POWER RESOURCES, INC.
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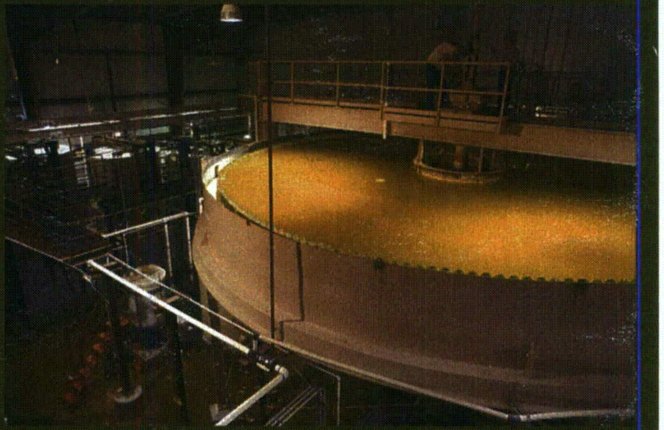
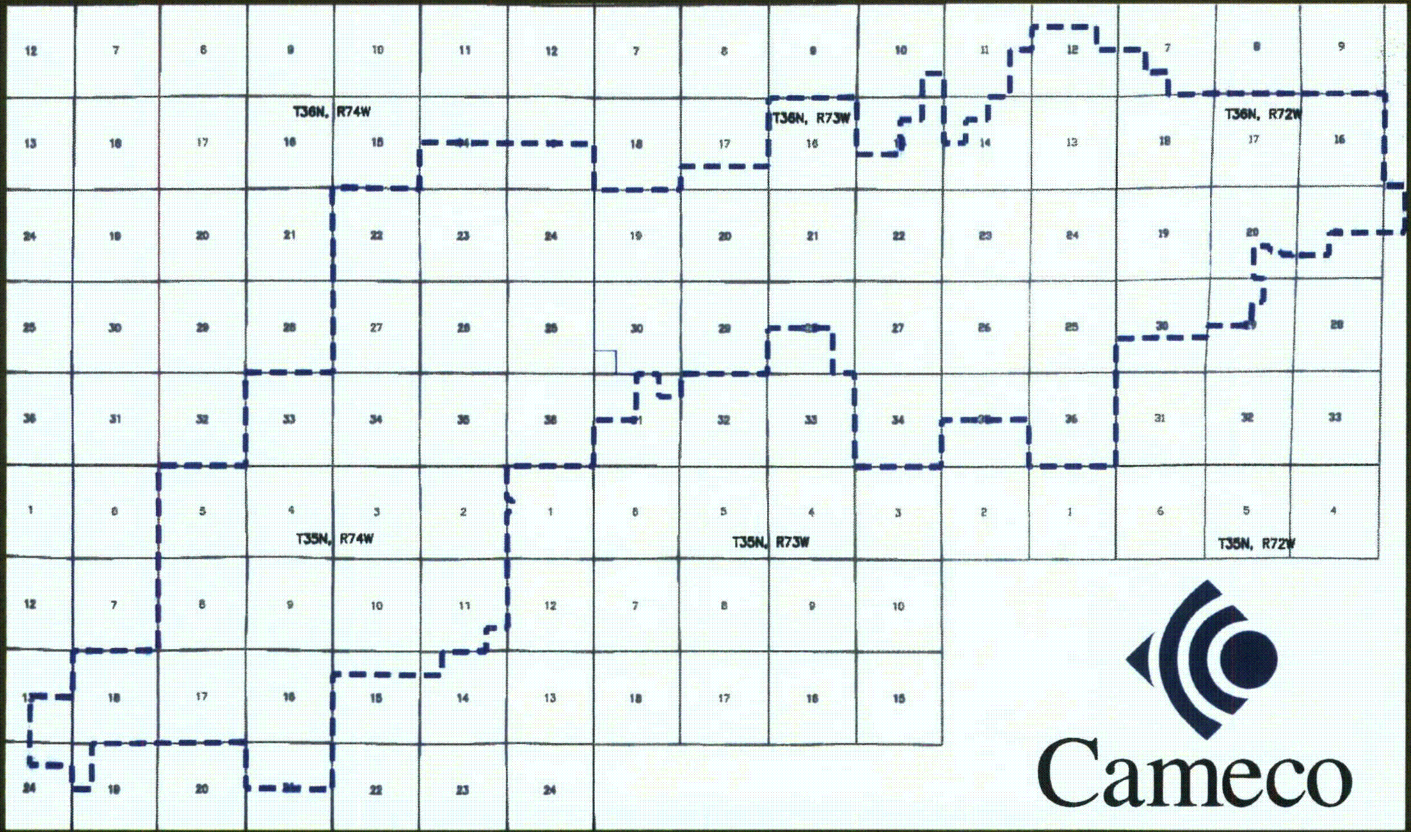
SMITH RANCH - HIGHLAND
ISR WDEQ PERMIT NO. 633
UPDATE





Cameco

Lidstone and
Associates, Inc.

VOLUME III
SUBMITTED MARCH 2010

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ADDENDUM D-6 A1: SMITH RANCH TABLES

NOTE: This Addendum contains no Supplemental Information; therefore tab B3 has been removed.

APPENDIX D-6
HYDROLOGY

1.0 GENERAL

The Smith Ranch Project consists of **approximately 40,000** acres and is located in the southern portion of the Powder River Basin. The Powder River Basin is bounded on the west by the Bighorn Mountains and the Casper Arch and on the south by the Laramie Range-Hartville Uplift. The northern and eastern margins of the basin are less distinct. The broad Black Hills Uplift forms the eastern demarcation, and the Miles City Arch forms the northern boundary. The topography in the permit area is characterized by gently rolling upland areas and broad stream valleys that are dissected by numerous draws with relatively steep slopes and rounded ridge crests (**Plate D6-4** of **Addendum D-6 B2**). The streams within the project area are all ephemeral and many areas drain internally to small playas. Small stock ponds have been constructed on some of the ephemeral streams. Surface waters in the area are used for stock watering and are utilized by wildlife.

Underlying the permit area are several thousand feet of sedimentary deposits. The shallow strata, which relate to this ISR application includes the Fort Union Formation, which consists of alternating beds of claystones, siltstones, and sandstones. These claystones, siltstones, and sandstones are usually discontinuous and lenticular over larger areas. The individual sandstone units are, depending on thickness and areal extent, considered aquifers in the area. Ground water obtained from these sandstones can be used for stock watering purposes and a few domestic uses. These ground water resources have historically also been used for uranium mining related (industrial) uses and were dewatered as part of historical underground and open pit mining.

2.0 SURFACE WATER

2.1 Surface Water Quantity

The permit area is located in the southern part of the Powder River Basin in the Sage Creek drainage of the North Platte River drainage system and the Box Creek, **Duck Creek, Willow Creek, and Brown Springs Creek** drainages of the Cheyenne River drainage system (**Figure D6-1**). The local topography and drainage system are shown on **Plate D6-4** of **Addendum D-6 B2**. All streams are ephemeral and flow only in response to snow melt and heavy thunderstorms. **There are no gauging stations within the drainages. Therefore, quantities are not measured.** A considerable portion of the area encompassed by the project site is internally drained to playas. The project site receives approximately 12 inches of precipitation annually (see **Appendix D4** for additional climate information). Stock ponds **constructed in many of the ephemeral streams**

draining the area collect some runoff for watering livestock; however these ponds are dry much of the time. **Additionally, there are numerous playas present which hold runoff water during times of abundant precipitation. Tables D6-1** and **D6-2** in **Addendum D-6 B1**, which contain USGS stream flow records for Box Creek, downstream of the permit area (drainage area = 109 mi^2) show the lack of runoff and stream flow in the area and the ephemeral nature of the stream system.

Sage Creek runs through the southwest portion of the permit boundary. The USGS maintained a stream gage near Orpha, Wyoming, approximately 1.6 miles southeast of the southeast corner of the permit boundary (USGS Gage No. 06648780). Peak streamflow values were recorded from 1965-1984 (Table D6-1). The data indicate that Sage Creek is highly variable as annual peak flow rates range from 0 to 229 cfs. Sage Creek is also ephemeral, as five out of nineteen years were dry.

2.2 Surface Water Quality

The land along Box Creek and the Middle and East Forks of Willow Creek is predominantly rangeland and surface water, when collected, is used for livestock and wildlife watering. **The drainages are ephemeral and flow only in response to snow melt or major precipitation events.** Exxon regularly analyzed water samples from selected points in the Box Creek drainage during operation of surface mining activities. The data, **which historically have been considered to be** representative of surface water quality from the entire permit area, are included in **Table D6-3** of **Addendum D-6 B1**. **Sampling locations are shown on Figure D6-1 of Addendum D-6 B2.** These data indicate that water quality in these surface waters does not meet Wyoming domestic water use suitability standards (Class I) or EPA public health standards for chloride, sulfate, and total dissolved solids. These waters do meet Wyoming livestock use suitability standards (Class III) and are suitable for stock and wildlife consumption.

Surface water at the Reynolds Ranch area of the permit is also limited to snow melt and runoff from major precipitation events. A working stock pond, which is supplied primarily by a shallow well, is located within the area. Surface water quality results for the Reynolds Ranch area are presented in Attachment D6-2 of Addendum C.

Sampling for radiological constituents have been collected at select surface water points within the Smith Ranch permit area since 2003 (see Figure D6-2). The results are summarized in Table D6-2.

2.3 Surface Water Rights

A list of all surface water rights within the permit area and on adjacent lands, as of **March 2011** is included in **Table D6-3**. The locations of the surface water rights are shown on **Plate D6-1**. The majority of surface water rights are limited to small stock ponds and associated ditches.

3.0 GROUND WATER

3.1 General

Descriptions of the geologic-formations of the Powder River Basin and their hydrologic properties have been discussed in numerous publications (Hodson et al., 1973; Hodson, 1971, Whitcomb et al., 1958; Huntoon, 1976; Davis, 1976) and are summarized in **Appendix D-5** (Geology). The hydrologic units beneath the permit area and in the general vicinity include the following: Holocence-age alluvial deposits, the Eocene-age Wasatch Formation, the Paleocene-age Fort Union Formation, and the Cretaceous-age Lance and Fox Hills Formations (**Table D-6.1** of **Addendum D-6 A1**). Individual sandstones within these units may be classified as aquifers depending on their hydrologic characteristics and potential yield to wells and/or springs. Previous reports for the individual sandstone units within the permit area have used different nomenclature for the different delineated sandstone (Smith Ranch vs. Highland) units. This historic nomenclature is maintained throughout this document in an effort to preserve the sampling, testing and mining history. For the purposes of correlation, the M sands, which are present on the Smith Ranch property side are equivalent to the 10 sands on the Highland property side; the O1, O2, O3 and O4 Sands on the Smith Ranch property side are equivalent to the 20/30, 40/50, 60/70 and 80 sands, respectively on the Highland property side. In addition, The Q and S sands on the Smith Ranch property side are equivalent to the 90 and 100 sands, respectively on the Highland property side. **A schematic sandstone correlation chart for Highland, Smith Ranch, and Reynolds Ranch is included in Appendix D-5.**

Wells drilled for conducting pump tests and/or collecting baseline data for the ISR project, including the two ISR pilot projects, are listed on **Table D-6.4** of **Addendum D-6 A1** and are located as shown on **Figures D-6.4**, **D-6.5**, and **D-6.6** of **Addendum D-6 A2**.

3.2 Ground Water Quality

Extensive ground water quality data have been collected from each of the two ISR pilot sites in the western portion of the permit area and were previously submitted to NRC and WDEQ in the NRC License Applications and LQD Quarterly reports. Baseline water quality data for the production zones in the pilot projects are summarized in **Addendum D-6 A1**, **Tables D6-5** and **D6-6** for the Q-Sand and O-Sand pilots, respectively.

In addition to sampling at the pilot sites, baseline water quality data has also been collected from about thirty of the other wells listed on **Table D-6.4** of **Addendum D-6 A1**, to provide an indication of the water quality to be expected in the permit area. Typically five samples were collected from each well over a period of six to nine months and analyzed for the full list of parameters. These data are included in **Tables D-6.7** through **D-6.36** of **Addendum D-6 A1**. In general, the water quality is similar to that seen at the pilot sites; however, detailed evaluations or consolidation of the data at this time would be of limited value, as the wells are completed in **different sand units within the lower Wasatch and Upper Fort Union** formations and there are only a limited number of wells in any one projected mine unit.

Baseline ground water quality data from the eastern portion of the permit area was submitted with the original Highland permit application and is limited to data collected at:

- four Exxon water supply wells completed in the Highland ore sand aquifer, outside of the ore zones;
- the Numrick livestock well;
- the Fowler Ranch water well; and
- the Vollman Ranch water well.

The latter three wells are completed in the intermediate sand zone which lies stratigraphically above the local ore sand aquifer. This aquifer has not, nor is it anticipated to be affected by mining activities. The locations of these wells are shown on **Figure D6-1** of **Addendum D-6 B2**. A summary of the water quality data are included in **Tables D6-6** and **D6-7** of **Addendum D-6 B1**.

A vast amount of baseline ground water quality data have been collected since ISR activities started in the eastern (Highland) portion of the permit area. Baseline ground water quality data have been collected from the A, B, C, D, **E, F, H, I, and J**-wellfield areas as part of required wellfield development activities at the Highland Project section. Numerous water quality samples have been collected from the 10, 20, 30, 40, 50 and 60-sands to document baseline conditions within this portion of the property. These data are on file with both the WDEQ and NRC.

In general the baseline ground water quality in these eastern (Highland) area sandstone aquifers usually meets Class I-Domestic use suitability standards (WQD R&R's Chapter 8) except in proximity of the ore zones where radium concentrations can greatly exceed the domestic, agriculture and livestock standard of 5 pCi/l. Total dissolved solids concentrations sometimes exceed the domestic standard of 500 mg/1. **Tables D6-8** and **D6-9** of **Addendum D-6 B1** provide a summary of the baseline water quality data for the 20 and 30-sands, respectively, in the A and B mine unit areas. This data summary is representative of baseline ground water quality conditions throughout the project site.

Extensive ground water quality data were previously collected by Solution Mining Corporation for the Reynolds Ranch area. The water quality data collected were from the planned production zones and potential potable or existing stock water sources. This baseline water quality data are presented in Attachment D6-2 of Addendum D-6 C. A well location map is also presented in Addendum D-6 C as Figure D6-1. Additional water quality data collected from the proposed Mine Unit 27 in 2004 is presented in Table(s) D-6-5, D6-6, D6-7, and D6-8.

A baseline water quality comparison was conducted using Smith Ranch, Highland and Reynolds Ranch historical water quality data. Average concentrations of constituents from Smith Ranch and Highland (Tables D6-5 and D6-6 of Addendum D-6 A1; Tables D6-8 and D6-9 of Addendum D-6 B1) were combined with averages from Reynolds Ranch Mine Unit 27 (Table D6-9). An average baseline range of parameters were created using Smith Ranch, Highland, and Reynolds Ranch data and compared to the approved mine unit baseline data. Averages for approved mine unit baseline data was developed from MP wells (i.e., interior production zone wells). A summary of water quality data previously mentioned above is presented in Table D6-9.

Comparing the approved mine unit data to the baseline average range of parameters, 98 outliers were identified from the hundreds of analyses that were performed. The majority of outliers were just outside the minimum or maximum average. Of note are uranium values for Mine Units C and D which exceed the average range of concentrations with values of 2.11 and 1.07 pCi/L, respectively.

The average water quality results for the approved mine units compared favorably to the baseline water quality range from Smith Ranch, Highland, and Reynolds Ranch. Overall, the water quality is dominated by Calcium-Sodium-Bicarbonate-Sulfate water.

3.3 Hydrogeologic Units

Alluvium. The alluvium in the permit area consists of thin, unconsolidated, poorly stratified clays, silts, sands, and gravels. The total thickness of these deposits is estimated to range from less than 1 foot to 30 feet. Small amounts of precipitation infiltrate the alluvium during part of the year and intermittent flows across the alluvium may provide some recharge. The water table is typically more than 100 feet below the land surface throughout most of the permit area. Therefore, most of the recharge flows through the lower portion of the alluvium. The potential for future development of alluvial groundwater supplies in the permit area is considered very poor. **A local geology map is presented on Figure D5-3.1 in Appendix D-5.**

Wasatch Formation. The Wasatch Formation typically is lenticular, fine- to coarse-grained sandstones with interbedded claystones and siltstones. This formation underlies all except the southwestern and extreme western portions of the permit area and ranges in thickness from 0 to approximately 500 feet. The Wasatch Formation is one of the more important shallow aquifers in the Powder River Basin.

Properly constructed wells penetrating the Wasatch Formation in the vicinity of the **Smith Ranch** Central Processing Plant generally yield from 5 to 15 gallons per minute (gpm). A water supply well (WW-103) completed in the Wasatch near the former Bill Smith Mine initially produced 140 gpm; however, production was from a composite thickness of approximately 120 feet of sandstone including four separate sandstone units commingled within the well. This 474 foot deep well taps the Wasatch Formation in one of its thicker zones in the permit area. **The discharge permit for this well has been cancelled for years, ever since the Bill Smith mine shaft was sealed.**

For the most part, groundwater in the Wasatch Formation exists under water table (unconfined) conditions and its primary use in the permit area includes low-yielding wells used for watering livestock. Artesian (confined) zones near the base of the formation are separated from near-surface deposits and from each other by impermeable shale layers.

The Wasatch Formation is considered to have good potential for possible development as a future water supply. Hodson et al, 1973 could not quantify its hydrologic characteristics adequately to estimate the maximum amount of groundwater that could be available from the permit area.

Fort Union Formation. The Fort Union Formation underlies the Wasatch Formation in the permit area. The top of the Fort Union Formation is exposed at the surface in the southwestern and western portions of the Smith Ranch area, but may be at depths of 500 feet or more in the eastern and northeastern part of the Smith Ranch area. Typically, the Fort Union is comprised of lenticular fine- to coarse-grained sandstones with interbedded claystones, siltstones, and coal. The formation is as much as 3000 feet thick beneath the permit area.

The Fort Union Formation is an important aquifer in the Powder River Basin, and as shown on **Table D-6.4** of **Addendum D-6 A1**, nearly all of the project's wells are completed in this formation. While most of the wells are designated for limited yields (5 to 30 gpm of water), wells completed in the Fort Union Aquifer associated with the former Bill Smith Mine dewatering program produced as much as 560 gpm (**Table D-6.2** of **Addendum D-6 A1**). Substantial volumes of groundwater can be produced from the Fort Union Formation over extended periods, as demonstrated by the various historical and current mining operations in the Southern Powder River Basin.

Lance and Fox Hills Formations. The Lance and Fox Hills Formations underlie the Fort Union Formation at depths of approximately 3500 feet and 5500 feet, respectively beneath the proposed plant site. The formations are comprised of fine-to medium-grained sandstones, interbedded sandy shales and claystones. Well yields from these formations are not expected to exceed 100 gpm, and the groundwater reserves may be limited. Little is known of the hydrologic characteristics of the Lance and Fox Hills Formations as no water wells tap these aquifers in the vicinity of the permit area. Because of the depths of these formations and the availability of water from other shallow aquifers, it appears unlikely that these formations will be tapped for water supplies in the future in the permit area.

3.4 Potential Ground Water Impacts

Of the formations described above, aquifers in the Wasatch and the Fort Union are of greatest importance to the proposed mining activities since they can yield substantial amounts of fresh water and are the aquifers that could potentially be impacted by the ISR operation. Impact to the Wasatch could occur if there were an excursion of leach solution to an overlying aquifer due to an injection well casing failure. The impact would be limited to the volume of water, which must be removed in an effort to restore the groundwater quality. Should this happen, the excursion would be short term and controlled. Excursion prevention and control measures are described in the Operations Plan of this application.

The economic uranium mineralization in the permit area occurs within the Fort Union Formation and as such, this geologic formation is most likely to be impacted by ISR activities. The impact will be of limited areal extent and will occur only for the duration of the mining and restoration program. The magnitude of the impact to the regional groundwater supply will be much less than has previously occurred during dewatering of conventional mining operations. The ability to restore groundwater quality within an ISR mine unit was demonstrated in the Q-Sand pilot restoration program, followed by the mining and restoration of the A- and B- Well Fields. In conclusion, CR does not expect any long term impact on groundwater quality.

3.5 Pump Testing and Analysis

A total of five baseline pump tests were conducted in the western portion (Smith Ranch) of the permit area to evaluate the baseline hydrologic characteristics of the mineralized zones. The first pump test was conducted in 1974 to evaluate what was to be expected in sinking and developing the Bill Smith Mine (Harshbarger and Associates) and is discussed in **Attachment "A"** of **Addendum D-6 A3**. The second pump test was conducted at the Q-sand ISL pilot site to document the suitability of the site for solution mining and is discussed in **Attachment "B"** of **Addendum D-6 A3**. The third pump test was conducted at the O-Sand ISL pilot site and is discussed in **Attachment "C"** of **Addendum D-6 A3**. To provide additional aquifer characteristic data, pump tests were also conducted in two additional areas, Sections 25 and 35, and a report including the results and analysis of these pump tests is included as **Attachment "D"** of **Addendum D-6 A3**.

Additionally, since 1987, more than 17 pump tests have been performed across the permit area as part of the hydrologic testing program for new mine units. The results of these tests can be found in Volume III-A through JJ of this combined permit 633. All pump tests conducted to date have demonstrated that the mineralized formations have acceptable permeability and transmissivity characteristics for ISR, and all confining units tested have proven to be effective aquitards for controlling the vertical movement of leach solutions.

A total of two pump tests were conducted in the Reynolds Ranch area of the permit. The tests were conducted in January 1989 in areas of future potential production. These sand zones include the U/S sand and the O sand. The pump tests conducted at Reynolds Ranch are discussed in Addendum D6 C.

3.6 Aquifer Piezometric Surfaces

Piezometric surface contours have been constructed for aquifers which could potentially be affected by mining activities. These aquifers are the M-Sand, O-Sand, Q-Sand and S-Sand (deepest to shallowest) in the western portion of the permit area and the 40, 50, and 60-sands in the eastern portion. The contour map for the western portion of the permit area was constructed by Hydro-Engineering using available wells within the permit area and water levels collected during February, 1991. In the eastern portion of the permit area, maps were constructed with water level data collected on, or near August 15, 1990. **A schematic sandstone correlation chart for Highland, Smith Ranch, and Reynolds Ranch is included in Appendix D-5.**

Figure D-6.7 of **Addendum D-6 A2** presents the piezometric surfaces for the M, O, Q and S aquifers in the western portion of the permit area. The circle, square, triangle and star symbols show locations for the M, O, Q and S wells respectively. Wells TW¬1, TW-2, OWD-1 and OWD-4 are completed in both the M and O sands. Therefore, their symbol is a combination of a square and circle. Some of these wells are completed over only a portion of these sands, and where the sand is very thick, a fair amount of head difference can exist from the top to the bottom of the sand. The contours on **Figure D-6.7** of **Addendum D-6 A2** are Hydro-Engineering's interpretation of average head conditions in each of these sands and, therefore, some points are not given as much weight as others. **Table D-6.37** of **Addendum D-6 A1**, provides the basic well information used for construction of the piezometric contours. It should be noted that the shaft, located at the Bill Smith mine site, was being pumped at a rate of approximately 200 gpm at the time all water levels were taken. The shaft has since been filled and sealed. **Updated potentiometric surface maps of the M, O, Q, and S sand are provided on Plates D6-1A through D6-1D.**

Water levels from wells M-136, M-421, M-422, M-310, M-295, M¬296, M-528, M-736, M-741, M-744 and OMM-1 were used to develop the potentiometric surface contours for the M sand aquifer in the western portion of the permit area. Groundwater in the M sand is flowing to the east-northeast and most of it presently converges to the mine shaft due to pumping at the time of measurement. The average groundwater velocity is estimated to be 1.3 ft/yr based on a permeability of 0.3 ft/day, an average gradient of 0.0012 ft/ft and an effective porosity of 0.1. The permeability was obtained from Section 35-739 multi-well pump test and is thought to be low due to the overall flat gradient in this aquifer. **An updated potentiometric surface of the M sand is provided on Plate D6-1A.**

The O sand multi-well pump tests at OP-2 and Section 25-584 yielded average permeabilities of 4.0 and 10.1 ft/day respectively. An average permeability of 7.0 ft/day, an average gradient of 0.0015 ft/ft and an effective porosity of 0.1 indicate that the average velocity in the O sand is 38 ft/year. **An updated potentiometric surface of the O sand is provided on Plate D6-1B.**

The hydrologic conditions of the Q sand have been defined in only Section 36. The small dashed lines in **Figure D-6.7** of **Addendum D-6 A2** represent the potentiometric surface of the Q sand in this area at the time of measurement. The contours yield an average gradient of 0.0036 ft/ft and the Section 35-739 multi-well test produced an average permeability of 4.5 ft/day. These properties indicate that groundwater is moving to the north-northwest at 59 ft/yr in the Q sand.

Additionally, Mine Units, 1, 2, 3, 15, 15A, J, and K have characterized the Q sand in the western portion of the permit area. An updated potentiometric surface of the Q sand is provided on Plate D6-1C.

The S sand potentiometric contours are represented with the small solid lines on **Figure D-6.7** of **Addendum D-6 A2**. These contours yield a steep gradient of 0.05 ft/ft. The groundwater is estimated to be moving to the north at 180 ft/yr based on this gradient and an estimated permeability of one foot/day. **An updated potentiometric surface of the S sand is provided on Plate D6-1D.**

Potentiometric surface maps for the 40, 50, and 60-sands in the eastern portion of the permit area are included as **Plates D6-1**, **D6-2** and **D6-3** of **Addendum D-6 B2**, respectively. These maps were constructed with water level data collected on, or near August 15, 1990. Potentiometric surface maps for the 20 and 30-sands are not representative of baseline conditions as water level data are limited to and affected by the A and B-wellfield areas which were in production at the time measurements were taken. Due to the lack of potential impacts to sands overlying the 60-sand and the corresponding lack of wells in these units, there is insufficient data to construct potentiometric surface maps for these units. It can be assumed that direction and gradients in these units are similar to those determined for the 40, 50 and 60-Sands.

A review of **Plates D6-1**, **D6-2**, and **D6-3** of **Addendum D-6 B2**, shows that in areas unaffected by ISR activities or past underground mine dewatering, the general direction of ground water flow is from the southwest to the northeast. Unaffected water level gradients are approximately .008 ft/ft for the 40-sand, .003 ft/ft for the 50-sand and .002 ft/ft for the 60-sand.

Past underground mining activities have affected 40-sand water levels near wells CMU-1, CMU-2, CMU-3A, CMU-7, CMU12 and CMU-13. These wells are completed in ore drifts within the 40-sand. The deflection of the potentiometric surface in the area covered by these wells show that water levels are depressed as a result of underground mining and dewatering activities which were halted in 1980. Data obtained during and prior to the detailed hydrology tests in the C and D-wellfields show that these depressed water levels are rising as a result of recharge from surrounding areas. Data collected during the Exxon R&D project show that water levels in the R&D area rose approximately 50 feet in six years.

Water level data for the 40-sand in the A and B-wellfield during the period of this data collection demonstrates that flow was towards the Exxon Highland Pit. The Exxon Highland Pit was a ground water sink (local cone of depression) with ground water flow towards the pit.

Although past underground mine dewatering activities also affected the 50-sand within the C-wellfield, the two cones of depression evident on **Plate D6-2** of **Addendum D-6 B2**, result from ISR production activities which were in progress during the time that water level data were collected.

The 60-sand is not affected by production activities. The two cones of depression evident on **Plate D6-3** of **Addendum D-6 B2** result from past dewatering of the two TVA shafts which have been sealed and reclaimed.

Figures D6-2 and D6-3 of Addendum D-6 C present the piezometric surfaces for the U/S and O aquifers in the Reynolds Ranch portion of the permit area. The water levels were taken on November 6, 2004. Production sand water levels were measured at six existing wells installed by Solution Mining Company and at five wells installed by PRI. Table D6-4 of Addendum D-6 C lists these wells and associated water level monitoring results.

3.7 Confining Unit Characteristics

Characterization of the confining layers was completed for the eastern portion of the permit area and is considered representative of the entire permit area. Low permeability confining units (aquitards) are present between the various sandstone aquifers. These units are typically 20 to 45 feet in thickness, but may be thicker in areas where the sandstone pinches out. These siltstone and claystone units are usually continuous over relatively large areas. Where individual sandstone units converge (facies change), the previous overlying claystone is non-existent. Geologic cross-sections which show the thickness and extent of confining units are included in **Appendix D-5**.

Vertical permeability of confining units has been determined in the laboratory from actual cored material and from pump test results utilizing the Neuman-Witherspoon Method. **Table D6-5** of **Addendum D-6 B1** contains estimates of the vertical permeability of the confining units. These vertical permeabilities should be representative of conditions found throughout the permit area in similar units.

3.8 Ground Water Rights

A list of all ground water rights within the permit area and adjacent lands, as of **March 2011** is included in **Table D6-10**. The locations of the ground water rights for the combined permit area are shown on **Plate D6-2**.

There are more than **3,000** ground water rights within the permit area **and within a three mile area of the permit boundary**. The vast majority of these ground water rights are for wells installed for hydrologic monitoring or dewatering purposes at decommissioned conventional uranium mining operations and ISR activities at the **Smith Ranch Project**. A small number of the ground water rights are associated with wells installed for livestock water. The majority of these wells are less than 200 feet in depth and should not be impacted by ISR activities at the site. **There are two additional wells located in the NE quarter of Section 12, T35N, R74W that are used for irrigation of an alfalfa field**.

Three ground water rights are for wells used intermittently for domestic supply. One well serves the Fowler Ranch. This well is located north of the northeast corner (Highland) of the permit area. The well is 212 ft in depth. The **second** domestic well is associated with the Vollman Ranch house, which is located near the center (Smith Ranch) of the permit area. This well is 180 ft in depth. **The third domestic well is located at the Sundquist Ranch site, approximately 2.6 miles south of the SR CPP**.

No adverse impacts are expected to any of the stock wells or domestic wells as the domestic wells and majority of the stock wells are screened in zones above the sandstones which contain uranium ore and are in situ mined at the project site.

A 2011 search of the WSEO files indicated that most of the wells within the permit area and adjacent lands that were operated by previous operators have either been abandoned or transferred to Power Resources/Cameco Resources. Figure D6-3 provides the complete permit boundary, including the proposed Reynolds Ranch Amendment area. Notes on the index map indicate when individual plates and figures for Smith Ranch, Highland or Reynolds can be found in the addenda.

4.0 REFERENCES

Davis, R.W. 1976. Hydrologic factors related to coal development in the eastern Powder River basin. <u>In</u> Guidebook, Wyoming Geological Association, 28th Annual Field Conference, p. 203-207

Harshburger & Associates, 1974, Analysis of Constant Yield Tests of Wells TW-2 and TW-1, Bill Smith Mine, Converse County, Wyoming.

Hodson, W.G., Pearl, R.H., and Druse, S.A. 1973. Water resources of the Powder River basin and adjacent areas, northeastern Wyoming. U.S. Geological Survey Hydrologic Investigations Atlas HA- 465. Washington, D.C.: U.S. Geological Survey.

Hodson, W.G. 1971. Chemical analyses of ground water in the Powder River basin and adjacent areas, northeastern Wyoming. Cheyenne, WY: Wyoming Department of Economic Planning and Development.

Huntoon, P.W. 1976. Permeability and groundwater circulation in the Madison aquifer along the eastern flank of the Bighorn Mountains of Wyoming. In Guidebook Wyoming Geological Association, 28th Annual Field Conference, p. 283.290.

USGS Water Data for the Nation http://waterdata.usgs.gov/nwis

Whitcomb, H.A. , Morris, D.A., Gordon, E.D., and Robinove, C.J. 1958. Occurrence of ground water in the eastern Powder River basin and western Black Hills, northeastern Wyoming, in Powder River basin. Wyoming Geological Association Guidebook, 13th Annual Field Conference, 1958, p. 245- 260.

Table D6-1 Sage Creek Peak Stream Flow Values

Date	Peak Streamflow (cfs)
7/25/1965	229
8/19/1966	33
6/15/1967	14
1968	1
1969	1
6/12/1970	8
5/5/1971	89
8/2/1972	51
7/22/1973	59
1974	0
1975	0
1976	0
7/9/1977	31
7/27/1979	76
2/19/1980	26
1981	0
8/22/1982	5.2
1983	0
5/21/1984	17
Source: USGS Water Data for the Nation http://waterdata.usgs.gov/nwis	

Table D6-2
Smith Ranch Surface Water Quality Data

SW-1			SW-2			SW-3			SW-4			SW-5		
DATE	U-NAT (mg/L)	Ra-226 (pCi/L)	DATE	U-NAT (mg/L)	Ra-226 (pCi/L)	DATE	U-NAT (mg/L)	Ra-226 (pCi/L)	DATE	U-NAT (mg/L)	Ra-226 (pCi/L)	DATE	U-NAT (mg/L)	Ra-226 (pCi/L)
2003-3	0.0222	<0.2	2003-3	D	D	2003-3	0.0044	<0.2	2003-3	D	D	2003-3	D	D
2003-4	D	D	2003-4	D	D	2003-4	D	D	2003-4	D	D	2003-4	D	D
2004-1	0.046	0.3	2004-1	D	D	2004-1	D	D	2004-1	D	D	2004-1	D	D
2004-2	0.0353	ND	2004-2	D	D	2004-2	D	D	2004-2	D	D	2004-2	D	D
2005-3	D	D	2005-3	D	D	2005-3	D	D	2005-3	D	D	2005-3	D	D
2005-4	D	D	2005-4	D	D	2005-4	D	D	2005-4	D	D	2005-4	D	D
2006-1	0.269	ND	2006-1	ND	ND	2006-1	ND	0.6	2006-1	ND	ND	2006-1	ND	ND
2006-2	0.0231	ND	2006-2	D	D	2006-2	D	D	2006-2	D	D	2006-2	D	D
2006-3	D	D	2006-3	D	D	2006-3	D	D	2006-3	D	D	2006-3	ND	ND
2006-4	0.0554	ND	2006-4	D	D	2006-4	D	D	2006-4	D	D	2006-4	D	D
2007-1	0.0121	ND	2007-1	D	D	2007-1	D	D	2007-1	0.0006	ND	2007-1	0.0026	ND
2007-2	0.0183	ND	2007-2	0.0008	1.1	2007-2	0.0116	6.2	2007-2	0.0004	0.7	2007-2	ND	ND
2007-3	D	D	2007-3	D	D	2007-3	0.0232	1.8	2007-3	D	D	2007-3	0.0009	ND
2007-4	D	D	2007-4	D	D	2007-4	D	D	2007-4	D	D	2007-4	F	F
2008-1	D	D	2008-1	D	D	2008-1	D	D	2008-1	D	D	2008-1	D	D
2008-2	0.0159	0.1	2008-2	D	D	2008-2	0.0341	7.4	2008-2	0.0019	1	2008-2	0.0026	3.4
2008-3	D	D	2008-3	D	D	2008-3	0.126	0.52	2008-3	D	D	2008-3	0.001	ND
2008-4	D	D	2008-4	D	D	2008-4	D	D	2008-4	D	D	2008-4	0.0005	0.3
2009-1	D	D	2009-1	D	D	2009-1	0.0039	0.58	2009-1	0.0009	0.23	2009-1	0.0006	0.12
2009-2	D	D	2009-2	D	D	2009-2	0.0044	0.83	2009-2	<0.0003	ND	2009-2	0.0006	0.05
2009-3	D	D	2009-3	D	D	2009-3	D	D	2009-3	D	D	2009-3	0.0013	0.21
2009-4	D	D	2009-4	D	D	2009-4	D	D	2009-4	D	D	2009-4	D	D
2010-1	0.0206	0.5	2010-1	D	D	2010-1	D	D	2010-1	D	D	2010-1	0.0004	0.36
2010-2	D	D	2010-2	D	D	2010-2	D	D	2010-2	D	D	2010-2	0.0011	0.51
AVG	**0.052**	**0.300**		**0.001**	**1.100**		**0.030**	**2.561**		**0.001**	**0.643**		**0.001**	**0.707**

SW-6			SW-7			SW-8			SW-9			SW-10		
DATE	U-NAT (mg/L)	Ra-226 (pCi/L)	DATE	U-NAT (mg/L)	Ra-226 (pCi/L)	DATE	U-NAT (mg/L)	Ra-226 (pCi/L)	DATE	U-NAT (mg/L)	Ra-226 (pCi/L)	DATE	U-NAT (mg/L)	Ra-226 (pCi/L)
2003-3	0.002	<0.2	2003-3	D	D	2003-3	0.013	<0.2	2003-3	D	D	2003-3	NS	NS
2003-4	D	D	2003-4	D	D	2003-4	D	D	2003-4	D	D	2003-4	NS	NS
2004-1	0.002	0.4	2004-1	ND	ND	2004-1	0.005	0.4	2004-1	0.004	ND	2004-1	0.001	ND
2004-2	0.0015	ND	2004-2	0.0021	ND	2004-2	0.0051	0.4	2004-2	0.0021	ND	2004-2	0.0059	0.7
2005-3	0.0024	0.3	2005-3	0.002	1.2	2005-3	0.024	1.3	2005-3	D	D	2005-3	D	D
2005-4	D	D	2005-4	D	D	2005-4	0.0462	0.8	2005-4	D	D	2005-4	0.0656	0.6
2006-1	ND	ND	2006-1	ND	ND	2006-1	N	0.5	2006-1	0.001	ND	2006-1	ND	0.6
2006-2	0.0003	ND	2006-2	0.0003	ND	2006-2	0.0041	ND	2006-2	0.001	ND	2006-2	D	D
2006-3	0.006	0.5	2006-3	ND	5.1	2006-3	N	ND	2006-3	D	D	2006-3	0.0102	1
2006-4	ND	ND	2006-4	0.0009	ND	2006-4	0.0104	ND	2006-4	D	D	2006-4	D	D
2007-1	ND	ND	2007-1	0.0003	ND	2007-1	0.0036	ND	2007-1	0.0024	0.8	2007-1	0.002	ND
2007-2	ND	ND	2007-2	0.0005	ND	2007-2	0.0005	ND	2007-2	0.0004	ND	2007-2	0.0004	1.8
2007-3	0.0006	ND	2007-3	0.002	ND	2007-3	0.0018	ND	2007-3	D	D	2007-3	0.0013	ND
2007-4	F	F	2007-4	F	F	2007-4	F	F	2007-4	D	D	2007-4	D	D
2008-1	D	D	2008-1	0.0006	0.9	2008-1	0.0008	0.2	2008-1	0.0006	0.2	2008-1	D	D
2008-2	<0.0000003	5.1	2008-2	<0.0000003	2.7	2008-2	0.0024	2.2	2008-2	0.0008	0.6	2008-2	0.0131	4.5
2008-3	0.0003	0.87	2008-3	0.0009	0.27	2008-3	0.0008	0.22	2008-3	D	D	2008-3	D	D
2008-4	0.0004	0.18	2008-4	D	D	2008-4	0.0031	0.34	2008-4	D	D	2008-4	D	D
2009-1	<0.0003	0.5	2009-1	<0.0003	ND	2009-1	0.005	ND	2009-1	0.0003	0.02	2009-1	0.0006	0.08
2009-2	<0.0003	ND	2009-2	<0.0003	ND	2009-2	0.003	0.21	2009-2	<0.0003	ND	2009-2	0.0011	0.32
2009-3	0.0005	0.52	2009-3	0.0005	0.19	2009-3	0.001	0.23	2009-3	0.0004	0.03	2009-3	D	D
2009-4	D	D	2009-4	D	D	2009-4	D	D	2009-4	D	D	2009-4	D	D
2010-1	<0.0003	0.23	2010-1	<0.0003	0.13	2010-1	0.0016	0.1	2010-1	<0.0003	0.07	2010-1	F	F
2010-2	0.0025	0.11	2010-2	0.0005	0.05	2010-2	0.0004	0.1	2010-2	0.0005	ND	2010-2	NS	NS
	0.002	**0.871**		**0.001**	**1.318**		**0.007**	**0.538**		**0.001**	**0.287**		**0.010**	**1.200**

D=	DRY
ND=	NON DETECT
NS=	NOT SAMPLED
F=	FROZEN

Table D6-5
Smith Ranch-Reynolds Ranch Water Quality Data - MO Wells

Mine Unit-27		Well ID	27MO-001	27MO-001	27MO-001	27MO-001	27MO-002	27MO-002	27MO-002	27MO-002	27MO-003	27MO-003	27MO-003	27MO-003	27MO-004A	27MO-004A	27MO-004A	27MO-004A	27MO-005	27MO-005	27MO-005	27MO-005	27MO-006	27MO-006	27MO-006	27MO-006
		Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4
Analyte	Units	PQL																								
Major Ions																										
Alkalinity, Total as CaCO3	mg/L	1			329	206			61	77				1340			166	167			837	825			231	93
Carbonate as CO3	mg/L	1	25	30			42	41			8	46			7	ND			43	52			ND	13		
Bicarbonate as HCO3	mg/L	1	ND	ND			ND	ND			19	ND			188	202			ND	ND			92	38		
Calcium	mg/L	1	134	129			50	30			34	343			87	86			184	240			65	35		
Chloride	mg/L	1	3	3	3	3	3	3	4	5	7	3		2	3	3	3	3	3	2	2	2	10	8	4	4
Fluoride	mg/L	0.1	0.2	0.3			0.7	0.6			0.2	0.2			0.2	0.2			0.2	0.2			0.2	0.4		
Magnesium	mg/L	1	ND	ND			ND	ND			14	ND			13	14			ND	ND			18	11		
Nitrogen, Ammonia as N	mg/L	0.05	0.07	0.07			1.74	1.29			ND	0.63			ND	ND			1.56	1.28			0.07	0.67		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND	ND			ND	ND			0.5	ND			ND	ND			ND	ND			ND	ND		
Potassium	mg/L	1	15	15			18	14			12	79			9	9			54	56			11	15		
Silica	mg/L	0.1	14.6	12.3			18.2	17.4			17.5	1.2			15.4	13.2			7	4.3			22.8	19.9		
Sodium	mg/L	1	19	29			49	44			30	86			40	41			74	81			22	31		
Sulfate	mg/L	1	83	80			184	113			191	54			221	228			134	94			210	166		
Physical Properties																										
Conductivity	umhos/cm	1	1310	1610	1590	1500	619	470	317	276	506	5020		5800	728	720	720	726	2660	3600	3660	3900	596	480	981	636
pH	s.u.	0.01	11.8	11.8			10.8	11			9.83	12.3			8.23	8.1			12	12.2			8.31	9.5		
Solids, Total Dissolved TDS @ 180 C	mg/L	10	444	450			355	274			314	1180			476	475			764	956			399	342		
Trace Metals																										
Aluminum	mg/L	0.1	0.1	0.1			0.1	0.1			ND	ND			ND	ND			ND	ND			ND	ND		
Arsenic	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			0.001	0.002		
Barium	mg/L	0.1	0.5	0.4			ND	ND			ND	1.3			ND	ND			0.6	1.1			ND	ND		
Boron	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			0.1	ND			ND	ND		
Cadmium	mg/L	0.005	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Chromium	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Copper	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Iron	mg/L	0.03	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Lead	mg/L	0.05	0.011	0.008			ND	ND			ND	0.009			ND	ND			0.004	0.002			ND	ND		
Manganese	mg/L	0.01	ND	ND			ND	ND			ND	ND			0.02	0.02			ND	ND			ND	ND		
Mercury	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Molybdenum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Nickel	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Selenium	mg/L	0.001	0.001	ND			ND	0.001			0.009	0.003			ND	ND			0.003	0.002			0.001	0.003		
Vanadium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Zinc	mg/L	0.01	ND	ND			ND	ND			ND	0.04			ND	ND			ND	ND			ND	ND		
Radionuclides																										
Uranium	mg/L	0.0003	0.0006	0.0014			0.0013	0.003			0.0121	0.0005			ND	0.0008			ND	ND			0.0154	0.0296		
Radium 226			3	1.7			3	2			2.2	2.6			0.42	0.27			0.61	0.98			16	12		
Quality Control																										
A/C Balance (± 5)	%	250	7.67	0.854			-3.99	-0.662			-3.42	-3.57			-3.91	-2.79			1.36	-2.57			-1.98	-3.4		
Anions	meq/L	250	6.79	7.92			5.67	4.06			4.79	24.6			8.02	8.14			13.5	18			6.17	4.75		
Cations	meq/L	250	7.91	8.06			5.24	4			4.47	22.9			7.41	7.7			13.9	17.1			5.93	4.44		
Solids, Total Dissolved Calculated	mg/L	250	422	458			380	283			330	1270			493	500			778	958			410	329		
TDS Balance (0.80 - 1.20)	dec. %	250	1.05	0.98			0.93	0.97			0.76	0.93			0.97	0.95			0.87	0.96			0.97	1.04		

Table D6-5
Smith Ranch-Reynolds Ranch Water Quality Data - MO Wells

Mine Unit-27		Well ID	27MO-007A	27MO-007A	27MO-007A	27MO-007A	27MO-008	27MO-008	27MO-008	27MO-008	27MO-009A	27MO-009A	27MO-009A	27MO-009A	27MO-010	27MO-010	27MO-010	27MO-010	27MO-011A	27MO-011A	27MO-011A	27MO-011A	27MO-012A	27MO-012A	27MO-012A	27MO-012A
		Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4
Analyte	Units	PQL																								
Major Ions																										
Alkalinity, Total as CaCO3	mg/L	1			162	144			326	275			87	91			126	108			164	131			107	116
Carbonate as CO3	mg/L	1	35	39			35	32			41	37			63	54			9	69			34	13		
Bicarbonate as HCO3	mg/L	1	38	69			ND	ND			9	12			ND	ND			115	ND			ND	80		
Calcium	mg/L	1	35	17			296	152			25	11			16	13			60	40			42	18		
Chloride	mg/L	1	7	4	5	5	3	2	3	4	7	6	5	5	5	5	6	5	8	4	5	5	5	5	5	5
Fluoride	mg/L	0.1	0.4	0.5			0.2	0.4			0.7	0.7			0.6	0.6			0.2	0.5			0.4	0.4		
Magnesium	mg/L	1	9	ND			ND	ND			ND	ND			ND	ND			20	ND			1	3		
Nitrogen, Ammonia as N	mg/L	0.05	1.24	0.29			1.32	2.04			0.25	0.09			0.62	0.31			0.97	1.7			1.43	0.28		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Potassium	mg/L	1	31	26			35	35			22	20			28	24			17	31			41	18		
Silica	mg/L	0.1	15.5	9.3			1.5	5.4			7.8	6.7			15.8	13.1			16.2	9.3			12.9	10.3		
Sodium	mg/L	1	47	41			41	56			45	40			42	36			36	67			70	38		
Sulfate	mg/L	1	186	48			103	89			109	72			50	32			241	110			163	79		
Physical Properties																										
Conductivity	umhos/cm	1	578	360	304	278	3330	856	1520	1470	384	365	287	250	335	474	448	350	688	904	733	470	673	359	336	350
pH	s.u.	0.01	10.2	9.9			12	12			10.6	10.6			11.1	11.2			8.63	11.5			11.3	9.35		
Solids, Total Dissolved TDS @ 180 C	mg/L	10	378	225			883	576			200	228			162	232			390	399			371	227		
Trace Metals																										
Aluminum	mg/L	0.1	ND	0.1			0.1	0.5			ND	ND			0.6	0.6			ND	ND			ND	ND		
Arsenic	mg/L	0.001	0.001	ND			ND	ND			0.007	0.006			ND	ND			ND	ND			ND	ND		
Barium	mg/L	0.1	ND	ND			0.3	0.3			ND	ND			ND	ND			ND	0.1			ND	ND		
Boron	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Cadmium	mg/L	0.005	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Chromium	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Copper	mg/L	0.01	ND	0.03			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Iron	mg/L	0.03	ND	ND			ND	0.09			ND	ND			0.06	ND			ND	ND			ND	ND		
Lead	mg/L	0.05	0.002	0.002			0.243	0.112			0.001	0.005			0.013	0.005			0.009	0.012			0.017	0.002		
Manganese	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Mercury	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Molybdenum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Nickel	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Selenium	mg/L	0.001	0.003	ND			0.003	0.001			0.002	ND			0.003	ND			0.003	0.002			0.003	ND		
Vanadium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Zinc	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Radionuclides																										
Uranium	mg/L	0.0003	0.0171	0.0011			0.0005	0.0003			0.0006	0.001			0.0003	ND			0.0409	0.0007			0.0016	0.0025		
Radium 226			1.1	0.17			2.6	3			0.68	0.38			6	2.8			47	14			0.09	0.11		
Quality Control																										
A/C Balance (± 5)	%	250	-4.28	-3.05			-5.7	-3.7			-1.98	-5.1			-5.59	-4.26			-5.35	-3.02			5.62	-1.57		
Anions	meq/L	250	5.86	3.59			19.6	11.9			4.01	3.13			3.79	3.3			7.42	6.21			5.68	3.56		
Cations	meq/L	250	5.38	3.37			17.5	11.1			3.86	2.82			3.39	3.03			6.66	5.84			6.36	3.45		
Solids, Total Dissolved Calculated	mg/L	250	388	226			1000	643			266	202			239	203			467	380			402	227		
TDS Balance (0.80 - 1.20)	dec. %	250	0.97	1			0.88	0.9			0.75	0.96			0.68	1.14			0.84	1.01			0.67	1		

Table D6-5
Smith Ranch-Reynolds Ranch Water Quality Data - MO Wells

Mine Unit-27		Well ID	27MO-013	27MO-013	27MO-013	27MO-013	27MO-014	27MO-014	27MO-014	27MO-014	27MO-015	27MO-015	27MO-015	27MO-015
		Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round1	Round 2	Round 3	Round 4
Analyte	Units	PQL												
Major Ions														
Alkalinity, Total as CaCO3	mg/L	1			358	334			357	238			174	175
Carbonate as CO3	mg/L	1	35	37			15	30			16	ND		
Bicarbonate as HCO3	mg/L	1	ND	ND			14	ND			188	210		
Calcium	mg/L	1	20	60			39	113			87	90		
Chloride	mg/L	1	12	8	7	6	4	3	4	5	3	3	3	2
Fluoride	mg/L	0.1	0.2	0.2			0.2	0.3			0.2	0.2		
Magnesium	mg/L	1	3	ND			14	ND			13	15		
Nitrogen, Ammonia as N	mg/L	0.05	0.51	0.37			0.07	0.66			ND	ND		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND	ND			ND	ND			ND	ND		
Potassium	mg/L	1	45	59			15	39			13	10		
Silica	mg/L	0.1	9.6	6.2			12.6	7.1			15.7	13.8		
Sodium	mg/L	1	46	63			50	68			40	41		
Sulfate	mg/L	1	137	93			256	156			223	232		
Physical Properties														
Conductivity	umhos/cm	1	472	1550	1830	1800	608	1780	1770	1400	743	750	752	754
pH	s.u.	0.01	11	11.8			9.83	11.8			8.51	8.1		
Solids, Total Dissolved TDS @ 180 C	mg/L	10	292	527			369	630			489	538		
Trace Metals														
Aluminum	mg/L	0.1	ND	ND			ND	0.2			ND	ND		
Arsenic	mg/L	0.001	ND	ND			ND	ND			ND	ND		
Barium	mg/L	0.1	ND	0.1			ND	0.1			ND	ND		
Boron	mg/L	0.1	ND	ND			ND	ND			ND	ND		
Cadmium	mg/L	0.005	ND	ND			ND	ND			ND	ND		
Chromium	mg/L	0.05	ND	ND			ND	ND			ND	ND		
Copper	mg/L	0.01	ND	ND			ND	ND			ND	ND		
Iron	mg/L	0.03	ND	ND			ND	ND			ND	0.08		
Lead	mg/L	0.05	0.003	0.189			ND	0.004			0.003	ND		
Manganese	mg/L	0.01	ND	ND			ND	ND			0.01	0.02		
Mercury	mg/L	0.001	ND	ND			ND	ND			ND	ND		
Molybdenum	mg/L	0.1	ND	ND			ND	ND			ND	ND		
Nickel	mg/L	0.05	ND	ND			ND	ND			ND	ND		
Selenium	mg/L	0.001	0.003	0.002			0.002	0.002			ND	ND		
Vanadium	mg/L	0.1	ND	ND			ND	ND			ND	ND		
Zinc	mg/L	0.01	ND	ND			ND	ND			ND	ND		
Radionuclides														
Uranium	mg/L	0.0003	ND	ND			0.0148	ND			0.0004	ND		
Radium 226			10	3.5			16	9.1			0.78	0.32		
Quality Control														
A/C Balance (± 5)	%	250	-3.04	-1.34			-4.9	3.66			-5.59	-3.52		
Anions	meq/L	250	4.7	7.67			6.17	9.16			8.33	8.35		
Cations	meq/L	250	4.42	7.47			5.6	9.86			7.45	7.78		
Solids, Total Dissolved Calculated	mg/L	250	320	456			415	564			506	515		
TDS Balance (0.80 - 1.20)	dec. %	250	0.71	1.11			0.78	1.08			0.97	1.04		

Table D6-6
Smith Ranch-Reynolds Ranch Water Quality Data - M Wells

Mine Unit 27

Analyte	Units	Well ID Round PQL	27M-001A Round 1	27M-001A Round 2	27M-001A Round 3	27M-001A Round 4	27M-002 Round 1	27M-002 Round 2	27M-002 Round 3	27M-002 Round 4	27M-003 Round 1	27M-003 Round 2	27M-003 Round 3	27M-003 Round 4	27M-004 Round 1	27M-004 Round 2	27M-004 Round 3	27M-004 Round 4	27M-005 Round 1	27M-005 Round 2	27M-005 Round 3	27M-005 Round 4	27M-006 Round 1	27M-006 Round 2	27M-006 Round 3	27M-006 Round 4	27M-007 Round 1	27M-007 Round 2	27M-007 Round 3	27M-007 Round 4
Major Ions																														
Alkalinity, Total as CaCO3	mg/L	1		215	227	238		220	232	239		227	235	239		217	216	228		240	241	242		231	234	235		235	237	241
Carbonate as CO3	mg/L	1	ND				ND				ND				7				7				ND				ND			
Bicarbonate as HCO3	mg/L	1	239				274				281				235				268				274				291			
Calcium	mg/L	1	123				142				139				131				144				137				142			
Chloride	mg/L	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Fluoride	mg/L	0.1	0.2				0.2				0.2				0.2				0.2				0.2				0.2			
Magnesium	mg/L	1	20				29				29				27				26				28				31			
Nitrogen, Ammonia as N	mg/L	0.05	ND				0.11				ND				ND				ND				ND				ND			
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Nitrogen, Nitrite as N	mg/L	0.1																												
Potassium	mg/L	1	23				14				14				18				19				14				14			
Silica	mg/L	0.1	17.4				18.6				18.2				17.4				16.6				18.7				17.7			
Sodium	mg/L	1	42				34				33				37				37				34				35			
Sulfate	mg/L	1	340				354				341				347				354				359				356			
Physical Properties																														
Conductivity	umhos/cm	1	980	1010	1030	1030	997	1010	1020	1020	999	1010	1020	1010	961	999	996	1010	1010	1040	1040	1030	1020	1040	1040	1040	1020	1000	1030	1030
pH	s.u.	0.01	8.1				7.87				7.76				8.13				8.02				7.84				7.72			
Solids, Total Dissolved TDS @ 180 C	mg/L	10	650				729				716				701				734				692				697			
Trace Metals																														
Aluminum	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Arsenic	mg/L	0.001	ND				ND				ND				0.001				0.002				0.001				ND			
Barium	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Boron	mg/L	0.1	ND				ND				ND				0.1				0.2				ND				ND			
Cadmium	mg/L	0.005	ND				ND				ND				ND				ND				ND				ND			
Chromium	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Copper	mg/L	0.01	ND				ND				ND				ND				0.01				ND				ND			
Iron	mg/L	0.03	0.04				ND				ND				ND				ND				ND				ND			
Lead	mg/L	0.05	ND				ND				ND				ND				ND				ND				0.002			
Manganese	mg/L	0.01	ND				ND				0.01				ND				ND				ND				0.01			
Mercury	mg/L	0.001	ND				ND				ND				ND				ND				ND				ND			
Molybdenum	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Nickel	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Selenium	mg/L	0.001	ND				ND				ND				ND				ND				ND				ND			
Vanadium	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Zinc	mg/L	0.01	ND				ND				ND				ND				ND				ND				ND			
Radionuclides																														
Uranium	mg/L	0.0003	0.0099				0.0118				0.013				0.0088				0.0093				0.0093				0.0075			
Radium 226	pCi/L	0.2	6.5				7.5				4.7				5.5				4.7				4.8				3.1			
Quality Control																														
A/C Balance (± 5)	%	250	-4.89				-2.79				-2.76				-2.25				-2.48				-4.54				-3.13			
Anions	meq/L	250	11.2				11.9				11.8				11.4				12.1				12				12.2			
Cations	meq/L	250	10.2				11.3				11.1				10.9				11.5				11				11.5			
Solids, Total Dissolved Calculated	mg/L	250	693				733				720				706				743				733				745			
TDS Balance (0.80 - 1.20)	dec. %	250	0.94				0.99				0.99				0.99				0.99				0.94				0.94			

Table D6-6
Smith Ranch-Reynolds Ranch Water Quality Data - M Wells

Mine Unit 27		Well ID Round	27M-008 Round 1	27M-008 Round 2	27M-008 Round 3	27M-008 Round 4	27M-009 Round 1	27M-009 Round 2	27M-009 Round 3	27M-009 Round 4	27M-010 Round 1	27M-010 Round 2	27M-010 Round 3	27M-010 Round 4	27M-011 Round 1	27M-011 Round 2	27M-011 Round 3	27M-011 Round 4	27M-012 Round 1	27M-012 Round 2	27M-012 Round 3	27M-012 Round 4	27M-013 Round 1	27M-013 Round 2	27M-013 Round 3	27M-013 Round 4	27M-014 Round 1	27M-014 Round 2	27M-014 Round 3	27M-014 Round 4
Analyte	Units	PQL																												
Major Ions																														
Alkalinity, Total as CaCO3	mg/L	1		230	241	238		233	233	235		233	240	236		240	239	242		231	227	232		198	201	201		161	172	184
Carbonate as CO3	mg/L	1	ND				ND				ND				ND				ND				ND				ND			
Bicarbonate as HCO3	mg/L	1	272				278				274				296				275				234				171			
Calcium	mg/L	1	141				139				147				154				156				126				107			
Chloride	mg/L	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Fluoride	mg/L	0.1	0.2				0.2				0.2				0.2				0.2				0.2				0.1			
Magnesium	mg/L	1	29				29				28				34				31				20				24			
Nitrogen, Ammonia as N	mg/L	0.05	ND				ND				0.05				ND				ND				ND				0.10			
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Nitrogen, Nitrite as N	mg/L	0.1																												
Potassium	mg/L	1	16				16				16				12				12				14				16			
Silica	mg/L	0.1	17.3				17.2				17.8				17.7				17.9				19.1				15.1			
Sodium	mg/L	1	36				37				39				37				37				39				39			
Sulfate	mg/L	1	380				371				394				398				402				327				344			
Physical Properties																														
Conductivity	umhos/cm	1	1000	1060	1060	1060	1040	1100	1060	1060	1080	1080	1080	1100	1100	1100	1100	1100	1080	1090	1080	1100	937	944	944	950	890	928	943	970
pH	s.u.	0.01	7.8				7.92				7.89				7.62				7.67				7.88				7.86			
Solids, Total Dissolved TDS @ 180 C	mg/L	10	721				721				797				793				773				652				634			
Trace Metals																														
Aluminum	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Arsenic	mg/L	0.001	ND				ND				0.001				ND				ND				ND				ND			
Barium	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Boron	mg/L	0.1	ND				ND				ND				ND				0.1				ND				ND			
Cadmium	mg/L	0.005	ND				ND				ND				ND				ND				ND				ND			
Chromium	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Copper	mg/L	0.01	ND				ND				ND				ND				ND				ND				ND			
Iron	mg/L	0.03	ND				ND				ND				ND				ND				ND				ND			
Lead	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Manganese	mg/L	0.01	0.01				ND				ND				0.01				0.01				0.01				ND			
Mercury	mg/L	0.001	ND				ND				ND				ND				ND				ND				ND			
Molybdenum	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Nickel	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Selenium	mg/L	0.001	ND				ND				ND				ND				ND				ND				ND			
Vanadium	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Zinc	mg/L	0.01	0.01				ND				0.01				ND				ND				ND				ND			
Radionuclides																														
Uranium	mg/L	0.0003	0.0064				0.0059				0.0058				0.0053				0.0429				0.0094				0.0096			
Radium 226	pCi/L	0.2	7				4.4				4.5				6.2				14				3.2				3.2			
Quality Control																														
A/C Balance (± 5)	%	250	-4.22				-4.28				-4.17				-2.99				-2.57				-3.4				-3.14			
Anions	meq/L	250	12.4				12.4				12.8				13.2				12.9				10.7				10			
Cations	meq/L	250	11.4				11.3				11.8				12.4				12.3				10				9.41			
Solids, Total Dissolved Calculated	mg/L	250	761				753				784				806				798				668				635			
TDS Balance (0.80 - 1.20)	dec. %	250	0.95				0.96				1.02				0.98				0.97				0.98				1			

Table D6-6
Smith Ranch-Reynolds Ranch Water Quality Data - M Wells

Mine Unit 27		Well ID Round	27M-015 Round 1	27M-015 Round 2	27M-015 Round 3	27M-015 Round 4	27M-016 Round 1	27M-016 Round 2	27M-016 Round 3	27M-016 Round 4	27M-017 Round 1	27M-017 Round 2	27M-017 Round 3	27M-017 Round 4	27M-018 Round 1	27M-018 Round 2	27M-018 Round 3	27M-018 Round 4	27M-019 Round 1	27M-019 Round 2	27M-019 Round 3	27M-019 Round 4	27M-020 Round 1	27M-020 Round 2	27M-020 Round 3	27M-020 Round 4	27M-021 Round 1	27M-021 Round 2	27M-021 Round 3	27M-021 Round 4
Analyte	Units	PQL																												
Major Ions																														
Alkalinity, Total as CaCO3	mg/L	1		203	207	207		205	206	209		206	208	207		203	205	205		200	199	198		194	196	195		185	184	189
Carbonate as CO3	mg/L	1	ND				ND				ND				ND				ND				ND				ND			
Bicarbonate as HCO3	mg/L	1	235				263				249				243				236				229				229			
Calcium	mg/L	1	138				141				143				133				120				109				106			
Chloride	mg/L	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2
Fluoride	mg/L	0.1	0.2				0.2				0.2				0.2				0.2				0.2				0.1			
Magnesium	mg/L	1	20				21				25				23				20				19				20			
Nitrogen, Ammonia as N	mg/L	0.05	0.37				ND				ND				0.13				ND				ND				0.05			
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Nitrogen, Nitrite as N	mg/L	0.1																												
Potassium	mg/L	1	14				13				11				13				12				13				13			
Silica	mg/L	0.1	18.9				18.4				18.8				18				18.6				18.7				19.5			
Sodium	mg/L	1	41				44				37				37				39				37				37			
Sulfate	mg/L	1	357				362				357				351				324				266				276			
Physical Properties																														
Conductivity	umhos/cm	1	980	1010	1010	1010	992	998	994	1000	1000	1010	1000	1010	990	1000	1010	1020	900	904	902	910	850	856	857	861	857	860	846	857
pH	s.u.	0.01	8				7.93				7.7				7.9				7.8				8				7.9			
Solids, Total Dissolved TDS @ 180 C	mg/L	10	663				647				682				667				573				535				582			
Trace Metals																														
Aluminum	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Arsenic	mg/L	0.001	0.001				ND				ND				ND				ND				0.001				0.001			
Barium	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Boron	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Cadmium	mg/L	0.005	ND				ND				ND				ND				ND				ND				ND			
Chromium	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Copper	mg/L	0.01	ND				ND				ND				ND				ND				ND				ND			
Iron	mg/L	0.03	ND				ND				0.06				ND				0.03				ND				ND			
Lead	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Manganese	mg/L	0.01	ND				0.01				0.02				0.02				0.02				0.01				0.02			
Mercury	mg/L	0.001	ND				ND				ND				ND				ND				ND				ND			
Molybdenum	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Nickel	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Selenium	mg/L	0.001	ND				ND				ND				ND				ND				ND				ND			
Vanadium	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Zinc	mg/L	0.01	ND				ND				ND				ND				ND				ND				ND			
Radionuclides																														
Uranium	mg/L	0.0003	0.0168				0.0205				0.0219				0.0352				0.0127				0.0072				0.0102			
Radium 226	pCi/L	0.2	4.2				4.9				8.8				11				4.1				2.6				2.9			
Quality Control																														
A/C Balance (± 5)	%	250	-2.83				-3.84				-2.08				-4.01				-5.12				-2.64				-3.85			
Anions	meq/L	250	11.3				11.9				11.6				11.3				10.7				9.41				9.56			
Cations	meq/L	250	10.7				11				11.1				10.5				9.63				8.92				8.85			
Solids, Total Dissolved Calculated	mg/L	250	712				736				722				701				656				584				591			
TDS Balance (0.80 - 1.20)	dec. %	250	0.93				0.88				0.94				0.95				0.87				0.92				0.98			

Table D6-6

Smith Ranch-Reynolds Ranch Water Quality Data - M Wells

Mine Unit 27		Well ID Round	27M-022 Round 1	27M-022 Round 2	27M-022 Round 3	27M-022 Round 4	27M-023 Round 1	27M-023 Round 2	27M-023 Round 3	27M-023 Round 4	27M-024A Round 1	27M-024A Round 2	27M-024A Round 3	27M-024A Round 4	27M-025 Round 1	27M-025 Round 2	27M-025 Round 3	27M-025 Round 4	27M-026 Round 1	27M-026 Round 2	27M-026 Round 3	27M-026 Round 4	27M-027 Round 1	27M-027 Round 2	27M-027 Round 3	27M-027 Round 4	27M-028A Round 1	27M-028A Round 2	27M-028A Round 3	27M-028A Round 4
Analyte	Units	PQL																												
Major Ions																														
Alkalinity, Total as CaCO3	mg/L	1		197	200	198		197	195	196		190	189	189		199	200	203		203	205	208		199	201	203		201	199	196
Carbonate as CO3	mg/L	1	ND				ND				ND				ND				ND				ND				ND			
Bicarbonate as HCO3	mg/L	1	238				236				213				239				247				231				244			
Calcium	mg/L	1	119				108				108				127				96				81				70			
Chloride	mg/L	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2
Fluoride	mg/L	0.1	0.2				0.2				0.2				0.1				0.1				0.1				0.2			
Magnesium	mg/L	1	22				20				18				18				18				13				12			
Nitrogen, Ammonia as N	mg/L	0.05	ND				ND				0.20				0.19				ND				ND				ND			
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Nitrogen, Nitrite as N	mg/L	0.1																												
Potassium	mg/L	1	12				12				15				16				10				13				11			
Silica	mg/L	0.1	18.8				19.5				18.2				17.5				17.7				18				18.3			
Sodium	mg/L	1	36				36				44				41				37				36				32			
Sulfate	mg/L	1	302				278				311				324				223				190				132			
Physical Properties																														
Conductivity	umhos/cm	1	910	918	914	916	864	870	868	869	885	910	902	902	928	933	930	940	780	781	777	779	683	700	697	706	605	610	599	595
pH	s.u.	0.01	7.9				7.97				7.84				8.17				7.9				8.12				8.13			
Solids, Total Dissolved TDS @ 180 C	mg/L	10	623				572				591				631				481				419				365			
Trace Metals																														
Aluminum	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Arsenic	mg/L	0.001	0.001				0.001				0.001				0.001				ND				0.001				0.002			
Barium	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Boron	mg/L	0.1	ND				ND				0.1				ND				ND				ND				ND			
Cadmium	mg/L	0.005	ND				ND				ND				ND				ND				ND				ND			
Chromium	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Copper	mg/L	0.01	ND				ND				ND				ND				ND				ND				ND			
Iron	mg/L	0.03	ND				ND				ND				ND				ND				ND				ND			
Lead	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Manganese	mg/L	0.01	0.02				0.02				0.01				0.01				0.02				ND				ND			
Mercury	mg/L	0.001	ND				ND				ND				ND				ND				ND				ND			
Molybdenum	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Nickel	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Selenium	mg/L	0.001	ND				ND				ND				ND				ND				ND				ND			
Vanadium	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Zinc	mg/L	0.01	ND				ND				ND				ND				ND				ND				0.01			
Radionuclides																														
Uranium	mg/L	0.0003	0.0143				0.0122				0.018				0.0118				0.0049				0.0075				0.0109			
Radium 226	pCi/L	0.2	5.6				3.4				5				3.1				2.6				2.4				2.7			
Quality Control																														
A/C Balance (± 5)	%	250	-2.87				-4.19				-4.38				-3.95				-3.82				-5.17				-5.48			
Anions	meq/L	250	10.3				9.71				10				10.8				8.82				7.76				6.85			
Cations	meq/L	250	9.69				8.93				9.19				9.98				8.17				6.99				6.14			
Solids, Total Dissolved Calculated	mg/L	250	636				597				627				669				533				469				404			
TDS Balance (0.80 - 1.20)	dec. %	250	0.98				0.96				0.94				0.94				0.9				0.89				0.9			

Table D6-6
Smith Ranch-Reynolds Ranch Water Quality Data - M Wells

Mine Unit 27

Analyte	Units	Well ID Round PQL	27M-029 Round 1	27M-029 Round 2	27M-029 Round 3	27M-029 Round 4	27M-030 Round 1	27M-030 Round 2	27M-030 Round 3	27M-030 Round 4	27M-031A Round 1	27M-031A Round 2	27M-031A Round 3	27M-031A Round 4	27M-032 Round 1	27M-032 Round 2	27M-032 Round 3	27M-032 Round 4	27M-033 Round 1	27M-033 Round 2	27M-033 Round 3	27M-033 Round 4	27M-034 Round 1	27M-034 Round 2	27M-034 Round 3	27M-034 Round 4	27M-035A Round 1	27M-035A Round 2	27M-035A Round 3	27M-035A Round 4
Major Ions																														
Alkalinity, Total as CaCO3	mg/L	1		200	204	203		199	203	208		210	209	211		202	210	211		215	217	219		221	187	229		218	234	227
Carbonate as CO3	mg/L	1	ND				ND				ND				ND				ND				ND				ND			
Bicarbonate as HCO3	mg/L	1	227				239				258				231				258				262				252			
Calcium	mg/L	1	75				123				131				129				142				136				145			
Chloride	mg/L	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	1	2	2	2	2	2	2
Fluoride	mg/L	0.1	0.2				0.2				0.2				0.2				0.2				0.2				0.2			
Magnesium	mg/L	1	13				20				26				18				22				21				22			
Nitrogen, Ammonia as N	mg/L	0.05	ND				0.16				ND				ND				ND				0.50				ND			
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Nitrogen, Nitrite as N	mg/L	0.1																												
Potassium	mg/L	1	10				15				12				15				18				15				16			
Silica	mg/L	0.1	18.7				17.4				18.3				17.9				18.6				17.4				16.3			
Sodium	mg/L	1	33				43				35				42				41				40				38			
Sulfate	mg/L	1	159				333				345				331				347				371				385			
Physical Properties																														
Conductivity	umhos/cm	1	636	650	647	648	947	960	954	953	1000	1000	994	998	956	980	984	989	988	1000	1020	1020	1040	1100	1050	1050	1000	1050	1050	1070
pH	s.u.	0.01	8.14				7.92				7.87				7.89				8				7.71				8			
Solids, Total Dissolved TDS @ 180 C	mg/L	10	385				622				702				662				691				713				738			
Trace Metals																														
Aluminum	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Arsenic	mg/L	0.001	0.001				0.007				0.026				0.031				0.001				0.041				ND			
Barium	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Boron	mg/L	0.1	ND				ND				ND				0.1				ND				ND				ND			
Cadmium	mg/L	0.005	ND				ND				ND				ND				ND				ND				ND			
Chromium	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Copper	mg/L	0.01	ND				ND				ND				ND				ND				ND				ND			
Iron	mg/L	0.03	ND				ND				ND				ND				ND				ND				ND			
Lead	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Manganese	mg/L	0.01	ND				0.03				0.04				0.01				0.02				0.02				0.01			
Mercury	mg/L	0.001	ND				ND				ND				ND				ND				ND				ND			
Molybdenum	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Nickel	mg/L	0.05	ND				ND				ND				ND				ND				ND				ND			
Selenium	mg/L	0.001	ND				0.001				ND				0.001				ND				ND				ND			
Vanadium	mg/L	0.1	ND				ND				ND				ND				ND				ND				ND			
Zinc	mg/L	0.01	ND				ND				ND				ND				0.01				ND				ND			
Radionuclides																														
Uranium	mg/L	0.0003	0.0148				0.0261				0.0176				0.0156				0.0213				0.0158				0.0255			
Radium 226	pCi/L	0.2	3				192				1.5				9.9				1.1				8.4				1.4			
Quality Control																														
A/C Balance (± 5)	%	250	-5.33				-4.06				-4.71				-3.08				-1.61				-5.05				-5.02			
Anions	meq/L	250	7.2				10.9				11.5				10.7				11.5				11.8				12.3			
Cations	meq/L	250	6.47				10				10.5				10.1				11.1				10.7				11.1			
Solids, Total Dissolved Calculated	mg/L	250	430				675				701				673				722				724				756			
TDS Balance (0.80 - 1.20)	dec. %	250	0.9				0.92				1				0.98				0.96				0.98				0.98			

Table D6-6
Smith Ranch-Reynolds Ranch Water Quality Data - M Wells

Mine Unit 27

Analyte	Units	Well ID Round PQL	27M-036 Round 1	27M-036 Round 2	27M-036 Round 3	27M-036 Round 4	27M-037 Round 1	27M-037 Round 2	27M-037 Round 3	27M-037 Round 4	27M-038A Round 1	27M-038A Round 2	27M-038A Round 3	27M-038A Round 4	27M-039 Round 1	27M-039 Round 2	27M-039 Round 3	27M-039 Round 4	27M-040 Round 1	27M-040 Round 2	27M-040 Round 3	27M-040 Round 4
Major Ions																						
Alkalinity, Total as CaCO3	mg/L	1		217	216	216		222	221	222		191	191	192		231	235	232		209	214	223
Carbonate as CO3	mg/L	1	ND				ND				ND				ND				7			
Bicarbonate as HCO3	mg/L	1	245				269				213	233			288				229			
Calcium	mg/L	1	143				136				140				139				144			
Chloride	mg/L	1	2	2	2	2	2	1	1	1	2	2	2	2	1	2	2	2	2	2	2	2
Fluoride	mg/L	0.1	0.2				0.2				0.2				0.2				0.2			
Magnesium	mg/L	1	27				28				18				30				23			
Nitrogen, Ammonia as N	mg/L	0.05	ND				ND				ND				0.29				ND			
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND				ND				ND				ND				ND			
Nitrogen, Nitrite as N	mg/L	0.1																				
Potassium	mg/L	1	15				12				18				11				18			
Silica	mg/L	0.1	18.5				17.4				15.9				17.3				15.8			
Sodium	mg/L	1	39				35				44				35				39			
Sulfate	mg/L	1	387				365				358				365				354			
Physical Properties																						
Conductivity	umhos/cm	1	1000	1060	1050	1070	1040	1000	1040	1050	960	995	998	1000	1100	1060	1060	1060	981	1010	1020	1020
pH	s.u.	0.01	8				7.91				8.1				7.7				8.1			
Solids, Total Dissolved TDS @ 180 C	mg/L	10	734				736				661				740				690			
Trace Metals																						
Aluminum	mg/L	0.1	ND				ND				ND				ND				ND			
Arsenic	mg/L	0.001	ND				ND				ND				ND				ND			
Barium	mg/L	0.1	ND				ND				ND				ND				ND			
Boron	mg/L	0.1	0.1				ND				ND				ND				ND			
Cadmium	mg/L	0.005	ND				ND				ND				ND				ND			
Chromium	mg/L	0.05	ND				ND				ND				ND				ND			
Copper	mg/L	0.01	ND				ND				ND				ND				ND			
Iron	mg/L	0.03	ND				ND				ND				ND				ND			
Lead	mg/L	0.05	ND				ND				ND				ND				ND			
Manganese	mg/L	0.01	ND				0.02				ND				0.02				ND			
Mercury	mg/L	0.001	ND				ND				ND				ND				ND			
Molybdenum	mg/L	0.1	ND				ND				ND				ND				ND			
Nickel	mg/L	0.05	ND				ND				ND				ND				ND			
Selenium	mg/L	0.001	ND				ND				ND				ND				0.001			
Vanadium	mg/L	0.1	ND				ND				ND				ND				ND			
Zinc	mg/L	0.01	ND				ND				ND				ND				ND			
Radionuclides																						
Uranium	mg/L	0.0003	0.0382				0.0212				0.0084				0.0142				0.0214			
Radium 226	pCi/L	0.2	57				1.6				4.7				2				13			
Quality Control																						
A/C Balance (± 5)	%	250	-2.95				-4.81				-0.808				-4.76				-0.798			
Anions	meq/L	250	12.1				12.1				11				12.4				11.4			
Cations	meq/L	250	11.4				10.9				10.8				11.2				11.2			
Solids, Total Dissolved Calculated	mg/L	250	757				732				705				745				719			
TDS Balance (0.80 - 1.20)	dec. %	250	0.97				1.01				0.94				0.99				0.96			

Table D6-7
Smith Ranch-Reynolds Ranch Water Quality Data - MU Wells

Mine Unit 27

		Well ID	27MU-001	27MU-001	27MU-001	27MU-001	27MU-002	27MU-002	27MU-002	27MU-002	27MU-003	27MU-003	27MU-003	27MU-003	27MU-004	27MU-004	27MU-004	27MU-004	27MU-005	27MU-005	27MU-005	27MU-005	27MU-006A	27MU-006A	27MU-006A	27MU-006A
		Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4
Analyte	Units	PQL																								
Major Ions																										
Alkalinity, Total as CaCO3	mg/L	1			219	230			223	229			232	230			235	232			241	245			247	248
Carbonate as CO3	mg/L	1	ND	ND			7	ND			ND	ND			ND	ND			6	ND			ND	ND		
Bicarbonate as HCO3	mg/L	1	229	257			229	275			277	278			272	281			273	295			285	289		
Calcium	mg/L	1	115	99			116	111			118	113			119	138			128	131			131	129		
Chloride	mg/L	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Fluoride	mg/L	0.1	0.3	0.3			0.2	0.2			0.2	0.2			0.2	0.2			0.2	0.2			0.2	0.2		
Magnesium	mg/L	1	19	17			14	15			24	24.3			24	31.2			22	30			26	26.4		
Nitrogen, Ammonia as N	mg/L	0.05	ND	0.13			0.29	0.27			ND	0.08			ND	ND			0.19	ND			ND	0.1		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Nitrogen, Nitrite as N	mg/L	0.1																								
Potassium	mg/L	1	18	14			21	15			14	12.8			13	11.3			16	11			19	16.3		
Silica	mg/L	0.1	16.5	15.2			17.9	16.4			18.4	15.5			17.9	15.8			16.5	17.5			17	13		
Sodium	mg/L	1	43	30			38	30			29	32.1			31	35.7			34	31			33	31.2		
Sulfate	mg/L	1	274	271			291	290			281	281			279	275			293	294			318	315		
Physical Properties																										
Conductivity	umhos/cm	1	860	888	902	914	890	913	926	925	902	910	919	917	892	900	912	915	922	952	946	942	973	973	980	990
pH	s.u.	0.01	8.3	7.97			8.4	7.97			7.87	7.8			7.95	8			8.11	7.74			7.83	7.64		
Solids, Total Dissolved TDS @ 180 C	mg/L	10	579	573			581	604			616	618			601	619			649	588			693	705		
Trace Metals																										
Aluminum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Arsenic	mg/L	0.001	0.002	0.001			0.001	ND			0.001	0.001			ND	0.001			ND	ND			ND	ND		
Barium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Boron	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	0.1			ND	ND		
Cadmium	mg/L	0.005	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Chromium	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Copper	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Iron	mg/L	0.03	ND	ND			ND	ND			ND	0.03			ND	ND			ND	ND			ND	ND		
Lead	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Manganese	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND	ND			ND	0.01			ND	ND		
Mercury	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Molybdenum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Nickel	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Selenium	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Vanadium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Zinc	mg/L	0.01	ND	0.01			ND	0.02			ND	0.01			ND	ND			ND	ND			ND	ND		
Radionuclides																										
Uranium	mg/L	0.0003	0.001	0.0045			0.001	0.003			0.0009	0.0026			0.0009	0.0011			0.0007	0.0008			0.0008	0.0006		
Radium 226	pCi/L	0.2	1.3	1.3			1.1	1.3			1.4	1.2			1.7	1.5			1.5	1.6			2.3	1.5		
Quality Control																										
A/C Balance (± 5)	%	250	-0.0877	-10.9			-4.63	-11.2			-4.94	-5.5			-4.07	4.14			-3.23	-1.55			-3.56	-4.49		
Anions	meq/L	250	9.68	9.94			10.1	10.6			10.5	10.5			10.4	10.4			10.8	11			11.4	11.4		
Cations	meq/L	250	9.66	7.98			9.2	8.47			9.48	9.38			9.59	11.3			10.2	10.7			10.6	10.4		
Solids, Total Dissolved Calculated	mg/L	250	610	579			625	619			628	622			627	651			658	668			691	680		
TDS Balance (0.80 - 1.20)	dec. %	250	0.95	0.99			0.93	0.98			0.98	0.99			0.96	0.95			0.99	0.88			1	1.04		

Table D6-7
Smith Ranch-Reynolds Ranch Water Quality Data - MU Wells

Mine Unit 27		Well ID	27MU-007	27MU-007	27MU-007	27MU-007	27MU-008	27MU-008	27MU-008	27MU-008	27MU-009A	27MU-009A	27MU-009A	27MU-009A	27MU-010	27MU-010	27MU-010	27MU-010	27MU-011	27MU-011	27MU-011	27MU-011	27MU-012A	27MU-012A	27MU-012A	27MU-012A
		Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4
Analyte	Units	PQL																								
Major Ions																										
Alkalinity, Total as CaCO3	mg/L	1			235	241			232	233			231	233			ND	229			229	239			231	233
Carbonate as CO3	mg/L	1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Bicarbonate as HCO3	mg/L	1	284	284			266	272			273	280			273	279			287	291			271	280		
Calcium	mg/L	1	125	129			123	128			142	124			139	129			141	143			135	134		
Chloride	mg/L	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Fluoride	mg/L	0.1	0.3	0.2			0.2	0.2			0.2	0.2			0.2	0.2	0.2		0.2	0.2			0.2	0.2		
Magnesium	mg/L	1	27	29.2			26	27			26	29			28	29			30	33.3			30	33.6		
Nitrogen, Ammonia as N	mg/L	0.05	ND	ND			ND	ND			0.26	0.09			ND	ND			ND	ND			ND	ND		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Nitrogen, Nitrite as N	mg/L	0.1																								
Potassium	mg/L	1	13	13.4			15	14.4			16	11			14	11			13	11.6			12	11		
Silica	mg/L	0.1	17.7	13.3			18.2	13.2			16.9	15.9			17.7	16.1			18.5	14.1			17.7	14.3		
Sodium	mg/L	1	34	35.1			36	35.9			36	29			33	29			33	32.8			32	33.1		
Sulfate	mg/L	1	313	315			324	319			337	331			338	340	339		355	358			355	353		
Physical Properties																										
Conductivity	umhos/cm	1	966	965	970	970	958	965	990	980	978	999	992	989	975	1000	2480	989	1030	1030	1000	1000	1010	1010	1000	1020
pH	s.u.	0.01	7.71	7.81			7.89	7.9			8.02	7.65			7.91	7.81	7.92		7.72	7.67			7.68	7.71		
Solids, Total Dissolved TDS @ 180 C	mg/L	10	721	686			706	694			710	638			723	648	641		677	738			720	753		
Trace Metals																										
Aluminum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Arsenic	mg/L	0.001	ND	ND			0.001	0.001			ND	ND			ND	ND	ND		ND	ND			ND	ND		
Barium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Boron	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Cadmium	mg/L	0.005	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Chromium	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Copper	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Iron	mg/L	0.03	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Lead	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Manganese	mg/L	0.01	ND	ND			ND	ND			ND	0.01			ND	ND			ND	0.01			ND	0.01		
Mercury	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Molybdenum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Nickel	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Selenium	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND	ND	ND		ND	ND			ND	ND		
Vanadium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Zinc	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Radionuclides																										
Uranium	mg/L	0.0003	0.0009	0.0009			0.0011	0.0009			0.001	0.0007			0.0013	0.0007	0.0007		0.0008	0.0007			0.0009	0.0008		
Radium 226	pCi/L	0.2	2.5	2			2.9	1.9			2.1	1.5			5.2	1.7	2.1		2.3	1.8			3.2	2.5		
Quality Control																										
A/C Balance (± 5)	%	250	-4.63	-2.66			-4.5	-2.97			-1.46	-6.82			-2.51	-6.17			-3.56	-2.95			-4.39	-3.48		
Anions	meq/L	250	11.3	11.3			11.2	11.2			11.6	11.5			11.6	11.7			12.1	12.3			11.9	12		
Cations	meq/L	250	10.3	10.7			10.2	10.5			11.2	10.1			11	10.3			11.3	11.6			10.9	11.2		
Solids, Total Dissolved Calculated	mg/L	250	677	681			680	677			715	683			712	698			739	742			721	723		
TDS Balance (0.80 - 1.20)	dec. %	250	1.06	1.01			1.04	1.03			0.99	0.93			1.02	0.93			0.92	0.99			1	1.04		

Table D6-7
Smith Ranch-Reynolds Ranch Water Quality Data - MU Wells

Mine Unit 27		Well ID	27MU-013	27MU-013	27MU-013	27MU-013	27MU-014	27MU-014	27MU-014	27MU-014	27MU-015	27MU-015	27MU-015	27MU-015
		Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4
Analyte	Units	PQL												
Major Ions														
Alkalinity, Total as CaCO3	mg/L	1			ND	231			235	236			249	247
Carbonate as CO3	mg/L	1	7	ND			ND	ND			ND	ND		
Bicarbonate as HCO3	mg/L	1	238	270			273	284			294	291		
Calcium	mg/L	1	121	106			140	138			140	151		
Chloride	mg/L	1	2	2	2	2	2	2	2	2	2	2	2	2
Fluoride	mg/L	0.1	0.2	0.2	0.2		0.2	0.2			0.2	0.2		
Magnesium	mg/L	1	19	19			28	33.9			32	35.6		
Nitrogen, Ammonia as N	mg/L	0.05	ND	0.14			0.29	ND			ND	ND		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND	ND			ND	ND			ND	ND		
Nitrogen, Nitrite as N	mg/L	0.1												
Potassium	mg/L	1	22	15			17	11.5			12	12.2		
Silica	mg/L	0.1	16.3	15.6			17.2	14			18.2	13.5		
Sodium	mg/L	1	42	29			35	32			31	35.6		
Sulfate	mg/L	1	284	277	289		353	354			334	395		
Physical Properties														
Conductivity	umhos/cm	1	890	915	2650	932	1020	1020	1000	1000	992	1100	1000	1000
pH	s.u.	0.01	8.3	7.88	7.81		7.88	7.65			7.69	7.61		
Solids, Total Dissolved TDS @ 180 C	mg/L	10	590	598	586		731	744			684	803		
Trace Metals														
Aluminum	mg/L	0.1	ND	ND			ND	ND			ND	ND		
Arsenic	mg/L	0.001	ND	ND	ND		ND	ND			ND	ND		
Barium	mg/L	0.1	ND	ND			ND	ND			ND	ND		
Boron	mg/L	0.1	ND	ND			ND	ND			0.1	ND		
Cadmium	mg/L	0.005	ND	ND			ND	ND			ND	ND		
Chromium	mg/L	0.05	ND	ND			ND	ND			ND	ND		
Copper	mg/L	0.01	ND	ND			ND	ND			ND	ND		
Iron	mg/L	0.03	ND	ND			0.08	ND			ND	ND		
Lead	mg/L	0.05	ND	ND			ND	ND			ND	ND		
Manganese	mg/L	0.01	ND	ND			ND	0.01			0.01	0.01		
Mercury	mg/L	0.001	ND	ND			ND	ND			ND	ND		
Molybdenum	mg/L	0.1	ND	ND			ND	ND			ND	ND		
Nickel	mg/L	0.05	ND	ND			ND	ND			ND	ND		
Selenium	mg/L	0.001	ND	ND	ND		ND	ND			ND	ND		
Vanadium	mg/L	0.1	ND	ND			ND	ND			ND	ND		
Zinc	mg/L	0.01	ND	0.01			ND	ND			ND	ND		
Radionuclides														
Uranium	mg/L	0.0003	0.0015	0.0027	0.0007		0.0011	0.0007			0.0007	0.0433		
Radium 226	pCi/L	0.2	1.1	1.5	2.2		2.4	2.3			1.4	293		
Quality Control														
A/C Balance (± 5)	%	250	-0.714	-9.54			-2.58	-3.16			-2.5	-2.81		
Anions	meq/L	250	10.1	10.3			11.9	12.1			11.8	13.1		
Cations	meq/L	250	9.96	8.48			11.3	11.3			11.3	12.3		
Solids, Total Dissolved Calculated	mg/L	250	634	601			732	728			720	792		
TDS Balance (0.80 - 1.20)	dec. %	250	0.93	1			1	1.02			0.95	1.01		

Table D6-8
Smith Ranch-Reynolds Rancy Water Quality Data - MP Wells

Mine Unit-27		Well ID	27MP-001A	27MP-001A	27MP-001A	27MP-001A	27MP-002A	27MP-002A	27MP-002A	27MP-002A	27MP-003A	27MP-003A	27MP-003A	27MP-003A	27MP-004	27MP-004	27MP-004	27MP-004	27MP-005	27MP-005	27MP-005	27MP-005	27MP-006	27MP-006	27MP-006	27MP-006
Wells		Round	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4
Analyte	Units	PQL																								
Major Ions																										
Alkalinity, Total as CaCO3	mg/L	1			215	222			233	230			225	237			222	222			204	211			220	223
Carbonate as CO3	mg/L	1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Bicarbonate as HCO3	mg/L	1	254	258			237	261			249	289			270	265			224	234			263	265		
Calcium	mg/L	1	141	117			135	121			140	141			145	132			139	136			145	150		
Chloride	mg/L	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
Fluoride	mg/L	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		0.2
Magnesium	mg/L	1	25	22			22	22			25	32			30	27			23	23			29	30.6		
Nitrogen, Ammonia as N	mg/L	0.05	ND	0.09			0.14	0.14			0.08	ND			ND	ND			0.05	ND			ND	ND		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Nitrogen, Nitrite as N	mg/L	0.1																								
Potassium	mg/L	1	20	15			24	15			19	12			13	10			14	12.3			12	12.5		
Silica	mg/L	0.1	17.6	15.2			18.7	15.2			16.8	17			17.1	14.2			17.2	15.1			17.8	13.5		
Sodium	mg/L	1	39	31			48	34			39	33			35	31			34	34.9			35	36.8		
Sulfate	mg/L	1	369	367	361	351	360	367	380	375	375	384	387	384	387	389	392	392	370	368	379	380	399	394		390
Physical Properties																										
Conductivity	umhos/cm	1	1000	1020	1010	1000	1000	1020	1060	1050	1020	1080	1050	1070	1060	1100	1070	1070	993	1000	1020	1030	1060	1070	1100	1100
pH	s.u.	0.01	8	7.84	7.76	7.69	8.2	7.88	7.82	7.73	7.96	7.66	7.86	7.69	7.86	7.8	7.72	7.71	8.13	8.1	7.96	7.9	7.69	7.92		7.7
Solids, Total Dissolved TDS @ 180 C	mg/L	10	666	709	774	737	683	689	808	740	790	695	813	750	741	764	745	709	712	716	735	704	790	823		786
Trace Metals																										
Aluminum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Arsenic	mg/L	0.001	ND	ND	0.004	ND	ND	ND	0.004	ND	ND	ND	0.003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND
Barium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			0.1	ND			ND	ND		
Boron	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Cadmium	mg/L	0.005	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Chromium	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Copper	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Iron	mg/L	0.03	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Lead	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Manganese	mg/L	0.01	0.02	0.01			ND	ND			0.01	0.01			ND	ND			ND	ND			0.02	0.01		
Mercury	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Molybdenum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Nickel	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Selenium	mg/L	0.001	ND	0.004	ND	ND	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	ND	0.001	ND	ND	ND		ND
Vanadium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Zinc	mg/L	0.01	ND	0.02			ND	ND			ND	0.02			ND	ND			ND	ND			ND	ND		
Radionuclides																										
Uranium	mg/L	0.0003	0.0416	0.0809	0.0249	0.0247	0.166	0.122	0.0577	0.0615	0.0587	0.0227	0.0347	0.026	0.0735	0.0576	0.075	0.0779	0.0462	0.0369	0.0501	0.0488	0.0339	0.0287		0.027
Radium 226	pCi/L	0.2	129	129	150	138	507	614	735	675	39	61	60	63	237	211	252	258	481	450	498	481	292	293		316
Quality Control																										
A/C Balance (± 5)	%	250	-2.61	-11.7			-0.782	-10.3			-3.55	-5.75			-4.4	-8.97			-4.29	-4.72			-4.77	-2.68		
Anions	meq/L	250	11.9	11.9			11.4	12			12.1	12.8			12.6	12.5			11.6	11.5			12.7	12.6		
Cations	meq/L	250	11.3	9.44			11.3	9.73			11.2	11.4			11.5	10.4			10.6	10.5			11.5	11.9		
Solids, Total Dissolved Calculated	mg/L	250	743	702			731	708			747	767			766	739			718	710			775	774		
TDS Balance (0.80 - 1.20)	dec. %	250	0.9	1.01			0.93	0.97			1.06	0.91			0.97	1.03			0.99	1.01			1.02	1.06		

Table D6-8
Smith Ranch-Reynolds Rancy Water Quality Data - MP Wells

Mine Unit-27 **Wells**		Well ID Round	27MP-007 Round 1	27MP-007 Round 2	27MP-007 Round 3	27MP-007 Round 4	27MP-008A Round 1	27MP-008A Round 2	27MP-008A Round 3	27MP-008A Round 4	27MP-009 Round 1	27MP-009 Round 2	27MP-009 Round 3	27MP-009 Round 4	27MP-010 Round 1	27MP-010 Round 2	27MP-010 Round 3	27MP-010 Round 4	27MP-011A Round 1	27MP-011A Round 2	27MP-011A Round 3	27MP-011A Round 4	27MP-012 Round 1	27MP-012 Round 2	27MP-012 Round 3	27MP-012 Round 4
Analyte	Units	PQL																								
Major Ions																										
Alkalinity, Total as CaCO3	mg/L	1			213	218			214	215			212	213			213	208			207	205			202	204
Carbonate as CO3	mg/L	1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Bicarbonate as HCO3	mg/L	1	251	252			262	261			251	256			259	258			232	246			239	245		
Calcium	mg/L	1	134	140			138	140			133	133			155	136			129	136			128	134		
Chloride	mg/L	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Fluoride	mg/L	0.1	0.2	0.2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2
Magnesium	mg/L	1	25	24.6			29	30.4			23	26			28	26			23	26.1			23	25		
Nitrogen, Ammonia as N	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	0.11			ND	ND		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Nitrogen, Nitrite as N	mg/L	0.1																								
Potassium	mg/L	1	14	14.4			14	14			12	10.5			12	11			13	11.7			14	12.5		
Silica	mg/L	0.1	19.8	14.9			17.8	14.3			18.4	14.3			18.7	16.4			17.7	14.1			18.8	14		
Sodium	mg/L	1	38	39.6			36	37.9			37	38.9			38	34			38	37.8			38	36.8		
Sulfate	mg/L	1	366	362		357	380	376	375	362	339	335	335	332	389	385	392	383	342	353	354	343	343	345	346	342
Physical Properties																										
Conductivity	umhos/cm	1	1010	1010	1000	1000	1040	1040	1050	1000	956	965	970	980	1040	1050	1040	1030	961	981	1010	995	964	972	978	980
pH	s.u.	0.01	7.77	7.88		7.7	7.62	7.59	7.6	7.6	7.87	7.66	7.7	7.7	7.67	7.64	7.83	7.73	7.7	7.58	7.6	7.59	7.77	7.83	7.7	7.8
Solids, Total Dissolved TDS @ 180 C	mg/L	10	756	745		725	777	770	701	729	657	718	639	702	765	695	801	723	726	726	674	721	719	710	664	715
Trace Metals																										
Aluminum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Arsenic	mg/L	0.001	0.002	0.002		0.001	ND	ND	ND	ND	0.00	0.00	0.001	0.001	0.002	0.001	0.005	0.002	0.004	0.004	0.005	0.004	0.003	0.002	0.003	0.003
Barium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Boron	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Cadmium	mg/L	0.005	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Chromium	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Copper	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Iron	mg/L	0.03	ND	ND			ND	ND			0.06	ND			ND	ND			ND	ND			ND	ND		
Lead	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Manganese	mg/L	0.01	0.01	0.01			0.02	0.02			0.02	0.02			0.02	0.02			0.02	0.03			0.02	0.02		
Mercury	mg/L	0.001	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Molybdenum	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Nickel	mg/L	0.05	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Selenium	mg/L	0.001	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND
Vanadium	mg/L	0.1	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Zinc	mg/L	0.01	ND	ND			ND	ND			ND	ND			ND	ND			ND	ND			ND	ND		
Radionuclides																										
Uranium	mg/L	0.0003	0.128	0.0953		0.0689	0.0445	0.0381	0.0424	0.0411	0.0595	0.033	0.032	0.0353	0.0688	0.0476	0.0512	0.0607	0.0448	0.0364	0.0388	0.0432	0.0627	0.0466	0.0611	0.0517
Radium 226	pCi/L	0.2	930	813		1020	580	469	765	835	623	627	745	714	1620	1550	1770	1530	219	229	282	221	455	489	480	502
Quality Control																										
A/C Balance (± 5)	%	250	-4.8	-2.57			-4.56	-2.81			-4.3	-2.31			-1.67	-7.13			-3.18	-2.45			-4.13	-2.61		
Anions	meq/L	250	11.8	11.7			12.3	12.2			11.3	11.2			12.4	12.3			11	11.4			11.1	11.3		
Cations	meq/L	250	10.7	11.1			11.2	11.5			10.4	10.7			12	10.7			10.3	10.9			10.2	10.7		
Solids, Total Dissolved Calculated	mg/L	250	727	726			750	746			694	689			775	741			684	705			688	694		
TDS Balance (0.80 - 1.20)	dec. %	250	1.04	1.03			1.04	1.03			0.95	1.04			0.99	0.94			1.06	1.03			1.05	1.02		

Table D6-8
Smith Ranch-Reynolds Rancy Water Quality Data - MP Wells

Mine Unit-27 **Wells** Analyte	Units	Well ID Round PQL	27MP-013 Round 1	27MP-013 Round 2	27MP-013 Round 3	27MP-013 Round 4	27MP-014 Round 1	27MP-014 Round 2	27MP-014 Round 3	27MP-014 Round 4
Major Ions										
Alkalinity, Total as CaCO3	mg/L	1			236	236			215	215
Carbonate as CO3	mg/L	1	ND	ND			ND	ND		
Bicarbonate as HCO3	mg/L	1	236	263			257	256		
Calcium	mg/L	1	135	131			139	133		
Chloride	mg/L	1	2	2	2	2	2	2	2	2
Fluoride	mg/L	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Magnesium	mg/L	1	24	23			27	25		
Nitrogen, Ammonia as N	mg/L	0.05	ND	ND			ND	ND		
Nitrogen, Nitrate+Nitrite as N	mg/L	0.1	ND	ND			ND	ND		
Nitrogen, Nitrite as N	mg/L	0.1								
Potassium	mg/L	1	22	16			11	10		
Silica	mg/L	0.1	15.9	15.8			19.2	14.9		
Sodium	mg/L	1	49	35			36	34		
Sulfate	mg/L	1	367	365	385	380	348	349	354	338
Physical Properties										
Conductivity	umhos/cm	1	1000	1040	1070	1060	1000	993	998	999
pH	s.u.	0.01	8.2	7.77	7.78	7.68	7.7	7.67	7.61	7.63
Solids, Total Dissolved TDS @ 180 C	mg/L	10	707	707	830	750	694	753	699	713
Trace Metals										
Aluminum	mg/L	0.1	ND	ND			ND	ND		
Arsenic	mg/L	0.001	ND	ND	0.004	ND	0.003	0.003	0.003	0.003
Barium	mg/L	0.1	ND	ND			ND	ND		
Boron	mg/L	0.1	ND	ND			0.1	ND		
Cadmium	mg/L	0.005	ND	ND			ND	ND		
Chromium	mg/L	0.05	ND	ND			ND	ND		
Copper	mg/L	0.01	ND	ND			ND	ND		
Iron	mg/L	0.03	ND	ND			ND	ND		
Lead	mg/L	0.05	ND	ND			ND	ND		
Manganese	mg/L	0.01	0.01	ND			0.03	0.04		
Mercury	mg/L	0.001	ND	ND			ND	ND		
Molybdenum	mg/L	0.1	ND	ND			ND	ND		
Nickel	mg/L	0.05	ND	ND			ND	ND		
Selenium	mg/L	0.001	0.004	0.002	ND	ND	ND	ND	ND	ND
Vanadium	mg/L	0.1	ND	ND			ND	ND		
Zinc	mg/L	0.01	ND	0.02			ND	ND		
Radionuclides										
Uranium	mg/L	0.0003	0.0997	0.0843	0.057	0.0636	0.0326	0.045	0.027	0.026
Radium 226	pCi/L	0.2	120	167	256	238	170	150	181	163
Quality Control										
A/C Balance (± 5)	%	250	-1.16	-7.04			-2.23	-4.89		
Anions	meq/L	250	11.6	12			11.5	11.5		
Cations	meq/L	250	11.4	10.4			11	10.4		
Solids, Total Dissolved Calculated	mg/L	250	736	721			715	702		
TDS Balance (0.80 - 1.20)	dec. %	250	0.96	0.98			0.97	1.07		

Table D6-9
Smith Ranch Baseline Water Quality Comparision

	Smith Ranch Q Sand Baseline	Smith Ranch O Sand Baseline	Highland Ranch 20 Sand Baseline	Highland Ranch 30 Sand Baseline	Reynolds Ranch Mine Unit 27 Baseline (Upper O Sand)	Smith Ranch Highland Ranch Reynolds Ranch Baseline Average Range	Mine Unit 1 (Q Sand)	Mine Unit 2 (O Sand)	Mine Unit 3 (O Sand)	Mine Unit 4 (M Sand)	Mine Unit 4 & 4A (M Sand)	Mine Unit 9 (K Sand)	Mine Unit 15 (K Sand)	Mine Unit 15A (K Sand)	Mine Unit B (30 Sand)	Mine Unit C (50 Sand)	Mine Unit D (40 Sand)	Mine Unit E (50 Sand)	Mine Unit F (50 Sand)	Mine Unit H (50 Sand)	Mine Unit I (30/40 Sand)	Mine Unit J (90 Sand)	Mine Unit K (O Sand)	Mine Unit K ext (O Sand)
MAJOR IONS mg/L	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average Range	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average	Baseline Average
Calcium	**72**	**107**	**44.7**	**47.0**	**131.8**	**44.7 - 107**	72.6	107.9	119.7	55.1	56.8.	108.6	88.6	83.7	49.5	83.2	90.3	95.1	108.0	73.9	76.4	71.2	107.0	104.3
Magnesium	**16**	**26**	**9.0**	**10.0**	**24.4**	**9 - 24.4**	17.4	26.3	29.4	15.9	16.0	29.1	19.4	15.3	10.2	16.1	19.2	20.5	21.9	14.8	ND	10.9	24.2	21.3
Sodium	**28**	**27**	**55.0**	**57.0**	**37.4**	**27 - 57**	22.5	30.2	28.2	22.7	24.1	28.1	28.3	27.4	57.2	45.8	39.5	38.6	35.3	46.9	37.4	29.4	30.2	34.9
Potassium	**12**	**13**	**8.0**	**8.0**	**14.1**	**8 - 14.1**	7.3	11.1	8.9	7.3	7.7	13.1	11.1	13.5	8.0	13.9	10.9	10.0	9.3	7.5	9.1	9.1	11.1	16.1
Carb	**3**	**-**	**<0.1**	**0.1**	**7.0**	**<0.1 - 7**	0.01	<1.0	0.1	1.0	0.5	5.0	ND	2.7	0.2	0.2	ND	0.0	0.0	0.2	ND	2.3	3.5	7.0
Bicarb	**199**	**204**	**215**	**207**	**252**	**199 - 252**	228	199	221	189	193	195	221	199	207	203	197	195	207	197	199	195	197	182
Sulfate	**124**	**268**	**91**	**117**	**353**	**91 - 353**	113	262	298	107	107	323	173	153	117	210	230	245	282	184	180	118	258	268
Chloride	**18**	**4**	**4.2**	**5.4**	**2**	**2 - 18**	4.18	4.1	3.1	3.7	3.6	2.3	4.4	2.7	2.3	5.03	2.79	3.61	2.75	3.93	4.0	2.76	2.43	2.73
Ammonium	**-**	**-**	**0.1**	**2**	**0.16**	**0.1 - 2**	0.05	0.14	0.06	0.09	0.08	0.24	0.18	0.20	3.80	0.14	0.12	0.09	0.11	0.15	0.14	0.10	0.10	0.28
Nitrite+Nitrate	**0.4**	**0.04**	**<0.1**	**<0.1**	**-**	**<0.1 - 0.4**	0.101	0.59	0.1	0.1	0.05	1.5	ND	0.1	0.14	0.14	0.01	0.02	0.23	0.10	ND	ND	ND	ND
Flouride	**0.3**	**0.46**	**0.2**	**0.23**	**0.19**	**0.19 - .46**	0.322	0.85	0.44	0.53	0.53	-	0.3	0.56	0.22	0.22	0.20	0.19	0.21	0.24	0.2	0.26	0.3	0.33
Silica	**-**	**-**	**16**	**16**	**17.3**	**16 - 17.3**	17.0	16.4	16.9	15.3	15.7	18.5	18.1	17.8	15.8	17.5	20.2	17.4	17.7	16.8	16.6	15.7	18.4	18.1
TDS	**388**	**583**	**330**	**355**	**701**	**330 - 701**	330	567	630	334	329	568	451	384	350	492	501	521	580	447	450	383	551	554
SC@25--umoh/cm	**582**	**778**	**525**	**574**	**980**	**525 - 980**	573	808	892	492	499	921	658	627	564	721	792	803	864	675	678	562	802	801
Alkalinity	**-**	**-**	**177**	**168**	**214**	**168 - 214**	186	163	181	156	158	172	184	168	171	165	161	161	170	162	-	163	166	157
pH SU	**8.0**	**7.69**	**8**	**8**	**7.83**	**7.69 - 8.0**	7.40	7.80	7.60	7.55	7.56	7.70	7.60	8.00	8.10	7.79	7.86	8.00	7.61	8.06	8.05	8.10	8.02	7.93
TRACE METALS mg/L																								
Aluminum	**0.135**	**0.104**	**<0.1**	**<0.1**	**ND**	**<0.1 - .135**	-	ND	-	-	-	0.2	ND	ND	ND	0.052	ND	ND	0.190	0.100	ND	ND	ND	ND
Arsenic	**0.004**	**0.004**	**<0.001**	**<0.001**	**0.004**	**<0.001 - 0.004**	0.001	0.003	0.003	0.003	0.0019	0.02	0.005	0.006	0.0013	0.002	0.001	0.002	0.002	0.002	0.003	0.003	0.004	0.007
Barium	**0.09**	**0.104**	**<0.1**	**<0.1**	**0.1**	**<0.1 - .104**	-	ND	-	-	-	0.1	ND	ND	ND	0.031	ND	ND	ND	0.100	ND	ND	ND	ND
Boron	**0.15**	**0.14**	**<0.1**	**<0.1**	**0.11**	**<0.1 - .15**	0.100	ND	0.171	0.1	0.05	ND	0.1	0.1	ND	0.031	ND	ND	ND	ND	ND	ND	0.1	ND
Cadmium	**0.036**	**0.004**	**<0.01**	**<0.01**	**ND**	**<0.01 - .036**	0.010	ND	0.006	0.005	0.003	ND	ND	ND	ND	0.003	ND	ND	ND	0.007	ND	ND	ND	ND
Chromium	**0.023**	**0.02**	**<0.05**	**<0.05**	**ND**	**<0.05**	0.050	ND	0.03	0.05	0.03	ND	ND	ND	ND	0.016	ND	ND	ND	0.050	ND	ND	ND	ND
Copper	**0.015**	**0.012**	**<0.01**	**<0.01**	**0.01**	**<0.01 - .015**	-	ND	-	-	-	ND	ND	ND	ND	0.005	0.011	0.018	0.013	0.010	ND	ND	ND	ND
Iron	**0.025**	**0.06**	**<0.05**	**0.04**	**0.05**	**<0.05 - .06**	0.050	0.153	0.082	0.07	0.03	0.099	0.104	ND	0.052	0.022	0.060	0.134	0.096	0.056	0.044	0.055	ND	ND
Manganese	**0.077**	**0.03**	**0.03**	**0.02**	**0.017**	**0.017 - 0.077**	0.021	0.02	0.022	0.01	0.01	0.072	0.032	0.031	0.032	0.021	0.028	0.031	0.035	0.030	0.020	0.062	0.021	0.012
Mercury	**0.0011**	**0.0002**	**<0.001**	**<0.001**	**ND**	**<0.001 - .0011**	-	0.025	-	-	-	ND	ND	ND	ND	0.0003	ND	ND	ND	0.001	ND	ND	ND	ND
Molybdenum	**0.16**	**0.07**	**<0.1**	**<0.1**	**ND**	**<0.1 - .16**	0.100	ND	0.092	0.1	0.05	ND	ND	ND	ND	0.031	ND	ND	ND	0.100	ND	ND	ND	ND
Nickel	**0.045**	**0.03**	**<0.05**	**<0.05**	**ND**	**<0.05**	-		-	-	-	ND	ND	ND	ND	0.016	ND	ND	ND	0.050	ND	ND	ND	ND
Lead	**0.043**	**0.05**	**<0.05**	**<0.05**	**0.002**	**<0.05 - .05**	-	ND	-	-	-	ND	0.06	ND	ND	0.015	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	**0.004**	**0.005**	**<0.001**	**<0.001**	**0.002**	**<0.001 - .005**	0.001	0.004	0.003	0.001	0.0005	0.001	0.002	0.004	0.001	0.012	0.001	0.002	0.005	0.001	ND	0.001	0.005	ND
Vanadium	**0.022**	**0.1**	**<0.1**	**<0.1**	**ND**	**<0.1 - .10**	0.100	ND	0.1	0.1	0.05	ND	ND	0.1	ND	0.031	ND	ND	ND	0.100	ND	0.097	0.1	ND
Zinc	**0.135**	**0.19**	**<0.01**	**<0.01**	**0.014**	**<0.01 - .19**	0.010	0.19	0.121	0.01	0.01	0.016	0.012	ND	0.011	0.007	0.011	0.014	ND	0.012	0.020	0.010	ND	0.01
RADIOMETRIC																								
Uranium--mg/L	**0.28**	**0.252**	**0.041**	**0.06**	**0.04**	**0.04 - 0.28**	0.064	0.084	0.089	0.039	0.037	0.093	0.151	0.165	0.062	2.11	1.067	0.057	0.034	0.089	0.025	0.042	0.125	0.021
Radium 226--pCi/L	**340**	**272**	**675**	**313**	**278.5**	**272 - 675**	726	560	384	491	-	407	454	386	316	682	651	633	592	366	119	506	430	14
Radon 222-pCi/L	**-**	**-**	**-**	**-**	**-**	**-**	268597.22	-	203392	471169	605.4	-	-	-	-	-	-	-	-	-	-	-	-	-
Th-230-pCi/L	**1.03**	**1.1**	**-**	**-**	**-**	**-**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table D6-3 Surface Water Rights - SR-HUP/Reynolds +3 Mile Buffer

Appropriation	Township	Range	Section	Qtrqtr	Status	SW Permit Uses	SW Permit Facility name	SW Permit Applicant	SW Permit Source
P1616S	36	72	6	SENW	PU	STO	Stratton #1 Stock Reservoir	HYLAND SHEEP CO	Stratton Draw
P1616S	36	72	6	SENW	PUO	STO	Stratton #1 Stock Reservoir	HYLAND SHEEP CO	Stratton Draw
P5072R	36	72	13	NWSE	PUO	STO	Morton's Inc. No. 3 Reservoir	MORTON'S INC.	Gumbo Draw
P5072R	36	72	13	SWNE	PU	STO	Morton's Inc. No. 3 Reservoir	MORTON'S INC.	Gumbo Draw
P5072R	36	72	13	NWSE	PU	STO	Morton's Inc. No. 3 Reservoir	MORTON'S INC.	Gumbo Draw
P1562S	36	72	15	SESW	UNA	STO	Bobby #1 Stock Reservoir	LEE FOWLER	Bobby Draw
P8124R	36	72	17	SESE	PU	IND	Buffalo Shaft Containment Berm	U.S.A. EXXON MINERALS COMPANY	DRAINAGE OF NORTH PRONG LITTLE THUNDER CREEK
P8124R	36	72	17	SESE	PUO	IND	Buffalo Shaft Containment Berm	U.S.A. EXXON MINERALS COMPANY	DRAINAGE OF NORTH PRONG LITTLE THUNDER CREEK
P5110R	36	72	18	SWSW	PU	STO,IRR	Numrich Reservoir	J. H. NUMRICH	NUMRICH GULCH
P5110R	36	72	18	SESW	PU	STO,IRR	Numrich Reservoir	J. H. NUMRICH	NUMRICH GULCH
P5110R	36	72	18	NESW	PU	STO,IRR	Numrich Reservoir	J. H. NUMRICH	NUMRICH GULCH
P5110R	36	72	18	NESW	PUO	STO,IRR	Numrich Reservoir	J. H. NUMRICH	NUMRICH GULCH
P5110R	36	72	18	NWSW	PU	STO,IRR	Numrich Reservoir	J. H. NUMRICH	NUMRICH GULCH
P9088S	36	72	18	NWSW	GST	STO	Curry #1 Stock Reservoir	RUTH N. WHITING	Numrich Gulch
P25464D	36	72	20	NWSE	PUD	RES	Exxon Drainage Ditch - Sheep Draw Diversion	U.S.A. EXXON CO.	Sheep Draw
P8219S	36	72	20	NWSE	GST	STO	Sheep Draw Stock Reservoir	LEE FOWLER	Sheep Draw
P8219S	36	72	20	SWNE	GST	STO	Sheep Draw Stock Reservoir	LEE FOWLER	Sheep Draw
P8219S	36	72	20	SENW	GST	STO	Sheep Draw Stock Reservoir	LEE FOWLER	Sheep Draw
P8219S	36	72	20	NESW	GST	STO	Sheep Draw Stock Reservoir	LEE FOWLER	Sheep Draw
P9217R	36	72	20	NWSE	ADJ	WIL,STO	North Pond Reservoir	EXXON MINERALS COMPANY	North Fork Box Creek
P9217R	36	72	20	SESE	ADJ	WIL,STO	North Pond Reservoir	EXXON MINERALS COMPANY	North Fork Box Creek
P9217R	36	72	20	NESE	ADJ	WIL,STO	North Pond Reservoir	EXXON MINERALS COMPANY	North Fork Box Creek
P25463D	36	72	20	SWNE	PU	RES	Exxon Drainage Ditch	U.S.A. EXXON CO.	Fowler Draw
P25463D	36	72	20	SENW	PU	RES	Exxon Drainage Ditch	U.S.A. EXXON CO.	Fowler Draw
P25463D	36	72	20	NESW	PU	RES	Exxon Drainage Ditch	U.S.A. EXXON CO.	Fowler Draw
P25463D	36	72	20	NESW	PUD	RES	Exxon Drainage Ditch	U.S.A. EXXON CO.	Fowler Draw
P25463D	36	72	20	NWSE	PU	RES	Exxon Drainage Ditch	U.S.A. EXXON CO.	Fowler Draw
P7727S	36	72	20	SWNW	GST	STO	Fowler Stock Reservoir	LEE FOWLER	Fowler Draw
P7727S	36	72	20	NESW	GST	STO	Fowler Stock Reservoir	LEE FOWLER	Fowler Draw
P7727S	36	72	20	NWSW	GST	STO	Fowler Stock Reservoir	LEE FOWLER	Fowler Draw
P9216R	36	72	20	SWSE	ADJ	WIL,STO	Highland Reservoir	EXXON MINERALS COMPANY	Antelope Draw
P9216R	36	72	20	SESE	ADJ	WIL,STO	Highland Reservoir	EXXON MINERALS COMPANY	Antelope Draw
P25465D	36	72	21	SESE	PU	RES	Exxon Drainage Ditch - Fawn Draw Diversion	U.S.A. EXXON CO.	North Fork Box Creek
P7376R	36	72	21	SWSE	PU	FLO	Fawn Reservoir	U.S.A. EXXON CO.	Fawn Draw
P7376R	36	72	21	SWSE	PUO	FLO	Fawn Reservoir	U.S.A. EXXON CO.	Fawn Draw
P25463D	36	72	21	SESE	PU	RES	Exxon Drainage Ditch	U.S.A. EXXON CO.	Fowler Draw
P25463D	36	72	21	SWSE	PU	RES	Exxon Drainage Ditch	U.S.A. EXXON CO.	Fowler Draw
P25465D	36	72	21	SWSE	PUD	RES	Exxon Drainage Ditch - Fawn Draw Diversion	U.S.A. EXXON CO.	North Fork Box Creek
P9289R	36	72	21	NENE	INA	TEM,IND	Highland Purge Storage Reservoir	Power Resources, Inc.	Buckskin Draw
P9289R	36	72	21	SENE	UNA	TEM,IND	Highland Purge Storage Reservoir	Power Resources, Inc.	Buckskin Draw
P9217R	36	72	21	NWSW	UNA	WIL,STO	North Pond Reservoir	EXXON MINERALS COMPANY	North Fork Box Creek
P25467D	36	72	21	NWSW	PUD	RES	Exxon Drainage Ditch - North Fork Box Creek Diversion	U.S.A. EXXON CO.	North Fork Box Creek
P25467D	36	72	21	SWSE	PU	RES	Exxon Drainage Ditch - North Fork Box Creek Diversion	U.S.A. EXXON CO.	North Fork Box Creek
P25467D	36	72	21	SESE	PU	RES	Exxon Drainage Ditch - North Fork Box Creek Diversion	U.S.A. EXXON CO.	North Fork Box Creek
P25464D	36	72	21	SWSE	PU	RES	Exxon Drainage Ditch - Sheep Draw Diversion	U.S.A. EXXON CO.	Sheep Draw
P25464D	36	72	21	SESE	PU	RES	Exxon Drainage Ditch - Sheep Draw Diversion	U.S.A. EXXON CO.	Sheep Draw
P25464D	36	72	22	NWSW	PU	RES	Exxon Drainage Ditch - Sheep Draw Diversion	U.S.A. EXXON CO.	Sheep Draw
P25464D	36	72	22	SWSW	PU	RES	Exxon Drainage Ditch - Sheep Draw Diversion	U.S.A. EXXON CO.	Sheep Draw
P25467D	36	72	22	SWSW	PU	RES	Exxon Drainage Ditch - North Fork Box Creek Diversion	U.S.A. EXXON CO.	North Fork Box Creek
P25467D	36	72	22	NWSW	PU	RES	Exxon Drainage Ditch - North Fork Box Creek Diversion	U.S.A. EXXON CO.	North Fork Box Creek
P7378R	36	72	22	SWSW	PU	FLO	Doe Reservoir	U.S.A. EXXON CO.	Doe Draw
P7378R	36	72	22	SWSW	PUO	FLO	Doe Reservoir	U.S.A. EXXON CO.	Doe Draw
P7378R	36	72	22	NWSW	PU	FLO	Doe Reservoir	U.S.A. EXXON CO.	Doe Draw
P25463D	36	72	22	NWSW	PU	RES	Exxon Drainage Ditch	U.S.A. EXXON CO.	Fowler Draw
P25463D	36	72	22	SWSW	PU	RES	Exxon Drainage Ditch	U.S.A. EXXON CO.	Fowler Draw
P25465D	36	72	22	NWSW	PU	RES	Exxon Drainage Ditch - Fawn Draw Diversion	U.S.A. EXXON CO.	North Fork Box Creek
P25465D	36	72	22	SWSW	PU	RES	Exxon Drainage Ditch - Fawn Draw Diversion	U.S.A. EXXON CO.	North Fork Box Creek
P9216R	36	72	28	NWSW	ADJ	WIL,STO	Highland Reservoir	EXXON MINERALS COMPANY	Antelope Draw
P9216R	36	72	28	SWNW	ADJ	WIL,STO	Highland Reservoir	EXXON MINERALS COMPANY	Antelope Draw
P9216R	36	72	28	NWNW	ADJ	WIL,STO	Highland Reservoir	EXXON MINERALS COMPANY	Antelope Draw
P7430R	36	72	29	SWNW	ADJ	FLO	Antelope Reservoir	U.S.A. EXXON CO.	Antelope Draw
P7430R	36	72	29	SENW	ADJ	FLO	Antelope Reservoir	U.S.A. EXXON CO.	Antelope Draw
P8062R	36	72	29	SWNW	PU	IND	Highland No. 1 Reservoir	U.S.A. EXXON MINERALS COMPANY	Antelope Draw
P8062R	36	72	29	NWSW	PU	IND	Highland No. 1 Reservoir	U.S.A. EXXON MINERALS COMPANY	Antelope Draw
P8062R	36	72	29	SWNW	PUO	IND	Highland No. 1 Reservoir	U.S.A. EXXON MINERALS COMPANY	Antelope Draw
P8062R	36	72	29	SENW	PU	IND	Highland No. 1 Reservoir	U.S.A. EXXON MINERALS COMPANY	Antelope Draw
P8062R	36	72	29	NESW	PU	IND	Highland No. 1 Reservoir	U.S.A. EXXON MINERALS COMPANY	Antelope Draw
P8140R	36	72	29	SENW	UNA	IND	Highland No. 2 Reservoir	POWER RESOURCES INC.	Antelope Draw
P8140R	36	72	29	SENE	UNA	IND	Highland No. 2 Reservoir	POWER RESOURCES INC.	Antelope Draw
P8140R	36	72	29	NENW	UNA	IND	Highland No. 2 Reservoir	POWER RESOURCES INC.	Antelope Draw
P9216R	36	72	29	SENW	ADJ	WIL,STO	Highland Reservoir	EXXON MINERALS COMPANY	Antelope Draw
P9216R	36	72	29	NESE	ADJ	WIL,STO	Highland Reservoir	EXXON MINERALS COMPANY	Antelope Draw
P9216R	36	72	29	SENE	ADJ	WIL,STO	Highland Reservoir	EXXON MINERALS COMPANY	Antelope Draw
P9216R	36	72	29	NENE	ADJ	WIL,STO	Highland Reservoir	EXXON MINERALS COMPANY	Antelope Draw
P9216R	36	72	29	NWNE	ADJ	WIL,STO	Highland Reservoir	EXXON MINERALS COMPANY	Antelope Draw
P9216R	36	72	29	SWNE	ADJ	WIL,STO	Highland Reservoir	EXXON MINERALS COMPANY	Antelope Draw
P8139R	36	72	29	SWNW	UNA	IND	S-X SPCC Reservoir	Power Resources, Inc.	Antelope Draw
P8139R	36	72	29	SENW	UNA	IND	S-X SPCC Reservoir	Power Resources, Inc.	Antelope Draw
P8139R	36	72	29	NESW	UNA	IND	S-X SPCC Reservoir	Power Resources, Inc.	Antelope Draw
P8139R	36	72	29	NWSW	UNA	IND	S-X SPCC Reservoir	Power Resources, Inc.	Antelope Draw
P7517R	36	72	33	NWNE	ADJ	ERO,FLO	2A Reservoir	U.S.A. EXXON COMPANY	Box Creek
P7517R	36	72	33	SWNE	ADJ	ERO,FLO	2A Reservoir	U.S.A. EXXON COMPANY	Box Creek
P7517R	36	72	33	NENW	ADJ	ERO,FLO	2A Reservoir	U.S.A. EXXON COMPANY	Box Creek
P7517R	36	72	33	SENW	ADJ	ERO,FLO	2A Reservoir	U.S.A. EXXON COMPANY	Box Creek
P10045R	36	73	11	SESE	UNA	IND,FLO,TEM	Satellite No. 2 Purge Storage	Power Resources, Inc.	Bob Draw
P7725S	36	73	11	SESE	PU	STO	MX-1 Stock Reservoir	R. L. BONER	MX - 1 Draw

Table D6-3 Surface Water Rights - SR-HUP/Reynolds +3 Mile Buffer

P7725S	36	73	11	SESE	PUO	STO	MX-1 Stock Reservoir	R. L. BONER	MX - 1 Draw
P10045R	36	73	12	SWSW	UNA	IND,FLO,TEM	Satellite No. 2 Purge Storage	Power Resources, Inc.	Bob Draw
P1615S	36	73	14	SWNW	PU	STO	Whipple #1 Stock Reservoir	HYLAND SHEEP CO	Whipple Draw
P1615S	36	73	14	SWNW	PUO	STO	Whipple #1 Stock Reservoir	HYLAND SHEEP CO	Whipple Draw
P1007S	36	73	26	SENE	PUO	STO	Ridgeway No. 1 Stock Reservoir	WM. VOLLMAN	Ridgeway Draw
P1007S	36	73	26	SENE	PU	STO	Ridgeway No. 1 Stock Reservoir	WM. VOLLMAN	Ridgeway Draw
P1883D	36	73	32	NESE	PU	STO,DOM	Lake Springs and Pipeline	JOHN T. WILLIAMS	Lake Spring
P1883D	36	73	32	NESE	PUD	STO,DOM	Lake Springs and Pipeline	JOHN T. WILLIAMS	Lake Spring
P1883D	36	73	32	NESE	PU	STO,DOM	Lake Springs and Pipeline	JOHN T. WILLIAMS	Lake Spring
P1632S	36	73	34	NESE	PU	STO	Mart #1 Stock Reservoir	W. R. VOLLMAN	Marts Draw
P1632S	36	73	34	NESE	PUO	STO	Mart #1 Stock Reservoir	W. R. VOLLMAN	Marts Draw
P25313D	36	74	4	NWSE	ADJ	STO	Brown Springs Pipeline No. 2	HORNBUCKLE RANCH	Brown Spings Creek
P25312D	36	74	4	SWSE	PU	STO	Brown Springs Pipeline No. 1	HORNBUCKLE RANCH	Hornbuckle Draw
P25312D	36	74	4	SWSE	PUD	STO	Brown Springs Pipeline No. 1	HORNBUCKLE RANCH	Hornbuckle Draw
P5067R	36	74	6	SWNW	PU	STO,IRR	Judson No. 1 Reservoir	CARL J. JUDSON	NORTH BRANCH
P4056R	36	74	6	SWNW	PU	STO	Judson Reservoir	CARL J. JUDSON	Phillips Creek
P4056R	36	74	6	NWNW	PU	STO	Judson Reservoir	CARL J. JUDSON	Phillips Creek
P4056R	36	74	6	NWNW	PUO	STO	Judson Reservoir	CARL J. JUDSON	Phillips Creek
P5393R	36	74	12	NENW	PU	STO	Silver Spoon Reservoir	JOE REYNOLDS	Hold-up Hollow Draw
P5393R	36	74	12	NENW	PUO	STO	Silver Spoon Reservoir	JOE REYNOLDS	Hold-up Hollow Draw
P5393R	36	74	12	NWNW	PU	STO	Silver Spoon Reservoir	JOE REYNOLDS	Hold-up Hollow Draw
P4799R	36	74	22	NWNE	PU	STO	Converse County Stock Reservoir No. 2	BOARD OF CONVERSE COUNTY COMMISSI	Hold-up Hollow Draw
P4799R	36	74	22	NWNE	PUO	STO	Converse County Stock Reservoir No. 2	BOARD OF CONVERSE COUNTY COMMISSI	Hold-up Hollow Draw
P2718S	36	74	30	SWNW	PU	STO	Leland #1 Stock Reservoir	LELAND CROUCH	Leland Draw
P2718S	36	74	30	SWNW	PUO	STO	Leland #1 Stock Reservoir	LELAND CROUCH	Leland Draw
P1879D	36	74	33	SESW	ADJ	STO,IRR	Williams No. 2 Ditch	JOHN T. WILLIAMS	Sage Creek (12-33-73)
P1879D	36	74	33	SESW	PUD	STO,IRR	Williams No. 2 Ditch	JOHN T. WILLIAMS	Sage Creek (12-33-73)
P1878D	36	74	33	SWSW	ADJ	STO,IRR	Williams No. 1 Ditch	JOHN T. WILLIAMS	Sage Creek (12-33-73)
P1878D	36	74	33	NWSW	PUD	STO,IRR	Williams No. 1 Ditch	JOHN T. WILLIAMS	Sage Creek (12-33-73)
P11741D	35	74	1	SESW	UNA	IRR	Ditch No. 2	FRANK AMSPOKER	Sage Creek (12-33-73)
P23404D	35	74	1	SESW	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P23404D	35	74	2	SESE	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P11741D	35	74	2	SESE	UNA	IRR	Ditch No. 2	FRANK AMSPOKER	Sage Creek (12-33-73)
P11741D	35	74	2	SESE	PUD	IRR	Ditch No. 2	FRANK AMSPOKER	Sage Creek (12-33-73)
P11742D	35	74	2	NWSW	PUD	RES,IRR	Supply Ditch	FRANK AMSPOKER	Sage Creek (12-33-73)
P2597R	35	74	2	SWNW	PU	IRR	Sage Creek No. 2 Reservoir	S. F. AMSPOKER	Sage Creek (12-33-73)
P2597R	35	74	2	SWNW	PUO	IRR	Sage Creek No. 2 Reservoir	S. F. AMSPOKER	Sage Creek (12-33-73)
P2597R	35	74	3	NESE	PU	IRR	Sage Creek No. 2 Reservoir	S. F. AMSPOKER	Sage Creek (12-33-73)
P2597R	35	74	3	SENE	PU	IRR	Sage Creek No. 2 Reservoir	S. F. AMSPOKER	Sage Creek (12-33-73)
P1952S	35	74	6	NENE	PU	STO	Crouch No. 3 Stock Reservoir	PATRICK F. CONROY**LELAND CROUCH	North Platte River
P1952S	35	74	6	NENE	PUO	STO	Crouch No. 3 Stock Reservoir	PATRICK F. CONROY**LELAND CROUCH	North Platte River
P1881D	35	74	6	NWSW	PU	STO,DOM	White Rock Spring and Pipeline	JOHN T. WILLIAMS	White Rock Springs
P1881D	35	74	6	NWSW	PUD	STO,DOM	White Rock Spring and Pipeline	JOHN T. WILLIAMS	White Rock Springs
P1881D	35	74	6	NWSW	PU	STO,DOM	White Rock Spring and Pipeline	JOHN T. WILLIAMS	White Rock Springs
P4656R	35	74	7	NESE	UNA	STO	Smith Reservoir	WILLIAM J. SMITH	Blackjack Draw
P4656R	35	74	7	SESE	UNA	STO	Smith Reservoir	WILLIAM J. SMITH	Blackjack Draw
P4656R	35	74	8	NWSW	UNA	STO	Smith Reservoir	WILLIAM J. SMITH	Blackjack Draw
P11741D	35	74	11	NENE	UNA	IRR	Ditch No. 2	FRANK AMSPOKER	Sage Creek (12-33-73)
P23404D	35	74	11	NENE	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P23404D	35	74	11	SENE	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P23404D	35	74	12	SENW	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P23404D	35	74	12	NENW	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P23404D	35	74	12	NWNW	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P23404D	35	74	12	SWNW	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P23404D	35	74	12	NWNW	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P23404D	35	74	12	SWNW	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P23404D	35	74	12	NWSW	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P23404D	35	74	12	SENW	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P23404D	35	74	12	NENW	ADJ	IRR	Amspoker No. 1 Ditch	SMITH SHEEP CO.	Amspoker Draw
P11741D	35	74	12	NWNW	UNA	IRR	Ditch No. 2	FRANK AMSPOKER	Sage Creek (12-33-73)
P11741D	35	74	12	SWNE	UNA	IRR	Ditch No. 2	FRANK AMSPOKER	Sage Creek (12-33-73)
P11741D	35	74	12	NENW	UNA	IRR	Ditch No. 2	FRANK AMSPOKER	Sage Creek (12-33-73)
P1965S	35	74	29	SWSE	PU	STO	Federal No. 1 Stock Reservoir	U.S. BUREAU OF LAND MGMT.**OTIS BAR	Federal Draw
P1965S	35	74	29	SWSE	PUO	STO	Federal No. 1 Stock Reservoir	U.S. BUREAU OF LAND MGMT.**OTIS BAR	Federal Draw
P1966S	35	74	30	SWSW	ADJ	STO	Bruce Mine Stock Reservoir	Otis Barber	Bruce Mine Draw
P5071R	35	74	32	SESE	PU	STO	Morton's Inc. No. 2 Reservoir	MORTON'S INC.	Duffy Draw
P16808D	37	74	10	SWNE	ADJ	IRR	Harland Ditch	JOHN C. HARLAND	Brown Spings Creek
P17330D	37	74	33	SENE	UNA	IRR	Judson No. 2 Ditch	CARL J. JUDSON	BROWN SPRING CREEK
P17330D	37	74	33	SESE	UNA	IRR	Judson No. 2 Ditch	CARL J. JUDSON	BROWN SPRING CREEK
P17330D	37	74	33	NESE	UNA	IRR	Judson No. 2 Ditch	CARL J. JUDSON	BROWN SPRING CREEK
P8097S	37	74	35	NESE	ADJ	STO	Brown Springs No. 1 Stock Reservoir	HORNBUCKLE RANCH**WYO BOARD OF L	Brown Spings Creek
P8098S	37	74	36	SENE	ADJ	STO	Brown Springs No. 2 Stock Reservoir	HORNBUCKLE RANCH**WYO BOARD OF L	Brown Spings Creek
P10434S	37	73	9	SESE	UNA	STO	Betty Lou Stock Reservoir	ROY C. & FEROL BAKER	Betty Lou Draw
P10398S	37	73	15	SWNE	PU	STO	AML 15-II Site 30 Stock Reservoir	WYO BOARD OF LAND COMMISSIONERS**	Solar Draw
P10398S	37	73	15	SWNE	PUO	STO	AML 15-II Site 30 Stock Reservoir	WYO BOARD OF LAND COMMISSIONERS**	Solar Draw
P4541S	37	73	21	NWNE	PU	STO	Jeff #1 Stock Reservoir	WALTER J. REYNOLDS	South Fork Brush Creek
P4541S	37	73	21	NWNE	PUO	STO	Jeff #1 Stock Reservoir	WALTER J. REYNOLDS	South Fork Brush Creek
P7806R	37	73	32	SWSW	PU	MIS	Settling Ponds, Sections 28-33 Reservoir	SEQUOYAH FUELS CORPORATION**WYO	Dry Wash
P7806R	37	73	32	SWSW	PUO	MIS	Settling Ponds, Sections 28-33 Reservoir	SEQUOYAH FUELS CORPORATION**WYO	Dry Wash
P5241S	37	72	31	SESW	PU	STO	Genevieve No. 1 Stock Reservoir	GENEVIEVE MANNING	Genevieve Draw
P5241S	37	72	31	SESW	PUO	STO	Genevieve No. 1 Stock Reservoir	GENEVIEVE MANNING	Genevieve Draw
P5241S	37	72	31	SWSE	PU	STO	Genevieve No. 1 Stock Reservoir	GENEVIEVE MANNING	Genevieve Draw
P4380S	37	72	33	NWNW	PU	STO	West Skunk #1 Stock Reservoir	INC. MORTONS	West Skunk Creek
P4380S	37	72	33	NWNW	PUO	STO	West Skunk #1 Stock Reservoir	INC. MORTONS	West Skunk Creek
P19267D	36	71	18		UNA	STO,IRR	Kuykendall Ditch	G.C. KUYKENDALL	Box Creek
P19267D	36	71	18	SWNE	UNA	STO,IRR	Kuykendall Ditch	G.C. KUYKENDALL	Box Creek
P19267D	36	71	18	NWNE	UNA	STO,IRR	Kuykendall Ditch	G.C. KUYKENDALL	Box Creek
P19267D	36	71	18	NENE	UNA	STO,IRR	Kuykendall Ditch	G.C. KUYKENDALL	Box Creek
P4703R	35	72	3	SESE	PU	STO	Morton Reservoir	MORTONS INC.	Dry Draw
P4703R	35	72	3	SESE	PUO	STO	Morton Reservoir	MORTONS INC.	Dry Draw

Table D6-3 Surface Water Rights - SR-HUP/Reynolds +3 Mile Buffer

P1882D	35	73	3	SENE	PU	STO,DOM	Willow Springs	JOHN T. WILLIAMS	Willow Springs Creek
P1882D	35	73	3	SENE	PU	STO,DOM	Willow Springs	JOHN T. WILLIAMS	Willow Springs Creek
P1882D	35	73	4	SENE	PUD	STO,DOM	Willow Springs	JOHN T. WILLIAMS	Willow Springs Creek
P654S	35	73	4	NWSE	PU	STO	Vollman #1 Stock Reservoir	W.R. VOLLMAN	Vollman Draw
P654S	35	73	4	NWSE	PUO	STO	Vollman #1 Stock Reservoir	W.R. VOLLMAN	Vollman Draw
P1322S	35	73	16	SENW	PU	STO	Lehman #1 Stock Reservoir	W. R. VOLLMAN	North Platte River
P1322S	35	73	16	SENW	PUO	STO	Lehman #1 Stock Reservoir	W. R. VOLLMAN	North Platte River
P1456S	34	74	3	NENE	UNA	STO	Layton Pit No. 1 Stock Reservoir	A. C. LAYTON	North Platte River
P5071R	34	74	4	NENE	PU	STO	Morton's Inc. No. 2 Reservoir	MORTON'S INC.	Duffy Draw
P5083R	34	75	1	NESW	PU	STO	Hylton No. 4 Reservoir	SARAH A. SMITH	Hylton Draw
P5083R	34	75	1	NESW	PUO	STO	Hylton No. 4 Reservoir	SARAH A. SMITH	Hylton Draw
P17551S	35	75	1	NESW	UNA	STO	Dave Johnston Mine SP-1 Stock Reservoir	Glenrock Coal Company	Bishop Draw
P8265R	35	75	2	NENW	UNA	TEM,IND	Dave Johnston Mine SP-7 Reservoir	Glenrock Coal Co.	Herkimer Draw
P8265R	35	75	3	NWNW	UNA	TEM,IND	Dave Johnston Mine SP-7 Reservoir	Glenrock Coal Co.	Herkimer Draw
P8862R	35	75	3	NWSW	UNA	TEM,MIS,FLO	UPS-7 Reservoir	Glenrock Coal Co.	Bishop Draw
P8862R	35	75	3	SWNW	UNA	TEM,MIS,FLO	UPS-7 Reservoir	Glenrock Coal Co.	Bishop Draw
P8862R	35	75	3	SENW	UNA	TEM,MIS,FLO	UPS-7 Reservoir	Glenrock Coal Co.	Bishop Draw
P8862R	35	75	3	NESW	UNA	TEM,MIS,FLO	UPS-7 Reservoir	Glenrock Coal Co.	Bishop Draw
P9195R	35	75	3	NESW	UNA	TEM,IND	Dave Johnston Mine-SP-1 Reservoir	Glenrock Coal Company	Bishop Draw
P8263R	35	75	3	NENW	UNA	TEM,IND	Dave Johnston Mine SP-5 Reservoir	Glenrock Coal Co.	Herkimer Draw
P8263R	35	75	3	NWNW	UNA	TEM,IND	Dave Johnston Mine SP-5 Reservoir	Glenrock Coal Co.	Herkimer Draw
P8863R	35	75	3	NWNW	UNA	TEM,MIS,FLO	UPS-8 Reservoir	Glenrock Coal Co.	UPS-8 Draw
P8264R	35	75	4	NENW	UNA	TEM,IND	Dave Johnston Mine SP-6 Reservoir	Glenrock Coal Co.	Herkimer Draw
P8264R	35	75	4	NWNW	UNA	TEM,IND	Dave Johnston Mine SP-6 Reservoir	Glenrock Coal Co.	Herkimer Draw
P8861R	35	75	4	SESE	UNA	TEM,MIS,FLO	UPS-6 Reservoir	Glenrock Coal Co.	North Platte River
P17549S	35	75	9	NESW	UNA	STO	Dave Johnston Mine SP-19 Stock Reservoir	Glenrock Coal Company	East Fork Sand Creek (South)
P17550S	35	75	10	NESW	UNA	STO	Dave Johnston Mine SP-18 Stock Reservoir	Glenrock Coal Company	SP-18 Draw
P8823R	35	75	10	SESW	UNA	TEM,MIS,FLO	UPS-3 Reservoir	Glenrock Coal Co.	UPS-3 Draw
P8274R	35	75	11	NWNE	UNA	TEM,IND	Dave Johnston Mine SP-16 Reservoir	Glenrock Coal Co.	SP-16 Draw
P8274R	35	75	11	SWNE	UNA	TEM,IND	Dave Johnston Mine SP-16 Reservoir	Glenrock Coal Co.	SP-16 Draw
P8860R	35	75	11	NESW	UNA	TEM,MIS,FLO	UPS-4 Reservoir	Glenrock Coal Co.	SP-22 Draw
P8828R	35	75	13	NENE	UNA	TEM,IND,MIS	SP-35 Reservoir	Glenrock Coal Co.	SP-22 Draw
P8141R	35	75	13	SWSW	PU	IND	Dave Johnston Mine SP-22	GLENROCK COAL COMPANY	SP-22 Draw
P8141R	35	75	13	SESW	PUO	IND	Dave Johnston Mine SP-22	GLENROCK COAL COMPANY	SP-22 Draw
P8279R	35	75	13	SESE	UNA	TEM,IND	Dave Johnston Mine SP-21 Reservoir	Glenrock Coal Co.	SP-21 Draw
P8824R	35	75	13	SWNW	UNA	TEM,MIS,FLO	UPS-5 Reservoir	Glenrock Coal Co.	SP-20 Draw
P8278R	35	75	13	NESW	UNA	TEM,IND	Dave Johnston Mine SP-20 Reservoir	Glenrock Coal Co.	SP-20 Draw
P10431S	35	75	13	SWNW	ADJ	STO	Dave Johnston Mine SP-17 Stock Reservoir	GLENROCK COAL COMPANY	North Platte River
P8829R	35	75	14	SWNW	UNA	TEM,IND,MIS	SP-36 Reservoir	Glenrock Coal Co.	SP-36 Draw
P8829R	35	75	15	NWSW	UNA	TEM,IND,MIS	SP-36 Reservoir	Glenrock Coal Co.	SP-36 Draw
P8821R	35	75	15	SENE	UNA	TEM,MIS,FLO	UPS-1 Reservoir	Glenrock Coal Co.	SP-36 Draw
P17548S	35	75	24	SENW	UNA	STO	Dave Johnston Mine SP-38 Stock Reservoir	Glenrock Coal Company	SP-38 Draw
P17548S	35	75	24	NENW	UNA	STO	Dave Johnston Mine SP-38 Stock Reservoir	Glenrock Coal Company	SP-38 Draw
P9485R	35	75	24	NESW	UNA	TEM,IND	SP-39 Reservoir	Glenrock Coal Co.	SP-39 Draw
P9485R	35	75	24	NESE	UNA	TEM,IND	SP-39 Reservoir	Glenrock Coal Co.	SP-39 Draw
P8830R	35	75	28	NWNW	UNA	TEM,IND,MIS	SP-37 Reservoir	Glenrock Coal Co.	SP-37 Draw
P17552S	36	75	34	SWSW	UNA	STO	Dave Johnston Mine SP-7A Stock Reservoir	Glenrock Coal Company	Herkimer Draw
P17552S	36	75	34	NWSW	UNA	STO	Dave Johnston Mine SP-7A Stock Reservoir	Glenrock Coal Company	Herkimer Draw
P17552S	36	75	34	NESW	UNA	STO	Dave Johnston Mine SP-7A Stock Reservoir	Glenrock Coal Company	Herkimer Draw
P17552S	36	75	34	SESW	UNA	STO	Dave Johnston Mine SP-7A Stock Reservoir	Glenrock Coal Company	Herkimer Draw
P10429S	36	75	36	NWSW	ADJ	STO	Dave Johnston Mine SP-8 Stock Reservoir	GLENROCK COAL COMPANY	North Platte River

Table D6-4 Smith Ranch Pump Test Summary

Mine Unit	Pumping Test Volume No. aka Hydrologic Test Report
PERMIT 603	
A/B	14
C – Sec. 14 – 50 Sand (North)	16
C – Sec. 14 – 50 Sand (South)	18
D – Secs. 22,23 – 40 Sand	20
E – 50 Sand	21, 22
F	23
H	25, 26
D Extension	28
I	30
J	34
PERMIT 633	
1	III-A
3	III-B, III-C
4	III-E, III-F
2	III-G, III-H
15	III-I
15A	III-J
K	III-K
9	III-L
SW-Area Regional Hydrologic Test	III-N

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

Appropriation	Township	Range	Section	Qtrqtr	Status	Gw Permit Uses	GW Permit Facility Name	GW Permit Applicant
21/11/281W	36	72	1	NENE	UNA	STO	IRWIN DIKE	BONER BROTHERS PARTNERSHIP
21/12/242W	36	72	12	NENE	UNA	STO	ANTONE #3	BONER BROS. PARTNERSHIP
21/6/281W	35	72	12	SWSE	UNA	STO	ANTONE #40	BONER BROTHERS PARTNERSHIP
21/7/243W	35	72	14	NENE	UNA	MON	CMO 2	POWER RESOURCES INC.
21/7/281W	35	72	14	NESW	UNA	STO	NORTH BOX #130	BONER BROTHERS PARTNERSHIP
21/8/243W	35	72	14	NENE	UNA	MON	CMO 18	POWER RESOURCES INC.
21/8/281W	35	72	14	NENE	UNA	MON	CMO 16	POWER RESOURCES INC.
22/1/260W	35	72	14	NENE	UNA	MON	CMU 18	POWER RESOURCES INC.
22/1/262W	35	72	14	NENE	UNA	MON	CMU 16	POWER RESOURCES INC.
22/1/263W	35	72	14	NWSE	UNA	MON	CMU 7	POWER RESOURCES INC.
22/1/285W	35	72	14	SWSW	UNA	MON	CMU 11	POWER RESOURCES INC.
22/1/286W	35	72	14	NENE	UNA	MON	CMU 17	POWER RESOURCES INC.
22/10/261W	35	72	14	NESW	UNA	MON	CM 31	POWER RESOURCES INC.
22/10/262W	35	72	14	NESW	UNA	MON	CMU 12	POWER RESOURCES INC.
22/10/263W	35	72	14	SWSW	UNA	MON	CMU 10	POWER RESOURCES INC.
22/10/285W	35	72	14	NESW	UNA	MON	CMO 13	POWER RESOURCES INC.
22/11/255W	35	72	14	NESW	UNA	MON	CMO 12	POWER RESOURCES INC.
22/11/260W	35	72	14	SWSW	UNA	MON	CMO 11	POWER RESOURCES INC.
22/11/262W	35	72	14	SWNE	UNA	MON	CMO 15	POWER RESOURCES INC.
22/11/284W	35	72	14	SWNE	UNA	MON	CMU 15	POWER RESOURCES INC.
22/11/285W	35	72	14	NESW	UNA	MIS	ENL. NORTH BOX #130	Boner Bros. Partnership** NEWFIELD EXPLORATION
22/12/262W	35	72	14	NESW	UNA	MON	CMU 13	POWER RESOURCES INC.
22/12/284W	35	72	14	SESW	UNA	MON	CMU 9	POWER RESOURCES INC.
22/12/390W	35	72	16	SWSW	UNA	MON	M 56	POWER RESOURCES INC.
22/2/257W	35	72	16	SWSW	UNA	MON	M 13	POWER RESOURCES INC.
22/2/259W	35	72	16	SWSW	UNA	MON	M 12	POWER RESOURCES INC.
22/2/262W	35	72	16	SWSW	UNA	MON	M 15	POWER RESOURCES INC.
22/2/263W	35	72	16	SWSW	UNA	MON	SW SW SEC 17 WELL M 1	POWER RESOURCES INC.
22/2/285W	35	72	16	SWSW	UNA	MON	M 57	POWER RESOURCES INC.
22/3/261W	35	72	16	SWSW	UNA	MON	M 20	POWER RESOURCES INC.
22/3/262W	35	72	16	SWSW	UNA	MON	M 14	POWER RESOURCES INC.
22/3/263W	35	72	17	SESE	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
22/3/285W	35	72	17	SWSW	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
22/4/263W	35	72	17	SWSE	UNA	MON	M-99	POWER RESOURCES INC.
22/4/285W	35	72	17	SESE	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
22/5/260W	35	72	17	SESE	UNA	MON	M 64	POWER RESOURCES INC.
22/5/263W	35	72	17	SESE	UNA	MON	M 55	POWER RESOURCES INC.
22/5/285W	35	72	18	NWSW	GST	MON	HM35	POWER RESOURCES INC.
22/5/370W	35	72	18	SESW	GST	MON	HM32	POWER RESOURCES INC.
22/5/41W	35	72	18	NESW	GST	MON	HMU8	POWER RESOURCES INC.
22/6/259W	35	72	18	NESW	GST	MON	HMU9	POWER RESOURCES INC.
22/6/260W	35	72	18	SWNW	GST	MON	HMU6	POWER RESOURCES INC.
22/6/263W	35	72	18	SWNW	GST	MON	HM37	POWER RESOURCES INC.
22/6/285W	35	72	18	NESW	GST	MON	HM09	POWER RESOURCES INC.
22/6/370W	35	72	18	NESW	GST	MON	HM14	POWER RESOURCES INC.
22/7/258W	35	72	18	SWSE	UNA	IND	SW/SE 18-36-72; (75 WELLS)	POWER RESOURCES INC.
22/7/263W	35	72	18	SWSE	UNA	IND	SW/SE 18-36-72; (75 WELLS)	POWER RESOURCES INC.
22/7/285W	35	72	18	NWSE	GST	MON	HM15	POWER RESOURCES INC.
22/8/257W	35	72	18	SWNW	GST	MON	HMU7	POWER RESOURCES INC.
22/8/258W	35	72	18	SWNW	GST	MON	HM11	POWER RESOURCES INC.
22/8/262W	35	72	18	SWNW	GST	MON	HM10	POWER RESOURCES INC.
22/8/263W	35	72	18	NESW	GST	MON	HMP9	POWER RESOURCES INC.
22/8/285W	35	72	18	SWSE	UNA	MON	PUMP #2	POWER RESOURCES INC.
22/9/258W	35	72	18	SENW	UNA	IND	SE/NW 18/36/72 (3 wells)	POWER RESOURCES INC
22/9/262W	35	72	18	SENW	UNA	IND	SE/NW 18/36/72 (3 wells)	POWER RESOURCES INC
22/9/263W	35	72	18	NWSE	UNA	IND	NW/SE 18-36-72; (5 WELLS)	POWER RESOURCES INC.
22/9/285W	35	72	18	NWSE	UNA	IND	NW/SE 18-36-72; (5 WELLS)	POWER RESOURCES INC.
23/10/49W	35	72	18	NWNW	GST	MON	HM8	POWER RESOURCES INC.
23/4/199W	35	72	18	SENE	UNA	IND	SE/NE 13-36-73; (3 WELLS)	POWER RESOURCES INC.
23/4/293W	35	72	18	SWNW	GST	MON	HM07	POWER RESOURCES INC.
23/9/98W	35	72	18	NWSE	GST	MON	HM16	POWER RESOURCES INC.
24/10/114W	35	72	18	SENW	GST	MON	HM12	POWER RESOURCES INC.
24/10/220W	35	72	18	NWNW	GST	MON	HM9	POWER RESOURCES INC.
24/11/220W	35	72	18	NESW	GST	MON	HM08	POWER RESOURCES INC.
24/7/114W	35	72	18	NWSW	GST	MON	HM34	POWER RESOURCES INC.
24/8/114W	35	72	18	SWSE	GST	MON	HM010	POWER RESOURCES INC.
24/9/114W	35	72	18	SWNW	GST	MON	HMP7	POWER RESOURCES INC.
40/1/486W	35	72	18	SWSE	GST	MON	HMP10	POWER RESOURCES INC.
40/1/576W	35	72	18	NESW	UNA	IND	NE/SW 18-36-72; (39 WELLS)	POWER RESOURCES INC.
40/10/485W	35	72	18	NENW	UNA	IND	NE/NW 13-36-73; (59 WELLS)	POWER RESOURCES INC.
40/10/486W	35	72	18	NESW	UNA	IND	NE/SW 18-36-72; (39 WELLS)	POWER RESOURCES INC.
40/10/575W	35	72	18	NWNW	UNA	IND	NW/NW 18-36-72 (5 wells)	POWER RESOURCES INC
40/2/486W	35	72	18	NWNW	UNA	IND	NW/NW 18-36-72 (5 wells)	POWER RESOURCES INC
40/2/576W	35	72	18	SWSE	GST	MON	HMU10	POWER RESOURCES INC.
40/3/486W	35	72	18	SENW	GST	MON	HM13	POWER RESOURCES INC.
40/3/576W	35	72	18	SWNW	GST	MON	HMP6	POWER RESOURCES INC.
40/4/486W	35	72	18	NESW	GST	MON	HMP8	POWER RESOURCES INC.
40/4/567W	35	72	18	SWSE	GST	MON	HM18	POWER RESOURCES INC.
40/4/576W	35	72	18	SWSE	GST	MON	HM17	POWER RESOURCES INC.
40/5/486W	35	72	18	SWSE	GST	MON	HM30	POWER RESOURCES INC.
40/5/500W	35	72	18	SESW	GST	MON	HM31	POWER RESOURCES INC.
40/5/567W	35	72	18	SWNW	GST	MON	HM36	POWER RESOURCES INC.
40/5/576W	35	72	18	SWNW	GST	MON	HM06	POWER RESOURCES INC.
40/6/486W	35	72	18	NESW	GST	MON	HM33	POWER RESOURCES INC.
40/6/567W	35	72	19	SWNE	GST	MON	HM27	POWER RESOURCES INC.
40/7/486W	35	72	19	SENE	GST	MON	HM23	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

40/7/567W	35	72	19	SWNE	GST	MON	HM26	POWER RESOURCES INC.
40/8/486W	35	72	19	SENE	GST	MON	HM25	POWER RESOURCES INC.
40/8/567W	35	72	19	SENE	GST	MON	HM22	POWER RESOURCES INC.
40/9/485W	35	72	19	NENE	GST	MON	HM19	POWER RESOURCES INC.
40/9/486W	35	72	19	NWNE	GST	MON	HMU11	POWER RESOURCES INC.
41/1/537W	35	72	19	SENE	UNA	IND	SOLUTION MINE WELLS #451 1025	POWER RESOURCES INC.
41/10/13W	35	72	19	NWNE	GSI	MON	HM28	POWER RESOURCES INC.
41/10/536W	35	72	19	NWNE	GST	MON	HM011	POWER RESOURCES INC.
41/10/586W	35	72	19	SENE	GST	MON	HMU12	POWER RESOURCES INC.
41/2/499W	35	72	19	NENE	GST	MON	HM20	POWER RESOURCES INC.
41/2/523W	35	72	19	NWNE	GST	MON	HMP11	POWER RESOURCES INC.
41/3/30W	35	72	19	NWNE	GST	MON	HM29	POWER RESOURCES INC.
41/3/491W	35	72	19	SENW	GST	MON	HMP12	POWER RESOURCES INC.
41/3/499W	35	72	19	SENE	GST	MON	HM012	POWER RESOURCES INC.
41/3/561W	35	72	19	SENE	GST	MON	HM24	POWER RESOURCES INC.
41/4/13W	35	72	19	NENE	GST	MON	HM21	POWER RESOURCES INC.
41/5/136W	35	72	20	NESE	UNA	MON	MU 16	POWER RESOURCES INC.
41/5/13W	35	72	20	NENE	UNA	MON	M 52	POWER RESOURCES INC.
41/5/215W	35	72	20	SENE	UNA	MON	M 44	POWER RESOURCES INC.
41/5/491W	35	72	20	NENE	UNA	MON	MU 15	POWER RESOURCES INC.
41/5/500W	35	72	20	NESE	UNA	MON	MU 19	POWER RESOURCES INC.
41/6/13W	35	72	20	NENE	UNA	MON	M 51	POWER RESOURCES INC.
41/6/491W	35	72	20	SESW	UNA	MON	LO-1	POWER RESOURCES INC
41/7/499W	35	72	20	SESE	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
C72/184A	35	72	20	NENE	UNA	MON	M 54	POWER RESOURCES INC.
C72/184A	35	72	20	NENE	UNA	MON	M 53	POWER RESOURCES INC.
C72/184A	35	72	20	NENE	UNA	MON	M 50	POWER RESOURCES INC.
C72/184A	35	72	20	SWSE	UNA	STO	NORTH BOX #130	BONER BROTHERS PARTNERSHIP
C72/184A	35	72	20	NENE	UNA	MON	M 58	POWER RESOURCES INC.
C72/184A	35	72	20	NENE	UNA	MON	M 48	POWER RESOURCES INC.
C72/184A	35	72	20	SESW	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
C72/184A	35	72	20	SWSW	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
C72/184A	35	72	20	NENE	UNA	MON	M 60	POWER RESOURCES INC.
C72/184A	35	72	20	NESE	UNA	MON	MU 17	POWER RESOURCES INC.
C72/184A	35	72	20	NENE	UNA	MON	M 59	POWER RESOURCES INC.
C72/184A	35	72	20	SWNW	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
C72/184A	35	72	20	NWSW	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
C72/184A	35	72	20	SESW	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
C72/184A	35	72	20	SENE	UNA	MON	M 45	POWER RESOURCES INC.
C72/184A	35	72	20	NWSE	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
C72/184A	35	72	20	SWSE	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
C72/184A	35	72	20	NESE	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
C72/184A	35	72	20	SESE	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
C72/269A	35	72	20	NENW	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
C72/269A	35	72	20	NENE	UNA	MON	MO 17	POWER RESOURCES INC.
CR12/368A	35	72	20	NWSW	UNA	MON	LO-3	POWER RESOURCES INC
CR12/368A	35	72	20	SENE	UNA	MON	M 46	POWER RESOURCES INC.
CR12/368A	35	72	20	SENE	UNA	MON	M 47	POWER RESOURCES INC.
CR12/368A	35	72	20	NESE	UNA	MON	M 40	POWER RESOURCES INC.
CR12/368A	35	72	20	SENE	UNA	MON	M 14	POWER RESOURCES INC.
CR12/368A	35	72	20	NENE	UNA	MON	MO 16 (PREVIOUSLY M 53)	POWER RESOURCES INC.
CR12/368A	35	72	20	NENE	UNA	MON	M 63	POWER RESOURCES INC.
CR12/368A	35	72	20	NESE	UNA	MON	MU 18	POWER RESOURCES INC.
CR12/368A	35	72	20	NENE	UNA	MON	M 62	POWER RESOURCES INC.
CR12/369A	35	72	20	NWSE	UNA	MON	M 39	POWER RESOURCES INC.
CR13/149A	35	72	20	NESW	UNA	MON	LO-2	POWER RESOURCES INC
CR7/045A	35	72	20	NENE	UNA	MON	M 61	POWER RESOURCES INC.
CR7/045A	35	72	20	NESE	UNA	RES,IND	SOLUTION MINE WELLS #1 THROUGH #450	POWER RESOURCES INC.
CU2/304A	35	72	20	SWSE	UNA	RES,IND	SOLUTION MINE WELLS #1 THROUGH #450	POWER RESOURCES INC.
CU2/304A	35	72	20	SENE	UNA	RES,IND	SOLUTION MINE WELLS #1 THROUGH #450	POWER RESOURCES INC.
CU2/304A	35	72	20	SESE	UNA	RES,IND	SOLUTION MINE WELLS #1 THROUGH #450	POWER RESOURCES INC.
CU2/304A	35	72	20	NWSW	UNA	RES,IND	SOLUTION MINE WELLS #1 THROUGH #450	POWER RESOURCES INC.
CU2/304A	35	72	20	NWSE	UNA	RES,IND	SOLUTION MINE WELLS #1 THROUGH #450	POWER RESOURCES INC.
CU2/304A	35	72	20	NESE	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
CU2/304A	35	72	20	NWSE	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
CU2/304A	35	72	21	SESW	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
CU2/304A	35	72	21	NWSW	UNA	RES,IND	SOLUTION MINE WELLS #1 THROUGH #450	POWER RESOURCES INC.
CU2/304A	35	72	21	NESE	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
CU2/304A	35	72	21	SWSE	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
CU2/304A	35	72	21	SESE	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
CU2/304A	35	72	21	SWNW	UNA	RES,IND	SOLUTION MINE WELLS #1 THROUGH #450	POWER RESOURCES INC.
CU2/304A	35	72	21	NWNW	UNA	MON	MO 1	POWER RESOURCES INC.
CU2/305A	35	72	21	SENW	UNA	RES,IND	SOLUTION MINE WELLS #1 THROUGH #450	POWER RESOURCES INC.
CU2/305A	35	72	21	NESW	UNA	RES,IND	SOLUTION MINE WELLS #1 THROUGH #450	POWER RESOURCES INC.
CU2/305A	35	72	21	SENE	UNA	RES,IND	SOLUTION MINE WELLS #1 THROUGH #450	POWER RESOURCES INC.
CU2/305A	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
CU2/305A	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
CU2/305A	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
CU2/305A	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
CU2/305A	35	72	21	SENE	UNA	IND	SW/NW 23-36-73; 125 WELLS	POWER RESOURCES INC.
CU2/305A	35	72	21	NENW	UNA	IND	SW/NW 23-36-73; 125 WELLS	POWER RESOURCES INC.
CU2/305A	35	72	21	SENW	UNA	IND	SW/NW 23-36-73; 125 WELLS	POWER RESOURCES INC.
CU2/305A	35	72	21	NENE	UNA	IND	SW/NW 23-36-73; 125 WELLS	POWER RESOURCES INC.
CU2/305A	35	72	21	NWNE	UNA	IND	SW/NW 23-36-73; 125 WELLS	POWER RESOURCES INC.
CU2/305A	35	72	21	SWNE	UNA	IND	SW/NW 23-36-73; 125 WELLS	POWER RESOURCES INC.
CU2/305A	35	72	21	NWNE	GSI	MIS,IND	NW1/4SE1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/305A	35	72	21	SWNE	GSI	MIS,IND	NW1/4SE1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/307A	35	72	21	SENE	GSI	MIS,IND	NW1/4SE1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/309A	35	72	21	NENW	UNA	MON	M 24	POWER RESOURCES INC.
CU2/311A	35	72	21	NENW	UNA	IND	SE/NE 22-36-73 (76 WELLS)	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

CU2/311A	35	72	21	NENE	UNA	IND	SE/NE 22-36-73 (76 WELLS)	POWER RESOURCES INC.
CU2/311A	35	72	21	NWNE	UNA	IND	SE/NE 22-36-73 (76 WELLS)	POWER RESOURCES INC.
CU2/311A	35	72	21	SWNE	UNA	IND	SE/NE 22-36-73 (76 WELLS)	POWER RESOURCES INC.
CU2/311A	35	72	21	SENE	UNA	IND	SE/NE 22-36-73 (76 WELLS)	POWER RESOURCES INC.
CU2/311A	35	72	21	NENE	GSI	IND,MIS	NW1/4NE1/4 SEC 14-36-73 45 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/311A	35	72	21	NWNE	GSI	IND,MIS	NW1/4NE1/4 SEC 14-36-73 45 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/311A	35	72	21	SWNE	GSI	IND,MIS	NW1/4NE1/4 SEC 14-36-73 45 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/311A	35	72	21	SENE	GSI	IND,MIS	NW1/4NE1/4 SEC 14-36-73 45 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/311A	35	72	21	NWNW	UNA	MON	MSH 35	POWER RESOURCES INC.
CU2/311A	35	72	21	NWNW	UNA	MON	MO 8	POWER RESOURCES INC.
CU2/311A	35	72	21	NWNW	UNA	MON	MO 2	POWER RESOURCES INC.
CU2/311A	35	72	21	NENW	UNA	MON	M 22	POWER RESOURCES INC.
CU2/311A	35	72	21	SWNW	UNA	MON	MU 10	POWER RESOURCES INC.
CU2/311A	35	72	21	NWNW	UNA	MON	MO 9	POWER RESOURCES INC.
CU2/311A	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
CU2/312A	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
CU2/312A	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
CU2/312A	35	72	21	SWNW	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
CU2/312A	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
CU2/312A	35	72	21	NWNW	UNA	MON	MU 8	POWER RESOURCES INC.
CU2/312A	35	72	21	NWNE	UNA	IND	SW/NW 23-36-73 (55 WELLS)	POWER RESOURCES INC.
CU2/312A	35	72	21	SWNE	UNA	IND	SW/NW 23-36-73 (55 WELLS)	POWER RESOURCES INC.
CU2/312A	35	72	21	SENE	UNA	IND	SW/NW 23-36-73 (55 WELLS)	POWER RESOURCES INC.
CU2/312A	35	72	21	NENE	UNA	IND	SW/NW 23-36-73 (55 WELLS)	POWER RESOURCES INC.
CU2/312A	35	72	21	NENW	UNA	IND	SW/NW 23-36-73 (55 WELLS)	POWER RESOURCES INC.
CU2/312A	35	72	21	NWNW	UNA	MON	MU 2	POWER RESOURCES INC.
CU2/312A	35	72	21	NENE	GSI	MIS,IND	SW1/4SE1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/312A	35	72	21	NWNE	GSI	MIS,IND	SW1/4SE1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/312A	35	72	21	SWNE	GSI	MIS,IND	SW1/4SE1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/312A	35	72	21	SENE	GSI	MIS,IND	SW1/4SE1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/312A	35	72	21	SWNW	UNA	MON	MU 12	POWER RESOURCES INC.
CU2/312A	35	72	21	SWNW	UNA	MON	MO 13A	POWER RESOURCES INC.
CU2/312A	35	72	21	SWSE	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
CU2/313A	35	72	21	SESE	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
CU2/313A	35	72	21	SESW	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
CU2/313A	35	72	21	NESE	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
CU2/313A	35	72	21	SENW	UNA	IND	SW/NW 23-36-73 (55 WELLS)	POWER RESOURCES INC.
CU2/313A	35	72	21	SENW	UNA	MON	M 30	POWER RESOURCES INC.
CU2/313A	35	72	21	SESE	UNA	IND	SE/SE 21-36-73: (30 WELLS)	POWER RESOURCES INC.
CU2/313A	35	72	21	NWSW	UNA	MON	M 36	POWER RESOURCES INC.
CU2/313A	35	72	21	NWNW	UNA	MON	MO 7	POWER RESOURCES INC.
CU2/313A	35	72	21	NWNW	UNA	MON	MU 1	POWER RESOURCES INC.
CU2/313A	35	72	21	NENW	UNA	IND	NE/NE 22-36-73; 60 WELLS	POWER RESOURCES INC.
CU2/313A	35	72	21	SWNE	UNA	IND	NE/NE 22-36-73; 60 WELLS	POWER RESOURCES INC.
CU2/313A	35	72	21	SENE	UNA	IND	NE/NE 22-36-73; 60 WELLS	POWER RESOURCES INC.
CU2/313A	35	72	21	NENE	UNA	IND	NE/NE 22-36-73; 60 WELLS	POWER RESOURCES INC.
CU2/313A	35	72	21	NWNE	UNA	IND	NE/NE 22-36-73; 60 WELLS	POWER RESOURCES INC.
CU2/313A	35	72	21	SENW	UNA	IND	NE/NE 22-36-73; 60 WELLS	POWER RESOURCES INC.
CU2/313A	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
CU2/313A	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
CU2/313A	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
CU2/314A	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
CU2/314A	35	72	21	NWNE	GSI	MIS,IND	SW1/4NE1/4 SEC 14-36-73 225 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/314A	35	72	21	SWNE	GSI	MIS,IND	SW1/4NE1/4 SEC 14-36-73 225 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/314A	35	72	21	SENE	GSI	MIS,IND	SW1/4NE1/4 SEC 14-36-73 225 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/314A	35	72	21	NENE	GSI	MIS,IND	SW1/4NE1/4 SEC 14-36-73 225 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/315A	35	72	21	NENE	GSI	MIS,IND	NE1/4SW1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/315A	35	72	21	NWNE	GSI	MIS,IND	NE1/4SW1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/315A	35	72	21	SWNE	GSI	MIS,IND	NE1/4SW1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/315A	35	72	21	SENE	GSI	MIS,IND	NE1/4SW1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/315A	35	72	21	SESW	UNA	MON	M 21	POWER RESOURCES INC.
CU2/315A	35	72	21	SESW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
CU2/315A	35	72	21	NWNW	UNA	MON	MU 7	POWER RESOURCES INC.
CU2/315A	35	72	21	NWNW	UNA	MON	M 10	POWER RESOURCES INC.
CU2/315A	35	72	21	SWNE	GSI	MIS,IND	SE1/4SW1/4 SEC 14-36-73 85 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/315A	35	72	21	SENE	GSI	MIS,IND	SE1/4SW1/4 SEC 14-36-73 85 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/315A	35	72	21	NENE	GSI	MIS,IND	SE1/4SW1/4 SEC 14-36-73 85 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/315A	35	72	21	NWNE	GSI	MIS,IND	SE1/4SW1/4 SEC 14-36-73 85 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/315A	35	72	21	NWSW	UNA	MON	M 34	POWER RESOURCES INC.
CU2/317A	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
CU2/317A	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
CU2/317A	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
CU2/317A	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
CU2/317A	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
CU2/317A	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
CU2/317A	35	72	21	SESW	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
CU2/317A	35	72	21	SWSE	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
CU2/317A	35	72	21	SESE	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
CU2/317A	35	72	21	NESE	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
CU2/317A	35	72	21	SWSE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
CU2/317A	35	72	21	SESE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
CU2/317A	35	72	21	NESE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
CU2/317A	35	72	21	SENE	GSI	MIS,IND	SE1/4NE1/4 SEC 14-36-73 125 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/317A	35	72	21	NENE	GSI	MIS,IND	SE1/4NE1/4 SEC 14-36-73 125 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/317A	35	72	21	NWNE	GSI	MIS,IND	SE1/4NE1/4 SEC 14-36-73 125 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/317A	35	72	21	SWNE	GSI	MIS,IND	SE1/4NE1/4 SEC 14-36-73 125 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/317A	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
CU2/318A	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
CU2/318A	35	72	21	SWNW	UNA	MON	M 33	POWER RESOURCES INC.
CU2/318A	35	72	21	SWNW	UNA	MON	M 42	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

