Province of British Columbia
Ministry of Environment

# MEMORANDUM

To: Dr. J.C. Foweraker, Head
Groundwater Section
Hydrology Division

Date: February 5, 1980

File: ~~0183613~~
92B/11-32

Fr: Mr. D. Johanson
Technician
Groundwater Section
Hydrology Division

Re: Ardmore Water Level Hydrographs

As requested I have prepared water level graphs for nine wells I have been monitoring in the Ardmore area. These graphs and a location map are attached.

The following are some comments on each observation well and hydrograph.

WR-238-79

This well is 245 feet deep and is reported to have a yield of 75 gpm from rock fractures.

It was equipped with a Stevens recorder from February 21, 1979 to July 30, 1979. There was a short period in May when the recorder was removed at the owner's request. Since the final removal of the recorder the well has been read manually.

On inspection of the graph one can readily observe the influence of Pendray's large irrigation well.

The well has been recovering steadily since the shutdown of the Pendray well and with the heavy rains experienced in December the water level has responded rapidly.

WR-239-78

This well is 250 feet deep and is reported to yield 17 gpm from rock fractures.

It was equipped with a Stevens recorder in November 1978, which is still installed.

This hydrograph appears to display only a normal seasonal trend. In December it has recovered rapidly.

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D Johnson

Info. incorporated in my report

WR-2[illegible]79

This well is 270 feet deep and is reported to yield 4 gpm from rock fractures.

It was equipped with a Stevens recorder on May 16, 1979, and the equipment is presently on the well.

The hydrograph shows the water level declined over 8 metres in the May to August period. In the September to November period there are a few sharp declines on the graph caused probably by pumping in the area.

Whether this large decline of water level in the May to August period is just the normal water level trend or partly caused by interference from a well or other wells in the area is not known. No production wells are known to exist in the immediate area, and the graph movements appear to be out of phase with the pumping periods of Pendray's well.

Rapid recovery has taken place in December following early December rainfall.

WR-242-79

This well is 250 feet deep and is reported to yield 3.75 gpm from rock fractures.

It is read manually about once a month.

This well is very close to WR-241-79 and the graph is much the same.

WR-243-79

When drilled in 1934 the well was 60 feet deep and was reported to yield 500 gp hour from rock fractures. Over the years soil has filled the bottom part of the well as it had been left uncapped and the casing was cut off just below ground level. This may have closed off some of the well flow, although, a slug test showed it took water readily. On August 21, 1979, it was deepened to over 200 feet and a good flow was encountered.

On inspection of the graph it is observed that there was a rather steady decline of the water level in the well from March to August 21 when it was deepened. After deepening the water level declined even faster, which is shown by a steeper slope of the graph. It appears that just prior to this deepening, other wells in the immediate area of this well had a deeper depth to water. Possibly this well was partly plugged off and could only react slowly to water level changes, or its connection to the deeper fractured zone was very poor and so much time was required for the well to reach equilibrium with the deeper zone. From early

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September to early December the water level shows a steady recovery and this is likely due to the shutting down of Pendray's irrigation well. It appears that this area was significantly affected by Pendray's pumping as two other wells in this immediate area were deepened prior to Pendray's irrigation well being shut down on August 21 and in one other well the jet pump in use couldn't lift the water from the depth the water level was then at. The owner replaced it with a submersible pump.

In December the well recovered rapidly with the heavy rains.

An incident which occurred in December, when I was inspecting the recorder now mounted in this well, is of interest. At that time it had been raining heavily and it was observed that about 2-3 gpm of water was cascading down the bore hole and flowing into the lower zone. This water appeared to be mostly entering the bore hole at 5-15 feet below the bottom of the casing but there also appeared to be a small flow entering at the base of the casing. Mr. Hodge stated he has also observed this same phenomena on other observation wells on Saanich Peninsula. There possibly could be a potential pollution aspect to this type of well completion, especially in an area such as Ardmore, where there are many wells and septic tanks located in an area of shallow overburden.

WR-244-79

This well is 175 feet deep and is reported to produce 8 gpm from fractures in rock. It is only used during the summer months for the garden.

This well is read manually about once a month.

The hydrograph appears to display only a normal seasonal trend. The erratic slopes of the graph from July to October are probably due to the well being in use prior to some of the readings.

It has recovered rapidly in December with the heavy rains.

WR-245-79

This well is 245 feet deep and is reported to produce 4 gpm from rock fractures.

This hydrograph may show only a normal seasonal trend, but there is a significant rise in the water level from August 21 (when Pendray's well was shut down) to early October. This may only be in response though to the rains which occurred in early September.

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Other wells which could have affected this well are the Ardmore Golf Course wells which were pumped much of the summer: the 870' well of Ardmore Golf Course was pumped from approximately May 17 to late September at a rate that began at 17 Igpm and steadily declined over the summer to 11.5 Igpm. The Golf Course Clubhouse well was pumped steadily from approximately later June to late August or early September at a rate of about 10 Igpm at the start and declining over the summer to about 3 Igpm. There appers to be no obvious evidence of the pumping of these two wells from the hydrograph plot. Though influence from the Clubhouse well cannot definitely be ruled out, the influence of wells in the subdivision to the south of the Clubhouse well, is probably far more effective. The flow-meter readings for the 870' well of the Ardmore Golf Course are attached.

WR-246-78

This well is drilled 400 feet deep and is reported to produce 1.5 gpm from rock fractures.

This well is manually read about once per month.

This well is near WR-239-78 and the hydrograph is much the same as it. It appears to display only a normal seasonal trend and neither Pendray's pumping or the pumping of the Ardmore Golf Course Wells seem to have created any noticeable decline in the water table in this area.

