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FINAL REPORT
EXISTING INSTRUMENTATION
MANSFIELD HOLLOW DAM
MANSFIELD, CONNECTICUT
New England Division
Corps of Engineers

December 31, 1987

Prepared for

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1. INTRODUCTION

1.1 Purpose

The purpose of this project was to evaluate the instrumentation at Mansfield Hollow Dam and prepare a geotechnical appendix for the instrumentation evaluation report being prepared for Mansfield Hollow Dam by the New England Division, U.S. Army Corps of Engineers (NED-USCE). The geotechnical appendix is included as Appendix A of this report.

1.2 Scope

The scope of work performed for this project was as follows:

1. Review previous inspection reports for Mansfield Hollow Dam.

2. Visit dam to inspect condition of existing piezometers, crest monuments, control points, and outlets from toe drain system. Observe seepage conditions along downstream slope and toe. Perform a falling head test in each piezometer to evaluate whether the piezometer is functioning. A summary of Daily Field Activities during GEI's site visit is included in Appendix B. The GEI Weekly Safety Report is included in Appendix C.

3. Develop a Lotus 1-2-3® database for piezometer readings at Mansfield Hollow Dam. Develop a user friendly menu using macros for inputting data and making plots. Documentation for the program is included in Appendix D.

4. Input existing piezometer readings into the database.

5. Prepare final plates for the appendix, as follows:

    a. One plan showing locations of the piezometers and crest monuments for the entire dam.

    b. Four plates showing the longitudinal profile along the dam, including the subsurface profile based on logs from previous borings and the location of the toe drains. The profiles were previously rough drafted by NED-USCE. GEI checked that NED-USCE correctly transferred the information from the boring logs to the profiles. We did not change any soil descriptions given on the boring logs.

c. Seven plates for piezometer data. The plates include geologic cross sections of the dam and foundation, and plots of peak piezometer readings and peak pool elevations. The peak piezometer and pool plots are repeated in Appendix E.

d. Four plates showing crest monument layout and horizontal and vertical movement.

6. Prepare a geotechnical appendix for the NED-USCE evaluation report on Mansfield Hollow Dam summarizing the conditions of the piezometers, crest monuments, and toe drain system, results of the field tests, review of past instrumentation data, recommendations for future monitoring and maintenance of the instrumentation, and recommendations for additional instrumentation. The geotechnical appendix is included as Appendix A of this report.

7. Prepare a separate report for recommended future instrumentation maintenance and reading schedule. This is included in Appendix F. Information in this report is repeated in the geotechnical appendix (Item 6).

A copy of the NED-USCE Scope of Work is included in Appendix G.

1.3 Authorization

The services were provided by GEI under Delivery Order No. 2 of Contract DACW33-87-D-0002 and were authorized in a letter from NED-USCE dated July 15, 1987.

1.4 Available Data

The following items were provided by NED-USCE for Mansfield Hollow Dam:

a. As-built drawings, plans and cross sections.

b. Design Memorandum titled "Thames River Flood Control, Analysis of Design, Mansfield Hollow Dam, Natchaug River, Connecticut dated October 1949.

c. Periodic Inspection Report Nos. 1, 2 and 3 dated May 1976, June 1980 and September 1985.

d. Boring logs for BH-1 through BH-76.

e. Draft plates for report showing layout of geotechnical instrumentation.

f. Piezometer readings notebook.

g. Supplemental Data for Periodic Dam Inspection Report No. 3, West Hill Dam, Uxbridge, MA dated July 1987.

h. Crest monument locations and survey data.

i. A washable mylar base sheet of the General Plan.

j. Blank mylar sheets (16) with NED-USCE title blocks.

1.5 Project Personnel

The following people at GEI performed the services related to this project:

Ronald H. Hirschfeld	In-house Consultant
Stephen L. Whiteside	Project Manager
Michael Paster	Senior Geotechnical Engineer
Charles R. Conlon	Geotechnical Engineer
Kenneth A. Pidgeon	Geotechnical Engineer

2. PROJECT DESCRIPTION

Mansfield Hollow Dam is located on the Natchaug River in Mansfield, Connecticut in the Thames River Basin. Construction of the dam began in 1949 and the dam became operational in 1952.

The dam is a compacted, zoned earth embankment constructed on a sand and gravel foundation. The dam has a crest at El. 273.0 National Geodetic Vertical Datum (NGVD) with a maximum height of 68 feet above the streambed and a crest length of about 12,500 feet. The embankment typically includes an upstream inclined impervious fill zone, a central random fill zone, a downstream pervious fill zone, riprap slope protection on the upstream slope, and processed gravel on the downstream slope. For a few hundred feet north and south of the spillway, the impervious fill zone extends downstream of the centerline of the embankment.

The dam is divided into a north and south dam by a chute spillway that is located near the middle of the dam at the location of the main stream channel. The outlet works are incorporated into the spillway and consist of five gated rectangular conduits located in the spillway weir. The spillway weir is an uncontrolled concrete ogee type 690 feet long with a crest at El. 257.0 NGVD. Under normal conditions the reservoir pool is maintained at El. 211.5 in the summer and El. 210.0 in the winter. The highest reservoir pool to date was El. 246.8 in August 1955.

In addition to the dam, there are six dikes, with a total length of about 2670 feet located in saddles along the rim of the reservoir. The dikes are compacted random earth fill embankments, except for Dike B, which is a compacted, zoned earth embankment similar to the dam.

Dike B was constructed in a low saddle in the rim of the reservoir and blocks the natural flow of Chapin Brook into the reservoir. The flow from Chapin Brook passes into the reservoir through Dike B in a concrete conduit.

A toe drain system exists along the downstream toe of the dam from about Sta. 81 to 83 and 89 to 133. The water collected from the toe drain system discharges into drainage ditches downstream of the dam. The toe drain system was modified in 1955 after seepage was observed in some areas following the high pool levels in August 1955.

3. EVALUATION OF INSTRUMENTATION

The existing instrumentation at Mansfield Hollow Dam was evaluated for the preparation of the geotechnical appendix for the NED-USCE instrumentation evaluation report. The geotechnical appendix for the NED-USCE instrumentation evaluation report is presented in Appendix A of this report. Appendix A includes sections on data collection, interpretation of data, and evaluation of adequacy of crest monuments and piezometers, as well as recommendations for maintenance and monitoring instrumentation at Mansfield Hollow Dam.

A site visit was made by GEI personnel in July 1987 to inspect and evaluate the condition of piezometers, crest monuments, control points and outlets from the toe drain system, and to perform a falling head test in each piezometer. A summary of daily field activities during the inspection is provided in Appendix C. The results of the falling head tests are included in Attachment 1 of Appendix A. The falling head tests were used along with piezometer readings taken by NED-USCE during the April 1987 high pool elevation to evaluate the performance of the piezometers.

GEI developed a Lotus data base program for piezometer data at Mansfield Hollow Dam. Documentation for the program is in Appendix D. Also included is a recommended form for recording piezometer levels at the site. The new form was prepared to simplify the transfer of data from the field to the computer data base.

APPENDIX A

Geotechnical Appendix to NED-USCE
Instrumentation Evaluation Report

GEOTECHNICAL APPENDIX TO
INSTRUMENTATION EVALUATION REPORT
MANSFIELD HOLLOW DAM

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GEOTECHNICAL APPENDIX TO INSTRUMENTATION EVALUATION REPORT

1. SUMMARY OF EVALUATION OF MANSFIELD HOLLOW DAM PERFORMANCE

Based on visual observations made during the site visit on July 27 to 29, 1987 and a review of instrumentation data, the dam performance is rated as good.

The crest monument survey measurements indicate little vertical movement and random but fairly large horizontal movements, some one to two feet. These large movements probably reflect a survey error, and a survey for horizontal movements of the crest monuments should be performed in the near future as a check. Three of the eight survey control points located off of the dam could not be found during the site visit and the five that were found were difficult to locate. All of the survey control points should be located and clearly marked.

The piezometer data indicate that seepage through the dam is exiting at the toe drain, and staying below ground surface downstream of the dam in reaches where there is no toe drain. The present number of piezometers is adequate to monitor pore pressures in the dam foundation. However, based on the falling head tests performed on each of the piezometers, some of the piezometers should be cleaned. If the piezometers do not function adequately after cleaning, they should be replaced. The embankment and foundation appear stable and apparently behaved satisfactorily during the high pool in April 1987. Seepage was not observed along the downstream slope and toe during the site visit on July 27, 1987.

2. DESCRIPTION OF EMBANKMENT

The dam is a compacted, zoned earth embankment constructed on a sand and gravel foundation. The dam has a crest at El. 273.0 National Geodetic Vertical Datum (NGVD) with a maximum height of 68 feet above the streambed and a crest length of about 12,500 feet. The embankment typically includes an upstream inclined impervious fill zone, a central random fill zone, a downstream pervious fill zone, riprap slope protection on the upstream slope and processed gravel on the downstream slope. For a few hundred feet north and south of the spillway, the impervious fill zone extends downstream of the centerline of the embankment.

The dam is divided into a north and south dam by a chute spillway that is located near the middle of the dam at the location of the main stream channel. The outlet works are

incorporated into the spillway and consist of five gated rectangular conduits located in the spillway weir. The spillway weir is an uncontrolled concrete ogee type 690 feet long with a crest at El. 257.0 NGVD. Under normal conditions the reservoir pool is maintained at El. 211.5 in the summer and El. 210.0 in the winter. Flood stages are measured relative to El. 195 which is the sill elevation of the low-level outlet conduit. The highest reservoir pool to date was El. 246.8 in August 1955.

In addition to the dam, there are six dikes with a total length of about 2670 feet located in saddles along the rim of the reservoir. The dikes are compacted random earth fill embankments, except for Dike B, which is a compacted, zoned earth embankment similar to the dam.

Dike B was constructed in a low saddle in the rim of the reservoir blocking the natural flow of Chapin Brook into the reservoir. The flow from Chapin Brook passes into the reservoir through Dike B in a concrete conduit. The conduit is about 233 feet long with an inlet invert at El. 218.0 and an outlet invert at El. 216.0 on the reservoir side of the dike. The conduit has a slide gate located under about the halfway point of the slope on the reservoir side and a backwater gate at the toe of the dike also on the reservoir side. The slide gate at Dike B is normally closed at reservoir stage 20 to 25 feet (El. 215 to 220) and the water level rises on both sides of the dike. The slide gate is reopened when the reservoir level drops below the water level on the Chapin Brook side of the dike.

A toe drain system exists along the downstream toe of the dam from about Sta. 81 to 83 and Sta. 89 to 133. The water collected from the toe drain system discharges into drainage ditches downstream of the dam. The toe drain system was modified in 1955 after seepage was observed in some areas following the high pool levels in August 1955.

3. DESCRIPTION AND INSPECTION OF EXISTING INSTRUMENTATION

General. The existing instrumentation at Mansfield Hollow Dam consists of 28 piezometers and 42 crest monuments. Eighteen of the crest monuments also serve as survey control points for measuring horizontal movement of the dam. In addition to the survey control points located on the dam, there are 8 survey control points located off the dam.

An inspection of the existing instrumentation was made by GEI personnel, July 27 to 29, 1987. As part of the inspection falling head tests were performed on all 28 piezometers. The falling head test results are included in Attachment 1. Four headwalls and three outlets associated with the toe drain system were also inspected.

Crest Monuments. Forty-two crest monuments are located on the centerline of the dam. The monuments were initially surveyed in 1976 by Close, Jensen & Miller, Civil Engineers and Land Surveyors, Wethersfield, Connecticut. The locations of the monuments are shown on Plate 1 and Plates 13 through 16. The depth and composition of the monuments are unknown. A brass disk is set into the top of each monument. Eight survey control points were also installed upstream or downstream of the dam and are assumed to be fixed reference points. Additional surveys were performed in 1978 and 1984 by New England Division Corps of Engineers (NED-USCE) surveyors using electronic distance meter (EDM) instruments. Vertical movements were surveyed on all crest monuments in both 1978 and 1984. Seventeen of the eighteen crest monuments which also serve as survey control points were surveyed for horizontal movement in 1984, but only four were surveyed in 1978. The current standards and procedures employed by NED-USCE surveyors for crest monument surveys at Mansfield Hollow Dam are described in Attachment 2.

All of the crest monuments appeared to be in good condition at the time of the GEI site visit. Three of the survey control points located off the dam (B, G, and R) could not be located. The other five survey control points located off the dam (K, L, O, W and Y) were difficult to find, but appeared to be in good condition. Survey control points R, W, and Y are located upstream of the dam, and may not be accessible during a flood.

Piezometers. Twenty-eight open system piezometers have been installed at the site: 21 on the main embankment and 7 on Dike B located north of the main embankment. The locations of the piezometers are shown on Plates 1, 6, and 13 through 16. PZ-1 through 25 were installed during construction of the dam and consist of slotted steel well screen tips with 1-3/4-inch-diameter steel casing riser pipes. The steel casing risers are protected at the surface by an approximately 18-inch square concrete block about 12-inches high with an approximately 6-inch-diameter hole in the center of the block. The 6-inch-diameter hole in the center of the concrete block is covered with a steel manhole cover. The other three piezometers (PZ-26, PZ-27, and PZ-28) were installed in 1985 by Mobile District Corps of Engineers and consist of Casagrande

type (porous tube) piezometer tips with 3/4-inch PVC riser pipes protected at the surface by steel casing. Most of the piezometer tips are set in the foundation of the dam. Cross-sections of selected embankment sections showing the locations of the piezometer tips are shown in Plates 6 through 12.

A falling head test was performed on each piezometer during the July 27-29, 1987 site visit to determine whether the piezometers were functioning properly. The results of the falling head tests are included in Attachment 1. The falling head tests involved measuring the initial water level in the piezometers, filling the piezometer risers with water to the top (if possible), and measuring the drop of the water level over time. Water level readings were taken every minute for the first few minutes of each falling head test and then the time interval between readings was increased depending on the rate at which the water level dropped in the piezometers. Some piezometers returned to their initial water level within a few minutes while other piezometers did not return to their initial water level after 2 to 3 days. The piezometers that did not return to their initial water level after 2 to 3 days were read approximately one month after the tests were begun by Mr. Wayne Hawthorne (Project Manager, NED-USCE Mansfield Hollow Dam).

All of the piezometer tips are believed to be located in either sand or gravel in the embankment or the foundation, and were therefore expected to return to their initial water level in a relatively short period of time. However, the actual piezometer installation logs are not available for PZ-1 through PZ-25, and it is possible that some of these piezometers were located in local zones of silty soil.

Based on the data collected from the falling head tests, piezometers 2, 3, 6, 7, 15, 16, 17, 18, and 19 may not be functioning adequately. The water level in all of these piezometers remained 12 feet or more above their initial level after one hour, and 4 feet or more above their initial water level after one day. These nine piezometers were read approximately one month after the tests were begun and all of the piezometers had returned to about their initial water level except for PZ-16. This indicates that PZ-16 is completely inoperable.

Several of the protective concrete blocks for the piezometers appear to have slid downslope slightly and should be repositioned. A diagram is included on each falling head test form in Attachment 1 showing the relative position of the steel casing riser within the hole in the concrete block and

the direction of apparent movement of the concrete block. We have also noted on the test forms if manhole covers are missing or if the piezometers stick up above the concrete block.

Toe Drain Outlets. The seven outlets of the toe drain system were checked during the July 27, 1987 inspection. A list of the outlets from the toe drain system is presented in Table 1. The headwalls and pipes were all in good condition. At headwalls 2 and 4, the drainage ditches downstream of the headwalls were overgrown with grass or saplings. This growth should be removed.

Other Instrumentation. There is no other existing instrumentation at Mansfield Hollow Dam.

4. INSTRUMENTATION DATA COLLECTION, INTERPRETATION AND EVALUATION

4.1 Crest Monuments

Data Collection. The data from the three crest monument surveys are included on Plates 13 through 16. Computed horizontal and vertical movements of each monument are also plotted on the plates.

Interpretation of Data. The 1978 and 1984 surveys were performed using EDMs and a third order accuracy (1:5000) according to the standards and procedures contained in Attachment 2. The type and accuracy of the instruments used to perform the initial survey in 1976 are unknown.

The measured total vertical movements of all monuments were less than 0.1 foot over the eight year period. The measurements are within the range of third order accuracy. This small amount of settlement is considered negligible.

Seventeen of the 18 crest monuments were surveyed for horizontal movement in 1984. Computed total horizontal movements between 1976 and 1984 ranged from 0.1 to 2.3 feet and have been random in direction. The survey indicates that the crest monument at Sta. 97+95 (M) moved 2.3 feet upstream. The next largest surveyed movement was at Sta. 95+88 (N) which moved 1.4 feet upstream. There was no observed physical evidence of movement at any monument, such as slumps, scarps, cracks or depressions which would indicate movement of more than one foot in the embankment. The measured movement is, therefore, believed to be attributable to survey inaccuracies.

Evaluation of Adequacy. The existing crest monuments are adequate for future monitoring of possible embankment movements. All of the survey control points located off of the dam should be located and clearly marked for future surveys. Third order accuracy is presently the standard utilized to perform all crest monument surveys. Based on the NED report for West Hill Dam (July 1987), conventional higher accuracy surveys are considered too expensive to implement on a routine basis at this time. With the advent of Global Positioning System Surveys (GPS), such as NAVSTAR, (which utilize signals bounced off satellites) the accuracy of three dimensional movements can be detected at a level of less than 5 millimeters (Ref ETL 1110-1-133). The implementation of this type of monitoring should be considered within the next 5 to 10 years if it proves to be cost effective.

It should be noted that control points R, W, and Y are located upstream of the dam. If embankment monitoring was required during a flood emergency these control points could be inaccessible.

4.2 Piezometers

Data Collection. The piezometer data collected during the high reservoir pools in August 1955, May 1963 and April 1987 are compiled in Attachment 3. Pertinent information listed includes date of reading, pool elevation, depth to water below the top of piezometer riser pipe, and corresponding water elevation for each piezometer. The peak piezometer readings and peak pool elevations measured in August 1955, May 1963, and April 1987 are plotted on Plates 6 through 12. A cross-section showing the location of each piezometer tip is provided at the top of the plates.

Plots of piezometer and pool elevation versus time during the three periods of high reservoir pools are given in Attachment 4. Also provided in Attachment 4 are plots of piezometer elevation versus pool elevation for each piezometer.

Interpretation of Data. The piezometer readings at Mansfield Hollow Dam during the April 1987 high pool (47 feet stage, El. 242) are discussed below. Plots of these data are included in Attachment 4, Figures 18 through 27. The piezometers are grouped according to their location along the dam. Our discussions of the data assume that all piezometers except PZ-16 operated adequately. As mentioned earlier, however, several of the piezometers may require maintenance.

(1) Dike B (PZ-1 through PZ-7)

As described in Section 2, Chapin Brook flows under Dike B into the reservoir. The gates at Dike B are

normally closed when the reservoir stage reaches 20 to 25 feet (El. 215 to 220), and the water level then rises on both sides of the dike. The gate is reopened when the reservoir pool elevation drops below the water level in Chapin Brook.

During the flood of April 1987, PZ-3, 5, 6, and 7, on the Chapin Brook side of Dike B, and PZ-4 on the reservoir side near the centerline all rose about 10 to 15 feet as the reservoir level rose. The water elevations in PZ-3, 5, 6, 7 were all about the same as each other during the flood, while the water elevation in PZ-4 stayed about 20 feet lower. It is assumed that the water levels on either side of the dike were approximately the same during the flood. The low water level in PZ-4 implies that the flood did not last long enough to raise the phreatic surface near the center of the dike.

Further interpretation of the piezometers at Dike B is difficult, because the water levels of Chapin Brook are not known. In the future, we recommend that Chapin Brook water levels be recorded whenever the piezometers on Dike B are read.

(2) Sta. 47+50 to Sta. 50+17 (PZ-8 and PZ-9)

PZ-8 is located at Sta. 47+50, 70 feet downstream of the dam centerline and about 20 feet downstream of the toe. PZ-9 is located at Sta. 50+17, 55 feet downstream of the dam centerline and about 20 feet downstream of the toe. During the high pool in April 1987, the reservoir level (El. 242) was below the ground surface (El. 250 to El. 260) upstream of the dam in the vicinity of PZ-8 and PZ-9 and no water was impounded in front of the dam at this section. The piezometers did not respond to the change in pool elevation. The water level in the PZ-8 rose to El. 248 and in PZ-9 rose to El. 250 which was higher than the reservoir level (El. 242). Consequently, it appears that the piezometers were reading the downstream ground water level.

(3) Sta. 77+00 to Sta. 79+00 (PZ-10 and PZ-11)

PZ-10 is located at Sta. 77+00, 186 feet downstream of the dam centerline and about 90 feet downstream of the toe. PZ-11 is located at Sta. 79+00, 200 feet downstream of the dam centerline and about 120 feet downstream of the toe. The water level in PZ-10 rose about 5 feet to El. 198 while PZ-11 remained dry at El. 199 during the high pool elevation in April 1987. The water level in PZ-10 was about 34 feet below the ground (El. 232) and

about 44 feet below the reservoir level (El. 242). The water level at PZ-11 was at least 46 feet below the ground (El. 245) and at least 43 feet below the reservoir level. These data indicate that the dam is functioning adequately and downstream water levels are staying well below ground surface in this reach of the dam.

(4) Sta. 86+00 to Sta. 90+00 (PZ-12 through PZ-15)

PZ-12 and PZ-13 are both located at Sta. 86+00. PZ-12 is 15.5 feet upstream of the dam centerline and PZ-13 is 112 feet downstream of the dam centerline, about 50 feet downstream of the toe of the dam. PZ-14 is located at Sta. 89+25, 100 feet downstream of the centerline of the dam, and about 40 feet downstream of the toe. PZ-15 is located at Sta. 90+00, 15.5 feet upstream of the dam centerline. The water level in PZ-12 rose about 8 feet to El. 215.5 and in PZ-15 rose about 13 feet to El. 220 during the high pool in April 1987. The water level in PZ-14 rose 9 feet to El. 215 and PZ-13 remained dry at El. 208 during the high pool in April 1987. The water levels in the upstream piezometers, PZ-12 and PZ-15, were about 26 and 22 feet below the reservoir level (El. 242), respectively. The water level in PZ-14 was about 36 feet below the ground (El. 251) and about 27 feet below the reservoir level. The water level at PZ-13 was at least 45 feet below the ground (El. 253) and at least 34 feet below the reservoir level. These data indicate that the dam is functioning adequately and downstream water levels are staying well below the ground surface in this reach of the dam.

(5) Sta. 100+75 (PZ-16 and PZ-17)

PZ-16 and PZ-17 are both located at Sta. 100+75. PZ-16 is 15.5 feet upstream of the dam centerline and PZ-17 is 87 feet downstream of the dam centerline at the toe of the dam. The water level in the downstream piezometer, PZ-17, rose 9 feet to El. 216 while the water level in upstream piezometer, PZ-16, only rose about 5 feet to El. 213 during the high pool elevation in April 1987. The water level in PZ-17 was about 5 feet above the water level in PZ-16 on the day of the reservoir's highest stage at El. 242. Based on this information and on the falling head test, PZ-16 does not appear to be functioning properly and should be cleaned. The water level in PZ-17 was about 17 feet below the ground (El. 233) and about 26 feet below the reservoir level (El. 242). This indicates that the dam is functioning adequately and downstream water levels are staying well below ground surface in this reach of the dam.

(6) Sta. 113+50 (PZ-18 through PZ-20)

PZ-18, PZ-19 and PZ-20 are all located at Sta. 113+50. PZ-18 is 15.5 feet upstream of the dam centerline. PZ-19 is located at the toe of the dam, 82 feet downstream of the dam centerline. PZ-20 is 200 feet downstream of the dam centerline about 125 feet downstream of the toe. At its highest point during the April 1987 flood, the water level in the upstream piezometer, PZ-18 (El. 227.5), was about 14 feet below the reservoir level (El. 242). The water level in PZ-19 (El. 226) was about 11 feet below the ground (El. 237) and about 16 feet below the reservoir level. The water level in PZ-20 (El. 225) was about 12 feet below the ground (El. 237) and about 17 feet below the reservoir. These data indicate that the dam is functioning adequately and that downstream water levels are staying well below the ground surface in this reach of the dam. After the reservoir level returned to its normal operating elevation, the water level in all three piezometers remained above the pool elevation. This probably reflects normal ground water conditions.

(7) Sta. 131+00 to Sta. 136+00 (PZ-21 through PZ-28)

PZ-21 is located at Sta. 131+00, 16.5 feet upstream of the dam centerline. PZ-22 is located at Sta. 131+02, 100 feet downstream of the dam centerline at the toe. PZ-23 is located at Sta. 136+00, 13.5 feet downstream of the dam centerline at the crest. PZ-24 is located at Sta. 135+00, 89 feet downstream of the dam and about 20 feet downstream of the toe. PZ-25 is located at Sta. 132+60, 260 feet downstream of the toe and about 160 feet downstream of the toe. PZ-26 and PZ-28 are both located at Sta. 132+90. PZ-26 is 7 feet upstream of the dam centerline and PZ-28 is 109 feet downstream of the dam centerline at the toe. PZ-27 is located at Sta. 130+97, 117 feet downstream of the dam centerline and about 20 feet downstream of the toe. The water levels in the piezometers downstream of the embankment (PZ-22, 23, 24, 25, 27 and 28) all tended to be within a few feet of the downstream ground surface (about El. 233) during the high water in April 1987. When the pool elevation dropped back to approximately the normal operating pool (El. 212.5), the elevations of the water levels in the downstream piezometers dropped down by about two to five feet from their highest readings. At this point, the readings in the downstream piezometers tended to be higher than in the upstream piezometers (PZ-21 and PZ-26), and all piezometer levels were higher than the reservoir pool.

This implies that the water levels in the downstream piezometers are controlled by the downstream ground water levels and not by the reservoir level. According to Mr. Donald Warren (Assistant Project Manager, NED-USCE Mansfield Hollow Dam), the ground is normally wet during the spring along this reach of the dam in the area downstream of the embankment. Therefore, it appears that the natural ground water in this area is higher than the normal operating pool elevation, at least during the spring.

Evaluation of Adequacy. The present level of piezometers is adequate to monitor pore pressures in the dam foundation. Most of the piezometers responded to fluctuations of the pool level. Piezometers that may not be functioning adequately, based on the falling head tests and review of the piezometer data during the April 1987 high pool, are discussed in Section 5.2. If piezometers that are not functioning adequately now cannot be cleaned, then those piezometers should be replaced. However, no additional piezometers are recommended at this time.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 General

Not all of the geotechnical instrumentation at Mansfield Hollow Dam is functioning properly. Based on the falling head tests, we recommend that several of the piezometers be cleaned. Some of the piezometers also require repositioning of their protective enclosure.

The crest monuments all appeared to be in good condition. However, three of the survey control points located off of the dam could not be found during the July 27, 1987 inspection. All of the survey control points located off of the dam should be located and clearly marked. A survey for horizontal movements of the crest monuments should be performed in the near future to check some of the large horizontal movements previously measured.

5.2 Maintenance of Instrumentation

Based on the data collected from the falling head tests, piezometers 2, 3, 6, 7, 15, 16, 17, 18 and 19 may not be functioning adequately and should be cleaned. The piezometers should be cleaned by a combination of surging and jetting. Surging could be performed using a pipe with a diameter slightly smaller than the diameter of the piezometer riser and a capped end. The pipe should be lowered to the bottom of the piezometer and quickly raised and lowered several times in succession. Jetting should be performed after surging by

lowering a hose to the bottom of the piezometer and jetting clear water through the hose until the water return at the top appears clear. After the piezometer has been cleaned, a falling or rising head test should be performed on the piezometer to determine whether it is functioning adequately. If the piezometer does not function adequately after cleaning, it should be replaced.

In addition to cleaning, some of the piezometers require maintenance to their protective enclosure. PZ-4, 5, 12 and 18 do not have manhole covers and the steel riser for PZ-5, 18, 24 and 25 sticks above the top of the protective concrete block enclosure. The protective concrete block enclosure should be realigned to center the piezometer riser for PZ-2, 3, 6, 12 and 21.

All of the survey control points located off of the dam should be located and clearly marked. Shrubs and high weeds around the control points should be removed on a regular basis.

At headwalls 2 and 4, the drainage ditches downstream of the headwalls were overgrown with grass or saplings. This growth should be removed.

5.3 Additional Instrumentation

No additional instrumentation is recommended at this time.

5.4 Schedule for Crest Monument Surveys

A crest monument survey should be scheduled in the near future to check the accuracy of the horizontal movements from Sta. 88+06 to Sta. 97+95. In the future, a crest monument survey should be scheduled to coincide with the periodic inspection schedule (once every five years).

5.5 Schedule for Reading Piezometers

We recommend the following schedule for reading the piezometers at Mansfield Hollow Dam:

(1) Routine Monitoring. During periods when the reservoir is below the 16.5 feet stage (El. 211.5) readings should be made by the project manager at least once every three months. Pool elevations should be recorded simutaneously with piezometer readings. When access to the piezometers is made hazardous by snow or ice, the readings may be deferred until safe access is possible.

(2) High Pool Conditions. During periods when the reservoir level is above the 16.5 feet stage (El. 211.5) and below the 30 feet stage (El. 225), piezometers PZ-10 through PZ-28 should be read on a weekly basis until the pool returns to the 16.5 feet stage. During periods when the reservoir level is above the 30 feet stage (El. 225) and below the 40 feet stage (El. 235), all piezometers, except PZ-8 and PZ-9, should be read on a daily basis until the pool returns to the 30 feet stage. During periods when the reservoir level is above the 40 feet stage (El. 235), all piezometers should be read on a daily basis until the pool returns to the 40 feet stage. Pool elevations should be recorded simultaneously with piezometer readings. Elevations of Chapin Brook should be recorded simultaneously with piezometer readings at Dike B.

(3) Special Conditions. If unusual changes in readings develop or if piezometers become inoperable, the Geotechnical Engineering Branch should be contacted.

TABLE 1 - OUTLETS FROM TOE DRAIN SYSTEM
Mansfield Hollow Dam

Approx. Station	Outlet Headwall No.	Type of Outlet Pipe(s)	Observations Made During July 27, 1987 Inspection
81+00	4	15-inch pipe	no flow - saplings growing in drainage ditch
95+00	3	two 15-inch pipes one 12-inch pipe	total flow approx. 0.2 cfs
98+00	2	30-inch pipe with baffle block	no flow - outlet pipe and drainage ditch choked with grass and sediment
122+00	1	24-inch pipe	no flow
126+00	-	12-inch pipe	no flow
129+00	-	12-inch pipe	no flow
131+00	-	12-inch pipe	no flow

Notes:

All pipes and concrete headwalls appeared to be in good condition during the July 27, 1987 inspection.

ATTACHMENT 1

Piezometer Falling Head Permeability Tests

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

Performed by K. PIDGEON / C. CONLON Date 7/27/87 Piezometer No. PZ-1

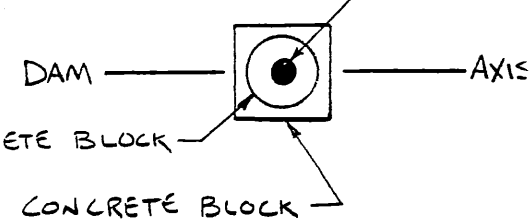
Initial Depth to Water DRY Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 23.3' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1308	0	2.9	20.4	
	0.5	14.1	9.2	
	1	17.6	5.7	
	2	20.4	2.9	
	3	20.9	2.4	
	4	21.1	2.2	
	5	21.4	1.9	
1326	18	22.5	0.8	
7/28 1703	1675	23.2	0.1	

RELATIVE POSITION OF STEEL CASING RISER



GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

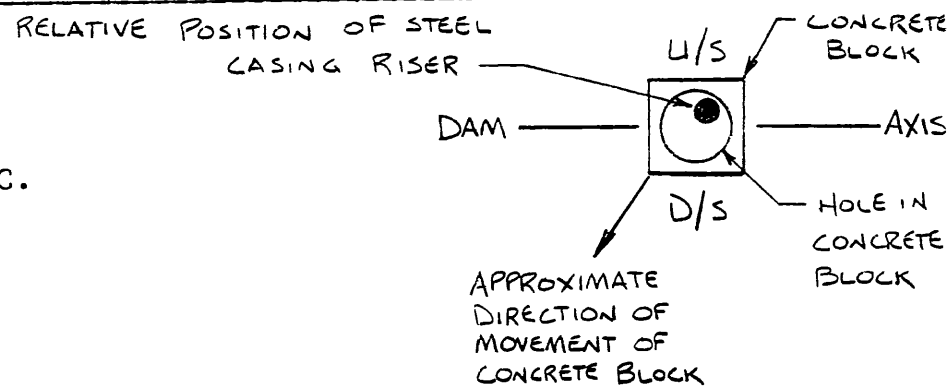
Performed by K. PIDGEON / C. CONLON Date 7/27/87 Piezometer No. PZ-2

Initial Depth to Water 27.1' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 38.0' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1323	0	2.8	24.3	
	1	3.0	24.1	
	2	3.2	23.9	
1329	6	3.7	23.4	
1345	22	4.9	22.2	
1428	65	6.6	20.5	
1456	93	7.4	19.7	
1635	192	9.2	17.9	
7/28 1700	1657	17.1	10.0	
7/29 0815	2632	19.3	7.8	
8/27/87		27.2	~0	



GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

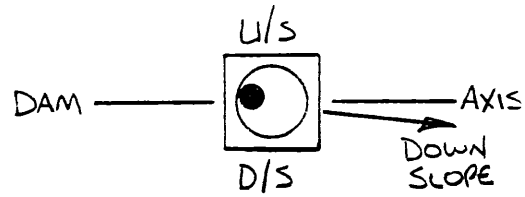
Performed by K. PIDGEON / C. CONLON Date 7/27/87 Piezometer No. PZ-3

Initial Depth to Water 25.4' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 28.6' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1338	0	1.7	23.7	
	1	1.8	23.6	
	2	1.9	23.5	
1355	17	2.0	23.4	
1413	35	2.4	23.0	
1432	54	2.5	22.9	
1500	82	2.8	22.6	
1642	184	3.8	21.6	
7/28 1657	1639	12.1	13.3	
7/29 0813	2555	15.2	10.2	
8/27/87		25.3	0.1	



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PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

Performed by K. PIDGEON / C. CONLON Date 7/27/87 Piezometer No. PZ-4

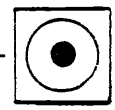
Initial Depth to Water 49.1' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 57.6' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1420	0	3.0 (1)	46.1 (2)	(1) COULD NOT FILL TO THE
	2	48.8	0.3	TOP OF RISER
	3	48.9	0.2	
1516	0	3.9 (2)	45.2 (2)	(2) QUESTIONABLE INITIAL
	1	48.5	0.6	READING USING ELECTRIC
	2	48.7	0.4	WATER LEVEL INDICATOR
	3	48.75	0.35	
	4	48.8	0.3	
7/28 1707	1551	49.1	0	

NO COVER

DAM  AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

Performed by K. PIDGEON / C. CONLON Date 7/27/87 Piezometer No. PZ-5

Initial Depth to Water 28.5' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 38.0' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1352	0	3.7	24.8	DEPTHS REFERENCED TO
	1	9.2	19.3	TOP OF CONCRETE BLOCK
	2	12.6	15.9	EL. 249.96
	3	14.8	13.7	
	4	16.3	12.2	
	5	17.7	10.8	
	6	18.7	9.8	
	7	19.8	8.7	
	8	20.3	8.2	
	10	21.3	7.2	
1411	19	23.8	4.7	
1500	68	26.4	2.1	
7/28 1657	1625	28.4	0.1	
				PIEZOMETER RISER 0.1' ABOVE
				ELEVATION MARKER.

NO COVER

DAM AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

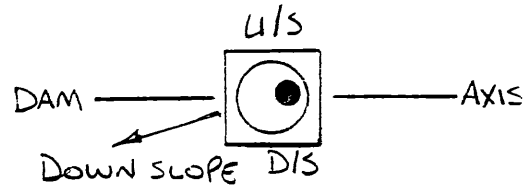
Performed by K. PIDGEON / C. CONLON Date 7/27/87 Piezometer No. PZ-6

Initial Depth to Water 17.4' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 23.6' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1429	0	1.4	16.0	
	1	1.5	15.9	
	3	2.0	15.4	
	5	2.0	15.4	
	7	2.0	15.4	
	10	2.3	15.1	
1457	28	3.5	13.9	
1648	139	6.8	10.6	
7/28 1653	1445	13.6	3.8	
7/29 0809	2361	15.0	2.4	
8/27/87		17.1	0.3	



SLOPE PROTECTION UNDER CONCRETE BLOCK IS ERODING AWAY.

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PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

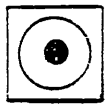
Performed by K. PIDGEON / C. CONLON Date 7/27/87 Piezometer No. PZ-7

Initial Depth to Water DRY Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 44.5' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1447	0	3.3	41.2	
	1	6.8	37.7	
	2	9.1	35.4	
	3	10.8	33.7	
	4	12.2	32.3	
	5	13.5	31.0	
1504	17	21.3	23.2	
1652	125	33.2	11.3	
7/28 1650	1563	39.4	5.1	
7/29 0805	2478	40.2	4.3	
8/27/87		DRY	0	

DAM  AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

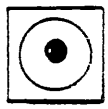
Performed by K. PIDGEON / C. CONLON Date 7/27/87 Piezometer No. PZ-8

Initial Depth to Water 12.2' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 17.0' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1609	0	1.5	10.7	
	1	2.0	10.2	
	2	2.8	9.4	
	3	2.8	9.4	
	4	3.1	9.1	
	5	3.8	8.4	
	7	4.1	8.1	
	9	4.7	7.5	
1620	11	5.3	6.9	
1710	61	11.0	1.2	
7/28 1729	1520	12.2	0	

DAM  AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

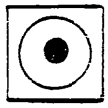
Performed by K. PIDGEON / C. CONLON Date 7/27/87 Piezometer No. PZ-9

Initial Depth to Water 16.4' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 28.0' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1549	0	6.4	10.0	
	0.5	8.9	7.5	
	1	10.7	5.7	
	2	13.1	3.3	
	3	14.4	2.0	
	5	15.9	0.5	
	6	16.3	0.1	

DAM  AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

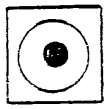
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-10

Initial Depth to Water DRY Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 39.9' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
0940	0	19.3	20.6	
	0.5	25.0	14.9	
	1	28.7	11.2	
	2	33.5	6.4	
	3	35.7	4.2	
	4	37.1	2.8	
	5	37.9	2.0	
	6	38.3	1.6	
	7	38.5	1.4	
1512	332	39.7	0.2	

DAM  AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-11

Initial Depth to Water DRY Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 43.3' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1000	0	37.6	5.7	COULD NOT FILL RISER
	0.5	41.0	2.3	
	2	DRY	0	

DAM ——— ⊙ ——— AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

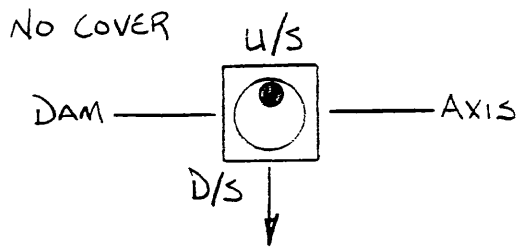
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-12

Initial Depth to Water DRY Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 18.89m (62.0') Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ~~ft~~ m	Piezometric Head ~~ft~~ m	Remarks
0914	0	15.20	3.69	
	1	16.15	2.74	
	2	16.54	2.35	
	3	16.79	2.10	
	4	16.97	1.92	
	5	17.12	1.77	
0921	7	17.32	1.57	
0925	11	17.53	1.36	
0929	15	17.64	1.25	
0934	20	17.73	1.16	
1520	366	DRY	0	



GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

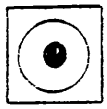
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-13

Initial Depth to Water DRY Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 45.3' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1014	0	12.1	33.2	
	0.5	18.3	27.0	
	1	23.2	22.1	
	2	30.7	14.6	
	3	34.9	10.4	
	4	37.7	7.6	
	5	39.6	5.7	
	6	41.2	4.1	
1559	345	44.8	0.5	
7/29 0859	1365	45.2	0.1	

DAM  AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

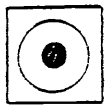
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-14

Initial Depth to Water DRY Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 43.6' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1031	0	6.0	37.6	
	0.5	11.6	32.0	
	1	15.7	27.9	
	2	22.0	21.6	
	3	26.4	17.2	
	4	29.7	13.9	
	5	32.6	11.0	
	6	34.1	9.5	
	7	35.5	8.1	
	8	36.7	6.9	
	10	38.3	5.3	
	15	40.2	3.4	
1601	330	43.4	0.2	

DAM  AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

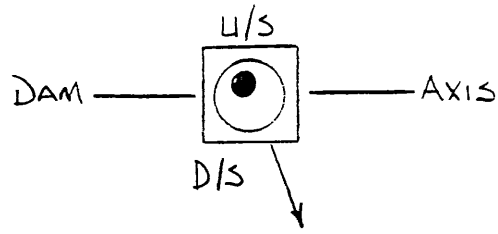
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-15

Initial Depth to Water DRY Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 62.8' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
0904	0	1.7	61.1	
	1	1.9	60.9	
	2	2.0	60.8	
	3	2.0	60.8	
	5	2.2	60.6	
	8	2.3	60.5	
	10	2.5	60.3	
	15	2.9	59.9	
	20	3.4	59.4	
0945	41	5.0	57.8	
1530	386	14.3	48.5	
7/29 0904	1440	22.9	39.9	
8/27/87		DRY	0	



GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

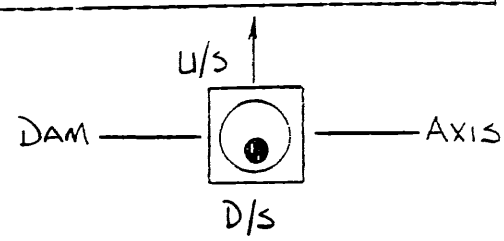
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-16

Initial Depth to Water 60.3' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 67.7' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
0848	0	0.6	59.7	
0930	42	1.1	59.2	
1200	192	2.0	58.3	
1535	407	3.5	56.8	
7/29 0908	1460	9.3	51.0	
8/27/87		39.0	21.3	



GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

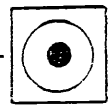
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-17

Initial Depth to Water 24.6' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 30.0' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1053	0	1.1	23.5	
	1	1.3	23.3	
	2	1.3	23.3	
	3	1.4	23.2	
	5	1.6	23.0	
1103	10	2.0	22.6	
1108	15	2.3	22.3	
1113	20	2.5	22.1	
1139	46	3.3	21.3	
1605	312	6.4	18.2	
7/29 0853	1320	12.4	12.2	
8/27/87		24.3	0.3	

DAM  AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-18

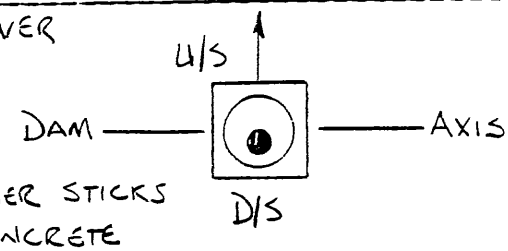
Initial Depth to Water 58.4' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 79.5' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
0828	0	5.0	53.4	
	1	6.8	51.6	
	2	7.9	50.5	
	3	8.6	49.8	
	5	9.6	48.8	
	8	10.3	48.1	
	10	10.7	47.7	
	15	11.6	46.8	
	20	12.3	46.1	
0900	32	13.7	44.7	
0925	57	15.5	42.9	
1158	153	21.0	37.4	
1538	373	25.9	32.5	
7/29 0913	1428	38.5	19.9	
8/27/87		58.9	~0	

NO COVER



GEOTECHNICAL ENGINEERS INC.

CAP ON RISER STICKS ABOVE CONCRETE BLOCK.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

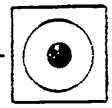
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-19

Initial Depth to Water 25.4' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 31.3' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1106	0	1.1	24.3	
	1	1.2	24.2	
	2	1.4	24.0	
	3	1.6	23.8	
	4	1.8	23.6	
	5	1.9	23.5	
	7	2.2	23.2	
	10	2.6	22.8	
1131	25	4.5	20.9	
1149	43	6.5	18.9	
1159	53	7.3	18.1	
1608	302	13.4	12.0	
7/29 0849	1303	20.0	5.4	
8/27/87		25.5	~0	

DAM  AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

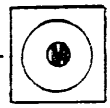
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-20

Initial Depth to Water 25.9' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 35.8' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1121	0	7.0	18.9	
	0.5	11.0	14.9	
	1	13.3	12.6	
	2	16.4	9.5	
	3	18.4	7.5	
	4	19.7	6.2	
	5	20.6	5.3	
1133	12	23.4	2.5	
1145	24	24.7	1.2	
1158	37	25.3	0.6	
1204	43	25.5	0.4	
1610	289	25.9	0	

DAM  AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

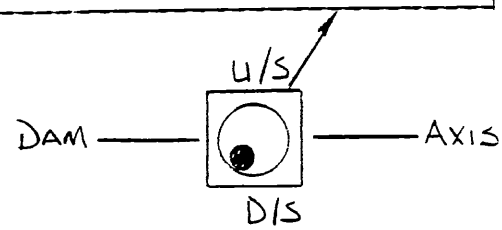
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-21

Initial Depth to Water 48.2' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 64.2' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
0810	0	47.8	0.4	COULD NOT FILL RISER
	0.5	47.8	0.4	TO THE TOP.
	1	47.9	0.3	
	3	48.0	0.2	
	5	48.0	0.2	
0840	30	48.2	0	



GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

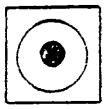
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-22

Initial Depth to Water 15.1' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 26.3 Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1306	0	2.3	12.8	
	1	4.2	10.9	
	2	5.4	9.7	
	4	7.1	8.0	
	6	8.2	6.9	
	9	9.2	5.9	
	12	10.0	5.1	
1615	189	15.1	0	

DAM  AXIS

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-23

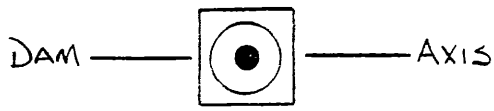
Initial Depth to Water 47.2' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 58.5' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
0742	0	1.8	45.4	
	1	2.6	44.6	
	2	3.3	43.9	
	3	3.9	43.3	
	5	5.0	42.2	
	9	6.4	40.8	
0801	19	10.9	36.3	
0825	43	16.3	30.9	
0917	95	23.3	23.9	
1142	240	32.8	14.4	
1548	486	40.0	7.2	
7/29 0917	1535	46.5	0.7	

NO COVER



GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

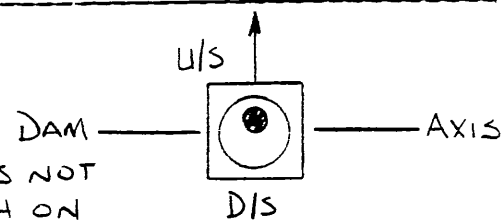
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-24

Initial Depth to Water 24.9' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 44.9' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1235	0	3.6	21.3	
	1	7.4	17.5	
	2	10.8	14.1	
	3	12.6	12.3	
	4	14.1	10.8	
	5	15.3	9.6	
	6	16.3	8.6	
	8	18.0	6.9	
	10	19.2	5.7	
1258	23	23.0	1.9	
1424	86	25.0	~0	



GEOTECHNICAL ENGINEERS INC.

COVER DOES NOT SET FLUSH ON CONCRETE BLOCK, PIEZOMETER CAP TOO HIGH.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

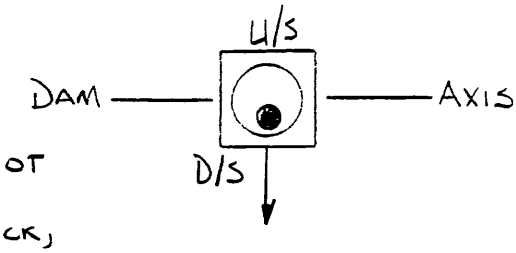
Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-25

Initial Depth to Water 6.4' Diameter of Riser 1-3/4"

Length of Porous Section 2.0' Diameter of Porous Section

Depth of Piezometer Tip 26.8' Type of Porous Section WELL SCREEN

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1217	0	1.3	5.1	
	1	2.1	4.3	
	2	2.6	3.8	
	3	2.9	3.5	
	4	3.1	3.3	
	5	3.5	2.9	
	7	3.9	2.5	
	10	4.3	2.1	
1249	32	5.9	0.5	
1625	216	6.4	0	



GEOTECHNICAL ENGINEERS INC.

COVER DOES NOT SET FLUSH ON CONCRETE BLOCK, PIEZOMETER CAP TOO HIGH.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-26

Initial Depth to Water 61.8' Diameter of Riser 3/4"

Length of Porous Section 2.0' Diameter of Porous Section 1-1/2"

Depth of Piezometer Tip 63.6' Type of Porous Section POROUS POLYETHYLENE

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
0755	0	43.0	18.8	COULD NOT FILL RISER
	0.5	51.0	10.8	TO THE TOP.
	1	53.5	8.3	
	2	54.2	7.6	
	4	54.3	7.5	
	9	54.3	7.5	
0820	25	54.3	7.5	
0910	75	54.4	7.4	
1145	155	61.4	0.4	

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-27

Initial Depth to Water 12.5' Diameter of Riser 3/4"

Length of Porous Section 2.0' Diameter of Porous Section 1-1/2"

Depth of Piezometer Tip 56.9 Type of Porous Section POROUS POLYETHYLENE

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1302	0	6.3	6.2	COULD NOT FILL RISER
	1.5	12.5	0	TO THE TOP.
1305	0	0.61m	3.21m	SECOND TEST USING
	0.5	3.78m	0.04m	METRIC ELECTRIC WATER
	1	3.80m	0.02m	LEVEL INDICATOR BECAUSE
	2	3.82m	0	OF QUESTIONABLE INITIAL
	3	3.82m	0	READING.

GEOTECHNICAL ENGINEERS INC.

PIEZOMETER FALLING HEAD PERMEABILITY TEST

Project MANSFIELD HOLLOW DAM Project No. 87255

Performed by K. PIDGEON / C. CONLON Date 7/28/87 Piezometer No. PZ-28

Initial Depth to Water 15.3' Diameter of Riser 3/4"

Length of Porous Section 2.0' Diameter of Porous Section 1-1/2"

Depth of Piezometer Tip 47.2' Type of Porous Section POROUS POLYETHYLENE

Time min.	Elasped Time min.	Water Depth ft	Piezometric Head ft	Remarks
1244	0	12.5	2.8	COULD NOT FILL RISER
	0.5	13.0	2.3	TO THE TOP.
	1.5	15.1	0.2	
	2	15.2	0.1	
	3	15.3	0	
1249	0	12.6	2.7	SECOND TEST
	0.5	13.0	2.3	
	1.5	15.3	0	

GEOTECHNICAL ENGINEERS INC.

ATTACHMENT 2

Standards for Settlement Surveys
(To Be Provided by NED-USCE)

ATTACHMENT 3

Compilation of Piezometer Data

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM -- Mansfield, Connecticut

PIEZOMETER NUMBER	1
CENTERLINE STATION	82
CENTERLINE OFFSET (FT)	92 R
TOP ELEV (FT)	246.48
BOTTOM ELEV (FT)	222.5

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5		
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	DRY	222.5
29-May-63	11:00:00 AM	210.4	-	
31-May-63	02:10:00 PM	210.5	23.40	223.1
03-Apr-87	10:00:00 AM	232.3	22.28	224.2
04-Apr-87	07:00:00 AM	230.2	21.69	224.8
05-Apr-87	01:00:00 PM	236.2	20.87	225.6
06-Apr-87	07:00:00 AM	240.0	19.69	226.8
07-Apr-87	07:00:00 AM	241.7	17.55	228.9
08-Apr-87	07:00:00 AM	241.2	15.09	231.4
09-Apr-87	11:00:00 AM	238.9	12.14	234.3
10-Apr-87	01:30:00 AM	235.7	10.14	236.3
11-Apr-87	09:00:00 AM	233.1	9.71	236.8
12-Apr-87	08:30:00 AM	229.9	10.10	236.4
13-Apr-87	07:00:00 AM	226.4	11.12	235.4
14-Apr-87	07:00:00 AM	224.4	11.94	234.5
15-Apr-87	12:30:00 PM	219.6	12.70	233.8
16-Apr-87	08:45:00 AM	216.0	13.35	233.1
17-Apr-87	08:30:00 AM	212.6	14.01	232.5

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM -- Mansfield, Connecticut

PIEZOMETER NUMBER	1
CENTERLINE STATION	82
CENTERLINE OFFSET (FT)	92 R
TOP ELEV (FT)	246.48
BOTTOM ELEV (FT)	222.5

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	14.66	231.8
20-Apr-87	08:15:00 AM	212.7	15.75	230.7
22-Apr-87	02:15:00 PM	212.7	16.21	230.3

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	2
CENTERLINE STATION	1+54
CENTERLINE OFFSET (FT)	92 R
TOP ELEV (FT)	250.01
BOTTOM ELEV (FT)	211.9

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	-	
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	28.60	221.4
29-May-63	11:00:00 AM	210.4	-	
31-May-63	02:10:00 PM	210.5	28.68	221.3
03-Apr-87	10:00:00 AM	232.3	25.43	224.6
04-Apr-87	07:00:00 AM	230.2	24.93	225.1
05-Apr-87	01:00:00 PM	236.2	23.33	226.7
06-Apr-87	07:00:00 AM	240.0	21.72	228.3
07-Apr-87	07:00:00 AM	241.7	19.09	230.9
08-Apr-87	07:00:00 AM	241.2	16.67	233.3
09-Apr-87	11:00:00 AM	238.9	13.98	236.0
10-Apr-87	01:30:00 AM	235.7	11.38	238.6
11-Apr-87	09:00:00 AM	233.1	12.30	237.7
12-Apr-87	08:30:00 AM	229.9	13.12	236.9
13-Apr-87	07:00:00 AM	226.4	14.53	235.5
14-Apr-87	07:00:00 AM	224.4	15.58	234.4
15-Apr-87	12:30:00 PM	219.6	16.57	233.4
16-Apr-87	08:45:00 AM	216.0	17.42	232.6
17-Apr-87	08:30:00 AM	212.6	18.04	232.0

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	2
CENTERLINE STATION	1+54
CENTERLINE OFFSET (FT)	92 R
TOP ELEV (FT)	250.01
BOTTOM ELEV (FT)	211.9

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	18.77	231.2
20-Apr-87	08:15:00 AM	212.7	19.39	230.6
22-Apr-87	02:15:00 PM	212.7	19.95	230.1

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	3
CENTERLINE STATION	4+54
CENTERLINE OFFSET (FT)	100 R
TOP ELEV (FT)	247.02
BOTTOM ELEV (FT)	215.4

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5		
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	26.70	220.3
29-May-63	11:00:00 AM	210.4	-	
31-May-63	02:10:00 PM	210.5	26.55	220.5
03-Apr-87	10:00:00 AM	232.3	19.55	227.5
04-Apr-87	07:00:00 AM	230.2	17.45	229.6
05-Apr-87	01:00:00 PM	236.2	13.42	233.6
06-Apr-87	07:00:00 AM	240.0	10.27	236.8
07-Apr-87	07:00:00 AM	241.7	8.33	238.7
08-Apr-87	07:00:00 AM	241.2	6.89	240.1
09-Apr-87	11:00:00 AM	238.9	5.81	241.2
10-Apr-87	01:30:00 AM	235.7	5.22	241.8
11-Apr-87	09:00:00 AM	233.1	6.23	240.8
12-Apr-87	08:30:00 AM	229.9	8.96	238.1
13-Apr-87	07:00:00 AM	226.4	12.76	234.3
14-Apr-87	07:00:00 AM	224.4	15.19	231.8
15-Apr-87	12:30:00 PM	219.6	17.16	229.9
16-Apr-87	08:45:00 AM	216.0	18.50	228.5
17-Apr-87	08:30:00 AM	212.6	19.56	227.5

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	3
CENTERLINE STATION	4+54
CENTERLINE OFFSET (FT)	100 R
TOP ELEV (FT)	247.02
BOTTOM ELEV (FT)	215.4

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	20.18	226.8
20-Apr-87	08:15:00 AM	212.7	21.19	225.8
22-Apr-87	02:15:00 PM	212.7	21.56	225.5

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	4
CENTERLINE STATION	5+75
CENTERLINE OFFSET (FT)	14 L
TOP ELEV (FT)	270.18
BOTTOM ELEV (FT)	212.9

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5		
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	50.70	199.3
29-May-63	11:00:00 AM	210.4	-	
31-May-63	02:10:00 PM	210.5	50.75	199.2
03-Apr-87	10:00:00 AM	232.3	41.40	208.6
04-Apr-87	07:00:00 AM	230.2	39.99	210.0
05-Apr-87	01:00:00 PM	236.2	34.19	215.8
06-Apr-87	07:00:00 AM	240.0	33.37	216.6
07-Apr-87	07:00:00 AM	241.7	31.23	218.7
08-Apr-87	07:00:00 AM	241.2	29.79	220.2
09-Apr-87	11:00:00 AM	238.9	29.63	220.3
10-Apr-87	01:30:00 AM	235.7	31.56	218.4
11-Apr-87	09:00:00 AM	233.1	31.96	218.0
12-Apr-87	08:30:00 AM	229.9	35.17	214.8
13-Apr-87	07:00:00 AM	226.4	38.94	211.0
14-Apr-87	07:00:00 AM	224.4	41.11	208.9
15-Apr-87	12:30:00 PM	219.6	42.88	207.1
16-Apr-87	08:45:00 AM	216.0	43.90	206.1
17-Apr-87	08:30:00 AM	212.6	45.52	204.4

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	4
CENTERLINE STATION	5+75
CENTERLINE OFFSET (FT)	14 L
TOP ELEV (FT)	270.18
BOTTOM ELEV (FT)	212.9

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	45.01	205.0
20-Apr-87	08:15:00 AM	212.7	45.73	204.2
22-Apr-87	02:15:00 PM	212.7	45.96	204.0

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	5
CENTERLINE STATION	5+75
CENTERLINE OFFSET (FT)	54 R
TOP ELEV (FT)	249.96
BOTTOM ELEV (FT)	212

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5		
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	29.70	220.3
29-May-63	11:00:00 AM	210.4	-	
31-May-63	02:10:00 PM	210.5	29.60	220.4
03-Apr-87	10:00:00 AM	232.3	-	
04-Apr-87	07:00:00 AM	230.2	18.83	231.1
05-Apr-87	01:00:00 PM	236.2	14.44	235.5
06-Apr-87	07:00:00 AM	240.0	11.98	238.0
07-Apr-87	07:00:00 AM	241.7	10.17	239.8
08-Apr-87	07:00:00 AM	241.2	9.25	240.7
09-Apr-87	11:00:00 AM	238.9	8.66	241.3
10-Apr-87	01:30:00 AM	235.7	8.43	241.5
11-Apr-87	09:00:00 AM	233.1	11.25	238.7
12-Apr-87	08:30:00 AM	229.9	15.12	234.8
13-Apr-87	07:00:00 AM	226.4	19.29	230.7
14-Apr-87	07:00:00 AM	224.4	21.49	228.5
15-Apr-87	12:30:00 PM	219.6	23.33	226.6
16-Apr-87	08:45:00 AM	216.0	24.21	225.8
17-Apr-87	08:30:00 AM	212.6	24.34	225.6

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	5
CENTERLINE STATION	5+75
CENTERLINE OFFSET (FT)	54 R
TOP ELEV (FT)	249.96
BOTTOM ELEV (FT)	212

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	25.16	224.8
20-Apr-87	08:15:00 AM	212.7	25.66	224.3
22-Apr-87	02:15:00 PM	212.7	25.89	224.1

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	6
CENTERLINE STATION	7+02
CENTERLINE OFFSET (FT)	98 R
TOP ELEV (FT)	239.46
BOTTOM ELEV (FT)	215.3

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5		
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	18.60	220.9
29-May-63	11:00:00 AM	210.4	-	
31-May-63	02:10:00 PM	210.5	18.75	220.7
03-Apr-87	10:00:00 AM	232.3	7.71	231.8
04-Apr-87	07:00:00 AM	230.2	6.96	232.5
05-Apr-87	01:00:00 PM	236.2	2.13	237.3
06-Apr-87	07:00:00 AM	240.0	-	
07-Apr-87	07:00:00 AM	241.7	-	
08-Apr-87	07:00:00 AM	241.2	-	
09-Apr-87	11:00:00 AM	238.9	-	
10-Apr-87	01:30:00 AM	235.7	-	
11-Apr-87	09:00:00 AM	233.1	0.92	238.5
12-Apr-87	08:30:00 AM	229.9	4.53	234.9
13-Apr-87	07:00:00 AM	226.4	9.45	230.0
14-Apr-87	07:00:00 AM	224.4	11.81	227.7
15-Apr-87	12:30:00 PM	219.6	13.35	226.1
16-Apr-87	08:45:00 AM	216.0	13.88	225.6
17-Apr-87	08:30:00 AM	212.6	14.17	225.3

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	6
CENTERLINE STATION	7+02
CENTERLINE OFFSET (FT)	98 R
TOP ELEV (FT)	239.46
BOTTOM ELEV (FT)	215.3

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	14.44	225.0
20-Apr-87	08:15:00 AM	212.7	14.76	224.7
22-Apr-87	02:15:00 PM	212.7	14.99	224.5