CU2/318A	35	72	21	SWNW	UNA	MON	MO 12A	POWER RESOURCES INC.
CU2/318A	35	72	21	NWNW	UNA	MON	M 6	POWER RESOURCES INC.
CU2/318A	35	72	21	SENE	UNA	IND	SE/NE 22-36-73; 50 WELLS	POWER RESOURCES INC.
CU2/318A	35	72	21	NENW	UNA	IND	SE/NE 22-36-73; 50 WELLS	POWER RESOURCES INC.
CU2/318A	35	72	21	SENW	UNA	IND	SE/NE 22-36-73; 50 WELLS	POWER RESOURCES INC.
CU2/318A	35	72	21	NENE	UNA	IND	SE/NE 22-36-73; 50 WELLS	POWER RESOURCES INC.
CU2/318A	35	72	21	NWNE	UNA	IND	SE/NE 22-36-73; 50 WELLS	POWER RESOURCES INC.
CU2/318A	35	72	21	SWNE	UNA	IND	SE/NE 22-36-73; 50 WELLS	POWER RESOURCES INC.
CU2/318A	35	72	21	NWNW	UNA	MON	M 5	POWER RESOURCES INC.
CU2/318A	35	72	21	NESE	UNA	MON	M 38	POWER RESOURCES INC.
CU2/319A	35	72	21	NWNW	UNA	MON	M 16	POWER RESOURCES INC.
CU2/319A	35	72	21	NESE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
CU2/319A	35	72	21	SWSE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
CU2/319A	35	72	21	SESE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
CU2/319A	35	72	21	SESW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
CU2/319A	35	72	21	SWNW	UNA	MON	MO 11	POWER RESOURCES INC.
CU2/319A	35	72	21	NENE	GSI	MIS,IND	NW1/4SE1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
CU2/319A	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
CU2/319A	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
CU2/319A	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
CU2/319A	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
CU2/319A	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
CU2/319A	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
CU2/319A	35	72	21	NWNW	UNA	MON	M 4	POWER RESOURCES INC.
CU2/319A	35	72	21	NWSW	UNA	MON	M 37	POWER RESOURCES INC.
CU2/319A	35	72	21	SWNW	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
CU2/319A	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
CU2/320A	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
CU2/320A	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
CU2/320A	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
CU2/320A	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
CU2/320A	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
CU2/320A	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
CU2/320A	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
CU2/320A	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
CU2/320A	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
CU2/320A	35	72	21	NWSW	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
CU2/320A	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
CU2/320A	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
CU2/320A	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
CU2/320A	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
CU2/320A	35	72	21	NWNW	UNA	MON	MU 6	POWER RESOURCES INC.
CU2/320A	35	72	21	NWNE	UNA	IND	NW/NW 23-36-73 (8 WELLS)	POWER RESOURCES INC.
CU2/320A	35	72	21	SWNE	UNA	IND	NW/NW 23-36-73 (8 WELLS)	POWER RESOURCES INC.
CU2/320A	35	72	21	SENE	UNA	IND	NW/NW 23-36-73 (8 WELLS)	POWER RESOURCES INC.
CU2/321A	35	72	21	NENW	UNA	IND	NW/NW 23-36-73 (8 WELLS)	POWER RESOURCES INC.
CU2/321A	35	72	21	NENE	UNA	IND	NW/NW 23-36-73 (8 WELLS)	POWER RESOURCES INC.
CU2/321A	35	72	21	NWNW	UNA	MON	M 7	POWER RESOURCES INC.
CU2/321A	35	72	21	SWNW	UNA	MON	MU 11	POWER RESOURCES INC.
CU2/321A	35	72	21	NENW	UNA	MON	M 25	POWER RESOURCES INC.
CU2/321A	35	72	21	NENW	UNA	MON	M 26	POWER RESOURCES INC.
CU2/321A	35	72	21	NWSW	UNA	MON	MO 15	POWER RESOURCES INC.
CU2/321A	35	72	21	NWSW	UNA	MON	MU 14	POWER RESOURCES INC.
CU2/321A	35	72	21	NENE	UNA	IND	SE/SE 15-36-73 (65 WELLS)	POWER RESOURCES INC.
CU2/321A	35	72	21	NWNE	UNA	IND	SE/SE 15-36-73 (65 WELLS)	POWER RESOURCES INC.
CU2/321A	35	72	21	SWNE	UNA	IND	SE/SE 15-36-73 (65 WELLS)	POWER RESOURCES INC.
CU2/321A	35	72	21	SENE	UNA	IND	SE/SE 15-36-73 (65 WELLS)	POWER RESOURCES INC.
CU2/321A	35	72	21	NENW	UNA	IND	SE/SE 15-36-73 (65 WELLS)	POWER RESOURCES INC.
CU2/321A	35	72	21	SENW	UNA	IND	SE/SE 15-36-73 (65 WELLS)	POWER RESOURCES INC.
CU2/321A	35	72	21	SENW	UNA	MON	M 29	POWER RESOURCES INC.
CU2/321A	35	72	21	NENW	UNA	MON	M 23	POWER RESOURCES INC.
CU2/321A	35	72	21	SWNE	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
CU2/321A	35	72	21	SENE	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
CU2/324A	35	72	21	NENW	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
CU2/324A	35	72	21	NENE	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
CU2/324A	35	72	21	NWNE	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
CU2/324A	35	72	21	NWNW	UNA	MON	M 11	POWER RESOURCES INC.
CU2/324A	35	72	21	NWNW	UNA	MON	MU 5	POWER RESOURCES INC.
CU2/324A	35	72	21	NENW	UNA	MON	M 27	POWER RESOURCES INC.
CU2/324A	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
CU2/324A	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
CU2/324A	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
CU2/439A	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
CU6/320A	35	72	21	NWNW	UNA	MON	M 2	POWER RESOURCES INC.
CU6/320A	35	72	21	SWNW	UNA	MON	MU 13	POWER RESOURCES INC.
CU6/320A	35	72	21	SWNW	UNA	IND,MIS	SATELLITE NO. 1 WELL	POWER RESOURCES INC
CU6/320A	35	72	21	SWNW	UNA	IND,MIS	SATELLITE NO. 1 WELL	POWER RESOURCES INC
CU6/320A	35	72	21	NWNW	UNA	MON	M 8	POWER RESOURCES INC.
CU6/320A	35	72	21	NWNE	UNA	IND	NW/NE 22-36-73 (120 WELLS)	POWER RESOURCES INC.
CU6/320A	35	72	21	SWNE	UNA	IND	NW/NE 22-36-73 (120 WELLS)	POWER RESOURCES INC.
CU6/320A	35	72	21	SENE	UNA	IND	NW/NE 22-36-73 (120 WELLS)	POWER RESOURCES INC.
CU6/320A	35	72	21	NENE	UNA	IND	NW/NE 22-36-73 (120 WELLS)	POWER RESOURCES INC.
CU6/320A	35	72	21	NENW	UNA	IND	NW/NE 22-36-73 (120 WELLS)	POWER RESOURCES INC.
CU6/320A	35	72	21	SENW	UNA	IND	NW/NE 22-36-73 (120 WELLS)	POWER RESOURCES INC.
P10045R	35	72	21	NWNW	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P101098W	35	72	21	SESW	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P101098W	35	72	21	NESE	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P101098W	35	72	21	SWSE	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P101098W	35	72	21	SESE	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P101099W	35	72	21	SENW	UNA	MON	M 31	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P101099W	35	72	21	NENE	UNA	IND	SW/SW 14-36-73 (40 WELLS)	POWER RESOURCES INC.
P101099W	35	72	21	NWNE	UNA	IND	SW/SW 14-36-73 (40 WELLS)	POWER RESOURCES INC.
P101099W	35	72	21	SWNE	UNA	IND	SW/SW 14-36-73 (40 WELLS)	POWER RESOURCES INC.
P101099W	35	72	21	SENE	UNA	IND	SW/SW 14-36-73 (40 WELLS)	POWER RESOURCES INC.
P101099W	35	72	21	NENW	UNA	IND	SW/SW 14-36-73 (40 WELLS)	POWER RESOURCES INC.
P101339W	35	72	21	SENW	UNA	IND	SW/SW 14-36-73 (40 WELLS)	POWER RESOURCES INC.
P101339W	35	72	21	SWNW	UNA	MON	MO 14	POWER RESOURCES INC.
P101339W	35	72	21	NWNW	UNA	MON	M 3	POWER RESOURCES INC.
P101339W	35	72	21	SWNW	UNA	MON	M 43	POWER RESOURCES INC.
P101339W	35	72	21	SWNW	UNA	MON	M 32	POWER RESOURCES INC.
P101339W	35	72	21	NWNW	UNA	MON	MO 6	POWER RESOURCES INC.
P101339W	35	72	21	NWNW	UNA	MON	M 9	POWER RESOURCES INC.
P101889W	35	72	21	NWNW	UNA	MON	MSH 15	POWER RESOURCES INC.
P102859W	35	72	21	SENW	UNA	MON	M 28	POWER RESOURCES INC.
P102860W	35	72	21	NWSW	UNA	MON	M 35	POWER RESOURCES INC.
P102860W	35	72	21	NWNW	UNA	MON	MO 5	POWER RESOURCES INC.
P103602W	35	72	22	SWSW	UNA	STO	NORTH BOX #2	BONER BROS. PARTNERSHIP
P10431S	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P10434S	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P104714W	35	72	22	NWSW	UNA	MON	FT-16(L)	POWER RESOURCES INC.
P104714W	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P104714W	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P104714W	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P104716W	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P104716W	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P104716W	35	72	22	SWSW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P104716W	35	72	22	SWSW	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P104716W	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P104897W	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P104897W	35	72	22	SWSW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P107035W	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P107035W	35	72	22	SWSW	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P107036W	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P107036W	35	72	22	SWSW	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
P107036W	35	72	22	SWSW	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
P107036W	35	72	23	SWNE	UNA	MON	CMU 15	POWER RESOURCES INC.
P107036W	35	72	27	SWNE	GST	MON	MFG-1	EXXONMOBIL ENVIRONMENTAL REMEDIATION
P107499W	35	72	27	SWNE	GST	MON	MFG-2	EXXONMOBIL ENVIRONMENTAL REMEDIATION
P107500W	35	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P107501W	35	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P107502W	35	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P107503W	35	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P107504W	35	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P107505W	35	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P107506W	35	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P107507W	35	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P107508W	35	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P107509W	35	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P107510W	35	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P107511W	35	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P107513W	35	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P107514W	35	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P107515W	35	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P107801W	35	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P107802W	35	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P107803W	35	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P107810W	35	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P107817W	35	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P107818W	35	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P108020W	35	72	27	NWSW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W	35	72	27	SWNW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W	35	72	27	NWNW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W	35	72	27	SWNW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P108020W	35	72	27	NWSW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P108020W	35	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	35	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	35	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	35	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	35	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	35	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	35	72	27	NWSW	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	35	72	27	NWNW	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	35	72	27	SWNW	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	35	72	27	NWNW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P108020W	35	72	27	SWNE	GST	MON	MFG-3	EXXONMOBIL ENVIRONMENTAL REMEDIATION
P108020W	35	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	35	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	35	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	36	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
P108020W	36	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
P108020W	36	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
P108020W	36	72	27	NWNW	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
P108020W	36	72	27	SWNW	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
P108020W	36	72	27	NWSW	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
P108020W	36	72	27	SWNW	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108020W	36	72	27	NWSW	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108020W	36	72	27	NWNW	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108020W	36	72	27	NENW	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P108020W	36	72	27	NWNW	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108020W	36	72	27	NWSW	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	UNA	MON	TDM XIR (116R)	EXXON CORPORATION
P108020W	36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
P108020W	36	72	28	SENE	ADJ	RES,IND,DOM	HIGHLAND #3	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
P108020W	36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #1	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108020W	36	72	28	SENE	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108020W	36	72	28	NENE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P108020W	36	72	28	NENW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P108020W	36	72	28	SENE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P108020W	36	72	28	NENW	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	36	72	28	NENE	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	36	72	28	SENE	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P108020W	36	72	28	NWSW	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W	36	72	28	SENW	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W	36	72	28	SWNW	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W	36	72	28	NENW	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W	36	72	28	NWNW	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W	36	72	28	NWNE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W	36	72	28	NENW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W	36	72	28	SENE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W	36	72	28	NENE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P108020W	36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P108020W	36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P108020W	36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P108020W	36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P108020W	36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P108020W	36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P108020W	36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P108020W	36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P108020W	36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P108020W	36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P108020W	36	72	28	NENW	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P108020W	36	72	28	NWNW	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P108020W		36	72	28	NENE	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P108020W		36	72	28	NWNE	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P108020W		36	72	28	SENE	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P108020W		36	72	29	NENW	UNA	MON	M 52	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MO 5	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 35	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 28	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 44	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MSH 15	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 9	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MO 6	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 32	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 55	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 3	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 43	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MO 14	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 23	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 56	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 11	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 54	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MU 14	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 53	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 50	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MO 15	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 26	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 7	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MU 11	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 25	POWER RESOURCES INC.
P108020W		36	72	29	SENW	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P108020W		36	72	29	NWNE	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P108020W		36	72	29	SWNE	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P108020W		36	72	29	NENW	ADJ	RES,IND,MIS	HIGHLAND #13	EXXON CORPORATION
P108020W		36	72	29	NWNE	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P108020W		36	72	29	NENW	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P108020W		36	72	29	SWNE	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 4	POWER RESOURCES INC.
P108020W		36	72	29	SENW	ADJ	RES,IND,MIS	HIGHLAND #16	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 37	POWER RESOURCES INC.
P108020W		36	72	29	NWNE	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P108020W		36	72	29	SWNE	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P108020W		36	72	29	NENW	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P108020W		36	72	29	SENW	ADJ	RES,IND,MIS	HIGHLAND #11	POWER RESOURCES INC.
P108020W		36	72	29	NWNE	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P108020W		36	72	29	SWNE	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P108020W		36	72	29	NENW	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P108020W		36	72	29	SENW	ADJ	RES,IND,MIS	HIGHLAND #20	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 48	POWER RESOURCES INC.
P108020W		36	72	29	NWNE	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P108020W		36	72	29	SWNE	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P108020W		36	72	29	NENW	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P108020W		36	72	29	SENW	ADJ	RES,IND,MIS	HIGHLAND #17	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MU 6	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MU 5	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 27	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MU 13	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 2	POWER RESOURCES INC.
P108020W		36	72	29	NWNE	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P108020W		36	72	29	SWNE	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P108020W		36	72	29	NENW	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P108020W		36	72	29	SENW	ADJ	RES,IND,MIS	HIGHLAND #18	EXXON CORPORATION
P108020W		36	72	29	NENW	UNA	MON	M 8	POWER RESOURCES INC.
P108020W		36	72	29	NWNE	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P108020W		36	72	29	SWNE	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P108020W		36	72	29	NENW	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P108020W		36	72	29	SENW	ADJ	RES,IND,MIS	HIGHLAND #14	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 31	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 51	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 33	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 12	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 42	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 13	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MO 12A	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 38	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 5	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 6	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	MO 11	POWER RESOURCES INC.
P108020W		36	72	29	NWNE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W		36	72	29	SWNE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W		36	72	29	SENW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P108020W		36	72	29	NESE	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W		36	72	29	NENW	UNA	MON	M 45	POWER RESOURCES INC.
P108020W		36	72	29	NENW	UNA	MON	M 21	POWER RESOURCES INC.
P108020W		36	72	29	NENE	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W		36	72	29	SWNW	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W		36	72	29	SENE	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W		36	72	29	SWNE	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W		36	72	29	SENW	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W		36	72	29	NWSW	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W		36	72	29	NWNE	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P108020W	36	72	29	NWSE	ADJ	STO,MIS,RES	HIGHLAND RESERVOIR	EXXON MINERALS COMPANY
P108020W	36	72	29	NENW	UNA	MON	MU 7	POWER RESOURCES INC.
P108020W	36	72	29	NWNE	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	36	72	29	SWNE	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	36	72	29	NENW	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	36	72	29	SENW	ADJ	RES,IND,MIS	HIGHLAND #21	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	M 10	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	M 34	POWER RESOURCES INC.
P108020W	36	72	29	NWNE	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	36	72	29	SENW	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	36	72	29	SWNE	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	36	72	29	NENW	ADJ	RES,IND,MIS	HIGHLAND #22	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	SW SW SEC 17 WELL M 1	POWER RESOURCES INC.
P108020W	36	72	29	NWNE	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	36	72	29	SWNE	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	36	72	29	SENW	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	RES,IND,MIS	HIGHLAND #24	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	MO 13A	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	MU 12	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	MU 2	POWER RESOURCES INC.
P108020W	36	72	29	NENW	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	36	72	29	SENW	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	36	72	29	NWNE	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	36	72	29	SWNE	ADJ	RES,IND,MIS	HIGHLAND #23	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	M 30	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	M 36	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	MU 1	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	MO 7	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	M 57	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	M 24	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	M 20	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	M 39	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	MO 1	POWER RESOURCES INC.
P108020W	36	72	29	NENW	UNA	MON	MO 8	POWER RESOURCES INC.
P108020W	36	72	29	SENW	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108020W	36	72	29	NWNE	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108020W	36	72	29	SWNE	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108084W	36	72	29	NENW	ADJ	RES,IND,MIS	HIGHLAND #15	POWER RESOURCES INC.
P108084W	36	72	29	NENW	UNA	MON	MSH 35	POWER RESOURCES INC.
P108084W	36	72	29	NENW	UNA	MON	MO 2	POWER RESOURCES INC.
P108085W	36	72	29	NENW	UNA	MON	MO 9	POWER RESOURCES INC.
P108085W	36	72	29	NENW	UNA	MON	M 40	POWER RESOURCES INC.
P108085W	36	72	29	NENW	UNA	MON	M 14	POWER RESOURCES INC.
P108086W	36	72	29	NENW	UNA	MON	MU 10	POWER RESOURCES INC.
P108086W	36	72	29	NENW	UNA	MON	M 47	POWER RESOURCES INC.
P108087W	36	72	29	SWNE	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108087W	36	72	29	NESW	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108087W	36	72	29	SENE	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108088W	36	72	29	NENW	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108088W	36	72	29	NWNW	ADJ	RES,IND,DOM	HIGHLAND #6	POWER RESOURCES INC.
P108088W	36	72	29	NENW	UNA	MON	M 46	POWER RESOURCES INC.
P108089W	36	72	29	NENW	UNA	MON	MU 8	POWER RESOURCES INC.
P108090W	36	72	30	NWSW	UNA	DEW,STO,IND,MIS	DM 5	POWER RESOURCES INC.
P108524W	36	72	30	NWSW	UNA	DEW,STO,IND,MIS	DM 4	POWER RESOURCES INC.
P108525W	36	72	30	SENE	UNA	MON	3750 5350 30 36 72	POWER RESOURCES INC.
P108526W	36	72	30	NWSW	UNA	DEW,STO,IND,MIS	DM 8	POWER RESOURCES INC.
P108527W	36	72	33	SWNW	GST	STO	NORTH BOX - WEST	BONER BROTHERS PARTNERSHIP
P108528W	36	72	33	SWNW	GST	STO	NORTH BOX - WEST	BONER BROTHERS PARTNERSHIP
P108533W	36	73	5	SESW	GST	STO	MANGY COYOTE S5-1	DUCK CREEK RANCHES INC.
P108534W	36	73	5	SESW	GST	STO	MANGY COYOTE S5-1	DUCK CREEK RANCHES INC.
P108535W	36	73	11	SESE	UNA	STO,IND	MX #WW1 (DEEPENED)	POWER RESOURCES INC.
P108536W	36	73	11	SESE	UNA	STO,IND	MX #WW1 (DEEPENED)	POWER RESOURCES INC.
P108538W	36	73	11	SESE	UNA	STO	WILLOW CREEK #1	BONER BROS. PARTNERSHIP
P108539W	36	73	12	NWSW	UNA	IND	SE/SE 21-36-73: (30 WELLS)	POWER RESOURCES INC.
P108540W	36	73	12	NESW	UNA	IND	SE/SE 21-36-73: (30 WELLS)	POWER RESOURCES INC.
P108541W	36	73	12	SWNW	UNA	IND	SE/SE 21-36-73: (30 WELLS)	POWER RESOURCES INC.
P108542W	36	73	12	SENW	UNA	IND	SE/SE 21-36-73: (30 WELLS)	POWER RESOURCES INC.
P108543W	36	73	12	NESW	GSI	IND	SW/SW 24-36-73 (31 WELLS)	POWER RESOURCES INC
P108544W	36	73	12	SWNW	GSI	IND	SW/SW 24-36-73 (31 WELLS)	POWER RESOURCES INC
P108545W	36	73	12	SENW	GSI	IND	SW/SW 24-36-73 (31 WELLS)	POWER RESOURCES INC
P108546W	36	73	12	NWSW	GSI	IND	SW/SW 24-36-73 (31 WELLS)	POWER RESOURCES INC
P108547W	36	73	12	SESE	UNA	MON	HM6	POWER RESOURCES INC.
P108548W	36	73	12	SWNW	UNA	IND	SW/SE 21-36-73 (35 WELLS)	POWER RESOURCES INC.
P108549W	36	73	12	SENW	UNA	IND	SW/SE 21-36-73 (35 WELLS)	POWER RESOURCES INC.
P108550W	36	73	12	NESW	UNA	IND	SW/SE 21-36-73 (35 WELLS)	POWER RESOURCES INC.
P108551W	36	73	12	NWSW	UNA	IND	SW/SE 21-36-73 (35 WELLS)	POWER RESOURCES INC.
P108552W	36	73	12	NWSW	GST	IND	NE/SW 24-36-73(104 WELLS)	POWER RESOURCES INC
P108553W	36	73	12	SWNW	GST	IND	NE/SW 24-36-73(104 WELLS)	POWER RESOURCES INC
P108554W	36	73	12	NESW	GST	IND	NE/SW 24-36-73(104 WELLS)	POWER RESOURCES INC
P108555W	36	73	12	SENW	GST	IND	NE/SW 24-36-73(104 WELLS)	POWER RESOURCES INC
P108556W	36	73	12	NWSW	GST	IND	SW/NE 22-36-73; 31 WELLS	POWER RESOURCES INC
P108557W	36	73	12	SENW	GST	IND	SW/NE 22-36-73; 31 WELLS	POWER RESOURCES INC
P108558W	36	73	12	SWNW	GST	IND	SW/NE 22-36-73; 31 WELLS	POWER RESOURCES INC
P108559W	36	73	12	NESW	GST	IND	SW/NE 22-36-73; 31 WELLS	POWER RESOURCES INC
P108560W	36	73	12	NWSW	UNA	IND	NW/SE 21-36-73: (50 WELLS)	POWER RESOURCES INC.
P108561W	36	73	12	SENW	UNA	IND	NW/SE 21-36-73: (50 WELLS)	POWER RESOURCES INC.
P108562W	36	73	12	SWNW	UNA	IND	NW/SE 21-36-73: (50 WELLS)	POWER RESOURCES INC.
P108563W	36	73	12	NESW	UNA	IND	NW/SE 21-36-73: (50 WELLS)	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P108564W	36	73	12	NWSW	UNA	IND	NE/NE 13-36-73 (81 wells)	POWER RESOURCES INC
P108565W	36	73	12	SWNW	UNA	IND	NW/NW 18-36-72 (5 wells)	POWER RESOURCES INC
P108566W	36	73	12	NWSW	UNA	IND	SW/SW 22-36-73 (21 WELLS)	POWER RESOURCES INC.
P108567W	36	73	12	SENW	UNA	IND	NW/NW 18-36-72 (5 wells)	POWER RESOURCES INC
P108568W	36	73	12	NESW	UNA	IND	NW/NW 18-36-72 (5 wells)	POWER RESOURCES INC
P108569W	36	73	12	SWNW	UNA	IND	SW/SW 22-36-73 (21 WELLS)	POWER RESOURCES INC.
P108570W	36	73	12	NESW	UNA	IND	SW/SW 22-36-73 (21 WELLS)	POWER RESOURCES INC.
P108571W	36	73	12	SENW	UNA	IND	SW/SW 22-36-73 (21 WELLS)	POWER RESOURCES INC.
P108572W	36	73	12	NWSW	UNA	IND	NE/NW 13-36-73; (59 WELLS)	POWER RESOURCES INC.
P108573W	36	73	12	SENW	UNA	IND	NE/NW 13-36-73; (59 WELLS)	POWER RESOURCES INC.
P108574W	36	73	12	NESW	UNA	IND	NE/NW 13-36-73; (59 WELLS)	POWER RESOURCES INC.
P108575W	36	73	12	SWNW	UNA	IND	NE/NW 13-36-73; (59 WELLS)	POWER RESOURCES INC.
P108576W	36	73	12	SENW	UNA	IND	NE/SW 18-36-72; (39 WELLS)	POWER RESOURCES INC.
P108577W	36	73	12	NESW	UNA	IND	NE/SW 18-36-72; (39 WELLS)	POWER RESOURCES INC.
P108578W	36	73	12	NWSW	UNA	IND	NE/SW 18-36-72; (39 WELLS)	POWER RESOURCES INC.
P108579W	36	73	12	SWNW	UNA	IND	NE/SW 18-36-72; (39 WELLS)	POWER RESOURCES INC.
P108580W	36	73	12	NESW	UNA	IND	SW/SE 18-36-72; (75 WELLS)	POWER RESOURCES INC.
P108581W	36	73	12	NWSW	UNA	IND	SW/SE 18-36-72; (75 WELLS)	POWER RESOURCES INC.
P108582W	36	73	12	SWNW	UNA	IND	SW/SE 18-36-72; (75 WELLS)	POWER RESOURCES INC.
P108583W	36	73	12	SENW	UNA	IND	SW/SE 18-36-72; (75 WELLS)	POWER RESOURCES INC.
P108584W	36	73	12	NWSW	GST	IND	NW/SE 22-36-73; 19 WELLS	POWER RESOURCES INC
P108585W	36	73	12	SWNW	GST	IND	NW/SE 22-36-73; 19 WELLS	POWER RESOURCES INC
P108586W	36	73	12	NESW	GST	IND	NW/SE 22-36-73; 19 WELLS	POWER RESOURCES INC
P108588W	36	73	12	SENW	GST	IND	NW/SE 22-36-73; 19 WELLS	POWER RESOURCES INC
P108589W	36	73	12	SWNW	UNA	IND	NE/NE 13-36-73 (81 wells)	POWER RESOURCES INC
P108590W	36	73	12	NWSW	UNA	IND	NE/NE 13-36-73 (81 wells)	POWER RESOURCES INC
P108591W	36	73	12	NESW	UNA	IND	NE/NE 13-36-73 (81 wells)	POWER RESOURCES INC
P108592W	36	73	12	SENW	UNA	IND	NE/NE 13-36-73 (81 wells)	POWER RESOURCES INC
P108593W	36	73	12	SENW	GST	IND	SW/SE 24-36-73(25WELLS)	POWER RESOURCES INC
P108594W	36	73	12	NWSW	GST	IND	SW/SE 24-36-73(25WELLS)	POWER RESOURCES INC
P108595W	36	73	12	SWNW	GST	IND	SW/SE 24-36-73(25WELLS)	POWER RESOURCES INC
P108596W	36	73	12	NESW	GST	IND	SW/SE 24-36-73(25WELLS)	POWER RESOURCES INC
P108597W	36	73	12	SWSE	UNA	MON	HM5	WYO BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC.
P108598W	36	73	12	SWNW	UNA	IND	NE/SW 22-36-73; 27 WELLS	POWER RESOURCES INC
P108599W	36	73	12	NWSW	GSI	IND	NW/SE 24-36-73 (87 WELLS)	POWER RESOURCES INC
P108600W	36	73	12	SWNW	GSI	IND	NW/SE 24-36-73 (87 WELLS)	POWER RESOURCES INC
P108601W	36	73	12	NWSW	UNA	IND	NE/SW 22-36-73; 27 WELLS	POWER RESOURCES INC
P108602W	36	73	12	NESW	UNA	IND	NE/SW 22-36-73; 27 WELLS	POWER RESOURCES INC
P108603W	36	73	12	SENW	UNA	IND	NE/SW 22-36-73; 27 WELLS	POWER RESOURCES INC
P108604W	36	73	12	SENW	UNA	IND	SE/NE 13-36-73; (3 WELLS)	POWER RESOURCES INC.
P108648W	36	73	12	NWSW	UNA	IND	SE/NE 13-36-73; (3 WELLS)	POWER RESOURCES INC.
P109096W	36	73	12	NESW	UNA	IND	SE/NE 13-36-73; (3 WELLS)	POWER RESOURCES INC.
P109097W	36	73	12	SWNW	UNA	IND	SE/NE 13-36-73; (3 WELLS)	POWER RESOURCES INC.
P109098W	36	73	12	NESW	UNA	IND	NE/SE 21-36-73: (140 WELLS)	POWER RESOURCES INC.
P109099W	36	73	12	SENW	UNA	IND	NE/SE 21-36-73: (140 WELLS)	POWER RESOURCES INC.
P109100W	36	73	12	NWSW	UNA	IND	NW/SE 18-36-72; (5 WELLS)	POWER RESOURCES INC.
P109101W	36	73	12	SWNW	GSI	IND	NW/SW 24-36-73(16 WELLS)	POWER RESOURCES INC
P109102W	36	73	12	SENW	GSI	IND	NW/SW 24-36-73(16 WELLS)	POWER RESOURCES INC
P109103W	36	73	12	NESW	GSI	IND	NW/SW 24-36-73(16 WELLS)	POWER RESOURCES INC
P109104W	36	73	12	NWSW	GSI	IND	NW/SW 24-36-73(16 WELLS)	POWER RESOURCES INC
P109105W	36	73	12	SENW	GSI	IND	NW/SE 24-36-73 (87 WELLS)	POWER RESOURCES INC
P109106W	36	73	12	NESW	GSI	IND	NW/SE 24-36-73 (87 WELLS)	POWER RESOURCES INC
P109107W	36	73	12	NWSW	GST	IND	SE/SW 24-36-73 (93 WELLS)	POWER RESOURCES INC
P109108W	36	73	12	SWNW	GST	IND	SE/SW 24-36-73 (93 WELLS)	POWER RESOURCES INC
P109109W	36	73	12	NESW	GST	IND	SE/SW 24-36-73 (93 WELLS)	POWER RESOURCES INC
P109110W	36	73	12	SENW	GST	IND	SE/SW 24-36-73 (93 WELLS)	POWER RESOURCES INC
P109111W	36	73	12	SWNW	UNA	IND	NW/SE 18-36-72; (5 WELLS)	POWER RESOURCES INC.
P109112W	36	73	12	SENW	UNA	IND	NW/SE 18-36-72; (5 WELLS)	POWER RESOURCES INC.
P109114W	36	73	12	NESW	UNA	IND	NW/SE 18-36-72; (5 WELLS)	POWER RESOURCES INC.
P109115W	36	73	12	NWSW	UNA	IND	NE/SE 21-36-73: (140 WELLS)	POWER RESOURCES INC.
P109116W	36	73	12	SWNW	UNA	IND	NE/SE 21-36-73: (140 WELLS)	POWER RESOURCES INC.
P109117W	36	73	12	SWNW	UNA	IND	SE/NW 18/36/72 (3 wells)	POWER RESOURCES INC
P109118W	36	73	12	SENW	UNA	IND	SE/NW 18/36/72 (3 wells)	POWER RESOURCES INC
P109119W	36	73	12	NESW	UNA	IND	SE/NW 18/36/72 (3 wells)	POWER RESOURCES INC
P109120W	36	73	12	NWSW	UNA	IND	SE/NW 18/36/72 (3 wells)	POWER RESOURCES INC
P109121W	36	73	12	SWNW	UNA	IND	SE/NW 22-36-73; 3 WELLS	POWER RESOURCES INC
P109122W	36	73	12	SENW	UNA	IND	SE/NW 22-36-73; 3 WELLS	POWER RESOURCES INC
P109123W	36	73	12	NESW	UNA	IND	SE/NW 22-36-73; 3 WELLS	POWER RESOURCES INC
P109125W	36	73	12	NWSW	UNA	IND	SE/NW 22-36-73; 3 WELLS	POWER RESOURCES INC
P109126W	36	73	12	SWSE	UNA	MON	HM4	WYO BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC.
P109127W	36	73	13	NWNW	UNA	MON	CM 2	POWER RESOURCES INC.
P109128W	36	73	13	NWNE	UNA	MON	HMP3	POWER RESOURCES INC.
P109129W	36	73	13	NWNW	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P109130W	36	73	13	NENW	UNA	MON	HM02	POWER RESOURCES INC.
P109131W	36	73	13	NENW	UNA	MON	HMP2	POWER RESOURCES INC.
P109132W	36	73	13	NWNE	UNA	MON	HM03	POWER RESOURCES INC.
P109133W	36	73	13	SENE	UNA	IND	SE/NE 13-36-73; (3 WELLS)	POWER RESOURCES INC.
P109134W	36	73	13	NENE	UNA	MON	HM04	POWER RESOURCES INC.
P109135W	36	73	13	NENW	UNA	MON	HM2	POWER RESOURCES INC.
P109136W	36	73	13	NWNW	UNA	MON	CM 4	POWER RESOURCES INC.
P109137W	36	73	13	NENW	UNA	MON	HMP1	POWER RESOURCES INC.
P109138W	36	73	13	NENE	UNA	MON	HM7	POWER RESOURCES INC.
P109139W	36	73	13	NENW	UNA	MON	HM3	POWER RESOURCES INC.
P109140W	36	73	13	NENE	UNA	IND	NE/NE 13-36-73 (81 wells)	POWER RESOURCES INC
P109141W	36	73	13	NWNE	UNA	MON	HMU3	POWER RESOURCES INC.
P109142W	36	73	13	NENE	UNA	IND	NE/NE 13-36-73 (81 wells)	POWER RESOURCES INC
P109144W	36	73	13	SWNE	UNA	MON	HM41	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P109145W	36	73	13	NENE	UNA	MON	HMP5	POWER RESOURCES INC.
P109146W	36	73	13	SWNE	UNA	MON	HM40	POWER RESOURCES INC.
P109147W	36	73	13	NENE	UNA	MON	HMU4	POWER RESOURCES INC.
P109148W	36	73	13	NENE	UNA	MON	HM05	POWER RESOURCES INC.
P109149W	36	73	13	NENE	UNA	MON	HMP4	POWER RESOURCES INC.
P109150W	36	73	13	NENW	UNA	IND	NE/NW 13-36-73; (59 WELLS)	POWER RESOURCES INC.
P109151W	36	73	13	NENE	UNA	MON	PUMP #1	POWER RESOURCES INC.
P109152W	36	73	13	NENW	UNA	MON	HM01	POWER RESOURCES INC.
P109153W	36	73	13	SENE	UNA	MON	HM38	POWER RESOURCES INC.
P109154W	36	73	13	NENW	UNA	MON	HM1	POWER RESOURCES INC.
P109155W	36	73	13	SENW	UNA	MON	HM43	POWER RESOURCES INC.
P109156W	36	73	13	NENW	UNA	MON	HMU1	POWER RESOURCES INC.
P109157W	36	73	13	NWNW	UNA	MON	HM45	POWER RESOURCES INC.
P109158W	36	73	13	NENW	UNA	MON	HM44	POWER RESOURCES INC.
P109159W	36	73	13	NWNW	UNA	MON	CM 5	POWER RESOURCES INC.
P109160W	36	73	13	NENW	UNA	MON	HMU2	POWER RESOURCES INC.
P109161W	36	73	13	SENE	UNA	MON	HM39	POWER RESOURCES INC.
P109162W	36	73	13	SENW	UNA	MON	HM42	POWER RESOURCES INC.
P109163W	36	73	13	NWNW	UNA	MON	CM 3	POWER RESOURCES INC.
P109164W	36	73	13	NENE	UNA	MON	HMU5	POWER RESOURCES INC.
P109165W	36	73	13	NENW	UNA	MON	HMO13	POWER RESOURCES INC.
P109166W	36	73	14	NENE	UNA	MON	CM 41	POWER RESOURCES INC.
P109167W	36	73	14	SWNE	UNA	IND	SE/SE 21-36-73: (30 WELLS)	POWER RESOURCES INC.
P109623W	36	73	14	SENE	UNA	MON	CMSH 1	POWER RESOURCES INC.
P109623W	36	73	14	SENW	UNA	MON	CM 35	POWER RESOURCES INC.
P109623W	36	73	14	SWNE	GSI	MIS,IND	SW1/4NE1/4 SEC 14-36-73 225 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P109623W	36	73	14	SENE	GSI	MIS,IND	SW1/4NE1/4 SEC 14-36-73 225 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P109623W	36	73	14	SWNE	GSI	MIS,IND	SW1/4NE1/4 SEC 14-36-73 225 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P109623W	36	73	14	SWNE	GSI	IND	SW/SW 24-36-73 (31 WELLS)	POWER RESOURCES INC
P109624W	36	73	14	SWNE	UNA	IND	SW/NW 22-36-73: (50 WELLS)	POWER RESOURCES INC.
P109624W	36	73	14	NWNE	UNA	MON	CM 39	POWER RESOURCES INC.
P109624W	36	73	14	SWNE	UNA	IND	NE/NW 28-36-73: (40 WELLS)	POWER RESOURCES INC.
P109624W	36	73	14	NENE	UNA	MON	CM 42	POWER RESOURCES INC.
P109624W	36	73	14	SWNE	UNA	MON	CM 37	POWER RESOURCES INC.
P109624W	36	73	14	SWNE	UNA	MON	CM 46	POWER RESOURCES INC.
P109625W	36	73	14	NESW	UNA	MON	COW 1	POWER RESOURCES INC.
P109625W	36	73	14	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P109625W	36	73	14	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P109625W	36	73	14	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P109625W	36	73	14	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P109625W	36	73	14	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P109626W	36	73	14	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P109626W	36	73	14	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P109626W	36	73	14	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P109626W	36	73	14	NESW	UNA	MON	CMO 13	POWER RESOURCES INC.
P109626W	36	73	14	SWNE	UNA	IND	SW/NE 22-36-73 (10 WELLS)	POWER RESOURCES INC.
P109626W	36	73	14	NENE	UNA	MON	CM 1	POWER RESOURCES INC.
P109650W	36	73	14	SWSW	UNA	MON	CM 27	POWER RESOURCES INC.
P109651W	36	73	14	SWNE	UNA	IND	SE/NW 22-36-73 (90) WELLS	POWER RESOURCES INC.
P110558W	36	73	14	SESW	UNA	MON	CRMW 6	POWER RESOURCES INC.
P110559W	36	73	14	NENE	UNA	DEW,STO,IND,MIS	DM 5	POWER RESOURCES INC.
P110974W	36	73	14	SESW	UNA	DEW,STO,IND,MIS	DM 5	POWER RESOURCES INC.
P110975W	36	73	14	NWSW	UNA	MON	CM 29	POWER RESOURCES INC.
P110976W	36	73	14	NESW	UNA	MON	CMU 13	POWER RESOURCES INC.
P110978W	36	73	14	NESW	UNA	DEW,STO,IND,MIS	DM 4	POWER RESOURCES INC.
P112657W	36	73	14	SESW	UNA	DEW,STO,IND,MIS	DM 4	POWER RESOURCES INC.
P113366W	36	73	14	NWSE	UNA	DEW,STO,IND,MIS	DM 4	POWER RESOURCES INC.
P113366W	36	73	14	SWNE	GST	IND	NE/SW 24-36-73(104 WELLS)	POWER RESOURCES INC
P113366W	36	73	14	SWNE	UNA	IND	SW/SE 21-36-73 (35 WELLS)	POWER RESOURCES INC.
P113366W	36	73	14	SESW	UNA	MON	CM 17	POWER RESOURCES INC.
P113369W	36	73	14	SWSW	UNA	MON	CM 25	POWER RESOURCES INC.
P113369W	36	73	14	SWNE	UNA	IND	NE/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P113369W	36	73	14	SWNE	UNA	MON	CM 47	POWER RESOURCES INC.
P113369W	36	73	14	SESW	UNA	STO,MIS	UNC #2	POWER RESOURCES INC.
P113370W	36	73	14	SWNE	UNA	IND	NE/NE 22-36-73; 60 WELLS	POWER RESOURCES INC.
P113370W	36	73	14	SWNE	GST	IND	SW/NE 22-36-73; 31 WELLS	POWER RESOURCES INC
P113370W	36	73	14	NWSE	UNA	MON	CMO 7	POWER RESOURCES INC.
P113370W	36	73	14	NENE	UNA	MON	CMO 3	POWER RESOURCES INC.
P113371W	36	73	14	SESW	UNA	MON	CIMW 1	POWER RESOURCES INC.
P113371W	36	73	14	SWNE	UNA	IND	NW/NE 22-36-73 (120 WELLS)	POWER RESOURCES INC.
P113371W	36	73	14	SWNE	UNA	IND	SW/SW 22-36-73 (21 WELLS)	POWER RESOURCES INC.
P113371W	36	73	14	SWNE	UNA	IND	NE/NW 13-36-73; (59 WELLS)	POWER RESOURCES INC.
P113372W	36	73	14	SWNE	UNA	IND	NW/NW 18-36-72 (5 wells)	POWER RESOURCES INC
P113372W	36	73	14	SWNE	UNA	IND	NW/SE 21-36-73: (50 WELLS)	POWER RESOURCES INC.
P113372W	36	73	14	SWNE	GSI	MIS,IND	SE1/4NE1/4 SEC 14-36-73 125 WELLS (C-WELLFIELD)	POWER RESOURCES, INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P113372W		36	73	14	SENE	GSI	MIS,IND	SE1/4NE1/4 SEC 14-36-73 125 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P113373W		36	73	14	NWNE	GSI	MIS,IND	SE1/4NE1/4 SEC 14-36-73 125 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P113373W		36	73	14	SWNE	UNA	IND	NE/SW 18-36-72; (39 WELLS)	POWER RESOURCES INC.
P113373W		36	73	14	SESW	UNA	MON	CMO 9	POWER RESOURCES INC.
P113373W		36	73	14	SENE	UNA	MON	CMO 5	POWER RESOURCES INC.
P113374W		36	73	14	NESW	UNA	MON	CMU 12	POWER RESOURCES INC.
P113374W		36	73	14	SWNE	UNA	IND	SW/SE 18-36-72; (75 WELLS)	POWER RESOURCES INC.
P113374W		36	73	14	NWNW	UNA	DEW,STO,IND,MIS	DM 8	POWER RESOURCES INC.
P113374W		36	73	14	SESW	UNA	DEW,STO,IND,MIS	DM 8	POWER RESOURCES INC.
P113375W		36	73	14	NENE	UNA	MON	CMU 2	POWER RESOURCES INC.
P113375W		36	73	14	NENE	GSI	IND,MIS	NE1/4NE1/4 SEC 14-36-73 250 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P113375W		36	73	14	NESE	UNA	MON	CM 10	POWER RESOURCES INC.
P113375W		36	73	14	SENE	UNA	MON	CM 9	POWER RESOURCES INC.
P113376W		36	73	14	NWNE	UNA	MON	CM 38	POWER RESOURCES INC.
P113376W		36	73	14	SENW	UNA	MON	CM 34	POWER RESOURCES INC.
P113376W		36	73	14	SENE	GSI	IND,MIS	NE1/4NE1/4 SEC 14-36-73 250 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P113376W		36	73	14	NENE	GSI	IND,MIS	NE1/4NE1/4 SEC 14-36-73 250 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P113376W		36	73	14	SWSE	UNA	MON	CMO 8	POWER RESOURCES INC.
P113376W		36	73	14	NWSW	UNA	MON	CM 30	POWER RESOURCES INC.
P113376W		36	73	14	SWNE	UNA	MON	CM 45	POWER RESOURCES INC.
P113376W		36	73	14	SESW	UNA	MON	CRMW 3	POWER RESOURCES INC.
P113376W		36	73	14	SWNE	UNA	IND	SE/NE 21-36-73: (119 WELLS)	POWER RESOURCES INC.
P113377W		36	73	14	SWSE	UNA	MON	CM 15	POWER RESOURCES INC.
P113377W		36	73	14	SWSE	GSI	MIS,IND	SW1/4SE1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P113377W		36	73	14	NWNE	GSI	MIS,IND	SW1/4SE1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P113377W		36	73	14	SWNE	GSI	MIS,IND	SW1/4SE1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P113377W		36	73	14	NESE	UNA	MON	CM 11	POWER RESOURCES INC.
P113377W		36	73	14	SWNE	GST	IND	NW/SE 22-36-73; 19 WELLS	POWER RESOURCES INC
P113377W		36	73	14	SWNE	GSI	IND,MIS	14-1-3673 WW	POWER RESOURCES, INC
P113377W		36	73	14	SWNE	GSI	IND,MIS	14-1-3673 WW	POWER RESOURCES, INC
P113377W		36	73	14	SWNE	UNA	IND	SW/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P114459W		36	73	14	SENW	UNA	MON	CM 33	POWER RESOURCES INC.
P114459W		36	73	14	NENE	UNA	MON	CMU 1	POWER RESOURCES INC.
P114620W		36	73	14	NWSE	UNA	MON	CM 13	POWER RESOURCES INC.
P114745W		36	73	14	SENW	GSI	MIS,IND	SE1/4NW1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P114745W		36	73	14	SENW	GSI	MIS,IND	SE1/4NW1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P114745W		36	73	14	SWNE	GSI	MIS,IND	SE1/4NW1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P114745W		36	73	14	SWSW	UNA	MON	CM 23	POWER RESOURCES INC.
P114745W		36	73	14	SWNE	UNA	IND	NW/NW 23-36-73; 100 WELLS	POWER RESOURCES INC.
P114745W		36	73	14	SWNE	UNA	IND	NE/NE 13-36-73 (81 wells)	POWER RESOURCES INC
P114745W		36	73	14	NENE	UNA	MON	C MO 1	POWER RESOURCES INC.
P114746W		36	73	14	SWNE	UNA	IND	SW/NW 23-36-73 (55 WELLS)	POWER RESOURCES INC.
P114746W		36	73	14	SWSE	UNA	MON	CM 14	POWER RESOURCES INC.
P114746W		36	73	14	NESW	UNA	MON	CMO 12	POWER RESOURCES INC.
P114746W		36	73	14	SWNE	UNA	IND	SW/NW 23-36-73; 125 WELLS	POWER RESOURCES INC.
P114746W		36	73	14	NWSE	GSI	MIS,IND	NW1/4SE1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P114746W		36	73	14	NWNE	GSI	MIS,IND	NW1/4SE1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P114746W		36	73	14	SWNE	GSI	IND	NW/SW 24-36-73(16 WELLS)	POWER RESOURCES INC
P114749W		36	73	14	SWNE	GST	IND	SW/SE 24-36-73(25WELLS)	POWER RESOURCES INC
P114749W		36	73	14	SWNE	UNA	MON	CM 36	POWER RESOURCES INC.
P114749W		36	73	14	NENE	UNA	MON	CM 44	POWER RESOURCES INC.
P114749W		36	73	14	SENE	UNA	MON	CM 6	POWER RESOURCES INC.
P114749W		36	73	14	SWNE	GSI	IND,MIS	NW1/4NE1/4 SEC 14-36-73 45 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P114749W		36	73	14	NWNE	GSI	IND,MIS	NW1/4NE1/4 SEC 14-36-73 45 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P114749W		36	73	14	NWNE	GSI	IND,MIS	NW1/4NE1/4 SEC 14-36-73 45 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P114751W		36	73	14	SWNE	UNA	IND	SE/NE 22-36-73 (76 WELLS)	POWER RESOURCES INC.
P114751W		36	73	14	NESW	UNA	MON	CM 32	POWER RESOURCES INC.
P114751W		36	73	14	NENE	UNA	MON	CMO 4	POWER RESOURCES INC.
P114751W		36	73	14	SENE	UNA	MON	CMO 4	POWER RESOURCES INC.
P114751W		36	73	14	SWNE	UNA	IND	NE/SW 22-36-73; 27 WELLS	POWER RESOURCES INC
P114751W		36	73	14	SWNE	UNA	IND	SE/SW 22-36-73 (6 WELLS)	POWER RESOURCES INC.
P114751W		36	73	14	SWNE	UNA	IND	NE/NE 22-36-73 (12 WELLS)	POWER RESOURCES INC.
P114752W		36	73	14	NENE	UNA	MON	CMU 3	POWER RESOURCES INC.
P114752W		36	73	14	SWNE	UNA	IND	SE/NE 13-36-73; (3 WELLS)	POWER RESOURCES INC.
P114752W		36	73	14	SWNE	UNA	IND	SW/NE 21-36-73; (49 WELLS)	POWER RESOURCES INC.
P114752W		36	73	14	NWSE	UNA	MON	CM 12	POWER RESOURCES INC.
P114752W		36	73	14	SWNE	UNA	IND	SE/SW 21-36-73: (75 WELLS)	POWER RESOURCES INC.
P114752W		36	73	14	SWNE	UNA	IND	NW/SE 18-36-72; (5 WELLS)	POWER RESOURCES INC.
P114752W		36	73	14	SWSW	UNA	IND	SW/SW 14-36-73 (40 WELLS)	POWER RESOURCES INC.
P114913W		36	73	14	SWNE	UNA	IND	SW/SW 14-36-73 (40 WELLS)	POWER RESOURCES INC.
P114914W		36	73	14	NWNE	UNA	MON	CM 40	POWER RESOURCES INC.
P116204W		36	73	14	SWNE	GSI	MIS,IND	NW1/4SE1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P116205W		36	73	14	SENE	UNA	MON	CM 7	POWER RESOURCES INC.
P116206W		36	73	14	NESE	UNA	MON	14 2 3673 WW	POWER RESOURCES INC.
P116207W		36	73	14	SWNE	UNA	IND	SE/NE 22-36-73; 50 WELLS	POWER RESOURCES INC.
P116208W		36	73	14	SWNE	GSI	IND	NW/SE 24-36-73 (87 WELLS)	POWER RESOURCES INC
P116209W		36	73	14	SWSE	UNA	MON	CM 26	POWER RESOURCES INC.
P116210W		36	73	14	SWSW	UNA	MON	CM 28	POWER RESOURCES INC.
P116211W		36	73	14	SESW	UNA	MON	CRMW 1	POWER RESOURCES INC.
P116212W		36	73	14	NESW	GSI	MIS,IND	NE1/4SW1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P116213W		36	73	14	NWNE	GSI	MIS,IND	NE1/4SW1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P116214W		36	73	14	SENE	GSI	MIS,IND	NE1/4SW1/4 SEC 14-36-73 130 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P116215W		36	73	14	SWNE	GSI	MIS,IND	SE1/4SW1/4 SEC 14-36-73 85 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P116216W		36	73	14	SESW	GSI	MIS,IND	SE1/4SW1/4 SEC 14-36-73 85 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P116217W		36	73	14	NWNE	GSI	MIS,IND	SE1/4SW1/4 SEC 14-36-73 85 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P116218W		36	73	14	SESW	UNA	MON	CRMW 5	POWER RESOURCES INC.
P116219W		36	73	14	NESE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P116220W		36	73	14	SWSE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P116221W		36	73	14	NWSW	UNA	MIS	23 1 3673	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P116222W	36	73	14	SENW	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P116223W	36	73	14	NENE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P116225W	36	73	14	NWSE	UNA	MON	CMO 6	POWER RESOURCES INC.
P116226W	36	73	14	SESW	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P116227W	36	73	14	SENE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P11741D	36	73	14	NWSE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P11741D	36	73	14	NESW	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P11741D	36	73	14	NWNE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P11741D	36	73	14	SWSW	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P11741D	36	73	14	SWNE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P11741D	36	73	14	NENE	UNA	MON	CM 43	POWER RESOURCES INC.
P117937W	36	73	14	SWSW	UNA	MON	CMO 10	POWER RESOURCES INC.
P117938W	36	73	14	SWNE	UNA	IND	NW/SE 22-36-73 (9 WELLS)	POWER RESOURCES INC.
P117939W	36	73	14	SWNE	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
P117940W	36	73	14	SWSW	UNA	MON	CM 24	POWER RESOURCES INC.
P117941W	36	73	14	SWNE	GST	IND	SE/SW 24-36-73 (93 WELLS)	POWER RESOURCES INC
P117942W	36	73	14	SWNE	UNA	IND	SE/NW 22-36-73; 3 WELLS	POWER RESOURCES INC
P117943W	36	73	14	SENE	UNA	IND	SE/SE 15-36-73 (65 WELLS)	POWER RESOURCES INC.
P117944W	36	73	14	SWNE	UNA	MON	CMO 14	POWER RESOURCES INC.
P117945W	36	73	14	SWNE	UNA	IND	SE/NW 18/36/72 (3 wells)	POWER RESOURCES INC
P117946W	36	73	14	SWNE	UNA	IND	NE/SE 21-36-73: (140 WELLS)	POWER RESOURCES INC.
P117947W	36	73	14	SWSE	UNA	MON	CM 16	POWER RESOURCES INC.
P117948W	36	73	14	SESW	UNA	MON	CRMW 4	POWER RESOURCES INC.
P117949W	36	73	14	SWNE	UNA	IND	NW/NW 23-36-73 (8 WELLS)	POWER RESOURCES INC.
P117950W	36	73	15	SESE	UNA	IND	SE/SE 15-36-73 (65 WELLS)	POWER RESOURCES INC.
P118304W	36	73	15	SESE	UNA	MON	W H 50 11	POWER RESOURCES INC.
P118304W	36	73	15	SESE	UNA	MON	EM-27	POWER RESOURCES INC.
P118304W	36	73	15	SWSE	UNA	MON	15-M1	POWER RESOURCES INC.
P118305W	36	73	15	SWSE	UNA	MON	EM-23	POWER RESOURCES INC.
P118305W	36	73	15	SESE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P118305W	36	73	15	SWSE	UNA	MON	EM-24	POWER RESOURCES INC.
P118305W	36	73	15	SESE	UNA	MON	EMU-8	POWER RESOURCES INC.
P118306W	36	73	15	SESE	UNA	MON	EM-26	POWER RESOURCES INC.
P118306W	36	73	15	SESE	UNA	MON	EM-28	POWER RESOURCES INC.
P118307W	36	73	15	SENE	UNA	MON	MWN #15	POWER RESOURCES INC.
P118307W	36	73	15	SESE	UNA	MON	EM-25	POWER RESOURCES INC.
P118307W	36	73	15	SESE	UNA	MON	EMO-8	POWER RESOURCES INC.
P118307W	36	73	15	SWSW	GST	STO	TERRELL NO. 1	NUMRICH RANCH
P118308W	36	73	15	SWSW	GST	STO	TERRELL NO. 1	NUMRICH RANCH
P118308W	36	73	17	SESW	GSI	MIS,IND	SE/SW 17-36-73 (60 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P118308W	36	73	17	SESW	GSI	MIS,IND	SE/SW 17-36-73 (60 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P118308W	36	73	17	SWSW	GSI	MIS,IND	SW/SW 17-36-73 (19 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P118309W	36	73	17	SWSW	GSI	MIS,IND	SW/SW 17-36-73 (19 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P118309W	36	73	17	SWNW	GST	STO	DUCK CREEK S17-1	DUCK CREEK RANCHES INC.
P118309W	36	73	17	SWNW	GST	STO	DUCK CREEK S17-1	DUCK CREEK RANCHES INC.
P118309W	36	73	17	SWNW	GST	STO	DUCK CREEK #17-2	DUCK CREEK RANCHES INC.
P118310W	36	73	17	SWNW	GST	STO	DUCK CREEK #17-2	DUCK CREEK RANCHES INC.
P118310W	36	73	17	SWSW	GST	MON	SW/SW 17-36-73 (2 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P118310W	36	73	17	SESW	GST	MON	SE/SW 17-36-73 (5 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P118310W	36	73	17	SWSE	GST	MON	SW/SE 17-36-73 (1 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P118311W	36	73	19	NESE	GST	MON	NE/SE 19-36-73 (1 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P118644W	36	73	19	NENW	UNA	MON	SNOW-1	POWER RESOURCES INC.
P118645W	36	73	19	NENE	GST	MON	NE/NE 19-36-73 (1 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P118996W	36	73	19	SENE	GST	MON	SE/NE 19-36-73 (3 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P119557W	36	73	19	NENW	UNA	MON	SNOW-2	POWER RESOURCES INC.
P119558W	36	73	19	SENE	GSI	MIS,IND	SE/NE 19-36-73 (7 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P119559W	36	73	19	SENE	GSI	MIS,IND	SE/NE 19-36-73 (7 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P119560W	36	73	19	NENW	UNA	MON	SNOW-4	POWER RESOURCES INC.
P119561W	36	73	19	SWSW	GSI	MON	SW/SW 19-36-73 (2 WELLS)-MINE UNIT K MONITOR WELLS	POWER RESOURCES, INC
P119562W	36	73	19	SWSW	GST	MON	OWD 9	POWER RESOURCES INC
P119563W	36	73	19	NENW	UNA	MON	SNOW-3	POWER RESOURCES INC.
P119564W	36	73	20	NESW	UNA	MIS	WW-36-2	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P119565W	36	73	20	NESE	UNA	MON	FM-38(M)	POWER RESOURCES INC.
P119566W	36	73	20	NWSE	UNA	MON	W H 50 2	POWER RESOURCES INC.
P119567W	36	73	20	SESE	UNA	MON	FMU-6	POWER RESOURCES INC.
P119568W	36	73	20	SENE	GSI	MIS,IND	SW/NW 20-36-73 (39 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P119569W	36	73	20	SESE	GSI	MIS,IND	SW/NW 20-36-73 (39 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P119570W	36	73	20	SWNW	GSI	MIS,IND	SW/NW 20-36-73 (39 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P119571W	36	73	20	NESE	GSI	MIS,IND	SW/NW 20-36-73 (39 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P120487W	36	73	20	SWNW	GSI	MIS,IND	SW/NW 20-36-73 (39 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P120488W	36	73	20	SESE	UNA	IND	NW/NW 28-36-73; (36 WELLS)	POWER RESOURCES INC.
P120489W	36	73	20	SWSE	UNA	MON	FMU-2	POWER RESOURCES INC.
P124116W	36	73	20	NESE	UNA	IND	NW/NW 28-36-73; (36 WELLS)	POWER RESOURCES INC.
P124116W	36	73	20	SENE	UNA	IND	NW/NW 28-36-73; (36 WELLS)	POWER RESOURCES INC.
P124116W	36	73	20	SESE	UNA	MON	FMU-5	POWER RESOURCES INC.
P124116W	36	73	20	NESE	GSI	IND,MISC	ENL NW/SW 30-36-73 (29 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P124116W	36	73	20	SENE	GSI	IND,MISC	ENL NW/SW 30-36-73 (29 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P124116W	36	73	20	SESE	GSI	IND,MISC	ENL NW/SW 30-36-73 (29 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P124116W	36	73	20	SWSE	UNA	MON	W H 70 1	POWER RESOURCES INC.
P124117W	36	73	20	SESE	UNA	MON	W H 50 4	POWER RESOURCES INC.
P124117W	36	73	20	SWSE	UNA	MON	FMP-4	POWER RESOURCES INC.
P124117W	36	73	20	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P124117W	36	73	20	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P124118W	36	73	20	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P124118W	36	73	20	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P124118W	36	73	20	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P124118W	36	73	20	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P124118W	36	73	20	SWSE	UNA	MON	FMP-2	POWER RESOURCES INC.
P126088W	36	73	20	SWSW	GST	MON	SW/SW 20-36-73 (5WELLS) - MINE UNIT J	POWER RESOURCES, INC
P126089W	36	73	20	SWSE	UNA	MON	FM-35(M)	POWER RESOURCES INC.
P126426W	36	73	20	SESE	UNA	MON	FMP-5	POWER RESOURCES INC.
P126426W	36	73	20	SESW	GST	MON	SE/SE 20-36-73 (2WELLS) - MINE UNIT J	POWER RESOURCES, INC
P127394W	36	73	20	SWSE	UNA	MON	FMU-3	POWER RESOURCES INC.
P127394W	36	73	20	SENE	GSI	MIS,IND	SE/SW 17-36-73 (60 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P128384W	36	73	20	NESW	GST	MON	JMT-001	POWER RESOURCES, INC
P128385W	36	73	20	SESE	UNA	MON	FMO-7	POWER RESOURCES INC.
P128970W	36	73	20	NESE	UNA	IND	NE/NW 29-36-73; (14 WELLS)	POWER RESOURCES INC.
P129013W	36	73	20	SESE	UNA	IND	NE/NW 29-36-73; (14 WELLS)	POWER RESOURCES INC.
P129013W	36	73	20	NESW	GST	MON	NE/SW 20-36-73 (4 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P129013W	36	73	20	NWNE	GST	MON	NW/NE 20-36-73 (3 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P129013W	36	73	20	SESE	GSI	MIS,IND	SE/SW 17-36-73 (60 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129013W	36	73	20	NESE	GSI	MIS,IND	SE/SW 17-36-73 (60 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129013W	36	73	20	SESE	UNA	IND	NW/NE 29-36-73; (35 WELLS)	POWER RESOURCES INC.
P129013W	36	73	20	NESE	UNA	IND	NW/NE 29-36-73; (35 WELLS)	POWER RESOURCES INC.
P129014W	36	73	20	SESE	GSI	MIS,IND	SE/SW 20-36-73 (10 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129014W	36	73	20	SESW	GSI	MIS,IND	SE/SW 20-36-73 (10 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129014W	36	73	20	SESW	GSI	MIS,IND	SE/SW 20-36-73 (10 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129014W	36	73	20	NESE	GSI	MIS,IND	SE/SW 20-36-73 (10 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129014W	36	73	20	SENE	GSI	MIS,IND	SE/SW 20-36-73 (10 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129014W	36	73	20	NESE	GSI	MIS,IND	SW/SW 17-36-73 (19 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129014W	36	73	20	SESE	GSI	MIS,IND	SW/SW 17-36-73 (19 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129015W	36	73	20	SESE	UNA	MON	FMP-6	POWER RESOURCES INC.
P129015W	36	73	20	SENE	GSI	MIS,IND	SW/SW 17-36-73 (19 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129015W	36	73	20	SENE	GSI	IND,MIS	SW 1/4 NW 1/4 30-36-73 (45 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P129015W	36	73	20	NESE	GSI	IND,MIS	SW 1/4 NW 1/4 30-36-73 (45 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P129015W	36	73	20	SESE	GSI	IND,MIS	SW 1/4 NW 1/4 30-36-73 (45 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P129015W	36	73	20	SENE	UNA	IND	NW/NE 29-36-73; (35 WELLS)	POWER RESOURCES INC.
P129015W	36	73	20	NWSE	UNA	MON	FM-37(M)	POWER RESOURCES INC.
P129016W	36	73	20	NESE	UNA	IND	NW/SW 21-36-73; (65 WELLS)	POWER RESOURCES INC.
P129016W	36	73	20	SESE	UNA	IND	NW/SW 21-36-73; (65 WELLS)	POWER RESOURCES INC.
P129016W	36	73	20	SESW	UNA	MON	FM-34(M)	POWER RESOURCES INC.
P129016W	36	73	20	SENE	GSI	MIS,IND	SE/NE 19-36-73 (7 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129016W	36	73	20	SESE	GSI	MIS,IND	SE/NE 19-36-73 (7 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129016W	36	73	20	NESE	GSI	MIS,IND	SE/NE 19-36-73 (7 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P129016W	36	73	20	SESE	UNA	IND	SW/SW 21-36-73; (160 WELLS)	POWER RESOURCES INC.
P129266W	36	73	20	SESE	GSI	IND,MISC	NW/SW 30-36-73 (7 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P129266W	36	73	20	SENE	GSI	IND,MISC	NW/SW 30-36-73 (7 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P129283W	36	73	20	SENE	UNA	IND	SW/SW 21-36-73; (160 WELLS)	POWER RESOURCES INC.
P131347W	36	73	20	NESE	UNA	IND	SW/SW 21-36-73; (160 WELLS)	POWER RESOURCES INC.
P131347W	36	73	20	NESE	GSI	IND,MISC	NW/SW 30-36-73 (7 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P131425W	36	73	20	SENE	GSI	IND,MIS	NW 1/4 NW 1/4 30-36-73 (44 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P131426W	36	73	20	SESE	GSI	IND,MIS	NW 1/4 NW 1/4 30-36-73 (44 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P131426W	36	73	20	NESE	GSI	IND,MIS	NW 1/4 NW 1/4 30-36-73 (44 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P131427W	36	73	20	SENE	UNA	IND	NE/SW 21-36-73; (9 WELLS)	POWER RESOURCES INC.
P131427W	36	73	20	NESE	UNA	IND	NE/SW 21-36-73; (9 WELLS)	POWER RESOURCES INC.
P131428W	36	73	20	SESE	UNA	IND	NE/SW 21-36-73; (9 WELLS)	POWER RESOURCES INC.
P131428W	36	73	20	SESE	UNA	MON	FMO-5	POWER RESOURCES INC.
P131429W	36	73	20	SESW	GST	MON	JMT-002	POWER RESOURCES, INC
P131430W	36	73	20	SWSE	UNA	MON	FMP-3	POWER RESOURCES INC.
P131430W	36	73	20	NWNW	GST	MON	NW/NW 20-36-73 (7 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P131431W	36	73	20	SESE	GSI	IND,MISC	SESE 25-36-74 (71 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P131431W	36	73	20	SENE	GSI	IND,MISC	SESE 25-36-74 (71 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P131432W	36	73	20	NESE	GSI	IND,MISC	SESE 25-36-74 (71 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P131432W	36	73	20	NESE	UNA	MON	FM-34(M)	POWER RESOURCES INC.
P131434W	36	73	20	SENE	UNA	IND	SE/NW 29-36-73; (9 WELLS)	POWER RESOURCES INC.
P131434W	36	73	20	NESE	UNA	IND	SE/NW 29-36-73; (9 WELLS)	POWER RESOURCES INC.
P131435W	36	73	20	SESE	UNA	IND	SE/NW 29-36-73; (9 WELLS)	POWER RESOURCES INC.
P131435W	36	73	20	NESE	GSI	MIS,IND	NE/NW 20-36-73 (75 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P131436W	36	73	20	NENW	GSI	MIS,IND	NE/NW 20-36-73 (75 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P131436W	36	73	20	NENW	GSI	MIS,IND	NE/NW 20-36-73 (75 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135264W	36	73	20	SENE	GSI	MIS,IND	NE/NW 20-36-73 (75 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135265W	36	73	20	SESE	GSI	MIS,IND	NE/NW 20-36-73 (75 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135266W	36	73	20	SWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P135267W	36	73	20	NENE	UNA	MIS	21-1	POWER RESOURCES INC.
P135268W	36	73	20	SENW	UNA	MIS	21-1	POWER RESOURCES INC.
P135269W	36	73	20	SESW	UNA	MIS	21-1	POWER RESOURCES INC.
P135270W	36	73	20	NESE	UNA	MIS	21-1	POWER RESOURCES INC.
P135271W	36	73	20	NENW	UNA	MIS	21-1	POWER RESOURCES INC.
P135272W	36	73	20	NWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P135273W	36	73	20	NESW	UNA	MIS	21-1	POWER RESOURCES INC.
P135274W	36	73	20	NWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P135275W	36	73	20	SESE	UNA	MIS	21-1	POWER RESOURCES INC.
P135276W	36	73	20	NWNW	UNA	MIS	21-1	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P135277W	36	73	20	SWNW	UNA	MIS	21-1	POWER RESOURCES INC.
P135278W	36	73	20	NWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P135279W	36	73	20	SWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P135280W	36	73	20	SENE	UNA	MIS	21-1	POWER RESOURCES INC.
P135281W	36	73	20	SWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P135282W	36	73	20	NESE	GSI	IND,MISC	ENL SW1/4 NW1/4 30-36-73 (21) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P135283W	36	73	20	SENE	GSI	IND,MISC	ENL SW1/4 NW1/4 30-36-73 (21) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P135284W	36	73	20	SESE	GSI	IND,MISC	ENL SW1/4 NW1/4 30-36-73 (21) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P135286W	36	73	20	NWNW	GSI	MIS,IND	NW/NW 20-36-73 (73 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135287W	36	73	20	NWNW	GSI	MIS,IND	NW/NW 20-36-73 (73 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135288W	36	73	20	SENE	GSI	MIS,IND	NW/NW 20-36-73 (73 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135289W	36	73	20	SESE	GSI	MIS,IND	NW/NW 20-36-73 (73 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135290W	36	73	20	NESE	GSI	MIS,IND	NW/NW 20-36-73 (73 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135291W	36	73	20	NESE	GSI	MIS,IND	NW/SW 20-36-73 (7WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135292W	36	73	20	SESE	GSI	MIS,IND	NW/SW 20-36-73 (7WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135293W	36	73	20	NWSW	GSI	MIS,IND	NW/SW 20-36-73 (7WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135294W	36	73	20	SENE	GSI	MIS,IND	NW/SW 20-36-73 (7WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135295W	36	73	20	NWSW	GST	MON	NW/SW 20-36-73 (4 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P135296W	36	73	20	NWSW	GSI	MIS,IND	NW/SW 20-36-73 (7WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135297W	36	73	20	SENE	UNA	IND	SW/NE 29-36-73; (8 WELLS)	POWER RESOURCES INC.
P135298W	36	73	20	SWSE	UNA	MON	FMO-3	POWER RESOURCES INC.
P135299W	36	73	20	NESE	UNA	IND	SW/NE 29-36-73; (8 WELLS)	POWER RESOURCES INC.
P135300W	36	73	20	SESE	UNA	IND	SW/NE 29-36-73; (8 WELLS)	POWER RESOURCES INC.
P135301W	36	73	20	SENE	UNA	IND	NW/SW 22-36-73; (20 WELLS)	POWER RESOURCES INC.
P135302W	36	73	20	NESE	UNA	IND	NW/SW 22-36-73; (20 WELLS)	POWER RESOURCES INC.
P135303W	36	73	20	SESE	UNA	IND	NW/SW 22-36-73; (20 WELLS)	POWER RESOURCES INC.
P135304W	36	73	20	SENW	GST	MON	SE/NW 20-36-73 (8WELLS) - MINE UNIT J	POWER RESOURCES, INC
P135305W	36	73	20	SESE	GSI	MIS,IND	SE/NW 20-36-73 (78 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135306W	36	73	20	SENW	GSI	MIS,IND	SE/NW 20-36-73 (78 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135307W	36	73	20	SESE	GSI	IND,MISC	NE/SE 25-36-74 (27 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P135308W	36	73	20	SENE	GSI	IND,MISC	NE/SE 25-36-74 (27 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P135309W	36	73	20	NESE	GSI	IND,MISC	NE/SE 25-36-74 (27 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P135310W	36	73	20	SENW	GSI	MIS,IND	SE/NW 20-36-73 (78 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135311W	36	73	20	SENE	GSI	MIS,IND	SE/NW 20-36-73 (78 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135312W	36	73	20	NESE	GSI	MIS,IND	SE/NW 20-36-73 (78 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135313W	36	73	20	SESE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135314W	36	73	20	NESE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135768W	36	73	20	NWSE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135768W	36	73	20	SWSE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135768W	36	73	20	NWSW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135768W	36	73	20	SWSW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135768W	36	73	20	SESW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135768W	36	73	20	SWNW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135768W	36	73	20	SENW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135768W	36	73	20	NESW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135768W	36	73	20	SENE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135768W	36	73	20	NENW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135769W	36	73	20	NWNW	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135769W	36	73	20	NENE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135769W	36	73	20	NWNE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135769W	36	73	20	SWNE	UNA	RES,IND	HIGHLAND #28	POWER RESOURCES INC.
P135769W	36	73	20	SESE	UNA	MON	FMO-6	POWER RESOURCES INC.
P135769W	36	73	20	SWSE	UNA	MON	W H 50 3	POWER RESOURCES INC.
P135769W	36	73	20	SWSE	UNA	MON	FMO-2	POWER RESOURCES INC.
P135769W	36	73	20	NWNW	UNA	IND	SE/SE 20-36-73; (175 WELLS)	POWER RESOURCES INC.
P135769W	36	73	20	SENE	UNA	IND	SE/SE 20-36-73; (175 WELLS)	POWER RESOURCES INC.
P135770W	36	73	20	NESE	UNA	IND	SE/SE 20-36-73; (175 WELLS)	POWER RESOURCES INC.
P135770W	36	73	20	NENW	GST	MON	NE/NW 20-36-73 (2 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P135770W	36	73	20	NESW	GSI	MIS,IND	NE/SW 20-36-73 (23 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135770W	36	73	20	SENE	GSI	MIS,IND	NE/SW 20-36-73 (23 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135770W	36	73	20	SESE	GSI	MIS,IND	NE/SW 20-36-73 (23 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135770W	36	73	20	NESE	GSI	MIS,IND	NE/SW 20-36-73 (23 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135770W	36	73	20	SWSE	UNA	MON	FMO-4	POWER RESOURCES INC.
P135770W	36	73	20	SESE	UNA	IND	SE/SE 20-36-73; (175 WELLS)	POWER RESOURCES INC.
P135770W	36	73	20	NESW	GSI	MIS,IND	NE/SW 20-36-73 (23 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P135771W	36	73	20	SWNW	GST	MON	SW/NW 20-36-73 (4 WELLS) - MINE UNIT J	POWER RESOURCES, INC
P135771W	36	73	20	SESE	UNA	IND,MIS	SATELLITE NO. 3 WELL	POWER RESOURCES INC
P135771W	36	73	20	SESE	UNA	IND,MIS	SATELLITE NO. 3 WELL	POWER RESOURCES INC
P135771W	36	73	20	NESE	UNA	MON	W H 70 2	POWER RESOURCES INC.
P135771W	36	73	20	SESE	GSI	IND,MISC	ENL NE/SE 25-36-74 (98 WELLS) - MINE UNIT K (I &P WELLS)	POWER RESOURCES, INC
P135771W	36	73	20	SENE	GSI	IND,MISC	ENL NE/SE 25-36-74 (98 WELLS) - MINE UNIT K (I &P WELLS)	POWER RESOURCES, INC
P135771W	36	73	20	NESE	GSI	IND,MISC	ENL NE/SE 25-36-74 (98 WELLS) - MINE UNIT K (I &P WELLS)	POWER RESOURCES, INC
P135771W	36	73	20	NWSE	UNA	MON	FM-36(M)	POWER RESOURCES INC.
P136150W	36	73	20	NWNW	UNA	IND	SW/SE 20-36-73; (144 WELLS)	POWER RESOURCES INC.
P136150W	36	73	20	SWSE	UNA	IND	SW/SE 20-36-73; (144 WELLS)	POWER RESOURCES INC.
P136150W	36	73	20	SESE	UNA	IND	SW/SE 20-36-73; (144 WELLS)	POWER RESOURCES INC.
P136150W	36	73	20	NWSE	UNA	IND	SW/SE 20-36-73; (144 WELLS)	POWER RESOURCES INC.
P136151W	36	73	20	SENE	UNA	IND	SW/SE 20-36-73; (144 WELLS)	POWER RESOURCES INC.
P136151W	36	73	20	NESE	GSI	MIS,IND	SW/SW 20-36-73 (20WELLS)-MINE UNIT J (I&PWELLS)	POWER RESOURCES, INC
P136151W	36	73	20	SESE	GSI	MIS,IND	SW/SW 20-36-73 (20WELLS)-MINE UNIT J (I&PWELLS)	POWER RESOURCES, INC
P136151W	36	73	20	SENE	GSI	MIS,IND	SW/SW 20-36-73 (20WELLS)-MINE UNIT J (I&PWELLS)	POWER RESOURCES, INC
P136152W	36	73	20	SWSW	GSI	MIS,IND	SW/SW 20-36-73 (20WELLS)-MINE UNIT J (I&PWELLS)	POWER RESOURCES, INC
P136152W	36	73	20	SWSW	GSI	MIS,IND	SW/SW 20-36-73 (20WELLS)-MINE UNIT J (I&PWELLS)	POWER RESOURCES, INC
P136152W	36	73	20	SWSE	UNA	MON	FMU-4	POWER RESOURCES INC.
P136152W	36	73	21	NWSW	GSI	MIS,IND	SW/SW 20-36-73 (20WELLS)-MINE UNIT J (I&PWELLS)	POWER RESOURCES, INC
P136153W	36	73	21	SWNW	GSI	MIS,IND	SW/SW 20-36-73 (20WELLS)-MINE UNIT J (I&PWELLS)	POWER RESOURCES, INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P136153W	36	73	21	SWNW	UNA	MON	FM-43(M)	POWER RESOURCES INC.
P136153W	36	73	21	SWNW	UNA	IND	SW/SE 20-36-73; (144 WELLS)	POWER RESOURCES INC.
P136153W	36	73	21	NWSW	UNA	IND	SW/SE 20-36-73; (144 WELLS)	POWER RESOURCES INC.
P136154W	36	73	21	SENE	UNA	IND	SW/NE 21-36-73; (49 WELLS)	POWER RESOURCES INC.
P136154W	36	73	21	SWNE	UNA	IND	SW/NE 21-36-73; (49 WELLS)	POWER RESOURCES INC.
P136154W	36	73	21	NESW	UNA	IND	SW/NE 21-36-73; (49 WELLS)	POWER RESOURCES INC.
P136154W	36	73	21	NENE	UNA	IND	SW/NE 21-36-73; (49 WELLS)	POWER RESOURCES INC.
P136155W	36	73	21	NESE	UNA	IND	NE/SE 21-36-73: (140 WELLS)	POWER RESOURCES INC.
P136155W	36	73	21	SENE	UNA	IND	NE/SE 21-36-73: (140 WELLS)	POWER RESOURCES INC.
P136155W	36	73	21	SESW	UNA	IND	SE/SW 21-36-73: (75 WELLS)	POWER RESOURCES INC.
P136155W	36	73	21	SWNE	UNA	IND	SE/SW 21-36-73: (75 WELLS)	POWER RESOURCES INC.
P136156W	36	73	21	NENW	UNA	IND	SE/SW 21-36-73: (75 WELLS)	POWER RESOURCES INC.
P136156W	36	73	21	SENW	UNA	IND	SE/SW 21-36-73: (75 WELLS)	POWER RESOURCES INC.
P136156W	36	73	21	NENE	UNA	IND	SE/SW 21-36-73: (75 WELLS)	POWER RESOURCES INC.
P136156W	36	73	21	NWNE	UNA	IND	SE/SW 21-36-73: (75 WELLS)	POWER RESOURCES INC.
P137351W	36	73	21	SENE	UNA	IND	SE/SW 21-36-73: (75 WELLS)	POWER RESOURCES INC.
P139440W	36	73	21	NENW	UNA	IND	SW/NE 21-36-73; (49 WELLS)	POWER RESOURCES INC.
P139440W	36	73	21	NWNE	UNA	IND	SW/NE 21-36-73; (49 WELLS)	POWER RESOURCES INC.
P140786W	36	73	21	NWSW	UNA	MON	FM-41(M)	POWER RESOURCES INC.
P141280W	36	73	21	SWNW	GSI	IND,MISC	ENL NE/SE 25-36-74 (98 WELLS) - MINE UNIT K (I &P WELLS)	POWER RESOURCES, INC
P142001W	36	73	21	NWSW	GSI	IND,MISC	ENL NE/SE 25-36-74 (98 WELLS) - MINE UNIT K (I &P WELLS)	POWER RESOURCES, INC
P14378W	36	73	21	SWSW	UNA	MON	FMP-9	POWER RESOURCES INC.
P14378W	36	73	21	NWSW	UNA	MON	FMO-8	POWER RESOURCES INC.
P14378W	36	73	21	NWSE	UNA	MON	FMO-15	POWER RESOURCES INC.
P14378W	36	73	21	SWSE	UNA	MON	FMU-13	POWER RESOURCES INC.
P14378W	36	73	21	NESE	UNA	MON	FMO-19	POWER RESOURCES INC.
P14378W	36	73	21	SWSW	UNA	MON	FMU-9	POWER RESOURCES INC.
P14378W	36	73	21	SENW	UNA	MON	FM-45(M)	POWER RESOURCES INC.
P14378W	36	73	21	SWSW	UNA	MON	FT-9(U)	POWER RESOURCES INC.
P14378W	36	73	21	NENW	UNA	IND	NE/NE 22-36-73 (12 WELLS)	POWER RESOURCES INC.
P14378W	36	73	21	SENE	UNA	IND	NE/NE 22-36-73 (12 WELLS)	POWER RESOURCES INC.
P14378W	36	73	21	NENE	UNA	IND	NE/NE 22-36-73 (12 WELLS)	POWER RESOURCES INC.
P14378W	36	73	21	SWNE	UNA	MON	FMO-14	POWER RESOURCES INC.
P14378W	36	73	21	SWNE	UNA	IND	NE/NE 22-36-73 (12 WELLS)	POWER RESOURCES INC.
P14378W	36	73	21	NWNE	UNA	IND	NE/NE 22-36-73 (12 WELLS)	POWER RESOURCES INC.
P14378W	36	73	21	SENE	UNA	IND	SE/SW 22-36-73 (6 WELLS)	POWER RESOURCES INC.
P14378W	36	73	21	NENW	UNA	IND	SE/SW 22-36-73 (6 WELLS)	POWER RESOURCES INC.
P14378W	36	73	21	NESW	UNA	IND	SE/SW 22-36-73 (6 WELLS)	POWER RESOURCES INC.
P14378W	36	73	21	NENE	UNA	IND	SE/SW 22-36-73 (6 WELLS)	POWER RESOURCES INC.
P144333W	36	73	21	NWNE	UNA	IND	SE/SW 22-36-73 (6 WELLS)	POWER RESOURCES INC.
P144333W	36	73	21	SWNE	UNA	IND	SE/SW 22-36-73 (6 WELLS)	POWER RESOURCES INC.
P145531W	36	73	21	NWSW	GSI	MIS,IND	NE/SW 20-36-73 (23 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P145532W	36	73	21	SWNE	UNA	MON	FM-47(M)	POWER RESOURCES INC.
P145533W	36	73	21	SWNW	UNA	IND	SE/SE 20-36-73; (175 WELLS)	POWER RESOURCES INC.
P145534W	36	73	21	NWSW	UNA	MON	FM-42(M)	POWER RESOURCES INC.
P145535W	36	73	21	SWNW	GSI	MIS,IND	NE/SW 20-36-73 (23 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P145536W	36	73	21	NWSW	UNA	MON	FMP-8	POWER RESOURCES INC.
P145537W	36	73	21	SWSW	UNA	MON	W H 60 1	POWER RESOURCES INC.
P145538W	36	73	21	NWSW	UNA	IND	SE/SE 20-36-73; (175 WELLS)	POWER RESOURCES INC.
P145539W	36	73	21	SESE	UNA	MON	FM-14(U)	POWER RESOURCES INC.
P145540W	36	73	21	SESE	UNA	MON	FT-13(L)	POWER RESOURCES INC.
P145541W	36	73	21	SWNW	GSI	IND,MISC	NE/SE 25-36-74 (27 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P1456S	36	73	21	NWSW	GSI	IND,MISC	NE/SE 25-36-74 (27 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P14636P	36	73	21	SWNW	GSI	MIS,IND	SE/NW 20-36-73 (78 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P14636P	36	73	21	NWSW	GSI	MIS,IND	SE/NW 20-36-73 (78 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P150529W	36	73	21	NESW	UNA	IND	NW/SE 22-36-73 (9 WELLS)	POWER RESOURCES INC.
P150529W	36	73	21	NWNE	UNA	IND	NW/SE 22-36-73 (9 WELLS)	POWER RESOURCES INC.
P150691W	36	73	21	SWSE	UNA	MON	FMO-13	POWER RESOURCES INC.
P151581W	36	73	21	SESW	UNA	MON	FMU-12	POWER RESOURCES INC.
P151581W	36	73	21	SENE	UNA	IND	NW/SE 22-36-73 (9 WELLS)	POWER RESOURCES INC.
P151872W	36	73	21	NENW	UNA	IND	NW/SE 22-36-73 (9 WELLS)	POWER RESOURCES INC.
P151873W	36	73	21	NENE	UNA	IND	NW/SE 22-36-73 (9 WELLS)	POWER RESOURCES INC.
P151874W	36	73	21	SESW	UNA	MON	W H 60 2	POWER RESOURCES INC.
P151875W	36	73	21	NENE	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
P151876W	36	73	21	SWNW	UNA	IND	NW/SW 22-36-73; (20 WELLS)	POWER RESOURCES INC.
P151877W	36	73	21	SWNE	UNA	IND	NW/SE 22-36-73 (9 WELLS)	POWER RESOURCES INC.
P151878W	36	73	21	SWNW	UNA	IND	SW/NE 29-36-73; (8 WELLS)	POWER RESOURCES INC.
P151879W	36	73	21	NWSW	UNA	IND	SW/NE 29-36-73; (8 WELLS)	POWER RESOURCES INC.
P151880W	36	73	21	SWNW	GSI	MIS,IND	NW/SW 20-36-73 (7WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P151881W	36	73	21	NWSW	GSI	MIS,IND	NW/SW 20-36-73 (7WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P151882W	36	73	21	SWNW	GSI	MIS,IND	NW/NW 20-36-73 (73 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P151883W	36	73	21	NWSW	GSI	MIS,IND	NW/NW 20-36-73 (73 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P151884W	36	73	21	NWSE	UNA	MON	FMP-15	POWER RESOURCES INC.
P151885W	36	73	21	SENE	UNA	MON	FMU-16	POWER RESOURCES INC.
P151886W	36	73	21	NWSW	UNA	IND	NW/SW 22-36-73; (20 WELLS)	POWER RESOURCES INC.
P151887W	36	73	21	SWNW	GSI	IND,MISC	ENL SW1/4 NW1/4 30-36-73 (21) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P151889W	36	73	21	NWSW	GSI	IND,MISC	ENL SW1/4 NW1/4 30-36-73 (21) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P151890W	36	73	21	SWNE	UNA	MON	FM-46(M)	POWER RESOURCES INC.
P151891W	36	73	21	SWSW	UNA	MON	FT-6(L)	POWER RESOURCES INC.
P151892W	36	73	21	NENE	UNA	MIS	21-1	POWER RESOURCES INC.
P151893W	36	73	21	NWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P151894W	36	73	21	NESW	UNA	MIS	21-1	POWER RESOURCES INC.
P151895W	36	73	21	SESE	UNA	MIS	21-1	POWER RESOURCES INC.
P151896W	36	73	21	SWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P151897W	36	73	21	NWNW	UNA	MIS	21-1	POWER RESOURCES INC.
P151898W	36	73	21	NESE	UNA	MIS	21-1	POWER RESOURCES INC.
P151899W	36	73	21	SENW	UNA	MIS	21-1	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P151900W		36	73	21	SWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P151901W		36	73	21	NWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P151902W		36	73	21	NENW	UNA	MIS	21-1	POWER RESOURCES INC.
P151903W		36	73	21	SWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P151904W		36	73	21	SESW	UNA	MIS	21-1	POWER RESOURCES INC.
P151905W		36	73	21	SWNW	UNA	MIS	21-1	POWER RESOURCES INC.
P151906W		36	73	21	NWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P151907W		36	73	21	NWSW	GSI	MIS,IND	NE/NW 20-36-73 (75 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P151908W		36	73	21	SWNW	GSI	MIS,IND	NE/NW 20-36-73 (75 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P151909W		36	73	21	SENE	UNA	MIS	21-1	POWER RESOURCES INC.
P151910W		36	73	21	SENW	UNA	MON	FM-44(M)	POWER RESOURCES INC.
P153477W		36	73	21	SENE	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
P153478W		36	73	21	NWNE	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
P153488W		36	73	21	SWNE	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
P153488W		36	73	21	NENW	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
P154804W		36	73	21	SWNW	UNA	IND	SE/NW 29-36-73; (9 WELLS)	POWER RESOURCES INC.
P154804W		36	73	21	NWSW	UNA	IND	SE/NW 29-36-73; (9 WELLS)	POWER RESOURCES INC.
P15500W		36	73	21	SWNE	UNA	MON	FMU-14	POWER RESOURCES INC.
P155779W		36	73	21	SWSW	UNA	MON	FMO-9	POWER RESOURCES INC.
P155779W		36	73	21	SWSE	UNA	MON	FMP-13	POWER RESOURCES INC.
P155779W		36	73	21	SENE	UNA	MON	FMP-17	POWER RESOURCES INC.
P155779W		36	73	21	NWNE	UNA	IND	NW/NW 23-36-73; 100 WELLS	POWER RESOURCES INC.
P155779W		36	73	21	SENE	UNA	IND	NW/NW 23-36-73; 100 WELLS	POWER RESOURCES INC.
P155779W		36	73	21	NENW	UNA	IND	NW/NW 23-36-73; 100 WELLS	POWER RESOURCES INC.
P155780W		36	73	21	NENW	UNA	IND	SW/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P155780W		36	73	21	SENE	UNA	IND	SW/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P155780W		36	73	21	SWNE	UNA	IND	SW/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P155780W		36	73	21	SWNW	GSI	IND,MISC	SESE 25-36-74 (71 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P155780W		36	73	21	NWSW	GSI	IND,MISC	SESE 25-36-74 (71 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P155780W		36	73	21	SWSW	UNA	MON	FMU-10	POWER RESOURCES INC.
P155781W		36	73	21	NWNE	UNA	IND	SW/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P155781W		36	73	21	NENE	UNA	IND	SW/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P155781W		36	73	21	SWSW	UNA	MON	FMO-10	POWER RESOURCES INC.
P155781W		36	73	21	SWNE	GSI	IND,MIS	NE1/4NE1/4 SEC 14-36-73 250 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P155781W		36	73	21	SENE	GSI	IND,MIS	NE1/4NE1/4 SEC 14-36-73 250 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P155781W		36	73	21	NENE	GSI	IND,MIS	NE1/4NE1/4 SEC 14-36-73 250 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P155782W		36	73	21	NWNE	GSI	IND,MIS	NE1/4NE1/4 SEC 14-36-73 250 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P155782W		36	73	21	NESW	UNA	MON	FT-11(M)	POWER RESOURCES INC.
P155782W		36	73	21	SENW	UNA	IND	SE/NE 21-36-73: (119 WELLS)	POWER RESOURCES INC.
P155782W		36	73	21	SWNE	UNA	IND	SE/NE 21-36-73: (119 WELLS)	POWER RESOURCES INC.
P155782W		36	73	21	SWNW	UNA	IND	NE/SW 21-36-73; (9 WELLS)	POWER RESOURCES INC.
P155782W		36	73	21	NENW	UNA	IND	SE/NE 21-36-73: (119 WELLS)	POWER RESOURCES INC.
P155783W		36	73	21	SESE	UNA	MON	FM-15(U)	POWER RESOURCES INC.
P155783W		36	73	21	NENE	UNA	IND	SE/NE 21-36-73: (119 WELLS)	POWER RESOURCES INC.
P155783W		36	73	21	NWNE	UNA	IND	SE/NE 21-36-73: (119 WELLS)	POWER RESOURCES INC.
P155783W		36	73	21	SENE	UNA	IND	SE/NE 21-36-73: (119 WELLS)	POWER RESOURCES INC.
P155783W		36	73	21	SESW	UNA	MON	FT-8(M)	POWER RESOURCES INC.
P155783W		36	73	21	NESW	UNA	IND	NE/SW 21-36-73; (9 WELLS)	POWER RESOURCES INC.
P155784W		36	73	21	NWSW	UNA	IND	NE/SW 21-36-73; (9 WELLS)	POWER RESOURCES INC.
P155784W		36	73	21	SENE	UNA	MON	FMO-17	POWER RESOURCES INC.
P155784W		36	73	21	NWSW	UNA	MON	W H 50 5	POWER RESOURCES INC.
P155784W		36	73	21	SWNW	GSI	IND,MIS	NW 1/4 NW 1/4 30-36-73 (44 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P155784W		36	73	21	NWSW	GSI	IND,MIS	NW 1/4 NW 1/4 30-36-73 (44 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P155784W		36	73	21	NESE	UNA	MON	FT-15(U)	POWER RESOURCES INC.
P15611W		36	73	21	SWNE	GSI	MIS,IND	SE1/4NW1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P15611W		36	73	21	SENE	UNA	MON	FM-49(M)	POWER RESOURCES INC.
P1562S		36	73	21	SENE	GSI	MIS,IND	SE1/4NW1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P156846W		36	73	21	NWNE	GSI	MIS,IND	SE1/4NW1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P156847W		36	73	21	NENE	GSI	MIS,IND	SE1/4NW1/4 SEC 14-36-73 25 WELLS (C-WELLFIELD)	POWER RESOURCES, INC
P156848W		36	73	21	SENW	UNA	IND	NW/NW 23-36-73; 100 WELLS	POWER RESOURCES INC.
P156849W		36	73	21	NENE	UNA	IND	NW/NW 23-36-73; 100 WELLS	POWER RESOURCES INC.
P156850W		36	73	21	SWNE	UNA	IND	NW/NW 23-36-73; 100 WELLS	POWER RESOURCES INC.
P156851W		36	73	21	SWSW	UNA	MON	FMP-10	POWER RESOURCES INC.
P156852W		36	73	21	NWSW	UNA	MON	FMU-8	POWER RESOURCES INC.
P156853W		36	73	21	SWNW	GSI	IND,MISC	NW/SW 30-36-73 (7 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P156854W		36	73	21	NWSW	GSI	IND,MISC	NW/SW 30-36-73 (7 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P156855W		36	73	21	NENW	GST	STO	REYNOLDS #21-3	DUCK CREEK RANCHES INC.
P156856W		36	73	21	NENW	GST	STO	REYNOLDS #21-3	DUCK CREEK RANCHES INC.
P156857W		36	73	21	SWSW	UNA	IND	SW/SW 21-36-73; (160 WELLS)	POWER RESOURCES INC.
P156858W		36	73	21	NWSW	UNA	IND	SW/SW 21-36-73; (160 WELLS)	POWER RESOURCES INC.
P156859W		36	73	21	SWNE	UNA	MON	FMP-14	POWER RESOURCES INC.
P156860W		36	73	21	NESE	UNA	MON	FMU-20	POWER RESOURCES INC.
P156861W		36	73	21	NWSW	GSI	MIS,IND	SE/NE 19-36-73 (7 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P156862W		36	73	21	SWNW	GSI	MIS,IND	SE/NE 19-36-73 (7 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P156863W		36	73	21	SWNW	UNA	IND	SW/SW 21-36-73; (160 WELLS)	POWER RESOURCES INC.
P156864W		36	73	21	NESW	UNA	MON	W H 50 6	POWER RESOURCES INC.
P156865W		36	73	21	SESE	UNA	MON	FM-16(U)	POWER RESOURCES INC.
P158732W		36	73	21	SWSE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P158732W		36	73	21	SESE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P158735W		36	73	21	SESE	UNA	MON	W H 60 3	POWER RESOURCES INC.
P158735W		36	73	21	NESE	UNA	MON	FMO-20	POWER RESOURCES INC.
P158736W		36	73	21	NESE	UNA	MON	FMP-19	POWER RESOURCES INC.
P158736W		36	73	21	NWSW	UNA	IND	NW/SW 21-36-73; (65 WELLS)	POWER RESOURCES INC.
P158737W		36	73	21	NESE	UNA	MON	FMU-19	POWER RESOURCES INC.
P158839W		36	73	21	SENE	UNA	MON	FMP-16	POWER RESOURCES INC.
P158840W		36	73	21	NWSW	UNA	MON	FM-40(M)	POWER RESOURCES INC.
P158842W		36	73	21	SESW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P159091W		36	73	21	NESE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P159091W		36	73	21	NWSE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P159489W	36	73	21	NESW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P159489W	36	73	21	NWSW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P160753W	36	73	21	SWSW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P160753W	36	73	21	NWNW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P161415W	36	73	21	SWNW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P162571W	36	73	21	SENW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P162572W	36	73	21	SWNE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P162573W	36	73	21	SENE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P163066W	36	73	21	NENW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P163066W	36	73	21	NENE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P163067W	36	73	21	NWNE	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P163067W	36	73	21	SWNW	UNA	IND	NW/NE 29-36-73; (35 WELLS)	POWER RESOURCES INC.
P163613W	36	73	21	SENE	UNA	MON	FT-19(L)	POWER RESOURCES INC.
P163613W	36	73	21	NWSE	UNA	IND	NW/SE 21-36-73: (50 WELLS)	POWER RESOURCES INC.
P163615W	36	73	21	SENW	UNA	IND	NW/SE 21-36-73: (50 WELLS)	POWER RESOURCES INC.
P163615W	36	73	21	SWNW	GSI	IND,MIS	SW 1/4 NW 1/4 30-36-73 (45 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P163616W	36	73	21	NWSW	GSI	IND,MIS	SW 1/4 NW 1/4 30-36-73 (45 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P164093W	36	73	21	NWSW	GSI	MIS,IND	SW/SW 17-36-73 (19 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P164093W	36	73	21	SWNW	GSI	MIS,IND	SW/SW 17-36-73 (19 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P165194W	36	73	21	NWSW	GSI	MIS,IND	SE/SW 20-36-73 (10 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P165194W	36	73	21	NWSW	UNA	IND	NW/NE 29-36-73; (35 WELLS)	POWER RESOURCES INC.
P165195W	36	73	21	SWNW	GSI	MIS,IND	SE/SW 20-36-73 (10 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P165195W	36	73	21	SESW	UNA	MON	FT-10(U)	POWER RESOURCES INC.
P167743W	36	73	21	SESW	UNA	MON	FMO-12	POWER RESOURCES INC.
P167744W	36	73	21	SWNW	UNA	IND	NE/NW 29-36-73; (14 WELLS)	POWER RESOURCES INC.
P167745W	36	73	21	NWSW	UNA	IND	NE/NW 29-36-73; (14 WELLS)	POWER RESOURCES INC.
P167746W	36	73	21	SENE	UNA	MON	FM-50(M)	POWER RESOURCES INC.
P167747W	36	73	21	SWSW	UNA	MON	FMO-7	POWER RESOURCES INC.
P167748W	36	73	21	NESE	UNA	MON	FMP-20	POWER RESOURCES INC.
P167749W	36	73	21	NESE	UNA	MON	FT-14(M)	POWER RESOURCES INC.
P167750W	36	73	21	NWSW	GSI	MIS,IND	SE/SW 17-36-73 (60 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P167751W	36	73	21	SWNW	GSI	MIS,IND	SE/SW 17-36-73 (60 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P167752W	36	73	21	SENE	UNA	MON	FMO-16	POWER RESOURCES INC.
P167754W	36	73	21	SWNW	UNA	IND	NW/SW 21-36-73; (65 WELLS)	POWER RESOURCES INC.
P167755W	36	73	21	SENE	UNA	IND	NE/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P167756W	36	73	21	SWSE	UNA	IND	SW/SE 21-36-73 (35 WELLS)	POWER RESOURCES INC.
P167757W	36	73	21	NWNE	UNA	IND	NE/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P16808D	36	73	21	NENW	UNA	IND	NE/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P168161W	36	73	21	NENE	UNA	IND	NE/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P168161W	36	73	21	SWNE	UNA	IND	NE/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P168580W	36	73	21	SWSE	UNA	MON	FM-17(L)	POWER RESOURCES INC.
P168581W	36	73	21	SWSW	UNA	MON	FMP-7	POWER RESOURCES INC.
P171394W	36	73	21	NESE	UNA	MON	W H 40 3	POWER RESOURCES INC.
P171394W	36	73	21	SESW	UNA	MON	FMP-12	POWER RESOURCES INC.
P171394W	36	73	21	NWSE	UNA	MON	FMU-15	POWER RESOURCES INC.
P171394W	36	73	21	SWNE	UNA	IND	SW/NE 22-36-73 (10 WELLS)	POWER RESOURCES INC.
P171394W	36	73	21	NWNE	UNA	IND	SW/NE 22-36-73 (10 WELLS)	POWER RESOURCES INC.
P171394W	36	73	21	NENW	UNA	IND	SW/NE 22-36-73 (10 WELLS)	POWER RESOURCES INC.
P171395W	36	73	21	SENE	UNA	MON	FMU-17	POWER RESOURCES INC.
P171395W	36	73	21	NWNE	UNA	IND	NE/NW 28-36-73: (40 WELLS)	POWER RESOURCES INC.
P171395W	36	73	21	SWNE	UNA	IND	NE/NW 28-36-73: (40 WELLS)	POWER RESOURCES INC.
P171395W	36	73	21	SENE	UNA	IND	NE/NW 28-36-73: (40 WELLS)	POWER RESOURCES INC.
P171395W	36	73	21	SENW	UNA	IND	NE/NW 28-36-73: (40 WELLS)	POWER RESOURCES INC.
P171395W	36	73	21	NENW	UNA	IND	NE/NW 28-36-73: (40 WELLS)	POWER RESOURCES INC.
P171395W	36	73	21	NENE	UNA	IND	NE/NW 28-36-73: (40 WELLS)	POWER RESOURCES INC.
P171396W	36	73	21	SWSE	UNA	MON	FM-18(L)	POWER RESOURCES INC.
P171396W	36	73	21	NWNE	UNA	IND	SW/NW 22-36-73: (50 WELLS)	POWER RESOURCES INC.
P171396W	36	73	21	SENE	UNA	IND	SW/NW 22-36-73: (50 WELLS)	POWER RESOURCES INC.
P171396W	36	73	21	SWNE	UNA	IND	SW/NW 22-36-73: (50 WELLS)	POWER RESOURCES INC.
P171396W	36	73	21	SENW	UNA	IND	SW/NW 22-36-73: (50 WELLS)	POWER RESOURCES INC.
P171396W	36	73	21	NENE	UNA	IND	SW/NW 22-36-73: (50 WELLS)	POWER RESOURCES INC.
P171396W	36	73	21	SENE	UNA	IND	SW/NE 22-36-73 (10 WELLS)	POWER RESOURCES INC.
P171397W	36	73	21	NENE	UNA	IND	SW/NE 22-36-73 (10 WELLS)	POWER RESOURCES INC.
P171397W	36	73	21	NWSW	GSI	IND,MISC	ENL NW/SW 30-36-73 (29 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P171397W	36	73	21	SWNW	GSI	IND,MISC	ENL NW/SW 30-36-73 (29 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P171397W	36	73	21	NENW	UNA	IND	SW/NW 22-36-73: (50 WELLS)	POWER RESOURCES INC.
P171397W	36	73	21	SESE	UNA	IND	SE/SE 21-36-73: (30 WELLS)	POWER RESOURCES INC.
P171397W	36	73	21	NWSW	UNA	IND	NW/NW 28-36-73; (36 WELLS)	POWER RESOURCES INC.
P171397W	36	73	21	SWNW	UNA	IND	NW/NW 28-36-73; (36 WELLS)	POWER RESOURCES INC.
P171398W	36	73	21	SENE	UNA	MON	FM-48(M)	POWER RESOURCES INC.
P171398W	36	73	21	NENE	UNA	IND	SE/NW 22-36-73 (90) WELLS	POWER RESOURCES INC.
P171398W	36	73	21	NWNE	UNA	IND	SE/NW 22-36-73 (90) WELLS	POWER RESOURCES INC.
P171398W	36	73	21	SWNE	UNA	MON	W H 50 7	POWER RESOURCES INC.
P171398W	36	73	21	NWSW	GSI	MIS,IND	SW/NW 20-36-73 (39 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P171398W	36	73	21	NWSE	UNA	MON	FT-12(L)	POWER RESOURCES INC.
P171399W	36	73	21	SWNW	GSI	MIS,IND	SW/NW 20-36-73 (39 WELLS) - MINE UNIT J (I&P WELLS)	POWER RESOURCES, INC
P171399W	36	73	21	SWSW	UNA	MON	FMU-7	POWER RESOURCES INC.
P171399W	36	73	21	SWNE	UNA	MON	W H 40 2	POWER RESOURCES INC.
P171399W	36	73	21	SWNE	UNA	IND	SE/NW 22-36-73 (90) WELLS	POWER RESOURCES INC.
P171399W	36	73	21	SENE	UNA	IND	SE/NW 22-36-73 (90) WELLS	POWER RESOURCES INC.
P171399W	36	73	21	NENW	UNA	IND	SE/NW 22-36-73 (90) WELLS	POWER RESOURCES INC.
P171400W	36	73	22	SWNW	UNA	MON	FM-1(M)	POWER RESOURCES INC.
P171400W	36	73	22	SWSW	UNA	MON	FMO-21	POWER RESOURCES INC.
P171400W	36	73	22	SENE	UNA	IND	SE/NW 22-36-73 (90) WELLS	POWER RESOURCES INC.
P171400W	36	73	22	SENW	UNA	IND	SE/NW 22-36-73 (90) WELLS	POWER RESOURCES INC.
P171400W	36	73	22	NENE	UNA	MON	DM-16	POWER RESOURCES INC.
P171400W	36	73	22	NWSW	UNA	MON	FM-4(L)	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P171400W	36	73	22	NENW	UNA	IND	SW/NE 22-36-73 (10 WELLS)	POWER RESOURCES INC.
P171401W	36	73	22	NESE	UNA	MON	EMO-13	POWER RESOURCES INC.
P171401W	36	73	22	NWSE	UNA	MON	DM-21	POWER RESOURCES INC.
P171401W	36	73	22	NWSW	UNA	MON	FT-18(M)	POWER RESOURCES INC.
P171401W	36	73	22	SWSW	UNA	MON	FMU-21	POWER RESOURCES INC.
P171401W	36	73	22	SWNW	UNA	IND	SW/NW 22-36-73: (50 WELLS)	POWER RESOURCES INC.
P171401W	36	73	22	SWNE	UNA	IND	SW/NW 22-36-73: (50 WELLS)	POWER RESOURCES INC.
P171401W	36	73	22	SWNE	UNA	MON	DMU-7	POWER RESOURCES INC.
P171402W	36	73	22	SWNE	UNA	MON	ET-4	POWER RESOURCES INC.
P171402W	36	73	22	SENE	UNA	MON	EMO-15	POWER RESOURCES INC.
P171402W	36	73	22	SENE	UNA	MON	DM-10	POWER RESOURCES INC.
P171402W	36	73	22	NWSE	UNA	MON	DM-22	POWER RESOURCES INC.
P171402W	36	73	22	SWNW	UNA	MON	FMU-18	POWER RESOURCES INC.
P171402W	36	73	22	NWSW	UNA	MON	FM-5(L)	POWER RESOURCES INC.
P171402W	36	73	22	SWNW	UNA	MON	FM-2(M)	POWER RESOURCES INC.
P171403W	36	73	22	SWNE	UNA	MON	DM-14	POWER RESOURCES INC.
P171403W	36	73	22	SWNW	UNA	MON	FMP-18	POWER RESOURCES INC.
P171403W	36	73	22	NENE	UNA	IND	NE/NE 22-36-73; 60 WELLS	POWER RESOURCES INC.
P171403W	36	73	22	NESW	UNA	MON	DM-24	POWER RESOURCES INC.
P171403W	36	73	22	NESW	UNA	MON	DM-23	POWER RESOURCES INC.
P171403W	36	73	22	NENW	UNA	IND	NE/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P171403W	36	73	22	SESW	UNA	MON	FM-10(U)	POWER RESOURCES INC.
P171404W	36	73	22	NESW	UNA	MON	FM-7(U)	POWER RESOURCES INC.
P171404W	36	73	22	NWNW	UNA	MON	EM-19	POWER RESOURCES INC.
P171404W	36	73	22	SENW	UNA	MON	EMU-3	POWER RESOURCES INC.
P171404W	36	73	22	NENE	UNA	MON	DM-17	POWER RESOURCES INC.
P171404W	36	73	22	NWNE	UNA	MON	W H 50 10	POWER RESOURCES INC.
P171404W	36	73	22	NWSW	UNA	MON	EM-16	POWER RESOURCES INC.
P171404W	36	73	22	SWNE	GST	IND	SW/NE 22-36-73; 31 WELLS	POWER RESOURCES INC
P172013W	36	73	22	NWSE	GST	IND	SW/NE 22-36-73; 31 WELLS	POWER RESOURCES INC
P172013W	36	73	22	SENW	UNA	MON	EMO-2	POWER RESOURCES INC.
P172014W	36	73	22	NWNE	UNA	MON	EMO-5	POWER RESOURCES INC.
P172014W	36	73	22	SWSW	UNA	IND	SW/SW 22-36-73 (21 WELLS)	POWER RESOURCES INC.
P172014W	36	73	22	SENW	UNA	MON	DM-25	POWER RESOURCES INC.
P172014W	36	73	22	NWNE	UNA	MON	DM-29	POWER RESOURCES INC.
P172014W	36	73	22	NENW	UNA	MON	EM-20	POWER RESOURCES INC.
P172015W	36	73	22	SENW	UNA	MON	EMO-3	POWER RESOURCES INC.
P172015W	36	73	22	NWNE	UNA	MON	EMU-7	POWER RESOURCES INC.
P172015W	36	73	22	SENE	UNA	MON	EMO-10	POWER RESOURCES INC.
P172015W	36	73	22	NENW	UNA	MON	EM-22	POWER RESOURCES INC.
P172015W	36	73	22	NENE	UNA	MON	DM-19	POWER RESOURCES INC.
P172015W	36	73	22	SENE	UNA	IND	SE/NE 22-36-73 (76 WELLS)	POWER RESOURCES INC.
P172016W	36	73	22	SWSW	UNA	MON	FM-13(U)	POWER RESOURCES INC.
P172016W	36	73	22	SENW	UNA	MON	EMU-1	POWER RESOURCES INC.
P172016W	36	73	22	NESE	UNA	MON	EM-10	POWER RESOURCES INC.
P172016W	36	73	22	SENW	UNA	MON	W H 50 9	POWER RESOURCES INC.
P172016W	36	73	22	NWNE	UNA	MON	EMU-4	POWER RESOURCES INC.
P172016W	36	73	22	SENE	UNA	MON	ET-3	POWER RESOURCES INC.
P172016W	36	73	22	NWSW	UNA	MON	FM-6(U)	POWER RESOURCES INC.
P172017W	36	73	22	NWNE	UNA	MON	EMU-5	POWER RESOURCES INC.
P172017W	36	73	22	SWNW	UNA	MON	FM-3(L)	POWER RESOURCES INC.
P172017W	36	73	22	NENE	UNA	MON	ET-1	POWER RESOURCES INC.
P172017W	36	73	22	NESE	UNA	MON	EM-9	POWER RESOURCES INC.
P172017W	36	73	22	SENE	UNA	MON	EMU-12	POWER RESOURCES INC.
P172017W	36	73	22	NWNE	UNA	MON	EMU-6	POWER RESOURCES INC.
P172017W	36	73	22	SWNW	UNA	MON	EM-18	POWER RESOURCES INC.
P172018W	36	73	22	SWNW	UNA	MON	W H 50 8	POWER RESOURCES INC.
P172018W	36	73	22	NESW	UNA	MON	DMT-1	POWER RESOURCES INC.
P172018W	36	73	22	SWSW	UNA	MON	FM-12(U)	POWER RESOURCES INC.
P172018W	36	73	22	SENE	UNA	MON	EMSHO-1	POWER RESOURCES INC.
P172018W	36	73	22	NENE	UNA	MON	ET-2	POWER RESOURCES INC.
P172018W	36	73	22	NWNE	UNA	IND	NW/NE 22-36-73 (120 WELLS)	POWER RESOURCES INC.
P172019W	36	73	22	SWNW	UNA	IND	SW/NW 22-36-73 (15 WELLS)	POWER RESOURCES INC.
P172019W	36	73	22	NWSW	UNA	MON	DMU-9	POWER RESOURCES INC.
P172019W	36	73	22	NWSE	GST	IND	NW/SE 22-36-73; 19 WELLS	POWER RESOURCES INC
P172019W	36	73	22	NWSE	GST	IND	NW/SE 22-36-73; 19 WELLS	POWER RESOURCES INC
P172019W	36	73	22	SENE	UNA	MON	DMU-1	POWER RESOURCES INC.
P172019W	36	73	22	NESW	UNA	MON	DMP-12	POWER RESOURCES, INC.
P172020W	36	73	22	SENE	UNA	MON	DM-13	POWER RESOURCES INC.
P172020W	36	73	22	NWSW	UNA	MON	EM-15	POWER RESOURCES INC.
P172020W	36	73	22	SWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P172020W	36	73	22	NWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P172020W	36	73	22	NENW	UNA	MIS	21-1	POWER RESOURCES INC.
P172020W	36	73	22	SWNW	UNA	MON	EM-17	POWER RESOURCES INC.
P172020W	36	73	22	NWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P172021W	36	73	22	NESE	UNA	MIS	21-1	POWER RESOURCES INC.
P172021W	36	73	22	SESE	UNA	MIS	21-1	POWER RESOURCES INC.
P172021W	36	73	22	SESW	UNA	MIS	21-1	POWER RESOURCES INC.
P172021W	36	73	22	SWNW	UNA	MIS	21-1	POWER RESOURCES INC.
P172021W	36	73	22	NWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P172021W	36	73	22	NESW	UNA	MIS	21-1	POWER RESOURCES INC.
P172021W	36	73	22	SENE	UNA	MIS	21-1	POWER RESOURCES INC.
P172022W	36	73	22	SWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P172022W	36	73	22	NWNW	UNA	MIS	21-1	POWER RESOURCES INC.
P172022W	36	73	22	NENE	UNA	MIS	21-1	POWER RESOURCES INC.
P172022W	36	73	22	SENW	UNA	MIS	21-1	POWER RESOURCES INC.
P172022W	36	73	22	SWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P172022W	36	73	22	SESW	UNA	MON	FM-8(U)	POWER RESOURCES INC.
P172022W	36	73	22	NWSE	UNA	MON	DM-20	POWER RESOURCES INC.
P172660W	36	73	22	NWSW	UNA	MON	DMU-10	POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P172660W	36	73	22	SWNE	UNA	MON	DM-27	POWER RESOURCES INC.
P172660W	36	73	22	SENW	UNA	IND	SE/NW 22-36-73; 3 WELLS	POWER RESOURCES INC
P172660W	36	73	22	NWSE	UNA	IND	SE/NW 22-36-73; 3 WELLS	POWER RESOURCES INC
P172660W	36	73	22	NESW	UNA	MON	DMU-6	POWER RESOURCES INC.
P172661W	36	73	22	SWNE	UNA	MON	ET-6	POWER RESOURCES INC.
P172661W	36	73	22	NESW	UNA	MON	DMO-6	POWER RESOURCES INC.
P172661W	36	73	22	NWSW	UNA	IND	NW/SW 22-36-73; (20 WELLS)	POWER RESOURCES INC.
P172661W	36	73	22	NWSE	UNA	MON	EM-12	POWER RESOURCES INC.
P172661W	36	73	22	NESE	UNA	IND	NE/SE 22-36-73 (52 WELLS)	POWER RESOURCES INC.
P172661W	36	73	22	NENW	UNA	MON	EM-21	POWER RESOURCES INC.
P172662W	36	73	22	NWSE	UNA	IND	NW/SE 22-36-73 (9 WELLS)	POWER RESOURCES INC.
P172662W	36	73	22	SENE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P172662W	36	73	22	NENE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P172662W	36	73	22	SENW	UNA	MON	EMU-2	POWER RESOURCES INC.
P172662W	36	73	22	NWSW	UNA	MON	FT-16(L)	POWER RESOURCES INC.
P172663W	36	73	22	SWNE	UNA	MON	DMU-8	POWER RESOURCES INC.
P172663W	36	73	22	SENW	UNA	MON	DM-26	POWER RESOURCES, INC.
P172663W	36	73	22	NENE	UNA	MON	DMU-2	POWER RESOURCES INC.
P172663W	36	73	22	SENE	UNA	IND	SE/NE 22-36-73; 50 WELLS	POWER RESOURCES INC.
P172663W	36	73	22	SESW	UNA	MON	FM-11(U)	POWER RESOURCES INC.
P172664W	36	73	22	SENE	UNA	MON	DM-12	POWER RESOURCES INC.
P172664W	36	73	22	NWSE	UNA	MON	EM-11	POWER RESOURCES INC.
P172664W	36	73	22	NENE	UNA	IND	NE/NE 22-36-73 (12 WELLS)	POWER RESOURCES INC.
P172664W	36	73	22	NESE	UNA	MON	EMU-14	POWER RESOURCES INC.
P172664W	36	73	22	SWNW	UNA	MON	FMO-18	POWER RESOURCES INC.
P172664W	36	73	22	SESW	UNA	IND	SE/SW 22-36-73 (6 WELLS)	POWER RESOURCES INC.
P172665W	36	73	22	NESW	UNA	IND	NE/SW 22-36-73; 27 WELLS	POWER RESOURCES INC
P172665W	36	73	22	NWSE	UNA	IND	NE/SW 22-36-73; 27 WELLS	POWER RESOURCES INC
P172665W	36	73	22	NWNE	UNA	MON	EMO-4	POWER RESOURCES INC.
P172665W	36	73	22	NWSW	UNA	MON	FT-17(U)	POWER RESOURCES INC.
P172665W	36	73	22	SWNE	UNA	MON	DMP-11	POWER RESOURCES, INC.
P172665W	36	73	22	SESW	UNA	MON	FM-9(U)	POWER RESOURCES INC.
P172666W	36	73	22	NESW	UNA	MON	EM-14	POWER RESOURCES INC.
P172666W	36	73	22	NWNE	UNA	MON	EMO-7	POWER RESOURCES INC.
P172666W	36	73	22	SENE	UNA	MON	DM-11	POWER RESOURCES INC.
P172666W	36	73	22	NENE	UNA	MON	DM-18	POWER RESOURCES INC.
P172666W	36	73	22	NENE	UNA	MON	DMO-2	POWER RESOURCES INC.
P172666W	36	73	22	SWNE	UNA	MON	DM-28	POWER RESOURCES INC.
P172667W	36	73	22	SWSW	UNA	MON	FMP-21	POWER RESOURCES INC.
P172667W	36	73	22	NESE	UNA	MON	EMU-13	POWER RESOURCES INC.
P172667W	36	73	22	SWNE	UNA	MON	ET-5	POWER RESOURCES INC.
P172667W	36	73	22	SWNE	UNA	MON	DM-15	POWER RESOURCES INC.
P172667W	36	73	22	NWSE	UNA	MON	EM-13	POWER RESOURCES INC.
P172667W	36	73	22	SENE	UNA	MON	DMO-1	POWER RESOURCES INC.
P172668W	36	73	23	SWNW	UNA	MON	DMD-2	POWER RESOURCES INC.
P172668W	36	73	23	NWNW	UNA	MON	DMU-3	POWER RESOURCES INC.
P172668W	36	73	23	SWNW	UNA	MON	DMO-5	POWER RESOURCES INC.
P172668W	36	73	23	NWNW	UNA	MON	EMO-9	POWER RESOURCES INC.
P172668W	36	73	23	NWNW	UNA	MON	DM-2	POWER RESOURCES INC.
P172669W	36	73	23	NWNW	UNA	MON	CM 22	POWER RESOURCES INC.
P172669W	36	73	23	SWNW	UNA	MON	DM-9	POWER RESOURCES INC.
P172669W	36	73	23	SWNW	UNA	MON	EMO-16	POWER RESOURCES INC.
P172669W	36	73	23	NESE	GST	MON	IM-1	POWER RESOURCES INC
P172669W	36	73	23	SENW	UNA	MON	EM-5	POWER RESOURCES INC.
P172670W	36	73	23	NENW	UNA	MON	EM-2	POWER RESOURCES INC.
P172670W	36	73	23	NENE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P172670W	36	73	23	NESE	GST	MON	IM-21	POWER RESOURCES INC
P172670W	36	73	23	SENE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P172670W	36	73	23	NWNW	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P172670W	36	73	23	SWNE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P172671W	36	73	23	NENW	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P172671W	36	73	23	NWNE	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P172671W	36	73	23	NWNW	UNA	IND	NW/NW 23-36-73 (8 WELLS)	POWER RESOURCES INC.
P172671W	36	73	23	SENW	UNA	MON	DM-6	POWER RESOURCES INC.
P172671W	36	73	23	NENW	UNA	MON	CRMW 2	POWER RESOURCES INC.
P172671W	36	73	23	NWNW	UNA	IND	NW/NW 23-36-73; 100 WELLS	POWER RESOURCES INC.
P172672W	36	73	23	SWNW	UNA	MON	DMU-5	POWER RESOURCES INC.
P172672W	36	73	23	SENW	UNA	MON	EM-3	POWER RESOURCES INC.
P172672W	36	73	23	SWNW	UNA	MON	EM-6	POWER RESOURCES INC.
P172672W	36	73	23	NWNW	UNA	MON	DMO-3	POWER RESOURCES INC.
P172672W	36	73	23	SWNW	UNA	IND	SW/NW 23-36-73 (55 WELLS)	POWER RESOURCES INC.
P172673W	36	73	23	SESE	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P172673W	36	73	23	NENW	UNA	MON	CM 19	POWER RESOURCES INC.
P172673W	36	73	23	SWSE	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P172673W	36	73	23	NWNW	UNA	MON	DM-3	POWER RESOURCES INC.
P172673W	36	73	23	NENW	UNA	MON	CM 20	POWER RESOURCES INC.
P172673W	36	73	23	NENW	UNA	MON	CM 21	POWER RESOURCES INC.
P172934W	36	73	23	SWNW	UNA	IND	SW/NW 23-36-73; 125 WELLS	POWER RESOURCES INC.
P172935W	36	73	23	SENW	UNA	IND	SW/NW 23-36-73; 125 WELLS	POWER RESOURCES INC.
P172936W	36	73	23	SENW	UNA	MON	DM-5	POWER RESOURCES INC.
P172937W	36	73	23	NWNW	UNA	MON	DMD-1	POWER RESOURCES INC.
P172938W	36	73	23	SWNW	UNA	DEW,STO,IND,MIS	DM 8	POWER RESOURCES INC.
P172939W	36	73	23	NWNW	UNA	MON	DSH-1	POWER RESOURCES INC.
P172940W	36	73	23	NWSW	UNA	MON	EM-8	POWER RESOURCES INC.
P172941W	36	73	23	SESE	GST	MON	IM-20	POWER RESOURCES INC
P172942W	36	73	23	SWNW	UNA	MON	DM-7	POWER RESOURCES INC.
P172943W	36	73	23	NENW	UNA	MON	DM-4	POWER RESOURCES INC.
P172944W	36	73	23	NENW	UNA	MON	EM-1	POWER RESOURCES INC.
P17330D	36	73	23	SWNW	UNA	MON	DMU-4	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P17330D		36	73	23	NENE	GST	MIS	23-1A 3673	POWER RESOURCES INC
P175279W		36	73	23	NENE	GST	MIS	23-1A 3673	POWER RESOURCES INC
P175280W		36	73	23	SWNW	UNA	MON	DMO-4	POWER RESOURCES INC.
P175281W		36	73	23	NWNW	UNA	MON	DSH-2	POWER RESOURCES INC.
P175282W		36	73	23	SENW	UNA	MON	EM-4	POWER RESOURCES INC.
P175283W		36	73	23	NENW	UNA	MON	CM 18	POWER RESOURCES INC.
P175284W		36	73	23	NESE	GST	MON	IM-22	POWER RESOURCES INC
P175285W		36	73	23	NWSW	UNA	MON	EM-7	POWER RESOURCES INC.
P175286W		36	73	23	NWNW	UNA	MON	DM-1	POWER RESOURCES INC.
P175287W		36	73	23	SWNW	UNA	MON	DM-8	POWER RESOURCES INC.
P175288W		36	73	24	NESW	GST	MON	IMP-5	POWER RESOURCES INC
P175289W		36	73	24	NESE	GSI	MON	IM-10	POWER RESOURCES INC
P175290W		36	73	24	NWSW	GST	MON	IMU-7	POWER RESOURCES INC
P175369W		36	73	24	SWSW	GSI	IND	SW/SW 24-36-73 (31 WELLS)	POWER RESOURCES INC
P175369W		36	73	24	NWSW	GSI	IND	SW/SW 24-36-73 (31 WELLS)	POWER RESOURCES INC
P17548S		36	73	24	NWSE	GST	MON	IMP-3	POWER RESOURCES INC
P17548S		36	73	24	SWSE	GST	MON	IM-14	POWER RESOURCES INC
P17549S		36	73	24	NWSW	GST	IND	NE/SW 24-36-73(104 WELLS)	POWER RESOURCES INC
P17550S		36	73	24	NESW	GST	IND	NE/SW 24-36-73(104 WELLS)	POWER RESOURCES INC
P17551S		36	73	24	SWSE	GSI	MON	IM-12	POWER RESOURCES INC
P17552S		36	73	24	NWSE	GST	MON	IMU-3	POWER RESOURCES INC
P17552S		36	73	24	SWSW	GST	MON	IMP-6	POWER RESOURCES INC
P17552S		36	73	24	SESW	GST	MON	IM-15	POWER RESOURCES INC
P17552S		36	73	24	SWNW	GST	MON	IM-2	POWER RESOURCES INC
P175552W		36	73	24	SWSW	GST	MON	IM-17	POWER RESOURCES INC
P176078W		36	73	24	SENW	GST	MON	IM-5	POWER RESOURCES INC
P176079W		36	73	24	NWSW	GSI	IND	NW/SW 24-36-73(16 WELLS)	POWER RESOURCES INC
P176080W		36	73	24	SWSE	GST	IND	SW/SE 24-36-73(25WELLS)	POWER RESOURCES INC
P176081W		36	73	24	NWSW	GST	IND	SW/SE 24-36-73(25WELLS)	POWER RESOURCES INC
P176082W		36	73	24	NESW	GST	MON	IMU-2	POWER RESOURCES INC
P176083W		36	73	24	NESW	GST	MON	IMP-2	POWER RESOURCES INC
P176084W		36	73	24	SESW	GST	MON	IMU-4	POWER RESOURCES INC
P176085W		36	73	24	NWSW	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P176086W		36	73	24	NESE	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P176087W		36	73	24	NESW	GST	MON	IMU-5	POWER RESOURCES INC
P177382W		36	73	24	SESE	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P177382W		36	73	24	SESW	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P178359W		36	73	24	NWSE	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P178359W		36	73	24	NESW	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P178359W		36	73	24	SWSE	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P178359W		36	73	24	SWSW	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P178359W		36	73	24	NESW	GST	MON	IMO-2	POWER RESOURCES INC
P178359W		36	73	24	SWSW	GST	MON	IM-18	POWER RESOURCES INC
P178359W		36	73	24	NWSE	GSI	MON	IM-7	POWER RESOURCES INC
P178359W		36	73	24	SESW	GST	MON	IM-16	POWER RESOURCES INC
P178360W		36	73	24	SWSW	GST	MON	IM-19	POWER RESOURCES INC
P178360W		36	73	24	SENW	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P178360W		36	73	24	SWSE	GST	MON	IM-13	POWER RESOURCES INC
P178360W		36	73	24	SWNW	UNA	MIS	23 1 3673	POWER RESOURCES INC.
P178360W		36	73	24	SENW	GST	MON	IM-4	POWER RESOURCES INC
P178360W		36	73	24	NWSW	GST	MON	IMO-6	POWER RESOURCES INC
P178360W		36	73	24	NWSW	GST	IND	SE/SW 24-36-73 (93 WELLS)	POWER RESOURCES INC
P178361W		36	73	24	SWSW	GST	MON	IMO-5	POWER RESOURCES INC
P178361W		36	73	24	SESW	GST	IND	SE/SW 24-36-73 (93 WELLS)	POWER RESOURCES INC
P178361W		36	73	24	SWNW	GST	MON	IM-3	POWER RESOURCES INC
P178361W		36	73	24	NESE	GST	MON	IM-9	POWER RESOURCES INC
P178361W		36	73	24	SESE	GST	MON	IM-11	POWER RESOURCES INC
P178361W		36	73	24	NWSW	GSI	IND	NW/SW 24-36-73(16 WELLS)	POWER RESOURCES INC
P178361W		36	73	24	SWSE	UNA	IND	SOLUTION MINE WELLS #451 1025	POWER RESOURCES INC.
P178362W		36	73	24	SESE	UNA	IND	SOLUTION MINE WELLS #451 1025	POWER RESOURCES INC.
P178362W		36	73	24	SESW	UNA	IND	SOLUTION MINE WELLS #451 1025	POWER RESOURCES INC.
P178362W		36	73	24	NESE	UNA	IND	SOLUTION MINE WELLS #451 1025	POWER RESOURCES INC.
P178362W		36	73	24	NWSE	UNA	IND	SOLUTION MINE WELLS #451 1025	POWER RESOURCES INC.
P178362W		36	73	24	NESW	UNA	IND	SOLUTION MINE WELLS #451 1025	POWER RESOURCES INC.
P178362W		36	73	24	NWSW	UNA	IND	SOLUTION MINE WELLS #451 1025	POWER RESOURCES INC.
P178362W		36	73	24	SWSW	UNA	IND	SOLUTION MINE WELLS #451 1025	POWER RESOURCES INC.
P178998W		36	73	24	NWSW	GST	MON	IMP-7	POWER RESOURCES INC
P178998W		36	73	24	NWSW	GSI	IND	NW/SE 24-36-73 (87 WELLS)	POWER RESOURCES INC
P179128W		36	73	24	NWSE	GSI	IND	NW/SE 24-36-73 (87 WELLS)	POWER RESOURCES INC
P179129W		36	73	24	NESW	GST	MON	IMO-4	POWER RESOURCES INC
P179130W		36	73	24	NWSE	GST	MON	IM-8	POWER RESOURCES INC
P179131W		36	73	24	SWNE	GST	MON	IM-6	POWER RESOURCES INC
P179132W		36	73	24	SESW	GST	MON	IMO-3	POWER RESOURCES INC
P179133W		36	73	24	SESW	GST	MON	IMP-4	POWER RESOURCES INC
P179134W		36	73	24	SWSW	GST	MON	IMU-6	POWER RESOURCES INC
P179135W		36	73	25	NESE	GSI	IND,MISC	NE/SE 25-36-74 (27 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P179136W		36	73	25	NWNE	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P179137W		36	73	25	NWNW	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P179138W		36	73	25	NENW	UNA	MIS	25 1 3673	POWER RESOURCES INC.
P179139W		36	73	27	NWSE	UNA	STO	STOCK WATER OVERFILING SWEPI #1 WATER	W. R. "BILL" VOLLMAN
P179140W		36	73	27	NWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P179160W		36	73	27	NESE	UNA	MIS	21-1	POWER RESOURCES INC.
P179160W		36	73	27	SENW	UNA	MIS	21-1	POWER RESOURCES INC.
P179591W		36	73	27	SWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P179591W		36	73	27	NWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P179591W		36	73	27	NENW	UNA	MIS	21-1	POWER RESOURCES INC.
P179591W		36	73	27	SESW	UNA	MIS	21-1	POWER RESOURCES INC.
P179591W		36	73	27	SWNW	UNA	MIS	21-1	POWER RESOURCES INC.
P179591W		36	73	27	NWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P179591W		36	73	27	NESW	UNA	MIS	21-1	POWER RESOURCES INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P179592W	36	73	27	SENE	UNA	MIS	21-1	POWER RESOURCES INC.
P179592W	36	73	27	SWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P179592W	36	73	27	NWNW	UNA	MIS	21-1	POWER RESOURCES INC.
P179592W	36	73	27	NENE	UNA	MIS	21-1	POWER RESOURCES INC.
P179592W	36	73	27	SESE	UNA	MIS	21-1	POWER RESOURCES INC.
P179592W	36	73	27	SWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P179592W	36	73	27	SWNE	UNA	MON	W H 40 4	POWER RESOURCES INC.
P180360W	36	73	28	NENW	UNA	MON	FM-20(L)	POWER RESOURCES INC.
P180361W	36	73	28	NENW	UNA	IND	NE/NW 28-36-73: (40 WELLS)	POWER RESOURCES INC.
P180362W	36	73	28	NWNW	UNA	IND	NW/NW 28-36-73; (36 WELLS)	POWER RESOURCES INC.
P180363W	36	73	28	NWNE	UNA	MON	FM-19(U)	POWER RESOURCES INC.
P181041W	36	73	28	SWNW	UNA	MON	FM-23(L)	POWER RESOURCES INC.
P181041W	36	73	28	NENW	UNA	MON	FM-21(L)	POWER RESOURCES INC.
P181041W	36	73	28	NWNW	UNA	MON	FM-24(L)	POWER RESOURCES INC.
P181041W	36	73	28	SESE	UNA	MIS	21-1	POWER RESOURCES INC.
P181041W	36	73	28	NWNW	UNA	MON	FMU-11	POWER RESOURCES INC.
P182204W	36	73	28	NWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P182204W	36	73	28	SWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P182204W	36	73	28	NESE	UNA	MIS	21-1	POWER RESOURCES INC.
P182204W	36	73	28	NWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P182205W	36	73	28	NWNW	UNA	MON	FMO-11	POWER RESOURCES INC.
P182205W	36	73	28	SWNW	UNA	MIS	21-1	POWER RESOURCES INC.
P182205W	36	73	28	SENW	UNA	MIS	21-1	POWER RESOURCES INC.
P182205W	36	73	28	SWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P182206W	36	73	28	SENE	UNA	MIS	21-1	POWER RESOURCES INC.
P182206W	36	73	28	NENW	UNA	MIS	21-1	POWER RESOURCES INC.
P182206W	36	73	28	SESW	UNA	MIS	21-1	POWER RESOURCES INC.
P182206W	36	73	28	NENE	UNA	MIS	21-1	POWER RESOURCES INC.
P182207W	36	73	28	NWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P182207W	36	73	28	NESW	UNA	MIS	21-1	POWER RESOURCES INC.
P182207W	36	73	28	SWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P182207W	36	73	28	NWNW	UNA	MIS	21-1	POWER RESOURCES INC.
P182208W	36	73	28	NWNW	UNA	MON	W H 40 1	POWER RESOURCES INC.
P182208W	36	73	28	NENW	UNA	MON	FT-7(U)	POWER RESOURCES INC.
P182209W	36	73	28	NWNW	UNA	MON	FMP-11	POWER RESOURCES INC.
P182209W	36	73	28	NENW	UNA	MON	FM-22(L)	POWER RESOURCES INC.
P182209W	36	73	28	NWNW	UNA	MON	FT-5(M)	POWER RESOURCES INC.
P182210W	36	73	29	NENE	UNA	MON	FM-25(L)	POWER RESOURCES INC.
P182210W	36	73	29	NENE	UNA	MON	FT-4(U)	POWER RESOURCES INC.
P182212W	36	73	29	NENW	UNA	MON	FM-33(M)	POWER RESOURCES INC.
P182213W	36	73	29	SENW	UNA	MON	FM-30(M)	POWER RESOURCES INC.
P182213W	36	73	29	SWNE	UNA	IND	SW/NE 29-36-73; (8 WELLS)	POWER RESOURCES INC.
P182213W	36	73	29	SWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P182214W	36	73	29	NWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P182214W	36	73	29	SESE	UNA	MIS	21-1	POWER RESOURCES INC.
P182214W	36	73	29	SESW	UNA	MIS	21-1	POWER RESOURCES INC.
P182215W	36	73	29	SWNW	UNA	MIS	21-1	POWER RESOURCES INC.
P182215W	36	73	29	NWSE	UNA	MIS	21-1	POWER RESOURCES INC.
P182215W	36	73	29	NESW	UNA	MIS	21-1	POWER RESOURCES INC.
P182216W	36	73	29	SENE	UNA	MIS	21-1	POWER RESOURCES INC.
P182216W	36	73	29	SWSW	UNA	MIS	21-1	POWER RESOURCES INC.
P182216W	36	73	29	NWNW	UNA	MIS	21-1	POWER RESOURCES INC.
P183359W	36	73	29	NENE	UNA	MIS	21-1	POWER RESOURCES INC.
P183360W	36	73	29	SENW	UNA	MIS	21-1	POWER RESOURCES INC.
P183361W	36	73	29	SWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P183362W	36	73	29	NESE	UNA	MIS	21-1	POWER RESOURCES INC.
P183440W	36	73	29	NENW	UNA	MIS	21-1	POWER RESOURCES INC.
P183440W	36	73	29	NWNE	UNA	MIS	21-1	POWER RESOURCES INC.
P183440W	36	73	29	SENW	UNA	IND	SE/NW 29-36-73; (9 WELLS)	POWER RESOURCES INC.
P183440W	36	73	29	SENE	UNA	MON	FM-26(L)	POWER RESOURCES INC.
P183440W	36	73	29	NWNE	UNA	MON	FMO-1	POWER RESOURCES INC.
P183441W	36	73	29	NWNE	UNA	MON	FMU-1	POWER RESOURCES INC.
P183441W	36	73	29	NWNE	UNA	MON	FMP-1	POWER RESOURCES INC.
P183441W	36	73	29	NENW	UNA	MON	FM-32(M)	POWER RESOURCES INC.
P183441W	36	73	29	NENW	UNA	IND	NE/NW 29-36-73; (14 WELLS)	POWER RESOURCES INC.
P183442W	36	73	29	SENW	UNA	MON	FM-31(M)	POWER RESOURCES INC.
P183442W	36	73	29	NENW	UNA	RES,IND	HIGHLAND #29	POWER RESOURCES INC.
P183442W	36	73	29	NWNE	UNA	MON	FM-28(M)	POWER RESOURCES INC.
P183442W	36	73	29	SWNE	UNA	MON	FM-29(M)	POWER RESOURCES INC.
P183442W	36	73	29	NWNE	UNA	IND	NW/NE 29-36-73; (35 WELLS)	POWER RESOURCES INC.
P183443W	36	73	29	NWNE	UNA	IND	NW/NE 29-36-73; (35 WELLS)	POWER RESOURCES INC.
P183443W	36	73	29	NWNE	UNA	MON	FT-1(M)	POWER RESOURCES INC.
P183443W	36	73	29	NENE	UNA	MON	FM-27(L)	POWER RESOURCES INC.
P183443W	36	73	29	NENE	UNA	MON	FT-2(L)	POWER RESOURCES INC.
P184296W	36	73	29	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P184296W	36	73	29	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P184297W	36	73	29	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P184297W	36	73	29	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P1878D	36	73	29	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P1879D	36	73	29	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P19267D	36	73	29	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P19267D	36	73	29	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P19267D	36	73	29	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P19267D	36	73	29	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P1966S	36	73	29	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	29	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	29	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	29	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	29	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	29	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20002W	36	73	30	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20003W	36	73	30	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20003W	36	73	30	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20003W	36	73	30	NWSW	GST	MON	OM 30 376	POWER RESOURCES INC
P20003W	36	73	30	NWSW	GSI	IND,MISC	ENL NW/SW 30-36-73 (29 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20003W	36	73	30	NWSW	GSI	IND,MISC	ENL NW/SW 30-36-73 (29 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20003W	36	73	30	SWNW	GSI	IND,MIS	SW 1/4 NW 1/4 30-36-73 (45 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20003W	36	73	30	SWNW	GSI	IND,MIS	SW 1/4 NW 1/4 30-36-73 (45 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20003W	36	73	30	SWSW	GSI	MON	SW/SW 30-36-73 (1 WELL)-MINE UNIT K MONITOR WELL EXT.	POWER RESOURCES, INC
P20003W	36	73	30	NWNW	GSI	IND,MIS	NW 1/4 NW 1/4 30-36-73 (44 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20003W	36	73	30	NWNW	GSI	IND,MIS	NW 1/4 NW 1/4 30-36-73 (44 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20003W	36	73	30	NWSW	GSI	MON	NW/SW 30-36-73 (7WELLS)-MINE UNIT K MONITOR WELLS	POWER RESOURCES, INC
P20003W	36	73	30	NWSW	GSI	IND,MISC	NW/SW 30-36-73 (7 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20003W	36	73	30	NWSW	GSI	IND,MISC	NW/SW 30-36-73 (7 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20003W	36	73	30	NWNW	GSI	MON	NW/NW30-36-73 (4 WELLS)-MINE UNIT K MONITOR WELLS	POWER RESOURCES, INC
P20003W	36	73	30	SWSW	GSI	MON	SW/SW 30-36-73 (1 WELLS)-MINE UNIT K MONITOR WELLS	POWER RESOURCES, INC
P20003W	36	73	30	SWNW	GSI	IND,MISC	ENL SW1/4 NW1/4 30-36-73 (21) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20003W	36	73	30	SWNW	GSI	IND,MISC	ENL SW1/4 NW1/4 30-36-73 (21) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20003W	36	73	30	SWNW	GSI	MON	SW/NW 30-36-73 (6 WELLS)-MINE UNIT K MONITOR WELLS	POWER RESOURCES, INC
P20004W	36	73	31	SWNW	GST	MON	M-10	POWER RESOURCES INC
P20004W	36	73	31	NWNW	GST	MON	M-8	POWER RESOURCES INC
P20004W	36	73	31	SWNW	GST	MON	M-11	POWER RESOURCES INC
P20004W	36	73	31	SWNW	GST	MON	M-9	POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P20004W	36	73	31	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20004W	36	73	31	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20004W	36	73	31	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20004W	36	73	31	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20004W	36	74	1	NWNW	UNA	MON	NWNW 1-36-74 (1 WELL)-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC
P20004W	36	74	2	NWSE	GSI	IND,MIS	SW/SW 10-35-74 (2 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20004W	36	74	2	NWSE	GSI	IND,MIS	SW/SW 10-35-74 (2 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20004W	36	74	2	NWSE	GSI	IND,MIS	NW/SE 10-35-74 (94 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20004W	36	74	2	NWSE	GSI	IND,MIS	NE/NW 15-35-74 (24 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20004W	36	74	2	NWSE	GSI	IND,MIS	NE/NW 15-35-74 (24 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20004W	36	74	2	NWSE	GSI	IND,MIS	SE/SE 10-35-74 (63 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20004W	36	74	2	NWSE	GSI	IND,MIS	NE/SW 10-35-74 (104 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20004W	36	74	2	NWSE	GSI	IND,MIS	SE/SW 10-35-74 (92 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20005W	36	74	2	NWSE	GSI	IND,MIS	SE/SW 10-35-74 (92 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20005W	36	74	2	NENE	UNA	MON	NENE 2-36-74 (2 WELL) - MINE UNIT 27 MONITOR WELLS	CAMECO RESOURCES
P20005W	36	74	2	NWSE	GSI	IND,MIS	NW/SW 10-35-74 (50 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20005W	36	74	2	NWSE	GSI	IND,MIS	NE/SE 10-35-74 (114 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20005W	36	74	2	NWSE	GSI	IND,MIS	SW/NW 10-35-74 (31 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20005W	36	74	2	NWSE	GSI	IND,MIS	NW/NW 15-35-74 (2 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20005W	36	74	2	NWSE	GSI	IND,MIS	SE/NE 10-35-74 (65 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20005W	36	74	2	NWSE	GSI	IND,MIS	SW/NW 11-35-74 (7 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20005W	36	74	2	NWSE	GSI	IND,MIS	SW/SE 10-35-74 (110 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20005W	36	74	2	NWSE	GSI	IND,MIS	SW/SE 10-35-74 (110 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20005W	36	74	2	NWSE	GSI	IND,MIS	NW/SW 11-35-74 (3 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20005W	36	74	6	SENW	GST	STO	JUDSON SPRING	HORNBUCKLE RANCH INC.
P20005W	36	74	6	SENW	GST	STO	JUDSON SPRING	HORNBUCKLE RANCH INC.
P20005W	36	74	9	NWSW	GST	STO	UPPER BROWN SPRING #1	HORNBUCKLE RANCH, INC.
P20005W	36	74	9	NWSW	GST	STO	UPPER BROWN SPRING #1	HORNBUCKLE RANCH, INC.
P20005W	36	74	12	NWNW	GST	STO	SILVER SPOON SPRING S12-1	DUCK CREEK RANCHES INC.
P20005W	36	74	12	NWNW	GST	STO	SILVER SPOON SPRING S12-1	DUCK CREEK RANCHES INC.
P20006W	36	74	13	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	13	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	13	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	13	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	13	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	13	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	13	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	13	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	14	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	14	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	14	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P20006W	36	74	14	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	14	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	14	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	14	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	14	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20006W	36	74	20	NESE	GSI	IND,MIS	NE 1/4 NE 1/4 25-36-74 (40 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20006W	36	74	20	SESE	GSI	IND,MIS	NE 1/4 NE 1/4 25-36-74 (40 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20007W	36	74	20	SENE	GSI	IND,MIS	NE 1/4 NE 1/4 25-36-74 (40 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20007W	36	74	20	SESE	GSI	IND,MIS	SE 1/4 NE 1/4 25-36-74 (114 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20007W	36	74	20	NESE	GSI	IND,MIS	SE 1/4 NE 1/4 25-36-74 (114 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20007W	36	74	20	SENE	GSI	IND,MIS	SE 1/4 NE 1/4 25-36-74 (114 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20007W	36	74	21	NWSW	GSI	IND,MIS	SE 1/4 NE 1/4 25-36-74 (114 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20007W	36	74	21	SWNW	GSI	IND,MIS	SE 1/4 NE 1/4 25-36-74 (114 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20007W	36	74	21	NWSW	GSI	IND,MIS	NE 1/4 NE 1/4 25-36-74 (40 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20007W	36	74	21	SWNW	GSI	IND,MIS	NE 1/4 NE 1/4 25-36-74 (40 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20007W	36	74	22	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20007W	36	74	22	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20007W	36	74	22	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20007W	36	74	22	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20007W	36	74	22	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20007W	36	74	22	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20007W	36	74	22	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20007W	36	74	22	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20007W	36	74	22	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20007W	36	74	22	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	22	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	22	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	22	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	22	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	22	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	22	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	23	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	23	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	23	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	23	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	23	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	23	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	23	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	23	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	23	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P20009W	36	74	23	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	23	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20009W	36	74	23	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	23	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	23	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	23	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	23	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20010W	36	74	24	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20011W	36	74	24	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20011W	36	74	24	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20011W	36	74	24	SESE	GSI	MON	SE/SE24-36-74 (1 WELL)-MINE UNIT K MONITOR WELLS	POWER RESOURCES, INC
P20011W	36	74	24	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20011W	36	74	25	NENE	GSI	MON	NE/NE25-36-74 (8 WELLS)-MINE UNIT K MONITOR WELLS	POWER RESOURCES, INC
P20011W	36	74	25	SESW	GST	MON	OWS 3	POWER RESOURCES INC
P20011W	36	74	25	SESW	GST	IND	WELLFIELD 2 SE/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P20011W	36	74	25	SESE	GSI	IND,MISC	SESE 25-36-74 (71 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20011W	36	74	25	SESE	GSI	IND,MISC	SESE 25-36-74 (71 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P20011W	36	74	25	SWSW	GST	IND	WELLFIELD 2 SE/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P20011W	36	74	25	NESE	GST	IND	0 25 583	POWER RESOURCES INC
P20011W	36	74	25	NESE	GST	IND	0 25 583	POWER RESOURCES INC
P20011W	36	74	25	SESW	GST	MON	M-213	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P20011W	36	74	25	SESE	GST	MON	OWS 2	POWER RESOURCES INC
P20011W	36	74	25	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20011W	36	74	25	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20011W	36	74	25	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20011W	36	74	25	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P20012W	36	74	25	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P20012W	36	74	25	NWSW	GST	MON	MS-209	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P20012W	36	74	25	SWSE	GST	MON	OWS 1	POWER RESOURCES INC
P20012W	36	74	25	SWSW	GSI	IND,MIS	SE/SW 10-35-74 (92 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20012W	36	74	25	SWSW	GSI	IND,MIS	NE/SW 10-35-74 (104 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20012W	36	74	25	NWSE	GSI	IND,MIS	NE/SW 10-35-74 (104 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20012W	36	74	25	NWSW	GST	MON	MD-207	RIO ALGOM MINING CORP.** USDI, BUREAU OF LAND MANAGEMENT
P20013W	36	74	25	NESW	GST	MON	M-217	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P20013W	36	74	25	SWSW	GSI	IND,MIS	SE/SE 10-35-74 (63 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20013W	36	74	25	NWSE	GSI	IND,MIS	SE/SE 10-35-74 (63 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20013W	36	74	25	SWSW	GST	MON	OWD 4	POWER RESOURCES INC
P20013W	36	74	25	SWSE	GSI	MON	SW/SE 25-36-74 (2 WELLS)-MINE UNIT K MONITOR WELLS	POWER RESOURCES, INC
P20013W	36	74	25	SWSW	GSI	IND,MIS	SW/SW 10-35-74 (2 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20013W	36	74	25	SESW	GST	MON	MS-213	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P20013W	36	74	25	SWSW	GSI	IND,MIS	NE/NW 15-35-74 (24 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20013W	36	74	25	SENE	GST	IND	O 25 591	POWER RESOURCES INC
P20013W	36	74	25	SENE	GST	IND	O 25 591	POWER RESOURCES INC
P20013W	36	74	25	SWSW	GST	MON	OWS 4	POWER RESOURCES INC
P20013W	36	74	25	SWSW	GST	MON	OM 25 589	POWER RESOURCES INC
P20013W	36	74	25	NWSW	GST	MON	M-218	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P20013W	36	74	25	SENE	GSI	MON	SE/NE 25-36-74 (12 WELLS)-MINE UNIT K MONITOR WELLS	POWER RESOURCES, INC
P20013W	36	74	25	NWSW	GST	IND	WELLFIELD 2 NW/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P20013W	36	74	25	SWSW	GST	IND	WELLFIELD 2 NW/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P20013W	36	74	25	SWSW	GSI	IND,MIS	NW/SE 10-35-74 (94 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P20013W	36	74	25	NWSE	GSI	IND,MIS	NW/SE 10-35-74 (94 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P22357P	36	74	25	NESE	GSI	MON	NE/SE 25-36-74 (12WELLS)-MINE UNIT K MONITOR WELLS	POWER RESOURCES, INC
P22360P	36	74	25	SWSW	GST	MON	MS-212	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P22372P	36	74	25	SWSE	GSI	MON	SW/SE 25-36-74 (1 WELL)-MINE UNIT K MONITOR WELL EXT.	POWER RESOURCES, INC
P22374P	36	74	25	SWSW	GSI	IND,MIS	NW/SW 11-35-74 (3 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P22378P	36	74	25	SWSW	GSI	IND,MIS	SW/SE 10-35-74 (110 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P22382P	36	74	25	NENE	GST	IND	0 25 592	POWER RESOURCES INC
P23404D	36	74	25	NENE	GST	IND	0 25 592	POWER RESOURCES INC
P23404D	36	74	25	NWSE	GSI	IND,MIS	NW/SW 11-35-74 (3 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P23404D	36	74	25	SESE	GST	MON	NM 25 588	POWER RESOURCES INC
P23404D	36	74	25	SESE	GST	MON	PM 25 587	POWER RESOURCES INC
P23404D	36	74	25	NESE	GST	IND	0 25 581	POWER RESOURCES INC
P23404D	36	74	25	NESE	GST	IND	0 25 581	POWER RESOURCES INC
P23404D	36	74	25	NESE	GST	IND	0 25 582	POWER RESOURCES INC
P23404D	36	74	25	NESE	GST	IND	0 25 582	POWER RESOURCES INC
P23404D	36	74	25	SESW	GST	MON	M-214	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P23404D	36	74	25	NWSW	GST	MON	M-220	RIO ALGOM MINING CORP.** USDI, BUREAU OF LAND MANAGEMENT
P23404D	36	74	25	SWSW	GSI	IND,MIS	NW/NW 15-35-74 (2 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P23404D	36	74	25	NESW	GST	MON	M-216	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P23404D	36	74	25	NESW	GST	MON	M-215	RIO ALGOM MINING CORP.** USDI, BUREAU OF LAND MANAGEMENT
P2414W	36	74	25	NWSW	GST	MON	MS-207	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2414W	36	74	25	SWSW	GST	IND	WELLFIELD 2 NE/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2414W	36	74	25	SWSW	GSI	IND,MIS	SE/NE 10-35-74 (65 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P2414W	36	74	25	NWSE	GSI	IND,MIS	SE/NE 10-35-74 (65 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P2491W	36	74	25	SWSW	GST	MON	MS-211	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2491W	36	74	25	NENE	GSI	IND,MIS	NE 1/4 NE 1/4 25-36-74 (40 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P2491W	36	74	25	SESW	GST	MON	M-212	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2491W	36	74	25	NENE	GSI	IND,MIS	NE 1/4 NE 1/4 25-36-74 (40 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P2491W	36	74	25	NENE	GSI	IND,MIS	NE 1/4 NE 1/4 25-36-74 (40 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P2491W	36	74	25	SWSW	GST	IND	WELLFIELD 2 SW/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2491W	36	74	25	SWSW	GSI	IND,MIS	SW/NW 11-35-74 (7 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P2491W	36	74	25	NWSE	GSI	IND,MIS	SW/NW 11-35-74 (7 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P2491W	36	74	25	SWSW	GST	MON	MS-206	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2491W	36	74	25	NESE	GST	MON	QM 25 585	POWER RESOURCES INC
P2491W	36	74	25	SWSW	GSI	IND,MIS	NE/SE 10-35-74 (114 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P2491W	36	74	25	NWSE	GSI	IND,MIS	NE/SE 10-35-74 (114 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P2491W	36	74	25	SESW	GST	MON	OWD 3	POWER RESOURCES INC
P2491W	36	74	25	SESE	GSI	MON	SE/SE 25-36-74 (3 WELLS)-MINE UNIT K MONITOR WELL EXT.	POWER RESOURCES, INC
P2493W	36	74	25	SWSW	GST	MON	MD-210	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2493W	36	74	25	NWSE	GSI	IND,MIS	SW/NW 10-35-74 (31 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P2493W	36	74	25	SWSW	GSI	IND,MIS	SW/NW 10-35-74 (31 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P2493W	36	74	25	NESE	GSI	IND,MISC	ENL NE/SE 25-36-74 (98 WELLS) - MINE UNIT K (I &P WELLS)	POWER RESOURCES, INC
P2493W	36	74	25	NESE	GSI	IND,MISC	ENL NE/SE 25-36-74 (98 WELLS) - MINE UNIT K (I &P WELLS)	POWER RESOURCES, INC
P2493W	36	74	25	NWSE	GSI	MON	NW/SE 25-36-74 (1 WELL)-MINE UNIT K MONITOR WELL EXT.	POWER RESOURCES, INC
P2493W	36	74	25	NESE	GST	MON	MM 25 586	POWER RESOURCES INC
P2493W	36	74	25	SWSW	GST	MON	MD-209	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2493W	36	74	25	SWSW	GST	MON	MS-210	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2493W	36	74	25	SESW	GST	MON	MD-213	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2493W	36	74	25	SWSW	GSI	IND,MIS	NW/SW 10-35-74 (50 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P2493W	36	74	25	NWSE	GSI	IND,MIS	NW/SW 10-35-74 (50 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P2493W	36	74	25	SESE	GST	MON	OWD 2	POWER RESOURCES INC
P2493W	36	74	25	SESE	GST	IND	0 25 584	POWER RESOURCES INC
P2493W	36	74	25	SESE	GST	IND	0 25 584	POWER RESOURCES INC
P25313D	36	74	25	NWSW	GST	MON	M-219	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2574W	36	74	25	SWSW	GST	MON	MS-208	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2574W	36	74	25	SWSW	GST	MON	MD-211	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2600W	36	74	25	SWSW	GST	MON	TW 2	POWER RESOURCES INC
P2600W	36	74	25	SWSW	GST	MON	MD-212	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2600W	36	74	25	SWSW	GST	IND	WELLFIELD 2 SE/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2600W	36	74	25	SWSW	GST	IND	WELLFIELD 2 SW/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2600W	36	74	25	SWSW	GST	IND	WELLFIELD 2 SW/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2600W	36	74	25	SWSW	GST	MON	MD-206	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2600W	36	74	25	SWSW	GST	MON	MD-208	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2600W	36	74	25	NESE	GSI	IND,MISC	NE/SE 25-36-74 (27 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P2600W	36	74	25	SESE	GST	MON	TW 1	POWER RESOURCES INC
P2600W	36	74	25	SENE	GSI	IND,MIS	SE 1/4 NE 1/4 25-36-74 (114 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P2600W	36	74	25	NESE	GST	MON	OM 25 590	POWER RESOURCES INC
P2600W	36	74	25	NESW	GST	IND	WELLFIELD 2 NE/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2600W	36	74	25	SWSW	GST	IND	WELLFIELD 2 NE/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P2600W	36	74	25	SESE	GSI	MON	SE/SE 25-36-74 (6 WELLS)-MINE UNIT K MONITOR WELLS	POWER RESOURCES, INC
P2600W	36	74	25	SENE	GSI	IND,MIS	SE 1/4 NE 1/4 25-36-74 (114 WELLS) - MINE UNIT K (I&P WELLS)	POWER RESOURCES, INC
P2600W	36	74	25	SWSE	GST	MON	OWD 1	POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P2600W		36	74	26	NWSW	GST	MON	M-317	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P2600W		36	74	26	NESW	GST	MON	OM10	POWER RESOURCES INC
P28245W		36	74	26	SWNW	GST	IND	WELLFIELD 3 NW/SW/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28245W		36	74	26	SWSE	GST	IND	WELLFIELD 3 SW/SE/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28245W		36	74	26	SWSE	GST	IND	WELLFIELD 3 SW/SE/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28245W		36	74	26	NESW	GST	MON	OM11	POWER RESOURCES INC
P28245W		36	74	26	NWSE	GST	MON	M-224	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28245W		36	74	26	SWNW	UNA	MON	M-301	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28245W		36	74	26	SWSE	GST	MON	M-313	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28245W		36	74	26	NESW	GST	MON	MD-305	POWER RESOURCES INC
P28245W		36	74	26	NWSW	GST	MON	MD-302	POWER RESOURCES INC
P28245W		36	74	26	SWSE	GST	MON	M-201	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28245W		36	74	26	NWSE	GST	MON	OM 76 835	WY STATE DEPARTMENT OF TRANSPORTATION
P28245W		36	74	26	NESE	GST	MON	MD-205	RIO ALGOM MINING CORP.** USDI, BUREAU OF LAND MANAGEMENT
P28245W		36	74	26	SESE	GST	IND	WELLFIELD 2 SE/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28245W		36	74	26	SESE	GST	MON	MD-202	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28245W		36	74	26	SESE	GST	MON	M-205	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28245W		36	74	26	NESW	GST	MON	OM9	POWER RESOURCES INC
P28245W		36	74	26	NWSE	GST	MON	MD-311	POWER RESOURCES INC
P28245W		36	74	26	NESW	GST	MON	MD-303	POWER RESOURCES INC
P28245W		36	74	26	NESE	GST	MON	MS-204	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28245W		36	74	26	SESE	GST	MON	MS-203	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28245W		36	74	26	SWNW	GST	MON	M-302	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28245W		36	74	26	NESW	GST	MON	MD-304	POWER RESOURCES INC
P28245W		36	74	26	NESW	GST	MON	MS-306	POWER RESOURCES INC
P28245W		36	74	26	NESW	GST	MON	OM8	POWER RESOURCES INC
P28245W		36	74	26	NWSE	GST	MON	O-301	POWER RESOURCES INC
P28245W		36	74	26	NWSE	GST	IND	WELLFIELD 3 NW/SE/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28245W		36	74	26	NESW	UNA	MON	MD-308	RIO ALGOM MINING CORP.
P28245W		36	74	26	NWSE	GST	IND	WELLFIELD 3 NW/SE/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28245W		36	74	26	SWSE	GST	MON	M-311	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28245W		36	74	26	SWNW	GST	MON	M-320	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28245W		36	74	26	NESE	GST	MON	MD-204	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28245W		36	74	26	SENW	UNA	MON	M-303	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28245W		36	74	26	NWSW	GST	MON	M-318	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W		36	74	26	SWSE	GST	MON	MD-201	RIO ALGOM MINING CORP.** USDI, BUREAU OF LAND MANAGEMENT
P28246W		36	74	26	NESW	GST	IND	WELLFIELD 3 NE/SW/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W		36	74	26	NESW	GST	IND	WELLFIELD 3 NE/SW/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W		36	74	26	SWSE	GST	MON	M-312	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W		36	74	26	SENW	GST	MON	M-305	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W		36	74	26	SESW	GST	MON	M-315	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W		36	74	26	SWNE	GST	MON	M-306	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W		36	74	26	NESE	GST	MON	M-223	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28246W		36	74	26	NWSE	GST	MON	MS-311	POWER RESOURCES INC
P28246W		36	74	26	SESE	GST	MON	MD-203	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28246W		36	74	26	SWSE	GST	MON	MP-201	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28246W		36	74	26	NWSW	GST	MON	MS-301	POWER RESOURCES INC
P28246W		36	74	26	NWSE	GST	MON	M-310	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W		36	74	26	NWSE	UNA	MON	M-308	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W		36	74	26	SESE	GST	MON	OWD 5	POWER RESOURCES INC
P28246W		36	74	26	NESW	GST	MON	MS-303	POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P28246W	36	74	26	NESW	GST	MON	MD-306	POWER RESOURCES INC
P28246W	36	74	26	NESW	GST	MON	MS-308	POWER RESOURCES INC
P28246W	36	74	26	SWSE	GST	IND	WELLFIELD 2 SW/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28246W	36	74	26	SESE	GST	MON	OWS 5	POWER RESOURCES INC
P28246W	36	74	26	SESE	GST	MON	MS-202	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28246W	36	74	26	SESE	GST	MON	OM 26 837	POWER RESOURCES INC
P28246W	36	74	26	NESW	GST	MON	MS-305	POWER RESOURCES INC
P28246W	36	74	26	SWNW	GST	IND	WELLFIELD 3 SW/NW/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W	36	74	26	SWNW	GST	IND	WELLFIELD 3 SW/NW/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W	36	74	26	NWSW	GST	MON	M-319	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28246W	36	74	26	NWSW	GST	MON	MS-302	POWER RESOURCES INC
P28246W	36	74	26	NESE	GST	IND	WELLFIELD 2 NE/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28246W	36	74	26	NESW	GST	MON	OM4	POWER RESOURCES INC
P28246W	36	74	26	SENW	GST	IND	WELLFIELD 3 SE/NW/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28276W	36	74	26	SENW	GST	IND	WELLFIELD 3 SE/NW/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P28277W	36	74	26	NESW	GST	MON	MS-309	POWER RESOURCES INC
P28410W	36	74	26	NESW	UNA	MON	OM 3	RIO ALGOM MINING CORP.
P28410W	36	74	26	SESW	GST	MON	M-314B	POWER RESOURCES INC
P28416W	36	74	26	SWSE	GST	MON	MS-201	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P28416W	36	74	26	SESE	GST	MON	M-206	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P29606W	36	74	26	NESW	GST	MON	OM6	POWER RESOURCES INC
P29606W	36	74	26	NESW	GST	MON	OM5	POWER RESOURCES INC
P29606W	36	74	26	NWSW	GST	MON	OM 26 834	POWER RESOURCES INC
P29606W	36	74	26	NWSE	GST	MON	MS-313	POWER RESOURCES INC
P29607W	36	74	26	NESW	GST	MON	MS-304	POWER RESOURCES INC
P29607W	36	74	26	NESE	GST	MON	M-221	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P29607W	36	74	26	SWSE	GST	MON	M-202	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P29610W	36	74	26	SESW	GST	MON	M-316	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P29610W	36	74	26	NESE	GST	MON	M-222	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P29610W	36	74	26	NESE	GST	MON	MS-205	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P29610W	36	74	26	NWSE	GST	MON	MD-310	POWER RESOURCES INC
P32561W	36	74	26	NWSE	GST	MON	OM2	POWER RESOURCES INC
P32561W	36	74	26	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P32562W	36	74	26	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P34330W	36	74	26	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P35182W	36	74	26	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P35182W	36	74	26	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P35182W	36	74	26	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P35182W	36	74	26	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P35182W	36	74	26	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P35182W	36	74	26	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P35182W	36	74	26	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P35182W	36	74	26	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P35182W	36	74	26	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P35182W	36	74	26	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P35182W	36	74	26	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P36169P	36	74	26	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P39032W	36	74	26	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P41450W	36	74	26	NWSW	GST	MON	MD-301	POWER RESOURCES INC
P41450W	36	74	26	SENW	GST	MON	OWO 8	POWER RESOURCES INC
P41450W	36	74	26	NWSE	GST	MON	M-309	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P41450W	36	74	26	SWNE	GST	MON	M-307	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P41450W	36	74	26	SWNE	GST	IND	WELLFIELD 3 SW/NE/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P41450W	36	74	26	SESE	GST	MON	M-204	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P41450W	36	74	26	NESW	GST	MON	MS-307	POWER RESOURCES INC
P41450W	36	74	26	SWNE	GST	IND	WELLFIELD 3 SW/NE/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P41450W	36	74	26	SENW	GST	MON	M-304	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P4656R	36	74	26	NESW	GST	MON	OM7	POWER RESOURCES INC
P4656R	36	74	26	NWSE	GST	MON	MS-310	POWER RESOURCES INC
P4656R	36	74	26	SWSE	GST	MON	OM 26 836	POWER RESOURCES INC
P47383W	36	74	26	NESW	GST	MON	MD-309	POWER RESOURCES INC
P47384W	36	74	26	NWSE	GST	MON	OM1	POWER RESOURCES INC
P47385W	36	74	26	NWSE	UNA	IND	PU OP - WELLFIELD #2	RIO ALGOM MINING CORP.**U.S BUREAU OF LAND MANAGEMENT
P47386W	36	74	27	NWSE	GST	IND	WELLFIELD 2 SE/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P47387W	36	74	27	NENW	GST	IND	WELLFIELD 4 NW/SE/34	POWER RESOURCES INC
P47389W	36	74	27	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47390W	36	74	27	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47391W	36	74	27	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47392W	36	74	27	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47393W	36	74	27	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47394W	36	74	27	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47395W	36	74	27	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47396W	36	74	27	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47397W	36	74	27	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47398W	36	74	27	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47399W	36	74	27	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47400W	36	74	27	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P47401W	36	74	27	NENW	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P47402W	36	74	27	NENW	GST	IND	WELLFIELD 4 NE/SW/34	POWER RESOURCES INC
P48461W	36	74	27	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P48461W	36	74	27	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P52153W	36	74	27	NENW	GST	IND	WELLFIELD 4 SE/NW/34	POWER RESOURCES INC
P52154W	36	74	27	NENW	GST	IND	WELLFIELD 4 SW/NE/34	POWER RESOURCES INC
P52155W	36	74	27	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P54909W	36	74	27	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P54910W	36	74	27	NWSE	GST	IND	WELLFIELD 2 NW/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P54911W	36	74	27	NENW	GST	IND	WELLFIELD 4 SE/NE/34	POWER RESOURCES INC
P54912W	36	74	27	NENW	GST	IND	WELLFIELD 4 SE/SE/33	POWER RESOURCES INC
P54913W	36	74	27	NWSE	GST	IND	WELLFIELD 4 SW/SE/35	POWER RESOURCES INC
P54914W	36	74	27	NWSE	GST	IND	WELLFIELD 4 NE/NE/2	POWER RESOURCES INC
P54915W	36	74	27	NWSE	GST	IND	WELLFIELD 2 SW/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P54916W	36	74	27	NENW	GST	IND	WELLFIELD 4 SW/NW/35	POWER RESOURCES INC
P54917W	36	74	27	NWSE	UNA	IND	WELLFIELD 4 NW/NE/2	POWER RESOURCES INC
P54918W	36	74	27	NWSE	GST	IND	WELLFIELD 2 NE/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P54919W	36	74	27	NWSE	GST	IND	WELLFIELD 4 NE/SW/35	POWER RESOURCES INC
P54921W	36	74	27	NWSE	GST	IND	WELLFIELD 2 SW/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P55578W	36	74	27	NENW	GST	IND	WELLFIELD 4 NE/SE/34	POWER RESOURCES INC
P56682W	36	74	27	NWSE	GST	IND	WELLFIELD 4 SW/NE/2	POWER RESOURCES INC
P6022W	36	74	27	NWSE	GST	IND	WELLFIELD 4 SE/SW/35	POWER RESOURCES INC
P6022W	36	74	27	NWSE	GST	IND	WELLFIELD 2 SE/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P61829W	36	74	27	NWSE	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P61830W	36	74	27	NWSE	GST	IND	WELLFIELD 4 NE/NW/2	POWER RESOURCES INC
P61832W	36	74	27	NWSE	GST	IND	WELLFIELD 2 NE/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P61833W	36	74	27	NENW	GST	IND	WELLFIELD 4 NW/SW/34	POWER RESOURCES INC
P61834W	36	74	31	NWNW	UNA	CBM	JOHN ADAMS FEDERAL #31-2	AMMONITE ENERGY TEXAS, INC.
P61835W	36	74	31	NWNW	UNA	CBM	JOHN ADAMS FEDERAL #31-2	AMMONITE ENERGY TEXAS, INC.

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P61836W	36	74	31	SWNW	UNA	CBM	JOHN ADAMS FEDERAL #31-1	AMMONITE ENERGY TEXAS, INC.
P61837W	36	74	31	SWNW	UNA	CBM	JOHN ADAMS FEDERAL #31-1	AMMONITE ENERGY TEXAS, INC.
P61838W	36	74	31	SWSW	UNA	CBM	PETROQUEST SWEET MARY FEDERAL #31-1	AMMONITE ENERGY TEXAS, INC.
P61839W	36	74	31	NENW	UNA	CBM	JOHN ADAMS FEDERAL #31-3	AMMONITE ENERGY TEXAS, INC.
P68500W	36	74	31	NENW	UNA	CBM	JOHN ADAMS FEDERAL #31-3	AMMONITE ENERGY TEXAS, INC.
P69509W	36	74	31	SWSW	UNA	CBM	PETROQUEST SWEET MARY FEDERAL #31-1	AMMONITE ENERGY TEXAS, INC.
P70183W	36	74	31	NWSW	UNA	CBM	PETROQUEST SWEET MARY FEDERAL #31-2	AMMONITE ENERGY TEXAS, INC.
P70184W	36	74	31	NWSW	UNA	CBM	PETROQUEST SWEET MARY FEDERAL #31-2	AMMONITE ENERGY TEXAS, INC.
P70185W	36	74	31	NESW	UNA	CBM	PETROQUEST SWEET MARY FEDERAL #31-3	AMMONITE ENERGY TEXAS, INC.
P70186W	36	74	31	NESW	UNA	CBM	PETROQUEST SWEET MARY FEDERAL #31-3	AMMONITE ENERGY TEXAS, INC.
P70187W	36	74	31	SENW	UNA	CBM	JOHN ADAMS FEDERAL #31-4	AMMONITE ENERGY TEXAS, INC.
P70188W	36	74	31	SENW	UNA	CBM	JOHN ADAMS FEDERAL #31-4	AMMONITE ENERGY TEXAS, INC.
P70189W	36	74	31	SESW	UNA	CBM	PETROQUEST SWEET MARY FEDERAL #31-4	AMMONITE ENERGY TEXAS, INC.
P70190W	36	74	31	SESW	UNA	CBM	PETROQUEST SWEET MARY FEDERAL #31-4	AMMONITE ENERGY TEXAS, INC.
P70191W	36	74	33	SESE	UNA	MON	MS-411	POWER RESOURCES INC
P70193W	36	74	33	SESE	GST	IND	WELLFIELD 4 SE/SE/33	POWER RESOURCES INC
P70195W	36	74	33	SESE	GST	MON	M-420	POWER RESOURCES INC
P70196W	36	74	33	SESE	GST	IND	WELLFIELD 4 SE/SE/33	POWER RESOURCES INC
P70199W	36	74	33	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70200W	36	74	33	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70201W	36	74	33	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70202W	36	74	33	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70203W	36	74	33	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70204W	36	74	33	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70285W	36	74	33	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70285W	36	74	33	NESE	GST	MON	MP-401	POWER RESOURCES INC
P70285W	36	74	33	SESE	GST	MON	M-419	POWER RESOURCES INC
P70286W	36	74	33	NESE	GST	MON	M-417	POWER RESOURCES INC
P70286W	36	74	33	NESE	GST	MON	M-418A	POWER RESOURCES INC
P70287W	36	74	33	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70287W	36	74	33	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70288W	36	74	33	SESE	UNA	MON	MD-411	POWER RESOURCES INC
P70288W	36	74	33	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70288W	36	74	33	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70289W	36	74	33	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70289W	36	74	33	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70289W	36	74	33	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70290W	36	74	33	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70290W	36	74	33	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70290W	36	74	34	SWNE	GST	MON	MS 405A	POWER RESOURCES INC
P70291W	36	74	34	NWSW	GST	IND	WELLFIELD 4 NW/SW/34	POWER RESOURCES INC
P70291W	36	74	34	NWSW	GST	IND	WELLFIELD 4 NW/SW/34	POWER RESOURCES INC
P70291W	36	74	34	NWSE	GST	MON	MP-411	POWER RESOURCES INC
P70292W	36	74	34	NESW	GST	MON	MS-404	POWER RESOURCES INC
P70292W	36	74	34	NESW	GST	MON	MP-408	POWER RESOURCES INC
P70292W	36	74	34	SWNE	GST	MON	MD-405	POWER RESOURCES INC
P70293W	36	74	34	NESW	GST	IND	WELLFIELD 4 NE/SW/34	POWER RESOURCES INC
P70293W	36	74	34	NESW	GST	IND	WELLFIELD 4 NE/SW/34	POWER RESOURCES INC
P70293W	36	74	34	SENE	GST	MON	MP-416	POWER RESOURCES INC
P70294W	36	74	34	SENE	GST	MON	M-406	POWER RESOURCES INC
P70294W	36	74	34	NWSE	GST	IND	WELLFIELD 4 NW/SE/34	POWER RESOURCES INC
P70294W	36	74	34	NWSE	GST	IND	WELLFIELD 4 NW/SE/34	POWER RESOURCES INC
P70295W	36	74	34	NWSW	GST	MON	M-415	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70295W	36	74	34	SENE	GST	MON	MP-418	POWER RESOURCES INC
P70295W	36	74	34	NWSE	GST	MON	M-430	POWER RESOURCES INC
P70296W	36	74	34	SENE	GST	MON	M-407	POWER RESOURCES INC
P70296W	36	74	34	NESW	GST	MON	MP-406	POWER RESOURCES INC
P70296W	36	74	34	SENW	GST	IND	WELLFIELD 4 SE/NW/34	POWER RESOURCES INC
P70297W	36	74	34	SENW	GST	IND	WELLFIELD 4 SE/NW/34	POWER RESOURCES INC
P70297W	36	74	34	SENE	GST	MON	MP-417	POWER RESOURCES INC
P70297W	36	74	34	NESE	GST	MON	M-432	POWER RESOURCES INC
P70298W	36	74	34	SENE	GST	IND	WELLFIELD 4 SE/NE/34	POWER RESOURCES INC
P70298W	36	74	34	NWSE	GST	MON	M-428	POWER RESOURCES INC
P70298W	36	74	34	SENE	GST	IND	WELLFIELD 4 SE/NE/34	POWER RESOURCES INC
P70299W	36	74	34	NESE	GST	MON	MS-409	POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P70299W	36	74	34	NWSW	GST	MON	MD-402	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70299W	36	74	34	NESW	GST	MON	MP-409	POWER RESOURCES INC
P70300W	36	74	34	SENW	GST	MON	M-411	POWER RESOURCES INC
P70300W	36	74	34	NWSW	GST	MON	M-416	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P70300W	36	74	34	NESE	GST	MON	MP-420	POWER RESOURCES INC
P73878W	36	74	34	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P73878W	36	74	34	NESW	GST	MON	MD-404	POWER RESOURCES INC
P73878W	36	74	34	SENE	GST	MON	MD-408	POWER RESOURCES INC
P73878W	36	74	34	SWNE	GST	MON	MP-412	POWER RESOURCES INC
P73878W	36	74	34	NWSW	GST	MON	M-423	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P7430R	36	74	34	NESW	GST	MON	MP-410	POWER RESOURCES INC
P7430R	36	74	34	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P74925W	36	74	34	SWNE	GST	IND	WELLFIELD 4 SW/NE/34	POWER RESOURCES INC
P74925W	36	74	34	SWNE	GST	IND	WELLFIELD 4 SW/NE/34	POWER RESOURCES INC
P7517R	36	74	34	NWSW	GST	MON	MS-401	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P7517R	36	74	34	NWSW	GST	MON	MP-402	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P7517R	36	74	34	SENE	GST	MON	MD-407	POWER RESOURCES INC
P7517R	36	74	34	SWNE	GST	MON	M-408	POWER RESOURCES INC
P75937W	36	74	34	SENW	GST	MON	M-412	POWER RESOURCES INC
P76121W	36	74	34	SWNE	GST	MON	MP-415	POWER RESOURCES INC
P76121W	36	74	34	SENE	GST	MON	MS-408	POWER RESOURCES INC
P76121W	36	74	34	NWSW	GST	MON	MP-404	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76121W	36	74	34	NESE	GST	MON	M-433	POWER RESOURCES INC
P76121W	36	74	34	SWNE	GST	MON	MP-413	POWER RESOURCES INC
P76121W	36	74	34	NWSW	GST	MON	MP-403	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76121W	36	74	34	SENE	GST	MON	MD-406	POWER RESOURCES INC
P76121W	36	74	34	NESW	GST	MON	M-425	POWER RESOURCES INC
P76121W	36	74	34	NESW	GST	MON	M-424	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76121W	36	74	34	NESW	GST	MON	MS-403	POWER RESOURCES INC
P76121W	36	74	34	NESW	GST	MON	MP-407	POWER RESOURCES INC
P76121W	36	74	34	NESW	GST	MON	M-426	POWER RESOURCES INC
P76121W	36	74	34	NWSW	GST	MON	M-414	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76798W	36	74	34	SWSW	GST	MON	M-421	POWER RESOURCES INC
P76798W	36	74	34	NESE	GST	MON	M-431	POWER RESOURCES INC
P76799W	36	74	34	SWNE	GST	MON	MP-414	POWER RESOURCES INC
P76799W	36	74	34	SWSW	GST	MON	M-422	POWER RESOURCES INC
P76800W	36	74	34	NESE	GST	MON	M-434	POWER RESOURCES INC
P76800W	36	74	34	SENE	GST	MON	M-405	POWER RESOURCES INC
P76801W	36	74	34	SENE	GST	MON	MS-406	POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P76801W	36	74	34	NWSW	GST	MON	MM 34 528	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76802W	36	74	34	SENW	GST	MON	M-413	POWER RESOURCES INC
P76802W	36	74	34	NWSW	GST	MON	MP-405	POWER RESOURCES INC
P76804W	36	74	34	SWNE	GST	MON	M-409	POWER RESOURCES INC
P76804W	36	74	34	NESW	GST	MON	M-427	POWER RESOURCES INC
P76805W	36	74	34	NESW	GST	MON	MD-403	POWER RESOURCES INC
P76805W	36	74	34	SENE	GST	MON	MS-407	POWER RESOURCES INC
P76806W	36	74	34	NESE	GST	IND	M 34 529	SMITH LAND COMPANY** POWER RESOURCES INC
P76806W	36	74	34	NESE	GST	IND	M 34 529	SMITH LAND COMPANY** POWER RESOURCES INC
P76807W	36	74	34	NESE	GST	IND	WELLFIELD 4 NE/SE/34	POWER RESOURCES INC
P76807W	36	74	34	NESE	GST	IND	WELLFIELD 4 NE/SE/34	POWER RESOURCES INC
P76808W	36	74	34	NESE	GST	MON	MP-419	POWER RESOURCES INC
P76808W	36	74	34	NESW	GST	MON	MD-410	POWER RESOURCES INC
P76809W	36	74	34	NWSW	GST	MON	MS-402	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76809W	36	74	34	NWSE	GST	MON	M 429A	POWER RESOURCES INC
P76810W	36	74	34	NESE	GST	MON	MD-409	POWER RESOURCES INC
P76810W	36	74	34	NWSW	GST	MON	MD-401	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76811W	36	74	34	SWNE	GST	MON	M-410	POWER RESOURCES INC
P76811W	36	74	35	SESW	GST	IND	M 35 736	POWER RESOURCES INC
P76812W	36	74	35	SESW	GST	IND	M 35 736	POWER RESOURCES INC
P76812W	36	74	35	SESW	GST	MON	MD-414	POWER RESOURCES INC
P76813W	36	74	35	SESW	GST	MON	M-439	POWER RESOURCES INC
P76813W	36	74	35	NENE	GST	MIS	WW-35-1	POWER RESOURCES INC
P76814W	36	74	35	SESW	GST	IND	WELLFIELD 4 SE/SW/35	POWER RESOURCES INC
P76814W	36	74	35	SESW	GST	IND	WELLFIELD 4 SE/SW/35	POWER RESOURCES INC
P76815W	36	74	35	NENE	GST	MIS	WW-35-1	POWER RESOURCES INC
P76815W	36	74	35	NWSW	GST	MON	M-458	POWER RESOURCES INC
P76816W	36	74	35	NWSW	GST	MON	M-435	POWER RESOURCES INC
P76816W	36	74	35	NWSW	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P76817W	36	74	35	NWSW	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P76817W	36	74	35	NWNE	GST	MON	M-203	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P76818W	36	74	35	SESW	GST	MON	M-438	POWER RESOURCES INC
P76818W	36	74	35	NESW	GST	MON	MM 35 744	POWER RESOURCES INC
P76819W	36	74	35	NWSW	GST	MON	M-401	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76819W	36	74	35	SWNW	GST	MON	M-403	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76820W	36	74	35	SWNW	GST	IND	WELLFIELD 4 SW/NW/35	POWER RESOURCES INC
P76820W	36	74	35	SWNW	GST	IND	WELLFIELD 4 SW/NW/35	POWER RESOURCES INC
P76821W	36	74	35	NWSW	GST	MON	MD-412	POWER RESOURCES INC
P76821W	36	74	35	NESW	GST	MON	M-456	POWER RESOURCES INC
P76822W	36	74	35	SWNW	GST	IND	WELLFIELD 4 SW/NW/35	POWER RESOURCES INC
P76822W	36	74	35	SWNW	GST	IND	WELLFIELD 4 SW/NW/35	POWER RESOURCES INC
P76823W	36	74	35	SWNW	GST	IND	WELLFIELD 4 SW/NW/35	POWER RESOURCES INC
P76823W	36	74	35	SWNW	GST	IND	WELLFIELD 4 SW/NW/35	POWER RESOURCES INC
P76824W	36	74	35	SWNW	GST	IND	WELLFIELD 4 SW/NW/35	POWER RESOURCES INC
P76824W	36	74	35	SWSE	GST	MON	M-453	POWER RESOURCES INC
P76825W	36	74	35	SESW	GST	MON	OM 35 740	POWER RESOURCES INC
P76825W	36	74	35	NESW	GST	IND	WELLFIELD 4 NE/SW/35	POWER RESOURCES INC
P76826W	36	74	35	NESW	GST	IND	WELLFIELD 4 NE/SW/35	POWER RESOURCES INC
P76826W	36	74	35	NWSW	GST	MON	MS-413	POWER RESOURCES INC
P76827W	36	74	35	SESW	GST	IND	M 35 737	POWER RESOURCES INC
P76827W	36	74	35	SWSE	GST	IND	WELLFIELD 4 SW/SE/35	POWER RESOURCES INC
P76828W	36	74	35	SESW	GST	IND	M 35 737	POWER RESOURCES INC
P76828W	36	74	35	SWSE	GST	IND	WELLFIELD 4 SW/SE/35	POWER RESOURCES INC
P76829W	36	74	35	SWNW	GST	MON	M-404	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76829W	36	74	35	SESW	GST	IND	M 35 738	POWER RESOURCES INC
P76830W	36	74	35	SESW	GST	IND	M 35 738	POWER RESOURCES INC
P76830W	36	74	35	SWSW	GST	MON	M-437	POWER RESOURCES INC
P76831W	36	74	35	NWSW	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P76831W	36	74	35	NWSW	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P76832W	36	74	35	SESW	GST	IND	M 35 739	POWER RESOURCES INC
P76832W	36	74	35	SESW	GST	IND	M 35 739	POWER RESOURCES INC
P76833W	36	74	35	SESW	GST	MON	MS-415	POWER RESOURCES INC
P76833W	36	74	35	NWSW	GST	MON	MS-412	POWER RESOURCES INC
P76834W	36	74	35	NWSW	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P76834W	36	74	35	NWSW	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P76835W	36	74	35	NWSW	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P76835W	36	74	35	NWSW	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P76836W	36	74	35	NWSW	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P76836W	36	74	35	NWSW	GST	MON	M-402	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76837W	36	74	35	SESW	GST	MON	MM 35 742	POWER RESOURCES INC
P76837W	36	74	35	SWSE	GST	MON	M-452	POWER RESOURCES INC
P76838W	36	74	35	NWSW	GST	MON	MD-413	POWER RESOURCES INC
P76838W	36	74	35	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76839W	36	74	35	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P76839W	36	74	35	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76840W	36	74	35	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76840W	36	74	35	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76841W	36	74	35	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76841W	36	74	35	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76842W	36	74	35	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76842W	36	74	35	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76843W	36	74	35	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76843W	36	74	35	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76844W	36	74	35	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76844W	36	74	35	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76845W	36	74	35	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76845W	36	74	35	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76846W	36	74	35	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76846W	36	74	35	SESW	GST	MON	LM 35 743	POWER RESOURCES INC
P76847W	36	74	35	SESW	GST	MON	MD-415	POWER RESOURCES INC
P76847W	36	74	35	SESW	GST	MON	MS-414	POWER RESOURCES INC
P76848W	36	74	35	SESW	GST	MON	KM 35 741	POWER RESOURCES INC
P76848W	36	74	35	SESW	GST	MON	M-454	POWER RESOURCES INC
P76850W	36	74	35	SWSW	GST	MON	M-436	POWER RESOURCES INC
P76850W	36	74	35	NESW	GST	MON	M-455A	POWER RESOURCES INC
P76851W	36	74	35	NESW	GST	MON	M-457	POWER RESOURCES INC
P76851W	36	74	35	SWSE	GST	MON	M-451	POWER RESOURCES INC
P76852W	36	74	36	NESE	GST	MON	M-14	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76852W	36	74	36	NENW	GST	IND	WELLFIELD 3 NW/SW/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76853W	36	74	36	NENW	GST	IND	WELLFIELD 3 SW/SE/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P76853W	36	74	36	NWSE	GST	IND	WELLFIELD 4 NW/SW/34	POWER RESOURCES INC
P76854W	36	74	36	NESE	GST	MON	M-12	POWER RESOURCES INC
P76854W	36	74	36	NENW	GST	IND	WELLFIELD 2 NE/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P76855W	36	74	36	NESW	GST	MON	M-19	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76855W	36	74	36	NENW	GST	MON	M-25	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76856W	36	74	36	SENW	GST	MON	MS-2	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76856W	36	74	36	NENW	UNA	IND	SECTION 36 36 74 #2	WY BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P76857W	36	74	36	NENW	GST	MON	OWD 6	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P76857W	36	74	36	NWSE	GST	IND	WELLFIELD 4 NE/SW/34	POWER RESOURCES INC
P76858W	36	74	36	SENW	UNA	IND	PU OP - WELLFIELD #2	RIO ALGOM MINING CORP.**U.S BUREAU OF LAND MANAGEMENT
P76858W	36	74	36	NENW	GST	IND	WELLFIELD 2 SE/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P76859W	36	74	36	SENW	GST	MON	MS-4	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76859W	36	74	36	NWSE	GST	IND	WELLFIELD 4 NW/SE/34	POWER RESOURCES INC
P76860W	36	74	36	NWNW	GST	IND	0 25 583	POWER RESOURCES INC
P76860W	36	74	36	SWNE	GST	MON	MT1	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P76861W	36	74	36	NENW	GST	MON	MS-1	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76862W	36	74	36	SENE	GST	MON	MS-10	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76862W	36	74	36	NENW	GSI	IND,MIS	NE/SW 10-35-74 (104 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P76863W	36	74	36	NENW	UNA	MIS	WW-36-1	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P76863W	36	74	36	NWSE	GST	MON	M-17	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76864W	36	74	36	NENW	GSI	IND,MIS	SE/SW 10-35-74 (92 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P76864W	36	74	36	NWSE	GST	IND	WELLFIELD 4 SE/NW/34	POWER RESOURCES INC
P76865W	36	74	36	NENW	GST	IND	WELLFIELD 3 SW/NE/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

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P76865W	36	74	36	SENW	GST	MON	MD-3	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76866W	36	74	36	SENW	GST	MON	B-5	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76866W	36	74	36	NENW	GST	MON	M-1	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76867W	36	74	36	NENW	GST	MON	WW-36-3	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P76867W	36	74	36	NENW	GST	IND	O 25 591	POWER RESOURCES INC
P76868W	36	74	36	SWNE	GST	MON	MD-5	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P76868W	36	74	36	SENW	GST	IND	Q 36 1048	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P76869W	36	74	36	SWNE	GST	IND	Q 36 1048	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P76869W	36	74	36	NENW	GST	IND	Q 36 1048	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P76870W	36	74	36	NWSE	GST	IND	WELLFIELD 4 SE/NE/34	POWER RESOURCES INC
P76870W	36	74	36	NENW	GST	IND	WELLFIELD 2 NW/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P76871W	36	74	36	NENW	GSI	IND,MIS	NW/SE 10-35-74 (94 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P76871W	36	74	36	NENW	GST	MON	OWD 10	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P76872W	36	74	36	SENW	GST	IND	Q 36 1047	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P76872W	36	74	36	SWNE	GST	IND	Q 36 1047	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P77026W	36	74	36	NENW	GST	IND	Q 36 1047	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P77027W	36	74	36	NENW	GSI	IND,MIS	SW/SW 10-35-74 (2 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P77028W	36	74	36	SENE	GST	MON	B-12	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77029W	36	74	36	SENE	GST	IND	WELLFIELD 1 SE/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77030W	36	74	36	NWSE	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P77031W	36	74	36	SENE	GST	MON	MD-9	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77032W	36	74	36	NENW	GST	IND	Q 36 1046	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P77203W	36	74	36	SENW	GST	IND	Q 36 1046	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P77204W	36	74	36	SENW	GST	IND	Q 36 1046	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P77205W	36	74	36	SENE	GST	IND	WELLFIELD 1 SE/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77206W	36	74	36	SENW	GST	IND	WELLFIELD 1 SE/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77207W	36	74	36	NENW	GST	IND	WELLFIELD 1 SE/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77208W	36	74	36	SENE	GST	IND	WELLFIELD 1 SE/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77209W	36	74	36	NENW	GST	IND	WELLFIELD 1 SE/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77210W	36	74	36	NENW	GST	IND	WELLFIELD 1 SE/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77211W	36	74	36	NENE	GST	IND	WELLFIELD 1 SE/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77212W	36	74	36	SENE	GST	IND	WELLFIELD 1 SE/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P7727S	36	74	36	SWNE	GST	IND	WELLFIELD 1 SE/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P7727S	36	74	36	NENW	GSI	IND,MIS	NE/NW 15-35-74 (24 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P7727S	36	74	36	NENW	GST	MON	M-211	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77431W	36	74	36	NWSE	GST	IND	WELLFIELD 4 SW/NE/34	POWER RESOURCES INC
P77432W	36	74	36	NENW	GST	IND	M 35 739	POWER RESOURCES INC
P77433W	36	74	36	SWNE	GST	MON	MS-11	POWER RESOURCES INC
P77434W	36	74	36	NWSE	GST	MON	M-16	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77434W	36	74	36	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77435W	36	74	36	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77436W	36	74	36	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77437W	36	74	36	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77438W	36	74	36	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77439W	36	74	36	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77440W	36	74	36	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77441W	36	74	36	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

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P77442W	36	74	36	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77443W	36	74	36	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77444W	36	74	36	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77446W	36	74	36	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77447W	36	74	36	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77448W	36	74	36	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77449W	36	74	36	SENE	GST	MON	MD-8	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77453W	36	74	36	NENW	GSI	IND,MIS	SE/SE 10-35-74 (63 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P77455W	36	74	36	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77456W	36	74	36	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77457W	36	74	36	SWNE	GST	MON	B-10	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77459W	36	74	36	NENW	GST	IND	WELLFIELD 4 SW/SE/35	POWER RESOURCES INC
P77459W	36	74	36	NENW	GST	IND	M 35 738	POWER RESOURCES INC
P77460W	36	74	36	NENW	GST	IND	0 25 581	POWER RESOURCES INC
P77461W	36	74	36	SENW	GST	MON	MD-4	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77462W	36	74	36	SENW	GST	MON	B-6	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77463W	36	74	36	NWSE	GST	IND	WELLFIELD 4 SE/SE/33	POWER RESOURCES INC
P77464W	36	74	36	NWNW	GST	MON	M-208	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77465W	36	74	36	SENW	GST	MON	MD-2	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77466W	36	74	36	SENE	GST	MON	B-14	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77467W	36	74	36	NESW	GST	MON	M-18	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77468W	36	74	36	NENW	GSI	IND,MIS	NW/SW 11-35-74 (3 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P77470W	36	74	36	NENW	GST	IND	0 25 592	POWER RESOURCES INC
P77471W	36	74	36	NENW	GSI	IND,MIS	SW/SE 10-35-74 (110 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P77472W	36	74	36	NESW	GST	MON	MT 2A	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P77473W	36	74	36	NENE	GST	IND	WELLFIELD 1 NE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77474W	36	74	36	SWNE	GST	IND	WELLFIELD 1 NE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77475W	36	74	36	NENW	GST	IND	WELLFIELD 1 NE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77476W	36	74	36	SENE	GST	IND	WELLFIELD 1 NE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77477W	36	74	36	NENW	GST	IND	WELLFIELD 1 NE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77478W	36	74	36	SENE	GST	IND	WELLFIELD 1 NE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77479W	36	74	36	NENW	GST	IND	WELLFIELD 1 NE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77480W	36	74	36	SENW	GST	IND	WELLFIELD 1 NE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77481W	36	74	36	SENE	GST	IND	WELLFIELD 1 NE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77482W	36	74	36	NENW	GST	IND	WELLFIELD 1 NE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77483W	36	74	36	NWNW	GST	MON	M-207	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77484W	36	74	36	NENW	GST	IND	0 25 582	POWER RESOURCES INC
P77485W	36	74	36	SENW	GST	MON	B-4	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77486W	36	74	36	NENW	GST	IND	M 35 737	POWER RESOURCES INC
P77487W	36	74	36	NENW	GST	IND	WELLFIELD 3 SE/NW/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77488W	36	74	36	NENW	GST	MON	M-24	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77489W	36	74	36	NENE	UNA	IND	WELLFIELD 1 - NE/NW/36	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P77490W	36	74	36	NWNE	UNA	IND	WELLFIELD 1 - NE/NW/36	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P77491W	36	74	36	SWNE	UNA	IND	WELLFIELD 1 - NE/NW/36	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P77492W	36	74	36	SENE	UNA	IND	WELLFIELD 1 - NE/NW/36	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P77493W	36	74	36	NENW	UNA	IND	WELLFIELD 1 - NE/NW/36	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P77494W	36	74	36	SENW	UNA	IND	WELLFIELD 1 - NE/NW/36	WYO BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P77495W	36	74	36	SENE	GST	MON	MD-10	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P77496W		36	74	36	NENW	UNA	IND	Q 36 1045	WY BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P77497W		36	74	36	SENW	UNA	IND	Q 36 1045	WY BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P77498W		36	74	36	SENE	GST	MON	MS-8	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77499W		36	74	36	NWNE	GST	MON	M-4	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77500W		36	74	36	NENW	GSI	IND,MIS	SW/NW 11-35-74 (7 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P77501W		36	74	36	NENW	GST	IND	WELLFIELD 2 SW/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P77502W		36	74	36	NENW	GST	IND	WELLFIELD 3 SW/NW/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77503W		36	74	36	SWNE	GST	MON	MD-11	POWER RESOURCES INC
P77504W		36	74	36	NENW	GST	IND	WELLFIELD 4 NE/SW/35	POWER RESOURCES INC
P77505W		36	74	36	SENE	GST	MON	MD-7	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77506W		36	74	36	SWNW	GST	MON	M-21	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77506W		36	74	36	NENW	GSI	IND,MIS	SE/NE 10-35-74 (65 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P77507W		36	74	36	NENW	GST	MON	B-1	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77507W		36	74	36	NENW	GST	IND	WELLFIELD 2 NE/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P77508W		36	74	36	NENW	GST	IND	WELLFIELD 1 SE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77508W		36	74	36	NENW	GSI	IND,MIS	NW/NW 15-35-74 (2 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P77509W		36	74	36	SENE	GST	IND	WELLFIELD 1 SE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77509W		36	74	36	SWNE	GST	IND	WELLFIELD 1 SE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	NENW	GST	IND	WELLFIELD 1 SE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	SENE	GST	IND	WELLFIELD 1 SE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	SENW	GST	IND	WELLFIELD 1 SE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	SENW	GST	IND	WELLFIELD 1 SE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	NENE	GST	IND	WELLFIELD 1 SE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	SENE	GST	IND	WELLFIELD 1 SE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	NENW	GST	IND	WELLFIELD 1 SE/NW/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	SENE	GST	MON	B-13	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77746W		36	74	36	NENW	UNA	IND	WELLFIELD 4 NW/NE/2	POWER RESOURCES INC
P77746W		36	74	36	NESE	GST	MON	M-13	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77746W		36	74	36	SENE	GST	IND	WELLFIELD 1 SW/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	SWNE	GST	IND	WELLFIELD 1 SW/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	NENW	GST	IND	WELLFIELD 1 SW/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	NENE	GST	MON	M-5	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77746W		36	74	36	SENW	GST	MON	B-3	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77746W		36	74	36	SWNE	GST	MON	B-9	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77746W		36	74	36	NWSE	GST	IND	WELLFIELD 4 SW/NW/35	POWER RESOURCES INC
P77746W		36	74	36	NWNE	GST	MON	M-2	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77746W		36	74	36	SENW	GST	MON	M-23	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77746W		36	74	36	NENW	GST	IND	WELLFIELD 3 NW/SE/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P77746W		36	74	36	NENW	GST	MON	M-210	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P77746W		36	74	36	NENW	GSI	IND,MIS	NW/SW 10-35-74 (50 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P77746W		36	74	36	NENW	GST	IND	0 25 584	POWER RESOURCES INC
P77746W		36	74	36	NENW	GST	IND	WELLFIELD 4 SW/NE/2	POWER RESOURCES INC
P77861W		36	74	36	SWNE	GST	MON	B-8	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77862W		36	74	36	NENW	GST	MON	MD-1	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P77863W		36	74	36	SENW	GST	MON	MS-3	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78083W		36	74	36	NENW	GSI	IND,MIS	SW/NW 10-35-74 (31 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P78083W		36	74	36	SWNE	GST	MON	MS-5	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78084W		36	74	36	NENW	GST	IND	WELLFIELD 3 NE/SW/26	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78084W		36	74	36	SENW	GST	MON	B-2	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78084W		36	74	36	NENW	GST	IND	M 34 529	SMITH LAND COMPANY** POWER RESOURCES INC
P78085W		36	74	36	NESW	GST	MON	M-20	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78085W		36	74	36	NENE	GST	MON	M-6	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P78085W	36	74	36	SWNW	GST	MON	M-22	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78086W	36	74	36	NWNW	GST	MON	M-209	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P78086W	36	74	36	NWSE	GST	IND	WELLFIELD 4 NE/SE/34	POWER RESOURCES INC
P78086W	36	74	36	NENW	GSI	IND,MIS	NE/SE 10-35-74 (114 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P78087W	36	74	36	SWNE	GST	MON	MD-6	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78087W	36	74	36	NENW	GST	IND	O 2 296	POWER RESOURCES INC
P78087W	36	74	36	SENE	GST	MON	MS-9	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78088W	36	74	36	NENW	GST	IND	WELLFIELD 4 NE/NW/2	POWER RESOURCES INC
P78088W	36	74	36	NENW	GST	IND	WELLFIELD 4 NW/SW/35	POWER RESOURCES INC
P78089W	36	74	36	NWNE	GST	MON	M-3	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78089W	36	74	36	NENW	GST	IND	WELLFIELD 2 SW/SW/25	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P78089W	36	74	36	NENW	GST	IND	WELLFIELD 2 SE/SE/26	POWER RESOURCES INC** USDI, BUREAU OF LAND MANAGEMENT
P78090W	36	74	36	SENE	GST	MON	B-11	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78090W	36	74	36	NENW	GST	IND	WELLFIELD 4 SE/SW/35	POWER RESOURCES INC
P78090W	36	74	36	NWNE	GST	IND	SECTION 36 #1	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P78091W	36	74	36	NENW	GST	IND	SECTION 36 #1	WY STATE BOARD OF LAND COMMISSIONERS** POWER RESOURCES INC
P78091W	36	74	36	SWNE	GST	MON	MS-6	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78091W	36	74	36	NENW	GST	IND	WELLFIELD 4 NE/NE/2	POWER RESOURCES INC
P78092W	36	74	36	SENE	GST	IND	WELLFIELD 1 SW/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P78092W	36	74	36	NENE	GST	IND	WELLFIELD 1 SW/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P78092W	36	74	36	SWNE	GST	IND	WELLFIELD 1 SW/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P78093W	36	74	36	SENW	GST	IND	WELLFIELD 1 SW/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P78093W	36	74	36	NENW	GST	IND	WELLFIELD 1 SW/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P78093W	36	74	36	SENE	GST	IND	WELLFIELD 1 SW/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P78113W	36	74	36	NENW	GST	IND	WELLFIELD 1 SW/NE/36	POWER RESOURCES INC** WY STATE BOARD OF LAND COMMISSIONERS
P78113W	36	74	36	SENW	GST	MON	B-7	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78113W	36	74	36	SWNE	GST	MON	M-15	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78113W	36	74	36	NENW	GST	IND	M 35 736	POWER RESOURCES INC
P78113W	36	74	36	SENE	GST	MON	MS-7	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78113W	36	74	36	NENE	GST	MON	M-7	WY STATE LAND & FARM LOAN OFFICE** POWER RESOURCES INC
P78113W	36	74	1	NENW	GST	MON	OWD 7	POWER RESOURCES INC
P78113W	36	74	1	SENE	GST	STO	HAY MEADOW #1	SMITH SHEEP CO.
P78113W	36	74	1	SENE	GST	STO	HAY MEADOW #1	SMITH SHEEP CO.
P78113W	36	74	2	NENE	GST	IND	WELLFIELD 4 NE/NE/2	POWER RESOURCES INC
P78113W	36	74	2	NENE	GST	IND	WELLFIELD 4 NE/NE/2	POWER RESOURCES INC
P78113W	36	74	2	NWNE	UNA	IND	WELLFIELD 4 NW/NE/2	POWER RESOURCES INC
P78113W	36	74	2	NWNE	UNA	IND	WELLFIELD 4 NW/NE/2	POWER RESOURCES INC
P78113W	36	74	2	SWNE	GST	MON	M-445	POWER RESOURCES INC
P78113W	36	74	2	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78113W	36	74	2	NWNE	GST	MON	M-442	POWER RESOURCES INC
P78113W	36	74	2	NWNE	GST	MON	M-450	POWER RESOURCES INC
P78113W	36	74	2	NENW	GST	MON	M-440	POWER RESOURCES INC
P78113W	36	74	2	NWNE	GST	MON	MS-416	POWER RESOURCES INC
P78113W	36	74	2	NENE	GST	MON	M-447	POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P78113W	36	74	2	NENE	GST	MON	M-449	POWER RESOURCES INC
P78113W	36	74	2	NENW	GST	MON	M-441	POWER RESOURCES INC
P78113W	36	74	2	NWNE	GST	MON	MD-417	POWER RESOURCES INC
P78113W	36	74	2	NWNE	GST	MON	MD-416	POWER RESOURCES INC
P78113W	36	74	2	NENW	GST	IND	WELLFIELD 4 NE/NW/2	POWER RESOURCES INC
P78113W	36	74	2	NENW	GST	IND	WELLFIELD 4 NE/NW/2	POWER RESOURCES INC
P78113W	36	74	2	SWNE	GST	MON	M-444	POWER RESOURCES INC
P78113W	36	74	2	NWNE	GST	MON	MM 2 295	POWER RESOURCES INC
P78113W	36	74	2	SWNW	GST	STO	HAY MEADOW #1	SMITH SHEEP CO.
P78113W	36	74	2	SWNW	GST	STO	HAY MEADOW #1	SMITH SHEEP CO.
P78113W	36	74	2	NWNE	GST	MON	M-443	POWER RESOURCES INC
P78113W	36	74	2	SWNE	GST	IND	WELLFIELD 4 SW/NE/2	POWER RESOURCES INC
P78113W	36	74	2	SWNE	GST	IND	WELLFIELD 4 SW/NE/2	POWER RESOURCES INC
P78113W	36	74	2	SENE	GST	MON	M-446	POWER RESOURCES INC
P78263W	36	74	2	NWNE	GST	IND	O 2 296	POWER RESOURCES INC
P78264W	36	74	2	NWNE	GST	IND	O 2 296	POWER RESOURCES INC
P78265W	36	74	2	NWNE	GST	MON	MS-417	POWER RESOURCES INC
P78266W	36	74	2	NENE	GST	MON	M-448	POWER RESOURCES INC
P78267W	36	74	3	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78268W	36	74	3	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78269W	36	74	3	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78270W	36	74	3	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78271W	36	74	3	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78272W	36	74	3	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78273W	36	74	3	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78279W	36	74	3	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78280W	36	74	3	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78281W	36	74	3	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78282W	36	74	3	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78283W	36	74	3	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78284W	36	74	3	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78285W	36	74	3	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78286W	36	74	3	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78929W	36	74	3	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78930W	36	74	4	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P78931W	36	74	4	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P79115W	36	74	4	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P80478W	36	74	4	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P80503W	36	74	4	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P80709W	36	74	4	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P80710W	36	74	4	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P80711W	36	74	4	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P80712W	36	74	4	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P80713W	36	74	4	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P80714W	36	74	4	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P80715W	36	74	4	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P80814W	36	74	4	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P80960W	36	74	4	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8097S	36	74	4	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8098S	36	74	4	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8139R	36	74	5	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8139R	36	74	5	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8139R	36	74	5	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8139R	36	74	5	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8140R	36	74	5	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8140R	36	74	5	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8140R	36	74	5	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P81685W	36	74	5	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8219S	36	74	5	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8219S	36	74	5	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8219S	36	74	5	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8219S	36	74	5	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8263R	36	74	5	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8263R	36	74	5	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8264R	36	74	5	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P8264R	36	74	5	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82651W	36	74	7	SESE	GSI	IND,MIS	SE/SE 7-35-74 (11 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8265R	36	74	7	SESE	GSI	IND,MIS	SE/SE 7-35-74 (11 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8265R	36	74	7	SESE	UNA	MIS	WW-7-3 (MINE UNIT 9 WATER WELL)	CAMECO RESOURCES
P8274R	36	74	7	SESE	GSI	MIS	WW-7-1 (MINE UNIT 9 WATER WELL)	POWER RESOURCES, INC** USDI - BLM** STATE BOARD OF LAND COMMISSIONERS
P8274R	36	74	7	SESE	GSI	MIS	WW-7-1 (MINE UNIT 9 WATER WELL)	POWER RESOURCES, INC** USDI - BLM** STATE BOARD OF LAND COMMISSIONERS
P82913W	36	74	7	SESE	GSI	MIS	WW-7-2 (MINE UNIT 9 WATER WELL)	POWER RESOURCES, INC** USDI - BLM** WYOMING STATE BOARD OF LAND COMMISSIONERS
P82914W	36	74	7	SESE	GSI	MIS	WW-7-2 (MINE UNIT 9 WATER WELL)	POWER RESOURCES, INC** USDI - BLM** WYOMING STATE BOARD OF LAND COMMISSIONERS
P82915W	36	74	7	SESE	GSI	MON	SE/SE 7-35-74 (2 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P82916W	36	74	8	SWSW	GSI	MON	SW/SW 8-35-74 (9 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P82917W	36	74	8	SWSW	GST	MON	K 140	POWER RESOURCES INC
P82918W	36	74	8	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82919W	36	74	8	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82920W	36	74	8	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82921W	36	74	8	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82922W	36	74	8	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82923W	36	74	8	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82924W	36	74	8	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82925W	36	74	8	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82926W	36	74	8	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82927W	36	74	8	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82928W	36	74	8	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P82929W	36	74	8	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82930W	36	74	8	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82931W	36	74	8	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82932W	36	74	8	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82933W	36	74	8	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82934W	36	74	8	SESW	GSI	IND,MIS	SE/SW 8-35-74 (113 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P82935W	36	74	8	SESW	GSI	IND,MIS	SE/SW 8-35-74 (113 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P82936W	36	74	8	SWSW	GST	MON	KM 8 136	POWER RESOURCES INC
P82937W	36	74	8	SESW	GSI	MON	SE/SW 8-35-74 (12 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P82938W	36	74	8	SWSW	GST	MON	KM 138	POWER RESOURCES INC
P82939W	36	74	8	SWSW	GST	MON	KM 137	POWER RESOURCES INC
P82940W	36	74	8	SWSW	GSI	IND,MIS	SW/SW 8-35-74 (76 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P82941W	36	74	8	SWSW	GSI	IND,MIS	SW/SW 8-35-74 (76 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P82943W	36	74	8	SWSE	GSI	MON	SW/SE 8-35-74 (2 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P82943W	36	74	9	NESE	GST	MON	NE/SE 9-35-74 (1 WELL)	POWER RESOURCES INC
P82943W	36	74	9	SENE	GST	MON	SE/NE 9-35-74 (2 WELLS)	POWER RESOURCES INC
P82943W	36	74	9	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82943W	36	74	9	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82943W	36	74	9	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82943W	36	74	9	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82943W	36	74	9	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82944W	36	74	9	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82944W	36	74	9	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82944W	36	74	9	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82944W	36	74	9	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82944W	36	74	9	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82944W	36	74	9	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82944W	36	74	9	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82944W	36	74	9	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82945W	36	74	9	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82945W	36	74	9	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82945W	36	74	9	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82945W	36	74	10	SESE	GST	MON	SE/SE 10-35-74 (8 WELLS)	POWER RESOURCES INC
P82945W	36	74	10	NESW	GSI	IND,MIS	NE/SW 10-35-74 (104 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P82945W	36	74	10	NESW	GSI	IND,MIS	NE/SW 10-35-74 (104 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P82945W	36	74	10	SESW	GSI	IND,MIS	SE/SW 10-35-74 (92 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P82945W	36	74	10	SESW	GSI	IND,MIS	SE/SW 10-35-74 (92 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P82946W	36	74	10	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82946W	36	74	10	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82946W	36	74	10	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82946W	36	74	10	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82946W	36	74	10	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82946W	36	74	10	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

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P82946W	36	74	10	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82946W	36	74	10	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P82946W	36	74	10	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P83069W	36	74	10	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P84388W	36	74	10	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P84389W	36	74	10	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P84390W	36	74	10	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P84391W	36	74	10	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P84392W	36	74	10	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P84393W	36	74	10	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P84394W	36	74	10	SESW	GST	MON	SE/SW 10-35-74 (10 WELLS)	POWER RESOURCES INC
P84395W	36	74	10	SWSE	GST	MON	773CORE	POWER RESOURCES INC
P84396W	36	74	10	NWSW	GST	MON	NW/SW 10-35-74 (6 WELLS)	POWER RESOURCES INC
P84397W	36	74	10	SWNE	GST	STO	POTTS #1	SMITH SHEEP COMPANY
P84398W	36	74	10	SWNE	GST	STO	POTTS #1	SMITH SHEEP COMPANY
P84399W	36	74	10	SENE	GSI	IND,MIS	SE/NE 10-35-74 (65 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84400W	36	74	10	SENE	GSI	IND,MIS	SE/NE 10-35-74 (65 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84401W	36	74	10	SESE	GSI	IND,MIS	SE/SE 10-35-74 (63 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84402W	36	74	10	SESE	GSI	IND,MIS	SE/SE 10-35-74 (63 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84403W	36	74	10	NWSW	GSI	IND,MIS	NW/SW 10-35-74 (50 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84404W	36	74	10	NWSW	GSI	IND,MIS	NW/SW 10-35-74 (50 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84405W	36	74	10	SENW	GST	MON	SE/NW 10-35-74 (2 WELLS)	POWER RESOURCES INC
P84406W	36	74	10	SWNW	GST	MON	SW/NW 10-35-74 (10 WELLS)	POWER RESOURCES INC
P84407W	36	74	10	NESE	GSI	IND,MIS	NE/SE 10-35-74 (114 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84408W	36	74	10	NESE	GSI	IND,MIS	NE/SE 10-35-74 (114 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84409W	36	74	10	NESE	GST	MON	NE/SE 10-35-74 (12 WELLS)	POWER RESOURCES INC
P84410W	36	74	10	SENE	GST	MON	SE/NE 10-35-74 (8 WELLS)	POWER RESOURCES INC
P84411W	36	74	10	NESW	GST	MON	NE/SW 10-35-74 (12 WELLS)	POWER RESOURCES INC
P84412W	36	74	10	SWSE	GSI	IND,MIS	SW/SE 10-35-74 (110 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84413W	36	74	10	SWSE	GSI	IND,MIS	SW/SE 10-35-74 (110 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84414W	36	74	10	NWSE	GST	MON	NW/SE 10-35-74 (7 WELLS)	POWER RESOURCES INC
P84415W	36	74	10	NWSE	GSI	IND,MIS	NW/SE 10-35-74 (94 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84416W	36	74	10	NWSE	GSI	IND,MIS	NW/SE 10-35-74 (94 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84417W	36	74	10	SWSW	GST	STO	POTTS #2	SMITH SHEEP COMPANY
P84418W	36	74	10	SWSW	GST	STO	POTTS #2	SMITH SHEEP COMPANY
P84419W	36	74	10	SWNE	GST	MON	SW/NE 10-35-74 (1 WELL)	POWER RESOURCES INC
P84420W	36	74	10	SWSE	UNA	MIS	WW-10-1	SMITH LAND CO.** RIO ALGOM MINING CORP.
P84421W	36	74	10	SWSE	UNA	MIS	WW-10-1	SMITH LAND CO.** RIO ALGOM MINING CORP.
P84422W	36	74	10	SWSW	GSI	IND,MIS	SW/SW 10-35-74 (2 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84423W	36	74	10	SWSW	GSI	IND,MIS	SW/SW 10-35-74 (2 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84424W	36	74	10	SENE	GST	MON	771CORE	POWER RESOURCES INC
P84425W	36	74	10	SWSE	GST	MON	SW/SE 10-35-74 (9 WELLS)	POWER RESOURCES INC
P84426W	36	74	10	SWSW	GST	MON	SW/SW 10-35-74 (3 WELLS)	POWER RESOURCES INC
P84427W	36	74	10	SWNW	GSI	IND,MIS	SW/NW 10-35-74 (31 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84428W	36	74	10	SWNW	GSI	IND,MIS	SW/NW 10-35-74 (31 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84431W	36	74	11	SWNE	GSI	MON	SW/NE 11-35-74 (8 WELLS) - MINE UNIT 15A	POWER RESOURCES, INC.
P84433W	36	74	11	SWNW	GST	MON	SW/NW 11-35-74 (3 WELLS)	POWER RESOURCES INC
P84435W	36	74	11	NESW	GSI	MON	NE/SW 11-35-74 (7 WELLS) - MINE UNIT 15A	POWER RESOURCES, INC.
P84497W	36	74	11	NENE	GSI	MON	NE/NE 11-35-74 (1 WELL) - MINE UNIT 15A	POWER RESOURCES, INC.
P84842W	36	74	11	NWNE	GSI	MON	NW/NE 11-35-74 (4 WELLS) - MINE UNIT 15A	POWER RESOURCES, INC.
P84843W	36	74	11	SESW	GSI	MON	SE/SW 11-35-74 (4 WELLS) - MINE UNIT 15A	POWER RESOURCES, INC.

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P84845W	36	74	11	SWNW	GSI	IND,MIS	SW/NW 11-35-74 (7 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84846W	36	74	11	SWNW	GSI	IND,MIS	SW/NW 11-35-74 (7 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84847W	36	74	11	NWSW	GSI	IND,MIS	NW/SW 11-35-74 (3 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84848W	36	74	11	NWSW	GSI	IND,MIS	NW/SW 11-35-74 (3 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P84849W	36	74	11	SENW	GSI	MON	SE/NW 11-35-74 (8 WELLS) - MINE UNIT 15A	POWER RESOURCES, INC.
P85774W	36	74	11	NWSE	GSI	MON	NW/SE 11-35-74 (4 WELLS) - MINE UNIT 15A	POWER RESOURCES, INC.
P85774W	36	74	11	SENW	UNA	IND,MIS	SE/NW 11-35-74 (36 WELLS) - MINE UNIT 15A (I&P WELLS)	CAMECO RESOURCES
P85774W	36	74	11	SWNW	UNA	IND,MIS	ENL. SW/NW 11-35-74 (90 WELLS) - MINE UNIT 15A (I&P WELLS)	CAMECO RESOURCES
P85774W	36	74	11	SWNW	GSI	MON	SW/NW 11-35-74 (4 WELLS) - MINE UNIT 15A	POWER RESOURCES, INC.
P85922W	36	74	11	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85923W	36	74	11	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85924W	36	74	11	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85925W	36	74	11	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85926W	36	74	11	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85927W	36	74	11	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85928W	36	74	11	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85929W	36	74	11	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85930W	36	74	11	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85931W	36	74	11	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85932W	36	74	11	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85933W	36	74	11	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85934W	36	74	11	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85935W	36	74	11	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P85936W	36	74	11	SENE	GSI	MON	SE/NE 11-35-74 (3 WELLS) - MINE UNIT 15A	POWER RESOURCES, INC.
P85937W	36	74	11	SWSW	GSI	MON	SW/SW 11-35-74 (7 WELLS) - MINE UNIT 15A	POWER RESOURCES, INC.
P85938W	36	74	11	NESW	UNA	IND,MIS	NE/SW 11-35-74 (17 WELLS) - MINE UNIT 15A (I&P WELLS)	CAMECO RESOURCES
P85940W	36	74	11	NWNE	UNA	STO	SOLAR PANEL 2	SMITH LAND CO.
P85941W	36	74	11	NWNE	UNA	STO	SOLAR PANEL 2	SMITH LAND CO.
P85942W	36	74	11	SWSW	UNA	IND,MIS	SW/SW 11-35-74 (87 WELLS) - MINE UNIT 15A (I&P WELLS)	CAMECO RESOURCES
P85943W	36	74	11	NENW	GSI	MON	NE/NW 11-35-74 (6 WELLS) - MINE UNIT 15A	POWER RESOURCES, INC.
P85944W	36	74	11	NWSW	UNA	IND,MIS	ENL. NW/SW 11-35-74 (60 WELLS) - MINE UNIT 15A (I&P WELLS)	CAMECO RESOURCES
P85945W	36	74	11	NWSW	GST	MON	NW/SW 11-35-74 (2 WELLS)	POWER RESOURCES INC
P85976W	36	74	12	NWNW	UNA	IRR	SMITH #1	SMITH SHEEP CO.
P85977W	36	74	12	SWNW	UNA	IRR	SMITH #1	SMITH SHEEP CO.
P85978W	36	74	12	SENW	UNA	IRR	SMITH #1	SMITH SHEEP CO.
P85979W	36	74	12	NENW	UNA	IRR	SMITH #1	SMITH SHEEP CO.
P86020W	36	74	14	NWNW	GSI	MON	NW/NW 14-35-74 (2 WELLS) - MINE UNIT 15A	POWER RESOURCES, INC.
P86020W	36	74	15	NWNW	GSI	IND,MIS	NW/NW 15-35-74 (2 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P86020W	36	74	15	NWNW	GSI	IND,MIS	NW/NW 15-35-74 (2 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P86020W	36	74	15	NENE	GSI	MON	NE/NE 15-35-74 (1 WELL) - MINE UNIT 15A	POWER RESOURCES, INC.
P86020W	36	74	15	NWNW	GST	MON	NW/NW 15-35-74 (2 WELLS)	POWER RESOURCES INC
P86020W	36	74	15	NWNE	GST	MON	NW/NE 15-35-74 (2 WELLS)	POWER RESOURCES INC
P86020W	36	74	15	NENW	GSI	IND,MIS	NE/NW 15-35-74 (24 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P86020W	36	74	15	NENW	GSI	IND,MIS	NE/NW 15-35-74 (24 WELLS)-MINE UNIT 15 (I&P WELLS)	POWER RESOURCES, INC** WY STATE BOARD OF LAND COMMISSIONERS** USDI, BUREAU OF LAND MANAGEMENT
P86021W	36	74	15	NENW	GST	MON	NE/NW 15-35-74 (3 WELLS)	POWER RESOURCES INC
P86021W	36	74	15	NENE	GST	MON	NE/NE 15-35-74 (2 WELLS)	POWER RESOURCES INC
P86021W	36	74	16	NESW	GSI	MON	SWMU-002	POWER RESOURCES, INC
P86021W	36	74	16	NESW	GSI	MON	SWPW-002	POWER RESOURCES, INC
P86021W	36	74	16	NESW	GSI	MON	SWMO-002	POWER RESOURCES, INC
P86021W	36	74	16	SENE	UNA	STO	EAST LOLA	SMITH SHEEP COMPANY
P86021W	36	74	16	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86021W	36	74	16	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P86355W	36	74	16	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86355W	36	74	16	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86355W	36	74	16	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86355W	36	74	16	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86355W	36	74	16	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86355W	36	74	16	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86355W	36	74	16	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86357W	36	74	16	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86357W	36	74	16	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86357W	36	74	16	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86357W	36	74	16	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86357W	36	74	16	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86357W	36	74	16	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86357W	36	74	16	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86358W	36	74	17	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86358W	36	74	17	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86358W	36	74	17	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86358W	36	74	17	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86358W	36	74	17	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86358W	36	74	17	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86358W	36	74	17	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86359W	36	74	17	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86359W	36	74	17	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86359W	36	74	17	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86359W	36	74	17	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86359W	36	74	17	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86359W	36	74	17	NENW	GSI	MON	NE/NW 17-35-74 (8 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P86359W	36	74	17	NWNE	GSI	MON	NW/NE 17-35-74 (2 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P86457W	36	74	17	SWNE	GSI	IND,MIS	SE/NE 18-35-74 (85 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P86457W	36	74	17	SWNE	GSI	MON	SWMP-002	POWER RESOURCES, INC
P86457W	36	74	17	SWNE	GSI	IND,MIS	SE/SW 8-35-74 (113 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P86457W	36	74	17	SENE	GSI	MON	SWMP-003	POWER RESOURCES, INC
P86457W	36	74	17	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86457W	36	74	17	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86457W	36	74	17	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P86457W	36	74	17	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P87634W	36	74	17	SWNE	GSI	IND,MIS	NE/NE 18-35-74 (2 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P88184W	36	74	17	SWNE	GST	MON	OM 17 422	POWER RESOURCES INC
P88184W	36	74	17	NWNE	GSI	MIS	WW-17-2	POWER RESOURCES, INC
P88184W	36	74	17	NWNE	GSI	MIS	WW-17-2	POWER RESOURCES, INC
P88184W	36	74	17	SWNE	GSI	IND,MIS	SE/SW 18-35-74 (12 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P88184W	36	74	17	SWNE	GSI	IND,MIS	SE/SW 18-35-74 (12 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P88184W	36	74	17	SWNE	GSI	IND,MIS	SW/NW 17-35-74 (32 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P88184W	36	74	17	SWNW	GSI	IND,MIS	SW/NW 17-35-74 (32 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P88184W	36	74	17	SWNW	GSI	IND,MIS	SW/NW 17-35-74 (32 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8821R	36	74	17	SWNE	GSI	IND,MIS	SE/SE 7-35-74 (11 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P8823R	36	74	17	SWNE	GSI	IND,MIS	NW/SE 18-35-74 (45 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8824R	36	74	17	SWNE	GSI	IND,MIS	NW/SE 18-35-74 (45 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8828R	36	74	17	NENW	GST	MON	KM 17 421	POWER RESOURCES INC
P8829R	36	74	17	SWNE	GSI	IND,MIS	SW/SW 18-35-74 (53 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8829R	36	74	17	SWNE	GSI	IND,MIS	NE/NW 17-35-74 (87 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8830R	36	74	17	NENW	GSI	IND,MIS	NE/NW 17-35-74 (87 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8860R	36	74	17	NENW	GSI	IND,MIS	NE/NW 17-35-74 (87 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8861R	36	74	17	SWNE	GSI	IND,MIS	SW/SW 8-35-74 (76 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8862R	36	74	17	SWNE	GSI	IND,MIS	SW/NE 18-35-74 (11 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8862R	36	74	17	NWNE	UNA	MIS	WW-17-3	CAMECO RESOURCES
P8862R	36	74	17	SWNE	GSI	IND,MIS	SW/SW 18-35-74 (53 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P8863R	36	74	17	SWNW	GSI	MON	SW/NW 17-35-74 (6 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P90259W	36	74	17	SWNE	GSI	IND,MIS	NE/SW 18-35-74 (51 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90351W	36	74	17	SWNE	GSI	IND,MIS	NE/SW 18-35-74 (51 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90352W	36	74	17	NWNW	GSI	IND,MIS	NW/NW 17-35-74 (72 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90353W	36	74	17	NWNW	GSI	IND,MIS	NW/NW 17-35-74 (72 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90354W	36	74	17	SWNE	GSI	IND,MIS	NW/NW 17-35-74 (72 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90355W	36	74	17	NWNW	GSI	MON	NW/NW 17-35-74 (6 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P90356W	36	74	18	NWSE	GSI	MON	SWPW-001	POWER RESOURCES, INC
P90357W	36	74	18	NWSE	GSI	MON	SWMU-001	POWER RESOURCES, INC
P90358W	36	74	18	NESW	GSI	IND,MIS	NE/SW 18-35-74 (51 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90359W	36	74	18	NESW	GSI	IND,MIS	NE/SW 18-35-74 (51 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90360W	36	74	18	NWSE	GSI	MON	NW/SE 18-35-74 (6 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P90361W	36	74	18	SWNE	GSI	IND,MIS	SW/NE 18-35-74 (11 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90362W	36	74	18	SWNE	GSI	IND,MIS	SW/NE 18-35-74 (11 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90363W	36	74	18	SWSW	GSI	IND,MIS	SW/SW 18-35-74 (53 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90364W	36	74	18	SWSW	GSI	IND,MIS	SW/SW 18-35-74 (53 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90365W	36	74	18	NWSE	GSI	IND,MIS	NW/SE 18-35-74 (45 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90366W	36	74	18	NWSE	GSI	IND,MIS	NW/SE 18-35-74 (45 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90367W	36	74	18	SENE	GSI	MON	SE/NE 18-35-74 (8 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P90368W	36	74	18	SESW	GSI	IND,MIS	SE/SW 18-35-74 (12 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90369W	36	74	18	SESW	GSI	IND,MIS	SE/SW 18-35-74 (12 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90370W	36	74	18	NWSW	GSI	MON	NW/SW 18-35-74 (2 WELLS)-MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P90371W	36	74	18	NENE	GSI	IND,MIS	NE/NE 18-35-74 (2 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90372W	36	74	18	SESW	GSI	MON	SE/SW 18-35-74 (7 WELLS)-MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P90373W	36	74	18	NENE	GSI	IND,MIS	NE/NE 18-35-74 (2 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90374W	36	74	18	SWNE	GSI	MON	SW/NE 18-35-74 (3 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P90375W	36	74	18	NESW	GSI	MON	NE/SW 18-35-74 (6 WELLS)-MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P90376W	36	74	18	NWSE	GSI	MON	SWMO-001	POWER RESOURCES, INC
P90377W	36	74	18	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90378W	36	74	18	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90379W	36	74	18	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90380W	36	74	18	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90381W	36	74	18	NESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90382W	36	74	18	NWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90383W	36	74	18	SESW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90384W	36	74	18	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90385W	36	74	18	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90386W	36	74	18	SENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90387W	36	74	18	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90388W	36	74	18	SWSW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90389W	36	74	18	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90390W	36	74	18	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90391W	36	74	18	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90392W	36	74	18	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90393W	36	74	18	NENE	GSI	MON	NE/NE 18-35-74 (4 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P90394W	36	74	18	SENE	GSI	IND,MIS	SE/NE 18-35-74 (85 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90395W	36	74	18	SENE	GSI	IND,MIS	SE/NE 18-35-74 (85 WELLS) - MINE UNIT 9 (I&P WELLS)	POWER RESOURCES, INC
P90396W	36	74	18	NWSW	GSI	MON	SWMP-001	POWER RESOURCES, INC
P90397W	36	74	18	SWSW	GSI	MON	SW/SW 18-35-74 (4 WELLS)-MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P90398W	36	74	18	NESE	GSI	MON	NE/SE 18-35-74 (2 WELLS) - MINE UNIT 9 MONITOR WELLS	POWER RESOURCES, INC
P90399W	36	74	19	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90400W	36	74	19	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90402W	36	74	21	NWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90403W	36	74	21	NENW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90404W	36	74	21	SWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90405W	36	74	21	SWNE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90406W	36	74	21	NWNW	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90407W	36	74	21	NENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90408W	36	74	21	SENE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P90408W	36	74	21	NESW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90409W	36	74	21	NWSW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90410W	36	74	21	SWSW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90411W	36	74	21	NWSE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90412W	36	74	21	SWSE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90413W	36	74	21	SESE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90414W	36	74	21	SESW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90415W	36	74	21	NESE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90416W	36	74	21	SWNE	GSI	MON	SWMP-004	POWER RESOURCES, INC
P90417W	36	74	22	SESW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90418W	36	74	22	SWSE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90419W	36	74	22	SESE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90420W	36	74	22	NESW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90421W	36	74	22	NWSW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90422W	36	74	22	SWSW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90423W	36	74	22	NESE	UNA	STO	ONIEL #3	SMITH SHEEP CO.
P90424W	36	74	26	NWSW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90425W	36	74	26	SWSW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90426W	36	74	26	SESW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90427W	36	74	26	NWNW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90428W	36	74	26	SENW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90429W	36	74	26	SWNW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90430W	36	74	26	NESW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90431W	36	74	26	NENW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90432W	36	74	27	NENE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90433W	36	74	27	SENW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90434W	36	74	27	NENW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90435W	36	74	27	NWNW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90436W	36	74	27	SWNW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90437W	36	74	27	NWNE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90438W	36	74	27	SWNE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90439W	36	74	27	SENE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90440W	36	74	28	NESE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90441W	36	74	28	NWSE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90442W	36	74	28	SWSE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90443W	36	74	28	NWSW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90444W	36	74	28	SWSW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90445W	36	74	28	SESW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90446W	36	74	28	SWNW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90447W	36	74	28	SENW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90448W	36	74	28	NESW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90449W	36	74	28	SENE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90450W	36	74	28	NENW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90451W	36	74	28	NWNW	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90452W	36	74	28	NENE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90453W	36	74	28	NWNE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90454W	36	74	28	SWNE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90455W	36	74	28	SWSW	GST	STO	WEST DOWNS #1	SMITH SHEEP CO.
P90456W	36	74	28	SWSW	GST	STO	WEST DOWNS #1	SMITH SHEEP CO.
P90458W	36	74	32	NENE	GST	STO	CAMPBELL #1	SMITH SHEEP CO.
P90459W	36	74	32	NENE	GST	STO	CAMPBELL #1	SMITH SHEEP CO.
P90460W	36	74	35	SENE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90461W	36	74	35	NWSE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90462W	36	74	35	SWSE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90463W	36	74	35	SWNE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90464W	36	74	35	SESE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90700W	36	74	35	NESE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90701W	36	74	35	NENE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90702W	36	74	35	NWNE	UNA	STO,MIS	PN5 L314	WILLIAM J. SMITH
P90703W	36	74	9	SESW	UNA	STO	HENRY #5	WILLIAM M. HENRY**WYO BOARD OF LAND COMMISSIONERS
P90705W	36	74	10	SENW	GST	STO	WES DIPPING VAT	WILLIAM M HENRY III
P90706W	36	74	11	SENW	GST	STO	WES DIPPING VAT	WILLIAM M HENRY III
P90707W	36	74	12	NESW	GST	STO	SOUTH PAST. SOLAR	WILLIAM M. HENRY III
P90708W	36	74	12	NESW	GST	STO	SOUTH PAST. SOLAR	WILLIAM M. HENRY III
P90709W	36	74	12	SWSW	GSI	STO	PHILLIPS CREEK WINDMILL	WILLIAM M. HENRY III
P90710W	36	74	12	SWSW	GSI	STO	PHILLIPS CREEK WINDMILL	WILLIAM M. HENRY III

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

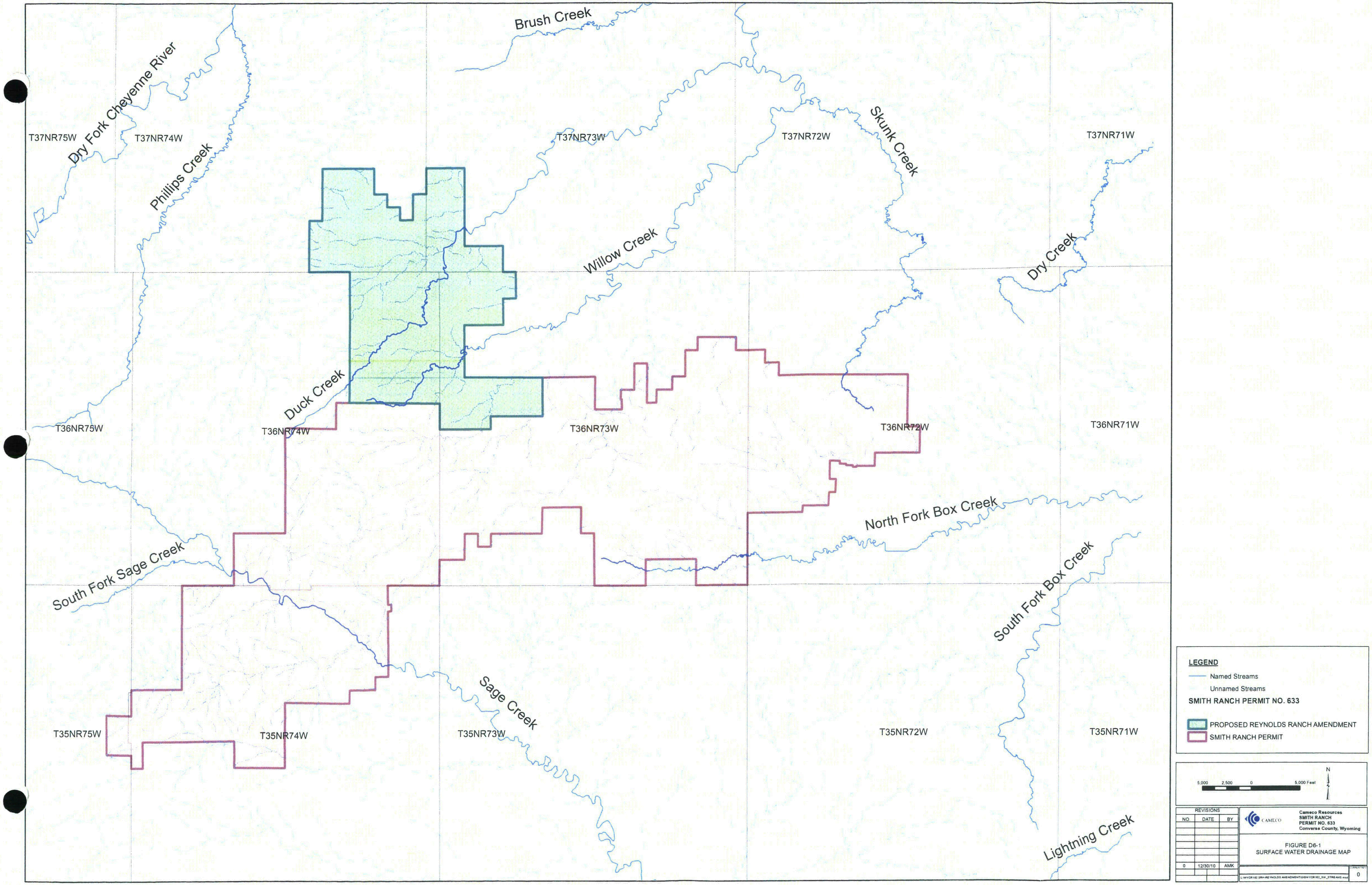
P90711W	36	74	20	SESE	GST	MON	26-477 (REYNOLDS RANCH)	POWER RESOURCES INC
P90712W	36	74	20	SENW	GST	MON	26-476 (REYNOLDS RANCH)	POWER RESOURCES INC
P90713W	36	74	21	NESW	GST	MON	SMC1074S	POWER RESOURCES INC
P90714W	36	74	21	SESE	UNA	MON	SE/SE 26-37-74 (6 WELLS) - MINE UNIT 27 MONITOR WELLS	CAMECO RESOURCES
P90714W	36	74	21	SWSE	UNA	MON	SWSE 26-37-74 (2 WELLS)-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC
P90715W	36	74	21	NWSW	GST	STO	HOOPER HOUSE WELL	WILLIAM M. HENRY III
P90716W	36	74	21	NWSW	GST	STO	HOOPER HOUSE WELL	WILLIAM M. HENRY III
P90717W	36	74	23	SWSW	GST	STO	SHEARING PENS # 2	WILLIAM M HENRY III
P9088S	36	74	24	SWSW	GST	STO	SHEARING PENS # 2	WILLIAM M HENRY III
P91513W	36	74	24	SWSW	UNA	IND	SMC1063	POWER RESOURCES INC
P91513W	36	74	25	SWSW	UNA	IND	SMC1055C	POWER RESOURCES INC
P91513W	36	74	25	SWSW	UNA	IND	SMC1061	POWER RESOURCES INC
P91513W	36	74	26	SWSW	UNA	IND	SMC1066C	POWER RESOURCES INC
P91513W	36	74	26	SWSW	UNA	IND	SMC1057	POWER RESOURCES INC
P91513W	36	74	26	SWSW	UNA	MON	SWSW 25-37-74 (2 WELLS)-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC
P91513W	36	74	26	SWSW	UNA	IND	SMC1064	POWER RESOURCES INC
P91514W	36	74	26	NESE	GST	MON	SMC1073S	POWER RESOURCES INC
P91514W	36	74	26	SWSW	UNA	IND	SMC1065	POWER RESOURCES INC
P91514W	36	74	26	NWNE	GSI	STO	WATERS FEE 31-21	WILLIAM M. HENRY III
P91514W	36	74	26	NWNE	GSI	STO	WATERS FEE 31-21	WILLIAM M. HENRY III
P91514W	36	74	26	NESE	UNA	MON	NESE (2 WELLS) 26-37-74-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC
P91514W	36	74	26	SWSW	GST	IND	SMC1054	POWER RESOURCES INC
P91514W	36	74	26	SWSW	UNA	IND	SMC1056C	POWER RESOURCES INC
P91514W	36	74	26	SESW	GST	MON	SMC1075S	POWER RESOURCES INC
P91514W	36	74	26	SWSW	UNA	IND	SMC1067C	POWER RESOURCES INC
P91514W	36	74	26	SESE	UNA	MON	SESE 26-37-74 (2 WELLS)-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC
P91514W	36	74	26	SWSW	UNA	IND	SMC1060	POWER RESOURCES INC
P91515W	36	74	33	SENE	UNA	MON	SE/NW 35-37-74 (3 WELLS) - MINE UNIT 27 MONITOR WELLS	CAMECO RESOURCES
P91515W	36	74	33	SWNE	GST	MON	SMC1064	WY STATE BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P91515W	36	74	33	SENE	GST	MON	SMC1070S	WILLIAM F. HERBST FAMILY TRUST
P91515W	36	74	33	SWSW	UNA	MON	SWSW 36-37-74 (2 WELL) - MINE UNIT 27 MONITOR WELLS	CAMECO RESOURCES
P9169P	36	74	34	SWNW	GST	MON	SMC1060	WY STATE BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P9216R	36	74	34	SENE	UNA	MON	SENE 35-37-74 (1 WELL) - MINE UNIT 27 MONITOR WELL	CAMECO RESOURCES
P9216R	36	74	34	SENW	GST	MON	35-882 (REYNOLDS RANCH)	POWER RESOURCES INC
P9216R	36	74	34	NESE	GST	MON	SMC1069S	POWER RESOURCES INC
P9216R	36	74	34	NWNE	UNA	MON	NWNE 35-37-74 (3 WELLS)-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC
P9216R	36	74	34	SENE	UNA	STO	REYNOLDS #36 (DEEPENED)	GAME & FISH COMM., STATE OF WYOMING** DUCK CREEK RANCHES INC.
P9216R	36	74	34	SENE	GST	MON	SMC1065	WY STATE BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P9216R	36	74	34	SWNE	UNA	MON	SWNE 35-37-74 (3 WELLS)-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC
P9216R	36	74	34	NESW	UNA	MON	NESW 36-37-74 (2 WELLS)-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC
P9216R	36	74	34	NWSW	UNA	MON	NWSW 36-37-74 (3 WELL) - MINE UNIT 27 MONITOR WELLS	CAMECO RESOURCES
P9216R	36	74	35	SWNE	GST	MON	SMC1056C	WY STATE BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P9217R	36	74	35	SENW	GST	MON	SMC1061	WY STATE BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P9217R	36	74	35	NENE	UNA	MON	NE/NE 35-37-74 (6 WELLS) - MINE UNIT 27 MONITOR WELLS	CAMECO RESOURCES
P9217R	36	74	35	SWNW	UNA	MON	SW/NW 36-37-74 (6 WELLS) - MINE UNIT 27 MONITOR WELLS	CAMECO RESOURCES
P9217R	36	74	35	SENE	GST	MON	SMC1071S	POWER RESOURCES INC
P9289R	36	74	35	SENW	UNA	IND	SMC1063	POWER RESOURCES INC
P93089W	36	74	35	SENE	GST	MON	SMC1059	POWER RESOURCES INC
P93089W	36	74	35	SWNE	UNA	IND	SMC1063	POWER RESOURCES INC
P93089W	36	74	35	SENW	GST	STO	LOWER BROWN SPRINGS #1	HORNBUCKLE RANCH, INC.
P93089W	36	74	35	SENW	GST	STO	LOWER BROWN SPRINGS #1	HORNBUCKLE RANCH, INC.
P93089W	36	74	35	SWNW	UNA	IND	SMC1055C	POWER RESOURCES INC
P93089W	36	74	35	SENW	UNA	IND	SMC1055C	POWER RESOURCES INC
P93089W	36	74	35	SWNW	GST	MON	SMC1055C	WY STATE BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P93089W	36	74	35	SWNW	UNA	IND	SMC1061	POWER RESOURCES INC
P93189W	36	74	35	SENW	UNA	IND	SMC1061	POWER RESOURCES INC
P93189W	36	74	36	SENW	UNA	IND	SMC1066C	POWER RESOURCES INC
P94580W	36	74	36	SWSE	UNA	IND	SMC1066C	POWER RESOURCES INC
P94580W	36	74	36	NESE	UNA	MON	NESE 35-37-74 (3 WELL) - MINE UNIT 27 MONITOR WELLS	CAMECO RESOURCES
P94580W	36	74	36	SESW	UNA	MON	SESW 36-37-74 (3 WELLS)-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC
P94580W	36	74	36	SWSE	GST	MON	SMC1066C	WY STATE BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P94580W	36	74	36	SESE	GST	MON	SMC1068S	POWER RESOURCES INC
P94580W	36	74	36	SESW	UNA	MON	SE/SW 36-37-74 (3 WELLS) - MINE UNIT 27 MONITOR WELLS	CAMECO RESOURCES
P9485R	36	74	36	SWSW	GST	MON	SMC1067C	WY STATE BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P9485R	36	74	36	NENW	UNA	MON	NENW 36-37-74 (2 WELLS)-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P94860W	36	74	36	SWNE	GST	MON	SMC1063	WY STATE BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P95216W	36	74	36	NENW	UNA	IND	SMC1057	POWER RESOURCES INC
P95217W	36	74	36	SENW	UNA	IND	SMC1057	POWER RESOURCES INC
P95218W	36	74	36	NENW	GST	MON	SMC1057	RIO ALGOM MINING CORP.
P96072W	36	74	36	SWNE	UNA	IND	SMC1064	POWER RESOURCES INC
P96072W	36	74	36	SENW	UNA	IND	SMC1064	POWER RESOURCES INC
P96072W	36	74	36	SENW	GST	MON	SMC1058	RIO ALGOM MINING CORP.
P96072W	36	74	36	SWNE	UNA	IND	SMC1065	POWER RESOURCES INC
P96072W	36	74	36	SENW	UNA	IND	SMC1065	POWER RESOURCES INC
P96072W	36	74	36	NWNW	GST	MON	SMC1054	WY STATE BOARD OF LAND COMMISSIONERS** RIO ALGOM MINING CORP.
P96072W	36	74	36	NWNW	UNA	MON	NW/NW 36-37-74 (6 WELLS) - MINE UNIT 27 MONITOR WELLS	CAMECO RESOURCES
P96072W	36	74	36	SWNE	GST	MON	SMC1062	POWER RESOURCES INC
P96072W	36	74	36	SENE	GST	MON	35-883 (REYNOLDS RANCH)	POWER RESOURCES INC
P96072W	36	74	36	NWNW	UNA	MON	NWNW 36-37-74 (2 WELLS)-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC
P96072W	36	74	36	SWNW	GST	IND	SMC1054	POWER RESOURCES INC
P96072W	36	74	36	SENW	GST	IND	SMC1054	POWER RESOURCES INC
P96072W	36	74	36	SWNE	UNA	IND	SMC1056C	POWER RESOURCES INC
P96072W	36	74	36	SENW	UNA	IND	SMC1056C	POWER RESOURCES INC
P96072W	37	74	36	SENW	UNA	IND	SMC1067C	POWER RESOURCES INC
P96072W	37	74	36	SWSW	UNA	IND	SMC1067C	POWER RESOURCES INC
P96072W	37	74	36	SWNW	UNA	MON	SWNW 36-37-74 (1 WELL) - MINE UNIT 27 MONITOR WELL	CAMECO RESOURCES
P96072W	37	74	36	SENE	GST	MON	SMC1072S	POWER RESOURCES INC
P96072W	37	74	36	SENW	UNA	MON	SENW 36-37-74 (3 WELLS)-MINE UNIT 27 MONITOR WELLS	POWER RESOURCES, INC
P96072W	37	74	36	NESE	GSI	IND	WW-35-1	POWER RESOURCES, INC** USDI - BLM** WYOMING STATE BOARD OF LAND COMMISSIONERS
P96072W	37	74	36	NESE	GSI	IND	WW-35-1	POWER RESOURCES, INC** USDI - BLM** WYOMING STATE BOARD OF LAND COMMISSIONERS
P96072W	37	74	36	NWSW	UNA	MON	NW/SW 36-37-74 (6 WELLS) - MINE UNIT 27 MONITOR WELLS	CAMECO RESOURCES
P96072W	37	74	36	SWNW	UNA	IND	SMC1060	POWER RESOURCES INC
P96072W	37	74	36	SENW	UNA	IND	SMC1060	POWER RESOURCES INC
P96072W	37	73	22	SENE	UNA	STO	DUCK CREEK #22-1	DUCK CREEK RANCHES, INC.
P96072W	37	73	22	SENE	UNA	STO	DUCK CREEK #22-1	DUCK CREEK RANCHES, INC.
P96072W	37	73	28	SENW	GST	MON	U 201	POWER RESOURCES INC
P96072W	37	73	28	NWNW	UNA	STO	DUCK CREEK #31	DUCK CREEK RANCHES INC.
P96072W	37	73	28	SENW	GST	MON	UM 200	POWER RESOURCES INC
P96072W	37	73	28	SENW	GST	MON	UM 199	POWER RESOURCES INC
P96072W	37	73	28	NESW	UNA	STO	DUCK CREEK #32	DUCK CREEK RANCHES INC.
P96072W	37	73	32	SWSW	ADJ	MIS	WS 28-1	WY BOARD OF LAND COMMISSIONERS** SEQUOYAH FUELS CORPORATION
P96072W	37	73	33	SWSW	GST	STO	DUCK CREEK #1	DUCK CREEK RANCHES INC.
P96072W	37	73	33	SWSW	GST	STO	DUCK CREEK #1	DUCK CREEK RANCHES INC.
P96072W	37	73	33	SENW	GST	MON	UM 198	POWER RESOURCES INC
P96072W	37	73	33	NWNE	UNA	STO	DCR #1	DUCK CREEK RANCHES INC.
P96072W	37	72	30	NWNW	GST	STO	MANNING #6	USDI, BUREAU OF LAND MANAGEMENT**WARREN A. & JUDITH Y. MANNING
P96072W	37	72	31	NWNW	GST	STO	MANNING #6	USDI, BUREAU OF LAND MANAGEMENT**WARREN A. & JUDITH Y. MANNING
P96072W	37	72	31	SESE	GST	STO	#1 G MANNING SOUTHWEST WINDMILL	WARREN A. & JUDITH Y. MANNING
P96072W	37	72	31	SESE	GST	STO	#1 G MANNING SOUTHWEST WINDMILL	WARREN A. & JUDITH Y. MANNING
P96072W	37	71	18	NWNE	UNA	STO	EAST ANTONE #94	BONER BROTHERS PARTNERSHIP
P96072W	37	72	2	NWSE	UNA	STO	EAST JENKINS #13	CANON LAND AND LIVESTOCK
P96072W	37	72	2	NESE	UNA	STO	JENKINS #20	SCOTT RANCHES LIABILITY COMPANY
P96072W	37	72	2	NWSE	UNA	STO	MONUMENT #68	CANON LAND AND LIVESTOCK
P96072W	37	73	5	NWNW	GST	STO	TAYLOR # 3	SMITH SHEEP CO.
P96072W	37	73	5	NWNW	GST	STO	TAYLOR # 3	SMITH SHEEP CO.
P96072W	37	75	3	SENW	ADJ	MIS,FIR	D J MINE #2	PACIFIC POWER & LIGHT CO.
P96072W	37	75	3	SENW	ADJ	MIS,FIR	D J MINE #2	PACIFIC POWER & LIGHT CO.
P96072W	37	75	4	SESE	UNA	MON	DJ84-SC-21	GLENROCK COAL COMPANY
P96072W	37	75	4	SENE	GST	MIS	GD-MPVE-01, GD-MPVE-02	WDEQ/WQD
P96072W	37	75	4	SENW	UNA	MIS	ENL. D.J. MINE #2	PACIFIC POWER & LIGHT COMPANY
P96072W	37	75	10	NWSE	GSI	STO	DJ07	DAVE JOHNSTON MINE
P96072W	37	75	10	SESE	GSI	STO	DJ07	DAVE JOHNSTON MINE
P96072W	37	75	10	SWSW	GSI	STO	DJ07	DAVE JOHNSTON MINE
P96072W	37	75	10	NWSE	GSI	STO	DJ07	DAVE JOHNSTON MINE
P96072W	37	75	10	NESE	GSI	STO	DJ07	DAVE JOHNSTON MINE
P96072W	37	75	10	SWNE	UNA	MON	DJ SW 38 90	GLENROCK COAL COMPANY
P96072W	37	75	11	SWNE	UNA	MON	DJ98-SW-14	GLENROCK COAL COMPANY
P96072W	37	75	11	SESW	GST	STO	HERMA # 3	TILLARD 55 L. T. D.
P96072W	37	75	12	SESW	GST	STO	HERMA # 3	TILLARD 55 L. T. D.
P96072W	37	75	13	NESW	UNA	DOM,STO	JOAN #2	GEORGE C. KINDT
P96420W	37	75	13	NESW	UNA	DOM,STO	JOAN #2	GEORGE C. KINDT
P96481W	37	75	13	NESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P96481W	37	75	13	NWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P96481W	37	75	13	SWSE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P96481W	37	75	13	SESE	GST	MIS	WW-27-1	USDI, BUREAU OF LAND MANAGEMENT** POWER RESOURCES INC
P96482W	37	75	24	SESE	GST	DOM,STO	HOYER #1	ROY G. HOYER

Table D6-10 Ground Water Rights SR-HUP/Reynolds +3 Mile Buffer

P96483W	37	75	24	SESE	GST	DOM,STO	HOYER #1	ROY G. HOYER
P96483W	37	75	24	NWNE	UNA	DOM,STO	POPSKULL 28-2	MELVIN H. SR. & E. LOUISE SEIDEL
P96483W	37	75	24	NWSE	UNA	MON	DJ98-SW-15	GLENROCK COAL COMPANY
P96483W	37	75	28	SWSW	GST	DOM	EMVY #1	DAMON J & GRETCHEN C ENGEL
P98616W	37	75	28	SWSW	GST	DOM	EMVY #1	DAMON J & GRETCHEN C ENGEL
P98616W	37	75	28	SENW	GST	DOM,STO	Hoyer #1	DAMON J & GRETCHEN C ENGEL
P98616W	37	75	28	SENW	GST	DOM,STO	Hoyer #1	DAMON J & GRETCHEN C ENGEL
P98616W	37	75	28	SWNE	GSI	DOM	ALLISON #1	TERRY LYNN ALLISON
P98617W	37	75	28	SWNE	GSI	DOM	ALLISON #1	TERRY LYNN ALLISON
P98617W	37	75	34	NWNW	UNA	STO,IRR,DOM	SCHOLTZ #2	NA FIRST INTERSTATE BANK OF CASPER
P98617W	37	75	34	NWNW	GSI	DOM	ENL. SCHOLTZ #1	ROY G. HOYER
P98617W	37	75	34	NWNW	UNA	IRR	SCHOLTZ #1	NA FIRST INTERSTATE BANK OF CASPER
P98617W	37	75	34	NWNW	UNA	IRR	SCHOLTZ #1	NA FIRST INTERSTATE BANK OF CASPER
P98617W	37	75	34	SWSW	GSI	DOM,STO	ROLLING HILLS #2	ROY G. HOYER
P99382W	37	75	34	SWSW	GSI	DOM,STO	ROLLING HILLS #2	ROY G. HOYER
P99386W	37	75	34	NWNW	UNA	MON	DJ81-BA-12	WY BOARD OF LAND COMMISSIONERS** GLENROCK COAL COMPANY
P99579W	37	75	34	NWNE	GST	MON	36-UB (W)-11	AMMONITE ENERGY TEXAS, INC.** WY STATE BOARD OF LAND COMMISSIONERS
P99579W	37	75	34	SWNW	UNA	MON	DJ96-1B-12A	GLENROCK COAL COMPANY
P99579W	37	75	34	NWNE	UNA	CBM	THOMAS JEFFERSON STATE #36-2	WY STATE BOARD OF LAND COMMISSIONERS** AMMONITE ENERGY TEXAS, INC.
P99579W	37	75	34	NWNE	UNA	CBM	THOMAS JEFFERSON STATE #36-2	WY STATE BOARD OF LAND COMMISSIONERS** AMMONITE ENERGY TEXAS, INC.
P99580W	37	75	35	NWNW	UNA	MIS	SDU WATER WELL #1	KERR-MCGEE CORPORATION
P99580W	37	75	36	SWNE	UNA	CBM	THOMAS JEFFERSON STATE #36-1	WY STATE BOARD OF LAND COMMISSIONERS** AMMONITE ENERGY TEXAS, INC.
P99580W	37	75	36	SWNE	UNA	CBM	THOMAS JEFFERSON STATE #36-1	WY STATE BOARD OF LAND COMMISSIONERS** AMMONITE ENERGY TEXAS, INC.
P99580W	37	75	36	SENE	UNA	CBM	THOMAS JEFFERSON STATE #36-4	WY STATE BOARD OF LAND COMMISSIONERS** AMMONITE ENERGY TEXAS, INC.
P99580W	37	75	36	SENE	UNA	CBM	THOMAS JEFFERSON STATE #36-4	WY STATE BOARD OF LAND COMMISSIONERS** AMMONITE ENERGY TEXAS, INC.
P99580W	37	75	36	NENE	UNA	CBM	THOMAS JEFFERSON STATE #36-3	WY STATE BOARD OF LAND COMMISSIONERS** AMMONITE ENERGY TEXAS, INC.
P99580W	37	75	36	NENE	UNA	CBM	THOMAS JEFFERSON STATE #36-3	WY STATE BOARD OF LAND COMMISSIONERS** AMMONITE ENERGY TEXAS, INC.



REVISIONS		
NO.	DATE	BY
0	12/30/10	AMK

CAMECO

Cameco Resources
SMITH RANCH
PERMIT NO. 633
Converse County, Wyoming

FIGURE D6-1
SURFACE WATER DRAINAGE MAP

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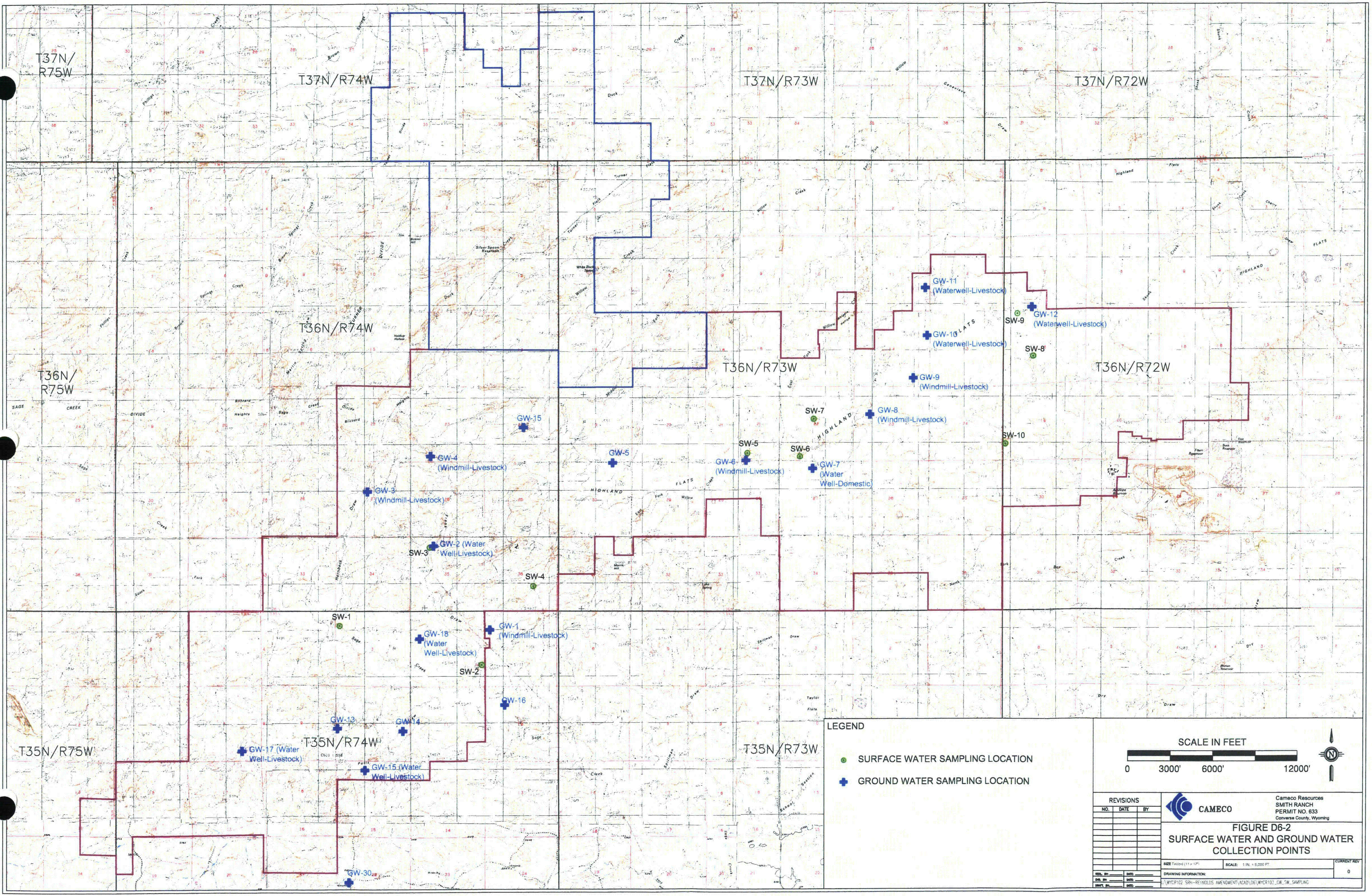
CURRENT REV
0

:\WYCR102 SRH-REYNOLDS AMENDMENT\ACAD\D6\WYCR102_GW_SW_SAMPLING.dwg, SW_GW_SAMPLING, 4/25/2011 10:28:34 AM, som, Tabloid (11 x 17")



LEGEND

- SURFACE WATER SAMPLING LOCATION
- ✚ GROUND WATER SAMPLING LOCATION

SCALE IN FEET

0 3000' 6000' 12000'

N

REVISIONS		
NO.	DATE	BY

GEOL. BY: ______ DATE: ______
DWG. BY: ______ DATE: ______
DRAFT. BY: ______ DATE: ______

CAMECO

Cameco Resources
SMITH RANCH
PERMIT NO. 633
Converse County, Wyoming

FIGURE D6-2
SURFACE WATER AND GROUND WATER
COLLECTION POINTS

SIZE Tabloid (11 x 17")
SCALE: 1 IN. = 6,000 FT.
CURRENT REV 0
DRAWING INFORMATION:
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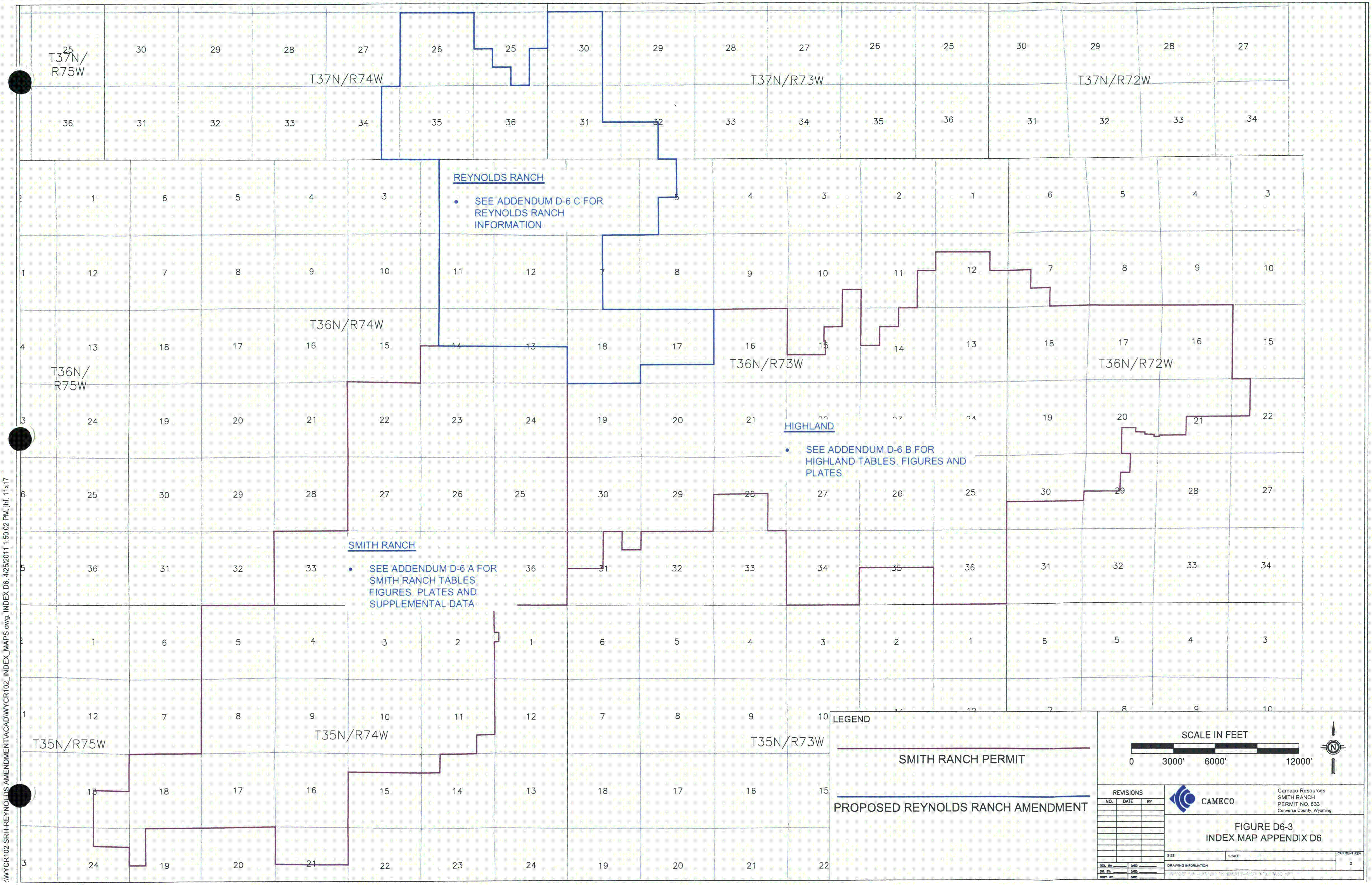

REYNOLDS RANCH

- SEE ADDENDUM D-6 C FOR REYNOLDS RANCH INFORMATION

HIGHLAND

- SEE ADDENDUM D-6 B FOR HIGHLAND TABLES, FIGURES AND PLATES

SMITH RANCH

- SEE ADDENDUM D-6 A FOR SMITH RANCH TABLES, FIGURES, PLATES AND SUPPLEMENTAL DATA

LEGEND

🟪	SMITH RANCH PERMIT
🟦	PROPOSED REYNOLDS RANCH AMENDMENT

REVISIONS

NO.	DATE	BY

GEOL. BY: DATE:
DIG. BY: DATE:
DRAFT. BY: DATE:

CAMECO

Cameco Resources
SMITH RANCH
PERMIT NO. 633
Converse County, Wyoming

FIGURE D6-3
INDEX MAP APPENDIX D6

SIZE
SCALE
CURRENT REV 0
DRAWING INFORMATION

:WYCR102 SRH-REYNOLDS AMENDMENT\ACAD\WYCR102_INDEX_MAPS.dwg, INDEX D6, 4/25/2011 1:50:02 PM, jhf, 11x17

The following 6 Drawings specifically referenced Appendix D6 Table of Contents have been processed into ADAMS.

