



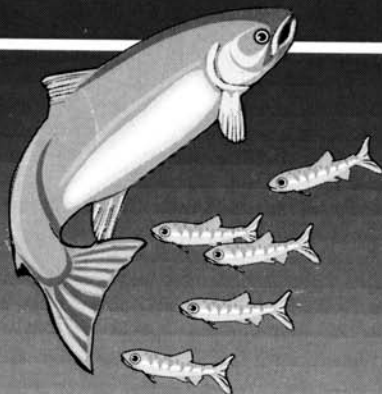
US Army Corps  
of Engineers  
Walla Walla District

# 1992 Reservoir Drawdown Test

Lower Granite and Little Goose Dams

## Appendix D

### Piezometer Study



December 1993

APPENDIX D  
PIEZOMETER STUDY  
1992 Reservoir Drawdown Test  
Lower Granite and Little Goose Dams

Scott Leech  
Walla Walla District  
U.S. Army Corps of Engineers

*Walla Walla District*

## APPENDIX D

### TEST DRAWDOWN 1992 OF LITTLE GOOSE AND LOWER GRANITE DAMS PIEZOMETER STUDY

#### 1. INTRODUCTION.

In accordance with recommendations contained in the Record of Decision for the 1992 Options Analysis Document/Environmental Impact Statement for the Columbia River Salmon Flow Measures, a test drawdown of Little Goose and Lower Granite Reservoirs was conducted during the period of 1 to 31 March 1992. The drawdown test enabled the Corps of Engineers to evaluate the effects and feasibility of conducting reduced reservoir water levels on a regular basis. The lowering of water levels within the reservoirs theoretically would increase instream velocities that would potentially move salmon smolts downstream at a faster rate, which would theoretically increase their survival.

One of the consequences of performing such a test is the increase in stresses placed on the reservoir embankments and levees due to a loss of buoyancy caused by drainage of the embankments. The drawdown period is one of the most unstable times in the life of an embankment and thus warrants special attention during the periods that the reservoir levels are dropped below normal pool levels and steady state conditions. With the imminent implementation of the drawdown option, the Geotechnical Branch of the Walla Walla District, U.S. Army Corps of Engineers initiated a surveillance plan to detail geotechnical monitoring of the reservoir levees, embankments, bridge foundations, and other areas of concern. Included in that plan was the monitoring of existing piezometers situated at Lower Granite Dam, Little Goose Dam, and the Lewiston levees. The location of the aforementioned piezometers and typical embankment sections are shown on plates 1 through 11. Drawdown water levels taken at the Lower Granite forebay and tailwater, Little Goose forebay and tailwater, Snake River confluence gage, and Clearwater East Lewiston gage are shown on plates 12 through 17. The Lower Granite Reservoir was lowered 36 feet below its minimum operating pool of 733 feet above mean sea level (fmsl) and the Little Goose Reservoir was lowered 12 feet below its minimum operating pool of 633 fmsl.

Existing piezometers were selected for monitoring during the drawdown period. Piezometers were selected via rising and falling head tests to determine if they were still operational. The piezometer monitoring schedule identifying the selected piezometers is shown on plates 18 and 19. Known defective piezometers were not tested. Piezometers at Lower Granite Dam and the Lewiston levees were measured using a steel tape and plunker. Piezometers at Little Goose Dam were measured using an electronic water level indicator.

## 2. OPEN-TUBE PIEZOMETER TESTING.

a. Testing Program. Field testing of the piezometers was completed by the firm of Shannon & Wilson, Inc. by 18 February 1992. As stated previously, selected piezometers were tested using the falling or rising head tests described in the scope of work contained in Appendix D1. The rising head test was the preferred method, however, if not enough water was available in the piezometer to allow for 10 feet of rise, the falling head test would be performed. A total of 44 piezometers were tested at the Lewiston levees, 17 were tested in the Lower Granite Dam north embankment and 12 were tested in the Little Goose Dam north embankment. All piezometers were open-tube and were generally installed as shown in the diagram on plate 20. At least 10 feet differential was required between the piezometer water level prior to and after the bailing or adding of water. Water level readings were taken at prescribed logarithmic time intervals to a period of 48 hours. Because of the quick reaction times of many piezometers, it was necessary to reduce the reading interval to more practical increments.

b. Test Results. The minimum criterion to determine if a piezometer was not clogged was that it had to recover or drain at least 1 foot in 1 hour with an induced head change of at least 10 feet. Most piezometers met the minimum criterion. Those considered clogged were piezometers PN-411 and PN-412 at Little Goose Dam and PN-1084 at the West Lewiston levee. Field measurements compared to the original drill logs indicates sediment has collected in some piezometers; however, the test results indicate sedimentation does not affect the responsiveness of the piezometer. Some piezometers were found to be dry at the time of testing. These were PN-1684 at West Lewiston levee, PN-417, PN-418, and RD-13 at Little Goose Dam, and PN-1338, PN-1339, PN-1340, PN-1638, PN-1639, PN-1640, and PN-1641 at Lower Granite Dam. On some fast reacting piezometers, both falling head and rising head tests were performed. The Shannon & Wilson report containing test results is given in Appendix D2.

c. Basic Time Lag Computations. Data from the Shannon & Wilson falling and rising head tests was compiled, plotted, and analyzed in accordance with the procedures contained in the publication, "Time Lag and Soil Permeability in Ground-Water Observations, Bulletin No. 36, Waterways Experiment Station (WES), April 1951." Basic time lag values were calculated for most functional piezometers including multiple plots for those with rising and falling head test results. Some piezometers had an insufficient number of readings to produce a meaningful plot. As the reservoir levels changed significantly in 24 hours, point plots were represented only to the 5th hour reading. Most piezometers fully recovered well within a 5-hour period.

To compare the piezometer field response with the theoretical response, the basic time lag values were extracted



from the semi-logarithmic plot of the test data as exemplified by the plot on Figure 1. By definition, the basic time lag, T, is given as the time at which the head ratio,  $H/H_0$ , is equal to 0.37 as shown in Figure 1. The theoretical time lag values were calculated using the flow formula taken from the WES Bulletin No. 36 for Case 8 on page 30 given as:

$$q = \frac{2 \pi L k_h H}{\ln(2m L/D)} \quad (1)$$

and the total volume of flow required for equalization is

$$V = \frac{\pi d^2 H}{4} \quad (2)$$

In these equations, the terms are identified as follows:

L = Length of slotted portion of piezometer

$k_h$  = Horizontal coefficient of permeability

H = Height of water in piezometer measured from tip

D = Inside diameter of piezometer which is equal to d in this study

$m = \sqrt{k_h/k_v}$ ; For this study it is assumed that the permeability is homogeneous and therefore m is equal to one

The time lag, T, is given as

$$T = \frac{q}{V} = \frac{D^2 \ln(2L/D)}{8Lk} \quad (3)$$

Where  $k = k_h$  for assumed isotropic permeability conditions. The empirical values used for the permeability, k, of the materials measured are given in Table 1.

The theoretical and field time lag values for the piezometers are given on plate 21. Plots of the theoretical and actual piezometer response are given in appendix D2 with the respective piezometer test data reading sheets.

TABLE 1  
EMPIRICAL VALUES OF PERMEABILITY FOR PROJECT MATERIALS

<u>Material</u>	<u>Project Location</u>	<u>k (cm/sec)</u>
Silt (core)	Little Goose Dam, Lower Granite Dam, and Lewiston levees	$1 \times 10^{-6}$
Sandy gravel (foundation)	Lewiston levees	$1 \times 10^{-2}$
Sandy gravel (shell)	Little Goose Dam, Lower Granite Dam and Lewiston levees	$8 \times 10^{-2}$
Sand and gravel (filter)	Lewiston levees	$1 \times 10^{-2}$
Gravel (filter)	Lower Granite and Little Goose Dams	$1 \times 10^{-1}$
Sand (filter)	Lower Granite and Little Goose Dams	$1 \times 10^{-3}$

Under ideal conditions, the field piezometer readings should plot nearly in a straight line on a semi-logarithmic scale. However, as shown on plate 13, and on the piezometer time lag plots of Appendix D2, many of the piezometers showed strong nonlinear behavior, especially those of the Lewiston levees group. A nonlinear response can be attributed to stress or volume adjustments in the soil surrounding the piezometer, gas bubbles within the soil voids, disturbances caused by drilling, or transient stress adjustments.

Many of the piezometers plots, although nonlinear, do show linearity beyond a stress adjustment period. It is noteworthy that the piezometers contained within silt core materials do not show as much nonlinearity as those in the cohesionless foundation, filter, and shell materials. Experiments performed by WES at Vicksburg, Mississippi, imply that initial curvature of equalization plots may be attributed to transient volume changes of gas within the sand filter or surrounding soil. There is not enough information to adequately assess the cause of the nonlinearity problem. It should be noted that vacuum problems were supposedly negated as most piezometers had holes in the caps to allow free passage of air. Very little evidence of sediment was found in the piezometers.

When comparing the theoretical time lag values with the actual values, one must remember that the assumptions made, especially the empirical permeability values, are subject to error depending on the actual field conditions. Many piezometers situated in cohesionless foundation, shell, and filter materials

reacted slower than did predicted values; whereas in general, the field piezometer values showed faster reaction times than the predicted values. However, considering the wide variability of assigned permeability actual values, other selections may bring the predicted time lag values more in line with measured time lags.

Where rising and falling head tests were conducted on the same piezometer, generally it was noticed that the rising head tests tended to be slower to recover than the falling head tests.

### 3. DRAWDOWN PIEZOMETER REACTION.

a. General. The Lower Granite and Little Goose embankment piezometers listed on plate 18 were read on a daily basis through the drawdown. The daily monitoring schedule for Little Goose Dam did not begin until 16 March. Plate 19 lists the piezometers that were monitored for the Lewiston levee system. There were piezometers read on a daily basis within the levee embankment, and those read on a periodic basis that are situated along the levee perimeter inside protected areas. All piezometers were read prior to the drawdown to establish a pre-drawdown operating elevations. Plots of each scheduled piezometer are shown in Appendices D3, D4, and D5 for Lewiston levees, Lower Granite Dam and Little Goose Dam, respectively. Daily readings and plots were faxed each day to field personnel by the Materials and Dam Safety Section to detect possible trouble areas during the drawdown period. Piezometer designations (i.e. DH, RD, and PN) identify the type of drilling used, for DH the boring was performed by a core drill, for RD the boring was performed by a rotary drill, and for PN the boring was performed by a pneumatic drill.

b. Lewiston Levee Readings. General observations concerning the Lewiston levees indicate toe foundation piezometers that were placed in primarily sandy gravels were only slightly effected by the reduced water levels, attributed mainly to the tightness of the cutoff wall, slurry trench system, and impervious blanket along the Clearwater River West levee. Shell, filter, and core piezometers dropped as expected along the levee system and then recovered as the water level was raised.

Problems were encountered with interior piezometers PN-1508, PN-1477, PN-514, PN-618, PN-132, PN-1515, and PN-629 situated along the levee perimeter inside protected areas of the West and East levees. These piezometers indicated water levels higher than normal during the drawdown test. Piezometers PN-629, PN-132, and PN-1515 are situated at the Potlatch plant and may have been effected by local milling operations. Piezometer PN-514 is situated near a storm sewer line and may have been influenced by a leaking pipeline. It stabilized and dropped after a few days of monitoring. All the piezometers with higher than normal readings are isolated with no problems indicated in adjacent

piezometers.

Along the West levee undesirable behavior was noted in piezometers PN-1560 (Sta. 40+29), PN-1371 (Sta. 48+10), PN-1703 (Sta. 47+70), PN-1710 (Sta. 48+75), PN-1702 (Sta. 48+69), and PN-1370 (Sta. 69+50). These piezometers mirrored the drawdown levels of the confluence and in some cases rose above pre-drawdown levels around 27 March. Elevations for these piezometers leveled off to pre-drawdown elevations by the end of April. These piezometers are in the proximity of each other and are situated in an area of past seepage problems. During construction of the cutoff trench between Stations 20+00 and 79+00, a number of sinks developed in the backfill material. A large sink also developed at Station 93+00. No piezometers were monitored in the immediate area except PN-1369 (Sta. 84+70) which showed little reaction to the drawdown. The material around the sinks was removed and rebackfilled. The cutoff trench platform elevation was approximately 717 fmsl in this area. Moist soils were encountered at elevations between 709 fmsl and 717 fmsl for the above mentioned piezometer installations.

The noticeable difference from other levee piezometers is the way these piezometers almost mirrored the raise in pool level indicating possible higher permeabilities than in other levee areas. PN-1703 and PN-1710 rose 2.8' and 1.0' respectively above any recorded levels for the life of the piezometer. After the drawdown, seeps were noted through the gravels at the pond immediately upstream from the Interstate Bridge in an area approximately 50 to 60 feet long, along the bank of the pond. Further investigations will be made to determine the amount of seepage and if remedial action will be necessary.

Cross-sections along profile lines WL-3 and WL-4 are shown on plates 22 and 23 respectively. These profiles show water levels for piezometers on selected dates for the landward side of the levee, near the toe of the levee, and interior piezometers of the levee. It is interesting to note the higher levels for WL-4.

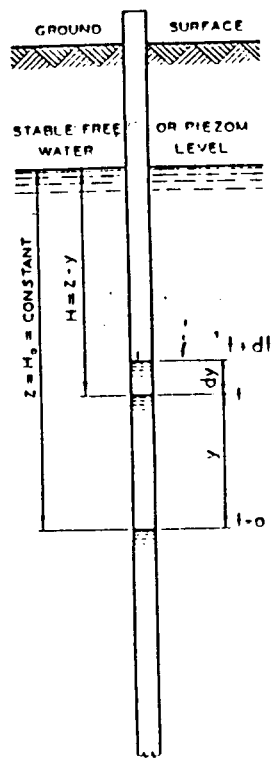
On the East Lewiston levee, piezometer PN-1350 (Sta. 221+00) showed the water level rising as the pool dropped. Its continued usage should be evaluated.

It also should be noted that water levels on North Lewiston interior piezometers PN-158, PN-159, PN-162, PN-1499, PN-1500, and PN-1506 situated along the levee perimeter inside protected areas were observed to drop below their normal levels.

c. Lower Granite Dam. Piezometer PN-1328 and PN-1330 are equipped with pressure transducers. All other piezometers for Lower Granite Dam are open-tube piezometers. The Lower Granite north embankment piezometers reacted fairly consistently as a group and showed good response to the drawdown and reimpoundment. Readings continued to drop until the end of March when rising

levels from reimpoundment started to saturate the core again. Two open-tube piezometers were equipped with pressure transducers for the drawdown period, PN-1331 and PN-1337. Graphs of the data collectors were compared with the daily readings taken by a steel tape and plunker for both of these piezometers (see plates 24 through 27). The graphs of the daily readings compared with the plunker readings match well.

d. Little Goose Dam. The Little Goose Reservoir was not lowered as much as Lower Granite Reservoir; however, the core piezometer water levels were generally more reactive than the Lower Granite piezometers. In fact, piezometers PN-404, PN-401, and DH-1 almost directly mirrored the Little Goose forebay elevations during the drawdown. This may indicate that these piezometers are not situated in the core, but rather in the filter or embankment shell material. Forebay elevations went below hole bottoms in piezometers RD-13, RD-17, RD-15, and RD-16. Piezometers PN-411 and PN-412 indicated good response to the drawdown and reimpoundment reservoir water levels. All of the piezometers at Little Goose Dam are open-tube piezometers. Two piezometers at Little Goose Dam, PN-401 and PN-411, were equipped with pressure transducers for the drawdown period. The graphs of the daily readings compared with the electronic water level indicator readings (see plates 28 through 31) match very well; however, the pressure transducers read values approximately one foot below the manual readings. The peak seen on the graph of PN-411 on 10 April 1992 coincides with heavy rains and indicates the piezometer was probably flooded.



FOR CONSTANT OUTSIDE PRESS

$$z = H_0 = \text{CONSTANT}$$

DIFFERENTIAL EQUATION

$$\frac{dy}{H-y} = \frac{dt}{T}$$

T = BASIC TIME LAG

TIME LAG RATIO

$$\frac{t}{T} = \ln \frac{H_0}{H_0 - y} = \ln \frac{H_0}{H} \quad (5)$$

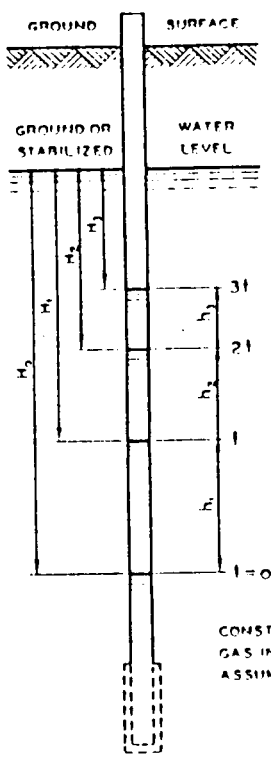
HEAD RATIO

$$\frac{H}{H_0} = e^{-\frac{t}{T}} \quad (6)$$

EQUALIZATION RATIO

$$E = \frac{y}{H_0} = 1 - \frac{H}{H_0} = 1 - e^{-\frac{t}{T}} \quad (7)$$

A - GENERAL CASE



WITH THE RISE OR FALL OBSERVED AT EQUAL TIME INTERVALS, t, AND EQ. 5

$$\frac{t}{T} = \ln \frac{H_0}{H_1} = \ln \frac{H_0}{H_2} = \ln \frac{H_0}{H_3}$$

AND HENCE

$$\frac{H_0}{H_1} = \frac{H_0}{H_2} = \frac{H_0 - H_1}{H_1 - H_2} = \frac{h_1}{h_2}$$

THE BASIC TIME LAG CAN THEN BE DETERMINED BY

$$\frac{t}{T} = \ln \frac{h_1}{h_2} = \ln \frac{h_2}{h_3}, \text{ ETC.} \quad (8)$$

AND THE STABILIZED PIEZOMETRIC LEVEL BY EQ. 6 OR FIG. 3C OR BY

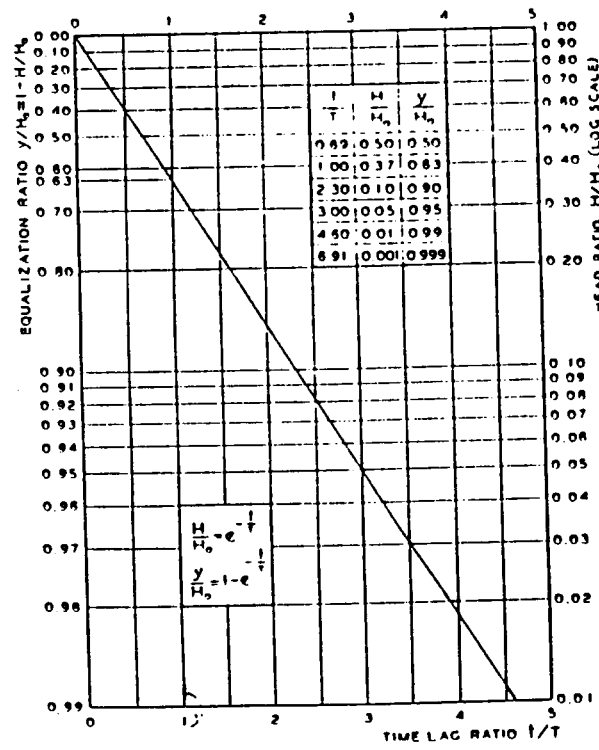
$$H_0 = \frac{h_1^2}{h_1 - h_2} \quad (9)$$

$$H_1 = \frac{h_2^2}{h_2 - h_3}$$

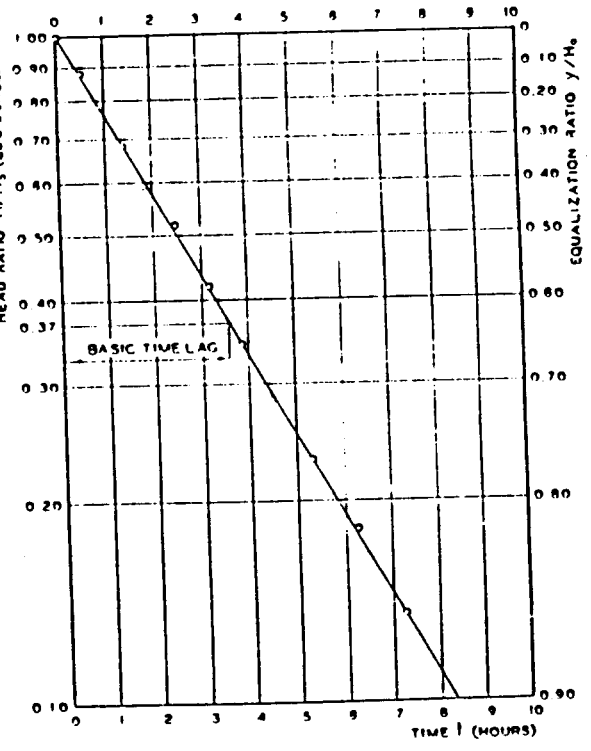
CONSTANT INTAKE SHAPE FACTOR, NO GAS IN SOIL OR WELL POINT, ETC. ASSUMED. GENERAL REQUIREMENT:

$$\frac{h_1}{h_2} = \frac{h_2}{h_3} = \frac{h_3}{h_4}, \text{ ETC.}$$

B - OBSERVATIONS AT EQUAL TIME INTERVALS

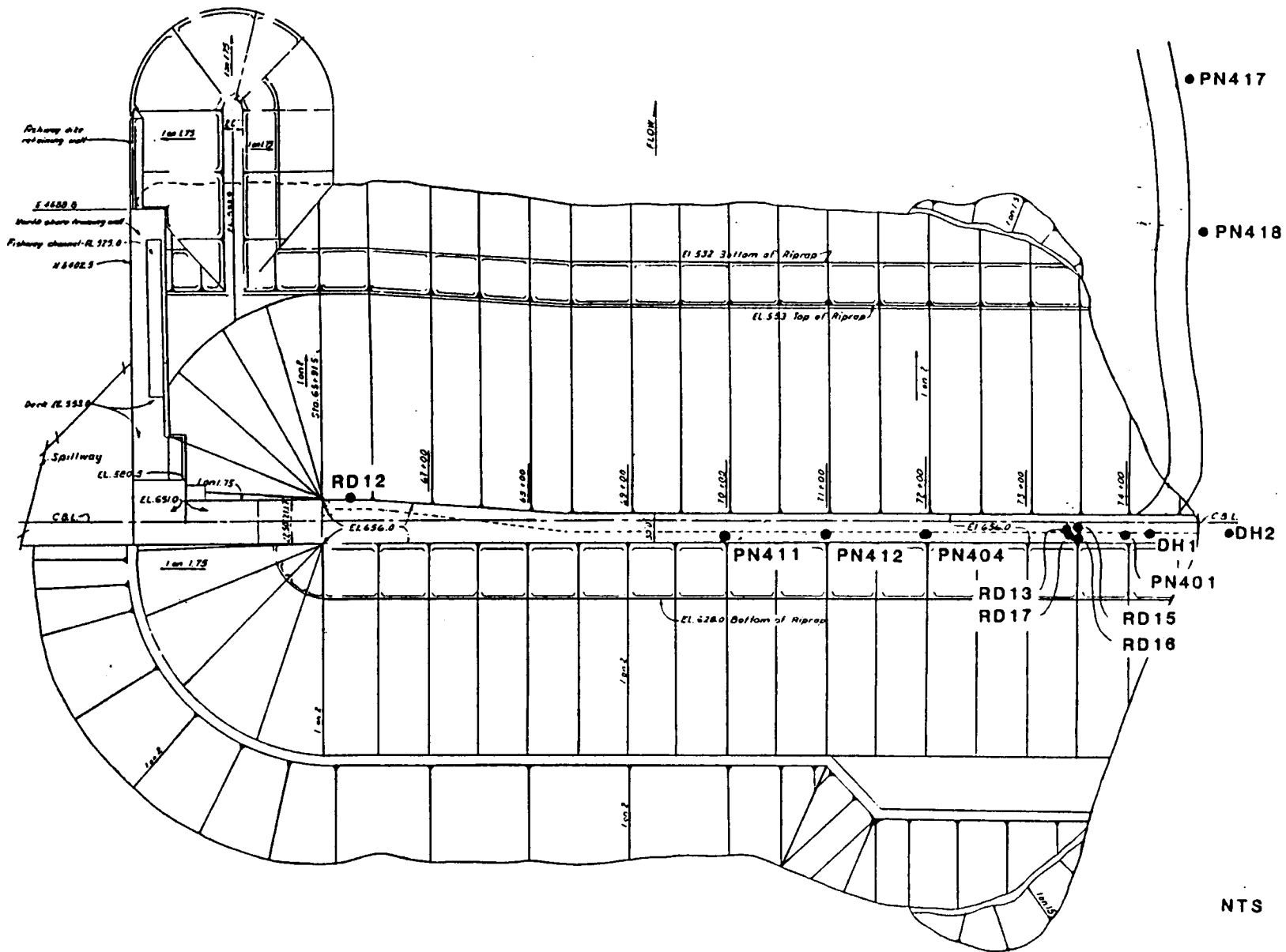


C - HEAD AND EQUALIZATION RATIOS



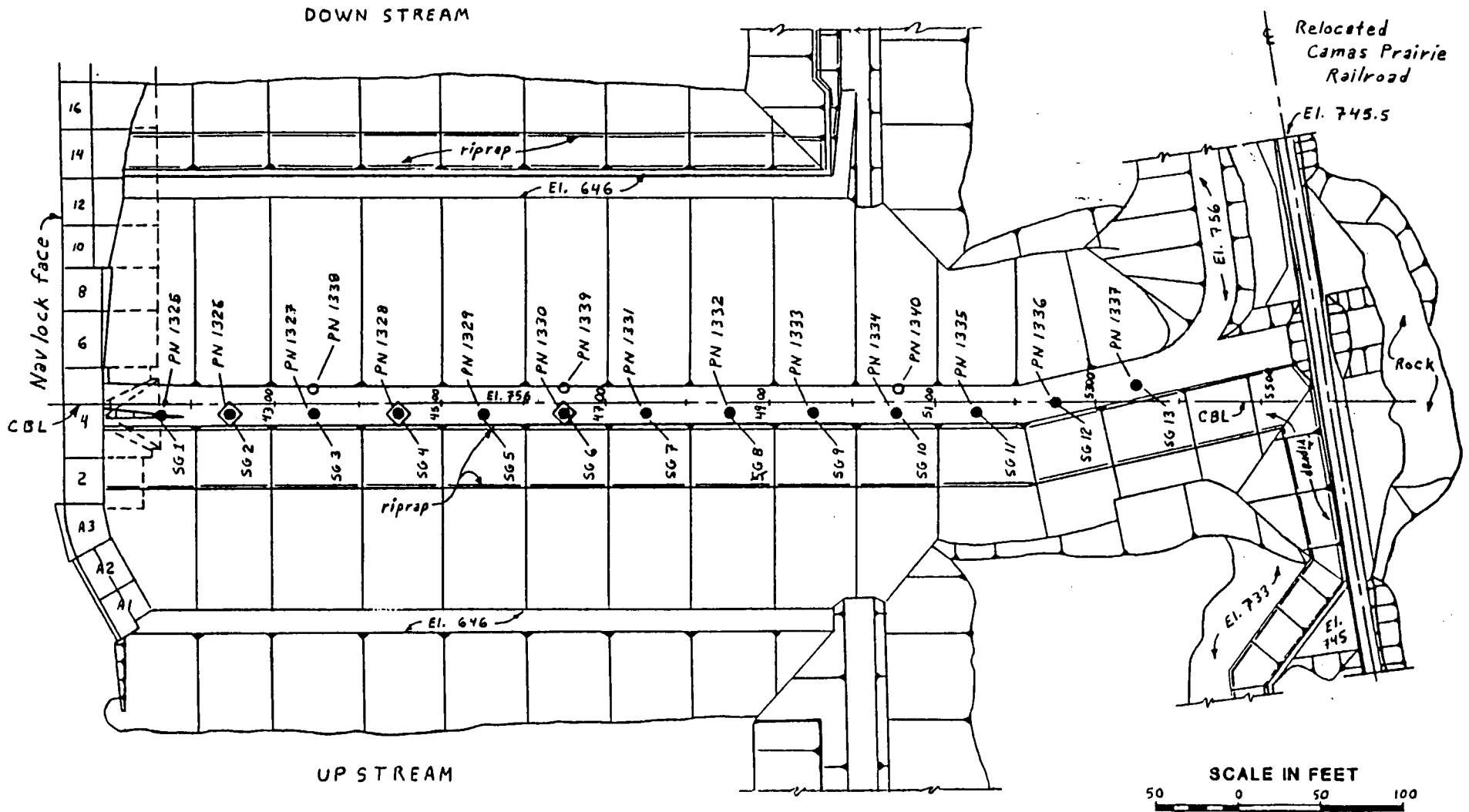
D - DETERMINATION OF BASIC TIME LAG

Figure 1. Equalization Diagram for Time Lag Data  
 Source: Time Lag and soil permeability in Ground Water Observations, Bulletin No. 36, WES, 1951.



LITTLE GOOSE LOCK AND DAM  
NORTH EMBANKMENT  
PIEZOMETERS' LOCATIONS - PLAN VIEW

NTS



LEGEND:

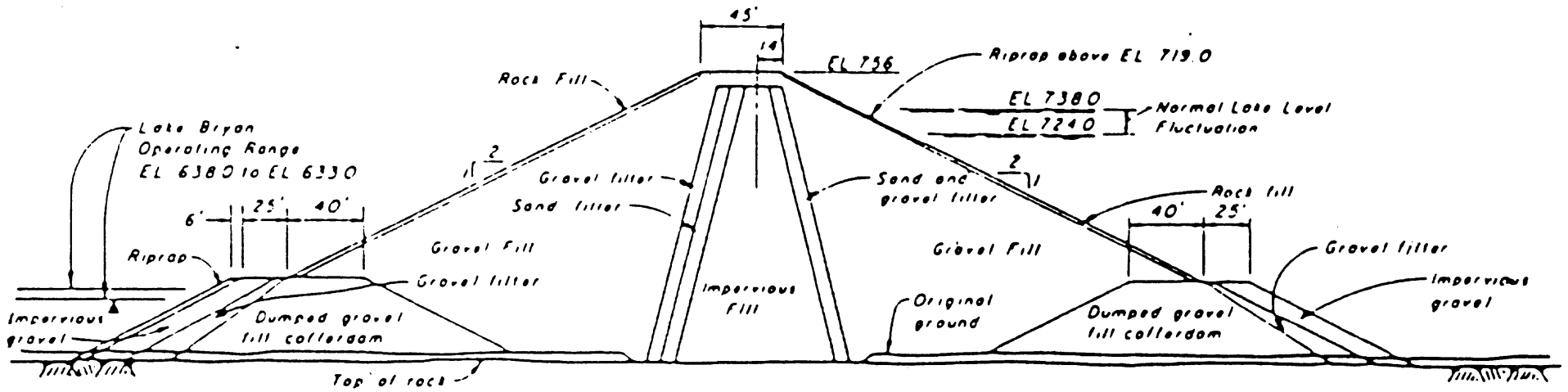
- - OPEN TUBE PIEZOMETER
- ◻ - PORE PRESSURE METER
- - SETTLEMENT PIN LOCATED IN CONCRETE COLLAR AROUND HOLE CASING

LOWER GRANITE LOCK AND DAM  
NORTH EMBANKMENT  
INSTRUMENTATION LOCATIONS - PLAN VIEW

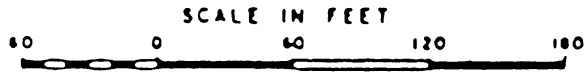




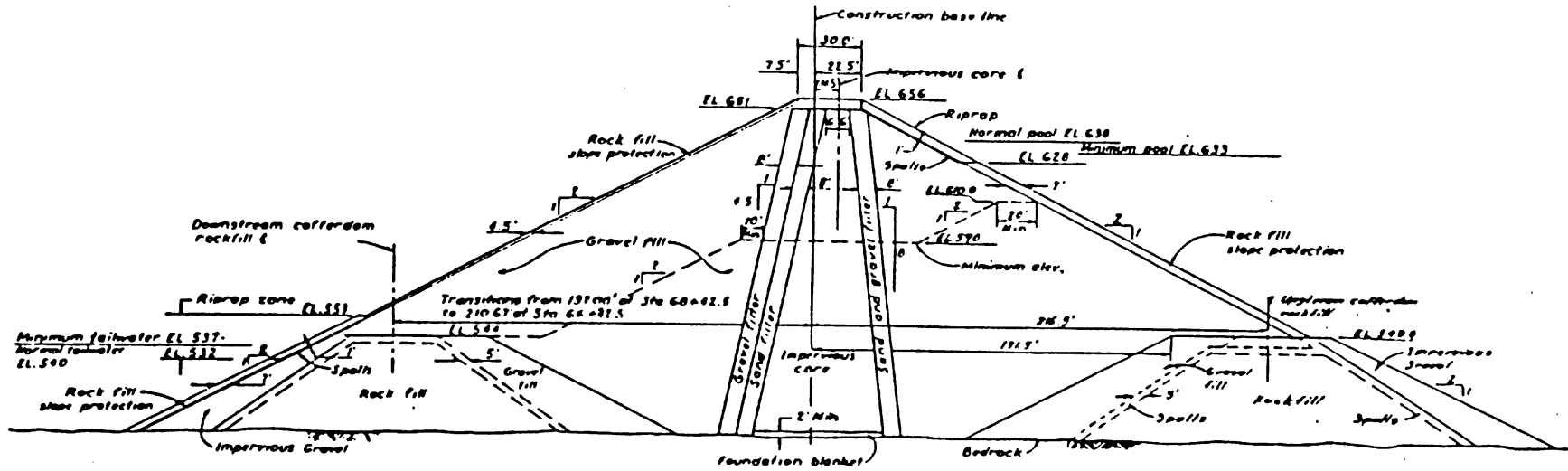
PLATE 4



TYPICAL EMBANKMENT SECTION

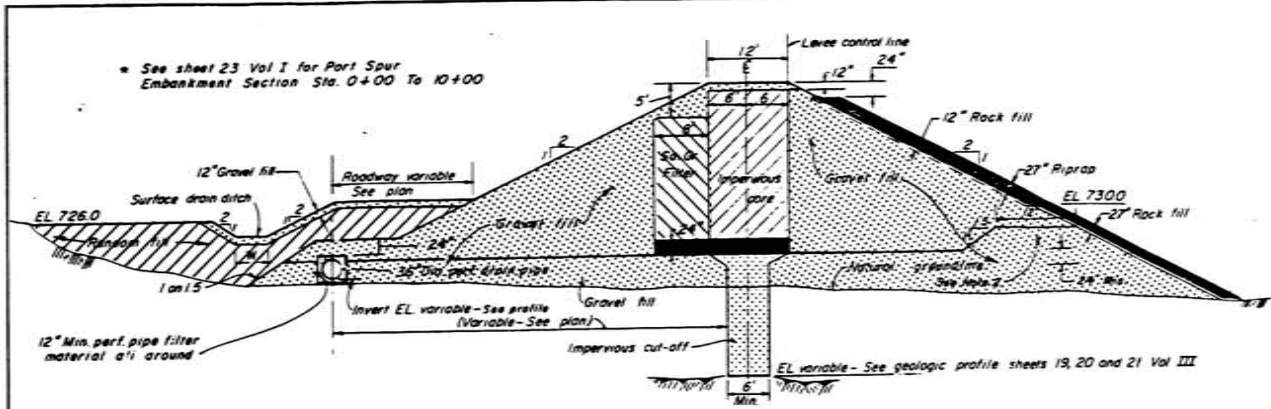


LOWER GRANITE LOCK AND DAM  
NORTH EMBANKMENT  
SECTION VIEW

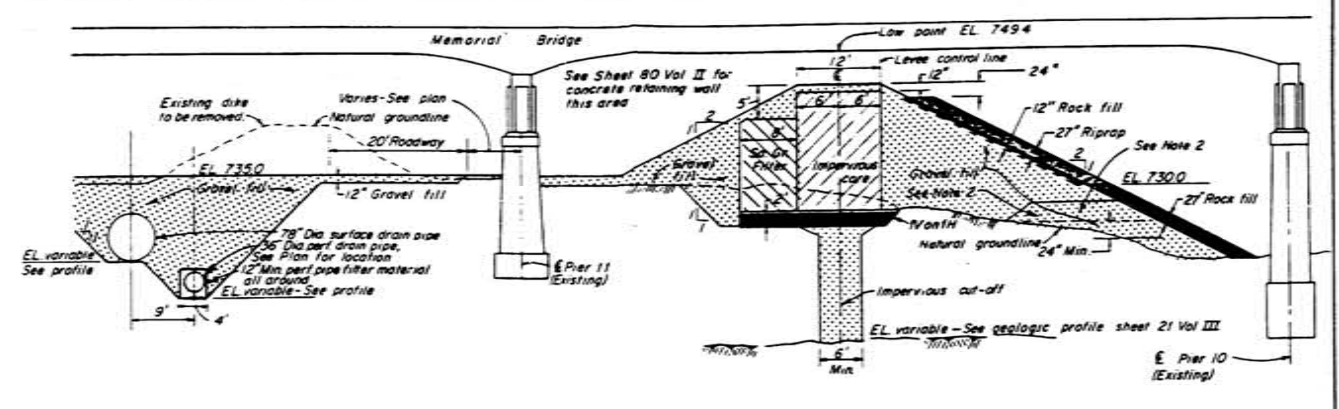


SECTION  
 C.B.L. STA 66+42.5  
 Typical from Sta 66+42.5 to Abutment Tie-in

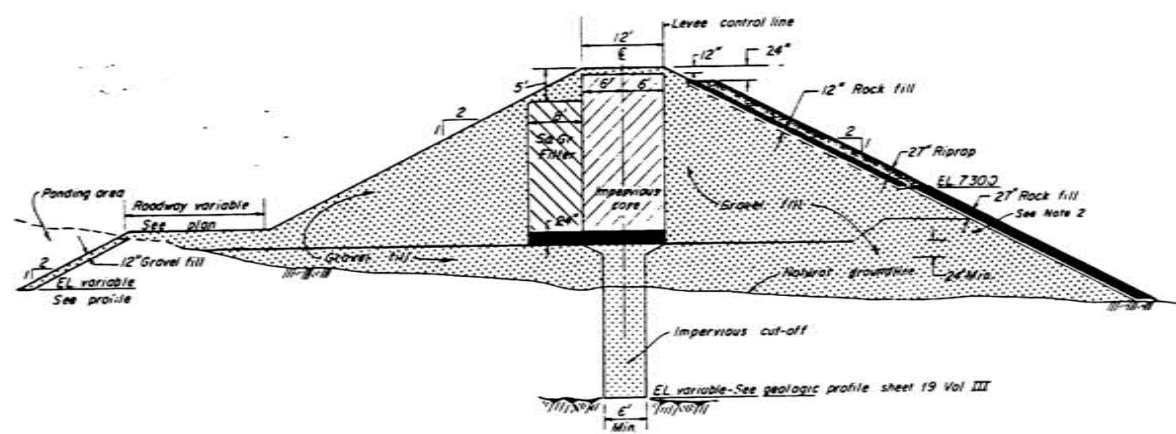
LITTLE GOOSE LOCK AND DAM  
 NORTH EMBANKMENT  
 TYPICAL SECTION



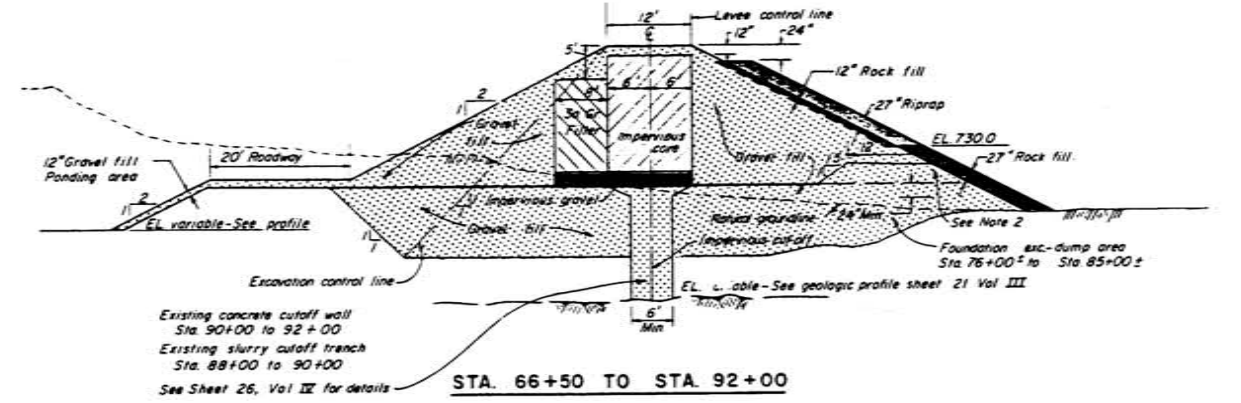
STA. 0+00 TO STA. 11+00 W=4'  
 STA. 12+50 TO STA. 16+00 W=6'  
 STA. 52+00 TO STA. 65+00 W=8'



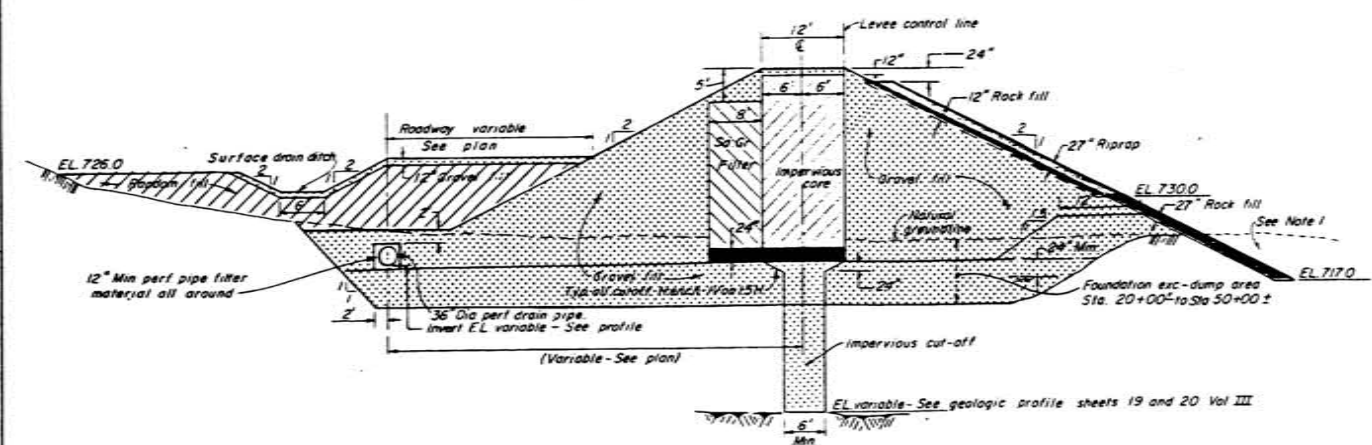
STA. 65+00 TO STA. 66+50



STA. 11+00 TO STA. 12+50



STA. 66+50 TO STA. 92+00

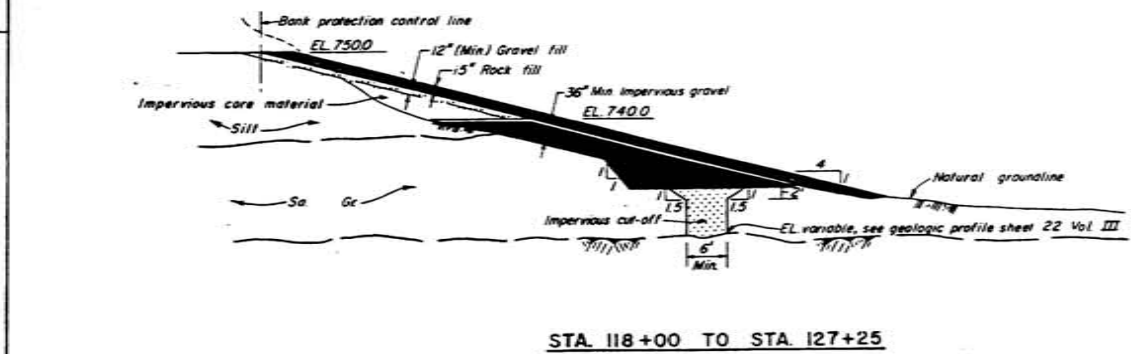
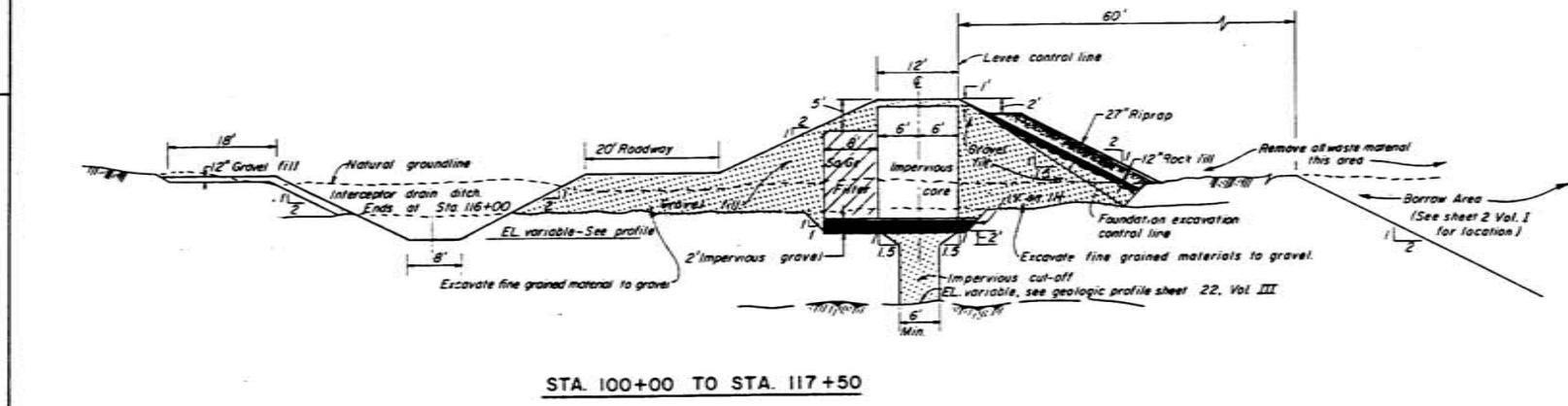
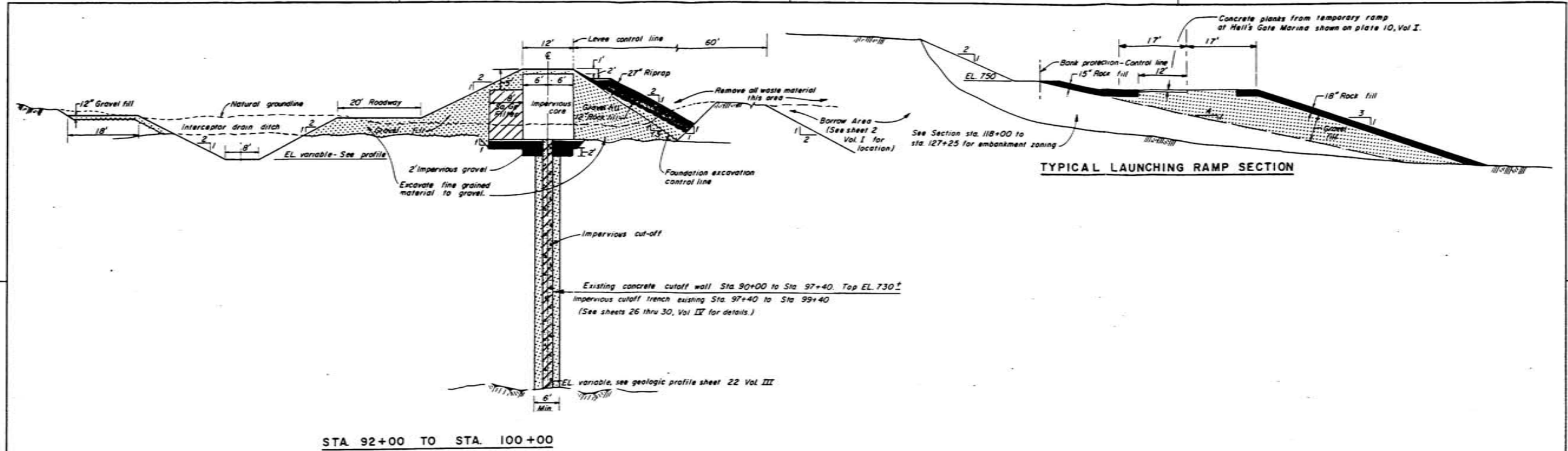


STA. 16+00 TO STA. 52+00

- NOTES:
1. Excavate riverward toe to EL. 717.0 See Sheet 2 Vol I for limits of required excavation.
  2. SEE SHEET 22 FOR BERM CONSTRUCTION FOR RIVER FLOW CONTROL DURING SLURRY TRENCH CONSTRUCTION.

DESIGNED BY	DATE	DESCRIPTION
CHECKED BY		
APPROVED BY		
U. S. ARMY ENGINEER DISTRICT WALLA WALLA, WASHINGTON <b>LOWER GRANITE LOCK AND DAM</b> SNAKE RIVER, OREGON, WASHINGTON & IDAHO <b>NORTH LEWISTON LEVEE</b> TYPICAL SECTIONS I		
SCALE AS SHOWN	SCALE AS SHOWN	SCALE AS SHOWN
FILE NO.	FILE NO.	FILE NO.
SHEET 32	GDL-1-0-4/42	



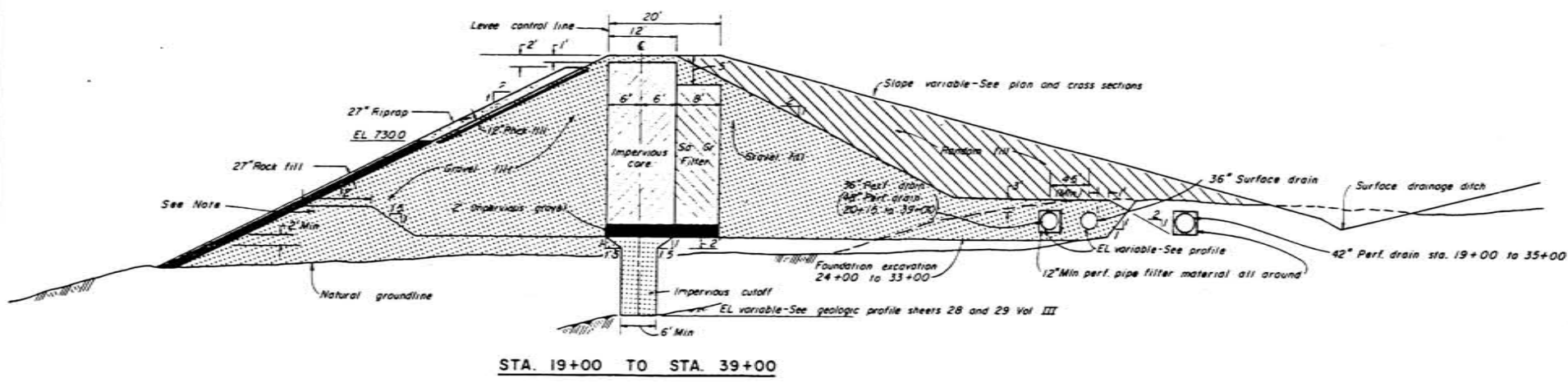
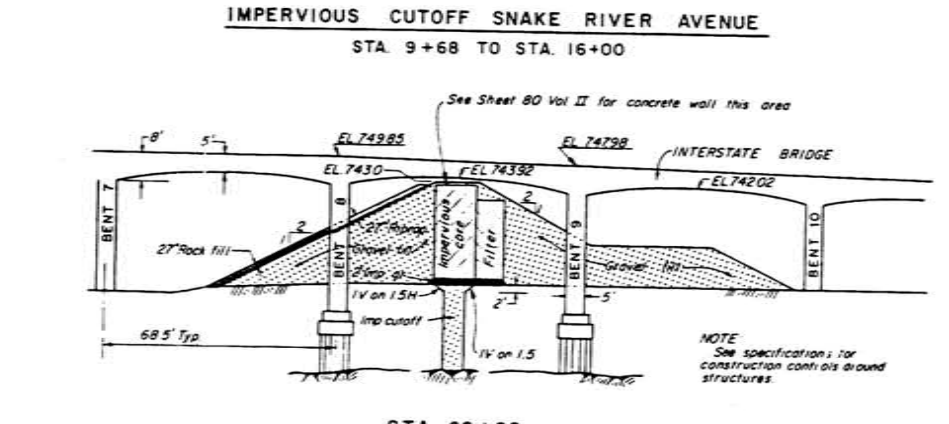
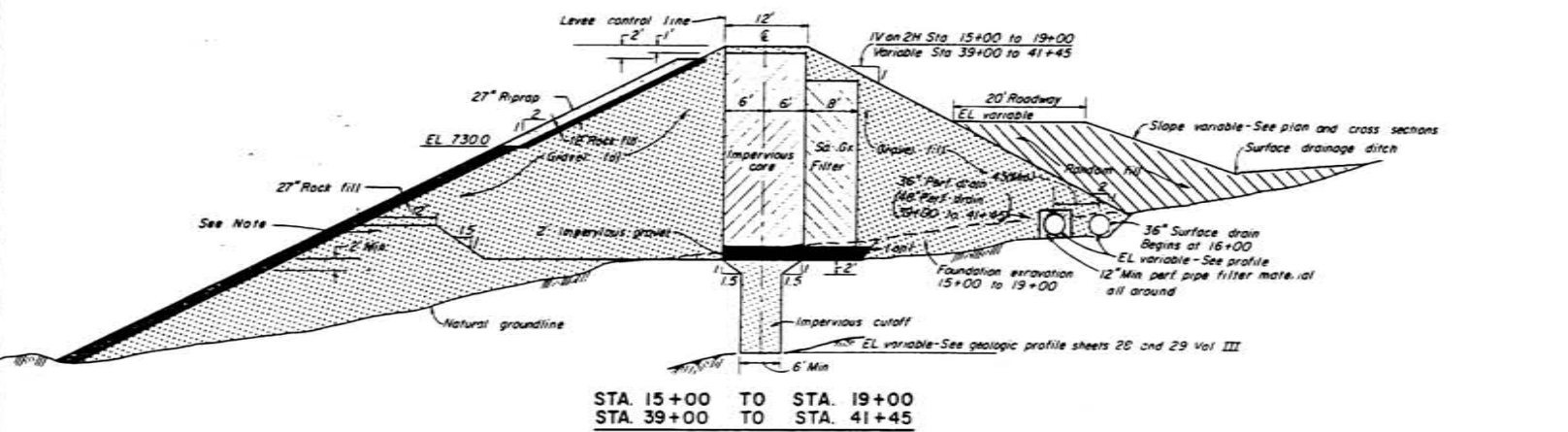
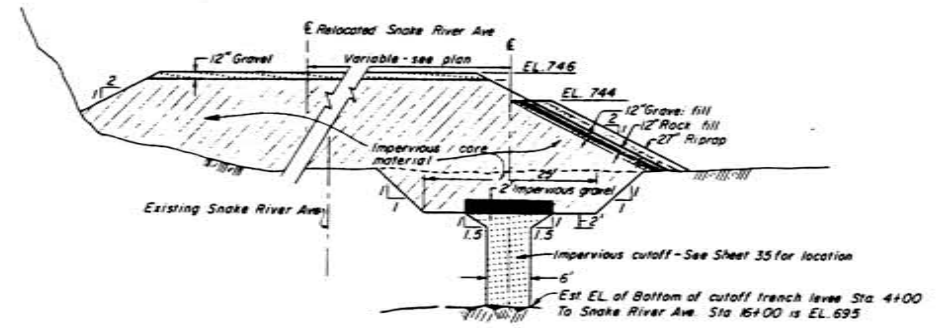
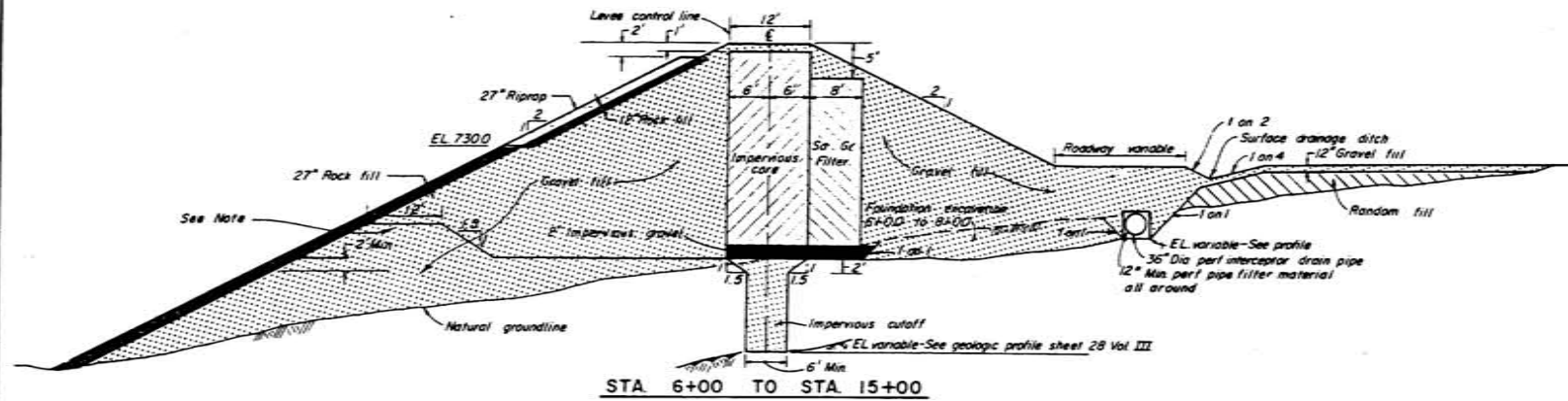
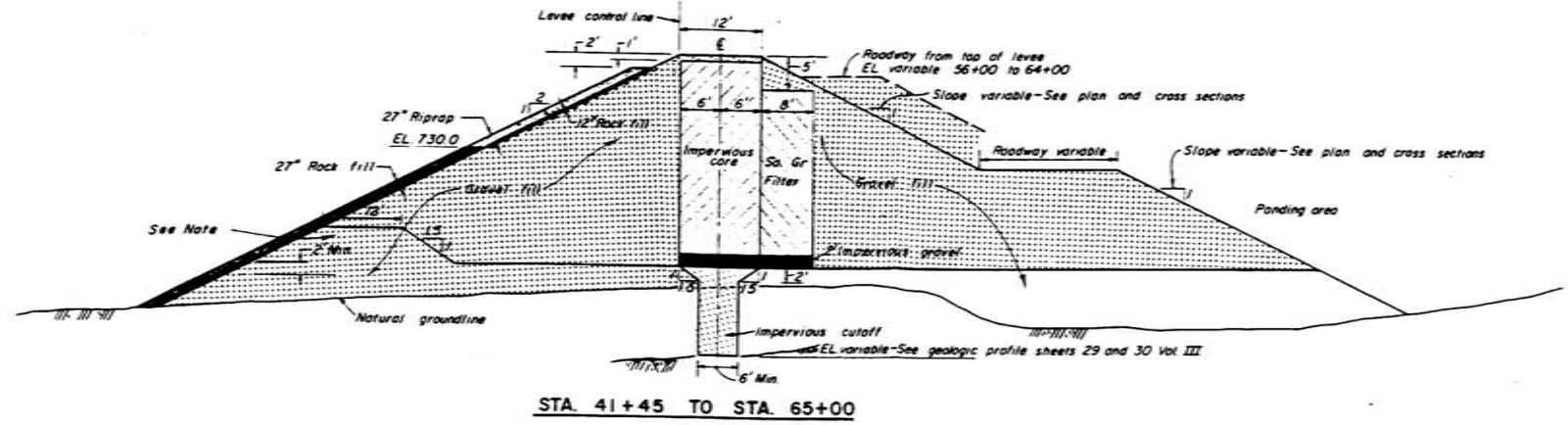
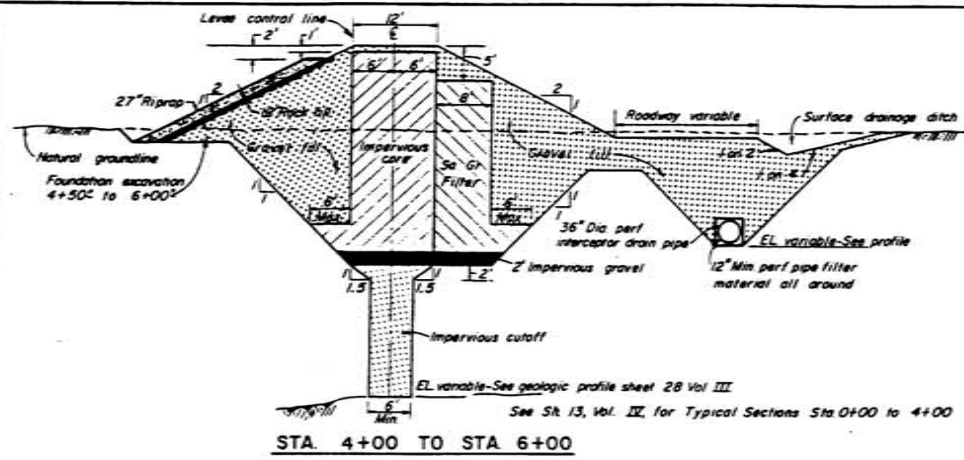


**NOTE:**  
SEE SHEET 22 FOR BERM CONSTRUCTION FOR RIVER FLOW CONTROL DURING SLURRY TRENCH CONSTRUCTION.



D	7/4/43	AS CONSTRUCTED	U.S.A.
C	12/1/43	Added Launching Ramp Plans	U.S.A.
B	7/1/43	Max. 101 Rev. Notes on Sta. Sections	U.S.A.
A	7/1/43	Added Note B Misc. Revisions	U.S.A.
REVISION	DATE	DESCRIPTION	
U.S. ARMY ENGINEER DISTRICT WALLA WALLA, WASHINGTON <b>LOWER GRANITE LOCK AND DAM</b> SNAKE RIVER, OREGON, WASHINGTON & IDAHO <b>NORTH LEWISTON LEVEE</b> TYPICAL SECTIONS II			
DESIGNED BY	McDermitt	APPROVED	DATE: 15 Jan. 43.
DRAWN BY	SCOTT	ENGINEER	SCALE AS SHOWN
CHECKED BY	E. JONES	INCHES	INV. NO. 73-B 66
RECOMMENDED BY		FOOTINGS AND MATERIALS	FILE NO.
CHEF ENGINEER DIVISION			SHEET 33 GDL-1-0-4/43





NOTE  
SEE SHEET 22 FOR BERM CONSTRUCTION FOR RIVER FLOW CONTROL DURING SLURRY TRENCH CONSTRUCTION

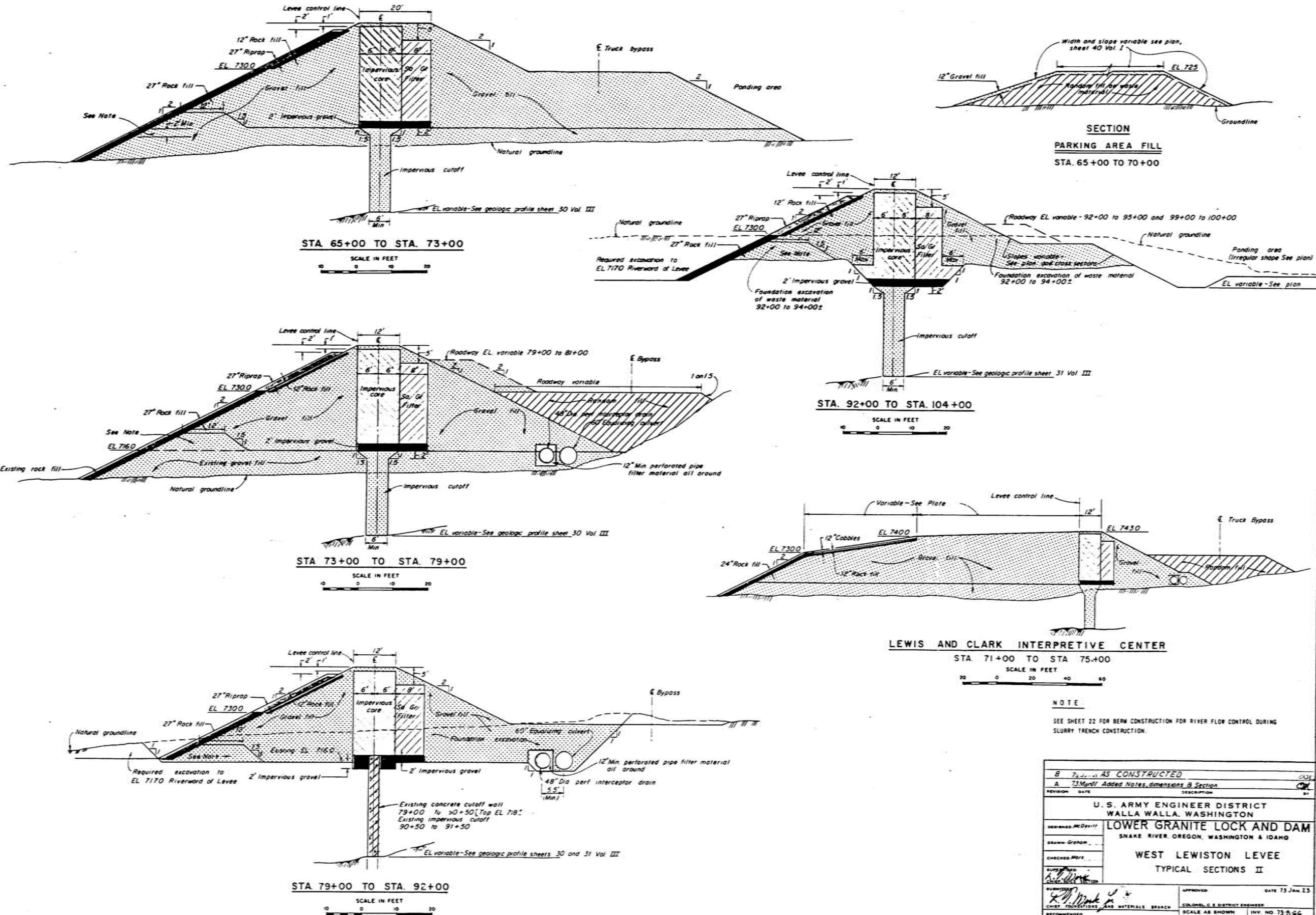
REVISION	DATE	DESCRIPTION
E	11 Mar 51	AS CONSTRUCTED
D	17 Mar 51	Revised Elevation
C	17 Mar 50	Revised note
B	17 Mar 50	Deleted note, Rev Sta, notes, misc
A	17 Mar 50	Added notes, dimension, misc

U.S. ARMY ENGINEER DISTRICT  
WALLA WALLA, WASHINGTON

DESIGNED: McDowell  
DRAWN: Graham  
CHECKED: Mize  
SUBMITTED: [Signature]  
RECOMMENDED: [Signature]  
CHIEF ENGINEERING DIVISION

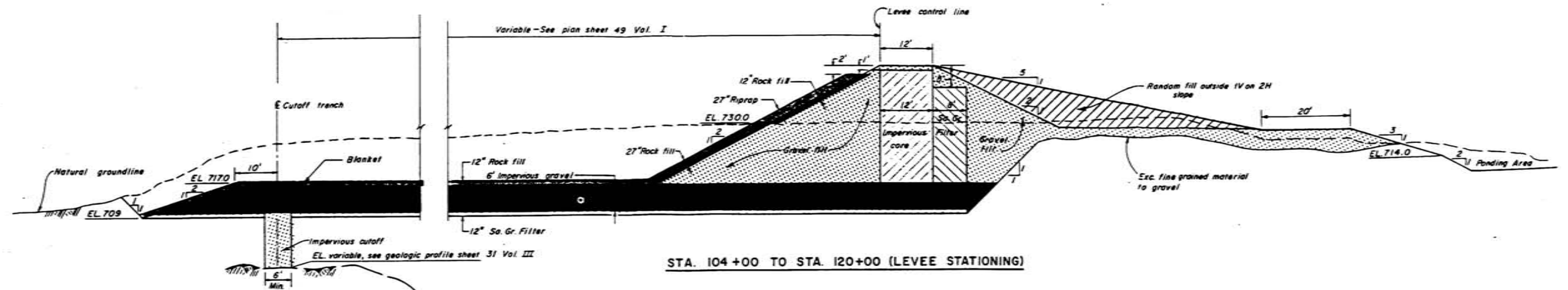
LOWER GRANITE LOCK AND DAM  
SNAKE RIVER, OREGON, WASHINGTON & IDAHO  
WEST LEWISTON LEVEE  
TYPICAL SECTIONS I

APPROVED: [Signature] DATE: 73 JAN 23  
COLONEL, U.S. DISTRICT ENGINEER  
SCALE AS SHOWN INV. NO. 73 B 66  
FILE NO.  
SHEET 58 GDL-10-4/47

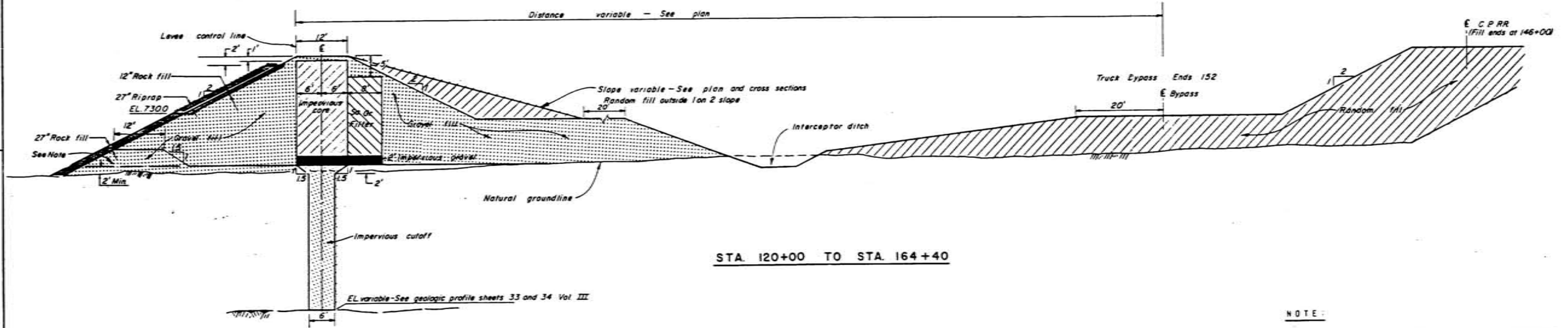


NOTE  
SEE SHEET 22 FOR BERM CONSTRUCTION FOR RIVER FLOOR CONTROL DURING SLURRY TRENCH CONSTRUCTION.

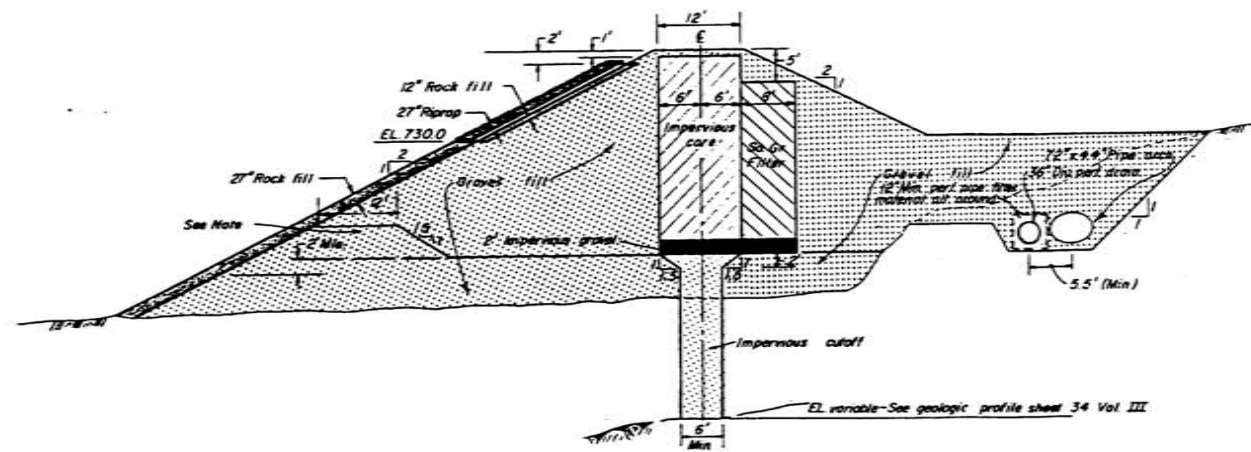
B 73-10-1 AS CONSTRUCTED		DATE
A 73-10-1 Added Notes, dimensions, B Section		BY
REVISION	DATE	DESCRIPTION
U. S. ARMY ENGINEER DISTRICT WALLA WALLA, WASHINGTON <b>LOWER GRANITE LOCK AND DAM</b> SNAKE RIVER, OREGON, WASHINGTON & IDAHO		
<b>WEST LEWISTON LEVEE</b> TYPICAL SECTIONS II		
DESIGNED BY MCDONNELL	CHECKED BY MCDONNELL	DATE 73 JAN 23
BRANCH GRAVITY	APPROVED BY [Signature]	SCALE AS SHOWN
RECOMMENDED BY [Signature]	CHIEF ENGINEERING DIVISION	INV. NO 73 8 66
		FILE NO
		SHEET 59



STA. 104+00 TO STA. 120+00 (LEVEE STATIONING)



STA. 120+00 TO STA. 164+40



STA. 164+40 TO STA. 167+00

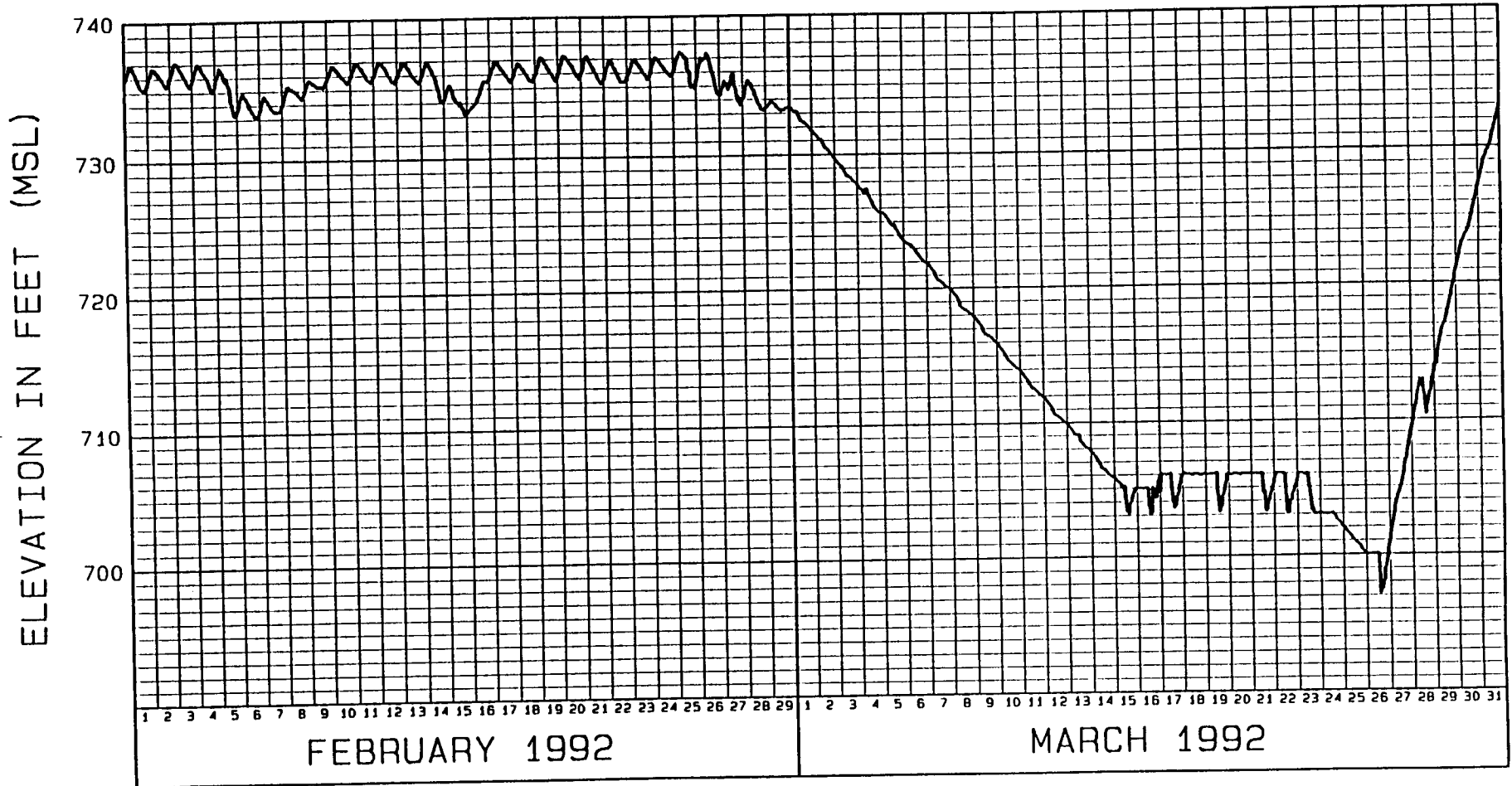
NOTE:  
SEE SHEET 22 FOR BERM CONSTRUCTION FOR RIVER FLOW CONTROL DURING SLURRY TRENCH CONSTRUCTION.



D	AS CONSTRUCTED	1/2/73
C	7/26/66 Minor Revision	1/2/73
B	7/26/66 Rev slopes, notes and section	1/2/73
A	7/26/66 Added Intercep ditch, notes, misc	1/2/73
REVISION	DATE	DESCRIPTION
U. S. ARMY ENGINEER DISTRICT WALLA WALLA, WASHINGTON		
DESIGNED: M. DeWitt	LOWER GRANITE LOCK AND DAM	
DRAWN: S. Green	SNAKE RIVER, OREGON, WASHINGTON & IDAHO	
CHECKED: M. DeWitt	WEST LEWISTON LEVEE	
CONSTRUCTION: M. DeWitt	TYPICAL SECTIONS III	
APPROVED: [Signature]	DATE: 73 JAN 13	
RECOMMENDED:	SCALE AS SHOWN	INV. NO. 73-B-66
CHIEF ENGINEERING DIVISION	SHEET 60	GDL-1-0-4/49

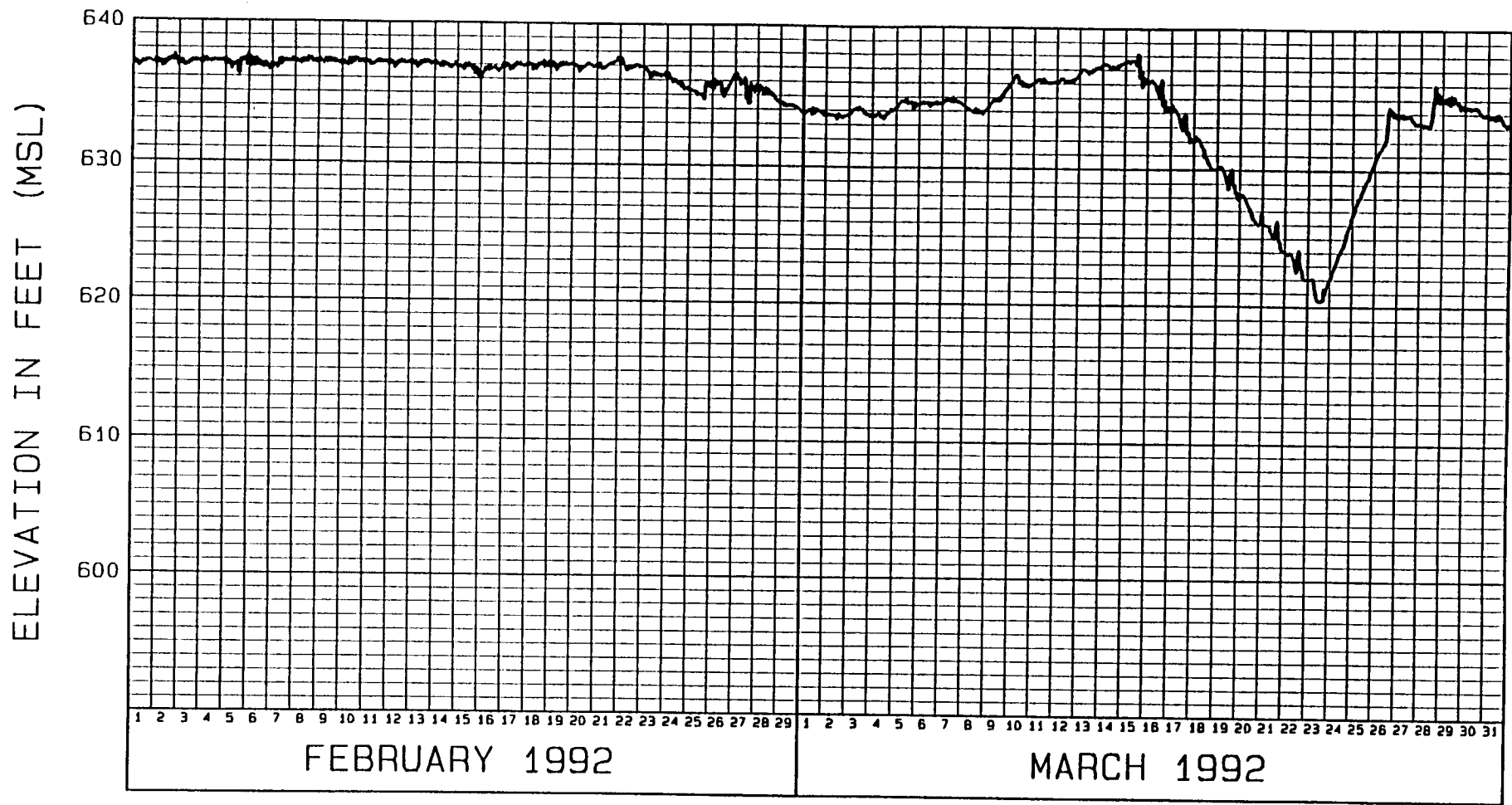






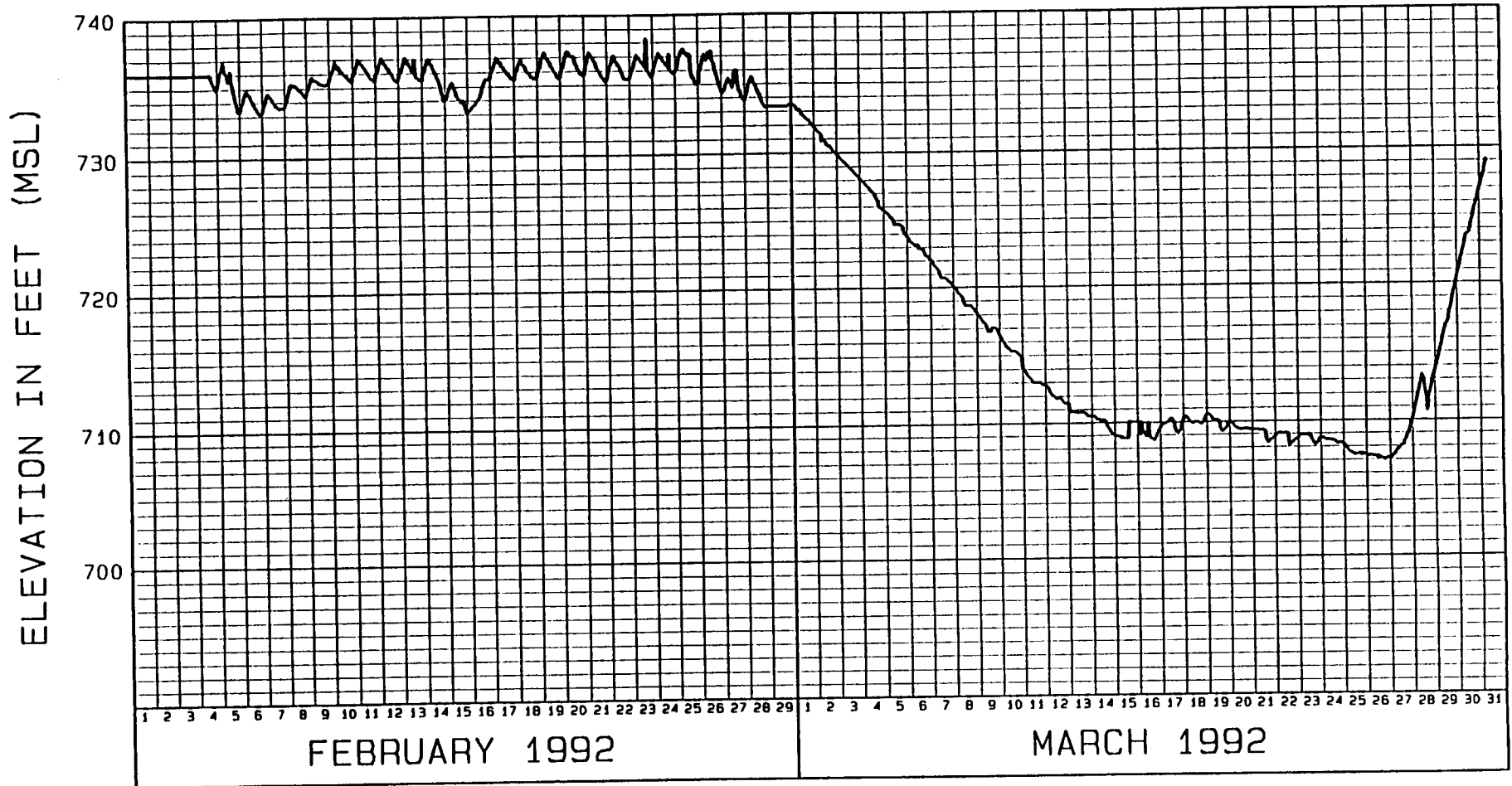
# LOWER GRANITE DAM FOREBAY

SNAKE RIVER BASIN  
 MARCH 1992  
 RESERVOIR  
 DRAWDOWN TEST  
 U.S. ARMY ENGINEER DISTRICT  
 WALLA WALLA - HYDROLOGY BRANCH



LITTLE GOOSE DAM FOREBAY

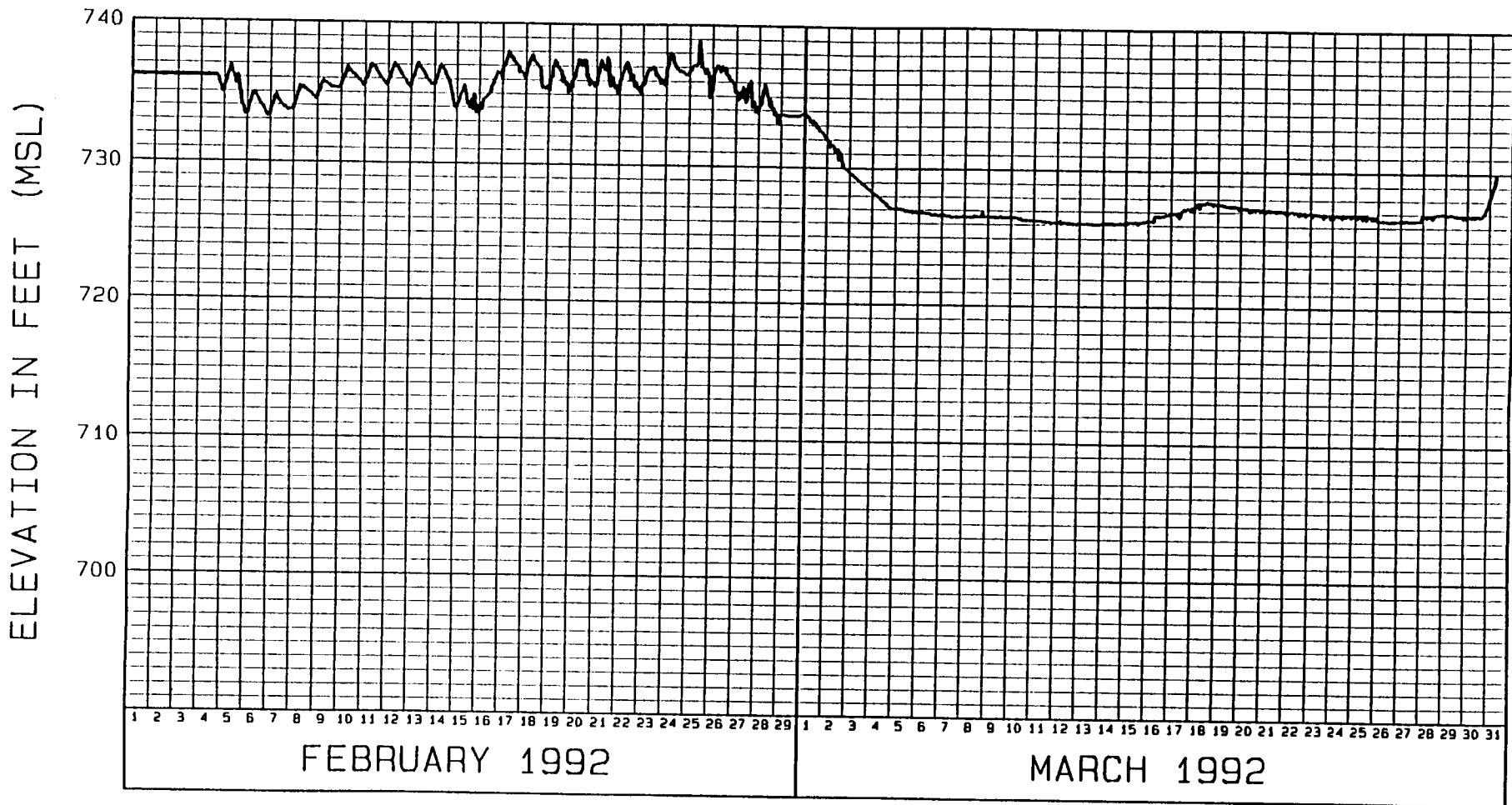
SNAKE RIVER BASIN  
 MARCH 1992  
 RESERVOIR  
 DRAWDOWN TEST  
 U.S. ARMY ENGINEER DISTRICT  
 WALLA WALLA - HYDROLOGY BRANCH



# Snake River at Confluence

- NOTES:
1. Snake River at Clearwater River Confluence
  2. River Mile: 139.5
  3. Period of Record: 1975 to current year

Snake River Basin  
 March 1992  
 Reservoir  
 Drawdown Test  
 U.S. Army Engineer District  
 Walla Walla - Hydrology Branch



# CLEARWATER RIVER - EAST LEWISTON

Snake River Basin

MARCH 1992  
RESERVOIR  
DRAWDOWN TEST

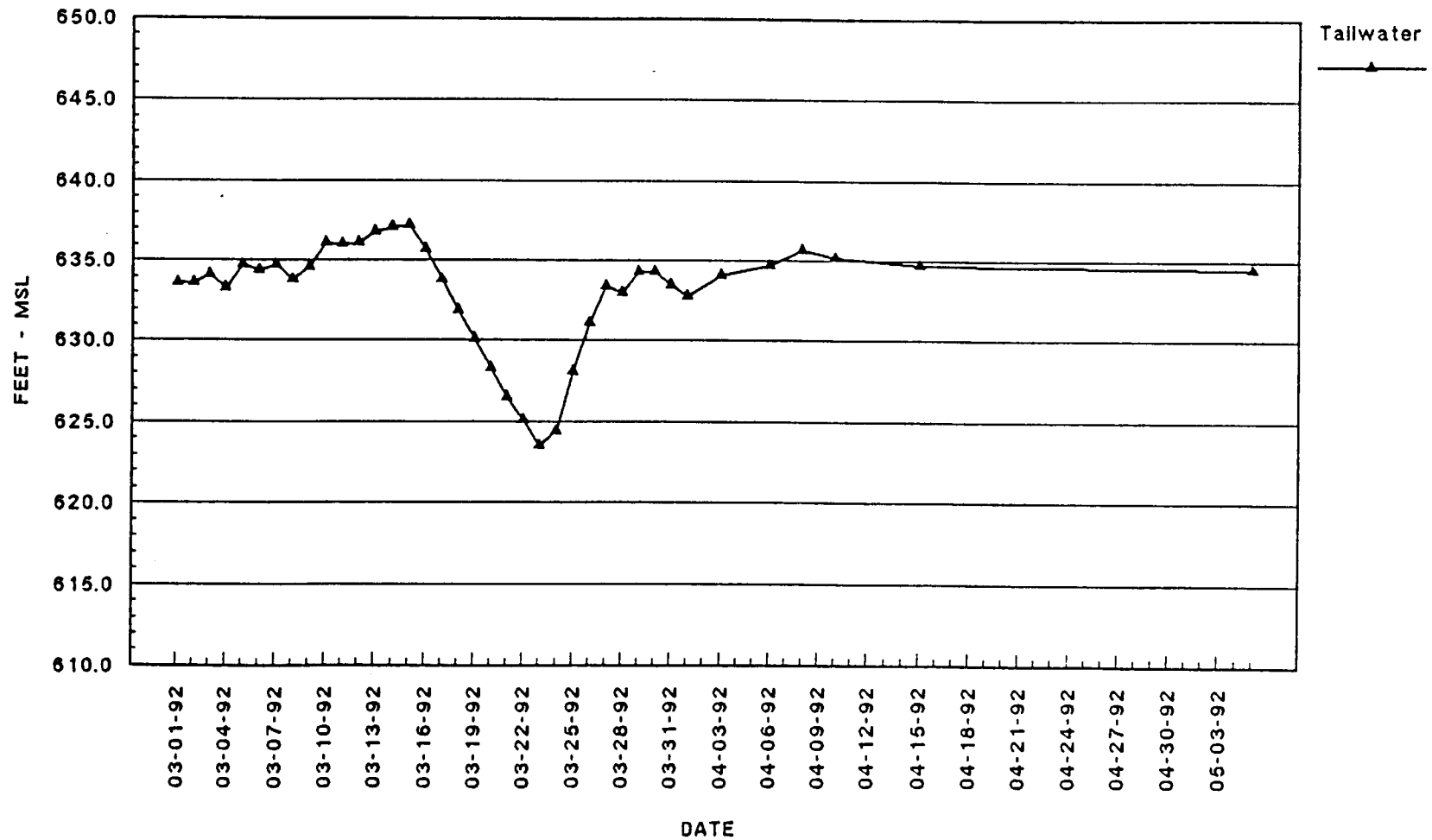
U.S. ARMY ENGINEER DISTRICT  
WALLA WALLA - HYDROLOGY BRANCH

- NOTES:
1. CLEARWATER RIVER AT EAST LEWISTON, IDAHO
  2. River Mile: 2.9
  3. Period of Record: 1975 to current year

# Lower Granite Lock And Dam – Drawdown 1992

## Tailwater Elevation

PLATE 16



# LITTLE GOOSE LOCK AND DAM - DRAWDOWN 1992

## Tailwater Elevation

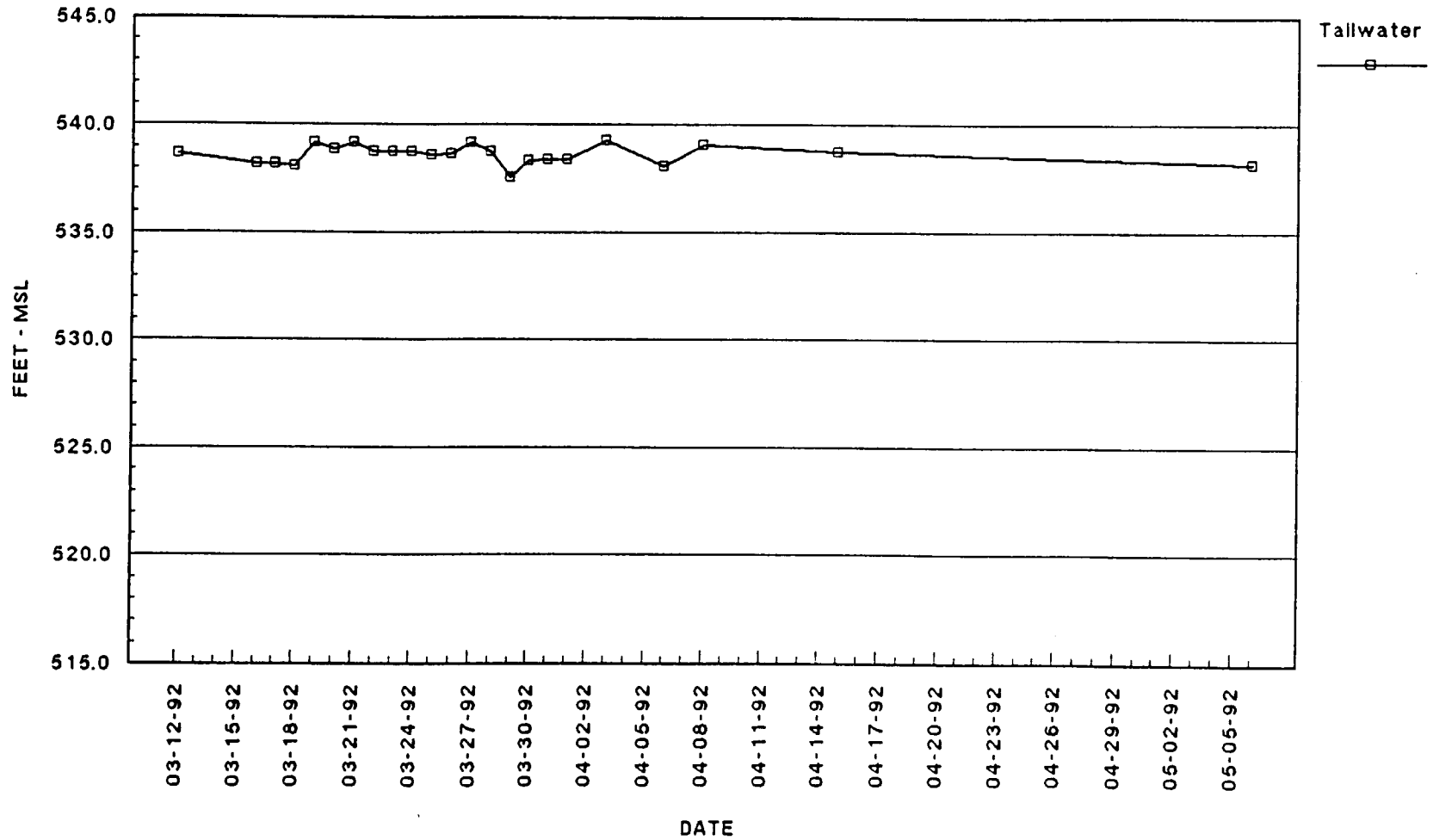


PLATE 17

## DRAWDOWN PIEZOMETER MONITORING SCHEDULE

### LOWER GRANITE DAM

Open-tube Piezometers: PN-1325, PN-1327, PN-1329, PN-1331, PN-1332, PN-1333, PN-1334, PN-1335, PN-1336, PN-1337, PN-1338, PN-1339, PN-1340, PN-1340, PN-1638, PN-1639, PN-1640, PN-1641

Pressure Transducer Piezometers: PN-1328, PN-1330

02/26/92  
03/01/92 through 03/31/92

Pre-Drawdown Readings  
Daily Drawdown Readings  
- Dry Piezometer Readings  
Discontinued on 03/04/92  
- Dry Piezometer Readings  
Activated on 03/28/92

04/01/92  
04/03/92  
04/06/92  
04/08/92  
04/10/92  
04/15/92  
05/05/92

### LITTLE GOOSE DAM

Open-tube Piezometers: DH-1, DH-2, PN-401, PN-404, PN-411, PN-412, PN-417, PN-418, RD-13, RD-15, RD-16, RD-17

03/12/92  
03/16/92 through 03/31/92

Pre-Drawdown Readings  
Daily Drawdown Readings  
- Dry Piezometer Readings  
Discontinued on 03/18/92  
- Dry Piezometer Readings  
Activated on 03/24/92

04/01/92  
04/03/92  
04/06/92  
04/08/92  
04/15/92  
05/06/92



DRAWDOWN MONITORING PIEZOMETER SCHEDULE

LEWISTON LEVEES

Open-tube Piezometers North levee - PN-1341, PN-1342, PN-1348  
for Daily Readings: West levee - PN-1360, PN-1367, PN-1369, PN-1370,  
PN-1371, PN-1493, PN-1494, PN-1495, PN-1496,  
PN-1497, PN-1548, PN-1549, PN-1553, PN-1559,  
PN-1560, PN-1563, PN-1684, PN-1687, PN-1703,  
PN-1704, PN-1707, PN-1708, PN-1710,  
East levee - PN-1350, PN-1351, PN-1353, PN-1354,  
PN-1355, PN-1359

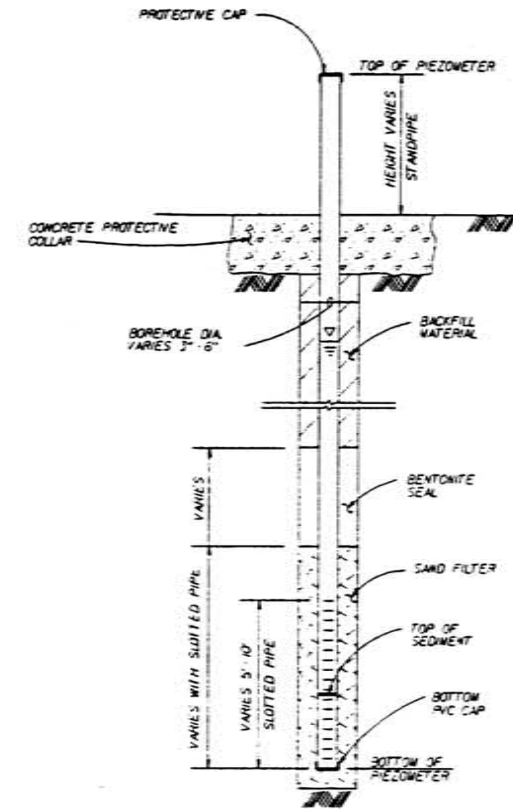
Open-tube Piezometers North levee - PN-1498, PN-1507  
for Periodic Readings: West levee - PN-694, PN-1084, PN-1479, PN-1490,  
PN-1492, PN-1516  
East levee - PN-100, PN-102, PN-1356, PN-1357

02/18/92 and 02/19/92	Pre-Drawdown Readings for All Piezometers
02/27/92	Pre-Drawdown Readings for Periodic Readings
03/01/92 through 04/01/92	Daily Drawdown Readings - All piezometers read on 03/18/92 and 03/19/92; PN-1684 Discontinued after 03/02/92 (dry)
04/03/92	Daily Drawdown Reading
04/06/92	Daily Drawdown Reading
04/08/92	Daily Drawdown Reading
04/10/92	Daily Drawdown Reading
04/15/92 and 04/16/92	Daily and Periodic Drawdown Readings
05/04/92	Daily Drawdown Reading

Periodic piezometers are interior piezometers situated along the levee perimeter inside protected areas.

LEWISTON LEVEES PIEZOMETER DATA

INSTRUMENT NAME	INSTRUMENT LEVEE LOCATION	STATION	COORDINATES		PERFORATION LOCATION	LENGTH OF PERFORATION (FT)	ELEVATION TOP OF PIPE (FT)	DEPTH TO BOTTOM (FT)
			NORTHING	EASTING				
PN - 134	N. LEWISTON ( T )	16+00	48,350	2,885,801	30P	5	740.33	26.3
PN - 1342	N. LEWISTON ( T )	76+00	46,451	2,883,525	30P	5	735.51	27.6
PN - 1348	N. LEWISTON ( T )	4+00	48,171	2,876,171	30P	5	732.77	28.9
PN - 1360	W. LEWISTON ( T )	140+00	45,535	2,879,848	30P	5	729.20	24.0
PN - 1367	W. LEWISTON ( T )	121+00	45,946	2,878,079	-	-	728.00	25.1
PN - 1369	W. LEWISTON ( T )	85+00	47,301	2,875,071	-	-	728.00	40.5
PN - 1370	W. LEWISTON ( T )	69+50	46,670	2,874,001	-	-	734.00	32.8
PN - 1371	W. LEWISTON ( T )	47+70	44,508	2,874,258	30P	5	721.79	9.9
PN - 1493	W. LEWISTON ( T )	10+00	40,762	2,873,857	30P	10	730.79	24.0
PN - 1494	W. LEWISTON ( T )	16+00	48,288	2,873,996	30P	10	731.9	23.7
PN - 1495	W. LEWISTON ( C )	22+00	48,992	2,874,180	30P	10	745.43	41.9
PN - 1496	W. LEWISTON ( C )	28+00	42,509	2,874,200	30P	5	744.89	34.6
PN - 1497	W. LEWISTON ( C )	35+00	43,250	2,874,202	30P	5	744.4	33.3
PN - 1548	W. LEWISTON ( S )	148+00	45,454	2,880,674	30P	5	744.87	20.4
PN - 1549	W. LEWISTON ( C )	148+00	45,463	2,880,677	30P	5	746.71	18.8
PN - 1553	W. LEWISTON ( C )	148+50	45,440	2,880,748	30P	5	746.87	22.0
PN - 1559	W. LEWISTON ( C )	4+16	43,836	2,874,214	30P	5	743.79	29.8
PN - 1560	W. LEWISTON ( C )	40+30	43,749	2,874,201	30P	5	744.86	29.7
PN - 1563	W. LEWISTON ( C )	40+00	-	-	30P	5	746.65	30.2
PN - 1684	W. LEWISTON ( T )	104+05	47,297	2,876,997	30P	5	728.01	3.9
PN - 1687	W. LEWISTON ( T )	66+00	44,920	2,882,371	30P	10	737.02	17.8
PN - 1703	W. LEWISTON ( T )	47+70	44,502	2,874,200	30P	5	740.6	33.5
PN - 1704	W. LEWISTON ( C )	48+69	44,601	2,874,294	30P	5	740.29	31.4
PN - 1707	W. LEWISTON ( C )	43+76	44,006	2,874,298	30P	10	746.65	33.9
PN - 1708	W. LEWISTON ( C )	45+73	44,305	2,874,201	30P	10	741.36	32.9
PN - 1710	W. LEWISTON ( T )	48+68	44,607	2,874,251	30P	5	721.98	3.0
PN - 1350	E. LEWISTON ( T )	220+00	47,550	2,886,402	30P	5	741.00	23.1
PN - 1351	E. LEWISTON ( T )	200+00	46,160	2,884,808	30P	5	745.10	30.5
PN - 1353	E. LEWISTON ( T )	263+00	420,355	2,889,154	30P	5	749.20	28.5
PN - 1354	E. LEWISTON ( T )	247+00	49,137	2,887,718	30P	5	745.50	24.4
PN - 1355	E. LEWISTON ( T )	236+00	48,813	2,887,087	30P	5	743.24	20.7
PN - 1359	E. LEWISTON ( T )	179+00	45,056	2,883,008	30P	5	741.00	29.1
PN - 1498	N. LEWISTON ( T )	17+00	49,290	2,866,096	30P	10	748.85	22.3
PN - 507	N. LEWISTON ( T )	33+00	47,009	2,879,680	30P	10	728.36	17.4
PN - 694	W. LEWISTON ( T )	6+00	48,268	2,874,287	30P	WELL POINT	732.05	23.8
PN - 1084	W. LEWISTON ( T )	85+00	48,852	2,875,035	30P	WELL POINT	729.66	42.7
PN - 1479	W. LEWISTON ( T )	10+00	40,727	2,873,969	30P	10	727.47	23.5
PN - 1490	W. LEWISTON ( T )	35+00	43,257	2,874,337	30P	10	722.83	31.8
PN - 1492	W. LEWISTON ( T )	47+70	44,536	2,874,483	30P	10	732.66	21.4
PN - 516	W. LEWISTON ( T )	104+00	46,468	2,876,372	W.S.C. PLACES	W.S.C.	719.90	63.6
PN - 100	E. LEWISTON ( T )	176+00	44,581	2,882,778	30P	WELL POINT	755.58	36.8
PN - 102	E. LEWISTON ( T )	31+00	47,420	2,886,516	30P	WELL POINT	749.6	28.3
PN - 1356	E. LEWISTON ( T )	236+00	48,736	2,887,201	30P	5	744.60	9.3
PN - 1357	E. LEWISTON ( T )	247+00	49,650	2,887,669	30P	5	745.42	23.7



TYP. OPEN TUBE PIEZOMETER DETAIL  
NTS

NOTE:  
COMPONENTS AND DIMENSIONS ARE TYPICAL FOR MOST PIEZOMETERS BUT MAY VARY FROM SITE TO SITE.

LOWER GRANITE DAM PIEZOMETER DATA

INSTRUMENT NAME	METER LEVEE LOCATION	STATION	LOCAL COORDINATES		PERFORATION LOCATION	LENGTH OF PERFORATION (FT)	ELEVATION TOP OF PIPE (FT)	DEPTH TO BOTTOM (FT)
			NORTHING	EASTING				
PN - 325	NORTH EMBANKMENT	41+50	-	-	30P	5	754.70	45.8
PN - 327	NORTH EMBANKMENT	43+50	-	-	30P	5	756.30	17.5
PN - 329	NORTH EMBANKMENT	45+50	-	-	30P	5	756.40	48.8
PN - 331	NORTH EMBANKMENT	47+50	-	-	30P	5	756.30	48.5
PN - 332	NORTH EMBANKMENT	48+50	-	-	30P	5	756.30	49.1
PN - 333	NORTH EMBANKMENT	49+50	-	-	30P	5	756.20	19.4
PN - 334	NORTH EMBANKMENT	50+50	-	-	30P	5	756.30	49.2
PN - 335	NORTH EMBANKMENT	51+50	-	-	30P	5	756.30	47.5
PN - 336	NORTH EMBANKMENT	52+50	-	-	30P	5	756.30	46.4
PN - 337	NORTH EMBANKMENT	53+50	-	-	30P	5	756.40	44.0
PN - 338	NORTH EMBANKMENT	43+50	-	-	30P	5	756.40	36.5
PN - 339	NORTH EMBANKMENT	46+50	-	-	30P	5	756.00	19.4
PN - 340	NORTH EMBANKMENT	50+50	-	-	30P	5	756.00	19.6
PN - 638	NORTH ABUTMENT	-	5455	7641	30P	5	754.02	68.9
PN - 639	NORTH ABUTMENT	-	5323	7660	30P	5	729.94	64.4
PN - 640	NORTH ABUTMENT	-	5286	7487	30P	5	730.50	60.7
PN - 641	NORTH ABUTMENT	-	5259	7299	30P	5	731.31	70.3

LITTLE GOOSE DAM PIEZOMETER DATA

INSTRUMENT NAME	METER LEVEE LOCATION	STATION	LOCAL COORDINATES		PERFORATION LOCATION	LENGTH OF PERFORATION (FT)	ELEVATION TOP OF PIPE (FT)	DEPTH TO BOTTOM (FT)
			NORTHING	EASTING				
PN - 1	NORTH ABUTMENT	-	7422	501	-	-	656.0	36.0
PN - 2	NORTH ABUTMENT	-	7497	501	-	-	644.0	40.2
PN - 401	NORTH EMBANKMENT	-	7400	502	-	-	656.4	50.5
PN - 404	NORTH EMBANKMENT	-	7200	502	-	-	656.1	46.1
PN - 41	NORTH EMBANKMENT	-	7000	502	-	-	656.3	48.3
PN - 42	NORTH EMBANKMENT	-	7100	502	-	-	656.3	46.5
PN - 47	NORTH ABUTMENT	-	7442	4954	-	-	615.9	44.6
PN - 48	NORTH ABUTMENT	-	7448	4701	-	-	629.2	24.5
PN - 13	NORTH EMBANKMENT	-	7340	5008	-	-	656.4	23.5
PN - 5	NORTH EMBANKMENT	-	7350	5005	-	-	656.4	28.9
PN - 16	NORTH EMBANKMENT	-	7350	5005	-	-	656.6	29.5
PN - 17	NORTH EMBANKMENT	-	7347	5000	-	-	656.5	25.1

LEGEND  
 ( C ) = CREST  
 ( T ) = TOE  
 ( S ) = SLOPE  
 ( I ) = INTERIOR  
 30P = BOTTOM OF PIEZOMETER

COMPUTER AIDED DESIGN & DRAFTING

U. S. ARMY ENGINEER DISTRICT  
 WALLA WALLA, WASHINGTON  
 LOWER GRANITE LITTLE GOOSE  
 SNAKE RIVER, ORE., WASH. & ID.  
 1992 DRAWDOWN  
 PIEZOMETER TESTING  
 PIEZOMETER DATA

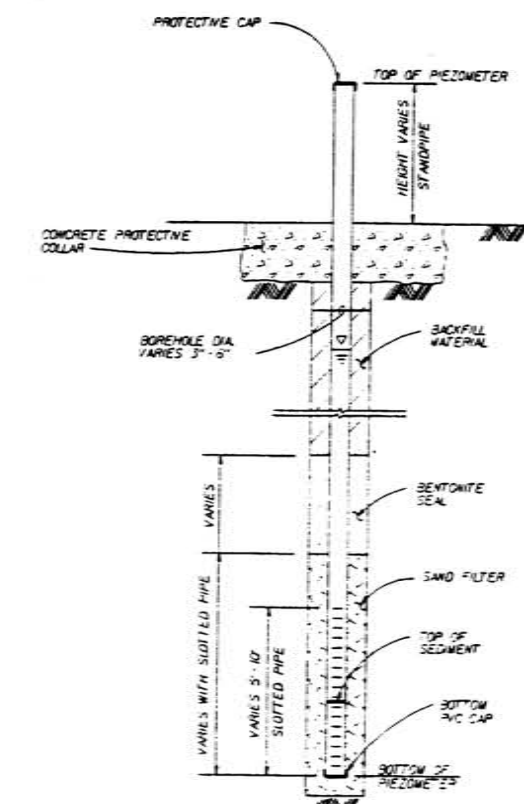
SCALE AS SHOWN IN V. NO.  
 3 FN

LEWISTON LEVEES PIEZOMETER DATA

INSTRUMENT NAME	INSTRUMENT LEVEE LOCATION	PERFORATION LOCATION	LENGTH OF PERFORATION (FT)	ELEVATION TOP OF PIPE (FT)	DEPTH TO BOTTOM (FT)	PIZO CATEGORY	SOIL TYPE	MATERIAL ZONE	TIME LAG ACTUAL	TIME LAG THEORY
PN - 134	N. LEWISTON (T)	30P	5	740.33	26.9	-	ROCK	FDN	-	-
PN - 1342 **	N. LEWISTON (T)	30P	5	735.9	27.6	C2	SANDY GRAVEL	FDN	0.3 m	0.087 m
PN - 1348 **	N. LEWISTON (T)	30P	5	732.77	28.9	C2	SANDY GRAVEL	FDN	R-2.5 m/F-3.4 s	5.22 s
PN - 1360 **	N. LEWISTON (T)	30P	5	729.20	24.0	C2	SANDY GRAVEL	FDN	R-5.2 m/F-1.0 s	5.22 s
PN - 1367 **	N. LEWISTON (T)	-	-	728.00	25.1	-	SANDY GRAVEL	FDN	R-2.0 m/F-1.0 s	5.22 s
PN - 1369 **	N. LEWISTON (T)	-	-	728.00	40.5	-	SANDY GRAVEL	FDN	R-5 s/F-6.5 s	5.22 s
PN - 1370 **	N. LEWISTON (T)	-	-	734.00	32.8	-	SANDY GRAVEL	FDN	6 s	5.22 s
PN - 1371	N. LEWISTON (T)	30P	5	721.79	9.9	02	GRAVEL FILL	EMB SHELL	6 s	0.65 s
PN - 1493 **	N. LEWISTON (T)	30P	10	730.79	24.0	C4	SANDY GRAVEL	FDN	R-55 m/F-22 s	3.0 s
PN - 1494	N. LEWISTON (T)	30P	0	730.9	23.7	C4	SANDY GRAVEL	FDN	-	3.0 s
PN - 1495 **	N. LEWISTON (C)	30P	0	745.43	41.9	C4	SANDY GRAVEL	FDN	R-2 m/F-5.5 s	3.0 s
PN - 1496 **	N. LEWISTON (C)	30P	5	744.89	14.6	C2	SANDY GRAVEL	FDN	2.5 m	0.087 m
PN - 1497 **	N. LEWISTON (C)	30P	5	744.4	33.3	C2	SANDY GRAVEL	FDN	0.22 m	0.087 m
PN - 1548 **	N. LEWISTON (S)	30P	5	744.87	20.4	02	SANDY GRAVEL	EMB SHELL	0.8 m	0.009 m
PN - 1549	N. LEWISTON (C)	30P	5	746.71	8.8	A2	SLT	CORE	12 m	370 m
PN - 1553	N. LEWISTON (C)	30P	5	746.87	22.0	A2	SLT	CORE	12 m	370 m
PN - 1559 **	N. LEWISTON (C)	30P	5	743.79	29.8	C2	SANDY GRAVEL	FILTER ?	0.4 m	0.005 m
PN - 1560 **	N. LEWISTON (C)	30P	5	744.86	29.7	C2	SANDY GRAVEL	FILTER ?	0.29 m	0.005 m
PN - 1563 **	N. LEWISTON (C)	30P	5	746.25	30.2	C2	SANDY GRAVEL	FILTER	0.22 m	0.005 m
PN - 1684	N. LEWISTON (T)	30P	5	728.00	9.9	C2	SANDY GRAVEL	FDN	38.5 m	0.087 m
PN - 1687	N. LEWISTON (T)	30P	10	737.02	17.8	C4	SANDY GRAVEL	FDN	3 m	0.050 m
PN - 1703	N. LEWISTON (T)	30P	5	740.61	33.5	C2	SANDY GRAVEL	FDN	13.4 s	5.22 s
PN - 1704 **	N. LEWISTON (C)	30P	5	740.29	31.4	C2	SANDY GRAVEL	FILTER OR SHELL	6 s	5.22 s
PN - 1707 **	N. LEWISTON (C)	30P	0	741.65	33.9	C2	SANDY GRAVEL	FILTER OR SHELL	R-4.5 m/F-3 s	5.22 s
PN - 1708 **	N. LEWISTON (C)	30P	0	741.36	32.9	C2	SANDY GRAVEL	FILTER OR SHELL	R-95 m/F-6.1 s	5.22 s
PN - 1710	N. LEWISTON (T)	30P	5	726.98	3.0	C2	SANDY GRAVEL	FDN	0 s	5.22 s
PN - 1350	E. LEWISTON (T)	30P	5	740.0	23.1	C2	SANDY GRAVEL	FDN	1.5 m	0.087 m
PN - 1351 **	E. LEWISTON (T)	30P	5	745.10	30.5	C2	SANDY GRAVEL	FDN	R-94 m/F-2 m	0.087 m
PN - 1353 **	E. LEWISTON (T)	30P	5	749.20	28.5	C2	SANDY GRAVEL	FDN	0.13 m	0.087 m
PN - 1354	E. LEWISTON (T)	30P	5	745.50	24.4	C2	SANDY GRAVEL	FDN	10.5 s	5.22 s
PN - 1355 **	E. LEWISTON (T)	30P	5	743.24	20.7	C2	SANDY GRAVEL	FDN	0.4 m	0.087 m
PN - 1359 **	E. LEWISTON (T)	30P	5	740.0	29.1	C2	SANDY GRAVEL	FDN	R-m/F-25 s	5.22 s
PN - 1498	N. LEWISTON (I)	30P	0	748.85	22.3	-	ROCK	FDN	-	-
PN - 507 **	N. LEWISTON (I)	30P	0	728.26	7.4	C4	SANDY GRAVEL	FDN	2.8 m	0.050 m
PN - 634	N. LEWISTON (I)	30P	WELL POINT	732.05	23.8	C1	SANDY GRAVEL	FDN	-	7.7 s
PN - 084	N. LEWISTON (I)	30P	WELL POINT	729.66	42.7	C1	SANDY GRAVEL	FDN	1870 m	0.28 m
PN - 1479 **	N. LEWISTON (I)	30P	0	727.47	23.5	C4	SANDY GRAVEL	FDN	R-3.8 m/F-2 s	3.02 s
PN - 490 **	N. LEWISTON (I)	30P	0	722.33	21.8	C4	SANDY GRAVEL	FDN	9.2 s	3.02 s
PN - 492	N. LEWISTON (I)	30P	0	732.66	21.4	C4	SANDY GRAVEL	FDN	-	-
PN - 516	N. LEWISTON (I)	MISC. PLACES	MISC.	719.90	43.6	-	ROCK	FDN	-	-
PN - 00 **	E. LEWISTON (I)	30P	WELL POINT	755.58	36.8	C1	SANDY GRAVEL	FDN	12 s	7.7 s
PN - 02	E. LEWISTON (I)	30P	WELL POINT	749.6	28.3	C1	SANDY GRAVEL	FDN	6 m	3.13 m
PN - 356	E. LEWISTON (I)	30P	5	744.60	19.3	C2	SANDY GRAVEL	FDN	3.4 s	5.22 s
PN - 357 **	E. LEWISTON (I)	30P	5	745.42	23.7	C2	SANDY GRAVEL	FDN	3 s	5.22 s

PIEZOMETER CATEGORIES WITH BASIC TIME LAG VALUES MEASURED AT H/6 = 0.37

PERMEABILITIES	(1) L = 3 FT	(2) L = 5 FT	(3) L = 7 FT	(4) L = 10 FT
A (K=10 <sup>-10</sup> CM/SEC)	281 m	869.8 m	668.9 m	503.7 m
B (K=10 <sup>-11</sup> CM/SEC)	76.87 s	52.19 s	40.13 s	30.22 s
C (K=10 <sup>-12</sup> CM/SEC)	7.69 s	5.22 s	4.01 s	3.02 s
D (K=10 <sup>-13</sup> CM/SEC)	0.961 s	0.653 s	0.502 s	0.378 s
E (K=10 <sup>-14</sup> CM/SEC)	0.169 s	0.122 s	0.093 s	0.071 s



TYP. OPEN TUBE PIEZOMETER DETAIL

NOTE: COMPONENTS AND DIMENSIONS ARE TYPICAL FOR MOST PIEZOMETERS BUT MAY VARY FROM SITE TO SITE.