Mr. Anderson's Well WR-257-79

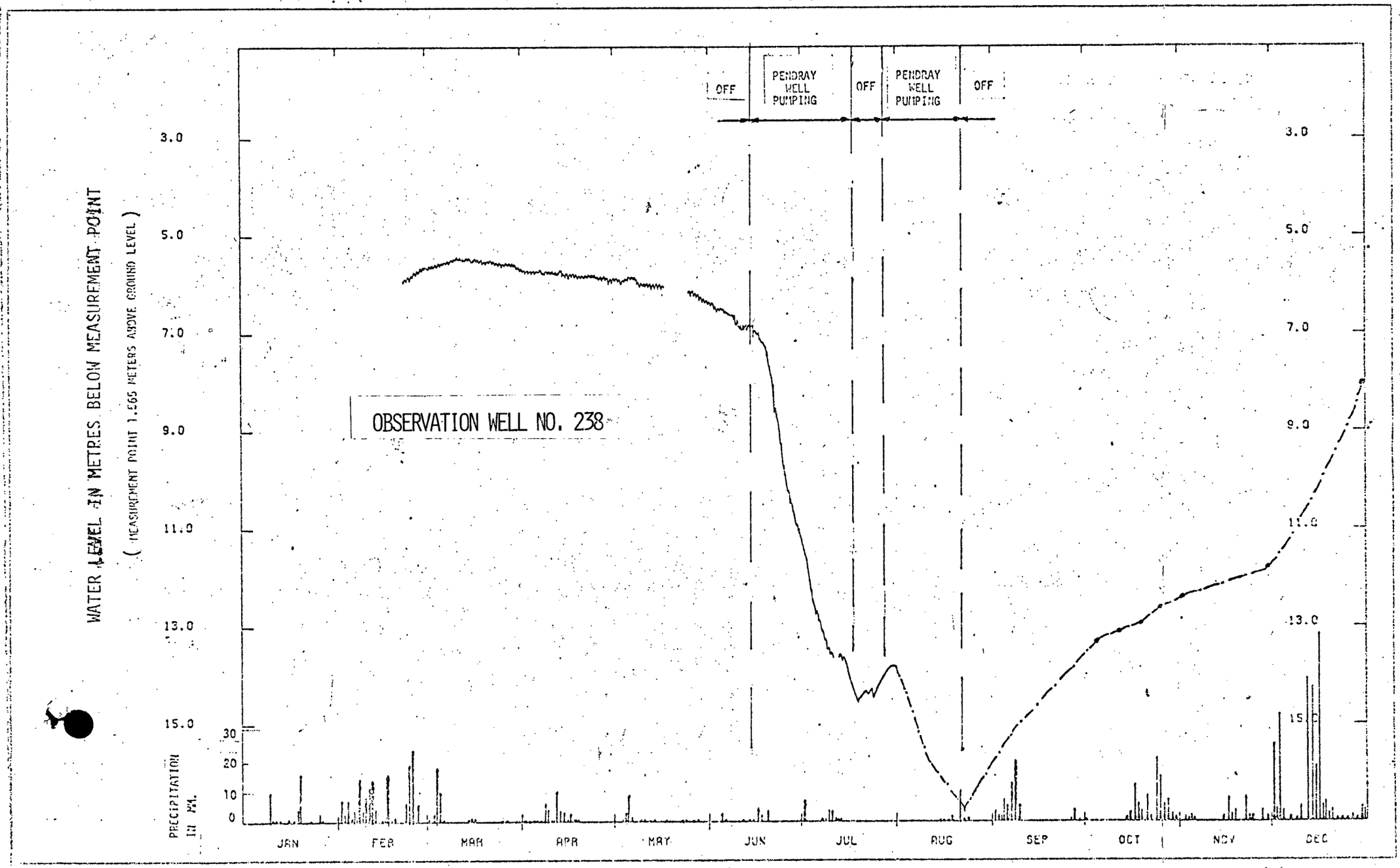
This well is 94 feet deep and is reported to yield 1,000 gph from rock fractures.

This hydrograph declines right to August 21 when Pendray's well was shut off, then it shows a recovery period from there right to the end of the year. As this well is near the coastline on the far side of the Ardmore area, from the Pendray well, it would seem unlikely it is influenced from that well.

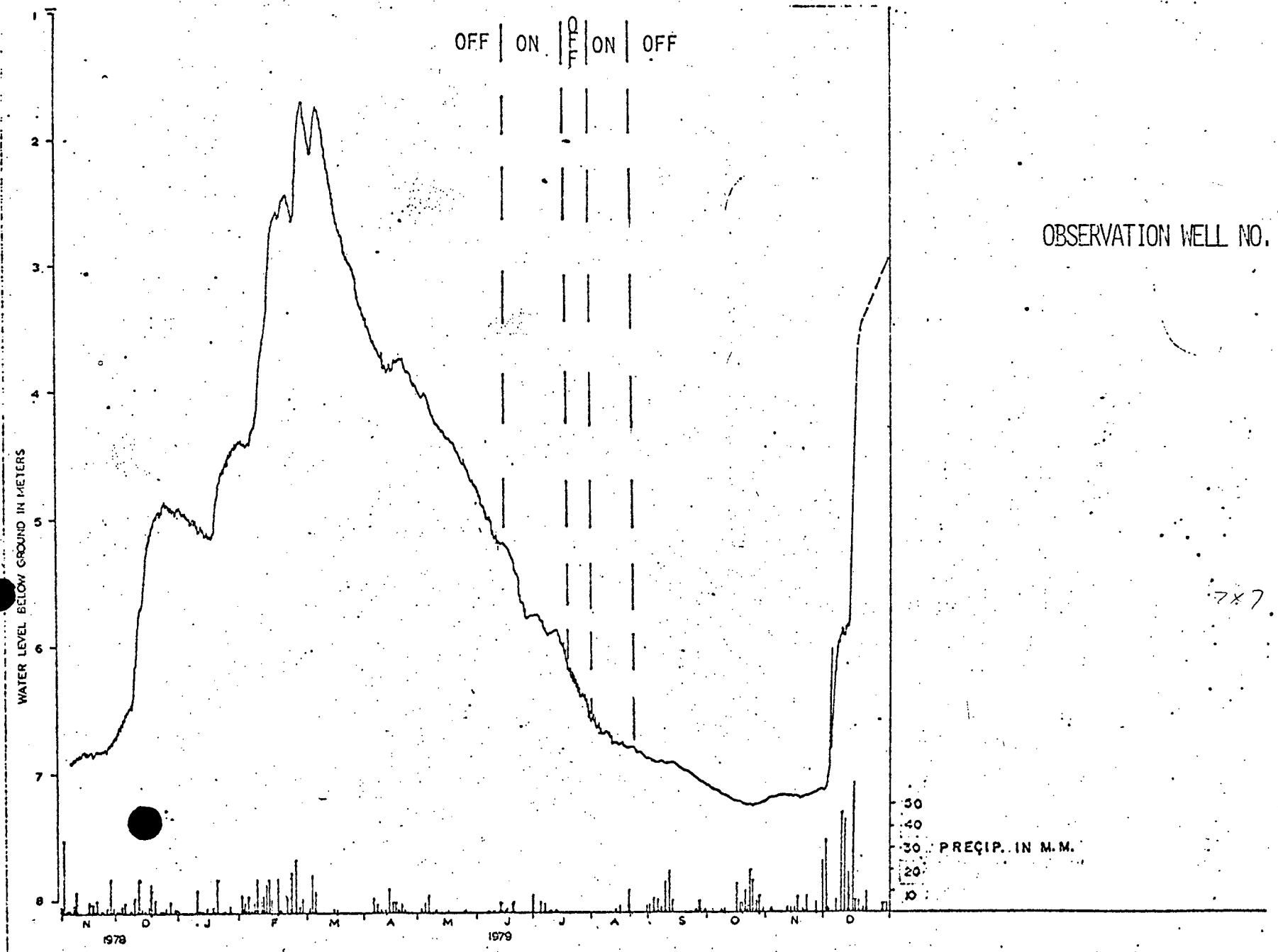
D. Johanson
Technician
Groundwater Section
Hydrology Division