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	7
CENTERLINE STATION	7+75
CENTERLINE OFFSET (FT)	14 R
TOP ELEV (FT)	272.26
BOTTOM ELEV (FT)	227.5

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5		
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	DRY	227.5
29-May-63	11:00:00 AM	210.4	-	
31-May-63	02:10:00 PM	210.5	45.00	227.3
03-Apr-87	10:00:00 AM	232.3	DRY	227.5
04-Apr-87	07:00:00 AM	230.2	43.18	229.1
05-Apr-87	01:00:00 PM	236.2	40.72	231.5
06-Apr-87	07:00:00 AM	240.0	37.63	234.6
07-Apr-87	07:00:00 AM	241.7	35.17	237.1
08-Apr-87	07:00:00 AM	241.2	33.73	238.5
09-Apr-87	11:00:00 AM	238.9	32.81	239.5
10-Apr-87	01:30:00 AM	235.7	32.51	239.8
11-Apr-87	09:00:00 AM	233.1	33.89	238.4
12-Apr-87	08:30:00 AM	229.9	36.65	235.6
13-Apr-87	07:00:00 AM	226.4	39.53	232.7
14-Apr-87	07:00:00 AM	224.4	41.11	231.2
15-Apr-87	12:30:00 PM	219.6	42.36	229.9
16-Apr-87	08:45:00 AM	216.0	43.14	229.1
17-Apr-87	08:30:00 AM	212.6	43.70	228.6

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	7
CENTERLINE STATION	7+75
CENTERLINE OFFSET (FT)	14 R
TOP ELEV (FT)	272.26
BOTTOM ELEV (FT)	227.5

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	DRY	227.5
20-Apr-87	08:15:00 AM	212.7	DRY	227.5
22-Apr-87	02:15:00 PM	212.7	DRY	227.5

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	8
CENTERLINE STATION	47+50
CENTERLINE OFFSET (FT)	70 R
TOP ELEV (FT)	254.69
BOTTOM ELEV (FT)	237.8

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5		
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	-	
31-May-63	02:10:00 PM	210.5	12.25	242.4
03-Apr-87	10:00:00 AM	232.3	8.43	246.3
04-Apr-87	07:00:00 AM	230.2	7.35	247.3
05-Apr-87	01:00:00 PM	236.2	7.94	246.8
06-Apr-87	07:00:00 AM	240.0	7.45	247.2
07-Apr-87	07:00:00 AM	241.7	7.05	247.6
08-Apr-87	07:00:00 AM	241.2	6.96	247.7
09-Apr-87	11:00:00 AM	238.9	6.86	247.8
10-Apr-87	01:30:00 AM	235.7	7.12	247.6
11-Apr-87	09:00:00 AM	233.1	6.89	247.8
12-Apr-87	08:30:00 AM	229.9	6.89	247.8
13-Apr-87	07:00:00 AM	226.4	7.09	247.6
14-Apr-87	07:00:00 AM	224.4	6.73	248.0
15-Apr-87	12:30:00 PM	219.6	6.69	248.0
16-Apr-87	08:45:00 AM	216.0	6.66	248.0
17-Apr-87	08:30:00 AM	212.6	8.20	246.5

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	8
CENTERLINE STATION	47+50
CENTERLINE OFFSET (FT)	70 R
TOP ELEV (FT)	254.69
BOTTOM ELEV (FT)	237.8

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	6.82	247.9
20-Apr-87	08:15:00 AM	212.7	7.02	247.7
22-Apr-87	02:15:00 PM	212.7	7.05	247.6

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	9
CENTERLINE STATION	50+17
CENTERLINE OFFSET (FT)	55 R
TOP ELEV (FT)	261.71
BOTTOM ELEV (FT)	233.2

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5		
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	18.55	243.2
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	18.70	243.0
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	14.44	247.3
04-Apr-87	07:00:00 AM	230.2	14.64	247.1
05-Apr-87	01:00:00 PM	236.2	14.47	247.2
06-Apr-87	07:00:00 AM	240.0	13.94	247.8
07-Apr-87	07:00:00 AM	241.7	13.35	248.4
08-Apr-87	07:00:00 AM	241.2	11.84	249.9
09-Apr-87	11:00:00 AM	238.9	11.65	250.1
10-Apr-87	01:30:00 AM	235.7	11.58	250.1
11-Apr-87	09:00:00 AM	233.1	11.78	249.9
12-Apr-87	08:30:00 AM	229.9	11.75	250.0
13-Apr-87	07:00:00 AM	226.4	11.84	249.9
14-Apr-87	07:00:00 AM	224.4	12.01	249.7
15-Apr-87	12:30:00 PM	219.6	11.68	250.0
16-Apr-87	08:45:00 AM	216.0	11.55	250.2
17-Apr-87	08:30:00 AM	212.6	11.52	250.2

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	9
CENTERLINE STATION	50+17
CENTERLINE OFFSET (FT)	55 R
TOP ELEV (FT)	261.71
BOTTOM ELEV (FT)	233.2

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	11.71	250.0
20-Apr-87	08:15:00 AM	212.7	11.98	249.7
22-Apr-87	02:15:00 PM	212.7	11.98	249.7

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	10
CENTERLINE STATION	77+00
CENTERLINE OFFSET (FT)	185 R
TOP ELEV (FT)	231.92
BOTTOM ELEV (FT)	190.8

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5		
21-Aug-55	09:00:00 AM	243.8	DRY	190.8
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5	36.12	195.8
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	34.22	197.7
22-May-63	04:30:00 PM	210.5	DRY	190.8
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	DRY	190.8
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	39.14	192.8
04-Apr-87	07:00:00 AM	230.2	38.85	193.1
05-Apr-87	01:00:00 PM	236.2	38.58	193.3
06-Apr-87	07:00:00 AM	240.0	38.16	193.8
07-Apr-87	07:00:00 AM	241.7	37.47	194.5
08-Apr-87	07:00:00 AM	241.2	36.91	195.0
09-Apr-87	11:00:00 AM	238.9	36.12	195.8
10-Apr-87	01:30:00 AM	235.7	35.63	196.3
11-Apr-87	09:00:00 AM	233.1	34.91	197.0
12-Apr-87	08:30:00 AM	229.9	34.55	197.4
13-Apr-87	07:00:00 AM	226.4	34.19	197.7
14-Apr-87	07:00:00 AM	224.4	34.02	197.9
15-Apr-87	12:30:00 PM	219.6	33.92	198.0
16-Apr-87	08:45:00 AM	216.0	34.02	197.9
17-Apr-87	08:30:00 AM	212.6	33.79	198.1

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	10
CENTERLINE STATION	77+00
CENTERLINE OFFSET (FT)	185 R
TOP ELEV (FT)	231.92
BOTTOM ELEV (FT)	190.8

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	34.02	197.9
20-Apr-87	08:15:00 AM	212.7	34.25	197.7
22-Apr-87	02:15:00 PM	212.7	34.22	197.7

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	11
CENTERLINE STATION	79+00
CENTERLINE OFFSET (FT)	200 R
TOP ELEV (FT)	245.13
BOTTOM ELEV (FT)	199.1

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	-	
21-Aug-55	09:00:00 AM	243.8	DRY	199.1
22-Aug-55	11:00:00 AM	246.8	-	
22-Aug-55	07:30:00 PM	246.6	-	
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	-	
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	-	
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	-	
25-Aug-55	04:00:00 PM	241.0	-	
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	DRY	199.1
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	DRY	199.1
22-May-63	04:30:00 PM	210.5	DRY	199.1
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	DRY	199.1
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	DRY	199.1
04-Apr-87	07:00:00 AM	230.2	DRY	199.1
05-Apr-87	01:00:00 PM	236.2	DRY	199.1
06-Apr-87	07:00:00 AM	240.0	DRY	199.1
07-Apr-87	07:00:00 AM	241.7	DRY	199.1
08-Apr-87	07:00:00 AM	241.2	DRY	199.1
09-Apr-87	11:00:00 AM	238.9	DRY	199.1
10-Apr-87	01:30:00 AM	235.7	DRY	199.1
11-Apr-87	09:00:00 AM	233.1	DRY	199.1
12-Apr-87	08:30:00 AM	229.9	DRY	199.1
13-Apr-87	07:00:00 AM	226.4	DRY	199.1
14-Apr-87	07:00:00 AM	224.4	DRY	199.1
15-Apr-87	12:30:00 PM	219.6	DRY	199.1
16-Apr-87	08:45:00 AM	216.0	DRY	199.1
17-Apr-87	08:30:00 AM	212.6	DRY	199.1

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MAIN MENU
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	11
CENTERLINE STATION	79+00
CENTERLINE OFFSET (FT)	200 R
TOP ELEV (FT)	245.13
BOTTOM ELEV (FT)	199.1

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	DRY	199.1
20-Apr-87	08:15:00 AM	212.7	DRY	199.1
22-Apr-87	02:15:00 PM	212.7	DRY	199.1

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	12
CENTERLINE STATION	86+00
CENTERLINE OFFSET (FT)	15.5 R
TOP ELEV (FT)	269.43
BOTTOM ELEV (FT)	207.2

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	DRY	207.2
21-Aug-55	09:00:00 AM	243.8	DRY	207.2
22-Aug-55	11:00:00 AM	246.8	-	
22-Aug-55	07:30:00 PM	246.6	-	
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	-	
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	-	
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	-	
25-Aug-55	04:00:00 PM	241.0	-	
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	53.43	216.0
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	57.33	212.1
22-May-63	04:30:00 PM	210.5	DRY	207.2
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	DRY	207.2
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	DRY	207.2
04-Apr-87	07:00:00 AM	230.2	DRY	207.2
05-Apr-87	01:00:00 PM	236.2	DRY	207.2
06-Apr-87	07:00:00 AM	240.0	60.50	208.9
07-Apr-87	07:00:00 AM	241.7	58.63	210.8
08-Apr-87	07:00:00 AM	241.2	57.58	211.9
09-Apr-87	11:00:00 AM	238.9	54.46	215.0
10-Apr-87	01:30:00 AM	235.7	53.97	215.5
11-Apr-87	09:00:00 AM	233.1	54.68	214.8
12-Apr-87	08:30:00 AM	229.9	54.27	215.2
13-Apr-87	07:00:00 AM	226.4	54.66	214.8
14-Apr-87	07:00:00 AM	224.4	54.95	214.5
15-Apr-87	12:30:00 PM	219.6	55.38	214.1
16-Apr-87	08:45:00 AM	216.0	56.66	212.8
17-Apr-87	08:30:00 AM	212.6	57.51	211.9

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	12
CENTERLINE STATION	86+00
CENTERLINE OFFSET (FT)	15.5 R
TOP ELEV (FT)	269.43
BOTTOM ELEV (FT)	207.2

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	58.46	211.0
20-Apr-87	08:15:00 AM	212.7	60.04	209.4
22-Apr-87	02:15:00 PM	212.7	60.66	208.8

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	13
CENTERLINE STATION	86+00
CENTERLINE OFFSET (FT)	112 R
TOP ELEV (FT)	253.49
BOTTOM ELEV (FT)	208

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	DRY	208.0
21-Aug-55	09:00:00 AM	243.8	DRY	208.0
22-Aug-55	11:00:00 AM	246.8	-	
22-Aug-55	07:30:00 PM	246.6	-	
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	-	
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	-	
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	-	
25-Aug-55	04:00:00 PM	241.0	-	
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	DRY	208.0
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	DRY	208.0
22-May-63	04:30:00 PM	210.5	DRY	208.0
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	DRY	208.0
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	DRY	208.0
04-Apr-87	07:00:00 AM	230.2	DRY	208.0
05-Apr-87	01:00:00 PM	236.2	DRY	208.0
06-Apr-87	07:00:00 AM	240.0	DRY	208.0
07-Apr-87	07:00:00 AM	241.7	DRY	208.0
08-Apr-87	07:00:00 AM	241.2	DRY	208.0
09-Apr-87	11:00:00 AM	238.9	DRY	208.0
10-Apr-87	01:30:00 AM	235.7	DRY	208.0
11-Apr-87	09:00:00 AM	233.1	DRY	208.0
12-Apr-87	08:30:00 AM	229.9	DRY	208.0
13-Apr-87	07:00:00 AM	226.4	DRY	208.0
14-Apr-87	07:00:00 AM	224.4	DRY	208.0
15-Apr-87	12:30:00 PM	219.6	DRY	208.0
16-Apr-87	08:45:00 AM	216.0	DRY	208.0
17-Apr-87	08:30:00 AM	212.6	DRY	208.0

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	13
CENTERLINE STATION	86+00
CENTERLINE OFFSET (FT)	112 R
TOP ELEV (FT)	253.49
BOTTOM ELEV (FT)	208

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	DRY	208.0
20-Apr-87	08:15:00 AM	212.7	DRY	208.0
22-Apr-87	02:15:00 PM	212.7	DRY	208.0

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	14
CENTERLINE STATION	89+25
CENTERLINE OFFSET (FT)	100 R
TOP ELEV (FT)	251.08
BOTTOM ELEV (FT)	206

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	40.28	210.8
21-Aug-55	09:00:00 AM	243.8	36.58	214.5
22-Aug-55	11:00:00 AM	246.8	32.08	219.0
22-Aug-55	07:30:00 PM	246.6	31.68	219.4
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	-	
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	31.28	219.8
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	-	
25-Aug-55	04:00:00 PM	241.0	-	
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	32.38	218.7
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	DRY	206.0
22-May-63	04:30:00 PM	210.5	DRY	206.0
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	DRY	206.0
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	DRY	206.0
04-Apr-87	07:00:00 AM	230.2	41.67	209.4
05-Apr-87	01:00:00 PM	236.2	40.55	210.5
06-Apr-87	07:00:00 AM	240.0	38.98	212.1
07-Apr-87	07:00:00 AM	241.7	37.27	213.8
08-Apr-87	07:00:00 AM	241.2	36.12	215.0
09-Apr-87	11:00:00 AM	238.9	36.35	214.7
10-Apr-87	01:30:00 AM	235.7	36.78	214.3
11-Apr-87	09:00:00 AM	233.1	37.43	213.7
12-Apr-87	08:30:00 AM	229.9	38.12	213.0
13-Apr-87	07:00:00 AM	226.4	39.33	211.8
14-Apr-87	07:00:00 AM	224.4	40.42	210.7
15-Apr-87	12:30:00 PM	219.6	41.14	209.9
16-Apr-87	08:45:00 AM	216.0	42.16	208.9
17-Apr-87	08:30:00 AM	212.6	DRY	206.0

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	14
CENTERLINE STATION	89+25
CENTERLINE OFFSET (FT)	100 R
TOP ELEV (FT)	251.08
BOTTOM ELEV (FT)	206

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	DRY	206.0
20-Apr-87	08:15:00 AM	212.7	DRY	206.0
22-Apr-87	02:15:00 PM	212.7	DRY	206.0

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	15
CENTERLINE STATION	90+00
CENTERLINE OFFSET (FT)	15.5 L
TOP ELEV (FT)	269.54
BOTTOM ELEV (FT)	203.5

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	61.34	208.2
21-Aug-55	09:00:00 AM	243.8	61.24	208.3
22-Aug-55	11:00:00 AM	246.8	60.44	209.1
22-Aug-55	07:30:00 PM	246.6	60.44	209.1
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	60.64	208.9
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	-	
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	-	
25-Aug-55	04:00:00 PM	241.0	-	
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	60.04	209.5
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	57.34	212.2
22-May-63	04:30:00 PM	210.5	61.00	208.5
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	62.20	207.3
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	55.02	214.5
04-Apr-87	07:00:00 AM	230.2	54.56	215.0
05-Apr-87	01:00:00 PM	236.2	50.07	219.5
06-Apr-87	07:00:00 AM	240.0	49.90	219.6
07-Apr-87	07:00:00 AM	241.7	49.70	219.8
08-Apr-87	07:00:00 AM	241.2	49.41	220.1
09-Apr-87	11:00:00 AM	238.9	49.54	220.0
10-Apr-87	01:30:00 AM	235.7	49.67	219.9
11-Apr-87	09:00:00 AM	233.1	50.07	219.5
12-Apr-87	08:30:00 AM	229.9	50.43	219.1
13-Apr-87	07:00:00 AM	226.4	50.52	219.0
14-Apr-87	07:00:00 AM	224.4	50.62	218.9
15-Apr-87	12:30:00 PM	219.6	51.57	218.0
16-Apr-87	08:45:00 AM	216.0	52.59	217.0
17-Apr-87	08:30:00 AM	212.6	53.77	215.8

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	15
CENTERLINE STATION	90+00
CENTERLINE OFFSET (FT)	15.5 L
TOP ELEV (FT)	269.54
BOTTOM ELEV (FT)	203.5

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	54.69	214.9
20-Apr-87	08:15:00 AM	212.7	57.02	212.5
22-Apr-87	02:15:00 PM	212.7	56.96	212.6

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	16
CENTERLINE STATION	100+75
CENTERLINE OFFSET (FT)	15.5 L
TOP ELEV (FT)	269.87
BOTTOM ELEV (FT)	201.25

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	54.77	215.1
21-Aug-55	09:00:00 AM	243.8	50.17	219.7
22-Aug-55	11:00:00 AM	246.8	46.07	223.8
22-Aug-55	07:30:00 PM	246.6	45.37	224.5
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	45.37	224.5
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	-	
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	-	
25-Aug-55	04:00:00 PM	241.0	-	
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	47.17	222.7
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	58.97	210.9
22-May-63	04:30:00 PM	210.5	62.10	207.8
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	62.70	207.2
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	61.35	208.5
04-Apr-87	07:00:00 AM	230.2	60.86	209.0
05-Apr-87	01:00:00 PM	236.2	60.37	209.5
06-Apr-87	07:00:00 AM	240.0	59.97	209.9
07-Apr-87	07:00:00 AM	241.7	59.45	210.4
08-Apr-87	07:00:00 AM	241.2	58.96	210.9
09-Apr-87	11:00:00 AM	238.9	58.37	211.5
10-Apr-87	01:30:00 AM	235.7	58.00	211.9
11-Apr-87	09:00:00 AM	233.1	57.64	212.2
12-Apr-87	08:30:00 AM	229.9	57.48	212.4
13-Apr-87	07:00:00 AM	226.4	57.22	212.7
14-Apr-87	07:00:00 AM	224.4	57.19	212.7
15-Apr-87	12:30:00 PM	219.6	57.35	212.5
16-Apr-87	08:45:00 AM	216.0	57.05	212.8
17-Apr-87	08:30:00 AM	212.6	56.92	213.0

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	16
CENTERLINE STATION	100+75
CENTERLINE OFFSET (FT)	15.5 L
TOP ELEV (FT)	269.87
BOTTOM ELEV (FT)	201.25

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	56.92	213.0
20-Apr-87	08:15:00 AM	212.7	56.92	213.0
22-Apr-87	02:15:00 PM	212.7	56.96	212.9

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	17
CENTERLINE STATION	100+75
CENTERLINE OFFSET (FT)	87 R
TOP ELEV (FT)	233.3
BOTTOM ELEV (FT)	201.6

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	23.50	209.8
21-Aug-55	09:00:00 AM	243.8	19.70	213.6
22-Aug-55	11:00:00 AM	246.8	17.10	216.2
22-Aug-55	07:30:00 PM	246.6	16.40	216.9
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	15.90	217.4
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	16.00	217.3
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	-	
25-Aug-55	04:00:00 PM	241.0	-	
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	16.20	217.1
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	21.50	211.8
22-May-63	04:30:00 PM	210.5	25.65	207.7
23-May-63	03:40:00 PM	210.5	-	
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	26.10	207.2
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	21.03	212.3
04-Apr-87	07:00:00 AM	230.2	19.69	213.6
05-Apr-87	01:00:00 PM	236.2	18.90	214.4
06-Apr-87	07:00:00 AM	240.0	18.14	215.2
07-Apr-87	07:00:00 AM	241.7	17.36	215.9
08-Apr-87	07:00:00 AM	241.2	17.13	216.2
09-Apr-87	11:00:00 AM	238.9	17.06	216.2
10-Apr-87	01:30:00 AM	235.7	17.29	216.0
11-Apr-87	09:00:00 AM	233.1	17.45	215.9
12-Apr-87	08:30:00 AM	229.9	17.75	215.6
13-Apr-87	07:00:00 AM	226.4	18.21	215.1
14-Apr-87	07:00:00 AM	224.4	18.44	214.9
15-Apr-87	12:30:00 PM	219.6	18.80	214.5
16-Apr-87	08:45:00 AM	216.0	19.16	214.1
17-Apr-87	08:30:00 AM	212.6	19.65	213.7

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	17
CENTERLINE STATION	100+75
CENTERLINE OFFSET (FT)	87 R
TOP ELEV (FT)	233.3
BOTTOM ELEV (FT)	201.6

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	20.14	213.2
20-Apr-87	08:15:00 AM	212.7	20.73	212.6
22-Apr-87	02:15:00 PM	212.7	20.93	212.4

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	18
CENTERLINE STATION	113+50
CENTERLINE OFFSET (FT)	15.5 L
TOP ELEV (FT)	270.13
BOTTOM ELEV (FT)	190

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	45.93	224.2
21-Aug-55	09:00:00 AM	243.8	42.93	227.2
22-Aug-55	11:00:00 AM	246.8	40.93	229.2
22-Aug-55	07:30:00 PM	246.6	40.83	229.3
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	40.83	229.3
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	-	
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	-	
25-Aug-55	04:00:00 PM	241.0	-	
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	43.23	226.9
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	56.23	213.9
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	61.10	209.0
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	60.32	209.8
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	48.29	221.8
04-Apr-87	07:00:00 AM	230.2	47.51	222.6
05-Apr-87	01:00:00 PM	236.2	45.73	224.4
06-Apr-87	07:00:00 AM	240.0	44.85	225.3
07-Apr-87	07:00:00 AM	241.7	42.85	227.3
08-Apr-87	07:00:00 AM	241.2	42.68	227.5
09-Apr-87	11:00:00 AM	238.9	43.01	227.1
10-Apr-87	01:30:00 AM	235.7	43.41	226.7
11-Apr-87	09:00:00 AM	233.1	44.29	225.8
12-Apr-87	08:30:00 AM	229.9	44.98	225.2
13-Apr-87	07:00:00 AM	226.4	46.19	223.9
14-Apr-87	07:00:00 AM	224.4	46.95	223.2
15-Apr-87	12:30:00 PM	219.6	48.43	221.7
16-Apr-87	08:45:00 AM	216.0	50.07	220.1
17-Apr-87	08:30:00 AM	212.6	51.90	218.2

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	18
CENTERLINE STATION	113+50
CENTERLINE OFFSET (FT)	15.5 L
TOP ELEV (FT)	270.13
BOTTOM ELEV (FT)	190

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	53.05	217.1
20-Apr-87	08:15:00 AM	212.7	54.33	215.8
22-Apr-87	02:15:00 PM	212.7	54.46	215.7

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	19
CENTERLINE STATION	113+50
CENTERLINE OFFSET (FT)	82 R
TOP ELEV (FT)	237
BOTTOM ELEV (FT)	204.5

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	-	
21-Aug-55	09:00:00 AM	243.8	13.60	223.4
22-Aug-55	11:00:00 AM	246.8	10.70	226.3
22-Aug-55	07:30:00 PM	246.6	10.60	226.4
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	10.50	226.5
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	10.60	226.4
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	-	
25-Aug-55	04:00:00 PM	241.0	-	
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	11.50	225.5
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	22.40	214.6
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	26.60	210.4
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	26.95	210.1
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	14.76	222.2
04-Apr-87	07:00:00 AM	230.2	15.12	221.9
05-Apr-87	01:00:00 PM	236.2	13.81	223.2
06-Apr-87	07:00:00 AM	240.0	12.30	224.7
07-Apr-87	07:00:00 AM	241.7	11.32	225.7
08-Apr-87	07:00:00 AM	241.2	11.02	226.0
09-Apr-87	11:00:00 AM	238.9	11.29	225.7
10-Apr-87	01:30:00 AM	235.7	11.38	225.6
11-Apr-87	09:00:00 AM	233.1	11.88	225.1
12-Apr-87	08:30:00 AM	229.9	12.30	224.7
13-Apr-87	07:00:00 AM	226.4	13.19	223.8
14-Apr-87	07:00:00 AM	224.4	13.88	223.1
15-Apr-87	12:30:00 PM	219.6	15.45	221.6
16-Apr-87	08:45:00 AM	216.0	16.17	220.8
17-Apr-87	08:30:00 AM	212.6	17.81	219.2

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	19
CENTERLINE STATION	113+50
CENTERLINE OFFSET (FT)	82 R
TOP ELEV (FT)	237
BOTTOM ELEV (FT)	204.5

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	19.06	217.9
20-Apr-87	08:15:00 AM	212.7	20.31	216.7
22-Apr-87	02:15:00 PM	212.7	20.67	216.3

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	20
CENTERLINE STATION	113+50
CENTERLINE OFFSET (FT)	200 R
TOP ELEV (FT)	237.57
BOTTOM ELEV (FT)	200.6

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	-	
21-Aug-55	09:00:00 AM	243.8	15.37	222.2
22-Aug-55	11:00:00 AM	246.8	12.97	224.6
22-Aug-55	07:30:00 PM	246.6	12.87	224.7
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	12.87	224.7
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	12.97	224.6
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	-	
25-Aug-55	04:00:00 PM	241.0	-	
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	12.97	224.6
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	22.17	215.4
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	27.10	210.5
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	27.40	210.2
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	18.31	219.3
04-Apr-87	07:00:00 AM	230.2	16.93	220.6
05-Apr-87	01:00:00 PM	236.2	15.58	222.0
06-Apr-87	07:00:00 AM	240.0	14.17	223.4
07-Apr-87	07:00:00 AM	241.7	13.12	224.5
08-Apr-87	07:00:00 AM	241.2	12.80	224.8
09-Apr-87	11:00:00 AM	238.9	12.76	224.8
10-Apr-87	01:30:00 AM	235.7	12.83	224.7
11-Apr-87	09:00:00 AM	233.1	13.09	224.5
12-Apr-87	08:30:00 AM	229.9	13.42	224.2
13-Apr-87	07:00:00 AM	226.4	14.11	223.5
14-Apr-87	07:00:00 AM	224.4	14.67	222.9
15-Apr-87	12:30:00 PM	219.6	15.45	222.1
16-Apr-87	08:45:00 AM	216.0	16.57	221.0
17-Apr-87	08:30:00 AM	212.6	18.01	219.6

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	20
CENTERLINE STATION	113+50
CENTERLINE OFFSET (FT)	200 R
TOP ELEV (FT)	237.57
BOTTOM ELEV (FT)	200.6

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	19.19	218.4
20-Apr-87	08:15:00 AM	212.7	20.44	217.1
22-Apr-87	02:15:00 PM	212.7	20.99	216.6

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	21
CENTERLINE STATION	131+00
CENTERLINE OFFSET (FT)	16.5 L
TOP ELEV (FT)	267.51
BOTTOM ELEV (FT)	201.8

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	-	
21-Aug-55	09:00:00 AM	243.8	33.61	233.9
22-Aug-55	11:00:00 AM	246.8	31.61	235.9
22-Aug-55	07:30:00 PM	246.6	30.91	236.6
23-Aug-55	12:30:00 AM	246.4	30.51	237.0
23-Aug-55	07:15:00 AM	246.2	30.41	237.1
23-Aug-55	02:00:00 PM	246.0	30.01	237.5
24-Aug-55	12:30:00 AM	245.2	30.01	237.5
24-Aug-55	08:00:00 AM	244.6	29.81	237.7
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	30.81	236.7
25-Aug-55	04:00:00 PM	241.0	31.41	236.1
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	32.71	234.8
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	48.11	219.4
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	52.00	215.5
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	51.95	215.6
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	42.65	224.9
04-Apr-87	07:00:00 AM	230.2	41.80	225.7
05-Apr-87	01:00:00 PM	236.2	39.80	227.7
06-Apr-87	07:00:00 AM	240.0	38.12	229.4
07-Apr-87	07:00:00 AM	241.7	36.55	231.0
08-Apr-87	07:00:00 AM	241.2	35.79	231.7
09-Apr-87	11:00:00 AM	238.9	34.45	233.1
10-Apr-87	01:30:00 AM	235.7	35.56	232.0
11-Apr-87	09:00:00 AM	233.1	36.09	231.4
12-Apr-87	08:30:00 AM	229.9	36.78	230.7
13-Apr-87	07:00:00 AM	226.4	37.70	229.8
14-Apr-87	07:00:00 AM	224.4	38.19	229.3
15-Apr-87	12:30:00 PM	219.6	38.94	228.6
16-Apr-87	08:45:00 AM	216.0	39.44	228.1
17-Apr-87	08:30:00 AM	212.6	40.72	226.8

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	21
CENTERLINE STATION	131+00
CENTERLINE OFFSET (FT)	16.5 L
TOP ELEV (FT)	267.51
BOTTOM ELEV (FT)	201.8

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	41.54	226.0
20-Apr-87	08:15:00 AM	212.7	42.59	224.9
22-Apr-87	02:15:00 PM	212.7	43.18	224.3

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	22
CENTERLINE STATION	131+02
CENTERLINE OFFSET (FT)	100 R
TOP ELEV (FT)	232.6
BOTTOM ELEV (FT)	209.1

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	-	
21-Aug-55	09:00:00 AM	243.8	4.50	228.1
22-Aug-55	11:00:00 AM	246.8	2.90	229.7
22-Aug-55	07:30:00 PM	246.6	1.60	231.0
23-Aug-55	12:30:00 AM	246.4	0.90	231.7
23-Aug-55	07:15:00 AM	246.2	0.70	231.9
23-Aug-55	02:00:00 PM	246.0	0.20	232.4
24-Aug-55	12:30:00 AM	245.2	-0.10	232.7
24-Aug-55	08:00:00 AM	244.6	-0.20	232.8
24-Aug-55	12:00:00 PM	244.3	-0.40	233.0
25-Aug-55	07:30:00 AM	242.0	-0.40	233.0
25-Aug-55	04:00:00 PM	241.0	-0.60	233.2
26-Aug-55	07:30:00 AM	237.9	-0.40	233.0
26-Aug-55	11:00:00 AM	237.5	-0.40	233.0
26-Aug-55	08:00:00 PM	235.8	-0.20	232.8
27-Aug-55	08:30:00 AM	233.4	-0.30	232.9
27-Aug-55	06:45:00 PM	231.8	-0.30	232.9
28-Aug-55	12:45:00 PM	227.2	-0.20	232.8
28-Aug-55	06:00:00 PM	226.0	1.20	231.4
29-Aug-55	08:30:00 AM	222.5	1.70	230.9
29-Aug-55	03:35:00 PM	220.5	2.40	230.2
30-Aug-55	03:15:00 PM	212.3	4.30	228.3
02-Sep-55	09:30:00 AM	207.7	7.20	225.4
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	17.40	215.2
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	17.40	215.2
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	9.58	223.0
04-Apr-87	07:00:00 AM	230.2	8.96	223.6
05-Apr-87	01:00:00 PM	236.2	7.28	225.3
06-Apr-87	07:00:00 AM	240.0	5.91	226.7
07-Apr-87	07:00:00 AM	241.7	5.15	227.5
08-Apr-87	07:00:00 AM	241.2	5.02	227.6
09-Apr-87	11:00:00 AM	238.9	4.88	227.7
10-Apr-87	01:30:00 AM	235.7	1.67	230.9
11-Apr-87	09:00:00 AM	233.1	5.31	227.3
12-Apr-87	08:30:00 AM	229.9	5.58	227.0
13-Apr-87	07:00:00 AM	226.4	3.54	229.1
14-Apr-87	07:00:00 AM	224.4	6.10	226.5
15-Apr-87	12:30:00 PM	219.6	6.53	226.1
16-Apr-87	08:45:00 AM	216.0	6.99	225.6
17-Apr-87	08:30:00 AM	212.6	7.64	225.0

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	22
CENTERLINE STATION	131+02
CENTERLINE OFFSET (FT)	100 R
TOP ELEV (FT)	232.6
BOTTOM ELEV (FT)	209.1

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	8.27	224.3
20-Apr-87	08:15:00 AM	212.7	9.12	223.5
22-Apr-87	02:15:00 PM	212.7	9.38	223.2

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	23
CENTERLINE STATION	136+00
CENTERLINE OFFSET (FT)	13.5 R
TOP ELEV (FT)	271.21
BOTTOM ELEV (FT)	211.75

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	-	
21-Aug-55	09:00:00 AM	243.8	41.91	229.3
22-Aug-55	11:00:00 AM	246.8	35.61	235.6
22-Aug-55	07:30:00 PM	246.6	34.41	236.8
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	33.11	238.1
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	32.61	238.6
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	33.41	237.8
25-Aug-55	04:00:00 PM	241.0	33.21	238.0
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	33.91	237.3
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	-	
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	40.41	230.8
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	49.50	221.7
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	49.10	222.1
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	43.34	227.9
04-Apr-87	07:00:00 AM	230.2	43.83	227.4
05-Apr-87	01:00:00 PM	236.2	39.76	231.5
06-Apr-87	07:00:00 AM	240.0	41.54	229.7
07-Apr-87	07:00:00 AM	241.7	38.52	232.7
08-Apr-87	07:00:00 AM	241.2	36.98	234.2
09-Apr-87	11:00:00 AM	238.9	36.08	235.1
10-Apr-87	01:30:00 AM	235.7	36.09	235.1
11-Apr-87	09:00:00 AM	233.1	36.55	234.7
12-Apr-87	08:30:00 AM	229.9	37.07	234.1
13-Apr-87	07:00:00 AM	226.4	37.24	234.0
14-Apr-87	07:00:00 AM	224.4	38.35	232.9
15-Apr-87	12:30:00 PM	219.6	39.07	232.1
16-Apr-87	08:45:00 AM	216.0	39.57	231.6
17-Apr-87	08:30:00 AM	212.6	39.96	231.2

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	23
CENTERLINE STATION	136+00
CENTERLINE OFFSET (FT)	13.5 R
TOP ELEV (FT)	271.21
BOTTOM ELEV (FT)	211.75

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	40.35	230.9
20-Apr-87	08:15:00 AM	212.7	41.01	230.2
22-Apr-87	02:15:00 PM	212.7	41.08	230.1

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	24
CENTERLINE STATION	135+00
CENTERLINE OFFSET (FT)	89 R
TOP ELEV (FT)	249.38
BOTTOM ELEV (FT)	203.8

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	21.08	228.3
21-Aug-55	09:00:00 AM	243.8	18.98	230.4
22-Aug-55	11:00:00 AM	246.8	15.98	233.4
22-Aug-55	07:30:00 PM	246.6	15.28	234.1
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	14.08	235.3
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	13.28	236.1
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	13.08	236.3
25-Aug-55	04:00:00 PM	241.0	13.18	236.2
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	13.48	235.9
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	-	
27-Aug-55	06:45:00 PM	231.8	14.28	235.1
28-Aug-55	12:45:00 PM	227.2	-	
28-Aug-55	06:00:00 PM	226.0	-	
29-Aug-55	08:30:00 AM	222.5	-	
29-Aug-55	03:35:00 PM	220.5	-	
30-Aug-55	03:15:00 PM	212.3	-	
02-Sep-55	09:30:00 AM	207.7	19.28	230.1
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	26.60	222.8
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	26.85	222.5
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	21.59	227.8
04-Apr-87	07:00:00 AM	230.2	21.29	228.1
05-Apr-87	01:00:00 PM	236.2	20.67	228.7
06-Apr-87	07:00:00 AM	240.0	18.67	230.7
07-Apr-87	07:00:00 AM	241.7	16.93	232.5
08-Apr-87	07:00:00 AM	241.2	15.91	233.5
09-Apr-87	11:00:00 AM	238.9	15.42	234.0
10-Apr-87	01:30:00 AM	235.7	15.45	233.9
11-Apr-87	09:00:00 AM	233.1	15.88	233.5
12-Apr-87	08:30:00 AM	229.9	16.27	233.1
13-Apr-87	07:00:00 AM	226.4	16.99	232.4
14-Apr-87	07:00:00 AM	224.4	17.36	232.0
15-Apr-87	12:30:00 PM	219.6	17.85	231.5
16-Apr-87	08:45:00 AM	216.0	18.24	231.1
17-Apr-87	08:30:00 AM	212.6	18.60	230.8

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	24
CENTERLINE STATION	135+00
CENTERLINE OFFSET (FT)	89 R
TOP ELEV (FT)	249.38
BOTTOM ELEV (FT)	203.8

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	17.32	232.1
20-Apr-87	08:15:00 AM	212.7	19.46	229.9
22-Apr-87	02:15:00 PM	212.7	19.49	229.9

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	25
CENTERLINE STATION	132+60
CENTERLINE OFFSET (FT)	260 R
TOP ELEV (FT)	233.14
BOTTOM ELEV (FT)	205.8

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	7.54	225.6
21-Aug-55	09:00:00 AM	243.8	5.24	227.9
22-Aug-55	11:00:00 AM	246.8	5.54	227.6
22-Aug-55	07:30:00 PM	246.6	4.74	228.4
23-Aug-55	12:30:00 AM	246.4	-	
23-Aug-55	07:15:00 AM	246.2	-	
23-Aug-55	02:00:00 PM	246.0	2.74	230.4
24-Aug-55	12:30:00 AM	245.2	-	
24-Aug-55	08:00:00 AM	244.6	1.94	231.2
24-Aug-55	12:00:00 PM	244.3	-	
25-Aug-55	07:30:00 AM	242.0	1.84	231.3
25-Aug-55	04:00:00 PM	241.0	1.74	231.4
26-Aug-55	07:30:00 AM	237.9	-	
26-Aug-55	11:00:00 AM	237.5	1.24	231.9
26-Aug-55	08:00:00 PM	235.8	-	
27-Aug-55	08:30:00 AM	233.4	0.84	232.3
27-Aug-55	06:45:00 PM	231.8	0.84	232.3
28-Aug-55	12:45:00 PM	227.2	0.74	232.4
28-Aug-55	06:00:00 PM	226.0	0.64	232.5
29-Aug-55	08:30:00 AM	222.5	0.84	232.3
29-Aug-55	03:35:00 PM	220.5	0.84	232.3
30-Aug-55	03:15:00 PM	212.3	1.14	232.0
02-Sep-55	09:30:00 AM	207.7	1.84	231.3
22-May-63	04:30:00 PM	210.5	-	
23-May-63	03:40:00 PM	210.5	8.70	224.4
24-May-63	10:45:00 AM	210.5	-	
29-May-63	11:00:00 AM	210.4	8.50	224.6
31-May-63	02:10:00 PM	210.5	-	
03-Apr-87	10:00:00 AM	232.3	4.46	228.7
04-Apr-87	07:00:00 AM	230.2	4.13	229.0
05-Apr-87	01:00:00 PM	236.2	4.92	228.2
06-Apr-87	07:00:00 AM	240.0	3.05	230.1
07-Apr-87	07:00:00 AM	241.7	2.49	230.6
08-Apr-87	07:00:00 AM	241.2	2.10	231.0
09-Apr-87	11:00:00 AM	238.9	1.64	231.5
10-Apr-87	01:30:00 AM	235.7	1.35	231.8
11-Apr-87	09:00:00 AM	233.1	1.08	232.1
12-Apr-87	08:30:00 AM	229.9	0.95	232.2
13-Apr-87	07:00:00 AM	226.4	0.82	232.3
14-Apr-87	07:00:00 AM	224.4	0.82	232.3
15-Apr-87	12:30:00 PM	219.6	0.82	232.3
16-Apr-87	08:45:00 AM	216.0	0.95	232.2
17-Apr-87	08:30:00 AM	212.6	0.98	232.2

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	25
CENTERLINE STATION	132+60
CENTERLINE OFFSET (FT)	260 R
TOP ELEV (FT)	233.14
BOTTOM ELEV (FT)	205.8

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	1.12	232.0
20-Apr-87	08:15:00 AM	212.7	1.35	231.8
22-Apr-87	02:15:00 PM	212.7	1.48	231.7

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	26
CENTERLINE STATION	132+90
CENTERLINE OFFSET (FT)	7 L
TOP ELEV (FT)	274.5
BOTTOM ELEV (FT)	211.0

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5		
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5		
23-May-63	03:40:00 PM	210.5		
24-May-63	10:45:00 AM	210.5		
29-May-63	11:00:00 AM	210.4		
31-May-63	02:10:00 PM	210.5		
03-Apr-87	10:00:00 AM	232.3	48.56	225.9
04-Apr-87	07:00:00 AM	230.2	48.00	226.5
05-Apr-87	01:00:00 PM	236.2	45.93	228.6
06-Apr-87	07:00:00 AM	240.0	43.90	230.6
07-Apr-87	07:00:00 AM	241.7	42.52	232.0
08-Apr-87	07:00:00 AM	241.2	42.06	232.4
09-Apr-87	11:00:00 AM	238.9	41.99	232.5
10-Apr-87	01:30:00 AM	235.7	42.22	232.3
11-Apr-87	09:00:00 AM	233.1	43.31	231.2
12-Apr-87	08:30:00 AM	229.9	43.80	230.7
13-Apr-87	07:00:00 AM	226.4	44.91	229.6
14-Apr-87	07:00:00 AM	224.4	45.51	229.0
15-Apr-87	12:30:00 PM	219.6	46.52	228.0
16-Apr-87	08:45:00 AM	216.0	47.60	226.9
17-Apr-87	08:30:00 AM	212.6	48.20	226.3

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	26
CENTERLINE STATION	132+90
CENTERLINE OFFSET (FT)	7 L
TOP ELEV (FT)	274.5
BOTTOM ELEV (FT)	211.0

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	48.72	225.8
20-Apr-87	08:15:00 AM	212.7	49.48	225.0
22-Apr-87	02:15:00 PM	212.7	49.67	224.8

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	27
CENTERLINE STATION	130+97
CENTERLINE OFFSET (FT)	117 R
TOP ELEV (FT)	234.7
BOTTOM ELEV (FT)	177.6

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5		
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5		
23-May-63	03:40:00 PM	210.5		
24-May-63	10:45:00 AM	210.5		
29-May-63	11:00:00 AM	210.4		
31-May-63	02:10:00 PM	210.5		
03-Apr-87	10:00:00 AM	232.3	7.58	227.1
04-Apr-87	07:00:00 AM	230.2	7.09	227.6
05-Apr-87	01:00:00 PM	236.2	5.51	229.2
06-Apr-87	07:00:00 AM	240.0	3.61	231.1
07-Apr-87	07:00:00 AM	241.7	2.69	232.0
08-Apr-87	07:00:00 AM	241.2	2.49	232.2
09-Apr-87	11:00:00 AM	238.9	2.56	232.1
10-Apr-87	01:30:00 AM	235.7	2.79	231.9
11-Apr-87	09:00:00 AM	233.1	3.61	231.1
12-Apr-87	08:30:00 AM	229.9	3.67	231.0
13-Apr-87	07:00:00 AM	226.4	4.13	230.6
14-Apr-87	07:00:00 AM	224.4	4.52	230.2
15-Apr-87	12:30:00 PM	219.6	5.12	229.6
16-Apr-87	08:45:00 AM	216.0	4.13	230.6
17-Apr-87	08:30:00 AM	212.6	6.53	228.2

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	27
CENTERLINE STATION	130+97
CENTERLINE OFFSET (FT)	117 R
TOP ELEV (FT)	234.7
BOTTOM ELEV (FT)	177.6

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	6.89	227.8
20-Apr-87	08:15:00 AM	212.7	7.61	227.1
22-Apr-87	02:15:00 PM	212.7	7.84	226.9

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	28
CENTERLINE STATION	132+90
CENTERLINE OFFSET (FT)	109 R
TOP ELEV (FT)	238.0
BOTTOM ELEV (FT)	191.0

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
20-Aug-55	04:30:00 PM	242.5	-	
21-Aug-55	09:00:00 AM	243.8		
22-Aug-55	11:00:00 AM	246.8		
22-Aug-55	07:30:00 PM	246.6		
23-Aug-55	12:30:00 AM	246.4		
23-Aug-55	07:15:00 AM	246.2		
23-Aug-55	02:00:00 PM	246.0		
24-Aug-55	12:30:00 AM	245.2		
24-Aug-55	08:00:00 AM	244.6		
24-Aug-55	12:00:00 PM	244.3		
25-Aug-55	07:30:00 AM	242.0		
25-Aug-55	04:00:00 PM	241.0		
26-Aug-55	07:30:00 AM	237.9		
26-Aug-55	11:00:00 AM	237.5		
26-Aug-55	08:00:00 PM	235.8		
27-Aug-55	08:30:00 AM	233.4		
27-Aug-55	06:45:00 PM	231.8		
28-Aug-55	12:45:00 PM	227.2		
28-Aug-55	06:00:00 PM	226.0		
29-Aug-55	08:30:00 AM	222.5		
29-Aug-55	03:35:00 PM	220.5		
30-Aug-55	03:15:00 PM	212.3		
02-Sep-55	09:30:00 AM	207.7		
22-May-63	04:30:00 PM	210.5		
23-May-63	03:40:00 PM	210.5		
24-May-63	10:45:00 AM	210.5		
29-May-63	11:00:00 AM	210.4		
31-May-63	02:10:00 PM	210.5		
03-Apr-87	10:00:00 AM	232.3	11.38	226.6
04-Apr-87	07:00:00 AM	230.2	10.79	227.2
05-Apr-87	01:00:00 PM	236.2	9.42	228.6
06-Apr-87	07:00:00 AM	240.0	8.04	230.0
07-Apr-87	07:00:00 AM	241.7	7.02	231.0
08-Apr-87	07:00:00 AM	241.2	6.59	231.4
09-Apr-87	11:00:00 AM	238.9	6.30	231.7
10-Apr-87	01:30:00 AM	235.7	3.02	235.0
11-Apr-87	09:00:00 AM	233.1	6.63	231.4
12-Apr-87	08:30:00 AM	229.9	6.89	231.1
13-Apr-87	07:00:00 AM	226.4	7.32	230.7
14-Apr-87	07:00:00 AM	224.4	7.55	230.5
15-Apr-87	12:30:00 PM	219.6	7.97	230.0
16-Apr-87	08:45:00 AM	216.0	7.09	230.9
17-Apr-87	08:30:00 AM	212.6	8.92	229.1

ALT-A ADV PZ
ALT-B BACK PZ
ALT-F REFORMAT
ALT-D DRY PZ
ALT-N NULL PZ
ALT-M MENUO
F9 CALC

MANSFIELD HOLLOW DAM

PIEZOMETER NUMBER	28
CENTERLINE STATION	132+90
CENTERLINE OFFSET (FT)	109 R
TOP ELEV (FT)	238.0
BOTTOM ELEV (FT)	191.0

DATE OF READING	TIME OF READING	ELEVATION OF POOL (FT)	DEPTH OF WATER SURFACE (FT)	ELEVATION OF WATER SURFACE (FT)
18-Apr-87	08:15:00 AM	212.5	9.25	228.8
20-Apr-87	08:15:00 AM	212.7	9.91	228.1
22-Apr-87	02:15:00 PM	212.7	10.10	227.9

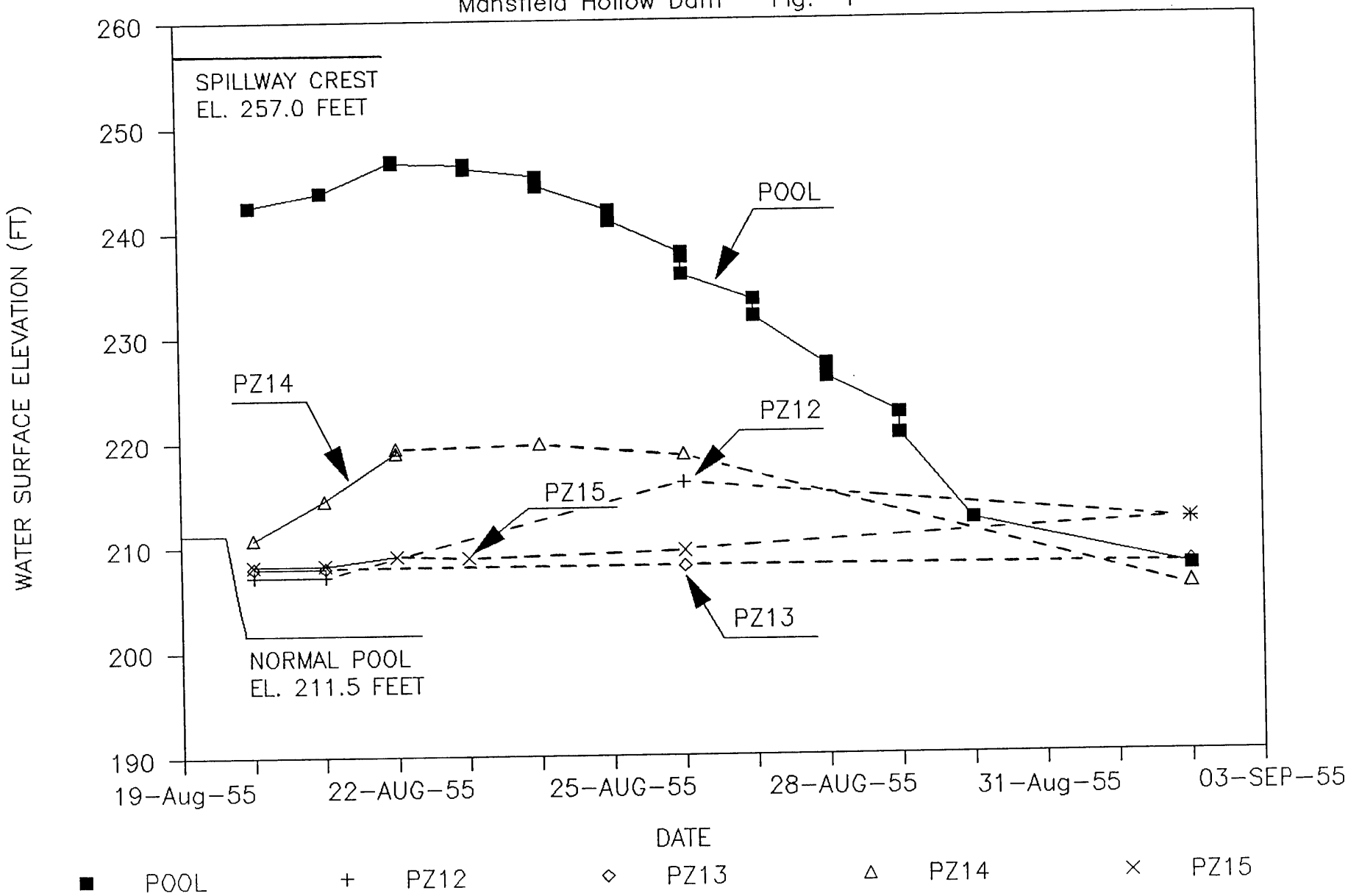
ATTACHMENT 4

Plots of Piezometer Data

POOL AND PIEZOMETER VS TIME (AUGUST 1955)

Piezometers PZ12, PZ13, PZ14, and PZ15

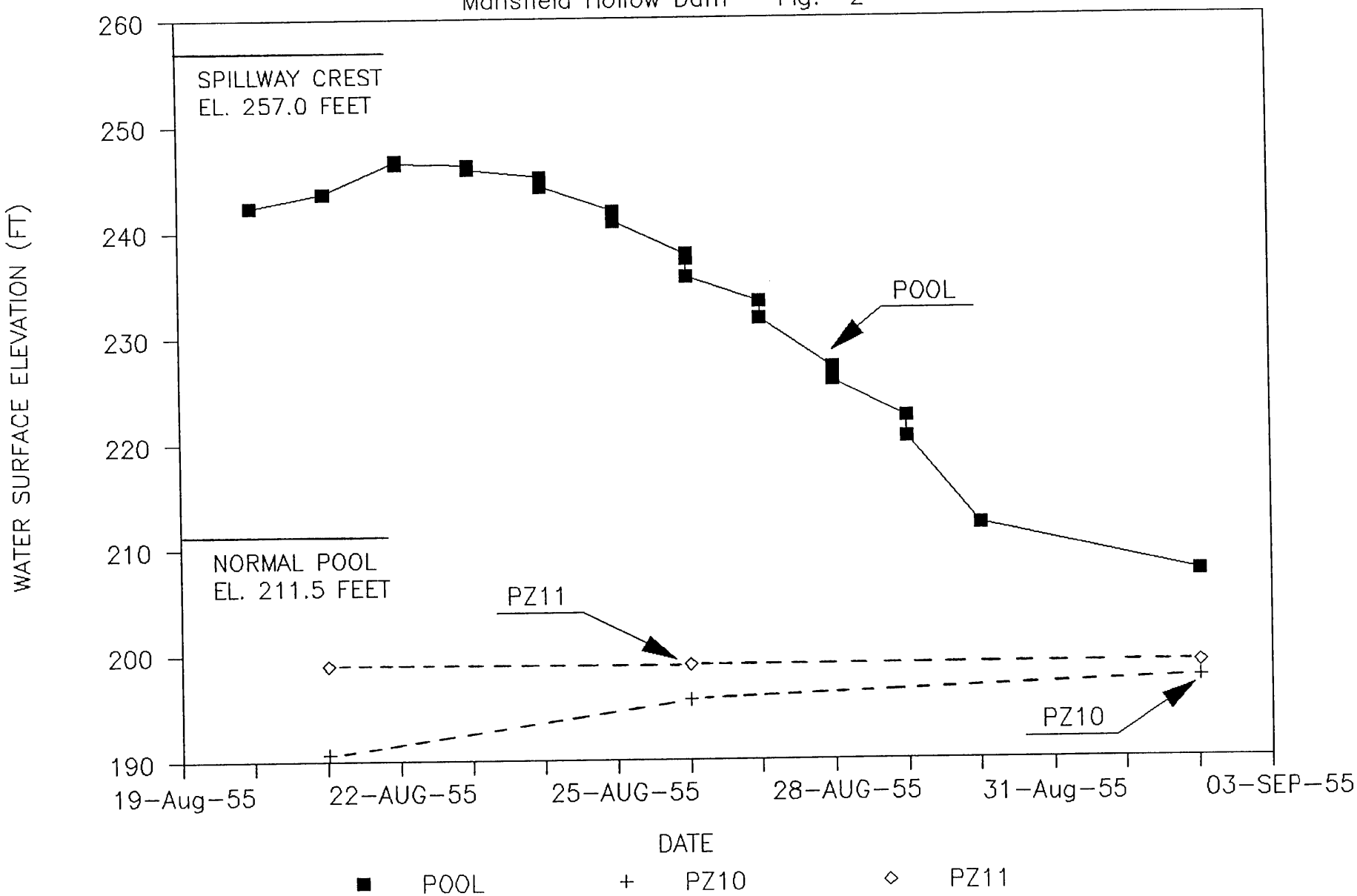
Mansfield Hollow Dam Fig. 1



POOL AND PIEZOMETER VS TIME (AUGUST 1955)

Piezometers PZ10 and PZ11

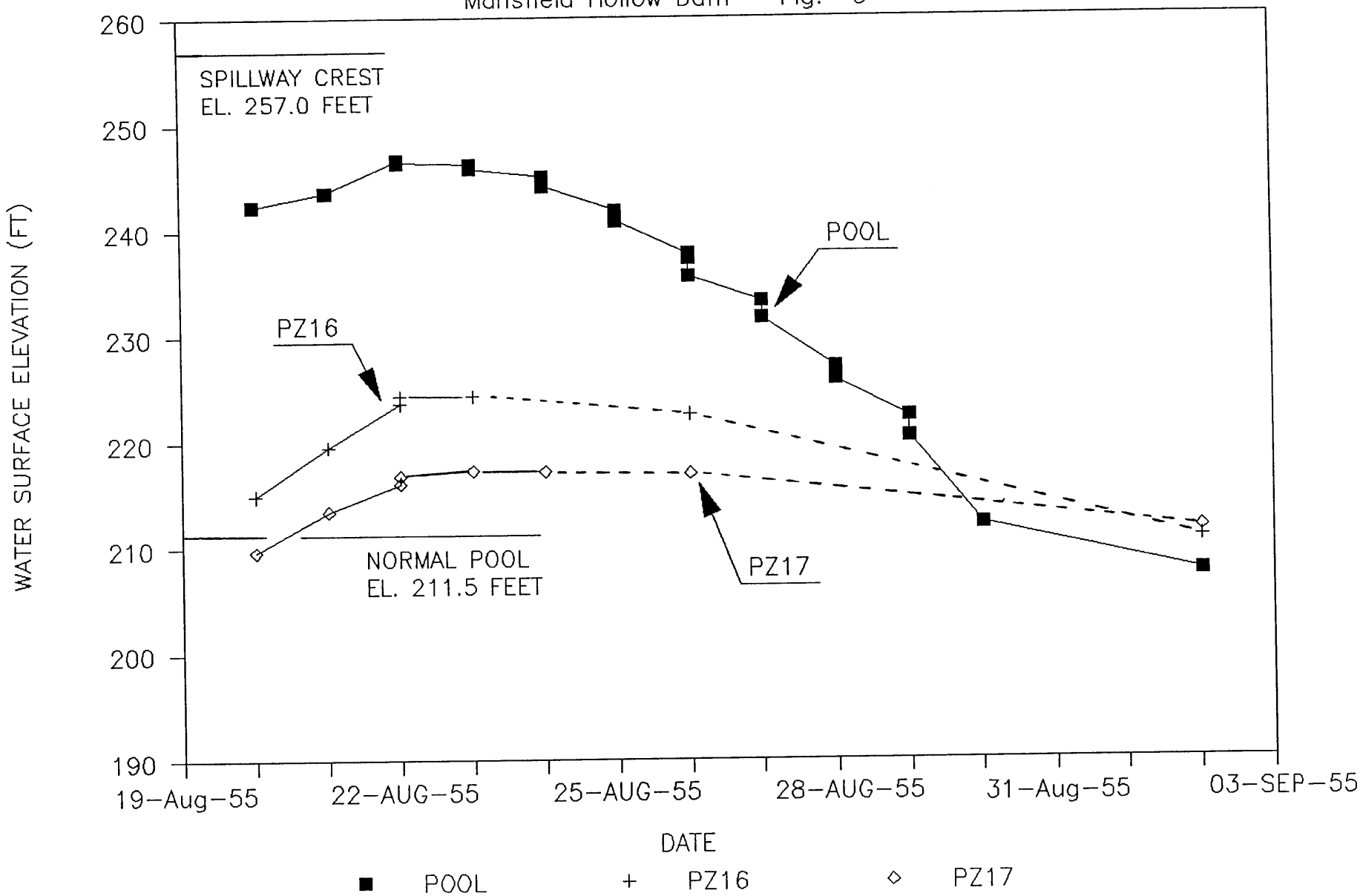
Mansfield Hollow Dam Fig. 2



POOL AND PIEZOMETER VS TIME (AUGUST 1955)

Piezometers PZ16 and PZ17

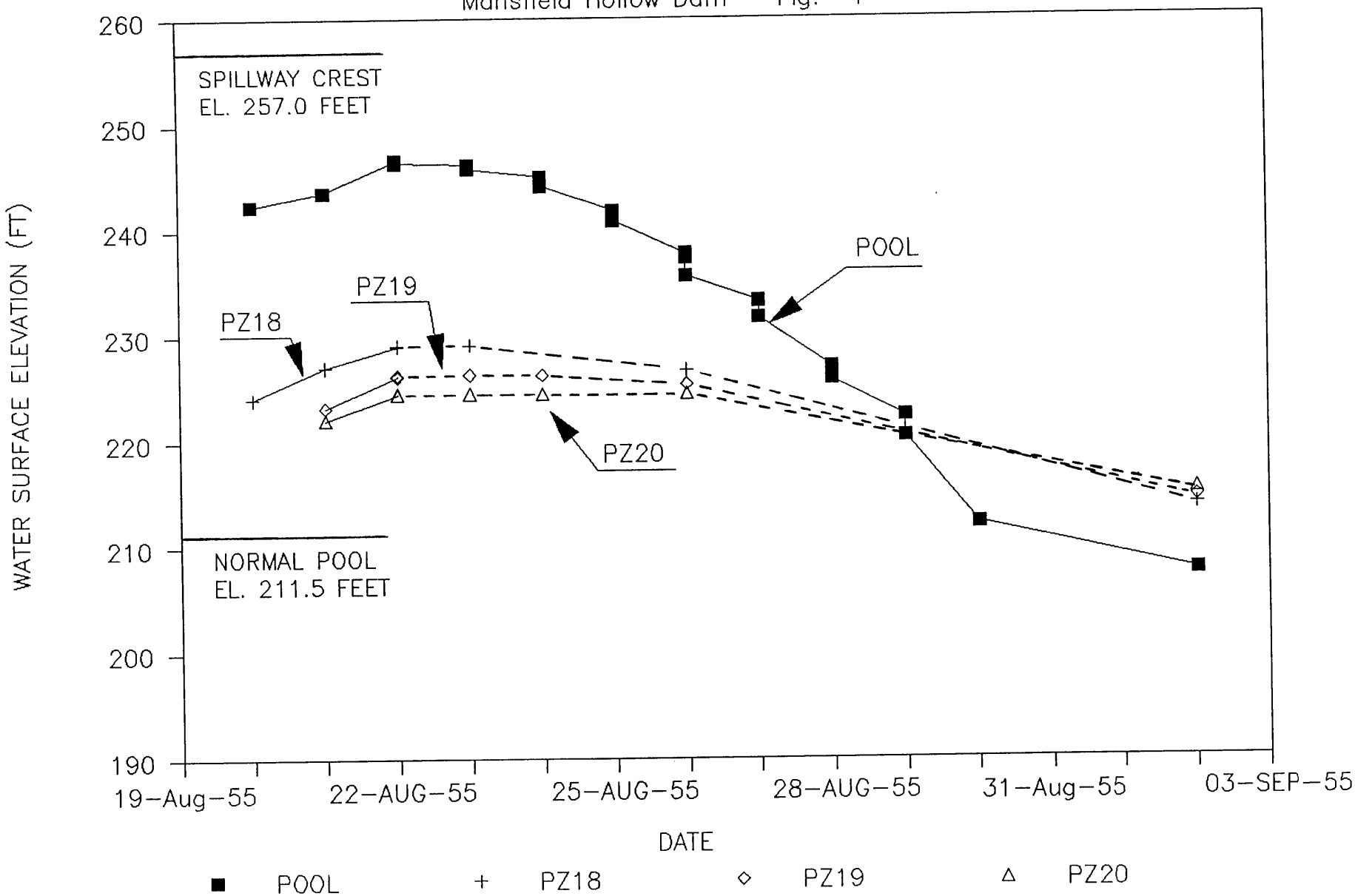
Mansfield Hollow Dam Fig. 3



POOL AND PIEZOMETER VS TIME (AUGUST 1955)