LOWER GRANITE DAM PIEZOMETER DATA

INSTRUMENT NAME	METER LEVEE LOCATION	PERFORATION LOCATION	LENGTH OF PERFORATION (FT)	ELEVATION TOP OF PIPE (FT)	DEPTH TO BOTTOM (FT)	PIZO CATEGORY	SOIL TYPE	MATERIAL ZONE	TIME LAG ACTUAL	TIME LAG THEORY
PN - 325	NORTH EMBANKMENT	30P	5	54.70	45.8	A2	SLT	CORE	55 m	370 m
PN - 327	NORTH EMBANKMENT	30P	5	56.30	47.5	A2	SLT	CORE	40 m	370 m
PN - 329	NORTH EMBANKMENT	30P	5	56.40	48.8	A2	SLT	CORE	30 m	370 m
PN - 331	NORTH EMBANKMENT	30P	5	56.30	48.5	A2	SLT	CORE	32 m	370 m
PN - 332	NORTH EMBANKMENT	30P	5	56.30	49.1	A2	SLT	CORE	100 m	370 m
PN - 333	NORTH EMBANKMENT	30P	5	56.20	49.4	A2	SLT	CORE	3.9 m	370 m
PN - 334	NORTH EMBANKMENT	30P	5	56.30	49.2	A2	SLT	CORE	1.35 m	370 m
PN - 335	NORTH EMBANKMENT	30P	5	56.30	47.5	A2	SLT	CORE	1.4 m	370 m
PN - 336	NORTH EMBANKMENT	30P	5	56.30	46.4	A2	SLT	CORE	3.9 m	370 m
PN - 337	NORTH EMBANKMENT	30P	5	56.40	44.0	A2	SLT	CORE	1800 m	370 m
PN - 338	NORTH EMBANKMENT	30P	5	56.40	36.5	02	SANDY GRAVEL	SHELL	-	3.65 s
PN - 339	NORTH EMBANKMENT	30P	5	56.00	39.4	02	SANDY GRAVEL	SHELL	-	3.65 s
PN - 340 **	NORTH EMBANKMENT	30P	5	56.00	39.6	02	SANDY GRAVEL	SHELL	5 s	3.65 s
PN - 638 **	NORTH ABUTMENT	30P	5	54.02	38.9	02	SANDY GRAVEL	FILTER OR SHELL	2.2 m	3.45 m
PN - 639	NORTH ABUTMENT	30P	5	729.94	34.4	02	GRAVEL & SAND	FILTER OR SHELL	50 s	3.52 s
PN - 640	NORTH ABUTMENT	30P	5	730.50	60.7	02	GRAVEL & SAND	FILTER OR SHELL	-	3.52 s
PN - 641	NORTH ABUTMENT	30P	5	731.31	70.3	02	GRAVEL & SAND	FILTER OR SHELL	3 m	0.009 m

LITTLE GOOSE DAM PIEZOMETER DATA

INSTRUMENT NAME	METER LEVEE LOCATION	PERFORATION LOCATION	LENGTH OF PERFORATION (FT)	ELEVATION TOP OF PIPE (FT)	DEPTH TO BOTTOM (FT)	PIZO CATEGORY	SOIL TYPE	MATERIAL ZONE	TIME LAG ACTUAL	TIME LAG THEORY
PN - 1	NORTH ABUTMENT	-	-	556.0	16.0	A2+	SLT	CORE	70 m	370 m
PN - 2	NORTH ABUTMENT	-	-	544.0	140.2	A2+	SLT	CORE	-	370 m
PN - 401 **	NORTH EMBANKMENT	-	-	556.4	50.5	A2+	SLT	CORE	50 m	370 m
PN - 404	NORTH EMBANKMENT	-	-	556.1	46.1	A2+	SLT	CORE	120 m	370 m
PN - 41	NORTH EMBANKMENT	-	-	556.3	48.3	A2+	SLT	CORE	070 m	370 m
PN - 42	NORTH EMBANKMENT	-	-	556.3	46.5	A2+	SLT	CORE	370 m	370 m
PN - 47 **	NORTH ABUTMENT	-	-	555.9	44.6	-	ROCK	ABUTMENT	-	-
PN - 48	NORTH ABUTMENT	-	-	555.9	24.5	-	ROCK	ABUTMENT	-	-
PN - 3	NORTH EMBANKMENT	-	-	556.4	23.5	A2+	SLT	CORE	3 m	370 m
PN - 5	NORTH EMBANKMENT	-	-	556.4	28.9	A2+	SLT	CORE	350 m	370 m
PN - 6	NORTH EMBANKMENT	-	-	556.6	29.5	A2+	SLT	CORE	90 m	370 m
PN - 7	NORTH EMBANKMENT	-	-	556.5	26.1	A2+	SLT	CORE	390 m	370 m

\* VALUE IS ESTIMATED AS PIEZOMETER LENGTHS NOT KNOWN  
 \*\* PIEZOMETERS WHICH EXHIBITED HIGH NON-LINEARITY IN THE LAG PLOTS

- LEGEND
- (C) = CREST
  - (T) = TOE
  - (S) = SLOPE
  - (I) = INTERIOR
  - 30P = BOTTOM OF PIEZOMETER
  - FDN = FOUNDATION
  - EMB = EMBANKMENT
  - s = SECONDS
  - m = MINUTE
  - h = HOURS
  - R = RISING HEAD TEST
  - F = FALLING HEAD TEST

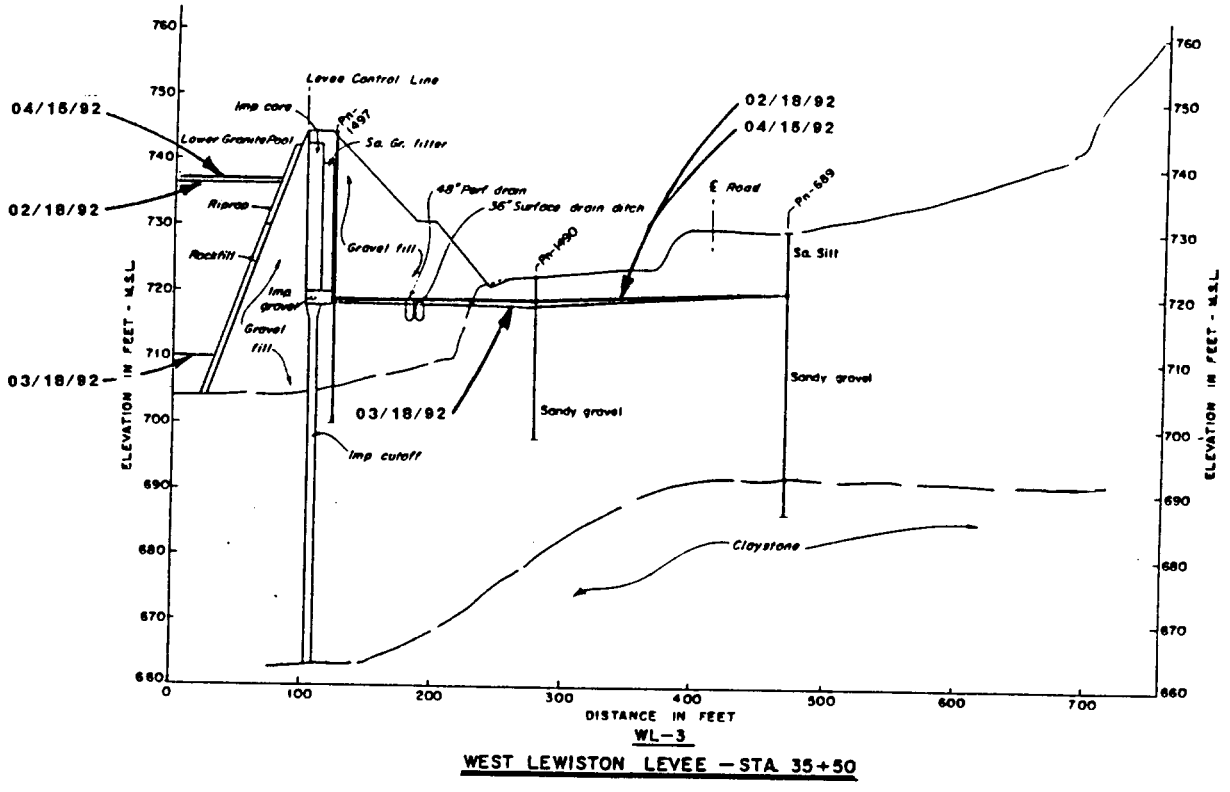
COMPUTER AIDED DESIGN & DRAFTING

U.S. ARMY ENGINEER DISTRICT  
 WALLA WALLA, WASHINGTON

LOWER GRANITE LITTLE GOOSE  
 SNAKE RIVER, ORE., WASH. & IDA.  
 1992 DRAWDOWN  
 PIEZOMETER TESTING  
 PIEZOMETER DATA

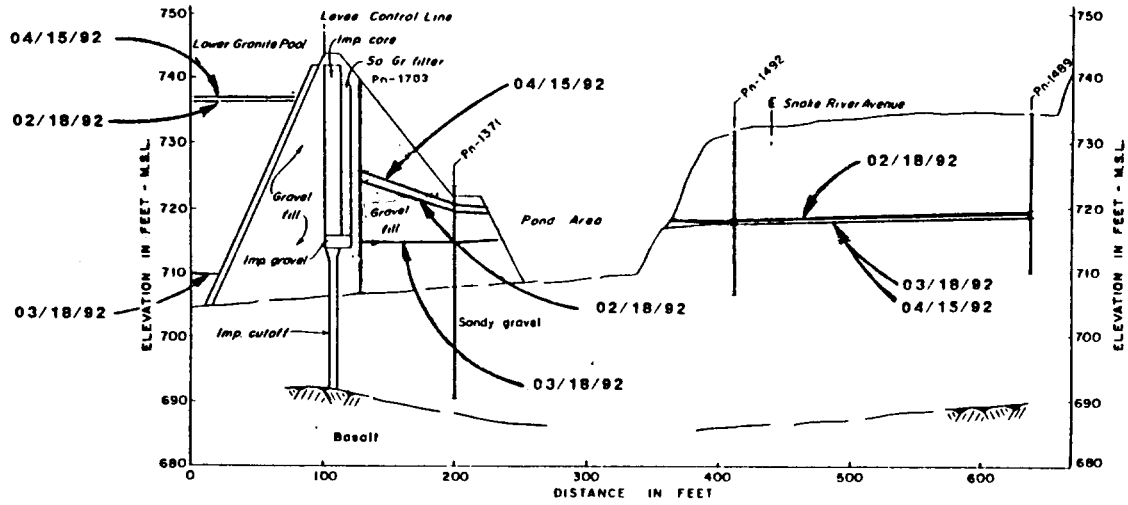
SCALE AS SHOWN (INV. NO.)

FN



DATE	CONFLUENCE EL. - MSL	PN-1497 EL. - MSL	PN-1490 EL. - MSL	PN-689 EL. - MSL
02/18/92	736.2	719.3	719.0	719.9
03/18/92	710.0	718.1	718.1	719.9
04/15/92	736.9	719.1	718.8	719.7

LEWISTON LEVEES  
WEST LEVEE STATION 35+50  
PROFILE LINE WL-3



WL-4  
**WEST LEWISTON LEVEE - STA. 47+70**

DATE	CONFLUENCE EL. - MSL	PN-1703 EL. - MSL	PN-1371 EL. - MSL	PN-1492 EL. - MSL	PN-1489 EL. - MSL
02/18/92	736.2	724.2	719.9	717.4	719.3
03/18/92	710.0	715.1	715.2	717.0	718.7
04/15/92	736.9	726.1	720.9	717.1	718.6

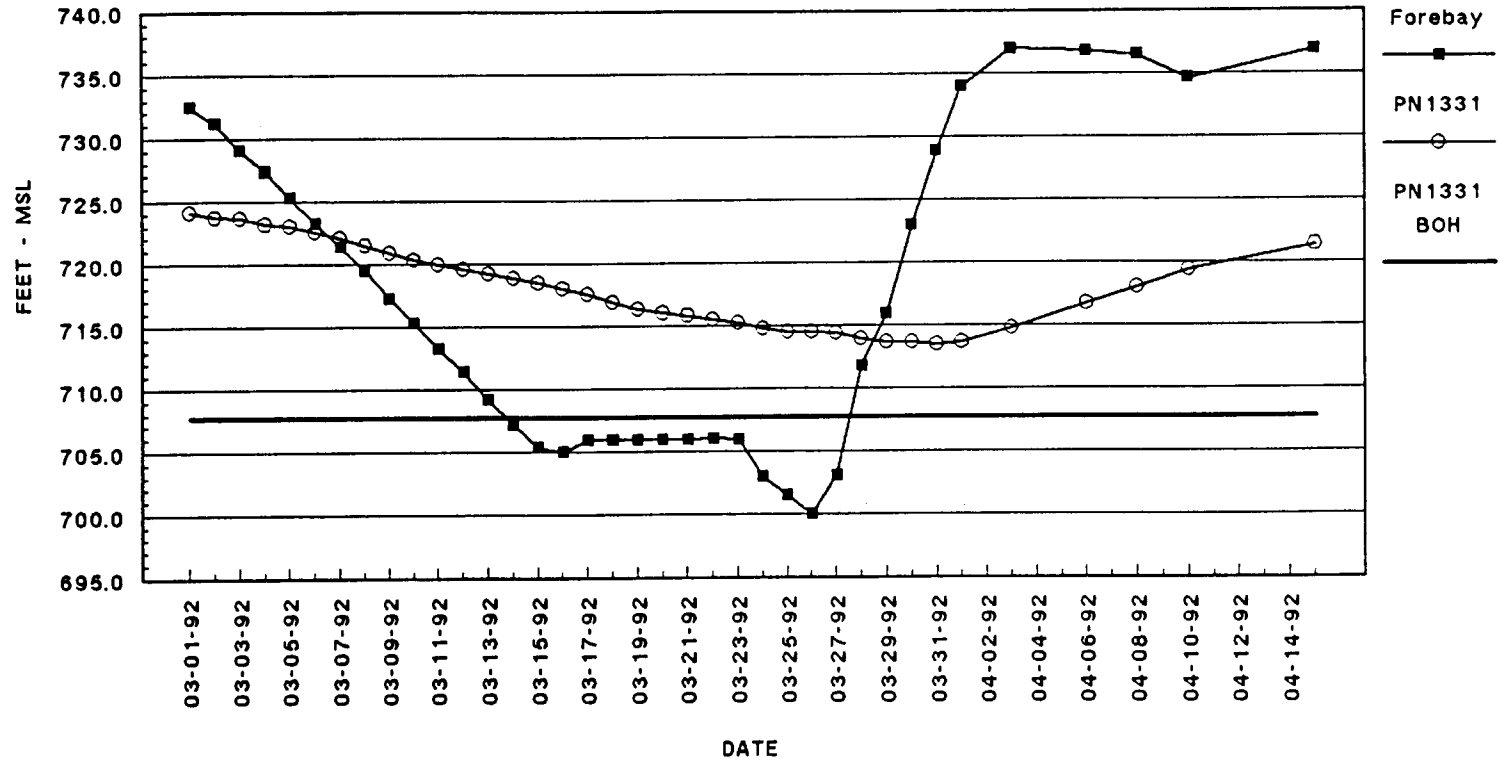
LEWISTON LEVEES  
 WEST LEVEE STATION 47+70  
 PROFILE LINE WL-4

# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 47+50

### Open Tube Piezometer PN1331

PLATE 24



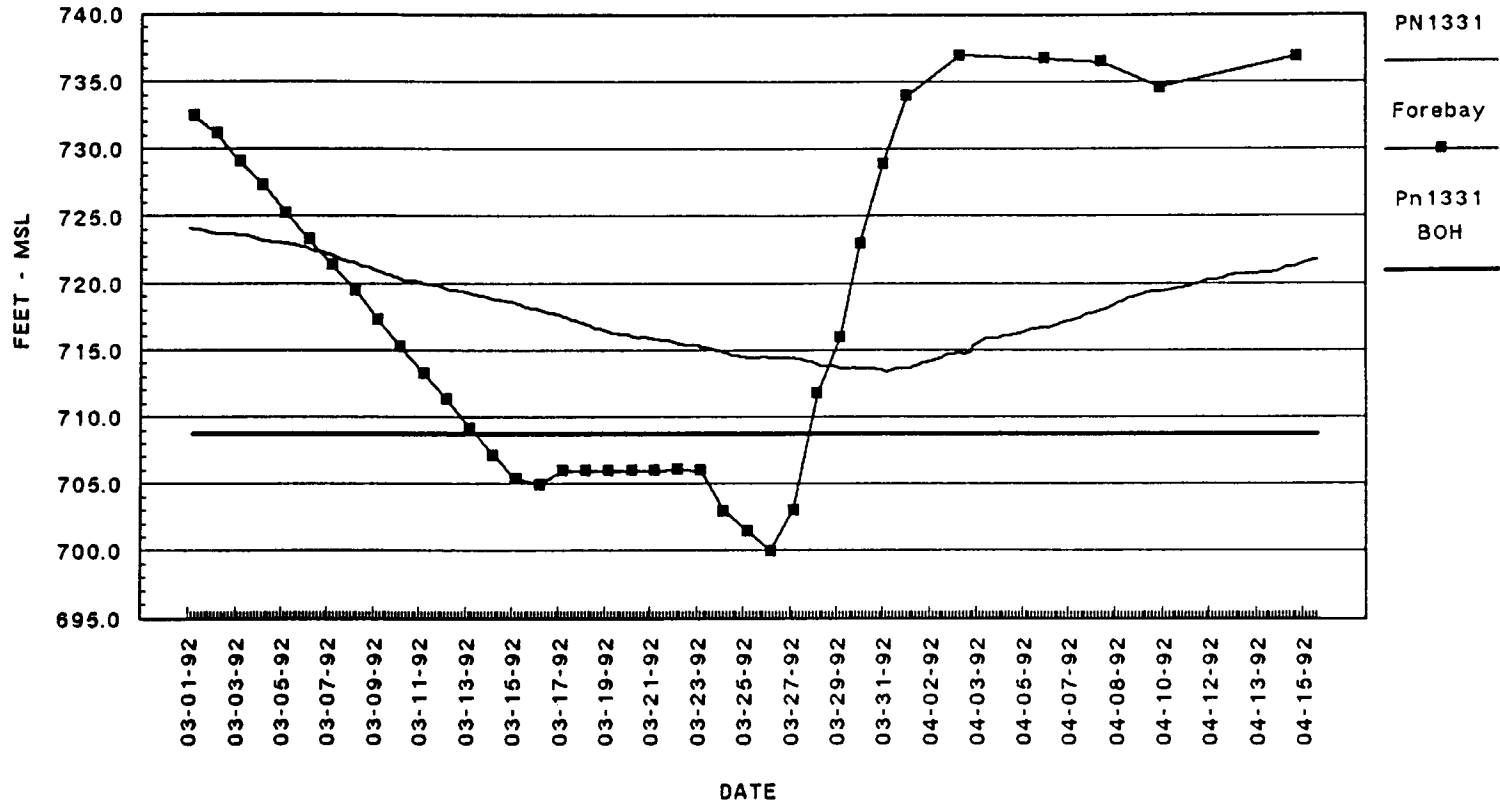
This graph represents the daily field readings taken by project personnel using a precision steel tape with attached plunker.

# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 47+50

### Open Tube Piezometer PN1331

PLATE 25



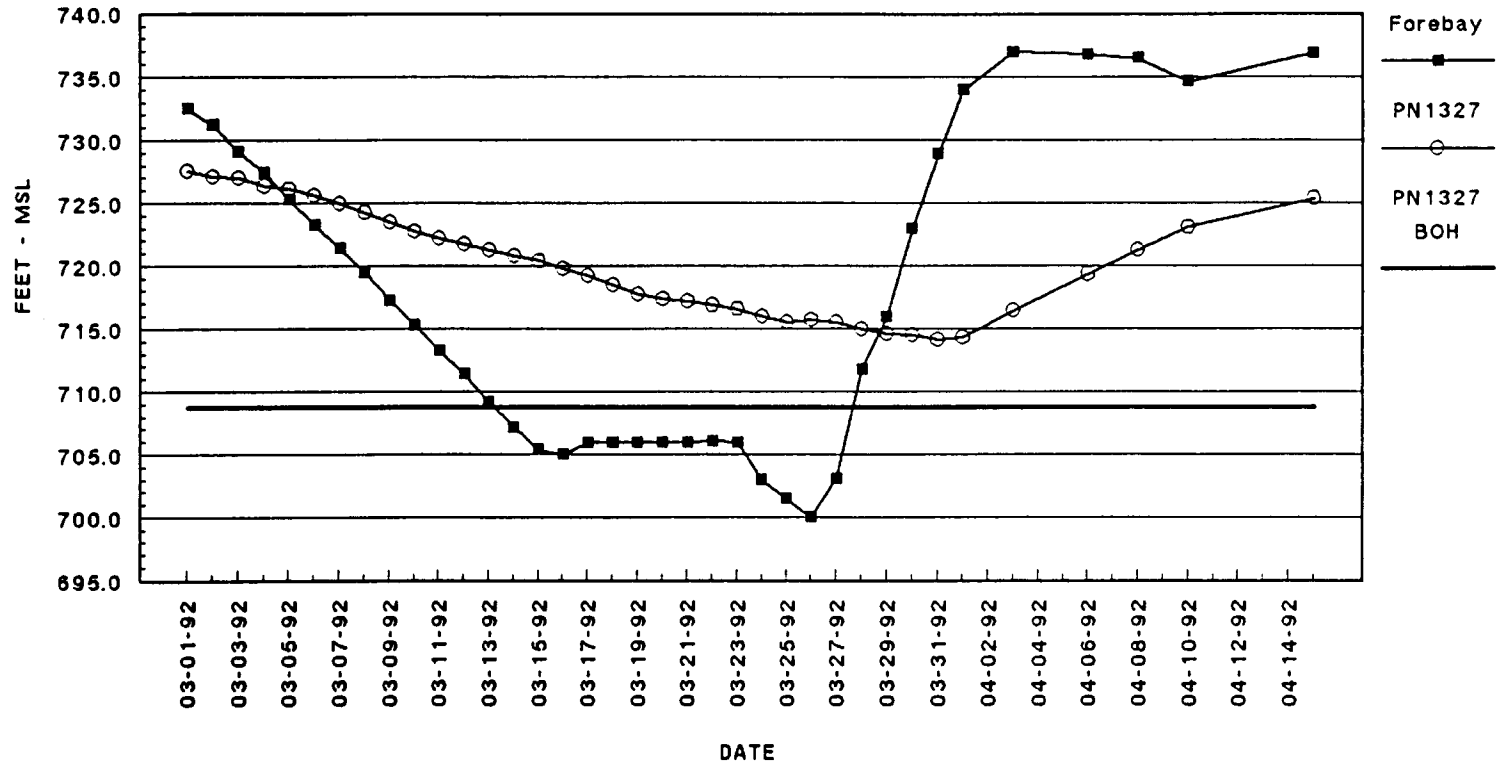
This graph represents data collected every four hours by a vibrating wire transducer.

# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 43+50

### Open Tube Piezometer PN1327

PLATE 26



This graph represents the daily field readings taken by project personnel using a precision steel tape with attached plunger.

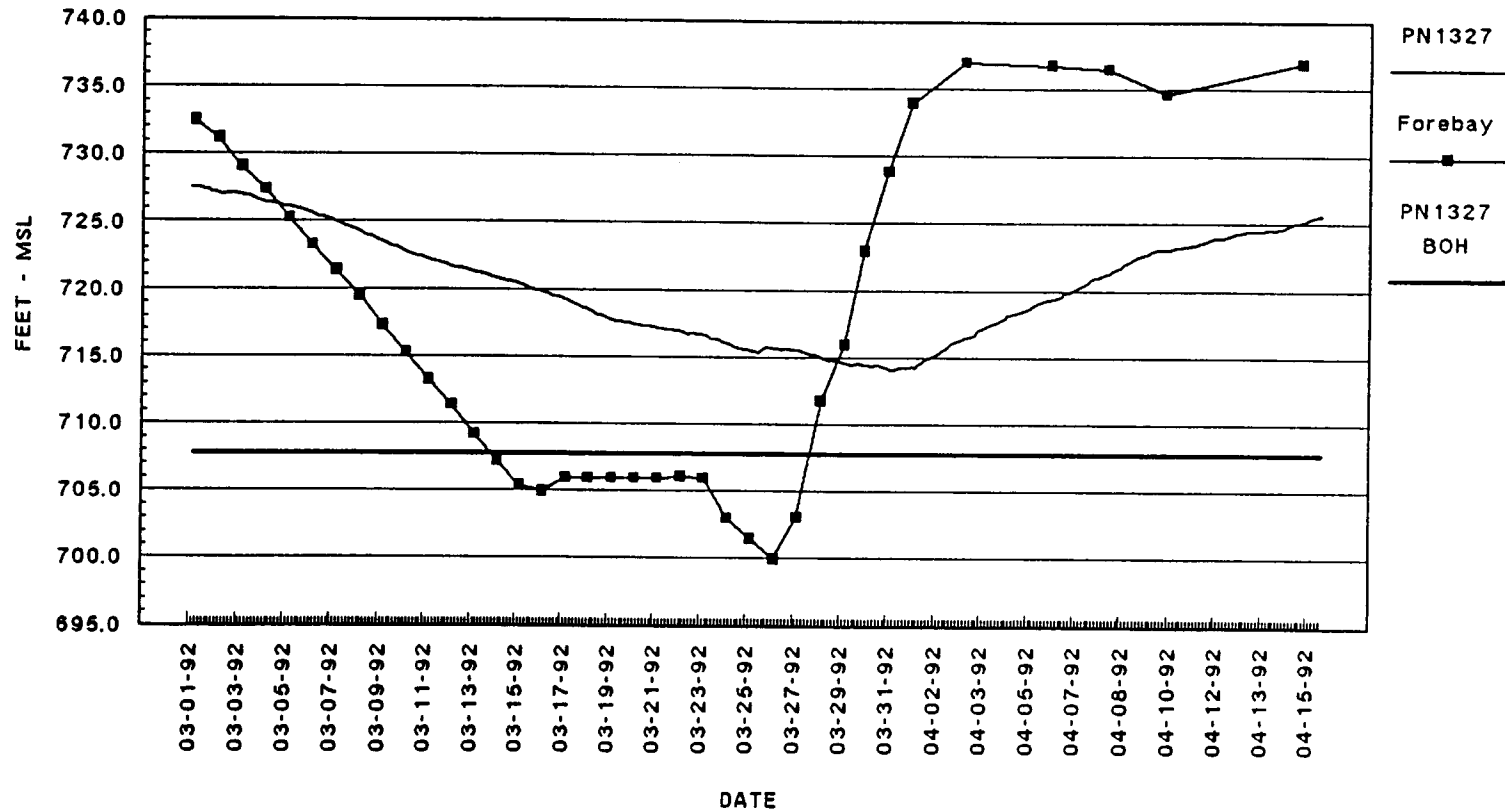


# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 43+50

### Open Tube Piezometer PN1327

PLATE 27



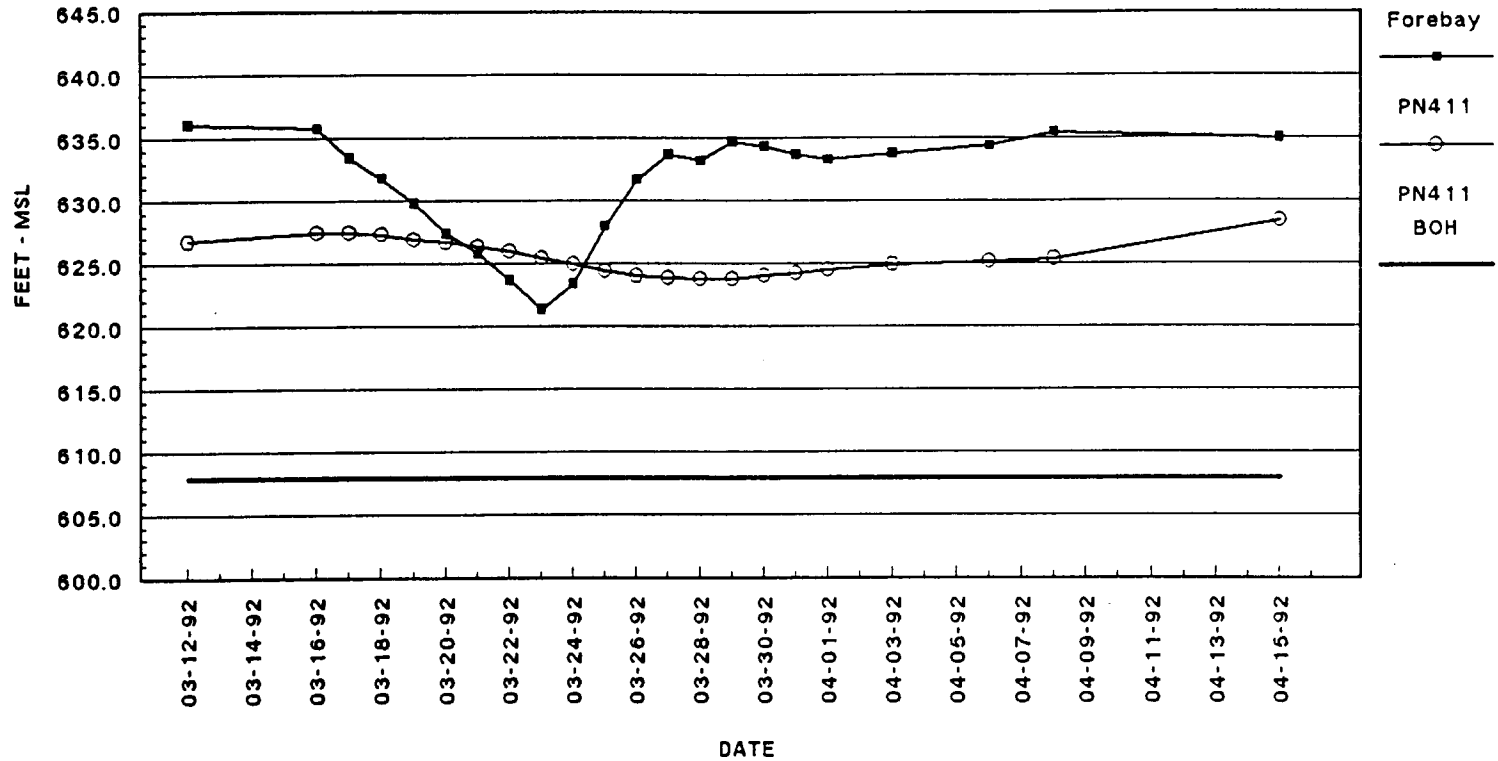
This graph represents data collected every four hours by a vibrating wire transducer.

# LITTLE GOOSE LOCK AND DAM – DRAWDOWN 1992

## North Embankment Station 70+00

### Open Tube Piezometer PN411

PLATE 28



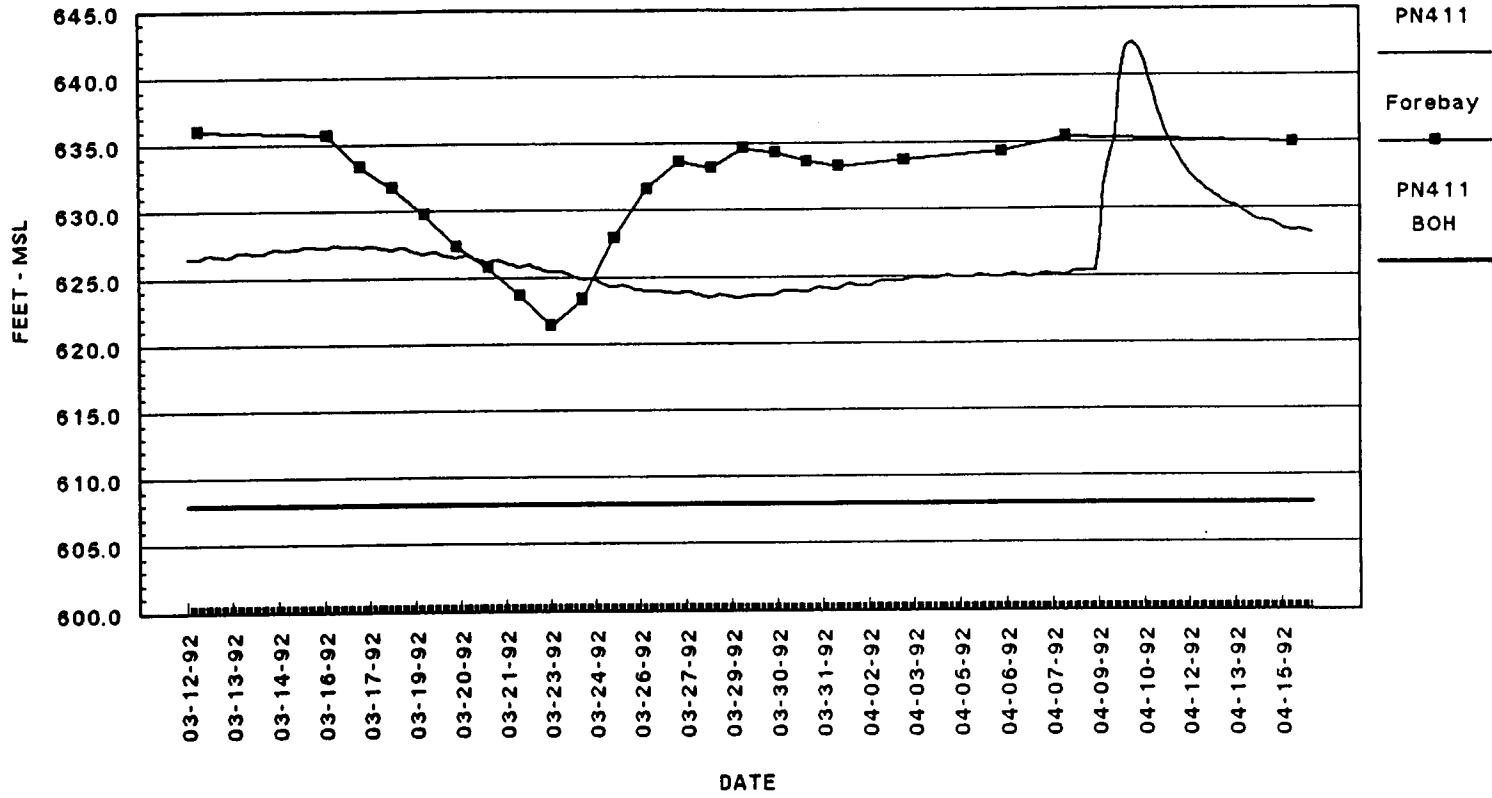
This graph represents daily field readings taken by project personnel using an electronic water level indicator.

# LITTLE GOOSE LOCK AND DAM – DRAWDOWN 1992

## North Embankment Station 70+00

### Open Tube Piezometer PN411

PLATE 29



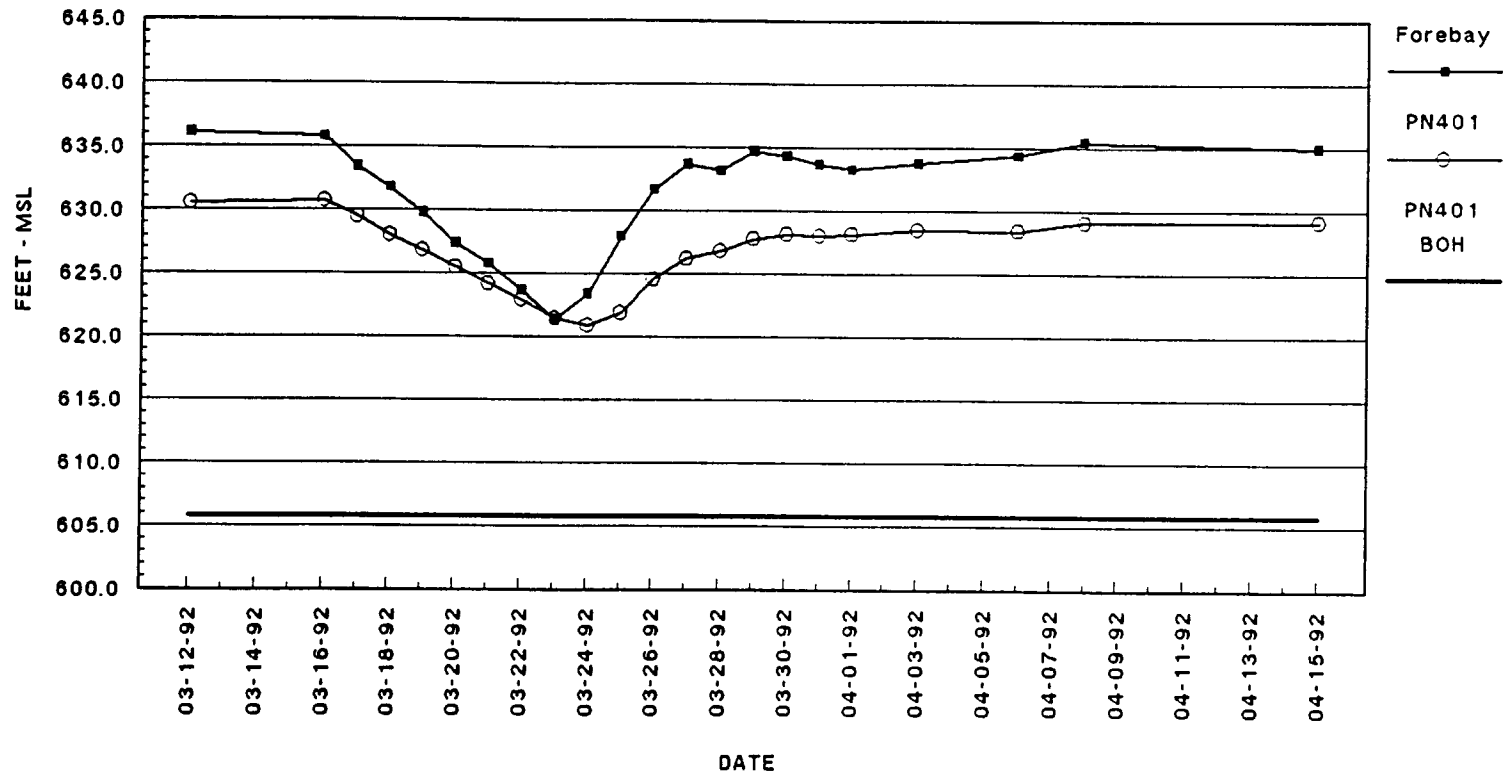
This graph represents data collected every four hours by a vibrating wire transducer.

# LITTLE GOOSE LOCK AND DAM – DRAWDOWN 1992

North Embankment Station 74+00

Open Tube Piezometer PN401

PLATE 30



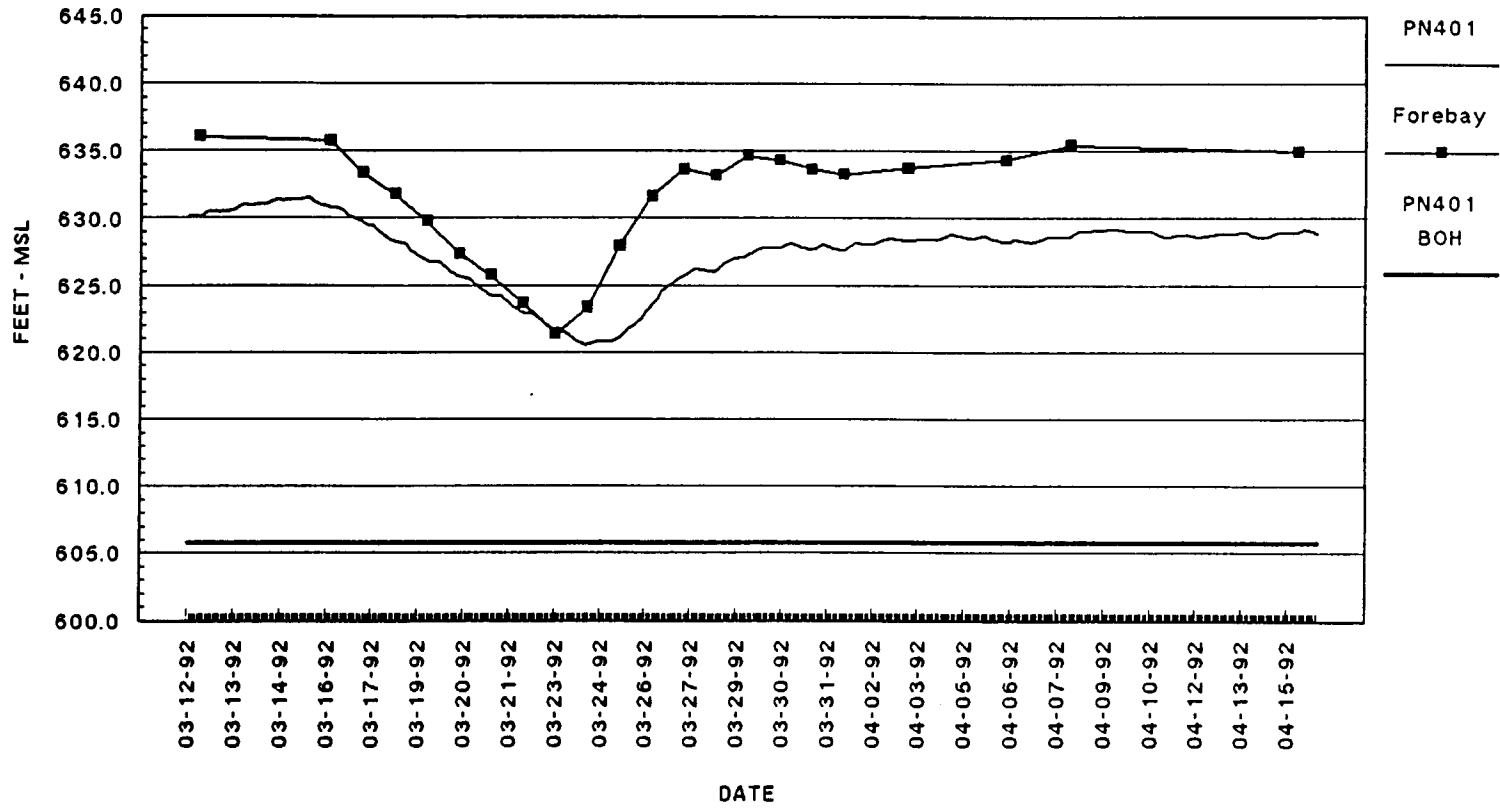
This graph represents the daily field readings taken by project personnel using an electronic water level indicator.

# LITTLE GOOSE LOCK AND DAM – DRAWDOWN 1992

## North Embankment Station 74+00

### Open Tube Piezometer PN401

PLATE 31



This graph represents data collected every four hours by a vibrating wire transducer.

APPENDIX D-1  
SCOPE OF WORK FOR OPEN TUBE  
PIEZOMETER TESTING

December 9, 1991

Contracting Division

SUBJECT: Proposal for Open Tube Piezometer Testing at Lower Granite Dam, Little Goose Dam and the Lewiston Levees, Contract No. DACW68-91-D-0004, Delivery Order No. 5

Richard Gates, Ph.D.  
Vice President  
Shannon and Wilson, Inc., Suite 100  
Post Office Box C-30313  
Seattle, Washington 98103

Dear Dr. Gates:

Please refer to your open-end, indefinite delivery order contract that your company has recently signed with the Walla Walla District. I have enclosed for your information and review Appendix "A" (Scope of Work), Appendix "B" (Open Tube Piezometer Test) and eight (8) drawings that identify the location and description of the field work.

You will please note the piezometer testing program described in the appendices requires a summary letter report identifying your observations and findings.

Your cost proposal shall be a lump sum amount supported by a breakdown by the tasks identified in the appendices with manhours, materials, travel charges, overhead and profit in sufficient detail to allow a meaningful review and analysis. Please refer to Section B, Supplies or Services and Prices/Costs, within your contract, pages B-1 and B-2. Also identify all work that is to be performed by subcontractors and appropriate item numbers for their work.

Please submit your proposal for this work at your earliest convenience. Our desire is to have the work completed by February 10, 1992. Mr. Scott Leech is your technical point of

contact regarding the Scope of Work. He can be reached at the Walla Walla District, Geotechnical Branch, (509) 522-6528. The points of contact are indicated in paragraphs 4.4, 4.6 and 8 of Appendix "A". I may be reached at the Walla Walla District Contracting Division, (509) 522-6801. Our telecopier number is (509) 522-6433 and may be verified at (509) 522-6432.

Sincerely,

Richard W. Glenn  
Chief, Contracting Division

Enclosures

LEECH/EN-GB-SC/dm

WELLER/EN-GB-SC

MIKLANCIC/EN-GB

KADEN/EN

BRAMMER/EN

GLENN/CT

IM-SM

EN



APPENDIX "A"  
SCOPE OF WORK

SHANNON & WILSON  
DELIVERY ORDER # 5

1. General Statement of Work.

Measure current water surface elevations and perform open tube piezometer tests as prescribed in the guide specification given in Appendix "B" and as indicated on attached drawings.

2. Location.

The work will be performed on the open tube piezometers located on the north embankment and abutment of Little Goose Dam, Washington, the north embankment of Lower Granite Dam, Washington and the north, east and west levees of the City of Lewiston, Idaho. Piezometer descriptions and locations are contained on the attached drawings.

3. Controls and Accuracies.

Locations, length and details of piezometers shall be as shown the attached drawings. The Contracting Officer may approve alternate locations as necessary to facilitate the work.

4. Field Work.

4.1 Existing Piezometers. Typical existing piezometer dimensions and installation configurations are given on the drawings. Variations in the dimensions provided should be expected in the field. To avoid any uncertainties as to any piezometer location or condition a joint site visit between the Contractor and Government representatives will be conducted at each of the 3 sites. This site visit will be conducted within seven (7) days after contract award and will be coordinated with Government personnel.

4.2 Testing. Testing of piezometers shall be conducted in accordance with the guide specifications provisions given in Appendix "B".

4.3 Summary Letter Report. A letter report shall be completed which summarized the testing investigations. Special attention shall be given to existing site conditions which may adversely influence the accuracy of the test results.

4.4 Utilities. Water at the two dam sites will be available, however, extended hoses will be necessary. Electric power (120v) is also available but will require extension cords. Exact locations of power and water hookups can be obtained from the project offices at Little Goose Dam (509) 399-2233 and Lower Granite Dam (509) 843-1493. Due to the remote nature of the Lewiston levees water and electric utilities may not be available for many of the piezometer locations, therefore, portable power and water facilities will need to be provided by the Contractor to conduct tests on piezometers along the Lewiston levees.

4.5 Schedule. All work will be accomplished during the normal Project working hours, Monday-Friday, 0630-1700 hours unless approved otherwise by the Contracting Officer.

4.6 Cleanup. After completion of the work, all work areas shall be cleaned and restored to the original pretest condition including the repair of any damage done to existing piezometers or facilities. All piezometer caps shall be re-secured upon completion of testing. Locking type caps shall be locked after testing with the keys to be returned to Mr. Bob Berger of the Walla Walla District Office (509) 522-6764.

4.7 Access. The Contractor will be allowed access to, and use of, existing walkways, stairways, and elevators as necessary for access to work areas by workmen. Access to the sites shall be as indicated on the attached drawings and as shown during the site inspection. Keys for locking type caps will be provided by Corps personnel during the site inspection.

## 5. Safety.

Work shall be performed in a safe manner and operations shall conform to the applicable requirements of EM 385-1-1, Safety and Health Requirements Manual.

## 6. Insurance.

The Contractor shall procure and maintain during the entire period of his performance under this contract the following minimum insurance.

6.1 Coverage complying with State laws governing insurance requirements pertaining to Workman's Compensation and Employer's Liability Insurance.

6.2 Bodily injury liability insurance with minimum limits of \$500,000 per occurrence shall be required on the comprehensive form of policy.

6.3 Automobile bodily injury and property damage liability with minimum limits of \$200,000 per person and \$500,000 per occurrence for bodily injury liability and \$20,000 per occurrence for property damage liability shall be required.

6.4 Prior to the commencement of work hereunder, the Contractor shall furnish to the Contracting Officer, a certificate or written statement of the above required insurance. The policies evidencing required insurance shall contain an endorsement to the effect that cancellation on any interest of the Government in such insurance shall not be effective for each period as may be prescribed by the laws of the State of Washington and in no event less than 30 days after written notice thereof to the Contracting Officer.

7. Contract Completion Date.

Completion of all work shall be no later than 18 February 1992.

8. Point of Contact.

All work shall be coordinated with Mr. Richard Weller, at the Walla Walla District Office, Geotechnical Branch, telephone (509) 522-6775. Field direction of the work will be coordinated with Mr. Scott Leech, Geotechnical Branch, telephone (509) 522-6528.

APPENDIX "B"

OPEN TUBE PIEZOMETER TEST

PART 1 - GENERAL

This specification includes materials, transportation and labor for testing of designated existing open tube type piezometers.

1.1 REFERENCES (not applicable)

1.2 ITEMS OF WORK

1.2.1 General. Testing of open tube piezometers at Little Goose Dam, Lower Granite Dam and the Lewiston Levees is to be broken down in the Contractor's proposal by the following items of work:

(a) Mobilization and Demobilization. This item of work shall include all preparatory work prior to travel to the project sites. It shall also include any work subsequent to the completion of piezometer testing excluding report preparation and return travel from the test sites. A lumpsum price shall be provided in the Contractor's proposal with a breakdown of all individual costs used to establish the lumpsum price.

(b) Piezometer Testing. This item of work shall include all travel to, from and around the piezometer test sites, labor, equipment and all other costs associated with piezometer testing. The price for this item shall be presented as a unit price per piezometer, with a breakdown of the individual costs for travel, labor, equipment and associated incidental items used to establish the unit price for this item of work. The quantity shall be established by the designated test piezometers shown on the attached drawings.

(c) Summary Letter Report. This item of work shall include labor, equipment, reproduction, materials and all other incidental costs associated with providing the summary letter report. A lumpsum price shall be provided in the Contractor's proposal with a breakdown of all individual costs used to establish the lumpsum price.

(d) Site Visit. This item of work shall include all correspondence, travel to, from and around the test sites, labor and any incidental work associated with the site visit. The site visit shall not exceed three (3) calendar days including travel time. The site visit shall be conducted with Government personnel to identify access and test piezometer locations. A lumpsum price shall be provided with the Contractor's proposal with a breakdown of all individual costs used to establish the lumpsum price.

### 1.3 SUBMITTALS

1.3.1 General. Government approval is required for the testing equipment used on the rising head or filling head test. Piezometer test reports shall be submitted within 24-hours of conclusion of the tests with two (2) copies of test results. Test reports shall be provided on the Piezometer Test Form for each piezometer tested.

PART 2 - PRODUCTS (Not Applicable)

Part 3 - EXECUTION

### 3.0 PIEZOMETER TESTING

3.1.1 General. The locations of the piezometers are indicated on the drawings. A precondition survey will be conducted with Government personnel to identify location of piezometers to be tested. Piezometer physical data is also provided on the drawings. Testing shall be performed in accordance with the specification requirements. The work in the specification includes all labor, transportation costs, instruments and equipment required to test the selected piezometers. Any instruments or Government property damaged during the testing operations will be repaired or replaced at Contractor's expense. M- Scope or tape type water surface detection devices are acceptable to take water surface elevation measurements. During testing the Contractor shall insure that exterior seepage flow into piezometers from rain or other sources is prohibited so as not to invalidate the test. A minimum of two people shall be on site to perform the test. One of the persons shall be designated as the recorder during the test.

#### 3.1.2 Testing Procedure.

3.1.2.1 Record on the Piezometer Test Form, date, water surface data, piezometer number and location, and the top of sediment depth if encountered. If the piezometer is clean this will correspond with the piezometer bottom depth. A sample of the Piezometer Test Form follows this specification.

3.1.2.2 Perform falling head or rising head test on each specified piezometer to verify whether the piezometer is clean and functioning properly. The test results shall be tabulated on the Piezometer Test Form.

3.1.3 Rising Head Test. In piezometers where substantial bailing is required and the natural water surface elevation is greater than ten (10) feet above the bottom of the piezometer a rising head test shall be performed. Immediately after the hole is cleaned, the recorder shall set a start time and take a water surface elevation reading and shall continue to take readings at the intervals shown on the test form. There should be a one (1)

the intervals shown on the test form. There should be a one (1) foot rise in the water surface elevation in a one (1) hour test period when the water surface has been drawn down by a significant amount, approximately ten (10) feet. If the recharge is very slow with less than one foot rise in an hour, the piezometer will be considered clogged. This test shall be conducted on all piezometers unless field conditions dictate the use of the falling head test as described below.

3.1.4 Falling Head Test. A falling head test shall be performed at the direction of the Contracting Office. For exceptionally dry piezometers, the water shall be introduced into the hole to a minimum height of ten (10) feet above the piezometer water surface elevation measured after cleaning. The test time shall start once the piezometer is filled to desired height and its starting water surface elevation measured. The recorder shall record the depth of fall at the intervals shown on the enclosed test form.

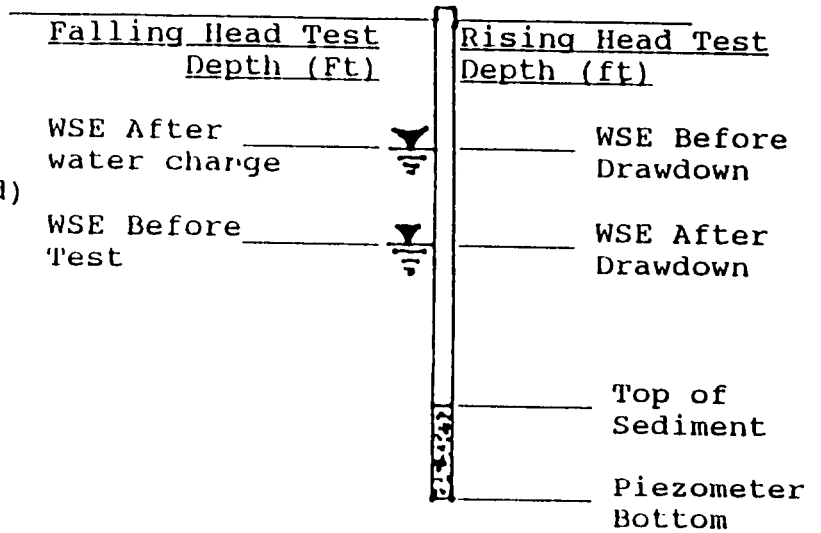
3.1.5 Test Forms. The Piezometer Test Forms for each piezometer shall be completely filled out. All water levels shall be recorded to the nearest tenth of a foot. Time readings shall be recorded to the nearest minute. Any obstructions or site peculiarities that may have an adverse effect on the readings should be recorded in the notes section of the test form. The elapsed time shall be entered based on the recordings in the time column. The Contractor shall endeavor to keep the actual reading intervals shown in the elapsed time column the same as the specified interval. Under no circumstances can the specified and actual elapsed time values differ by more than five (5) minutes. The top of sediment reading is the measured piezometer bottom. The piezometer bottom entry will be left blank. Any indication of sediment in the piezometer during the testing should be indicated in the notes on the test form.

**PIEZOMETER TEST FORM**

Location: \_\_\_\_\_

Piezometer No: \_\_\_\_\_

Type of Test: \_\_\_\_\_  
(Falling Head or Rising Head)



WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
_____	_____	0	_____	_____
_____	_____	30 min.	_____	_____
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES:

**APPENDIX D-2**  
**OPEN-TUBE PIEZOMETER TESTING REPORT**

Huge over-size plates on the location map and piezometer testing   
and data. Refer to the original document.



***Open Tube Piezometer Testing  
Lower Granite Dam, Little Goose Dam,  
and the Lewiston Levees  
Snake River, Washington and  
Lewiston, Idaho***

*February 1992*

***Department of the Army  
Walla Walla District, Corps of Engineers  
City-County Airport  
Walla Walla, WA 99362-9265***



**SHANNON & WILSON, INC.**

1313 W. Clark Street  
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(509) 547-9696



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February 12, 1992

Department of the Army  
Walla Walla District, Corps of Engineers  
City-County Airport  
Walla Walla, Washington 99362-9265

Attn: Mr. Richard Weller

**RE: OPEN TUBE PIEZOMETER TESTING AT LOWER GRANITE DAM,  
LITTLE GOOSE DAM, AND THE LEWISTON LEVEES, SNAKE RIVER,  
WASHINGTON AND LEWISTON, IDAHO**

We are pleased to present the results of our field work at the referenced sites on the Snake River in Washington and at Lewiston, Idaho. This work was accomplished in accordance with Contract No. DACW68-91-D-0004, Delivery Order No. 5. The purpose of this project was to determine whether the tested piezometers were functional or clogged with sediment. Initial site visits were conducted on January 14, 1992, during which Paul Van Horne was shown the piezometers at the two dams and the North, East, and West Lewiston Levees. Piezometer testing was initiated on January 20 and completed on February 6. Tests were conducted in all 73 of the piezometers required by the contract. In general, where the water level recovery in a piezometer was rapid, multiple tests were performed in order to provide graphable data. These data are included at the end of this report on piezometer test forms along with the site maps and the piezometer construction data table which you provided to us.

#### FIELD METHODS

Solinest- and Slope Indicator-brand electronic water level indicators were used to measure water levels during the tests. At the start of a test, the static water level in a piezometer was measured. Then the piezometer bottom was sounded with a weighted tape to measure the amount of sediment which had built up. A stainless steel bailer was used to evacuate water from the piezometer in order to induce a head change of about 10 feet or more, when possible. Water level measurements were begun as quickly as possible after the completion of bailing. Occasionally, a piezometer with little or no water in it or with a slight bend in its casing was encountered, which prevented the performance of a bail-down (rising head) test. In this case, water was poured rapidly into the piezometer for a falling head test. Those piezometers which responded

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Richard H. Gates, Ph.D., P.E.  
Vice President

Frank W. Pita, P.E., P.G.  
Vice President

Jess T. Abed, P.E.  
Senior Associate

Department of the Army  
Attn: Mr. Richard Weller  
February 12, 1992  
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quickly typically recovered or drained so rapidly that neither bailing nor adding water could induce more than a few feet of head change.

### RESULTS

The criterion for determining whether or not a piezometer is functional is set forth in the contract document. This criterion specifies that a piezometer is to be considered functional if it recovers or drains at least 1 foot within 1 hour of an induced head change of at least 10 feet. Most of the piezometers tested were found to meet this criterion. Exceptions (piezometers which would be considered clogged) include PN-411 and PN-412 at Little Goose Dam and PN-694 and PN-1084 at the West Lewiston Levee. In general, very little sediment was encountered in the piezometer bottoms. Exceptions include PN-401 (2.7 feet of sediment) at Little Goose Dam and PN-1640 (0.9 feet) at Lower Granite Dam. All others were found to have 0.4 feet or less of sediment. A number of piezometers were discovered to be dry at the time of testing. These include PN-1684 at the West Lewiston Levee, PN-417, PN-418, and RD-13 at Little Goose Dam, and PN-1338, PN-1339, PN-1340, PN-1638, PN-1639, PN-1640, and PN-1641 at Lower Granite Dam.

### CLOSURE

We appreciate this opportunity to be of assistance to you. If you have any questions regarding this, please do not hesitate to call.

Sincerely,

SHANNON & WILSON, INC.

  
Paul L. Van Horne  
Hydrogeologist



Richard H. Gates, P.E.  
Vice President

PVH:RHG/lkd

Enclosures: Piezometer Test Forms  
Piezometer Testing Sheets 1-8

cc: Scott Leech

H100-01.LT2/PVH-lkd/lkd

SHANNON & WILSON, INC.

PIEZOMETER TEST FORM

Location: West Lewiston Levee

Piezometer No: PN-1084

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water charge

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

14.62 WSE Before  
Drawdown

29.2 WSE After  
Drawdown

42.7 Top of  
Sediment

42.7 Piezometer  
Bottom

$H_0 = 29.2 - 14.62 = 14.58$   
 $H = 14.62$

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>2-4-92</u>	<u>0834</u>	0	<u>0</u> <small>min.</small>	<u>29.2</u> / 14.58 / 1.0
"	<u>0904</u>	30 min.	<u>30</u>	<u>28.6</u> / 13.95 / .959
"	<u>0934</u>	1hr	<u>60</u> <small>min.</small>	<u>28.5</u> / 13.88 / .957
"	<u>1004</u>	1hr 30min	<u>90</u>	<u>28.4</u> / 13.78 / .945
"	<u>1034</u>	2hr	<u>120</u>	<u>28.2</u> / 13.58 / .931
"	<u>1104</u>	2hr 30min	<u>150</u>	<u>28.0</u> / 13.38 / .917
"	<u>1134</u>	3hr	<u>180</u>	<u>27.8</u> / 13.18 / .904
"	<u>1239</u>	4hr	<u>245</u>	<u>27.4</u> / 12.78 / .877
"	<u>1339</u>	5hr	<u>305</u>	<u>27.0</u> / 12.38 / .849
<u>2-5-92</u>	<u>0834</u>	24hr	<u>1440</u>	<u>21.6</u>
<u>2-6-92</u>	<u>0834</u>	48hr	<u>2880</u>	<u>17.3</u>

NOTES: Bailed 1 gal. in 2.5 min.  
slight oily sheen on water.

**PIEZOMETER TEST FORM**

Location: North Lewiston Levee

Piezometer No: PN-1348

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 9.5  
water charge

WSE Before 14.44  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

28.9 Top of  
Sediment

28.9 Piezometer  
Bottom

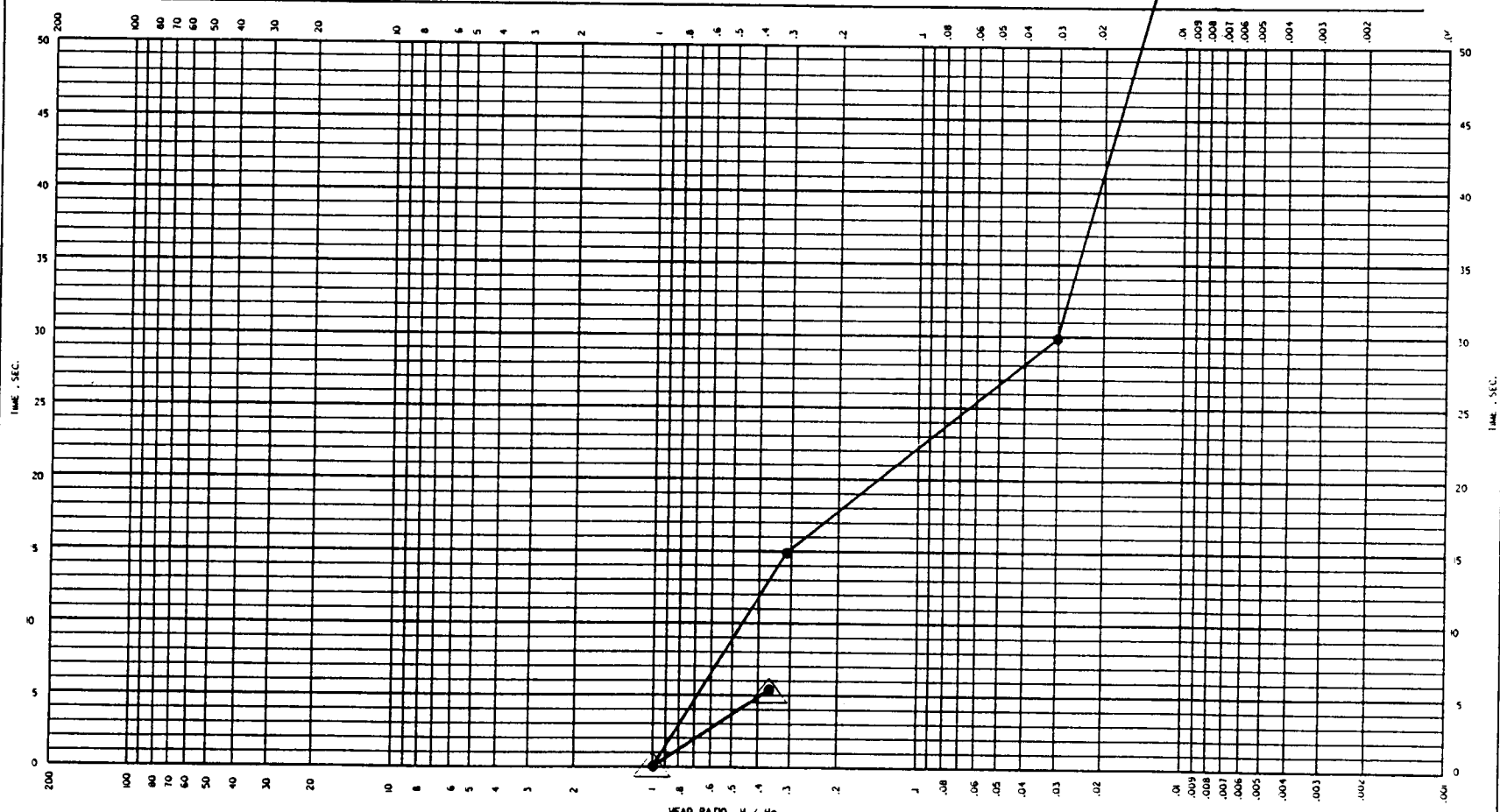
$H_0 = 14.55 - 9.5$  *Prison to bailing*  
 $= 5.05$  *(14.55 when*  
*water added)*  
 $H = 14.55 - \text{reading}$


WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/L
		Specified	Actual			
<u>2-4-92</u>	<u>17:03</u>		0	<u>9.5</u>	<u>5.05</u>	<u>1.00</u>
"	<u>17:03.95</u>	<u>30 min.</u>	<u>0.95 min</u>	<u>12.9</u>	<u>1.65</u>	<u>.327</u>
"	<u>17:03.5</u>	<u>1hr</u>	<u>0.5 min</u>	<u>14.4</u>	<u>.19</u>	<u>.030</u>
	<u>17:04</u>	<u>1hr 30min</u>	<u>1 min</u>	<u>14.5</u>	<u>.05</u>	<u>.010</u>
		2hr				
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

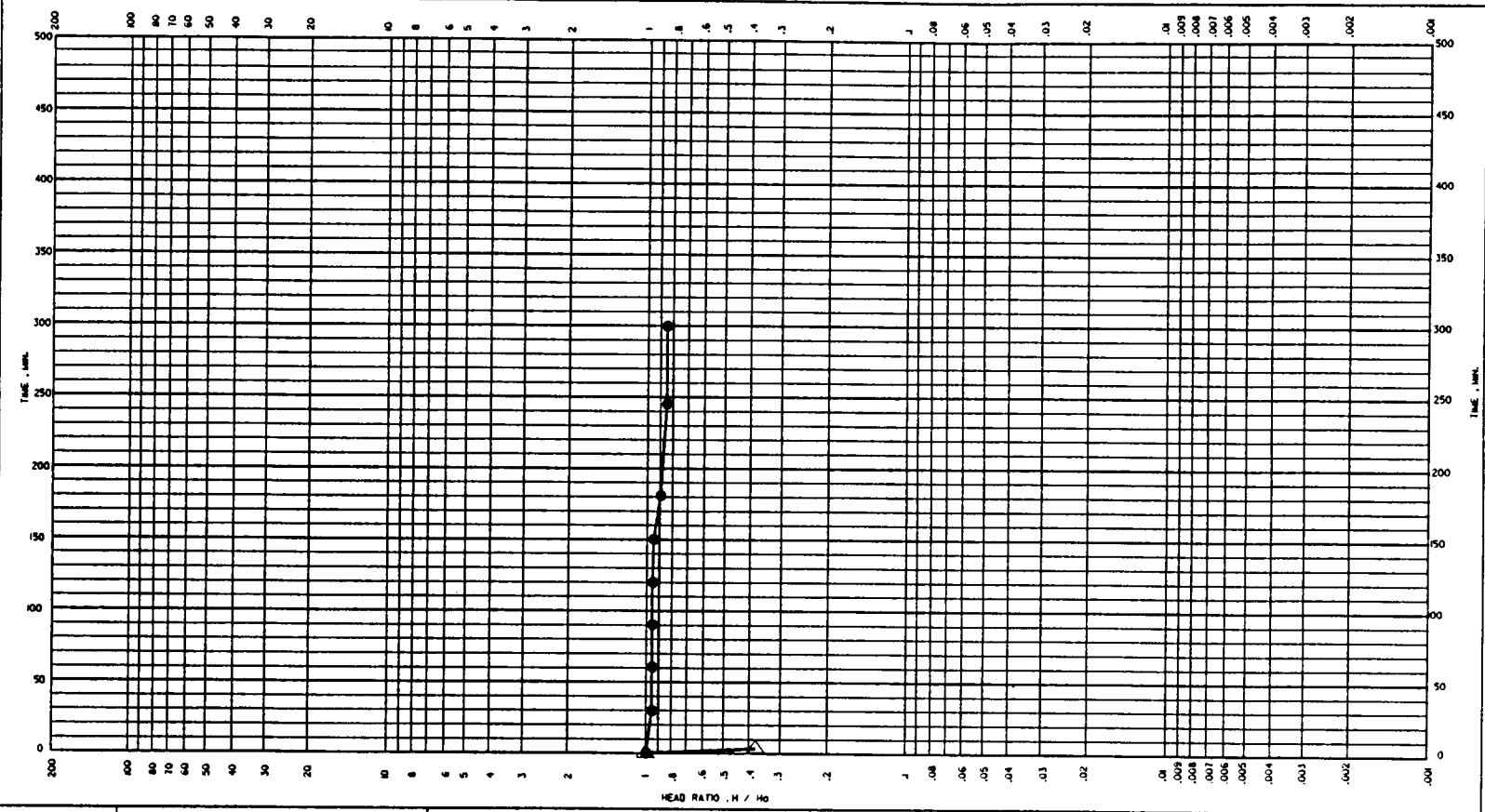
NOTES: Added 5.0 gallons

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/4/92	PN 1348 FALLING	 TIME LAG THEORY	NORTH LEWISTON LEVEE

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/4/92	PN 1084 RISING	 TIME LAG THEORY	WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewisten Levee

Piezometer No: PN-694

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water charge

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

11.5 WSE Before  
Drawdown

21.6 WSE After  
Drawdown

23.8 Top of  
Sediment

23.8 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>1-30-92</u>	<u>08:05</u>	0	<u>minutes</u>	<u>21.6</u>
	<u>0835</u>	30 min.	<u>30</u>	<u>21.6</u>
	<u>0905</u>	1hr	<u>60</u>	<u>21.6</u>
	<u>0945</u>	1hr 30min	<u>95</u>	<u>21.6</u>
	<u>1005</u>	2hr	<u>120</u>	<u>21.6</u>
	<u>1035</u>	2hr 30min	<u>150</u>	<u>21.6</u>
	<u>1105</u>	3hr	<u>180</u>	<u>21.6</u>
	<u>1205</u>	4hr	<u>240</u>	<u>21.6</u>
	<u>1305</u>	5hr	<u>300</u>	<u>21.6</u>
<u>1-31-92</u>	<u>0805</u>	24hr	<u>1440</u>	<u>21.6</u>
<u>2-3-92</u>	<u>1605</u>	48hr	<u>6240</u>	<u>21.6</u>

NOTES: Bailed 1.0 gal. over 2 1/2 minutes.

Checked total well depth again after bailing → no change.

This well point appears to be dysfunctional.

We may have removed rainwater that had enter the well from at or near the surface and never drained out... or it may just be extremely slow to recover.

*BAD  
PIEZOMETER*



**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1360

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water charge

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

10.83 WSE Before  
Drawdown

12.46 WSE After  
Drawdown

$H_0 = 12.46 - 10.83 = 1.63$

$H = \text{reading} - 10.83$

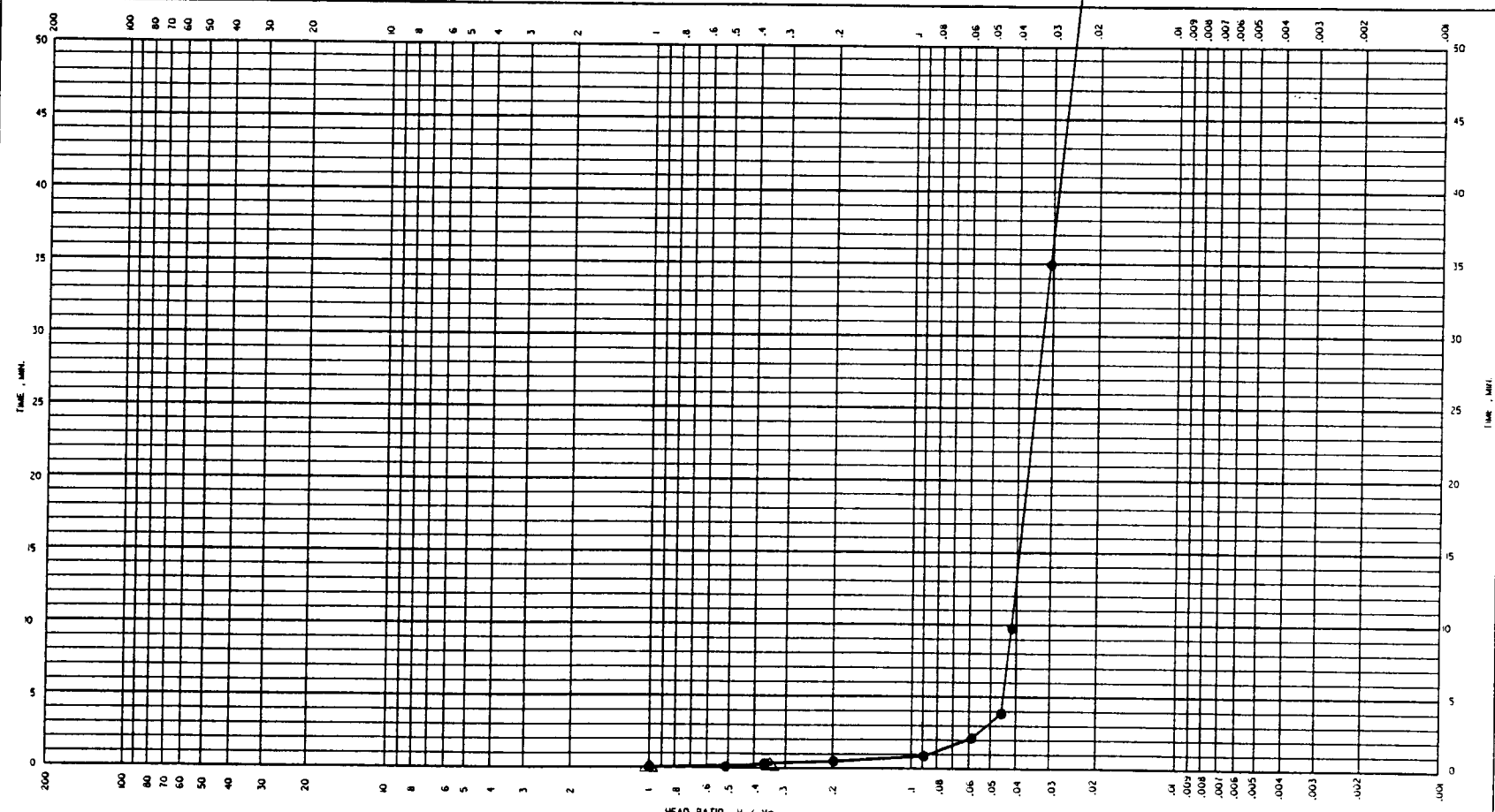
24.0 Top of  
Sediment  
24.0 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>7-4-92</u>	<u>9:26.95</u>	0		<u>12.46</u>	<u>1.63</u>	<u>1.0</u>
"	<u>9:26.5</u>	<del>30 min.</del>	<u>0.25 min</u>	<u>11.67</u>	<u>.84</u>	<u>.515</u>
"	<u>9:27</u>	<del>1hr</del>	<u>0.75 min</u>	<u>11.17</u>	<u>.34</u>	<u>.209</u>
"	<u>9:27.95</u>	<del>1hr 30min</del>	<u>1 min</u>	<u>10.99</u>	<u>.16</u>	<u>.098</u>
"	<u>9:28.95</u>	<del>2hr</del>	<u>2 min</u>	<u>10.93</u>	<u>.10</u>	<u>.0613</u>
"	<u>9:30.25</u>	<del>2hr 30min</del>	<u>4 min</u>	<u>10.91</u>	<u>.08</u>	<u>.049</u>
"	<u>9:36</u>	<del>3hr</del>	<u>10 min</u>	<u>10.90</u>	<u>.07</u>	<u>.043</u>
"	<u>10:01</u>	<del>4hr</del>	<u>35 min</u>	<u>10.88</u>	<u>.05</u>	<u>.031</u>
"	<u>10:26</u>	<del>5hr</del>	<u>60 min</u>	<u>10.87</u>	<u>.04</u>	<u>.025</u>
"	<u>10:56</u>	<del>24hr</del>	<u>90 min</u>	<u>10.86</u>	<u>.03</u>	<u>.018</u>
"	<u>11:31</u>	<del>48hr</del>	<u>125 min</u>	<u>10.85</u>	<u>.02</u>	<u>.012</u>
"	<u>11:58</u>		<u>152 min</u>	<u>10.84</u>	<u>.01</u>	<u>.006</u>

NOTES: Bailed 2.0 gallons over 3.0 minutes

PIEZOMETER TIME LAG PLOT



DATE 2/4/92	PIEZOMETER NO. AND DATA PN 1360 RISING	PROJECT TIME LAG THEORY	LOCATION West Lewiston Levee
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**PIEZOMETER TEST FORM**

Location: West Lewiston Levee Falling Head Test  
 Depth (Ft)



Rising Head Test  
 Depth (ft)

Piezometer No: PN-1360

Type of Test: Falling  
 (Falling Head or Rising Head)

WSE After 1.0   
 water change 

WSE Before  
 Drawdown

WSE Before 10.95   
 Test 

WSE After  
 Drawdown

$H_0 = 10.95 - 1.0 = 9.95$   
 $H = 10.95 - \text{reading}$

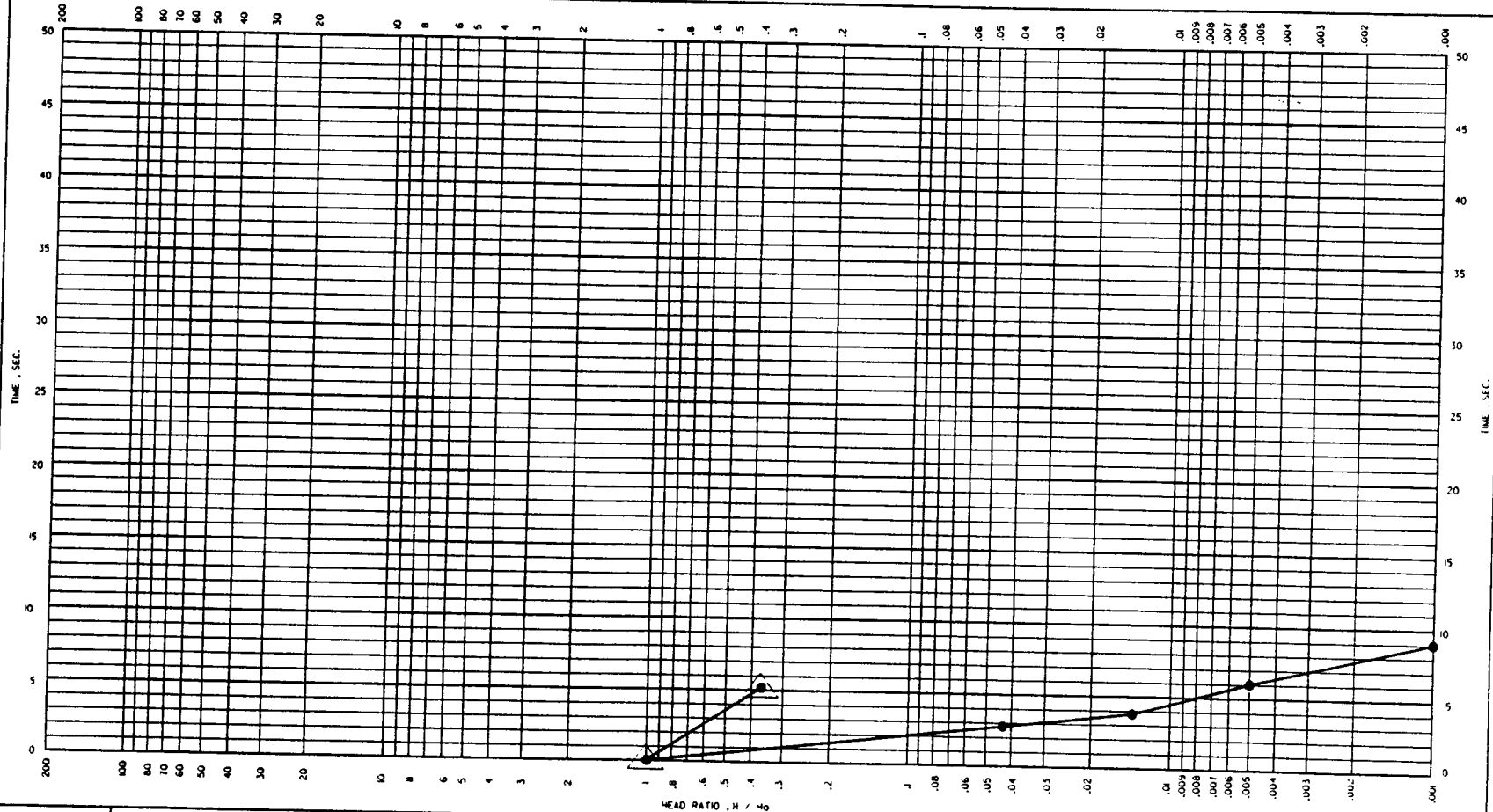
24.0 Top of Sediment  
24.0 Piezometer Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>2-6-92</u>	<u>1020:30</u>		0	<u>1.0</u>	<u>9.95</u>	<u>1.0</u>
	<u>1021:00</u>	30 min.	<u>30 sec</u>	<u>10.5</u>	<u>.45</u>	<u>.045</u>
	<u>1021:10</u>	1hr	<u>40 sec</u>	<u>10.8</u>	<u>.15</u>	<u>.015</u>
	<u>1021:30</u>	1hr 30min	<u>1 min</u>	<u>10.9</u>	<u>.05</u>	<u>.005</u>
	<u>1022</u>	2hr	<u>1.5 min</u>	<u>10.95</u>	0	—
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Added 2 gal.

### PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/6/92	PN 1360 FALLING	TIME LAG THEORY	WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1367

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water charge

WSE Before \_\_\_\_\_  
Test

$H_0 = 12.30 - 12.2 = .10$   
 $H = reading - 12.2$

Rising Head Test  
Depth (ft)

12.20 WSE Before  
Drawdown

12.30 WSE After  
Drawdown

25.1 Top of  
Sediment

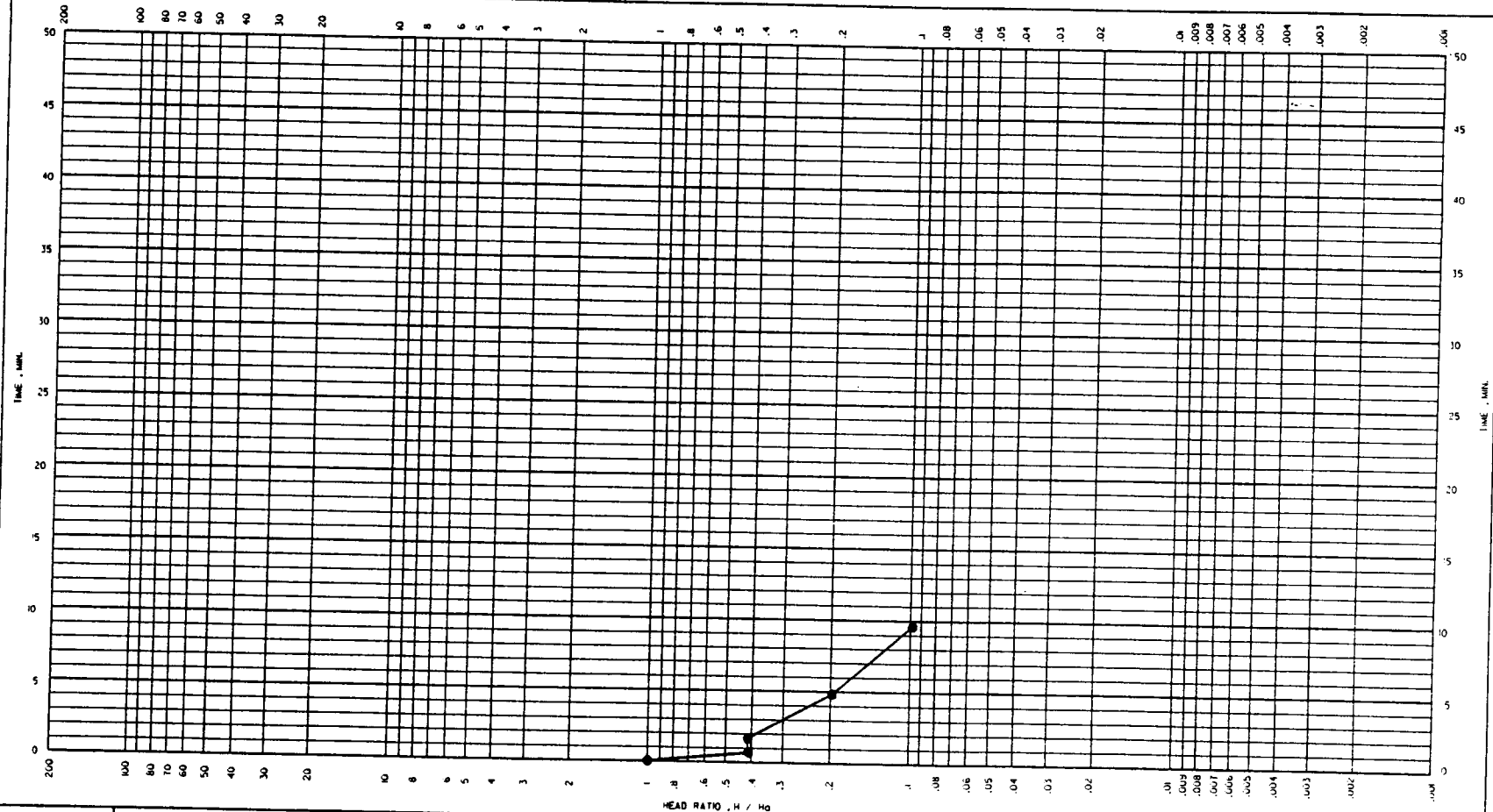
25.1 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time <i>t</i>		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>2-4-92</u>	<u>0906</u>		0	<u>12.30</u>	<u>.10</u>	<u>1.00</u>
	<u>0907</u>	30 min.	<u>1 min</u>	<u>12.24</u>	<u>.04</u>	<u>.40</u>
	<u>0907:30</u>	1hr	<u>1.5 min</u>	<u>12.24</u>	<u>.04</u>	<u>.40</u>
	<u>0911</u>	1hr 30min	<u>5 min</u>	<u>12.22</u>	<u>.02</u>	<u>.20</u>
	<u>0916</u>	2hr	<u>10 min</u>	<u>12.21</u>	<u>.01</u>	<u>.10</u>
	<u>0940</u>	2hr 30min	<u>34 min.</u>	<u>12.20</u>	<u>0</u>	<u>—</u>
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Bailed 2 gal. in 5 minutes.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/4/92	PN 1367 RISING		WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1367

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 9.0  
water charge

WSE Before 12.24  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

$H_0 = 12.24 - 9.0 = 3.24$   
 $H = 12.24 - \text{reading}$

25.1 Top of  
Sediment

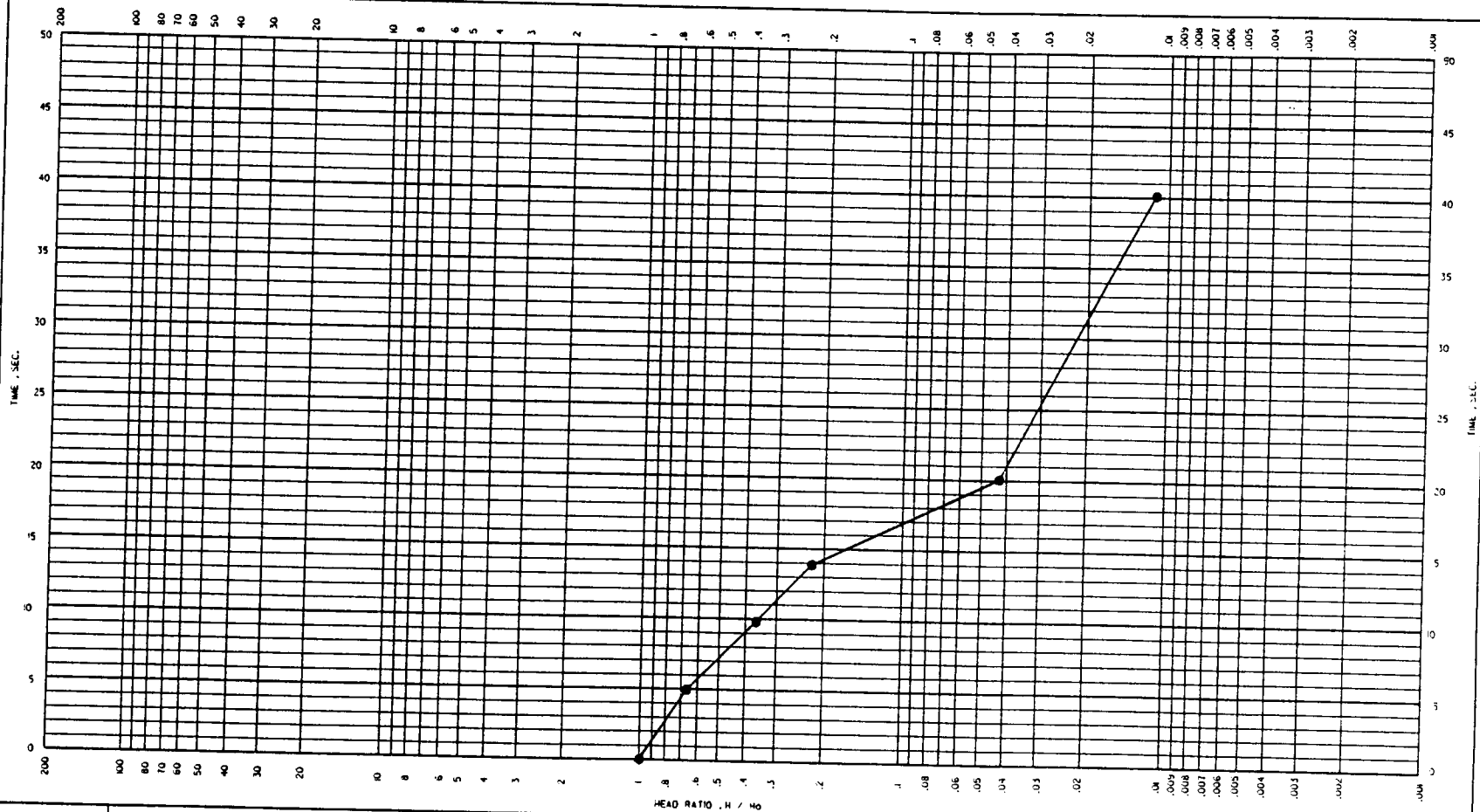
25.1 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time $t$		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>2-6-92</u>	<u>1029:10</u>	0	0	<u>9.0</u>	<u>3.24</u>	<u>1.00</u>
"	<u>1029:15</u>	30 min.	<u>5</u> sec.	<u>10.0</u>	<u>2.24</u>	<u>.691</u>
"	<u>1029:20</u>	1hr	<u>10</u> sec.	<u>11.0</u>	<u>1.24</u>	<u>.383</u>
"	<u>1029:24</u>	1hr 30min	<u>14</u> sec.	<u>11.5</u>	<u>.74</u>	<u>.228</u>
"	<u>1029:30</u>	2hr	<u>20</u> sec.	<u>12.1</u>	<u>.14</u>	<u>.043</u>
"	<u>1029:50</u>	2hr 30min	<u>40</u> sec.	<u>12.2</u>	<u>.04</u>	<u>.012</u>
_____	_____	3hr	_____	_____	_____	_____
_____	_____	4hr	_____	_____	_____	_____
_____	_____	5hr	_____	_____	_____	_____
_____	_____	24hr	_____	_____	_____	_____
_____	_____	48hr	_____	_____	_____	_____

NOTES: Added 5 gal.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/6/92	PN 1367 FALLING		WEST LEWISTON LEVEE



**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1369

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After                       
water change

WSE Before                       
Test

$H_0 = 11.45 - 11.3 = .15$   
 $H = \text{read } g - 11.3$

Rising Head Test  
Depth (ft)

11.30 WSE Before  
Drawdown

11.45 WSE After  
Drawdown

40.4 Top of  
Sediment

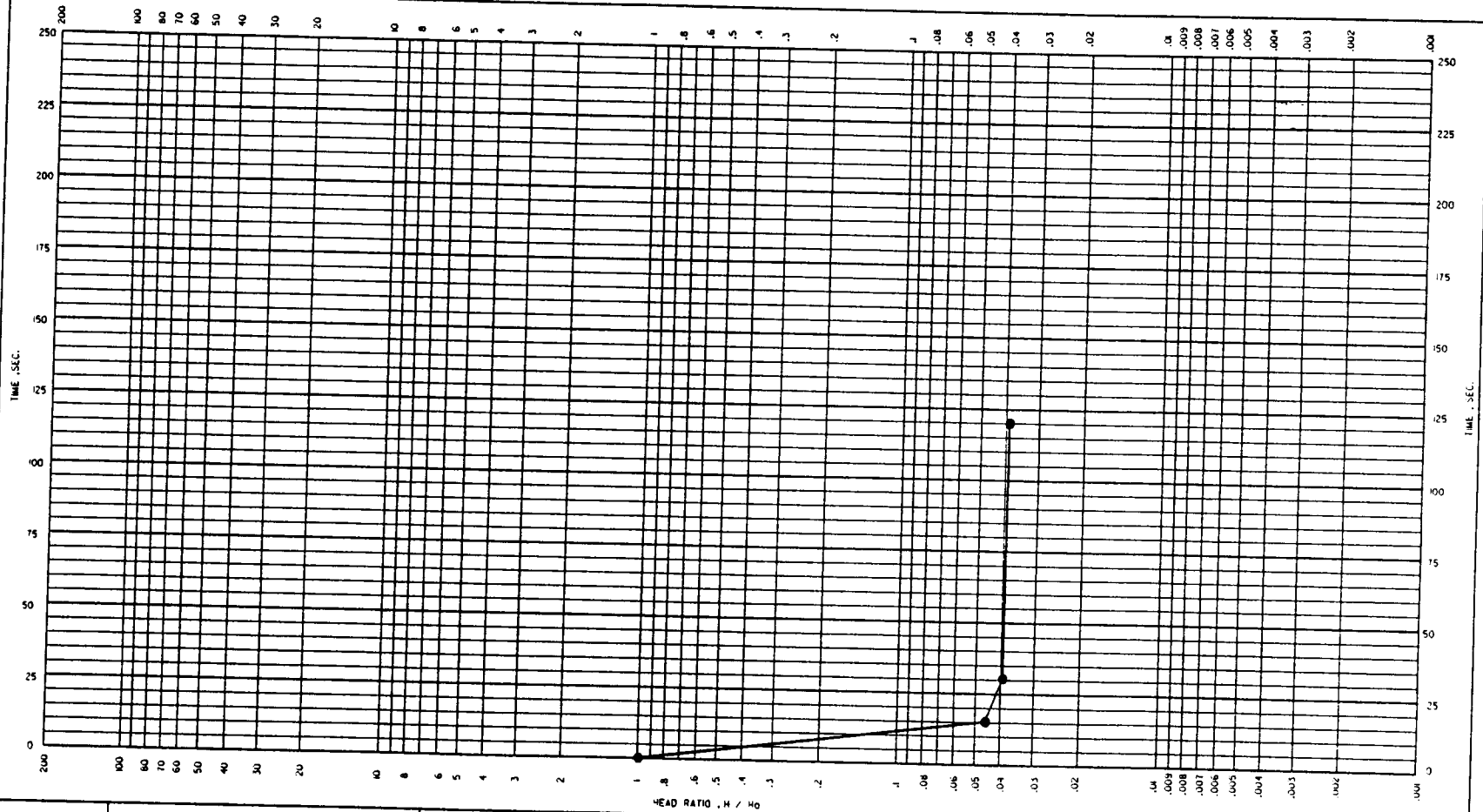
40.5 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-31-92</u>	<u>8:55</u>		<u>0</u>	<u>11.45</u>	<u>.15</u>	<u>1.00</u>
<u>"</u>	<u>8:55.95</u>	<u>30 min.</u>	<u>15 sec</u>	<u>11.37</u>	<u>.07</u>	<u>.467</u>
<u>"</u>	<u>8:55.5</u>	<u>1hr</u>	<u>30 sec</u>	<u>11.36</u>	<u>.06</u>	<u>.400</u>
<u>"</u>	<u>8:57</u>	<u>1hr 30min</u>	<u>9 min</u>	<u>11.36</u>	<u>.06</u>	<u>.400</u>
<u>"</u>	<u>9:02</u>	<u>2hr</u>	<u>7 min</u>	<u>11.35</u>	<u>.05</u>	<u>.333</u>
	<u>9:05</u>	<u>2hr 30min</u>	<u>10 min</u>	<u>11.33</u>	<u>.03</u>	<u>.200</u>
		<u>3hr</u>				
		<u>4hr</u>				
		<u>5hr</u>				
		<u>24hr</u>				
		<u>48hr</u>				

NOTES: Bailed 2.0 gal. in 3.0 min.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/3/92	PN 1369 RISING		WEST LEWISTON LEVEE



**PIEZOMETER TEST FORM**



Location: West Lewiston Levee

Piezometer No: PN-1369

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 5.5   
water change 

WSE Before 11.33   
Test 

$H_0 = 11.33 - 5.5 = 5.83$   
 $H = 11.33 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

40.4 Top of  
Sediment

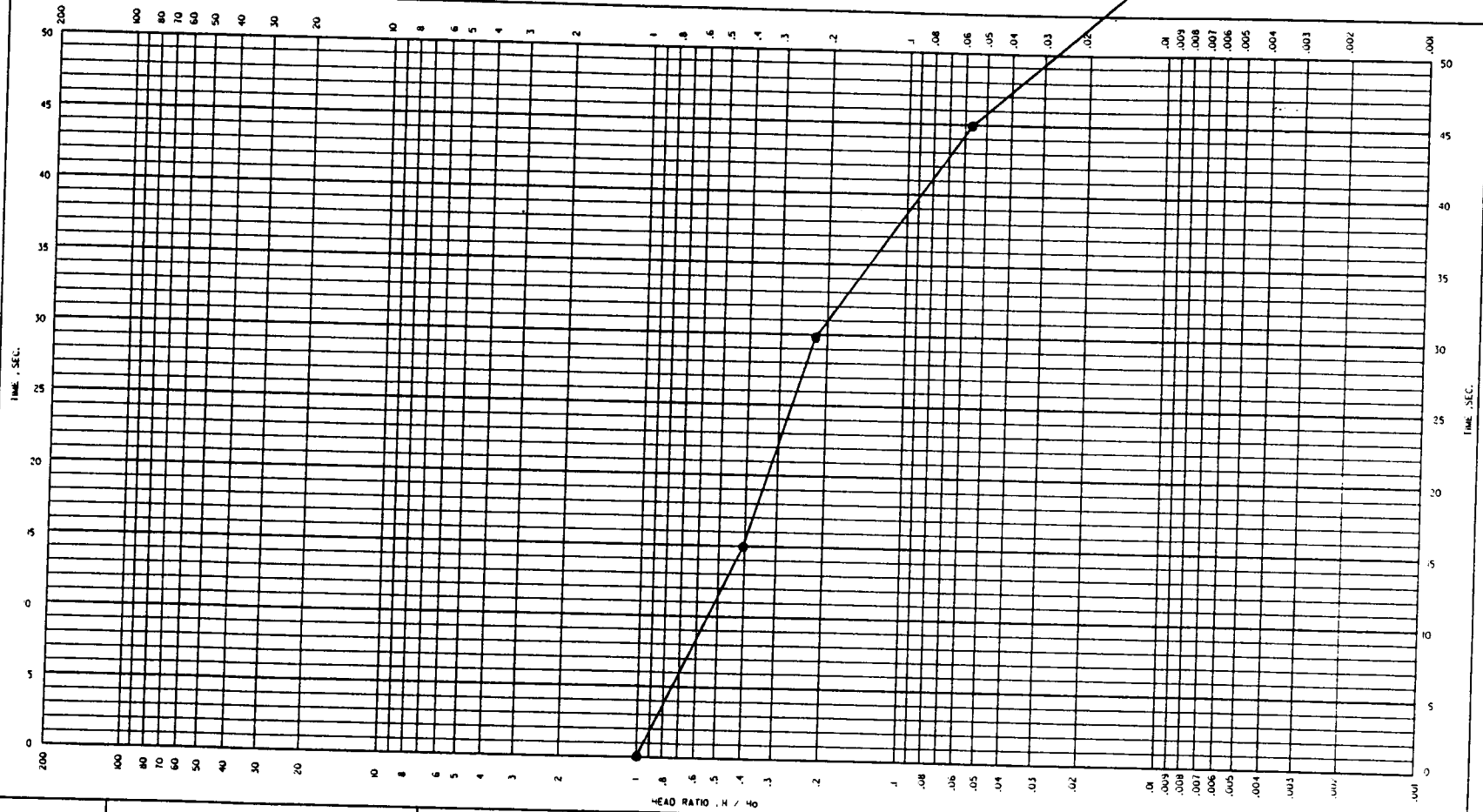
40.5 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/ H <sub>0</sub>
		Specified	Actual			
<u>1-31-92</u>	<u>1057</u>		0 min	<u>5.5</u>	<u>5.83</u>	<u>1.00</u>
	<u>1057:15</u>	30 min.	<u>0.25</u>	<u>9.0</u>	<u>2.33</u>	<u>.400</u>
	<u>1057:30</u>	1hr	<u>0.5</u>	<u>10.0</u>	<u>1.33</u>	<u>.228</u>
	<u>1057:45</u>	1hr 30min	<u>0.75</u>	<u>11.0</u>	<u>.73</u>	<u>.1057</u>
	<u>1058</u>	2hr	<u>1</u>	<u>11.3</u>	<u>.103</u>	<u>.1005</u>
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Added 5 gal → couldn't get it to increase the head by 10 ft → drained too fast.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
12/31/92	PN 1369 FALLING		WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewisba Levee

Piezometer No: PN-1370

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water change

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

15.74 WSE Before  
Drawdown

15.78 WSE After  
Drawdown

32.8 Top of  
Sediment

32.8 Piezometer  
Bottom

$H_0 = 15.78 - 15.74 = .04$   
 $H = reading - 15.74$

WSE=Water Surface Elevation (Feet)

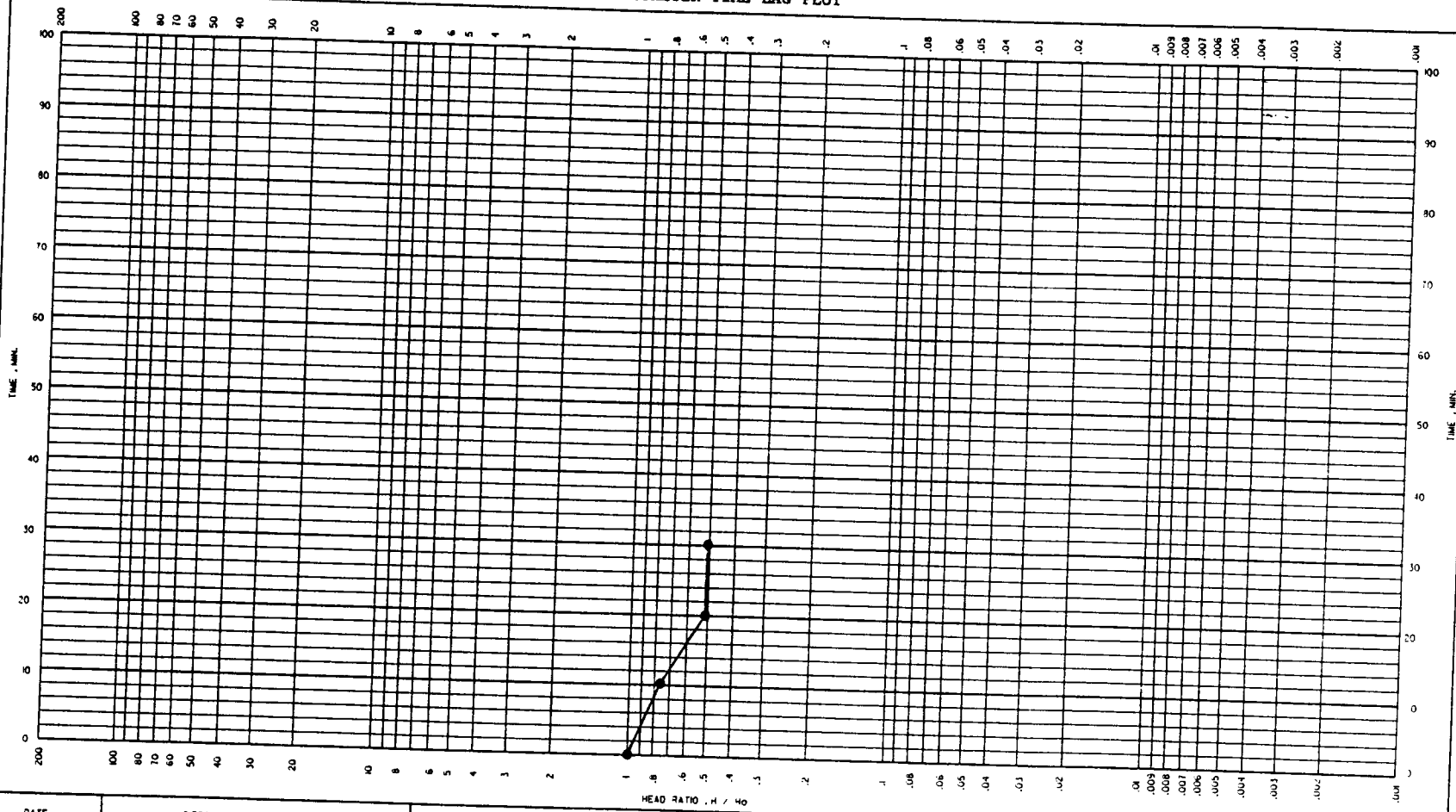
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/ H <sub>0</sub>
		Specified	Actual			
<u>1-31-92</u>	<u>0836</u>		0 (min.)	<u>15.78</u>	<u>.04</u>	<u>1.00</u>
"	<u>PVH 0836</u>	<u>0837</u>	<u>90 min.</u>	<u>15.77</u>	<u>.03</u>	<u>.75</u>
"	<u>0837</u>	<u>0838</u>	<u>1hr</u>	<u>15.76</u>	<u>.02</u>	<u>.50</u>
"	<u>0839</u>		<u>1hr 30min</u>	<u>15.76</u>	<u>.02</u>	<u>.50</u>
			2hr			
			2hr 30min			
			3hr			
			4hr			
			5hr			
			24hr			
			48hr			

NOTES:

Bailed 2 gal. in 6 min.

*Check  
PVH?  
why not more  
readings*

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/31/92	PN 1370 RISING		

**PIEZOMETER TEST FORM**

Location: West Lowiston Levee

Piezometer No: PN-1370

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After <sup>PVH</sup> 5.0  
water charge

WSE Before 15.78  
Test

$H_0 = 15.78 - 5.0 = 10.78$

$H = 15.78 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

32.8 Top of  
Sediment

32.8 Piezometer  
Bottom

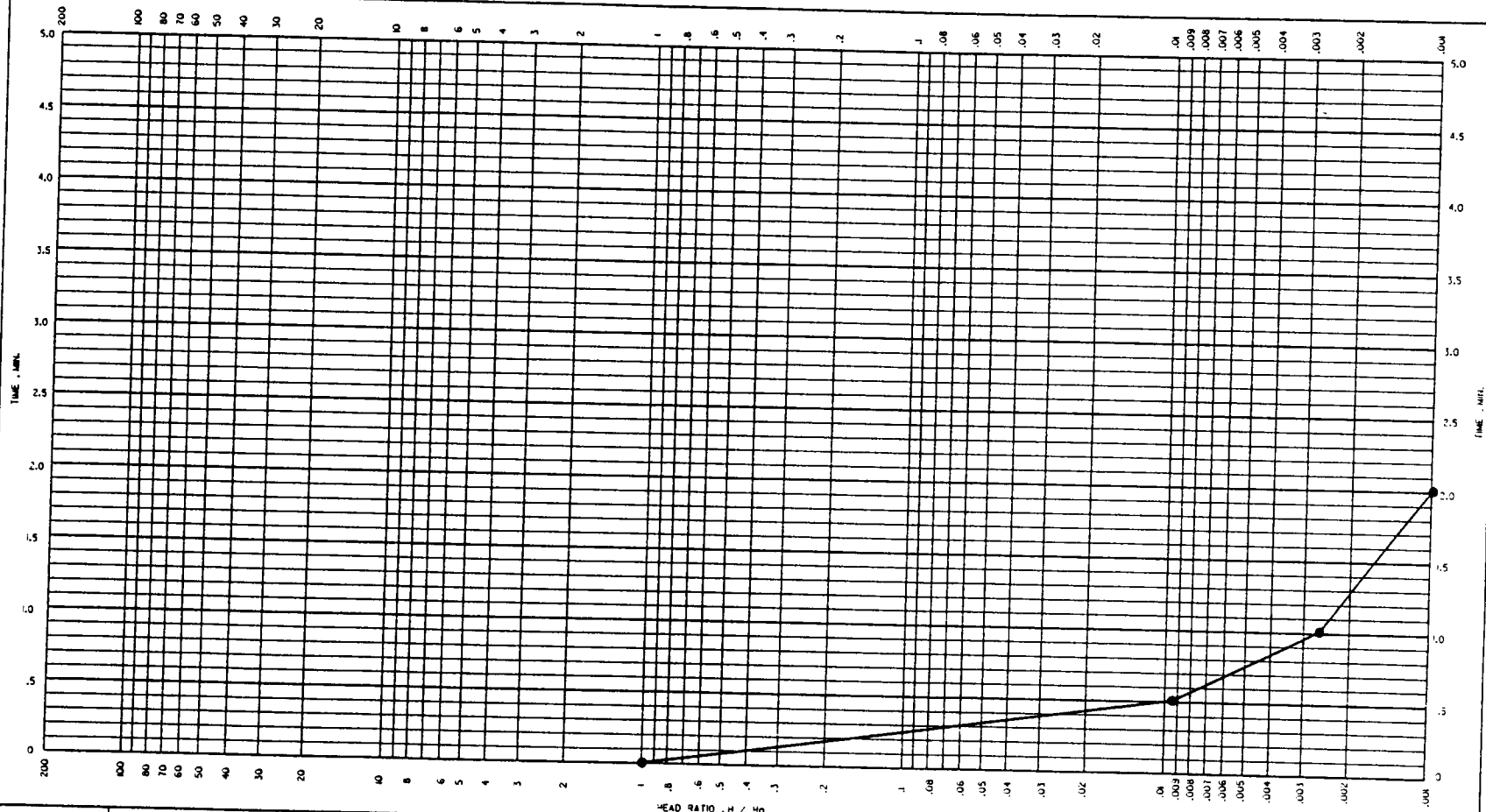
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-31-92</u>	<u>1026</u>	0	<u>min</u>	<sup>PVH</sup> <u>5.0</u>	<u>?/10.78</u>	<u>1.00</u>
"	<u>1026:30</u>	<del>30 min.</del>	<u>0.5</u>	<u>15.68</u>	<u>.10</u>	<u>.009</u>
"	<u>1027</u>	<u>1hr</u>	<u>1</u>	<u>15.75</u>	<u>.03</u>	<u>.0028</u>
"	<u>1027:30</u>	<del>1hr 30min</del>	<u>1.5</u>	<u>15.77</u>	<u>.101</u>	<u>.009</u>
"	<u>1028</u>	<del>2hr</del>	<u>2</u>	<u>15.78</u>	<u>0</u>	<u>-</u>
		<u>2hr 30min</u>				
		<u>3hr</u>				
		<u>4hr</u>				
		<u>5hr</u>				
		<u>24hr</u>				
		<u>48hr</u>				

NOTES: Added 2 gal water.

