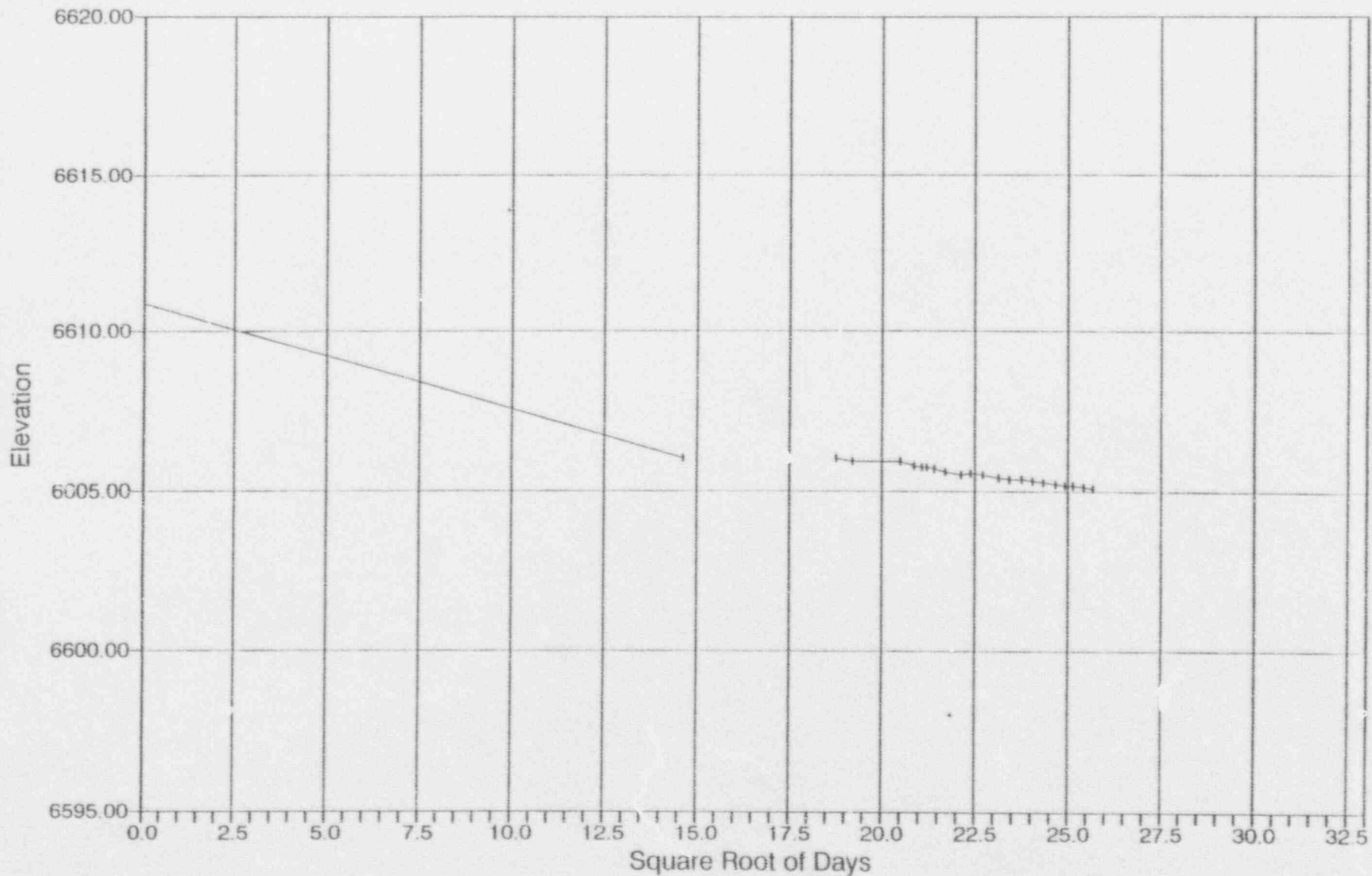
Settlement vs Square Root of Time

Date: 11/23/93

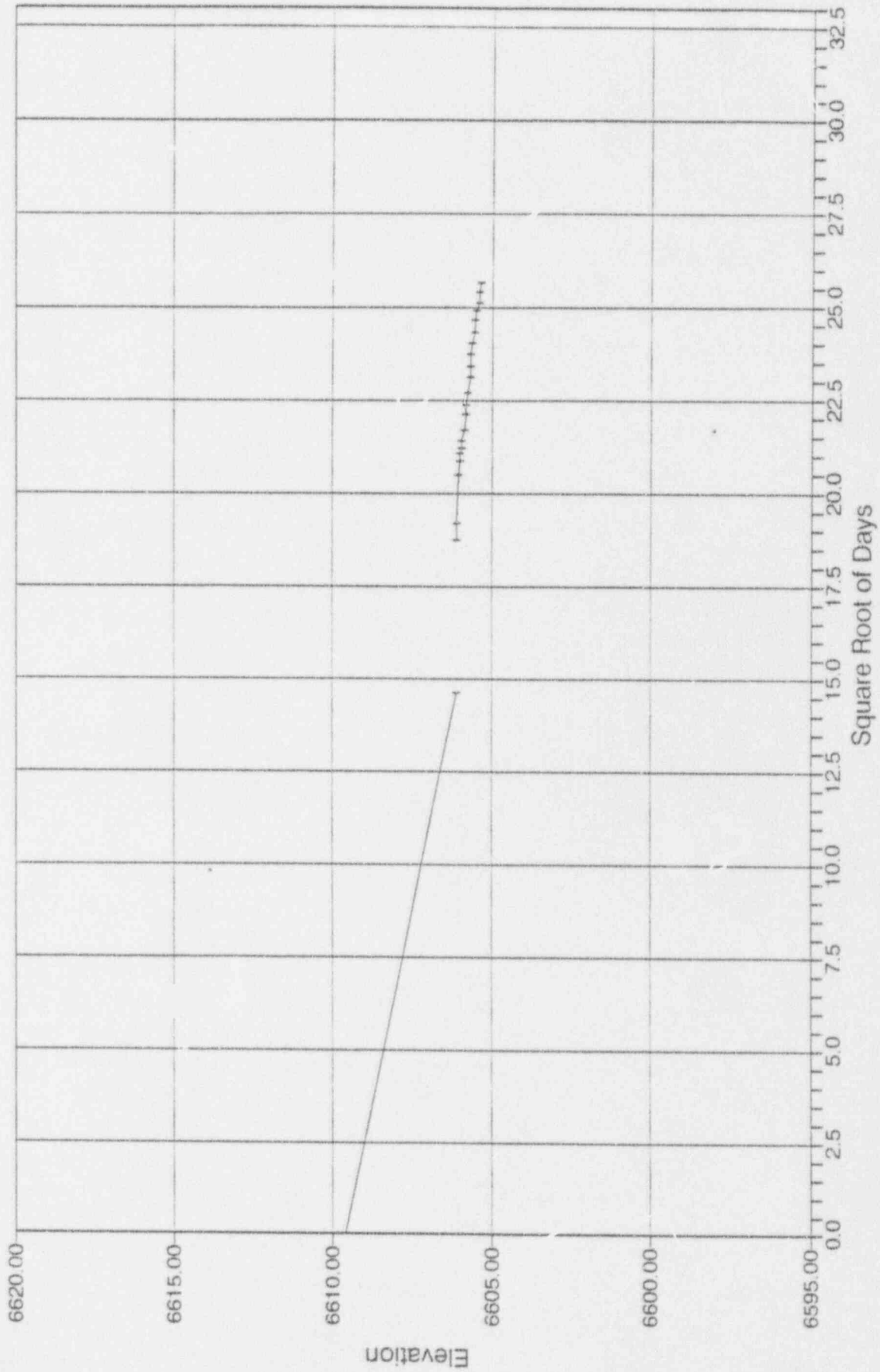
Project: 360

File:

Settlement Point 28



Settlement Point 29

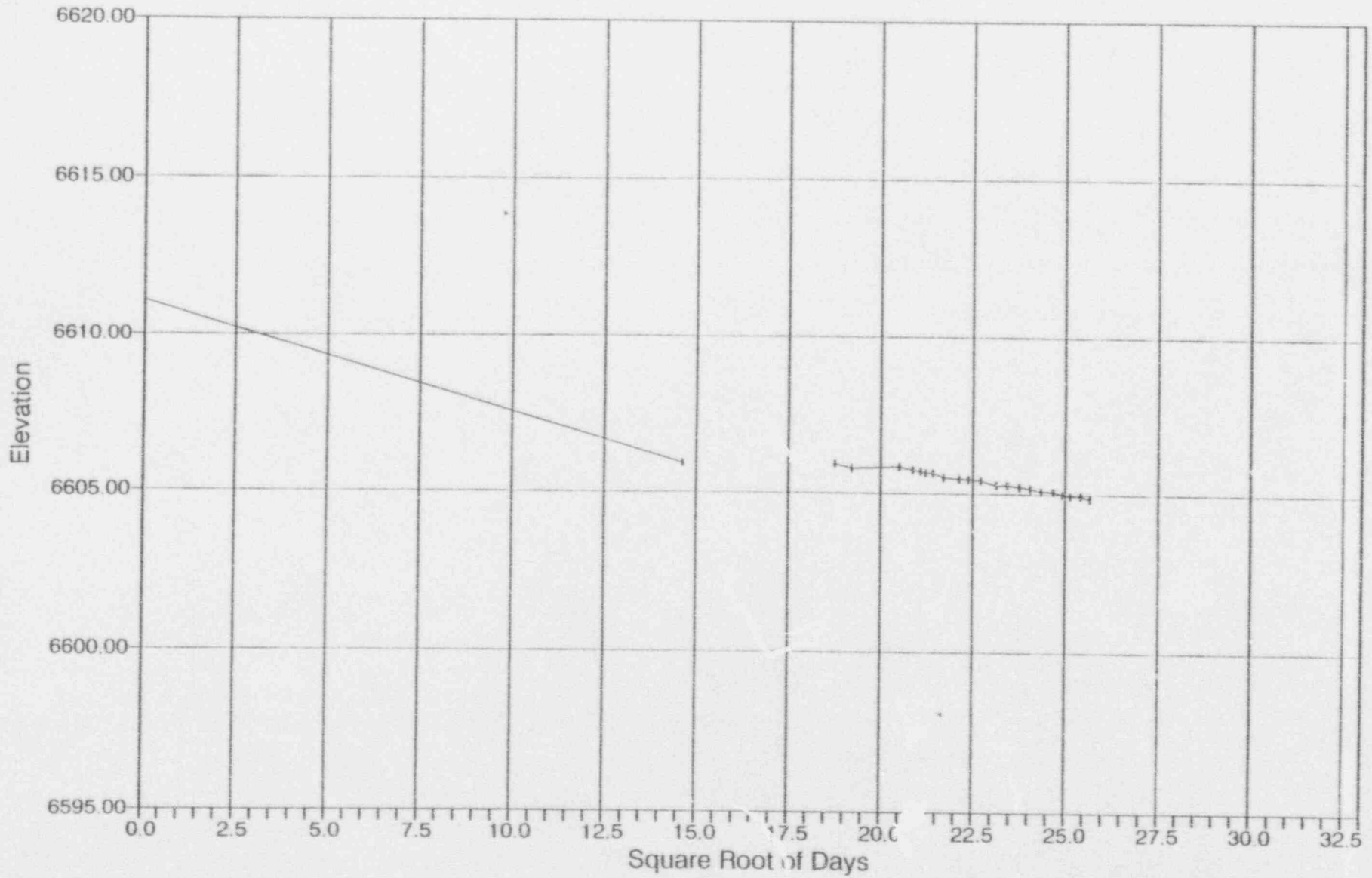


Date: 11/23/93
Project: 360
File:

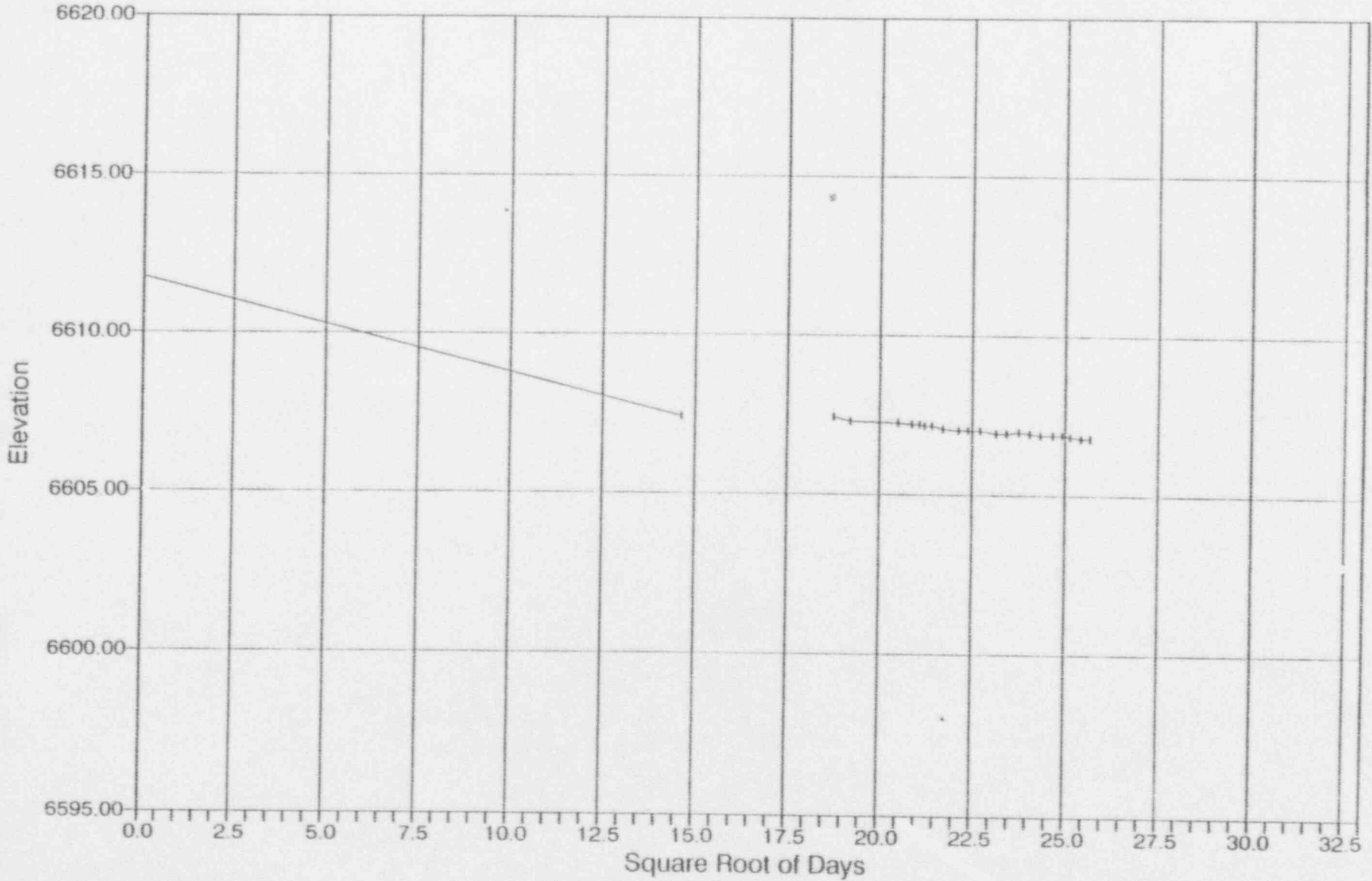
Settlement vs Square Root of Time



Settlement Point 30



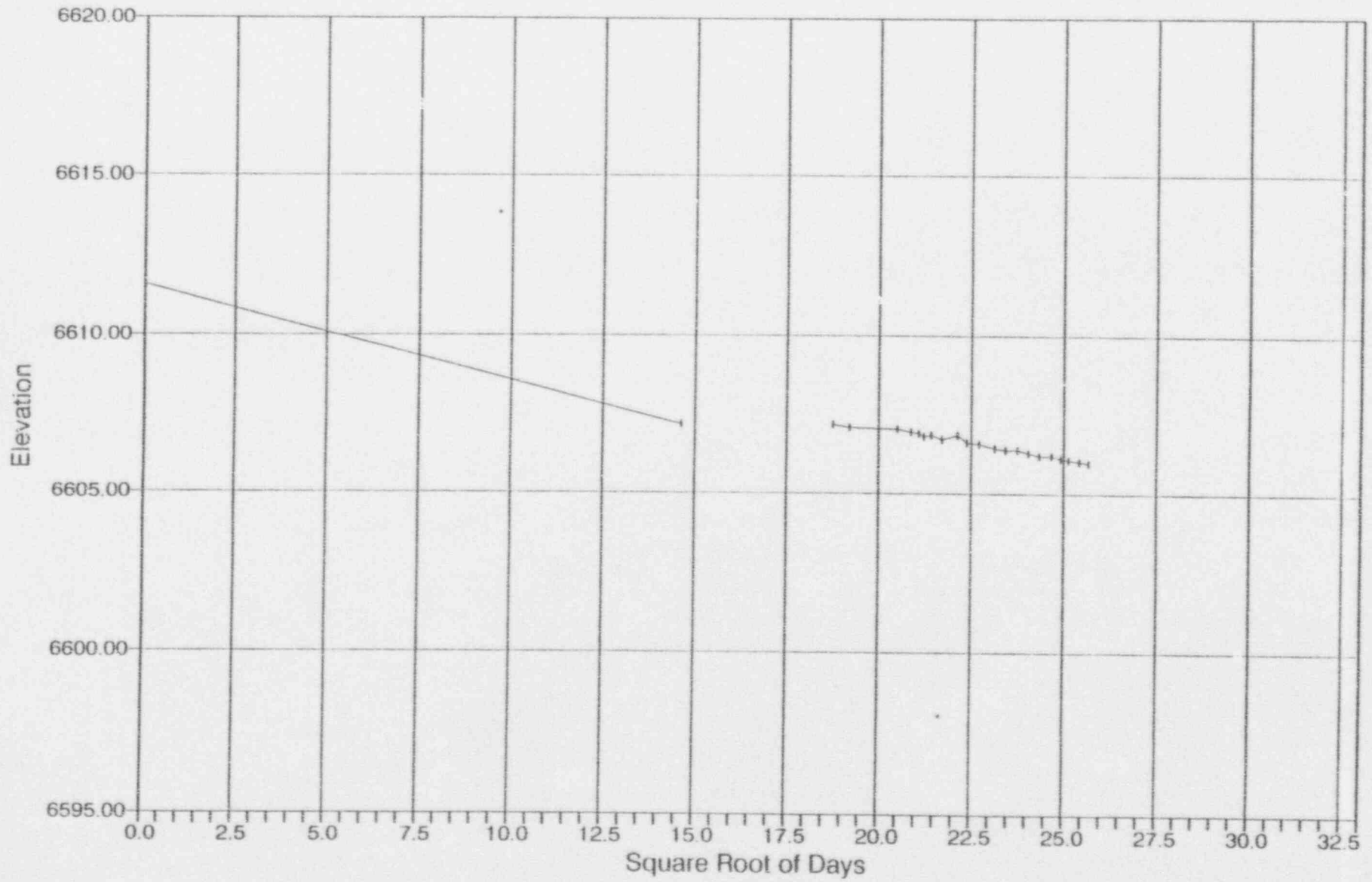
Settlement Point 31



Settlement vs Square Root of Time

Date: 11/23/93
Project: 360
File:

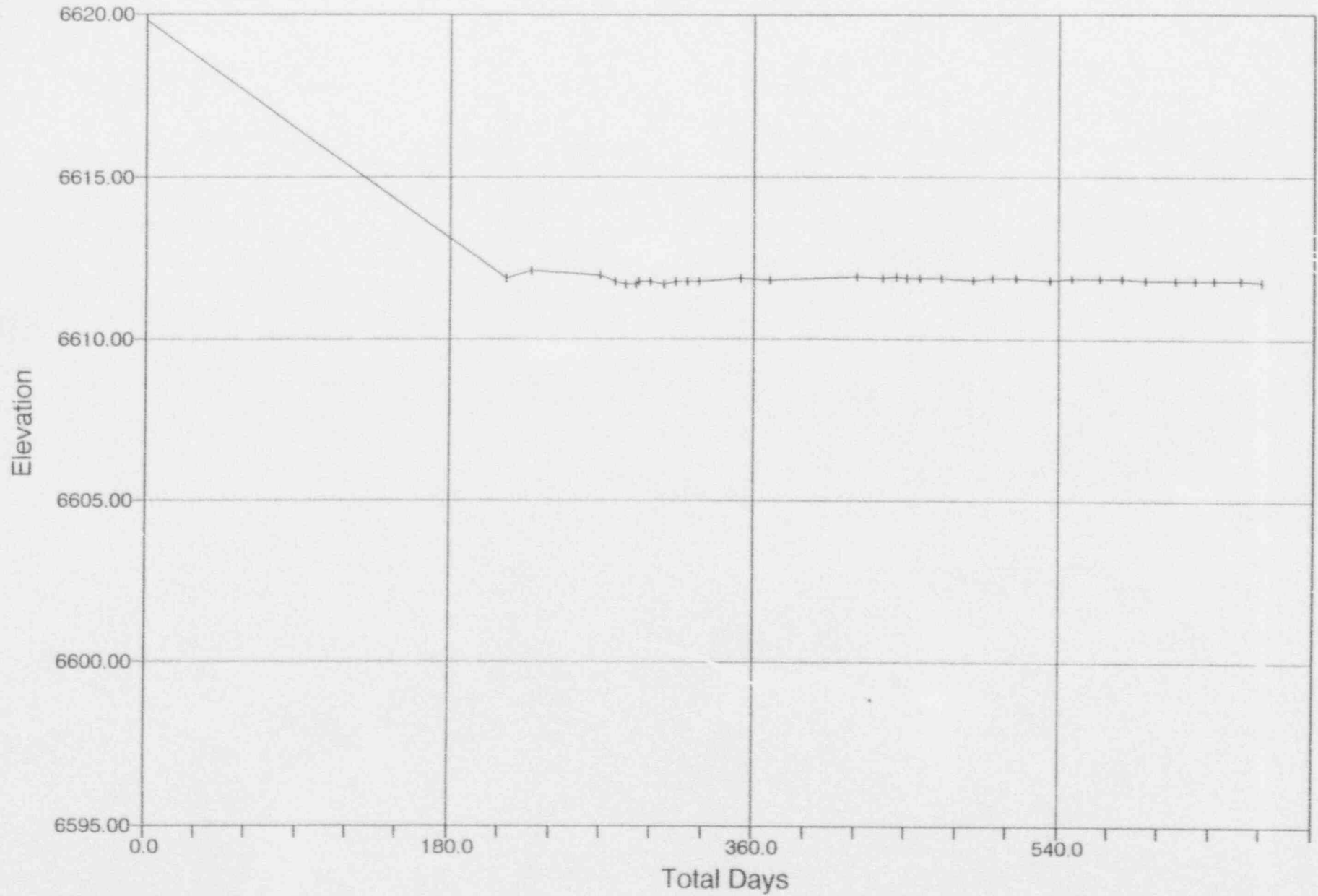
Settlement Point 32



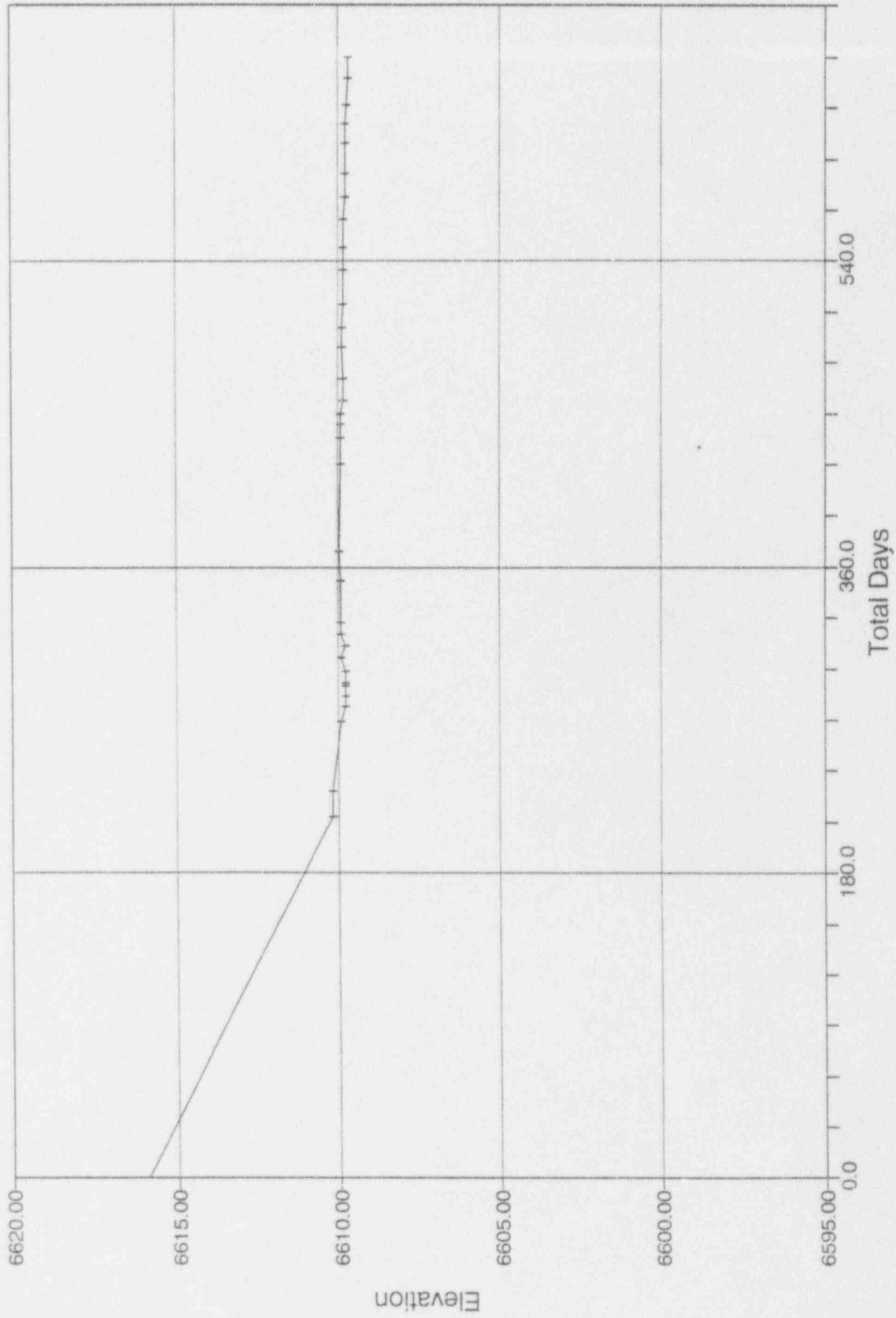
Settlement vs Square Root of Time

Date: 11/23/93
Project: 360
File:

Settlement Point 1



Settlement Point 2

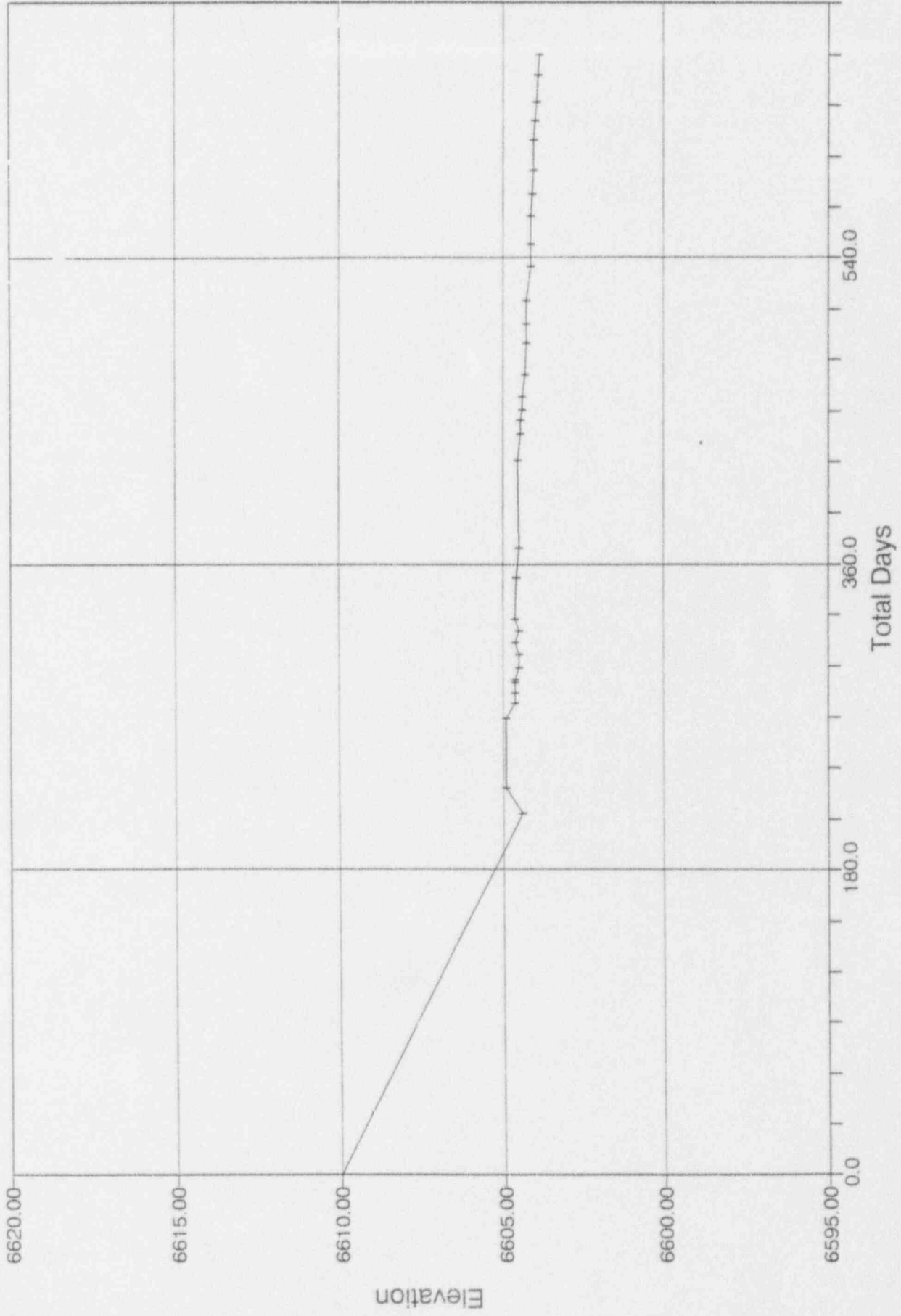


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 3

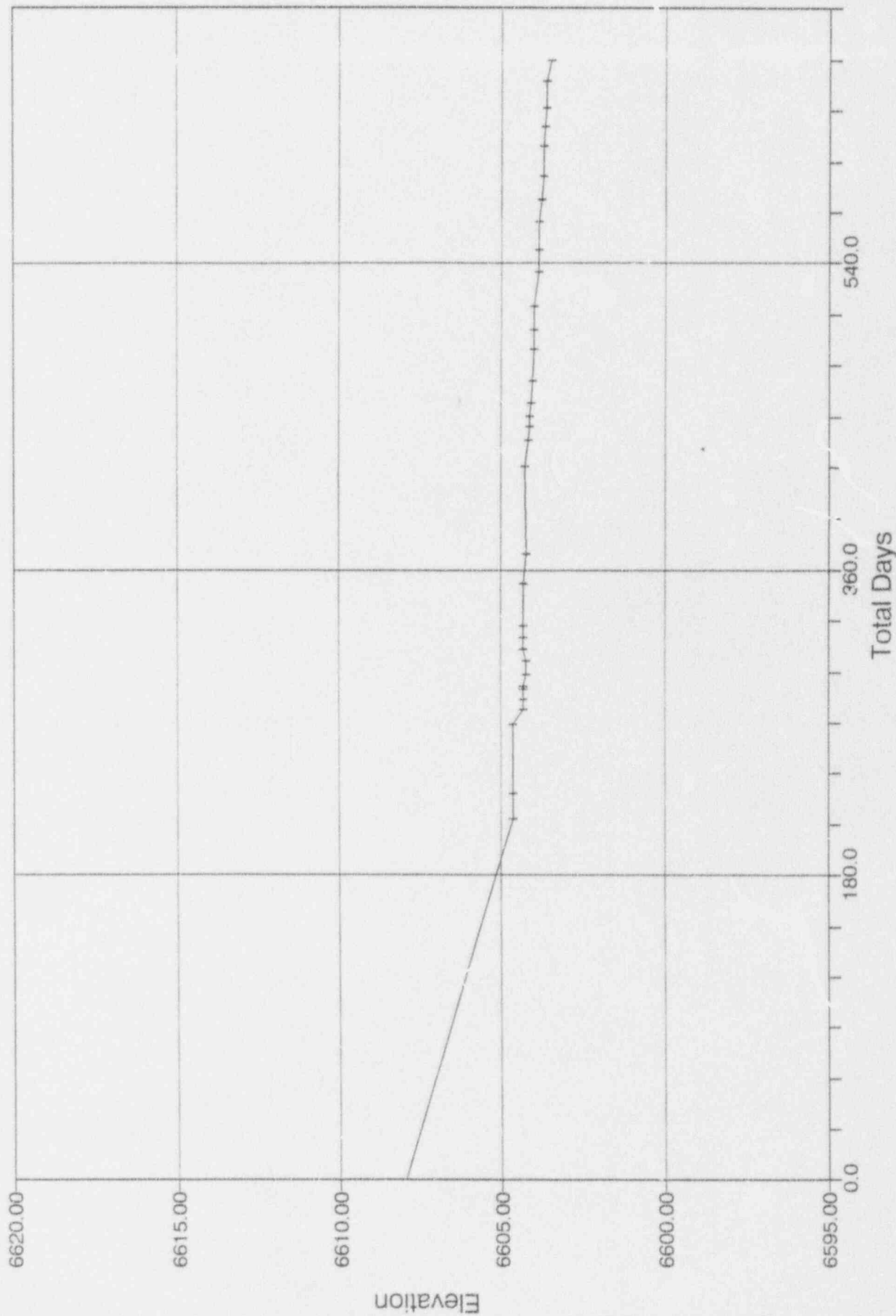


Date: 11/23/93
Project: 360
File:

Settlement vs. Time

SMI
SHEPHERD MILLER, INC.