These drawings can be accessed within the ADAMS package or by performing a search on the Document/Report Number.

D-139 to D-144

Table D-6.1 Description of Hydrogeologic Units in the Vicinity of the Proposed Site

GEOLOGIC AGE	HYDRO-GEOLOGICAL UNIT	APPROXIMATE TOP / THICKNESS (ft.)	LITHOLOGIC CHARACTERISTICS	HYDROLOGIC CHARACTERISTICS
Holocene	Alluvium	Surf. / 0-30	Clay, silt, sand, & gravel w/ some slope - wash material	Small quantities of water & small yields in stream valleys
Eocene	Wasatch Fm.	30 / 0-500	Fine to coarse gr. Lenticular Ss. & int-bed. Clayst. & Siltst.	Groundwater procuction good, but lenticular nature restricts aquifer use locally, yields of as much as 140 gpm have been produced.
Paleocene	Fort Union Fm.	0-500 / 3,000	Fine to coarse gr. Lenticular Ss int-bed. Carbonaceous	Groundwater production good beneath site, yields of 550 gpm have been produced over prolonged periods.
Cretaceous	Lance Fm.	3,500 / 3,000	Fine to medium gr. Ss., & int-bed. Sh., Clayst.	Groundwater production largely unknown in vicinty of site, probably would not yield over 20 gpm.
Cretaceous	Fox Hills Ss.	6,500 / 500-1,000	Fine to medium gr. Ss., & int-bed. thin, sndy. Sh.	Groundwater production largely unknown in vicinity of mine site, probably would not yield over 100 gpm.
Cretaceous	Pierre Sh.	7,500 / 4,650	Marine Sh., bentonitic, w/ local off-shore bar to near-shore Ss. members - Teckla, Teapot, Parkman, Sussex, Shannon.	Groundwater production unknown in vacinity of mine site, probably v. saline/briney water.
Cretaceous	Niobrara Sh.	12,150 / 400-500	Sh., dk.gry - dk.brn.gry, "speckled", v. calcareous.	Groundwater production unknown, probably briney waters / hydro-carbons.
Cretaceous	Frontier Fm.	12,650 / 1,200	Marine Sh., bentonitic, w/ int-bed Ss., & Ls. Locally divided into Turner (Wall Creek) Ss., Carlile Sh., & Greenhorn Ls.	Groundwater production unknown in vacinity of mine site except for briney water production associated with oil wells.
Cretaceous (Lower)	Mowry Sh.	13,850 / 140	Marine Sh., med. - dk. gry., v. calc., & bentonitic.	Groundwater production unknown, probably tight, low water yield, & briney.
Cretaceous (Lower)	Muddy Ss.	13,990 / 50	Ss., v. fine - fine gr., argil., w/int-bed Clay lenses.	Groundwater production unknown in area, except for briny water production associated with oil wells.
Cretaceous (Lower)	Skull Creek Sh.	14,040 / 100-120	Marine Sh., dk. gry. - blk., locally carbonaceous & bentonitic.	Groundwater production unknown - probably tight, w/ low-yield briney conate fluids.
Cretaceous (Lower)	Dakota Fm.	14,160 / 65-80	Int-bed., Siltst. - Ss., lt. gry. - white, fine- medium gr., loc. - conglomeritic.	Groundwater - probably briney, conate fluids.
Cretaceous (Lower)	Inyan Kara Group	14,240 / 40	Marine Sh., dk. gry., & Ss., brn. gry. - white, fine - medium gr., (Fuson Sh. & Lakota Ss.)	Groundwater production unknown in mine site area, probably briney, conate, marine waters, & hydro-carbons.
Jurassic	Morrison Fm.	14,280 / 155	Int-bed., Sh, Clayst., Siltst., variegated gry. - gry. grn. - maroon, v. bentonitic.	Groundwater production unknown - probably tight, w/ low-yield briney fluids.
Jurassic	Sundance Fm.	14,435 / 320	Marine Sh., grn. gry., loc. fossiliferous - (belemnite), Basal member - (Canyon Springs Ss.), white - lt. gry., v. fine - fine gr.	Groundwater production unknown in area, briney, conate fluids most likely.
Triassic	Chugwater Group	14,755 / 750	(Red - beds), Alcova Ls., White - pnk.gry., micro-crystaline, marine, & Spearfish Sh., mod. red - maroon, loc. v. gypsumniferous & Silty.	Groundwater - briney conate fluids.
Permian	Goose Egg Group	15,505 / 385 - 400	Evaporite sequence - anhydrite, salt, gypsum, coastal - near/shore enviro., (Forelle, & Minnekahta Ls.) (Glendo, & Opeche Sh.)	Groundwater - briney conate fluids.
Pennsylvanian	Minnelusa Fm.	15,905 / 600 - 650	Int - bed. costal, Ss., Ls., & Dolo. pink. gry.- white., v. fine - med. fine. gr.	Groundwater production unknown - most likely briney, conate fluids - water/ hydrocarbon ??
Mississippian	Madison Ls.	16,555 / Thk. unknown	Ls., gry. - white, massive, crypto. - micro.crystalline, loc. vug. - frac. porosity.	Groundwater production unknown, most likely briney, conate fluid at this depth.
Devonian / Silurian		Absent		
Ordovician	Big Horn Dolo.	Top / Thk. unknown	Dolo., Ls., lt. gry., massive, siliceous	Groundwater unknown - briney conate fluid, most likey.
Cambrian	Deadwood Fm.	Top / Thk. unknown	Ss., predom., brn. gry - white, fine - med. gr., (Flathead equivalent).	Groundwater unknown - briney conate fliud.

Sources:
Holocene through Fox Hills after Hodson et al., 1973; Pierre through Deadwood, T. Nicholson compilation - ANSCHUTZ - Colter 14-8, Sec. 8, T. 36N., R. 74W. & SWEPCO - Vollman 33-27, Sec. 27, T.36N., R. 73W. & RANCHER Unit No. 175, Sec.20, T.32N., R.75W.

TABLE D-6.4

INVENTORY OF WELLS IN PERMIT AREA AND ON ADJACENT LANDS

Q-SAND ISL PILOT WELLS

						Water Level			
Wyoming Well Number - a	Owner and/or RAMC's Well Number	Wyoming Well Permit Number	Formation-Aquifer b,e	Elevation of Land Surface AMSL (feet)	Depth of Well (feet)	Depth to Water Below Land Surface (feet)	Elevation of Water Level AMSL (feet)	Date of Water Level Measurement (month/year)	Yield (gpm)
36-74-36*	SFC - QP-1	51366	W - Q	5545	497	371.7	5173.3	10/80	15
	SFC - QP-2	51367	W - Q	5543	495	368.3	5174.7	10/80	15
	SFC - QP-3	51368	W - Q	5556	512	382.7	5173.3	10/80	79
	SFC - QP-4	51369	W - Q	5558	515	384.9	5173.1	10/80	25
	SFC - QP-5	56256	W - Q	5551	517	377.8	5173.2	10/80	25
	SFC - QI-1	65138	W - Q	5555	509	381.7	5173.3	10/80	20
	SFC - QI-2	65130	W - Q	5545	496	371.1	5173.9	10/80	18
	SFC - QI-4	65140	W - Q	5547	513	373.5	5173.5	10/80	20
	SFC - QI-5	65141	W - Q	5559	513	385.9	5173.1	10/80	20
	SFC - QI-6	65142	W - Q	5564	520	390.9	5173.1	10/80	20
	SFC - QI-7	65143	W - Q	5566	522	393.1	5172.9	10/80	20
	SFC - QI-8	65144	W - Q	5552	503	378.1	5173.9	10/80	20
	SFC - QI-9	65145	W - Q	5551	505	377.6	5173.4	10/80	20
	SFC - QI-10	65146	W - Q	5542	514	368.4	5173.6	10/80	20
	SFC - QI-11	65147	W - Q	5553	525	379.9	5173.1	10/80	20
	SFC - QM-1	48319	W - Q	5549	505	374.2	5174.8	10/80	-
	SFC - QM-2	51371	W - Q	5534	505	359.5	5174.5	10/80	-
	SFC - QM-3	51372	W - Q	5527	505	353.5	5173.5	10/80	-
	SFC - QM-4	51373	W - Q	5549	539	376.4	5172.6	10/80	-
	SFC - QM-5	51374	W - Q	5581	537	409.2	5171.8	10/80	-
	SFC - QM-6	51375	W - Q	5561	520	388.5	5172.5	10/80	-
	SFC - QM-7	51376	W - Q	5561	514	387.7	5173.3	10/80	-
	SFC - QM-8	51377	W - Q	5555	508	378.3	5176.7	10/80	-
	SFC - QMW-1	52900	W - W	5557	350	186.8	5370.2	10/80	-
	SFC - QMS-1	48319	W - S	5552	421	313.7	5238.2	10/80	-
	SFC - QMO-1	48319	F - O	5544	612	577.9	4966.1	10/80	-

* See Figure D-6.4 for pilot location and Figure D-6.5 for pilot well pattern

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Q-SAND WELLFIELD BASELINE DATA AND RESTORATION TARGETS

Parameter	EPA Drinking Water Standard*	Baseline Range	Baseline Mean	Baseline Mean + 2 Std. Dev.	Restoration Target Value	Average Final Value
Aluminum (Al)	-	.006- .37	.135	.293	**	.1
Arsenic (As)	.05	.001- .013	.004	.011	.05	.008
Boron (B)	-	.002- .70	.15	.47	.54	.14
Barium (Ba)	1.0	.016- .42	.09	.24	**	.1
Calcium (Ca)	-	24- 171	72	127	120	78
Cadmium (Cd)	.01	.001- .1	.036	.122	**	.002
Chromium (Cr)	.05	.01- .14	.023	.091	**	.01
Copper (Cu)	1.0	.005- .19	.015	.082	**	.01
Iron (Fe)	0.3	.01- .27	.025	.12	.3	.24
Mercury (Hg)	.002	.001- .003	.0011	.0019	**	.0002
Potassium (K)	-	7- 34	12	22	23	8
Magnesium (Mg)	-	3- 22	16	24	26	19
Manganese (Mn)	.05	.01- .077	.023	.06	.092	.06
Molybdenum (Mo)	-	.017- .2	.16	.30	**	.1
Sodium (Na)	-	19- 87	28	57	41	38
Nickel (Ni)	-	.015- .05	.045	.067	**	.02
Lead (Pb)	.05	.001- .05	.043	.078	**	.05
Selenium (Se)	.01	.001- .024	.004	.014	.029	.003
Uranium (U)	-	.001- 3.1	.28	1.44	3.7	1.45
Vanadium (V)	-	.005- .27	.022	.120	**	.1
Zinc (Zn)	5.0	.003- .95	.135	.521	**	.122
Chloride (Cl)	250	4- 65	18	52	250	15
Bicarbonate (HCO_3)	-	129- 245	199	265	294	254
Carbonate (CO_3)	-	ND- 13	3	12	16	ND
Fluoride (F)	2	.19- .40	.30	.42	**	.29
Nitrate (as N)	10	.1- 1	.4	1.0	**	.13
pH Units	6.5-8.5	7.5- 9.4	8.0	8.8	6.5-8.6	7.0
Sp. Cond. umhos/cm	-	518- 689	582	669	827	642
Sulfate (SO_4)	250	100- 200	124	164	250	128
TDS	500	155- 673	388	568	571	443
Th-230 (Th), pCi/l	-	.027- 4.68	1.03	5.1	5.62	3.4
Ra-226 (Ra), pCi/l	5	6- 1132	340	968	923	477

*EPA Primary or Secondary Drinking Water Standards

**Parameter not affected by mining - no restoration target required.

TA J-6.6

O-SAND WELLFIELD BASELINE DATA AND RESTORATION TARGETS

Parameter	EPA Drinking Water Standard*	Baseline Range	Baseline Mean	Baseline Mean + 2 Std. Dev.	Current License Language
Aluminum (Al)	-	.1- .2	.104	.14	.24
Arsenic (As)	.05	.001- .016	.004	.011	.05
Boron (B)	-	.01- .3	.14	.26	.36
Barium (Ba)	1.0	.1- .2	.104	.14	1.0
Calcium (Ca)	-	83- 122	107	124	146
Cadmium (Cd)	.01	.002- .02	.004	.012	.024
Cobalt (Co)	-	.01- .05	.012	.03	.06
Chromium (Cr)	.05	.01- .05	.02	.06	.06
Copper (Cu)	1.0	.01- .04	.012	.02	1.0
Iron (Fe)	0.3	.01- .32	.06	.21	.38
Mercury (Hg)	.002	.0002-.0005	.0002	.0003	.002
Potassium (K)	-	6- 25	13	26	30
Magnesium (Mg)	-	21- 32	26	30	38
Manganese (Mn)	.05	.01- .31	.03	.12	.37
Molybdenum (Mo)	-	.001- .1	.07	.17	.12
Sodium (Na)	-	24- 32	27	31	38
Nickel (Ni)	-	.02- .18	.03	.08	.22
Lead (Pb)	.05	.01- .20	.05	.10	.24
Selenium (Se)	.01	.001- .046	.005	.023	.055
Uranium (U)	-	.003- 1.68	.252	1.02	2.02
Vanadium (V)	-	.01- .1	.10	.14	.12
Zinc (Zn)	5.0	.005- 1.11	.19	.67	5.0
Chloride (Cl)	250	2- 8	4	8	250
Bicarbonate (HCO_3)	-	146- 234	204	240	281
Carbonate (CO_3)	-	Not Detected	-	-	-
Fluoride (F)	2	.2- .74	.46	.69	2
Nitrate (as N)	10	.01- .21	.04	.11	10
pH Units	6.5-8.5	7.31- 8.16	7.69	8.1	8.5
Sp. Cond. umhos/cm	-	636- 978	778	901	1174
Sulfate (SO_4)	250	244- 310	268	300	372
TDS	500	522- 656	583	644	787
Th-230 (Th), pCi/l	-	.0- 5.6	1.1	3.3	6.7
Ra-226 (Ra), pCi/l	5	61- 680	272	561	816

*EPA Primary or Secondary Drinking Water Standards

TABLE D-6.7

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 2-295, Sec. 2, T35N, R74W

	1/2/86	1/30/86	3/13/86	5/27/86	7/30/86
Dissolved Solids (TDS)	323	359	322	334	351
Sodium (Na)	25	27	26	26	26
Potassium (K)	11	8	8	7.9	8
Calcium (Ca)	59	64	59	56	58
Magnesium (Mg)	12	10	15	16	16
Sulfate (SO_4)	98	111	106	126	98
Chloride (Cl)	11	9	9	5.1	10
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	185	195	195	187	193
Major Cations, meq	5.30	5.38	5.50	5.46	5.54
Major Anions, meq	5.10	5.65	5.65	5.86	5.49
Nitrate (as N)	0.05	0.17	0.07	0.02	0.10
Floride (F)	0.36	0.45	0.45	0.50	0.34
Boron (B)	0.14	0.16	0.05	< .01	0.05
[illegible]uminum (Al)	< .10	< .10	< .10	< .01	< .10
[illegible]senic (As)	< .001	< 0.001	< .001	< 0.001	0.008
Barium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	< .002	< .002	< .002	< 0.01	< .002
Cobalt (Co)	< .10	< .01	< .10	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	< .01	< .01	0.01	< 0.05	0.03
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	< .01	0.01	0.02	< 0.02	< .01
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	< .001	0.001	< .001	0.002	0.002
Zinc (Zn)	0.265	0.220	0.593	0.65	0.585
Molybdenum (Mo)	< .10	< .10	< .10	< 0.1	< .10
Uranium (U)	0.292	0.026	0.028	0.065	0.028
Vanadium (V)	< .10	< .10	< .10	< 0.10	< .10
Radium-226 (Ra-226)	5.0	10.2	29.2	91.8	10.2
Thorium-230 (Th-230)	2.3	5.4	1.8	18.4	3.5
[illegible]ec. Cond - umhos	524	582	393	497	506
[illegible]perature °F	14	15	15	16	16
[illegible] - Units	7.70	7.39	7.33	7.35	7.36

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.8

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 2-296, Sec. 2, T35N, R74W

	1/2/86	2/03/86	3/12/86	6/03/86	8/05/86
Dissolved Solids (TDS)	349	343	326	346	308
Sodium (Na)	27	27	27	26	26.4
Potassium (K)	14	11	11	9	7.7
Calcium (Ca)	61	59	50	56	52.5
Magnesium (Mg)	10	12	14	16	12.3
Sulfate (SO_4)	97	105	106	116	103
Chloride (Cl)	10	9	8	8	4.3
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	188	185	173	185	168
Major Cations, meq	5.39	5.38	5.10	5.47	5.00
Major Anions, meq	5.38	5.46	5.27	5.67	5.05
Nitrate (as N)	0.07	.05	0.07	.05	0.03
Floride (F)	0.45	0.51	0.51	0.33	0.47
Boron (B)	0.11	0.04	0.18	0.21	< 0.10
uminum (Al)	< .10	< .10	< .10	< .10	< 0.10
senic (As)	< .001	< 0.001	0.001	0.002	0.001
rium (Ba)	< .10	< .10	< .10	< .10	< 0.10
Cadmium (Cd)	< .002	< .002	< .002	< .002	< 0.01
Cobalt (Co)	< .10	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .10	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .10	< .01	< .01	< .01	< 0.01
Iron (Fe)	0.05	< .01	0.04	0.02	< 0.05
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	< .01	0.01	0.04	0.03	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	.02	< .02	< 0.05
Selenium (Se)	< .001	0.001	0.001	0.001	< 0.001
Zinc (Zn)	0.151	0.143	0.010	0.140	0.59
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.081	0.049	0.046	0.044	0.030
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	306	190	282	257	28.7
Thorium-230 (Th-230)	28	8.2	52	1.1	21.8
ec. Cond - umhos	549	521	523	516	496
nperature °F	14	15	15	17	18
- Units	8.10	7.62	8.42	7.55	7.44

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.9

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 8-136, Sec. 8, T35N, R74W

	1/27/86	2/17/86	3/17/86	5/27/86	7/31/86
Dissolved Solids (TDS)	630	632	658	612	599
Sodium (Na)	25	24	26	26	22
Potassium (K)	8	8	8	8	8
Calcium (Ca)	120	124	120	114	116
Magnesium (Mg)	34	37	37	35	37
Sulfate (SO_4)	279	299	296	214	290
Chloride (Cl)	7	7	7	1.9	9
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	220	222	229	207	210
Major Cations, meq	10.07	10.47	10.36	9.97	9.99
Major Anions, meq	9.61	10.06	10.12	10.01	9.72
Nitrate (as N)	0.08	< .05	0.09	< 0.01	< .05
Floride (F)	0.51	0.51	0.45	0.46	0.34
Boron (B)	0.22	0.08	0.16	< 0.1	0.23
uminum (Al)	< .10	< .10	< .10	< 0.1	< .10
senic (As)	0.002	< .001	0.002	0.003	0.002
arium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	0.008	< .002	< .002	< 0.01	< .002
Cobalt (Co)	< .01	< .01	< .10	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	< .01	0.17	0.88	< 0.05	0.16
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	0.10	0.10	0.13	0.19	0.04
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	< .001	0.001	0.001	0.008	0.010
Zinc (Zn)	0.224	0.608	0.718	0.85	1.58
Molybdenum (Mo)	< .10	< .10	< .10	< 0.1	< .10
Uranium (U)	1.823	2.078	0.390	2.265	2.600
Vanadium (V)	< .10	< .10	< .10	< 0.10	< .10
Radium-226 (Ra-226)	420	552	279	443.6	399
Thorium-230 (Th-230)	99	5.8	1.3	197.9	6.8
ec. Cond - umhos	864	930	873	849	877
mperature °F	13	15	15	18	18
- Units	6.67	7.05	6.94	7.07	7.10

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.10

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 17-421, Sec. 17, T35N, R74W

	1/27/86	2/17/86	3/17/86	5/27/86	7/31/86
Dissolved Solids (TDS)	855	968	849	858	896
Sodium (Na)	31	30	30	34	29
Potassium (K)	13	13	12	13.5	13
Calcium (Ca)	152	168	148	140	164
Magnesium (Mg)	41	46	54	51	51
Sulfate (SO_4)	448	510	436	483	444
Chloride (Cl)	8	7	7	4.4	7
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	183	220	232	235	254
Major Cations, meq	12.63	13.80	13.45	13.52	13.96
Major Anions, meq	12.55	14.42	13.07	14.07	13.61
Nitrate (as N)	0.07	0.11	0.24	0.11	0.12
Floride (F)	0.51	0.57	0.51	0.52	0.35
Boron (B)	0.27	0.10	0.10	< .01	0.38
uminum (Al)	< .10	< .10	< .10	< 0.1	< .10
enic (As)	< .001	0.001	0.002	0.012	0.002
ium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	0.012	0.004	< .002	< 0.01	< .002
Cobalt (Co)	< .01	< .01	< .10	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	0.02	< .01	0.01	< 0.05	0.15
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	0.14	0.11	0.14	0.13	0.12
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	0.039	0.38	0.139	0.219	0.125
Zinc (Zn)	0.662	1.40	2.14	1.53	1.67
Molybdenum (Mo)	< .10	< .10	< .10	< 0.1	< .10
Uranium (U)	0.139	0.095	0.079	6.795	0.079
Vanadium (V)	< .10	< .10	< .10	0.10	< .10
Radium-226 (Ra-226)	194	324	401	319	386
Thorium-230 (Th-230)	26.1	40	3.1	170.1	32
ec. Cond - umhos	1027	1169	1147	1158	1103
perature °F	16	15	14	17	22
- Units	7.33	7.23	7.19	7.17	7.26

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.11

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 17-422, Sec. 17, T35N, R74W

	1/27/86	2/20/86	4/10/86	6/24/86	8/28/86
Dissolved Solids (TDS)	307	311	291	272	375
Sodium (Na)	24	24	25	29	32
Potassium (K)	9	9	10	10.5	7
Calcium (Ca)	51	50	50	49	59
Magnesium (Mg)	12	12	13	13.3	11
Sulfate (SO_4)	98	109	110	99.6	86
Chloride (Cl)	10	9	9	2.6	9
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	142	146	151	160	200
Major Cations, meq	4.80	4.76	4.92	5.09	5.41
Major Anions, meq	4.65	4.91	5.02	4.80	5.32
Nitrate (as N)	0.07	0.08	0.13	0.06	0.15
Floride (F)	0.65	0.57	0.57	0.54	0.40
Boron (B)	0.11	0.04	< .01	< .01	0.13
uminum (Al)	< .10	< .10	< .10	< .01	< .10
senic (As)	0.002	0.002	0.002	0.002	0.003
Barium (Ba)	< .10	< .10	< .10	< .01	< .10
Cadmium (Cd)	< .002	0.004	< .002	< 0.01	< .002
Cobalt (Co)	< .01	< .01	< .01	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	< .01	0.01	< .01	< 0.05	0.02
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	0.02	< .01	0.01	< 0.01	0.03
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	0.022	0.011	0.028	0.02	0.017
Zinc (Zn)	0.741	1.33	0.786	1.24	1.095
Molybdenum (Mo)	< .10	< .10	< .10	< 0.10	< .10
Uranium (U)	2.247	1.866	1.87	2.700	2.120
Vanadium (V)	< .10	< .10	< .10	< 0.10	< .10
Radium-226 (Ra-226)	17.3	91	91	100.7	43
Thorium-230 (Th-230)	17.4	11.6	3.0	21.5	3.6
ec. Cond - umhos	464	450	495	458	496
perature °F	14	15	15	17	17
- Units	7.29	7.40	7.33	7.25	7.28

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.12

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 25-583, Sec. 25, T36N, R74W

	2/12/86	3/13/86	4/10/86	6/24/86	8/28/86
Dissolved Solids (TDS)	610	587	510	506	537
Sodium (Na)	30	27	30	31	31
Potassium (K)	9	9	9	9.7	7
Calcium (Ca)	104	104	104	102	96
Magnesium (Mg)	32	32	29	27.9	27
Sulfate (SO_4)	264	260	272	260	240
Chloride (Cl)	8	8	7	2.1	9
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	205	203	207	192	190
Major Cations, meq	9.36	9.22	9.11	9.02	8.54
Major Anions, meq	9.08	8.97	9.25	8.64	8.36
Nitrate (as N)	1.37	0.25	0.06	0.04	0.06
Floride (F)	0.36	0.40	0.40	0.32	0.30
Boron (B)	0.11	0.14	0.20	< 0.1	0.10
uminum (Al)	< .10	< .10	< .10	< 0.1	< .10
senic (As)	0.001	0.001	0.002	0.003	0.004
arium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	< .002	< .002	< .002	< 0.01	< .002
Cobalt (Co)	< .01	< .10	< .01	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	0.05	0.07	< .01	< 0.05	0.01
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	0.02	0.02	0.02	0.03	0.03
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	0.008	0.001	< .001	< 0.001	0.002
Zinc (Zn)	0.081	0.090	< .005	0.19	0.056
Molybdenum (Mo)	< .10	< .10	< .10	< 0.10	< .10
Uranium (U)	0.051	0.024	0.022	0.047	0.017
Vanadium (V)	< .10	< .10	< .10	< 0.10	< .10
Radium-226 (Ra-226)	106	88	169	76.8	75
Thorium-230 (Th-230)	1.5	1.2	1.7	5.7	1.2
ec. Cond - umhos	811	636	850	651	790
perature °F	16	15	15	17	17
- Units	7.23	7.24	7.20	7.16	7.30

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.13

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 25-584, Sec. 25, T36N, R74W

	1/31/86	2/20/86	3/19/86	5/25/86	7/10/86	7/31/86
Dissolved Solids (TDS)	618	597	576	546	578	571
Sodium (Na)	30	28	29	29	30.2	27
Potassium (K)	8	8	8	8	8.70	9
Calcium (Ca)	108	112	101	98	101	104
Magnesium (Mg)	29	29	32	26	25.4	29
Sulfate (SO_4)	288	264	246	259	256	240
Chloride (Cl)	8	7	6	2	2.7	9
Carbonate (CO_3)	0	0	0	0	0	0
Bicarbonate (HCO_3)	212	210	215	195	195	203
Major Cations, meq	9.28	9.39	9.13	8.53	8.70	8.97
Major Anions, meq	9.70	9.13	8.82	8.67	8.62	8.57
Nitrate (as N)	0.18	< .05	0.37	0.09	0.02	< .05
Floride (F)	0.36	0.45	0.40	0.32	0.31	0.24
Boron (B)	0.06	0.04	0.07	< .1	< 0.1	0.17
Aluminum (Al)	< .10	< .10	< .10	< .1	< 0.1	< .10
Arsenic (As)	0.001	0.001	0.001	0.001	0.001	0.004
Barium (Ba)	< .10	< .10	< .10	< .1	< 0.1	< .10
dmium (Cd)	< .002	0.004	< .002	< .01	< 0.01	< .002
obalt (Co)	< .01	< .01	< .01	< .01	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< .05	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	< .01	0.07	0.04	< .05	0.14	0.10
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	0.02	0.02	0.06	0.03	0.03	0.03
Mercury (Hg)	< .0002	< .0002	< .0002	< .001	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< .05	< 0.05	< .02
Selenium (Se)	0.002	0.001	0.001	0.001	< 0.001	0.005
Zinc (Zn)	0.456	1.17	0.095	0.65	0.54	0.524
Molybdenum (Mo)	< .10	< .10	< .10	< .1	< 0.1	< .10
Uranium (U)	0.014	0.024	0.025	0.047	0.041	0.017
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10	< .10
Radium-226 (Ra-226)	315	342	43	270	291.2	147
Thorium-230 (Th-230)	9.5	32.0	2.0	97.5	55.4	0.7
Spec. Cond - umhos	825	799	925	760	786	802
Temperature °F	16	15	15	17	17	17
pH - Units	7.35	7.13	7.06	7.23	7.20	7.17

a-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.14

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 25-585, Sec. 25, T36N, R74W

	3/19/86	4/11/86	5/05/86	7/24/86	9/30/86
Dissolved Solids (TDS)	304	318	317	173	342
Sodium (Na)	36	34	32	32	31
Potassium (K)	9	10	10	10	8
Calcium (Ca)	48	56	38	14	59.2
Magnesium (Mg)	10	7	6	3	8.9
Sulfate (SO_4)	104	110	105	82	109
Chloride (Cl)	17	16	14	11	11.2
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	159	160	100	37	165
Major Cations, meq	5.02	5.11	4.04	2.60	5.25
Major Anions, meq	5.25	5.36	4.21	2.63	5.30
Nitrate (as N)	0.11	0.07	0.10	< .05	0.02
Floride (F)	0.33	0.38	0.33	0.21	0.15
Boron (B)	0.09	0.09	0.16	0.03	< 0.10
Aluminum (Al)	< .10	< .10	< .10	< .10	< 0.01
Arsenic (As)	0.009	0.012	< .001	0.002	0.018
[illegible]ium (Ba)	< .10	< .10	< .10	< .10	< 0.10
Cadmium (Cd)	< .002	< .002	< .002	< .002	< 0.01
Cobalt (Co)	< .01	< .01	< .01	< .01	-
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	< .01	< 0.01
Iron (Fe)	0.02	< .01	0.02	0.02	< 0.05
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	0.03	0.01	0.01	< .01	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	0.003	< .001	< .001	0.001	< 0.001
Zinc (Zn)	0.135	< .005	0.063	< .005	0.36
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.036	0.032	0.08	0.095	0.034
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	40	218	73	7.9	2.0
Thorium-230 (Th-230)	2.2	0.8	1.0	0.6	0.5
Spec. Cond - umhos	540	499	436	330	530
Temperature °F	15	15	15	16	16
[illegible] - Units	8.36	8.15	8.40	7.67	7.93

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.15

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 25-586, Sec. 25, T36N, R74W

	4/28/86	6/19/86	11/05/86	12/17/86	2/26/87
Dissolved Solids (TDS)	531	259	256	262	269
Sodium (Na)	26	31	33	28	29.2
Potassium (K)	9	8	9	5	8.5
Calcium (Ca)	120	49	30	32	40.9
Magnesium (Mg)	20	9	9	5	9.6
Sulfate (SO_4)	252	114	103	87	109
Chloride (Cl)	45	16	13	12	5.0
Carbonate (CO_3)	0	0	17	0	0
Bicarbonate (HCO_3)	139	122	51	66	116
Major Cations, meq	8.99	4.74	3.91	3.36	4.337
Major Anions, meq	8.79	4.82	3.92	3.23	4.330
Nitrate (as N)	0.13	0.07	0.27	0.36	< 0.01
Floride (F)	0.40	0.33	0.30	0.33	0.36
Boron (B)	0.11	0.18	0.23	0.15	< 0.10
Aluminum (Al)	< .10	< .10	< .10	< .10	< 0.10
Arsenic (As)	< .001	< 0.001	< .001	< .001	< 0.001
Barium (Ba)	< .10	< .10	< .10	< .10	< 0.10
[illegible]dmium (Cd)	< .002	< .002	< .002	< .002	< 0.01
Cobalt (Co)	< .10	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	0.01	< .01	< .01	< .01	< 0.01
Iron (Fe)	0.04	0.02	0.01	0.03	< 0.05
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	0.15	0.05	0.01	0.02	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	0.005	0.001	< .001	0.002	< 0.001
Zinc (Zn)	0.263	0.231	0.007	0.231	0.11
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.020	0.002	0.005	0.003	0.005
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	31	10.4	2.0	2.6	3.5
Thorium-230 (Th-230)	0.7	0.6	1.3	0.7	2.5
Spec. Cond - umhos	779	515	717	505	469
Temperature °F	16	17	15	17	18
pH - Units	7.94	8.02	9.01	8.52	8.43

Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.16

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 25-589, Sec. 25, T36N, R74W

	1/16/86	1/28/86	3/07/86	5/25/86	7/30/86
Dissolved Solids (TDS)	584	600	522	518	583
Sodium (Na)	29	30	29	30	26
Potassium (K)	9	9	10	10	9
Calcium (Ca)	109	108	82	91	103
Magnesium (Mg)	20	27	20	26	24
Sulfate (SO_4)	223	251	242	259	252
Chloride (Cl)	8	9	8	2.9	9
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	207	207	142	181	205
Major Cations, meq	8.57	9.15	7.25	8.28	8.47
Major Anions, meq	8.26	8.86	7.59	8.47	8.85
Nitrate (as N)	< .05	0.07	< .05	0.01	0.06
Floride (F)	0.45	0.40	0.45	0.39	0.33
ron (B)	0.13	0.16	0.10	< 0.1	0.09
uminum (Al)	< .10	< .10	< .10	< 0.1	< .10
senic (As)	< .001	0.001	0.001	0.001	0.005
Barium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	< .002	0.004	0.006	< 0.01	< .002
Cobalt (Co)	< .01	< .01	< .01	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	0.14	< .01	0.02	< 0.05	0.05
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	< .01	0.01	0.02	< 0.02	< .01
Mercury (Hg)	< .0002	< .0002	< .0002	< .0001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	< .001	< .001	< .001	< 0.001	< .001
Zinc (Zn)	0.025	0.089	0.139	0.29	0.443
Molybdenum (Mo)	< .10	< .10	< .10	< 0.1	< .10
Uranium (U)	0.019	0.012	0.014	0.031	0.015
Vanadium (V)	< .10	< .10	< .10	< .10	< .10
Radium-226 (Ra-226)	166	145	48	225.8	162
Thorium-230 (Th-230)	24.1	7.1	5.6	101.2	1.8
c. Cond - umhos	795	944	688	776	769
perature °F	16	15	15	16	16
pH - Units	7.18	7.26	7.58	7.27	7.28

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.17

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 25-590, Sec. 25, T36N, R74W

	12/17/85	1/28/86	3/05/86	5/13/86	7/23/86
Dissolved Solids (TDS)	613	606	603	616	586
Sodium (Na)	30	30	31	25	31.6
Potassium (K)	10	9	9	8	8.9
Calcium (Ca)	98	107	112	112	109
Magnesium (Mg)	37	29	37	32	25.6
Sulfate (SO_4)	196	213	254	278	239
Chloride (Cl)	9	9	7	7	2.7
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	281	264	254	224	234.9
Major Cations, meq	10.20	9.26	10.21	9.51	9.19
Major Anions, meq	8.69	9.01	9.65	9.65	8.93
Nitrate (as N)	< .05	< .05	< .05	< .05	0.07
Floride (F)	0.36	0.36	0.33	0.38	0.30
Boron (B)	0.10	0.22	0.21	0.05	< 0.1
minum (Al)	< .10	< .10	< .10	< .10	< 0.1
enic (As)	0.010	0.003	0.001	0.001	0.002
Barium (Ba)	< .10	< .10	< .10	< .10	< 0.1
Cadmium (Cd)	< .002	< .002	< .002	< .002	< 0.01
Cobalt (Co)	< .01	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	< 0.01	< 0.01
Iron (Fe)	0.69	1.58	0.96	1.88	1.95
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	0.07	0.08	0.14	0.11	0.13
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	< .001	< .001	0.001	< .001	< 0.001
Zinc (Zn)	0.643	0.440	0.100	0.788	0.82
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.008	0.013	0.013	0.008	0.029
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	32.8	38	53	32	13
Thorium-230 (Th-230)	9.1	2.2	3.7	1.1	3.8
ec. Cond - umhos	795	846	700	825	814
perature °F	16	15	16	16	17
- Units	7.18	6.89	6.83	7.05	7.20

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.18

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 25-591, Sec. 25, T36N, R74W

	1/22/86	1/29/86	3/05/86	5/13/86	7/23/86
Dissolved Solids (TDS)	500	509	530	550	530
Sodium (Na)	30	29	28	25	30.3
Potassium (K)	11	9	9	9	9.7
Calcium (Ca)	84	92	88	100	98.4
Magnesium (Mg)	29	27	29	27	26.5
Sulfate (SO_4)	215	212	230	236	228
Chloride (Cl)	6	9	7	7	2.8
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	205	210	224	220	231.7
Major Cations, meq	8.16	8.30	8.22	8.53	8.69
Major Anions, meq	8.00	8.10	8.65	8.72	8.65
Nitrate (as N)	0.12	0.05	< .05	< .05	0.09
Floride (F)	0.45	0.40	0.40	0.36	0.28
Boron (B)	0.14	0.22	0.13	0.27	< 0.1
minum (Al)	< .10	< .10	< .10	< .10	< 0.1
enic (As)	0.007	0.007	0.007	0.001	0.005
rium (Ba)	< .10	< .10	< .10	< .10	< 0.1
Cadmium (Cd)	< .002	< .002	< .002	< .002	< 0.01
Cobalt (Co)	< .01	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	0.01	< 0.01
Iron (Fe)	0.07	< .01	.04	0.20	0.11
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	0.01	0.02	0.03	0.03	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	0.003	0.011	0.002	0.001	< 0.001
Zinc (Zn)	0.766	0.385	0.575	0.513	0.44
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.232	0.157	0.509	0.259	0.266
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	106	74	103	63	81.3
Thorium-230 (Th-230)	36.2	3.5	23	1.0	14.3
c. Cond - umhos	807	737	640	729	755
perature °F	15	16	16	16	17
- Units	7.30	7.28	7.13	7.18	7.28

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.19

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 25-592, Sec. 25, T36N, R74W

	1/22/86	1/29/86	3/05/86	5/13/86	7/23/86
Dissolved Solids (TDS)	636	608	635	662	636
Sodium (Na)	29	29	29	29	31.9
Potassium (K)	10	9	9	9	10.5
Calcium (Ca)	112	110	104	128	114
Magnesium (Mg)	34	32	37	24	31.4
Sulfate (SO_4)	282	270	296	308	274
Chloride (Cl)	8	8	7	6	2.3
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	217	210	210	220	222
Major Cations, meq	9.90	9.61	9.72	9.85	9.83
Major Anions, meq	9.66	9.29	9.80	10.19	9.43
Nitrate (as N)	0.09	< .05	< .05	< .05	0.11
Floride (F)	0.40	0.36	0.40	0.38	0.27
Boron (B)	0.23	0.20	0.11	0.15	< 0.1
uminum (Al)	< .10	< .10	< .10	< .10	< 0.1
senic (As)	0.001	0.001	< .001	< .001	0.002
Barium (Ba)	< .10	< .10	< .10	< .10	< 0.1
Cadmium (Cd)	< .002	0.003	< .002	< .002	< 0.01
Cobalt (Co)	< .10	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	0.01	< 0.01
Iron (Fe)	0.02	< .01	0.02	0.01	< 0.05
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	0.01	0.02	0.03	0.02	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	< .001	< .001	0.003	< .001	< 0.001
Zinc (Zn)	0.881	0.498	1.34	1.096	0.83
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.026	0.026	0.032	0.029	0.066
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	60	73	141	104	101.1
Thorium-230 (Th-230)	11.1	4.1	27	1.6	24.9
ec. Cond - umhos	933	888	830	883	861
perature °F	16	16	16	16	17
- Units	7.20	7.19	7.08	7.18	7.21

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.20

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 26-834, Sec. 26, T36N, R74W

	1/15/86	1/30/86	3/10/86	5/13/86	7/23/86
Dissolved Solids (TDS)	619	661	628	611	634
Sodium (Na)	29	30	29	30	31.9
Potassium (K)	10	10	10	11	10.1
Calcium (Ca)	110	120	110	109	118
Magnesium (Mg)	29	29	34	27	29.7
Sulfate (SO_4)	264	308	268	278	254
Chloride (Cl)	8	8	8	7	1.8
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	215	217	229	224	249.5
Major Cations, meq	9.39	9.94	9.80	9.25	10.02
Major Anions, meq	9.25	10.20	9.56	9.65	9.52
Nitrate (as N)	.05	0.11	0.06	< .05	0.11
Floride (F)	0.40	0.40	0.51	0.45	0.42
Boron (B)	0.11	0.20	0.12	0.10	< 0.1
uminum (Al)	< .10	< .10	< .10	< .10	< 0.1
senic (As)	< .001	0.001	0.001	0.001	< 0.001
rium (Ba)	< .10	< .10	< .10	< .10	< 0.10
Cadmium (Cd)	< .002	< .002	< .002	< .002	< 0.01
Cobalt (Co)	< .01	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	0.01	< 0.01
Iron (Fe)	0.19	< .01	0.05	0.07	0.17
Lead (Pb)	< .005	< .05	< .05	< .05	< 0.05
Manganese (Mn)	< .01	0.01	0.02	0.01	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	< .001	0.005	0.003	< .001	< 0.001
Zinc (Zn)	0.042	0.007	0.183	0.033	0.02
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.075	0.023	0.038	0.022	0.095
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	318	303	306	378	317.7
Thorium-230 (Th-230)	115	11.2	90	1.8	67.6
ec. Cond - umhos	906	904	958	808	873
perature °F	17	15	17	17	17
- Units	7.30	7.27	7.26	7.26	7.20

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.21

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 26-835, Sec. 26, T36N, R74W

	12/19/85	1/30/86	3/11/86	5/13/86	7/23/86
Dissolved Solids (TDS)	640	666	609	648	638
Sodium (Na)	27	29	26	24	29.3
Potassium (K)	9	8	8	8	8.8
Calcium (Ca)	124	124	112	120	119
Magnesium (Mg)	29	32	37	37	25.9
Sulfate (SO_4)	264	288	264	308	258
Chloride (Cl)	7	7	7	7	2.0
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	246	242	242	234	246.1
Major Cations, meq	9.97	10.28	9.96	10.27	9.61
Major Anions, meq	9.72	10.16	9.66	10.45	9.51
Nitrate (as N)	< .05	0.05	0.10	< .05	0.13
Floride (F)	0.45	0.45	0.40	0.40	0.35
Boron (B)	0.13	0.22	0.14	0.11	< 0.1
luminum (Al)	< .10	< .10	< .10	< .10	< 0.1
senic (As)	0.003	0.001	< .001	0.001	0.002
rium (Ba)	< .10	< .10	< .10	< .10	< 0.10
Cadmium (Cd)	< .002	< .002	< .002	< .002	< 0.01
Cobalt (Co)	< .10	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	< .01	< 0.01
Iron (Fe)	0.53	< .01	0.10	0.74	0.53
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	0.04	0.02	0.05	0.04	0.04
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	< .001	< .001	< 0.001	< .001	< 0.001
Zinc (Zn)	< .005	0.005	0.133	0.542	0.46
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.018	0.016	0.005	0.016	0.041
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	9.8	9.8	9.5	11	20.4
Thorium-230 (Th-230)	0.9	6.8	2.0	0.6	17.1
ec. Cond - umhos	880	873	997	874	850
perature °F	14	15	15	16	17
- Units	7.11	7.12	7.22	7.20	7.19

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.22

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 26-836, Sec. 26, T36N, R74W

	12/19/85	1/29/86	3/07/86	5/13/86	7/22/86
Dissolved Solids (TDS)	539	527	457	439	496
Sodium (Na)	33	28	31	27	33.1
Potassium (K)	14	13	15	13	14.2
Calcium (Ca)	92	104	69	71	92.6
Magnesium (Mg)	22	17	15	14	16.4
Sulfate (SO_4)	235	217	230	228	247
Chloride (Cl)	16	13	13	13	7.7
Carbonate (CO_3)	0	0	0	2	0
Bicarbonate (HCO_3)	156	171	61	78	145.2
Major Cations, meq	8.20	8.14	6.40	6.19	7.95
Major Anions, meq	7.90	7.89	6.55	6.46	7.78
Nitrate (as N)	0.11	< .05	< .05	< .05	0.11
Floride (F)	0.45	0.45	0.45	0.40	0.46
Boron (B)	0.14	0.28	0.06	0.12	< 0.1
uminum (Al)	< .10	< .10	< .10	< .10	< 0.1
senic (As)	0.016	0.006	< .001	0.001	0.009
arium (Ba)	< .10	< .10	< .10	< .10	< 0.10
Cadmium (Cd)	< .002	< .002	< .002	< .002	< 0.01
Cobalt (Co)	< .10	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	< .01	< 0.01
Iron (Fe)	0.02	< .01	< .01	0.02	< 0.05
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	< .01	0.01	0.01	< .01	< 0.01
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	0.001	< .001	0.006	< .001	0.002
Zinc (Zn)	< .005	< .005	< .005	0.039	< 0.01
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.032	0.027	0.018	0.016	0.057
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	21.7	25.7	15.6	26	29.1
Thorium-230 (Th-230)	2.1	40	0.9	1.0	5.3
ec. Cond - umhos	899	822	651	663	708
perature °F	15	15	15	16	17
- Units	8.50	8.18	8.89	8.97	8.38

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.23

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 26-837, Sec. 26, T36N, R74W

	12/19/85	1/30/86	3/10/86	5/13/86	7/23/86
Dissolved Solids (TDS)	571	540	522	503	463
Sodium (Na)	27	28	28	25	27.9
Potassium (K)	9	8	9	8	8.5
Calcium (Ca)	108	92	92	92	89.7
Magnesium (Mg)	24	29	27	24	22.3
Sulfate (SO_4)	247	256	222	238	199
Chloride (Cl)	6	7	7	7	3.2
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	190	183	198	185	191.1
Major Cations, meq	8.76	8.39	8.26	7.85	7.77
Major Anions, meq	8.43	8.52	8.07	8.18	7.41
Nitrate (as N)	0.07	0.14	0.06	< .05	0.22
Floride (F)	0.45	0.45	0.45	0.40	0.46
Boron (B)	0.09	0.23	0.11	0.12	< 0.1
minum (Al)	< .10	< .10	< .10	< .10	< 0.1
enic (As)	0.001	< .001	< .001	< .001	< 0.001
ium (Ba)	< .10	< .10	< .10	< .10	< 0.1
Cadmium (Cd)	< .002	< .002	< .002	< .002	< 0.01
Cobalt (Co)	< .10	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	< .01	< 0.01
Iron (Fe)	0.08	< .01	0.06	0.13	0.13
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	0.01	0.01	0.02	0.01	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	< .001	< .001	0.001	< .001	0.002
Zinc (Zn)	0.220	0.116	1.11	0.130	0.01
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< .10
Uranium (U)	0.011	0.007	0.006	0.008	0.033
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	16.5	24	40	63	82.6
Thorium-230 (Th-230)	6.8	2.1	6.8	1.4	15.6
c. Cond - umhos	745	757	713	699	699
erature °F	15	15	15	17	16
- Units	7.28	7.38	7.41	7.39	7.40

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.24

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 27-316, Sec. 27, T36N, R74W

	1/10/86	1/31/86	3/11/86	5/22/86	7/30/86
Dissolved Solids (TDS)	371	315	302	296	301
Sodium (Na)	23	21	18	19	19
Potassium (K)	8	6	63	6.1	7
Calcium (Ca)	63	59	53	54	56
Magnesium (Mg)	20	12	16	15	14
Sulfate (SO_4)	122	95	85	107	70
Chloride (Cl)	8	8	7	3.3	9
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	188	185	188	170	190
Major Cations, meq	5.98	4.99	4.89	4.93	4.95
Major Anions, meq	5.85	5.24	5.05	5.14	4.83
Nitrate (as N)	0.06	< .05	0.08	0.01	0.06
Floride (F)	0.57	0.51	0.51	0.64	0.40
Boron (B)	0.14	0.05	0.12	< 0.1	0.05
uminum (Al)	< .10	< .10	< .10	< 0.1	< .10
senic (As)	0.002	0.001	0.002	< 0.001	0.003
rium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	< .002	< .002	< .002	< 0.01	< .002
Cobalt (Co)	< .01	< .01	< .01	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	0.15	< .01	0.04	0.08	0.02
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	< .01	0.02	0.03	0.03	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	0.006	< .001	0.001	< 0.001	0.001
Zinc (Zn)	0.075	0.125	0.050	0.31	0.265
Molybdenum (Mo)	< .10	< .10	< .10	< 0.1	< .10
Uranium (U)	0.704	0.049	0.020	0.071	0.069
Vanadium (V)	< .10	< .10	< .10	< 0.1	< .10
Radium-226 (Ra-226)	111	240	284	269.5	132
Thorium-230 (Th-230)	69	8.8	51	53.10	3.7
ec. Cond - umhos	497	526	499	473	461
perature °F	16	15	15	16	18
- Units	7.18	7.31	7.15	7.26	7.37

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.25

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 30-376, Sec. 30, T36N, R73W

	1/22/86	1/29/86	3/10/86	5/13/86	7/23/86
Dissolved Solids (TDS)	545	575	552	568	546
Sodium (Na)	28	33	29	26	30
Potassium (K)	9	8	9	8	8.7
Calcium (Ca)	100	104	100	109	98.2
Magnesium (Mg)	27	22	29	25	22.6
Sulfate (SO_4)	227	226	240	258	226
Chloride (Cl)	6	8	7	8	2.0
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	215	210	217	210	218.6
Major Cations, meq	8.66	8.64	8.86	8.82	8.51
Major Anions, meq	8.42	8.37	8.75	9.04	8.37
Nitrate (as N)	0.27	0.11	0.07	< .05	0.03
Floride (F)	0.40	0.40	0.45	0.36	0.32
Boron (B)	0.15	0.18	0.13	0.07	< 0.1
uminum (Al)	< .10	< .10	< .10	< .10	< 0.1
senic (As)	0.002	< .001	0.009	< .001	< 0.001
Barium (Ba)	< .10	< .10	< .10	< .10	< 0.1
Cadmium (Cd)	< .002	0.003	< .002	< .002	< 0.01
Cobalt (Co)	< .10	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	< .01	< 0.01
Iron (Fe)	0.50	< .01	0.05	0.14	0.92
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	0.001	0.03	0.05	0.07	0.09
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	< .001	< .001	< .001	< .001	< 0.001
Zinc (Zn)	0.114	0.041	0.007	0.706	0.39
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.014	0.012	0.017	0.011	0.025
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	16.5	19.0	8.3	23	22.4
Thorium-230 (Th-230)	7.6	0.8	2.7	1.9	7.9
ec. Cond - umhos	799	810	835	790	732
perature °F	15	15	15	16	17
pH - Units	7.21	7.14	7.11	7.15	7.25

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.26

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 34-528, Sec. 34, T36N, R74W

	1/10/86	2/03/86	3/11/86	5/27/86	7/31/86
Dissolved Solids (TDS)	305	373	343	366	378
Sodium (Na)	21	24	22	27.9	24
Potassium (K)	6	7	7	7.3	9
Calcium (Ca)	53	66	59	57	63
Magnesium (Mg)	17	16	18	17	18
Sulfate (SO_4)	78	114	125	148	123
Chloride (Cl)	10	8	8	3.4	8
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	181	173	178	167	183
Major Cations, meq	5.10	5.83	5.56	5.67	5.89
Major Anions, meq	4.87	6.07	5.75	5.95	5.79
Nitrate (as N)	< .05	< .05	0.12	0.02	< .05
Floride (F)	0.51	0.57	0.51	0.56	0.38
Boron (B)	0.14	0.03	0.09	< 0.1	0.15
Aluminum (Al)	< .10	< .10	< .10	< 0.1	< .10
enic (As)	< .001	0.002	< .001	0.003	0.003
ium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	< .002	< .002	< .002	< 0.01	< .002
Cobalt (Co)	< .10	< .01	< .01	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	0.10	< .01	0.07	< 0.05	0.18
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	< .01	0.01	0.03	0.04	0.03
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	< .001	0.024	0.013	0.009	0.013
Zinc (Zn)	0.060	0.797	0.218	0.93	1.54
Molybdenum (Mo)	< .10	< .10	< .10	< 0.1	< .10
Uranium (U)	0.041	0.882	0.235	1.473	0.865
Vanadium (V)	< .10	< .10	< .10	< 0.10	< .10
Radium-226 (Ra-226)	172	147	77	164.8	139
Thorium-230 (Th-230)	32.4	9.1	16.0	90.2	4.7
Spec. Cond - umhos	574	581	586	532	554
nperature °F	15	15	15	16	17
- Units	7.77	7.41	7.41	7.38	7.44

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.27

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 34-529, Sec. 34, T36N, R74W

	1/10/86	1/31/86	3/11/86	5/22/86	7/30/86
Dissolved Solids (TDS)	310	319	264	308	297
Sodium (Na)	24	24	22	24	22
Potassium (K)	8	7	8	7.1	8
Calcium (Ca)	56	55	40	48	50
Magnesium (Mg)	13	17	15	16.2	16
Sulfate (SO_4)	74	95	81	108	74
Chloride (Cl)	9	9	9	5.0	8
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	190	195	159	172	185
Major Cations, meq	5.10	5.36	4.39	4.97	4.98
Major Anions, meq	4.91	5.43	4.54	5.24	4.80
Nitrate (as N)	0.05	0.32	0.18	0.01	< .05
Floride (F)	0.57	0.57	0.51	0.58	0.40
Boron (B)	0.13	0.08	0.13	< 0.1	0.05
uminum (Al)	< .10	< .10	< .10	< 0.1	< .10
senic (As)	0.002	0.002	0.001	0.003	0.005
Barium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	< .002	< .002	< .002	< 0.01	< .002
Cobalt (Co)	< .01	< .01	< .01	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	0.07	< .01	< .01	< 0.05	0.02
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	< .01	< .01	0.01	< 0.02	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	< .001	0.034	0.001	< 0.001	0.001
Zinc (Zn)	0.151	0.203	0.254	0.41	0.491
Molybdenum (Mo)	< .10	< .10	< .10	< 0.1	< .10
Uranium (U)	0.025	0.025	0.016	0.016	0.022
Vanadium (V)	< .10	< .10	< .10	< 0.1	< .10
Radium-226 (Ra-226)	101	54	52	72.8	137
Thorium-230 (Th-230)	25.8	4.4	10.3	12.50	1.1
ec. Cond - umhos	420	520	461	443	483
perature °F	16	16	15	16	17
- Units	7.47	7.40	7.65	7.42	7.44

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.28

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 35-738, Sec. 35, T36N, R74W

	3/18/86	4/10/86	5/05/86	7/10/86	9/16/86
Dissolved Solids (TDS)	319	313	343	406	260
Sodium (Na)	23	24	22	26.9	22
Potassium (K)	7	7	7	7.8	8
Calcium (Ca)	61	61	63	66	63
Magnesium (Mg)	15	15	13	15.9	16
Sulfate (SO_4)	102	110	103	143	82
Chloride (Cl)	9	9	9	3	12
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	200	190	195	184	195
Major Cations, meq	5.45	5.49	5.35	5.99	5.62
Major Anions, meq	5.65	5.49	5.35	6.10	5.25
Nitrate (as N)	< .05	< .05	0.06	<0.01	< .05
Floride (F)	0.40	0.51	0.45	0.46	0.57
Boron (B)	0.08	0.13	0.18	<0.1	0.17
Aluminum (Al)	< .10	< .10	< .10	<0.1	< .10
Arsenic (As)	< .001	0.001	0.001	<0.001	<0.002
ium (Ba)	< .10	< .10	< .10	<0.1	< .10
mium (Cd)	< .002	< .002	< .002	<0.01	< .002
Cobalt (Co)	< .01	< .01	< .01	<0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	<0.05	< .01
Copper (Cu)	< .01	< .01	<0.01	<0.01	< .01
Iron (Fe)	0.26	< .01	0.06	0.07	0.02
Lead (Pb)	< .05	< .05	< .05	<0.05	< .05
Manganese (Mn)	0.03	0.02	0.03	0.02	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	<0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	<0.05	< .02
Selenium (Se)	< .001	< .001	0.001	<0.001	0.001
Zinc (Zn)	0.097	0.010	0.346	0.07	0.129
Molybdenum (Mo)	< .10	< .10	< .10	<0.1	< .10
Uranium (U)	0.034	0.051	0.028	0.059	0.050
Vanadium (V)	< .10	< .10	< .10	<0.10	< .10
Radium-226 (Ra-226)	436	25	413	679	486
Thorium-230 (Th-230)	5.6	4.2	3.1	578	0.8
Spec. Cond - umhos	530	502	528	544	602
Temperature °F	15	15	15	16	15
- Units	7.35	7.31	7.48	7.30	7.25

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.29

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 35-739, Sec. 35, T36N, R74W

	1/31/86	2/14/86	3/18/86	5/25/86	7/30/86
Dissolved Solids (TDS)	346	326	316	320	346
Sodium (Na)	26	24	23	25	24
Potassium (K)	7	7	7	7	8
Calcium (Ca)	56	58	59	55	59
Magnesium (Mg)	17	17	16	15	14
Sulfate (SO_4)	102	99	97	100	98
Chloride (Cl)	9	8	7	4.5	8
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	193	195	203	192	198
Major Cations, meq	5.50	5.51	5.44	5.27	5.33
Major Anions, meq	5.54	5.49	5.55	5.38	5.52
Nitrate (as N)	0.06	< .05	< .05	0.02	0.12
Floride (F)	0.51	0.51	0.51	0.50	0.36
Boron (B)	0.12	0.04	0.10	< 0.1	0.12
uminum (Al)	< .10	< .10	< .10	< 0.1	< .10
enic (As)	< .001	< .001	< .001	0.001	0.002
ium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	< .002	< .002	< .002	< 0.01	< .002
Cobalt (Co)	< .01	< .01	< .01	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	< .01	< .01	0.01	< 0.05	0.02
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	0.02	0.02	0.02	0.02	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	< .001	< .001	< .001	< 0.001	0.001
Zinc (Zn)	0.481	0.665	0.675	0.42	0.488
Molybdenum (Mo)	< .10	< .10	< .10	< 0.1	< .10
Uranium (U)	0.023	0.031	0.036	0.055	0.031
Vanadium (V)	< .10	< .10	< .10	< 0.10	< .10
Radium-226 (Ra-226)	353	254	503	371.6	312
Thorium-230 (Th-230)	7.1	6.8	3.2	57.6	2.6
ec. Cond - umhos	550	640	518	507	531
perature °F	15	15	15	17	16
- Units	7.40	7.46	7.42	7.36	7.32

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.30

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 35-740, Sec. 35, T36N, R74W

	1/24/86	2/14/86	3/13/86	5/25/86	7/30/86
Dissolved Solids (TDS)	374	403	385	364	374
Sodium (Na)	23	26	23	25	24
Potassium (K)	7	7	7	8	10
Calcium (Ca)	77	77	71	67	66
Magnesium (Mg)	14	14	20	18	18
Sulfate (SO_4)	118	140	125	133	114
Chloride (Cl)	8	9	8	4.3	9
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	203	203	198	190	198
Major Cations, meq	6.17	6.30	6.36	6.14	6.07
Major Anions, meq	6.01	6.30	6.36	6.14	5.87
Nitrate (as N)	< .05	0.07	0.07	0.03	< .05
Floride (F)	0.45	0.57	0.51	0.61	0.40
Boron (B)	0.19	0.05	0.10	< 0.1	< .01
uminum (Al)	< .10	< .10	< .10	< 0.1	< .10
enic (As)	< .001	0.002	0.001	0.003	0.004
rium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	< .002	< .002	< .002	< 0.01	< .002
Cobalt (Co)	< .01	< .01	< .10	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	0.01	0.01	0.01	< 0.05	0.05
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	0.02	0.02	0.04	0.03	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	0.001	< .001	0.001	< 0.001	0.001
Zinc (Zn)	0.146	0.261	0.244	< 0.01	0.427
Molybdenum (Mo)	< .10	< .10	< .10	< 0.1	< .10
Uranium (U)	0.013	0.183	0.017	0.036	0.021
Vanadium (V)	< .10	< .10	< .10	< 0.10	< .10
Radium-226 (Ra-226)	0.4	3.7	4.0	238.4	3.6
Thorium-230 (Th-230)	1.2	0.6	1.6	46.4	0.6
ec. Cond - umhos	592	640	450	578	605
perature °F	15	15	15	15	15
- Units	7.25	7.46	7.15	7.24	7.27

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.31

BASELINE WATER QUALITY DATA*
CONVERSE COUNTY, WYOMING

Well No. 35-741, Sec. 35, T36N, R74W

	1/24/86	2/14/86	3/18/86	5/25/86	8/06/86
Dissolved Solids (TDS)	305	315	320	290	321
Sodium (Na)	28	29	28	29	27
Potassium (K)	8	8	7	9	8
Calcium (Ca)	53	51	53	38	45
Magnesium (Mg)	14	14	19	15	17
Sulfate (SO_4)	90	92	97	95.5	95
Chloride (Cl)	10	10	9	4.9	9
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	192	181	203	150	181
Major Cations, meq	5.21	5.15	5.60	4.64	5.02
Major Anions, meq	5.30	5.16	5.60	4.61	5.20
Nitrate (as N)	0.09	< .05	0.09	0.07	< .05
Floride (F)	0.45	0.51	0.51	0.44	0.35
Boron (B)	0.25	< .01	0.09	< 0.1	0.02
minum (Al)	< .10	< .10	< .10	< 0.1	< .10
enic (As)	< .001	< .001	< .001	0	0.001
rium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	< .002	< .002	< .002	< 0.01	< .002
Cobalt (Co)	< .01	< .01	< .01	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	0.10	< .01	0.03	< 0.05	0.17
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	0.02	0.03	0.05	0.09	0.07
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	0.002	0.001	0.004	< 0.001	0.001
Zinc (Zn)	0.223	0.018	0.833	0.17	0.410
Molybdenum (Mo)	< .10	< .10	< .10	< 0.1	< .10
Uranium (U)	0.004	0.067	0.110	0.006	0.003
Vanadium (V)	< .10	< .10	< .10	< 0.10	< .10
Radium-226 (Ra-226)	3.6	12.1	263	69.9	74
Thorium-230 (Th-230)	2.8	0.5	0.4	9.6	1.2
c. Cond - umhos	543	678	530	435	483
erature °F	15	15	15	16	17
- Units	7.64	7.40	7.44	7.60	7.65

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.32

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 35-744, Sec. 35, T36N, R74W

	1/02/86	1/31/86	3/13/86	5/22/86	7/24/86
Dissolved Solids (TDS)	289	314	277	294	282
Sodium (Na)	25	27	24	27	25
Potassium (K)	10	9	9	10.3	9
Calcium (Ca)	48	50	46	46	48
Magnesium (Mg)	11	11	12	11	14
Sulfate (SO_4)	70	83	79	103	86
Chloride (Cl)	11	11	9	5.1	9
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	168	168	176	160	171
Major Cations, meq	4.65	4.80	4.56	4.65	4.87
Major Anions, meq	4.53	4.80	4.78	4.94	4.84
Nitrate (as N)	0.06	0.07	0.09	< 0.01	0.07
Floride (F)	0.51	0.51	0.51	0.52	0.34
Boron (B)	0.15	0.04	0.10	< 0.1	0.18
minum (Al)	< .10	< .10	< .10	< 0.1	< .10
enic (As)	< .001	< .001	< .001	< 0.001	< .001
rium (Ba)	< .10	< .10	< .10	< 0.1	< .10
Cadmium (Cd)	< .002	< .002	< .002	< 0.01	< .002
Cobalt (Co)	< .10	< .01	< .10	< 0.01	< .01
Chromium (Cr)	< .01	< .01	< .01	< 0.05	< .01
Copper (Cu)	< .01	< .01	< .01	< 0.01	< .01
Iron (Fe)	0.05	< .01	< .01	< 0.05	0.01
Lead (Pb)	< .05	< .05	< .05	< 0.05	< .05
Manganese (Mn)	< .01	< .01	0.01	< 0.02	< .01
Mercury (Hg)	< .0002	< .0002	< .0002	< 0.001	< .0002
Nickel (Ni)	< .02	< .02	< .02	< 0.05	< .02
Selenium (Se)	< .001	0.001	0.001	< 0.001	< .001
Zinc (Zn)	0.151	0.073	0.351	0.18	0.373
Molybdenum (Mo)	< .10	< .10	< .10	< 0.1	< .10
Uranium (U)	0.081	0.026	0.023	0.009	0.017
Vanadium (V)	< .10	< .10	< .10	< 0.1	< .10
Radium-226 (Ra-226)	47	39	5.5	4.7	12.3
Thorium-230 (Th-230)	3.6	2.2	0.7	4.50	0.8
ec. Cond - umhos	460	520	365	472	469
perature °F	14	16	15	15	15
- Units	7.60	7.75	7.54	7.70	7.55

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.33

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 36-1045, Sec. 36, T36N, R74W

	12/4/85	1/28/86	3/07/86	5/15/86	7/22/86
Dissolved Solids (TDS)	381	397	394	379	394
Sodium (Na)	22	24	23	24	23.6
Potassium (K)	8	7	8	10	7.8
Calcium (Ca)	74	85	71	77	71.9
Magnesium (Mg)	17	14	19	14	17.2
Sulfate (SO_4)	92	105	120	115	107
Chloride (Cl)	11	11	8	9	4.9
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	242	239	224	229	222
Major Cations, meq	6.25	6.61	6.30	6.29	6.25
Major Anions, meq	6.19	6.41	6.40	6.40	6.09
Nitrate (as N)	0.73	0.11	0.16	< .05	1.02
Floride (F)	0.40	0.36	0.36	0.40	0.32
Boron (B)	0.12	0.20	0.07	0.12	< 0.1
minum (Al)	< .10	< .10	< .10	< .10	< 0.1
senic (As)	0.012	0.004	0.006	0.004	0.009
rium (Ba)	< .10	< .10	< .10	< .10	< 0.1
Cadmium (Cd)	< .002	< .002	< .002	< .002	< 0.01
Cobalt (Co)	< .01	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	< .01	< 0.01
Iron (Fe)	0.02	< .01	0.03	0.13	0.11
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	0.03	0.03	0.04	0.03	0.03
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	< .001	0.006	< .001	< .001	< 0.001
Zinc (Zn)	0.421	0.528	0.431	0.502	0.75
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.036	0.043	0.042	0.035	0.049
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	372	293	180	167	339
Thorium-230 (Th-230)	482	1.8	23	0.8	56.9
ec. Cond - umhos	616	610	565	580	568
mperature °F	14	14	15	15	15
- Units	7.20	7.20	7.14	7.23	7.33

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.34

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 36-1046, Sec. 36, T36N, R74W

	12/04/85	1/28/86	3/07/86	5/15/86	7/22/86
Dissolved Solids (TDS)	381	376	392	382	385
Sodium (Na)	22	27	23	22	24.3
Potassium (K)	11	11	11	11	10.5
Calcium (Ca)	71	69	67	72	65.2
Magnesium (Mg)	20	18	20	16	18.3
Sulfate (SO_4)	95	98	127	118	110
Chloride (Cl)	10	9	10	11	6.2
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	239	232	224	224	217
Major Cations, meq	6.42	6.37	6.26	6.15	6.11
Major Anions, meq	6.18	6.09	6.59	6.43	6.05
Nitrate (as N)	< .05	0.06	0.07	< .05	0.08
Floride (F)	0.45	0.40	0.40	0.36	0.32
Boron (B)	0.15	0.16	0.06	0.09	< 0.1
luminum (Al)	< .10	< .10	< .10	< .10	< 0.1
senic (As)	0.001	0.001	0.001	0.001	0.002
ium (Ba)	< .10	< .10	< .10	< .10	< 0.1
Cadmium (Cd)	< .002	< .002	< .002	< .002	< 0.01
Cobalt (Co)	< .01	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	< .01	< 0.01
Iron (Fe)	0.01	.01	0.04	0.07	0.09
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	0.01	0.02	0.02	0.02	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	0.002	0.012	< .001	< .001	< 0.001
Zinc (Zn)	0.279	0.290	0.505	0.685	0.63
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.027	0.020	0.024	0.022	0.028
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	141	108	80	152	128
Thorium-230 (Th-230)	4.8	4.0	7.4	2.0	27.7
pec. Cond - umhos	594	598	553	580	580
perature °F	15	14	15	15	15
- Units	7.35	7.48	7.30	7.33	7.30

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.35

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 36-1047, Sec. 36, T36N, R74W

	12/06/85	1/28/86	3/07/86	5/15/86	7/22/86
Dissolved Solids (TDS)	387	367	383	361	386
Sodium (Na)	25	23	23	26	20
Potassium (K)	19	20	15	29	20.4
Calcium (Ca)	74	63	64	51	61.2
Magnesium (Mg)	12	15	19	13	15.5
Sulfate (SO_4)	98	98	127	107	107
Chloride (Cl)	10	10	8	10	5.9
Carbonate (CO_3)	0	0	0	9	0
Bicarbonate (HCO_3)	229	220	210	161	202
Major Cations, meq	6.26	5.88	6.13	5.48	5.74
Major Anions, meq	6.08	5.93	6.31	5.45	5.76
Nitrate (as N)	< .05	0.05	< .05	< .05	0.48
Floride (F)	0.36	0.36	0.40	0.36	0.30
Boron (B)	0.09	0.19	0.11	0.30	< 0.1
uminum (Al)	< .10	< .10	< .10	< .10	< 0.1
senic (As)	0.004	0.002	0.002	0.003	0.004
rium (Ba)	< .10	< .10	< .10	< .10	< 0.1
Cadmium (Cd)	< .002	< .002	0.004	< .002	< 0.01
Cobalt (Co)	< .01	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	< .01	< 0.01
Iron (Fe)	< .01	< .01	0.03	0.03	< 0.05
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	< .01	0.01	0.02	< .01	0.01
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	< .001	< .001	0.001	0.001	< 0.001
Zinc (Zn)	0.052	0.006	0.294	0.037	0.29
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.066	0.058	0.065	0.050	0.059
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	24.9	15.5	50	24	28.8
Thorium-230 (Th-230)	3.2	3.4	3.8	0.8	4.7
ec. Cond - umhos	530	574	577	543	555
rature °F	15	14	15	15	16
Units	7.99	8.02	7.40	8.27	7.40

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.36

BASELINE WATER QUALITY DATA
CONVERSE COUNTY, WYOMING

Well No. 36-1048, Sec. 36, T36N, R74W

	1/16/86	1/28/86	3/07/86	5/15/86	7/22/86
Dissolved Solids (TDS)	378	388	375	385	380
Sodium (Na)	24	30	23	28	23.1
Potassium (K)	8	7	9	9	8.3
Calcium (Ca)	75	71	67	74	69
Magnesium (Mg)	14	18	18	15	16.6
Sulfate (SO_4)	92	107	125	123	112
Chloride (Cl)	9	9	9	9	5.2
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	224	232	214	229	212
Major Cations, meq	6.13	6.51	6.05	6.37	5.95
Major Anions, meq	5.83	6.28	6.36	6.57	5.99
Nitrate (as N)	< .05	0.14	< .05	< .05	0.21
Floride (F)	0.45	0.40	0.40	0.36	0.34
Boron (B)	0.14	0.15	0.15	0.22	< 0.1
uminum (Al)	< .10	< .10	< .10	< .10	< 0.1
enic (As)	< .001	0.001	0.001	0.003	0.003
ium (Ba)	< .10	< .10	< .10	< .10	< 0.1
Cadmium (Cd)	< .002	< .002	.003	< .002	< 0.01
Cobalt (Co)	< .01	< .01	< .01	< .01	< 0.01
Chromium (Cr)	< .01	< .01	< .01	< .01	< 0.05
Copper (Cu)	< .01	< .01	< .01	< .01	< 0.01
Iron (Fe)	0.04	< .01	0.02	0.03	< 0.05
Lead (Pb)	< .05	< .05	< .05	< .05	< 0.05
Manganese (Mn)	0.01	0.02	0.03	0.02	0.02
Mercury (Hg)	< .0002	< .0002	< .0002	< .0002	< 0.001
Nickel (Ni)	< .02	< .02	< .02	< .02	< 0.05
Selenium (Se)	< 0.001	< .001	< .001	0.002	< 0.001
Zinc (Zn)	0.062	0.026	0.106	0.100	0.28
Molybdenum (Mo)	< .10	< .10	< .10	< .10	< 0.10
Uranium (U)	0.027	0.027	0.028	0.267	0.033
Vanadium (V)	< .10	< .10	< .10	< .10	< 0.10
Radium-226 (Ra-226)	150	82	113	203	140.4
Thorium-230 (Th-230)	31.1	3.5	14	1.6	17.1
c. Cond - umhos	641	622	614	568	555
erature °F	14	14	15	15	15
Units	7.09	7.28	7.08	7.12	7.10

*Ra-226 and Th-230 are in pCi/l. All other values are mg/l, except where noted.

TABLE D-6.37

DATA USED FOR CONSTRUCTION OF PIEZOMETRIC SURFACE CONTOURS
(Figure D-6.7)

BASIC WELL DATA FOR THE SMITH RANCH PROJECT

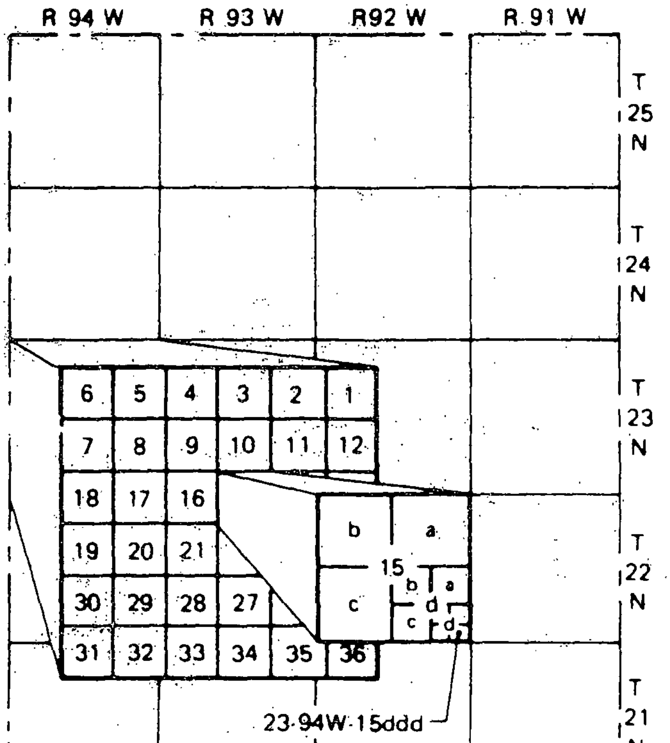
WELL	AQUIFER	TOTAL DEPTH (ft)	COMPLETION INTERVAL (ft+lsd)	M.P. ELEVATION (ft-msl)	LAND SURFACE ELEVATION (ft-msl)	STATIC WATER LEVEL (ft-mp)	WATER LEVEL DATE	WATER LEVEL ELEVATION (ft-msl)	EASTING (ft)	NORTHING (ft)
TW-1	Ou	1010	675-785	5602.31	5602.31	407.8	2/91	5194.51	363467	871474
	01		800-903							
	M		978-998							
TW-2	Ou	946	584-680	5542.24	5543.24	342.3	2/91	5200.94	359792	870923
	01		709-831							
	M		906-915							
M-1				5520.0		327.08	2/91	5192.92	361790	870100
OWD-1	0	987	651-903	5586.09		394.9	2/91	5191.19	363554	871516
	M		945-987							
OWD-2	0	900	667-900	5593.93		398.6	2/91	5195.33	364384	871843
OWD-3	0	882	614-882	5563.17		366.4	2/91	5196.77	361584	871291
OWD-4	0&M	945	586-943	5546.79		346.2	2/91	5200.59	359651	870992
OWD-5	0	897	574-897	5534.75		333.9	2/91	5200.85	358855	871499
OWD-6	0	865	613-854	5568.40		373.0	2/91	5195.40	361355	869060
OWD-7	0	720	608-720	5438.48		245.1	2/91	5193.38	361391	865229
OWD-7A				5535.50					361568	869746
OWD-8	0	916	801-916	5617.52		408.2	2/91	5209.32	355608	874044
OWD-9	0	936	823-936	5605.93		414.3	2/91	5191.63	365168	876294
OWS-1	S	575	147-399	5585.53		228.8	2/91	5356.73	363558	871507
			462-504							
			546-567							
OWS-2	S	584	101-584	5593.88		236.0	2/91	5357.88	364368	871850
OWS-3	S	570	108-570	5562.53		202.9	2/91	5359.63	361576	871294
OWS-4	S			5546.61					359639	870991
OWS-5	S	510	113-512	5534.88		142.5	2/91	5392.38	358844	871502
OM-1	0	812		5523.84	5521.20	320.6	2/91	5203.2	356986	873296
OM-4	0	825		5528.66	5525.24	322.7	2/91	5206.0	356120	872202
OMO-1	0	805		5505.69	5504.87	300.9	2/91	5204.8	356612	873030
OMM-1	M	899		5505.52	5503.3	286.5	2/91	5219.0	356612	873050
OMS-1	S	320		5507.06	5504.6	206.1	2/91	5301.0	356673	873109
0-581	0	900		5625.3	5622.6	436.6	2/91	5188.7	364188	872241
OM-585	0	775		5626.5	5624.0	431.4	2/91	5195.1	364292	872216
MM-586	M	990		5625.2	5622.2	236.3	2/91	5388.9	364296	872168
0-589	0	864		5572e	5570e	365.3	2/91	5207e		
0-590	0	977		5679.1	5676.1	480.8	2/91	5198.3	363791	872949
0-591	0	983		5681.1	5679.6	491.0	2/91	5190.1	364474	874445
0-592	0	959		5675.0	5673.9	484.0	2/91	5191.0	364436	875457
0-834	0	783		5547.7	5545.9	340.7	2/91	5207.0	355320	873156

TABLE D-6.37
Cont.

BASIC WELL DATA FOR THE SMITH RANCH PROJECT

WELL	AQUIFER	TOTAL DEPTH (ft)	COMPLETION INTERVAL (ft+lsd)	M.P. ELEVATION (ft-msl)	LAND SURFACE ELEVATION (ft-msl)	STATIC WATER LEVEL (ft-mp)	WATER LEVEL DATE	WATER LEVEL ELEVATION (ft-msl)	EASTING (ft)	NORTHING (ft)
O-835	O	752		5516.9	5514.0	315.4	2/91	5201.6	357673	872332
O-836	O	776		5501.9	5499.0	300.0	2/91	5201.9	357117	871589
Q-1045	Q	507		5559.57	5557.2	339.2	2/91	5220.4	361019	868652
QM-1046	Q	540		5583.08	5581.2	364.1	2/91	5219.0	361807	869269
Q-1047	Q	520		5557.57	5555.78	338.2	2/91	5219.4	362328	868944
Q-1048	Q	488		5516.81	5514.9	298.5	2/91	5218.3	362924	868915
QM-1	Q	505		5550.53	5549.0	328.9	2/91	5221.6	361518	868359
QM-4	Q	539		5550.72	5549.0	329.5	2/91	5221.2	361878	868909
M-136	M	870		5567.23	5566.6	330.6	2/91	5236.6	339399	855504
MM-295	M	757		5396.78	5395.3	198.5	2/91	5198.3	357637	865396
M-296	M	760		5379.63	5377.75	183.7	2/91	5195.9	357871	864721
M-316	M	901		5668.97	5666.4	457.4	2/91	5211.6	352125	871931
OM-376	O	947		5629.96	5627.4	441.1	2/91	5188.9	365343	872800
M-421	M	930		5658.87	5655.9	419.0	2/91	5239.9	338692	853831
M-422	M	670		5671.93	5670.2	440.4	2/91	5231.5	341315	852750
M-528	M	800		5452e		234.2	2/91		349500	867500
M-529	M	821		5470.85	5468.05	248.7	2/91	5222.2	353879	868200
M-736	M	799		5414.14	5412.6	206.1	2/91	5208.0	356549	866094
M-741	M	880		5410.64	5408.13	232.2	2/91	5177.4	356511	865979
MM-744	M	777		5409.02	5405.5	197.1	2/91	5211.9	355969	867001

FIGURE D-6.1



EXPLANATION: Well and test hole numbers in this report describe the location of wells and test holes according to the Bureau of Land Management's system of land subdivision as follows: first number, township; second number, range; third number, section, first letter, 160-acre tract (quarter section) within that section; second letter, 40-acre tract (quarter-quarter section) within that quarter section; third letter, 10-acre tract (quarter-quarter-quarter section) within that quarter-quarter section. The 160-acre, 40-acre, and 10-acre tracts are designated a, b, c, and d in a counterclockwise direction beginning in the northeast corner. For example, well 23-94W-15ddd is in the SE¼SE¼SE¼ Sec. 15, T23N, R94N. When two or more wells are located in the same 10-acre tract, the wells are numbered serially in the order they were inventoried.

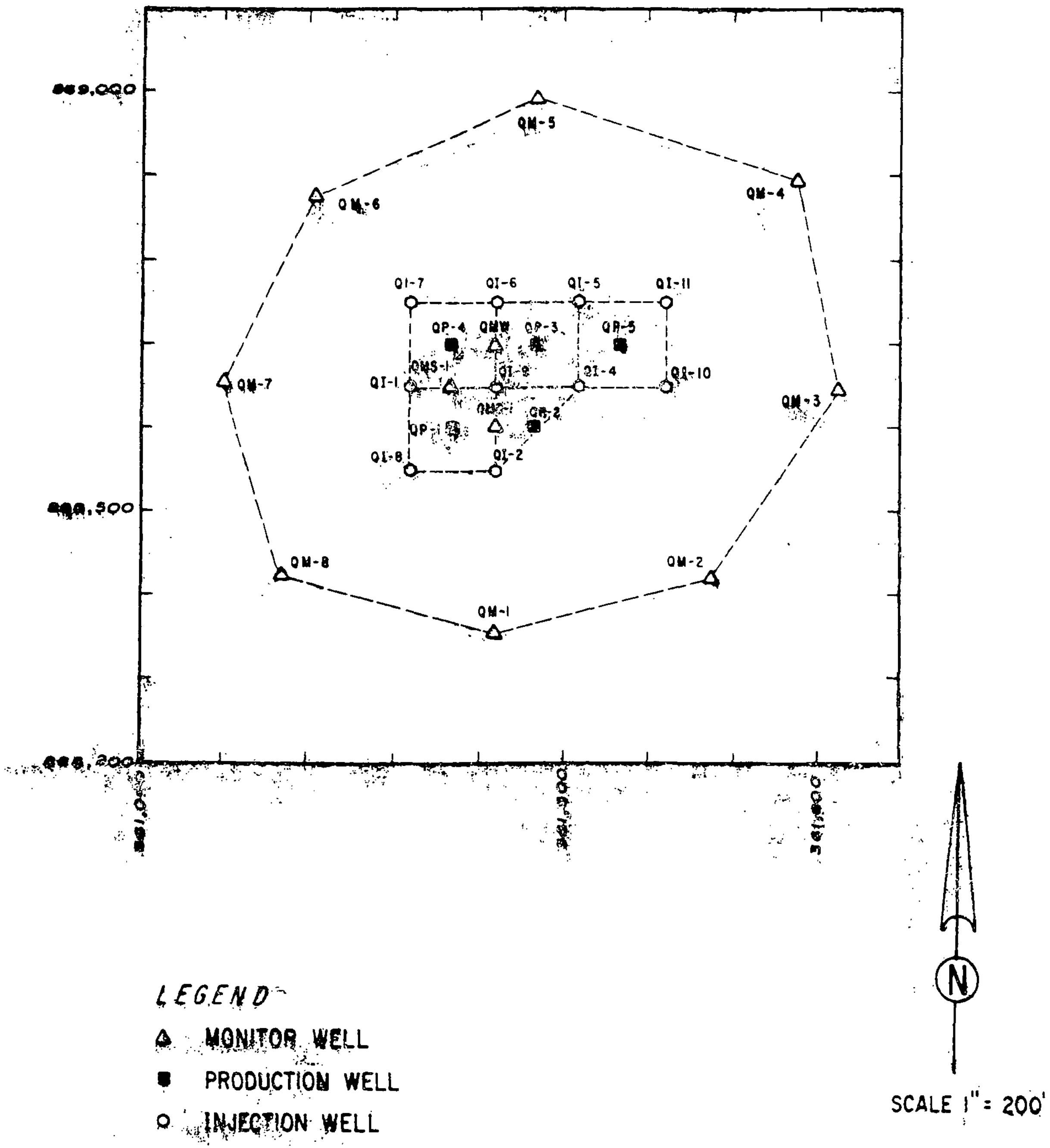
WELL NUMBERING SYSTEM

The following 1 Drawing specifically referenced Appendix D6 Table of Contents have been processed into ADAMS.

These drawings can be accessed within the ADAMS package or by performing a search on the Document/Report Number.

Figure D-6.5

IN SITU R&D PROJECT WELL PATTERN
"Q" SAND DEPOSIT
SECTION 36-T36N, R74W
CONVERSE COUNTY, WYOMING

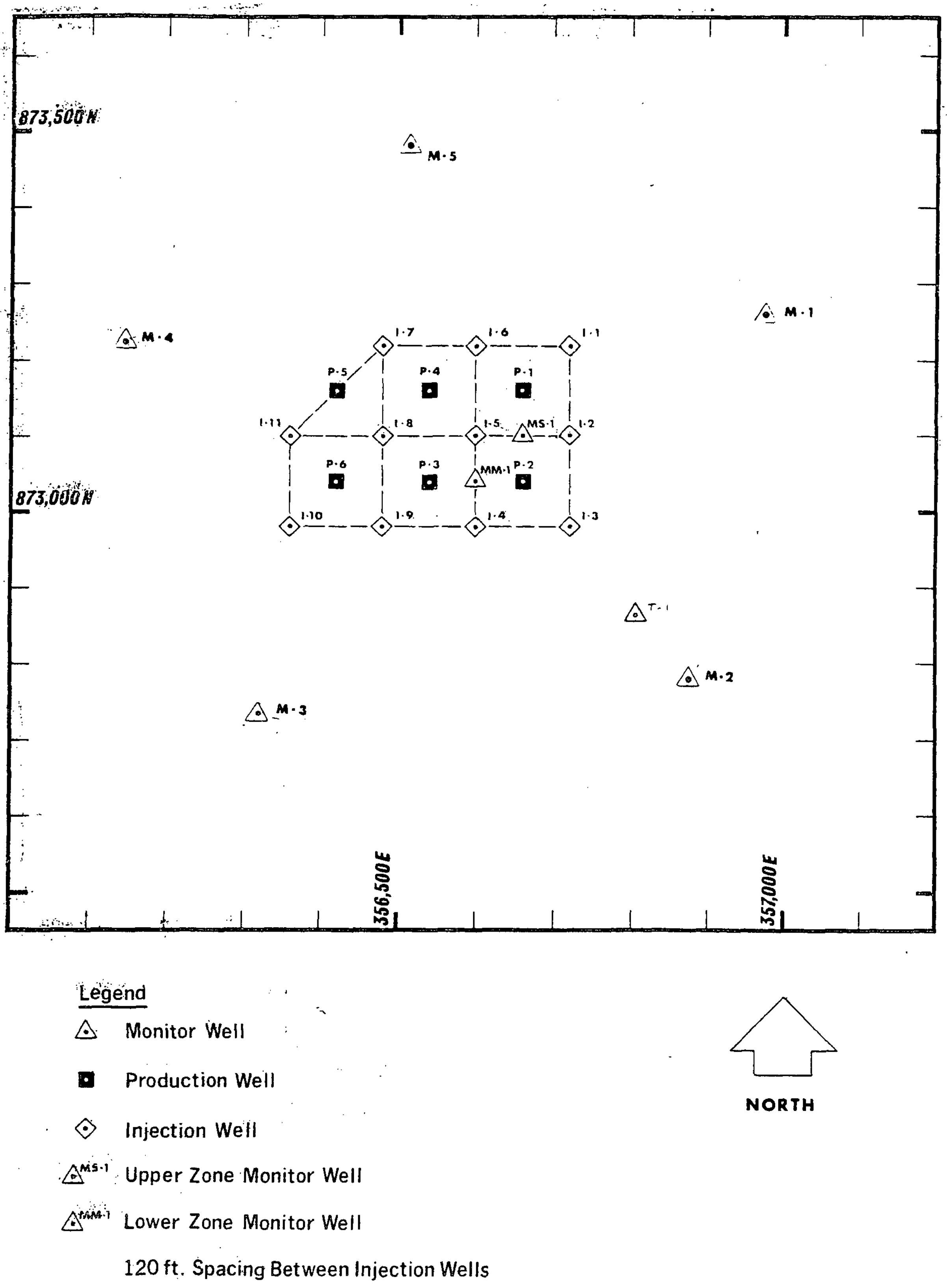


FEB. 1980
REV. JULY 1980

Figure D-6.6

"O" SAND WELL PATTERN

Section 26, T-36N; R-74W



The following 2 Drawings specifically referenced Appendix D6 Table of Contents have been processed into ADAMS.

These drawings can be accessed within the ADAMS package or by performing a search on the Document/Report Number.

D-146 to D-147

Hydrology

Attachment 'A'

Bill Smith Mine Site Pump Test

Pump testing was conducted at the Bill Smith Mine site in 1974 by Harshbarger and Associates and a copy of Harshbarger's report is attached. The locations of the test wells used in the Harshbarger study are shown on Figure 1 in the report. The primary purpose of pump tests conducted at well sites TW-1 and TW-2 was to obtain quantitative hydrologic data necessary for designing a mine dewatering and water level monitoring network. The tests were conducted during separate periods of time at TW-1 and TW-2 using a pumping well, five shallow observation wells, and five deep observation wells. All observation well sites shown in Figure 1 include one shallow and one deep observation well. The depths, completion intervals, and distances of the observation wells from the pump well are given on page 10 of the attached report.

The shallow observation wells penetrated approximately 500 feet of the unconfined Wasatch formation. The pumping wells and deeper observation wells penetrated the confined Fort Union aquifer. Near the Bill Smith Mine the aquitard between the shallow and the deeper observation wells ranges from 40 to 75 feet thick, but it is less than 5 feet thick near well site TW-2.

From the data it was estimated that the average transmissivity of the confined aquifer ranged from about 8000 gpd/ft in the vicinity of wells OWD-3 and OWD-5 to 5000 gpd/ft at wells OWD-1 and OWD-2. The storage coefficient ranged from 0.00015 to 0.00035.

No noticeable changes in the water levels in the shallow observations wells were noted, even though pumping lowered the water levels in the aquifer beneath the aquitard below the top of the confined aquifer in areas adjacent to wells TW-1 and TW-2.

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ANALYSIS OF CONSTANT YIELD TESTS OF WELLS TW-2 AND TW-1 BILL SMITH MINE, CONVERSE COUNTY, WYOMING

Prepared For

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BILL SMITH MINE, CONVERSE COUNTY, WYOMING

CONCLUSIONS

The following conclusions and recommendations are given based on the data obtained from the performance of pumping tests of wells TW-1 and TW-2. Kerr McGee Nuclear Corporation provided essential information for the analysis, including the borehole geophysical logs and isopachous maps of the "P" shale and "O" sand lithologic units.

1. The average transmissivity of the artesian aquifer system between wells OWD-3 and OWD-5 is about 7,500 gpd/ft (gallons per day per foot width of aquifer at 1:1 hydraulic gradient); the average storage coefficient is about 0.0003.

2. Transmissivity in the vicinity of well TW-1 is about 5,500 gpd/ft and in the well OWD-2 vicinity it is less than 5,000 gpd/ft; the storage coefficient is about 0.0004. The lower value of transmissivity as compared to that near TW-2 is attributed to finer-grained material in the aquifer near well TW-1 and a lesser thickness of the "O" and "M" sands.

3. Pumping of wells TW-1 and TW-2 created a cone of pressure relief to more than 10,000 feet during the 6 and 10-day pumping periods. The simultaneous pumping of the two wells for a prolonged period of time would create a cone of pressure relief to extend about 3 to 4 miles from the wells.

4. The hydrostatic head in the water-table aquifer overlying the "P" shale is higher in elevation than the head in the underlying "O" and "M" sands; consequently, there is a hydraulic gradient downward through the "P" shale. Pumping of wells TW-1 and TW-2 did not cause noticeable changes in the water level in observation wells tapping the water-table aquifer; therefore, there was no apparent increase in the rate of water movement through the "P" shale during the pumping periods.

5. Pumping of wells TW-1 and TW-2 induced water-table conditions to occur in the immediate vicinity of each well as the hydrostatic head was lowered below the top of the "O" sand.

6. Additional wells will be required for dewatering operations to accommodate the proposed mining operations.

7. Additional observation wells in both the water-table and artesian aquifer systems are essential to monitor the effect pumping in the artesian system will have on both systems.

RECOMMENDATIONS

1. Wells TW-1 and TW-2 should be equipped with 300 gpm (gallons per minute) and 400 gpm pumps, respectively and should be capable to produce this discharge rate from a depth of 800 feet. The pumps should be operated continuously. If necessary to maintain continous pumping, throttle the discharge and/or install a water-return line from the discharge pipe to the well to maintain the pumping water level above the pump intake.

2. Install additional dewatering wells into the artesian aquifer, "O" and "M" sands, along the proposed mine drifts. The wells should be spaced at about 2,000-foot intervals and should pump continuously for at least one year before the drift advances to the well vicinity (Figure 14).

3. Conduct a 10-day constant discharge test at each new dewatering well. Each constant discharge test should be preceded by a step-discharge test with a pump that can be throttled to obtain three separate rates--the minimum difference between rates should be 50 gpm. Install two observation wells tapping the artesian system; one well at 100 feet and the other at 700 feet from the pumped well.

4. Install paired observation wells during 1976 in those areas where mining is proposed for the next 10 years. One of the paired wells should tap the water-table aquifer and the other should tap the artesian aquifer. Install several observation wells where the "P" shale is less than 10 feet thick.

WELL TW-2 PUMP TEST

PRE-PUMPING PERIOD

Pumping of well TW-2 was not started until the water levels in all wells indicated a predictable trend. The pump which had been operating continuously in the vent hole near the Bill Smith mine shaft was stopped and removed for repairs on July 3, 1975; on July 12 the pump was replaced and started pumping again. This shut-down and subsequent restarting of pumping from the vent hole caused pressure disturbances in the confined aquifer system; consequently, the start of the constant yield test in well TW-2 was delayed until the effects of the disturbance had stabilized in the observation wells. Depth-to-water measurements were made once or twice a day in all observation wells and two monitor wells near the mine shaft in the period from July 12 to July 20. On July 20 it was concluded that the water levels in the observation wells were following predictable fluctuation trends and that the constant yield test of well TW-2 could be started the next day.

CONSTANT YIELD PUMPING PERIOD

The pump in well TW-2 was turned on at 0820 hours on July 21, 1975 and the discharge valve was adjusted to a constant discharge rate of about 550 gpm. The discharge control valve was adjusted when necessary during the first several hours of pumping to maintain the discharge rate at approximately 550 gpm. Pumping was continuous for 10 days except for a 5 minute power failure between 1726 and 1731 hours on July 21 and a 1 hour 50 minute power failure between 0500 and 0650 hours on July 29. A study of the recorder chart, which indicated the water stage at the Parshall flume, revealed that the average rate of discharge during the 10-day period was about 560 gpm.

Depth-to-water measurements were made in the pumped well and in the observation wells in accordance with Appendix in the report, "Groundwater Conditions and Water Control for Proposed Workings at the Bill Smith Mine near Glenrock, Wyoming". The measuring device at well OWS-1 malfunctioned on the second day of the pumping phase, and no additional water-level data were obtained from that well. No measurements were made in OWS-2 during the pumping and post-pumping periods.

POST-PUMPING PERIOD

The pump was turned off at 0800 hours on July 31. Depth to water was measured in the pumped well and observation wells, except the wells in the shallow system, at the same time intervals used during the pumping period. There had been no measurable effect on the water levels in wells tapping the shallow aquifer system; therefore,the time intervals between measurements in those wells were greater than those used during the pumping period. Measurement of the water levels were continued for 10 days after pumping ceased in well TW-2.

ANALYSIS OF TEST DATA

Significant magnitudes of drawdown occurred in all observation wells tapping the artesian system. The static water level, the amount of drawdown, the residual drawdown (difference between static water level and the water level 10 days after pumping stopped), and the distance from well TW-2 to the observation well are given in the following tabulation.

WELL	DISTANCE FROM WELL TW-2 (Feet)	STATIC WATER LEVEL (Feet)	MAXIMUM DRAWDOWN (Feet)	RESIDUAL DRAWDOWN 10 DAYS AFTER PUMPING STOPPED (Feet)
TW-2	0	487.42	270.62	4.0
OWD-4	110	487.05	64.29	4.0
OWD-5	1,015	455.10	38.23	5.3
OWD-3	1,920	520.40	23.50	4.4
OWD-1	3,920	537.03	15.90	5.4
OWD-2	4,800	538.61	10.04	2.3

The maximum drawdown was greatest near the pumped well and was less at greater distances from the pumped well, as shown in the above tabulation.

Water-level data obtained during the pumping and post-pumping periods were analyzed by the Theis non-equilibrium equation and the modified non-equilibrium graphical procedures to obtain information about the hydraulic properties of the artesian aquifer in the test site area. Water levels in wells tapping the artesian system were affected to some degree by changes in barometric pressure. Barometric effects have not been corrected in the water level data obtained; however, corrections probably would not have changed the data pattern sufficiently to cause significant errors in computing coefficients of transmissivity and storage. Some errors were made in making depth-to-water measurements, and the more obvious ones were eliminated from calculation procedures. Computational values of transmissivity and storage from the data analysis are given in Table 1.

TABLE 1.-- SUMMARY OF HYDRAULIC PROPERTIES OF THE "O" AND "M" SANDSTONES, PUMP TEST OF WELL TW-2, JULY 21 - AUGUST 9, 1975

	SEMI-LOGARITHMIC				LOGARITHMIC			
	DRAWDOWN		RECOVERY		DRAWDOWN		RECOVERY	
ELL	TRANSMISSIVITY 1/	STORAGE 2/	TRANSMISSIVITY	STORAGE	TRANSMISSIVITY	STORAGE	TRANSMISSIVITY	STORAG
O-1	8,100	0.00019	7,400	0.00022	6,970	0.00026	6,300	0.0003
O-2	3/	3/	3/	3/	8,330	.00032	8,440	.0003
O-3	8,450	.00032	7,040	.00037	7,050	.00042	8,670	.0004
O-4	8,450	.00010	6,570	.0020 4/	2,850 4/	.0006 4/	6,980	.0017
O-5	8,000	.00020	7,400	.00026	8,000	.00034	6,400	.0003
W-2	3/	3/	6,300	3/	3/	3/	3/	3/

1/ Gallons per day per foot width of aquifer at 1:1 hydraulic gradient

2/ Dimensionless; ratio of volume of water released per unit decline in head per unit volume

3/ Cannot be interpreted by procedure

4/ Coefficients not considered to be valid

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1975 Tucson, Arizona

The transmissivity and storage values given in Table 1, within the various categories, are in good agreement. Transmissivity values range from 6,300 to 8,450 gpd/ft (gallons per day per foot). It is considered that a reasonable average value would be 7,500 gpd/ft. Storage coefficient values range from 0.00010 to 0.00046 and average 0.00030. Computation based on distance-drawdown graph (Figure 7) indicates the transmissivity and storage values are about 7,700 gpd/ft and 0.0022 respectively.

Figure 2 is a hydrograph of water levels in wells OWS-1, OWS-2, OWS-3, OWS-4, and OWS-5 tapping the water table aquifer system. Pumping of well TW-2 caused no apparent change in water level in those wells, and, therefore, it could be concluded that no appreciable increase in movement of water occurred from the water table aquifer to the artesian aquifer through the "P" shale aquitard. The hydrostatic head in the water table aquifer is higher than the head in the artesian aquifer; consequently, there is a hydraulic gradient downward from the water table aquifer to the artesian aquifer system. The vertical permeability of the "P" shale is low and the downward movement of water is very slow; thus, the amount of water moving through the "P" shale is small per unit area, particularly in areas where the shale is thick.

An isopach map of the "P" shale shows the approximate thickness of the shale at the sites of the observation wells to be: OWS-1, 45 feet; OWS-2, 45 feet; OWS-3, 40 feet; OWS-4, 75 feet; and OWS-5, 75 feet. However, the same map reveals areas within 600 feet of well TW-2 where the "P" shale is less than 5 feet thick. These areas are small and probably could be classed as "windows" in the shale if the shale is missing entirely. The drawdown curve of the pumped well does not exhibit a shape that would indicate leaky aquifer conditions. It is concluded that there was little or no increase in the downward movement of water through the "P" shale during the pumping period. The increase in the amount of water that might move downward through the "P" shale during a prolonged period of pumping cannot be calculated from the available data.

Figure 3 is a semi-logarithmic graph of water-level drawdown and recovery versus time after pumping started (drawdown curve) and time after pumping stopped (recovery curve) for well TW-2. Some of the irregularities in the drawdown curve were caused by changes in pumping rate when the discharge control valve was adjusted; two stoppages of pumping by power failures also caused additional irregularities in the curve.

A change from artesian to water-table conditions probably occurred in the vicinity of well TW-2 during the pumping period and should have caused a decrease in the downward slope of the drawdown curve. However, if that effect occurred, it cannot be identified on the drawdown curve with certainty. The water level in well TW-2 was drawn down to about the 757-foot level below measuring point or about 755 feet below land surface. At that level, the water in the well probably was more than 100 feet below the hydrostatic head in the aquifer at the aquifer-well interface. Data are insufficient to determine the exact position of the head in the aquifer at the aquifer-well interface. The head in the aquifer at the aquifer-well interface would drop below the top of the "O" sand, which is at a depth of about 580 feet below land surface, when the change from artesian to water table conditions occurs. A tentative interpretation is that the head at the aquifer-well interface dropped below the top of the "O" sand at well TW-2 and might have declined several feet below that level. Additional information on this question is given later in a discussion of Figure 7.

Water-level recovery data were used to compute transmissivity only; storage was not computed because the effective radius of the pumped well was not determinable.

Figure 4 is a semi-logarithmic graph of water-level drawdown versus time after pumping started for observation wells OWD-1, OWD-2, OWD-3, OWD-4, and OWD-5. If the aquifer were ideal (homogeneous, isotropic, infinite areal extent, and instantaneous release of water from storage) and the pumping rate remained constant, the latter part of the drawdown curves for observation wells tapping that aquifer would become parallel; thus, the rate of water level decline in all wells would reach a common value. Less than ideal aquifer conditions and a short pumping period would result in drawdown curves not attaining an absolute parallel pattern. The curve for well OWD-4 (well is 110 feet from well TW-2) contains several changes in slope, some being attributed to adjustments in pumping rate and others to local geological conditions near well TW-2. Well OWD-4 is close to the pumped well and the water level in well OWD-4 reacts more readily to local conditions around the pumped well than the water levels do in the more remote observation wells. Drilling mud probably is entrained in the aquifer near well TW-2 because of the long time the well was under construction. Some of the mud could be partially blocking some sand intervals, thereby causing anomalous head differences in the aquifer adjacent to the well which decrease in effect as distance from the pumped well increase. The effects of change from artesian to water-table conditions at the pumped well would extend to well OWD-4 several hours before such effect would reach the more distant observation wells. If the pumping period had been several tens of days, the drawdown curves in the observation wells would have attained a more nearly parallel pattern.

It is not possible to positively identify an inflection on the drawdown curve of well OWD-4, or any of the other observation wells, and be sure that the inflection is a response to the change from artesian to water-table conditions near well TW-2. It is believed that the effect would reach well OWD-4 in the first several hundred minutes after pumping started and extend to well OWD-5 probably no later than several thousand minutes after pumping started, but it cannot be identified from the curves on Figure 4.

Values for transmissivity and storage were computed using drawdown data for wells OWD-1, OWD-3, OWD-4, and OWD-5. Values were not computed from drawdown data for the other observation wells as the pumping period was insufficient to meet the conditions of the computational procedure.

Figure 5 is a semi-logarithmic graph of water-level recovery versus time after pumping stopped for wells OWD-1, OWD-2, OWD-3, OWD-4, and OWD-5. The recovery curves, particularly that for well OWD-4, exhibit less irregularities than their companion curves in Figure 4. Irregularities caused by changes in pumping rate did not affect the recovery data; the water levels respond to a uniform rate of recharge to the cone of depression created during the pumping period. The effect of a change from water table to artesian condition at well TW-2 apparently reached well OWD-4 prior to 200 minutes after pumping stopped. The reason for the anomaly in the recovery curve of well OWD-4 between the elapsed recovery time of 1,000 and 1,800 minutes is not readily apparent. It might have been caused by the dislocation of a metal marker on the cable of the water-level measuring device.

Figure 6 is a logarithmic graph of water-level drawdown and recovery after pumping started (drawdown curve) or stopped (recovery curve) for wells OWD-1, OWD-3, OWD-4, and OWD-5.

The curves for well OWD-2 were not included because of their close proximity to the curves of OWD-1. Theoretically, the drawdown and recovery curves of an observation well would be in close agreement on the logarithmic graph if the aquifer conditions were ideal. The separation between these two curves for well OWD-4 indicates the effect of local conditions that were mentioned in the discussion of Figures 4 and 5.

Figure 7 is a semi-logarithmic graph of drawdown versus distance for selected times during the pumping period. Lines connecting data points for a common time were extended to the 1-foot distance which is assumed to be the approximate effective radius of well TW-2. The drawdown at 1-foot is interpreted as being the drawdown of head in the aquifer at the aquifer-well interface. The drawdown at the aquifer-well interface was compared with the drawdown in the pumped well. The drawdown at the aquifer-well interface and in the well at the three periods of time selected are: 1,000 minutes, 131 feet and 213 feet; 5,000 minutes, 146 feet and 243 feet; and 10,000 minutes, 151 feet and 259 feet. The efficiency of well TW-2 when pumping about 560 gpm was calculated by dividing the drawdown at the aquifer-well interface by the drawdown in the well; the result was multiplied by 100 to express the efficiency in percent. The efficiency of well TW-2 is about 60 percent at a pumping rate of about 560 gpm.

Pumping of TW-2 for 10 days caused some decline in water levels in two monitor wells near the Bill Smith mine shaft which reduced the rate of water yield from the shaft and the vent hole. The water level in monitor well M-2 declined about 10.5 feet during the 10-day pumping period. Measurements were not made each day in monitor well M-1; consequently, the records do not show the amount of change in water level in that well. Some of the decline is attributed to pumping from the shaft and the vent hole; however, most is attributed to pumping of well TW-2. The combined rate of discharge from the shaft and the vent hole decreased about 110 gpm during the pumping period of well TW-2.

WELL TW-1 PUMP TEST

PRE-PUMPING PERIOD

A step-discharge test was attempted in well TW-1 prior to the start of the constant discharge test. The object of the step test was to determine the head loss in the aquifer and the head loss through the gravel pack and screen and obtain information about the specific capacity of the well. The well was to have been pumped at three different rates of discharge, each rate being maintained constant for 2 hours. The test was unsuccessful because of difficulty in operating the pump at rates considerably less than the full discharge rating of the pump. When the pumping rate was 600 gpm, the water level declined to the pump intake; and by partially closing the discharge control valve to achieve smaller rates of pumping endangered the seals of the pump. As a last effort in the step-test, the control valve was set to a discharge rate of about 460 gpm. A study of the drawdown data at that pumping rate indicated that the constant discharge test should be operated at that rate.

The disturbance of hydraulic head in the aquifer caused by the step-test pumping required that the start of the constant discharge test be delayed until the effect of that disturbance was negligible. The recovery of the water levels were monitored daily, and it was concluded that the constant discharge test could begin on September 29, 1975.

CONSTANT YIELD PUMPING PERIOD

The pump in well TW-1 was started at 0800 hours on September 29, 1975. It was decided not to change the setting of the discharge control valve during the pumping period in hopes of avoiding some of the irregularities in the drawdown curves such as seen in the drawdown curve of well TW-2. The test was to continue for 10 days, unless the water level in the pumped well declined below the 880-foot level. A semi-logarithmic graph of drawdown versus time of pumping was kept current and projections of the drawdown were revised as the test progressed. Projections indicated that the drawdown would reach the 880-foot level either during the evening of October 5 or the early morning hours of October 6. It was decided to stop pumping at 0800 hours on October 5 to assure that personnel would be available to obtain water-level recovery measurements. No power failures occurred during the 6-day pumping period. The average rate of discharge was about 425 gpm.

Water-level measurements were made in all observation wells except OWS-4 and OWS-5. Measurements were not made in those two wells because data from the test of well TW-2 showed no evidence of water movement from the water-table to the artesian aquifer in the vicinity of the two wells. If no water moved between the two aquifer systems in that area when a large head difference was created near wells OWS-4 and OWS-5, it was considered unlikely that the two wells would show water movement when a much smaller head difference was created by pumping well TW-1.

The water level in the observation wells was measured with the frequency-distance relation used in the constant discharge test of well TW-2.

POST-PUMPING PERIOD

Pumping of well TW-1 was stopped at 0800 hours on October 5, 1975. Recovery water level measurements were made in the pumped well and in observation wells OWS-1, OWD-1, OWS-2, and OWD-2. Measurements were not made in the other observation wells because the measuring in the recovery period was to last no more than 2 days. The greater distance to the other observation wells would have yielded no better information than was obtained in them during the pumping period. Recovery water level measurements were made in the pumped well and nearby observation wells primarily to study the head changes in the aquifer when irregularities that might be caused by a slowly changing pumping rate were eliminated. The discharge rate decreased from about 460 gpm to about 400 gpm during the pumping period.

ANALYSIS OF TEST DATA

Drawdowns occurred in all observation wells tapping the artesian aquifer system when well TW-1 was pumped at a near-constant discharge rate for 6 days. The static water level, the amount of drawdown, the residual drawdown (difference between static level and the water level 30 hours after pumping stopped), and the distance from well TW-1 to the observation wells are given in the following tabulation.

WELL	DISTANCE FROM WELL TW-1 (Feet)	STATIC WATER LEVEL (Feet)	MAXIMUM DRAWDOWN (Feet)	RESIDUAL DRAWDOWN 30 HOURS AFTER PUMPING STOPPED (Feet)
TW-1	0	569.48	305.12	15.90
OWD-1	154	547.12	54.41	15.50
OWD-2	1,040	543.29	39.74	16.49
OWD-3	1,840	525.06	16.64	---
OWD-4	3,800	491.49	6.28	---
OWD-5	4,600	459.00	5.36	---

Water-level data obtained during the pumping and recovery periods were analyzed by the Theis non-equilibrium equation and the modified non-equilibrium graphic procedures to obtain information about the hydraulic properties of the artesian aquifer in the test site area. As during the test of well TW-2, barometric effects on the water level in wells were not considered in analyzing the data; those effects probably would not have changed the data pattern sufficiently to cause significant changes in the computation of transmissivity and storage. Computational values of transmissivity and storage from the data analysis are given in Table 2.

The transmissivity values given in Table 2 range from 2,670 gpd/ft (gallons per day per foot) to 9,550 gpd/ft. The lower values are for well TW-1 and observation wells east of TW-1; the higher values are for observation wells west of TW-1 in the vicinity of well TW-2. The lower transmissivity probably is related to a greater percentage of fine-grained material in the artesian aquifer near and east of well TW-1 and/or a probable decrease in thickness of the aquifer by an increase eastward in the number and thickness of shale beds.

Figure 8 is a hydrograph of water levels in wells OWS-1, OWS-2, and OWS-3 tapping the water-table aquifer system. The hydrostatic head in the water-table aquifer system is higher than that of the artesian system in the test site area; consequently the hydraulic gradient is from the water-table to the artesian system. The vertical permeability of the "P" shale (the aquitard between the two systems) is very low and the amount of water transmitted downward through that shale is small per unit area. The greatest movement per unit area will be where the shale is thin or possibly absent. Pumping of well TW-1 caused no apparent change in water level in the wells in the water-table aquifer at the test site; therefore, it is concluded that pumping of well TW-1 did not increase the rate of drainage of water from the water-table to the artesian aquifer system. It is probable that over a long period of pumping the effects of recharge from the water-table system to the artesian system might become evident.

TABLE 2.--SUMMARY OF HYDRAULIC PROPERTIES OF THE "O" AND "M" SANDSTONES, PUMP TEST OF WELL TW-1, SEPTEMBER 29 - OCTOBER 6, 1975

SEMI-LOGARITHMIC				LOGARITHMIC			
DRAWDOWN		RECOVERY		DRAWDOWN		RECOVERY	
TRANSMISSIVITY[1]	STORAGE[2]	TRANSMISSIVITY	STORAGE	TRANSMISSIVITY	STORAGE	TRANSMISSIVITY	STORAG
3,870	0.00036	6,600	0.00057	3,040	0.00047	6,580	0.0005
4,680	.00011	4,680	.00011	3,250	.00051	3,750	.0002
[3]	[3]	[3]	[3]	7,270	.00018	-	-
[3]	[3]	[3]	[3]	9,550	.00036	-	-
[3]	[3]	[3]	[3]	8,860	.00031	-	-
2,670	[3]	4,010	[3]	[3]	[3]	[3]	[3]

[1] Gallons per day per foot width of aquifer at 1:1 hydraulic gradient

[2] Dimensionless; ratio of volume of water released per unit decline in head per unit volume

[3] Cannot be interpreted by procedure

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Figure 9 is a semi-logarithmic graph of water-level drawdown and recovery versus time after pumping started (drawdown curve) and stopped (recovery curve) for well TW-1. The initial discharge rate of about 460 gpm gradually decreased during the pumping period and was about 400 gpm at the end of the pumping period. Allowing the discharge rate to decrease gradually rather than adjusting the discharge control valve to try and maintain a constant rate of discharge, eliminated the abrupted shifts in the drawdown curve such as occurred in the test of TW-2. The reduction in the downward trend of the curve in the time interval 240-800 minutes is in response to the change from artesian to water-table conditions in the aquifer near the well. The steepening of the downward trend in drawdown after 800 minutes of pumping is probably related to the well characteristics rather than conditions of the aquifer. An increase in the drawdown slope in the nearby observation well (OWD-1) would have occurred if this factor were related to the aquifer.

The water level in the pumped well declined more rapidly than the hydrostatic head in the aquifer at the aquifer-well interface. The drawdown curve for well TW-1 shows that the drawdown in the well was approximately 230 feet when a change from artesian to water table conditions began. Studies of the drawdown in the observation wells with respect to distance from the pumped well indicate that the hydrostatic head at the aquifer-well interface may have declined as much as 130 feet at the end of the pumping period as compared to the drawdown of 305 feet in well TW-1.

Transmissivity was computed from the recovery data for well TW-1. Storage was not computed because the effective radius of the well was not determinable.

Figure 10 is a semi-logarithmic graph of water-level drawdown versus time after pumping started for wells OWD-1, OWD-2, OWD-3, OWD-4, and OWD-5. The non-parallel nature of the curves, one to the other, indicates a difference in the hydraulic properties of the aquifer within the test site. The curves for wells OWD-1 and OWD-2 have some similarity in shape; whereas, the curves for wells OWD-3, OWD-4, and OWD-5 have a similarity in shape. Computations of transmissivity given in Table 2 show higher values for the wells near TW-2 and lower values for wells near TW-1.

The change in slope of the drawdown curve for well OWD-1 after 200-300 minutes of pumping is in response to the change from artesian to water table conditions near well TW-1. A change in slope of the drawdown curve for well OWD-2 also is apparent, but the time of the change cannot be determined precisely for well OWD-1. Changes in slope in the drawdown curves for the other three observation wells are not apparent.

The slope of the drawdown curve for well OWD-1 after the effect of the change from artesian to water table occurs remains constant and does not shift to an increase in slope as did the drawdown curve of the pumped well. This lack of change in slope is interpreted as indicating that the increase in rate of drawdown in well TW-1 is related to the hydraulic characteristic of the pumped well and not to the aquifer.

Values for transmissivity and storage were not computed from drawdown data for wells OWD-3, OWD-4, and OWD-5 using the modified non-equilibrium graphic procedures because the time of pumping was not long enough to cause sufficient drawdown in those wells to create conditions prescribed for the procedures.

Figure 11 is a semi-logarithmic graph of water level recovery for wells OWD-1 and OWD-2. These are the only observation wells tapping the artesian aquifer system from which recovery data were collected. The change from water table to artesian conditions in the aquifer near well TW-1 is not apparent in either of these curves. The greater part of the curves reflect artesian conditions in the aquifer.

Figure 12 is a logarithmic graph of water level drawdown and recovery versus time after pumping started (drawdown curves) or stopped (recovery curves) for wells OWD-1 and OWD-2; drawdown curves also are shown for wells OWD-3, OWD-4, and OWD-5. No recovery data were obtained for the latter three wells. The difference in shape between the drawdown and recovery curves for well OWD-1 and also those for OWD-2 reflect the change from artesian to water table and back to artesian conditions as well as the non-homogeneity of the aquifer.

Figure 13 is a semi-logarithmic graph of water level drawdown in the observation wells versus distance from well TW-1 for selected periods of time. Lines drawn along data plots for each common time were extended to the 1-foot distance, which is assumed to be the aquifer-well interface. The intersection of the lines at the 1-foot distance approximates the drawdown of the hydrostatic head at the aquifer-well interface. The 300-minute and 1,000-minute lines are parallel; however, there is doubt that part of the line for 1,000 minutes should be parallel at distances less than 100 feet from the pumped well. The change from artesian to water table conditions at the pumped well altered the rate of drawdown near the pumped well. The 8,600-minute line slopes toward the other lines and shows the effect of the change in conditions in the aquifer. Data plots of 1,000 minutes and 8,600 minutes for well OWD-2 are displaced from the lines as a result of the artesian to water table change. If the change from artesian to water table conditions occurred near the pumped well after about 240 minutes of pumping, as discussed previously, then the effect of the change began radiating outward from the pumped well at that time. As a consequence, the rate of lowering of the hydrostatic head in the aquifer would decrease at the pumped well.

The transmissivity and storage computed from the slope of the 300 and 1,000-minute lines, are 6,000 gpd/ft and 0.00084, respectively; the transmissivity computed for the 8,600-minute line is 6,300 gpd/ft. It is believed a transmissivity of about 5,500 gpd/ft would be representative for the artesian aquifer in the well TW-1 locality.

SUMMARY

The performance of pumping tests on wells TW-1 and TW-2 accommodated with five paired observation wells (Figure 1) provides definitive data on the artesian aquifer system beneath the "P" shale aquitard. The analysis of each pump test indicates that the asymptotic portion of the depression cone of the potentiometric surface extended at least two miles at the end of the pumping period (Figures 7 and 13). This extent and a computed coefficient of storage of about 3×10^{-4} clearly demonstrate the existence of artesian hydraulic conditions in the "O" and "M" sands. The areal extent of the depression cone is not known beyond the outlying observation wells OWD-2 and OWD-5. However, study of the isopachous maps of the "P" shale aquitard indicates continuity over an area of about 3 square miles. In the vicinity of the observation wells, the aquitard ranges from 40 to 75 feet thick; but at two locations, about 600 feet from well TW-2, the "P" shale is less than 5 feet thick. The water level in an observation well in the water table aquifer above such a thin shale section might have been affected by pumping of well TW-2; however, these are small areas and may not have significant influence on the gross system.

The water level data obtained from the observation wells which penetrated only the shallow water table aquifer above the "P" shale did not show any influence of pumping from wells TW-1 and TW-2 (Figures 2 and 8). Although the vertical permeability of the "P" shale is not known, the non-influence of pumping response on the water table aquifer indicates a relatively low vertical coefficient of permeability. The magnitude of potential leakage via the "P" shale is dependent upon the thickness, vertical permeability, the hydraulic head differential between the water table aquifer and the potentiometric surface of the "O" sand aquifer system. A tentative estimate was made as to the length of time of vertical leakage via the "P" shale, based on the following assumed values: Vertical hydraulic head differential of 500 feet; vertical coefficient of permeability ranging from 0.01 to 0.001 gallons per day per square foot; thickness of the "P" shale of 20, 50, and 100 feet; and a porosity of 40 percent. The range of travel times, based on the assumed parameters, is given in the following tabulation:

PARAMETERS USED TO ESTIMATE TRAVEL TIME OF GROUNDWATER FLOW FROM WATER-TABLE AQUIFER TO THE "O" SAND AQUIFER, BILL SMITH MINE AREA

Hydraulic Conductivity (Gallons/day/ft^2)	Aquitard Thickness (Feet)	Estimated Flow Rate (Feet/year)	Time Required For Groundwater To Move Via The "P" Shale (Years)
0.01	20	30	0.65
0.01	50	12	4+
0.01	100	6	16+
0.001	20	3	6.5
0.001	50	1.2	42
0.001	100	0.6	167

These estimates indicate that significant leakage via the "P" shale could occur during mining operations in areas where the shale is less than 20 feet thick, having a hydraulic conductivity of 0.01 gpd/ft^2 or greater.

The coefficient of transmissivity determined from the well TW-2 test ranges from 6,300 to 8,450 gpd/ft and from 2,670 to 9,550 gpd/ft for well TW-1 test (Tables 1 and 2). A study of these T values indicates that the average T for the western part of the test area (Figure 1) is about 7,500 gpd/ft and about 5,500 gpd/ft in the eastern part of the test area. A major factor related to the variability of T values is the total thickness of the "O" and "M" sands and the grain-size distribution within the sand units. The intercalation frequency of the lenticular shale units within the "O" sand might also account for erratic drawdown characteristics. A review of the isopachous map of the "O" sandstone indicates it is slightly more than 300 feet thick in the western area and about 250 feet in the eastern area. Examination of several borehole geophysical logs indicates there is perhaps a greater percentage of fine-grained material in the "O" sand in the eastern part of the area. The variability of the lithologic fabric in the Bill Smith area has a significant effect on the variability of transmissivity. However, the average T values are considered to be adequate to project the response that would be expected to occur from long-term continuous pumping.

The principal objective of the two pumping tests was to assess whether or not it would be tenable to create a depression cone in the potentiometric surface to accommodate proposed mining operations. A preliminary projection analysis has been attempted using the average T and S values obtained from the two pump tests with continuous pumping of 400 gpm at well TW-2 and 300 gpm at well TW-1. Two additional hypothetical wells were also assumed to be in operation as follows; one at about 1,000 feet west of OWD-5 and the other at about 1,200 feet north of OWD-2. The assumed pumping rates for the two additional wells are 400 and 300 gpm, respectively. Projected drawdown was computed at all well locations and the projected drawdown cone after about one year of continuous pumping is shown on Figure 14. The depression cone has an elongate "U" configuration, roughly parallel to the alignment of the pumping wells. It indicates that the hydraulic head of the "O" sand aquifer would be beneath the base of the "P" shale aquitard with continuous pumpage from the four wells in about one year. At about that time, non-artesian hydraulic conditions would prevail in the "O" sand aquifer system and the yield from the wells would probably be appreciably less. As mine drifts proceed forward into the depressurized area, most of the water could be withdrawn via the mine drainage sump-pump system; and pumping via the wells could be terminated.

The principal utility of the dewater wells would be to depressurize the artesian hydraulic head in the area ahead of the mine operations. These advance dewater wells should be pumped continuously to intercept the groundwater inflow along the margin of the depression cone. When the water level in the "O" sand aquifer is under non-artesian conditions, the drainage of water from storage in the sand could be accommodated by the mine drift drainage via the water sump constructed near each shaft.

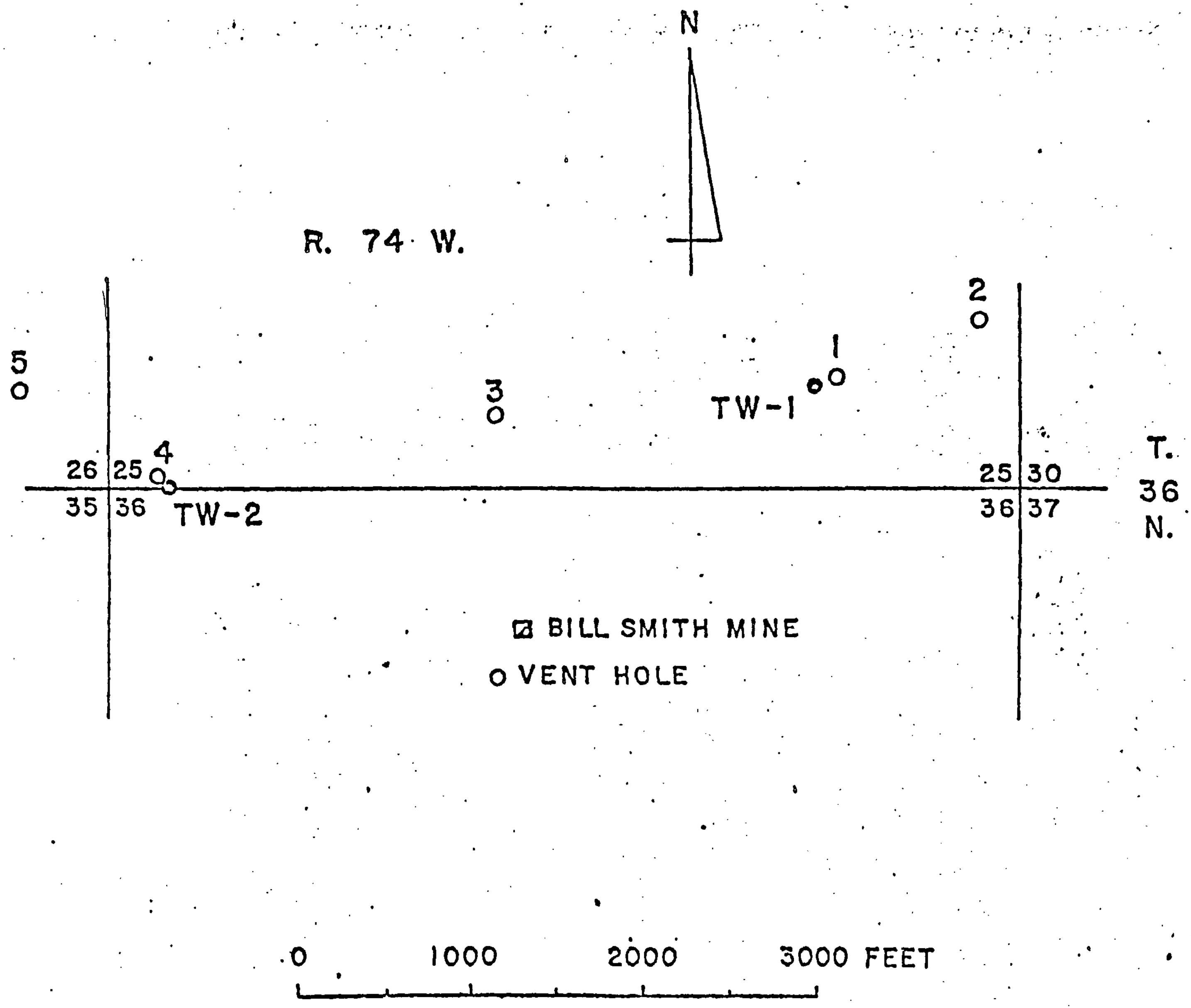


FIGURE 1 -- MAP OF BILL SMITH MINE AREA AND TEST WELL LOCATIONS

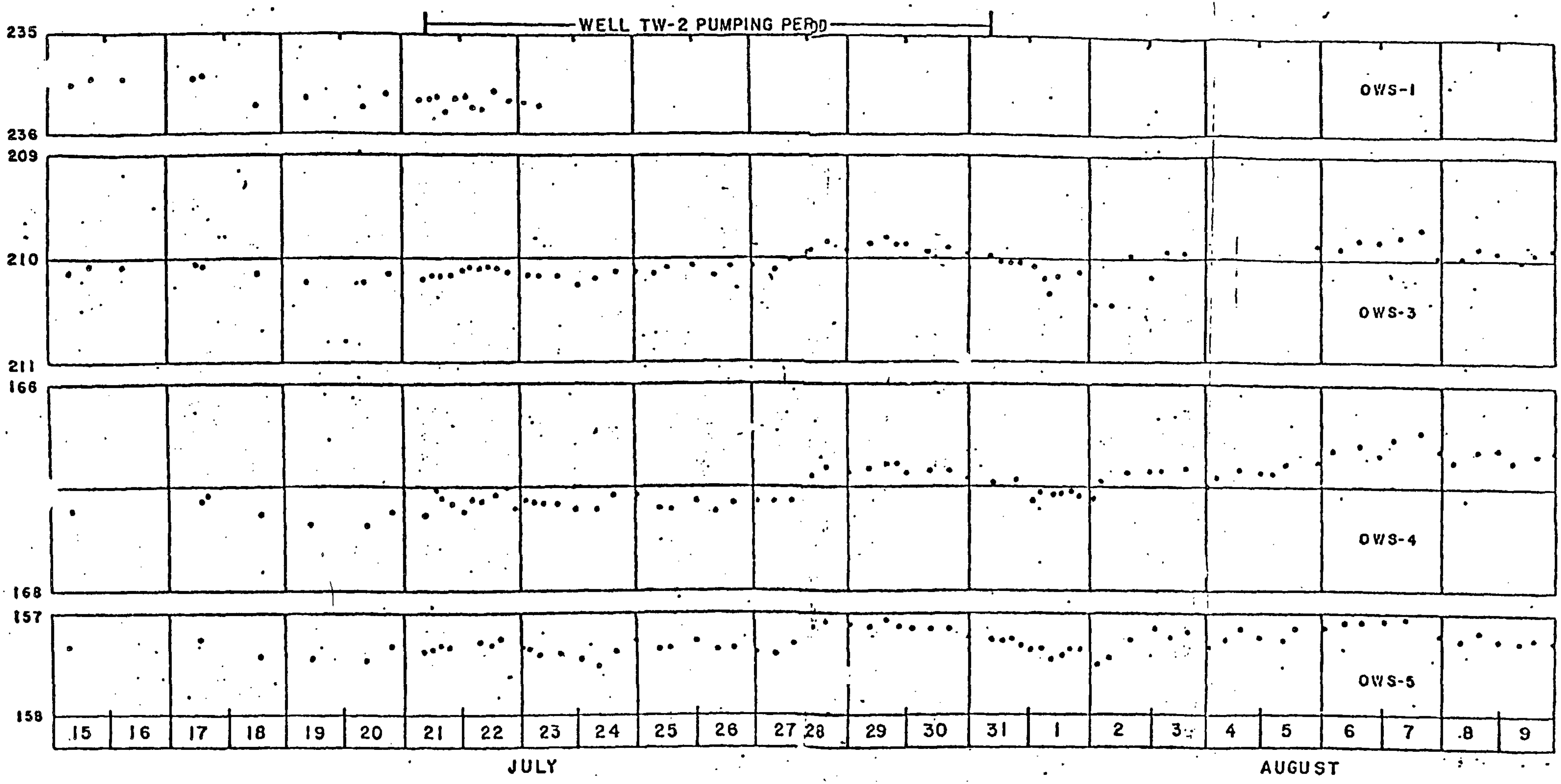


FIGURE 2 --HYDROGRAPHS WATER LEVEL IN OBSERVATION ELLS IN WATER TABLE AQUIFER, JULY 15-AUGUST 9, 1975

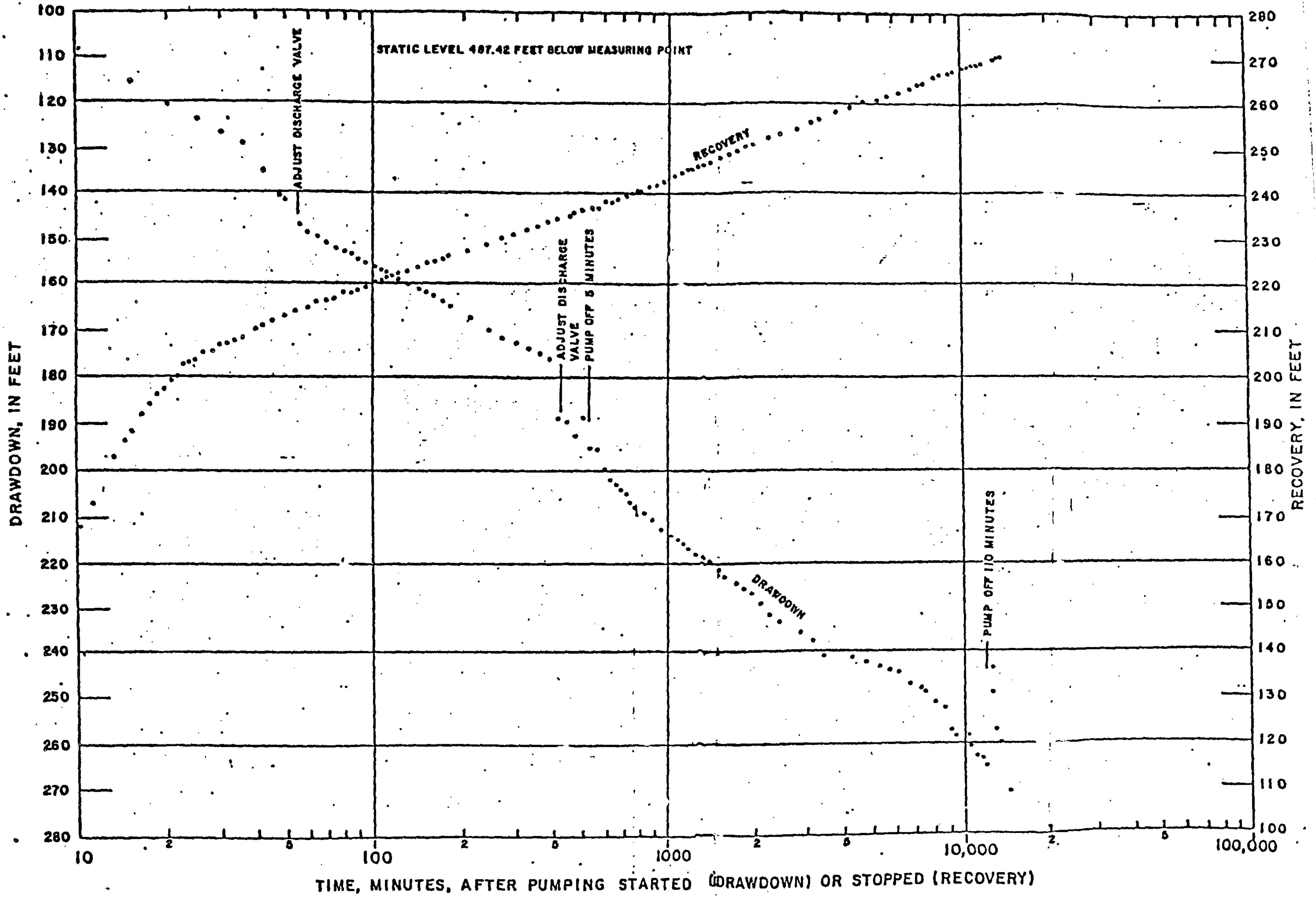


FIGURE 3 — SEMI-LOGARITHMIC GRAPH OF DRAWDOWN AND RECOVERY IN WELL TW-2

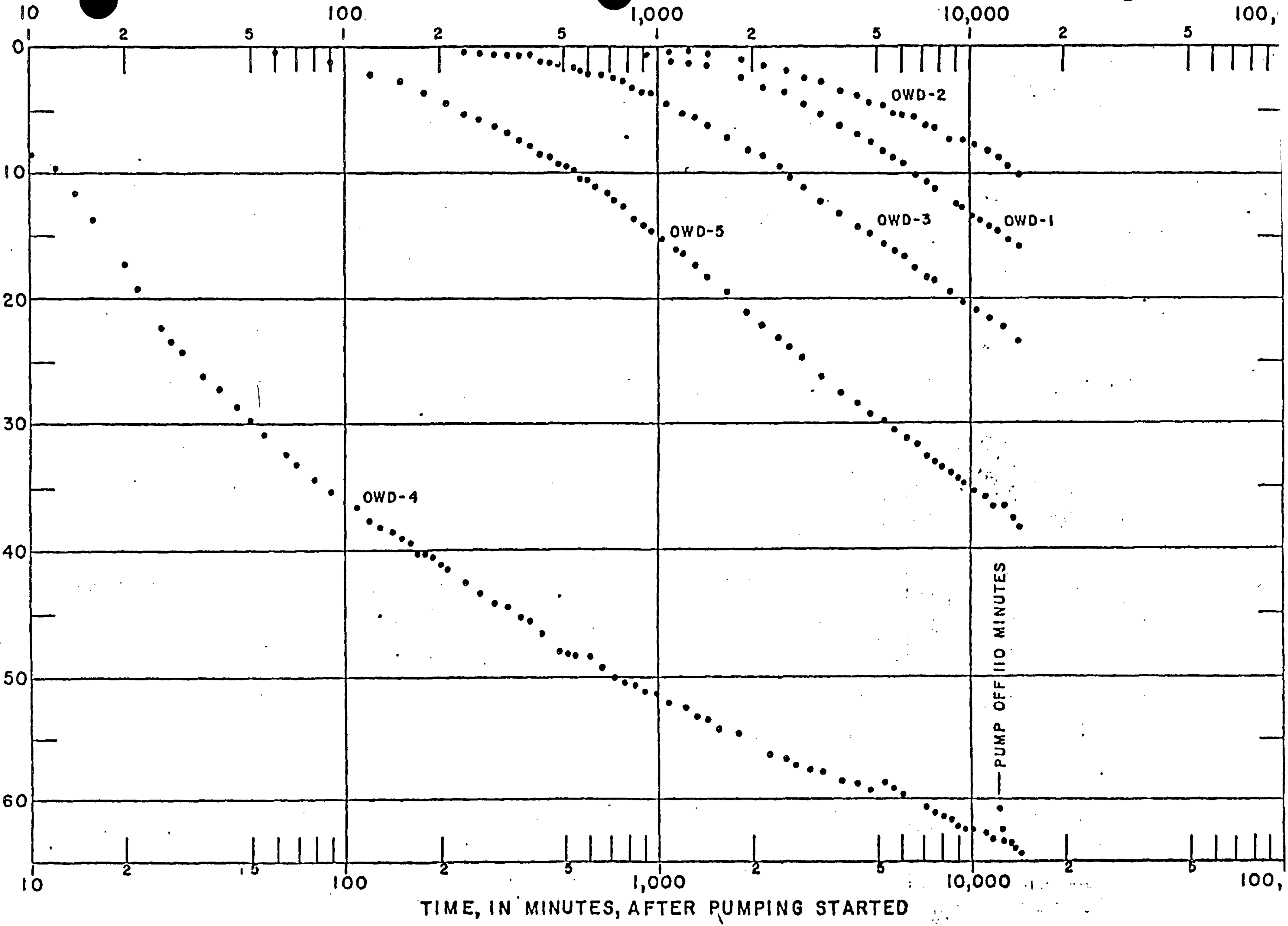


FIGURE 4 --SEMI-LOGARITHMIC GRAPH OF DRAWDOWN IN WELLS OWD-1. OWD-2. OWD-3. OWD-4

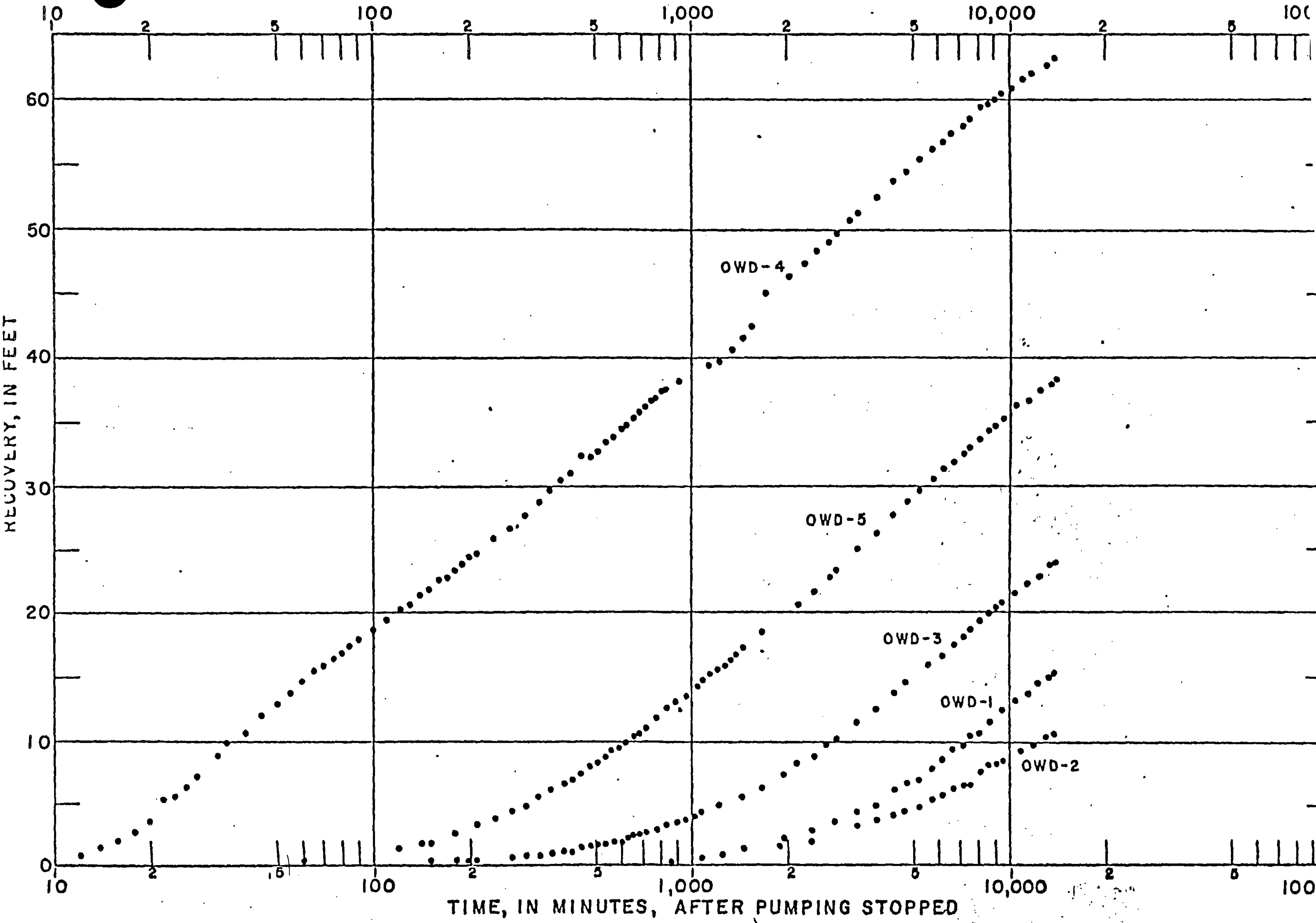


FIGURE 5 --SEMI-LOGARITHMIC GRAPH OF RECOVERY IN

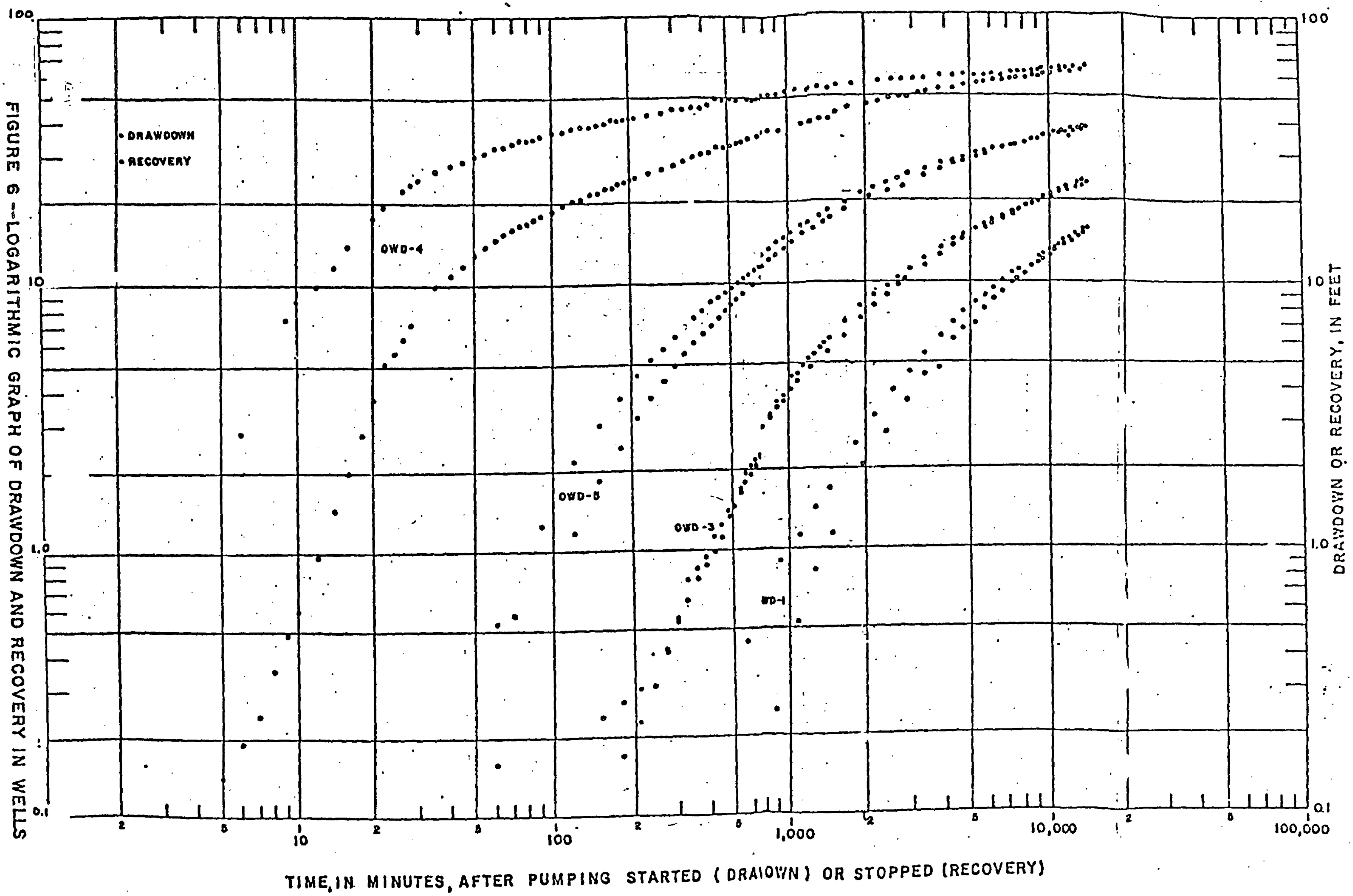


FIGURE 6 --LOGARITHMIC GRAPH OF DRAWDOWN AND RECOVERY IN WELLS OWD-1, OWD-3, OWD-4, AND OWD-5; WELL TV-2 TEST

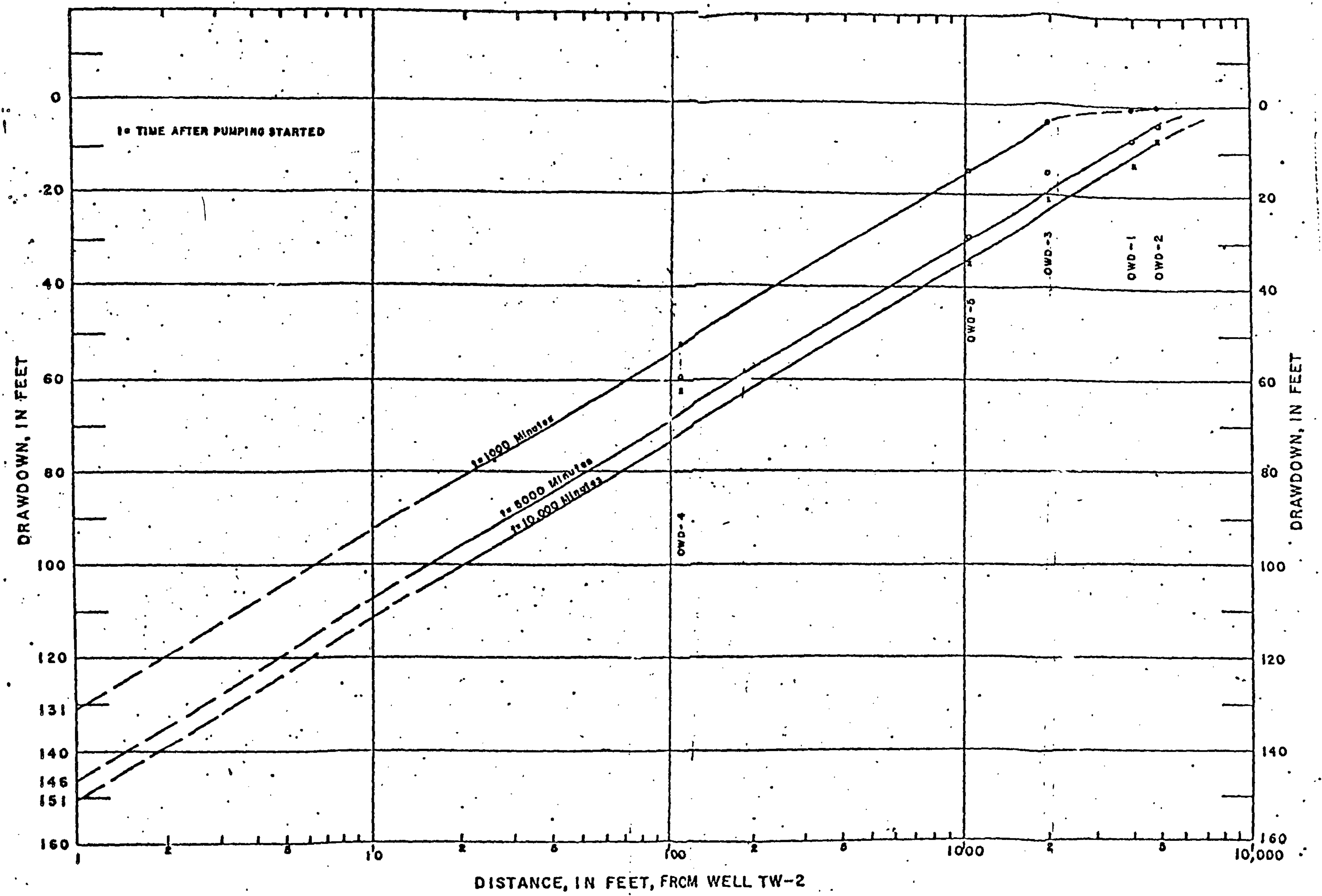


FIGURE 7 --DISTANCE-DRAWDOWN GRAPH FOR WELLS IN BILL SMITH MINE AREA; WELL TW-2 TEST

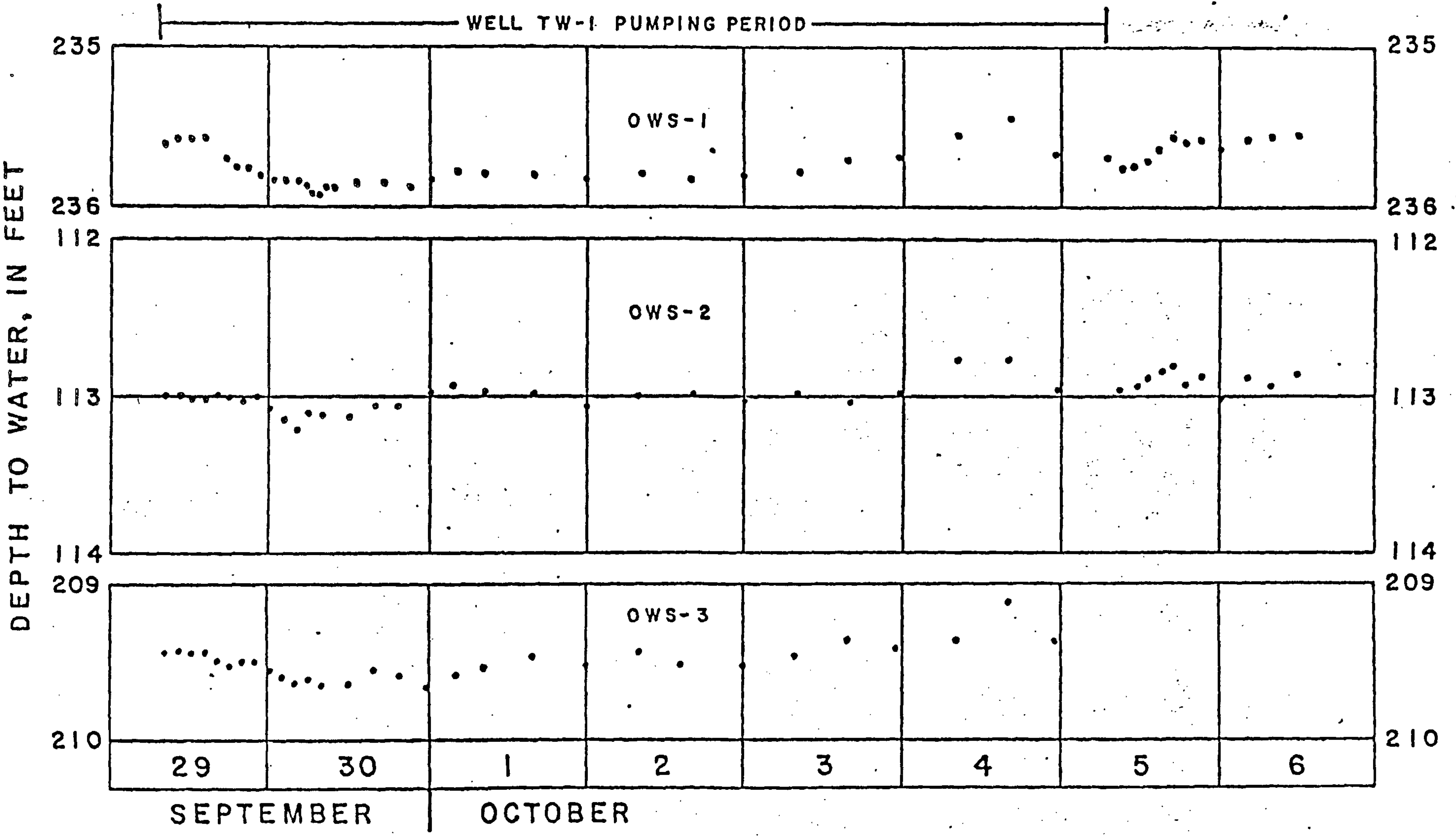


FIGURE 8 --HYDROGRAPHS WATER LEVEL IN OBSERVATION WELLS IN WATER TABLE AQUIFER, SEPTEMBER 29 - OCTOBER 6, 1975

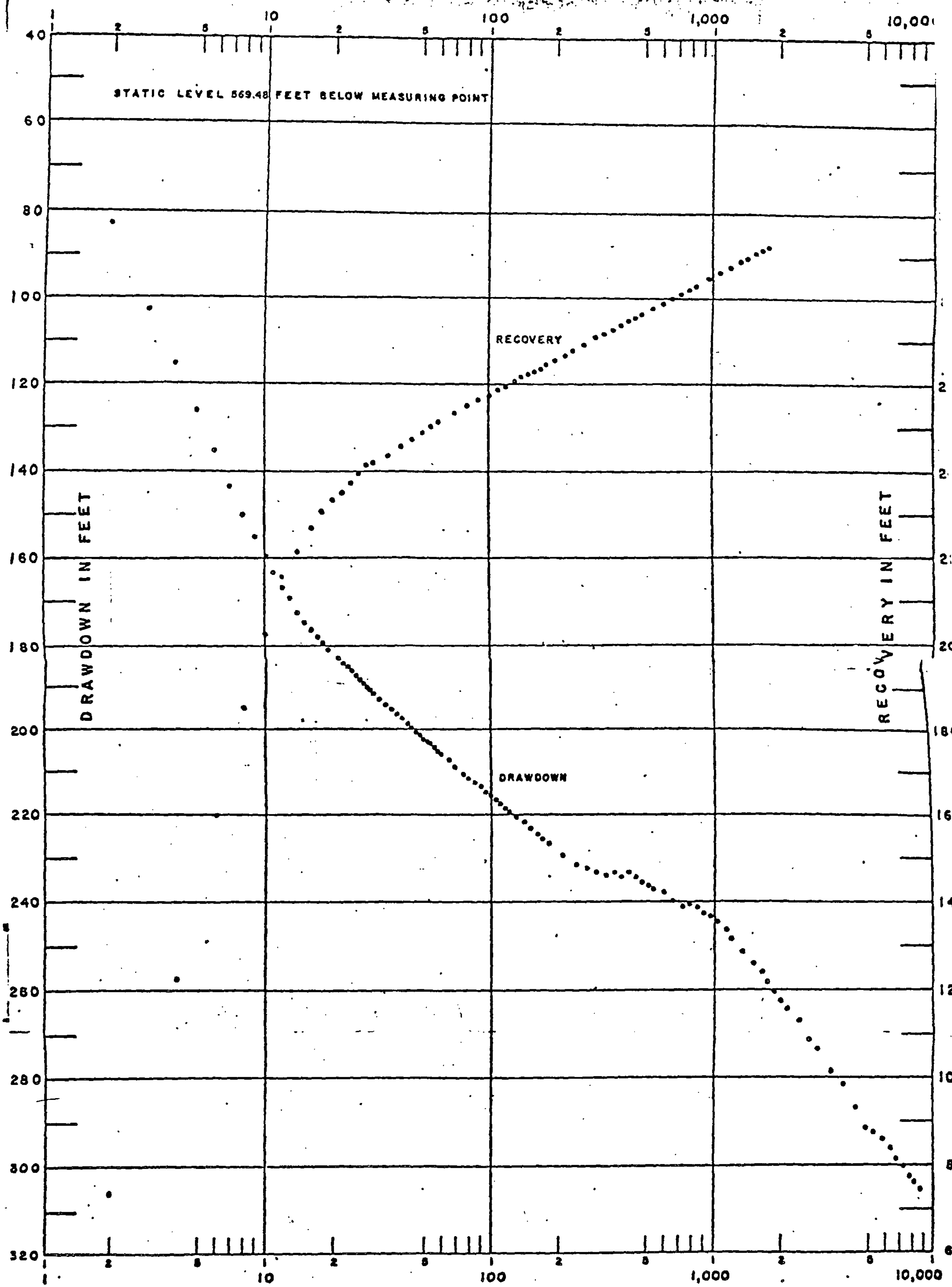
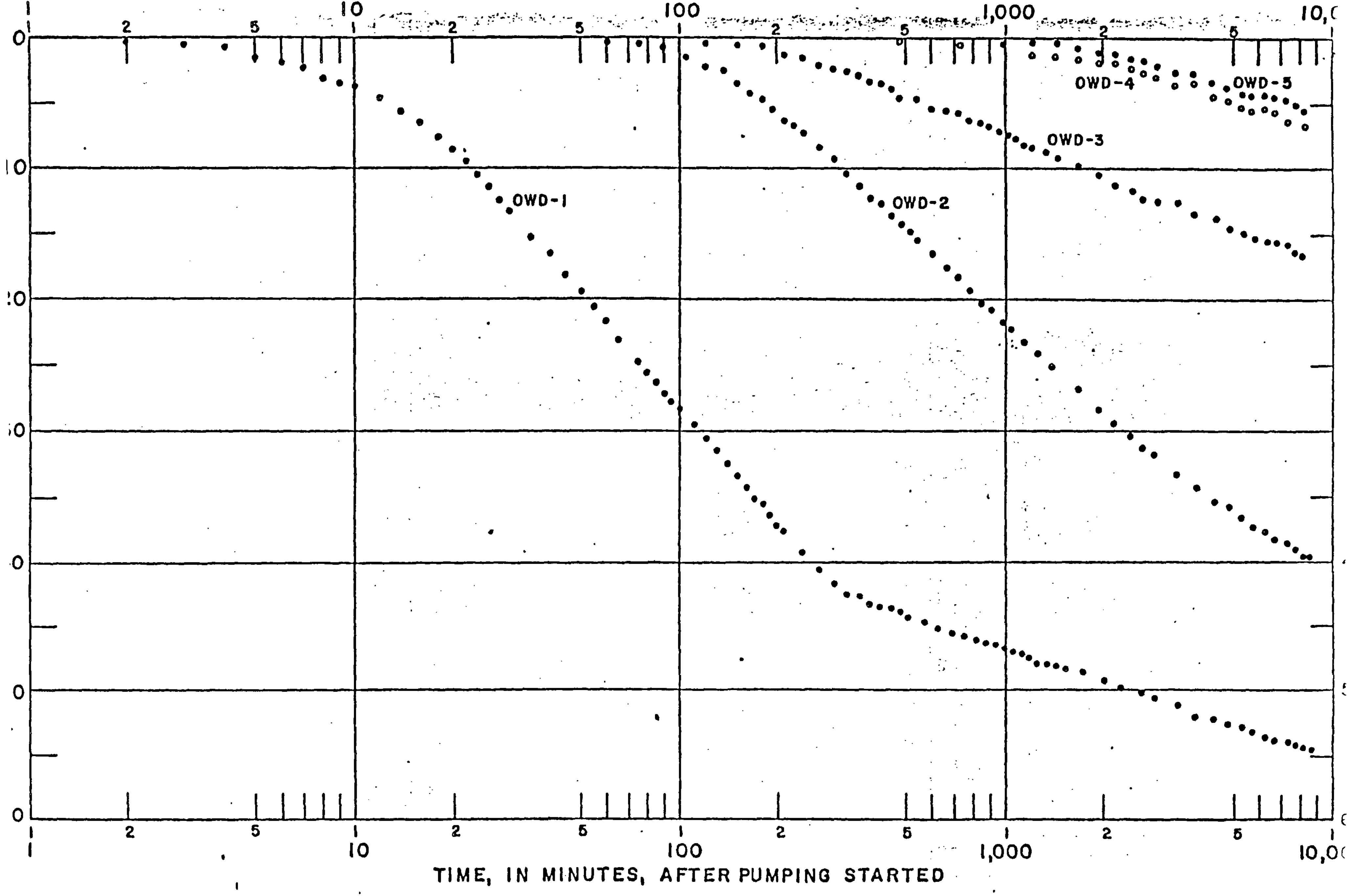


FIGURE 9 --SEMI-LOGARITHMIC GRAPH OF DRAWDOWN AND RECOVERY IN WELL TW-1



IGURE 10--SEMI-LOGARITHMIC GRAPH OF DRAWDOWN IN WELLS OWD-1, OWD-2, OWD-3, OWD-

AND OWD-5, WELL TW-1 TEST

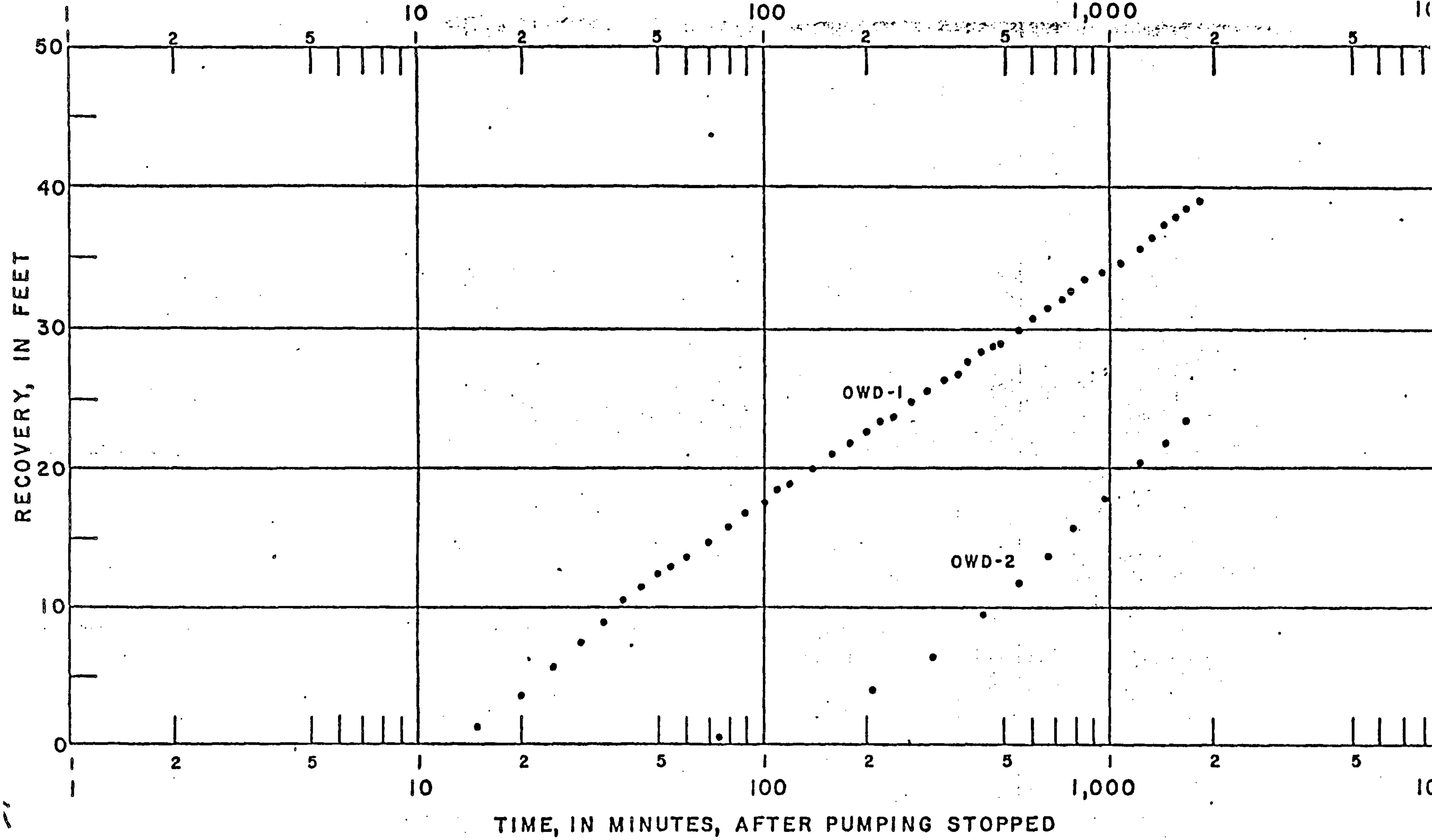


FIGURE 11--SEMI-LOGARITHMIC GRAPH OF RECOVERY IN WELLS OWD-1 AND OWD-2; WELL TW-1 TEST

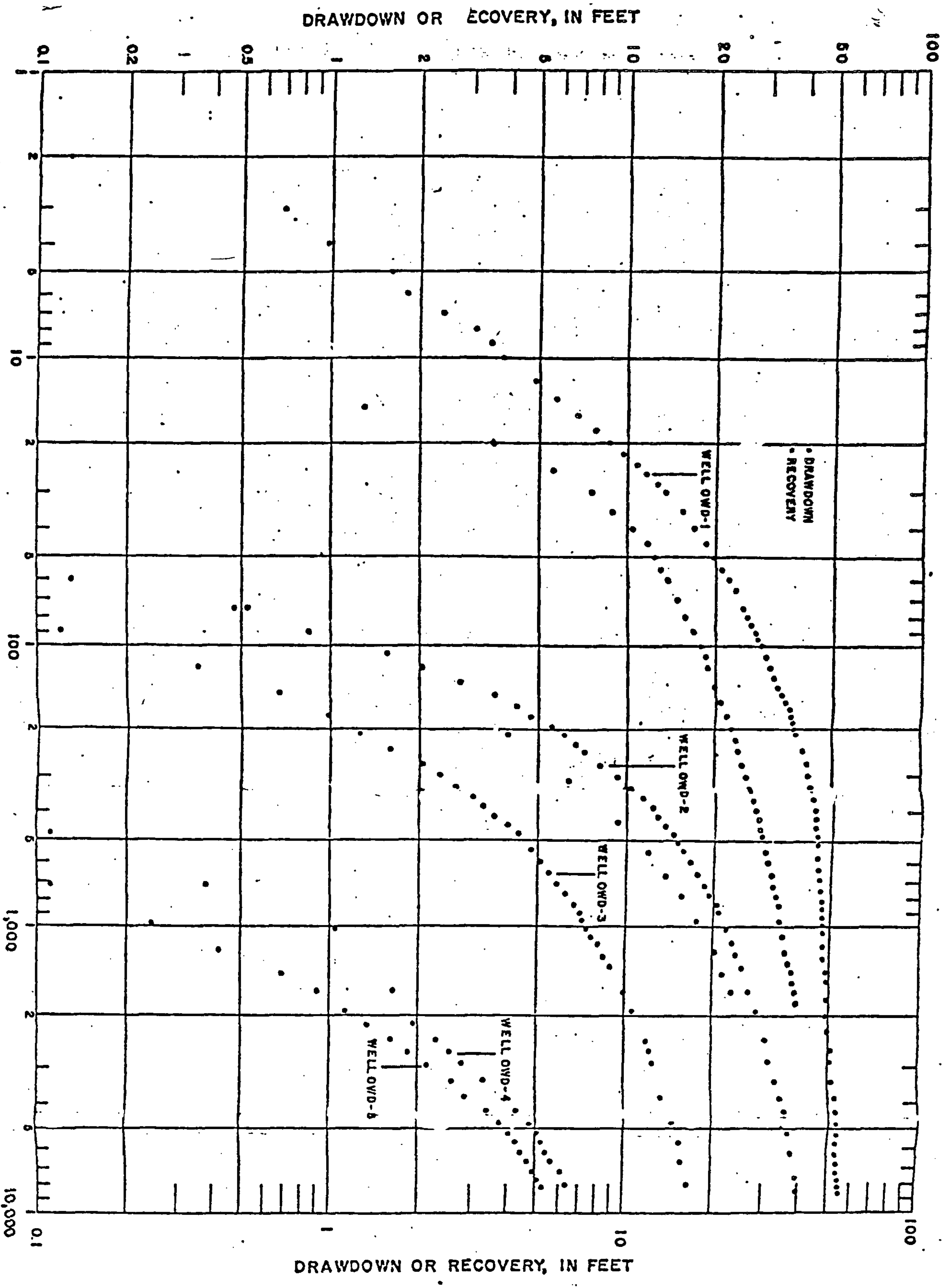


FIGURE 12--LOGARITHMIC GRAPH OF DRAWDOWN AND RECOVERY IN WELLS OWD-1, OWD-2, OWD-3, OWD-4, AND OWD-5; WELL TW-1 TEST

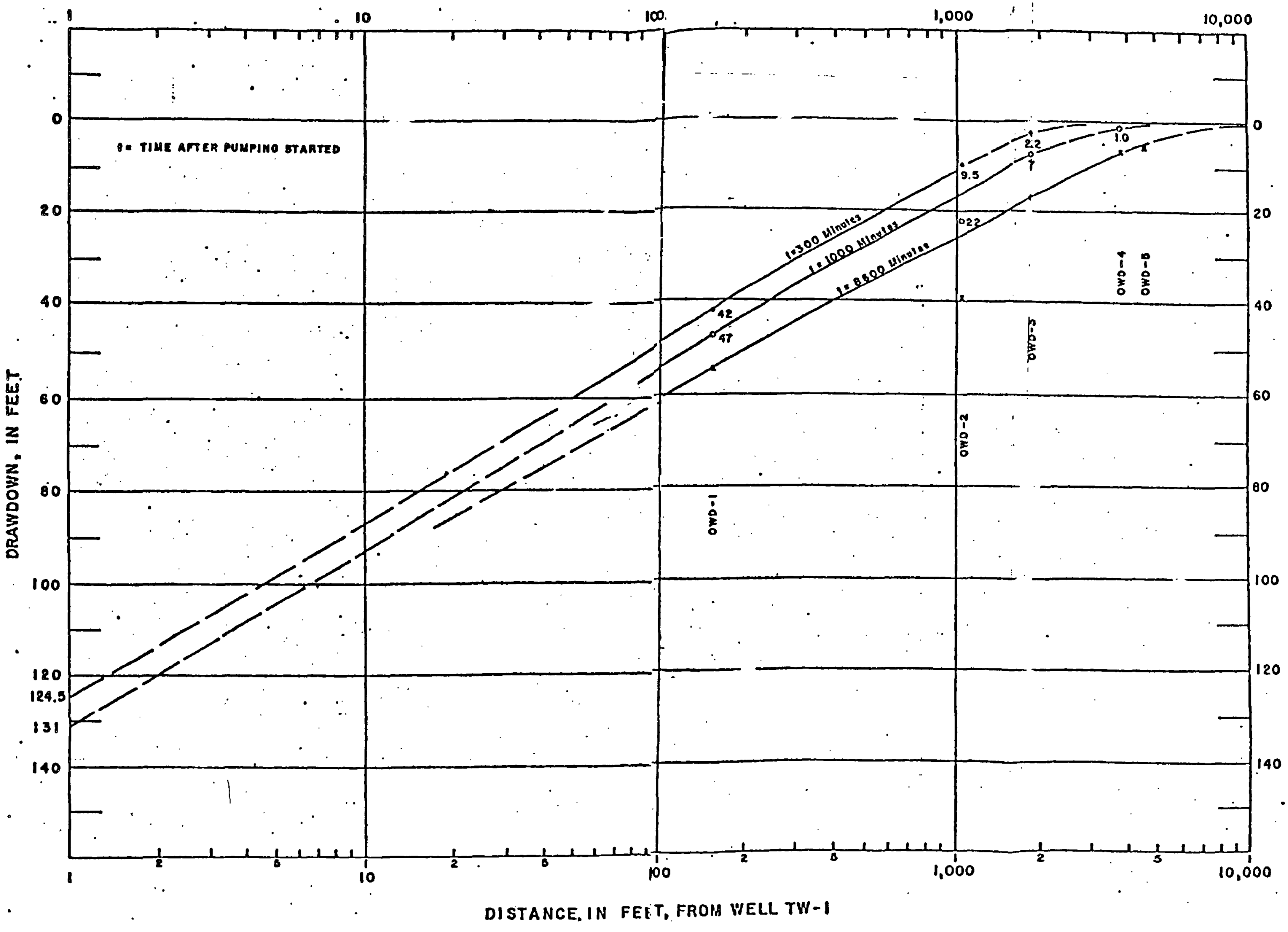


FIGURE 13--DISTANCE-DRAWDOWN GRAPH FOR WELLS IN BILL SMITH MINE AREA: WELL TW-I TEST

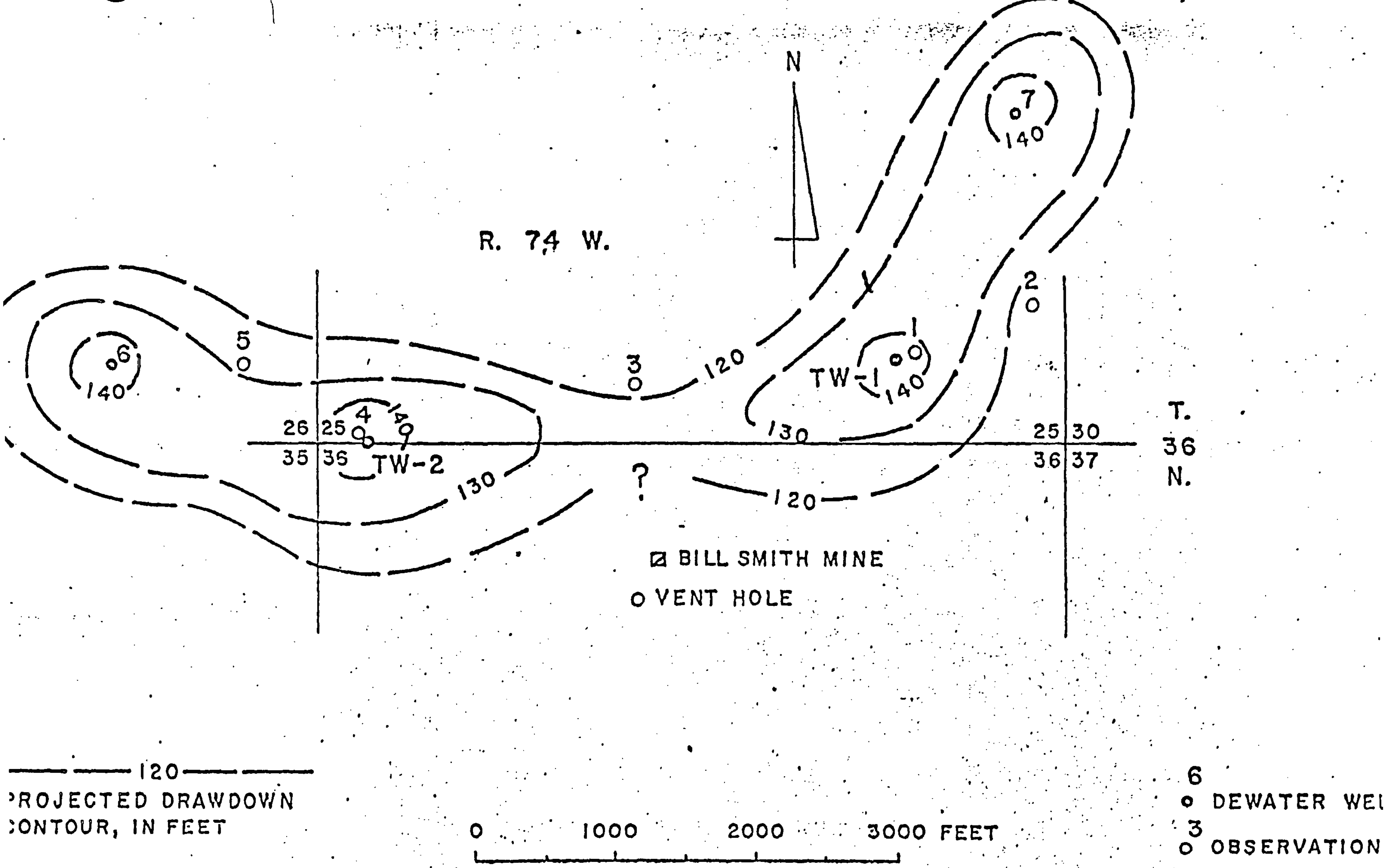


FIGURE 14 -- MAP OF BILL SMITH MINE AREA AND DEWATER WELL LOCATIONS.

Hydrology

Attachment 'B'

Q-Sand Pilot Pump Test

The pump test for the Q-Sand ISL pilot was conducted in April 1981 to demonstrate the site was suitable for a solution mining research and development test site. The average Q-Sand transmissivity at the test site was 950 gpd/ft with a permeability and storage coefficient of 32 gpd/ft^2 and $6x10^{-5}$, respectively. NRC's Environmental Impact Appraisal (EIA) concluded the vertical permeability of the overlying and underlying shale was in the range of $6x10^{-8}$ cm/sec to $6x10^{-6}$ cm/sec. The Q-Sand pilot leaching began in October 1981 and aquifer restoration was complete in May 1985. No vertical or lateral excursion occurred during the life of the project. Those sections of NRC's EIA discussing the Q-Sand pump test are attached.

UNITED STATES NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL IMPACT APPRAISAL

BY THE

DIVISION OF WASTE MANAGEMENT

IN CONSIDERATION OF THE ISSUANCE OF

SOURCE MATERIAL LICENSE NO. SUA-1387 FOR THE

KERR-McGEE NUCLEAR CORPORATION

SOUTH POWDER RIVER BASIN "Q" SAND SOLUTION MINING PROJECT

DOCKET NO. 40-8768

Dated: June 1981

Groundwater units in the vicinity of the proposed test site consist of 0-30 feet of alluvium and several hundred feet of lenticular sandstones of Wasatch and Fort Union Age (see Table 2.2.01). The lenticular sandstones of the Wasatch Formation form the upper "W" aquifer at the site. It is a low-yielding aquifer that is geologically confined but not confined under pressure. The water level in the "W" aquifer at the site is approximately 190 feet below the land surface. Most water wells penetrate the Wasatch ("S" aquifer) and Fort Union Formations ("Q" and "O" aquifers). In the vicinity of the test area, such wells generally yield from 5 to 20 gallons per minute (gpm), but some wells yield in excess of 100 gpm. In general, the groundwater in the basal Wasatch ("S" aquifer) and Fort Union Formations ("Q" and "O" aquifers) is under artesian pressure and groundwater flow in each of the aquifers appears to move to the north-northeast from the proposed test area (Figure 2.2.07).

All known wells in the license area and adjacent lands are owned and operated by Kerr-McGee and are properly constructed. An inventory of the wells with the well designation, completion aquifer, surface elevation, well depth, and the water level and yield at time of completion is included in Tables 2.2.02 and 2.2.02(a). Wells which do not have a yield value were completed as observation wells and were not pumped. The approximate well locations relative to the license area are also shown in Figure 2.2.06. The only well that is being used on-site is well WW103 which is completed in the "W" sand and is pumped at around 10 gpm. The mine shaft which penetrates the lower "O" aquifer is being dewatered at a rate of around 1700 gpm.

A long-term aquifer pumping test was conducted so that evaluations could be made of the hydrogeological characteristics of the "Q" sand and of the isolation provided by the overlying and underlying shales in the test area. The pumped well and three monitor wells were completed and monitored in the "Q" sand. Two additional monitor wells were also monitored in the overlying (S-sand zone) and underlying (O-sand zone) aquifers to check for vertical communication. The locations of the wells used in the pumping test (QP-3 was pumped and wells QI-2, QI-7, QI-11, QMS-1, and QMO-1 monitored as observation wells) are shown in Figure 2.2.07. The well completion data are provided in Tables 2.2.02 and 2.2.02(a) and the pump test data, data plots, and barometric pressure readings taken for the aquifer pump test are included in Appendix B.

The aquifer pumping test was conducted on well QP-3 for a period of nearly three days 4305 minutes (from 9:38 a.m. on April 10, 1981 to 9:23 a.m. on April 13, 1981), at a steady discharge rate of 16.7 gpm.

The results of the analyses of the "Q" sand observation well drawdown and recovery data are listed in Table 2.2.03, and log-log drawdown and recovery data plots with match points indicated are included in Appendix B, Figures B-1 and B-2. These data indicate that the "Q" ore zone aquifer is a confined leaky aquifer, with an average value of transmissivity of approximately 950 gpd/ft, a permeability of around 32 gpd/ft^2 (.002 cm/sec), and a storage coefficient of around 6x10^{-5}.

TABLE 2.2.01 DESCRIPTION OF HYDROGEOLOGIC UNITS IN THE VICINITY OF THE PROPOSED SITE

Geologic Age	Hydrogeologic Unit	Approximate Thickness (feet)	Lithologic Characteristics	Hydrologic Characteristics
Eocene	Wasatch Formation	0-500	Fine- to coarse-grained lenticular arkosic sandstone, and interbedded claystone and siltstone	Groundwater production generally good, but lenticular nature restricts aquifer use locally; yields of as much as 140 gpm have been produced
Paleocene	Fort Union Formation	3000	Fine- to coarse-grained, lenticular sandstone, and interbedded carbonaceous shale and coal	Groundwater production good beneath site; yields of 550 gpm have been produced over prolonged periods
Cretaceous	Lance Formation	3000	Fine- to medium-grained sandstone, and interbedded sand, shale, and claystone	Groundwater production largely unknown in vicnity of site; probably would not yield over 20 gpm
Cretaceous	Fox Hills	500-700	Fine- to medium-grained sandstone, and interbedded thin sandy shale	Groundwater production largely unknown in vicinity of site; probably would not yield over 100 gpm

Sources: Hodson et al., 1973; Hodson, 1971; Harshbarger and Associates, 1974.

TABLE 2.2.02

INVENTORY OF WELLS ON THE LICENSE AREA AND ADJACENT LANDS

KERR-McGEE "Q" SAND PROJECT
CONVERSE COUNTY, WYOMING

Figure 2.2.06 Location No.	Kerr-McGee[1] Well Number	Wyoming Well Permit Number	Aquifer	Elevation of Land Surface (Feet Above MSL)	Depth of Well (Feet)	Elevation of Water Level (Feet Above MSL)	Date of Level Measurement (Month/Year)	Yi (G
1	TW-2	29,277	Fort Union	5541.9	946	5054.5	7/76	56
2	OWS-4	--	Wasatch	5545.6	546	5375.6	7/76	--
3	OWD-4	--	Fort Union	5546.7	943	5107.0	7/76	--
4	OWS-3	--	Wasatch	5562.5	570	5350.6	7/76	--
5	OWD-3	--	Fort Union	5563.1	887	5057.8	7/76	--
6	TW-1	28,276	Fort Union	5599.5	1006	5030.0	7/76	42
7	OWS-1	--	Wasatch	5585.5	567	5349.7	7/76	--
8	OWD-1	--	Fort Union	5586.1	987	5060.7	7/76	--
9	OWS-2	--	Wasatch	5593.8	584	5482.0	7/76	--
10	OWD-2	--	Fort Union	5593.9	900	5070.9	7/76	--
11 (2)	WW103	2,574	Wasatch	5540	474	5280	9/69	14
12 (3)	Mine Shaft	15,500	Fort Union	5519	949	5250	11/74	85
13	OWD-6	--	Fort Union	5568	868	4955	12/79	--
14	QI-1	--	Fort Union	5555	509	5171	12/79	--
15	QP-1	--	Fort Union	5545	497	5169.5	12/79	15
16	QI-2	--	Fort Union	5541	497	5168.5	12/79	19
17	QM-1	--	Fort Union	5551	505	5174	12/79	--
18	QMD-1	--	Fort Union	5543	612	4962	12/79	--
19	QMS-1	--	Wasatch	5554	421	5239.5	12/79	--
20	I-300	--	Fort Union	557[illegible]	812	-0-	11/79	--
21	I-500	--	Fort Union	557[illegible]	774	-0-	11/79	--

[1] All known wells in the license area and adjacent lands are owned and operated by Kerr-McGee.

[2] Well WW103 is the only well that Kerr-McGee is currently operating for water supply, at a rate of approximately 10 gpm from the W aquifer.

[3] The mine shaft is being pumped at around 1700 gpm, from the O aquifer.

TABLE 2.2.02(a)

ISL WELLS
KERR-McGEE Q SAND PROJECT
CONVERSE COUNTRY, WYOMING

Kerr-McGee Well Number	Elevation at Top of casing (feet above MSL)	Depth of well (feet)	Depth from Casing Top 9/11/80	MSL Elevation	Completion Interval (T.D.-up)
QP-1*	5549.65	497	375.80	5173.85	497'-475'
QP-2	5544.06	495	369.40	5174.66	495'-470'
QP-3	5557.24	512	383.97	5173.27	512'-480'
QP-4	5559.96	515	386.83	5173.13	515'-490'
QP-5	5552.11	517	378.88	5173.23	517'-465'
QI-1*	5556.17	509	382.86	5173.31	509'-492'
QI-2	5546.38	496	372.45	5173.93	496'-475'
QI-4	5548.68	513	375.22	5173.46	513'-475'
QI-5	5560.62	513	387.55	5173.07	513'-490'
QI-6	5565.42	520	392.35	5173.07	520'-495'
QI-7	5567.82	522	394.88	5172.94	522'-495'
QI-8	5553.52	503	379.59	5173.94	503'-480'
QI-9	5552.04	505	378.66	5173.38	505'-480'
QI-10	5543.38	514	369.80	5173.58	514'-465'
QI-11	5554.35	525	381.28	5173.07	525'-475'
QMW-1**	5558.71	350	188.48	5370.23	350'-170'
QMS-1**	5553.63	421	315.35	5238.28	421'-393'
QMO-1**	5545.47	612	579.34	4966.13	612'-558'
QM-1	5550.53	505	375.75	5174.78	505'-475'
QM-2	5535.80	505	361.35	5174.45	505'-460'
QM-3	5528.17	505	354.65	5173.52	505'-455
QM-4	5550.72	539	378.10	5172.62	539'-475
QM-5	5582.73	537	410.9	5171.83	537'-513
QM-6	5562.61	520	390.16	5172.45	520'-495
QM-7	5562.15	514	388.81	5173.34	514'-438
QM-8	5556.75	508	380.08	5176.67	508'-494

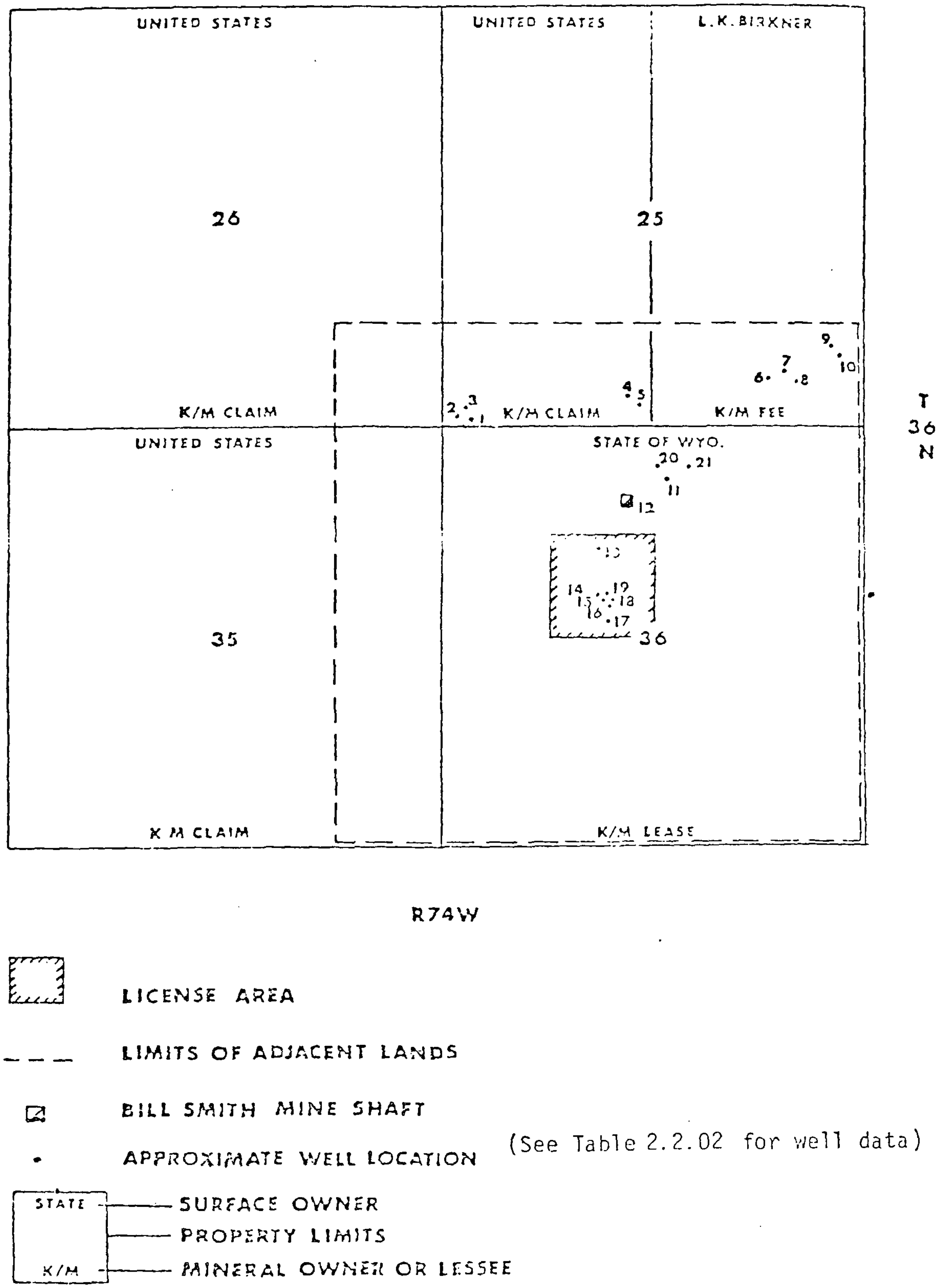
*6" I.D. steel casing, all other holes cased with 4.33 I.D. fiberglass

**Monitor well completed in another aquifer unit. Wells QMS-1 and QMW-1 are completed in the Wasatch formation. All other wells are completed in the Fort Union formation.

FIGURE 2.2.06

APPROXIMATE WELL LOCATIONS
LICENSE AREA AND ADJACENT LANDS

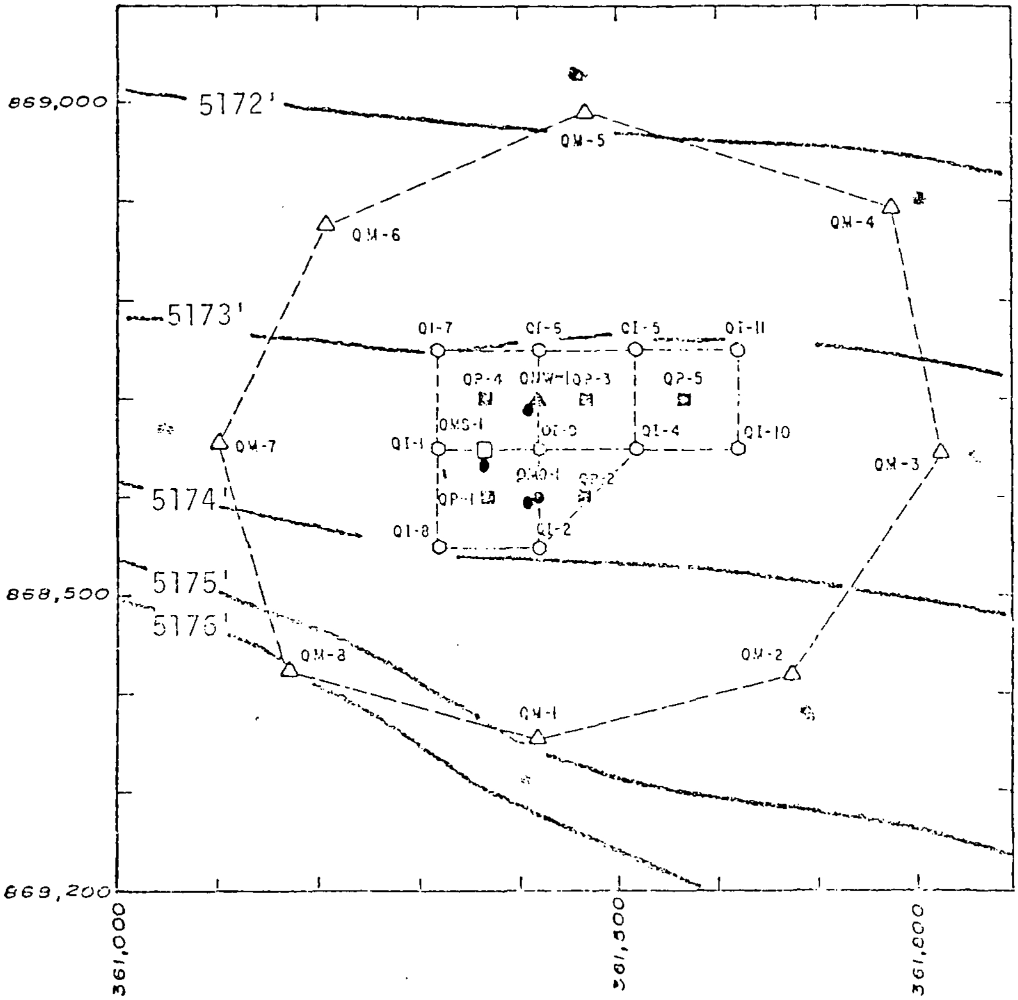
KERR-McGEE 'Q' SAND PROJECT
CONVERSE COUNTY WYOMING



(See Table 2.2.02 for well data)

Figure 2.2.07

IN SITU R&D PROJECT WELL PATTERN
"Q" SAND DEPOSIT
SECTION 36-T36N, R74W
CONVERSE COUNTY, WYOMING



LEGEND

▣ Production Well QP

⬡ Injection Well QI

Monitor Wells:

- △ "Q" Ore Zone (QM-1 → 8)
- ▲ "W" Shallow Zone (QMW-1)
- □ "S" Shallow Zone (QMS-1)
- ● "O" Deep Zone (QMO-1)

—5172— WATER LEVEL ELEVATION ABOVE MSL

(Q Ore Zone Aquifer, 1980)

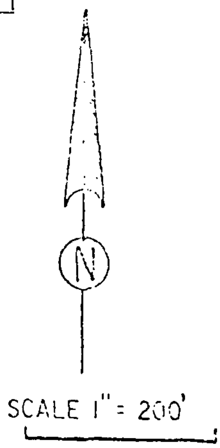


TABLE 2.2.03

"Q" SAND AQUIFER PROPERTIES
Q-SAND PILOT PROJECT

Well	Q-Sand Transmissivity (T, gpd/ft)		Q-Sand Thickness	Permeability	Q-Sand Storativity	r	p'/m'	m'	p'		
Number	Drawdown	Recovery	(m,feet)	(P=Tav/m,gpd/ft²)	(dimensionless)	/b	[gpd/ft²/ft]	ft	gpd/ ft²	ft/ yr	c
QI-2	770	1472	21		$7x10^{-5}$, $6.6x10^{-5}$	0.3, 0	.0026	40	.1	5.7	5.6
QI-7	798	722	27		$7x10^{-5}$, $4.3x10^{-5}$	0.3, 0.3	.0029, .0026	40	.12,.10	5.8, 5	5.6 5x1
QI-11	912	1007	50		$8x10^{-5}$, $4.5x10^{-5}$	0.3, 0.3	.003, .0036	40	.13,.15	6,7.3	6x1 7x1
Representative Values		950	30	32	$6x10^{-5}$		.003	40	.01	6	6x10

(1) Based on the thickness of the "R" Shale from Cross Sections (Figures 2.2.04 and 2.2.05).

Early drawdown and recovery data from the "Q" sand observation wells were matched to the Hantush leaky type curves ($^{r}/B=0.3$) while later data indicated the presence of a low flow boundary. Analysis of the early data, which were analyzed assuming no water released from storage in the aquitard, indicates that the vertical permeability of the overlying "R" shale may be around 6 ft/yr ($6x10^{-6}$ cm/sec). Although water probably was released from storage in the aquitard, the results of the pump test analysis completed are believed to be representative of the hydrogeologic properties of the Q-aquifer and the "R" confining unit. Analysis of the later data indicate the presence of at least one barrier or low flow boundary, located approximately 350, 400, and 430 feet away from observation wells QI-2, QI-7, and QI-11, respectively. Thinning of the "Q" sand aquifer to the south and west of the well field could account for the barrier boundary that was observed (see Figures 2.2.04 and 2.2.05 and Appendix B, Figures B-1 and B-2).

Water levels in the overlying and underlying S and O sand aquifers were monitored in wells QMS-1 and QMO-1, respectively. Water levels in these observation wells did not fluctuate during pumping from the "Q" ore zone aquifer, demonstrating that there is confinement of the ore zone from the surrounding aquifer units. Water level data from these wells are plotted in Figure B-3 of Appendix B.

Analyses of the aquifer pump test data indicate that the vertical permeability of the "R" confining shale unit (assuming that water flowed down through the "R" shale and not up through the "P" shale based on vertical hydraulic gradients) is around 6 ft/yr ($6x10^{-6}$ cm/sec). Laboratory permeability tests conducted by Kerr-McGee on plugs taken from cored sections of the R and P shales indicate permeabilities of less than $5x10^{-4}$ ft/yr ($4.7x10^{-10}$ cm/sec).

The NRC staff believes that the vertical permeability of the R and P shales is not as low as $5x10^{-4}$ ft/yr ($4.7x10^{-10}$ cm/sec), based on: (1) the analyses of the aquifer pump test data, (2) values for permeability cited in the literature ($5x10^{-4}$ ft/yr to 5 ft/yr for shale, Walton, 1970), and (3) the fact that most laboratory permeability tests generally indicate permeabilities that are much lower than in the field.

Realizing that some of the recharge that was observed during the early part of the aquifer pump test could have come from waters released from storage in the aquitard, and not waters "leaking" down from the S aquifer through the R shale, then a vertical permeability of 6 ft/yr may be conservative (slightly high). However, taking into account all of the information presented, the NRC staff believes that the vertical permeability of the R and P shales is low and ranges from around .06 ft/yr ($6x10^{-8}$ cm/sec) to 6 ft/yr ($6x10^{-6}$ cm/sec).

Based on the hydrogeologic information obtained at the site, confinement of the "Q" sand aquifer appears to be adequate.

The potentiometric water level elevations of the W,S,Q, and O sand aquifers are each distinct at the site and measure approximately 5370 feet, 5240 feet, 5168-5174 feet and 4955-4962 feet above mean sea level, respectively. Although water levels in the O aquifer have been affected by underground mine dewatering, it appears that the natural vertical hydraulic potential decreases with depth.

APPENDIX B

AQUIFER PUMP TEST DATA AND DATA PLOTS

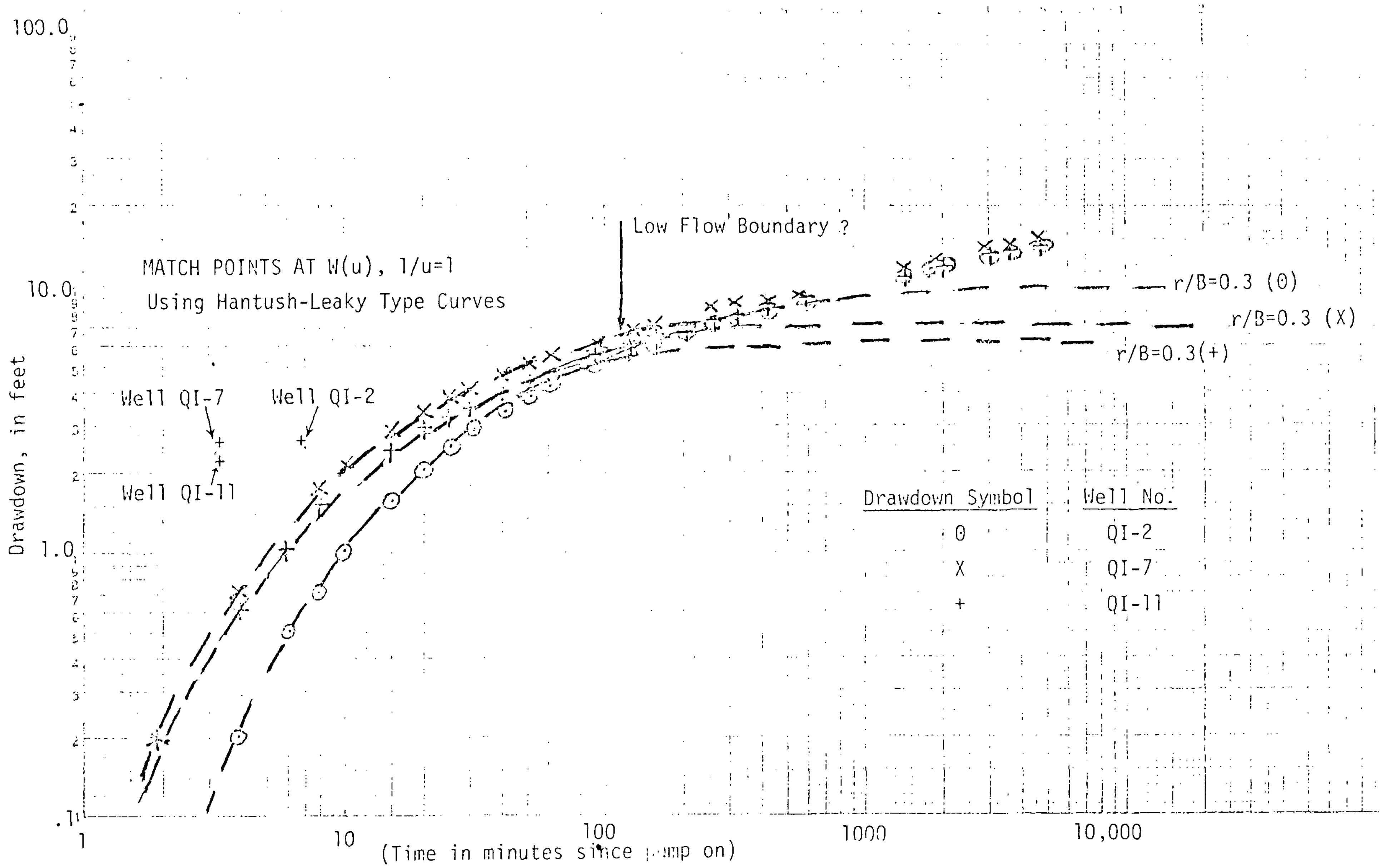


FIGURE B-1 LOG-LOG DRAWDOWN DATA PLOTS FOR Q-[illegible] AND OBSERVATION WELLS QI-2, QI-7, QI-11

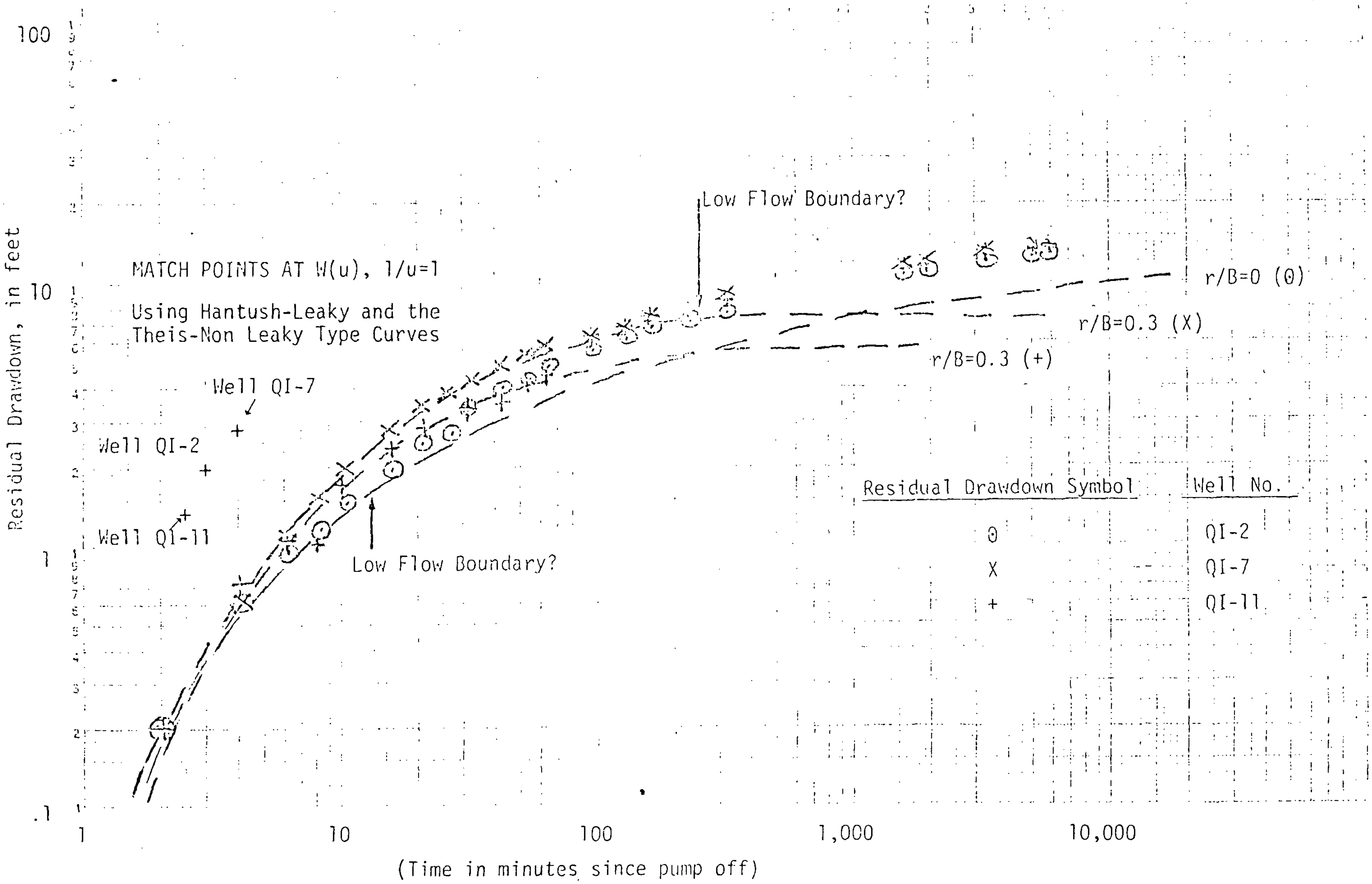


FIGURE B-2 LOG-LOG RECOVERY DRAWDOWN DATA PLOTS FOR Q-SAND OBSERVATION WELLS QI-2, QI-7, QI-11

FIGURE B-3

OVERLYING AND UNDERLYING
AQUIFER DATA
Q SAND ISL PROJECT PUMP TEST
CONVERSE COUNTY, WYOMING

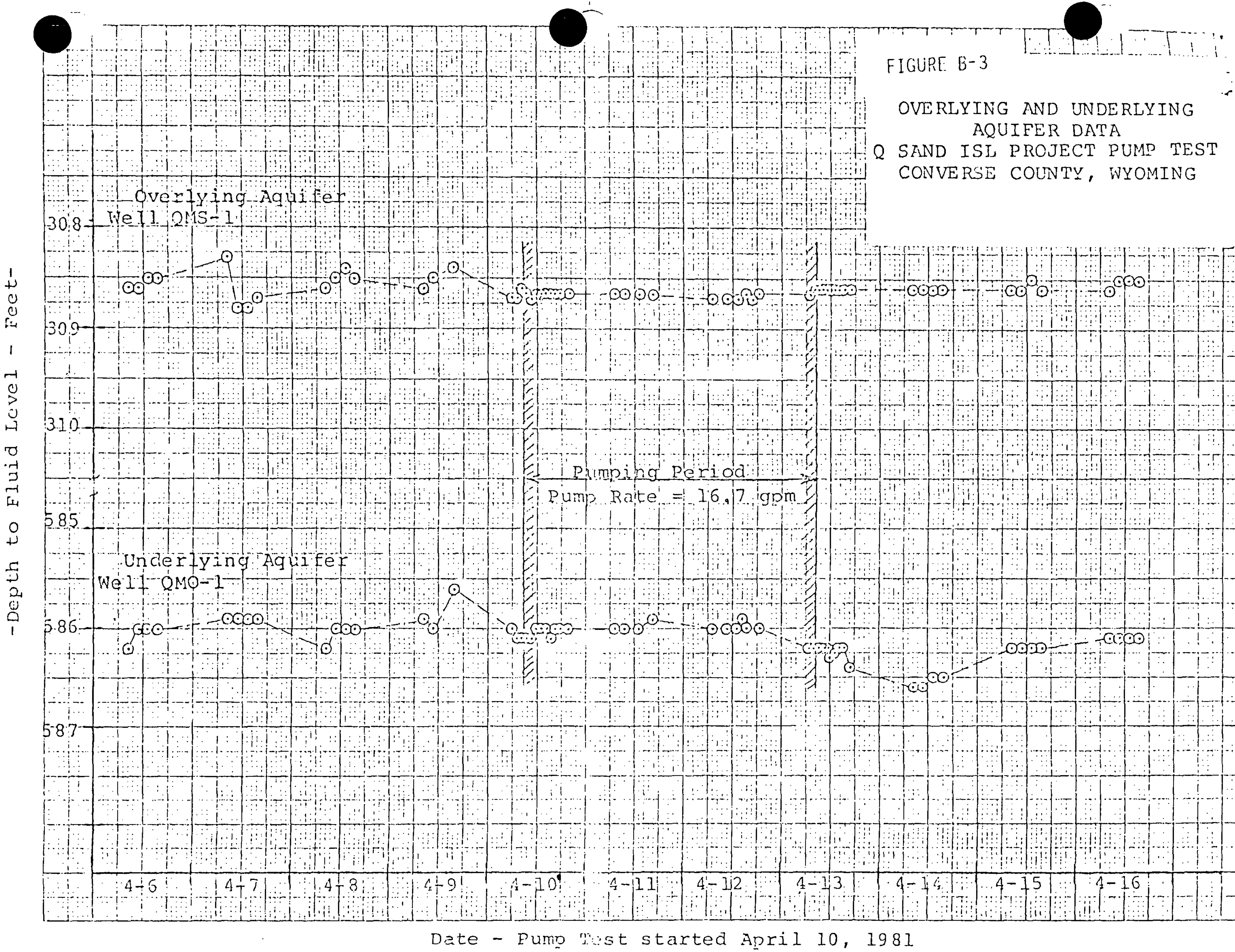


TABLE B-1

OVERLYING AND UNDERLYING AQUIFER DATA
Q SAND ISL PROJECT PUMPT TEST
CONVERSE COUNTY, WYOMING

	Depth to Fluid Level - Feet		
Date/Time	Overlying Aquifer Well QMS-1	Underlying Aquifer Well QMO-1	Q Sand Aquifer Well QI-2
4-6-81			
1000	308.6	586.2	
1200	308.6	586.0	376.0
1400	308.5	586.0	375.5
1600	308.5	586.0	375.6
4-7-81			
1000	308.3	585.9	375.5
1200	308.8	585.9	373.3
1400	308.8	585.9	375.5
1600	308.7	585.9	375.4
4-8-81			
1000	308.6	586.2	375.5
1200	308.5	586.0	375.5
1400	308.4	586.0	375.5
1600	308.5	586.0	375.5
4-9-81			
1000	308.5	585.9	375.5
1200	308.5	586.0	375.4
1600	308.4	585.6	375.4
4-10-81			
818	308.7	586.0	-
836	308.7	586.1	-
914	308.6	586.1	375.7
955[1]	308.65	586.1	377.2[2]
1033	308.7	586.1	379.6
1103	308.7	586.0	380.5
1134	308.65	586.0	380.0
1206	308.65	586.0	381.5
1300	308.65	586.0	382.1
1354	308.65	586.0	382.6
1450	308.65	586.1	382.9
1540	308.65	586.0	383.3
1625	308.65	586.0	383.5
1845	308.65	586.0	384.0
4-11-81			
745	308.65	586.0	386.1
1030	308.65	586.0	386.2
1330	308.65	586.0	386.7
1620	308.65	585.9	386.9

[1] Pump started on 4-10-81 at 9:38 am

[2] Level data during test interpolated

TABLE B-1 Cont'd.