It was difficult to get a good first water level after adding the water - mostly due to water clinging to the sides of the casing and interfering with the water level indicator. It is possible that the water never reached 5.0 ft.

### PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/31/92	PN 1370 FALLING		WEST LEWISTON LEVEE



PIEZOMETER TEST FORM

Location: West Lewiston Levee

Piezometer No: PN-1371

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water change

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

1.29 WSE Before  
Drawdown

1.29 ~~1.2~~ <sup>PVH</sup> WSE After  
Drawdown

Top of Sediment  
Table: 9.3  
Piezometer Bottom  
Measured 9.5

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>1-28-92</u>	<u>0740</u>		0	<u>1.29</u>
_____	_____	30 min.	_____	_____
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES: Bailed 1 3/4 gal → no effect.

NO PLOT  
ONE POINT  
SEE NEXT PAGE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1371

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After 0.0  
water change

WSE Before  
Drawdown

WSE Before 2.30  
Test

WSE After  
Drawdown

$H_0 = 2.30 - 0 = 2.3$   
 $H = 2.30 - \text{reading}$

9.5 ← measured  
Top of  
Sediment  
9.3 ← tabulated value  
Piezometer  
Bottom

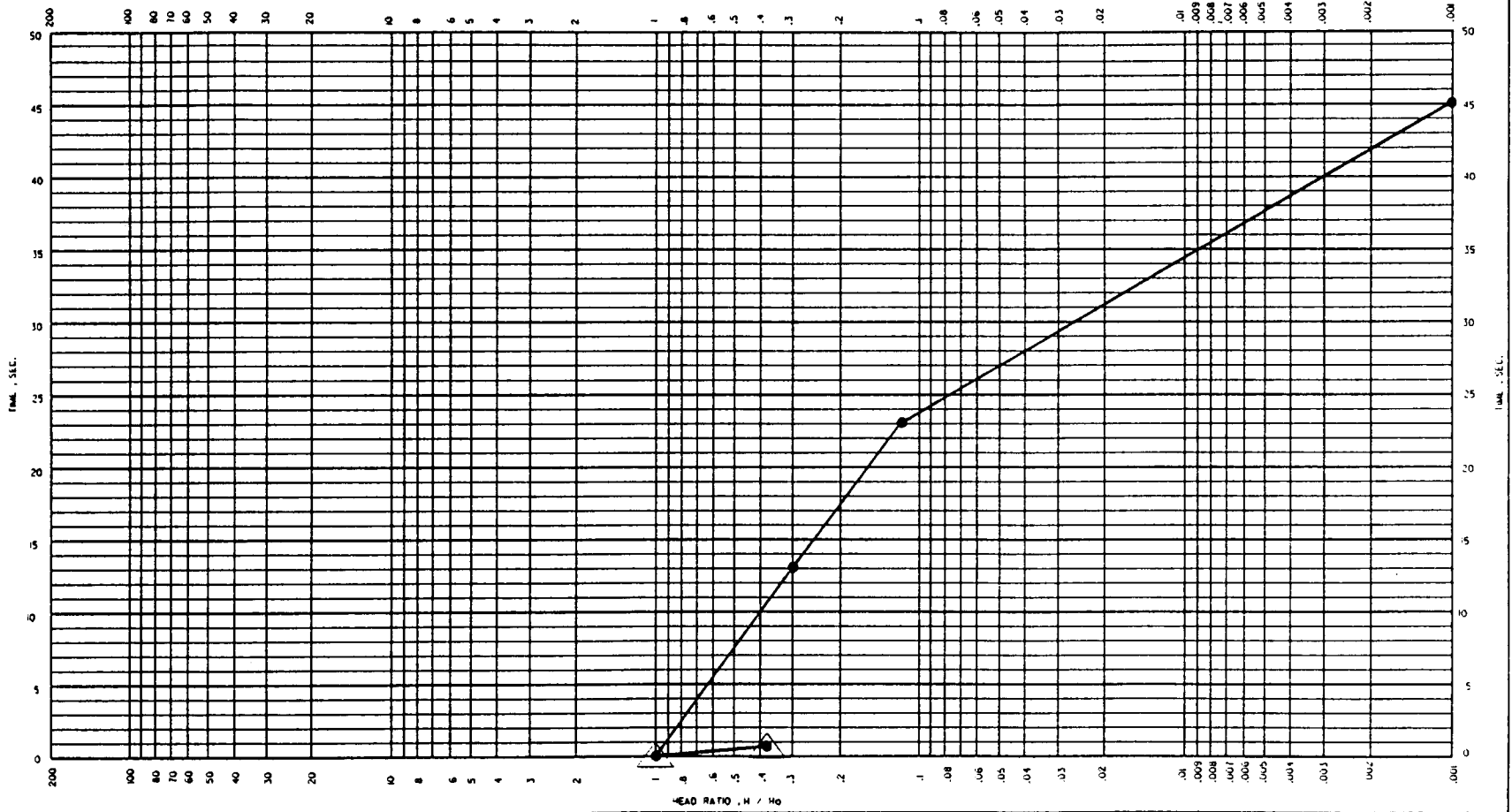
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)		
		Specified	Actual	H	H <sub>0</sub>	H <sub>1</sub>
<u>2-6-92</u>	<u>1347:15</u>		0	<u>0.0</u>	<u>2.3</u>	<u>1.0</u>
	<u>1347:28</u>	30 min.	<u>13</u> sec.	<u>1.6</u>	<u>.7</u>	<u>.30</u>
	<u>1347:38</u>	1hr	<u>23</u> sec.	<u>2.0</u>	<u>.3</u>	<u>.1</u>
	<u>1348</u>	1hr 30min	<u>45</u> sec.	<u>2.3</u>	<u>0</u>	<u>-</u>
		2hr				
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Added 5 gal. of water to get more of a head change than was achieved during rising head test.

BE V6  
PUTTED

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/6/92	PN 1371 FALLING			WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1479

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water change

WSE Before \_\_\_\_\_  
Test

$H_a = 7.08 - 6.97 = .11$

$H = \text{reading} - 6.97$

Rising Head Test  
Depth (ft)

6.97 WSE Before  
PWN Drawdown

7.08 WSE After  
Drawdown

23.5 Top of  
Sediment

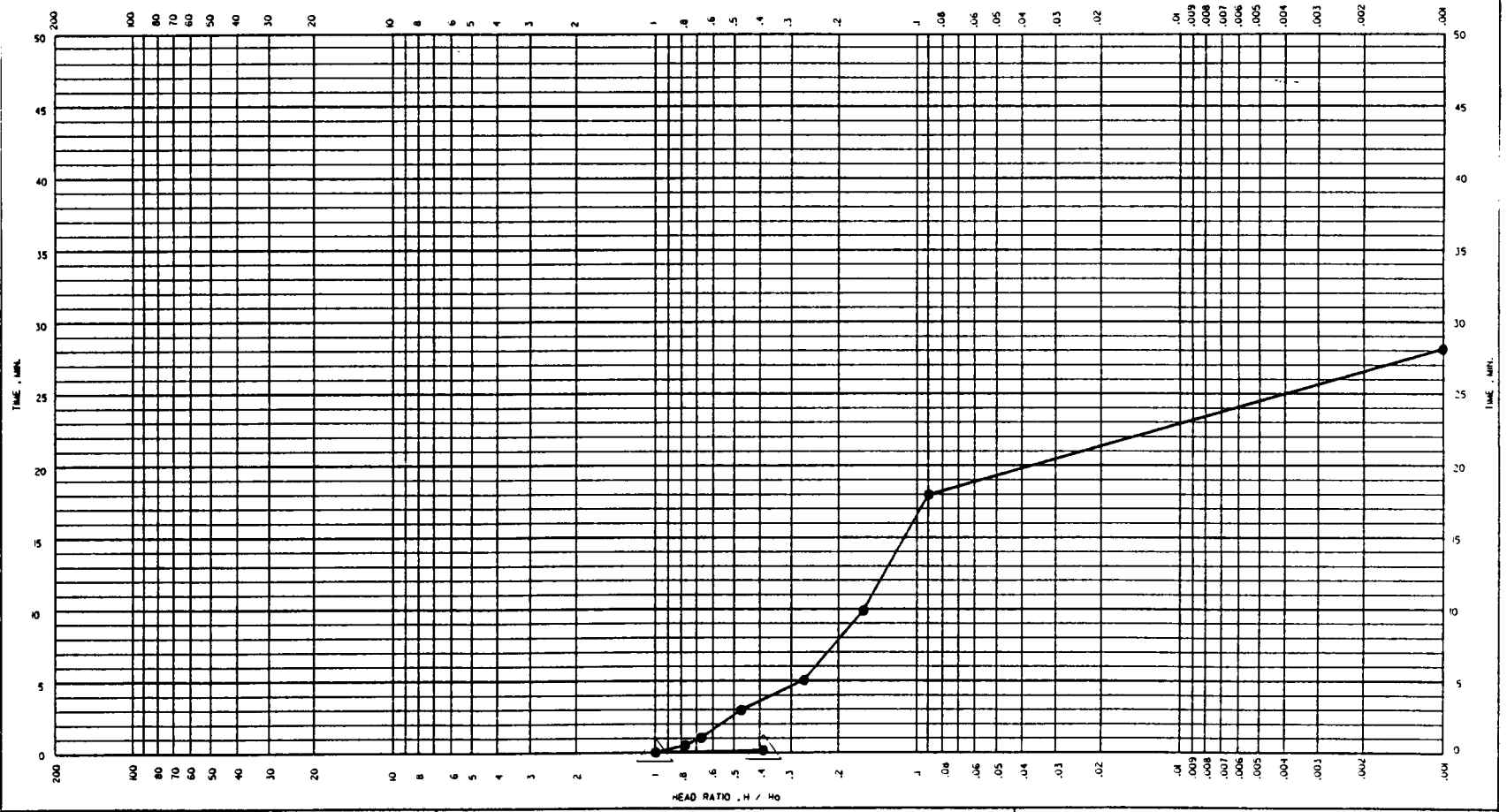
23.5 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/L
		Specified	Actual			
<u>1-30-92</u>	<u>8:40</u>		0	<u>7.08</u>	<u>.11</u>	<u>1.00</u>
<u>"</u>	<u>8:40.5</u>	<u>30 min.</u>	<u>30 sec</u>	<u>7.05</u>	<u>.08</u>	<u>.727</u>
<u>"</u>	<u>8:41</u>	<u>1hr</u>	<u>1 Min</u>	<u>7.04</u>	<u>.07</u>	<u>.66</u>
<u>"</u>	<u>8:43</u>	<u>1hr 30min</u>	<u>3 Min</u>	<u>7.02</u>	<u>.05</u>	<u>.455</u>
<u>"</u>	<u>8:45</u>	<u>2hr</u>	<u>5 Min</u>	<u>7.00</u>	<u>.03</u>	<u>.23</u>
<u>"</u>	<u>8:50</u>	<u>2hr 30min</u>	<u>10 Min</u>	<u>6.99</u>	<u>.02</u>	<u>.172</u>
<u>"</u>	<u>8:58</u>	<u>3hr</u>	<u>18 Min</u>	<u>6.98</u>	<u>.01</u>	<u>.091</u>
<u>"</u>	<u>9:08</u>	<u>4hr</u>	<u>28 Min</u>	<u>6.97</u>	<u>0</u>	<u>-</u>
		<u>5hr</u>				
		<u>24hr</u>				
		<u>48hr</u>				

NOTES: Bailed 2 gal in 2.5 min.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
11/30/92	PH 1419 RISING	 TIME LAG THEORY	

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1479

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 5.0  
water change

WSE Before 7.00  
Test

$H_0 = 7.00 - 5.0 = 2.0$   
 $H = 2.00 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

23.5 Top of  
Sediment

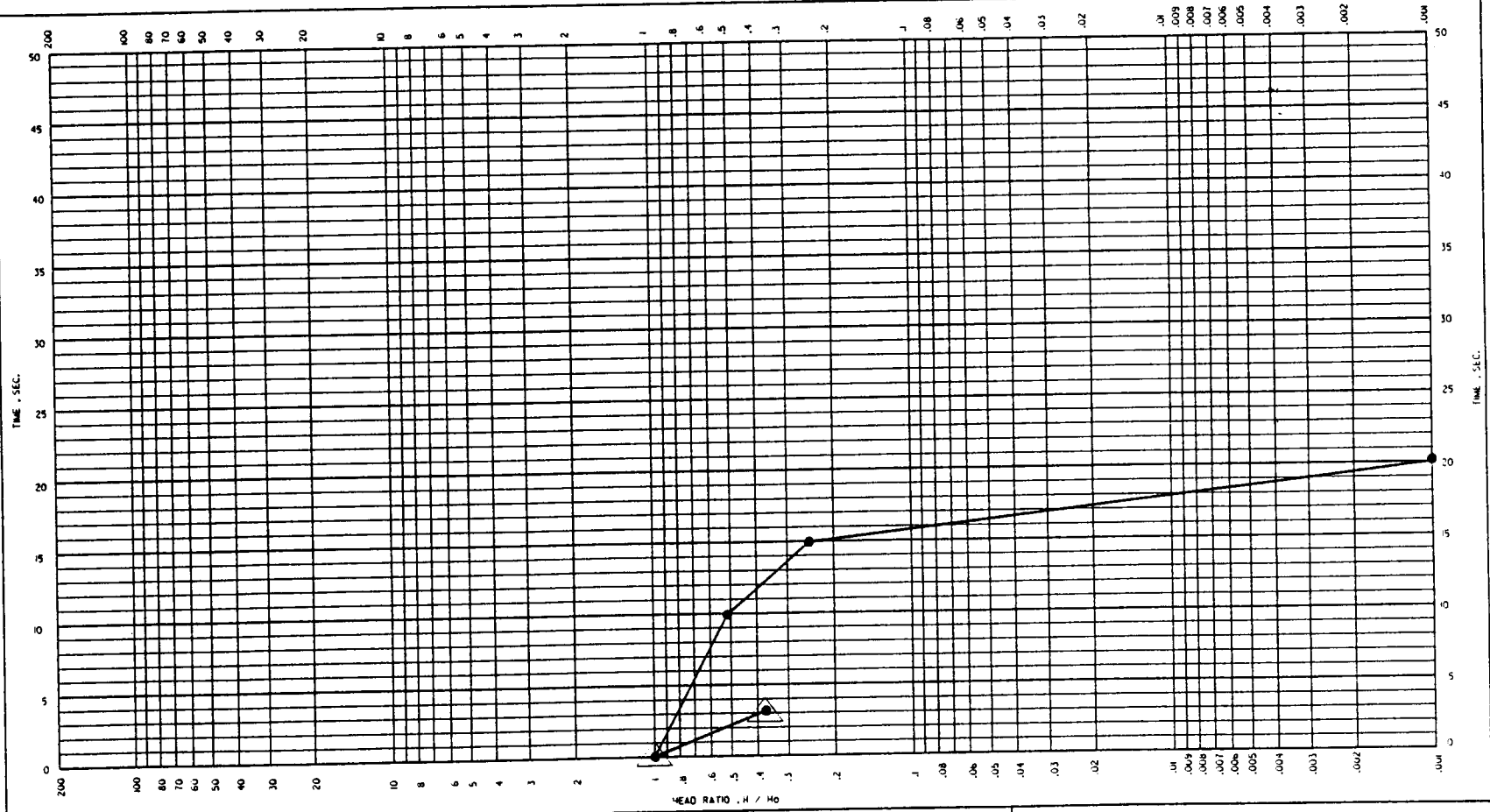
23.5 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	1/H
		Specified	Actual			
<u>2-6-92</u> ↓	<u>0815</u>		0	<u>5.0</u>	<u>2.0</u>	<u>1/2</u>
	<u>0815:10</u>	<del>30 min.</del>	<u>10 sec.</u>	<u>6.0</u>	<u>1.0</u>	<u>0.50</u>
	<u>0815:15</u>	<del>1 hr</del>	<u>15 sec.</u>	<u>6.5</u>	<u>.5</u>	<u>1/25</u>
	<u>0815:20</u>	<del>1 hr 30 min</del>	<u>20 sec.</u>	<u>7.0</u>	<u>0</u>	<u>—</u>
	_____	2hr	_____	_____	_____	_____
	_____	2hr 30min	_____	_____	_____	_____
	_____	3hr	_____	_____	_____	_____
	_____	4hr	_____	_____	_____	_____
	_____	5hr	_____	_____	_____	_____
	_____	24hr	_____	_____	_____	_____
_____	48hr	_____	_____	_____	_____	

NOTES: Added 3 gal.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/6/92	PN 4499 FALLING 1839	TIME LAG THEORY	

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1490

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After \_\_\_\_\_  
water charge

3.7 WSE Before  
Drawdown

WSE Before \_\_\_\_\_  
Test

3.8 WSE After  
Drawdown

21.7 Top of  
Sediment

21.8 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>1-29-92</u>	<u>09:06</u>		0	<u>3.8</u>
<u>"</u>	<u>09:07</u>	<u>30 min.</u>	<u>1.0 min</u>	<u>3.7</u>
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES: Purged 2.0 gallons of water by bailing for 2.75 minutes

NO PLOT



**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1490

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 0.6  
water charge

WSE Before 3.88  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

$$H_0 = 3.88 - 0.6 = 3.28$$

$$H = 3.88 - \text{reading}$$

21.7 Top of  
Sediment

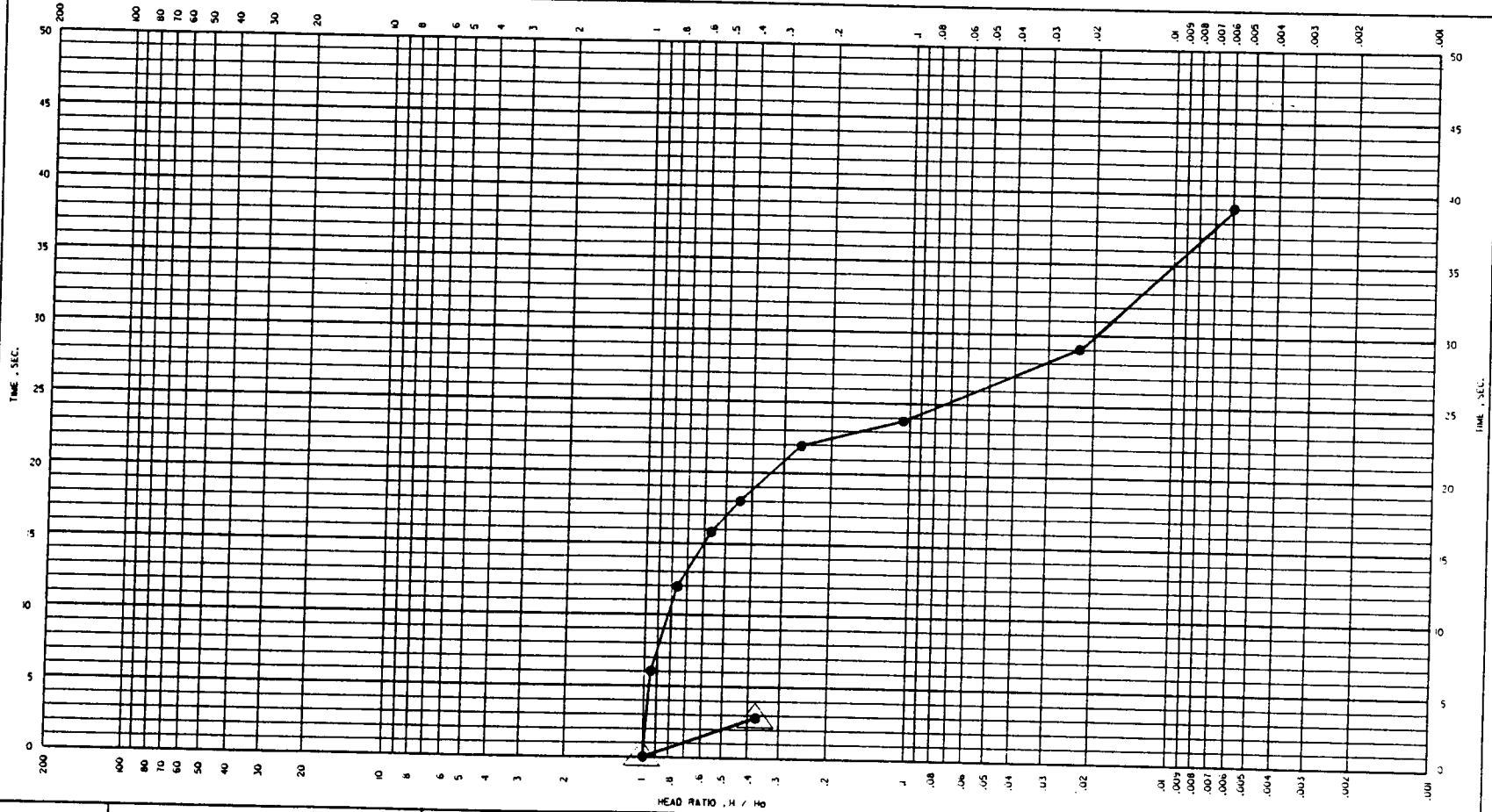
21.8 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>2-6-92</u>	<u>1326:06</u>	0	<u>0 seconds</u>	<u>0.6</u>	<u>3.28</u>	<u>1.00</u>
	<u>1326:12</u>	30 min.	<u>6 sec.</u>	<u>0.8</u>	<u>3.08</u>	<u>.939</u>
	<u>1326:18</u>	1hr	<u>12 sec.</u>	<u>1.5</u>	<u>2.38</u>	<u>.726</u>
	<u>1326:22</u>	1hr 30min	<u>16 sec.</u>	<u>2.0</u>	<u>1.88</u>	<u>.573</u>
	<u>1326:24</u>	2hr	<u>18 sec.</u>	<u>2.5</u>	<u>1.38</u>	<u>.421</u>
	<u>1326:28</u>	2hr 30min	<u>22 sec.</u>	<u>3.0</u>	<u>.88</u>	<u>.269</u>
	<u>1326:30</u>	3hr	<u>24 sec.</u>	<u>3.5</u>	<u>.38</u>	<u>.116</u>
	<u>1326:35</u>	4hr	<u>29 sec.</u>	<u>3.8</u>	<u>.08</u>	<u>.024</u>
	<u>1326:45</u>	5hr	<u>39 sec.</u>	<u>3.86</u>	<u>.02</u>	<u>.006</u>
		24hr				
		48hr				

NOTES: Added 4 gal. of water in attempt to cause greater head change than that achieved during rising head test.

### PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/6/92	PN 1490 FALLING	TIME LAG THEORY	WEST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: West Lewiston Levee

Piezometer No: PN-1492

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 15.3  
water charge

WSE Before 15.32  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

21.3 Top of  
Sediment

21.4 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>2-6-92</u>	<u>1407</u>		<u>0</u>	<u>15.3</u>
_____	_____	30 min.	_____	_____
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES: Added 4 gal. of water — got no appreciable change in head. (About 10 sec. elapsed from the end of filling the well and the first water level measurement.)

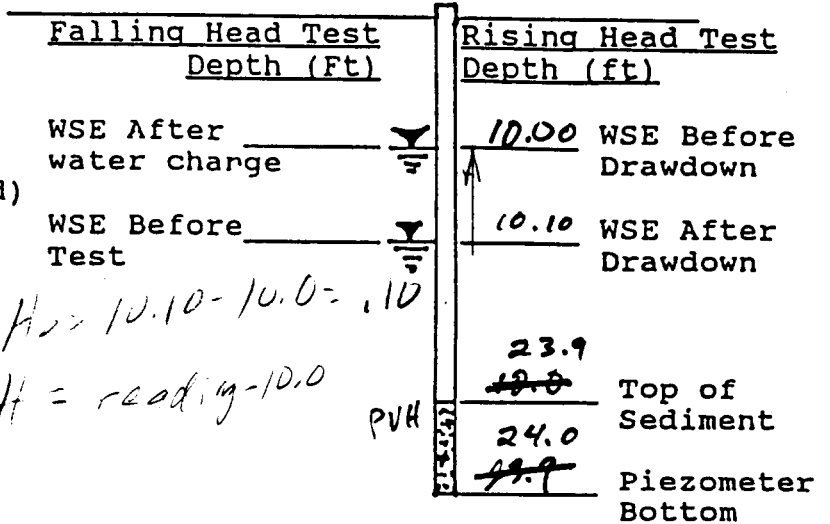
NO PLOT

**PIEZOMETER TEST FORM**

Location: West Livestock Lane

Piezometer No: PN-1493

Type of Test: Rising  
(Falling Head or Rising Head)

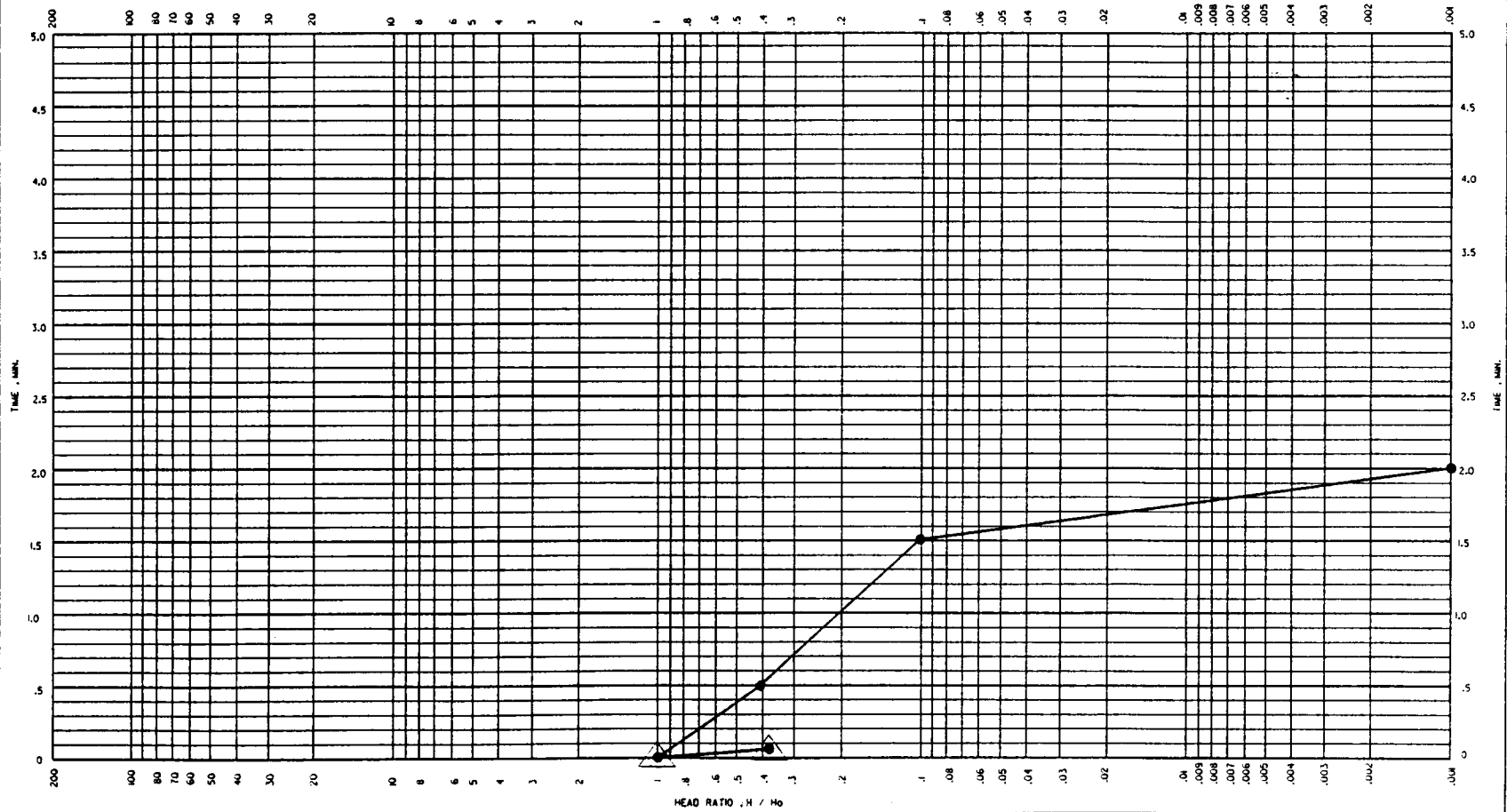



WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H' H'
		Specified	Actual			
<u>1-30-92</u>	<u>8:19</u>		0	<u>10.10</u>	<u>.10</u>	<u>.10</u>
	<u>8:19:30</u>	<u>30 min</u>	<u>0.5 min</u>	<u>10.04</u>	<u>.04</u>	<u>.40</u>
	<u>8:20:30</u>	<u>1hr</u>	<u>1.5</u>	<u>10.01</u>	<u>.01</u>	<u>.10</u>
	<u>8:21</u>	<u>1hr 30min</u>	<u>2</u>	<u>10.00</u>	<u>0</u>	<u>-</u>
		2hr				
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Purged 1 gallon of water By Bailing for 2 Minutes

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/30/92	PN 1493 RISING	 TIME LAG THEORY	

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1493

Type of Test: Falling  
(Falling Head or Rising Head)

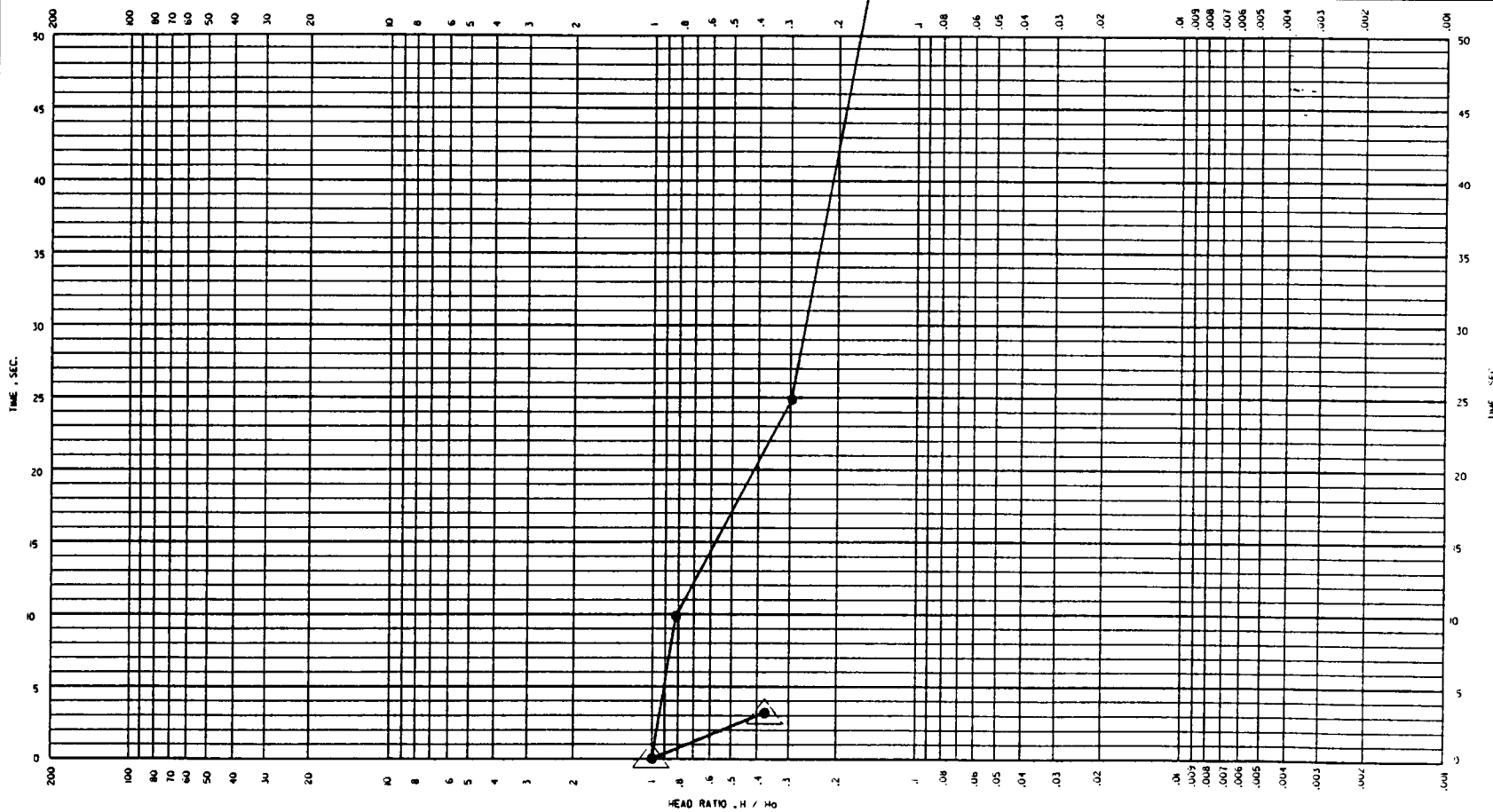
Falling Head Test		Rising Head Test	
Depth (Ft)		Depth (ft)	
WSE After water change	<u>8.1</u>	WSE Before Drawdown	
WSE Before Test	<u>10.1</u>	WSE After Drawdown	
$H_0 = 10.1 - 8.1 = 2.0$			
		<u>23.9</u>	Top of Sediment
		<u>24.0</u>	Piezometer Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/ H <sub>0</sub>
		Specified	Actual			
<u>2-6-92</u>	<u>0820:46</u>		0	<u>8.1</u>	<u>2.0</u>	<u>1.00</u>
"	<u>0826:50</u>	<u>30 min.</u>	<u>10 sec.</u>	<u>8.5</u>	<u>1.6</u>	<u>.80</u>
"	<u>0821:05</u>	<u>3hr</u>	<u>25 sec.</u>	<u>9.5</u>	<u>1.6</u>	<u>.80</u>
"	<u>0821:50</u>	<u>1hr 30min</u>	<u>1 min. 10 sec.</u>	<u>9.9</u>	<u>1.2</u>	<u>.10</u>
"	<u>822:20</u>	<u>2hr</u>	<u>1 min. 30 sec.</u>	<u>10.0</u>	<u>1.1</u>	<u>1.0</u>
		<u>2hr 30min</u>				
		<u>3hr</u>				
		<u>4hr</u>				
		<u>5hr</u>				
		<u>24hr</u>				
		<u>48hr</u>				

NOTES: Added 5 gal.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/30/92	PN 1493 FALLING	TIME LAG THEORY	WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1494

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water change

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

10.7 WSE Before  
Drawdown

10.8 WSE After  
Drawdown

23.7 Top of  
Sediment

23.7 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>1-30-92</u>	<u>7:58</u>		0	<u>10.8</u>
<u>11</u>	<u>7:59</u>	30 min.	<u>1.0 min.</u>	<u>10.7</u>
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES:

Bailed 1.5 gal. in 3.0 min.

NO PLOT



PIEZOMETER TEST FORM

Location: West Lewiston Levee

Piezometer No: PN-1494

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 9.5  
water charge

WSE Before 10.7  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

23.7 Top of  
Sediment

23.7 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>2.6.92</u>	<u>0937</u>	0	0	<u>9.5</u>
<u>"</u>	<u>0937:15</u>	30 min.	<u>15 sec.</u>	<u>10.7</u>
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES: Added 4 gal.

NO PLOT

PIEZOMETER TEST FORM

Location: West Lewiston Levee

Piezometer No: PN- 1495

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water charge

WSE Before \_\_\_\_\_  
Test

$$H_0 = 26.50 - 26.37 = .13$$

$$H = \text{reading} - 26.37$$

Rising Head Test  
Depth (ft)

26.37 WSE Before  
Drawdown

26.50 WSE After  
Drawdown

41.9 Top of  
Sediment

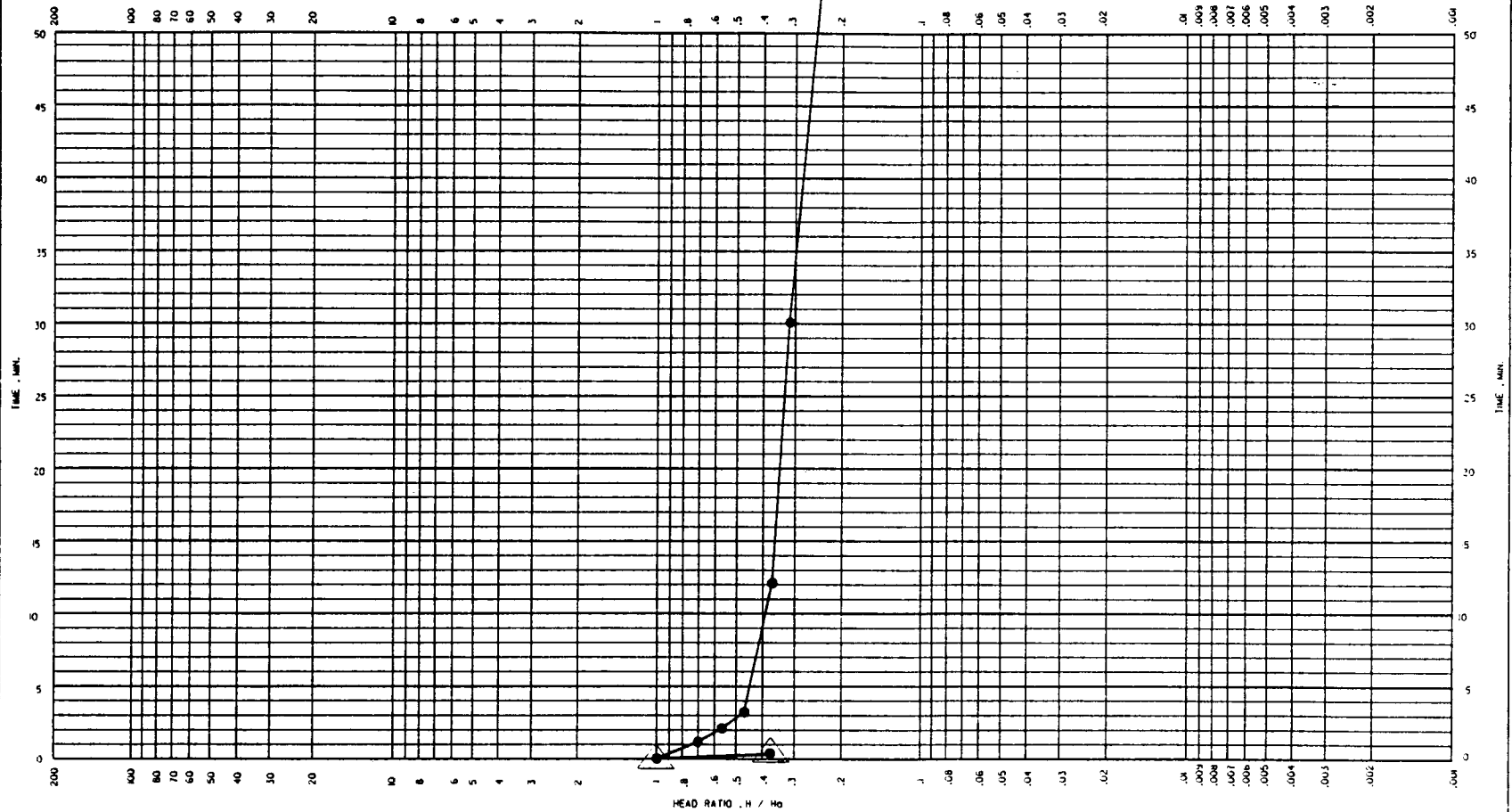
41.9 Piezometer  
Bottom


WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-30-92</u>	<u>0934</u>		0	<u>26.50</u>	<u>.13</u>	<u>1.00</u>
"	<u>0935</u>	<del>30 min</del>	<u>1 min.</u>	<u>26.46</u>	<u>.109</u>	<u>.692</u>
"	<u>0936</u>	<del>1hr</del>	<u>2 min.</u>	<u>26.44</u>	<u>.107</u>	<u>.59</u>
"	<u>0937</u>	<del>1hr 30min</del>	<u>3 min.</u>	<u>26.43</u>	<u>.106</u>	<u>.462</u>
"	<u>0946</u>	<del>2hr</del>	<u>12 min.</u>	<u>26.42</u>	<u>.105</u>	<u>.309</u>
"	<u>10:04</u>	<del>0.5 hr</del> <del>2hr 30min</del>	<u>30 min.</u>	<u>26.41</u>	<u>.104</u>	<u>.308</u>
"	<u>10:34</u>	<del>1 hr</del> <del>3hr</del>	<u>60 min.</u>	<u>26.40</u>	<u>.103</u>	<u>.231</u>
"	<u>11:04</u>	<del>1.5 hr</del> <del>4hr</del>	<u>90 min.</u>	<u>26.40</u>	<u>.103</u>	<u>.21</u>
"	<u>11:34</u>	<del>2 hr</del>	<u>120 min.</u>	<u>26.39</u>	<u>.102</u>	<u>.157</u>
"	<u>12:04</u>	<del>5hr</del> <del>2.5hr</del>	<u>150 min.</u>	<u>26.39</u>		
"	<u>12:34</u>	<del>3 hr.</del>	<u>180 min.</u>	<u>26.39</u>		
"	<u>13:34</u>	<del>4hr</del> <del>4hr</del>	<u>240 min.</u>	<u>26.39</u>		
"	<u>14:34</u>	<del>5 hr.</del>	<u>300 min.</u>	<u>26.39</u>		
<u>1-31-92</u>	<u>09:56</u>	<del>4hr</del> <del>24 hr.</del>	<u>1462 min.</u>	<u>26.41</u>		

NOTES: Bailed 2 gal. in 3.5 min.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
1/6/92	PH 1495 RISING			WEST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: West Lewiston Levee

Piezometer No: PN-1495

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After water change 23.0

WSE Before Test 26.4

Rising Head Test  
Depth (ft)

WSE Before Drawdown

WSE After Drawdown

41.9 Top of Sediment

41.9 Piezometer Bottom

$H_0 = 26.4 - 23.0 = 3.4$

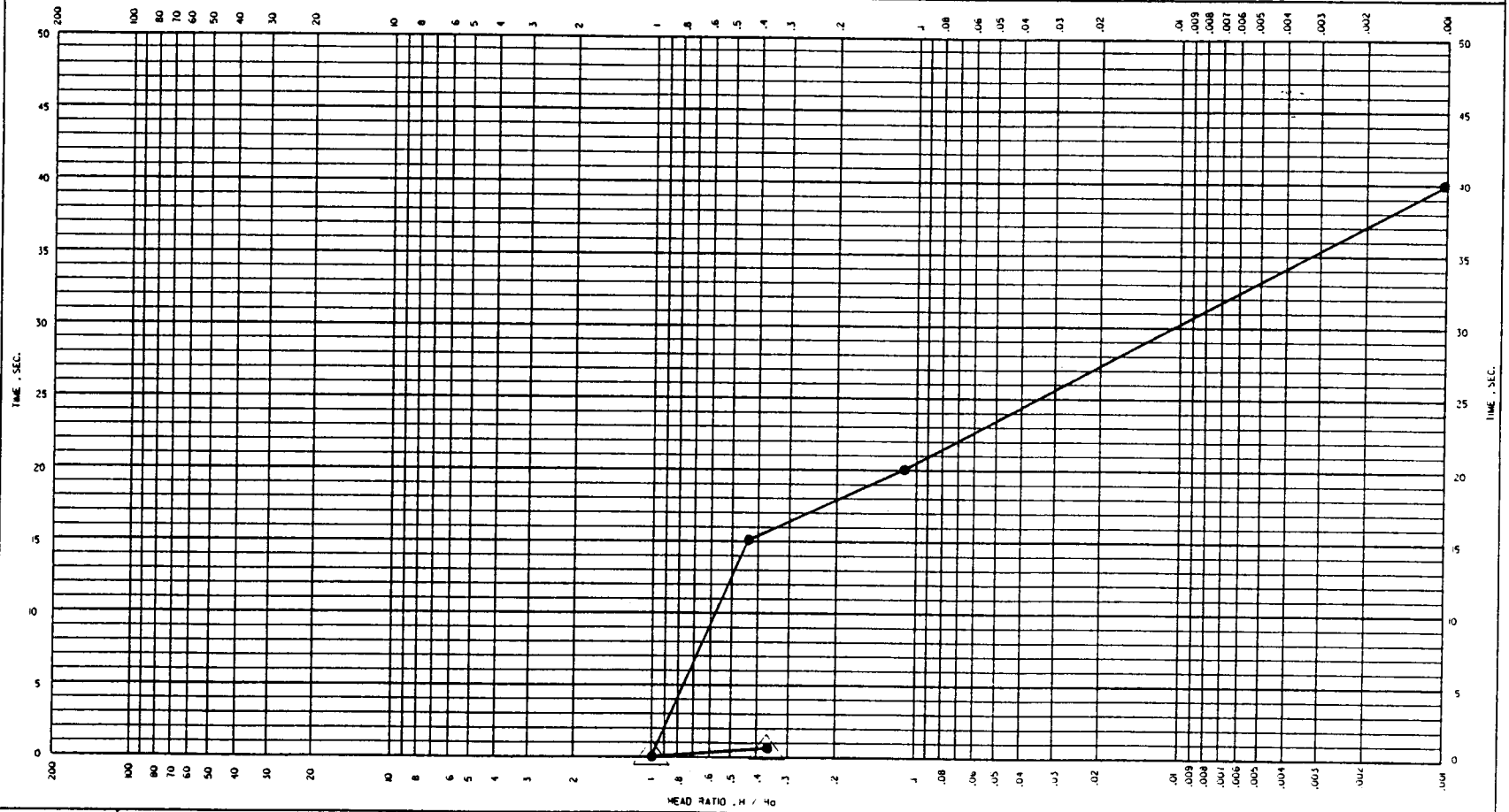
$H = 26.4 - \text{reading}$


WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	h/l
		Specified	Actual			
<u>2-6-92</u>	<u>0949:10</u>		0	<u>23.0</u>	<u>3.4</u>	<u>1.00</u>
"	<u>0949:25</u>	30 min.	<u>15 sec.</u>	<u>25.0</u>	<u>1.4</u>	<u>.412</u>
"	<u>0949:30</u>	1hr	<u>20 sec.</u>	<u>26.0</u>	<u>.4</u>	<u>.13</u>
"	<u>0949:50</u>	1hr 30min	<u>40 sec.</u>	<u>26.4</u>	<u>0</u>	<u>—</u>
_____	_____	2hr	_____	_____	_____	_____
_____	_____	2hr 30min	_____	_____	_____	_____
_____	_____	3hr	_____	_____	_____	_____
_____	_____	4hr	_____	_____	_____	_____
_____	_____	5hr	_____	_____	_____	_____
_____	_____	24hr	_____	_____	_____	_____
_____	_____	48hr	_____	_____	_____	_____

NOTES: Added 4 gal.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/6/92	PN 1495 FALLING	 TIME LAG THEORY	WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1496

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 19.4  
water charge

WSE Before 26.88  
Test

$$H_0 = 26.88 - 12.4 = 14.48$$

$$H_i = 26.88 \text{ reading}$$

Rising Head Test  
Depth (ft)

pvh

~~46.46~~ WSE Before Drawdown

WSE After Drawdown

34.7 Measured Top of Sediment

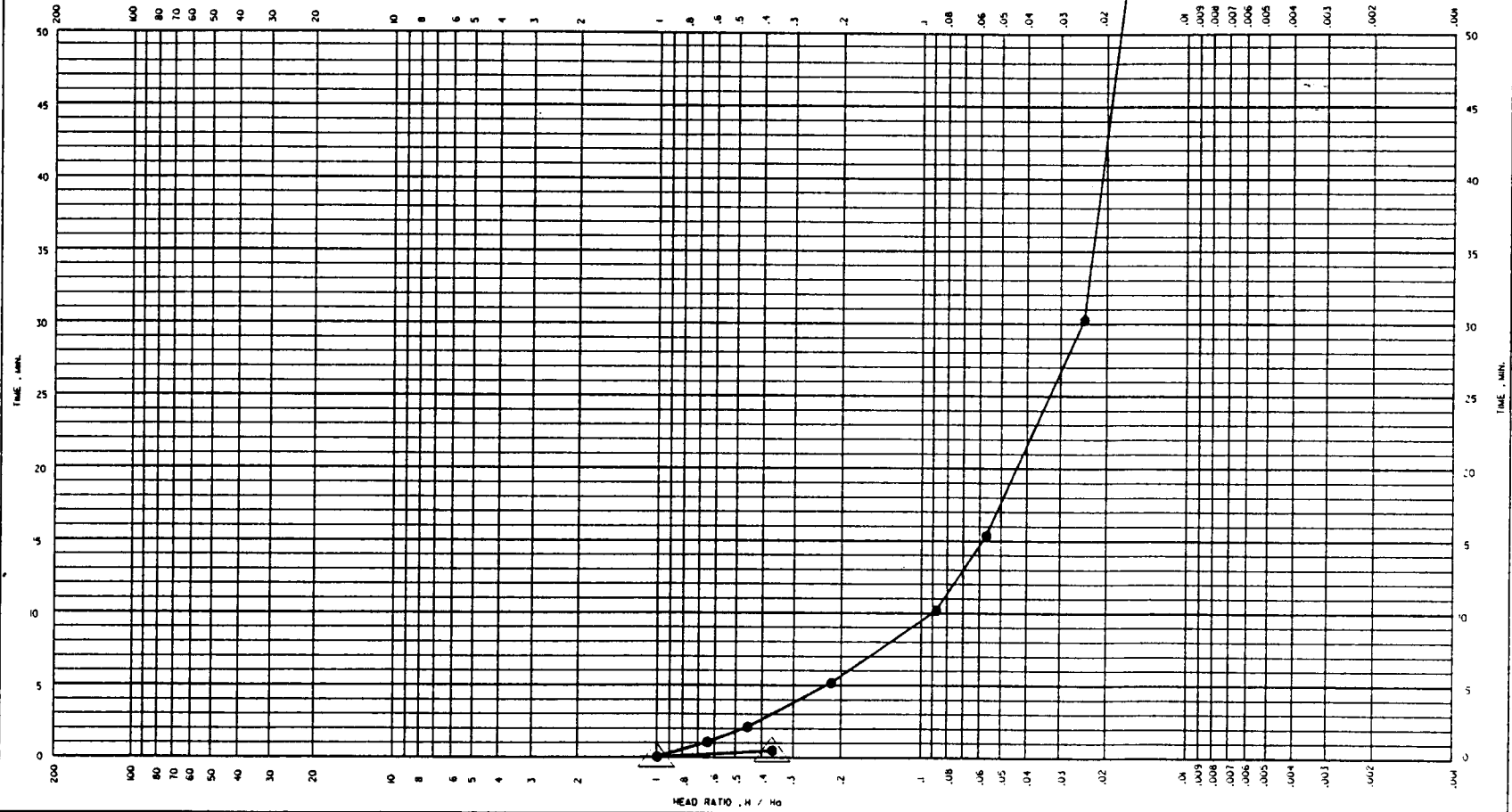
34.6 Piezometer Bottom  
Tables


WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time	t		Water Table Depth (Feet)	#	#/11
			Specified	Actual			
<u>1-30-92</u>	<u>9:57</u>			<u>min.</u>	<u>12.4</u>	<u>14.48</u>	<u>1.00</u>
<u>"</u>	<u>9:58</u>			<u>1.0 min</u>	<u>18.1</u>	<u>8.78</u>	<u>1.62</u>
<u>"</u>	<u>9:59</u>	<u>30 min.</u>		<u>2.0</u>	<u>20.5</u>	<u>6.38</u>	<u>1.44</u>
<u>"</u>	<u>10:02</u>			<u>5.0</u>	<u>23.9</u>	<u>2.98</u>	<u>2.26</u>
<u>"</u>	<u>10:07</u>	<u>2hr</u>		<u>10 min</u>	<u>25.7</u>	<u>1.18</u>	<u>1.05</u>
<u>"</u>	<u>10:12</u>			<u>15 min</u>	<u>26.1</u>	<u>.78</u>	<u>.054</u>
<u>"</u>	<u>10:27</u>	<u>1hr 30min</u>		<u>30 min</u>	<u>26.56</u>	<u>.32</u>	<u>.022</u>
<u>"</u>	<u>10:57</u>	<u>1hr</u>		<u>60</u>	<u>26.62</u>	<u>.26</u>	<u>.018</u>
<u>"</u>	<u>11:27</u>	<u>2hr 1.5hr</u>		<u>90</u>	<u>26.65</u>	<u>.23</u>	<u>.016</u>
<u>"</u>	<u>11:57</u>	<u>2 hr</u>		<u>120</u>	<u>26.64</u>	<u>.24</u>	<u>.0</u>
<u>"</u>	<u>12:27</u>	<u>2hr 30min</u>		<u>150</u>	<u>26.64</u>		
<u>"</u>	<u>12:57</u>	<u>3hr</u>		<u>180</u>	<u>26.63</u>		<u>← began rising</u>
<u>"</u>	<u>13:57</u>	<u>4hr</u>		<u>240</u>	<u>26.63</u>		
<u>"</u>	<u>14:57</u>	<u>5hr</u>		<u>300</u>	<u>26.62</u>		
<u>1-31-92</u>	<u>9:57</u>	<u>24hr</u>		<u>1440</u>	<u>26.59</u>		
<u>2-3-92</u>	<u>16:14</u>	<u>48hr</u>		<u>6137</u>	<u>26.56</u>		

NOTES: Added 2.0 gallons water

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/30/ 32	PN 1496 FALLING	 TIME LAG THEORY	WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lawiston Levee

Piezometer No: PN-1497

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After <sup>PVH</sup> 14.0  
water change

WSE Before 24.9  
Test

$$H_0 = 24.9 - 14.0 = 10.9$$

$$H = 24.9 - \text{reading}$$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

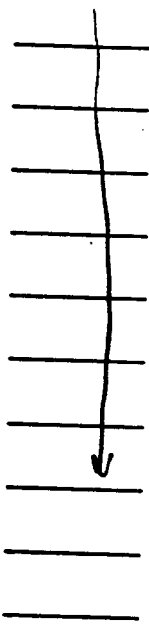
WSE After  
Drawdown

Top of  
Sediment

33.3 Table  
Piezometer  
Bottom

33.4 - Measured

WSE=Water Surface Elevation (Feet)

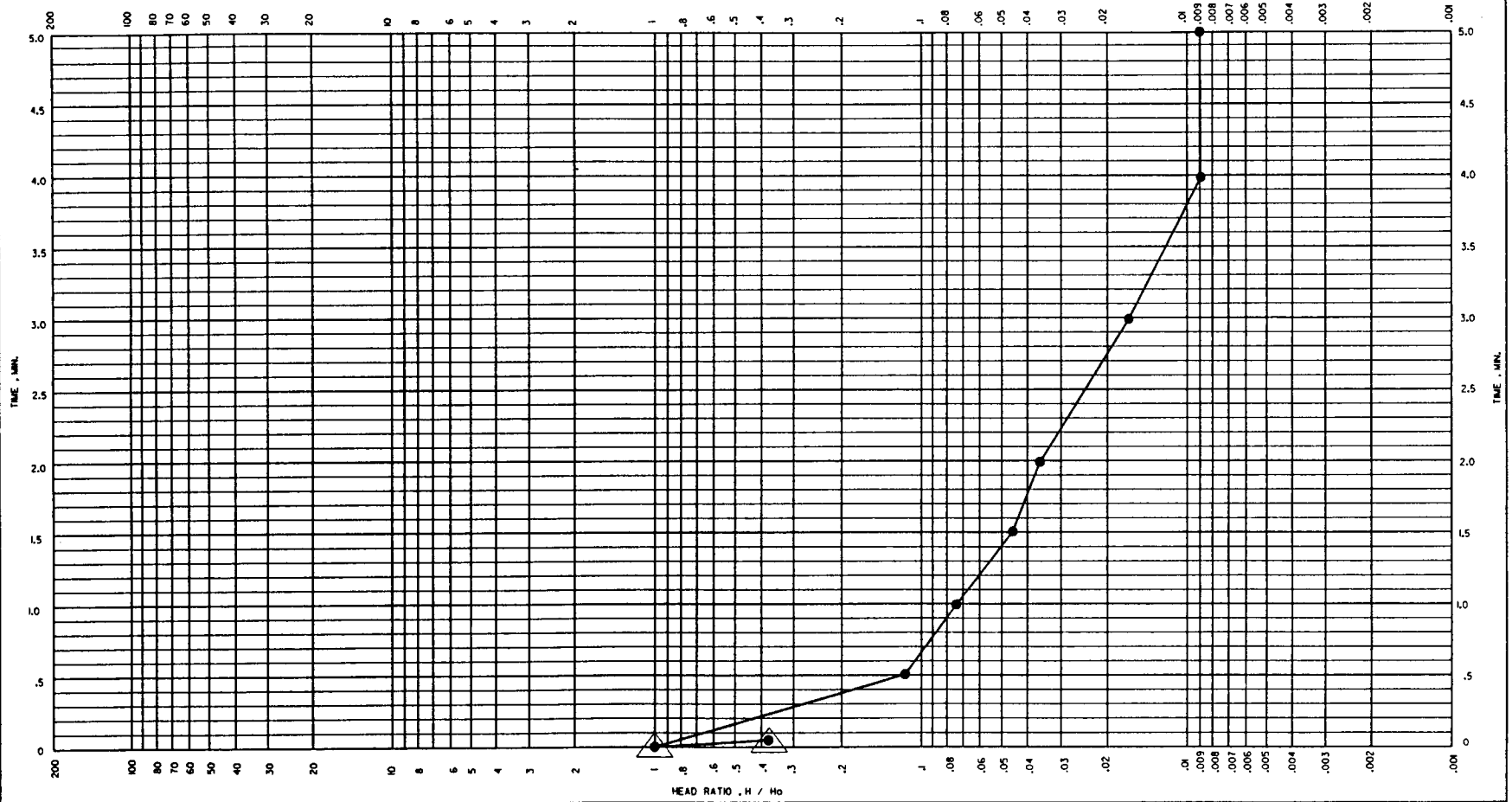
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H <sub>1</sub>	H <sub>2</sub>
		Specified	Actual				
<u>1-29-92</u> 	<u>0852</u>	0	min.	<sup>PVH</sup> <u>14.0</u>	10.9	1.0	0
	<u>0852:30</u>	<del>30 min.</del>	<u>0.5</u>	<u>23.5</u>	1.4	1.28	
	<u>0853</u>	<del>1hr</del>	<u>1</u>	<u>24.1</u>	0.80	0.3	
	<u>0853:30</u>	<del>1hr 30min</del>	<u>1.5</u>	<u>24.4</u>	0.50	0.46	
	<u>0854</u>	<del>2hr</del>	<u>2</u>	<u>24.5</u>	0.40	0.7	
	<u>0855</u>	<del>2hr 30min</del>	<u>3</u>	<u>24.7</u>	.20	0.19	
	<u>0856</u>	<del>3hr</del>	<u>4</u>	<u>24.8</u>	.10	0.09	
	<u>0857</u>	<del>4hr</del>	<u>5</u>	<u>24.8</u>	.10	0.9	
	<u>0900</u>	<del>5hr</del>	<u>8</u>	<u>24.9</u>	0	recovered	
			<del>24hr</del>				
			<del>48hr</del>				

NOTES:

Added 3 gal.



PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
1/29/92	PN 1497 FALLING			WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1516

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After \_\_\_\_\_  
water charge

WSE Before \_\_\_\_\_  
Test

5.64

WSE Before  
Drawdown

5.68

WSE After  
Drawdown

$H = 5.68 - 5.64 = .04$   
 $H_s = \text{read of } 5.64$

63.6

Top of  
Sediment

63.6

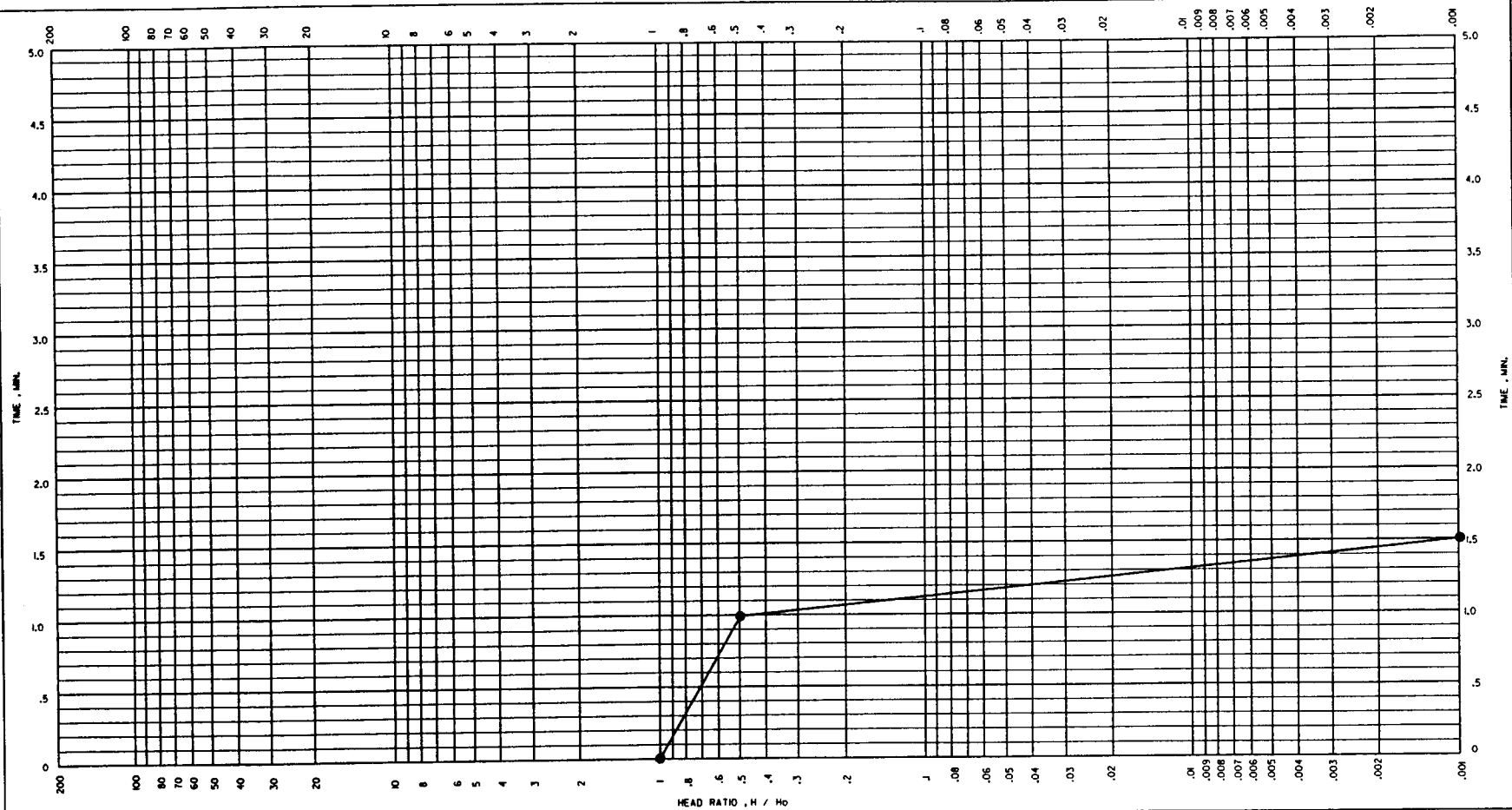
Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	dy/dt
		Specified	Actual			
2-4-92 ↓	0848		0	5.68	.04	1.0
	0849	30 min.	1 min.	5.66	.02	0.50
	0849:30	1hr	1.5 min.	5.64	0	-
		1hr 30min				
		2hr				
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Bailed 2 gal. over 3 minutes.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/4/92	PN 1516 RISING		WEST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: West Lewiston Levee Falling Head Test  
 Depth (Ft)

Piezometer No: PN-1516

Type of Test: Falling  
 (Falling Head or Rising Head)

WSE After 4.5  
 water change  
 WSE Before 5.84  
 Test

Rising Head Test  
 Depth (ft)

WSE Before  
 Drawdown

WSE After  
 Drawdown

$H_0 = 5.84 - 4.5 = 1.34$   
 $H = 5.84 - \text{reading}$

63.6 Top of  
 Sediment

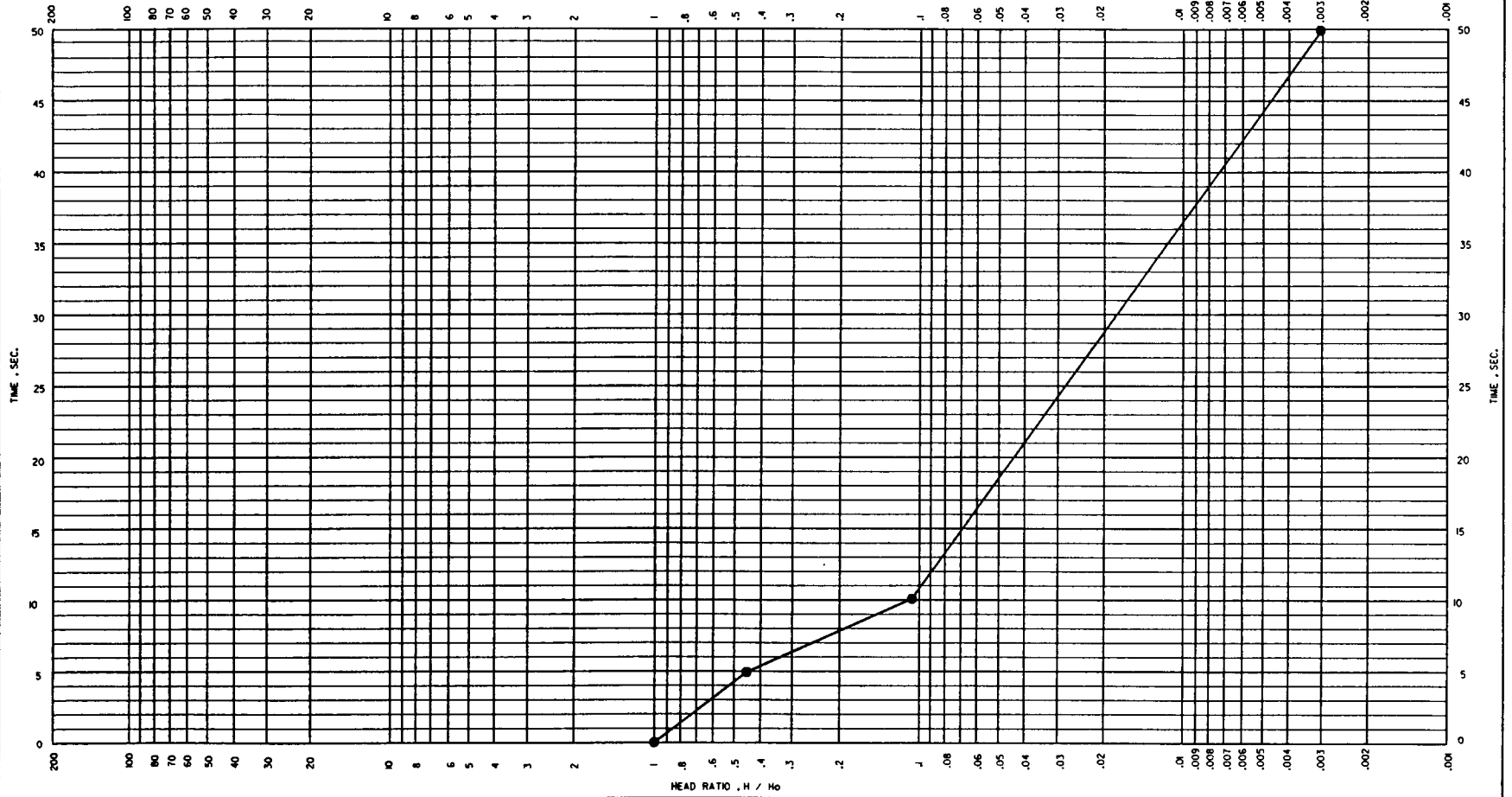
63.6 Piezometer  
 Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H' /
		Specified	Actual			
<u>2-6-92</u>	<u>1043:30</u>		0	<u>4.5</u>	<u>1.34</u>	<u>1.10</u>
<u>..</u>	<u>1043:35</u>	30 min.	<u>5 sec.</u>	<u>5.2</u>	<u>1.64</u>	<u>.478</u>
<u>..</u>	<u>1043:40</u>	1hr	<u>10. sec.</u>	<u>5.7</u>	<u>1.14</u>	<u>1.15</u>
<u>..</u>	<u>1044:20</u>	1hr 30min	<u>50 sec.</u>	<u>5.8</u>	<u>1.04</u>	<u>1.03</u>
		2hr		<del>5.8</del>		
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Added 2 gal.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/6/92	PN 1516 FALLING		WEST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: West Lewiston Levee

Piezometer No: PN-1548

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 6.00  
water charge

WSE Before 15.93  
Test

$15.93 - 6.00 = 9.93$

$H = 15.93 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

20.4 Top of  
Sediment

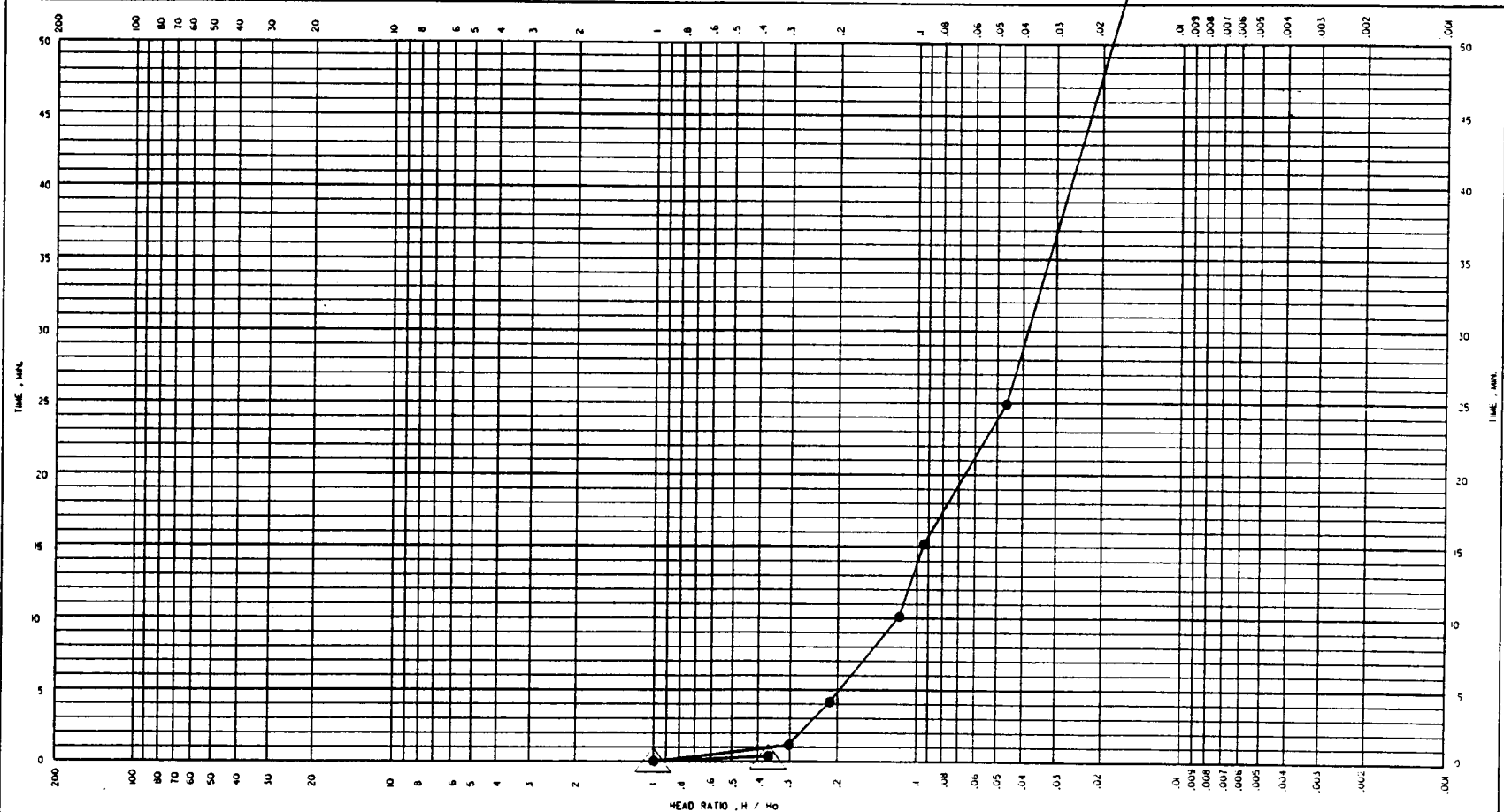
20.4 Piezometer  
Bottom


WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)		
		Specified	Actual			
<u>2-4-92</u>	<u>10:08</u>		0	<u>6.00</u>	<u>9.93</u>	<u>1.00</u>
<u>"</u>	<u>10:09</u>	<u>30 min.</u>	<u>1.0 min</u>	<u>19.9</u>	<u>3.03</u>	<u>.305</u>
<u>"</u>	<u>10:12</u>	<u>1hr</u>	<u>4.0</u>	<u>13.9</u>	<u>2.03</u>	<u>.261</u>
<u>"</u>	<u>10:18</u>	<u>1hr 30min</u>	<u>10.0</u>	<u>14.6</u>	<u>1.33</u>	<u>.134</u>
<u>"</u>	<u>10:43</u>	<u>2hr</u>	<u>15.0</u>	<u>15.0</u>	<u>.93</u>	<u>.091</u>
<u>"</u>	<u>10:58</u>	<u>2hr 30min</u>	<u>30</u>	<u>15.95</u>	<u>.48</u>	<u>.048</u>
<u>"</u>	<u>11:08</u>	<u>2hr 30min</u>	<u>60</u>	<u>15.80</u>	<u>.13</u>	<u>.012</u>
<u>"</u>	<u>11:38</u>	<u>3hr</u>	<u>90</u>	<u>15.83</u>	<u>.10</u>	<u>.012</u>
<u>"</u>	<u>12:08</u>	<u>4hr</u>	<u>120</u>	<u>15.83</u>	<u>.10</u>	<u>.012</u>
<u>"</u>	<u>12:38</u>	<u>4hr</u>	<u>150</u>	<u>15.84</u>	<u>.09</u>	<u>.012</u>
<u>"</u>	<u>13:08</u>	<u>5hr</u>	<u>180</u>	<u>15.84</u>		
<u>"</u>	<u>14:08</u>	<u>5hr 4hr</u>	<u>240</u>	<u>15.84</u>		
<u>"</u>	<u>15:08</u>	<u>5hr</u>	<u>300</u>	<u>15.83</u>		
<u>2-5-92</u>	<u>10:08</u>	<u>24hr</u>	<u>1440</u>	<u>15.88</u>		
<u>2-6-92</u>	<u>10:08</u>	<u>48hr</u>	<u>1440</u>	<u>15.90</u>		

NOTES: Added 9.0 gal. of water

PIEZOMETER TIME LAG PLOT



DATE	PEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/4/92	PN 548 FALLING			WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1549

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After 0.0  
water charge

WSE Before 16.34  
Test

WSE Before  
Drawdown

WSE After  
Drawdown

$H_0 = 16.34 - 0 = 16.34$   
 $H = 16.34 - \text{reading}$

18.8 Top of Sediment  
18.8 Piezometer Bottom

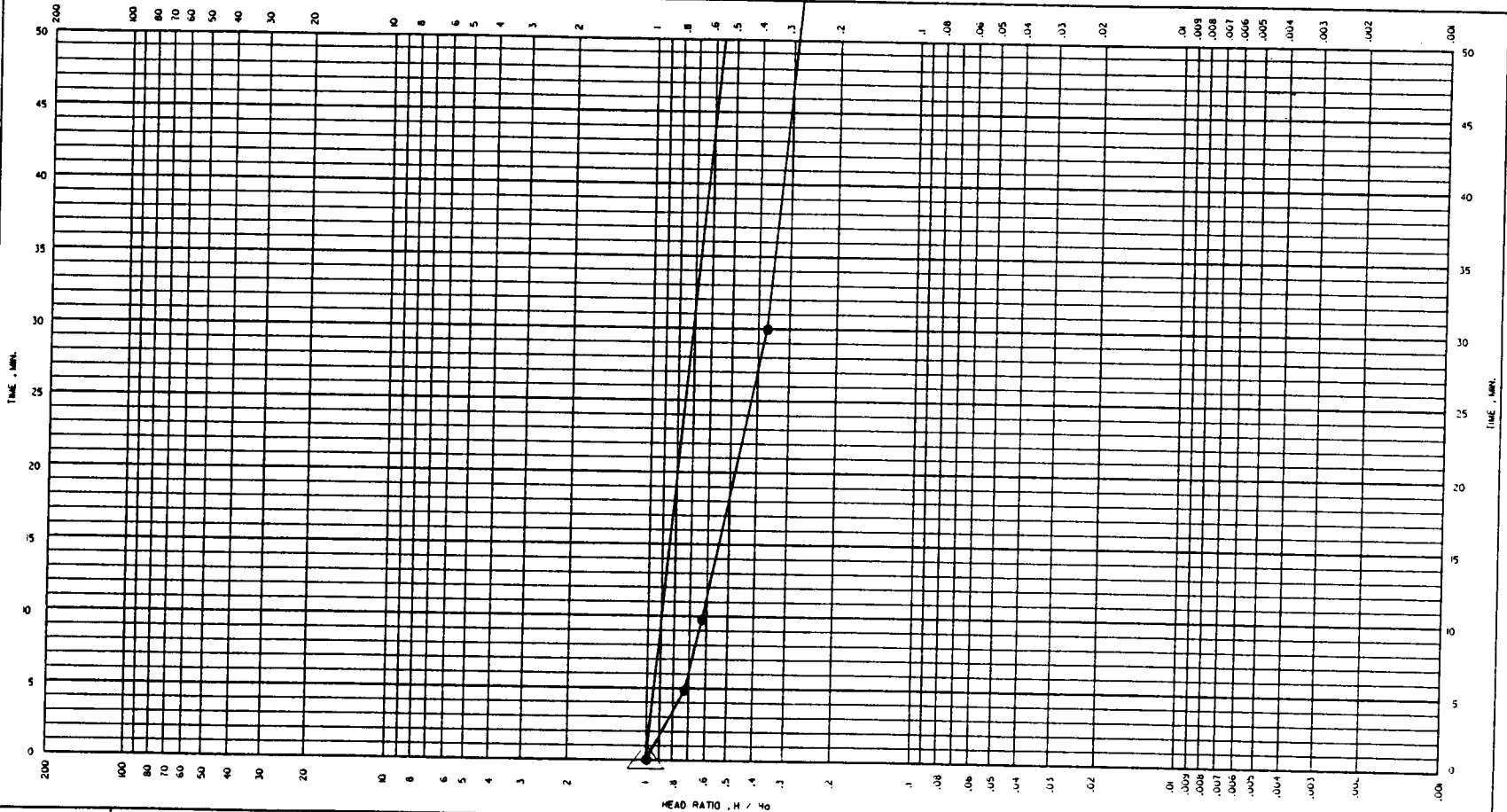
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>2-4-92</u>	<u>1005</u>	0	(min)	<u>0.0 16.34 1.40</u>
	<u>1010</u>	30 min.	<u>5</u>	<u>3.7 12.64 .774</u>
	<u>1015</u>	1hr	<u>10</u>	<u>5.6 10.74 .657</u>
	<u>1035</u>		<u>30</u>	<u>9.9 6.44 .394</u>
	<u>1105</u>	1hr 30min	<u>60</u>	<u>11.7 4.64 .284</u>
	<u>1135</u>		<u>90</u>	<u>12.6 3.74 .22</u>
	<u>1205</u>	2hr	<u>120</u>	<u>13.2 3.14 .196</u>
	<u>1235</u>	2hr 30min	<u>150</u>	<u>13.8 2.54 .15</u>
	<u>1305</u>	3hr	<u>180</u>	<u>14.1 2.24 .131</u>
	<u>1405</u>	4hr	<u>240</u>	<u>14.6 1.74 .10</u>
	<u>1505</u>	5hr	<u>300</u>	<u>14.9 1.44 .088</u>
<u>2-5-92</u>	<u>1005</u>	24hr	<u>1440</u>	<u>16.0 .34 .02</u>
<u>2-6-92</u>	<u>1005</u>	48hr	<u>2880</u>	<u>16.2 .14 .008</u>

NOTES: Added 2 gal. of water



### PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/4/92	PN 1549 FALLING			WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1553

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 2.0  
water change

WSE Before 12.72  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

22.0 Top of  
Sediment

22.0 Piezometer  
Bottom

$H_0 = 12.72 - 2.0 = 10.72$   
 $H = 12.72 - \text{reading}$

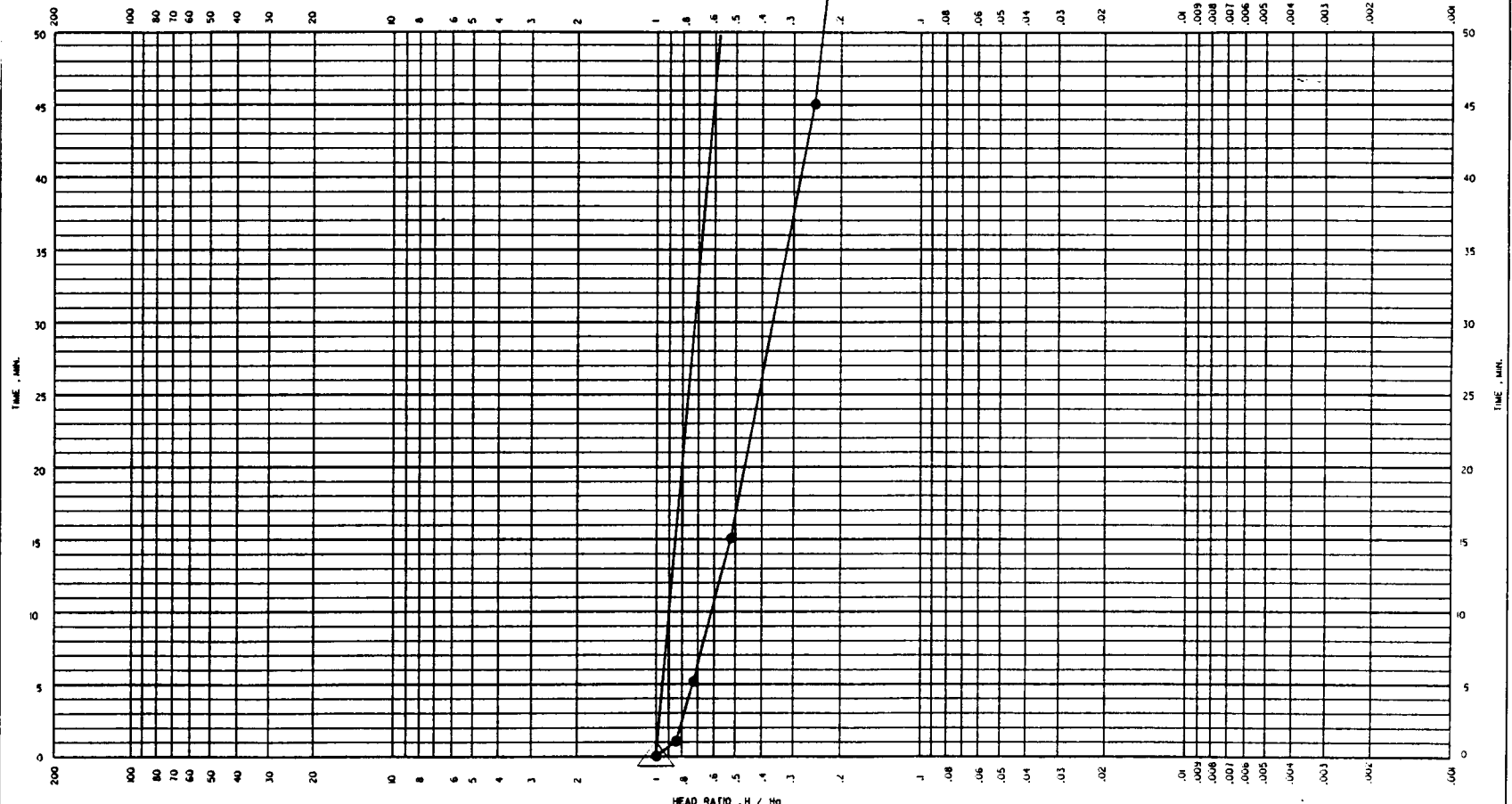
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>2-4-92</u>	<u>1020</u>		0 (min.)	<u>2.0</u>	<u>10.72</u>	<u>1.00</u>
	<u>1021</u>	30 min.	<u>1</u>	<u>3.1</u>	<u>9.62</u>	<u>.897</u>
	<u>1025</u>	1hr	<u>5</u>	<u>4.9</u>	<u>7.82</u>	<u>.710</u>
	<u>1035</u>		<u>15</u>	<u>7.2</u>	<u>5.52</u>	<u>.515</u>
	<u>1105</u>	1hr 30min	<u>45</u>	<u>9.9</u>	<u>2.82</u>	<u>.263</u>
	<u>1135</u>		<u>75</u>	<u>10.85</u>	<u>1.87</u>	<u>.17</u>
	<u>1205</u>	2hr	<u>105</u>	<u>11.3</u>	<u>1.42</u>	<u>.13</u>
	<u>1235</u>		<u>135</u>	<u>11.70</u>	<u>1.02</u>	<u>.095</u>
	<u>1305</u>	2hr 30min	<u>165</u>	<u>11.94</u>	<u>.78</u>	<u>.07</u>
	<u>1335</u>	3hr	<u>195</u>	<u>12.12</u>	<u>.60</u>	<u>.055</u>
	<u>1435</u>	4hr	<u>255</u>	<u>12.40</u>	<u>.32</u>	<u>.03</u>
	<u>1535</u>	5hr	<u>315</u>	<u>12.55</u>	<u>.17</u>	<u>.016</u>
				PVH <u>12.55</u>		← recovery
<u>2-5-92</u>	<u>1020</u>	24hr	<u>1440</u>	<u>12.99</u>		
		48hr		PVH <u>12.99</u>		

NOTES: Added 2 gal. of water.

Accidentally got onto a measurement schedule 15 min. off of that specified, but recovery was slow enough that plenty of data was obtained.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/4/32	PN 1553 FALLING			WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1559

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test

Depth (Ft)

WSE After 17.0  
water change

WSE Before 22.9  
Test

Rising Head Test

Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

$H_0 = 22.9 - 9.0 = 13.9$   
 $H = 22.9 - \text{reading}$

29.5

Top of  
Sediment

29.8

Piezometer  
Bottom

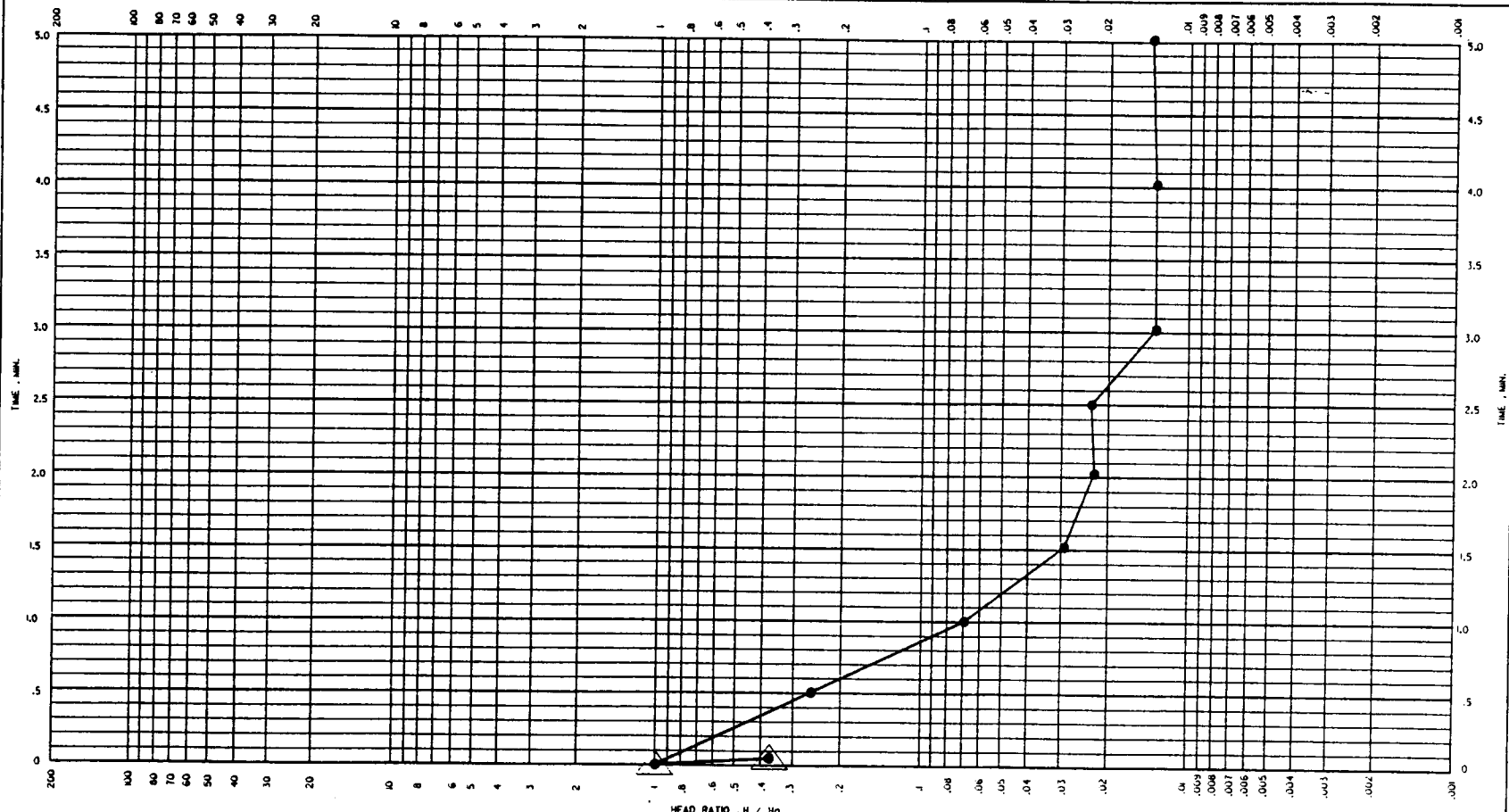
WSE=Water Surface Elevation (Feet)


Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H <sub>0</sub>
		Specified	Actual			
<u>1-29-92</u>	<u>9:41</u>		0 (min.)	<del>9.0</del> <u>9.0 DRA</u>	13.9	1.20
"	<u>9:43</u>	<del>30 min.</del>	<u>2</u>	<u>9.7</u>	<u>13.2</u>	<u>.950</u>
"	<u>10:11</u>	<u>30</u>	<u>30</u>	<u>19.0</u>	<u>3.7</u>	<u>.26</u>
"	<u>10:41</u>	1hr	<u>60</u>	<u>22.0</u>	<u>.90</u>	<u>.015</u>
"	<u>11:11</u>	1hr 30min	<u>90</u>	<u>22.5</u>	<u>.40</u>	<u>.029</u>
"	<u>11:41</u>	2hr	<u>120</u>	<u>22.6</u>	<u>.30</u>	<u>.012</u>
"	<u>12:11</u>	2hr 30min	<u>150</u>	<u>22.6</u>	<u>.30</u>	<u>.02</u>
"	<u>12:41</u>	3hr	<u>180</u>	<u>22.7</u>	<u>.2</u>	<u>.014</u>
"	<u>13:41</u>	4hr	<u>240</u>	<u>22.7</u>	<u>.2</u>	<u>.014</u>
"	<u>14:41</u>	5hr	<u>300</u>	<u>22.7</u>	<u>.2</u>	<u>.014</u>
<u>1-30-92</u>	<u>9:41</u>	24hr	<u>1440</u>	<u>22.5</u>	← began rising	
<u>2-3-92</u>	<u>16:24</u>	<del>48hr</del> 126 hr. 43 min.	<u>7603</u>	<u>22.8</u>	← dropped again	

NOTES:

Added  $1\frac{1}{2}$  gal.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/29/92	PN 1559 FALLING	 TIME LAG THEORY	WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lawiston Levee

Piezometer No: PN-1560

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water change

WSE Before \_\_\_\_\_  
Test

$H_0 = 25.0 - 15.1 = 9.9$   
 $H_1 = \text{reading} - 15.1$

Rising Head Test  
Depth (ft)

15.1 WSE Before  
Drawdown

25.0 WSE After  
Drawdown

29.5 Top of  
Sediment

29.7 Piezometer  
Bottom

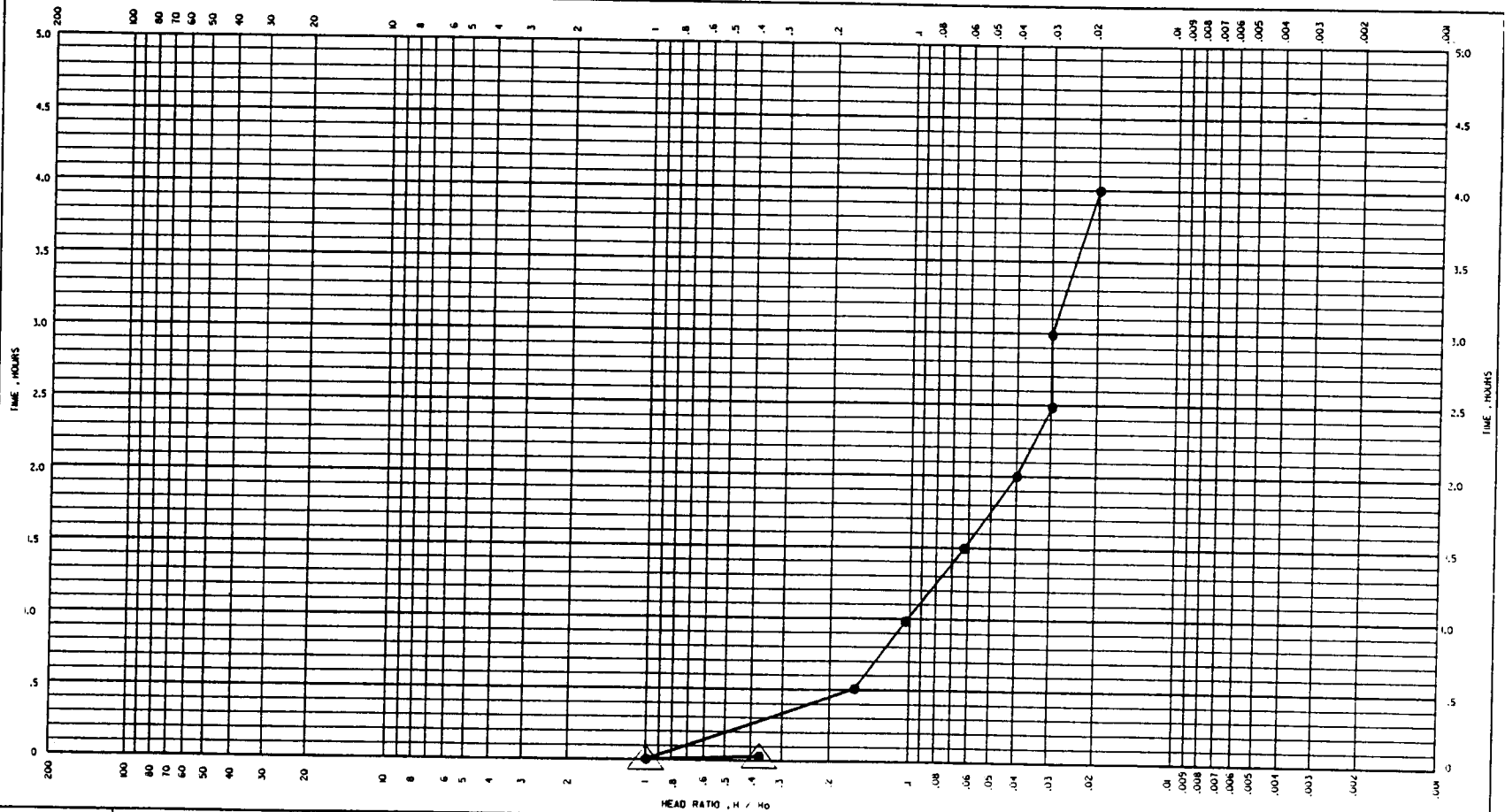
WSE=Water Surface Elevation (Feet)


Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-29-92</u>	<u>09:36</u>			<u>25.0</u>	<u>9.9</u>	<u>1.00</u>
<u>"</u>	<u>9:38</u>	<u>2 min</u>	<u>2 min</u>	<u>22.3</u>	<u>7.2</u>	<u>.73</u>
<u>"</u>	<u>10:06</u>	<u>30 min.</u>	<u>30</u>	<u>16.8</u>	<u>1.7</u>	<u>.172</u>
<u>"</u>	<u>10:36</u>	<u>1hr</u>	<u>60</u>	<u>16.1</u>	<u>1.0</u>	<u>.11</u>
<u>"</u>	<u>11:06</u>	<u>1hr 30min</u>	<u>90</u>	<u>15.7</u>	<u>16</u>	<u>.061</u>
<u>"</u>	<u>11:36</u>	<u>2hr</u>	<u>120</u>	<u>15.5</u>	<u>.4</u>	<u>.00</u>
<u>"</u>	<u>12:06</u>	<u>2hr 30min</u>	<u>150</u>	<u>15.4</u>	<u>13</u>	<u>.030</u>
<u>"</u>	<u>12:36</u>	<u>3hr</u>	<u>180</u>	<u>15.4</u>	<u>13</u>	<u>.00</u>
<u>"</u>	<u>13:36</u>	<u>4hr</u>	<u>240</u>	<u>15.3</u>	<u>12</u>	<u>.00</u>
<u>"</u>	<u>14:36</u>	<u>5hr</u>	<u>300</u>	<u>15.3</u>	<u>12</u>	<u>.020</u>
<u>1-30-92</u>	<u>9:36</u>	<u>24hr</u>	<u>1440</u>	<u>14.9</u>		
		<u>48hr</u>				

NOTES:

1 3/4  
Purged 1.94 gallons by Boiling for 4.0 minutes  
PVH

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/29/92	PN 156 RISING	 TIME LAG THEORY	WEST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: West Lewiston Levee

Piezometer No: PN-1563

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 0.0  
water change

WSE Before 20.4  
Test

$H_0 = 20.4 - 0 = 20.4$   
 $H = 20.4 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

30.2 Top of  
Sediment

30.2 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

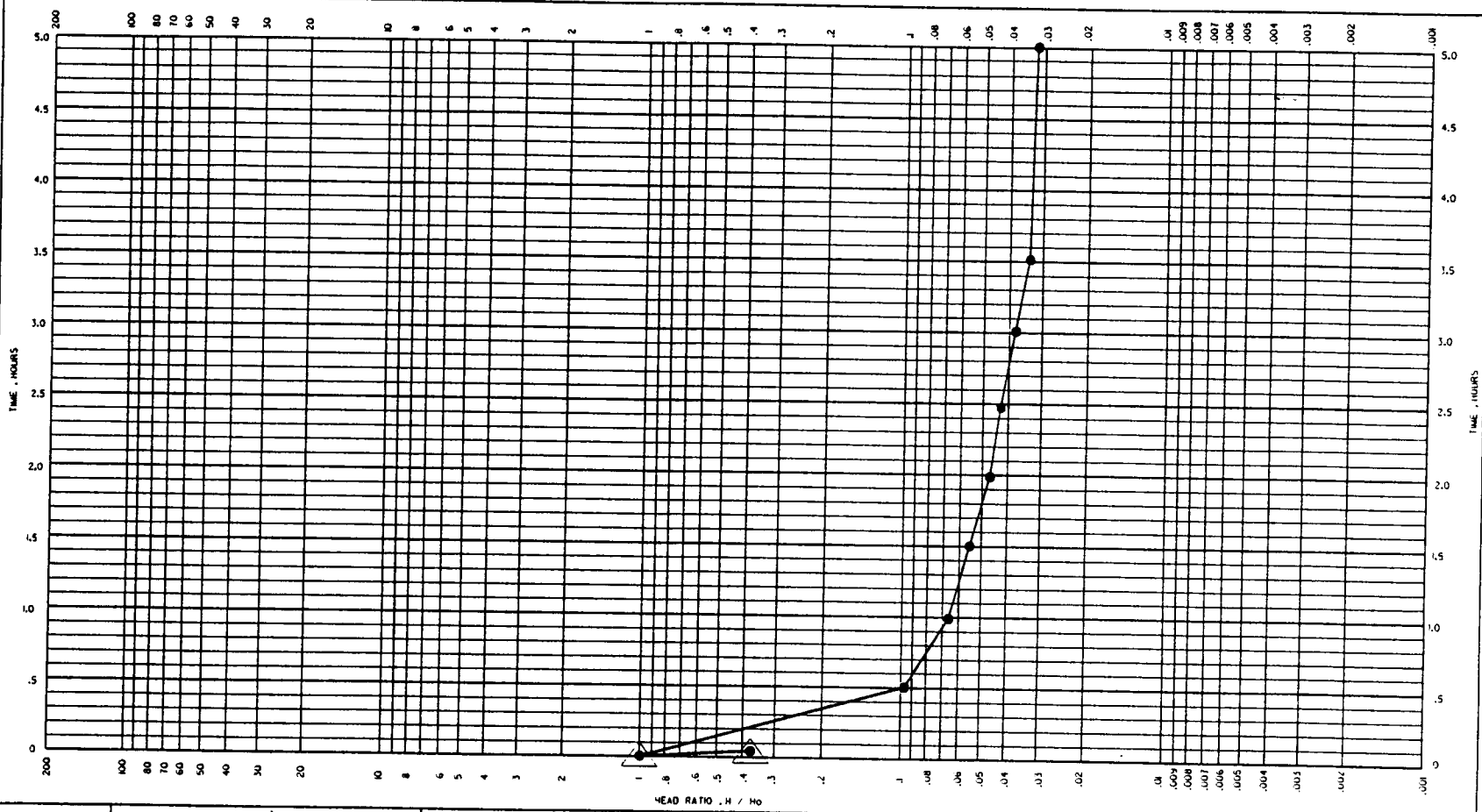
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	A/H
		Specified	Actual			
<u>1-29-92</u>	<u>0918</u>	0	(min.)	<u>0.0</u>	<u>20.4</u>	<u>20.4</u>
"	<u>0919</u>	<del>30 min.</del>	<u>1</u>	<u>5.0</u>	<u>15.4</u>	<u>15.4</u>
"	<u>0920</u>	<del>1hr</del>	<u>2</u>	<u>8.6</u>	<u>11.8</u>	<u>11.8</u>
"	<u>0921</u>	<del>1hr 30min</del>	<u>3</u>	<u>10.8</u>	<u>9.6</u>	<u>9.6</u>
"	<u>0923</u>	<del>2hr</del>	<u>5</u>	<u>13.5</u>	<u>6.9</u>	<u>6.9</u>
"	<u>0948</u>	<del>2hr 30min</del>	<u>30</u>	<u>18.4</u>	<u>2.0</u>	<u>2.0</u>
"	<u>1018</u>	<del>3hr 1hr</del>	<u>60</u>	<u>19.0</u>	<u>1.4</u>	<u>1.4</u>
"	<u>10:48</u>	<u>1.5 hr</u>	<u>90</u>	<u>19.3</u>	<u>1.1</u>	<u>1.1</u>
"	<u>11:18</u>	<del>4hr 2hr</del>	<u>120</u>	<u>19.4</u>	<u>1.0</u>	<u>1.0</u>
"	<u>11:48</u>	<u>2.5hr</u>	<u>150</u>	<u>19.5</u>	<u>0.9</u>	<u>0.9</u>
"	<u>12:18</u>	<del>5hr 3.0hr</del>	<u>180</u>	<u>19.6</u>	<u>0.8</u>	<u>0.8</u>
"	<u>13:18</u>	<u>4.0hr</u>	<u>240</u>	<u>19.7</u>	<u>0.7</u>	<u>0.7</u>
"	<u>14:18</u>	<del>24hr 5.0hr</del>	<u>300</u>	<u>19.75</u>	<u>0.65</u>	<u>0.65</u>
<u>1-30-92</u>	<u>9:18</u>	<u>24hr 24.0hr</u>	<u>1440</u>	<u>19.96</u>	<u>0.4</u>	<u>0.4</u>
<u>2-3-92</u>	<u>16:22</u>	<del>48hr 127hr 4min</del>	<u>7624</u>	<u>20.34</u>		


NOTES:

Added ~ 3 gal. → Filled to top



PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/29/92	PN 563 FALLING	 TIME LAG THEORY	WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Newton Levee

Piezometer No: PN-1684

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 6.9  
water change

WSE Before Dry 9.9  
Test

$H_s = 9.9 - 6.9 = 3.0$

$H = 9.9 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

9.9 Top of  
Sediment

9.9 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

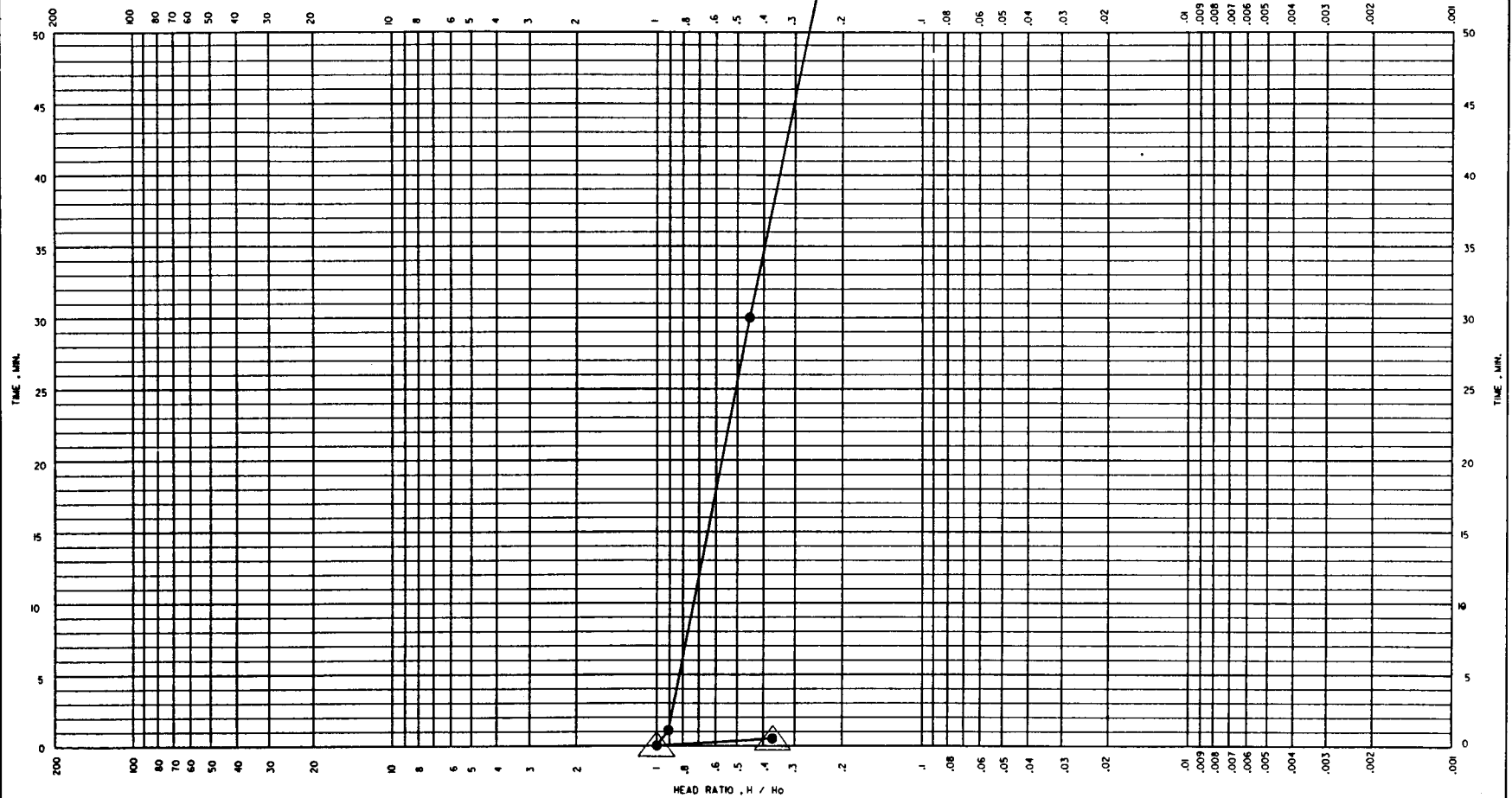
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H <sub>s</sub>
		Specified	Actual			
<u>1-31-92</u>	<u>0939</u>		0	<u>6.9</u>	<u>3.0</u>	<u>1.61</u>
"	<u>0940:30</u>	<del>30 min.</del>	<u>1.5 min</u>	<u>7.0</u>	<u>2.9</u>	<u>.967</u>
"	<u>10:09</u>	<u>30 min.</u>	<u>30 min</u>	<u>8.5</u>	<u>1.4</u>	<u>.467</u>
"	<u>10:39</u>	<u>1hr</u>	<u>50 min</u>	<u>9.3</u>	<u>.6</u>	<u>0.25</u>
"	<u>11:09</u>	<u>1hr 30min</u>	<u>90 min</u>	<u>9.6</u>	<u>.3</u>	<u>.10</u>
"	<u>11:39</u>	<u>2hr</u>	<u>190 min</u>	<u>Dry</u>	<u>0</u>	<u>-</u>
		<u>2hr 30min</u>				
		<u>3hr</u>				
		<u>4hr</u>				
		<u>5hr</u>				
		<u>24hr</u>				
		<u>48hr</u>				

NOTES:

Added 4 gal. water. → a plugged in blank casing, 1.5" diameter, this would cause about a 40 Ft head change. Most of it ran out immediately.

DRT

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/31/92	PN 1684 FALLING	TIME LAG THEORY	WEST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: West Lewiston Levee Falling Head Test  
 Depth (Ft)

Piezometer No: PN-1687

Type of Test: Falling  
 (Falling Head or Rising Head)

WSE After 2.8  
 water charge  
 WSE Before 12.76  
 Test

Rising Head Test  
 Depth (ft)

WSE Before  
 Drawdown  
 WSE After  
 Drawdown

$H_0 = 12.76 - 2.8 = 9.96$   
 $H = 12.76 - \text{reading}$

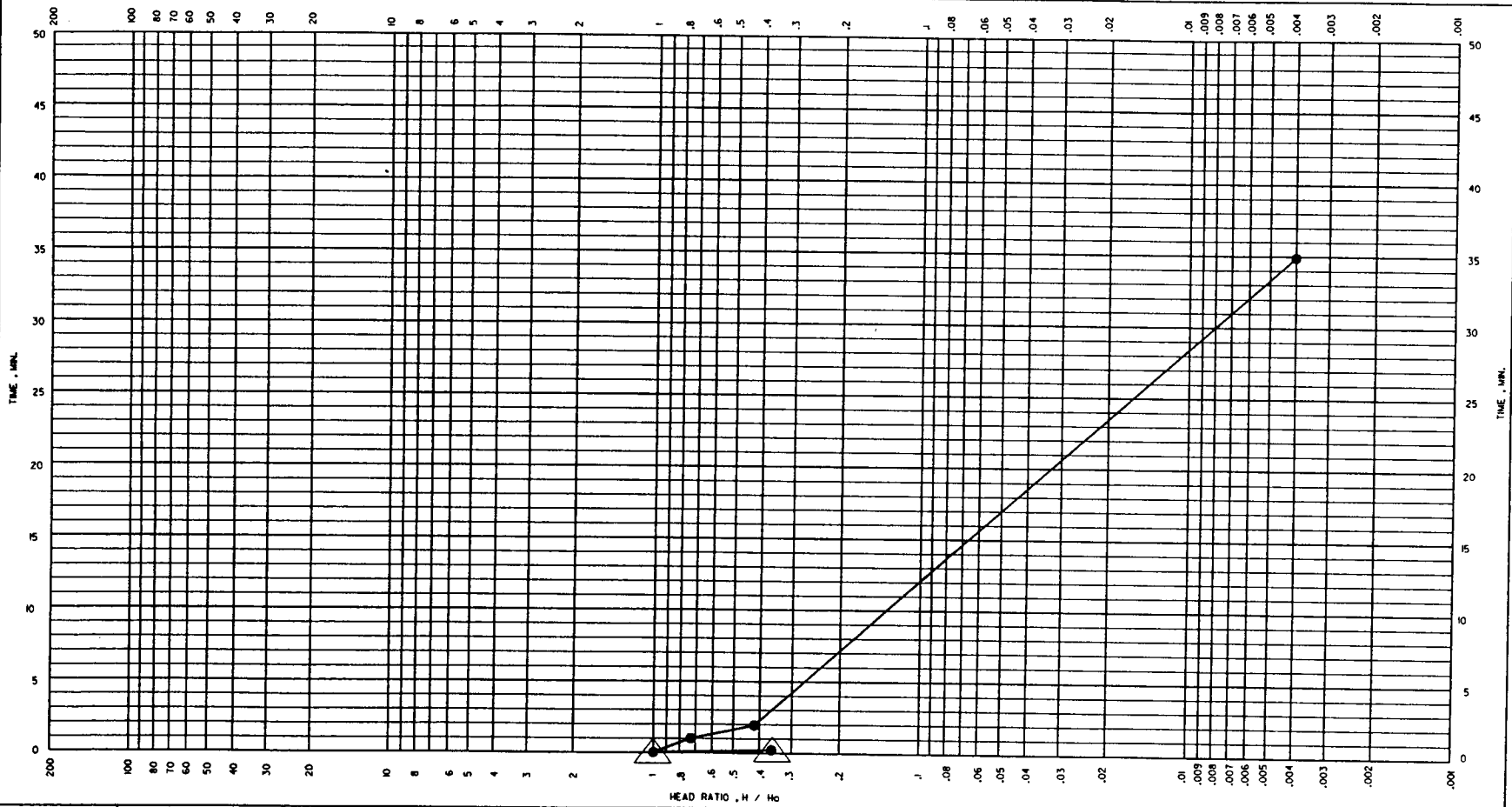
17.7 Top of  
 Sediment  
17.8 Piezometer  
 Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	h/L <sub>0</sub>
		Specified	Actual			
<u>2-4-92</u>	<u>10:49</u>		0	<u>2.8</u>	<u>9.96</u>	<u>1.00</u>
"	<u>10:50</u>	<u>30 min.</u>	<u>1.0 min</u>	<u>5.4</u>	<u>7.36</u>	<u>.739</u>
"	<u>10:51</u>	<u>1hr</u>	<u>2.0 min</u>	<u>8.6</u>	<u>4.16</u>	<u>.418</u>
"	<u>11:19</u>	<u>30min</u>	<u>3.0 min</u>	<u>12.72</u>	<u>1.04</u>	<u>.1004</u>
"	<u>11:49</u>	<u>1hr</u>	<u>6.0 min</u>	<u>12.80</u>		
"	<u>12:19</u>	<u>2hr</u>	<u>1hr 30min</u>	<u>12.80</u>		
		<u>2hr 30min</u>				
		<u>3hr</u>				
		<u>4hr</u>				
		<u>5hr</u>				
		<u>24hr</u>				
		<u>48hr</u>				

NOTES: Added 5.0 gallons of water

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/4/92	PN 1687 FALLING			WEST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: West Lewiston Levee

Piezometer No: FN-1703

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After \_\_\_\_\_  
water change

17.20

WSE Before  
Drawdown

WSE Before \_\_\_\_\_  
Test

19.8

WSE After  
Drawdown

33.5

Top of  
Sediment

33.5

Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>1-28-92</u>	<u>0732</u> <del>0827</del> PVH		0	<u>19.8</u>
<u>1-28-92</u>	<u>0802</u>	30 min.	<u>30</u>	<u>16.9</u>
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES:

Bailed  $1\frac{1}{2}$  gal (ideally would induce ~ 16 Ft of drawdown if there were no recharge).