DJ/hw

Attach.

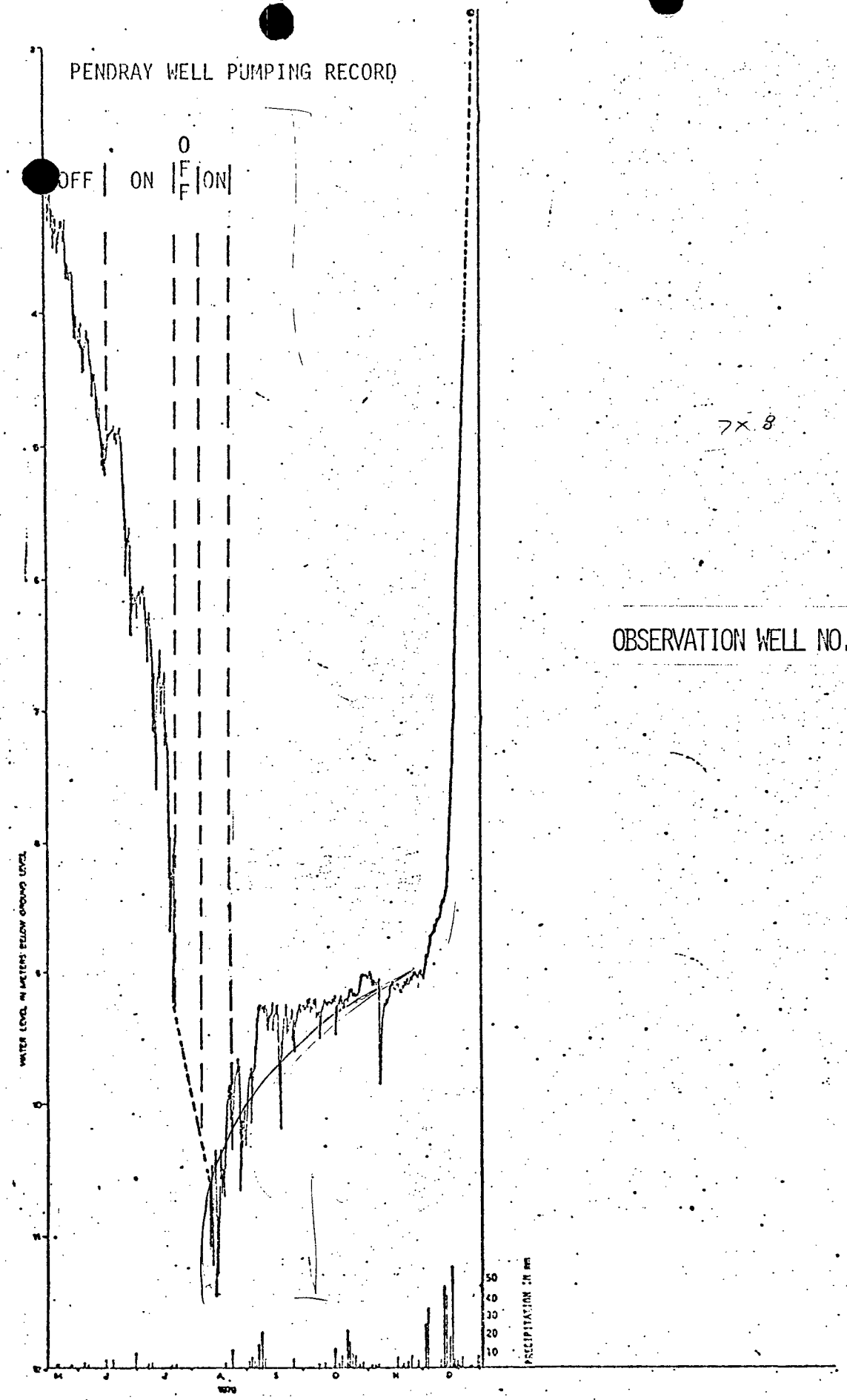

OFF
PENDRAY WELL PUMPING
OFF
PENDRAY WELL PUMPING
OFF
OBSERVATION WELL NO. 238
WATER LEVEL IN METRES BELOW MEASUREMENT POINT
( MEASUREMENT POINT 1.565 METERS ABOVE GROUND LEVEL )
3.0
5.0
7.0
9.0
11.0
13.0
15.0
PRECIPITATION IN MM.
30
20
10
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
1979