Date/Time	Depth to Fluid Level - Feet Overlying Aquifer Well QMS-1	Underlying Aquifer Well QMO-1	Q Sand Aquifer Well QI-2
4-12-81			
830	308.7	586.0	388.1
1050	308.7	586.0	388.2
1300	308.7	586.0	388.4
1400	308.65	585.9	388.4
1525	308.7	586.0	388.5
1830	308.65	586.0	388.6
4-13-81			
810	308.65	586.2	389.3
915	308.6	586.2	389.3
940[3]	308.6	586.2	387.4[3]
958	308.6	586.2	386.1
1015	308.6	586.2	385.3
1040	308.6	586.2	384.6
1120	308.6	586.2	383.6
1200	308.6	586.3	383.1
1255	308.6	586.25	382.4
1320	308.6	586.2	382.2
1420	308.6	586.2	382.0
1620	308.6	586.4	381.4
4-14-81			
1000	308.6	586.6	379.4
1200	308.6	586.6	379.2
1400	308.6	586.5	379.2
1600	308.6	586.5	379.0
4-15-81			
1000	308.6	586.2	378.2
1200	308.6	586.2	378.1
1400	308.5	586.2	378.1
1600	308.6	586.2	378.1
4-16-81			
1000	308.6	586.1	377.6
1200	308.5	586.1	377.6
1400	308.5	586.1	377.5
1600	308.5	586.1	377.5

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[3] Pump shutdown on 4-13-91 at 9:23 am

TABLE B-2

Q SAND AQUIFER DRAWDOWN DATA
Q SAND ISL PROJECT PUMP TEST
CONVERSE COUNTY, WYOMING

Time From Start of Pump Minutes	Drawdown, In Monitor Wells, In Feet			
	Pumped Well QP-3	Monitor Well QI-2	Monitor Well QI-7	Monitor Well QI-11
2	13.0	-	0.2	0.2
4	13.8	0.2	0.7	0.6
6	13.9	0.5	1.2	1.0
8	14.6	0.7	1.7	1.5
10	15.1	1.0	2.1	1.9
15	15.6	1.5	2.8	2.3
20	15.8	2.0	3.3	2.8
25	16.3	2.4	3.7	3.1
30	16.6	2.8	4.0	3.3
40	16.9	3.3	4.5	3.7
50	17.6	3.7	4.8	4.0
60	17.8	4.1	5.2	4.4
90	18.5	4.9	5.8	5.0
120	19.0	5.4	6.4	5.5
150	19.5	5.9	6.8	6.0
200	20.0	6.4	7.3	6.5
250	-	6.9	7.8	7.1
300	20.7	7.2	8.2	7.4
360	21.0	7.6	8.4	7.7
400	21.3	7.7	8.5	7.9
550	22.0	8.3	9.3	8.6
1330	24.1	10.4	11.4	10.5
1490	24.4	10.5	11.7	10.9
1670	24.8	11.0	12.0	11.1
1840	25.1	11.2	12.3	11.4
2810	26.3	12.4	13.6	12.7
2960	26.5	12.5	13.7	12.9
3090	26.6	12.7	13.8	13.0
3240	26.6	12.8	13.9	13.1
3430	26.8	12.9	14.0	13.3
4180	27.5	13.6	14.8	14.0
4300	27.6	13.6	14.9	14.0
4305		-Pump Shut Off-		

TABLE B-3

Q SAND AQUIFER RECOVERY DATA
Q SAND ISL PROJECT PUMP TEST
CONVERSE COUNTY, WYOMING

Time From Start of Pump Minutes	Time Since Pumping Stopped Minutes	Residual Drawdown in Monitor Wells - Feet			
		Pumped Well QP-3	Monitor Well QI-2	Monitor Well QI-7	Monitor We QI-11
4307	2	16.1	0=13.8	14.7	13.8
4309	4	14.8	13.2	14.3	13.3
4311	6	14.0	12.9	13.8	13.0
4313	8	13.5	12.7	13.4	13.0
4315	10	13.1	12.4	13.0	12.3
4320	15	12.3	11.9	12.2	11.8
4325	20	11.8	11.4	11.7	11.3
4330	25	11.4	11.2	11.2	11.3
4335	30	11.0	10.7	10.9	10.9
4345	40	10.4	10.1	10.3	10.7
4355	50	10.0	9.7	9.9	10.1
4365	60	9.7	9.3	9.5	9.8
4395	90	8.9	8.6	8.9	8.0
4425	120	8.4	7.9	8.3	7.7
4455	150	7.8	7.3	8.0	7.2
4520	215	7.4	6.9	7.3	6.8
4540	235	6.7	6.5	6.8	6.8
4600	295	6.4	6.5	6.4	6.1
4720	415	5.9	5.7	6.0	5.3
5780	1475	4.0	3.7	3.9	3.3
5900	1595	3.7	3.5	3.7	3.0
6020	1715	3.5	3.5	3.5	2.9
6140	1835	3.5	3.3	3.5	2.9
7220	2915	2.7	2.5	2.7	2.1
7340	3035	2.6	2.4	2.6	2.0
7460	3155	2.5	2.4	2.6	1.8
7580	3275	2.5	2.4	2.5	1.8
8660	4355	2.0	1.9	2.0	1.4
8780	4475	2.0	1.9	2.0	1.3
8900	4595	1.9	1.8	1.9	1.3
9020	4715	1.9	1.8	1.9	1.2

TABLE B-4

BAROMETRIC PRESSURE DATA
Q SAND PUMP TEST
CONVERSE COUNTY, WYOMING

The following data was taken from a barometric pressure monitoring station located about 8 miles east of the test site. A calibration indicated the recorder was reading 0.68 inches too high, however, if corrected, all data would be adjusted accordingly.

Date	Time	Pressure in. Hg.
4/6	8 am	25.5
	12 N	25.5
	4 pm	25.4
4/7	8 am	25.4
	12 N	25.3
	4 pm	25.3
4/8	8 am	25.5
	12 N	25.5
	4 pm	25.5
4/9	8 am	25.4
	12 N	25.3
	4 pm	25.3
4/10	8 am	25.6
	12 N	25.5
	4 pm	25.4
4/11	8 am	25.5
	12 N	25.5
	4 pm	25.4
4/12	8 am	25.6
	12 N	25.5
	4 pm	25.5
4/13	8 am	25.9
	12 N	25.9
	4 pm	26.0
4/14	8 am	26.2
	12 N	26.1
	4 pm	26.1

Hydrology

Attachment C

O-Sand Pilot Pump Test

The pump test at the O-Sand pilot site was conducted to demonstrate the site was suitable for the ISL pilot project. Multiple tests and analysis methods were utilized in responding to NRC and DEQ questions regarding the lower 'O' shale as a confining layer. The calculated O-Sand transmissitivity values varied from 3000 gpd/ft to 7000 gpd/ft with storage coefficients averaging about $2x10^{-4}$. To monitor the effectiveness of the thin lower O shale a monitor well was completed in the lower O-Sand and sampled at two week intervals. Leaching operations began in July 1984 and to date there has been no indication of leach solution movement through the thin lower O-shale, nor have there been any other leach solution excursions at the pilot site. A copy of the O-Sand pump test evaluation as published by NRC in the Environmental Impact Appraisal, except for the tabulated fluid level data, is attached.

UNITED STATES NUCLEAR REGULATORY COMMISSION
ENVIRONMENTAL IMPACT APPRAISAL
BY THE
URANIUM RECOVERY FIELD OFFICE
IN CONSIDERATION OF THE ISSUANCE OF
AN AMENDMENT TO
SOURCE MATERIAL LICENSE NO. SUA-1387 FOR THE
SEQUOYAH FUELS CORPORATION
SOUTH POWDER RIVER BASIN "O" SAND RESEARCH & DEVELOPMENT
IN SITU LEACH PROJECT

DOCKET NO. 40-8768

PUMP TEST REVIEW
AND NRC POSITION

In July 1983, SFC performed a second multi-well pump test at their proposed "O"-Sand Insitu R&D site located in Converse County, Wyoming. A previous pump test performed in November 1982, was not accepted by the staff primarily because of a power failure midway through the test rendering much of the data useless. Additionally, SFC did not adequately evaluate the potential for leakage through the confining beds; especially the lower "O"-Shale.

The pump test wellfield consisted of nine observation wells plus the pumping well. Figure B-28 shows the spatial arrangement of the wells and distances from the pumping well, and Figure B-29 shows the vertical relationship and completion interval of each well. Table B-1 presents well completion details. The "O"-Sand observation wells (OI-8, OP-3, OI-5, OI-3 and OI-1) are partially penetrating with respect to the "O"-Sand and the pumping well. The pumping well penetrates the "O"-Sand down to the top of the Lower "O"-Shale (see Figure B-29). A piezometer well (OMP-1) was completed in the lower portion of the "P"-Shale to evaluate potential leakage through this unit. However, SFC did not complete a well in either the Lower "O"-Shale or the "N"-Shale, making it very difficult to determine leakage through these two units.

Static ground-water levels measured in the "O" and "M"-Sand observation wells, prior to the pump test, indicated an upward trend which was attributed to the response of these formations to the cessation of dewatering at the Bill Smith underground mine project located approximately 6000 feet southeast of the proposed R&D site. A downward water level trend was noted in the "P"-Shale piezometer well (OMP-1) prior to the pump test. In an attempt to accelerate stabilization of water levels in this well, it was bailed twice prior to commencement of the pump test, during which time drilling fluid was recovered from the well.

Pump Test Analysis and Staff Review

SFC utilized several methods to analyze the drawdown data obtained during the pump test including:

(1) Semi-log plot of drawdown versus distance to estimate transmissivity of the "O"-Sand.

(2) Various methods to determine directional transmissivity.

(3) Semi-log plots of drawdown vs. time to estimate transmissivity and storativity of the "O"-Sand.

(4) Matching of log-log plots of drawdown vs. time to delayed yield type curves (Boulton, 1963) for unconfined aquifers and to Hantush (1963) type curves for nonsteady flow in an infinite leaky artesian aquifer. These methods were used to analyze for boundary conditions and leakage, respectively.

(5) Log-log plots of drawdown vs $^{t}/_{r^2}$ (time/the square of the radial distance of observation well from pumping well) were matched to Hantush and Jacob (1955) leaky type curves to determine "O"-Sand transmissivity and storativity, and vertical hydraulic conductivity (Kv') of the Lower "O"-Shale.

(6) The Neuman and Witherspoon (1972) ratio method was used to determine the vertical hydraulic conductivity of the "P"-Shale.

Most of the methods used by SFC to analyze the pump test data were not directly applicable to geohydrologic conditions present at the project site, as discussed below.

The log-log method which incorporated the Boulton method for analysis of delayed yield from unconfined aquifers, by definition, is not applicable to the confined conditions existing in the "O"-Sand. Values of transmissivity and storativity estimated for the "O"-Sand by this method would, therefore, be erroneous.

The semi-log method used by SFC to compute transmissivity and storativity of the "O"-Sand ignored the early time drawdown data which has the same effect as ignoring leakage altogether resulting in erroneous transmissivity estimates.

In calculating the vertical hydraulic conductivity of the "P"-Shale, SFC used the ratio method of Neuman and Witherspoon (1972). This method requires that a fully penetrating well be located in the pumped aquifer at the same radial distance from the pumping well as the aquitard well. If such a well does not exist, the method allows for developing distance-drawdown plots for all wells in the pumped aquifer to determine what the drawdown would be at an imaginary well located at the same radial distance from the pumping well as the aquitard well at the time drawdown was noted in the aquitard well. SFC used the drawdown data from Well OI-5 to calculate $^{s}/_{s}$ (ratio of drawdown in aquitard well to drawdown in pumped aquifer well, both wells being the same radial distance from the pumped well). This well does not meet the radial distance requirement, thus invalidating the method. Also, SFC used a transmissivity value derived from the semi-log method in their calculation of t_D (dimensionless time unit for the pumped aquifer) for the ratio method. For the reasons described above, use of this transmissivity value further enhanced the potential for error in the calculation.

The Hantush and Jacob (1955) method for leaky aquifer analysis was used by SFC to estimate transmissivity and storativity of the "O"-Sand and vertical hydraulic conductivity of the Lower "O"-Shale. Of all the methods used by SFC to analyze the pump test data, this method presents the most defensible values for the "O"-Sand. However, SFC did not correct the water level data for the rising water level trend.

Table B-2 presents a summary of the hydraulic properties of the "O"-Sand, "P"-Shale and the Lower "O"-Shale as determined by SFC for all the methods. As can be seen, transmissivity values vary considerably depending upon the method of analysis used.

At the request of the staff, SFC reanalyzed the pump test data, using the Hantush and Jacob method, correcting for the pre-test water level trend, and provided a worst case model of potential leakage through the "N"-Shale. Additionally, the staff requested that "O"-Sand transmissivity and storativity be recalculated utilizing a method which accounts for leakage. Using the new transmissivity value and the proportional method for determining $^{s'}/_{s}$, SFC was to recalculate the vertical hydraulic conductivity of the "P"-Shale.

SFC attempted to use the modified Hantush (1960) method, but because of difficulties in matching early time data and obtaining unrealistically low transmissivity values, the method was not considered to be useful. SFC then applied corrected drawdown data to the Hantush and Jacob (1955) method and computed transmissivities resulting in a range of "O"-Sand transmissivity values of 2977 to 4256 gal/day/ft. The staff performed independent analyses of the pump test data utilizing the early drawdown data and the Hantush and Jacob (1955) method, resulting in a range of transmissivity values for the "O"-Sand of 3200 to 4400 gal/day/ft. (see Table B-3).

SFC re-evaluated the vertical hydraulic conductivity of the lower aquitard system on a worst case basis using the Hantush and Jacob (1955) method on two separate, assumed situations:

Situation No. 1

SFC assumed that the Lower "O"-Sand was nonexistent and that the "N"-Shale extended to the top of the Lower "O"-Shale giving an effective "N"-Shale thickness of 130 feet. This resulted in "N"-Shale vertical permeabilities ranging from 2.55×10^{-4} cm/sec to 1.23×10^{-3} cm/sec.

Situation No. 2

SFC assumed that the Lower "O"-Shale was nonexistent and that the effects of partial penetration were negligible. For this situation, SFC used the true "N"-Shale thickness (60 ft). Resulting values of "N"-Shale permeability ranged from 1.1 x 10^{-4} cm/sec to 9.4 X 10^{-4} cm/sec.

The staff performed two separate independent evaluations to confirm SFC's reported maximum vertical hydraulic conductivity values. In the first evaluation, the modified Hantush (1960) method was used. Late drawdown data (after 500 minutes) of Wells OI-8 and OI-1 were matched with beta type curves. These two wells were used in the evaluation because they were farthest from the pumping well and should be affected least by the effects of partial penetration. Assuming a thickness of 60 feet for the "N"-Shale, the staff then solved for the maximum "N"-Shale vertical hydraulic conductivity. These values are shown in Table B-3 and agree favorably with the maximum possible values calculated by SFC.

The staff's second evaluation was an attempt to calculate vertical hydraulic conductivity values for the Lower "O"-Shale. Early drawdown data for each well was fitted to Hantush and Jacob (1955) $\frac{r}{B}$ curves, and vertical hydraulic conductivity was then calculated resulting in a range of Lower "O"-Shale vertical hydraulic conductivities of 2.5 x 10^{-6} cm/sec to 1.1 x 10^{-5} cm/sec (see Table B-3).

NRC FINAL POSITION

Based on SFC's re-evaluation of the pump test data and the staff's independent evaluations, the staff's final position is as follows: 1) it appears that 3500 gal/day/ft and 1.8 x 10^{-4} are reasonable and conservative estimations of average transmissivity and storativity of the "O"-Sand; 2) the "P"-Shale should provide adequate confinement because of its low permeability (4.2 x 10^{-8} cm/sec) and its thickness (approximately 170 feet); and 3) from available data, it appears unlikely that the vertical hydraulic conductivity of the "N"-Shale would be greater than about 10^{-4} cm/sec. Referring to Table B-4, this would classify the unit as a silt to silty sand. The staff calculated vertical hydraulic conductivities for the Lower "O"-Shale in the range of 10^{-5} to 10^{-6} cm/sec. Since the geology indicates the Lower "O"-Shale to be sandier and less competent than the "N"-Shale, it is probable that the true value for vertical hydraulic conductivity of the "N"-Shale is in the range of 10^{-6} to 10^{-7} cm/sec which, together with its thickness, should provide adequate confinement. However, because the pump test design did not allow for accurate definition of "N"-Shale permeability, SFC will be required to monitor both the Lower "O"-Sand and the "M"-Sand throughout the life of the operation.

TABLE B-1

WELL CONSTRUCTION AND COMPLETION TABLE
"O" SAND IN-SITU LEACH PROJECT
CONVERSE COUNTY, WYOMING
SECTION 26, T36N, R74W

Well No.	Total Depth (Ft.)	Drill Hole Size		Casing		Open Interval (Depth-Ft.)
		Depth (Ft.)	Dia. (In.)	Depth (Ft.)	Type	
OI-1	730	676 730	7-7/8 3-7/8	671	4" Fiber-glass	671-730 59'
OI-5	730	675 730	7-1/2 3-7/8	672	4" Fiber-glass	672-730(1) 58'
OI-8	736	670 736	7-7/8 3-7/8	662	4" Fiber-glass	662-715(1) 53'
OP-3	736	675 736	9-7/8 5-7/8	670	6" Steel	670-713 43'
OMM-1	899	877 899	7-7/8 3-7/8	877	4" Steel	877-899 22'
OMS-1	320	290 320	7-7/8 3-7/8	285	4" Steel	285-320 35'
OP-2	745	510 745	8-3/4 5-7/8	510	6" Steel	510-745 235'
OI-3	740	675 740	6-3/4 3-7/8	675	4" Fiber-glass	675-740 65'
OMP-1	467	467	5-1/4	464	See Fig. 4	464-467 3'
OMO-1	805	775	6-3/4 3-7/8	775	4" Steel	775-805 30'

(1) - Fill in hole from bottom of open interval to total depth drilled.

TABLE B-2

SUMMARY OF AQUIFER COEFFICIENTS AND LEAKAGE DATA
"O" SAND PUMPING TEST

	Transmissivity (gpd/ft)				Storage Coefficient				K' gpd/sq. ft.	
	log/log	Hantush	Semi-log		log/log	Hantush	Semi-log		lower	"P"
Well			obs.	cor.			obs.	cor.	"O" sh	shale
OI-1	5000	4300	7300	6900	$1.7x10^{-4}$	$1.3x10^{-4}$	$1.5x10^{-4}$	$1.8x10^{-4}$	$4.2x10^{-1}$	
OI-3	3500	3000	6800	6700	$2.7x10^{-4}$	$2.0x10^{-4}$	$1.6x10^{-4}$	$1.8x10^{-4}$	$1.5x10^{0}$	
OI-5	2400	3000	7200	6600	$1.8x10^{-4}$	$1.9x10^{-4}$	$1.7x10^{-4}$	2. $x10^{-4}$	$1.4x10^{0}$	
OI-8	3500	3900	7200	7500	$1.7x10^{-4}$	$1.8x10^{-4}$	$1.6x10^{-4}$	$1.5x10^{-4}$	3.9x10-^{1}	
OP-3	4200	3400	7300	7200	$2.1x10^{-4}$	$2.0x10^{-4}$	$1.5x10^{-4}$	$1.6x10^{-4}$	8.5x10-^{1}	
									(Witherspoon) $1.1x10^{-2}$	$1.4x10^{-3}$(Neuman & Witherspoon)

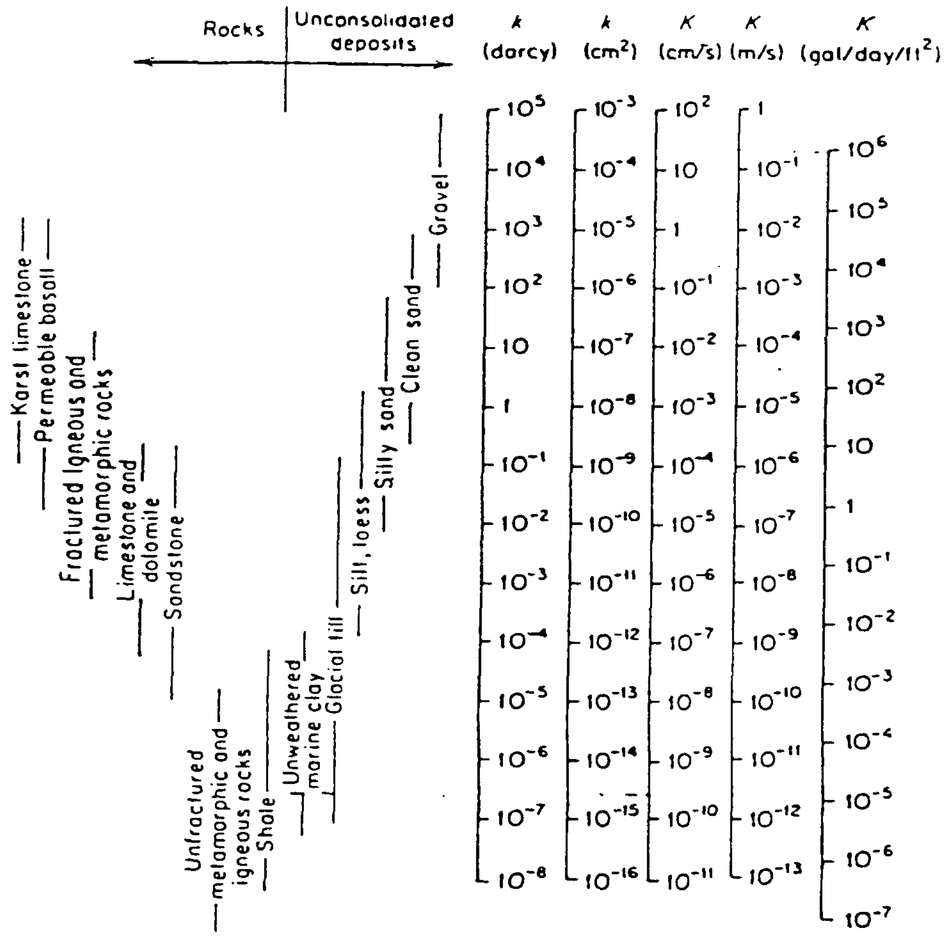
TABLE B-3
COMPARISON OF ESTIMATED HYDRAULIC PROPERTY VALUES

	TRANSMISSIVITY OF "O" SAND (gal/day/ft)		STORATIVITY OF "O"-SAND		VERT. HYD. COND. OF LOWER "O"-SHALE (cm/sec)		MAX. VERT. HYD. COND. OF "N"-SHALE (cm/sec)	
	SFC	URFO	SFC	URFO	SFC	URFO	SFC	URFO*
OI-1	4256	3200	1.3×10^{-4}	1.4×10^{-4}	2.0×10^{-5}	3.2×10^{-5}	1.2×10^{-4}	7.6×10^{-4}
OI-3	2985	3700	2.0×10^{-4}	2.4×10^{-4}	7.1×10^{-5}	4.6×10^{-5}	4.2×10^{-4}	--
OP-3	3359	3900	2.0×10^{-4}	2.2×10^{-4}	4.0×10^{-5}	2.5×10^{-6}	2.4×10^{-4}	--
OI-5	2977	2800	1.9×10^{-4}	2.1×10^{-4}	6.6×10^{-5}	7.9×10^{-5}	4.0×10^{-4}	--
OI-8	3920	4400	1.8×10^{-4}	2.1×10^{-4}	1.8×10^{-5}	1.1×10^{-5}	1.1×10^{-4}	1.6×10^{-4}
Mean Value	3499	3600	1.8×10^{-4}	2.0×10^{-4}	4.3×10^{-5}	3.4×10^{-5}	2.6×10^{-4}	4.6×10^{-4}

* OI-1 and OI-8 were considered to give the most defensible values because they were farthest from the pumping well and should have been affected least by the effects of partial penetration.

Table B-4

Range of Values of Hydraulic Conductivity and Permeability



Conversion Factors for Permeability and Hydraulic Conductivity Units

	Permeability, k*			Hydraulic conductivity, K		
	cm²	ft²	darcy	m/s	ft/s	gal/day/ft²
cm²	1	1.08×10^{-3}	1.01×10^{8}	9.80×10^{2}	3.22×10^{3}	1.85×10^{9}
ft²	9.29×10^{2}	1	9.42×10^{10}	9.11×10^{5}	2.99×10^{6}	1.71×10^{12}
darcy	9.87×10^{-9}	1.06×10^{-11}	1	9.66×10^{-6}	3.17×10^{-5}	1.82×10^{1}
m/s	1.02×10^{-3}	1.10×10^{-6}	1.04×10^{5}	1	3.28	2.12×10^{6}
ft/s	3.11×10^{-4}	3.35×10^{-7}	3.15×10^{4}	3.05×10^{-1}	1	5.74×10^{5}
gal/day/ft²	5.42×10^{-10}	5.83×10^{-13}	5.49×10^{-2}	4.72×10^{-7}	1.74×10^{-6}	1

*To obtain k in ft², multiply k in cm² by 1.08×10^{-3}.

Source: Freeze and Cherry, 1979

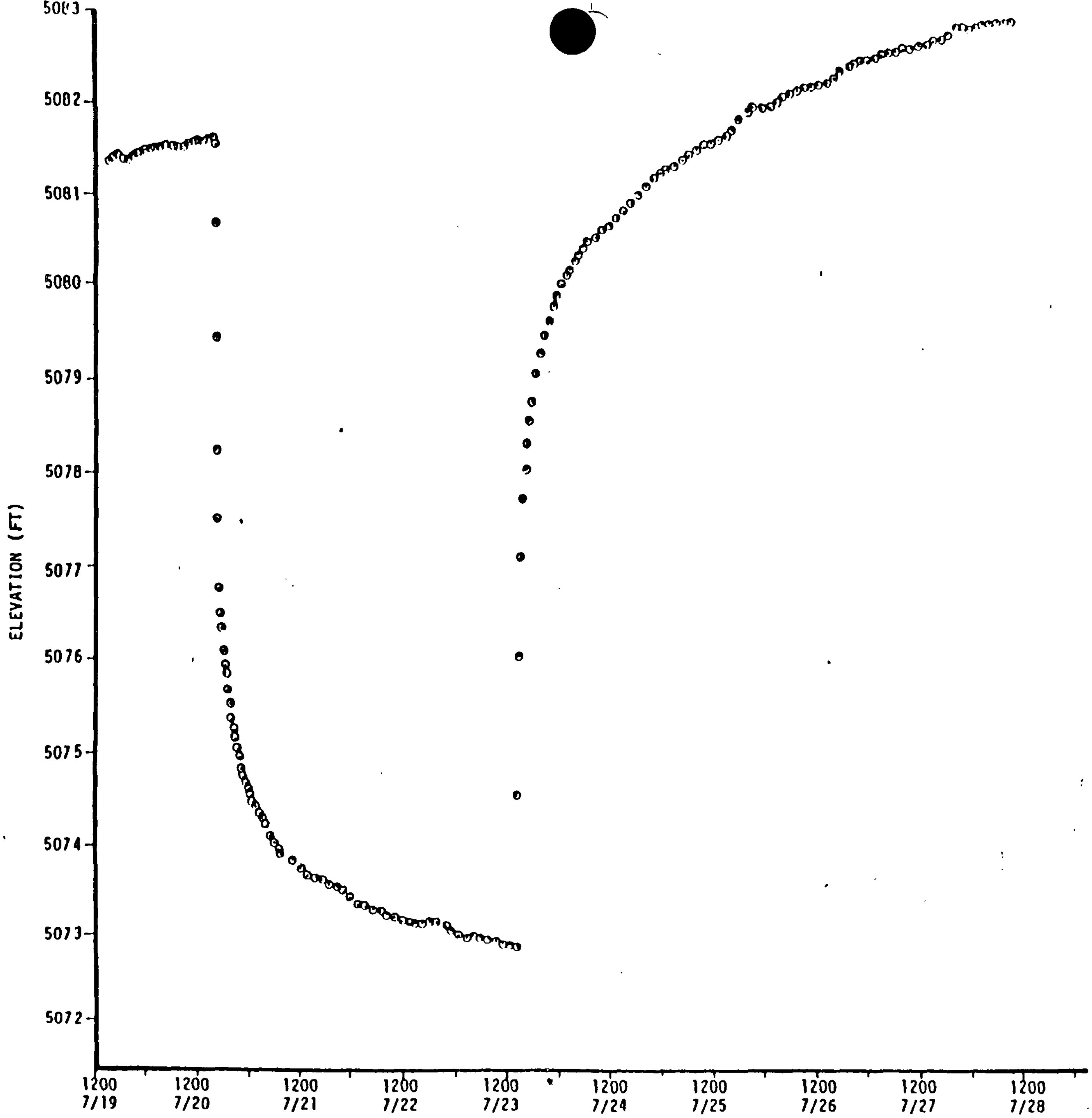


FIGURE B-2 HYDROGRAPH OI-3

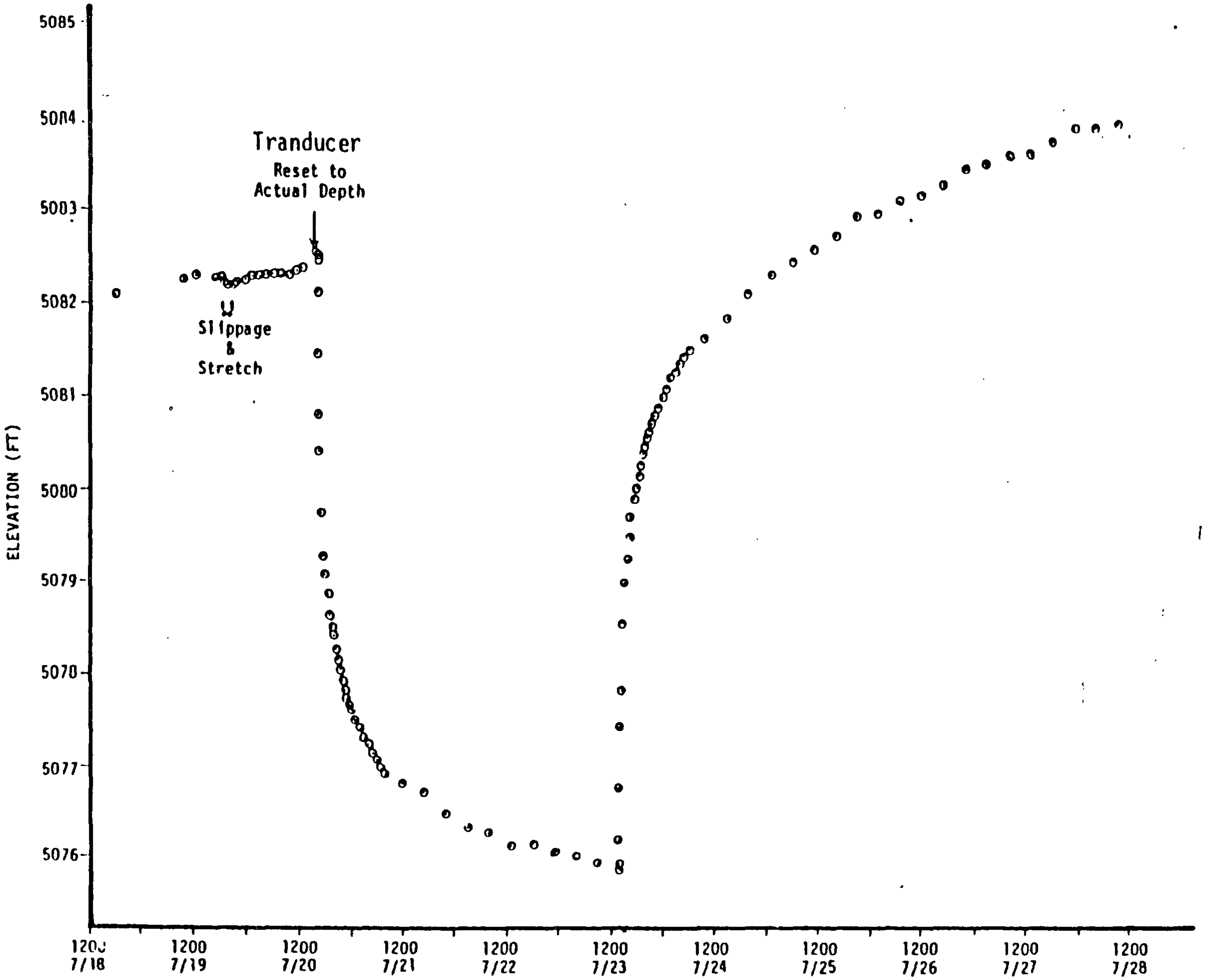


FIGURE B-3 HYDROGRAPH OI-8

FIGURE B-4 HYDROGRAPH OI-1

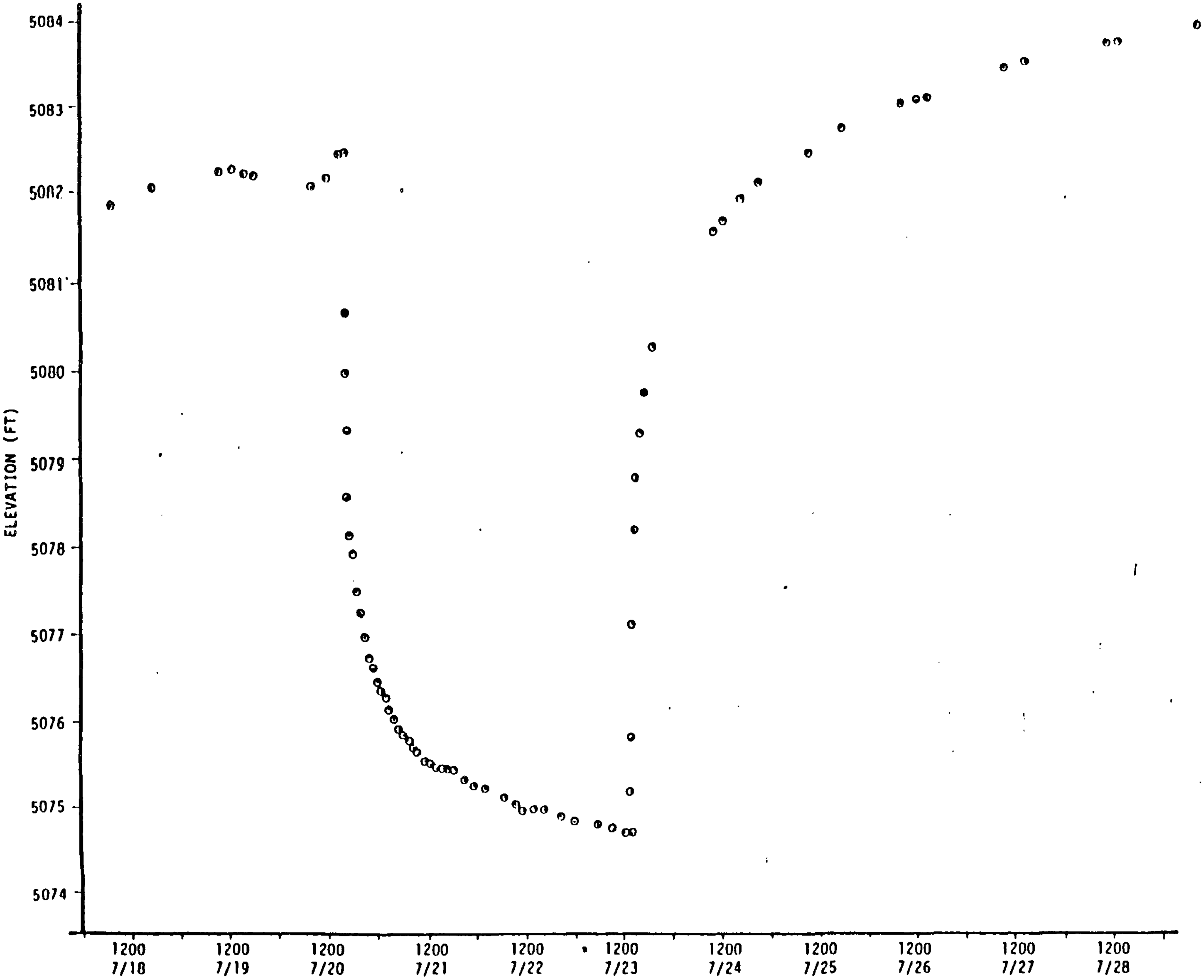


FIGURE B-5 HYDROGRAPH OP-3

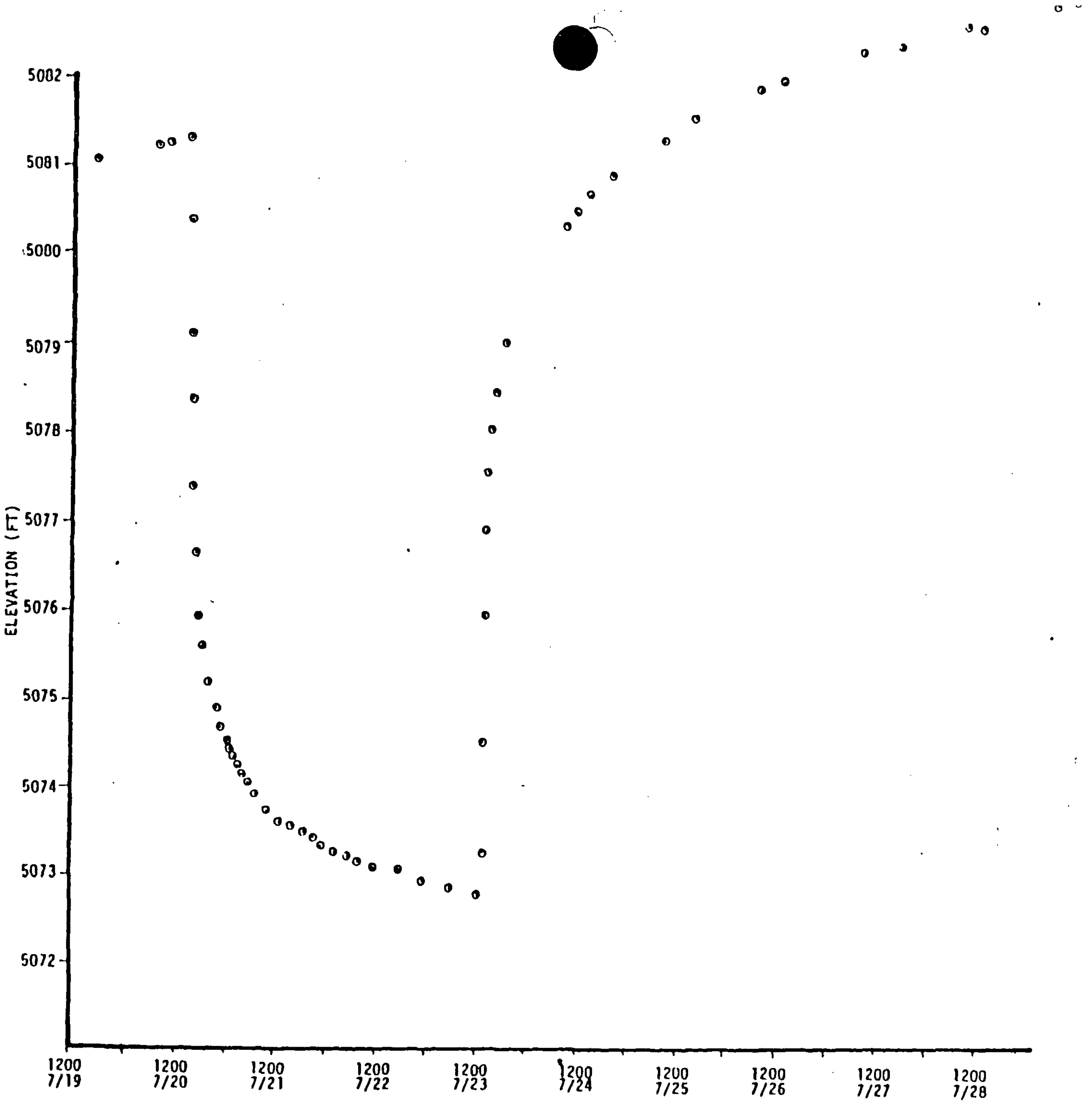
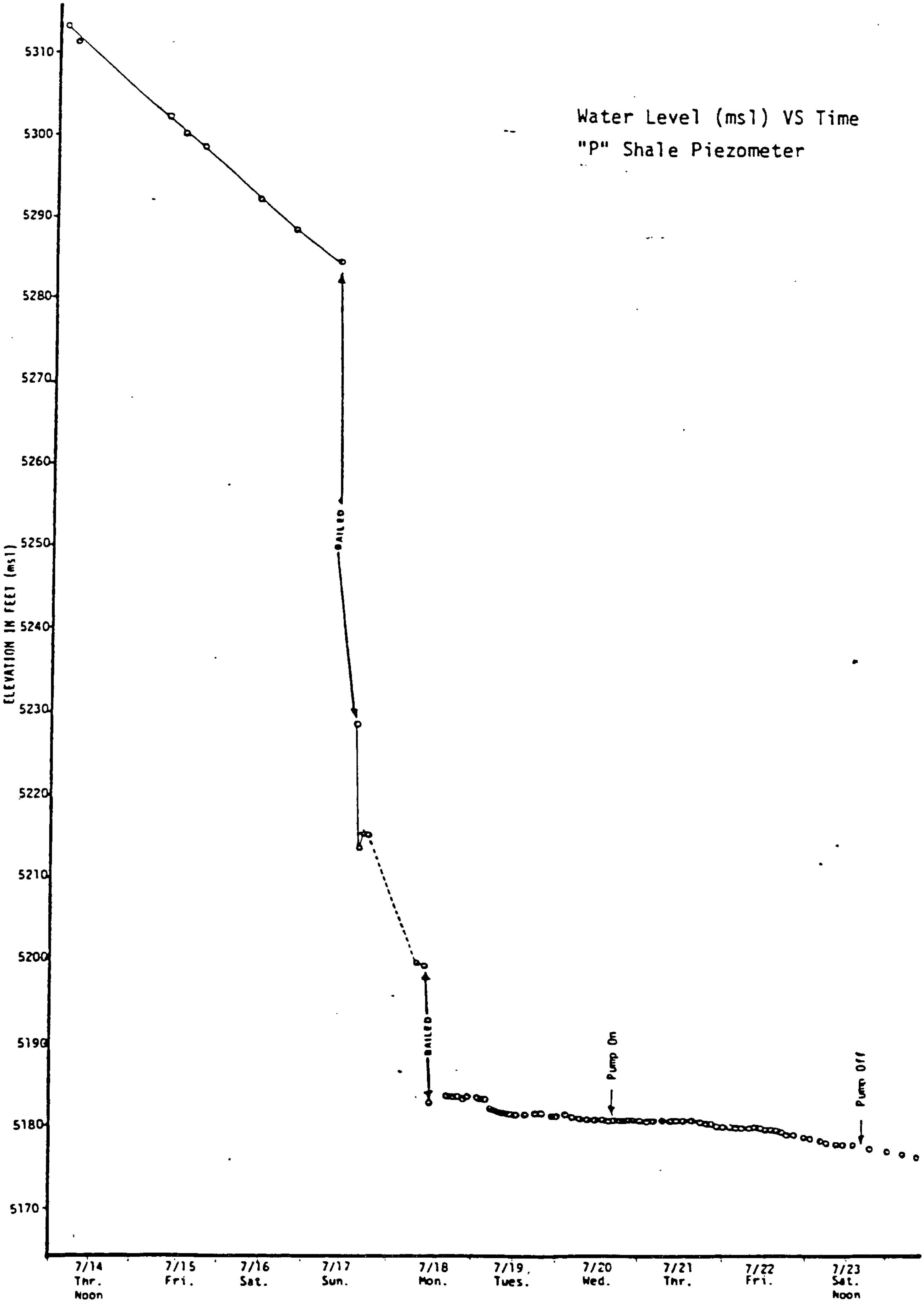


FIGURE B-6 HYDROGRAPH OI-5

Figure B-7

HYDROGRAPH - OMP-1



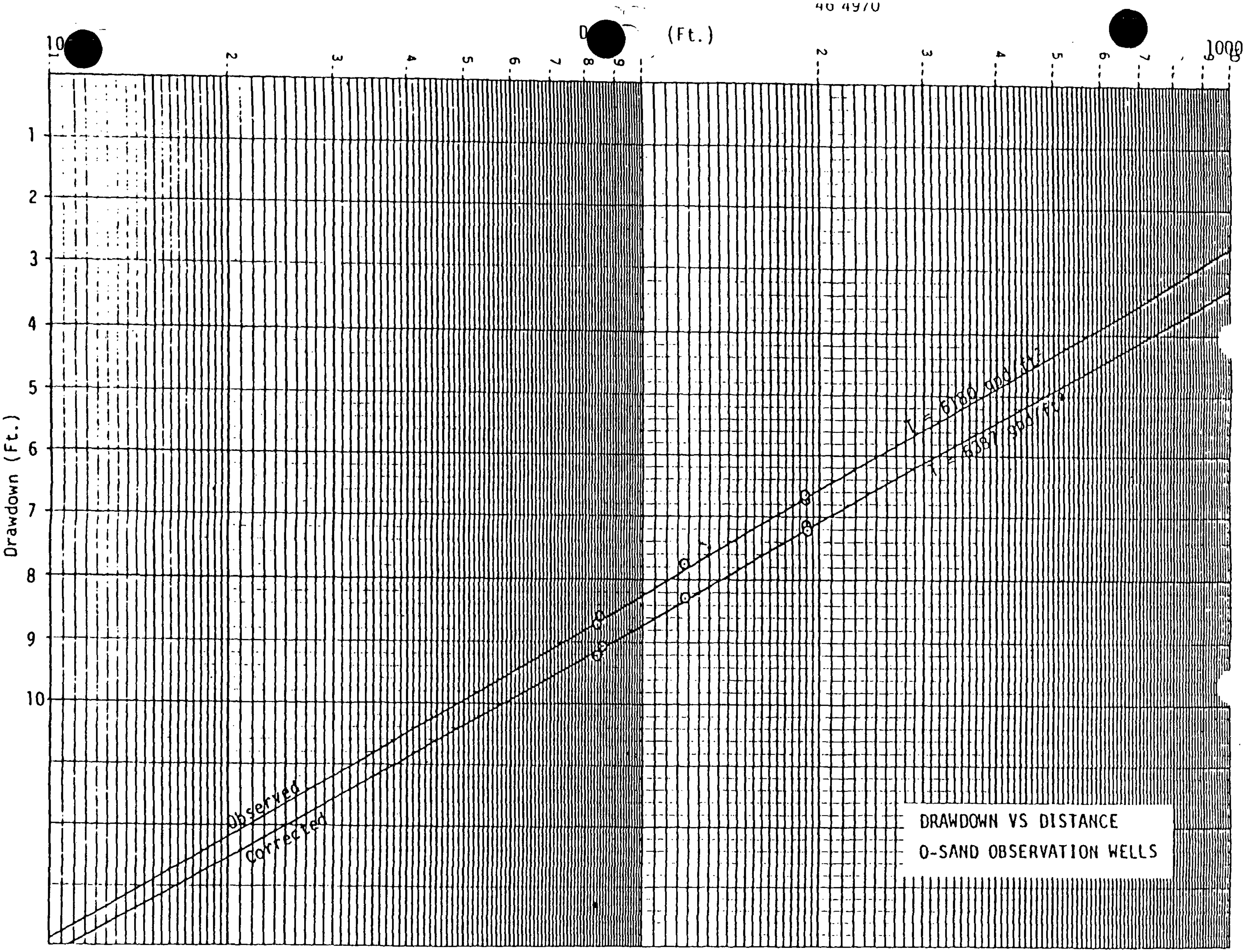
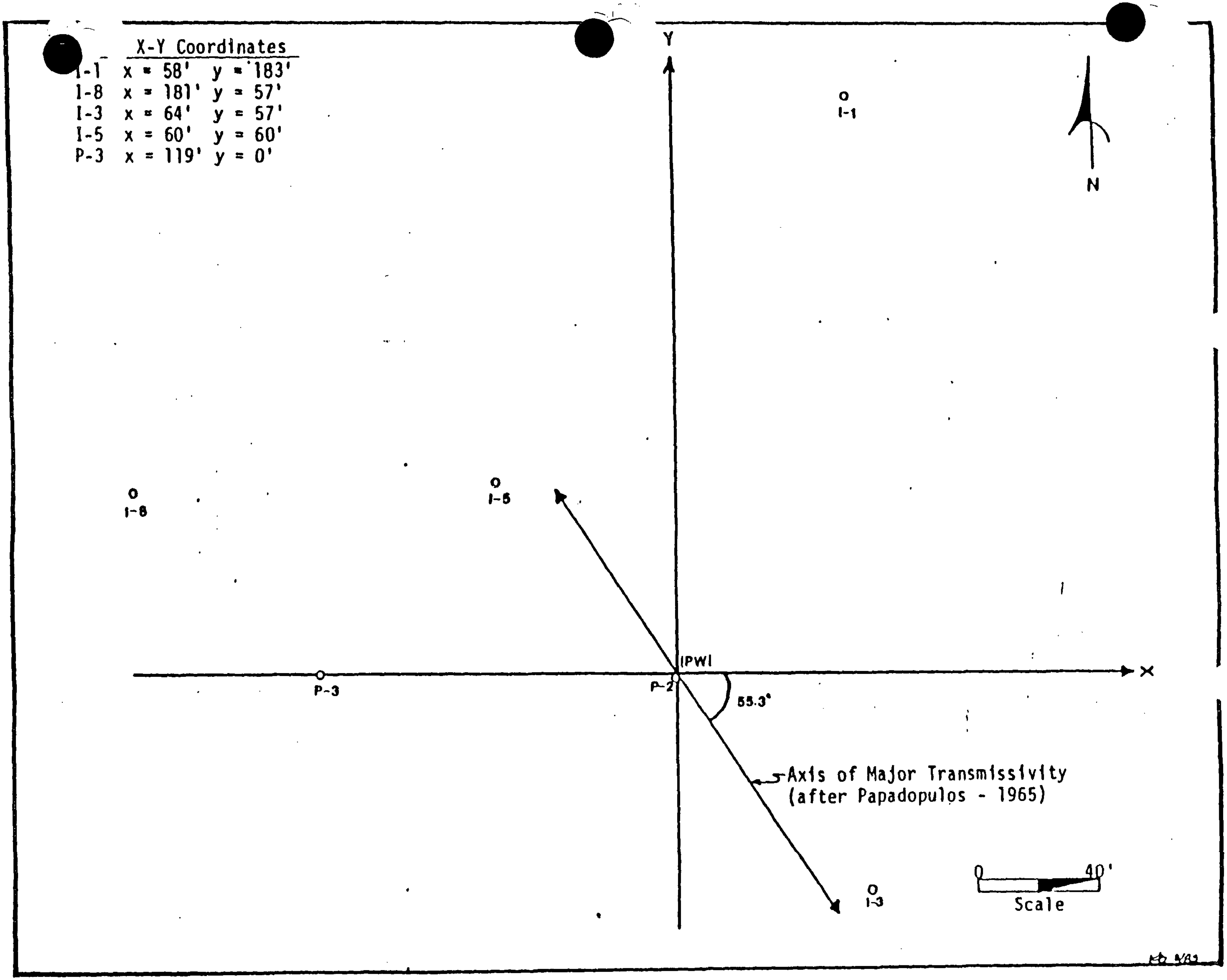


FIGURE B-8 DRAWDOWN VERSUS DISTANCE



X-Y Coordinates

I-1	x = 58'	y = 183'
I-8	x = 181'	y = 57'
I-3	x = 64'	y = 57'
I-5	x = 60'	y = 60'
P-3	x = 119'	y = 0'

FIGURE B-9 COORDINATES AND DIRECTIONAL TRANSMISSIVITY

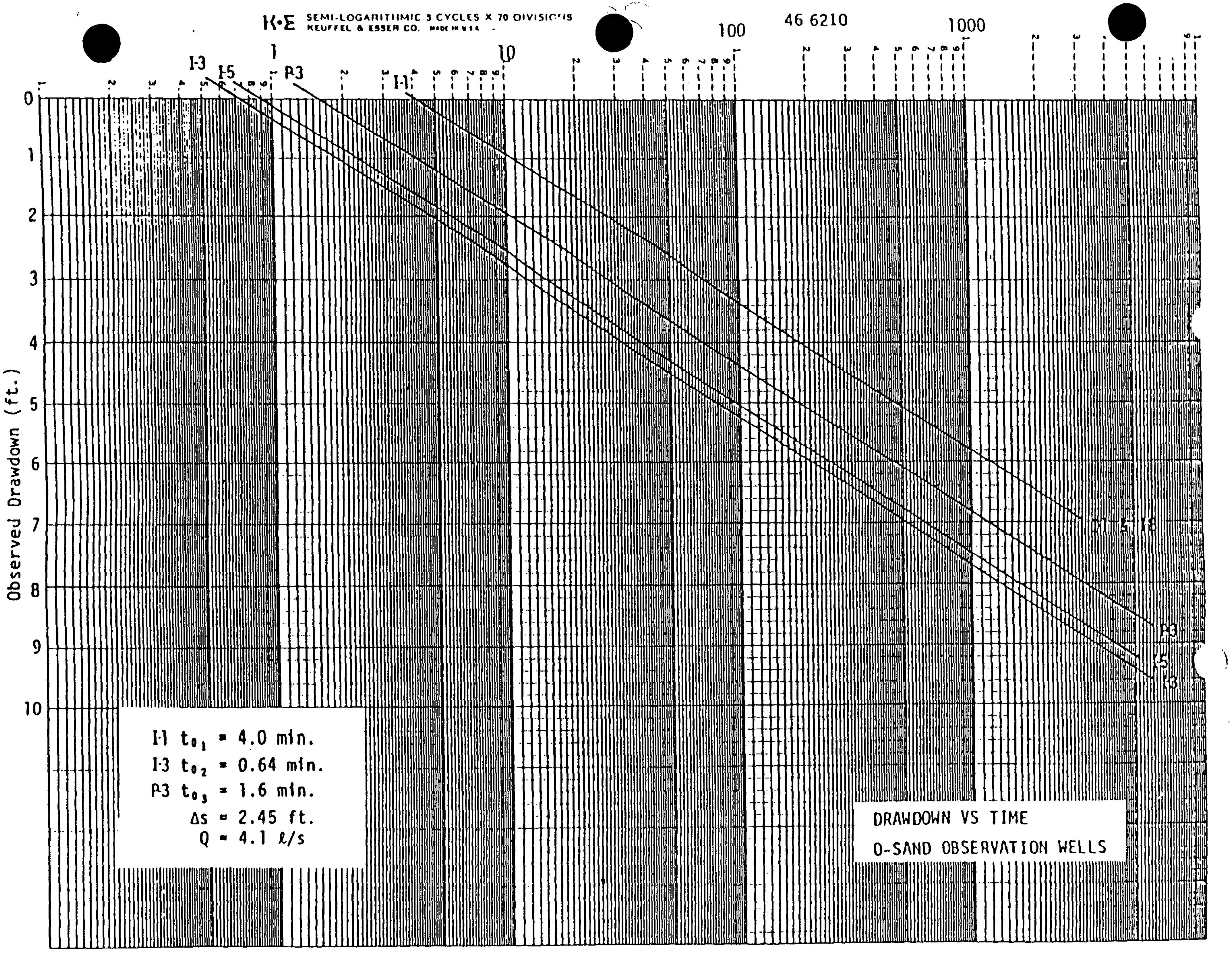
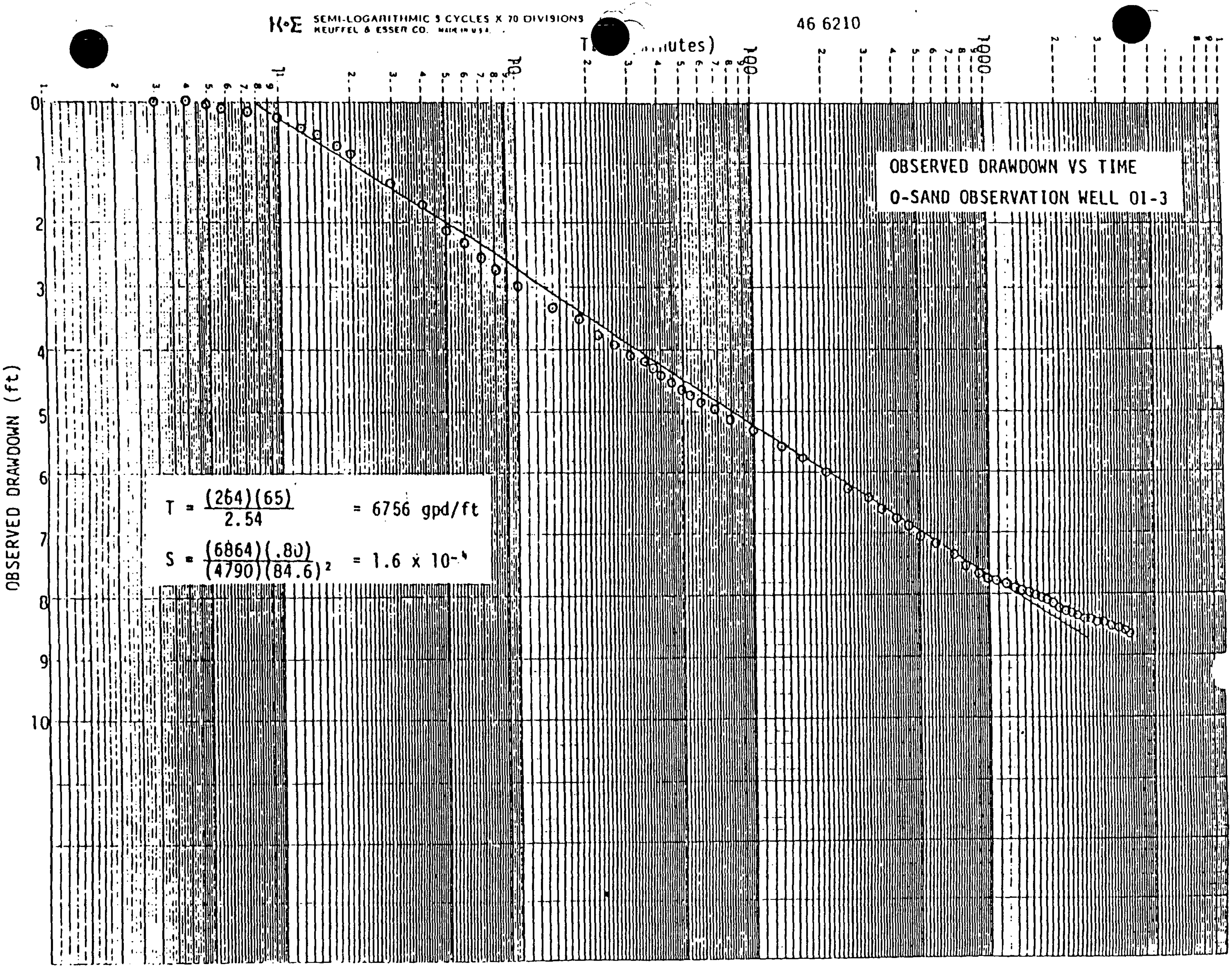


Figure B-10 Straight Line Method - Directional Transmissivity



$$T = \frac{(264)(65)}{2.54} = 6756 \text{ gpd/ft}$$

$$S = \frac{(6864)(.80)}{(4790)(84.6)^2} = 1.6 \times 10^{-4}$$

FIGURE B-11WELL OI-3

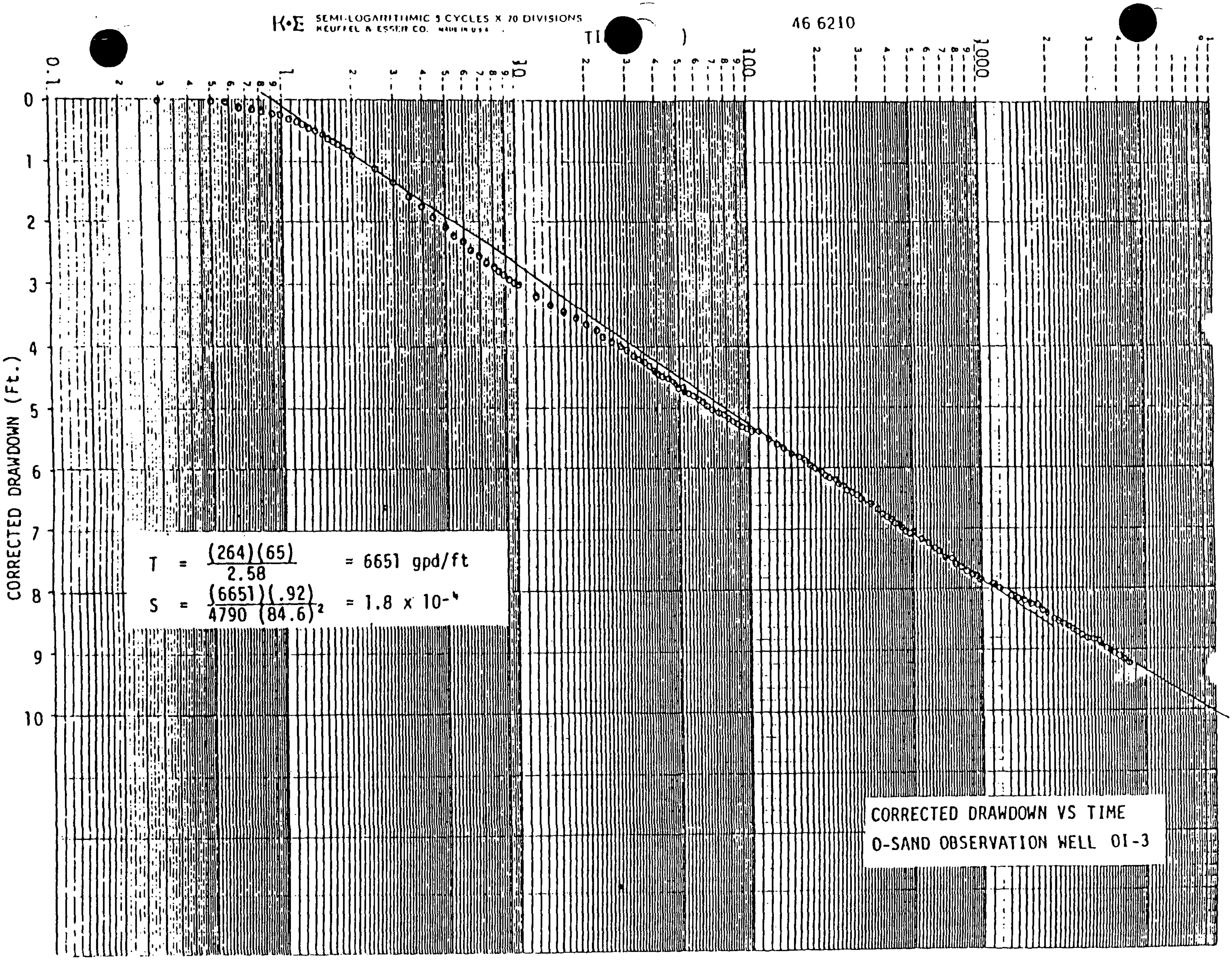
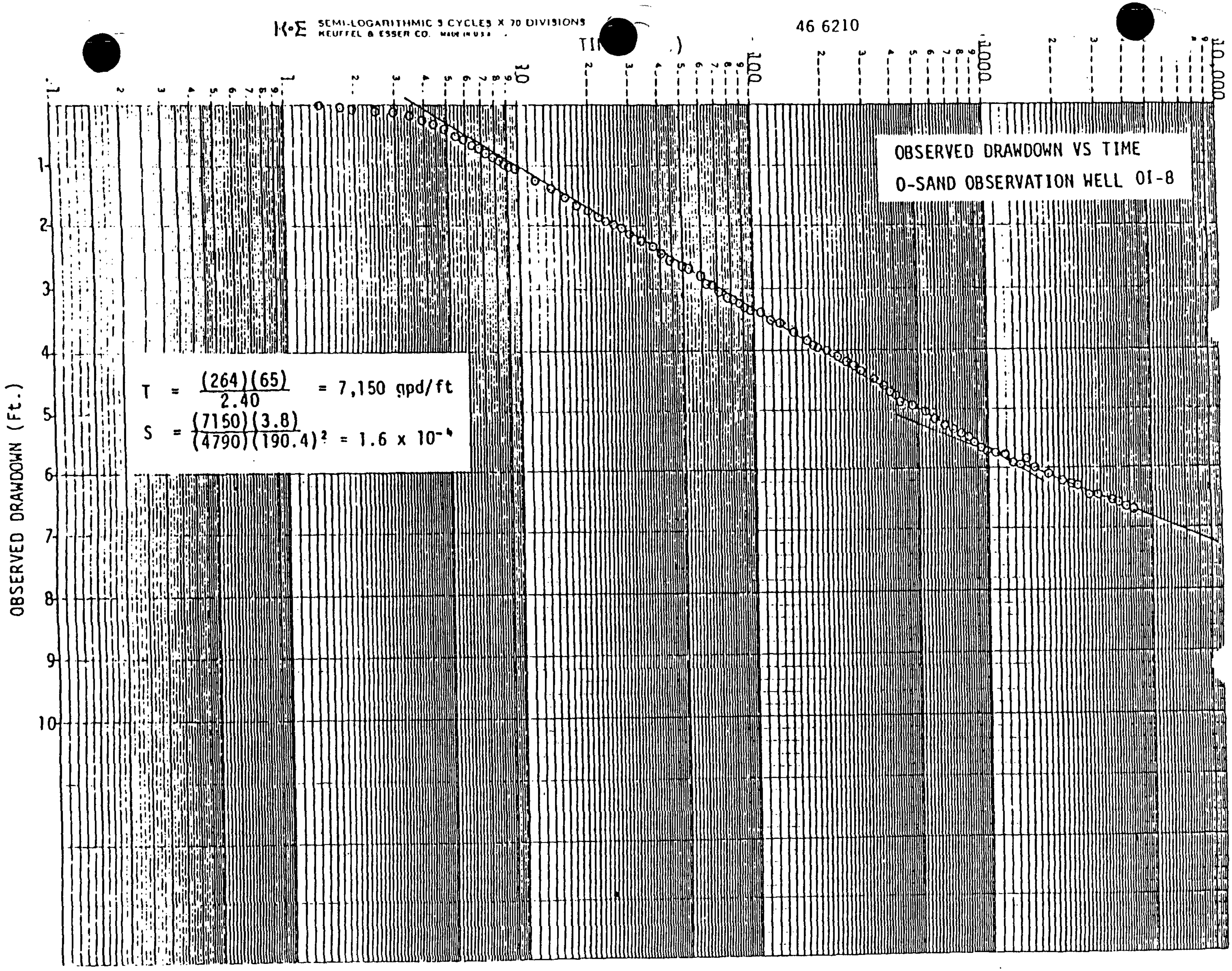


FIGURE B-12 WELL OI-3



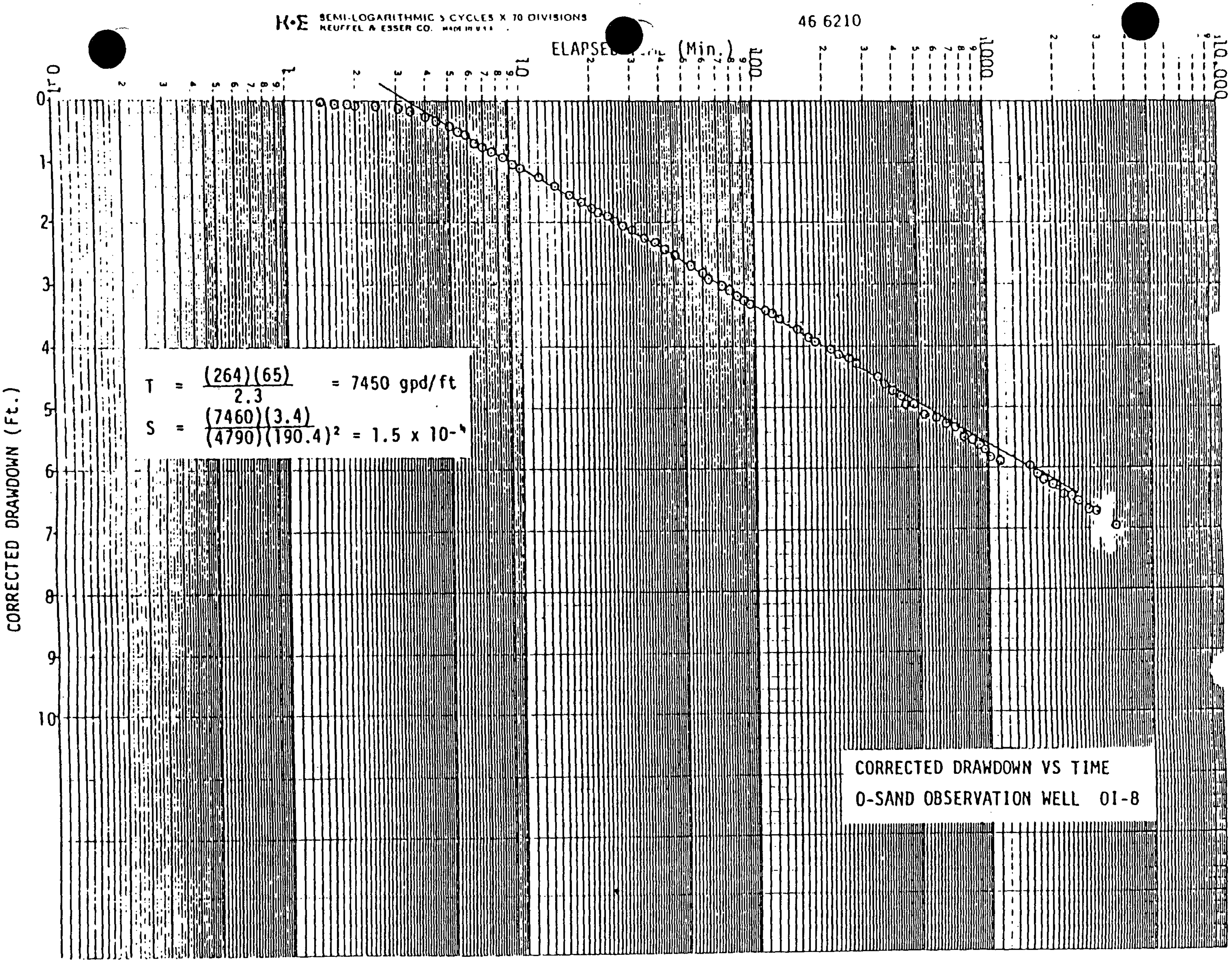
OBSERVED DRAWDOWN VS TIME

O-SAND OBSERVATION WELL OI-8

$$T = \frac{(264)(65)}{2.40} = 7{,}150 \text{ gpd/ft}$$

$$S = \frac{(7150)(3.8)}{(4790)(190.4)^2} = 1.6 \times 10^{-4}$$

FIGURE B-13WELL OI-8



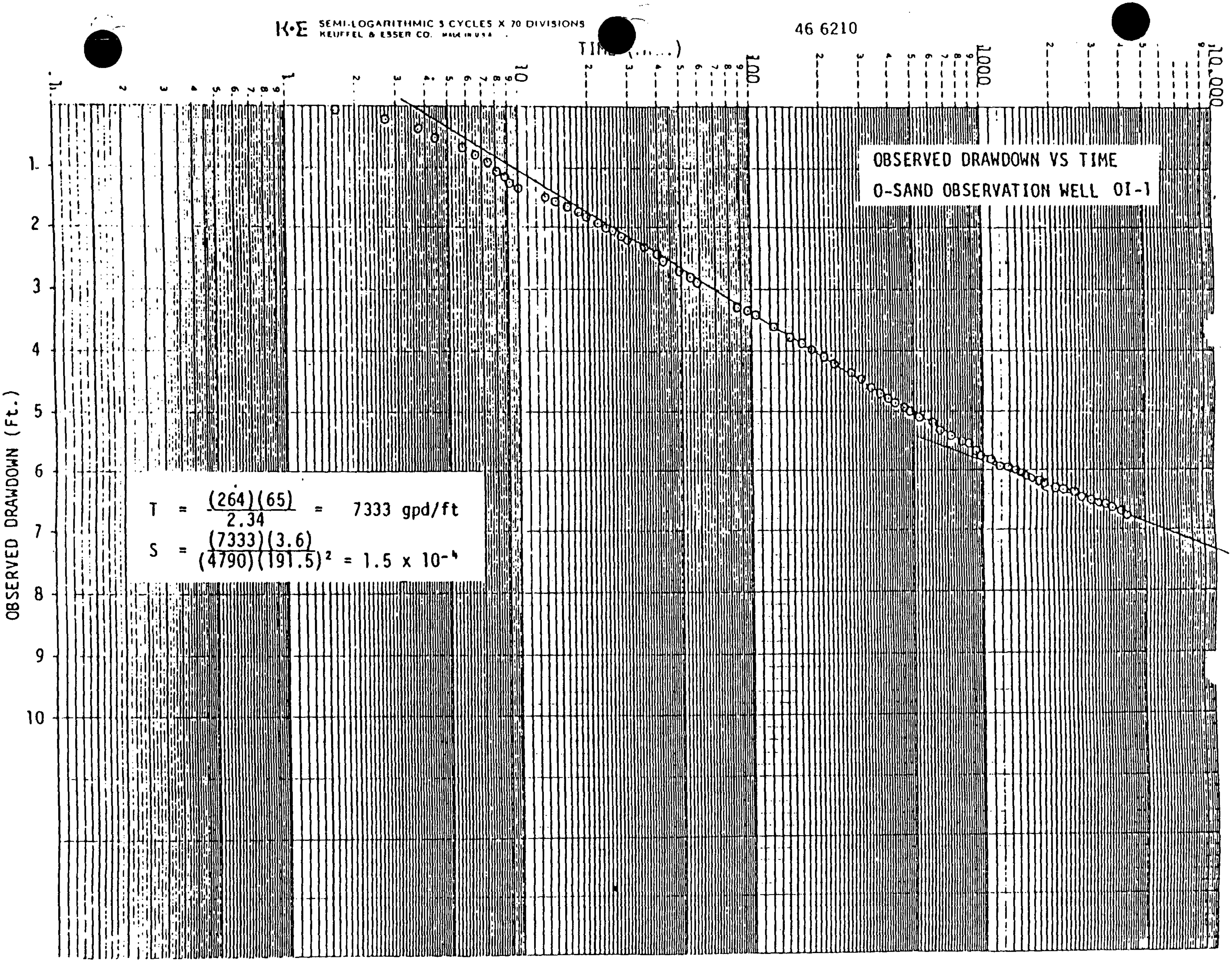
$$T = \frac{(264)(65)}{2.3} = 7450 \text{ gpd/ft}$$

$$S = \frac{(7460)(3.4)}{(4790)(190.4)^2} = 1.5 \times 10^{-4}$$

CORRECTED DRAWDOWN VS TIME

O-SAND OBSERVATION WELL 01-8

FIGURE B-14 WELL 01-8

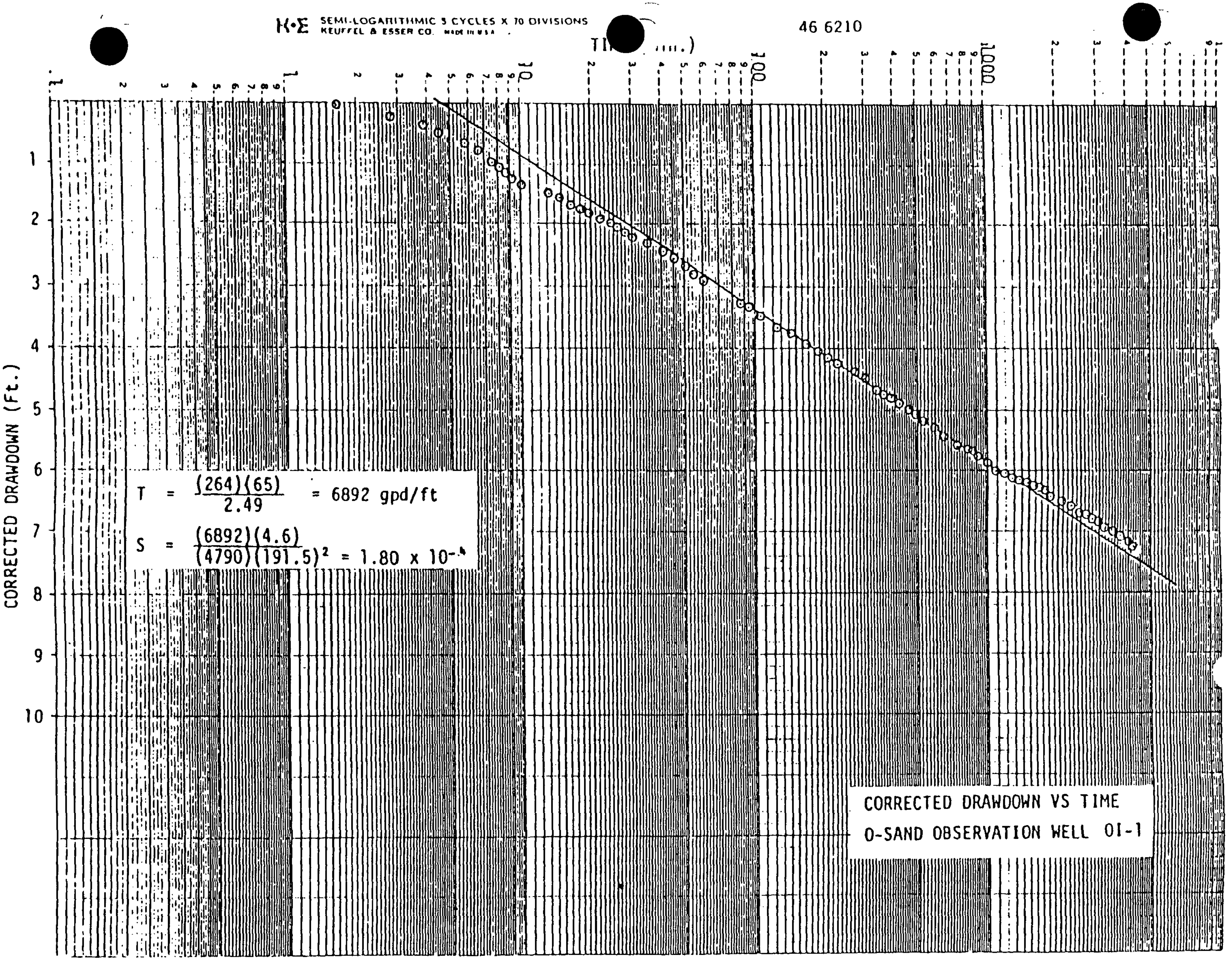


OBSERVED DRAWDOWN VS TIME
O-SAND OBSERVATION WELL OI-1

$$T = \frac{(264)(65)}{2.34} = 7333 \text{ gpd/ft}$$

$$S = \frac{(7333)(3.6)}{(4790)(191.5)^2} = 1.5 \times 10^{-4}$$

FIGURE B-15 WELL OI-1



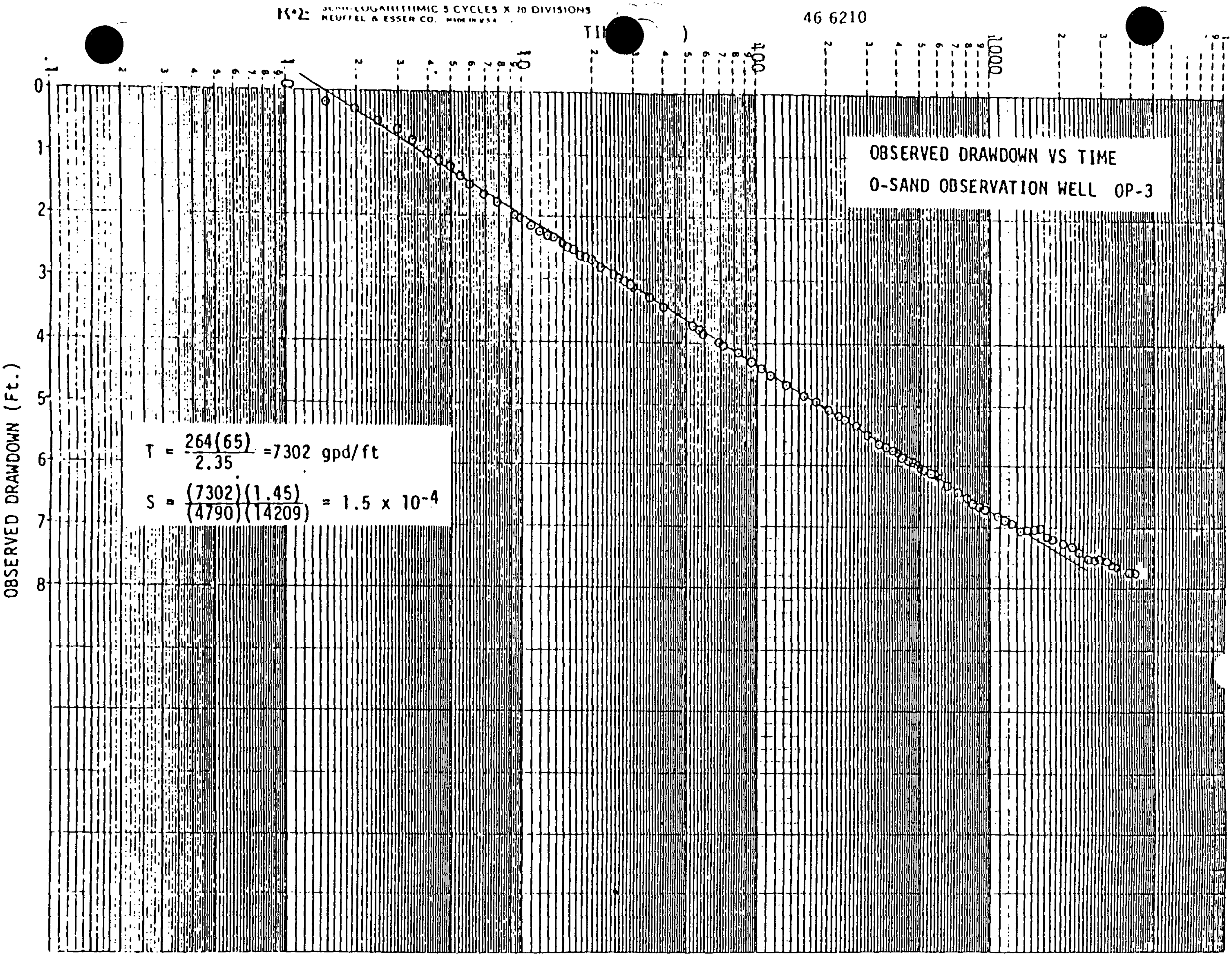
$$T = \frac{(264)(65)}{2.49} = 6892 \text{ gpd/ft}$$

$$S = \frac{(6892)(4.6)}{(4790)(191.5)^2} = 1.80 \times 10^{-4}$$

CORRECTED DRAWDOWN VS TIME

O-SAND OBSERVATION WELL OI-1

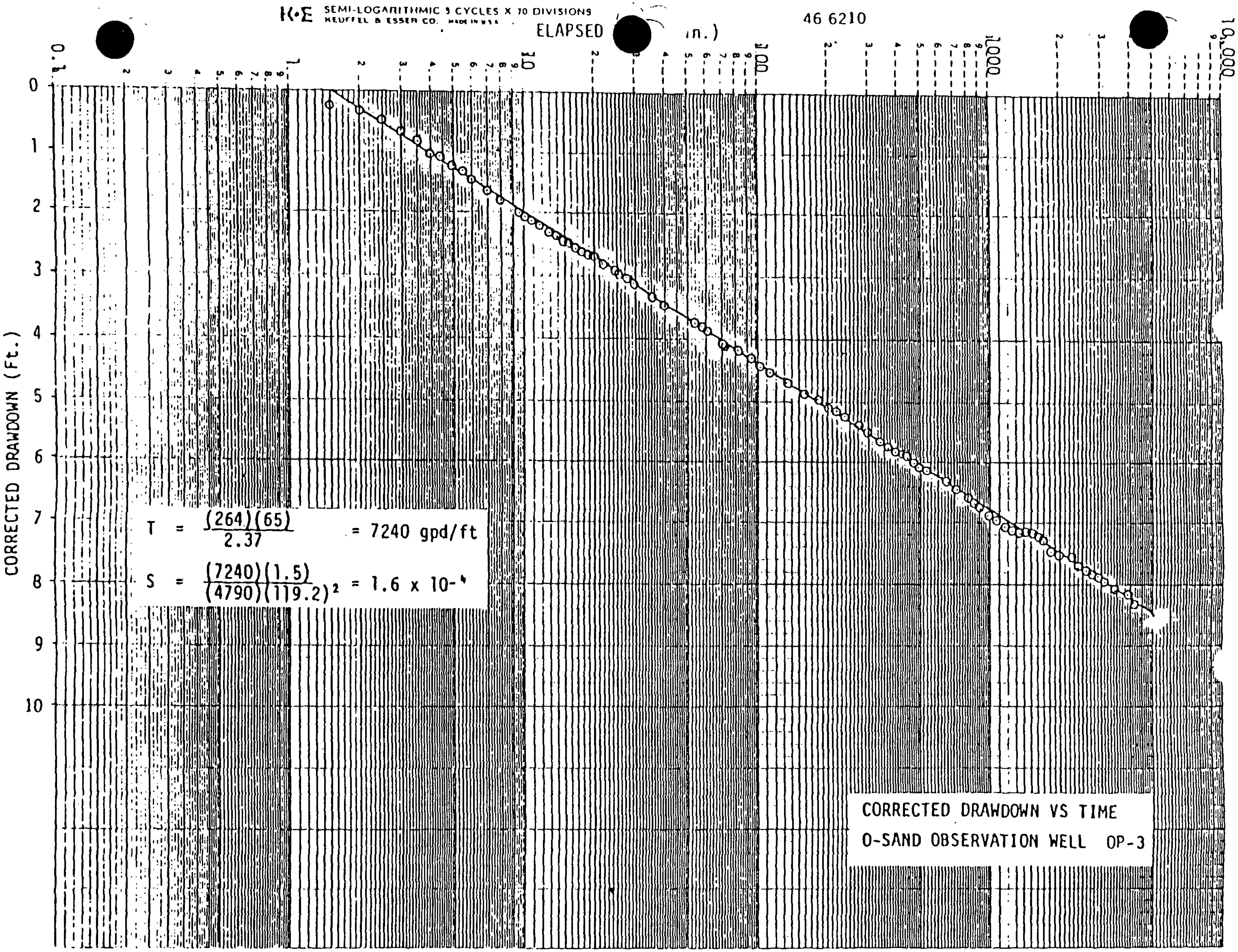
FIGURE B-16 WELL OI-1



$$T = \frac{264(65)}{2.35} = 7302 \text{ gpd/ft}$$

$$S = \frac{(7302)(1.45)}{(4790)(14209)} = 1.5 \times 10^{-4}$$

FIGURE B-1.7WELL OP-3

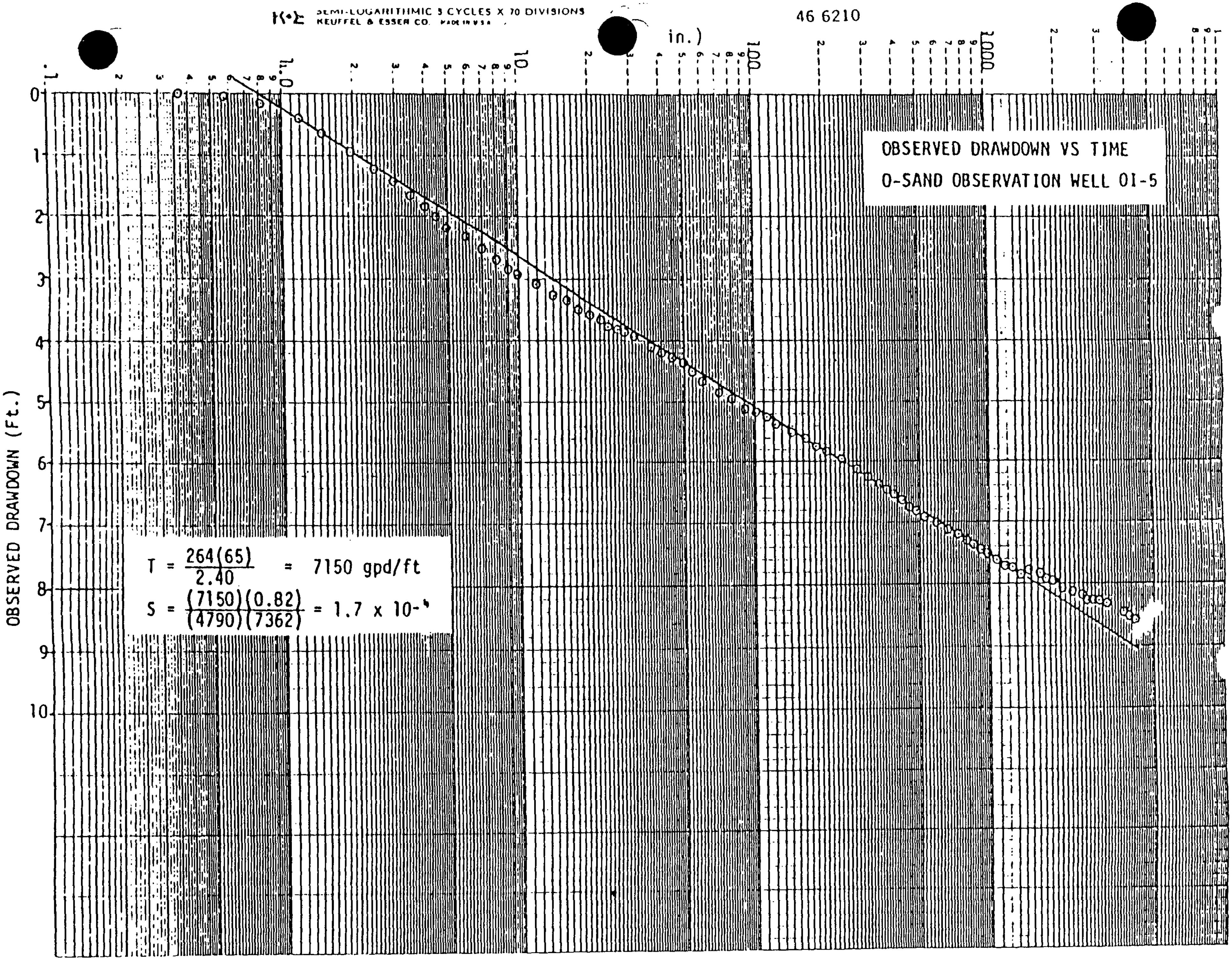


$$T = \frac{(264)(65)}{2.37} = 7240 \text{ gpd/ft}$$

$$S = \frac{(7240)(1.5)}{(4790)(119.2)^2} = 1.6 \times 10^{-4}$$

CORRECTED DRAWDOWN VS TIME
O-SAND OBSERVATION WELL OP-3

FIGURE B-18WELL OP-3

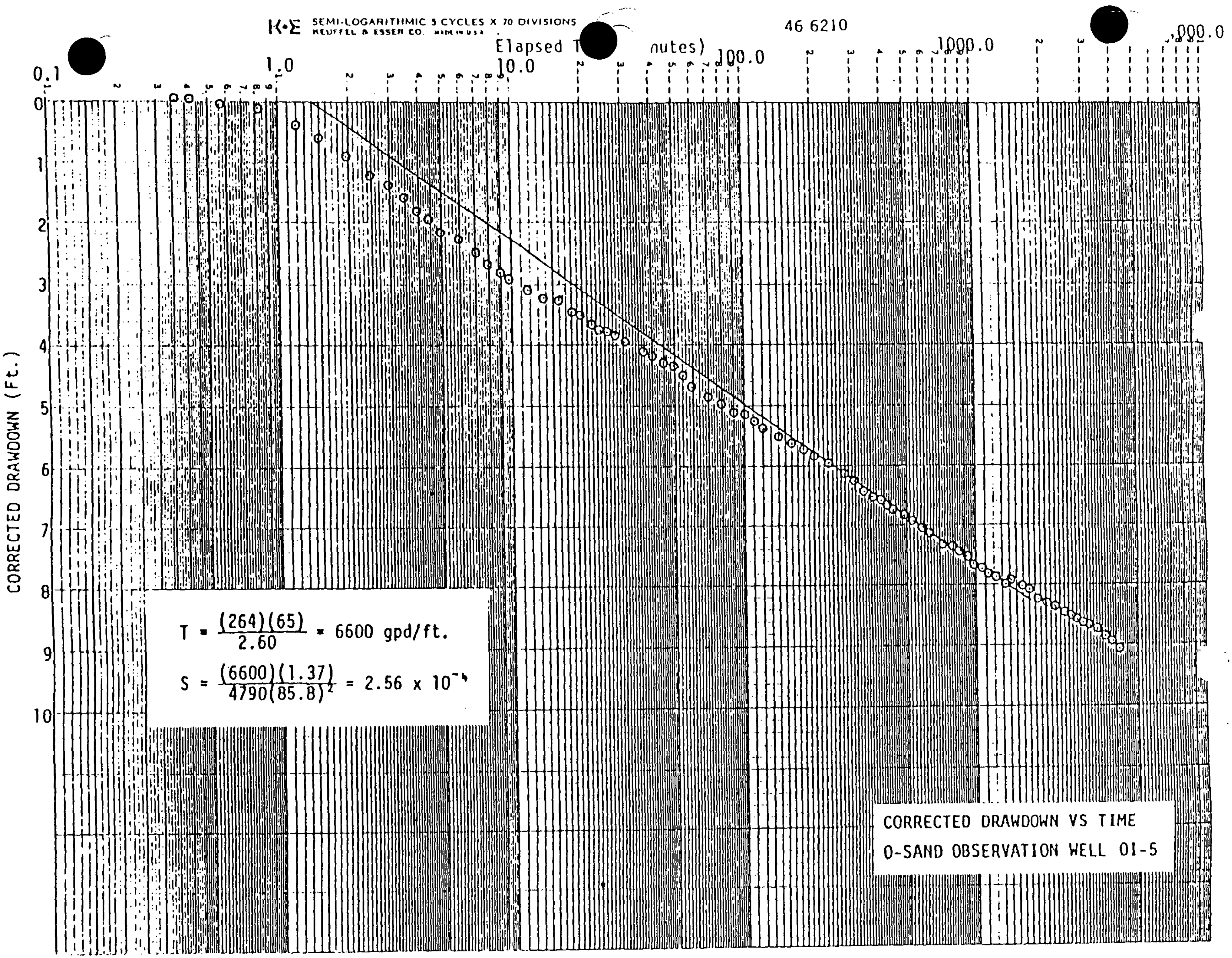


OBSERVED DRAWDOWN VS TIME
O-SAND OBSERVATION WELL OI-5

$$T = \frac{264(65)}{2.40} = 7150 \text{ gpd/ft}$$

$$S = \frac{(7150)(0.82)}{(4790)(7362)} = 1.7 \times 10^{-4}$$

FIGURE B-19 WELL OI-5



$$T = \frac{(264)(65)}{2.60} = 6600 \text{ gpd/ft.}$$

$$S = \frac{(6600)(1.37)}{4790(85.8)^2} = 2.56 \times 10^{-4}$$

CORRECTED DRAWDOWN VS TIME
O-SAND OBSERVATION WELL OI-5

FIGURE B-20 WELL OI-5

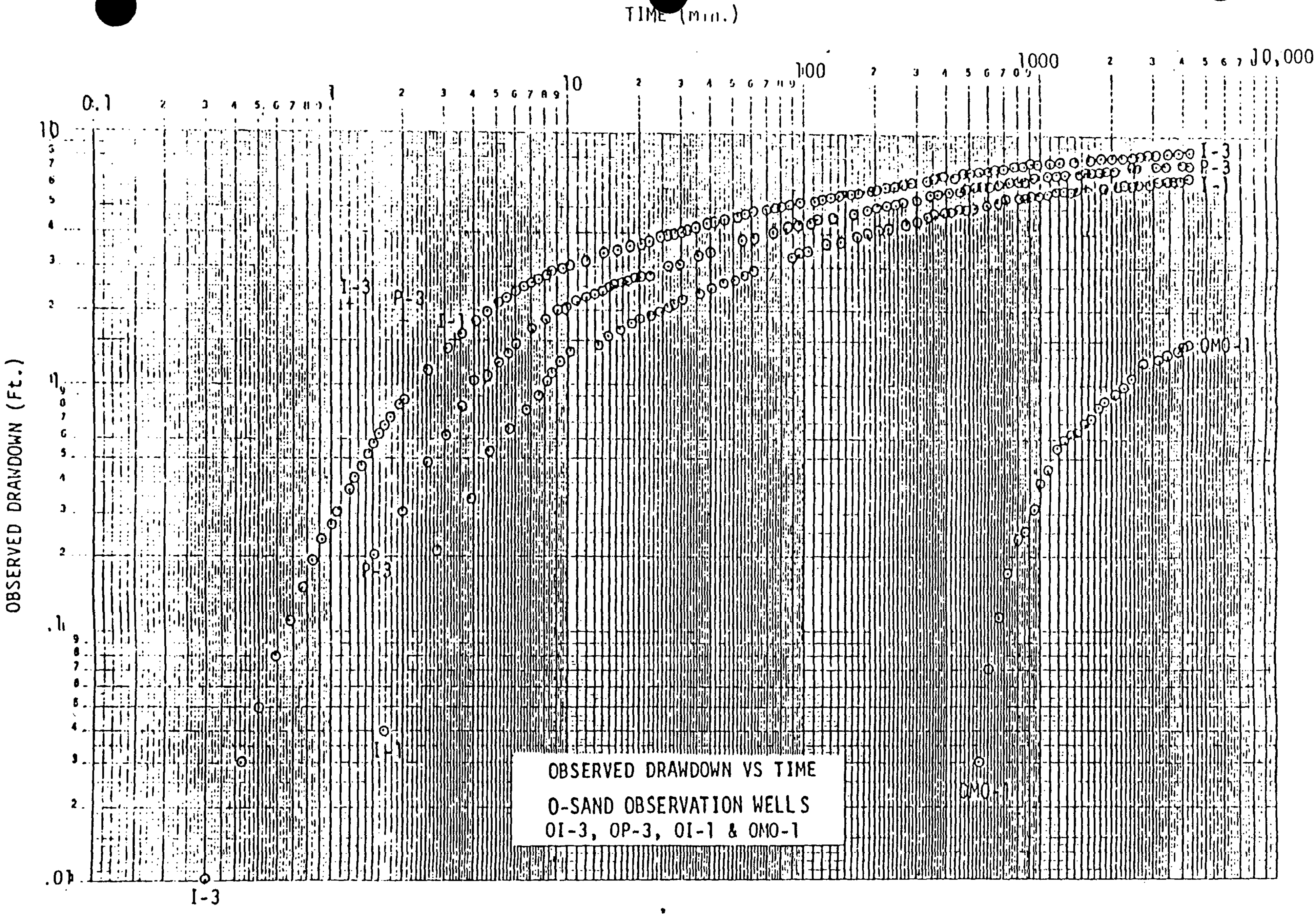


FIGURE B-21 DRAWDOWN VS TIME
O-SAND OBSERVATION WELLS OI-3,
OP-3, OI-1 AND OMO-1

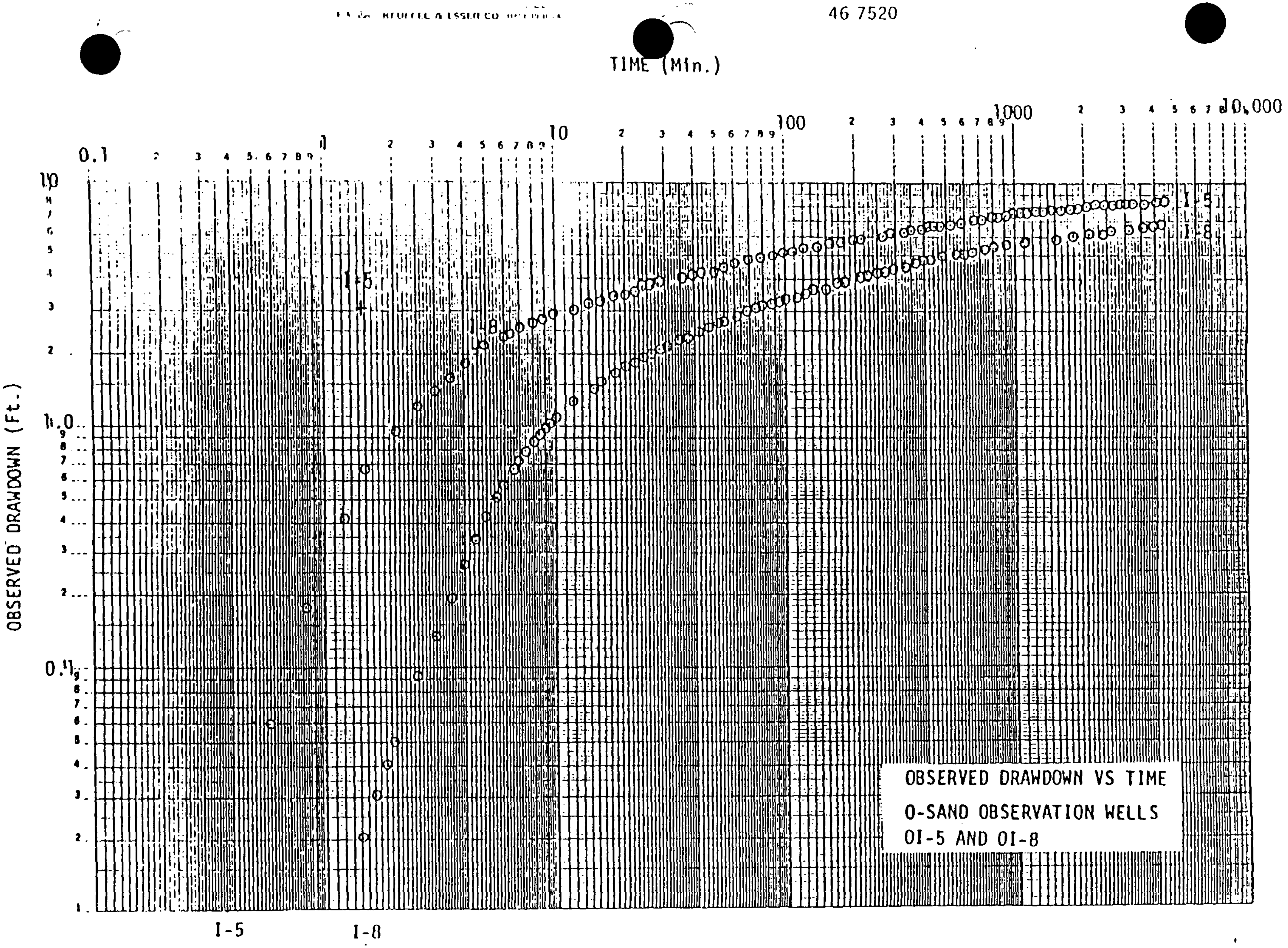


FIGURE B-22 DRAWDOWN VS TIME

O-SAND OBSERVATION WELLS OI-5 AND OI-8

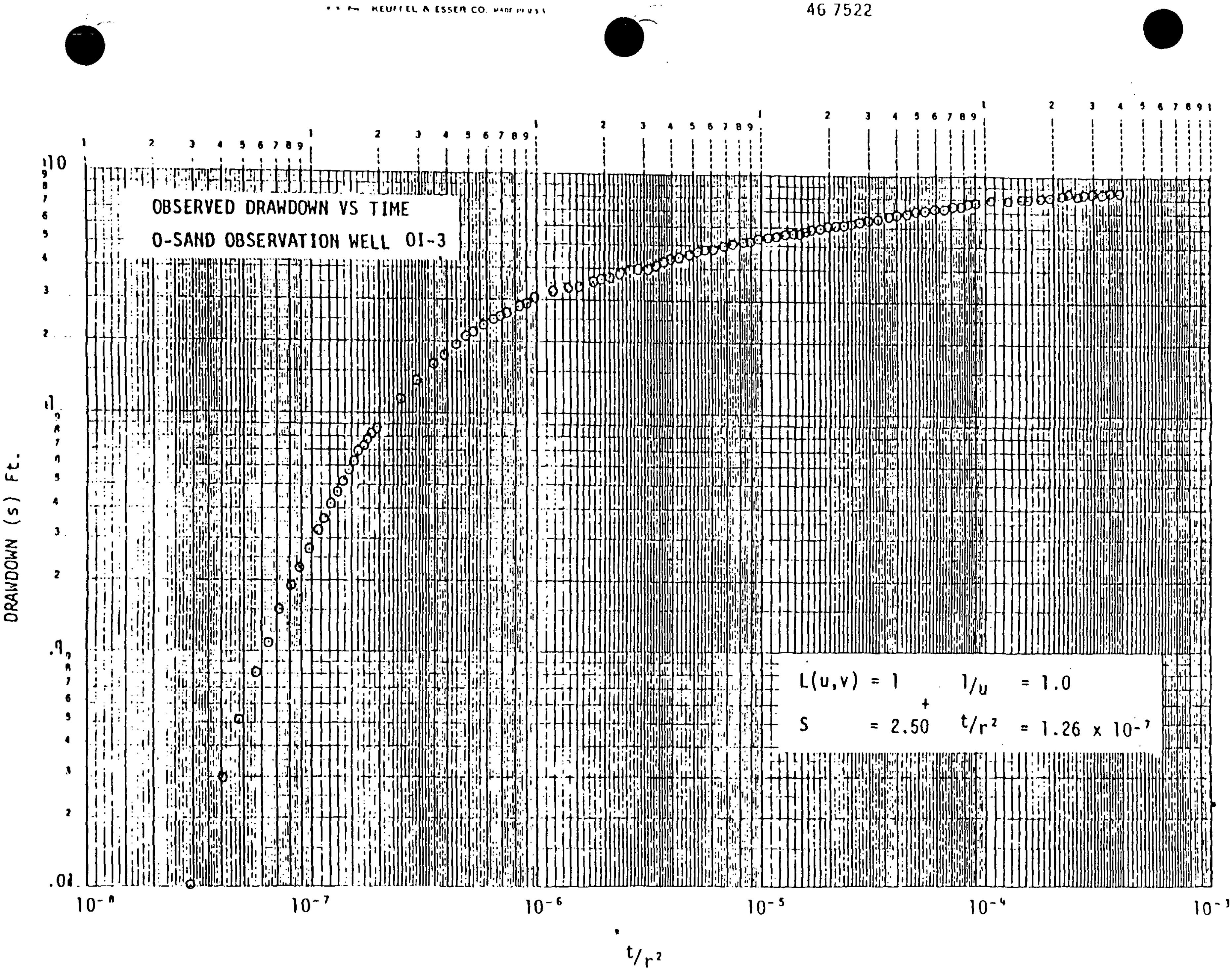


FIGURE B-23 WELL OI-3

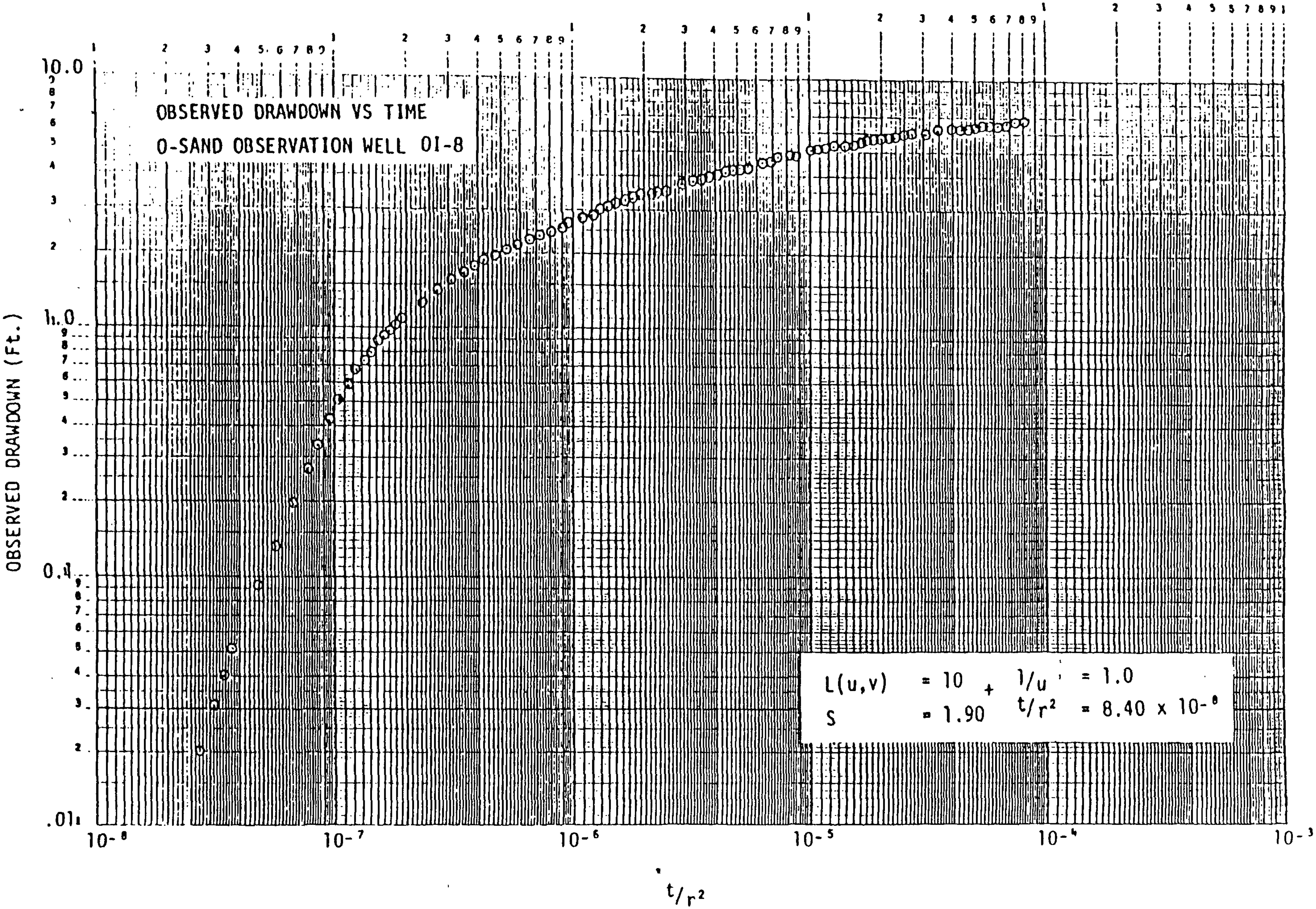


FIGURE B-24 WELL OI-8

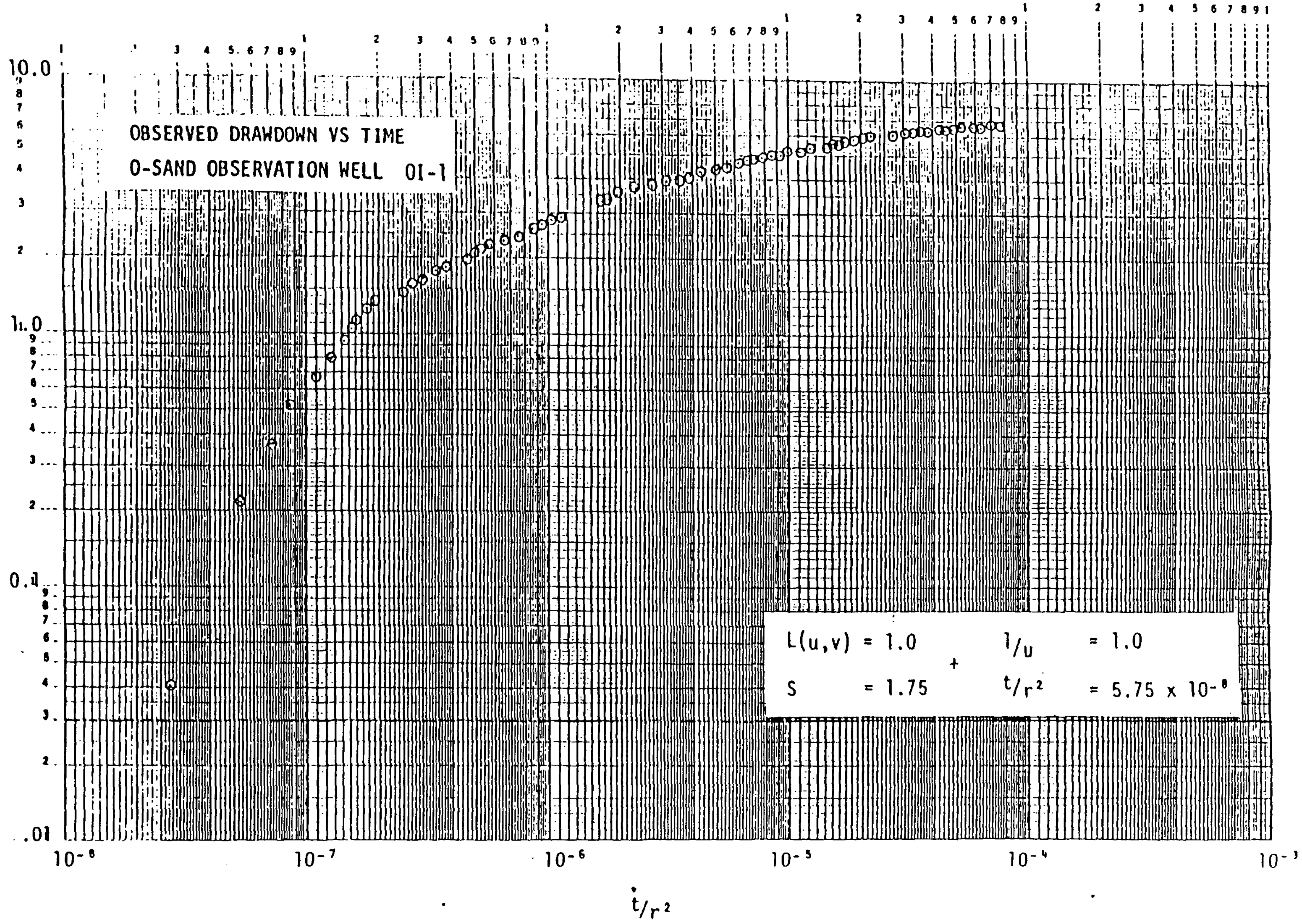


FIGURE B-25 WELL OI-1

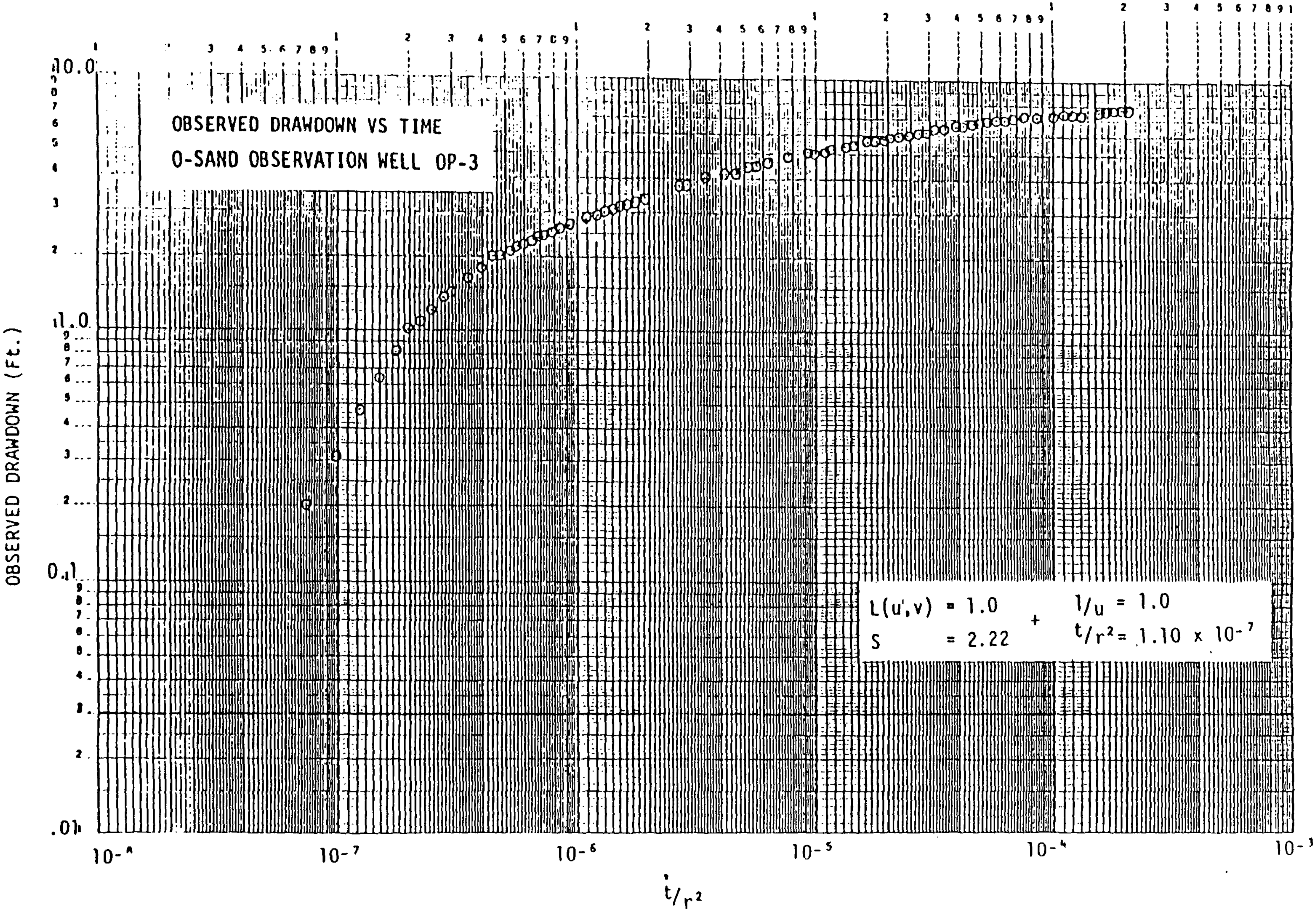


FIGURE B-26 WELL OP-3

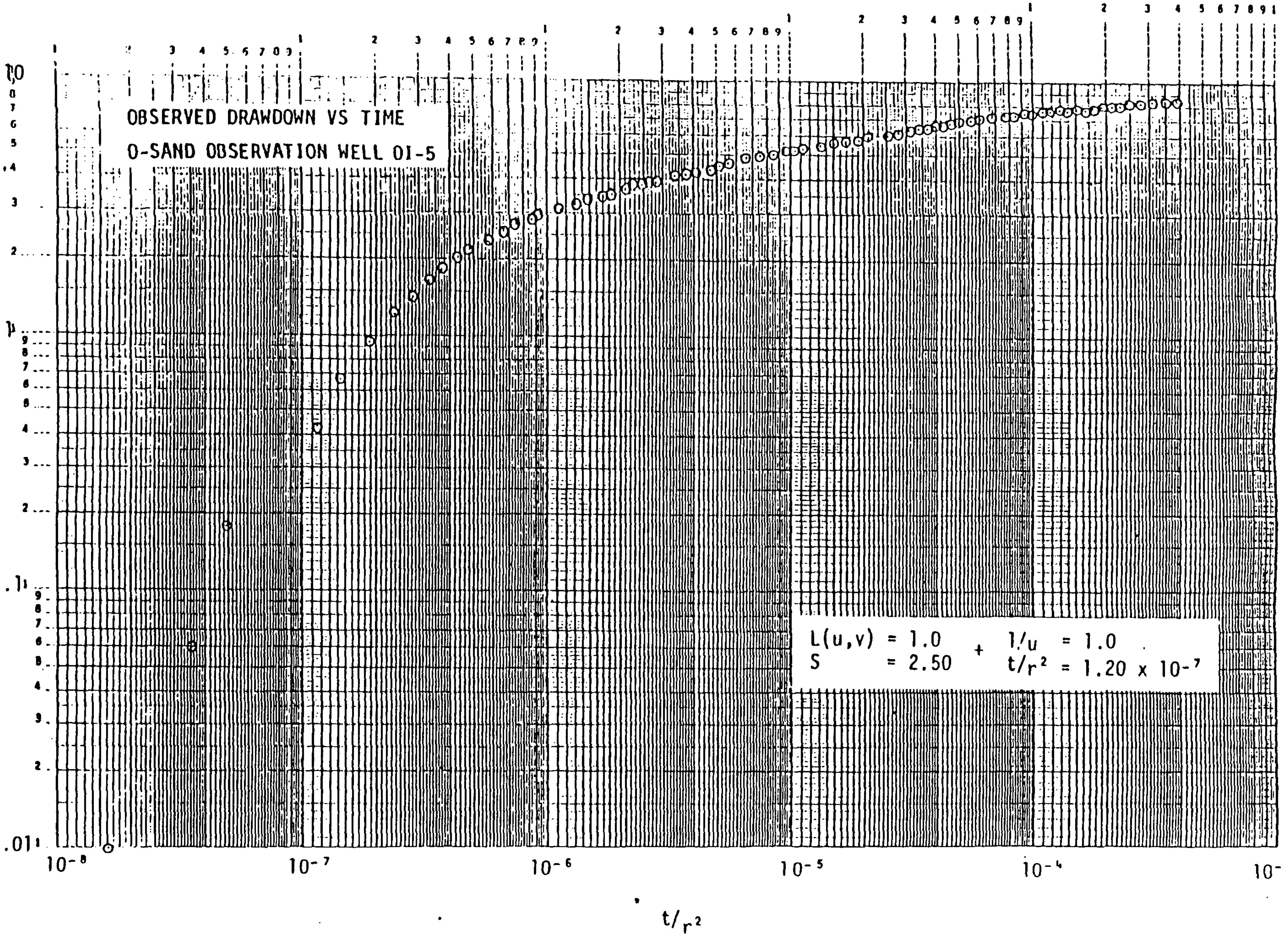


FIGURE B-27 WELL OI-5

FIGURE - [illegible] PLAN VIEW OF [illegible] SAND TEST PATTERN

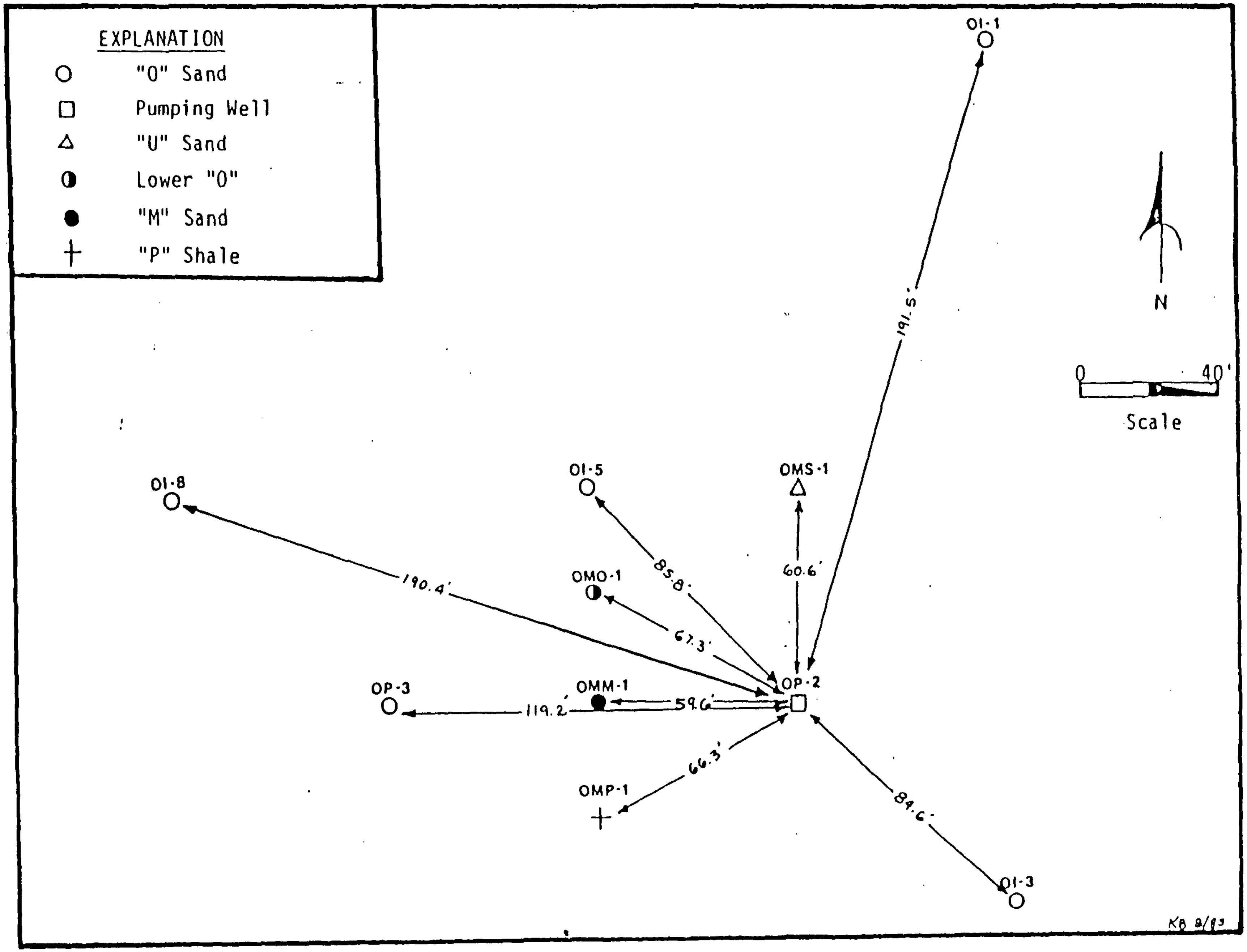
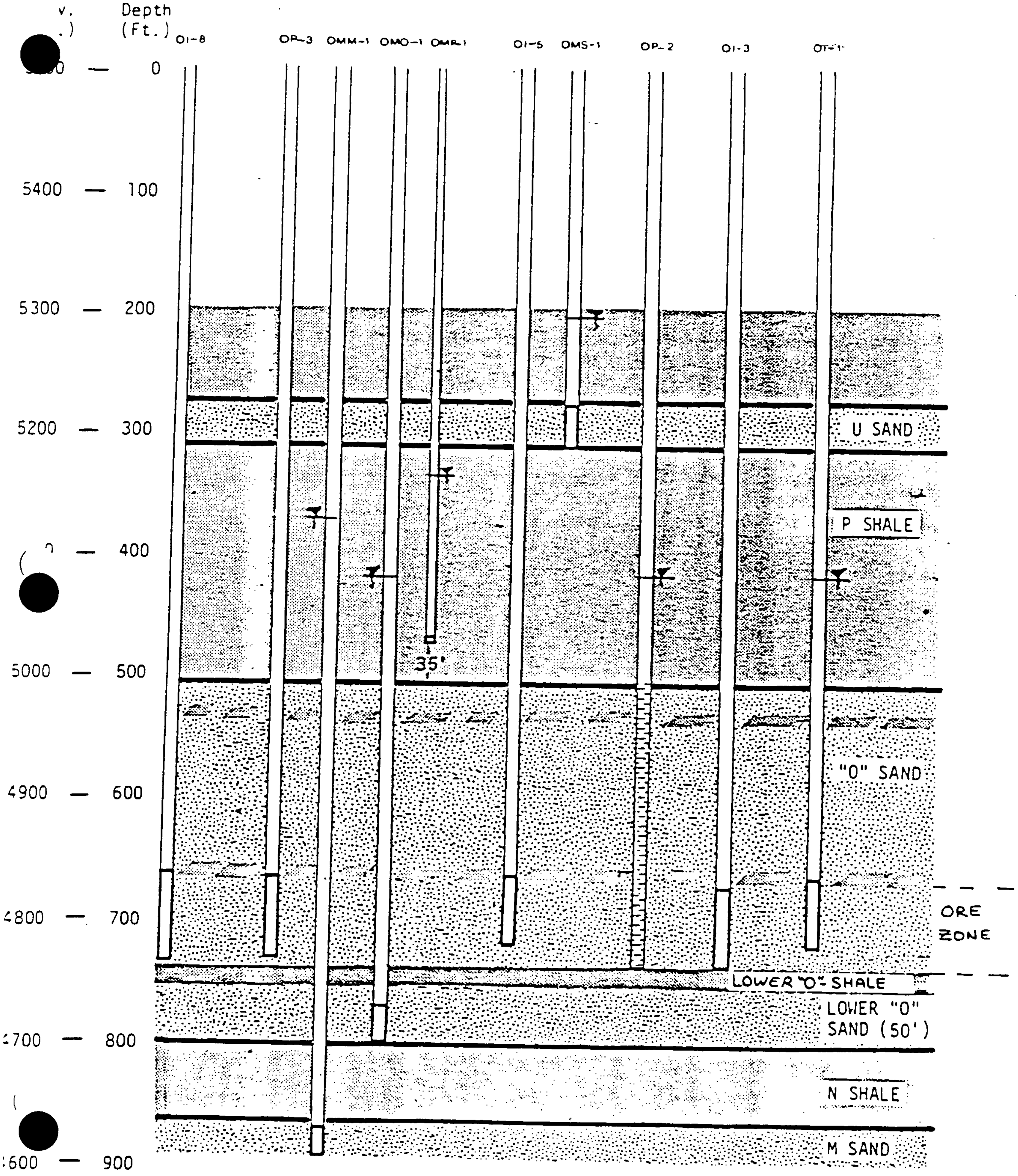
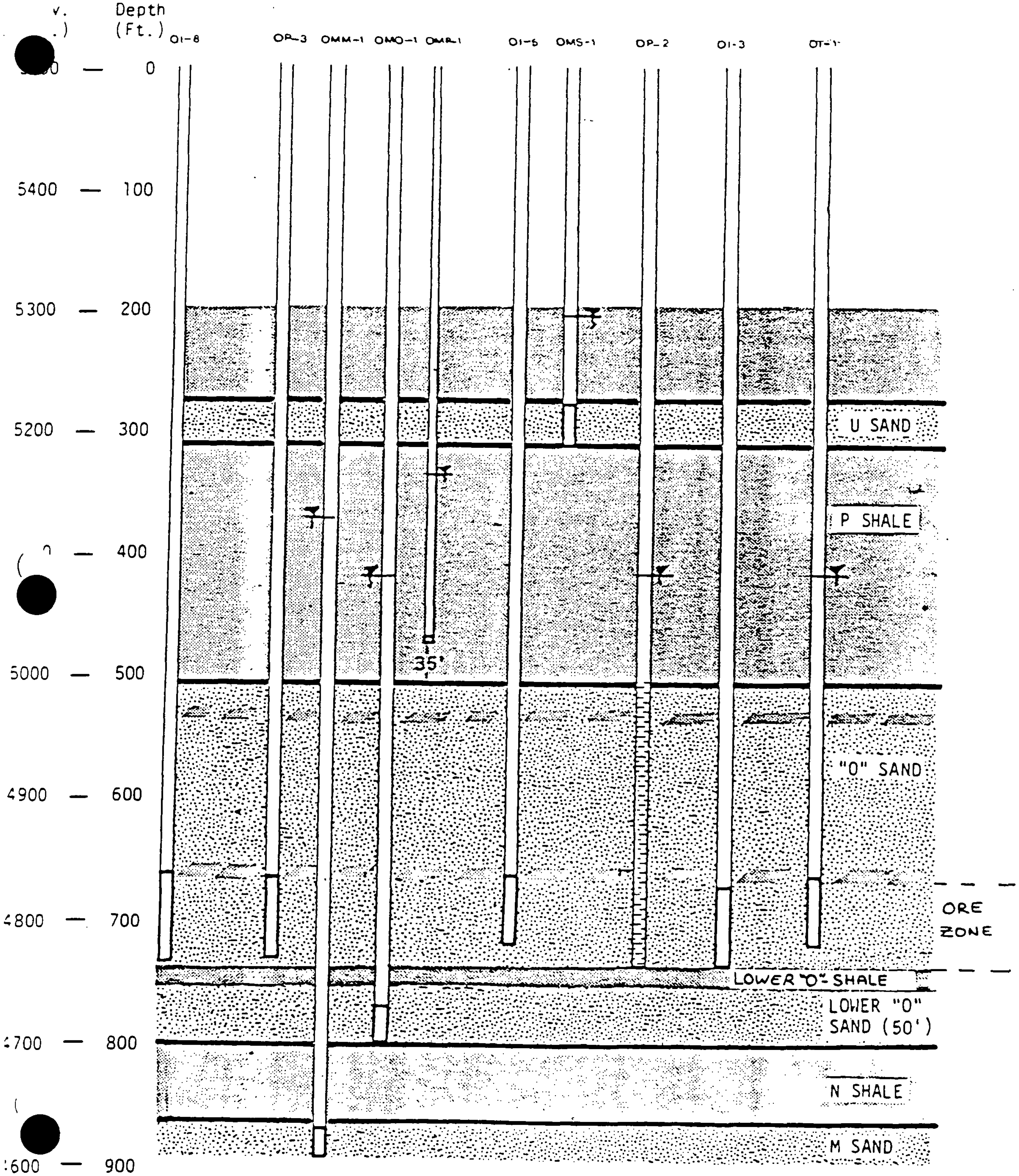


FIGURE B-29 CROSS SECTION OF "O" SAND TEST PATTERN
(Horizontal not to Scale)



otentiometric Levels 7/28/83

FIGURE B-29 CROSS SECTION OF "O" SAND TEST PATTERN
(Horizontal not to Scale)



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Hydrology

Attachment 'D'

Section 25 and Section 35 Pump Tests

In the Projected Development Schedule, the initial development will include mining units in Section 25 and Section 35 in addition to mining units in the two pilot test areas. In support of this development plan aquifer pumping tests were conducted in Section 25 and Section 35. The tests were designated to determine characteristics of the production zone and the overlying and underlying shale boundaries. The test results were evaluated and analyzed by Kerr-McGee Hydrology and a copy of the report which includes the field data and analysis is attached.

AQUIFER TEST ANALYSES
IN SITU LEACH PROJECT
SEQUOYAH FUELS CORPORATION
SOUTH POWDER RIVER BASIN
CONVERSE COUNTY, WYOMING

Prepared By:

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Senior Hydrologist
Engineering Services Division
Kerr-McGee Corporation

March 25, 1988

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LIST OF FIGURES

SUMMARY AND CONCLUSIONS

Sequoyah Fuels Corporation (SFC) has conducted several pumping tests in support of the uranium in situ leach research and development projects in Converse County, Wyoming. The pumping tests were conducted to evaluate the vertical hydraulic conductivity, K', of shale layers which confine ore bodies and to characterize the various sand strata of the Fort Union Formation. The tests addressed in this report were conducted in a lower 'O' sand member and the 'M' sand in Sections 25 and 35, T36N, R74W, respectively. The responses to pumping at each test site were monitored in the producing sands and in overlying and underlying shale and sand layers. The tests were run specifically to derive input data for application of the ratio method of K' evaluation developed by Neuman and Witherspoon (1972). For additional input data required by the ratio method, SFC retrieved representative core samples from confining shale layers and submitted these for laboratory analysis of formation compressibility, from which specific storage, S_s, was calculated. Test responses were monitored during a period of background monitoring, 72 hours of pumping and during a recovery phase. Production wells were pumped at the rate of 50 gpm (Section 25) and 8 gpm (Section 35).

The general observations, results and conclusions derived from the tests are as follows:

1.) Water levels in wells completed in shales showed no response to pumping of the confined sand bodies, except the 'N' shale (overlying) well in Section 35.

2) Specific storage values determined by laboratory analyses of core samples range from 1.2×10^{-6} ft^{-1} to 1.9×10^{-6} ft^{-1}.

3) Transmissivity and storage coefficient values for the 'O' (Section 25) and 'M' (Section 35) sand test sites are approximately 1160 gpd/ft and 5 X 10^{-4} and 100 gpd/ft and 7.5 X 10^{-5}, respectfully.

4) K' values determined by the ratio method at the Section 35 test site are 3 X 10^{-9} cm/sec (overlying shale) based on observed drawdown and less than 6.8 X 10^{-8} cm/sec (underlying shale) based on an assumed value of drawdown in the underlying shale well as no actual response to pumping was observed in this well.

5) K' values determined by the ratio method at the Section 25 test site are less than 1.7 X 10^{-9} cm/sec (overlying shale) and less than 1.3 X 10^{-8} cm/sec (underlying shale). These values were also derived by inputting assumed values of drawdown as no actual drawdown responses were observed in the shale wells.

6) Recharge boundary conditions are suggested by the responses in production zone observation wells.

7) The observed recharge boundary conditions are considered to result more from lateral variation of aquifer thickness, lateral discontinuity of confining shales or from lateral variation of permeability of the ore body rather than from leakance across the confining shales.

8) K' values derived by inputting the initial time of pumping response observed in overlying and underlying aquifer observation wells into the Witherspoon et.al. (1967) equation are 1 X 10^{-7} cm/sec (overlying shale) and 4.2 X 10^{-8} cm/sec (underlying shale) in Section 25. In Section 35, these values are 1 X 10^{-7} cm/sec (overlying shale) and 8.5 X 10^{-8} cm/sec (underlying shale).

9) Based on the overall response to the two aquifer tests and the various methods of data analysis, it is concluded that the shale layers provide effective barriers to the vertical migration of fluids in the area.

AQUIFER TEST ANALYSIS
IN SITU LEACH PROJECT
SEQUOYAH FUELS CORPORATION
SOUTH POWDER RIVER BASIN
CONVERSE COUNTY, WYOMING

INTRODUCTION

Sequoyah Fuels Corporation (SFC) owns and operates uranium mining operations in the South Powder River Basin of Converse County, Wyoming (Figure 1). Uranium ores at the Bill Smith Mine, in Section 36, T36N, R74W, were mined by underground methods in 1977 and 1978. The mine was then put on standby until mid 1982, at which time flooding of the mine was allowed to occur and alternative mining methods were pursued. SFC initiated an in situ-leach (ISL) pilot program in the 'O' sand member of the Fort Union Formation in 1983 as an alternative to deep shaft mining of 'O' sand ore bodies. In an effort to quantify ISL operational parameters, and to determine the potential for the vertical migration of leach fluids through shale layers which confine ore bodies in the 'O' sand, SFC conducted pumping tests in the 'O' sand member in 1983 (Figure 1). The results of these tests were submitted to the U. S. Nuclear Regulatory Commission (NRC) and the Wyoming Department of Environmental Quality (DEQ) in reports submitted in support of an amendment to NRC Source Material License SUA-1387, Docket 40-8768 and for a revision to Wyoming DEQ Land Quality Division Permit 304C. These reports are titled "Aquifer Pump Test, 'O' Sand In Situ Leach Project" and "Addendum to-Aquifer Pump Test, 'O' Sand In Situ Leach Project" and were submitted in September, 1983 and February, 1984, respectively.

Based on the pilot experience, SFC decided to proceed with licensing a commercial ISL project and SFC conducted two additional pump tests to further investigate the vertical hydraulic conductivity

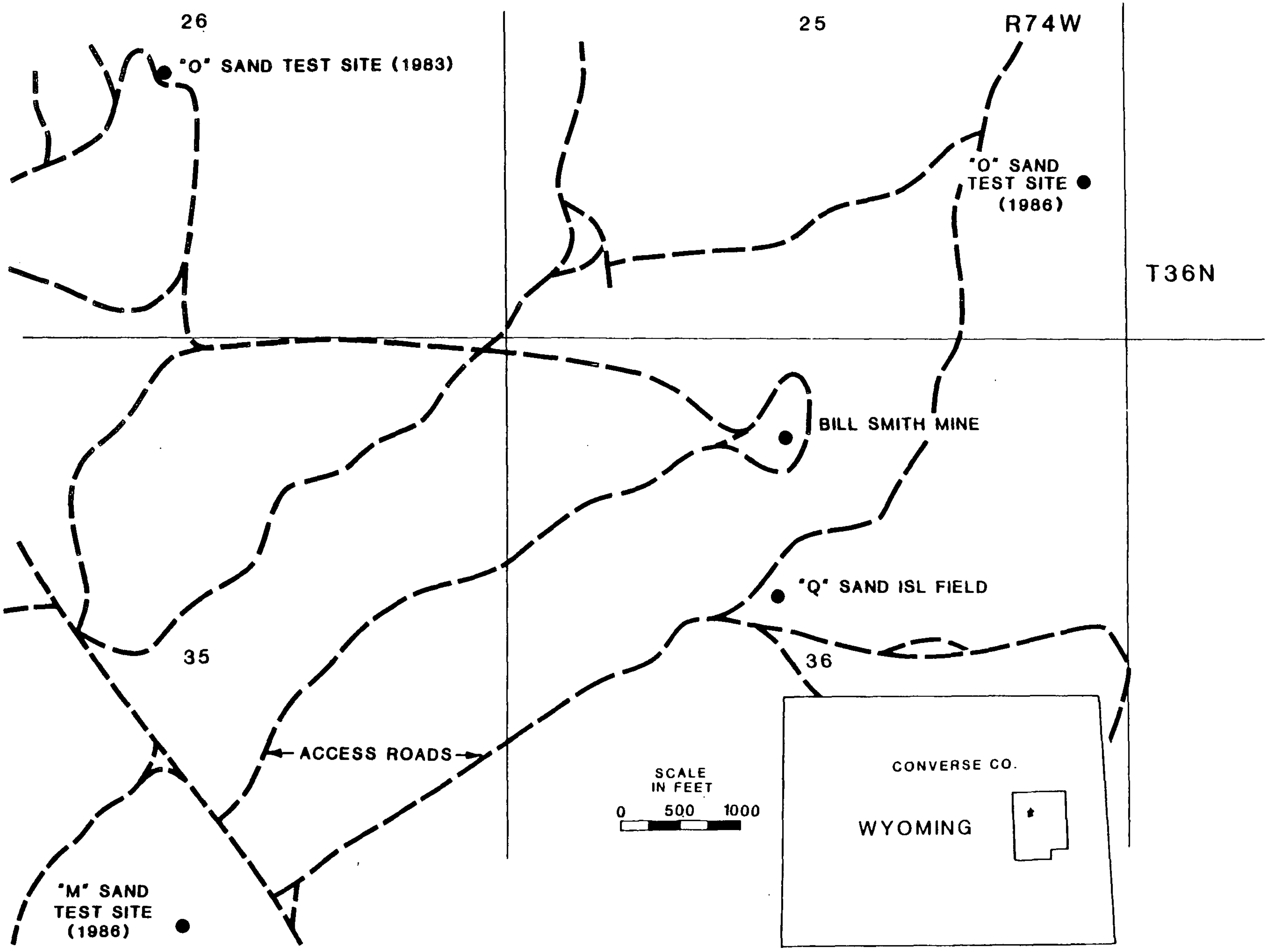


FIGURE 1

LOCATION OF "O" AND "M" SAND TEST SITES.

of confining shale layers by field test methods, specifically the ratio method developed by Neuman and Witherspoon (1969, 1969 and 1972). To determine the hydraulic properties of shales, or any confining medium, by the ratio method, the specific storage of the medium must also be quantified as input data for the ratio analysis. Therefore, the objectives of this additional investigation have been to: 1) determine the specific storage (S_s) for overlying and underlying shale layers which confine ore bodies in intervening sand layers, and 2) determine the vertical hydraulic conductivity (K') for these shale layers.

This report details the results of these investigations which quantify the shale layer properties of specific storage and vertical hydraulic conductivity of the two additional sites in the Fort Union section. The areas selected as test locations are referenced as Section 25 and Section 35 (Figure 1).

AQUIFER TESTS PROCEDURES

Pumping tests were conducted at two locations for the purpose of defining the vertical hydraulic conductivity, K', of shale layers which bound ore bodies in the Fort Union Formation. These locations are referenced as Section 25 and Section 35 (Figure 1). A lower 'O' sand member and confining shale beds were monitored during the pumping tests in Section 25 (Figure 2). In Section 35, the 'M' sand member and confining shale beds comprised the subject test zone (Figure 3).

Well Field Test Patterns

In both test locations, wells were installed and completed across the test interval to isolate formation pressures and respondent water levels in, ascending order: 1) the underlying sand aquifer, 2) the underlying confining shale, 3) the production

FIGURE 2: CROSS SECTION OF "O" SAND TEST PATTERN, SECTION 25

(HORIZONTAL NOT TO SCALE)

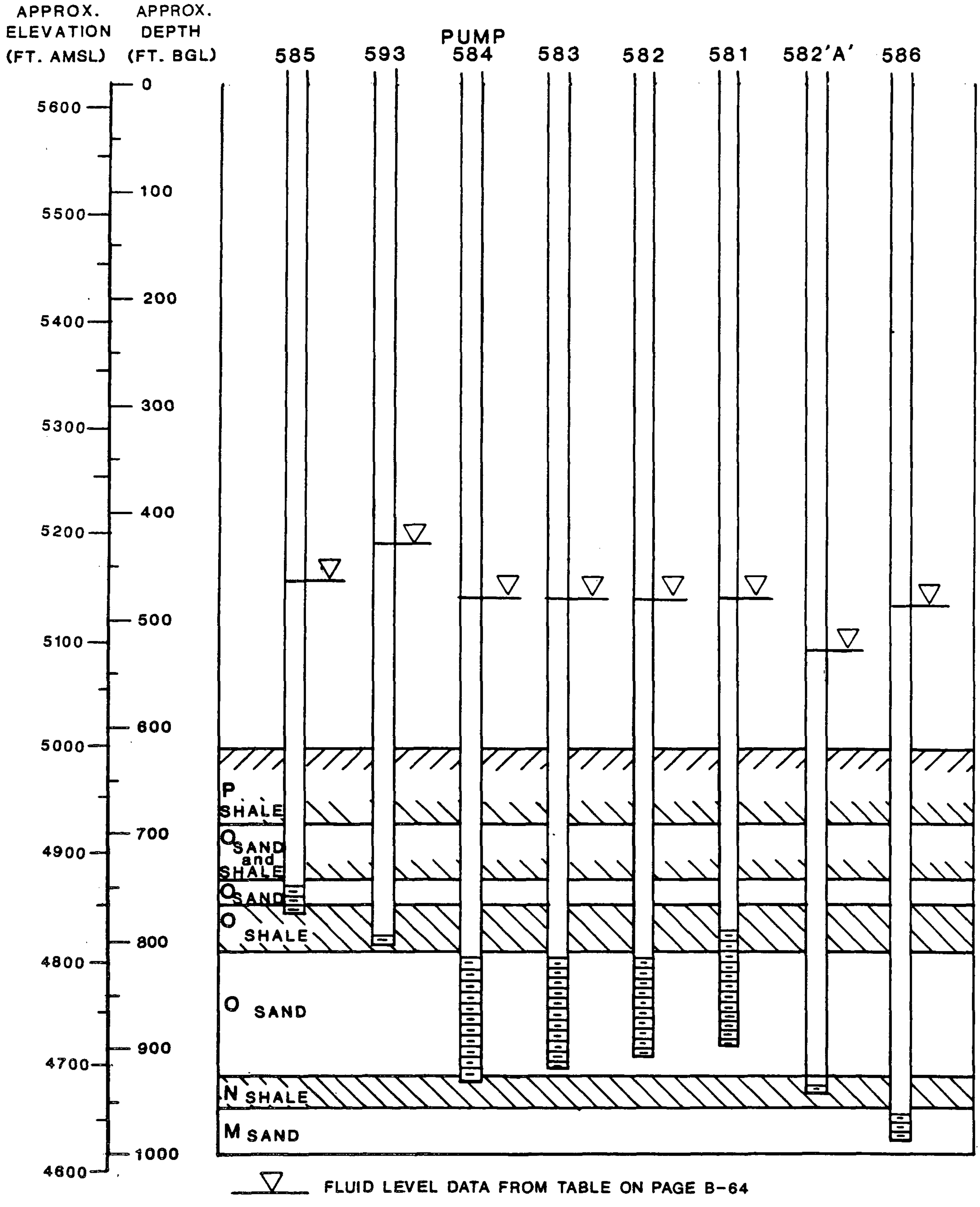
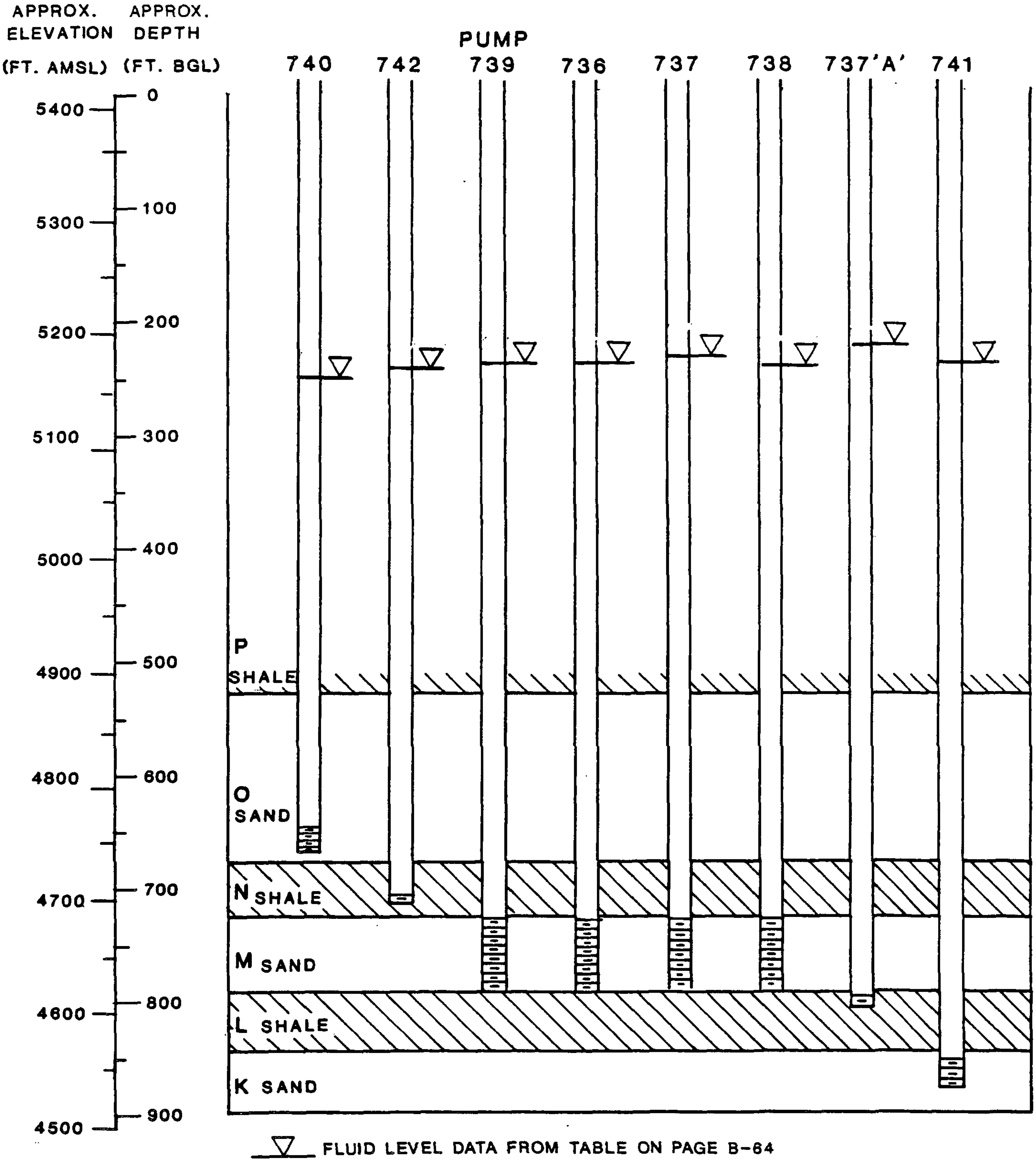


FIGURE 3: CROSS SECTION OF "M" SAND TEST PATTERN, SECTION 35

(HORIZONTAL NOT TO SCALE)



▽ FLUID LEVEL DATA FROM TABLE ON PAGE B-64 sand, or ore body, 4) the overlying confining shale, and 5) the overlying sand aquifer. Three production zone observation wells were installed along a 180^{0} arc at approximately equidistant locations from the production wells. Underlying and overlying shale observation wells were installed at distances from the production well equal to the production zone observation wells, as required by the ratio method (Neuman and Witherspoon, 1972). Underlying and overlying aquifer observation wells were installed at variable distances from the production wells.

Section 25 - The 'O' sand test in Section 25 was accomplished by pumping well 25-584 (Figure 4). Well 25-581, 25-582, and 25-583 comprise the production zone observation wells network and wells 25-582'A' and 25-593 monitor the underlying and overlying confining shale layers, respectively. Well 25-586 and 25-585 were installed to monitor the underlying and overlying sand aquifers, respectively. Figure 2 illustrates the general geologic cross-section and vertical pattern of wells installed across the test interval in the Section 25 'O' sand test.

Section 35 - The 'M' sand test in Section 35 was accomplished by pumping well 35-739 (Figure 5). Well 35-736, 35-737, and 35-738 comprise the production zone observation wells network and wells 35-737'A' and 35-742 monitor the underlying and overlying confining shale layers, respectively. Wells 35-741 and 35-740 were installed to monitor the underlying and overlying sand aquifers, respectively. Figure 3 illustrates the general geologic cross-section and vertical pattern of wells installed across the test interval in the Section 35 'M' sand test.

Procedures For Pumping Tests

In both test locations, an electric submersible pump was set near the bottom of casing in the respective production wells

FIGURE 4: MAP VIEW OF '0' SAND TEST PATTERN, SECTION 25

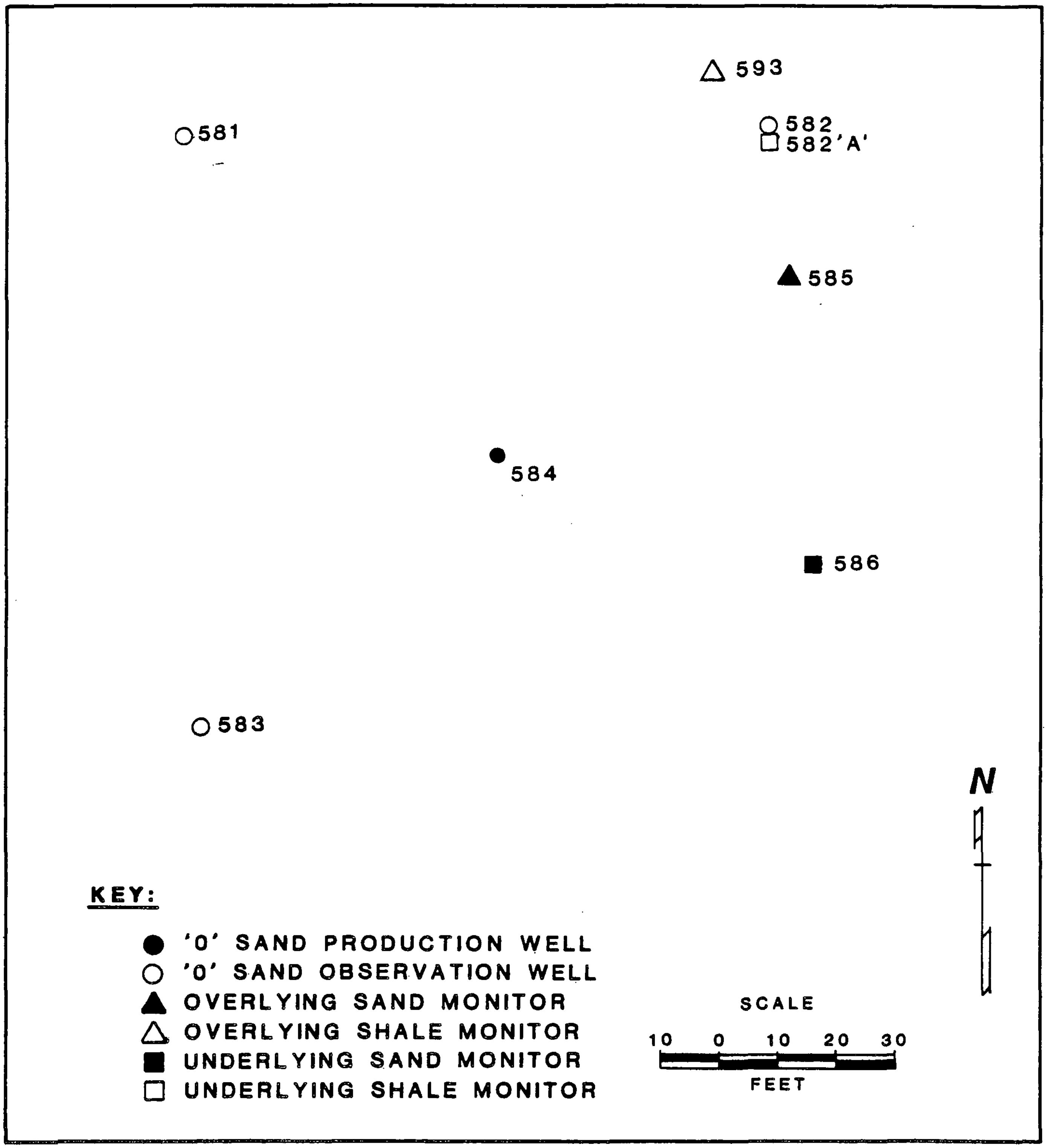
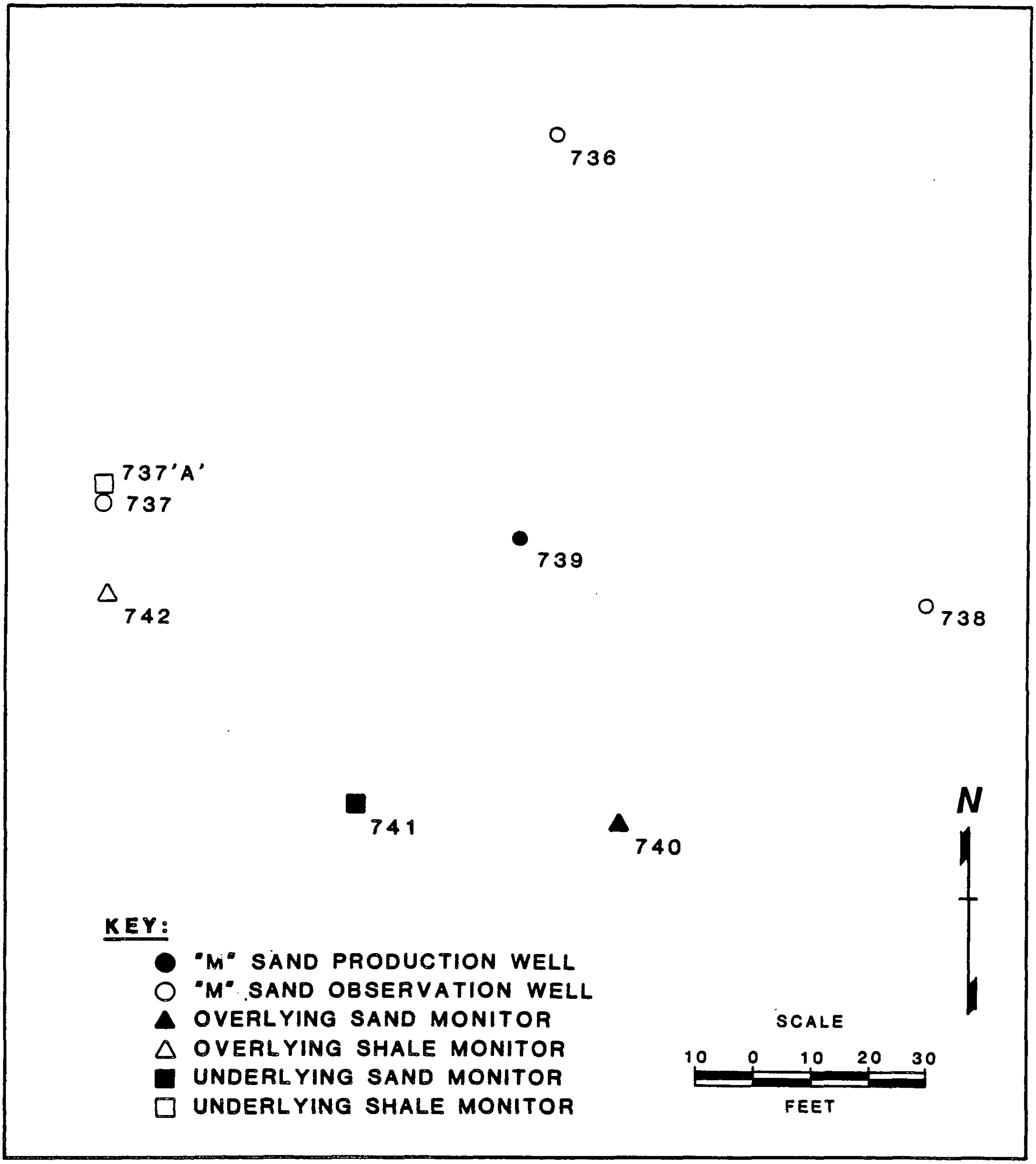


FIGURE 5 : MAP VIEW OF 'M' SAND TEST PATTERN, SECTION 35



to facilitate pumping of the production zone. Power was supplied by a portable generator. The discharge piping included a ball valve located approximately 25 feet from the well head. A Halliburton turbine flow meter, equipped with a digital instantaneous flow indicator and volume totalizer, was installed approximately 5 feet upstream from the ball valve.

Water levels in the various layers comprising the test section were monitored before, during, and after test pumping using In-Situ, Inc. transducer units (0.1% accuracy). Insitu SE 1000B Data Loggers were used to collect, store, and reproduce the test data. Background water levels were recorded at periodic, linear time increments. Pumping and recovery water level data were recorded at logarithmic time increments. The water level data were "dumped" to and printed out on an Insitu SE 1004B Printer.

Prior to beginning the pumping tests at each test location, the production wells were pumped for a duration long enough to determine the specific capacity of each well from which the pumping test volumes could be determined. Following this phase of the tests, wells were allowed to recover prior to beginning the actual pumping tests.

Previous '0' sand pumping test experience had shown that manual measurement of water levels with electric tapes had introduced data "scatter" and other undesirable elements to the data base. This was due to the use of different tapes by different people, tape stretch and the depths of water levels. Therefore, for the purpose of more accurate water level and time measurement during the pumping tests, SFC opted for the use of pressure transducers and data loggers over manual methods. Because each test site consists of eight wells to monitor and only five pressure transducers were available, SFC divided each pumping test into segments so that the key data from each segment of the test could be monitored by a pressure transducer. This resulted in a phased test approach where successive phases of pumping were conducted in identical fashion, i.e. same pumping volume and duration. A minimum of three days recovery between each phase of pumping was allowed before the next phase of pumping began. In this manner, the pressure transducers were rotated between wells so that the most important data of the test section was monitored by transducer during nearly identical successive phases of pumping in the production layer. The reproducibility of the response to pumping in various test layers was also confirmed in this manner. The resultant data base has been composited to represent the vertical and lateral hydraulic responses as if it were a single event of pumping in the production zone; however, Appendix B of this report includes the test data by segment.

All phased pumping tests were run for approximately 72 hours. Pumping volumes were 50 gpm in Section 25 tests and 8 gpm in Section 35 tests. Generator malfunctions and identified casing/annulus leaks in shale wells resulted in repeating some phases ~~of~~ pumping tests after correcting equipment problems and/or redrilling the shale wells.

Data Analyses

Data obtained during the tests were analyzed by several standard methods. Prior to beginning the data analyses, the water levels for background, pumping and recovery water levels for each well were plotted. These graphs represent time versus relative water level fluctuation rather than time versus water level elevation as this was the form in which the data was recorded. The modified hydrographs were used to evaluate background trends with respect to drawdown corrections as applicable to respective wells.

The production wells were fully penetrating and the observation wells, even though partially penetrating, were at sufficient distances from the production wells so that partial penetration corrections were not necessary. Drawdowns in the observation wells were evaluated without correction for background trends due to the magnitude of observed drawdowns compared to relatively insignificant changes in background water levels.

Drawdown in production zone observation wells was plotted versus pumping time on log-log and semi-log scales. Transmissivity, T, and storage coefficient, S, were calculated using early time data which were applied to Theis (1935) curve matching and Jacob (1950) straight line methods. The resultant values of T and S values calculated by the two methods were averaged for respective wells. The averaged T and S values were applied to the ratio method (Neuman and Witherspoon, 1972) along with observed and assumed responses in shale observation wells and calculated S_s values to evaluate the vertical hydraulic conductivity, K', of shale layers.

SPECIFIC STORAGE CALCULATION

Ideally, specific storage would be determined by pumping tests conducted in the shale confining layers. However, owing to their low permeability, it is considered impractical to conduct meaningful pumping tests in the shales. As an alternative, one can determine each of the individual physical characteristics comprising specific storage and make the determination by calculation. The following discussion presents the theory behind the calculation, describes an alternative laboratory method, and reports the measured results.

Theory

Storage coefficient, S, of a saturated formation is defined as the volume of water that a unit volume of the formation releases from storage under a unit decline in hydraulic head.

Specific storage, S_s, is the amount of water per unit volume of saturated formation that is stored or released from storage due to the compressibility of the mineral skeleton and the pore water. Storage coefficient is related to specific storage by the formation thickness, b, by: $S = bS_s$. Lowering the water level in a well decreases the aquifer fluid pressure, p, and increases the effective stress, σ_e, which is borne by the formation solid skeleton. Each of these related changes results in release of water from storage. Therefore, S_s is a function of the compressibility of water, α , and the compressibility of the aquifer skeleton, β , and the porosity of the formation. Specific storage is defined by the expression:

$$S_s = \rho g(\alpha + n\beta) \quad (L^{-1})$$

Where:

ρg is density of water (F/L^3)

n is porosity of the aquifer (unitless fraction)

α is compressibility of the aquifer (L^2/F)

β is compressibility of water (L^2/F)

Pumping tests typically are preferred for determining specific storage, but are considered impractical in low permeability formations such as the shales of the Fort Union Formation. An alternative approach is to determine formation porosity and compressibility in the specific storage equation and calculate S_s.

The compressibility and density of water cover a relatively small range of values under the conditions normally found in aquifers. Thus, assumed values can be used for ρg and β, leaving only α and η as unknowns. Porosity is a relatively insensitive parameter in the determination due to its narrow range of variation as compared to the aquifer compressibility. Therefore, the greatest effort should be expended in estimating.

The usual techniques for determining α utilizes a consolidometer, a device in which the material is loaded uniaxially in a laterally confined chamber (Jorgensen, 1980). Measurements of sample compression at various loads plot as a stress-strain curve. The inverse of the slope tangent at the in situ stress level is the compressibility of the aquifer skeleton, α . There are, however, several reasons why consolidation tests may be unsuitable for rock materials. Firstly, in many cases, the stress levels required to simulate in situ conditions cannot be attained with standard soil consolidometers. Secondly, the material sample must be trimmed to completely fill the consolidometer chamber. The additional sample consolidation caused by a failure to completely fill the chamber is interpreted as actual vertical compression. This would bias the compressibility toward a higher value. Normally, this effect is acceptably low for higher compressible materials such as soil, but may represent a major error by percentage in less compressible rock samples. Thirdly, consolidation tests are performed on saturated samples which may exhibit substantial swell prior to reloading. The initial sample expansion causes increased compressibility during sample reload.

For these reasons, an alternative to consolidometer testing was followed. The core samples were subjected to unconfined compressive tests in which axial and lateral strains were recorded. While the test conditions do not directly simulate field conditions, sufficient data can be collected to translate the test conditions to the field situation.

As previously mentioned, α is the reciprocal of the tangent slope of the consolidometer stress-strain curve. The tangent slope or modulus is referred to as the constrained modulus, D, due to the confined or constrained test conditions. Thus, $\alpha = 1/D$. Geomechanical studies have shown that the moduli for varying test conditions are related by Poisson's ratio, μ the ratio of strain in the lateral directions to the strain in the axial (vertical) direction. The relationship between the constrained modulus and Young's modulus of elasticity, E, is as follows (Lambe and Whitman, 1969):

$$D = \frac{E\,(1 - \mu)}{(1 + \mu)\ (1 - 2\,\mu)}$$

Young's modulus, E, is determined in unconfined uniaxial loading. Thus, an unconfined uniaxial compressive test, with measurement of vertical and horizontal strain to determine Poisson's ratio, μ, gives sufficient information to calculate D and therefore, the aquifer compressibility, as follows:

$$\alpha = \frac{1}{D}$$

$$\alpha = \frac{(1 + \mu)\ (1 - 2\,\mu)}{E\,(1 - \mu)}$$

Since the remaining parameters in the specific storage equation are known or can be easily measured in the laboratory, the specific storage can be determined without the attendant problems associated with consolidometer tests.

Laboratory Testing

The laboratory testing performed by Dr. Charles J. Haas & Associates at the Rock Mechanics and Explosives Research Center of the University of Missouri-Rolla are presented in Appendix A. Four core samples of two-foot length were received but only two samples of sufficient length for strength testing remained intact.

For each of the four samples received, the porosity was measured on three sub-samples with a helium porosimeter. The measured values and related parameters are presented in Tables A-2 and A-3. The porosity ranges between 14% and 23%, with an average for all twelve tests of 18.6%. The dry density averages 2.18 g/cm^3 (136 lbs/ft.^{3}).

The compression tests were performed on samples LM-35-743 (depth 810 feet) and NM-35-742 (depth 718 feet). Plots of the stress-strain data are presented in Appendix A of Dr. Haas's report. Note that a scale change and change of plotter paper were required when the plotter pens pegged out.

Calculation

The aquifer compressibility, as previously mentioned, can be calculated from Poisson's ratio and the Young's modulus. These two parameters are derived from the stress-strain curve at the effective stress level encountered in the aquifer. The in situ effective stress conditions may be estimated knowing the weight of the overlying material and the height of water column present in wells penetrating the shale unit, as shown:

$$\sigma_e = \sigma_t - p$$

where: σ_t is total stress (geostatic)

p is pore pressure, where

$$p = (1.03 \text{ psi/ft}) (d) - (0.433 \text{ psi/ft.}) (d - \text{w.l.})$$

where: d is sample depth (ft.)

w.l. is depth to water (ft.)

The table below shows the input data to compute effective stress for the two samples.

Sample #	Sample Depth (ft.)	Water Level Depth* (ft.)	Geostatic Stress (psi)	Vertical Effective Stress (psi)
NM-35-742	718	245	740	535
LM-35-743	810	240	835	588

* Measured 11/25/85

The results indicate that the stress-strain tangent slopes should be taken at 535 psi for sample NM-35-742 and at 588 psi for LM-35-743.

The stress-strain curves from Dr. Haas's report are replotted at a consistent scale on Figure 6 and Figure 7. Note also that tangent slopes have been fitted to the curves at their appropriate in situ stress levels. The resulting Young's Modulus, E, and Poisson's ratio, μ, are tabulated below:

NM-35-742 (Depth 718 feet)

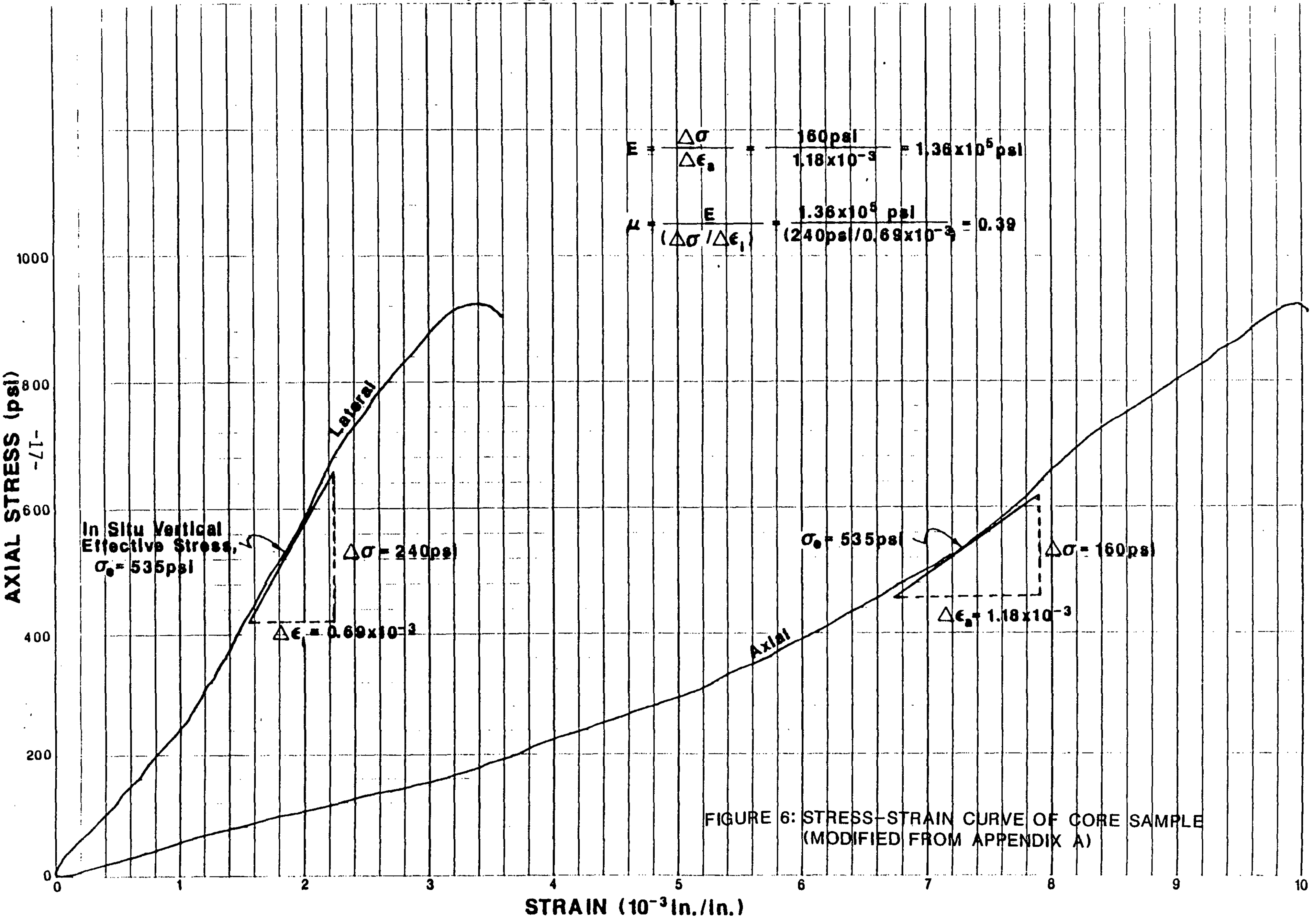
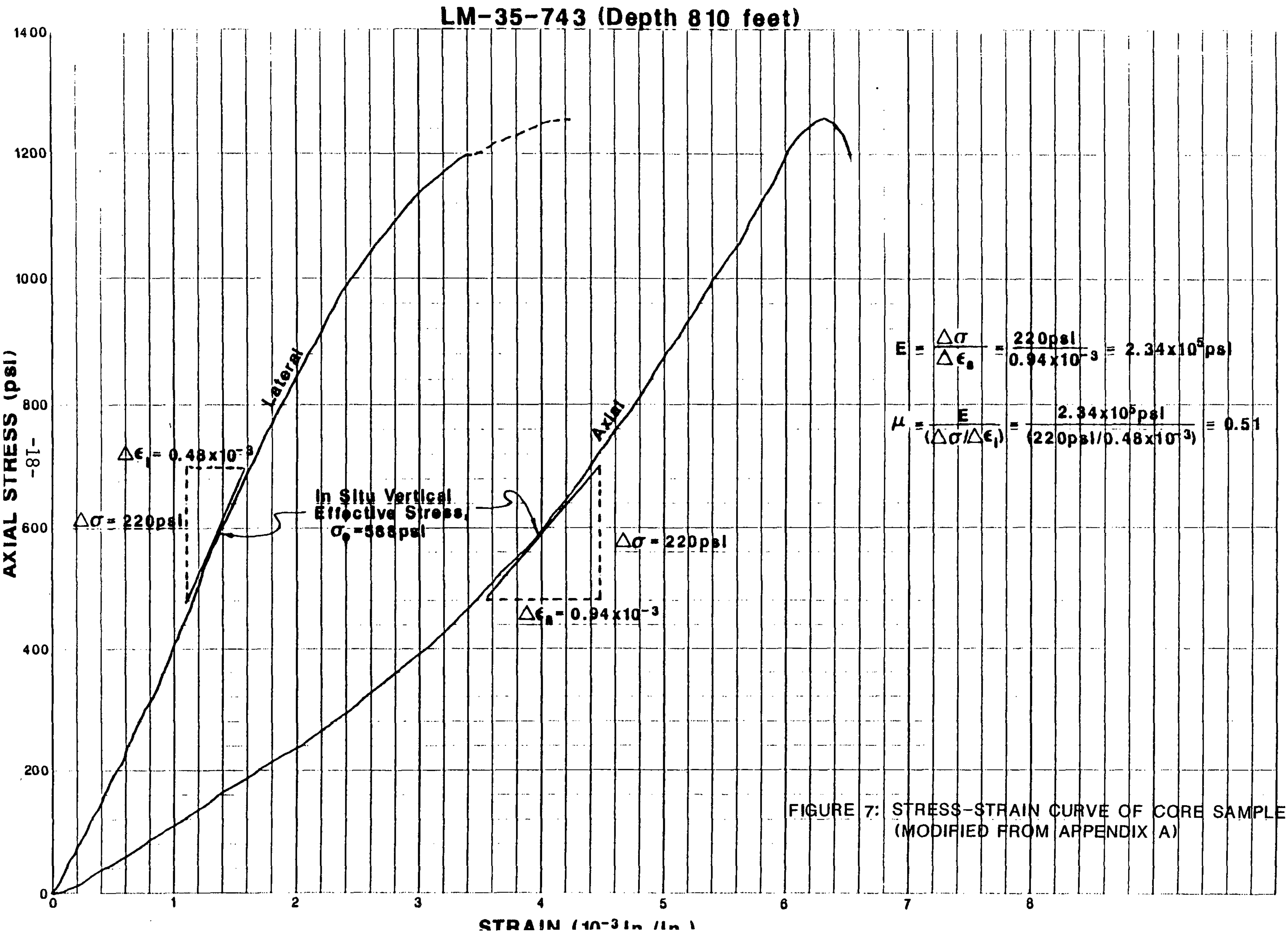


FIGURE 6: STRESS-STRAIN CURVE OF CORE SAMPLE (MODIFIED FROM APPENDIX A)



$$E = \frac{\Delta\sigma}{\Delta\epsilon_a} = \frac{220\text{psi}}{0.94\times10^{-3}} = 2.34\times10^5\text{psi}$$

$$\mu = \frac{E}{(\Delta\sigma/\Delta\epsilon_l)} = \frac{2.34\times10^5\text{psi}}{(220\text{psi}/0.48\times10^{-3})} = 0.51$$

FIGURE 7: STRESS-STRAIN CURVE OF CORE SAMPLE (MODIFIED FROM APPENDIX A)

Sample #	Sample Depth (ft.)	Young's Modulus, E (psi)	Poisson's Ratio, μ
NM-35-742	718	1.26×10^5	0.39
LM-35-743	810	2.34×10^5	0.51

The values agree with expected ranges except for Poisson's ratio, $\mu = 0.51$ in sample LM-35-743. The value lies beyond the theoretical range of 0 to 0.5 for elastic materials. Most likely, the value is higher due to the vertical splitting failure mode as reported by Dr. Haas. That type of failure causes excessive horizontal strains due to vertical fracture openings. As a result, the underlying assumption of elastic deformation for Poisson's ration does not apply. The other sample shows $\mu = 0.39$ a reasonable value for shale materials.

As discussed previously, compressibility is calculated by the equation:

$$\alpha = \frac{(1 + \mu)(1 - 2\mu)}{E(1 - \mu)}$$

where: α is formation compressibility
E is Young's Modulus
μ is Poisson's ratio

For the tested samples, one can use $\mu = 0.39$ as a reasonable value. After inserting that value, the previous formula becomes:

$$\alpha = \frac{(1 + 0.39)(1 - 2 \times 0.39)}{E(1 - 0.39)}$$

$$\alpha = \frac{(0.50)}{E}$$

Specific storage, S_s, is calculated by the following equation using data as noted:

$$S_s = pg \ (\alpha + nB \ )$$

where: pg is density of water, 62.4 lbs/ft^3

n is porosity = 0.19

β is water compressibility, 3.3 X 10^{-6} psi

The following table summarizes the data input and concludes with calculation of specific storage for the two samples:

Sample #	Sample Depth (ft.)	Young's Modulus, E (psi)	Poisson's Ratio, μ	Shale Compressibility α, (in^2/lb.)	Specific Storage (ft.$^{-1}$)
NM-35-742	718	1.36 X 10^5	0.39	3.7 X 10^{-6}	1.9 X 10^{-6}
LM-35-743	810	2.34 X 10^5	0.39*	2.1 X 10^{-6}	1.2 X 10^{-6}

* assumed from other sample result

The resulting specific storage values of 1.9 X 10^{-6} feet $^{-1}$ and 1.2 X 10^{-6} feet $^{-1}$ compare favorably with the rule-of-thumb value 1 X 10^{-6} feet $^{-1}$ presented by Lohman (1972).

AQUIFER TESTS RESULTS

As mentioned previously, the phased pumping tests in Sections 25 and 35 are presented as if responses to pumping in each segment of the test were a single aquifer discharge event. The responses to pumping of production layers have been evaluated to calculate the aquifer parameters of transmissivity, T, and storage coefficient, S. Using aquifer T and S values, the laboratory calculation of specific storage, S'_s, and the pumping responses in the shale layers, the vertical hydraulic conductivity, K', of the shale layers, or aquitards, have been calculated using the aforementioned parameters as input data to the ratio method (Neuman and Witherspoon, 1972). Pumping responses in overlying and underlying sands have also been applied to the K' calculation by application of an alternative equation (Witherspoon et. al., 1967). All water level data used for evaluation of hydraulic properties of the various test layers are contained in Appendix B.

Section 25

Figures 8 through 13 illustrate, as modified hydrographs, the tests responses in wells completed across the Section 25 lower 'O' sand test interval. Figures 8 through 11 illustrate the responses in the production layer pumping well (25-584) and production zone observation wells (25-581, 25-582, and 25-583), respectively. When compared to the magnitude of drawdown, the background water level trends are seen to be relatively stable and no drawdown correction for background trends was introduced in subsequent data analyses. Figure 12 illustrates the responses in the overlying and underlying sand observation wells, 25-585 and 25-586, respectively. The general trend of water level response in both wells, when considering the magnitude of water level changes and the accuracy of the monitoring equipment, appears to represent a slow rise of the potentiometric surface until some time into the pumping phase where the water level rise appears to stabilize in both wells. In wells completed in the overlying and underlying

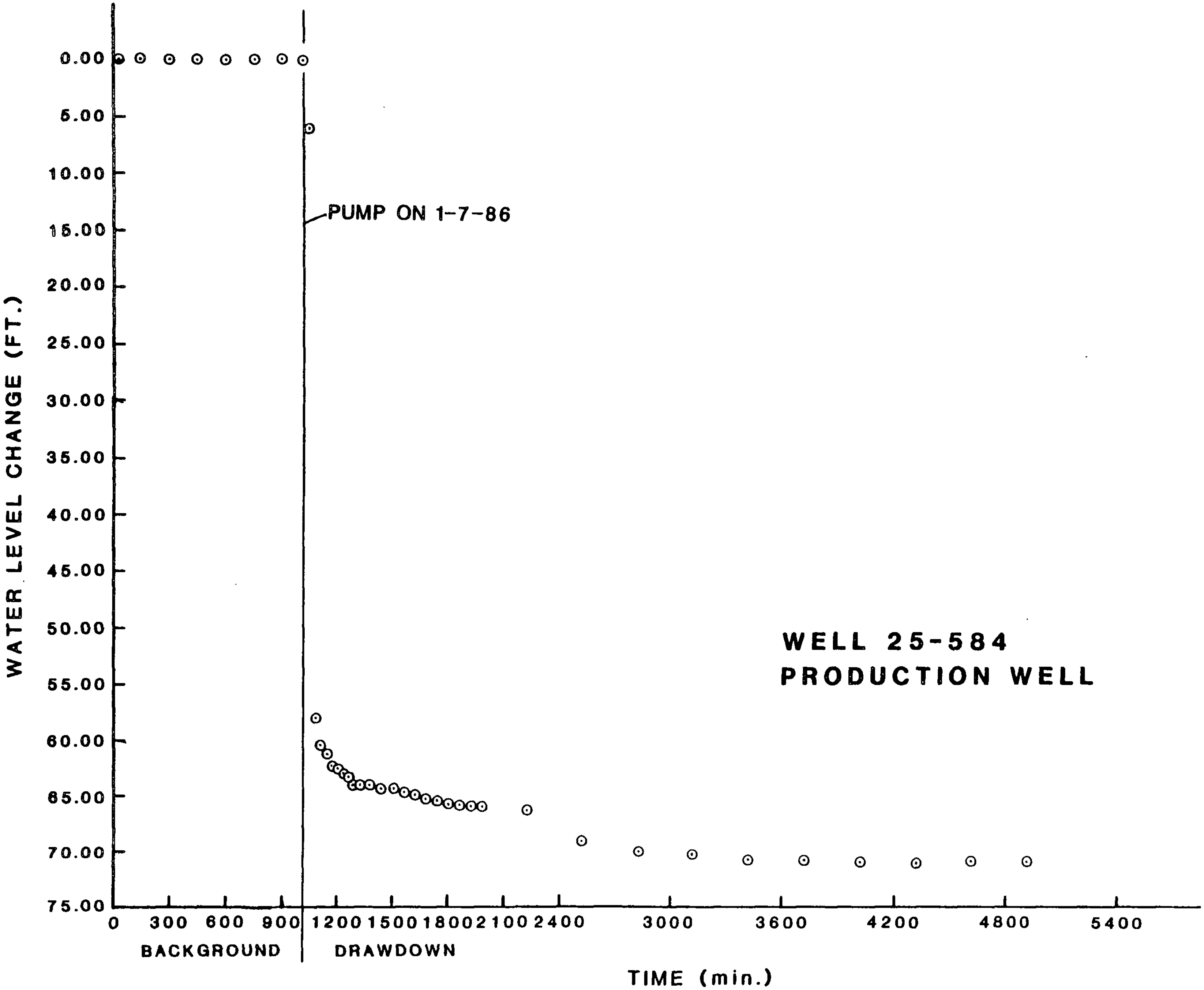


FIGURE 8: HYDROGRAPH OF WELL 25-584.

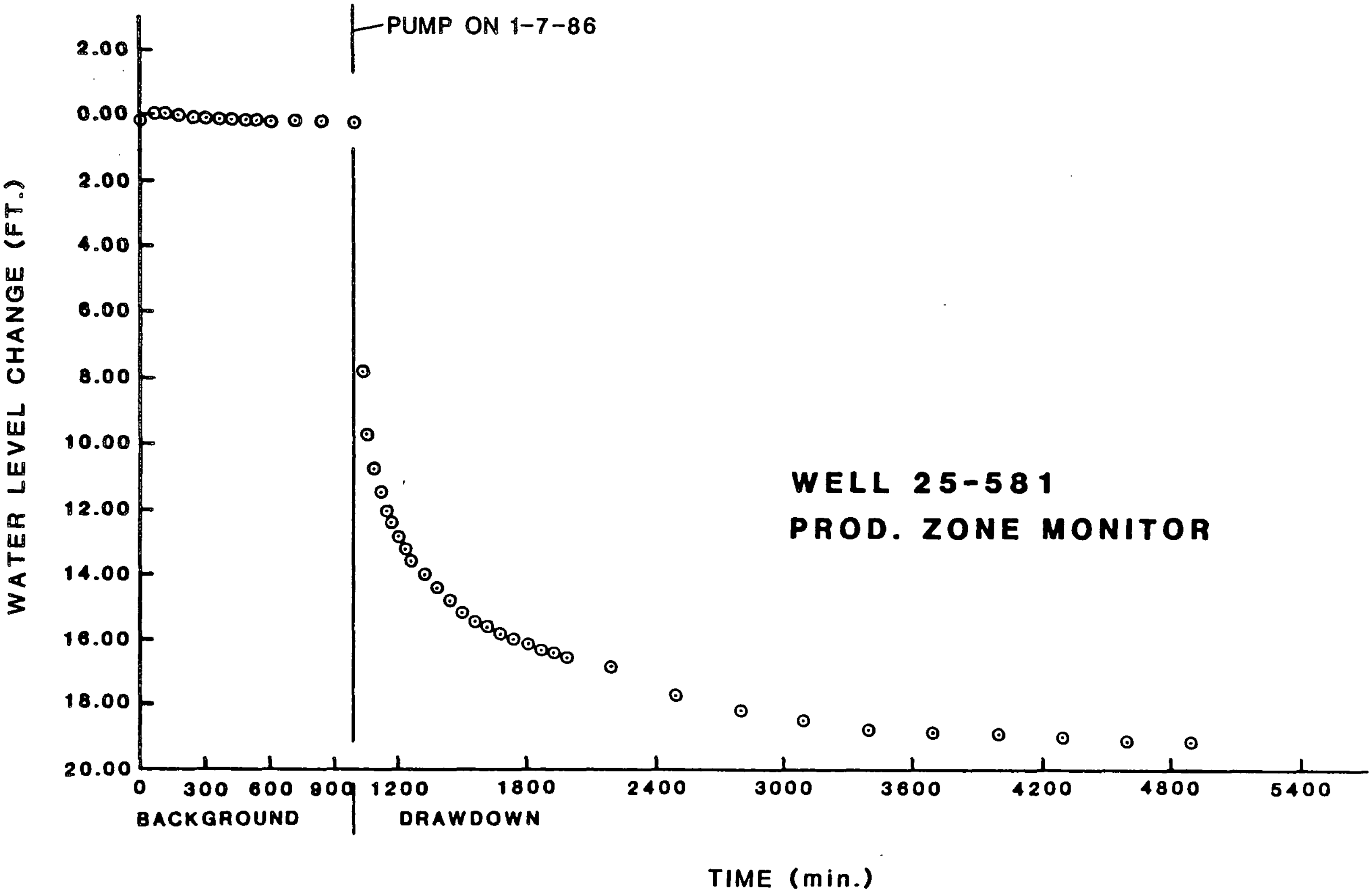


FIGURE 9: HYDROGRAPH OF WELL 25-581.

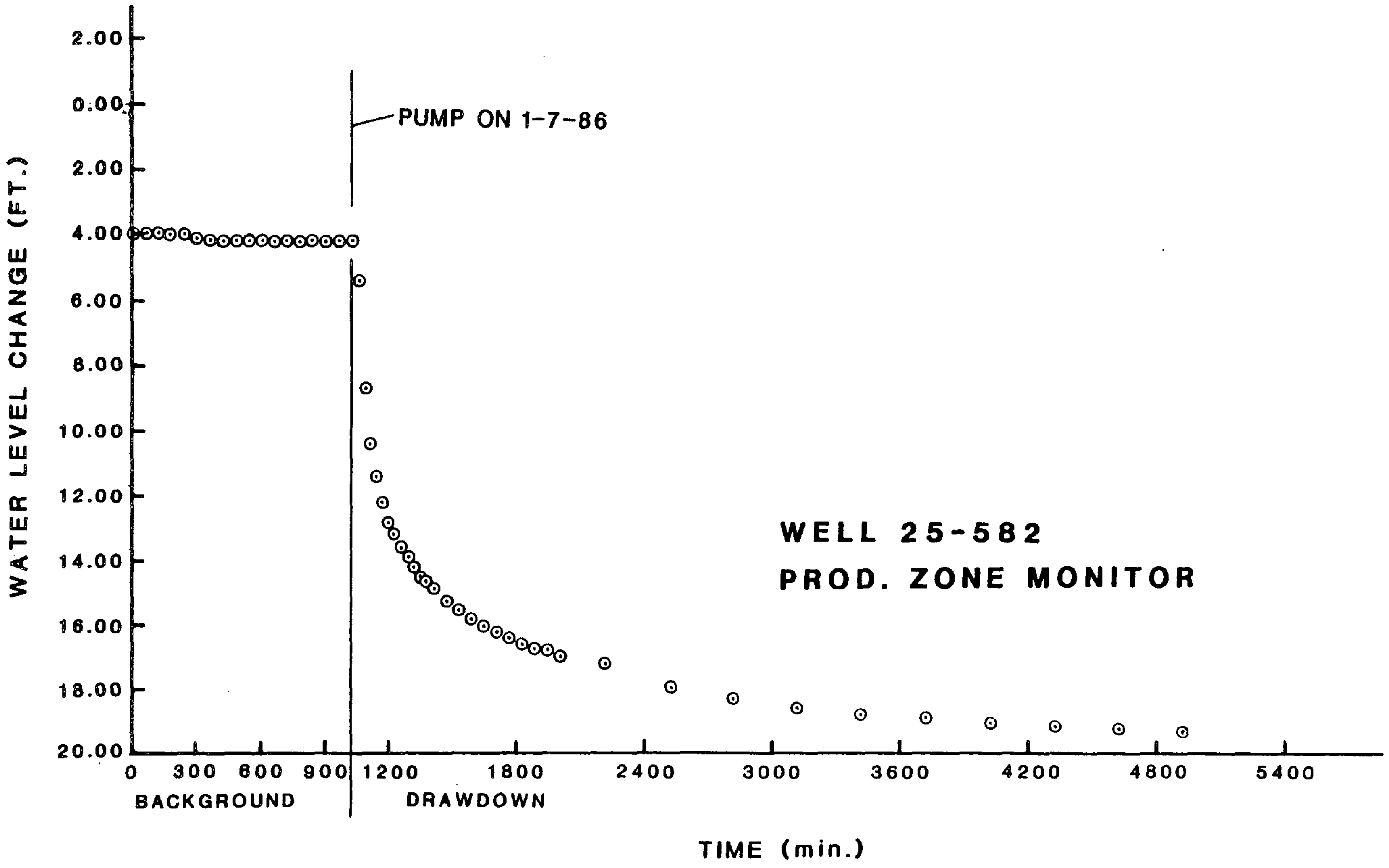


FIGURE 10: HYDROGRAPH OF WELL 25-582

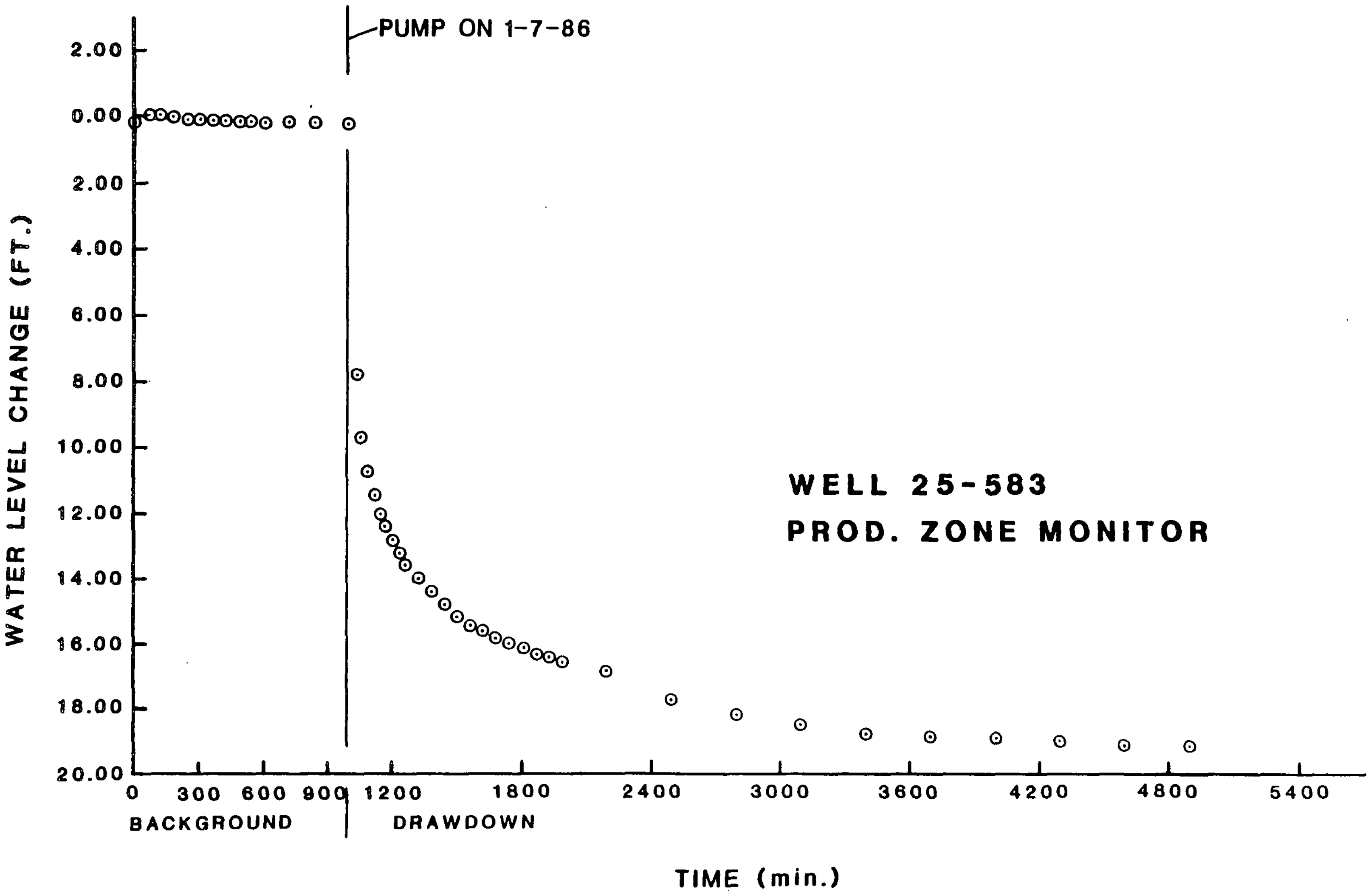


FIGURE 11: HYDROGRAPH OF WELL 25-583

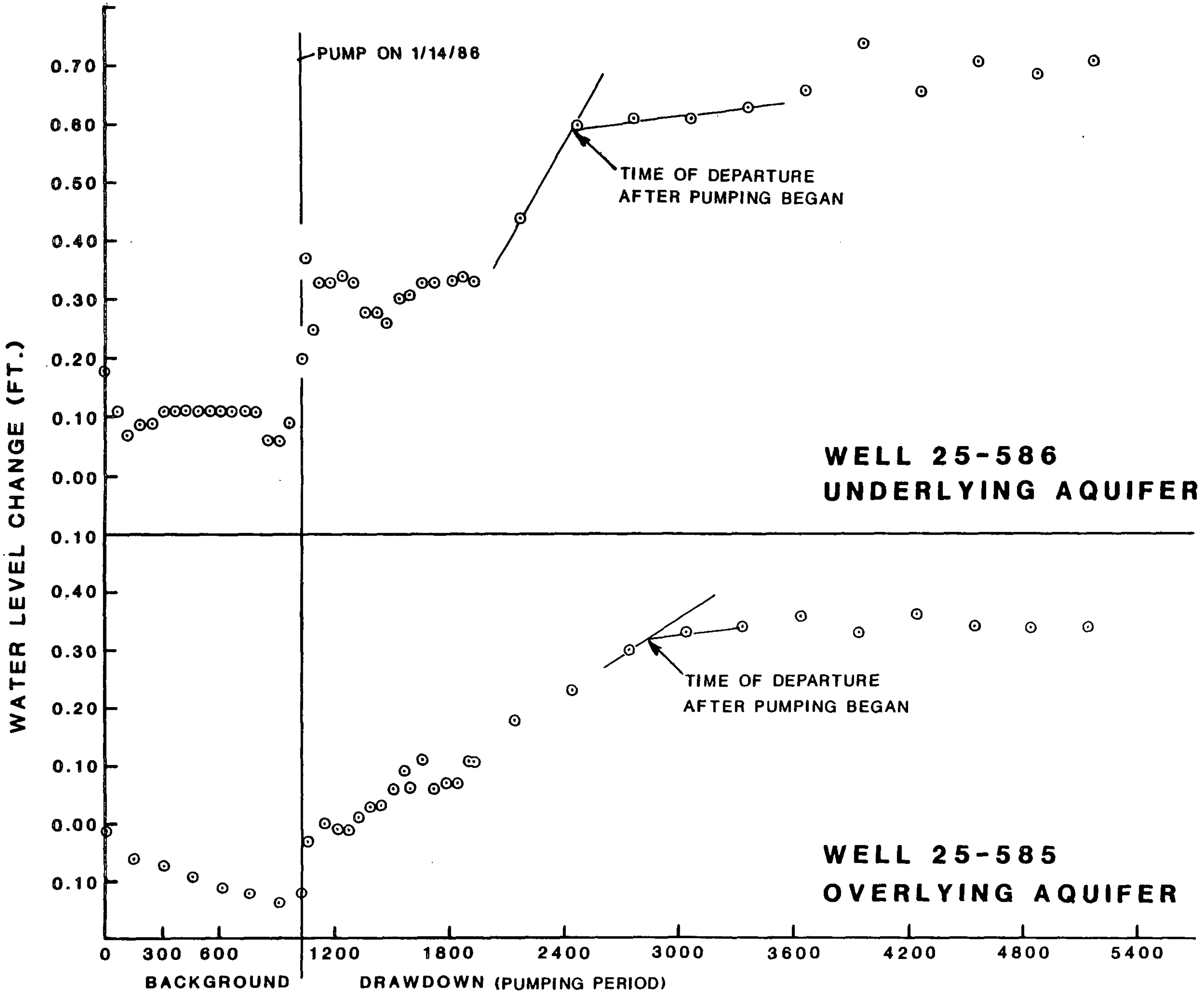


FIGURE 12: HYDROGRAPHS OF WELLS 25-585 AND 25-586.

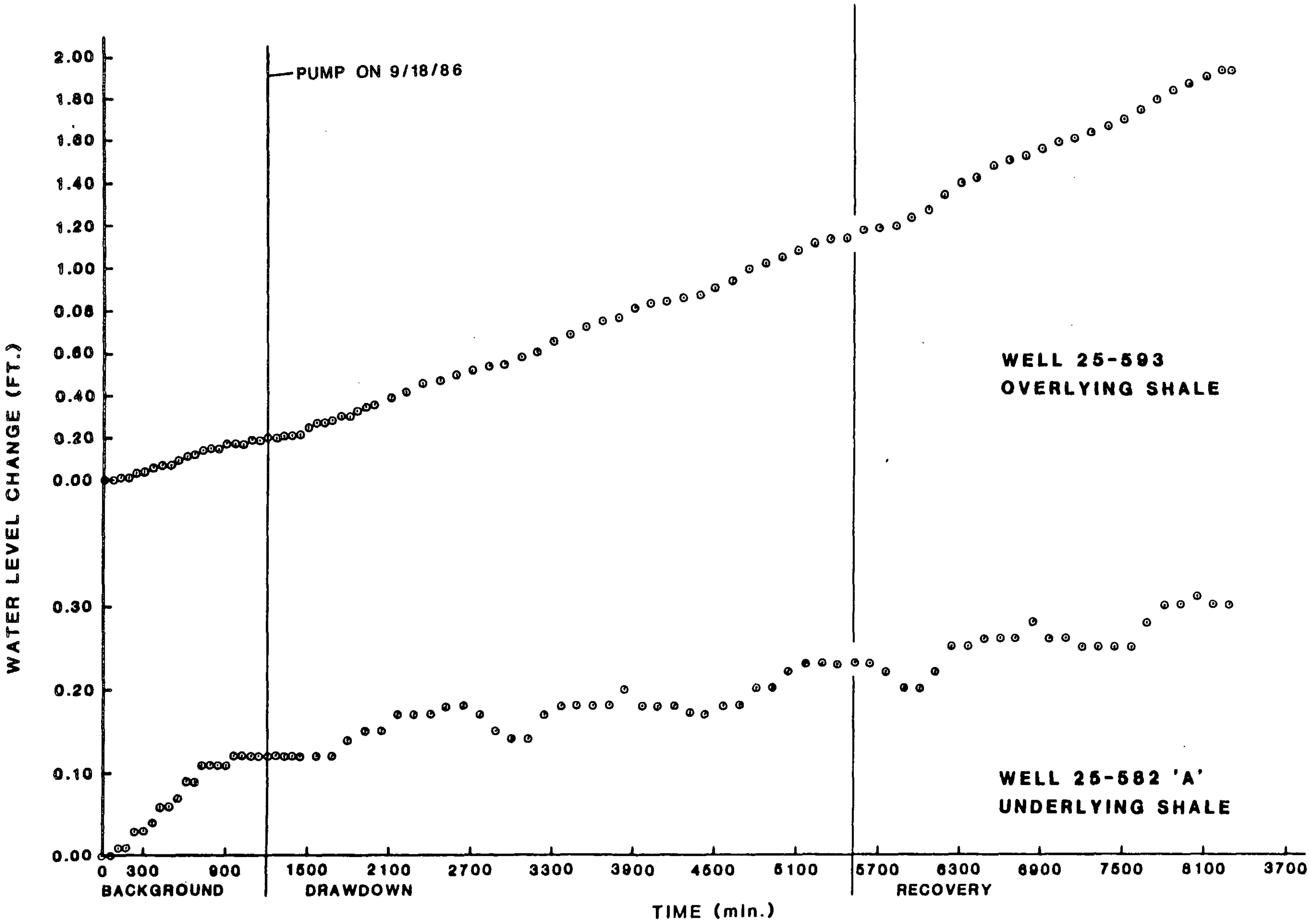


FIGURE 13: HYDROGRAPHS OF WELLS 25-582'A' AND 593.

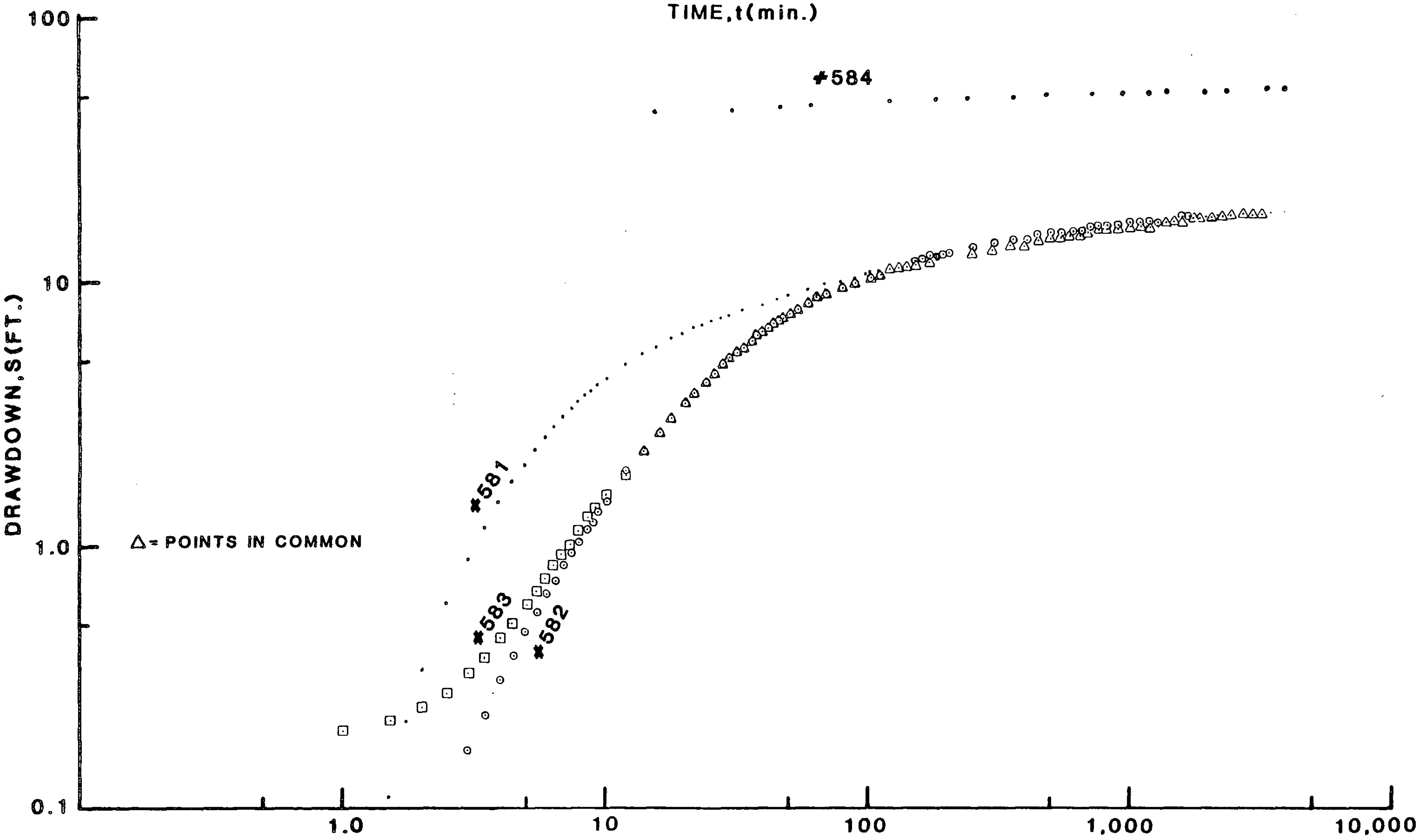
shales a rising trend in the potentiometric surface is evident, apparently unaffected by the pumping (Figure 13). This rise is believed to be related to the long-term recovery in the area associated with the cessation of dewatering in the nearby Bill Smith mine.

Aquifer/Aquitard Parameters - Drawdown versus time data for the lower 'O' sand production zone pumping and observation wells were plotted as log-log and semi-log plots. Figure 14 compares the drawdown response of these wells. At approximately t = 100 minutes, the magnitude of drawdown in the three observation wells becomes almost equal for the duration of pumping time.

Figures 15 through 20 illustrate the log-log and semi-log response of the production layer observation wells. The log-log plots were compared to a Theis (1935) type curve and early time data evaluated for calculation of T and S values. T and S values were also evaluated using early time data by the semi-log methods of Jacob (1950). All T and S calculations are included as Appendix C.

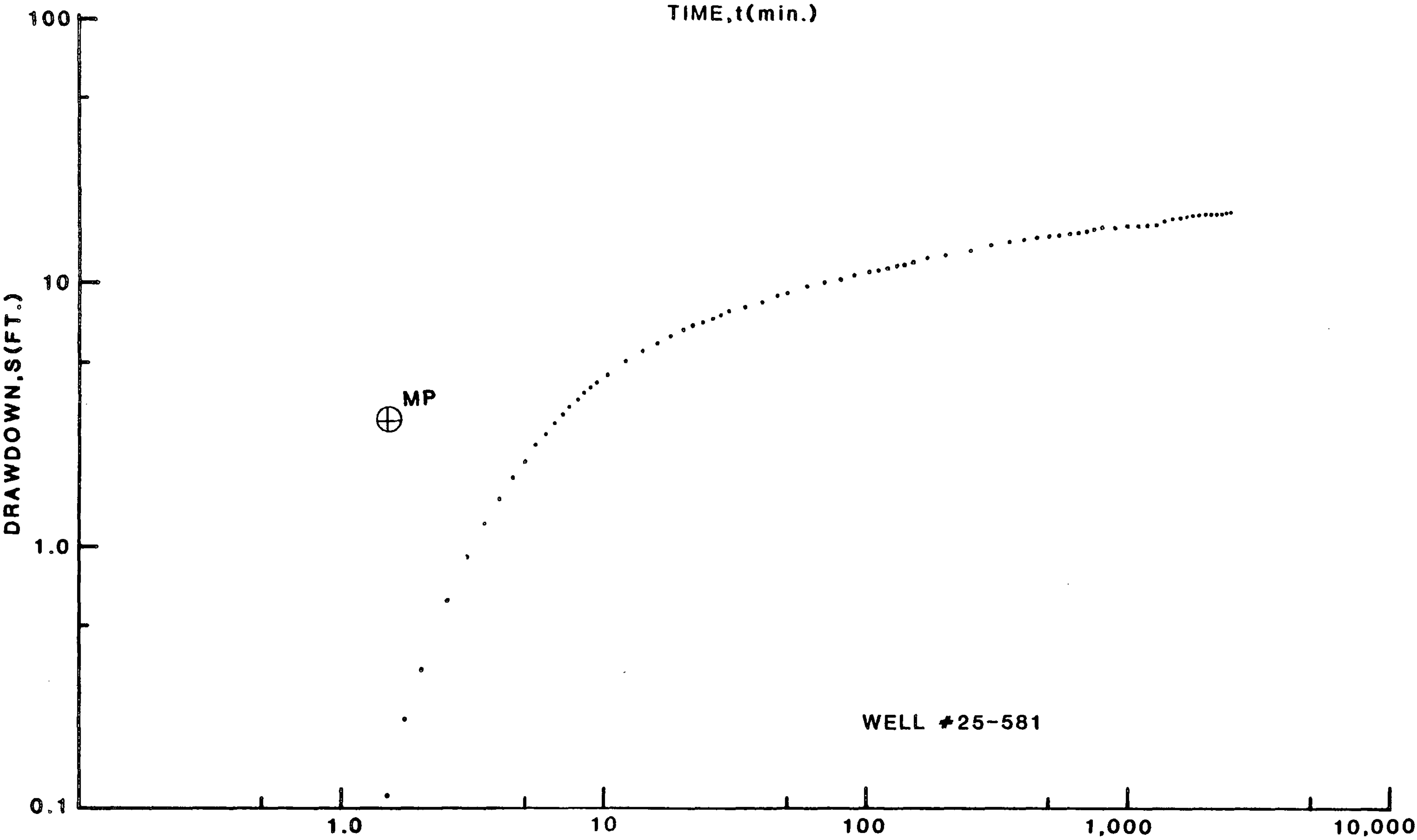
T values evaluated by the two methods range from 1025 to 2160 gpd/ft in the production layer. The averaged T value of well 25-582, which is used in the ratio analysis of K', is 1160 gpd/ft (155 ft^2/day). S values range from 1×10^{-4} to 6×10^{-4} and the value of S of well 25-582, used in the ratio analyses, is 5×10^{-4}.

As is readily apparent from the semi-log plots, and can be seen when the log-log plots are matched to the Theis type curve, a recharge boundary condition begins to influence the drawdowns at approximately t = 100 min. after pumping started. The boundary condition will be discussed in a subsequent section.