Recovered higher than initial static level.

NO PLDT  
NO ENOUGH  
POINTS  
SEE NEXT  
PAGE

**PIEZOMETER TEST FORM**

Location: West Lewisten Levee

Piezometer No: PN-1703

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 17.0  
water change

WSE Before 17.3  
Test

$H_0 = 17.3 - 17.0 = 0.3$

$H = 17.3 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

33.5 Top of  
Sediment

33.5 Piezometer  
Bottom

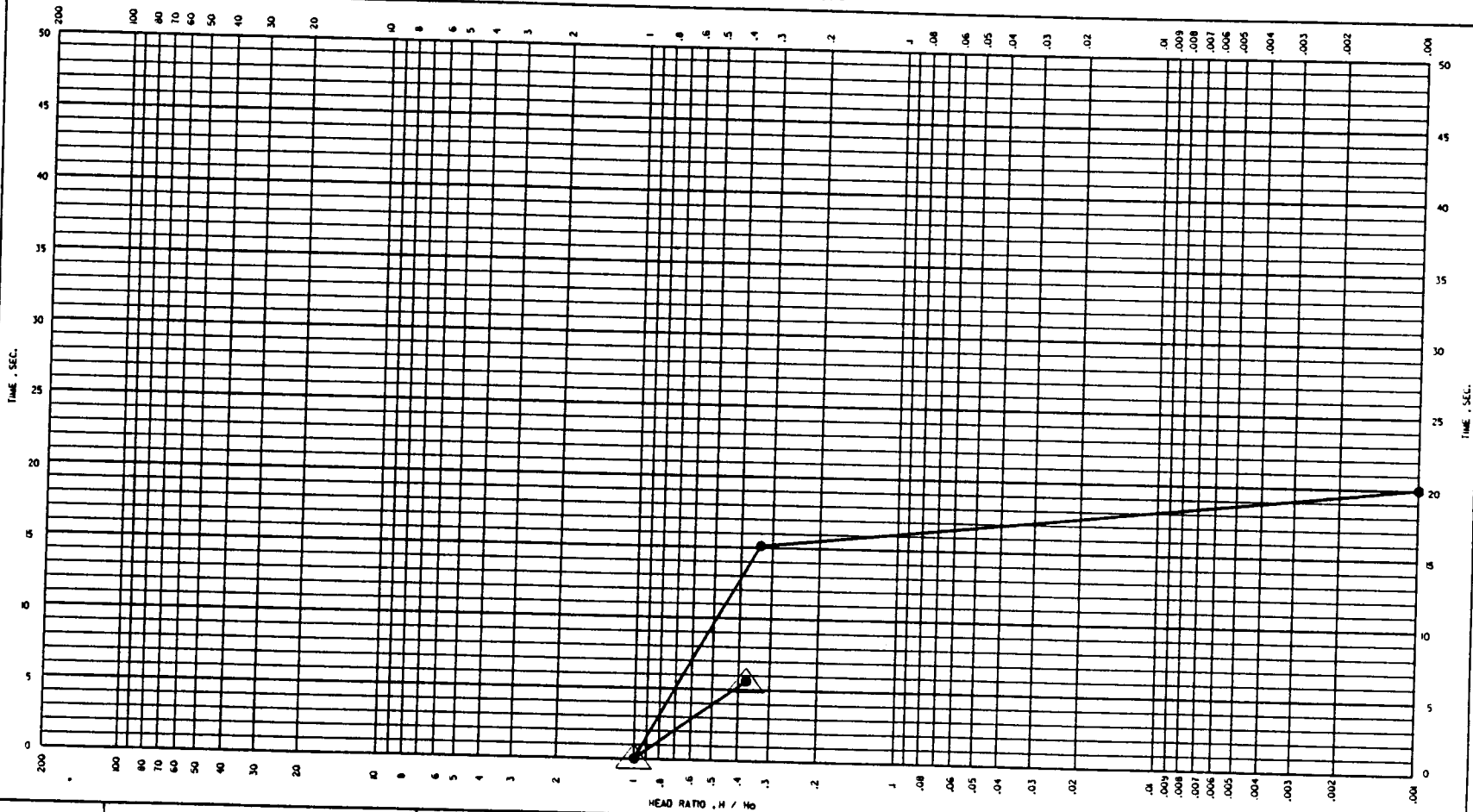
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>2-6-92</u>	<u>1305:30</u>	0		<u>17.0</u> <u>0.3</u> <u>1.0</u>
	<u>1305:45</u>	30 min.	<u>15 sec.</u>	<u>17.2</u> <u>0.1</u> <u>0.35</u>
	<u>1305:50</u>	1hr	<u>20 sec.</u>	<u>17.3</u> <u>0</u> <u>0</u>
		1hr 30min		
		2hr		
		2hr 30min		
		3hr		
		4hr		
		5hr		
		24hr		
		48hr		

NOTES: Add 5 gal. of water in an attempt to get more data points than the bail-down (rising head) test provided.

BEING  
PLOTED

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/6/92	PN 1703 FALLING	TIME LAG THEORY	WEST LEWISTON LEVEE



**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1704

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 7.0?  
water change

WSE Before 17.3  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

31.4 Top of  
Sediment

31.4 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>1-28-92</u>	<u>0832</u>		0	<u>7.0?</u>
	<u>0832:30</u>	30 min.	<u>30 sec.</u>	<u>16.5</u>
	<u>0902</u>	1hr.	<u>30 min.</u>	<u>17.7</u>
		1hr 30min		
		2hr		
		2hr 30min		
		3hr		
		4hr		
		5hr		
		24hr		
		48hr		

NOTES: Added 4 gal. of water. Interference from water clinging to/running down the inside of the casing makes the first water level measurement (7.0?)

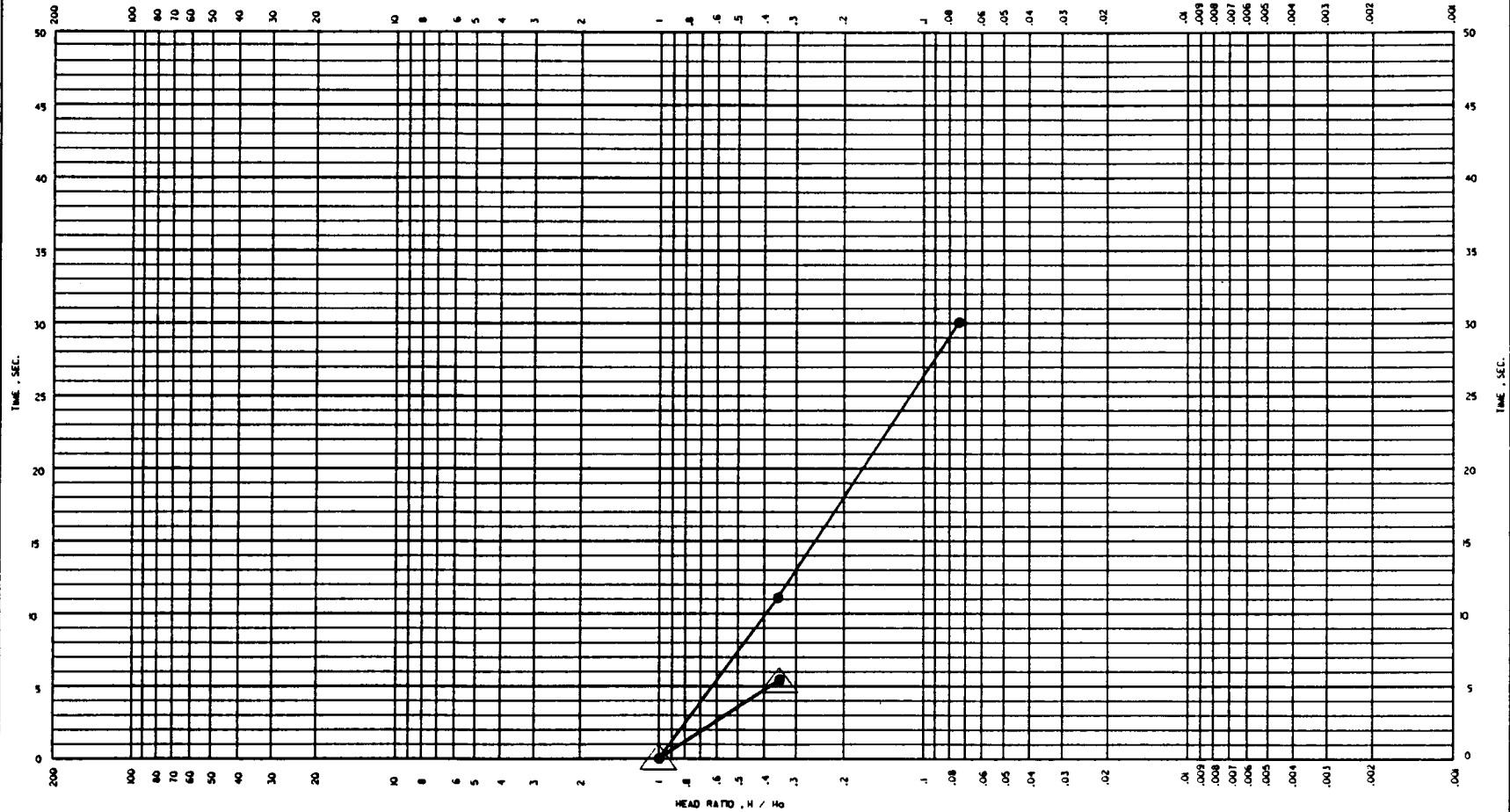
Before Falling head test, we tried bailing, just to check its effect and suitability as a testing method. Bailed 0.5 gal. →

17.4 = Static Depth to Water  
time + (min) PTW (ft)  
0:56    0    17.9

Rising Head

*Being plotted!*  
17.4 ✓  
17.7 ✓

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
1/28/92	PN 1704 FALLING			WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1704

Type of Test: Falling (Test 2)  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 14.9  
water change

WSE Before 18.36  
Test

$H_0 = 18.36 - 14.9 = 3.46$   
 $H = 18.36 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

31.4 Top of  
Sediment

31.4 Piezometer  
Bottom

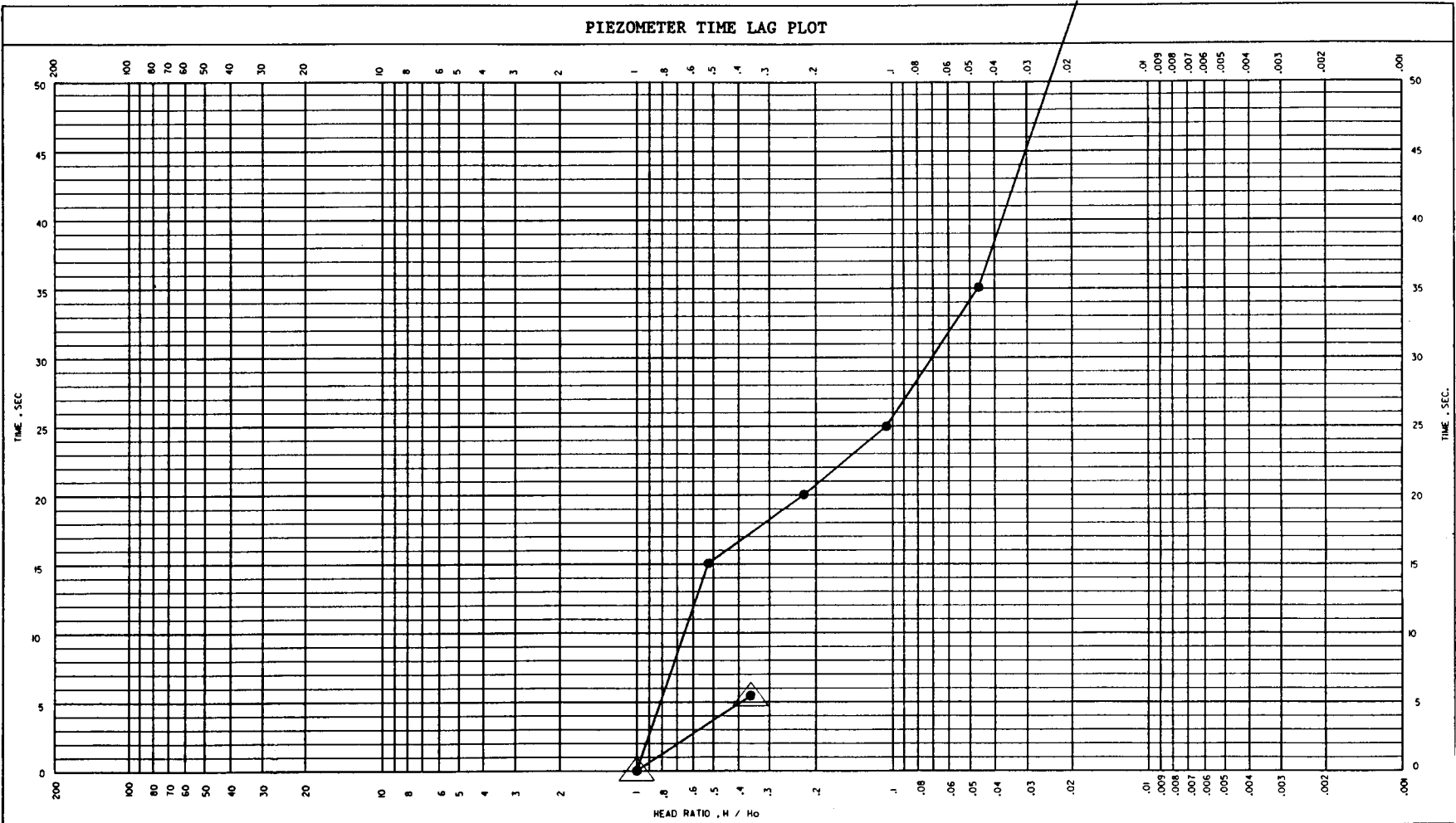
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	f	H/H
		Specified	Actual			
<u>2-6-92</u>	<u>1254</u>		0	<u>14.9</u>	<u>3.46</u>	<u>1.00</u>
	<u>1254:15</u>	30 min.	<u>15 sec.</u>	<u>16.5</u>	<u>1.86</u>	<u>.538</u>
	<u>1254:20</u>	1hr	<u>20 sec.</u>	<u>17.5</u>	<u>.86</u>	<u>.249</u>
	<u>1254:25</u>	1hr 30min	<u>25 sec.</u>	<u>18.0</u>	<u>.36</u>	<u>.104</u>
	<u>1254:35</u>	2hr	<u>35 sec.</u>	<u>18.2</u>	<u>.16</u>	<u>.046</u>
	<u>1255</u>	2hr 30min	<u>1 min.</u>	<u>18.3</u>	<u>.06</u>	<u>.017</u>
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Added 4 gal. of water in an attempt to get more data than during first test.

Water drained rapidly, and we were not able to get a 10-ft. head change (or, if there was 10 ft. of change, it dropped to less than 10 ft. before we could get a reading).

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/6/92	SECOND TEST PH 1704 FALLING		TIME LAG THEORY	WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: W. Lewis Dr Levee

Piezometer No: PN-1707

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water charge

WSE Before 24.2  
Test

Rising Head Test  
Depth (ft)

24.1 WSE Before  
Drawdown

24.2 WSE After  
Drawdown

$h_0 = 24.2 - 24.06 = .14$

$H = \text{reading} - 24.06$

34.0 (measured depth)  
Top of Sediment  
33.9 (Table)  
Piezometer Bottom

WSE=Water Surface Elevation (Feet)

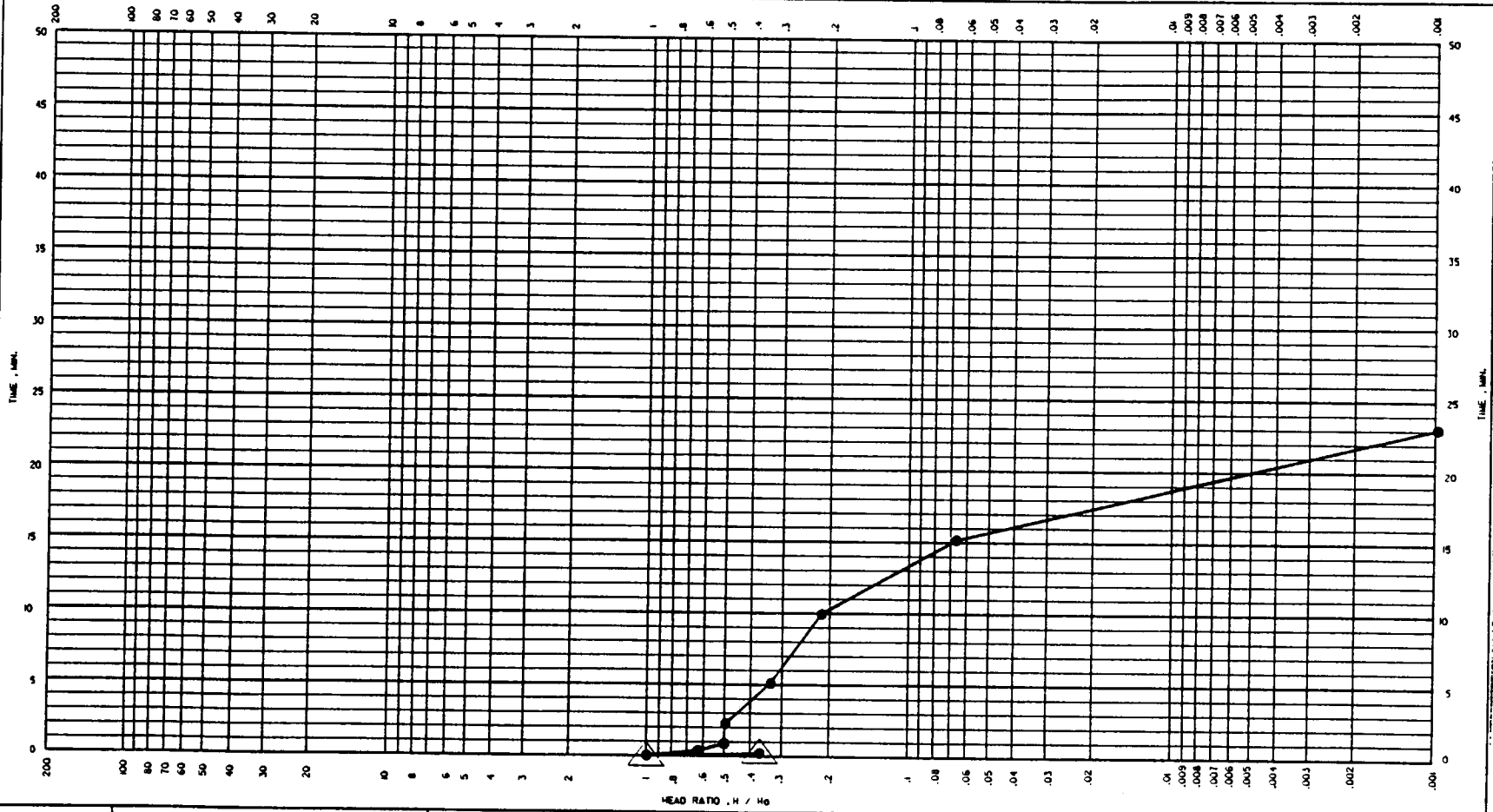
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/h <sub>0</sub>
		Specified	Actual			
<u>1-28-92</u>	<u>07:57</u>	0	0	<u>24.2</u>	<u>.14</u>	<u>1.00</u>
<u>"</u>	<u>08:27</u>	30 min.	<u>30</u>	<u>24.1</u>		<u>recovered</u>
<u>"</u>	<u>10:26:15</u>	1hr	<u>0.25 min</u>	<u>24.15</u>	<u>.090</u>	<u>.64</u>
	<u>10:26:45</u>	<del>1hr 30min</del>	<u>0.15 min</u>	<u>24.13</u>	<u>.070</u>	<u>.50</u>
	<u>10:28</u>	<del>2hr</del>	<u>2 min</u>	<u>24.13</u>	<u>.070</u>	<u>.50</u>
	<u>10:31</u>	<del>2hr 30min</del>	<u>5 min</u>	<u>24.11</u>	<u>.050</u>	<u>.35</u>
	<u>10:36</u>	<del>2hr</del>	<u>10 min</u>	<u>24.09</u>	<u>.030</u>	<u>.214</u>
	<u>10:41</u>	<del>4hr</del>	<u>15.20 min</u>	<del>PNR 24.08</del>	<u>.01</u>	<u>.07</u>
	<u>10:49</u>	<del>5hr</del>	<u>23 min</u>	<u>24.06</u>	0	0
		24hr				<u>recovered</u>
		48hr				

1st test  
rd  
test

NOTES: Removed 1.0 gal By Bailing  
Bailed a lot of fine sand.

Rebailed to get more data points... <sup>2</sup> gal. in 5 min.  
← static = 24.06.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/28/92	PN 1707 R/SAG	TIME LAG THEORY	WEST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1707

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 20.5  
water change

WSE Before 24.82  
Test

$$H_0 = 24.82 - 20.5 = 4.32$$

$$H = 24.82 - \text{reading}$$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

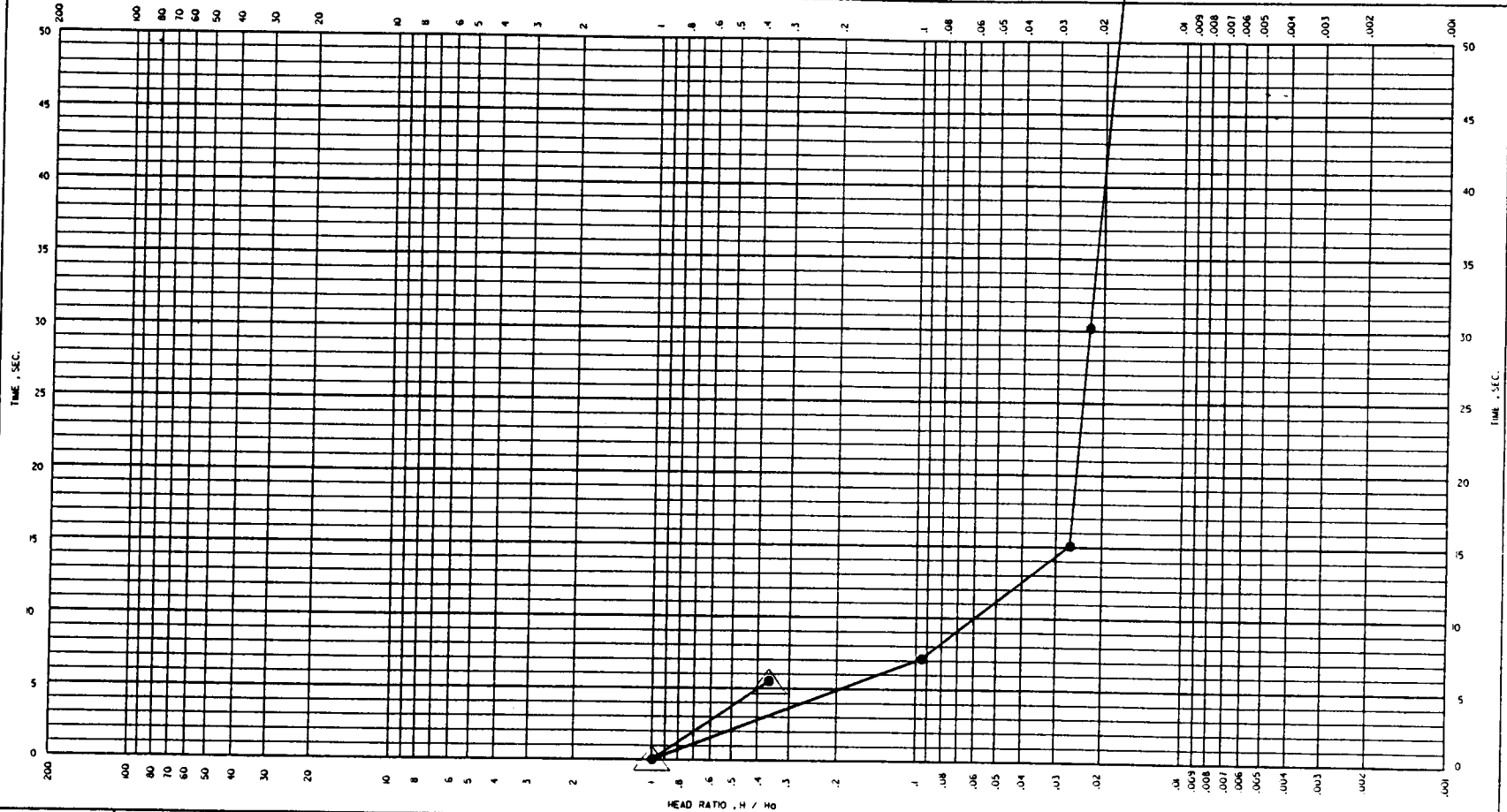
34.0 ← measured  
Top of  
Sediment  
33.9 ← tabulated value  
Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>2-6-92</u>	<u>1316:50</u>		0	<u>20.5</u>	<u>4.32</u>	<u>1.00</u>
	<u>1316:57</u>	30 min.	<u>7 sec.</u>	<u>24.5</u>	<u>1.32</u>	<u>1.074</u>
	<u>1317:05</u>	1hr	<u>15 sec.</u>	<u>24.7</u>	<u>1.12</u>	<u>1.028</u>
	<u>1317:20</u>	1hr 30min	<u>30 sec.</u>	<u>24.72</u>	<u>1.10</u>	<u>1.023</u>
	<u>1318</u>	2hr	<u>70 sec.</u>	<u>24.75</u>	<u>1.07</u>	<u>1.016</u>
	<u>1319</u>	2hr 30min	<u>130 sec.</u>	<u>28.80</u>		
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Added 4.5 gal. of water in attempt to get more data points than the 2 rising head tests provided.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/6/92	PN 1707 FALLING	TIME LAG THEORY	



**PIEZOMETER TEST FORM**

Location: West Lewiston Levee Falling Head Test  
 Depth (Ft)

Piezometer No: PN-1708

Type of Test: Rising  
 (Falling Head or Rising Head)

WSE After \_\_\_\_\_  
 water charge

WSE Before \_\_\_\_\_  
 Test

Rising Head Test  
 Depth (ft)

23.45 WSE Before  
 Drawdown

23.6 WSE After  
 Drawdown

$H_0 = 23.6 - 23.45 = .15$

$H = \text{reading} - 23.45$

33.0 ← measured  
 Top of  
 Sediment  
 32.9 ← tabulated value  
 Piezometer  
 Bottom

WSE=Water Surface Elevation (Feet)

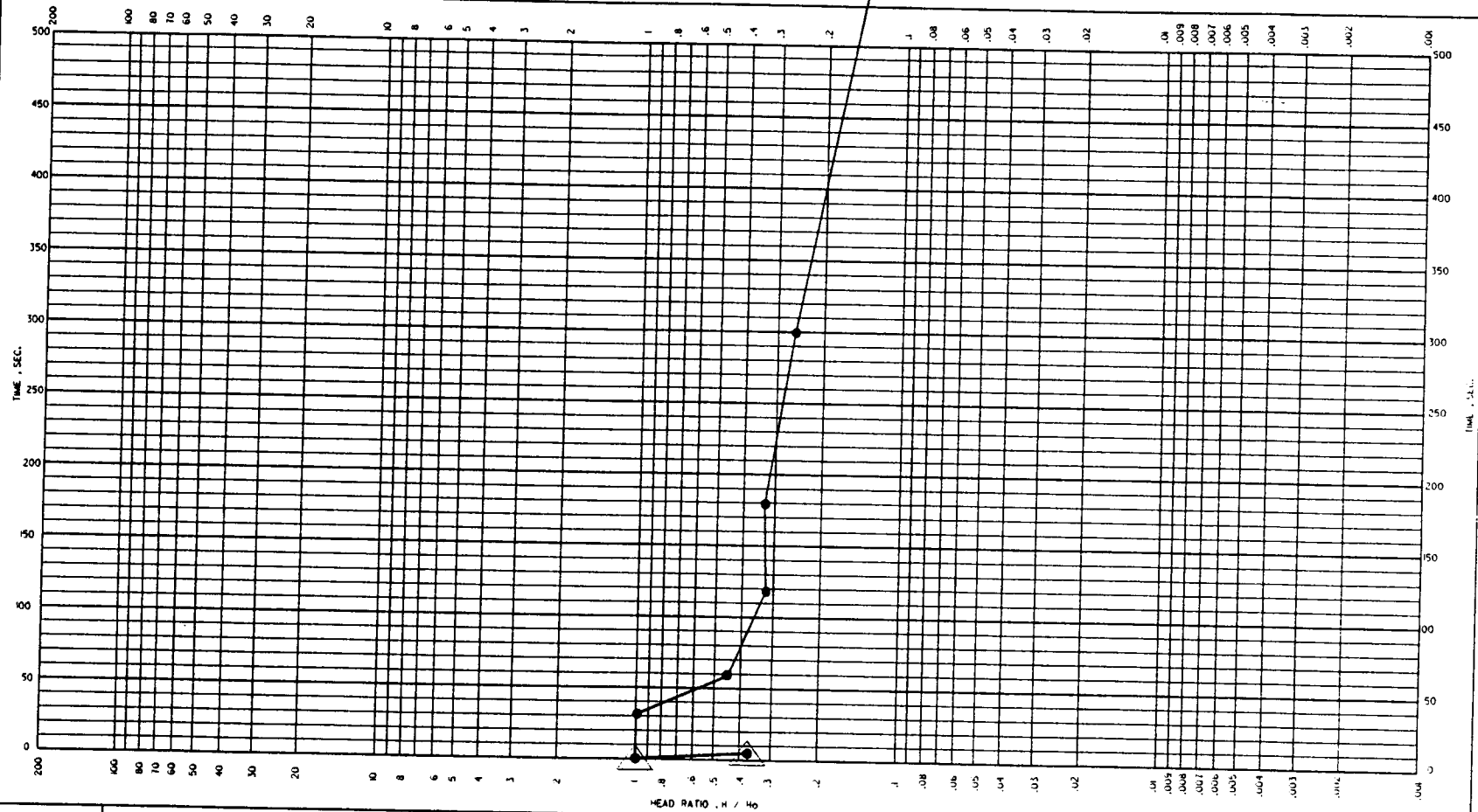
	Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	A	H	h'		
			Specified	Actual (min.)						
Test 1	1-28-92	0808 ↓		0	23.6	<del>1.15</del>	<del>1.00</del>			
			30 min.	30	23.4 (recovered)					
Test 2	1-28-92	↓	1hr			1.15	1.80			
			1hr 30min	0	23.60					
			2hr	0.5	23.52				1.07	1.46
			2hr 30min	1.5	23.50				.65	.33
			3hr	3	23.50				.05	.33
			4hr	5	23.49				.04	.26
			5hr	10	23.47				.02	.13
			24hr	15	23.47				.02	.13
48hr	30	23.45	0	—						


NOTES: Bailed 2 gal → Test 1.

Rebailed 2gal. over 5 min. to get more data → Test 2 (after recovery of Test 1).

Bailed a lot of Fine sand.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/28/92	PN 1708 RISING	 TIME LAG THEORY	WEST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: W. LEWISTON Levee

Piezometer No: PN-1708

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water charge

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

23.45 WSE Before  
Drawdown

23.6  
~~23.4~~ WSE After  
PVH Drawdown

33.0 <sup>measured</sup> Top of  
Sediment

32.9 <sup>table</sup> Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date \_\_\_\_\_ Time \_\_\_\_\_ Elapsed \_\_\_\_\_ Water Table \_\_\_\_\_  
(24-Hour Clock) Time \_\_\_\_\_ Depth (Feet)

	Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
			Specified	Actual	
1st test	<u>1-28-92</u>	<u>08:08</u>		0	<u>23.6</u>
	<u>"</u>	<u>8:38</u>	30 min.	<u>30 min.</u>	<u>23.4</u>
2nd test	<u>1-28-92</u>	<u>10:08</u>	<del>1hr</del>	<del>2.5 min</del> <u>30 sec. (0.5 min)</u>	<del>24.6</del> <u>23.60</u> ← recovers
		<u>1009</u>	<del>1hr 30min</del>	<u>1 min</u>	<u>23.52</u>
		<u>1010</u>	<del>2hr</del>	<u>2 min.</u>	<u>23.50</u>
		<u>1011</u>	<del>2hr 30min</del>	<u>3</u>	<u>23.50</u>
		<u>1013</u>	<del>3hr</del>	<u>5</u>	<u>23.49</u>
		<u>10:18</u>	<del>4hr</del>	<u>10</u>	<u>23.47</u>
		<u>10:23</u>	<del>5hr</del>	<u>15</u>	<u>23.47</u>
		<u>10:38</u>	<del>24hr</del>	<u>30</u>	<u>23.45</u>
			<del>48hr</del>		

NOTES: Removed 2.0 gallons By Bailing

Rebailed so we could get more data points  
→ 2 gal. in 5 min. Static was 23.45'.

Lots Bailed a lot of Fine sand.

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1708

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 20.0  
water change

WSE Before 24.32  
Test

$H_0 = 24.32 - 20.0 = 4.32$

$H = 24.32 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

33.0 ← measured  
Top of  
Sediment

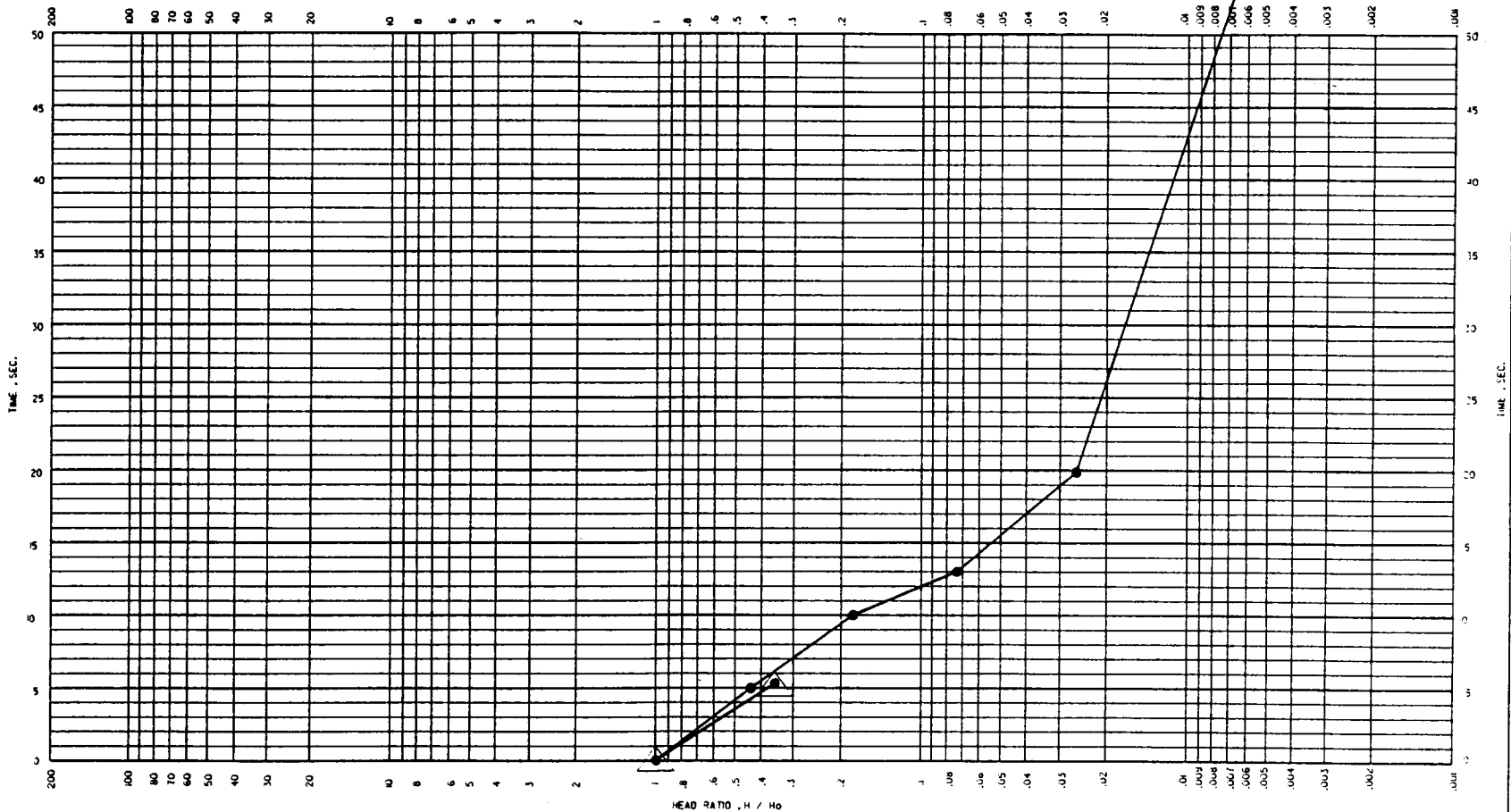
32.9 ← tabulated value  
Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time $t$		Water Table Depth (Feet)	H	H/ H <sub>0</sub>
		Specified	Actual			
<u>2-6-92</u>	<u>1311</u>		<u>0</u>	<u>20.0</u>	<u>4.32</u>	<u>1.00</u>
	<u>1311:05</u>	<u>30 min.</u>	<u>5 sec.</u>	<u>22.5</u>	<u>1.82</u>	<u>.42</u>
	<u>1311:10</u>	<u>1hr</u>	<u>10 sec.</u>	<u>23.5</u>	<u>.82</u>	<u>.19</u>
	<u>1311:13</u>	<u>1hr 30min</u>	<u>13 sec.</u>	<u>24.0</u>	<u>.32</u>	<u>.074</u>
	<u>1311:20</u>	<u>2hr</u>	<u>20 sec.</u>	<u>24.2</u>	<u>.12</u>	<u>.028</u>
	<u>1312</u>	<u>2hr 30min</u>	<u>1 min</u>	<u>24.3</u>	<u>.02</u>	<u>.005</u>
		<u>3hr</u>				
		<u>4hr</u>				
		<u>5hr</u>				
		<u>24hr</u>				
		<u>48hr</u>				

NOTES: Added 4.5 gal. of water in attempt to get a larger head change than was achieved during rising head tests.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/6/92	PN 1708 FALLING			WEST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: West Lewiston Levee

Piezometer No: PN-1710

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After \_\_\_\_\_  
water change

WSE Before \_\_\_\_\_  
Test



2.56

5.7

13.0

13.0

WSE Before  
Drawdown

WSE After  
Drawdown

Top of  
Sediment

Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	
		Specified	Actual (min)		
<u>1-28-92</u>	<u>0756</u>		0		<u>5.7</u>
"	<del>0816</del> <u>0816</u>	30 min.	<u>20</u>	PVH	<del>2.5</del> <u>2.50</u>
		1hr			
		1hr 30min			
		2hr			
		2hr 30min			
		3hr			
		4hr			
		5hr			
		24hr			
		48hr			

NOTES: Bailed 2 gal. → got little lowering of water column.

(In absence of recharge, 2 gal → 21' of water in well.)

NO PLOT  
SEE NEXT  
PAGE

**PIEZOMETER TEST FORM**

Location: West Lewiston Levee

Piezometer No: PN-1710

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 0.0  
water change

WSE Before 2.45  
Test

$H_0 = 2.45 - 0 = 2.45$

$H = 2.45 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

13.0 Top of  
Sediment

13.0 Piezometer  
Bottom

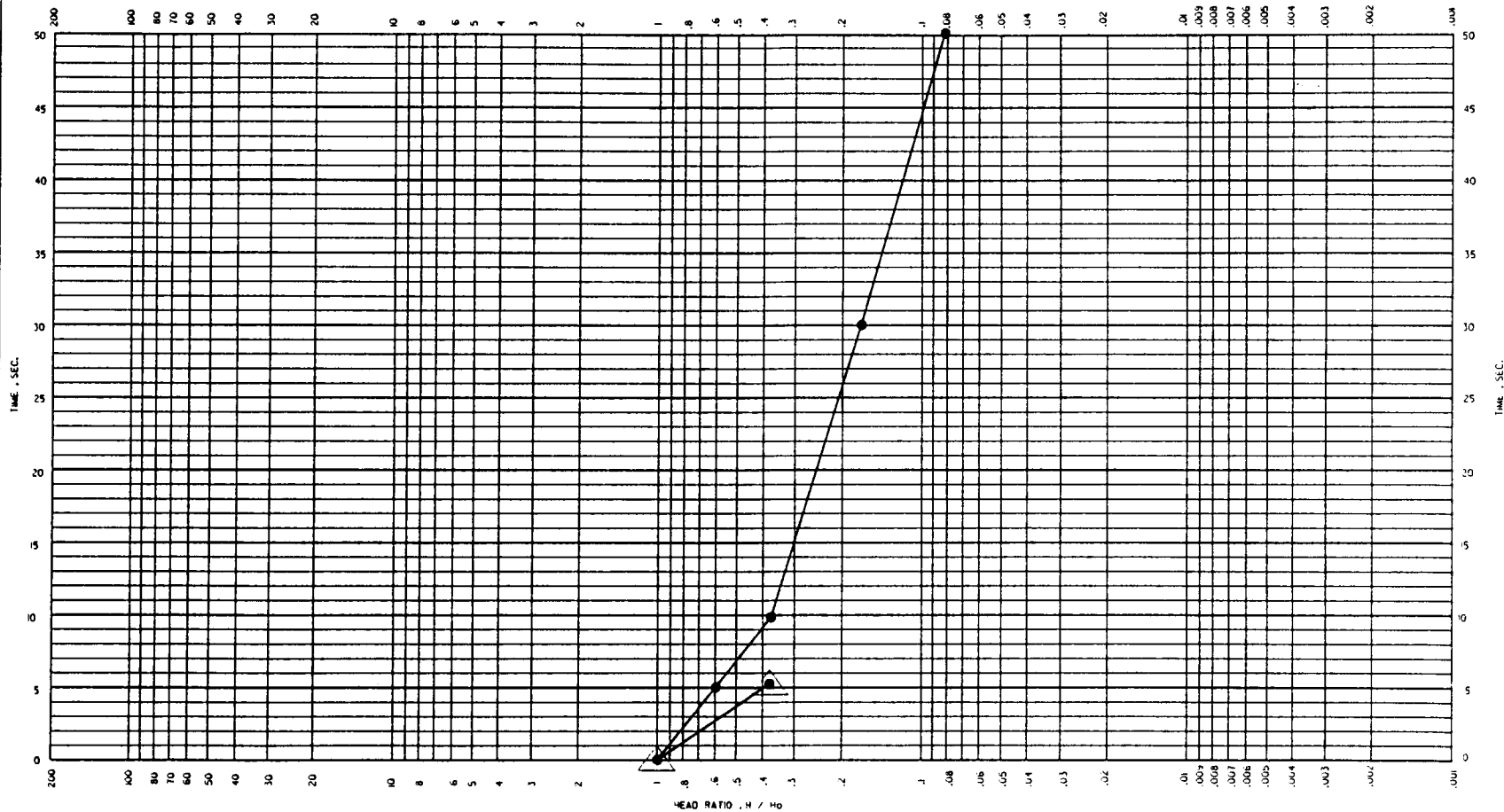
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>2-6-92</u>	<u>1335:20</u>		0	<u>0</u>	<u>2.45</u>	<u>1.0</u>
	<u>1335:25</u>	30 min.	<u>5 sec.</u>	<u>1.0</u>	<u>1.45</u>	<u>.592</u>
	<u>1335:30</u>	1hr	<u>10 sec.</u>	<u>1.5</u>	<u>.95</u>	<u>.388</u>
	<u>1335:50</u>	1hr 30min	<u>30 sec.</u>	<u>2.0</u>	<u>.45</u>	<u>.184</u>
	<u>1335:10</u>	2hr	<u>50 sec.</u>	<u>2.25</u>	<u>.20</u>	<u>.082</u>
	<u>1337</u>	2hr 30min	<u>100 sec.</u>	<u>2.30</u>	<u>.15</u>	<u>.061</u>
	<u>1350</u>	3hr	<u>4min 40sec.</u>	<u>2.45</u>	<u>0</u>	<u>—</u>
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Added 1.5 gal. of water.

*BEING PLOTTED*

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/6/92	PN 1710 FALLING			WEST LEWISTON LEVEE



**PIEZOMETER TEST FORM**

Location: East Lawiston Levee

Piezometer No: PN-100

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water change

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

24.1 WSE Before  
Drawdown

34.1 WSE After  
Drawdown

36.9 ← measured  
Top of  
Sediment

36.8 ← tabulated value  
Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>2-5-91</u>	<u>0824</u>		0	<u>34.1</u>
<u>↓</u>	<u>0859</u>	30 min.	<u>35 min</u>	<u>24.1</u>
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES: Bailed 1.5 gal. of water over 5 min.

NO  
PLOT

**PIEZOMETER TEST FORM**

Location: East Lewisden Levee

Piezometer No: PN-100

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 14.0  
water charge

WSE Before 24.1  
Test

$H_0 = 24.1 - 14.0 = 10.1$

$H = 24.1 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

36.9 ← measured  
Top of  
Sediment

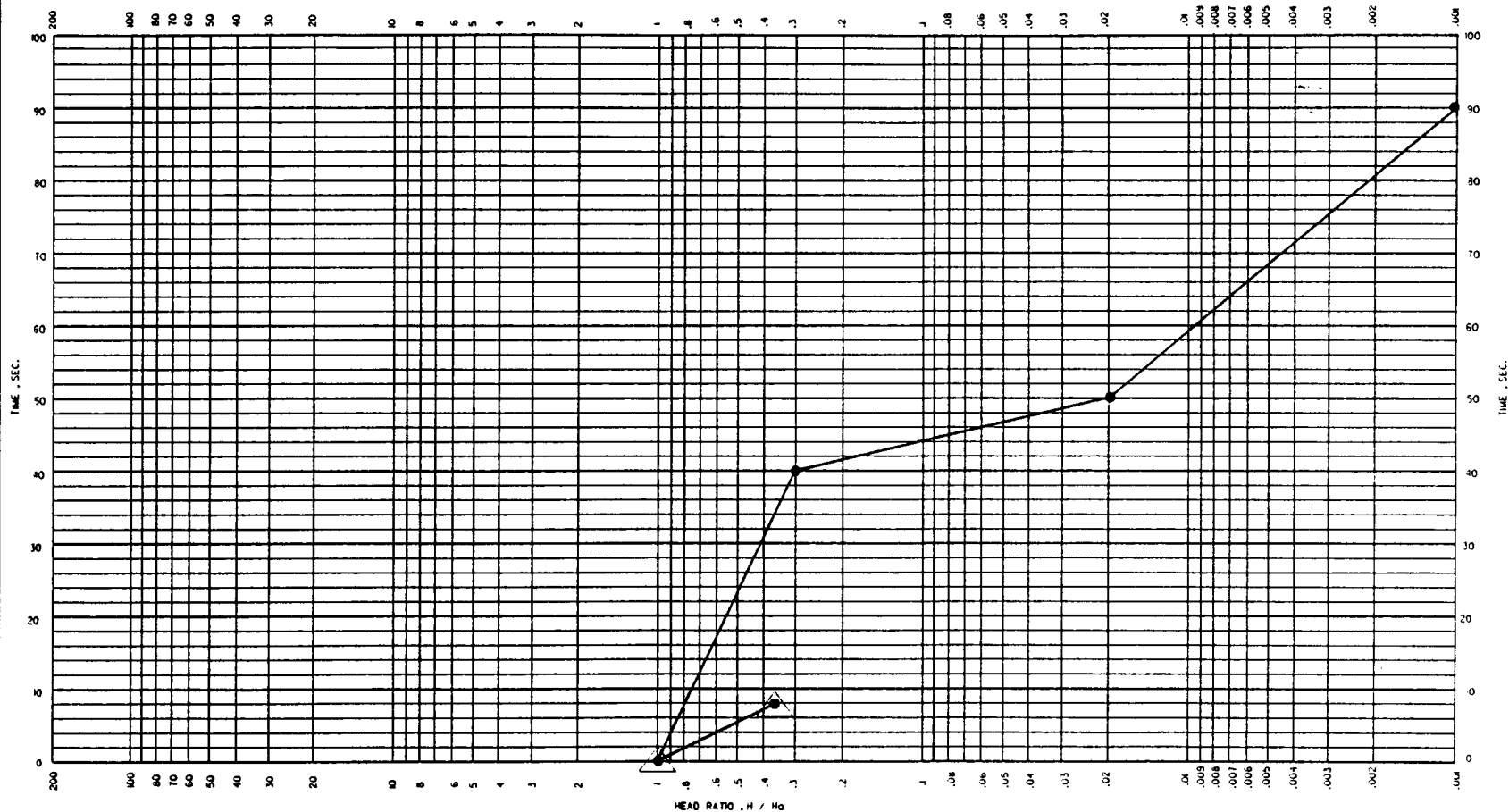
36.8 ← tabulated value  
Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	f	H <sub>1</sub>
		Specified	Actual			
<u>2-5-92</u>	<u>15:54</u>		0	<u>14.0</u>	<u>10.1</u>	<u>1.0</u>
	<u>1554:40</u>	30 min.	<u>40 sec.</u>	<u>23.8</u>	<u>13</u>	<u>10.30</u>
	<u>1554:50</u>	1hr	<u>50 sec.</u>	<u>23.9</u>	<u>12</u>	<u>10.1</u>
	<u>1555:30</u>	1hr 30min	<u>90 sec.</u>	<u>24.1</u>	<u>0</u>	<u>—</u>
		2hr				
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Added 3.5 gal. of water.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/5/92	PN 100 FALLING			EAST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: East Lewiston Levee

Piezometer No: PN-102

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 0.00  
water change

WSE Before 19.72  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

28.4 Measured  
Top of  
Sediment

28.3  
(Table)  
Piezometer  
Bottom

$H_0 = 19.72 - 0 = 19.72$

$H = 19.72 - \text{reading}$

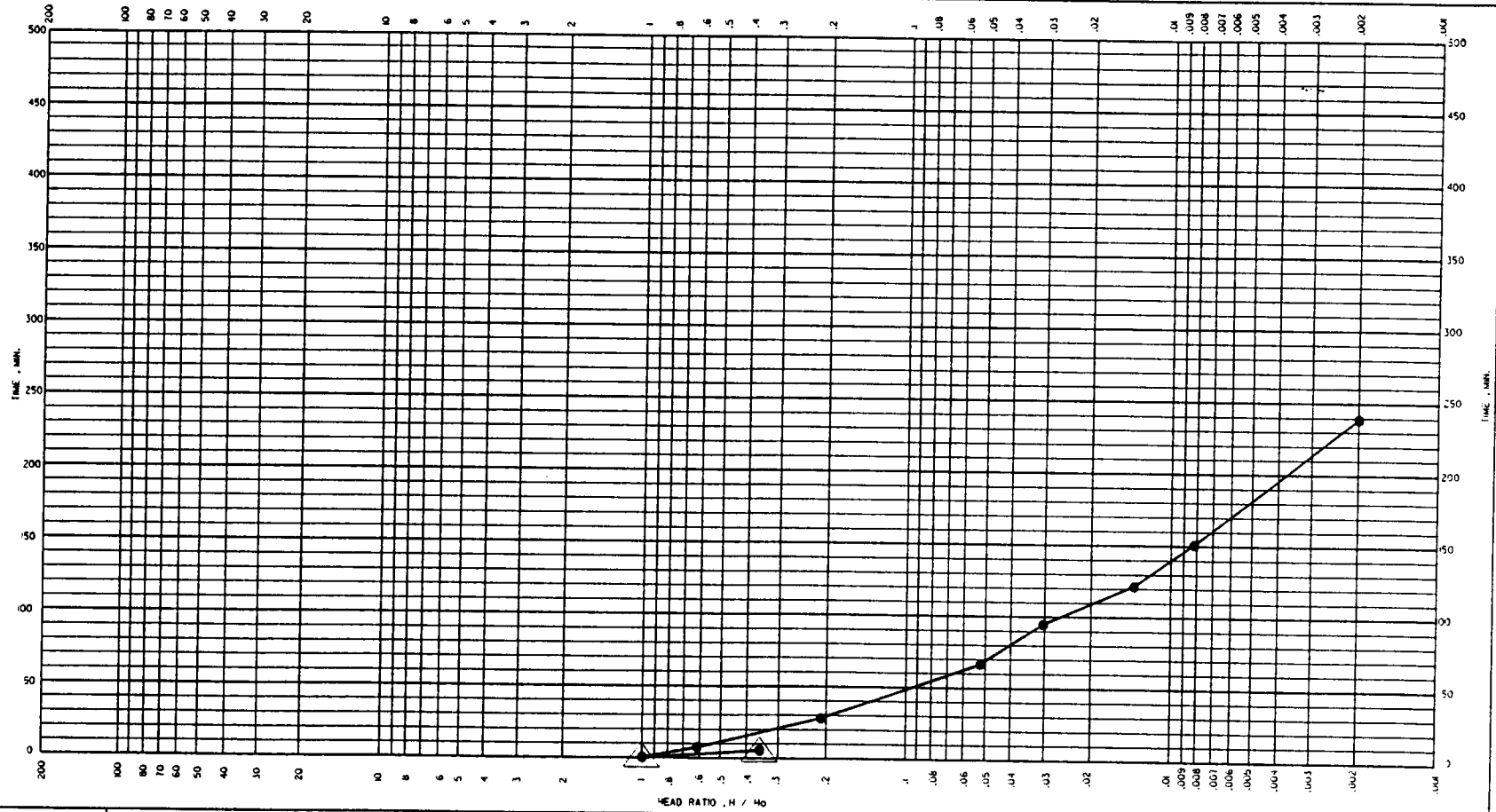
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time	t		Water Table Depth (Feet)	H	H/H <sub>0</sub>
			Specified	Actual			
<u>2-5-92</u>	<u>11:34</u>			<u>min.</u>	<u>0.00</u>	<u>19.72</u>	<u>1.00</u>
<u>"</u>	<u>11:35</u>			<u>1 min</u>	<u>3.6</u>	<u>16.12</u>	<u>.817</u>
<u>"</u>	<u>11:39</u>	<u>20 min.</u>		<u>5 min</u>	<u>7.6</u>	<u>12.12</u>	<u>.615</u>
<u>"</u>	<u>12:02</u>	<u>30 min</u>		<u>28</u>	<u>15.5</u>	<u>4.22</u>	<u>.21</u>
<u>"</u>	<u>12:04</u>	<u>1hr</u>		<u>65</u>	<u>18.7</u>	<u>1.02</u>	<u>.05</u>
<u>"</u>	<u>12:40</u>			<u>95</u>	<u>19.1</u>	<u>.62</u>	<u>.031</u>
<u>"</u>	<u>13:09</u>	<u>1hr 30min</u>					
<u>"</u>	<u>13:34</u>	<u>2hr</u>		<u>130</u>	<u>19.4</u>	<u>.32</u>	<u>.014</u>
<u>"</u>	<u>14:04</u>	<u>2hr 30min</u>		<u>150</u>	<u>19.55</u>	<u>.17</u>	<u>.0081</u>
<u>"</u>	<u>14:34</u>	<u>3hr</u>		<u>180</u>	<u>19.57</u>	<u>.15</u>	<u>.0076</u>
<u>"</u>	<u>15:39</u>	<u>4hr</u>		<u>240</u>	<u>19.68</u>	<u>.04</u>	<u>.002</u>
<u>"</u>		<u>5hr</u>					
<u>"</u>		<u>24hr</u>					
<u>"</u>		<u>48hr</u>					

NOTES:

Added 2.0 Gallons Water

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/5/92	PN 102 FALLING		EAST LEWISTON LEVEE

TIME LAG THEORY

**PIEZOMETER TEST FORM**

Location: East Lawiston Levee

Piezometer No: PN-1350

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water change

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

~~11.44~~ 11.44  
WSE Before  
Drawdown

11.50 WSE After  
Drawdown

23.1 Top of  
Sediment

23.1 Piezometer  
Bottom

$H_0 = 11.5 - 11.44 = .060$   
 $H = \text{reading} - 11.44$

WSE=Water Surface Elevation (Feet)

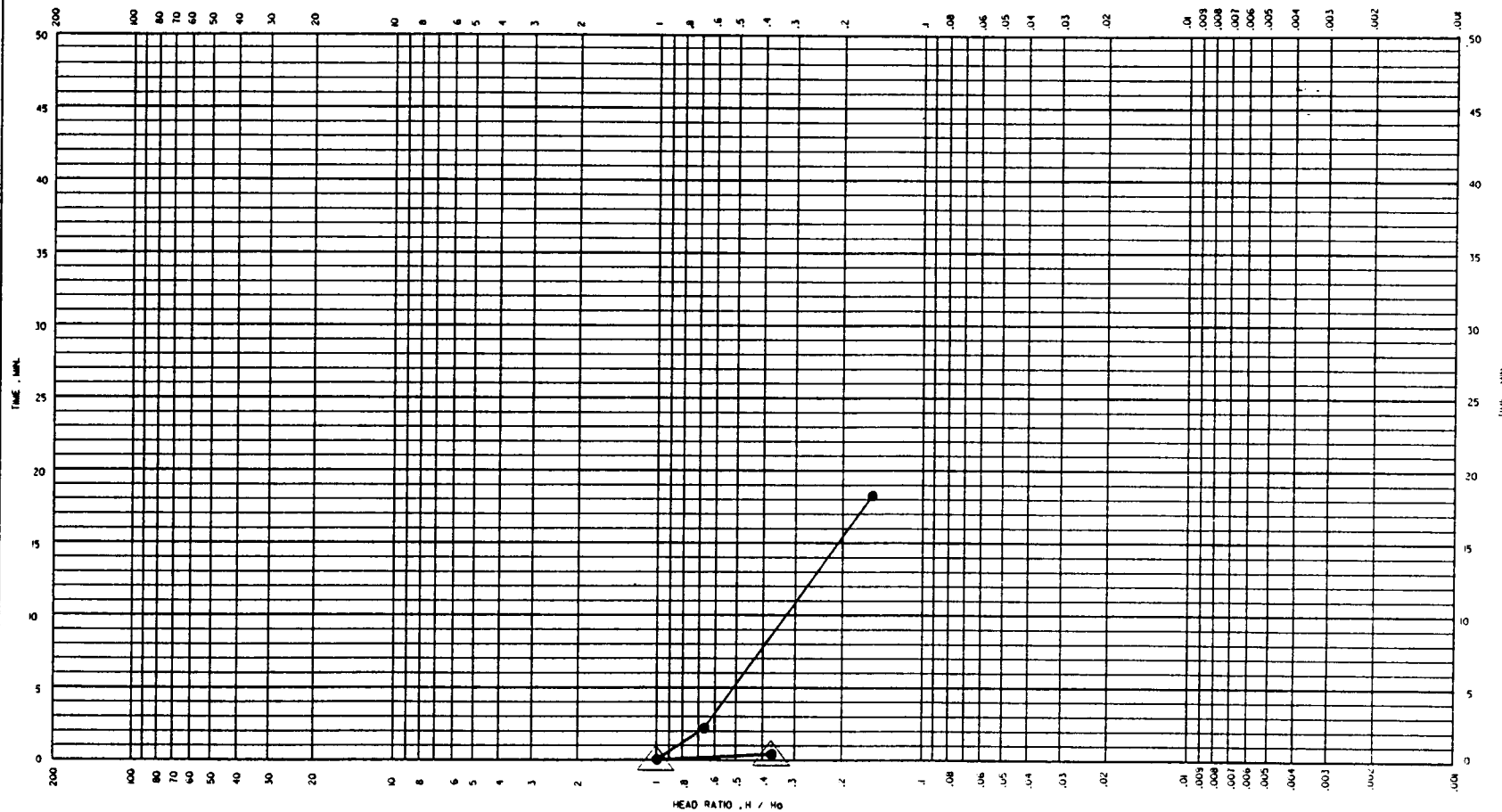
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/ H <sub>0</sub>
		Specified	Actual			
<u>2-4-92</u>	<u>1510</u>	0	<u>min</u>	<u>11.50</u>	<u>.060</u>	<u>1.0</u>
<u>"</u>	<u>1512</u>	<u>30 min.</u>	<u>2</u>	<u>11.48</u>	<u>.04</u>	<u>.667</u>
<u>"</u>	<u>1528</u>	<u>1hr</u>	<u>18</u>	<u>11.45</u>	<u>.01</u>	<u>.167</u>
_____	_____	<u>1hr 30min</u>	_____	_____	_____	_____
_____	_____	<u>2hr</u>	_____	_____	_____	_____
_____	_____	<u>2hr 30min</u>	_____	_____	_____	_____
_____	_____	<u>3hr</u>	_____	_____	_____	_____
_____	_____	<u>4hr</u>	_____	_____	_____	_____
_____	_____	<u>5hr</u>	_____	_____	_____	_____
_____	_____	<u>24hr</u>	_____	_____	_____	_____
_____	_____	<u>48hr</u>	_____	_____	_____	_____

NOTES: Cap is not vented.

Bailed 1 gal. in 2 min. → ~ no drawdown.

Decided to do a falling head test, too. → See separate sheet

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/4/92	PH 1350 RISING			EAST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: East Lewiston Levee Falling Head Test  
 Depth (Ft)

Piezometer No: PN-1350

Type of Test: Falling  
 (Falling Head or Rising Head)

WSE After 10.2  
 water charge

WSE Before 11.4  
 Test

Rising Head Test  
 Depth (ft)

11.4 <sup>PUN</sup>  
 WSE Before  
 Drawdown

WSE After  
 Drawdown

23.1 Top of  
 Sediment

23.1 Piezometer  
 Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>2-4-92</u>	<u>1531</u>		0	<u>10.2</u>
<u>"</u>	<u>1531:30</u>	<del>30 min</del>	<u>0.5 min</u>	<u>11.4</u>
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES: Added 5 gal. of water

NO  
 PLOT



**PIEZOMETER TEST FORM**

Location: East Lewiston Levee

Piezometer No: PN-1351

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After \_\_\_\_\_  
water charge

WSE Before \_\_\_\_\_  
Test

15.47 WSE Before  
Drawdown

15.64 WSE After  
Drawdown

$H = 15.64 - 15.47 = .17$

$H = \text{reading} - 15.47$

30.5 Top of  
Sediment

30.5 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time	$t$	Water Table Depth (Feet)	H	P/I
<u>2-4-92</u>	<u>14:44</u>	Specified	Actual (minutes)	<u>15.64</u>	<u>.17</u>	<u>1.00</u>
"	<u>14:45</u>	<del>30 min</del>	<del>1</del>	<u>15.53</u>	<u>.06</u>	<u>.353</u>
"	<u>14:47</u>	<del>1hr</del>	<u>3</u>	<u>15.52</u>	<u>.05</u>	<u>.294</u>
"	<u>14:50</u>	<del>1hr 30min</del>	<u>6</u>	<u>15.51</u>	<u>.04</u>	<u>.235</u>
		2hr				
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

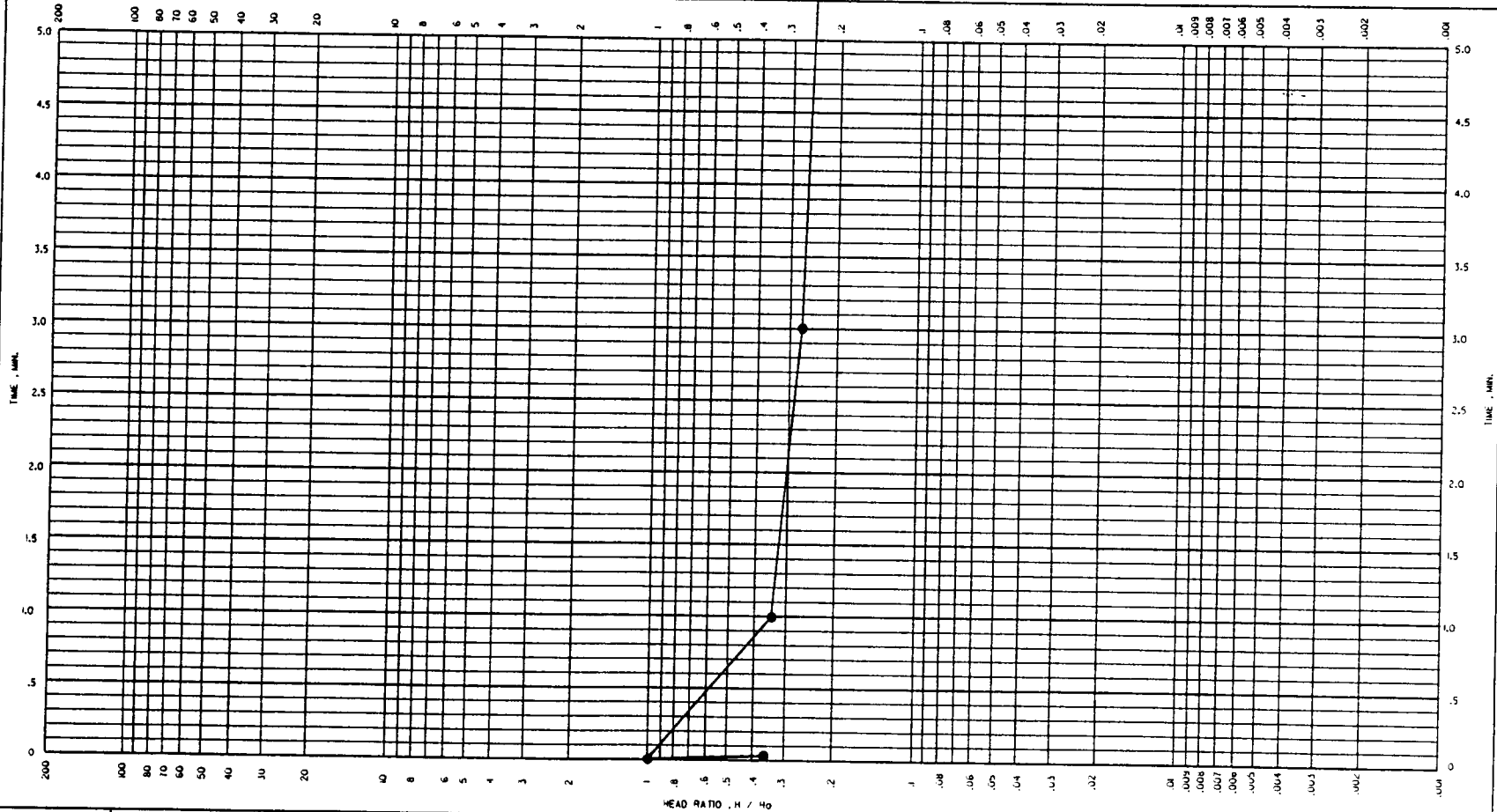
NOTES:

Cap is not vented.

Bailed 1 gal in 2 min.

Decided to do a Falling head test, too. See separate sheet.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/4/92	PH 1351 RISING	TIME LAG THEORY	EAST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: East Lewiston Levee

Piezometer No: PN-1351

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 15.5  
water change

WSE Before 13.8  
Test

$H_0 = 15.5 - 13.8 = 1.7$   
 $H = 15.5$  ready

Rising Head Test  
Depth (ft)

15.5 WSE Before  
Drawdown

13.8 WSE After  
Drawdown

30.5 Top of  
Sediment

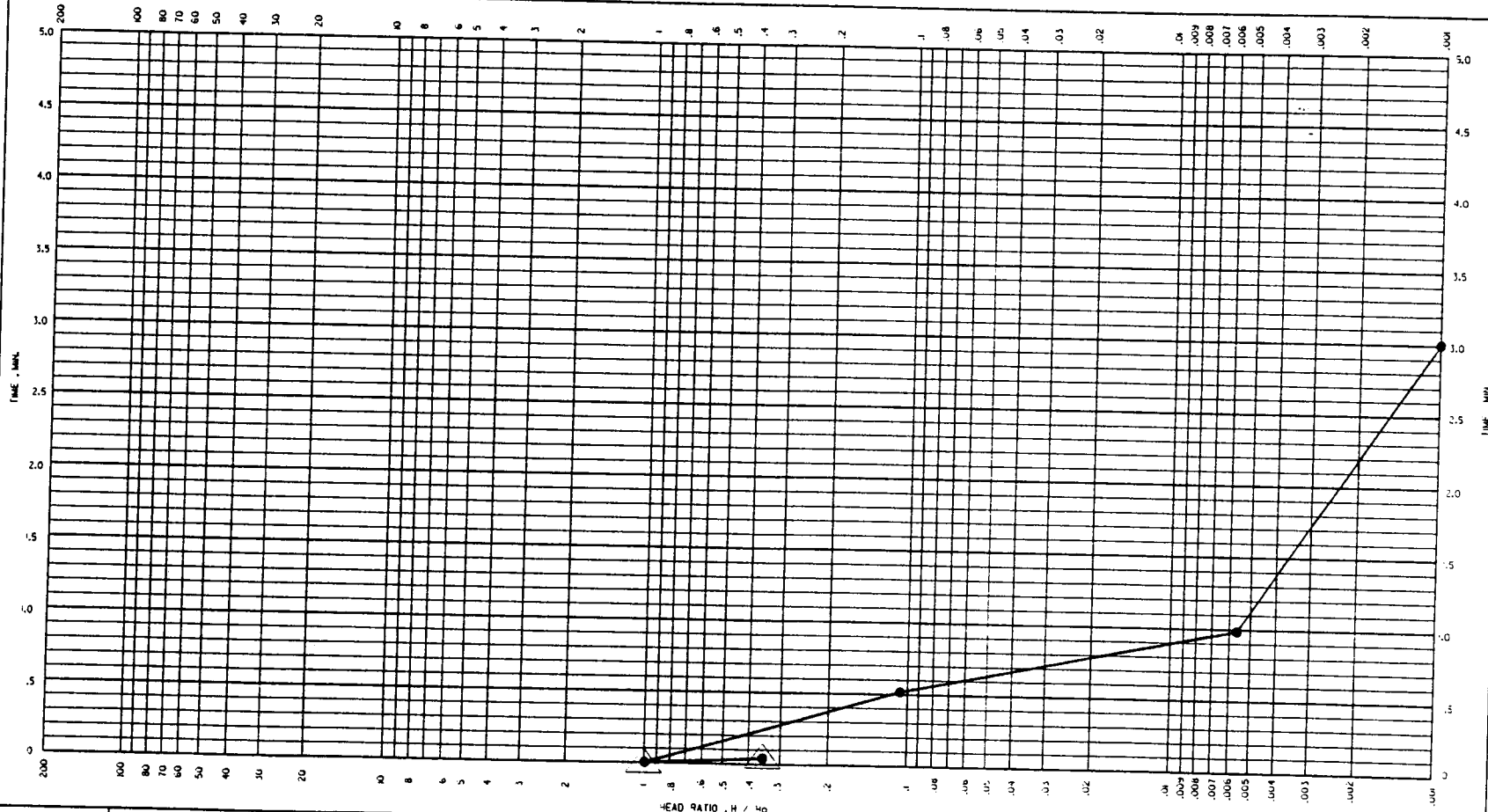
30.5 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	h	h/h <sub>0</sub>
		Specified	Actual			
<u>2-4-92</u>	<u>1453</u>	0	<u>0</u> Min	<u>13.8</u>	<u>1.7</u>	<u>1.00</u>
"	<u>1453:30</u>	<del>30 min.</del>	<u>0.5 min</u>	<u>15.3</u>	<u>1.2</u>	<u>.118</u>
"	<u>1454</u>	<del>1 hr</del>	<u>1</u>	<u>15.4</u>	<u>1.1</u>	<u>.059</u>
"	<u>1456</u>	<del>1 hr 30 min</del>	<u>3</u>	<u>15.5</u>	<u>0</u>	<u>—</u>
		2hr				
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Add 5 gal. of water  
Couldn't get water to come up 10 ft.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/4/92	PN 1351 FALLING	TIME LAG THEORY	EAST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: East Lewiston Levee

Piezometer No: PN-1353

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 12.0  
water charge

WSE Before 14.29  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

$H_0 = 14.29 - 12.0 = 2.29$   
 $H = 14.29 - \text{reading}$

28.5 Top of  
Sediment  
28.5 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	t	t/1
		Specified	Actual			
<u>2-4-92</u>	<u>1600:30</u>		0 min	<u>12.00</u>	2.29	1.00
"	<u>1601</u>	<del>30 min</del>	<u>0.5 min</u>	<u>14.20</u>	.09	.039
"	<u>1602:30</u>	<del>1hr</del>	<u>2 min</u>	<u>14.26</u>	.07	.013
"	<u>1604</u>	<del>1hr 30min</del>	<u>3.5 min</u>	<u>14.28</u>	.01	.004
		2hr				
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

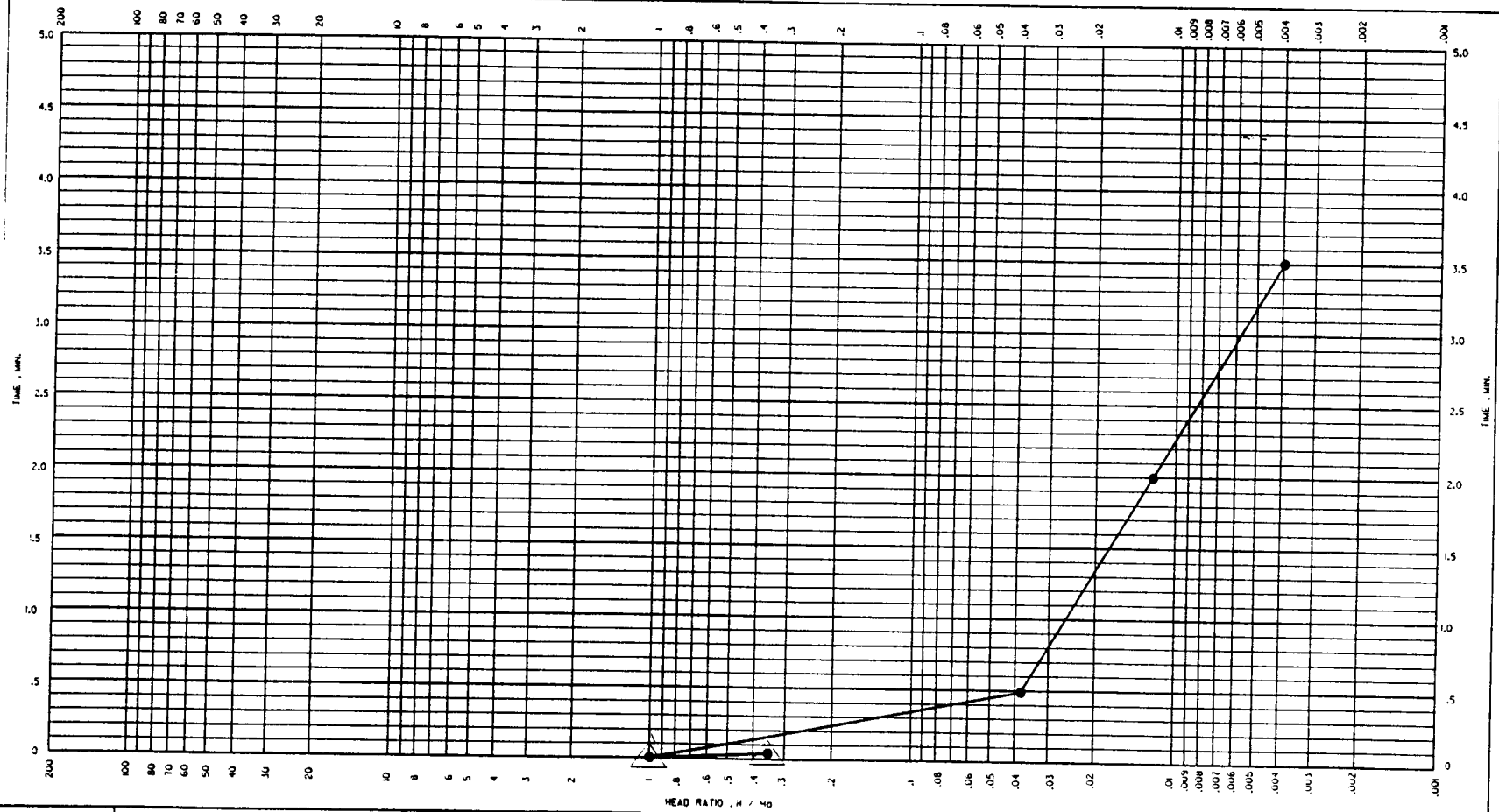
NOTES: Cap is not vented.

① Tried bailing 1 gal in  $2\frac{1}{2}$  min. → 0.05' of drawdown

(1352 → t=0 → 14.34')  
(1354 → t=2 → 14.32')

② After rapid recovery, added 5 gal. of water for falling head test.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/4/92	PN 1353 FALLING			EAST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: East Lewiston Levee

Piezometer No: PN-1354

Type of Test: <sup>PVH</sup> ~~Rising~~ Falling  
 (Falling Head or Rising Head)

Falling Head Test  
 Depth (Ft)

WSE After 10.3  
 water change

WSE Before 13.09  
 Test

$H_0 = 13.09 - 10.3 = 2.79$

$H = 13.09 - \text{reading}$

Rising Head Test  
 Depth (ft)

~~13.09~~ <sup>PVH</sup> WSE Before  
 Drawdown

WSE After  
 Drawdown

24.4 Top of  
 Sediment

24.4 Piezometer  
 Bottom

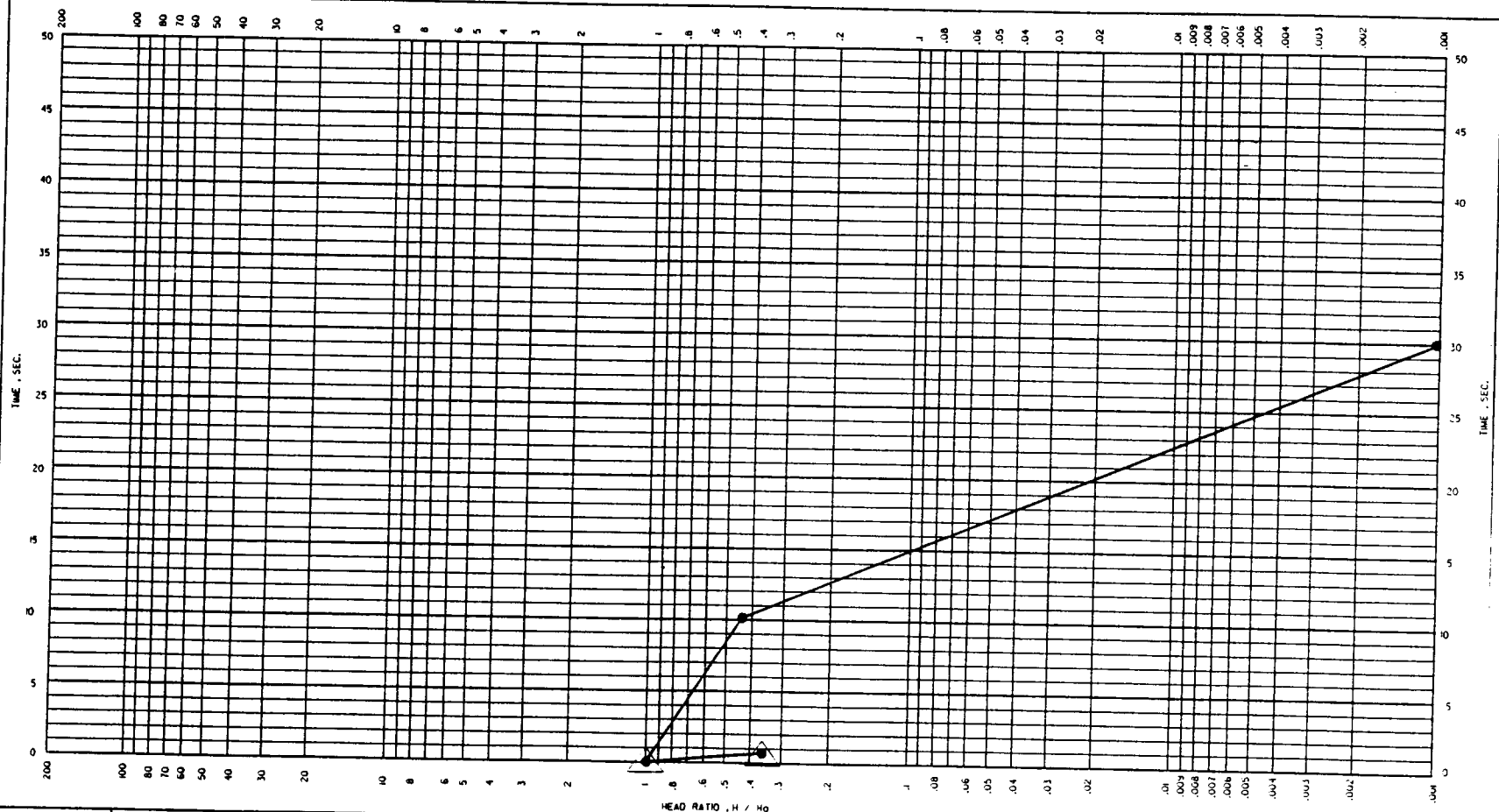
WSE=Water Surface Elevation (Feet)


Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	1/H
		Specified	Actual			
<u>2-5-92</u>	<u>11:50</u>		0	<u>10.3</u>	<u>2.79</u>	<u>1.00</u>
<u>"</u>	<u>"</u>	30 min.	<u>10 sec</u>	<u>11.9</u>	<u>1.19</u>	<u>.427</u>
<u>"</u>	<u>11:50.5</u>	1hr	<u>30 sec</u>	<u>13.1</u>	<u>0</u>	<u>—</u>
		1hr 30min				
		2hr				
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: ~~Bailed <sup>PVH</sup> gal. in min.~~ Did not bail because pipe was crooked.

Added 4.0 gal. of water

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/5/92	PN 1354 FALLING	 TIME LAG THEORY	EAST LEWISTON LEVEE



**PIEZOMETER TEST FORM**

Location: East Lewiston Levee Falling Head Test  
 Depth (Ft)

Rising Head Test  
 Depth (ft)

Piezometer No: PN-1355

Type of Test: Falling  
 (Falling Head or Rising Head)

WSE After 9.8  
 water change

WSE Before  
 Drawdown

WSE Before 11.16  
 Test

WSE After  
 Drawdown

$H_0 = 11.16 - 9.8 = 1.36$   
 $H = 11.16 - \text{reading}$

20.7 Top of  
 Sediment

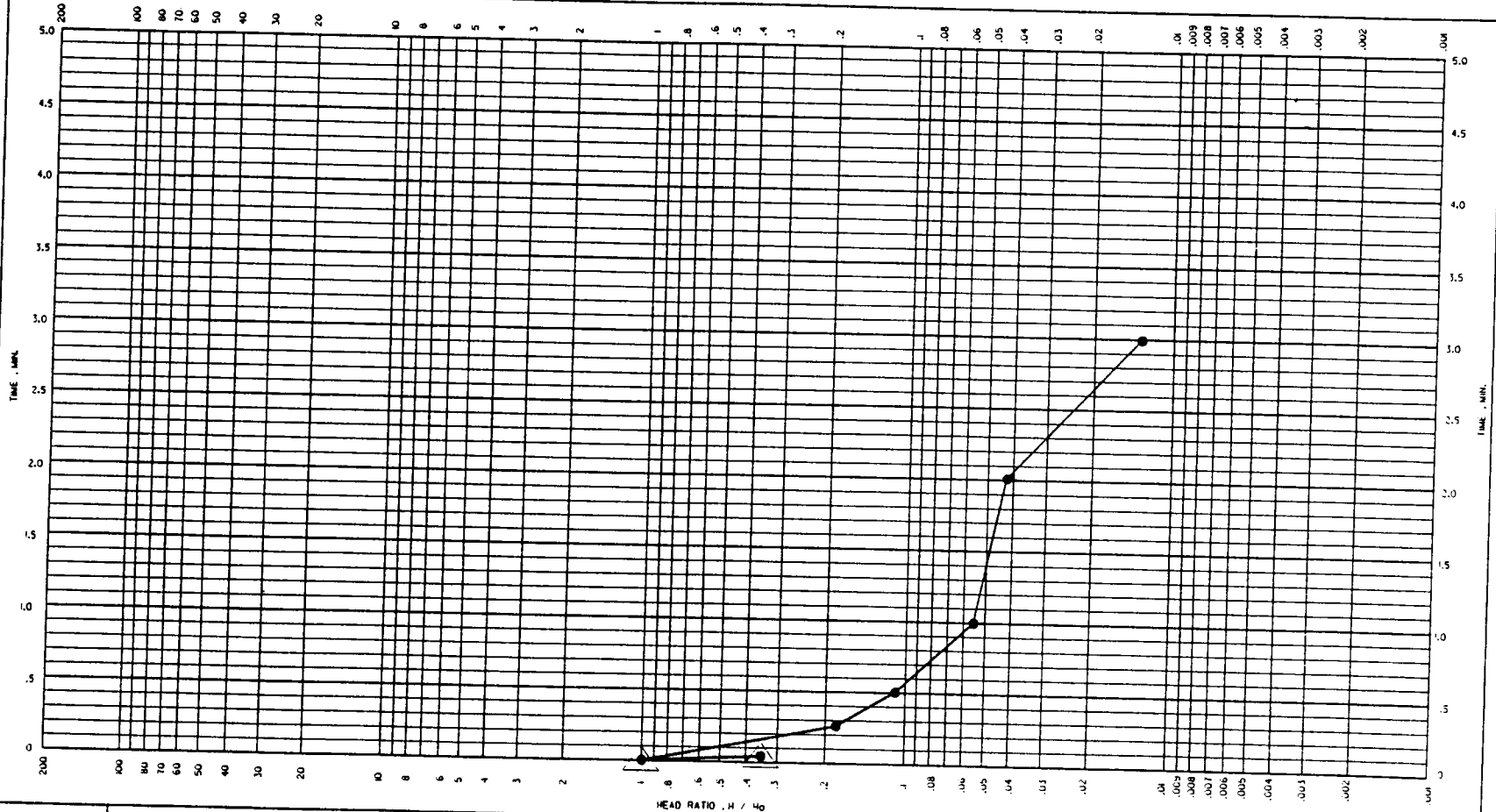
20.7 Piezometer  
 Bottom


WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	f	H/H <sub>0</sub>
		Specified	Actual			
<u>2-5-92</u>	<u>9:49.15</u>		0	<u>9.80</u>	<u>1.36</u>	<u>1.00</u>
<u>"</u>	<u>9:50</u>	30 min.	<u>0.95 min</u>	<u>9.9</u>	<u>10.90</u>	<u>1.91</u>
<u>"</u>	<u>9:50.75</u>	1hr	<u>0.5 min</u>	<u>11.00</u>	<u>.16</u>	<u>.118</u>
<u>"</u>	<u>9:50.75</u>	1hr 30min	<u>1 min</u>	<u>11.08</u>	<u>.08</u>	<u>.059</u>
<u>"</u>	<u>9:51.75</u>	2hr	<u>2 min</u>	<u>11.10</u>	<u>.06</u>	<u>.044</u>
<u>"</u>	<u>9:52.75</u>	2hr 30min	<u>3 min</u>	<u>11.14</u>	<u>.02</u>	<u>.0147</u>
_____	_____	3hr	_____	_____	_____	_____
_____	_____	4hr	_____	_____	_____	_____
_____	_____	5hr	_____	_____	_____	_____
_____	_____	24hr	_____	_____	_____	_____
_____	_____	48hr	_____	_____	_____	_____

NOTES: Added 4.0 gal. of water.

### PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	 TIME LAG THEORY
2/5/92	PN 1355 FALLING		LOCATION EAST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: East Lewiston Levee

Piezometer No: PN-1356

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 10.90  
water charge

WSE Before 12.53  
Test

$H_0 = 12.53 - 10.9$   
 $= 1.63$   
 $H = 12.53 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

19.2 Top of  
Sediment

19.3 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	P/H
		Specified	Actual			
<u>2-5-92</u>	<u>10:46.15</u>		0	<u>10.90</u>	<u>1.63</u>	<u>1.06</u>
"	<u>10:47</u>	30 min.	<u>10 sec.</u>	<u>11.90</u>	<u>.63</u>	<u>.387</u>
"	<u>10:47.25</u>	1hr	<u>30 sec</u>	<u>12.5</u>	<u>.03</u>	<u>.018</u>
		1hr 30min				
		2hr				
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES: Added 4 gal. of water.

PIEZOMETER TEST FORM

Location: East Lewislow Lagoon

Piezometer No: PN-1357

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 9.1  
water charge

WSE Before 12.68  
Test

$12.68 - 8.1 = 4.58$

$H = 12.68 - \text{read.}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

23.7 Top of  
Sediment

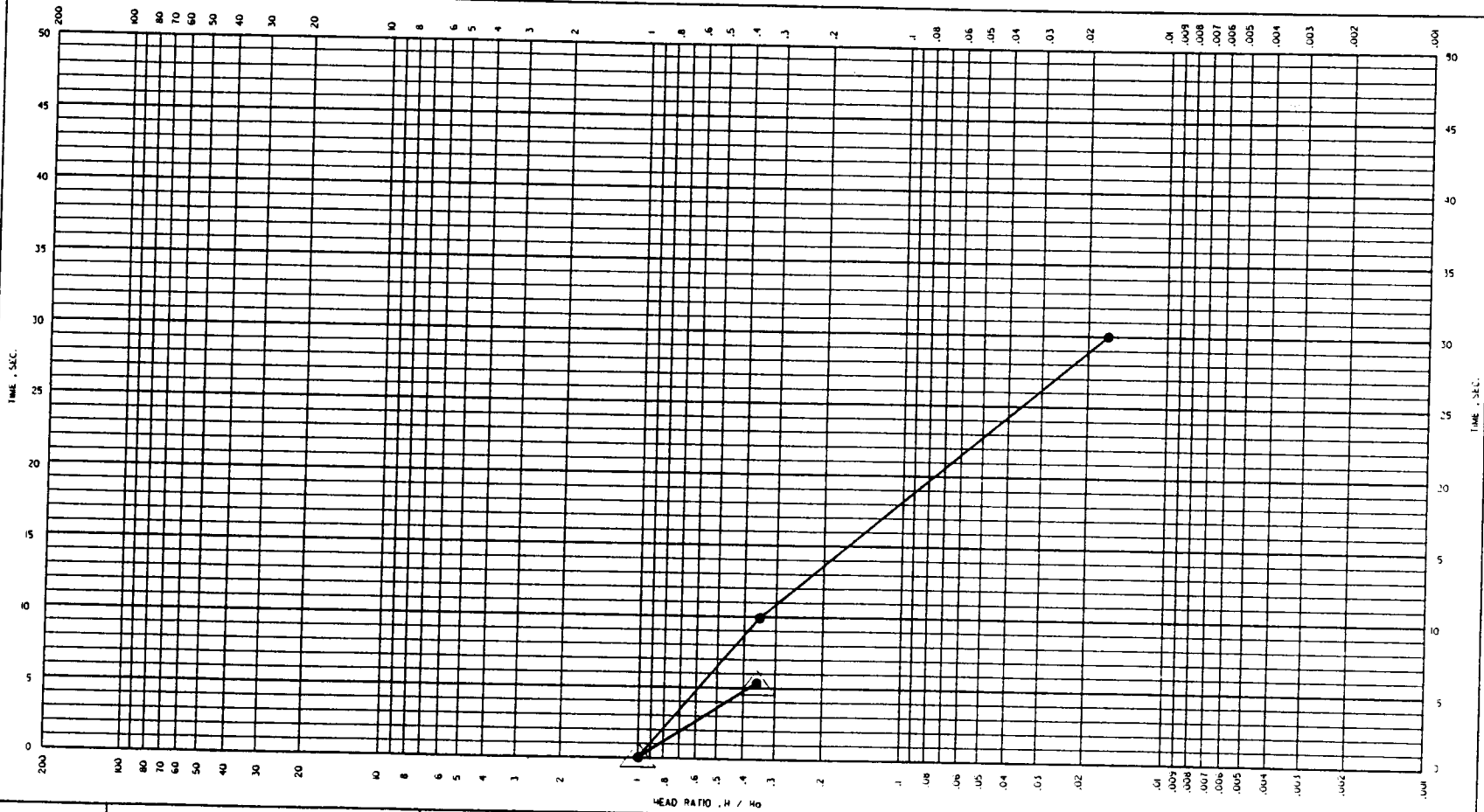
23.7 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	h	V <sub>0</sub>
		Specified	Actual			
<u>2-5-92</u>	<u>10:57:30</u>		0	<u>9.10</u>	<u>4.58</u>	<u>1.0</u>
<u>"</u>	<u>10:57:40</u>	30 min.	<u>10 sec</u>	<u>10.40</u>	<u>2.28</u>	<u>.498</u>
<u>"</u>	<u>10:58</u>	1hr	<u>30 sec</u>	<u>12.20</u>	<u>.48</u>	<u>.165</u>
<u>"</u>	<u>10:58:10</u>	1hr 30min	<u>40 sec</u>	<u>12.68</u>	<u>0</u>	<u>=</u>
_____	_____	2hr	_____	_____	_____	_____
_____	_____	2hr 30min	_____	_____	_____	_____
_____	_____	3hr	_____	_____	_____	_____
_____	_____	4hr	_____	_____	_____	_____
_____	_____	5hr	_____	_____	_____	_____
_____	_____	24hr	_____	_____	_____	_____
_____	_____	48hr	_____	_____	_____	_____

NOTES: Added 4.0 gallons water

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/5/92	PN 1356 FALLING			EAST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: East Lewiston Levee

Piezometer No: PN-1357

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water charge

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

12.68 WSE Before  
Drawdown

12.70 WSE After  
Drawdown

23.7 Top of  
Sediment

23.7 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

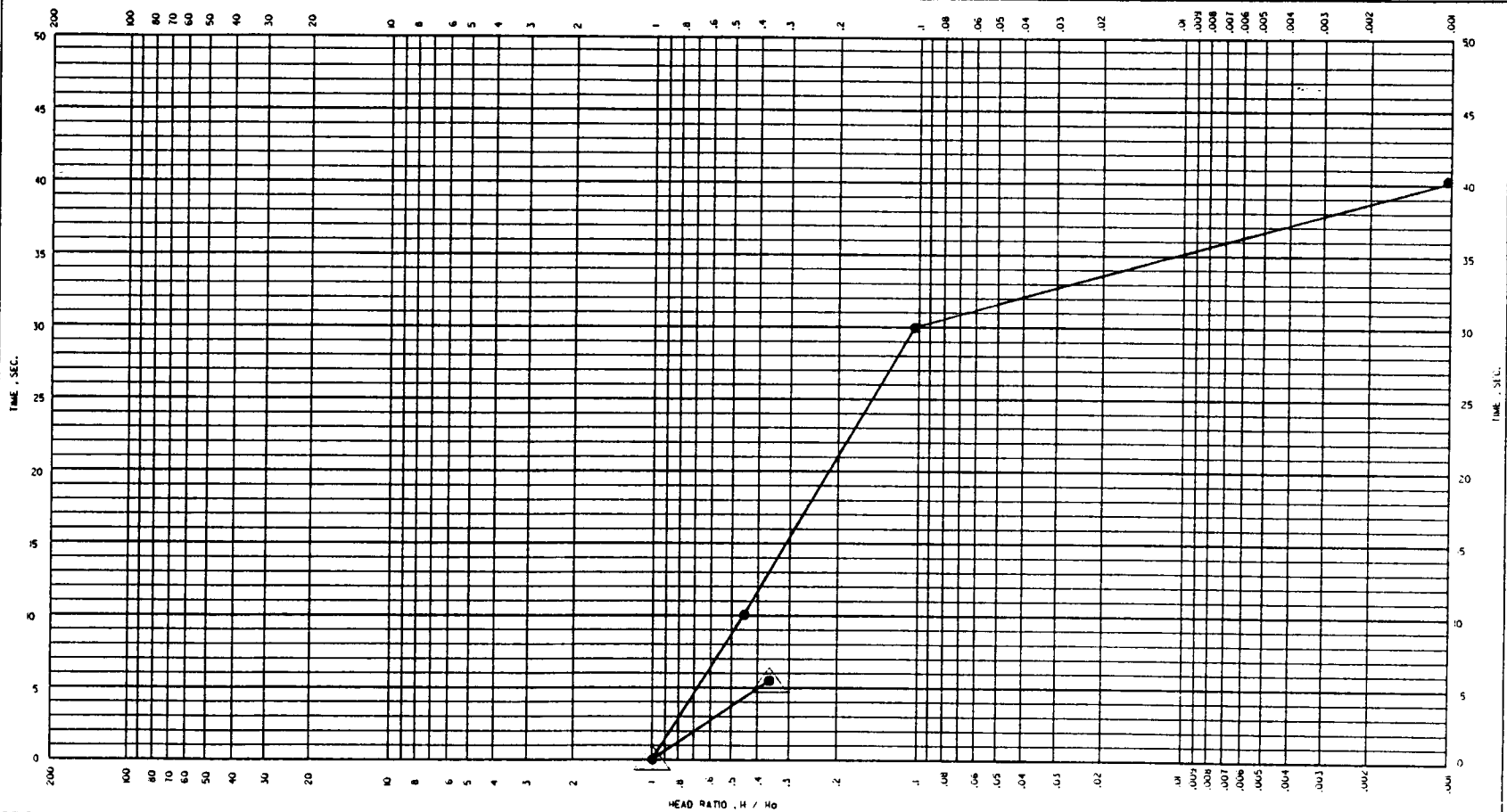
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>2-5-92</u>	<u>1055:30</u> <del><u>10:55:30</u></del>		0	<u>12.70</u>
_____	_____	30 min.	_____	_____
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____


*Will Add  
Water To  
Induce Head  
Change  
(See separate  
sheet).*

NOTES: Bailed 1.6 gal. in 2.0 min.

*NO PLOT*

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/5/92	PN 1357 FALLING		 TIME LAG THEORY	EAST LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: East Lewiston Levee

Piezometer No: PN-1359

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 14.87  
water change

WSE Before 16.90  
Test

Rising Head Test  
Depth (ft)

WSE Before 14.87  
Drawdown

WSE After 16.90  
Drawdown

$H_0 = 16.90 - 14.87 = 2.03$   
 $H = 16.90 - 14.87$

29.1 Top of Sediment

29.1 Piezometer Bottom

WSE=Water Surface Elevation (Feet)

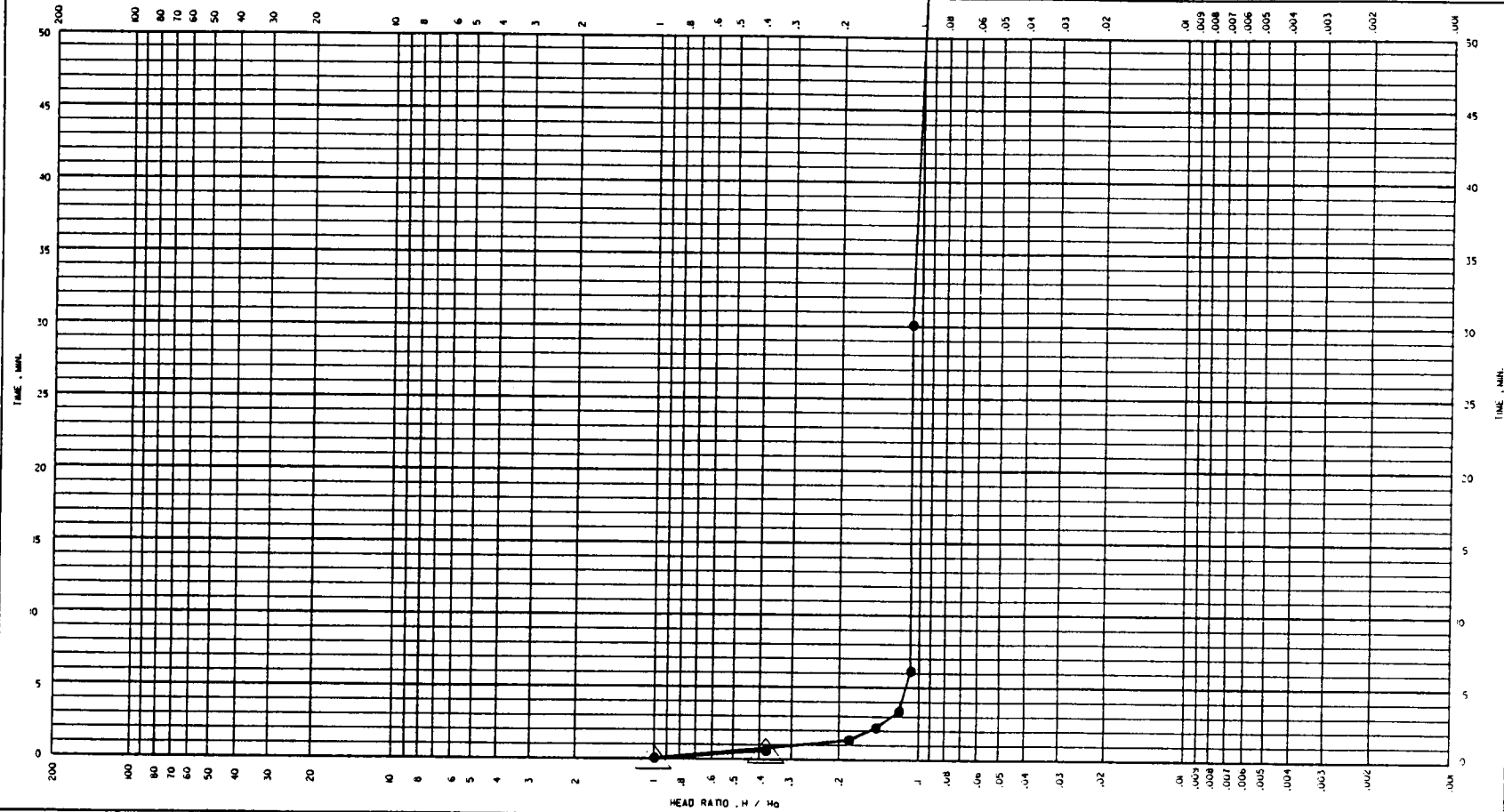
Date	Time (24-Hour Clock)	Elapsed Time <i>t</i>		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>2-4-92</u>	<u>11:16</u>		0	<u>16.90</u>	<u>2.03</u>	<u>1.00</u>
"	<u>11:17</u>	1 min	<u>1</u>	<u>15.26</u>	<u>.37</u>	<u>.172</u>
"	<u>11:18</u>	<del>2</del> min.	<u>2</u>	<u>15.18</u>	<u>.31</u>	<u>.153</u>
"	<u>11:19</u>		<u>3</u>	<u>15.15</u>	<u>.28</u>	<u>.13</u>
"	<u>11:22</u>	<del>4</del> min.	<u>6</u>	<u>15.10</u>	<u>.23</u>	<u>.113</u>
"	<u>11:46</u>		<u>30</u>	<u>15.10</u>	<u>.23</u>	<u>.113</u>
"	<u>12:16</u>	1hr 30min	<u>60</u>	<u>15.07</u>	<u>.20</u>	<u>.0985</u>
"	<u>12:46</u>		<u>90</u>	<u>15.07</u>		
"	<u>13:16</u>	2hr	<u>120</u>	<u>15.07</u>		
"	<u>13:46</u>	2hr 30min	<u>150</u>	<u>15.07</u>		
"	<u>14:16</u>	3hr	<u>180</u>	<u>15.07</u>		
"	<u>15:16</u>	4hr	<u>240</u>	<u>15.09</u>		
"	<u>16:16</u>	5hr	<u>300</u>	<u>15.09</u>		
<u>2-5-92</u>	<u>11:16</u>	24hr	<u>1440</u>	<u>15.12</u>		
<u>2-6-92</u>	<u>11:16</u>	48hr	<u>2880</u>	<u>15.18</u>		

NOTES:  
Bailed 2 gal. in 3 min.  
Cap is not vented.

reservoir level is down a few feet from 2-5-92.



PIEZOMETER TIME LAG PLOT



DATE

PIEZOMETER NO. AND DATA

PROJECT



TIME LAG THEORY

LOCATION

EAST LEWISTON LEVEE

7/4/92

PN 1359 RISING

PIEZOMETER TEST FORM

Location: East Lewiston Levee

Piezometer No: PN-1359

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After water charge 14.5

WSE Before Test 15.18

$H_0 = 15.18 - 14.5 = .68$

$H = 15.18 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before Drawdown

WSE After Drawdown

29.1 Top of Sediment

29.1 Piezometer Bottom

WSE=Water Surface Elevation (Feet)

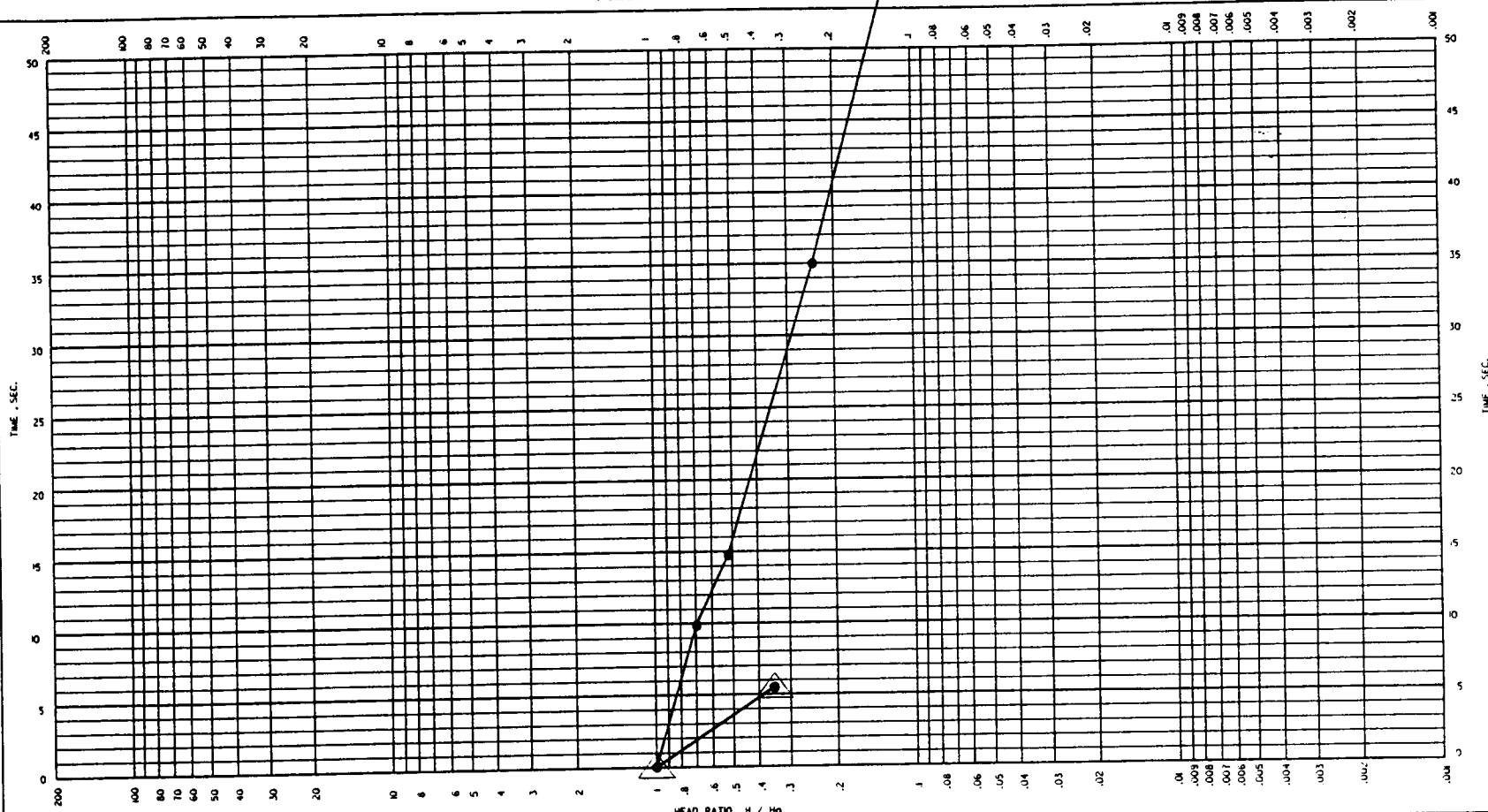
Date	Time (24-Hour Clock)	Elapsed Time $t$		Water Table Depth (Feet)	H	$t/H$
		Specified	Actual			
<u>2-6-92</u>	<u>11 27:30</u>		0	<u>14.5</u>	<u>.68</u>	<u>1.06</u>
"	<u>11 27:40</u>	30 min.	<u>10 sec.</u>	<u>14.7</u>	<u>.48</u>	<u>.706</u>
"	<u>11 27:45</u>	1hr	<u>15 sec.</u>	<u>14.8</u>	<u>.38</u>	<u>.55</u>
"	<u>11 28:05</u>	1hr 30min	<u>35 sec.</u>	<u>15.0</u>	<u>.18</u>	<u>.265</u>
"	<u>11 28:30</u>	2hr	<u>1 min 50 sec.</u>	<u>15.1</u>	<u>.08</u>	<u>.118</u>
<u>2/7</u>	<u>11 28:30</u>	2hr 30min	_____	_____	_____	_____
_____	_____	3hr	_____	_____	_____	_____
_____	_____	4hr	_____	_____	_____	_____
_____	_____	5hr	_____	_____	_____	_____
_____	_____	24hr	_____	_____	_____	_____
_____	_____	48hr	_____	_____	_____	_____


NOTES:

Added 5 gal. → drained fast ... missed readings due to water on sides of casing interfering w/ water level indicator.

Added 5 more gal. after having returned to static → got a little more data (see above).

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/6/92	PN 1359 FALLING	 TIME LAG THEORY	EAST LEWISTON LEVEE

PIEZOMETER TEST FORM

Location: North Lewisston Levee

Piezometer No: PN-1341

Type of Test: Falling ~~Rising~~ <sup>DRH</sup>  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 14.0 ~~15.95~~ <sup>DRH</sup>  
water charge

WSE Before 15.95  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

15.95 <sup>DRH</sup> WSE After  
Drawdown

26.9 Top of  
Sediment

26.9 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>2-5-92</u>	<u>15:00</u>		0	<u>14.0</u>
	<u>15:00:30</u>	30 min.	<u>30 seconds</u>	<del>14.0</del> <u>15.95</u> <sup>DRH</sup>
		1hr		
		1hr 30min		
		2hr		
		2hr 30min		
		3hr		
		4hr		
		5hr		
		24hr		
		48hr		

NOTES: Cap is not vented.

Casing is bent just below the water level. We will add water.

Added 4.0 gallons

NO  
PLOT

ASK  
PAUL

**PIEZOMETER TEST FORM**

Location: North Lewiston Levee

Piezometer No: PN-1342

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 3.0  
water change  
WSE Before 13.58  
Test

$H_0 = 13.58 - 3.0 = 10.58$   
 $H = 13.58 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown  
WSE After  
Drawdown

27.6 Top of  
Sediment  
27.6 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

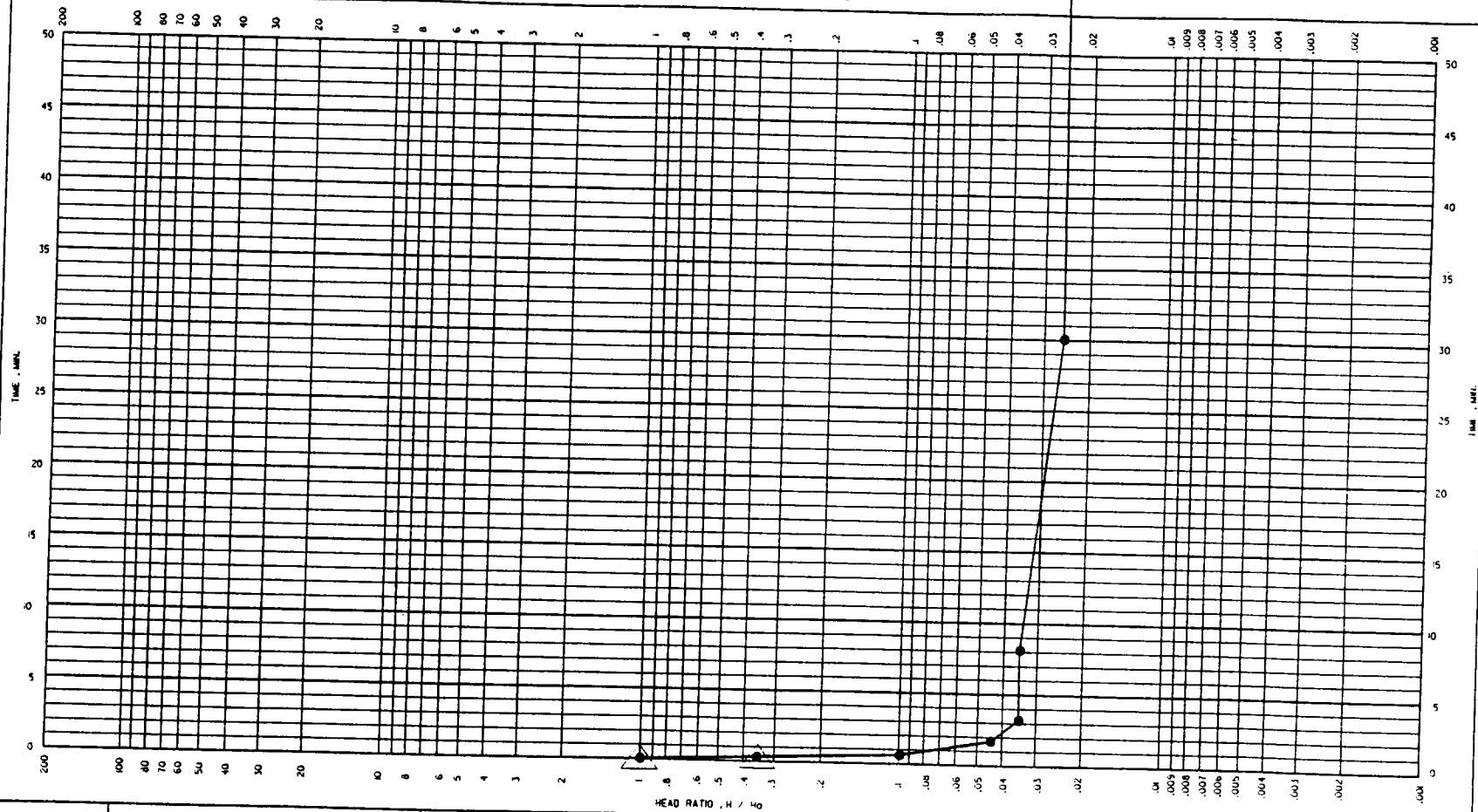
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/ H <sub>0</sub>
		Specified	Actual min.			
<u>2-5-92</u>	<u>1404</u>	0	0	<u>3.0</u>	<u>10.58</u>	<u>1.00</u>
"	<u>1404:30</u>	<del>30 min.</del>	<u>0.5</u>	<u>12.5</u>	<u>1.08</u>	<u>.102</u>
"	<u>1405:30</u>	<del>1hr</del>	<u>1.5</u>	<u>12.1</u>	<u>.48</u>	<u>.045</u>
"	<u>1407</u>	<del>1hr 30min</del>	<u>3</u>	<u>13.2</u>	<u>.38</u>	<u>.036</u>
"	<u>1412</u>	<del>2hr</del>	<u>8</u>	<u>13.2</u>	<u>.38</u>	<u>.036</u>
"	<u>1434</u>	<del>2hr 30min</del>	<u>30</u>	<u>13.3</u>	<u>.28</u>	<u>.027</u>
"	<u>1506</u>	<del>3hr</del>	<u>62</u>	<u>13.3</u>	<u>.28</u>	<u>.027</u>
"	<u>1529</u>	<del>4hr</del>	<u>85</u>	<u>13.3</u>		
"	<u>1606</u>	<del>5hr</del>	<u>122</u>	<u>13.28</u>	← started measuring in hundredths	
"	<u>1639</u>	<del>6hr</del>	<u>155</u>	<u>13.29</u>		
<u>2-6-92</u>	<u>1059</u>	<del>4hr</del>	<u>1955</u>	<u>13.37</u>		
<u>2-6-92</u>	<u>14:26</u>	<del>14hr</del>	<u>1462</u>	<u>13.37</u>		


NOTES: Added 1.5 gal of water.