Settlement Point 4

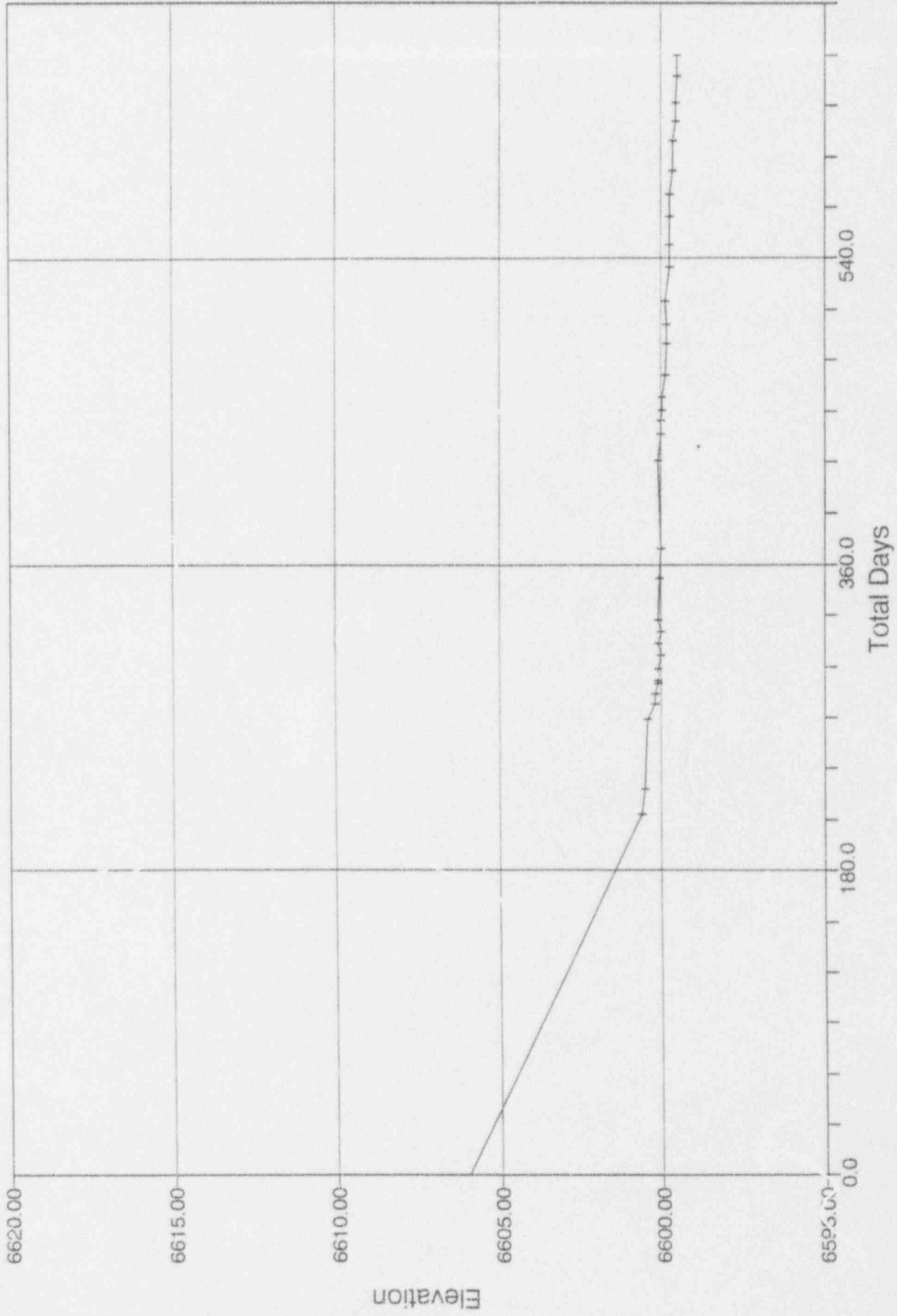


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 5

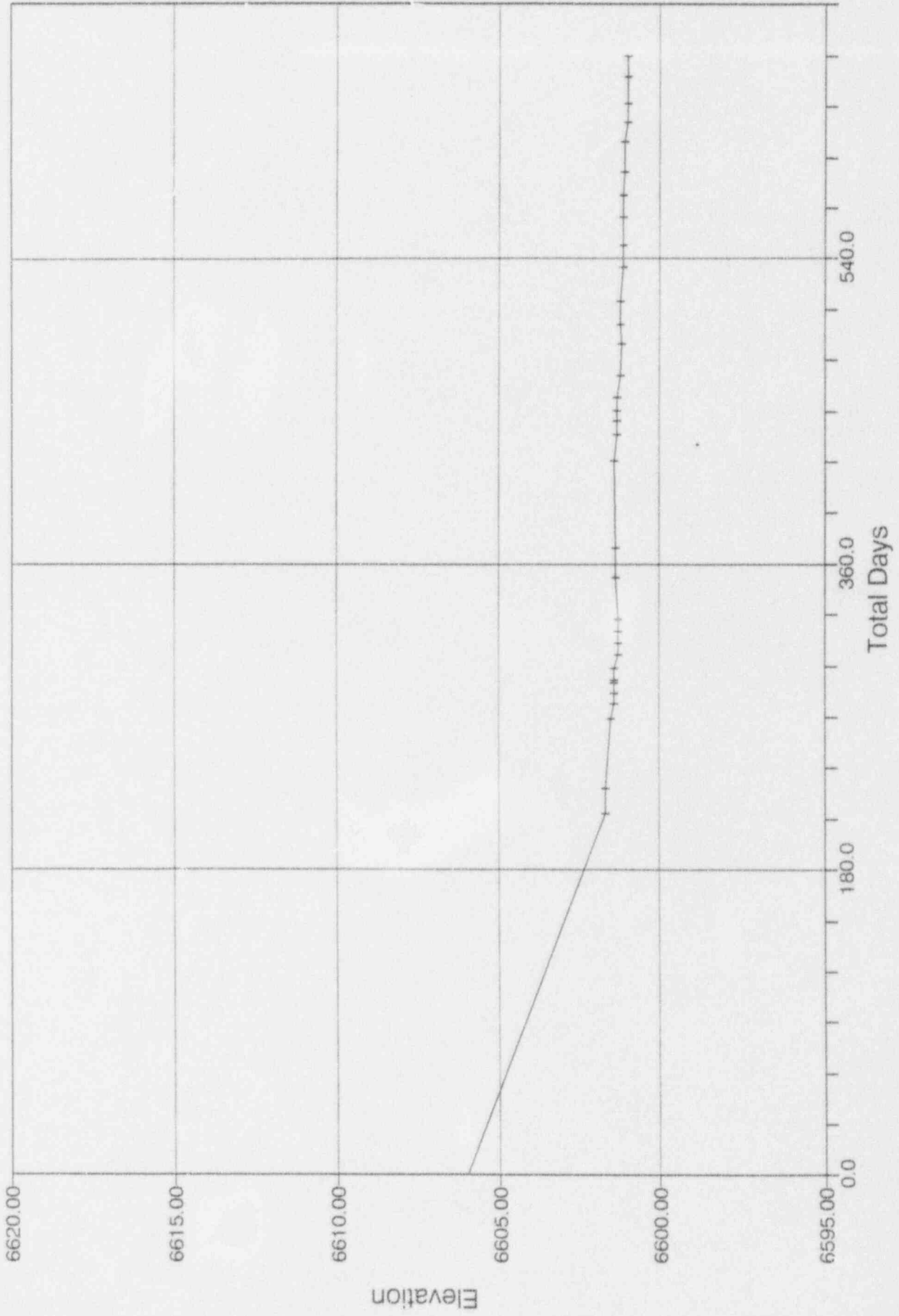


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 6

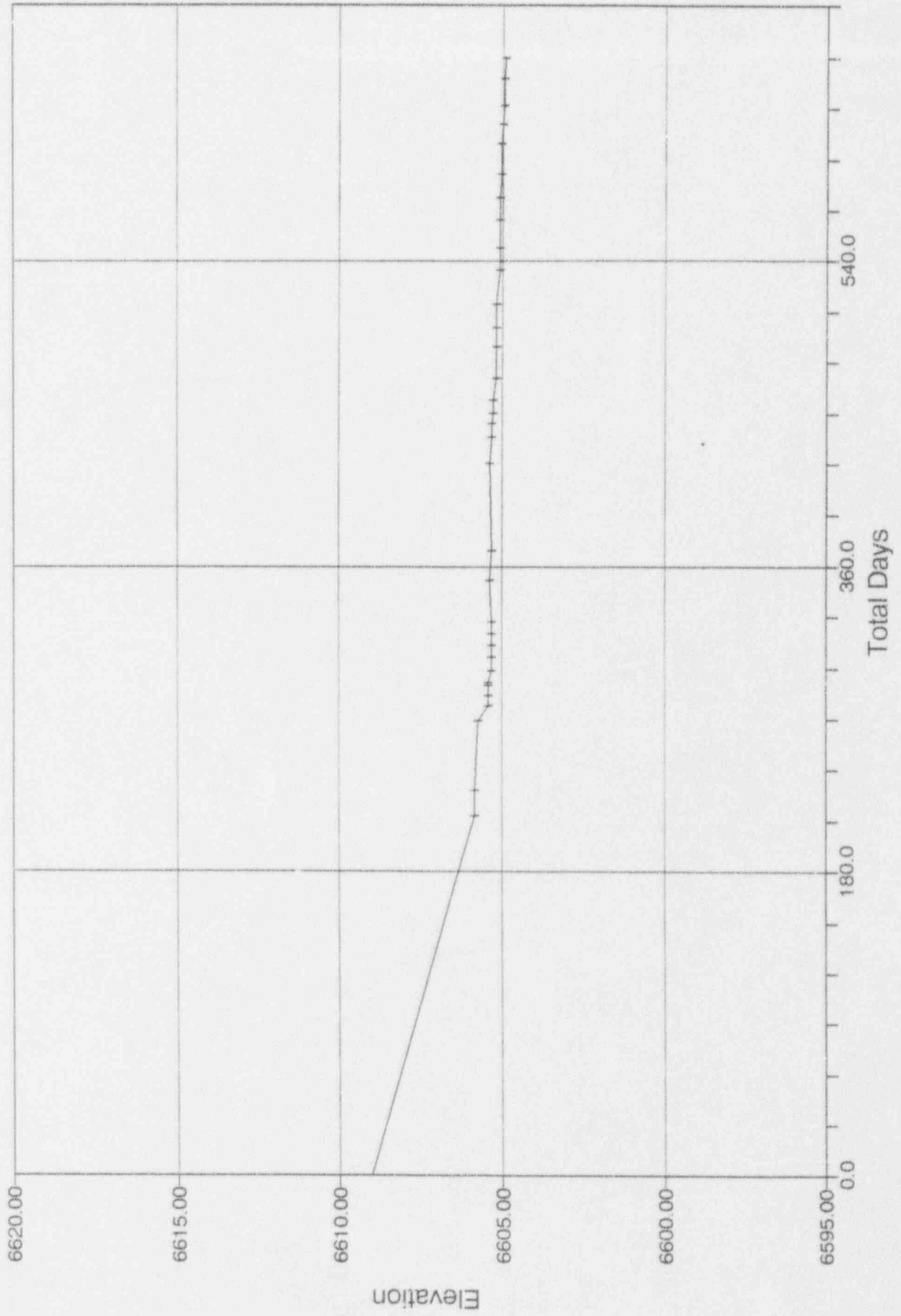


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 7



Date: 11/23/93

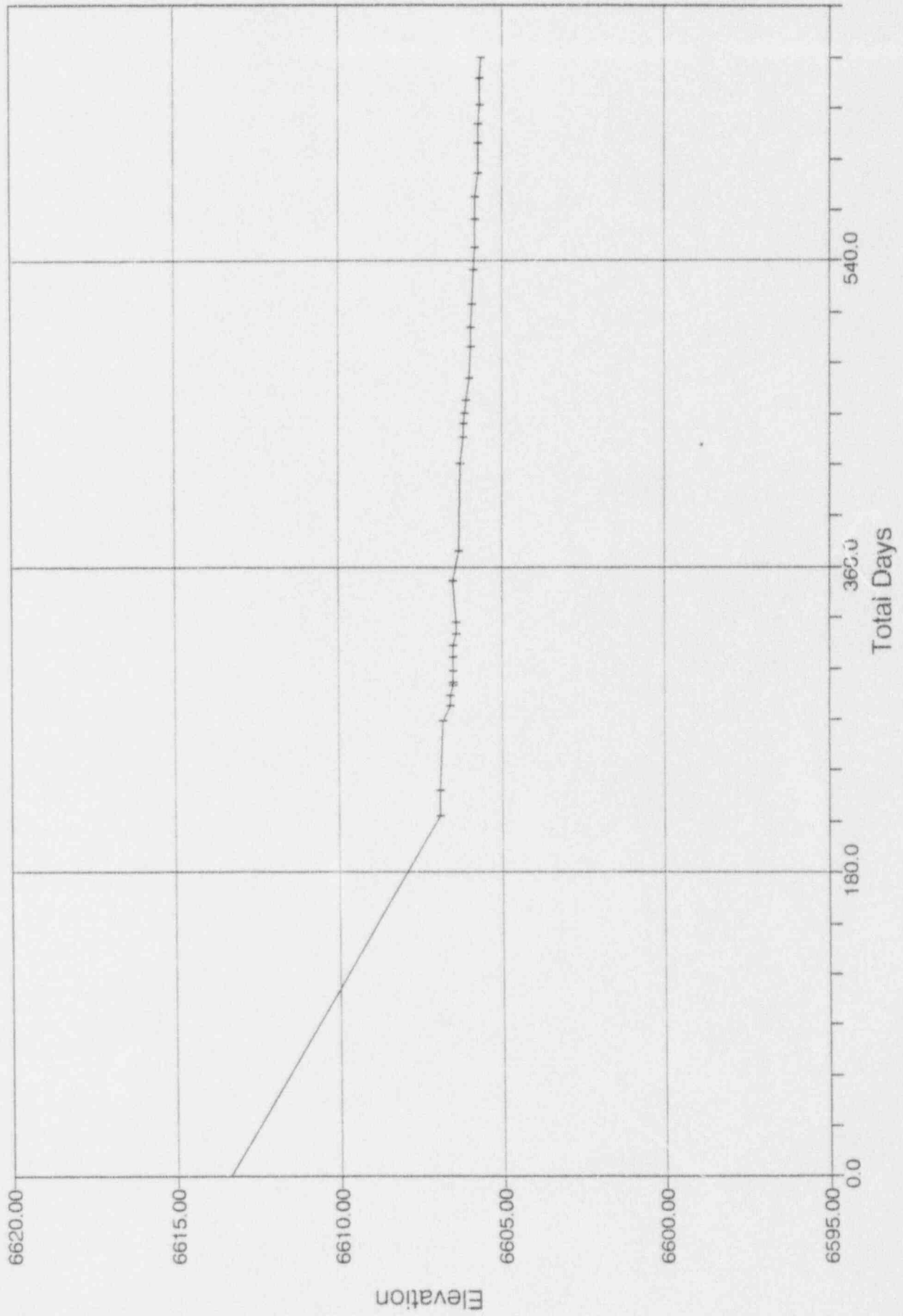
Project: 360

File:

Settlement vs. Time

SMI
SHEPHERD MILLER, INC.