Piezometers PZ18, PZ19, and PZ20

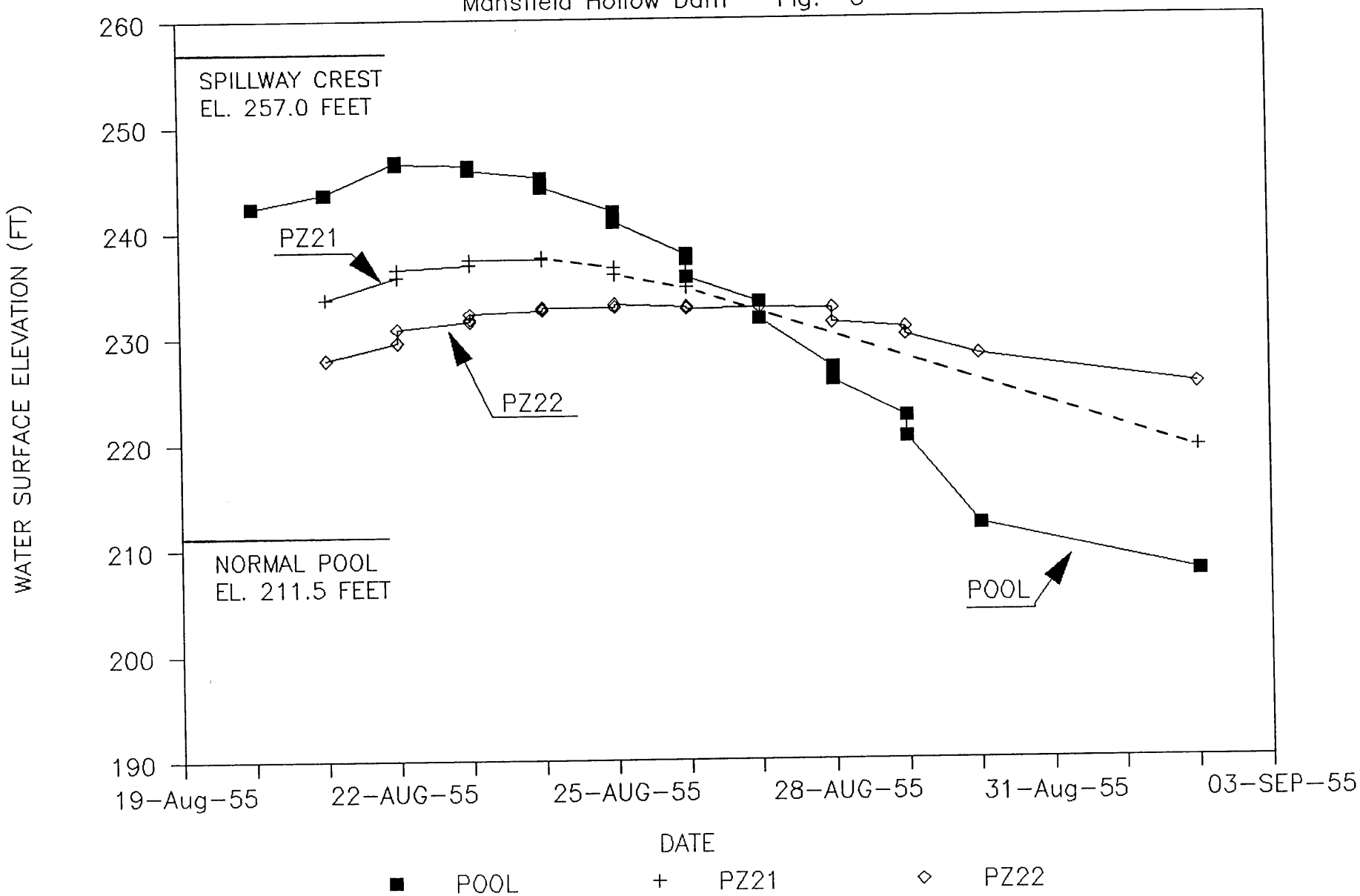
Mansfield Hollow Dam Fig. 4



POOL AND PIEZOMETER VS TIME (AUGUST 1955)

Piezometer PZ21 and PZ22

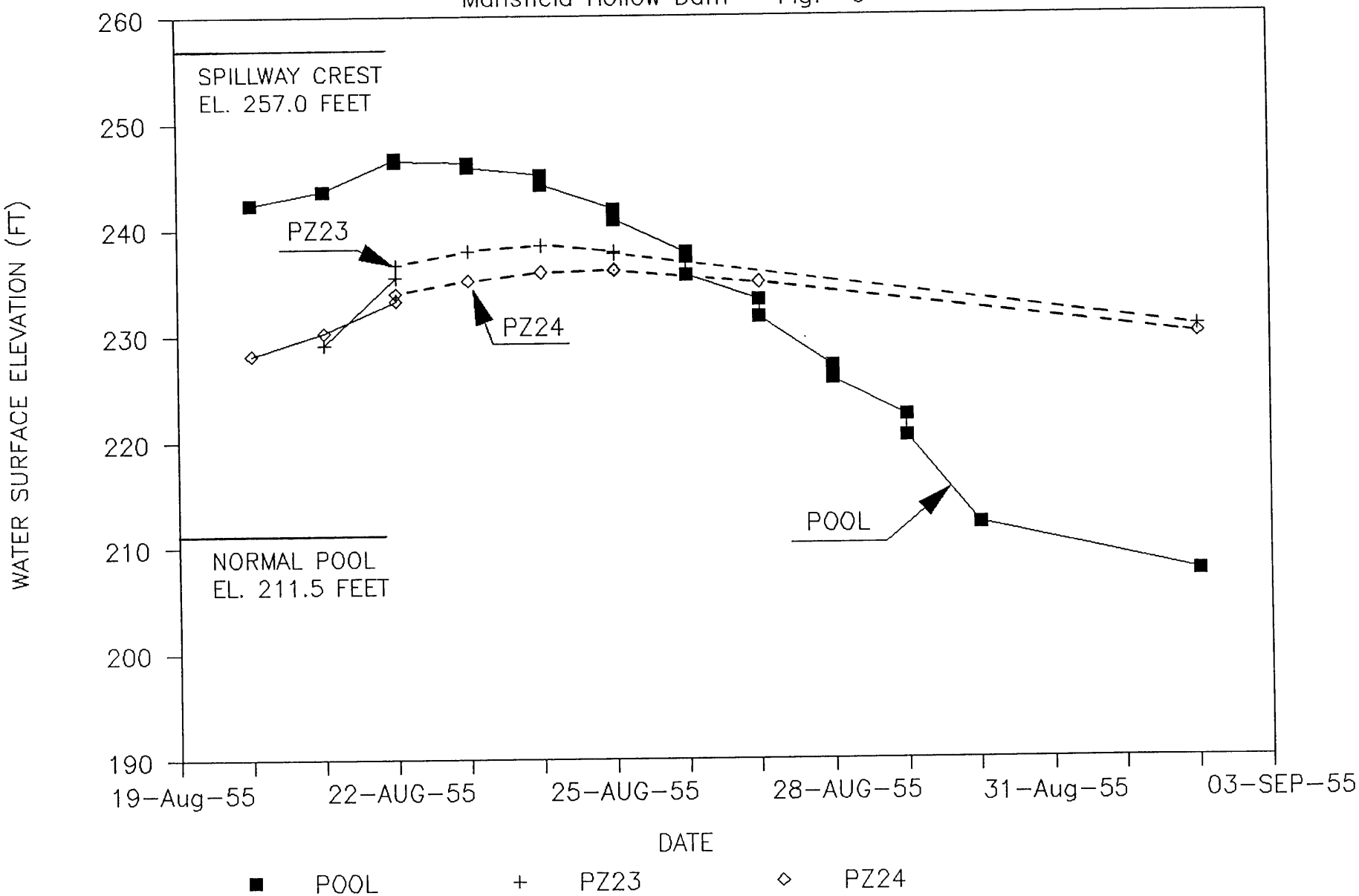
Mansfield Hollow Dam Fig. 5



POOL AND PIEZOMETERS VS TIME (AUGUST 1955)

Piezometers PZ23 and PZ24

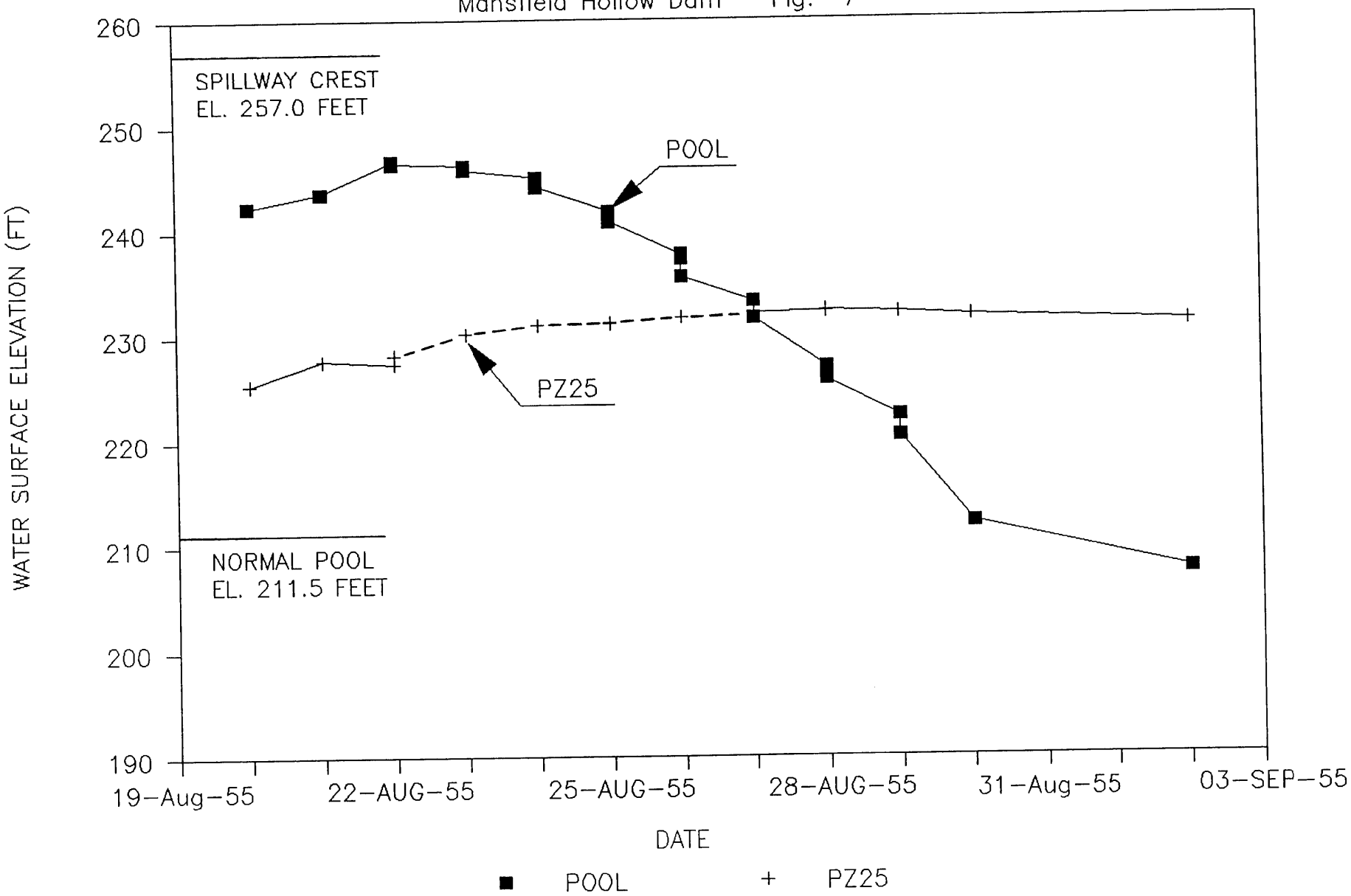
Mansfield Hollow Dam Fig. 6



POOL AND PIEZOMETERS VS TIME (AUGUST 1955)

Piezometer PZ25

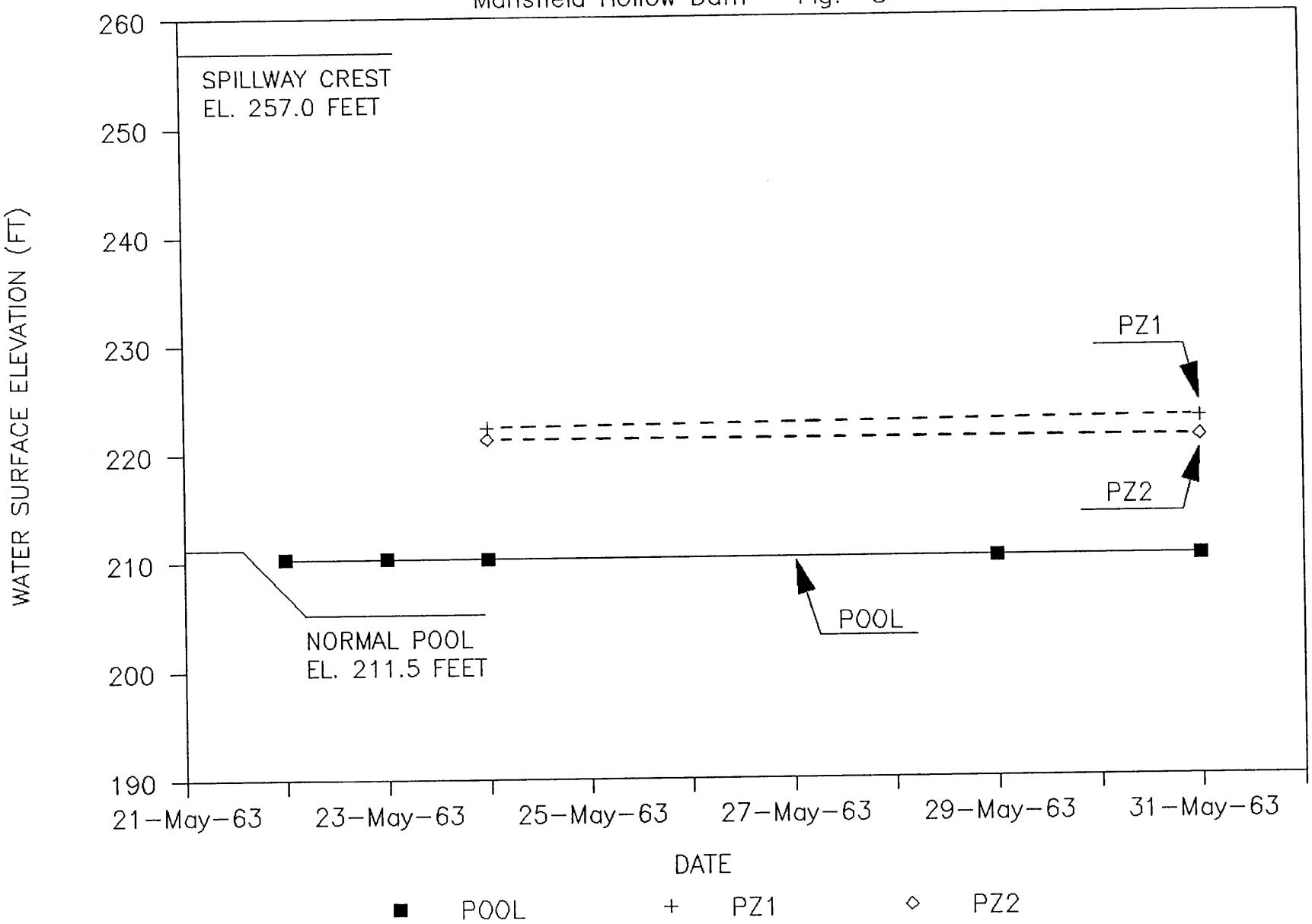
Mansfield Hollow Dam Fig. 7



POOL AND PIEZOMETERS VS TIME (MAY 1963)

Piezometers PZ1 and PZ2

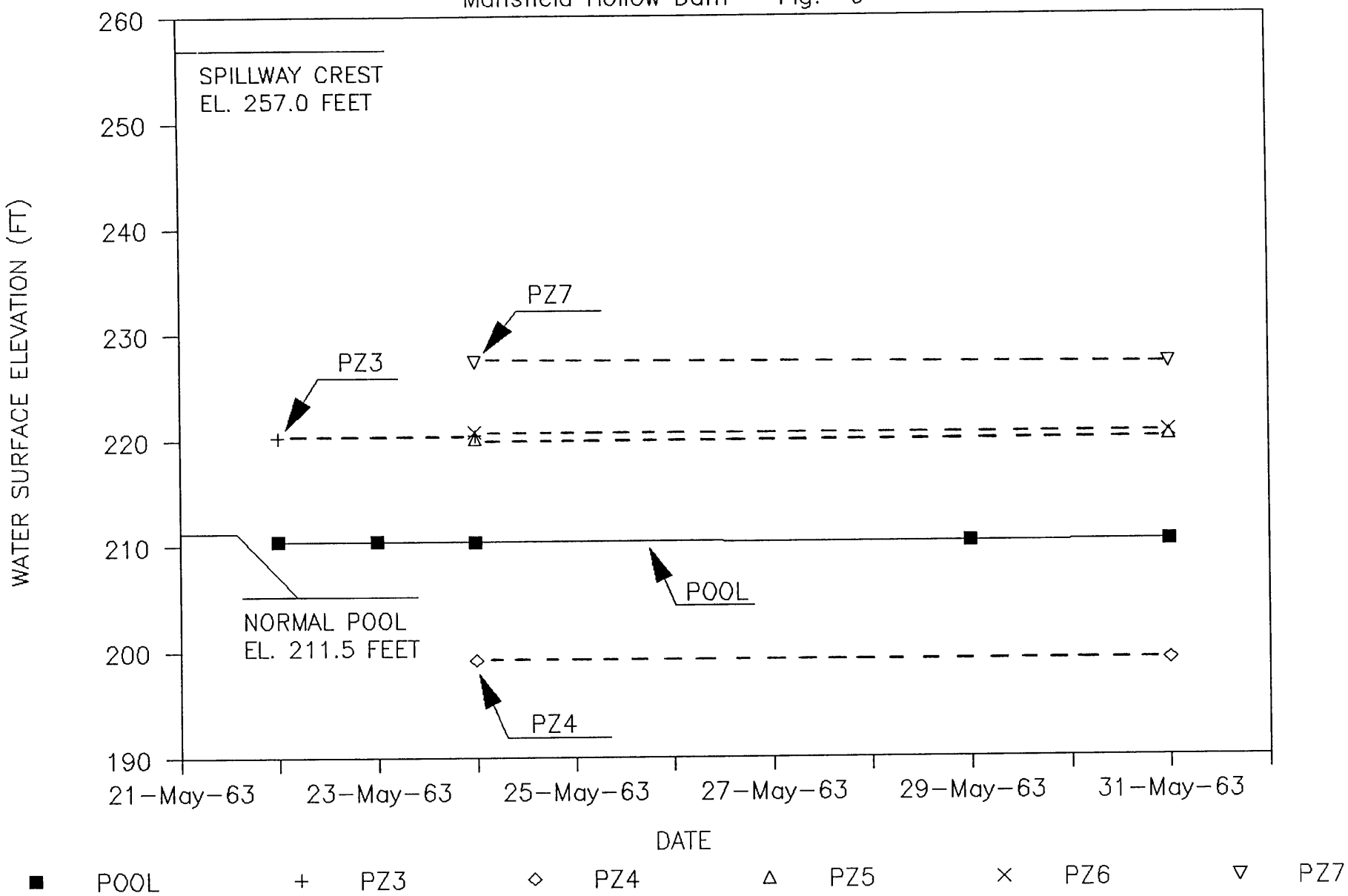
Mansfield Hollow Dam Fig. 8



POOL AND PIEZOMETERS VS TIME (MAY 1963)

Piezometers PZ3, PZ4, PZ5, PZ6, and PZ7

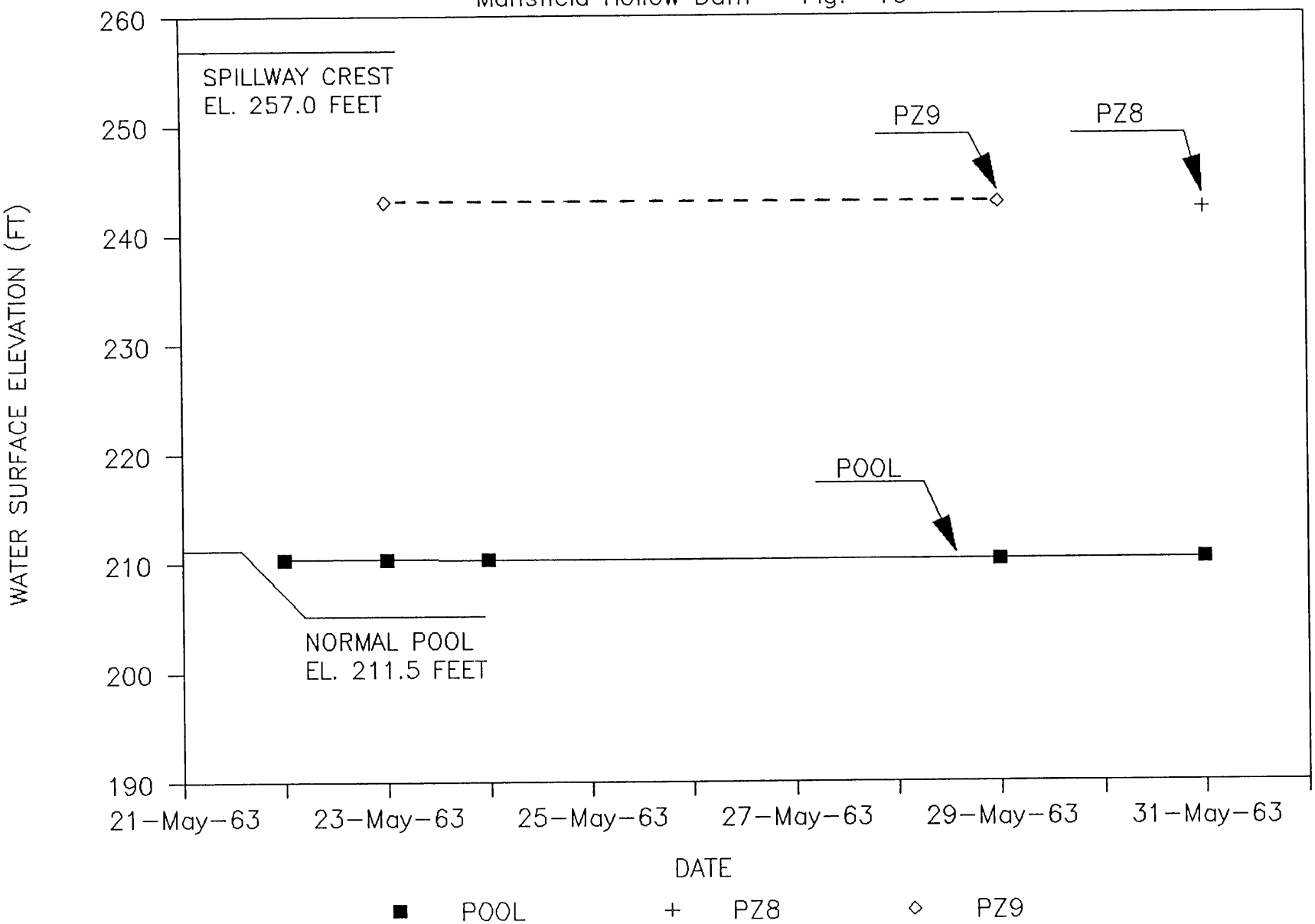
Mansfield Hollow Dam Fig. 9



POOL AND PIEZOMETERS VS TIME (MAY 1963)

Piezomerters PZ8 and PZ9

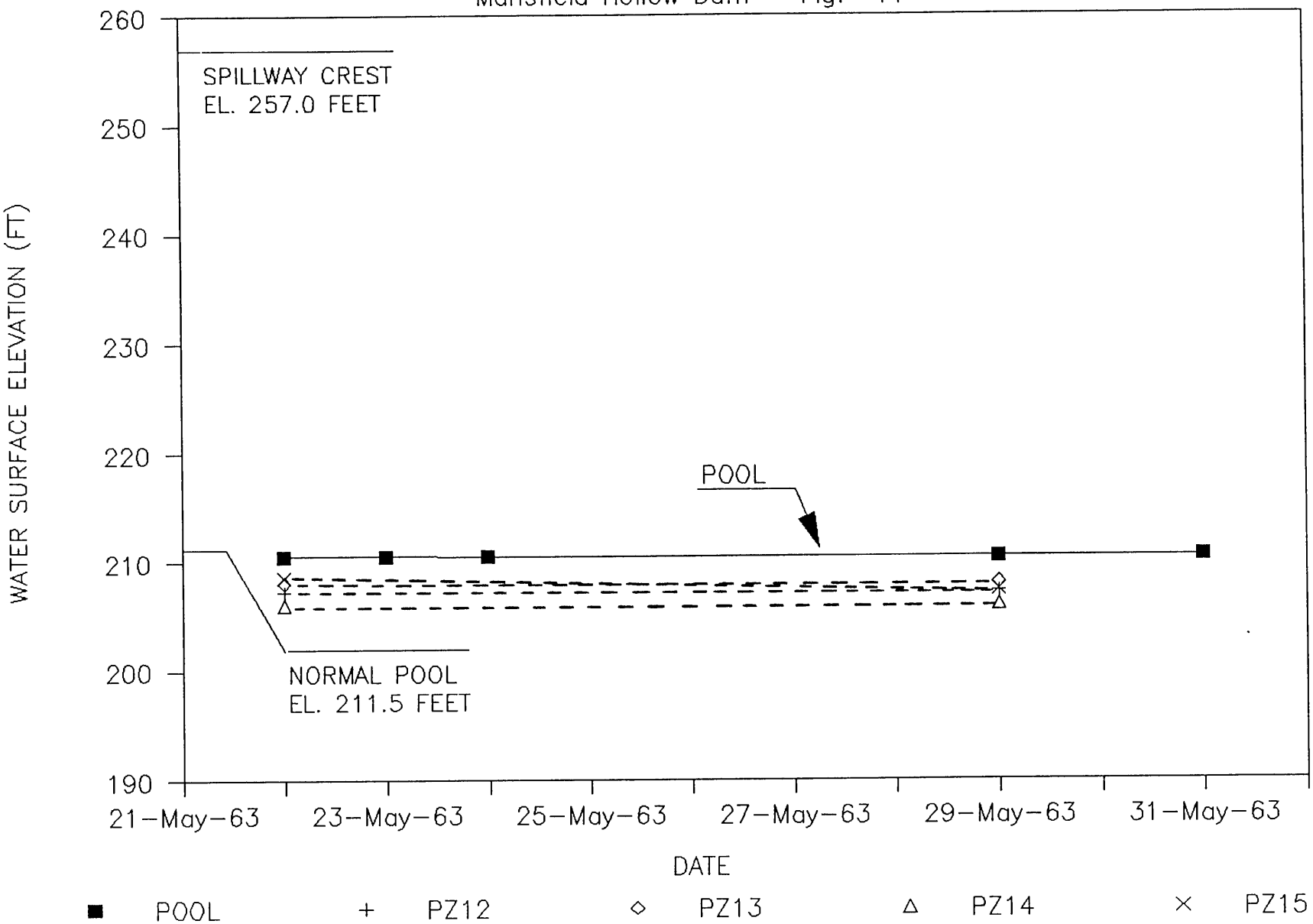
Mansfield Hollow Dam Fig. 10



POOL AND PIEZOMETERS VS TIME (MAY 1963)

Piezometers PZ12, PZ13, PZ14, and PZ15

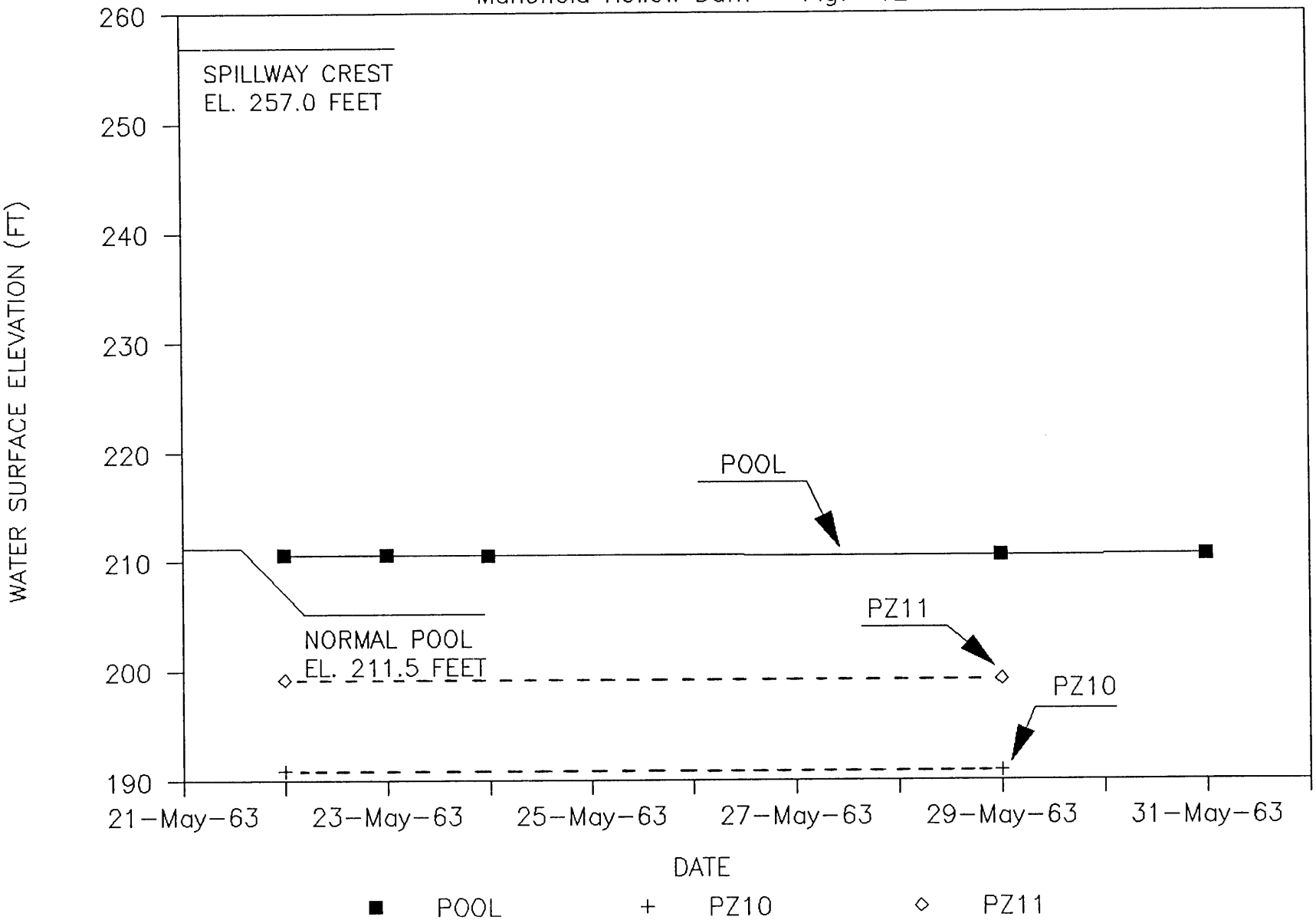
Mansfield Hollow Dam Fig. 11



POOL AND PIEZOMETERS VS TIME (MAY 1963)

Piezometers PZ10 and PZ11

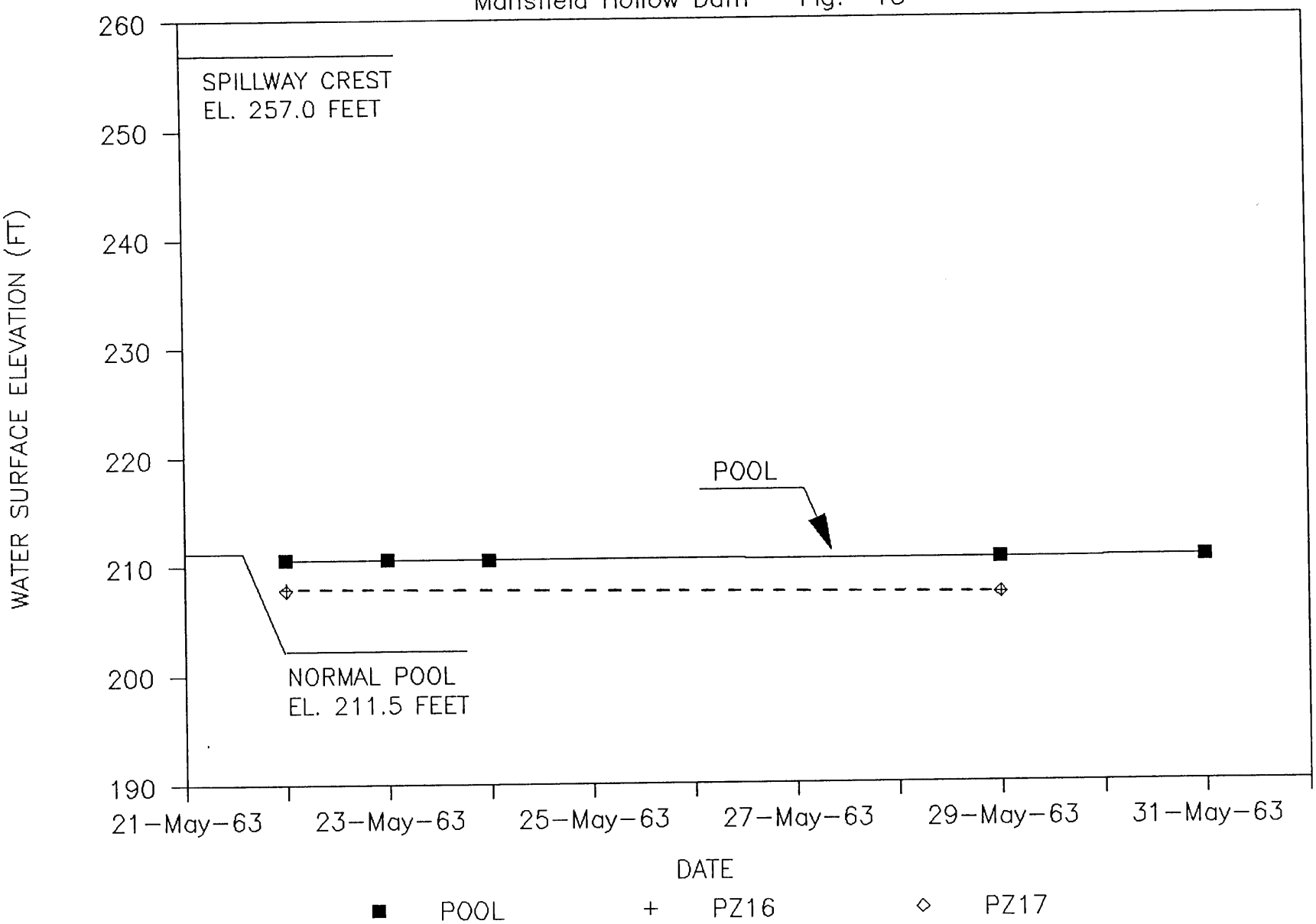
Mansfield Hollow Dam Fig. 12



POOL AND PIEZOMETERS VS TIME (MAY 1963)

Piezometers PZ16 and PZ17

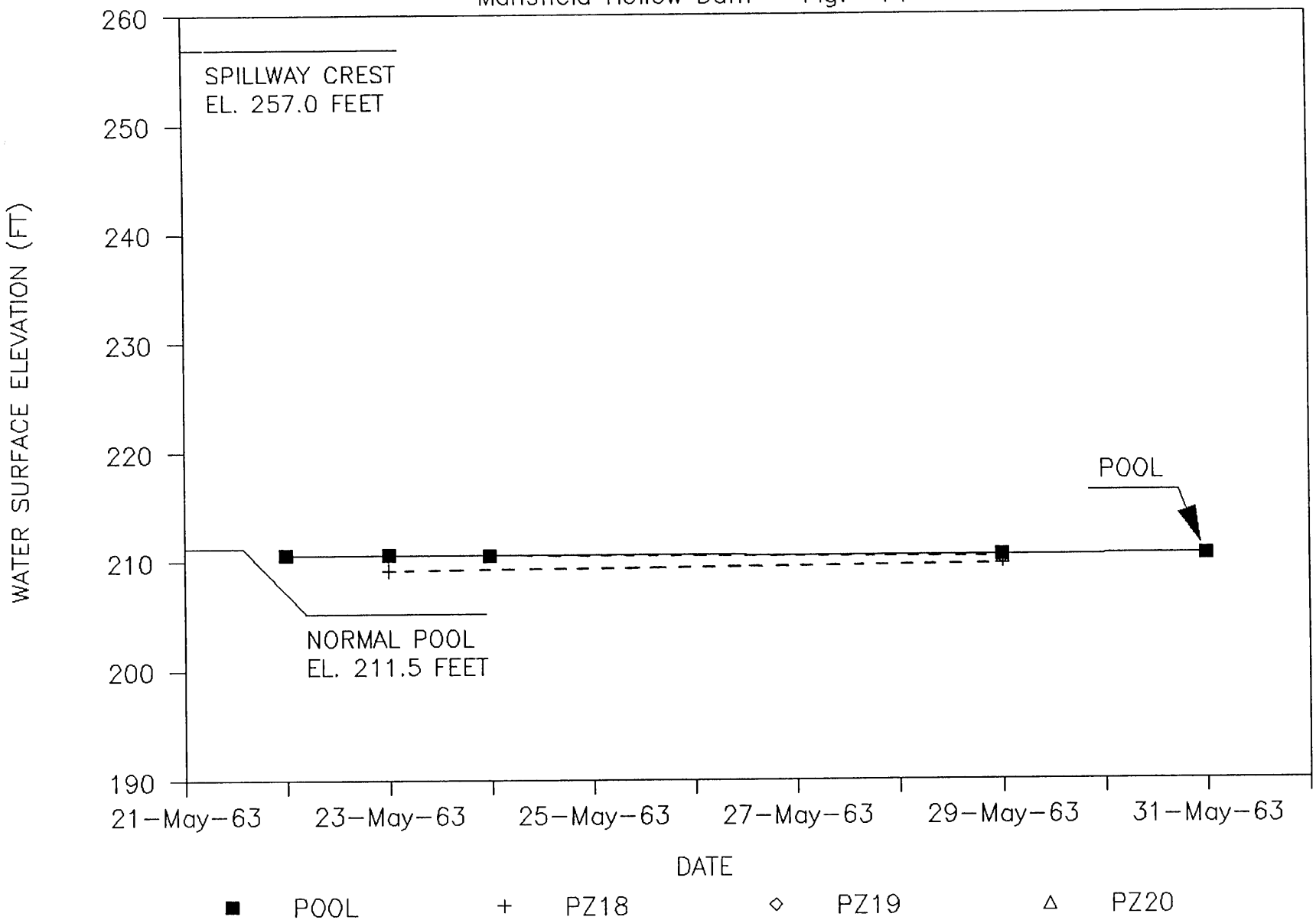
Mansfield Hollow Dam Fig. 13



POOL AND PIEZOMETERS VS TIME (MAY 1963)

Piezometers PZ18, PZ19, and PZ20

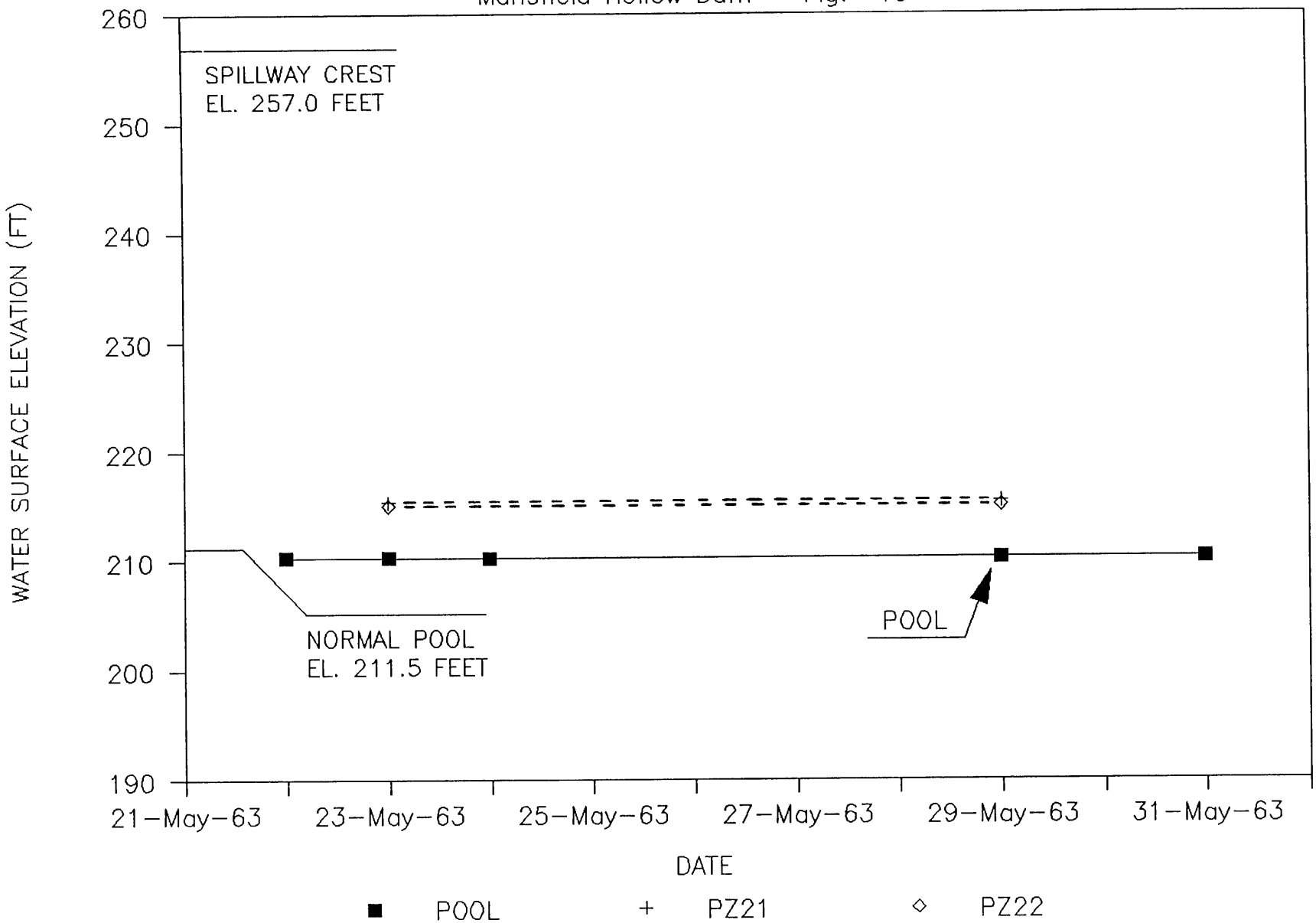
Mansfield Hollow Dam Fig. 14



POOL AND PIEZOMETERS VS TIME (MAY 1963)

Piezometers PZ21 and PZ22

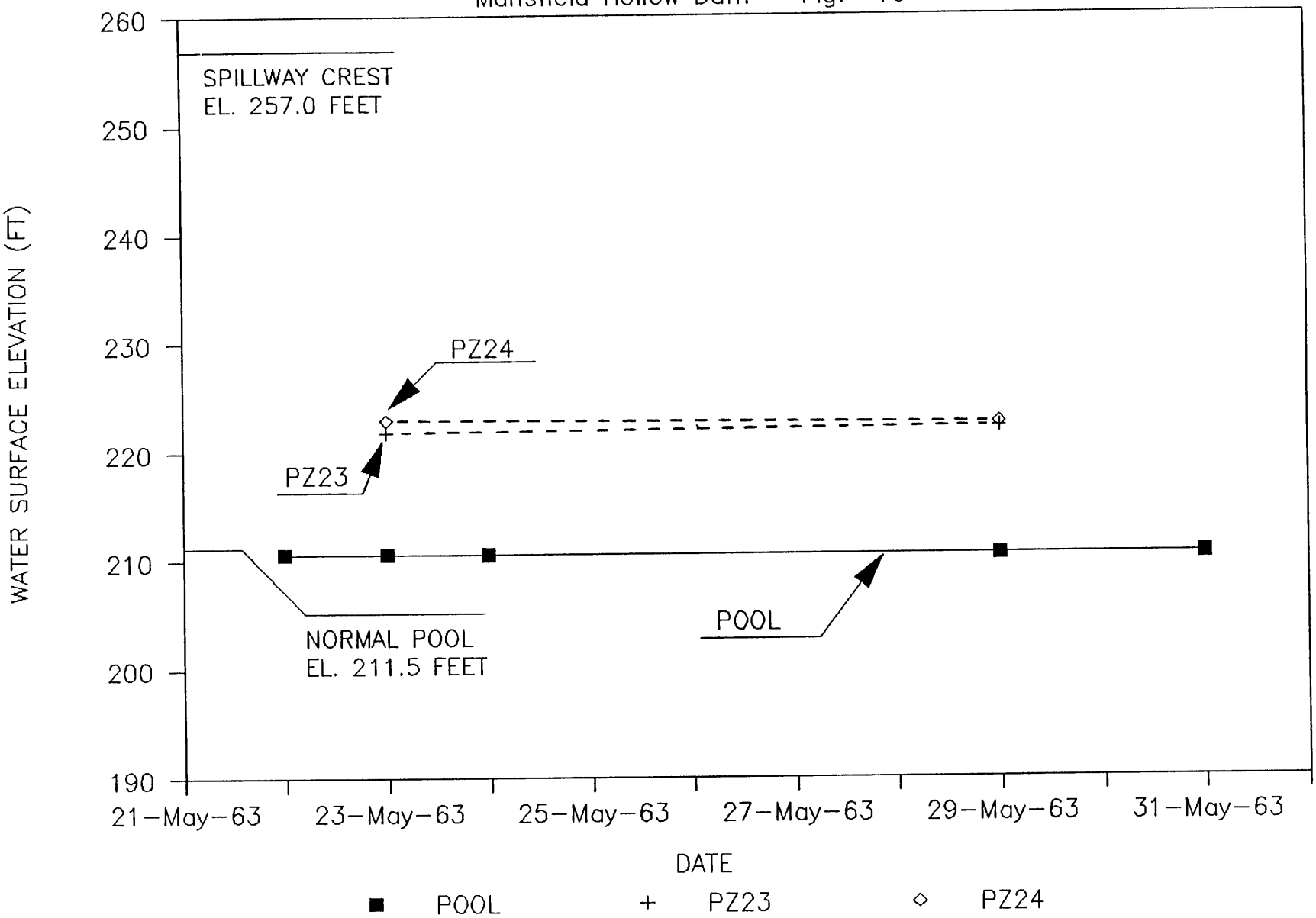
Mansfield Hollow Dam Fig. 15



POOL AND PIEZOMETERS VS TIME (MAY 1963)

Piezometers PZ23 and PZ24

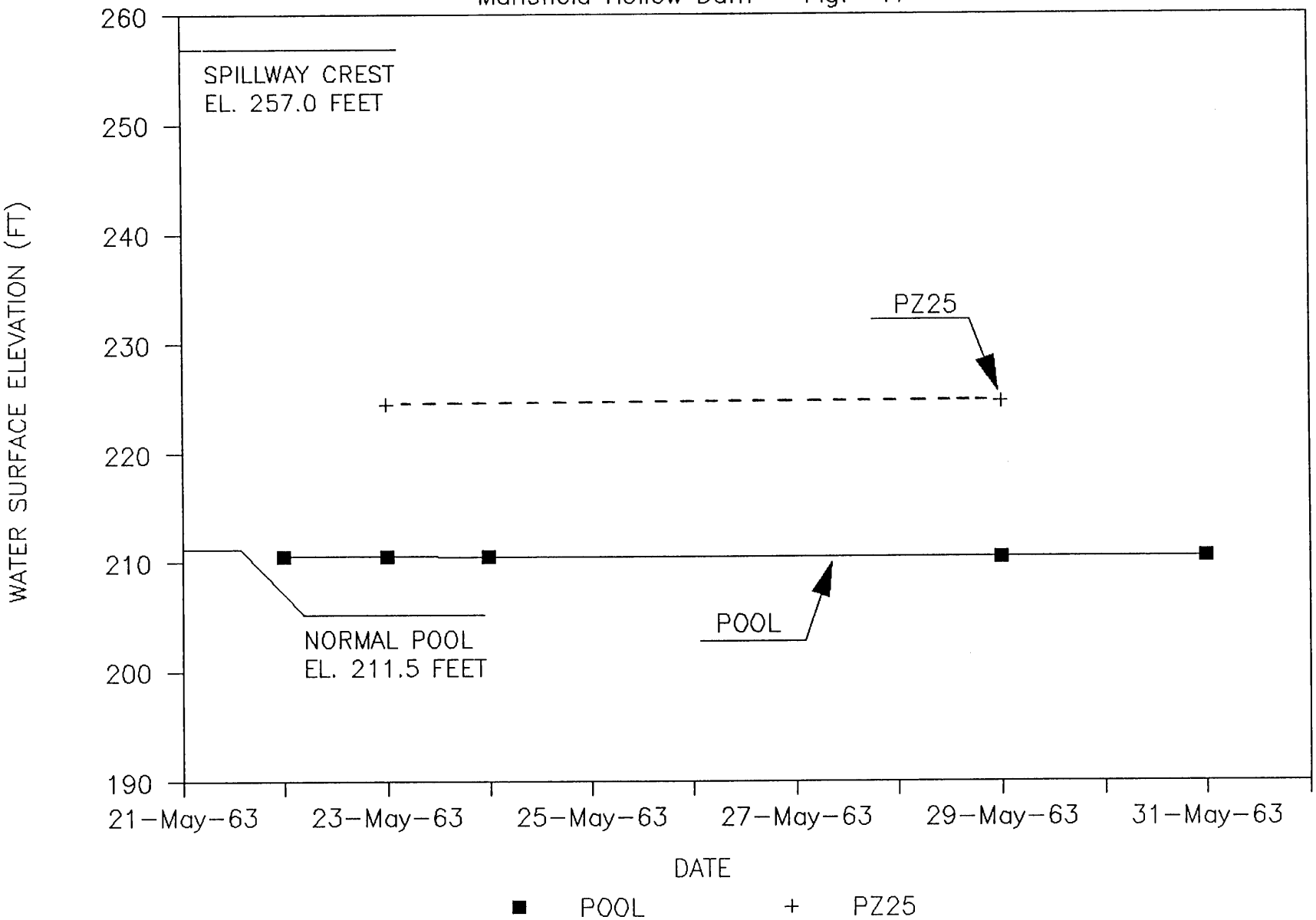
Mansfield Hollow Dam Fig. 16



POOL AND PIEZOMETERS VS TIME (MAY 1963)

Piezometer PZ25

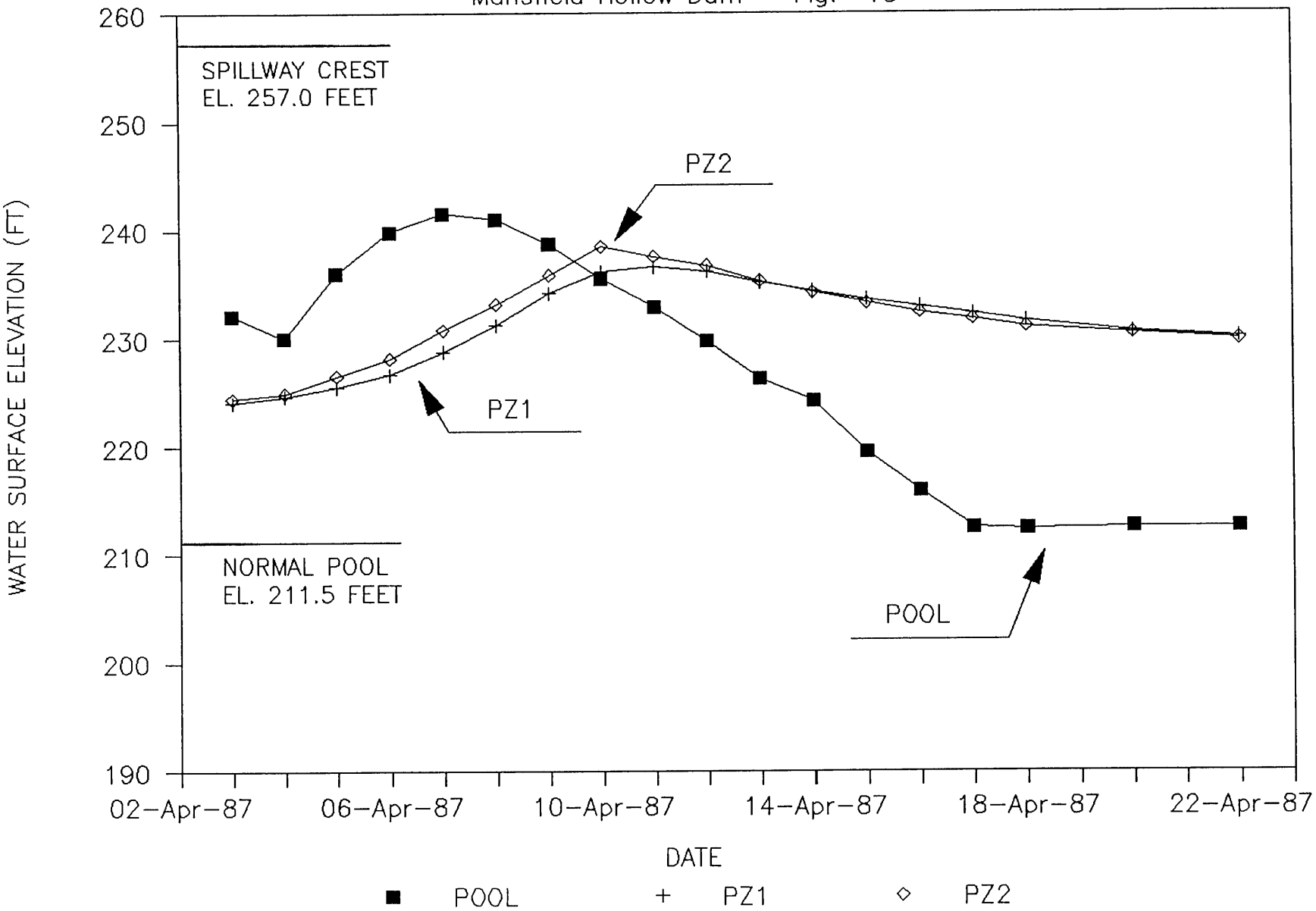
Mansfield Hollow Dam Fig. 17



POOL AND PIEZOMETERS VS TIME (April 1987)

Piezometers PZ1 and PZ2

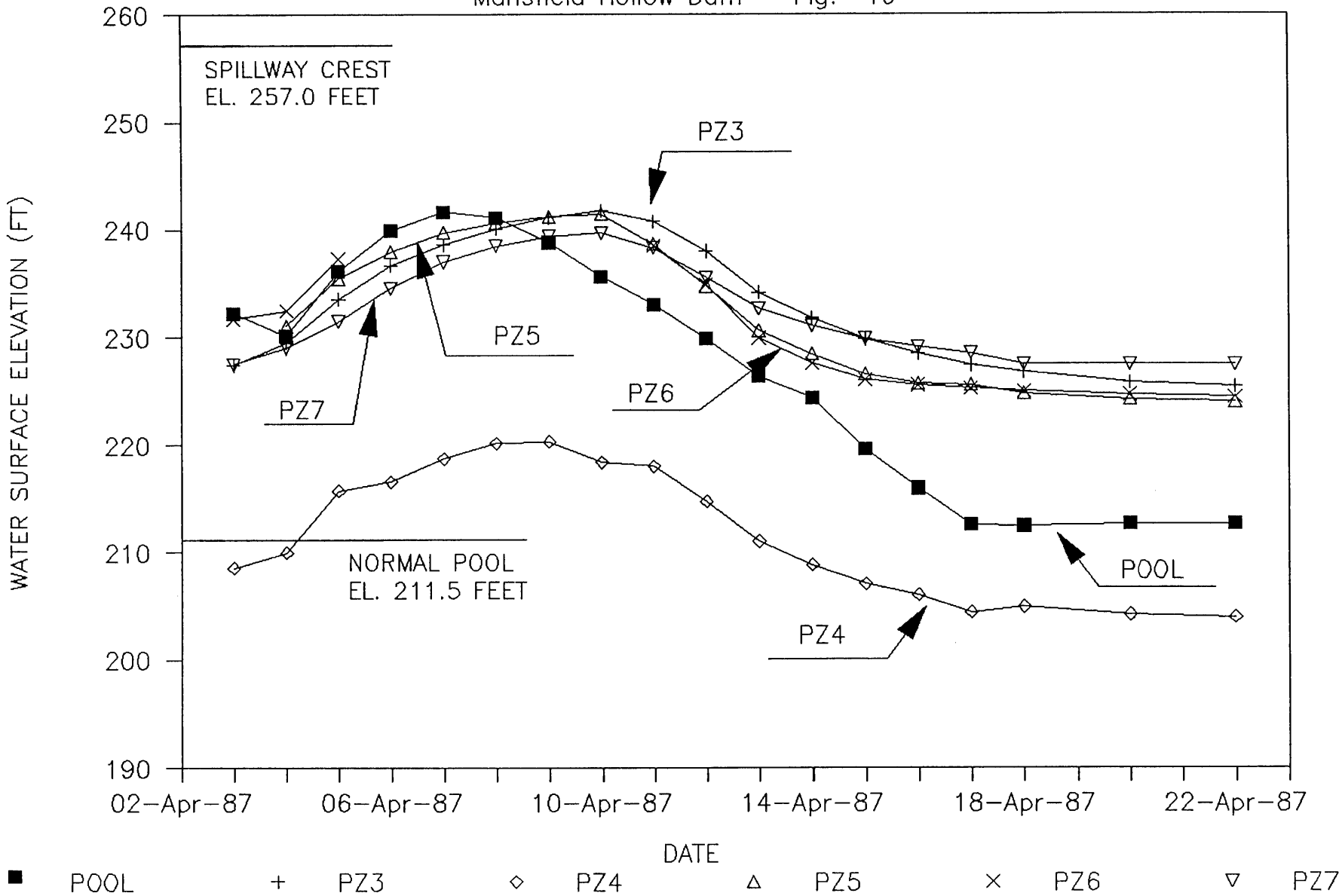
Mansfield Hollow Dam Fig. 18



POOL AND PIEZOMETERS VS TIME (April 1987)