Cap is not vented.

Reservoir level is down a few feet from 2-5-92.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/5/92	PN 1342 FALLING	 TIME LAG THEORY	NORTH LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: North Lewis & Levens

Piezometer No: PN-1348

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After \_\_\_\_\_  
water change

WSE Before \_\_\_\_\_  
Test

14.44 WSE Before  
Drawdown

14.74 WSE After  
Drawdown

$H_0 = 14.74 - 14.44$   
 $= .30$   
 $H_1 = \text{reading} - 14.44$

28.9 Top of  
Sediment

28.9 Piezometer  
Bottom

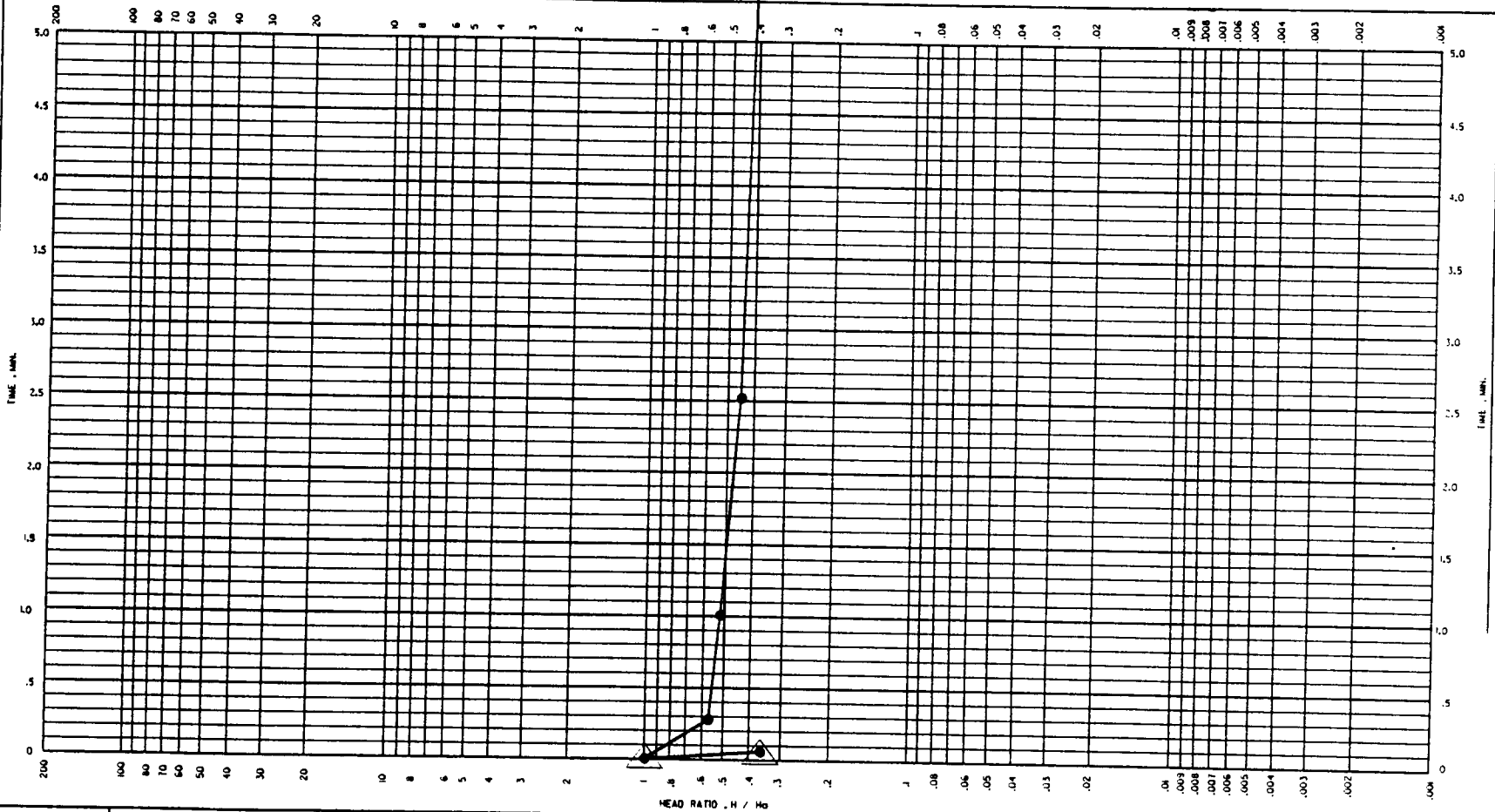
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)		H	H/H <sub>0</sub>
		Specified	Actual				
<u>2-4-92</u>	<u>16:46</u>		0	<u>14.74</u>	<u>.30</u>		<u>1.00</u>
<u>"</u>	<u>16:46.5</u>	30 min.	<u>30 sec</u>	<u>14.62</u>	<u>.18</u>		<u>.60</u>
<u>"</u>	<u>16:48</u>	1hr	<u>2 min</u>	<u>14.60</u>	<u>.16</u>		<u>.53</u>
	<u>16:51</u>	1hr 30min	<u>5 min</u>	<u>14.58</u>	<u>.14</u>		<u>.47</u>
	<u>16:59</u>	2hr	<u>12 min</u>	<u>14.56</u>	<u>.12</u>		<u>.40</u>
	<u>17:01</u>	2hr 30min	<u>14 min</u>	<u>14.55</u>	<u>.11</u>		<u>.37</u>
		3hr					
		4hr					
		5hr					
		24hr					
		48hr					

NOTES: Bailed 1.0 gallons in 1.5 minutes

Tried adding water after recovery was nearly complete.  
See separate sheet.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
2/4/92	PN 1348 RISING			NORTH LEWISTON LEVEE



**PIEZOMETER TEST FORM**

Location: North Lewiston Levee

Piezometer No: PN-1498

Type of Test: Falling  
(Falling Head or Rising Head)

**Falling Head Test**  
Depth (Ft)

WSE After 18.4  
water change

WSE Before 19.07  
Test

$H_0 = 19.07 - 18.4 = .67$   
 $H = 19.07 - \text{reading}$

**Rising Head Test**  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

22.3 Top of  
Sediment

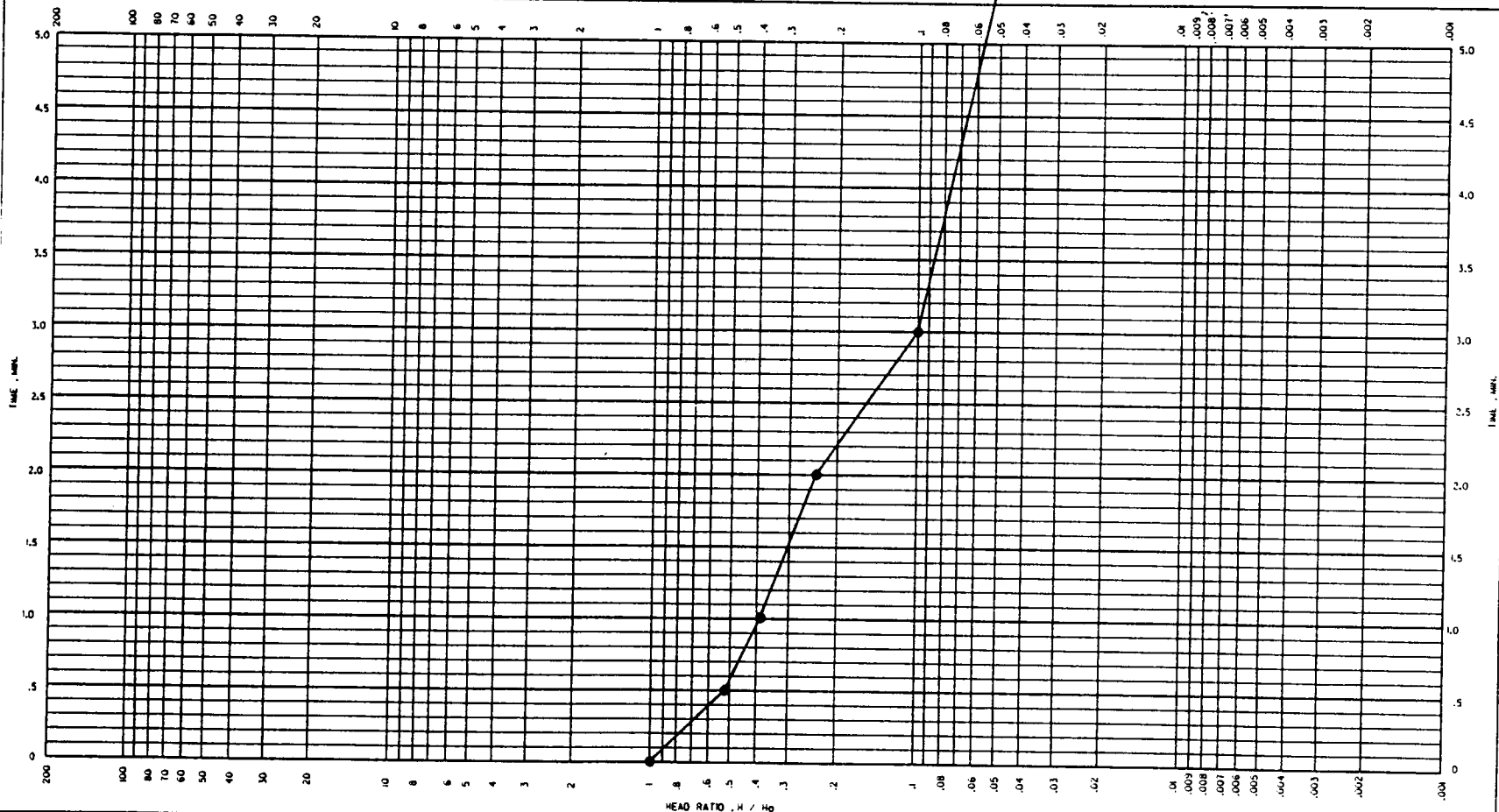
22.3 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>2-5-92</u>	<u>15:18</u>		0	<u>18.4</u>	<u>.67</u>	<u>1.00</u>
<u>"</u>	<u>15:18.5</u>	<u>30 min.</u>	<u>30 sec</u>	<u>18.7</u>	<u>.37</u>	<u>.552</u>
<u>"</u>	<u>15:19</u>	<u>1hr</u>	<u>1 Min</u>	<u>18.8</u> <del>18.8</del> DRN	<u>.27</u>	<u>.403</u>
<u>"</u>	<u>15:20</u>	<u>1hr 30min</u>	<u>2 Min</u>	<u>18.9</u> <del>18.9</del> DRN	<u>.17</u>	<u>.254</u>
<u>"</u>	<u>15:41</u>	<u>2hr</u>	<u>3 Min</u>	<u>19.0</u> <del>19.0</del> DRN	<u>.07</u>	<u>.105</u>
<u>"</u>	<u>15:24</u>	<u>2hr 30min</u>	<u>6 Min</u>	<u>19.04</u>	<u>.03</u>	<u>.045</u>
		<u>3hr</u>				
		<u>4hr</u>				
		<u>5hr</u>				
		<u>24hr</u>				
		<u>48hr</u>				

NOTES: Cap is not vented.  
Added 4.5 gal. of water.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/5/92	PH 1498 FALLING		NORTH LEWISTON LEVEE

**PIEZOMETER TEST FORM**

Location: North Lewistoa Levee

Piezometer No: PN-1507

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 0.8  
water charge

WSE Before 10.63  
Test

$H_0 = 10.63 - .8 = 9.81$   
 $H = 10.63 - \text{read } 1/4$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

17.4 Top of  
Sediment

17.4 Piezometer  
Bottom

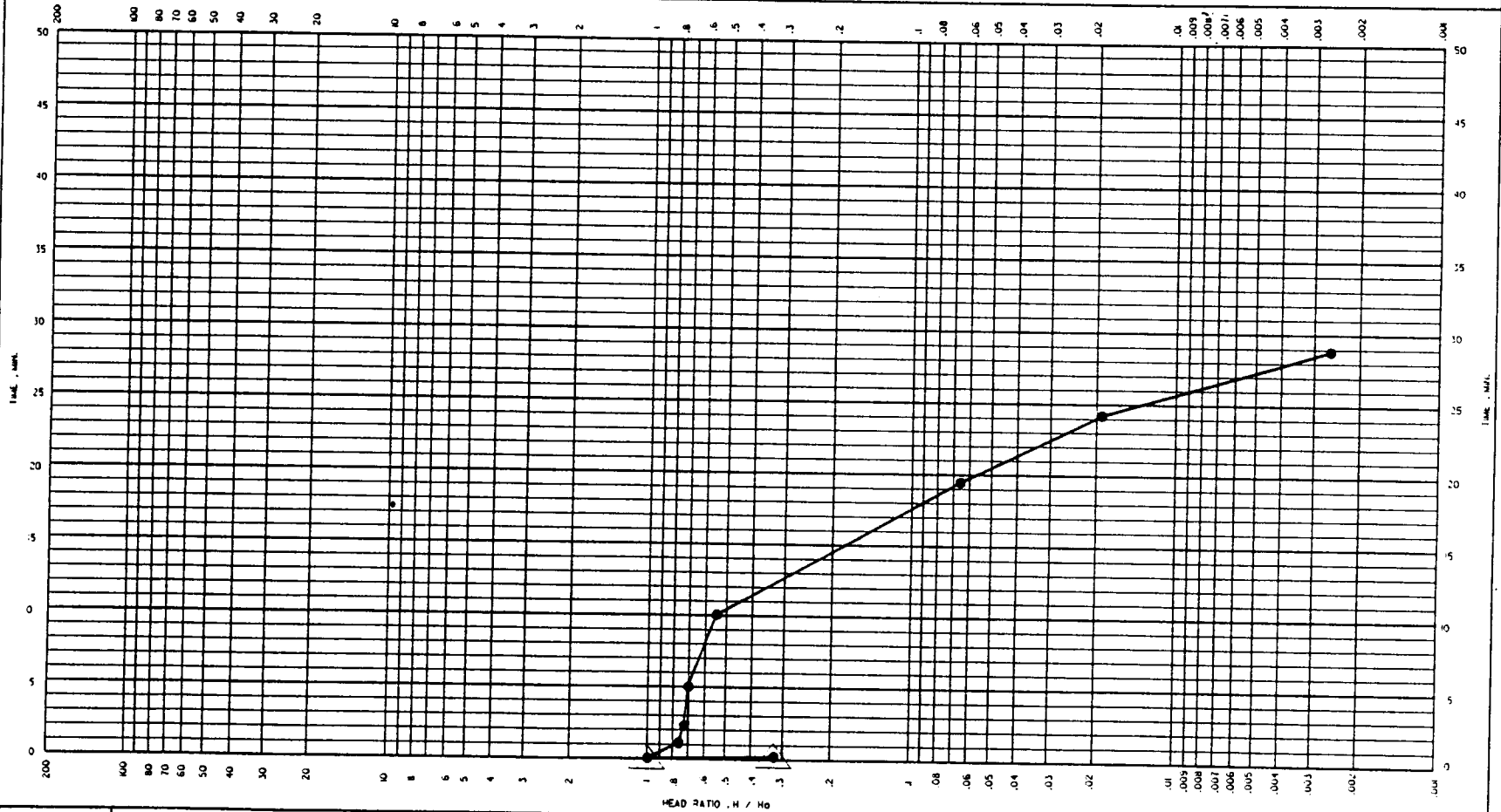
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>2-5-92</u>	<u>1317</u>		0 Min	<u>0.8</u>	<u>9.81</u>	<u>1.00</u>
"	<u>1318</u>	<del>30 min.</del>	<u>1</u>	<u>2.0</u>	<u>8.63</u>	<u>.880</u>
"	<u>1319</u>	<del>1hr</del>	<u>2</u>	<u>2.3</u>	<u>8.33</u>	<u>.849</u>
"	<u>1322</u>	<del>1hr 30min</del>	<u>5</u>	<u>2.7</u>	<u>7.93</u>	<u>.808</u>
"	<u>1327</u>	<del>2hr</del>	<u>10</u>	<u>4.0</u>	<u>6.63</u>	<u>.676</u>
"	<u>1337</u>	<del>2hr 30min</del>	<u>20</u>	<u>9.9</u>	<u>.73</u>	<u>.074</u>
"	<u>1343</u>	<del>3hr</del>	<u>26</u>	<u>10.4</u>	<u>.23</u>	<u>.023</u>
"	<u>1347</u>	<del>4hr</del>	<u>30</u>	<u>10.6</u>	<u>.03</u>	<u>.003</u>
			5hr			
			24hr			
			48hr			

NOTES: Cap is not vented.

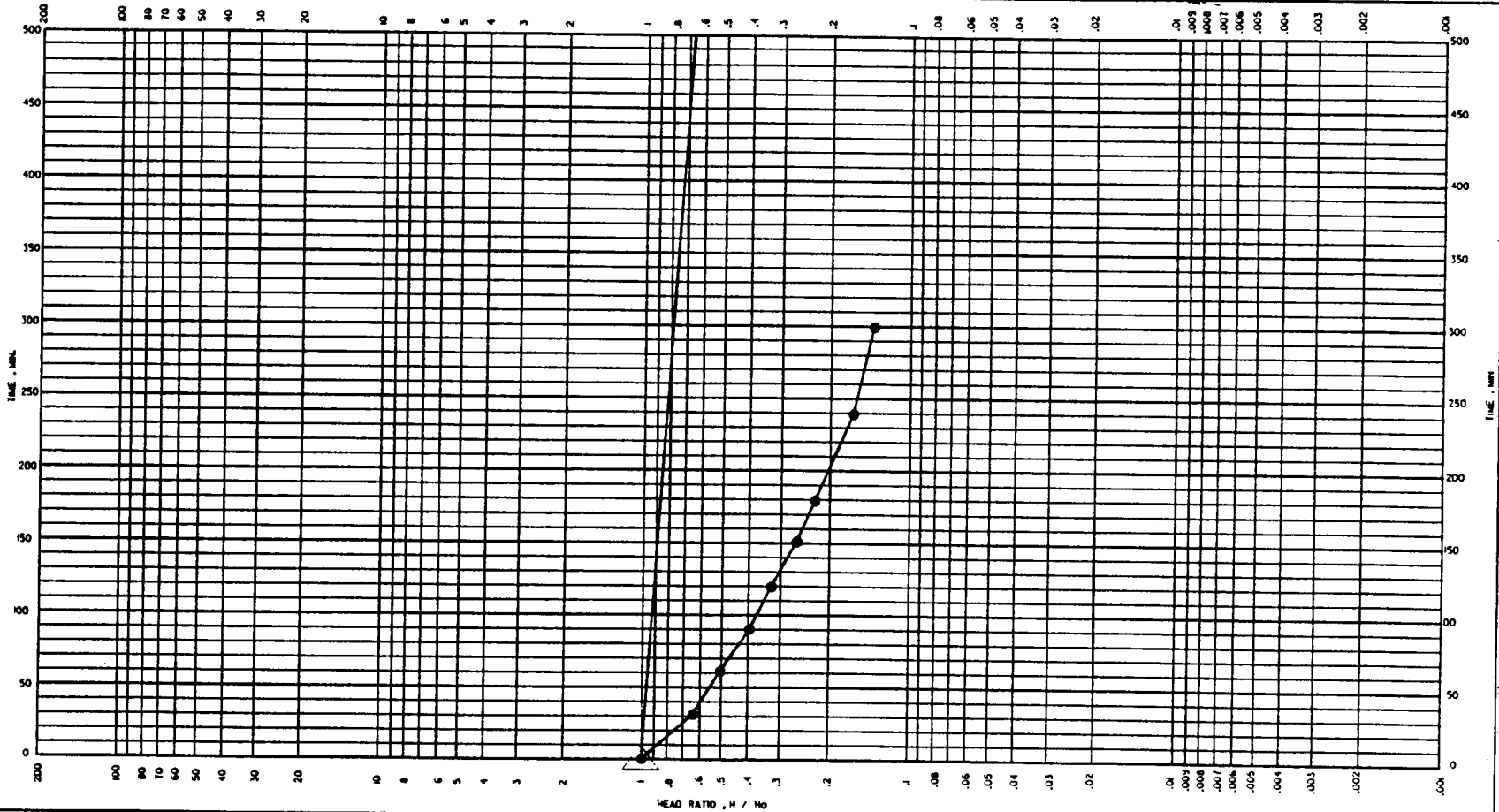
Added 5 gal. of water → got water up to 1.8' ...  
added 3<sup>1/2</sup> gal. more w/in 5 min → to 0.8'.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/5/92	PN 1507 FALLING	TIME LAG THEORY	NORTH LEWISTON LEVEE

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
1/22/92	PN 483B RYSMC			LOWER GRANITE DAM

1323

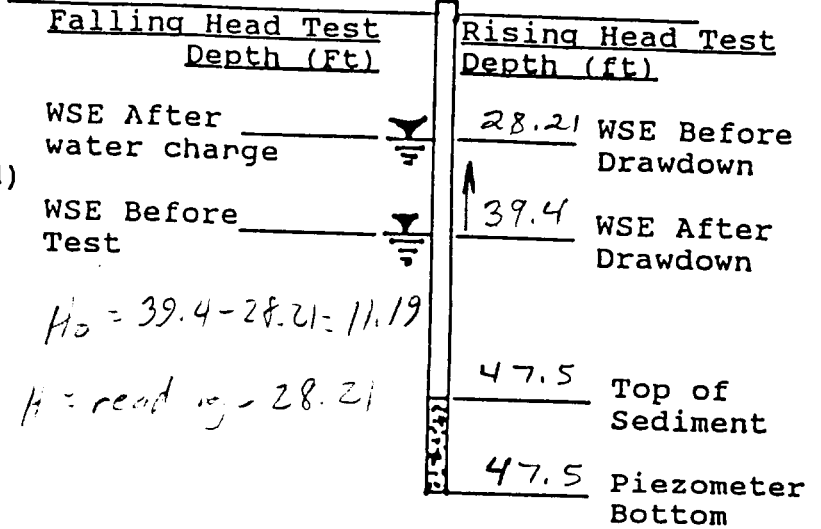
X

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PN-1327

Type of Test: Rising  
(Falling Head or Rising Head)



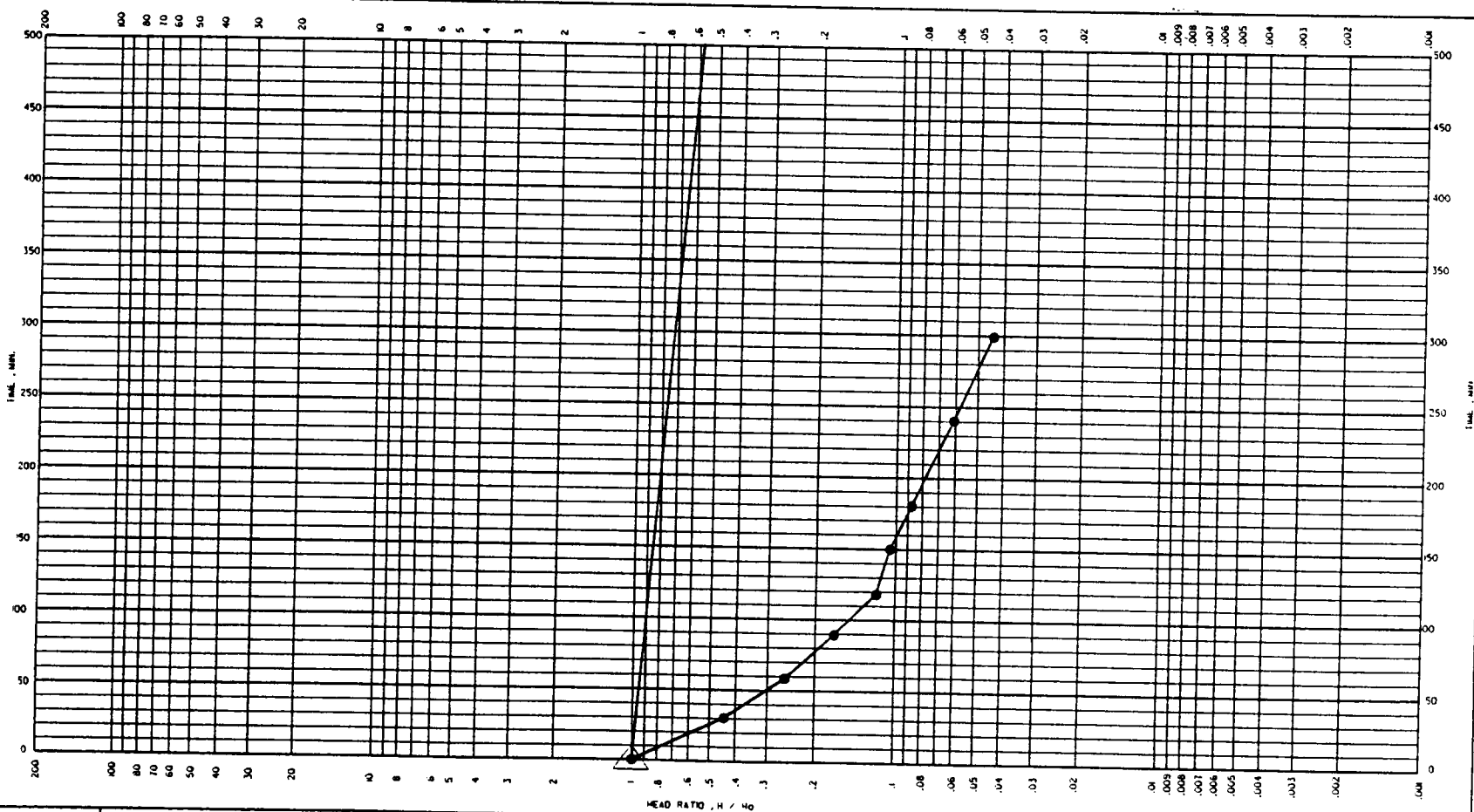
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
1-22-92	1124		0 min. 0	39.4	11.19	1.00
"	1154	30 min.	30	32.9	4.69	.419
"	1224	1hr	60	31.1	2.89	.258
"	1254	1hr 30min	90	30.2	1.99	.177
"	1324	2hr	120	29.7	1.49	.133
"	1354	2hr 30min	150	29.4	1.19	.106
"	1424	3hr	180	29.2	.99	.089
"	1524	4hr	240	28.9	.69	.061
"	1624	5hr	300	28.7	.49	.044
1-23-92	1124	24hr	1440	28.1		
1-24-92	1124	48hr	2880	28.1		

NOTES:

Bailed 1 gal.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/22/92	PH 1327 RISING	TIME LAG THEORY	LOWER GRANITE DAM

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PM-1329

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 34.03  
water change

WSE Before 45.7  
Test

Rising Head Test  
Depth (ft)

WSE Before 45.7  
Drawdown

WSE After 34.03  
Drawdown

48.8 Top of  
Sediment

48.8 Piezometer  
Bottom

$H_0 = 45.7 - 34.03 = 11.67$

$H = \text{reading} - 34.03$

WSE=Water Surface Elevation (Feet)

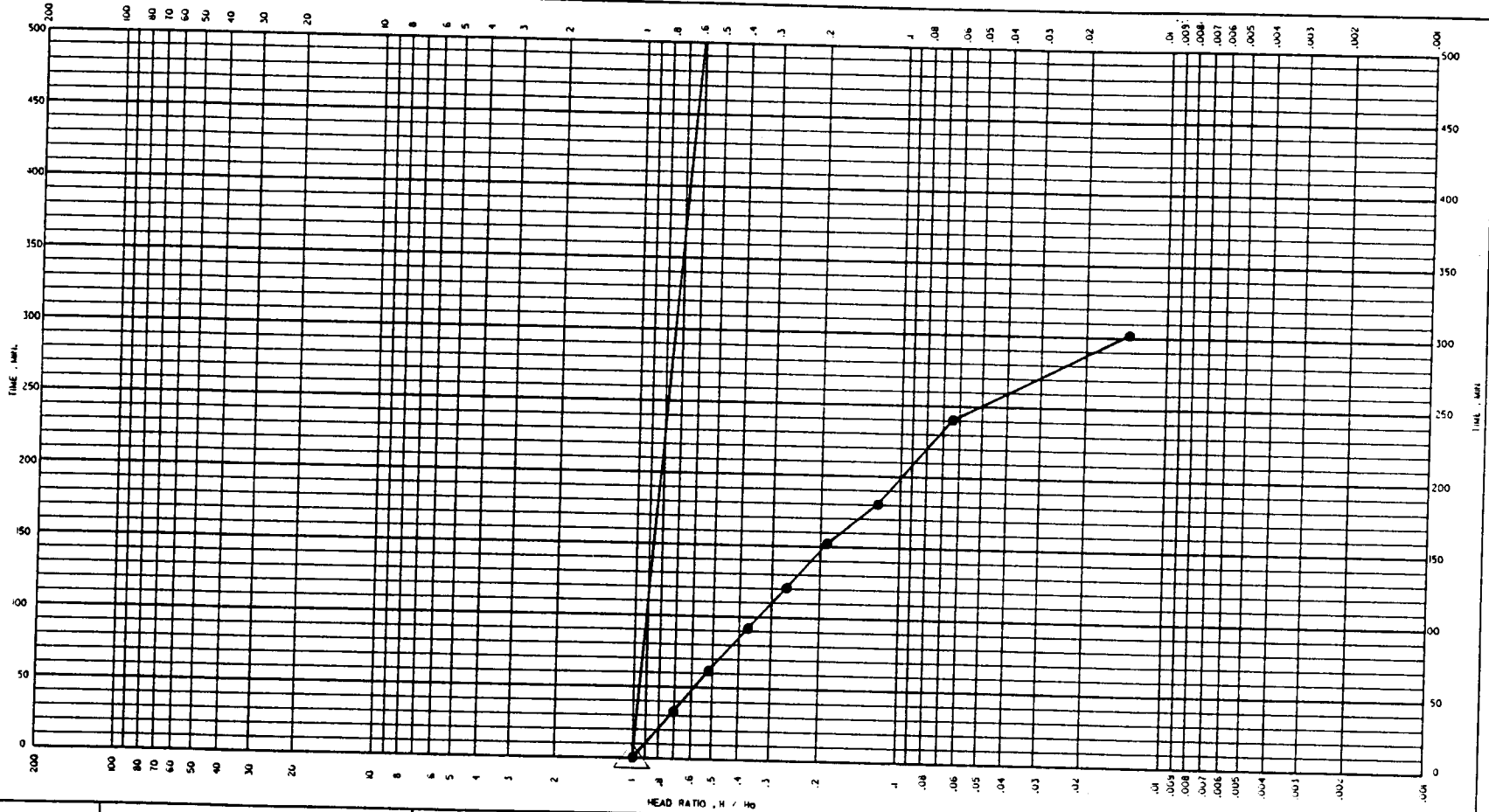
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	t
		Specified	Actual			
<u>1-22-92</u>	<u>1130</u>			<u>45.7</u>	<u>11.67</u>	<u>1.00</u>
"	<u>1200</u>	30 min.	<u>30</u>	<u>42.2</u>	<u>8.17</u>	<u>.74</u>
"	<u>1230</u>	1hr	<u>60</u>	<u>40.0</u>	<u>5.97</u>	<u>.516</u>
"	<u>1300</u>	1hr 30min	<u>90</u>	<u>38.3</u>	<u>4.27</u>	<u>.360</u>
"	<u>1330</u>	2hr	<u>120</u>	<u>37.2</u>	<u>3.17</u>	<u>.272</u>
"	<u>1400</u>	2hr 30min	<u>150</u>	<u>36.3</u>	<u>2.27</u>	<u>.185</u>
"	<u>1430</u>	3hr	<u>180</u>	<u>35.6</u>	<u>1.57</u>	<u>.135</u>
"	<u>1530</u>	4hr	<u>240</u>	<u>34.8</u>	<u>.77</u>	<u>.066</u>
"	<u>1630</u>	5hr	<u>300</u>	<u>34.2</u>	<u>.17</u>	<u>.015</u>
<u>1-23-92</u>	<u>11.30</u>	24hr	<u>1440</u>	<u>32.3</u>		
<u>1-24-92</u>	<u>1130</u>	48hr	<u>2880</u>	<u>32.1</u>		

NOTES:

Bailed 1 gal.



PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/22/92	PN 1329 RISNG	TIME LAG THEORY	LOWER GRANITE DAM

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PN-1331

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After  
water charge

WSE Before  
Test

Rising Head Test  
Depth (ft)

31.60 WSE Before  
Drawdown

41.9 WSE After  
Drawdown

48.5 Top of  
Sediment

48.5 Piezometer  
Bottom

$$H_0 = 41.9 - 31.60 = 10.30$$

$$H = \text{read } 14 - 31.60$$

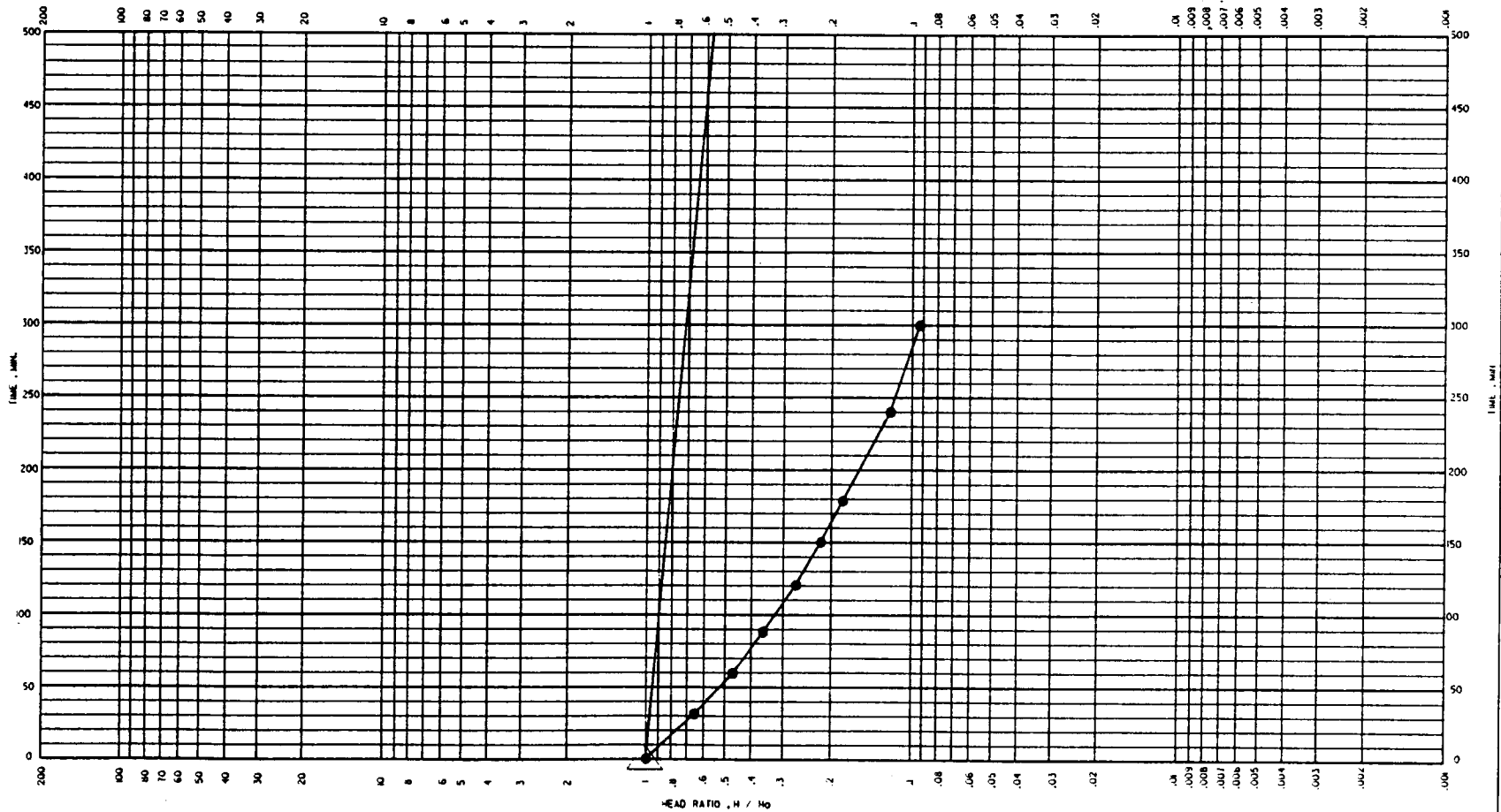
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	h/H
		Specified	Actual			
<u>1-22-92</u>	<u>1137</u>		0 min	<u>41.9</u>	<u>10.3</u>	<u>1.00</u>
"	<u>1207</u>	30 min.	<u>30</u>	<u>38.1</u>	<u>6.5</u>	<u>.65</u>
"	<u>1237</u>	1hr	<u>60</u>	<u>36.4</u>	<u>4.8</u>	<u>.464</u>
"	<u>1307</u>	1hr 30min	<u>90</u>	<u>35.3</u>	<u>3.70</u>	<u>.35</u>
"	<u>1337</u>	2hr	<u>120</u>	<u>34.5</u>	<u>2.90</u>	<u>.282</u>
"	<u>1407</u>	2hr 30min	<u>150</u>	<u>34.0</u>	<u>2.40</u>	<u>.23</u>
"	<u>1437</u>	3hr	<u>180</u>	<u>33.6</u>	<u>2.00</u>	<u>.194</u>
"	<u>1537</u>	4hr	<u>240</u>	<u>33.0</u>	<u>1.7</u>	<u>.136</u>
"	<u>1637</u>	5hr	<u>300</u>	<u>32.6</u>	<u>1.0</u>	<u>.097</u>
<u>1-23-92</u>	<u>1137</u>	24hr	<u>1440</u>	<u>31.4</u>		
<u>1-24-92</u>	<u>1137</u>	48hr	<u>2880</u>	<u>31.3</u>		

NOTES:

Bailed 1 gal.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/22/92	PH 133 RISING	TIME LAG THEORY	LOWER GRANITE DAM

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PN-1332

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After  
water charge

WSE Before  
Test

34.85

45.0

WSE Before  
Drawdown

WSE After  
Drawdown

$H_0 = 45.0 - 34.85 = 10.15$

$H = \text{reading} - 34.85$

49.1

49.1

Top of  
Sediment

Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	t'
		Specified	Actual			
<u>1-22-92</u>	<u>1142</u>		0	<u>45.0</u>	<u>10.15</u>	<u>1.0</u>
"	<u>1212</u>	30 min.	<u>30</u>	<u>41.5</u>	<u>6.65</u>	<u>.655</u>
"	<u>1242</u>	1hr	<u>60</u>	<u>40.0</u>	<u>5.15</u>	<u>.57</u>
"	<u>1312</u>	1hr 30min	<u>90</u>	<u>38.9</u>	<u>4.05</u>	<u>.39</u>
"	<u>1342</u>	2hr	<u>120</u>	<u>38.2</u>	<u>3.35</u>	<u>.330</u>
"	<u>1412</u>	2hr 30min	<u>150</u>	<u>37.7</u>	<u>2.85</u>	<u>.281</u>
"	<u>1442</u>	3hr	<u>180</u>	<u>37.3</u>	<u>2.45</u>	<u>.241</u>
"	<u>1542</u>	4hr	<u>240</u>	<u>36.7</u>	<u>1.85</u>	<u>.182</u>
"	<u>1642</u>	5hr	<u>300</u>	<u>36.4</u>	<u>1.55</u>	<u>.153</u>
<u>1-23-92</u>	<u>1142</u>	24hr	<u>1440</u>	<u>34.3</u>		
<u>1-24-92</u>	<u>1142</u>	48hr	<u>2880</u>	<u>34.0</u>		

NOTES:

Boiled 1 gal

PIEZOMETER TEST FORM

Location: North Lewiston Levee

Piezometer No: PN-1342

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water charge

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

13.58 WSE Before  
Drawdown

14.0 WSE After  
Drawdown

27.6 Top of  
Sediment

27.6 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>2-5-92</u>	<u>1358</u>	0	<u>0</u> min.	<u>14.0</u>
<u>"</u>	<u>1359</u>	30 min.	<u>1</u>	<u>13.7</u>
<u>"</u>	<u>1401</u>	1hr	<u>3</u>	<u>13.6</u>
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES: Initially tried bailing 1 gal. in 2.5 min. Recovered from 0.4' head change in 3 min.

Later added water for falling head test. (see separate sheet.)

Cap is not vented.

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PN-1325

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After water charge

WSE Before Test

Rising Head Test  
Depth (ft)

30.13 WSE Before Drawdown

40.8 WSE After Drawdown

45.8 Top of Sediment

45.8 Piezometer Bottom

$H_0 = 40.8 - 30.13 = 10.67$

$H = \text{read. hg} - 30.13$

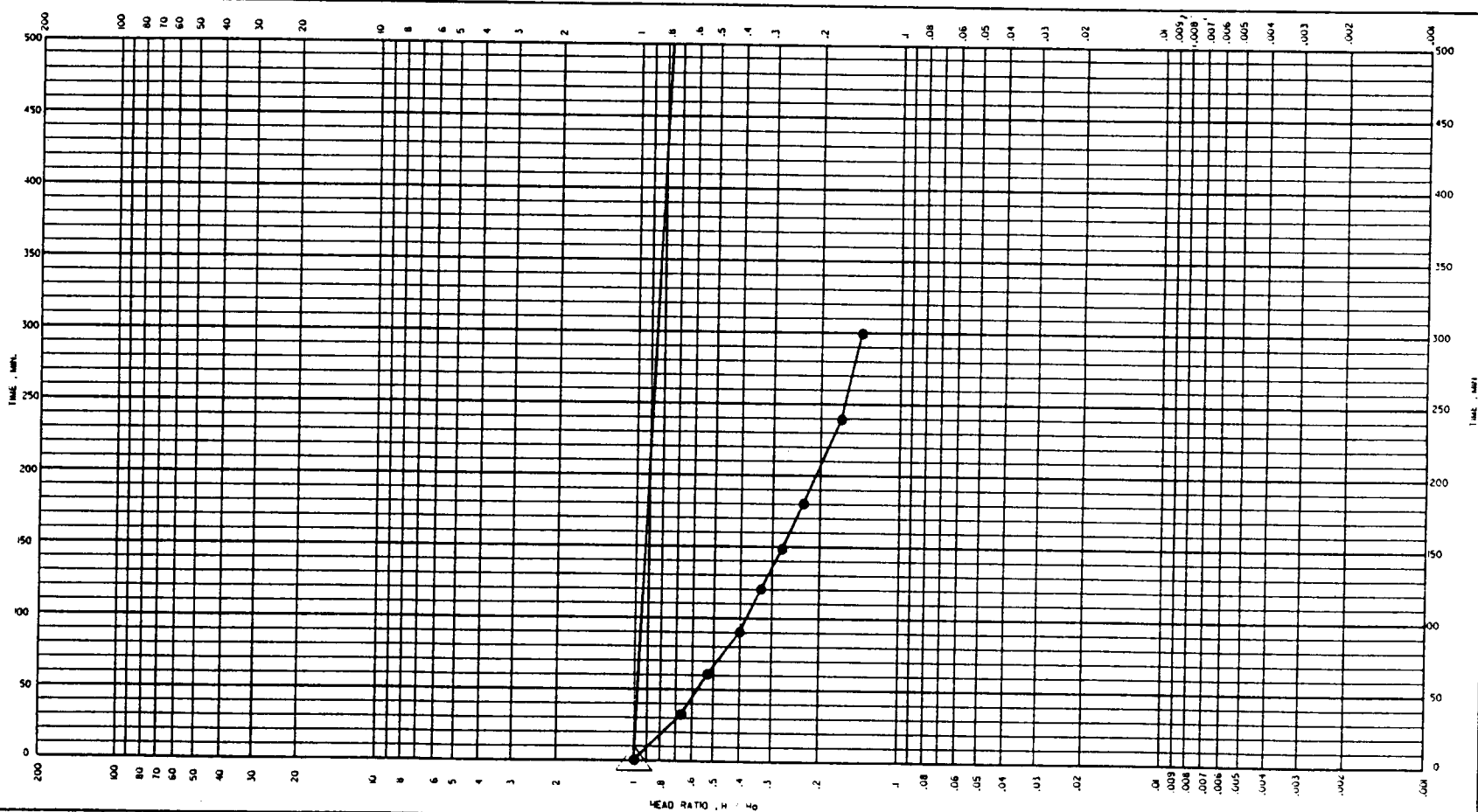
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-22-92</u>	<u>1117</u>			<u>40.8</u>	<u>10.67</u>	<u>1.00</u>
"	<u>1147</u>	30 min.	<u>30</u>	<u>36.1</u>	<u>5.97</u>	<u>.560</u>
"	<u>1217</u>	1hr	<u>60</u>	<u>34.6</u>	<u>4.47</u>	<u>.417</u>
"	<u>1247</u>	1hr 30min	<u>90</u>	<u>33.7</u>	<u>3.57</u>	<u>.33</u>
"	<u>1317</u>	2hr	<u>120</u>	<u>33.1</u>	<u>2.97</u>	<u>.278</u>
"	<u>1347</u>	2hr 30min	<u>150</u>	<u>32.7</u>	<u>2.57</u>	<u>.24</u>
"	<u>1417</u>	3hr	<u>180</u>	<u>32.4</u>	<u>2.27</u>	<u>.213</u>
"	<u>1517</u>	4hr	<u>240</u>	<u>32.0</u>	<u>1.87</u>	<u>.175</u>
"	<u>1617</u>	5hr	<u>300</u>	<u>31.8</u>	<u>1.67</u>	<u>.157</u>
<u>1-23-92</u>	<u>1117</u>	24hr	<u>1440</u>	<u>30.9</u>		
<u>1-24-92</u>	<u>1117</u>	48hr	<u>2880</u>	<u>30.8</u>		

NOTES:

Bailed 1 gal.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
1/22/92	PH 1332 RISING			LOWER GRANITE DAM

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PN-1333

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After  
water change

WSE Before  
Test

Rising Head Test  
Depth (ft)

31.2 (1-29-92)  
WSE Before  
Drawdown

41.2  
WSE After  
Drawdown

none Top of  
Sediment  
table

48.8 Piezometer  
Bottom

49.4 ← measured

$H_0 = 41.2 - 31.2 = 10.0$   
 $H = \text{reading} - 31.2$

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H' 1.0
		Specified	Actual			
<u>1-29-92</u>	<u>1326</u>	0		<u>41.2</u>	<u>10.0</u>	<u>1.0</u>
	<u>1356</u>	30 min.	<u>30</u>	<u>36.3</u>	<u>5.1</u>	<u>1.5</u>
	<u>1426</u>	1hr	<u>60</u>	<u>34.7</u>	<u>3.5</u>	<u>3.0</u>
	<u>1456</u>	1hr 30min	<u>90</u>	<u>33.8</u>	<u>2.6</u>	<u>2.4</u>
	<u>1526</u>	2hr	<u>120</u>	<u>33.2</u>	<u>2.0</u>	<u>2.0</u>
	<u>1556</u>	2hr 30min	<u>150</u>	<u>32.9</u>	<u>1.7</u>	<u>1.7</u>
	<u>1626</u>	3hr	<u>180</u>	<u>32.6</u>	<u>1.4</u>	<u>1.4</u>
	<u>1726</u>	4hr	<u>240</u>	<u>32.3</u>	<u>1.1</u>	<u>1.1</u>
	<u>1826</u>	5hr	<u>300</u>	<u>32.1</u>	<u>0.9</u>	<u>0.9</u>
	<u>1-30-92</u>	<u>1326</u>	24hr	<u>1440</u>	<u>31.5</u>	
<u>1-31-92</u>	<u>1321</u>	48hr	<u>2875</u>	<u>31.2</u>		

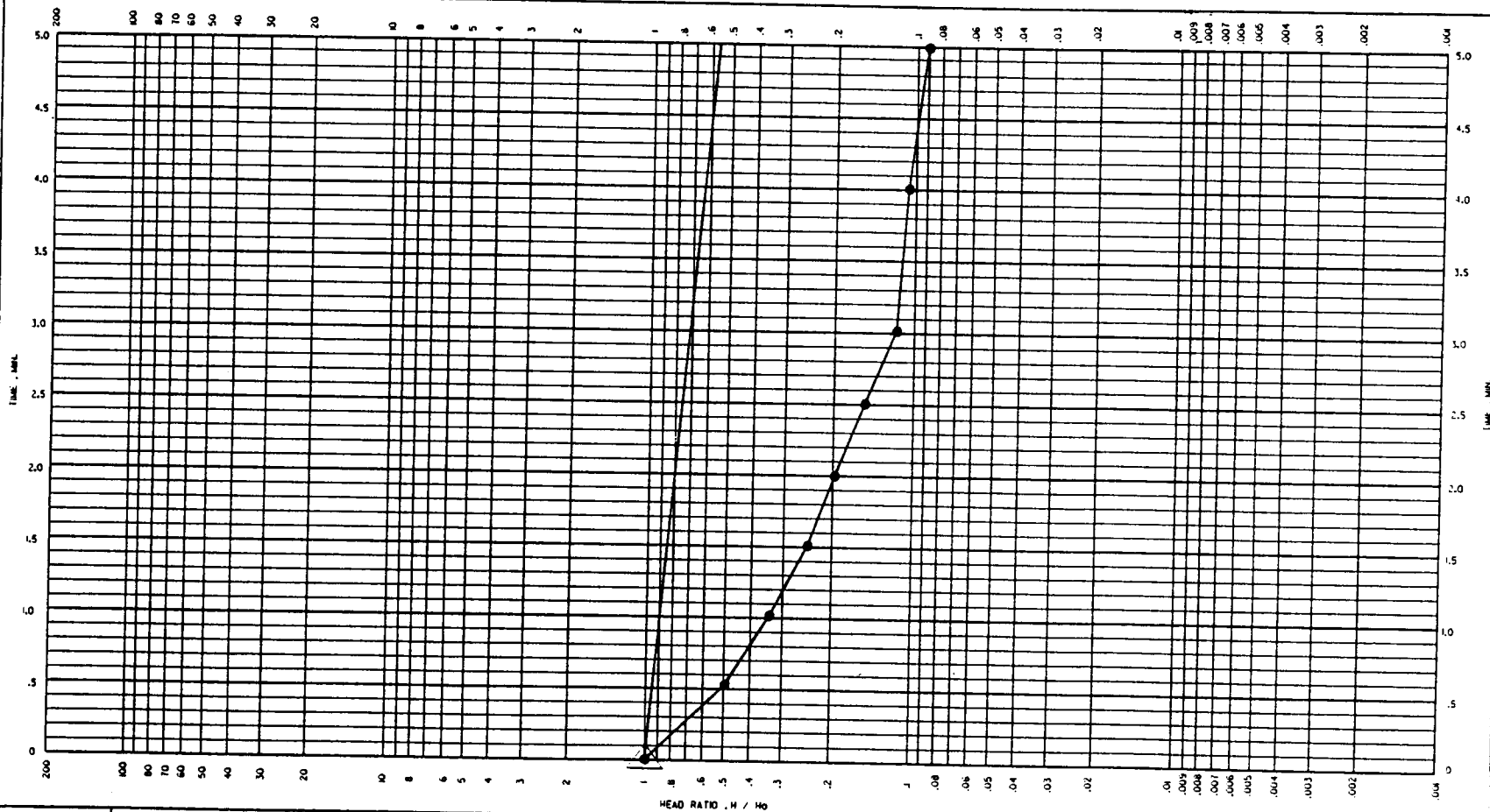
NOTES: Bailed 1 gal. over 4 min. on 1-29-92.  
~~Bailed 1 gal.~~

13:45, 1-27-92: Rain water ~~run~~ into well to depth of  $6\frac{1}{2}$  ft below top.

14:00, 1-28-92: Well was negatively pressurized (vacuum released when I unscrewed the lid). Water level dropped from ~20.5 to 26.8 over 1 hr (1400 to 1500) & was still dropping. Vented the well overnight & will test on 1-29-92. Kept plastic cap inverted over top of well - appeared to have kept most or all of water in annulus from entering well during rainy morning of 1-29-92.



PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/28/92	PN 1333 RYBAG	TIME LAG THEORY	LOWER GRANITE DAM

PIEZOMETER TEST FORM

Location: Lower Granite Dam

Piezometer No: PN-1334

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After water charge

WSE Before Test

35.2 WSE Before Drawdown

45.2 WSE After Drawdown

$$H_0 = 45.2 - 35.2 = 10.0$$

$$H = \text{reading} - 35.2$$

49.2 Top of Sediment

49.2 Piezometer Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time $t$		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-27-92</u>	<u>14:01</u>		0	<u>45.2</u>	<u>10.0</u>	<u>1.00</u>
"	<u>14:31</u>	30 min.	<u>30</u>	<u>42.2</u>	<u>7.0</u>	<u>.70</u>
"	<u>15:01</u>	1hr	<u>60</u>	<u>40.0</u>	<u>4.8</u>	<u>.48</u>
"	<u>15:31</u>	1hr 30min	<u>90</u>	<u>38.5</u>	<u>3.3</u>	<u>.33</u>
"	<u>16:01</u>	2hr	<u>120</u>	<u>37.7</u>	<u>2.5</u>	<u>.25</u>
"	<u>16:31</u>	2hr 30min	<u>150</u>	<u>37.0</u>	<u>1.8</u>	<u>.18</u>
"	<u>17:01</u>	3hr	<u>180</u>	<u>36.6</u>	<u>1.4</u>	<u>.14</u>
"	<u>18:06</u>	4hr	<sup>PNH</sup> <u>240</u> <u>245</u>	<u>36.0</u>	<u>.80</u>	<u>.08</u>
"	<u>19:01</u>	5hr	<u>300</u>	<u>35.6</u>	<u>.40</u>	<u>.04</u>
<u>1-28-92</u>	<u>14:05</u>	24hr	<u>1444</u>	<u>34.9</u>	<u>← recovery</u>	
<u>1-29-92</u>	<u>14:01</u>	48hr	<u>2880</u>	<u>34.7</u>		

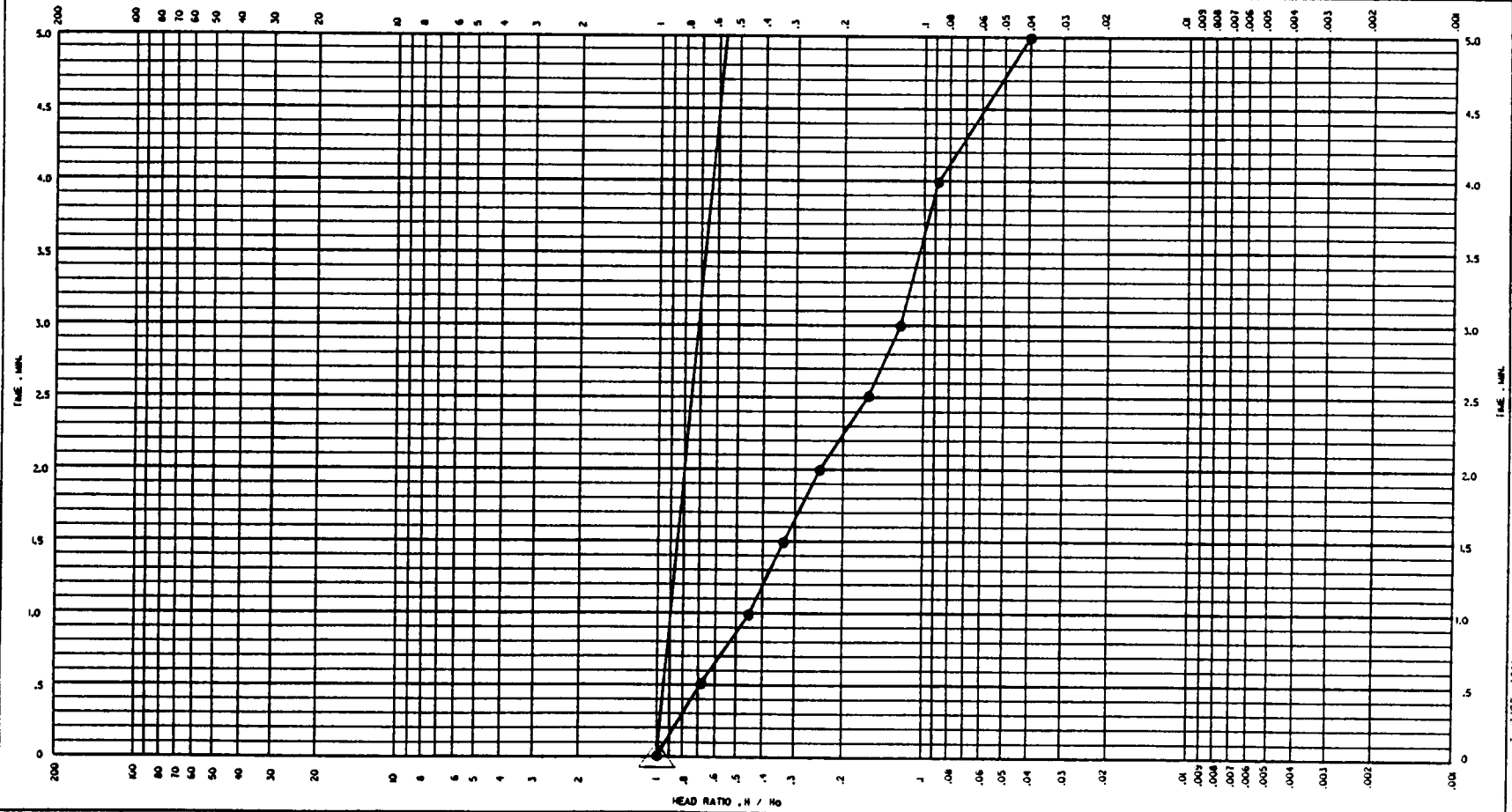
NOTES:


Bailed 1 gal.

Had to screw on cap between measurements to keep runoff out of casing. Casing pressurized slightly while recovering.

still slightly pressurized on 1-28-92

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/27/92	PH 1334 RESNG	 TIME LAG THEORY	LOWER GRANITE DAM

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PN-1335

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water charge

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

29.7 WSE Before  
Drawdown

41.5 WSE After  
Drawdown

47.5 Top of  
Sediment

47.5 Piezometer  
Bottom

$H_0 = 41.5 - 29.7 = 11.8$   
 $H = \text{reading } 29.7$

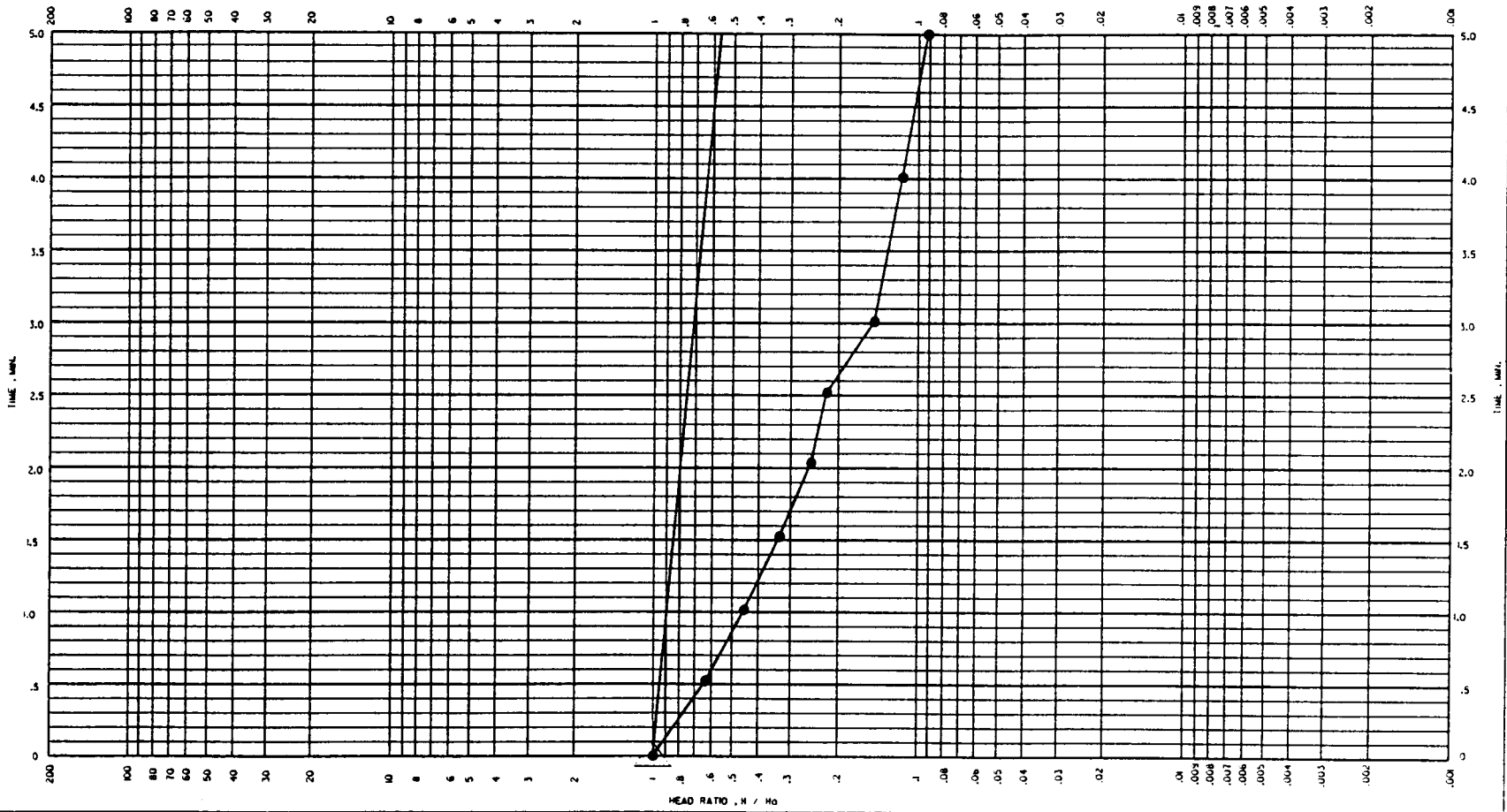
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)		
		Specified	Actual			
<u>1-27-92</u>	<u>1409</u>			<u>41.5</u>	<u>11.8</u>	<u>11.0</u>
"	<u>1439</u>	30 min.	<u>30</u>	<u>37.5</u>	<u>7.8</u>	<u>16.6</u>
"	<u>1509</u>	1hr	<u>60</u>	<u>35.4</u>	<u>5.7</u>	<u>14.3</u>
"	<u>15:39</u>	1hr 30min	<u>90</u>	<u>34.0</u>	<u>4.3</u>	<u>13.4</u>
"	<u>16:09</u>	2hr	<u>120</u>	<u>33.1</u>	<u>3.4</u>	<u>12.8</u>
"	<u>16:39</u>	2hr 30min	<u>150</u>	<u>32.4</u>	<u>2.7</u>	<u>12.3</u>
"	<u>17:09</u>	3hr	<u>180</u>	<u>31.9</u>	<u>2.2</u>	<u>11.6</u>
"	<u>18:09</u>	4hr	<u>240</u>	<u>31.2</u>	<u>1.5</u>	<u>11.2</u>
"	<u>19:09</u>	5hr	<u>300</u>	<u>30.8</u>	<u>1.1</u>	<u>10.9</u>
<u>1-28-92</u>	<u>14:13</u>	24hr	<u>1444</u>	<u>29.8</u>		
<u>1-29-92</u>	<u>14:09</u>	48hr	<u>2880</u>	<u>30.5</u>		

NOTES: Bailed 1 gal.

The piezometer casing is chipped at the top, allowing rainwater into the well during heavy down pours. We bailed water from the annulus frequently to prevent filling by runoff. After 5 hours we taped a piece of plastic over the piezometer top, between readings. The plastic appears to have kept rainwater out of the piezometer overnight (Oral 1-28-92).

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
1/27/92	PH 1335 RISING			LOWER GRANITE DAM

**PIEZOMETER TEST FORM**

Location: Louisa Granite Dam

Piezometer No: PN-1336

Type of Test: 2.1.1 PVH  
(Falling Head or Rising Head)

Falling

Falling Head Test  
Depth (Ft)

WSE After 15.3  
water charge

WSE Before 29.9  
Test

$$H_0 = 29.9 - 15.3 = 14.6$$

$$H = 29.9 - \text{reading}$$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

← Measured

46.6 Top of  
Sediment

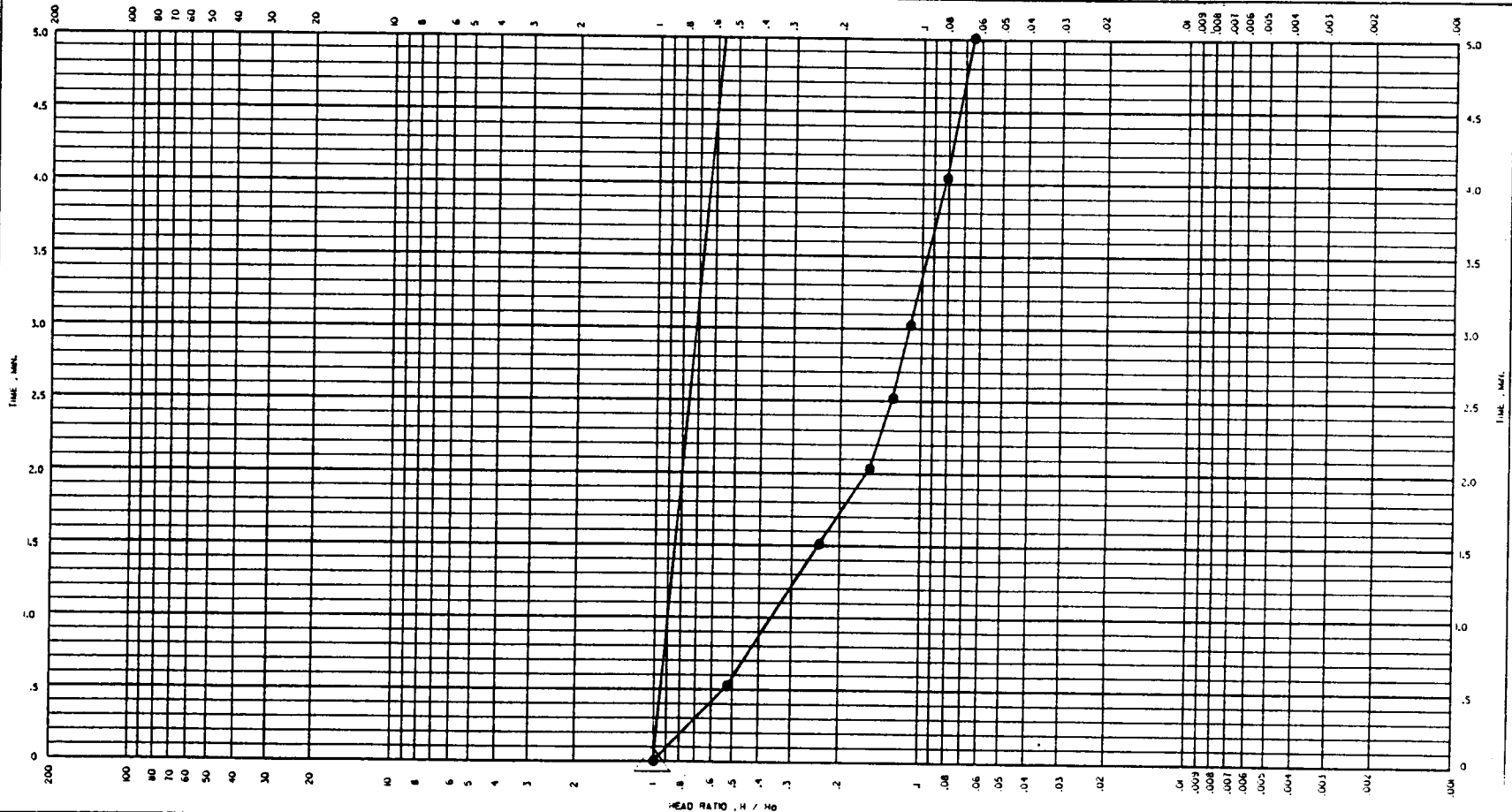
← Table's value  
46.4 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H <sub>0</sub>
		Specified	Actual			
<u>1-27-92</u>	<u>14:28</u>		0	<u>15.3</u>	<u>14.6</u>	<u>14.6</u>
	<u>14:58</u>	30 min.	<u>30</u>	<u>21.7</u>	<u>8.2</u>	<u>5.0</u>
	<u>15:28</u>	1hr	<u>60</u>	<u>24.7</u>	<u>5.2</u>	<u>1.6</u>
	<u>15:58</u>	1hr 30min	<u>90</u>	<u>26.2</u>	<u>3.7</u>	<u>2.5</u>
	<u>16:28</u>	2hr	<u>120</u>	<u>27.2</u>	<u>2.7</u>	<u>1.5</u>
	<u>16:58</u>	2hr 30min	<u>150</u>	<u>27.7</u>	<u>2.2</u>	<u>1.1</u>
	<u>17:28</u>	3hr	<u>180</u>	<u>28.1</u>	<u>1.8</u>	<u>1.2</u>
	<u>18:28</u>	4hr	<u>240</u>	<u>28.7</u>	<u>1.2</u>	<u>10.2</u>
	<u>19:28</u>	5hr	<u>300</u>	<u>29.0</u>	<u>.9</u>	<u>10.6</u>
	<u>1-28-92</u>	<u>14:28</u>	24hr	<u>1440</u>	<u>29.7</u>	
<u>1-29-92</u>	<u>14:28</u>	48hr	<u>2880</u>	<u>30.2</u>		

NOTES: Added 1.5 gallons

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
1/27/92	PN 1336 FALLING			LOWER GRANITE DAM

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PN-1337

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 0.0  
water charge

WSE Before 38.1  
Test

$H_0 = 38.1 - 0 = 38.1$   
 $H = 38.1 - \text{reading}$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

44.0 Top of  
Sediment

44.0 Piezometer  
Bottom

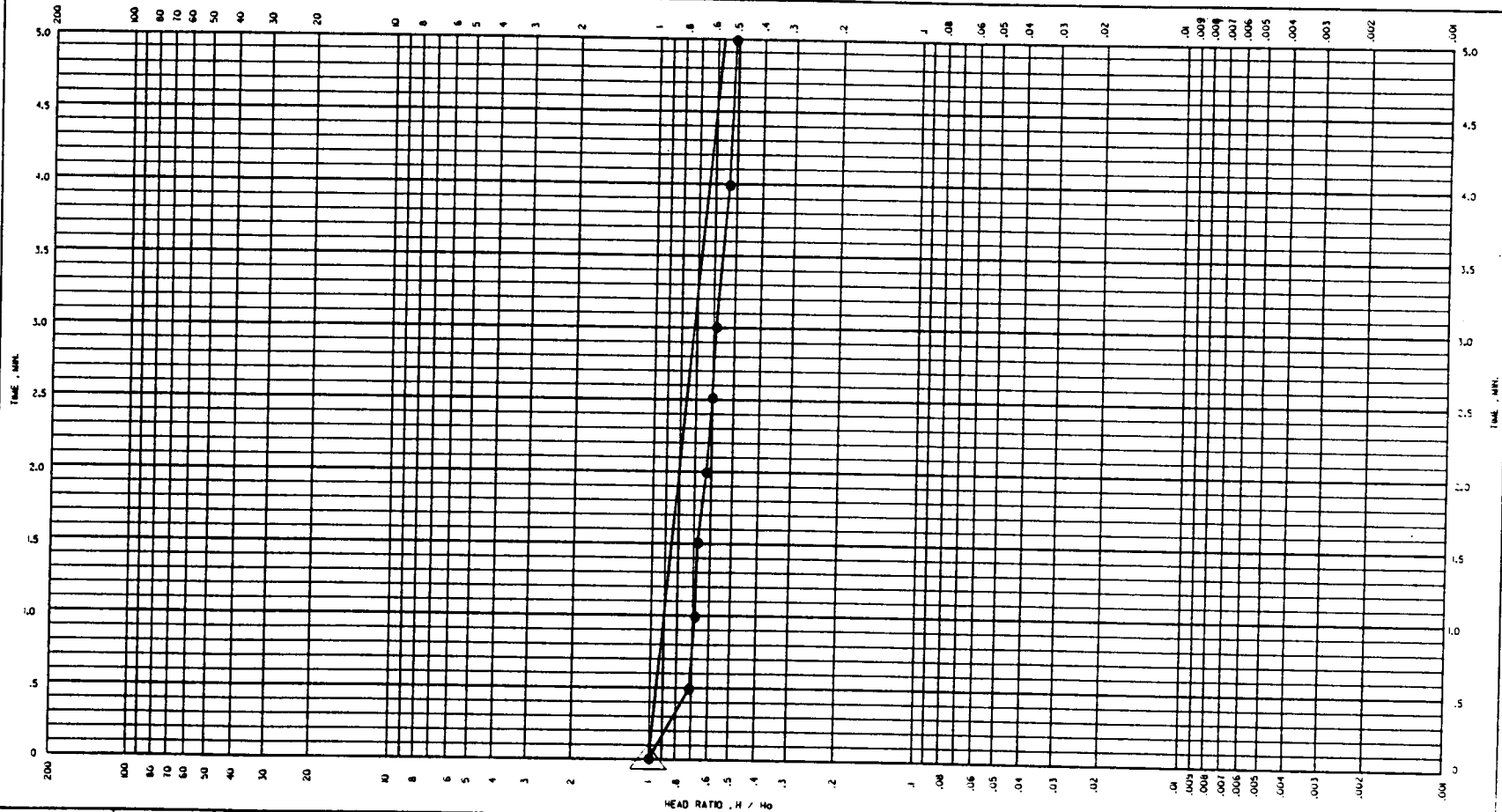
WSE=Water Surface Elevation (Feet)


Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	L
		Specified	Actual			
<u>1-27-92</u>	<u>1423</u>		0 (min.)	<u>0.0</u>	<u>38.1</u>	<u>1.76</u>
	<u>1453</u>	30 min.	<u>30</u>	<u>8.0</u>	<u>30.1</u>	<u>.790</u>
	<u>1523</u>	1hr	<u>60</u>	<u>9.8</u>	<u>28.3</u>	<u>.743</u>
	<u>1553</u>	1hr 30min	<u>90</u>	<u>11.4</u>	<u>26.7</u>	<u>.701</u>
	<u>1623</u>	2hr	<u>120</u>	<u>12.8</u>	<u>25.3</u>	<u>.664</u>
	<u>1653</u>	2hr 30min	<u>150</u>	<u>14.0</u>	<u>24.1</u>	<u>.633</u>
	<u>1723</u>	3hr	<u>180</u>	<u>15.2</u>	<u>22.9</u>	<u>.601</u>
	<u>1823</u>	4hr	<u>240</u>	<u>17.2</u>	<u>20.9</u>	<u>.59</u>
	<u>1923</u>	5hr	<u>300</u>	<u>19.0</u>	<u>19.1</u>	<u>.501</u>
<u>1-28-92</u>	<u>1423</u>	24hr	<u>1440</u>	<u>31.5</u>	<u>6.6</u>	<u>.52</u>
<u>1-29-92</u>	<u>1423</u>	48hr	<u>2880</u>	<u>34.7</u>		

NOTES: Added 3.5 gal. of water.



PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/27/92	PN 1337 FALLING	 TIME LAG THEORY	LOWER GRANITE DAM

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PN-1338

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After Day  
water change

WSE Before Day  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

36.5' Top of  
Sediment

36.5' Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>1-22-92</u>	<u>11:23</u>		0	<u>Day</u>
_____	_____	30 min.	_____	_____
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES: Added 4.0 gallons of water within 0.5 min. and  
All water was gone from PN-1338 within 1.0 min.

*NO PLOT  
NO POINTS*

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PN-1399

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After Dry  
water charge

WSE Before Dry  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

39.4' Top of  
Sediment

39.4' Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>1-22-92</u>	<u>11:37</u>		<u>0</u>	<u>Dry</u>
_____	_____	30 min.	_____	_____
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES: Added 4.0 gallons of water to PN-1339. Water was added within a 0.5 min time period and water ran out within 1.0 min. time period

NO PLOT  
NO POINTS

X

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PN-1340

Type of Test: Falling  
(Falling Head or Rising Head)

**Falling Head Test**  
Depth (Ft)

**Rising Head Test**  
Depth (ft)

WSE After 29'  
water change

WSE Before Dry  
Test

WSE Before  
Drawdown

WSE After  
Drawdown

$H_0 = 39.5 - 29 = 10.5$

$H = 39.5$  reading

39.6 Top of  
Sediment

39.6 Piezometer  
Bottom

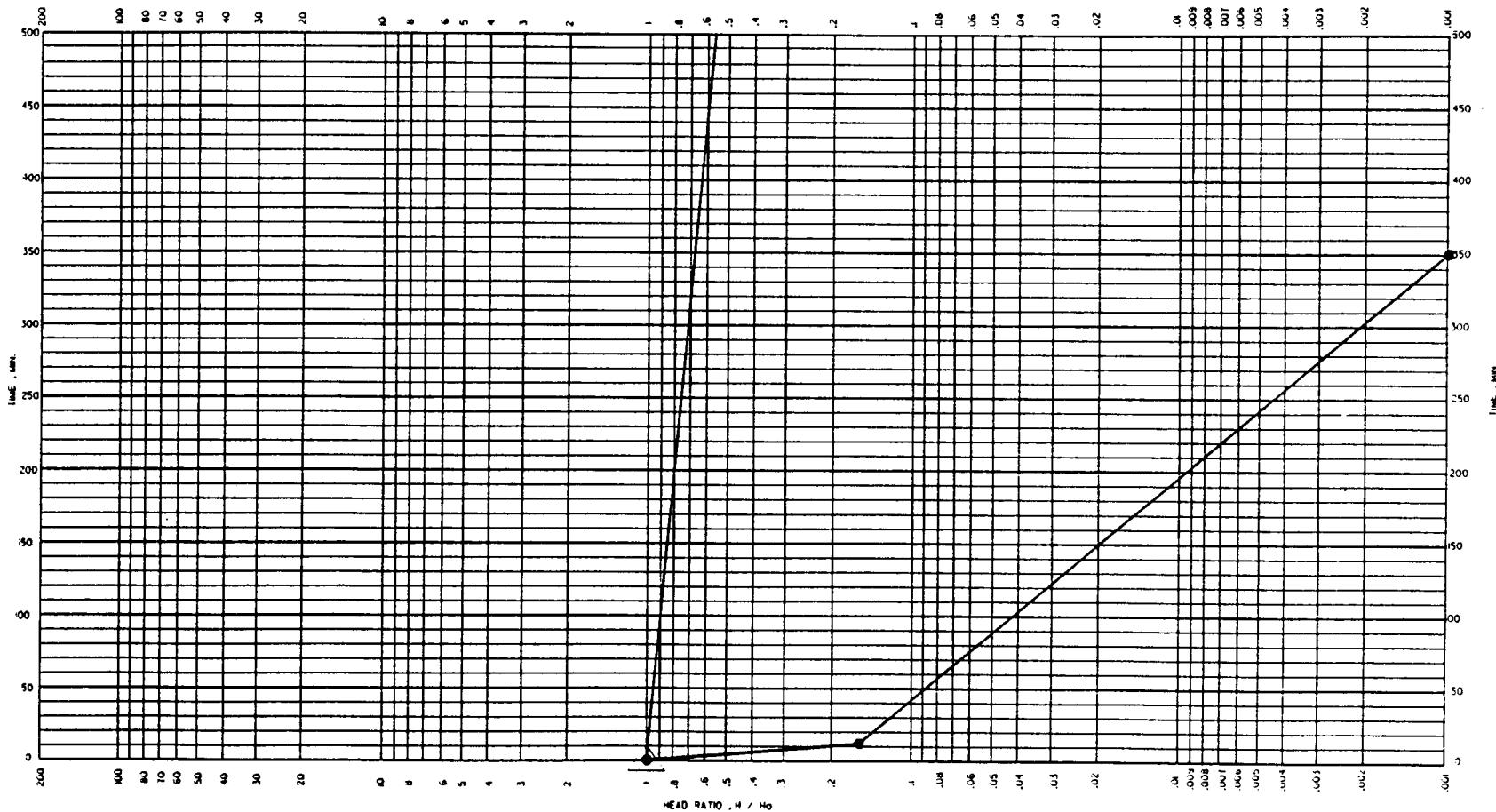
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time $t$		Water Table Depth (Feet)	A	H
		Specified	Actual			
<u>1-23-92</u>	<u>1047</u>			<u>29'</u>		<u>10.5</u>
<u>"</u>	<u>1048</u>	<u>1 min</u>	<u>1</u>	<u>37.7</u>		<u>1.9</u>
<u>"</u>	<u>1122</u>	<u>30 min.</u>	<u>35</u>	<u>39.5</u>		<u>0</u>
<u>1-23-92</u>	<u>11:47</u>	<u>1hr</u>	<u>60</u>	<u>39.5</u>	} dry	<u>0</u>
<u>"</u>	<u>1220</u>	<u>1hr 30min</u>	<u>93</u>	<u>39.5</u>		<u>0</u>
<u>"</u>	<u>1247</u> PVH	<u>2hr</u>	<u>---</u>	<u>---</u>		<u>---</u>
<u>"</u>	<u>1317</u> PVH	<u>2hr 30min</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>
<u>"</u>	<u>1347</u> PVH	<u>3hr</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>
<u>"</u>	<u>---</u>	<u>4hr</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>
<u>"</u>	<u>---</u>	<u>5hr</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>
<u>"</u>	<u>---</u>	<u>24hr</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>
<u>"</u>	<u>---</u>	<u>48hr</u>	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>

**NOTES:**

Added 5 gal. of water. Sounder set initially at 29'. Dropped for

PIEZOMETER TIME LAG PLOT



DATE	PEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
1/23/92	PN 1340 FALLING			LOWER GRANITE DAM

**PIEZOMETER TEST FORM**

Location: Lower Granite Dam

Piezometer No: PN-1638

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After <58  
water change put

WSE Before 58  
Test Dry

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

$H = 68.9 - 58 = 10.9$

$H = 68.9 - \text{reading}$

69.9 Top of Sediment  
68.9 (Measured) Piezometer  
68.5 (Table) Bottom

WSE=Water Surface Elevation (Feet)

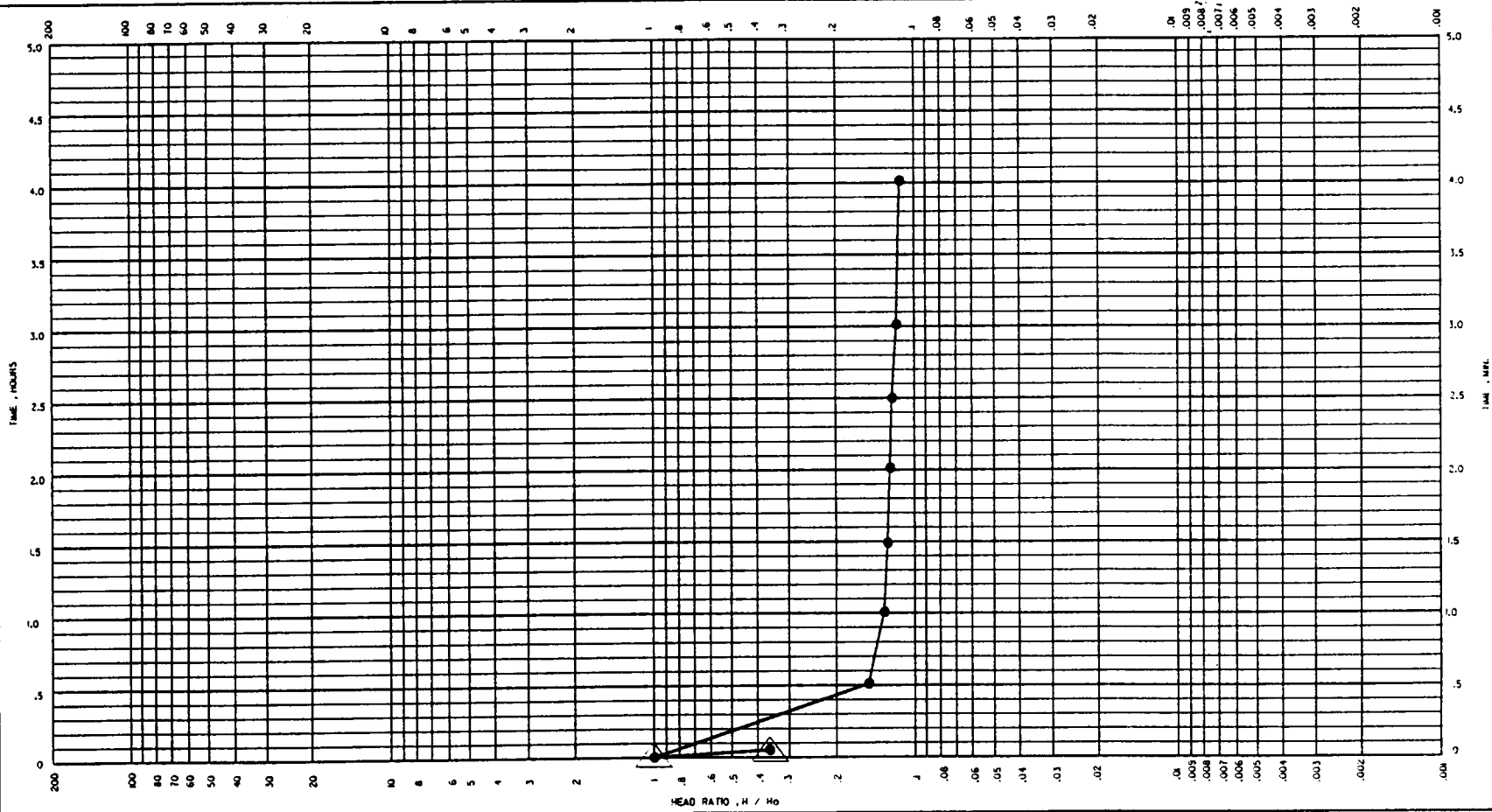
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	h	z
		Specified	Actual			
<u>1-27-92</u>	<u>14:12 DRA</u>			<u>&lt;58</u>	<u>10.9</u>	<u>1.00</u>
	<u>14:42</u>	30 min.	<u>30</u>	<u>67.2</u>	<u>1.7</u>	<u>.150</u>
	<u>15:12</u>	1hr	<u>60</u>	<u>67.3</u>	<u>1.6</u>	<u>.147</u>
	<u>15:42</u>	1hr 30min	<u>90</u>	<u>67.3</u>	<u>1.6</u>	<u>.147</u>
	<u>16:12</u>	2hr	<u>120</u>	<u>67.4</u>	<u>1.5</u>	<u>.130</u>
	<u>16:42</u>	2hr 30min	<u>150</u>	<u>67.4</u>	<u>1.5</u>	<u>.13</u>
	<u>17:12</u>	3hr	<u>180</u>	<u>67.5</u>	<u>1.4</u>	<u>.128</u>
	<u>18:12</u>	4hr	<u>240</u>	<u>67.6</u>	<u>1.3</u>	<u>.119</u>
	<u>19:12</u>	5hr	<u>300</u>	<u>67.6</u>	<u>1.3</u>	<u>.119</u>
<u>1-28-92</u>	<u>14:17</u>	24hr	<u>1445</u>	<u>68.2</u>		
<u>1-29-92</u>	<u>14:12</u>	48hr	<u>2880</u>	<u>dry</u>		

NOTES:

Added 40 gallons

The water dropped rapidly at the start of the test - the first measurement (<58ft) could be considered to be 58 ft. for purposes of data plotting

PIEZOMETER TIME LAG PLOT



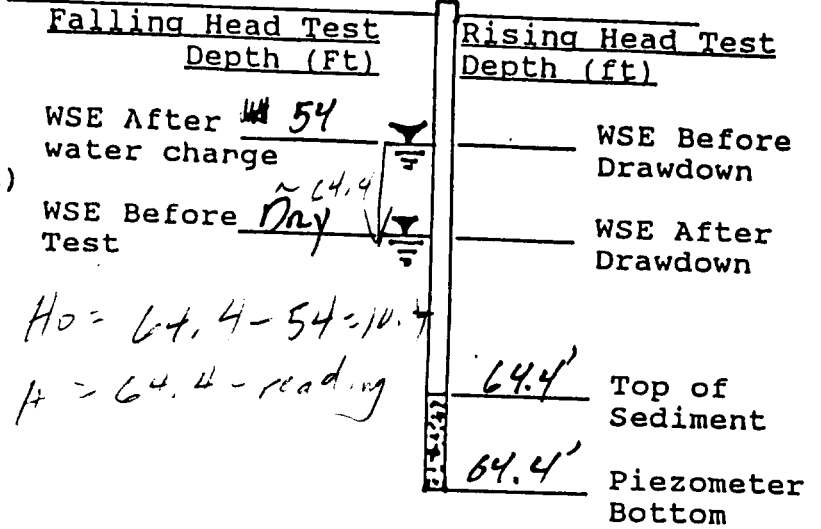
DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
1/27/92	PH 1638 FALLING			LOWER GRANITE DAM

**PIEZOMETER TEST FORM**

Location: Lowon Granite

Piezometer No: PN-1639

Type of Test: Falling  
(Falling Head or Rising Head)



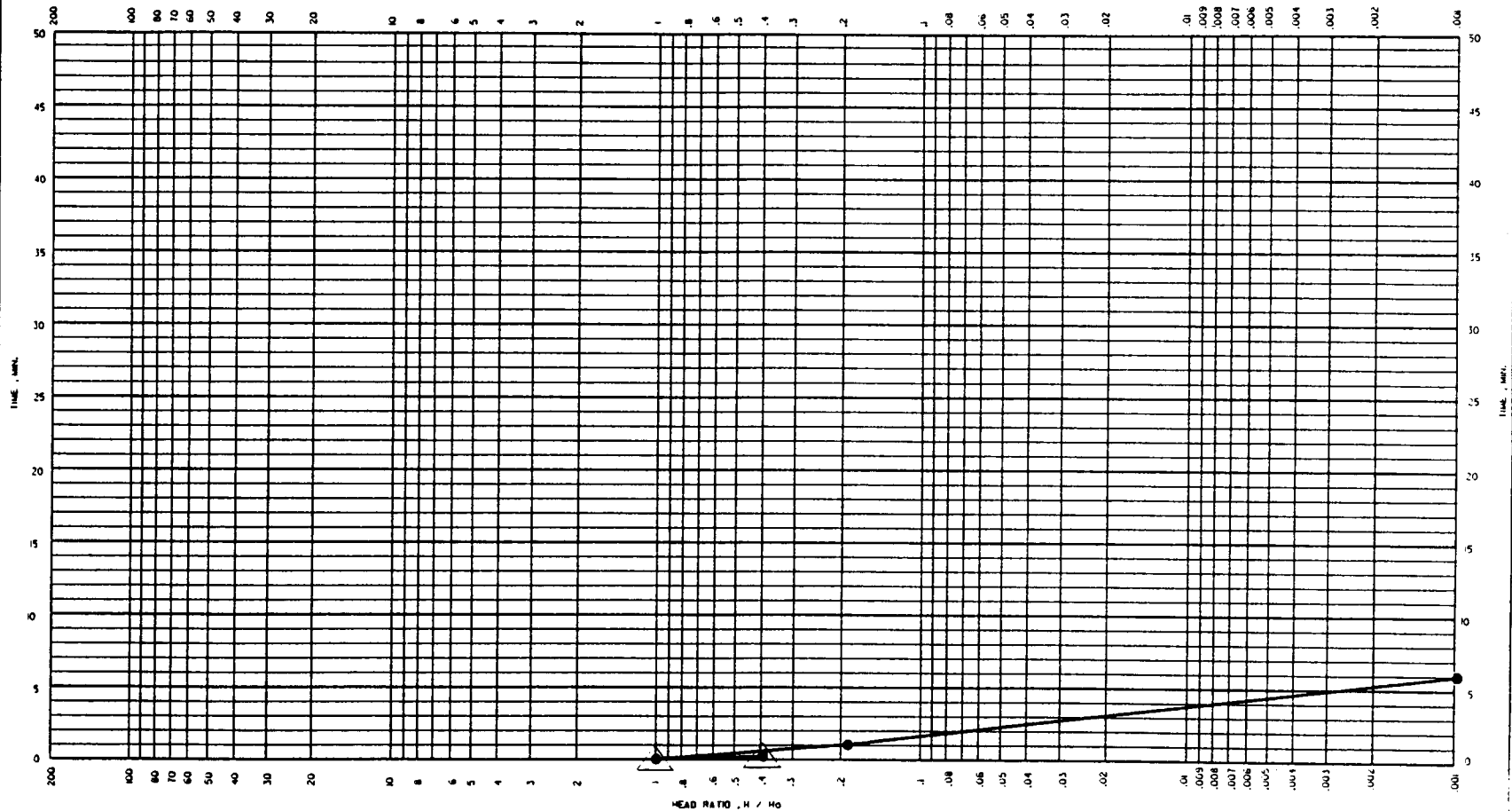
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time $t$ (min)		Water Table Depth (Feet)	H	t <sub>10</sub>
		Specified	Actual			
<u>1-23-92</u>	<u>1252</u>	0		<u>45.4</u>	<u>10.4</u>	<u>1.19</u>
<u>"</u>	<u>1253</u>	<u>1 min</u>		<u>62.4</u>	<u>2.0</u>	
<u>"</u>	<u>13:52</u>	<u>30 min.</u>	<u>30</u>	<u>Day</u>	<u>0</u>	
<u>"</u>	<u>1352</u> PVM	<u>1hr</u>	<u>60</u> PVM	<u>Day</u>		
		<u>1hr 30min</u>				
		<u>2hr</u>				
		<u>2hr 30min</u>				
		<u>3hr</u>				
		<u>4hr</u>				
		<u>5hr</u>				
		<u>24hr</u>				
		<u>48hr</u>				

NOTES:  
Added 4 gal.



PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
1/23/92	PN 1639 FALLING			LOWER GRANITE DAM



**PIEZOMETER TEST FORM**

Location: Lowell Granite

Piezometer No: PN-1641

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After <sup>PNH</sup> ~~60'~~ 60'  
water change

WSE Before <sup>70.3</sup> Dry  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

$$H_0 = 70.3 - 60 = 10.3$$

$$H = 70.3 - \text{reading}$$

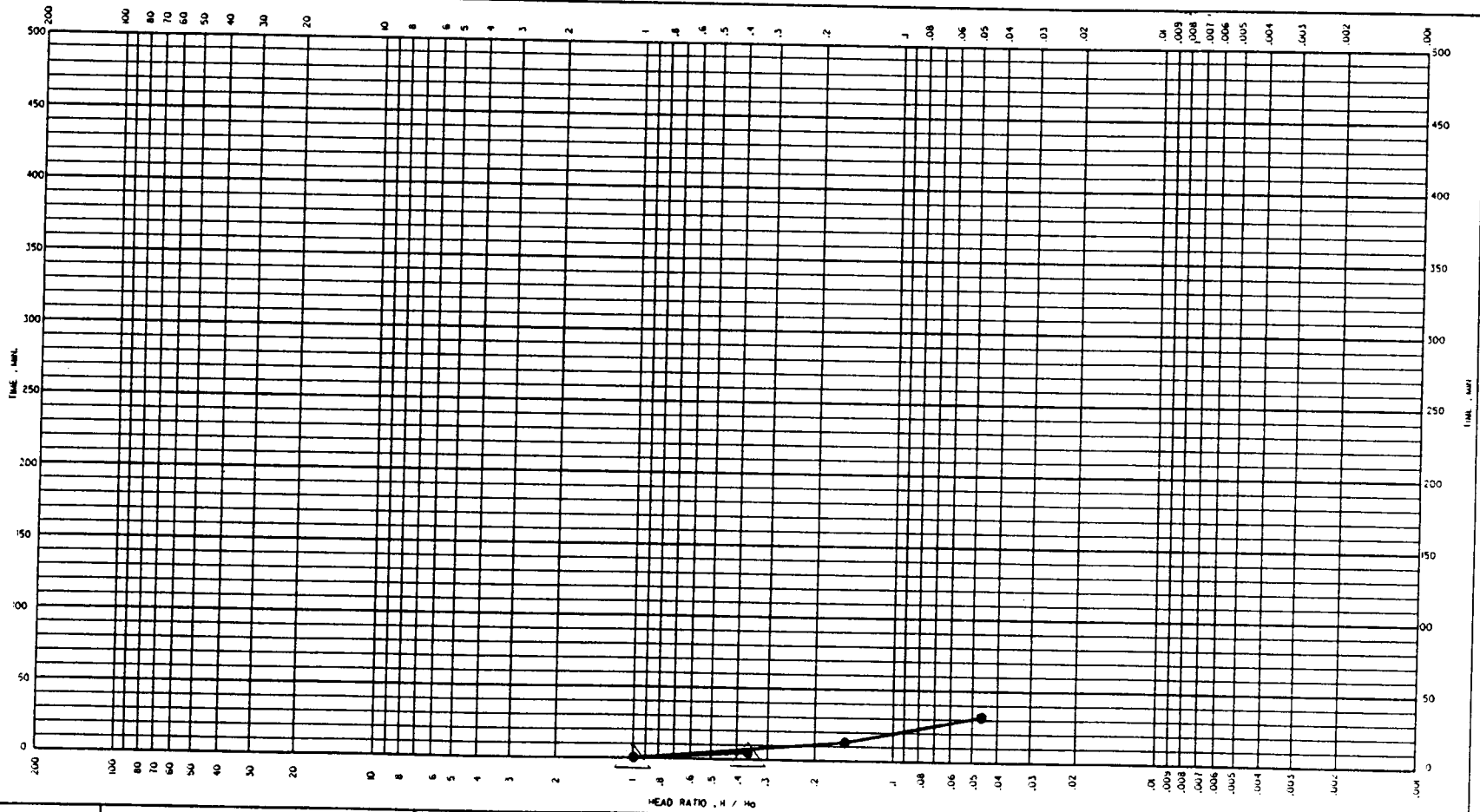
70.3' Top of Sediment  
70.3' Piezometer Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-23-92</u>	<u>12:25</u>		<u>Min</u>	<u>60'</u>	<u>10.3</u>	<u>1.0</u>
<u>1-23-92</u>	<u>12:26</u>	<u>1 min</u>	<u>1</u>	<u>62.5</u>	<u>7.8</u>	<u>.175</u>
<u>1-23-92</u>	<u>12:56</u>	<u>30 min.</u>	<u>30</u>	<u>69.8</u>	<u>0.5</u>	<u>.049</u>
<u>1-23-92</u>	<u>13:26</u>	<u>1hr</u>	<u>60</u>	<u>Dry</u>	<u>0</u>	<u>-</u>
_____	_____	<u>1hr 30min</u>	_____	_____	_____	_____
_____	_____	<u>2hr</u>	_____	_____	_____	_____
_____	_____	<u>2hr 30min</u>	_____	_____	_____	_____
_____	_____	<u>3hr</u>	_____	_____	_____	_____
_____	_____	<u>4hr</u>	_____	_____	_____	_____
_____	_____	<u>5hr</u>	_____	_____	_____	_____
_____	_____	<u>24hr</u>	_____	_____	_____	_____
_____	_____	<u>48hr</u>	_____	_____	_____	_____

NOTES: Added 4.0 gallons of water over a 0.5 min time period

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/23/92	PN 1541 FALLING	TIME LAG THEORY	LITTLE GOOSE DAM

Lower Ground

**PIEZOMETER TEST FORM**

Location: Little Goose Dam

Piezometer No: PN-401

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test

Depth (Ft)

13.0

WSE After ~~26.98~~  
water charge PVH

WSE Before 26.98  
Test

Rising Head Test

Depth (ft)

PVH

26.98 WSE Before  
Drawdown

WSE After  
Drawdown

50.4' Top of  
Sediment

53.1 Piezometer  
Bottom

$$H_0 = 26.98 - 13.0 = 13.98$$

$$H = 26.98 - \text{reading}$$

WSE=Water Surface Elevation (Feet)

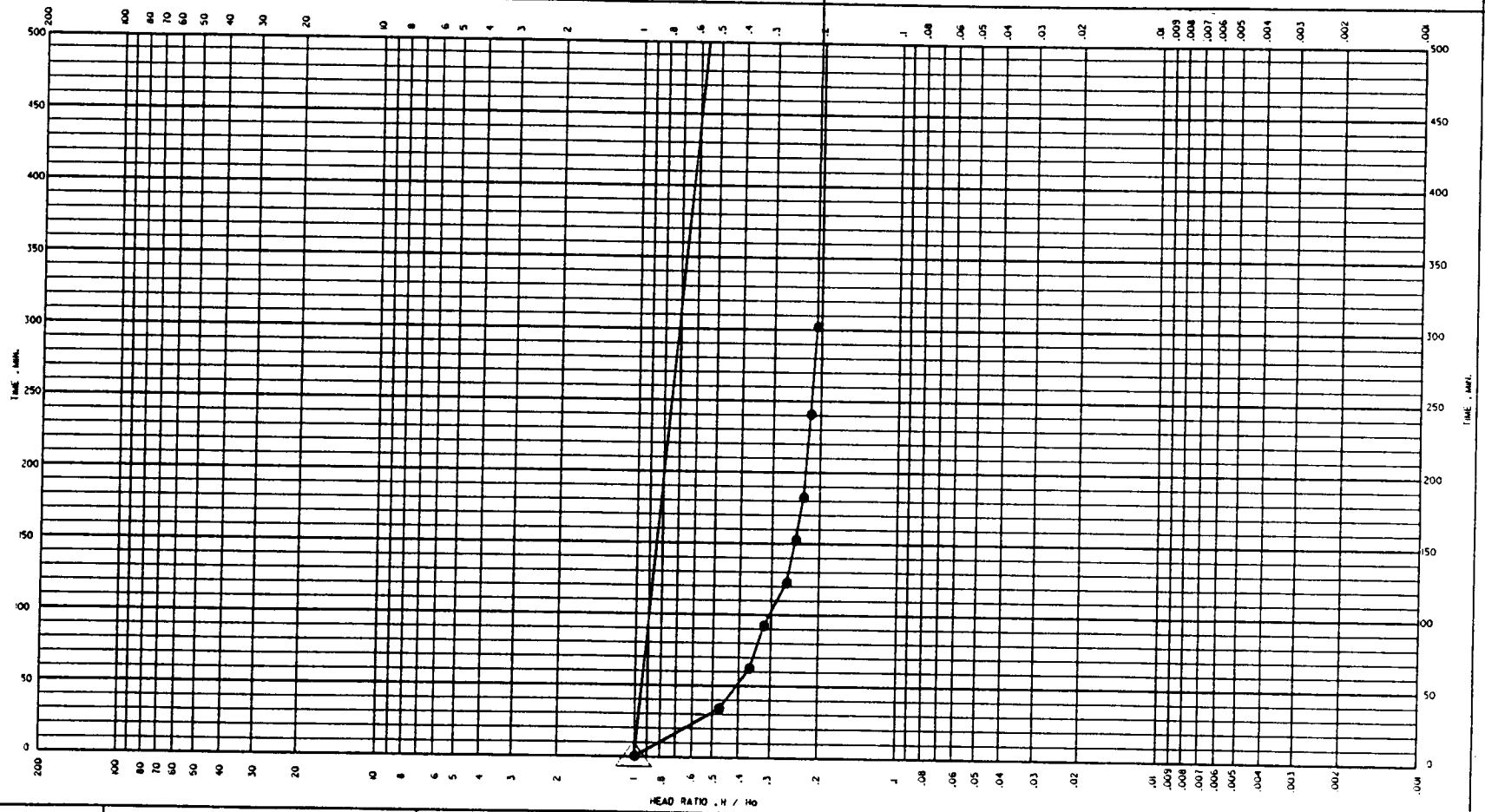
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-20-92</u>	<u>13:24</u>		0 min.	<u>13.0</u>	<u>13.98</u>	<u>1.00</u>
<u>1-20-92</u>	<u>13:54</u>	30 min.	<u>30</u>	<u>20.40</u>	<u>6.58</u>	<u>.471</u>
<u>1-20-92</u>	<u>14:24</u>	1hr	<u>60</u>	<u>21.92</u>	<u>5.06</u>	<u>.362</u>
<u>1-20-92</u>	<u>14:54</u>	1hr 30min	<u>90</u>	<u>22.68</u>	<u>4.30</u>	<u>.308</u>
<u>1-20-92</u>	<u>15:24</u>	2hr	<u>120</u>	<u>23.15</u>	<u>3.83</u>	<u>.274</u>
<u>1-20-92</u>	<u>15:54</u>	2hr 30min	<u>150</u>	<u>23.43</u>	<u>3.55</u>	<u>.254</u>
<u>1-20-92</u>	<u>16:24</u>	3hr	<u>180</u>	<u>23.63</u>	<u>3.35</u>	<u>.240</u>
<u>1-20-92</u>	<u>17:24</u>	4hr	<u>240</u>	<u>23.87</u>	<u>3.11</u>	<u>.223</u>
<u>1-20-92</u>	<u>18:24</u>	5hr	<u>300</u>	<u>24.03</u>	<u>2.95</u>	<u>.211</u>
<u>1-21-92</u>	<u>13:24</u>	24hr	<u>1440</u>	<u>24.19</u>	<u>2.75</u>	<u>.200</u>
<u>1-22-92</u>	<u>0800</u>			<u>24.07</u>		
<u>1-22-92</u>	<u>13:24</u>	48hr	<u>2880</u>	<u>24.00</u>		


NOTES: Added 1 1/2 gal water because casing is crooked.

on 1-21-92, reservoir is up 1-2 Ft above 1-20-92 level.

1-22-92 → higher reservoir than 1-21-92

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/20/52	PN 401 FALLING	 TIME LAG THEORY	LITTLE GOOSE DAM

**PIEZOMETER TEST FORM**

Location: Little Goose Dam

Piezometer No: PN-404

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water change

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

22.90 WSE Before  
Drawdown

37.03 WSE After  
Drawdown

$H_0 = 37.03 - 22.90 = 14.13$   
 $H = \text{reading} - 22.90$

46.1  
~~48.3~~ <sup>PWH</sup> Top of  
Sediment  
46.1 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

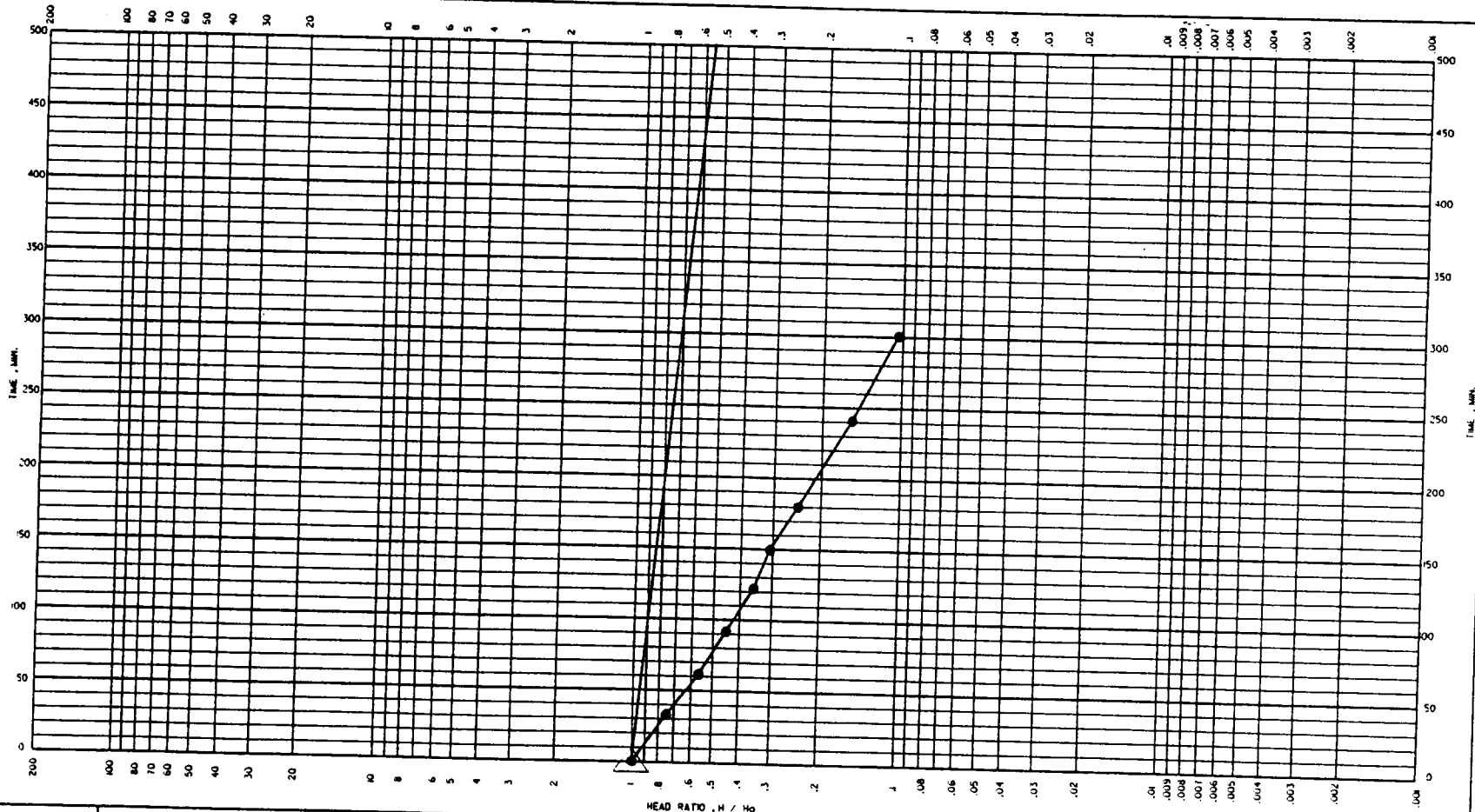
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	t	H/H <sub>0</sub>
		Specified	Actual			
<u>1-21-92</u>	<u>0834</u>	0	0min.	<u>37.03</u>	<u>14.13</u>	<u>1</u>
"	<u>0904</u>	30 min.	<u>30</u>	<u>33.57</u>	<u>10.67</u>	<u>.759</u>
"	<u>0935</u>	1hr	<u>61</u>	<u>31.23</u>	<u>8.33</u>	<u>.590</u>
"	<u>1004</u>	1hr 30min	<u>90</u>	<u>29.65</u>	<u>6.75</u>	<u>.478</u>
"	<u>1034</u>	2hr	<u>120</u>	<u>28.34</u>	<u>5.41</u>	<u>.386</u>
"	<u>1104</u>	2hr 30min	<u>150</u>	<u>27.31</u>	<u>4.41</u>	<u>.32</u>
"	<u>1133</u>	3hr	<u>179</u>	<u>26.53</u>	<u>3.63</u>	<u>.257</u>
"	<u>1234</u>	4hr	<u>240</u>	<u>25.32</u>	<u>2.42</u>	<u>.21</u>
"	<u>1334</u>	5hr	<u>300</u>	<u>24.53</u>	<u>1.63</u>	<u>.15</u>
<u>1-22-92</u>	<u>0834</u>	24hr	<u>1440</u>	<u>22.45</u>		← passed str level
<u>1-23-92</u>	<u>0834</u>	48hr	<u>2880</u>	<u>22.39</u>		

NOTES:

Baited  $1\frac{1}{4}$  gal in ~5 min.

Reservoir level up on 1-22-92 from 1-21-92 level.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/21/92	PN 404 RISING	TIME LAG THEORY	LITTLE GOOSE DAM



**PIEZOMETER TEST FORM**

Location: Little Goose Dam

Piezometer No: PN-411

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 18.5  
water change

WSE Before 28.55  
Test

$$H_0 = 28.55 - 18.5 = 10.05$$

$$H = 28.55 - \text{reading}$$

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

48.3 Top of  
Sediment

48.3 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

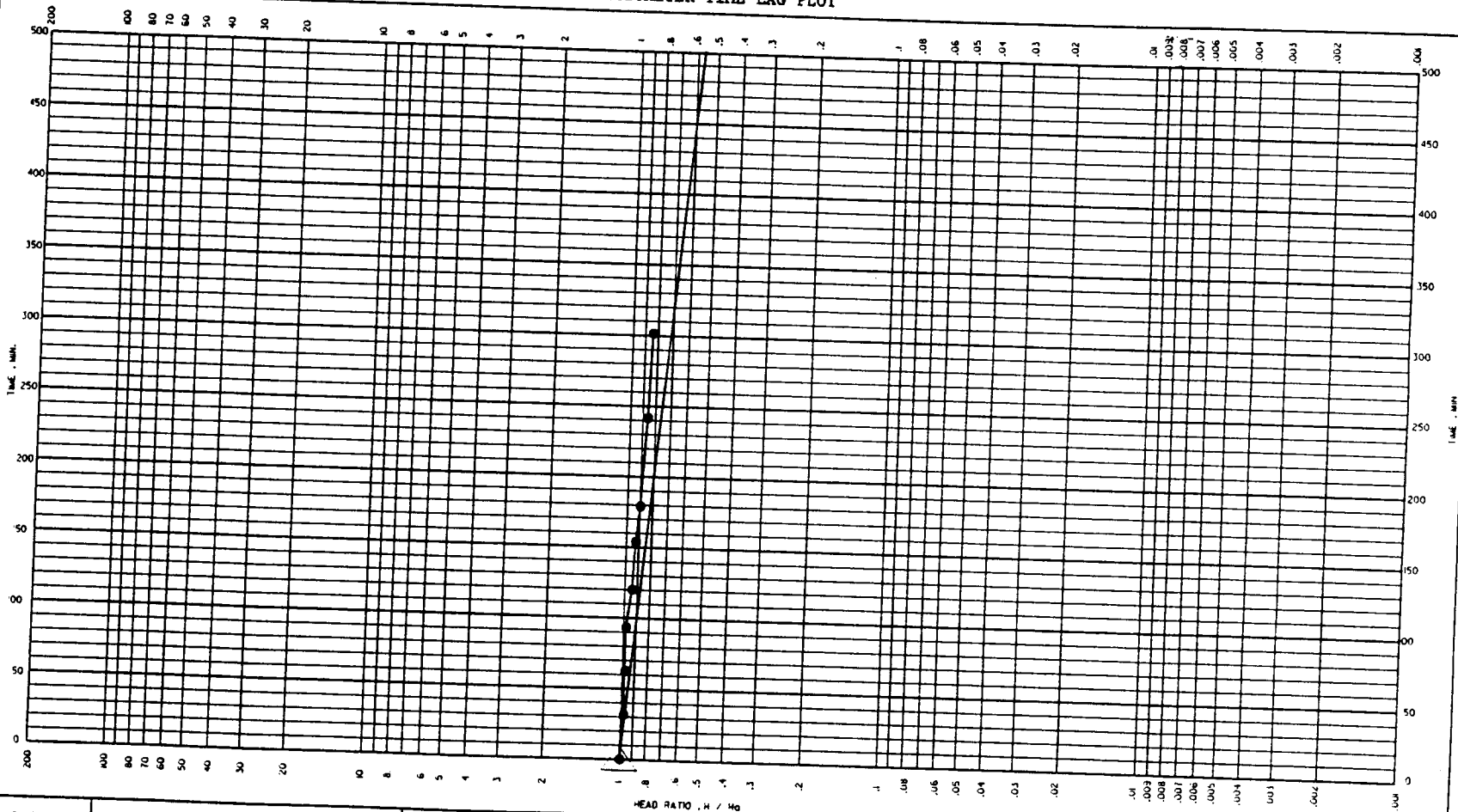
Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H H <sub>0</sub>
		Specified	Actual			
<u>1-21-92</u>	<u>0852</u>		0 min.	<u>18.5</u>	<u>10.05</u>	<u>1.00</u>
"	<u>0922</u>	30 min.	<u>30</u>	<u>18.74</u>	<u>9.81</u>	<u>.976</u>
"	<u>0951</u>	1hr	<u>59</u>	<u>18.97</u>	<u>9.58</u>	<u>.953</u>
"	<u>1022</u>	1hr 30min	<u>90</u>	<u>19.19</u>	<u>9.36</u>	<u>.931</u>
"	<u>1052</u>	2hr	<u>120</u>	<u>19.38</u>	<u>9.17</u>	<u>.912</u>
"	<u>1122</u>	2hr 30min	<u>150</u>	<u>19.56</u>	<u>8.99</u>	<u>.895</u>
"	<u>1152</u>	3hr	<u>180</u>	<u>19.73</u>	<u>8.82</u>	<u>.878</u>
"	<u>1252</u>	4hr	<u>240</u>	<u>20.05</u>	<u>8.50</u>	<u>.846</u>
"	<u>1352</u>	5hr	<u>300</u>	<u>20.36</u>	<u>8.19</u>	<u>.815</u>
<u>1-22-92</u>	<u>0852</u>	24hr	<u>1440</u>	<u>23.60</u>		
<u>1-23-92</u>	<u>0852</u>	48hr	<u>2880</u>	<u>25.22</u>		

NOTES:

Cracked casing → had to fill w/ 1 gal water.