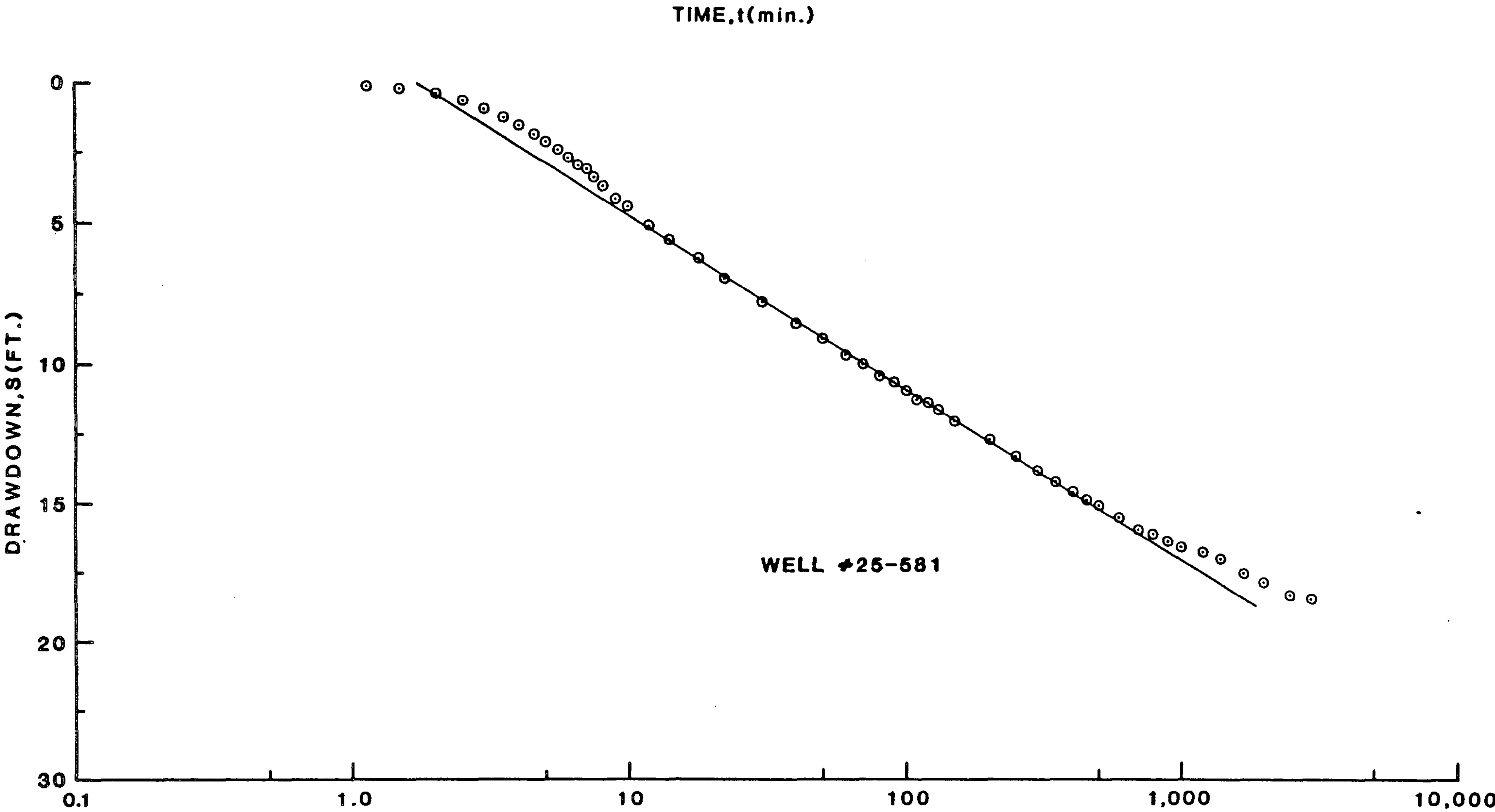
LOG-LOG PLOT OF OBSERVED DRAWDOWNS IN SECTION 25 'O' SAND TEST

FIGURE 14



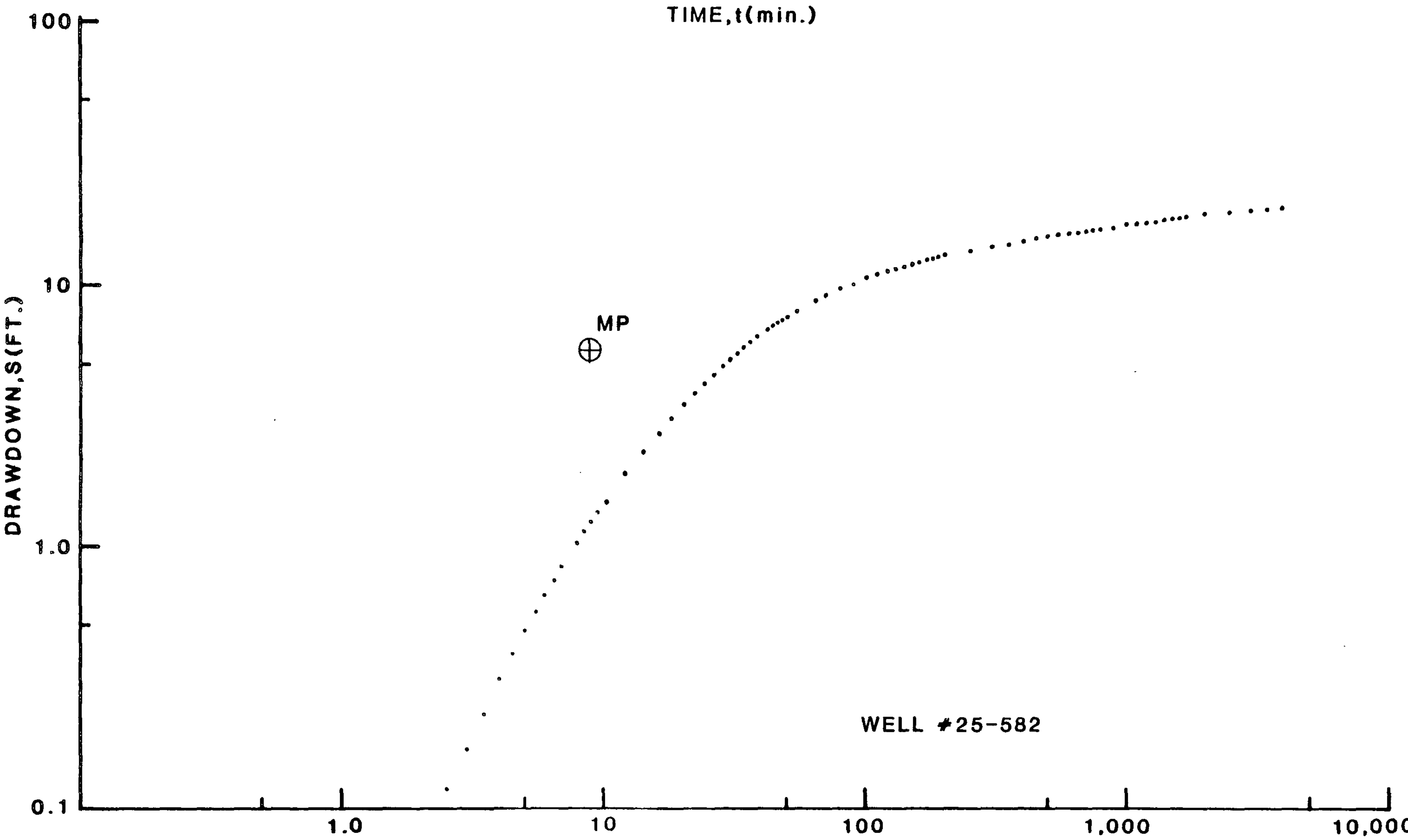
LOG-LOG PLOT OF 'O' SAND OBSERVATION WELL #581

FIGURE 15



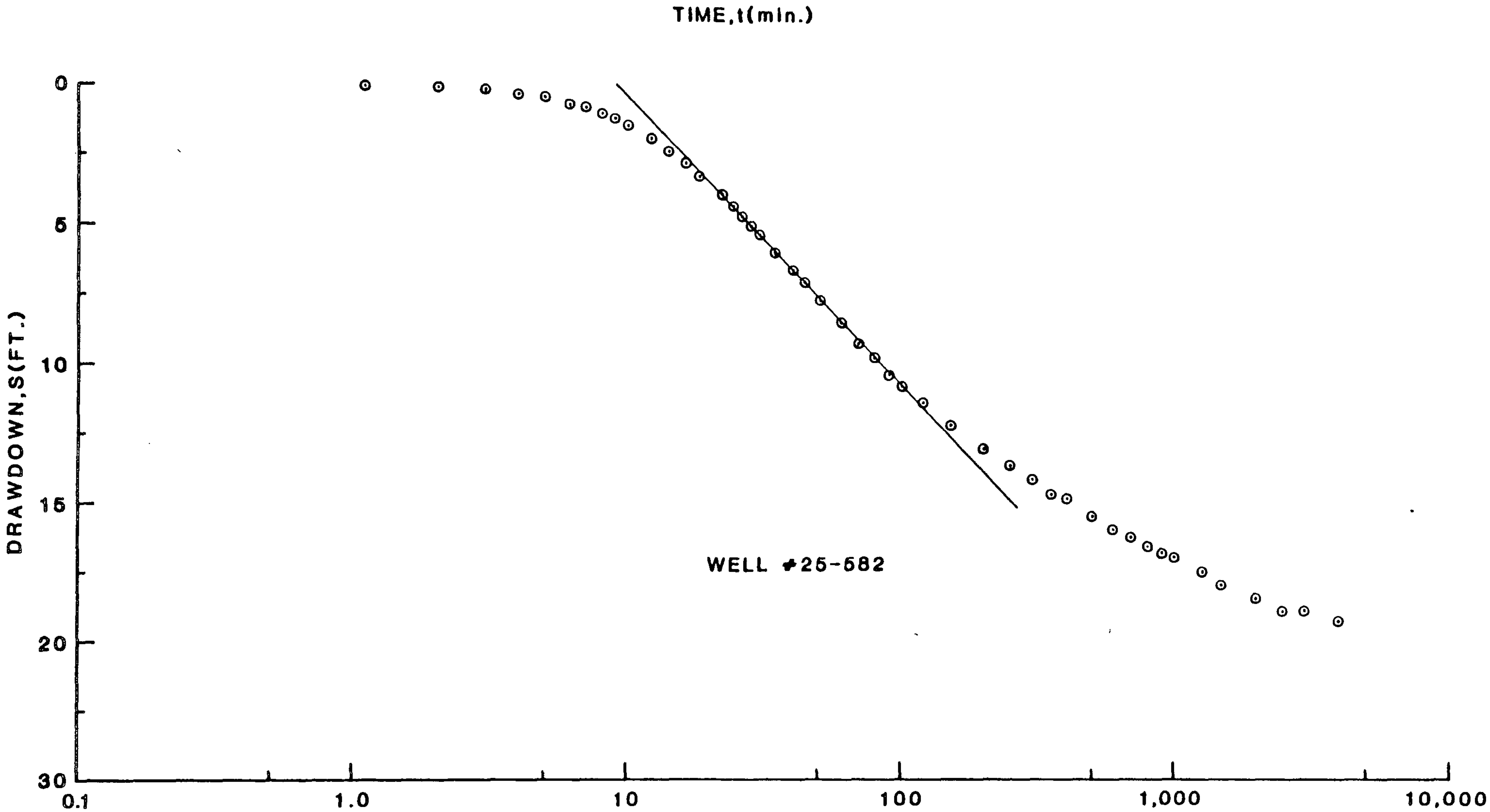
SEMI-LOG PLOT OF DRAWDOWN VS. TIME, WELL #25-581

FIGURE 16



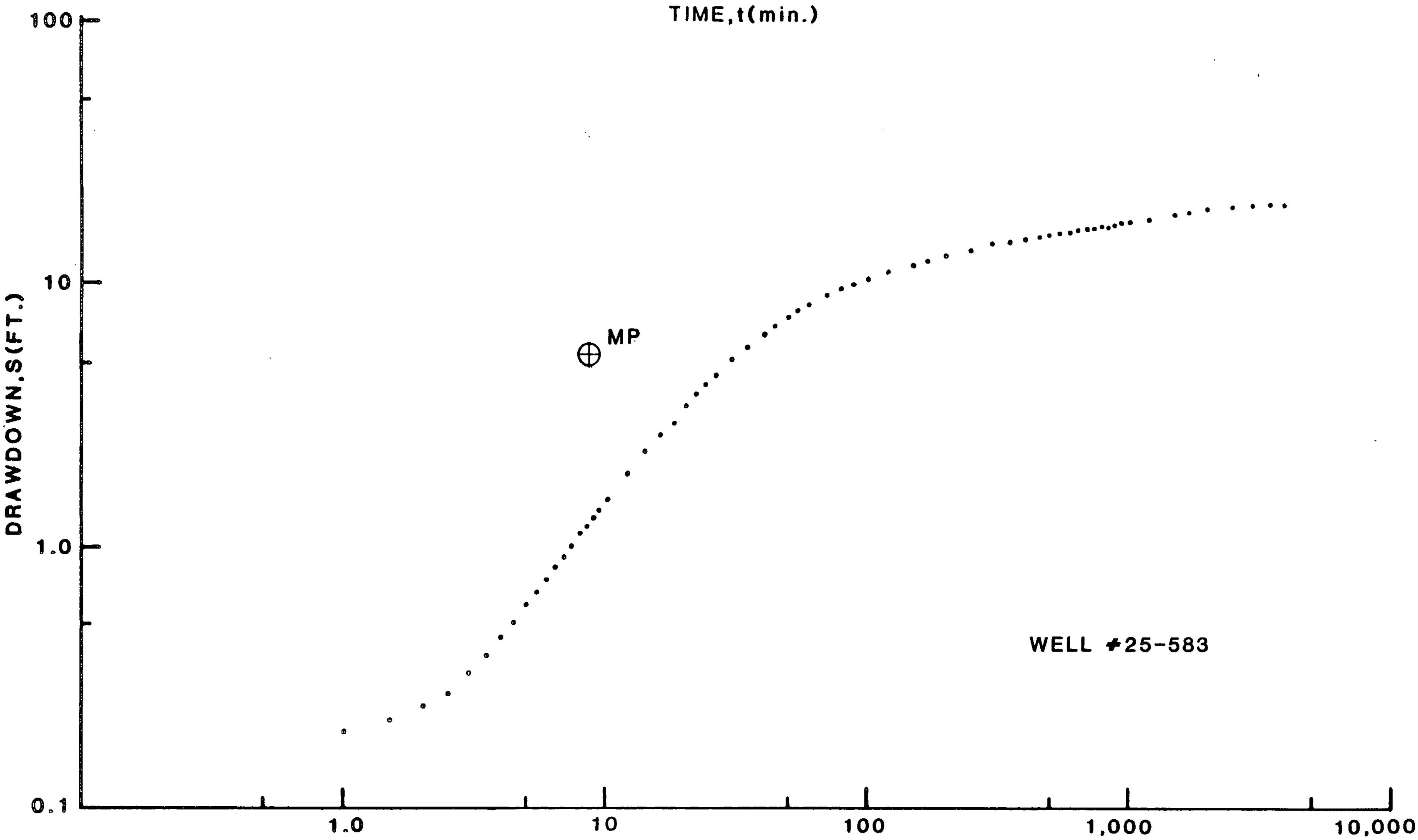
LOG-LOG PLOT OF 'O' SAND OBSERVATION WELL #582

FIGURE 17



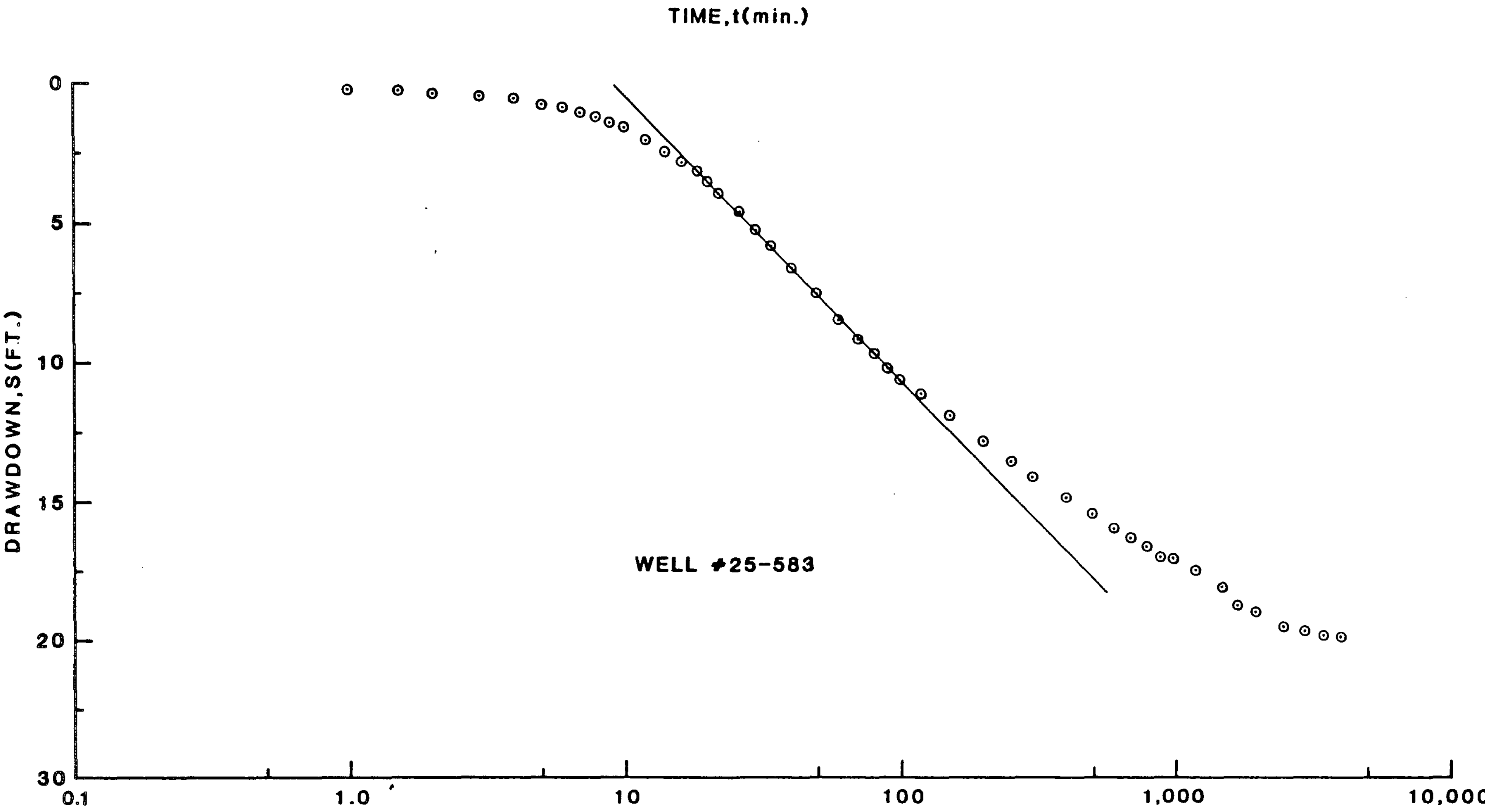
SEMI-LOG PLOT OF DRAWDOWN VS. TIME, WELL #25-582

FIGURE 18



LOG-LOG PLOT OF 'O' SAND OBSERVATION WELL #583

FIGURE 19



SEMI-LOG PLOT OF DRAWDOWN VS. TIME, WELL #25-583

FIGURE 20

The laboratory calculation of specific storage, S_s, was found to be 1.9 X 10^{-6} ft^{-1} for the overlying shale layer and 1.2 X 10^{-6} ft^{-1} for the underlying shale layer. These values have been shown to be well within the range for shales and are considered to be representative for the shale layers within the Fort Union Formation.

Leakage Calculations - Vertical hydraulic conductivity, K', has been evaluated for the overlying and underlying shale layers by the ratio method of Neuman and Witherspoon (1972). The input data are defined and the calculations are shown in Appendix D. The ratio method does not require curve matching; however, a drawdown or departure from trend response in water levels in the confining shale wells is required for the analysis. As no response to pumping was noted in either shale well (25-582'A' and 25-593), an assumed drawdown response at a given time was introduced to the analyses for both confining layers. Resultant K' values of less than 1.7 X 10^{-9} and 1.3 X 10^{-8} cm/sec were calculated for the overlying and underlying shale layers, respectively, for an assumed 0.5 feet of drawdown after two days of pumping the aquifer at 50 gpm. Therefore, leakage across the shales is considered negligible and the boundary conditions noted in aquifer test data are considered to be due to a source other than leakage.

In contrast to the shale wells, a possible response attributable to pumping was noted in the overlying and underlying aquifer wells 25-585 and 25-586, respectively. According to Witherspoon et. al. (1967), the effects of pumping in an aquifer will not reach the top or bottom of an overlying or underlying aquitard if $t < 0.1 S_s' b'^2/K'$, where:

t is time after pumping started (days)
b' is aquitard thickness (ft)

$S_s{}'$ is aquitard specific storage (ft^{-1})
K' is aquitard vertical hydraulic conductivity (ft/day)

Using the time of departure from rising water level trends in wells 25-585 and 25-586 (Figure 12) of t = 1.21 days (1740 min) and t = 0.90 days (1250 min.), respectively, the K' values would be as follows:

Overlying shale $K' = 0.1\ (1.9 \times 10^{-6})(43)^2/(1.21) =$
3×10^{-4} ft/day = $\underline{1 \times 10^{-7}}$ cm/sec

and

Underlying shale $K' = 0.1\ (1.2 \times 10^{-6})(28)^2/(0.90)$
$= 1 \times 10^{-4}$ ft/day = $\underline{4.2 \times 10^{-8}}$

Considering that no response to pumping was noted in either shale well, these values of K' are conservatively high for leakage across the shale layers. Some drawdown or departure from trend in the shale wells should have been noted if these responses in the overlying and underlying aquifers were a result of leakage.

Section 35

Figures 21 through 24 illustrate, as modified hydrographs, the responses of the various layers monitored in the Section 35 'M' sand test interval. Figure 21 illustrates the response of production well 35-739 (pumped at 8 gpm) as compared to the response of 'M' sand observation well 35-738. Figure 22 compares the response of 'M' sand observation well 35-737 to 'O' sand and 'K' sand observation wells 35-740 and 35-741, respectively. The 'O' and 'K' sand observation wells illustrate

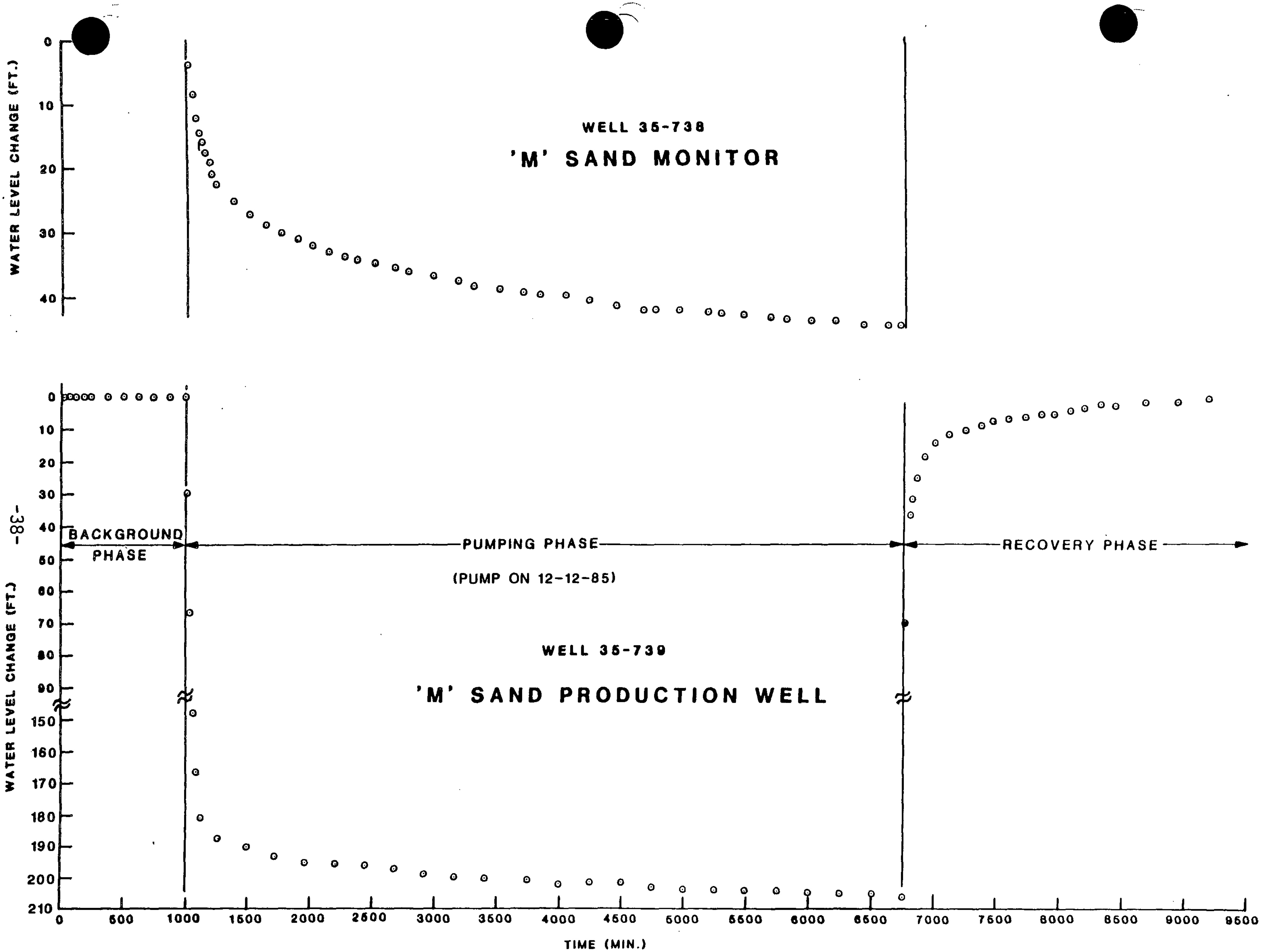


FIGURE. 21: HYDROGRAPH OF WELLS 35-738 AND 35-739

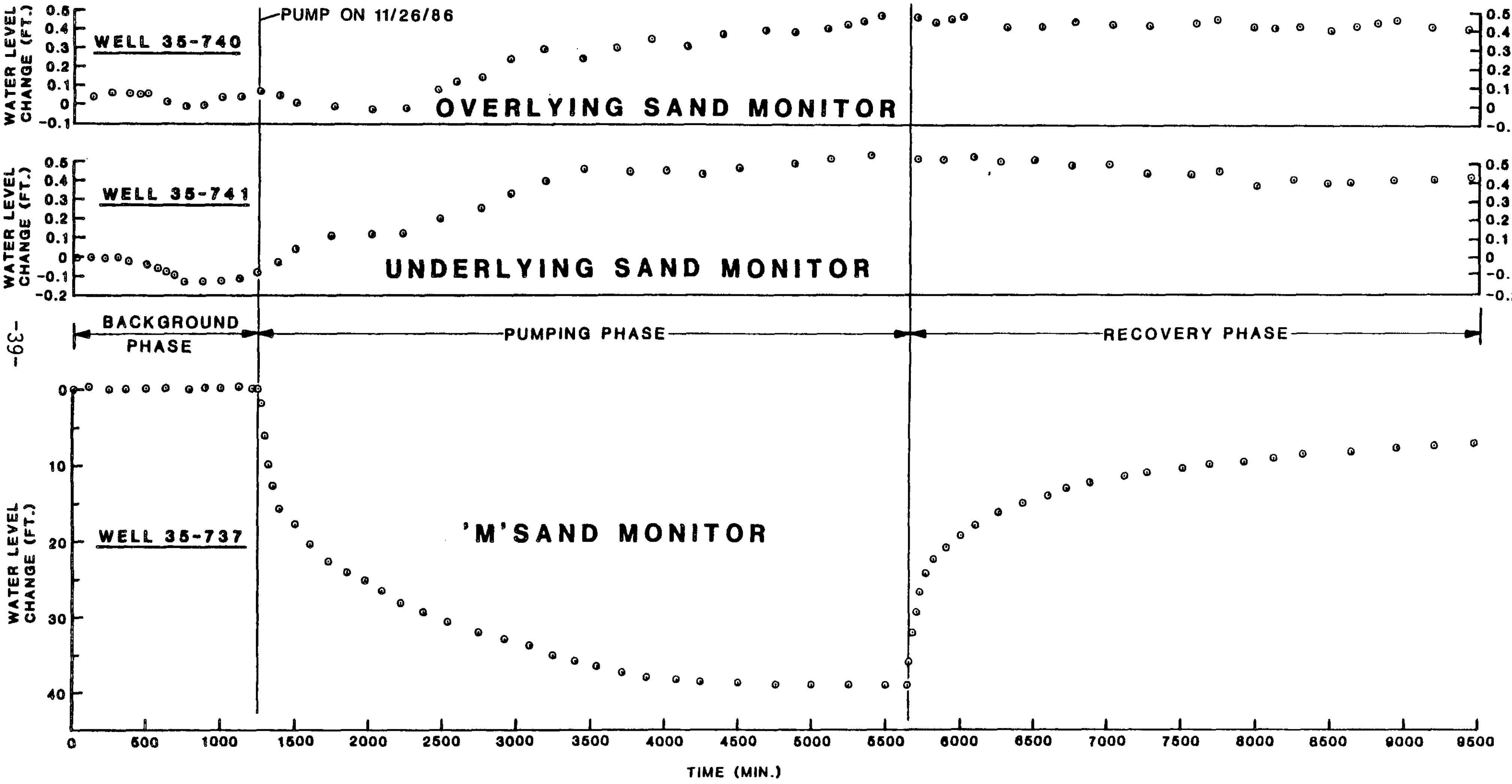


FIGURE 22: HYDROGRAPH OF WELLS 35-737, 35-740 AND 35-741.

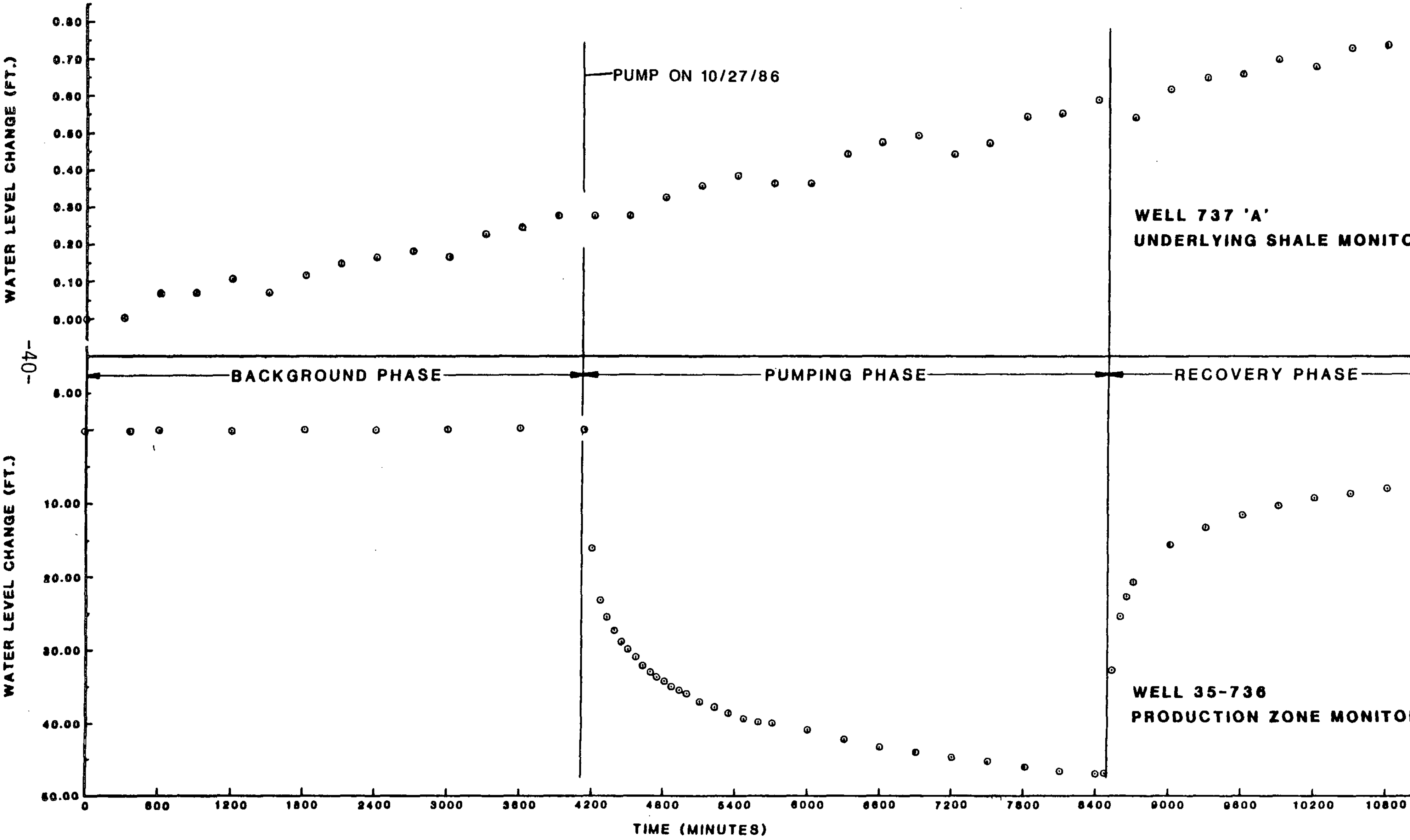
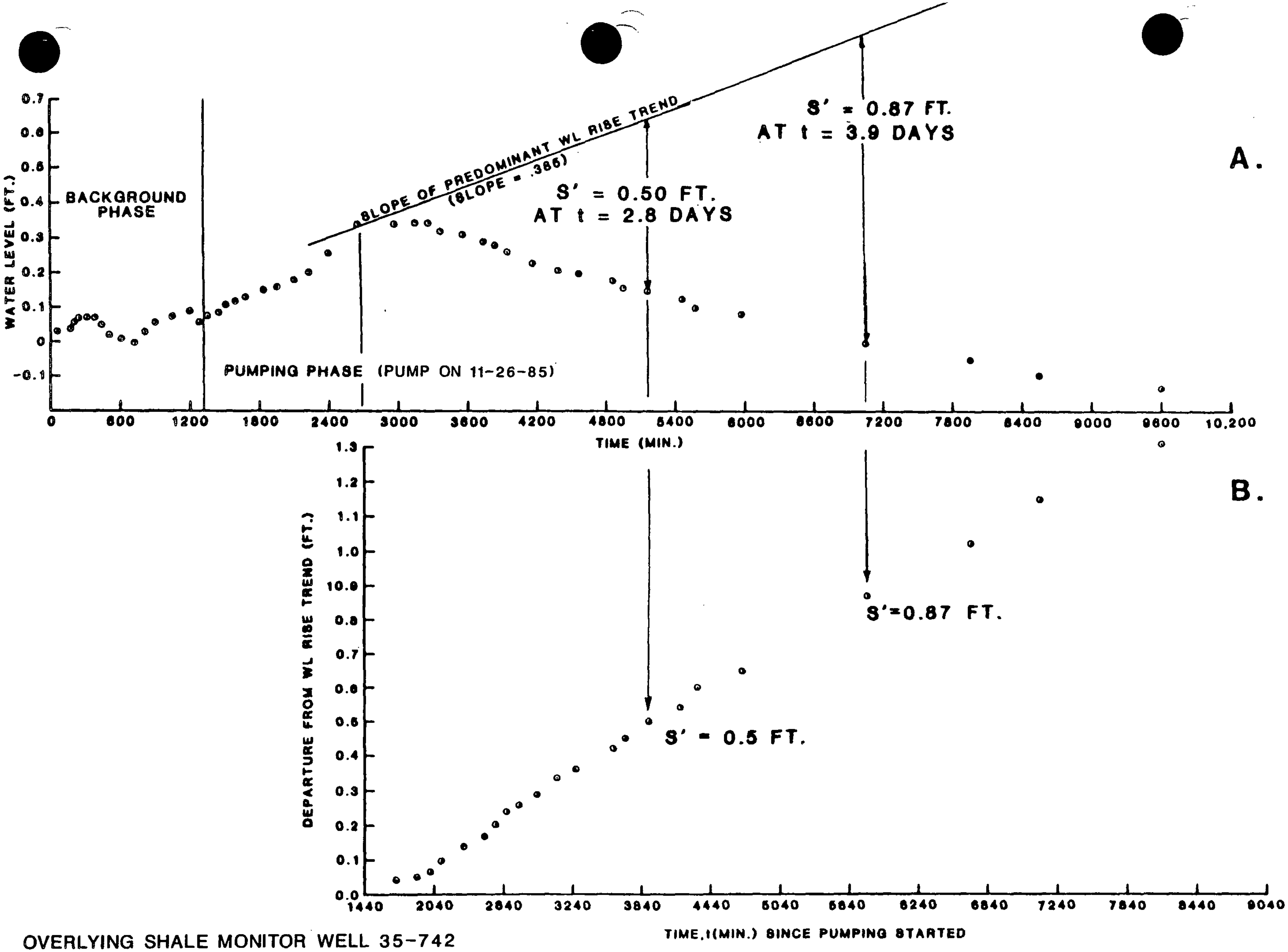


FIGURE 23: HYDROGRAPH OF WELLS 35-736 AND 35-737'A'.



OVERLYING SHALE MONITOR WELL 35-742

A. HYDROGRAPH OF BACKGROUND AND RESPONSE TO PUMPING

B. GRAPH OF DEPARTURE RESPONSE FROM RISING TREND

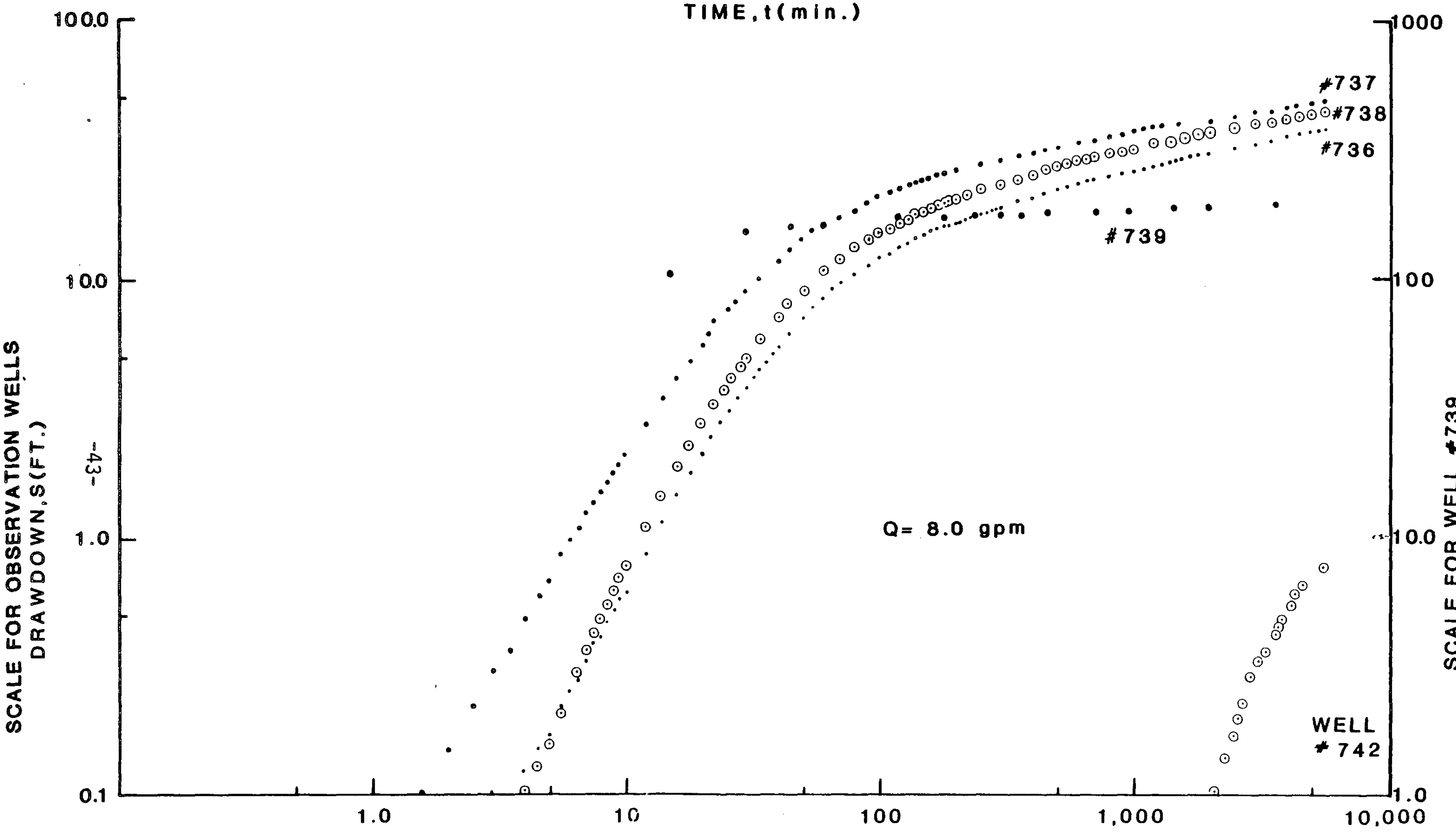
FIGURE 24

a general trend of water level rise through a period of the pumping phase at which time both trends appear to stabilize (pumping time, t = 1870 minutes and t = 2190 minutes for wells 35-740 and 35-741, respectively). Figure 23 compares the responses of 'M' sand observation well 35-736 to 'L' shale observation well 35-737'A'. Well 35-737'A' illustrates a persistent water level rise throughout the pumping phase indicating that pressures in the 'L' shale were unaffected by pumping in the 'M' sand. Figure 24 illustrates the response of the 'N' shale well 35-742 to pumping in the 'M' sand. The trend shows a relatively consistent water level rise in the well until pumping time t = 1900 minutes. At this time, the slope of the predominant trend of water level rise in the well was extrapolated across the graph and the drawdown in the well was measured as the departure from this trend. The values of drawdown, s', at respective time values were introduced into the ratio method to evaluate K' of the 'N' shale.

Aquifer/Aquitard Parameters - Drawdown versus time data for the 'M' sand pumping and observation wells were plotted as log-log and semi-log plots. Figure 25 compares the drawdown response of these wells and also illustrates the drawdown, corrected for the departure from trend shown in Figure 24, observed in the overlying 'N' shale observation well.

Figures 26 through 31 illustrate the log-log and semi-log response of the 'M' sand observation wells. These data were evaluated by previously described methods to calculate T and S values of the 'M' sand. All T and S calculations are included as Appendix C.

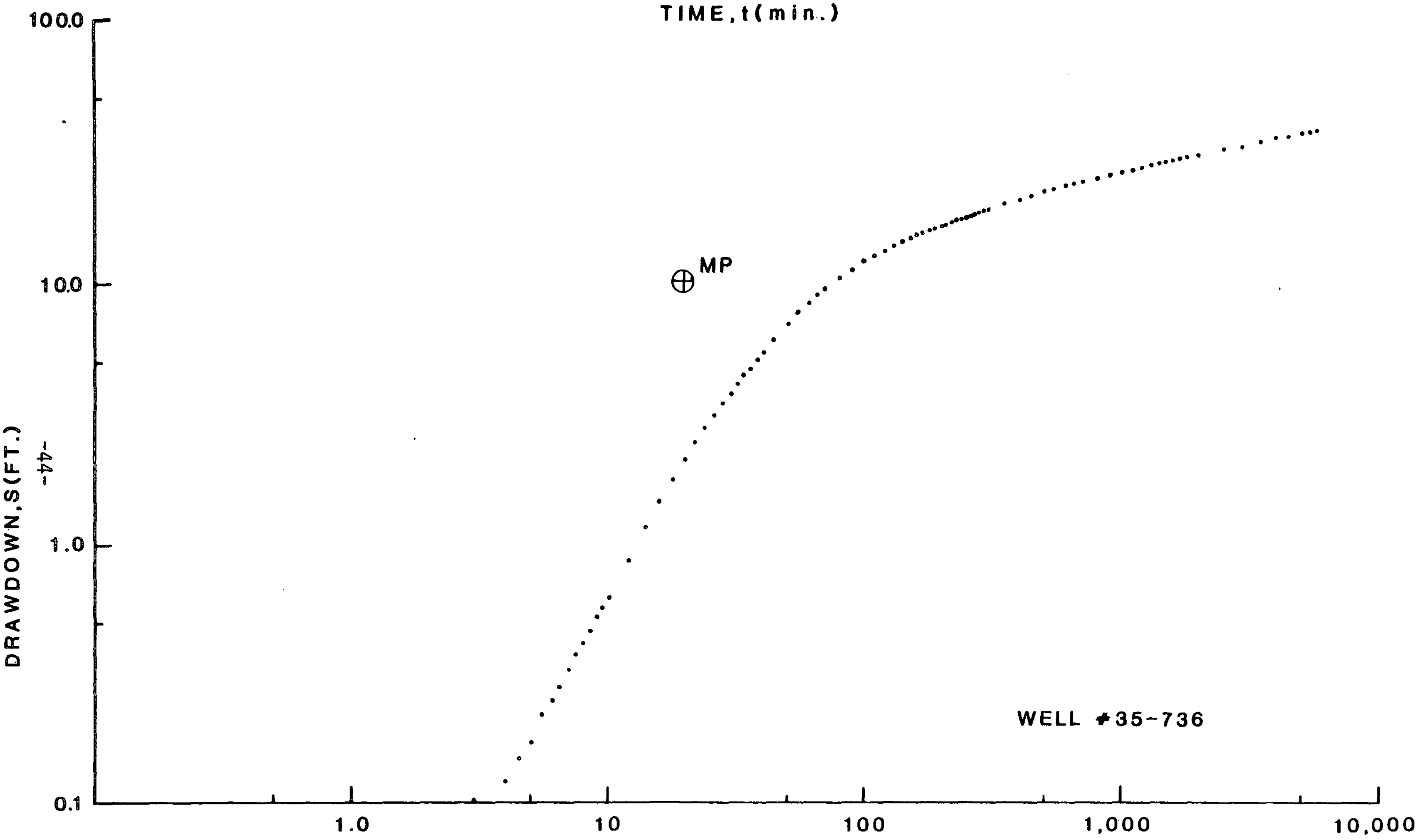
'M' sand T values evaluated by the two methods range from 65 to 150 gpd/ft. The averaged T value of well 35-737, which is used in the ratio analysis of K', is 102 gpd/ft (14 ft^2/day).



LOG-LOG PLOTS OF OBSERVED DRAWDOWNS IN SECTION 35,'M' SAND TEST

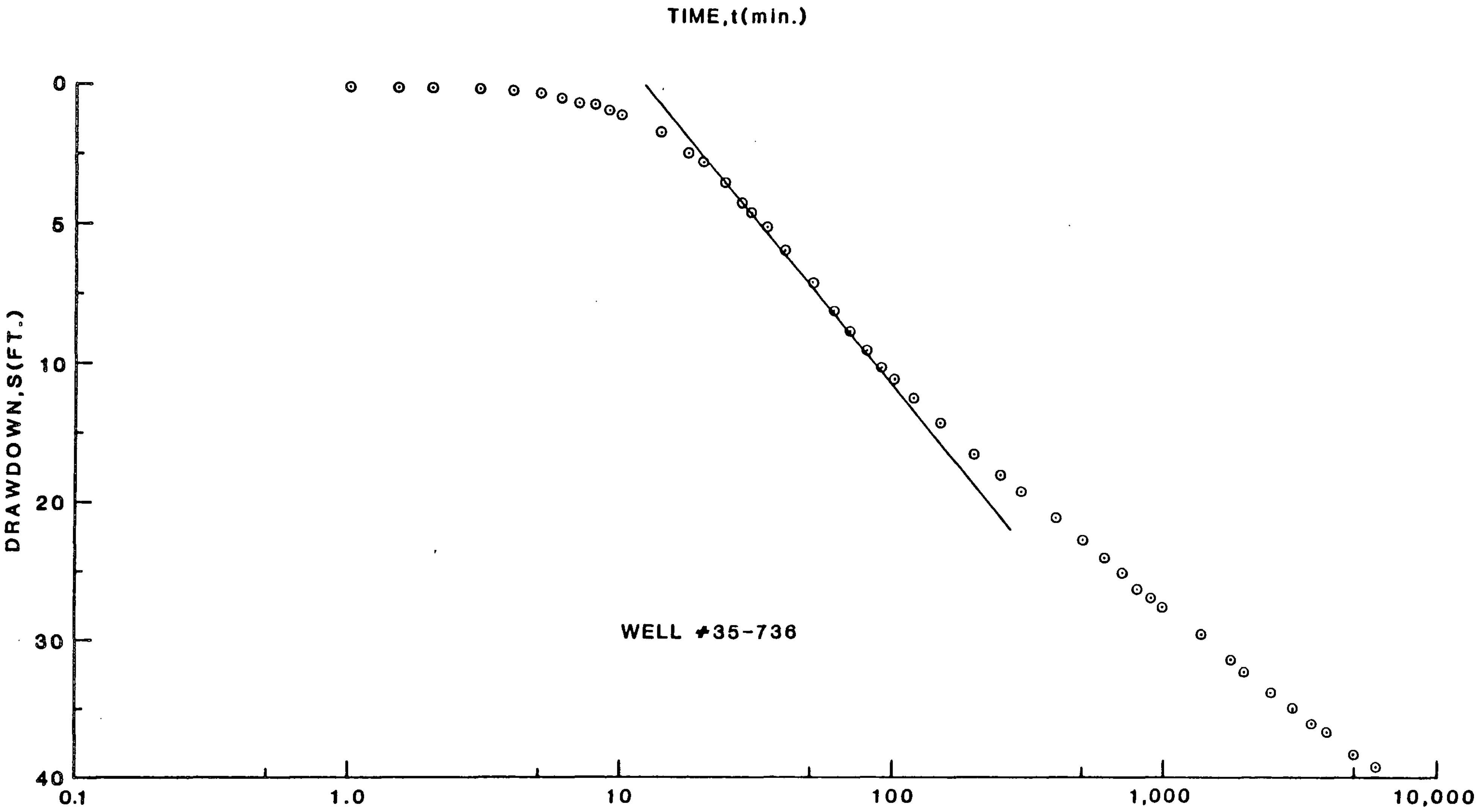
(NOTE VERTICAL SCALE FOR RESPECTIVE WELLS)

FIGURE 25



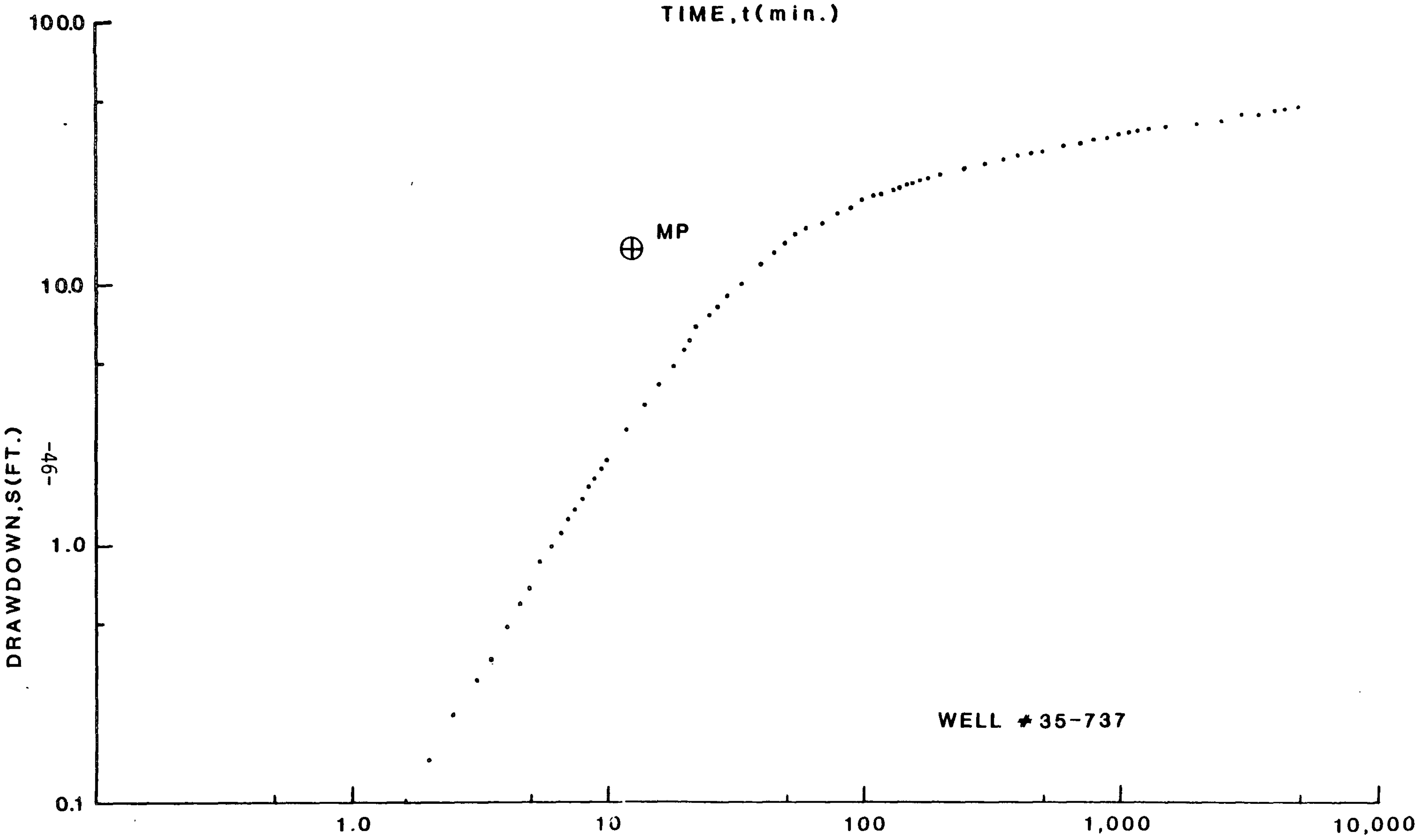
LOG-LOG PLOT OF 'M' SAND OBSERVATION WELL #736

FIGURE 26



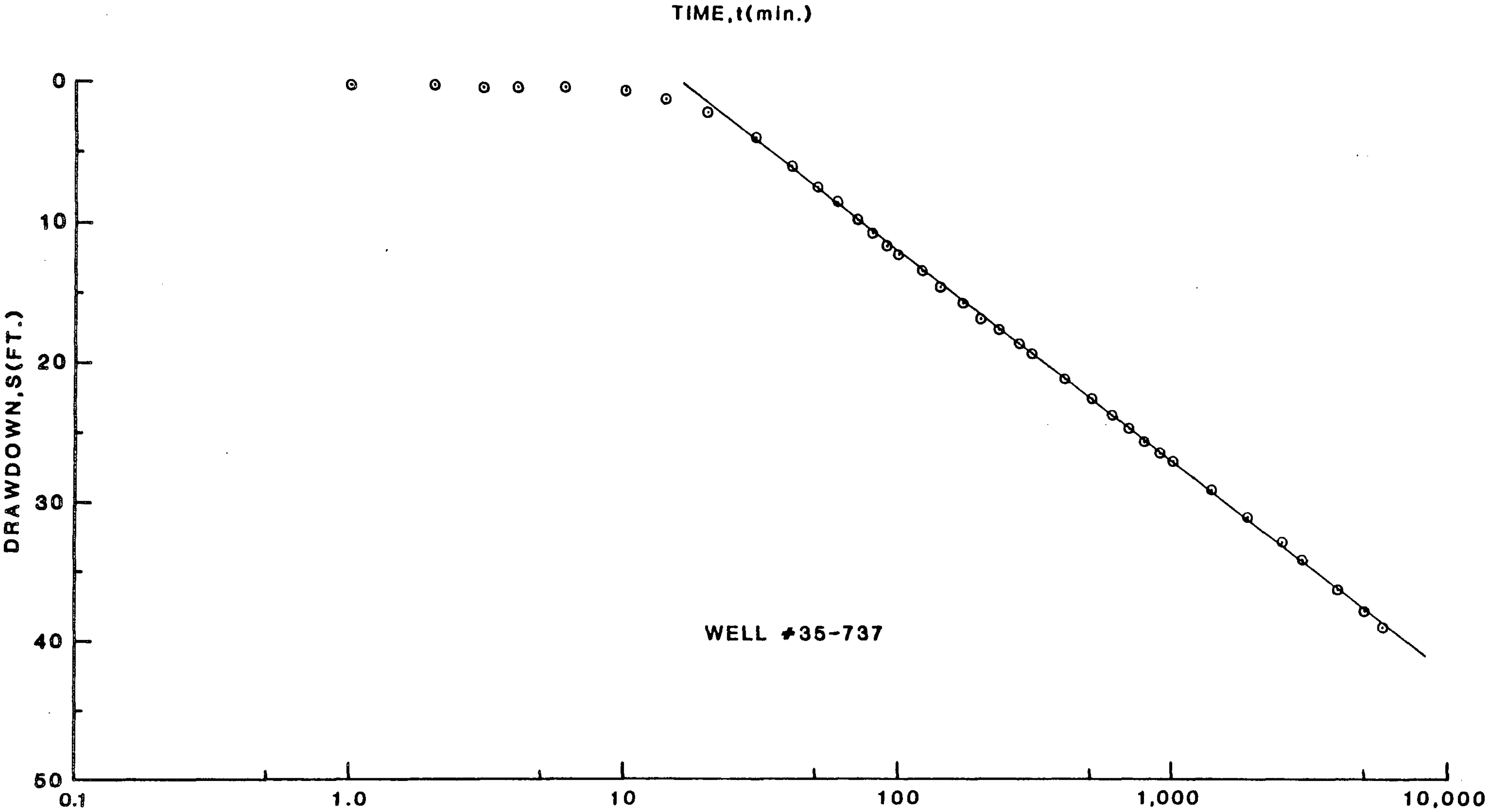
SEMI-LOG PLOT OF DRAWDOWN VS. TIME, WELL #35-736

FIGURE 27



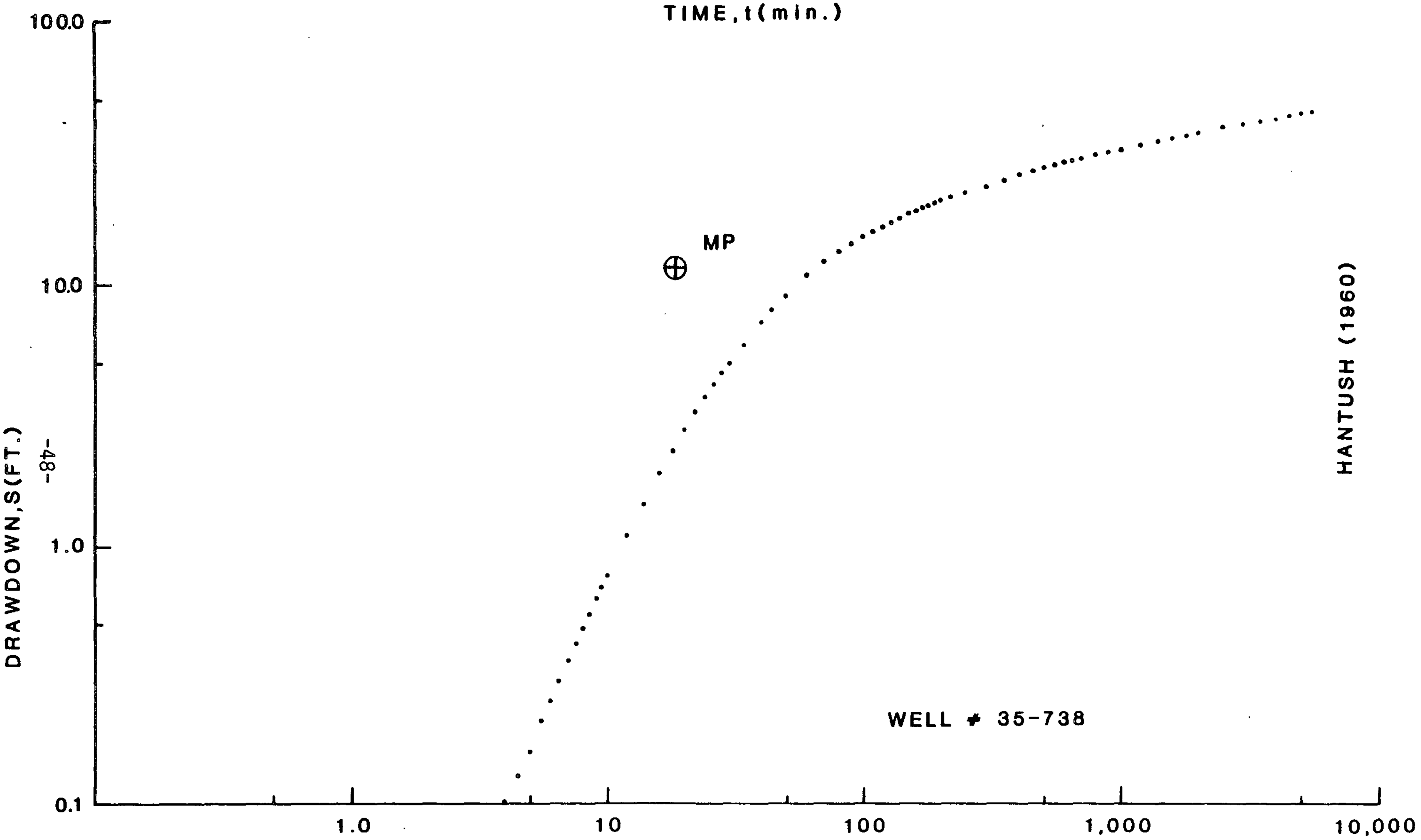
LOG-LOG PLOT OF 'M' SAND OBSERVATION WELL #737

FIGURE 28



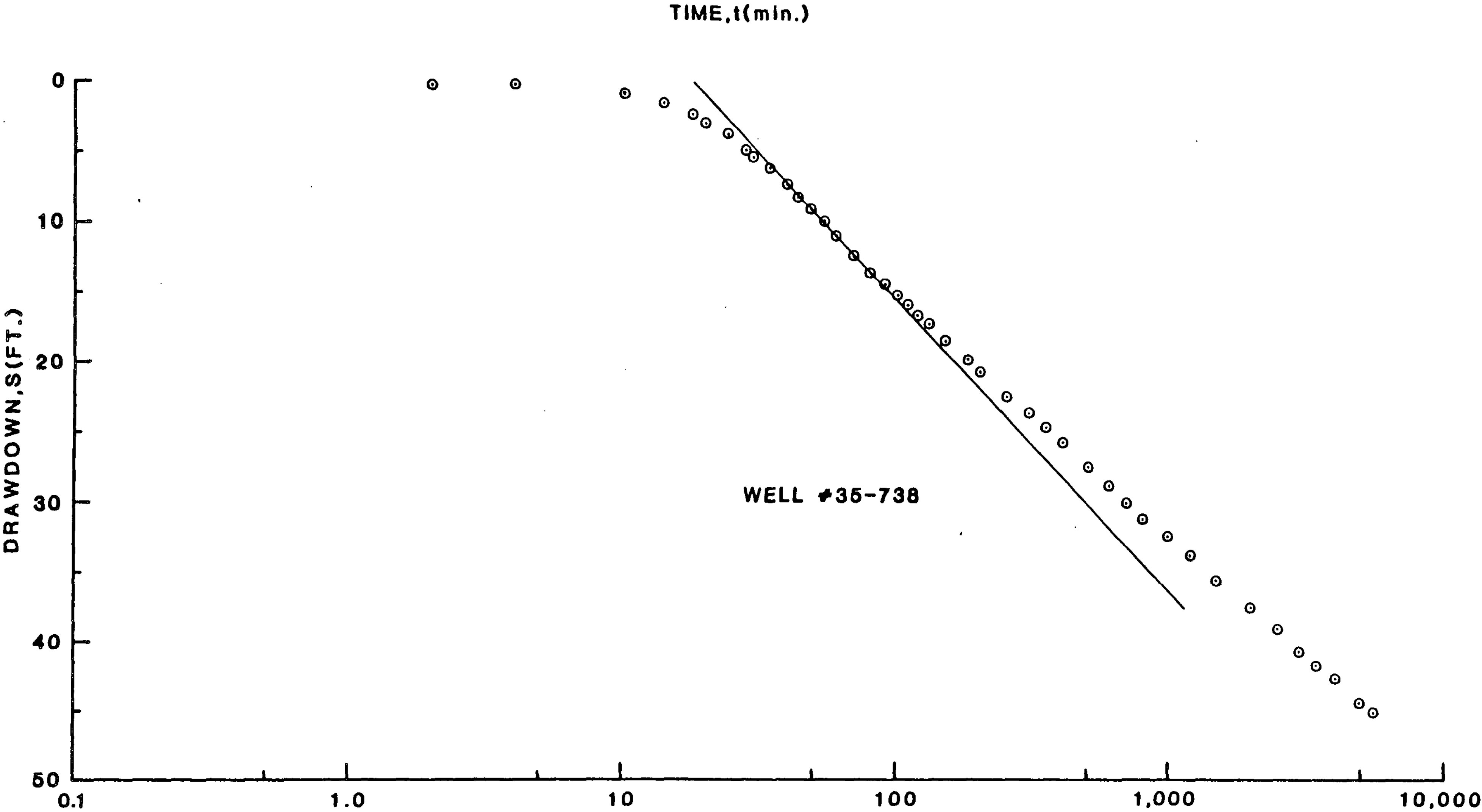
SEMI-LOG PLOT OF DRAWDOWN VS. TIME, WELL #35-737

FIGURE 29



LOG-LOG PLOT OF 'M' SAND OBSERVATION WELL #738

FIGURE 30



SEMI-LOG PLOT OF DRAWDOWN VS. TIME, WELL #35-738

FIGURE 31

'M' sand S values range from $6 X 10^{-5}$ to $1 X 10^{-4}$ and the averaged value of well 35-737 is $7.5 X 10^{-5}$, which is applied to the ratio analysis.

As is apparent from the semi-log plots, and as can be seen when the log-log plots are matched to a Theis type curve, a recharge boundary condition influences the drawdown in the 'M' sand within approximately t = 100 minutes after pumping started. The semi-log plot of well 35-737 does not illustrate a significant deviation from the straight line; however, the log-log plot for this well illustrates deviation from the type curve at approximately t = 90 minutes.

The laboratory calculation of specific storage, S_s, was found to be $1.9 X 10^{-6} ft^{-1}$ for the 'N' shale (overlying) and $1.2 X 10^{-6} ft^{-1}$ for the 'L' shale (underlying). The values are used as input data for the ratio method of K' analysis.

Leakage Calculations - A direct application of the Neuman and Witherspoon (1972) ratio method is possible due to the drawdown response noted in 'N' shale (overlying) observation well 35-737'A' (Figure 24). However, no response to pumping the 'M' sand was noted in 'L' shale (underlying) observation well 35-742. Therefore, an assumed drawdown response was introduced to the ratio analysis to represent a worse case scenario in order to determine the upper limit of K' value. All ratio method analysis calculations are given in Appendix D.

As noted in Appendix D, the ratio method was applied to the 'N' shale K' solution at two different times. At time A (t = 2.8 days), drawdown, s', in the 'N' shale was approximately 0.5 feet and the resultant K' was found to be $3 X 10^{-9}$ cm/sec. At time B (3.9 days), s' was 0.87 feet and the resultant K' was found to be 6.8 X 10^{-10} cm/sec. Both values of K' indicate a low potential for leakage across the 'N' shale. An assumed s' of 0.5 at t=2.8 days was applied to the 'L' shale and a resultant K' of 2.9 X 10^{-9} cm/sec was found.

In contrast to the shale wells, response to pumping the 'M' sand were noted in 'O' and 'K' sand wells. Using the time of departure from trend of water level rises in wells 35-740 and 35-741, application of the Witherspoon et. al. (1967) equation, $t = 0.1S'_s b'^2/K'$, can be applied to evaluate K':

<u>Overlying shale</u> @ t = 1.3 days (Well 35-740)

$$K' = 0.1\ (1.9 \text{ X } 10^{-6})(49)^2/(1.30) = 3.5 \text{ X } 10^{-4} \text{ ft/day}$$
$$= \underline{1 \text{ X } 10^{-7}}\ \underline{\text{cm/sec}}$$

<u>Underlying shale</u> @ t = 1.52 days (Well 35-741)

$$K' = 0.1\ (1.2 \text{ X } 10^{-6})(52)^2/(1.52) = 2 \text{ X } 10^{-4} \text{ ft/day}$$
$$= \underline{8.5 \text{ X } 10^{-8}}\ \underline{\text{cm/sec}}$$

GENERAL INTERPRETATION

The calculations and conclusions which have been derived from the data base presented herein must be considered with respect to the local geologic conditions and not just the formation hydraulic properties derived from the data. Some observations which need to be considered are:

1) The persistent rise of water levels in 3 of the 4 shale wells for the duration of pumping and recovery;

2) The lack of response in shale layers to pumping in the adjacent sand aquifers;

3) The resultant low values of K' for the shale layers that were derived from the introduction of assumed and observed values of s' into the ratio method and the Witherspoon et. al. (1967) equation;

4) The recharge boundary conditions indicated by the departure of log-log plots from the Theis type curve and Jacob straight line plots; and

5) The apparent positive response to pumping observed in overlying and underlying sand aquifers.

Items #1, #2, and #3, above, would seem to be contradictory to item #5 when considered without regards to other probable geologic causes for these responses.

The K' calculations by the ratio method (Neuman and Witherspoon, 1972) and by the Witherspoon et. al. (1967) equation, where $t = 0.1S_s'b'^2/K'$, are in general agreement in that both methods suggest K' values to be acceptably low. However, the ratio method, which depends on drawdown in confining shales as input data, and the Witherspoon equation, which depends on the initial time of drawdown or departure in overlying and underlying aquifers for input data, produced K' values which differed by an order of magnitude, or more. The ratio method was consistently lower than the Witherspoon equation, which assumes all drawdown in overlying or underlying aquifers is due to leakage across aquitard layers into the pumped aquifer.

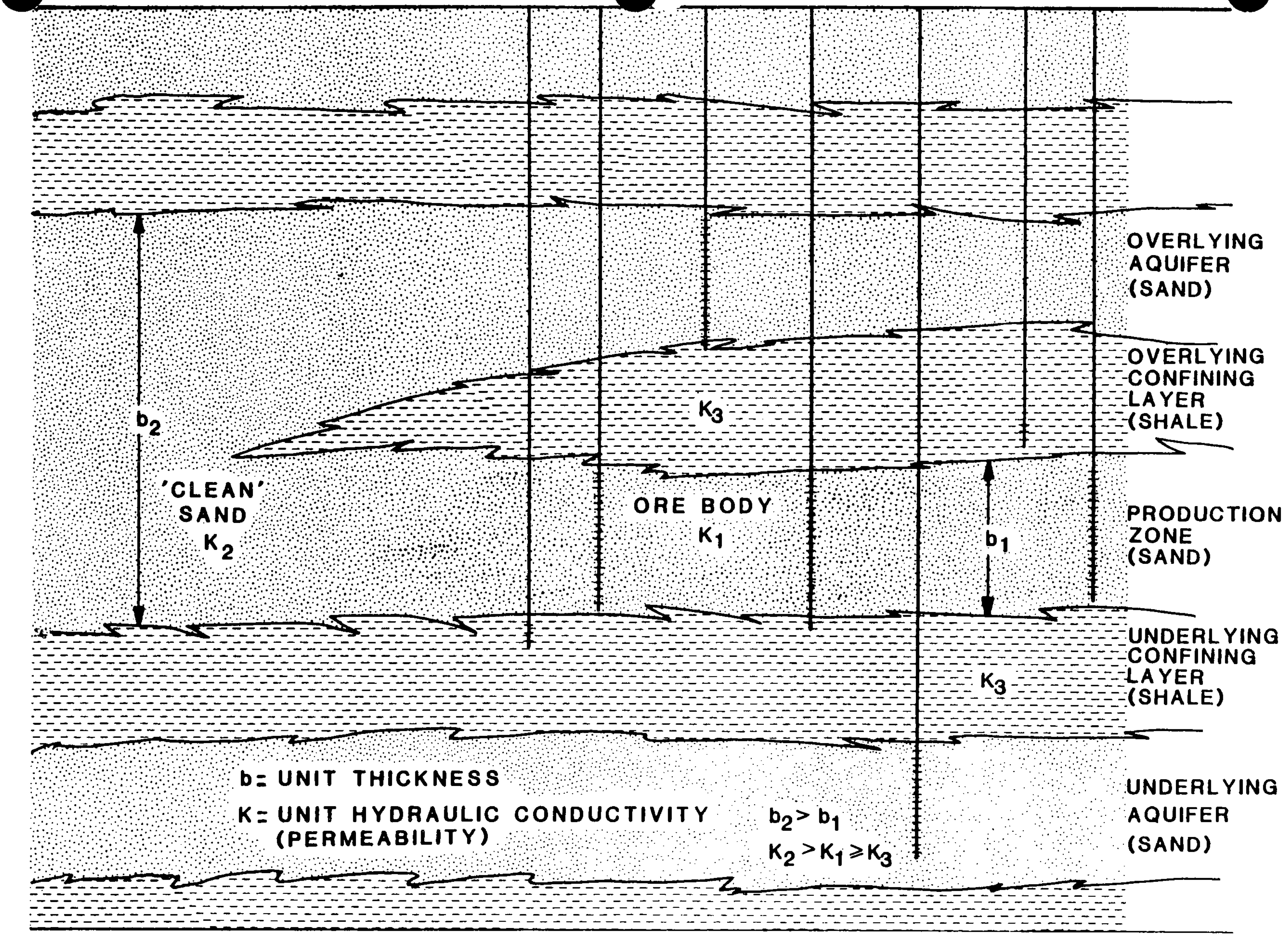
With respect to these considerations, the following comments and explanations are offered:

1.) Wells drilled into shales, for the purpose of pumping test monitoring and applications to the ratio method, may need months or years to completely stabilize. This is especially true for thick, indurated shales occurring at depths as occur in the current test areas.

2.) Results from the application of the ratio method to the current tests are probably the most accurate for the portion of the formations intersected by the shale wells. However, due to the limited area of response for the screened shale formation, the results may not be indicative of the hydraulic properties of the shale formation on an extended areal basis. However, the totality of the data support the conclusion that the shale layers act as adequate barriers to the vertical migration of leach fluids over the mineralized area when shown to be laterally continuous.

3.) Recharge boundary conditions noted in the aquifer test data are the result of lateral changes in formation characteristics and not due to leakage across the confining shale layers. Boundary analyses were performed at each well for the time departure noted from log-log plots. Distances to image wells from the observation wells were computed and arcs scribed at each observation well with radii equal to the respective, computed distances. The failure of arcs to intersect at a common point (or to intersect at all) supports the contention that a point or line source of recharge does not exist. Although leakage is one possible explanation for this recharge effect, it is inconsistent with the responses noted in the shale wells. The lateral variations near but outside the well field are the probable sources for recharge effects and not leakage across the confining shales. Figure 32 illustrates two geologic conditions known to exist in the area which would cause leaky type responses in the aquifer tests: 1) laterally discontinuous shale layers which result in greater aquifer thickness by direct interconnection of sand bodies, or 2) a lateral change of formation permeability as a result of a "dirty", less permeable ore body grading laterally to "clean", more permeable sand.

Due to the limited variations in the responses of the production zone monitor wells in the test patterns, other analyses, such as directional transmissivity, were not possible. However, as shown in previous SFC reports and by the small variability in the monitor well responses in these tests, directional transmissivity in the Fort Union sands in this area appears to be a minor factor. The orientation of the axis of major transmissivity and the preferred direction of groundwater flow will be more accurately determined from operational data as the well fields are developed.



FOR ILLUSTRATIVE PURPOSES: HORIZONTAL SCALE 1 IN = 100'S OF FT VERTICAL SCALE 1 IN = 10'S OF FT

FIGURE 32: ILLUSTRATION OF GEOLOGIC CONDITIONS WHICH COULD PRODUCE RECHARGE BOUNDARY EFFECTS; 1) LATERAL CHANGE OF FORMATION PERMEABILTY, AND 2) LATERAL CHANGE OF FORMATION THICKNESS.

REFERENCES

Jacobs, C. E., 1950, Flow of Groundwater, in Rouse, Hunter, Engineering Hydraulics: New York, John Wiley, Chapter 5, p. 321-386.

Jorgensen, Donald G., Relationship between Basic Soils - Engineering Equations and Basic Ground-Water Flow Equations, U. S. Geological Survey Water - Supply Paper 2064, 1980.

Lambe, T. William and Robert V. Whitman, Soil Mechanics, 1969, p. 153.

Lohman, S. W., Ground-Water Hydraulics, U. S. Geological Survey Professional Paper 708, 1972, p. 53.

Neuman, Shlomo P., and Paul A. Witherspoon, Field Determination of the Hydraulic Properties of Leaky Multiple Aquifer Systems, Water Resource Research Vol. 8, No. 5, October, 1972.

Theis, C. V., 1935, The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage; Transactions of the American Geophysical Union, V. 16, p. 519-524.

Witherspoon, P. A., et. al., 1967, Interpretation of Aquifer Gas Storage Conditions from Water Pumping Tests, American Gas Association, N.Y., 273 p.

APPENDIX A

Compression and Porosity Tests on Shale Cores

Report by Dr. C. J. Haas

COMPRESSION AND POROSITY TESTS ON SHALE CORE FROM SOUTH POWDER RIVER BASIN - WYOMING

by

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Report Prepared for

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November 11, 1985

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COMPRESSION AND POROSITY TESTS ON SHALE FROM SOUTH POWDER RIVER BASIN - WYOMING

INTRODUCTION

On September 10, 1985, four 2-ft lengths of shale drill core from the South Powder River Basin-Wyoming were delivered to the University of Missouri-Rolla for testing by Charles J. Haas & Associates. The core was sent by Mr. E. G. Orrell from Sequoyah Fuels Corporation, Glenrock, Wyoming.

The drill hole numbers and depths were as follows:

Drill Hole No.	Depth, ft.
PM-25-587	795-797
NM-25-588	939-941
NM-35-742	717-718.7
LM-35-743	809-811

For shipment each core length had been sealed in Polyethylene Layflat tubing to preserve its natural moisture state. The core lengths were then wrapped in several layers of foam plastic and shipped by United Parcel Service. According to Mr. Orrell the core lengths were intact before shipping, however they were quite badly broken when they arrived at UMR. There was no apparent damage to the box. It is not known why the samples deteriorated so much during shipment because they were very well wrapped and insulated from shock and vibration. As a result of this deterioration it was not possible to obtain an intact core specimen of sufficient length for the compression tests on Drill Holes

PM-25-587 and NM-25-588. The porosity tests were performed on small cubes cut from all four core lengths.

Each core length was a sandy shale and had a moist feel when taken from the tubing, indicating that some or all of the natural moisture remained.

The required tests were: uniaxial compressive strength, stress-strain plots, Young's modulus, and Poisson's ratio, all determined on the same compression specimen; and apparent porosity, density, and degree of saturation, all determined on a small cube specimen.

SPECIMEN PREPARATION

Intact core specimens approximately 5.8 in. long were desired for the compression tests to give a length-to-diameter ratio of 2.0 for the 2.9-in. diameter core as specified by the ASTM standards for these tests. This requirement had to be relaxed since the available material only permitted specimen lengths of 2.1, 2.8, and 5.3 in. The shortest specimen was too short for a valid stress-strain plot so it was used to obtain a preliminary value of the strength before the other two complete tests were performed.

The ends of the compression specimens were surface ground while being supported by two machinist V-blocks held by the magnetic chuck on the grinding machine. After both ends had been ground, the specimen was stored in sealed plastic tubing until testing.

It was requested by Kerr-McGee that the porosity and saturation be determined by water saturation methods when practicable. Since the shale appeared so weak, it was decided to use a helium porosimeter to determine the pore volume. This method is more accurate for low permeability rock and does not risk sample deterioration during water saturation. One test on each core length was requested, however three were performed for quality assurance for the data.

One porosity specimen was cut from each end of the 2-ft core length while the other was cut from near the midpoint. These were rectangular specimens approximately 0.7 X 0.7 X 1.0 in; these specimens did not have to be perfectly shaped since the bulk volumes were determined by a mercury displacement method. As soon as the specimens were cut they were sealed in plastic tubing so that the initial moisture state would be preserved until testing.

All specimen cutting for the compression and porosity test specimens was done with a diamond cut-off saw with no coolant to prevent further specimen deterioration.

COMPRESSION TESTS - PROCEDURE AND RESULTS

The uniaxial compressive strength and the stress-strain plots were determined on the same compression specimen. ASTM Standard D2938 was followed for the compressive strength test, and ASTM Standard D3148 was followed for the stress-strain plots and determination of Young's modulus and Poisson's ratio. Load was applied with a Tinius Olsen Super "L" testing machine with 120,000 lbs capacity. The load ranges used were 3,000 and 12,000 lbs. The loading rate was 4 psi/sec.

Axial and lateral strains were measured with a clamp-on LVDT deformation jacket with three axial and three lateral sensors. The axial gage length was 2.0 in. and the lateral gage length was the radius of the test specimen. Both the axial and lateral stress-strain curves were simultaneously plotted versus load with the two-pen XYY´ recorder. Young's modulus is herein defined as the tangent modulus at a stress equal to one half of the ultimate strength. Poisson's ratio is taken as the ratio of the slope of the axial stress-strain curve to the slope of the lateral stress-strain curve, both slopes being taken at the same percentage of the ultimate strength. Since the lateral stress-strain curves are often nonlinear, a large range of values for Poisson's ratio could be obtained, depending on the stress level chosen.

The moisture state of the three compression specimens was partially saturated, as received.

The first compression test (Drill Hole LM-35-743, depth 809.9 ft) was for strength only since its length was too short for valid stress-strain plots. Stress-strain plots were obtained for the other two compression specimens, a second one for Drill Hole LM-35-743 and one from Drill Hole MM-35-742 (Appendix A). With the limited number of available specimens and the apparent weak character of the rock it was not possible to accurately choose the proper load and deformation ranges before the test was begun. So that data would not be lost due to unexpected weakness of the rock, the instrumentation was initially set on sensitive ranges and then switched to less sensitive ranges as the load and deformations exceeded the initial range settings. On both tests it was necessary to switch from the 3,000-lb to the 12,000-lb load range. The recording paper was also changed at this point so each test includes two sheets of graph paper in Appendix A. The initial deformation ranges were also exceeded so the user of the graphs in Appendix A must pay attention to the scales for the various portions of the curves.

The specimen data, failure loads, and calculated uniaxial compressive strength for the three compression specimens are given in Table 1. The strength C_o (Table 1) is based on the failure load P and the cross-sectional area A as follows:

$$C_o = \frac{P}{A}$$

ASTM Standard D2938 recommends that compression test specimens have a length-to-diameter (L/D) ratio of 2.00 for the best measure of uniaxial compressive strength. If the L/D ratio is not 2.00 then the tests may be performed on specimens with other values of L/D ratio, and the strength corrected to give the strength of an equivalent specimen with a L/D ratio of 2.00. The recommended empirical equation which relates the strengths is:

$$C_{2:1} = \frac{0.889\ C_o}{0.778 + 0.222\ (D/L)}$$

$C_{2:1}$ = compressive strength of an equivalent test specimen with an L/D ratio of 2.00

TABLE 1

COMPRESSION TEST DATA

Dimension or Property	Drill Hole No.		
	NM-35-742	LM-35-743	LM-35-743
Depth, ft.	717.9	810.3	809.9
Length, in.	2.765	5.315	2.105
Diameter, in.	2.791	2.910	2.910
Failure Load, lbs	5,720	8,460	11,950
Comp. Strength C_o, psi	935	1,272	1,797
Comp. Strength $C_{2:1}$, psi	829	1,257	1,472
Young's modulus, 10^5 psi	1.04	2.35	--
Poisson's ratio	0.288	0.570	--

C_o = compressive strength of actual test specimen with diameter D and length L

The equivalent compressive strengths $C_{2:1}$ are also given in Table 1. The $C_{2:1}$ strength values are the ones which should be used for comparison purposes and design calculations.

The values of Young's modulus and Poisson's ratio given in Table 1 were taken from calculations based on the slopes of the axial and lateral stress-strain curves in Appendix A.

POROSITY AND SATURATION TESTS - PROCEDURE AND RESULTS

The porosity and saturation tests were performed by Mr. Ralph Roesler, a graduate student in Petroleum Engineering at UMR, using equipment in the Petroleum Engineering Department.

The required results were dry density, apparent or effective porosity, and percent water saturation in the initial or as-received moisture state. The required measurements to calculate these quantities are the initial weight of each specimen, its oven-dry weight, its grain volume, and its bulk volume.

The test specimens were cubical in shape, approximately 0.7 X 0.7 X 1.0 in. They ranged from fragile but consolidated to very soft and friable. Due to the delicate nature of the specimens it was difficult to avoid losing a few of the grains, especially for the very friable specimens.

A test was begun by removing the specimen from the sealed plastic tubing and measuring its initial weight W_n in the partially saturated state. The specimen was then placed on a glass dish and dried in a ventilated oven at 70° C for one day. The weight of the glass was then measured, and the oven-dry weight of the specimen W_o was calculated. The drying temperature was limited to 70° C instead of the customary 110° C to reduce the possibility of driving off chemically attached water from the clay minerals.

Next, the grain volume was measured using a helium porosimeter built by Core Labs of Dallas, Texas. The helium porosimeter accurately measures grain volume since helium is thin enough to penetrate all interconnected pore spaces. The procedure is to make a "zero" reading by measuring the volume of helium required to fill the empty specimen holder. Then the test specimen is placed inside the same holder and another reading is made. The difference between the two readings is the grain volume V_G in cubic centimeters. The grain volume is equal to the bulk volume minus the interconnected pore volume.

The final step was to measure the bulk or exterior .volume of the specimen using an electric pycnometer from The Refinery Supply Co. With this instrument the test specimen is submerged in a reservoir of mercury, and the increase in the level of the mercury is measured. The procedure is to take a "zero" reading with no test specimen in the mercury reservoir, and then to take a reading with the test specimen in the reservoir. The difference between the two readings is the apparent bulk volume. One needs to take into account the volume of the rods that keep the rock sample submerged. Multiplying the apparent volume by 0.9752 gives the true bulk volume V_B in cubic centimeters.

The values of W_n, W_o, V_G and V_B for the 12 test specimens are given in Table 2.

The values of apparent porosity AP, dry density ρ_o and degree of saturation S are calculated from the data in Table 2 with the following equations to give the results listed in Table 3.

$$AP = (1 - \frac{V_G}{V_B}) \text{ X } 100\%$$

$$\rho_o = \frac{W_o}{V_B} \quad \text{g/cc}$$

$$S = \frac{W_n - W_o}{\gamma_w (V_B - V_G)} \text{ X } 100 \%$$

where γ_w = unit weight of water = 1.00 g/cc

The apparent porosity is the ratio of the connected pore volume to the total volume of the specimen, times 100. The degree of saturation represents the percent of the pore volume which was filled with water in the as-received moisture state.

SUMMARY DISCUSSION

The final results from Tables 1 and 3 are summarized in Table 4 for each depth interval. The values for apparent porosity, oven-dry density, and degree of saturation are the average of three determinations on each depth interval.

The average uniaxial compressive strengths ranged from 829 to

TABLE 2

TEST DATA FOR POROSITY AND SATURATION TESTS

Drill Hole No.	Depth ft.	Initial Wgt W_n, g	Oven-Dry Wgt. W_o, g	Grain Vol. V_G, cc	Bulk Vol. V_B, cc
NM-25-588	939.3	17.8381	16.8815	6.33	7.410
NM-25-588	940.0	14.1119	13.3126	5.04	5.940
NM-25-588	941.0	21.2396	20.0236	7.49	8.960
PM-25-587	795.0	13.2194	11.7648	4.41	5.714
PM-25-587	796.0	8.7340	8.1839	3.08	3.718
PM-25-587	797.0	20.4352	18.4540	6.91	8.752
NM-35-742	717.0	21.0448	19.3100	7.21	8.789
NM-35-742	717.2	18.7218	17.0700	6.25	7.821
NM-35-742	717.7	22.6698	21.0395	7.89	10.189
LM-35-743	809.0	26.3289	24.4054	8.90	11.091
LM-35-743	809.2	22.6772	21.3267	7.90	9.659
LM-35-743	809.4	22.2130	20.9219	7.75	9.430

TABLE 3

POROSITY AND SATURATION TEST RESULTS

Drill Hole No.	Depth ft.	Apparent Porosity AP, %	Oven-Dry Density ρ_o, g/cc	Degree of Saturation S, %
NM-25-588	939.3	14.58	2.278	88.6
NM-25-588	940.0	15.15	2.241	88.8
NM-25-588	941.0	16.41	2.235	82.7
PM-25-587	795.0	22.82	2.059	111.5
PM-25-587	796.0	17.17	2.201	86.2
PM-25-587	797.0	21.05	2.108	107.6
NM-35-742	717.0	17.97	2.197	109.9
NM-35-742	717.2	20.09	2.183	105.1
NM-35-742	717.7	22.56	2.065	70.9
LM-35-743	809.0	19.75	2.200	87.8
LM-35-743	809.2	18.21	2.208	76.8
LM-35-743	809.4	17.82	2.219	76.9

TABLE 4

SUMMARY TABLE OF PROPERTIES

Property	Drill Hole No. (Depth, ft.)			
	NM-25-588 (939-941)	PM-25-587 (795-797)	NM-35-742 (717-718.7)	LM-35-743 (809-811)
Comp. Strength, $C_{2:1}$, psi	--	--	829	1,364
Young's Modulus, 10^5 psi	--	--	1.04	2.35
Poisson's Ratio	--	--	0.288	0.570
Apparent Porosity, %	15.38	20.35	20.21	18.59
Oven-Dry Density, g/cc	2.251	2.123	2.148	2.209
Degree of Saturation, %	86.7	101.8	95.3	80.5

1364 psi (Table 4). These strengths indicate that the rock is very weak, which corresponds to the observations during specimen preparation and testing. Extreme care had to be exercised to maintain the integrity of the few intact core pieces. The values of Young's modulus, 1.04 and 2.35 X 10^5 psi, at a stress level of 50 percent of the ultimate strengths are low as expected for this weak rock. The stress-strain curves (Appendix A) are fairly linear considering the weak character of the rock. It is noted that the higher Young's modulus was for the specimen with the higher strength which is expected.

One of the values of Poisson's ratio, 0.288, is in the theoretical elastic range for Poisson's ratio between 0 and 0.5. The other value, 0.570,is outside the theoretical range. Microfracturing in the specimen as the load is increased allows the specimen to expand more than normal in the lateral direction, resulting in abnormally high values of Poisson's ratio as the stress level increases. This behavior is more pronounced for weak rocks.

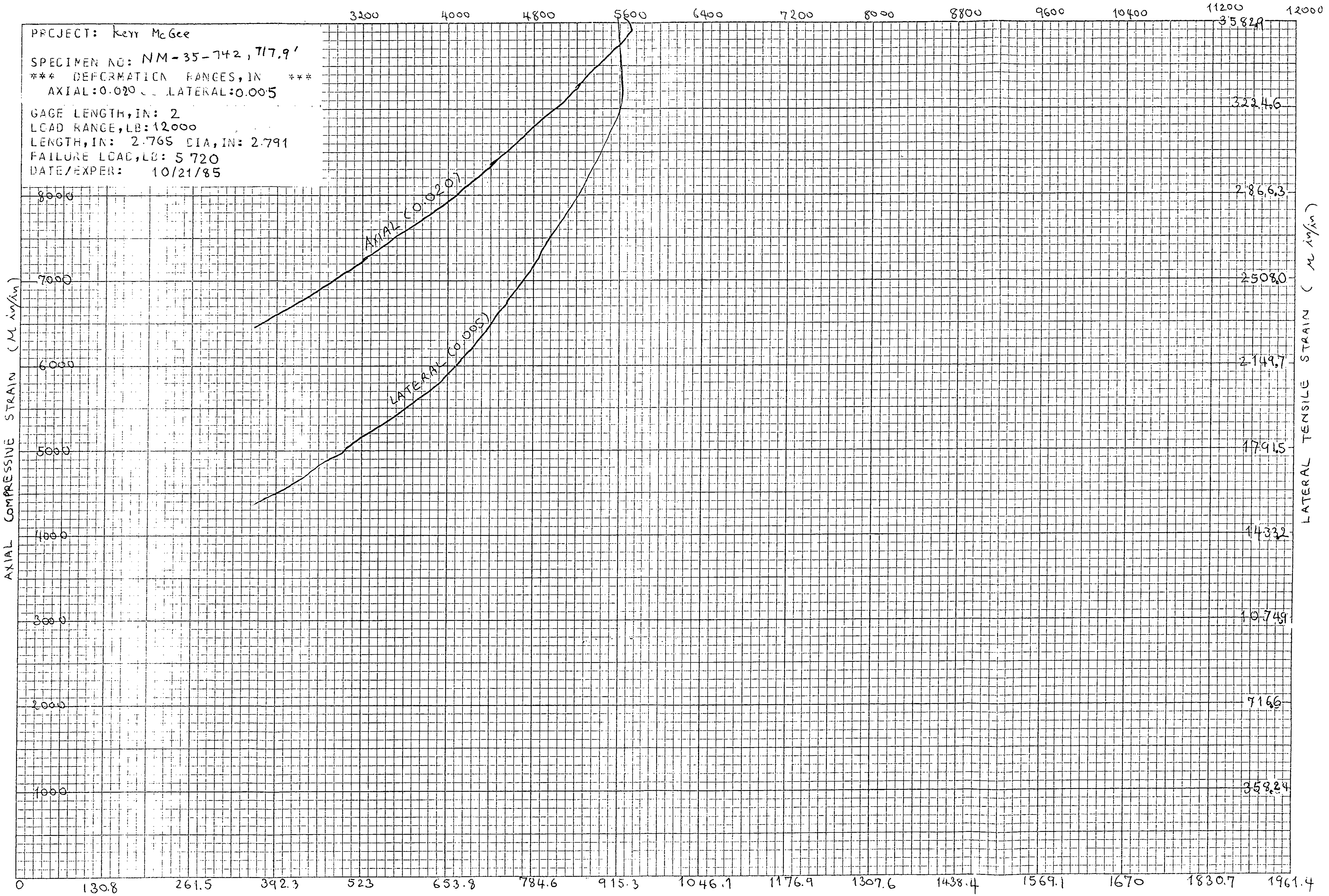
The apparent or effective porosity of the rock is high with average values ranging from 15.38 to 20.35 percent as given in Table 4. The oven-dry densities ranged from 2.123 to 2.251 g/cc, also as given in Table 4. These densities are reasonable for rocks with porosities in the range of 15 to 20 percent.

The degree of saturation (Tables 3 and 4) represents the percent of the connected pore volume which was filled with water in the initial as-received moisture state. The average percents saturation from Table 4 show that the rock was nearly saturated when received, with values ranging from 80.5 to 101.8 percent. It was surprising that four of the 12 measurements of degree of saturation listed in Table 3 were greater than 100 percent. Experimentally this could occur if too much water were driven off during the drying process, or if the measured pore volume were too small. The water which may have been driven off may have been chemically bound to some minerals in the shale, or it may have been from some unconnected pore space in the specimen. The low drying temperature of 70° C was believed to be low enough that such loss would not occur. There may also be minerals of unexpected types in the shale which may decompose upon heating. The pore volume is the difference between the bulk volume and the grain volume. If the measured bulk volume were too low, the calculated pore volume would be too small, resulting in too high a degree of saturation. This may well have been the case because some of the friable specimens crumbled slightly under the force of the hold-down supports in the mercury reservoir. With material which crumbles this easily one must not view the results as though they are very precise.

The degree of saturation as measured here is a function of the in-situ moisture state, probable moisture gain during drilling, loss during storage, and loss during specimen preparation and testing. No water was used in the sawing and grinding processes to minimize the change in the moisture state. Storage in sealed plastic tubing also helped maintain the initial moisture state.

APPENDIX A

STRESS-STRAIN CURVES



PROJECT: Kerr McGee

SPECIMEN NO: NM-35-742, 717.9'

*** DEFORMATION RANGES, IN ***

AXIAL:0.020 .. LATERAL:0.005

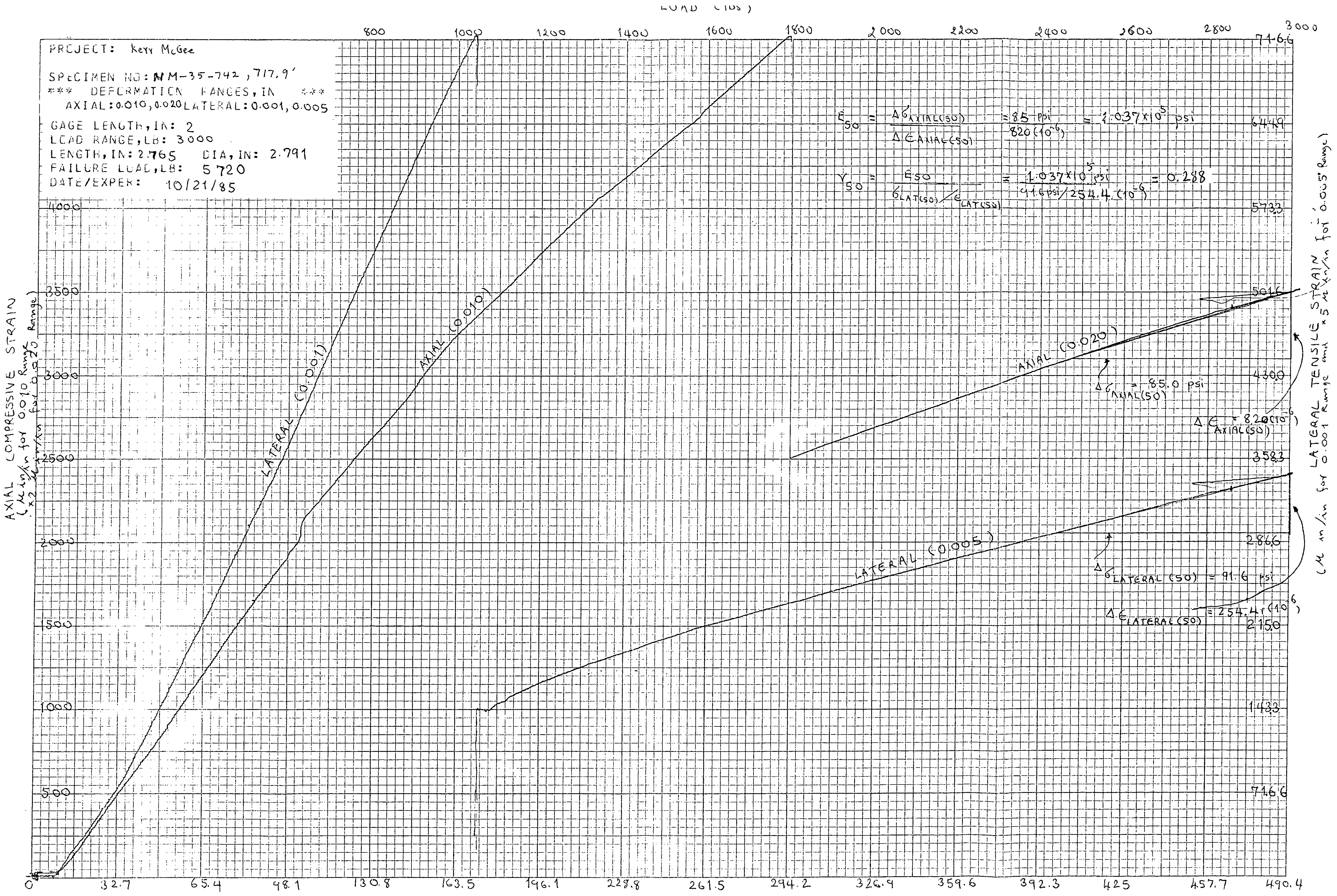
GAGE LENGTH, IN: 2

LOAD RANGE, LB: 12000

LENGTH, IN: 2.765 DIA, IN: 2.791

FAILURE LOAD, LB: 5 720

DATE/EXPER: 10/21/85



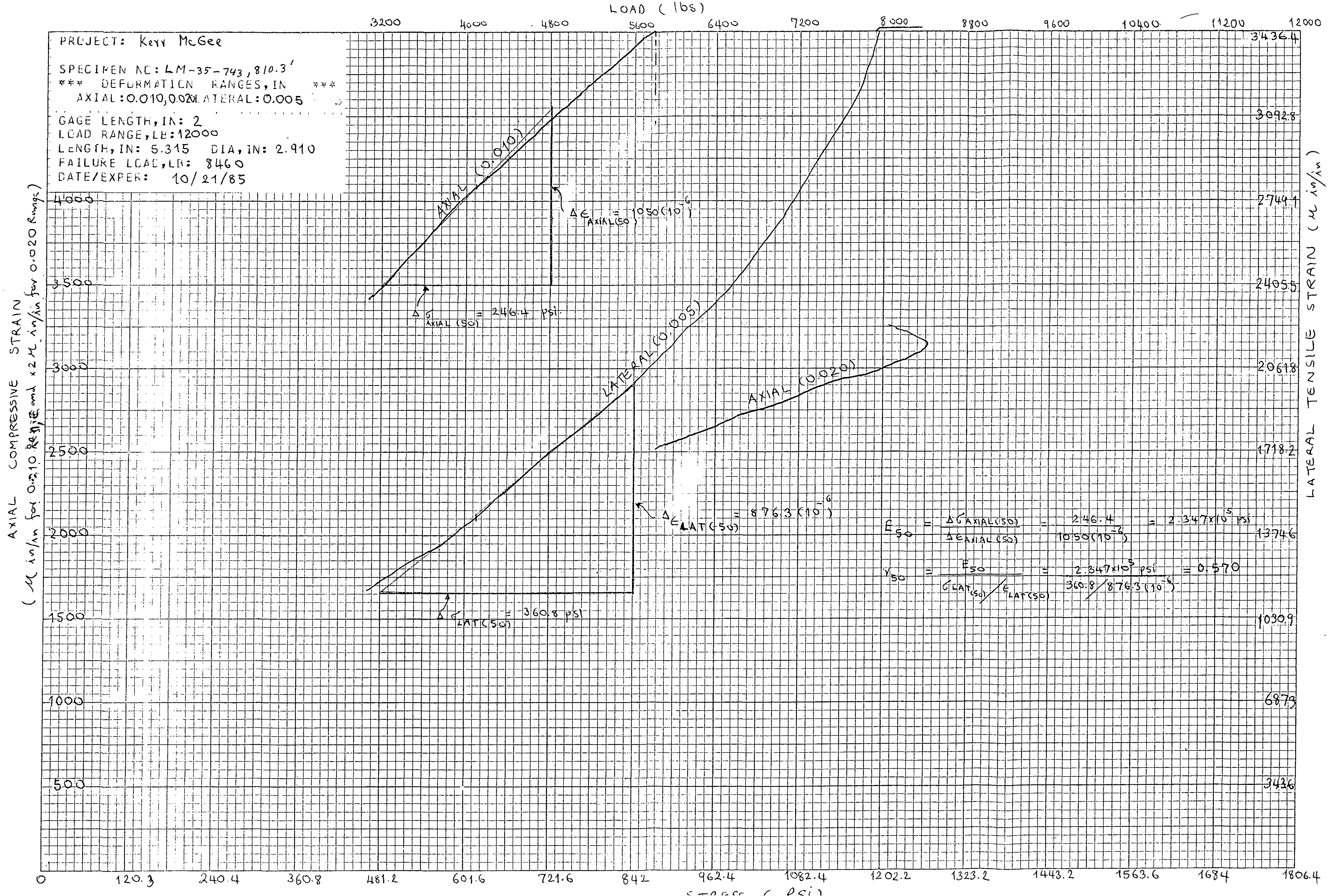
PROJECT: Kerr McGee

SPECIMEN NO: NM-35-742, 717.9'
*** DEFORMATION RANGES, IN ***
AXIAL: 0.010, 0.020 LATERAL: 0.001, 0.005

GAGE LENGTH, IN: 2
LOAD RANGE, LB: 3000
LENGTH, IN: 2.765 DIA, IN: 2.791
FAILURE LOAD, LB: 5720
DATE/EXPER: 10/21/85

$$E_{50} = \frac{\Delta\sigma_{AXIAL(50)}}{\Delta\epsilon_{AXIAL(50)}} = \frac{85 \text{ psi}}{820(10^{-6})} = 1.037\times10^{5} \text{ psi}$$

$$\nu_{50} = \frac{E_{50}}{\sigma_{LAT(50)}/\epsilon_{LAT(50)}} = \frac{1.037\times10^{5} \text{ psi}}{91.6 \text{ psi}/254.4(10^{-6})} = 0.288$$



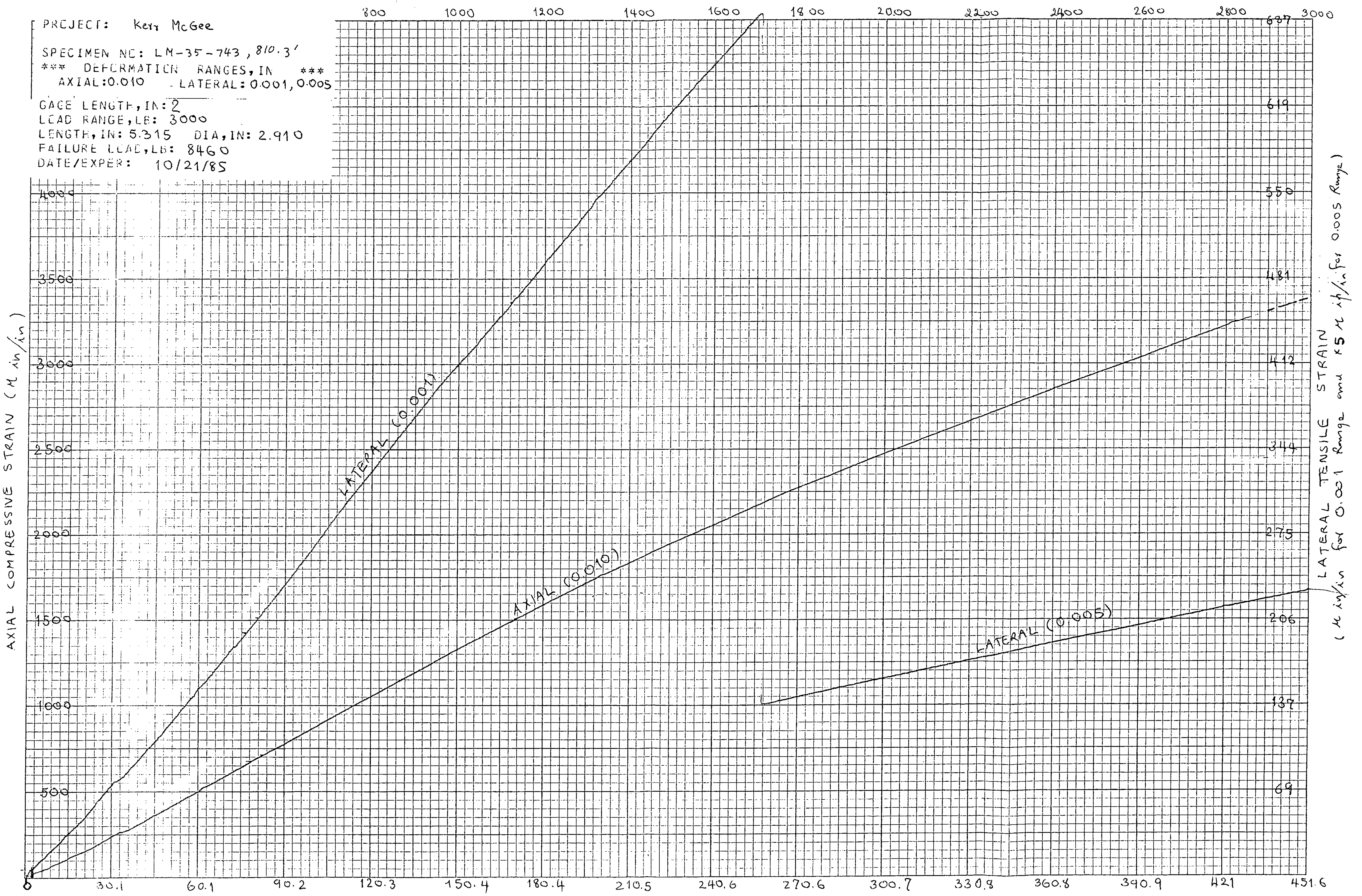
PROJECT: Kerr McGee

SPECIMEN NO: LM-35-743, 810.3′
*** DEFORMATION RANGES, IN ***
AXIAL: 0.010, 0.020 LATERAL: 0.005

GAGE LENGTH, IN: 2
LOAD RANGE, LB: 12000
LENGTH, IN: 5.315 DIA, IN: 2.910
FAILURE LOAD, LB: 8460
DATE/EXPER: 10/21/85

$$E_{50} = \frac{\Delta\sigma_{AXIAL(50)}}{\Delta\epsilon_{AXIAL(50)}} = \frac{246.4}{1050(10^{-6})} = 2.347 \times 10^{5} \text{ psi}$$

$$\nu_{50} = \frac{E_{50}}{\sigma_{LAT(50)} / \epsilon_{LAT(50)}} = \frac{2.347 \times 10^{5} \text{ psi}}{360.8 / 876.3(10^{-6})} = 0.570$$


PROJECT: Kerr McGee

SPECIMEN NO: LM-35-743 , 810.3'

*** DEFORMATION RANGES, IN ***

AXIAL:0.010 LATERAL: 0.001, 0.005

GAGE LENGTH, IN: 2

LOAD RANGE, LB: 3000

LENGTH, IN: 5.315 DIA, IN: 2.910

FAILURE LOAD, LB: 8460

DATE/EXPER: 10/21/85

APPENDIX B

PUMPING TESTS DATA

APPENDIX B

PUMPING TEST DATA

INDEX PAGE

Section 25 Phase I Test

The Phase I test was to demonstrate the isolating characteristics of the overlying and underlying shales; however, an equipment malfunction shutdown the pump after only 17 hours of pumping and none of the Phase I data was used in the analyses. Data did indicate an isolated pressure source significantly higher than the test formation in the overlying shale well and a seal problem on the underlying shale well completion. Both shale wells were subsequently abandoned after attempts to repair them were unsuccessful. Data on the pump well flow rate and drawdown for Phase I is attached.

PUMPED WELL RATE
& FLUID LEVEL
(WELL 25-584)
DRAWDOWN DATA
PHASE I TEST
SECTION 25-T36N-R74W

Commence pumping 50 gpm at 1100 hours on 12-23-85.

Time	Rate	Pumped Well 25-584 Fluid Level	Date
1100	0 - 50	473.43'	12-23-85
1105	49	530.14'	"
1110	50	534.46'	"
1115	50	535.26'	"
1120	50	536.00'	"
1125	50	536.68'	"
1130	49	536.95'	"
1200	50	538.22'	"
1230	49	538.94'	"
1300	49	539.40'	"
1330	49	539.87'	"
1400	50	541.07'	"
1500	51	543.48'	"
1600	50	543.46'	"
1700	51	544.00'	"
2000	52	544.16'	"
2400	50	542.93'	"
0400	51	543.70'	12-24-85

Pump quit between 0400 - 0800

Section 25 Phase II Test

In the Section 25 Phase II Test production zone monitor wells 581, 582 and 583, pumped well 584, and the reworked underlying shale well were monitored with transducers. The Phase II test was conducted to provide data in the production zone characteristics and check the repair to the underlying shale well. The generator malfunctioned and shutdown after 2.8 days of pumping and no meaningful aquifer recovery data was collected in this test segment. Repairs to the underlying shale well were not successful and the well was subsequently abandoned. Background and drawdown data on wells 581, 582, 583, and 584 are attached.

The Section 25 Phase II Retest was conducted to obtain aquifer recovery data which could not be collected when the generator malfunctioned in the initial phase II test and to monitor the overlying and underlying aquifers for possible response to pumping from the production zone. Transducers were placed in the production zone wells 583 and 584 for background and drawdown data to ensure a similar drawdown situation was created prior to collecting the recovery data and in the wells 585 and 586 completed in the overlying and underlying aquifers.

After drawdown was established by pumping well 584 for three days, transducers were removed from overlying and underlying aquifer wells 585 and 586 and placed in production zone monitor wells 581 and 582 to collect recovery data for the production zone aquifer. Data for the wells monitored in the Phase II Retest follow well data from the Phase II test.

PUMPED WELL RATE
WELL 25-584
DRAWDOWN DATA
PHASE II TEST
SECTION 25-T36N-R74W

Commence pumping at 1000 hours on 1-7-86.

Time	Rate	Date
1000	50	1-7-86
1200	49	"
1400	49	"
1600	48	"
2000	48	"
2400	48	"
0400	48	1-8-86
0800	47	"
	Reset to 50 GPM	
1300	50	"
1600	50	"
2000	50	"
2400	50	"
0400	50	1-9-86
0800	50	"
1200	49	"
2000	49	"
2400	49	"
0400	49	1-10-86
0800	-	"

Pump quit between 0400 - 0800

WELL 25-584

BACKGROUND DATA
PHASE II TEST

SECTION 25-T36N-R74W

```
        SE1000B
  Environmental Logger
     01/07  08:27

  Unit# 00000  Test# 1

INPUT 1:  Level (F) TOC

Reference          0.00
Scale factor      50.00
Offset             0.00

Step# 0   01/06  15:01

Elapsed Time    Value
------------   ---------
   0.0000          0.00
  30.0000      -   0.01
  60.0000      -   0.03
  90.0000      -   0.03
  120.000      -   0.04
  150.000      -   0.04
  180.000      -   0.04
  210.000      -   0.03
  240.000      -   0.03
  270.000      -   0.01
  300.000      -   0.01
  330.000      -   0.01
  360.000      -   0.01
  390.000          0.00
  420.000      -   0.01
  450.000          0.00
  480.000          0.00
  510.000          0.00
  540.000      -   0.01
  570.000      -   0.01
  600.000      -   0.01
  630.000      -   0.01
  660.000      -   0.03
  690.000      -   0.03
  720.000      -   0.03
  750.000      -   0.03
  780.000      -   0.03
  810.000      -   0.03
  840.000      -   0.04
  870.000      -   0.04
  900.000      -   0.04
  930.000      -   0.04
  960.000      -   0.04
  990.000      -   0.04
  1020.00      -   0.04
END
```

25-584

WELL 25-584

DRAWDOWN DATA
PHASE II TEST

SECTION 25-T36N-R74W

25-584 ph. II

```
     SE1000B
Environmental Logger
   01/10  09:56

 Unit# 00000  Test# 0

INPUT 1:  Level (F) TOC

Reference          0.00
Scale factor      50.00
Offset             0.00

Step# 0   01/07  10:00

Elapsed Time    Value
------------  ---------
    0.0000        6.08
    0.0033        6.22
    0.0066        6.41
    0.0099        6.55
    0.0133        6.77
    0.0166        7.01
    0.0200        7.25
    0.0233        7.49
    0.0266        7.79
    0.0300        7.77
    0.0333        8.02
    0.0500        9.14
    0.0666       10.09
    0.0833       11.17
    0.1000       12.04
    0.1166       13.17
    0.1333       13.89
    0.1500       14.90
    0.1666       15.62
    0.1833       16.38
    0.2000       17.39
    0.2166       17.96
    0.2333       18.69
    0.2500       19.56
    0.2666       20.17
    0.2833       20.81
    0.3000       21.33
    0.3166       21.82
    0.3333       22.29
    0.4167       24.06
    0.5000       26.35
    0.5833       27.63
    0.6667       28.77
    0.7500       30.24
    0.8333       31.57
    0.9167       32.56
    1.0000       33.13
    1.0833       34.37
    1.1667       35.36
    1.2500       36.34
    1.3333       36.72
    1.4166       38.13
    1.5000       38.57
    1.5833       39.50
    1.6667       39.88
    1.7500       40.34

    1.8333       41.07
    1.9167       41.89
    2.0000       42.03
    2.5000       44.75
    3.0000       47.07
    3.5000       48.51
    4.0000       49.65
    4.5000       50.74
    5.0000       51.26
    5.5000       51.81
    6.0000       52.41
    6.5000       52.52
    7.0000       52.92
    7.5000       53.39
    8.0000       53.39
    8.5000       53.53
    9.0000       53.93
    9.5000       54.26
   10.0000       54.42
   12.0000       55.87
   14.0000       56.35
   16.0000       56.22
   18.0000       56.62
   20.0000       57.04
   22.0000       57.41
   24.0000       57.44
   26.0000       57.72
   28.0000       57.96
   30.0000       58.05
   32.0000       58.15
   34.0000       58.54
   36.0000       58.84
   38.0000       59.14
   40.0000       59.05
   42.0000       59.48
   44.0000       59.82
   46.0000       59.79
   48.0000       59.54
   50.0000       59.33
   52.0000       59.63
   54.0000       59.65
   56.0000       59.43
   58.0000       59.81
   60.0000       59.71
   62.0000       60.16
   64.0000       59.81
   66.0000       59.86
   68.0000       60.09
   70.0000       60.19
   72.0000       60.39
   74.0000       60.08
   76.0000       60.27
   78.0000       60.12
   80.0000       60.14
   82.0000       60.42
   84.0000       60.09
   86.0000       60.39
   88.0000       60.49
   90.0000       60.46
   92.0000       60.65
   94.0000       60.28
   96.0000       60.50

   98.0000       60.69
   100.000       60.50
   110.000       60.97
   120.000       61.21
   130.000       61.13
   140.000       62.11
   150.000       62.32
   160.000       62.02
   170.000       62.26
   180.000       62.30
   190.000       62.45
   200.000       62.70
   210.000       63.01
   220.000       63.35
   230.000       63.15
   240.000       63.27
   250.000       63.47
   260.000       63.71
   270.000       63.61
   280.000       63.95
   290.000       63.79
   300.000       64.12
   310.000       64.11
   320.000       63.77
   330.000       64.07
   340.000       63.72
   350.000       63.82
   360.000       63.9[illegible]
   370.000       64.02
   380.000       64.09
   390.000       63.95
   400.000       64.14
   410.000       64.27
   420.000       64.36
   430.000       64.74
   440.000       64.41
   450.000       64.47
   460.000       64.34
   470.000       64.45
   480.000       64.47
   490.000       64.60
   500.000       64.82
   510.000       64.67
   520.000       64.80
   530.000       64.82
   540.000       64.79
   550.000       64.79
   560.000       64.83
   570.000       64.96
   580.000       64.90
   590.000       64.85
   600.000       64.88
   610.000       65.02
   620.000       65.28
   630.000       65.09
   640.000       65.16
   650.000       65.31
   660.000       65.31
   670.000       65.34
   680.000       65.21
   690.000       65.13
   700.000       65.50
   710.000       65.46

   720.000       65.[illegible]
   730.000       65.48
   740.000       65.61
   750.000       65.59
   760.000       65.72
   770.000       65.54
   780.000       65.77
   790.000       65.73
   800.000       65.52
   810.000       65.69
   820.000       65.84
   830.000       65.75
   840.000       65.73
   850.000       65.64
   860.000       65.99
   870.000       65.77
   880.000       65.84
   890.000       65.99
   900.000       65.78
   910.000       65.91
   920.000       66.07
   930.000       65.97
   940.000       65.95
   950.000       66.40
   960.000       66.02
   970.000       66.32
   980.000       66.11
   990.000       66.32
   1000.00       66.11
   1100.00       66.10
   1200.00       66.24
   [illegible]   [illegible]
   [illegible]   67.62
   [illegible]   69.02
   1600.00       69.91
   1700.00       69.94
   1800.00       69.90
   1900.00       69.97
   2000.00       70.22
   2100.00       70.25
   2200.00       72.47
   2300.00       71.74
   2400.00       70.66
   2500.00       70.69
   2600.00       70.63
   2700.00       70.77
   2800.00       71.51
   2900.00       70.54
   3000.00       70.96
   3100.00       70.93
   3200.00       70.91
   3300.00       71.15
   3400.00       71.22
   3500.00       71.39
   3600.00       70.79
   3700.00       70.85
   3800.00       70.91
   3900.00       70.42
   4000.00       70.96
   4100.00        9.10
   4200.00       [illegible]
END
```

WELL 25-581

BACKGROUND DATA
PHASE II TEST

SECTION 25-T36N-R74W

```
            SE1000B
     Environmental Logger
       [illegible]  08:11

     Unit# 00000  Test# 1

   INPUT 1:  Level (F) TOC

   Reference          0.00
   Scale factor      50.08
   Offset             0.00

   Step# 0   01/06  15:08

   Elapsed Time     Value
   ------------   ---------
      0.0000           0.01
     30.0000           0.00
     60.0000       -   0.03
     90.0000       -   0.03
     120.000       -   0.03
     150.000       -   0.01
     180.000           0.00
     210.000           0.01
     240.000           0.03
     270.000           0.03
     300.000           0.04
     330.000           0.06
     360.000           0.07
     390.000           0.07
     420.000           0.09
     450.000           0.11
     480.000           0.11
     510.000           0.11
     540.000           0.11
     570.000           0.11
     600.000           0.11
     630.000           0.12
     660.000           0.12
     690.000           0.12
     720.000           0.12
     750.000           0.12
     780.000           0.12
     810.000           0.14
     840.000           0.14
     870.000           0.14
     900.000           0.14
     930.000           0.15
     960.000           0.15
     990.000           0.15
  END
```

25-581 Background phase 2

WELL 25-581

DRAWDOWN DATA
PHASE II TEST

SECTION 25-T36N-R74W

phase II

```
READY 25-581

      SE1000B
 Environmental Logger
   01/10  08:58

 Unit# 00000  Test# 0

INPUT 1:  Level (F) TOC

Reference          0.00
Scale factor      50.08
Offset             0.00

Step# 0    01/07  10:00

Elapsed Time      Value
------------    -------
   0.0000       - 0.17
   0.0033       - 0.17
   0.0066       - 0.17
   0.0099       - 0.17
   0.0133       - 0.17
   0.0166       - 0.17
   0.0200       - 0.17
   0.0233       - 0.17
   0.0266       - 0.17
   0.0300       - 0.17
   0.0333       - 0.17
   0.0500       - 0.17
   0.0666       - 0.17
   0.0833       - 0.17
   0.1000       - 0.17
   0.1166       - 0.17
   0.1333       - 0.17
   0.1500       - 0.15
   0.1666       - 0.17
   0.1833       - 0.17
   0.2000       - 0.15
   0.2166       - 0.17
   0.2333       - 0.15
   0.2500       - 0.15
   0.2666       - 0.15
   0.2833       - 0.15
   0.3000       - 0.15
   0.3166       - 0.15
   0.3333       - 0.15
   0.4167       - 0.15
   0.5000       - 0.14
   0.5833       - 0.14
   0.6667       - 0.12
   0.7500       - 0.11
   0.8333       - 0.09
   0.9167       - 0.07
   1.0000       - 0.04
   1.0833       - 0.03
   1.1667         0.00
   1.2500         0.03
   1.3333         0.04
   1.4166         0.07
   1.5000         0.11
   1.5833         0.14
   1.6667         0.18
   1.7500         0.22
   1.8333         0.26
   1.9167         0.30
   2.0000         0.34
   2.5000         0.61
   3.0000         0.91
   3.5000         1.21
   4.0000         1.51
   4.5000         1.83
   5.0000         2.11
   5.5000         2.40
   6.0000         2.67
   6.5000         2.94
   7.0000         3.17
   7.5000         3.41
   8.0000         3.63
   8.5000         3.84
   9.0000         4.03
   9.5000         4.20
  10.0000         4.37
  12.0000         5.02
  14.0000         5.51
  16.0000         5.94
  18.0000         6.27
  20.0000         6.60
  22.0000         6.89
  24.0000         7.13
  26.0000         7.35
  28.0000         7.57
  30.0000         7.76
  32.0000         7.93
  34.0000         8.09
  36.0000         8.25
  38.0000         8.39
  40.0000         8.53
  42.0000         8.68
  44.0000         8.80
  46.0000         8.93
  48.0000         9.07
  50.0000         9.18
  52.0000         9.28
  54.0000         9.37
  56.0000         9.45
  58.0000         9.55
  60.0000         9.64
  62.0000         9.72
  64.0000         9.80
  66.0000         9.88
  68.0000         9.96
  70.0000        10.02
  72.0000        10.10
  74.0000        10.16
  76.0000        10.24
  78.0000        10.30
  80.0000        10.37
  82.0000        10.43
  84.0000        10.49
  86.0000        10.54
  88.0000        10.59
  90.0000        10.65
  92.0000        10.70
  94.0000        10.76
  96.0000        10.81
  98.0000        10.86
  100.000        10.91
  110.000        11.14
  120.000        11.36
  130.000        11.55
  140.000        11.78
  150.000        11.98
  160.000        12.15
  170.000        12.31
  180.000        12.44
  190.000        12.58
  200.000        12.69
  210.000        12.83
  220.000        12.98
  230.000        13.09
  240.000        13.20
  250.000        13.29
  260.000        13.40
  270.000        13.51
  280.000        13.61
  290.000        13.69
  300.000        13.78
  310.000        13.86
  320.000        13.94
  330.000        14.02
  340.000        14.07
  350.000        14.13
  360.000        14.21
  370.000        14.27
  380.000        14.34
  390.000        14.40
  400.000        14.46
  410.000        14.54
  420.000        14.62
  430.000        14.67
  440.000        14.72
  450.000        14.76
  460.000        14.81
  470.000        14.86
  480.000        14.92
  490.000        14.97
  500.000        15.03
  510.000        15.08
  520.000        15.14
  530.000        15.17
  540.000        15.22
  550.000        15.27
  560.000        15.30
  570.000        15.35
  580.000        15.38
  590.000        15.43
  600.000        15.46
  610.000        15.51
  620.000        15.54
  630.000        15.59
  640.000        15.62
  650.000        15.66
  660.000        15.70
  670.000        15.73
  680.000        15.76
  690.000        15.79
  700.000        15.82
  710.000        15.85
  720.000        15.89
  730.000        15.93
  740.000        15.97
  750.000        16.00
  760.000        16.01
  770.000        16.04
  780.000        16.08
  790.000        16.09
  800.000        16.12
  810.000        16.14
  820.000        16.17
  830.000        16.19
  840.000        16.22
  850.000        16.23
  860.000        16.27
  870.000        16.28
  880.000        16.30
  890.000        16.33
  900.000        16.34
  910.000        16.36
  920.000        16.39
  930.000        16.41
  940.000        16.42
  950.000        16.46
  960.000        16.47
  970.000        16.49
  980.000        16.50
  990.000        16.52
  1000.00        16.55
  1100.00        16.69
  1200.00        16.84
  1300.00        16.96
  1400.00        17.51
  1500.00        17.67
  1600.00        17.89
  1700.00        18.02
  1800.00        18.12
  1900.00        18.24
  2000.00        18.35
  2100.00        18.45
  2200.00        18.54
  2300.00        18.62
  2400.00        18.70
  2500.00        18.76
  2600.00        18.81
  2700.00        18.84
  2800.00        18.87
  2900.00        18.87
  3000.00        18.92
  3100.00        18.92
  3200.00        18.92
  3300.00        19.02
  3400.00        19.03
  3500.00        19.11
  3600.00        19.10
  3700.00        19.13
  3800.00        19.14
  3900.00        19.14
  4000.00        19.16
  4100.00         8.75
  4200.00         6.59
END
```

WELL 25-582

BACKGROUND DATA
PHASE II TEST

SECTION 25-T36N-R74W

```
          SE1000B
   Environmental Logger
       01/07  08:29

   Unit# 00000  Test# 1

 INPUT 2:  Level (F) TOC

 Reference          0.00
 Scale factor      50.07
 Offset             0.00

 Step# 0   01/06  15:01

 Elapsed Time     Value
 ------------   ---------
    0.0000       -  0.01
   30.0000       -  0.03
   60.0000       -  0.04
   90.0000       -  0.06
   120.000       -  0.04
   150.000       -  0.04
   180.000       -  0.04
   210.000       -  0.03
   240.000       -  0.01
   270.000       -  0.01
   300.000          0.07
   330.000          0.09
   360.000          0.11
   390.000          0.11
   420.000          0.11
   450.000          0.12
   480.000          0.14
   510.000          0.14
   540.000          0.14
   570.000          0.12
   600.000          0.12
   630.000          0.12
   660.000          0.12
   690.000          0.11
   720.000          0.11
   750.000          0.11
   780.000          0.11
   810.000          0.11
   840.000          0.09
   870.000          0.09
   900.000          0.09
   930.000          0.09
   960.000          0.09
   990.000          0.09
   1020.00          0.09
 END
```

25-582

WELL 25-582

DRAWDOWN DATA
PHASE II TEST

SECTION 25-T36N-R74W

25-582 phase II

```
     SE1000B
Environmental Logger
   01/13 10:05

Unit# 00000  Test# 0

INPUT 2:  Level (F) TOC

Reference          0.00
Scale factor       5[illegible]
Offset             0.00

Step# 0   01/07  10:00

Elapsed Time     Value
------------   ---------
    0.0000     -  0.01
    0.0033     -  0.01
    0.0066     -  0.01
    0.0099     -  0.01
    0.0133        0.[illegible]
    0.0166     -  0.01
    0.0200     -  0.01
    0.0233     -  0.01
    0.0266     -  0.01
    0.0300     -  0.01
    0.0333     -  0.01
    0.0500     -  0.01
    0.0666     -  0.01
    0.0833     -  0.01
    0.1000     -  0.01
    0.1166     -  0.01
    0.1333     -  0.01
    0.1500     -  0.01
    0.1666     -  0.01
    0.1833     -  0.01
    0.2000     -  0.01
    0.2166     -  0.01
    0.2333     -  0.01
    0.2500     -  0.01
    0.2666     -  0.01
    0.2833     -  0.01
    0.3000     -  0.01
    0.3166     -  0.01
    0.3333     -  0.01
    0.4167     -  0.01
    0.5000     -  0.01
    0.5833     -  0.01
    0.6667     -  0.01
    0.7500        0.00
    0.8333        0.00
    0.9167        0.00
    1.0000        0.00
    1.0833        0.00
    1.1667        0.01
    1.2500        0.01
    1.3333        0.01
    1.4166        0.03
    1.5000        0.03
    1.5833        0.03
     .6667        0.04
     7500         0.04

    1.8333        0.04
    1.9167        0.06
    2.0000        0.06
    2.5000        0.12
    3.0000        0.17
    3.5000        0.23
    4.0000        0.31
    4.5000        0.39
    5.0000        0.46
    5.5000        0.56
    6.0000        0.66
    6.5000        0.75
    7.0000        0.85
    7.5000        0.96
    8.0000        1.05
    8.5000        1.16
    9.0000        1.26
    9.5000        1.37
   10.0000        1.48
   12.0000        1.92
   14.0000        2.35
   16.0000        2.78
   18.0000        3.20
   20.0000        3.62
   22.0000        3.99
   24.0000        4.34
   26.0000        4.63
   28.0000        5.04
   30.0000        5.35
   32.0000        5.64
   34.0000        5.94
   36.0000        6.20
   38.0000        6.46
   40.0000        6.6[illegible]
   42.0000        6.95
   44.0000        7.17
   46.0000        7.39
   48.0000        7.59
   50.0000        7.77
   52.0000        7.94
   54.0000        8.13
   56.0000        8.29
   58.0000        8.45
   60.0000        8.62
   62.0000        8.76
   64.0000        8.91
   66.0000        9.05
   68.0000        9.14
   70.0000        9.29
   72.0000        9.41
   74.0000        9.52
   76.0000        9.63
   78.0000        9.73
   80.0000        9.85
   82.0000        9.93
   84.0000       10.03
   86.0000       10.14
   88.0000       10.23
   90.0000       10.33
   92.0000       10.42
   94.0000       10.47
   96.0000       10.58

   98.0000       10.5[illegible]
   100.000       10.7[illegible]
   110.000       11.07
   120.000       11.4[illegible]
   130.000       11.69
   140.000       11.[illegible]
   150.000       12.1[illegible]
   160.000       12.47
   170.000       12.62
   180.000       12.79
   190.000       [illegible]
   200.000       [illegible]
   210.000       [illegible]
   220.000       13.33
   230.000       13.47
   240.000       13.60
   250.000       13.[illegible]
   260.000       [illegible]
   270.000       [illegible]
   280.000       14.0[illegible]
   290.000       14.1[illegible]
   300.000       14.[illegible]
   310.000       [illegible]
   320.000       14.[illegible]
   330.000       [illegible]
   340.000       14.[illegible]
   350.000       14.[illegible]
   360.000       14.64
   370.000       14.6[illegible]
   380.000       [illegible]
   390.000       14.[illegible]
   400.000       14.[illegible]
   410.000       15.04
   420.000       15.[illegible]
   430.000       15.1[illegible]
   440.000       15.1[illegible]
   450.000       15.2[illegible]
   460.000       15.3[illegible]
   470.000       15.34
   480.000       15.40
   490.000       15.45
   500.000       15.48
   510.000       15.54
   520.000       15.57
   530.000       15.65
   540.000       15.67
   550.000       15.73
   560.000       15.75
   570.000       15.81
   580.000       15.86
   590.000       15.87
   600.000       15.90
   610.000       15.97
   620.000       15.98
   630.000       16.05
   640.000       16.06
   650.000       16.11
   660.000       16.14
   670.000       16.19
   680.000       16.21
   690.000       16.25
   700.000       16.28
   710.000       16.30

   720.000       [illegible]
   730.000       [illegible]
   740.000       16.4[illegible]
   750.000       16.47
   760.000       16.46
   770.000       16.4[illegible]
   780.000       16.5[illegible]
   790.000       16.54
   800.000       16.[illegible]
   810.000       [illegible]
   820.000       [illegible]
   830.000       [illegible]
   840.000       16.[illegible]
   850.000       [illegible]
   860.000       [illegible]
   870.000       16.7[illegible]
   880.000       [illegible]
   890.000       [illegible]
   900.000       [illegible]
   [illegible]   [illegible]
   [illegible]   [illegible]
   [illegible]   [illegible]
   [illegible]   [illegible]
   [illegible]   [illegible]
   [illegible]   [illegible]
   [illegible]   [illegible]
   [illegible]   [illegible]
   [illegible]   [illegible]
   [illegible]   16.96
   [illegible]   [illegible]
   1200.00       [illegible]
   1300.00       [illegible]
   1400.00       [illegible]
   1500.00       [illegible]
   1600.00       [illegible]
   1700.00       [illegible]
   1800.00       [illegible]
   1900.00       [illegible]
   2000.00       [illegible]
   2100.00       [illegible]
   2200.00       [illegible]
   2300.00       [illegible]
   2400.00       [illegible]
   2500.00       18.04
   2600.00       18.41
   2700.00       18.[illegible]
   2800.00       [illegible]
   2900.00       [illegible]
   3000.00       [illegible]
   3100.00       19.0[illegible]
   3200.00       19.[illegible]
   3300.00       [illegible]
   3400.00       [illegible]
   3500.00       [illegible]
   3600.00       [illegible]
   3700.00       19.[illegible]
   3800.00       [illegible]
   3900.00       [illegible]
   4000.00       [illegible].32
   4100.00       9.4[illegible]
   4200.00       4.90
END
```

WELL 25-583

BACKGROUND DATA
PHASE II TEST

SECTION 25-T36N-R74W

```
        SE1000B
  Environmental Logger
      01/07  08:22

  Unit# 00000  Test# 1

INPUT 2:  Level (F) TOC

Reference            0.00
Scale factor        50.32
Offset               0.00

Step# 0   01/06  15:05

Elapsed Time     Value
------------   ---------
    0.0000          0.00
   30.0000     -    0.03
   60.0000     -    0.06
   90.0000     -    0.07
   120.000     -    0.11
   150.000     -    0.09
   180.000     -    0.11
   210.000     -    0.11
   240.000     -    0.11
   270.000     -    0.04
   300.000     -    0.04
   330.000     -    0.03
   360.000     -    0.03
   390.000     -    0.03
   420.000     -    0.03
   450.000     -    0.03
   480.000     -    0.03
   510.000     -    0.03
   540.000     -    0.03
   570.000     -    0.03
   600.000     -    0.03
   630.000     -    0.03
   660.000     -    0.03
   690.000     -    0.04
   720.000     -    0.04
   750.000     -    0.04
   780.000     -    0.04
   810.000     -    0.06
   840.000     -    0.06
   870.000     -    0.06
   900.000     -    0.06
   930.000     -    0.06
   960.000     -    0.06
   990.000     -    0.06
END
```

583

WELL 25-583

DRAWDOWN DATA
PHASE II TEST

SECTION 25-T36N-R74W

25-583 ph. 2

SE1000B
Environmental Logger
01/10 09:43

Unit# 00000 Test# 0

INPUT 2: Level (F) TOC

Reference . 0.00
Scale factor 50.32
Offset 0.00

Step# 0 01/07 10:00

Elapsed Time	value
0.0000	0.17
0.0033	0.17
0.0066	0.20
0.0099	0.17
0.0133	0.19
0.0166	0.19
0.0200	0.19
0.0233	0.19
0.0266	0.19
0.0300	0.19
0.0333	0.19
0.0500	0.17
0.0666	0.19
0.0833	0.19
0.1000	0.19
0.1166	0.19
0.1333	0.19
0.1500	0.19
0.1666	0.19
0.1833	0.19
0.2000	0.19
0.2166	0.19
0.2333	0.19
0.2500	0.19
0.2666	0.19
0.2833	0.19
0.3000	0.19
0.3166	0.19
0.3333	0.19
0.4167	0.19
0.5000	0.19
0.5833	0.19
0.6667	0.19
0.7500	0.19
0.8333	0.19
0.9167	0.20
1.0000	0.19
1.0833	0.20
1.1667	0.20
1.2500	0.20
1.3333	0.20
1.4166	0.22
1.5000	0.22
1.5833	0.22
1.6667	0.23
1.7500	0.22
1.8333	0.23
1.9167	0.25
2.0000	0.25
2.5000	0.28
3.0000	0.33
3.5000	0.39
4.0000	0.46
4.5000	0.52
5.0000	0.60
5.5000	0.68
6.0000	0.76
6.5000	0.85
7.0000	0.93
7.5000	1.03
8.0000	1.12
8.5000	1.20
9.0000	1.30
9.5000	1.41
10.0000	1.50
12.0000	1.90
14.0000	2.31
16.0000	2.71
18.0000	3.08
20.0000	3.47
22.0000	3.82
24.0000	4.17
26.0000	4.50
28.0000	4.84
30.0000	5.14
32.0000	5.44
34.0000	5.71
36.0000	5.98
38.0000	6.24
40.0000	6.49
42.0000	6.73
44.0000	6.93
46.0000	7.16
48.0000	7.36
50.0000	7.55
52.0000	7.74
54.0000	7.92
56.0000	8.08
58.0000	8.24
60.0000	8.39
62.0000	8.54
64.0000	8.70
66.0000	8.82
68.0000	8.95
70.0000	9.08
72.0000	9.20
74.0000	9.32
76.0000	9.43
78.0000	9.54
80.0000	9.63
82.0000	9.74
84.0000	9.84
86.0000	9.93
88.0000	10.01
90.0000	10.09
92.0000	10.17
94.0000	10.24
96.0000	10.32
98.0000	10.40
100.000	10.46
110.000	10.79
120.000	11.11
130.000	11.38
140.000	11.62
150.000	11.87
160.000	12.09
170.000	12.28
180.000	12.46
190.000	12.62
200.000	12.78
210.000	12.94
220.000	13.08
230.000	13.22
240.000	13.35
250.000	13.49
260.000	13.60
270.000	13.73
280.000	13.84
290.000	13.95
300.000	14.06
310.000	14.15
320.000	14.25
330.000	14.37
340.000	14.43
350.000	14.49
360.000	14.57
370.000	14.65
380.000	14.71
390.000	14.79
400.000	14.86
410.000	14.92
420.000	14.96
430.000	15.05
440.000	15.11
450.000	15.17
460.000	15.22
470.000	15.29
480.000	15.33
490.000	15.40
500.000	15.44
510.000	15.51
520.000	15.56
530.000	15.60
540.000	15.67
550.000	15.71
560.000	15.76
570.000	15.81
580.000	15.86
590.000	15.91
600.000	15.95
610.000	15.98
620.000	16.03
630.000	16.08
640.000	16.11
650.000	16.16
660.000	16.21
670.000	16.24
680.000	16.29
690.000	16.32
700.000	16.35
710.000	16.38
720.000	16.43
730.000	16.46
740.000	16.49
750.000	16.54
760.000	16.56
770.000	16.60
780.000	16.64
790.000	16.65
800.000	16.68
810.000	16.71
820.000	16.73
830.000	16.78
840.000	16.79
850.000	16.83
860.000	16.86
870.000	16.87
880.000	16.91
890.000	16.94
900.000	16.95
910.000	16.97
920.000	17.00
930.000	17.03
940.000	17.05
950.000	17.06
960.000	17.10
970.000	17.11
980.000	17.13
990.000	17.16
1000.00	17.19
1100.00	17.33
1200.00	17.51
1300.00	17.65
1400.00	18.02
1500.00	18.29
1600.00	18.51
1700.00	18.70
1800.00	18.81
1900.00	18.95
2000.00	19.03
2100.00	19.14
2200.00	19.26
2300.00	19.37
2400.00	19.46
2500.00	19.51
2600.00	19.57
2700.00	19.60
2800.00	19.60
2900.00	19.68
3000.00	19.73
3100.00	19.76
3200.00	19.79
3300.00	19.83
3400.00	19.87
3500.00	19.95
3600.00	20.00
3700.00	20.00
3800.00	20.02
3900.00	20.05
4000.00	20.05
4100.00	9.79
4200.00	7.36

END

PUMPED WELL RATE
WELL 25-584
DRAWDOWN DATA
PHASE II RETEST
SECTION 25-T36N-R74W

Commence pumping at 1000 hours on 1-14-86

Time	Rate	Date
1000	51	1-14-86
1030	50	"
1300	49	"
1500	48	"
	Adjusted to 50	
1600	50	"
2000	50	"
2400	50	"
0400	51	1-15-86
0800	50	"
1200	50	"
1600	50	"
2000	50	"
2400	50	"
0400	50	1-16-86
0800	50	"
1200	50	"
1600	50	"
2000	50	"
2400	51	"
0400	50	1-17-86
0800	50	"
1000	50	"
1040	50	"

Pump test terminated at 1045 hours 1-17-86

WELL 25-584

BACKGROUND DATA
PHASE II RETEST

SECTION 25-T36N-R74W

```
       SE1000B
 Environmental Logger
     01 14  09:03

  Unit# 00000  Test# 0

INPUT 1:  Level (F) TOC

Reference          0.00
Scale factor      50.00
Offset             0.00

Step# 0   01 13  16:00

Elapsed Time     Value
------------   -  ----
      0.000    -  0.04
     30.000    -  [illegible]
     60.000    -  0.06
     90.000    -  0.07
    120.000    -  0.07
    150.000    -  0.07
    180.000    -  0.09
    210.000    -  0.09
    240.000    -  0.09
    270.000    -  0.09
    300.000    -  0.09
    330.000    -  0.09
    360.000    -  0.09
    390.000    -  0.11
    420.000    -  0.11
    450.000    -  0.11
    480.000    -  0.11
    510.000    -  0.11
    540.000    -  0.11
    570.000    -  0.11
    600.000    -  0.11
    630.000    -  0.12
    660.000    -  0.11
    690.000    -  0.12
    720.000    -  0.14
    750.000    -  0.14
    780.000    -  0.15
    810.000    -  0.15
    840.000    -  0.17
    870.000    -  0.18
    900.000    -  0.18
    930.000    -  0.20
    960.000    -  0.20
    990.000    -  0.20
    1020.00    -  0.20
END
```

Background 25-584 phase #A

WELL 25-584

DRAWDOWN DATA
PHASE II RETEST

SECTION 25-T36N-R74W

SE1000B
Environmental Logger
01/17 09:06

Unit# 00000 Test# 1

INPUT 1: Level (F) TOC

Reference 0.00
Scale factor 50.08
Offset 0.00

Step# 0 01/14 10:00

25-584 Phase II A.

Elapsed Time	Value
0.0000	8.96
0.0033	9.54
0.0066	9.78
0.0099	10.05
0.0133	10.14
0.0166	10.39
0.0200	10.74
0.0233	10.98
0.0266	11.26
0.0300	11.58
0.0333	11.70
0.0500	13.11
0666	14.56
0833	16.21
1000	17.57
0.1166	18.66
0.1333	20.19
0.1500	21.68
0.1666	23.13
0.1833	24.31
0.2000	25.37
0.2166	26.83
0.2333	28.11
0.2500	29.13
0.2666	30.19
0.2833	31.35
0.3000	32.49
0.3166	33.67
0.3333	34.71
0.4167	39.52
0.5000	43.48
0.5833	47.29
0.6667	50.29
0.7500	52.68
0.8333	54.69
0.9167	56.60
1.0000	57.71
1.0833	58.50
1.1667	59.21
1.2500	59.18
1.3333	59.00
1.4166	58.83
1.5000	58.67
1.5833	58.42
.6667	58.35
7500	58.13
1.8333	57.90
1.9167	57.56
2.0000	57.06
2.5000	55.76
3.0000	55.40
3.5000	55.53
4.0000	55.35
4.5000	55.46
5.0000	55.95
5.5000	56.28
6.0000	56.63
6.5000	57.09
7.0000	57.14
7.5000	57.23
8.0000	57.33
8.5000	57.71
9.0000	57.78
9.5000	57.93
10.0000	57.99
12.0000	58.46
14.0000	59.10
16.0000	59.32
18.0000	59.63
20.0000	59.97
22.0000	60.06
24.0000	60.12
26.0000	60.42
28.0000	60.42
30.0000	60.79
32.0000	60.90
34.0000	60.96
36.0000	61.07
38.0000	60.74
40.0000	61.01
42.0000	60.90
44.0000	60.91
46.0000	61.10
48.0000	61.45
50.0000	61.10
52.0000	61.45
54.0000	61.93
56.0000	61.77
58.0000	62.23
60.0000	62.35
62.0000	62.68
64.0000	63.02
66.0000	62.72
68.0000	62.56
70.0000	62.57
72.0000	62.75
74.0000	62.67
76.0000	63.03
78.0000	63.08
80.0000	63.57
82.0000	63.41
84.0000	63.81
86.0000	63.52
88.0000	63.55
90.0000	63.51
92.0000	63.32
94.0000	63.47
96.0000	63.47
98.0000	63.51
100.000	63.74
110.000	63.55
120.000	63.93
130.000	63.82
140.000	64.47
150.000	64.66
160.000	65.29
170.000	65.34
180.000	65.61
190.000	65.43
200.000	65.84
210.000	66.30
220.000	66.78
230.000	66.16
240.000	66.41
250.000	66.68
260.000	66.44
270.000	66.63
280.000	66.40
290.000	66.60
300.000	66.59
310.000	68.18
320.000	68.39
330.000	68.04
340.000	68.61
350.000	68.52
360.000	68.15
370.000	[illegible]
380.000	[illegible]
390.000	68.53
400.000	68.82
410.000	68.94
420.000	69.50
430.000	69.35
440.000	69.21
450.000	69.67
460.000	69.92
470.000	69.94
480.000	69.78
490.000	69.98
500.000	69.53
510.000	69.13
520.000	69.15
530.000	66.38
540.000	66.57
550.000	66.46
560.000	66.40
570.000	66.62
580.000	66.70
590.000	66.74
600.000	66.89
610.000	66.78
620.000	66.93
630.000	66.81
640.000	66.79
650.000	66.93
660.000	66.84
670.000	66.93
680.000	67.06
690.000	67.27
700.000	67.11
710.000	67.25
720.000	[illegible]
730.000	[illegible]
740.000	67.28
750.000	67.33
760.000	67.23
770.000	67.66
780.000	67.52
790.000	67.41
800.000	67.60
810.000	67.55
820.000	67.74
830.000	67.77
840.000	67.57
850.000	67.66
860.000	67.49
870.000	67.47
880.000	67.72
890.000	67.76
900.000	67.36
910.000	67.53
920.000	67.74
930.000	67.84
940.000	67.79
950.000	[illegible]
960.000	67.75
970.000	67.79
980.000	68.21
990.000	[illegible]
1000.00	67.90
1100.00	68.10
1200.00	68.42
1300.00	68.56
1400.00	68.82
1500.00	68.85
1600.00	69.07
1700.00	69.13
1800.00	69.24
1900.00	69.48
2000.00	69.18
2100.00	69.77
2200.00	69.73
2300.00	69.56
2400.00	70.17
2500.00	70.24
2600.00	70.24
2700.00	70.28
2800.00	70.19
2900.00	70.16
3000.00	70.25
3100.00	70.60
3200.00	70.36
3300.00	70.36
3400.00	70.65
3500.00	70.65
3600.00	70.53
3700.00	70.56
3800.00	70.77
3900.00	70.62
4000.00	70.53
4100.00	70.49
4200.00	70.70

END

WELL 25-584

RECOVERY DATA
PHASE II RETEST

SECTION 25-T36N-R74W

Recovery DATA

25-584 phase II "A"

```
      [illegible]
 Environmental Logger
    01/20  12:43

 Unit# 00000  Test# 1

INPUT 1:  Level (F) TOC

Reference          0.00
Scale factor      50.08
Offset             0.00

Step# 0   01/17   [illegible]

Elapsed Time    Value
------------  ---------
 [illegible]    - [illegible]
 1[illegible].0000     -  0.05
 2[illegible].0000     -  0.0[illegible]
 32.0000
 40.0000     -  0.11
 [illegible]2.0000     -  0.30
END

      [illegible]
 Environmental Logger
    01/20  12:45

 Unit# 00002  Test# [illegible]

 PUT 1:  Level (F) TOC

 ference           0.00
Scale factor      50.0[illegible]
Offset             0.00

Step# 0   01/17  10:45

Elapsed Time    Value
------------  ---------
 0.0000     -  4.2[illegible]
 0.0033     -  4.44
 0.0066     -  4.[illegible]
 0.0099     -  4.74
 0.0133     -  4.9[illegible]
 0.0166     -  5.12
 0.0200     -  5.30
 0.0233     -  5.43
 0.0266     -  5.60
 0.0300     -  5.7[illegible]
 0.0333     -  5.95
 0.0500     -  6.82
 0.0666     -  7.66
 0.0833     -  8.42
 0.1000     -  9.22
 0.1166     -  9.95
 0.1333     - 10.68
 0.1500     - 11.31
 0.1666     - 11.99
 0.1833     - 12.62
 0.2000     - 13.22
 0.2166     - 13.87
 0.2333     - 14.50
 0.2500     - 15.13
 0.2666     - 15.77
 0.2833     - 16.40
 0.3000     - 17.05
 0.3166     - 17.71
```

```
 0.3333     - 18.[illegible]
 0.4167     - 21.14
 0.5000     - 23.81
 0.5833     - 26.7[illegible]
 0.6667     - 2[illegible]
 0.7500     - [illegible]
 0.8333     - [illegible]
 0.9167     - [illegible]4.45
 1.0000     - 36.18
 1.0833     - 37.78
 1.1667     - 39.26
 1.2500     - 4[illegible]
 1.3333     - [illegible]
 1.4166     - 4[illegible].95
 1.5000     - 44.[illegible]
 1.5833     - 45.[illegible]
 1.6667     - 46.01
 1.7500     - 46.88
 1.8333     - 47.73
 1.9167     - 4[illegible]
 2.0000     - 4[illegible].10
 2.5000     - [illegible]
 3.0000     - 5[illegible]
 3.5000     - 5[illegible]
 4.0000     - [illegible]
 4.5000     - 58.6[illegible]
 5.0000     - [illegible]
 5.5000     - [illegible]
 6.0000     - [illegible]
 6.5000     - [illegible]
 7.0000     - [illegible]
 7.5000     - [illegible].62
 8.0000     - 60.99
 8.5000     - 61.[illegible]
 9.0000     - 61.[illegible]
 9.5000     - [illegible]
10.0000     - [illegible]
12.0000     - [illegible].07
14.0000     - 60.96
16.0000     - 60.87
18.0000     - 60.83
20.0000     - 61.47
22.0000     - 61.74
24.0000     - 6[illegible]
26.0000     - 5[illegible].67
28.0000     - 59.41
30.0000     - 59.43
32.0000     - 59.51
34.0000     - 59.63
36.0000     - 59.76
38.0000     - 59.[illegible]
40.0000     - 60.00
42.0000     - 60.11
44.0000     - 60.23
46.0000     - 60.34
48.0000     - 60.46
50.0000     - 60.55
52.0000     - 60.65
54.0000     - 60.74
56.0000     - 60.83
58.0000     - 60.91
60.0000     - 61.01
62.0000     - 61.09
64.0000     - 61.17
66.0000     - 61.25
68.0000     - 61.34
70.0000     - 61.39
72.0000     - 61.47
74.0000     - 61.55
```

```
 [illegible]     - 61.[illegible]
 78.0000     - 61.6[illegible]
 80.0000     - [illegible]
 82.0000     - [illegible]
 84.[illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 90.[illegible]     - [illegible]
 92.0000     - 62.11
 [illegible]     - 6[illegible]
 96.0000     - 6[illegible]
 98.0000     - [illegible]
100.000      - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
140.000      - [illegible]
150.000      - [illegible]
160.000      - [illegible]
170.000      - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - 64.[illegible]
 [illegible]     - 64.[illegible]
230.000      - [illegible]
240.000      - [illegible]
250.000      - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
300.000      - [illegible]
310.000      - [illegible]
320.000      - [illegible]
 [illegible]     - [illegible]
340.000      - [illegible]
 [illegible]     - [illegible]
360.000      - 65.51
 [illegible]     - 65.[illegible]
380.000      - 6[illegible]
390.000      - [illegible]
400.000      - [illegible]
410.000      - [illegible]
420.000      - [illegible]
 [illegible]     - 66.[illegible]
440.000      - 6[illegible]
450.000      - 66.[illegible]
460.000      - [illegible]
470.000      - [illegible]
480.000      - 6[illegible]
490.000      - [illegible]
500.000      - 6[illegible]
510.000      - 66.49
520.000      - 66.54
530.000      - 66.6[illegible]
540.000      - 6[illegible]
550.000      - 66.7[illegible]
560.000      - [illegible]
570.000      - 6[illegible]
580.000      - 66.[illegible]2
590.000      - 66.[illegible]7
600.000      - 66.9[illegible]
610.000      - 6[illegible]
620.000      - [illegible]
630.000      - 67.0[illegible]
640.000      - 67.06
650.000      - 67.09
660.000      - 67.14
```

```
 670.000     - [illegible]
 [illegible].000     - [illegible]
 690.000     - [illegible]
 700.000     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
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 [illegible]     - [illegible]
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 [illegible]     - [illegible]
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 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 2400.00     - [illegible]
 2500.00     - [illegible]
 [illegible].00     - [illegible]
 [illegible].00     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]
 3000.00     - [illegible]
 3100.00     - [illegible]
 3200.00     - [illegible]
 3300.00     - [illegible]
 [illegible]     - [illegible]
 [illegible]     - [illegible]41
 [illegible]     - [illegible]
 3700.00     - 70.54
 [illegible]     - 70.5[illegible]
 3900.00     - [illegible]
 4000.00     - [illegible]
 4100.00     - [illegible]
 4200.00     - [illegible]
 4300.00     - [illegible]
END
```

RECOVERY DATA
PHASE II RETEST

SECTION 25-T36N-R74W

very DATA

25-581 phase II "A" Reco

```
READY

      SE1000B
 Environmental Logger
    01/20  12:28

 Unit# 00000  Test# 2

INPUT 1:  Level (F  TOC)

Reference          0.00
Scale factor      50.00
Offset             0.00

Step# 0   01/17  09:47

Elapsed Time     Value
------------   --------
  0.0000     -   [illegible]
 10.0000         0.07
 20.0000     -   0.14
 30.0000     -   0.15
 40.0000     -   [illegible]
END

      SE1000B
 Environmental Logger
    01/20  12:29

 Unit# 00000  Test# [illegible]

INPUT 1:  Level (F  TOC)

Reference          0.00
Scale factor      10.00
Offset             0.00

Step# 0   01/17  10:45

Elapsed Time     Value
------------   --------
  0.0000     -   0.12
  0.0033     -   0.12
  0.0066     -   0.14
  0.0099     -   0.12
  0.0133     -   0.12
  0.0166     -   0.12
  0.0200     -   0.12
  0.0233     -   0.12
  0.0266     -   0.12
  0.0300     -   0.12
  0.0333     -   0.12
  0.0500     -   0.11
  0.0666     -   0.11
  0.0833     -   0.11
  0.1000     -   0.11
  0.1166     -   0.11
  0.1333     -   0.09
  0.1500     -   0.09
  0.1666     -   0.09
  0.1833     -   0.07
  0.2000     -   0.07
  0.2166     -   0.07
  0.2333     -   0.07
  0.2500     -   0.07
  0.2666     -   0.07
  0.2833     -   0.06
  0.3000     -   0.06
  0.3166     -   0.06

  0.3333     -   [illegible]
  0.4167     -   0.04
  0.5000     -   0.04
  0.5833     -   0.03
  0.6667     -   0.03
  0.7500     -   0.07
  0.8333     -   0.07
  0.9167     -   [illegible]
  1.0000     -   [illegible]
  1.0833     -   0.07
  1.1667     -   [illegible]
  1.2500     -   0.04
  [illegible] -  [illegible]
  1.4166     -   0.07
  1.5000     -   [illegible]
  1.5833     -   [illegible]
  1.6667     -   [illegible]
  1.7500     -   [illegible]
  1.8333     -   [illegible]
  1.9167     -   [illegible]
  2.0000     -   [illegible]
  2.5000     -   [illegible]
  3.0000     -   [illegible]
  3.5000     -   [illegible]
  4.0000     -   [illegible]
  4.5000     -   [illegible]
  5.0000         2.75
  5.5000     -   2.79
  6.0000     -   [illegible]
  6.5000     -   [illegible]
  7.0000     -   [illegible]
  7.5000         [illegible]
  8.0000         [illegible]
  8.5000     -   [illegible]
  9.0000     -   4.[illegible]
  9.5000     -   4.[illegible]
 10.0000     -   [illegible]
 12.0000     -   [illegible]
 14.0000     -   [illegible]
 16.0000     -   [illegible]
 18.0000     -   [illegible]
 20.0000     -   7.46
 22.0000     -   7.73
 24.0000     -   7.98
 26.0000     -   [illegible]
 28.0000     -   [illegible]
 30.0000     -   [illegible]
 32.0000     -   8.55
 34.0000     -   8.68
 36.0000     -   8.80
 38.0000     -   [illegible]
 40.0000     -   [illegible]
 42.0000     -   9.17
 44.0000     -   9.25
 46.0000     -   9.36
 48.0000     -   9.47
 50.0000     -   9.56
 52.0000     -   9.66
 54.0000     -   9.75
 56.0000     -   [illegible]
 58.0000     -   [illegible]
 60.0000     -  10.00
 62.0000     -  10.10
 64.0000     -  10.19
 66.0000     -  10.28
 68.0000     -  10.34
 70.0000     -  10.40
 72.0000     -  10.46
 74.0000     -  10.52

 [illegible] -  10.61
 [illegible] -  10.67
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 [illegible] -  10.79
 [illegible] -  [illegible]
 86.0000     -  10.91
 88.0000     -  [illegible]
 90.0000     -  [illegible]
 [illegible] -  [illegible]
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 [illegible] -  [illegible]
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100.000      -  [illegible]
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190.000      -  [illegible]
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[illegible]  -  [illegible]
[illegible]  -  [illegible]
[illegible]  -  [illegible]
[illegible]  -  [illegible]
330.000      -  [illegible]
340.000      -  [illegible]
[illegible]  -  [illegible]
[illegible]  -  [illegible]
[illegible]  -  [illegible]
[illegible]  -  [illegible]
[illegible]  -  [illegible]
400.000      -  [illegible]
410.000      -  [illegible]
420.000      -  [illegible]
430.000      -  [illegible]
440.000      -  [illegible]
[illegible]  -  [illegible]
460.000         15.17
[illegible]  -  [illegible]
480.000      -  [illegible]
490.000      -  [illegible]
500.000      -  [illegible]
510.000      -  [illegible]
520.000      -  15.44
[illegible]  -  15.54
540.000      -  15.59
550.000      -  15.67
560.000      -  [illegible]
570.000      -  [illegible]
580.000      -  [illegible]
590.000      -  [illegible]
600.000      -  [illegible]
610.000         15.90
[illegible]  -  [illegible]
630.000      -  [illegible]
640.000      -  [illegible]
650.000      -  [illegible]
660.000         [illegible]

670.000
680.000      -  [illegible]
[illegible]
700.000      -  [illegible]
[illegible]
[illegible]  -  [illegible]
[illegible]  -  [illegible]
[illegible]  -  [illegible]
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740.000      -  [illegible]
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[illegible]
3400.00
3500.00
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
4200.00
[illegible]
```

RECOVERY DATA
PHASE II RETEST

SECTION 25-T36N-R74W

```
      SE1000B
Environmental Logger
  01/20  12:56

Unit# 00000  Test# 1

INPUT 2:  Level  F  TOC

Reference          0.00
Scale factor      50.07
Offset       [illegible]

Step# 0   01/17  [illegible]

Elapsed Time     Value
------------     ------
 0.0000           0.00
 10.0000          [illegible]
 20.0000          [illegible]
 30.0000          [illegible]
 40.0000          [illegible]
 50.0000          [illegible]
END
```

```
      SE1000B
Environmental Logger
  01/20  [illegible]

Unit# 00000  Test# 3

INPUT 2:  Level  F  TOC

Reference          0.00
Scale factor      50.07
Offset       [illegible]

Step# 0   01/17  [illegible]

Elapsed Time     Value
------------     ---------
  0.0000          0.01
  0.0033          0.01
  0.0066          0.01
  0.0099          0.01
  0.0133          0.01
  0.0166          0.01
  0.0200          0.01
  0.0233          0.01
  0.0266          0.01
  0.0300          0.01
  0.0333          0.01
  0.0500          0.01
  0.0666          0.01
  0.0833          0.01
  0.1000          0.01
  0.1166          0.01
  0.1333          0.01
  0.1500          0.01
  0.1666          0.03
  0.1833          0.01
  0.2000          0.01
  0.2166          0.01
  0.2333          0.01
  0.2500          0.01
  0.2666          [illegible]
  0.2833          [illegible]
  0.3000          [illegible]
  0.3166          0.03
  0.3333          [illegible]
  0.4167          0.01
  0.5000          0.01
  0.5833          [illegible]
  0.6667          [illegible]
  0.7500          0.01
  0.8333          [illegible]
  0.9167          [illegible]
  1.0000          0.01
  [illegible]     [illegible]
  1.1667          [illegible]
  1.2500          [illegible]
  1.3333          [illegible]
  1.4166          [illegible]
  1.5000          [illegible]
  1.5833          [illegible]
  1.6667          [illegible]
  1.7500     -    [illegible]
  1.8333          [illegible]
  1.9167     -    [illegible]
  [illegible] -   [illegible]
  [illegible] -   [illegible]
  [illegible]     [illegible]
  [illegible]     [illegible]
  [illegible] -   [illegible]
  4.5000     -    [illegible]
  5.0000     -    [illegible]
  5.5000     -    [illegible]
  6.0000     -    [illegible]
  6.5000     -    [illegible]
  7.0000     -    [illegible]
  7.5000     -    [illegible]
  8.0000     -    [illegible]
  8.5000     -    [illegible]
  9.0000     -    [illegible]
  9.5000     -    [illegible]
 10.0000     -    [illegible]
 12.0000     -    [illegible]
 14.0000     -    3.39
 [illegible] -    [illegible]
 18.0000     -    4.45
 20.0000     -    [illegible]
 22.0000     -    5.35
 24.0000     -    [illegible]
 26.0000     -    6.14
 28.0000     -    6.47
 30.0000     -    6.76
 32.0000     -    7.03
 34.0000     -    7.26
 36.0000     -    7.48
 38.0000     -    7.67
 40.0000     -    7.86
 42.0000     -    8.05
 44.0000     -    8.21
 46.0000     -    8.35
 48.0000     -    8.51
 50.0000     -    8.65
 52.0000     -    8.78
 54.0000     -    8.91
 56.0000     -    9.03
 58.0000     -    9.14
 60.0000     -    9.25
 62.0000     -    9.35
 64.0000     -    9.46
```

```
 66.0000     -    [illegible]
 68.0000     -    [illegible]
 70.0000          [illegible]
 [illegible] -    [illegible]
 74.0000     -    [illegible]
 [illegible] -    [illegible]
 [illegible] -    [illegible]
 80.0000     -    [illegible]
 [illegible]      [illegible]
 84.0000     -    [illegible]
 86.0000          [illegible]
 [illegible]      [illegible]
 [illegible]      [illegible]
 [illegible] -    [illegible]
 94.0000          [illegible]
 [illegible]      [illegible]
 [illegible] -    [illegible]
 [illegible]      [illegible]
 [illegible]      [illegible]
 [illegible]      [illegible]
 [illegible] -    [illegible]
 [illegible] -    [illegible]
 [illegible] -    [illegible]
 [illegible] -    [illegible]
 [illegible]      [illegible]
 [illegible]      [illegible]
 [illegible]      [illegible]
 [illegible]      [illegible]
 [illegible] -    [illegible]
 [illegible]      [illegible]
 [illegible]      [illegible]
 [illegible] -    [illegible]
 [illegible] -    [illegible]
 [illegible]      [illegible]
 [illegible]      [illegible]
 [illegible] -    [illegible]
 [illegible]      [illegible]
 300.000     -    [illegible]
 [illegible]      [illegible]
 [illegible] -    [illegible]
 [illegible]      [illegible]
 [illegible] -    [illegible]
 [illegible] -    [illegible]
 360.000          [illegible]
 [illegible] -    [illegible]
 [illegible]      [illegible]
 [illegible]      [illegible]
 400.000     -    [illegible]
 [illegible] -    [illegible]
 420.000     -    [illegible]
 430.000     -    [illegible]
 [illegible] -    14.77
 450.000     -    [illegible]
 460.000     -    [illegible]
 470.000     -    [illegible]
 480.000          [illegible]
 490.000     -    15.12
 500.000     -    [illegible]
 510.000     -    [illegible]
 520.000     -    [illegible]
 530.000     -    15.32
 540.000     -    [illegible]
 550.000     -    15.41
 [illegible] -    [illegible]
 570.000     -    15.51
 580.000     -    15.56
 [illegible] -    [illegible]
 600.000     -    [illegible]
 610.000     -    [illegible]
 620.000          [illegible]
 630.000          [illegible]
```

"A" Recovery Data

25-582 phase II

WELL 25-583

BACKGROUND DATA
PHASE II RETEST

SECTION 25-T36N-R74W

```
       SE1000B
 Environmental Logger
     01/14  08:52

 Unit# 00000  Test# 0

INPUT 2:  Level  F. TOC

Reference           0.00
Scale factor       50.32
Offset              0.00

Step# 0   01 13  16:00

Elapsed Time     Value
------------   ---------
    0.0000      -  0.07
   30.0000      -  0.07
   60.0000      -  0.07
   90.0000      -  0.07
   120.000      -  0.09
   150.000      -  0.09
   180.000      -  0.09
   210.000      -  0.11
   240.000      -  0.11
   270.000      -  0.12
   300.000      -  0.12
   330.000      -  0.12
   360.000      -  0.12
   390.000      -  0.12
   420.000      -  0.12
   450.000      -  0.12
   480.000      -  0.14
   510.000      -  0.14
   540.000      -  0.14
   570.000      -  0.14
   600.000      -  0.14
   630.000      -  0.14
   660.000      -  0.14
   690.000      -  0.15
   720.000      -  0.15
   750.000      -  0.15
   780.000      -  0.17
   810.000      -  0.17
   840.000      -  0.19
   870.000      -  0.20
   900.000      -  0.20
   930.000      -  0.22
   960.000      -  0.22
   990.000      -  0.23
END
```

Background 25-583 phase IIA.

WELLS 25-583

DRAWDOWN DATA
PHASE II RETEST

SECTION 25-T36N-R74W

25-583 phase II A

```
      SE1000B
Environmental Logger
   01/17  10:13

 Unit# 00000  Test# 1

INPUT 2:  Level (F) TOC

Reference          0.00
Scale factor       [illegible]
Offset             0.00

Step# 0   01/14  10:00

Elapsed Time      Value
------------   ----------
   0.0000      [illegible]
   0.0033      [illegible]
   0.0066      [illegible]
   0.0099      [illegible]
   0.0133         0.00
   0.0166         0.00
   0.0200         0.20
   0.0233         0.00
   0.0266      [illegible]
   0.0300         0.00
   0.0333         0.00
   0.0500         0.00
   0.0666         0.00
   0.0833         0.00
   0.1000         0.00
   0.1166         0.00
   0.1333         0.00
   0.1500         0.00
   0.1666         0.00
   0.1833         0.00
   0.2000         0.00
   0.2166         0.00
   0.2333         0.00
   0.2500         0.00
   0.2666         0.00
   0.2833         0.00
   0.3000         0.00
   0.3166         0.00
   0.3333         0.00
   0.4167         0.00
   0.5000         0.00
   0.5833         0.00
   0.6667         0.00
   0.7500         0.01
   0.8333         0.01
   0.9167         0.01
   1.0000         0.01
   1.0833         0.03
   1.1667         0.03
   1.2500         0.04
   1.3333         0.04
   1.4166         0.06
   1.5000         0.06
   1.5833         0.07
   1.6667         0.07
   1.7500         0.09
   1.8333         0.11
   1.9167         0.11
   2.0000         0.12
   2.5000         0.19
   3.0000         0.26
   3.5000         0.34
   4.0000         0.44
   4.5000         0.53
   5.0000         0.63
   5.5000         0.77
   6.0000         0.84
   6.5000         0.93
   7.0000         1.04
   7.5000         1.15
   8.0000         1.27
   8.5000         1.36
   9.0000         1.47
   9.5000         1.58
  10.0000         1.69
  12.0000         2.15
  14.0000         2.58
  16.0000         3.01
  18.0000         3.41
  20.0000      [illegible]
  22.0000      [illegible]
  24.0000      [illegible]
  26.0000         4.87
  28.0000         5.19
  30.0000         5.47
  32.0000         5.77
  34.0000         6.06
  36.0000         6.31
  38.0000         6.55
  40.0000         6.78
  42.0000         7.00
  44.0000         7.20
  46.0000         7.39
  48.0000         7.58
  50.0000         7.76
  52.0000         7.93
  54.0000         8.09
  56.0000         8.25
  58.0000         8.39
  60.0000         8.54
  62.0000         8.66
  64.0000         8.81
  66.0000         8.92
  68.0000         9.05
  70.0000         9.16
  72.0000         9.28
  74.0000         9.39
  76.0000         9.49
  78.0000         9.59
  80.0000         9.68
  82.0000         9.78
  84.0000         9.87
  86.0000         9.95
  88.0000        10.05
  90.0000        10.13
  92.0000        10.20
  94.0000        10.28
  96.0000        10.36
  98.0000        10.43
  100.000        10.51
  110.000      [illegible]
  120.000      [illegible]
  130.000        11.35
  140.000        11.59
  150.000      [illegible]
  160.000      [illegible]
  170.000      [illegible]
  180.000      [illegible]
  190.000        12.55
  200.000      [illegible]
  210.000      [illegible]
  220.000      [illegible]
  230.000      [illegible]
  240.000      [illegible]
  250.000      [illegible]
  260.000        13.49
  270.000      [illegible]
  280.000        13.71
  290.000      [illegible]
  300.000      [illegible]
  310.000      [illegible]
  320.000      [illegible]
  330.000      [illegible]
  340.000      [illegible]
  350.000      [illegible]
  360.000      [illegible]
  370.000      [illegible]
  380.000      [illegible]
  390.000      [illegible]
  400.000      [illegible]
  410.000      [illegible]
  420.000      [illegible]
  430.000        15.10
  440.000        15.17
  450.000        15.25
  460.000        15.31
  470.000        15.40
  480.000      [illegible]
  490.000        15.52
  500.000        15.59
  510.000        15.65
  520.000        15.71
  530.000        15.76
  540.000        15.83
  550.000        15.87
  560.000        15.94
  570.000        15.98
  580.000        16.03
  590.000        16.08
  600.000        16.13
  610.000        16.18
  620.000        16.22
  630.000        16.27
  640.000        16.32
  650.000        16.38
  660.000        16.43
  670.000        16.48
  680.000        16.51
  690.000        16.56
  700.000        16.59
  710.000        16.61
  720.000      [illegible]
  730.000      [illegible]
  740.000      [illegible]
  750.000        16.74
  760.000      [illegible]
  770.000      [illegible]
  780.000      [illegible]
  790.000      [illegible]
  800.000      [illegible]
  810.000      [illegible]
  820.000      [illegible]
  830.000      [illegible]
  840.000      [illegible]
  850.000      [illegible]
  860.000      [illegible]
  870.000      [illegible]
  880.000      [illegible]
  890.000        17.21
  900.000        17.24
  910.000      [illegible]
  920.000      [illegible]
  930.000      [illegible]
  940.000      [illegible]
  950.000      [illegible]
  960.000      [illegible]
  970.000      [illegible]
  980.000      [illegible]
  990.000      [illegible]
  1000.00      [illegible]
  1100.00      [illegible]
  1200.00      [illegible]
  1300.00        17.95
  1400.00        18.08
  1500.00      [illegible]
  1600.00      [illegible]
  1700.00      [illegible]
  1800.00      [illegible]
  1900.00      [illegible]
  2000.00      [illegible]
  2100.00        18.81
  2200.00        18.91
  2300.00      [illegible]
  2400.00      [illegible]
  2500.00      [illegible]
  2600.00      [illegible]
  2700.00      [illegible]
  2800.00      [illegible]
  2900.00        19.32
  3000.00        19.37
  3100.00      [illegible]
  3200.00        19.47
  3300.00      [illegible]
  3400.00      [illegible]
  3500.00      [illegible]
  3600.00        19.59
  3700.00      [illegible]
  3800.00      [illegible]
  3900.00      [illegible]
  4000.00      [illegible]
  4100.00      [illegible]
  4200.00        19.65
  4300.00        19.72
END
```

WELL 25-583

RECOVERY DATA
PHASE II RETEST

SECTION 25-T36N-R74W

A

25-583 Phase II "A" Recovery DAT

```
                                   1.8333       0.01      100.000     - 11
     SE1000B                       [illegible] - 0.01     110.000
  Environmental Logger             2.0000     - 0.0[illegible]
        25  12:12                  2.5000     -
                                   3.0000     -
  Unit# 00000  Te                  [illegible]
                                   [illegible]
  INPUT 1                          [illegible]
                                   5.0000     - 6.5[illegible]
                                   5.5000     - 1.[illegible]
                      58.72        6.0000     -
                      0.00         6.5000     -
                                   [illegible]
  Step# 0                          [illegible]
                                   [illegible] -
                                   [illegible]     2.25     2[illegible]0.000
                                   [illegible] - 2.44       260.000
                      0.03         9.5000     -
                      0.03         10.0000    -
                      0.0[illegible] 12.0000
                                   [illegible]
                                   [illegible]
                                   24.0000    -
                                   26.0000
                                   [illegible]
                                   34.0000       .93      400.000
                                   36.[illegible] - 8.11  410.000
                                   [illegible].0000 - 8.2[illegible]
                      0.03         40.0000    -
                      0.0[illegible] 42.0000
 0.1666                            44.[illegible]
 0.1833                            [illegible]
 0.[illegible]                     4[illegible]   - 8.4[illegible] [illegible]0.000
 [illegible]                       5[illegible].0000 - 9.11   4[illegible]0.000
 [illegible]          0.03         5[illegible] 0000 - 9.24   440.000
 0.2500               0.03         54.0000    - 9.35      [illegible].000
 0.2666               0.03         56.0000    - 9.4[illegible]
 0.2833               0.03         58.0000    - 9.5[illegible]
 0.3000               [illegible]  60.0000    - 9.[illegible]  [illegible]000
 0.3166               [illegible]  62.0000    - 9.[illegible]           15.[illegible]
 0.3333               [illegible]  64.0000      9.64      [illegible]0.000 - 15
 0.4167               0.03         [illegible] - 9.93     560.000
 0.5000               0.03         [illegible].0000 - 10.07  570.000
 0.5833               0.03         70.0000    - 10.1[illegible] 5[illegible]0.000
 0.6667               0.07         72.0000    - 10.1[illegible] 5[illegible]0.000
 0.7500               0.0[illegible] 74.[illegible] - 1[illegible] [illegible]0.000
 0.8333               [illegible]  76.0000    - 10.[illegible]5 6[illegible]0.000 - 1[illegible]
 0.9167               [illegible]  78.0000    - 10.47     620.000  - 1[illegible]
 1.0000               0.03         80.0000    - 10.49     630.000
 1.0833               0.03         82.0000    - 10.57     640.000
 1.1667               0.01         84.0000    - 10.65     650.000
 1.2500               0.01         86.0000    - 10.7[illegible] 6[illegible]0.000
 1.3333               0.01         88.0000    - 10.7[illegible] 6[illegible]0.000
 1.4166               0.01         90.0000    - 10.[illegible]4 [illegible]0.000           4[illegible].00
 1.5000               0.00  -      92.0000    - 10.90     [illegible]  - 15.1[illegible]   4200.00
 1.5833               0.00         94.0000    - 10.97     700.000  - 15   4[illegible]
 1.6667               0.00         96.0000    - 11.03     710.000  - 1[illegible]
 1.7500               0.01         98.0000    - 11.09     720.000
```

WELL 25-585

BACKGROUND DATA
PHASE II RETEST

SECTION 25-T36N-R74W

```
        SE1000B
  Environmental Logger
      01/14  09:04

  Unit# 00000  Test# 0

INPUT 2:  Level (F) TOC

Reference           0.00
Scale factor       50.00
Offset              0.00

Step# 0    01/13  16:00

Elapsed Time     Value
------------   ---------
     0.0000       0.01
    30.0000       [illegible]
    60.0000       0.04
    90.0000       0.04
    120.000       0.06
    150.000       0.06
    180.000       0.04
    210.000       0.06
    240.000       0.06
    270.000       0.07
    300.000       0.0[illegible]
    330.000       0.07
    360.000       0.07
    390.000       0.09
    420.000       0.09
    450.000       0.09
    480.000       0.11
    510.000       0.11
    540.000       0.11
    570.000       0.11
    600.000       0.11
    630.000       0.12
    660.000       0.12
    690.000       0.12
    720.000       0.12
    750.000       0.12
    780.000       0.12
    810.000       0.12
    840.000       0.14
    870.000       0.12
    900.000       0.14
    930.000       0.12
    960.000       0.12
    990.000       0.12
    1020.00       0.12
END
```

Background 25-585 phase IIA.

WELLS 25-585

DRAWDOWN DATA
PHASE II RETEST

SECTION 25-T36N-R74W

25-585 phase II A

```
READY

      SE1000B
 Environmental Logger
    01/17  09:20

 Unit# 00000  Test# 1

INPUT 2:  Level (F) TOC

Reference            0.00
Scale factor        50.07
Offset               0.00

Step# 0   01/14  10:00

Elapsed Time     Value
------------   ---------
    0.0000        0.00
    0.0033        [illegible]
    0.0066        0.01
    0.0099        0.00
    0.0133        0.01
    0.0166        0.00
    [illegible].0200        0.01
    [illegible].0233        0.00
    [illegible].0266        0.00
    0.0300        0.00
    0.0333        0.00
    0.0500        0.01
    0.0666        0.00
    0.0833        0.00
    0.1000        0.01
    0.1166        0.00
    0.1333        0.00
    0.1500        0.01
    0.1666        0.00
    0.1833        0.01
    0.2000        0.00
    0.2166        0.00
    0.2333        0.01
    0.2500        0.00
    0.2666        0.01
    0.2833        0.00
    0.3000        0.01
    0.3166        0.00
    0.3333        0.01
    0.4167        0.00
    0.5000        0.01
    0.5833        0.01
    0.6667        0.01
    0.7500        0.00
    0.8333        0.00
    0.9167        0.01
    1.0000        0.01
    1.0833        0.00
    [illegible]1667        0.01
    [illegible]2500        0.00
    1.3333        0.00
    1.4166        0.00
    1.5000        0.00
    1.5833        0.00
    1.6667        0.00

    1.7500        0.00
    1.8333        0.00
    1.9167        0.01
    2.0000        0.00
    2.5000        0.01
    3.0000        0.01
    3.5000        0.00
    4.0000        0.01
    4.5000        0.00
    5.0000        0.00
    5.5000        0.01
    6.0000        0.00
    6.5000        0.00
    7.0000        0.01
    7.5000        0.01
    8.0000        0.01
    8.5000        0.00
    9.0000        [illegible]
    9.5000        0.01
   10.0000        0.00
   12.0000        0.00
   14.0000        0.01
   16.0000        [illegible]
   18.0000        [illegible]
   20.0000        0.01
   22.0000        0.01
   24.0000        0.00
   26.0000        0.01
   28.0000        0.01
   30.0000        [illegible]
   32.0000        0.01
   34.0000        0.00
   36.0000        0.01
   38.0000        0.01
   40.0000        0.00
   42.0000        0.01
   44.0000        0.01
   46.0000        [illegible]
   48.0000        0.01
   50.0000        0.03
   52.0000        0.00
   54.0000        0.03
   56.0000        0.01
   58.0000        0.00
   60.0000        0.03
   62.0000        0.01
   64.0000        0.01
   66.0000        0.01
   68.0000        0.01
   70.0000        0.03
   72.0000        0.01
   74.0000        0.01
   76.0000        0.01
   78.0000        0.01
   80.0000        0.03
   82.0000        0.01
   84.0000        0.03
   86.0000        0.04
   88.0000        0.03
   90.0000        0.04
   92.0000        0.01
   94.0000        0.03
   96.0000        0.03

   98.0000        [illegible]
   100.000        0.01
   110.000        [illegible]
   120.000        0.00
   130.000        [illegible]
   140.000        0.01
   150.000        [illegible]
   160.000        0.03
   170.000        0.01
   180.000        [illegible]
   190.000        [illegible]
   200.000        [illegible]
   210.000        [illegible]
   220.000        [illegible]
   [illegible]    [illegible]
   [illegible]    [illegible]
   250.000        [illegible]
   [illegible]    [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   320.000        [illegible]
   [illegible]  - [illegible]
   340.000      - [illegible]
   350.000      -
   360.000      - [illegible]
   370.000      -
   380.000      - [illegible]
   390.000      - [illegible]
   400.000
   410.000      - [illegible]
   420.000      - [illegible]
   430.000      - [illegible]
   440.000      - [illegible]
   450.000      - [illegible]
   460.000      - [illegible]
   470.000      - 0.04
   480.000      - 0.06
   490.000      - [illegible]
   500.000      - 0.06
   510.000      - [illegible]
   520.000      - [illegible]
   530.000      - [illegible]
   540.000      - [illegible]
   550.000      - [illegible]
   560.000      - 0.06
   570.000      - 0.04
   580.000      - [illegible]
   590.000      - 0.07
   600.000      - 0.09
   610.000      - 0.07
   620.000      - 0.06
   630.000      - 0.07
   640.000      - 0.07
   650.000      - 0.07
   660.000      - [illegible]
   670.000      - 0.07
   680.000      - [illegible]
   690.000      - [illegible]
   700.000      - [illegible]
   710.000      - [illegible]

   [illegible]  - [illegible]
   730.000      - [illegible]
   740.000      - [illegible]
   [illegible]    [illegible]
   [illegible]  - [illegible]
   770.000      - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   800.000      - [illegible]
   810.000      - [illegible]
   [illegible]  - [illegible]
   [illegible]    [illegible]
   [illegible]  - [illegible]
   [illegible]
   [illegible]  -
   [illegible]  -
   [illegible]  -
   [illegible]  -
   [illegible]  -
   [illegible]  -
   [illegible]  -
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   1400.00      - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   [illegible]    [illegible]
   [illegible]  - [illegible]
   [illegible]  - [illegible]
   2100.00      - [illegible]
   2200.00      - [illegible]
   2300.00      -
   2400.00      - [illegible]
   [illegible]  - [illegible]
   2600.00      -
   2700.00      - [illegible]
   [illegible]  - [illegible]
   2900.00      - [illegible]
   3000.00      - [illegible]
   3100.00      - [illegible]
   3200.00      - [illegible]
   3300.00      - 0.36
   3400.00      - 0.77
   3500.00      - [illegible]
   3600.00      - [illegible]
   3700.00      - [illegible]
   3800.00      - [illegible]
   [illegible]  - [illegible]
   4000.00        [illegible]
   4100.00      - [illegible]
   4200.00      - [illegible]
 END
```

WELL 25-586

BACKGROUND DATA
PHASE II RETEST

SECTION 25-T36N-R74W

```
        SE1000B
  Environmental Logger
     01/14  09:14

  Unit# 00000  Test# 0

INPUT 1:  Level (F) TOC

Reference          0.00
Scale factor      50.00
Offset             0.00

Start @   01/13  16:00

Elapsed Time     Value
------------   ---------
     0.0000     -   0.18
    30.0000     -   0.14
    60.0000     -   0.11
    90.0000     -   0.07
    120.000     -   0.07
    150.000     -   0.09
    180.000     -   0.09
    210.000     -   0.09
    240.000     -   0.09
    270.000     -   0.11
    300.000     -   0.11
    330.000     -   0.11
    360.000     -   0.11
    390.000     -   0.11
    420.000     -   0.11
    450.000     -   0.11
    480.000     -   0.11
    510.000     -   0.11
    540.000     -   0.11
    570.000     -   0.11
    600.000     -   0.11
    630.000     -   0.11
    660.000     -   0.11
    690.000     -   0.11
    720.000     -   0.11
    750.000     -   0.11
    780.000     -   0.11
    810.000     -   0.07
    840.000     -   0.07
    870.000     -   0.07
    900.000     -   0.07
    930.000     -   0.09
    960.000     -   0.09
    990.000     -   0.14
    1020.00     -   0.20
END
```

Background 25-586 phase II A.

WELLS 25-586

DRAWDOWN DATA
PHASE II RETEST

SECTION 25-T36N-R74W

```
       SE1000B
 Environmental Logger
     01/17  09:41

  Unit# 00000  Test# 1

INPUT 1:  Level (F) TOC

Reference        0.00
Scale factor    50.08
Offset           0.00

Step# 0   01/14  10:00
```

Elapsed Time	Value
0.0000	- 0.37
0.0033	- 0.37
0.0066	- 0.37
0.0099	- 0.37
0.0133	- 0.37
0.0166	- 0.37
0.0200	- 0.37
0.0233	- 0.36
0.0266	- 0.36
0.0300	- 0.36
0.0333	- 0.36
0.0500	- 0.34
0.0666	- 0.33
0.0833	- 0.31
0.1000	- 0.31
0.1166	- 0.30
0.1333	- 0.30
0.1500	- 0.28
0.1666	- 0.28
0.1833	- 0.26
0.2000	- 0.28
0.2166	- 0.25
0.2333	- 0.26
0.2500	- 0.26
0.2666	- 0.25
0.2833	- 0.25
0.3000	- 0.23
0.3166	- 0.23
0.3333	- 0.23
0.4167	- 0.20
0.5000	- 0.17
0.5833	- 0.14
0.6667	- 0.12
0.7500	- 0.12
0.8333	- 0.11
0.9167	- 0.09
1.0000	- 0.07
1.0833	- 0.07
1.1667	- 0.06
1.2500	- 0.06
1.3333	- 0.06
1.4166	- 0.04
1.5000	- 0.04
1.5833	- 0.04
1.6667	- 0.03
1.7500	- 0.03
1.8333	- 0.03
1.9167	- 0.01
2.0000	- 0.01
2.5000	0.00
3.0000	0.01
3.5000	0.01
4.0000	0.03
4.5000	0.03
5.0000	0.04
5.5000	0.04
6.0000	0.06
6.5000	0.06
7.0000	0.06
7.5000	0.06
8.0000	0.06
8.5000	0.07
9.0000	0.07
9.5000	0.07
10.0000	0.07
12.0000	- 0.11
14.0000	- 0.15
16.0000	- 0.17
18.0000	- 0.20
20.0000	- 0.22
22.0000	- 0.22
24.0000	- 0.23
26.0000	- 0.23
28.0000	- 0.23
30.0000	- 0.25
32.0000	- 0.25
34.0000	- 0.25
36.0000	- [illegible]
38.0000	- 0.25
40.0000	- 0.26
42.0000	- 0.26
44.0000	- [illegible]
46.0000	- 0.26
48.0000	- 0.26
50.0000	- 0.26
52.0000	- 0.26
54.0000	- 0.26
56.0000	- 0.26
58.0000	- 0.26
60.0000	- 0.26
62.0000	- 0.26
64.0000	- 0.26
66.0000	- 0.26
68.0000	- 0.28
70.0000	- 0.26
72.0000	- 0.28
74.0000	- 0.28
76.0000	- 0.28
78.0000	- 0.28
80.0000	- 0.28
82.0000	- 0.28
84.0000	- 0.28
86.0000	- 0.28
88.0000	- 0.28
90.0000	- 0.28
92.0000	- 0.28
94.0000	- 0.28
96.0000	- 0.28
98.0000	- 0.28
100.000	- 0.28
110.000	- 0.33
120.000	- 0.33
130.000	- 0.34
140.000	- 0.34
150.000	- 0.34
160.000	- 0.34
170.000	- 0.34
180.000	- 0.33
190.000	- 0.34
200.000	- [illegible]
210.000	- [illegible]
220.000	- 0.34
230.000	- 0.34
240.000	- 0.34
250.000	- 0.33
260.000	- 0.34
270.000	- [illegible]
280.000	- [illegible]
290.000	- [illegible]
300.000	- [illegible]
310.000	- 0.33
320.000	- 0.31
330.000	- 0.32
340.000	- [illegible]
350.000	- [illegible]
360.000	- [illegible]
370.000	- [illegible]
380.000	- [illegible]
390.000	- [illegible]
400.000	- [illegible]
410.000	- [illegible]
420.000	- [illegible]
430.000	- [illegible]
440.000	- [illegible]
450.000	- [illegible]
460.000	- [illegible]
470.000	0.26
480.000	- 0.26
490.000	- [illegible]
500.000	- [illegible]
510.000	- [illegible]
520.000	- [illegible]
530.000	- 0.28
540.000	- [illegible]
550.000	- 0.28
560.000	- 0.28
570.000	- 0.28
580.000	- 0.30
590.000	- 0.30
600.000	- 0.30
610.000	- 0.30
620.000	- 0.30
630.000	- 0.30
640.000	- 0.30
650.000	- 0.31
660.000	- 0.31
670.000	- 0.31
680.000	- 0.31
690.000	- 0.31
700.000	- 0.31
710.000	- 0.31
720.000	- 0.33
730.000	- 0.31
740.000	- 0.33
750.000	- 0.33
760.000	- 0.33
770.000	- 0.33
780.000	- 0.33
790.000	- 0.33
800.000	- [illegible]
810.000	- [illegible]
820.000	- [illegible]
830.000	- [illegible]
840.000	- [illegible]
850.000	- [illegible]
860.000	- [illegible]
870.000	- [illegible]
880.000	- 0.34
890.000	- [illegible]
900.000	- [illegible]
910.000	- [illegible]
920.000	- 0.34
930.000	- 0.34
940.000	- [illegible]
950.000	- 0.33
960.000	- [illegible]
970.000	- [illegible]
980.000	- [illegible]
990.000	- [illegible]
1000.00	- [illegible]
1100.00	- [illegible]
1200.00	- [illegible]
1300.00	- [illegible]
1400.00	- [illegible]
1500.00	- [illegible]
1600.00	- [illegible]
1700.00	- 0.54
1800.00	0.61
1900.00	- 0.58
2000.00	- [illegible]
2100.00	- [illegible]
2200.00	- [illegible]
2300.00	- [illegible]
2400.00	- [illegible]
2500.00	- [illegible]
2600.00	- [illegible]
2700.00	- 0.44
2800.00	- [illegible]
2900.00	- [illegible]
3000.00	- [illegible]
3100.00	- 0.72
3200.00	- 0.71
3300.00	- 0.66
3400.00	- 0.67
3500.00	- 0.69
3600.00	- [illegible]
3700.00	- [illegible]
3800.00	- [illegible]
3900.00	- [illegible]
4000.00	- [illegible]
4100.00	- [illegible]
4200.00	- [illegible]

END

25-586

phase

II

B-25

Section 25 Overlying and Underlying Shale Communication Test

As previously stated both of the original shale wells were abandoned after attempts to repair them were unsuccessful and new shale wells, wells 593 and 582-A were completed for the overlying and underlying shales, respectively. The shale communication test monitoring included wire line probing of the pumped well 584 and production zone well 581 to document the production zone drawdown and transducers in shale wells 593 and 582-A. After background data collection for 20 hours, the pump was turned on and run for 3 days, then shut off. Fluid level monitoring in the shale wells continued two days after pump shut off before the transducers were removed. Data from this phase of the test follows this page.

OVERLYING & UNDERLYING
SHALE COMMUNICATION TEST
SECTION 25-T36N-R74W

START - 0800 Hours on 9-18-86, pump well 584 to 50 gpm

Hand Probe Readings:

DATE	TIME	WELL 25-581	WELL 25-584	WELL 25-584 FLOW RATE
9-18-86	0800 Hrs.	469.16	468.90	-
(Thursday)	0815 "	475.00	522.75	50 gpm
	0830 "	476.92	524.22	50 "
	0845 "	478.24	525.24	50 "
	0900 "	478.98	525.98	50 "
	1000 "	480.73	527.70	50 "
	1100 "	481.84	528.60	49 "
	1200 "	482.63	529.22	49 "
	1300 "	483.20	529.74	49 "
	1400 "	483.68	530.15	49 "
	1600 "	484.48	531.23	49 "
	2000 "	485.51	532.33	49 "
	2400 "	486.16	533.17	50 "
9-19-86	0400 "	486.62	533.65	49 "
(Friday)	0800 "	487.00	534.12	50 "
	1200 "	487.19	533.83	49 "
	1600 "	487.44	534.21	50 "
	2000 "	487.60	534.65	49 "
	2400 "	487.82	535.07	49 "
9-20-86	0400 "	488.00	535.22	49 "
(Saturday)	0800 "	487.95	535.45	49 "
	1200 "	488.10	534.55	49 "
	1600 "	488.15	535.10	49 "
	2000 "	488.26	535.10	49 "
	2400 "	488.38	535.42	49 "
9-21-86	0400 "	488.53	535.71	49 "
(Sunday)	0800 "	488.83	535.96	49 "

STOP GEN. AT 0800 HOURS

Well 584 is Pumped Well

Well 581 is Prod Zone Well located same distance from pumped well as shale wells (71 feet)

Well 593 is Overlying Shale

Well 582 'A' is Underlying Shale

UNDERLYING SHALE
COMMUNICATION TEST
SEC. 25-36N-74W
SPRB, WYOMING

UNDERLYING SHALE
WELL 582 'A'
Page 1 of 2

582 'A'

SE1000B
Environmental Logger
09/23/86 07:43

Unit# 00000 Test# 0

INPUT 2: Level (F) TOC

Reference 0.00
Scale factor 50.08
Offset 0.00

Step# 0 09/17 12:00

TOC LEVEL: 53805'

Background Data Collection

Elapsed Time	Value
0.0000	0.00
20.0000	0.00
40.0000	0.00
60.0000	0.00
80.0000	0.00
100.000	0.00
120.000	- 0.01
140.000	- 0.01
160.000	- 0.01
180.000	- 0.01
200.000	- 0.01
220.000	- 0.01
240.000	- 0.03
260.000	- 0.03
280.000	- 0.03
300.000	- 0.03
320.000	- 0.03
340.000	- 0.04
360.000	- 0.04
380.000	- 0.04
400.000	- 0.06
420.000	- 0.06
440.000	- 0.06
460.000	- 0.06
480.000	- 0.06
500.000	- 0.07
520.000	- 0.07
540.000	- 0.07
560.000	- 0.07
580.000	- 0.07
600.000	- 0.09
620.000	- 0.07
640.000	- 0.09
660.000	- 0.09
680.000	- 0.09
700.000	- 0.09
720.000	- 0.11
740.000	- 0.11
760.000	- 0.11
780.000	- 0.11
800.000	- 0.11
820.000	- 0.11
840.000	- 0.11
860.000	- 0.11
880.000	- 0.11
900.000	- 0.11
920.000	- 0.11
940.000	- 0.11
960.000	- 0.12
980.000	- 0.11
1000.00	- 0.11
1020.00	- 0.12
1040.00	- 0.12
1060.00	- 0.12
1080.00	- 0.12
1100.00	- 0.12
1120.00	- 0.12
1140.00	- 0.12
1160.00	- 0.12
1180.00	- 0.12
1200.00	- 0.12

PUMP ON.

DRAWDOWN PERIOD

1220.00	- 0.12
1240.00	- 0.12
1260.00	- 0.12
1280.00	- 0.12
1300.00	- 0.12
1320.00	- 0.12
1340.00	- 0.12
1360.00	- 0.12
1380.00	- 0.12
1400.00	- 0.12
1420.00	- 0.12
1440.00	- 0.12
1460.00	- 0.12
1480.00	- 0.12
1500.00	- 0.12
1520.00	- 0.12
1540.00	- 0.12
1560.00	- 0.12
1580.00	- 0.12
1600.00	- 0.12
1620.00	- 0.12
1640.00	- 0.12
1660.00	- 0.12
1680.00	- 0.12
1700.00	- 0.12
1720.00	- 0.12
1740.00	- 0.12
1760.00	- 0.14
1780.00	- 0.14
1800.00	- 0.14
1820.00	- 0.14
1840.00	- 0.14
1860.00	- 0.14
1880.00	- 0.14
1900.00	- 0.14
1920.00	- 0.15
1940.00	- 0.15
1960.00	- 0.15
1980.00	- 0.15
2000.00	- 0.15
2020.00	- 0.15
2040.00	- 0.15
2060.00	- 0.15
2080.00	- 0.15
2100.00	- 0.15
2120.00	- 0.15
2140.00	- 0.15
2160.00	- 0.17
2180.00	- 0.17
2200.00	- 0.17
2220.00	- 0.17
2240.00	- 0.17
2260.00	- 0.17
2280.00	- 0.17
2300.00	- 0.17
2320.00	- 0.17
2340.00	- 0.17
2360.00	- 0.17
2380.00	- 0.17
2400.00	- 0.17
2420.00	- 0.17
2440.00	- 0.17
2460.00	- 0.18
2480.00	- 0.18
2500.00	- 0.18
2520.00	- 0.18
2540.00	- 0.18
2560.00	- 0.18
2580.00	- 0.18

DRAWDOWN PERIOD

2600.00	- 0.18
2620.00	- 0.18
2640.00	- 0.18
2660.00	- 0.18
2680.00	- 0.17
2700.00	- 0.17
2720.00	- 0.17
2740.00	- 0.17
2760.00	- 0.17
2780.00	- 0.17
2800.00	- 0.17
2820.00	- 0.15
2840.00	- 0.15
2860.00	- 0.15
2880.00	- 0.15
2900.00	- 0.15
2920.00	- 0.15
2940.00	- 0.15
2960.00	- 0.14
2980.00	- 0.15
3000.00	- 0.14
3020.00	- 0.14
3040.00	- 0.14
3060.00	- 0.14
3080.00	- 0.14
3100.00	- 0.14
3120.00	- 0.14
3140.00	- 0.15
3160.00	- 0.15
3180.00	- 0.15
3200.00	- 0.17
3220.00	- 0.17
3240.00	- 0.17
3260.00	- 0.17
3280.00	- 0.17
3300.00	- 0.17
3320.00	- 0.17
3340.00	- 0.17
3360.00	- 0.18
3380.00	- 0.18
3400.00	- 0.18
3420.00	- 0.18
3440.00	- 0.18
3460.00	- 0.18
3480.00	- 0.18
3500.00	- 0.18
3520.00	- 0.18
3540.00	- 0.18
3560.00	- 0.18
3580.00	- 0.18
3600.00	- 0.18
3620.00	- 0.18
3640.00	- 0.18
3660.00	- 0.18
3680.00	- 0.18
3700.00	- 0.20
3720.00	- 0.18
3740.00	- 0.20
3760.00	- 0.20
3780.00	- 0.20
3800.00	- 0.20
3820.00	- 0.20
3840.00	- 0.20
3860.00	- 0.20
3880.00	- 0.20
3900.00	- 0.20
3920.00	- 0.18
3940.00	- 0.18
3960.00	- 0.18
3980.00	- 0.20
4000.00	- 0.20
4020.00	- 0.18

DRAWDOWN PERIOD

4040.00	-	0.20
4060.00	-	0.20
4080.00	-	0.18
4100.00	-	0.20
4120.00	-	0.18
4140.00	-	0.18
4160.00	-	0.18
4180.00	-	0.18
4200.00	-	0.18
4220.00	-	0.18
4240.00	-	0.18
4260.00	-	0.18
4280.00	-	0.17
4300.00	-	0.17
4320.00	-	0.17
4340.00	-	0.17
4360.00	-	0.17
4380.00	-	0.17
4400.00	-	0.17
4420.00	-	0.17
4440.00	-	0.17
4460.00	-	0.17
4480.00	-	0.17
4500.00	-	0.17
4520.00	-	0.18
4540.00	-	0.17
4560.00	-	0.18
4580.00	-	0.18
4600.00	-	0.18
4620.00	-	0.18
4640.00	-	0.18
4660.00	-	0.18
4680.00	-	0.18
4700.00	-	0.18
4720.00	-	0.20
4740.00	-	0.20
4760.00	-	0.20
4780.00	-	0.20
4800.00	-	0.20
4820.00	-	0.20
4840.00	-	0.20
4860.00	-	0.20
4880.00	-	0.20
4900.00	-	0.20
4920.00	-	0.20
4940.00	-	0.20
4960.00	-	0.20
4980.00	-	0.22
5000.00	-	0.22
5020.00	-	0.22
5040.00	-	0.22
5060.00	-	0.22
5080.00	-	0.22
5100.00	-	0.22
5120.00	-	0.22
5140.00	-	0.22
5160.00	-	0.23
5180.00	-	0.23
5200.00	-	0.22
5220.00	-	0.23
5240.00	-	0.23
5260.00	-	0.23
5280.00	-	0.23
5300.00	-	0.23
5320.00	-	0.23
5340.00	-	0.23
5360.00	-	0.23
5380.00	-	0.23
5400.00	-	0.23
5420.00	-	0.23
5440.00	-	0.23
5460.00	-	0.23
5480.00	-	0.23
5500.00	-	0.25
5520.00	-	0.23

Pump OFF

RECOVERY PHASE

5540.00	-	0.23
5560.00	-	0.23
5580.00	-	0.23
5600.00	-	0.23
5620.00	-	0.23
5640.00	-	0.23
5660.00	-	0.23
5680.00	-	0.23
5700.00	-	0.23
5720.00	-	0.23
5740.00	-	0.22
5760.00	-	0.22
5780.00	-	0.20
5800.00	-	0.20
5820.00	-	0.20
5840.00	-	0.20
5860.00	-	0.20
5880.00	-	0.20
5900.00	-	0.20
5920.00	-	0.22
5940.00	-	0.22
5960.00	-	0.22
5980.00	-	0.22
6000.00	-	0.20
6020.00	-	0.20
6040.00	-	0.22
6060.00	-	0.22
6080.00	-	0.22
6100.00	-	0.22
6120.00	-	0.22
6140.00	-	0.22
6160.00	-	0.22
6180.00	-	0.23
6200.00	-	0.23
6220.00	-	0.23
6240.00	-	0.25
6260.00	-	0.25
6280.00	-	0.25
6300.00	-	0.25
6320.00	-	0.25
6340.00	-	0.25
6360.00	-	0.25
6380.00	-	0.25
6400.00	-	0.25
6420.00	-	0.26
6440.00	-	0.26
6460.00	-	0.25
6480.00	-	0.26
6500.00	-	0.26
6520.00	-	0.26
6540.00	-	0.26
6560.00	-	0.26
6580.00	-	0.26
6600.00	-	0.26
6620.00	-	0.26
6640.00	-	0.26
6660.00	-	0.26
6680.00	-	0.26
6700.00	-	0.26
6720.00	-	0.26
6740.00	-	0.26
6760.00	-	0.26
6780.00	-	0.26
6800.00	-	0.26
6820.00	-	0.26
6840.00	-	0.28
6860.00	-	0.26
6880.00	-	0.26
6900.00	-	0.28

Recovery Phase

6920.00	-	0.26
6940.00	-	0.28
6960.00	-	0.26
6980.00	-	0.28
7000.00	-	0.26
7020.00	-	0.26
7040.00	-	0.26
7060.00	-	0.26
7080.00	-	0.26
7100.00	-	0.26
7120.00	-	0.26
7140.00	-	0.25
7160.00	-	0.25
7180.00	-	0.25
7200.00	-	0.25
7220.00	-	0.25
7240.00	-	0.25
7260.00	-	0.25
7280.00	-	0.23
7300.00	-	0.25
7320.00	-	0.25
7340.00	-	0.25
7360.00	-	0.25
7380.00	-	0.25
7400.00	-	0.25
7420.00	-	0.25
7440.00	-	0.25
7460.00	-	0.25
7480.00	-	0.25
7500.00	-	0.25
7520.00	-	0.25
7540.00	-	0.25
7560.00	-	0.25
7580.00	-	0.25
7600.00	-	0.26
7620.00	-	0.26
7640.00	-	0.26
7660.00	-	0.26
7680.00	-	0.28
7700.00	-	0.28
7720.00	-	0.28
7740.00	-	0.30
7760.00	-	0.28
7780.00	-	0.30
7800.00	-	0.30
7820.00	-	0.30
7840.00	-	0.30
7860.00	-	0.30
7880.00	-	0.30
7900.00	-	0.30
7920.00	-	0.30
7940.00	-	0.30
7960.00	-	0.30
7980.00	-	0.30
8000.00	-	0.30
8020.00	-	0.31
8040.00	-	0.31
8060.00	-	0.31
8080.00	-	0.31
8100.00	-	0.31
8120.00	-	0.31
8140.00	-	0.31
8160.00	-	0.30
8180.00	-	0.31
8200.00	-	0.31
8220.00	-	0.31
8240.00	-	0.31
8260.00	-	0.31
8280.00	-	0.31
8300.00	-	0.31
8320.00	-	0.31

END

TOC LEVEL: 537.74'

PAGE 1 of 2
On Well 593

OVERLYING SHALE
COMMUNICATION TEST
SEC. 25-36N-74W
SPRB, WYOMING

```
READY    593

      SE1000B
 Environmental Logger
   09/23/86 07:17

 Unit# 00000  Test# 0

INPUT 1:  Level (F) TOC

Reference          0.00
Scale factor      50.35
Offset             0.00

Step# 0   09/17  12:00
TOC: LEVEL       432.10
Elapsed Time     Value
------------   ---------
  0.0000           0.00
 20.0000           0.00
 40.0000           0.00
 60.0000           0.00
 80.0000           0.00
 100.000           0.00
 120.000    -      0.01
 140.000    -      0.01
 160.000    -      0.01
 180.000    -      0.01
 200.000    -      0.01
 220.000    -      0.03
 240.000    -      0.03
 260.000    -      0.03
 280.000    -      0.04
 300.000    -      0.04
 320.000    -      0.04
 340.000    -      0.06
 360.000    -      0.06
 380.000    -      0.06
 400.000    -      0.07
 420.000    -      0.07
 440.000    -      0.07
 460.000    -      0.07
 480.000    -      0.07
 500.000    -      0.09
 520.000    -      0.09
 540.000    -      0.09
 560.000    -      0.11
 580.000    -      0.11
 600.000    -      0.11
 620.000    -      0.11
 640.000    -      0.12
 660.000    -      0.12
 680.000    -      0.12
 700.000    -      0.12
 720.000    -      0.14
 740.000    -      0.14
 760.000    -      0.14
 780.000    -      0.15
 800.000    -      0.15
 820.000    -      0.15
 840.000    -      0.15
 860.000    -      0.15
 880.000    -      0.15
 900.000    -      0.17
 920.000    -      0.17
 940.000    -      0.17
 960.000    -      0.17
 980.000    -      0.17
 1000.00    -      0.17
```

Background Data Collection

```
1020.00     -   0.17
1040.00     -   0.19
1060.00     -   0.19
1080.00     -   0.19
1100.00     -   0.19
1120.00     -   0.20
1140.00     -   0.19
1160.00     -   0.20
1180.00     -   0.20
1200.00     -   0.20
1220.00     -   0.22
1240.00     -   0.22
1260.00     -   0.20
1280.00     -   0.22
1300.00     -   0.22
1320.00     -   0.23
1340.00     -   0.23
1360.00     -   0.23
1380.00     -   0.23
1400.00     -   0.23
1420.00     -   0.25
1440.00     -   0.23
1460.00     -   0.23
1480.00     -   0.23
1500.00     -   0.25
1520.00     -   0.25
1540.00     -   0.25
1560.00     -   0.27
1580.00     -   0.27
1600.00     -   0.27
1620.00     -   0.27
1640.00     -   0.27
1660.00     -   0.28
1680.00     -   0.28
1700.00     -   0.28
1720.00     -   0.28
1740.00     -   0.30
1760.00     -   0.30
1780.00     -   0.31
1800.00     -   0.30
1820.00     -   0.30
1840.00     -   0.33
1860.00     -   0.33
1880.00     -   0.33
1900.00     -   0.34
1920.00     -   0.34
1940.00     -   0.34
1960.00     -   0.36
1980.00     -   0.36
2000.00     -   0.36
2020.00     -   0.38
2040.00     -   0.38
2060.00     -   0.38
2080.00     -   0.38
2100.00     -   0.39
2120.00     -   0.39
2140.00     -   0.39
2160.00     -   0.41
2180.00     -   0.41
2200.00     -   0.41
2220.00     -   0.42
2240.00     -   0.42
2260.00     -   0.42
2280.00     -   0.42
2300.00     -   0.44
2320.00     -   0.44
2340.00     -   0.46
2360.00     -   0.46
2380.00     -   0.46
2400.00     -   0.46
2420.00     -   0.47
2440.00     -   0.47
2460.00     -   0.47
```

BACK GROUND

Pump ON

DRAWDOWN PERIOD

```
2480.00     -   0.49
2500.00     -   0.49
2520.00     -   0.49
2540.00     -   0.49
2560.00     -   0.50
2580.00     -   0.50
2600.00     -   0.50
2620.00     -   0.52
2640.00     -   0.52
2660.00     -   0.52
2680.00     -   0.52
2700.00     -   0.52
2720.00     -   0.52
2740.00     -   0.52
2760.00     -   0.52
2780.00     -   0.52
2800.00     -   0.52
2820.00     -   0.54
2840.00     -   0.54
2860.00     -   0.54
2880.00     -   0.54
2900.00     -   0.54
2920.00     -   0.55
2940.00     -   0.55
2960.00     -   0.57
2980.00     -   0.57
3000.00     -   0.57
3020.00     -   0.57
3040.00     -   0.57
3060.00     -   0.58
3080.00     -   0.58
3100.00     -   0.58
3120.00     -   0.60
3140.00     -   0.60
3160.00     -   0.60
3180.00     -   0.61
3200.00     -   0.63
3220.00     -   0.63
3240.00     -   0.65
3260.00     -   0.65
3280.00     -   0.65
3300.00     -   0.66
3320.00     -   0.66
3340.00     -   0.68
3360.00     -   0.68
3380.00     -   0.68
3400.00     -   0.69
3420.00     -   0.69
3440.00     -   0.69
3460.00     -   0.71
3480.00     -   0.71
3500.00     -   0.71
3520.00     -   0.71
3540.00     -   0.73
3560.00     -   0.73
3580.00     -   0.73
3600.00     -   0.74
3620.00     -   0.74
3640.00     -   0.74
3660.00     -   0.76
3680.00     -   0.76
3700.00     -   0.76
3720.00     -   0.76
3740.00     -   0.76
3760.00     -   0.77
3780.00     -   0.77
3800.00     -   0.79
3820.00     -   0.79
3840.00     -   0.81
3860.00     -   0.81
3880.00     -   0.81
3900.00     -   0.82
3920.00     -   0.82
3940.00     -   0.82
```

DRAWDOWN PERIOD

OVERLYING SHALE
WELL 593
PAGE 2 of 2

DRAWDOWN PERIOD

3960.00 - 0.82
3980.00 - 0.84
4000.00 - 0.84
4020.00 - 0.84
4040.00 - 0.84
4060.00 - 0.85
4080.00 - 0.84
4100.00 - 0.85
4120.00 - 0.85
4140.00 - 0.85
4160.00 - 0.85
4180.00 - 0.87
4200.00 - 0.87
4220.00 - 0.87
4240.00 - 0.87
4260.00 - 0.87
4280.00 - 0.87
4300.00 - 0.87
4320.00 - 0.87
4340.00 - 0.87
4360.00 - 0.88
4380.00 - 0.88
4400.00 - 0.88
4420.00 - 0.90
4440.00 - 0.90
4460.00 - 0.90
4480.00 - 0.92
4500.00 - 0.92
4520.00 - 0.93
4540.00 - 0.93
4560.00 - 0.93
4580.00 - 0.95
4600.00 - 0.95
4620.00 - 0.95
4640.00 - 0.96
4660.00 - 0.96
4680.00 - 0.98
4700.00 - 0.98
4720.00 - 0.98
4740.00 - 1.00
4760.00 - 1.00
4780.00 - 1.00
4800.00 - 1.01
4820.00 - 1.01
4840.00 - 1.01
4860.00 - 1.03
4880.00 - 1.03
4900.00 - 1.03
4920.00 - 1.04
4940.00 - 1.04
4960.00 - 1.06
4980.00 - 1.06
5000.00 - 1.06
5020.00 - 1.06
5040.00 - 1.08
5060.00 - 1.08
5080.00 - 1.09
5100.00 - 1.09
5120.00 - 1.09
5140.00 - 1.09
5160.00 - 1.11
5180.00 - 1.11
5200.00 - 1.11
5220.00 - 1.12
5240.00 - 1.12
5260.00 - 1.12
5280.00 - 1.12
5300.00 - 1.14
5320.00 - 1.14
5340.00 - 1.14
5360.00 - 1.14
5380.00 - 1.15
5400.00 - 1.15
5420.00 - 1.15
5440.00 - 1.15

5460.00 - 1.17
5480.00 - 1.17
5500.00 - 1.17
PUMP 5520.00 - 1.17

OFF 5540.00 - 1.19
5560.00 - 1.19
5580.00 - 1.19
5600.00 - 1.19
5620.00 - 1.19
5640.00 - 1.20
5660.00 - 1.20
5680.00 - 1.20
5700.00 - 1.20
5720.00 - 1.20
5740.00 - 1.20
5760.00 - 1.22
5780.00 - 1.20
5800.00 - 1.20
5820.00 - 1.20
5840.00 - 1.22
5860.00 - 1.22
5880.00 - 1.23
5900.00 - 1.23
5920.00 - 1.25
5940.00 - 1.25
5960.00 - 1.25
5980.00 - 1.25
6000.00 - 1.25
6020.00 - 1.27
6040.00 - 1.27
6060.00 - 1.28
6080.00 - 1.30
6100.00 - 1.31
6120.00 - 1.31
6140.00 - 1.33
6160.00 - 1.35
6180.00 - 1.35
6200.00 - 1.36
6220.00 - 1.36
6240.00 - 1.38
6260.00 - 1.39
6280.00 - 1.39
6300.00 - 1.41
6320.00 - 1.41
6340.00 - 1.42
6360.00 - 1.42
6380.00 - 1.42
6400.00 - 1.44
6420.00 - 1.44
6440.00 - 1.46
6460.00 - 1.46
6480.00 - 1.46
6500.00 - 1.47
6520.00 - 1.47
6540.00 - 1.49
6560.00 - 1.49
6580.00 - 1.49
6600.00 - 1.49
6620.00 - 1.50
6640.00 - 1.50
6660.00 - 1.52
6680.00 - 1.52
6700.00 - 1.52
6720.00 - 1.54
6740.00 - 1.54
6760.00 - 1.54
6780.00 - 1.54
6800.00 - 1.55
6820.00 - 1.55
6840.00 - 1.55
6860.00 - 1.57
6880.00 - 1.57

RECOVERY PHASE

HASE

RECOVERY P.