PENDRAY WELL PUMPING RECORD



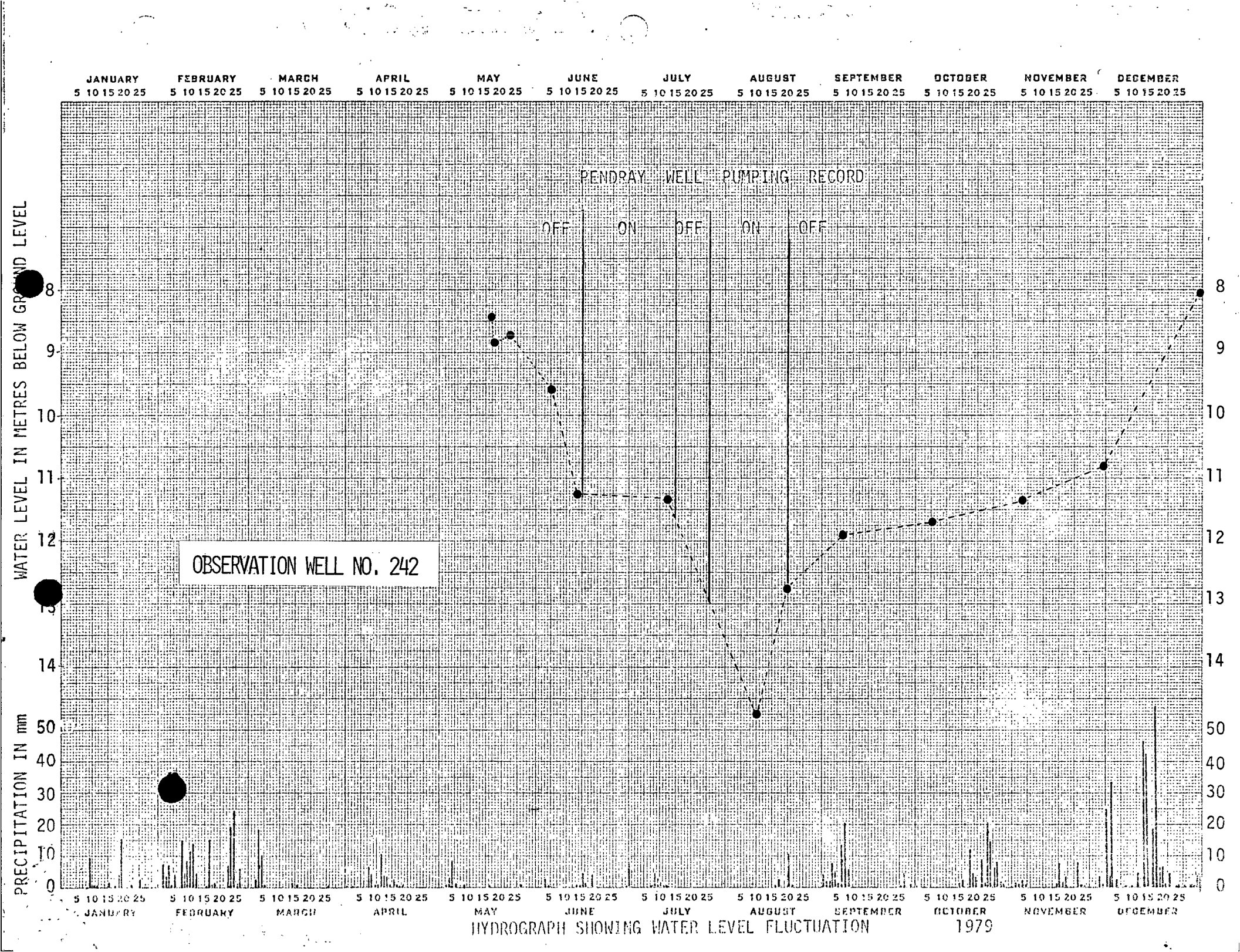

OBSERVATION WELL NO. 239

7×7

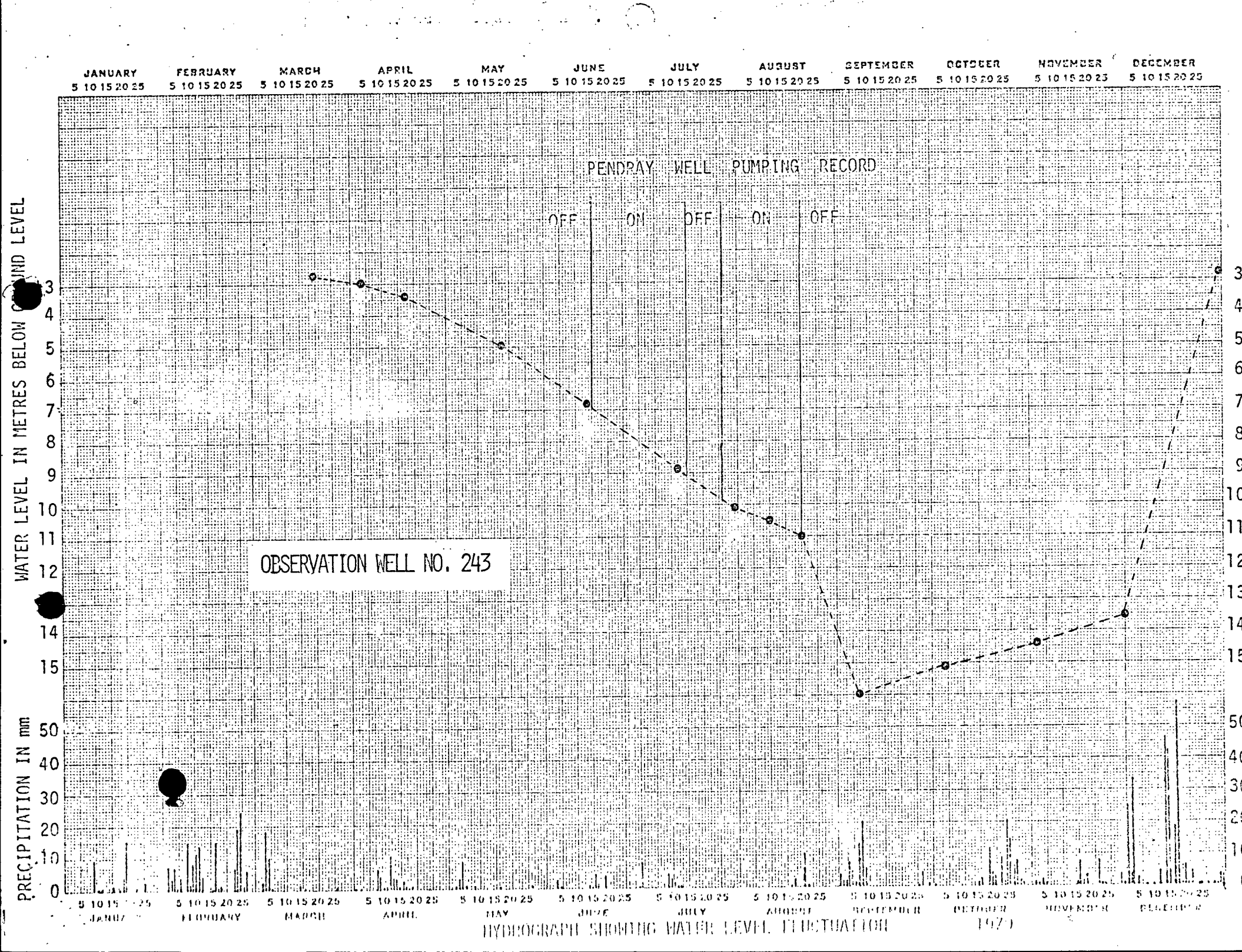



7×8

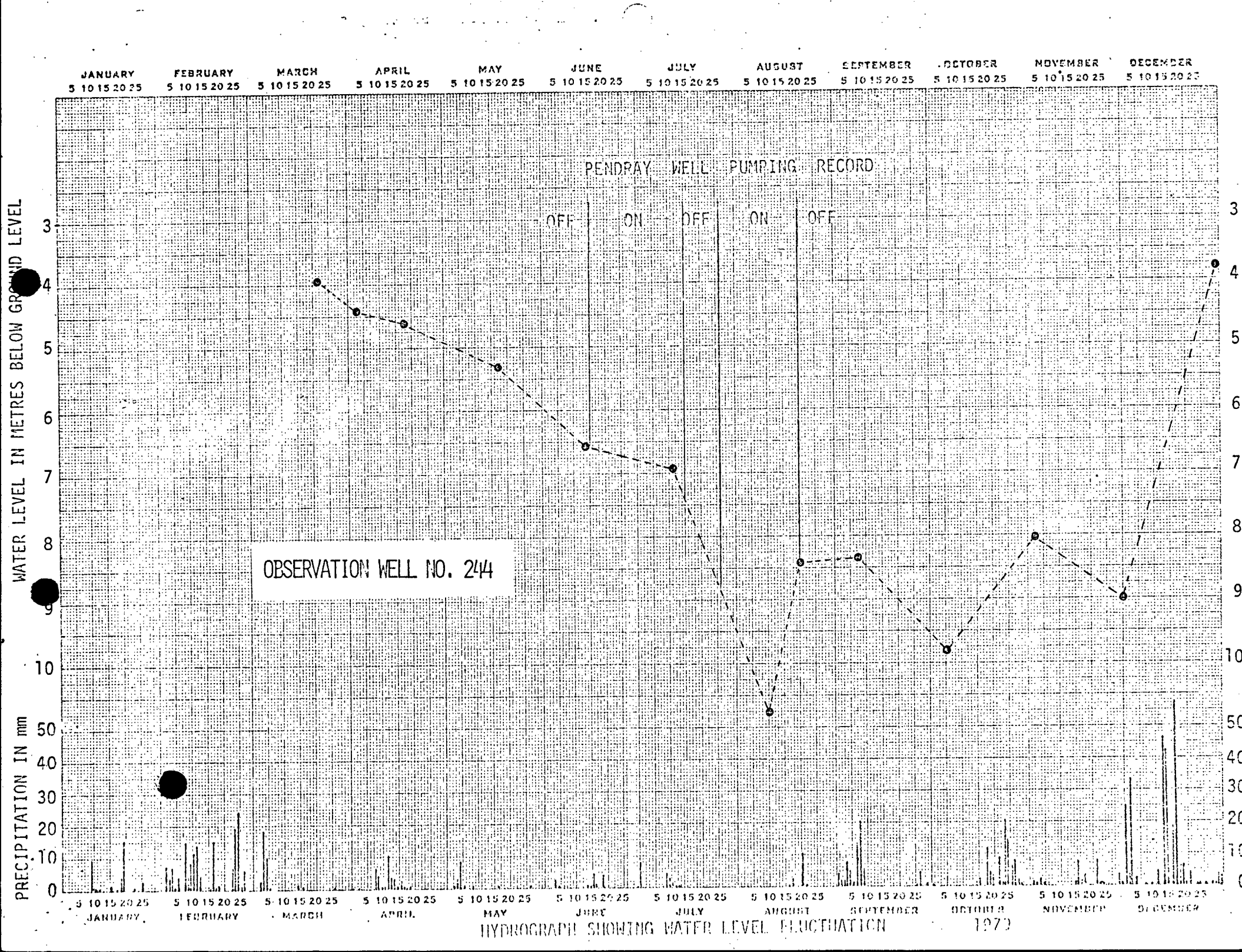