Reservoir level up on 1-22-92 from 1-21-92 level.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	TIME LAG THEORY	LOCATION
1/21/92	PN 48 FALLING			LITTLE GOOSE DAM

**PIEZOMETER TEST FORM**

Location: Little Goose Dam

Piezometer No: PN-412

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After \_\_\_\_\_  
water change

WSE Before \_\_\_\_\_  
Test

Rising Head Test  
Depth (ft)

25.96 WSE Before  
Drawdown

36.90 WSE After  
Drawdown

46.5 Top of  
Sediment

46.5 Piezometer  
Bottom

$$H_0 = 36.90 - 25.96 = 10.94$$

$$H = \text{reading} - 25.96$$

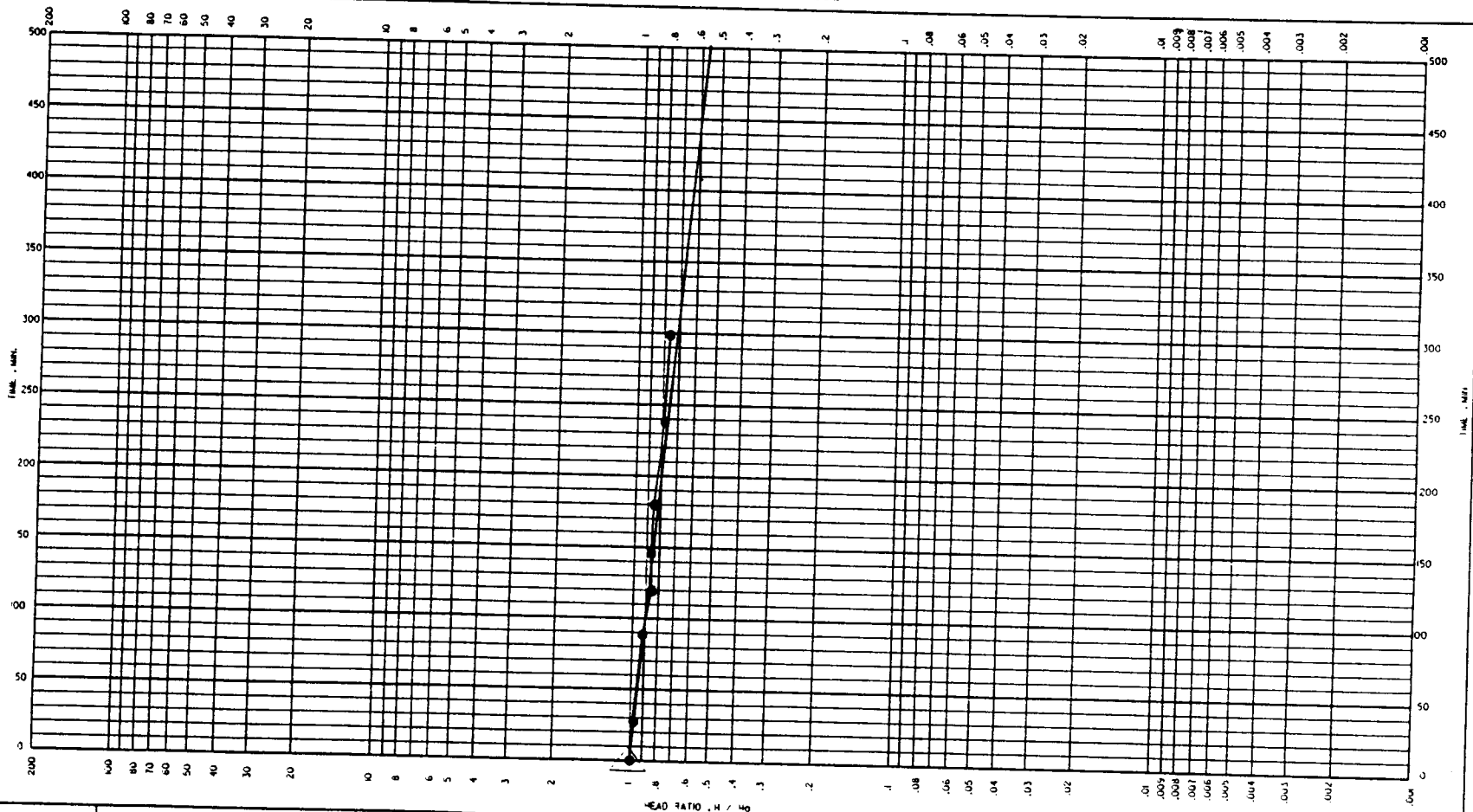
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H/H <sub>0</sub>
		Specified	Actual min		
<u>1-21-92</u>	<u>0844</u>	0		<u>36.90</u>	<u>10.94</u>
"	<u>0914</u>	30 min.	<u>30</u>	<u>36.46</u>	<u>10.50</u>
"	<u>0944</u>	1hr	<u>60</u>	<u>36.19</u>	<u>10.23</u>
"	<u>1016</u>	1hr 30min	<u>92</u>	<u>35.84</u>	<u>9.88</u>
"	<u>1046</u>	2hr	<u>122</u>	<u>35.56</u>	<u>9.60</u>
"	<u>1113</u>	2hr 30min	<u>149</u>	<u>35.32</u>	<u>9.36</u>
"	<u>1147</u>	3hr	<u>183</u>	<u>35.03</u>	<u>9.07</u>
"	<u>1244</u>	4hr	<u>240</u>	<u>34.58</u>	<u>8.62</u>
"	<u>1344</u>	5hr	<u>300</u>	<u>34.16</u>	<u>8.20</u>
<u>1-22-92</u>	<u>0844</u>	24hr	<u>1440</u>	<u>29.76</u>	
<u>1-23-92</u>	<u>0844</u>	48hr	<u>2880</u>	<u>27.45</u>	

NOTES:

Bailed 1 gal in 4 min.

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/21/92	PN 412 RISING	TIME LAG THEORY	LITTLE GOOSE DAM

**PIEZOMETER TEST FORM**

Location: Little Goose Dam

Piezometer No: PN-417

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After <sup>pv<sup>h</sup></sup> ~~30~~ 30"  
water charge

WSE Before 44.30  
Test (dry)

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

$H_0 = 44.30 - 30 = 14.3$

$H = 44.30 - \text{reading}$

44.3 Top of  
Sediment

44.6 Piezometer  
Bottom

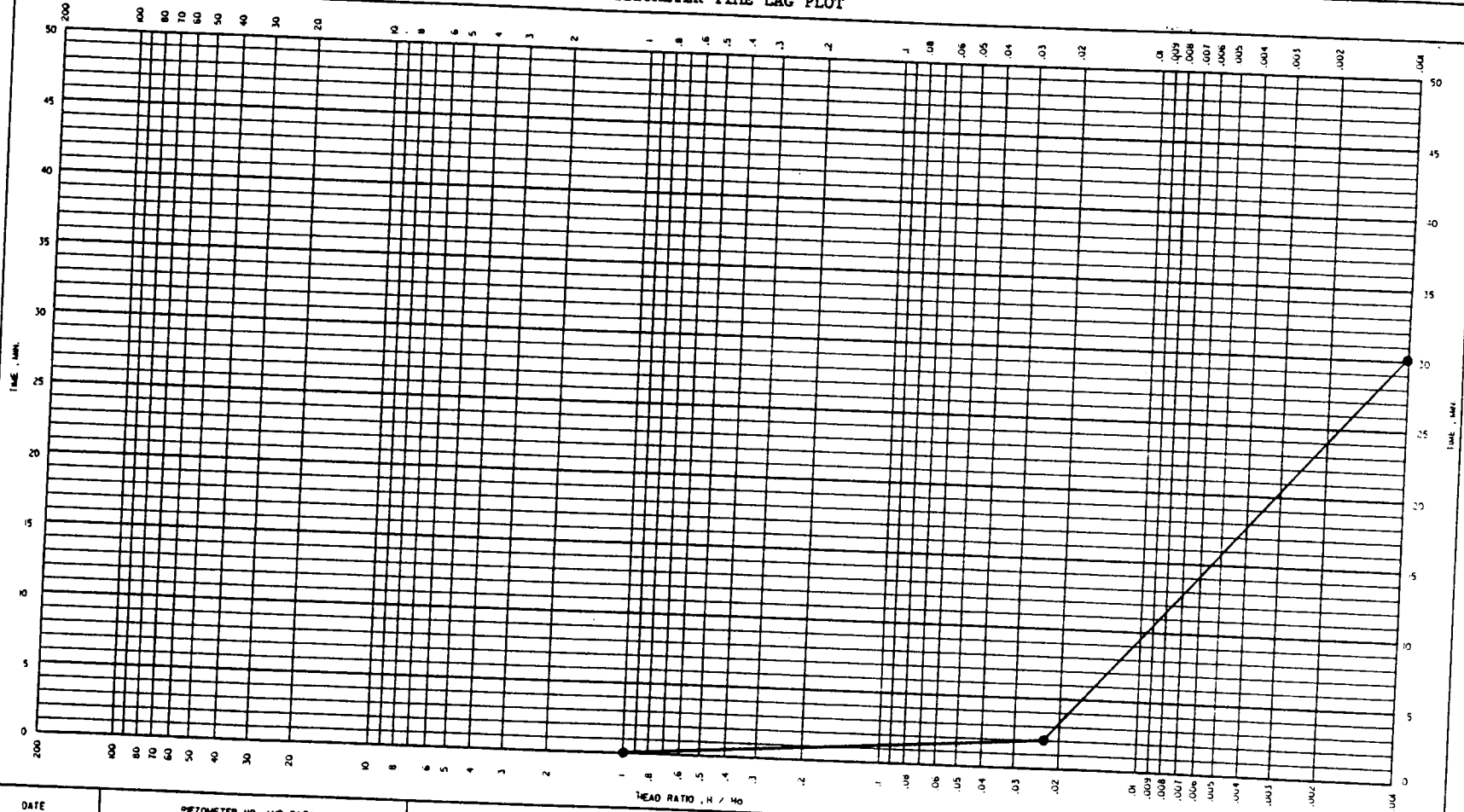
WSE=Water Surface Elevation (Feet)


Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-21-92</u>	<u>1011</u>	0	<u>min.</u>	<u>30"</u>	<u>14.3</u>	<u>1.00</u>
"	<u>1013</u>	30 min.	<u>2</u>	<u>43.95</u>	<u>35</u>	<u>10245</u>
"	<u>1041</u>	30 min	<u>30</u>	<u>44.30</u>	<u>recovered</u>	<u>0</u>
		1hr				
		1hr 30min				
		2hr				
		2hr 30min				
		3hr				
		4hr				
		5hr				
		24hr				
		48hr				

NOTES:

Added 1/4 gal - drained immediately. Difficult to tell what initial water level was. 0.9 gal should cause 10' of head change in a blank 1 1/2" I.D. casing.

### PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
2/19/92	PN 417 FALLING	 TIME LAG THEORY	LITTLE GOOSE DAM

**PIEZOMETER TEST FORM**

Location: Little Goose Dam

Piezometer No: PN-418

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After ~14  
water charge

WSE Before Dry  
Test

WSE Before  
Drawdown

WSE After  
Drawdown

$$H_0 = 24.2 - 14 = 10.2$$

$$H = 24.2 - \text{read } g$$

24.2 Top of Sediment

24.5 Piezometer Bottom

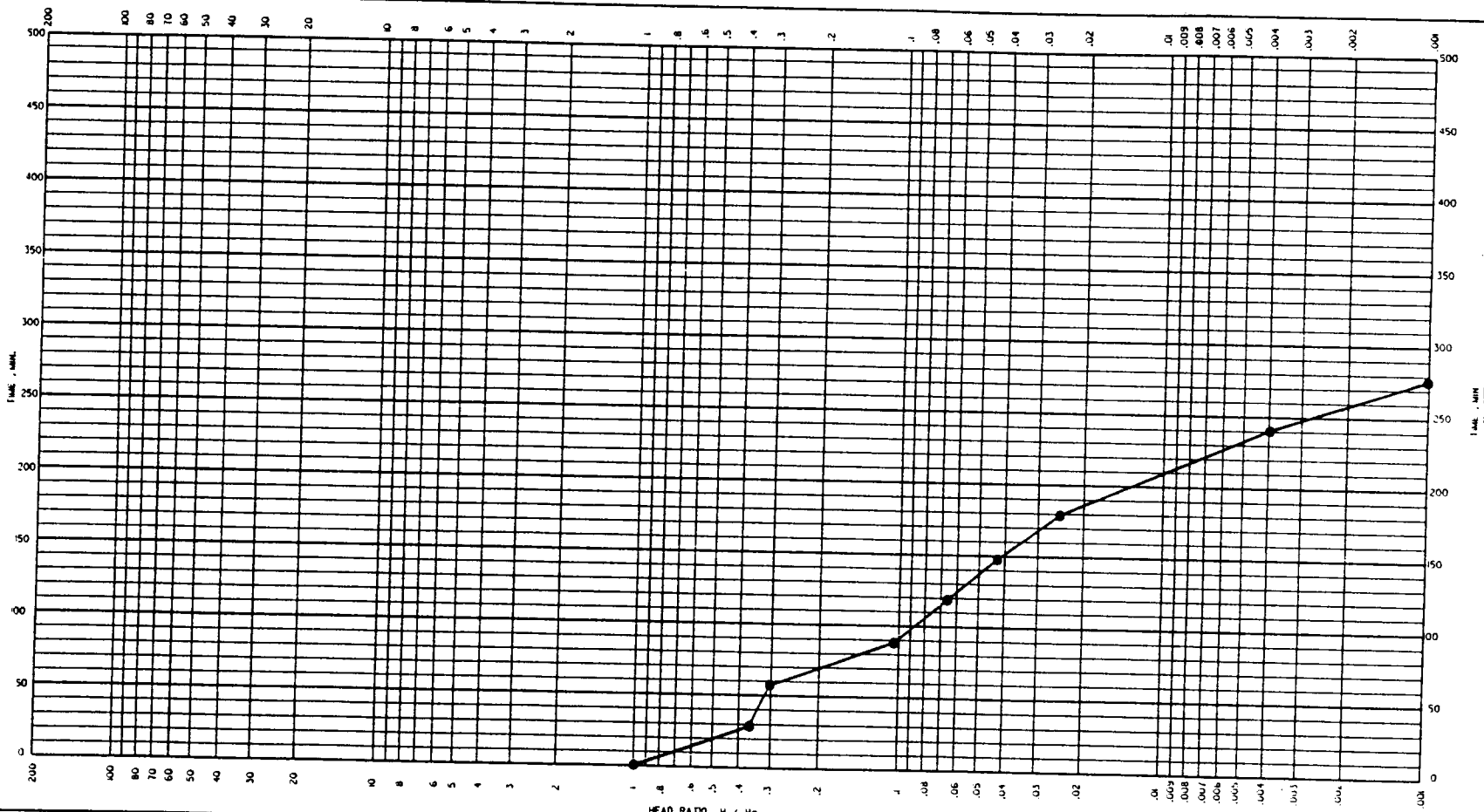
WSE=Water Surface Elevation (Feet)


Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-21-92</u>	<u>0958</u>	0	0 min.	<u>~14</u>	<u>10.2</u>	<u>1.00</u>
"	<u>1029</u>	30 min.	<u>31</u>	<u>20.60</u>	<u>3.60</u>	<u>.353</u>
"	<u>1057</u>	1hr	<u>59</u>	<u>21.19</u>	<u>3.01</u>	<u>.295</u>
"	<u>1128</u>	1hr 30min	<u>90</u>	<u>23.04</u>	<u>1.16</u>	<u>.114</u>
"	<u>1158</u>	2hr	<u>120</u>	<u>23.54</u>	<u>.66</u>	<u>.065</u>
"	<u>1227</u>	2hr 30min	<u>149</u>	<u>23.78</u>	<u>.42</u>	<u>.041</u>
"	<u>1258</u>	3hr	<u>180</u>	<u>23.95</u>	<u>.25</u>	<u>.025</u>
"	<u>1358</u>	4hr	<u>240</u>	<u>24.16</u>	<u>.04</u>	<u>.0035</u>
"	<u>1435</u>	5hr	<u>277</u>	<u>24.2</u>	recorded to former level.	
		24hr				
		48hr				

NOTES:

Added ~7 gal. → drops very quickly.

### PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/20/92	PN 48 FALLING	 TIME LAG THEORY	LITTLE GOOSE DAM



**PIEZOMETER TEST FORM**

Location: Little Goose

Piezometer No: PN-418

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 18.2  
water change 18.7

WSE Before 24.2  
Test 24.7

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

$H_0 = 24.2 - 18.2 = 6.0$

$H = 24.2 - \text{reading}$

24.2 Top of  
Sediment

24.5 Piezometer  
Bottom

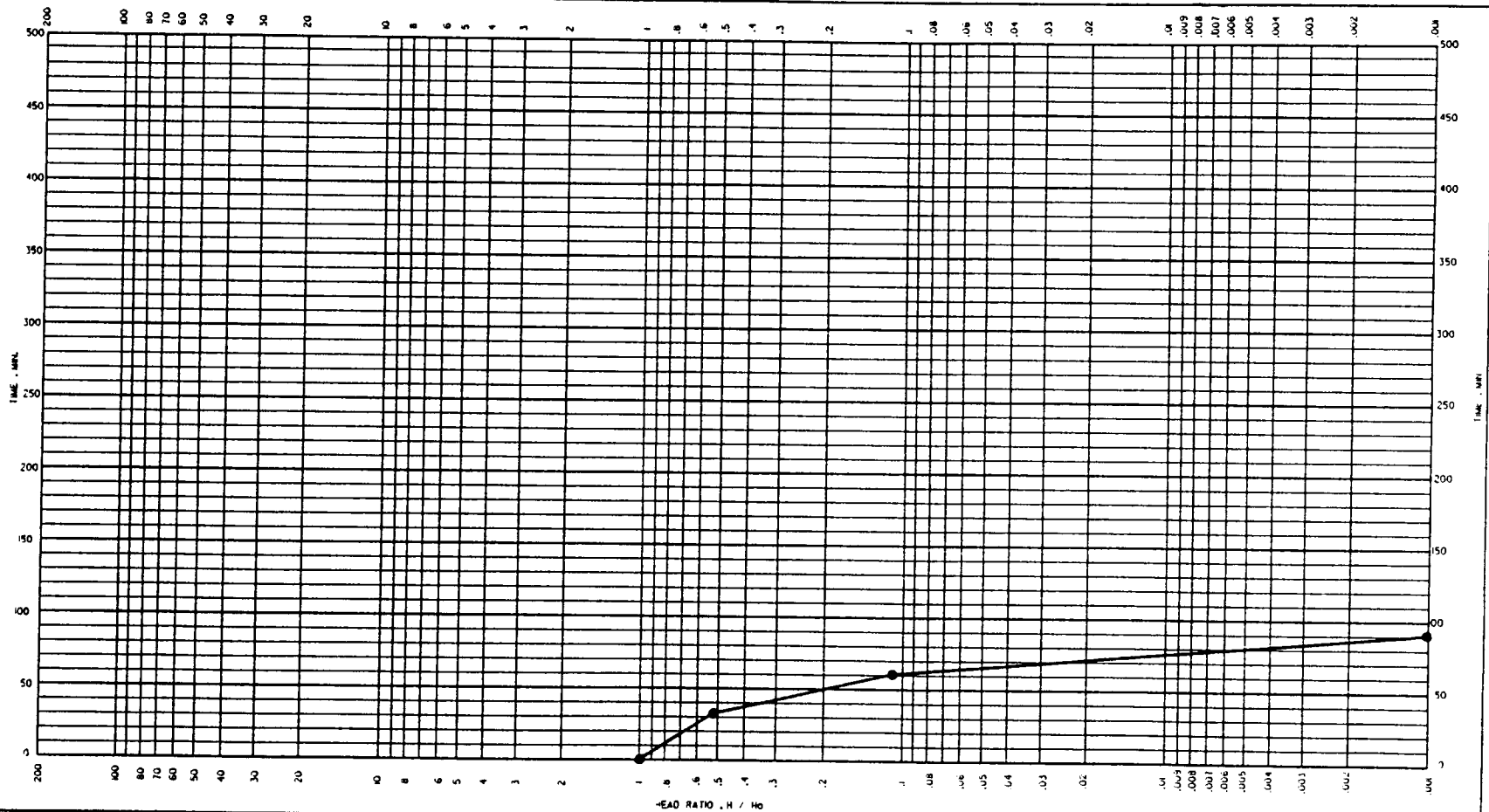
WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	h/h <sub>0</sub>
		Specified	Actual			
<u>1-20-92</u>	<u>13:57</u> <u>13:55</u>			<u>18.2</u>	<u>6.0</u>	<u>1.00</u>
<u>1-20-92</u>	<u>14:27</u>	30 min.	<u>30 min</u>	<u>21.1</u>	<u>3.1</u>	<u>.517</u>
<u>1-20-92</u>	<u>14:57</u>	1hr	<u>1 hr</u>	<u>23.5</u>	<u>.70</u>	<u>.117</u>
<u>1-20-92</u>	<u>15:27</u>	1hr 30min	<u>1.5 hr</u>	<u>24.2</u>	<u>0</u>	<u>—</u>
_____	_____	2hr	_____	_____	_____	_____
_____	_____	2hr 30min	_____	_____	_____	_____
_____	_____	3hr	_____	_____	_____	_____
_____	_____	4hr	_____	_____	_____	_____
_____	_____	5hr	_____	_____	_____	_____
_____	_____	24hr	_____	_____	_____	_____
_____	_____	48hr	_____	_____	_____	_____

NOTES:

Add  $1\frac{3}{4}$  gallons @ 13:49  
 added additional  $1\frac{1}{4}$  gallons @ 13:55 to increase  
 head  
 Added another 2 gallons @ 13:57

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/20/92	PN 418 FALLING	TIME LAG THEORY	LITTLE GOOSE DAM

**PIEZOMETER TEST FORM**

Location: Little Goose

Piezometer No: RD-13

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 10.0'  
water charge

WSE Before DRY  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

$H_0 = 23.5 - 10 = 13.5$   
 $f = 23.5 - \text{read}$

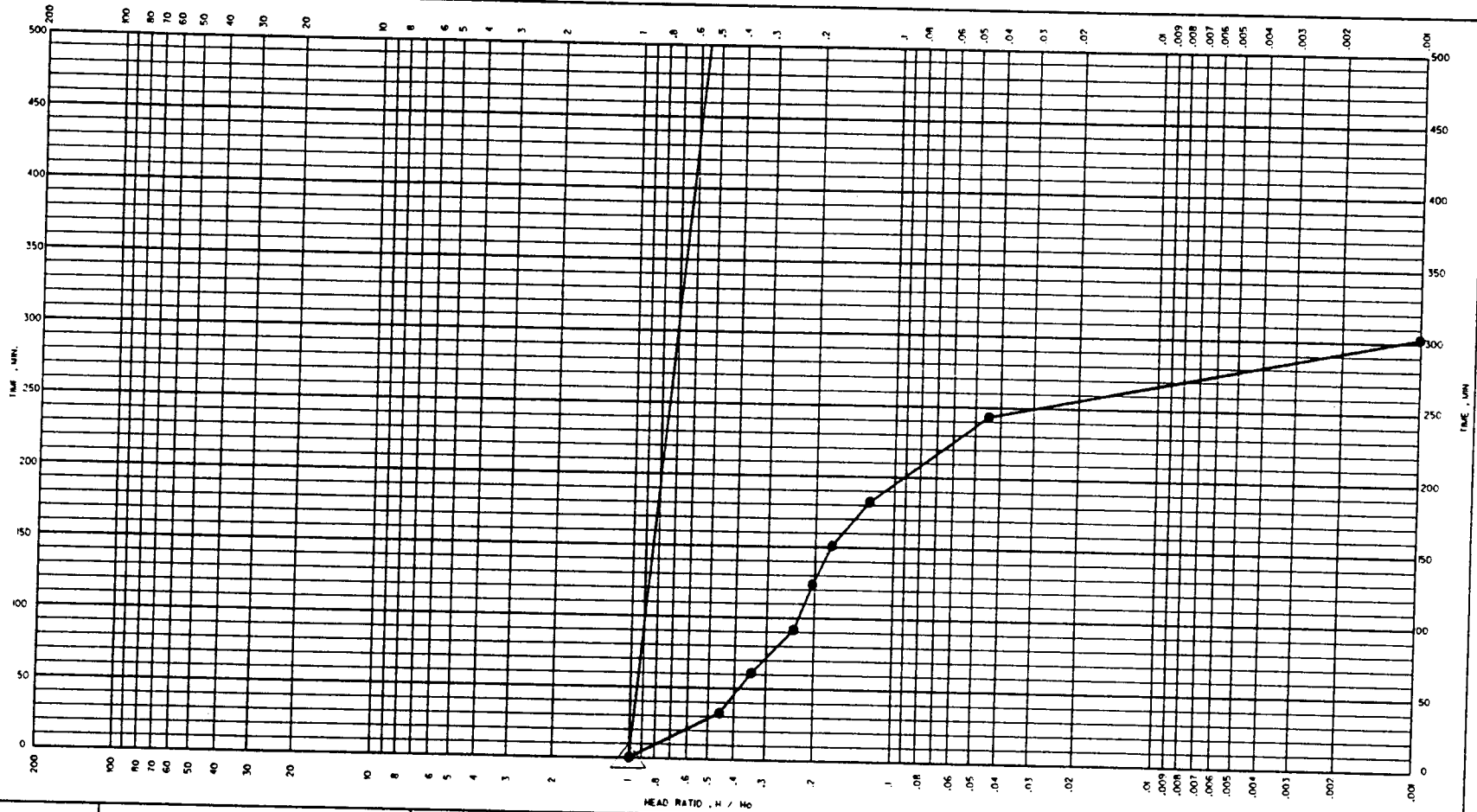
23.5' Top of Sediment  
23.5' Piezometer Bottom


WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time	Water Table Depth (Feet)	H	H/H <sub>0</sub>
<u>1-21-92</u>	<u>8:29</u> <del><u>8:29</u></del>	Specified Actual 0 <u>10.0'</u>	<u>10.0'</u> <del><u>18.1'</u></del>	13.5	1.00
<u>1-21-92</u>	<u>9:59</u>	30 min. <u>30</u>	<u>17.9'</u>	5.6	.415
<u>1-21-92</u>	<u>9:29</u>	1hr <u>60</u>	<u>19.0'</u>	4.5	.333
<u>1-21-92</u>	<u>9:59</u>	1hr 30min <u>90</u>	<u>20.2'</u>	3.30	.244
<u>1-21-92</u>	<u>10:29</u>	2hr <u>120</u>	<u>20.9'</u>	2.70	.200
<u>1-21-92</u>	<u>10:59</u>	2hr 30min <u>150</u>	<u>21.2'</u>	2.30	.170
<u>1-21-92</u>	<u>11:29</u>	3hr <u>180</u>	<u>21.8'</u>	1.70	.126
<u>1-21-92</u>	<u>12:29</u>	4hr <u>240</u>	<u>22.9'</u>	.60	.044
<u>1-21-92</u>	<u>13:29</u>	5hr <u>300</u>	<u>DRY</u>	0	0
_____	_____	24hr _____	_____	_____	_____
_____	_____	48hr _____	_____	_____	_____

NOTES: Added 8.0 gallons water

### PIEZOMETER TIME LAG PLOT



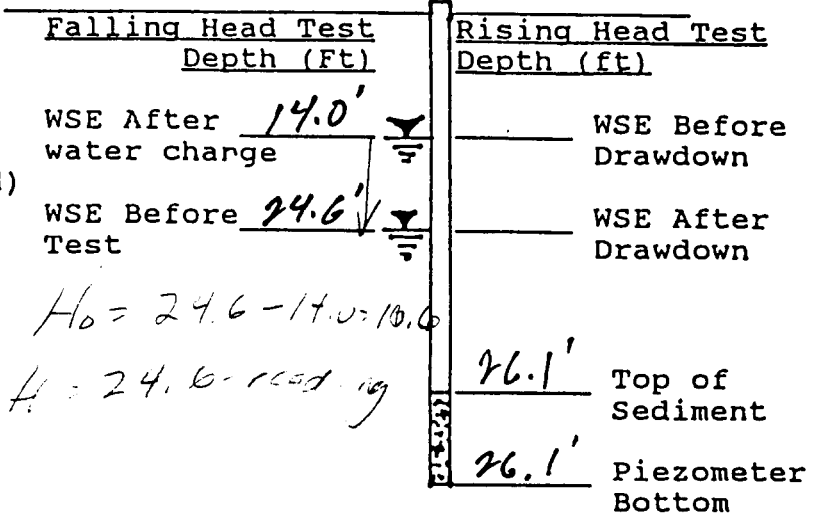
DATE	PIEZOMETER NO. AND DATA	PROJECT	 TIME LAG THEORY	LOCATION
1/21/92	RD 13 FALLING			LITTLE GOOSE DAM

**PIEZOMETER TEST FORM**

Location: Little Goose

Piezometer No: RD-14/RD-17

Type of Test: Falling  
(Falling Head or Rising Head)

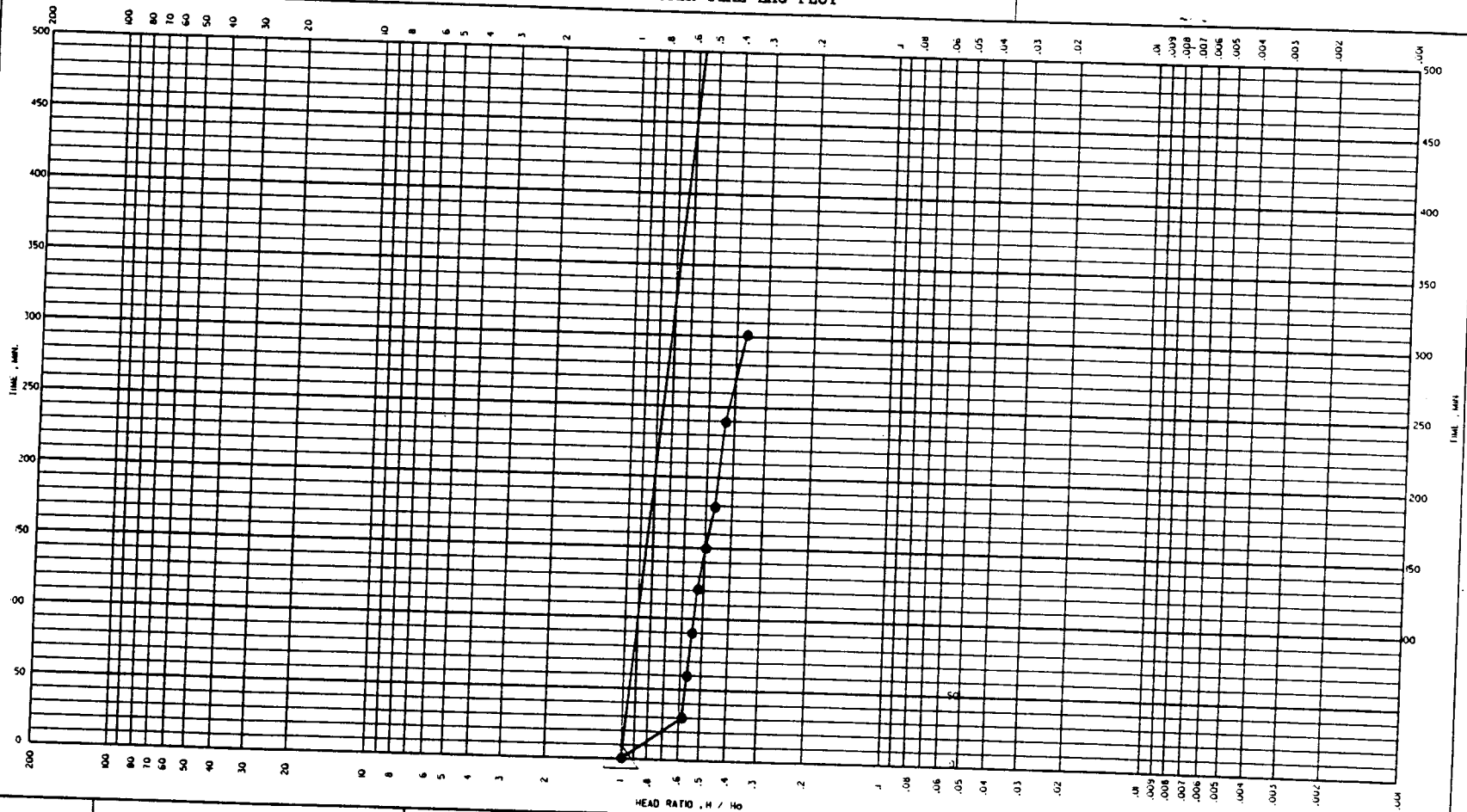


WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-21-92</u>	<u>9:33</u>	0	<u>Min</u>	<u>14.0'</u>	<u>10.6</u>	<u>1.00</u>
<u>1-21-92</u>	<u>9:03</u>	30 min.	<u>30</u>	<u>18.4'</u>	<u>6.20</u>	<u>.585</u>
<u>1-21-92</u>	<u>9:33</u>	1hr	<u>60</u>	<u>19.7'</u>	<u>5.90</u>	<u>.557</u>
<u>1-21-92</u>	<u>10:03</u>	1hr 30min	<u>90</u>	<u>19.9'</u>	<u>5.70</u>	<u>.538</u>
<u>1-21-92</u>	<u>10:33</u>	2hr	<u>120</u>	<u>19.2'</u>	<u>5.40</u>	<u>.509</u>
<u>1-21-92</u>	<u>11:03</u>	2hr 30min	<u>150</u>	<u>19.4'</u>	<u>5.20</u>	<u>.491</u>
<u>1-21-92</u>	<u>11:33</u>	3hr	<u>180</u>	<u>19.7'</u>	<u>4.9</u>	<u>.462</u>
<u>1-21-92</u>	<u>12:33</u>	4hr	<u>240</u>	<u>20.1'</u>	<u>4.5</u>	<u>.425</u>
<u>1-21-92</u>	<u>13:33</u>	5hr	<u>300</u>	<u>20.5'</u>	<u>4.10</u>	<u>.387</u>
<u>1-22-92</u>	<u>8:33</u>	24hr	<u>1,440</u>	<u>23.6'</u>	<u>1.00</u>	<u>.094</u>
<u>1-23-92</u>	<u>8:33</u>	48hr	<u>2,880</u>	<u>23.6'</u>	<u>1.00</u>	<u>.094</u>

NOTES: Added 4.0 gallons

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/21/92	RD 14 RD 17 FALLING		LITTLE GOOSE DAM



**PIEZOMETER TEST FORM**

Location: Little Goose

Piezometer No: RO-15

Type of Test: Falling  
(Falling Head or Rising Head)

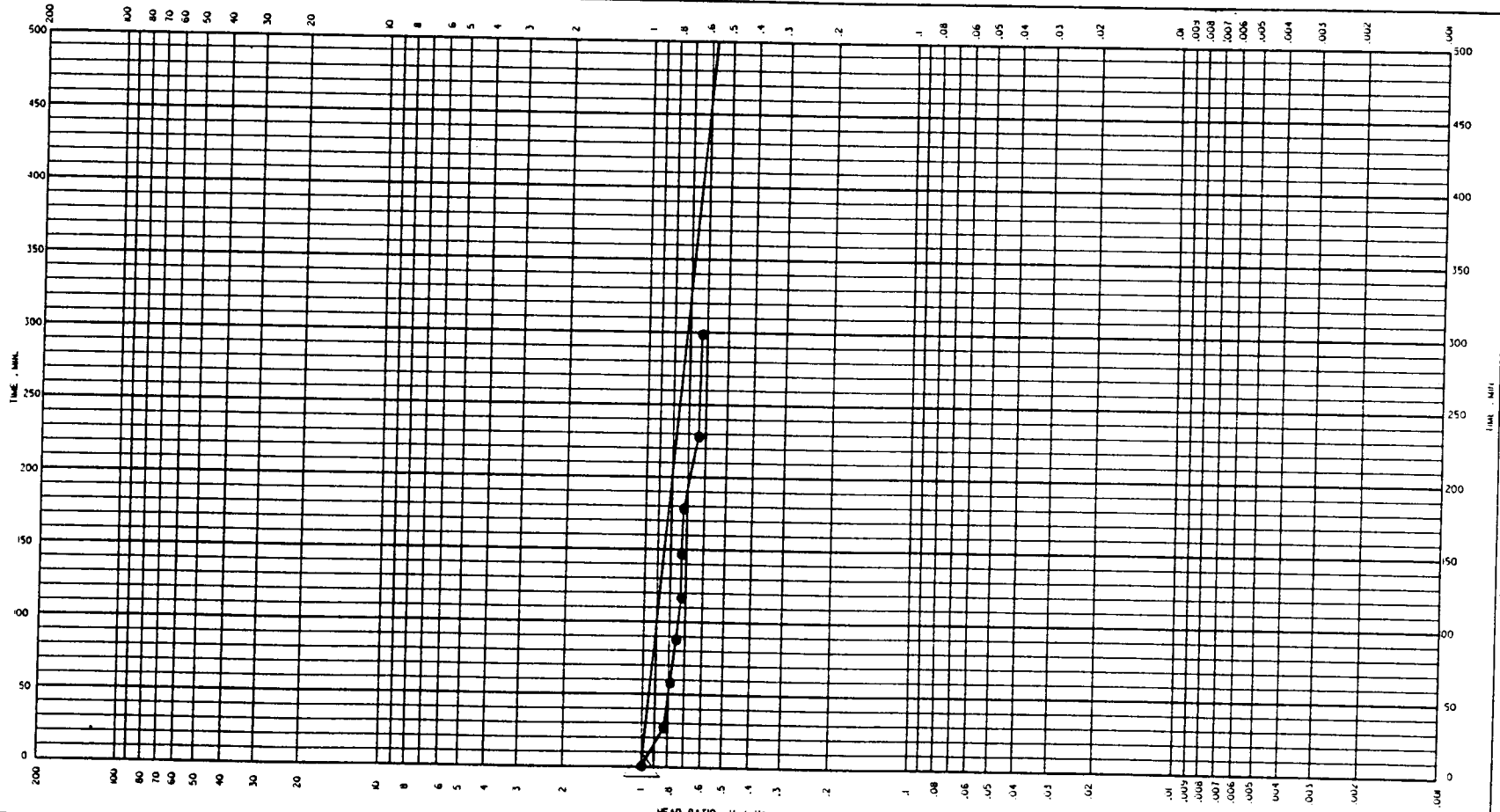
Falling Head Test		Rising Head Test	
Depth (Ft)		Depth (ft)	
WSE After water charge	<u>17.0'</u>	WSE Before Drawdown	
WSE Before Test	<u>27.2'</u>	WSE After Drawdown	
$H_0 = 27.2 - 17.0 = 10.2$		<u>28.9'</u>	Top of Sediment
$H = 27.2 - \text{read by}$		<u>28.9'</u>	Piezometer Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-21-92</u>	<u>8:41</u>	0	<u>17.0</u>	<u>17.0'</u>	<u>10.2</u>	<u>1.06</u>
<u>1-21-92</u>	<u>9:11</u>	30 min.	<u>30</u>	<u>18.4'</u>	<u>8.87</u>	<u>.870</u>
<u>1-21-92</u>	<u>9:41</u>	1hr	<u>60</u>	<u>18.8'</u>	<u>8.4</u>	<u>.824</u>
<u>1-21-92</u>	<u>10:11</u>	1hr 30min	<u>90</u>	<u>19.1'</u>	<u>8.1</u>	<u>.794</u>
<u>1-21-92</u>	<u>10:41</u>	2hr	<u>120</u>	<u>19.3'</u>	<u>7.9</u>	<u>.775</u>
<u>1-21-92</u>	<u>11:11</u>	2hr 30min	<u>150</u>	<u>19.6'</u>	<u>7.6</u>	<u>.745</u>
<u>1-21-92</u>	<u>11:41</u>	3hr	<u>180</u>	<u>19.8'</u>	<u>7.4</u>	<u>.726</u>
<u>1-21-92</u>	<u>12:41</u>	4hr	<u>240</u>	<u>20.9'</u>	<u>6.9</u>	<u>.677</u>
<u>1-21-92</u>	<u>13:41</u>	5hr	<u>300</u>	<u>20.7'</u>	<u>6.5</u>	<u>.637</u>
<u>1-22-92</u>	<u>8:41</u>	24hr	<u>1,440</u>	<u>24.7'</u>	<u>2.5</u>	<u>.245</u>
<u>1-23-92</u>	<u>8:41</u>	48hr	<u>2,880</u>	<u>25.9'</u>	<u>1.3</u>	<u>.128</u>

NOTES: Added 6.0 gallons

PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/28/92	90 15 FALLING	TIME LAG THEORY	LITTLE GOOSE DAM



**PIEZOMETER TEST FORM**

Location: Little Goose

Piezometer No: RO-16

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After water charge 6.5'

WSE Before Test 23.0'

Rising Head Test  
Depth (ft)

WSE Before Drawdown

WSE After Drawdown

$H_0 = 23.0 - 6.5 = 16.5$   
 $H = 23.0 - \text{reading}$

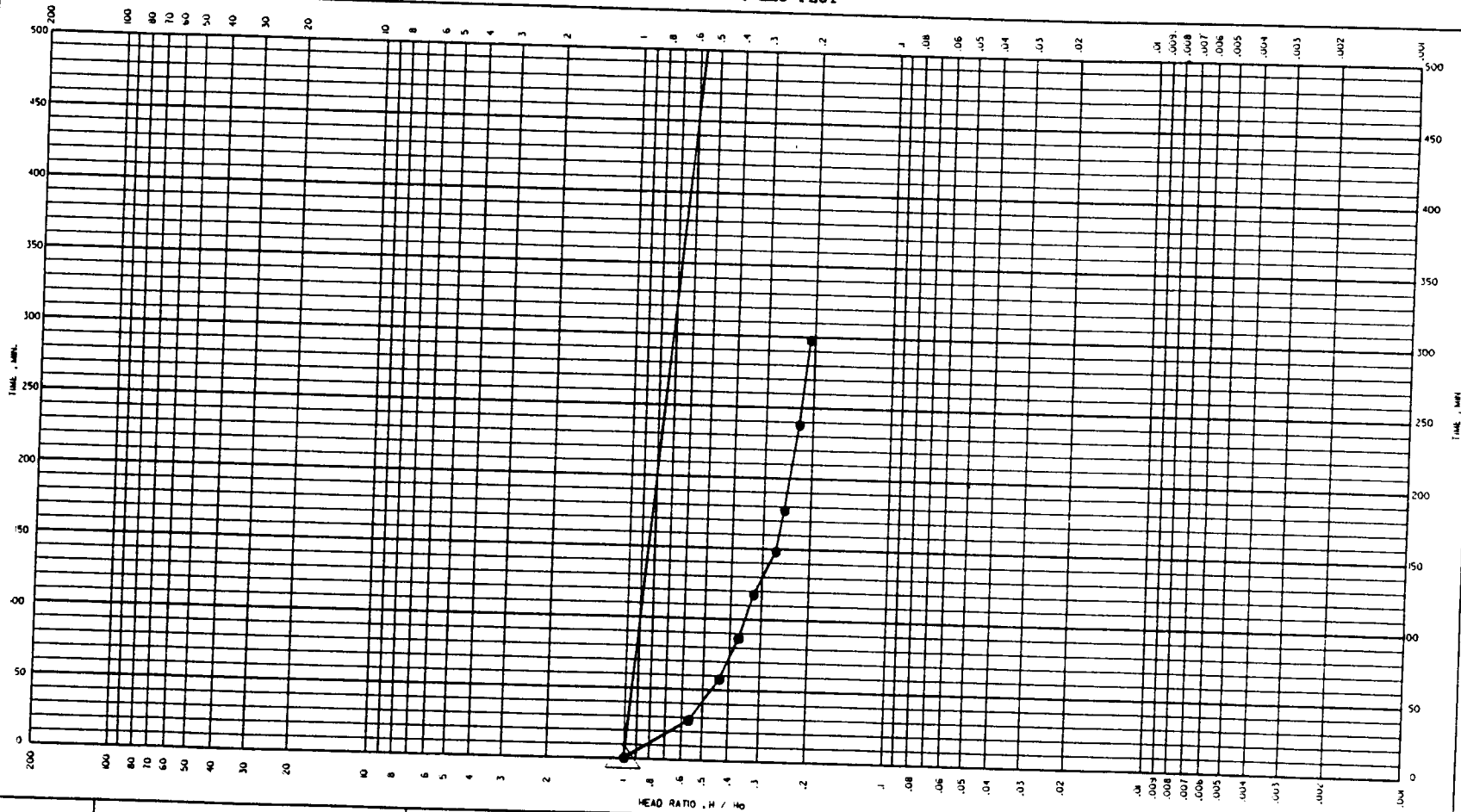
29.5 Top of Sediment  
29.5' Piezometer Bottom


WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	H	H/H <sub>0</sub>
		Specified	Actual			
<u>1-21-92</u>	<u>8:51</u>	0	<u>Min</u>	<u>6.5'</u>	<u>16.5</u>	<u>1.00</u>
<u>1-21-92</u>	<u>9:21</u>	30 min.	<u>30</u>	<u>13.9'</u>	<u>9.1</u>	<u>.55</u>
<u>1-21-92</u>	<u>9:51</u>	1hr	<u>60</u>	<u>15.9'</u>	<u>7.1</u>	<u>.43</u>
<u>1-21-92</u>	<u>10:21</u>	1hr 30min	<u>90</u>	<u>17.0'</u>	<u>6.0</u>	<u>.36</u>
<u>1-21-92</u>	<u>10:51</u>	2hr	<u>120</u>	<u>17.8'</u>	<u>5.2</u>	<u>.31</u>
<u>1-21-92</u>	<u>11:21</u>	2hr 30min	<u>150</u>	<u>18.3'</u>	<u>4.7</u>	<u>.28</u>
<u>1-21-92</u>	<u>11:51</u>	3hr	<u>180</u>	<u>18.7'</u>	<u>4.3</u>	<u>.26</u>
<u>1-21-92</u>	<u>12:51</u>	4hr	<u>240</u>	<u>19.2'</u>	<u>3.8</u>	<u>.23</u>
<u>1-21-92</u>	<u>13:51</u>	5hr	<u>300</u>	<u>19.5'</u>	<u>3.5</u>	<u>.21</u>
<u>1-22-92</u>	<u>8:51</u>	24hr	<u>1,440</u>	<u>20.9'</u>		
<u>1-23-92</u>	<u>8:51</u>	48hr	<u>2,880</u>	<u>20.9'</u>		

NOTES: Added 2.0 gallons

### PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	 TIME LAG THEORY	LOCATION
1/21/92	RD 16 FALLING			LITTLE GOOSE DAM

**PIEZOMETER TEST FORM**

Location: Little Goose Dam

Piezometer No: DH-1

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

Rising Head Test  
Depth (ft)

WSE After water charge

40.74 WSE Before Drawdown

WSE Before Test

53.9 WSE After Drawdown

$H_0 = 53.9 - 40.74 = 13.16$   
 $H = \text{level} - 40.74$

86.0 Top of Sediment (None)

86.0 Piezometer Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)	$H$	$H/H_0$
		Specified	Actual			
<u>1-20-92</u>	<u>1317</u>	0	0 min.	<u>53.9</u>	<u>13.16</u>	<u>1.00</u>
<u>1-20-92</u>	<u>1347</u>	30 min.	<u>30</u>	<u>45.91</u>	<u>5.17</u>	<u>.393</u>
<u>1-20-92</u>	<u><del>13</del> 1418</u>	1hr	<u>61</u>	<u>41.40</u>	<u>.66</u>	<u>.0502</u>
<u>1-20-92</u>	<u>1447</u>	1hr 30min	<u>90</u>	<u>39.42</u>		<u>← passed static level.</u>
<u>1-20-92</u>	<u>1517</u>	2hr	<u>120</u>	<u>38.32</u>		
<u>1-20-92</u>	<u>1547</u>	2hr 30min	<u>150</u>	<u>37.75</u>		
<u>1-20-92</u>	<u>1617</u>	3hr	<u>180</u>	<u>37.45</u>		
<u>1-20-92</u>	<u>17:17</u>	4hr	<u>240</u>	<u>37.17</u>		
<u>1-20-92</u>	<u>18:19</u>	5hr	<u>300</u>	<u>37.16</u>		
<u>1-21-92</u>	<u>1317</u>	24hr	<u>1440</u>	<u>37.33</u>		
<u>1-22-92</u>	<u>0805</u>	48hr	<u>2880</u>	<u>37.29</u>		
<u>1-22-92</u>	<u>13:17</u>			<u>37.4</u>		

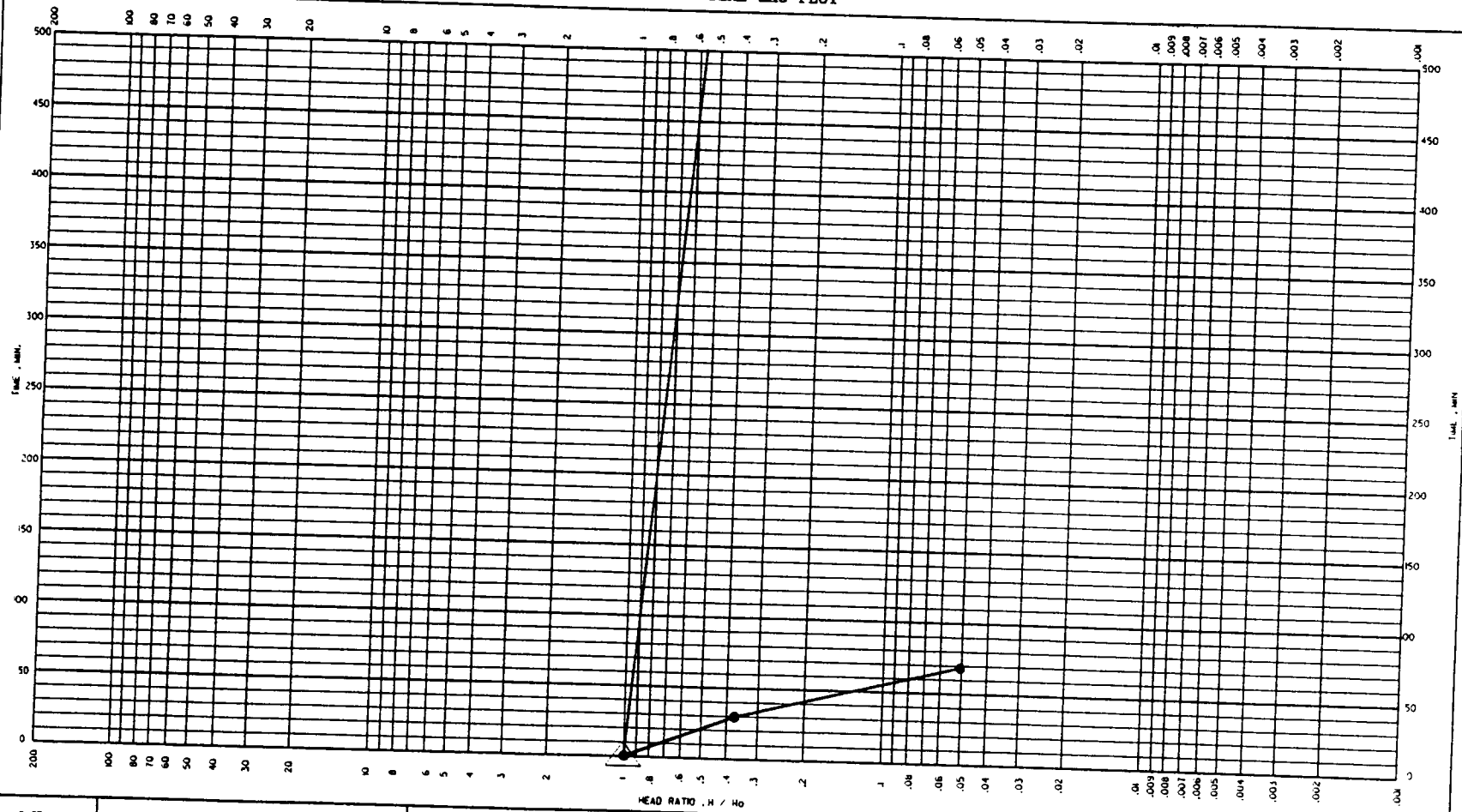
NOTES: Bailed  $1\frac{1}{4}$  gal in 5 min. (1312-1317)


Recovered to above the static level. PVC cap does have a hole drilled in it.

On 1-21-92, reservoir is up ~ 1 to 2 ft above 1-20-92 level.

1-22-92 → higher reservoir than 1-21-92.

### PIEZOMETER TIME LAG PLOT



DATE	PIEZOMETER NO. AND DATA	PROJECT	LOCATION
1/20/92	DH 1 RISING	 TIME LAG THEORY	LITTLE GOOSE DAM

PIEZOMETER TEST FORM

Location: OH-2 Little Goose

Piezometer No: OH-2

Type of Test: Falling  
(Falling Head or Rising Head)

Falling Head Test  
Depth (Ft)

WSE After 92.2  
water charge

WSE Before 92.2  
Test

Rising Head Test  
Depth (ft)

WSE Before  
Drawdown

WSE After  
Drawdown

139.8 Top of  
Sediment

140.2 Piezometer  
Bottom

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>1-20-92</u>	<u>14:18</u>		0	<u>92.2</u>
_____	_____	30 min.	_____	_____
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES: Added 1 gallon - drained immediately.

*1 point  
no plot*

**PIEZOMETER TEST FORM**

Location: Little Goose

Piezometer No: DN-2

Type of Test: Rising  
(Falling Head or Rising Head)

Falling Head Test		Rising Head Test	
Depth (Ft)		Depth (ft)	
WSE After water charge	<u>92.2</u>	WSE Before Drawdown	<u>92.2</u>
WSE Before Test	<u>92.3</u>	WSE After Drawdown	<u>92.3</u>
	<u>139.8</u>	Top of Sediment	<u>139.8</u>
	<u>140.2</u>	Piezometer Bottom	<u>140.2</u>

WSE=Water Surface Elevation (Feet)

Date	Time (24-Hour Clock)	Elapsed Time		Water Table Depth (Feet)
		Specified	Actual	
<u>1-20-92</u>	<u>13:00</u>		0	<u>92.3</u>
<u>1-20-92</u>	<u>13:05</u>	<u>5</u> <del>30</del> min.	<u>5</u>	<u>92.2</u>
_____	_____	1hr	_____	_____
_____	_____	1hr 30min	_____	_____
_____	_____	2hr	_____	_____
_____	_____	2hr 30min	_____	_____
_____	_____	3hr	_____	_____
_____	_____	4hr	_____	_____
_____	_____	5hr	_____	_____
_____	_____	24hr	_____	_____
_____	_____	48hr	_____	_____

NOTES:

Pumped 1.0 gallon

*No plot  
not enough  
points  
results to see*

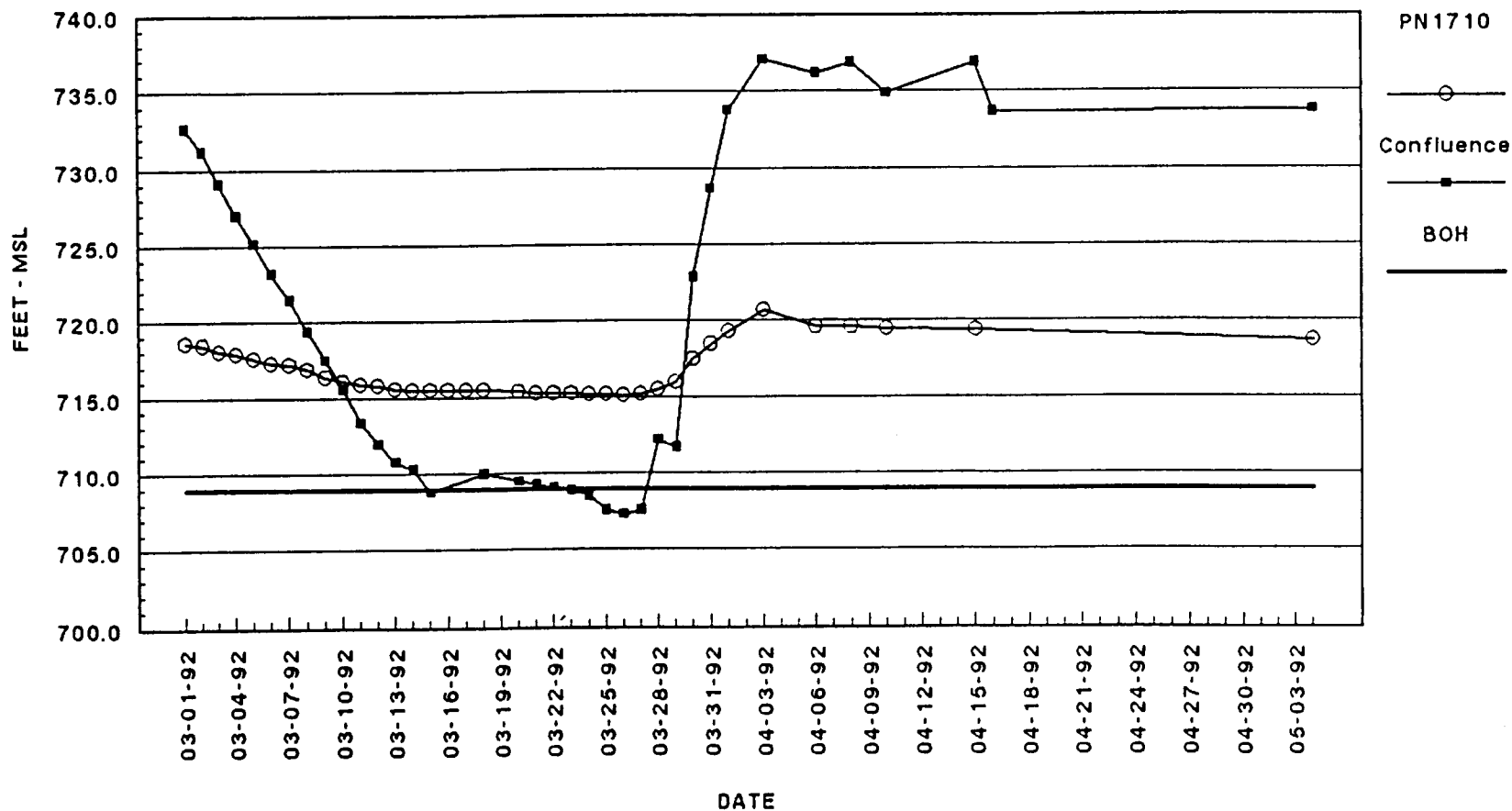
APPENDIX D-3

MARCH, 1992 DRAWDOWN PIEZOMETER READINGS

LEWISTON LEVEES

# LOWER GRANITE LEVEES - DRAWDOWN 1992

## OPEN TUBE PIEZOMETER PN1710

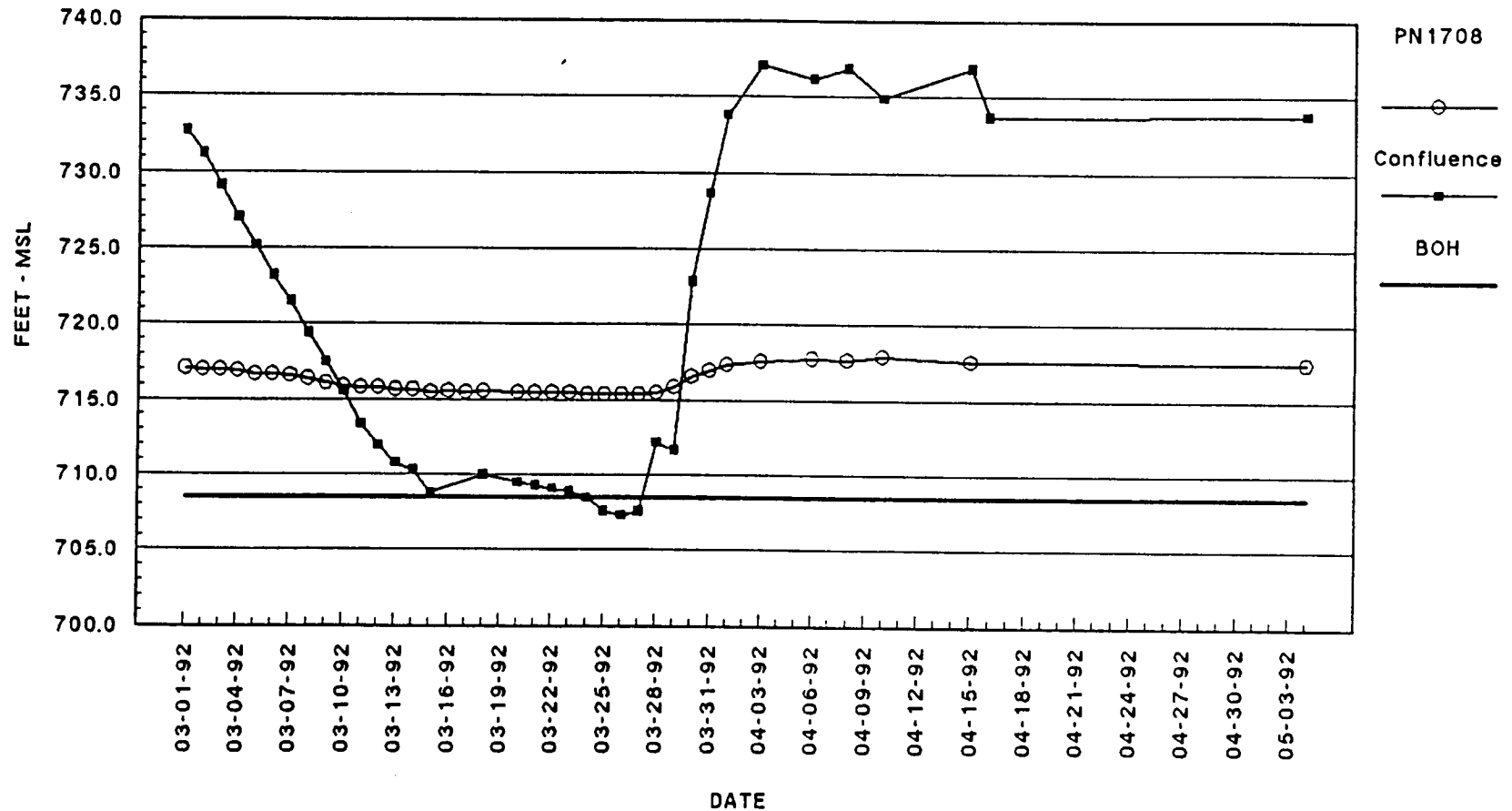


Located On West Levee - Station 48+75  
 Groundwater Profile WL-4



# LOWER GRANITE LEVEES - DRAWDOWN 1992

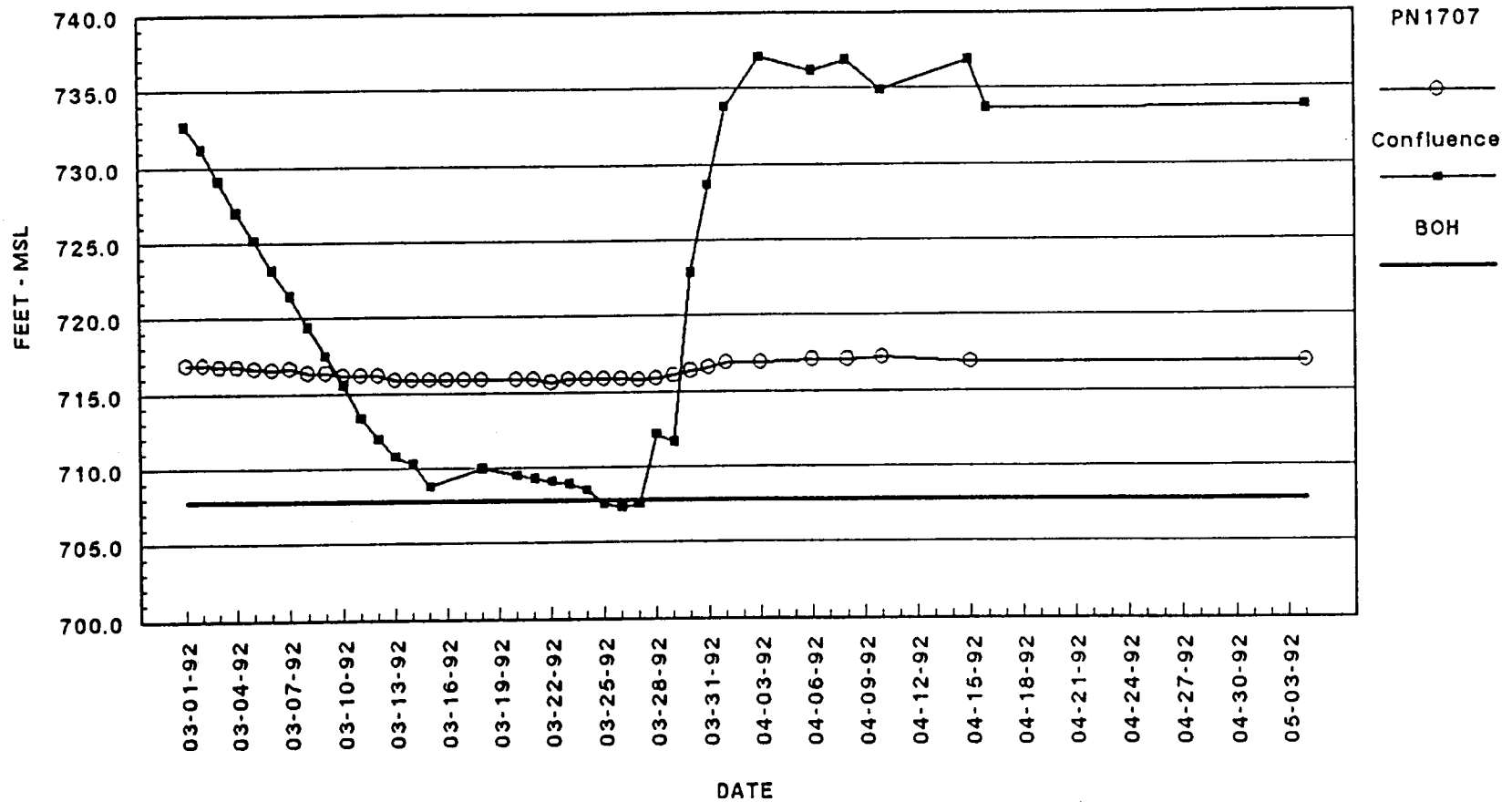
## OPEN TUBE PIEZOMETER PN1708



Located On West Levee - Station 45+76  
 South Of Groundwater Profile WL-4

# LOWER GRANITE LEVEES - DRAWDOWN 1992

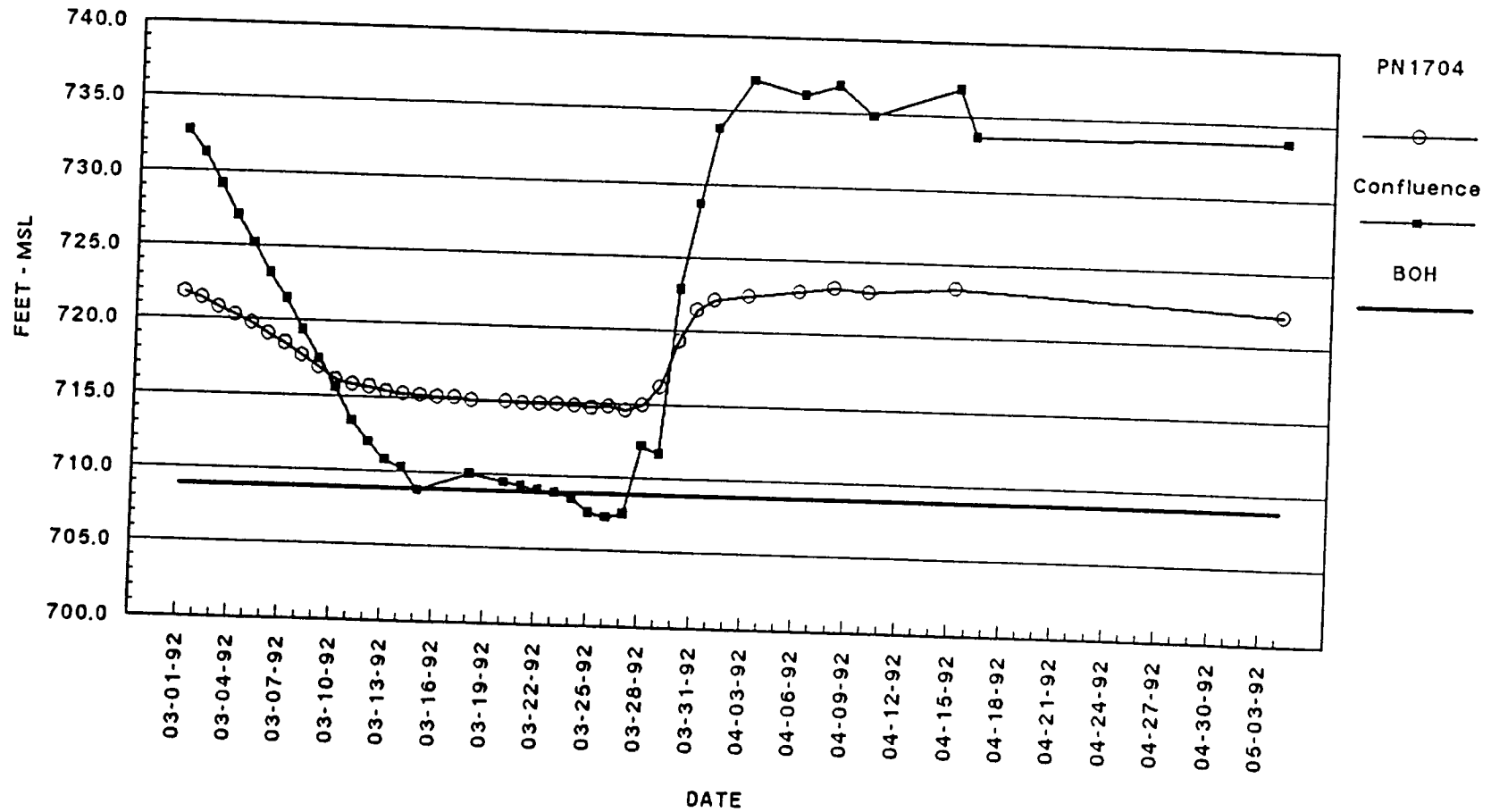
## OPEN TUBE PIEZOMETER PN1707



Located On West Levee - Station 43+76  
 South Of Groundwater Profile WL-4

# LOWER GRANITE LEVEES - DRAWDOWN 1992

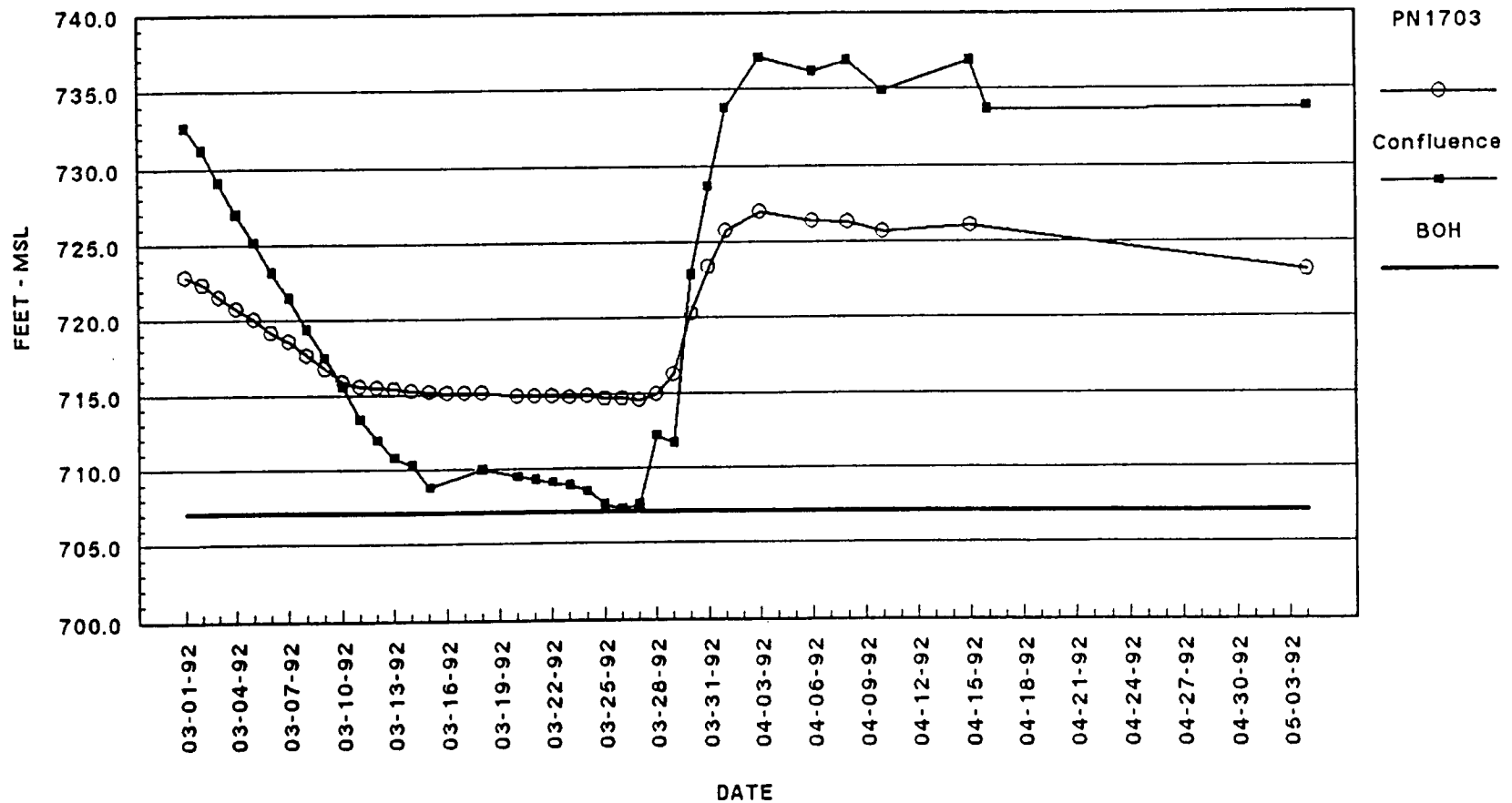
## OPEN TUBE PIEZOMETER PN1704



Located On West Levee - Station 48+69  
 South Of Groundwater Profile WL-4

# LOWER GRANITE LEVEES - DRAWDOWN 1992

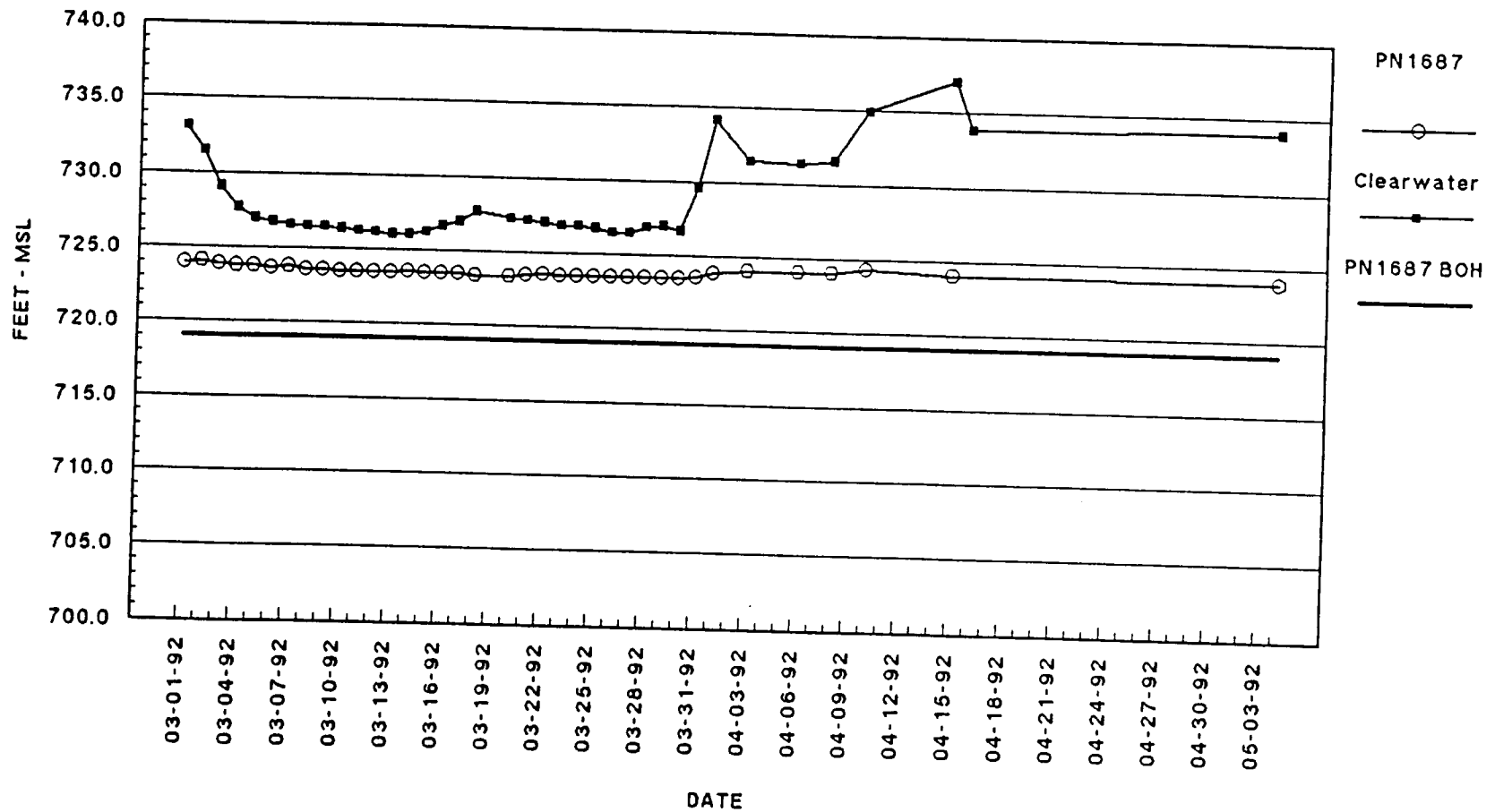
## OPEN TUBE PIEZOMETER PN1703



Located On West Levee - Station 47+70  
 Near Groundwater Profile WL-4

# LOWER GRANITE LEVEES - DRAWDOWN 1992

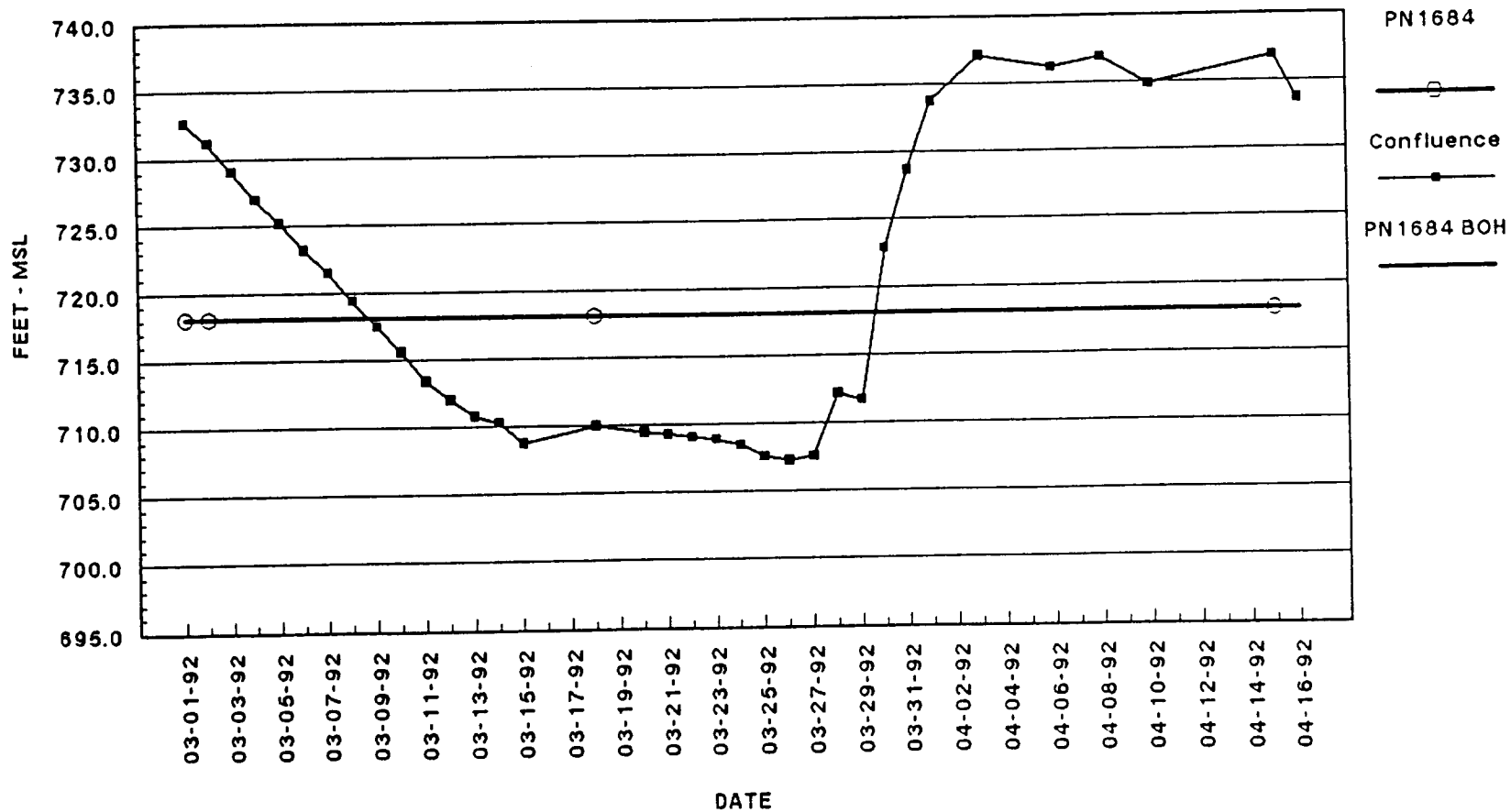
## OPEN TUBE PIEZOMETER PN1687



Located On West Levee Near Memorial Bridge  
 West Of Groundwater Profile Line EL-1

# LOWER GRANITE LEVEES - DRAWDOWN 1992

## OPEN TUBE PIEZOMETER PN1684

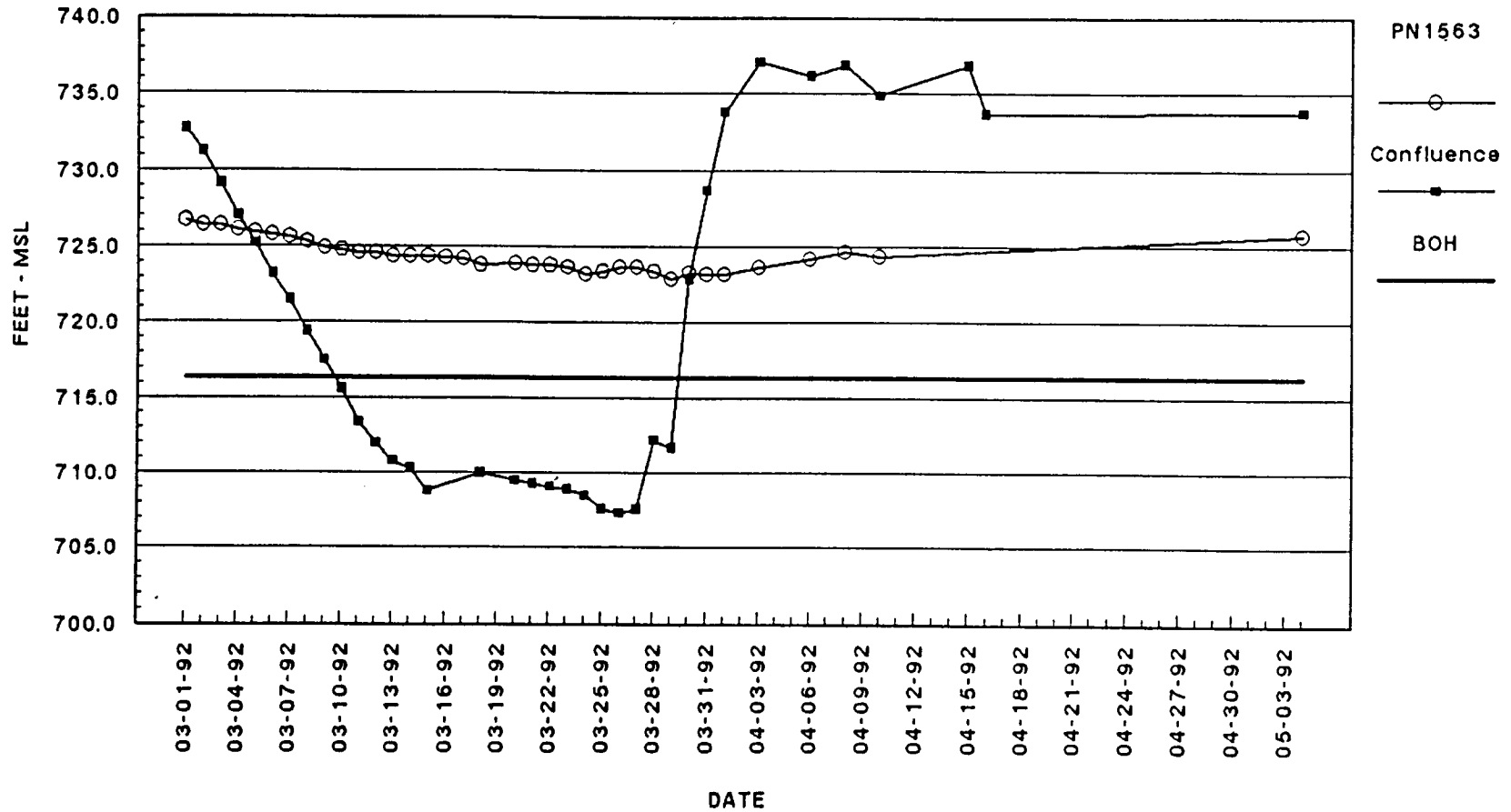


On West Levee Between Stations 100+00 & 110+00  
Groundwater Profile Line WL-6

This piezometer has always been "DRY"

# LOWER GRANITE LEVEES - DRAWDOWN 1992

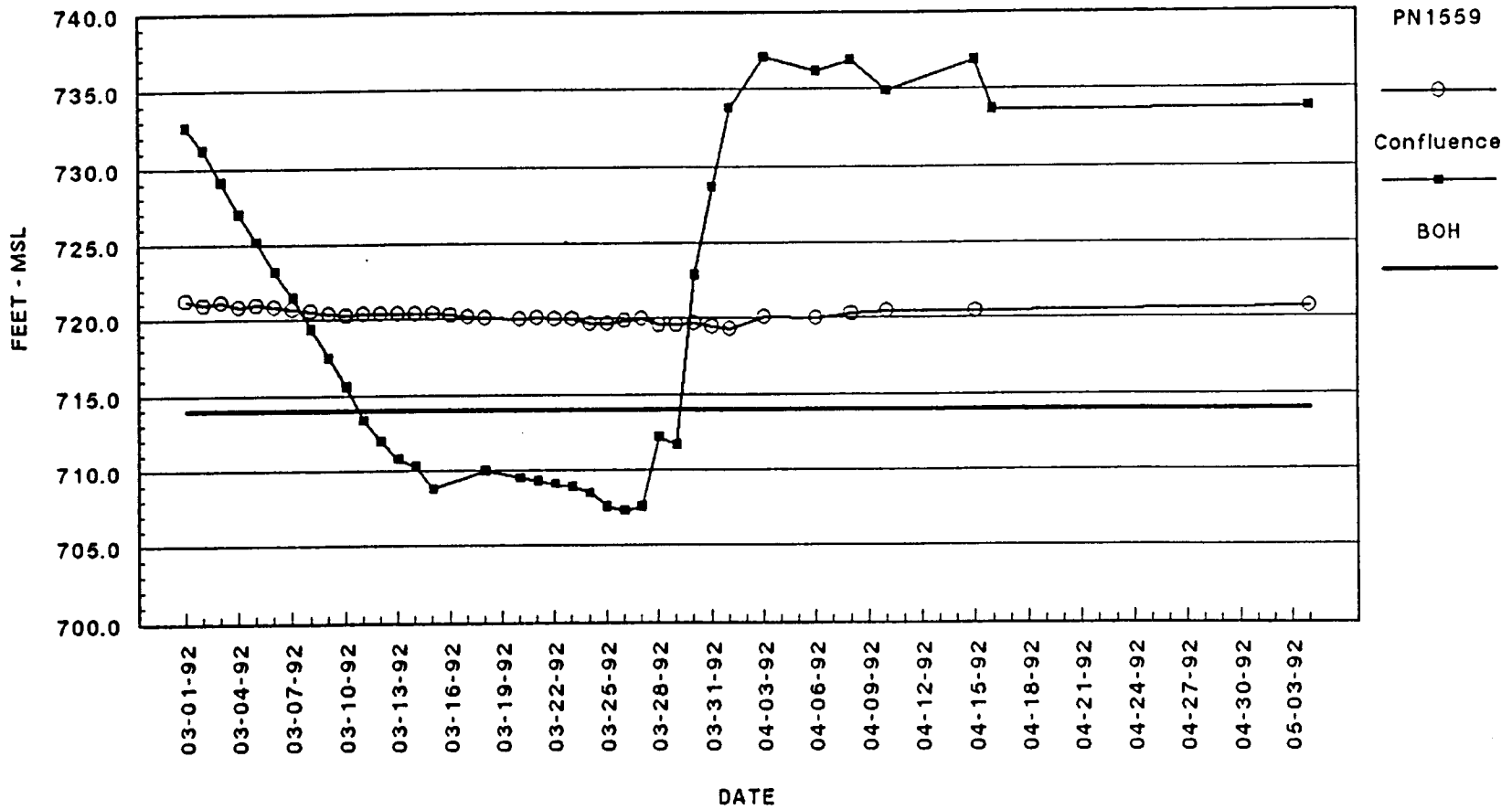
## OPEN TUBE PIEZOMETER PN1563



Located On West Levee - Station 39+90  
 North Of Groundwater Profile WL-3

# LOWER GRANITE LEVEES - DRAWDOWN 1992

## OPEN TUBE PIEZOMETER PN1559

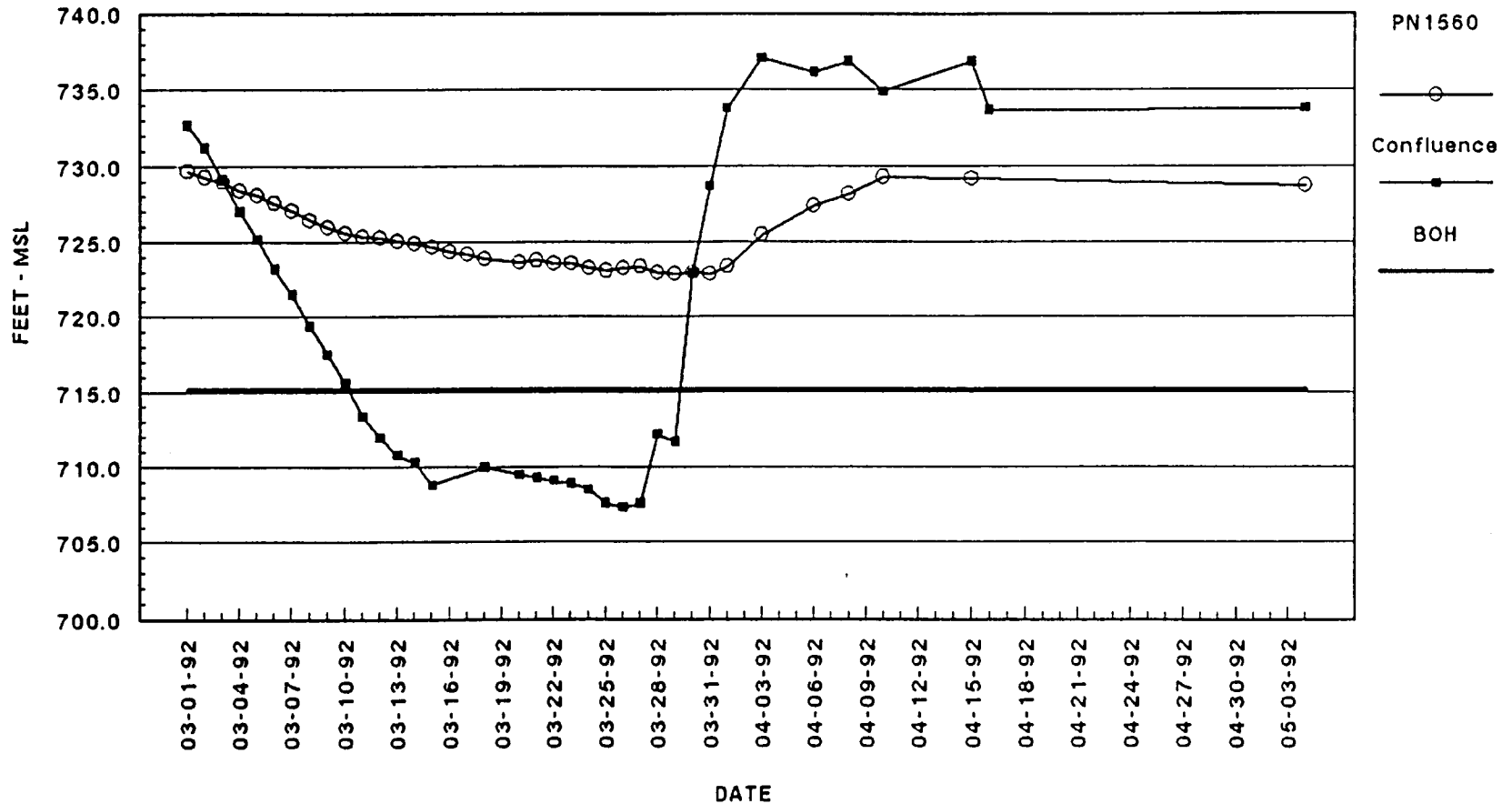


Located On West Levee - Station 41+07  
 North Of Groundwater Profile WL-3



# LOWER GRANITE LEVEES - DRAWDOWN 1992

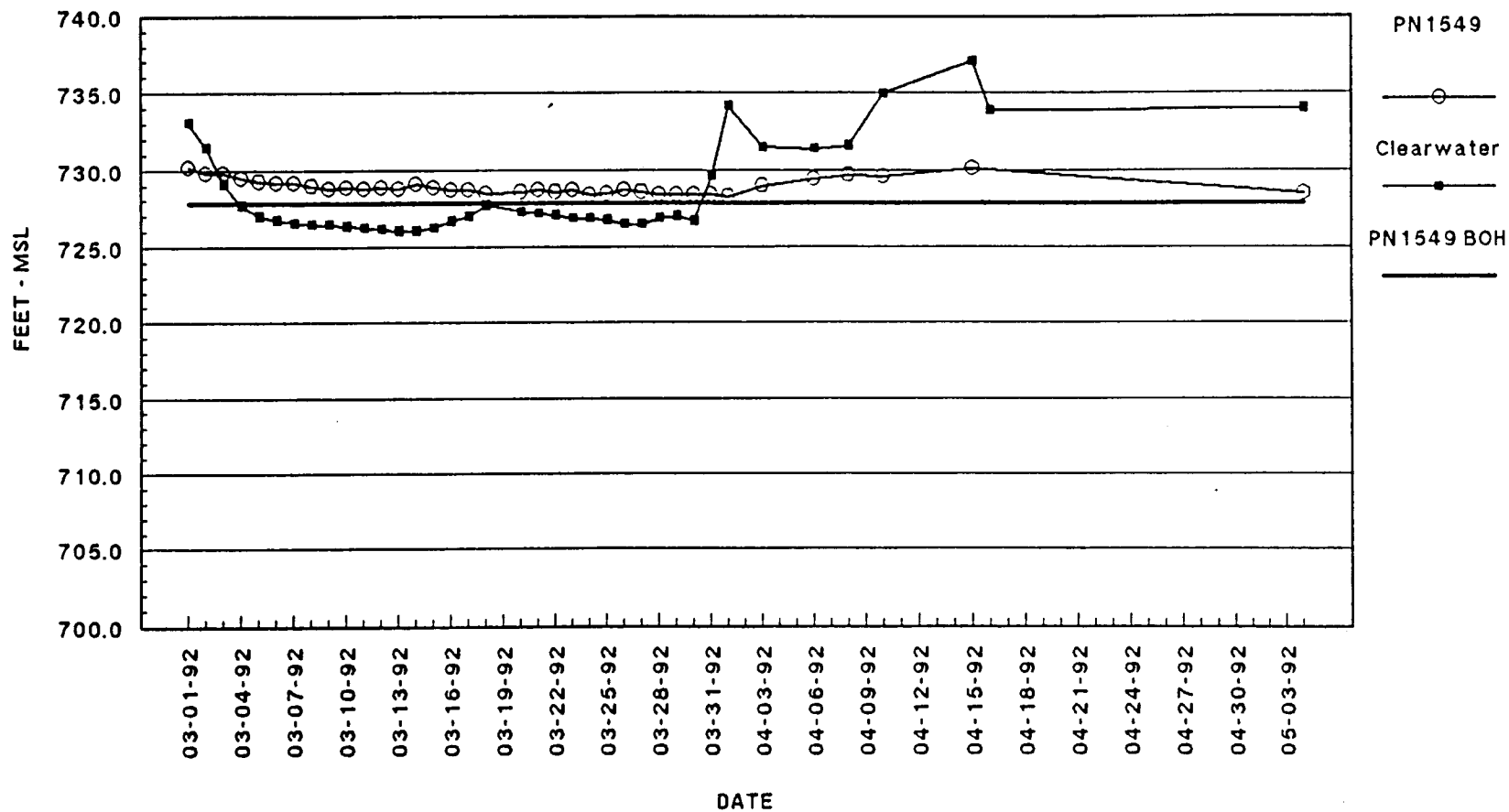
## OPEN TUBE PIEZOMETER PN1560



Located On West Levee - Station 40+29  
 North Of Groundwater Profile WL-3

# LOWER GRANITE LEVEES - DRAWDOWN 1992

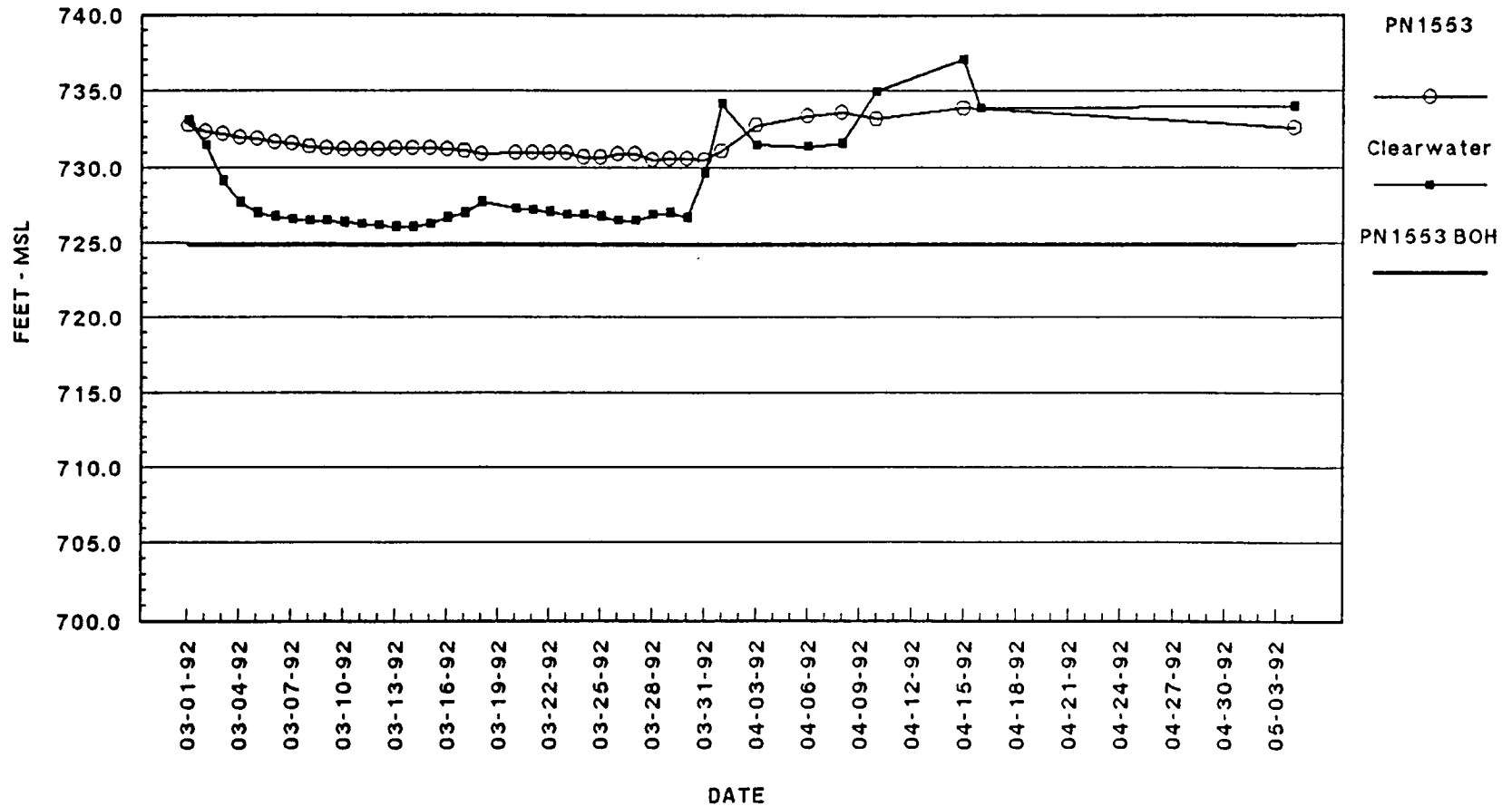
## OPEN TUBE PIEZOMETER PN1549



Located On West Levee - Station 148-00  
 West Of Groundwater Profile Line WL-9

# LOWER GRANITE LEVEES – DRAWDOWN 1992

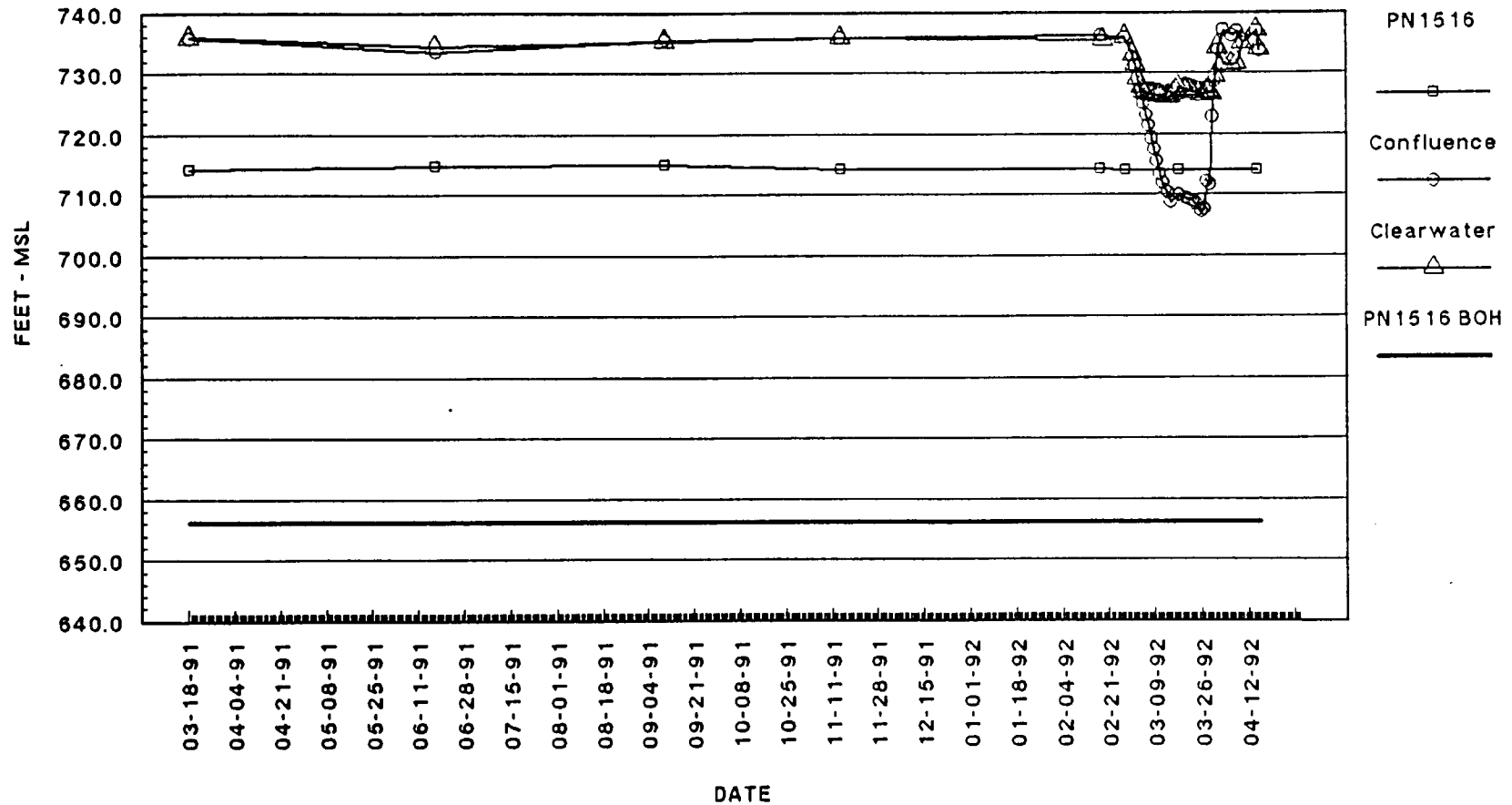
## OPEN TUBE PIEZOMETER PN1553



Located On West Levee - Station 148-70  
 West Of Groundwater Profile Line WL-9

# LOWER GRANITE LEVEES – DRAWDOWN 1992

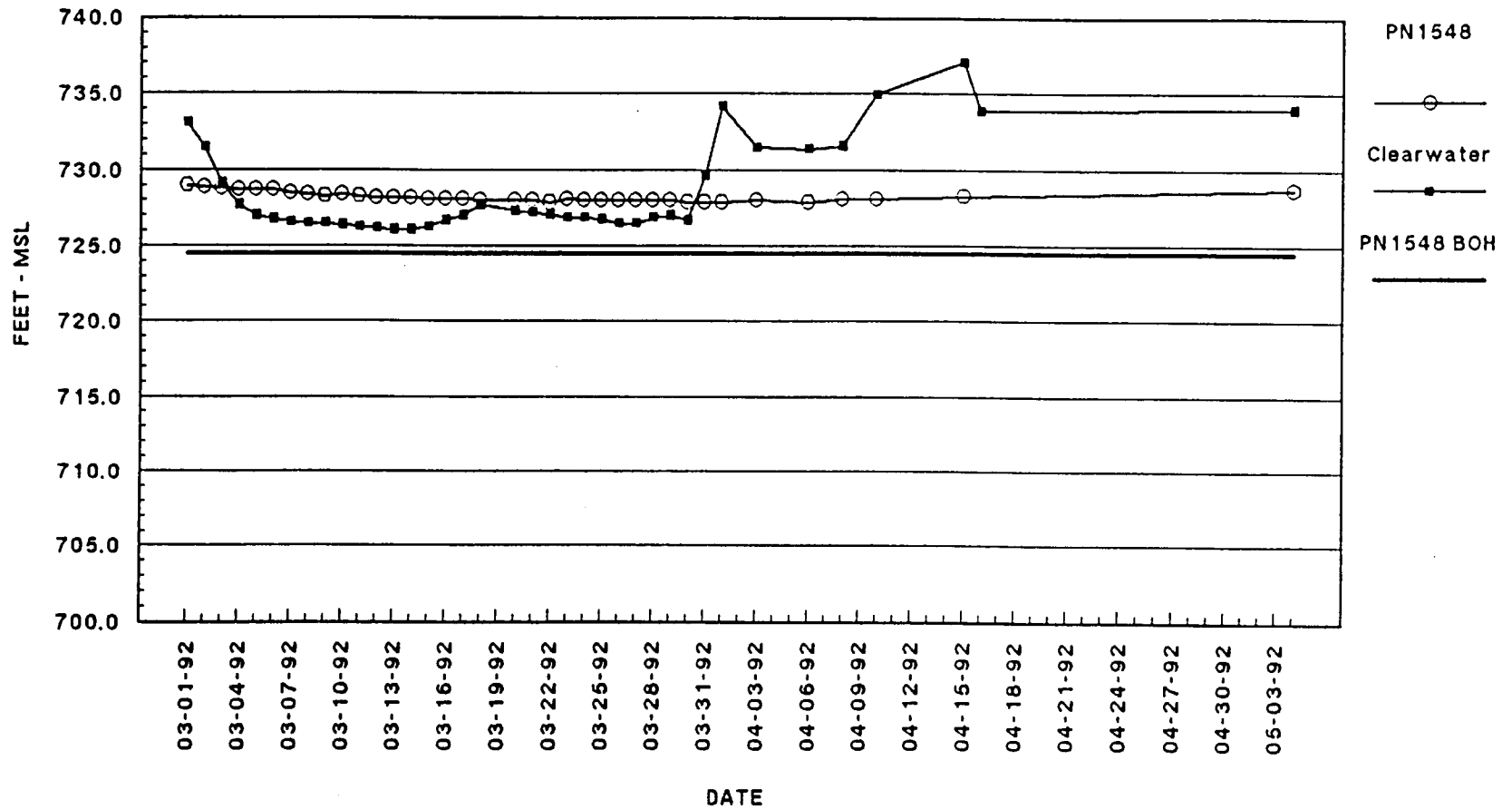
## OPEN TUBE PIEZOMETER PN1516



On West Levee Between Stations 100+00 & 110+00  
 Groundwater Profile Line WL-6

# LOWER GRANITE LEVEES - DRAWDOWN 1992

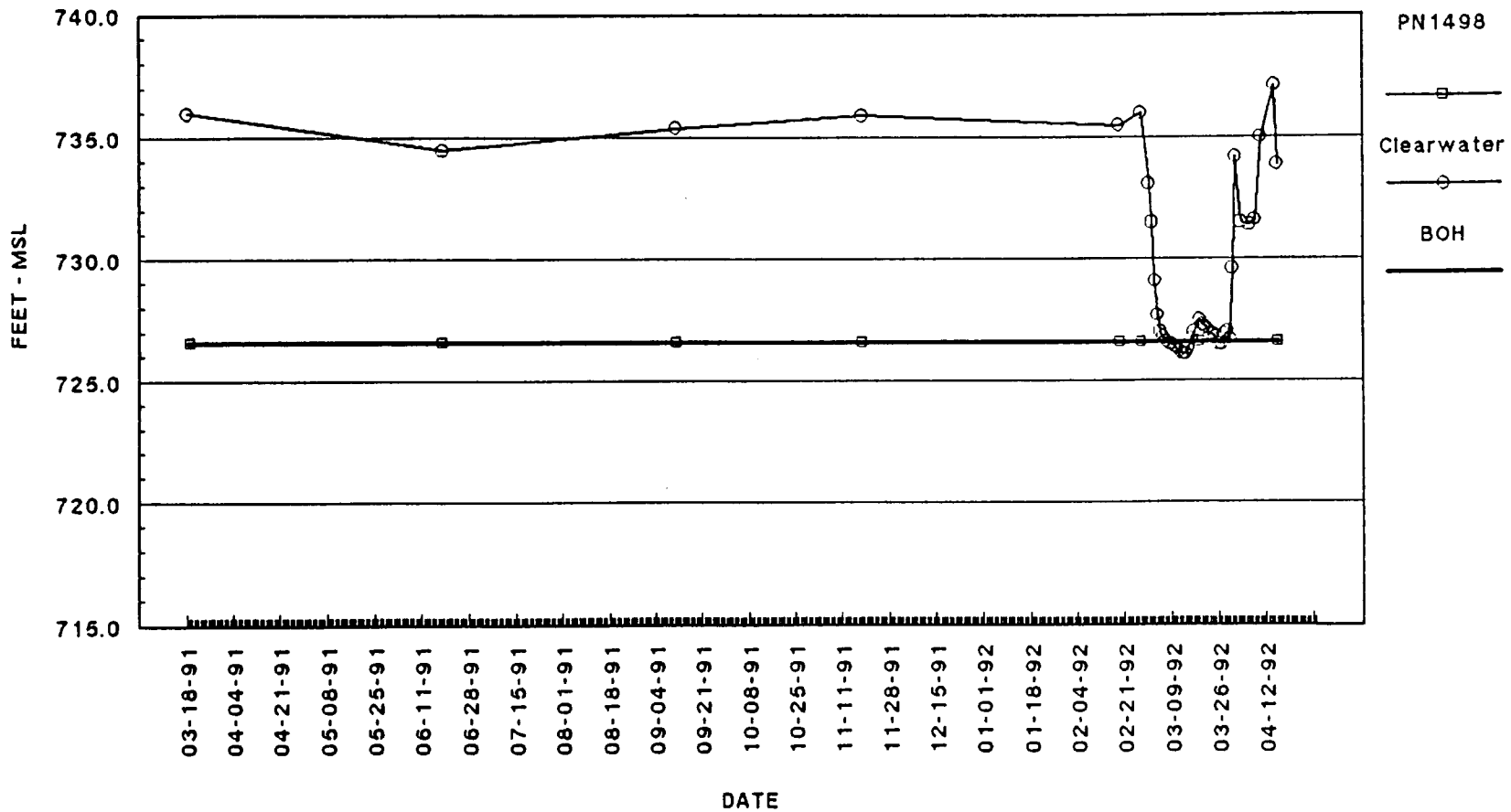
## OPEN TUBE PIEZOMETER PN1548



Located On West Levee - Station 148+00  
 West Of Groundwater Profile Line WL-9

# LOWER GRANITE LEVEES - DRAWDOWN 1992

## OPEN TUBE PIEZOMETER PN1498

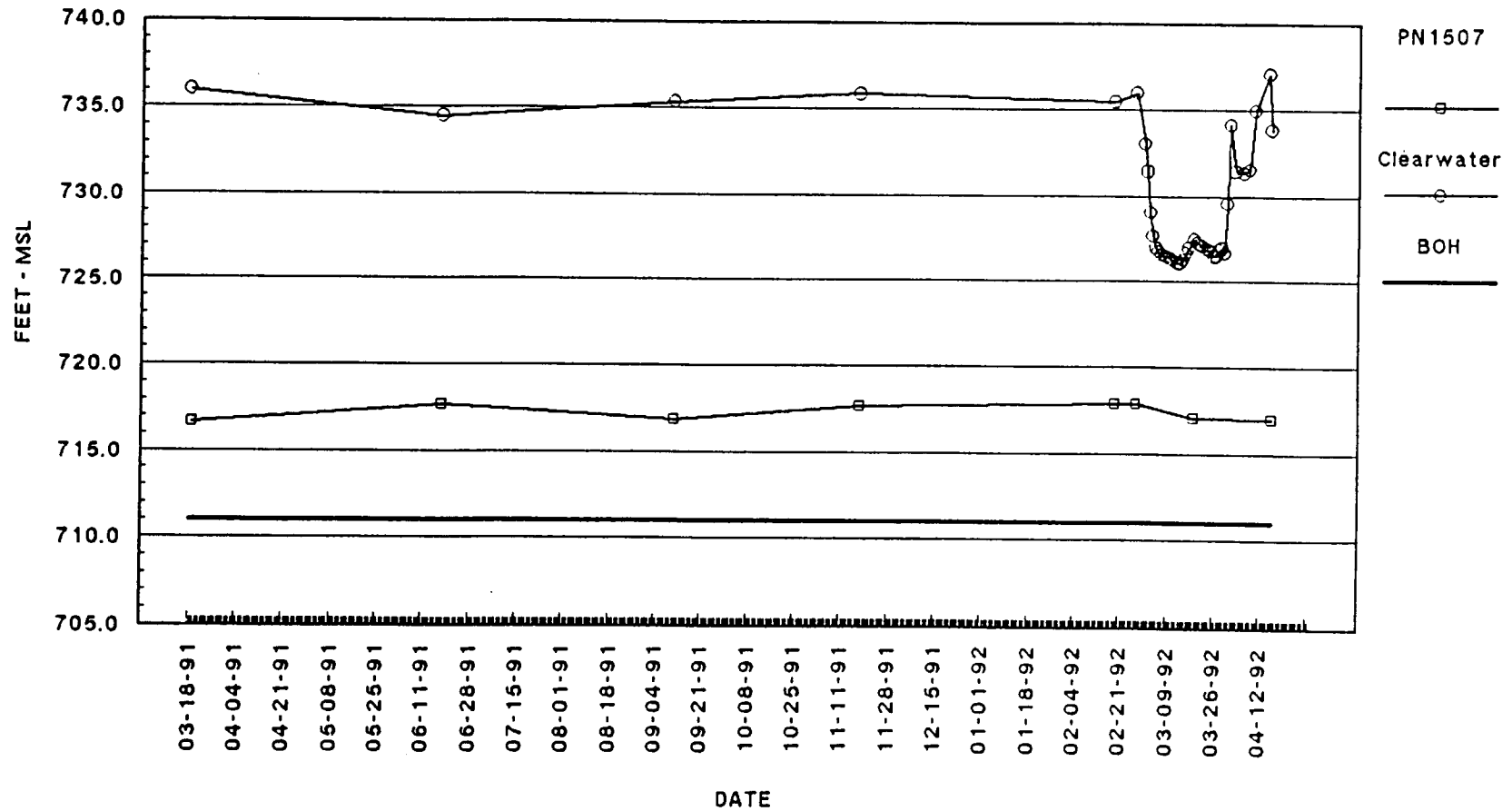


Located On North Levee - Station 117+00  
 120 Ft To Levee East Of Groundwater Profile N-4

This piezometer is occasionally dry.