Piezometers PZ3, PZ4, PZ5, PZ6, and PZ7

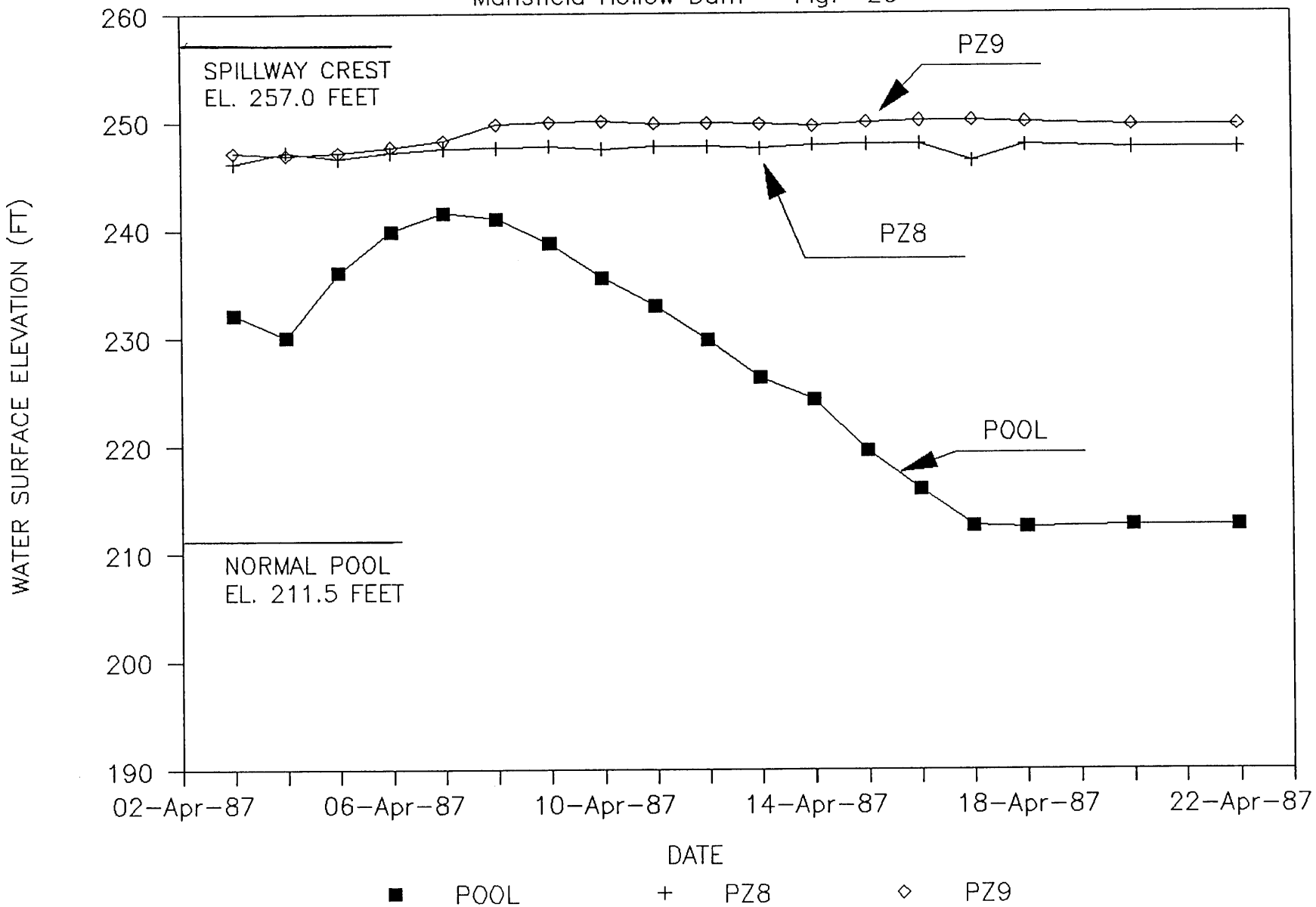
Mansfield Hollow Dam Fig. 19



POOL AND PIEZOMETERS VS TIME (April 1987)

Piezometers PZ8 and PZ9

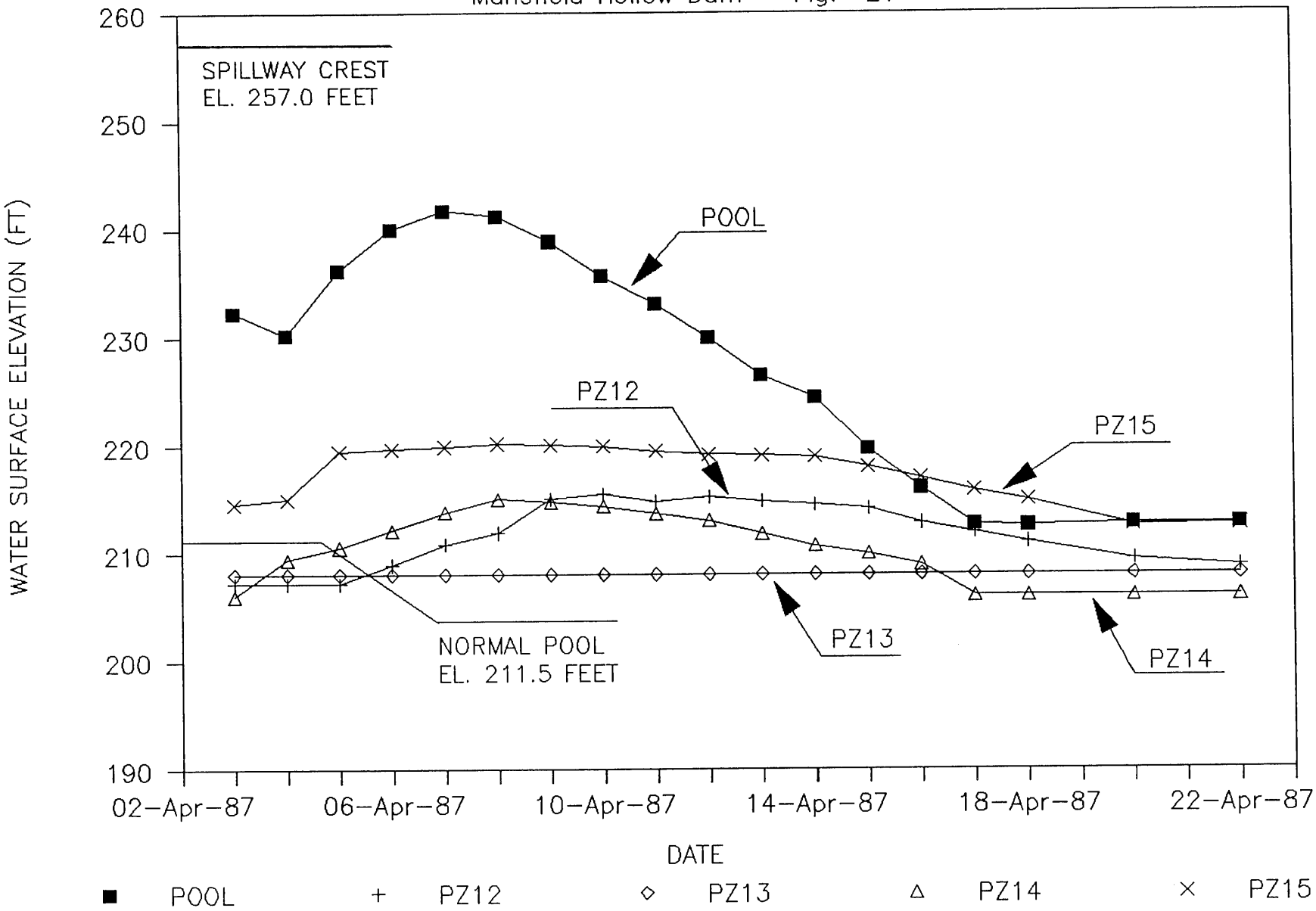
Mansfield Hollow Dam Fig. 20



POOL AND PIEZOMETERS VS TIME (April 1987)

Piezometers PZ12, PZ13, PZ14, PZ15, and PZ15

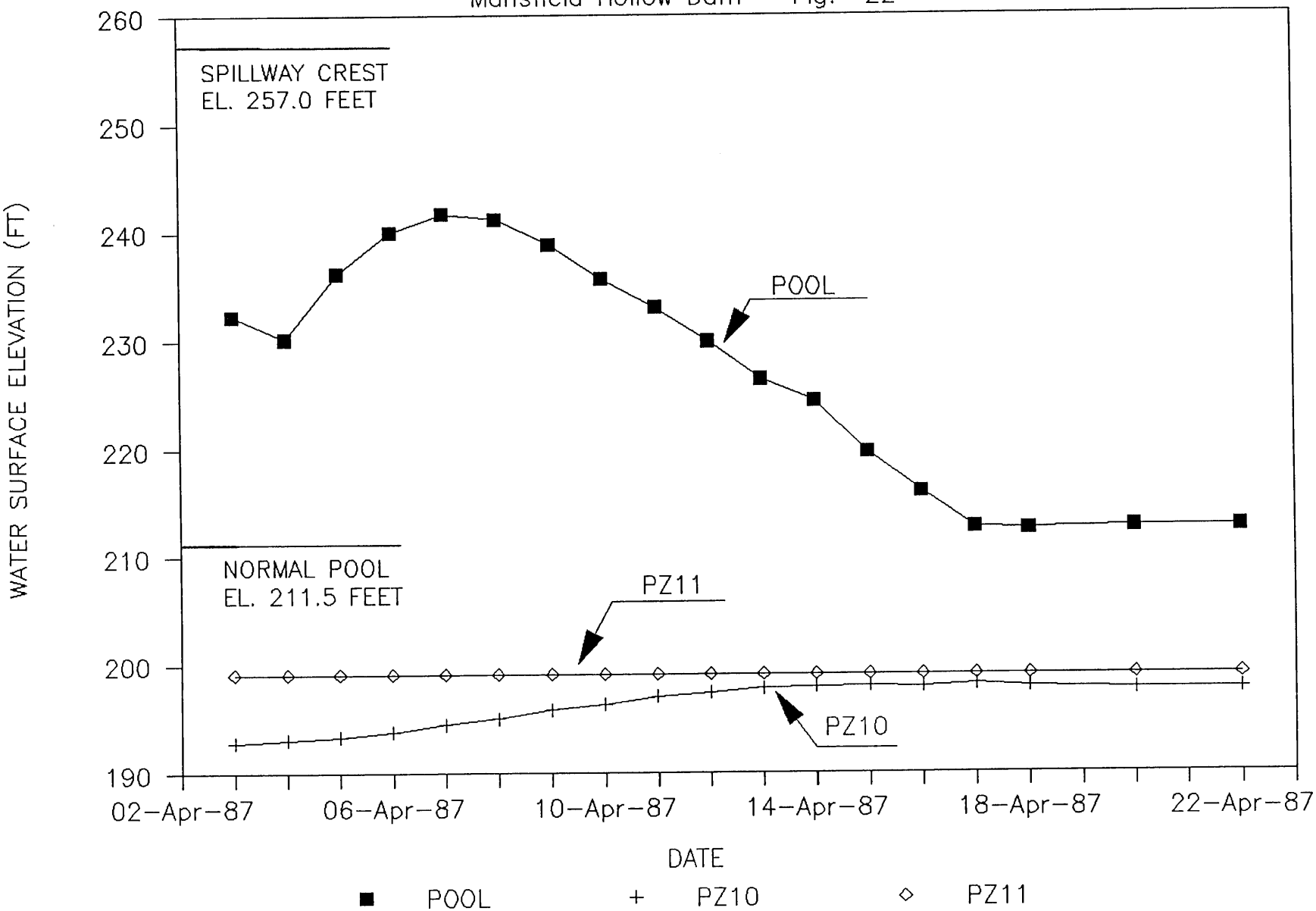
Mansfield Hollow Dam Fig. 21



POOL AND PIEZOMETERS VS TIME (April 1987)

Piezometers PZ10 and PZ11

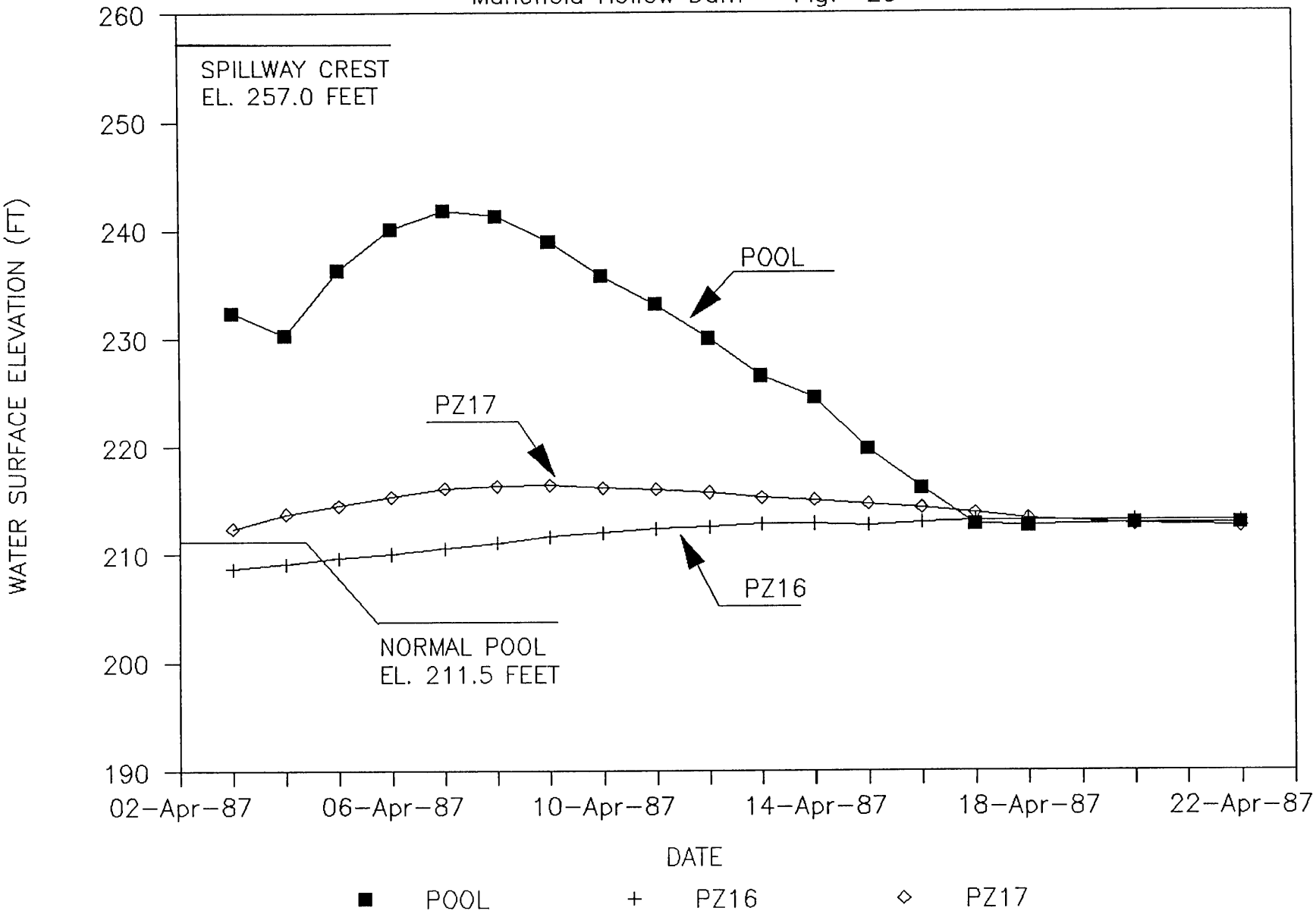
Mansfield Hollow Dam Fig. 22



POOL AND PIEZOMETERS VS TIME (April 1987)

Piezometers PZ16 and PZ17

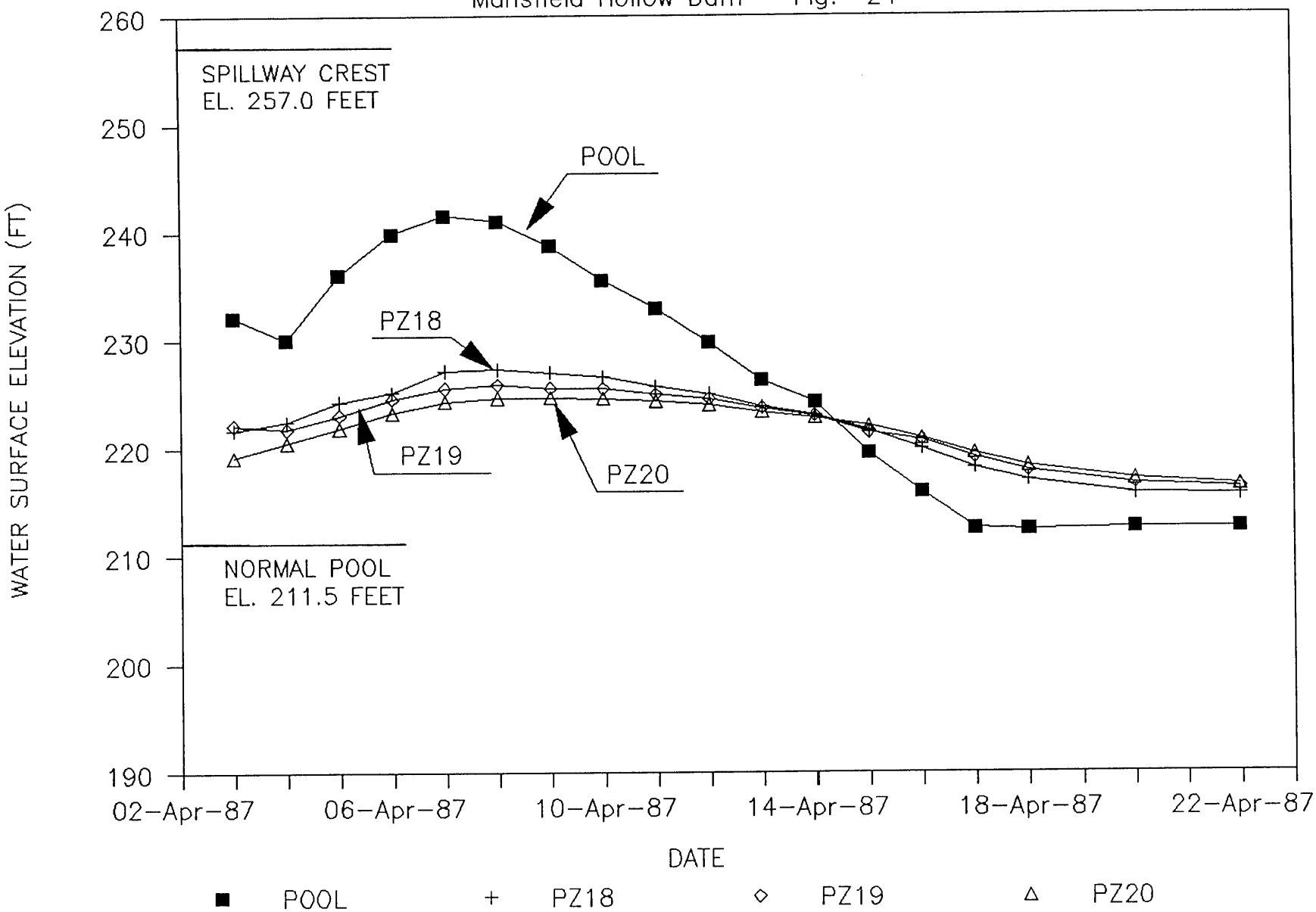
Mansfield Hollow Dam Fig. 23



POOL AND PIEZOMETERS VS TIME (April 1987)

Piezometers PZ18, PZ19, and PZ20

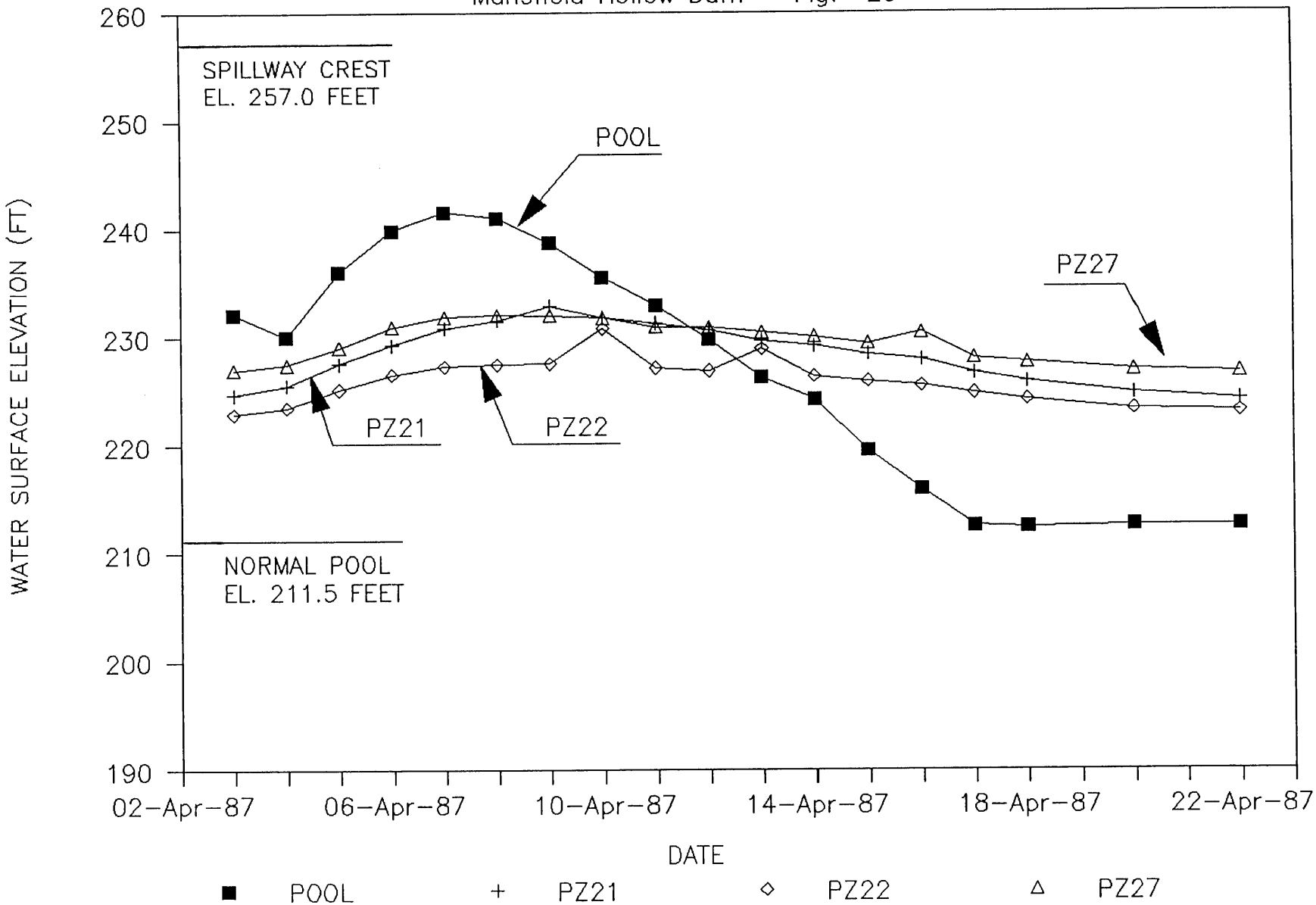
Mansfield Hollow Dam Fig. 24



POOL AND PIEZOMETERS VS TIME (April 1987)

Piezometers PZ21, PZ22, and PZ27

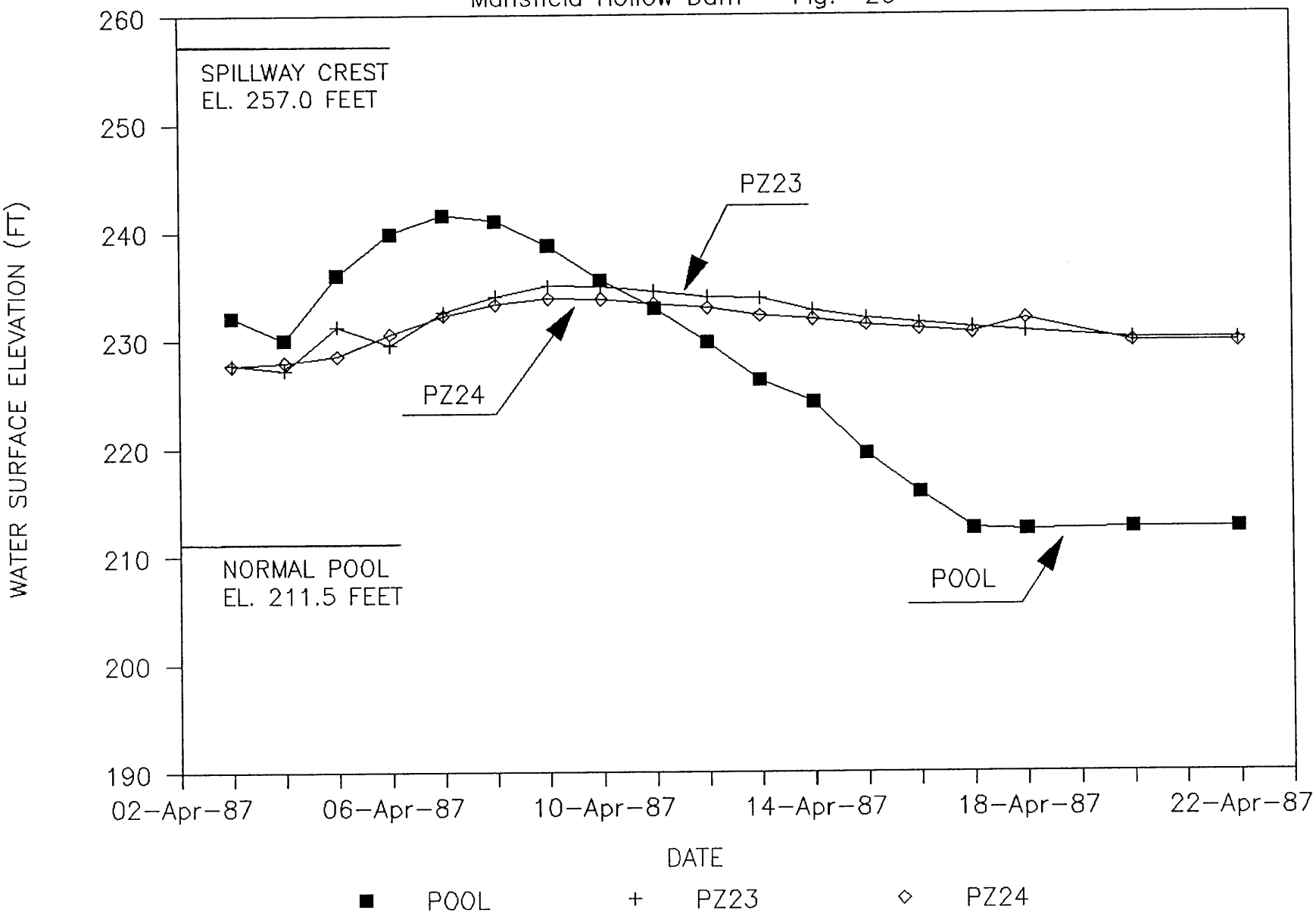
Mansfield Hollow Dam Fig. 25



POOL AND PIEZOMETERS VS TIME (April 1987)

Piezometers PZ23 and PZ24

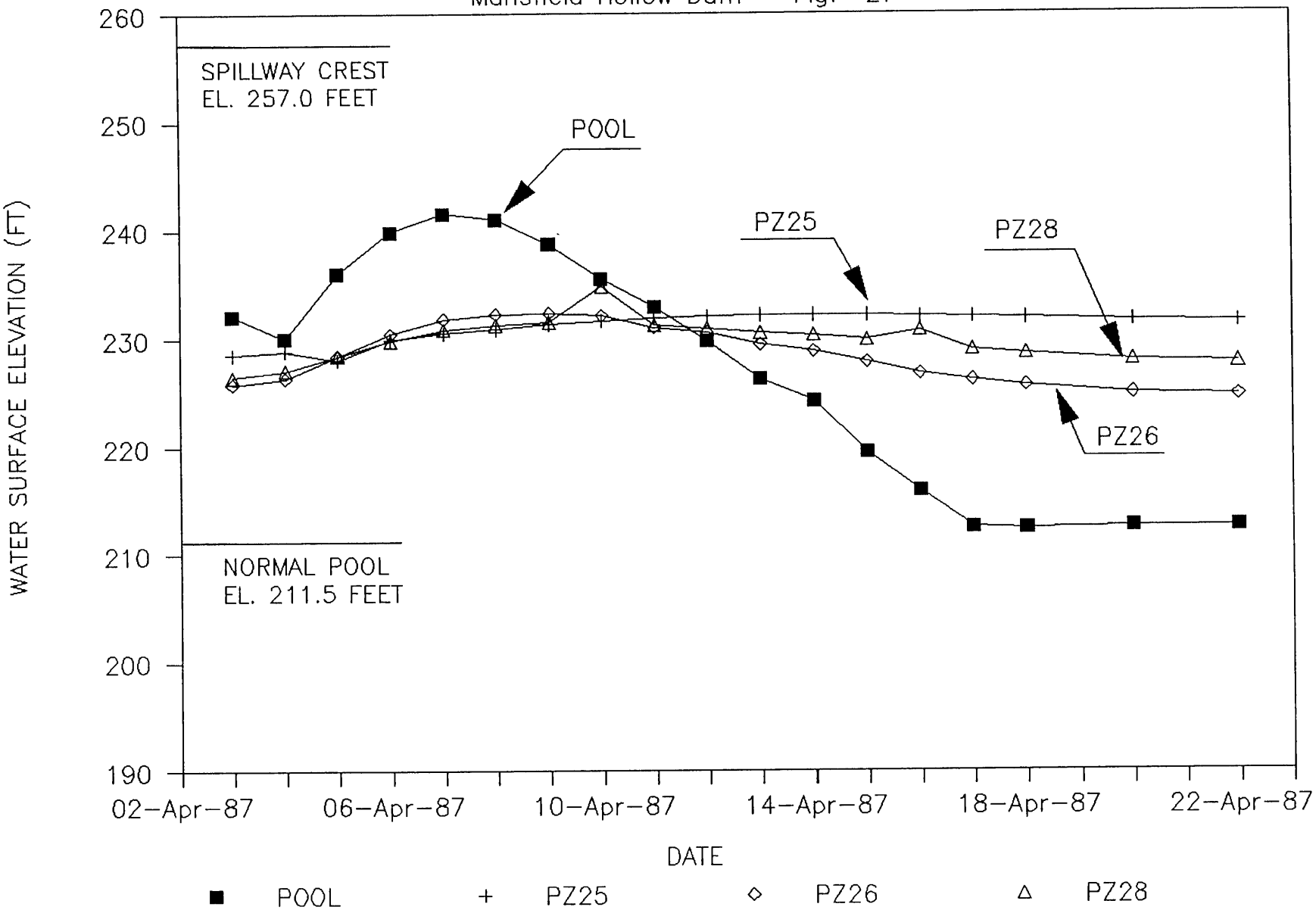
Mansfield Hollow Dam Fig. 26



POOL AND PIEZOMETERS VS TIME (April 1987)