OBSERVATION WELL NO. 241

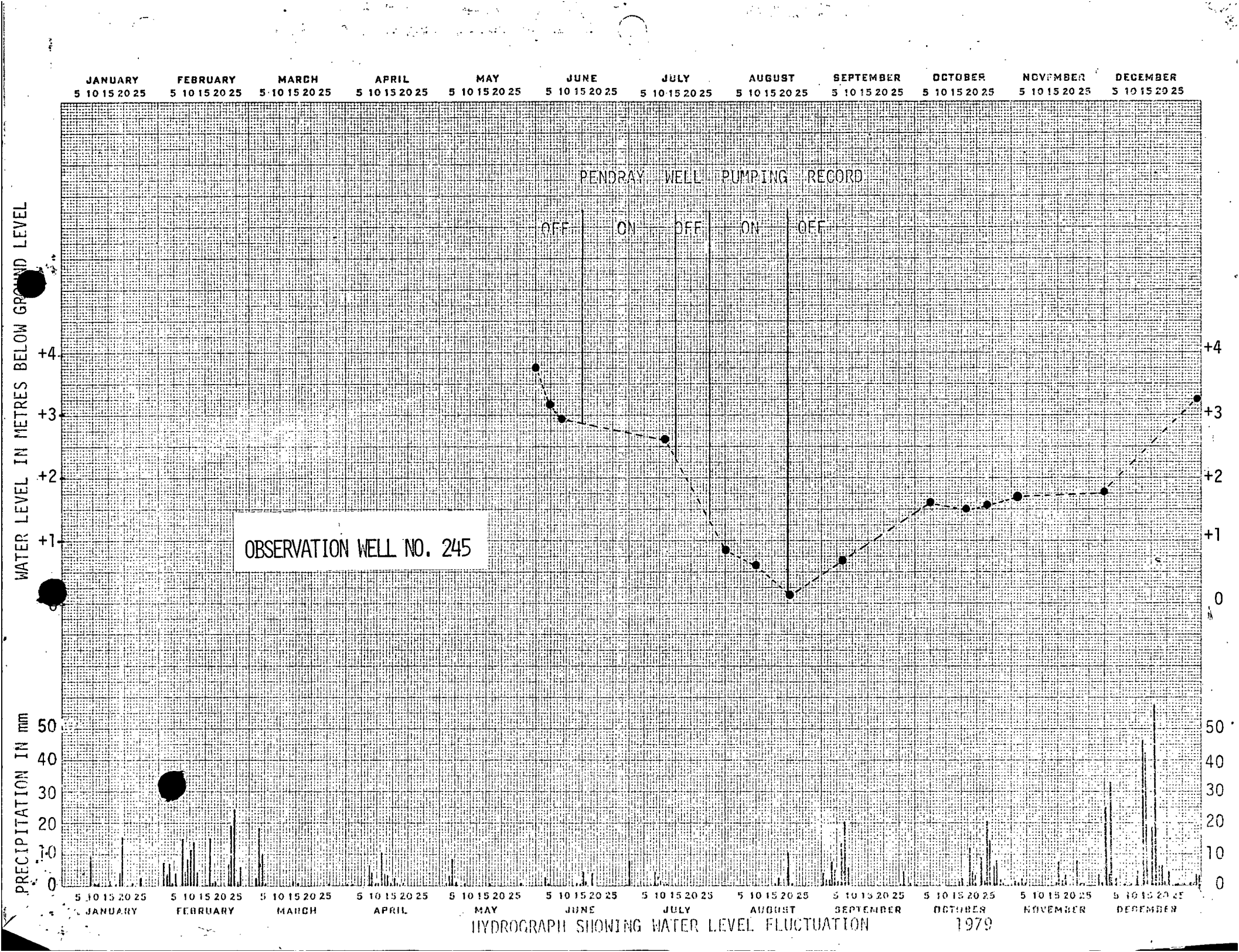



HYDROGRAPH SHOWING WATER LEVEL FLUCTUATION 1979

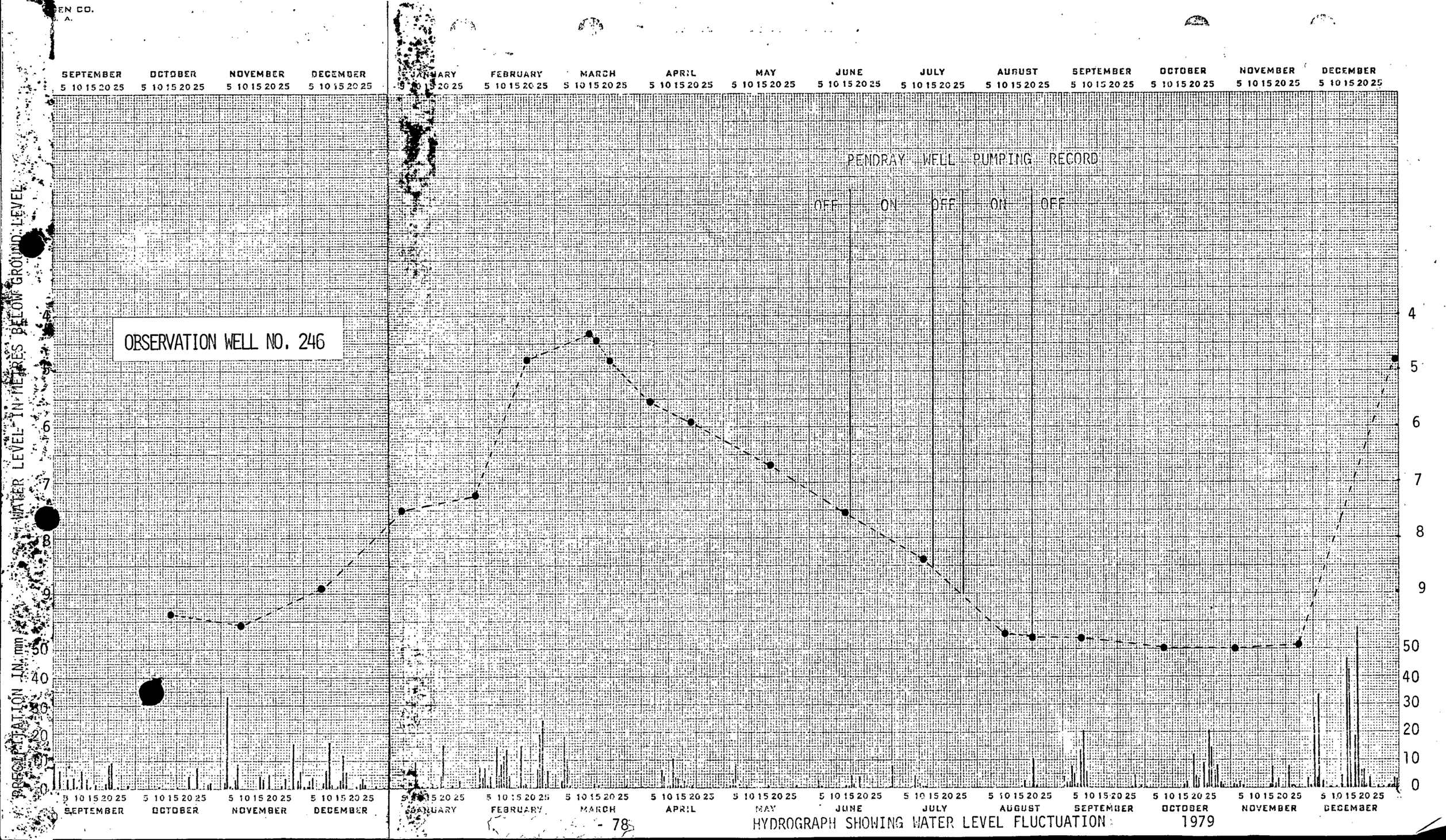