# LOWER GRANITE LEVEES - DRAWDOWN 1992

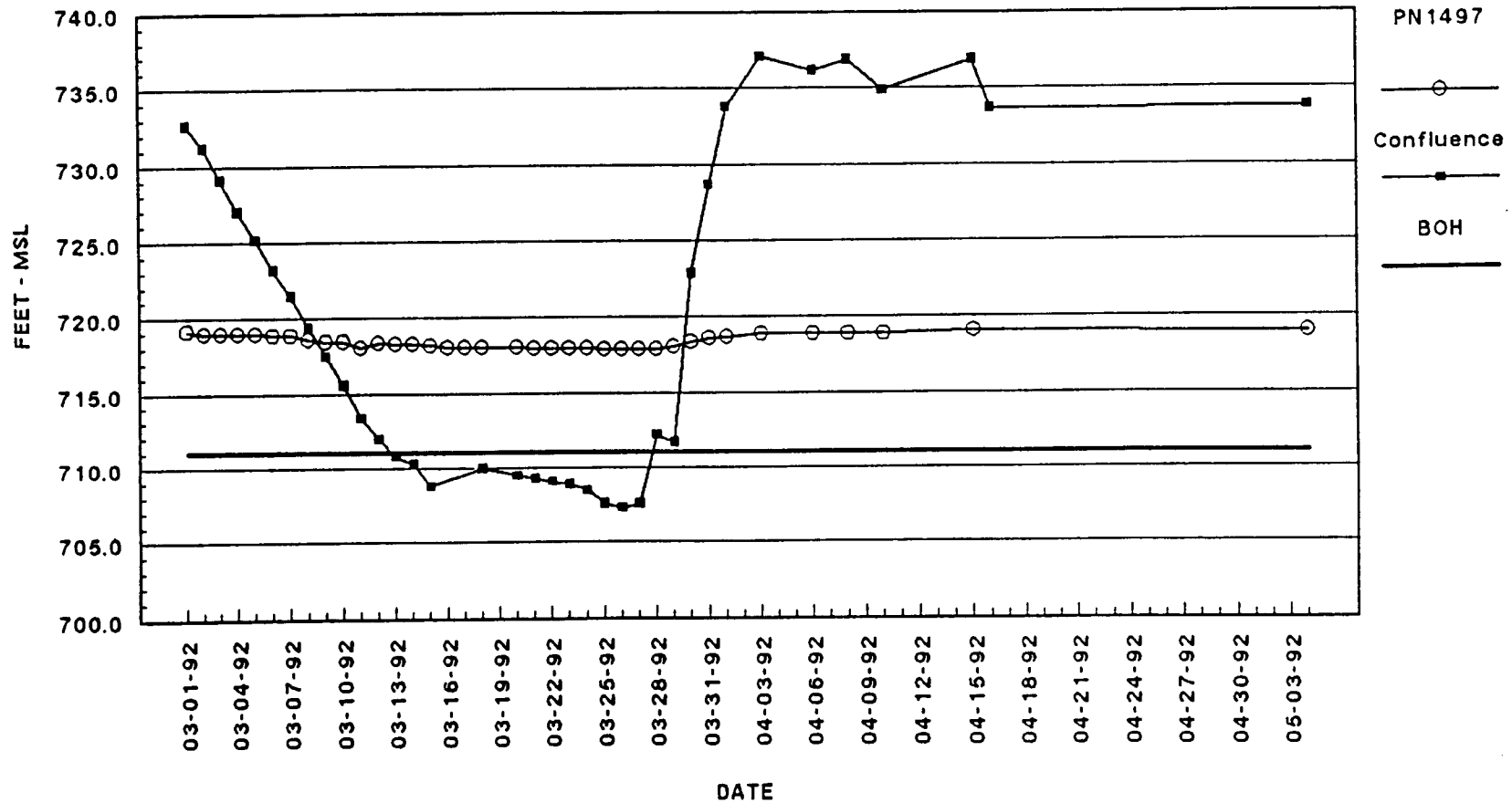
## OPEN TUBE PIEZOMETER PN1507



Located On North Levee - Station 35+10  
 80 Feet To Levee On Groundwater Profile N-2A

# LOWER GRANITE LEVEES - DRAWDOWN 1992

## OPEN TUBE PIEZOMETER PN1497

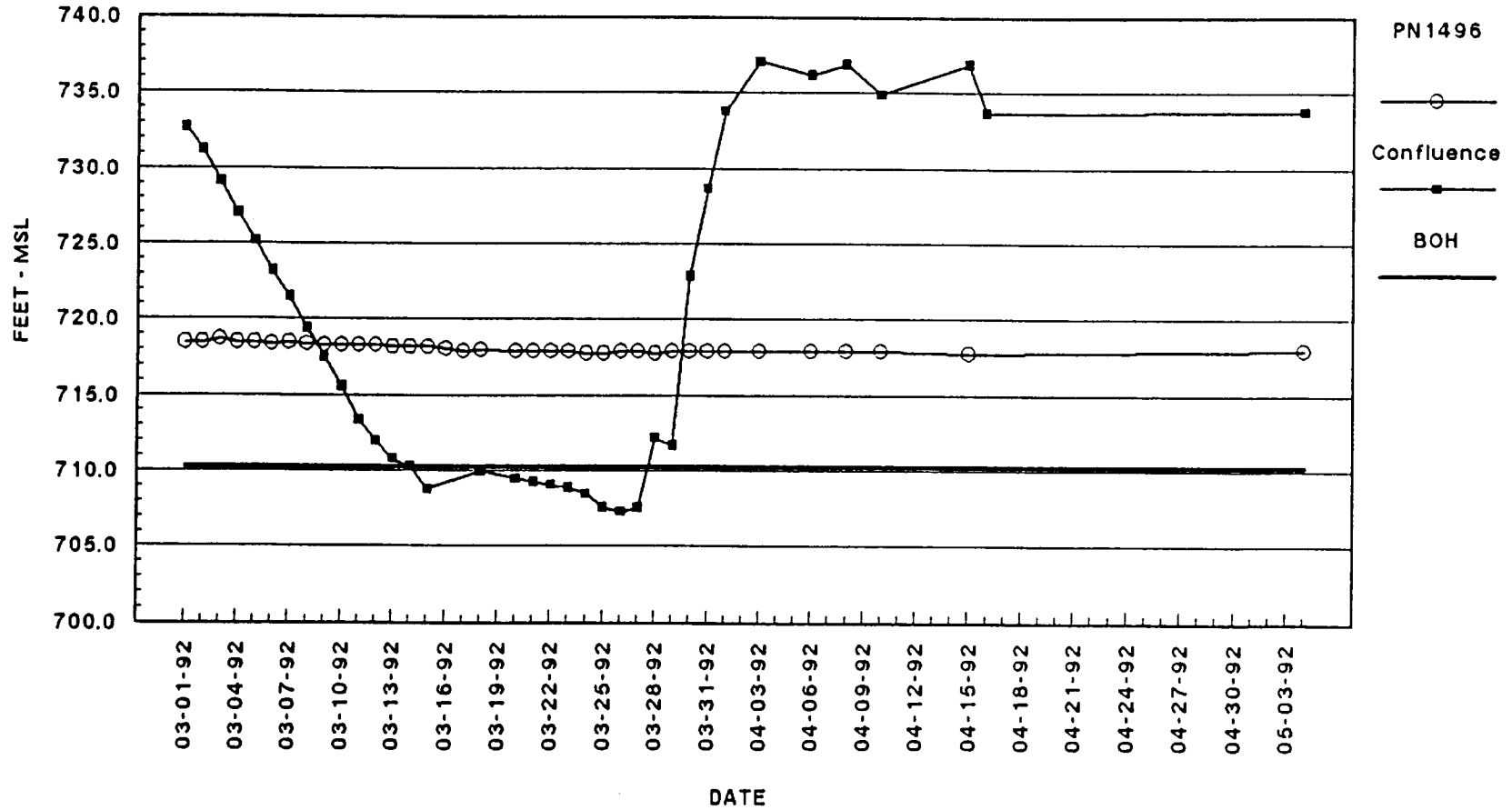


Located On West Levee - Station 35+20  
 On Groundwater Profile WL-3



# LOWER GRANITE LEVEES - DRAWDOWN 1992

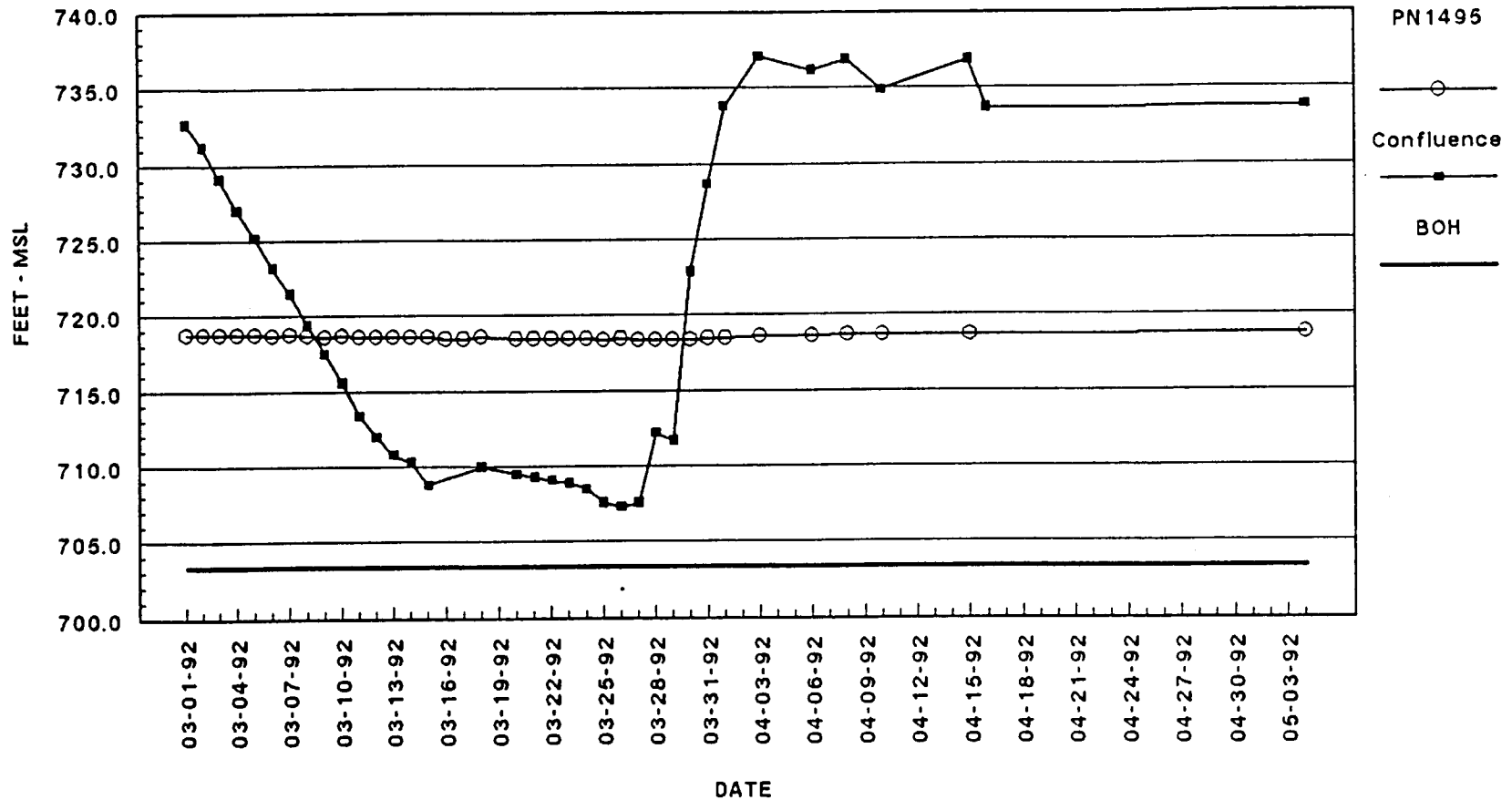
## OPEN TUBE PIEZOMETER PN1496



Located On West Levee - Station 27+80  
 Groundwater Profile WL-3A

# LOWER GRANITE LEVEES – DRAWDOWN 1992

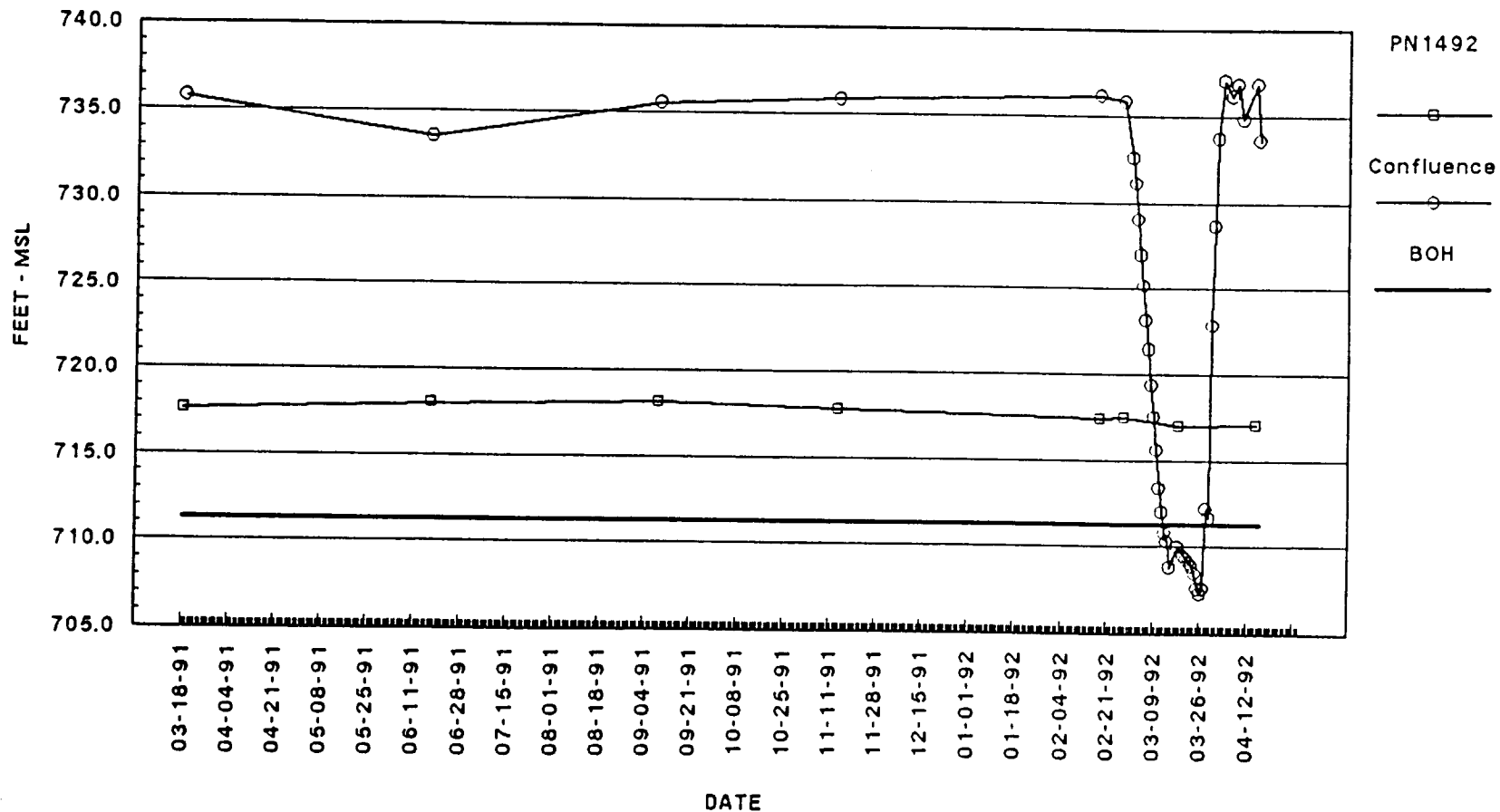
## OPEN TUBE PIEZOMETER PN1495



Located On West Levee - Station 22+20  
 Groundwater Profile WL-2

# LOWER GRANITE LEVEES - DRAWDOWN 1992

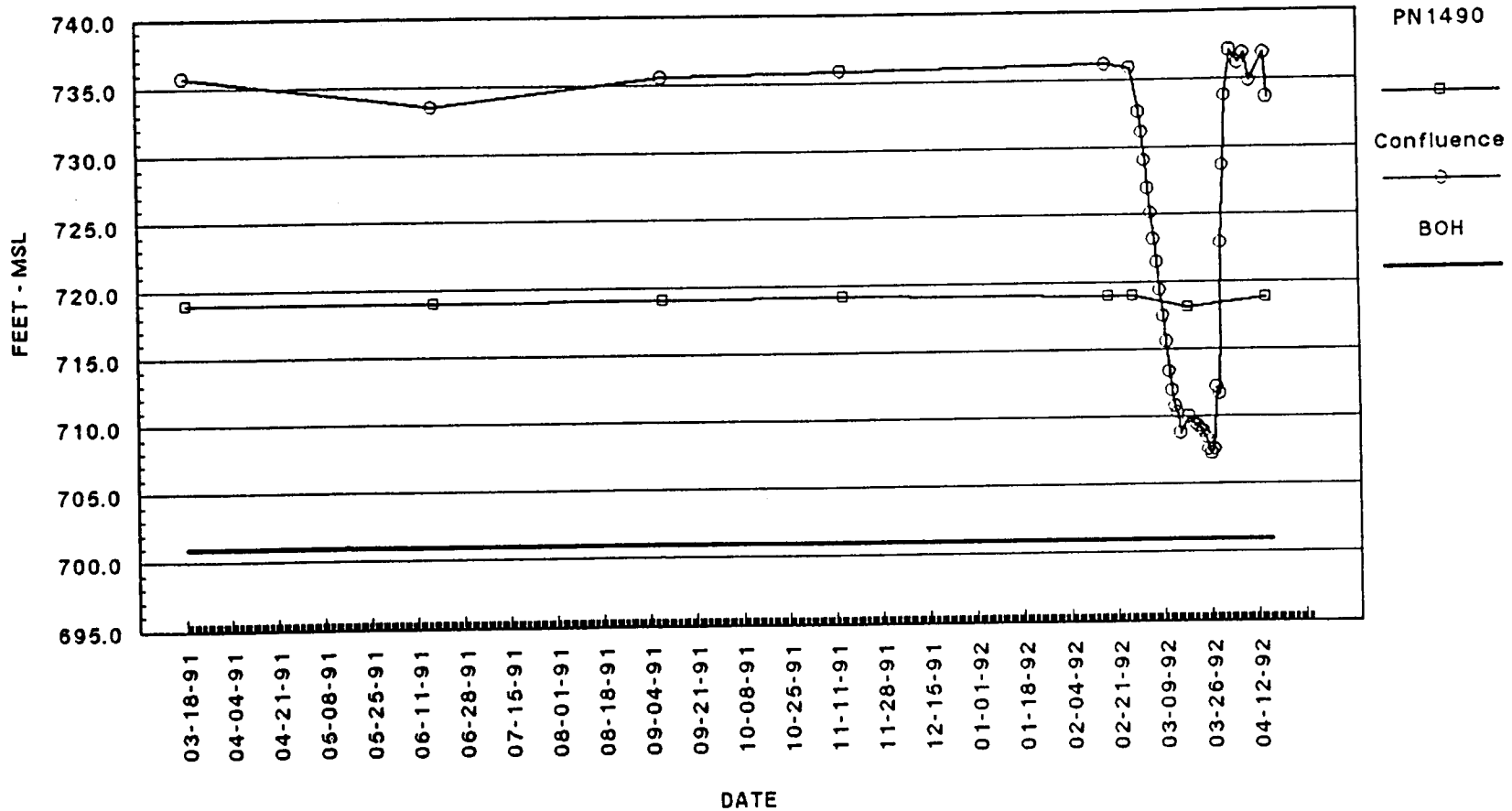
## OPEN TUBE PIEZOMETER PN1492



Located On West Levee - Station 48-10  
 300 Feet To Levee On Groundwater Profile WL-4

# LOWER GRANITE LEVEES - DRAWDOWN 1992

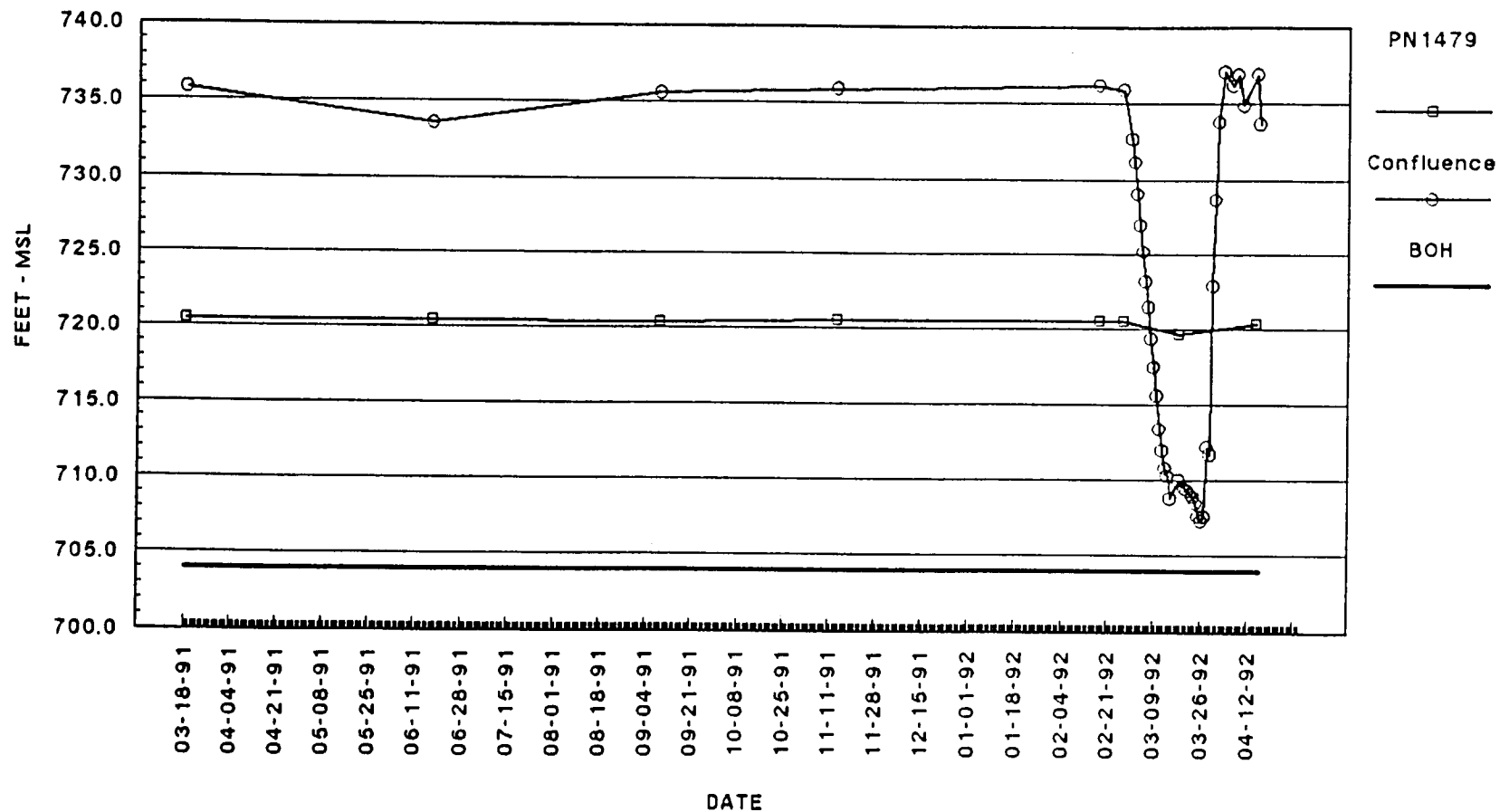
## OPEN TUBE PIEZOMETER PN1490



Located On West Levee - Station 35+20  
 150 Feet To Levee On Groundwater Profile WL-3

# LOWER GRANITE LEVEES - DRAWDOWN 1992

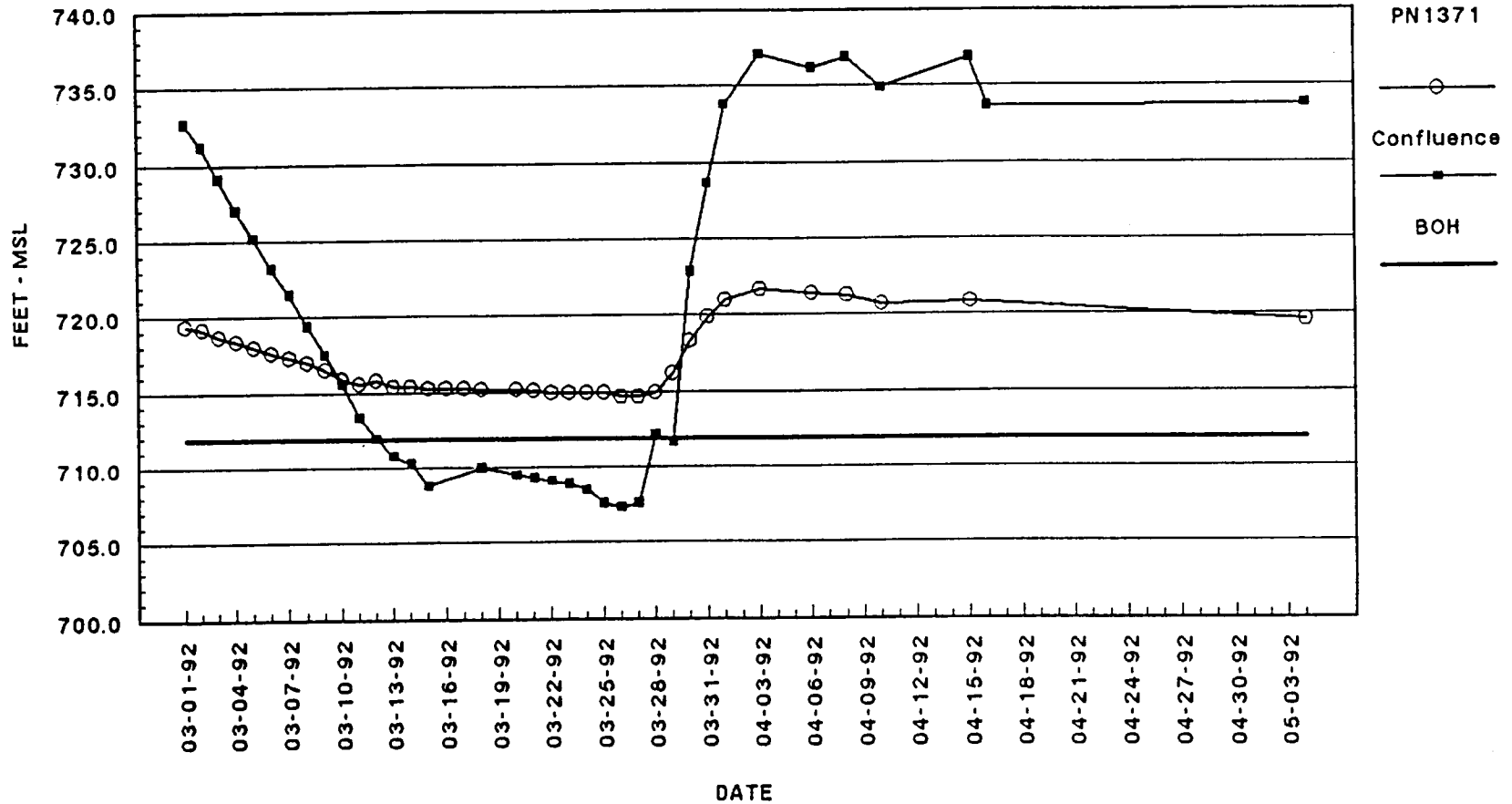
## OPEN TUBE PIEZOMETER PN1479



Located On West Levee - Station 10+00  
 150 Feet To Levee On Groundwater Profile WL-1

# LOWER GRANITE LEVEES - DRAWDOWN 1992

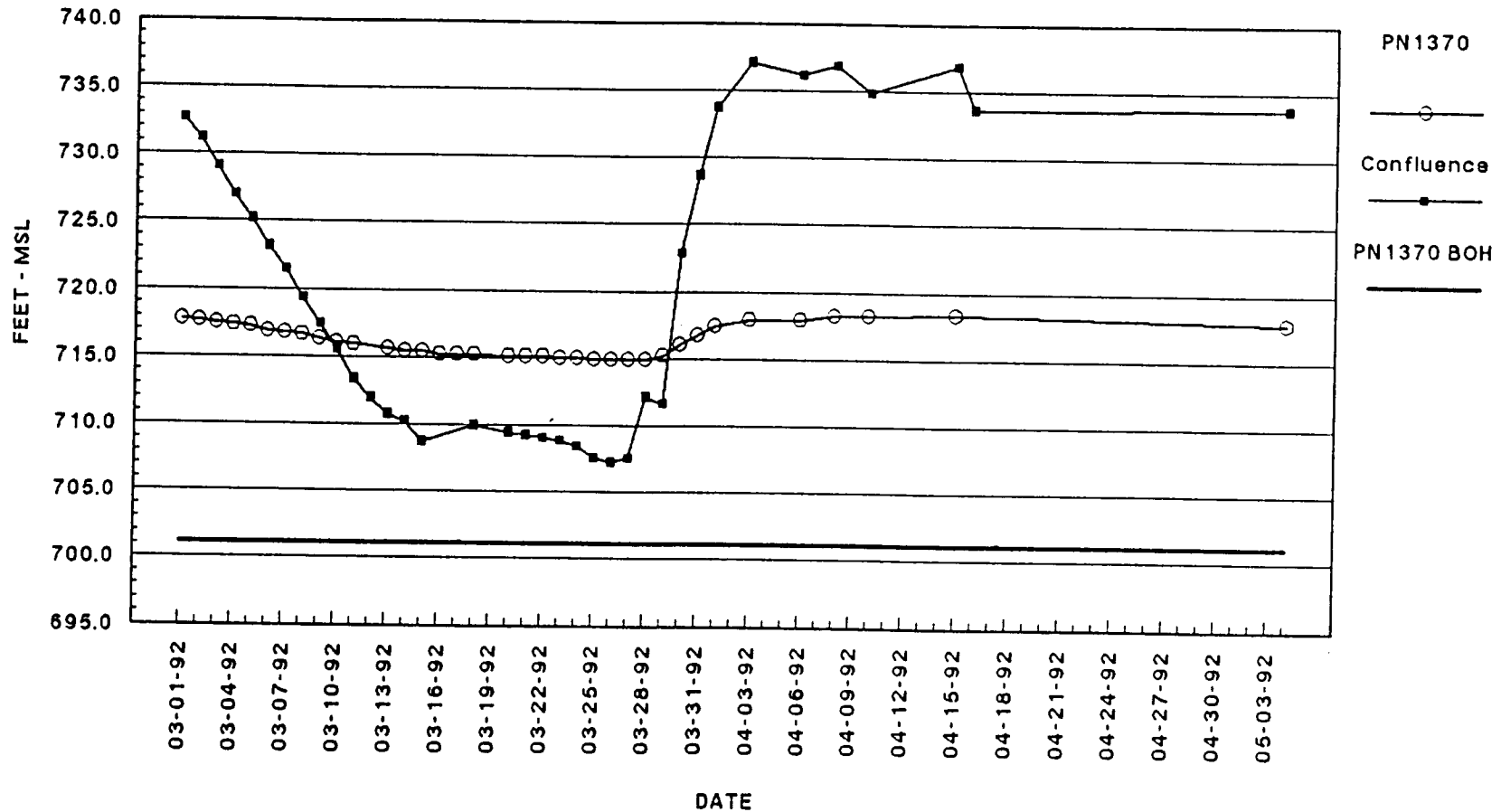
## OPEN TUBE PIEZOMETER PN1371



Located On West Levee - Station 48+10  
 Near Groundwater Profile WL-4

# LOWER GRANITE LEVEES - DRAWDOWN 1992

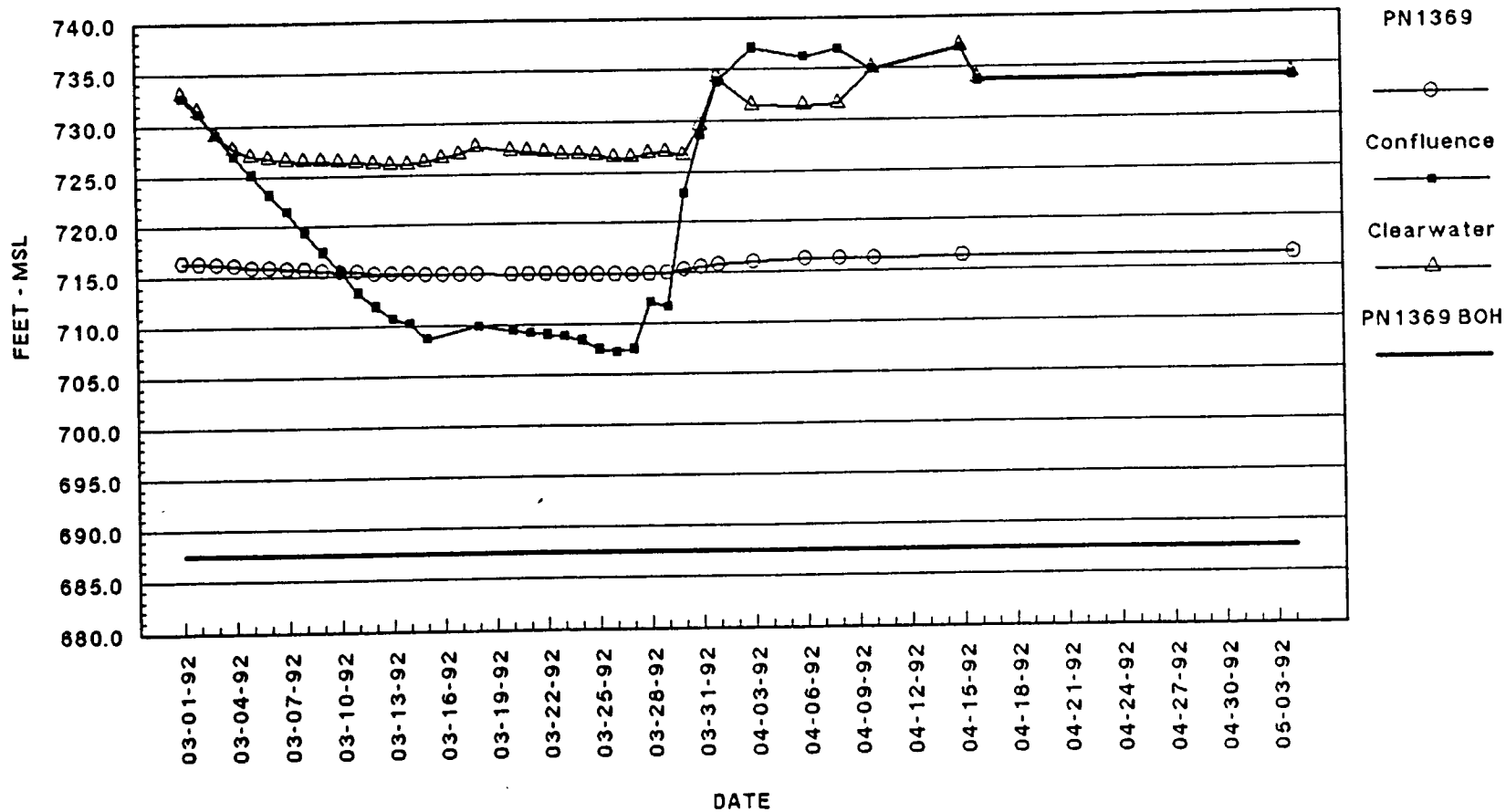
## OPEN TUBE PIEZOMETER PN1370



Located On West Levee - Station 69+50  
 Near Confluence West Of WL-5

# LOWER GRANITE LEVEES - DRAWDOWN 1992

## OPEN TUBE PIEZOMETER PN1369

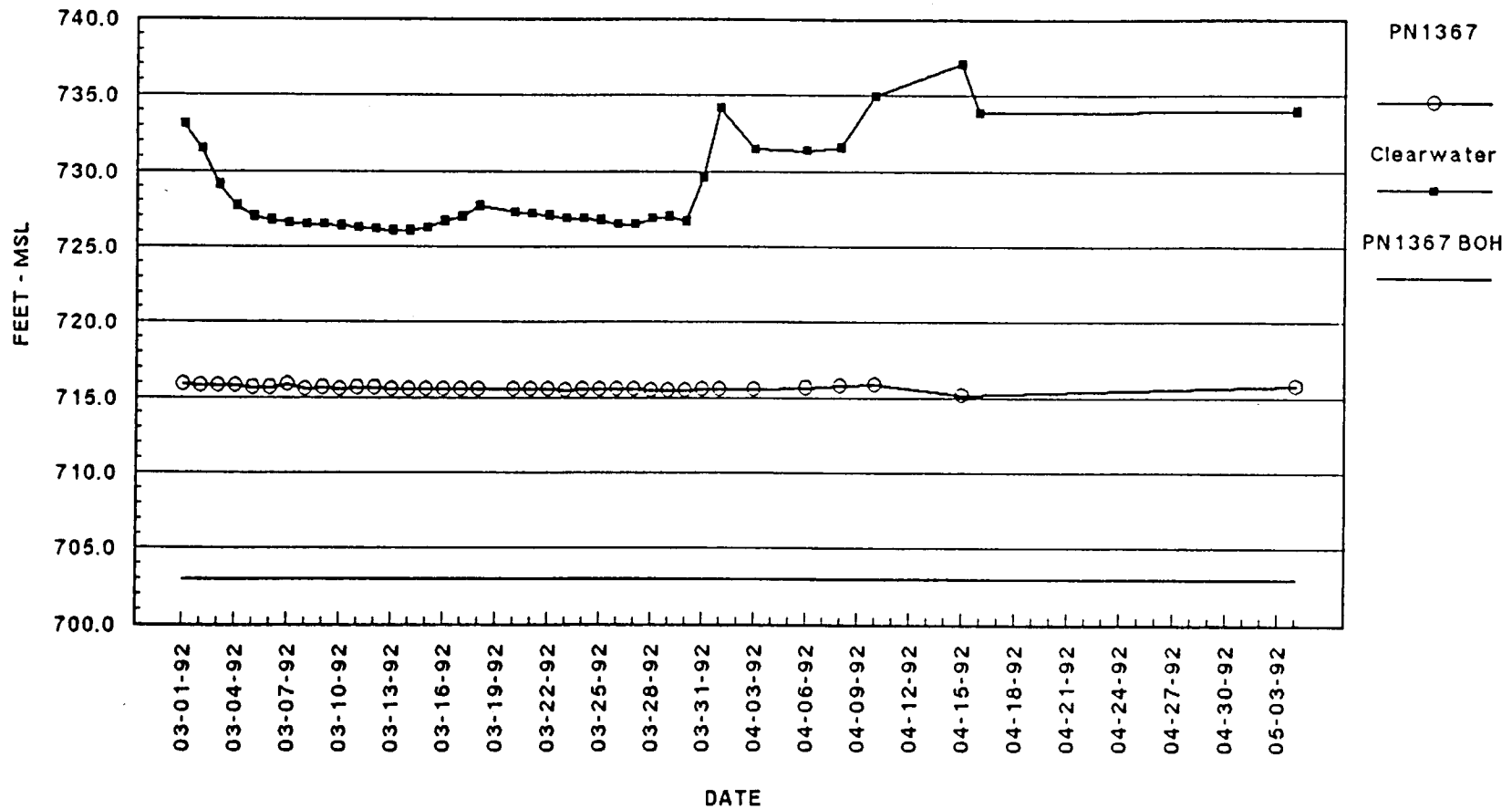


Located On West Levee - Station 84+70  
 Groundwater Profile WL-5



# LOWER GRANITE LEVEES - DRAWDOWN 1992

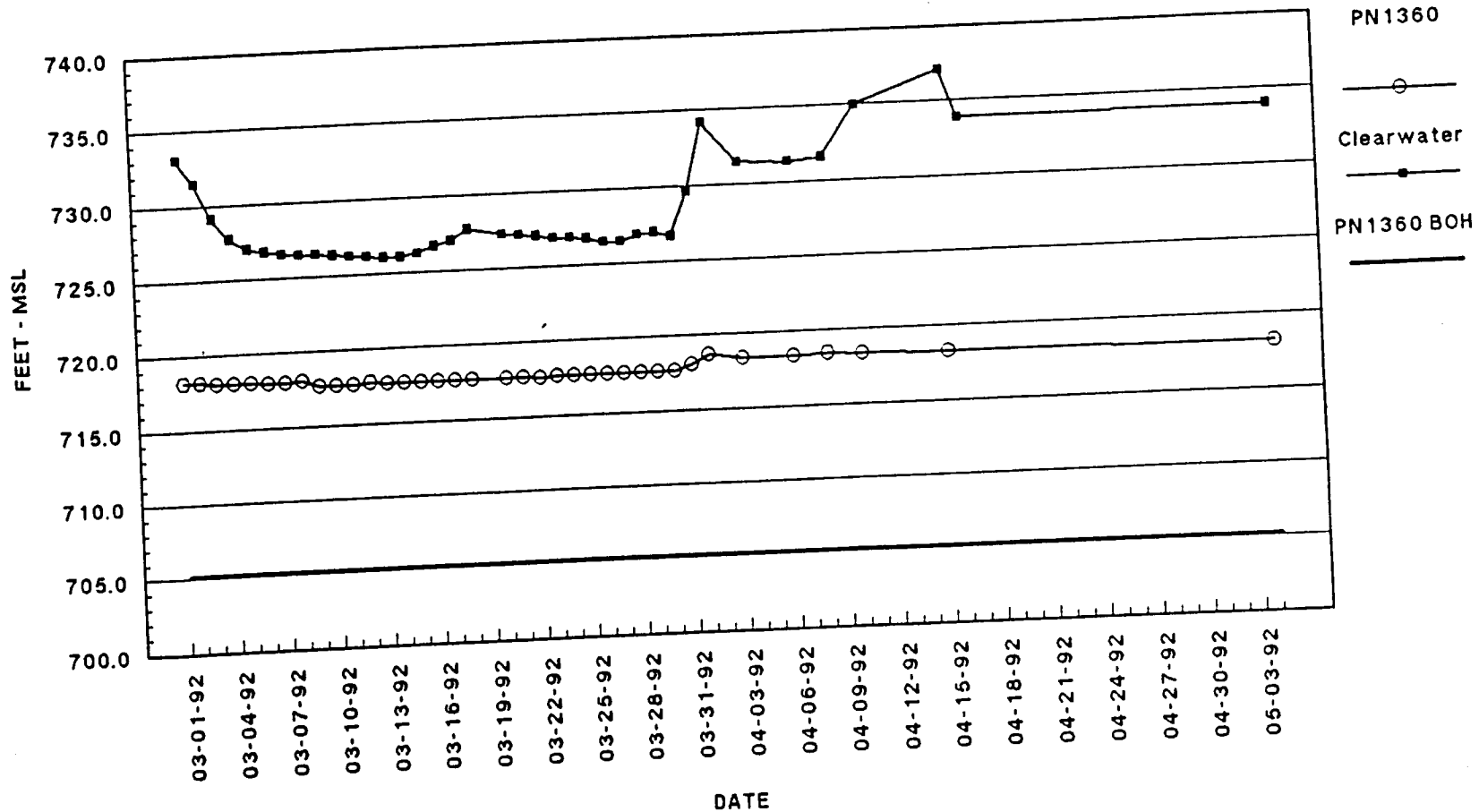
## OPEN TUBE PIEZOMETER PN1367



Located On West Levee - Station 121+20  
 Groundwater Profile Line WL-7

# LOWER GRANITE LEVEES - DRAWDOWN 1992

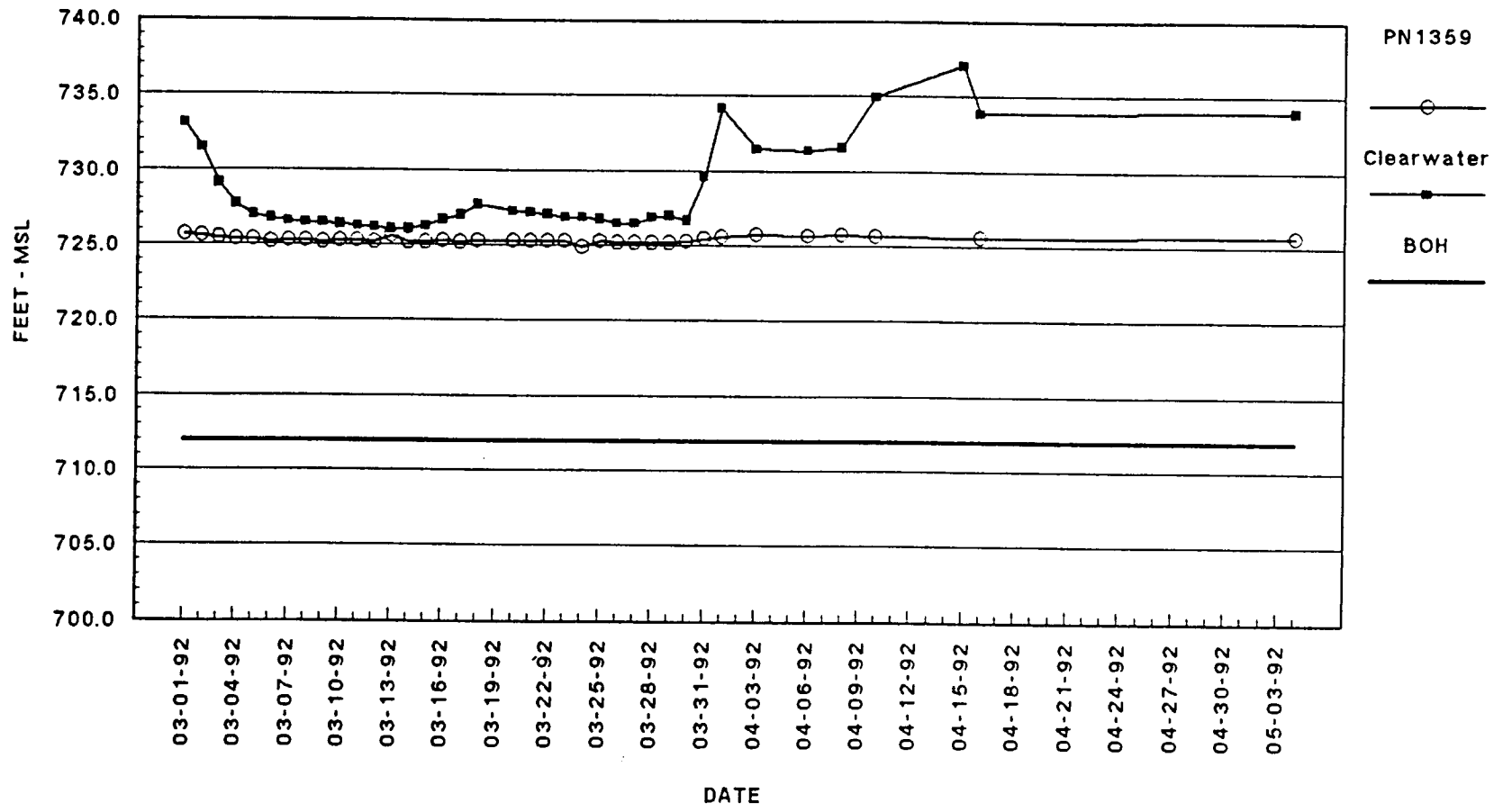
## OPEN TUBE PIEZOMETER PN1360



Located On West Levee - Station 139+00  
 Groundwater Profile Line WL-8

# LOWER GRANITE LEVEES - DRAWDOWN 1992

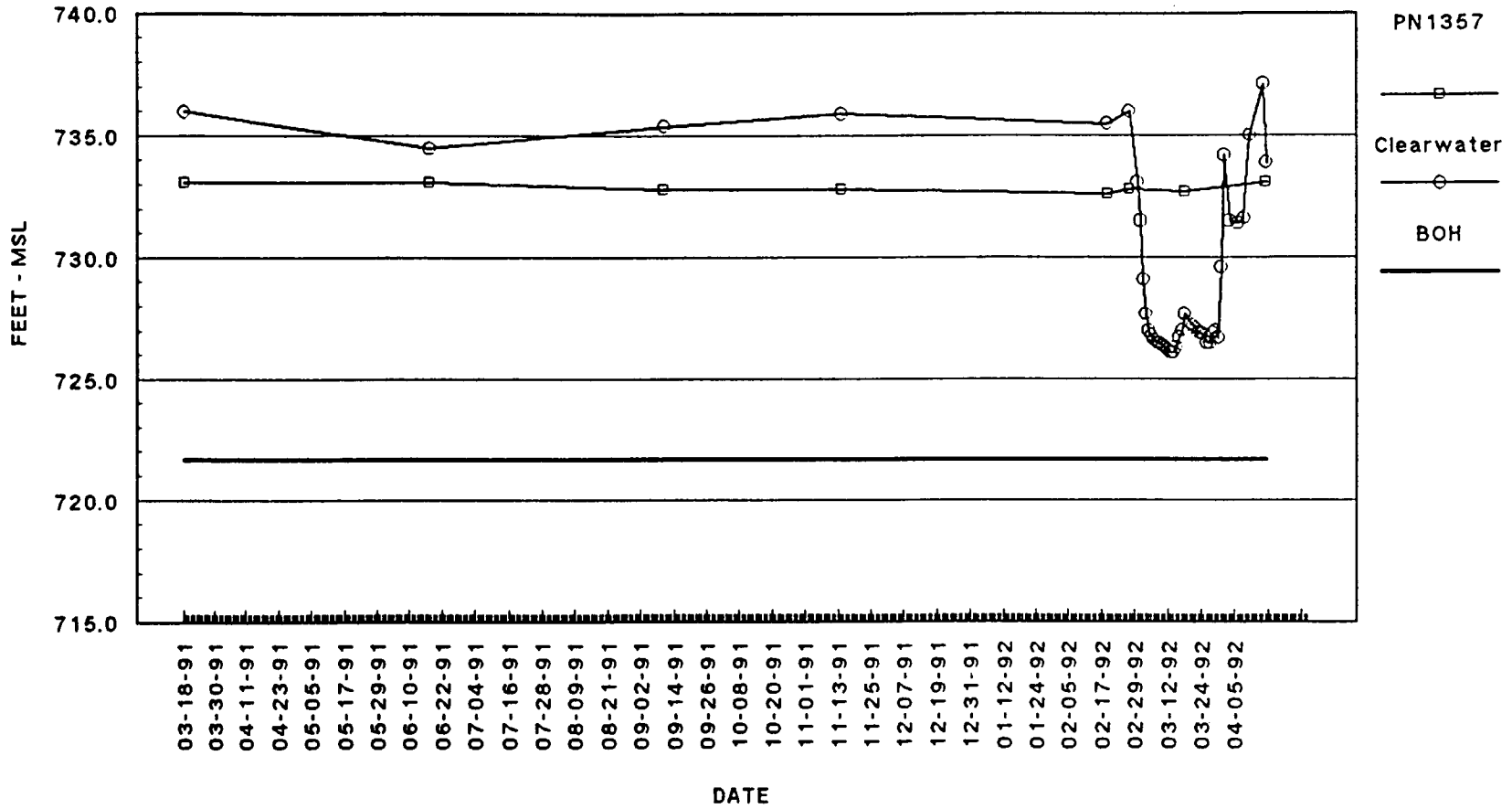
## OPEN TUBE PIEZOMETER PN1359



Located On East Levee - Station 170+00  
 East Of Groundwater Profile EL-1

# LOWER GRANITE LEVEES - DRAWDOWN 1992

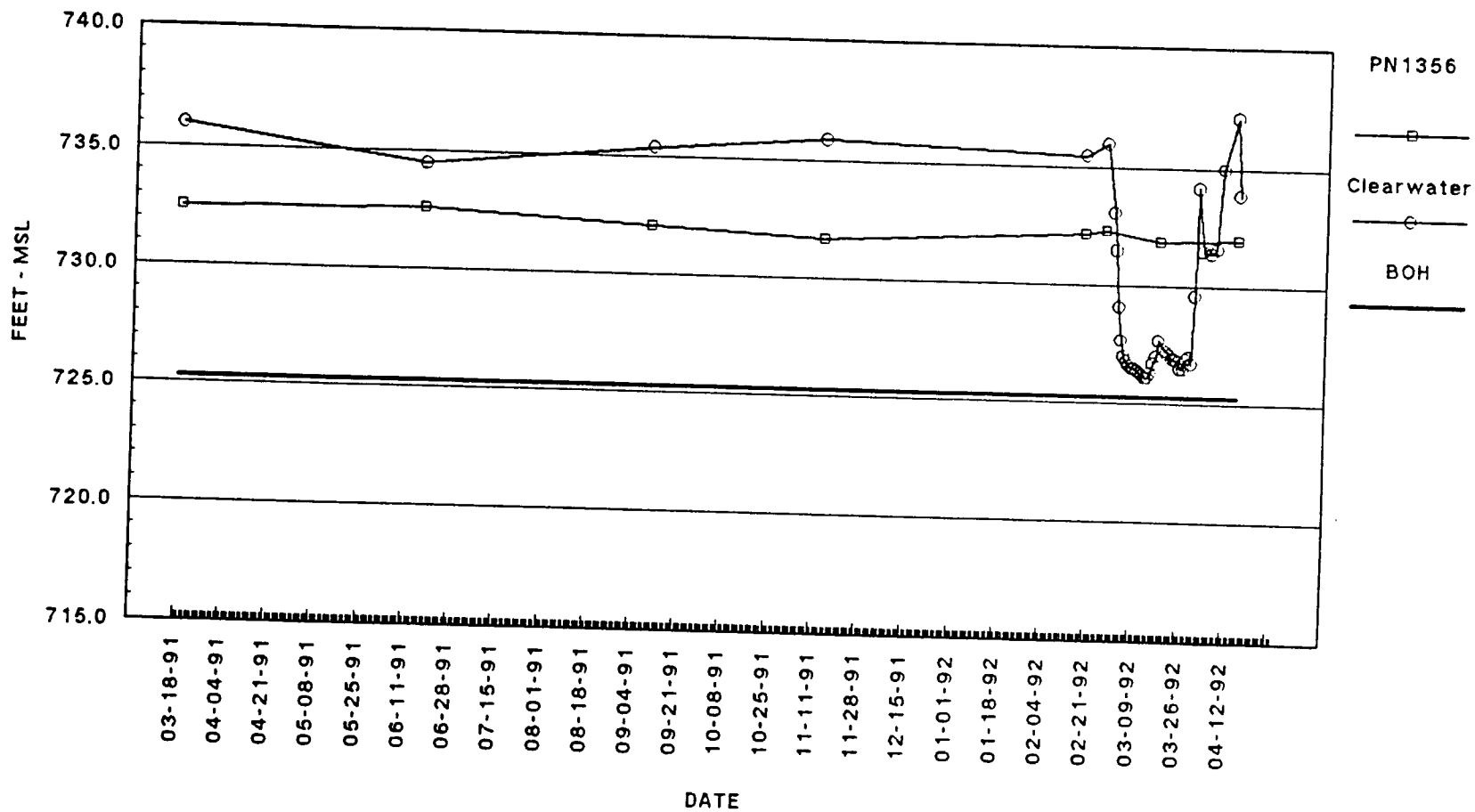
## OPEN TUBE PIEZOMETER PN1357



Located On East Levee - Station 248-00  
 30 Feet To Levee On Groundwater Profile EL-5

# LOWER GRANITE LEVEES - DRAWDOWN 1992

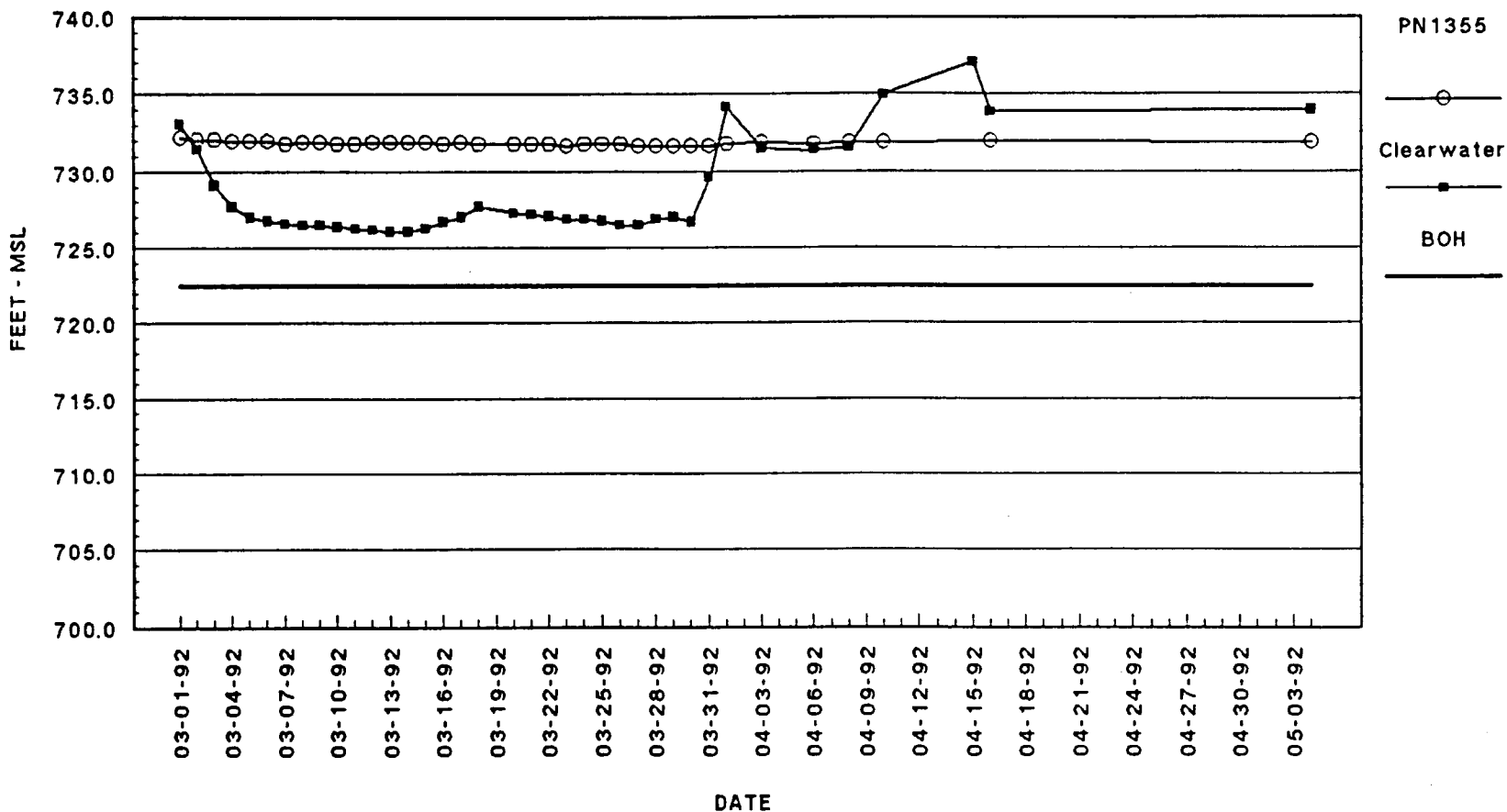
## OPEN TUBE PIEZOMETER PN1356



Located On East Levee - Station 232+00  
 30 Feet To Levee On Groundwater Profile EL-4

# LOWER GRANITE LEVEES – DRAWDOWN 1992

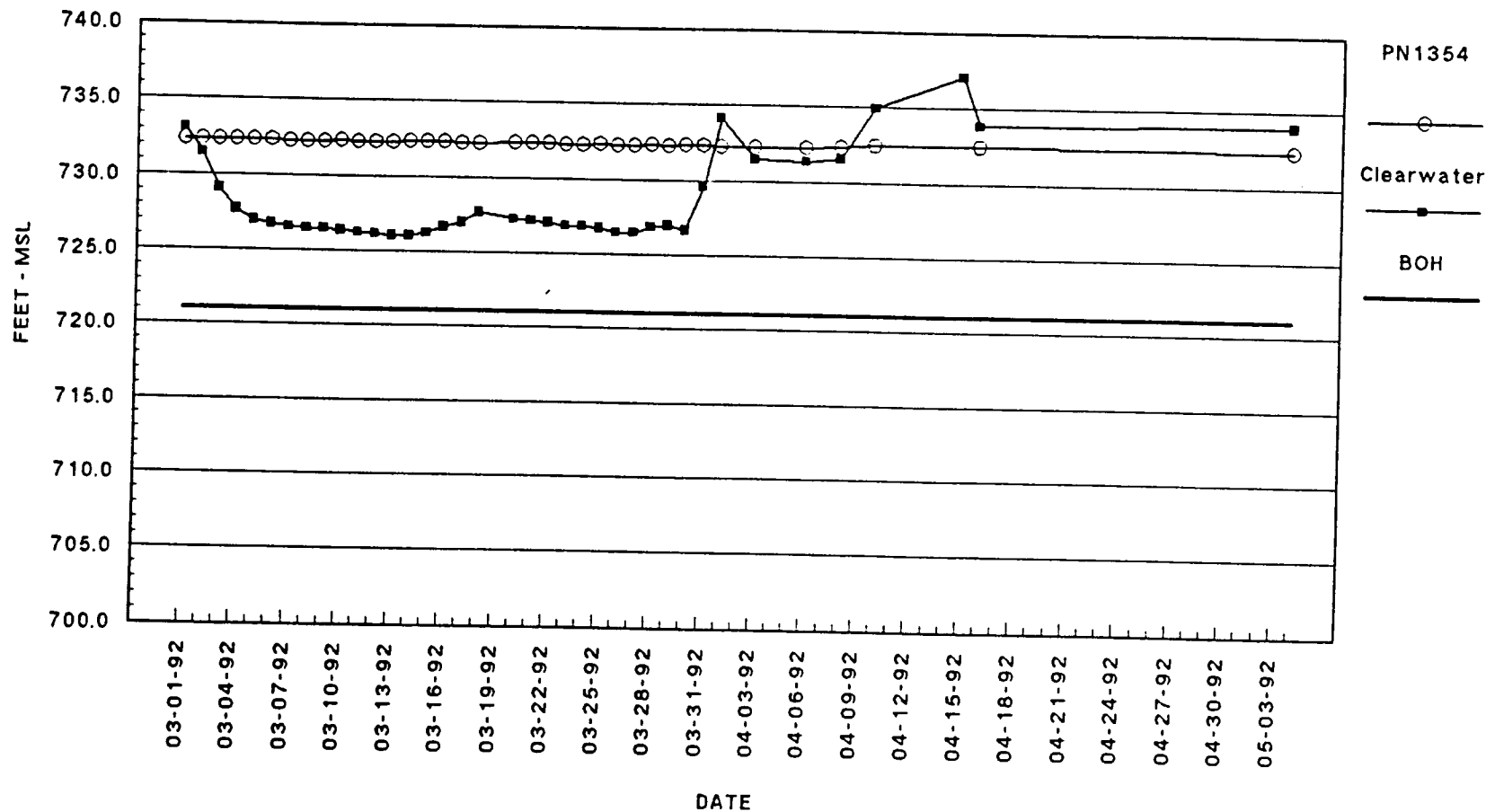
## OPEN TUBE PIEZOMETER PN1355



Located On East Levee - Station 232+00  
 Groundwater Profile EL-4

# LOWER GRANITE LEVEES - DRAWDOWN 1992

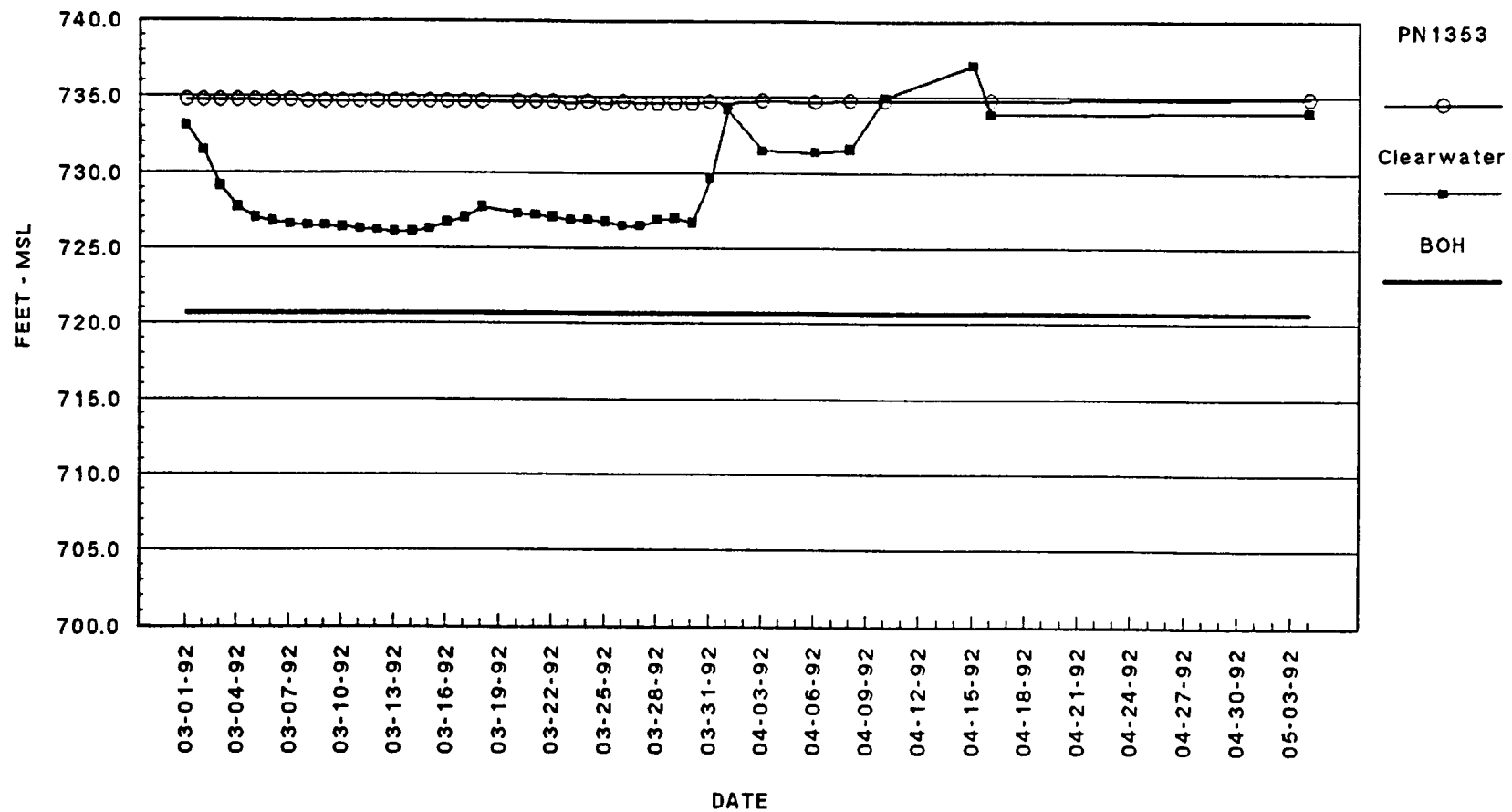
## OPEN TUBE PIEZOMETER PN1354



Located On East Levee - Station 248-00  
 Groundwater Profile EL-5

# LOWER GRANITE LEVEES - DRAWDOWN 1992

## OPEN TUBE PIEZOMETER PN1353

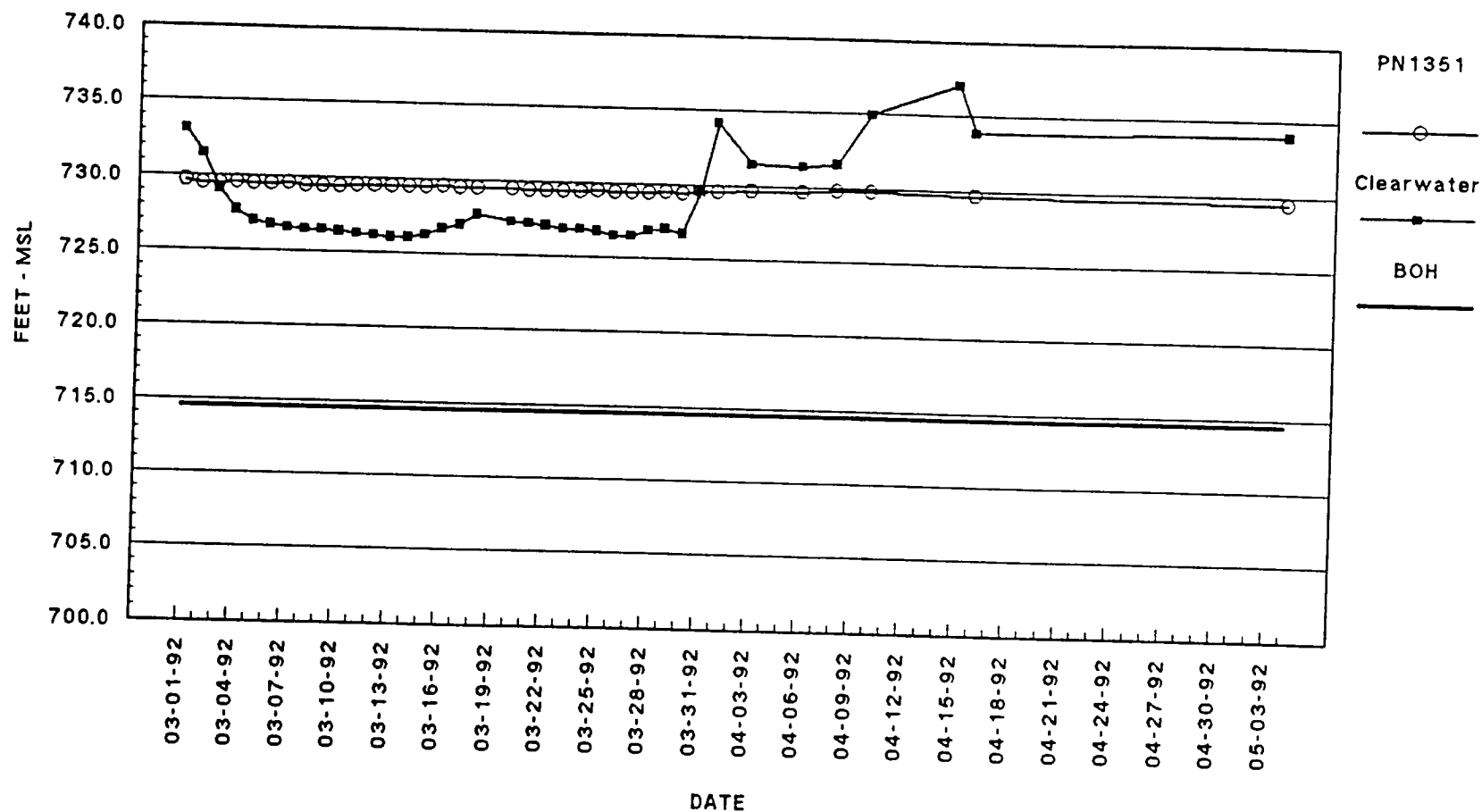


Located On East Levee - Station 268+00  
 Groundwater Profile EL-7



# LOWER GRANITE LEVEES - DRAWDOWN 1992

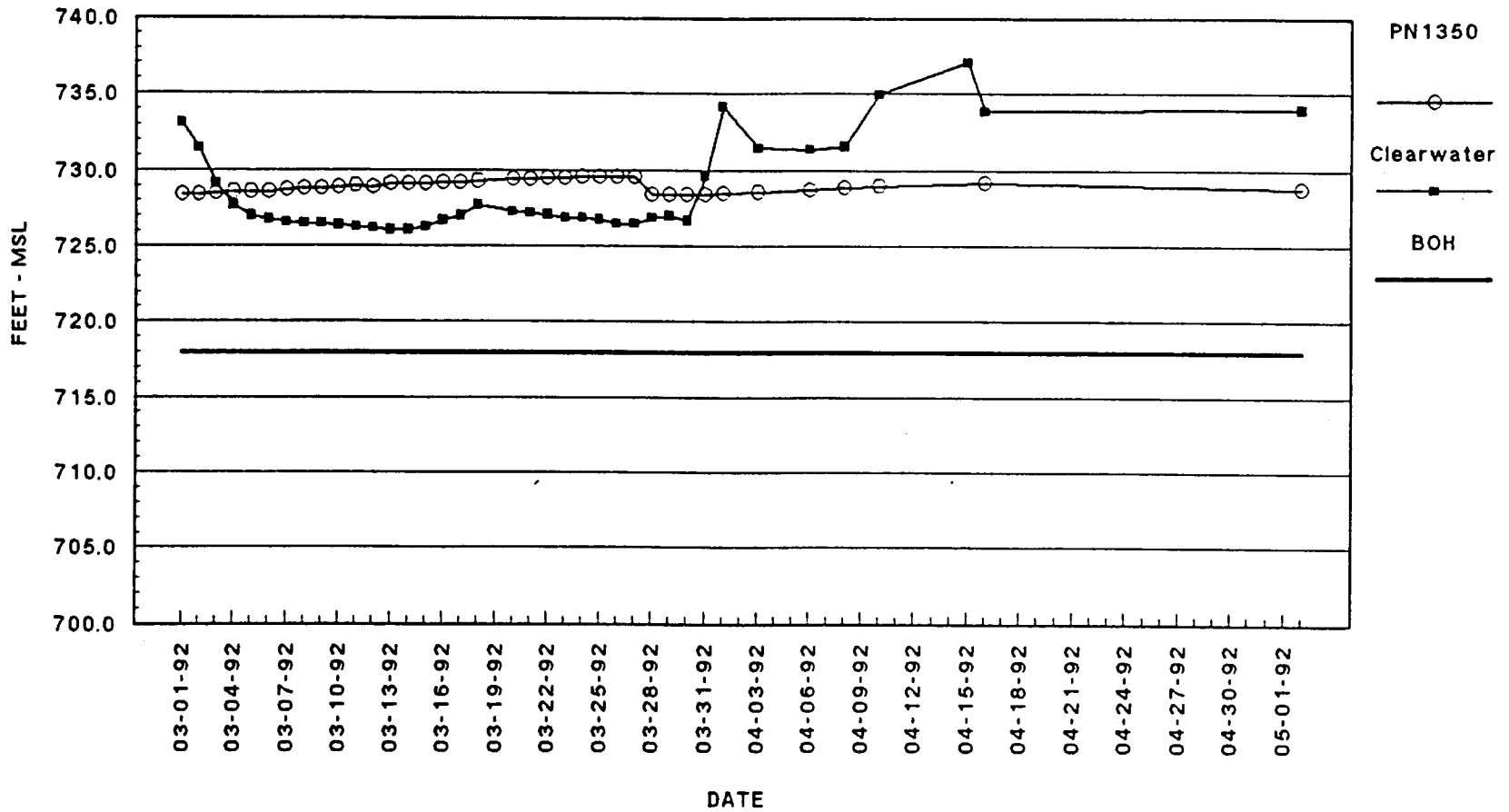
## OPEN TUBE PIEZOMETER PN1351



Located On East Levee - Station 200+50  
 30 Feet To Levee On Groundwater Profile EL-2

# LOWER GRANITE LEVEES - DRAWDOWN 1992

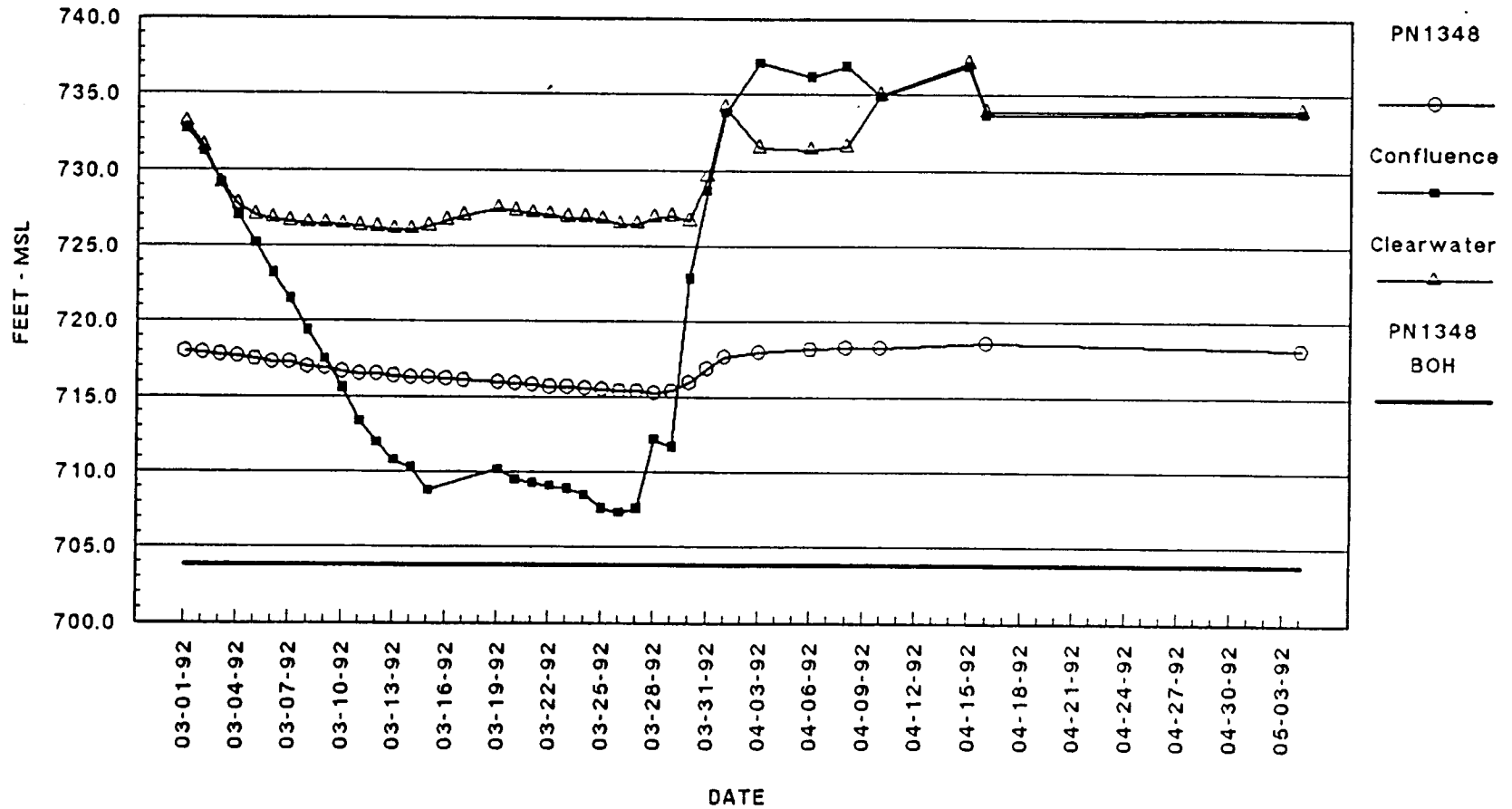
## OPEN TUBE PIEZOMETER PN1350



Located On East Levee - Station 221+00  
 30 Feet To Levee On Groundwater Profile EL-3

# LOWER GRANITE LEVEES - DRAWDOWN 1992

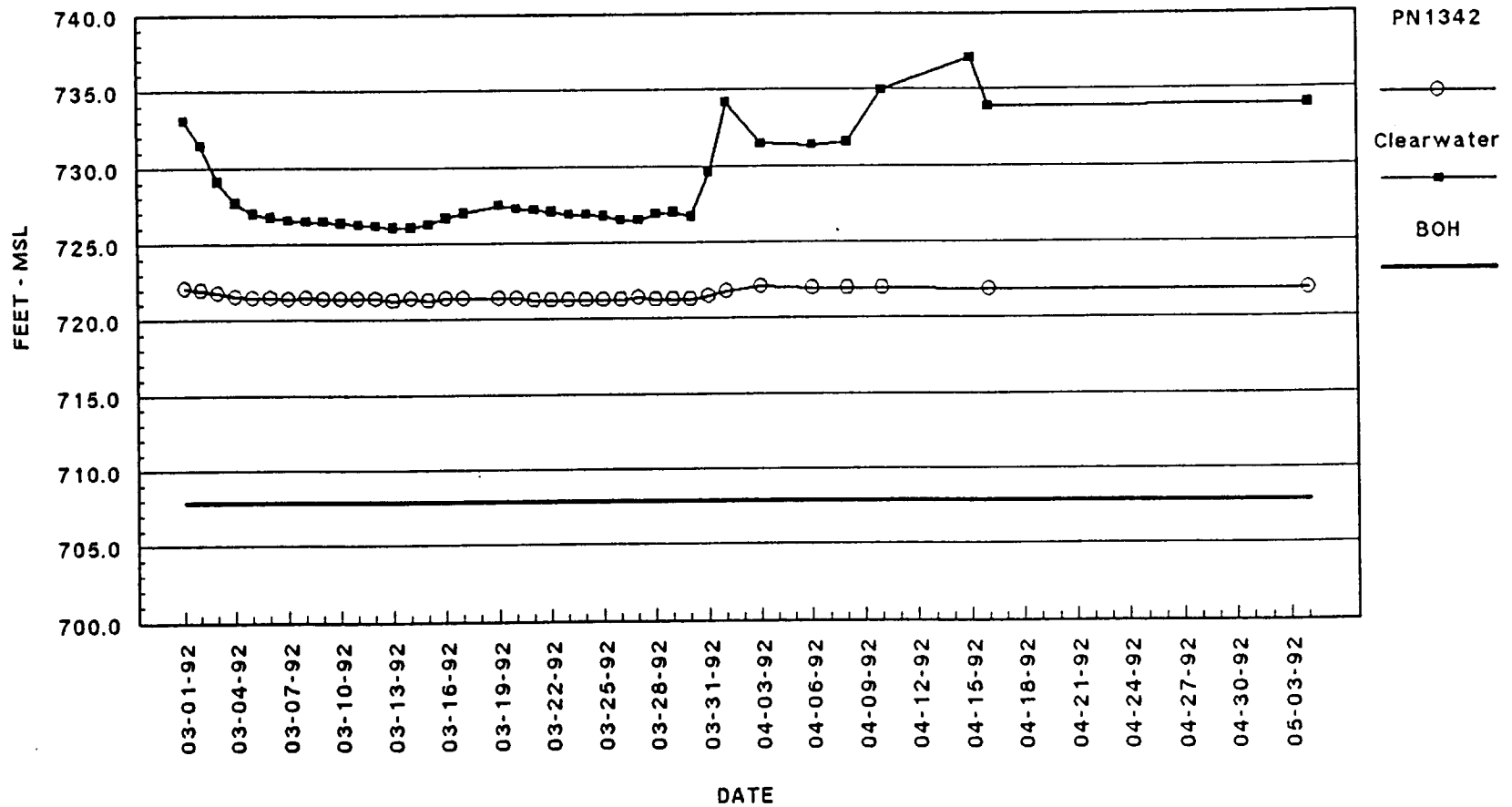
## OPEN TUBE PIEZOMETER PN1348



Located On North Levee - Station 2+00  
 On Groundwater Profile N-1A

# LOWER GRANITE LEVEES - DRAWDOWN 1992

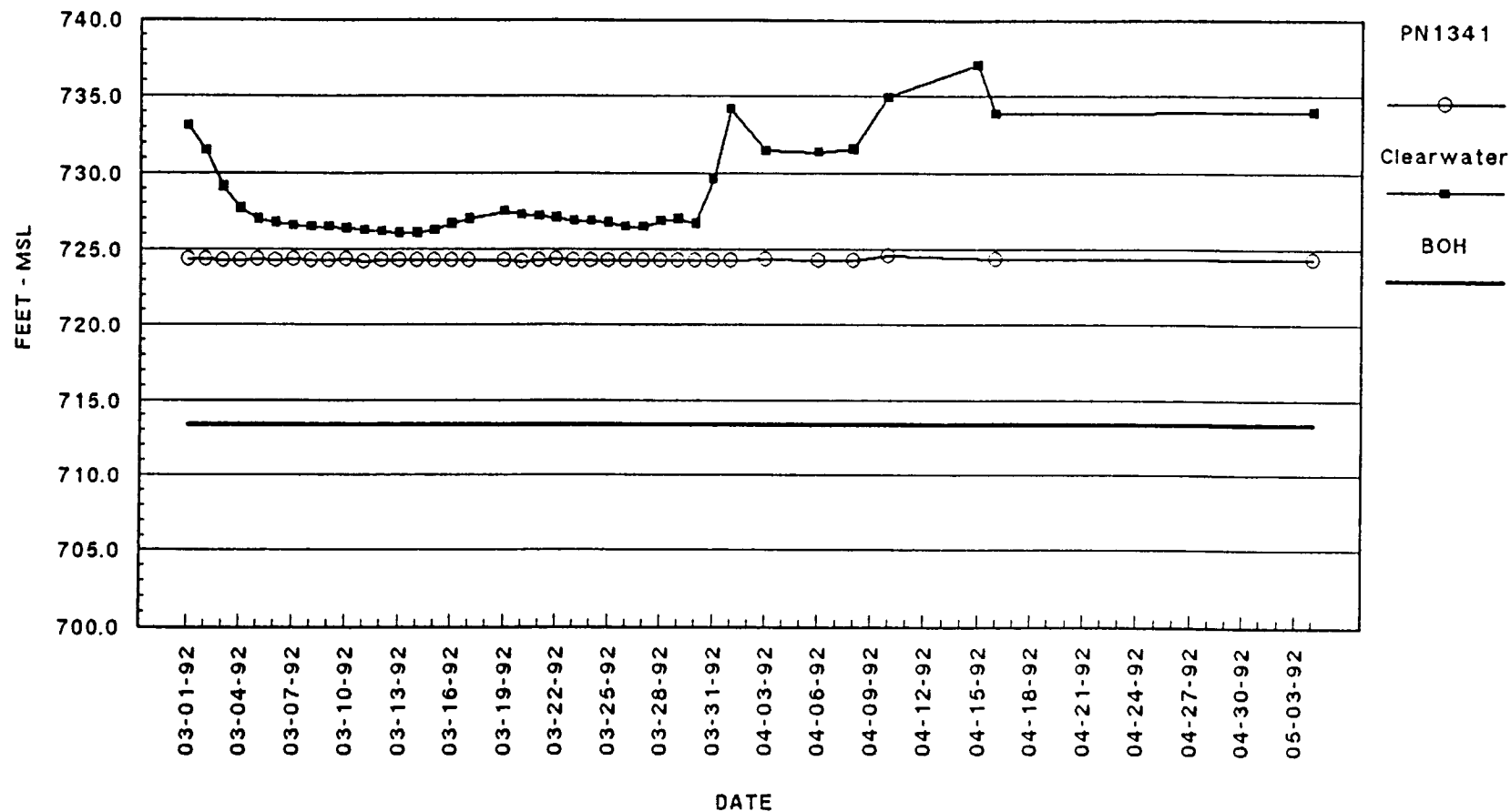
## OPEN TUBE PIEZOMETER PN1342



Located On North Levee - Station 77+00  
 On Groundwater Profile N-3

# LOWER GRANITE LEVEES - DRAWDOWN 1992

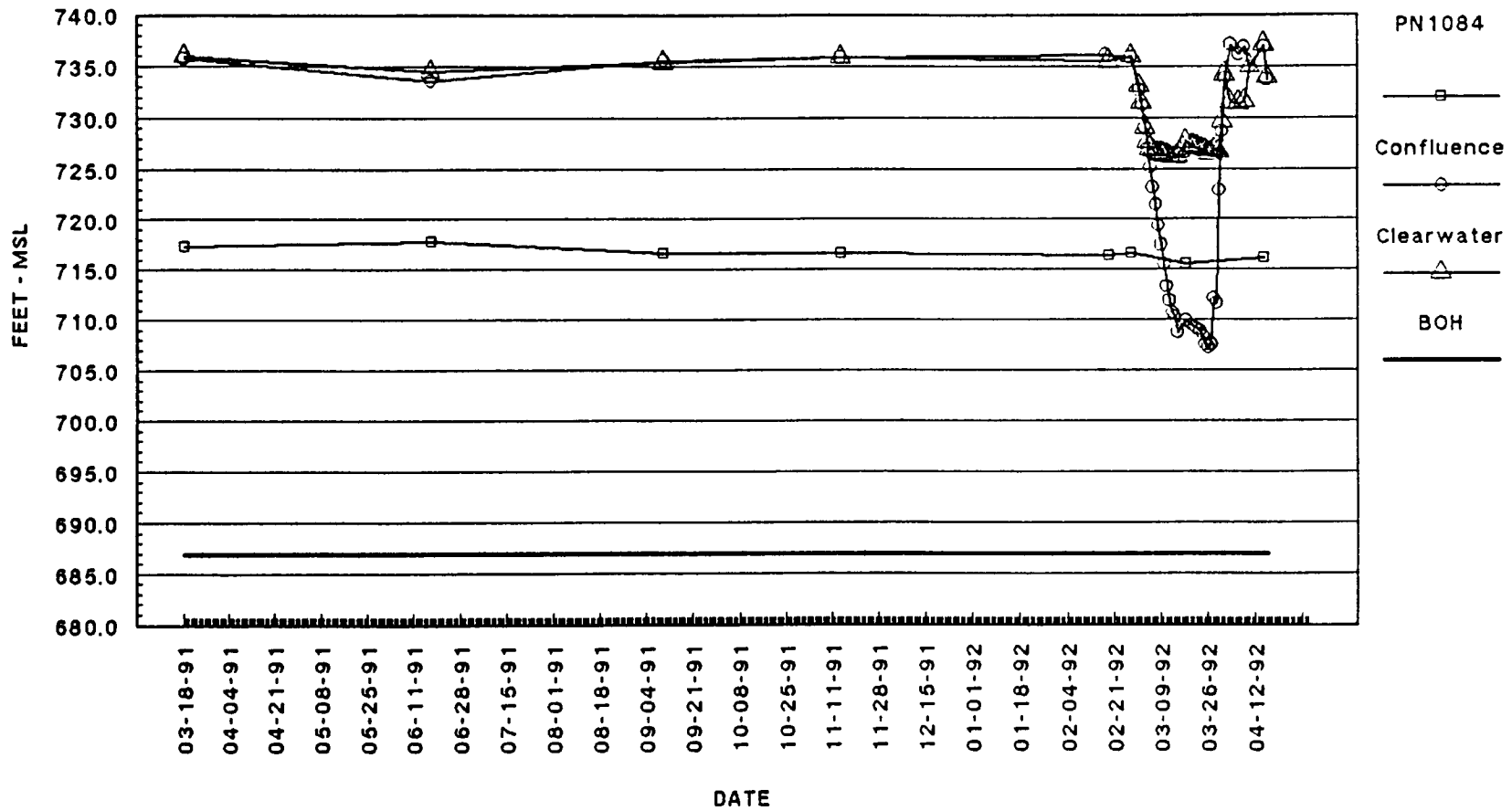
## OPEN TUBE PIEZOMETER PN1341



Located On North Levee - Station 107+00  
 On Groundwater Profile N-4

# LOWER GRANITE LEVEES - DRAWDOWN 1992

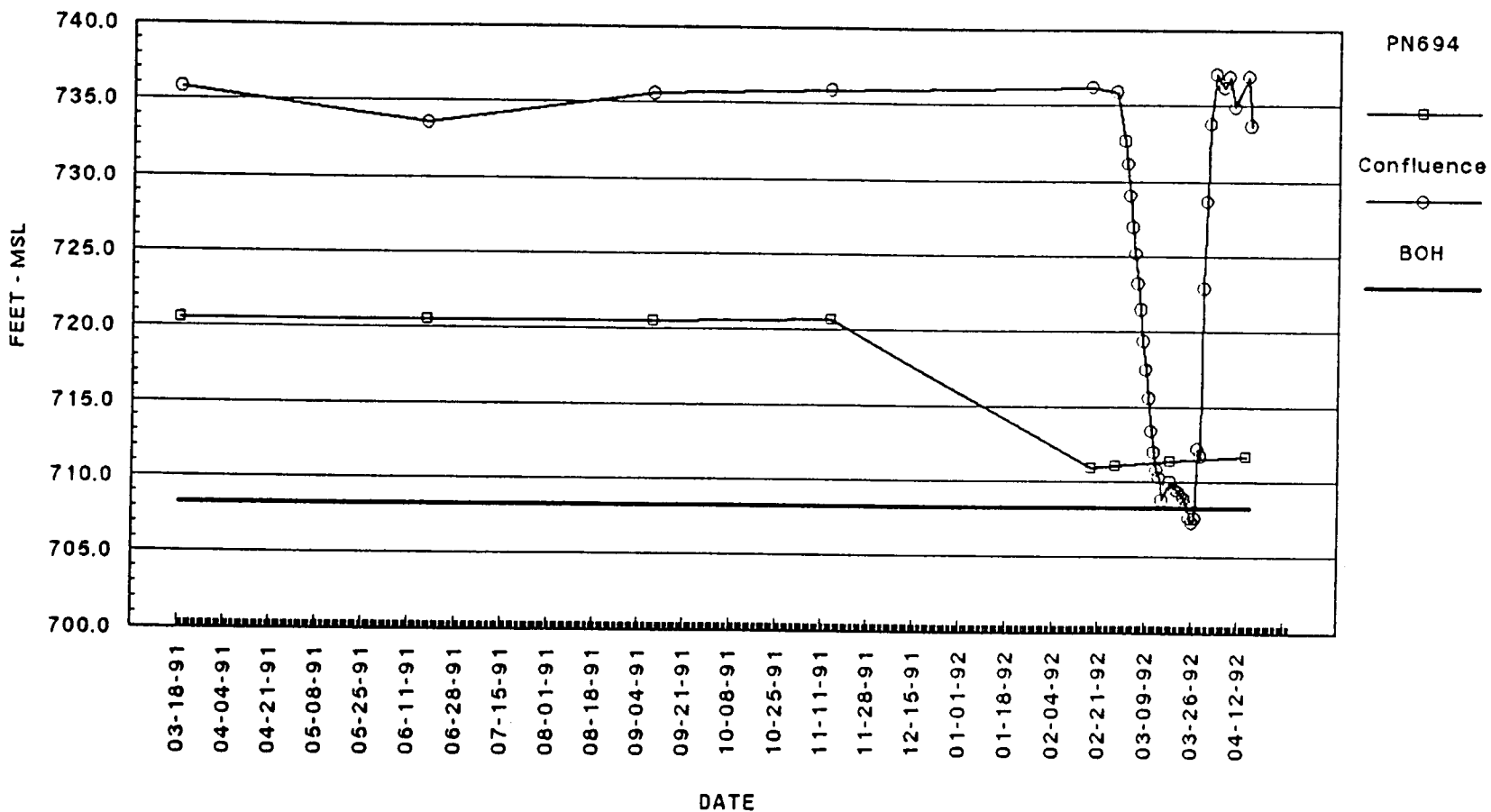
## OPEN TUBE PIEZOMETER PN1084



Located On West Levee - Station 84+70  
 450 Feet To Levee On Groundwater Profile WL-5

# LOWER GRANITE LEVEES - DRAWDOWN 1992

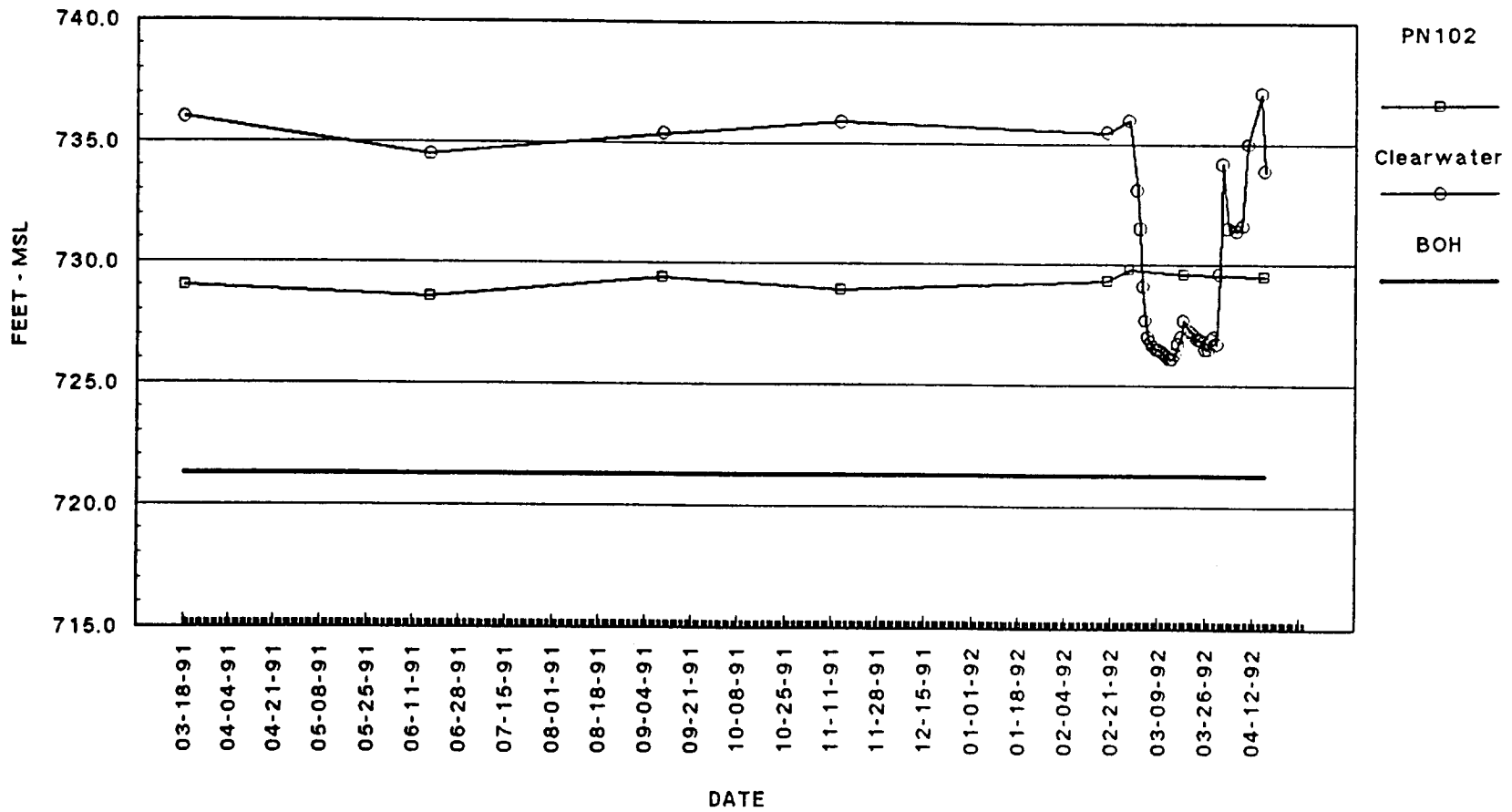
## OPEN TUBE PIEZOMETER PN694



Located On West Levee - Station 15+90  
 320 Feet To Levee On Groundwater Profile WL-1A

# LOWER GRANITE LEVEES - DRAWDOWN 1992

## OPEN TUBE PIEZOMETER PN102

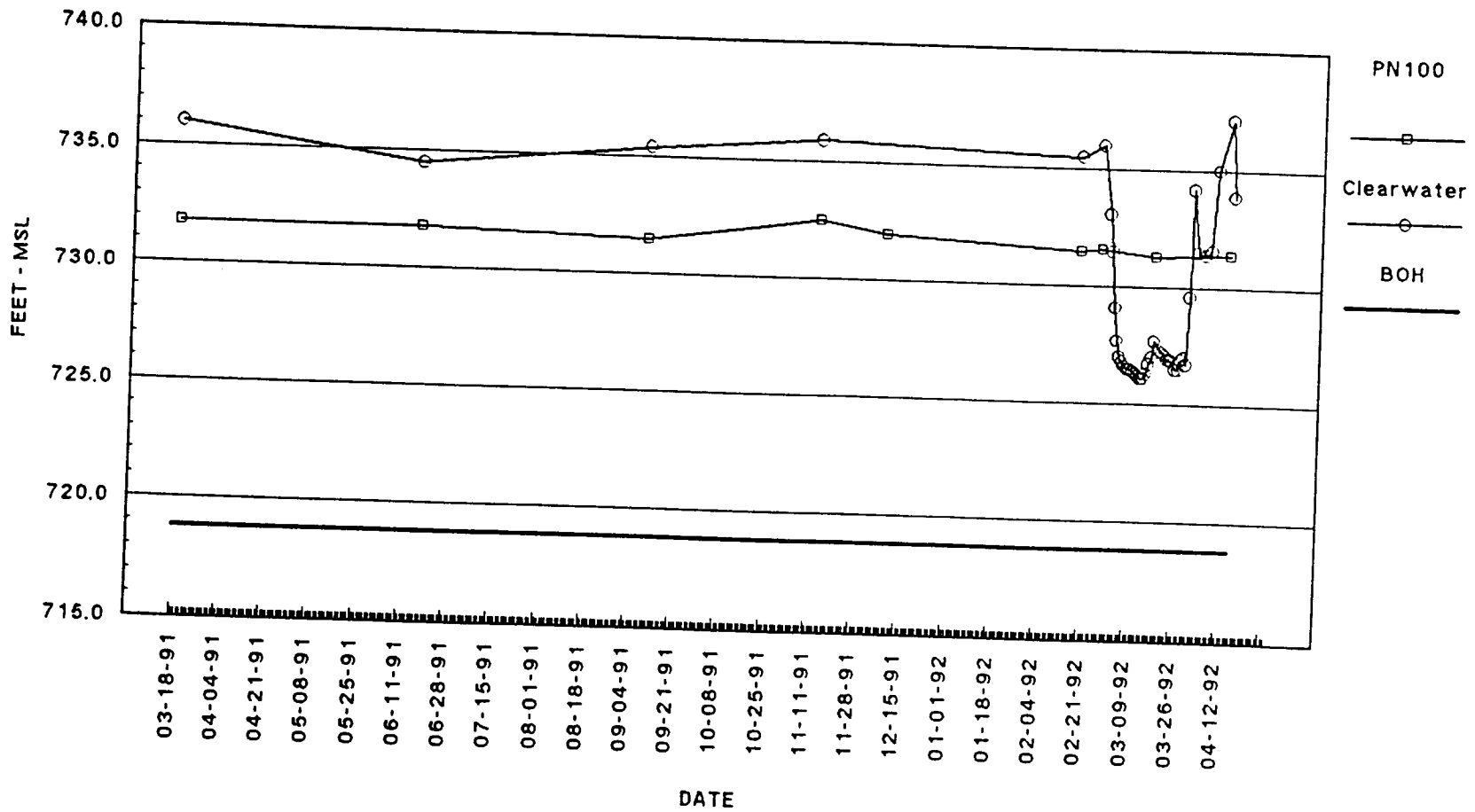


Located On East Levee - Station 221+00  
 200 Feet To Levee On Groundwater Profile EL-3



# LOWER GRANITE LEVEES - DRAWDOWN 1992

## OPEN TUBE PIEZOMETER PN100



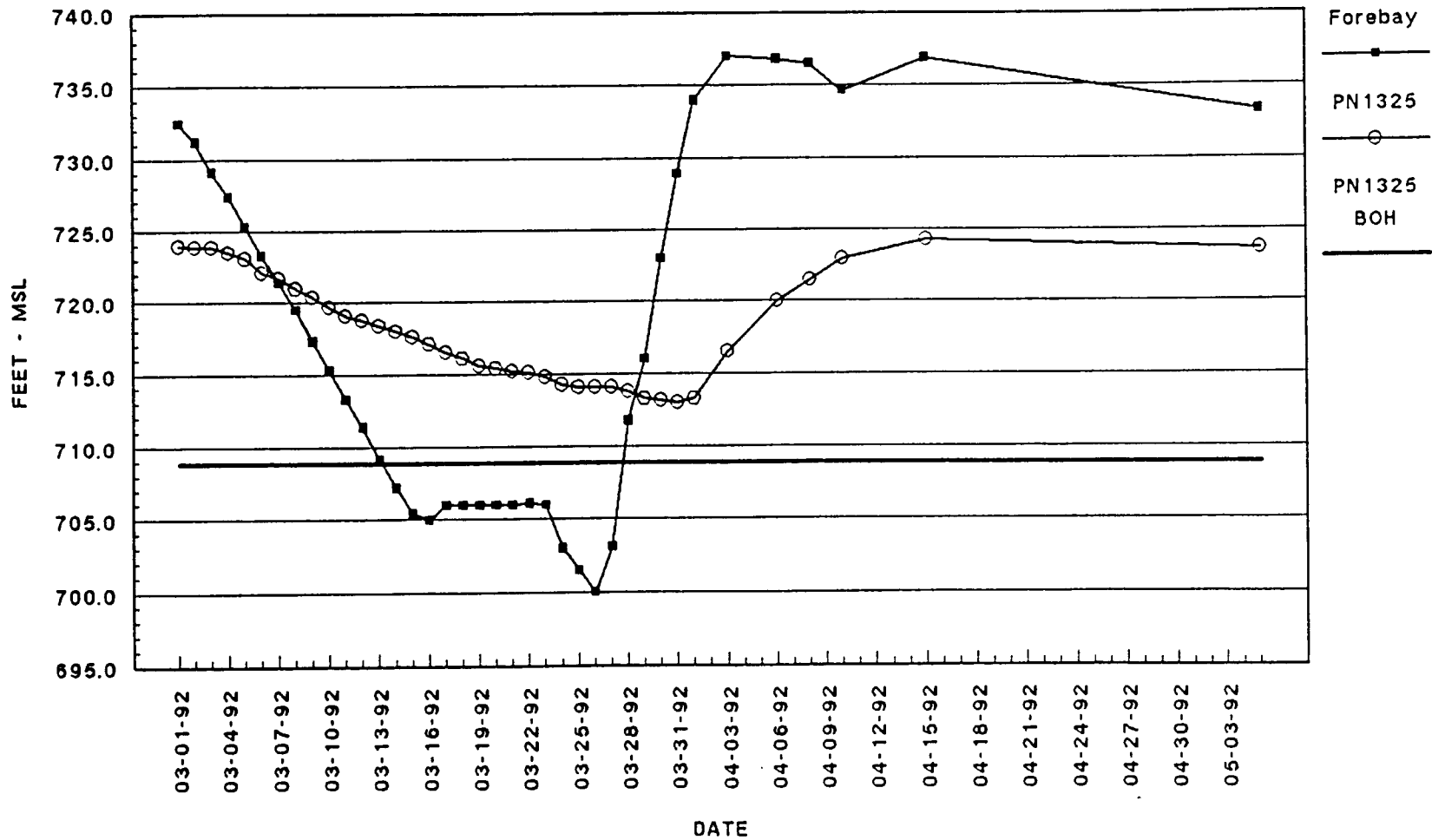
Located On East Levee - Station 170+00  
 400 Feet To Levee On Groundwater Profile EL-1