Piezometers PZ25, PZ26, and PZ28

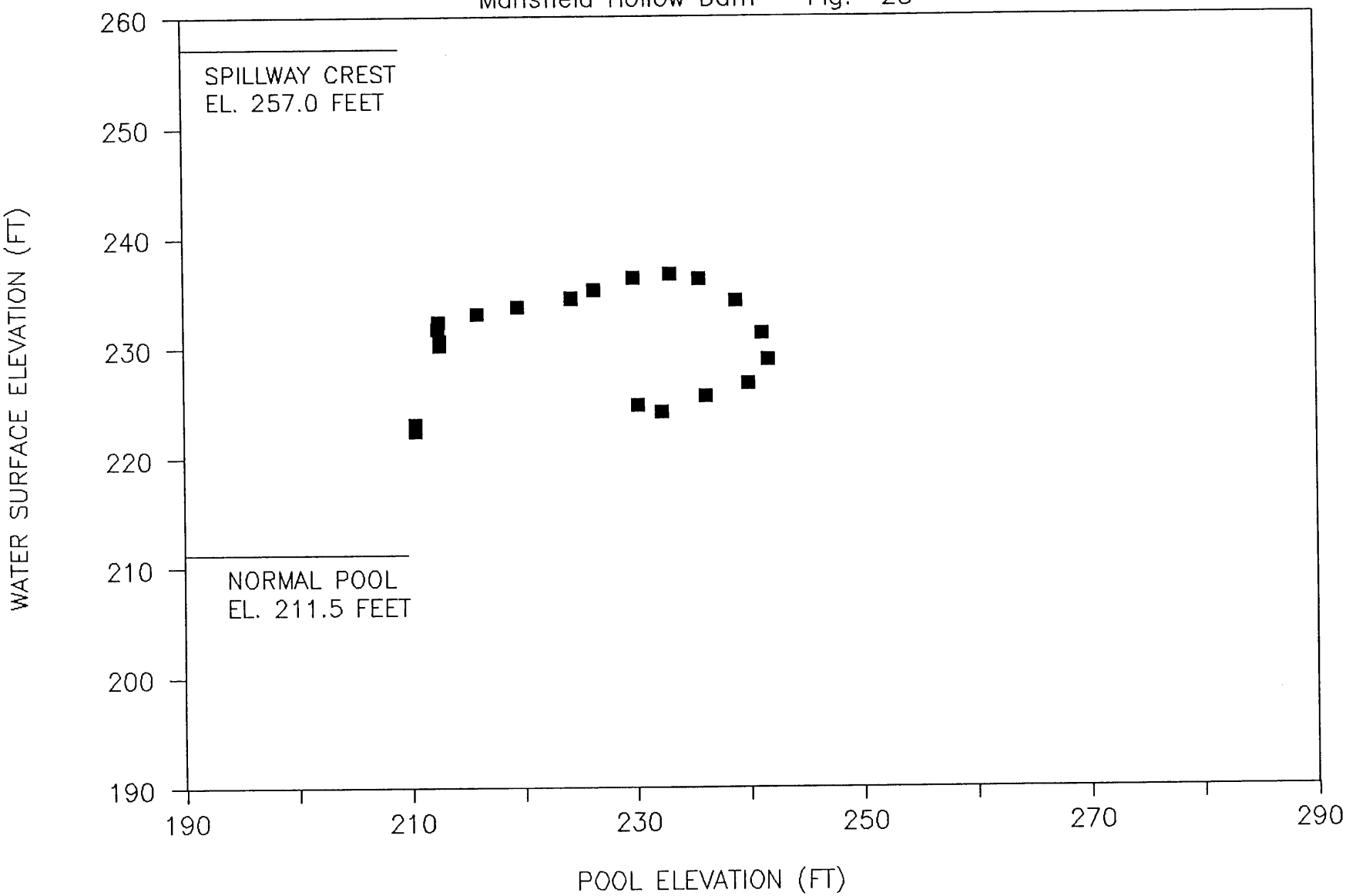
Mansfield Hollow Dam Fig. 27



PIEZOMETER VS POOL

Piezometer PZ1

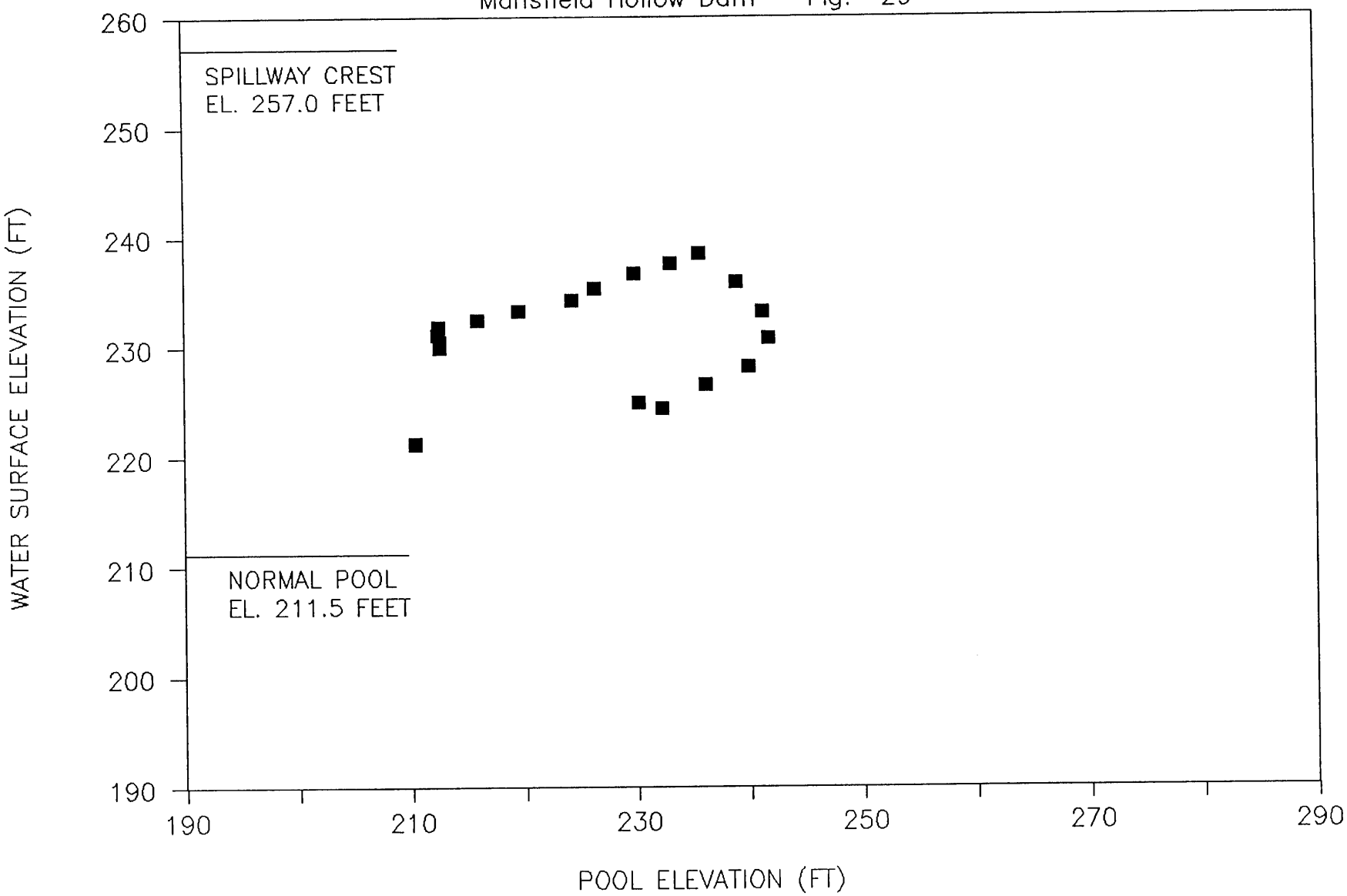
Mansfield Hollow Dam Fig. 28



PIEZOMETER VS POOL

Piezometer PZ2

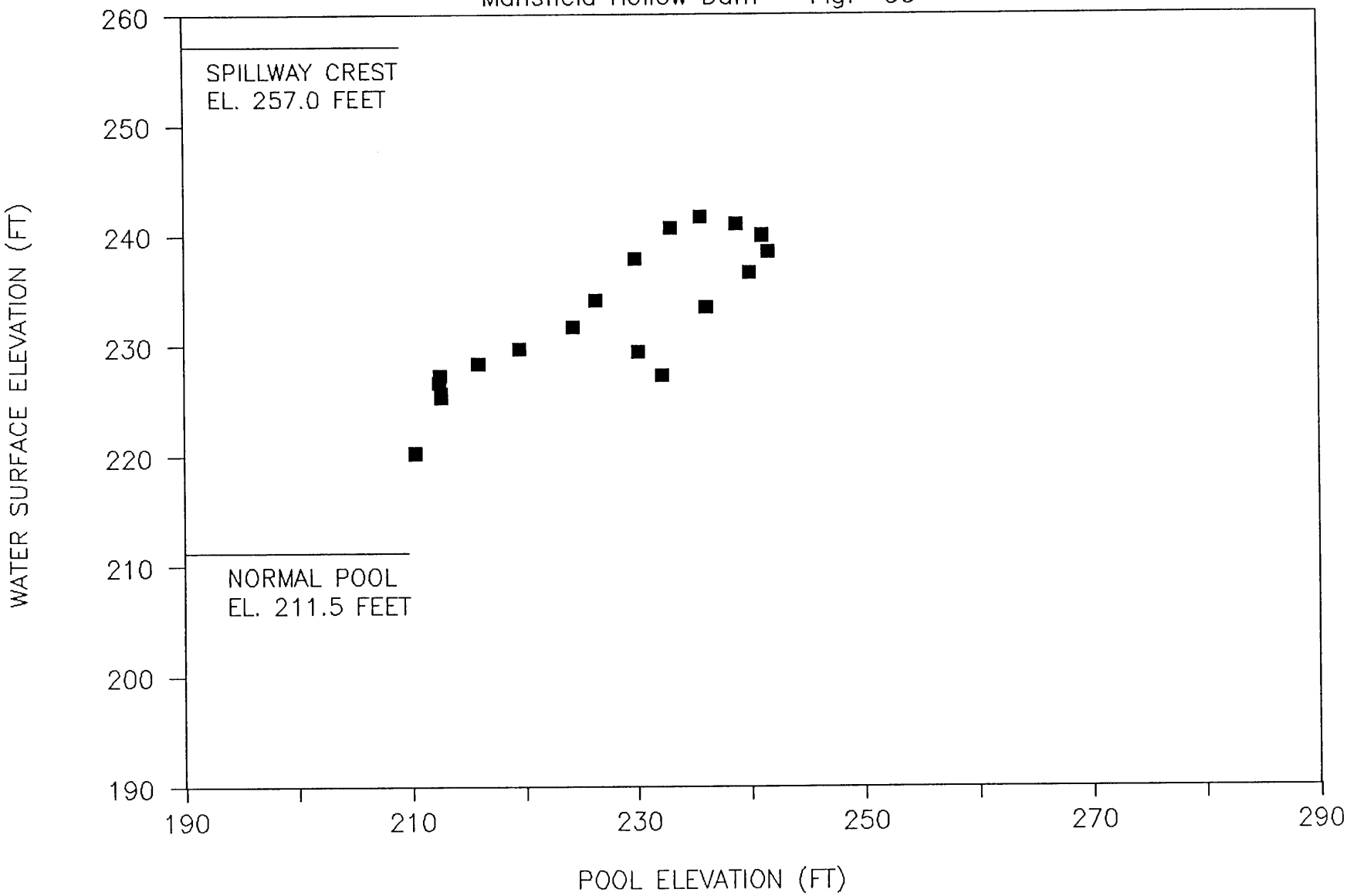
Mansfield Hollow Dam Fig. 29



PIEZOMETER VS POOL

Piezometer PZ3

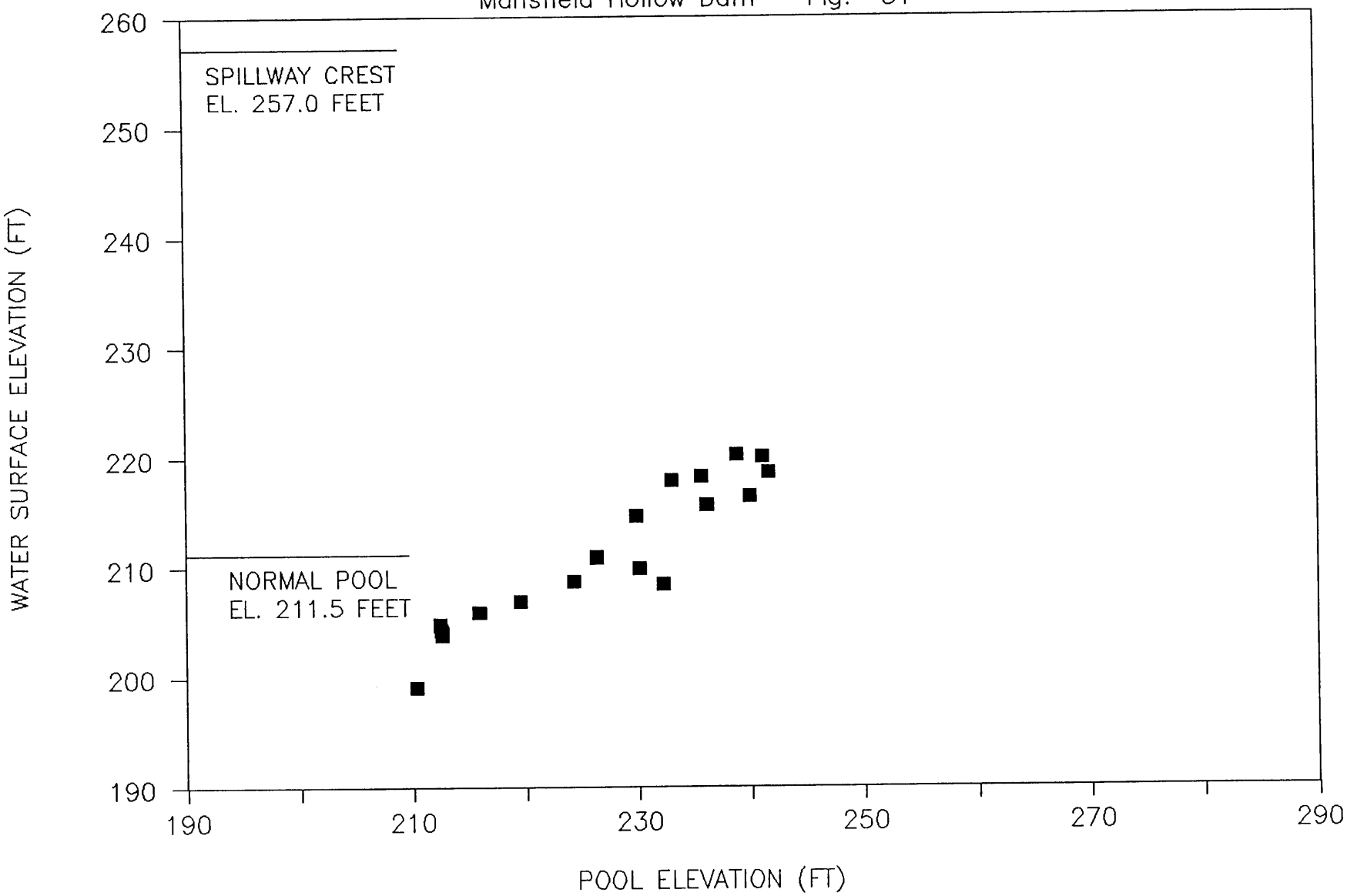
Mansfield Hollow Dam Fig. 30



PIEZOMETER VS POOL

Piezometer PZ4

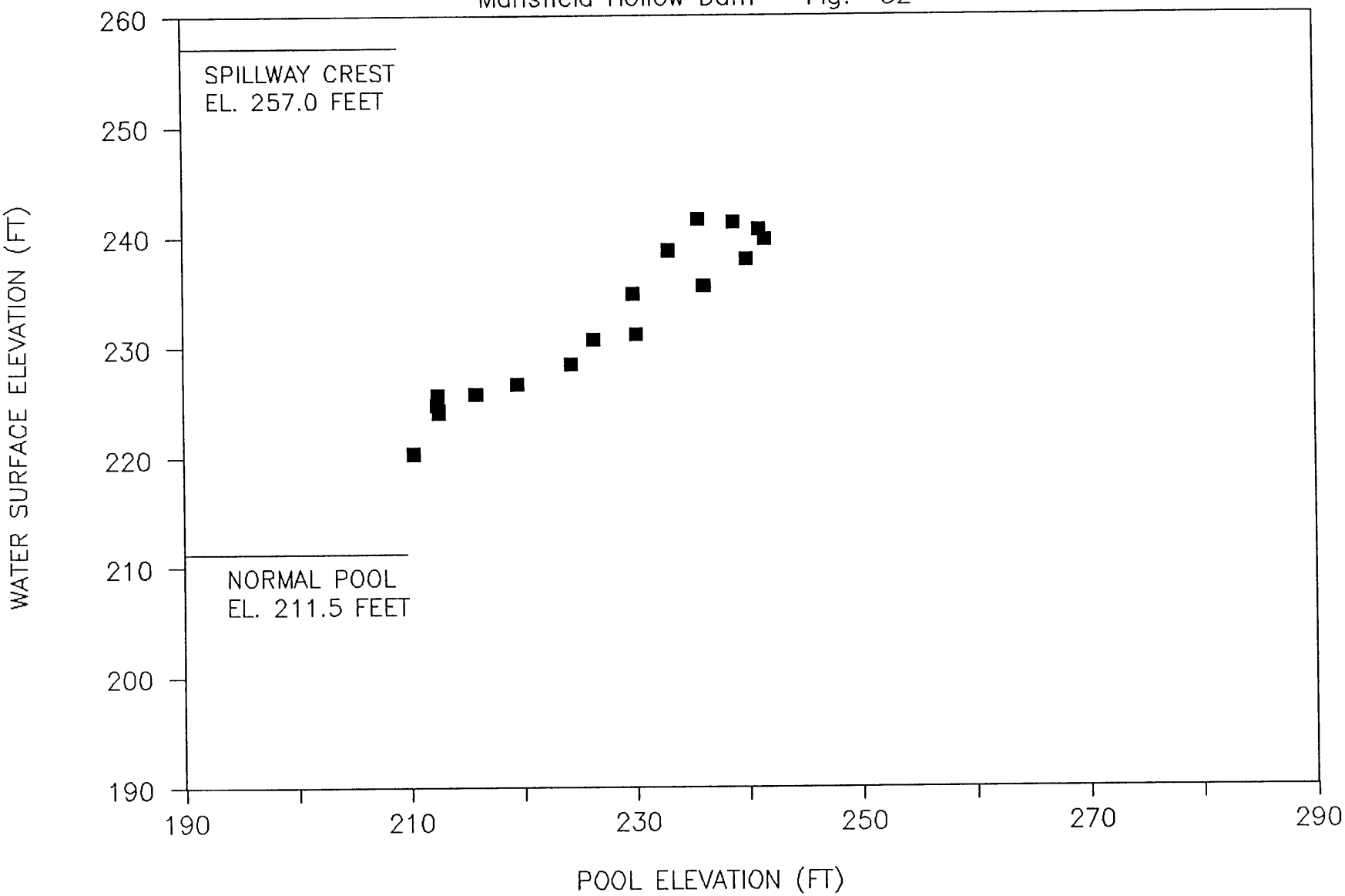
Mansfield Hollow Dam Fig. 31



PIEZOMETER VS POOL

Piezometer PZ5

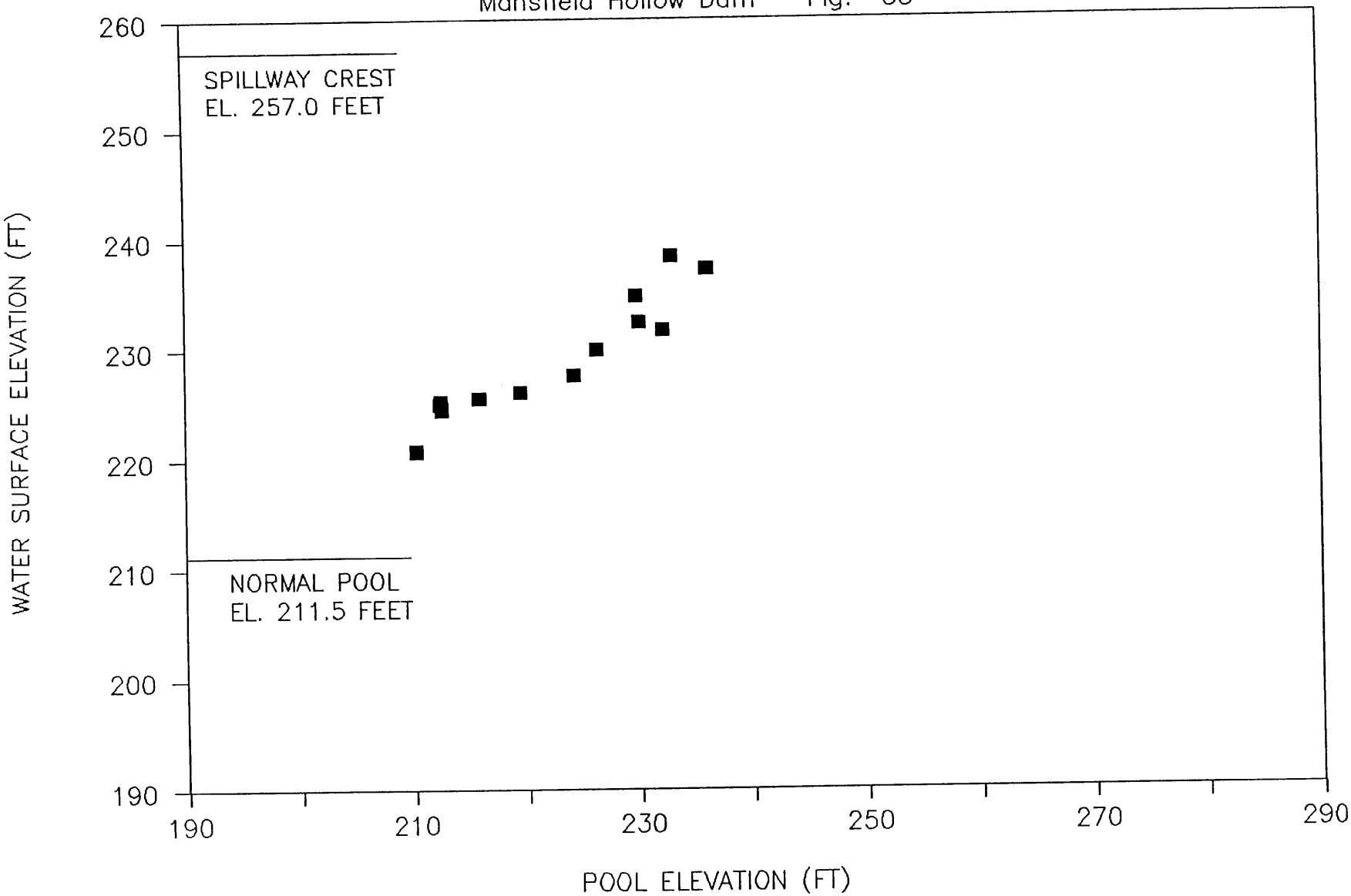
Mansfield Hollow Dam Fig. 32



PIEZOMETER VS POOL

Piezometer PZ6

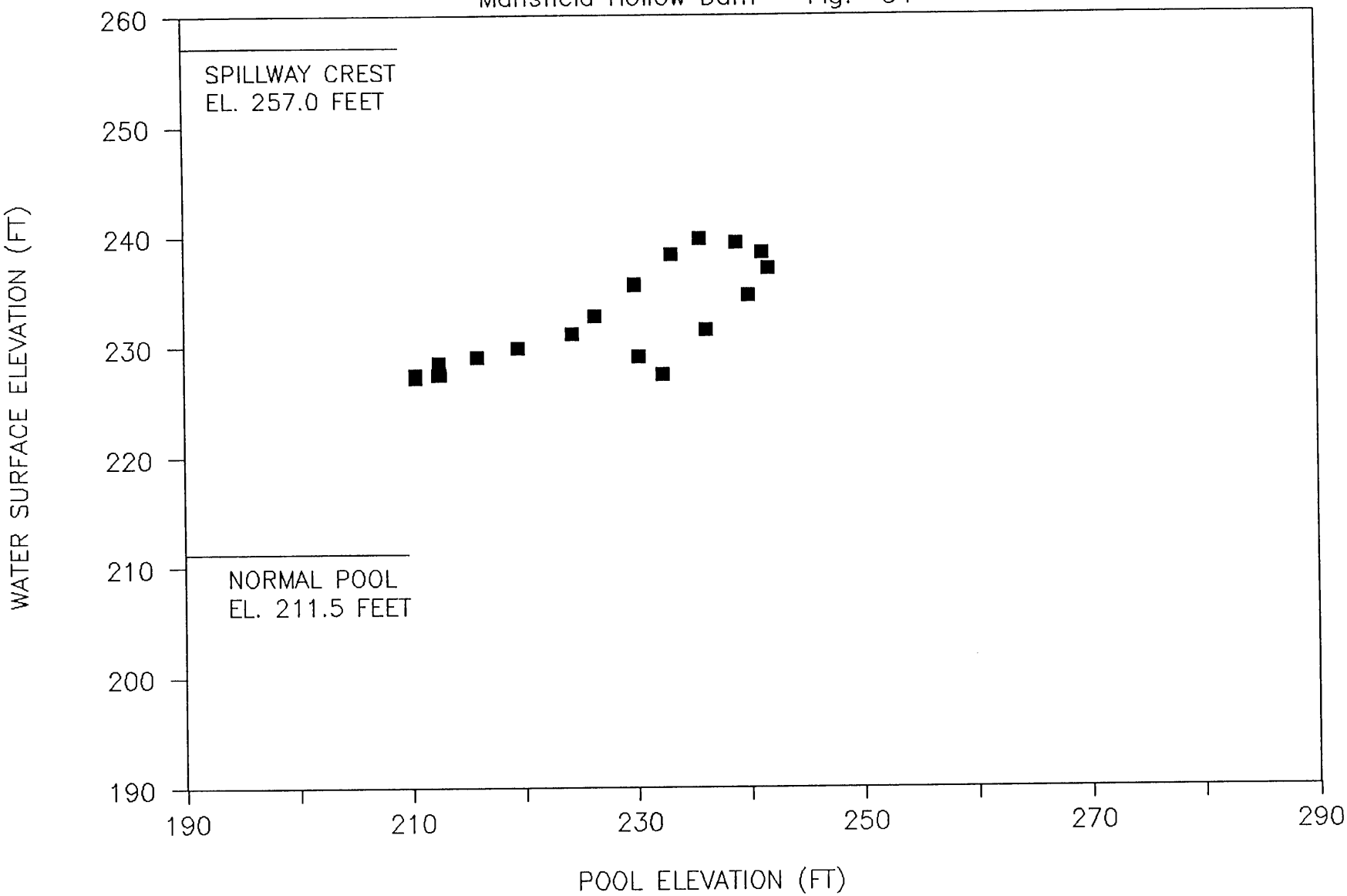
Mansfield Hollow Dam Fig. 33



PIEZOMETER VS POOL

Piezometer PZ7

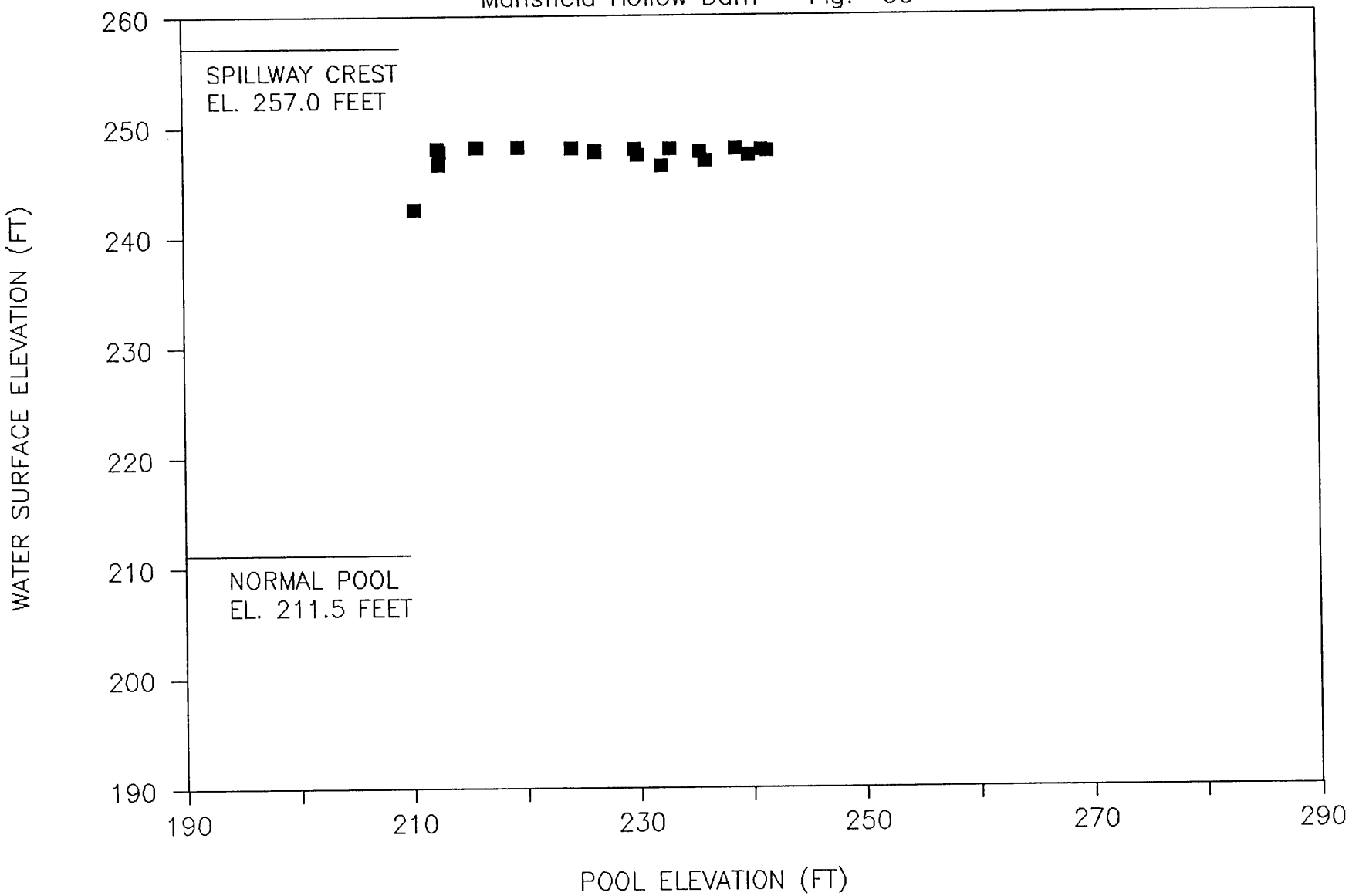
Mansfield Hollow Dam Fig. 34



PIEZOMETER VS POOL

Piezometer PZ8

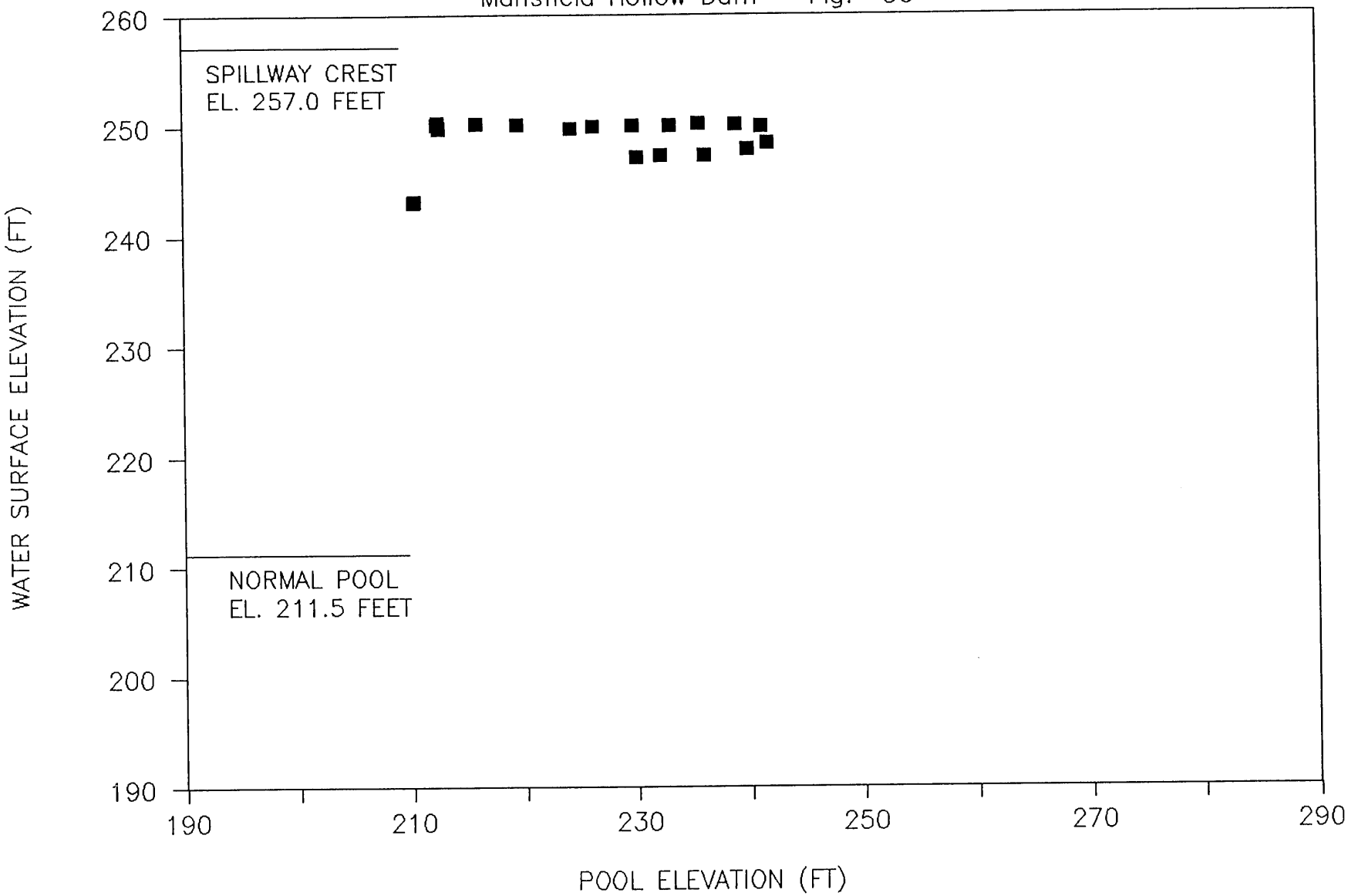
Mansfield Hollow Dam Fig. 35



PIEZOMETER VS POOL

Piezometer PZ9

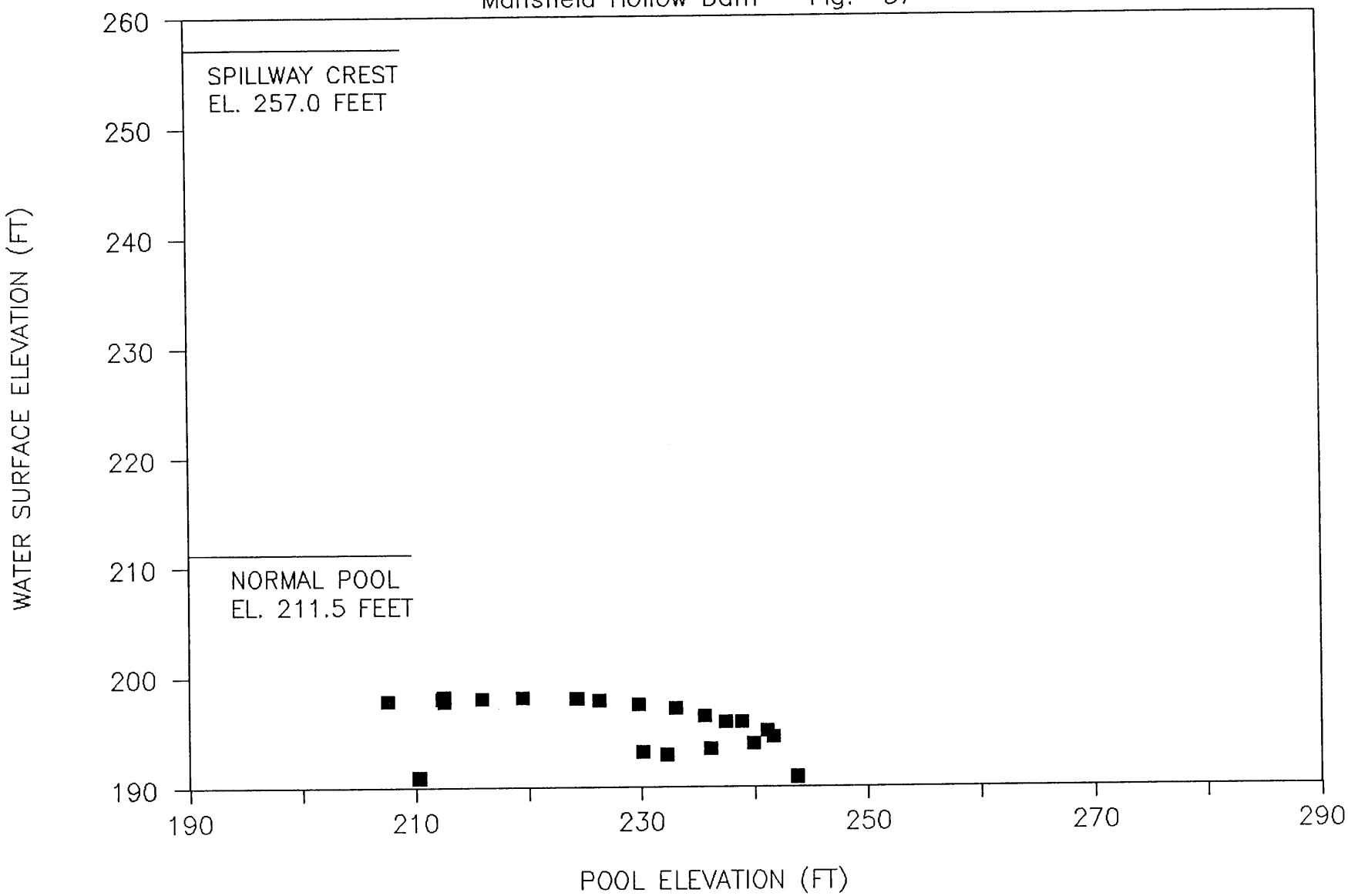
Mansfield Hollow Dam Fig. 36



PIEZOMETER VS POOL

Piezometer PZ10

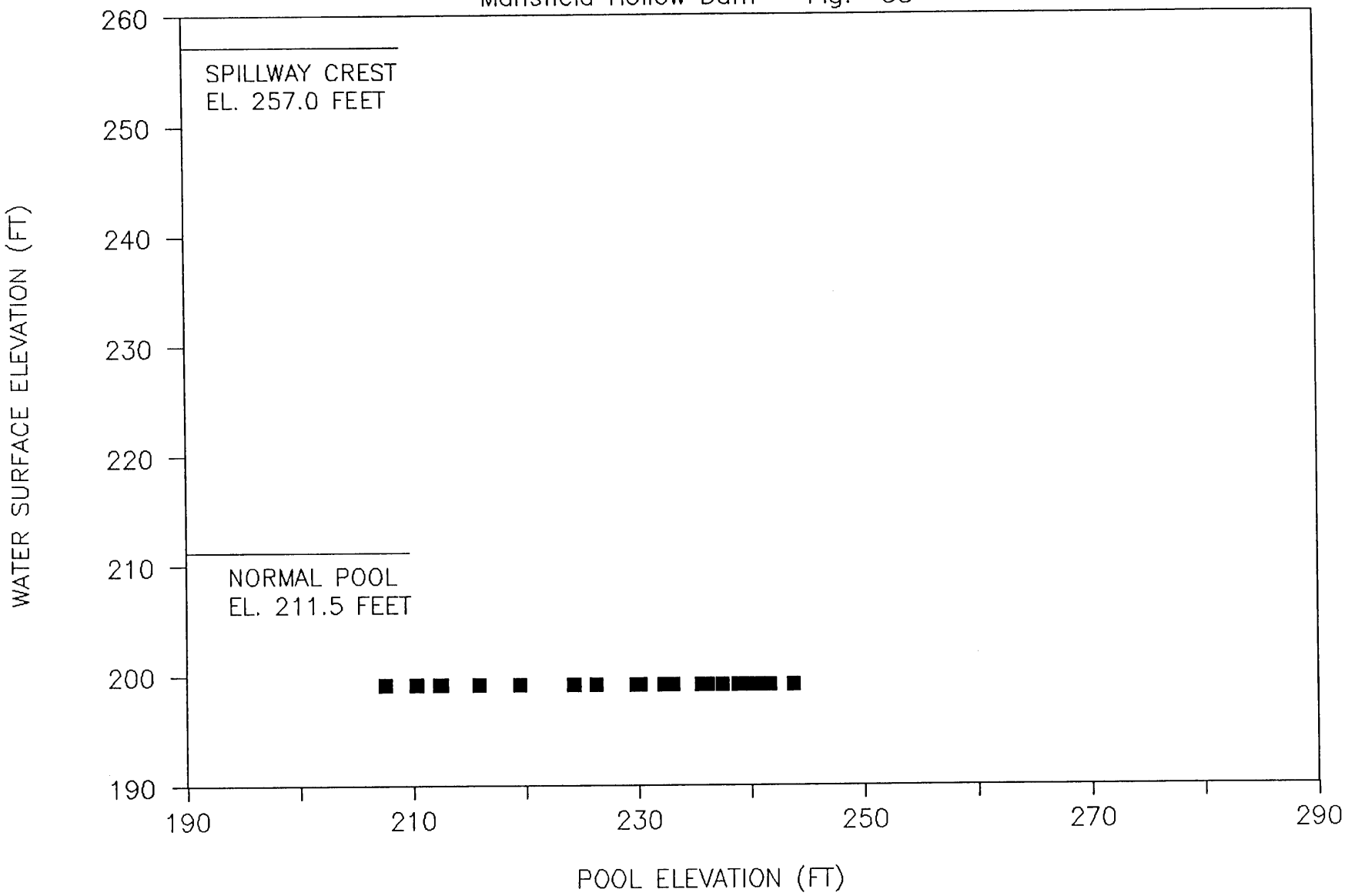
Mansfield Hollow Dam Fig. 37



PIEZOMETER VS POOL

Piezometer PZ11

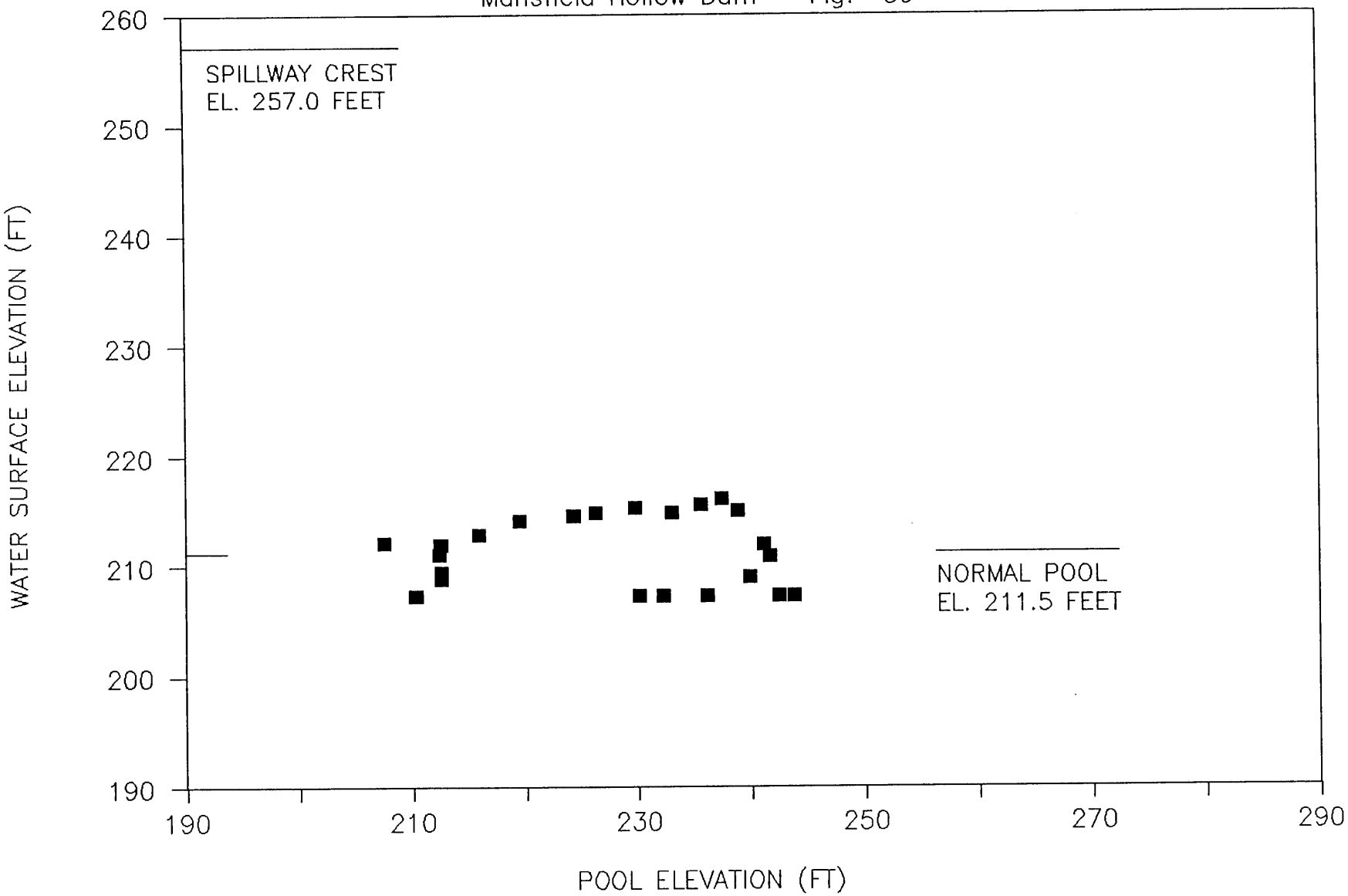
Mansfield Hollow Dam Fig. 38



PIEZOMETER VS POOL

Piezometer PZ12

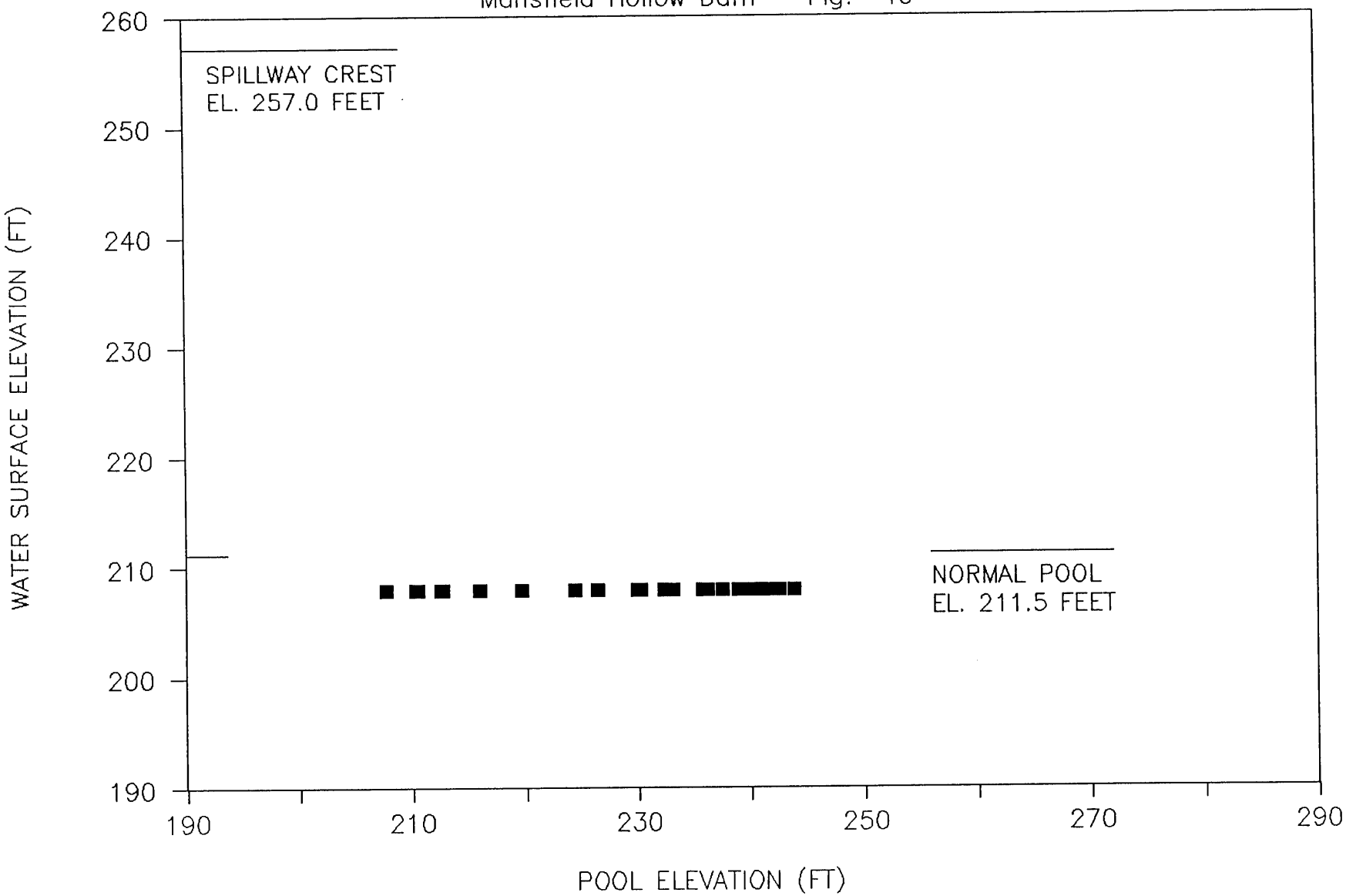
Mansfield Hollow Dam Fig. 39



PIEZOMETER VS POOL

Piezometer PZ13

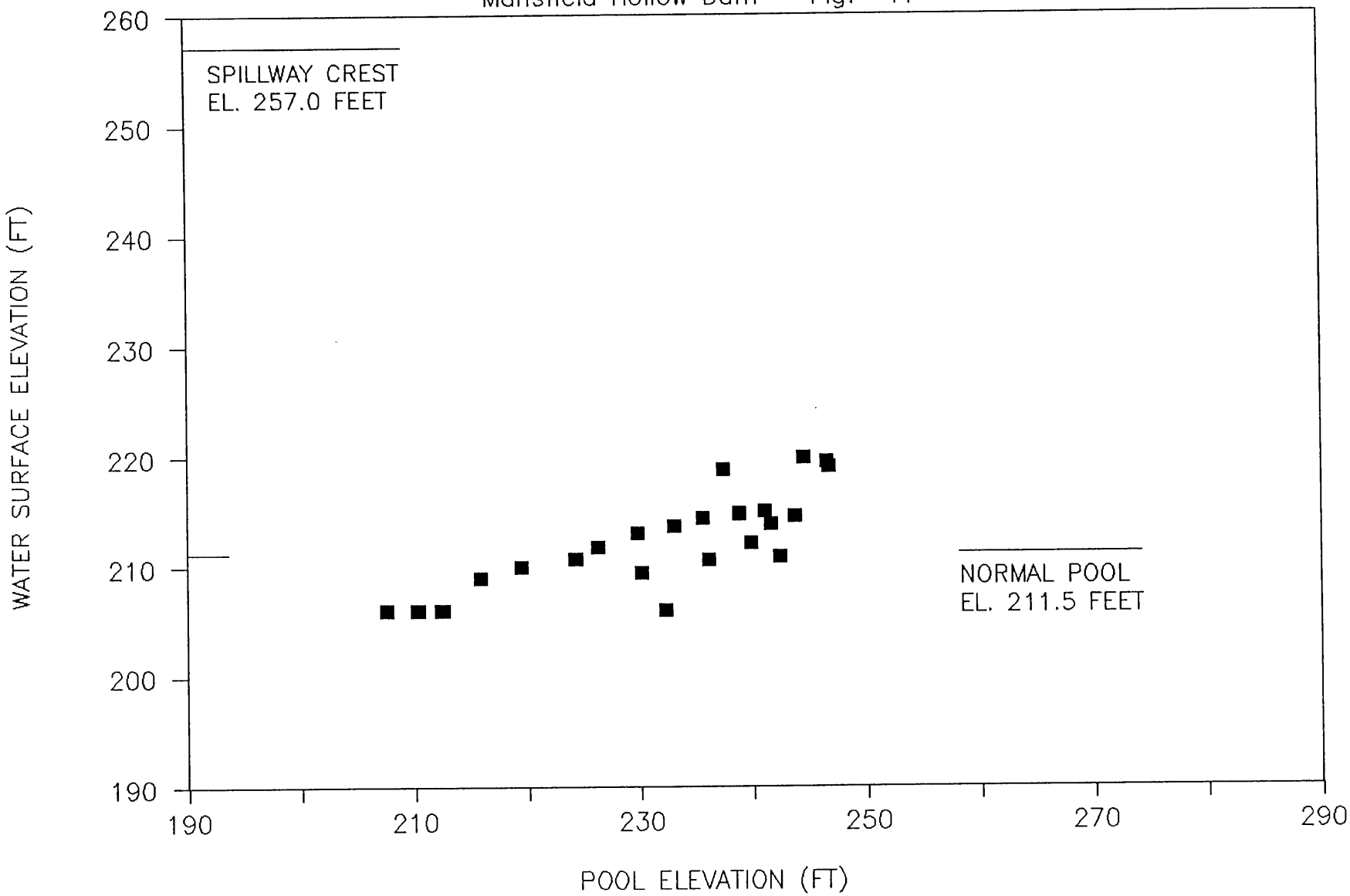
Mansfield Hollow Dam Fig. 40



PIEZOMETER VS POOL

Piezometer PZ14

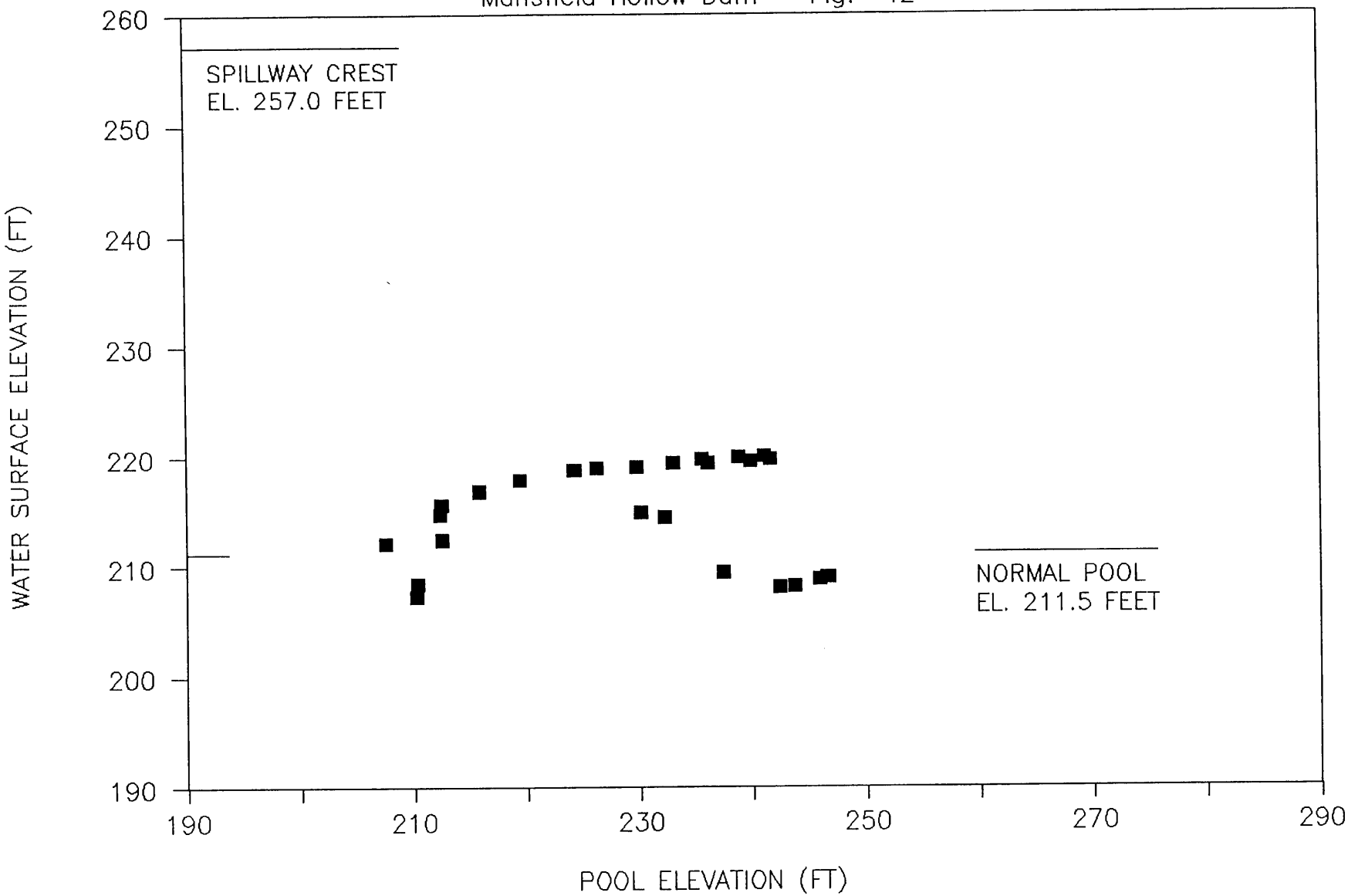
Mansfield Hollow Dam Fig. 41



PIEZOMETER VS POOL

Piezometer PZ15

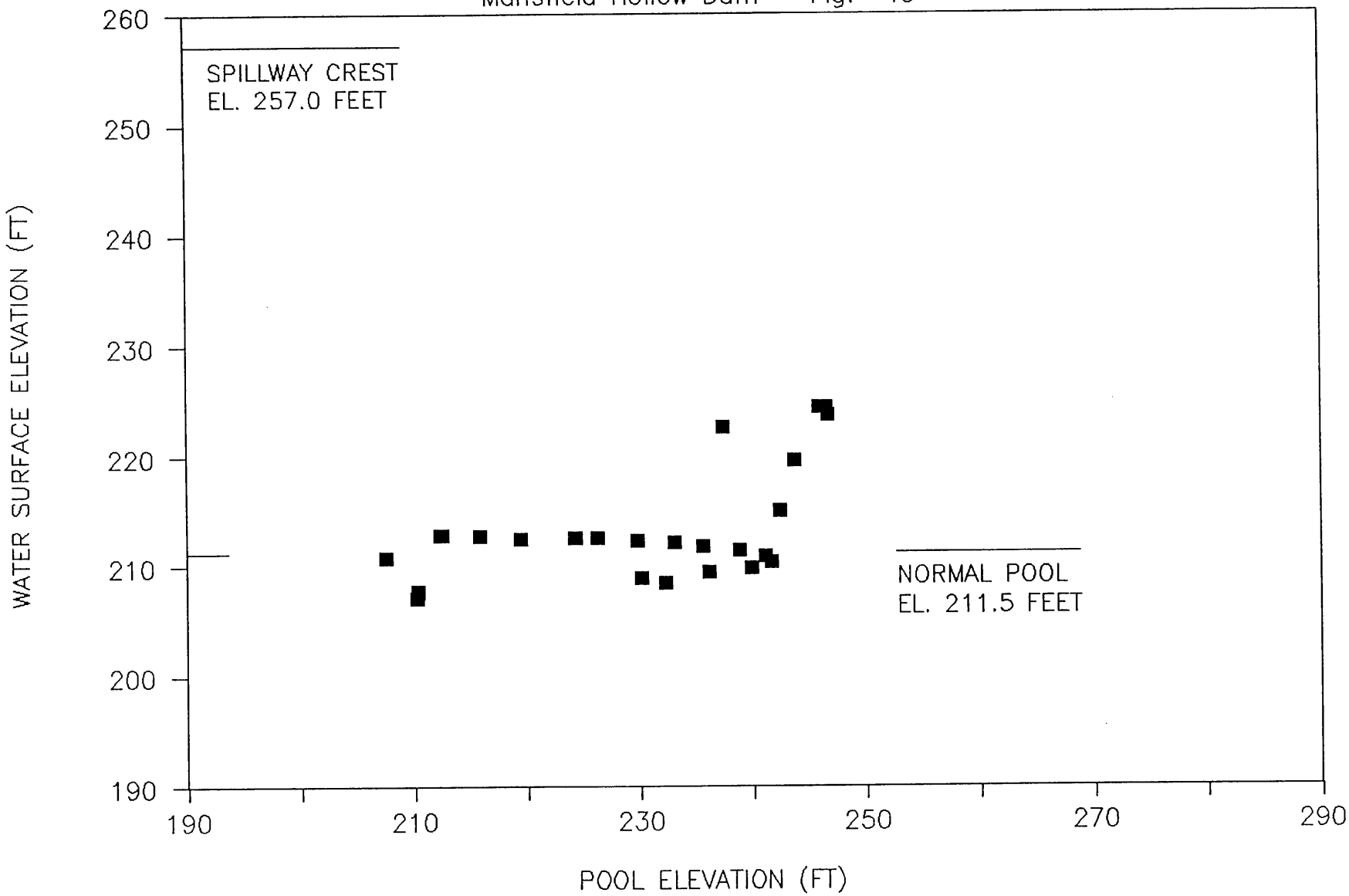
Mansfield Hollow Dam Fig. 42



PIEZOMETER VS POOL

Piezometer PZ16

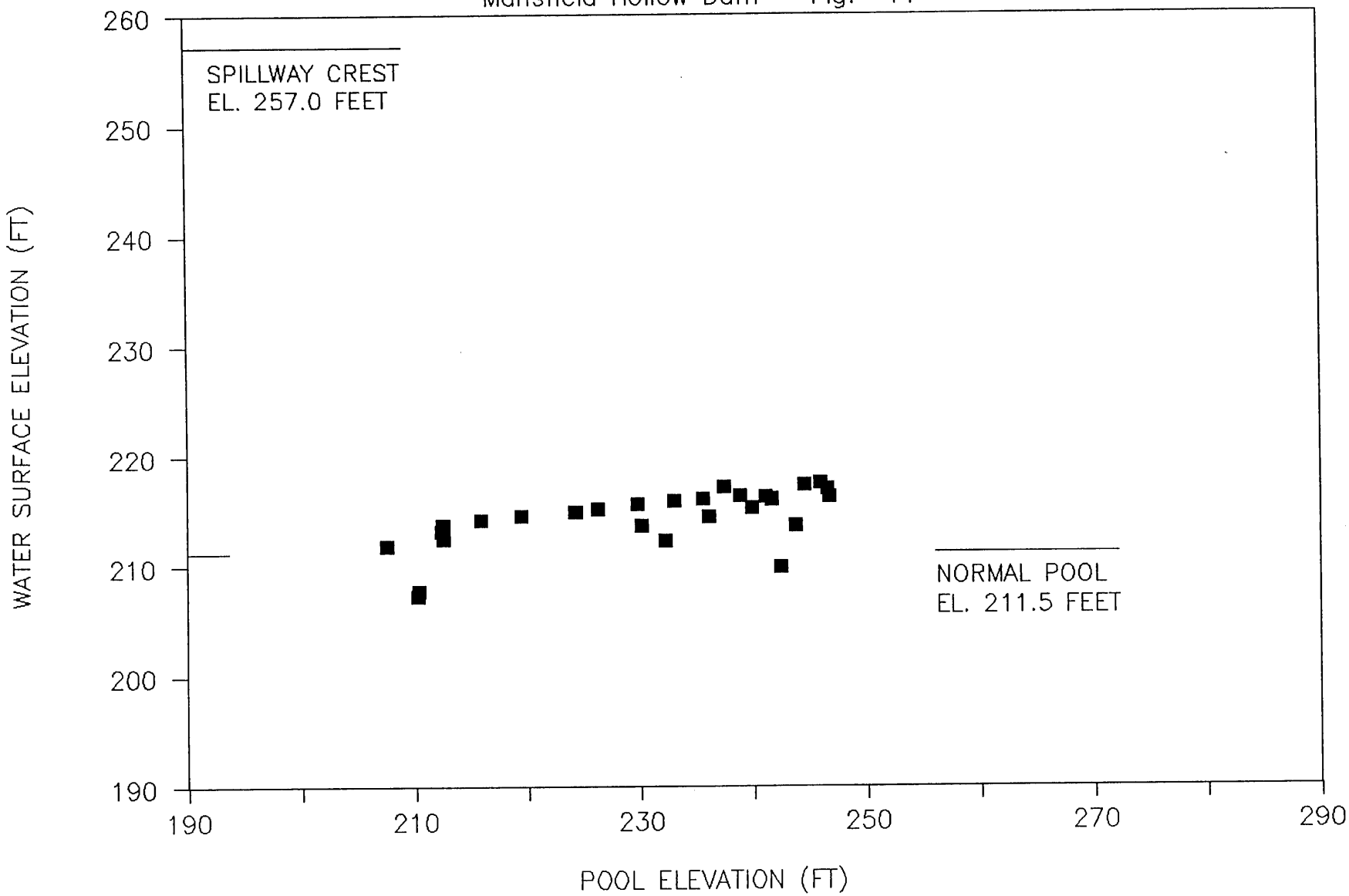
Mansfield Hollow Dam Fig. 43



PIEZOMETER VS POOL

Piezometer PZ17

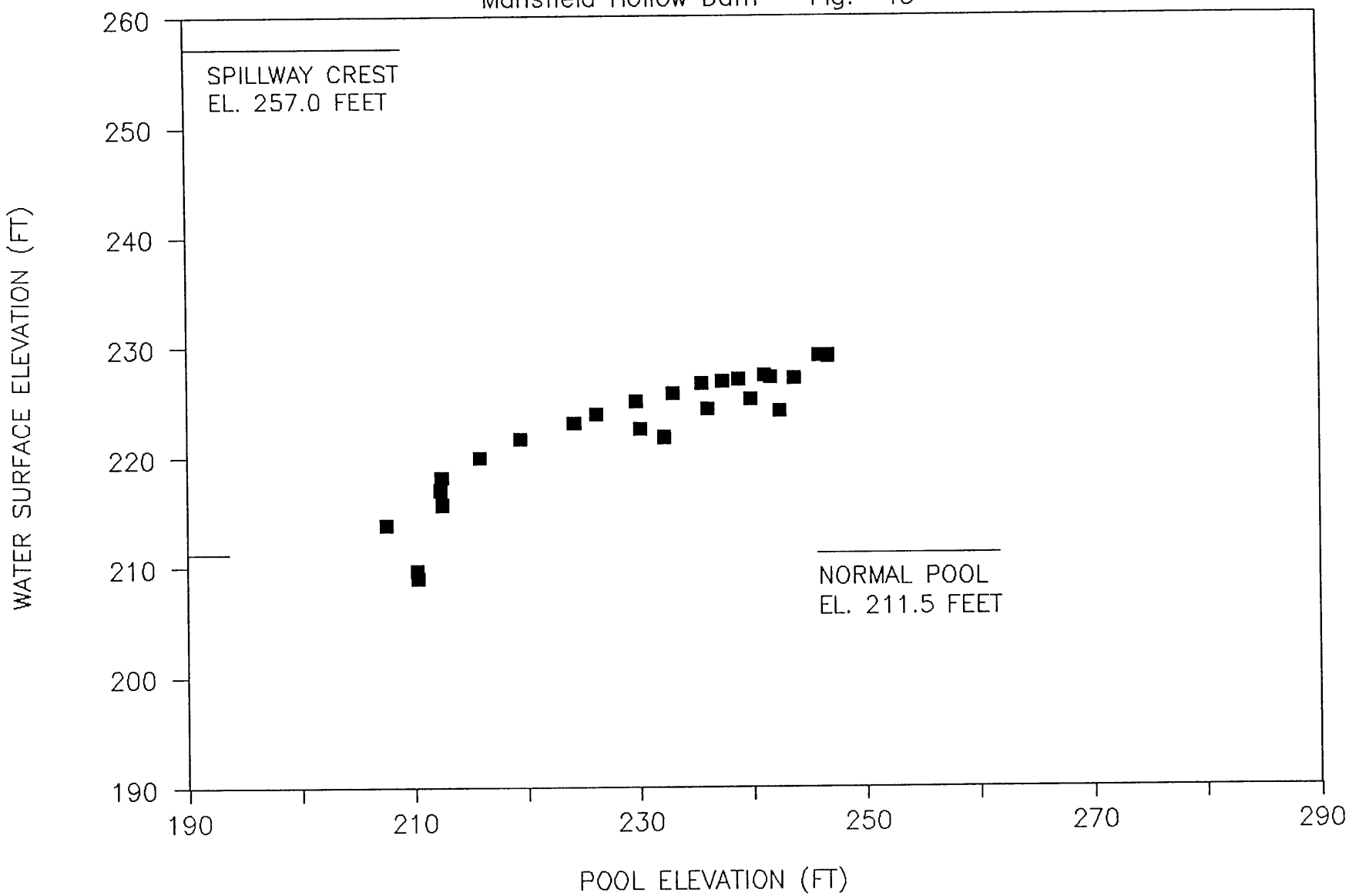
Mansfield Hollow Dam Fig. 44



PIEZOMETER VS POOL

Piezometer PZ18

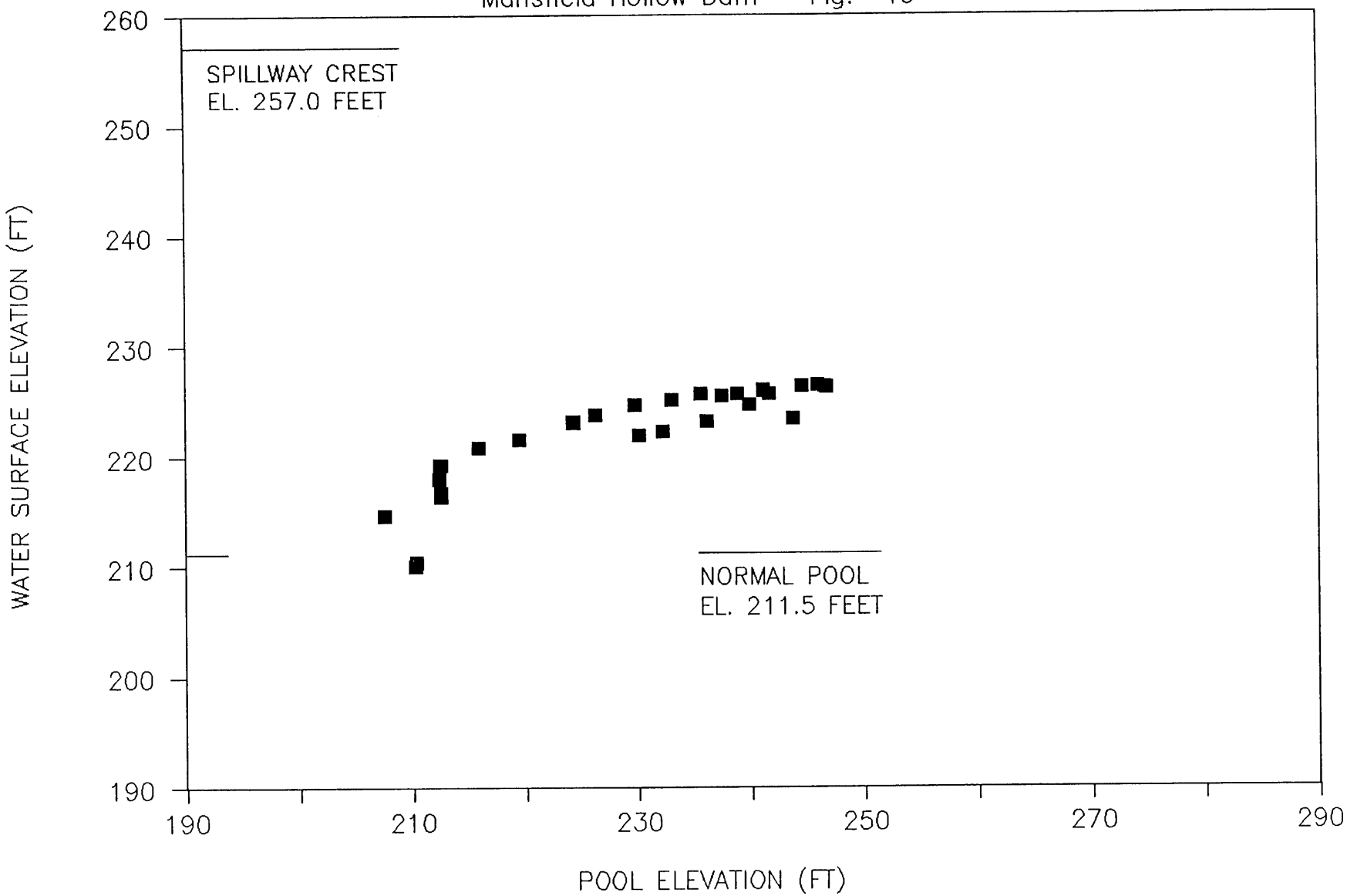
Mansfield Hollow Dam Fig. 45



PIEZOMETER VS POOL

Piezometer PZ19

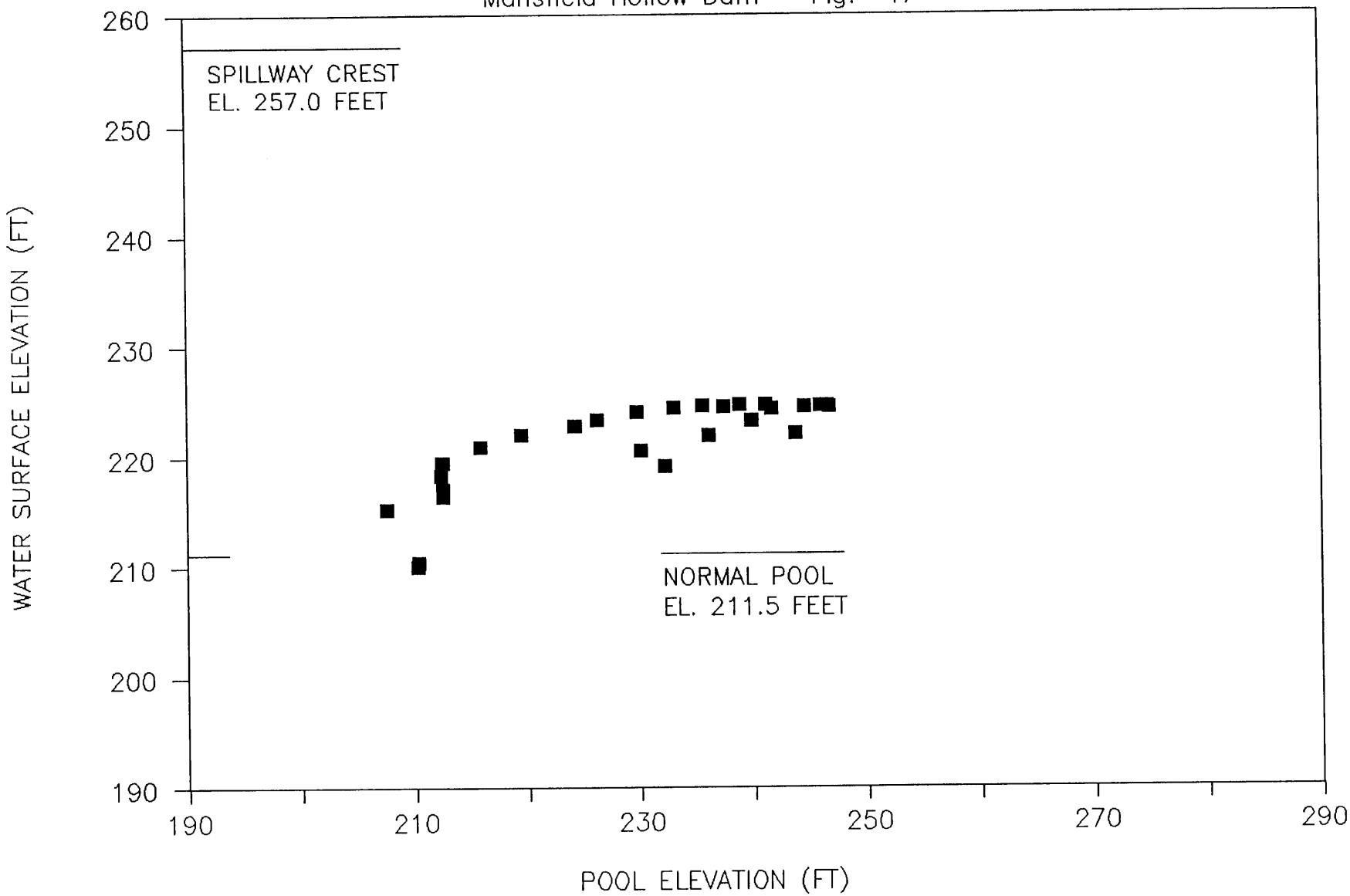
Mansfield Hollow Dam Fig. 46



PIEZOMETER VS POOL

Piezometer PZ20

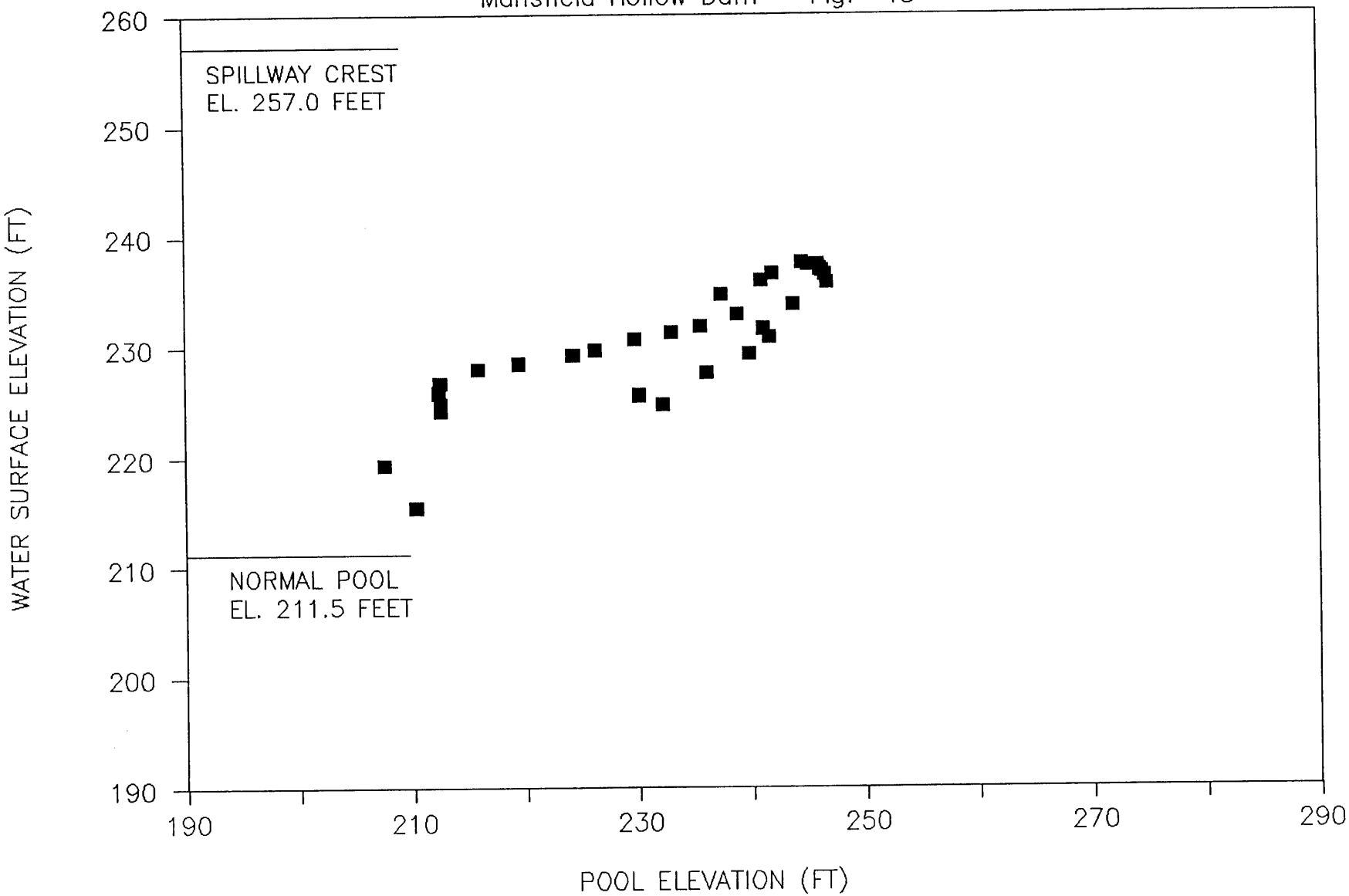
Mansfield Hollow Dam Fig. 47



PIEZOMETER VS POOL

Piezometer PZ21

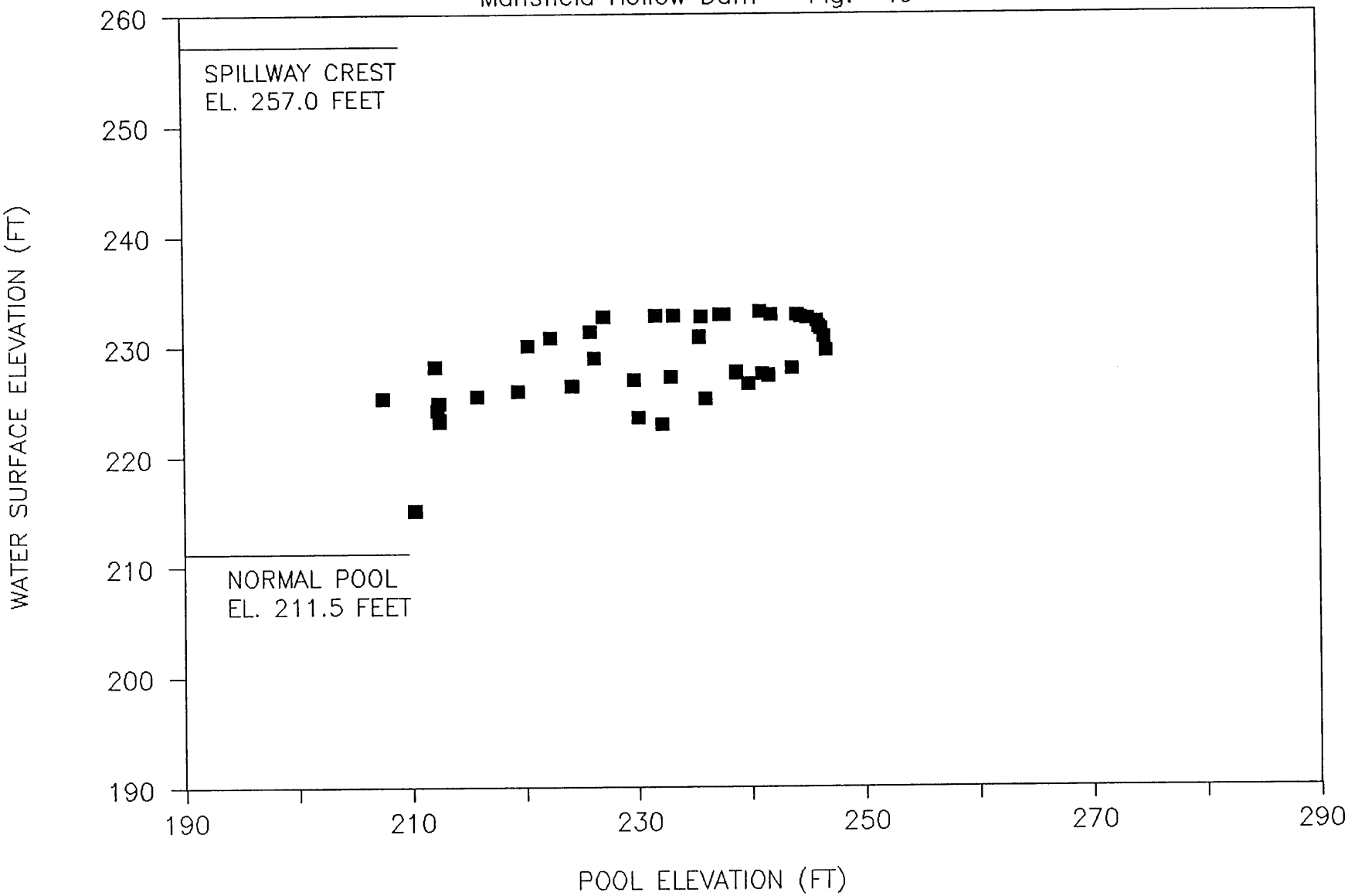
Mansfield Hollow Dam Fig. 48



PIEZOMETER VS POOL

Piezometer PZ22

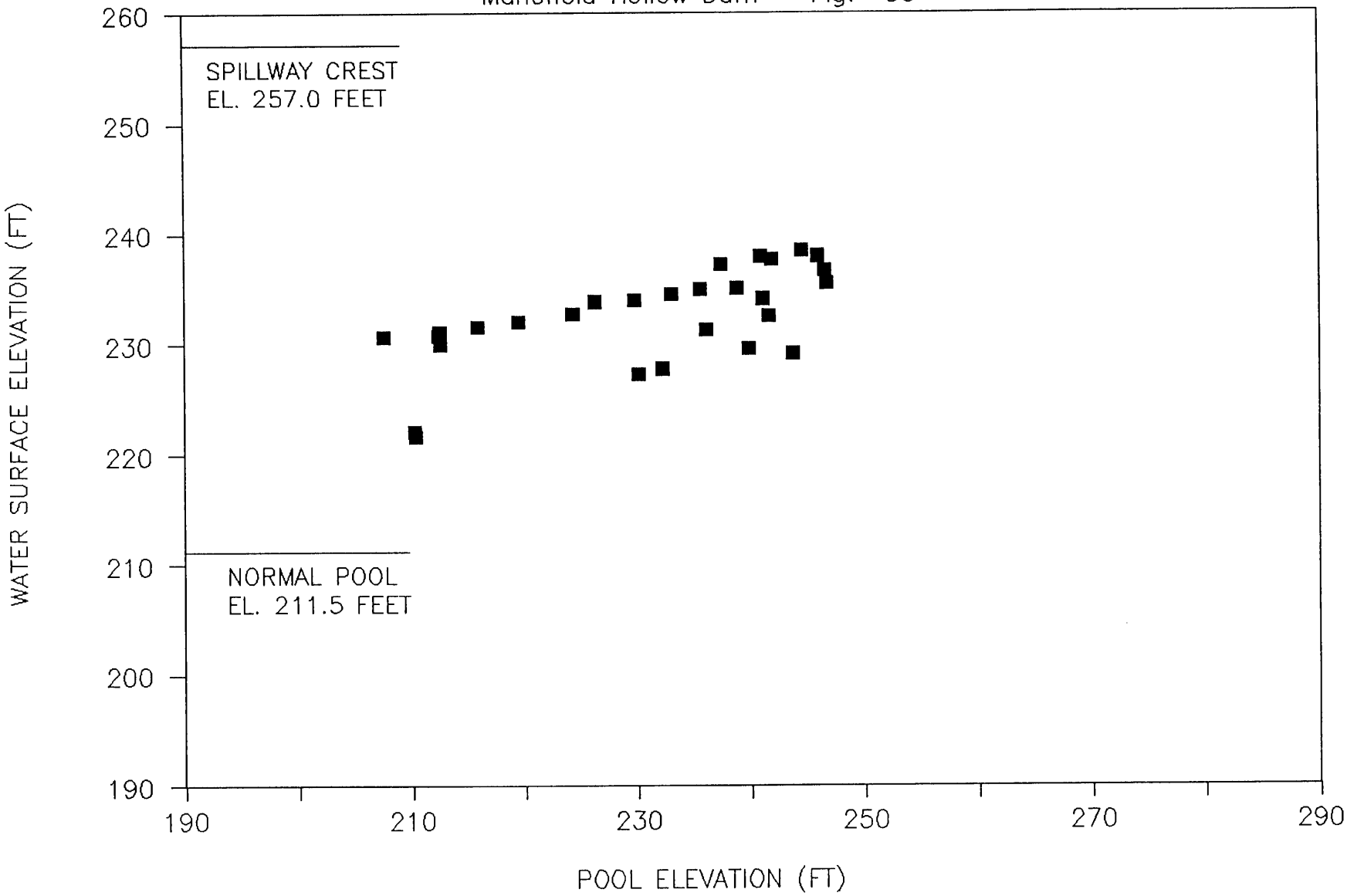
Mansfield Hollow Dam Fig. 49



PIEZOMETER VS POOL

Piezometer PZ23

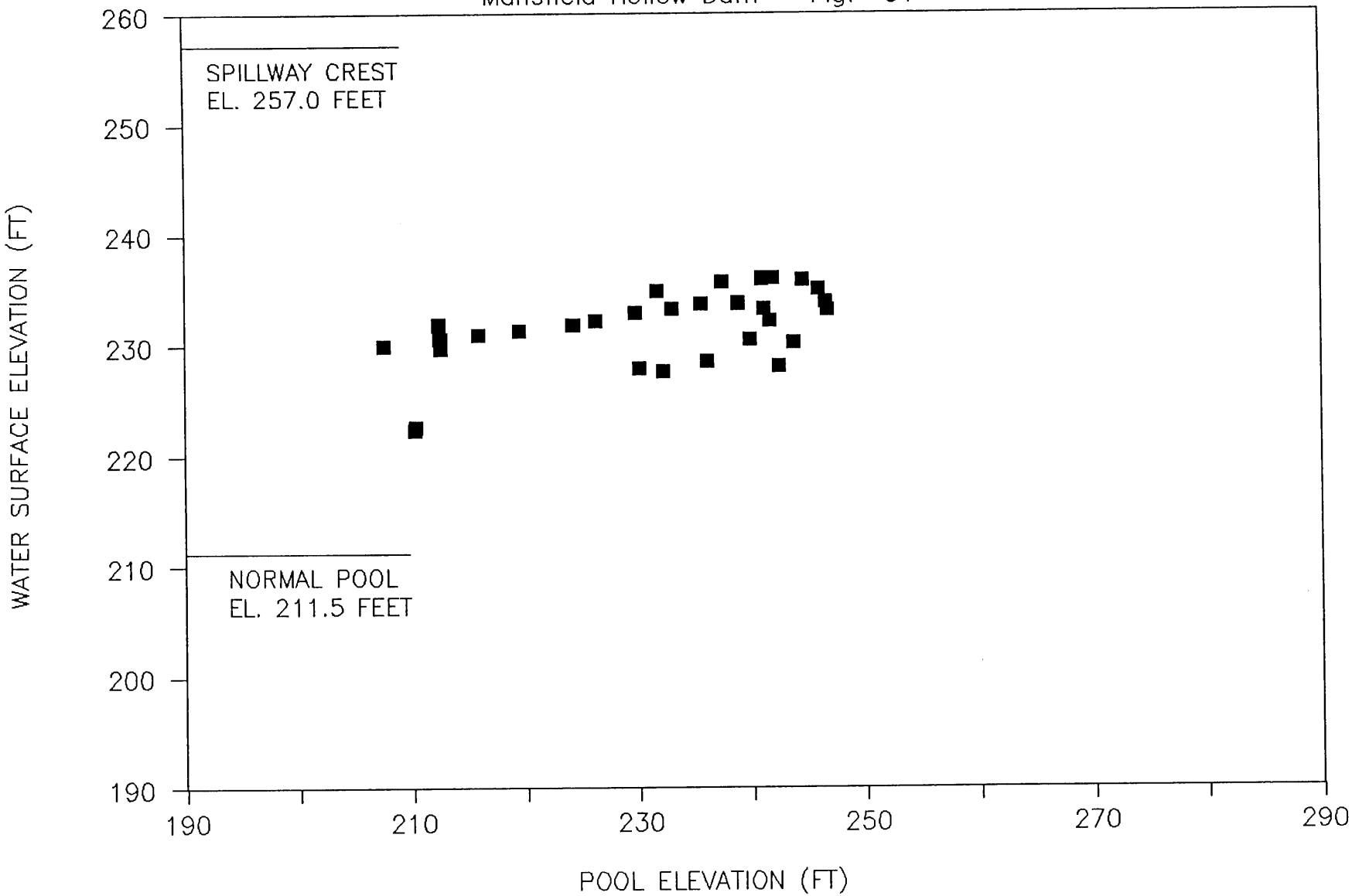
Mansfield Hollow Dam Fig. 50



PIEZOMETER VS POOL

Piezometer PZ24

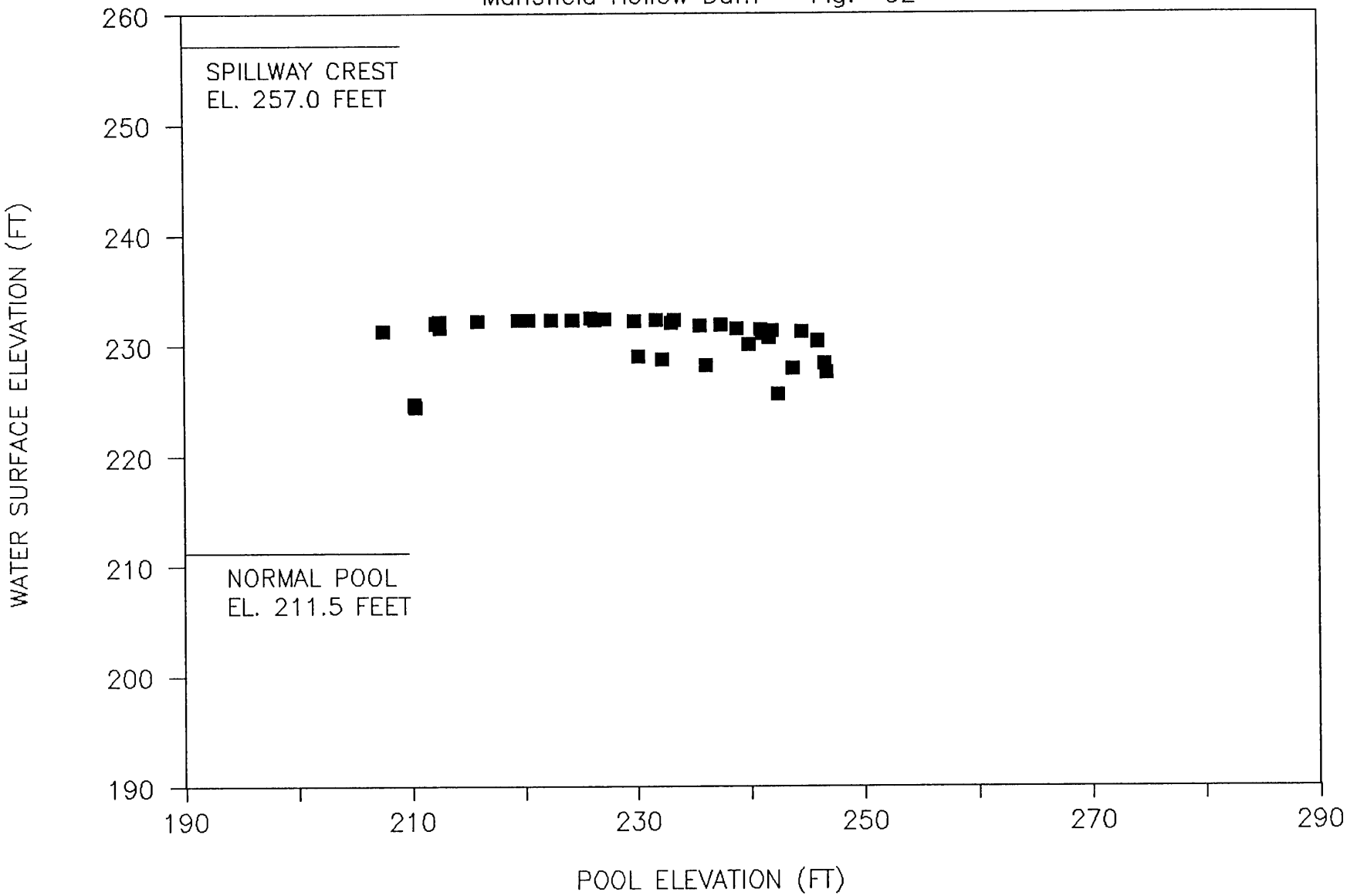
Mansfield Hollow Dam Fig. 51



PIEZOMETER VS POOL

Piezometer PZ25

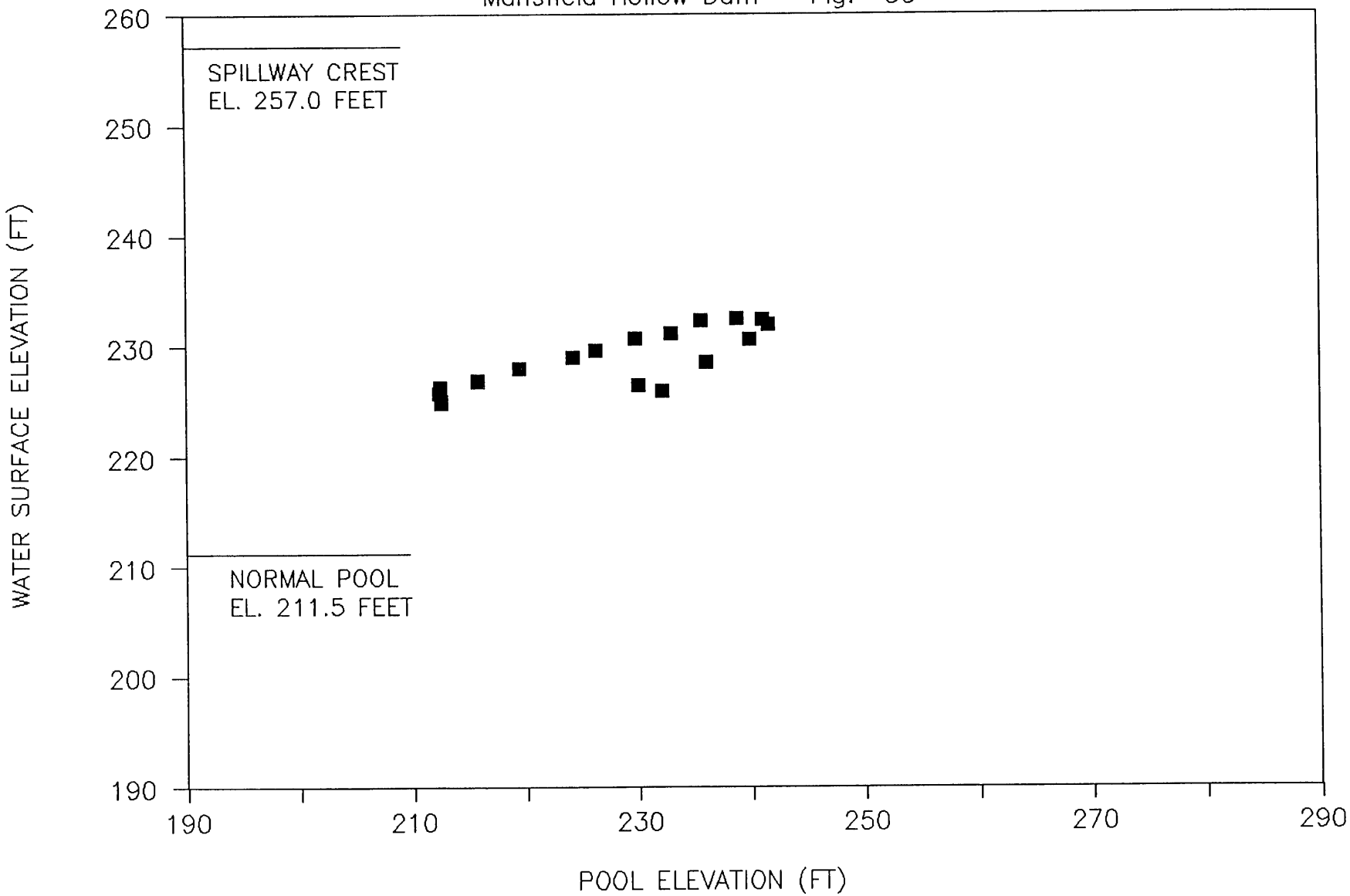
Mansfield Hollow Dam Fig. 52



PIEZOMETER VS POOL

Piezometer PZ26

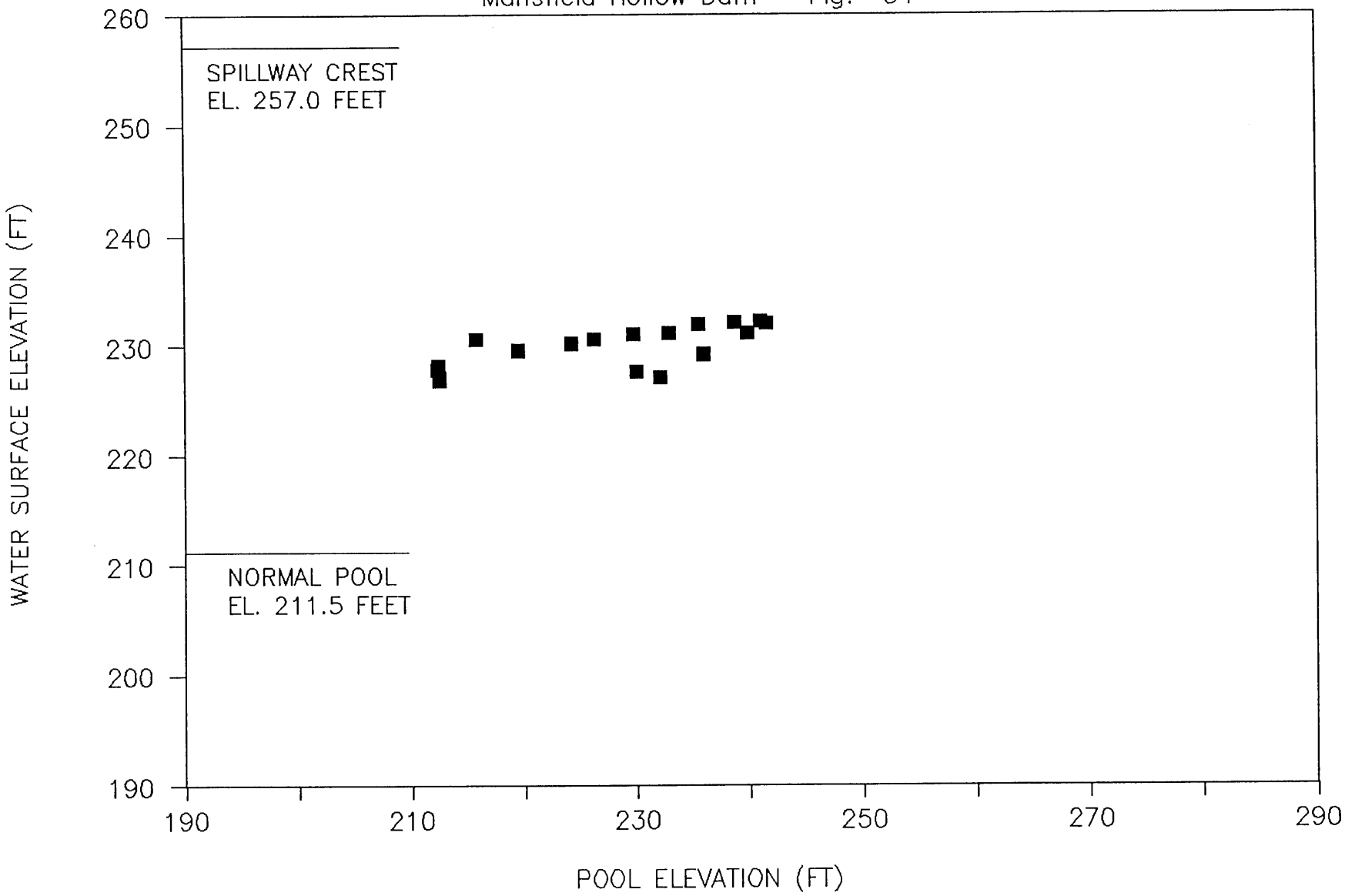
Mansfield Hollow Dam Fig. 53



PIEZOMETER VS POOL

Piezometer PZ27

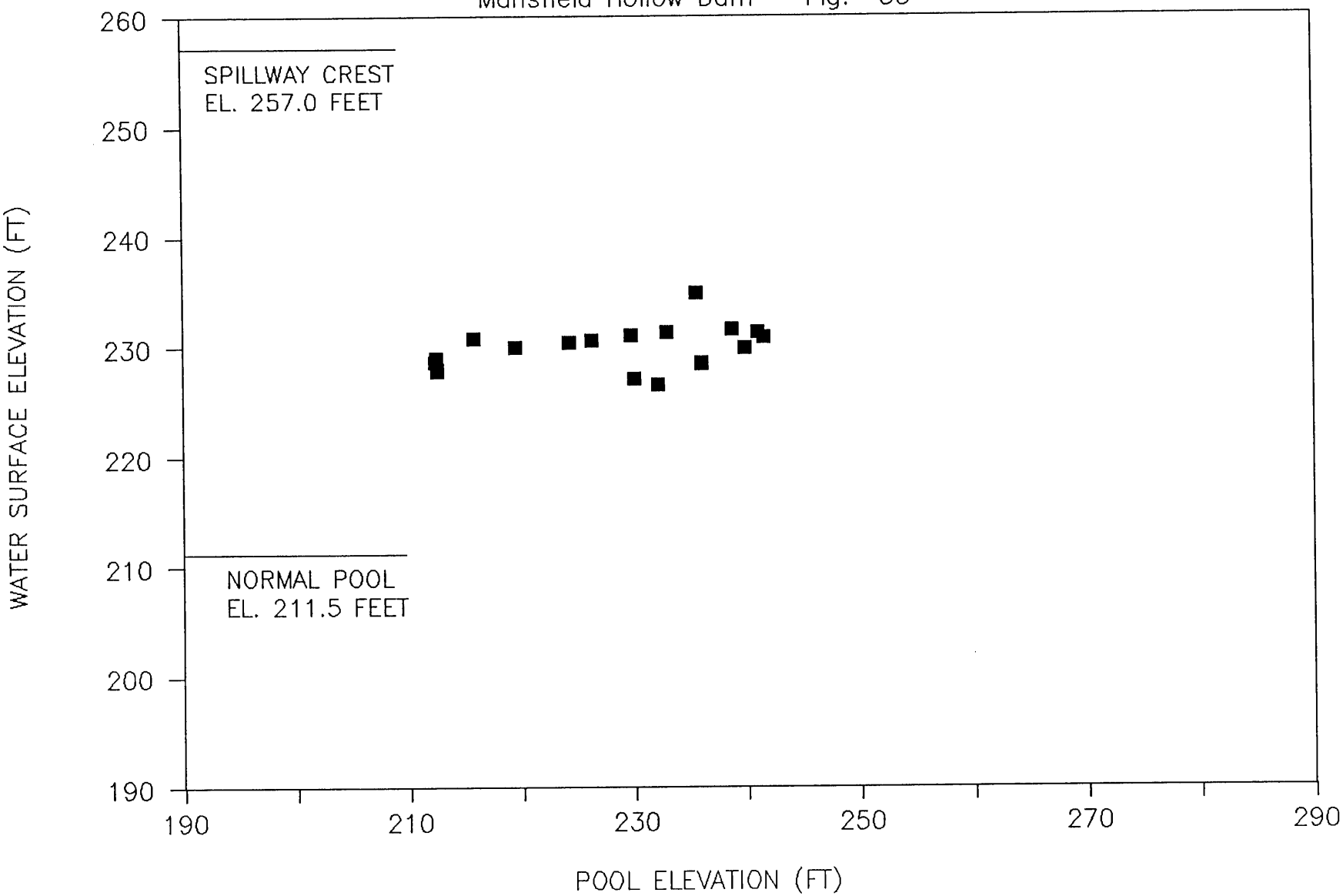
Mansfield Hollow Dam Fig. 54



PIEZOMETER VS POOL

Piezometer PZ28

Mansfield Hollow Dam Fig. 55

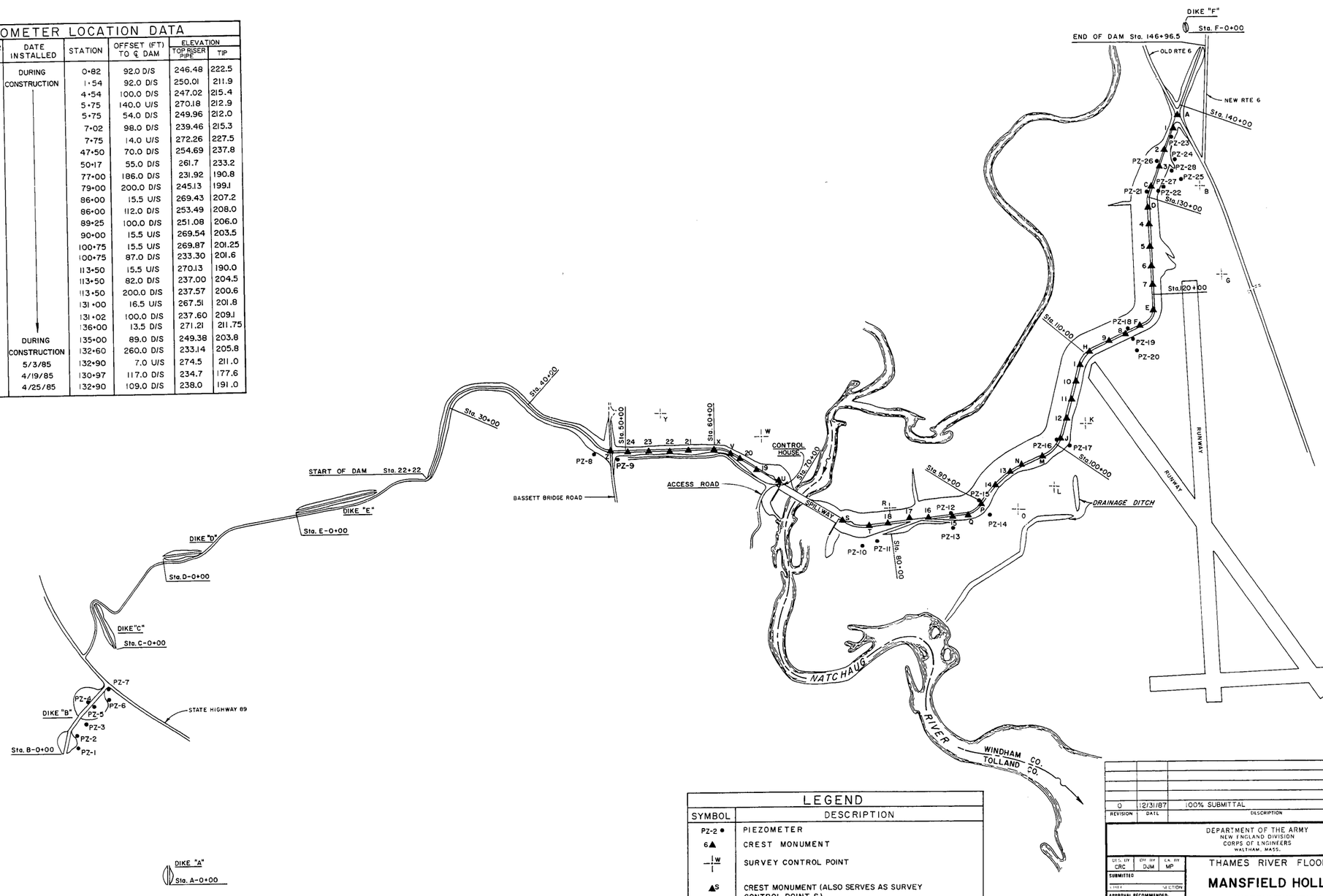


PLATES

CORPS OF ENGINEERS U. S. ARMY

PIEZOMETER LOCATION DATA

PIEZOMETER NO.	DATE INSTALLED	STATION	OFFSET (FT) TO ℄ DAM	ELEVATION TOP RISER PIPE	ELEVATION TIP
PZ-1	DURING CONSTRUCTION	0+82	92.0 D/S	246.48	222.5
PZ-2		1+54	92.0 D/S	250.01	211.9
PZ-3		4+54	100.0 D/S	247.02	215.4
PZ-4		5+75	140.0 U/S	270.18	212.9
PZ-5		5+75	54.0 D/S	249.96	212.0
PZ-6		7+02	98.0 D/S	239.46	215.3
PZ-7		7+75	14.0 U/S	272.26	227.5
PZ-8		47+50	70.0 D/S	254.69	237.8
PZ-9		50+17	55.0 D/S	261.7	233.2
PZ-10		77+00	186.0 D/S	231.92	190.8
PZ-11		79+00	200.0 D/S	245.13	199.1
PZ-12		86+00	15.5 U/S	269.43	207.2
PZ-13		86+00	112.0 D/S	253.49	208.0
PZ-14		89+25	100.0 D/S	251.08	206.0
PZ-15		90+00	15.5 U/S	269.54	203.5
PZ-16		100+75	15.5 U/S	269.87	201.25
PZ-17		100+75	87.0 D/S	233.30	201.6
PZ-18		113+50	15.5 U/S	270.13	190.0
PZ-19		113+50	82.0 D/S	237.00	204.5
PZ-20		113+50	200.0 D/S	237.57	200.6
PZ-21		131+00	16.5 U/S	267.51	201.8
PZ-22		131+02	100.0 D/S	237.60	209.1
PZ-23		136+00	13.5 D/S	271.21	211.75
PZ-24	DURING CONSTRUCTION	135+00	89.0 D/S	249.38	203.8
PZ-25		132+60	260.0 D/S	233.14	205.8
PZ-26	5/3/85	132+90	7.0 U/S	274.5	211.0
PZ-27	4/19/85	130+97	117.0 D/S	234.7	177.6
PZ-28	4/25/85	132+90	109.0 D/S	238.0	191.0



GRAPHIC SCALE

400' 0 400' 800'

LEGEND

SYMBOL	DESCRIPTION
PZ-2 ●	PIEZOMETER
6▲	CREST MONUMENT
W	SURVEY CONTROL POINT
▲S	CREST MONUMENT (ALSO SERVES AS SURVEY CONTROL POINT S)

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DR. BY DJM | CK. BY MP

SUBMITTED: CHIEF, SECTION

APPROVAL RECOMMENDED: CHIEF, DESIGN BRANCH

REVIEWED: PROJECT MANAGER

APPROVAL RECOMMENDED: CHIEF, PROJECT MANAGEMENT BRANCH

THAMES RIVER FLOOD CONTROL

MANSFIELD HOLLOW DAM

INSTRUMENTATION PLAN

NATCHAUG RIVER CONNECTICUT

APPROVED DATE

CHIEF, ENGINEERING DIVISION

GEOTECH. ENG. BR.

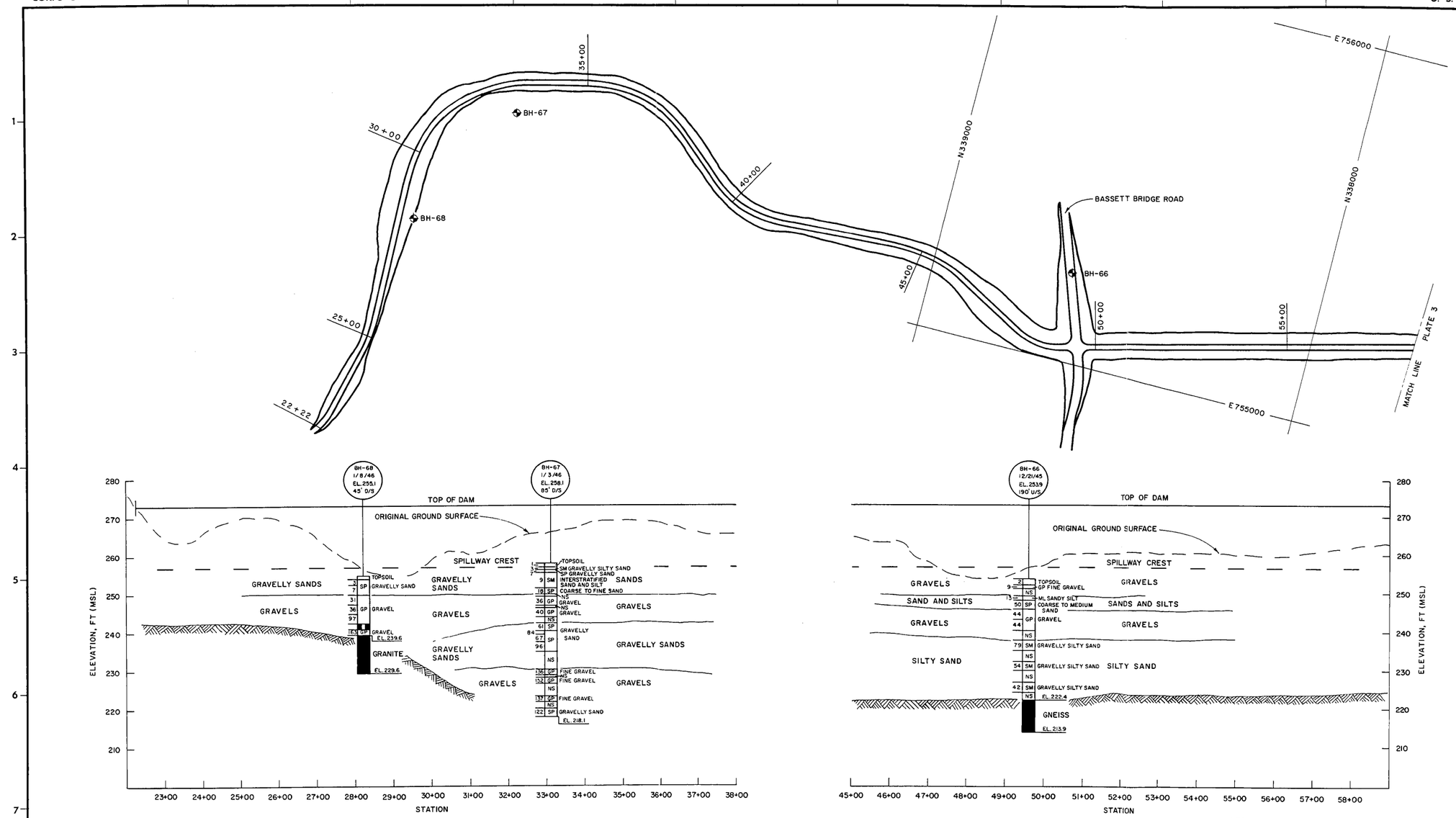
SCALE SPEC. NO

DRAWING NUMBER

PLATE 1

SHEET

CORPS OF ENGINEERS — U. S. ARMY



LEGEND

- GP — SOIL CLASSIFICATION
- NS — NOT SAMPLED
- 36 — BLOW COUNT NOT RECORDED
- 30 — NUMBER OF BLOWS PER FOOT OF PENETRATION
- COARSE GRAVEL OR NESTED COBBLES OR BOULDERS
- EL 222.4 — COBBLE OR BOULDER; ELEVATION AT BEDROCK SURFACE; ROCK CORE RECOVERY 0-25%
- ROCK CORE RECOVERY 25-50%
- ROCK CORE RECOVERY 50-75%
- ROCK CORE RECOVERY 75-90%
- EL 213.9 — ROCK CORE RECOVERY 90-100%; ELEVATION AT BOTTOM OF EXPLORATION

GRAPHIC SCALES

100' 0 100' 200'

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DW. BY DJM | CK. BY MP

SUBMITTED — CHIEF, SECTION