HYDROGRAPH SHOWING WATER LEVEL FLUCTUATION 1970

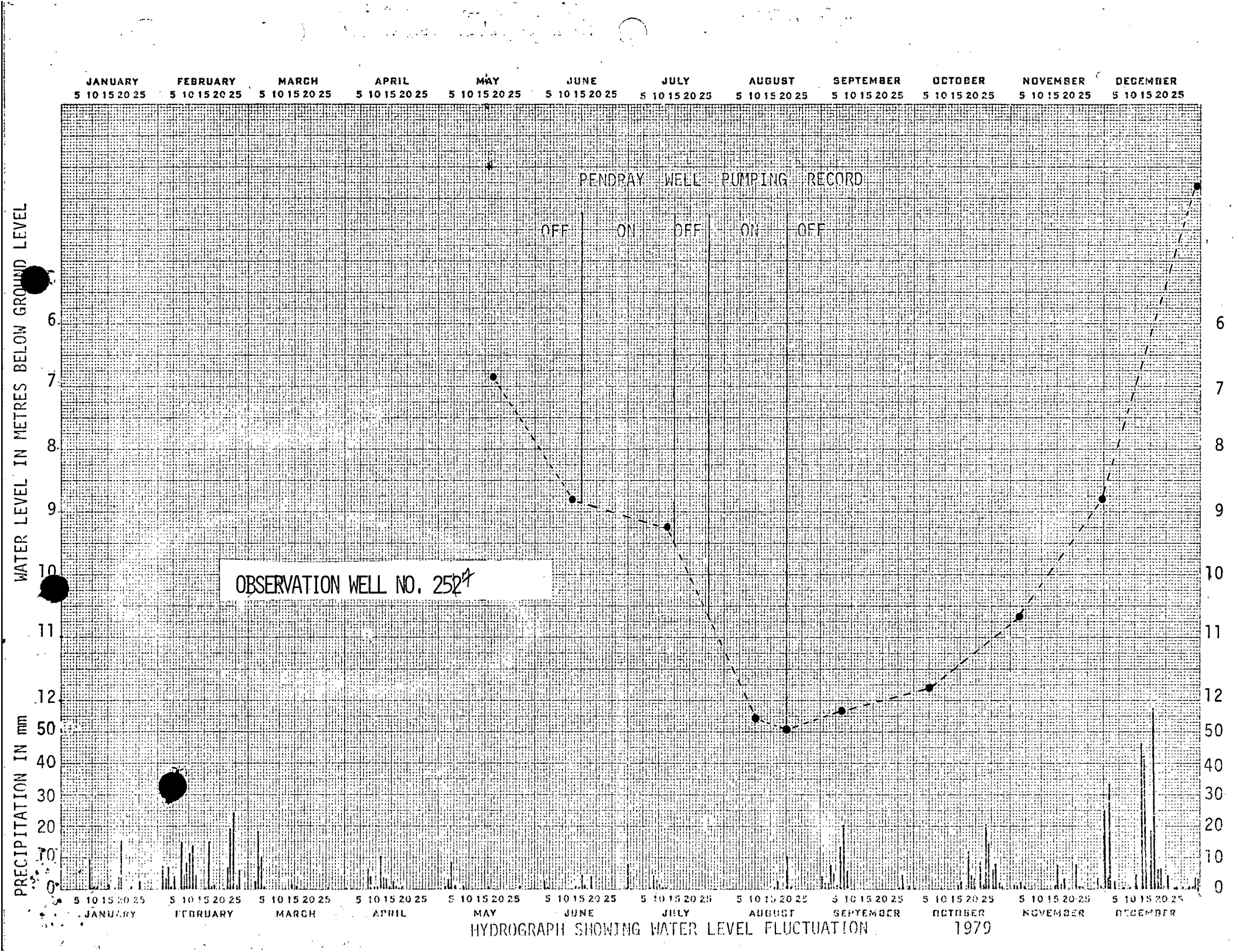

JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
5 10 15 20 25
PENDRAY WELL PUMPING RECORD
OFF
ON
OFF
ON
OFF
OBSERVATION WELL NO. 244
WATER LEVEL IN METRES BELOW GROUND LEVEL
PRECIPITATION IN mm
HYDROGRAPH SHOWING WATER LEVEL FLUCTUATION
1973