6900.00 - 1.57
6920.00 - 1.58
6940.00 - 1.58
6960.00 - 1.58
6980.00 - 1.60
7000.00 - 1.60
7020.00 - 1.60
7040.00 - 1.62
7060.00 - 1.60
7080.00 - 1.62
7100.00 - 1.62
7120.00 - 1.62
7140.00 - 1.62
7160.00 - 1.63
7180.00 - 1.63
7200.00 - 1.63
7220.00 - 1.65
7240.00 - 1.65
7260.00 - 1.65
7280.00 - 1.65
7300.00 - 1.66
7320.00 - 1.66
7340.00 - 1.66
7360.00 - 1.68
7380.00 - 1.68
7400.00 - 1.68
7420.00 - 1.70
7440.00 - 1.70
7460.00 - 1.70
7480.00 - 1.71
7500.00 - 1.71
7520.00 - 1.73
7540.00 - 1.73
7560.00 - 1.74
7580.00 - 1.74
7600.00 - 1.74
7620.00 - 1.76
7640.00 - 1.76
7660.00 - 1.77
7680.00 - 1.79
7700.00 - 1.79
7720.00 - 1.81
7740.00 - 1.81
7760.00 - 1.82
7780.00 - 1.82
7800.00 - 1.84
7820.00 - 1.84
7840.00 - 1.84
7860.00 - 1.85
7880.00 - 1.85
7900.00 - 1.85
7920.00 - 1.87
7940.00 - 1.87
7960.00 - 1.87
7980.00 - 1.89
8000.00 - 1.89
8020.00 - 1.90
8040.00 - 1.90
8060.00 - 1.90
8080.00 - 1.90
8100.00 - 1.92
8120.00 - 1.92
8140.00 - 1.92
8160.00 - 1.93
8180.00 - 1.93
8200.00 - 1.93
8220.00 - 1.95
8240.00 - 1.95
8260.00 - 1.95
8280.00 - 1.95
8300.00 - 1.97
8320.00 - 1.97

RECOVERY PHASE

END
TOC LEVEL - 430.13

Section 35 Phase I Test

The Section 35 Phase I Test was conducted to determine the characteristics of the confining shale layers. Transducers were installed in the overlying and underlying aquifer wells, the overlying and underlying shale wells and one production zone monitor well. The fluid levels in the pumped well, well 739, were checked periodically with a wire line probe. Data from the underlying shale well indicated a seal problem with the well completion. Attempts to obtain an effective seal was unsuccessful and the lower shale well was subsequently abandoned. Data for the other wells monitored during the Phase I test follow this page.

PUMPED WELL RATE
& FLUID LEVEL
WELL 35-739
DRAWDOWN DATA
PHASE I TEST
SECTION 35-T36N-R74W

DATE	TIME	RATE - Gpm	DEPTH	
11/26	1000	0	236.29	
	1005	8 ± .5	305.47	
	1010	8 ± .5	328.75	
	1015	8 ± .5	342.19	
	1020	8 ± .5	358.65	
	1025	8 ± .5	374.34	
	1030	8 ± .5 (7.8)	385.24	
	1100	8 ± .5	409.96	
	1130	8 ± .5	415.65	(11-26-85)
	1200	8 (7.9)	419.11	
	1230	8 (7.7)	420.78	
	1300	8 (7.9)	422.47	
	1400	8 (7.6)	424.53	
	1500	8 (7.7)	426.50	
	1600	8 (7.7)	427.61	
	1700	8	427.28	
	2000	8	429.27	
	2400	8 ↑ ≈ 12	429.82	
11/27	0400	≈ 12 ↓ ≈ 4	458.62	
	0800	≈ 4 ↑ 8	387.19	
	1200	7.7	430.87	(11-27-85)
	1600	7.8	431.02	
	2000	8.0	440.46	
	2400	8.2	442.20	
11/28	0400	8.2	441.25	
	0800	8.2	443.28	
	1200	8.2	442.36	(11-28-85)
	1600	8.2	445.27	
	2000	8.2	445.65	
	2400	7.9	446.22	
11/29	0400	8.2	446.10	
	0800	8.3	446.72	(11-29-85)
	1000	-	-	
	1030	8.2	447.12	

WELL 35-737

BACKGROUND DATA
PHASE I TEST

SECTION 35-T36N-R74W

737

[illegible]

		0.01
		0.01
		0.00
90.0000	-	0.01
	-	0.03
	-	0.06
180.000	-	0.07
	-	0.09
	-	0.11
	-	0.12
	-	0.12
330.000	-	0.12
	-	0.14
	-	0.14
	-	0.12
	-	0.11
490.000	-	0.11
	-	0.11
	-	0.09
	-	0.09
	-	0.07
	-	0.07
660.000	-	0.07
	-	0.07
	-	0.07
	-	0.06
	-	0.07
	-	0.07
	-	0.07
	-	0.09
900.000	-	0.11
	-	0.11
	-	0.12
	-	0.12
	-	0.1[illegible]
	-	0.1[illegible]
	-	0.1[illegible]
1110.00	-	0.13
	-	0.13
	-	0.1[illegible]
	-	0.1[illegible]
	-	[illegible]
	-	[illegible]

WELL 35-737

DRAWDOWN & RECOVERY DATA
PHASE I TEST
SECTION 35-T36N-R74W

35-737 phase I

SE1000B
Environmental Logger
12/02 09:51

Unit# 00000 Test# 1

INPUT 2: Level (F) TOC

Reference 0.00
Scale factor 50.36
Offset 0.00

Step# 0 11/26 10:00

Elapsed Time	Value	
0.0000	0.00	
0.0033	0.00	
0.0066	0.00	
0.0099	0.00	
0.0133	0.00	
0.0166	0.00	
.0200	0.00	
.0233	0.00	
.0266	0.00	
0.0300	0.01	
0.0333	0.01	
0.0500	0.00	
0.0666	0.00	
0.0833	0.00	
0.1000	0.00	
0.1166	0.00	
0.1333	0.00	
0.1500	0.00	
0.1666	0.00	
0.1833	0.00	
0.2000	0.00	
0.2166	0.00	
0.2333	0.00	
0.2500	0.00	
0.2666	0.00	
0.2833	0.00	
0.3000	0.00	
0.3166	0.00	
0.3333	0.00	
0.4167	0.00	
0.5000	0.00	
0.5833	0.00	
0.6667	0.00	
0.7500	0.00	
0.8333	0.00	
0.9167	0.00	
1.0000	0.00	
1.0833	0.01	
.1667	0.00	
.2500	0.01	
.3333	0.01	
1.4166	0.01	
1.5000	0.01	
1.5833	0.01	
1.6667	0.01	
1.7500	0.01	
1.8333	0.01	
2.0000	0.03	
2.5000	0.04	
3.0000	0.06	
3.5000	0.07	
4.0000	0.11	
4.5000	0.12	
5.0000	0.15	
5.5000	0.19	
6.0000	0.22	
6.5000	0.27	
7.0000	0.31	
7.5000	0.34	
8.0000	0.41	
8.5000	0.46	
9.0000	0.50	
9.5000	0.57	
10.0000	0.63	
12.0000	0.89	
14.0000	1.17	
16.0000	1.47	
18.0000	1.79	
20.0000	2.11	
22.0000	2.44	
24.0000	2.78	
26.0000	3.13	
28.0000	3.49	
30.0000	3.84	
32.0000	4.19	
34.0000	4.56	
36.0000	4.91	
38.0000	5.24	
40.0000	5.59	
42.0000	5.91	
44.0000	6.28	
46.0000	6.55	
48.0000	6.86	
50.0000	7.17	
52.0000	7.45	
54.0000	7.74	
56.0000	8.01	
58.0000	8.28	
60.0000	8.52	
62.0000	8.77	
64.0000	9.01	
66.0000	9.25	
68.0000	9.47	
70.0000	9.68	
72.0000	9.89	
74.0000	10.09	
76.0000	10.28	
78.0000	10.47	
80.0000	10.66	
82.0000	10.84	
84.0000	11.01	
86.0000	11.19	
88.0000	11.36	
90.0000	11.52	
92.0000	11.68	
94.0000	11.83	
96.0000	11.98	
98.0000	12.13	
100.000	12.27	
110.000	12.94	
120.000	13.54	
130.000	14.08	
140.000	14.58	
150.000	15.02	
160.000	15.43	
170.000	15.82	
180.000	16.18	
190.000	16.53	
200.000	16.85	
220.000	17.45	
230.000	17.74	
240.000	17.99	
250.000	18.26	
260.000	18.50	
270.000	18.74	
280.000	18.96	
290.000	19.19	
300.000	19.41	
310.000	19.60	
320.000	19.81	
330.000	20.00	
340.000	20.19	
350.000	20.36	
360.000	20.54	
370.000	20.71	
380.000	20.87	
390.000	21.02	
400.000	21.16	
410.000	21.29	
420.000	21.43	
430.000	21.56	
440.000	21.70	
450.000	21.83	
460.000	21.95	
470.000	22.08	
480.000	22.22	
490.000	22.34	
500.000	22.46	
510.000	22.57	
520.000	22.70	
530.000	22.81	
540.000	22.92	
550.000	23.03	
560.000	23.15	
570.000	23.26	
580.000	23.35	
590.000	23.45	
600.000	23.56	
610.000	23.65	
620.000	23.77	
630.000	23.86	
640.000	23.96	
650.000	24.05	
660.000	24.16	
670.000	24.24	
680.000	24.34	
690.000	24.43	
700.000	24.53	
710.000	24.61	
720.000	24.70	
730.000	24.78	
740.000	24.88	
750.000	24.96	
760.000	25.04	
770.000	25.12	
780.000	25.21	
790.000	25.29	
800.000	25.37	
810.000	25.47	
820.000	25.53	
830.000	25.61	
840.000	25.69	
850.000	25.77	
860.000	25.85	
870.000	26.10	
880.000	26.69	
890.000	27.30	
900.000	27.84	
910.000	28.31	
920.000	28.73	
930.000	29.09	
950.000	29.68	
960.000	29.94	
970.000	30.17	
980.000	30.40	
990.000	30.59	
1000.00	30.78	
1100.00	32.26	
1200.00	24.13	
1300.00	21.13	
1400.00	25.07	
1500.00	27.15	
1600.00	28.31	
1700.00	29.01	
1800.00	29.52	
1900.00	30.33	
2000.00	31.03	
2100.00	31.56	
2200.00	32.00	
2300.00	32.42	
2400.00	32.73	
2500.00	33.07	
2600.00	33.34	
2700.00	33.62	
2800.00	33.90	
2900.00	34.23	
3000.00	34.52	
3100.00	34.85	
3200.00	35.14	
3300.00	35.39	
3400.00	35.61	
3500.00	35.87	
3600.00	36.11	
3700.00	36.33	
3800.00	36.52	
3900.00	36.71	
4000.00	36.88	
4100.00	37.06	
4200.00	37.27	
4300.00	37.46	Pump
4400.00	33.10	OFF
4500.00	23.69	
4600.00	20.13	
4700.00	17.99	
4800.00	16.47	
4900.00	15.31	
5000.00	14.39	
5100.00	13.61	
5200.00	12.92	
5300.00	12.32	
5400.00	11.78	
5500.00	11.28	
5600.00	10.86	
5700.00	10.47	
5800.00	10.14	
5900.00	9.79	
6000.00	9.49	
6100.00	9.20	
6200.00	8.93	
6300.00	8.68	
6400.00	8.44	
6500.00	8.23	
6600.00	8.04	
6700.00	7.83	
6800.00	7.66	
6900.00	7.47	
7000.00	7.28	
7100.00	7.12	
7200.00	6.99	
7300.00	6.85	
7400.00	6.71	
7500.00	6.56	
7600.00	6.42	
7700.00	6.29	
7800.00	6.16	
7900.00	6.04	
8000.00	5.93	
8100.00	5.81	
8200.00	5.70	
8300.00	5.59	
8400.00	5.46	

WELL 35-740

BACKGROUND DATA
PHASE I TEST

SECTION 35-T36N-R74W

35-740

```
       SE1000B
 Environmental Logger
     11/26  08:06

 Unit# 00000  Test# 0

INPUT 1:  Level (F) TOC

Reference           0.00
Scale factor       50.08
Offset              0.00

Step# 0   11/25  10:30

Elapsed Time     Value
------------    ---------
   0.0000          0.00
  30.0000       -  0.01
  60.0000       -  0.03
  90.0000       -  0.03
  120.000       -  0.03
  150.000       -  0.04
  180.000       -  0.04
  210.000       -  0.06
  240.000       -  0.07
  270.000       -  0.07
  300.000       -  0.07
  330.000       -  0.07
  360.000       -  0.07
  390.000       -  0.07
  420.000       -  0.07
  450.000       -  0.06
  480.000       -  0.06
  510.000       -  0.04
  540.000       -  0.03
  570.000       -  0.01
  600.000       -  0.01
  630.000       -  0.01
  660.000          0.00
  690.000          0.00
  720.000          0.01
  750.000          0.01
  780.000          0.00
  810.000          0.01
  840.000          0.00
  870.000       -  0.01
  900.000       -  0.01
  930.000       -  0.03
  960.000       -  0.03
  990.000       -  0.03
  1020.00       -  0.04
  1050.00       -  0.04
  1080.00       -  0.04
  1110.00       -  0.06
  1140.00       -  0.06
  1170.00       -  0.06
  1200.00       -  0.06
  1230.00       -  0.06
  1260.00       -  0.06
END
```

WELL 35-740
(Overlying Aquifer)

DRAWDOWN DATA
PHASE I TEST
SECTION 35-T36N-R74W

READY 35-740 phase I

```
        SE1000B
  Environmental Logger
     12/02  07:57

  Unit# 00000   Test# 1

INPUT 1:  Level (F) TOC

Reference           0.00
Scale factor       50.08
Offset              0.00

Step 0    11/26   10:00

Elapsed Time      Value
------------    ---------
    0.0000         0.00
    0.0033         0.01
    0.0066         0.00
    0.0099         0.00
    0.0133         0.01
    0.0166         0.01
    0.0200         0.01
    0.0233         0.01
    0.0266         0.01
    0.0300         0.01
    0.0333         0.00
    0.0500         0.01
    0.0666         0.01
    0.0833         0.01
    0.1000         0.01
    0.1166         0.01
    0.1333         0.01
    0.1500         0.01
    0.1666         0.01
    0.1833         0.01
    0.2000         0.01
    0.2166         0.01
    0.2333         0.01
    0.2500         0.01
    0.2666         0.01
    0.2833         0.01
    0.3000         0.01
    0.3166         0.01
    0.3333         0.01
    0.4167         0.01
    0.5000         0.00
    0.5833         0.01
    0.6667         0.01
    0.7500         0.01
    0.8333         0.01
    0.9167         0.01
    1.0000         0.01
    1.0833         0.01
    1.1667         0.01
    1.2500         0.01
    1.3333         0.01
    1.4166         0.01
    1.5000         0.01
    1.5833         0.01
    1.6667         0.01
    1.7500         0.01

    1.8333         0.01
    1.9167         0.01
    2.0000         0.01
    2.5000         0.01
    3.0000         0.01
    3.5000         0.01
    4.0000         0.01
    4.5000         0.01
    5.0000         0.03
    5.5000         0.03
    6.0000         0.01
    6.5000         0.03
    7.0000         0.03
    7.5000         0.03
    8.0000         0.03
    8.5000         0.03
    9.0000         0.03
    9.5000         0.03
   10.0000         0.03
   12.0000         0.03
   14.0000         0.03
   16.0000         0.03
   18.0000         0.03
   20.0000         0.03
   22.0000         0.03
   24.0000         0.03
   26.0000         0.03
   28.0000         0.03
   30.0000         0.03
   32.0000         0.03
   34.0000         0.03
   36.0000         0.03
   38.0000         0.03
   40.0000         0.03
   42.0000         0.03
   44.0000         0.03
   46.0000         0.03
   48.0000         0.03
   50.0000         0.03
   52.0000         0.03
   54.0000         0.03
   56.0000         0.03
   58.0000         0.03
   60.0000         0.03
   62.0000         0.03
   64.0000         0.03
   66.0000         0.03
   68.0000         0.03
   70.0000         0.03
   72.0000         0.03
   74.0000         0.03
   76.0000         0.03
   78.0000         0.03
   80.0000         0.04
   82.0000         0.03
   84.0000         0.04
   86.0000         0.04
   88.0000         0.03
   90.0000         0.04
   92.0000         0.03
   94.0000         0.03
   96.0000         0.04
   98.0000         0.04
   100.000         0.04
   110.000         0.03
   120.000         0.04
   130.000         0.04
   140.000         0.04
   150.000         0.04
   160.000         0.03
   170.000         0.03

   190.000         0.03
   200.000         0.03
   210.000         0.03
   220.000         0.03
   230.000         0.03
   240.000         0.03
   250.000         0.03
   260.000         0.01
   270.000         0.01
   280.000         0.01
   290.000         0.01
   300.000         0.01
   310.000         0.00
   320.000         0.01
   330.000         0.00
   340.000         0.00
   350.000         0.00
   360.000         0.00
   370.000         0.00
   380.000         0.00
   390.000         0.00
   400.000       - 0.01
   410.000       - 0.01
   420.000         0.00
   430.000         0.00
   440.000         0.00
   450.000         0.00
   460.000         0.00
   470.000         0.00
   480.000         0.00
   490.000         0.00
   500.000         0.00
   510.000         0.00
   520.000         0.00
   530.000         0.00
   540.000         0.01
   550.000         0.00
   560.000         0.01
   570.000         0.01
   580.000         0.01
   590.000         0.01
   600.000         0.01
   610.000         0.01
   620.000         0.01
   630.000         0.01
   640.000         0.01
   650.000         0.01
   660.000         0.03
   670.000         0.03
   680.000         0.03
   690.000         0.03
   700.000         0.03
   710.000         0.04
   720.000         0.04
   730.000         0.04
   740.000         0.04
   750.000         0.04
   760.000         0.04
   770.000         0.04
   780.000         0.04
   790.000         0.04
   800.000         0.04
   810.000         0.04
   820.000         0.04
   830.000         0.04
   840.000         0.04
   850.000         0.06
   860.000         0.06
   870.000         0.06
   880.000         0.06
   890.000         0.06
```

WELL 35-740 (Cont'd)
(Overlying Aquifer)

DRAWDOWN DATA
PHASE I TEST
SECTION 35-T36N-R74W

910.000		0.04	
920.000		0.04	
930.000		0.04	
940.000		0.04	
950.000		0.04	
960.000		0.04	
970.000		0.04	
980.000		0.03	
990.000		0.04	
1000.00		0.04	
1100.00	-	0.01	
1200.00	-	0.09	
1300.00	-	0.17	
1400.00	-	0.17	
1500.00	-	0.20	
1600.00	-	0.20	
1700.00	-	0.25	
1800.00	-	0.29	
1900.00	-	0.31	
2000.00	-	0.30	
2100.00	-	0.28	
2200.00	-	0.27	
2300.00	-	0.13	
2400.00	-	0.70	
2500.00	-	0.31	
2600.00	-	0.33	
2700.00	-	0.34	
2800.00	-	0.31	
2900.00	-	0.30	
3000.00	-	0.31	
3100.00	-	0.32	
3200.00	-	0.36	
3300.00	-	0.37	
3400.00	-	0.37	
3500.00	-	0.37	
3600.00	-	0.37	
3700.00	-	0.37	
3800.00	-	0.39	
3900.00	-	0.41	
4000.00	-	0.44	
4100.00	-	0.45	
4200.00	-	0.45	
4300.00	-	0.44	Pump
4400.00	-	0.44	off
4500.00	-	0.43	
4600.00	-	0.44	
4700.00	-	0.45	
4800.00	-	0.47	
4900.00	-	0.47	
5000.00	-	0.44	
5100.00	-	0.41	
5200.00	-	0.41	
5300.00	-	0.42	
5400.00	-	0.42	
5500.00	-	0.44	
5600.00	-	0.44	
5700.00	-	0.44	
5800.00	-	0.41	
5900.00	-	0.41	
6000.00	-	0.41	
6100.00	-	0.42	
6200.00	-	0.42	
6300.00	-	0.42	
6400.00	-	0.42	
6500.00	-	0.44	
6600.00	-	0.42	
6700.00	-	0.41	
6800.00	-	0.41	
6900.00	-	0.42	
7000.00	-	0.42	
7100.00	-	0.42	
7200.00	-	0.37	
7300.00	-	0.37	
7400.00	-	0.36	
7500.00	-	0.39	
7600.00	-	0.41	
7700.00	-	0.44	
7800.00	-	0.44	
7900.00	-	0.41	
8000.00	-	0.41	
8100.00	-	0.41	
8200.00	-	0.39	
[illegible]	-	[illegible]	
8400.00	-	[illegible]	

END

WELL 35-741

BACKGROUND DATA
PHASE I TEST

SECTION 35-T36N-R74W

35-741 ✓

```
          SE1000B
   Environmental Logger
        11/26  08:08

  Unit# 00002  Test# 0

INPUT 2:  Level (F) TOC

Reference           0.00
Scale factor       50.07
Offset              0.00

Step# 0    11/25  10:30

Elapsed Time     Value
------------   ---------
   0.0000         0.00
  30.0000         0.00
  60.0000         0.00
  90.0000         0.00
  120.000         0.00
  150.000         0.00
  180.000         0.00
  210.000         0.00
  240.000         0.00
  270.000         0.00
  300.000         0.00
  330.000         0.00
  360.000         0.01
  390.000         0.00
  420.000         0.00
  450.000         0.01
  480.000         0.01
  510.000         0.03
  540.000         0.04
  570.000         0.06
  600.000         0.07
  630.000         0.07
  660.000         0.09
  690.000         0.09
  720.000         0.11
  750.000         0.12
  780.000         0.12
  810.000         0.12
  840.000         0.12
  870.000         0.12
  900.000         0.12
  930.000         0.12
  960.000         0.12
  990.000         0.12
  1020.00         0.12
  1050.00         0.11
  1080.00         0.11
  1110.00         0.11
  1140.00         0.11
  1170.00         0.11
  1200.00         0.11
  1230.00         0.09
  1260.00         0.09
END
```

WELL 35-741
(Underlying Aquifer)

DRAWDOWN DATA
PHASE I TEST
SECTION 35-T36N-R74W

35-741 phase I

```
      SE1000B
 Environmental Logger
   12/02  08:08

 Unit# 00000  Test# 1

INPUT 2:  Level (F) TOC

Reference         0.00
Scale factor     50.07
Offset            0.00

Step# 0   11:26  10:00

Elapsed Time     Value
------------   ---------
    0.0000        0.00
    0.0033        0.00
    0.0066        0.00
    0.0099        0.00
    0.0133        0.00
    0.0166        0.01
    0.0200        0.01
    0.0233        0.01
    0.0266        0.01
    0.0300        0.01
    0.0333        0.01
    0.0500        0.01
    0.0666        0.01
    0.0833        0.01
    0.1000        0.01
    0.1166        0.01
    0.1333        0.01
    0.1500        0.01
    0.1666        0.01
    0.1833        0.01
    0.2000        0.01
    0.2166        0.01
    0.2333        0.01
    0.2500        0.01
    0.2666        0.01
    0.2833        0.01
    0.3000        0.01
    0.3166        0.01
    0.3333        0.01
    0.4167        0.01
    0.5000        0.01
    0.5833        0.01
    0.6667        0.01
    0.7500        0.00
    0.8333        0.01
    0.9167        0.01
    1.0000        0.01
    1.0833        0.01
    1.1667        0.00
    1.2500        0.01
    1.3333        0.01
    1.4166        0.01
    1.5000        0.01
    1.5833        0.01
    1.6667        0.01
    1.7500        0.01
    1.8333        0.01

    2.0000          0.01
    2.5000          0.01
    3.0000          0.01
    3.5000          0.01
    4.0000          0.01
    4.5000          0.01
    5.0000          0.01
    5.5000          0.01
    6.0000          0.01
    6.5000          0.01
    7.0000          0.01
    7.5000          0.01
    8.0000          0.01
    8.5000          0.01
    9.0000          0.01
    9.5000          0.01
   10.0000          0.01
   12.0000          0.00
   14.0000          0.01
   16.0000          0.00
   18.0000          0.00
   20.0000          0.00
   22.0000          0.00
   24.0000          0.00
   [illegible]      0.00
   28.0000          0.00
   30.0000          0.00
   32.0000          0.00
   34.0000          0.00
   36.0000          0.00
   38.0000          0.00
   [illegible]      0.00
   42.0000          0.00
   44.0000          0.00
   46.0000          0.00
   48.0000          0.00
   [illegible]      0.00
   52.0000          0.00
   54.0000          0.00
   56.0000          0.00
   58.0000          0.00
   60.0000          0.00
   62.0000          0.00
   64.0000          0.00
   66.0000          0.00
   68.0000          0.00
   70.0000          0.00
   72.0000          0.00
   74.0000          0.00
   76.0000          0.00
   78.0000          0.00
   80.0000          0.00
   82.0000          0.00
   84.0000          0.00
   86.0000          0.00
   88.0000          0.00
   90.0000          0.00
   92.0000          0.00
   94.0000          0.00
   96.0000          0.00
   98.0000          0.00
  100.000           0.00
  110.000           0.00
  120.000           0.00
  130.000      -    0.01
  140.000      -    0.01
  150.000      -    0.01
  160.000      -    0.01
  170.000      -    0.01
  180.000      -    0.03
  190.000      -    0.01

  210.000      -  [illegible]
  220.000      -  [illegible]
  230.000      -  [illegible]
  240.000      -  [illegible]
  250.000      -    0.04
  [illegible]  -  [illegible]
  270.000      -    0.04
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  340.000      -    0.07
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -    0.11
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -    0.11
  440.000      -  [illegible]
  450.000      -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]

  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  710.000      -  [illegible]
  [illegible]  -  [illegible]
  730.000      -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  800.000      -  [illegible]
  810.000      -  [illegible]
  820.000      -    0.11
  [illegible]  -  [illegible]
  840.000      -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  [illegible]  -  [illegible]
  890.000      -    0.11
  900.000      -    0.11
  [illegible]  -  [illegible]
```

WELL 35-741 (Cont'd)
(Underlying Aquifer)

DRAWDOWN DATA
PHASE I TEST
SECTION 35-T36N-R74W

```
930.000     -   0.12
940.000     -   0.12
950.000     -   0.12
960.000     -   0.12
970.000     -   0.11
980.000     -   0.12
990.000     -   [illegible]
1000.00     -   [illegible]
1100.00     -   [illegible]
```

Pump off

```
5400.00     -   0.47
5500.00     -   [illegible]
5600.00     -   [illegible]
5700.00     -   0.42
5800.00     -   [illegible]
5900.00     -   [illegible]
6000.00     -   [illegible]
6100.00     -   [illegible]
6200.00     -   [illegible]
6300.00     -   [illegible]
6400.00     -   [illegible]
6500.00     -   [illegible]
[illegible]
[illegible]
6800.00     -   [illegible]
6900.00     -   [illegible]
7000.00     -   [illegible]
7100.00     -   [illegible]
```

WELL 35-742

BACKGROUND DATA
PHASE I TEST

SECTION 35-T36N-R74W

75- → 35-142

```
         Logger
          :47

        Test# 0

      Level    TOC

                Value
            -----------

210.000    -   0.03

420.000    -   0 04

780.000    -   0.03

1020.00    -   0.06

1230.00    -   0.09
En
```

WELL 35-742
(Overlying Shale)

DRAWDOWN DATA
PHASE I TEST
SECTION 35-T36N-R74W

35-742
phase I

```
READY

        SE1000B
  Environmental Logger
    12/02  09:39

  Unit# 00000  Test# 1

INPUT 1:  Level (F) TOC

Reference          0.00
Scale factor      50.35
Offset             0.00

Step# 0    11/26  10:00

Elapsed Time     Value
------------   ---------
   0.0000         0.00
   0.0033         0.00
   0.0066         0.00
   0.0099         0.01
   0.0133         0.01
   0.0166         0.01
   0.0200         0.01
   0.0233         0.01
   0.0266         0.01
   0.0300         0.01
   0.0333         0.01
   0.0500         0.01
   0.0666         0.01
   0.0833         0.01
   0.1000         0.01
   0.1166         0.01
   0.1333         0.01
   0.1500         0.01
   0.1666         0.01
   0.1833         0.01
   0.2000         0.01
   0.2166         0.01
   0.2333         0.01
   0.2500         0.01
   0.2666         0.01
   0.2833         0.01
   0.3000         0.01
   0.3166         0.01
   0.3333         0.01
   0.4167         0.01
   0.5000         0.01
   0.5833         0.01
   0.6667         0.01
   0.7500         0.01
   0.8333         0.01
```

```
   1.0000         0.01
   1.0833         0.01
   1.1667         0.01
   1.2500         0.01
   1.3333         0.01
   1.4166         0.01
   1.5000         0.01
   1.5833         0.01
   1.6667         0.01
   1.7500         0.01
   1.8333         0.01
   1.9167         0.01
   2.0000         0.01
   2.5000         0.01
   3.0000         0.01
   3.5000         0.01
   4.0000         0.01
   4.5000         0.01
   5.0000         0.01
   5.5000         0.01
   6.0000         0.01
   6.5000         0.01
   7.0000         0.01
   7.5000         0.01
   8.0000         0.01
   8.5000         0.01
   9.0000         0.01
   9.5000         0.01
  10.0000         0.01
  12.0000         0.01
  14.0000         0.03
  16.0000         0.03
  18.0000         0.03
  20.0000         0.03
  22.0000         0.03
  24.0000         0.03
  26.0000         0.03
  28.0000         0.03
  30.0000         0.03
  32.0000         0.03
  34.0000         0.03
  36.0000         0.03
  38.0000         0.03
  40.0000         0.03
  42.0000         0.03
  44.0000         0.03
  46.0000         0.03
  48.0000         0.03
  50.0000         0.03
  52.0000         0.03
  54.0000         0.03
  56.0000         0.03
  58.0000         0.01
  60.0000         0.03
  62.0000         0.03
  64.0000         0.03
  66.0000         0.03
  68.0000         0.03
  70.0000         0.03
  72.0000         0.03
  74.0000         0.03
  76.0000         0.03
```

```
  80.0000          0.03
  82.0000          0.03
  84.0000          0.03
  86.0000          0.03
  88.0000          0.03
  90.0000          0.03
  92.0000          0.03
  94.0000          0.03
  96.0000          0.03
  98.0000          0.03
  100.000          0.03
  110.000          0.01
  120.000          0.01
  130.000          0.01
  140.000          0.01
  150.000          0.01
  160.000          0.01
  170.000          0.01
  180.000          0.00
  190.000          0.00
  200.000          0.00
  210.000          0.00
  220.000          0.00
  230.000          0.00
  240.000          0.00
  250.000          0.00
  260.000        - 0.01
  270.000        - 0.01
  280.000        - 0.01
  290.000        - 0.01
  300.000          0.00
  310.000        - 0.01
  320.000        - 0.01
  330.000        - 0.03
  340.000        - 0.03
  350.000        - 0.03
  360.000        - 0.03
  370.000        - 0.03
  380.000        - 0.03
  390.000        - 0.04
  400.000        - 0.03
  410.000        - 0.04
  420.000        - 0.04
  430.000        - 0.04
  440.000        - 0.04
  450.000        - 0.04
  460.000        - 0.04
  470.000        - 0.04
  480.000        - 0.04
  490.000        - 0.06
  500.000        - 0.04
  510.000        - 0.06
  520.000        - 0.04
  530.000        - 0.06
  540.000        - 0.06
  550.000        - 0.04
  560.000        - 0.06
  570.000        - 0.04
  580.000        - 0.06
  590.000        - 0.06
  600.000        - 0.06
  610.000        - 0.06
```

WELL 35-742 (Cont'd)
(Overlying Shale)

DRAWDOWN DATA
PHASE I TEST
SECTION 35-T36N-R74W

630.000		-	0.06
640.000		-	0.06
650.000		-	0.06
660.000		-	0.06
670.000		-	0.06
680.000		-	0.06
690.000		-	0.06
700.000		-	0.07
710.000		-	0.07
720.000		-	0.07
730.000		-	0.07
740.000		-	0.07
750.000		-	0.07
760.000		-	0.07
770.000		-	0.07
780.000		-	0.07
790.000		-	0.07
800.000		-	0.07
810.000		-	0.07
820.000		-	0.07
830.000		-	0.07
840.000		-	0.09
850.000		-	0.09
860.000		-	0.09
870.000		-	0.09
880.000		-	0.09
890.000		-	0.09
900.000		-	0.09
910.000		-	0.09
920.000		-	0.09
930.000		-	0.09
940.000		-	0.09
950.000		-	0.09
960.000		-	0.09
970.000		-	0.11
980.000		-	0.11
990.000		-	0.11
1000.00		-	0.11
1100.00		-	0.17
1200.00		-	0.22
1300.00		-	0.27
1400.00		-	0.25
1500.00		-	0.25
1600.00		-	0.23
1700.00		-	0.25
1800.00		-	0.25
1900.00		-	0.25
2000.00		-	0.25
2100.00		-	0.23
2200.00		-	0.23
2300.00		-	0.22
2400.00		-	0.22
2500.00		-	0.20
2600.00		-	0.19
2700.00		-	0.17
2800.00		-	0.17
2900.00		-	0.14
3000.00		-	0.14
3100.00		-	0.12
3200.00		-	0.12
3300.00		-	0.12
3400.00		-	0.11
3500.00		-	0.11
3600.00		-	0.09
3700.00		-	0.07
3800.00		-	0.07
3900.00		-	0.06
4000.00		-	0.06
4100.00		-	0.06
4200.00		-	0.04
4300.00	pump	-	0.01
4400.00	off	-	0.01
4500.00		-	0.01
4600.00		-	0.01
4700.00			0.00
4800.00			0.00
4900.00			0.00
5000.00			0.01
5100.00			0.03
5200.00			0.03
5300.00			0.04
5400.00			0.06
5500.00			0.07
5600.00			0.07
5700.00			0.07
5800.00			0.09
5900.00			0.09
6000.00			0.11
6100.00			0.11
6200.00			0.11
6300.00			0.11
6400.00			0.12
6500.00			0.12
6600.00			0.12
6700.00			0.14
6800.00			0.14
6900.00			0.14
7000.00			0.15
7100.00			0.15
7200.00			0.17
7300.00			0.19
7400.00			0.19
7500.00			0.17
7600.00			0.17
7700.00			0.17
7800.00			0.17
7900.00			0.19
8000.00			0.19
8100.00			0.19
8200.00			0.20
8300.00			0.22
8400.00			0.22

END

Section 35 Phase II Test

The Section 35 Phase II Test was conducted to provide data for calculating hydrological properties in the production zone aquifer. Transducers were placed in the pumped well, well 739, and the three production zone monitor wells, wells 736, 737 and 738. No background data or recovery data was collected on well 738 because of equipment problems. Drawdown data for well 738 was read and stored automatically from the transducer, however the data had to be manually accessed and recorded. Data collected for the above wells in this test follow this page.

PUMPED WELL DATA
WELL 35-739
DRAWDOWN DATA
PHASE II TEST

SECTION 35-T36N-R74W

Commenced Pumping at 10:00 a.m. 12-12-85

Time	Pumped Rate-GPM
1001	7.9
1015	7.8
1116	7.7
1200	7.5
1345	7.7

Maintained flow at 7.7 gpm for rest of test

WELL 35-739

BACKGROUND DATA
PHASE II TEST

SECTION 35-T36N-R74W

```
READY
```

131

```
      SE1000B
  Environmental Logger
     12/12  07:47

  Unit# 00000  Test# 0

 INPUT 1:  Level (F) TOC

 Reference          0.00
 Scale factor      50.35
 Offset             0.00

 Step# 0   12/11  15:10

 Elapsed Time     Value
 ------------   ---------
    0.0000          0.00
   30.0000          0.04
   60.0000          0.03
   90.0000      -   0.01
   120.000      -   0.04
   150.000      -   0.04
   180.000      -   0.04
   210.000      -   0.06
   240.000      -   0.06
   270.000      -   0.04
   300.000      -   0.04
   330.000      -   0.04
   360.000      -   0.04
   390.000      -   0.03
   420.000      -   0.01
   450.000      -   0.03
   480.000      -   0.01
   510.000      -   0.01
   540.000      -   0.03
   570.000      -   0.01
   600.000      -   0.03
   630.000      -   0.04
   660.000      -   0.06
   690.000      -   0.07
   720.000      -   0.07
   750.000      -   0.07
   780.000      -   0.11
   810.000      -   0.11
   840.000      -   0.14
   870.000      -   0.14
   900.000      -   0.15
   930.000      -   0.17
   960.000      -   0.17
   990.000      -   0.19
END
```

Background DATA phase II

WELL 35-739

DRAWDOWN DATA
PHASE II TEST

SECTION 35-T36N-R74W

739 ph.2

READY
READY

739 ph.2

SE1000B
Environmental Logger
12/16 10:28

Unit# 00000 Test# 0

INPUT 1: Level (F) TOC

Reference 0.00
Scale factor 50.35
Offset 0.00

Step# 0 12/12 10:00
(INITIAL PROBE DEPTH. 300 ft)

Elapsed Time	Value
0.0000	15.13
0.0033	15.29
0.0066	15.45
0.0099	15.62
0.0133	15.78
0.0166	15.94
0.0200	16.08
.0233	16.24
.0266	16.39
0.0300	16.56
0.0333	16.72
0.0500	17.47
0.0666	18.20
0.0833	19.01
0.1000	19.79
0.1166	20.52
0.1333	21.28
0.1500	22.01
0.1666	22.73
0.1833	23.43
0.2000	24.24
0.2166	24.89
0.2333	25.56
0.2500	26.15
0.2666	26.75
0.2833	27.35
0.3000	27.94
0.3166	28.45
0.3333	28.96
0.4167	30.18
0.5000	30.49
0.5833	31.09
0.6667	31.79
0.7500	32.78
0.8333	33.75
0.9167	34.57
1.0000	34.87
1.0833	35.10
1.1667	35.51
.2500	35.89
.3333	36.73
1.4166	37.53
1.5000	38.28
1.5833	38.82
1.6667	39.69
1.7500	40.17
1.8333	40.98
2.0000	42.31
2.5000	46.38
3.0000	50.09
3.5000	53.92
4.0000	57.51
4.5000	60.93
5.0000	Lowered probe 100 ft ~~49.74~~
5.5000	~~24.03~~
6.0000	~~15.40~~
6.5000	- 26.38
7.0000	- 23.78
7.5000	- 20.96
8.0000	- 18.34
8.5000	- 15.83
9.0000	- 13.56
9.5000	- 11.04
10.0000	- 8.91
12.0000	- 0.25
14.0000	8.12
16.0000	15.34
18.0000	21.52
20.0000	26.77
22.0000	31.57
24.0000	35.84
26.0000	Lowered probe 50 ft 39.10
28.0000	~~31.20~~
30.0000	- 4.68
32.0000	- 2.08
34.0000	0.74
36.0000	3.86
38.0000	6.31
40.0000	8.74
42.0000	10.63
44.0000	12.43
46.0000	14.06
48.0000	15.30
50.0000	16.70
52.0000	17.78
54.0000	18.80
56.0000	19.68
58.0000	20.57
60.0000	21.36
62.0000	21.98
64.0000	22.49
66.0000	23.06
68.0000	23.52
70.0000	24.13
72.0000	24.49
74.0000	24.86
76.0000	25.29
78.0000	25.56
80.0000	25.89
82.0000	26.18
84.0000	26.43
86.0000	26.89
88.0000	27.23
90.0000	27.58
92.0000	27.59
94.0000	27.72
96.0000	28.09
98.0000	28.29
100.000	28.50
110.000	29.39
120.000	30.15
130.000	31.07
140.000	31.55
150.000	32.01
160.000	32.60
170.000	33.14
180.000	33.40
190.000	33.89
210.000	34.52
220.000	35.02
230.000	35.26
240.000	35.61
250.000	35.81
260.000	36.32
270.000	36.58
280.000	36.83
290.000	37.00
300.000	37.48
310.000	37.27
320.000	37.24
330.000	37.45
340.000	37.85
350.000	38.28
360.000	38.51
370.000	39.17
380.000	39.10
390.000	39.04
400.000	39.40
410.000	39.50
420.000	39.45
430.000	39.80
440.000	39.90
450.000	40.23
460.000	40.42
470.000	40.17
480.000	40.31
490.000	40.64
500.000	40.58
510.000	40.47
520.000	40.71
530.000	40.92
540.000	40.52
550.000	40.68
560.000	40.77
570.000	40.68
580.000	40.90
590.000	40.93
600.000	41.11
610.000	41.90
620.000	41.98
630.000	41.98
640.000	42.08
650.000	42.00
660.000	42.30
670.000	42.16
680.000	42.30
690.000	42.36
700.000	42.38
710.000	42.50
720.000	42.73
730.000	42.79
740.000	42.74
750.000	43.17
760.000	43.20
770.000	43.14
780.000	43.27
790.000	43.43
800.000	43.39
810.000	43.47
820.000	43.82
830.000	44.13
840.000	44.30
850.000	44.60
860.000	44.36
870.000	44.27
880.000	44.17
890.000	44.21
900.000	44.25
910.000	44.41
930.000	44.24
940.000	44.48
950.000	44.56
960.000	44.84
970.000	44.76
980.000	44.81
990.000	44.83
1000.00	44.89
1100.00	45.30
1200.00	45.38
1300.00	45.41
1400.00	45.91
1500.00	46.32
1600.00	46.72
1700.00	47.15
1800.00	48.23
1900.00	48.61
2000.00	49.04
2100.00	50.01
2200.00	50.14
2300.00	50.37
2400.00	50.20
2500.00	51.01
2600.00	51.33
2700.00	51.60
2800.00	51.66
2900.00	51.66
3000.00	52.14
3100.00	52.49
3200.00	52.62
3300.00	52.08
3400.00	51.79
3500.00	52.14
3600.00	52.33
3700.00	52.63
3800.00	52.68
3900.00	52.90
4000.00	53.97
4100.00	53.90
4200.00	54.16
4300.00	54.59
4400.00	54.87
4500.00	54.71
4600.00	54.90
4700.00	55.08
4800.00	54.67
4900.00	54.56
5000.00	54.75
5100.00	54.73
5200.00	54.92
5300.00	54.89
5400.00	55.14
5500.00	55.37
5600.00	55.38
5700.00	55.51

END

WELL 35-739
(Pumped Well)

RECOVERY DATA
PHASE II TEST
SECTION 35-T36N-R74W

pump well
739 phase 2
Recov. DATA.

```
READY
READY



READY
READY

     SE1000B
 Environmental Logger
    12/19  12:47

 Unit# 00000  Test# 1

INPUT 1:  Level (F) TOC

Reference         0.00
Scale factor     50.35
Offset            0.00

Step# 0   12/16  12:15

 psed Time     Value
 ---------   ---------
 0.0000      -   0.93
 0.0033      -   1.06
 0.0066      -   1.12
 0.0099      -   1.19
 0.0133      -   1.23
 0.0166      -   1.30
 0.0200      -   1.43
 0.0233      -   1.43
 0.0266      -   1.54
 0.0300      -   1.65
 0.0333      -   1.73
 0.0500      -   2.08
 0.0666      -   2.46
 0.0833      -   2.87
 0.1000      -   3.16
 0.1166      -   3.46
 0.1333      -   3.73
 0.1500      -   4.14
 0.1666      -   4.41
 0.1833      -   4.81
 0.2000      -   5.21
 0.2166      -   5.46
 0.2333      -   5.85
 0.2500      -   6.16
 0.2666      -   6.58
 0.2833      -   6.82
 0.3000      -   7.23
 0.3166      -   7.47
 0.3333      -   7.86
 0.4167      -   9.47
 0.5000      -  11.09
  .5833      -  12.73
  .6667      -  14.24
 0.7500      -  15.91
 0.8333      -  17.39
 0.9167      -  18.85
 1.0000      -  20.42
 1.0833      -  22.01
 1.1667      -  23.49
```

```
        1.3333      - 26.38
        1.4166      - 27.64
        1.5000      - 29.15
        1.5833      - 30.52
        1.6667      - 31.81
        1.7500      - 33.28
        1.8333      - 34.52
        1.9167      - 35.99
        2.0000      - 37.24
        2.5000      - 44.64
        3.0000      - 51.61
        3.5000      - 58.00
        4.0000      - 63.93
        4.5000      - 69.37
↑50'    5.0000 *    - 70.50
        5.5000      - 30.87
        6.0000      - 33.73
        6.5000      - 37.64
        7.0000      - 41.41
        7.5000      - 44.33
        8.0000      - 46.32
        8.5000      - 48.16
        9.0000      - 50.02
↑50'    9.5000      - 51.84
       10.0000 *    - 53.55
       12.0000      - 10.55
↑50'   14.0000 *    - 16.34
       16.0000         7.64
       18.0000         7.69
       20.0000         7.69
       22.0000         7.69
       24.0000         7.69
       26.0000         7.69
       28.0000         6.27
       30.0000         3.70
       32.0000         1.43
       34.0000      -  0.65
       36.0000      -  2.52
       38.0000      -  4.24
       40.0000      -  5.80
       42.0000      -  7.23
       44.0000      -  8.55
       46.0000      -  9.74
       48.0000      - 10.87
       50.0000      - 11.89
       52.0000      - 12.82
       54.0000      - 13.70
       56.0000      - 14.49
       58.0000      - 15.24
       60.0000      - 15.94
       62.0000      - 16.59
       64.0000      - 17.21
       66.0000      - 17.77
       68.0000      - 18.31
       70.0000      - 18.82
       72.0000      - 19.28
       74.0000      - 19.72
       76.0000      - 20.15
       78.0000      - 20.53
       80.0000      - 20.92
       82.0000      - 21.25
       84.0000      - 21.60
       86.0000      - 21.92
       88.0000      - 22.24
       90.0000      - 22.52
       92.0000      - 22.79
       94.0000      - 23.08
       96.0000      - 23.33
       98.0000      - 23.55
       100.000      - 23.81
```

```
120.000      - 25.76
130.000      - 26.54
140.000      - 27.24
150.000      - 27.86
160.000      - 28.42
170.000      - 28.94
180.000      - 29.42
190.000      - 29.85
200.000      - 30.26
210.000      - 30.65
220.000      - 31.00
230.000      - 31.34
240.000      - 31.66
250.000      - 31.96
260.000      - 32.27
270.000      - 32.55
280.000      - 32.79
290.000      - 33.06
300.000      - 33.32
310.000      - 33.54
320.000      - 33.78
330.000      - 34.00
340.000      - 34.21
350.000      - 34.41
360.000      - 34.60
370.000      - 34.81
380.000      - 34.99
390.000      - 35.16
400.000      - 35.34
410.000      - 35.51
420.000      - 35.68
430.000      - 35.84
440.000      - 36.00
450.000      - 36.16
460.000      - 36.30
470.000      - 36.45
480.000      - 36.59
490.000      - 36.73
500.000      - 36.88
510.000      - 37.02
520.000      - 37.15
530.000      - 37.27
540.000      - 37.40
550.000      - 37.53
560.000      - 37.64
570.000      - 37.77
580.000      - 37.86
590.000      - 37.99
600.000      - 38.10
610.000      - 38.21
620.000      - 38.31
630.000      - 38.42
640.000      - 38.51
650.000      - 38.63
660.000      - 38.74
670.000      - 38.83
680.000      - 38.93
690.000      - 39.02
700.000      - 39.12
710.000      - 39.21
720.000      - 39.31
730.000      - 39.39
740.000      - 39.48
750.000      - 39.56
760.000      - 39.64
770.000      - 39.74
780.000      - 39.82
790.000      - 39.90
800.000      - 39.98
810.000      - 40.06
```

```
   830.000      - 40.2[illegible]
   840.000      - 40.28
   850.000      - 40.36
   860.000      - 40.44
   870.000      - 40.52
   880.000      - 40.58
   890.000      - 40.64
   900.000      - 40.72
   910.000      - 40.79
   920.000      - 40.87
   930.000      - 40.95
   940.000      - 41.01
   950.000      - 41.07
   960.000      - 41.14
   970.000      - 41.20
   980.000      - 41.28
   990.000      - 41.34
   1000.00      - 41.41
   1100.00      - 42.03
   1200.00      - 42.58
   1300.00      - 43.08
   1400.00      - 43.51
   1500.00      - 43.90
   1600.00      - 44.27
   1700.00      - 44.60
   1800.00      - 44.91
   1900.00      - 45.21
   2000.00      - 45.48
   2100.00      - 45.75
   2200.00      - 46.00
   2300.00      - 46.24
   2400.00      - 46.48
   2500.00      - 46.70
   2600.00      - 46.92
   2700.00      - 47.13
   2800.00      - 47.32
   2900.00      - 47.51
   3000.00      - 47.69
   3100.00      - 47.86
   3200.00      - 48.02
   3300.00      - 48.16
   3400.00      - 48.31
   3500.00      - 48.47
   3600.00      - 48.59
   3700.00      - 48.70
   3800.00      - 48.85
   3900.00      - 48.96
   4000.00      - 49.07
   4100.00      - 49.18
   4200.00      - 49.28
   4300.00      - 49.39
END
```

* TRANSDUCER RAISED
50 FEET BETWEEN
READINGS (3 TIMES)
TO KEEP FROM
EXCEEDING TRANSDUC
PRESSURE RATING.

WELL 35-736

BACKGROUND DATA
PHASE II TEST

SECTION 35-T36N-R74W

736

```
     SE1000B
Environmental Logger
    12/12  07:49

 Unit# 00000  Test# 0

INPUT 2:  Level (F) TOC

Reference          0.00
Scale factor      50.07
Offset             0.00

Step# 0   12/11  15:10

Elapsed Time    Value
------------  ---------
    0.0000         0.01
   30.0000         0.00
   60.0000         0.00
   90.0000     -   0.04
   120.000     -   0.04
   150.000     -   0.04
   180.000     -   0.04
   210.000     -   0.03
   240.000     -   0.04
   270.000     -   0.03
   300.000         0.00
   330.000     -   0.03
   360.000     -   0.01
   390.000         0.01
   420.000         0.01
   450.000         0.03
   480.000         0.03
   510.000         0.03
   540.000         0.01
   570.000         0.03
   600.000         0.03
   630.000         0.00
   660.000         0.01
   690.000         0.00
   720.000         0.00
   750.000         0.00
   780.000     -   0.03
   810.000     -   0.04
   840.000     -   0.04
   870.000     -   0.04
   900.000     -   0.04
   930.000     -   0.06
   960.000     -   0.09
   990.000     -   0.07
END
READY
```

^ 11

WELL 35-736

DRAWDOWN DATA
PHASE II TEST

SECTION 35-T36N-R74W

736 ph 2 ↓

```
     SE1000B
Environmental Logger
   12/16  10:37

 Unit# 00000  Test# 0

INPUT 2:  Level (F) TOC

Reference         0.00
Scale factor     50.07
Offset            0.00

Step# 0   12/12  10:00

Elapsed Time    Value
------------   ---------
   0.0000        0.03
   0.0033        0.04
   0.0066        0.03
   0.0099        0.04
   0.0133        0.03
   0.0166        0.07
   0.0200        0.11
   0.0233        0.09
   0.0266        0.04
   0.0300        0.03
   0.0333        0.03
   0.0500        0.03
   0.0666        0.04
   0.0833        0.03
   0.1000        0.03
   0.1166        0.04
   0.1333        0.01
   0.1500        0.04
   0.1666        0.03
   0.1833        0.03
   0.2000        0.04
   0.2166        0.03
   0.2333        0.03
   0.2500        0.04
   0.2666        0.04
   0.2833        0.01
   0.3000        0.03
   0.3166        0.04
   0.3333        0.03
   0.4167        0.03
   0.5000        0.04
   0.5833        0.03
   0.6667        0.03
   0.7500        0.04
   0.8333        0.06
   0.9167        0.06
   1.0000        0.06
   1.0833        0.07
   1.1667        0.07
   1.2500        0.07
   1.3333        0.07
   1.4166        0.07
   1.5000        0.09
   1.5833        0.11
   1.6667        0.11
   1.7500        0.12
   1.8333        0.12
   2.0000        0.15
   2.5000        0.23
   3.0000        0.31
   3.5000        0.37
   4.0000        0.49
   4.5000        0.60
   5.0000        0.69
   5.5000        0.88
   6.0000        0.98
   6.5000        1.12
   7.0000        1.26
   7.5000        1.39
   8.0000        1.53
   8.5000        1.69
   9.0000        1.83
   9.5000        1.97
  10.0000        2.15
  12.0000        2.84
  14.0000        3.52
  16.0000        4.23
  18.0000        4.96
  20.0000        5.67
  22.0000        6.37
  24.0000        7.08
  26.0000        7.76
  28.0000        8.41
  30.0000        9.04
  32.0000        9.64
  34.0000       10.26
  36.0000       10.82
  38.0000       11.36
  40.0000       11.90
  42.0000       12.41
  44.0000       12.90
  46.0000       13.37
  48.0000       13.81
  50.0000       14.25
  52.0000       14.70
  54.0000       15.09
  56.0000       15.47
  58.0000       15.87
  60.0000       16.20
  62.0000       16.55
  64.0000       16.89
  66.0000       17.20
  68.0000       17.51
  70.0000       17.78
  72.0000       18.08
  74.0000       18.33
  76.0000       18.60
  78.0000       18.93
  80.0000       19.08
  82.0000       19.36
  84.0000       19.55
  86.0000       19.77
  88.0000       19.98
  90.0000       20.18
  92.0000       20.37
  94.0000       20.56
  96.0000       20.74
  98.0000       20.93
 100.000        21.10
 110.000        21.91
 120.000        22.62
 130.000        23.28
 140.000        23.87
 150.000        24.40
 160.000        24.88
 170.000        25.35
 180.000        25.78
 190.000        26.17
 210.000        26.89
 220.000        27.20
 230.000        27.53
 240.000        27.82
 250.000        28.10
 260.000        28.40
 270.000        28.64
 280.000        28.91
 290.000        29.13
 300.000        29.37
 310.000        29.61
 320.000        29.81
 330.000        30.03
 340.000        30.22
 350.000        30.43
 360.000        30.63
 370.000        30.84
 380.000        31.03
 390.000        31.20
 400.000        31.39
 410.000        31.55
 420.000        31.71
 430.000        31.88
 440.000        32.04
 450.000        32.20
 460.000        32.34
 470.000        32.50
 480.000        32.62
 490.000        32.78
 500.000        32.89
 510.000        33.02
 520.000        33.16
 530.000        33.30
 540.000        33.40
 550.000        33.51
 560.000        33.65
 570.000        33.75
 580.000        33.86
 590.000        33.97
 600.000        34.10
 610.000        34.22
 620.000        34.33
 630.000        34.47
 640.000        34.59
 650.000        34.68
 660.000        34.81
 670.000        34.90
 680.000        35.00
 690.000        35.11
 700.000        35.20
 710.000        35.30
 720.000        35.41
 730.000        35.49
 740.000        35.57
 750.000        35.68
 760.000        35.77
 770.000        35.87
 780.000        35.94
 790.000        36.01
 800.000        36.10
 810.000        36.20
 820.000        36.28
 830.000        36.37
 840.000        36.45
 850.000        36.56
 860.000        36.64
 870.000        36.72
 880.000        36.78
 890.000        36.88
 900.000        36.93
 910.000        37.00
 930.000        37.15
 940.000        37.21
 950.000        37.29
 960.000        37.37
 970.000        37.41
 980.000        37.51
 990.000        37.56
 1000.00        37.64
 1100.00        38.22
 1200.00        38.70
 1300.00        39.17
 1400.00        39.66
 1500.00        40.12
 1600.00        40.51
 1700.00        40.91
 1800.00        41.34
 1900.00        41.75
 2000.00        42.11
 2100.00        42.52
 2200.00        42.84
 2300.00        43.15
 2400.00        43.39
 2500.00        43.72
 2600.00        44.01
 2700.00        44.21
 2800.00        44.47
 2900.00        44.72
 3000.00        44.94
 3100.00        45.18
 3200.00        45.43
 3300.00        45.64
 3400.00        45.64
 3500.00        45.81
 3600.00        46.02
 3700.00        46.25
 3800.00        46.43
 3900.00        46.57
 4000.00        46.81
 4100.00        46.98
 4200.00        47.14
 4300.00        47.33
 4400.00        47.53
 4500.00        47.66
 4600.00        47.82
 4700.00        47.99
 4800.00        48.12
 4900.00        48.21
 5000.00        48.36
 5100.00        48.50
 5200.00        48.62
 5300.00        48.75
 5400.00        48.88
 5500.00        49.00
 5600.00        49.11
 5700.00        49.21
END
```

RECOVERY DATA
PHASE II TEST

SECTION 35-T36N-R74W

35-T36

phase II Recovery Data

```
     SE1000B
nvironmental Logger
   12/19  12:56

 Unit# 00000  Test# 1

INPUT 2:  Level (F) TOC

Reference          0.00
Scale factor      50.07
Offset             0.00

Step# 0   12/16  12:15

Elapsed Time    Value
------------  ---------
   0.0000          0.04
   0.0033          0.03
   0.0066          0.03
   0.0099          0.03
   0.0133          0.03
   0.0166          0.04
   0.0200          0.03
   0.0233          0.04
   0.0266          0.03
   0.0300          0.03
   0.0333          0.03
   0.0500          0.03
   0.0666          0.03
   0.0833          0.03
   0.1000          0.04
    .1166          0.04
    .1333          0.04
   0.1500          0.04
   0.1666          0.04
   0.1833          0.03
   0.2000          0.03
   0.2166          0.03
   0.2333          0.03
   0.2500          0.03
   0.2666          0.03
   0.2833          0.03
   0.3000          0.04
   0.3166          0.04
   0.3333          0.03
   0.4167          0.03
   0.5000          0.03
   0.5833          0.03
   0.6667          0.03
   0.7500          0.03
   0.8333          0.01
   0.9167          0.03
   1.0000          0.03
   1.0833          0.01
   1.1667          0.03
   1.2500          0.01
   1.3333          0.00
   1.4166          0.01
   1.5000          0.00
   1.5833          0.00
   1.6667          0.00
   1.7500          0.00
    .8333          0.01
     9167          0.01
     0000          0.00
    .5000      -   0.03
   3.0000      -   0.09
   3.5000      -   0.15
   4.0000      -   0.23
   4.5000      -   0.33
   5.0000      -   0.41

   6.0000      -   0.66
   6.5000      -   0.80
   7.0000      -   0.93
   7.5000      -   1.10
   8.0000      -   1.26
   8.5000      -   1.43
   9.0000      -   1.59
   9.5000      -   1.77
  10.0000      -   1.96
  12.0000      -   2.71
  14.0000      -   3.46
  16.0000      -   4.20
  18.0000      -   4.93
  20.0000      -   5.65
  22.0000      -   6.30
  24.0000      -   6.95
  26.0000      -   7.63
  28.0000      -   8.25
  30.0000      -   8.86
  32.0000      -   9.46
  34.0000      -  10.00
  36.0000      -  10.54
  38.0000      -  11.06
  40.0000      -  11.55
  42.0000      -  12.03
  44.0000      -  12.48
  46.0000      -  12.93
  48.0000      -  13.32
  50.0000      -  13.72
  52.0000      -  14.10
  54.0000      -  14.48
  56.0000      -  14.84
  58.0000      -  15.17
  60.0000      -  15.49
  62.0000      -  15.80
  64.0000      -  16.12
  66.0000      -  16.40
  68.0000      -  16.69
  70.0000      -  16.96
  72.0000      -  17.23
  74.0000      -  17.46
  76.0000      -  17.70
  78.0000      -  17.95
  80.0000      -  18.18
  82.0000      -  18.40
  84.0000      -  18.62
  86.0000      -  18.82
  88.0000      -  19.01
  90.0000      -  19.22
  92.0000      -  19.41
  94.0000      -  19.58
  96.0000      -  19.77
  98.0000      -  19.93
  100.000      -  20.10
  110.000      -  20.89
  120.000      -  21.61
  130.000      -  22.22
  140.000      -  22.79
  150.000      -  23.31
  160.000      -  23.77
  170.000      -  24.21
  180.000      -  24.64
  190.000      -  25.04
  200.000      -  25.38
  210.000      -  25.73
  220.000      -  26.05
  230.000      -  26.36
  240.000      -  26.65
  250.000      -  26.92
  260.000      -  27.19
  270.000      -  27.44
  280.000      -  27.69

  300.000      -  28.15
  310.000      -  28.36
  320.000      -  28.58
  330.000      -  28.78
  340.000      -  28.97
  350.000      -  29.16
  360.000      -  29.35
  370.000      -  29.53
  380.000      -  29.70
  390.000      -  29.86
  400.000      -  30.03
  410.000      -  30.19
  420.000      -  30.35
  430.000      -  30.49
  440.000      -  30.65
  450.000      -  30.79
  460.000      -  30.93
  470.000      -  31.08
  480.000      -  31.20
  490.000      -  31.33
  500.000      -  31.47
  510.000      -  31.60
  520.000      -  31.72
  530.000      -  31.83
  540.000      -  31.96
  550.000      -  32.07
  560.000      -  32.18
  570.000      -  32.29
  580.000      -  32.40
  590.000      -  32.51
  600.000      -  32.61
  610.000      -  32.72
  620.000      -  32.81
  630.000      -  32.93
  640.000      -  33.02
  650.000      -  33.12
  660.000      -  33.21
  670.000      -  33.30
  680.000      -  33.40
  690.000      -  33.49
  700.000      -  33.57
  710.000      -  33.67
  720.000      -  33.76
  730.000      -  33.84
  740.000      -  33.92
  750.000      -  34.02
  760.000      -  34.08
  770.000      -  34.17
  780.000      -  34.25
  790.000      -  34.33
  800.000      -  34.41
  810.000      -  34.47
  820.000      -  34.55
  830.000      -  34.63
  840.000      -  34.70
  850.000      -  34.77
  860.000      -  34.84
  870.000      -  34.90
  880.000      -  34.98
  890.000      -  35.04
  900.000      -  35.12
  910.000      -  35.19
  920.000      -  35.25
  930.000      -  35.31
  940.000      -  35.38
  950.000      -  35.45
  960.000      -  35.52
  970.000      -  35.58
  980.000      -  35.64
  990.000      -  35.71
  1000.00      -  35.77
  1100.00      -  36.36

  1300.00      -  37.37
  1400.00      -  37.81
  1500.00      -  38.19
  1600.00      -  38.55
  1700.00      -  38.87
  1800.00      -  39.19
  1900.00      -  39.49
  2000.00      -  39.77
  2100.00      -  40.04
  2200.00      -  40.31
  2300.00      -  40.55
  2400.00      -  40.78
  2500.00      -  41.02
  2600.00      -  41.24
  2700.00      -  41.43
  2800.00      -  41.64
  2900.00      -  41.83
  3000.00      -  42.00
  3100.00      -  42.17
  3200.00      -  42.35
  3300.00      -  42.49
  3400.00      -  42.65
  3500.00      -  42.79
  3600.00      -  42.92
  3700.00      -  43.04
  3800.00      -  43.17
  3900.00      -  43.28
  4000.00      -  43.39
  4100.00      -  43.50
  4200.00      -  43.61
  4300.00      -  43.72
END
```

WELL 35-737

BACKGROUND DATA
PHASE II TEST

SECTION 35-T36N-R74W

121

737

```
          SE1000B
  Environmental Logger
      12/12  07:56

  Unit# 00000  Test# 0

INPUT 1:  Level (F) TOC

Reference          0.00
Scale factor      50.36
Offset             0.00

Step# 0   12/11  15:44

Elapsed Time     Value
------------   ---------
   0.0000          0.01
  30.0000          0.01
  60.0000          0.00
  90.0000          0.01
  120.000          0.00
  150.000      -   0.01
  180.000      -   0.01
  210.000      -   0.03
  240.000      -   0.01
  270.000      -   0.01
  300.000      -   0.03
  330.000      -   0.03
  360.000      -   0.01
  390.000      -   0.01
  420.000      -   0.01
  450.000      -   0.01
  480.000      -   0.01
  510.000      -   0.01
  540.000      -   0.01
  570.000      -   0.03
  600.000      -   0.03
  630.000      -   0.03
  660.000      -   0.04
  690.000      -   0.06
  720.000      -   0.07
  750.000      -   0.07
  780.000      -   0.09
  810.000      -   0.11
  840.000      -   0.11
  870.000      -   0.12
  900.000      -   0.12
  930.000      -   0.14
  960.000      -   0.14
END
```

DRAWDOWN DATA
PHASE II TEST
SECTION 35-T36N-R74W

DY

37 pk. 2 ↓

SE1000B
Environmental Logger
12/16 10:51

Unit# 00000 Test# 0

INPUT 1: Level (F) TOC

Reference 0.00
Scale factor 50.36
Offset 0.00

Step# 0 12/12 10:00

Elapsed Time	Value
0.0000	0.03
0.0033	0.03
0.0066	0.03
0.0099	0.03
0.0133	0.03
0.0166	0.03
0.0200	0.03
0.0233	0.03
.0266	0.03
.0300	0.03
0.0333	0.03
0.0500	0.04
0.0666	0.03
0.0833	0.03
0.1000	0.03
0.1166	0.03
0.1333	0.03
0.1500	0.03
0.1666	0.03
0.1833	0.03
0.2000	0.03
0.2166	0.03
0.2333	0.03
0.2500	0.03
0.2666	0.03
0.2833	0.03
0.3000	0.04
0.3166	0.04
0.3333	0.04
0.4167	0.03
0.5000	0.03
0.5833	0.03
0.6667	0.04
0.7500	0.03
0.8333	0.03
0.9167	0.04
1.0000	0.04
1.0833	0.04
1.1667	0.04
1.2500	0.04
.3333	0.04
.4166	0.04
1.5000	0.04
1.5833	0.04
1.6667	0.04
1.7500	0.04
1.8333	0.04
1.9167	0.04
2.0000	0.06
2.5000	0.06
3.0000	0.07
3.5000	0.09
4.0000	0.12
4.5000	0.15
5.0000	0.17
5.5000	0.22
6.0000	0.25
6.5000	0.28
7.0000	0.33
7.5000	0.38
8.0000	0.42
8.5000	0.47
9.0000	0.52
9.5000	0.58
10.0000	0.63
12.0000	0.88
14.0000	1.16
16.0000	1.47
18.0000	1.79
20.0000	2.12
22.0000	2.47
24.0000	2.82
26.0000	3.17
28.0000	3.54
30.0000	3.89
32.0000	4.24
34.0000	4.57
36.0000	4.92
38.0000	5.25
40.0000	5.57
42.0000	5.91
44.0000	6.22
46.0000	6.53
48.0000	6.83
50.0000	7.11
52.0000	7.42
54.0000	7.69
56.0000	7.96
58.0000	8.23
60.0000	8.48
62.0000	8.72
64.0000	8.97
66.0000	9.20
68.0000	9.42
70.0000	9.64
72.0000	9.85
74.0000	10.05
76.0000	10.26
78.0000	10.47
80.0000	10.64
82.0000	10.83
84.0000	11.01
86.0000	11.18
88.0000	11.36
90.0000	11.52
92.0000	11.67
94.0000	11.83
96.0000	11.99
98.0000	12.14
100.000	12.28
110.000	12.95
120.000	13.53
130.000	14.07
140.000	14.57
150.000	15.01
160.000	15.43
170.000	15.82
180.000	16.19
190.000	16.52
200.000	16.86
210.000	17.16
220.000	17.44
230.000	17.73
240.000	17.98
250.000	18.24
260.000	18.49
270.000	18.73
280.000	18.95
290.000	19.16
300.000	19.37
310.000	19.57
320.000	19.76
330.000	19.95
340.000	20.13
350.000	20.30
360.000	20.49
370.000	20.65
380.000	20.83
390.000	20.99
400.000	21.16
410.000	21.30
420.000	21.46
430.000	21.61
440.000	21.75
450.000	21.89
460.000	22.04
470.000	22.16
480.000	22.29
490.000	22.42
500.000	22.53
510.000	22.66
520.000	22.78
530.000	22.89
540.000	23.01
550.000	23.12
560.000	23.23
570.000	23.34
580.000	23.45
590.000	23.55
600.000	23.66
610.000	23.75
620.000	23.86
630.000	23.97
640.000	24.09
650.000	24.18
660.000	24.28
670.000	24.37
680.000	24.47
690.000	24.56
700.000	24.66
710.000	24.75
720.000	24.83
730.000	24.93
740.000	25.01
750.000	25.10
760.000	25.18
770.000	25.26
780.000	25.34
790.000	25.42
800.000	25.52
810.000	25.60
820.000	25.67
830.000	25.75
840.000	25.82
850.000	25.91
860.000	25.99
870.000	26.07
880.000	26.14
890.000	26.20
900.000	26.26
910.000	26.34
920.000	26.41
930.000	26.45
940.000	[illegible]
950.000	26.6
960.000	26.66
970.000	26.7
980.000	26.8
990.000	26.87
1000.00	26.93
1100.00	27.42
1200.00	27.98
1300.00	28.50
1400.00	29.01
1500.00	29.49
1600.00	29.90
1700.00	30.28
1800.00	30.68
1900.00	31.06
2000.00	31.44
2100.00	31.79
2200.00	32.14
2300.00	32.46
2400.00	32.73
2500.00	33.02
2600.00	33.29
2700.00	33.53
2800.00	33.78
2900.00	34.05
3000.00	34.30
3100.00	34.56
3200.00	34.80
3300.00	35.00
3400.00	35.16
3500.00	35.35
3600.00	35.56
3700.00	35.77
3800.00	35.94
3900.00	36.10
4000.00	36.34
4100.00	36.51
4200.00	36.69
4300.00	36.88
4400.00	37.07
4500.00	37.23
4600.00	37.37
4700.00	37.55
4800.00	37.72
4900.00	37.83
5000.00	37.97
5100.00	38.12
5200.00	38.28
5300.00	38.42
5400.00	38.53
5500.00	38.66
5600.00	38.77
5700.00	38.88
5800.00	39.02

END

RECOVERY DATA
PHASE II TEST

SECTION 35-T36N-R74W

35-737

Rec. data phase I

```
READY

       SE1000B
 Environmental Logger
    12/19  13:32

 Unit# 00000  Test# 1

INPUT 1:  Level (F) TOC

Reference           0.00
Scale factor       50.36
Offset              0.00

Step# 0   12/16  12:15

Elapsed Time      Value
------------    --------
    0.0000        0.03
    0.0033        0.04
    0.0066        0.04
    0.0099        0.04
    0.0133        0.04
    0.0166        0.04
    0.0200        0.04
    0.0233        0.04
    0.0266        0.06
    0.0300        0.04
    0.0333        0.04
    0.0500        0.04
     .0666        0.04
     .0833        0.04
    0.1000        0.04
    0.1166        0.04
    0.1333        0.04
    0.1500        0.04
    0.1666        0.04
    0.1833        0.04
    0.2000        0.04
    0.2166        0.04
    0.2333        0.04
    0.2500        0.04
    0.2666        0.04
    0.2833        0.06
    0.3000        0.04
    0.3166        0.04
    0.3333        0.04
    0.4167        0.06
    0.5000        0.04
    0.5833        0.04
    0.6667        0.04
    0.7500        0.06
    0.8333        0.06
    0.9167        0.06
    1.0000        0.04
    1.0833        0.04
    1.1667        0.06
    1.2500        0.04
    1.3333        0.04
    1.4166        0.04
    1.5000        0.04
     .5833        0.06
     .6667        0.06
     .7500        0.04
    1.8333        0.06
    1.9167        0.06
    2.0000        0.04
    2.5000        0.04
    3.0000        0.04
    3.5000        0.03
    4.0000        0.03
    4.5000        0.01
    5.0000      - 0.01
    5.5000      - 0.03
    6.0000      - 0.06
    6.5000      - 0.09
    7.0000      - 0.12
    7.5000      - 0.17
    8.0000      - 0.22
    8.5000      - 0.28
    9.0000      - 0.31
    9.5000      - 0.38
   10.0000      - 0.42
   12.0000      - 0.73
   14.0000      - 1.00
   16.0000      - 1.33
   18.0000      - 1.66
   20.0000      - 2.01
   22.0000      - 2.36
   24.0000      - 2.70
   26.0000      - 3.05
   28.0000      - 3.41
   30.0000      - 3.75
   32.0000      - 4.09
   34.0000      - 4.43
   36.0000      - 4.75
   38.0000      - 5.05
   40.0000      - 5.37
   42.0000      - 5.67
   44.0000      - 5.95
   46.0000      - 6.26
   48.0000      - 6.53
   50.0000      - 6.80
   52.0000      - 7.05
   54.0000      - 7.30
   56.0000      - 7.56
   58.0000      - 7.78
   60.0000      - 8.04
   62.0000      - 8.26
   64.0000      - 8.48
   66.0000      - 8.69
   68.0000      - 8.91
   70.0000      - 9.10
   72.0000      - 9.29
   74.0000      - 9.48
   76.0000      - 9.67
   78.0000      - 9.85
   80.0000      - 10.04
   82.0000      - 10.20
   84.0000      - 10.37
   86.0000      - 10.53
   88.0000      - 10.69
   90.0000      - 10.83
   92.0000      - 10.99
   94.0000      - 11.13
   96.0000      - 11.28
   98.0000      - 11.40
   100.000      - 11.55
   110.000      - 12.22
   120.000      - 12.79
   130.000      - 13.33
   140.000      - 13.82
   150.000      - 14.27
   160.000      - 14.68
   170.000      - 15.08
   180.000      - 15.43
   190.000      - 15.76
   200.000      - 16.09
   210.000      - 16.39
   220.000      - 16.68
   230.000      - 16.95
   240.000      - 17.21
   250.000      - 17.44
   260.000      - 17.70
   270.000      - 17.92
   280.000      - 18.14
   290.000      - 18.35
   300.000      - 18.56
   310.000      - 18.75
   320.000      - 18.92
   330.000      - 19.10
   340.000      - 19.29
   350.000      - 19.45
   360.000      - 19.62
   370.000      - 19.78
   380.000      - 19.94
   390.000      - 20.08
   400.000      - 20.22
   410.000      - 20.37
   420.000      - 20.51
   430.000      - 20.65
   440.000      - 20.78
   450.000      - 20.91
   460.000      - 21.03
   470.000      - 21.16
   480.000      - 21.29
   490.000      - 21.40
   500.000      - 21.53
   510.000      - 21.64
   520.000      - 21.75
   530.000      - 21.86
   540.000      - 21.97
   550.000      - 22.07
   560.000      - 22.16
   570.000      - 22.27
   580.000      - 22.37
   590.000      - 22.46
   600.000      - 22.56
   610.000      - 22.66
   620.000      - 22.75
   630.000      - 22.83
   640.000      - 22.93
   650.000      - 23.01
   660.000      - 23.10
   670.000      - 23.18
   680.000      - 23.28
   690.000      - 23.35
   700.000      - 23.43
   710.000      - 23.51
   720.000      - 23.59
   730.000      - 23.67
   740.000      - 23.75
   750.000      - 23.83
   760.000      - 23.90
   770.000      - 23.97
   780.000      - 24.04
   790.000      - 24.12
   800.000      - 24.20
   810.000      - 24.26
   820.000      - 24.32
   830.000      - 24.39
   840.000      - 24.45
   850.000      - 24.51
   860.000      - 24.59
   870.000      - 24.66
   880.000      - 24.72
   890.000      - 24.79
   900.000      - 24.83
   910.000      - 24.90
   920.000      - 24.96
   930.000      - 25.02
   940.000      - 25.09
   950.000      - 25.15
   960.000      - 25.20
   970.000      - 25.26
   980.000      - 25.33
   990.000      - 25.39
   1000.00      - 25.44
   1100.00      - 26.09
   1200.00      - 26.53
   1300.00      - 26.91
   1400.00      - 27.28
   1500.00      - 27.63
   1600.00      - 27.95
   1700.00      - 28.25
   1800.00      - 28.54
   1900.00      - 28.82
   2000.00      - 29.08
   2100.00      - 29.33
   2200.00      - 29.58
   2300.00      - 29.81
   2400.00      - 30.03
   2500.00      - 30.25
   2600.00      - 30.46
   2700.00      - 30.65
   2800.00      - 30.84
   2900.00      - 31.03
   3000.00      - 31.20
   3100.00      - 31.36
   3200.00      - 31.52
   3300.00      - 31.68
   3400.00      - 31.82
   3500.00      - 31.97
   3600.00      - 32.09
   3700.00      - 32.22
   3800.00      - 32.35
   3900.00      - 32.48
   4000.00      - 32.56
   4100.00      - 32.68
   4200.00      - 32.78
   4300.00      - 32.91
END
```

WELL 35-738
DRAWDOWN DATA
PHASE II TEST
SECTION 35-T36N-R74W

Time Minutes	Drawdown Feet	Time Minutes	Drawdown Feet	Time Minutes	Drawdown Feet	Time Minutes	Drawdown Feet
0.0067	.01	0.6667	.01	8.5	.54	62	10.98
0.0100	.01	0.7500	.01	9.0	.62	64	11.27
0.0133	.01	0.8333	.01	9.5	.69	66	11.55
0.0167	.01	0.9167	.01	10	.77	68	11.82
0.0200	.01	1.0000	.01	12	1.10	70	12.08
0.0233	.01	1.0833	.01	14	1.47	72	12.32
0.0267	.01	1.1667	.01	16	1.90	74	12.57
0.0300	.01	1.2500	.01	18	2.32	76	12.79
0.0333	.01	1.3333	.01	20	2.78	78	13.02
0.0500	.01	1.4167	.01	22	3.23	80	13.23
0.0667	.01	1.5000	.01	24	3.69	82	13.45
0.0833	.01	1.5833	.03	26	4.16	84	13.64
0.1000	.01	1.6667	.03	28	4.62	86	13.86
0.1167	.01	1.7500	.03	30	5.07	88	14.05
0.1333	.01	1.8333	.03	32	5.51	90	14.24
0.1500	.01	1.9167	.03	34	5.95	92	14.40
0.1667	.01	2.0	.03	36	6.38	94	14.59
0.2000	.03	2.5	.03	38	6.79	96	14.77
0.2167	.01	3.0	.06	40	7.18	98	14.94
0.2333	.01	3.5	.07	42	7.59	100	15.10
0.2500	.01	4.0	.10	44	7.97	110	15.88
0.2667	.01	4.5	.13	46	8.35	120	16.58
0.2833	.01	5.0	.16	48	8.72	130	17.20
0.3000	.01	5.5	.21	50	9.08	140	17.78
0.3167	.01	6.0	.25	52	9.42	150	18.31
0.3333	.01	6.5	.30	54	9.75	160	18.81
0.4167	.01	7.0	.36	56	10.09	170	19.28
0.5000	.01	7.5	.42	58	10.39	180	19.72
0.5833	.03	8.0	.48	60	10.70		

WELL 35-738
DRAWDOWN DATA
PHASE II TEST
PART 2
SECTION 35-T36N-R74W

Time Minutes	Drawdown Feet
190	20.13
200	20.53
210	20.89
220	21.24
230	21.58
240	21.90
250	22.22
260	22.51
270	22.79
280	23.07
290	23.33
300	23.58
310	23.84
320	24.07
330	24.30
340	24.53
350	24.74
360	24.95
370	25.17
380	25.38
390	25.58
400	25.77
410	25.96
420	26.15
430	26.32
440	26.50
450	26.67
460	26.84
470	27.00
480	27.16
490	27.31
500	27.46
510	27.60
520	27.75
530	27.89
540	28.02
550	28.16
560	28.30
570	28.42
580	28.54
590	28.68
600	28.80
610	28.92
620	29.06
630	29.19
640	29.32
650	29.42
660	29.54
670	29.67
680	29.77
690	29.88
700	29.98
710	30.09
720	30.20
730	30.30
740	30.41
750	30.50
760	30.61
770	30.70
780	30.79
790	30.90
800	30.99
810	31.08
820	31.17
830	31.26
840	31.35
850	31.44
860	31.55
970	31.64
880	31.70
890	31.78
900	31.85
910	31.94
920	32.02
930	32.10
940	32.17
950	32.25
960	32.32
970	32.40
980	32.48
990	32.54
1000	32.61
1100	33.27
1200	33.83
1300	34.36
1400	34.88
1500	35.38
1600	35.84
1700	36.25
1800	36.67
1900	37.08
2000	37.48
2100	37.87
2200	38.31
2300	38.59
2400	38.85
2500	39.16
2600	39.44
2700	39.70
2800	39.95
2900	40.23
3000	40.46
3100	40.73
3200	40.99
3300	41.19
3400	41.35
3500	41.54
3600	41.73
3700	41.95
3800	42.14
3900	42.30
4000	42.55
4100	42.74
4200	42.90
4300	43.10
4400	43.33
4500	43.47
4600	43.60
4700	43.79
4800	43.95
4900	44.06
5000	44.20
5100	44.36
5200	44.51
5300	44.55
5400	44.76
5500	44.89
5600	45.00

Section 35 Underlying Shale Test

As previously stated, attempts to repair the seal in the original underlying shale well were unsuccessful and a new shale monitor well, well 737-A, was completed. This test was conducted to evaluate the underlying shale completion. Transducers were placed in shale well 737-A and in production zone monitor well 736. Fluid levels in pumped well 739 were checked periodically with a wire line probe. Data collected from the above wells during this test follow this page.

PUMPED WELL RATE
& FLUID LEVEL
(WELL 35-739)
DRAWDOWN DATA
UNDERLYING SHALE TEST
SECTION 35-T36N-R74W

Test Start 10/27/86 @ 0800 Hrs.

Hand Probe Readings 35-739 (pumped well) (8 gpm)

Date	Time	Level	Flowrate
10-27-86	0800	225.9'	0 (↑ 8.0)
Mon.	0815	333.15	7.9
"	0830	378.95	8.1
"	0845	385.60	7.9
"	0900	391.90	7.8
"	1000	399.85	7.6
"	1100	403.35	7.8
"	1200	404.80	7.8
"	1300	405.90	7.8
"	1400	406.20	7.8
"	1600	410.30	7.9
"	2000	413.41	7.9
"	2400	415.82	7.9
10-28-86	0400	417.28	8.0
Tues.	0800	415.65	7.8
"	1200	415.05	7.8
"	1600	417.30	7.9
"	2000	419.21	7.9
"	2400	420.16	7.9
10-29-86	0400	420.76	7.8
Wed.	0800	420.85	7.8
"	1200	420.25	7.8
"	1600	420.45	7.8
"	2000	421.72	7.8
"	2400	422.75	7.8
10-30-86	0400	423.08	7-7 - 7.8
Thurs.	0800	422.80	7.8

STOP GENERATOR

WELL 35-736

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```
      SE1000B
  Environmental Logger
    11/05  14:40

  Unit# 00000  Test# 2

 INPUT 2:  Level (F) TOC

 Reference         0.00
 Scale factor     50.35
 Offset            0.00

 Step# 0   10/24  12:00

 Elapsed Time     Value
 ------------   ---------
   0.0000          0.00
  20.0000          0.00
  40.0000          0.00
  60.0000          0.00
  80.0000          0.00
  100.000          0.00
  120.000          0.00
  140.000          0.00
  160.000          0.00
  180.000          0.00
  200.000          0.00
  220.000          0.00
  240.000          0.00
  260.000          0.00
  280.000          0.00
  300.000          0.00
  320.000          0.00
  340.000          0.00
  360.000          0.00
  380.000     -    0.01
  400.000     -    0.01
  420.000     -    0.03
  440.000     -    0.03
  460.000     -    0.03
  480.000     -    0.03
  500.000     -    0.03
  520.000     -    0.03
  540.000     -    0.03
  560.000     -    0.03
  580.000     -    0.03
  600.000     -    0.03
  620.000     -    0.03
  640.000     -    0.03
  660.000     -    0.03
  680.000     -    0.03
  700.000     -    0.03
  720.000     -    0.03
  740.000     -    0.03
  760.000     -    0.01
  780.000     -    0.03
  800.000     -    0.03
  820.000     -    0.01
  840.000     -    0.01
  860.000     -    0.01
  880.000     -    0.01
  900.000     -    0.01
  920.000     -    0.01
  940.000     -    0.01
  960.000     -    0.01
  980.000     -    0.01
  1000.00     -    0.01
  1020.00          0.00
  1040.00     -    0.01
  1060.00          0.00
  1080.00          0.00
  1100.00          0.00
  1120.00          0.00
```

BACKGROUND DATA COLLECTION

BASELINE

```
  1140.00          0.00
  1160.00          0.00
  1180.00          0.00
  1200.00          0.00
  1220.00          0.00
  1240.00          0.00
  1260.00          0.01
  1280.00          0.01
  1300.00          0.01
  1320.00          0.03
  1340.00          0.03
  1360.00          0.03
  1380.00          0.03
  1400.00          0.03
  1420.00          0.03
  1440.00          0.03
  1460.00          0.03
  1480.00          0.03
  1500.00          0.03
  1520.00          0.03
  1540.00          0.03
  1560.00          0.01
  1580.00          0.03
  1600.00          0.03
  1620.00          0.01
  1640.00          0.01
  1660.00          0.03
  1680.00          0.01
  1700.00          0.01
  1720.00          0.01
  1740.00          0.01
  1760.00          0.01
  1780.00          0.01
  1800.00          0.01
  1820.00          0.01
  1840.00          0.00
  1860.00          0.00
  1880.00          0.00
  1900.00     -    0.01
  1920.00     -    0.01
  1940.00     -    0.01
  1960.00     -    0.01
  1980.00     -    0.01
  2000.00     -    0.01
  2020.00     -    0.01
  2040.00     -    0.01
  2060.00     -    0.01
  2080.00     -    0.01
  2100.00     -    0.01
  2120.00     -    0.01
  2140.00     -    0.01
  2160.00     -    0.01
  2180.00     -    0.01
  2200.00     -    0.01
  2220.00     -    0.01
  2240.00     -    0.01
  2260.00     -    0.01
  2280.00     -    0.01
  2300.00     -    0.01
  2320.00     -    0.01
  2340.00     -    0.01
  2360.00     -    0.01
  2380.00     -    0.01
  2400.00     -    0.01
  2420.00     -    0.01
  2440.00     -    0.01
  2460.00     -    0.01
  2480.00          0.00
  2500.00          0.00
  2520.00          0.00
  2540.00          0.00
  2560.00          0.00
  2580.00          0.01
```

BACKGROUND DATA COLLECTION

```
  2600.00          0.01
  2620.00          0.01
  2640.00          0.01
  2660.00          0.01
  2680.00          0.01
  2700.00          0.01
  2720.00          0.01
  2740.00          0.01
  2760.00          0.03
  2780.00          0.03
  2800.00          0.03
  2820.00          0.03
  2840.00          0.03
  2860.00          0.03
  2880.00          0.03
  2900.00          0.03
  2920.00          0.03
  2940.00          0.03
  2960.00          0.01
  2980.00          0.01
  3000.00          0.01
  3020.00          0.01
  3040.00          0.00
  3060.00          0.00
  3080.00          0.00
  3100.00          0.00
  3120.00          0.00
  3140.00     -    0.01
  3160.00     -    0.01
  3180.00     -    0.01
  3200.00     -    0.01
  3220.00     -    0.01
  3240.00     -    0.01
  3260.00     -    0.03
  3280.00     -    0.03
  3300.00     -    0.04
  3320.00     -    0.04
  3340.00     -    0.04
  3360.00     -    0.04
  3380.00     -    0.04
  3400.00     -    0.06
  3420.00     -    0.06
  3440.00     -    0.04
  3460.00     -    0.06
  3480.00     -    0.06
  3500.00     -    0.06
  3520.00     -    0.06
  3540.00     -    0.06
  3560.00     -    0.06
  3580.00     -    0.06
  3600.00     -    0.06
  3620.00     -    0.07
  3640.00     -    0.07
  3660.00     -    0.07
  3680.00     -    0.07
  3700.00     -    0.07
  3720.00     -    0.09
  3740.00     -    0.09
  3760.00     -    0.09
  3780.00     -    0.09
  3800.00     -    0.09
  3820.00     -    0.09
  3840.00     -    0.09
  3860.00     -    0.09
  3880.00     -    0.09
  3900.00     -    0.09
  3920.00     -    0.09
  3940.00     -    0.09
  3960.00     -    0.09
  3980.00     -    0.09
  4000.00     -    0.09
  4020.00     -    0.09
  4040.00     -    0.09
```

BACK GROUND DATA COLLECTION

PUMP ON

DRAWDOWN PERIOD

DRAWDOWN PERIOD

DRAWDOWN PERIOD

PUMP OFF

RECOVERY PHASE

4060.00	- 0.09	5500.00	39.49	6940.00	44.23	8380.00	47.02
4080.00	- 0.09	5520.00	39.60	6960.00	44.27	8400.00	47.05
4100.00	- 0.07	5540.00	39.70	6980.00	44.32	8420.00	47.10
4120.00	- 0.06	5560.00	39.79	7000.00	44.37	8440.00	47.13
4140.00	- 0.06	5580.00	39.84	7020.00	44.42	8460.00	47.13
4160.00	5.30	5600.00	39.79	7040.00	44.48	8480.00	47.05
4180.00	11.75	5620.00	39.79	7060.00	44.51	8500.00	37.19
4200.00	16.09	5640.00	39.83	7080.00	44.56	8520.00	32.60
4220.00	18.90	5660.00	39.87	7100.00	44.59	8540.00	29.74
4240.00	20.86	5680.00	39.94	7120.00	44.64	8560.00	27.64
4260.00	22.33	5700.00	40.00	7140.00	44.67	8580.00	26.07
4280.00	23.51	5720.00	40.06	7160.00	44.70	8600.00	24.83
4300.00	24.51	5740.00	40.13	7180.00	44.74	8620.00	23.81
4320.00	25.35	5760.00	40.19	7200.00	44.77	8640.00	22.94
4340.00	26.10	5780.00	40.25	7220.00	44.80	8660.00	22.21
4360.00	26.73	5800.00	40.33	7240.00	44.85	8680.00	21.52
4380.00	27.31	5820.00	40.40	7260.00	44.88	8700.00	20.94
4400.00	27.86	5840.00	40.48	7280.00	44.91	8720.00	20.46
4420.00	28.35	5860.00	40.53	7300.00	44.93	8740.00	19.89
4440.00	28.82	5880.00	40.59	7320.00	44.96	8760.00	19.43
4460.00	29.23	5900.00	40.65	7340.00	44.97	8780.00	19.00
4480.00	29.63	5920.00	40.72	7360.00	45.01	8800.00	18.60
4500.00	29.98	5940.00	40.78	7380.00	45.05	8820.00	18.23
4520.00	30.32	5960.00	40.84	7400.00	45.10	8840.00	17.90
4540.00	30.63	5980.00	40.91	7420.00	45.13	8860.00	17.55
4560.00	30.94	6000.00	40.97	7440.00	45.18	8880.00	17.25
4580.00	31.25	6020.00	41.10	7460.00	45.21	8900.00	16.96
4600.00	31.63	6040.00	41.22	7480.00	45.24	8920.00	16.66
4620.00	32.01	6060.00	41.32	7500.00	45.29	8940.00	16.42
4640.00	32.33	6080.00	41.41	7520.00	45.32	8960.00	16.17
4660.00	32.63	6100.00	41.51	7540.00	45.37	8980.00	15.93
4680.00	32.91	6120.00	41.59	7560.00	45.42	9000.00	15.71
4700.00	33.17	6140.00	41.68	7580.00	45.48	9020.00	15.49
4720.00	33.42	6160.00	41.76	7600.00	45.53	9040.00	15.28
4740.00	33.66	6180.00	41.84	7620.00	45.58	9060.00	15.09
4760.00	33.90	6200.00	41.94	7640.00	45.64	9080.00	14.88
4780.00	34.14	6220.00	42.02	7660.00	45.69	9100.00	14.71
4800.00	34.34	6240.00	42.10	7680.00	45.74	9120.00	14.53
4820.00	34.57	6260.00	42.18	7700.00	45.78	9140.00	14.36
4840.00	34.76	6280.00	42.26	7720.00	45.82	9160.00	14.18
4860.00	34.96	6300.00	42.34	7740.00	45.86	9180.00	14.02
4880.00	35.15	6320.00	42.40	7760.00	45.91	9200.00	13.87
4900.00	35.35	6340.00	42.46	7780.00	45.94	9220.00	13.74
4920.00	35.52	6360.00	42.54	7800.00	45.99	9240.00	13.58
4940.00	35.71	6380.00	42.61	7820.00	46.04	9260.00	13.45
4960.00	35.89	6400.00	42.67	7840.00	46.09	9280.00	13.31
4980.00	36.06	6420.00	42.75	7860.00	46.12	9300.00	13.18
5000.00	36.24	6440.00	42.81	7880.00	46.17	9320.00	13.04
5020.00	36.39	6460.00	42.88	7900.00	46.21	9340.00	12.93
5040.00	36.54	6480.00	42.96	7920.00	46.24	9360.00	12.80
5060.00	36.71	6500.00	43.00	7940.00	46.28	9380.00	12.67
5080.00	36.85	6520.00	43.07	7960.00	46.32	9400.00	12.56
5100.00	37.00	6540.00	43.13	7980.00	46.36	9420.00	12.44
5120.00	37.14	6560.00	43.19	8000.00	46.40	9440.00	12.32
5140.00	37.30	6580.00	43.26	8020.00	46.44	9460.00	12.21
5160.00	37.44	6600.00	43.31	8040.00	46.47	9480.00	12.10
5180.00	37.59	6620.00	43.37	8060.00	46.50	9500.00	11.99
5200.00	37.71	6640.00	43.43	8080.00	46.53	9520.00	11.89
5220.00	37.86	6660.00	43.48	8100.00	46.56	9540.00	11.78
5240.00	37.97	6680.00	43.54	8120.00	46.59	9560.00	11.69
5260.00	38.09	6700.00	43.59	8140.00	46.63	9580.00	11.58
5280.00	38.22	6720.00	43.64	8160.00	46.66	9600.00	11.48
5300.00	38.33	6740.00	43.70	8180.00	46.69	9620.00	11.39
5320.00	38.46	6760.00	43.75	8200.00	46.72	9640.00	11.29
5340.00	38.59	6780.00	43.80	8220.00	46.75	9660.00	11.21
5360.00	38.70	6800.00	43.85	8240.00	46.78	9680.00	11.12
5380.00	38.81	6820.00	43.89	8260.00	46.82	9700.00	11.04
5400.00	38.94	6840.00	43.96	8280.00	46.85	9720.00	10.96
5420.00	39.05	6860.00	44.00	8300.00	46.88	9740.00	10.88
5440.00	39.16	6880.00	44.07	8320.00	46.93	9760.00	10.80
5460.00	39.27	6900.00	44.12	8340.00	46.96	9780.00	10.72
5480.00	39.38	6920.00	44.18	8360.00	46.99	9800.00	10.64

PRODUCTION ZONE
WELL 35-736

Page 3 of 3

RECOVERY →

RECOVERY PHASE

RECOVERY PHASE

RECOVERY PHASE

9820.00	10.58	11320.0	7.13	[illegible]	[illegible]
9840.00	10.51	11340.0	7.11	[illegible]	[illegible]
9860.00	10.45	11360.0	7.08	[illegible]	[illegible]
9880.00	10.37	11380.0	7.05	[illegible]	[illegible]
9900.00	10.32	11400.0	7.03	[illegible]	[illegible]
9920.00	10.24	11420.0	7.02	[illegible]	[illegible]
9940.00	10.20	11440.0	6.99	[illegible]	[illegible]
9960.00	10.13	11460.0	6.97	[illegible]	[illegible]
9980.00	10.07	11480.0	6.94	[illegible]	[illegible]
10000.0	10.00	11500.0	6.92	[illegible]	[illegible]
10020.0	9.96	11520.0	6.89	[illegible]	[illegible]
10040.0	9.89	11540.0	6.87	[illegible]	[illegible]
10060.0	9.85	11560.0	6.84	[illegible]	[illegible]
10080.0	9.80	11580.0	6.81	[illegible]	[illegible]
10100.0	9.73	11600.0	[illegible]	[illegible]	[illegible]
10120.0	9.67	11620.0	6.76	[illegible]	[illegible]
10140.0	9.61	11640.0	6.73	[illegible]	[illegible]
10160.0	9.54	11660.0	[illegible]	[illegible]	[illegible]
10180.0	9.48	11680.0	[illegible]	[illegible]	[illegible]
10200.0	9.43	11700.0	[illegible]	[illegible]	[illegible]
10220.0	9.37	[illegible]	6.64	[illegible]	[illegible]
10240.0	9.31	[illegible]	6.62	[illegible]	[illegible]
[illegible]	9.26	[illegible]	6.57	[illegible]	[illegible]
[illegible]	9.19	[illegible]	6.54	[illegible]	[illegible]
[illegible]	9.13	[illegible]	6.50	[illegible]	[illegible]
[illegible]	9.08	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	6.43	[illegible]	[illegible]
[illegible]	8.97	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	8.61	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	8.57	[illegible]	6.21	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	8.48	[illegible]	6.16	[illegible]	[illegible]
[illegible]	8.45	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	8.42	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10660.0	8.34	[illegible]	[illegible]	[illegible]	[illegible]
10680.0	8.30	12180.0	[illegible]	[illegible]	[illegible]
10700.0	8.27	12200.0	[illegible]	[illegible]	[illegible]
10720.0	8.24	12220.0	6.02	[illegible]	[illegible]
10740.0	8.21	12240.0	[illegible]	[illegible]	[illegible]
10760.0	8.16	12260.0	5.98	[illegible]	[illegible]
10780.0	8.13	12280.0	[illegible]	[illegible]	[illegible]
10800.0	8.08	12300.0	5.94	[illegible]	[illegible]
10820.0	8.05	12320.0	5.91	[illegible]	[illegible]
10840.0	8.00	12340.0	5.89	[illegible]	[illegible]
10860.0	7.97	12360.0	5.86	[illegible]	[illegible]
10880.0	7.92	12380.0	5.84	[illegible]	[illegible]
10900.0	7.89	12400.0	5.81	[illegible]	[illegible]
10920.0	7.84	12420.0	[illegible]	[illegible]	[illegible]
10940.0	7.81	12440.0	[illegible]	[illegible]	[illegible]
10960.0	7.76	12460.0	5.71	[illegible]	[illegible]
10980.0	7.73	12480.0	5.70	[illegible]	[illegible]
11000.0	7.68	12500.0	5.67	[illegible]	[illegible]
11020.0	7.64	12520.0	5.64	[illegible]	[illegible]
11040.0	7.61	12540.0	5.62	[illegible]	[illegible]
11060.0	7.57	12560.0	5.59	[illegible]	[illegible]
11080.0	7.53	12580.0	5.57	[illegible]	[illegible]
11100.0	7.49	12600.0	5.54	[illegible]	[illegible]
11120.0	7.45	12620.0	5.51	[illegible]	[illegible]
11140.0	7.41	12640.0	5.49	[illegible]	[illegible]
11160.0	7.38	12660.0	5.48	[illegible]	[illegible]
11180.0	7.34	12680.0	5.44	[illegible]	[illegible]
11200.0	7.32	12700.0	5.43	[illegible]	[illegible]
11220.0	7.27	12720.0	5.41	[illegible]	[illegible]
11240.0	7.24	12740.0	5.40	[illegible]	[illegible]
11260.0	7.21	12760.0	5.37	[illegible]	[illegible]
11280.0	7.19	12780.0	5.35		
11300.0	7.16	12800.0	5.33		

WELL 35-737 'A'
Section 35-36N-74W

Page 1 of 3

```
      SE1000B
 Environmental Logger
   11/05  14:03

 Unit# 00000   Test# 2

INPUT 1:  Level (F) TOC

Reference          0.00
Scale factor      50.00
Offset             0.00

Step# 0   10/24  12:00

Elapsed Time     Value
---- -------   ---------
   0.0000         0.00
  20.0000         0.00
  40.0000         0.00
  60.0000         0.00
  80.0000         0.00
  100.000         0.00
  120.000         0.00
  140.000         0.00
  160.000         0.00
  180.000         0.00
  200.000         0.00
  220.000      -  0.01
  240.000      -  0.01
  260.000      -  0.01
  280.000      -  0.01
  300.000      -  0.01
  320.000      -  0.01
  340.000      -  0.03
  360.000      -  0.03
  380.000      -  0.04
  400.000      -  0.04
  420.000      -  0.04
  440.000      -  0.06
  460.000      -  0.06
  480.000      -  0.06
  500.000      -  0.06
  520.000      -  0.06
  540.000      -  0.06
  560.000      -  0.07
  580.000      -  0.06
  600.000      -  0.07
  620.000      -  0.07
  640.000      -  0.07
  660.000      -  0.07
  680.000      -  0.07
  700.000      -  0.07
  720.000      -  0.07
  740.000      -  0.07
  760.000      -  0.07
  780.000      -  0.07
  800.000      -  0.07
  820.000      -  0.07
  840.000      -  0.07
  860.000      -  0.07
  880.000      -  0.07
  900.000      -  0.07
  920.000      -  0.09
  940.000      -  0.09
  960.000      -  0.09
  980.000      -  0.09
  1000.00      -  0.09
  1020.00      -  0.09
  1040.00      -  0.09
  1060.00      -  0.09
  1080.00      -  0.09
  1100.00      -  0.09
  1120.00      -  0.09
```

BACKGROUND DATA COLLECTION

BASELINE DATA

```
  1140.00      -  0.09
  1160.00      -  0.09
  1180.00      -  0.09
  1200.00      -  0.11
  1220.00      -  0.09
  1240.00      -  0.11
  1260.00      -  0.09
  1280.00      -  0.09
  1300.00      -  0.09
  1320.00      -  0.09
  1340.00      -  0.07
  1360.00      -  0.07
  1380.00      -  0.07
  1400.00      -  0.07
  1420.00      -  0.07
  1440.00      -  0.07
  1460.00      -  0.07
  1480.00      -  0.07
  1500.00      -  0.07
  1520.00      -  0.07
  1540.00      -  0.07
  1560.00      -  0.07
  1580.00      -  0.07
  1600.00      -  0.07
  1620.00      -  0.09
  1640.00      -  0.09
  1660.00      -  0.09
  1680.00      -  0.09
  1700.00      -  0.09
  1720.00      -  0.09
  1740.00      -  0.11
  1760.00      -  0.11
  1780.00      -  0.11
  1800.00      -  0.12
  1820.00      -  0.12
  1840.00      -  0.14
  1860.00      -  0.14
  1880.00      -  0.14
  1900.00      -  0.14
  1920.00      -  0.15
  1940.00      -  0.15
  1960.00      -  0.15
  1980.00      -  0.15
  2000.00      -  0.15
  2020.00      -  0.15
  2040.00      -  0.15
  2060.00      -  0.15
  2080.00      -  0.17
  2100.00      -  0.15
  2120.00      -  0.17
  2140.00      -  0.17
  2160.00      -  0.17
  2180.00      -  0.17
  2200.00      -  0.17
  2220.00      -  0.17
  2240.00      -  0.17
  2260.00      -  0.17
  2280.00      -  0.17
  2300.00      -  0.17
  2320.00      -  0.17
  2340.00      -  0.18
  2360.00      -  0.17
  2380.00      -  0.17
  2400.00      -  0.17
  2420.00      -  0.18
  2440.00      -  0.17
  2460.00      -  0.17
  2480.00      -  0.18
  2500.00      -  0.18
  2520.00      -  0.18
  2540.00      -  0.18
  2560.00      -  0.18
  2580.00      -  0.18
```

BACKGROUND DATA COLLECTION

✓

```
  2600.00      -  0.18
  2620.00      -  0.18
  2640.00      -  0.18
  2660.00      -  0.18
  2680.00      -  0.18
  2700.00      -  0.18
  2720.00      -  0.18
  2740.00      -  0.17
  2760.00      -  0.17
  2780.00      -  0.17
  2800.00      -  0.17
  2820.00      -  0.17
  2840.00      -  0.17
  2860.00      -  0.17
  2880.00      -  0.17
  2900.00      -  0.17
  2920.00      -  0.17
  2940.00      -  0.17
  2960.00      -  0.17
  2980.00      -  0.17
  3000.00      -  0.17
  3020.00      -  0.17
  3040.00      -  0.17
  3060.00      -  0.17
  3080.00      -  0.17
  3100.00      -  0.18
  3120.00      -  0.17
  3140.00      -  0.18
  3160.00      -  0.18
  3180.00      -  0.18
  3200.00      -  0.20
  3220.00      -  0.20
  3240.00         0.20
  3260.00      -  0.22
  3280.00      -  0.22
  3300.00      -  0.23
  3320.00      -  0.23
  3340.00      -  0.23
  3360.00      -  0.23
  3380.00      -  0.23
  3400.00      -  0.23
  3420.00      -  0.23
  3440.00      -  0.25
  3460.00      -  0.25
  3480.00      -  0.25
  3500.00      -  0.25
  3520.00      -  0.25
  3540.00      -  0.25
  3560.00      -  0.25
  3580.00      -  0.25
  3600.00      -  0.25
  3620.00      -  0.25
  3640.00      -  0.26
  3660.00      -  0.26
  3680.00      -  0.26
  3700.00      -  0.26
  3720.00      -  0.26
  3740.00      -  0.26
  3760.00      -  0.26
  3780.00      -  0.26
  3800.00      -  0.26
  3820.00      -  0.26
  3840.00      -  0.26
  3860.00      -  0.26
  3880.00      -  0.28
  3900.00      -  0.28
  3920.00      -  0.28
  3940.00      -  0.28
  3960.00      -  0.28
  3980.00      -  0.28
  4000.00      -  0.28
  4020.00      -  0.28
  4040.00      -  0.28
```

BACKGROUND DATA COLLECTION

Pump on (between 4080.00 and 4100.00) — Drawdown Period

Pump off (between 8420.00 and 8440.00) — Recovery Phase

4060.00	-	0.28	5500.00	-	0.39	6940.00	-	0.50	8380.00	-	0.60
4080.00	-	0.28	5520.00	-	0.39	6960.00	-	0.50	8400.00	-	0.60
4100.00	-	0.28	5540.00	-	0.39	6980.00	-	0.50	8420.00	-	0.60
4120.00	-	0.28	5560.00	-	0.39	7000.00	-	0.50	8440.00	-	0.60
4140.00	-	0.26	5580.00	-	0.39	7020.00	-	0.50	8460.00	-	0.60
4160.00	-	0.28	5600.00	-	0.39	7040.00	-	0.50	8480.00	-	0.58
4180.00	-	0.28	5620.00	-	0.39	7060.00	-	0.50	8500.00	-	0.56
4200.00	-	0.28	5640.00	-	0.37	7080.00	-	0.50	8520.00	-	0.55
4220.00	-	0.28	5660.00	-	0.37	7100.00	-	0.48	8540.00	-	0.55
4240.00	-	0.28	5680.00	-	0.36	7120.00	-	0.48	8560.00	-	0.55
4260.00	-	0.26	5700.00	-	0.37	7140.00	-	0.47	8580.00	-	0.56
4280.00	-	0.28	5720.00	-	0.37	7160.00	-	0.47	8600.00	-	0.56
4300.00	-	0.26	5740.00	-	0.37	7180.00	-	0.47	8620.00	-	0.56
4320.00	-	0.26	5760.00	-	0.36	7200.00	-	0.45	8640.00	-	0.55
4340.00	-	0.26	5780.00	-	0.36	7220.00	-	0.45	8660.00	-	0.55
4360.00	-	0.26	5800.00	-	0.36	7240.00	-	0.45	8680.00	-	0.56
4380.00	-	0.28	5820.00	-	0.36	7260.00	-	0.45	8700.00	-	0.55
4400.00	-	0.25	5840.00	-	0.36	7280.00	-	0.45	8720.00	-	0.56
4420.00	-	0.28	5860.00	-	0.36	7300.00	-	0.45	8740.00	-	0.56
4440.00	-	0.28	5880.00	-	0.36	7320.00	-	0.45	8760.00	-	0.56
4460.00	-	0.28	5900.00	-	0.36	7340.00	-	0.47	8780.00	-	0.56
4480.00	-	0.28	5920.00	-	0.36	7360.00	-	0.47	8800.00	-	0.56
4500.00	-	0.28	5940.00	-	0.36	7380.00	-	0.47	8820.00	-	0.58
4520.00	-	0.28	5960.00	-	0.36	7400.00	-	0.47	8840.00	-	0.58
4540.00	-	0.28	5980.00	-	0.37	7420.00	-	0.47	8860.00	-	0.60
4560.00	-	0.28	6000.00	-	0.37	7440.00	-	0.47	8880.00	-	0.60
4580.00	-	0.28	6020.00	-	0.37	7460.00	-	0.48	8900.00	-	0.60
4600.00	-	0.28	6040.00	-	0.37	7480.00	-	0.48	8920.00	-	0.60
4620.00	-	0.28	6060.00	-	0.39	7500.00	-	0.48	8940.00	-	0.61
4640.00	-	0.28	6080.00	-	0.39	7520.00	-	0.48	8960.00	-	0.61
4660.00	-	0.30	6100.00	-	0.41	7540.00	-	0.50	8980.00	-	0.63
4680.00	-	0.31	6120.00	-	0.41	7560.00	-	0.50	9000.00	-	0.63
4700.00	-	0.31	6140.00	-	0.41	7580.00	-	0.52	9020.00	-	0.63
4720.00	-	0.31	6160.00	-	0.42	7600.00	-	0.52	9040.00	-	0.63
4740.00	-	0.31	6180.00	-	0.44	7620.00	-	0.53	9060.00	-	0.64
4760.00	-	0.33	6200.00	-	0.44	7640.00	-	0.53	9080.00	-	0.64
4780.00	-	0.33	6220.00	-	0.44	7660.00	-	0.53	9100.00	-	0.64
4800.00	-	0.33	6240.00	-	0.45	7680.00	-	0.53	9120.00	-	0.64
4820.00	-	0.33	6260.00	-	0.45	7700.00	-	0.53	9140.00	-	0.64
4840.00	-	0.34	6280.00	-	0.45	7720.00	-	0.53	9160.00	-	0.64
4860.00	-	0.33	6300.00	-	0.45	7740.00	-	0.53	9180.00	-	0.64
4880.00	-	0.34	6320.00	-	0.45	7760.00	-	0.53	9200.00	-	0.64
4900.00	-	0.34	6340.00	-	0.45	7780.00	-	0.55	9220.00	-	0.64
4920.00	-	0.34	6360.00	-	0.45	7800.00	-	0.55	9240.00	-	0.64
4940.00	-	0.34	6380.00	-	0.45	7820.00	-	0.55	9260.00	-	0.66
4960.00	-	0.34	6400.00	-	0.45	7840.00	-	0.55	9280.00	-	0.66
4980.00	-	0.34	6420.00	-	0.47	7860.00	-	0.55	9300.00	-	0.66
5000.00	-	0.34	6440.00	-	0.47	7880.00	-	0.55	9320.00	-	0.66
5020.00	-	0.34	6460.00	-	0.47	7900.00	-	0.55	9340.00	-	0.66
5040.00	-	0.34	6480.00	-	0.47	7920.00	-	0.56	9360.00	-	0.66
5060.00	-	0.36	6500.00	-	0.47	7940.00	-	0.56	9380.00	-	0.66
5080.00	-	0.36	6520.00	-	0.47	7960.00	-	0.56	9400.00	-	0.66
5100.00	-	0.36	6540.00	-	0.47	7980.00	-	0.56	9420.00	-	0.66
5120.00	-	0.36	6560.00	-	0.47	8000.00	-	0.56	9440.00	-	0.66
5140.00	-	0.36	6580.00	-	0.47	8020.00	-	0.56	9460.00	-	0.67
5160.00	-	0.36	6600.00	-	0.48	8040.00	-	0.56	9480.00	-	0.67
5180.00	-	0.37	6620.00	-	0.48	8060.00	-	0.56	9500.00	-	0.67
5200.00	-	0.37	6640.00	-	0.48	8080.00	-	0.56	9520.00	-	0.67
5220.00	-	0.37	6660.00	-	0.48	8100.00	-	0.56	9540.00	-	0.67
5240.00	-	0.37	6680.00	-	0.48	8120.00	-	0.56	9560.00	-	0.67
5260.00	-	0.37	6700.00	-	0.48	8140.00	-	0.58	9580.00	-	0.67
5280.00	-	0.37	6720.00	-	0.48	8160.00	-	0.58	9600.00	-	0.67
5300.00	-	0.37	6740.00	-	0.48	8180.00	-	0.58	9620.00	-	0.67
5320.00	-	0.37	6760.00	-	0.48	8200.00	-	0.58	9640.00	-	0.67
5340.00	-	0.37	6780.00	-	0.48	8220.00	-	0.58	9660.00	-	0.67
5360.00	-	0.37	6800.00	-	0.48	8240.00	-	0.58	9680.00	-	0.67
5380.00	-	0.37	6820.00	-	0.48	8260.00	-	0.60	9700.00	-	0.69
5400.00	-	0.39	6840.00	-	0.48	8280.00	-	0.60	9720.00	-	0.67
5420.00	-	0.39	6860.00	-	0.48	8300.00	-	0.60	9740.00	-	0.67
5440.00	-	0.39	6880.00	-	0.50	8320.00	-	0.60	9760.00	-	0.69
5460.00	-	0.39	6900.00	-	0.50	8340.00	-	0.60	9780.00	-	0.69
5480.00	-	0.39	6920.00	-	0.50	8360.00	-	0.60	9800.00	-	0.69

C — RECOVERY

RECOVERY PHASE

```
9820.00     -   0.71
9840.00     -   0.71
9860.00     -   0.71
9880.00     -   0.71
9900.00     -   0.71
9920.00     -   0.71
9940.00     -   0.69
9960.00     -   0.69
9980.00     -   0.71
10000.0     -   0.69
10020.0     -   0.71
10040.0     -   0.67
10060.0     -   0.66
10080.0     -   0.67
10100.0     -   0.67
10120.0     -   0.67
10140.0     -   0.67
10160.0     -   0.67
10180.0     -   0.69
10200.0     -   0.69
10220.0     -   0.69
10240.0     -   0.69
10260.0     -   0.69
10280.0     -   0.69
10300.0     -   0.69
10320.0     -   0.71
10340.0     -   0.71
10360.0     -   0.72
10380.0     -   0.72
10400.0     -   0.72
10420.0     -   0.72
10440.0     -   0.72
10460.0     -   0.72
10480.0     -   0.74
10500.0     -   0.74
10520.0     -   0.74
10540.0     -   0.74
10560.0     -   0.74
10580.0     -   0.74
10600.0     -   0.75
10620.0     -   0.74
10640.0     -   0.75
10660.0     -   0.75
10680.0     -   0.75
10700.0     -   0.75
10720.0     -   0.75
10740.0     -   0.75
10760.0     -   0.75
10780.0     -   0.75
10800.0     -   0.75
10820.0     -   0.77
10840.0     -   0.77
10860.0     -   0.77
10880.0     -   0.77
10900.0     -   0.77
10920.0     -   0.77
10940.0     -   0.77
10960.0     -   0.77
10980.0     -   0.77
11000.0     -   0.77
11020.0     -   0.77
11040.0     -   0.77
11060.0     -   0.77
11080.0     -   0.79
11100.0     -   0.79
11120.0     -   0.79
11140.0     -   0.79
11160.0     -   0.79
11180.0     -   0.79
11200.0     -   0.79
11220.0     -   0.79
11240.0     -   0.79
11260.0     -   0.80
11280.0     -   0.80
11300.0     -   0.79
```

RECOVERY PHASE

```
11320.0     -   0.80
11340.0     -   0.80
11360.0     -   0.80
11380.0     -   0.79
11400.0     -   0.79
11420.0     -   0.79
11440.0     -   0.79
11460.0     -   0.79
11480.0     -   0.79
11500.0     -   0.79
11520.0     -   0.79
11540.0     -   0.79
11560.0     -   0.77
11580.0     -   0.79
11600.0     -   0.77
11620.0     -   0.77
11640.0     -   0.77
11660.0     -   0.77
11680.0     -   0.77
11700.0     -   0.77
11720.0     -   0.77
11740.0     -   0.77
11760.0     -   0.77
11780.0     -   0.79
11800.0     -   0.79
11820.0     -   0.79
11840.0     -   0.79
11860.0     -   0.80
11880.0     -   0.80
11900.0     -   0.82
11920.0     -   0.83
11940.0     -   0.83
11960.0     -   0.83
11980.0     -   0.85
12000.0     -   0.85
12020.0     -   0.85
12040.0     -   0.85
12060.0     -   0.85
12080.0     -   0.85
12100.0     -   0.86
12120.0     -   0.86
12140.0     -   0.86
12160.0     -   0.86
12180.0     -   0.86
12200.0     -   0.86
12220.0     -   0.86
12240.0     -   0.86
12260.0     -   0.86
12280.0     -   0.86
12300.0     -   0.88
12320.0     -   0.88
12340.0     -   0.86
12360.0     -   0.88
12380.0     -   0.88
12400.0     -   0.88
12420.0     -   0.88
12440.0     -   0.88
12460.0     -   0.88
12480.0     -   0.88
12500.0     -   0.88
12520.0     -   0.88
12540.0     -   0.88
12560.0     -   0.88
12580.0     -   0.88
12600.0     -   0.88
12620.0     -   0.88
12640.0     -   0.90
12660.0     -   0.88
12680.0     -   0.88
12700.0     -   0.88
12720.0     -   0.88
12740.0     -   0.88
12760.0     -   0.88
12780.0     -   0.88
12800.0     -   0.86
```

RECOVERY PHASE