APPROVAL RECOMMENDED — CHIEF, GEOTECH. BRANCH

REVIEWED — CHIEF, ENGINEERING DIVISION

APPROVAL RECOMMENDED — CHIEF, PROJECT MANAGEMENT BRANCH

THAMES RIVER FLOOD CONTROL
MANSFIELD HOLLOW DAM
SUBSURFACE PROFILE
STA. 22+22 TO STA. 58+50

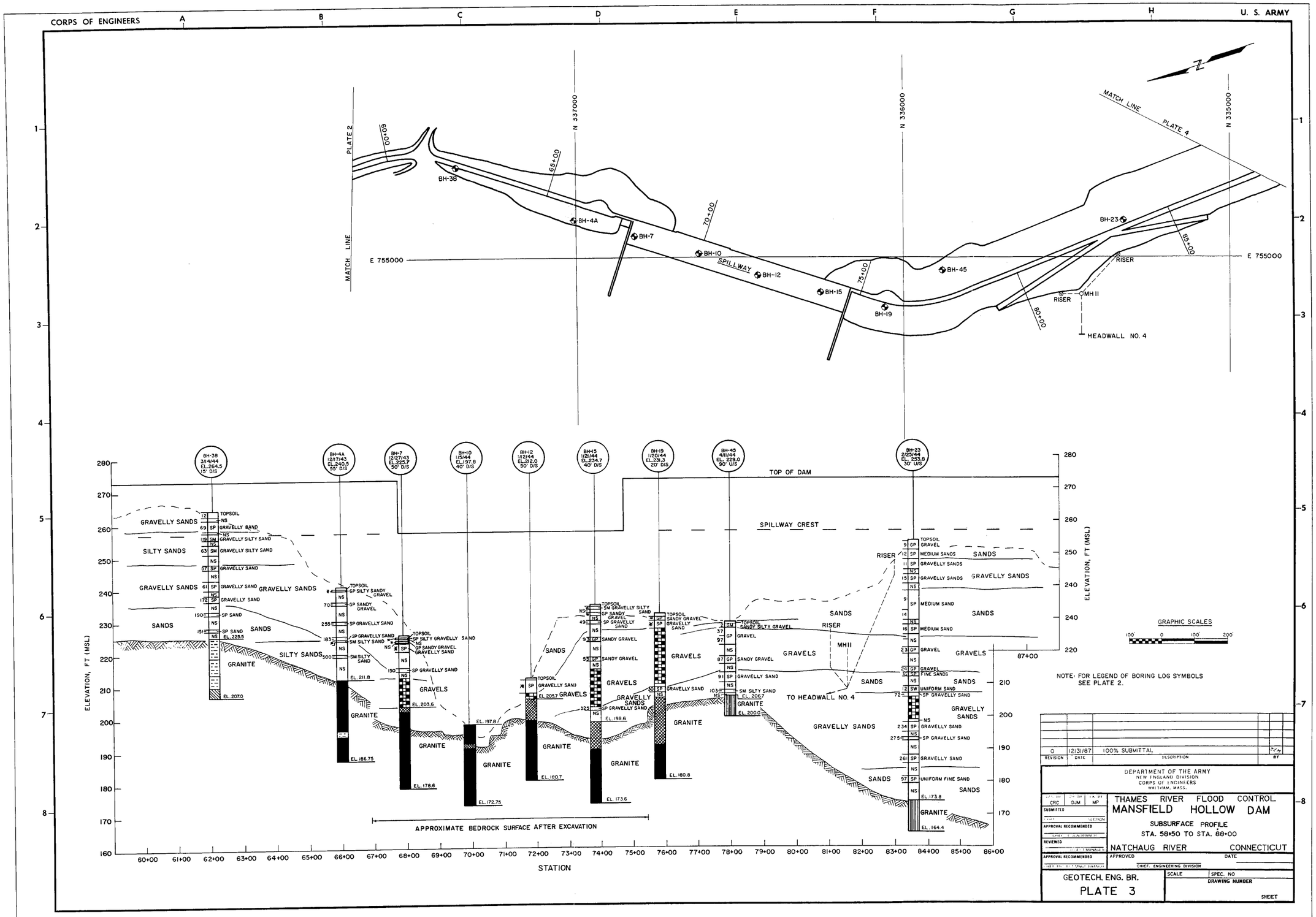
NATCHAUG RIVER — CONNECTICUT

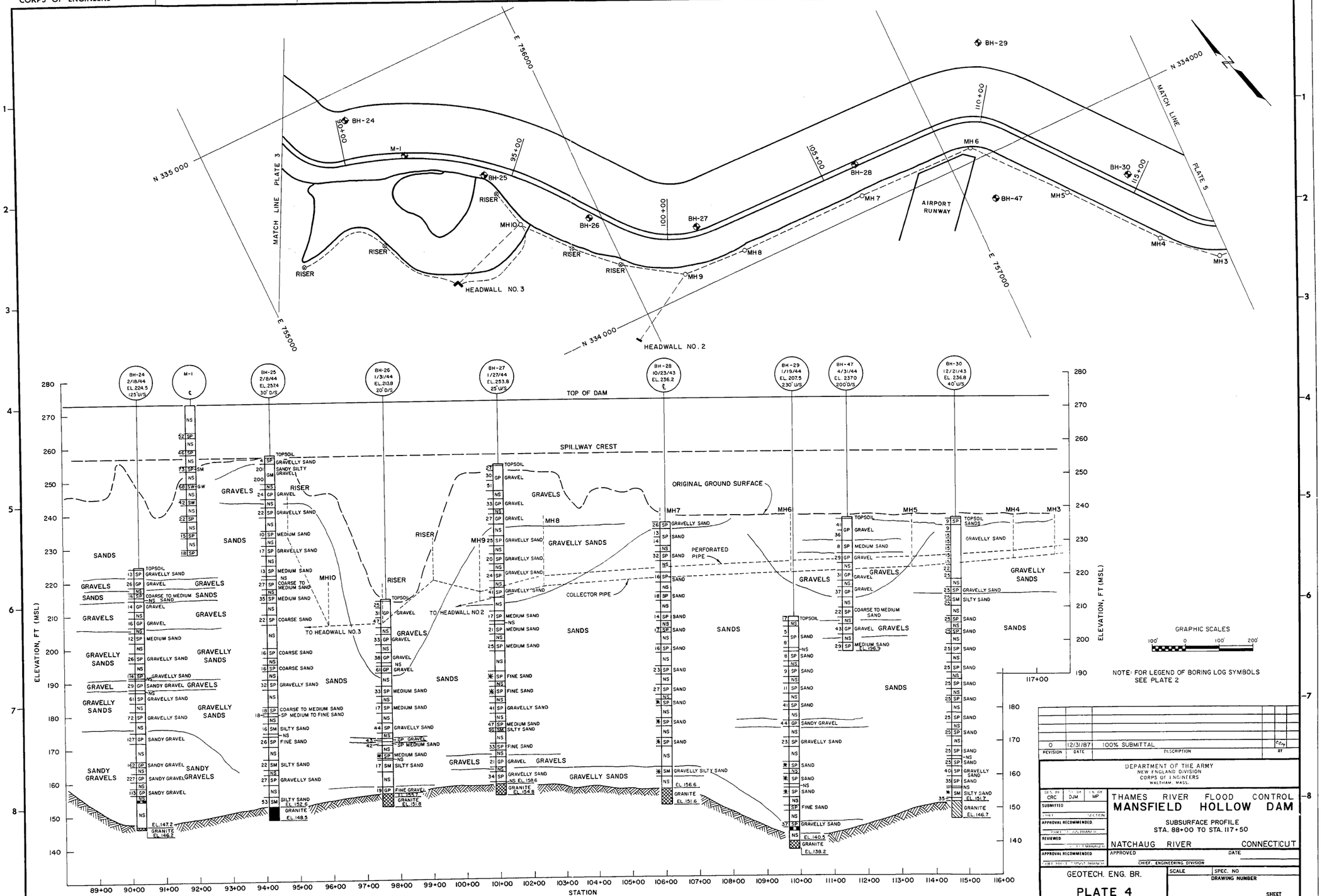
APPROVED — CHIEF, ENGINEERING DIVISION — DATE

GEOTECH. ENG. BR.

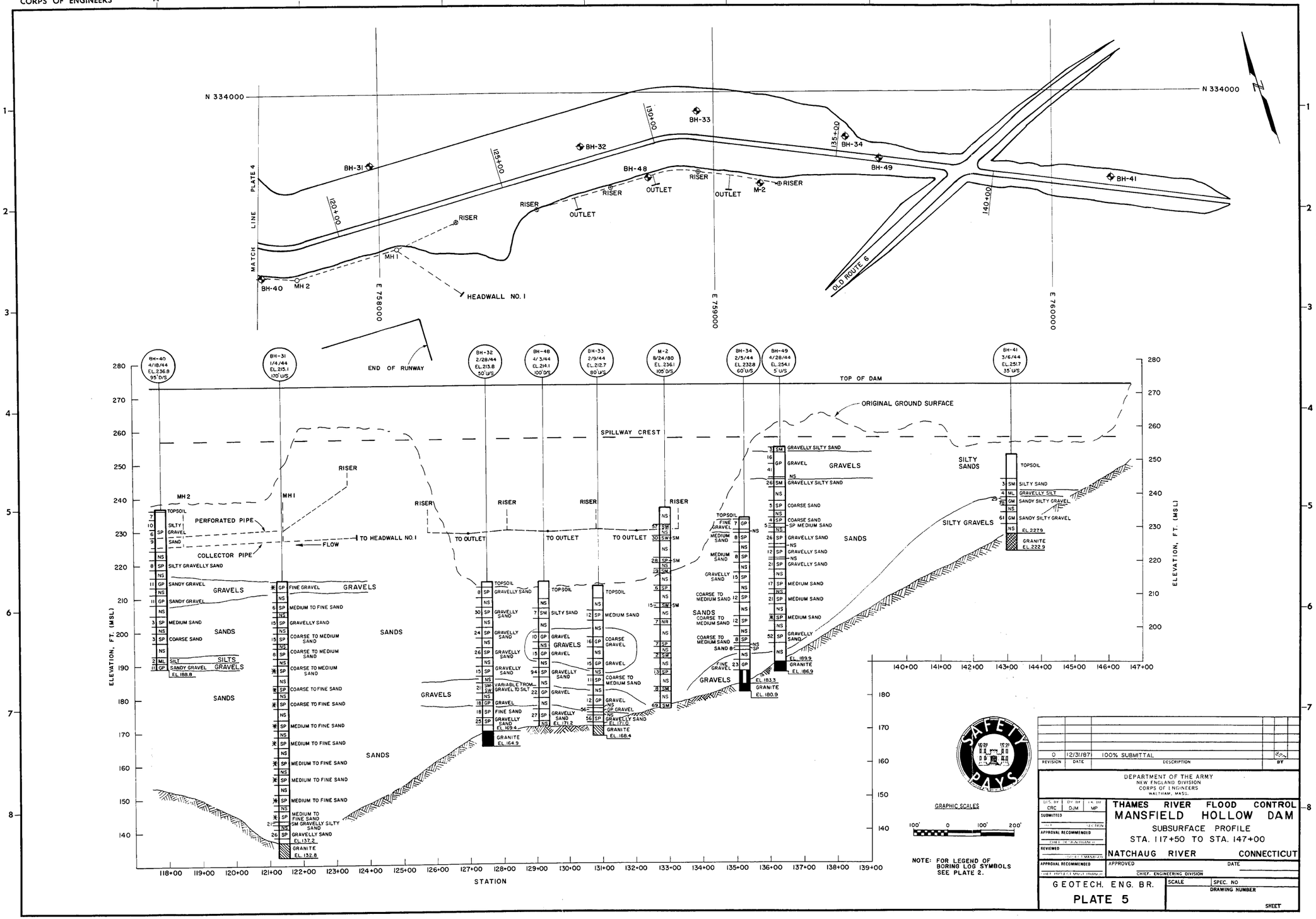
PLATE 2

SCALE — SPEC. NO — DRAWING NUMBER — SHEET


CORPS OF ENGINEERS
U. S. ARMY
MATCH LINE PLATE 2
MATCH LINE PLATE 4
N 337000
N 336000
N 335000
E 755000
SPILLWAY
HEADWALL NO. 4
RISER
MH 11
TOP OF DAM
SPILLWAY CREST
TO HEADWALL NO. 4
APPROXIMATE BEDROCK SURFACE AFTER EXCAVATION
ELEVATION, FT (MSL)
STATION
GRAPHIC SCALES
NOTE: FOR LEGEND OF BORING LOG SYMBOLS SEE PLATE 2.
0 12/31/87 100% SUBMITTAL
REVISION DATE DESCRIPTION BY
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.
THAMES RIVER FLOOD CONTROL
MANSFIELD HOLLOW DAM
SUBSURFACE PROFILE
STA. 58+50 TO STA. 88+00
NATCHAUG RIVER CONNECTICUT
APPROVED DATE
CHIEF, ENGINEERING DIVISION
GEOTECH. ENG. BR.
PLATE 3
SCALE SPEC. NO
DRAWING NUMBER
SHEET


CORPS OF ENGINEERS
U. S. ARMY
MATCH LINE PLATE 3
MATCH LINE PLATE 5
N 335 000
N 334 000
E 755000
E 756000
E 757000
BH-24
BH-25
BH-26
BH-27
BH-28
BH-29
BH-30
BH-47
M-1
MH3
MH4
MH5
MH6
MH7
MH8
MH9
MH10
RISER
HEADWALL NO. 3
HEADWALL NO. 2
AIRPORT RUNWAY
TOP OF DAM
SPILLWAY CREST
ORIGINAL GROUND SURFACE
PERFORATED PIPE
COLLECTOR PIPE
TO HEADWALL NO. 3
TO HEADWALL NO. 2
SANDS
GRAVELS
GRAVELLY SANDS
SANDY GRAVELS
ELEVATION, FT (MSL)
STATION
GRAPHIC SCALES
NOTE: FOR LEGEND OF BORING LOG SYMBOLS SEE PLATE 2
0 12/31/87 100% SUBMITTAL
REVISION DATE DESCRIPTION BY
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.
THAMES RIVER FLOOD CONTROL
MANSFIELD HOLLOW DAM
SUBSURFACE PROFILE
STA. 88+00 TO STA. 117+50
NATCHAUG RIVER CONNECTICUT
APPROVED
DATE
CHIEF, ENGINEERING DIVISION
GEOTECH. ENG. BR.
PLATE 4
SCALE
SPEC. NO
DRAWING NUMBER
SHEET

CORPS OF ENGINEERS U. S. ARMY



REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DR. BY DJM | CK. BY MP

SUBMITTED: CHIEF, DESIGN SECTION

APPROVAL RECOMMENDED: CHIEF, DESIGN BRANCH

REVIEWED: PROJECT MANAGER

APPROVAL RECOMMENDED: CHIEF, HYDRAULICS BRANCH

APPROVED: CHIEF, ENGINEERING DIVISION — DATE

THAMES RIVER FLOOD CONTROL
MANSFIELD HOLLOW DAM
SUBSURFACE PROFILE
STA. 117+50 TO STA. 147+00

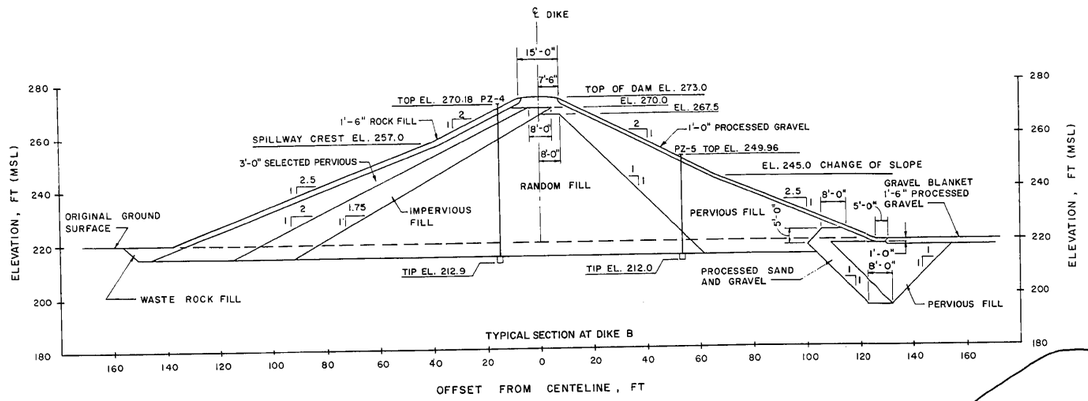
NATCHAUG RIVER — CONNECTICUT

GEOTECH. ENG. BR.

PLATE 5

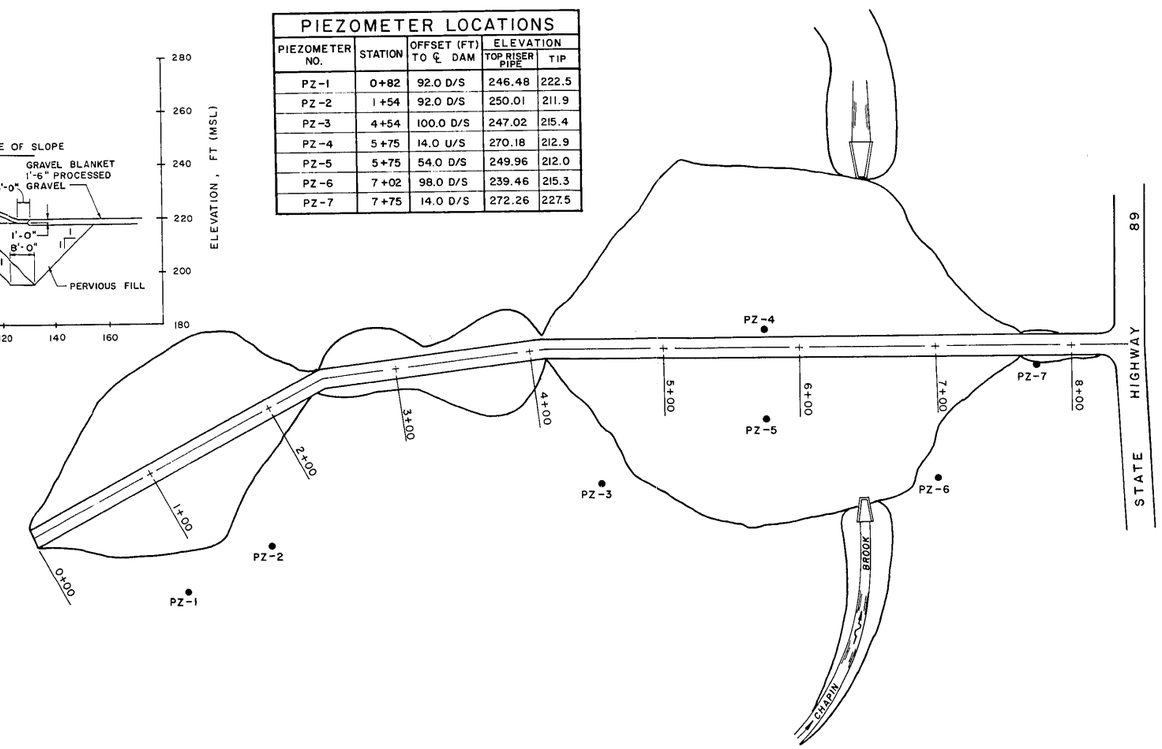
SCALE | SPEC. NO | DRAWING NUMBER | SHEET

CORPS OF ENGINEERS U. S. ARMY

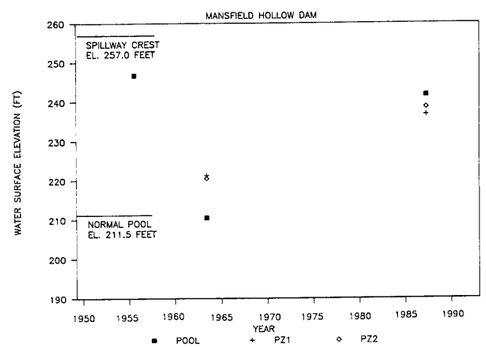


TYPICAL SECTION AT DIKE B

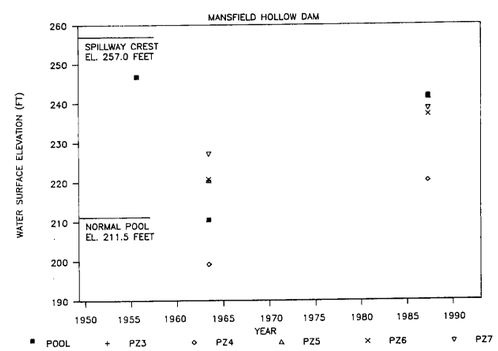
PIEZOMETER LOCATIONS				
PIEZOMETER NO.	STATION	OFFSET (FT) TO ℄ DAM	ELEVATION	
			TOP RISER PIPE	TIP
PZ-1	0+82	92.0 D/S	246.48	222.5
PZ-2	1+54	92.0 D/S	250.01	211.9
PZ-3	4+54	100.0 D/S	247.02	215.4
PZ-4	5+75	14.0 U/S	270.18	212.9
PZ-5	5+75	54.0 D/S	249.96	212.0
PZ-6	7+02	98.0 D/S	239.46	215.3
PZ-7	7+75	14.0 D/S	272.26	227.5



PEAK PIEZOMETER READINGS



PEAK PIEZOMETER READINGS



GRAPHIC SCALES

40' 20' 0 40' 80'

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DR. BY DJM | CK. BY MP

SUBMITTED — CHIEF, DESIGN BRANCH

APPROVAL RECOMMENDED — CHIEF, DESIGN BRANCH

REVIEWED — CHIEF, PROJECT MANAGER

APPROVAL RECOMMENDED — CHIEF, PROJECT MANAGEMENT BRANCH

THAMES RIVER FLOOD CONTROL

MANSFIELD HOLLOW DAM

PIEZOMETER DATA-DIKE B
PZ-1 THROUGH PZ-7
SECTION AT STA. 5+75

NATCHAUG RIVER CONNECTICUT

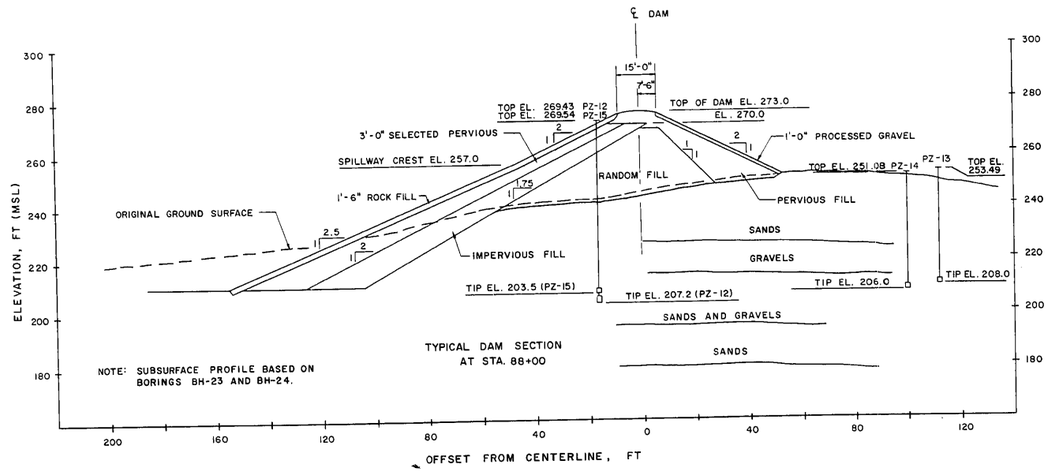
APPROVED — CHIEF, ENGINEERING DIVISION — DATE

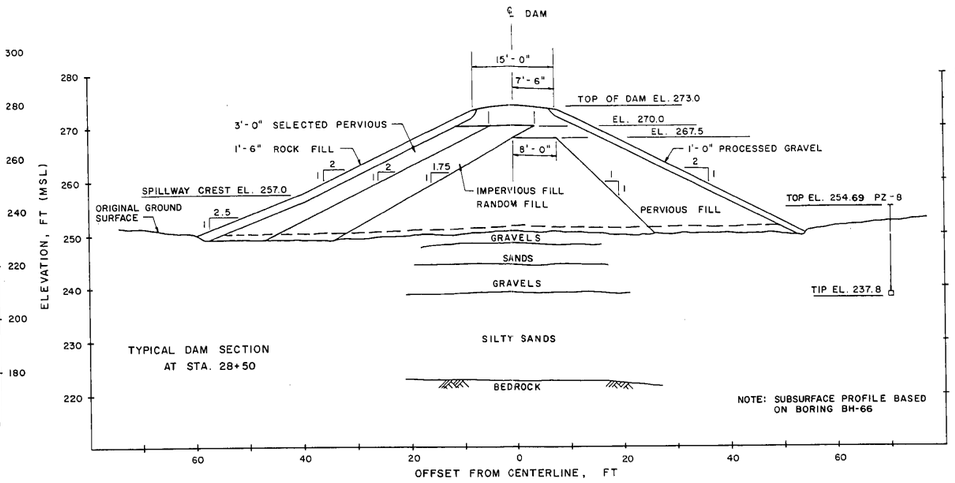
GEOTECH. ENG. BR.

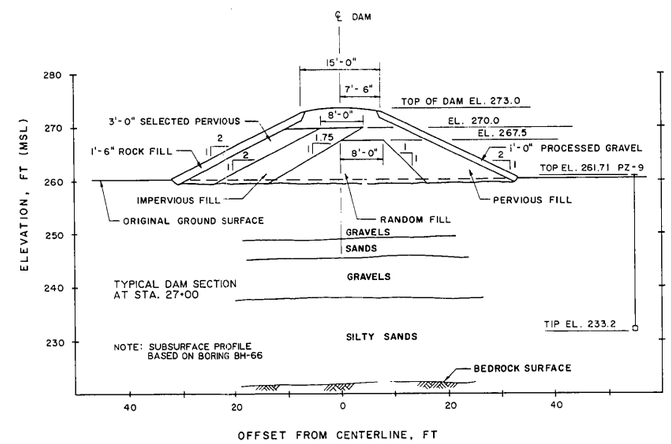
PLATE 6

SCALE | SPEC. NO | DRAWING NUMBER | SHEET

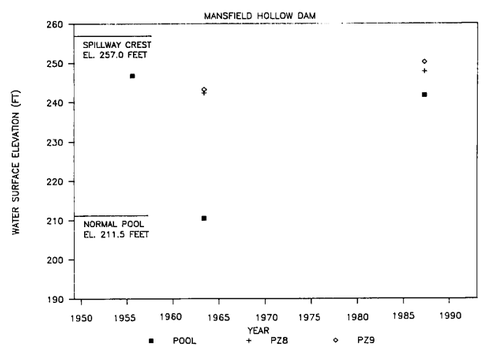
CORPS OF ENGINEERS U. S. ARMY



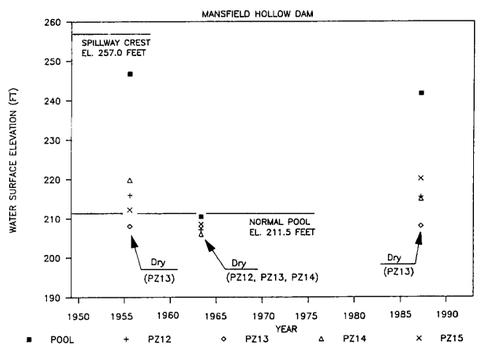




PEAK PIEZOMETER READINGS



PEAK PIEZOMETER READINGS



PIEZOMETER LOCATIONS

PIEZOMETER NO.	STATION	OFFSET(FT) TO ℄ DAM	ELEVATION TOP RISER PIPE	ELEVATION TIP
PZ-8	47+50	70.0 D/S	254.69	237.8
PZ-9	50+17	55.0 D/S	261.71	233.2
PZ-12	86+00	15.5 U/S	269.43	207.2
PZ-13	86+00	112.0 D/S	253.49	208.0
PZ-14	89+25	100.0 D/S	251.08	206.0
PZ-15	90+00	15.5 U/S	269.54	203.5

GRAPHIC SCALES

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DR. BY DJM | CK. BY MP

SUBMITTED

APPROVAL RECOMMENDED

REVIEWED

APPROVAL RECOMMENDED

THAMES RIVER FLOOD CONTROL
MANSFIELD HOLLOW DAM
PIEZOMETER DATA
PZ8, PZ-9 AND PZ-12 THROUGH PZ-15
SECTIONS AT STA. 47+50 TO 50+17
AND STA. 86+00 TO 90+00
NATCHAUG RIVER CONNECTICUT

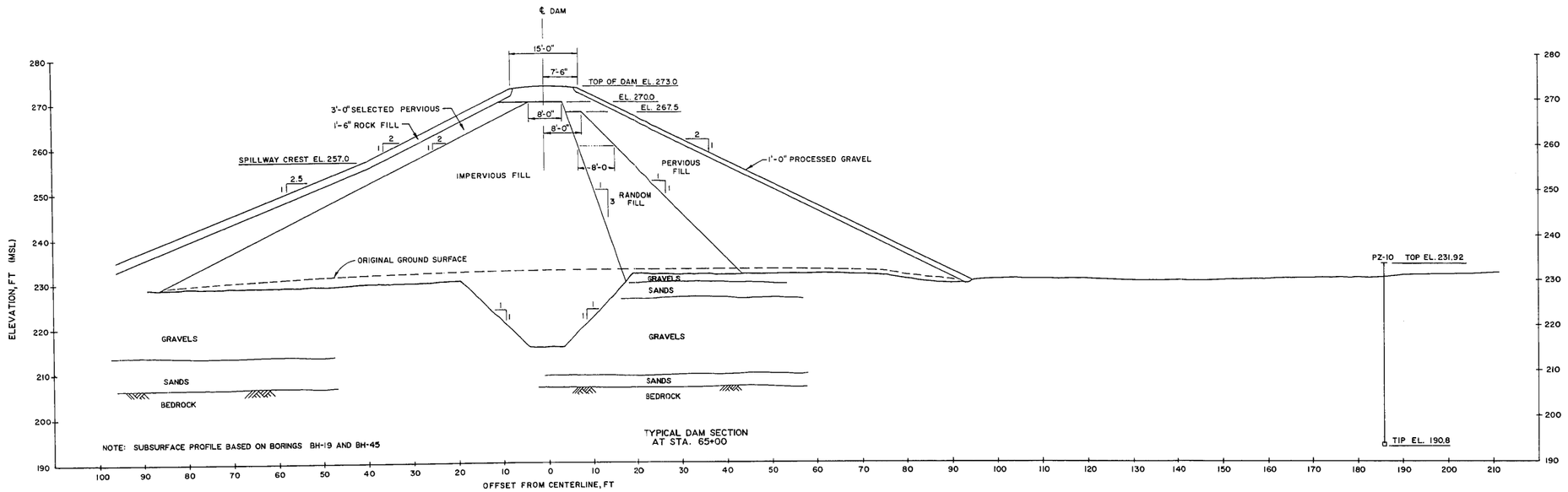
APPROVED DATE

CHIEF, ENGINEERING DIVISION

GEOTECH. ENG. BR.
PLATE 7

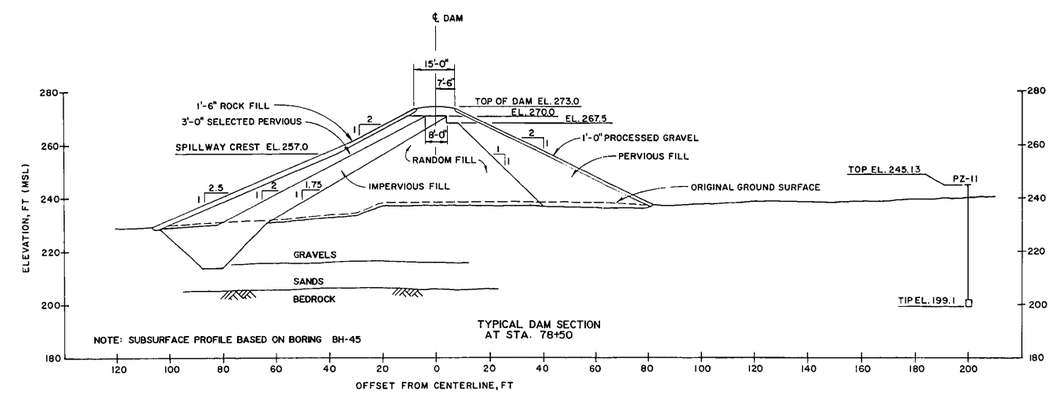
SCALE | SPEC. NO.
DRAWING NUMBER
SHEET

CORPS OF ENGINEERS U. S. ARMY



NOTE: SUBSURFACE PROFILE BASED ON BORINGS BH-19 AND BH-45

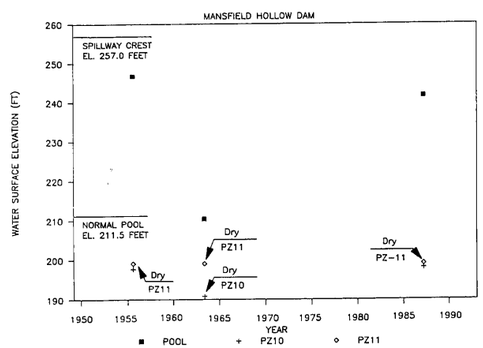
TYPICAL DAM SECTION AT STA. 65+00



NOTE: SUBSURFACE PROFILE BASED ON BORING BH-45

TYPICAL DAM SECTION AT STA. 78+50

PEAK PIEZOMETER READINGS



PIEZOMETER LOCATIONS				
PIEZOMETER NO.	STATION	OFFSET(FT) TO ℄ DAM	ELEVATION TOP RISER PIPE	ELEVATION TIP
PZ-10	77+00	186.0 D/S	231.92	190.8
PZ-11	79+00	200.0 D/S	245.13	199.1

GRAPHIC SCALES

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DR. BY DJM | CK. BY MP

SUBMITTED

APPROVAL RECOMMENDED

REVIEWED

APPROVAL RECOMMENDED

THAMES RIVER FLOOD CONTROL
MANSFIELD HOLLOW DAM
PIEZOMETER DATA
PZ-10 AND PZ-11
SECTIONS AT STA. 77+00 AND STA. 79+00
NATCHAUG RIVER CONNECTICUT

APPROVED DATE

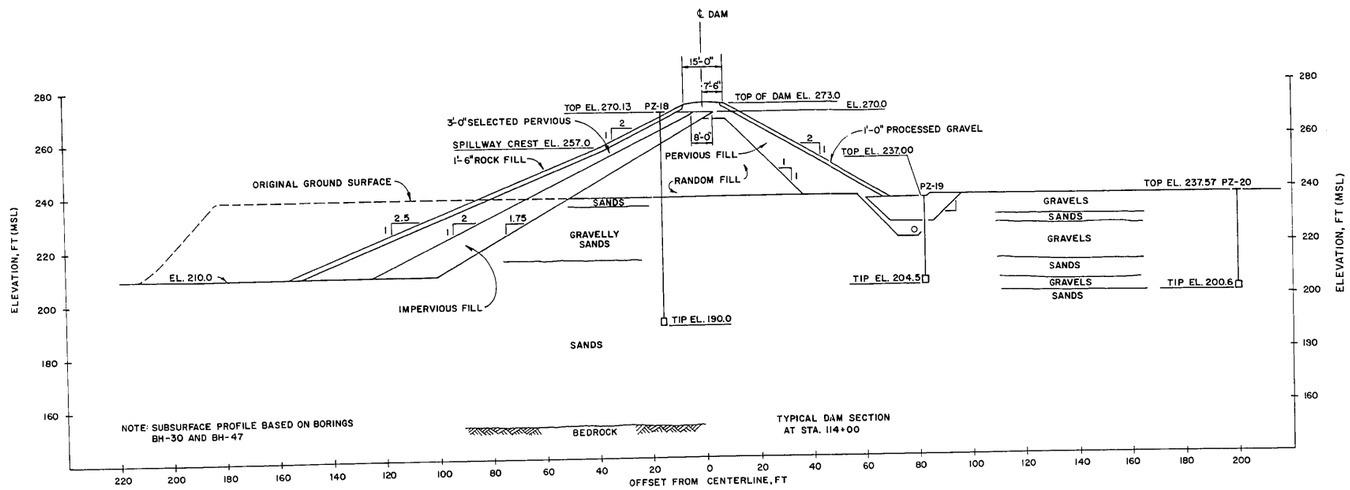
CHIEF, ENGINEERING DIVISION

GEOTECH. ENG. BR.