APPENDIX D-4  
MARCH, 1992 PIEZOMETER READINGS  
LOWER GRANITE DAM

# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 41+50

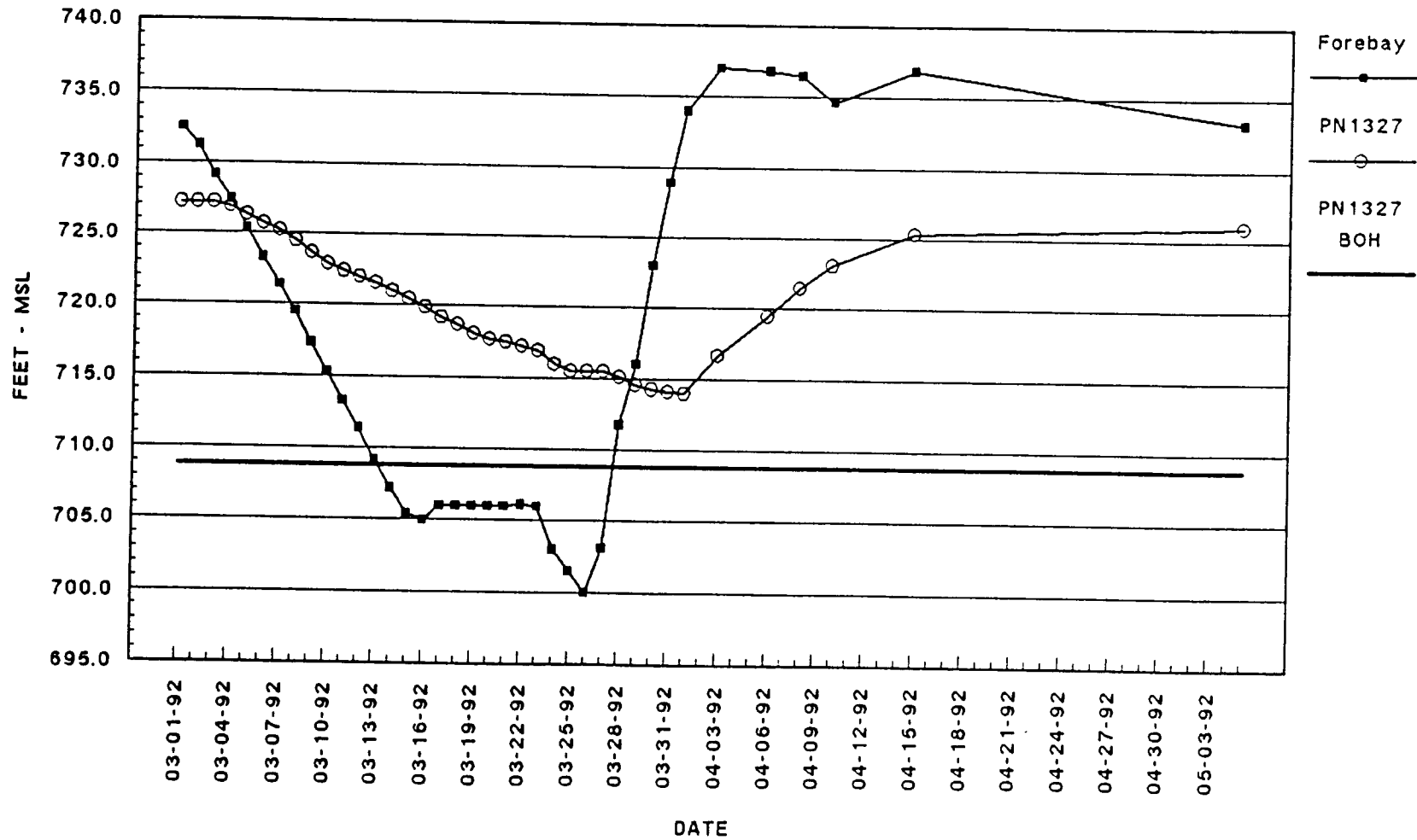
### Open Tube Piezometer PN1325



# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 43+50

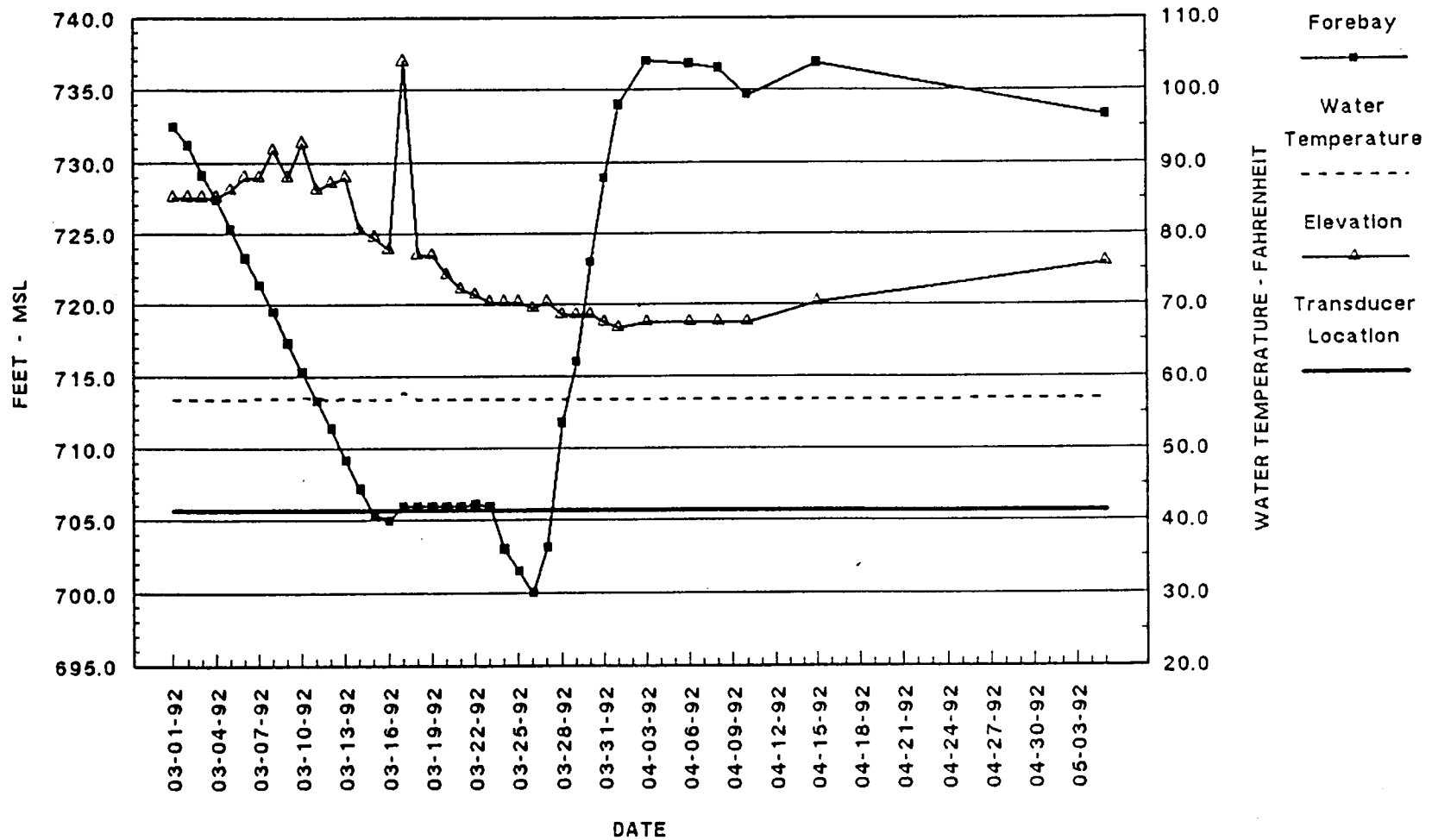
### Open Tube Piezometer PN1327



# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 44+50

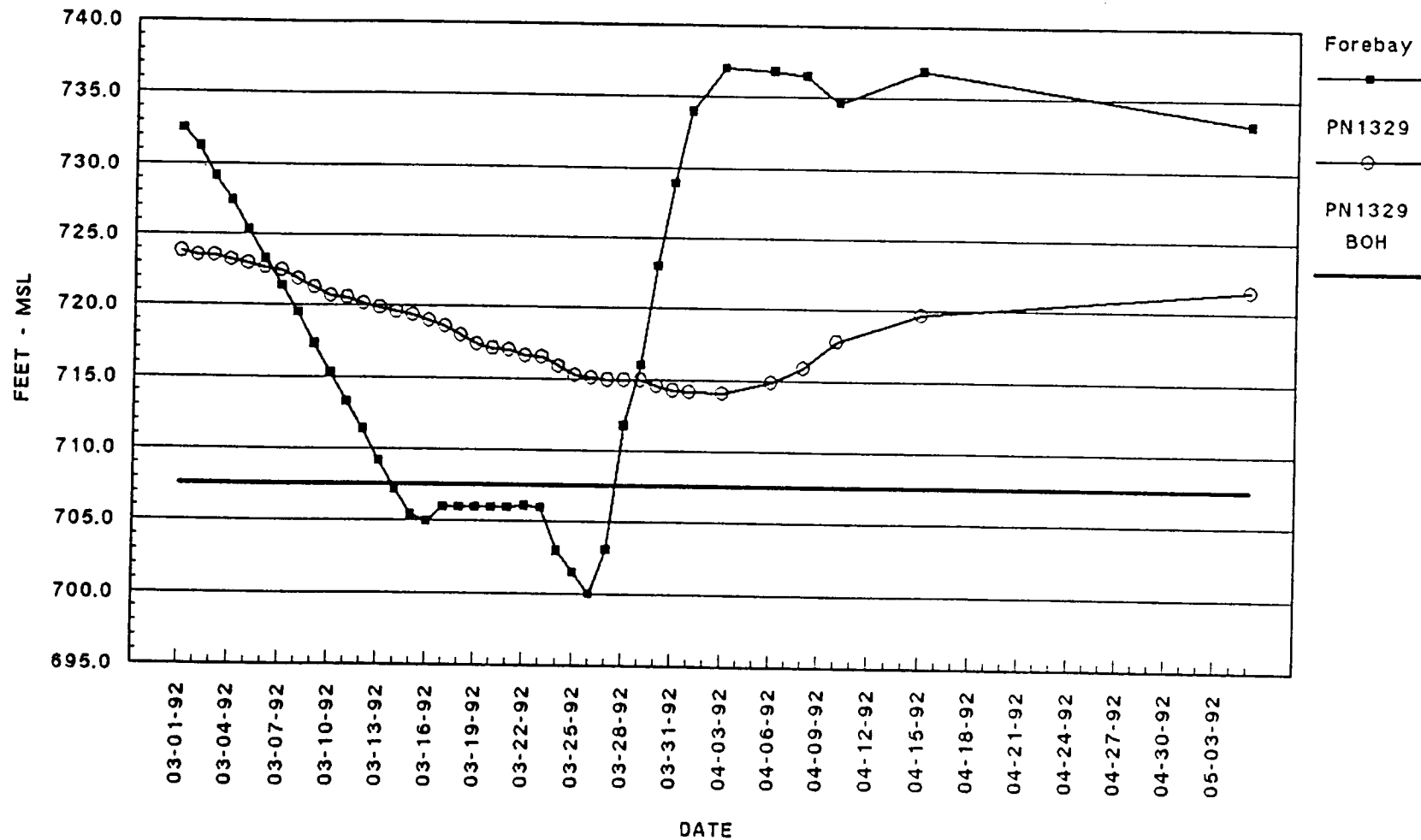
### Pressure Transducer – PN1328



# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 45+50

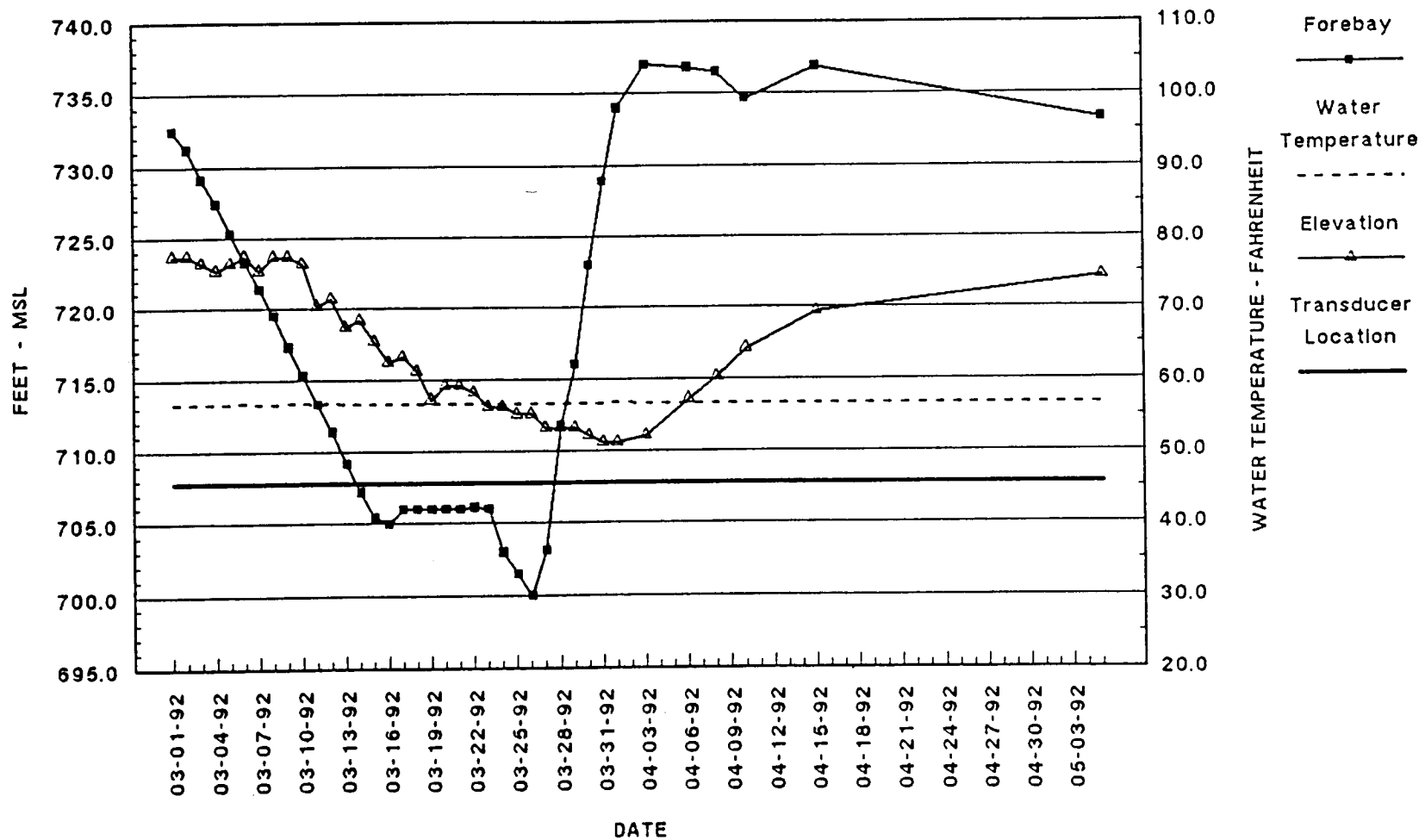
### Open Tube Piezometer PN1329



# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 46+50

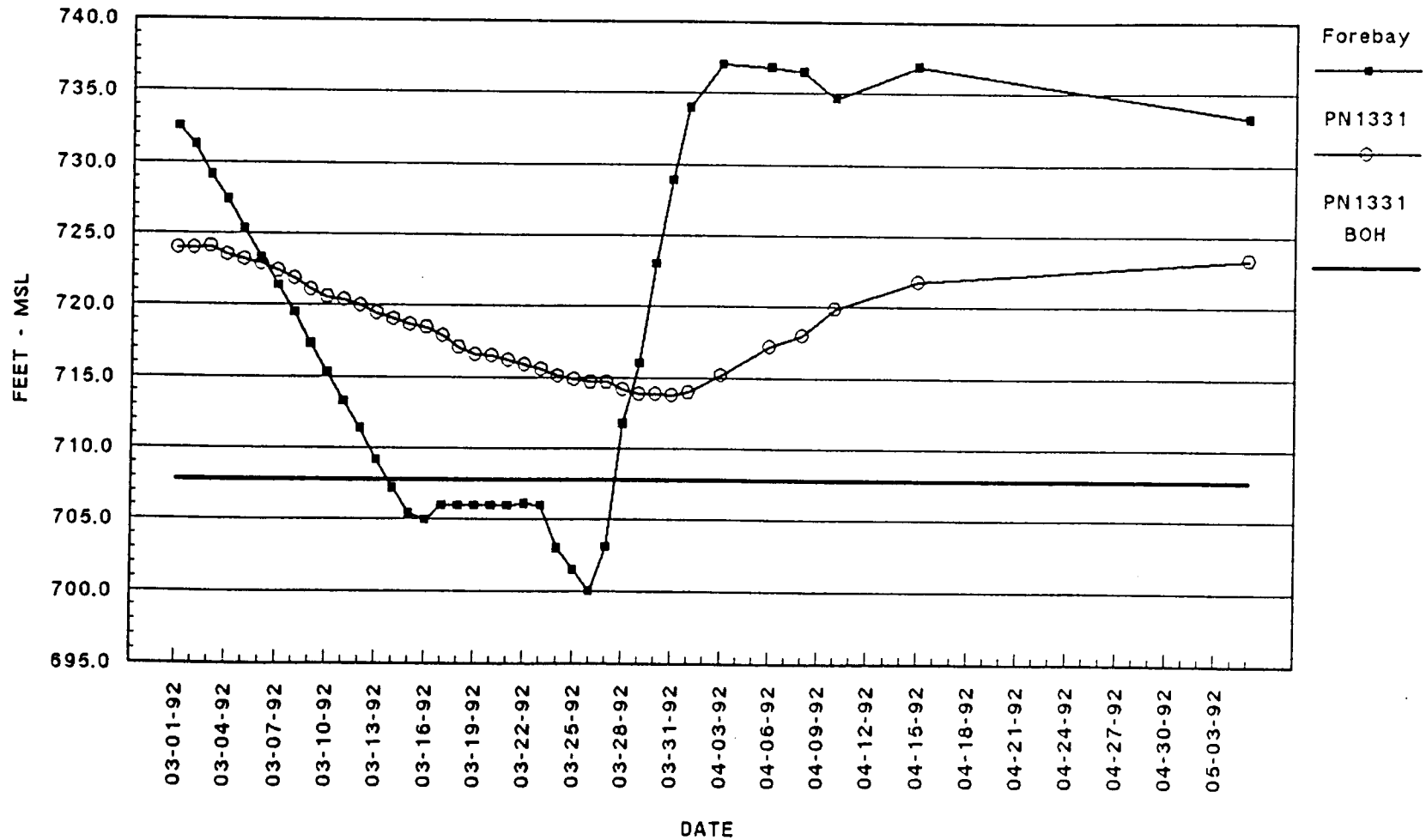
### Pressure Transducer – PN1330



# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 47+50

### Open Tube Piezometer PN1331

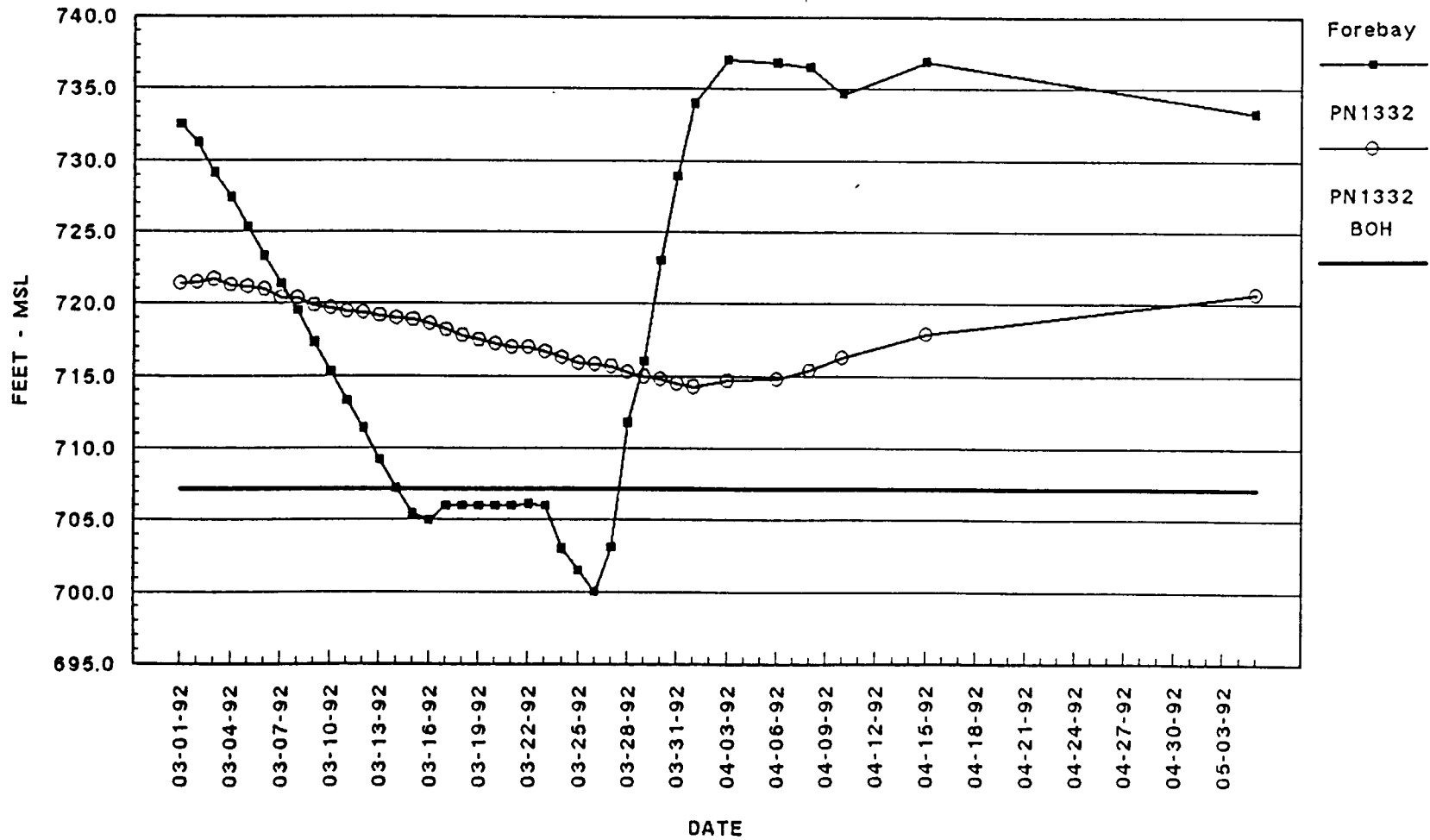




# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 48+50

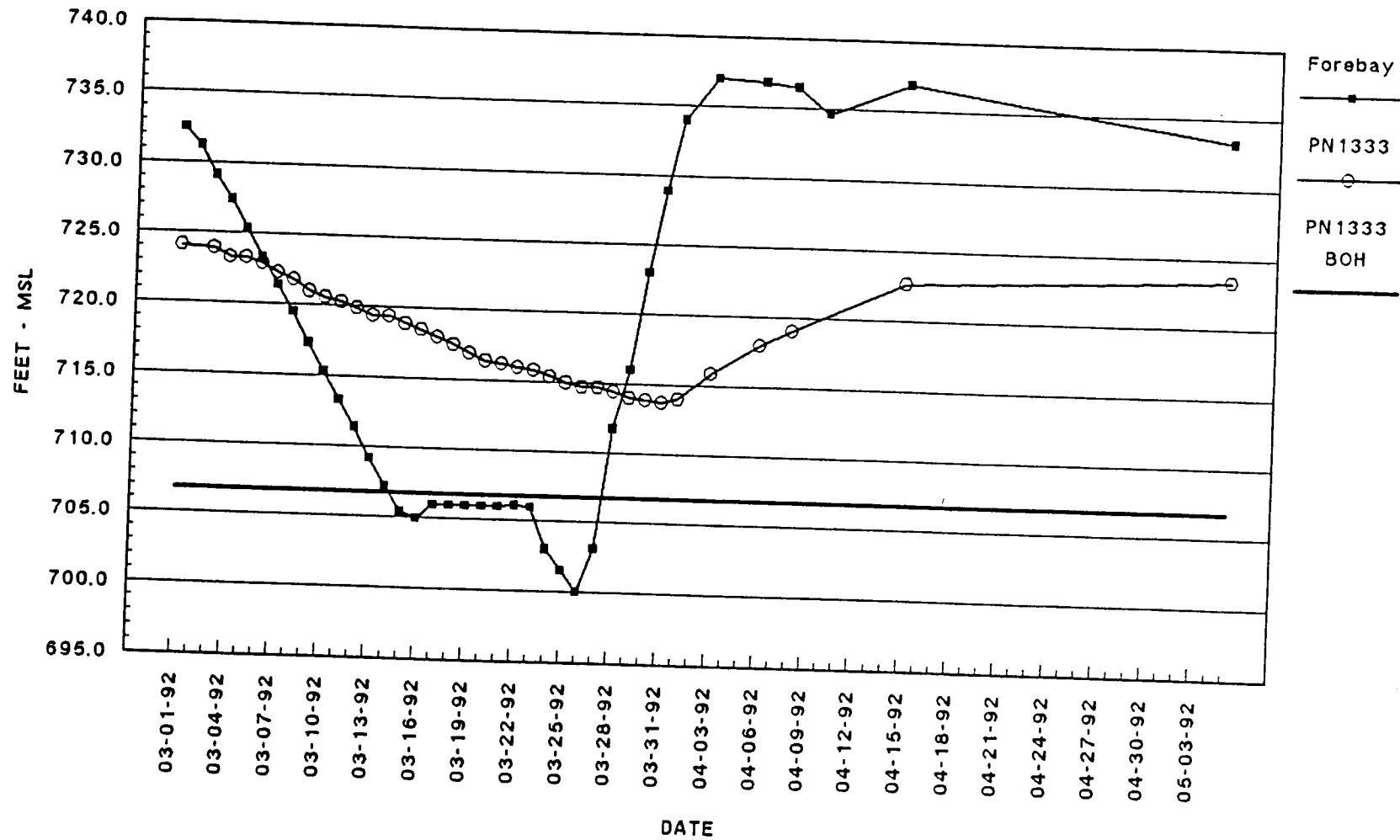
### Open Tube Piezometer PN1332



# Lower Granite Lock And Dam - Drawdown 1992

## North Embankment Station 49+50

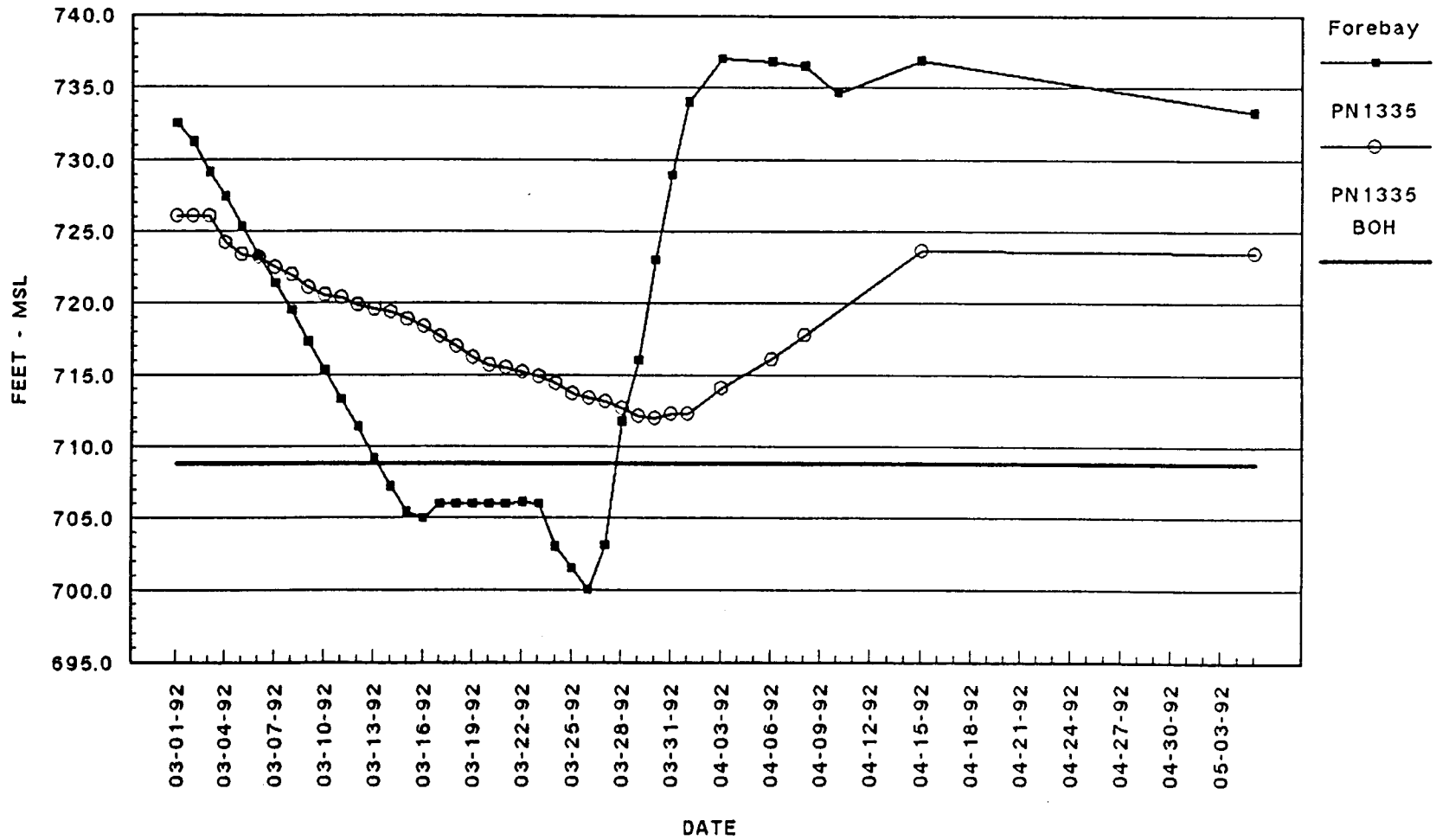
### Open Tube Piezometer PN1333



# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 51+50

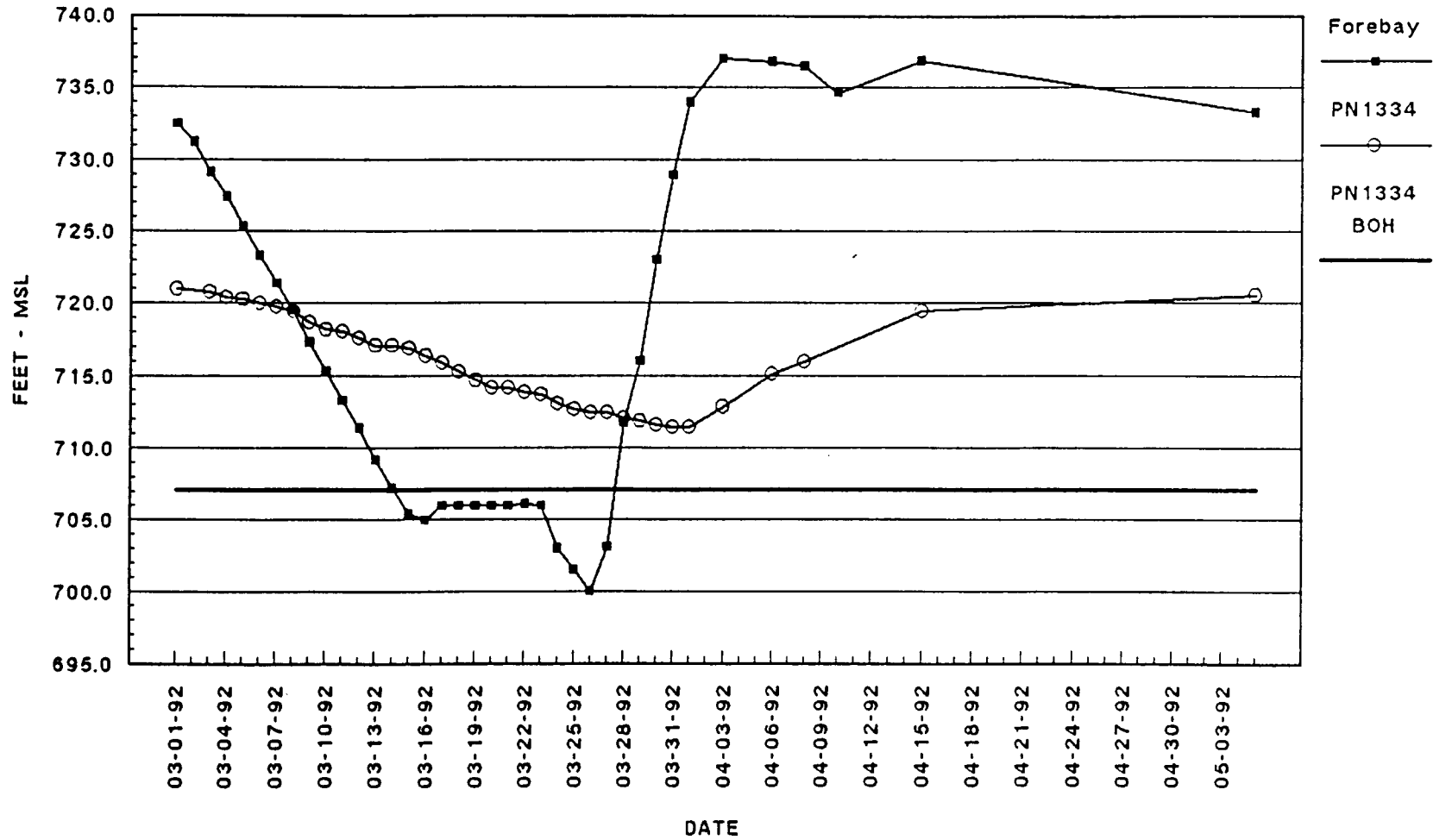
### Open Tube Piezometer PN1335



# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 50+50

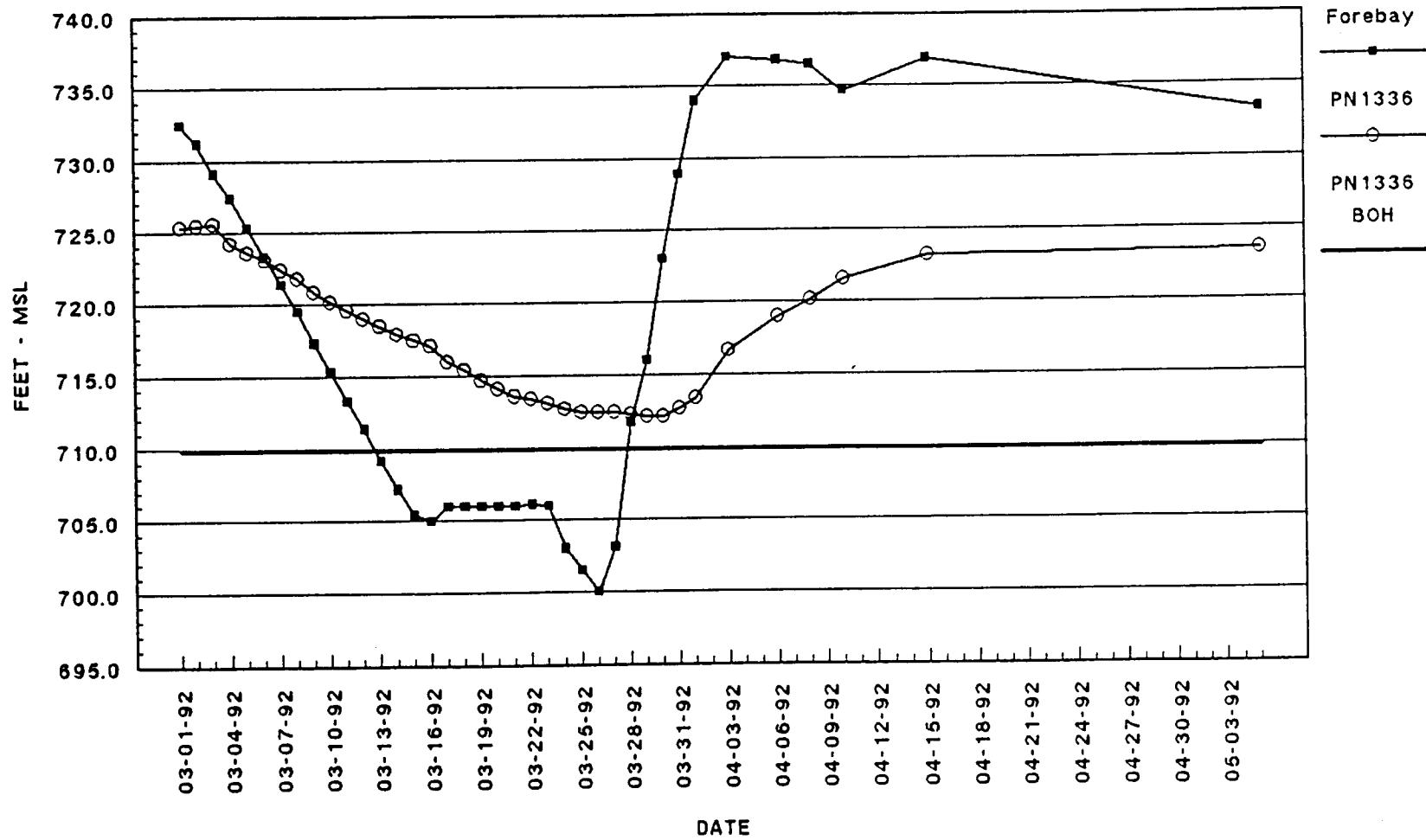
### Open Tube Piezometer PN1334



# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 52+50

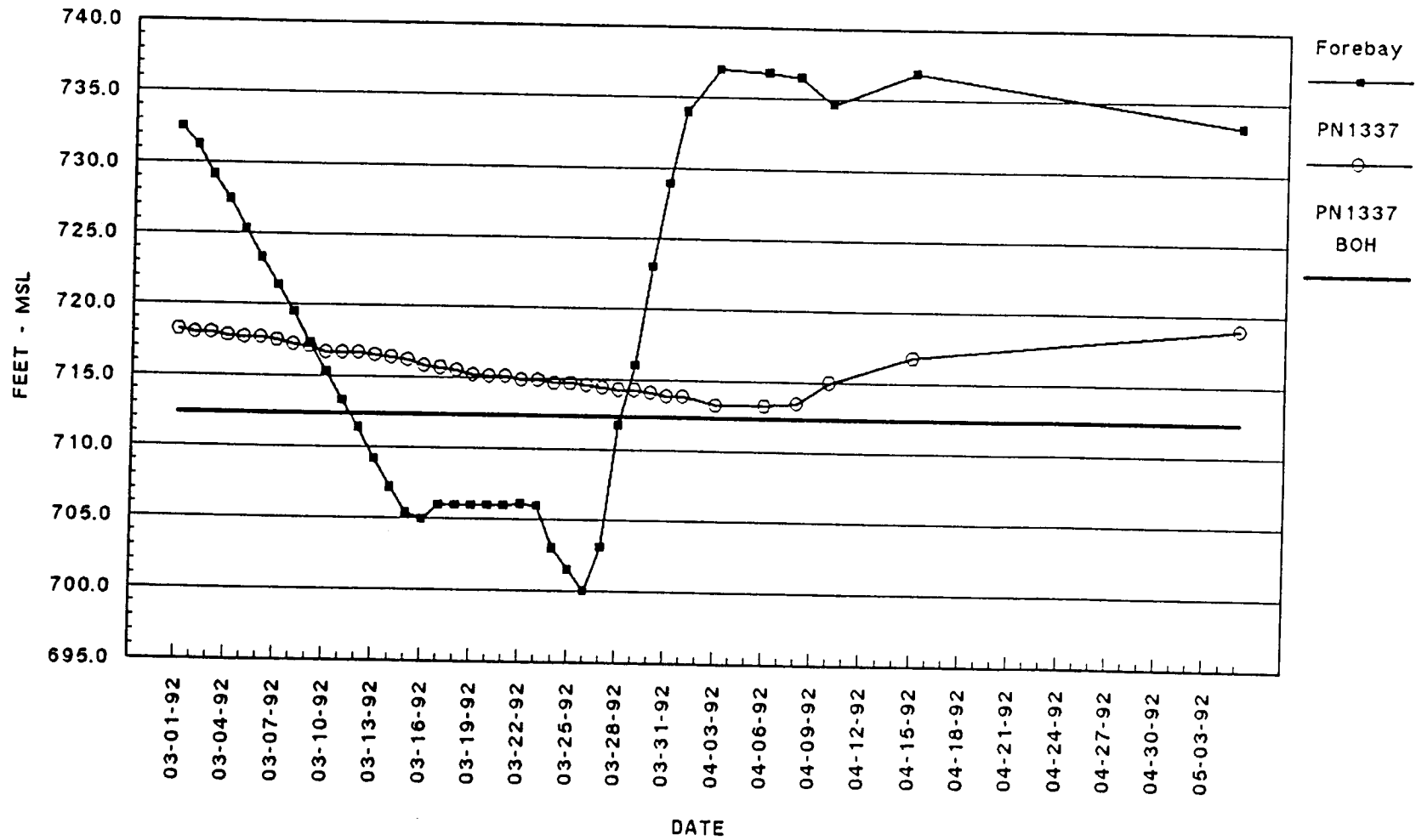
### Open Tube Piezometer PN1336



# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 53+50

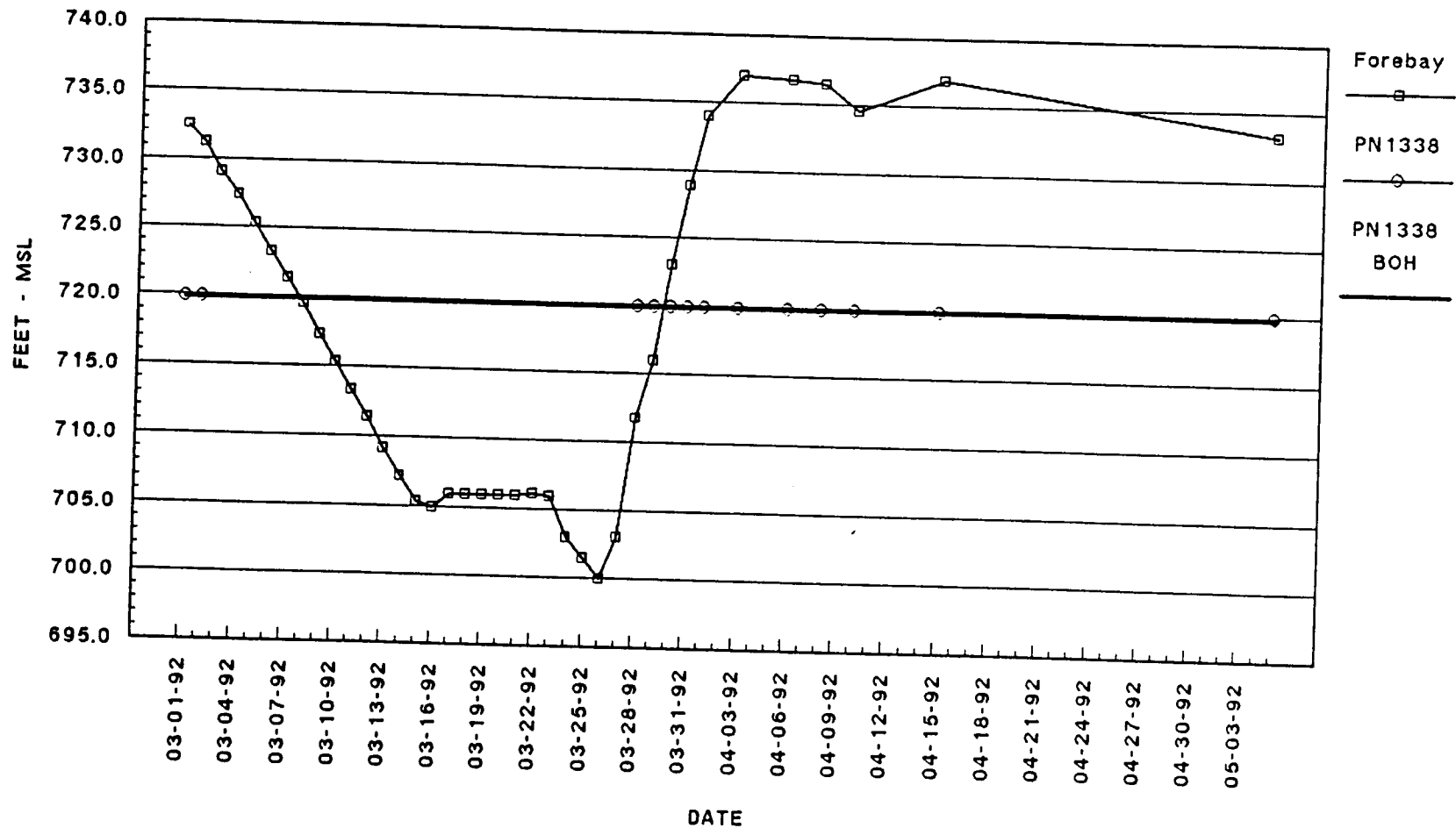
### Open Tube Piezometer PN1337



# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 43+50

### Open Tube Piezometer PN1338

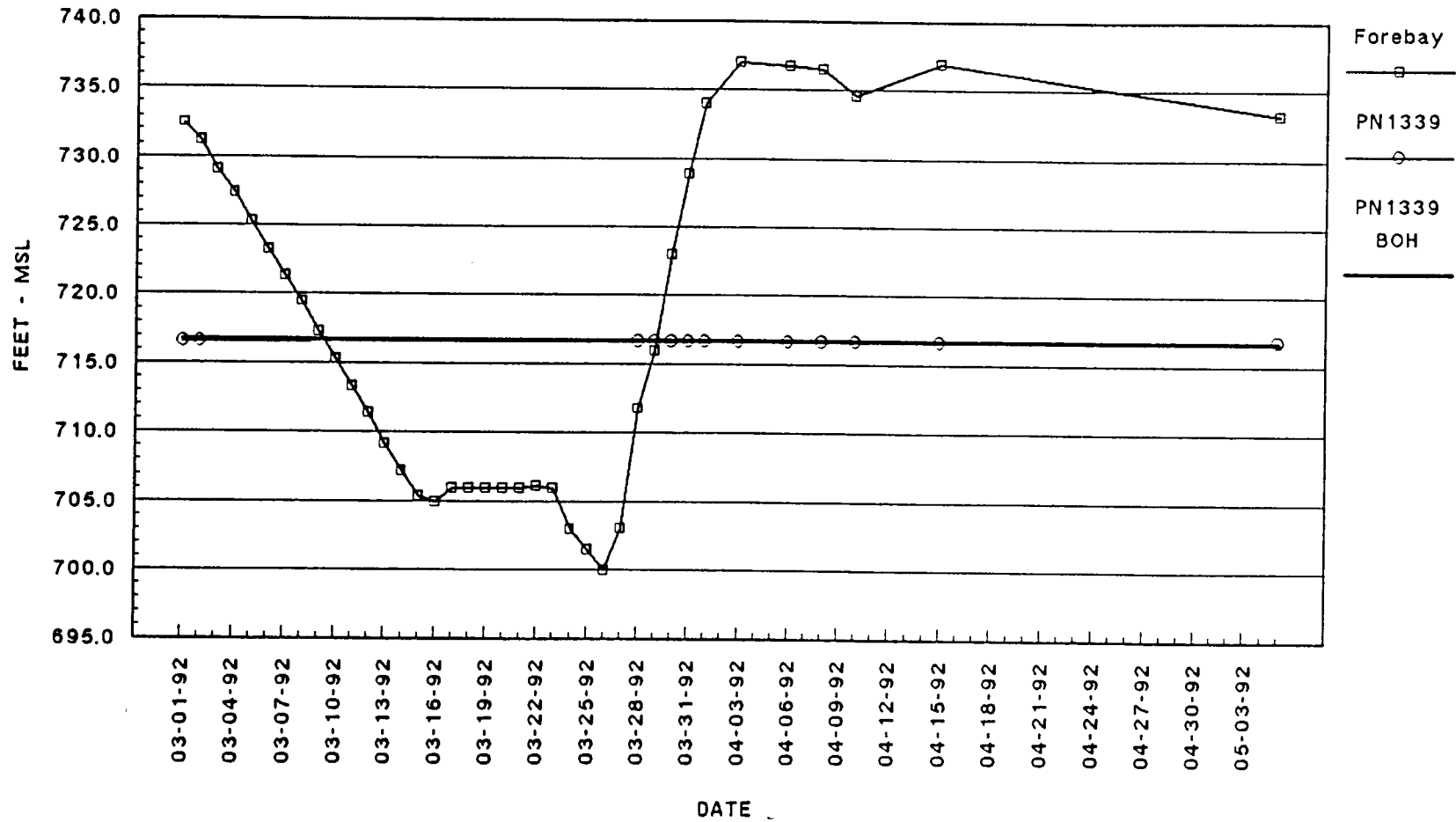


This Piezometer is "DRY"

# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 46+50

### Open Tube Piezometer PN1339



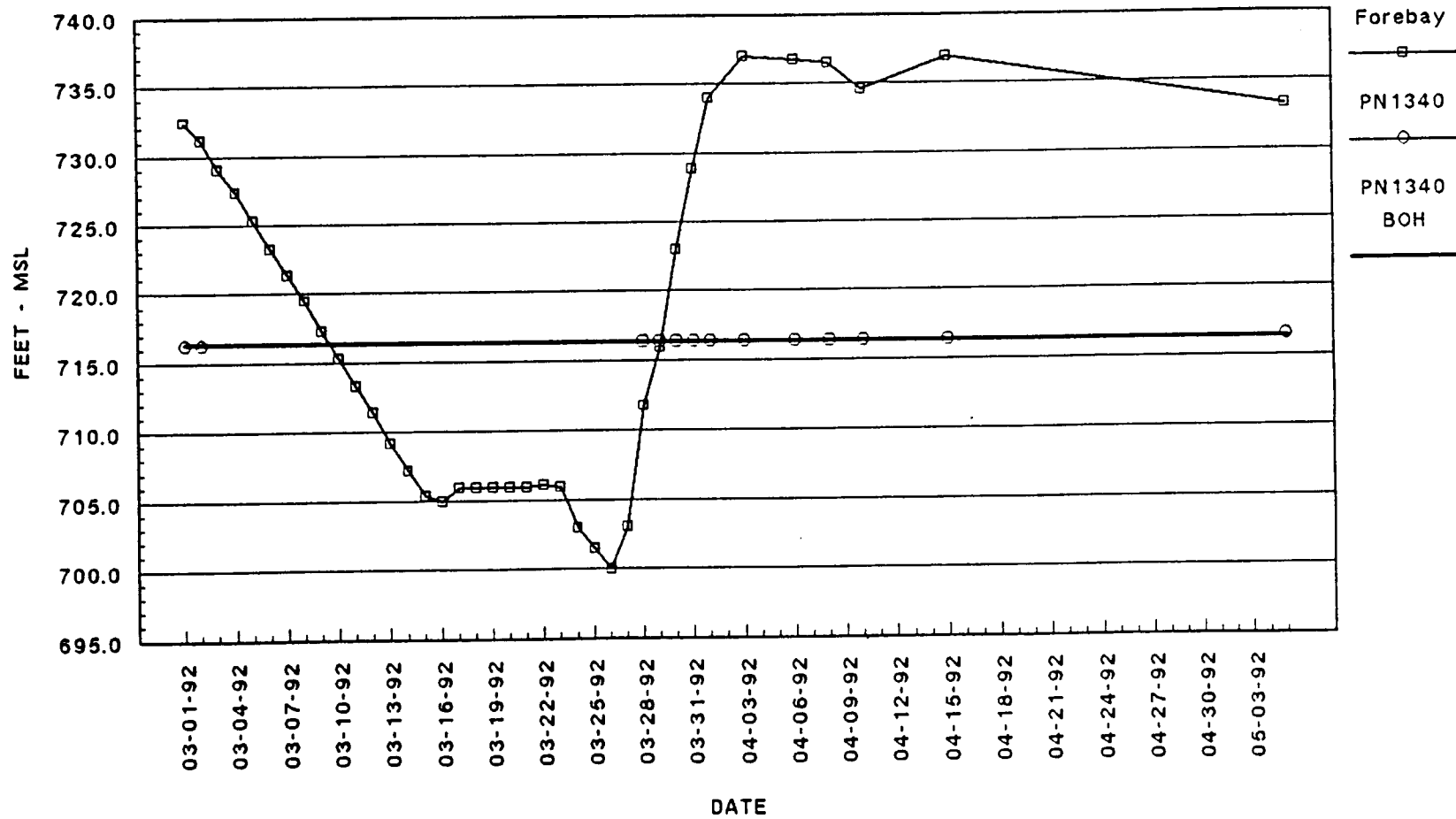
This Piezometer is "DRY"



# Lower Granite Lock And Dam – Drawdown 1992

## North Embankment Station 50+50

### Open Tube Piezometer PN1340

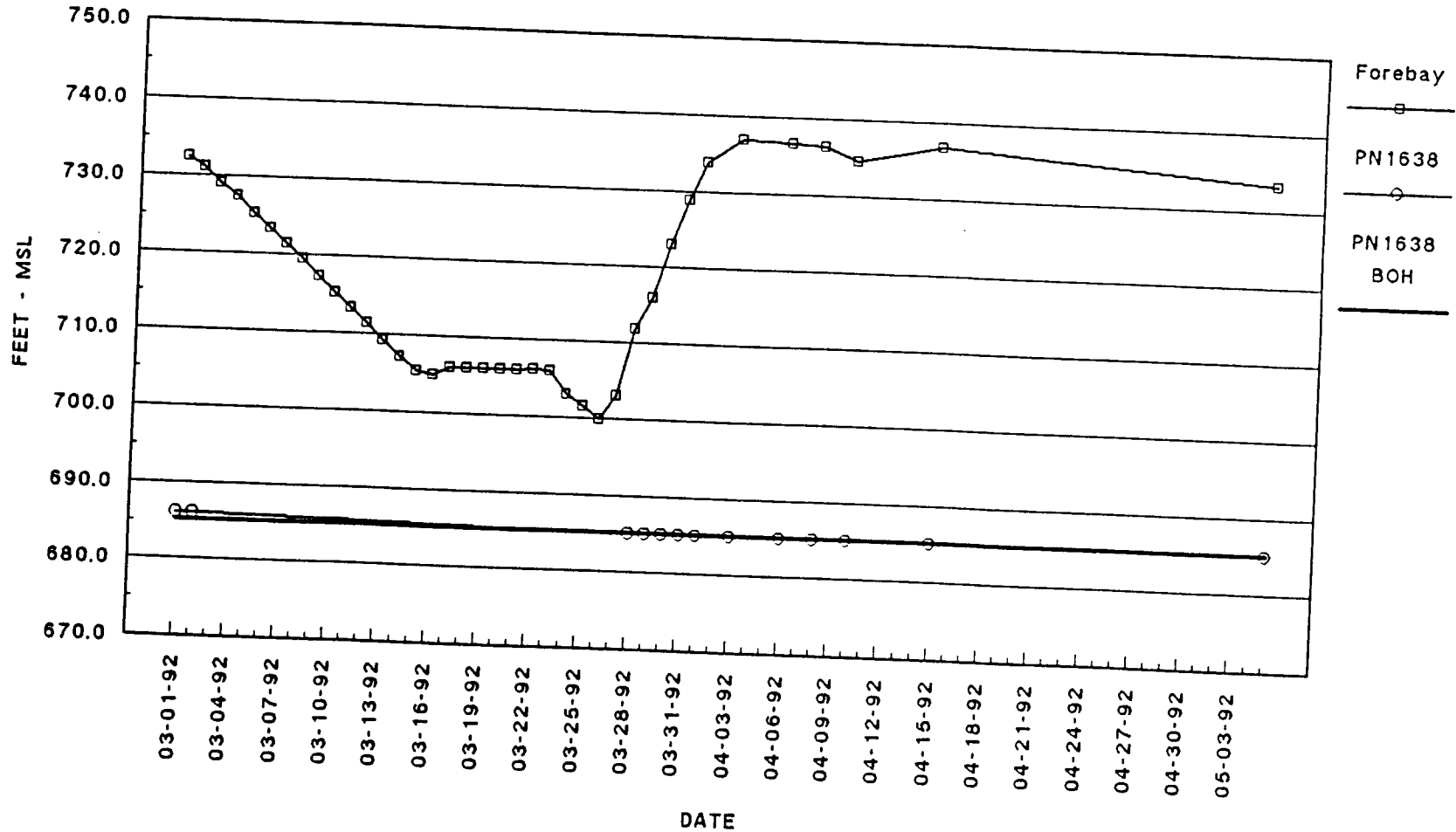


This Piezometer is "DRY"

# Lower Granite Lock And Dam - Drawdown 1992

## North Abutment - N500470 E2771804

### Open Tube Piezometer PN1638



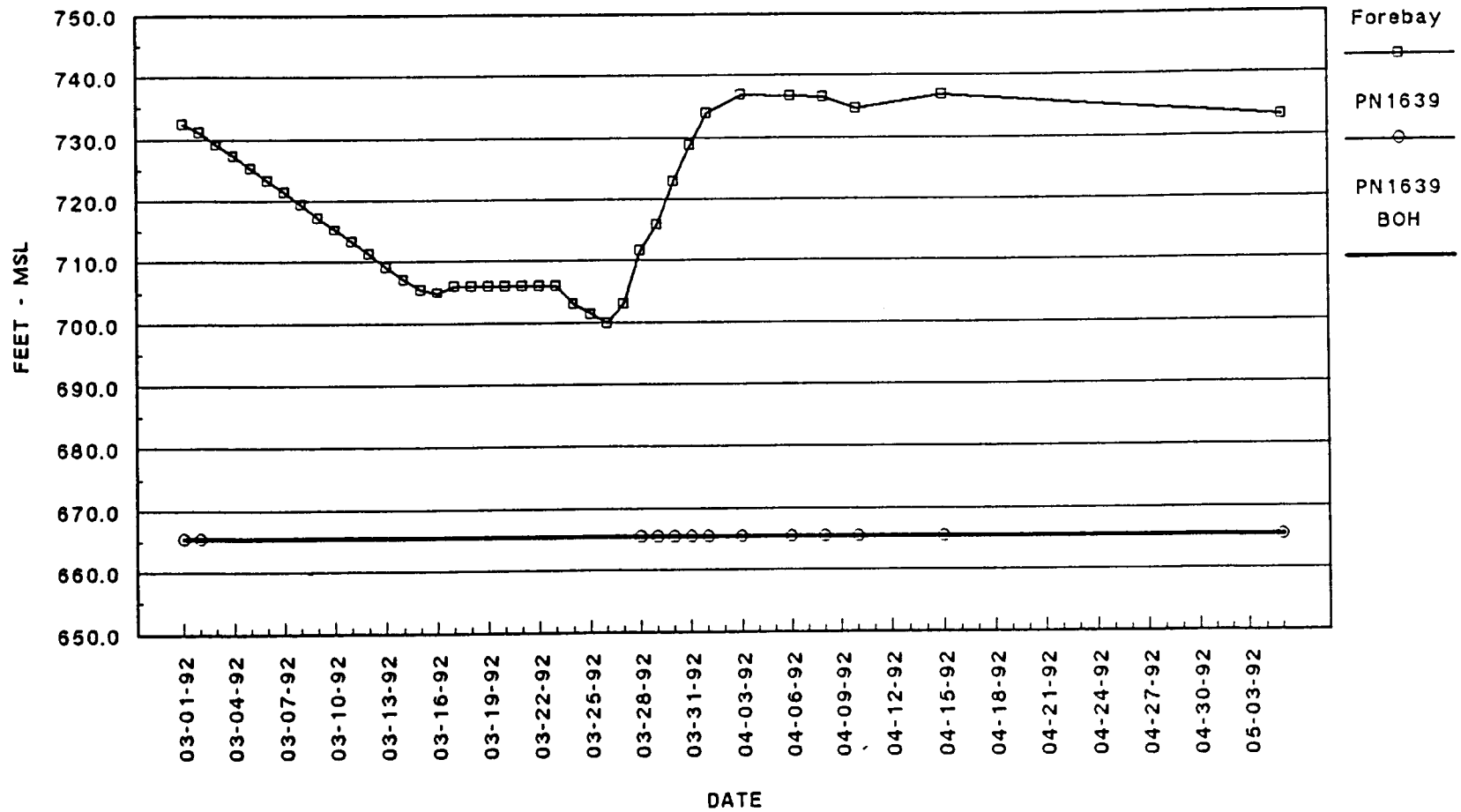
This Piezometer is "DRY"

Yearly BOH Readings Started In 1987

# Lower Granite Lock And Dam – Drawdown 1992

## North Abutment – N500348 E2771750

### Open Tube Piezometer PN1639



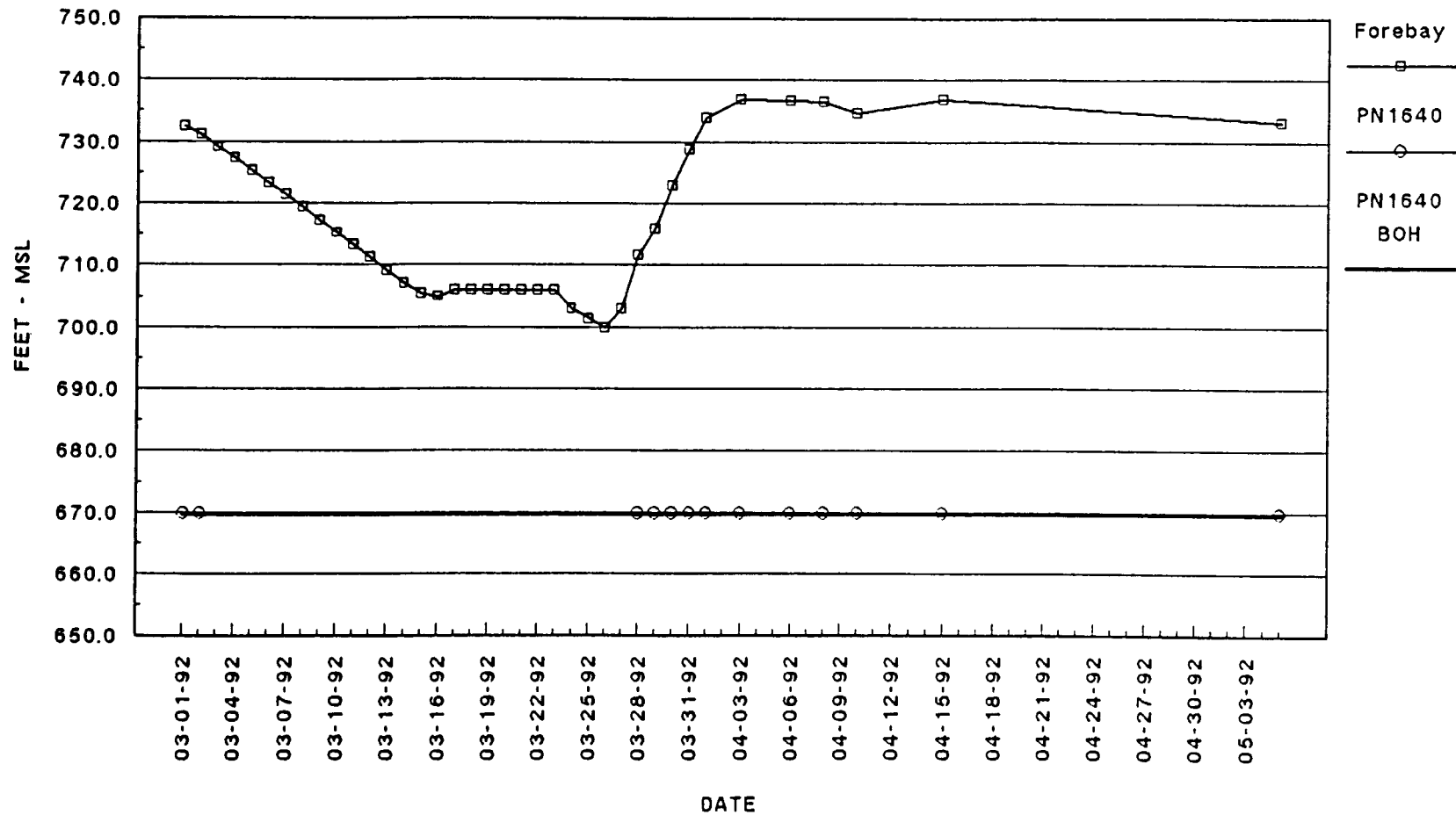
This Piezometer Is "DRY"

Yearly BOH Readings Started In 1987

# Lower Granite Lock And Dam – Drawdown 1992

## North Abutment – N500409 E2771584

### Open Tube Piezometer PN1640



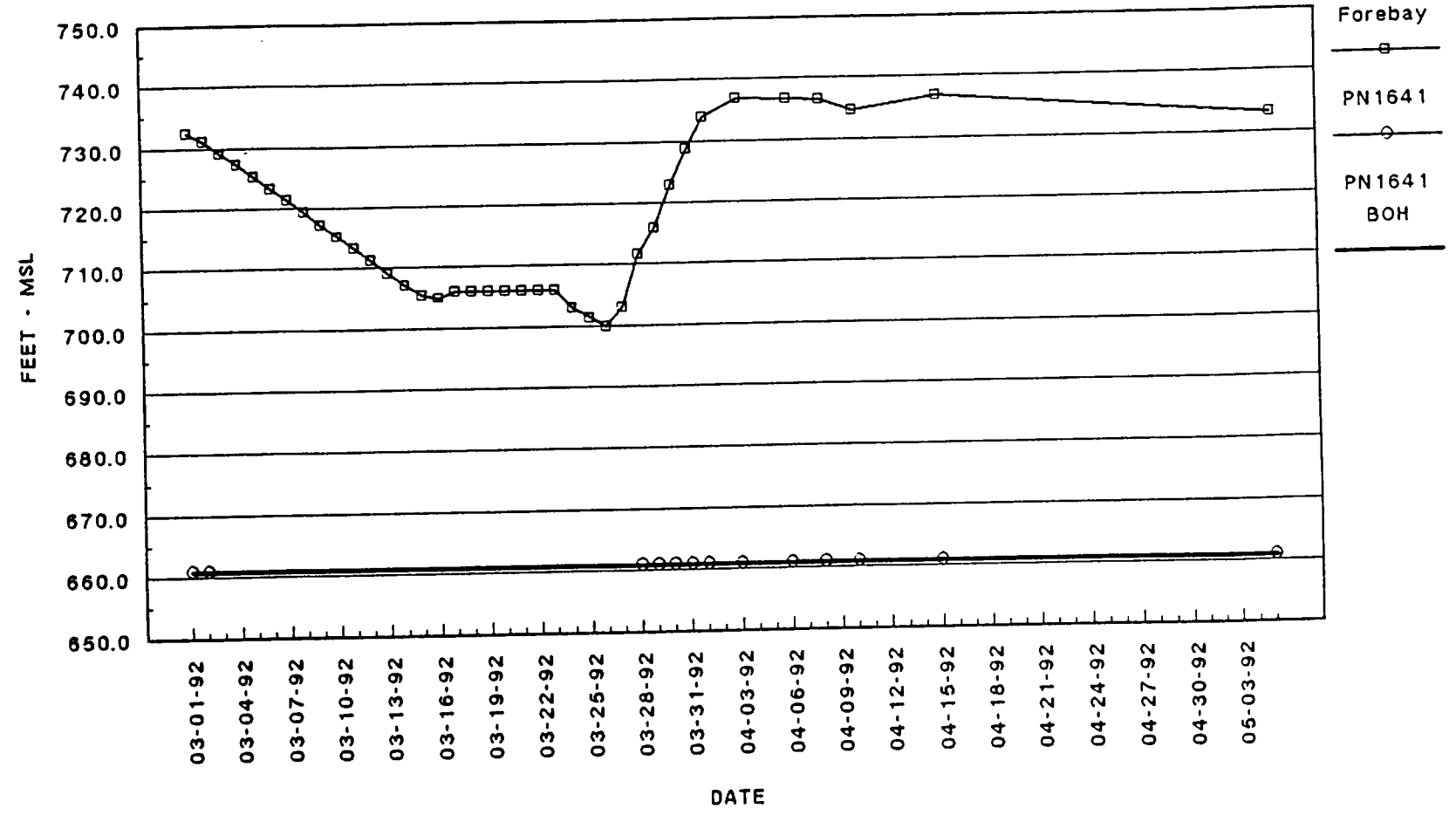
This Piezometer is "DRY"

Yearly BOH Readings Started In 1987

# Lower Granite Lock And Dam - Drawdown 1992

## North Abutment - N500485 E2771410

### Open Tube Piezometer PN1641



This Piezometer is "DRY"

Yearly BOH Readings Started In 1987

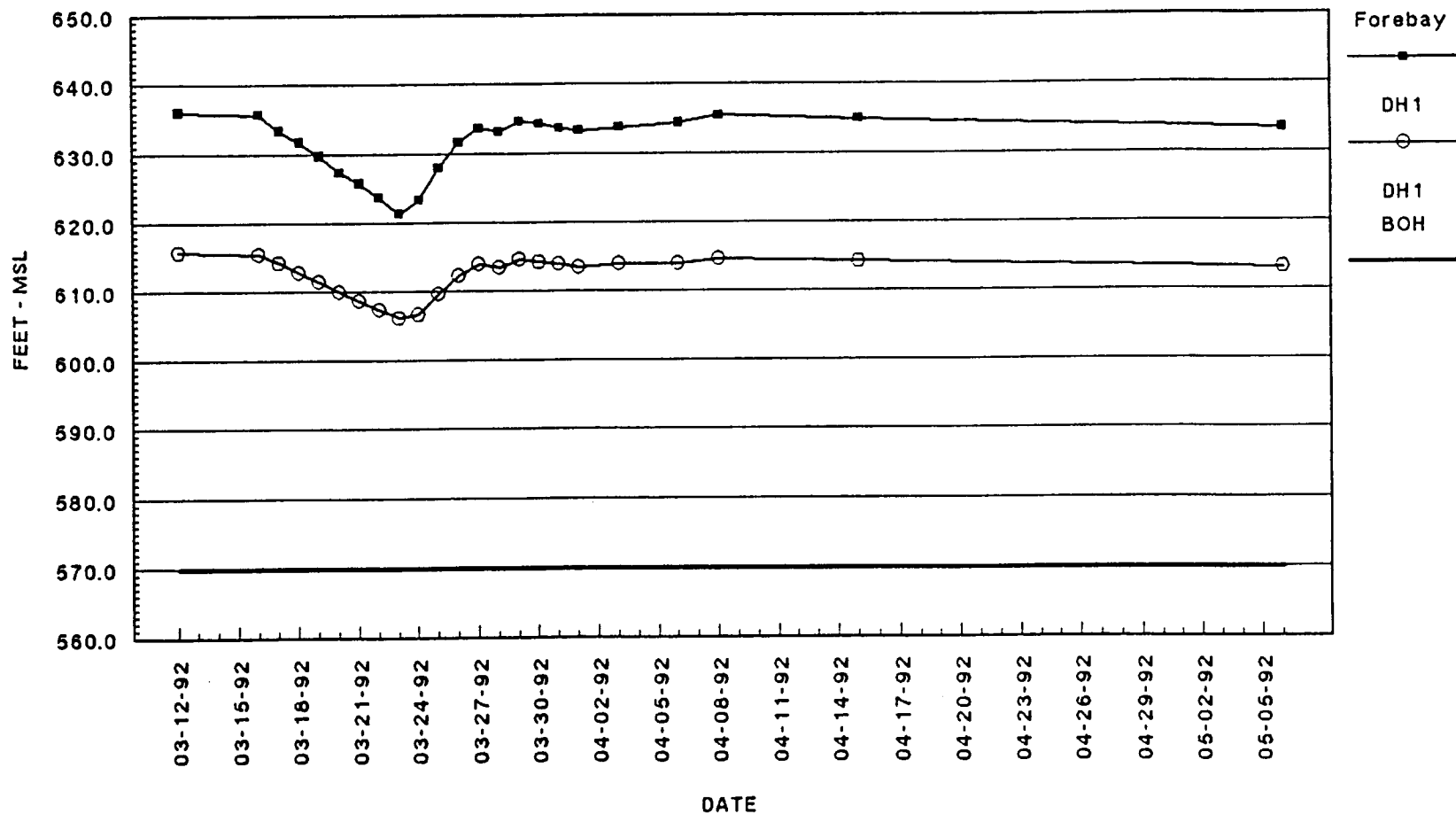
APPENDIX D-5

MARCH, 1992 PIEZOMETER READINGS

LITTLE GOOSE DAM

# LITTLE GOOSE LOCK AND DAM – DRAWDOWN 1992

North Embankment Station 74+22  
Open Tube Piezometer DH1

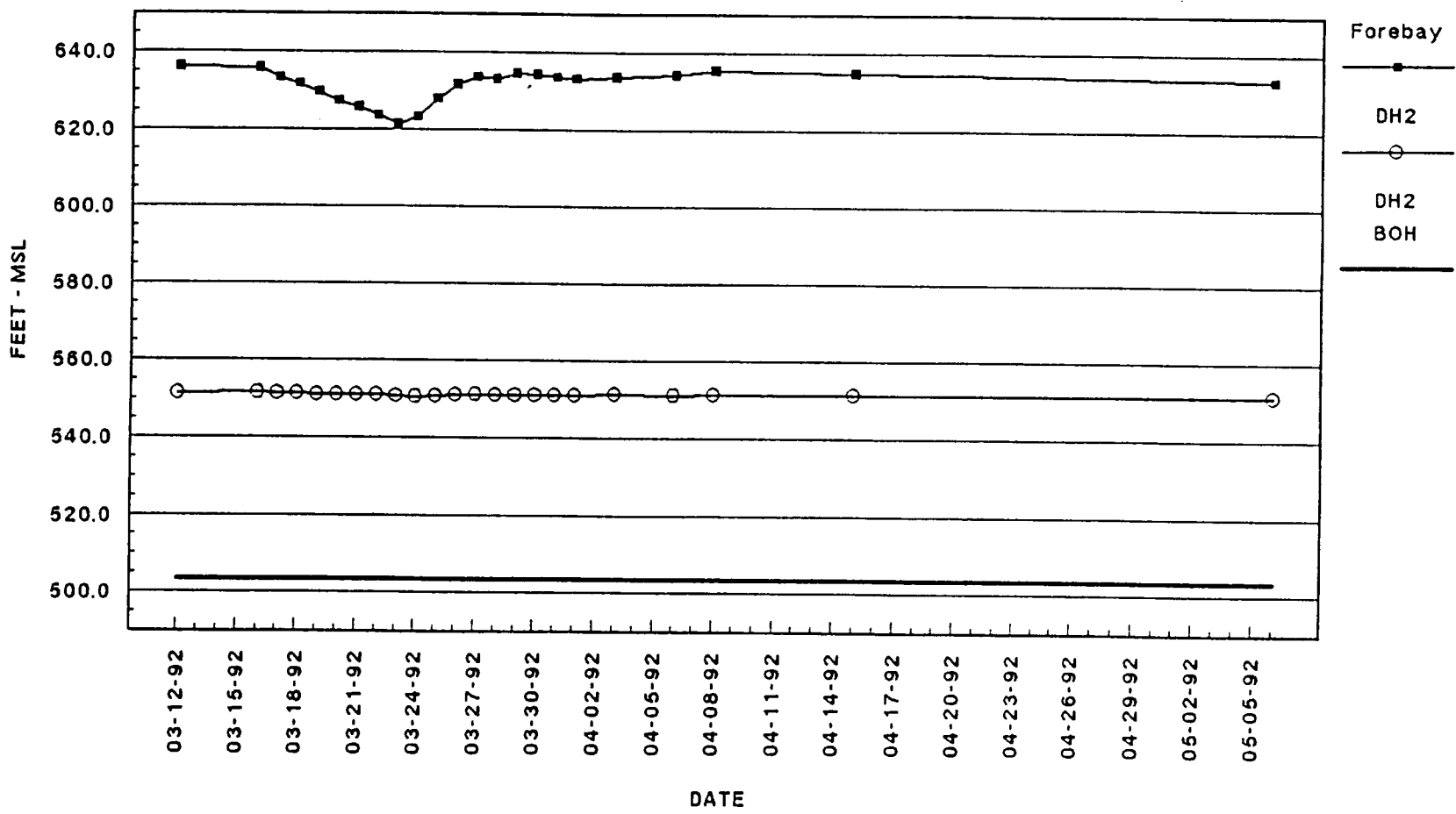


This is an abutment piezometer.

# LITTLE GOOSE LOCK AND DAM - DRAWDOWN 1992

## North Embankment Station 74+97

### Open Tube Piezometer DH2



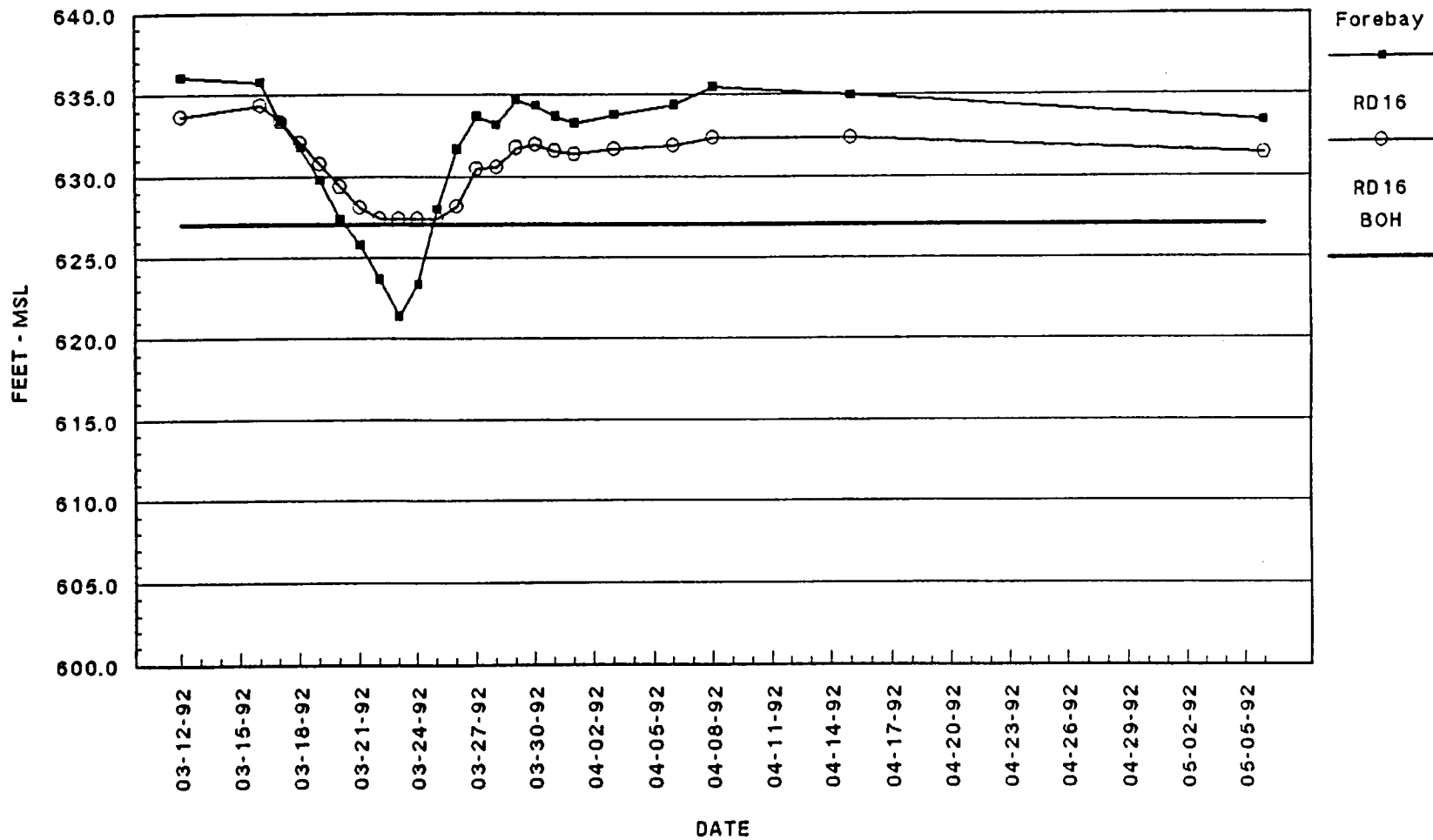
This is an abutment piezometer.



# LITTLE GOOSE LOCK AND DAM – DRAWDOWN 1992

North Embankment Station 73+50

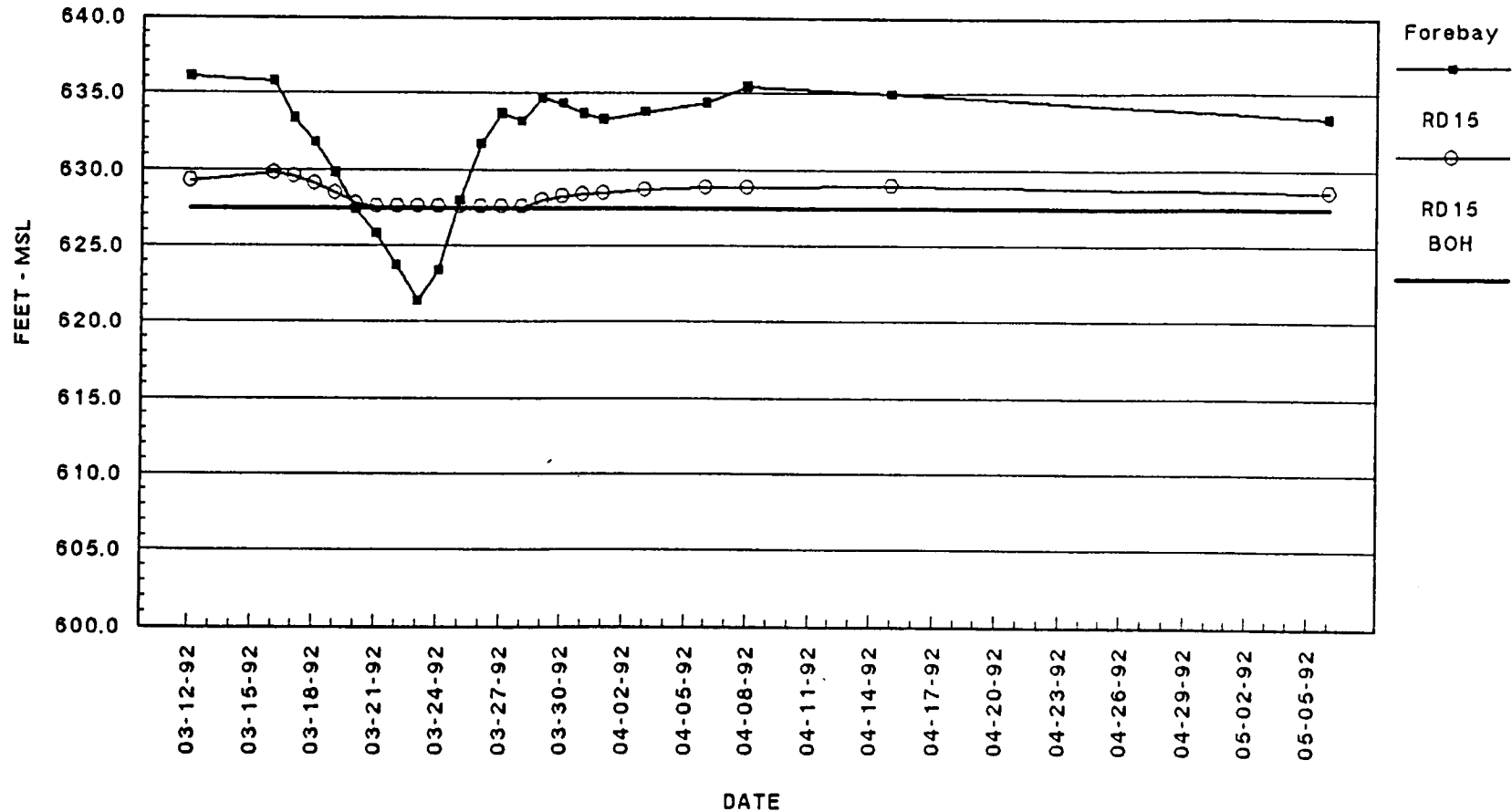
Open Tube Piezometer RD16



# LITTLE GOOSE LOCK AND DAM - DRAWDOWN 1992

North Embankment Station 73+50

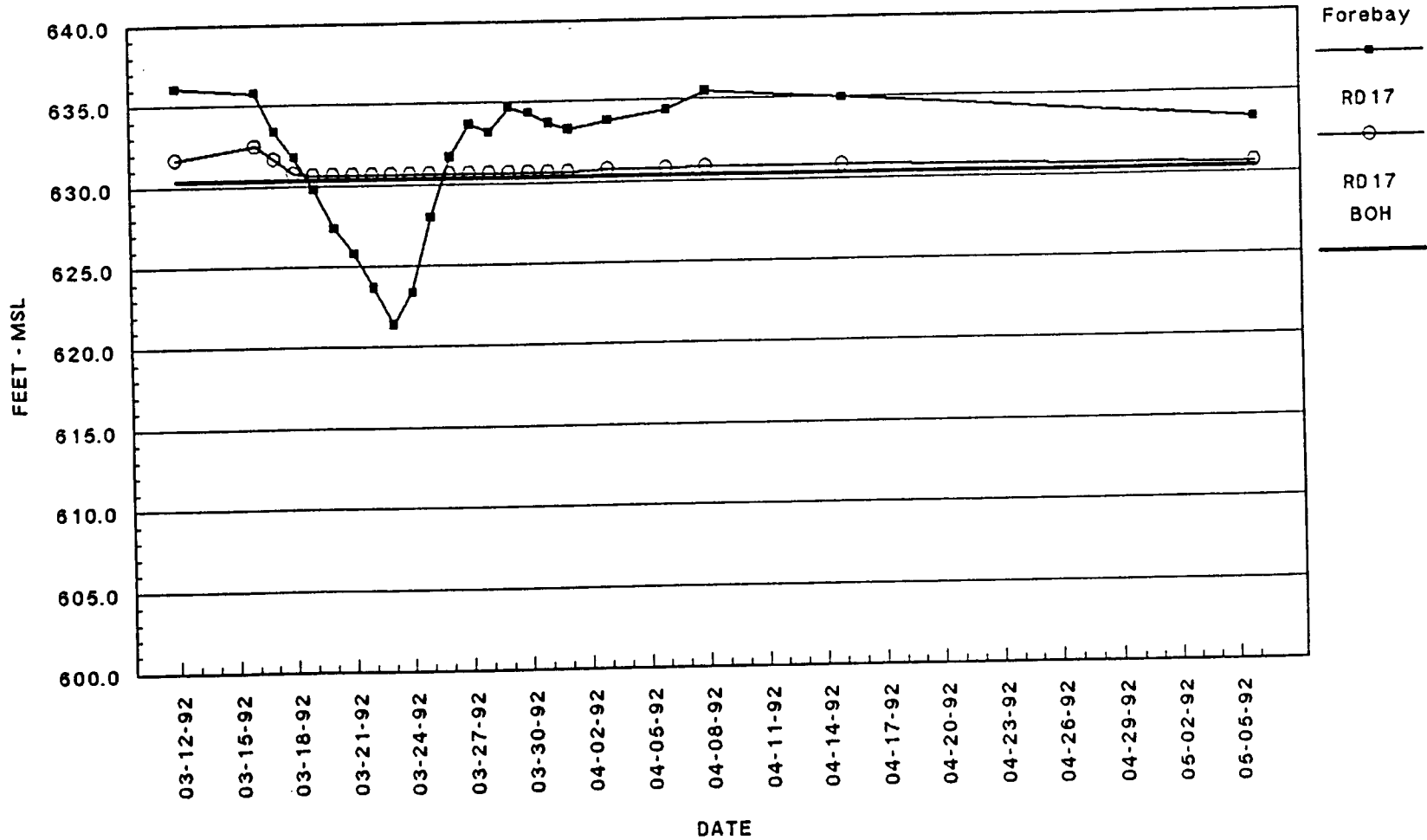
Open Tube Piezometer RD15



This is a "DRY" piezometer that occasionally has water in it.

# LITTLE GOOSE LOCK AND DAM - DRAWDOWN 1992

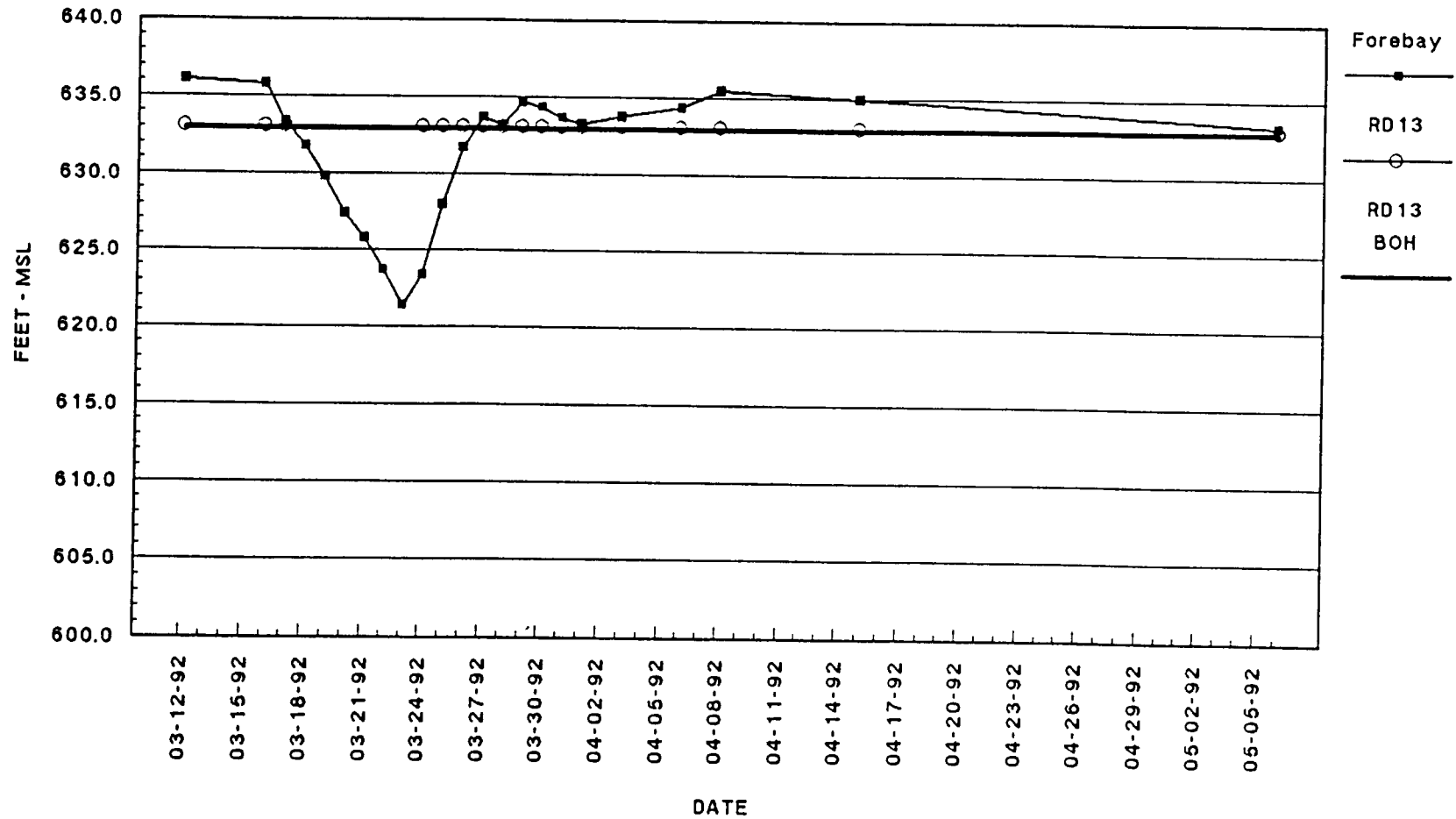
North Embankment Station 73+47  
Open Tube Piezometer RD17



# LITTLE GOOSE LOCK AND DAM - DRAWDOWN 1992

North Embankment Station 73+40

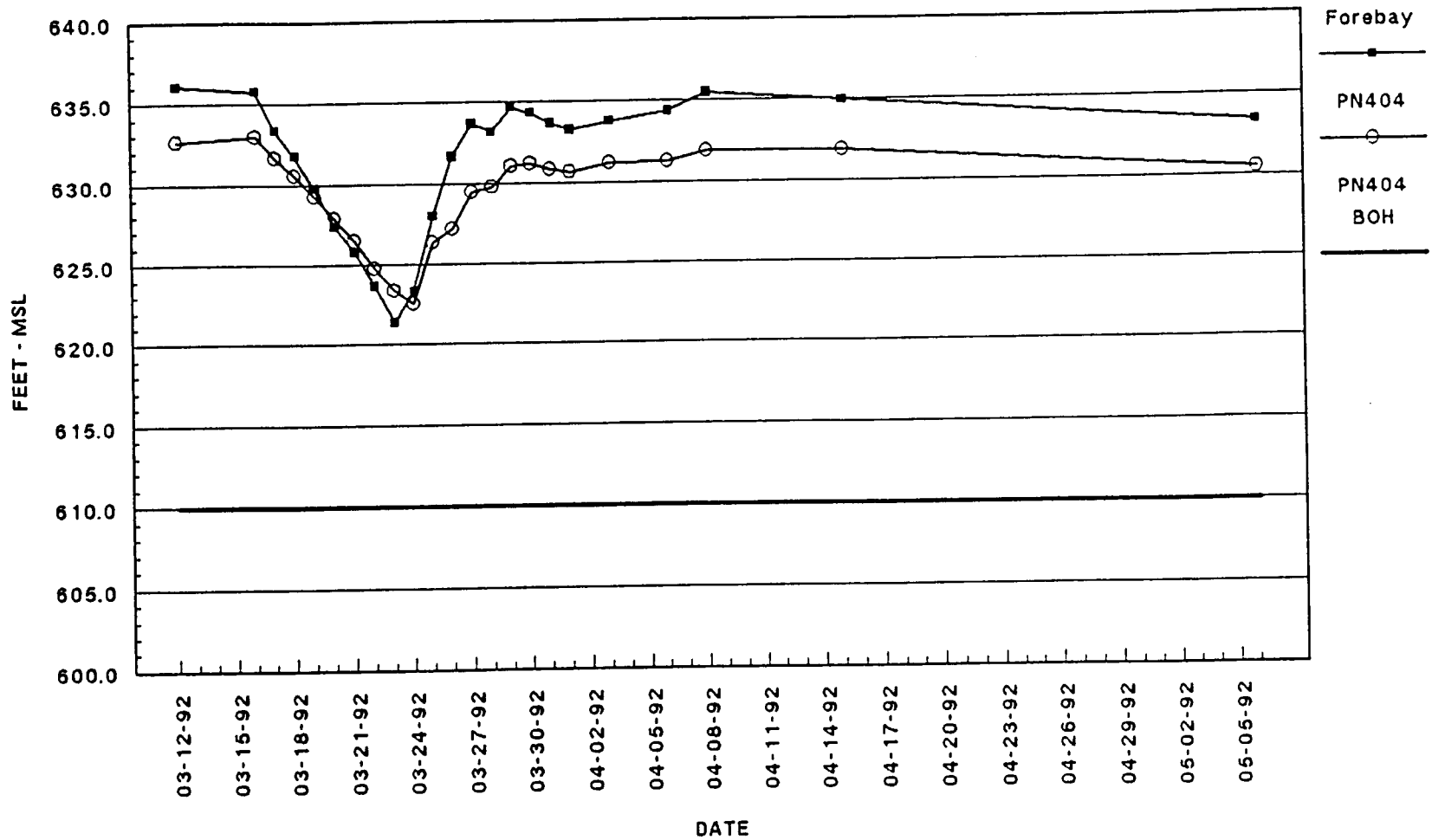
Open Tube Piezometer RD13



This is a "DRY" piezometer

# LITTLE GOOSE LOCK AND DAM - DRAWDOWN 1992

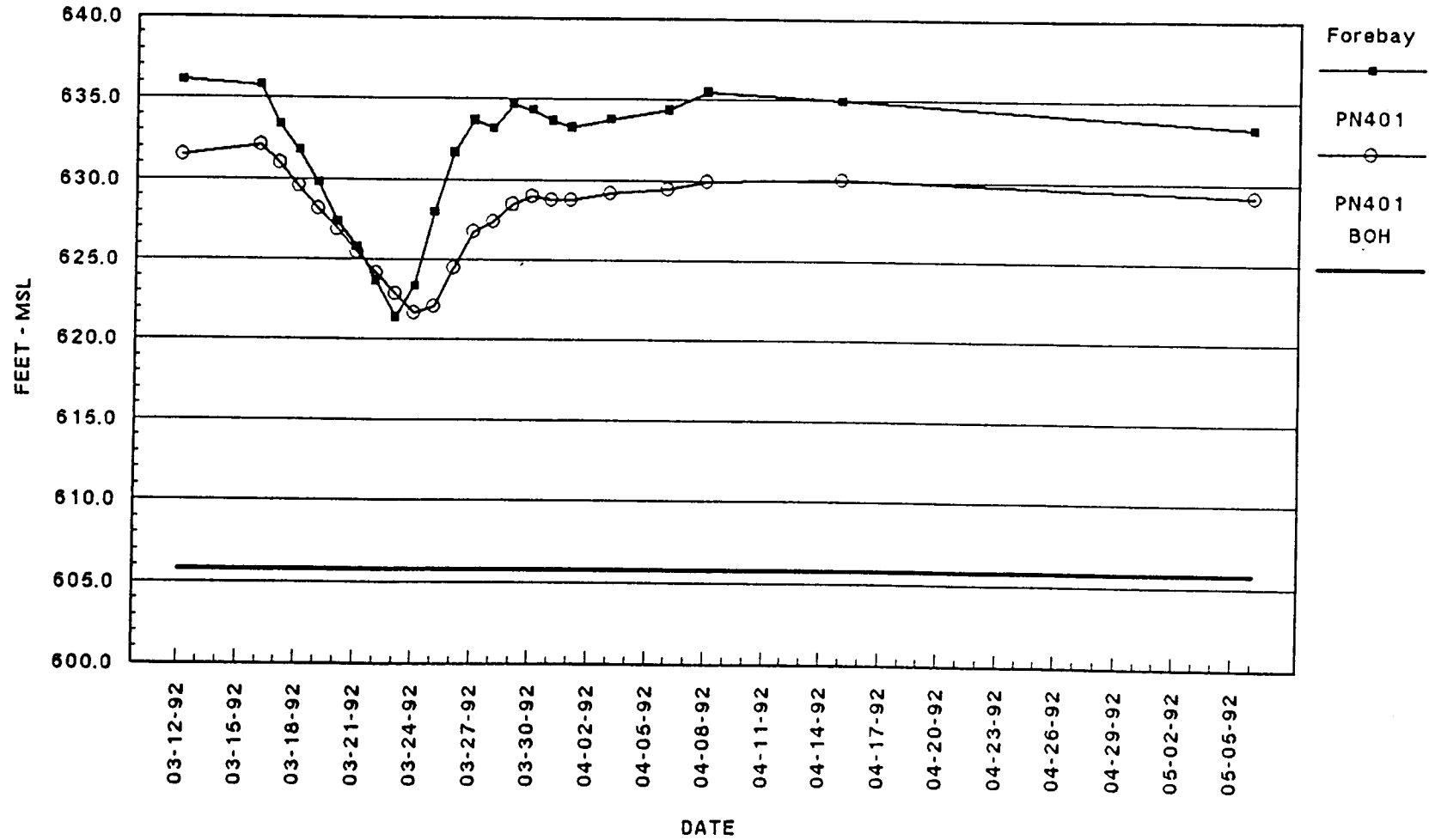
North Embankment Station 72+00  
Open Tube Piezometer PN404



# LITTLE GOOSE LOCK AND DAM - DRAWDOWN 1992

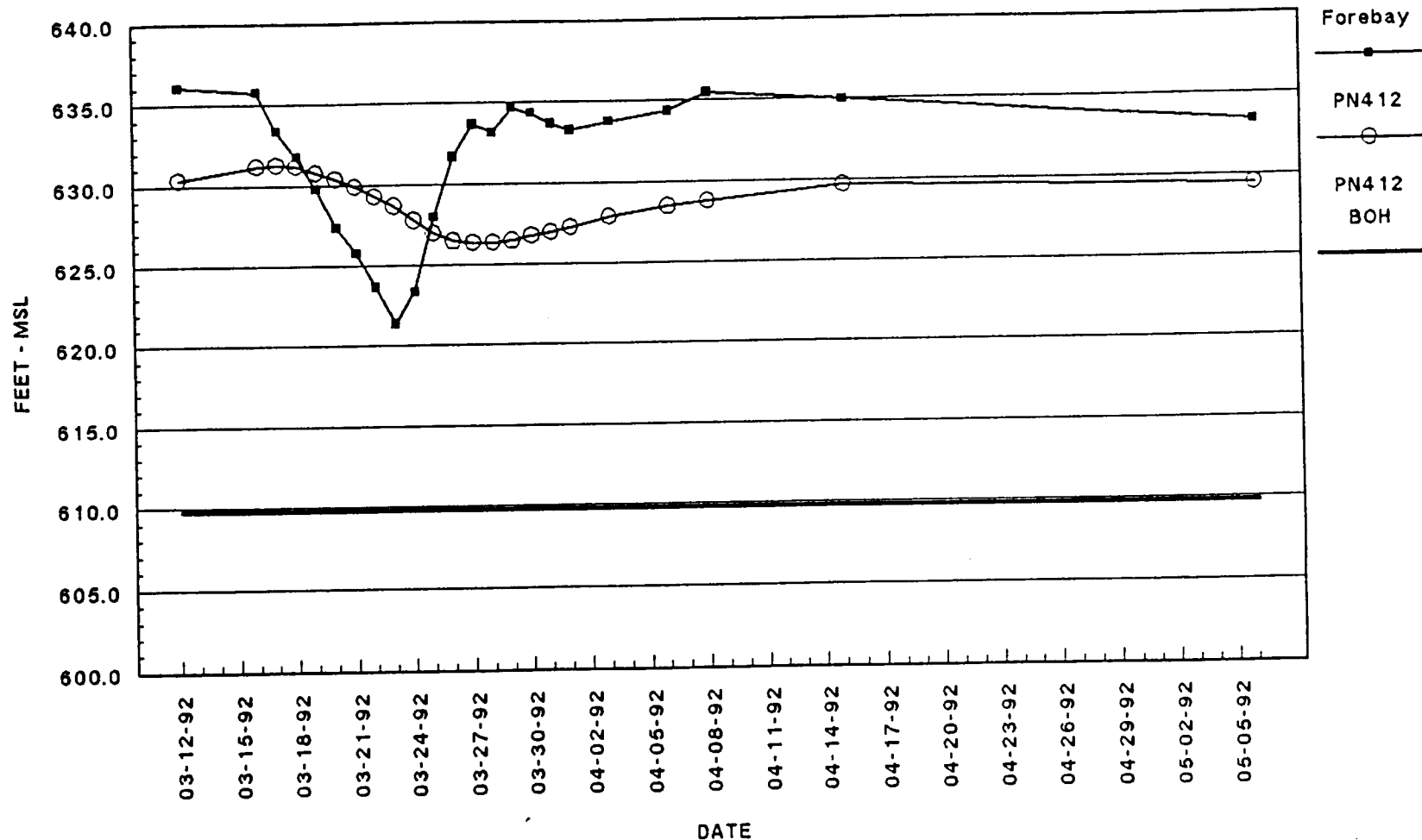
North Embankment Station 74+00

Open Tube Piezometer PN401



# LITTLE GOOSE LOCK AND DAM – DRAWDOWN 1992

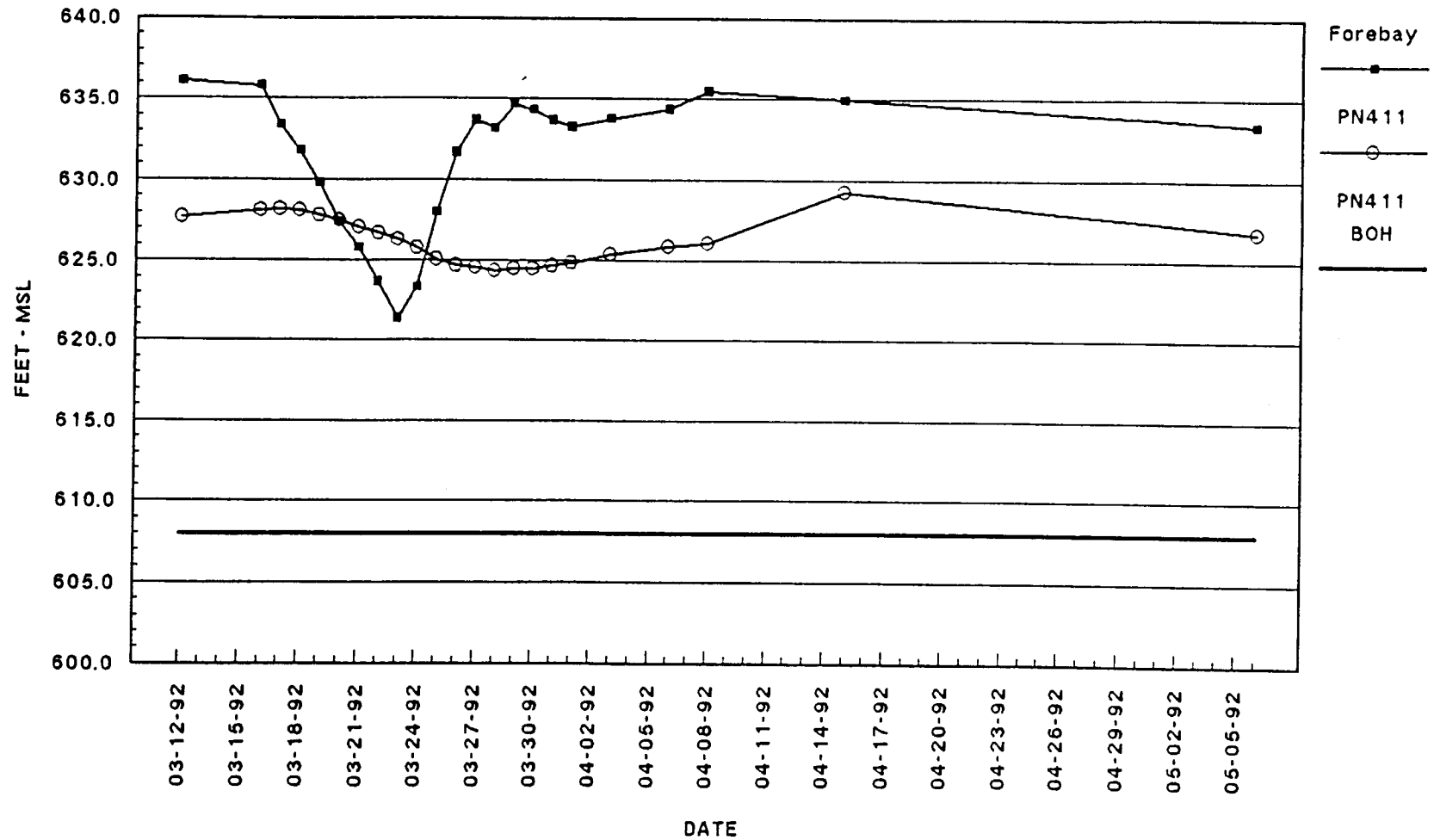
North Embankment Station 71+00  
Open Tube Piezometer PN412



# LITTLE GOOSE LOCK AND DAM - DRAWDOWN 1992

North Embankment Station 70+00

Open Tube Piezometer PN411

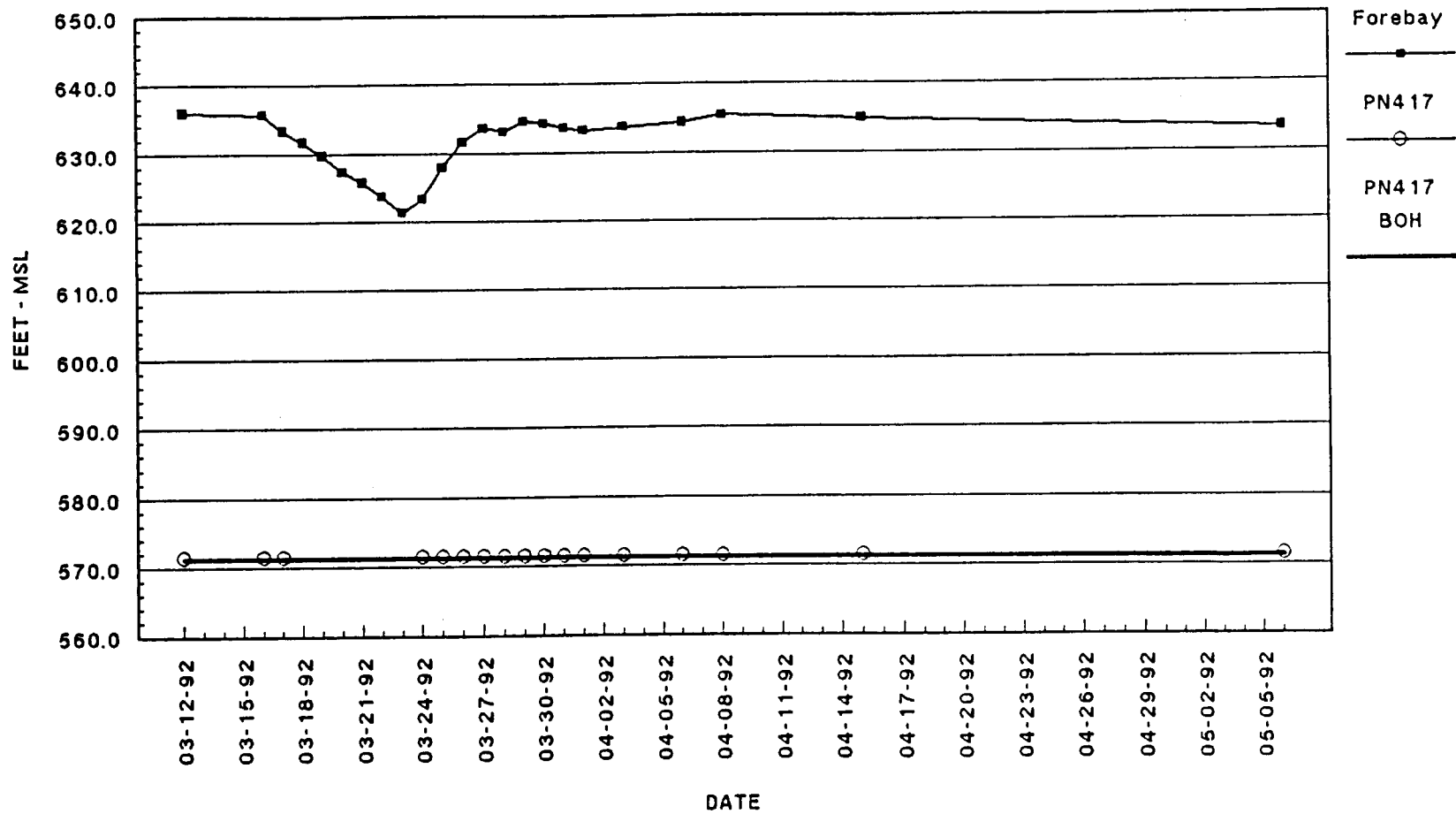




# LITTLE GOOSE LOCK AND DAM - DRAWDOWN 1992

North Abutment - N467560 E2621176

Open Tube Piezometer PN417

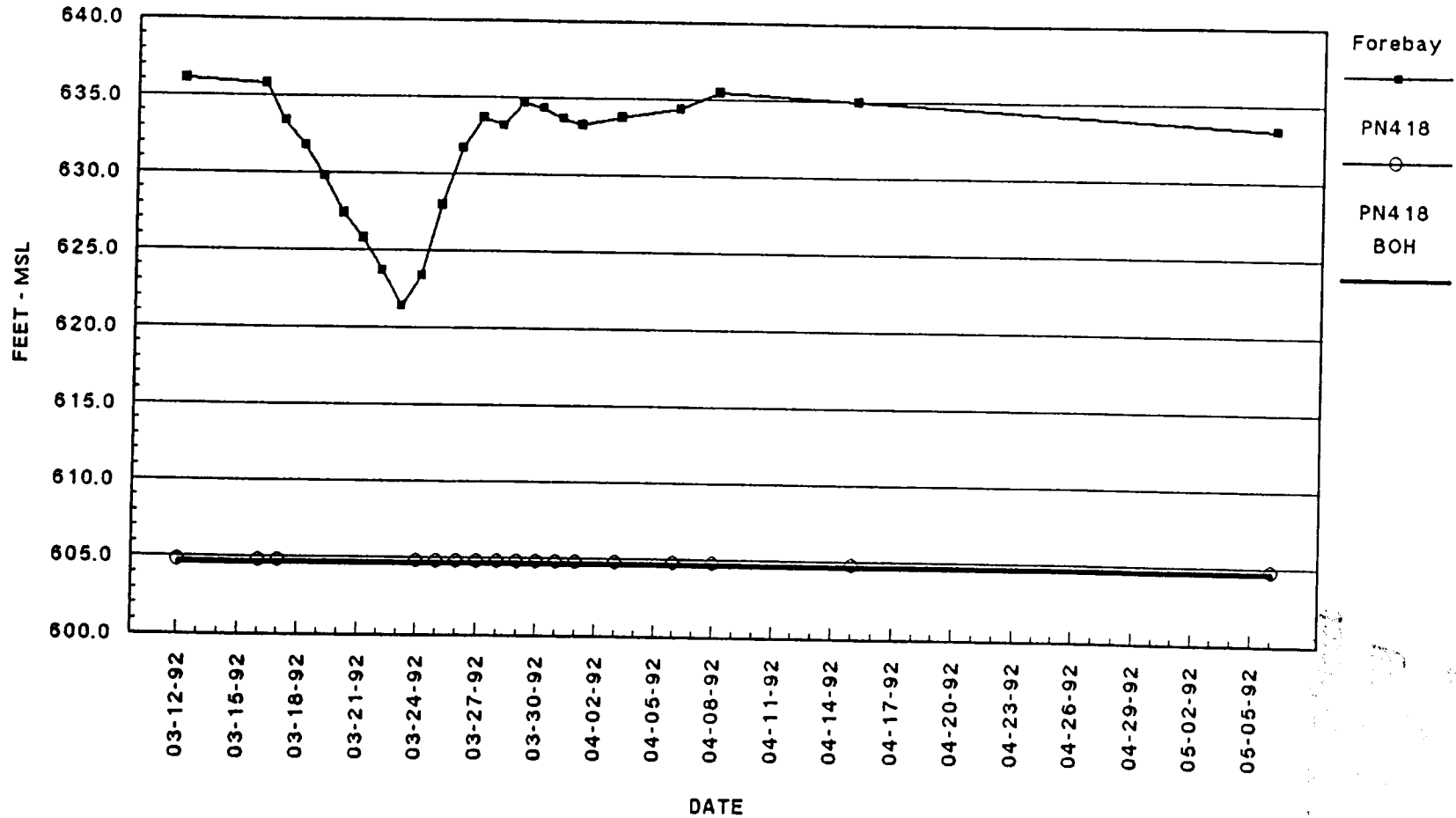


This is a "DRY" piezometer

# LITTLE GOOSE LOCK AND DAM - DRAWDOWN 1992

North Abutment - N467599 E2621318

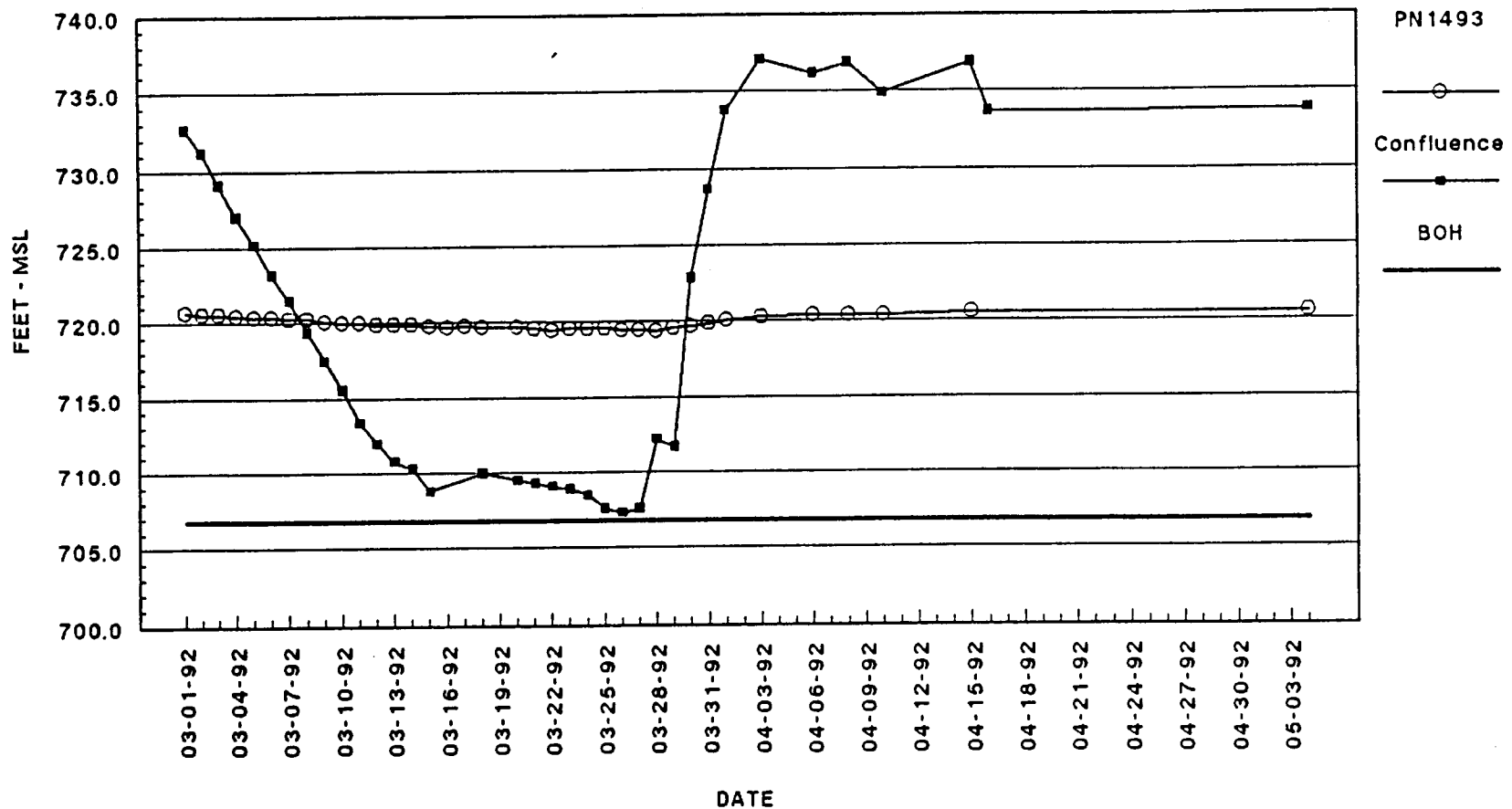
Open Tube Piezometer PN418



This is a "DRY" piezometer

# LOWER GRANITE LEVEES - DRAWDOWN 1992

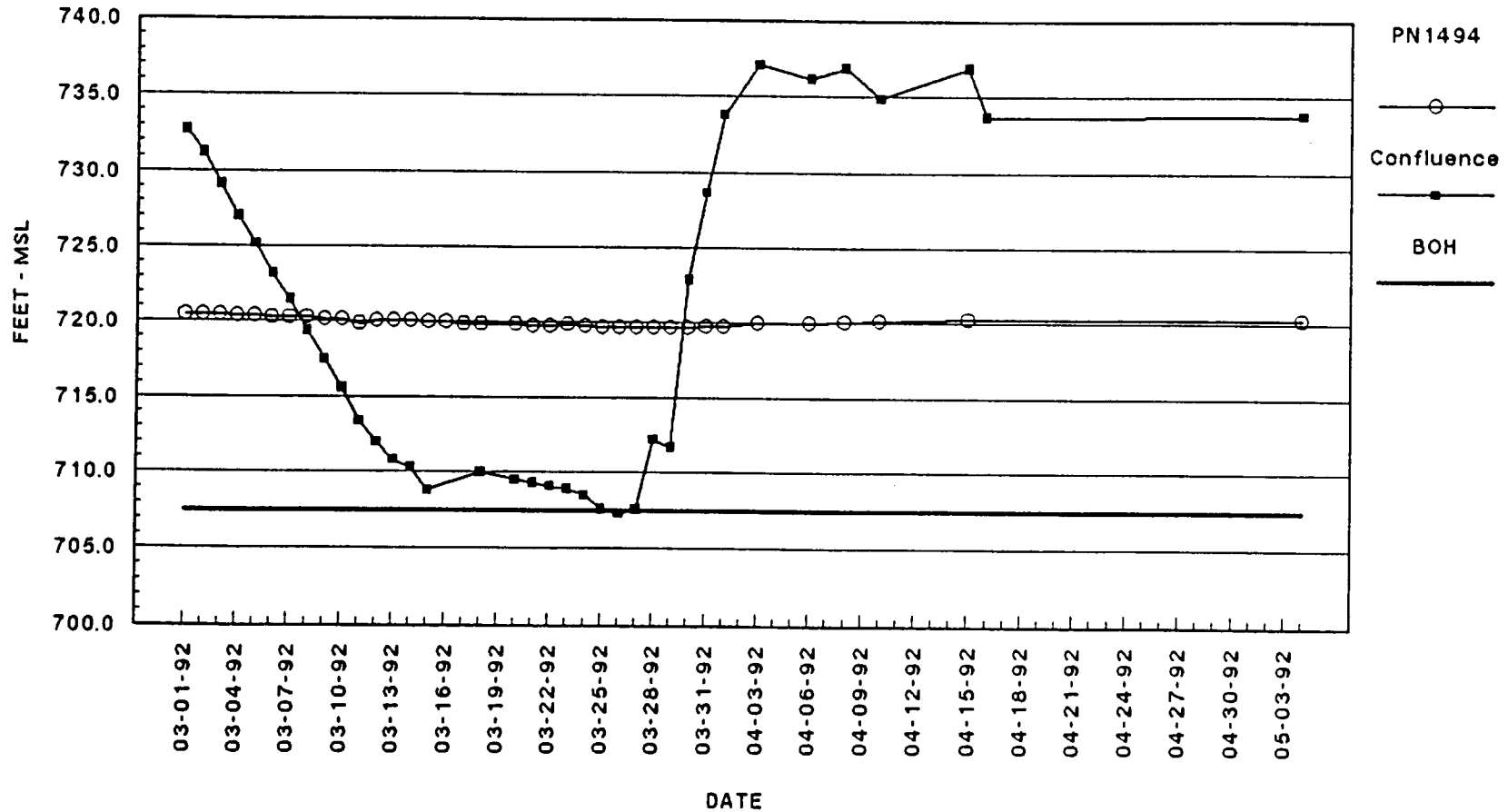
## OPEN TUBE PIEZOMETER PN1493



Located On West Levee - Station 10+00  
 Groundwater Profile WL-1

# LOWER GRANITE LEVEES - DRAWDOWN 1992

## OPEN TUBE PIEZOMETER PN1494



Located On West Levee - Station 15+90  
 Groundwater Profile WL-1A