```
12820.0     -   0.86
12840.0     -   0.86
12860.0     -   0.86
12880.0     -   0.86
12900.0     -   0.85
12920.0     -   0.85
12940.0     -   0.85
12960.0     -   0.85
12980.0     -   0.85
13000.0     -   0.85
13020.0     -   0.85
13040.0     -   0.85
13060.0     -   0.85
13080.0     -   0.85
13100.0     -   0.85
13120.0     -   0.85
13140.0     -   0.85
13160.0     -   0.85
13180.0     -   0.85
13200.0     -   0.86
13220.0     -   0.85
13240.0     -   0.86
13260.0     -   0.86
13280.0     -   0.88
13300.0     -   0.88
13320.0     -   0.88
13340.0     -   0.90
13360.0     -   0.90
13380.0     -   0.90
13400.0     -   0.91
13420.0     -   0.91
13440.0     -   0.91
13460.0     -   0.93
13480.0     -   0.93
13500.0     -   0.93
13520.0     -   0.93
13540.0     -   0.93
13560.0     -   0.93
13580.0     -   0.93
13600.0     -   0.93
13620.0     -   0.93
13640.0     -   0.93
13660.0     -   0.93
13680.0     -   0.93
13700.0     -   0.93
13720.0     -   0.93
13740.0     -   0.94
13760.0     -   0.94
13780.0     -   0.94
13800.0     -   0.94
13820.0     -   0.94
13840.0     -   0.94
13860.0     -   0.94
13880.0     -   0.94
13900.0     -   0.94
13920.0     -   0.94
13940.0     -   0.94
13960.0     -   0.94
13980.0     -   0.94
14000.0     -   0.94
14020.0     -   0.94
14040.0     -   0.94
14060.0     -   0.94
14080.0     -   0.94
14100.0     -   0.94
14120.0     -   0.94
14140.0     -   0.94
14160.0     -   0.94
14180.0     -   0.94
14200.0     -   0.94
14220.0     -   0.96
14240.0     -   0.96
14260.0     -   0.96
END
```

FLUID LEVEL MEASUREMENTS
SECTION 25 AND SECTION 35 PUMP TESTS
(Data Used in Figures 2 and 3)

Well Numbers	Water Level Feet Above MSL	Date of Measurement
25-581	5143.04	1/86
25-582	5142.68	1/86
25-583	5146.75	1/86
25-584	5142.56	1/86
25-585	5155.47	3/86
25-586	5131.39	4/86
25-593	5196.90	9/86
25-582A	5089.93	9/86
35-736	5176.04	1/86
35-737	5178.82	1/86
35-738	5174.23	3/86
35-739	5173.72	1/86
35-740	5162.07	1/86
35-741	5163.64	1/86
35-742	5170.42	1/86
35-737A	5195.22	1/88

APPENDIX C

Transmissivity and Storage Coefficient Calculations

THEIS LOG-LOG SOLUTION (EARLY TIME DATA)

$T = \frac{114.6Q}{s} W(u) = \text{gpd/ft}$ $S = \frac{uTt}{1.87r^2}$

Q = gpm
s = feet
r = feet
t = days

SECTION 25

Q = 50 gpm W(u) = 1 1/u = 1

Well #25-581:

s = 3.0
t = 0.001
r = 75

$$T = \frac{114.6(50)}{(3.0)}(1) = \underline{1910\ \text{gpd/ft}}$$

$$S = \frac{(1)(1910)(0.001)}{1.87(75)^2} = \underline{1.8 \times 10}^{-4}$$

Well #25-582:

s = 5.6
t = 0.006
r = 75

$$T = \frac{114.6(50)}{(5.6)}(1) = \underline{1025\ \text{gpd/ft}}$$

$$S = \frac{(1)(1025)(0.006)}{1.87(75)^2} = \underline{6 \times 10}^{-4}$$

Well #25-583:

s = 5.6
t = 0.006
r = 68

$$T = \frac{114.6(50)}{(5.4)}(1) = \underline{1060\ \text{gpd/ft}}$$

$$S = \frac{(1)(1060)(0.006)}{1.87(68)^2} = \underline{6 \times 10}^{-4}$$

SECTION 35

Q = 8.0 gpm W(u) = 1 1/u = 1

Well #35-736:

s = 10
t = 0.014
r = 71

$$T = \frac{114.6(8)}{10}(1) = \underline{92\ \text{gpd/ft}}$$

$$S = \frac{(1)(92)(0.014)}{1.87(71)^2} = \underline{1 \times 10}^{-4}$$

Well #35-737:

$s = 14$
$t = 0.009$
$r = 72$

$$T = \frac{114.6(8)}{14}(1) = \underline{65\ \text{gpd/ft}}$$

$$S = \frac{(1)(65)(0.009)}{1.87(72)^2} = \underline{6\ X\ 10}^{-5}$$

Well # 35-738:

$s = 11.5$
$t = 0.013$
$r = 71$

$$T = \frac{114.6(8)}{11.5}(1) = \underline{80\ \text{gpd/ft}}$$

$$S = \frac{(1)(80)(0.013)}{1.87(71)^2} = \underline{1\ X\ 10}^{-4}$$

JACOB SEMI-LOG SOLUTION

$$T = \frac{264Q}{s} = \text{gpd/ft} \qquad S = \frac{0.3\ Tt_o}{r^2}$$

Q = gpm
s = feet
r = feet
t_o = days

SECTION 25: Q = 50 gpm

Well #25-581:

$s = 6.1$
$t_o = 0.001$
$r = 75$

$$T = \frac{264(50)}{(6.1)} = \underline{2160\ \text{gpd/ft}}$$

$$S = \frac{0.3(2160)(0.001)}{(75)^2} = \underline{1\ X\ 10}^{-4}$$

Well #25-582:

$s = 10.25$
$t_o = 0.006$
$r = 75$

$$T = \frac{264(50)}{(10.25)} = \underline{1290\ \text{gpd/ft}}$$

$$S = \frac{0.3(1290)(0.006)}{(75)^2} = \underline{5\ X\ 10}^{-4}$$

Well #25-583:

$s = 10.25$

$t_o = 0.006$

$r = 68$

$$T = \frac{264(50)}{(10.25)} = \underline{1290 \text{ gpd/ft}}$$

$$S = \frac{0.3(1290)(0.006)}{(68)^2} = \underline{5 \text{ X } 10}^{-4}$$

<u>SECTION 35</u>: Q = 8 gpm

Well #35-736:

$s = 14.0$

$t_o = 0.008$

$r = 71$

$$T = \frac{264(8)}{(14)} = \underline{150 \text{ gpd/ft}}$$

$$S = \frac{0.3(150)(0.008)}{(71)^2} = \underline{7 \text{ X } 10}^{-5}$$

Well #35-737:

$s = 15$

$t_o = 0.011$

$r = 72$

$$T = \frac{264(8)}{(15)} = \underline{140 \text{ gpd/ft}}$$

$$S = \frac{0.3(140)(0.011)}{(72)^2} = \underline{9 \text{ X } 10}^{-5}$$

Well #35-738:

$s = 21$

$t = 0.013$

$r = 71$

$$T = \frac{264(8)}{(21)} = \underline{100 \text{ gpd/ft}}$$

$$S = \frac{0.3(100)(0.013)}{(71)^2} = \underline{8 \text{ X } 10}^{-5}$$

AVERAGES		T(GPD/FT)			
		Log-Log	Semi-Log	Average	T(ft^2/day)
SECTION 25:					
	25-581	1910	2160	2035	272
	25-582	1025	1290	1160	155
	25-583	1060	1290	1175	157
SECTION 35:					
	35-736	92	150	121	16
	35-737	65	140	102	14
	35-738	80	100	90	12
		S (DIMENSIONLESS)			
SECTION 25:					
	25-581	$2 X 10^{-4}$	$1 X 10^{-4}$	$1.8 X 10^{-4}$	-
	25-582	$6 X 10^{-4}$	$4 X 10^{-4}$	$5 X 10^{-4}$	-
	25-583	$6 X 10^{-4}$	$5 X 10^{-4}$	$5.5 X 10^{-4}$	-
SECTION 35:					
	35-736	$1 X 10^{-4}$	$7 X 10^{-5}$	$8.5 X 10^{-5}$	-
	35-737	$6 X 10^{-5}$	$9 X 10^{-5}$	$7.5 X 10^{-5}$	-
	35-738	$1 X 10^{-4}$	$8 X 10^{-5}$	$9 X 10^{-5}$	-

APPENDIX C

Transmissivity and Storage Coefficient Calculations

THEIS LOG-LOG SOLUTION (EARLY TIME DATA)

$T = \frac{114.6Q}{s} W(u) = gpd/ft$ $S = \frac{uTt}{1.87r^2}$

Q = gpm
s = feet
r = feet
t = days

SECTION 25

Q = 50 gpm W(u) = 1 1/u = 1

Well #25-581:

s = 3.0
t = 0.001
r = 75

$$T = \frac{114.6(50)}{(3.0)} (1) = \underline{1910\ gpd/ft}$$

$$S = \frac{(1)(1910)(0.001)}{1.87(75)^2} = \underline{1.8 X 10}^{-4}$$

Well #25-582:

s = 5.6
t = 0.006
r = 75

$$T = \frac{114.6(50)}{(5.6)} (1) = \underline{1025\ gpd/ft}$$

$$S = \frac{(1)(1025)(0.006)}{1.87(75)^2} = \underline{6 X 10}^{-4}$$

Well #25-583:

s = 5.6
t = 0.006
r = 68

$$T = \frac{114.6(50)}{(5.4)} (1) = \underline{1060\ gpd/ft}$$

$$S = \frac{(1)(1060)(0.006)}{1.87(68)^2} = \underline{6 X 10}^{-4}$$

SECTION 35

Q = 8.0 gpm W(u) = 1 1/u = 1

Well #35-736:

s = 10
t = 0.014
r = 71

$$T = \frac{114.6(8)}{10} (1) = \underline{92\ gpd/ft}$$

$$S = \frac{(1)(92)(0.014)}{1.87(71)^2} = \underline{1 X 10}^{-4}$$

Well #35-737:

$s = 14$
$t = 0.009$
$r = 72$

$$T = \frac{114.6(8)}{14}(1) = \underline{65 \text{ gpd/ft}}$$

$$S = \frac{(1)(65)(0.009)}{1.87(72)^2} = \underline{6 \text{ X } 10}^{-5}$$

Well # 35-738:

$s = 11.5$
$t = 0.013$
$r = 71$

$$T = \frac{114.6(8)}{11.5}(1) = \underline{80 \text{ gpd/ft}}$$

$$S = \frac{(1)(80)(0.013)}{1.87(71)^2} = \underline{1 \text{ X } 10}^{-4}$$

JACOB SEMI-LOG SOLUTION

$$T = \frac{264Q}{s} = \text{gpd/ft} \qquad S = \frac{0.3\ Tt_o}{r^2}$$

Q = gpm
s = feet
r = feet
t_o = days

SECTION 25: Q = 50 gpm

Well #25-581:

$s = 6.1$
$t_o = 0.001$
$r = 75$

$$T = \frac{264(50)}{(6.1)} = \underline{2160 \text{ gpd/ft}}$$

$$S = \frac{0.3(2160)(0.001)}{(75)^2} = \underline{1 \text{ X } 10}^{-4}$$

Well #25-582:

$s = 10.25$
$t_o = 0.006$
$r = 75$

$$T = \frac{264(50)}{(10.25)} = \underline{1290 \text{ gpd/ft}}$$

$$S = \frac{0.3(1290)(0.006)}{(75)^2} = \underline{5 \text{ X } 10}^{-4}$$

Well #25-583: $s = 10.25$ $t_o = 0.006$ $r = 68$

$$T = \frac{264(50)}{(10.25)} = \underline{1290 \text{ gpd/ft}}$$

$$S = \frac{0.3(1290)(0.006)}{(68)^2} = \underline{5 \text{ X } 10}^{-4}$$

SECTION 35: $Q = 8$ gpm

Well #35-736: $s = 14.0$ $t_o = 0.008$ $r = 71$

$$T = \frac{264(8)}{(14)} = \underline{150 \text{ gpd/ft}}$$

$$S = \frac{0.3(150)(0.008)}{(71)^2} = \underline{7 \text{ X } 10}^{-5}$$

Well #35-737: $s = 15$ $t_o = 0.011$ $r = 72$

$$T = \frac{264(8)}{(15)} = \underline{140 \text{ gpd/ft}}$$

$$S = \frac{0.3(140)(0.011)}{(72)^2} = \underline{9 \text{ X } 10}^{-5}$$

Well #35-738: $s = 21$ $t = 0.013$ $r = 71$

$$T = \frac{264(8)}{(21)} = \underline{100 \text{ gpd/ft}}$$

$$S = \frac{0.3(100)(0.013)}{(71)^2} = \underline{8 \text{ X } 10}^{-5}$$

AVERAGES		T(GPD/FT)			
		Log-Log	Semi-Log	Average	T(ft^2/day)
SECTION 25:					
	25-581	1910	2160	2035	272
	25-582	1025	1290	1160	155
	25-583	1060	1290	1175	157
SECTION 35:					
	35-736	92	150	121	16
	35-737	65	140	102	14
	35-738	80	100	90	12
		S (DIMENSIONLESS)			
SECTION 25:					
	25-581	2×10^{-4}	1×10^{-4}	1.8×10^{-4}	-
	25-582	6×10^{-4}	4×10^{-4}	5×10^{-4}	-
	25-583	6×10^{-4}	5×10^{-4}	5.5×10^{-4}	-
SECTION 35:					
	35-736	1×10^{-4}	7×10^{-5}	8.5×10^{-5}	-
	35-737	6×10^{-5}	9×10^{-5}	7.5×10^{-5}	-
	35-738	1×10^{-4}	8×10^{-5}	9×10^{-5}	-

APPENDIX D

Application of Ratio Method to K' Calculations

LEAKAGE CALCULATIONS

Neuman and Witherspoon (1972) - Ratio Method

Parameters:

T = Transmissivity of aquifer (ft^2/day)

S = Storage coefficient of aquifer (dimensionless)

S_s' = Specific storage of confining layer (ft^{-1})

s = Drawdown in aquifer observation well (ft)

s' = Drawdown in confining layer observation well (ft)

t = Time since pumping of aquifer started (days)

r = Distance to observation well from pumping well (ft)

K' = Vertical permeability of confining layer (ft/day)

Z' = Distance from middle of confining layer observation well screen to aquifer-aquitard interface (ft)

b' = Thickness of confining layer (ft)

Calculation of K':

1. solve the ratio s'/s at distance r and time t
2. solve $t_D = Tt/Sr^2$
3. find value of t_D' from graph of type curves t_D, (s'/s vs t_D')
4. solve $\alpha' = \left(\frac{Z^2}{t}\right) t_D'$
5. $K' = \alpha' S_s'$

SECTION 25

- No drawdowns were observed in confining layers (shale) observation wells; values of s' are assumed to illustrate a worse case scenario.

A. OVERLYING SHALE LAYER $S's = 1.9 \times 10^{-6}\ ft^{-1}$

Well #25-593 $s' = 0.5$ ft $r' = 75$ ft
$z' = 5.5$ ft $t = 2$ day

Well #25-582 $s = 19.0$ ft $T = 155\ ft^2/day$
$r = 75$ ft $S = 5 \times 10^{-4}$

1. $s'/s = (0.5)/(19.0) = 0.03$

2. $t_D = (155)(2)/(5 \times 10^{-4})(75)^2 = 110$

3. $t'_D = 0.15$

4. $\alpha' = \genfrac{}{}{0pt}{}{(5.5^2)}{2}\ (0.15) = 2.3$

5. $K' = (2.3)(1.9 \times 10^{-6} ft^{-1}) = \underline{4 \times 10}^{-6}$ ft/day $= \underline{1.7 \times 10}^{-9}$ cm/sec

B. UNDERLYING SHALE LAYER $S_s' = 1.2 \times 10^{-6} ft^{-1}$

Well #25-582'A' $s' = 0.5$ ft $r' = 75$ ft
$z' = 19.0$ $t = 2$ days

Well #25-582 $s = 19.0$ ft $T = 155\ ft^2/day$
$r = 75$ ft $S = 5 \times 10^{-4}$

1. $s'/s = (0.5)/(19.0) = 0.03$
2. $t_D = (155)(2)/(5 \times 10^{-4})(75^2) = 110$
3. $t_D' = 0.15$
4. $\alpha = \frac{(19^2)(0.15)}{2} = 27.1$
5. $K = (27.1)(1.2 \times 10^{-6}) = \underline{3.2 \times 10}^{-8}$ ft/day $= \underline{1.3 \times 10}^{-3}$ cm/sec

SECTION 35

- Drawdown observed and corrected (actual) in overlying shale well. No drawdown observed in underlying shale well; s' value is assumed to illustrate a worse case scenario.

A. OVERLYING SHALE LAYER $S_s' = 1.9 \times 10^{-6}$

Well #35-742 $s' = 0.5$ $r' = 72$ ft

$z' = 11$ ft $t = 2.8$ day (4,000 min)

Well #35-737 $s = 43.0$ ft $T = 14\ \text{ft}^2/\text{day}$

$r = 72$ ft $S = 7.5 \times 10^{-5}$

1. $s'/s = (0.5)/(43) = 0.01$
2. $t_D = (14)(2.8)/(7.5 \times 10^{-5})(72^2) = 101$
3. $t_D' = 0.09$
4. $\alpha' = \dfrac{(11^2)(0.09)}{2.8} = 3.9$
5. $K' = (3.9)(1.9 \times 10^{-6}) = \underline{7.4 \times 10}^{-6}$ ft/day $= \underline{3 \times 10}^{-9}$ cm/sec

@ t = 3.9 days (5600 min.)

$s' = 0.87$ ft

$s = 48.5$

1. $s'/s = (0.87)/(48.5) = 0.02$
2. $t_D = (14)(3.9)/(7.5 \times 10^{-5})(72^2) = 140$
3. $t_D' = 0.12$
4. $\alpha' = \dfrac{(5.5^2)(0.12)}{3.9} = 0.93$
5. $K' = (0.93)(1.9 \times 10^{-6}) = \underline{1.7 \times 10}^{-6}$ ft/day $= \underline{6.8 \times 10}^{-10}$ cm/sec

B. UNDERLYING SHALE LAYER

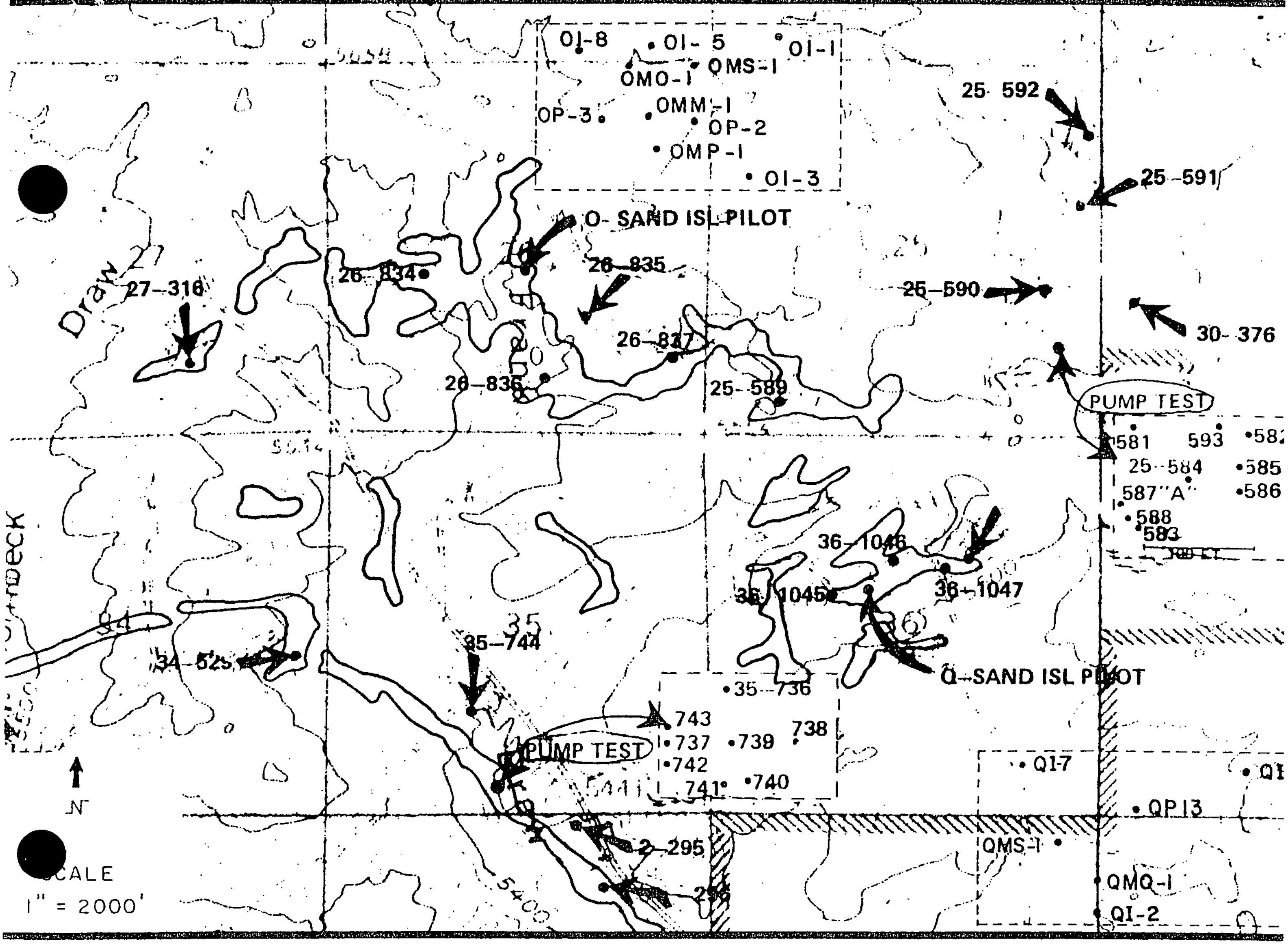
$S'_s = 1.2 \text{ X } 10^{-6} \text{ ft}^{-1}$

- No drawdowns observed in confining layer observation well; value of s' is assumed to illustrate a worse case scenario.

Well #35-737'A'
$s' = 0.5$ ft $\quad t = 2.8$ day
$z' = 14$ ft $\quad r = 72$ ft

Well #35-737
$s = 43.0$ ft $\quad T = 14 \text{ ft}^2/\text{day}$
$r = 72$ ft $\quad S = 7.5 \text{ X } 10^{-5}$

1. $s'/s = 0.5/43.0 = 0.01$
2. $t_D = (14)(2.8)/(7.5 \text{ X } 10^{-5})(72^2) = 101$
3. $t'_D = 0.09$
4. $\alpha' = \left(\frac{14^2}{2.8}\right)(0.09) = 6.3$
5. $K' = (6.3)(1.2 \text{ X } 10^{-6}) = \underline{7.2 \text{ X } 10}^{-6}$ ft/day $= \underline{2.9 \text{ X } 10}^{-9}$ cm/sec



RE-ANALYSIS OF THE SMITH RANCH ISL PUMP TESTS

RE-ANALYSIS OF THE
SMITH RANCH ISL
PUMP TESTS

FOR:

RIO ALGOM MINING

BY:

HYDRO-ENGINEERING

APRIL, 1990

Tom Quinn

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HYDROLOGIST

George J. Hoffman

GEORGE J. HOFFMAN, P.E.
HYDROLOGIST

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1.0 INTRODUCTION AND SUMMARY

In order to evaluate aquifer and aquitard parameters in the mine permit area, there have been five pump tests performed. The first of which was conducted in 1974 to evaluate the sinking and development of the Bill Smith Mine. The other four pump tests followed in the Q-Sand ISL pilot site, the O-Sand ISL pilot site, section 25 and section 35. The latter four pump tests have been reanalyzed by Hydro-Engineering (HYDRO), with the results of this analysis presented herein. Chapter 6 lists the reports that present the previous analysis of these tests.

The analysis performed by HYDRO is significantly different in several aspects. Due to the relatively significant well depths, bottom hole locations were used rather than surface locations where possible. Both well storage and prior trend effects with the exception of the O-sands, were not taken into account in previous analysis. As a result of factoring in prior trend data and recognizing well storage effects, the transmissivity values calculated are generally more homogeneous and constant than in the prior studies. Recovery data was carefully analyzed and proved to be remarkably consistent, therefore providing a check and redundancy to the drawdown analysis.

These factors led to a difference in the analysis of the data. Rather than use the "Modified Hantush" or the "Hantush-Jacob" methods of determining aquifer parameters under "leaky, confined" conditions, the "Theis log-log" and "Jacob straight line" methods were utilized. All available data was reanalyzed including vertical permeability calculations. Due to the fact that this reanalysis did not indicate "leaky" conditions, a vertical permeability value was not obtained from the "modified Hantush" curve matching. Therefore, the Neuman-Witherspoon ratio analysis was used to calculate vertical permeability.

A summary of this pump test reanalysis is presented in Tables 1-1 and 1-2.

TABLE 1-1 REPRESENTATIVE AQUIFER PROPERTIES AT SMITH RANCH

AQUIFER	THICKNESS FT.	T GPD/FT	T M^2/DAY	K GPD/FT^2	K FT/DAY	K MILLIDCY	K CM/SEC	S
Q-SAND	30	1000	12.4	33.3	4.5	1629.4	1.6E-03	4.8E-05
O-SAND	243	7230	89.7	29.8	4.0	1454.4	1.4E-03	1.2E-04
SCT 25	28	2115	26.2	75.5	10.1	3692.4	3.6E-03	1.2E-04
SCT 35	65	134	1.7	2.1	0.3	100.8	9.8E-05	7.0E-05

TABLE 1-2 SUMMARY OF AQUIFER PROPERTIES AT SMITH RANCH

SEMI-LOG (STRAIGHT LINE)
Q-SANDS

WELL NO.	AQUIFER	RADIUS FT.	THICKNESS FT.	T GPD/FT	T M^2/DAY	K GPD/FT^2	K FT/DAY	K MILLIDCY	K CM/SEC	S
QP-3	Q-SAND		30	1120	13.9	37.3	5.0	1825.0	1.8E-03	
QI-2	Q-SAND	171	30	1000	12.4	33.3	4.5	1629.4	1.6E-03	5.0E-05
QI-7	Q-SAND	160	30	1083	13.4	36.1	4.8	1764.7	1.7E-03	2.8E-05
QI-11	Q-SAND	155.5	30	961	11.9	32.0	4.3	1565.9	1.5E-03	6.2E-05
						O-SANDS				
OP-3	O SAND	119.2	243	7449	92.4	30.7	4.1	1498.5	1.4E-03	1.8E-04
OI-1	O SAND	191.5	243	6772	84.0	27.9	3.7	1362.3	1.3E-03	1.6E-04
OI-3	O SAND	84.6	243	7232	89.7	29.8	4.0	1454.8	1.4E-03	1.4E-04
OI-5	O SAND	85.8	243	7449	92.4	30.7	4.1	1498.5	1.4E-03	1.3E-04
OI-8	O SAND	190.4	243	7232	89.7	29.8	4.0	1454.8	1.4E-03	1.8E-04
						SECTION 25 PHASE II				
25-584	SCT 25		28	2324	28.8	83.0	11.1	4057.3	3.9E-03	
25-581	SCT 25	73	28	2113	26.2	75.5	10.1	3688.9	3.6E-03	1.4E-04
25-582	SCT 25	66	28	2388	29.6	85.3	11.4	4169.0	4.0E-03	7.7E-05
25-583	SCT 25	70	28	1984	24.6	70.9	9.5	3463.7	3.4E-03	4.1E-05
						SECTION 25, PHASE II RETEST				
25-584	SCT 25		28	2617	32.5	93.5	12.5	4568.8	4.4E-03	
25-583	SCT 25	70	28	1955	24.2	69.8	9.4	3413.1	3.3E-03	1.7E-04
						SECTION 25, SHALE COMMUNICATION TEST				
25-584	SCT 25		28	2186	27.1	78.1	10.5	3816.4	3.7E-03	
25-581	SCT 25	73	28	2124	26.3	75.9	10.2	3708.1	3.6E-03	1.1E-04
						SECTION 35, PHASE I				
35-739	SCT 35		65	96	1.2	1.5	0.2	72.2	7.0E-05	
35-737	SCT 35	64	65	149	1.8	2.3	0.3	112.1	1.1E-04	9.8E-05
						SECTION 35, PHASE II				
35-739	SCT 35		65	118	1.5	1.8	0.2	88.7	8.6E-05	
35-736	SCT 35	72	65	131	1.6	2.0	0.3	98.5	9.5E-05	2.1E-05
35-737	SCT 35	64	65	139	1.7	2.1	0.3	104.5	1.0E-04	1.0E-04
35-738	SCT 35	71	65	120	1.5	1.8	0.2	90.2	8.7E-05	6.0E-05
						SECTION 35, UNDERLYING SHALE				
35-739	SCT 35		65	117	1.5	1.8	0.2	88.0	8.5E-05	
35-736	SCT 35	72	65	117	1.5	1.8	0.2	88.0	8.5E-05	3.9E-05

TABLE 1-2 SUMMARY OF AQUIFER PROPERTIES AT SMITH RANCH (CONTINUED)

LOG-LOG (THEIS)

WELL NO.	AQUIFER	RADIUS FT.	THICKNESS FT.	T GPD/FT	T M^2/DAY	K GPD/FT^2	K FT/DAY	K MILLIDCY	K CM/SEC	S
Q-SANDS										
QI-2	Q-SAND	171	30	957	11.9	31.9	4.3	1559.4	1.5E-03	6.1E-05
QI-7	Q-SAND	160	30	1007	12.5	33.6	4.5	1640.8	1.6E-03	3.4E-05
QI-11	Q-SAND	155.5	30	1007	12.5	33.6	4.5	1640.8	1.6E-03	5.3E-05
O SANDS										
OP-2	O SAND		243	9073	112.5	37.3	5.0	1825.2	1.8E-03	
OP-3	O SAND	119.2	243	6880	85.3	28.3	3.8	1384.0	1.3E-03	6.2E-05
OI-1	O SAND	191.5	243	7236	89.7	29.8	4.0	1455.6	1.4E-03	1.3E-05
OI-3	O SAND	84.6	243	7150	88.7	29.4	3.9	1438.3	1.4E-03	1.4E-04
OI-5	O SAND	85.8	243	7144	88.6	29.4	3.9	1437.1	1.4E-03	1.3E-04
OI-8	O SAND	190.4	243	7725	95.8	31.8	4.3	1554.0	1.5E-03	1.5E-05
SECTION 25 PHASE II										
25-581	SCT 25	73	28	2340	29.0	83.6	11.2	4085.2	4.0E-03	1.1E-04
25-582	SCT 25	66	28	2390	29.6	85.4	11.4	4172.5	4.0E-03	6.8E-05
25-583	SCT 25	70	28	2001	24.8	71.5	9.6	3493.4	3.4E-03	1.5E-04
SECTION 25, PHASE II RETEST										
25-583	SCT 25	70	28	2246	27.9	80.2	10.7	3921.1	3.8E-03	1.4E-04
SECTION 25, SHALE COMMUNICATION TEST										
25-581	SCT 25	73	28	2246	27.9	80.2	10.7	3921.1	3.8E-03	1.1E-04
SECTION 35, PHASE I										
35-737	SCT 35	64	65	167	2.1	2.6	0.3	125.6	1.2E-04	9.6E-05
SECTION 35, PHASE II										
35-736	SCT 35	72	65	128	1.6	2.0	0.3	96.3	9.3E-05	2.4E-05
35-737	SCT 35	64	65	146	1.8	2.2	0.3	109.8	1.1E-04	1.2E-04
35-738	SCT 35	71	65	126	1.6	1.9	0.3	94.8	9.2E-05	6.2E-05
SECTION 35, UNDERLYING SHALE										
35-736	SCT 35	72	65	121	1.5	1.9	0.2	91.0	8.8E-05	3.9E-05

TABLE 1-2 SUMMARY OF AQUIFER PROPERTIES AT SMITH RANCH (CONTINUED)

THEIS RECOVERY
Q-SANDS

	AQUIFER	RADIUS FT.	THICKNESS FT.	T GPD/FT	T M^2/DAY	K GPD/FT^2	K FT/DAY	K MILLIDCY	K CM/SEC
QP-3	Q-SAND	------	30	1005	12.5	33.5	4.5	1637.6	1.6E-03
QI-2	Q-SAND	171	30	973	12.1	32.4	4.3	1585.4	1.5E-03
QI-7	Q-SAND	160	30	1062	13.2	35.4	4.7	1730.5	1.7E-03
QI-11	Q-SAND	155.5	30	963	11.9	32.1	4.3	1569.2	1.5E-03
						O SANDS			
OP-2	O SAND		243	9073	112.5	37.3	5.0	1825.2	1.8E-03
OP-3	O SAND	119.2	243	6880	85.3	28.3	3.8	1384.0	1.3E-03
OI-1	O SAND	191.5	243	7236	89.7	29.8	4.0	1455.6	1.4E-03
OI-3	O SAND	84.6	243	7150	88.7	29.4	3.9	1438.3	1.4E-03
OI-5	O SAND	85.8	243	7144	88.6	29.4	3.9	1437.1	1.4E-03
OI-8	O SAND	190.4	243	7725	95.8	31.8	4.3	1554.0	1.5E-03
						SECTION 25, PHASE II RETEST			
25-584	SCT 25		28	2091	25.9	74.7	10.0	3650.5	3.5E-03
25-581	SCT 25	68	28	2151	26.7	76.8	10.3	3755.3	3.6E-03
25-582	SCT 25	68	28	2006	24.9	71.6	9.6	3502.1	3.4E-03
25-583	SCT 25	68	28	1972	24.5	70.4	9.4	3442.8	3.3E-03
						SECTION 35, PHASE I			
35-737	SCT 35	72	65	137	1.7	2.1	0.3	103.0	1.0E-04
						SECTION 35, PHASE II			
35-739	SCT 35		65	118	1.5	1.8	0.2	88.7	8.6E-05
35-736	SCT 35	71	65	123	1.5	1.9	0.3	92.5	9.0E-05
35-737	SCT 35	72	65	137	1.7	2.1	0.3	103.0	1.0E-04
						SECTION 35, UNDERLYING SHALE			
35-736	SCT 35	71	65	154	1.9	2.4	0.3	115.8	1.1E-04

TABLE 1-3 SUMMARY OF AQUITARD PROPERTIES

WELL		VERTICAL	PERMEABILITY		SPECIFIC STORAGE
NO.	AQUITARD	FT/DAY	FT/YEAR	CM/SEC	1/FT
593	UPPER	1.4E-04	5.1E-02	4.9E-08	1.9E-06
582 'A'	LOWER	6.9E-05	2.5E-02	2.4E-08	1.2E-06
742	UPPER	3.2E-05	1.2E-02	1.1E-08	1.9E-06
737 'A'	LOWER	5.0E-06	1.8E-03	1.7E-09	1.2E-06
OMP-1	UPPER	1.4E-04	4.9E-02	4.8E-08	1.0E-06
OMO-1	LOWER	1.3E-04	4.7E-02	4.6E-08	1.0E-06

2.0 Q SAND PUMP TEST

The Q Sand ISL pilot site pump test was conducted in April, 1981. One pumping well (QP-3) and three observation wells (QI-2, QI-7 and QI-11), were located in the production zone to determine aquifer transmissivity and storage coefficient. Aquifer thickness varied laterally, ranging from 21 feet at QI-2 to 50 feet at QI-11. In addition two observation wells (QMS-1 and QMO-1), were placed in the overlying and underlying shale aquitards in order to analyze their vertical hydraulic conductivity. Well QP-3 was pumped at a constant discharge rate of 16.7 gpm for approximately three days (4305 minutes).

2.1 PREVIOUS ANALYSIS

The prior analysis of the Q Sand aquifer matched Hantush leaky type curves to the pump test data. This analytical method is used when the aquifer is under confined (leaky) conditions. It is used when the pump test data indicates recharge of the aquifer through "leaky confining layers". Generally, under these conditions, after several hours of pumping the drawdown data will indicate water levels stabilizing or slightly increasing. In practice it is similar to the Theis method (discussed below) with the exception of the well function containing a term for vertical leakage. Using this method an average transmissivity of 950 gpd/ft and a storage coefficient of 6.0E-5 were calculated.

2.2 HYDRO ANALYSIS

In reviewing both semi-log and log-log plots of drawdown versus time, it was apparent that no recharge was occurring in the early drawdown data. This indicated confined conditions with no appreciable vertical leakage from the confining layers. Therefore, the pump test data were analyzed using both the Theis method for confined conditions and the Jacob straight line method which is a simplification of the Theis method.

The results of this analysis are somewhat more consistent throughout the three observation wells although the representative (average) values are similar. The main significance between the two analyses is; the initial analysis indicated a leaky aquifer where our matches do not. Representative parameters of transmissivity, permeability and the storage coefficient for the Q sands aquifer are calculated to be approximately 1000 gpd/ft, (1629 millidarcys) and 4.8E-5 respectively. A low permeability boundary was detected in the later drawdown data. An attempt was made to calculate the relative position of the low flow boundary but the results were inconclusive. It is estimated to be located approximately 1600 feet from the pumping well, probably in a pinch out of the Q sand aquifer. The aquifer properties calculated from the late time drawdown and recovery (close to t/t' of 1), data were not used because they are influenced by the low permeability layer.

No drawdown was observed in the overlying observation well QMS-1. This is not surprising considering the thickness of the overlying aquitard ($\simeq$55 ft). After careful analysis of the underlying aquitard observation well (QMO-1), it was concluded that no drawdown had occurred here either. The hydrograph of this well presented in the previous analysis seemed to indicate a small amount of drawdown. However, it was occurring over an extremely short period of time ($\simeq$1.5 days), and recovery was even faster, being less than 1 day. If the drawdown was due to pumping it should have occurred over a similar time span as the pumping ($\simeq$3 days) with recovery not starting until 3 days after the start of drawdown. Most likely any changes in water level can be attributed to changing barometric pressure.

A standard technique for conservatively estimating aquitard vertical permeability when the aquitard well shows no drawdown is to assume 0.1 ft of drawdown at the end of pumping. In this case where both the overlying and underlying aquitards are 55 ft and approximately 150 ft thick respectively, the above assumption would provide unrealistically high vertical permeabilities. With these kinds of thicknesses both the overlying and underlying aquitards should provide ample isolation for the Q-sands. A pump test of longer duration would have to be conducted in order to quantify vertical permeability of the above two aquitards using the adjacent aquifer wells.

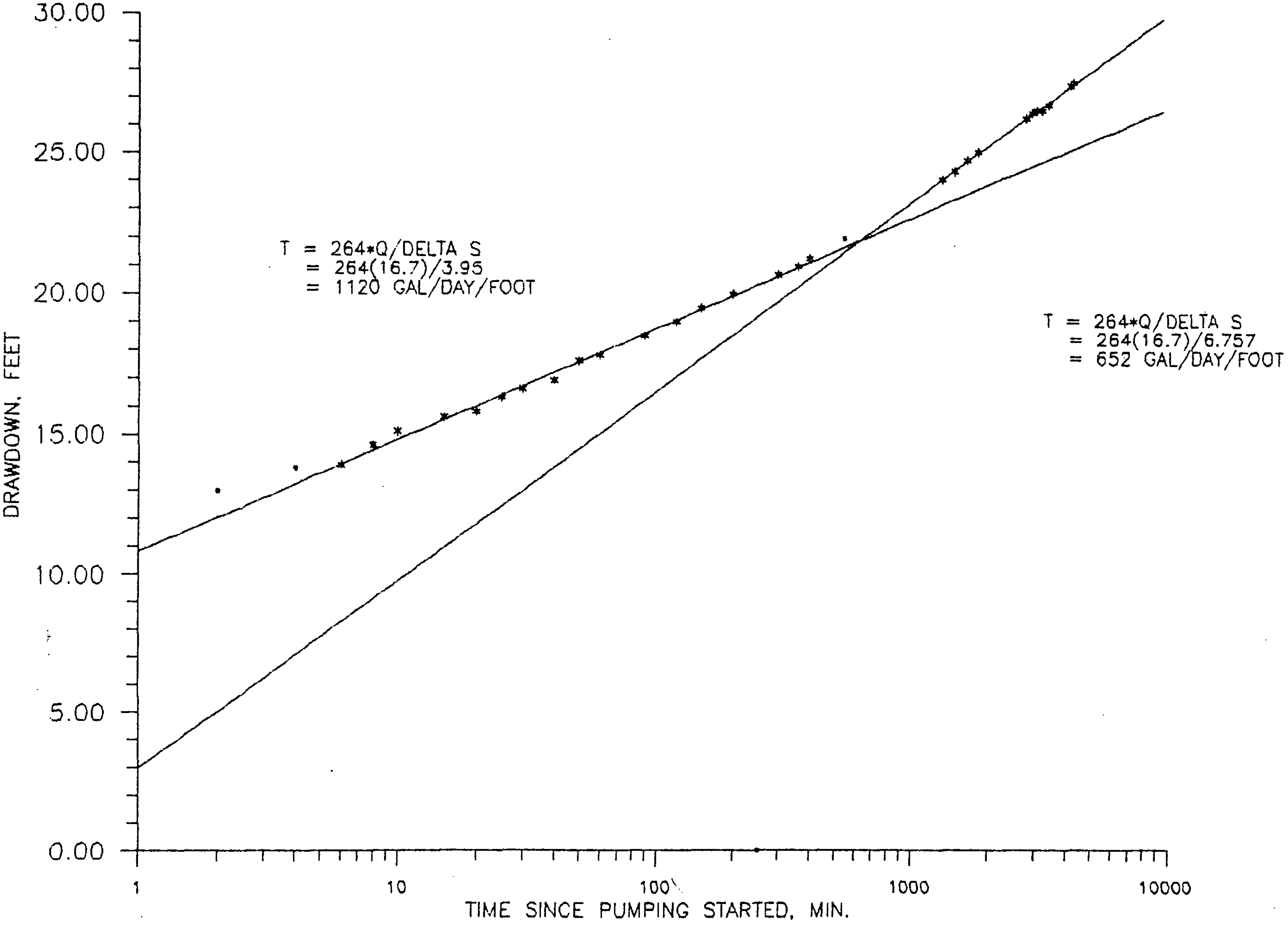
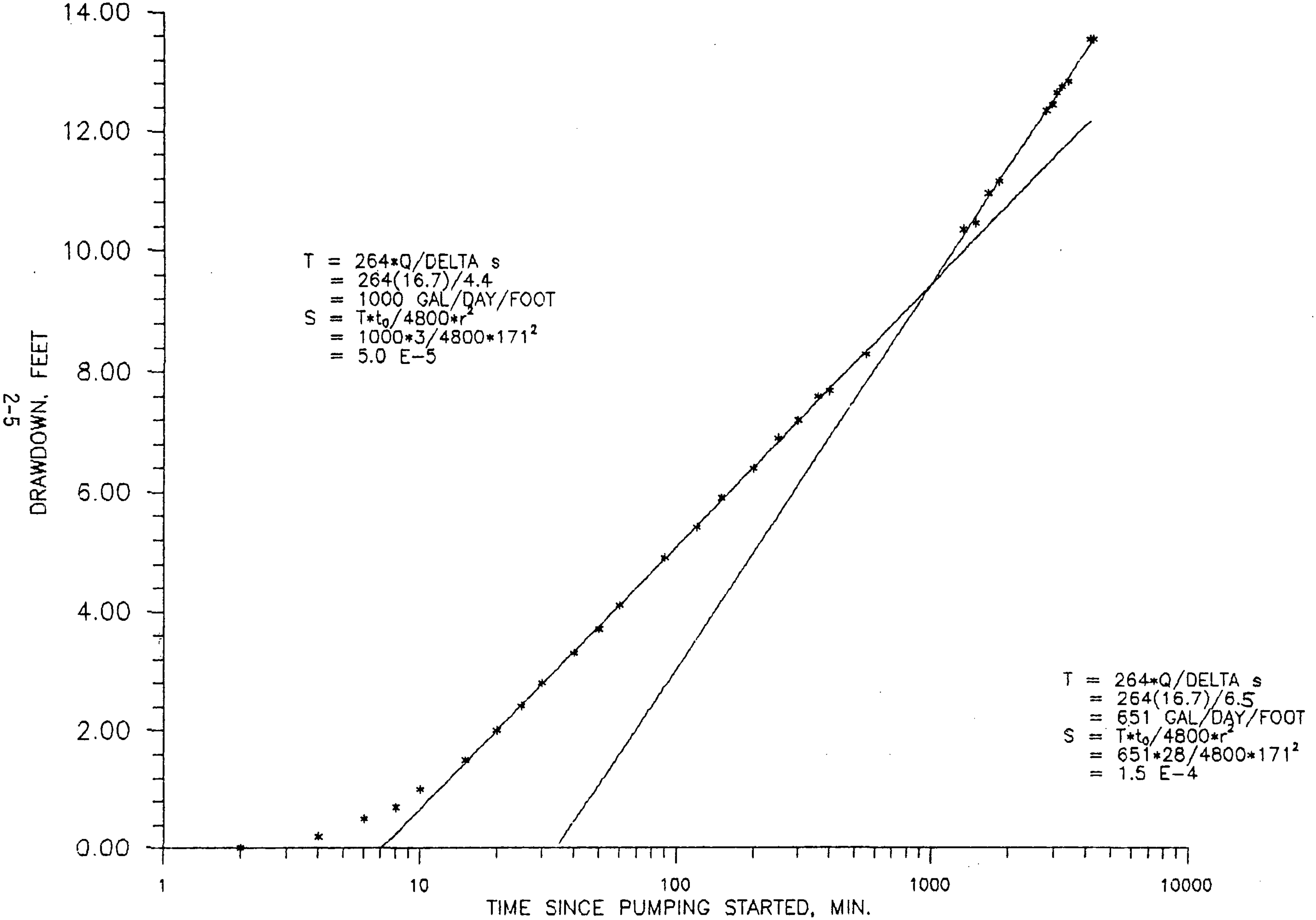


FIGURE 2-1 . DRAWDOWN IN PUMPING WELL QP-3.



$T = 264 * Q/\text{DELTA } s$
$= 264(16.7)/4.4$
$= 1000$ GAL/DAY/FOOT
$S = T * t_0/4800 * r^2$
$= 1000 * 3/4800 * 171^2$
$= 5.0$ E-5

$T = 264 * Q/\text{DELTA } s$
$= 264(16.7)/6.5$
$= 651$ GAL/DAY/FOOT
$S = T * t_0/4800 * r^2$
$= 651 * 28/4800 * 171^2$
$= 1.5$ E-4

FIGURE 2-2 . DRAWDOWN IN OBSERVATION WELL QI-2, SEMI-LOG

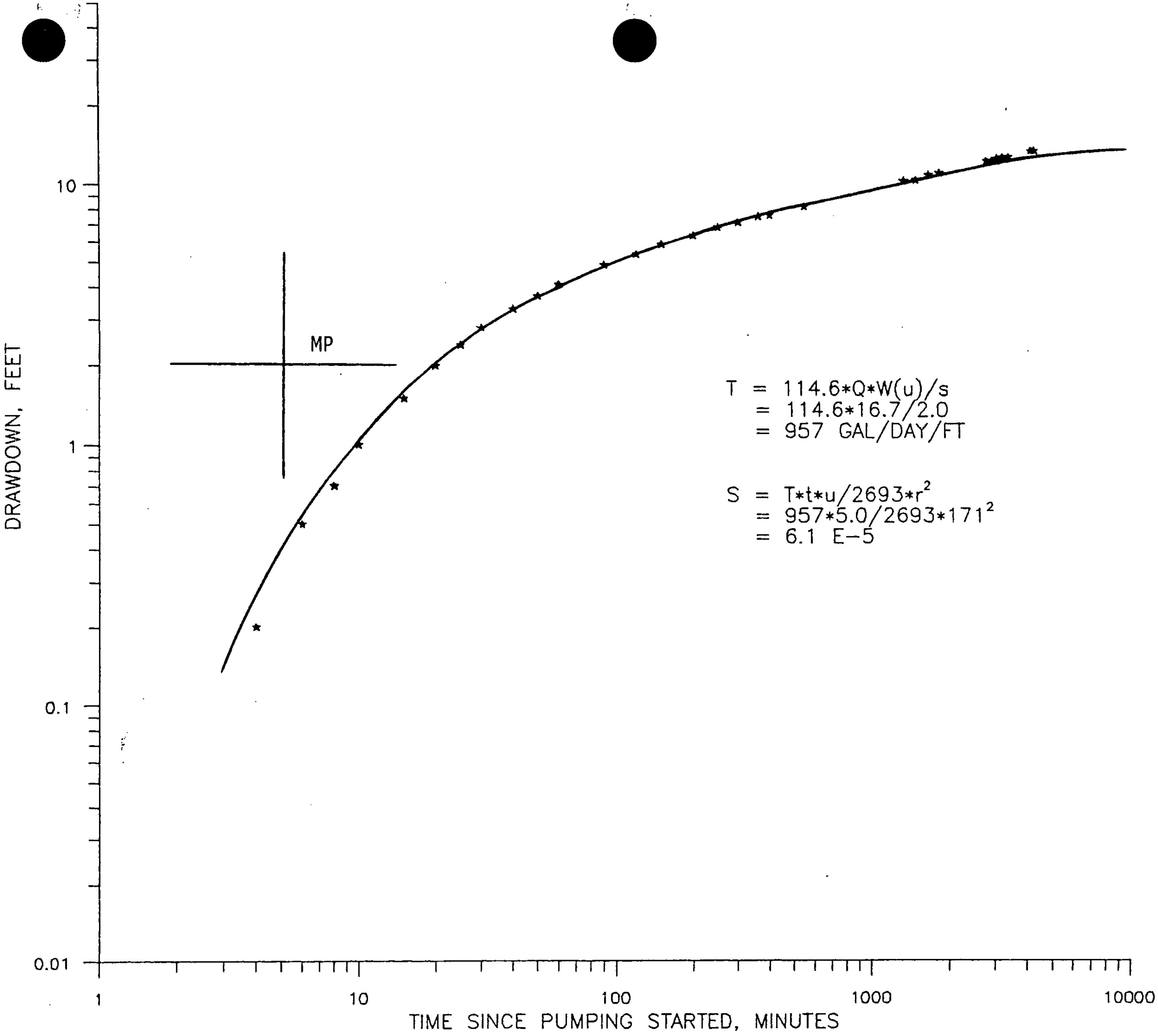


FIGURE 2-3 DRAWDOWN IN OBSERVATION WELL QI-2, LOG-LOG.

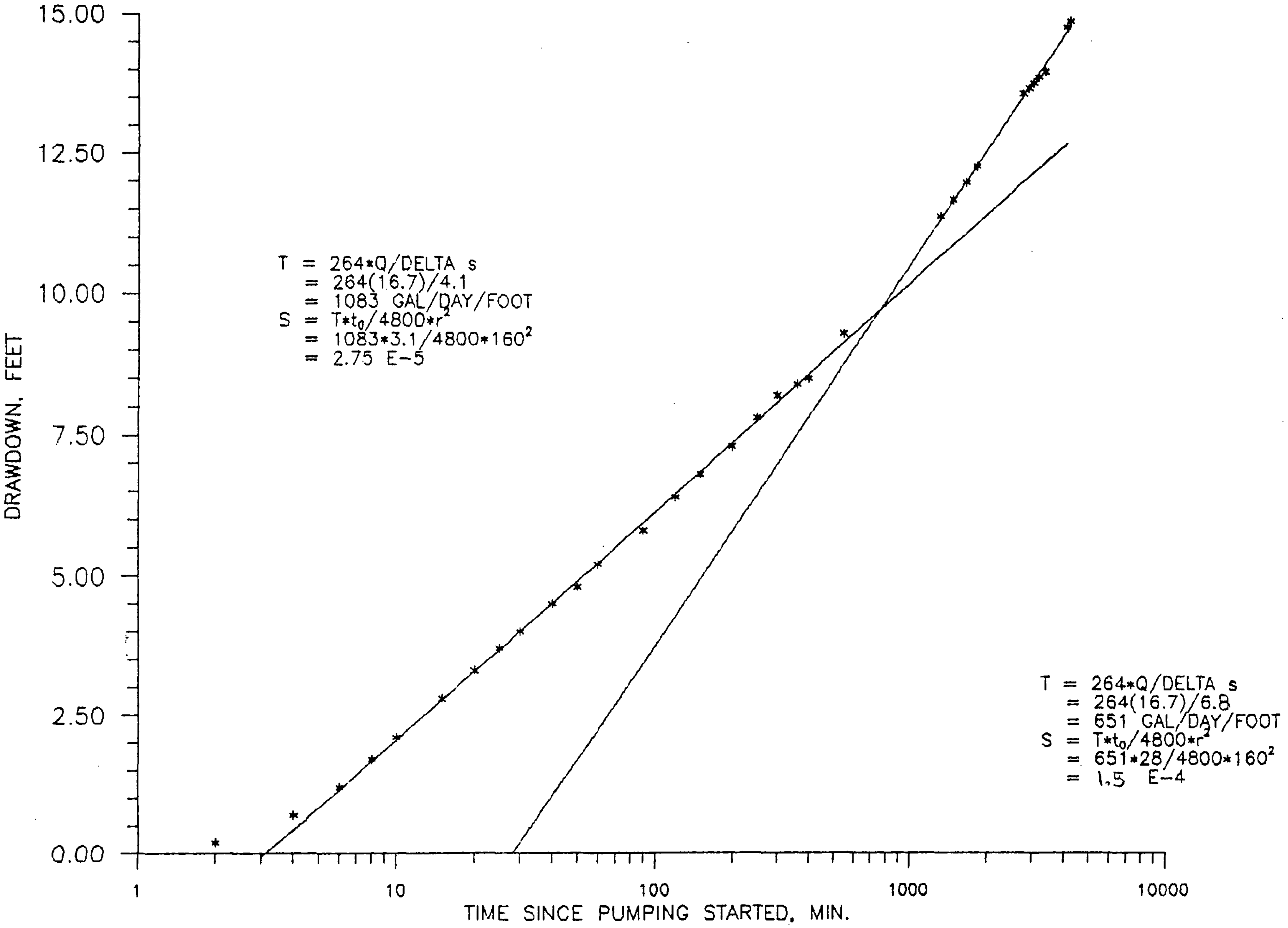
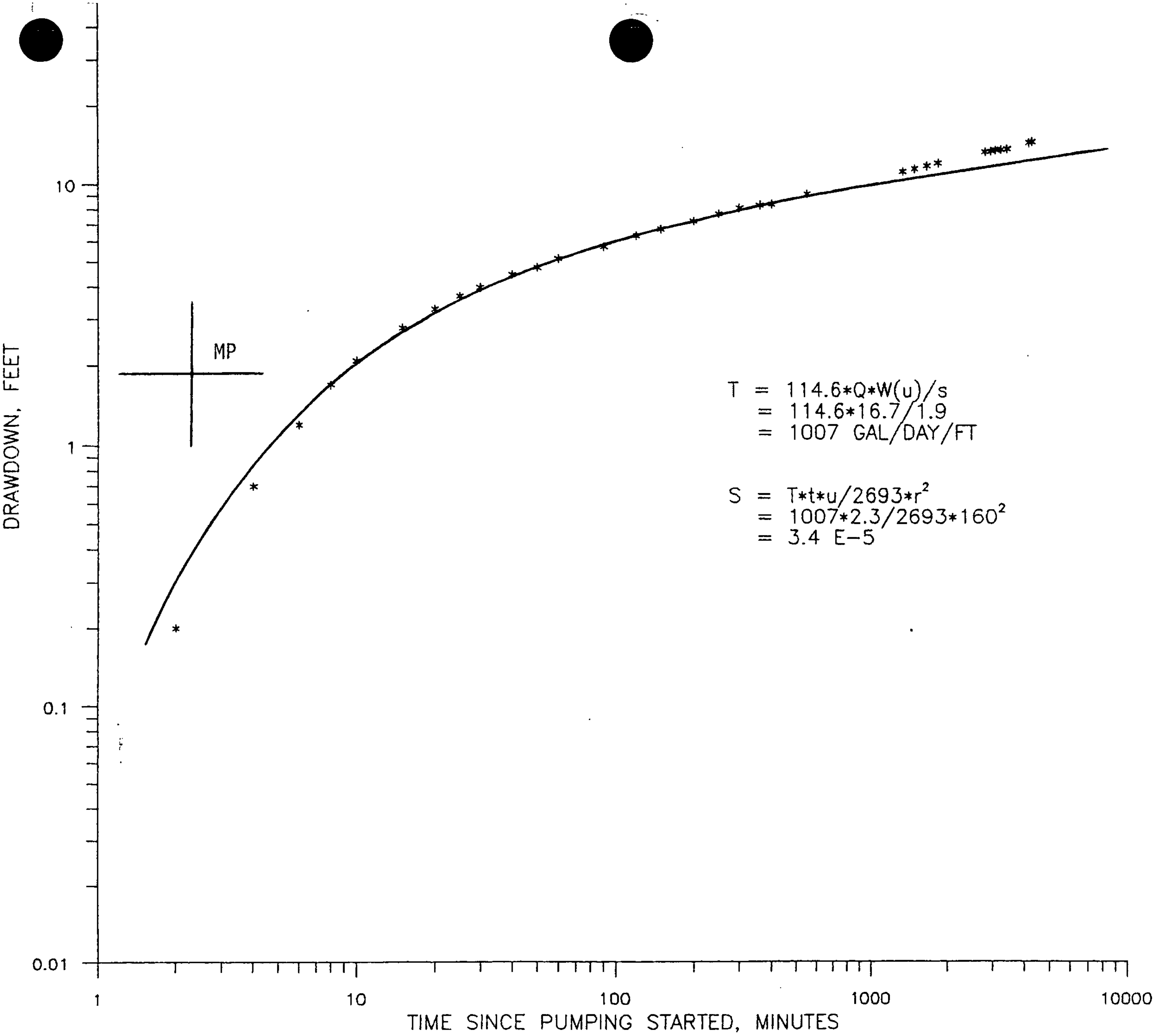


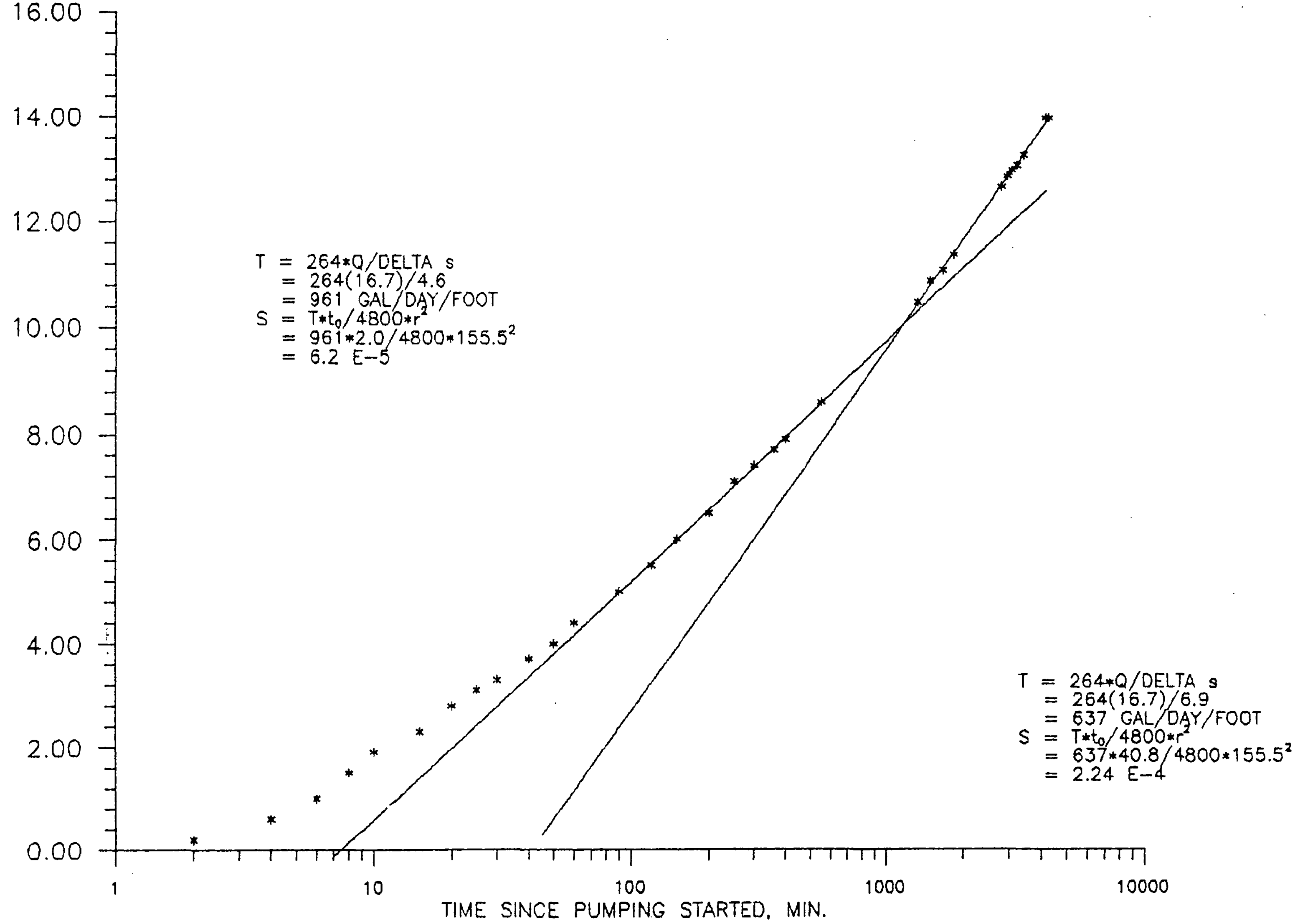
FIGURE 2-4 . DRAWDOWN IN OBSERVATION WELL QI-7, SEMI-LOG



T = 114.6*Q*W(u)/s
= 114.6*16.7/1.9
= 1007 GAL/DAY/FT

S = T*t*u/2693*r^2
= 1007*2.3/2693*160^2
= 3.4 E-5

FIGURE 2-5 DRAWDOWN IN OBSERVATION WELL QI -7, LOG-LOG.



T = 264*Q/DELTA s
= 264(16.7)/4.6
= 961 GAL/DAY/FOOT
S = $T*t_0/4800*r^2$
= $961*2.0/4800*155.5^2$
= 6.2 E-5

T = 264*Q/DELTA s
= 264(16.7)/6.9
= 637 GAL/DAY/FOOT
S = $T*t_0/4800*r^2$
= $637*40.8/4800*155.5^2$
= 2.24 E-4

FIGURE 2-6 . DRAWDOWN IN OBSERVATION WELL QI-11, SEMI-LOG

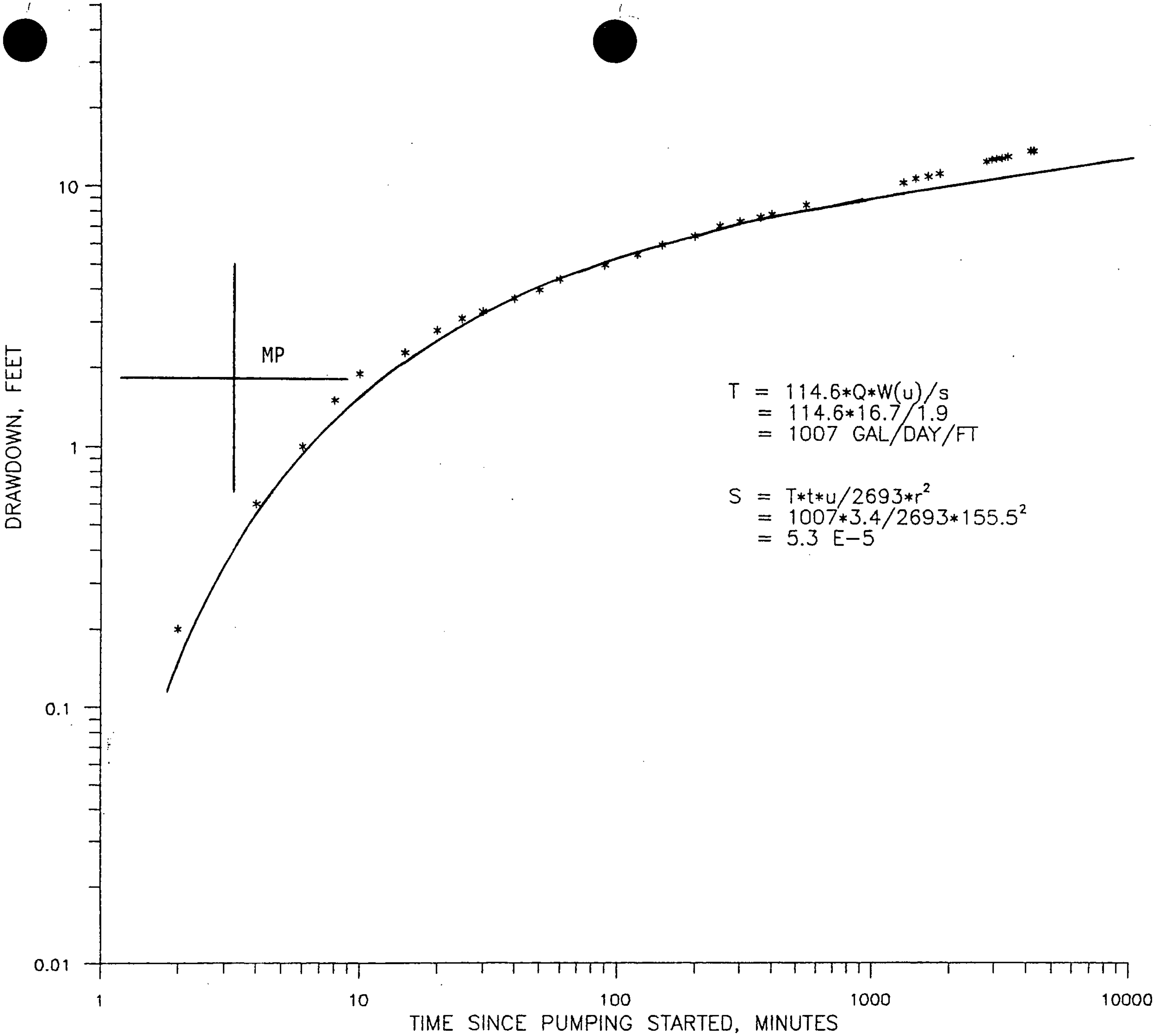


FIGURE 2-7 DRAWDOWN IN OBSERVATION WELL QI-11, LOG-LOG.

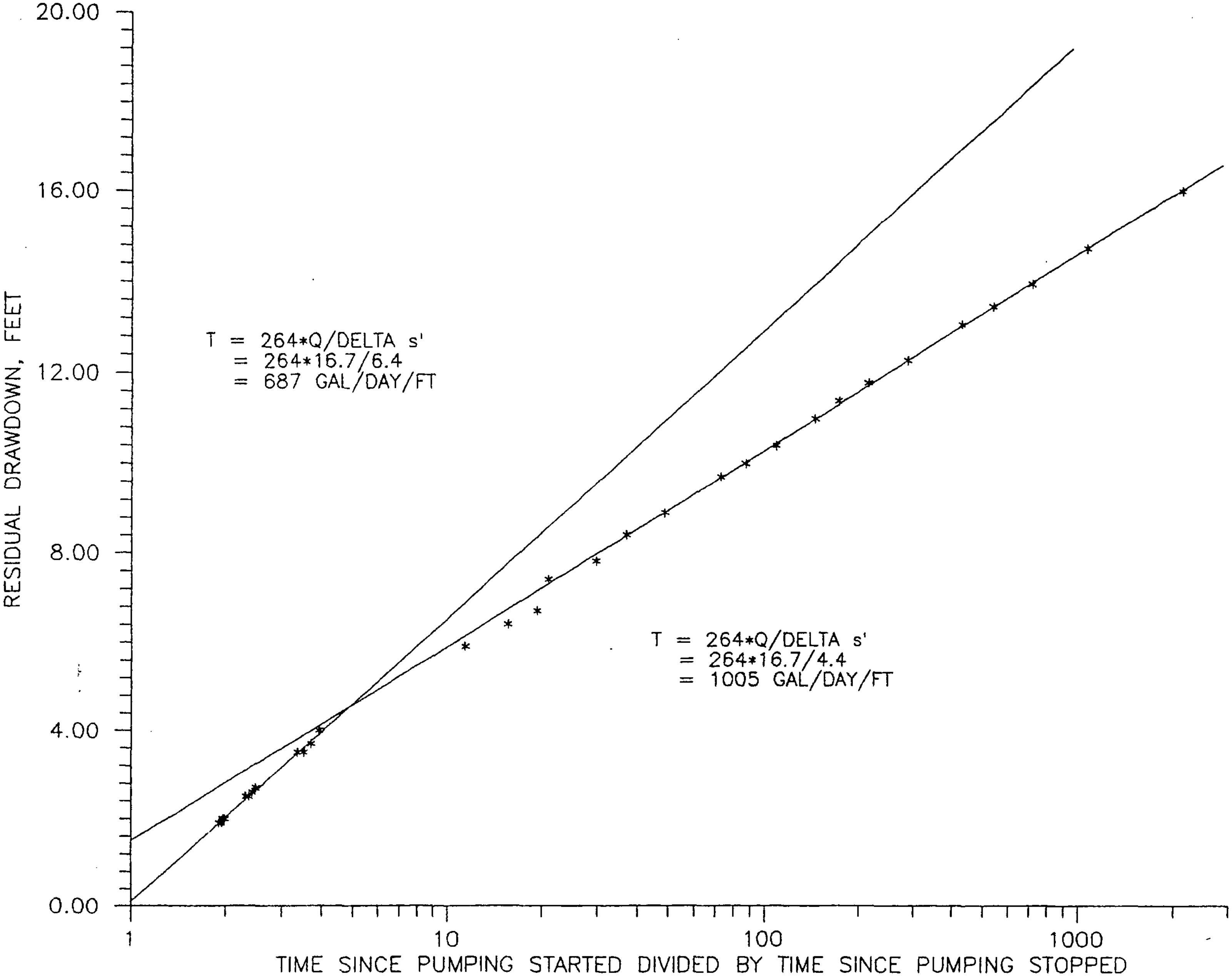


FIGURE 2-8 RECOVERY IN PUMPING WELL QP-3, SEMI LOG

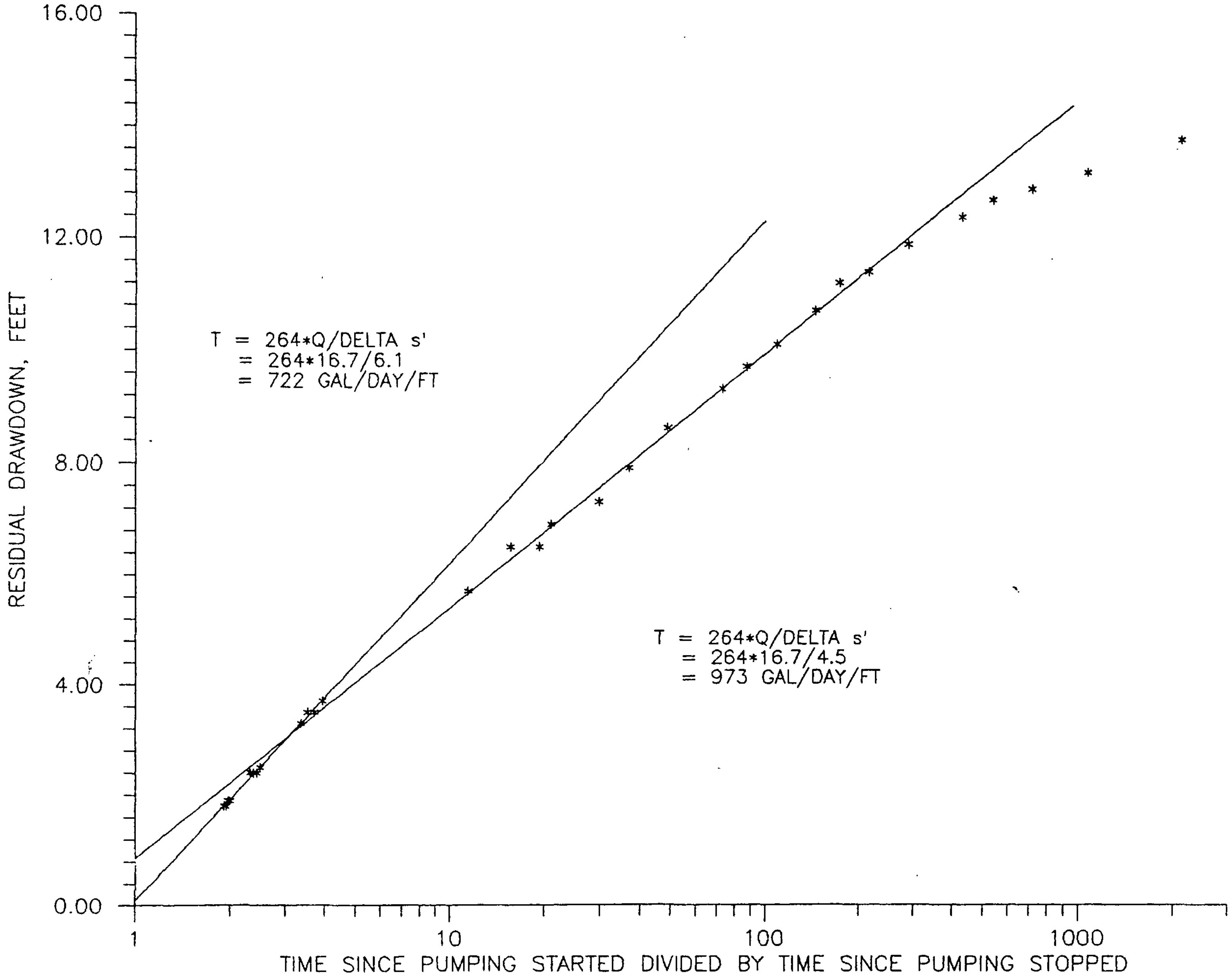


FIGURE 2-9 RECOVERY IN OBSERVATION WELL QI-2, SEMI LOG

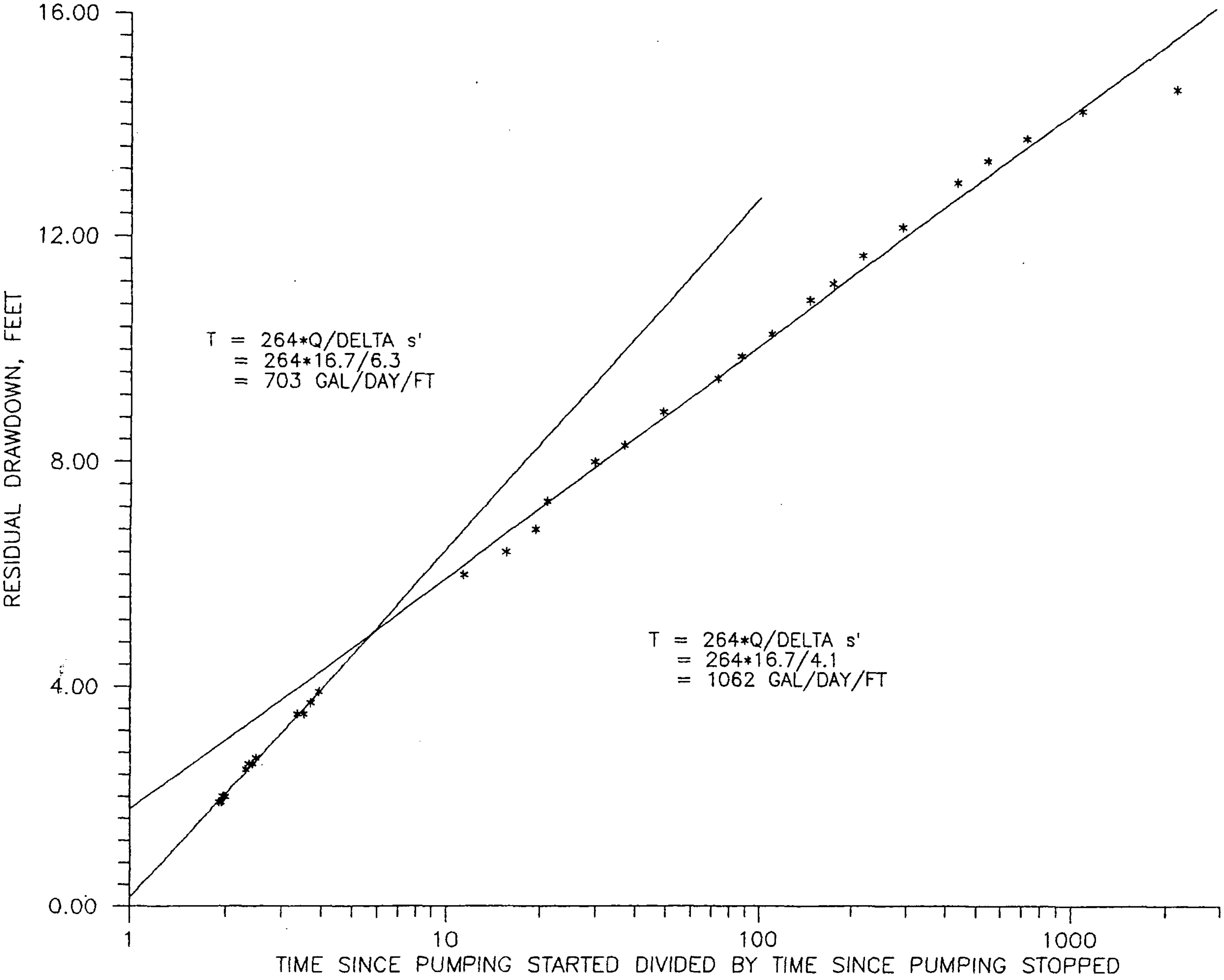


FIGURE **2-10** RECOVERY IN OBSERVATION WELL QI-7, SEMI LOG

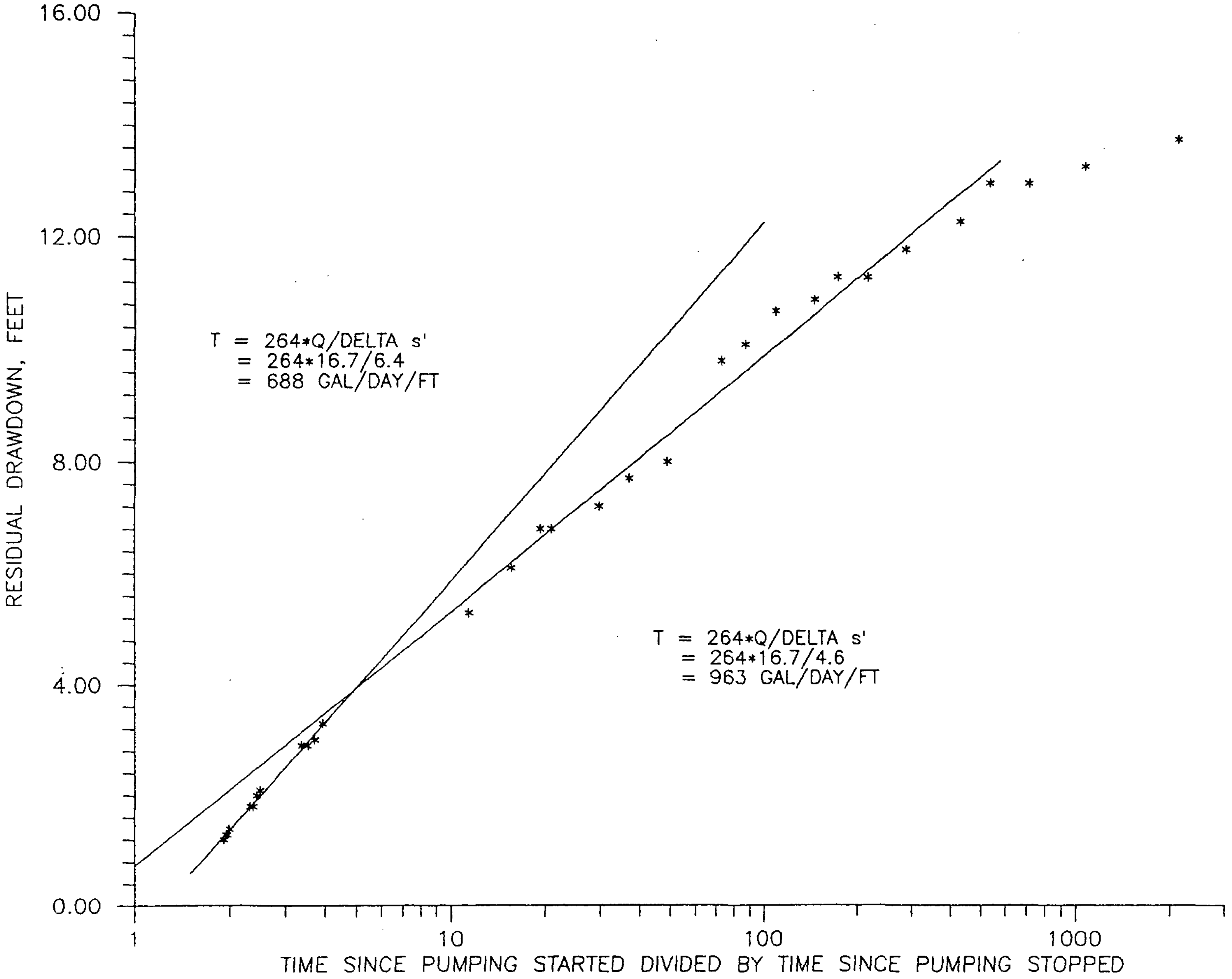


FIGURE 2-11 RECOVERY IN OBSERVATION WELL QI–11, SEMI LOG

3.0 O SAND TEST

The O Sand pump test was performed in July, 1983 and consisted of one pumping well and nine observation wells. The pumping well (0P-2), and five observation wells (01-1, 01-3, 01-5 0P-3 and 01-8), were located in the production zone. Well OMO-1 was placed in the lower O Sand, underlying the lower O shale. Well OMM-1 was placed in the M Sand which underlies the N shale. The N shale in turn underlies the lower O Sand. Two observation wells were placed in both the overlying aquitard and overlying aquifer (OMP-12 and OMS-2 respectively). Well OP-2 was pumped at a constant discharge rate of 65 gpm, for a period of 4185 minutes ($\simeq$ 2.9 days).

3.1 PREVIOUS ANALYSIS

The previous analysis of the pump test data was presented in two reports, one in September 1983 and an addendum in February 1984, (see Section 6.0, References). Transmissivities of 7000 gpd/ft were calculated with the "Jacob straight line" method. The same data was analyzed using log-log plots, (Hantush-Jacob), with transmissivities of approximately 3500 gpd/ft being estimated. 1.7E-4 was estimated to be a representative storage coefficient for the production zone. Prior trend data was used to correct the drawdown in this analysis.

3.2 HYDRO ANALYSIS

Neither semi-log or log-log plots of the data, after being corrected for prior trend, indicated the existence of "leaky" conditions. Prior trends of falling water level are as follows:

WELL	RISING TREND (ft/day)
OP-2	.11
OP-3	.33
OI-1	.30
OI-3	.22
OI-5	.27
OI-8	.15

Therefore, the same analysis that was performed for the Q-sands was used to obtain estimates of production zone aquifer parameters. This analysis indicates that representative values for the transmissivity, permeability and storage coefficient are 7230 gpd/ft, (1454 milldarcys), and 1.2E-4 respectively. Recovery data was also analyzed with similar results for transmissivity values in the production zone aquifer. Late time recovery data indicates that the trend most likely changed during pumping and/or recovery.

Vertical hydraulic conductivity was estimated by using the drawdowns and specific storage parameters as input into the Neuman-Witherspoon ratio method. This method uses the ratio of the drawdown in the confining layer to the aquifer in order to calculate a vertical permeability of the confining layer. Representative values of vertical permeability are estimated as 4E-8 cm/sec for the Upper aquitard and 4.7E-8 cm/sec for the lower O shale. Calculations for the vertical permeability are as follows:

OVERLYING AQUITARD (P SHALE)

Well OMP-1

$s' = 1$ ft $t = 2.9$ days

$r' = 66.3$ ft $z' = 35$ ft

$s_s = 1E-6/ft$

$$\frac{s'}{s} = \frac{1}{9.7} = .1$$

Predicted Drawdown

$T = 969$ ft^2/day $S = 1.2E-4$

$= 7230$ gpd/ft

$$u = \frac{1.87\ r^2\ S}{(T)\ (t)} = \frac{(1.87)(66.3)^2(1.2E-4)}{(7230)\ (2.9)} = 4.7E-5$$

$W(u) = 9.3882$

$$s = \frac{(114.6)(Q)(W(u))}{T} = \frac{114.6(65)(9.3882)}{7230} = 9.7 \text{ ft}$$

$$t_D = \frac{T(t)}{(S)(r^{2})} = \frac{(969)(2.9)}{(1.2E-4)(66.3^{2})}$$

$$= 5.3\ E3$$

$$t'_D = 3.2E-1$$

$$ALPHA' = \frac{z^{2}(t'_D)}{t} = \frac{35^{2}(3.2E-1)}{2.9} = 135.17$$

$$K' = ALPHA'S_s' = 135.17(1E-6) = 1.35E-4\ ft/day = 4.8E-8\ cm/sec$$

UNDERLYING AQUITARD (LOWER O SHALE)

Well OMO-1

$s' = 1.43$ ft $t=2.9$ days

$z = 10$ ft $r = 67.3$ ft

$S_s' = 1E-6$/ft

Predicated Drawdown

$T = 7230$ gpd/ft $= 969$ ft^2/day

$S = 1.2E-4$

$$u = \frac{(1.87)(1.2E-4)(67.3^{2})}{(7230)\ (2.9)}$$

$$= 4.8E-5$$

$$W(u) = 9.3671$$

$$s = \frac{(114.6)(65)(9.3671)}{7230} = 9.7\ ft$$

$$\frac{s'}{s} = \frac{1.43}{9.7} = 1.5E-1$$

$$t_D = \frac{(969)(2.9)}{(1.2E-4)(67.3^{2})} = 5.17E3$$

$$t_D = 3.9E-1$$

$$ALPHA' = \frac{(10^{2})(3.9E-1)}{2.9} = 1234.5$$

$$K' = 134.5(1E-6) = 1.3E-4\ ft/day = 4.7E-8\ cm/sec$$

When prior trend was accounted for, no drawdown was observed in well OMM1, the aquifer well underlying the lower N shale. No vertical permeability calculation for this aquitrard was made.

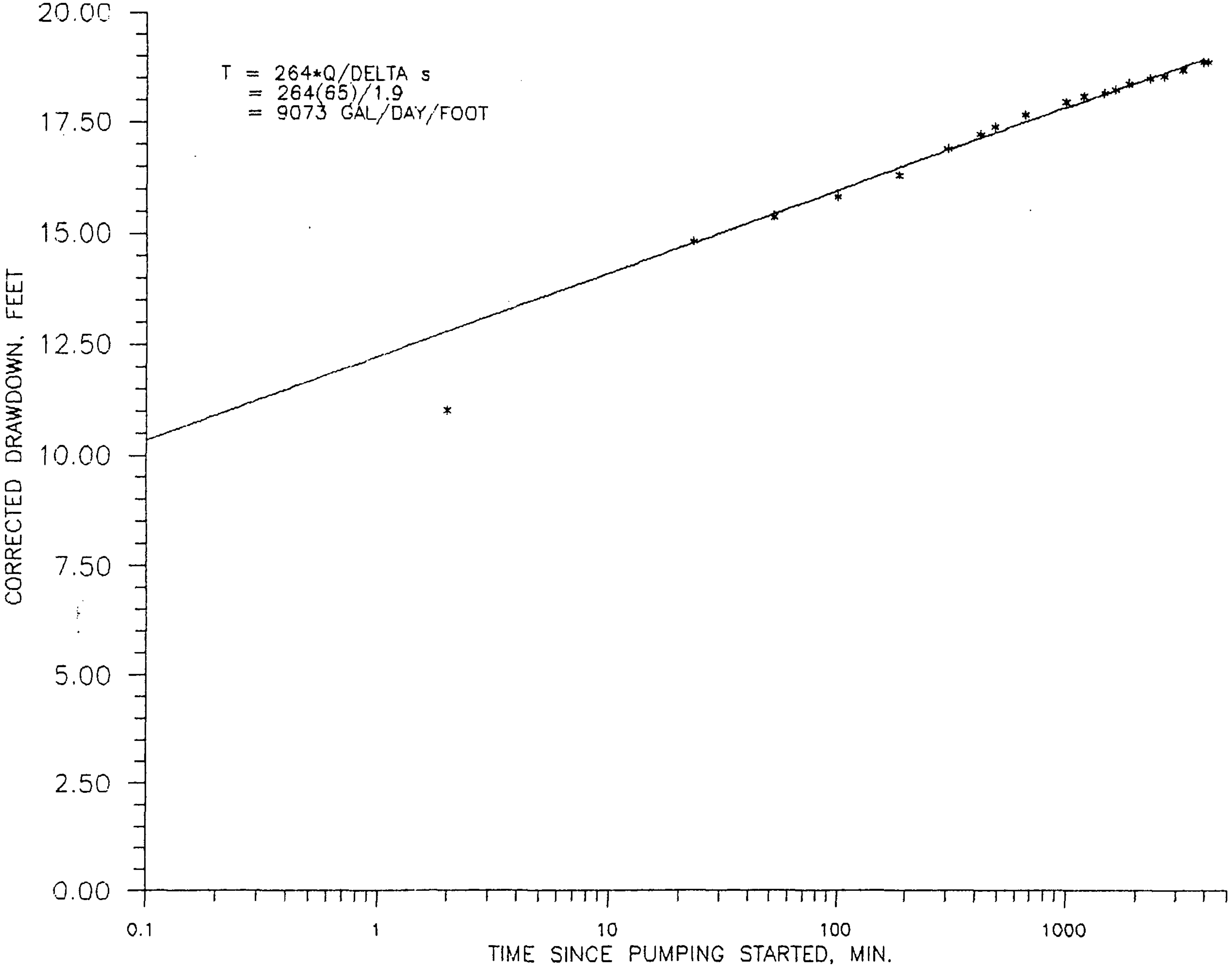
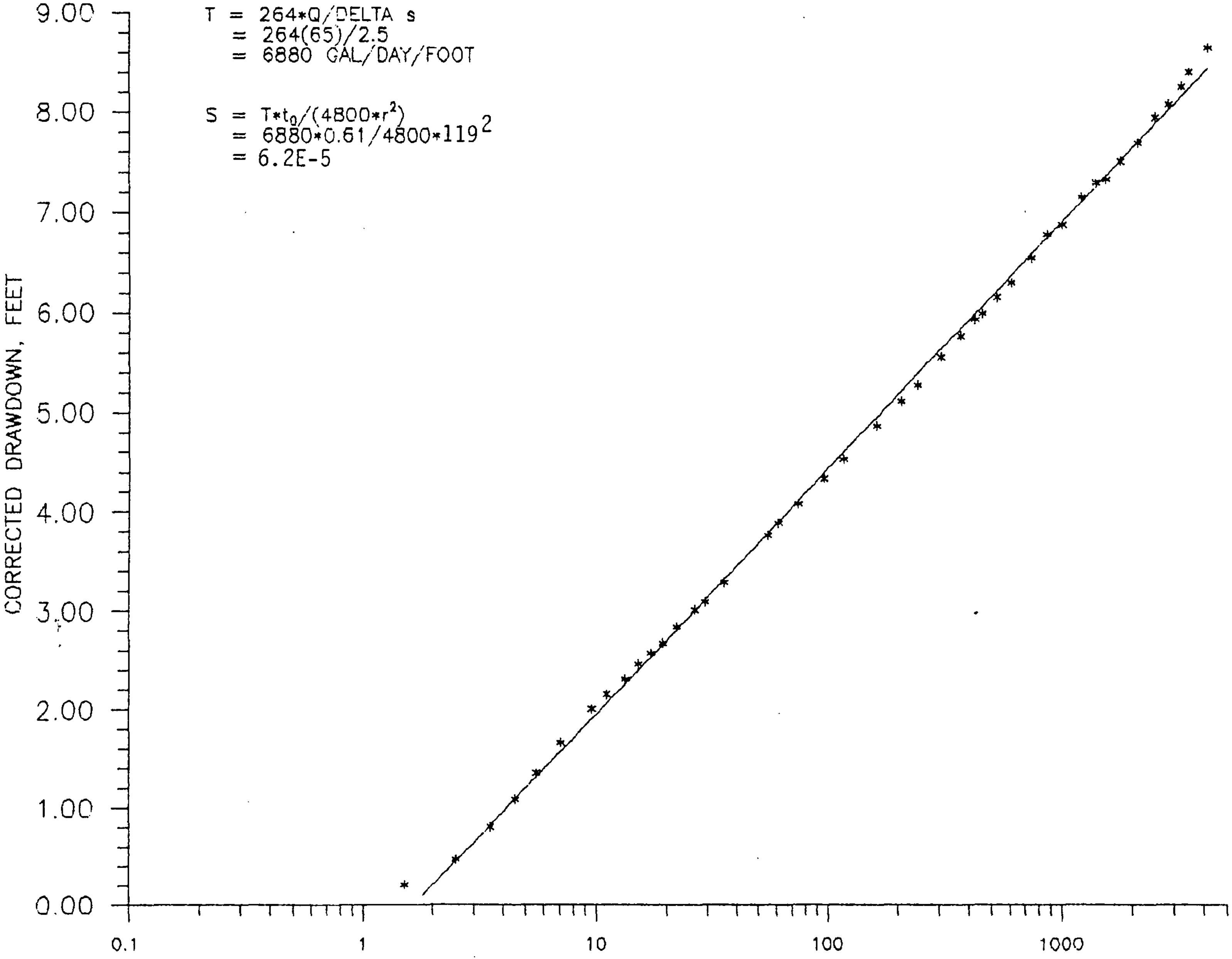


FIGURE 3-1 DRAWDOWN DATA FOR PUMPING WEL OP-2



T = 264*Q/DELTA s
= 264(65)/2.5
= 6880 GAL/DAY/FOOT

S = $T*t_0/(4800*r^2)$
= $6880*0.61/4800*119^2$
= 6.2E-5

FIGURE 3-2 DRAWDOWN DATA FOR OBSERVATION WELL OP-3

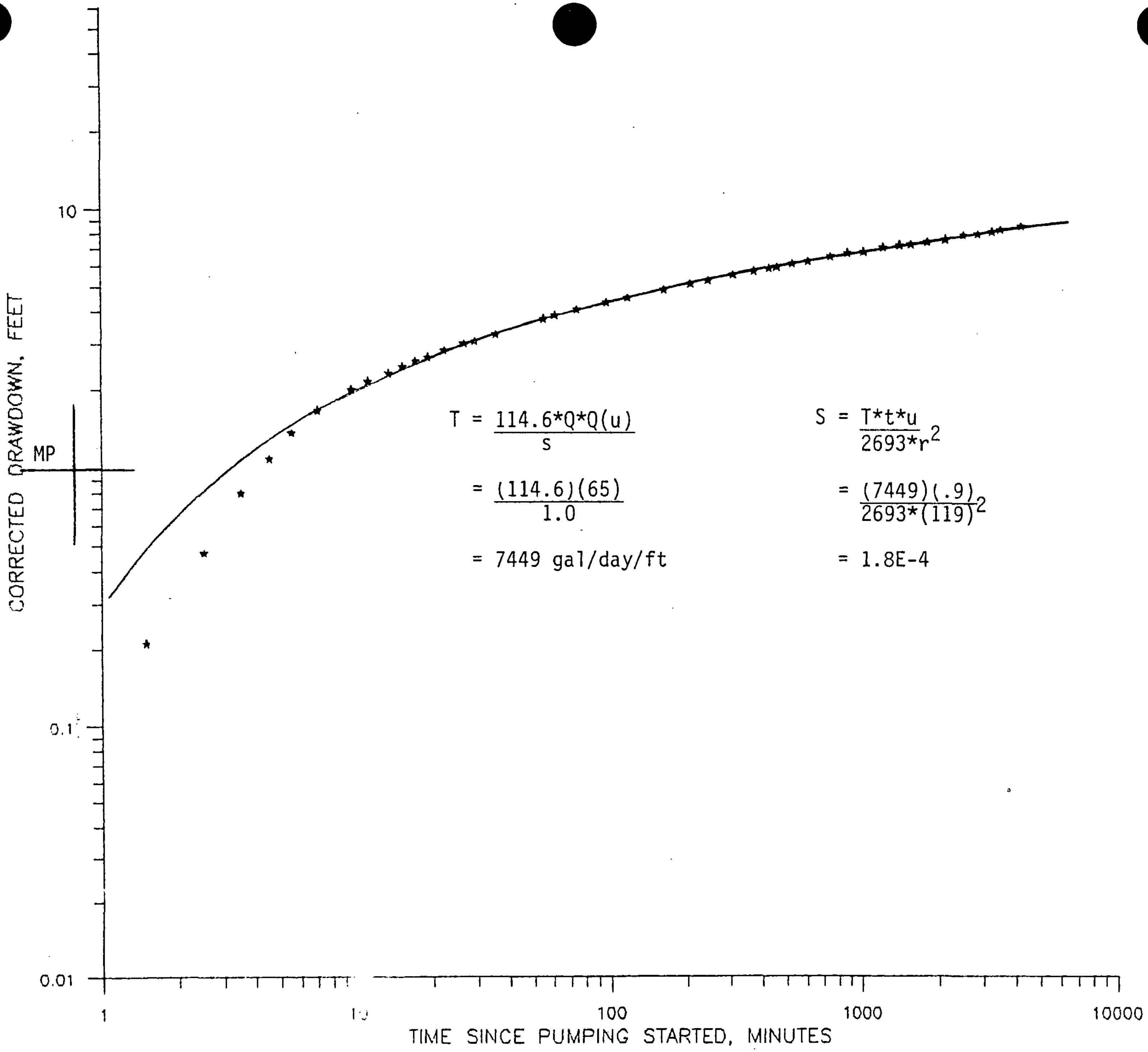
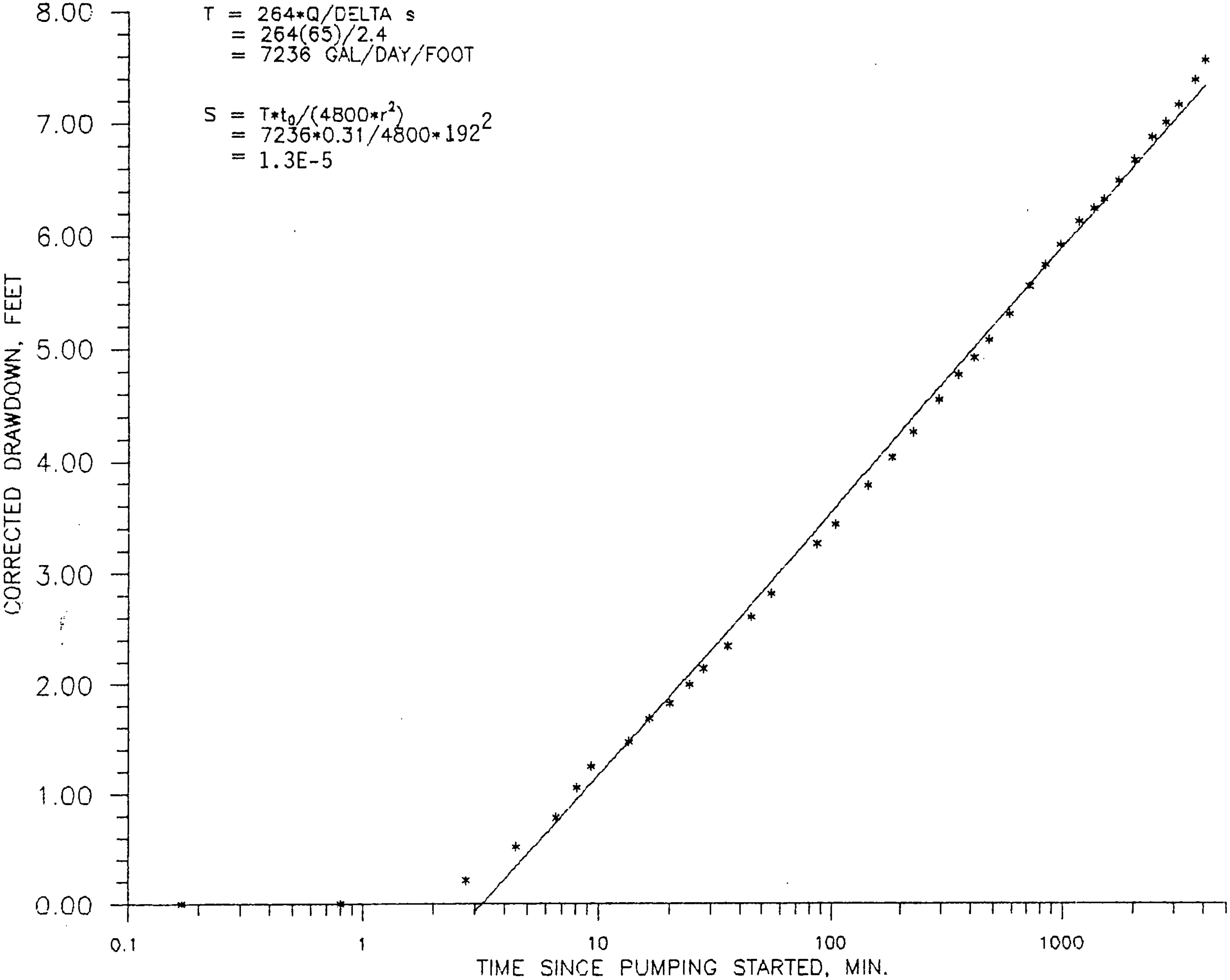


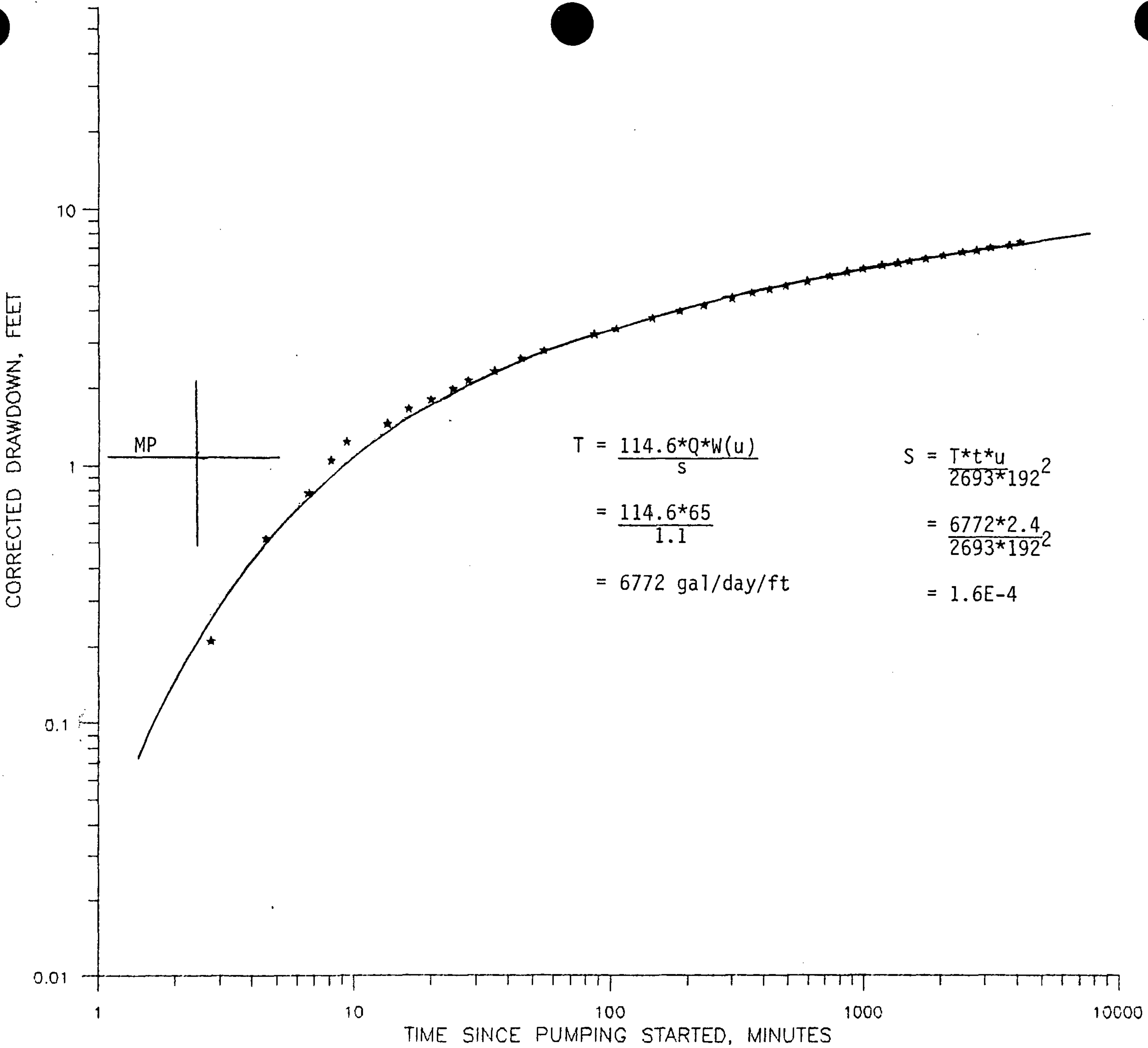
FIGURE 3-3 DRAWDOWN IN OBSERVATION WELL OP-3, LOG-LOG.



T = 264*Q/DELTA s
= 264(65)/2.4
= 7236 GAL/DAY/FOOT

S = $T*t_0/(4800*r^2)$
= $7236*0.31/4800*192^2$
= 1.3E-5

FIGURE 3-4 DRAWDOWN DATA FOR OBSERVATION WELL OI-1



$$T = \frac{114.6*Q*W(u)}{s}$$

$$= \frac{114.6*65}{1.1}$$

$$= 6772 \text{ gal/day/ft}$$

$$S = \frac{T*t*u}{2693*192^2}$$

$$= \frac{6772*2.4}{2693*192^2}$$

$$= 1.6E-4$$

FIGURE 3-5 DRAWDOWN IN OBSERVATION WELL OI-1, LOG-LOG.

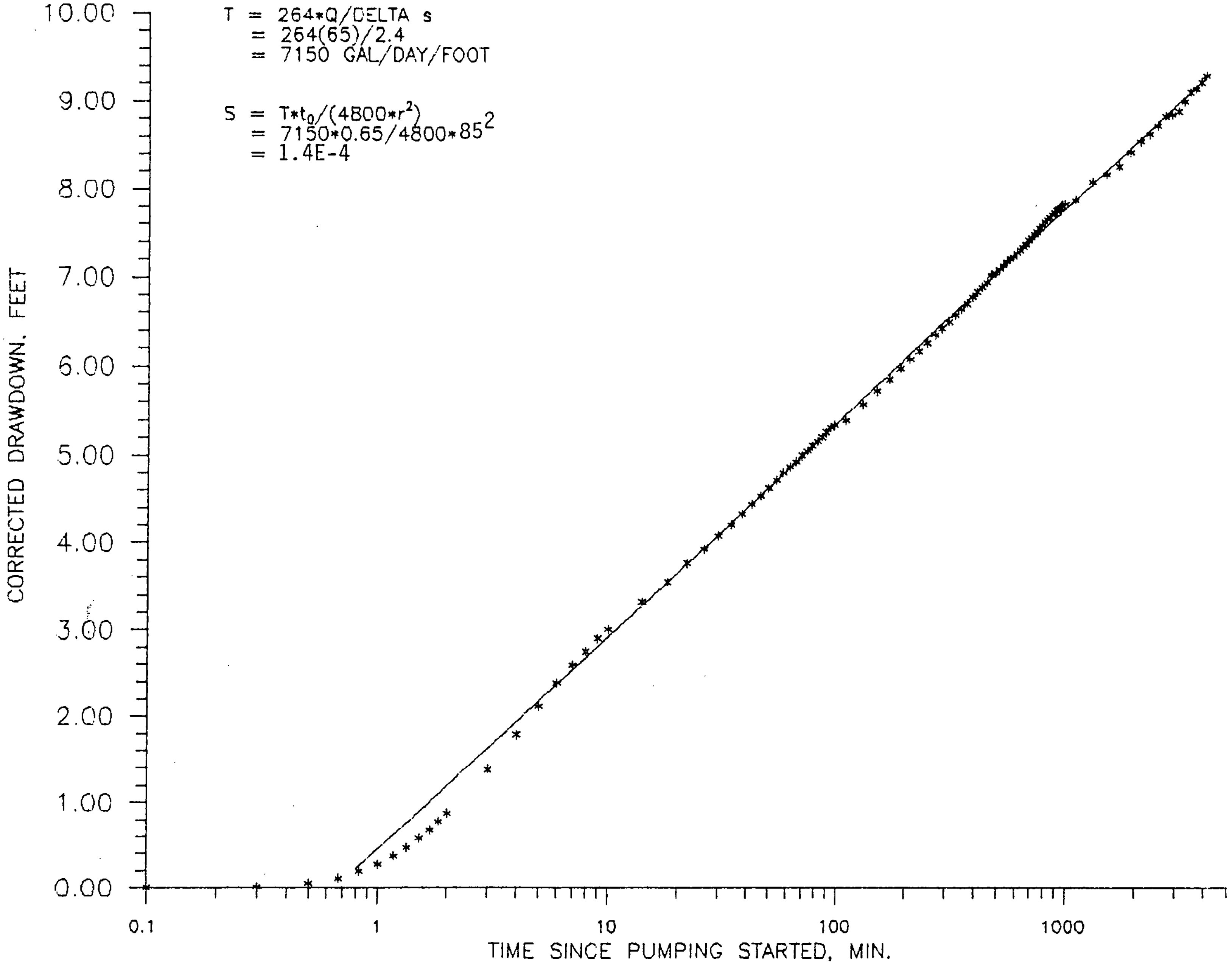


FIGURE 3-6 DRAWDOWN DATA FOR OBSERVATION WELL OI-3

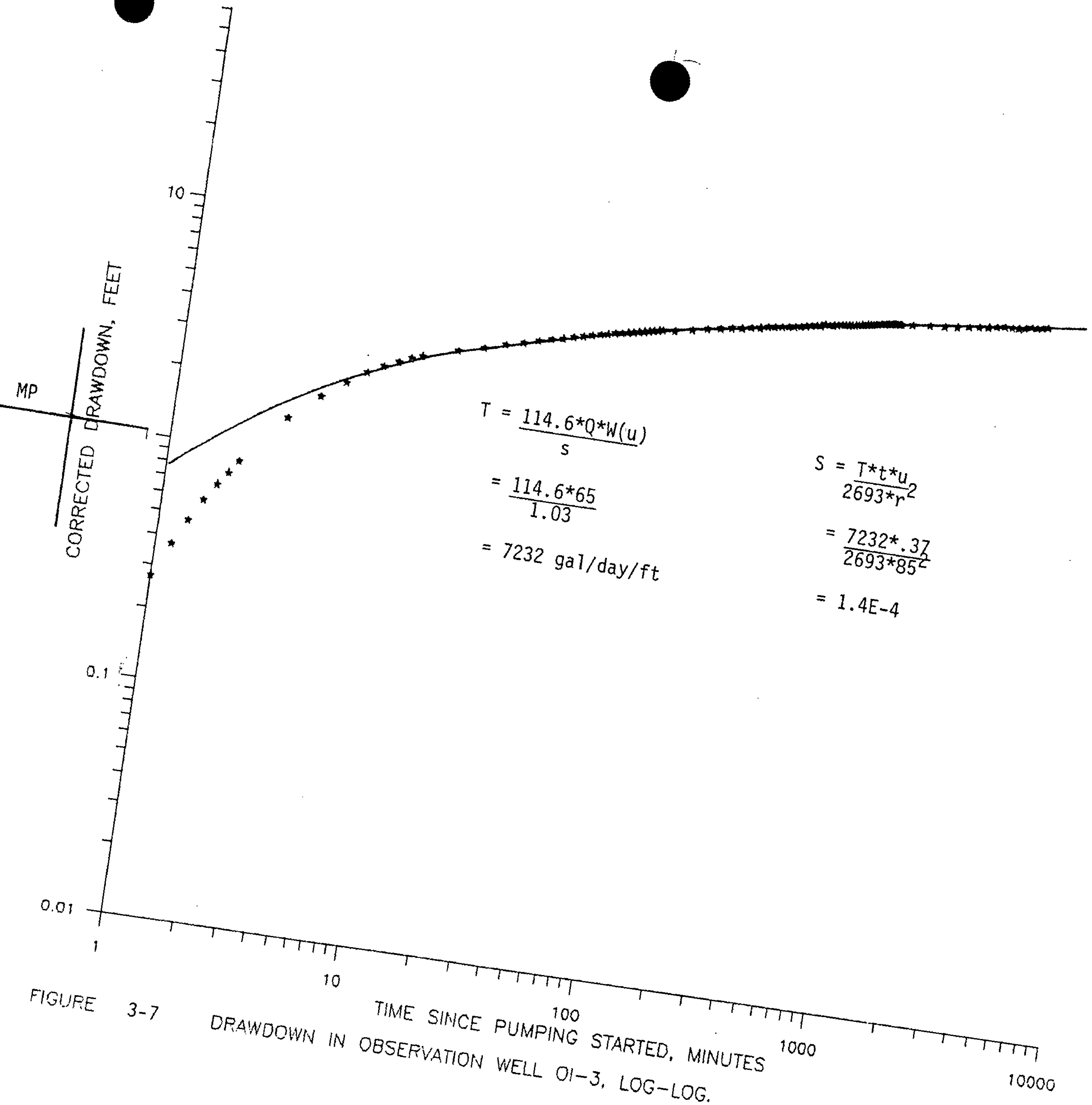


FIGURE 3-7 DRAWDOWN IN OBSERVATION WELL OI-3, LOG-LOG.

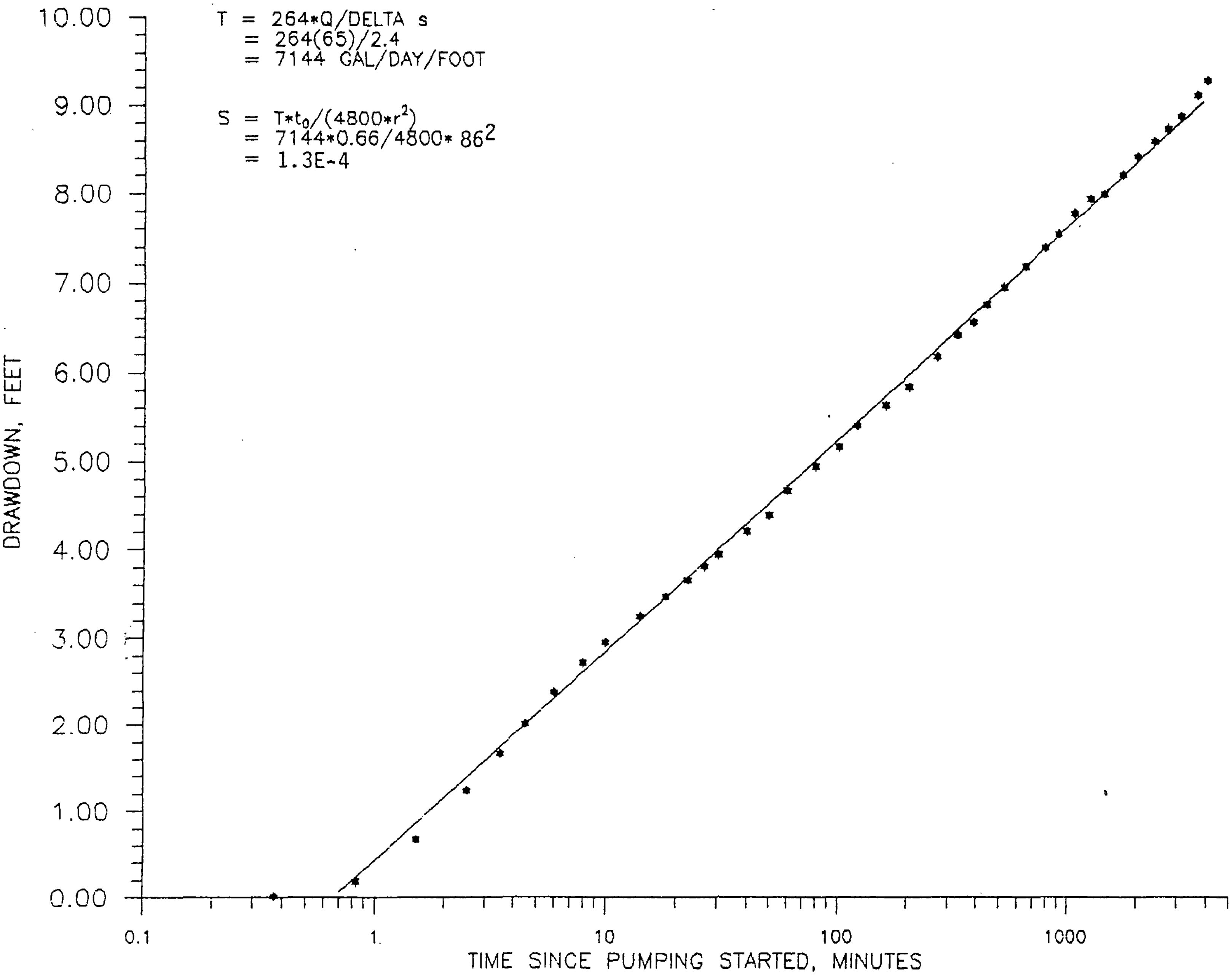
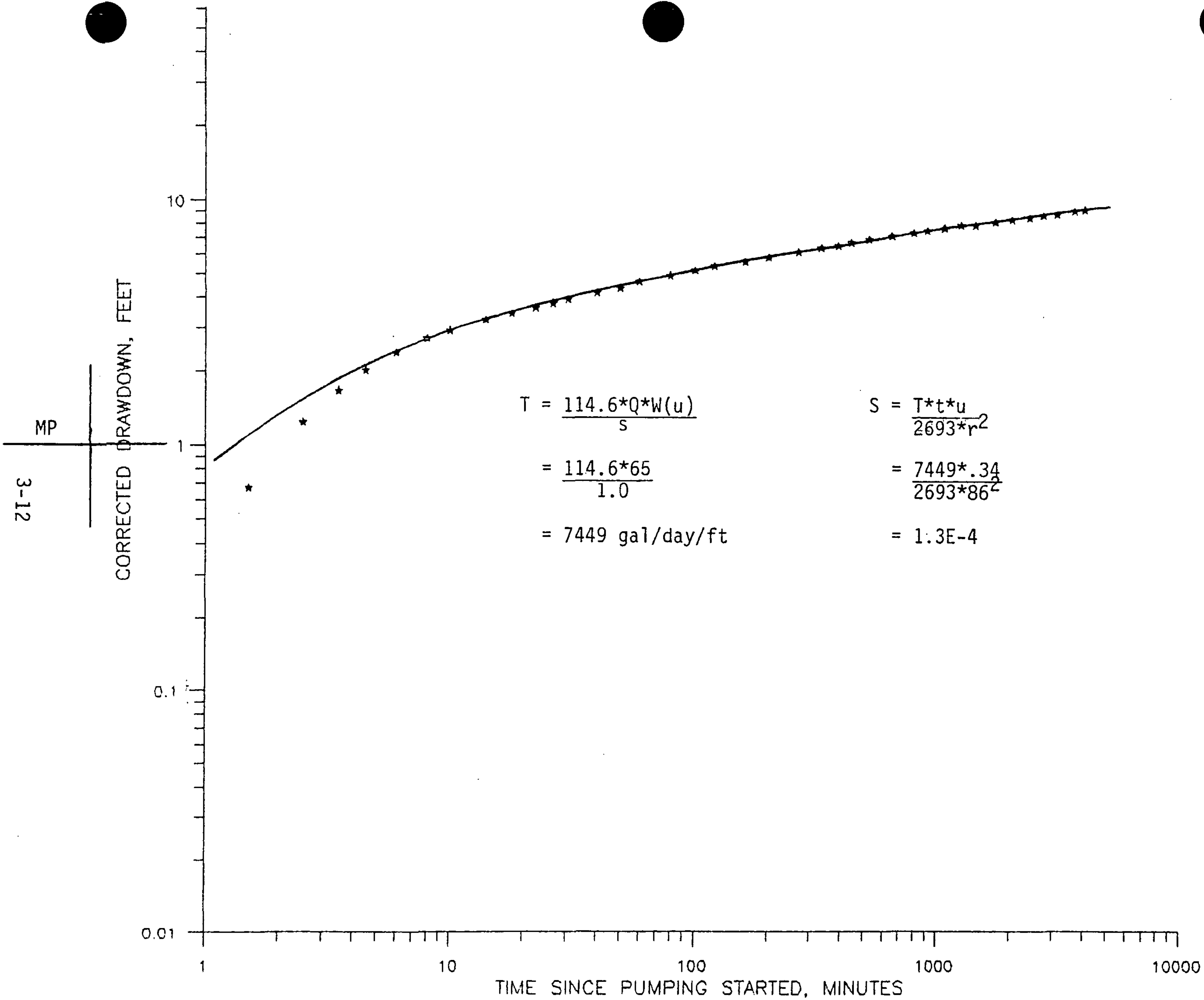


FIGURE 3-8 DRAWDOWN IN OBSERVATION WELL OI-5



$$T = \frac{114.6*Q*W(u)}{s}$$

$$= \frac{114.6*65}{1.0}$$

$$= 7449 \text{ gal/day/ft}$$

$$S = \frac{T*t*u}{2693*r^2}$$

$$= \frac{7449*.34}{2693*86^2}$$

$$= 1.3E-4$$

FIGURE 3-9 DRAWDOWN IN OBSERVATION WELL OI-5, LOG-LOG.

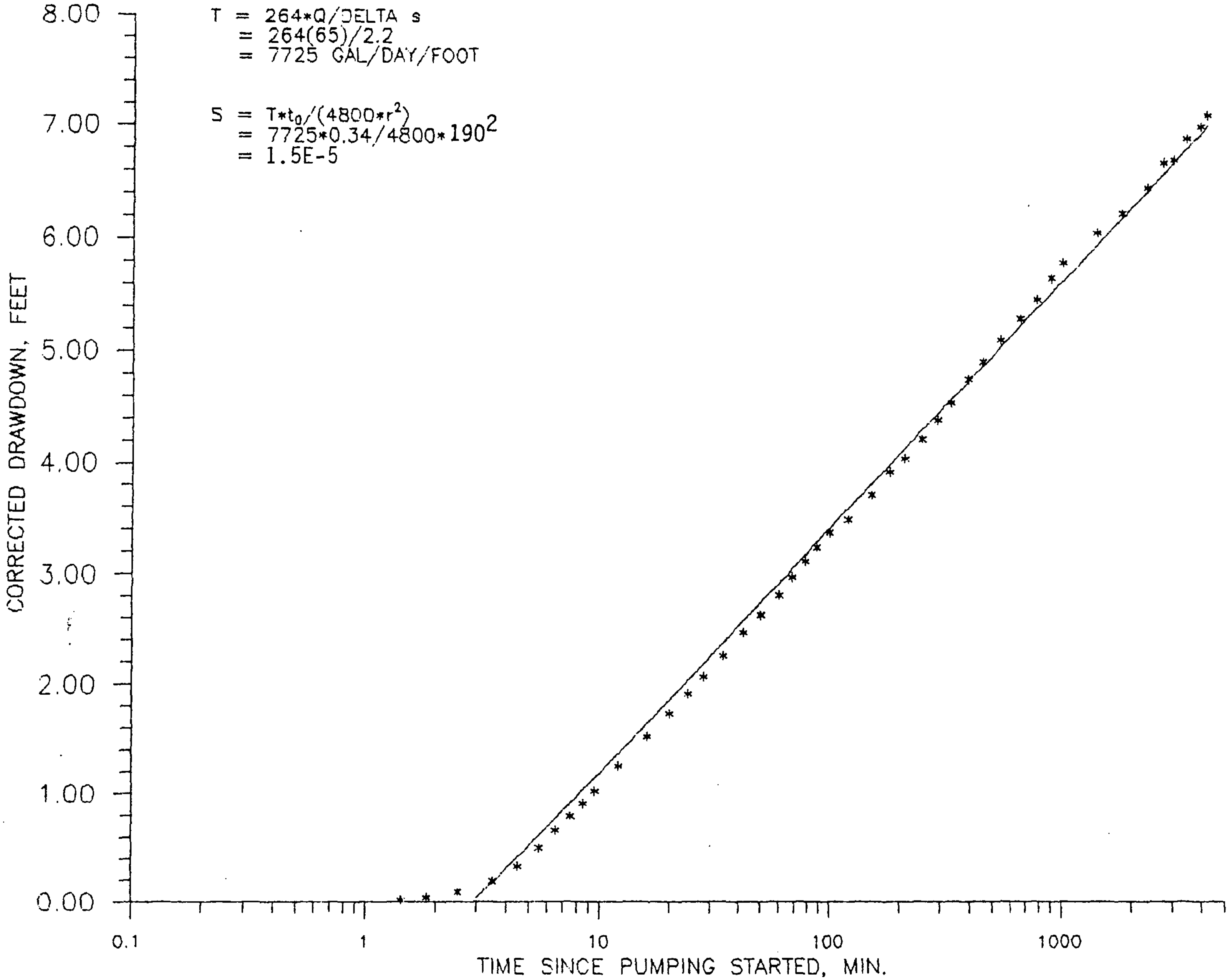


FIGURE 3-10 DRAWDOWN DATA FOR OBSERVATION WELL OI-8

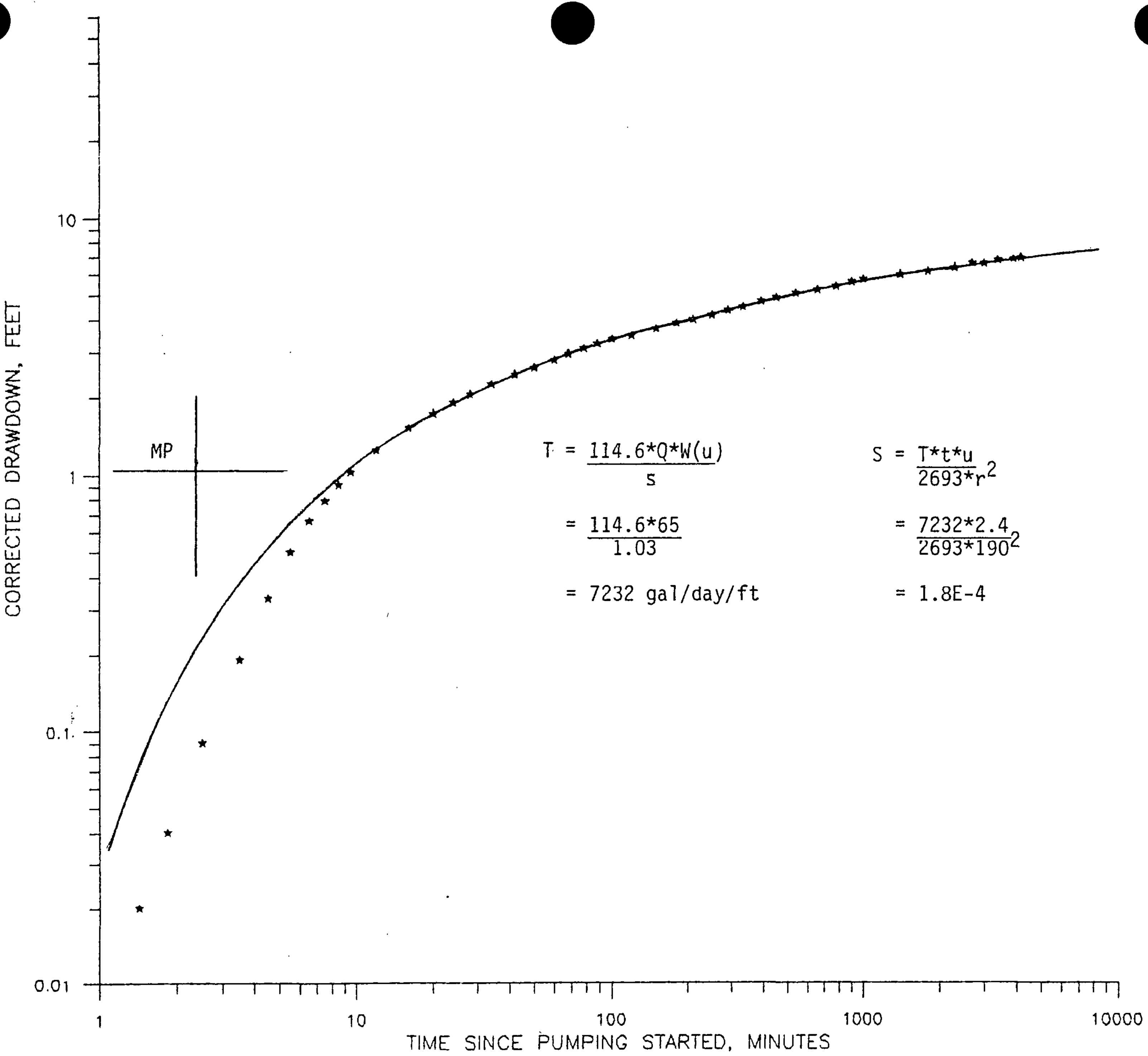


FIGURE 3-11 DRAWDOWN IN OBSERVATION WELL OI-8, LOG-LOG.

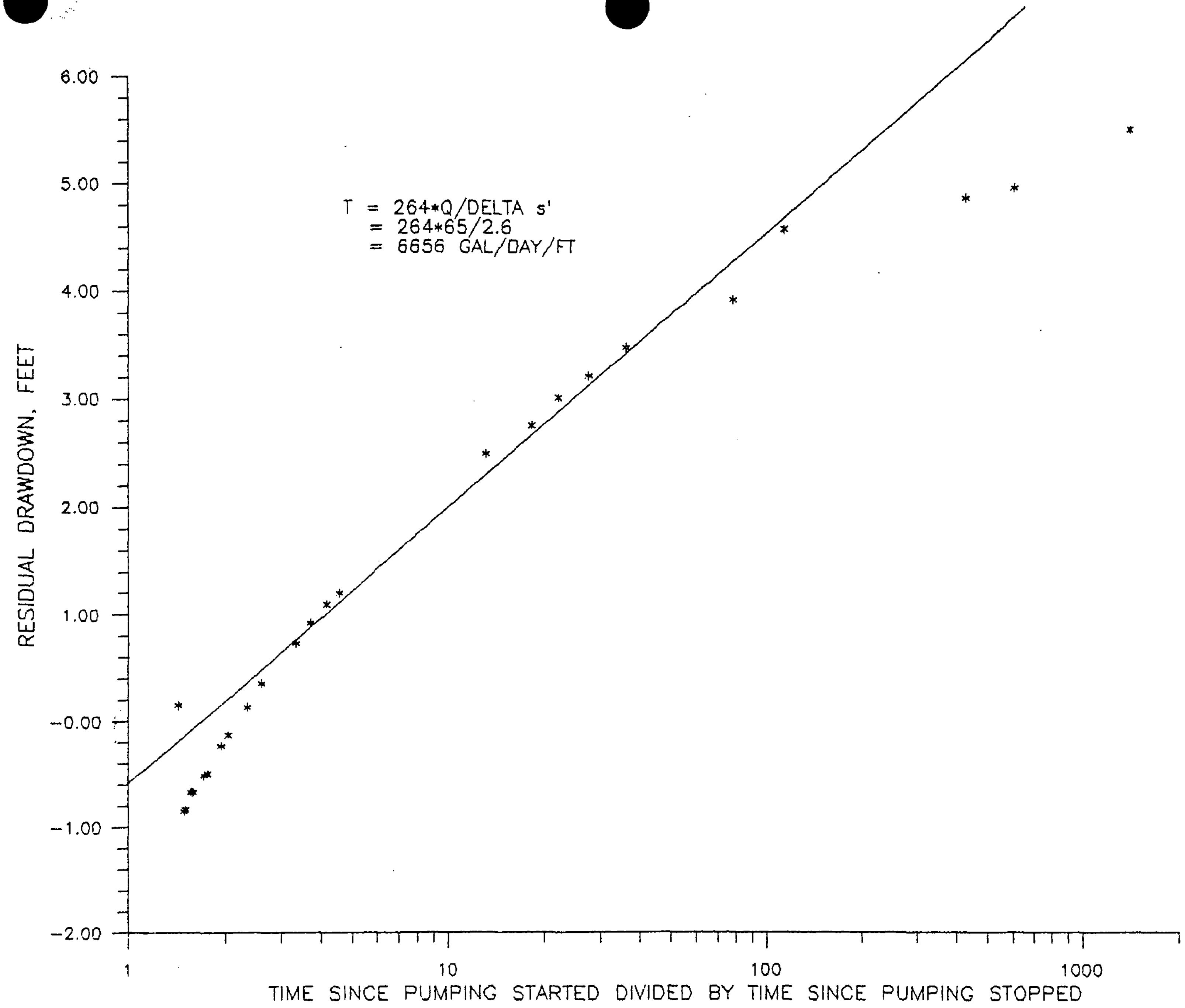


FIGURE 3-12 RECOVERY IN PUMPING WELL OP-2

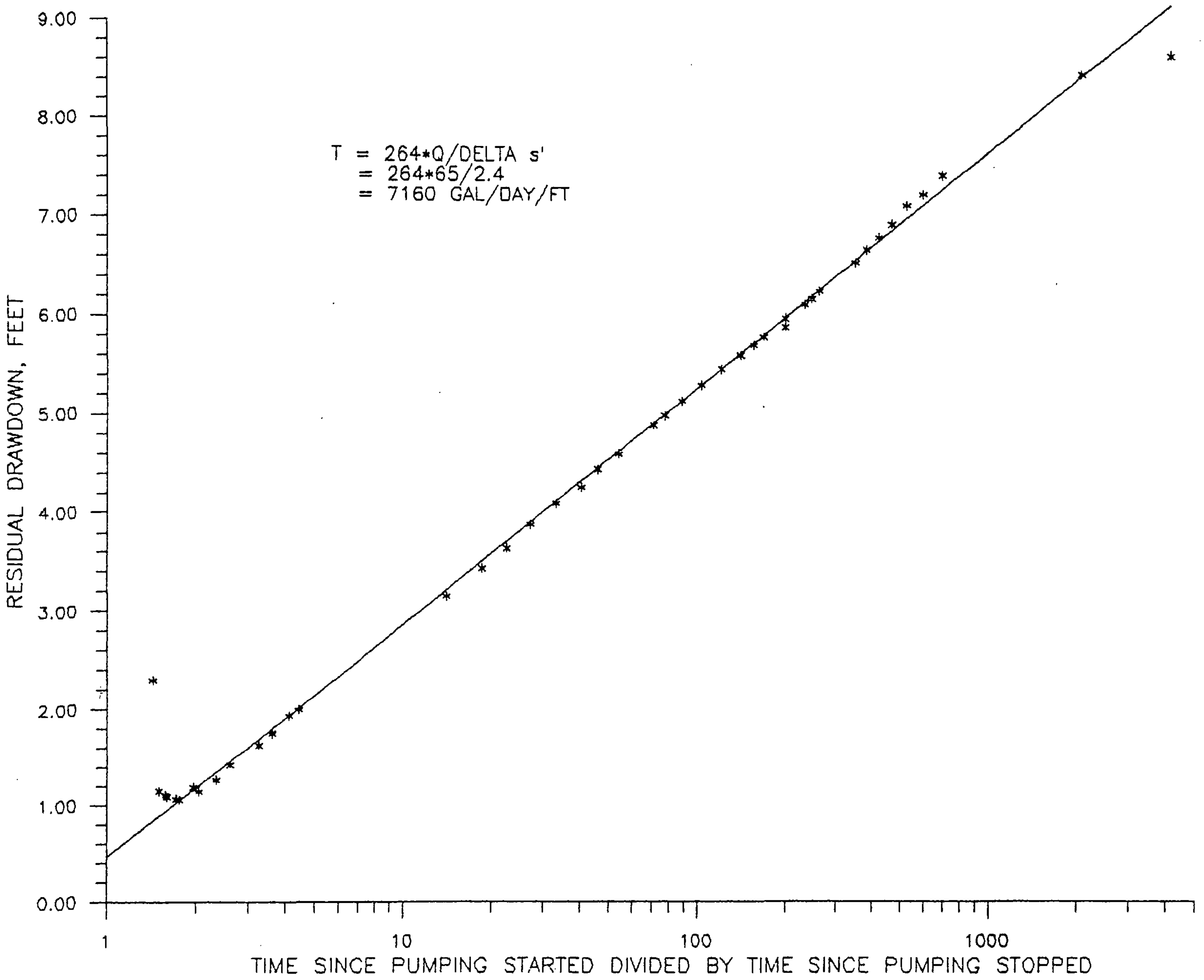


FIGURE **3-13** RECOVERY IN OBSERVATION WELL OP-3

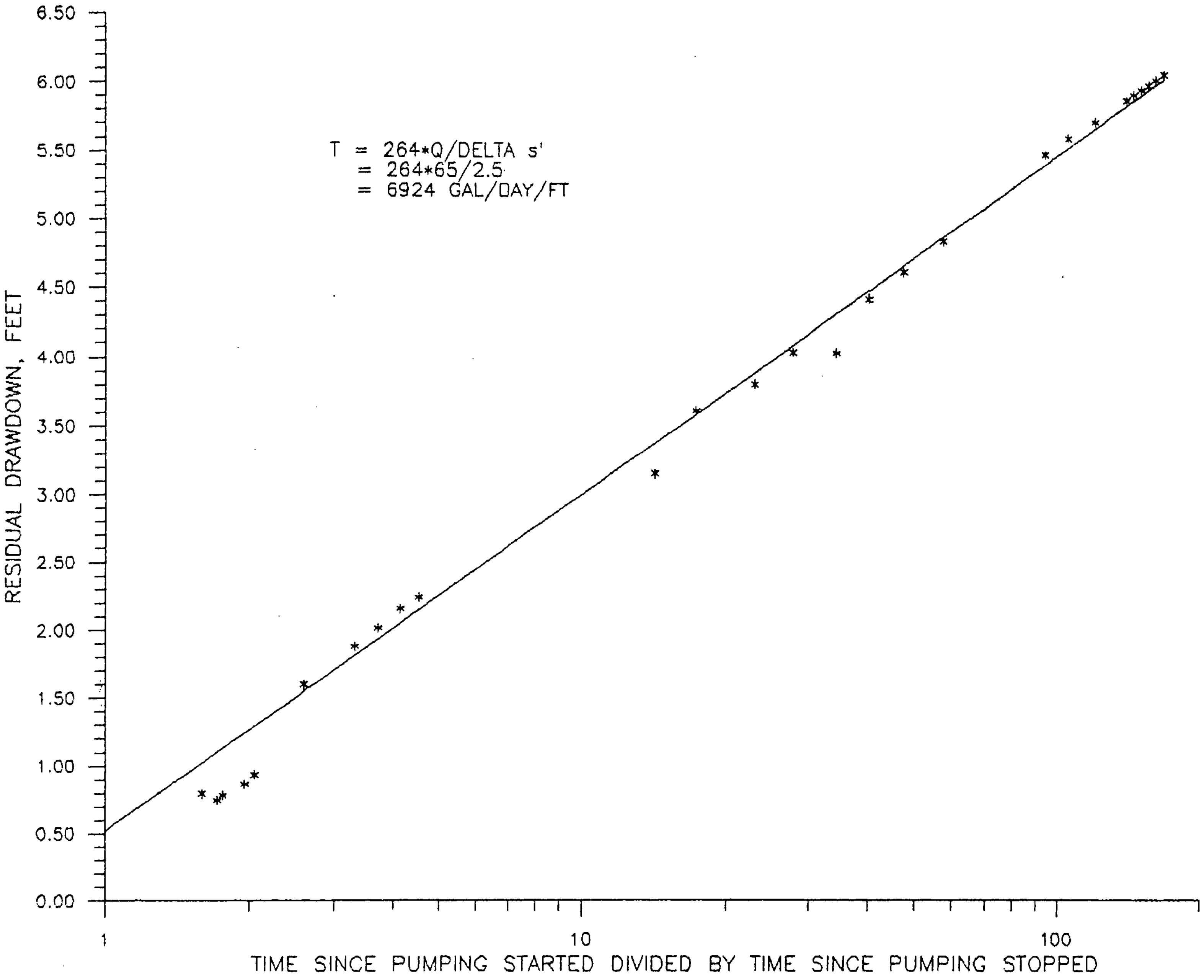


FIGURE 3-14 RECOVERY IN OBSERVATION WELL OI-1

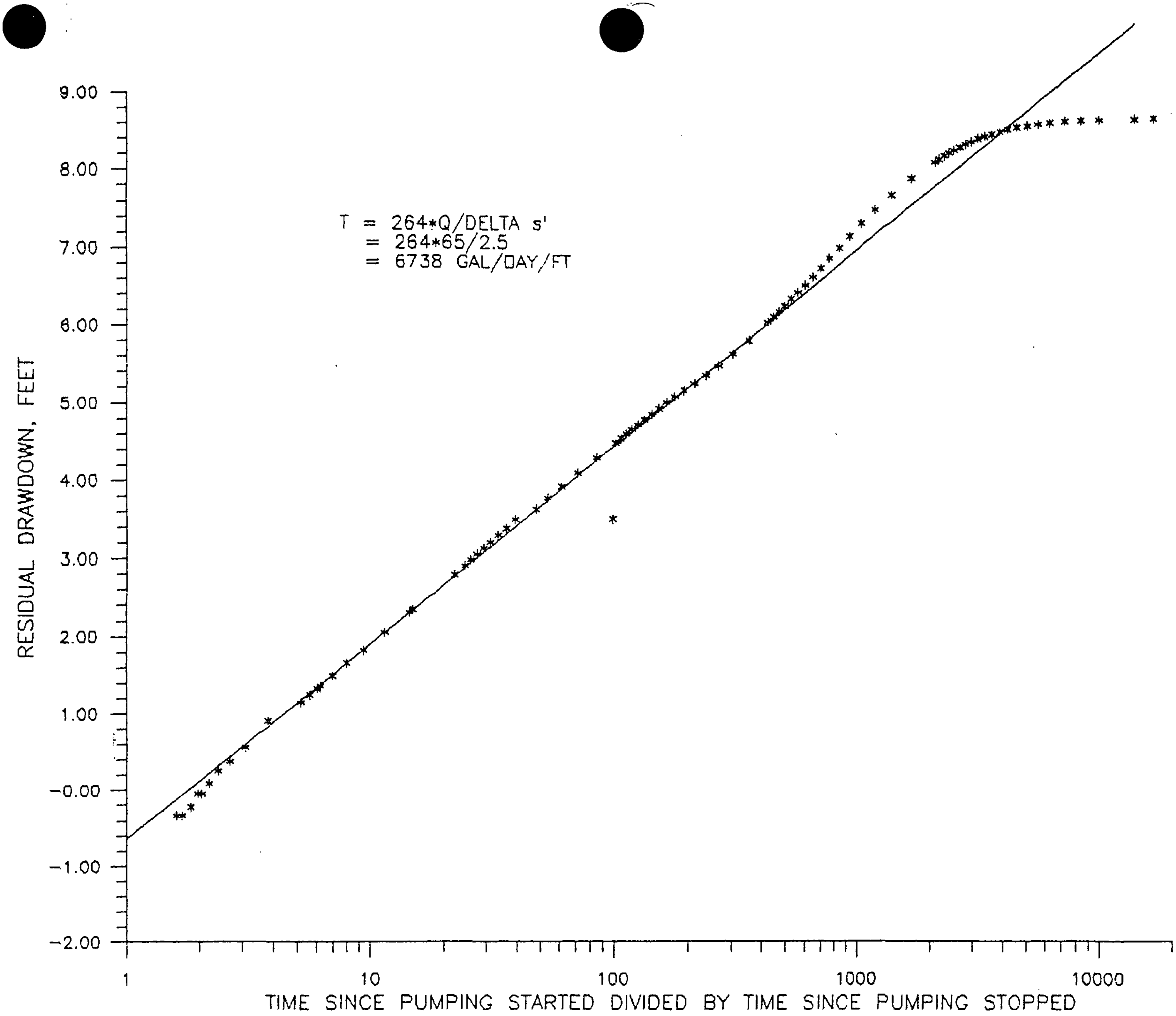
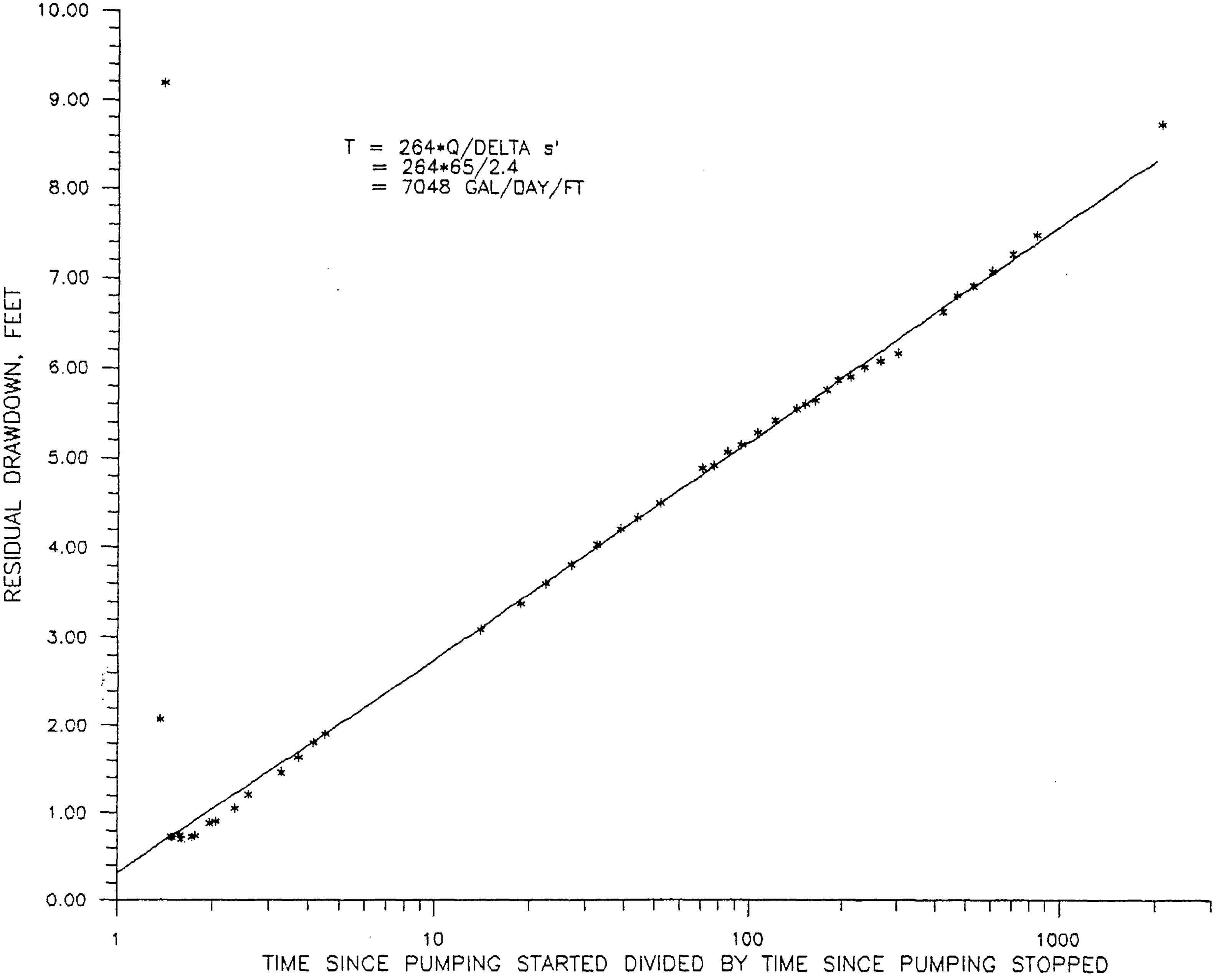


FIGURE 3-15 RECOVERY IN OBSERVATION WELL OI-3



T = 264*Q/DELTA s'
= 264*65/2.4
= 7048 GAL/DAY/FT

FIGURE 3-16 RECOVERY IN OBSERVATION WELL OI-5

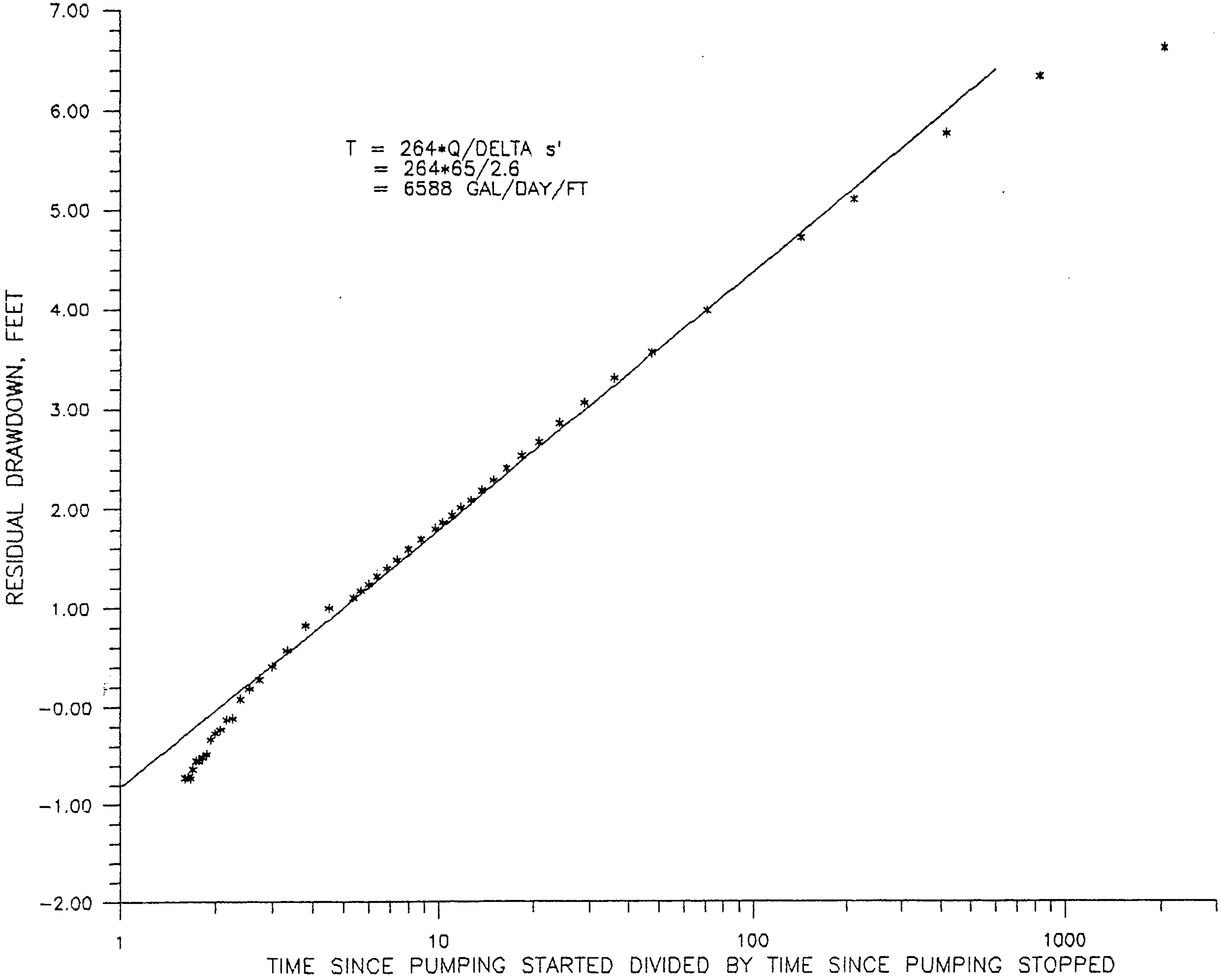


FIGURE 3-17 RECOVERY IN OBSERVATION WELL OI-8

4.0 SECTION 25 TEST

Section 25 data analysis consisted of four discrete phases, as described in the March 25, 1988 report prepared by Kerr-McGee. However, data from Phase I was not analyzed due to a malfunction of the pump after 17 hours. Phase II drawdown data was analyzed but the recovery data was not collected due to a breakdown of the generator. Both drawdown (only collected for wells 584 and 583) and recovery data were analyzed for the Phase II retest. The drawdowns in the production zone, (only wells 584 and 581), recorded during the shale communication test phase have also been analyzed. Table 1-1 presents a tabulation of the Section 25 pump test results along with the other aquifer tests.

For the ore production zone, representative values of T=2115 gal/day/ft, K=3700 millidarcy and S=1.2E-4 have been calculated. Vertical hydraulic conductivity of the overlying shale is in the neighborhood of 1.4E-4 ft/day (4.9E-8 cm/sec). The underlying shale has a vertical hydraulic conductivity of approximately 6.9E-5 ft/day (2.4E-8 cm/sec).

4.1 PREVIOUS ANALYSIS

Prior analysis of the pump test data for section 25 consisted of log-log (Theis) and semi-log (Jacob) curve matching and analysis. The Neuman-Witherspoon ratio method was used to estimate the vertical permeability of the upper and lower confining layers. Recovery data was not analyzed. Estimated production zone aquifer parameters were 1160 gpd/ft for transmissivity and 5E-4 for the storage coefficient. Vertical permeability (K′) was estimated to be 1.7E-9 for the overlying shale layer and 1.3E-8 for the underlying shale layer. K′ values were also calculated by using a relationship between observed drawdown in overlying and underlying aquifer wells and the vertical permeability of the aquitards. These K′ values did not necessarily agree with the Neuman-Witherspoon calculations.

4.2 HYDRO PHASE II ANALYSIS

Phase II began on January 7, 1986 and continued for approximately 2.8 days (4000 minutes). Well 25-584 was the pumping well for all phases. Wells 25-581, 582 and 583 are the observation wells in the production zone. Well 584 was pumped at 49 gpm.

Phase II drawdown data was analyzed using both the Theis log-log and the Jacob semi-log methods. Results were consistent from well to well indicating a relatively homogeneous horizontal hydraulic conductivity. This differs from the previous analysis performed in the aforementioned Kerr-McGee report in which transmissivities around well 25-581 were approximately twice the transmissivities around wells 25-583 and 25-582. These differences are thought to be due to the well storage effects noted on the semi-log plot, which the Kerr-McGee report did not take into account. An average transmissivity value for this phase of testing is 2200 gal/day/ft, with the storage coefficient being approximately 9.8E-5. The drawdown data was corrected for prior rising trends of 0.43, 0.53, 0.32 and 0.44 ft/day for wells 584, 581, 582 and 583 respectively. The corrected drawdown does not indicate leakage as the previous analysis did.

4.3 HYDRO PHASE II RETEST ANALYSIS

Drawdown data was analyzed in a similar fashion for wells 584 and 583 in this phase of the test. The Phase II retest began on January 14, 1986 and lasted for a period of 4200 minutes ($\simeq$ 2.9 days), with well 584 pumping at 49 gpm. No drawdown or recovery data for this phase of testing was analyzed in the Kerr-McGee report, although its' sole purpose was to collect recovery data. Recovery data was collected for wells 581, 582 583 and the pumping well 584. Trends equal to the ones used for these wells for the Phase II test were used to correct the drawdown and recovery data for the Phase II retest. The recovery data proved to be very consistent with earlier results. Calculated transmissivities of the aquifer ranged from 1955 to 2246 gal/day/ft from which a representative value of 2050 gal/day/ft was estimated.

4.4 HYDRO SHALE COMMUNICATION TEST ANALYSIS

The shale communication test began on September 18, 1986 and lasted a total of 3 days (4300 minutes), with the same pumping rate as before (49 gpm).

Vertical hydraulic conductivity (K), calculations were redone using the new values for T and S and data from well 581 rather than 582, due to the fact that well 581 was the monitor well during this phase of testing. These changes did not appreciably effect the previously calculated K′ values for either the overlying or underlying shale aquitards. The aquitard observation wells showed no drawdown response attributable to pumping. This could be due to a complete lack of vertical communication or more likely a lack of well development.

Observation wells were monitored in the aquifers overlying (585), and underlying the shale aquitards (586). Both the overlying and underlying aquifer wells experienced a slight drawdown. These drawdowns were used in the Neuman-Witherspoon ratio calculations in order to provide an estimate of the vertical permeability of the aquitards. In order to do this the full aquitard thickness was used for z′ in place of the distance from the piezometer to the aquifer-aquitard contact. No production zone observation well was exactly the same distance from the pumping well as wells 585 and 586. Therefore predicted drawdown in the production zone, at that particular radius was calculated and used. This resulted in vertical permeabilities of 4.9E-8cm/sec for the overlying shale layer and 2.4E-8 cm/sec for the underlying shale layer.

OVERLYING SHALE LAYER

Well 585

$r' = 60$ ft

$t = 2.5$ days

$s' = .34$

$z' = 45$ ft

$S = 1.9E-6$

Predicted Drawdown

$r = 60$ ft

T=2050 = 275 ft^2/day S=1.7E-4

$$u=\frac{187r^2s}{T\ t} = 2.2E-4$$

$W(u) = 7.8449$

$$s = \frac{(114.6)(Q)(W(u))}{T}$$

$$= \frac{(114.6)(49)(7.8449)}{2050} = 21.5$$

$$\frac{s'}{s} = \frac{.34}{21.4} = 1.6E-2$$

$$t_D = \frac{(T)(t)}{(S)(r^2)}$$

$$= \frac{(275)(2.5)}{(1.7E-4)(60)^2} = 1.1E2$$

(dimensionless time parameter) $ALPHA' = (z')^2(t'_D/t$

$t'_D = 9.0E2$

$$= \frac{(45)^2)(9.0E-2)}{2.5} = 72.9$$

$K' = ALPHA'S$

$K' = (72.9)(1.9E-6) = 1.4E-4$ ft/day = 4.9E-8 cm/sec

UNDERLYING SHALE LAYER

Well 586

$r' = 58$ ft

$t = 2.5$ days

$s' = .71$ ft

$z = 30$ ft

$$\frac{s'}{s} = \frac{.71}{21.2} = 3.3E-2$$

Predicted Drawdown

$r = 60$ ft $S = 1.7E-4$

$T = 2050 = 275$ ft^2/day

$s = 21.2$ ft

$t_D = 1.2E3$

$t_D' = 1.6E-1$

$ALPHA' = 57.6$

$K = 6.9E-5$ ft/day = 2.4E-8 cm/sec

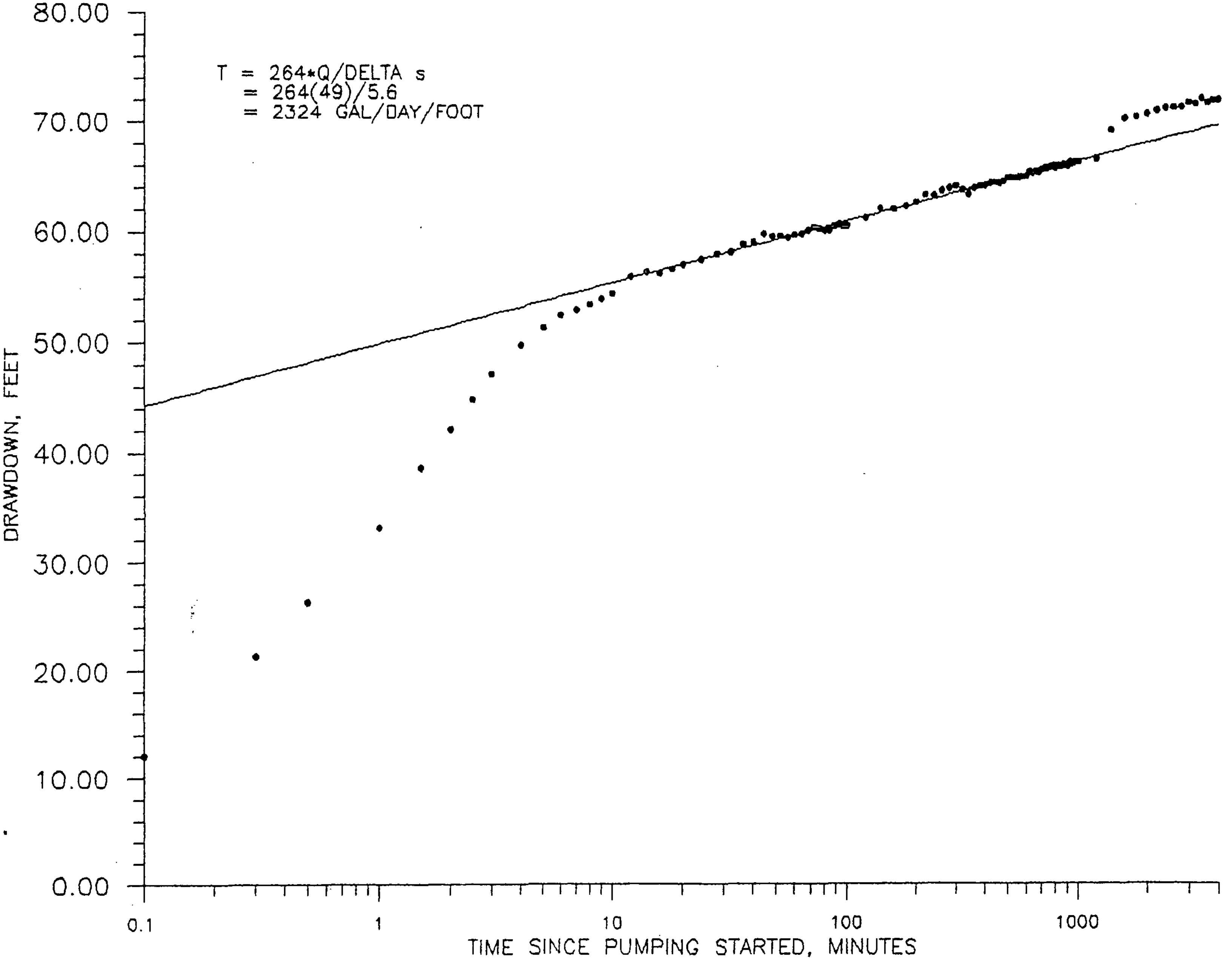


FIGURE 4-1 DRAWDOWN IN PUMPING WELL 584, PHASE 11, SEMI-LOG

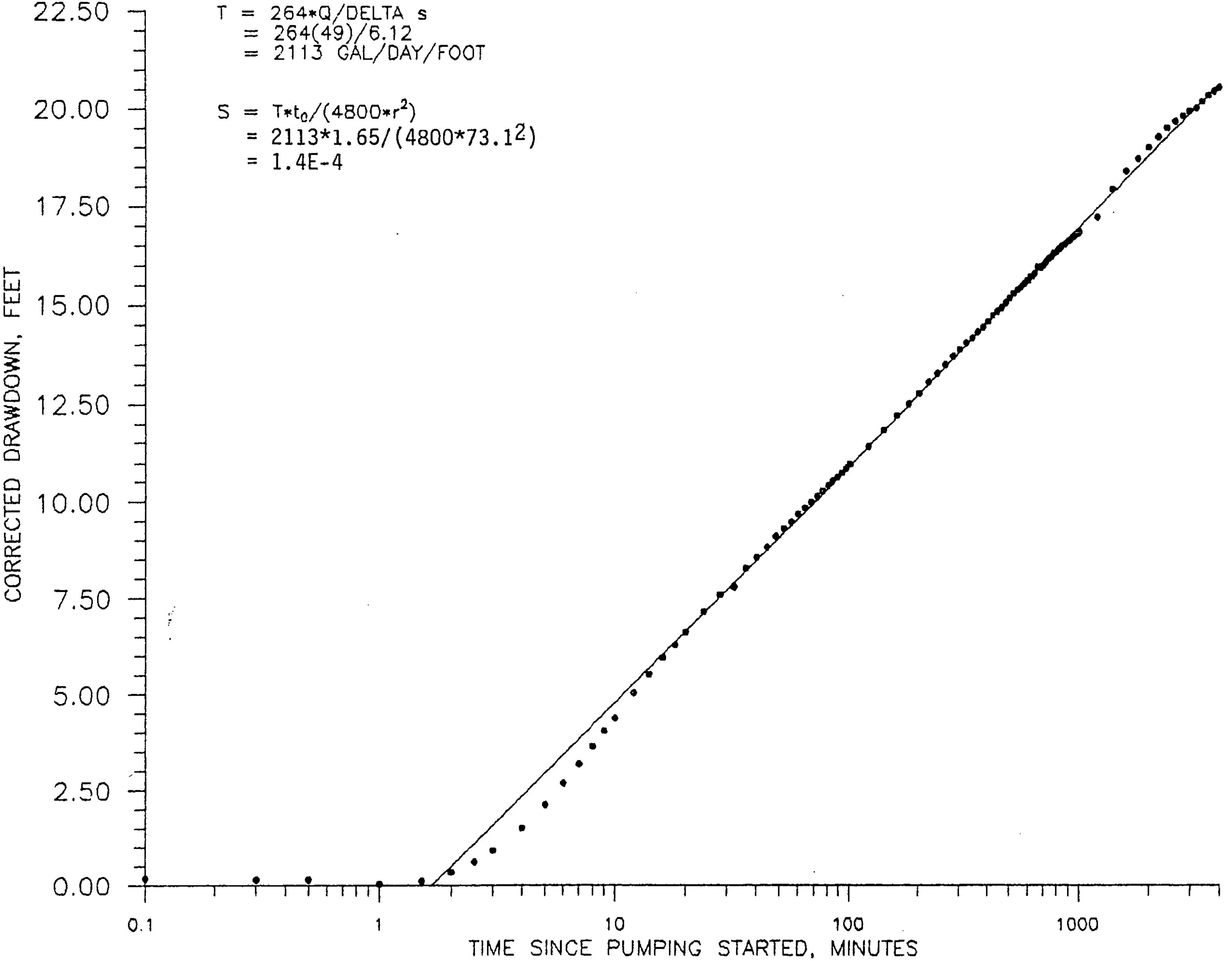


FIGURE 4-2 DRAWDOWN IN OBSERVATION WELL 581, PHASE 11, SEMI-LOG

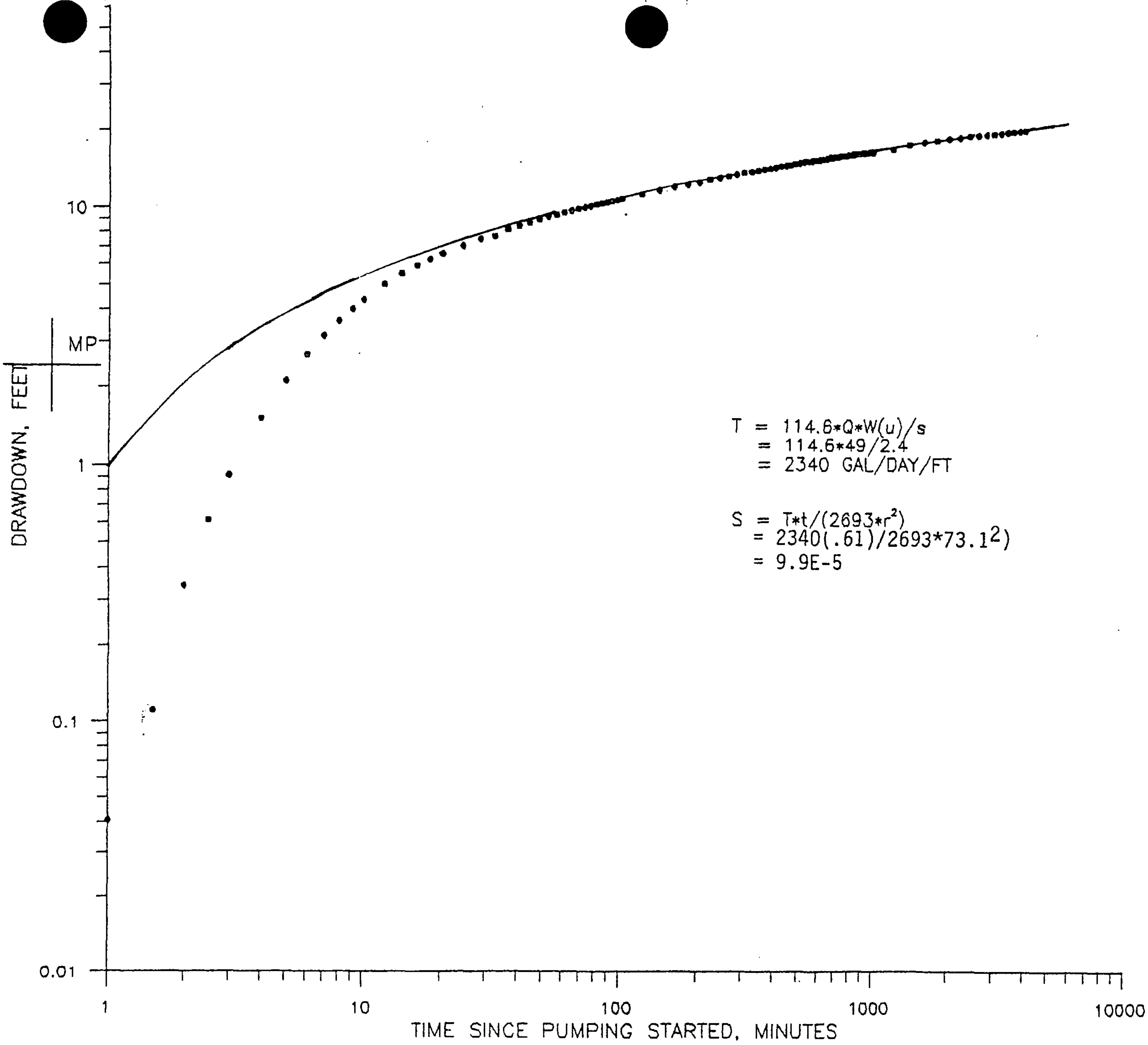


FIGURE 4-3 DRAWDOWN IN OBSERVATION WELL 581, PHASE II, LOG-LOG

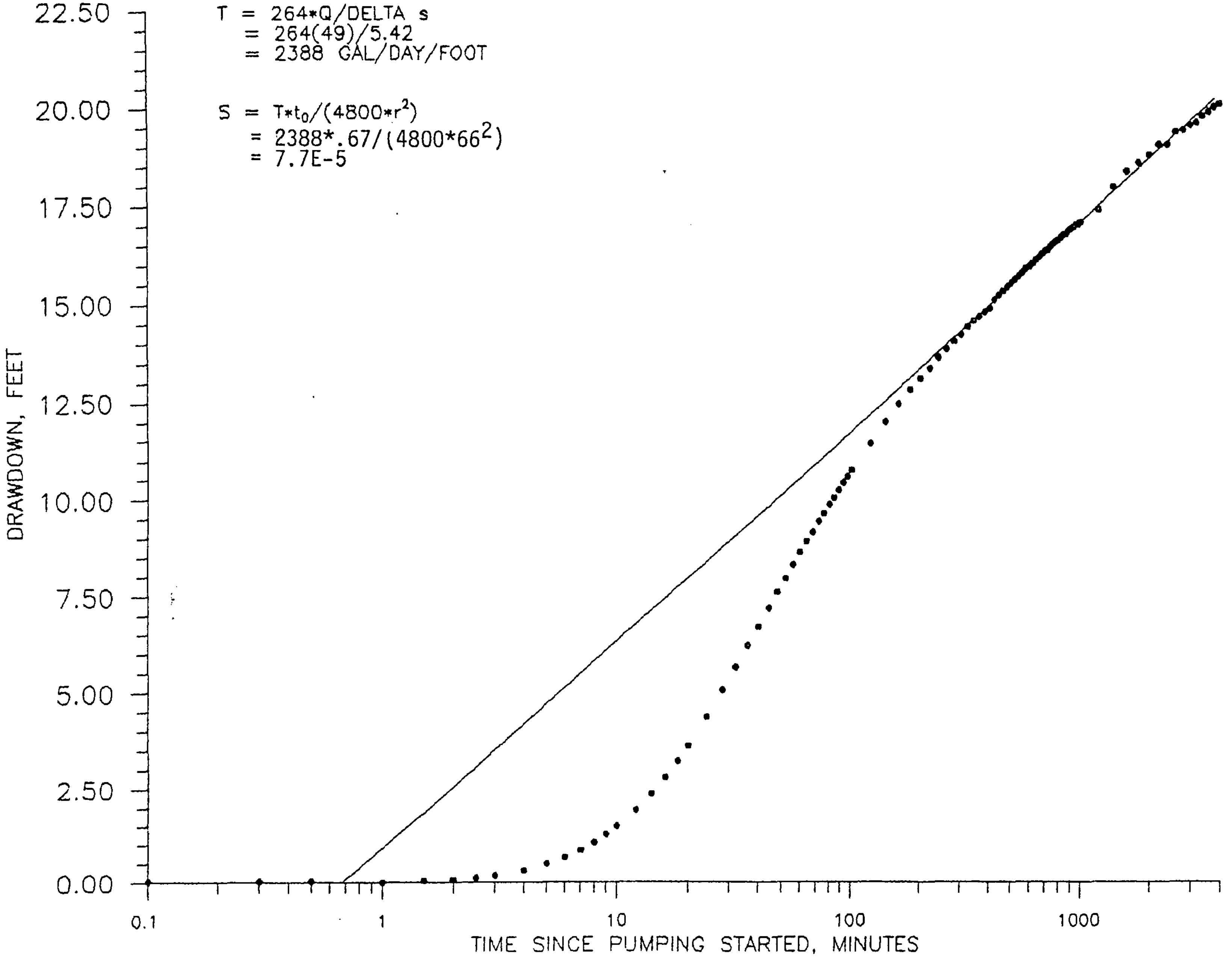
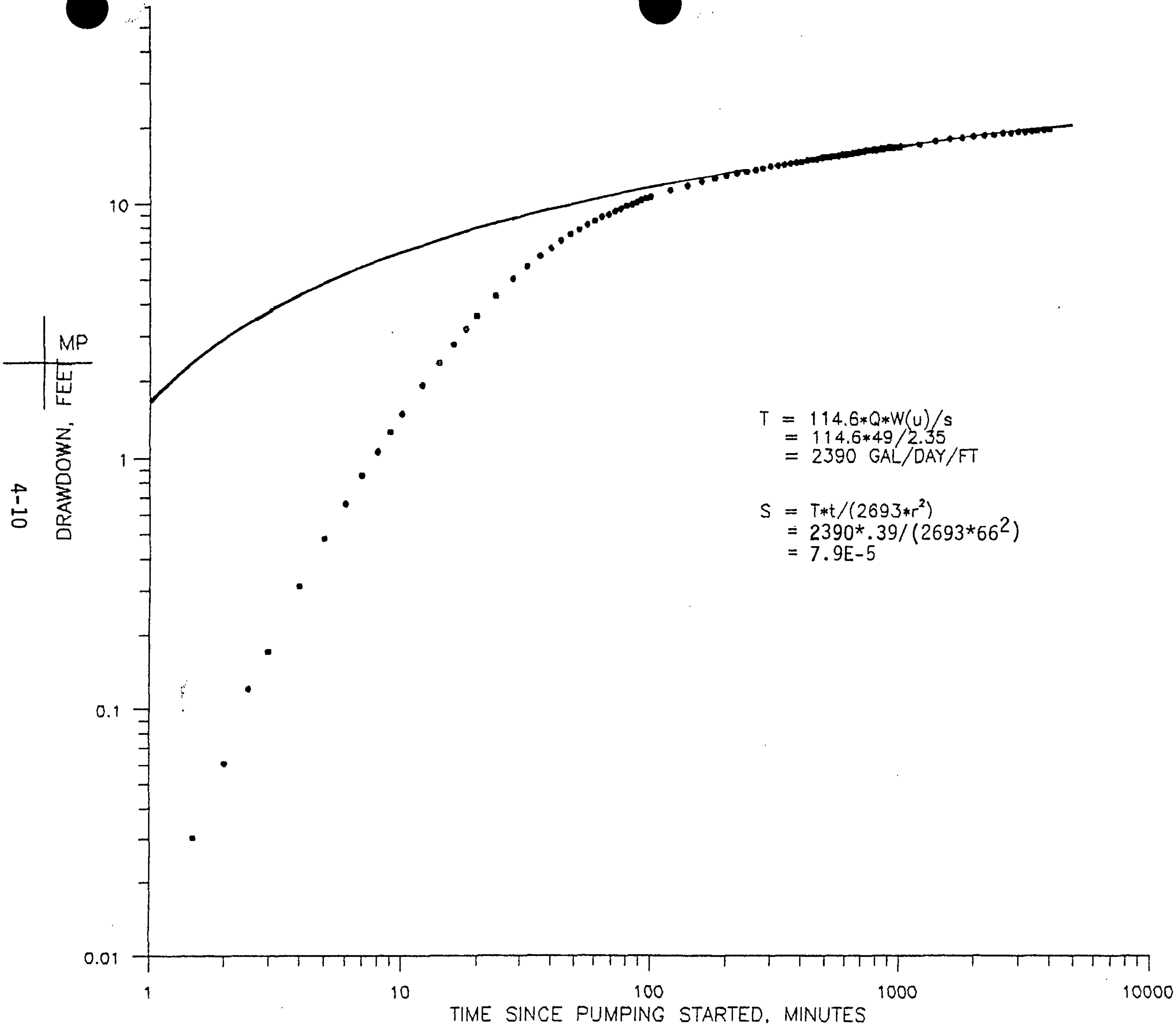


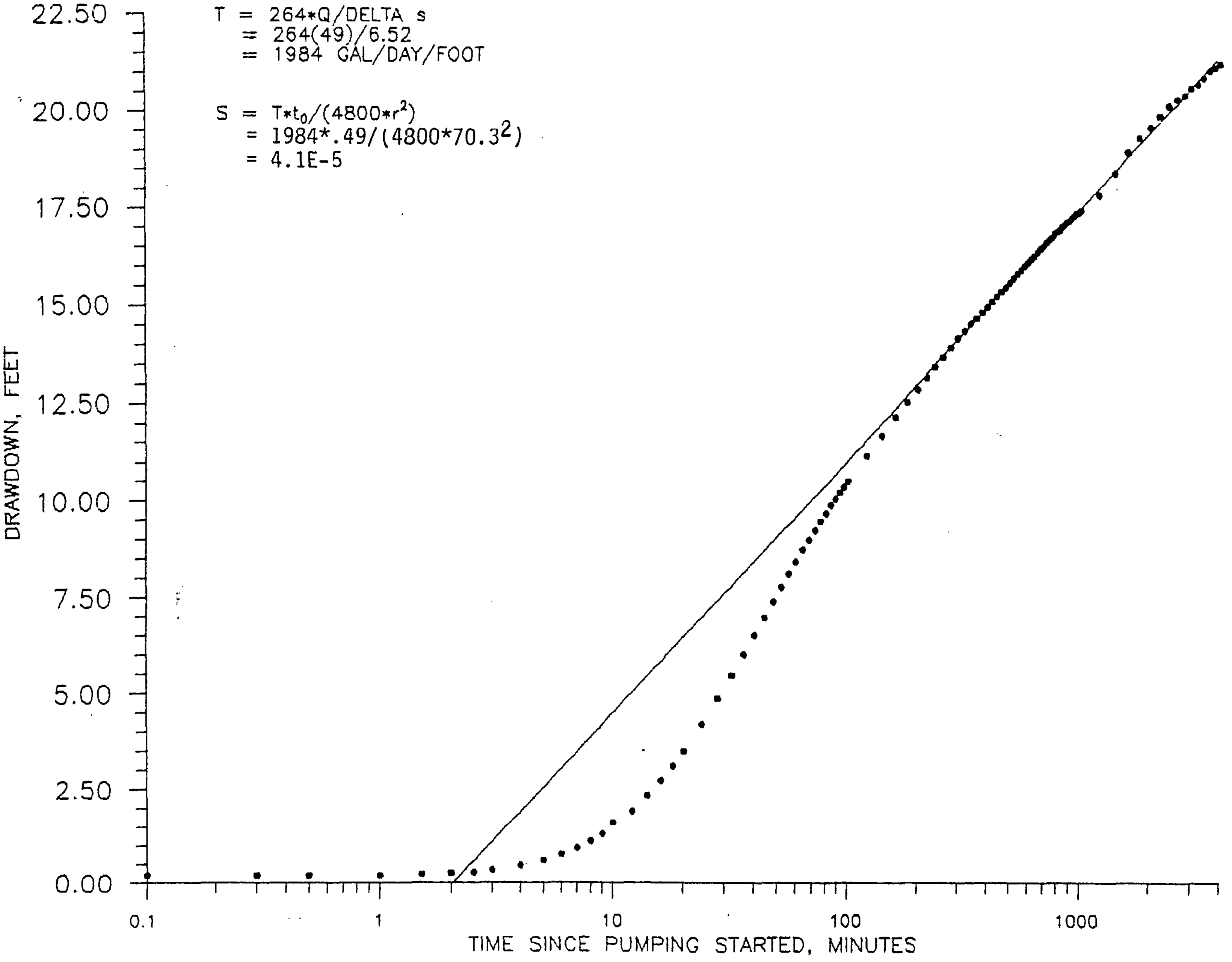
FIGURE 4-4 DRAWDOWN IN OBSERVATION WELL 582, PHASE 11, SEMI-LOG



T = 114.6*Q*W(u)/s
= 114.6*49/2.35
= 2390 GAL/DAY/FT

S = T*t/(2693*r^2)
= 2390*.39/(2693*66^2)
= 7.9E-5

FIGURE 4-5 DRAWDOWN IN OBSERVATION WELL 582, PHASE II, LOG-LOG



T = 264*Q/DELTA s
= 264(49)/6.52
= 1984 GAL/DAY/FOOT

S = $T*t_0/(4800*r^2)$
= $1984*.49/(4800*70.3^2)$
= 4.1E-5

FIGURE 4-6 DRAWDOWN IN OBSERVATION WELL 583, PHASE 11, SEMI-LOG

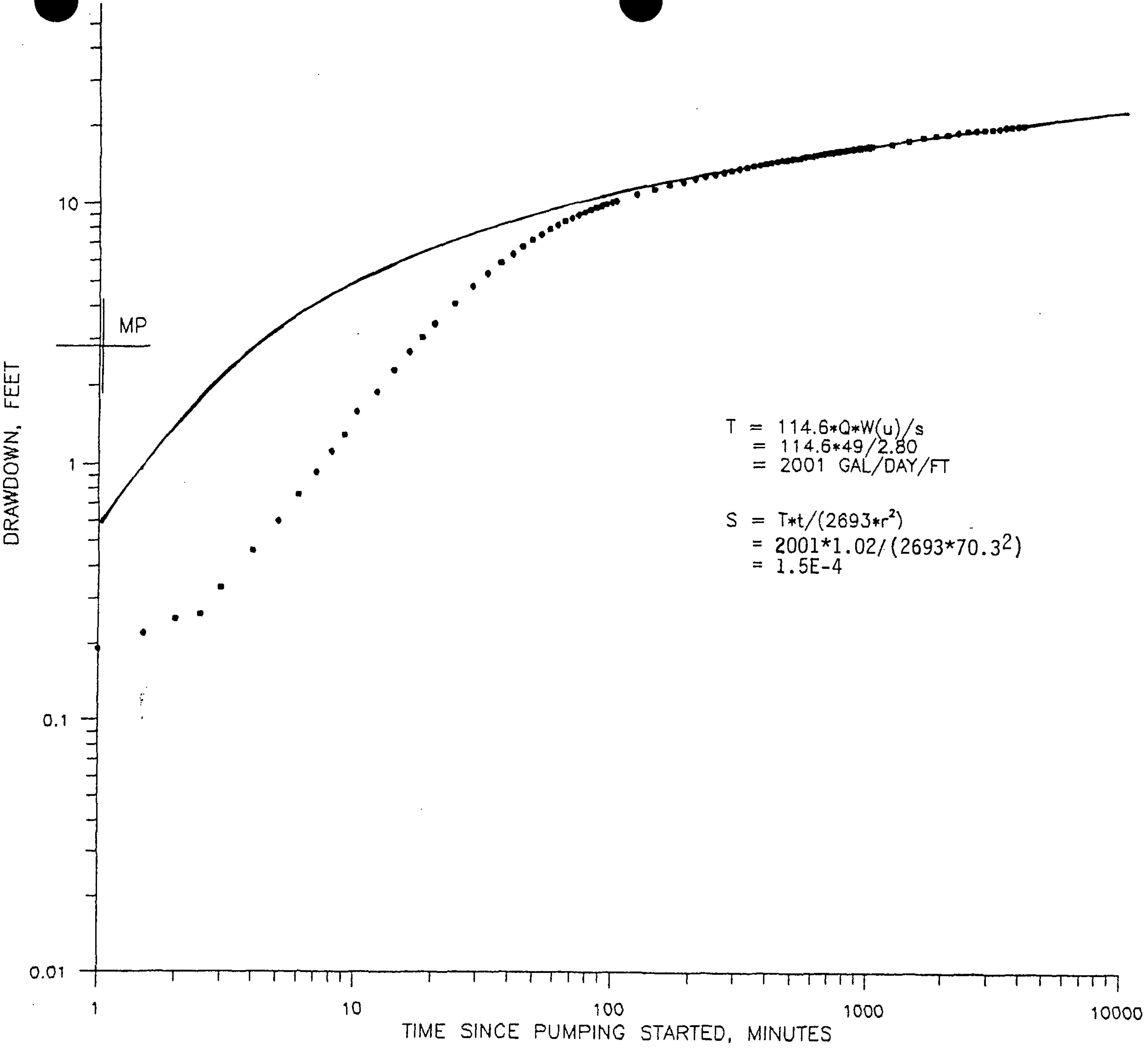


FIGURE 4-7 DRAWDOWN IN OBSERVATION WELL 583, PHASE II, LOG-LOG

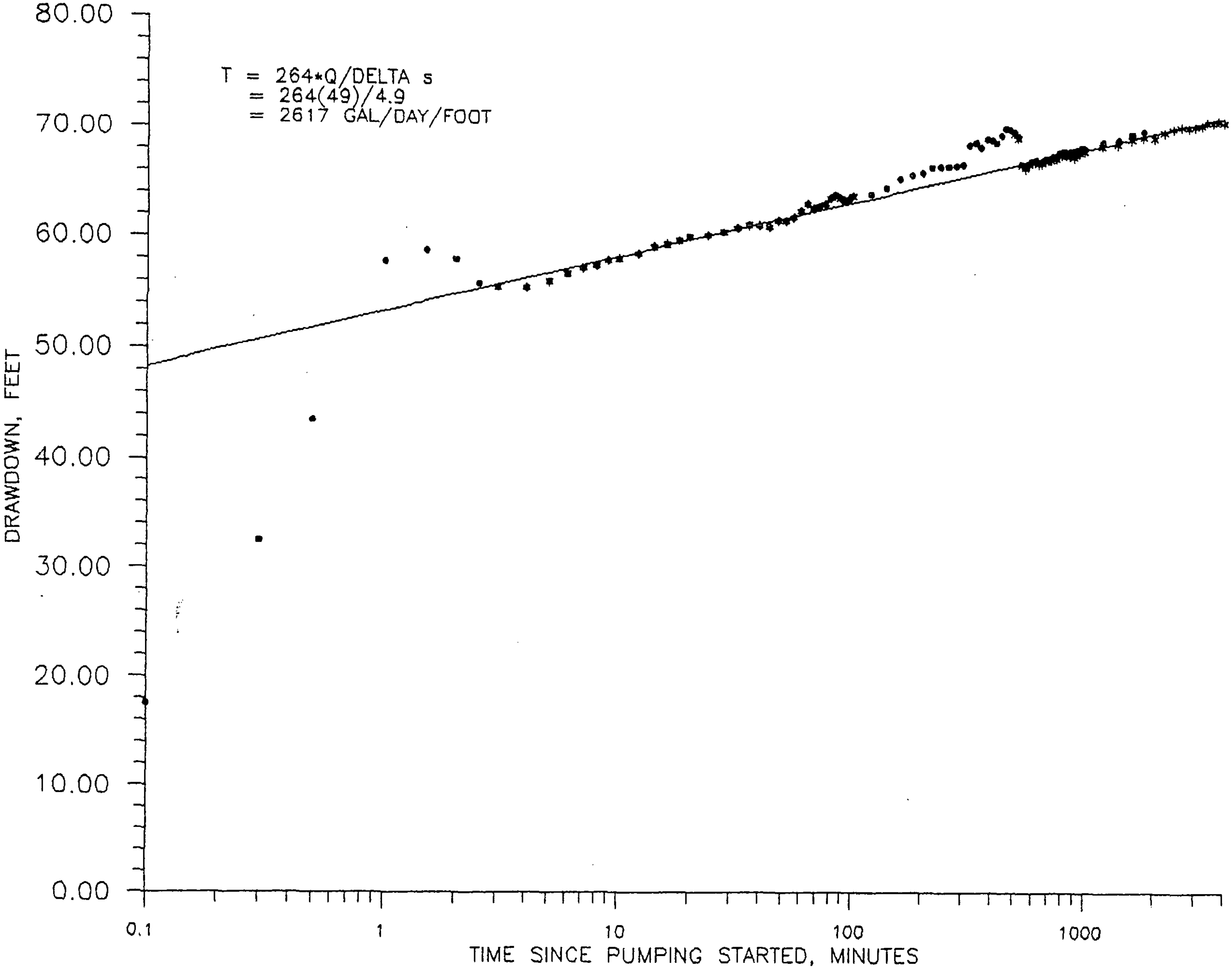
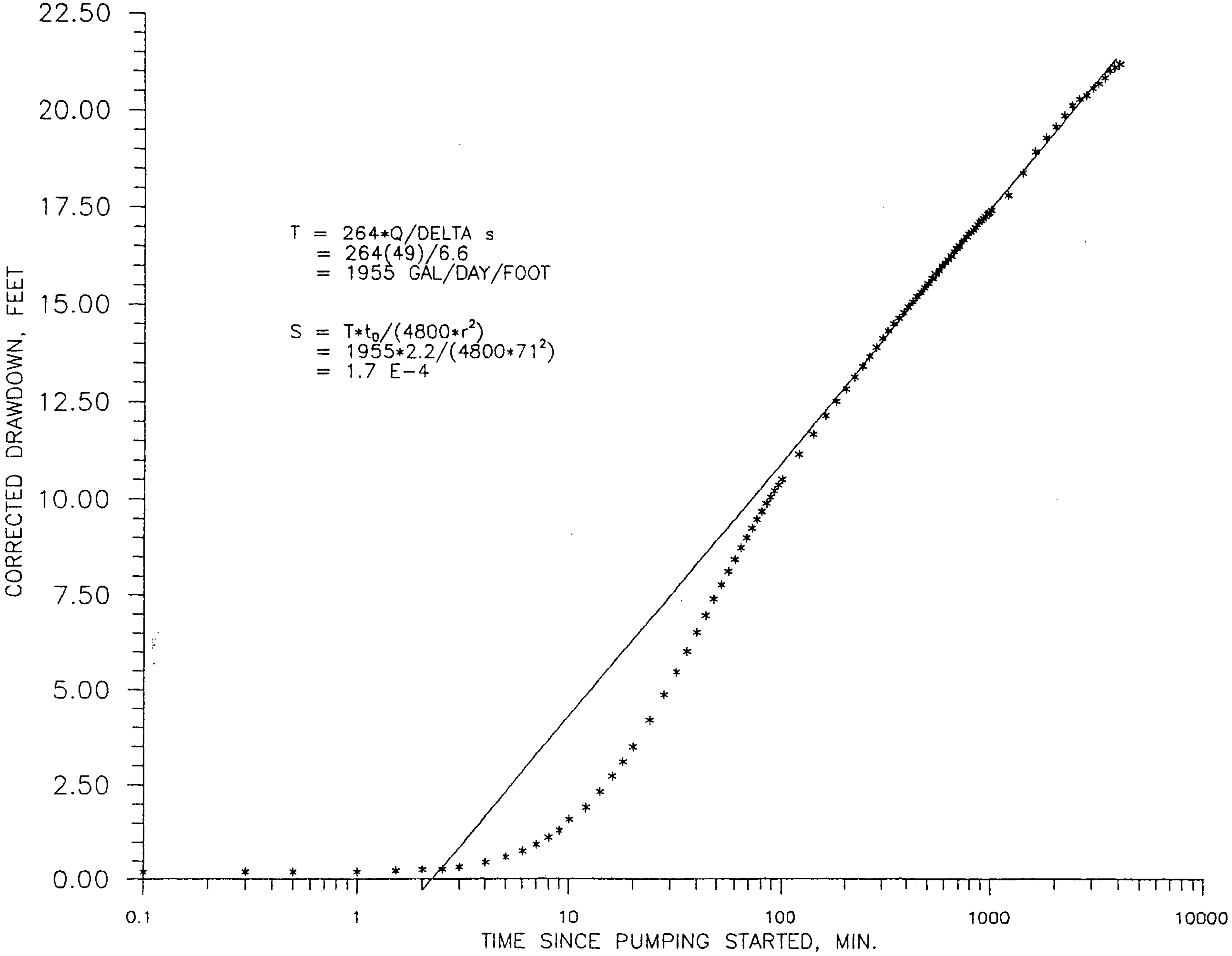


FIGURE 4-8 DRAWDOWN IN PUMPING WELL 584, PHASE II, RETEST, SEMI-LOG



T = 264*Q/DELTA s
= 264(49)/6.6
= 1955 GAL/DAY/FOOT

$S = T*t_0/(4800*r^2)$
$= 1955*2.2/(4800*71^2)$
$= 1.7\ E-4$

FIGURE 4-9 DRAWDOWN IN OBSERVATION WELL 25-583, PHASE II RETEST, SEMI-LOG

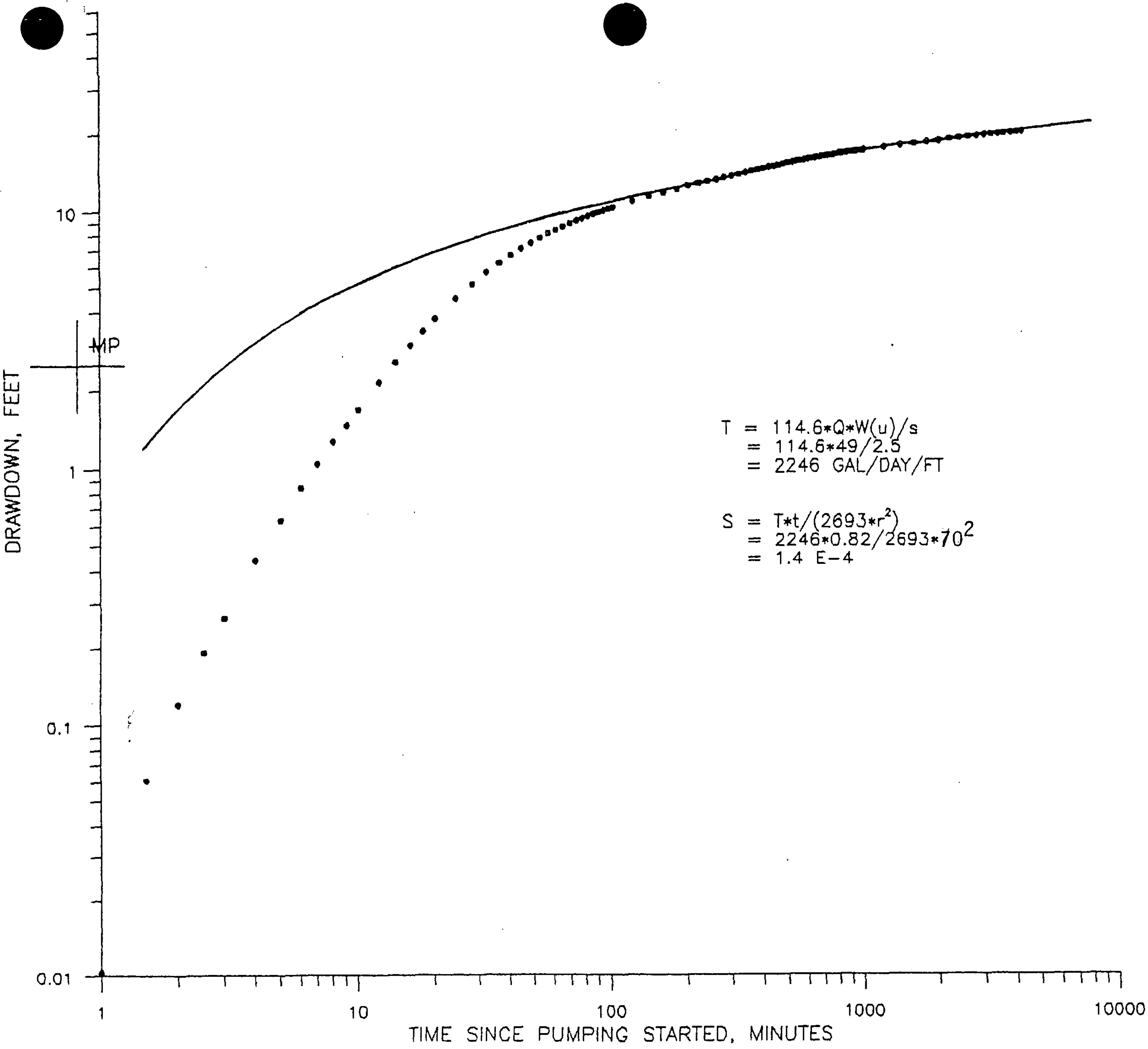


FIGURE 4-10 DRAWDOWN IN OBSERVATION WELL 583, PHASE II RETEST, LOG-LOG

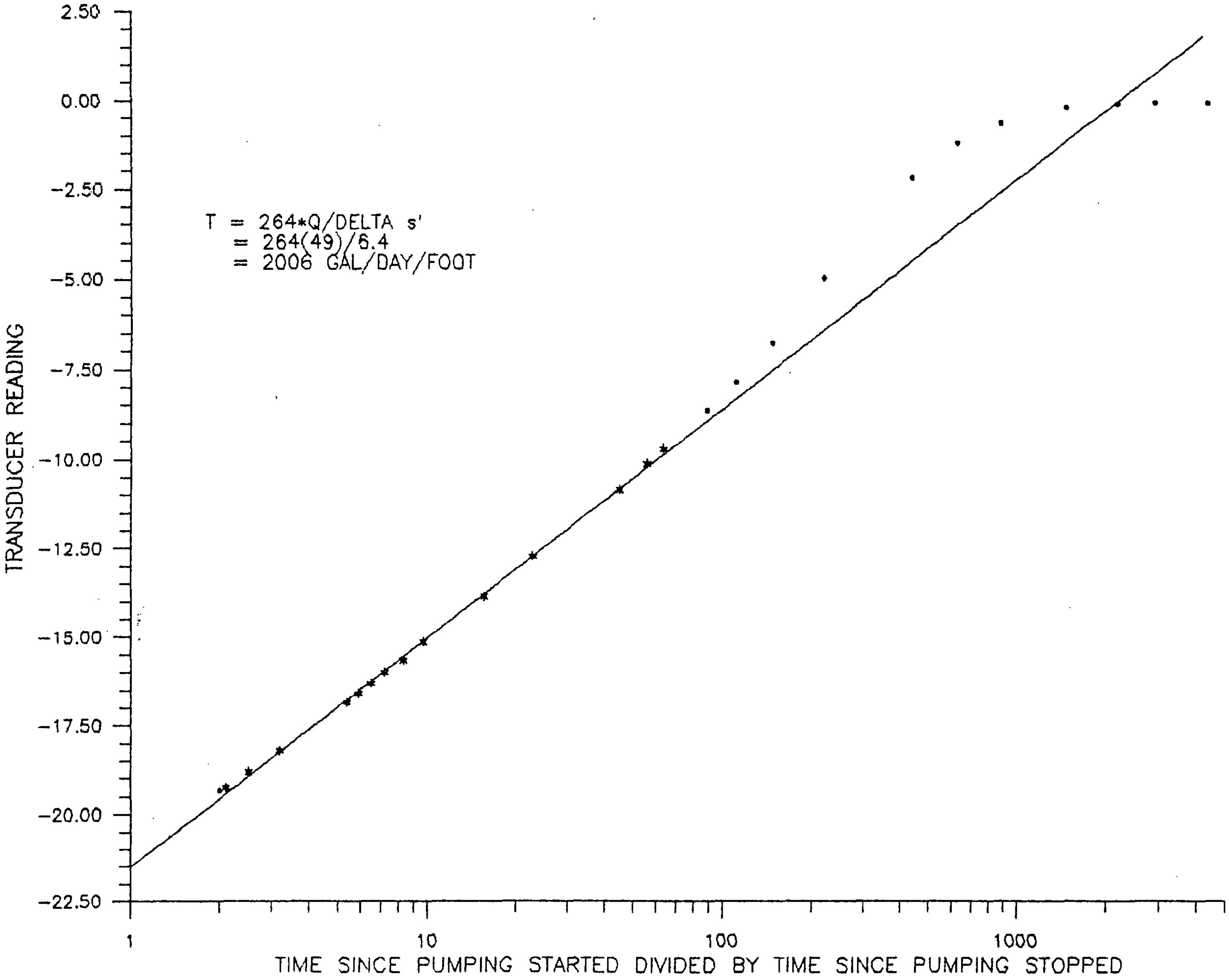


FIGURE 4-11 RECOVERY IN OBSERVATION WELL 582, PHASE II RETEST. SEMI-LOG

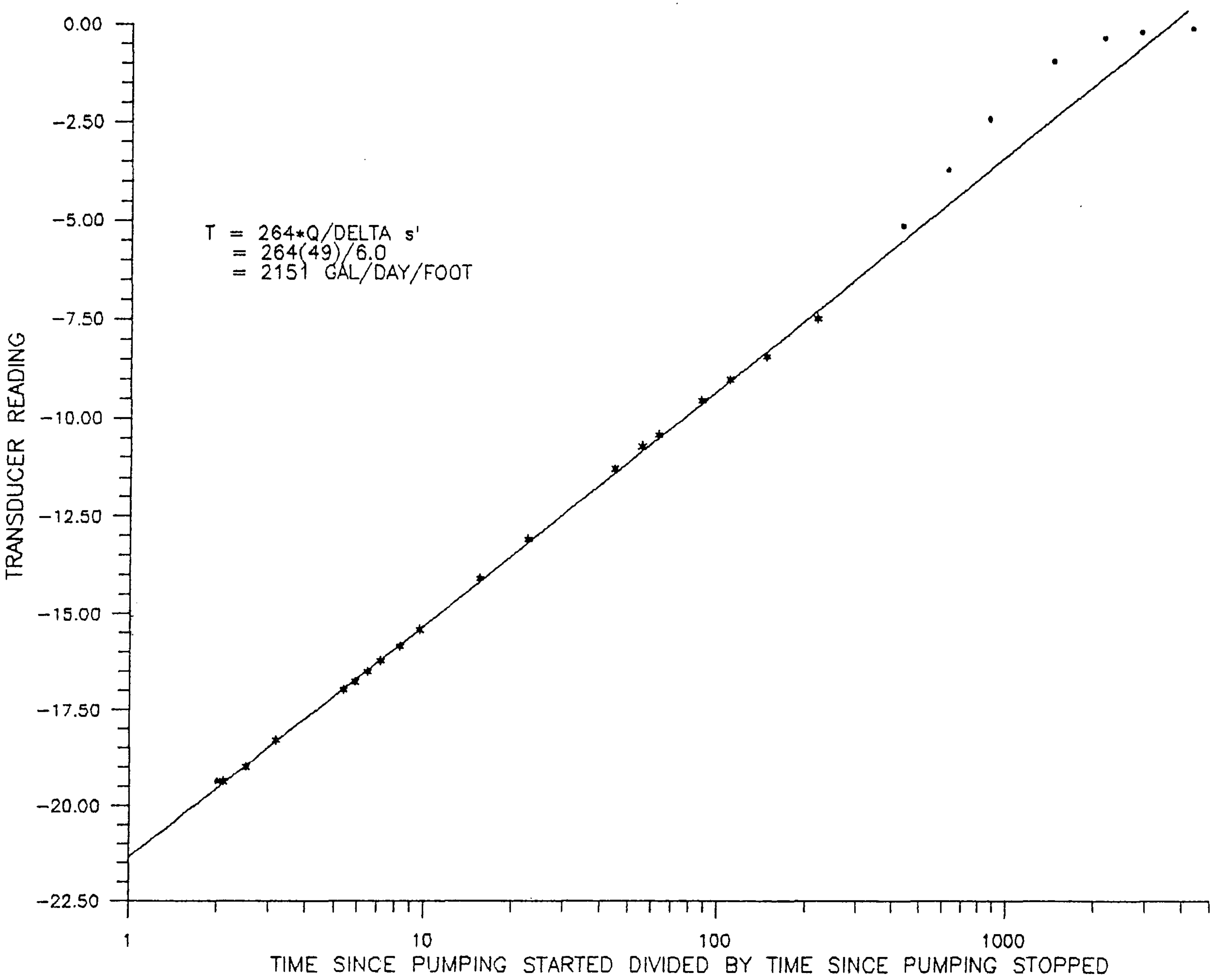


FIGURE 4-12 RECOVERY IN OBSERVATION WELL 581, PHASE II RETEST, SEMI-LOG

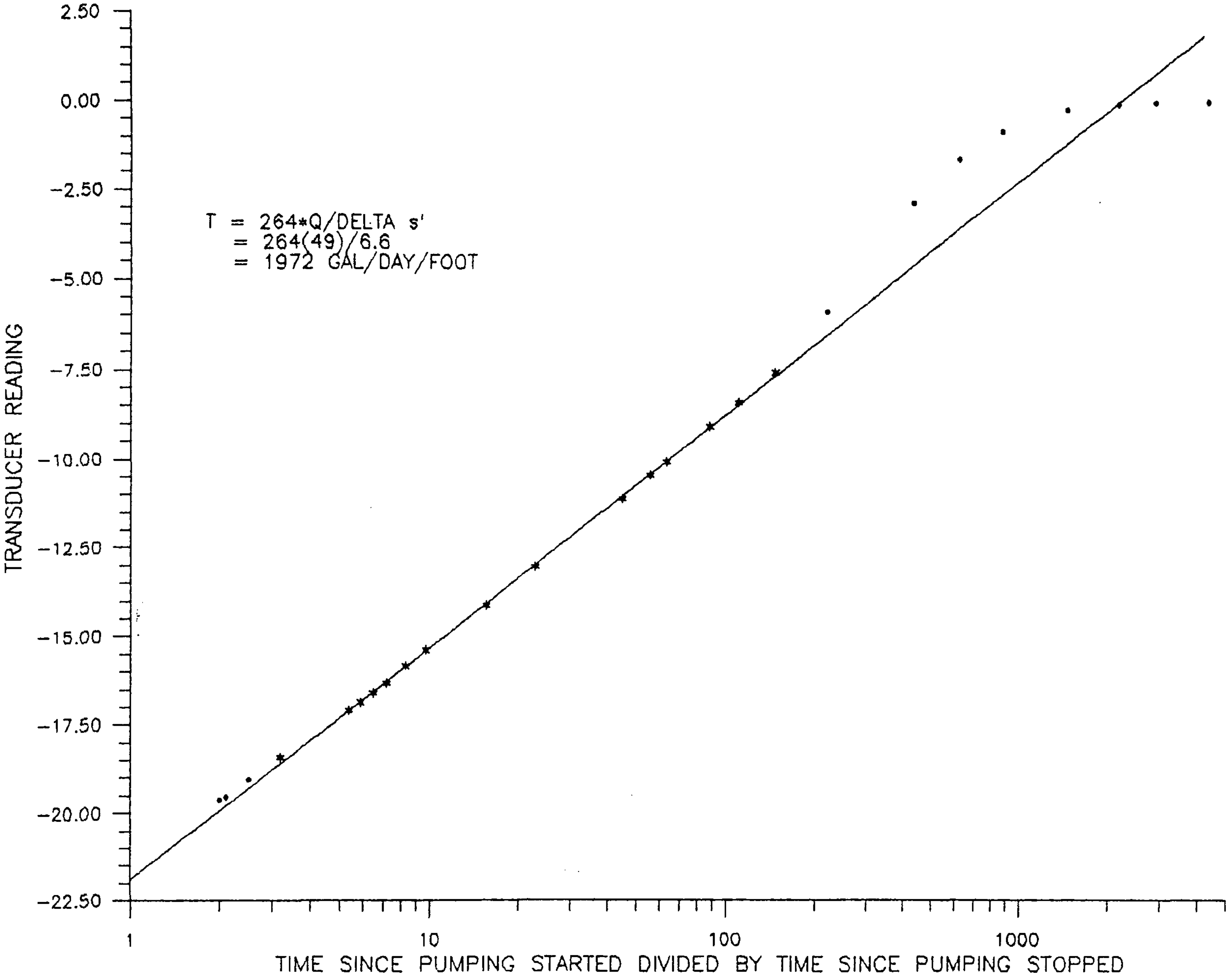


FIGURE 4-13 RECOVERY IN OBSERVATION WELL 583. PHASE II RETEST. SEMI-LOG

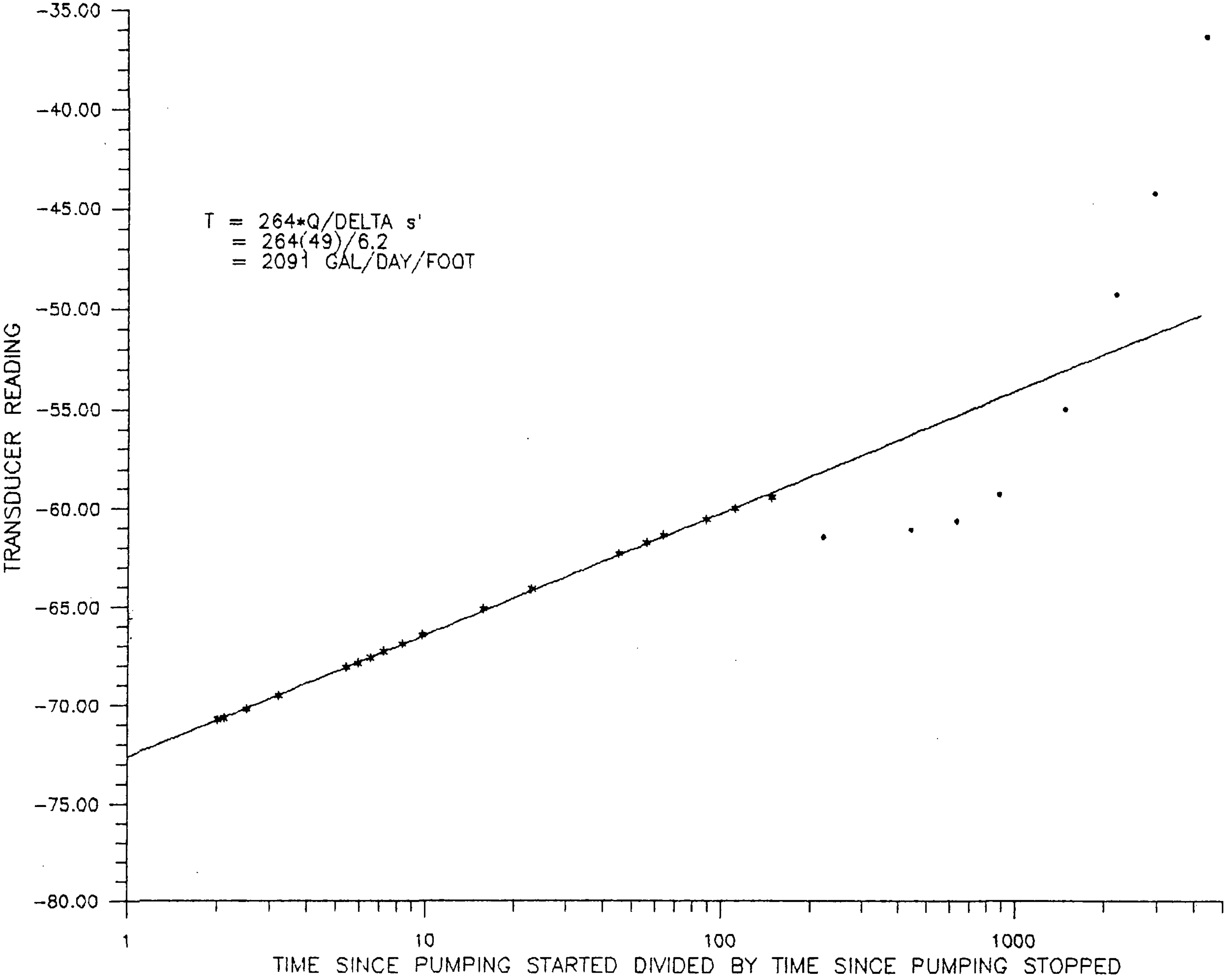


FIGURE 4-14 RECOVERY IN PUMPING WELL 584, PHASE II RETEST, SEMI-LOG

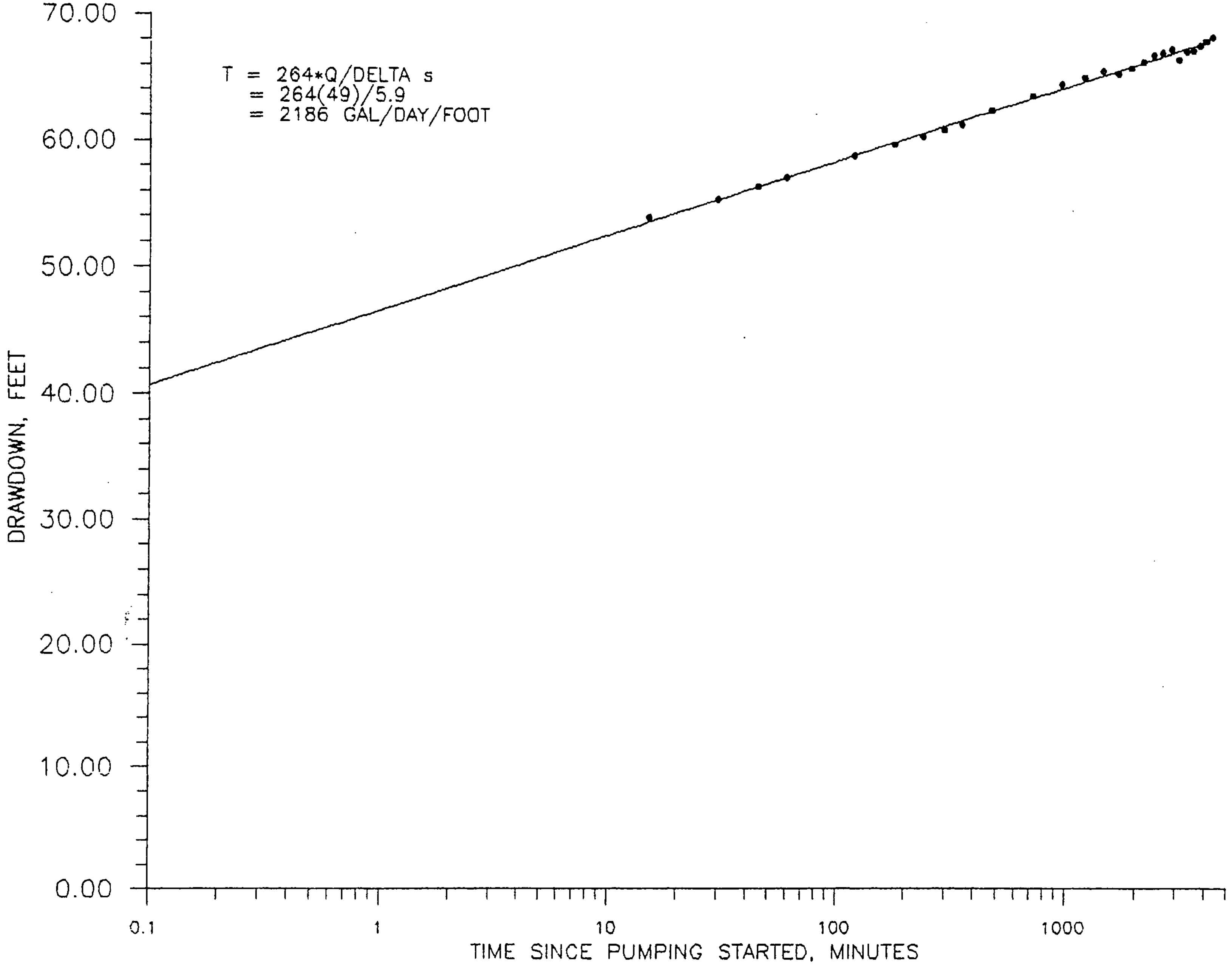


FIGURE 4-15 DRAWDOWN IN PUMPING WELL 584, SHALE COMMUNICATION TEST

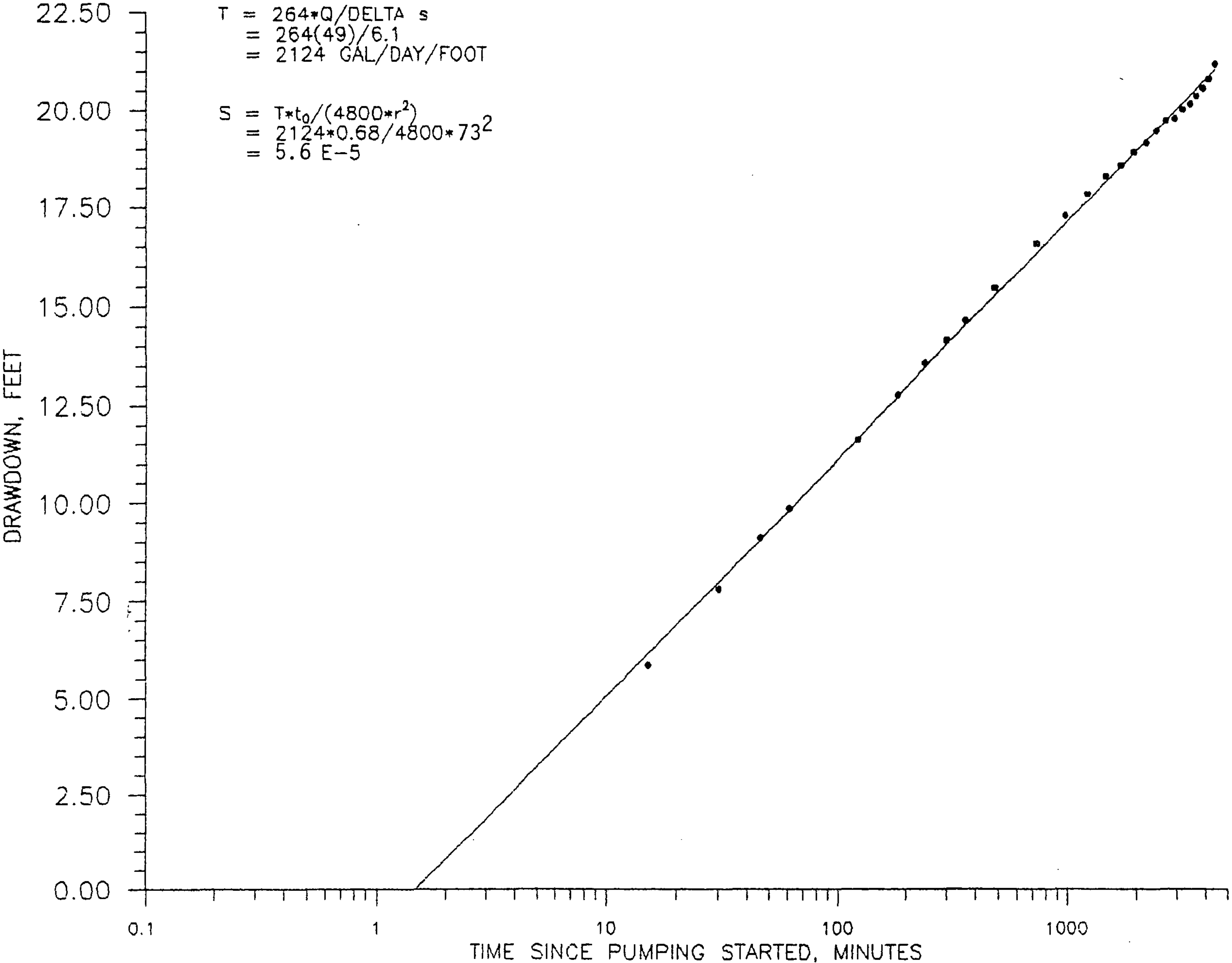
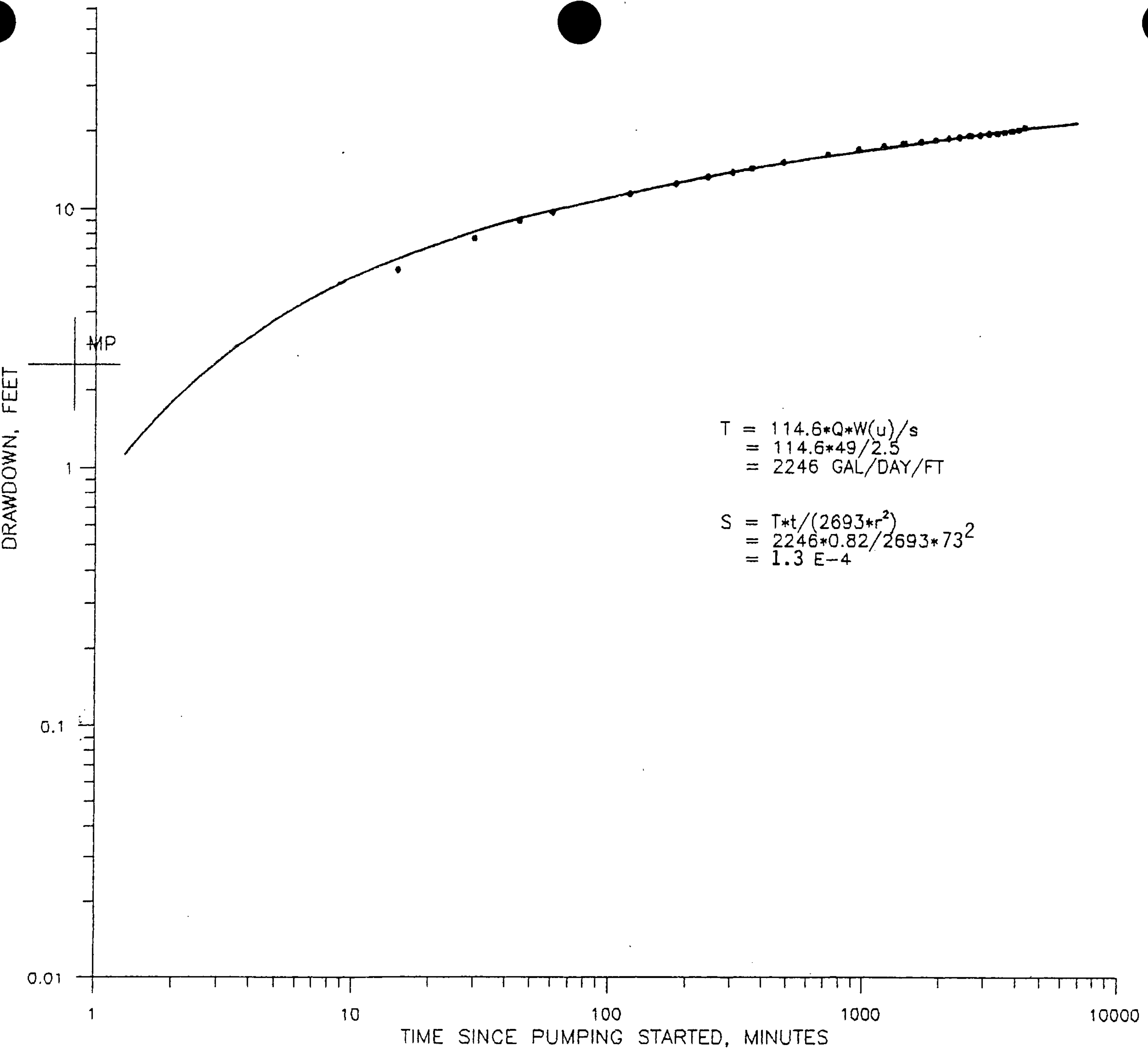


FIGURE 4-16 DRAWDOWN IN OBSERVATION WELL 581, SHALE COMMUNICATION TEST SEMI-LOG



$$T = 114.6 * Q * W(u)/s$$
$$= 114.6 * 49/2.5$$
$$= 2246 \text{ GAL/DAY/FT}$$

$$S = T * t/(2693 * r^2)$$
$$= 2246 * 0.82/2693 * 73^2$$
$$= 1.3 \text{ E-4}$$

FIGURE 4-17 DRAWDOWN IN OBSERVATION WELL 581, SHALE COMMUNICATION TEST LOG-LOG

5.0 SECTION 35 TEST

Pump testing of the ore sands in section 35 also consisted of separate phases (3), Phase I was pumped beginning on November 26, 1985 for a total of 4300 minutes (~3 days), and was designed to analyze the vertical permeability of the overlying aquitard. It consisted of pumping well 739, production zone monitor well 737, overlying shale well 741, overlying aquifer well 740, and underlying aquifer well 741. Phase II was designed to establish the production zone aquifer parameters and consisted of pumping well 739 and production zone monitoring wells 736, 737 and 738. This test began on December 12, 1985 and ran for 5700 minutes (~4 days). The third and last phase of the section 35 pump test was performed due to underlying shale well problems in Phase I. Its purpose was to quantify the vertical permeability of the underlying aquitard. It consisted of pumped well 739, production zone monitor well 736 and underlying aquitard well 737-A. It began on October 27, 1986 and lasted for 4340 minutes (~3 days). In all phases the pumping well (739) was pumped at 7.7 gpm.

Reanalysis of this data indicates that the production zone aquifer parameters are approximately 134 gpd/ft for the transmissivity, 101 millidarcy for permeability and 7E-5 for the storage coefficient. Vertical permeabilities were calculated to be 1.1E-8 and 1.7E-9 cm/sec for the upper and lower aquitards, respectively.

5.1 PREVIOUS ANALYSIS

Section 35 pump test data analysis was performed in a similar manner as section 25 analysis. Drawdown data was plotted on both log-log and semi-log plots and the Theis and Jacob analysis were applied respectively. The Neuman-Witherspoon ratio analysis was used as the primary estimate of vertical permeability.

5.2 HYDRO PHASE I ANALYSIS

The same analytical tools were used by HYDRO to evaluate section 35, Phase I pump test data. The primary purpose of Phase I was to analyze the vertical permeability of the overlying shale aquitard. Drawdown and recovery in both the monitor well (737) and the pumping well (739) were also analyzed in order to provide more data points for estimates of production zone transmissivity and storage coefficient.

Using the Neuman-Witherspoon ratio method to estimate vertical permeability the following calculations were made:

OVERLYING SHALE LAYER

Well 742

r' = 62 S = 1.9E-6
t = 2.8 days
s' = .5 ft
z = 11 ft

Well 737

T = 19.5 ft^2/day S=7.8E-5
s = 36.6

$$s' = \frac{.5}{36.6} = 1.36E-2$$

$$t_D = \frac{(19.5)(2.8)}{(7.8E-5)(68^2)} = 1.4E-2$$

$$t'_D = 9.5E-2$$

$$' = \frac{(11)^2(9.5E-2)}{2.8} = 4.1$$

K' = (4.1)(1.9E-6) = 3.2E-5 ft/day = 1.13E-8 cm/sec

5.3 HYDRO PHASE II TEST

Phase II of the section 35 pump test collected data to quantify hydrogeologic characteristics of the production zone aquifer. Analysis of this data indicated that corrections for prior trend were not necessary. Results in the production zone were consistent with Phase I and the underlying shale test. Well storage effects were noted in the production zone wells as with the other test.

5.4 HYDRO UNDERLYING SHALE TEST

Vertical permeability of the underlying shale aquitard was estimated using the same technique as before. No drawdown in either the aquitard well (737-A) or the underlying aquifer well (741) in Phase I. Therefore an assumed drawdown of .1 ft at t=4000 minutes was used.

Well 737-A

$s' = 1$ ft
$r' = 64$ ft
$t = 2.8$ days
$z = 14$ ft
$S_s' = 1.2E-6$

Well 737

$T = 19.5$ ft^2/day $S = 7.8E-5$
$s = 36.6$
$\frac{s'}{s} = \frac{.1}{36.6} = 2.7E-3$
$t_D = 1.35E-2$
$t_D' = 5.9E-2$

ALPHA' = 4.13
K' = (413)(1.2E-6) = 4.95E-6 ft/day = 1.7E-9 cm/sec

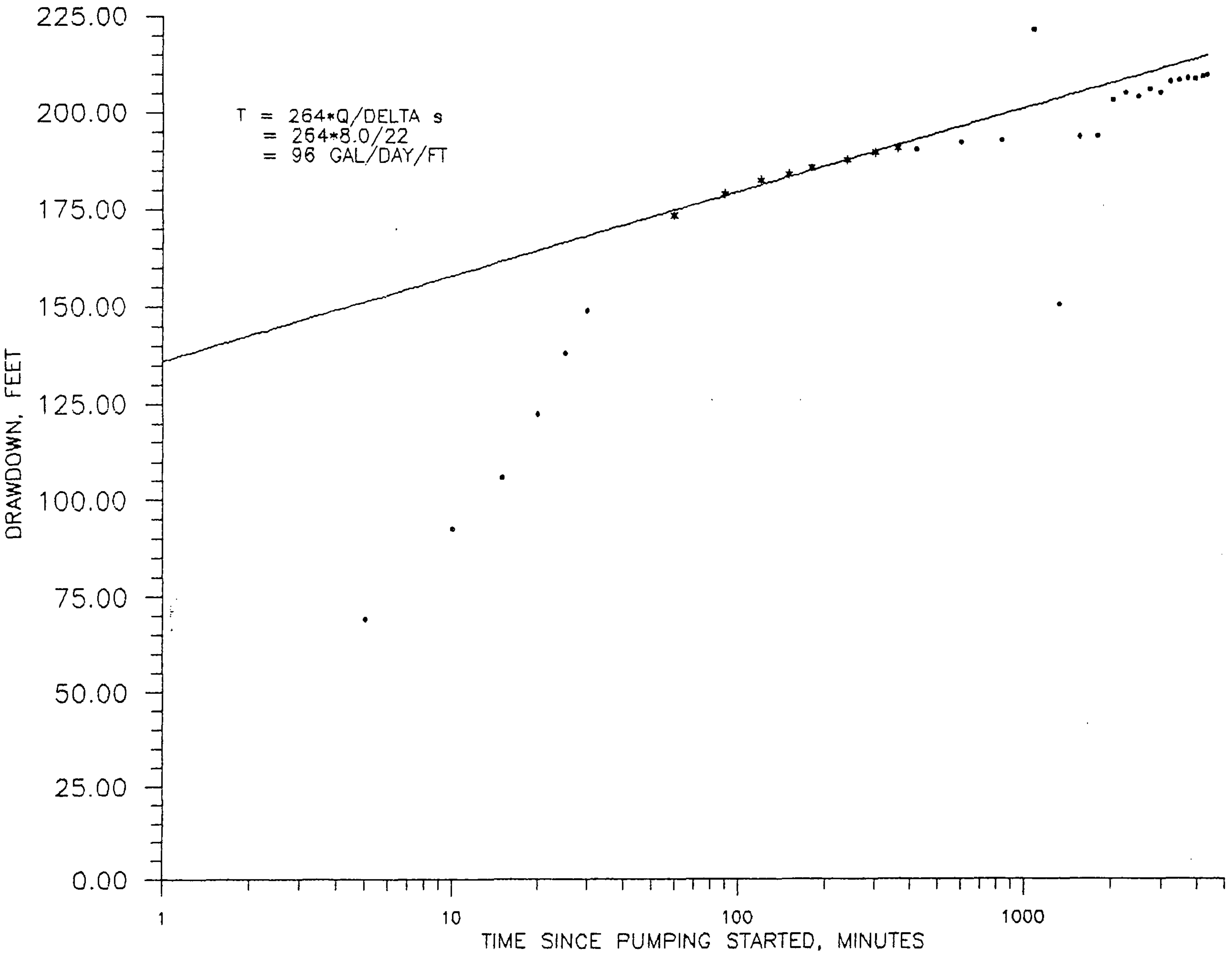


FIGURE 5-1 DRAWDOWN IN PUMPING WELL 35-739, PHASE I, SEMI-LOG

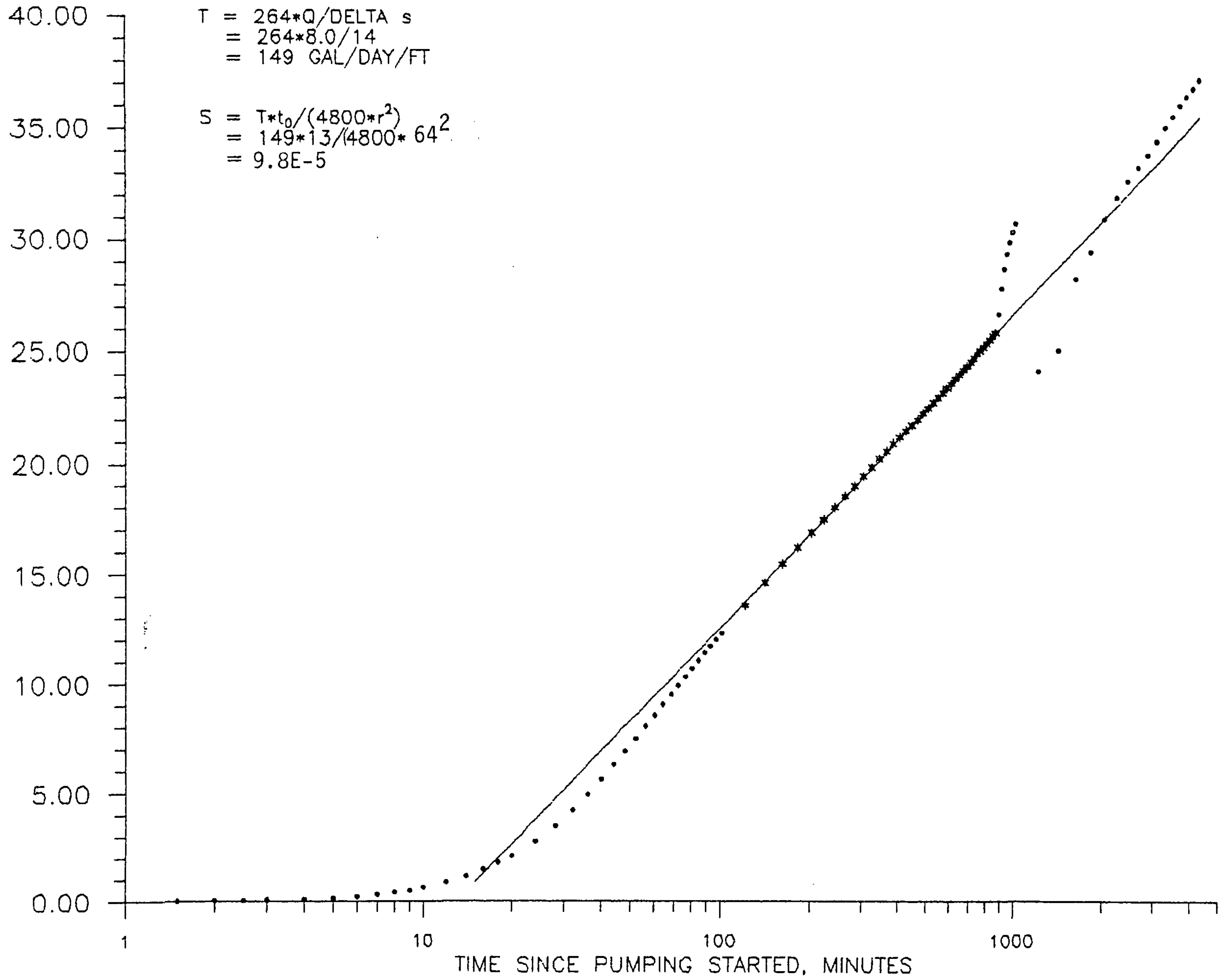
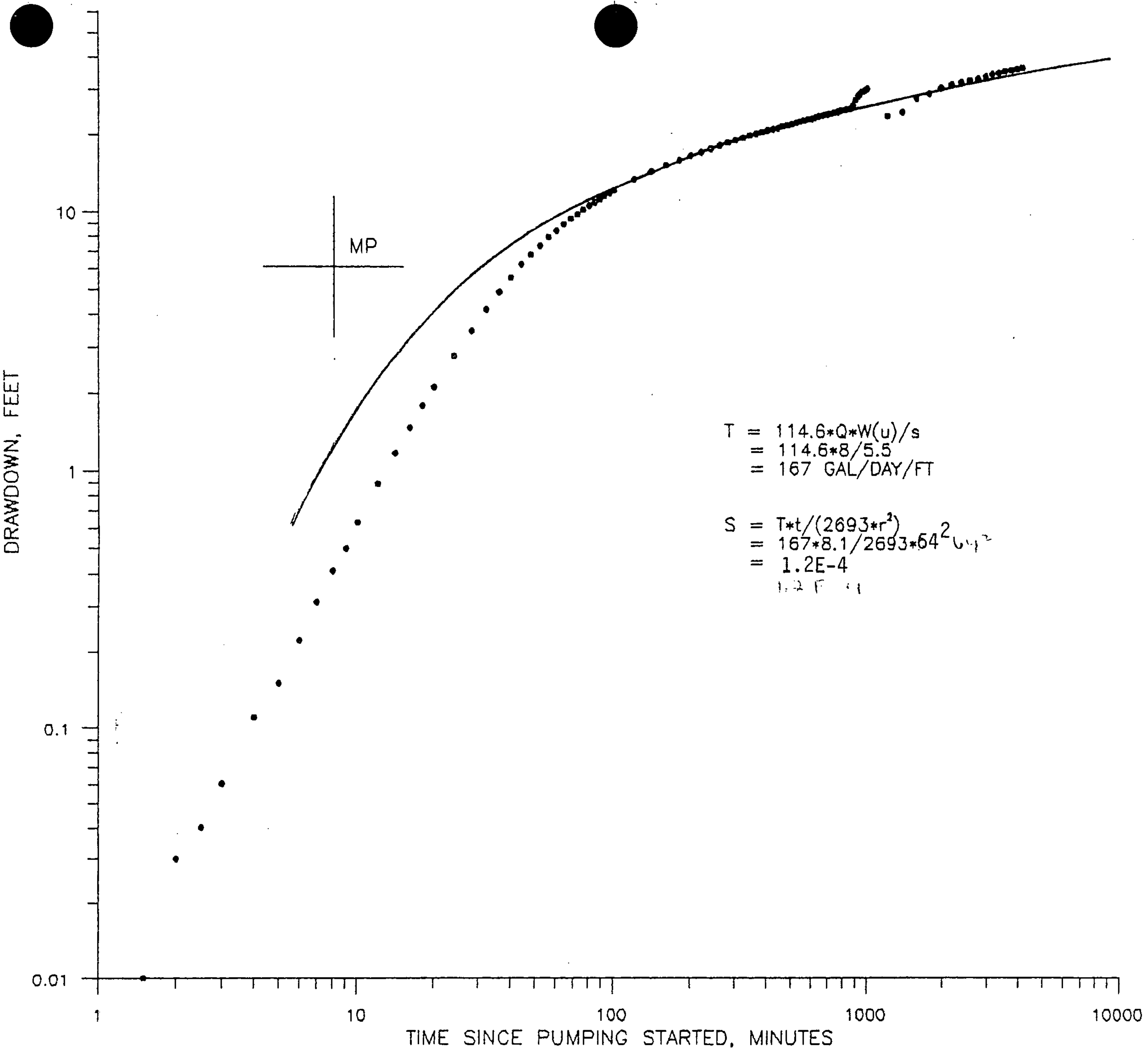


FIGURE 5-2 DRAWDOWN IN OBSERVATION WELL 35-737, PHASE I; SEMI-LOG



$T = 114.6*Q*W(u)/s$
$= 114.6*8/5.5$
$= 167$ GAL/DAY/FT

$S = T*t/(2693*r^2)$
$= 167*8.1/2693*64^2$
$= 1.2E-4$

FIGURE 5-3 DRAWDOWN IN OBSERVATION WELL 35-737, PHASE I, LOG-LOG

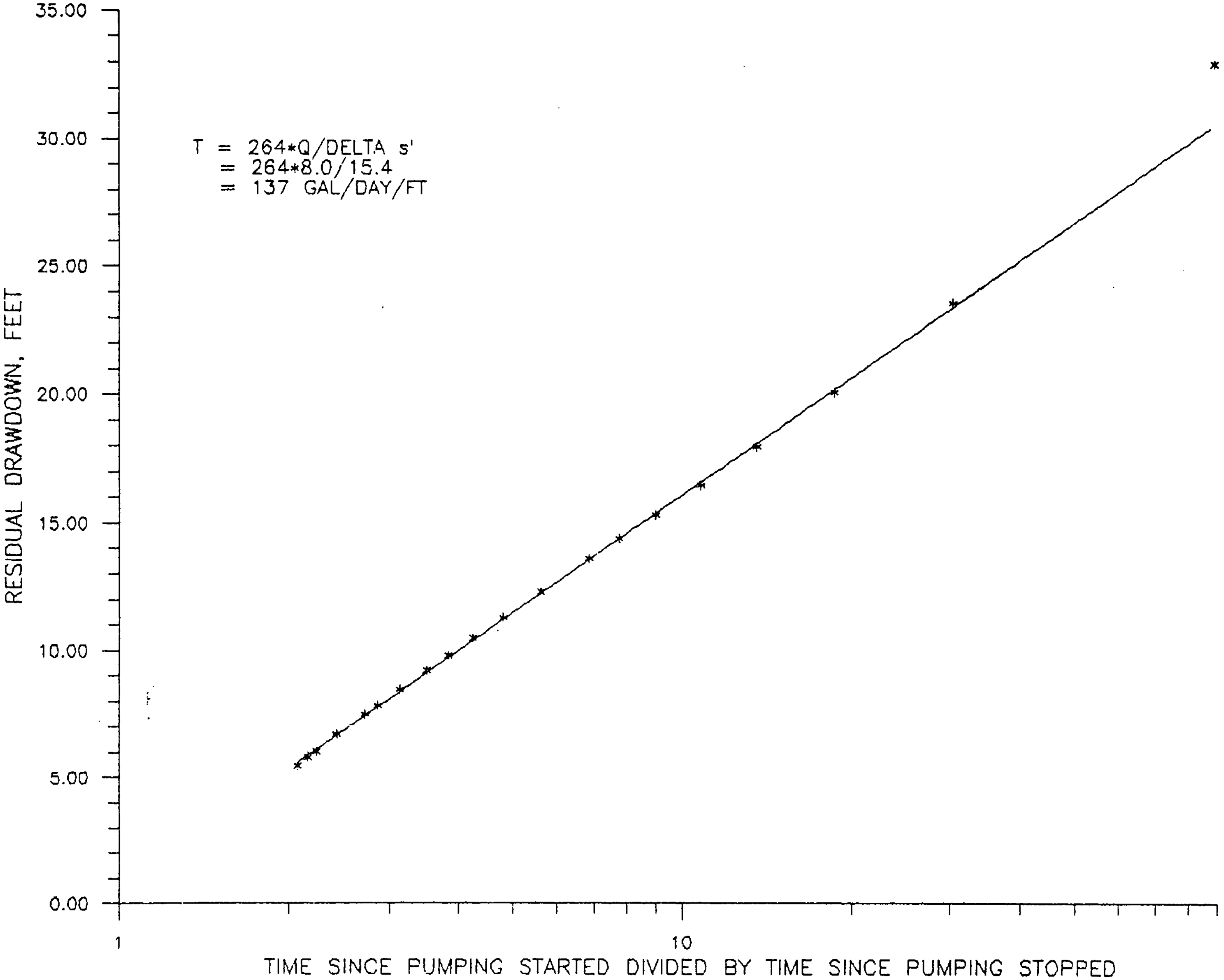


FIGURE 5-4 RECOVERY IN OBSERVATION WELL 35-737, PHASE I

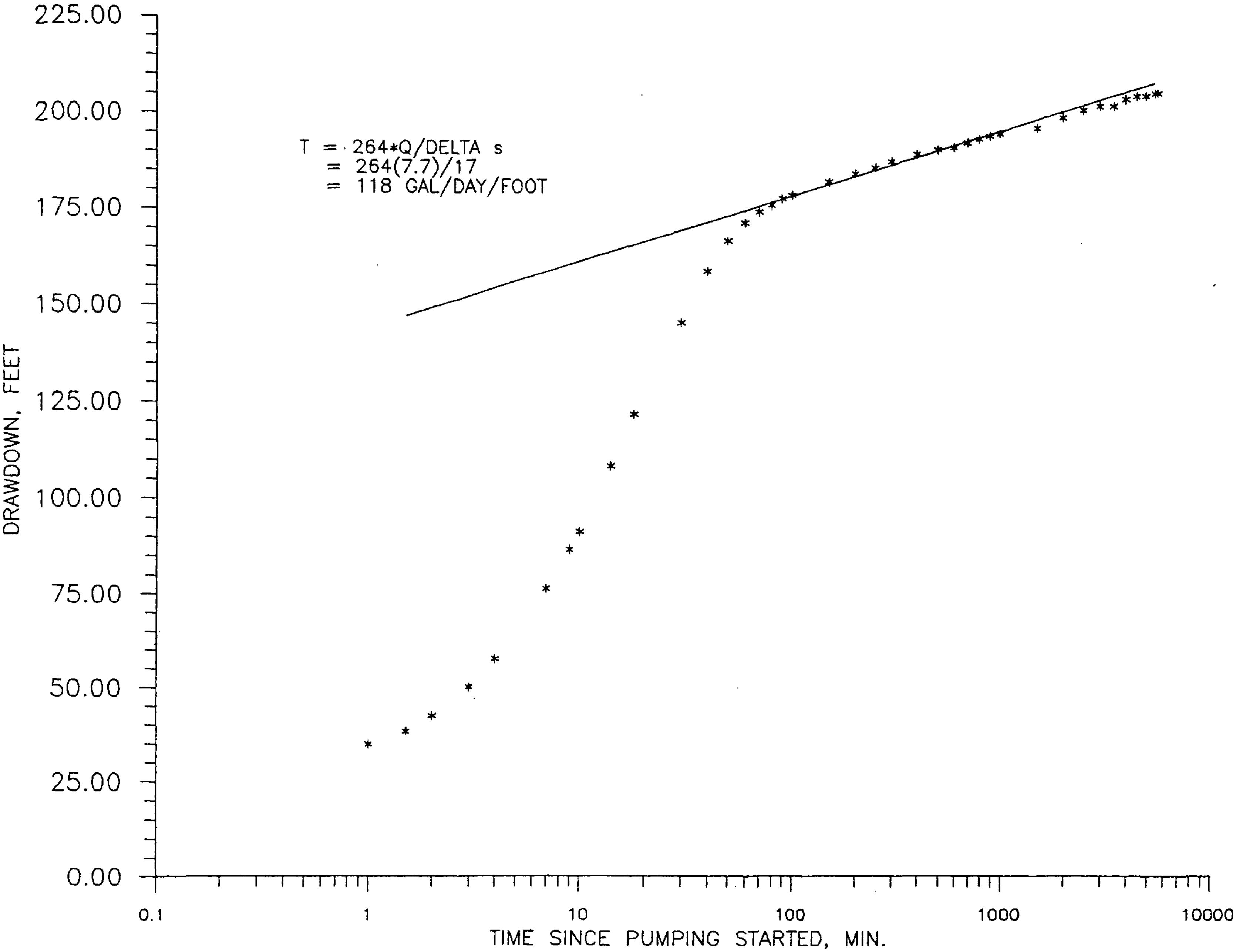
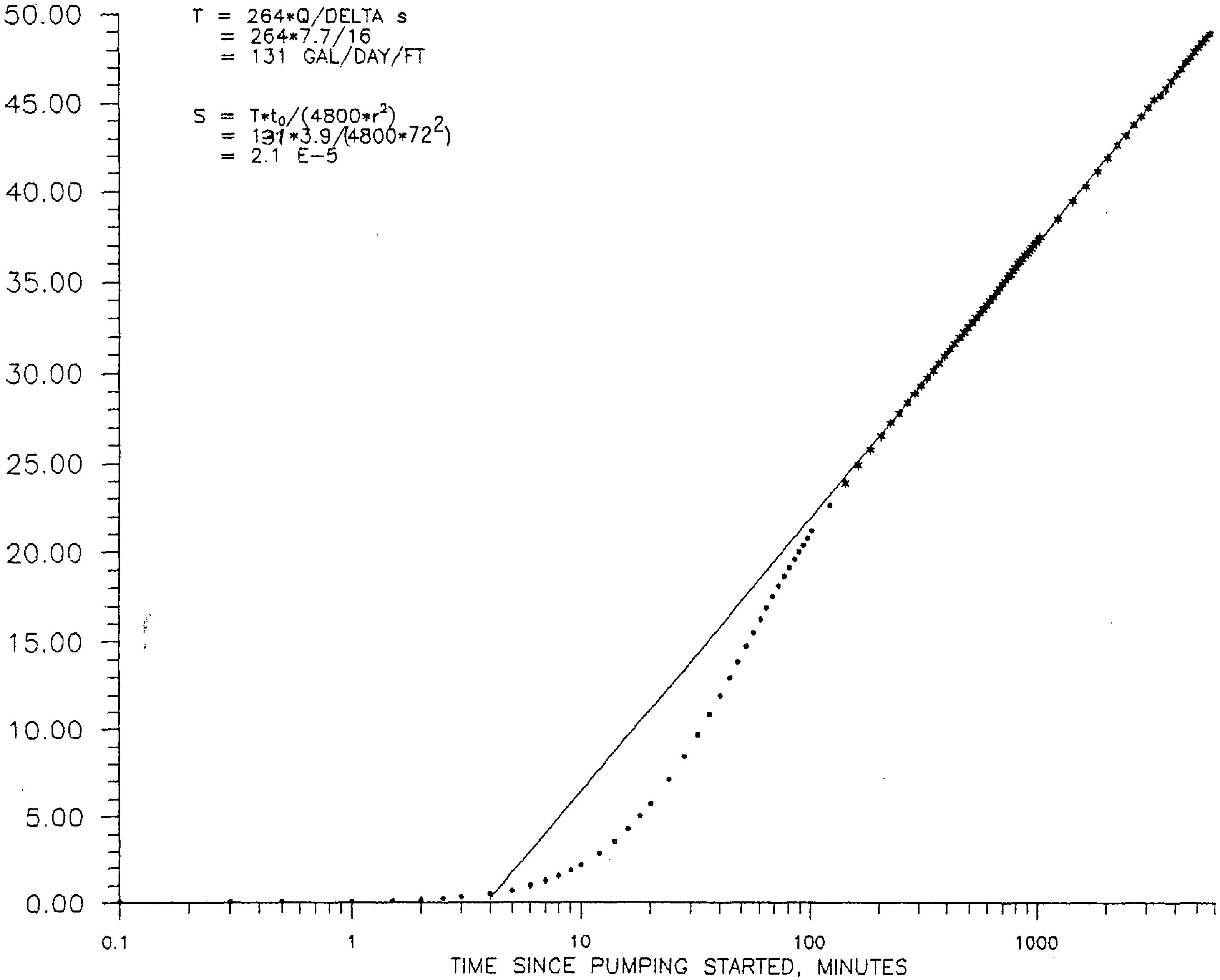


FIGURE 5-5 DRAWDOWN IN PUMPING WELL 35-739, PHASE II SEMI-LOG



T = 264*Q/DELTA s
= 264*7.7/16
= 131 GAL/DAY/FT

S = $T*t_0/(4800*r^2)$
= $131*3.9/(4800*72^2)$
= 2.1 E-5

FIGURE 5-6 DRAWDOWN IN OBSERVATION WELL 35-736, PHASE II, SEMI-LOG

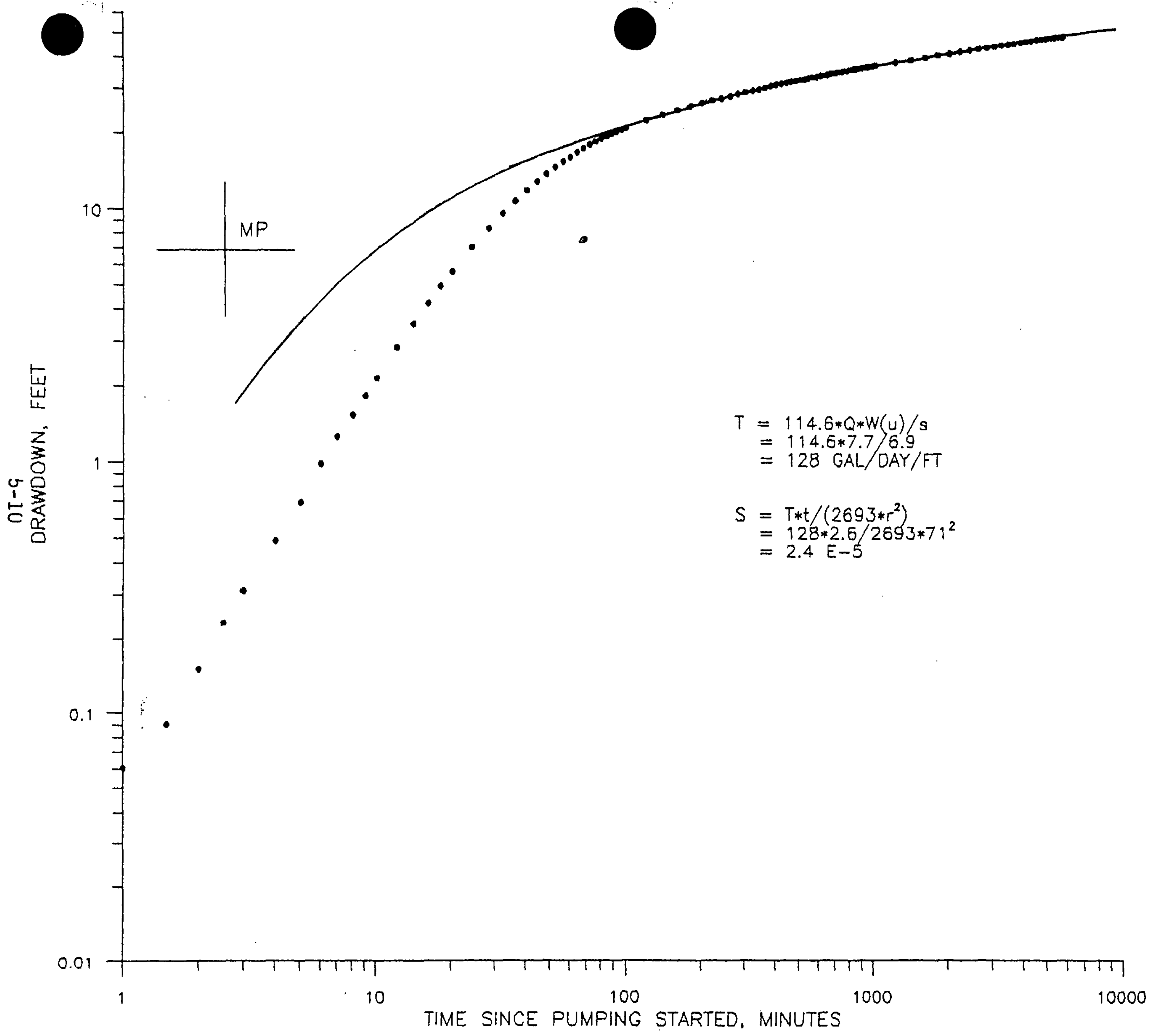


FIGURE 5-7 DRAWDOWN IN OBSERVATION WELL 35-736, PHASE II, LOG-LOG

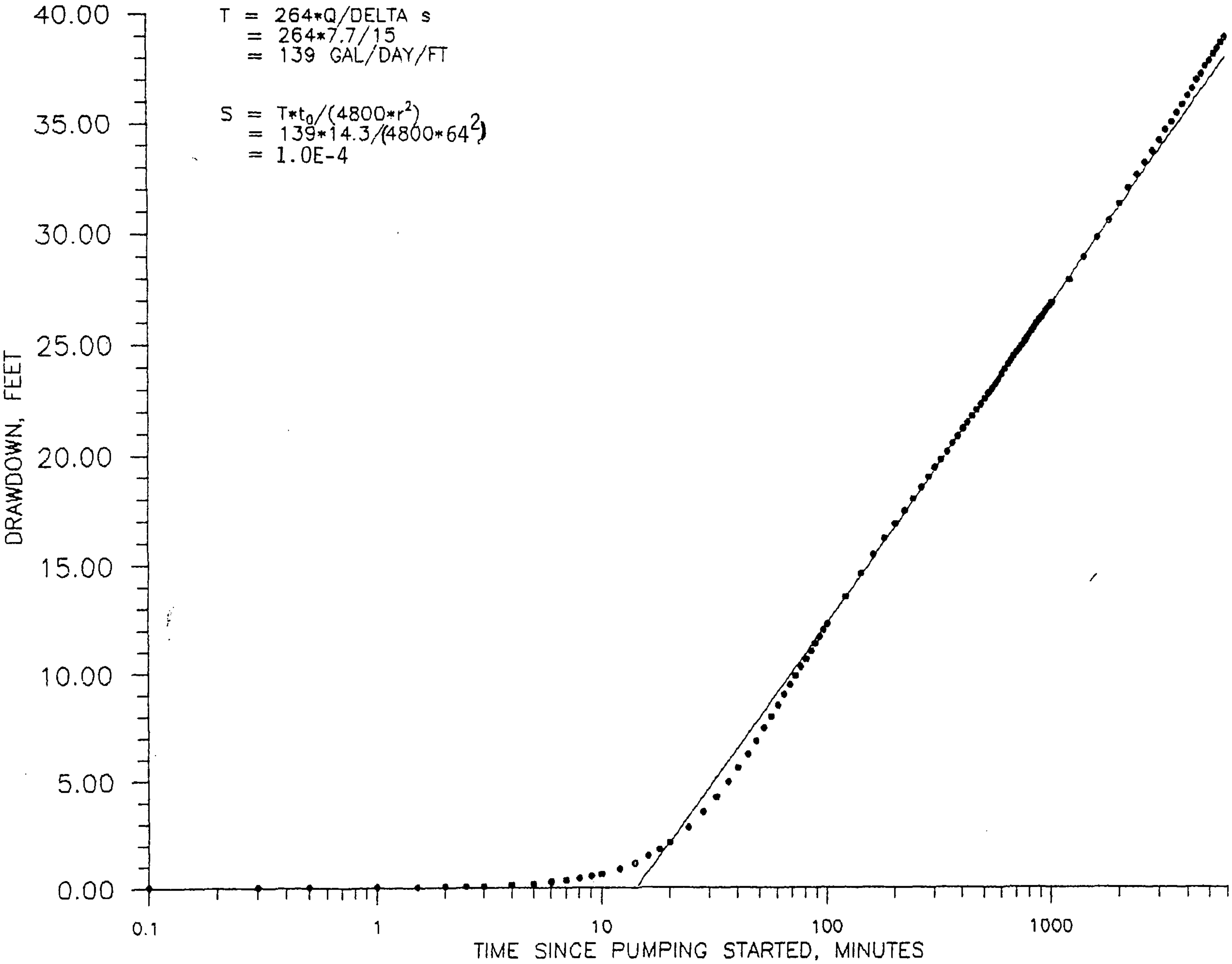


FIGURE 5-8 DRAWDOWN IN OBSERVATION WELL 35-737, PHASE II, SEMI-LOG

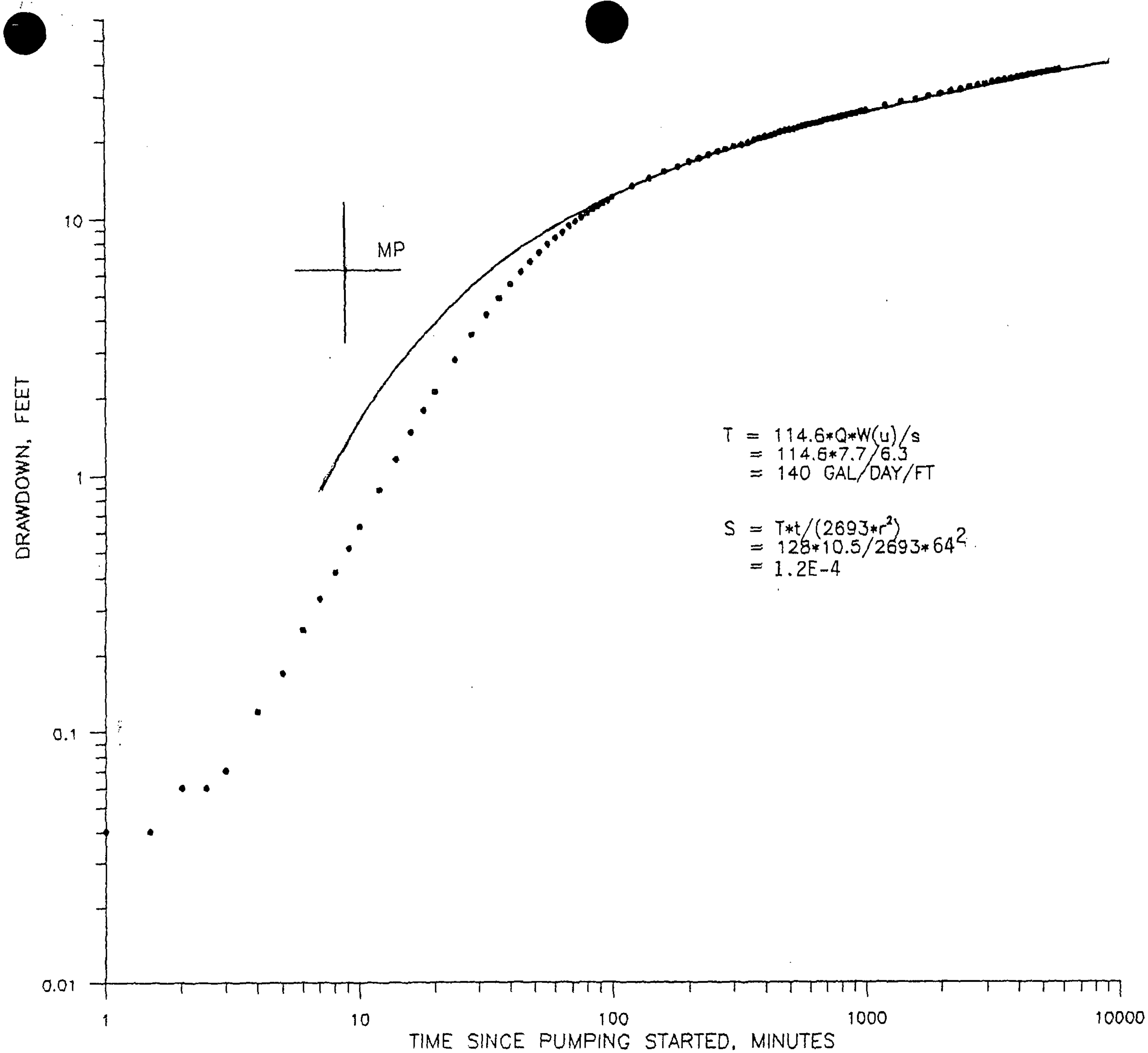


FIGURE 5-9 DRAWDOWN IN OBSERVATION WELL 35-737, PHASE II LOG-LOG

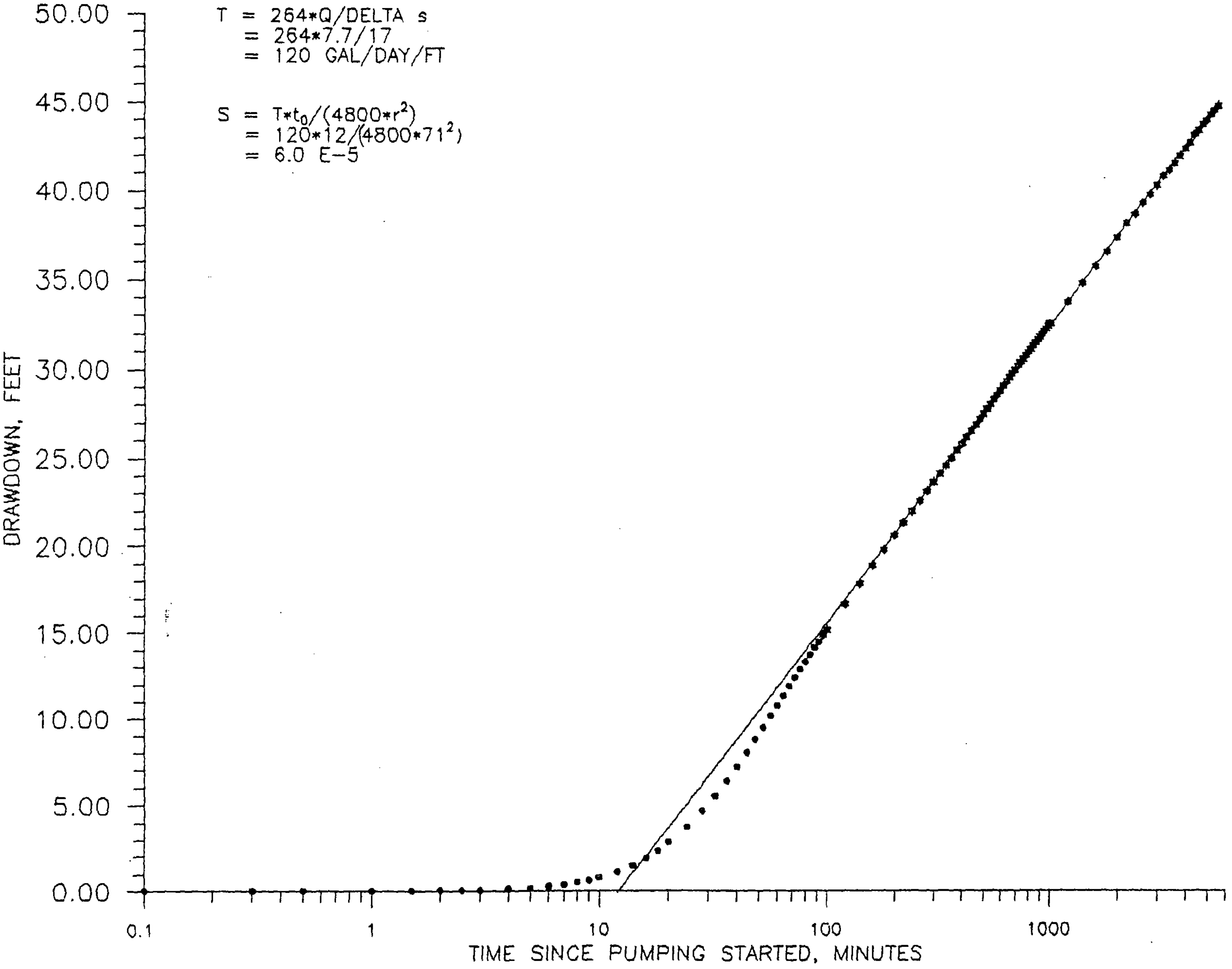
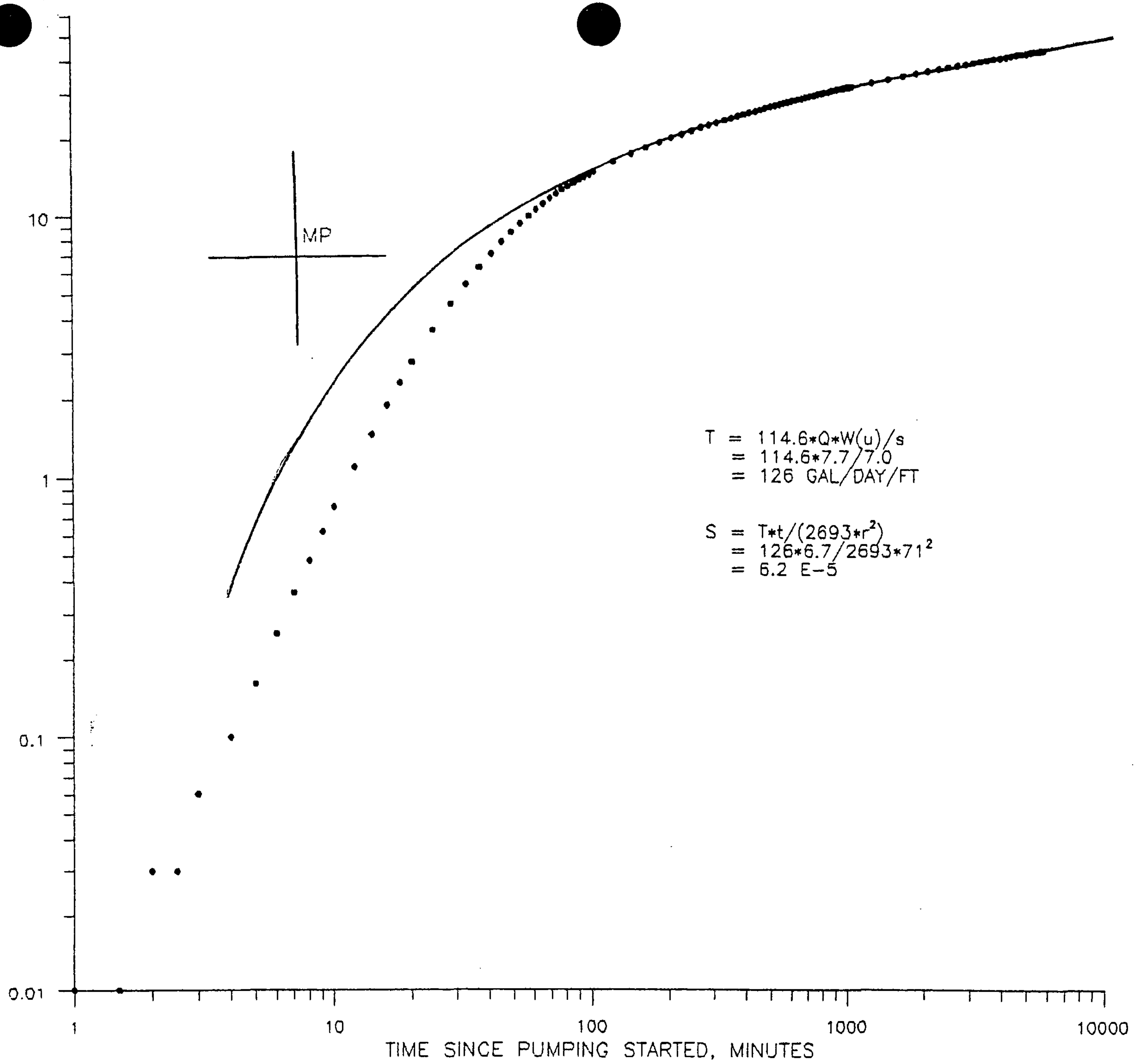


FIGURE 5-10 DRAWDOWN IN OBSERVATION WELL 35-738, PHASE II, SEMI LOG



$T = 114.6*Q*W(u)/s$
$= 114.6*7.7/7.0$
$= 126$ GAL/DAY/FT

$S = T*t/(2693*r^2)$
$= 126*6.7/2693*71^2$
$= 6.2$ E-5

FIGURE **5-11** DRAWDOWN IN OBSERVATION WELL 35-738, PHASE II, LOG-LOG

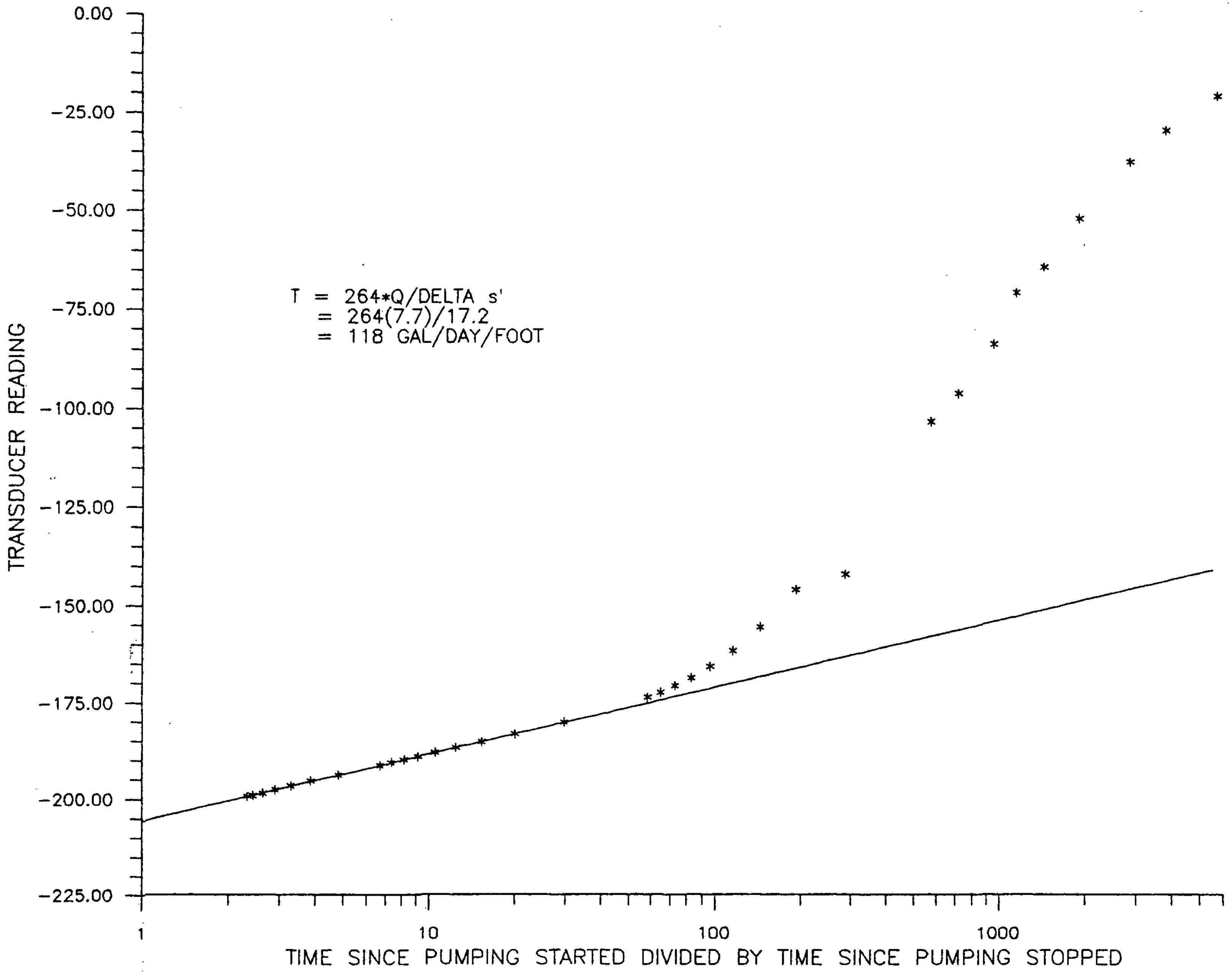


FIGURE **5-12** RECOVERY IN PUMPING WELL 35-739 PHASE II

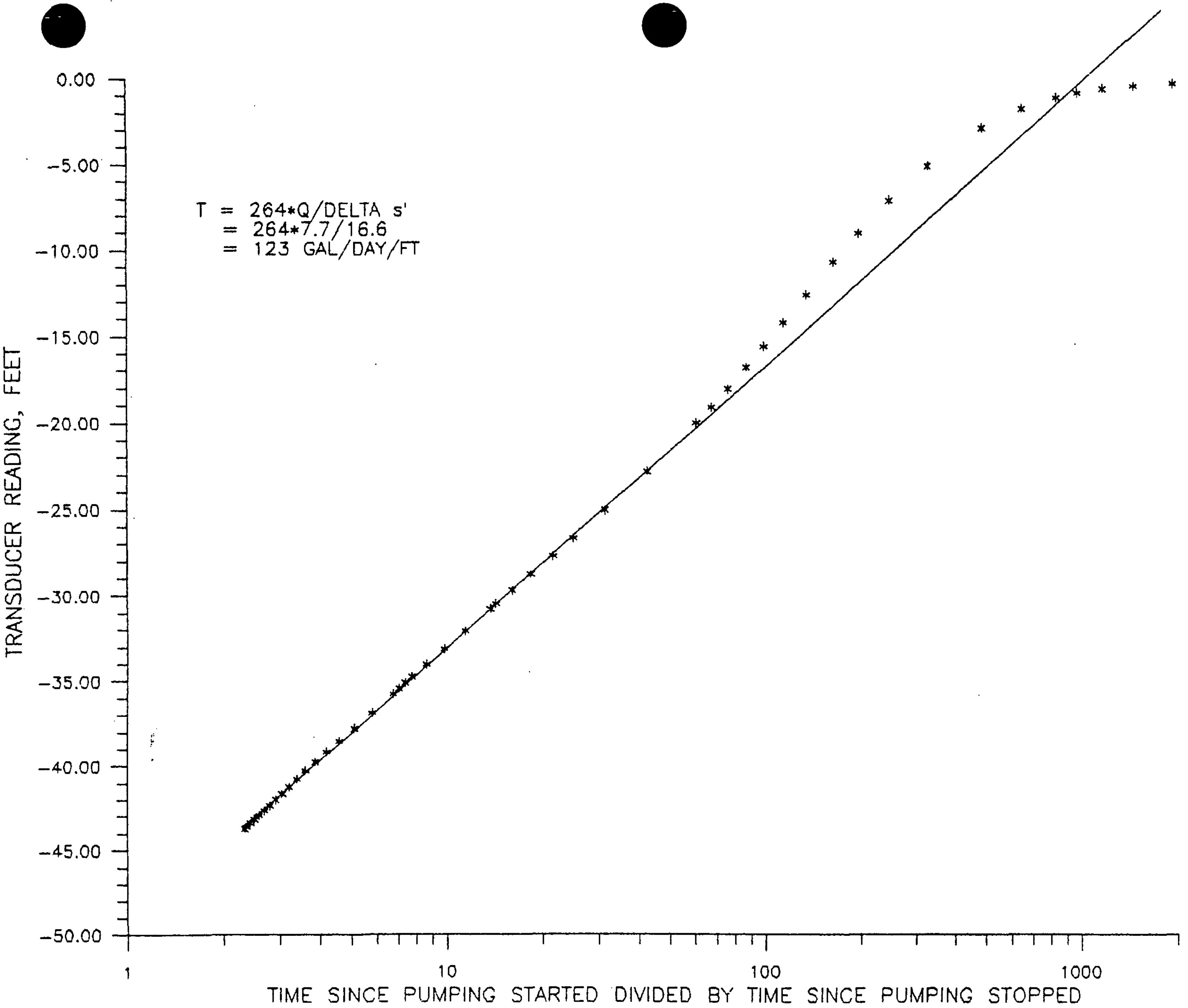


FIGURE 5-13 RECOVERY IN OBSERVATION WELL 35-736, PHASE II

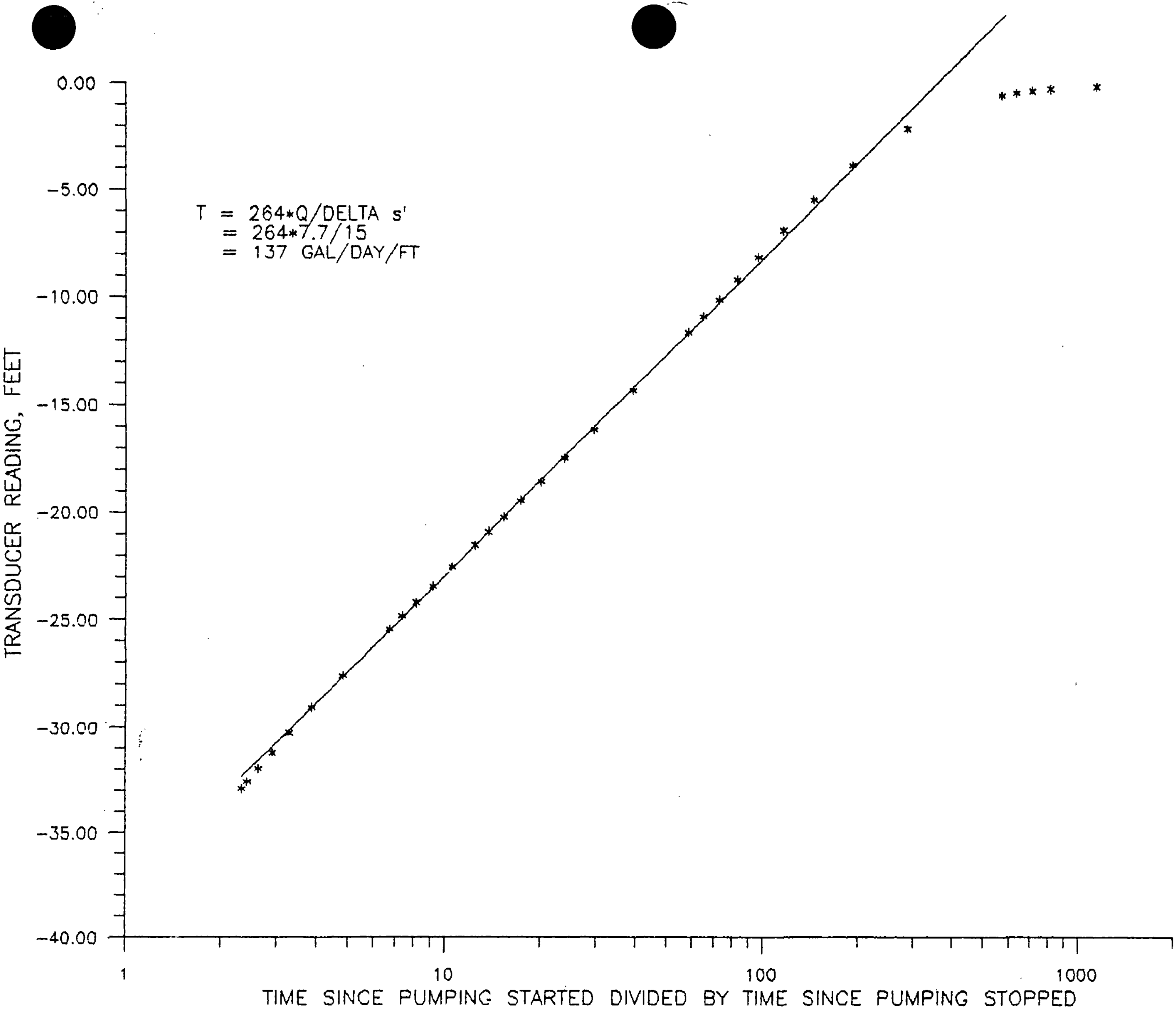


FIGURE **5-14** RECOVERY IN OBSERVATION WELL 35-737, PHASE II

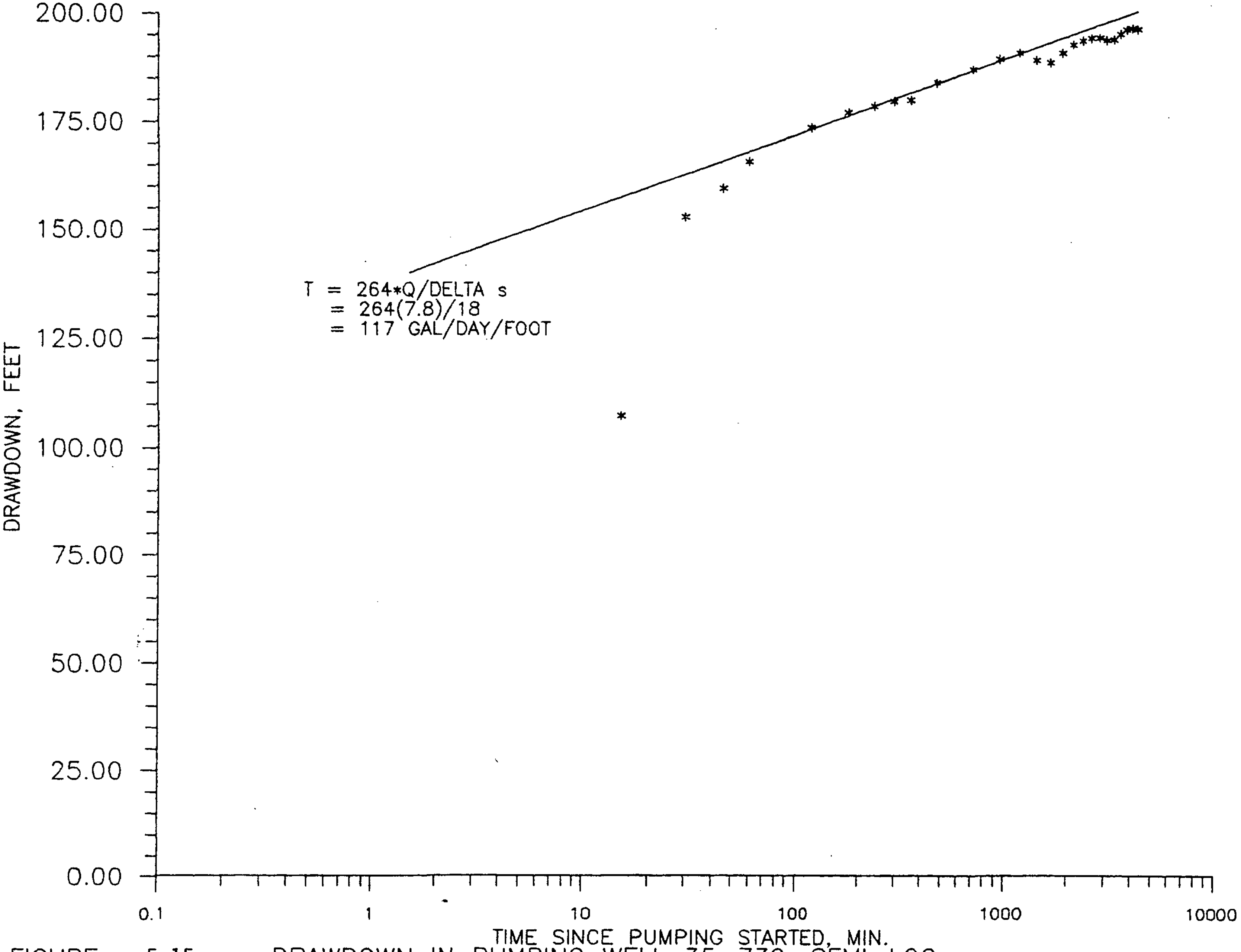


FIGURE 5-15 DRAWDOWN IN PUMPING WELL 35-739, SEMI-LOG UNDERLYING SHALE TEST

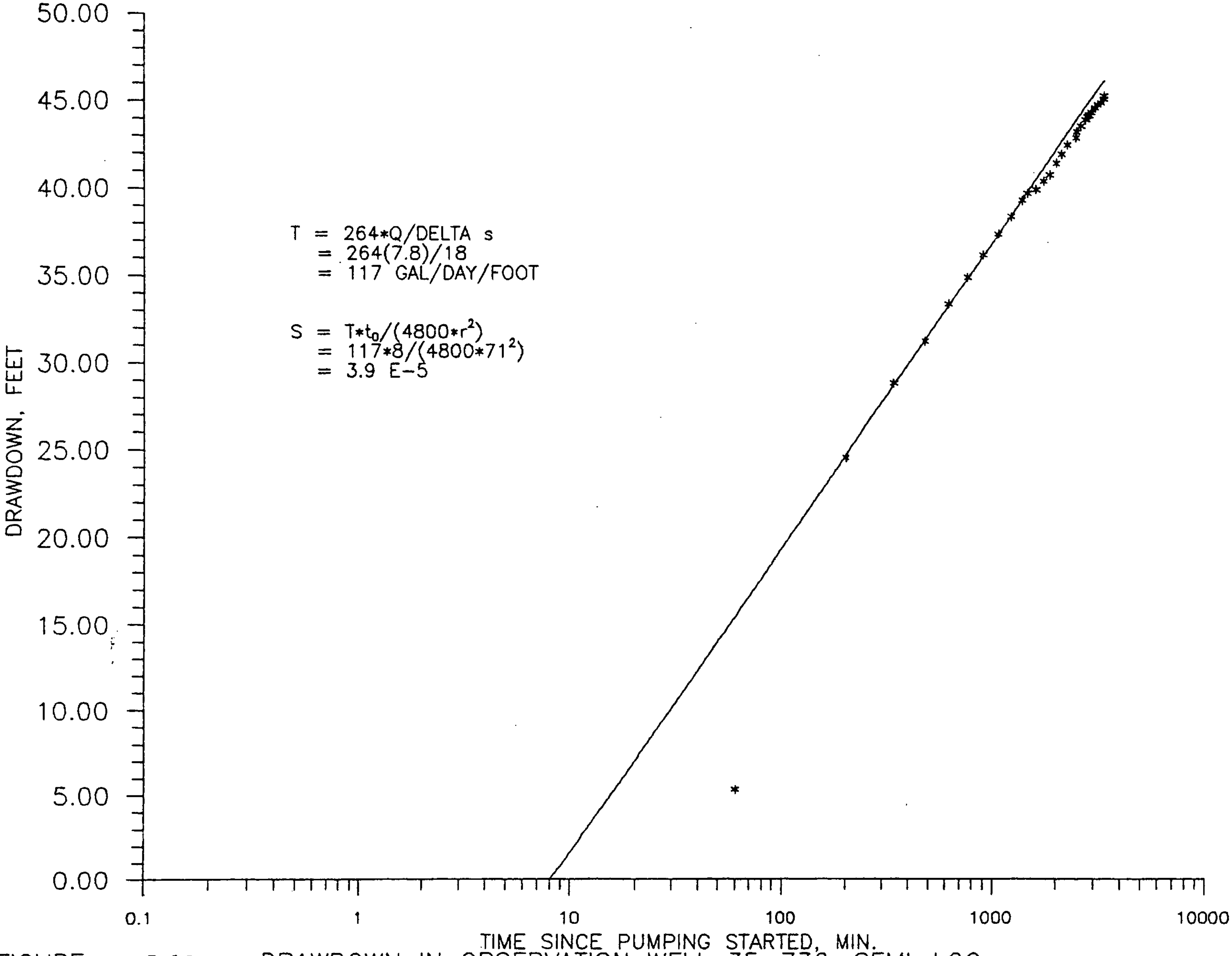


FIGURE **5-16** DRAWDOWN IN OBSERVATION WELL 35-736, SEMI-LOG
UNDERLYING SHALE TEST

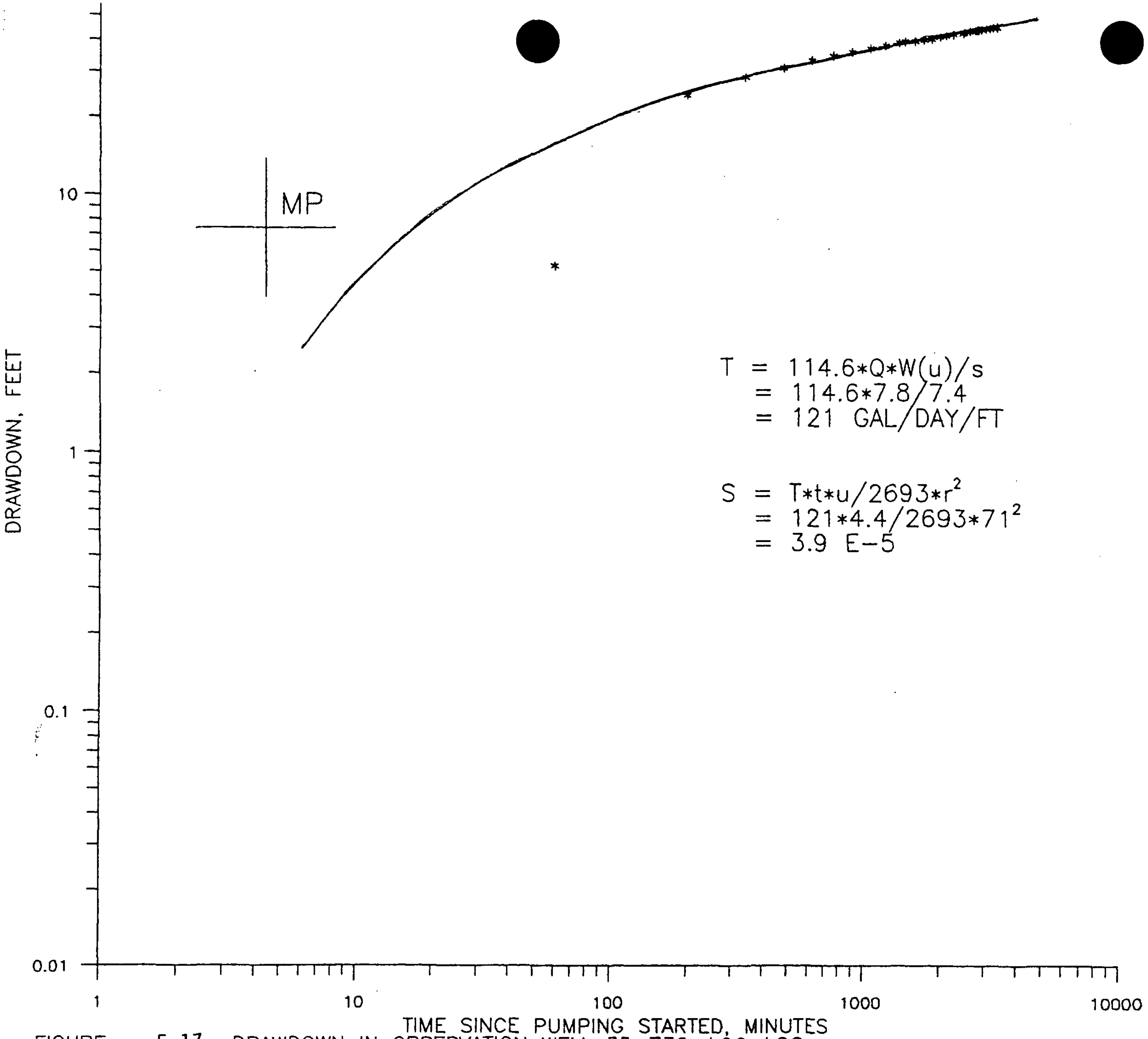


FIGURE 5-17 DRAWDOWN IN OBSERVATION WELL 35-736, LOG-LOG UNDERLYING SHALE TEST

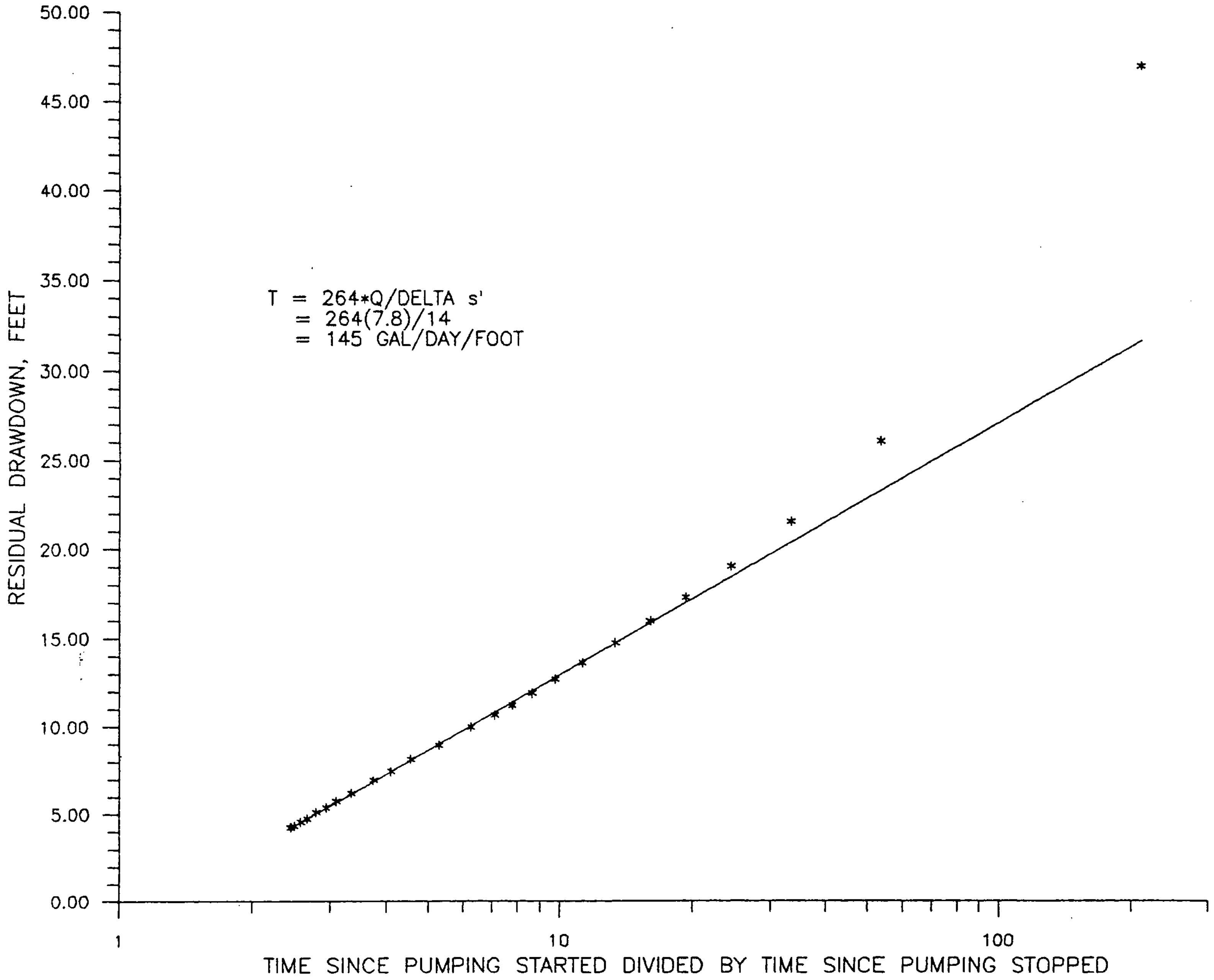


FIGURE 5-18 RECOVERY IN OBSERVATION WELL 35-736, UNDERLYING SHALE TEST

6.0 REFERENCES

USNRC, June 1987, Environmental Impact Appraisal in Consideration of the Issuance of Source Material License No. SUA-1387 for the KERR-MCGEE Nuclear Corporation South Powder River Basin "Q" Sand Solution Mining Project.

USNRC, June 1981, Environmental Impact Appraisal in Consideration of the Issuance of an Amendment to Source Material License No. SUA-1387 for the Sequoyah Fuels Corporation South Powder River Basin "O" Sand Research and Development In Situ Leach Project.

KERR-MCGEE Nuclear Corporation, February 1984, Addendum to Aquifer Pump Test "O" Sand In Situ Leach Project South Powder River Basin, Converse County, Wyoming.

Sequoyah Fuels Corporation March 1988, Aquifer Test Analysis, In Situ Leach Project, South Powder River Basin, Converse County, Wyoming. Analysis of Sections 25 and 35.

APPENDIX A

AQUIFER-TEST THEORY

APPENDIX A - TABLE OF CONTENTS

A.1 INTRODUCTION

Transmissivity is a definition of the ability of an aquifer to transmit water. Common units of transmissivity are gallons per day per foot (gal/day/ft). Transmissivity, expressed in these units, is the amount of water, in gallons per day, that can flow through a vertical strip of aquifer one-foot wide extending the full saturated height of the aquifer normal to the flow direction under a unit hydraulic gradient. Transmissivity must be adjusted by the actual aquifer width and hydraulic gradient to determine actual aquifer flow rates.

Horizontal hydraulic conductivity (permeability) of the aquifer is the transmissivity divided by the aquifer thickness. Permeability is the main parameter that governs the velocity of ground-water movement. Hydraulic gradient and effective porosity are also needed with permeability to determine the velocity.

The specific yield is the water yielded from an aquifer by gravity drainage, as occurs when the water table declines. More exactly, the specific yield of an aquifer is the ratio of (1) the volume of water which, after being saturated, it will yield by gravity to (2) its own volume.

The storage coefficient is defined by Theis as the volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head. The storage coefficient is dimensionless. The total storage obtained from an unconfined aquifer is virtually equal to the specific yield, as most of the water is released from storage by gravity drainage and only a very small part comes from compression of the aquifer and expansion of the water.

A.2. THEIS EQUATION

Theis, in 1935, introduced his equation which describes a non-leaky, confined aquifer. The following is a general definition of the Theis equation:

$$T = 114.6\ Q\ W(u)/s$$

$$u = 2693\ r^2\ S/T\ t$$

where: s = drawdown, in feet
Q = discharge, in gallons per minute (gpm)
W(u) = well function
= the integral from u to infinity of (e^-u)/u du
T = transmissivity, in gal/day/ft
u = well function variable
r = observation well radius from pumping well, in feet
S = storage coefficient
and t = time since pumping started, in minutes.

NOTE: "^" denotes exponentiation.

Pump test data are analyzed by matching the log-log plot of drawdown versus time to Theis' type curve [W(u) vs. 1/u] and applying the above equations to the match. Pages 92-98 of Ferris and others (1962) present a more thorough discussion of the Theis equation.

The value of the integral expression for W(u) is given by the following series:

$$W(u) = -0.577216 - \ln u + u - u^2/2.2! + u^3/3.3! \ldots$$

where all terms are as previously defined.

A.2.1 STRAIGHT LINE EQUATION

Jacob developed a simplified form of Theis' drawdown equation by truncating the well function series after the first two terms. Assuming the truncation, the following equations were developed to analyze drawdown versus time data on semi-log plots and is called the straight-line or Jacob equation:

$$T = 264\ Q\ [\log (t2/t1)]/(s2 - s1)$$
$$T = 264\ Q/\mathrm{DELTA}\ s$$
$$S = T\ to/4800\ r^2$$

s1 = drawdown, in feet, at time since pumping started, t1, in minutes
s2 = drawdown, in feet, at time since pumping started, t2, in minutes
and t2 > t1
DELTA s = change in drawdown over one log cycle of time on a semi-log plot, in feet
S = storage coefficient
to = straight-line intercept of zero drawdown, in min.
r = radius of well, in feet.

A straight line is fitted to the semi-log plot of drawdown versus time (log scale) to obtain transmissivity. Jacob suggested that u values less than 0.01 are needed before his straight-line method is useful. However, a plot of W(u) versus 1/u on semi-log paper indicates that this method should be applicable for values of u as large as 0.1. Pages 98-100 of Ferris and others (1962) should be consulted for additional information on Jacob's method.

A.2.2 THEIS RECOVERY EQUATION

Theis' equation can be modified to handle recharge of a well or multiple pumping periods by summation of the well functions. The following equation is the solution of Theis' equation for one pumping and recharge cycle (Recovery equation) using a log-log match format:

$$T = 114.6\ Q\ [w(u) - W\ (u')]/s'$$

$$u' = 2693\ r^2\ S/Tt'$$

$$T = 114.6\ Q\ [W(u) - W(u) + W(u')]\ sr$$

$$= 114.6\ Q\ W(u')/sr$$

$$sr = s - s'$$

where: sr = recovery, in feet
s' = residual drawdown (static water level - water level @ t'), in feet
$W(u')$ = recovery well function
u' = recovery well function variable
t' = time since pumping stopped, min.

The recovery data are analyzed by matching the log-log plot of the recovery versus time since pumping stopped to Theis' type curve. The type curve variables are $W(u')$ and $1/u'$ for the recovery match. The recovery is computed by estimating the drawdown which would have occurred if pumping had continued, and subtracting this predicted drawdown from the residual drawdown. For example, the recovery at 100 minutes after pumping has stopped is computed by estimating the drawdown at that time if the pumping has continued uninterrupted, and subtracting this drawdown from the residual drawdown. The straight-line fit of the drawdown is normally extended to obtain these estimates of drawdown.

The well functions of the residual-drawdown form of Theis' equation were approximated by using only the first two terms in the well function series. The following equations present the semi-log form of the Theis recovery equation:

$$T = 264\ Q\ [\log\ (t/t')]/s'$$

or $$T = 264\ Q/\mathrm{DELTA}\ s'$$

where: t = time since pumping started, in min.
t' = time since pumping stopped, in min.
s' = residual drawdown, in feet
and
DELTA s' = change in residual drawdown over one log cycle of t/t' on a semi-log plot, in feet

Therefore, when residual drawdown is plotted on an arithmetic scale versus t/t' on a logarithmic scale, the above equation can be used for the straight line fit. Pages 100-102 of Ferris and others (1962) should be consulted for a discussion of Theis' recovery method. Theis' recovery equation is for a non-leaky confined aquifer also.

AQUIFER THINNING

Theis' equation with Jacob's (1944) correction for aquifer thinning has been used extensively to analyze unconfined aquifer tests. The correction for aquifer thinning for both drawdown and residual drawdown equations can be expressed as follows:

ST = S - SC
SC = S^2/2M

where:

ST = drawdown (or residual drawdown), in feet, corrected for aquifer thinning,
S = observed drawdown (or observed residual drawdown), in feet,
SC = drawdown correction (or residual drawdown correction), in feet,
M = saturated aquifer thickness, in feet,
^ = denotes exponentiation.

A.3 HANTUSH'S MODIFIED METHOD

Hantush (1960) presented a modification of the theory of leaky confined aquifers which had previously been described by Hantush and Jacob (1955). The modification took into account storage of water in the semipervious confining bed. Equations developed are as follows:

T = [114.6 (Q) / s] H (u, BETA)

where:

H(u, BETA) = the integral from u to infinity of (e^-y)/y [complementary error function of (BETA/Square Root u) / Square Root (y(y-u))]dy

u = [(2693) r^2 (S)] / Tt
and BETA = r / 4b Square Root (K' Ss' / K ss)

The main parameters are as follows:

T = transmissivity, gal/day/ft,
Q = discharge, gpm
s = drawdown, ft,
y = variable of integration
r = radius, ft,
S = storage coefficient,
t = time, min,
b = aquifer thickness, ft,
K = aquifer permeability, ft/day,
K' = confining layer permeability, ft/day,

Ss = aquifer specific storage, 1/ft,
and Ss' = confining layer specific storage, 1/ft.

Hantush (1961) presented tabulations of H(u, BETA) for varying values of u and BETA, and subsequently, a family of type curves showing H(u, BETA) vs. 1/u has been developed. Main aquifer properties can be determined by matching plots of observed drawdown versus time data to one of Hantush's type curves and using the equations presented above. Semi-pervious confining layer vertical permeability can then be calculated by noting the value of BETA for the curve which best fits observed data and applying the equation for BETA presented above.

A.3 NEUMAN EQUATION

Theis' equation with Jacob's (1944) correction for aquifer thinning has been used extensively to analyze unconfined aquifer tests. However, this equation does not take into account the free surface boundary of the water table. Theories of unconfined aquifers are more complicated than Theis' equation with the moving boundary at the phreatic surface. Boulton (1954) presented an unconfined flow equation for drawdown at the free surface. This equation has not been used very extensively, because drawdowns at the phreatic surface and from a well which penetrates the aquifer are considerably different. Stallman (1963, 1965) developed some type curves for an unconfined aquifer from an electric analog, but these curves have not been used extensively because they are for limited well conditions. Dagan (1967) and Neuman (1972, 1976) have developed computer programs which compute type curve values for unconfined aquifer conditions. Neuman showed that unconfined aquifers have some storage from compression of the aquifer structure and the expansion of the fluid. His equation, therefore, has both a storage coefficient and a specific yield term. Dagan's equation considers only the specific yield for storage. All of these unconfined aquifer equations produce equal type curves for the same conditions except Neuman's curves, which depart from the other curves at early pumping times. Unconfined aquifers which demonstrate the confining effect normally have a flat drawdown curve after the confined portion of the curve. Finally, the drawdown curve returns to a Theis type drawdown curve. Neuman (1974) and Dagan (1967) have demonstrated that the flat portion of the drawdown curve is due to the vertical flow effects. This flat portion of the drawdown curve will be more obvious as the anisotropic ratio (vertical permeability divided by horizontal permeability) decreases.

Development of Neuman (1974) type curves requires execution of a computer program for each individual pump test. Streltsova (1972, 1973) developed an approximation of the vertical flow equation and has shown this approximation is the same as Boulton's (1963) flow equation. Streltsova's approximation allows Boulton's type curves to be used to analyze an unconfined aquifer with consideration of vertical flow, if all wells are fully penetrating. When penetration (the length of the well bore where water enters) of the pumping and observation wells is significant, the Streltsova method cannot be used. Under these conditions, the Neuman method was used.

Neuman (1974) presents the theory of his unconfined flow equation which is used in the development of Neuman type curves from a computer program. The following is a form of Neuman's unconfined aquifer equation.

T = 114.6(Q) (sD/s)
Sy = Tt/10,770 (r^2)(ty)
BETA = r^2/D^2 (Kv/Kh)
ALPHA = S/Sy

where: All terms are the same as previously defined, plus

sD = dimensionless drawdown (same as well function in Theis' equation, except it accounts for penetration and two storage terms)
ty = dimensionless time (same as 1/u in Theis' equation)
D = aquifer thickness, in feet
Sy = specific yield
Kv = vertical permeability, in ft/day
Kh = horizontal permeability, in ft/day

This basic form of the Neuman equation is used with the geometric setting of the pumping and observation wells and penetration information in the computer program to produce dimensionless drawdown (sD) versus dimensionless time (ty) data points for different BETA and ALPHA conditions. Figure A-1 presents the variables used to define well penetrations. The pumping well penetrations are defined by two variables and the observation well's penetration can be defined by two variables which define the top and bottom of the observation well perforation. It can be shown that most observation wells can be represented by a piezometer at the center of the perforated interval without introducing significant errors. The radius of the observation well from the pumping well and the aquifer thickness are included in the BETA term. This term is typically varied for different anisotropic ratios (Kv/Kh). Neuman (1975) recommends the use of a small ALPHA (S/Sy) value for the computer development of the type curves and then adjusting the ALPHA as outlined by Neuman (1975) to obtain the ALPHA value that best fits the observed data.

Neuman's or Dagan's equations do not account for aquifer thinning. Therefore, Jacob's (1944) correction for aquifer thinning is recommended for pump test analyses with these theories also. Pump test data are analyzed by matching the log- log plot of drawdown versus time to Neuman's type curve (sD vs. ty) and applying the above equation to the match.

Jacob's straight-line method can be used to analyze drawdown in unconfined aquifers, but the u value is not the only criterion to determine if this method is applicable. A semi-log plot of Neuman's type curves are presented in Figure 2 of Neuman (1975) to demonstrate the applicability of using the straight-line plot to determine transmissivity for unconfined aquifers. Early- and late-time portions of the Theis equation, which form a straight line, are shown as a solid line on this plot. The straight-line method should yield an accurate transmissivity when the Neuman type curves converge with the solid lines. The specific yield value could be in error, however, because partial penetration can cause the late straight line to be shifted away from the Theis straight line. Partial penetration can cause straight line slopes that are not equal to the Theis slope. An adjustment in straight line coefficient (264) needs to be made to adjust for the change in straight line slope.

Five Neuman type curves are shown on Figure 2 of Neuman (1975) to demonstrate when the straight-line method should be appropriate for certain portions of the aquifer. The curves for the very low BETA values (less than 0.01) fit some of the early-time Theis curves. The BETA curve of 0.001 is representative of a pumping well for typical aquifer properties. This curve indicates that early data from a pumping well could be accurately analyzed by the straight-line method. Early (first few minutes) drawdown data in pumping wells is often influenced by well storage effects which causes a deviation from the Theis straight line. Therefore, well storage effects would have to be small to make use of the straight-line method for early drawdown in a pumping well. The Neuman type curves do not fit the Theis type curve for moderate time values (normally a few tens of minutes to possibly days). The use of the straight-line method for analysis during this time would yield high transmissivity values. The BETA type curve of 0.001 eventually converges with the late-time Theis straight line and the slope is equal to the early-time slope after this convergence. This convergence generally occurs from a few hundred minutes to several days.

The BETA curve of 0.03 is typical of an observation well inside one aquifer thickness radius from the pumping well. The early drawdown data for an observation well with a BETA of 0.03 do not reach the slope of the Theis straight line. Transmissivities determined from a straight-line plot of early drawdown data for an observation well with a BETA of 0.03 would be too high. The BETA type curve converges with the late-time Theis curve at a ty value of 20. The time for the drawdown data of a close observation well to converge to the late-time Theis curve could be from a few minutes to a few days depending on the aquifer properties.

The BETA curve of 0.4 is more typical of distant observation wells (radius of several aquifer thicknesses). This plot indicates that the straight-line method should not be used for a distant observation well until the drawdown data converges on the late-time Theis curve. The pumping time required to reach the late-time straight line could be from a few tens of minutes to tens of days. General knowledge of aquifer properties is needed to determine roughly when the straight-line method is appropriate for analyzing unconfined aquifer tests.

The same straight-line equations which are presented for the Theis equation are applicable for determining the aquifer properties. The specific yield should replace the storage coefficient for analyzing late-time straight line.

A.4 NEUMAN-WITHERSPOON METHOD

A method for determining aquitard vertical permeability has been described by Neuman and Witherspoon (1971) and Neuman and Witherspoon (1972). In this technique, referred to as the Ratio Method, the ratio of drawdown in the aquitard to the drawdown in the pumped aquifer at the same time distance is related to a dimensionless time parameter, t'D:

$$t'D = K't / Ss\ z^2$$

where: K' = aquitard vertical permeability
t = time for which drawdown ratio was determined
Ss' = specific storage of the aquitard
= K'/ALPHA'
ALPHA' = aquitard diffusivity,
and z = vertical distance from the center of the screened section of the well completed in the aquitard to

the aquifer.

t'D is determined graphically. Therefore, aquitard diffusivity (ALPHA') can be calculated from $ALPHA' = K' / Ss' \doteq T'D\ Z^2 / t$.

In order to determine aquitard vertical permeability, K', aquitard specific storage, Ss', must be ascertained.

$$Ss' = avWw / (1 + e)$$

where: av = coefficient of compressibility
Ww = weight of water,
and e = void ratio

The values of av and e must be determined on samples of the aquitard in the laboratory or Ss'may be estimated based on published reports on similar sediments.

A.5 DIRECTIONAL TRANSMISSIVITY

To determine the directional anisotropy of the aquifer, a method described by Papadopulos (1965) is used. Papadopulos derived an equation for the drawdown distribution around a well discharging at a constant rate from an infinite horizontal anisotropic aquifer. Aquifer-test data from a minimum of three observation wells are analyzed to obtain principal transmissivities and the orientation of the principal axes.

The equations derived by Papadopulos for use in a type-curve matching technique are as follows:

$$s = \frac{114.6\ Q\ W(Uxy)}{[(Txx)(Tyy)-Txy^2]^{1/2}}, \text{ and}$$

$$Uxy = \frac{(1.87S)}{(t)}\ \frac{[(Txx)(y^2)+(Tyy)(x^2)-(2\ Txy)(x)(y)]}{[(Txx)(Tyy)-Txy^2]}$$

where: s = drawdown, in feet,
Q = discharge, in gpm,
W(Uxy) = well function,
Txx, Tyy & Txy = transmissivity components, in gal/day/ft,
Uxy = well function variable,
S = storage coefficient,
t = elapsed time, in days,
x = distance from pumping well of observation well along arbitrarily selected x-axis, in feet,
and y = distance from pumping well of observation well alongarbitrarily selected y-axis (orthogonl to x-axis), in feet.

For each of the three wells being analyzed, observed drawdown data are matched against type curves to determine values of s, t, W(Uxy), and Uxy. Three equations with three unknowns are then solved simultaneously to determine the transmissivity components Txx, Tyy and Txy. Then principal transmissivities, Tee and Tnn, are calculated from the equations:

$$Tee = 1/2[(Txx + Tyy) + (Txx - Tyy)^2 + 4\ Txy^2] \text{ and}$$

$$Tnn = 1/2[(Txx + Tyy) - (Txx - Tyy)^2 + 4\ Txy^2]$$

where: Tee = maximum transmissivity, and
Tnn = minimum transmissivity

The angle between the arbitrarily selected x-axis and the axis of maximum transmissivity (θ) is then determined by the following equation:

$$\theta = \arctan (Tee-Txx)/Txy$$

APPENDIX A REFERENCES

Ferris, J.G., D.B. Knowles, R.H. Brown, and R.W. Stallman, 1962, Theory of aquifer tests, U.S. Geol. Survey, Water-Supply Paper 1536-E.

Hantush, M.S., and C.E. Jacob, 1955, Nonsteady radial flow in an infinite leaky aquifer: Am. Geophys. Union Trans., V. 36, No. 1, p. 95-100.

Hantush, M.S., 1960, Modification of the theory of leaky aquifers: Jour. Geophys. Research, V. 65, No. 11, p. 3713-3725.

Hantush, M.S., 1961, Tables of the Function H (u, BETA): New Mexico Inst. Mining and Technology, Prof. Paper 103, 14p.

Jacob, C.E., 1944, Notes on determining permeability of pumping tests under water-table conditions, U.S. Geol. Survey, open-file report.

Neuman, S.P., and P.A. Witherspoon, 1971, Flow in multiple aquifer systems, Chap. IV, in Sea-Water Intrusion: Aquitards in the Ground Water Basin of Oxnard Plain, Ventura County, Bulletin No. 63-4, State of California Dept. of Water Resources and Univ. of California, Dept. of Civil Engineering, Geotechnical Engineering, Berkeley, California.

Neuman, S.P., and P.A. Witherspoon, 1972, Field determination of the hydraulic properties of leaky multiple aquifer systems: Water Res. Research, Vol. 8, No. 5, p. 1284- 1296.

Papadopulos, I.S., 1965, Nonsteady flow to a well in an infinite anisotropic aquifer, International Association of Scientific Hydrology, Symposium of Dubrovnik.

SPACING OF ORE SAND MONITORING WELLS ADJACENT TO THE SMITH RANCH PROJECT INSITU WELL FIELD
"O SANDS"

FOR:

RIO ALGOM, INC.

BY:
HYDRO-ENGINEERING
APRIL, 1990

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1.0 INTRODUCTION

This report presents the recommended ore sand monitor well spacing for the Smith Ranch Project insitu well field (O and Q sands). It is recommended that horizontal excursion monitoring wells be located within the well field zone of control. The well field zone of control is the zone in the aquifer where the well field controls the ground-water movement. The zone of control or gradient reversal is created by the bleed rate from the well field. The procedure presented in Hydro-Engineering (1989) that predicts the drawdowns from the bleed rate was used, with an adjustment for the natural ground-water gradient to determine the area where the well field controls the flow which exists within the zone of ground-water reversal. Recommendations on the selection of monitoring well spacing concludes this report.

2.0 ZONE OF CONTROL FOR THE O AND Q SANDS

The placement of monitoring wells in the ore sand aquifer needs to be within the zone where the ground-water flow is controlled by the operation of the mining unit. The bleed from the mining unit creates a zone around the mine where the head is lower than outside of this zone. This reversal zone causes ground water in this area to flow towards the mining unit and for purposes of this report is called the zone of control. The zone of control includes the area of ground-water reversal in the two downgradient sides of the well field and also the two upgradient sides. At present the Bill Smith mine shaft is being pumped at approximately 200 gpm, thus creating a depression in the O sand aquifer in its general area. The present gradient in the O sand is .0025 ft/ft at south 140° east. This pumping is going to be stopped at the time of mine construction which will allow the groundwater to recover to its natural gradient and flow direction. For calculation purposes this flow has been conservatively estimated with a gradient of 0.001 ft/ft at north 45° east. If it is found to be significantly different at the time of production begins these calculation may need revised. Q sand groundwater flow has been calculated to be north 41° east with a gradient of 0.0015 ft/ft. Therefore these sites have two upgradient and two downgradient sides. Flow from the upgradient sides of the well field enters the well field area prior to the operation with the bleed rate only increasing the gradient in these sides. The well field is effectively controlling flow on these two sides as well. Figure 2-1 of Hydro-Engineering (1989), presents a cross section of the hydraulic gradient adjacent to a well field. The zone of reversal is shown downgradient of the well field where the ground water is flowing back to the well- field. Beyond the zone of reversal the ground-water flow continues downgradient. The zone of control includes the two reversal (downgradient) sides and the two upgradient sides.

The following presents our evaluation of the zone of control around the proposed mining areas of the O and Q sand units. Only portions of the areas were initially simulated because they are proposed as the initial start-up regions. Drawdowns at distances from the mining units are first estimated by summing the individual drawdowns. The drawdowns are adjusted for the natural ground-water gradient to estimate the changes in the piezometric surface with distance from the mining unit.

2.1 DRAWDOWN ESTIMATES

The appropriate ground-water flow model for the O and Q sand mining units is the Theis confined non-leaky model. The use of a partially penetrating well model is not necessary due to the length of time and distances where the drawdowns are needed. The following procedures are the same as those outlined in Hydro-Engineering (1989).

A version of the WELFLO program presented in Walton (1989) has been modified by HYDRO in order to compute drawdowns from the Theis equation. This program has the advantage in that it computes drawdowns along grid lines and therefore several lines of drawdowns are developed with one execution.

2.1.1 O SAND WELL FIELD SIMULATION

The total production from the recovery wells is slightly higher than the total injection rate. This difference is called the bleed rate. It was simulated at 0.5%, 1%, and 1.5% in order to quantify drawdowns in the mining area. At bleed rates less than 1.5% the zone of control is relatively close (approximately 400 feet at 1%) to the mining area and at bleeds greater than 1.5% the zone of control is extremely far away (> 2000 feet). A bleed rate of 1.5% is therefore the recommended percentage rate of the total recovery for the O sand site. The bleed rate, not the recovery and injection rates, becomes the important rate with time. The zone of reversal was simulated with only the bleed rate for the proposed initial O sand mining area. Figure 2-1 shows the outer limits (dashed line) of the O sand mining unit. This area is being simulated by 29 bleed sites that are spaced 100 feet apart. The modelled area is shown on Figure 2-1 as a solid line. Average total bleed rate of 1.5% for the 29 well nodes is 1.55 gpm per node for a total recovery rate for this mining unit of 3000 gpm. The total bleed rate of 45 gpm for this simulation is applied uniformly over the well field area but could be applied unevenly if the well field was planned to be operated with a non-uniform bleed.

The drawdown calculations consist of 29 pumping (bleed) sites with drawdowns simulated over a 30 by 30 grid. Table 2-1 presents the list of input parameters that are listed with the output from the WELFLO program. The output listing does not list the first three inputs: enter 1 for printer, enter 1 for non leaky condition and enter 1 for fully penetrating wells. Table 2-1 presents the remainder of the input data. Table 2-2 presents the listing of the simulated drawdowns from the program output. Figure 2-1 shows the grid used to calculate the drawdown adjacent to the O sand mining unit.

2.1.2 O SAND AQUIFER PROPERTIES

Average aquifer properties (transmissivity and storage coefficient) from the HYDRO re-analysis (Hydro-Engineering, 1990) of pump test data were calculated to be 7230 gpd/ft and .00012. These parameters are very consistent throughout the O sand area and are thought to be the best representative along the line of drawdowns used for the reversal determination.

2.1.3 O SAND GRADIENT REVERSAL

The pre-mine hydraulic gradient in the ore sand aquifer is integrated with the drawdown calculations to determine the zone that the bleed has caused reversal in the gradient (towards the well field). This is the down gradient portion of the zone of control of the well field. Monitoring in the ore sand aquifer is recommended within the zone of control where the bleed controls the flow in the aquifer.

A pre-mine gradient of 0.001 ft/ft means that there needs to be more than 0.1 feet of drawdown between nodes along the line of drawdowns (100 foot spacing) for reversal to exist along the drawdown lines that are downgradient to the ground-water flow direction. The ground-water flow direction at the O sand is estimated to be north 45 degrees east. An adjustment needs to be made to the gradient due to the fact that it is intercepting the simulated mining area at an oblique angle. Therefore, the drawdown difference required for lines of drawdown to the north and east of the well field is 0.07 feet (0.1 x cosine 45 degrees). Figure 2-2 presents the drawdown changes along four lines extending from this well field. The change in drawdown in the drawdown lines between 100 foot node points needs to be 0.07 feet for the gradient to be reversed. Therefore, the reversal in this area extends greater than 1000 feet from the northern and southern edges of the well field.

The western half of the mining unit was not simulated but the zone of reversal will be very similar to the eastern half reversal because the area of withdrawal is very similar and the bleed rate will be the same. Therefore, a zone of reversal of greater than 1000 feet should exist as well field development progresses from the eastern to the western half of the O sand mining unit.

2.2 Q SAND WELL FIELD SIMULATION

The bleed rate for the Q sands was also simulated at 0.5%, 1%, and 1.5% with .5% found to be adequate. Bleed rates greater than .5% extend the zone of control to over 2000 feet. Figure 2-3 shows the outer limits (dashed line) of the Q sand mining unit. This area is being simulated by 120 nodes that are 100 feet on each side. The modelled area is shown on Figure 2-3 as a solid line.

Average total bleed rate of .5 percent for the 120 nodes is .125 gpm per node for a total recovery rate for this mining unit of 3000 gpm. The total bleed rate of 15 gpm for this simulation is applied uniformly over the well field area.

The drawdown calculations for the example consists of 120 pumping (bleed) sites with drawdowns simulated over a 36 by 31 grid. Table 2-3 presents the list of input parameters that are listed with the output from the WELFLO program. Table 2-4 presents the listing of the simulated drawdowns from the program output. Figure 2-3 shows the grid used to calculate the drawdown adjacent to the Q sand mining unit.

2.2.1 Q SAND AQUIFER PROPERTIES

Average aquifer properties (transmissivity and storage coefficient) from the HYDRO re-analysis (Hydro-Engineering, 1990) of pump test data were calculated to be 1000 gpd/ft and .000048. These parameters are very consistent throughout the Q sand area and are thought to be the best representative along the line of drawdowns used for the reversal determination.

2.2.2 Q SAND GRADIENT REVERSAL

A pre-mine gradient of 0.0015 ft/ft means that there needs to be more than 0.15 feet of drawdown between nodes along the line of drawdowns (100 foot spacing) for reversal to exist along the drawdown lines that are downgradient to the ground-water flow direction. The ground-water flow direction at the Q sand is estimated to be north 41 degrees east. An adjustment needs to be made to the gradient due to the fact that it is intercepting the simulated mining area at an oblique angle. Therefore, the drawdown difference required for lines of drawdown to the north of the well field is 0.11 feet (0.15 x cosine 41 degrees). On the east the drawdown difference is .098 feet (0.15 x cosine 49 degrees). Figure 2-4 presents the drawdown changes along two lines extending from this well field. The change in drawdown in the drawdown lines between 100 foot node points needs to be 0.11 feet and .098 feet in the north and east respectively for the gradient to be reversed. Therefore, the reversal in this area extends greater than 1800 feet from the north and over 1200 feet from the eastern edges of the well field.

The southern half of the mining unit was not simulated but the zone of reversal will be very similar to the northern half reversal because the area of withdrawal is very similar and the bleed rate will be the same. Therefore, a zone of reversal of greater than 1800 feet in the north and 1200 feet in the east should exist as well field development progresses from the northern to the southern half of the Q sand mining unit.

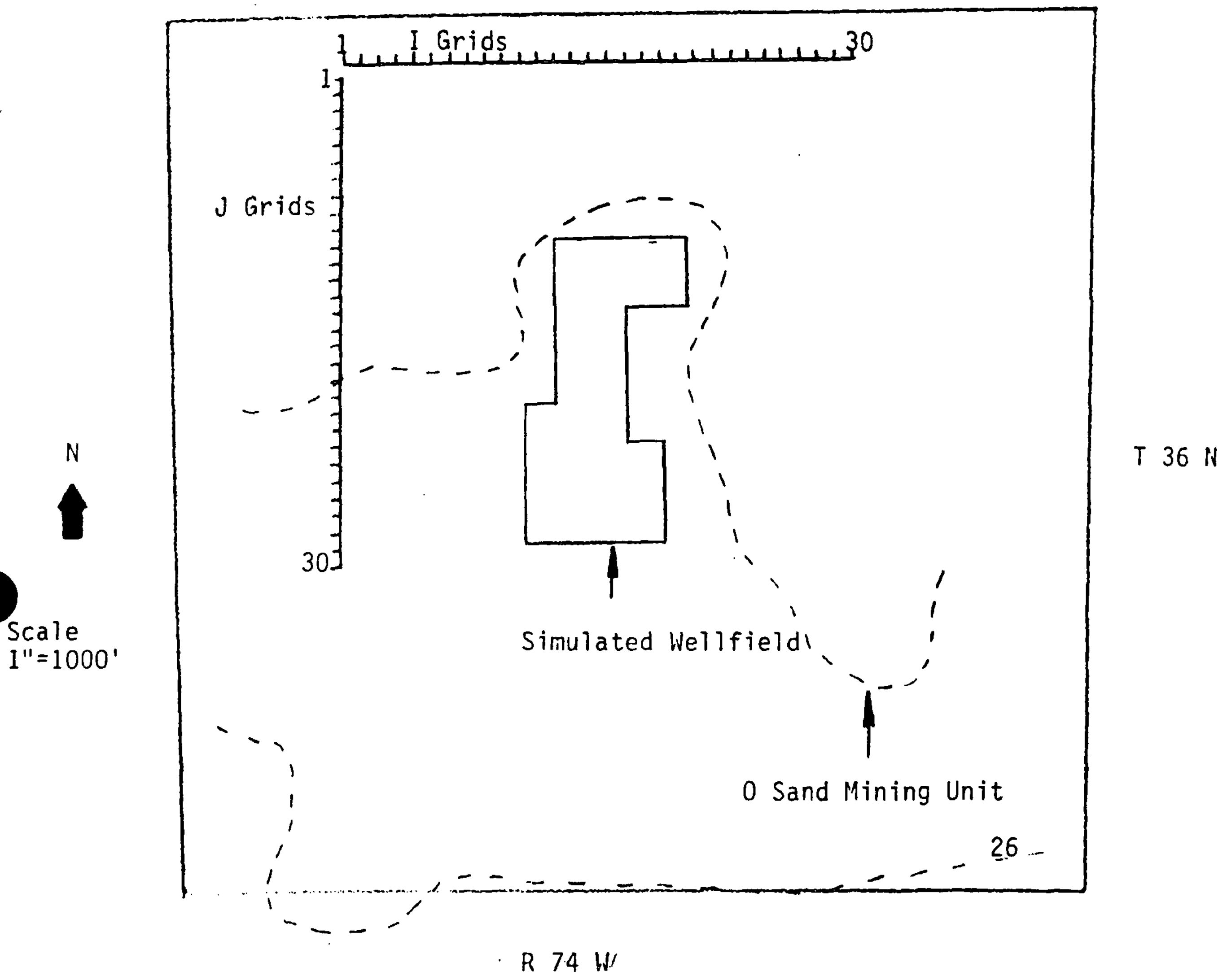

FIGURE 2-1. LOCATION OF WELL FIELD AND SIMULATED DRAWDOWN GRID (O SANDS)

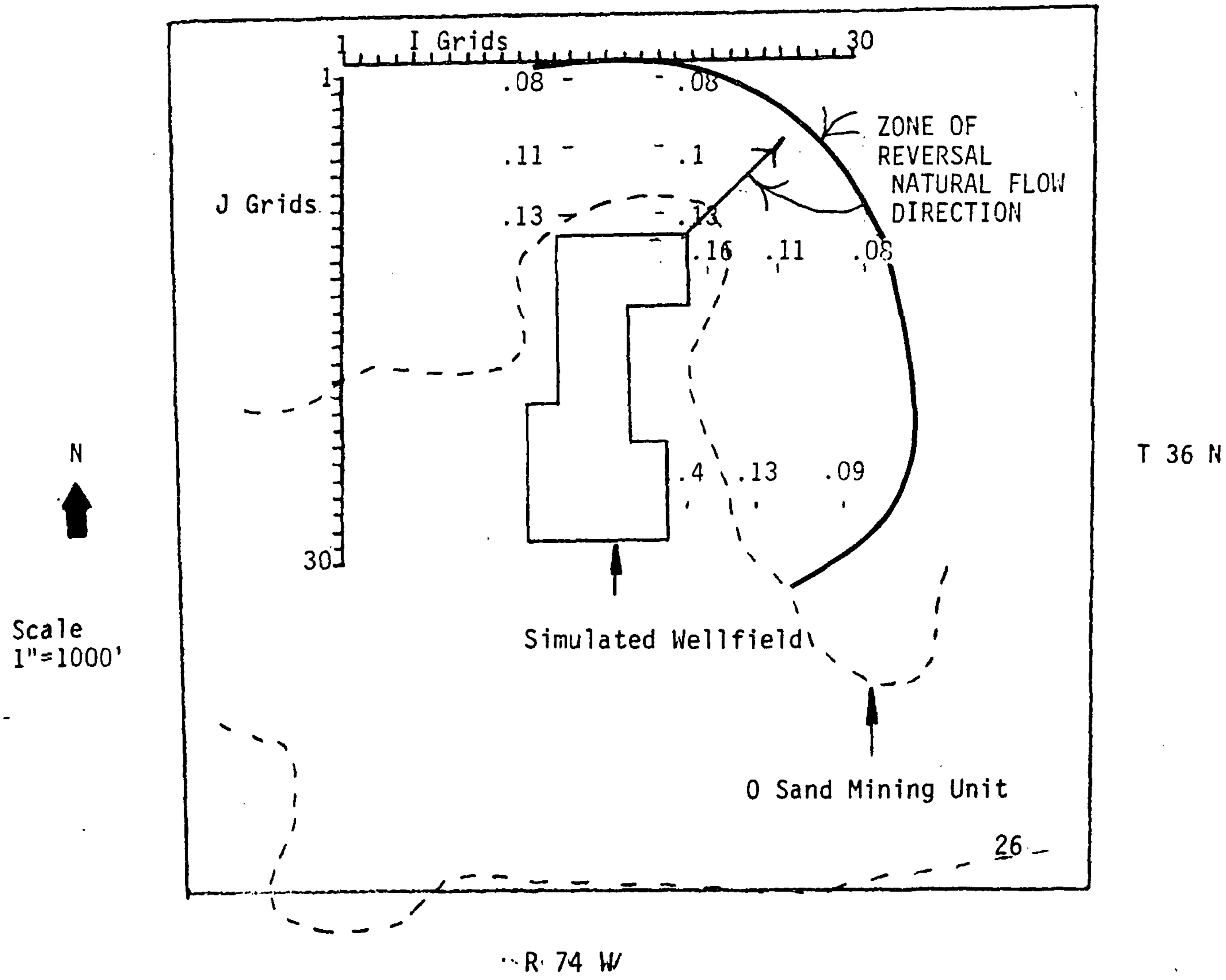

FIGURE 2-2. DRAWDOWN CHANGES ADJACENT TO THE O-SANDS MINING UNIT

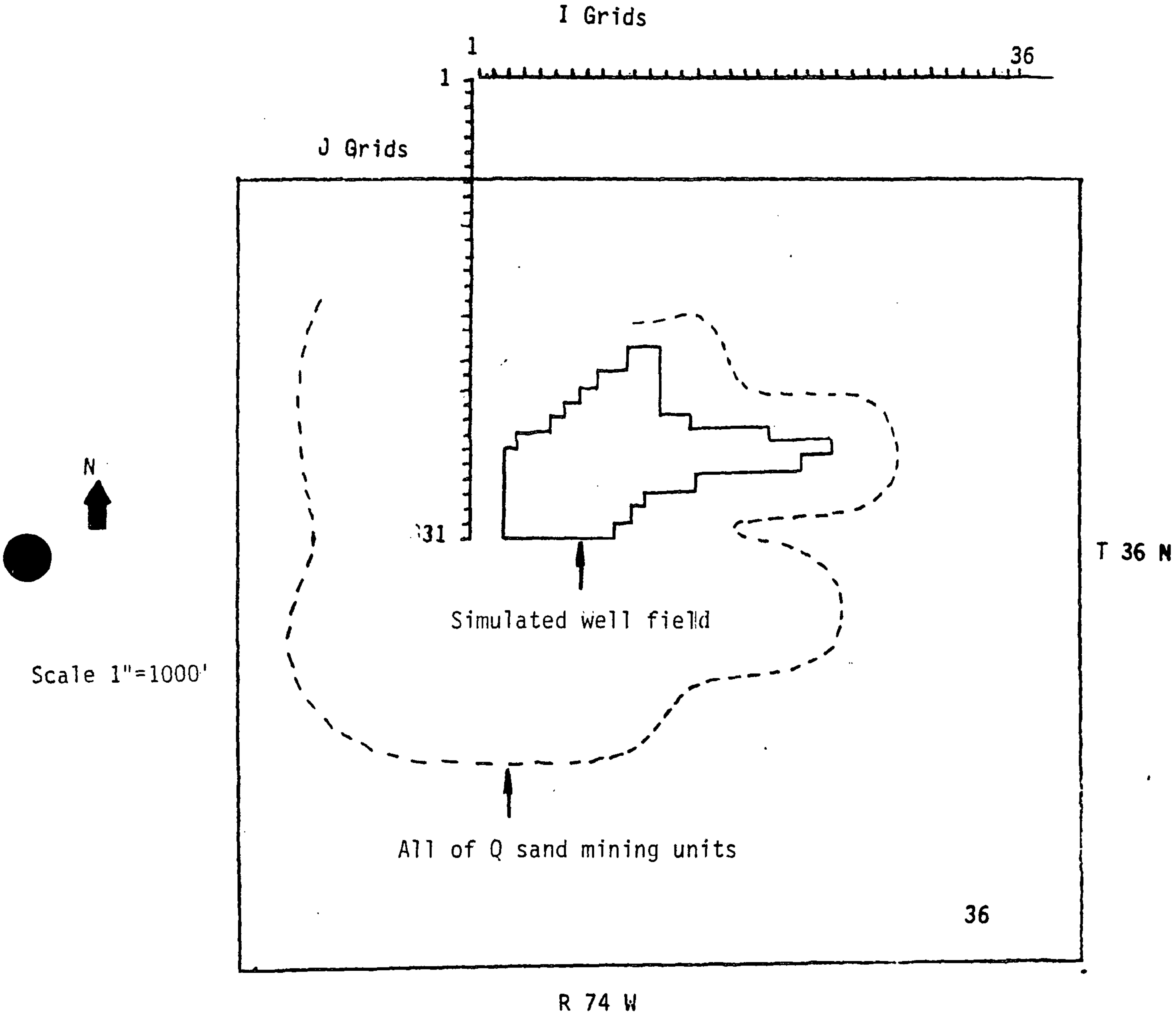

FIGURE 2-3. LOCATION OF WELL FIELD AND SIMULATED DRAWDOWN GRID (Q-SANDS

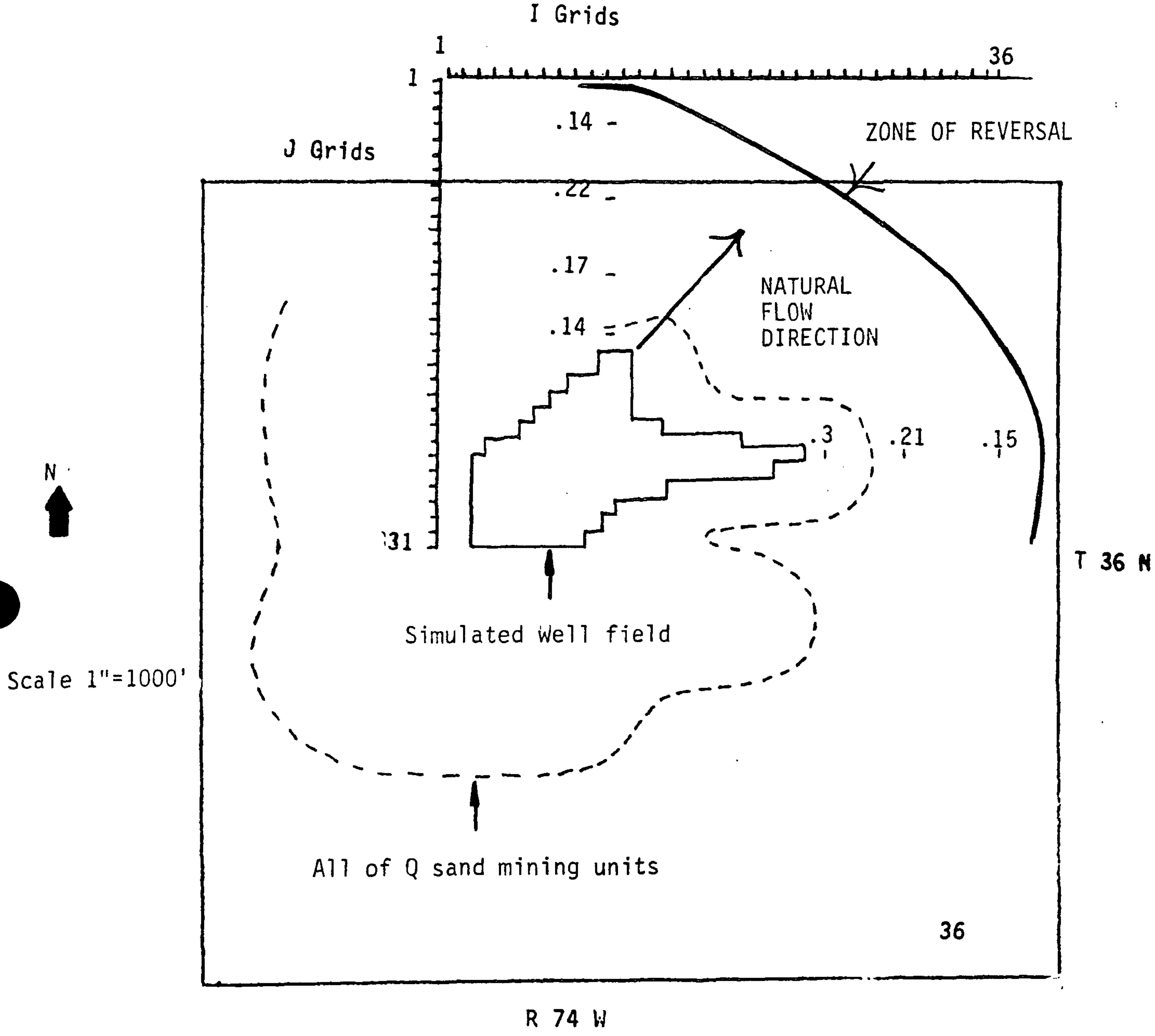

FIGURE 2-4. DRAWDOWN CHANGES ADJACENT TO THE O-SANDS MINING UNIT

TABLE 2-1 INPUT PARAMETERS FOR THE O-SANDS MINING UNIT

```
RIO ALGOM O-SAND BILL SMITH MINE 45GPM BLEED 1.5% over T=7230 S=0.00012

GENERAL DATA BASE:

Number of simulation periods for which drawdown
or recovery is to be calculated 1
Simulation period number= 1
Duration of simulation period in days=  365.000
Number of grid columns= 30
Number of grid rows= 30
Grid spacing in ft=   100.00
X-coordinate of upper-left grid node in ft= -1300.00
Y-coordinate of upper-left grid node in ft= -1100.00
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 1
X-coordinate of well in ft=  -100.00
Y-coordinate of well in ft=  1100.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 2
X-coordinate of well in ft=  -100.00
Y-coordinate of well in ft=  1300.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 3
X-coordinate of well in ft=  -100.00
Y-coordinate of well in ft=  1500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 4
X-coordinate of well in ft=  -100.00
Y-coordinate of well in ft=  1700.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 5
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=   100.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 6
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=   300.00
Well discharge in gpm=    1.55
```

```
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 7
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=   500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 8
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=   700.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 9
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=   900.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 10
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=  1100.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 11
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=  1300.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 12
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=  1500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 13
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=  1700.00
Well discharge in gpm=    1.55
```

TABLE 2-1 (Cont.)