PLATE 8

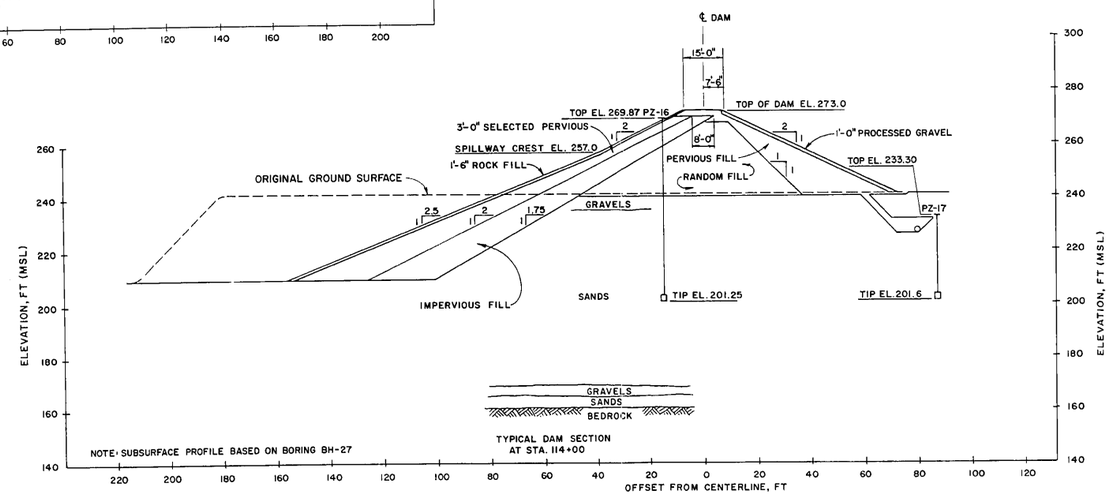
SCALE | SPEC. NO | DRAWING NUMBER | SHEET

CORPS OF ENGINEERS U. S. ARMY



NOTE: SUBSURFACE PROFILE BASED ON BORINGS BH-30 AND BH-47

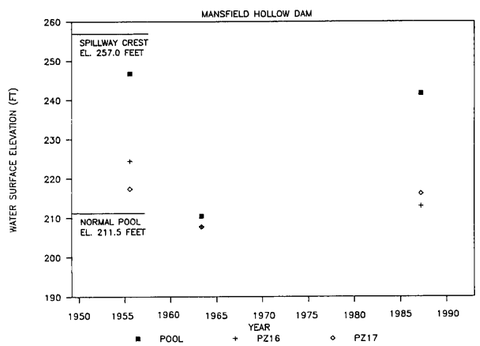
TYPICAL DAM SECTION AT STA. 114+00



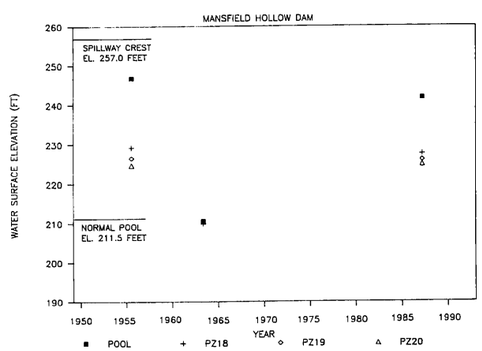
NOTE: SUBSURFACE PROFILE BASED ON BORING BH-27

TYPICAL DAM SECTION AT STA. 114+00

PEAK PIEZOMETER READINGS



PEAK PIEZOMETER READINGS



PIEZOMETER LOCATIONS

PIEZOMETER NO.	STATION	OFFSET(FT) TO ℄ DAM	ELEVATION TOP RISER PIPE	ELEVATION TIP
PZ-16	100+75	15.5 U/S	269.87	201.25
PZ-17	100+75	87.0 D/S	233.30	201.6
PZ-18	113+50	15.5 U/S	270.13	190.0
PZ-19	113+50	82.0 D/S	237.00	204.5
PZ-20	113+50	200.0 D/S	237.57	200.6

GRAPHIC SCALES

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DR. BY DJM | CK. BY MP

SUBMITTED — CHIEF, SECTION

APPROVAL RECOMMENDED — CHIEF, DESIGN BRANCH

REVIEWED — PROJECT MANAGER

APPROVAL RECOMMENDED — CHIEF, PROJECT MANAGEMENT BRANCH

THAMES RIVER FLOOD CONTROL
MANSFIELD HOLLOW DAM
PIEZOMETER DATA
PZ-16 THROUGH PZ-20
SECTIONS AT STA. 100+75 AND STA. 113+50
NATCHAUG RIVER CONNECTICUT

APPROVED — CHIEF, ENGINEERING DIVISION — DATE

GEOTECH. ENG. BR.

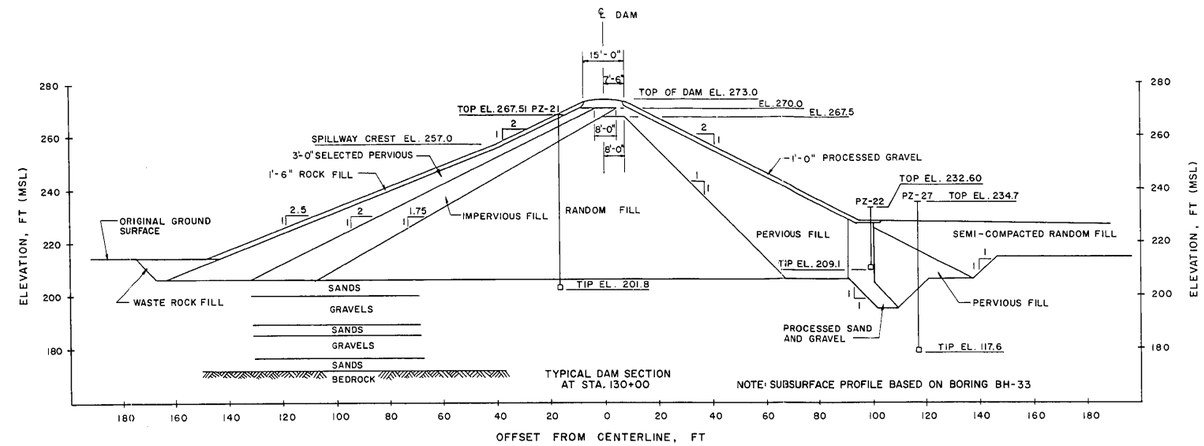
PLATE 9

SCALE | SPEC. NO | DRAWING NUMBER | SHEET

CORPS OF ENGINEERS — U. S. ARMY

PIEZOMETER LOCATIONS

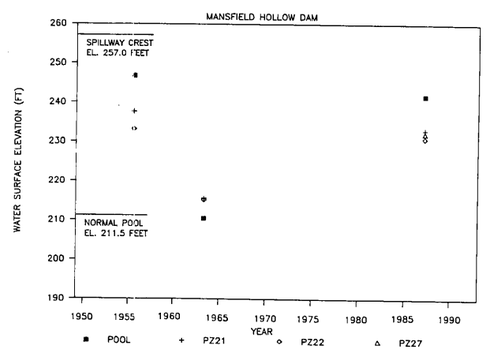
PIEZOMETER NO.	STATION	OFFSET (FT) TO ℄ DAM	ELEVATION TOP RISER PIPE	ELEVATION TIP
PZ-21	131+00	16.5 U/S	267.51	201.8
PZ-22	131+02	100.0 D/S	232.60	209.1
PZ-27	130+97	117.0 D/S	234.7	177.6



TYPICAL DAM SECTION AT STA. 130+00

NOTE: SUBSURFACE PROFILE BASED ON BORING BH-33

PEAK PIEZOMETER READINGS



GRAPHIC SCALES

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DR. BY DJM | CK. BY MP

SUBMITTED: CHIEF, SECTION

APPROVAL RECOMMENDED: CHIEF, DESIGN BRANCH

REVIEWED: CHIEF, PROJECT MANAGER

APPROVAL RECOMMENDED: CHIEF, PROJECT MANAGEMENT BRANCH

THAMES RIVER FLOOD CONTROL

MANSFIELD HOLLOW DAM

PIEZOMETER DATA
PZ-21, PZ-22 AND PZ-27
SECTION AT STA. 130+97 TO 131+02

NATCHAUG RIVER — CONNECTICUT

APPROVED — DATE
CHIEF, ENGINEERING DIVISION

GEOTECH. ENG. BR.

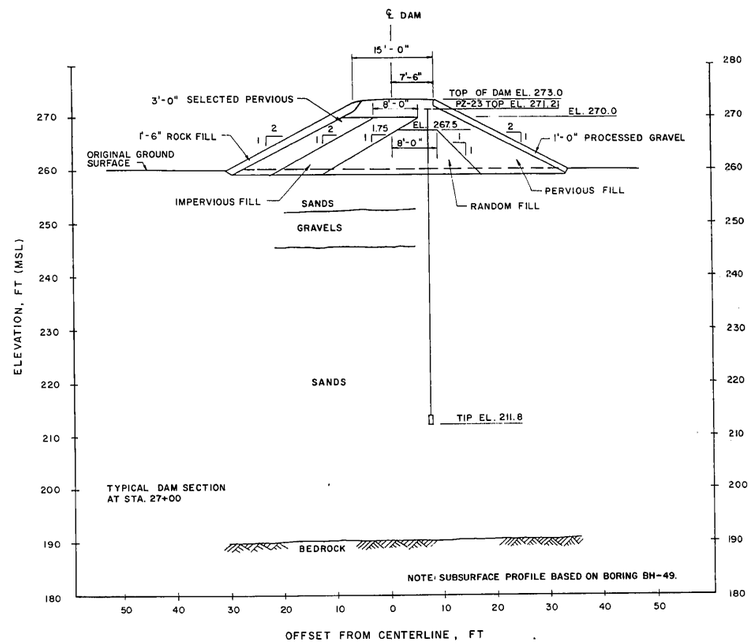
SCALE | SPEC. NO

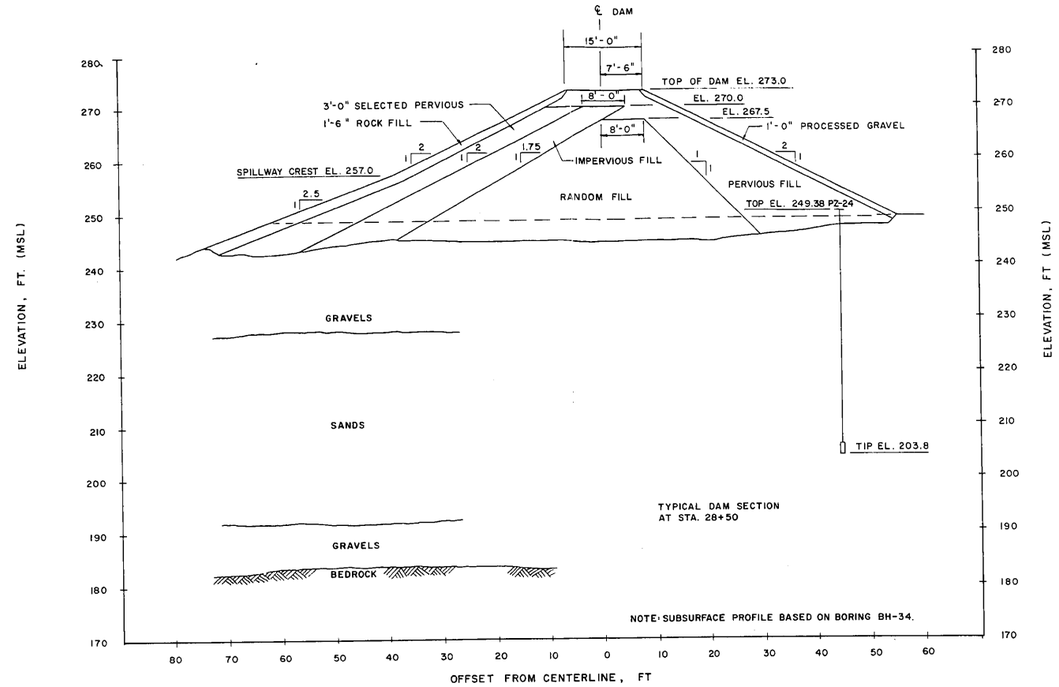
DRAWING NUMBER

PLATE 10

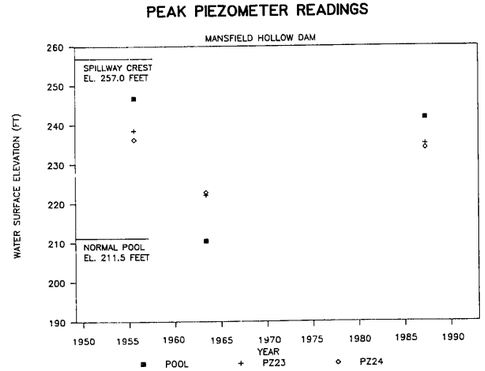
SHEET

CORPS OF ENGINEERS U. S. ARMY





PEAK PIEZOMETER READINGS



PIEZOMETER LOCATIONS

PIEZOMETER NO.	STATION	OFFSET (FT) TO ℄ DAM	ELEVATION TOP RISER PIPE	ELEVATION TIP
PZ-23	136+00	13.5 D/S	271.21	211.8
PZ-24	135+00	89.0 D/S	249.38	203.8

GRAPHIC SCALES

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DR. BY DJM | CK. BY MP

SUBMITTED — CHIEF, DESIGN SECTION
APPROVAL RECOMMENDED — CHIEF, DESIGN BRANCH
REVIEWED — PROJECT MANAGER
APPROVAL RECOMMENDED — CHIEF, PROJECT MANAGEMENT BRANCH

THAMES RIVER FLOOD CONTROL
MANSFIELD HOLLOW DAM
PIEZOMETER DATA
PZ-23 AND PZ-24
SECTIONS AT STA. 135+00 AND STA. 136+00
NATCHAUG RIVER CONNECTICUT

APPROVED — CHIEF, ENGINEERING DIVISION
DATE

SCALE | SPEC. NO | DRAWING NUMBER

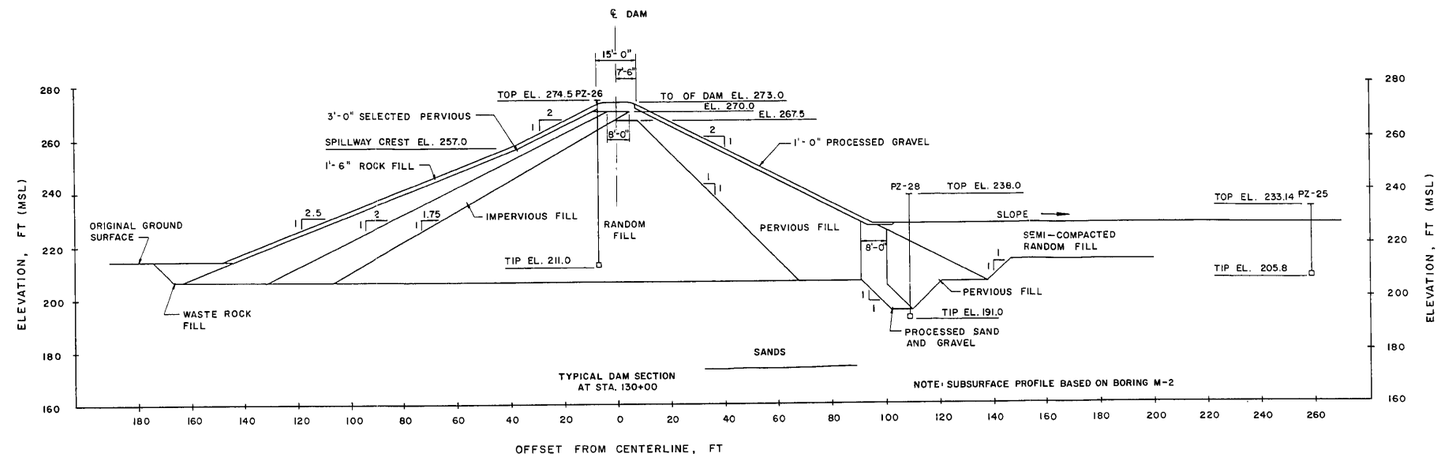
PLATE 11

SHEET

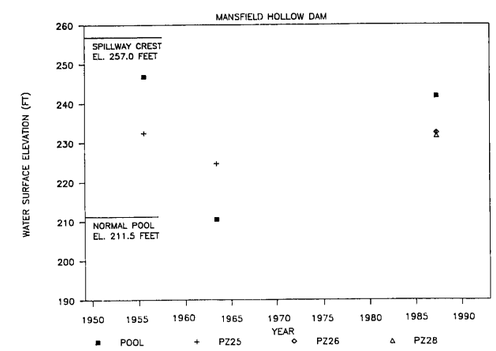
CORPS OF ENGINEERS U. S. ARMY

PIEZOMETER LOCATIONS

PIEZOMETER NO.	STATION	OFFSET(FT) TO ℄ DAM	ELEVATION TOP RISER PIPE	ELEVATION TIP
PZ-25	132+60	260.0 D/S	233.14	205.8
PZ-26	132+90	7.0 U/S	274.5	211.0
PZ-28	132+90	109.0 D/S	238.0	191.0



PEAK PIEZOMETER READINGS



GRAPHIC SCALES

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY | DR. BY | CK. BY

SUBMITTED
CHIEF SECTION
APPROVAL RECOMMENDED
CHIEF DESIGN BRANCH
REVIEWED
PROJECT MANAGER
APPROVAL RECOMMENDED
CHIEF PROJECT MANAGEMENT BRANCH

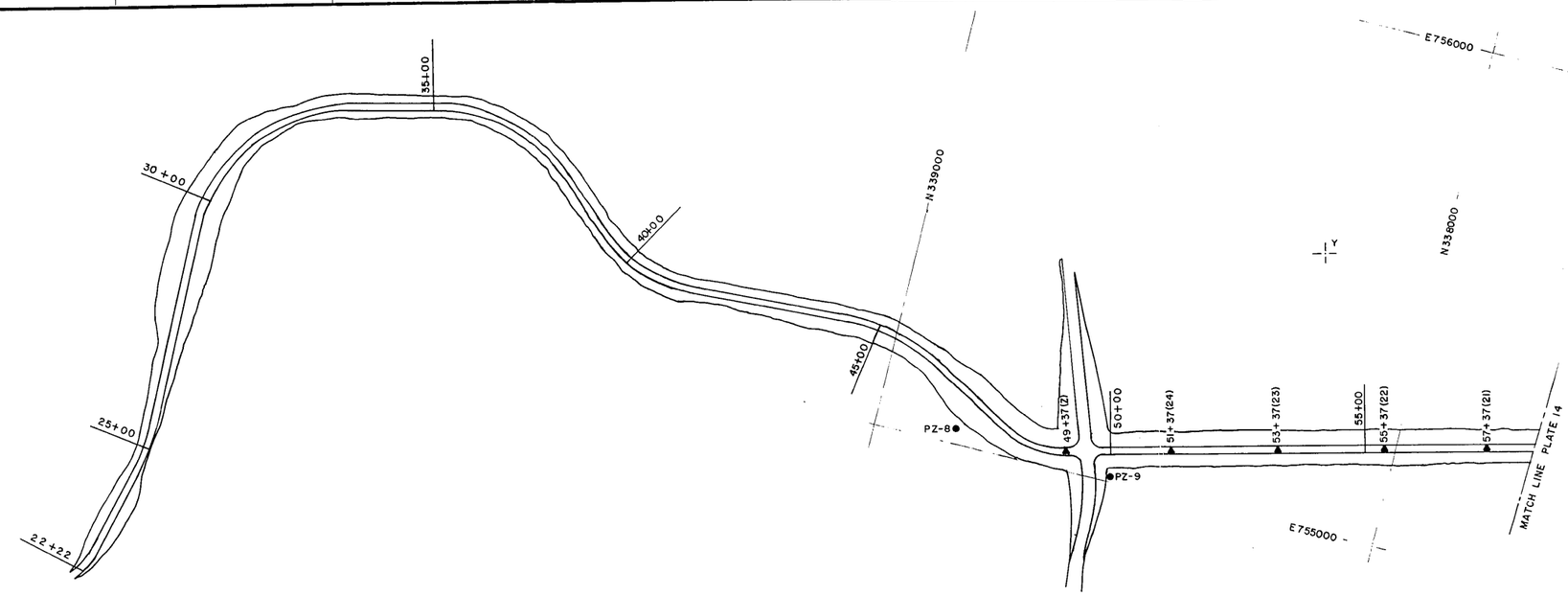
THAMES RIVER FLOOD CONTROL
MANSFIELD HOLLOW DAM
PIEZOMETER DATA
PZ-25, PZ-26 AND PZ-28
SECTION AT STA. 132+60 TO 132+90
NATCHAUG RIVER CONNECTICUT

APPROVED DATE
CHIEF, ENGINEERING DIVISION

GEOTECH. ENG. BR.
PLATE 12

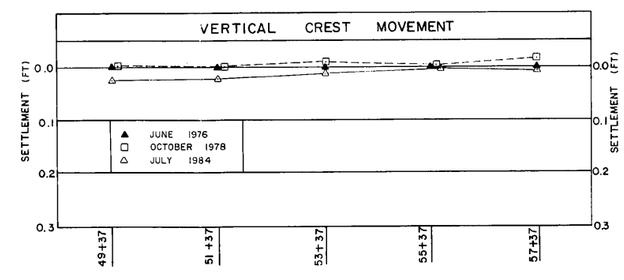
SCALE | SPEC. NO
DRAWING NUMBER
SHEET

CORPS OF ENGINEERS U. S. ARMY



LEGEND

SYMBOL	DESCRIPTION
PZ-9 ●	PIEZOMETER
57+37(21) ▲	CREST MONUMENT
Y	SURVEY CONTROL POINT
49+37(Z)▲	CREST MONUMENT (ALSO SERVES AS SURVEY CONTROL POINT Z)



CREST MONUMENT SETTLEMENT AND MOVEMENT RECORD

DATE	JUNE 1976			OCTOBER 1978			JULY 1984								
MONUMENT	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION
49+37 (Z)	338602.99	755042.51	273.32			273.323			273.296						
51+37 (24)	338409.30	755093.66	273.68			273.680			273.659						
53+37 (23)	338215.83	755144.76	273.58			273.588			273.568						
55+37 (22)	338022.72	755195.77	273.58			273.583			273.578						
57+37 (21)	337829.07	755246.92	273.51			273.525			273.504						

GRAPHIC SCALES

100' 0 100' 200'

HORIZONTAL MOVEMENT

0 0.2' 0.4'

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DR. BY DJM | CK. BY MP

SUBMITTED

APPROVAL RECOMMENDED

REVIEWED

APPROVAL RECOMMENDED

THAMES RIVER FLOOD CONTROL

MANSFIELD HOLLOW DAM

CREST SURVEY MONUMENTS
HORIZONTAL AND VERTICAL MOVEMENTS
STA. 22+22 TO STA. 58+50

NATCHAUG RIVER CONNECTICUT

APPROVED DATE

CHIEF, ENGINEERING DIVISION

GEOTECH. ENG. BR.

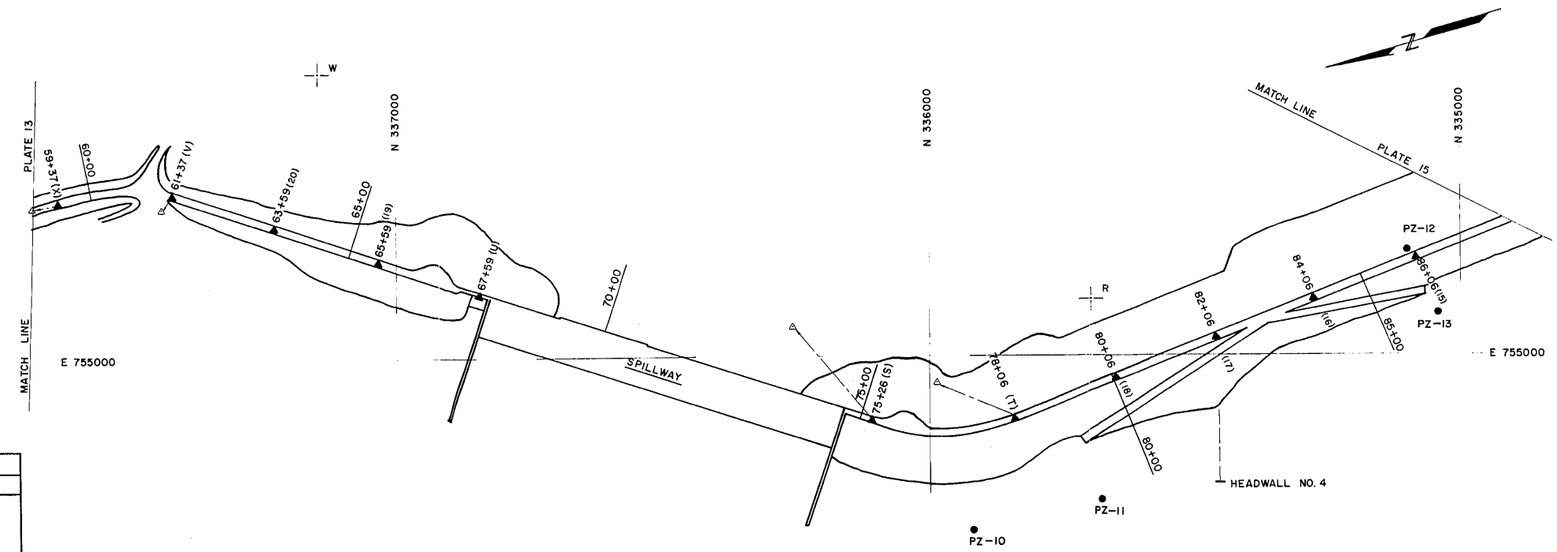
PLATE 13

SCALE SPEC. NO.

DRAWING NUMBER

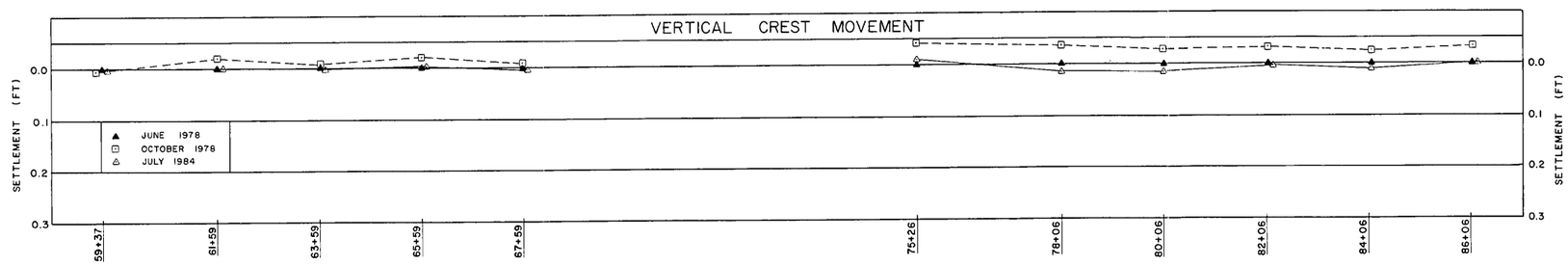
SHEET

CORPS OF ENGINEERS U. S. ARMY



LEGEND

SYMBOL	DESCRIPTION
PZ-10 ●	PIEZOMETER
84+06(16)▲	CREST MONUMENT
W	SURVEY CONTROL POINT
78+06(T) ▲	CREST MONUMENT (ALSO SERVES AS SURVEY CONTROL POINT T)
▲- - - -△	DIRECTION OF HORIZONTAL MOVEMENT



CREST MONUMENT SETTLEMENT AND MOVEMENT RECORD

DATE	JUNE 1976			OCTOBER 1978			JULY 1984								
MONUMENT	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION
59+37 (X)	337636.10	755297.89	273.63			273.626	337636.137	755297.839	273.628						
61+59 (V)	337428.61	755309.15	273.55			273.570	337428.704	755309.133	273.550						
63+59(20)	337238.81	755246.36	273.28			273.288			273.278						
65+59(19)	337048.87	755183.52	273.32			273.340			273.322						
67+59 (U)	336858.88	755120.67	272.88			272.887	336858.880	755120.670	272.876						
75+26 (S)	336131.60	754877.77	272.91			272.952	336131.893	754878.117	272.919						
78+06 (T)	335856.75	754879.24	273.51			273.546	335857.040	754879.378	273.495						
80+06 (18)	335669.87	754952.38	273.47			273.497			273.455						
82+06 (17)	335483.51	755025.33	273.44			273.472			273.435						
84+06 (16)	335297.48	755098.14	273.59			273.614			273.581						
86+06 (15)	335111.19	755171.05	273.58			273.613			273.581						

GRAPHIC SCALES

100' 0 100' 200'

HORIZONTAL MOVEMENT

0 0.2' 0.4'

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DR. BY DJM | CK. BY MP

SUBMITTED — CHIEF, SECTION

APPROVAL RECOMMENDED — CHIEF, DESIGN BRANCH

REVIEWED — PROJECT MANAGER

APPROVAL RECOMMENDED — CHIEF, PROJECT MGMT. BRANCH

THAMES RIVER FLOOD CONTROL

MANSFIELD HOLLOW DAM

CREST SURVEY MONUMENTS
HORIZONTAL AND VERTICAL MOVEMENTS
STA. 58+50 TO STA. 88+00

NATCHAUG RIVER CONNECTICUT

APPROVED — CHIEF, ENGINEERING DIVISION — DATE

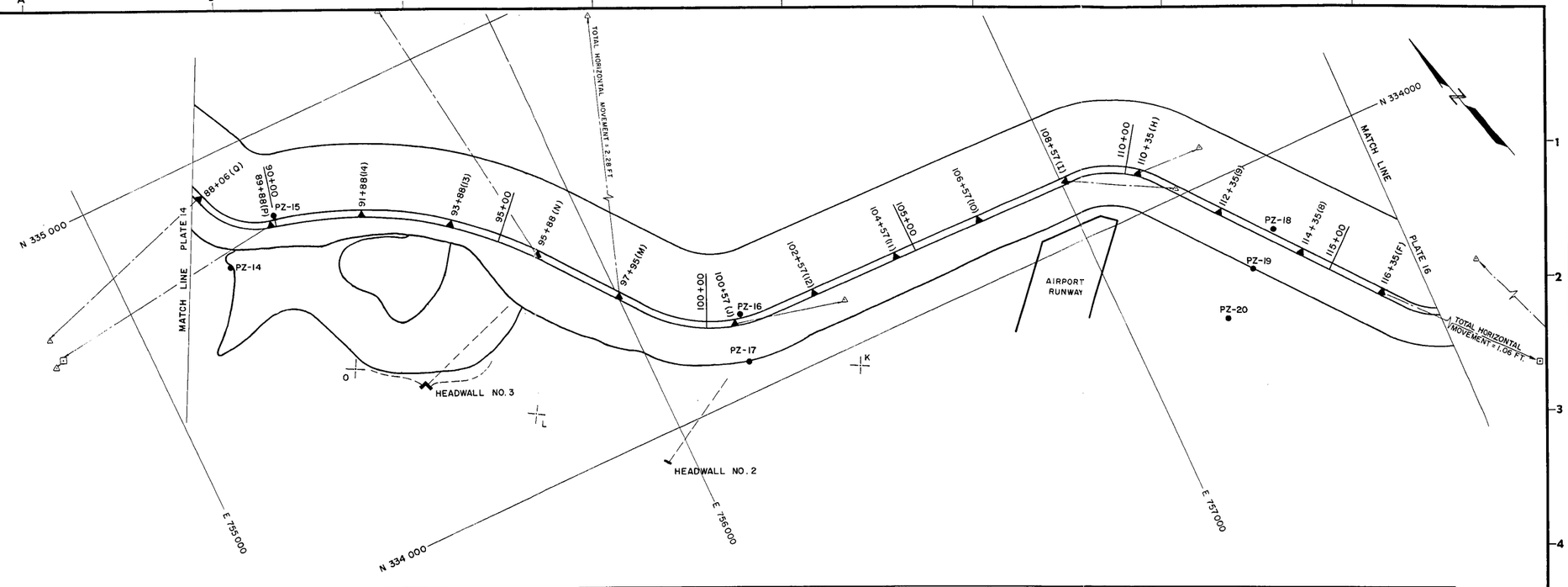
GEOTECH. ENG. BR.

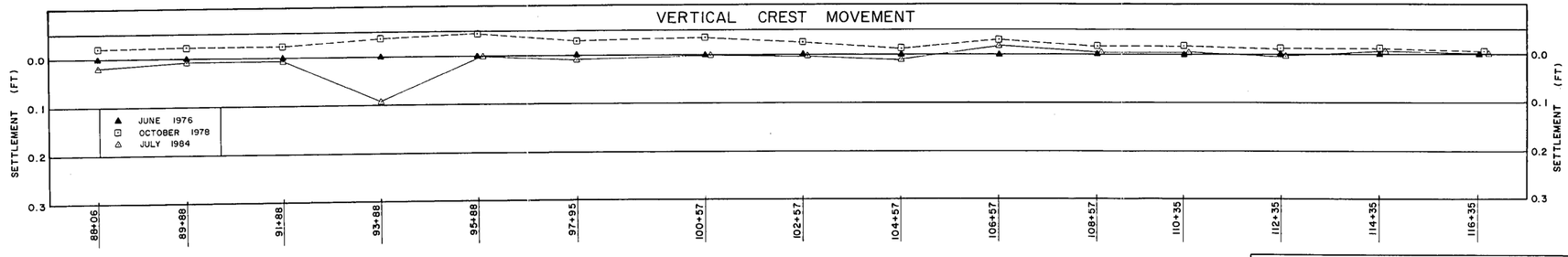
SCALE — SPEC. NO — DRAWING NUMBER

PLATE 14

SHEET

CORPS OF ENGINEERS — U. S. ARMY





CREST MONUMENT SETTLEMENT AND MOVEMENT RECORD

DATE	JUNE 1976			OCTOBER 1978			JULY 1984								
MONUMENT	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION
88+06 (Q)	334925.05	755243.91	273.38			273.401	334924.768	755243.040	273.361						
89+88 (P)	334802.02	755375.18	273.58	334801.895	755374.092	273.603	334801.883	755374.053	273.573						
91+88 (14)	334733.50	755562.99	273.40			273.423			273.392						
93+88 (13)	334626.35	755731.80	273.55			273.587			273.458						
95+88 (N)	334485.35	755873.30	273.58			273.625	334486.642	755873.1296	273.579						
97+95 (M)	334322.07	756000.77	273.41			273.440	334324.229	756001.515	273.400						
100+57 (J)	334166.29	756209.23	273.49			273.525	334166.181	756209.719	273.489						
102+57 (12)	334161.62	756409.89	273.31			273.335			273.307						
104+57 (11)	334156.97	756609.55	273.45			273.460			273.438						
106+57 (10)	334152.32	756809.23	273.51			273.539			273.527						
108+57 (I)	334147.67	757009.01	273.50			273.516	334147.434	757009.447	273.502						
110+35 (H)	334083.03	757169.02	273.51			273.527	334083.038	757169.315	273.513						
112+35 (9)	333927.91	757294.74	273.33			273.340			273.326						
114+35 (8)	333772.51	757420.69	273.45			273.461			273.457						
116+35 (F)	333617.17	757546.59	273.59	333616.389	757547.308	273.595	333617.128	757547.032	273.592						

LEGEND

SYMBOL	DESCRIPTION
PZ-14 ●	PIEZOMETER
91+88(14) ▲	CREST MONUMENT
L	SURVEY CONTROL POINT
89+88(I) ▲	CREST MONUMENT (ALSO SERVES AS SURVEY CONTROL POINT I)
▲---△	DIRECTION OF HORIZONTAL MOVEMENT

GRAPHIC SCALES

100' 0 100' 200'

HORIZONTAL MOVEMENT

0 0.2' 0.4'

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DW. BY DJM | CK. BY MP

SUBMITTED — CHIEF, SECTION

APPROVAL RECOMMENDED — CHIEF, DESIGN BRANCH

REVIEWED — DIVISION CHIEF, DESIGN BRANCH

APPROVAL RECOMMENDED — CHIEF, PROJECT MGMT. BRANCH

THAMES RIVER FLOOD CONTROL

MANSFIELD HOLLOW DAM

CREST SURVEY MONUMENTS
HORIZONTAL AND VERTICAL MOVEMENTS
STA. 88+00 TO STA. 117+50

NATCHAUG RIVER CONNECTICUT

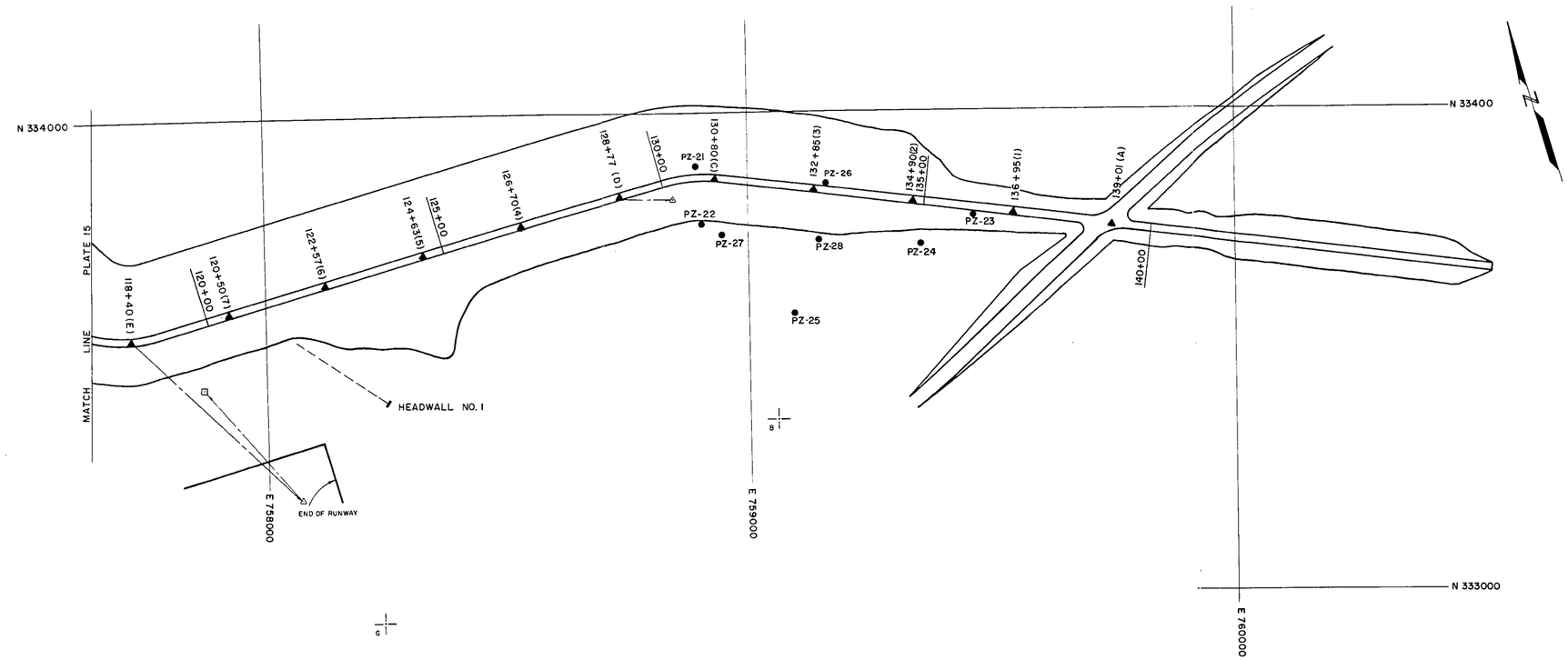
APPROVED — CHIEF, ENGINEERING DIVISION — DATE

GEOTECH. ENG. BR.

PLATE 15

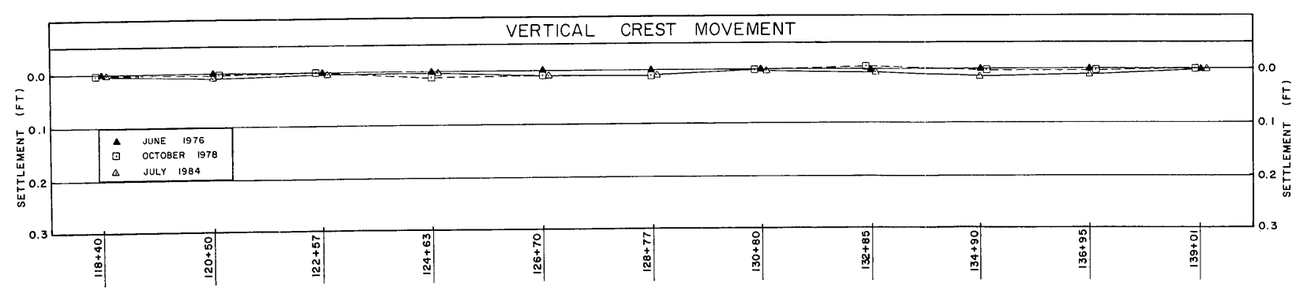
SCALE — SPEC. NO. — DRAWING NUMBER — SHEET

CORPS OF ENGINEERS U. S. ARMY



LEGEND

SYMBOL	DESCRIPTION
PZ-24 ●	PIEZOMETER
120+50(7) ▲	CREST MONUMENT
—|— G1	SURVEY CONTROL POINT
139+01(A)▲	CREST MONUMENT (ALSO SERVES AS SURVEY CONTROL POINT A)
▲—·—·—△	DIRECTION OF HORIZONTAL MOVEMENT



CREST MONUMENT SETTLEMENT AND MOVEMENT RECORD

DATE	JUNE 1976			OCTOBER 1978			JULY 1984								
MONUMENT	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION	NORTHING	EASTING	ELEVATION
118+40 (E)	333543.34	757736.09	273.43	333542.675	757736.787	273.427	333543.134	757736.372	273.427						
120+50 (7)	333602.96	757938.27	273.43			273.426			273.422						
122+57 (6)	333661.47	758136.65	273.62			273.620			273.617						
124+63 (5)	333720.04	758335.24	273.38			273.369			273.378						
126+70 (4)	333778.55	758533.65	273.45			273.440			273.439						
128+77 (D)	333837.12	758732.24	273.49			273.482	333837.11	758732.460	273.481						
130+80 (C)	333860.19	758931.62	273.54			273.537	333860.193	758931.712	273.538						
132+85 (3)	333835.28	759135.18	273.64			273.645			273.635						
134+90 (2)	333810.38	759338.56	273.52			273.517			273.507						
136+95 (1)	333785.48	759542.95	273.63			273.626			273.622						
139+01 (A)	333760.43	759746.66	273.55	333760.43	759746.66	273.550	333760.430	759746.66	273.55						

GRAPHIC SCALES

100' 0 100' 200'

HORIZONTAL MOVEMENT
0 0.2' 0.4'

REVISION	DATE	DESCRIPTION	BY
0	12/31/87	100% SUBMITTAL	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY CRC | DR. BY DJM | CK. BY MP

SUBMITTED: CHIEF, SECTION

APPROVAL RECOMMENDED: CHIEF, DESIGN BRANCH

REVIEWED: PROJECT MANAGER

APPROVAL RECOMMENDED: CHIEF, PROJECT MGMT. BRANCH

APPROVED: CHIEF, ENGINEERING DIVISION DATE

THAMES RIVER FLOOD CONTROL
MANSFIELD HOLLOW DAM
CREST SURVEY MONUMENTS
HORIZONTAL AND VERTICAL MOVEMENTS
STA. 117+50 TO STA. 140+00
NATCHAUG RIVER CONNECTICUT

GEOTECH. ENG. BR.

SCALE | SPEC. NO | DRAWING NUMBER

PLATE 16

SHEET

APPENDIX B

Summary of Daily Field Activities

APPENDIX B

SUMMARY OF DAILY FIELD ACTIVITIES

Date	Activity
July 27, 1987	Mike Paster, Ken Pidgeon and Chuck Conlon (GEI) met Wayne Hawthorne (NED-USCE) at Mansfield Hollow Dam at 10:15 a.m. Mr. Hawthorne showed the GEI personnel the locations of the instrumentation at the dam. The water truck provided by Guild Drilling Co. arrived at the dam at 12:00 noon. Ken Pidgeon and Chuck Conlon performed falling head tests on piezometers PZ-1 through PZ-9. Mike Paster inspected the condition of the crest monuments, control points and outlets from the toe drain system.
July 28, 1987	Performed falling head tests on piezometers PZ-10 through PZ-28. Mike Paster left the dam at 11:00 a.m. The water truck left the dam at 3:00 p.m.
July 29, 1987	Made another set of readings of piezometers that had not previously dropped to their initial water level. Ken Pidgeon and Chuck Conlon left the dam at 11:00 a.m.

APPENDIX C

Weekly Safety Report

GEI WEEKLY SAFETY MEETING
MANSFIELD HOLLOW DAM

TO: Safety Office, NED

FROM: Field Engineer

THRU: Project Manager

Contract No. DACW33-87-D-0002

1. Exposure: Total on-site exposure hours for July 1, 1987 to July 31, 1987 during site visit to Mansfield Hollow Dam.

Michael Paster	11 manhours
Kenneth Pidgeon	20 manhours
Charles Conlon	20 manhours

2. Forwarded: NED, Waltham, MA

Prepared by: Stephen L. Whitcomb
GEI Project Manager

GEI WEEKLY SAFETY MEETING
MANSFIELD HOLLOW DAM

TO: Safety Office, NED

Date Held: July 28, 1987

FROM: Field Engineer

Time: 1215 Hours

THRU: Project Manager

Weekly safety meeting was held this date for the following personnel:

Contract No. DACW33-87-D-0002

Conducted by: Charles Conlon

Personnel present: Charles Conlon (GEI)
Kenneth Pidgeon (GEI)
John Cota (Guild)

---

1. Subjects discussed (Note, delete, or add):

Accident Prevention Plan
Individual Protective Equipment - Hard hats were not required for the work.
Prevention of Falls - Not applicable (N.A.)
Back Injury, Safe Lifting Techniques - OK
Fire Prevention - Fire extinguisher and water tank
Sanitation, First Aid, Waste Disposal - First aid kit, plastic bag for trash, toilet in utility building
Tripping Hazards - Trash, hose, nails in lumber - Hose not a tripping hazard
Staging, Ladders, Concrete Forms, Safety Nets - N.A.
Hand Tools, Portable Power Tools, Woodworking Machinery - Good condition
Equipment Inspection and Maintenance (Zero Defects) - OK
Hoisting Equipment - N.A.
Ropes, Hooks, Chains, and Slings - N.A.
Electrical Grounding, Temporary Wiring, GFCI - N.A.

GEI WEEKLY SAFETY MEETING
MANSFIELD HOLLOW DAM

Lockouts for Safe Clearance Procedures - Electrical, pressure, moving parts - N.A.
Welding, Cutting - N.A.
Excavations - N.A.
Loose Rock and Steep Slopes - Walking up and down the slopes of the dam was avoided where possible.
Explosives - N.A.
Water Safety - N.A.
Toxic Materials - hazards, MSDS, respiratory, ventilation - N.A.
Other - N.A.

Prepared by: Charles Conlon
GEI Field Engineer

APPENDIX D

Documentation for Piezometer Data Program "PIEZ"

DOCUMENTATION FOR PIEZOMETER DATA PROGRAM "PIEZ"

1. INTRODUCTION

1.1 Purpose

The program contained in file PIEZ.WK1 is a Lotus 1-2-3 spreadsheet which provides a user-friendly environment for developing a database of the piezometer readings from Mansfield Hollow Dam. The program uses the Lotus macro language to assist the user with modifying, printing, and plotting the piezometer records. The program was developed by GEI as part of a contract with the New England Division of the Corps of Engineers.

1.2 Piezometer Readings

Instrumentation at the dam currently includes 28 piezometers. The depth to water surface is the distance measured from the top of a piezometer to the water surface. All elevations in the program are in feet. Recent readings which have been measured in meters must be converted to feet before adding the piezometer data to the Lotus spreadsheet.

1.3 Program Structure

The macro programs and data for the 28 piezometers are completely self-contained on a single Lotus 1-2-3 spreadsheet. The piezometer data are located in columns A through DJ.

The spreadsheet is formatted for 150 rows of piezometer data each representing a single date and pool elevation. A full spreadsheet can be stored on a 360 kbyte diskette.

Macros are used in PIEZ.WK1 to simplify tasks such as printing, plotting, and inputting data. Macro programs and macro program variables are identified by their Range Name. A cell location(s) is assigned to each Range Name. A list of Range Names from the program PIEZ.WK1 is presented with the range locations and a brief description in Table D1.

2. PROGRAM DOCUMENTATION

2.1 Getting Started

Required: 1. **Lotus 1-2-3 and support software**
2. Spreadsheet PIEZ.WK1

The computer must be configured so that 1-2-3 may be accessible from the users current directory.

To execute 1-2-3 type: 123 <enter>

After 1-2-3 has been loaded into the computer memory, the user is left in an empty spreadsheet in the 1-2-3 environment. The user must then load the spreadsheet containing the piezometer records and macro programs.

To load the spreadsheet PIEZ.WK1 type: /frpiez.wk1 <enter>

The program will automatically present the user with the Main Menu when PIEZ.WK1 is loaded into 1-2-3.

2.2 Main Menu

The Main Menu in program PIEZ provides the user with the following options:

1. Modify Piezometer Data
2. Plot Piezometer Data
3. Print Piezometer Data
4. Enter Lotus Environment
5. Save and Quit

To select an option at a menu level, the user must type the corresponding number followed by <enter>.

Each of these options are discussed in the following sections.

2.3 Modify Piezometer Data

The modification option allows the user to modify the piezometer records by inserting new data or editing old records.

Before entering the piezometer records, the ALT commands are displayed. ALT commands are independent macro programs which allow the user to carry out a special process when modifying the piezometer records. **ALT commands may only be used when modifying piezometer records.** To invoke an ALT command the user must simultaneously type the ALT key and the corresponding command character. The ALT commands are summarized below.

ALT-A **Advance one piezometer**

The program windows in on a selected piezometer. To move to the next piezometer the user must type ALT-A.

ALT-B **Back one piezometer**

The program windows in on a selected piezometer. To move back to the previous piezometer the user must type ALT-B.

ALT-F **Reformat line**

Occasionally a user will make an error which has wiped out the formulas on a particular row. ALT-F will reformat the entire row within the current piezometer.

To use ALT-F the user must place the cursor in any column on the row to be reformatted before typing the command. The reformatting will be performed only on the current piezometer.

The ALT-F command is useful when the user accidentally assigns a DRY or NULL status to the piezometer.

ALT-D **Assign a DRY status to the piezometer**

Dry piezometers are often encountered. The elevation of the water surface of a dry piezometer is unknown. The program assumes the elevation of the water surface is at the bottom of the well.

To use ALT-D the user must place the cursor in any column on the DRY row before typing the command. The operation will be performed only on the current piezometer.

To erase the DRY status of a piezometer reading the user must use the ALT-F command on the DRY row.

ALT-N **Assign a NULL status to the piezometer**

On some days only certain piezometers were read. This situation creates a problem for those piezometers which were not read. If the depth of water surface is left blank, the computer will interpret the empty cell as being a zero and the computed elevation of water surface will be equal to the elevation of the top of the piezometer. Thus, it is necessary for the user to eliminate the reading and the computed elevation from the record. The ALT-N command assigns a NULL status to the piezometer for that day.

To use ALT-N the user must place the cursor in any column on the NULL row before typing the command. The NULL status will be assigned only to the current piezometer.

To erase the NULL status of a piezometer reading the user must use the ALT-F command on the NULL row.

ALT-M **Returns user to Main Menu**

The ALT-M command returns the user to the Main Menu. ALT-M also sorts the records by date and recalculates the spreadsheet. ALT-M should always be used to return to the Main Menu after modifying piezometer records.

F9 **Recalculates spreadsheet**

Recalculation of the spreadsheet is automatically performed before the user is returned to the Main Menu. Lotus allows the user to manually recalculate the entire spreadsheet by pressing the F9 key.

When the user selects the Modify Piezometer Data option on the main menu, the next menu prompts the user for the starting piezometer. The user will generally begin with PZ1. However, the user may wish to only edit the data for a certain piezometer. Rather than starting at PZ1 and advancing (or backing-up) several piezometers, the user has the option to select the first piezometer to be displayed.

Following selection of the beginning piezometer number, the program will window in on the dates, pool elevations, and the data of the selected piezometer. The user is now free to modify the data in the Lotus 1-2-3 environment. The arrow keys on the numeric keypad provide cursor control. To insert a new record the user must move down to the next available line in the date column. The ALT commands (summarized above the column headings) are available to assist the user with more complex tasks. When the user has completed modifying the piezometer records, the command ALT-M must be used to return to the Main Menu. The modifications made to the piezometer records should be saved using the Save and Quit option in the Main Menu.

Time and Date

The date cells are already occupied with the format which must be used to tell Lotus the date of the reading. Similarly, the time cells are also occupied by the format for the time function. To add a new date, say April 25, 1993, the user must type "@DATE (93, 4, 25)". To add a new time, say 2:30 pm, the user must type "@TIME (14,30,00)".

2.4 Plot Piezometer Data

The program provides the capability to develop plots of the piezometer data using Lotus 1-2-3 commands.

The plot menu is displayed when the user selects the Plot Piezometer Data option from the Main Menu. The plot menu contains the following options:

1. Select Data For Plotting
2. View Graph
3. Save Graph
4. Return to Main Menu

The two types of plots are:

1. Piezometer Data vs. Date (including pool vs. date)
2. Piezometer Data vs. Pool

The program prompts the user to select the piezometers to be plotted and the range of dates for plotting. The program will return to the plot menu where the user will generally view the results. The save option allows the user to save the plot as a "pic" file which is the standard plot file generated by Lotus 1-2-3.

Further information regarding the selection of the range of dates for plotting is presented in Section 2.6.

2.5 Print Piezometer Data

The program allows the user to print individual piezometer records or all of the piezometer records. The user can also specify the range of dates to be printed (See Section 2.6). Each piezometer record is formatted to fit on an 8.5-inch-wide sheet of paper.

2.6 Selection of Date Range for Plotting and Printing

Date ranges are selected by the user for plotting and printing. During date range selection the user is presented with the list of dates stored in the database. The computer selects and marks the default range which includes all dates. A "1" is stored in the cell adjacent to the first date and a "2" is stored in the cell adjacent to the last date. The user may change the default range by moving the 1 marker to a new location adjacent to a new starting date and/or moving the 2 marker adjacent to a new end date. Instructions for using the Lotus move command (m) are provided on the screen. Alternatively, the user could erase the default numbers and insert a new 1 and 2 adjacent to the new dates. To save the selected dates and continue with the printing or plotting type ALT-C.

2.7 Lotus Environment

For the experienced Lotus 1-2-3 user, the program provides an opportunity to work in the spreadsheet using the 1-2-3 environment. This option is particularly useful for modifying the plots to the users requirements. To return to the Main Menu from the Lotus Environment, type ALT P. Note, however, that when modifying piezometer records, you must return to the Main Menu using ALT M.