HYDROGRAPH SHOWING WATER LEVEL FLUCTUATION 1979




HYDROGRAPH SHOWING WATER LEVEL FLUCTUATION 1979




HYDROGRAPH SHOWING WATER LEVEL FLUCTUATION 1979

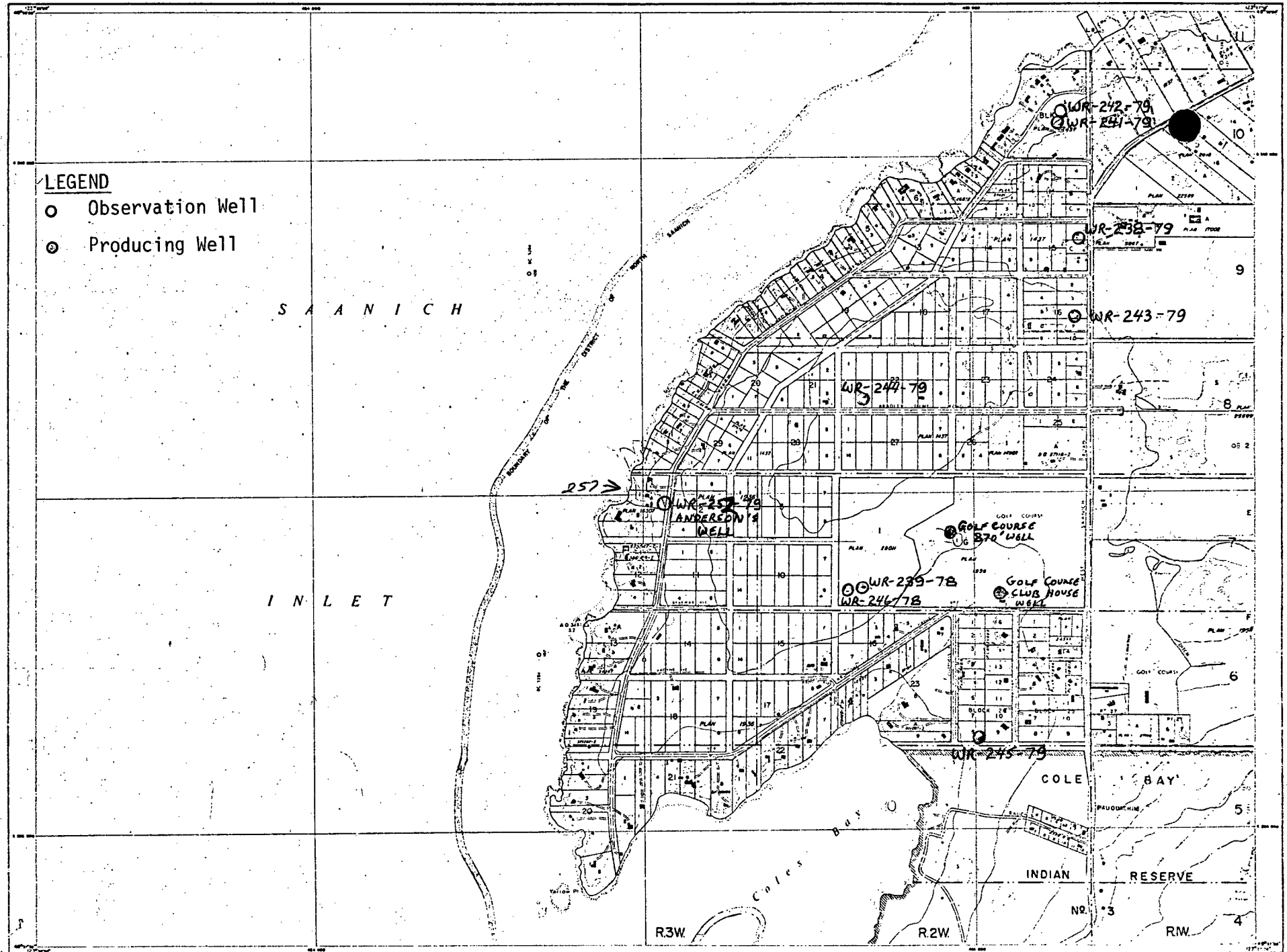
ARDMORE GOLF COURSE 870' WELL (Rg 2W, Sec. 7, #8)

May 31/79 1½" Dia. Rockwell Water Meter Installed
Initial Reading 0

| Date & Time | Meter Reading (in Imp. Gals.) | Calculated Average Pumping Rate in Igpm (Between Dates) | *Timed Pumping Rate (In Igpm) |
|---|---|---|---|
| May 31 12:30 pm | 0 | | 17 |
| June 5 3:25 pm | 92,700 | 12.57 | 13 |
| June 13 3:44 pm | 234,880 | 12.32 | 12 |
| July 12 2:40 pm | 729,300 | 11.86 | 12.5 |
| July 30 12:05 pm | 1,034,640 | 11.85 | 11.75 |
| Aug. 10 1:45 pm | 1,220,000 | 11.63 | 12.5 |
| Aug. 21 1:40 pm | 1,402,550 | 11.55 | 11.5 |
| Sept. 7 12:05 pm | 1,683,300 | 11.51 | 11.5 |
| Oct. 3 10:15 am | 1,999,010 | Pump Turned Off In Late September | 0 |

NOTE: Pumping is reported to have been 24 hrs./day.

* Observer's manual check on the operation of the flow meter.




SURVEYS AND MAPPING BRANCH
B.C. LANDS SERVICE, VICTORIA B.C.
DEPARTMENT OF ENVIRONMENT.

U.T.M. GRID ZONE 10 (1975)
BASE CONTROLLED PHOTOGRAMMETRIC
SEE INDEX FOR ADDITIONAL INFORMATION

LATEST PLAN: 2804
REVISION DATE: OCT. 20, 1975

NORTH SAANICH LAND DISTRICT COWICHAN LAND DISTRICT
VICTORIA LAND REGISTRATION DISTRICT

SCALE - 1:5000

CADASTRAL
92B·063·2·3