Settlement Point 8

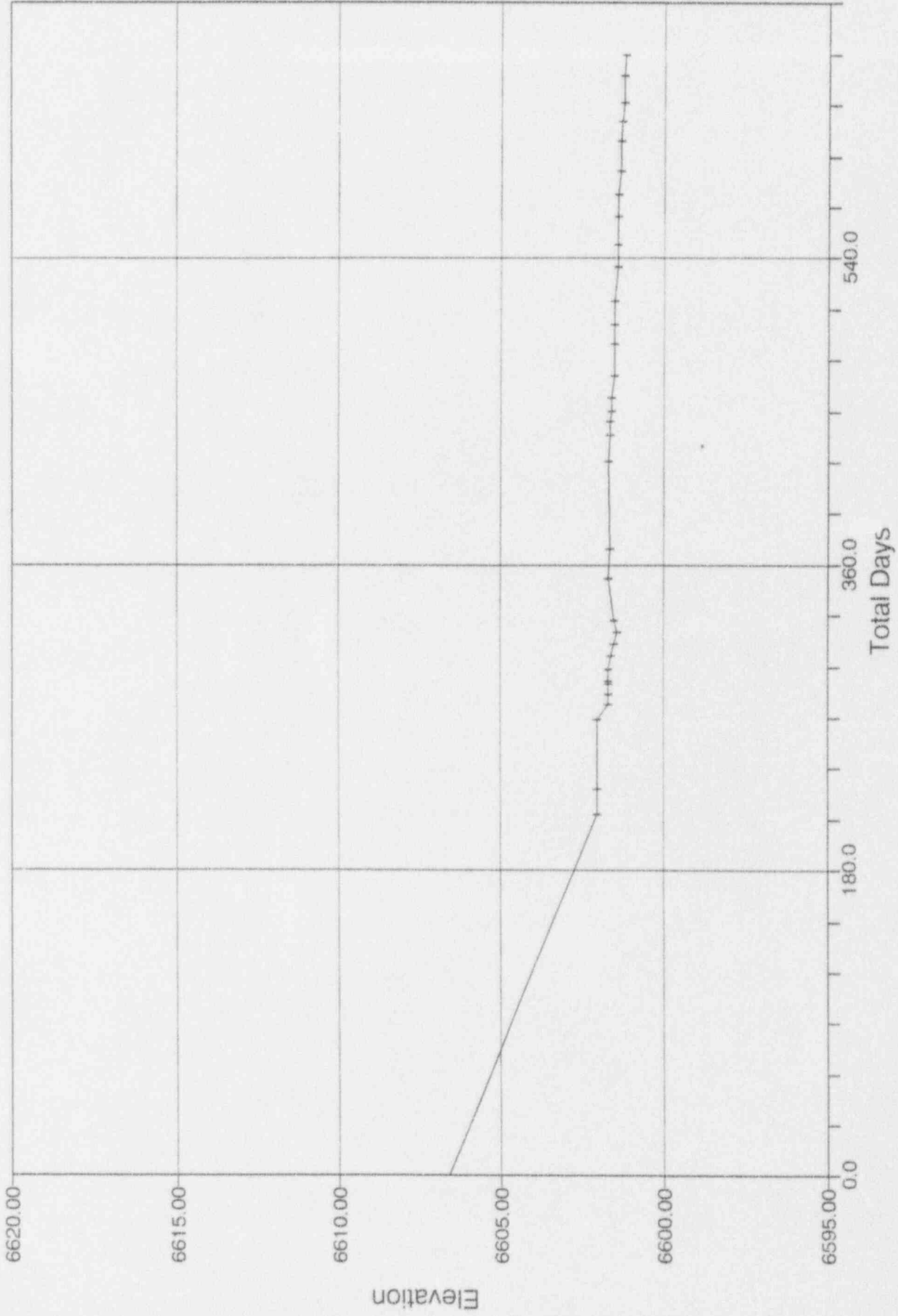


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point NS8

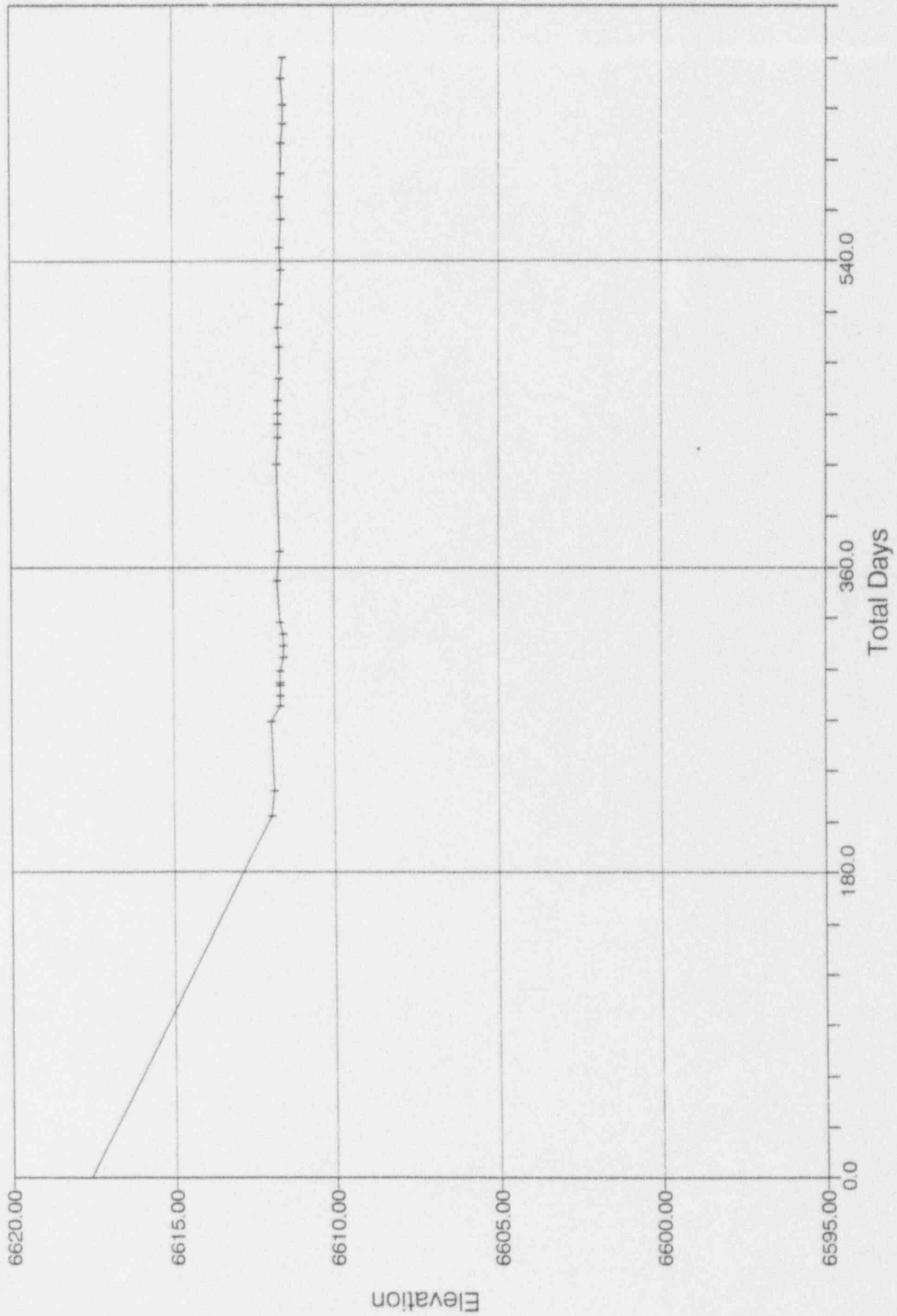


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 9

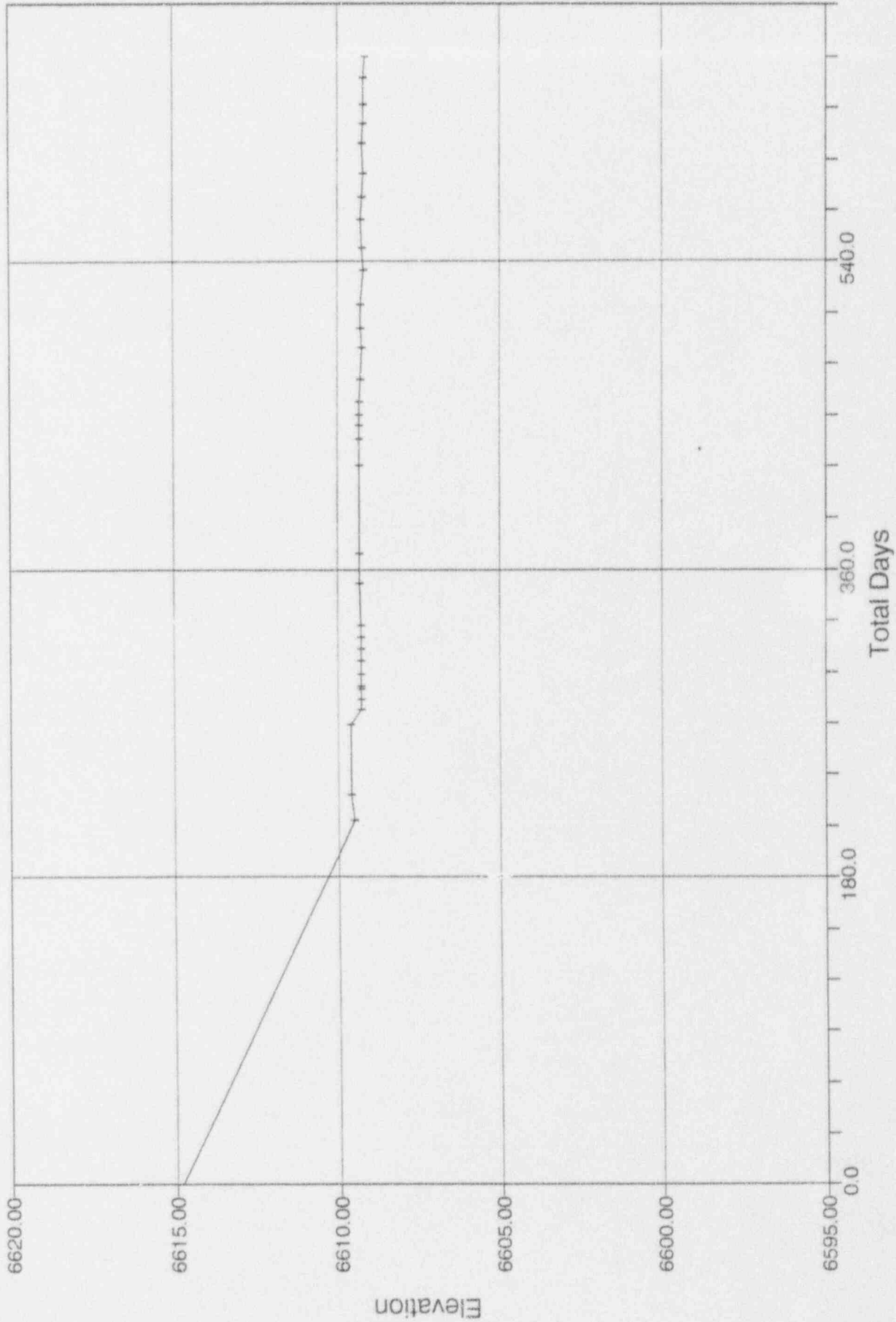


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 11

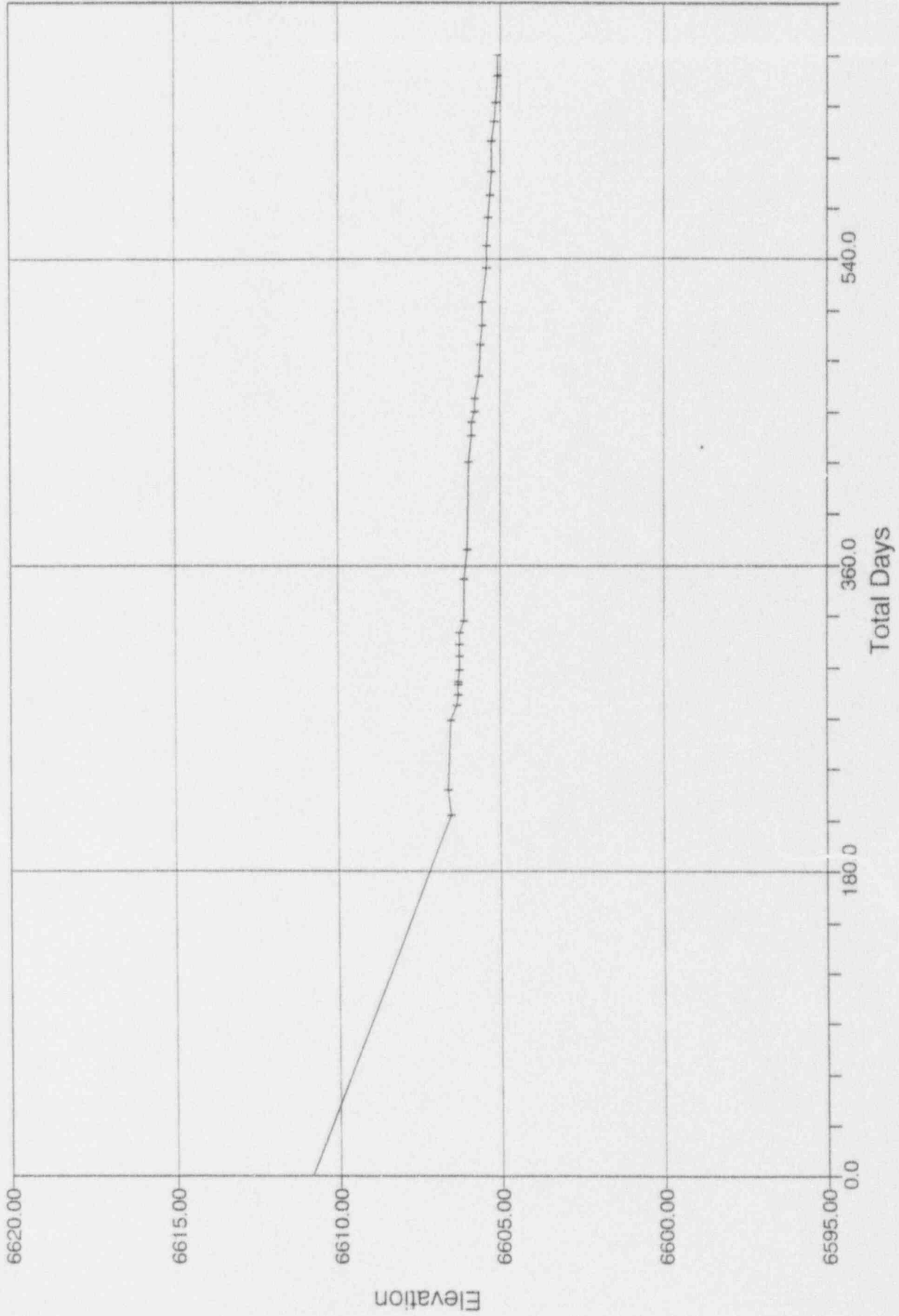


Date: 11/23/93
Project: 360
File:

Settlement vs. Time

SMI
SHEPHERD MILLER, INC.

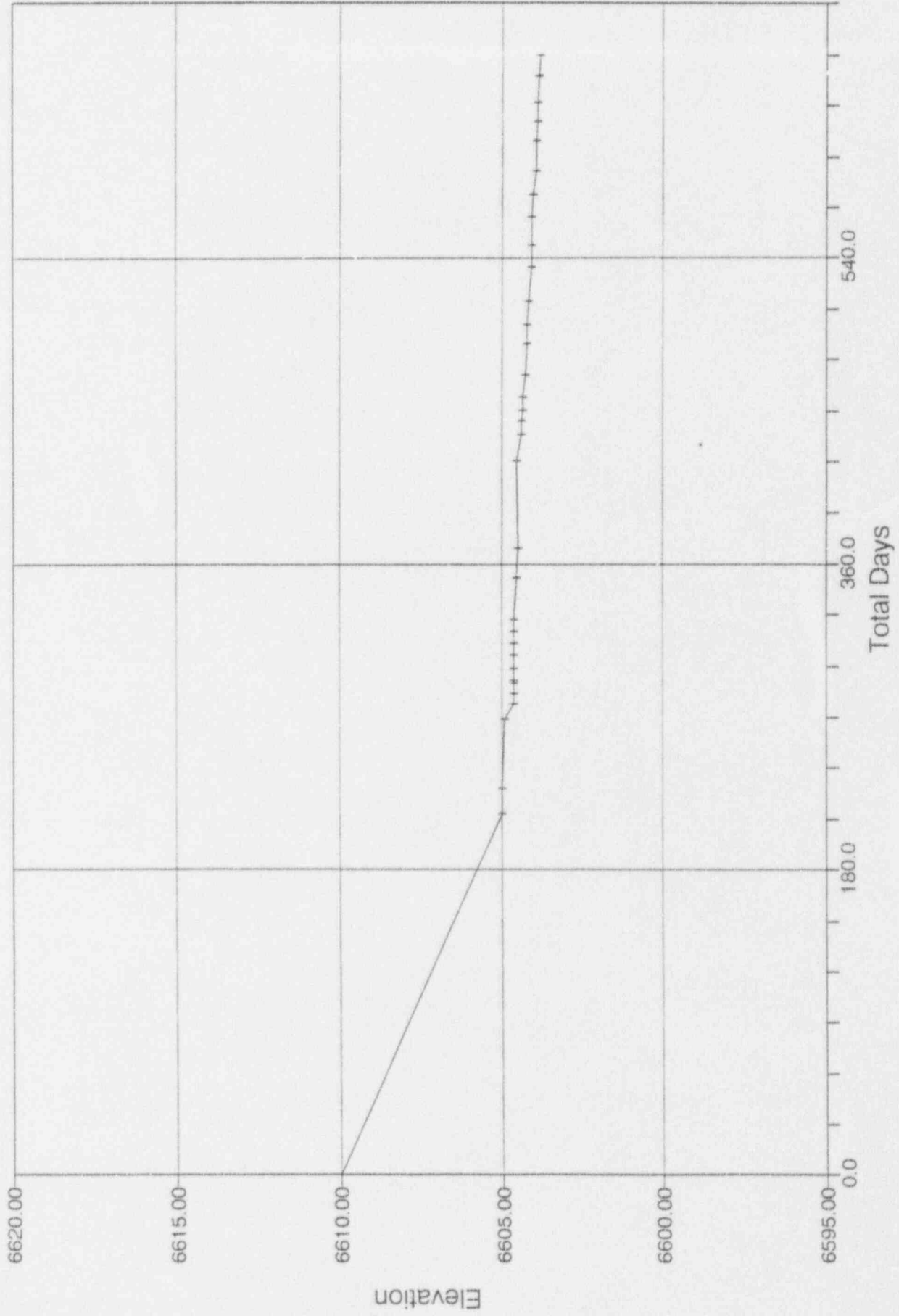
Settlement Point 16



Date: 11/23/93
Project: 360
File:

Settlement vs. Time

Settlement Point 17

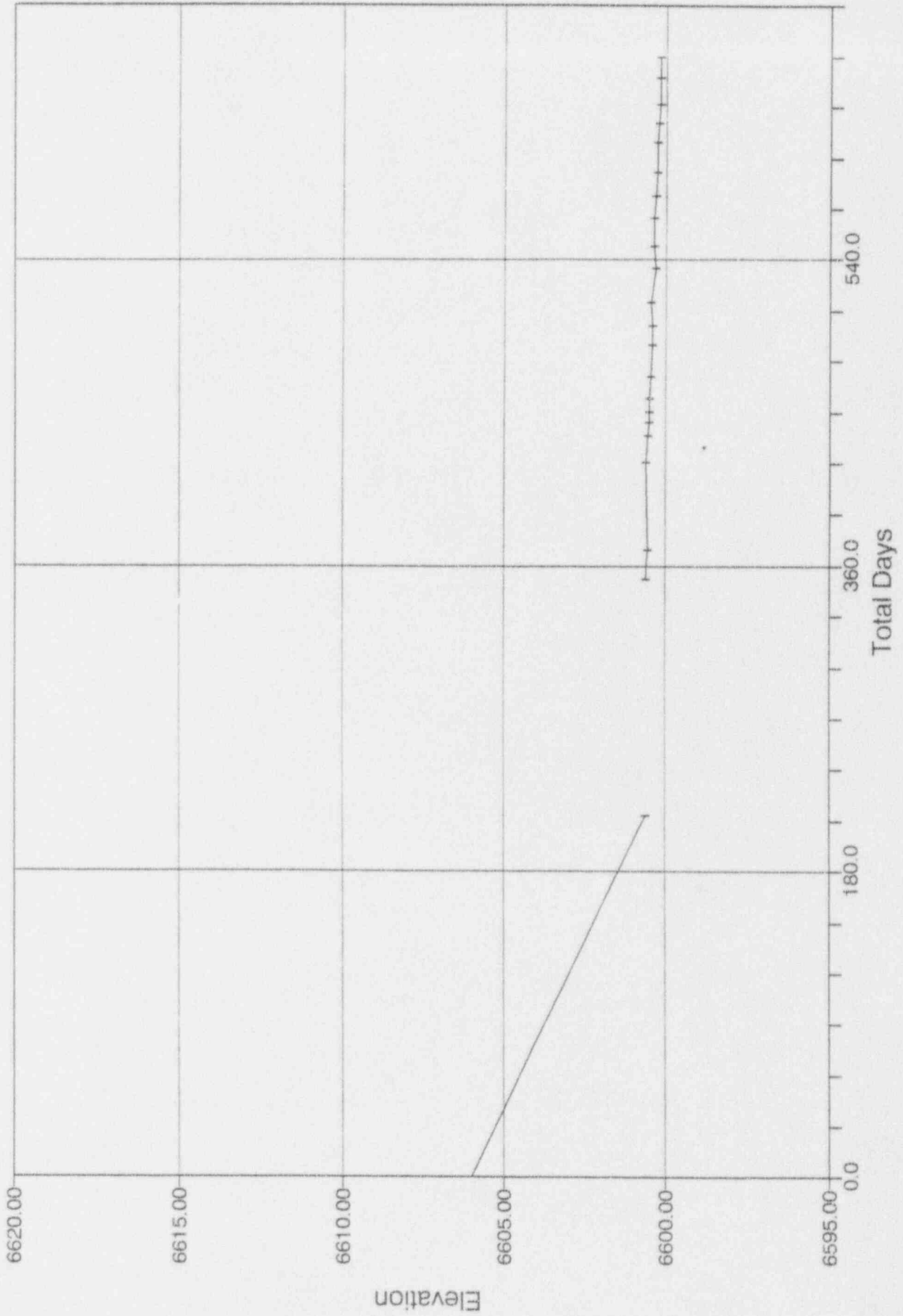


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 19

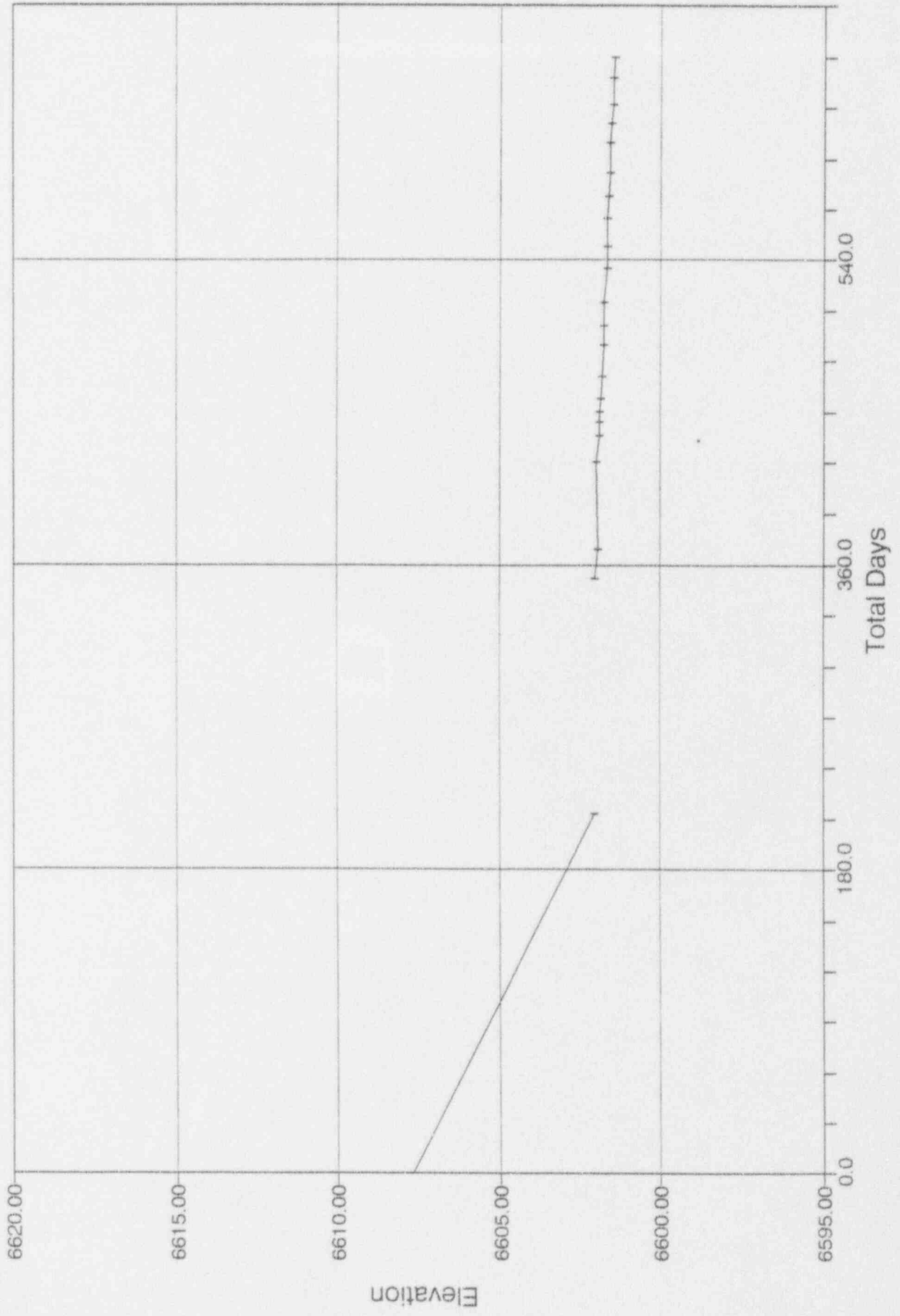


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 20

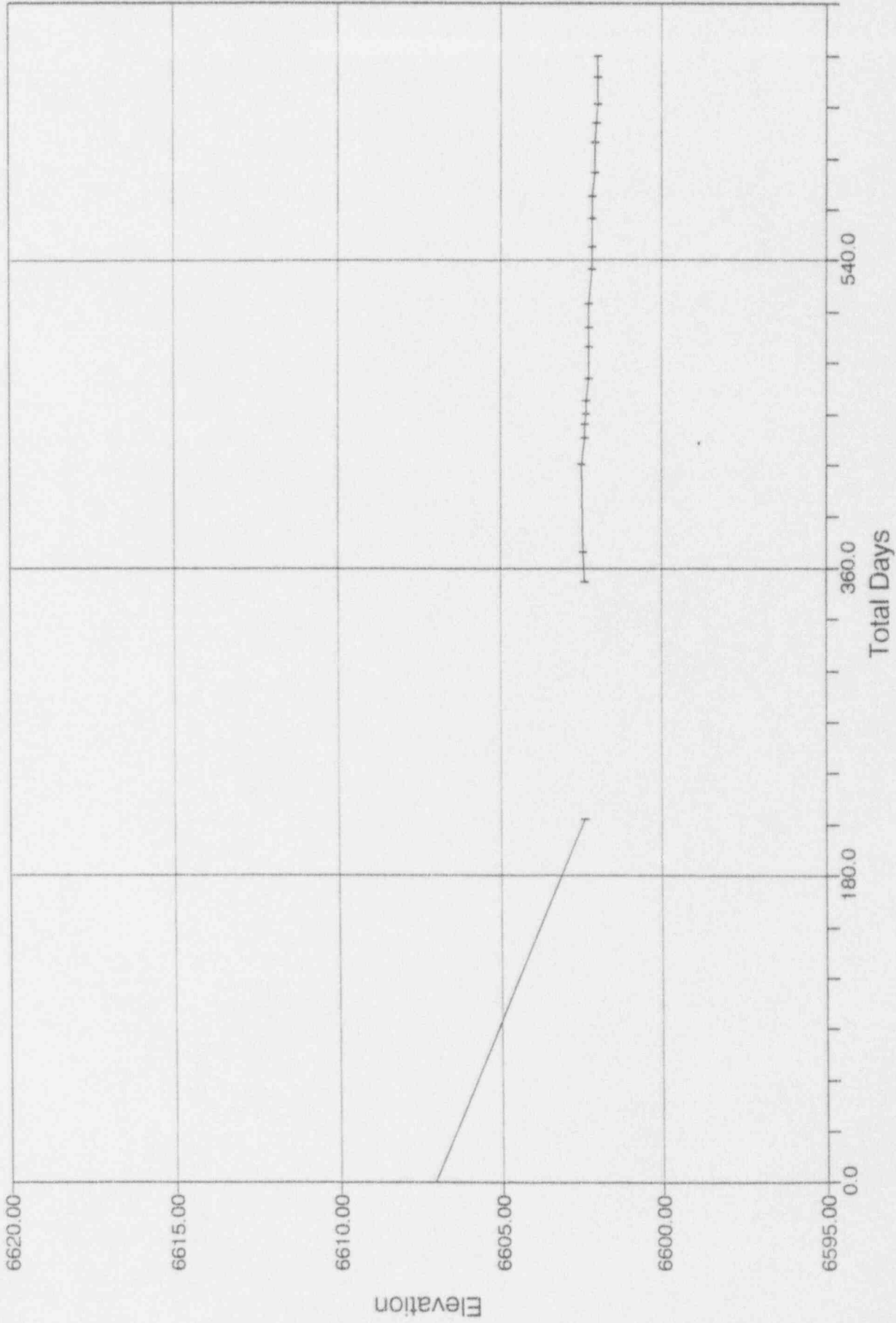


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 21



Date: 11/23/93

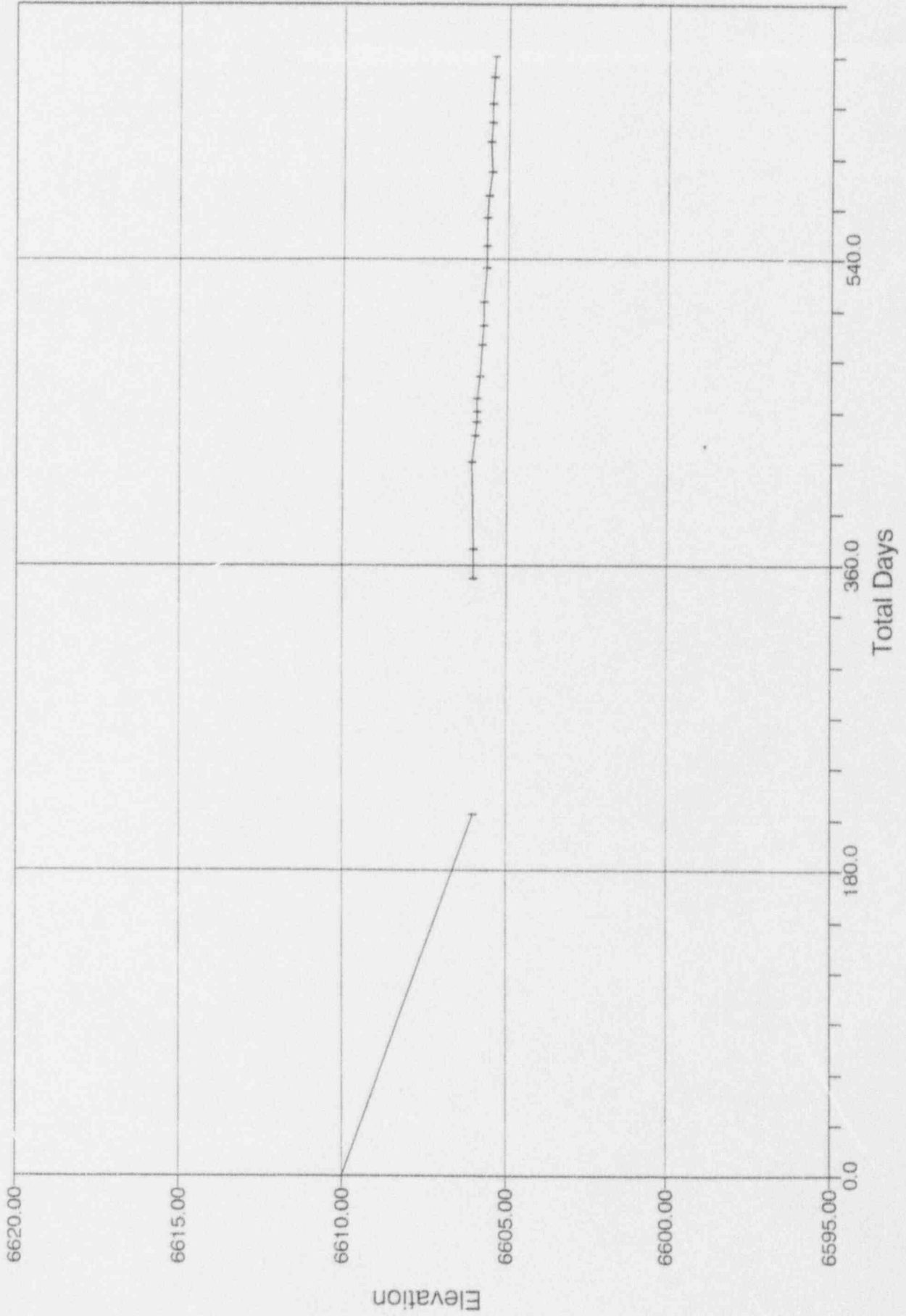
Project: 360

File:

Settlement vs. Time

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Settlement Point 22

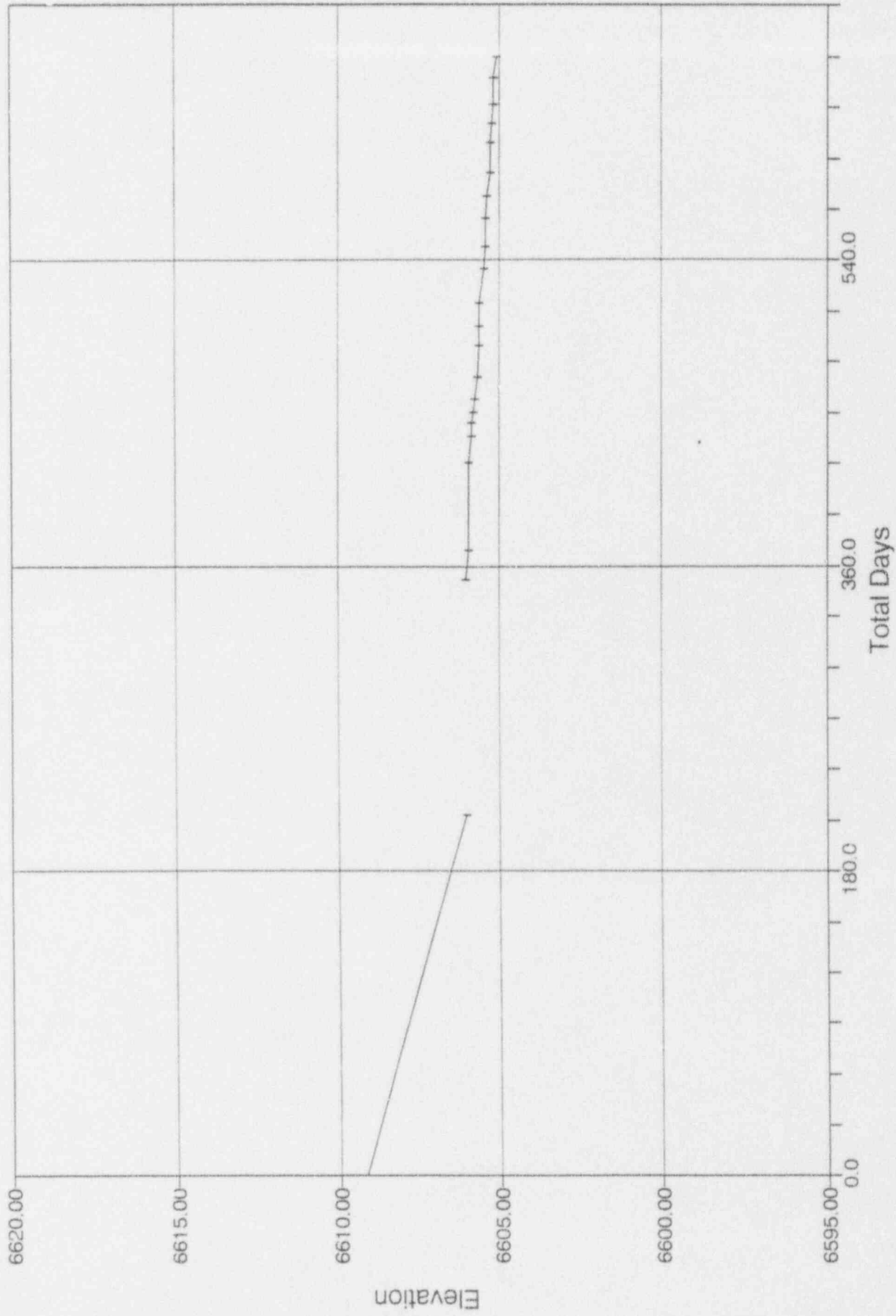


Date: 11/23/93
Project: 360
File:

Settlement vs. Time

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Settlement Point 23

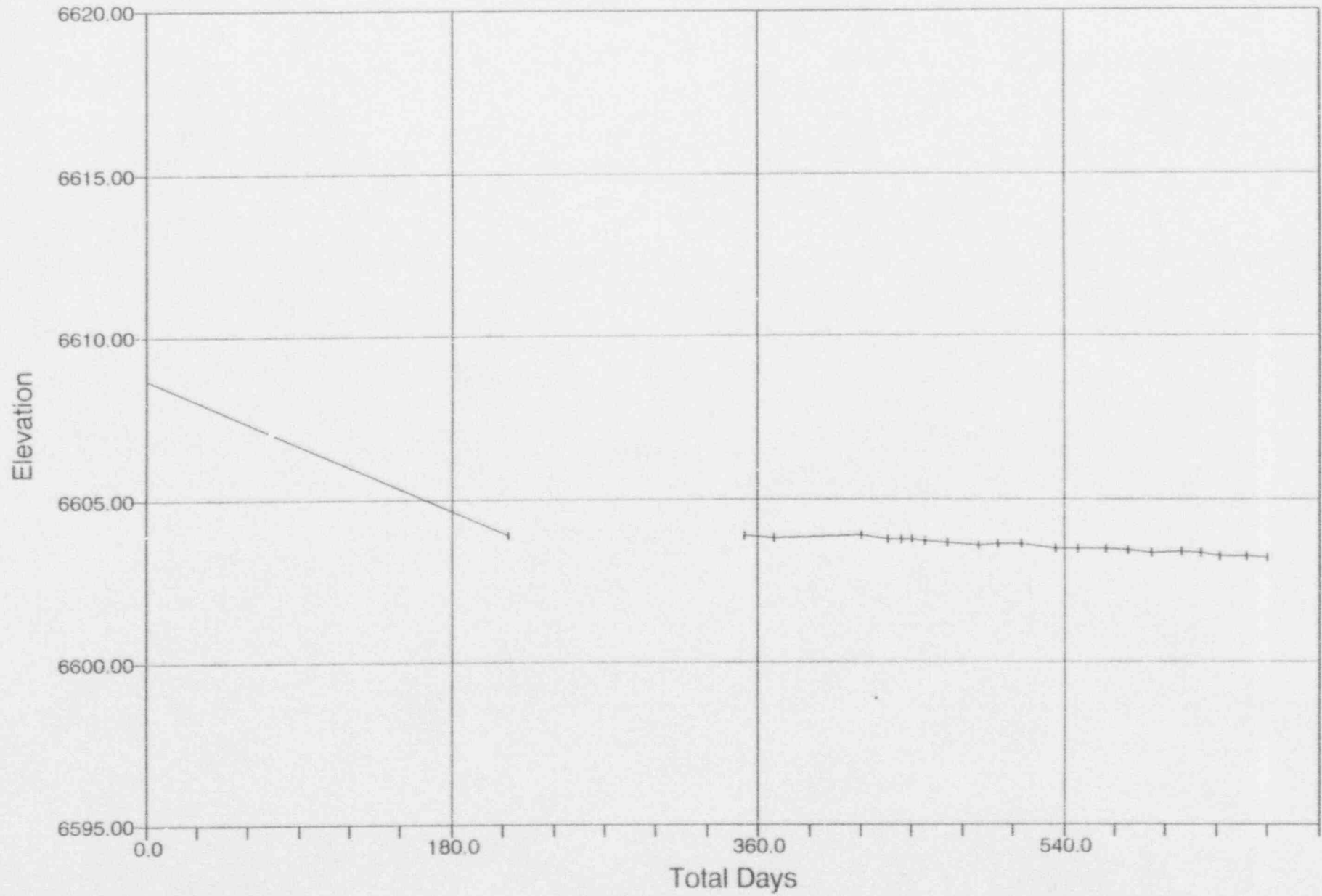


Date: 11/23/93
Project: 360
File:

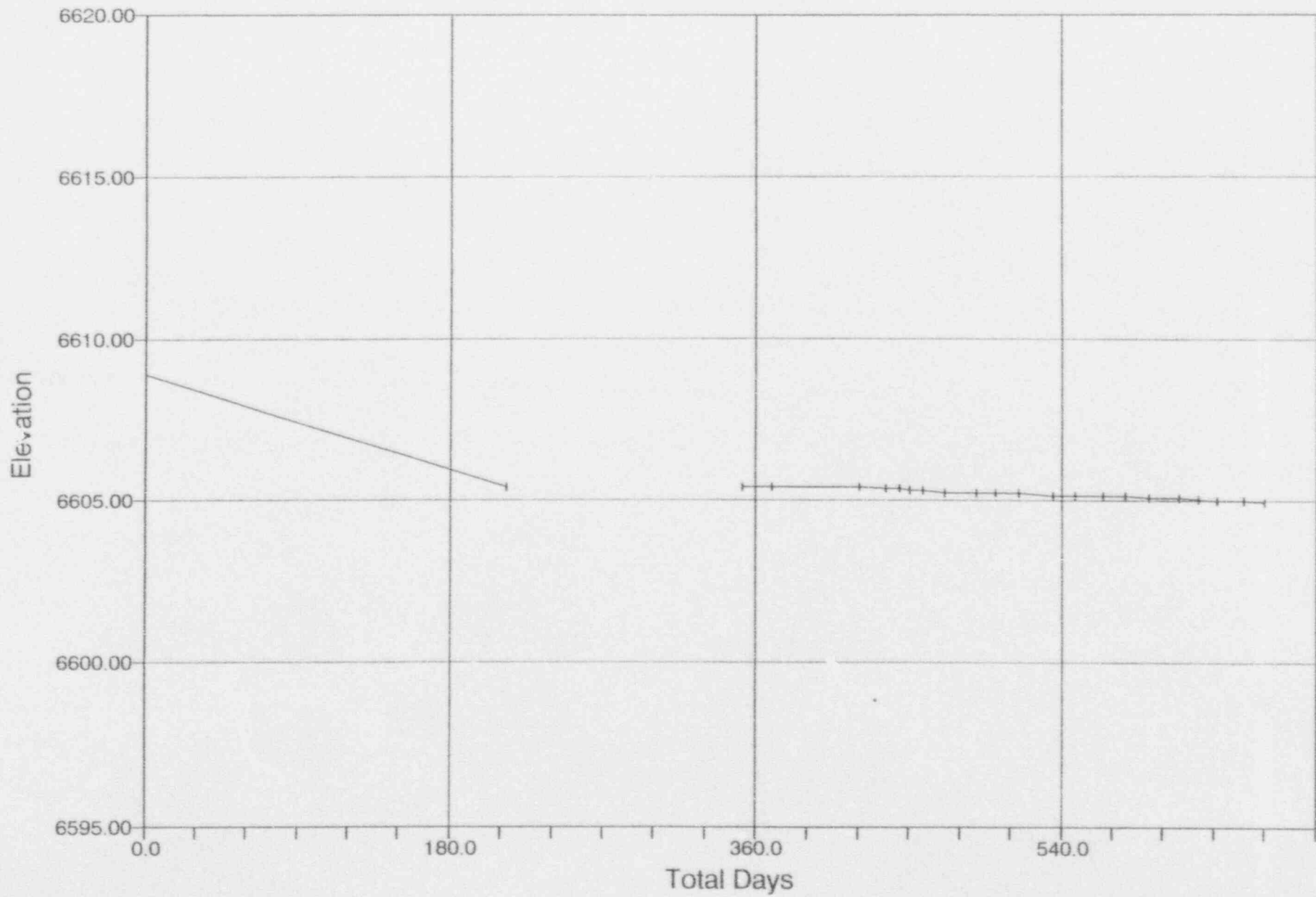
Settlement vs. Time



Settlement Point 24



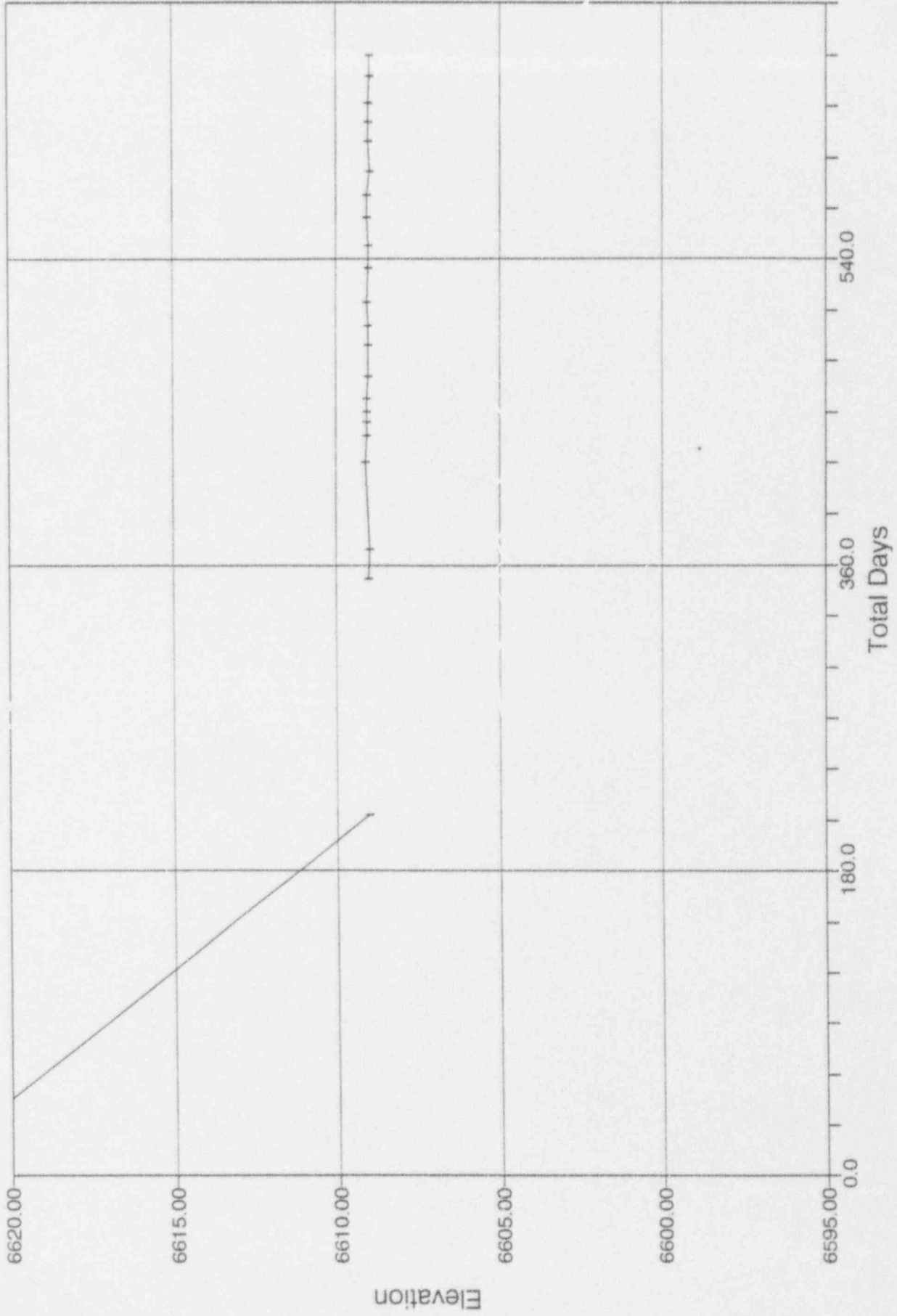
Settlement Point 25



Settlement vs. Time

Date: 11/23/93
Project: 360
File:

Settlement Point 26



Date: 11/23/93

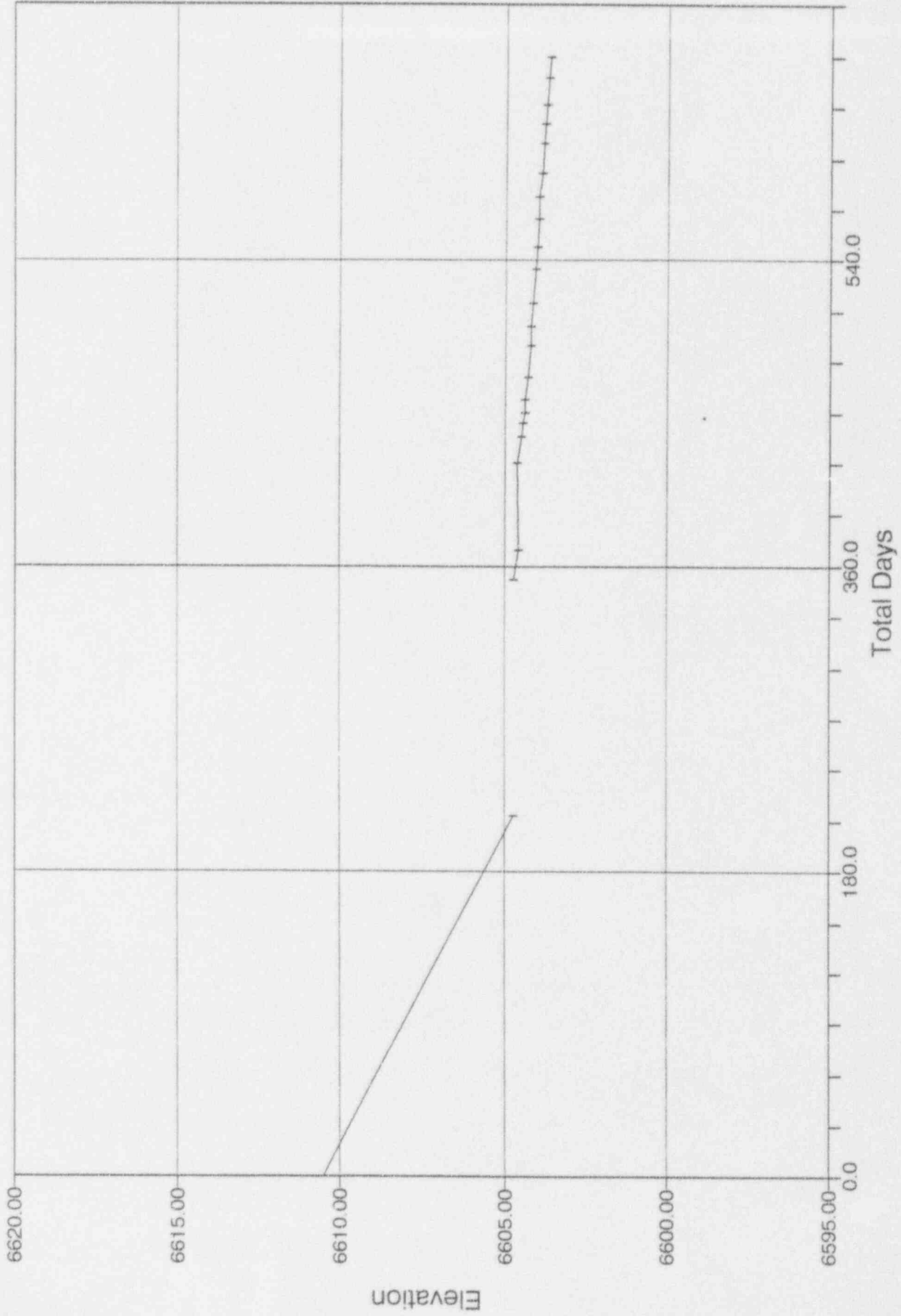
Project: 360

File:

Settlement vs. Time



Settlement Point 27



Date: 11/23/93

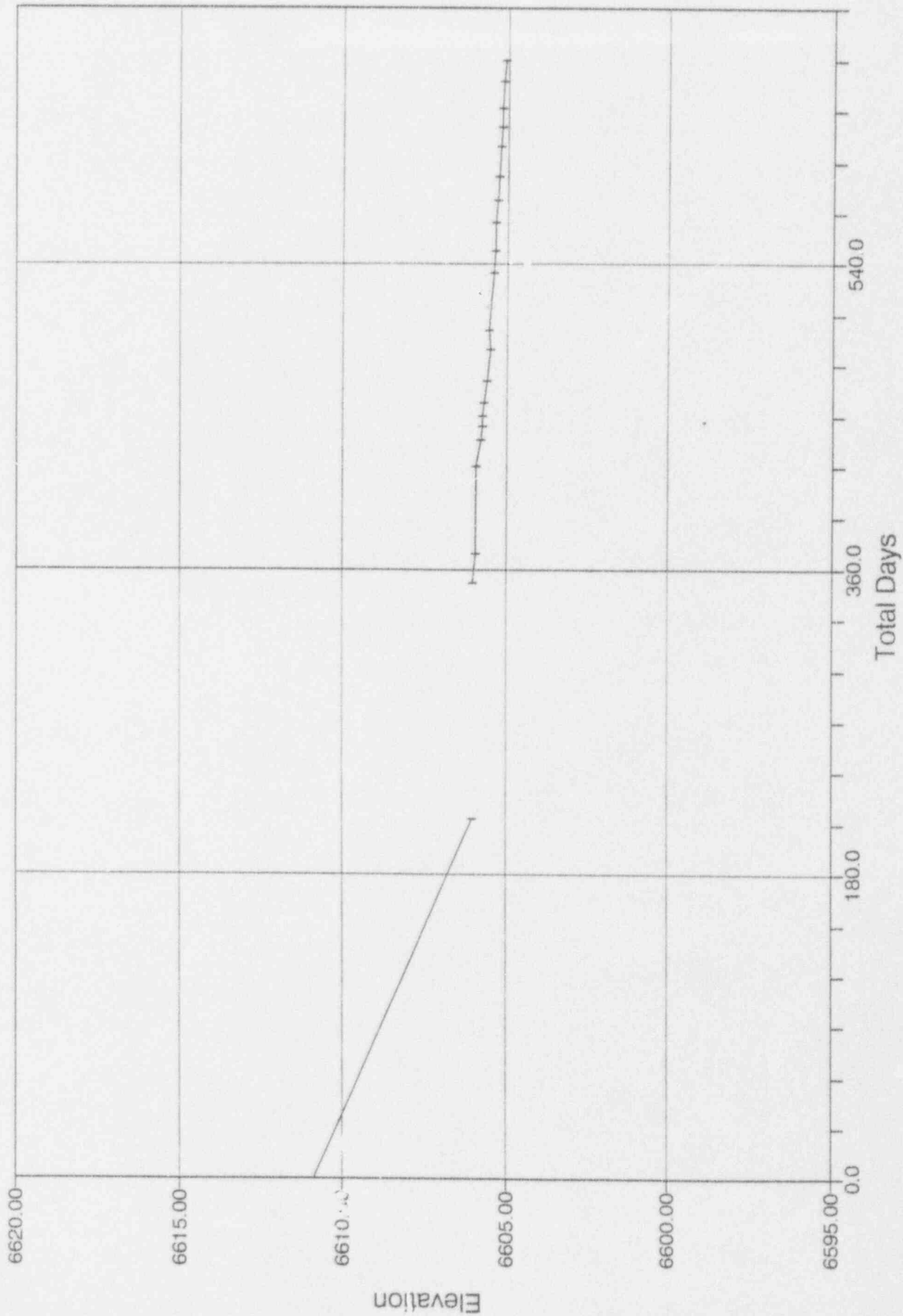
Project: 360

File:



Settlement vs. Time

Settlement Point 28



Date: 11/23/93

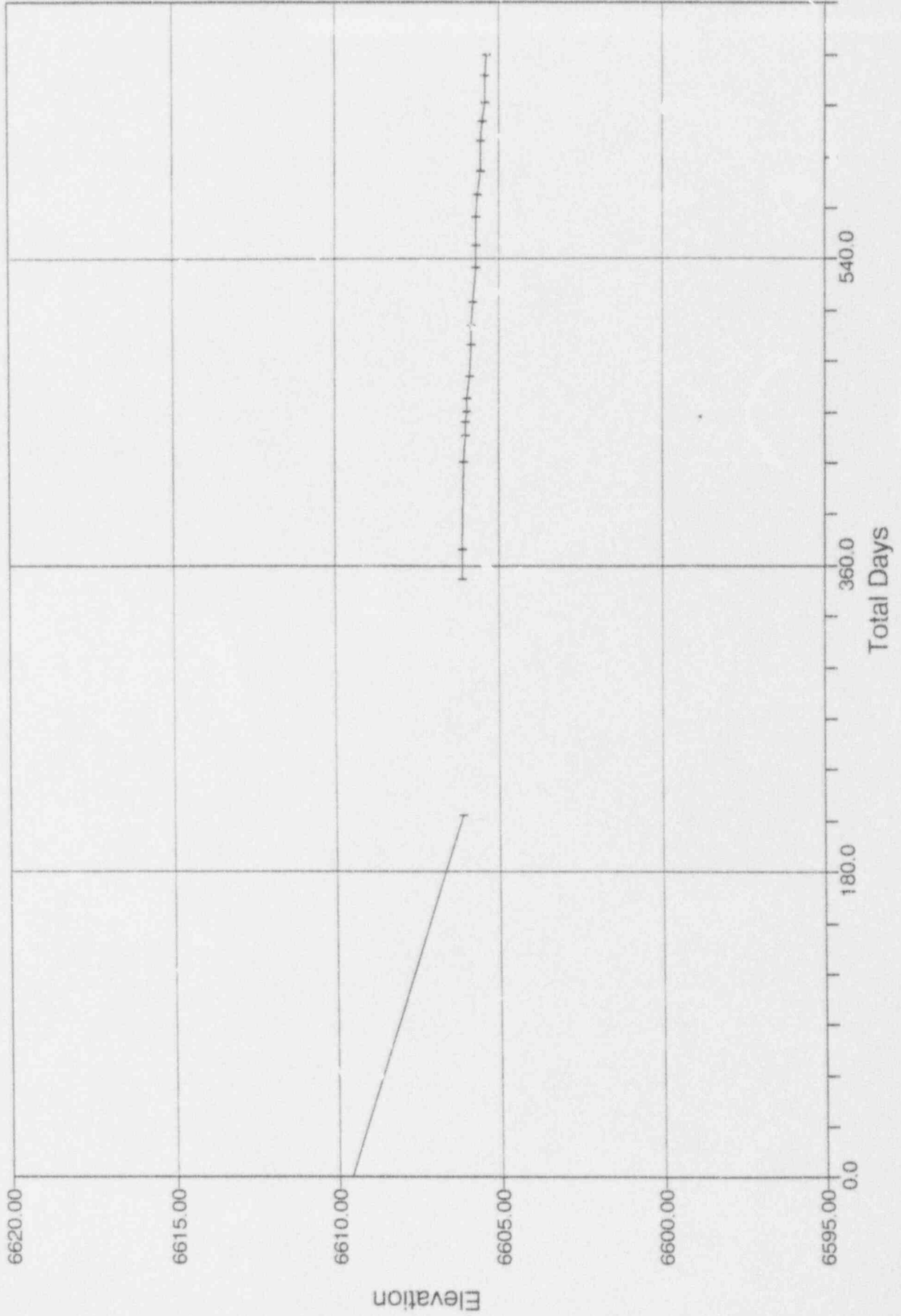
Project: 360

File:

Settlement vs. Time

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Settlement Point 29



Date: 11/23/93

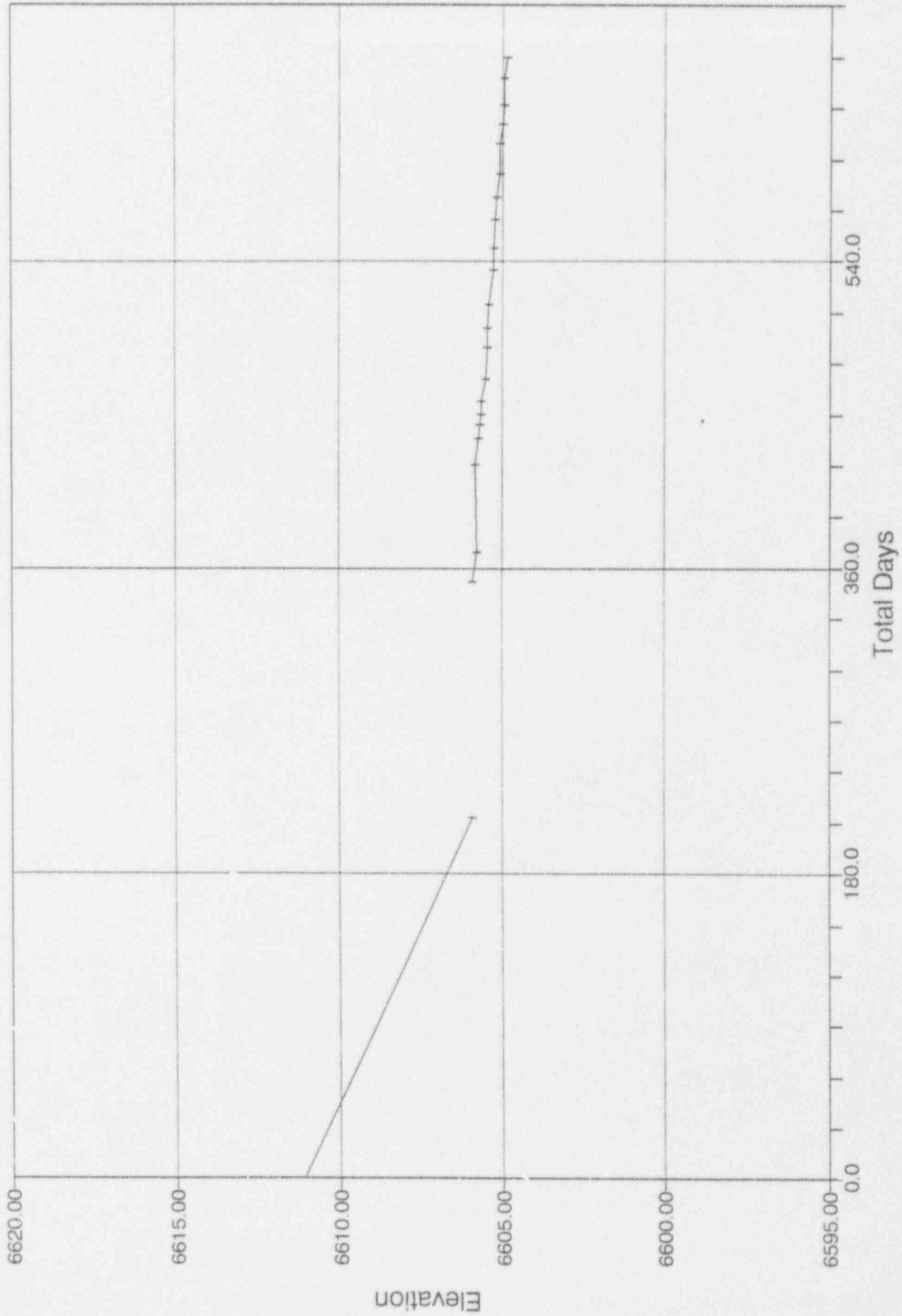
Project: 360

File:



Settlement vs. Time

Settlement Point 30



Date: 11/23/93

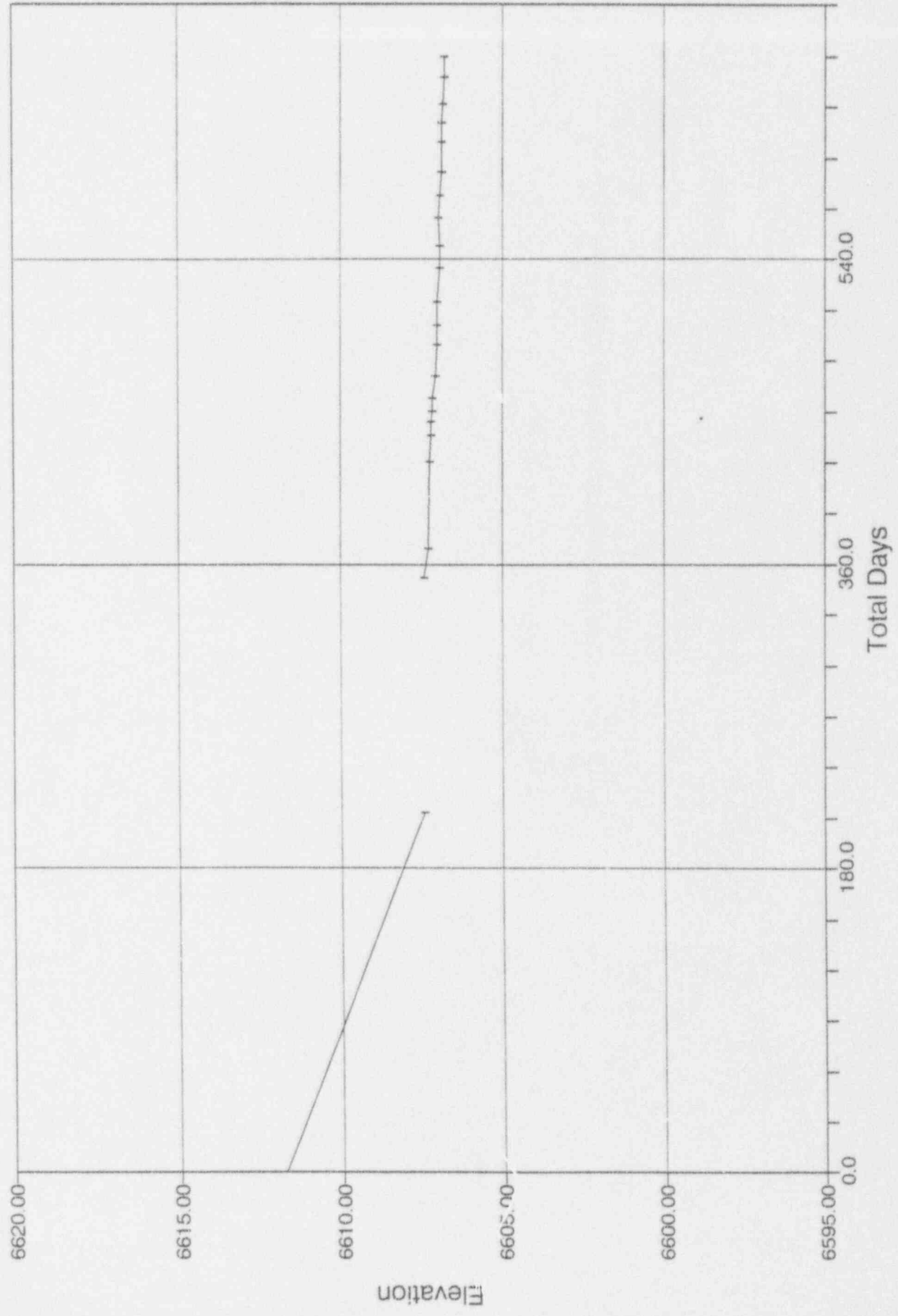
Project: 360

File:

Settlement vs. Time

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Settlement Point 31

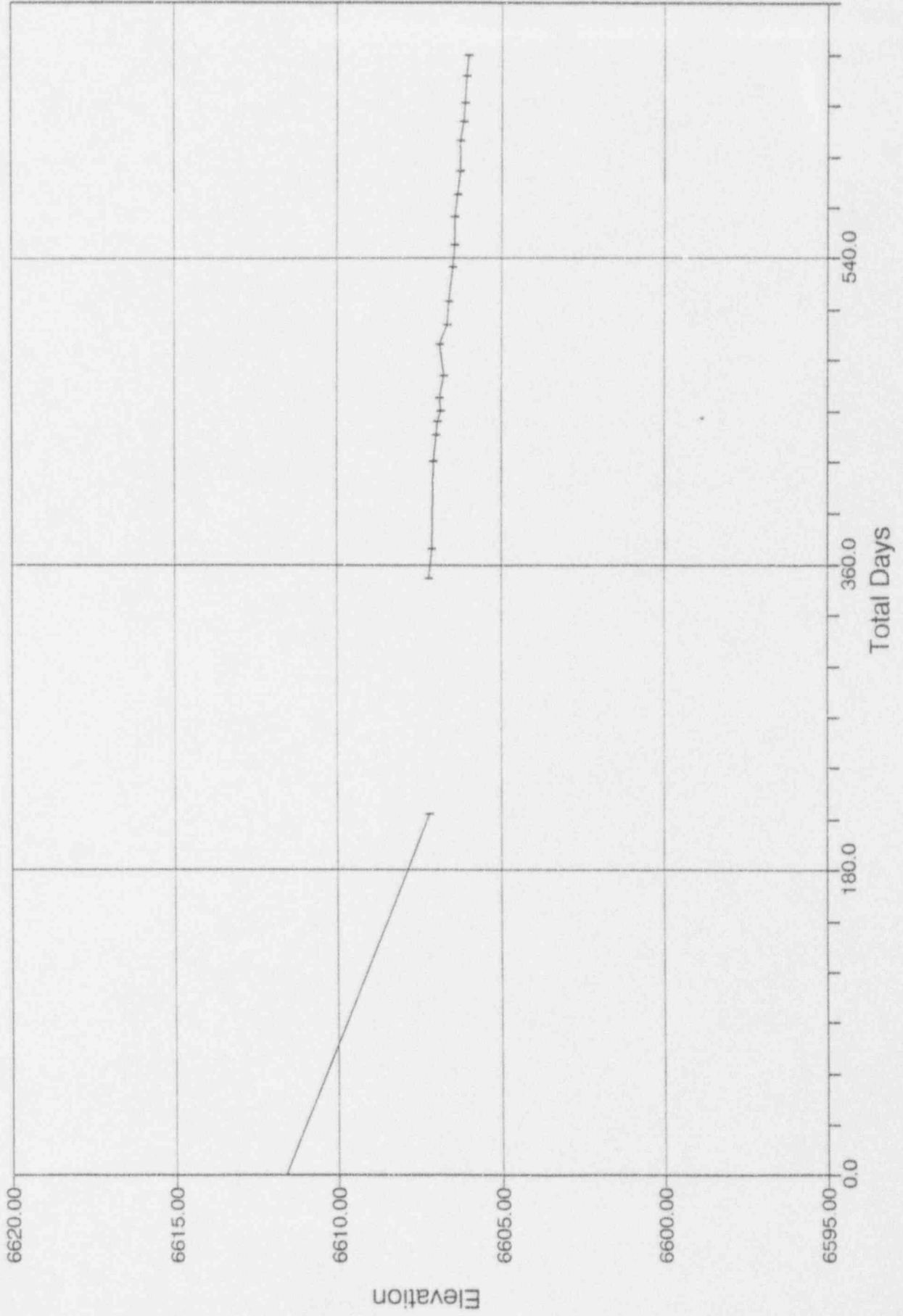


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 32



Date: 11/23/93

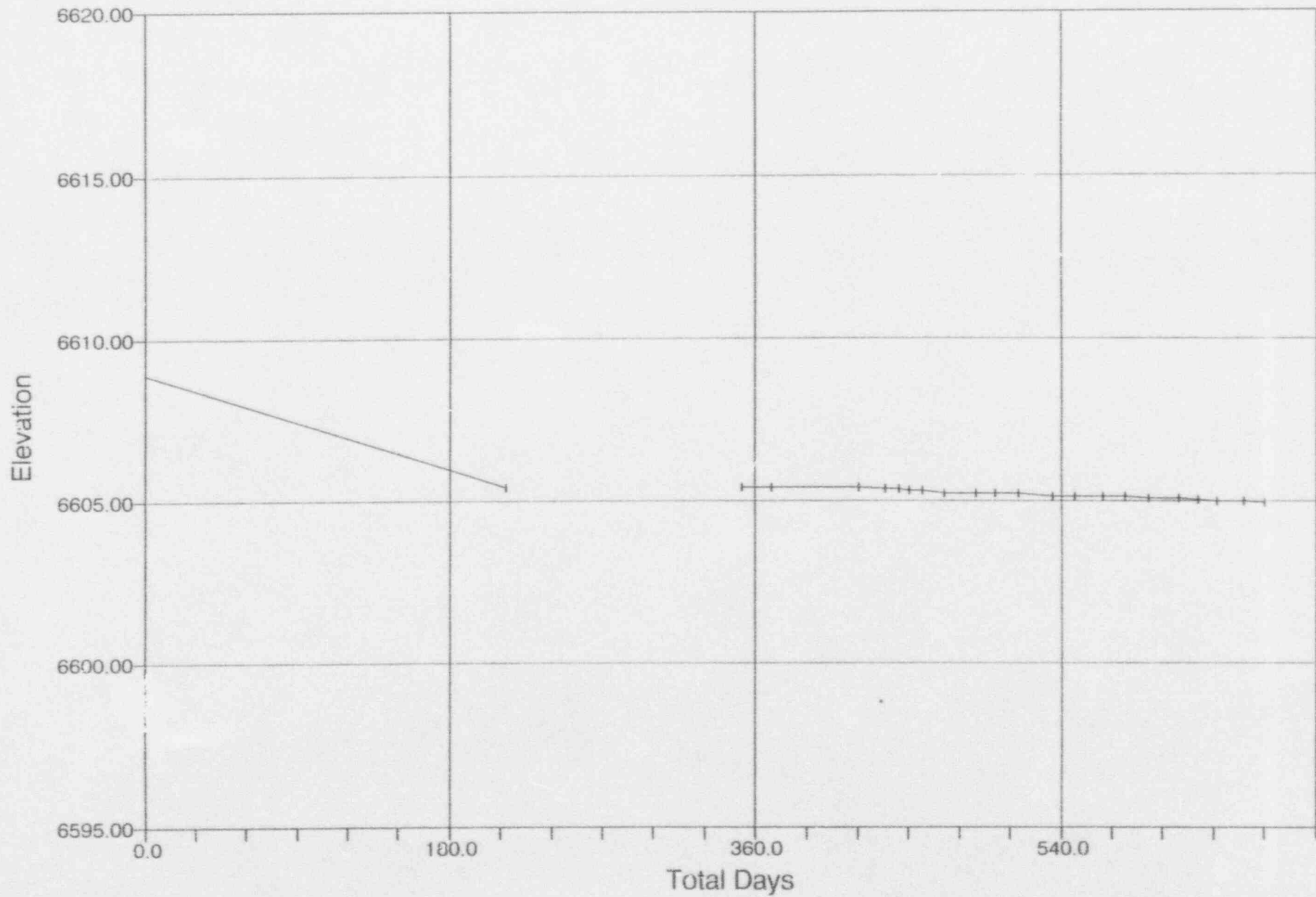
Project: 360

File:

Settlement vs. Time

SMI
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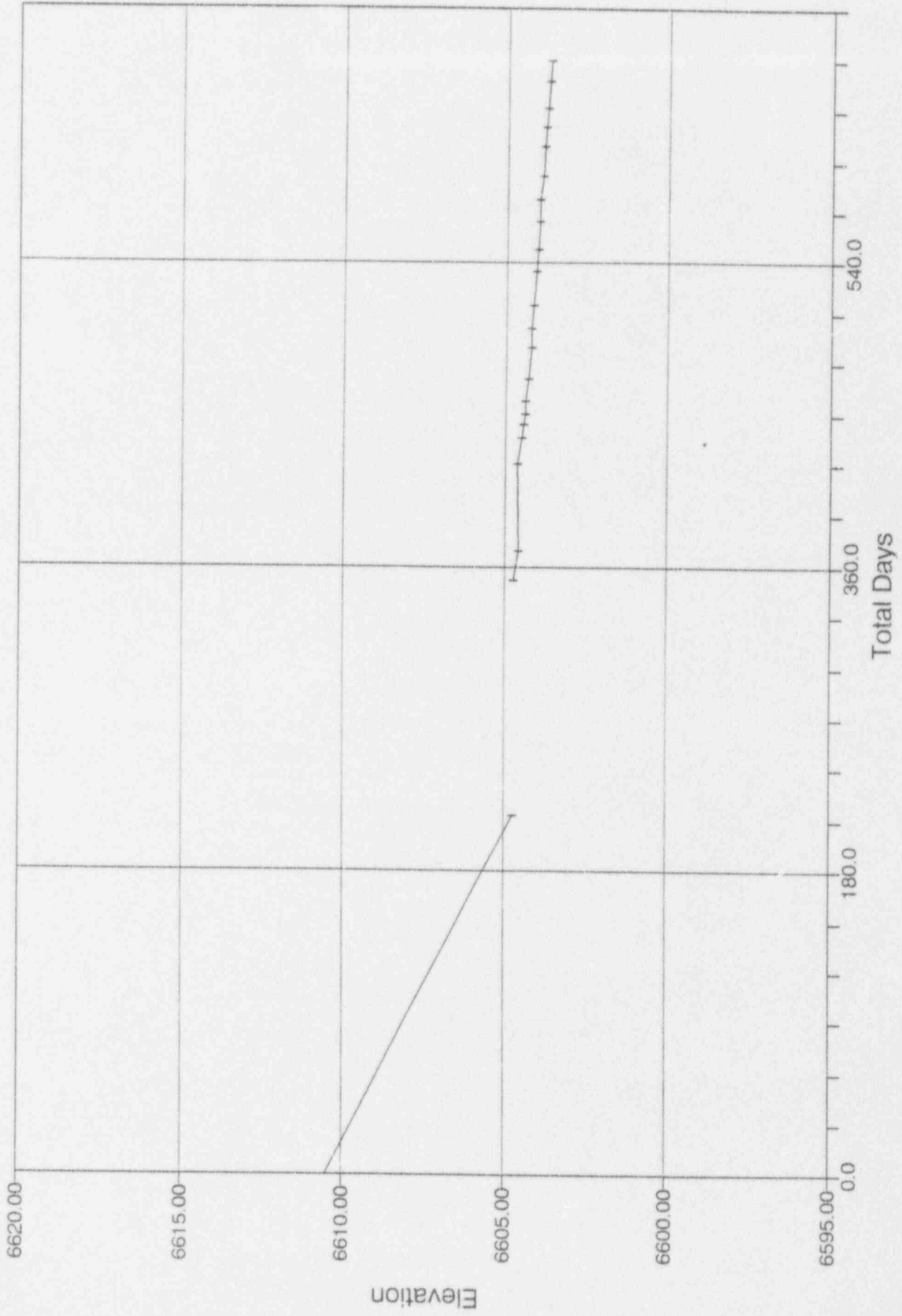
Settlement Point 25



Settlement vs. Time

Date: 11/23/93
Project: 360
File:

Settlement Point 27

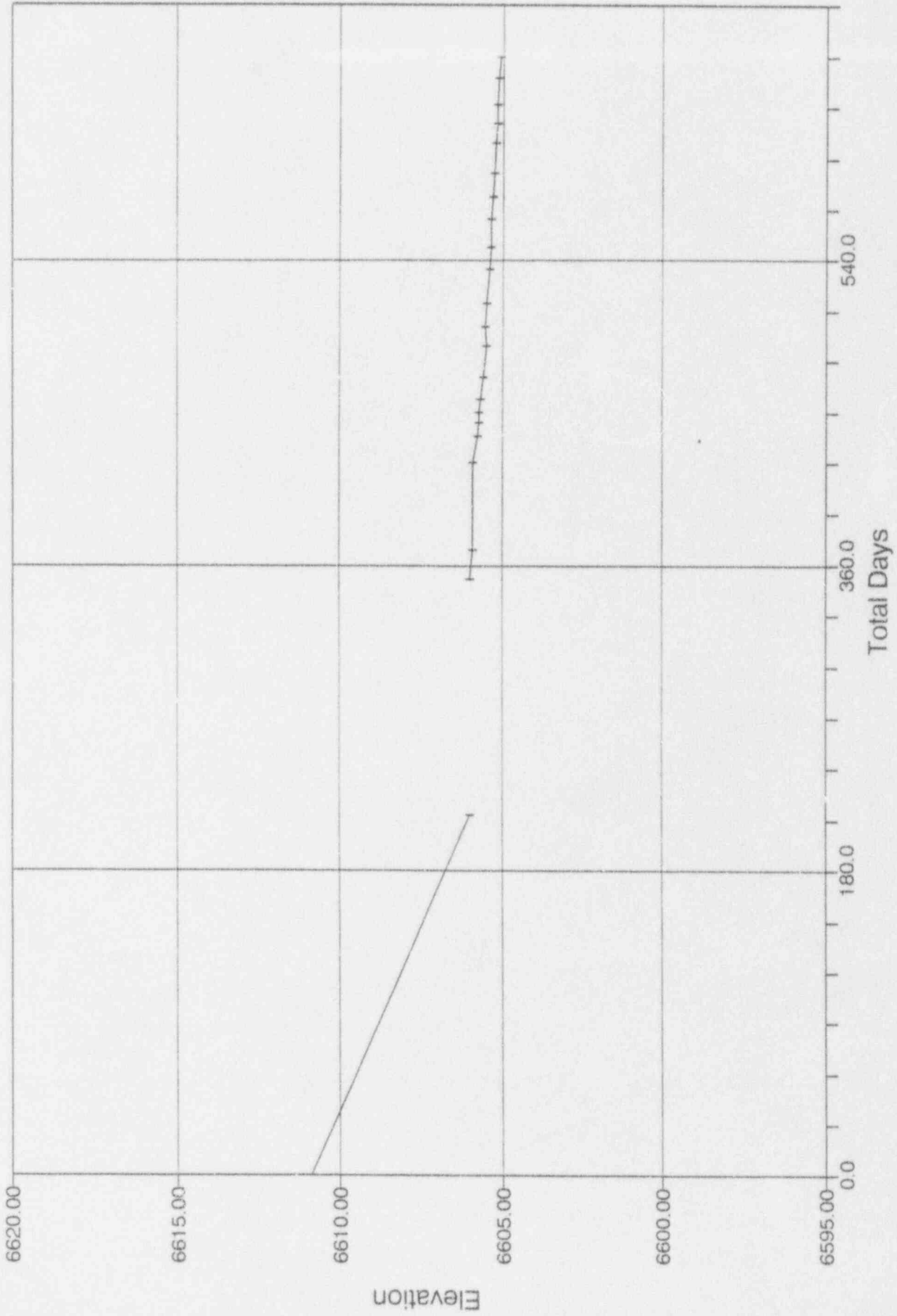


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 28

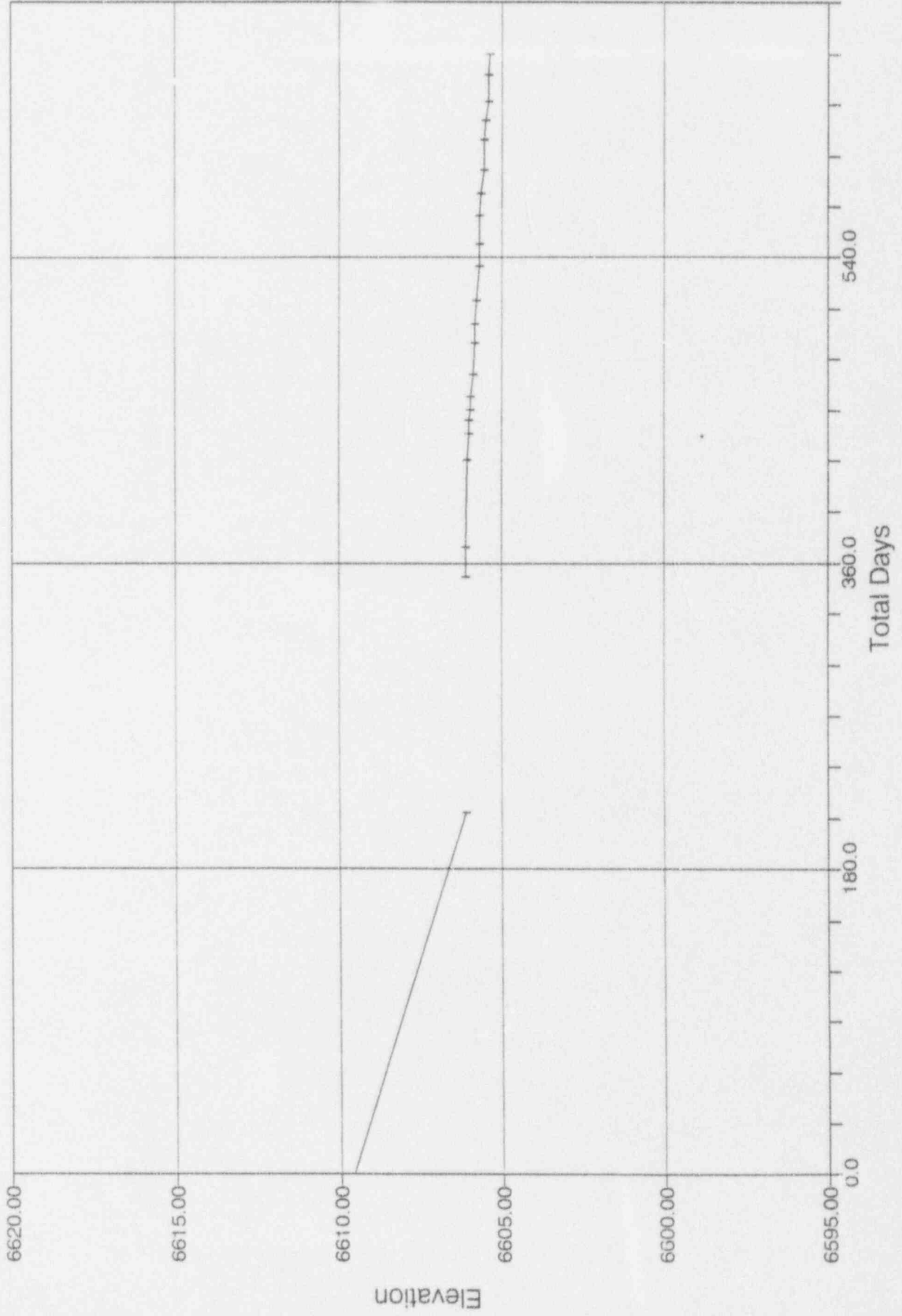


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 29

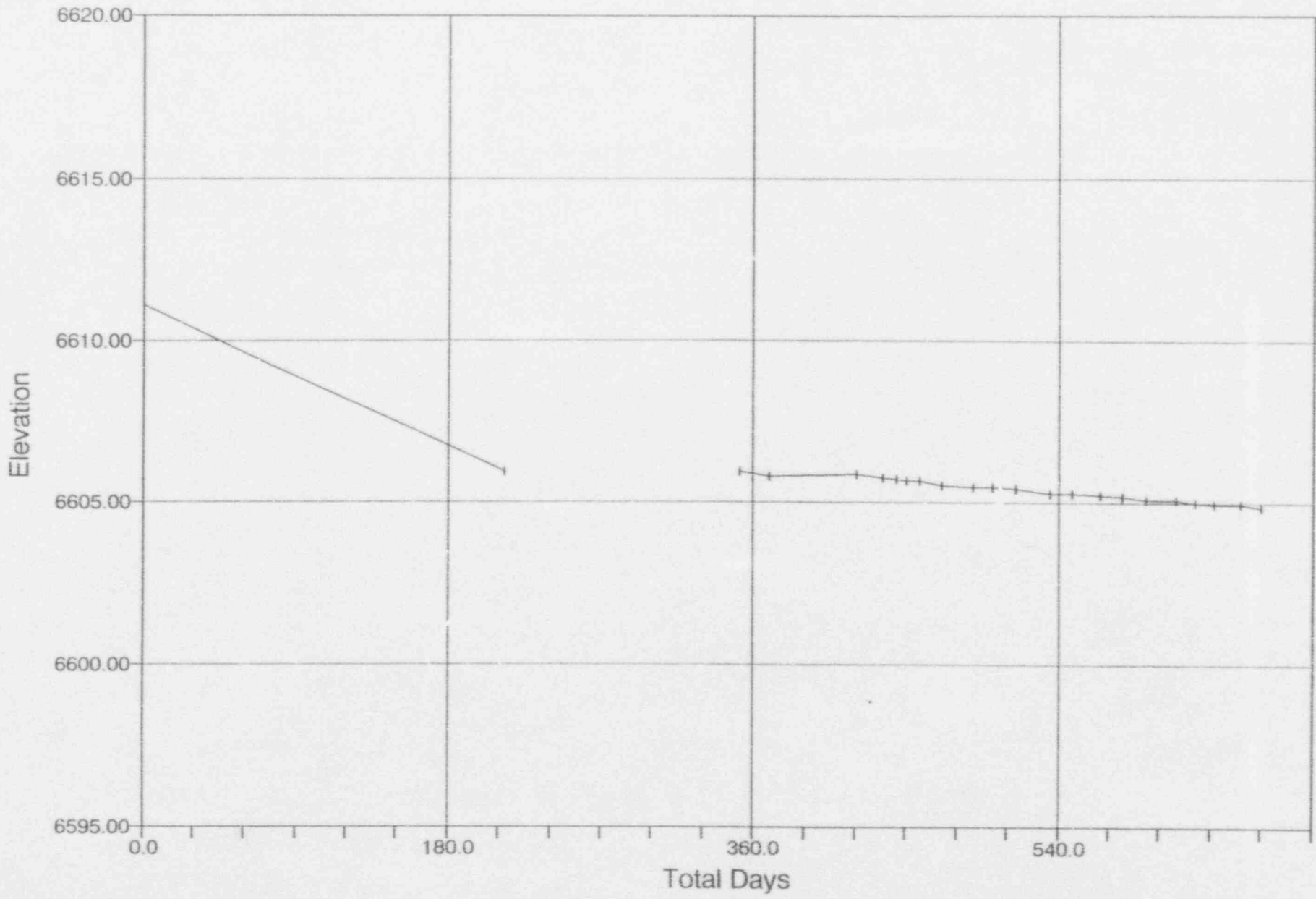


Date: 11/23/93
Project: 360
File:

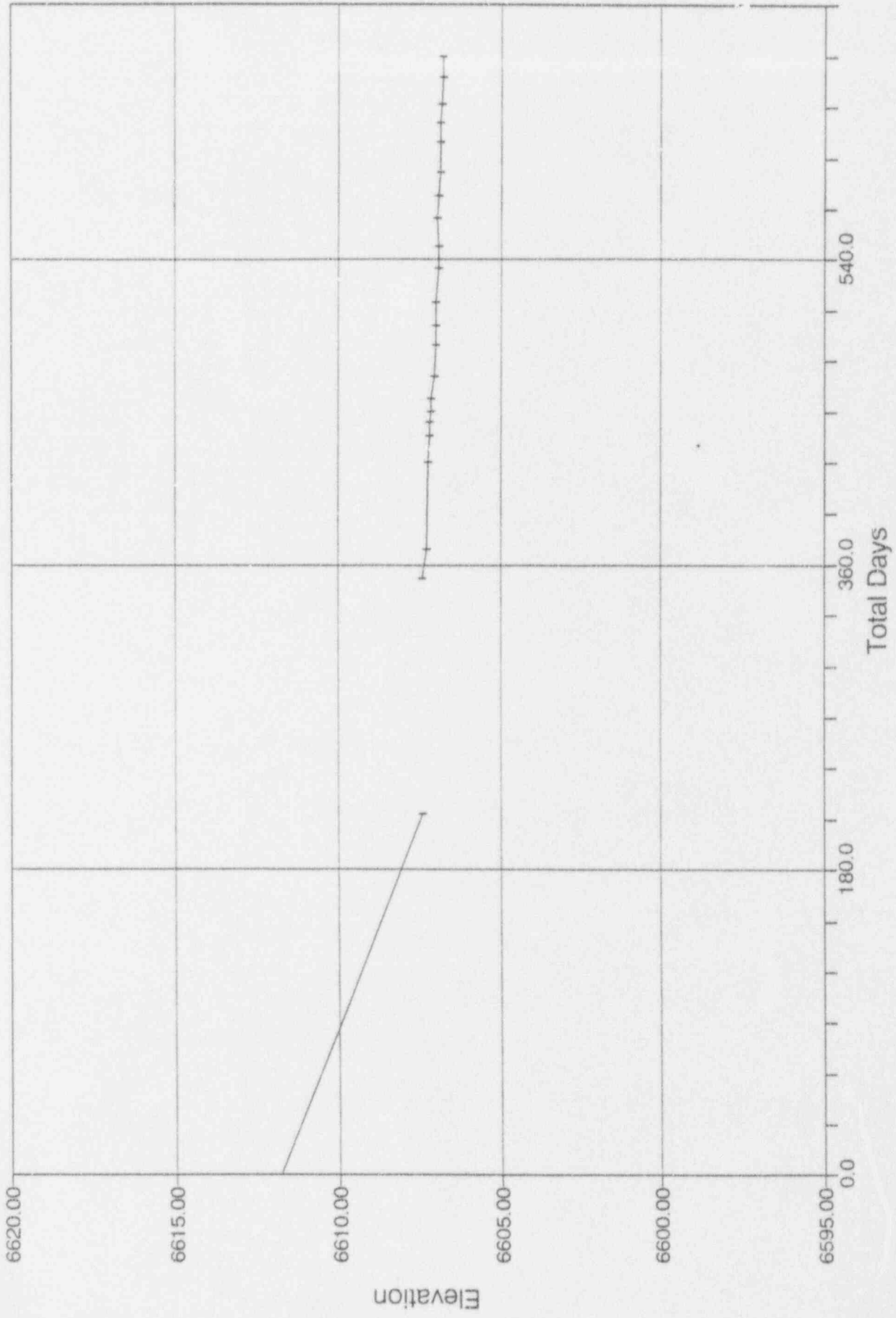
Settlement vs. Time



Settlement Point 30



Settlement Point 31

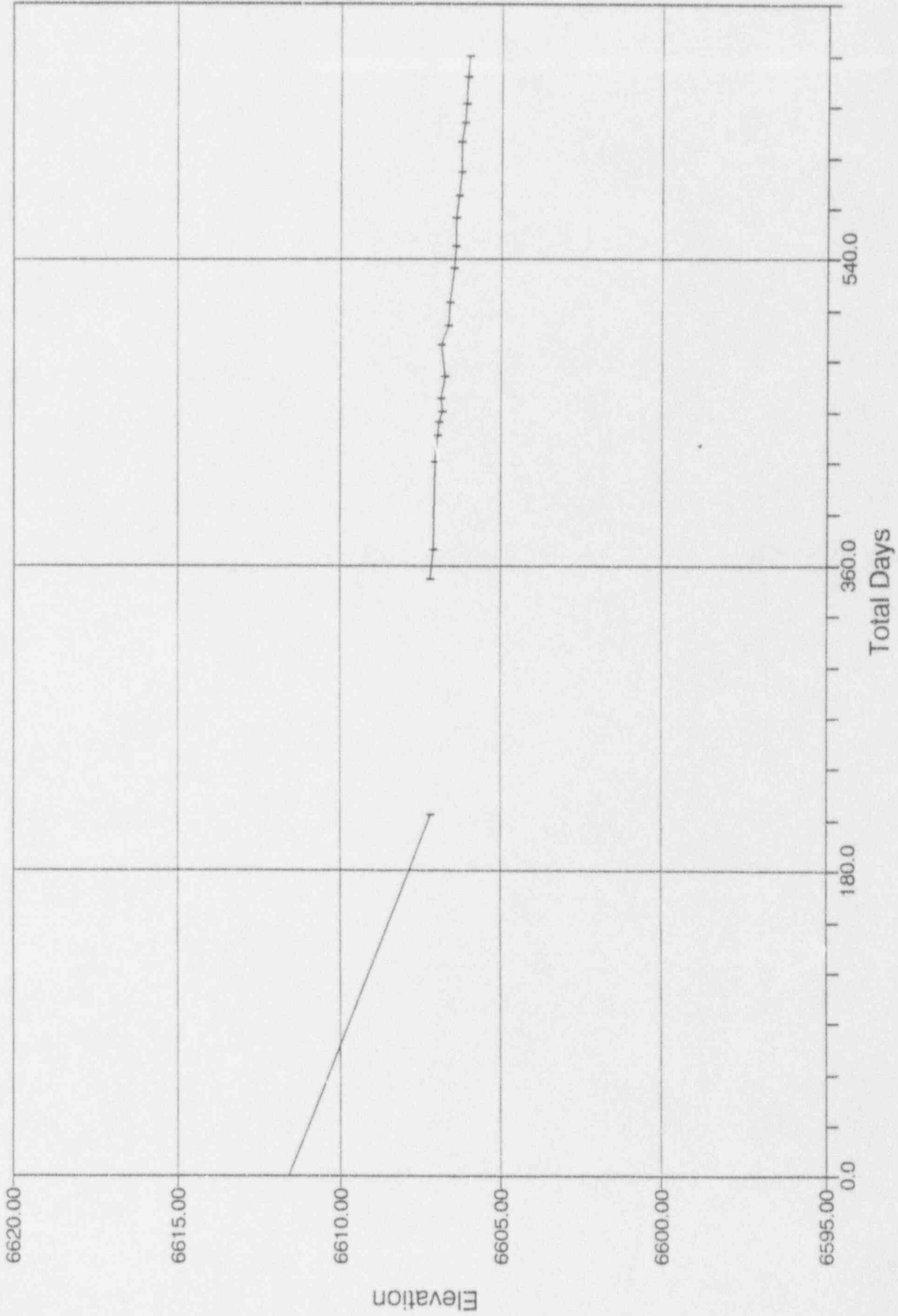


Date: 11/23/93
Project: 360
File:

Settlement vs. Time



Settlement Point 32



Date: 11/23/93
Project: 360
File:

Settlement vs. Time

SMI
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