2.8 Save & Quit Option

The Save and Quit option allows the user to save the modifications to the piezometer records. The quit menu displays the following options:

1. Save and Quit
2. Quit without Saving
3. Save and Return to Main Menu
4. Return to Main Menu without Saving

TABLE D1 - DESCRIPTION OF MACROS AND VARIABLES
PROGRAM PIEZ.WKS
Mansfield Hollow Dam
Mansfield, Connecticut

RANGE NAME	LOCATION	DESCRIPTION
AUTO-ADV	B608	ADVANCES PIEZOMETER FOR PRINT
CHOICE	BL217	VARIABLE
COL	B894	VARIABLE
COL-BEG	B721	VARIABLE
COL-END	B722	VARIABLE
COM10	B845	COMMAND VARIABLE
COM11	B848	COMMAND VARIABLE
COM11A	B851	COMMAND VARIABLE
COM12	B737	COMMAND VARIABLE
COM13	B620	COMMAND VARIABLE
COM15	B689	COMMAND VARIABLE
COM16	B713	COMMAND VARIABLE
COM2	B548	COMMAND VARIABLE
COM2A	B369	COMMAND VARIABLE
COM2B	B373	COMMAND VARIABLE
COM3	B499	COMMAND VARIABLE
COM3A	B503	COMMAND VARIABLE
COM3B	B508	COMMAND VARIABLE
COM3C	B519	COMMAND VARIABLE
COM3D	B483	COMMAND VARIABLE
COM3E	B488	COMMAND VARIABLE
COM3G	B512	COMMAND VARIABLE
COM3H	B515	COMMAND VARIABLE
COM4	B752	COMMAND VARIABLE
COM5	B763	COMMAND VARIABLE
COM6	B766	COMMAND VARIABLE
COM6A	B769	COMMAND VARIABLE
COM7	B782	COMMAND VARIABLE
COM7A	B788	COMMAND VARIABLE
COM8	B799	COMMAND VARIABLE
COM9	B814	COMMAND VARIABLE
COM9A	B817	COMMAND VARIABLE
COM-11	B535	COMMAND VARIABLE
COM-A	B408	COMMAND VARIABLE
COM-A3	B422	COMMAND VARIABLE
COM-A4	B424	COMMAND VARIABLE
COM-AA	B416	COMMAND VARIABLE
CONT-PLOT	B299	CONTINUES INTERUPTED PLOT MACROS
CONT-PLOT1	B261	CONTINUES INTERUPTED PLOT MACROS
CONT-PLOT2	B276	CONTINUES INTERUPTED PLOT MACROS
CONT-PRINT	B607	CONTINUES INTERUPTED PRINT MACROS
CONT-PZ	B405	ASSIGNS RANGES OF PZ DATA FOR PLOTTING

TABLE D1 - DESCRIPTION OF MACROS AND VARIABLES
PROGRAM PIEZ.WKS
Mansfield Hollow Dam
Mansfield, Connecticut

RANGE NAME	LOCATION	DESCRIPTION
CONVERT	B897	CONVERTS COLUMN NUMBER TO COLUMN LETTER
CON-COL	B902	VARIABLE
COUNT	B310	VARIABLE
COUNT1	B862	VARIABLE
COUNT2	B362	VARIABLE
COUNT3	B388	VARIABLE
DATE	A14..A59	RANGE OF DATES USED PLOTTING/PRINTING
DATE-BEG	C461	VARIABLE
DATE-END	C462	VARIABLE
DISPLAY	B724	SETS UP SCREEN DISPLAY FOR MODIFYING PZ
FNAME	EC209	VARIABLE
GCHOICE	CM216	VARIABLE
GETDATE	B465	DETERMINE DATE RANGE SET BY MARKERS 1&2
GRAPH1	D381	VARIABLE
GRAPH2	D382	VARIABLE
GRAPH3	D383	VARIABLE
GRAPH4	D384	VARIABLE
GRAPH5	D385	VARIABLE
GRAPH6	D386	VARIABLE
GSELECT	B243	SELECT GRAPH TYPE: PLOT1 OR PLOT2
JUNK	B387	VARIABLE
LIST	Y200	LIST OF RANGE NAMES AND LOCATIONS
LOC	B858	VARIABLE
LOCATE	B917	DETERMINES CURSOR LOCATION
LOC-COL	B861	VARIABLE
LOC-END	B543	DETERMINES ROW NUMBER OF LAST DATE
LOC-ROW	B860	VARIABLE
LOTUS	B633	LOTUS ENVIRONMENT FROM MAIN MENU
MENU0	B185	MAIN MENU
MOD	B205	MODIFY PIEZOMETER FROM MAIN MENU
NEW-PLOT	B391	SET UP NEW PLOT PARAMETERS
NNPZ	DG217	VARIABLE
NPLOTS	BM208	VARIABLE
NPZ	DH207	VARIABLE
PCHOICE	DN216	VARIABLE
PDATE-CH	EV214	VARIABLE
PLOT	B228	PLOT MENU: SELECT/VIEW/SAVE/MENU0
PLOT1	B257	PZ VS. DATE
PLOT2	B273	PZ VS. POOL
POOL	C42..C59	RANGE OF POOL ELEVATION DATA

TABLE D1 - DESCRIPTION OF MACROS AND VARIABLES
PROGRAM PIEZ.WKS
Mansfield Hollow Dam
Mansfield, Connecticut

RANGE NAME	LOCATION	DESCRIPTION
PRINT	B574	PRINT MENU: PRINT1 OR PRINT2
PRINT1	B583	PRINT ALL PZ RECORDS
PRINT2	B596	PRINT SELECTED PZ RECORDS
PRINT-CH	EK216	VARIABLE
PRINT-PZ	B606	VARIABLE
PZ0	U688	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ1	U689	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ10	U698	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ11	U699	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ12	U705	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ13	U706	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ14	U707	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ15	U708	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ16	U709	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ17	U710	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ18	U711	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ19	U712	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ2	U690	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ20	U713	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ21	U714	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ22	U715	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ23	U716	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ24	U717	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ25	U718	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ26	U719	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ27	U720	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ28	U721	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ3	U691	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ4	U692	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ5	U693	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ6	U694	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ7	U695	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ8	U696	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ9	U697	CATOLOG OF PZ LOCATIONS IN SPREADSHEET
PZ-COL	B386	VARIABLE
PZ-COL1	B381	VARIABLE
PZ-COL2	B382	VARIABLE
PZ-COL3	B383	VARIABLE
PZ-COL4	B384	VARIABLE
PZ-COL5	B385	VARIABLE
PZ-COL6	B386	VARIABLE

TABLE D1 - DESCRIPTION OF MACROS AND VARIABLES
PROGRAM PIEZ.WKS
Mansfield Hollow Dam
Mansfield, Connecticut

RANGE NAME	LOCATION	DESCRIPTION
PZ-NO	B361	VARIABLE
Q	B653	QUIT MENU
QCHOICE	CZ215	VARIABLE
RECORD	CF209	VARIABLE: RECORD OR PZ NUMBER
ROW-BEG	B459	VARIABLE
ROW-END	B460	VARIABLE
SAVE	B530	SAVE PIC FILE
SCRATCH	D188	VARIABLE
SCRATCH1	B892	VARIABLE
SCRATCH2	B893	VARIABLE
SCRATCH3	B463	VARIABLE
SCREEN-OFF	B565	FREEZE SCREEN
SCREEN-ON	B560	UNFREEZE SCREEN
SELECTPZ	B312	SELECT PIEZOMETER FOR GRAPH OR PRINT
SEL-DATE	B436	SELECT DATE RANGE FOR PLOT OR PRINT
SKIP	B458	VARIABLE
SLABEL	B866	ORGANIZES LABEL SEARCH
SNUMBER	B880	ORGANIZES NUMBER SEARCH
SORT	B842	SORTS PIEZOMETER DATA BY DATE
SPLICE	B912	CONVERTS COLUMN LETTER TO COLUMN NUMBER
STEP-ALPHA	B873	SEARCHES FOR LABEL IN STRING
STEP-LABEL	B873	SEARCHES FOR LABEL IN STRING
STEP-NUM	B887	SEARCHES FOR NUMBER IN STRING
STORE-COL	B364	STORES COLUMN LETTER OF PZ FOR PLOTTING
STRING	B859	VARIABLE:CONTAINS CHARACTERS FOR SEARCH
TITLEPAGE	B180	DISPLAYS TITLEPAGE OF PROGRAM
VALUE-BEG	H459	VARIABLE
VALUE-END	H460	VARIABLE
VIEW	B549	VIEWS GRAPH
X-DATE	B495	ASSIGNS DATE DATA RANGE TO X FOR GRAPH
X-POOL	B479	ASSIGNS POOL DATA RANGE TO X FOR GRAPH
0	B171	INITIAL MARCRO, 0 MARCRO IS AUTOEXEC
A	B675	ADVANCE PIEZOMETER
C	B290	SAVES DATE MARKERS
D	B745	DRY PIEZOMETER
F	B793	REFORMAT PIEZOMETER
M	B831	RETURN TO MAIN MENU
N	B776	NULLIFIES PIEZOMETER READING
P	B171	EXECUTES MACRO PROGRAM

Department of the Army
New England Division, Corps of Engineers
Mansfield Hollow Dam
Mansfield, Connecticut

PIEZOMETER WELL OBSERVATIONS

Date: _____

Piezometer Number

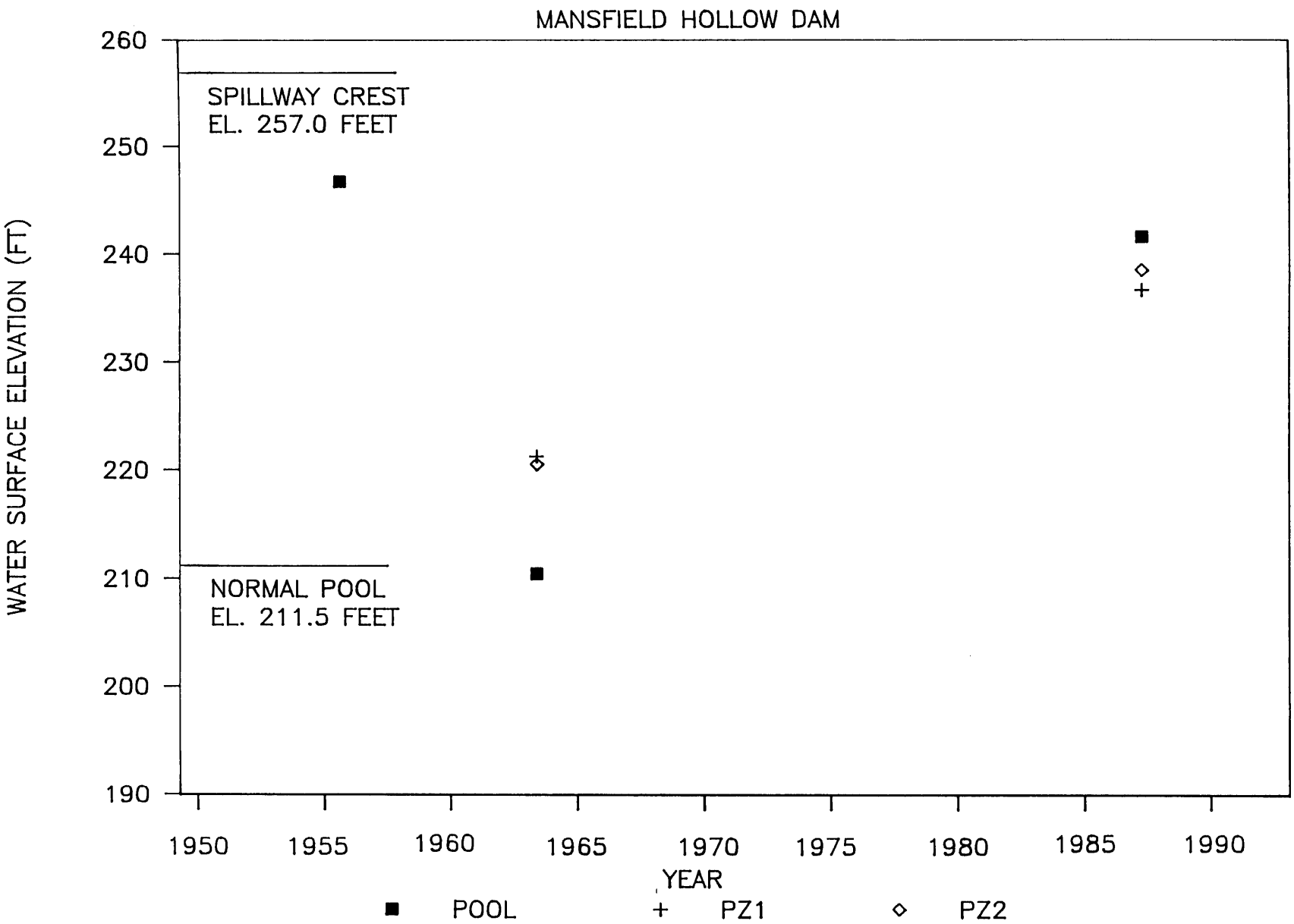
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Centerline Station	0+82	1+54	4+54	5+75	5+75	7+02	7+75	47+50	50+17	77+00	79+00	86+00	86+00	89+25
Centerline offset (ft)	92 D/S	92 D/S	100 D/S	14 U/S	54 D/S	98 D/S	14 D/S	70 D/S	55 D/S	186 D/S	200 D/S	15.5 U/S	112 D/S	100 D/S
Top Elevation (ft)	246.48	250.01	247.02	270.18	249.96	239.46	272.26	254.69	261.71	231.92	245.13	269.43	253.49	251.08
Bottom Elevation (ft)	222.5	211.9	215.4	212.9	212.0	215.3	227.5	237.8	233.2	190.8	199.1	207.2	208.0	206.0
Time of Reading														
Pool Elevation (ft)														
Chapin Brook El(ft)														
Depth to Water Surface (m)														
Depth to Water Surface (ft)														

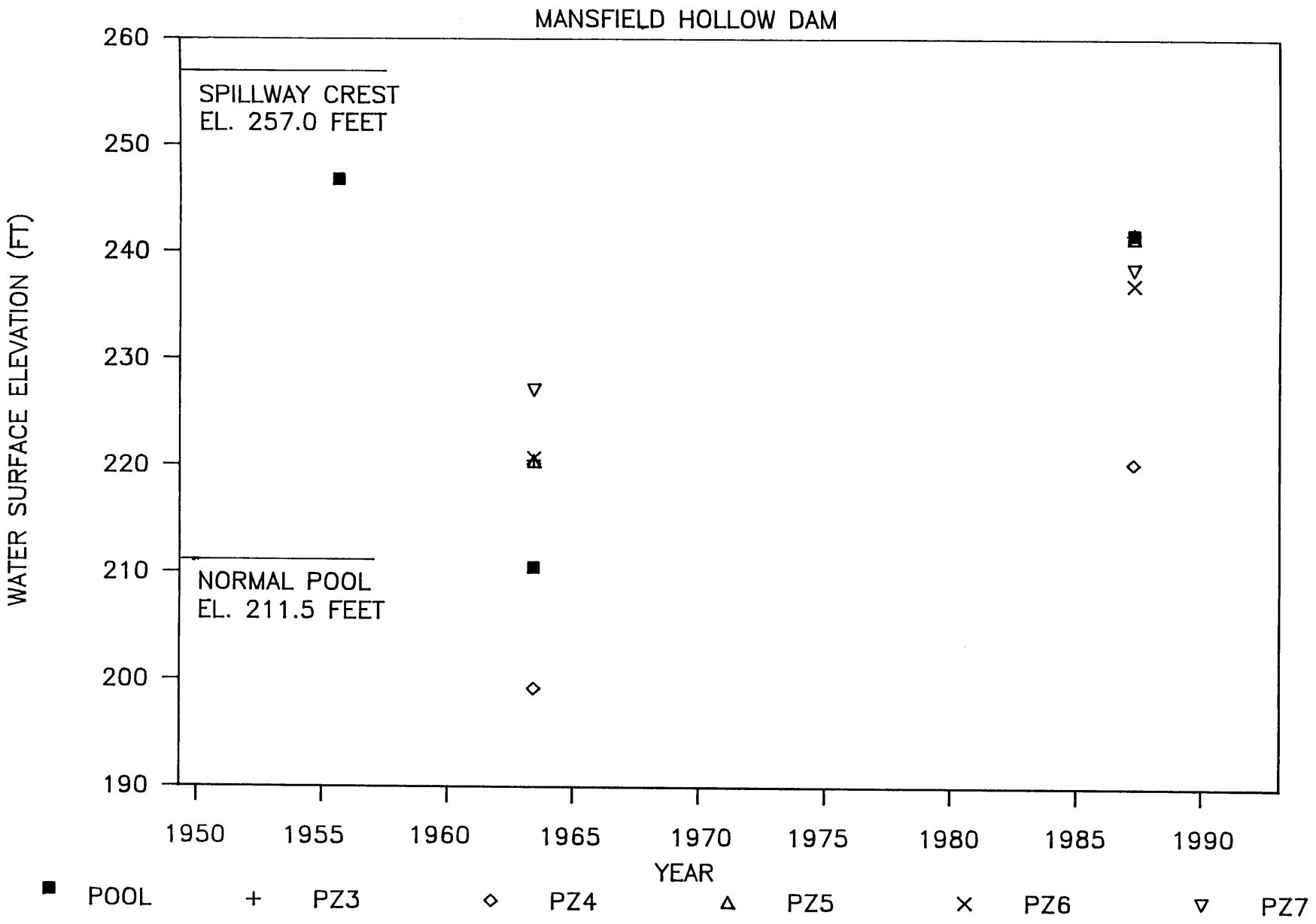
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Centerline Station	90+100	100+75	100+75	113+50	113+50	113+50	131+00	131+02	136+00	135+00	132+60	132+90	130+97	132+90
Centerline offset (ft)	15.5 U/S	15.5 U/S	87 D/S	15.5 U/S	82 D/S	200 D/S	16.5 U/S	100 D/S	13.5 D/S	89 D/S	260 D/S	7 U/S	117 D/S	109 D/S
Top Elevation (ft)	269.54	269.87	233.30	270.13	237.00	237.57	267.51	232.60	271.21	249.38	233.14	274.5	234.7	238.0
Bottom Elevation (ft)	203.5	201.25	201.6	190.0	204.5	200.6	201.8	209.1	211.75	203.8	205.8	211.0	177.6	191.0
Time of Reading														
Pool Elevation (ft)														
Depth to Water Surface (m)														
Depth to Water Surface (ft)														

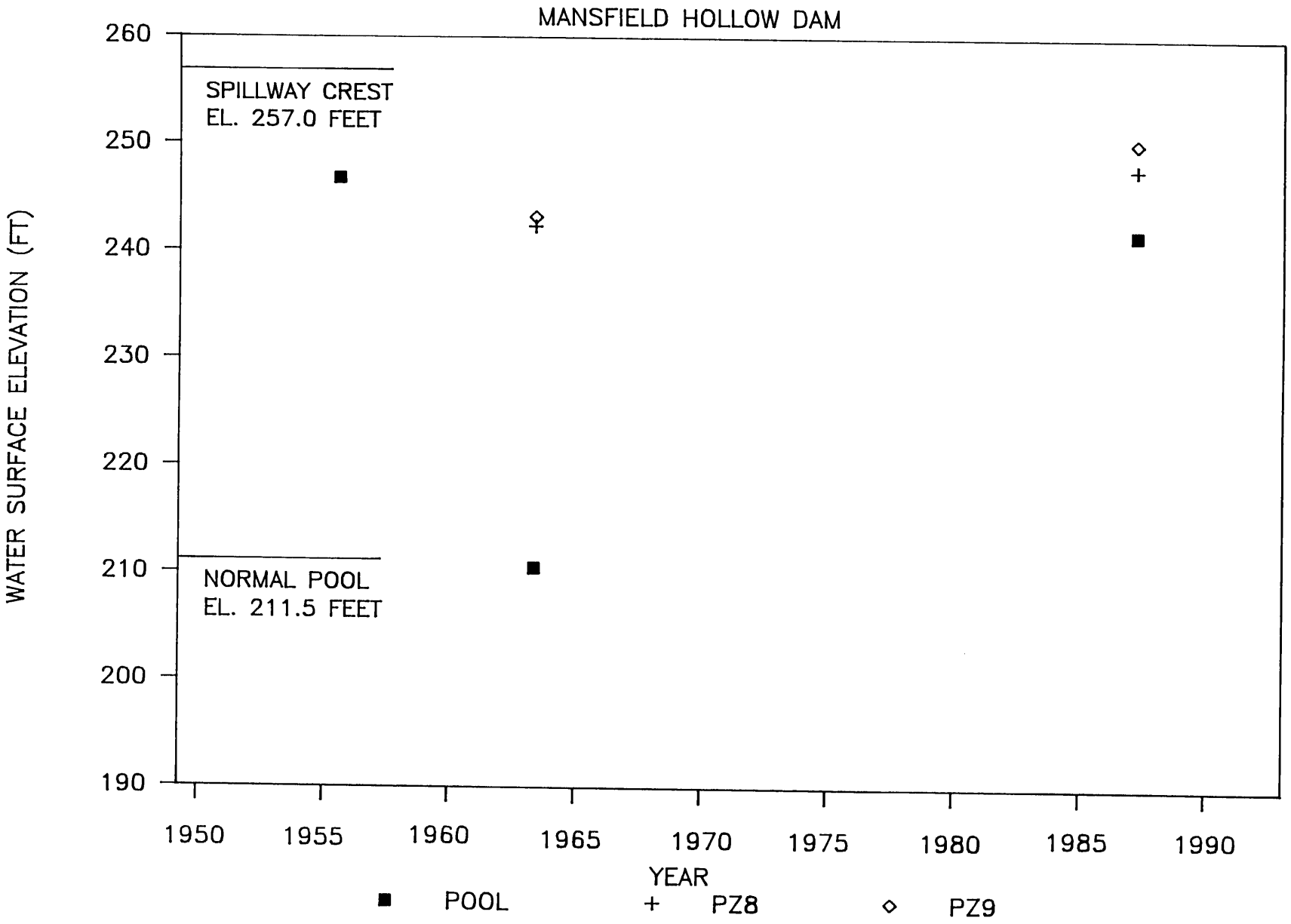
Signed: _____

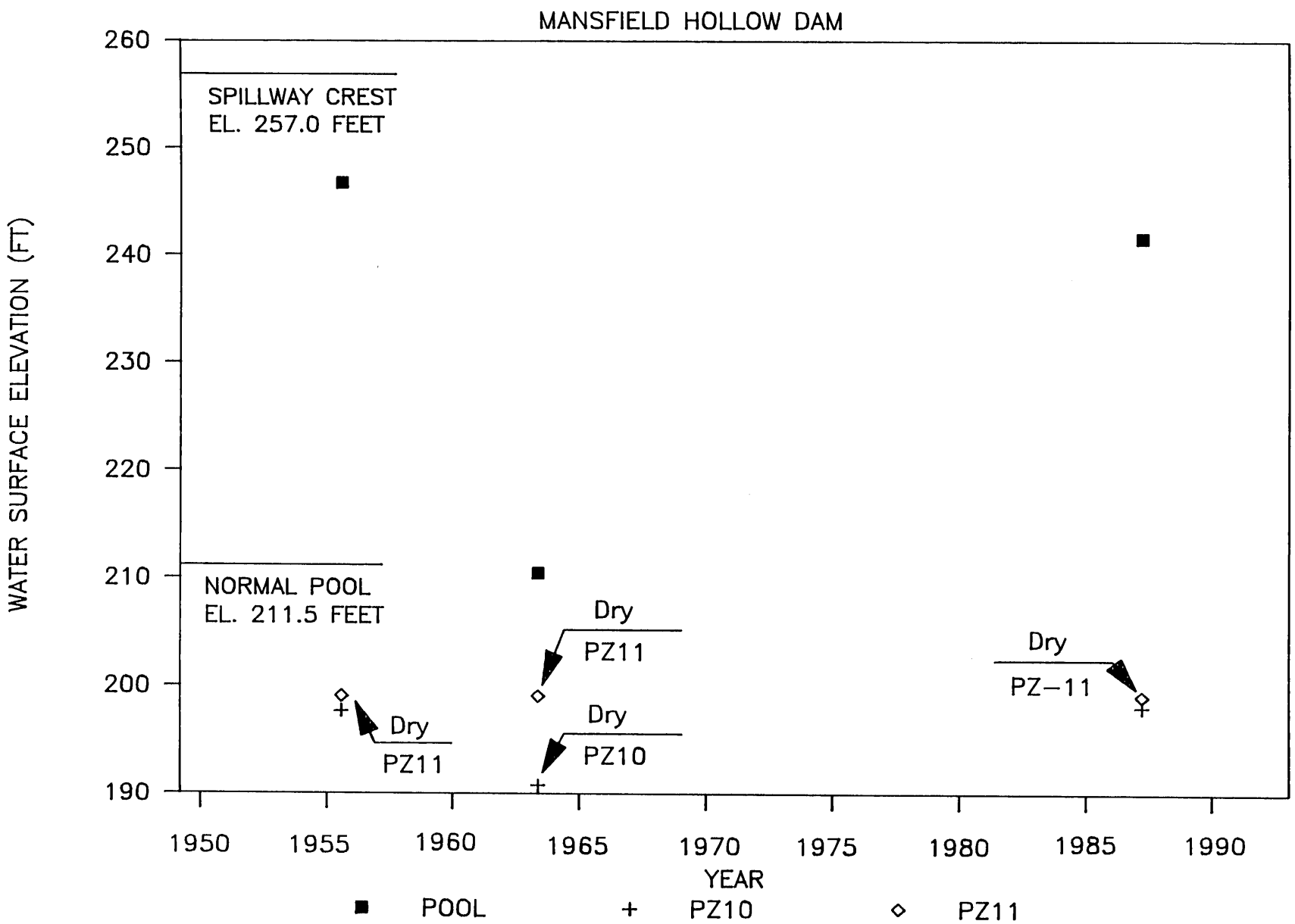
APPENDIX E

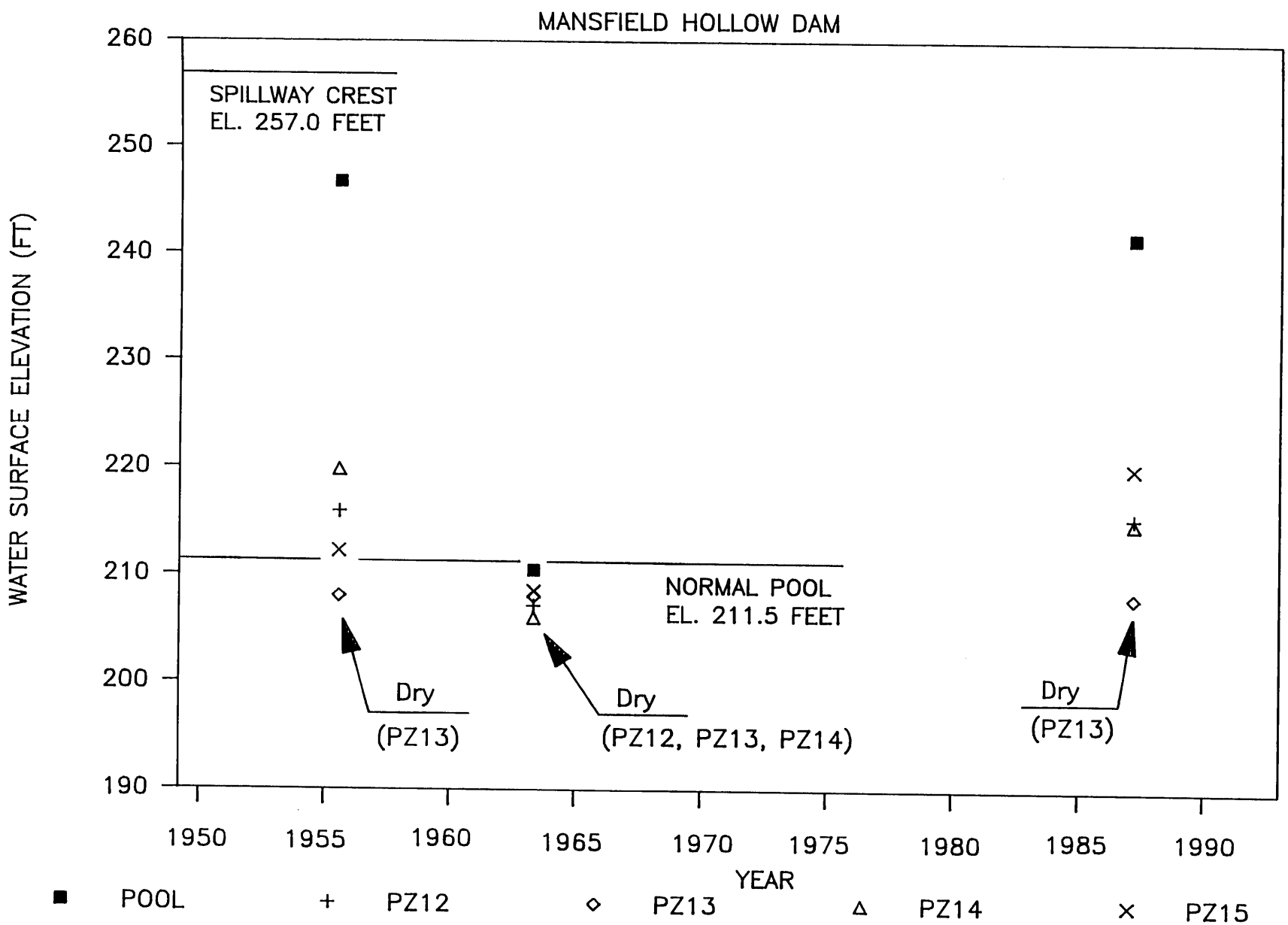
Plots of Peak Piezometer and
Peak Pool Elevations

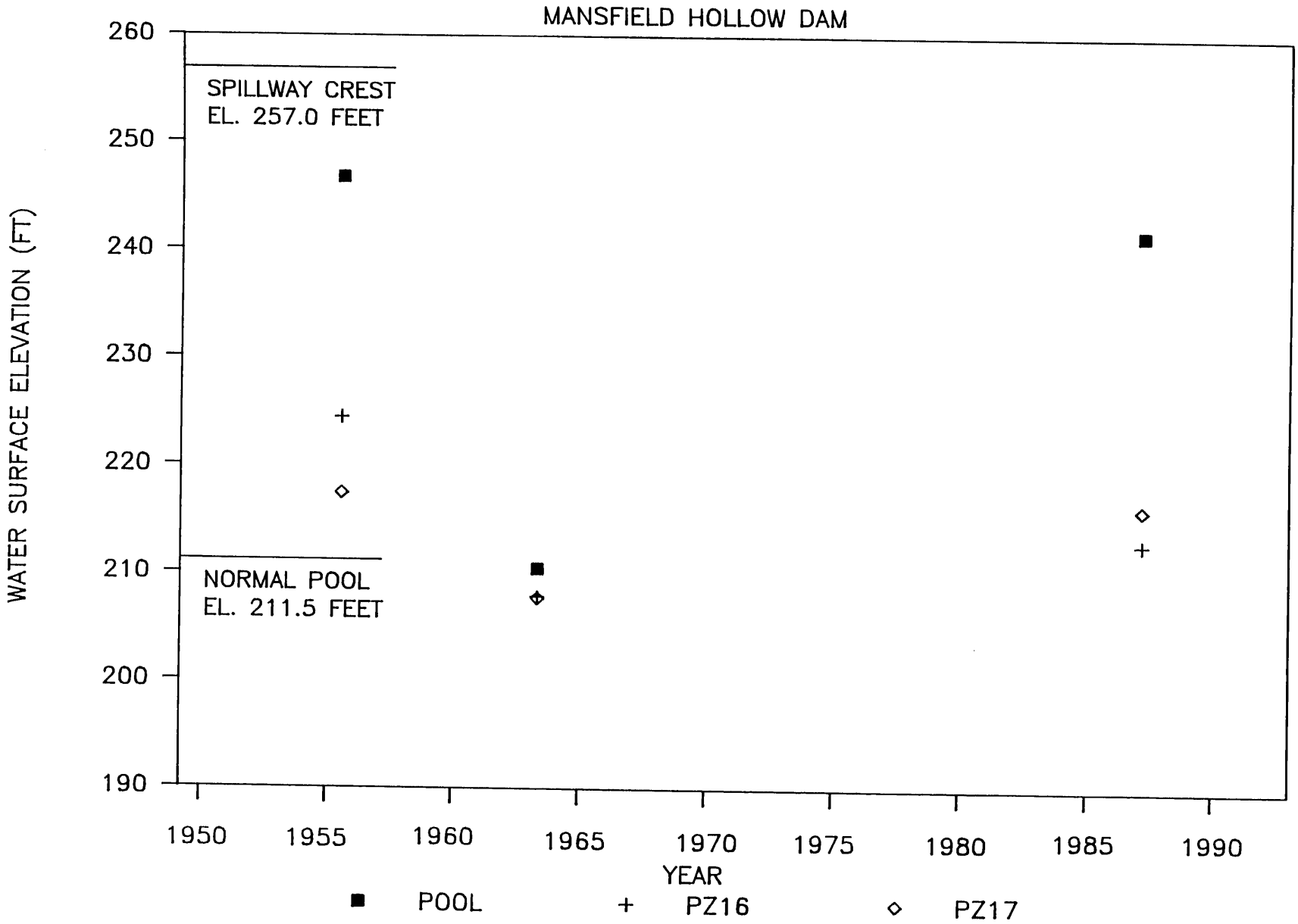

MANSFIELD HOLLOW DAM
SPILLWAY CREST
EL. 257.0 FEET
NORMAL POOL
EL. 211.5 FEET
WATER SURFACE ELEVATION (FT)
260
250
240
230
220
210
200
190
1950
1955
1960
1965
1970
1975
1980
1985
1990
YEAR
POOL
PZ1
PZ2

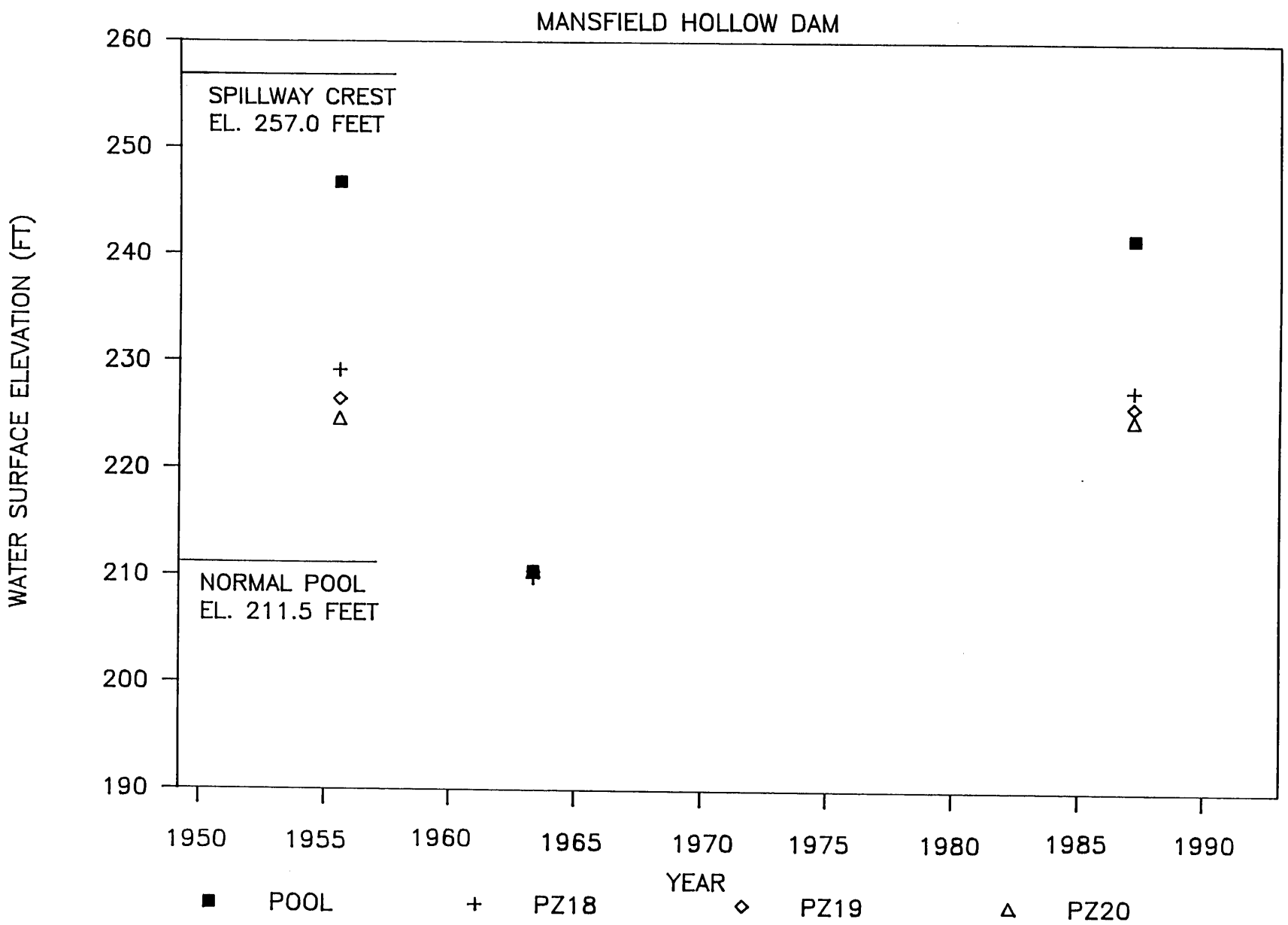

MANSFIELD HOLLOW DAM
SPILLWAY CREST
EL. 257.0 FEET
NORMAL POOL
EL. 211.5 FEET
WATER SURFACE ELEVATION (FT)
260
250
240
230
220
210
200
190
1950
1955
1960
1965
1970
1975
1980
1985
1990
YEAR
POOL
PZ3
PZ4
PZ5
PZ6
PZ7

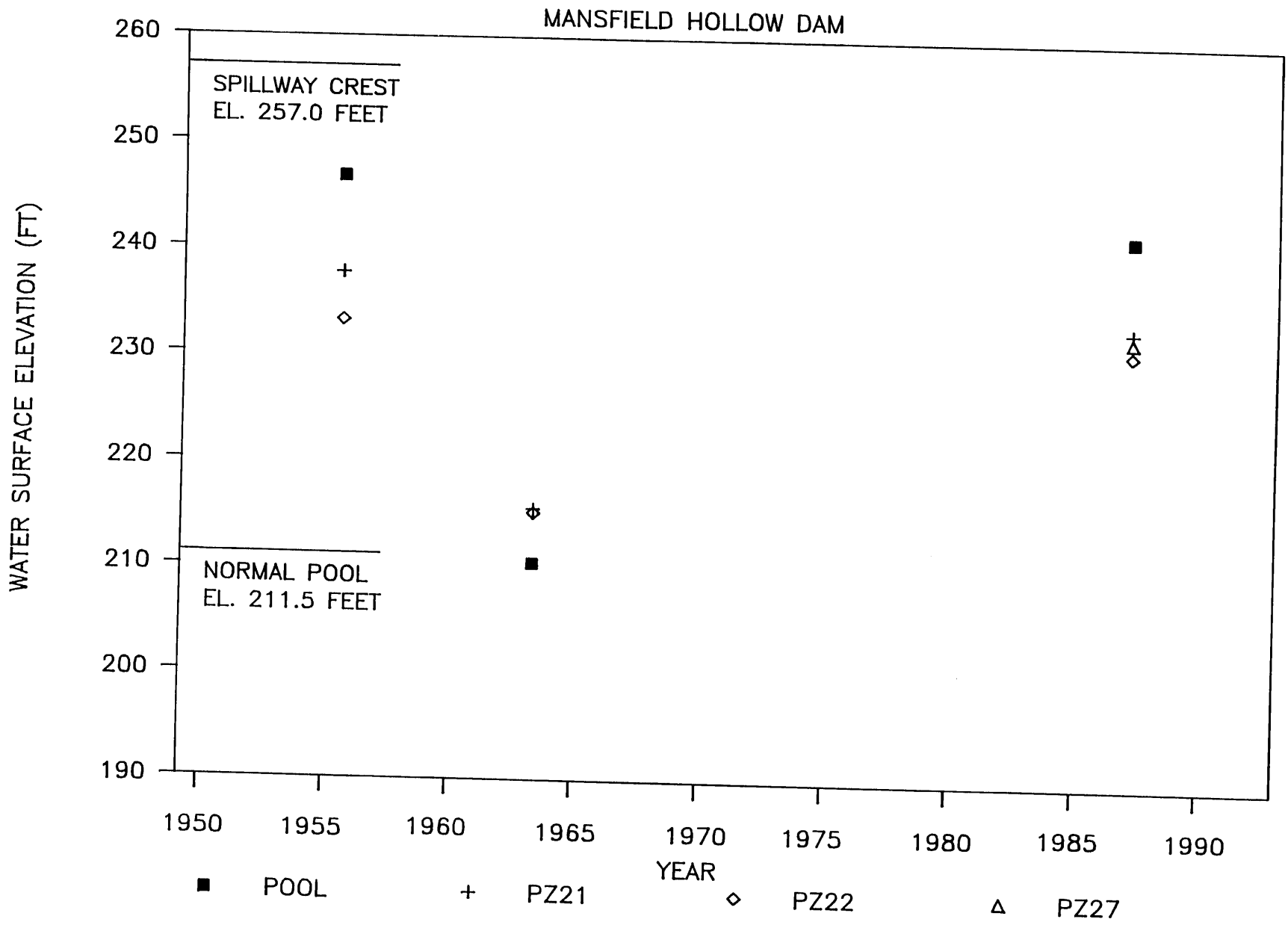

MANSFIELD HOLLOW DAM
SPILLWAY CREST
EL. 257.0 FEET
NORMAL POOL
EL. 211.5 FEET
WATER SURFACE ELEVATION (FT)
260
250
240
230
220
210
200
190
1950
1955
1960
1965
1970
1975
1980
1985
1990
YEAR
POOL
PZ8
PZ9

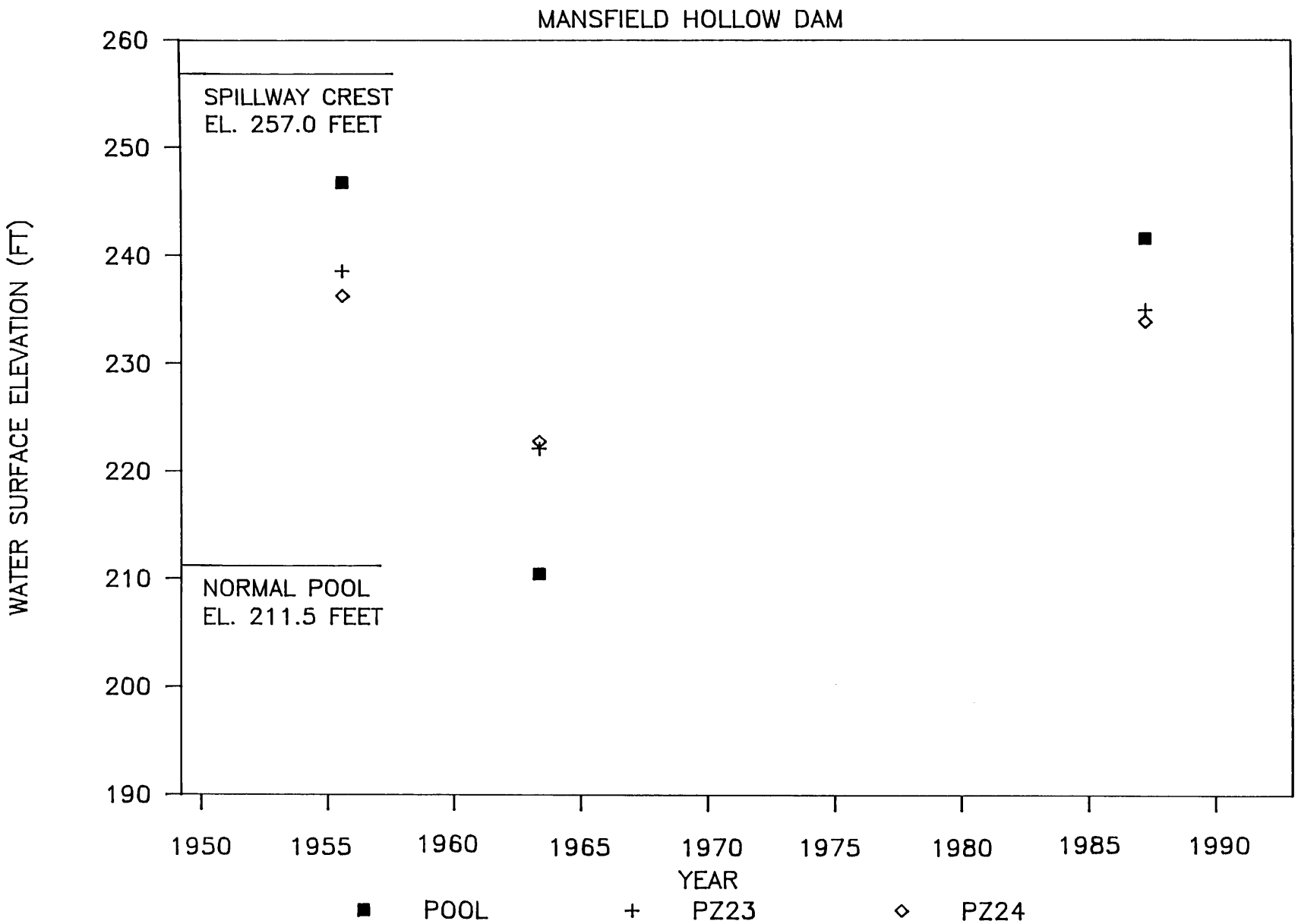

MANSFIELD HOLLOW DAM
WATER SURFACE ELEVATION (FT)
260
250
240
230
220
210
200
190
SPILLWAY CREST
EL. 257.0 FEET
NORMAL POOL
EL. 211.5 FEET
Dry
PZ11
Dry
PZ11
Dry
PZ10
Dry
PZ-11
1950
1955
1960
1965
1970
1975
1980
1985
1990
YEAR
POOL
PZ10
PZ11

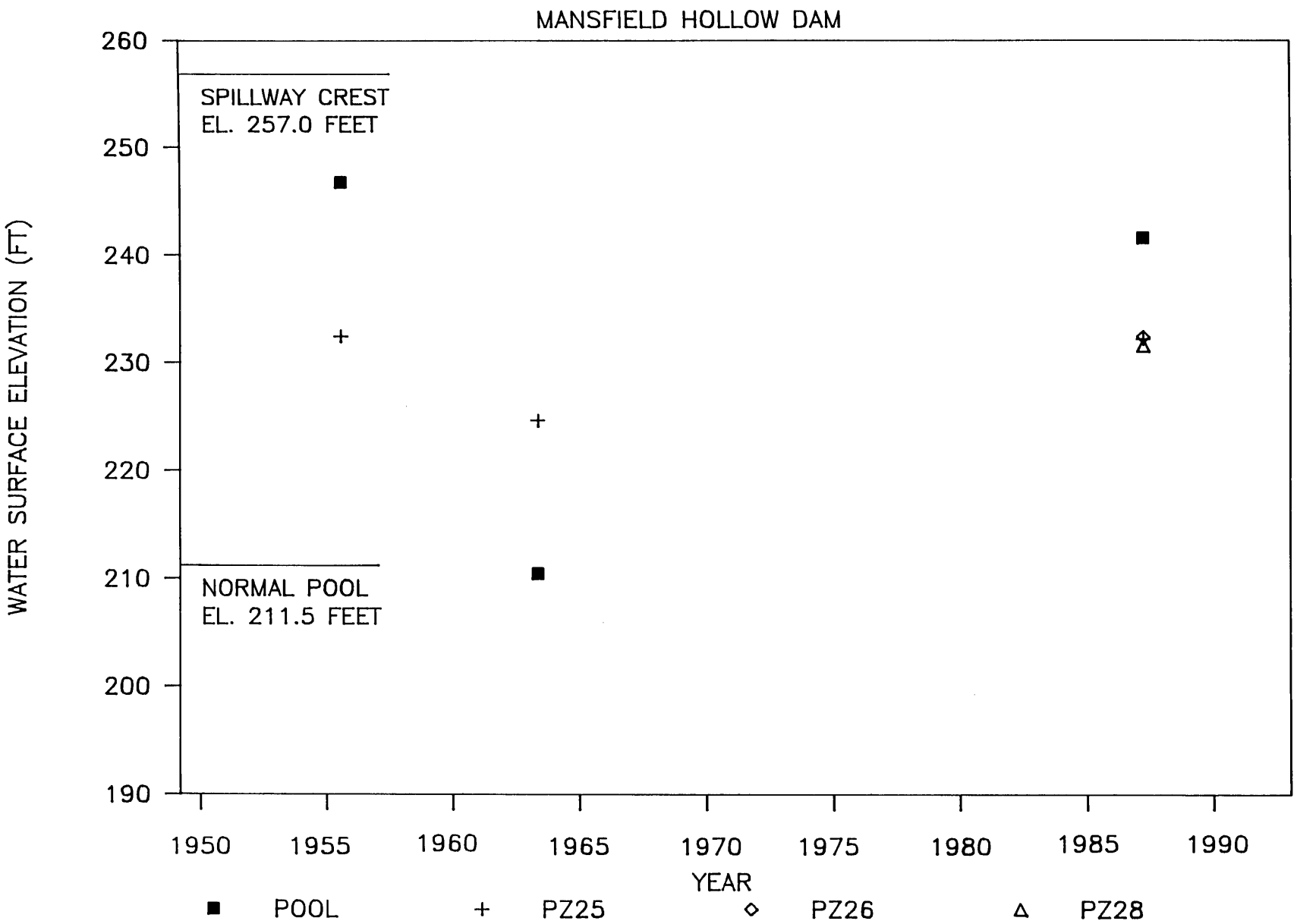

MANSFIELD HOLLOW DAM
SPILLWAY CREST
EL. 257.0 FEET
NORMAL POOL
EL. 211.5 FEET
Dry
(PZ13)
Dry
(PZ12, PZ13, PZ14)
Dry
(PZ13)
WATER SURFACE ELEVATION (FT)
260
250
240
230
220
210
200
190
1950
1955
1960
1965
1970
1975
1980
1985
1990
YEAR
POOL
PZ12
PZ13
PZ14
PZ15


MANSFIELD HOLLOW DAM
SPILLWAY CREST
EL. 257.0 FEET
NORMAL POOL
EL. 211.5 FEET
WATER SURFACE ELEVATION (FT)
260
250
240
230
220
210
200
190
1950
1955
1960
1965
1970
1975
1980
1985
1990
YEAR
POOL
PZ16
PZ17


MANSFIELD HOLLOW DAM
SPILLWAY CREST
EL. 257.0 FEET
NORMAL POOL
EL. 211.5 FEET
WATER SURFACE ELEVATION (FT)
260
250
240
230
220
210
200
190
1950
1955
1960
1965
1970
1975
1980
1985
1990
YEAR
POOL
PZ18
PZ19
PZ20


MANSFIELD HOLLOW DAM
SPILLWAY CREST
EL. 257.0 FEET
NORMAL POOL
EL. 211.5 FEET
WATER SURFACE ELEVATION (FT)
260
250
240
230
220
210
200
190
1950
1955
1960
1965
1970
1975
1980
1985
1990
YEAR
POOL
PZ21
PZ22
PZ27


MANSFIELD HOLLOW DAM
SPILLWAY CREST
EL. 257.0 FEET
NORMAL POOL
EL. 211.5 FEET
WATER SURFACE ELEVATION (FT)
260
250
240
230
220
210
200
190
1950
1955
1960
1965
1970
1975
1980
1985
1990
YEAR
POOL
PZ23
PZ24


MANSFIELD HOLLOW DAM
WATER SURFACE ELEVATION (FT)
260
250
240
230
220
210
200
190
SPILLWAY CREST
EL. 257.0 FEET
NORMAL POOL
EL. 211.5 FEET
1950
1955
1960
1965
1970
1975
1980
1985
1990
YEAR
POOL
PZ25
PZ26
PZ28

APPENDIX F

Recommendations for Instrumentation Maintenance and Reading Schedule

GEI

Principals
Steve J. Poulos, Ph.D., P.E.
Ronald C. Hirschfeld, Ph.D., P.E.
Daniel P. La Gatta, Ph.D., P.E.
Richard F. Murdock, P.E.
Gonzalo Castro, Ph.D., P.E.

Associates
Francis D. Leathers, P.E.
John W. France, P.E.
Joseph G. Engels, P.E.

December 31, 1987
Project 87255

Mr. Richard D. Reardon
Chief, Engineering Division
U.S. Department of the Army
New England Division
Corps of Engineers
Building 112S
424 Trapelo Road
Waltham, MA 02254-9149

Dear Mr. Reardon:

Re: Recommendations for Instrumentation Maintenance and Reading Schedule
Mansfield Hollow Dam
Mansfield, Connecticut

This letter presents our recommendations for instrumentation maintenance and for the schedule of instrumentation readings at Mansfield Hollow Dam in Mansfield, Connecticut. The recommendations presented in this letter are also included in the Geotechnical Appendix for the NED-USCE Instrumentation Evaluation Report.

Maintenance of Instrumentation

Based on data collected from falling head tests performed on all the piezometers at Mansfield Hollow Dam on July 27 to 29, 1987, piezometers 2, 3, 6, 7, 15, 16, 17, 18 and 19 may not be functioning adequately and should be cleaned. The piezometers should be cleaned by a combination of surging and jetting. Surging could be performed using a pipe with a diameter slightly smaller than the diameter of the piezometer riser and a capped end. The pipe should be lowered to the bottom of the piezometer and quickly raised and lowered several times in succession. Jetting should be performed after surging by lowering a hose to the bottom of the piezometer and jetting clear water through the hose until the water return at the top appears clear. After the piezometer has been cleaned, a falling or rising head test should be performed on the piezometer to determine whether it is functioning adequately. If the piezometer does not function adequately after cleaning, it should be replaced.

1021 Main Street Winchester, Massachusetts 01890 617 • 721 • 4000

Concord, New Hampshire and Denver, Colorado

In addition to cleaning, some of the piezometers require maintenance to their protective enclosure. PZ-4, 5, 12 and 18 do not have manhole covers and the steel riser for PZ-5, 18, 24 and 25 sticks above the top of the protective concrete block enclosure. The protective concrete block enclosure should be realigned to center the piezometer riser for PZ-2, 3, 6, 12 and 21.

All of the survey control points located off of the dam should be located and clearly marked. Shrubs and high weeds around the control points should be removed on a regular basis.

At headwalls 2 and 4, the drainage ditches downstream of the headwalls were overgrown with grass or saplings. This growth should be removed.

Schedule for Crest Monument Surveys

A crest monument survey should be scheduled in the near future to check the accuracy of the horizontal movements from Sta. 88+06 to Sta. 97+95. In the future, a crest monument survey should be scheduled to coincide with the periodic inspection schedule (once every five years).

Schedule for Reading Piezometers

We recommend the following schedule for reading the piezometers at Mansfield Hollow Dam:

(1) Routine Monitoring. During periods when the reservoir is below the 16.5 feet stage (El. 211.5) readings should be made by the project manager at least once every three months. Pool elevations should be recorded simutaneously with piezometer readings. When access to the piezometers is made hazardous by snow or ice, the readings may be deferred until safe access is possible.

(2) High Pool Conditions. During periods when the reservoir level is above the 16.5 feet stage (El. 211.5) and below the 30 feet stage (El. 225), piezometers PZ-10 through PZ-28 should be read on a weekly basis until the pool returns to the 16.5 feet stage. During periods when the reservoir level is above the 30 feet stage (El. 225) and below the 40 feet stage (El. 235), all piezometers, except PZ-8 and PZ-9, should be read on a daily basis until the pool returns to the 30 feet stage. During periods when the reservoir level is above the 40 feet stage (El. 235), all piezometers should be read on a daily basis until the pool returns to the 40 feet stage. Pool elevations should be recorded simultaneously with piezometer readings. Elevations of Chapin Brook should be recorded simultaneously with piezometer readings at Dike B.

(3) Special Conditions. If unusual changes in readings develop or if piezometers become inoperable, the Geotechnical Engineering Branch should be contacted.

Please call if you have any questions.

Sincerely,

G E I

Stephen L. Whiteside

Stephen L. Whiteside
Project Manager

Ronald C. Hirschfeld

Ronald C. Hirschfeld, P.E.
Principal

SLW/RCH:lmg

APPENDIX G

NED-USCE Scope of Work

SCOPE OF WORK

FOR

GEOTECHNICAL APPENDIX

MANSFIELD HOLLOW DAM, MANSFIELD, CT

9 JUNE 1987

1. PROJECT IDENTIFICATION.

a. Authority: The authority for this work is set forth in Corps of Engineers Regulation ER 1130-2-417, Project Operation Major Rehabilitation Program and Dam Safety Assurance program, 30 November 1980.

b. Project Site: Mansfield Hollow Dam, Mansfield, CT.

2. PROJECT DESCRIPTION.

The dam is a rolled earth embankment with rock slope protection upstream and processed gravel downstream, a rockfill downstream toe, and a chute spillway that was built in the main stream channel with the outlet works incorporated in the spillway weir. The outlet works consists of five gated rectangular conduits located in the central portion of the spillway weir. A control house, located at the right (north) end of the spillway weir, houses operating and emergency generating equipment and provides access to the gates through a spillway gallery. The dam embankment is approximately 14,050 feet long, 68 feet high and has a crest elevation of 273.0. The spillway weir is an uncontrolled concrete ogee type 690 feet long with a crest at elevation 257.0. In addition to the dam, there are six dikes, with a total length of about 2,670 feet, located in saddles in the rim of the reservoir.

The instruments on the dam consist of 28 piezometers and 42 crest monuments. Historic data from these instruments were recorded and are partially shown on the Government-furnished draft plates and notebooks.

The dam and dikes were constructed on a sand and gravel foundation. Seepage through the foundation was questionable at the time of the design. During the design of Mansfield Hollow Dam, it was considered impractical and uneconomical to provide positive protection, in initial construction, against seepage conditions arising from unfavorable local geologic details of arrangement or succession of strata, etc. A seepage test, developed by filling the reservoir slowly, was considered to offer the most expedient method of locating trouble spots, which could then be provided with additional treatment, such as pervious blankets or pipe drains. This testing entailed problems which were the length of period required to partially fill the reservoir, and the possibility of a flood occurring during the test, the creation of seepage conditions and the possibility of downstream flooding more severe than under normal reservoir operation. The seepage testing was performed during an actual flood condition (August 1955) and remedial measures were performed because of excess seepage at several areas.

In general, the initial seepage control system of the dam was regarded as having performed well, considering the unpredictable variations in foundation permeability. There was uncontrolled seepage at Stations 91 to 96 and 127 to 133 which require suitable corrective action to provide protection at higher reservoir stages. The remedial work consisted of toe drains and drainage ditches to relieve the excess pore pressure and discharge water away from the toe.

3. ITEMS FURNISHED BY THE GOVERNMENT

a. Attachment 1: As-built drawings, plans and cross sections of Mansfield Hollow Dam.
Attachment 2: Design Memo
Attachment 3: Piezometer Logs
Attachment 4: Periodic Inspection Reports (3)
Attachment 5: Crest Information
Attachment 6: Draft plates for report showing layout of geotechnical instrumentation
Attachment 7: Piezometer readings notebook
Attachment 8: West Hill report

The attachments and draft plates must be picked up at the Corps office prior to start of work.

4. A/E SERVICES.

a. Review previous inspection reports for Mansfield Hollow Dam.

b. Site visit to inspect conditions of the existing piezometers, crest monuments, control points, and outlets from toe drain system. Observe seepage conditions along downstream slope and toe. Perform a falling head test in each accessible piezometer to evaluate whether the piezometer is functioning.

c. Develop a Lotus 1-2-3 database for piezometer readings at Mansfield Hollow Dam. Develop a user-friendly menu using a macro for inputting data and making plots using a combination of Lotus 1-2-3 and Freelance.

d. Input existing piezometer readings into the database.

e. Prepare final plates for the appendix. The plates shall consist of the following:

(1) One plan showing locations of the piezometers and crest monuments for the entire dam. The base plan shall be provided by New England Division Corps of Engineers.

(2) Four plates showing the longitudinal profile along the dam, including the subsurface profile based on previous borings. The location of the toe drain shall be shown on the profile. The profiles have been rough drafted by New England Division Corps of Engineers. The profiles shall be checked and drafted by hand onto provided base sheets.

(3) Seven plates for piezometer data. The plates will include geologic cross sections of the dam and foundation, plots of piezometer and reservoir readings vs. time, and plots of selected piezometer readings vs. reservoir level. These plots shall be developed using the database described above and attached to the base sheets provided by New England Division Corps of Engineers. The cross sections have been rough drafted by New England Division Corps of Engineers. The cross sections shall be checked and drafted by hand onto the base sheets.

(4) Four plates showing crest survey monument layout and horizontal and vertical movement. These shall be drafted by hand onto base sheets provided by New England Division Corps of Engineers.

f. Prepare a report for recommended instrumentation maintenance and reading schedule. Information from this report shall be repeated in the main report (Item g).

g. Prepare a report summarizing the conditions of the piezometers, crest monuments, and toe drain system, results of the field tests, review of past instrumentation data, recommendations for future monitoring and maintenance of the instrumentation, and recommendations for additional instrumentation. The report shall be in the same format as the provided example West Hill report.

h. Three copies of each final report shall be submitted to the Chief, Engineering Division, Mr. Richard D. Reardon. Full size original plates shall be delivered to Mr. Terrance Wong after final acceptance of work.

5. COORDINATION

Liaison will be maintained for the duration of the delivery order through periodic meetings held at the request of the point of contact, Mr. T. Wong.

A meeting shall be held after submittal of draft report to discuss the report and plates. The Government will schedule the meeting approximately seven days after receipt of the draft report.

6. COMPLETION SCHEDULE

Services under this delivery order shall start on or before five days from the receipt of the notice to proceed. Duration of work is estimated to be seventy days.

All work under this delivery order shall be completed within the following time limits:

a.	Submission of Draft Engineering Report	Within 45 days from notice to proceed.
b.	Submission of Final Engineering Report	Within 14 days of Government review comments.

It is estimated that review of a. above will be completed within seven days from receipt of same.

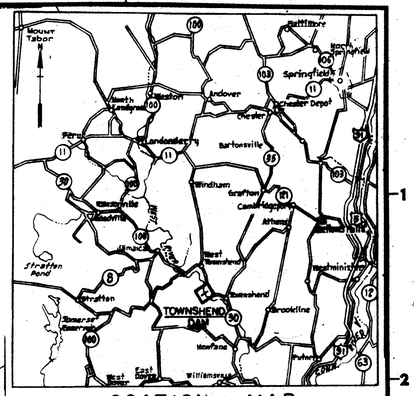
7. QUALITY CONTROL.

Your attention is invited to the Contract General Provisions, "Responsibility of the Architect-Engineer" and "Design Within Funding Limitations". You will be held responsible for the quality of the maps submitted and for all damages caused the Government as a result of your negligence in the performance of any services furnished under the contract.

CORPS OF ENGINEERS

U. S. ARMY

PIEZOMETER LOCATIONS			
NO.	STA.	OFFSET FROM ℄ OF DAM	TIP ELEV.
PZ-1	22+00	100' U/S	451.25
PZ-2	22+00	180' U/S	455.68
PZ-3	22+30	230' U/S	451.92
PZ-4	23+00	400' U/S	452.85



LOCATION MAP

5 0 5 10

SCALE IN MILES

NOTE: PIEZOMETER NO. PZ-5 WILL BE INSTALLED IN EXISTING BOREHOLE NO. FD85-8 ON THE CREST OF THE DAM. THE PIEZOMETER TIP WILL BE PLACED IN THE DAM FOUNDATION. THE TIP ELEVATION WILL BE DETERMINED IN THE FIELD.

NEW PIEZOMETER INSTALLATION

Project No. 87146	FIG. 1
GEOTECHNICAL ENGINEERS INC.	June 5, 1987

REVISION	DATE	DESCRIPTION	BY
		GEOTECHNICAL ENGINEERS INC.	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY M.Z. | DR. BY J.A.M. | CK. BY M.Z.

SUBMITTED: CHIEF, LAYOUT SECTION

APPROVED: CHIEF, TECH. ENG. BRANCH

RECOMMENDED: PROJECT ENGINEER

CONNECTICUT RIVER FLOOD CONTROL
TOWNSHEND DAM

WEST RIVER VERMONT

APPROVED: CHIEF, ENGINEERING DIVISION

DATE FEB. 1970

SCALE AS NOTED | SPEC. NO. DACW33-70-B-0018

DRAWING NUMBER
CON-87

SHEET 1

Although submissions required by your contract are technically reviewed by the Government, it is emphasized that your work must be prosecuted using proper internal controls and review procedures. The letter of transmittal for each submission which you make shall include a certification that the submission has been subjected to your own review and coordination procedures to insure (a) completeness for each discipline commensurate with the level of effort required for that submission, (b) professional and technical accuracy of the submission. Documents which are significantly deficient in any of these areas will be returned to you for correction and/or upgrading prior to our completing our review. Contract submission dates will not be extended if a resubmission of draft material is required for this reason. It is requested that you indicate in writing in your fee proposal letter your cognizance of this requirement and that your firm and your associates, if any, have the professional competency and technical expertise necessary to accomplish this project in a satisfactory manner.