```
Duration of pump operation during simulation period
in days= 365.000
Well radius in ft= 0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 14
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=   100.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days= 365.000
Well radius in ft= 0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 15
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=   300.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days= 365.000
Well radius in ft= 0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 16
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=   500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days= 365.000
Well radius in ft= 0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 17
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=   700.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days= 365.000
Well radius in ft= 0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 18
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=   900.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days= 365.000
Well radius in ft= 0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 19
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=  1100.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days= 365.000
Well radius in ft= 0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 20
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=  1300.00
Well discharge in gpm=    1.55
```

TABLE 2-1 (Cont.)

```
Duration of pump operation during simulation period
in days= 365.000
Well radius in ft= 0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 21
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=  1500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 22
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=  1700.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 23
X-coordinate of well in ft=   500.00
Y-coordinate of well in ft=   100.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 24
X-coordinate of well in ft=   500.00
Y-coordinate of well in ft=   300.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 25
X-coordinate of well in ft=   500.00
Y-coordinate of well in ft=  1300.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 26
X-coordinate of well in ft=   500.00
Y-coordinate of well in ft=  1500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 27
X-coordinate of well in ft=   500.00
Y-coordinate of well in ft=  1700.00
```

TABLE 2-1 (Cont.)

```
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 28
X-coordinate of well in ft=   700.00
Y-coordinate of well in ft=   100.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 29
X-coordinate of well in ft=   700.00
Y-coordinate of well in ft=   300.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Number of observation wells for which time-
drawdown tables are desired 0
Aquifer transmissivity in gpd/ft=    7230.00
Aquifer storativity as a decimal= 0.000120
```

TABLE 2-2 DRAWDOWN CHANGES ADJACENT TO THE O-SANDS MINING UNIT

```
NODAL COMPUTATION RESULTS:

SIMULATION PERIOD DURATION IN DAYS:  365.000

VALUES OF DRAWDOWN OR RECOVERY (FT) AT NODES:

J-ROW                                I-COLUMN
          1       2       3       4       5       6       7       8       9      10

  1     4.93    4.96    5.00    5.03    5.06    5.10    5.13    5.16    5.19    5.21
  2     4.97    5.01    5.04    5.08    5.12    5.15    5.19    5.22    5.25    5.28
  3     5.01    5.05    5.09    5.13    5.17    5.21    5.25    5.28    5.31    5.35
  4     5.06    5.10    5.14    5.18    5.22    5.27    5.31    5.34    5.38    5.42
  5     5.10    5.14    5.19    5.23    5.28    5.32    5.37    5.41    5.45    5.49
  6     5.14    5.19    5.24    5.29    5.34    5.38    5.43    5.48    5.52    5.57
  7     5.18    5.24    5.29    5.34    5.39    5.44    5.49    5.55    5.60    5.65
  8     5.23    5.28    5.33    5.39    5.45    5.50    5.56    5.62    5.67    5.73
  9     5.27    5.32    5.38    5.44    5.50    5.56    5.62    5.69    5.75    5.81
 10     5.31    5.37    5.43    5.49    5.56    5.62    5.69    5.76    5.83    5.90
 11     5.34    5.41    5.47    5.54    5.61    5.68    5.75    5.83    5.90    5.98
 12     5.38    5.45    5.52    5.59    5.66    5.73    5.81    5.89    5.98    6.06
 13     5.41    5.48    5.56    5.63    5.71    5.79    5.87    5.96    6.05    6.14
 14     5.45    5.52    5.59    5.67    5.75    5.84    5.93    6.02    6.12    6.22
 15     5.48    5.55    5.63    5.71    5.80    5.88    5.98    6.08    6.18    6.29
 16     5.50    5.58    5.66    5.74    5.83    5.93    6.03    6.13    6.24    6.35
 17     5.52    5.60    5.69    5.77    5.87    5.96    6.07    6.17    6.29    6.41
 18     5.54    5.62    5.71    5.80    5.90    6.00    6.10    6.22    6.33    6.46
 19     5.56    5.64    5.73    5.82    5.92    6.02    6.13    6.25    6.37    6.50
 20     5.57    5.65    5.74    5.84    5.94    6.04    6.16    6.28    6.40    6.54
 21     5.57    5.66    5.75    5.85    5.95    6.06    6.17    6.30    6.43    6.57
 22     5.58    5.66    5.75    5.85    5.95    6.06    6.18    6.31    6.44    6.59
 23     5.57    5.66    5.75    5.85    5.95    6.06    6.18    6.31    6.45    6.60
 24     5.57    5.65    5.74    5.84    5.94    6.05    6.17    6.30    6.44    6.59
 25     5.56    5.64    5.73    5.83    5.93    6.04    6.15    6.28    6.42    6.57
 26     5.54    5.62    5.71    5.81    5.91    6.01    6.13    6.25    6.39    6.54
 27     5.52    5.60    5.69    5.78    5.88    5.98    6.09    6.21    6.34    6.48
 28     5.50    5.58    5.66    5.75    5.84    5.94    6.04    6.16    6.28    6.41
 29     5.47    5.54    5.62    5.71    5.80    5.89    5.99    6.10    6.21    6.33
 30     5.44    5.51    5.59    5.67    5.75    5.84    5.93    6.03    6.13    6.24
```

TABLE 2-2 (Cont.)

J-ROW	I-COLUMN									
	11	12	13	14	15	16	17	18	19	20
1	5.23	5.25	5.27	5.29	5.29	5.30	5.30	5.30	5.29	5.28
2	5.30	5.32	5.34	5.36	5.37	5.38	5.38	5.38	5.37	5.36
3	5.37	5.40	5.42	5.44	5.45	5.46	5.46	5.46	5.45	5.44
4	5.45	5.48	5.50	5.52	5.54	5.55	5.55	5.55	5.54	5.52
5	5.53	5.56	5.59	5.61	5.63	5.64	5.64	5.64	5.63	5.61
6	5.61	5.64	5.68	5.70	5.72	5.74	5.74	5.74	5.73	5.71
7	5.69	5.73	5.77	5.81	5.83	5.85	5.85	5.85	5.84	5.81
8	5.78	5.83	5.87	5.91	5.94	5.96	5.97	5.97	5.95	5.93
9	5.87	5.93	5.98	6.03	6.07	6.09	6.10	6.10	6.08	6.05
10	5.96	6.03	6.10	6.16	6.20	6.24	6.25	6.25	6.22	6.18
11	6.06	6.14	6.22	6.29	6.36	6.40	6.42	6.41	6.38	6.34
12	6.15	6.25	6.34	6.44	6.53	6.58	6.61	6.60	6.57	6.51
13	6.24	6.35	6.46	6.59	6.94	6.77	7.03	6.78	6.98	6.67
14	6.33	6.44	6.57	6.71	6.84	6.90	6.93	6.91	6.86	6.77
15	6.41	6.53	6.66	6.81	7.18	7.01	7.27	7.01	7.18	6.85
16	6.48	6.61	6.75	6.90	7.03	7.09	7.10	7.05	6.97	6.86
17	6.54	6.67	6.82	6.97	7.34	7.16	7.39	7.08	6.97	6.85
18	6.59	6.73	6.87	7.03	7.16	7.20	7.20	7.10	6.98	6.86
19	6.64	6.78	6.93	7.08	7.44	7.25	7.47	7.13	7.00	6.87
20	6.68	6.83	6.98	7.12	7.24	7.28	7.26	7.15	7.02	6.88
21	6.72	6.87	7.02	7.17	7.52	7.32	7.52	7.17	7.03	6.89
22	6.74	6.91	7.08	7.21	7.31	7.33	7.30	7.19	7.04	6.90
23	6.76	6.95	7.36	7.25	7.57	7.35	7.55	7.20	7.06	6.91
24	6.76	6.95	7.13	7.24	7.32	7.34	7.31	7.21	7.08	6.92
25	6.74	6.93	7.34	7.23	7.54	7.32	7.53	7.21	7.32	6.91
26	6.70	6.88	7.06	7.17	7.25	7.26	7.24	7.16	7.05	6.88
27	6.64	6.82	7.22	7.10	7.40	7.18	7.40	7.09	7.22	6.82
28	6.56	6.73	6.88	6.98	7.05	7.06	7.05	6.98	6.88	6.73
29	6.46	6.62	6.99	6.85	7.14	6.92	7.14	6.85	6.99	6.62
30	6.35	6.47	6.58	6.66	6.71	6.72	6.71	6.66	6.59	6.48

J-ROW	I-COLUMN									
	21	22	23	24	25	26	27	28	29	30
1	5.27	5.25	5.23	5.21	5.18	5.15	5.12	5.08	5.05	5.02
2	5.34	5.32	5.30	5.27	5.24	5.21	5.18	5.14	5.10	5.07
3	5.42	5.40	5.37	5.34	5.31	5.27	5.23	5.20	5.16	5.12
4	5.50	5.48	5.45	5.41	5.38	5.34	5.29	5.25	5.21	5.17
5	5.59	5.56	5.53	5.49	5.45	5.40	5.36	5.31	5.26	5.22
6	5.68	5.65	5.61	5.56	5.52	5.47	5.42	5.37	5.32	5.27
7	5.78	5.74	5.70	5.65	5.59	5.54	5.48	5.43	5.37	5.32
8	5.89	5.84	5.79	5.73	5.67	5.61	5.55	5.49	5.43	5.37
9	6.00	5.95	5.88	5.82	5.75	5.68	5.61	5.54	5.48	5.41
10	6.13	6.06	5.98	5.91	5.83	5.75	5.67	5.60	5.53	5.46
11	6.27	6.18	6.09	5.99	5.90	5.82	5.73	5.65	5.58	5.51
12	6.42	6.31	6.19	6.08	5.98	5.88	5.79	5.70	5.62	5.55
13	6.81	6.43	6.28	6.16	6.04	5.94	5.84	5.75	5.67	5.58
14	6.67	6.51	6.36	6.22	6.10	5.99	5.89	5.79	5.70	5.62
15	6.96	6.57	6.41	6.27	6.14	6.03	5.93	5.83	5.74	5.65
16	6.74	6.59	6.44	6.31	6.18	6.07	5.96	5.86	5.76	5.67
17	6.73	6.60	6.46	6.33	6.21	6.09	5.98	5.88	5.79	5.69
18	6.73	6.60	6.47	6.35	6.23	6.11	6.00	5.90	5.80	5.71
19	6.74	6.61	6.48	6.36	6.24	6.12	6.02	5.91	5.81	5.72
20	6.75	6.62	6.49	6.37	6.25	6.13	6.02	5.92	5.82	5.73
21	6.76	6.62	6.49	6.37	6.25	6.13	6.02	5.92	5.82	5.73
22	6.76	6.62	6.49	6.36	6.24	6.13	6.02	5.92	5.82	5.73
23	6.76	6.62	6.48	6.35	6.23	6.12	6.01	5.91	5.81	5.72
24	6.76	6.61	6.47	6.34	6.21	6.10	5.99	5.89	5.80	5.71
25	6.74	6.58	6.44	6.31	6.19	6.08	5.97	5.87	5.78	5.69
26	6.70	6.54	6.40	6.28	6.16	6.05	5.94	5.85	5.75	5.67
27	6.64	6.49	6.36	6.23	6.12	6.01	5.91	5.82	5.73	5.64
28	6.57	6.42	6.30	6.18	6.07	5.97	5.87	5.78	5.69	5.61
29	6.47	6.34	6.22	6.11	6.01	5.92	5.83	5.74	5.66	5.58
30	6.36	6.25	6.14	6.04	5.95	5.86	5.78	5.69	5.62	5.54

TABLE 2-3 INPUT PARAMETERS FOR THE Q-SAND MINING UNIT

```
RIO ALGOM Q-SAND BILL SMITH MINE 15GPM BLEED .5% over T=1000 S=0.000048

GENERAL DATA BASE:

Number of simulation periods for which drawdown
or recovery is to be calculated 1
Simulation period number= 1
Duration of simulation period in days=  365.000
Number of grid columns= 36
Number of grid rows= 31
Grid spacing in ft=   100.00
X-coordinate of upper-left grid node in ft=  -200.00
Y-coordinate of upper-left grid node in ft= -3100.00
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 1
X-coordinate of well in ft=    50.00
Y-coordinate of well in ft=   -50.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 2
X-coordinate of well in ft=    50.00
Y-coordinate of well in ft=  -150.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 3
X-coordinate of well in ft=    50.00
Y-coordinate of well in ft=  -250.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 4
X-coordinate of well in ft=    50.00
Y-coordinate of well in ft=  -350.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 5
X-coordinate of well in ft=    50.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 6
X-coordinate of well in ft=    50.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
```

TABLE 2-3 (Cont.)

```
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 7
X-coordinate of well in ft=    150.00
Y-coordinate of well in ft=    -50.00
Well discharge in gpm=     0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 8
X-coordinate of well in ft=    150.00
Y-coordinate of well in ft=   -150.00
Well discharge in gpm=     0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 9
X-coordinate of well in ft=    150.00
Y-coordinate of well in ft=   -250.00
Well discharge in gpm=     0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 10
X-coordinate of well in ft=    150.00
Y-coordinate of well in ft=   -350.00
Well discharge in gpm=     0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 11
X-coordinate of well in ft=    150.00
Y-coordinate of well in ft=   -450.00
Well discharge in gpm=     0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 12
X-coordinate of well in ft=    150.00
Y-coordinate of well in ft=   -550.00
Well discharge in gpm=     0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 13
X-coordinate of well in ft=    150.00
Y-coordinate of well in ft=   -650.00
Well discharge in gpm=     0.13
```

TABLE 2-3 (Cont.)

```
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 15
X-coordinate of well in ft=   250.00
Y-coordinate of well in ft=  -150.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 16
X-coordinate of well in ft=   250.00
Y-coordinate of well in ft=  -250.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 17
X-coordinate of well in ft=   250.00
Y-coordinate of well in ft=  -350.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 18
X-coordinate of well in ft=   250.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 19
X-coordinate of well in ft=   250.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 20
X-coordinate of well in ft=   250.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 21
X-coordinate of well in ft=   350.00
Y-coordinate of well in ft=   -50.00
Well discharge in gpm=    0.13
```

TABLE 2-3 (Cont.)

```
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 22
 X-coordinate of well in ft=   350.00
 Y-coordinate of well in ft=  -150.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 23
 X-coordinate of well in ft=   350.00
 Y-coordinate of well in ft=  -250.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 24
 X-coordinate of well in ft=   350.00
 Y-coordinate of well in ft=  -350.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 25
 X-coordinate of well in ft=   350.00
 Y-coordinate of well in ft=  -450.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 26
 X-coordinate of well in ft=   350.00
 Y-coordinate of well in ft=  -550.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 27
 X-coordinate of well in ft=   350.00
 Y-coordinate of well in ft=  -650.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 28
 X-coordinate of well in ft=   350.00
 Y-coordinate of well in ft=  -750.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
```

TABLE 2-3 (Cont.)

```
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 29
X-coordinate of well in ft=   450.00
Y-coordinate of well in ft=   -50.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 30
X-coordinate of well in ft=   450.00
Y-coordinate of well in ft=  -150.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 31
X-coordinate of well in ft=   450.00
Y-coordinate of well in ft=  -250.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 32
X-coordinate of well in ft=   450.00
Y-coordinate of well in ft=  -350.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 33
X-coordinate of well in ft=   450.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 34
X-coordinate of well in ft=   450.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 35
X-coordinate of well in ft=   450.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
```

TABLE 2-3 (Cont.)

```
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 36
X-coordinate of well in ft=   450.00
Y-coordinate of well in ft=  -750.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 37
X-coordinate of well in ft=   450.00
Y-coordinate of well in ft=  -850.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 38
X-coordinate of well in ft=   550.00
Y-coordinate of well in ft=   -50.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 39
X-coordinate of well in ft=   550.00
Y-coordinate of well in ft=  -150.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 40
X-coordinate of well in ft=   550.00
Y-coordinate of well in ft=  -250.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 41
X-coordinate of well in ft=   550.00
Y-coordinate of well in ft=  -350.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 42
X-coordinate of well in ft=   550.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
```

TABLE 2-3 (Cont.)

```
Well number= 43
X-coordinate of well in ft=   550.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 44
X-coordinate of well in ft=   550.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 45
X-coordinate of well in ft=   550.00
Y-coordinate of well in ft=  -750.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 46
X-coordinate of well in ft=   550.00
Y-coordinate of well in ft=  -850.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 47
X-coordinate of well in ft=   550.00
Y-coordinate of well in ft=  -950.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 48
X-coordinate of well in ft=   650.00
Y-coordinate of well in ft=   -50.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 49
X-coordinate of well in ft=   650.00
Y-coordinate of well in ft=  -150.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
```

TABLE 2-3 (Cont.)

```
Well number= 50
X-coordinate of well in ft=   650.00
Y-coordinate of well in ft=  -250.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 51
X-coordinate of well in ft=   650.00
Y-coordinate of well in ft=  -350.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 52
X-coordinate of well in ft=   650.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 53
X-coordinate of well in ft=   650.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 54
X-coordinate of well in ft=   650.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 55
X-coordinate of well in ft=   650.00
Y-coordinate of well in ft=  -750.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 56
X-coordinate of well in ft=   650.00
Y-coordinate of well in ft=  -850.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
```

TABLE 2-3 (Cont.)

```
Well number= 57
X-coordinate of well in ft=   650.00
Y-coordinate of well in ft=  -950.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 58
X-coordinate of well in ft=   650.00
Y-coordinate of well in ft= -1050.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 59
X-coordinate of well in ft=   750.00
Y-coordinate of well in ft=  -150.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 60
X-coordinate of well in ft=   750.00
Y-coordinate of well in ft=  -250.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 61
X-coordinate of well in ft=   750.00
Y-coordinate of well in ft=  -350.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 62
X-coordinate of well in ft=   750.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 63
X-coordinate of well in ft=   750.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
```

TABLE 2-3 (Cont.)

```
Well number= 64
X-coordinate of well in ft=   750.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 65
X-coordinate of well in ft=   750.00
Y-coordinate of well in ft=  -750.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 66
X-coordinate of well in ft=   750.00
Y-coordinate of well in ft=  -850.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 67
X-coordinate of well in ft=   750.00
Y-coordinate of well in ft=  -950.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 68
X-coordinate of well in ft=   750.00
Y-coordinate of well in ft= -1050.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 69
X-coordinate of well in ft=   850.00
Y-coordinate of well in ft=  -250.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 70
X-coordinate of well in ft=   850.00
Y-coordinate of well in ft=  -350.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
```

TABLE 2-3 (Cont.)

```
Well number= 71
X-coordinate of well in ft=   850.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 72
X-coordinate of well in ft=   850.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 73
X-coordinate of well in ft=   850.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 74
X-coordinate of well in ft=   850.00
Y-coordinate of well in ft=  -750.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 75
X-coordinate of well in ft=   850.00
Y-coordinate of well in ft=  -850.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 76
X-coordinate of well in ft=   850.00
Y-coordinate of well in ft=  -950.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 77
X-coordinate of well in ft=   850.00
Y-coordinate of well in ft= -1050.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
```

TABLE 2-3 (Cont.)

```
Well number= 78
X-coordinate of well in ft=   850.00
Y-coordinate of well in ft= -1150.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 79
X-coordinate of well in ft=   850.00
Y-coordinate of well in ft= -1250.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 80
X-coordinate of well in ft=   950.00
Y-coordinate of well in ft=  -350.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 81
X-coordinate of well in ft=   950.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 82
X-coordinate of well in ft=   950.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 83
X-coordinate of well in ft=   950.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 84
X-coordinate of well in ft=   950.00
Y-coordinate of well in ft=  -750.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
```

TABLE 2-3 (Cont.)

```
 Well number= 85
 X-coordinate of well in ft=   950.00
 Y-coordinate of well in ft=  -850.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 86
 X-coordinate of well in ft=   950.00
 Y-coordinate of well in ft=  -950.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 87
 X-coordinate of well in ft=   950.00
 Y-coordinate of well in ft= -1050.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 88
 X-coordinate of well in ft=   950.00
 Y-coordinate of well in ft= -1150.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 89
 X-coordinate of well in ft=   950.00
 Y-coordinate of well in ft= -1250.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 90
 X-coordinate of well in ft=  1050.00
 Y-coordinate of well in ft=  -350.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 91
 X-coordinate of well in ft=  1050.00
 Y-coordinate of well in ft=  -450.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
```

TABLE 2-3 (Cont.)

```
Well number= 92
X-coordinate of well in ft=  1050.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 93
X-coordinate of well in ft=  1050.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 94
X-coordinate of well in ft=  1050.00
Y-coordinate of well in ft=  -750.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 95
X-coordinate of well in ft=  1150.00
Y-coordinate of well in ft=  -350.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 96
X-coordinate of well in ft=  1150.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 97
X-coordinate of well in ft=  1150.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 98
X-coordinate of well in ft=  1150.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
```

TABLE 2-3 (Cont.)

```
Well number= 99
X-coordinate of well in ft=  1150.00
Y-coordinate of well in ft=  -750.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 100
X-coordinate of well in ft=  1250.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 101
X-coordinate of well in ft=  1250.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 102
X-coordinate of well in ft=  1250.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 103
X-coordinate of well in ft=  1350.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 104
X-coordinate of well in ft=  1350.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 105
X-coordinate of well in ft=  1350.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
```

TABLE 2-3 (Cont.)

```
Well number= 106
X-coordinate of well in ft=  1450.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 107
X-coordinate of well in ft=  1450.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 108
X-coordinate of well in ft=  1450.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 109
X-coordinate of well in ft=  1550.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 110
X-coordinate of well in ft=  1550.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 111
X-coordinate of well in ft=  1550.00
Y-coordinate of well in ft=  -650.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
Well number= 112
X-coordinate of well in ft=  1650.00
Y-coordinate of well in ft=  -450.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 120
```

TABLE 2-3 (cont.)

```
 Well number= 113
 X-coordinate of well in ft=  1650.00
 Y-coordinate of well in ft=  -550.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 114
 X-coordinate of well in ft=  1650.00
 Y-coordinate of well in ft=  -650.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 115
 X-coordinate of well in ft=  1750.00
 Y-coordinate of well in ft=  -450.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 116
 X-coordinate of well in ft=  1750.00
 Y-coordinate of well in ft=  -550.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 117
 X-coordinate of well in ft=  1850.00
 Y-coordinate of well in ft=  -450.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 118
 X-coordinate of well in ft=  1850.00
 Y-coordinate of well in ft=  -550.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
 Well number= 119
 X-coordinate of well in ft=  1950.00
 Y-coordinate of well in ft=  -550.00
 Well discharge in gpm=    0.13
 Duration of pump operation during simulation period
 in days=  365.000
 Well radius in ft=  0.50
 Simulation period number= 1
 Number of production, injection, and image wells
 active during simulation period= 120
```

TABLE 2-3 (Cont.)

```
Well number= 120
X-coordinate of well in ft=  1950.00
Y-coordinate of well in ft=  -550.00
Well discharge in gpm=    0.13
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Number of observation wells for which time-
drawdown tables are desired 0
Aquifer transmissivity in gpd/ft=    1000.00
Aquifer storativity as a decimal= 0.000048
```

TABLE 2-4 DRAWDOWN CHANGES ADJACENT TO THE Q SAND MINING UNIT

```
NODAL COMPUTATION RESULTS:

SIMULATION PERIOD DURATION IN DAYS:  365.000

VALUES OF DRAWDOWN OR RECOVERY (FT) AT NODES:

J-ROW                                  I-COLUMN
         1       2       3       4       5       6       7       8       9       10

  1     9.80    9.84    9.88    9.91    9.94    9.97    9.99   10.00   10.02   10.02
  2     9.91    9.96   10.00   10.04   10.07   10.10   10.12   10.14   10.15   10.16
  3    10.03   10.08   10.13   10.17   10.20   10.23   10.25   10.27   10.29   10.30
  4    10.16   10.21   10.26   10.30   10.34   10.37   10.40   10.42   10.43   10.44
  5    10.29   10.34   10.39   10.44   10.48   10.51   10.54   10.57   10.58   10.59
  6    10.42   10.48   10.53   10.58   10.63   10.67   10.70   10.72   10.74   10.75
  7    10.55   10.62   10.68   10.73   10.78   10.82   10.86   10.89   10.90   10.92
  8    10.69   10.76   10.83   10.89   10.94   10.99   11.03   11.06   11.08   11.09
  9    10.84   10.91   10.99   11.05   11.11   11.16   11.20   11.24   11.26   11.27
 10    10.99   11.07   11.15   11.22   11.28   11.34   11.39   11.42   11.45   11.47
 11    11.14   11.23   11.32   11.40   11.47   11.53   11.58   11.62   11.65   11.67
 12    11.30   11.40   11.49   11.58   11.66   11.73   11.79   11.84   11.87   11.89
 13    11.46   11.57   11.67   11.77   11.86   11.94   12.01   12.06   12.10   12.12
 14    11.63   11.75   11.86   11.97   12.07   12.16   12.24   12.30   12.35   12.37
 15    11.80   11.93   12.06   12.18   12.29   12.39   12.48   12.55   12.61   12.64
 16    11.97   12.12   12.26   12.40   12.52   12.64   12.74   12.83   12.89   12.93
 17    12.15   12.31   12.47   12.62   12.77   12.90   13.02   13.12   13.20   13.25
 18    12.32   12.50   12.68   12.85   13.02   13.18   13.32   13.44   13.54   13.61
 19    12.50   12.70   12.90   13.10   13.28   13.46   13.63   13.78   13.90   13.99
 20    12.68   12.90   13.12   13.34   13.56   13.77   13.96   14.14   14.29   14.41
 21    12.85   13.10   13.35   13.59   13.84   14.08   14.31   14.53   14.73   14.87
 22    13.02   13.29   13.57   13.85   14.13   14.41   14.68   14.94   15.17   15.31
 23    13.18   13.48   13.79   14.10   14.42   14.74   15.05   15.34   15.56   15.68
 24    13.32   13.65   14.00   14.35   14.71   15.07   15.41   15.69   15.87   15.96
 25    13.44   13.80   14.19   14.61   15.01   15.38   15.70   15.94   16.09   16.16
 26    13.54   13.93   14.37   14.83   15.25   15.60   15.88   16.09   16.22   16.27
 27    13.59   14.01   14.49   14.96   15.37   15.70   15.96   16.14   16.25   16.28
 28    13.60   14.02   14.51   14.99   15.38   15.70   15.93   16.09   16.18   16.18
 29    13.56   13.98   14.46   14.92   15.30   15.59   15.80   15.94   16.00   15.98
 30    13.47   13.87   14.32   14.76   15.11   15.38   15.57   15.69   15.72   15.67
 31    13.34   13.70   14.12   14.51   14.83   15.07   15.23   15.33   15.35   15.27
```

TABLE 2-4 (Cont.)

J-ROW	I-COLUMN									
	11	12	13	14	15	16	17	18	19	20
1	10.02	10.02	10.01	10.00	9.98	9.96	9.93	9.90	9.87	9.83
2	10.16	10.15	10.15	10.13	10.11	10.09	10.06	10.03	9.99	9.95
3	10.30	10.29	10.28	10.27	10.25	10.22	10.19	10.16	10.12	10.07
4	10.44	10.44	10.43	10.41	10.39	10.36	10.33	10.29	10.25	10.20
5	10.59	10.59	10.58	10.56	10.54	10.51	10.47	10.43	10.38	10.33
6	10.75	10.75	10.74	10.72	10.69	10.66	10.62	10.57	10.52	10.46
7	10.92	10.91	10.90	10.88	10.85	10.81	10.77	10.72	10.66	10.60
8	11.09	11.09	11.07	11.05	11.02	10.98	10.93	10.88	10.81	10.75
9	11.28	11.27	11.26	11.23	11.19	11.15	11.10	11.04	10.97	10.90
10	11.47	11.47	11.45	11.42	11.38	11.33	11.27	11.20	11.13	11.05
11	11.68	11.67	11.65	11.62	11.57	11.52	11.45	11.38	11.30	11.21
12	11.90	11.89	11.86	11.83	11.78	11.71	11.64	11.56	11.47	11.38
13	12.13	12.12	12.09	12.05	11.99	11.92	11.84	11.75	11.65	11.55
14	12.38	12.37	12.34	12.29	12.22	12.14	12.05	11.95	11.84	11.72
15	12.65	12.64	12.60	12.54	12.47	12.37	12.27	12.15	12.03	11.90
16	12.95	12.93	12.89	12.82	12.73	12.62	12.50	12.37	12.23	12.09
17	13.27	13.26	13.20	13.11	13.00	12.87	12.73	12.59	12.43	12.27
18	13.64	13.62	13.55	13.43	13.29	13.14	12.98	12.81	12.64	12.46
19	14.05	14.05	13.94	13.77	13.59	13.41	13.23	13.04	12.85	12.66
20	14.49	14.49	14.33	14.11	13.90	13.69	13.48	13.27	13.06	12.85
21	14.93	14.89	14.70	14.45	14.21	13.97	13.74	13.51	13.28	13.04
22	15.34	15.26	15.05	14.77	14.51	14.25	14.00	13.74	13.49	13.24
23	15.69	15.59	15.37	15.08	14.80	14.53	14.25	13.98	13.71	13.43
24	15.96	15.86	15.66	15.39	15.10	14.79	14.50	14.22	13.92	13.62
25	16.15	16.05	15.88	15.64	15.35	15.05	14.75	14.46	14.15	13.82
26	16.24	16.14	15.98	15.75	15.49	15.21	14.92	14.62	14.31	13.97
27	16.23	16.12	15.95	15.73	15.47	15.19	14.91	14.61	14.31	13.99
28	16.11	15.98	15.79	15.56	15.29	15.00	14.72	14.44	14.15	13.85
29	15.88	15.71	15.49	15.26	15.00	14.72	14.45	14.18	13.91	13.63
30	15.54	15.34	15.12	14.90	14.67	14.43	14.18	13.93	13.68	13.42
31	15.12	14.94	14.75	14.56	14.35	14.13	13.91	13.68	13.45	13.21

TABLE 2-4 (Cont.)

J-ROW	I-COLUMN									
	21	22	23	24	25	26	27	28	29	30
1	9.79	9.74	9.69	9.64	9.59	9.53	9.47	9.41	9.35	9.29
2	9.90	9.85	9.80	9.75	9.69	9.63	9.57	9.51	9.44	9.38
3	10.02	9.97	9.91	9.86	9.80	9.73	9.67	9.60	9.53	9.46
4	10.15	10.09	10.03	9.97	9.90	9.84	9.77	9.70	9.63	9.55
5	10.27	10.21	10.15	10.08	10.01	9.94	9.87	9.79	9.72	9.64
6	10.40	10.34	10.27	10.20	10.13	10.05	9.97	9.89	9.81	9.73
7	10.54	10.47	10.40	10.32	10.24	10.16	10.08	9.99	9.91	9.82
8	10.68	10.60	10.52	10.44	10.36	10.27	10.18	10.09	10.00	9.91
9	10.82	10.74	10.65	10.57	10.48	10.38	10.29	10.20	10.10	10.01
10	10.97	10.88	10.79	10.69	10.60	10.50	10.40	10.30	10.20	10.10
11	11.12	11.02	10.92	10.82	10.72	10.61	10.51	10.40	10.29	10.19
12	11.28	11.17	11.06	10.95	10.84	10.73	10.62	10.50	10.39	10.28
13	11.44	11.32	11.21	11.09	10.97	10.84	10.72	10.60	10.48	10.37
14	11.60	11.48	11.35	11.22	11.09	10.96	10.83	10.70	10.58	10.45
15	11.77	11.63	11.49	11.35	11.22	11.08	10.94	10.80	10.67	10.54
16	11.94	11.79	11.64	11.49	11.34	11.19	11.05	10.90	10.76	10.62
17	12.11	11.95	11.79	11.62	11.46	11.30	11.15	11.00	10.85	10.70
18	12.29	12.11	11.93	11.76	11.58	11.41	11.25	11.09	10.93	10.78
19	12.46	12.27	12.08	11.89	11.70	11.52	11.34	11.17	11.01	10.85
20	12.64	12.43	12.22	12.01	11.81	11.62	11.43	11.25	11.08	10.91
21	12.81	12.58	12.36	12.14	11.92	11.72	11.52	11.33	11.15	10.97
22	12.99	12.74	12.49	12.25	12.02	11.80	11.59	11.39	11.20	11.02
23	13.15	12.88	12.62	12.36	12.11	11.88	11.66	11.45	11.25	11.07
24	13.32	13.02	12.73	12.45	12.19	11.94	11.71	11.49	11.29	11.10
25	13.48	13.16	12.84	12.53	12.25	11.99	11.75	11.52	11.32	11.12
26	13.62	13.30	12.94	12.58	12.28	12.01	11.76	11.54	11.33	11.13
27	13.67	13.32	12.95	12.59	12.28	12.01	11.76	11.54	11.33	11.13
28	13.54	13.20	12.86	12.54	12.25	11.99	11.75	11.52	11.31	11.12
29	13.34	13.04	12.74	12.46	12.19	11.94	11.71	11.49	11.29	11.10
30	13.15	12.89	12.62	12.36	12.11	11.88	11.65	11.45	11.25	11.06
31	12.97	12.73	12.48	12.25	12.02	11.80	11.59	11.39	11.20	11.02

J-ROW	I-COLUMN									
	31	32	33	34	35	36	37	38	39	40
1	9.23	9.16	9.10	9.03	8.97	8.90				
2	9.31	9.24	9.17	9.11	9.04	8.97				
3	9.39	9.32	9.25	9.18	9.11	9.04				
4	9.48	9.40	9.33	9.26	9.18	9.11				
5	9.56	9.49	9.41	9.33	9.25	9.17				
6	9.65	9.57	9.49	9.41	9.32	9.24				
7	9.74	9.65	9.57	9.48	9.40	9.31				
8	9.82	9.73	9.64	9.55	9.47	9.38				
9	9.91	9.82	9.72	9.63	9.54	9.44				
10	10.00	9.90	9.80	9.70	9.60	9.51				
11	10.08	9.98	9.87	9.77	9.67	9.57				
12	10.17	10.06	9.95	9.84	9.74	9.63				
13	10.25	10.13	10.02	9.91	9.80	9.70				
14	10.33	10.21	10.09	9.98	9.86	9.75				
15	10.41	10.28	10.16	10.04	9.92	9.81				
16	10.49	10.35	10.23	10.10	9.98	9.86				
17	10.56	10.42	10.29	10.16	10.03	9.91				
18	10.63	10.49	10.35	10.21	10.08	9.96				
19	10.69	10.54	10.40	10.26	10.13	10.00				
20	10.75	10.60	10.45	10.31	10.17	10.04				
21	10.81	10.65	10.49	10.35	10.21	10.07				
22	10.85	10.69	10.53	10.38	10.24	10.10				
23	10.89	10.72	10.56	10.41	10.26	10.12				
24	10.92	10.75	10.58	10.43	10.28	10.14				
25	10.94	10.76	10.60	10.44	10.29	10.15				
26	10.95	10.77	10.61	10.45	10.30	10.16				
27	10.95	10.77	10.61	10.45	10.30	10.16				
28	10.94	10.76	10.60	10.44	10.29	10.15				
29	10.92	10.75	10.58	10.43	10.28	10.14				
30	10.89	10.72	10.56	10.41	10.26	10.12				
31	10.85	10.69	10.53	10.38	10.24	10.10				

3.0 RECOMMENDED SPACING FOR THE O AND Q SAND WELL FIELDS

Horizontal excursion monitoring wells are recommended to be placed within the area where the well field controls the ground-water flow (zone of control). The spacing of the monitoring wells from both the O sand and Q sand mining units could be near 1000 feet in all directions of the well field and still be within the zone of control. A recommended spacing of approximately 500 feet from the mining unit on all sides of the well field places the monitoring wells significantly inside the reversal zone. This spacing is close enough for early detection of excursions and well within the zone of control.

This analysis shows that horizontal containment is going to be easier on the west and south sides than the north and east sides. Recommendation for spacing between monitoring wells is based on the areas most likely to have an excursion. Figures 3-1 and 3-2 show the recommended spacing and the limits of the spacing on each side of the well fields depending on the flow direction. A spacing between monitoring wells of 500 feet is recommended on the north and east downgradient sides of the well field. Spacing between monitoring wells on the upgradient sides of the well field is recommended to be 1000 feet on the south and west sides of the well field. These recommended spacings between monitoring wells are based on the fact that certain sides of the well field are much less likely to have an excursion as can be seen by the simulation of gradients.

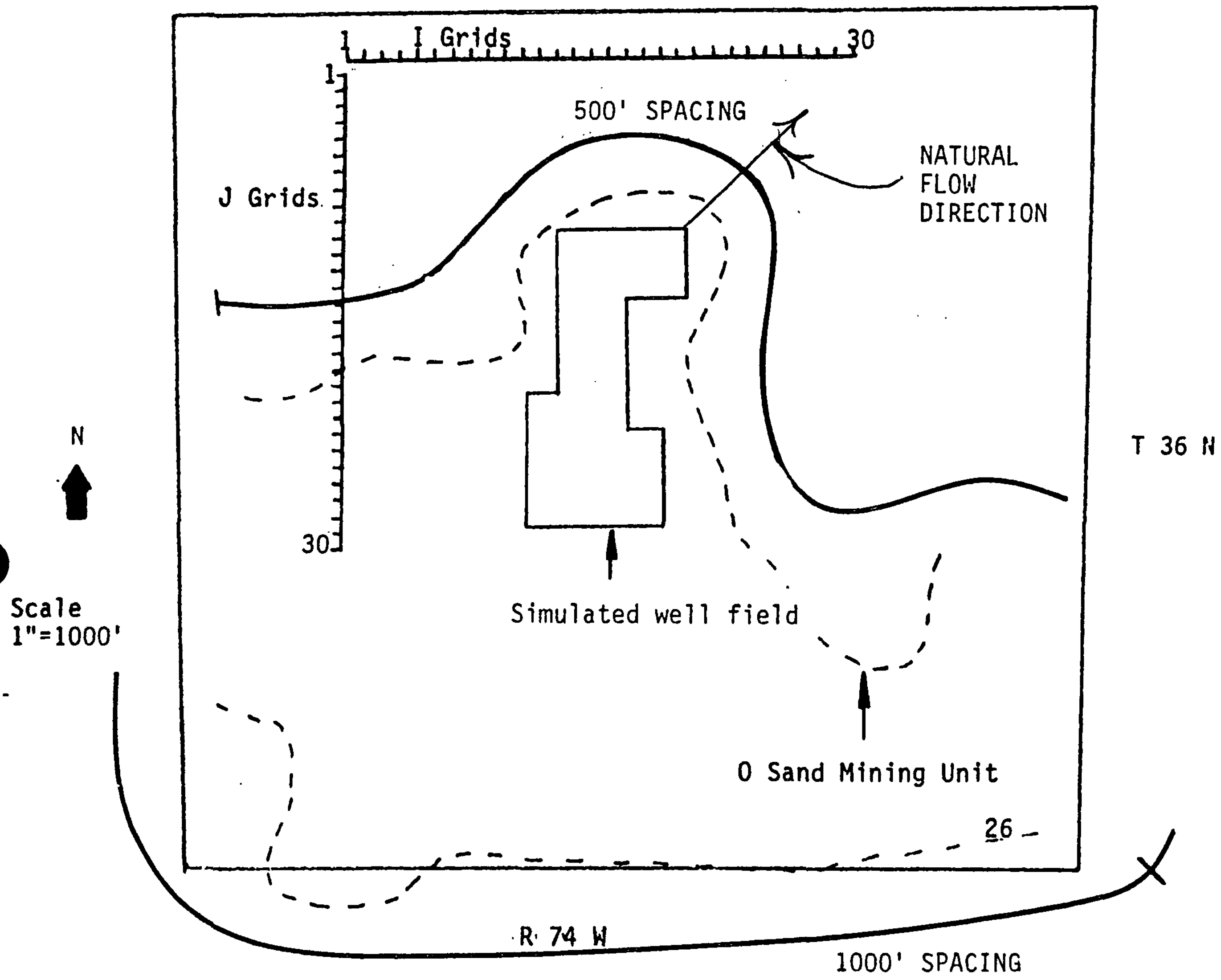

FIGURE 3-1. RECOMMENDED SPACING BETWEEN MONITOR WELLS FOR THE O-SAND MINING UNIT

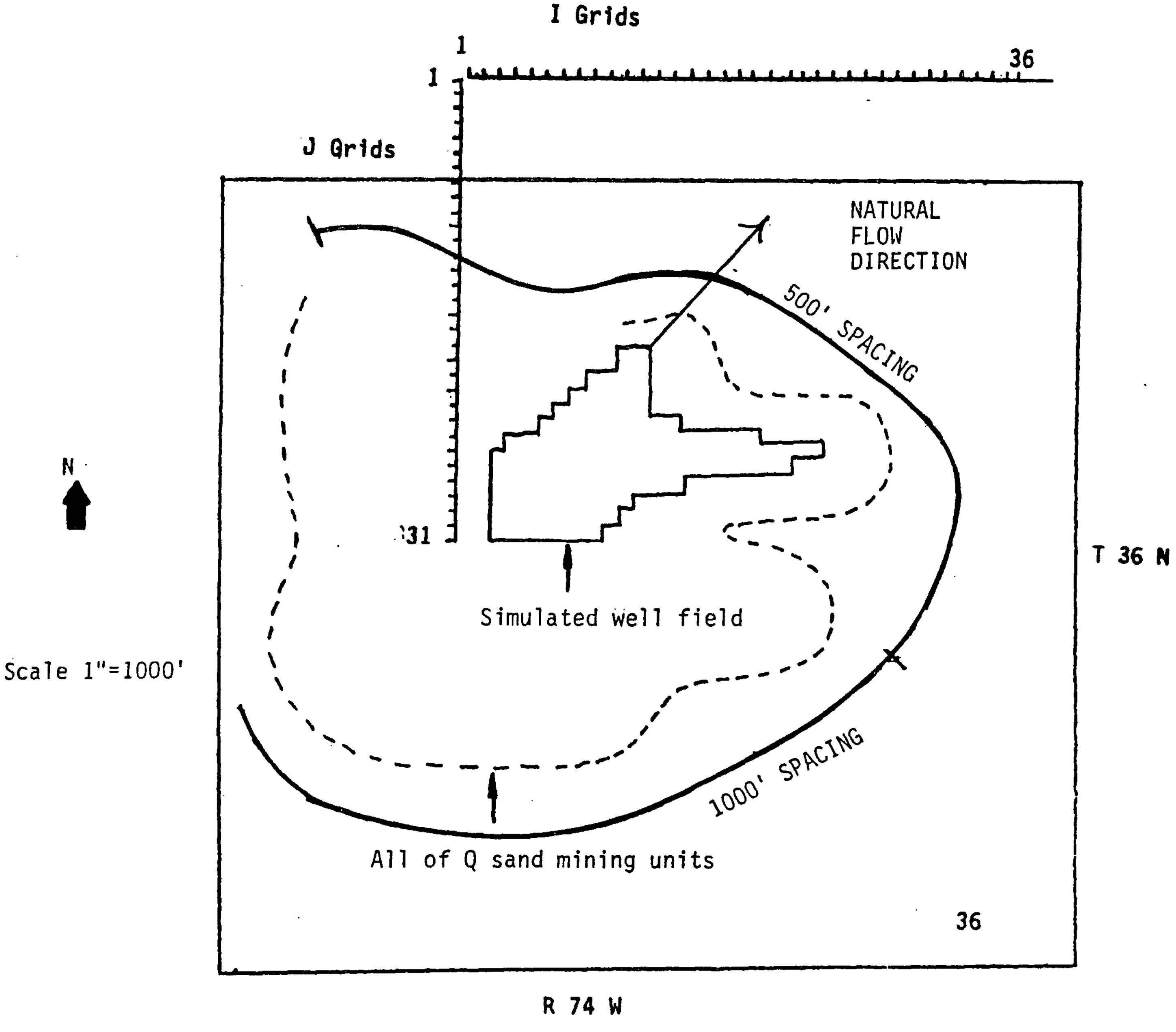

FIGURE 3-2. RECOMMENDED SPACING BETWEEN MONITOR WELLS FOR THE Q SAND MINING UNIT

4.0 EXCURSION RETRIEVAL

The well fields simulated in section 2 were simulated at varying bleed rates of 1.5% for the Q sands, and 2.5% for the O sands. These bleed rates were simulated in order to quantify additional one percent increase in the bleed rates. They were simulated to occur in the northeast six nodes. Bleed rates for the wells located at these nodes were increased to 5.12 gpm for Q sands and 6.56 gpm for the O sands. The following drawdowns were predicted from the two simulations:

DRAWDOWNS NORTH OF THE O AND Q SAND MINING UNITS (FT)

	1.5% BLEED (Q SANDS)	2.5% BLEED (O SANDS)
	TIME (DAYS)	TIME (DAYS)
DISTANCE FROM WELL FIELD (FT)	60	60
1100	23.46	7.07
1000	23.98	7.22
900	24.52	7.38
800	25.10	7.55
700	25.71	7.74
600	26.36	7.95
500	27.05	8.17
400	27.78	8.42
300	28.57	8.71
200	29.43	9.03
100	30.36	9.41
0	31.37	9.86

A correction of 0.07 ft. per 100 feet for the O sand gradient is needed to obtain the change in head between two 100 foot nodes. For the Q sand the correction is .11 ft per 100 feet. Therefore the predicted gradients toward the well field at the proposed monitoring well location (500 feet) after 60 days of increased rate are .0018 and .0062 ft/ft for the O and Q sands respectively. The average ground-water movement rates back to the well field are estimated to be .072 ft/day and .28 ft/day for the O and Q sands respectively with the increased bleed rates (based on permeabilities of 4.5 ft/day for the Q sands and 4.0 ft/day for the O sand, and effective porosities of 0.1). These movement rates will require travel times of 139 and 36 days, respectively for the water to move ten feet back to the well field. The excursion is "controlled" at the beginning of the period because contaminated water is moving back toward the well field. The wells on excursion status will most likely be off excursion prior to the end of the above stated periods due to the hydro-chemical nature of an excursion.

5.0 REFERENCES

Hydro-Engineering, 1989, Guideline for Spacing Ore Sand Monitoring Wells Adjacent to an Insitu Well Field.

Hydro-Engineering, 1990, Re-analysis of the Smith Ranch Project Pump Test Data.

Theis, C.V., 1935, The Relation Between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground-Water Storage: Transactions of the American Geophysical Union, V. 16, Part 2.

Walton, W.C., 1989, Analytical Ground-Water Modeling, Flow and Contaminant Migration: Lewis Publishers Inc.

HYDRO

December 21, 1990

Rio Algom
401 E E
Casper, WY 82601

ATTN: Donna Wichers

Dear Donna:

Enclosed are the responses to questions 18, 19 and 20. If you have any questions please give me a call.

Sincerely,

George

George L. Hoffman, P.E.
Hydrologist

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HYDRO-ENGINEERING
770 East Magnolia Casper, Wyoming 82604 (307) 266-6597

RESPONSE TO QUESTION #18

Partial penetrating effects are not significant when the pumping time and distance are relatively large. The additional drawdown due to partial penetration are affected only near pumping wells during their early drawdowns. Drawdowns in a partially penetrating pumping well form the same straight line slope as a fully penetrating pump well but just need more drawdown to produce the same rate. Partially penetrating pumping wells react similar to pumping wells that are inefficient. The additional drawdown caused by the partial penetration dampens quickly with distance from the pumping well to the same drawdown for fully penetrating wells. The attached simulation shows that the drawdown (0.26 ft) at an observation well that is 400 feet from the partially penetrating pump well is the same as that caused by a fully penetrating pump well.

```
RIO ALGOM O-SAND BILL SMITH MINE PARTIAL PENETRATING AFFECTS T=7230 S=0.00012

GENERAL DATA BASE:

Number of simulation periods for which drawdown
or recovery is to be calculated 1
Simulation period number= 1
Duration of simulation period in days=  365.000
Number of grid columns= 6
Number of grid rows= 6
Grid spacing in ft:   100.00
X-coordinate of upper-left grid node in ft:  -500.00
Y-coordinate of upper-left grid node in ft:  -500.00
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 1
Well number= 1
X-coordinate of well in ft=     0.00
Y-coordinate of well in ft=     0.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=  365.000
Well radius in ft=  0.50
Number of observation wells for which time-
drawdown tables are desired 0
Aquifer transmissivity in gpd/ft=    7230.00
Aquifer storativity as a decimal= 0.000120
```

```
NODAL COMPUTATION RESULTS:

SIMULATION PERIOD DURATION IN DAYS:  365.000

VALUES OF DRAWDOWN OR RECOVERY (FT) AT NODES:

J-ROW                       I-COLUMN
         1      2      3      4      5      6

  1    0.23   0.24   0.24   0.25   0.25   0.25
  2    0.24   0.24   0.25   0.26   0.26   0.26
  3    0.24   0.25   0.26   0.27   0.27   0.28
  4    0.25   0.26   0.27   0.28   0.29   0.30
  5    0.25   0.26   0.27   0.29   0.31   0.33
  6    0.25   0.26   0.28   0.30   0.33   0.59

WELL PARTIAL PENETRATION DATA BASE:

Drawdown with full well penetration as
calculated earlier in this program in ft= .26
Production well discharge rate in gpm= 1.55
Radial distance to observation well in ft=   400.00
Aquifer thickness in ft= 250.00
Aquifer horiz. hydr. conduct. in gpd/sq ft=    28.920
Aquifer vert. hydr. conduct. in gpd/sq ft=     2.892
Dist. from aquifer top to prod. well bottom(ft) 250.00
Dist. from aquifer top to prod. well screen top (ft)= 235.00
Dist. from aquifer top to obs. well bottom in ft= 250.00
Dist. from aquifer top to obs. well screen top (ft)=   0.00

PARTIAL PENETRATION COMPUTATION RESULTS:

Drawdown with partially penetration in ft=  0.26
```

RESPONSE TO QUESTION #19

The attached simulation shows that a bleed rate of 4.5% will retrieve the excursion 10 feet in 54 days. Therefore this is the proposed increased bleed rate to retrieve the excursion in a reasonable time.

TABLE FOR RESPONSE NO. 19.

```
RIO ALGOM O-SAND BILL SMITH MINE 135GPM BLEED 4.5% 3.0 OVER  T=7230 S=0.00012

GENERAL DATA BASE:

Number of simulation periods for which drawdown
or recovery is to be calculated 1
Simulation period number= 1
Duration of simulation period in days=   60.000
Number of grid columns= 30
Number of grid rows= 30
Grid spacing in ft=   100.00
X-coordinate of upper-left grid node in ft= -1300.00
Y-coordinate of upper-left grid node in ft= -1100.00
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 1
X-coordinate of well in ft=  -100.00
Y-coordinate of well in ft=  1100.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 2
X-coordinate of well in ft=  -100.00
Y-coordinate of well in ft=  1300.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 3
X-coordinate of well in ft=  -100.00
Y-coordinate of well in ft=  1500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 4
X-coordinate of well in ft=  -100.00
Y-coordinate of well in ft=  1700.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 5
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=   100.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 6
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=   300.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 7
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=   500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 8
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=   700.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 9
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=   900.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 10
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=  1100.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 11
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=  1300.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 12
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=  1500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 13
X-coordinate of well in ft=   100.00
Y-coordinate of well in ft=  1700.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 14
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=   100.00
Well discharge in gpm=   16.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 15
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=   300.00
Well discharge in gpm=   16.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
```

TABLE FOR RESPONSE NO. 19 (continued)

```
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 16
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=   500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 17
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=   700.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 18
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=   900.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 19
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=  1100.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 20
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=  1300.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 21
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=  1500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 22
X-coordinate of well in ft=   300.00
Y-coordinate of well in ft=  1700.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 23
X-coordinate of well in ft=   500.00
Y-coordinate of well in ft=   100.00
Well discharge in gpm=   16.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 24
X-coordinate of well in ft=   500.00
Y-coordinate of well in ft=   300.00
Well discharge in gpm=   16.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 25
X-coordinate of well in ft=   500.00
Y-coordinate of well in ft=  1300.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 26
X-coordinate of well in ft=   500.00
Y-coordinate of well in ft=  1500.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 27
X-coordinate of well in ft=   500.00
Y-coordinate of well in ft=  1700.00
Well discharge in gpm=    1.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 28
X-coordinate of well in ft=   700.00
Y-coordinate of well in ft=   100.00
Well discharge in gpm=   16.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Simulation period number= 1
Number of production, injection, and image wells
active during simulation period= 29
Well number= 29
X-coordinate of well in ft=   700.00
Y-coordinate of well in ft=   300.00
Well discharge in gpm=   16.55
Duration of pump operation during simulation period
in days=   60.000
Well radius in ft=  0.50
Number of observation wells for which time-
drawdown tables are desired 0
Aquifer transmissivity in gpd/ft=    7230.00
Aquifer storativity as a decimal= 0.000120
```

TABLE FOR RESPONSE NO. 19 (continued)

NODAL COMPUTATION RESULTS:

SIMULATION PERIOD DURATION IN DAYS: 60.000

VALUES OF DRAWDOWN OR RECOVERY (FT) AT NODES:

J-ROW				I-COLUMN						
	1	2	3	4	5	6	7	8	9	10
1	11.34	11.48	11.62	11.77	11.91	12.05	12.19	12.33	12.46	12.59
2	11.46	11.61	11.76	11.91	12.06	12.21	12.37	12.52	12.66	12.80
3	11.58	11.73	11.89	12.05	12.22	12.38	12.54	12.71	12.87	13.03
4	11.69	11.85	12.02	12.19	12.37	12.54	12.72	12.90	13.08	13.26
5	11.80	11.97	12.15	12.33	12.52	12.71	12.90	13.10	13.29	13.49
6	11.90	12.08	12.27	12.47	12.66	12.87	13.08	13.29	13.51	13.73
7	12.00	12.19	12.39	12.59	12.81	13.02	13.25	13.48	13.72	13.96
8	12.09	12.29	12.50	12.72	12.94	13.17	13.42	13.67	13.93	14.20
9	12.18	12.39	12.60	12.83	13.07	13.31	13.57	13.84	14.13	14.43
10	12.26	12.47	12.70	12.93	13.18	13.44	13.72	14.01	14.32	14.64
11	12.32	12.55	12.78	13.02	13.28	13.56	13.85	14.15	14.48	14.84
12	12.38	12.61	12.85	13.10	13.37	13.65	13.96	14.28	14.63	15.01
13	12.43	12.66	12.91	13.16	13.44	13.73	14.04	14.38	14.74	15.14
14	12.46	12.70	12.95	13.21	13.49	13.79	14.11	14.45	14.83	15.24
15	12.49	12.73	12.98	13.24	13.53	13.83	14.15	14.50	14.88	15.29
16	12.50	12.74	12.99	13.26	13.54	13.84	14.17	14.51	14.89	15.30
17	12.50	12.74	12.99	13.26	13.54	13.84	14.16	14.50	14.87	15.27
18	12.49	12.73	12.98	13.24	13.52	13.82	14.13	14.47	14.82	15.20
19	12.47	12.70	12.95	13.21	13.48	13.77	14.08	14.41	14.75	15.12
20	12.43	12.67	12.91	13.16	13.43	13.71	14.01	14.33	14.66	15.01
21	12.39	12.62	12.85	13.10	13.36	13.64	13.93	14.23	14.55	14.88
22	12.34	12.56	12.79	13.03	13.28	13.55	13.83	14.12	14.43	14.75
23	12.27	12.49	12.71	12.95	13.19	13.45	13.71	14.00	14.29	14.60
24	12.20	12.41	12.62	12.85	13.09	13.33	13.59	13.86	14.14	14.43
25	12.12	12.32	12.53	12.75	12.97	13.21	13.45	13.71	13.97	14.25
26	12.03	12.22	12.42	12.63	12.85	13.07	13.31	13.55	13.80	14.06
27	11.94	12.12	12.31	12.51	12.72	12.93	13.15	13.38	13.61	13.86
28	11.84	12.01	12.20	12.38	12.58	12.78	12.98	13.20	13.42	13.64
29	11.73	11.90	12.07	12.25	12.43	12.62	12.81	13.01	13.21	13.42
30	11.62	11.78	11.95	12.11	12.29	12.46	12.64	12.82	13.00	13.19

J-ROW				I-COLUMN						
	11	12	13	14	15	16	17	18	19	20
1	12.71	12.82	12.93	13.02	13.09	13.15	13.20	13.22	13.22	13.20
2	12.94	13.07	13.19	13.29	13.38	13.44	13.49	13.52	13.52	13.50
3	13.18	13.32	13.46	13.57	13.68	13.76	13.81	13.84	13.85	13.82
4	13.43	13.59	13.74	13.88	14.00	14.09	14.16	14.20	14.20	14.17
5	13.68	13.87	14.04	14.20	14.34	14.45	14.54	14.58	14.59	14.55
6	13.94	14.15	14.36	14.55	14.71	14.85	14.95	15.00	15.01	14.97
7	14.21	14.45	14.69	14.91	15.11	15.28	15.41	15.48	15.49	15.44
8	14.47	14.75	15.03	15.30	15.55	15.76	15.92	16.01	16.03	15.97
9	14.74	15.06	15.38	15.71	16.01	16.29	16.50	16.62	16.65	16.57
10	14.99	15.35	15.73	16.13	16.52	16.88	17.16	17.33	17.37	17.27
11	15.22	15.63	16.08	16.55	17.05	17.54	17.94	18.18	18.24	18.10
12	15.42	15.87	16.38	16.95	17.59	18.28	18.91	19.19	19.32	19.10
13	15.58	16.07	16.62	17.28	18.27	18.94	22.28	20.14	22.78	20.03
14	15.69	16.19	16.78	17.46	18.26	19.18	20.07	20.41	20.59	20.27
15	15.74	16.25	16.83	17.50	18.51	19.19	22.52	20.36	22.98	20.20
16	15.74	16.23	16.79	17.41	18.09	18.70	19.40	19.64	19.71	19.45
17	15.70	16.16	16.67	17.23	18.03	18.30	18.92	18.85	18.82	18.62
18	15.61	16.05	16.51	17.00	17.47	17.84	18.10	18.19	18.13	17.95
19	15.50	15.91	16.33	16.76	17.39	17.44	17.86	17.65	17.57	17.39
20	15.37	15.75	16.13	16.51	16.85	17.07	17.20	17.19	17.09	16.92
21	15.23	15.58	15.94	16.28	16.80	16.75	17.07	16.80	16.69	16.52
22	15.08	15.42	15.76	16.05	16.30	16.44	16.50	16.45	16.33	16.17
23	14.92	15.25	15.81	15.84	16.28	16.16	16.44	16.14	16.01	15.85
24	14.74	15.06	15.37	15.60	15.78	15.88	15.92	15.85	15.74	15.57
25	14.55	14.85	15.38	15.36	15.76	15.61	15.88	15.59	15.71	15.30
26	14.34	14.63	14.90	15.10	15.25	15.32	15.35	15.30	15.20	15.02
27	14.12	14.39	14.88	14.83	15.20	15.04	15.29	15.01	15.14	14.73
28	13.88	14.13	14.36	14.53	14.66	14.71	14.74	14.69	14.60	14.44
29	13.63	13.86	14.30	14.22	14.56	14.38	14.63	14.36	14.51	14.13
30	13.38	13.56	13.74	13.86	13.96	14.01	14.02	13.99	13.92	13.81

J-ROW				I-COLUMN						
	21	22	23	24	25	26	27	28	29	30
1	13.16	13.10	13.03	12.94	12.83	12.72	12.59	12.46	12.33	12.18
2	13.45	13.39	13.30	13.20	13.08	12.95	12.81	12.67	12.52	12.36
3	13.77	13.69	13.59	13.48	13.34	13.20	13.04	12.88	12.71	12.54
4	14.11	14.02	13.91	13.77	13.62	13.45	13.27	13.09	12.91	12.72
5	14.48	14.37	14.24	14.08	13.90	13.71	13.51	13.31	13.11	12.90
6	14.89	14.76	14.60	14.41	14.20	13.98	13.75	13.53	13.30	13.08
7	15.33	15.18	14.98	14.75	14.51	14.25	14.00	13.74	13.50	13.25
8	15.83	15.63	15.39	15.12	14.83	14.53	14.24	13.96	13.68	13.42
9	16.39	16.14	15.83	15.49	15.15	14.81	14.48	14.16	13.86	13.57
10	17.04	16.70	16.30	15.88	15.46	15.07	14.70	14.35	14.02	13.71
11	17.79	17.32	16.78	16.25	15.76	15.31	14.89	14.51	14.16	13.83
12	18.72	18.00	17.25	16.59	16.02	15.51	15.06	14.65	14.28	13.93
13	22.06	18.60	17.61	16.84	16.20	15.66	15.18	14.75	14.36	14.01
14	19.81	18.79	17.78	16.97	16.30	15.74	15.25	14.81	14.41	14.05
15	22.21	18.74	17.74	16.96	16.31	15.75	15.26	14.83	14.43	14.07
16	19.04	18.28	17.50	16.82	16.22	15.69	15.22	14.80	14.41	14.06
17	18.25	17.74	17.16	16.59	16.06	15.58	15.14	14.74	14.37	14.02
18	17.64	17.24	16.79	16.32	15.86	15.43	15.02	14.65	14.29	13.96
19	17.13	16.80	16.43	16.03	15.64	15.25	14.88	14.53	14.19	13.88
20	16.69	16.41	16.09	15.75	15.40	15.05	14.72	14.39	14.08	13.78
21	16.31	16.06	15.77	15.47	15.16	14.85	14.54	14.24	13.95	13.67
22	15.96	15.73	15.48	15.20	14.92	14.64	14.35	14.07	13.80	13.54
23	15.65	15.43	15.19	14.94	14.69	14.43	14.16	13.91	13.65	13.41
24	15.36	15.15	14.93	14.69	14.45	14.21	13.97	13.73	13.49	13.26
25	15.09	14.88	14.66	14.45	14.22	14.00	13.78	13.55	13.33	13.12
26	14.81	14.61	14.41	14.20	14.00	13.79	13.58	13.37	13.17	12.96
27	14.54	14.34	14.15	13.96	13.77	13.58	13.39	13.19	13.00	12.81
28	14.25	14.08	13.90	13.72	13.55	13.37	13.19	[illegible]	[illegible]	12.65
29	13.97	13.81	13.65	13.49	13.32	13.16	12.99	[illegible]	[illegible]	12.49
30	13.68	13.54	13.40	13.25	13.10	12.95	12.80	[illegible]	[illegible]	12.33

RESPONSE TO QUESTION #20

Adequate drawdowns need to be established to reverse the gradient in the area of the monitoring well to establish control. In a confined aquifer the drawdowns to reverse the gradient at a monitoring well should be developed within one day after the increased bleed rate is established. The over injection would develop a mound in the area which may extend a large distance beyond the monitoring well and the reversal needs to be developed only in the area near the monitoring well.

TABLE D6-1

Geological Survey Water Supply Paper 1509
Extracted From
Surface Water Supply of the United States - 1957
Part 6-A Missouri River Basin
above Sioux City, Iowa

Cheyenne River Basin
Box Creek near Bill, Wyoming

Location - Lat 43°06', long 105°15', in SE¼ sec. 9, T36N, R70W, on left bank 12 ft below bridge on State Highway 59 and 9.7 miles south of Bill.

Drainage area - 109 sq mi

Records available - July 1956 to September 1957

Gage - Water-stage recorder. Datum of gage is 4,694.12 ft above mean seal level (State Highway benchmark).

Extremes - 1956: No flow during period July to September.
1956-57: Maximum discharge during water year, 1,190 cfs June 9 (gage height, 7.26 ft), from rating curve extended above 70 cfs on basis of slope-area determination of peak flow; no flow at times.

Remarks - Records good except those above 70 cfs, which are fair, and those for period of ice effect or no gage-height record, which are poor. No flow July 14 (first day of record) to Dec. 7, 1956. Many small stock reservoirs above station.

Rating table, water year 1956-57 (gage height, in feet, and discharge, in cubic feet per second)
(Shifting-control method used May 16-18, 20, 21, 25-27, July 29 to Aug. 9)

2.4	0	2.8	1.6	4.0	45
2.5	.1	3.0	4.2	4.5	92
2.6	.4	3.3	11	5.0	175
2.7	.8	3.6	22	6.0	470

Discharge, in cubic feet per second, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			0		0	0	0	0	5.7	22	0	0.1
2			0		0	0	0	.1	3.1	*7.2	0	.1
3	(*)		0		0	0	0	.1	1.8	3.8	0	.1
4			0		0	0	0	.1	1.4	2.1	0	.2
5			0		0	0	0	.1	*1.2	1.4	*0	.2
6			0		b.1	0	0	.1	1.0	.9	0	.2
7			0		b.1	0	0	.1	1.0	.5	0	.2
8		(*)	.2		b.1	0	0	.2	1.2	.4	.1	.2
9			.4		b.2	.1	0	.2	*51	.3	.1	.2
10			.4		b.2	.1	0	.2	182	.2	.1	.2
11			.1		b.2	.1	0	.1	11	.1	0	.2
12			.1		*b.2	.1	0	.3	5.0	*.1	0	.2
13			.1		b.2	*.1	0	.4	*3.4	1.3	0	*.6
14			*.1		b.2	.1	0	1.1	3.2	.6	0	.2
15			.1		.1	.1	0	.9	2.3	.2	.1	.2
16			0		.1	.1	0	1.4	2.3	.1	.1	.2
17			0		0	.1	0	*7.7	2.6	.1	*.1	.2
18			0		0	.1	0	3.6	4.2	.1	.1	.2
19			0		0	.1	0	2.9	2.6	.1	.1	.2
20			0		0	.1	.4	3.9	*1.6	.1	.1	.2
21			0		0	.1	.3	28	*29	.2	.1	.2
22			0		0	.1	.1	6.8	*22	.1	.1	.2
23			0	(*)	0	.1	0	3.9	9.2	.1	.1	.2
24			0		.1	.1	.3	4.6	4.4	.1	.1	.2
25			0		0	.1	.5	*67	2.7	.1	.1	.2
26			0		0	.1	.4	13	2.1	.1	.1	.1
27			0		0	.1	.2	*8.9	2.1	.1	.1	.1
28			0		0	.1	.1	6.3	2.0	.1	.1	.1
29			0		-	.1	*0	*3.4	1.4	.1	.2	.1
30			0		------	.1	0	37	208	.1	.2	.1
31		------	0		------	.1	------	35	------	.1	.1	------
Total	0	0	1.5	0	1.8	2.3	2.3	237.5	570.5	42.8	2.2	5.6
Mean	0	0	0.05	0	0.06	0.07	0.08	7.66	19.0	1.38	0.07	0.19
Ac-ft	0	0	3.0	0	3.6	4.6	4.6	471	1,130	85	4.4	11

Calendar year 1956: Max - Min - Mean - Ac-ft -
Water year 1956-57: Max 208 Min 0 Mean 2.37 Ac-ft 1,720

Peak discharge (base, 100 cfs). - May 21 (4 a.m.) 118 cfs (4.59 ft); May 25 (11 a.m.) 190 cfs (4.95 ft); May 30 (9 a.m.) 141 cfs (4.83 ft); June 9 (11:30 p.m.) 1,190 cfs (7.25 ft); June 21 (5 p.m.) 121 cfs (4.76 ft); June 30 (6 a.m.) 840 cfs (6.7 ft).

*Discharge measurement or observation of no flow made on this day.

b Stage-discharge relation affected by ice.

Note - No gage-height record Sept. 14-30; discharge estimated on basis of recorded range in stage.

U.S. Geological Survey Water Supply Paper 1559
Extracted From
Surface Water Supply of the United States - 1958
Part 6-A Missouri River Basin
above Sioux City, Iowa

Cheyenne River Basin
3796. Box Creek near Bill, Wyoming

Location - Lat 43°06', long 105°15', in SE¼ sec. 9, T36N, R70W, on left bank 12 ft downstream from bridge on State Highway 59 and 9.7 miles south of Bill.
Drainage area - 109 sq mi.
Records available - July 1956 to June 1958 (discontinued).
Gage - Water-stage recorder. Datum of gage is 4,694.12 ft above mean sea level (State Highway bench mark).
Extremes - Maximum discharge during period, 15 cfs May 7 (gage height, 3.37 ft); no flow at times.
1956-58: Maximum discharge, 1,190 cfs June 9, 1957 (gage height, 7.26 ft), from rating curve extended above 70 cfs on basis of slope-area measurement of peak flow; no flow at times each year.
Remarks - Records fair. Many stock reservoirs above station.

Rating table, Oct. 1 to June 30, 1958 (gage height, in feet, and discharge, in cubic feet per second)

2.4	0
2.5	.5
2.6	1.6
2.7	2.9
3.0	8.2

Discharge, in cubic feet per second, October 1957 to June 1958

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		0.1	0.1	0.1	0.1	0.2	3.4	1.4	0.6			
2		.1	.1	.1	.1	.1	*3.4	1.1	.6			
3		.1	*.1	.1	.1	.1	*2.4	.6	.6			
4		.1	0	.1	*.1	.1	2.8	.5	.6			
5		.1	0	0	.1	.1	5.9	.4	.7			
6		.1	.1	0	.1	*.1	5.9	.3	.7			
7	0.1	.1	0	0	.1	.1	4.4	2.6	.7			
8		0	0	0	.1	.2	3.0	6.0	.6			
9		0	0	*0	.1	.2	2.5	2.2	.6			
10		.1	0	0	.1	.1	2.2	1.5	.6			
11		.1	.1	0	.1	.1	*2.2	1.1	*.8			
12		.1	0	.1	.1	.1	2.0	.8				
13		.1	0	0	.1	.1	1.9	.6				
14		.1	.1	.1	.1	.1	1.6	*.5				
15	*.1	.1	.1	.1	.1	.1	1.2	1.2				
16	.1	.1	.1	.1	.1	.1	1.1	1.9	.6			
17	.1	.1	.1	.1	.1	.1	1.0	1.6				
18	.1	.1	.1	.1	.1	.1	.7	1.4				
19	.1	.1	.1	.1	.2	.4	.8	1.0				
20	.1	.1	.1	.1	.2	1.4	.7	.8				
21	.1	.1	.1	.1	.2	2.0	.8	.6				
22	.1	.1	0	.1	.2	1.9	1.2	.6				
23	.1	.1	.1	.1	.2	1.7	1.6	.6				
24	.1	0	.1	.1	.2	1.9	2.0	.7				
25	.1	0	.1	.1	.2	1.4	2.6	.8	.3			
26	.1	0	.1	.1	.2	1.6	3.5	.5				
27	.1	0	0	.1	.1	2.2	2.8	.4				
28	.1	0	0	.1	.3	2.1	2.0	.4				
29	.1	.1	0	.1	-	2.1	1.7	.4				
30	.1	.1	0	.1		4.0	1.7	.5				
31	.1	------	0	.1	------	6.7	------	.6	------			------
Total	3.1	2.3	1.7	2.3	3.8	31.5	69.0	33.8	15.2			
Mean	0.10	0.06	0.05	0.07	0.14	1.02	2.30	1.09	0.51			
Ac-ft	6.1	4.6	3.4	4.6	7.5	62	137	67	30			

Calendar year 1957: Max 208 Min 0 Mean 2.39 Ac-ft 1,730
Water year 1957-58: Max - Min - Mean - Ac-ft -

Peak discharge (base, 100 cfs). - No peak above base.

* Discharge measurement made on this day.

Note - No gage-height record Oct. 1-14, June 12-30; discharge estimated on basis of weather records, recorded range in stage, and normal recession.

TABLE D6-3

Highland Uranium Project
Surface Water Quality Data

	Cations				Anions				Miscellaneous							Radioactivity						
Location	Sodium mg/l	Potassium mg/l	Calcium mg/l	Magnesium mg/l	Sulphate mg/l	Chloride mg/l	Carbonate mg/l	Bicarbonate mg/l	Total Dissolved Solids mg/l	NaCl Equivalent mg/l	Observed pH	Arsenic mg/l	Selenium mg/l	Oil & Grease	Date	Uranium pCi/l	Ra-226 pCi/l	Th-230 pCi/l	Gross Alpha pCi/l	Gross Beta pCi/l	Lead-210 pCi/l	Polonium-210 pCi/l
Sample Point 5, Creek SE of Highland Fenced Area																						
01/78	153	12	91	40	320	12	-	476	862	632	7.8				05/78	490	5.39	0.46				
06/78	156	9	122	37	360	16	-	586	1021	741	8				06/78	67	2.56	1				
10/78	140	8	37	13	164	16	-	329	538	394	7.7				07/78	100	1.3	1.9				
															08/78	53	2.7	6.3				
Sample Point 13, Outside Fence 100 Feet Below 12																						
01/78	141	10	508	121	1510	110	-	439	2616	1859	7.4				05/78	22	1.13	0.33				
03/78	99	17	411	102	1140	110	-	415	2083	1503	7.6				06/78	22	2.01	0.57				
06/78	156	8	660	139	1900	130	-	464	3242	2294	7.7				07/78	30	0.4	0				
10/78	122	7	675	135	1900	140	-	415	3183	2242	7.7				08/78	67	2.3	4.1				
Sample Point 26, Center Stock Pond																						
09/77												-0.01	-0.01									
10/77															10/77	25	1	0.6	40	7		
10/31/77															10/77	8	1.6	0	26	15		
12/77	91	10	132	6	355	32	-	183	716	497	7.2	0.01	-0.01		12/77							
01/78															01/78	9.82		3.8	1170	410		
02/78	70	10	62	13	188	20	12	159	453	337	8.2	-0.01	-0.01		02/78	9.8	0.61	1.78				
03/78	24	6	15	1	18	10	-	85	116	88	6.8	-0.01	-0.01		03/78	35	1.81					
04/78															04/78	5.3	0.68					
05/78															05/78	33	1.63					
06/78	33	7	30	4	10	8	-	163	182	139	7.7				06/78	1	2.51					
07/78															07/78	77	0.8					
08/78															08/78	51	0.4	0.3				
09/78															09/78	26	1.2					
10/78	43	5	28	6	16	6	-	207	206	156	7.7				10/78	15	2.86					
11/78															11/78	19	1.78					
12/78															12/78	10	0.57					
01/79	17	6	15	6	5	8	-	110	111	89	7.9				01/79	24	3.68					
02/79															02/79	<29	0.96					
03/79	24	13	43	7	59	10	-	159	234	174	7.2	-0.01	-0.01		03/79	73	100					
04/79															04/79	90	42	2				
05/79															05/79	32	1.3					
06/79	63	15	31	10	0	28	0	329	492		7.8				06/79	57	2					
07/79															07/79	60	0.95					
02/80															08/79	151	1.84					
04/80															04/80	2.8	4.4	0.58				
06/80	47	14	38	0.25	76	16	36	73	303		9.6				06/80	57	3.02					
11/82											7.9											
02/83																37						
05/86																						

TABLE D6-3

Highland Uranium Project
Surface Water Quality Data

	Cations				Anions				Miscellaneous							Radioactivity						
Location	Sodium mg/l	Potassium mg/l	Calcium mg/l	Magnesium mg/l	Sulphate mg/l	Chloride mg/l	Carbonate mg/l	Bicarbonate mg/l	Total Dissolved Solids mg/l	NaCl Equivalent mg/l	Observed pH	Arsenic mg/l	Selenium mg/l	Oil & Grease	Date	Uranium pCi/l	Ra-226 pCi/l	Th-230 pCi/l	Gross Alpha pCi/l	Gross Beta pCi/l	Lead-210 pCi/l	Polonium-210 pCi/l
Sample Point 32, West Underground Stock Pond																						
10/77															10/77	6.7	0.8	0.6	17	2		
10/31/77															10/77	3	9.7	0	15	0		
02/78	17	2	11	2	21	2	-	61	85	62	7.6	-0.01	-0.01		02/78	2.1	1.61	2.19				
05/78	30	8	20	1	22	4	-	122	145	107	7.2				05/78		3.01					
08/78															08/78	<1	0.2	0.3				
09/78	16	8	16	4	18	0	-	98	110	85	7.3											
11/78															11/78	<6.5	1.56					
02/79	2	1	6	1	0	6	-	24	26	21	7				02/79	<46	0.35					
05/79	15	6	10	4	9	8	-	73	88	71	8	0.02	-0.01		05/79	<4.9	0.71	24				
08/79	27	9	11	1	0	4	0	110	159		7.6				08/79	20	1.8					
02/80	16	18	20	3	67	3	0	37	156		6.2				02/80	39	4.8					
05/80															05/80	32	6	58				
08/80	20	20	44	8	63	7	0	195	338		7.6	-0.002	-0.002		08/80	34	0.8					
05/86																						
Sample Point 33, Fowler Draw Stock Pond																						
09/77												-0.01	-0.01		09/77	3.2	0.7	0	9.4	0		
01/78															01/78	6.3	0.68	3.03				
02/78	74	9	46	6	145	8	-	183	378	269	7.6	-0.01	-0.01		02/78	4.2	0	3.62				
05/78	17	5	31	0	28	8	-	98	137	100	7.4				05/78	4.2	1.32					
09/78	9	7	14	4	23	4	-	61	91	69	7.2				08/78	7	0.3	126				
11/78															11/78	12	2.39					
05/79	4	3	17	5	14	8	-	61	81	65	8	0.02	-0.01		05/79	<4.9	0.75	65				
08/79	20	5	26	3	54	7	0	73	188		7				08/79	25	0.8					
11/79	7	6	26	5	18	6	0	85	148		7.1				11/79	92	1.53					
02/80	7	3	15	2	12	0	0	45	84		6.7				02/80	-7.1	0.1					
05/80	4	3	15	1	10	2	0	49	83		7.3	0.002	-0.002		05/80	0	0.85	102				
08/80	7	9	21	3	18	6	0	79	143		7.1	-0.002	0.002		08/80	21	2.02					
11/80	9	7	32	10	35	4	0	122	216		7.3	-0.002	-0.002		11/80	80	0.73					
02/81	14	10	22	7	43	5	36	43	169		9.3	-0.002	0.002		02/81	104	5.8					
05/81	11	10	30	4	27	4	0	110	194		7.3	0.003	-0.002		05/81	63	5.01	8.8				
08/81	23	8	17	4	10	5	0	122	188		7.4	0.002	0.012		08/81	0.24						
05/86																						
Sample Point 34, Sheep Draw Stock Pond																						
02/78	64	9	40	11	165	6	-	195	411	294	7.8	-0.01	-0.01		02/78	1.2	0.53	3.04				
05/78	23	4	37	4	51	10	-	117	187	157	7.5				05/78	5.3	0.67					
09/78	9	7	13	3	25	6	-	49	87	66	7.2				08/78	2	0.4	30				
02/80	5	6	13	2	24	3	0	30.5	80.9		6.5				02/80	-3.5	2.8					
Sample Point 35, Antelope Reservoir																						

TABLE D6-3

Highland Uranium Project
Surface Water Quality Data

	Cations				Anions				Miscellaneous							Radioactivity							
Location	Sodium mg/l	Potassium mg/l	Calcium mg/l	Magnesium mg/l	Sulphate mg/l	Chloride mg/l	Carbonate mg/l	Bicarbonate mg/l	Total Dissolved Solids mg/l	NaCl Equivalent mg/l	Observed pH	Arsenic mg/l	Selenium mg/l	Oil & Grease	Date	Uranium pCi/l	Ra-226 pCi/l	Th-230 pCi/l	Gross Alpha pCi/l	Gross Beta pCi/l	Lead-210 pCi/l	Polonium-210 pCi/l
02/78	79	6	77	40	290	10	-	268	634	466	8				02/78	3.9	6.31	3.05				
05/78	12	4	21	4	22	6	-	85	111	84	7.3				05/78	0.14	0.2	-				
09/78	13	8	20	4	35	6	-	73	122	91	7.4				08/78	3	0.2	7.3				
Sample Point 36, Reservoir 2A																						
11/76															11/76	172.39	2.73	3.49	294.7	358.4		
07/77															07/77	82.65	0.36	3.76	135.2	194.5		
08/77												-0.01	-0.01		06/77							
09/77	268	16	77	0	550	48	24	195	1099	783	8.3	-0.01	-0.01	1.7								
09/77	208	16	45	21	395	44	-	244	849	614	8	-0.01	-0.01	0.4								
09/77	260	16	32	28	520	42	-	220	1006	724	7.7	-0.01	-0.01	0.2								
09/77	252	16	34	28	520	42	-	207	994	714	7.9	-0.01	-0.01	0.3								
09/77	574	12	584	191	2750	210	-	427	4531	3223	7.8	-0.01	-0.01	1.9								
02/78	263	19	86	56	628	50	-	437	1338	978	8.1	-0.01	-0.01		02/78	62	2.36	0.28				
05/78	163	9	61	19	253	16	-	220	569	410	8.1				05/78	29	0.49					
09/78	32	6	33	5	62	4	-	134	208	151	7.7				06/78	11	0.1	3.1				
11/78															11/78	16	2.32					
02/79	2	1	3	1	0	4	-	12	16	15	6.5				02/79	46	1.6					
05/79	105	8	86	20	260	12	36	232	759		8.5	0.0018	-0.01		05/79	22	2.1					
08/79	158	7	33	23	410	14	12	146	830		9.1				08/79	320	0.34	3.2				
11/79	175	8	66	20	410	16	0	244	945		8				11/79	39	2					
02/80	250	11	94	29	562	14	0	336	1310		7.8				02/80	68	0.16					
05/80	116	8	66	23	310	6	12	220	765		8.2	-0.002	0.002		05/80	11	1.8	0.7				
08/80	132	8	46	20	350	10	12	171	769		8.2	0.003	-0.002		08/80	38	4.0	1.06				
11/80	205	12	67	26	530	16	12	281	1184		8.1	-0.002	-0.002		11/80	49	1.1					
02/81	229	10	96	40	750	10	0	232	1399		8	-0.002	-0.002		02/81	55	3.1					
05/81	252	11	89	48	690	17	6	256	1360		8.2	0.002	-0.002		05/81	42	2.5					
08/81	355	15	72	29	821	20	96	61	1470		9.4	0.003	-0.002		08/81	0.29	0.67	3.8				
11/81	426	13	100	24	1050	40		177	1631		8.1	0.002	-0.002		11/81	25	6.1					
12/81						40	0				8.4				12/81	106	13.26					
02/82	616	16	168	97	1800	40		476			8.4	0.002	-0.002		02/82	69	2.6					0.4
03/82						40	0	475	3277		7.72				03/82	4.1	1.71	1.74			1	
04/82											8				04/82		1.41					
05/82					1416	170		96	2390		8.9	0.022	0.002		05/82	7.4	1	0.7			1.5	0.2
08/82					1952	39			3160		8.5	0.021	-0.005		08/82	8	1.8	0.82			3.5	0.2
11/82					84				296		7.3	0.002	-0.001		11/82	5.3	0.3	10			3.1	0.9
02/83					231				450		7.3	-0.002	0.002		02/83	7.7	0.6	7.8			1.4	0.3
05/83					354		-1		736		8.2	-0.001	-0.001		05/83	7.2	1.1	1.5			1.1	3.9
07/83						9			803		7.8	-0.001			07/83	26	3.9	0.4			1.6	1.6
11/83					679	28			1270		7.0	0.001	-0.001		11/83	10		0.4			2.9	1.2
02/84					544	10			1060			-0.001	-0.001		02/84	9.6	0.6	2.2			6.9	1.6
06/84					433	8			936		8.2		0.005		06/84	22.5	1	1.6			1.8	2.9
05/84					500	14			952		9.7	-0.001			08/84	10	0.8	0.8			1.2	1

TABLE D6-3

Highland Uranium Project
Surface Water Quality Data

	Cations				Anions				Miscellaneous							Radioactivity						
Location	Sodium mg/l	Potassium mg/l	Calcium mg/l	Magnesium mg/l	Sulphate mg/l	Chloride mg/l	Carbonate mg/l	Bicarbonate mg/l	Total Dissolved Solids mg/l	NaCl Equivalent mg/l	Observed pH	Arsenic mg/l	Selenium mg/l	Oil & Grease	Date	Uranium pCi/l	Ra-226 pCi/l	Th-230 pCi/l	Gross Alpha pCi/l	Gross Beta pCi/l	Lead-210 pCi/l	Polonium-210 pCi/l
11/84					313	16			1148		8.3	-0.001	-0.001		11/84	10	1	0.9			1.3	1.1
03/85					810				1386		7.7	-0.001	-0.001		03/85	10	1	1.1			2.1	1.2
05/85					675				1431		8.8		-0.001		05/85		0.5	0.8			1.0	1.6
11/85					950				1676			-0.001	-0.001		11/85	33	0.7	1			1.2	0.9
Sample Point 6B, East Stock Pond																						
02/78															02/78	990	10.82	5.01				
05/78	93	8	37	2	86	16	36	171	362	291	8.9				05/78	550	7.41	4				
07/78															07/78	880	3.4					
09/78	55	7	34	3	76	12	-	159	265	193	7.7				06/78	746	3.9	1.5				
11/78	99	10	30	13	155	18	-	220	437	322	7.5				11/78	330	5.83					
02/79	21	3	6	3	38	6	-	49	109	82	7.3				02/79	120	2.49					
05/79	63	16	43	9	76	14	-	244	339	254	7.8	-0.001	-0.001		05/79	990	1.4	6.1				
02/80	37	18	15	2	62	4	0	67	194		6.7				02/80	260	13					
05/80	24	26	22	2	35	6	0	110	218		8	0.006	0.002		05/80	260	26	23				
06/80															06/80		0.246					
07/80															07/80			0.72				
08/82					25	7			68		7.9	-0.001	0.067		08/82	4.8	1.1	1.3			0.3	0.8
11/82					48				226		7.7	0.002	-0.001		11/82	4.1	6.6	6.7			10.5	1
02/83					13				12		8.5	0.061	-0.001		02/83	6.4	1.5	19			1.3	2.1
05/83					16				138		8.2	-0.001	-0.001		05/83	8.6	2.6	2.6			1.1	1.1
07/83					5	2			409		7.4	-0.001	-0.001		07/83	9.1	10	1.5			5.7	2.6
11/83					62	3			392		7.8	-0.001	-0.001		11/83	427	6	3.2			6.0	4.5
02/84					52	3			194		6.3	-0.001	-0.001		02/84	4.7	1.4	3.1			30	298
06/84					21				122		7.9	0.001	-0.001		06/84	4.4	2.6	2.3			3.6	3.9
08/84					7	6			190		9.2	-0.001	0.001		08/84	1.3		0.8			1.2	1
Sample Point 73, 1926 Stock Pond																						
07/79	11	5	22	2	10	2	-	98	150		7.5	-0.001	-0.001		07/79	12	0.98	-1.4				
02/80															02/80	14	14	-0.34				
05/80	2	4	13	1	0	4	0	43	76		7.1	-0.002	-0.002		05/80	38	0.6	7.3				
08/80	4	5	18	2	4	4	0	73	111		7.6	0.002	-0.002		08/80	-3.6	1.20	3.59				
09/80	12	10	40	7	0	26	0	159	253		7.4	0.007	-0.002		09/80							

TABLE D6-3

Highland Uranium Project
Surface Water Quality Data

	Cations				Anions				Miscellaneous							Radioactivity						
Location	Sodium mg/l	Potassium mg/l	Calcium mg/l	Magnesium mg/l	Sulphate mg/l	Chloride mg/l	Carbonate mg/l	Bicarbonate mg/l	Total Dissolved Solids mg/l	NaCl Equivalent mg/l	Observed pH	Arsenic mg/l	Selenium mg/l	Oil & Grease	Date	Uranium pCi/l	Ra-226 pCi/l	Th-230 pCi/l	Gross Alpha pCi/l	Gross Beta pCi/l	Lead-210 pCi/l	Polonium-210 pCi/l

NOTES - Sample Locations on Figure D6-1
1. Sample Point 5, Box Creek, NW/4 NE/4 Section 34, T36N, R72W
2. Sample Point 13, Box Creek, SE/4 NW/4 Section 27, T36N, R72W
3. Sample Point 26, Center Stock Pond, SW/4 SW/4 Section 16, T36N, R73W
4. Sample Point 32, West Underground Stock Pond, SW/4 SW/4 Section 17, T36N, R72W
5. Sample Point 33, Fowler Draw Stock Pond, NE/4 SW/4 Section 20, T36N, R72W
6. Sample Point 34, Sheep Draw Stock Pond, SE/4 NW/4 Section 20, T36N, R72W
7. Sample Point 35, Antelope Reservoir, SW/4 NW/4 Section 29, T36N, R72W
8. Sample Point 36, Reservoir 2A, NW/4 NE/4 Section 33, T36N, R72W
9. Sample Point 68, East Stock Pond, SE/4 NW/4 Section 21, T36N, R72W
10. Sample Point 73, 1924 Stock Pond, NE/4 SE/4 Section 24, T36N, R72W
11. Sample Point 101, Stock Pond, SE/4 NE/4 Section 17, T36N, R72W
12. Sample Point 102, Irrigation Area, NE/4 SE/4 Section 21, T36N, R72W

TABLE D6-4

AQUIFER CHARACTERISTICS AT HIGHLAND URANIUM PROJECT

Wellfield Area Ore Zone	Range of Transmissivities (gpd/ft)	Approximate Average Transmissivity (gpd/ft)	Range of Storage Coefficient	Approximate Average Storage Coefficient
Section 21 20-Sand	72 to 378	120	$1.4x10^{-4}$ to $8.1x10^{-5}$	$2.0x10^{-5}$
Section 21 30-Sand	627 to 814	700	$1.1x10^{-4}$ to $9.8x10^{-5}$	$1.0x10^{-5}$
Section 14(N) 50-Sand	762 to 1060	850	$8.4x10^{-5}$ to $3.2x10^{-5}$	6.0×10^{-5}
Section 14(S) 50-Sand	1010 to 3540	1500	$1.2x10^{-4}$ to $8.4x10^{-4}$	$2.0x10^{-4}$
Section 22/23 40-Sand	888 to 1490	1120	$1.2x10^{-5}$ to $4.8x10^{-5}$	$3.5x10^{-5}$

TABLE D6-5

CONFINING UNIT AVERAGE VERTICAL PERMEABILITIES

Wellfield Area/ Ore Zone	Confining Unit Tested	Average Permeability (cm/sec) from Core Analysis	Average Permeability (cm/sec) from Neuman-Witherspoon Method
Section 21 20-Sand	Overlying Claystone	$9.65x10^{-10}$	
Section 21 20-Sand	Underlying Claystone	$1.35x10^{-8}$	
Section 14(N) 50-Sand	Underlying Claystone	$1.5x10^{-10}$	$1.3x10^{-8}$
Section 14(N) 50-Sand	Overlying Claystone	$.93x10^{-10}$	
Section 22/23 40-Sand	Underlying Claystone		$1.0x10^{-7}$
Section 22/23 40-Sand	Overlying Claystone		$4.0x10^{-9}$

TABLE D6-6

Highland Uranium Project
Potable Water Quality Data Summary

	Cations				Anions				Miscellaneous				Radioactivity		
Location	Sodium mg/l	Potassium mg/l	Calcium mg/l	Magnesium mg/l	Sulphate mg/l	Chloride mg/l	Carbonate mg/l	Bicarbonate mg/l	Total Dissolved Solids mg/l	NaCl Equivalent mg/l	Observed pH	Date	Uranium pCi/l	Ra-226 pCi/l	Th- pCi
Sample Point 3															
01/78	49	7	43	11	96	13	-	183	309	229	7.6	05/78	1.9	1.19	0.
03/78	70	12	42	10	126	10	-	207	372	271	7.7	06/78	6.4	1.13	0.
06/78	58	7	47	7	116	8	-	163	333	239	7.6	07/78	2	1.7	0.
10/78	67	7	45	9	126	10	-	195	360	260	8.1	08/78	5	2.1	0.
Sample Point 28															
09/77	115	6	42	4	238	12	-	139	485	337	8.1	01/78	6.6	0.48	-
01/78	72	6	36	15	185	10	-	134	390	281	7.6	02/78	<0.1	0.54	-
02/78	100	9	30	6	200	8	-	134	419	294	7.9	05/78	<0.1	0.23	-
09/78	94	6	44	5	190	10	-	159	427	300	8.1	08/78	<1	0.5	0.
Sample Point 23															
09/77	89	7	54	11	150	12	19	217	449	339	8.3	05/78	13	6.25	-
01/78	99	8	51	15	160	20	-	268	485	358	7.8	06/78	11	5.15	-
06/78	83	8	57	6	125	12	-	256	417	301	7.6	07/78	25	7.7	-
10/78	80	7	52	8	118	10	12	232	401	299	8.2	08/78	38	5.7	2.
Sample Point 24															
09/77	79	6	36	2	98	8	-	200	328	234	8.1	05/78	4.4	1.42	-
01/78	72	6	36	9	106	8	-	207	339	247	8.2	06/78	3.4	0.94	-
06/78	66	7	41	4	80	6	-	220	312	225	7.7	07/78	1	1.1	
10/78	73	6	34	11	84	6	-	244	334	247	8.1	06/78	3	1.1	0

NOTES - Sample Locations on Figure D6-1

1. Sample Point 3, NE/4 NW/4 Section 29, T36N, R72W
2. Sample Point 28, NE/4 SW/4 Section 20, T36N, R72W
3. Sample Point 23, NW/4 SW/4 Section 28, T36N, R72W
4. Sample Point 24, SE/4 SE/4 Section 17, T36N, R72W

TABLE D6-7

Highland Uranium Project
Shallow Wells Water Quality Data Summary

Location	Cations				Anions				Miscellaneous				Radioactivity		
	Sodium mg/l	Potassium mg/l	Calcium mg/l	Magnesium mg/l	Sulphate mg/l	Chloride mg/l	Carbonate mg/l	Bicarbonate mg/l	Total Dissolved Solids mg/l	NaCl Equivalent mg/l	Observed pH	Date	Uranium pCi/l	Ra-226 pCi/l	Th-230 pCi/l
Sample Point 2, Fowler Ranch Yard															
01/78	129	4	37	11	240	10	-	195	527	373	8.0	05/78	0.57	0.00	4.6
03/78	153	5	37	9	276	8	12	183	590	422	8.2	06/78	1.4	0.21	0.72
06/78	151	4	44	5	270	10	-	207	586	408	7.7	07/78	<1	1.0	1.6
10/78	145	4	41	9	280	10	6	177	582	411	8.2	08/78	<1	0.3	4.6
Sample Point 1, Vollman Ranch Yard															
01/78	40	7	73	12	110	9	-	244	371	270	7.8	05/78	5.6	0.14	1.13
03/78	40	9	66	15	94	12	-	256	362	270	7.7	06/78	13	0.42	0.40
06/78	46	9	72	8	90	8	-	268	365	265	7.7	07/78	19	2.3	0.0
10/78	74	7	68	11	150	6	-	268	448	321	8.0	08/78	16	2.1	0.6
Sample Point 1-A, Mumerich Livestock															
03/75	211	8	150	9	575	16	-	317	1125	769	7.4	03/75	1.6	0.6	0.0
06/75	143	4	40	6	265	8	-	188	559	388	7.7	06/75	7.2	0.6	0.0
09/75	117	6	71	20	310	8	-	227	644	455	8.1	09/75	4.9	3.3	0.0
12/75	143	6	63	13	360	14	-	165	680	473	7.5	12/75	1.7	0	0.47

TABLE D6-8

SECTION 21, 20-SAND MINE UNIT

Average Premining Ground Water quality Based on Baseline Sampling of Wells MP-1 through MP-5*

Parameter	Det. Limit & Range	Average Concentration
Ca	0.05	44.7
Mg	0.01	9
Na	0.05	55
K	0.10	8
CO_3	0.10	<0.1
HCO_3	0.10	215
SO_4	0.50	91
Cl	0.10	4.2
NH_4 (N)	0.05	0.1
NO_2 (N)	0.01	<0.01
NO_3 (N)	0.01	<0.01
F	0.10	0.2
SiO_2	1.00	16
TDS @ 180 C	1.0	330
Cond (umho/cm)	1.0	525
Alk-$CaCO_3$	0.1	177
pH (units)	1-14	8
Al	0.10	<0.1
As	0.001	<0.001
Ba	0.10	<0.1
B	0.10	<0.1
Cd	0.01	<0.01
Cr	0.05	<0.05
Cu	0.01	<0.01
Fe	0.05	<0.05
Pb	0.05	<0.05
Mn	0.01	0.03
Hg	0.001	<0.001
Mo	0.10	<0.1
Ni	0.05	<0.05
Se	0.001	<0.001
V	0.10	<0.1
Zn	0.01	<0.01
U - Total	0.0003	0.041
Ra-226 - Total (pCi/l)	0.20	675

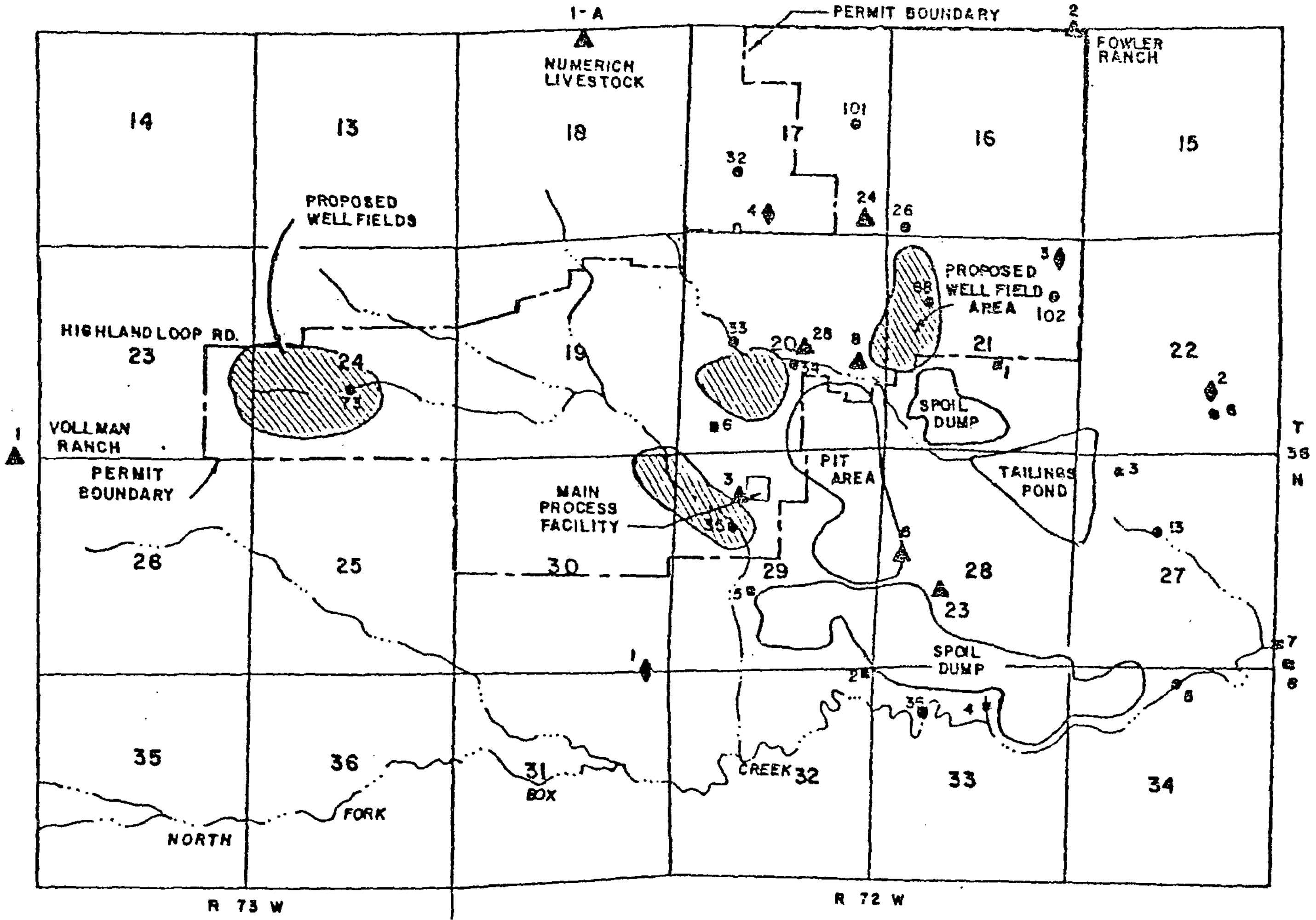
* mg/l unless specified otherwise

TABLE D6-9

SECTION 21, 30-SAND MINE UNIT

Average Pre-Injection Ground Water Quality Based on Baseline Sampling of Wells MP-11 through MP-31

Parameter	Det. Limit & Range	Average Concentration
Ca	0.05	47
Mg	0.01	10
Na	0.05	57
K	0.10	8
CO_3	0.10	0.11
HCO_3	0.10	207
SO_4	0.50	117
Cl	0.10	5.4
NH_4 (N)	0.05	2
NO_2 (N)	0.01	<0.01
NO_3 (N)	0.01	0.09
F	0.10	0.23
SiO_2	1.00	16
TDS @ 180 C	1.0	355
Cond (umho/cm)	1.0	574
Alk-$CaCO_3$	0.1	168
pH (units)	1-14	8
Al	0.10	<0.1
As	0.001	<0.001
Ba	0.10	<0.1
B	0.10	<0.1
Cd	0.01	<0.01
Cr	0.05	<0.05
Cu	0.01	<0.01
Fe	0.05	0.04
Pb	0.05	<0.05
Mn	0.01	0.02
Hg	0.001	<0.001
Mo	0.10	<0.1
Ni	0.05	<0.05
Se	0.001	<0.001
V	0.10	<0.1
Zn	0.01	<0.01
U - Total	0.0003	0.06
Ra-226 - Total (pCi/l)	0.20	313



● SURFACE WATER

▲ GROUND WATER

♦ AIR

▪ SOIL AND VEGETATION PLOTS

FIGURE D6-1

HIGHLAND URANIUM PROJECT

LOCATION OF MONITORING AND SAMPLI STATIONS

SCALE: AS SHOWN	DATE: 12-85	DRWN BY: PAH

The following 5 Drawings specifically referenced Appendix D6 Table of Contents have been processed into ADAMS.

These drawings can be accessed within the ADAMS package or by performing a search on the Document/Report Number.

D-148 to D-152

APPENDIX D-6

HYDROLOGY

REYNOLDS RANCH AMENDMENT AREA
CONVERSE COUNTY, WYOMING

1 GROUNDWATER

Descriptions of the geologic formations of the Powder River Basin and their hydrologic properties have been discussed in numerous publications (Hodson et al., 1973; Hodson, 1971, Whitcomb et al., 1958; Huntoon, 1976; Davis, 1976) and were summarized in Appendix D-5 (Geology). The hydrologic units beneath the permit area and the general vicinity include the following: Holocence-age alluvial deposits, the Eocene-age Wasatch Formation, the Paleocene-age Fort Union Formation, and the Cretaceous-age Lance and Fox Hills Formations (Table D-6.1). Individual sandstones within these units may be classified as aquifers depending on their hydrologic characteristics and potential yield to wells and/or springs.

1.1 GROUNDWATER RIGHTS

Listings of all known water wells and springs in the permit area or within three miles of the permit boundary are provided on Table D-6.2. The general locations of stock wells and springs within the nearest ¼ ¼ Section are indicated on Figure D-6.1. The well listing is by the Wyoming permit number and well name as listed in the Wyoming State Engineers Office (WSEO) Water Rights Database. Table D-6.2 reflects listings in the WSEO Water Rights Database as of August 2004. Monitor wells associated with in situ mining or development are not included in Table D-6.2.

1.2 GROUNDWATER QUALITY

Extensive groundwater quality data was previously collected by Solution Mining Corporation from the planned Production Zones and also other zones that are representative of potential potable or existing stock water sources (not planned mining zones). Baseline water quality data for the Production Zones and potable/stock water sources are summarized in Attachment D6-2. See Figure D6-1 for the locations of these wells.

Baseline data will be extensively developed for the designated wells in each mining unit prior to start-up to determine baseline conditions, Upper Control Limits, and Restoration Target Values. This data will be submitted to WDEQ-WQD prior to placing a mining unit into production.

1.3 HYDROGEOLOGIC UNITS

Alluvium. The alluvium in the permit area consists of thin, unconsolidated, poorly stratified clays, silts, sands, and gravels. The total thickness of these deposits is estimated to range from less than 1 foot to 30 feet. Small amounts of precipitation infiltrate the alluvium during part of the year and intermittent flows across the alluvium may provide some recharge. The water table however is typically more than 100 feet below the land surface throughout most of the permit area.

The potential for future development of alluvial groundwater supplies in the permit area is considered very poor.

Wasatch Formation. The Wasatch Formation typically is lenticular fine- to coarse-grained sandstones with interbedded claystones and siltstones. The Wasatch Formation contains some of the more important shallow aquifers in the Powder River Basin.

Properly constructed wells penetrating the Wasatch aquifer in the vicinity of the proposed project site generally yield from 5 to 15 gallons per minute (gpm).

For the most part, groundwater in the Wasatch aquifer occurs under water table (unconfined) conditions and its primary use in the permit area is low-yielding wells used for watering livestock. Artesian (confined) zones near the base of the formation are separated from near-surface deposits and from each other by impermeable shale layers.

Fort Union Formation. The Fort Union Formation underlies the Wasatch Formation in the permit area. Typically, the Fort Union is comprised of lenticular fine- to coarse-grained sandstones with interbedded claystones, siltstones, and coal. The formation is as much as 3000 feet thick beneath the permit area.

The Fort Union Formation contains important aquifers in the Powder River Basin, and contains the principle production zones for the Reynolds Ranch Project. While most of the solution mining wells are designated for limited yields (5 to 30 gpm of water), wells completed in the Fort Union formation can produce substantial volumes of groundwater over extended periods as demonstrated by the various past mining operations in the Southern Powder River Basin.

Lance and Fox Hills Formations. The Lance and Fox Hills Formations underlie the Fort Union Formation at depths of approximately 3500 feet and 5500 feet, respectively beneath the proposed permit area. The formations are comprised of fine to medium grained sandstones, interbedded sandy shales and claystones. Well yields from these formations are not expected to exceed 100 gpm, and the groundwater reserves may be limited. Little is known of the hydrologic characteristics of the Lance and Fox Hills Formations as no water wells tap these aquifers in the vicinity of the permit area. Because of the depths of these formation and the availability of water from other shallow aquifers, it appears unlikely that these formations will be tapped for water supplies in the future in the permit area.

1.4 LOCAL HYDROGEOLOGIC SETTING

The hydrostratigraphic units of primary concern in analyzing the possible impacts of uranium in-situ mining operations in the O-sand and U/S-Sand aquifers of the Fort Union Formation are:

- Wasatch Formation sandstones (overlying aquifers G and E-Sands)
- W-sand aquifer (upper production zone- undeveloped)
- Fort Union Formation V Shale (upper confining stratum)
- U/S-sand aquifer (middle production zone)
- Intermediate P Shale (U/S-sand lower confining stratum and O-sand upper confining stratum)
- O-sand aquifer (lower production zone)
- Basal Shale (lower confining stratum)

Detailed descriptions of each of these stratigraphic units is presented in Appendix D-5.

1.5 AQUIFER PUMP TESTS AND ANALYSIS

Pump tests have been conducted in the permit area to evaluate the hydrologic characteristics of the mineralized zones. The pump tests were performed by In-Situ, Inc. for Solution Mining Company and are presented in Attachment D6-1. The In-Situ Inc. pump tests were performed in January 1989 in areas of each production zone where future production is likely to occur. The pump tests conducted demonstrated that the mineralized formations have acceptable permeability and transmissivity characteristics for solution mining and all confining shale members tested have proven to be effective aquitards for controlling the vertical movement of leach solutions.

It is important to note that terminology for the stratigraphic formations described in the pump test and analysis by In-Situ Inc. and Solution Mining Company (SMC) is different than the terminology used by Power Resources, Inc for the same formations. The list below provides a cross-reference for the different terminologies used.

- The SMC E-sand is equivalent to the PRI O-sand.
- The SMC H-sand is equivalent to the PRI U/S-sand.
- The SMC I-shale is equivalent to the PRI V-shale.

1.5.1 U/S Sand Pump Test Results

The U/S-sand production zone aquifer is separated into upper (U) and lower (S) zones by a discontinuous shale horizon. Transmissivities of the U/S-sand were found to range from 490-570 gpd/ft during the pumping phase and up to 820 gpd/ft during the recovery phase of the pump test. The mean transmissivity was 540 gpd/ft with a slight anisotropy in the transmissivity of 1.6:1 to 1.2:1 noted. When the U/S-sand aquifer was stressed during the pumping phase both the upper and lower zones responded as a single hydraulic unit. The storage coefficient lies in a small range of 1.5E-5 to 1.7E-5.

As noted on page D6-A1-11, the H-sand consists of an upper and lower zone separated by a discontinuous shale layer. These two zones of the H-sand are referred to as the U and S-sand respectively under current PRI terminology (U is the upper zone and S is the lower zone). Monitor well 1062 is completed in the U-sand, which is overlying the S-sand. As noted, the aquitard separating these sands (T-shale) is in fact discontinuous in areas shown Figures D5-1 and D5-2 leading to communication between these zones. This explains the slight drawdown in well 1062 from pumping well 1054. The pumping well (1054) is located in the S-sand. Figures D5-1 and D5-2 were revised to show the referenced pump locations.

1.5.2 O-Sand Pump Test Results

Transmissities of the O-sand were found to range from 422 – 767 gpd/ft during the pumping phase and from 507-652 gpd/ft in the recovery phase of the test. The mean transmissivity is 640 gpd/ft. A pronounced anisotropy in the transmissvity is apparent (3.3:1) with the major axis of transmissivity oriented on a bearing of 57 degrees. Extreme anisotropy was detected in the data from one of the observation wells suggesting the existence of appreciable heterogeneity in the hydrologic properties of the O-sand aquifer. When the O-sand aquifer was stressed during the pump test it responded as a single hydraulic unit. The storage coefficient lies in the range 6.3E-5 to 7.8E-5.

1.6 AQUIFER POTENTIOMETRIC SURFACES

Potentiometric surface contours have been constructed for the O-sand and U/S-sand production zones. Figures D-6-2 and D6-3 presents the potentiometric surfaces for the U/S-sand and O-sand, respectively, and were produced from water levels taken on November 6, 2004. Production sand water levels were measured at six existing wells installed by Solution mining Company (three wells in the O-sand and three wells in the U/S-sand) and at an additional five wells installed by Power Resources, Inc. Well locations were chosen in order to provide adequate coverage for each production zone in northern half of the permit area where mining is initially planned. Table D6-4 lists these wells and associated water level monitoring results from July through November 2004.

Water levels from wells UM-200, 26-476 (PRI), 35-882 (PRI), SMC-1062, SMC-1066, 2-611 (PRI) were used to develop the potentiometric surface contours for the U/S-sand aquifer. These contours show the direction of groundwater flow in a northeast direction.

The average groundwater velocity is estimated to be 8 ft/yr based on a hydraulic conductivity of 22 gpd/ft^2 (2.89 ft/day), a matrix porosity of 0.27, and average gradient of 0.002 ft/ft. These estimates also correlate closely with estimates determined by the previous hydrologic testing from Solution Mining Company.

Water levels from wells SMC-1055, SMC-1058, SMC-1067, 26-477 (PRI), and 35-883 (PRI) were used to develop the potentiometric surface contours for the O-sand aquifer. These contours show the direction of groundwater flow in a northwesterly direction. The average velocity is estimated to be 1.9 ft/year based on a hydraulic conductivity of 21 gal/day/ft^2 (2.81 ft/day), a matrix porosity of 0.27, and an average gradient of 0.0005 ft/ft. These estimates show that the O-sand potentiometric surface is extremely flat, which correlates with the findings from Solution Mining Company hydrologic tests conducted previously.

2 SURFACE WATER

Surface flow in the permit area is intermittent, the result of both the relatively low average annual precipitation in the region and the fact that most stream channels in the area are underlain by quaternary deposits of high transmissivity.

Most of the high flow rates in the streams of the permit area result from high-intensity convective storms that enter the region from the east (Lowers, 1960). These storms are most likely to occur during May and June.

The permit area is located in the Duck Creek, Willow Creek, and Brown Springs Creek drainages all attendant to the Dry Fork drainage of Little Cheyenne River. The Little Cheyenne River is part of the Cheyenne River drainage system in the southern part of the Powder River Basin. The only natural surface water in the permit area is ephemeral runoff in response to intermittent precipitation and seepage into small basins at low points in the Duck Creek, Willow Creek, and Brown Springs Creek drainages. Surface runoff is very limited, surrounding stock ponds collect some runoff for livestock and wildlife consumption, but are dry most of the year. Some stock ponds on the permit area are fed by a pumped well and will contain water for longer durations.

The average annual runoff from this part of Wyoming is approximately 0.3 to 0.5 inches, or between approximately 0.022 and 0.037 cubic feet per second per square mile (U.S. Soil Conservation Service, 1975; Hodson et al., 1973).

2.1 SURFACE WATER QUALITY

Surface water inside the Permit Area is limited to snow melt and rain runoff. Surface water is present for only short periods of time. A working stock pond, which is supplied primarily by a shallow well, is located within the Permit Area. Solution Mining Company conducted surface water analysis of the stock pond and other surface water sites including the Silver Spoon Reservoir and Brown Springs Creek for radiological constituents. The results of these analyses are presented in Attachment D6-2.

2.2 SURFACE WATER RIGHTS

A listing of all the adjudicated and non-adjudicated surface water rights is provided in Table D-6-3. Only two surface water rights (the Silver Spoon Reservoir) exist in the Permit Area or with one-half mile of the Permit Area as determined from the WSEO Water Rights Database in August of 2004. The general location of these surface water rights are indicated on Figure D-6.1.

Table D-6.1. DESCRIPTION OF HYDROGEOLOGIC UNITS IN THE VICINITY OF THE PROPOSED SITE

Geologic Age	Hydro-geologic Unit	Approximate Thickness (feet)	Lithologic Characteristics	Hydrologic Characteristics
Holocene	Alluvium	0-30	Clays, silts, sands, gravels, and some slope-wash material	Small quantities of water and small yields in stream valleys
Eocene	Wasatch Formation	0-500	Fine- to coarse-grained lenticular arkosic sandstone, and interbedded claystone and siltstone	Groundwater production generally good, but lenticular nature restricts aquifer use locally; yields of as much as 140 gpm have been produced
Paleocene	Forth Union Formation	3000	Fine- to coarse-grained, lenticular sandstone, and interbedded carbonaceous shale and coal	Groundwater production good beneath site; yields of 550 gpm have been produced ovr prolonged periods
Cretaceous	Lance Formation	3000	Fine- to medium-grained sandstone, and interbedded sand, shale, and claystone	Groundwater production largely unknown in vicinity of site; probably would not yield over 20 gpm
Cretaceous	Fox Hills Formation	500-700	Fine- to medium-grained sandstone, and interbedded thin sandy shale	Groundwater production largely unknown in vicinity of site; probably would not yield over 100 gpm

Sources: Hodson et al., 1973; Hodson, 1971; Harshbarger and Associates, 1974.

TABLE D6-2
EXISTING STOCK AND DOMESTIC WELLS
REYNOLDS RANCH PERMIT AMENDMENT AREA + 1/2 MILE

Appropriation	Township	Tns suffix	Range	Rng suffix	Section	Qtrqtr	Status	Supply type	Gw Permit Uses	GW Permit Facility Name	GW Permit Applicant	GW Permit Priority	GW Permit Amount	GW Permit Unit	Permit Well Depth	Permit Static Well Depth
36/2/464W	36	N	73	W	21	NENW	UNA	ORI	STO	REYNOLDS #21-3	DUCK CREEK RANCHES INC.	7/12/2004				
P28416W	37	N	73	W	31	SWSW	GST	ORI	STO	DUCK CREEK #1	DUCK CREEK RANCHES INC.	11/15/1974	13.5	GPM	440	40
P77858W	36	N	73	W	17	SWNE	PUW	ORI	STO	DUCK CREEK #17	DUCK CREEK RANCHES INC.	8/23/1988	2	GPM	255	102
P9154P	36	N	74	W	1	SWNE	PUW	ORI	STO	REYNOLDS #1	DUCK CREEK RANCHES INC.	7/31/1940	3	GPM	11	4
P9158P	36	N	74	W	13	NWNW	PUW	ORI	STO	REYNOLDS #13	DUCK CREEK RANCHES INC.	11/30/1951	3	GPM	195	150
P9161P	36	N	73	W	20	NWNW	PU	ORI	STO	REYNOLDS #20	DUCK CREEK RANCHES INC.	8/31/1938	4	GPM	47	26
P9167P	37	N	73	W	32	SWSW	PUW	ORI	STO	REYNOLDS #32	DUCK CREEK RANCHES INC.	9/30/1951	3	GPM	175	130
P94860W	37	N	73	W	32	NESW	UNA	ORI	STO	DUCK CREEK #32	DUCK CREEK RANCHES INC.	3/28/1994	5	GPM	320	240
P96420W	37	N	73	W	31	NWNW	UNA	ORI	STO	DUCK CREEK #31	DUCK CREEK RANCHES INC.	8/2/1994	2	GPM	170	125
P9169P	37	N	74	W	36	SENE	UNA	ORI	STO	REYNOLDS #36 (DEEPENED)	GAME & FISH COMM., STATE OF WYOMING** DUCK CREEK RANCHES INC.	6/30/1942	3	GPM	180	58
P19965P	37	N	73	W	19	SWSE	PUW	ORI	STO	HORNBUCKLE WELL #4	HORNBUCKLE RANCH	12/31/1940	8	GPM	130	90
P47627W	36	N	74	W	3	NWNE	PU	ORI	STO	GRANPA #1	OGALALLA LAND LTD	4/9/1979	25	GPM		
P17313P	37	N	74	W	35	SWSE	PU	ORI	DOM	MASON #1	WILLIAM H. MASON	9/21/1928	3	GPM	118	75
P17314P	37	N	74	W	34	SWSE	PUW	ORI	STO	MASON #2	WILLIAM H. MASON	8/13/1955	4	GPM	255	120
P38165W	37	N	74	W	35	NESW	PUW	ORI	DOM,STO	MASON #3	WILLIAM H. MASON	5/31/1977	5	GPM	310	180
P27911W	36	N	73	W	19	NWNE	PUW	ORI	STO	ADAMS #1	WILLIAM R. & ALICE L. VOLLMAN	9/5/1974	25	GPM	300	100

TABLE D6-2

EXISTING STOCK AND DOMESTIC WELLS
REYNOLDS RANCH PERMIT AMENDMENT AREA + 1/2 MILE

Approp. Unit	Township	[illegible]	Range	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	GW Permit Facility Name	GW Permit Applicant	GW Permit Priority	GW Permit Amount	GW Permit Units	Total Well Depth	Permit Static Well Depth
36/2/464W	36	N	73	W	21	NENW	UNA	ORI	STO	REYNOLDS #21-3	DUCK CREEK RANCHES INC.	07/12/2004				
P17313P	37	N	74	W	35	SWSE	PU	ORI	DOM	MASON #1	WILLIAM H. MASON	09/21/1928	3	GPM	118	75
P17314P	37	N	74	W	34	SWSE	PUW	ORI	STO	MASON #2	WILLIAM H. MASON	08/13/1955	4	GPM	255	120
P19965P	37	N	73	W	19	SWSE	PUW	ORI	STO	HORNBUCKLE WELL #4	HORNBUCKLE RANCH	12/31/1940	8	GPM	130	90
P27911W	36	N	73	W	19	NWNE	PUW	ORI	STO	ADAMS #1	WILLIAM R. & ALICE L. VOLLMAN	09/05/1974	25	GPM	300	100
P28416W	37	N	73	W	31	SWSW	GST	ORI	STO	DUCK CREEK #1	DUCK CREEK RANCHES INC.	11/15/1974	13.5	GPM	440	40
P38165W	37	N	74	W	35	NESW	PUW	ORI	DOM,STO	MASON #3	WILLIAM H. MASON	05/31/1977	5	GPM	310	180
P47627W	36	N	74	W	3	NWNE	PU	ORI	STO	GRANPA #1	OGALALLA LAND LTD	04/09/1979	25	GPM		
P77858W	36	N	73	W	17	SWNE	PUW	ORI	STO	DUCK CREEK #17	DUCK CREEK RANCHES INC.	08/23/1988	2	GPM	255	102
P9154P	36	N	74	W	1	SWNE	PUW	ORI	STO	REYNOLDS #1	DUCK CREEK RANCHES INC.	07/31/1940	3	GPM	11	4
P9158P	36	N	74	W	13	NWNW	PUW	ORI	STO	REYNOLDS #13	DUCK CREEK RANCHES INC.	11/30/1951	3	GPM	195	150
P9161P	36	N	73	W	20	NWNW	PU	ORI	STO	REYNOLDS #20	DUCK CREEK RANCHES INC.	08/31/1938	4	GPM	47	26
P9167P	37	N	73	W	32	SWSW	PUW	ORI	STO	REYNOLDS #32	DUCK CREEK RANCHES INC.	09/30/1951	3	GPM	175	130
P9169P	37	N	74	W	36	SENE	UNA	ORI	STO	REYNOLDS #36 (DEEPENED)	GAME & FISH COMM., STATE OF WYOMING** DUCK CREEK RANCHES INC.	06/30/1942	3	GPM	180	58
P94860W	37	N	73	W	32	NESW	UNA	ORI	STO	DUCK CREEK #32	DUCK CREEK RANCHES INC.	03/28/1994	5	GPM	320	240
P96420W	37	N	73	W	31	NWNW	UNA	ORI	STO	DUCK CREEK #31	DUCK CREEK RANCHES INC.	08/02/1994	2	GPM	170	125

TABLE D6-3

SURFACE WATER RIGHTS
REYNOLDS RANCH PERMIT AMENDMENT AREA + 1/2 MILE

Appropriation	Township	Twn Suffix	Range	Rng Suffix	Section	Quarter	Qtr Qtr	Status	Supply Type	Adj Uses	Adj Facility Name	Adj Appropriation	Adj Priority	Adj Source		
CR1/269A	36	N	74	W	12	5	NENW	PU	ORI	STO	Silver Spoon Reservoir	Joseph W. Reynolds	01/24/1941	Hold-up Hollow Draw		
CR1/269A	36	N	74	W	12	6	NWNW	PU	ORI	STO	Silver Spoon Reservoir	Joseph W. Reynolds	01/24/1941	Hold-up Hollow Draw		

Appropriation	Township	Twn Suffix	Range	Rng Suffix	Section	Quarter	Qtr Qtr	Status	Supply Type	SW Permit Uses	SW Permit Facility name	SW Permit Applicant	SW Permit Priority	SW Permit Amount	SW Permit Unit	SW Permit Source
P5393R	36	N	74	W	12	5	NENW	PU	ORI	STO	Silver Spoon Reservoir	JOE REYNOLDS	01/24/1941	17.25	ACFT	Hold-up Hollow Draw
P5393R	36	N	74	W	12	5	NENW	PUO	ORI	STO	Silver Spoon Reservoir	JOE REYNOLDS	01/24/1941	17.25	ACFT	Hold-up Hollow Draw
P5393R	36	N	74	W	12	6	NWNW	PU	ORI	STO	Silver Spoon Reservoir	JOE REYNOLDS	01/24/1941	17.25	ACFT	Hold-up Hollow Draw

TABLE 6.4

Potentiometric Surface Monitor Well Information and Water Levels

U/S Sand					
Well	**Northing**	**Easting**	**Surf. Elev.**	**Stickup**	**Cas. Elev.**
UM-200			5452.00	2.00	5454.00
26-476	906140	355180	5475.87	0.17	5476.04
35-882	901150	354090	5585.73	0.50	5586.23
SMC-1062	899992	361234	5485.00	3.08	5488.08
SMC-1066	897795	360584	5458.00	2.58	5460.58
2-611	894765	359020	5567.05	0.58	5567.63

	Date	DTW	Wat. Elev.
UM-200	07/26/2004	220.00	5234.00
26-476	07/26/2004	236.57	5239.47
35-882	07/26/2004	335.65	5250.58
SMC-1062	07/26/2004	235.70	5252.38
SMC-1066	07/26/2004	203.75	5256.83
2-611	07/26/2004	308.30	5259.33
UM-200	09/02/2004	221.41	5232.59
26-476	09/02/2004	237.95	5238.09
35-882	09/02/2004	337.00	5249.23
SMC-1062	09/02/2004	237.22	5250.86
SMC-1066	09/02/2004	205.15	5255.43
2-611	09/02/2004	309.66	5257.97
UM-200	10/06/2004	220.00	5234.00
26-476	10/06/2004	236.59	5239.45
35-882	10/06/2004	335.70	5250.53
SMC-1062	10/06/2004	235.87	5252.21
SMC-1066	10/06/2004	203.79	5256.79
2-611	10/06/2004	308.34	5259.29
UM-200	11/11/2004	219.98	5234.02
26-476	11/09/2004	236.46	5239.58
35-882	11/09/2004	335.54	5250.69
SMC-1062	11/09/2004	235.68	5252.40
SMC-1066	11/09/2004	203.83	5256.75
2-611	11/09/2004	308.19	5259.44

O Sand					
Well	**Northing**	**Easting**	**Surf. Elev.**	**Stickup**	**Cas. Elev.**
SMC-1055	900788	358468	5482.00	2.58	5484.58
SMC-1058	900721	359629	5487.00	2.33	5489.33
SMC-1067	897654	359066	5510.00	3.29	5513.29
26-477	903640	357270	5523.78	0.25	5524.03
35-883	900920	354090	5537.47	0.63	5538.10

	Date	DTW	Wat. Elev.
SMC-1055	07/26/2004	245.55	5239.03
SMC-1058	07/26/2004	250.00	5239.33
SMC-1067	07/26/2004	272.80	5240.49
26-477	07/26/2004	288.10	5235.93
35-883	07/26/2004	299.70	5238.40
SMC-1055	09/02/2004	247.38	5237.20
SMC-1058	09/02/2004	251.70	5237.63
SMC-1067	09/02/2004	271.39	5241.90
26-477	09/02/2004	289.79	5234.24
35-883	09/02/2004	301.44	5236.66
SMC-1055	10/06/2004	246.35	5238.23
SMC-1058	10/06/2004	250.70	5238.63
SMC-1067	10/06/2004	273.68	5239.61
26-477	10/06/2004	287.67	5236.36
35-883	10/06/2004	300.42	5237.68
SMC-1055	11/09/2004	246.43	5238.15
SMC-1058	11/09/2004	250.68	5238.65
SMC-1067	11/11/2004	273.70	5239.59
26-477	11/09/2004	286.72	5237.31
35-883	11/09/2004	300.44	5237.66

The following 3 Drawings specifically referenced Appendix D6 Table of Contents have been processed into ADAMS.

These drawings can be accessed within the ADAMS package or by performing a search on the Document/Report Number.

D-153 to D-155

ATTACHMENT D6-1

O-SAND AND U/S-SAND PUMPING TESTS

Prepared By In-Situ Incorporated
December 1989

Note: The terminology for the stratigraphic formations described in the pump test and analysis by In-Situ Inc. and Solution Mining Company (SMC) is different than the terminology used by Power Resources, Inc for the same formations. The list below provides a cross-reference for the different terminologies used.

- The SMC E-sand is equivalent to the PRI O-sand.
- The SMC H-sand is equivalent to the PRI U/S-sand.
- The SMC I-shale is equivalent to the PRI V-shale.

APPENDIX D6-A1

H- AND E-SAND CONSTANT RATE PUMPING TESTS

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December 1989

APPENDIX D6-A1
H- AND E-SAND CONSTANT RATE PUMPING TESTS

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D6.A1.1 INTRODUCTION AND SUMMARY

Two multiple well, constant-rate pumping tests were conducted to investigate the ground water hydrology of two uranium-bearing horizons (H-sand and E-sand) at Solution Mining Corporation's Blizzard Heights project site in Converse County, Wyoming. Each test encompassed both a 72 hour pumping phase (pumping at approximately 20 gpm) and a 215-271 hour recovery phase after cessation of pumping.

Six methods were used to analyze the constant-rate and recovery data to determine:

- transmissivity
- storage coefficient
- directional transmissivity
- leakage

Water levels measured in July 1989 in the pumping and monitor wells after the aquifers had been undisturbed for several months were approximately 5243 ft msl for wells completely penetrating the H-sand horizon and approximately 5229 ft msl for the E-sand horizon. Ground water flows naturally at a bearing of 325 degrees with a gradient of - 0.002 ft/ft and a velocity of about 11 ft/yr in the H-sand horizon. The potentiometric surface of the E-sand aquifer is very flat and the ground water practically does not flow.

In the H-sand aquifer the mean transmissivity is 540 gpd/ft and the storage coefficient between $1.5x10^{-5}$ and $1.7x10^{-5}$. Slight directional transmissivity with a ratio of not more than 1.6:1 was seen and may be considered of minor concern. Drawdown of more than 2 ft in a well completed in what was initially believed to be the first aquifer overlying the H-sand production zone was noted; geologic analysis of the H-sand in the vicinity of the pumping test site subsequently revealed that the interlying shale aquitard is, in fact, a discontinuous shale parting. The drawdown response in the observation wells is not consistent with leakage through a competent aquitard.

In the E-sand aquifer the mean transmissivity is 590 to 640 gpd/ft and the storage coefficient between $6.3x10^{-5}$ and $7.8x10^{-5}$. Significant directional transmissivity with a ratio of at least 3.4:1 was seen. The bearing of the anisotropy generally is 0-60 degrees depending on whether monitor well 1058 is included in the analysis. Heterogeneity is likely in the E-sand aquifer.

D6.A1.2 PUMPING TEST PROCEDURE

Two 72-hour constant-rate pumping tests were conducted at Solution Mining Corporation's (SMC) Blizzard Heights Project site in Converse County, Wyoming (Section 36, T37N, R74W). Pumping Test 1 (11-25 January 1989) investigated the ground water hydrology of the H-sand production horizon and Pumping Test 2 (27 January - 8 February 1989) the E-sand horizon.

A 15 HP Lowara electric submersible pump with a gate valve at the head of the discharge line was used to control the discharge rate at about 20 gpm. A Badger meter was installed downstream of the control valve to measure the volume of water for calculating the discharge rate. (The Badger meter failed at the beginning of Pumping Test 1, and hourly measurements of the time needed to fill a 21-gallon container were used to compute the discharge rate.)

Pressure sensors to monitor and record the water level were installed in the pumping well and the four observation wells in each pumping test. An In-Situ Inc. HERMIT 2000 programmable data logger was used to automatically record time versus water level on a logarithmic schedule during three days of pumping and several days of recovery.

Water level measurements in each of the test wells prior to the start of pumping were used to determine the ground water gradient and flow direction for the H-sand and E-sand horizons.

Table D6-A1-1 summarizes the well construction and completion information for the ten wells used in the two pumping tests and Table D6-A1-2 the coordinates and collar elevations of the pumping and monitor wells.

D6.A1.3 DATA ANALYSIS METHODS

Several methods were used to analyze the constant-rate and recovery data to determine:

- transmissivity
- storage coefficient
- directional transmissivity
- leakage

The type-curve method of Agarwal and others (1970) was used to analyze the pumping well data, which are influenced by wellbore storage and skin effects. Translated into hydrologic terms, match-point data in American practical units (Q in gpm, T in gpd/ft, t in min, s in ft, r in ft, and S, u, and W(u) are dimensionless) may be substituted into the following equations:

$$T = \frac{114.6Q[W(u)]_M}{[s]_M} \qquad (1)$$

$$S = \frac{T[t]_M[u]_M}{2693r^2} \qquad (2)$$

The type-curve method of Theis (1935) was used to analyze the observation well data. Equations 1 and 2 also apply for this case.

The straight-line method of Cooper and Jacob (1946) was used to analyze appropriate data for both the pumping and observation wells. The following equations with American practical units (m in ft/log-cycle) were used:

$$T = \frac{264Q}{m} \qquad (3)$$

$$S = \frac{Tt_o}{4789r^2} \qquad (4)$$

$$t_e = \frac{t}{\left[\frac{s(t)}{m}\right]^{10}} \qquad (5)$$

Rewriting the basic equations of Cooper and Jacob (1946) yields an expression for transmissivity (T) in terms of specific capacity (Q/s) as follows (using American practical units):

$$T = 264 \frac{Q}{s} \log \left[\frac{Tte^{2skin}}{4789r^2S}\right] \qquad (6)$$

Equation 6 can be solved for T, which appears on both sides of the equation, by the method of successive approximations to serve as a check on the graphical method of Cooper and Jacob.

The recovery data after pumping stopped were also analyzed for transmissivity according to the principles set forth by Theis (1935). Residual drawdown versus the logarithm of $(tp+\Delta t)/\Delta t$, where tp is time of pumping and Δt is time since pumping stopped, may be plotted and the slope (m) of the straight-line portion of the data determined. Substitution into equation 3 yields the transmissivity.

Computer software marketed by In-Situ Inc. (TS-MATCH and PAPADOP) was also used to determine directional transmissivity. TS-MATCH automatically matches test data to Theis type-curves and uses the method of Papadopulos (1965) to determine directional transmissivity. PAPADOP uses the method of Papadopulos (1965) to determine directional transmissivity using aquifer parameters determined by other methods.

D6.A1.4 PUMPING TEST 1 (H-SAND) RESULTS

A pumping well (1056) and three observation wells (1063, 1064, and 1065) fully penetrating the H-sand aquifer were used for Pumping Test 1. An additional well (1062) was completed in what was initially believed to be the first aquifer above the H-sand aquifer to detect possible communication with other units when the H-sand aquifer is stressed. Subsequent geologic analysis revealed that in the area in which well 1062 was completed the H-sand production zone aquifer is simply separated into upper and lower zones by a relatively discontinuous shale horizon (see Section D6.2.6.1 of Appendix D-6 text).

Figure D6-A1-1 illustrates the well pattern for Pumping Test 1. Drift surveys of the wells (Table D6-A1-1) showed that the bottoms of all the wells were within one or two percent of directly below their tops, so the surface locations of the wells were used in all of the subsequent calculations. Water level elevations in the pumping and monitor wells prior to the start of the test at 0900 hours on 11 January 1989 are presented in Table D6-A1-9, hourly discharge rate data during the pumping phase in Table D6-A1-10 and drawdown versus time data for both the pumping and recovery phases in Table D6-A1-11.

Figures D6-A1-2 through D6-A1-13 show manual analyses by the various methods. Controlling the discharge rate at a constant rate was difficult because of freezing temperatures and a tendency for restriction of flow at exposed portions of the discharge line. The flow meter failed at the beginning of the test. Different discharge rates were used for different analysis methods. A rate of 18 gpm was used for methods using early data, 23 gpm for late data, and 20 gpm for an average rate.

The results of the various methods are summarized in Table D6-A1-3. With the exception of the transmissivity value from the recovery method for well 1064, the results are reasonably consistent.

Relying primarily on the earlier data from about one to two hours while the discharge rate was relatively constant, the parameters from the Theis type-curve matching and the Cooper and Jacob straight-line methods were input into PAPADOP to determine directional transmissivity. Table D6-A1-4 shows the results for the Theis method and Table D6-A1-5 for the Cooper and Jacob method. The mean values of transmissivity are both close to 540 gpd/ft with indications of slight anisotropy in the range of 1.6:1 to 1.2:1. The storage coefficient lies in a small range of $1.5x10^{-5}$ to $1.7x10^{-5}$. Only the orientation of the major axis of transmissivity is significantly different between the two sets of input data. Since the directional transmissivity is small, the orientation is a minor consideration. Assuming a mean transmissivity of 540 gpd/ft and mean H-sand thickness of 25 ft the permeability of this production zone aquifer is 1,052 millidarcies.

Water levels were measured in the wells of the test pattern on January 9 and again on January 10 prior to the start of the pumping test. Based on the calculated water level elevations on January 10 (see Table D6-A1-9) in wells 1063 (5243.16 ft msl), 1064 (5243.21), and 1065 (5243.60), the direction and gradient of the natural ground water flow were determined. Figure D6-A1-14 shows the resulting direction bearing 325 degrees with a gradient of -0.002 ft/ft. Based on a matrix porosity of 0.2 and hydraulic conductivity of 22 gpd/ft^2, the natural ground water flow rate is approximately 11 ft/yr.

As a check on the natural ground water flow characteristics, water level elevations measured on July 6 and 7 in H-sand wells 1057 (5240.2)m 1065 (5343.8), and 1066 (5246.6) were used to determine a direction of 325°, a gradient of -0.002 ft/ft, and a velocity of 11 ft/yr as shown in Figure D6-A1-15.

Slightly more than 2 ft of drawdown was seen in well 1062, completed in the sandstone aquifer (D" 55) above the H-sand (5" SAND) aquifer. This compares to more than 40 ft of drawdown seen in well 1064, completed in the H-sand aquifer, which is the same distance from the pumping well (1056) as well 1062. There is some communication between the two aquifers. As noted earlier, the most likely reason is the observed communication discontinuity in the shale layer separating the upper and lower zones of the H-sand aquifer. The response seen in the observation wells completed in the H-sand aquifer did not level out as one would expect if leakage through a continuous shale aquitard was involved, although the discharge rate may have varied enough to mask a classic leakage response.

D6.A1.5 PUMPING TEST 2 (E-SAND) RESULTS

A pumping well (1055) and four observation wells (1054, 1058, 1060, and 1061) fully penetrating the E-sand aquifer were used for Pumping Test 2.

Figure D6-A1-16 illustrates the well pattern for Pumping Test 2. Drift surveys of the wells showed that the bottoms of all the wells were within one or two percent of directly below their tops, so the surface locations of the wells were used in all so the subsequent calculations.

Water level elevations in the pumping and monitor wells prior to the start of the test at 1100 hours on 27 January 1989 are presented in Table D6-A1-12, hourly discharge rate data during the pumping phase in Table D6-A1-13 and drawdown versus time data for both the pumping and recovery phases in Table D6-A1-14.

Figures D6-A1-17 through D6-A1-31 show analyses by the various methods. The discharge rate remained quite constant throughout the duration of the test, varying between 20.5 and 22.9 gpm. The average discharge rate was 22.1 gpm.

The results of the various methods are summarized in Table D6-A1-6. The values of transmissivity from the Theis curve matching tend to be larger than from the other methods and the storage coefficient values smaller. The values from the recovery method exhibit the greatest differences from the other methods.

The values from the Cooper and Jacob straight-line method were input into PAPADOP to determine directional transmissivity. The results are summarized in Table D6-A1-7. The observation wells (1054, 1060, and 1061) nearest the pumping well (1055) yielded a mean transmissivity of 640 gpd/ft and an apparent storage coefficient of $1.2x10^{-4}$ with significant anisotropy of 3.3:1 oriented with the major axis of transmissivity on a bearing of 57°. Considering the outlying observation well (1058) yielded a mean transmissivity of 570 gpd/ft and an apparent storage coefficient of $1.3x10^{-4}$ with extreme anisotropy of 33:1 oriented on a bearing of 104 degrees. There is a strong indication of heterogeneity in the E-sand aquifer.

Table D6-A1-8 summarizes the results of the TS-MATCH automatic type-curve matching of the observation well data. Figures D6-A1-32 through D6-A1-35 show the match of the type-curve to the test data. The observation wells (1054, 1060, and 1061) nearest the pumping well (1055) yielded a somewhat larger mean transmissivity of 704 gpd/ft and an apparent storage coefficient of $8.7x10^{-5}$ with significant anisotropy of 3.4:1 oriented with the major axis of transmissivity on a bearing of 45°. Considering the outlying observation well (1058) again yielded a lower mean transmissivity of 606 to 640 gpd/ft with extreme anisotropy of 12.7:1 to 27.5:1 oriented in two different quadrants.

The results of the least squares fit for both PAPADOP and TS-MATCH are quite similar for the E-sand aquifer.

		PAPADOP	THEIS
Major Transmissivity	=	1344	1365
Minor Transmissivity	=	258	303
Mean Transmissivity	=	588	643
Direction of Major Transmissivity	=	22	36
Storage Coefficient	=	$7.8x10^{-5}$	$6.3x10^{-5}$

Assuming a mean transmissivity of 640 gpd/ft and mean E-sand thickness of 30 feet, the permeability of this production zone aquifer is 1039 millidarcies.

To determine the natural ground water flow characteristics water elevations measured on 26 January 1989 were plotted and a direction of 183 degrees and a gradient of -0.004 ft/ft were determined. Based upon a matrix porosity of 0.2 and a hydraulic conductivity of 21 gpd/ft^2, the natural ground water flow rate is approximately 22 ft/yr. These data are plotted in Figure D6-A1-36. However, water elevations taken in July of 1989 indicated no groundwater flow and an essentially flat piezometric surface. After consideration, the July data were selected as most representative.

D6.A1.6 REFERENCES

Agarwal, R. G., R. Al-Hussainy, and H. J. Ramey, Jr., 1970. An investigation of wellbore storage and skin effect in unsteady liquid flow, I: Analytical treatment. Soc. Petr. Eng. J., Sept., pp 291-297.

Cooper, H. H., Jr., and C. E. Jacob, 1946. A generalized graphical method for evaluating formation constants and summarizing well-field history. Trans. Amer. Geophysical Union, v. 27, pp. 526-534.

Papadopulos, I. S., 1965. Nonsteady flow to a well in an infinite anisotropic aquifer. Int. Assoc. Sci. Hydrol., Symposium of Dubrovnik, pp. 21-31.

Theis, C. V., 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage. Trans. Amer. Geophysical Union, v. 16, pp. 519-524.

TABLE D6-A1-1 Well Construction and Completion Data for Constant-Rate Pumping Tests

Well Number	Total Depth (ft)	Drill Depth (ft)	Hole Size Diameter (in)	Casing		Open Interval (Depth - Ft)	Hole Survey	
				Depth (ft)	Type		Azimuth ( )	Deviation (ft)
1054	834	760	8	754	4 1/2" Yellowmine	754-834	241.0	17.90
		834	4 1/8	834	3" slotted PVC	80		
1055	792	717	8 3/4	715	6" Fiberglass	710.792	202.0	8.77
		792	6	790	4" slotted PVC			
1056	525	505	9	510	6" Fiberglass	505-525	N.D.	N.D.
		525	6	525	4" slotted PVC			
1058	796	796	7 3/8	760	4 1/2" Fiberglass	776-796	221.9	9.18
				796	3" slotted PVC			
1060	785	785	7 1/2	717	4 1/2" Fiberglass	720-785	147.0	8.48
				785	3" slotted PVC			
1061	785	785	7 1/2	714	4 1/2" Fiberglass	715-785	31.8	5.98
				785	3" slotted PVC			
1062	490	490	7 3/8	440	4 1/2" Fiberglass	440-490	42.0	5.26
				490	3" slotted PVC			
1063	525	525	7 1/2	510	4 1/2" Fiberglass	510-525	186.8	3.64
				523	3" slotted PVC			
1064	525	525	7 1/2	510	4 1/2" Fiberglass	510-525	256.5	5.70
				525	3" slotted PVC			
1065	525	525	7 1/2	510	4 1/2" Fiberglass	510-514	122.2	2.97
				514	3" slotted PVC			

TABLE D6-A1-2 COORDINATES AND COLLAR ELEVATIONS OF WELLS USED IN PUMPING TEST

I. H-SAND PUMPING TEST

Well Number	State Plane Coordinates Northing	Easting	Collar Elevation (ft msl)
1056	900058	361255	5476
1062	899992	361234	5486
1063	900126	361245	5467
1064	900055	361186	5480
1065	899968	361377	5479

II. E-SAND PUMPING TEST

Well Number	State Plane Coordinates Northing	Easting	Collar Elevation (ft msl)
1054	901003	358541	5524
1055	900788	358468	5482
1058	900721	359629	5487
1060	900698	358571	5477
1061	900774	358258	5482

Note: Collar elevations are stated for the intersection of the well casing with the ground surface.

TABLE D6-A1-3

Transmissivities and Storage Coefficient Values For H-Sand Pumping Test Computed According To Differect Analytical Methods

Transmissivities (T) expressed in gal/day/ft.; storage coefficients (S) are unitless and expressed as S x E+5

		PUMPING PHASE				RECOVERY PHASE
Well		Agarwal	Theis	Cooper Jacob	Specific Capacity	Recovery
1056	T	500				560
	S	1.7				
1063	T		570	550	570	580
	S		1.5	1.6	1.5	
1064	T		570	560	550	820
	S		1.8	2.0	2.0	
1065	T		490	500	500	600
	S		1.7	1.6	1.7	

TABLE D6-A1-4 Determination of Horizontal Directional Transmissivities By Means of Papadopulos Method with Theis Input Data: H-Sand Pumping Test

PAPADOP V2.1
Directional Permeability Analysis
IN-SITU INC. SOFTWARE SERIES

Pumping Test 1 (H-Sand)

A. INPUT DATA

Well Number	X Coordinate (ft)	Y Coordinate (ft)	Transmissivity (gpd/ft)	Storage Coefficient (unitless)
1: 1065	122	-90	4.90E+02	1.70E-05
2: 1064	-69	-3	5.70E+02	1.80E-05
3: 1063	-10	68	5.70E+02	1.50E-05

B. ANALYTICAL RESULTS

SUMMARY OF RESULTS - 3 WELL COMBINATIONS

Well Number	T-major (gpd/ft)	T-minor (gpd/ft)	T-mean (gpd/ft)	Angle of T-major (degrees)	Storage Coefficient
1 2 3	688.92	426.38	541.98	62.1	1.49E-05

PAPADOP COMPLETED

TABLE D6-A1-5 Determination of Horizontal Directional Transmissivities By Means of Papadopulos Method with Cooper-Jacob Input Data: H-Sand Pumping Test

PAPADOP V2.1

Directional Permeability Analysis

IN-SITU INC. SOFTWARE SERIES

Pumping Test 1 (H-Sand)

A. INPUT DATA

Well Number	X Coordinate (ft)	Y Coordinate (ft)	Transmissivity (gpd/ft)	Storage Coefficient (unitless)
1: 1065	122	-90	5.00E+02	1.60E-05
2: 1064	-69	-3	5.60E+02	2.00E-05
3: 1063	-10	68	5.50E+02	1.60E-05

B. ANALYTICAL RESULTS

SUMMARY OF RESULTS - 3 WELL COMBINATIONS

Well Number	T-major (gpd/ft)	T-minor (gpd/ft)	T-mean (gpd/ft)	Angle of T-major (degrees)	Storage Coefficient
1 2 3	596.09	481.98	536.01	-77.3	1.73E-05

PAPADOP COMPLETED

TABLE D6-A1-6 Transmissivities and Storage Coefficient Values For E-Sand Pumping Test Computed According To Differect Analytical Methods

Transmissivities (T) expressed in gal/day/ft.; storage coefficients (S) are unitless and expressed as S x E+5

		PUMPING PHASE				RECOVERY PHASE
Well		Agarwal	Theis	Cooper Jacob	Specific Capacity	Recovery
1054	T		767	646	647	507
	S		7.7	12.0	12.0	
1055	T	614		673		566
	S	6.5				
1058	T		422	457	450	516
	S		4.6	3.7	3.7	
1060	T		703	642	638	604
	S		15.0	20.0	20.0	
1061	T		684	632	630	652
	S		8.0	9.8	9.8	

By Means of Papadopulos Method with Cooper-Jacob
Input Data: E-Sand Pumping Test

PAPADOP V2.1
Directional Permeability Analysis
IN-SITU INC. SOFTWARE SERIES

Pumping Test 2 (E-Sand)

A. INPUT DATA

Well Number	X Coordinate (ft)	Y Coordinate (ft)	Transmissivity (gpd/ft)	Storage Coefficient (unitless)
1: 1054	73.00	215.00	6.46E+02	1.20E-04
2: 1060	103.00	-90.00	6.42E+02	2.00E-04
3: 1061	-210.00	-14.00	6.32E+02	9.80E-05
4: 1058	1161.00	-67.00	4.57E+02	3.70E-05

B. ANALYTICAL RESULTS

SUMMARY OF RESULTS - 3 WELL COMBINATIONS

Well Number	T-major (gpd/ft)	T-minor (gpd/ft)	T-mean (gpd/ft)	Angle of T-major (degrees)	Storage Coefficient
1 2 3	1160.94	352.79	639.97	33.3	1.16E-04
1 2 4	Probably heterogeneous media				
1 3 4	Probably heterogeneous media				
2 3 4	3297.23	98.62	570.24	-13.7	1.30E-04

INTETVAL (Degrees)	FREQUENCY	INTERVAL (deg) (Degrees)	FREQUENCY
-90.0 - -75.0	0	0.0 - 15.0	0
-75.0 - -60.0	0	15.0 - 30.0	0
-60.0 - -45.0	0	30.0 - 45.0	1
-45.0 - -30.0	0	45.0 - 60.0	0
-30.0 - -15.0	0	60.0 - 75.0	0
-15.0 - 0.0	1	75.0 - 90.0	0

RESULTS OF LEAST SQUARES FIT

Major Transmissivity	= 1343.56 gpd/ft
Minor Transimissivity	= 257.60 gpd/ft
Mean Transmissivity	= 588.30 gpd/ft
Direction of Major Tranmissivity	= 22.26 degrees
Storage Coefficient	= 7.75E-05

PAPADOP COMPLETED

TABLE D6-A1-8 Determination of Transmissivity, Storage Coefficient and Horizontal Directional Transmissivities By Means of Theis Curve Matching: E-Sand Pumping Test

TS - MATCH V3.2
Theis Curve Automatic Matching
IN-SITU INC. SOFTWARE SERIES

Pumping Test 2 (E-Sand)

A. THEIS CURVE MATCHING (T and S Determination)

(1) TIME VERSUS DRAWDOWN DATA (SUMMARY)

Time (min)	Drawdown Well 1 (1054)	Drawdown Well 2 (1060)	Drawdown Well 3 (1061)	Drawdown Well 4 (1058)
1.58	0.03	0.00	0.00	0.00
2.50	0.03	0.25	0.16	0.03
4.00	0.03	0.70	0.35	0.03
6.50	0.13	1.27	0.79	0.03
10.00	0.35	1.87	1.23	0.03
16.00	0.94	2.63	1.89	0.03
26.00	1.73	3.48	2.71	0.03
40.00	2.65	4.28	3.47	0.03
64.00	3.72	5.20	4.38	0.03
100.00	4.94	6.46	5.61	0.09
160.00	6.23	7.70	6.87	0.22
250.00	7.78	9.38	8.54	0.56
400.00	9.13	10.93	10.11	1.29
630.00	10.39	12.32	11.59	2.45
1000.00	12.09	14.25	13.55	4.09
1300.00	13.16	15.22	14.68	5.25
1600.00	14.11	16.19	15.66	6.36
1900.00	14.70	16.69	16.26	7.21
2200.00	15.18	17.17	16.70	7.93
2500.00	15.59	17.55	17.14	8.62
2800.00	15.96	17.99	17.58	9.25
3100.00	16.47	18.50	18.11	9.85
3400.00	16.75	18.91	18.56	10.35
3700.00	17.16	19.29	18.93	10.83
4000.00	17.54	19.67	19.31	11.27
4300.00	17.92	20.02	19.69	11.67

Flow rate = 22.10 gpm
Number of Observation Wells = 4
Number of Time-Drawdown Pairs/Well = 26
Maximum Number of Iterations = 60
Tolerance of Iteration (Relative) = 1.00E-03
Angular Frequency Interval = 15.00 deg

Observation Well Coordinates and Radial Distances Referenced to Pumping Well:

	Well	X (ft)	Y (ft)	R (ft)
Well 1	1054	73.00	215.00	227.06
Well 2	1060	103.00	-90.00	136.78
Well 3	1061	-210.00	-14.00	210.47
Well 4	1058	1161.00	-67.00	1162.93

(2) BEST FIT TIME-DRAWDOWN MATCH DATA: WELL 1054

Transmissivity = 769.15 gpd/ft
Storage Coefficient = 7.6E-05

Time (min)	Drawdown Data	(feet) Match
1.58	0.03	0.00
2.50	0.03	0.00
4.00	0.03	0.03
6.50	0.13	0.14
10.00	0.35	0.40
16.00	0.94	0.93
26.00	1.73	1.74
40.00	2.65	2.67
64.00	3.72	3.84
100.00	4.94	5.08
160.00	6.23	6.47
250.00	7.78	7.84
400.00	9.13	9.32
630.00	10.39	10.77
1000.00	12.09	12.27
1300.00	13.16	13.12
1600.00	14.11	13.80
1900.00	14.70	14.36
2200.00	15.18	14.84
2500.00	15.59	15.26
2800.00	15.96	15.63
3100.00	16.47	15.96
3400.00	16.75	16.27
3700.00	17.16	16.54
4000.00	17.54	16.80
4300.00	17.92	17.04

(3) BEST FIT TIME-DRAWDOWN MATCH DATA: WELL 1060

Transmissivity =691.06 gpd/ft
Storage Coefficient = 1.6E-04

Time (min)	Drawdown Data	(feet) Match
100.00	6.46	6.27
160.00	7.70	7.84
250.00	9.38	9.39
400.00	10.93	11.05
630.00	12.32	12.68
1000.00	14.25	14.34
1300.00	15.22	15.30
1600.00	16.19	16.05
1900.00	16.69	16.68
2200.00	17.17	17.21
2500.00	17.55	17.68
2800.00	17.99	18.09
3100.00	18.50	18.46
3400.00	18.91	18.80
3700.00	19.29	19.11
4000.00	19.67	19.39
4300.00	20.02	19.66

(4) BEST FIT TIME-DRAWDOWN MATCH
DATA: WELL 1061

Transmissivity = 657.97 gpd/ft
Storage Coefficient = 8.9E-05

Time (min)	Drawdown Data	(feet) Match
100	5.61	5.40
160	6.87	7.00
230	8.54	8.58
400	10.11	10.30
630	11.59	11.99
1000	13.55	13.73
1300	14.68	14.73
1600	15.66	15.52
1900	16.26	16.17
2200	16.70	16.73
2500	17.14	17.22
2800	17.58	17.66
3100	18.11	18.05
3400	18.56	18.40
3700	18.93	18.72
4000	19.31	19.02
4300	19.69	19.30

(5) BEST FIT TIME-DRAWDOWN MATCH
DATA: WELL 1058

Transmissivity = 488.33 gpd/ft
Storage Coefficient = 4.4E-05

Time (min)	Drawdown Data	(feet) Match
1.58	0.00	0.00
2.50	0.03	0.00
4.00	0.03	0.00
6.50	0.03	0.00
10.00	0.03	0.00
16.00	0.03	0.00
26.00	0.03	0.00
40.00	0.03	0.00
64.00	0.03	0.01
100.00	0.09	0.05
160.00	0.22	0.23
250.00	0.56	0.68
400.00	1.29	1.54
630.00	2.45	2.76
1000.00	4.09	4.34
1300.00	5.25	5.36
1600.00	6.36	6.22
1900.00	7.21	6.95
2200.00	7.93	7.60
2500.00	8.62	8.18
2800.00	9.25	8.70
3100.00	9.85	9.17
3400.00	10.35	9.60
3700.00	10.83	10.00
4000.00	11.27	10.37
4300.00	11.67	10.72

(6) SUMMARY OF TS-MATCH PARAMETERS

Well Number	Transmissivity (gpd/ft)	Storage Coefficient
1: 1054	769.15	7.6E-05
2: 1060	691.06	1.6E-04
3: 1061	657.97	8.5E-05
4: 1058	488.33	4.4E-05

B. DIRECTIONAL PERMEABILITY COMPUTATION

SUMMARY OF RESULTS - 3 WELL COMBINATIONS

Well Combination	T-major (gpd/ft)	T-minor (gpd/ft)	T-mean (gpd/ft)	Angle of T-major (degrees)	Storage Coefficient
1 2 3	1294.3	383.5	704.5	44.69	8.7E-05
1 2 4	3343.1	121.7	637.9	32.93	3.0E-05
1 3 4	Probably heterogeneous media				
2 3 4	2155.8	170.1	605.5	-13.84	1.4E-04

INTERVAL (degrees)	FREQUENCY	INTERVAL (degrees)	FREQUENCY
-90.0 - -75.0	0	0.0 - 15.0	0
-75.0 - -60.0	0	15.0 - 30.0	0
-60.0 - -45.0	0	30.0 - 45.0	2
-45.0 - -30.0	0	45.0 - 60.0	0
-30.0 - -15.0	0	60.0 - 75.0	0
-15.0 - 0.0	1	75.0 - 90.0	0

RESULTS OF LEAST SQUARES FIT

Major Transmissivity = 1364.53 gpd/ft
Minor Transmissivity = 302.86 gpd/ft
Mean Transmissivity = 642.85 gpd/ft
Direction of Major Transmissivity = 35.92 degrees
Storage Coefficient = 6.3E-05

The curve-matches for the four observation wells are plotted in the following figures:

Well	Figure
1054	D6-A1-32
1060	D6-A1-33
1061	D6-A1-34
1058	D6-A1-35

TS-MATCH COMPLETED

TABLE D6-A1-9
H-SAND PUMPING TEST
WATER LEVELS IN PUMPING AND MONITOR WELLS PRIOR TO COMMENCEMENT OF PUMPING TEST

Well	9 January 1989			10 January 1989		
Number	Time	Level (TOC)	Elevation (ft msl)	Time	Level (TOC)	Elevation (ft msl)
1056	13:38	230.07	5245.93	10:52	232.59	5243.41
1062	13:26	243.77	5241.23	11:06	242.99	5242.01
1063	13:20	223.61	5243.39	10:43	223.84	5243.16
1064	13:10	236.53	5243.47	10:46	236.79	5243.21
1065	13:30	234.75	5244.25	11:51	234.40	5243.60

Note: "Elevation (ft msl)" refers to the elevation of the top of the casing (TOC) and not that of the ground surface at the well.

TABLE D6-A1-10
H-SAND PUMPING TEST
HOURLY DISCHARGE RATES DURING PUMPING PHASE

Date	Time	Elapsed Time (1) (sec)	Flow Rate (gpm)
11-Jan-89	09:10	61	20.7
	11:00	78	16.2
	12:00	81	15.6
	12:40	56	22.5
	13:00	63	20.0
	14:00	76	16.6
	15:00	96	13.1
	16:00	55	23.0
	17:00	57	22.1
	18:00	58	21.7
	19:00	59	21.4
	20:00	59	21.4
	21:00	69	18.3
	22:10	52	24.2
	23:00	52	24.2
	24:00	53	23.3
12-Jan-89	01:00	53	23.3
	02:00	52	24.2
	03:00	52	24.2
	04:00	51	24.7
	05:00	53	23.3
	06:00	53	23.3
	07:00	53	23.3
	08:00	53	23.3
	09:00	53	23.3
	10:00	53	23.3
	11:00	53	23.3
	12:00	N.D.	----
	13:00	N.D.	----
	14:00	N.D.	----
	15:00	59	21.4
	16:00	59	22.1
	17:00	58	21.7
	18:00	58	21.7
	19:00	59	21.4
	20:00	58	21.7
	21:00	59	21.4
	22:00	58	21.7

23:00	59	21.4
00:00	59	21.4
01:00	60	21.0
02:00	62	20.3
03:00	63	20.0
04:00	63	20.0
05:00	68	18.5
06:00	68	18.5
07:00	73	17.3
07:10	Removed Sand Screen	
08:00	52	24.2
09:00	52	24.2
09:30	Replaced Sand Screen	
10:00	61	20.7
11:00	60	21.0
12:00	58	21.7
13:00-22:00	N.D.	—
23:00	53	23.8
00:00	54	23.3
01:00	54	23.3
02:00	53	23.8
03:00	54	23.3
04:00	54	23.3
05:00	54	23.3
06:00	54	23.3
07:00	53	23.8

Notes: (1) "Elapsed Time (sec)" refers to the time required to fill a 21 gallon garbage pail. Freezing of the discharge line totalizer necessitated use of this method to determine mean hourly flow rates.

TABLE D6-A1-11

H-SAND PUMPING TEST

WELL DRAWDOWN VERSUS TIME FOR PUMPING AND RECOVERY PHASES

This Appendix presents water level data as a function of time for the five wells used in the H-sand pumping test. Data are presented in the following order:

Well Number	Test Phase	Duration
1056	Pumping	4,300 min
1056	Recovery	16,270 min
1062	Pumping	4,300 min
1062	Recovery	16,270 min
1063	Pumping	4,300 min
1063	Recovery	16,270 min
1064	Pumping	4,300 min
1064	Recovery	16,270 min
1065	Pumping	4,300 min
1065	Recovery	16,270 min

TABLE D6-A1-12
E-SAND PUMPING TEST
WATER LEVELS IN PUMPING AND MONITOR WELLS PRIOR TO COMMENCEMENT OF PUMPING TEST

Well		26 January 1989	
Number	Time	Level (TOC)	Elevation (ft msl)
1054	11:00	295.10	5228.90
1055	11:12	254.25	5227.75
1058	12:06	258.85	5228.15
1060	11:25	249.40	5227.60
1061	11:37	254.15	5227.85

Note: "Elevation (ft msl)" refers to the elevation of the top of the casing (TOC) and not that of the ground surface at the well.

TABLE D6-A1-13
E-SAND PUMPING TEST
HOURLY DISCHARGE RATES DURING PUMPING PHASE

Date	Time	Totalizer Reading (gal)	Flow Rate (gpm)
27-Jan-89	11:00	0239417.5	22.2
	12:00	0240740.0	20.5
	Valve adjusted to increase flow		21.8
	13:00	0242170.0	21.5
	14:00	0243440.0	21.5
	15:00	0244750.0	22.7
	16:10	0246360.0	22.5
	17:00	0247530.0	22.5
	18:00	0248880.0	22.4
	19:00	0250220.0	22.5
	20:00	0251550.0	22.3
	21:00	0252990.0	22.0
	22:00	0254120.0	22.3
	23:00	0255460.0	21.9
28-Jan-89	00:00	0256740.0	21.8
	01:00	0258060.0	21.5
	02:00	0259440.0	23.0
	03:00	0260820.0	22.8
	04:00	0026190.0	22.6
	05:00	0263530.0	22.7
	06:00	0264910.0	23.0
	07:00	0266290.0	22.9
	08:00	0267660.0	22.8
	09:00	0269020.0	22.8
	10:00	0270390.0	22.7
	11:00	0271880.0	23.0
	12:00	0273220.0	22.9
	13:00	0274630.0	22.6
	14:00	0275990.0	22.6
	15:00	0277370.0	22.7
	16:00	0278770.0	22.7
	17:00	0280100.0	22.5
	18:00	0281460.0	22.2
	19:00	0282790.0	22.3
	20:00	0284140.0	22.0
	21:00	0285500.0	21.9
	22:00	0286640.0	22.1
	23:00	0287980.0	22.0

29-Jan-89	00:00	0289290.0	21.8
	01:00	0290600.0	21.8
	02:00	0291950.0	22.1
	03:00	0293270.0	21.8
	04:00	0294540.0	21.8
	05:00	0295840.0	21.6
	06:00	0297160.0	21.8
	07:00	0298460.0	21.7
	08:00	0299770.0	21.8
	09:00	0301090.0	21.8
	10:00	0302380.0	21.6
	11:00	0303780.0	21.6
	12:00	0305150.0	21.6
	13:00	0306480.0	21.7
	14:00	0307740.0	21.9
	15:00	0308990.0	21.8
	16:00	0310370.0	21.8
	17:00	0311670.0	21.6
	18:00	0313010.0	21.8
	19:00	0314340.0	21.7
	20:00	0315600.0	21.7
	21:00	0316920.0	21.7
	22:00	0318120.0	21.8
	23:00	0319400.0	22.0
30-Jan-89	00:00	0320710.0	21.8
	01:00	0322040.0	21.9
	02:00	0323330.0	21.8
	03:00	0324610.0	21.8
	04:00	0325940.0	21.8
	05:00	0327260.0	21.8
	06:00	0328570.0	21.8
	07:00	0329900.0	21.8
	08:00	0331160.0	21.8
	09:00	0332500.0	21.8
	10:00	0333770.0	21.7
	11:00	0335060.0	21.8

Note: Mean flow rate = (335060-239417)/4320 minutes = 22.1 gpm.

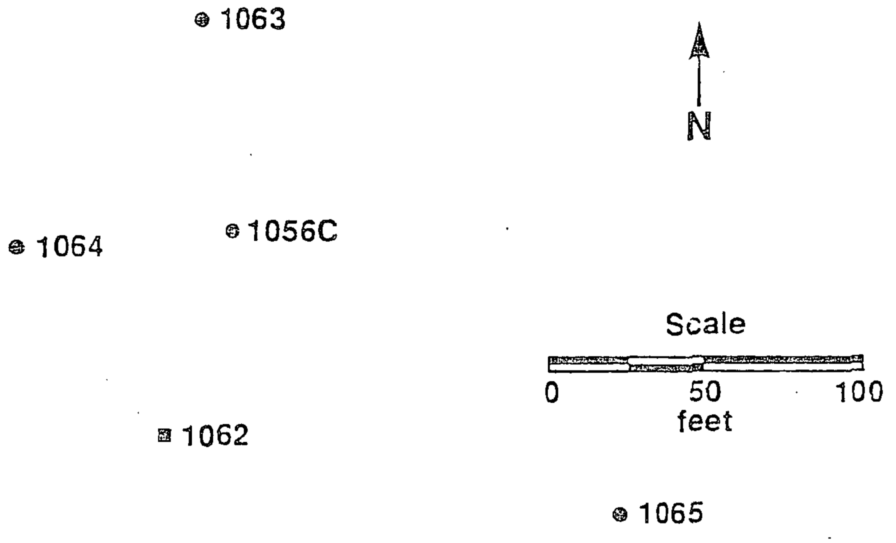
TABLE D6-A1-14

E-SAND PUMPING TEST

WELL DRAWDOWN VERSUS TIME FOR PUMPING AND RECOVERY PHASES

This Appendix presents water level data as a function of time for the five wells used in the E-sand pumping test. Data are presented in the following order:

Well Number	Test Phase	Duration
1054	Pumping	4,300 min
1054	Recovery	12,910 min
1055	Pumping	4,300 min
1055	Recovery	12,910 min
1058	Pumping	4,300 min
1058	Recovery	12,910 min
1060	Pumping	4,300 min
1060	Recovery	12,910 min
1061	Pumping	4,300 min
1061	Recovery	12,910 min



H-Sand
Distance between Wells

1062	1063	1064	1065	
69.3	68.7	69.1	151.6	1065C
	134.5	79.2	145.0	1062
		92.3	205.9	1063
			209.9	1064

Figure D6-A1-1. H-Sand Pumping Test 1 Well Configuration

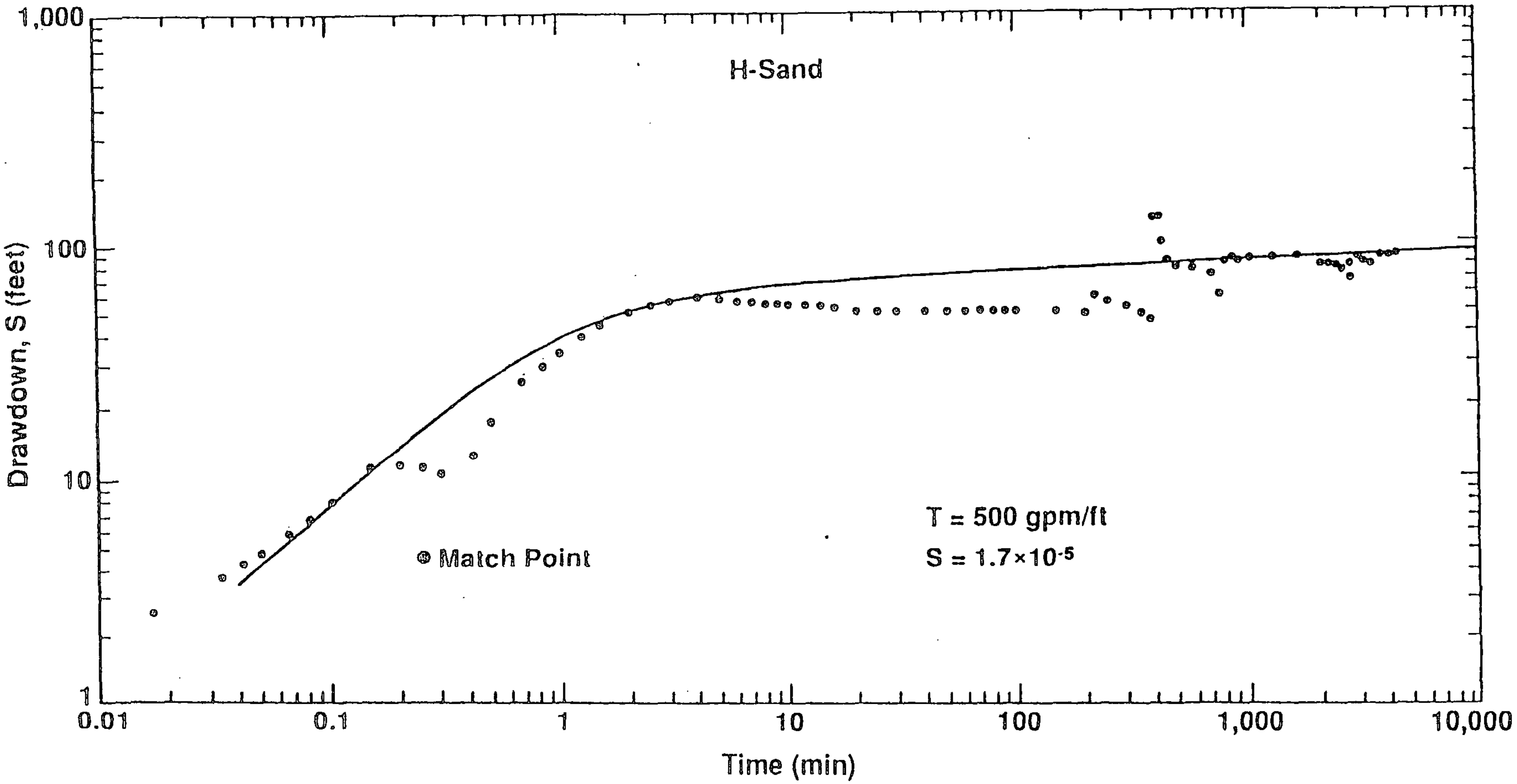


Figure D6-A1-2. SMC Pumping Test 1, Well 1056 (Log-Log, Pumping Phase)

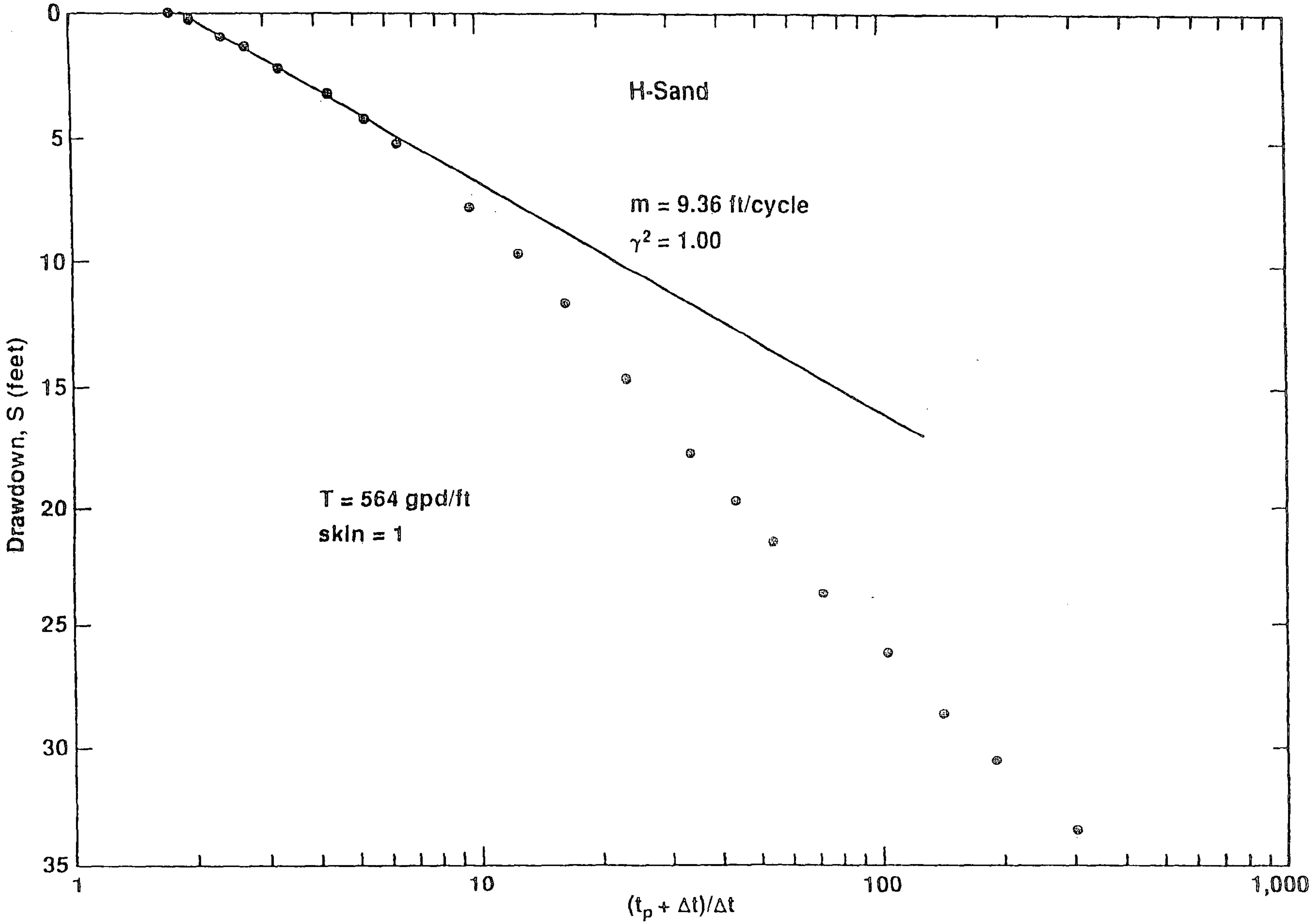


Figure D6-A1-3. SMC Pumping Test 1, Well 1056 (Semi-Log, Recovery Phase)

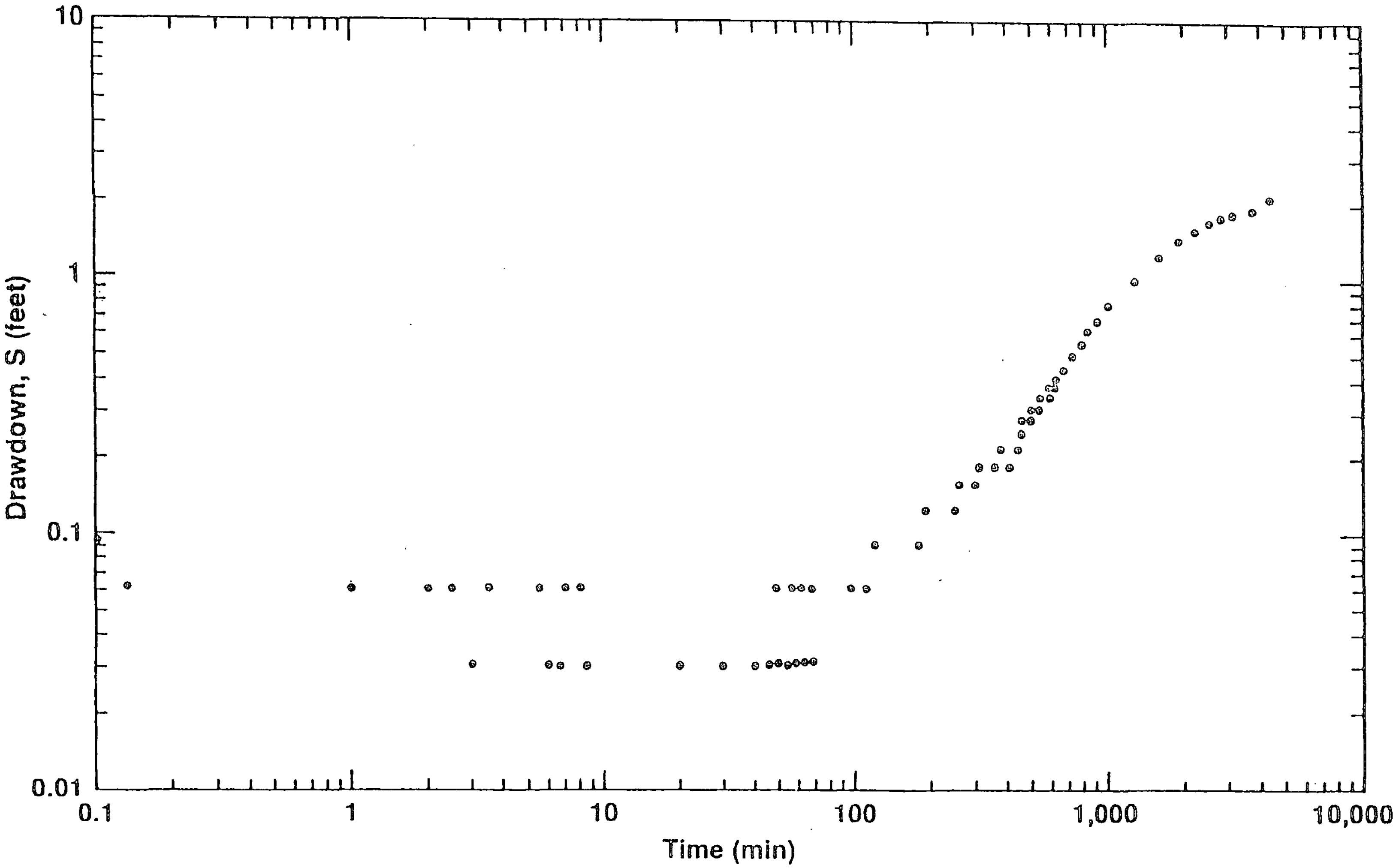


Figure D6-A1-4. SMC Pumping Test 1, Well 1062 (Log-Log, Pumping Phase)

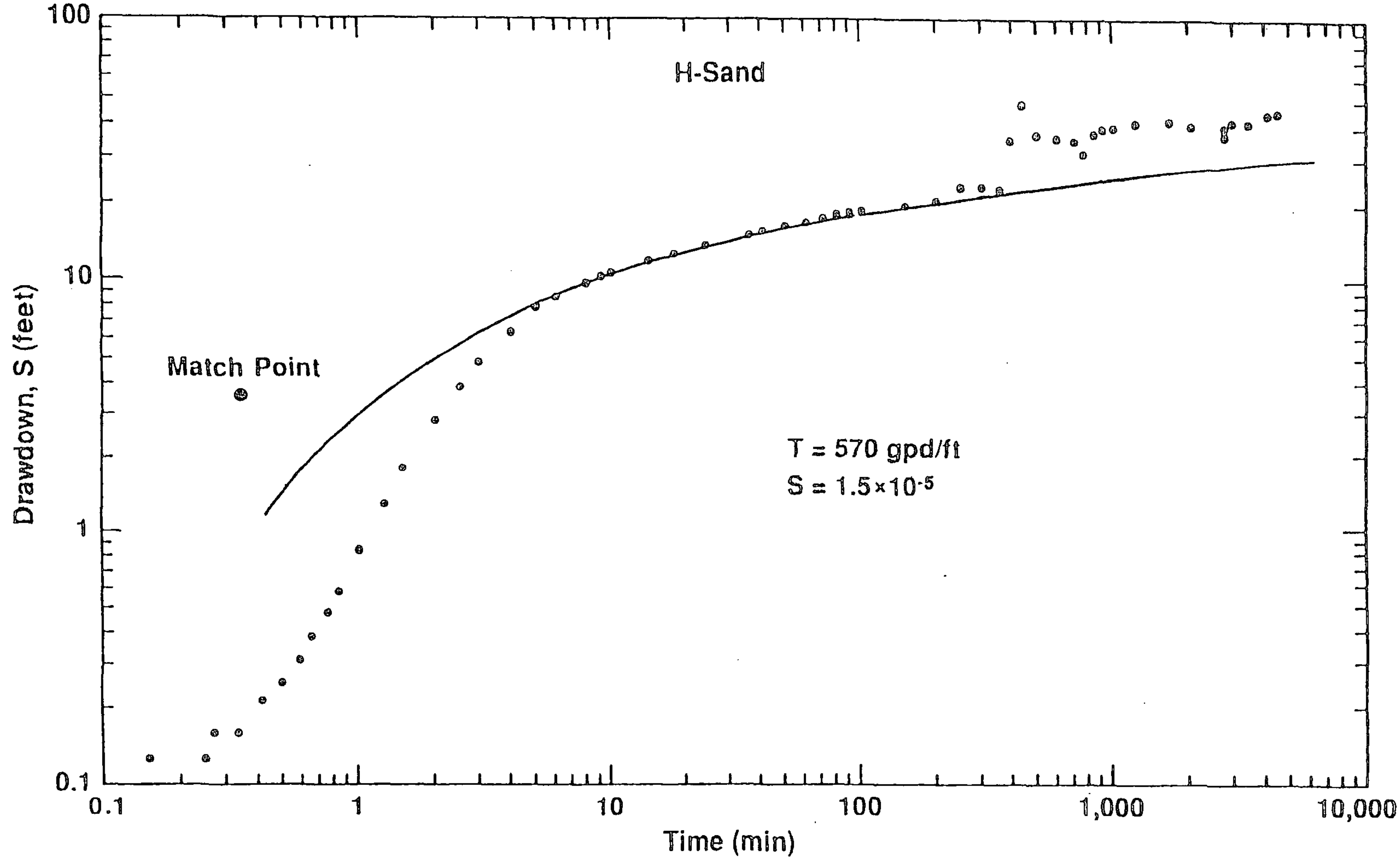


Figure D6-A1-5. SMC Pumping Test 1, Well 1063 (Log-Log, Pumping Phase)

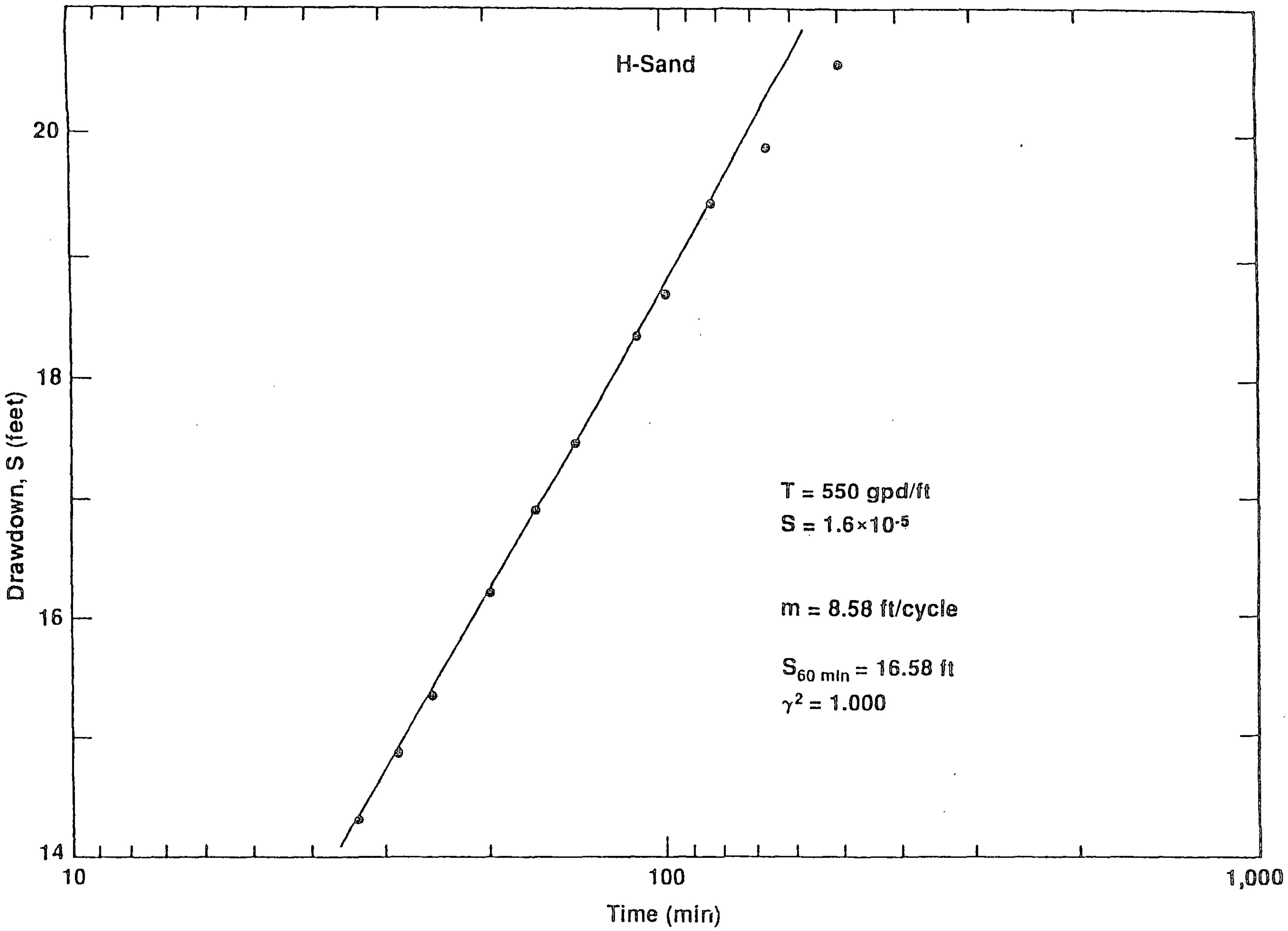


Figure D6-A1-6. SMC Pumping Test 1, Well 1063 (Semi-Log, Pumping Phase)

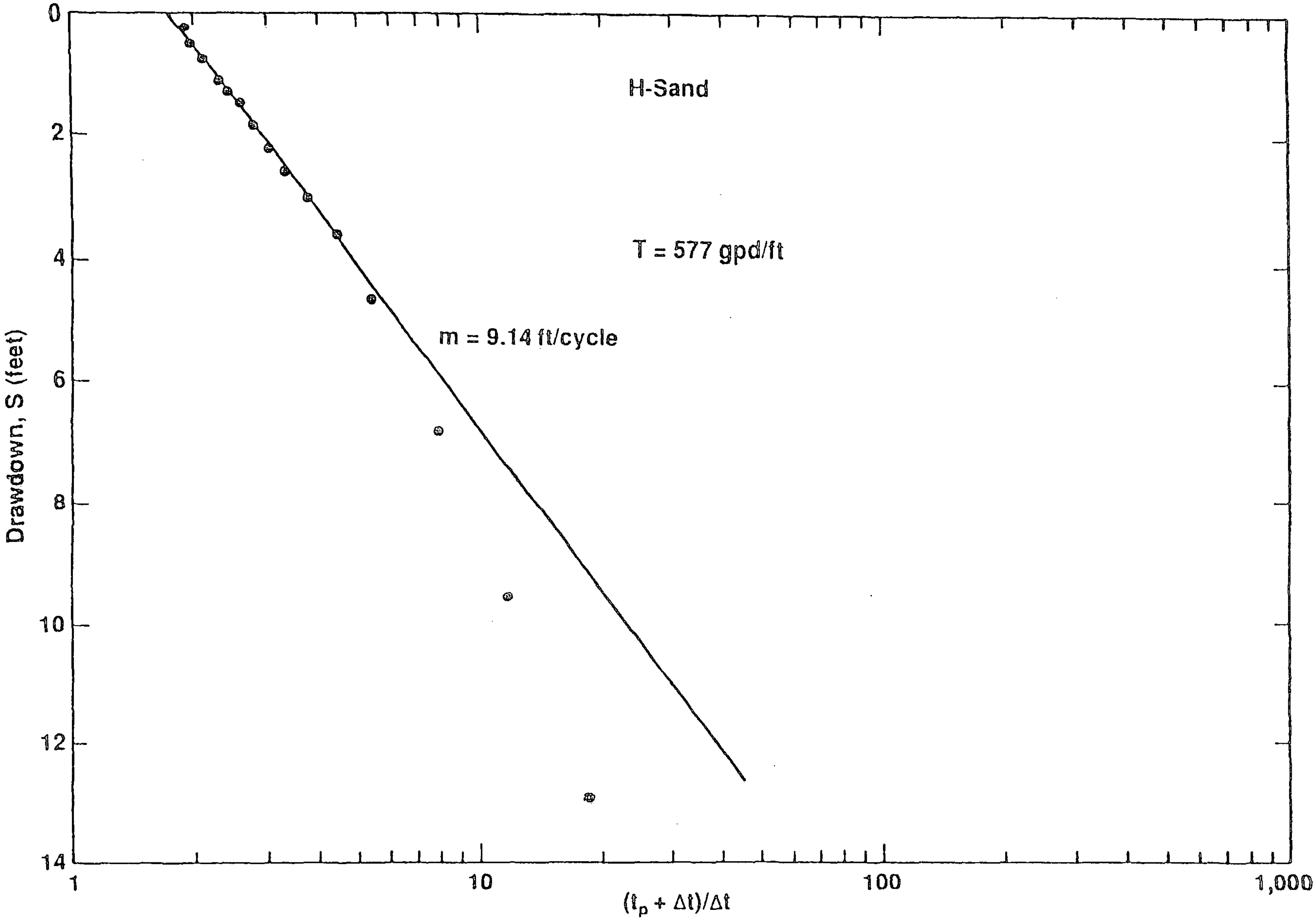


Figure D6-A1-7. SMC Pumping Test 1, Well 1063 (Semi-Log, Recovery Phase)

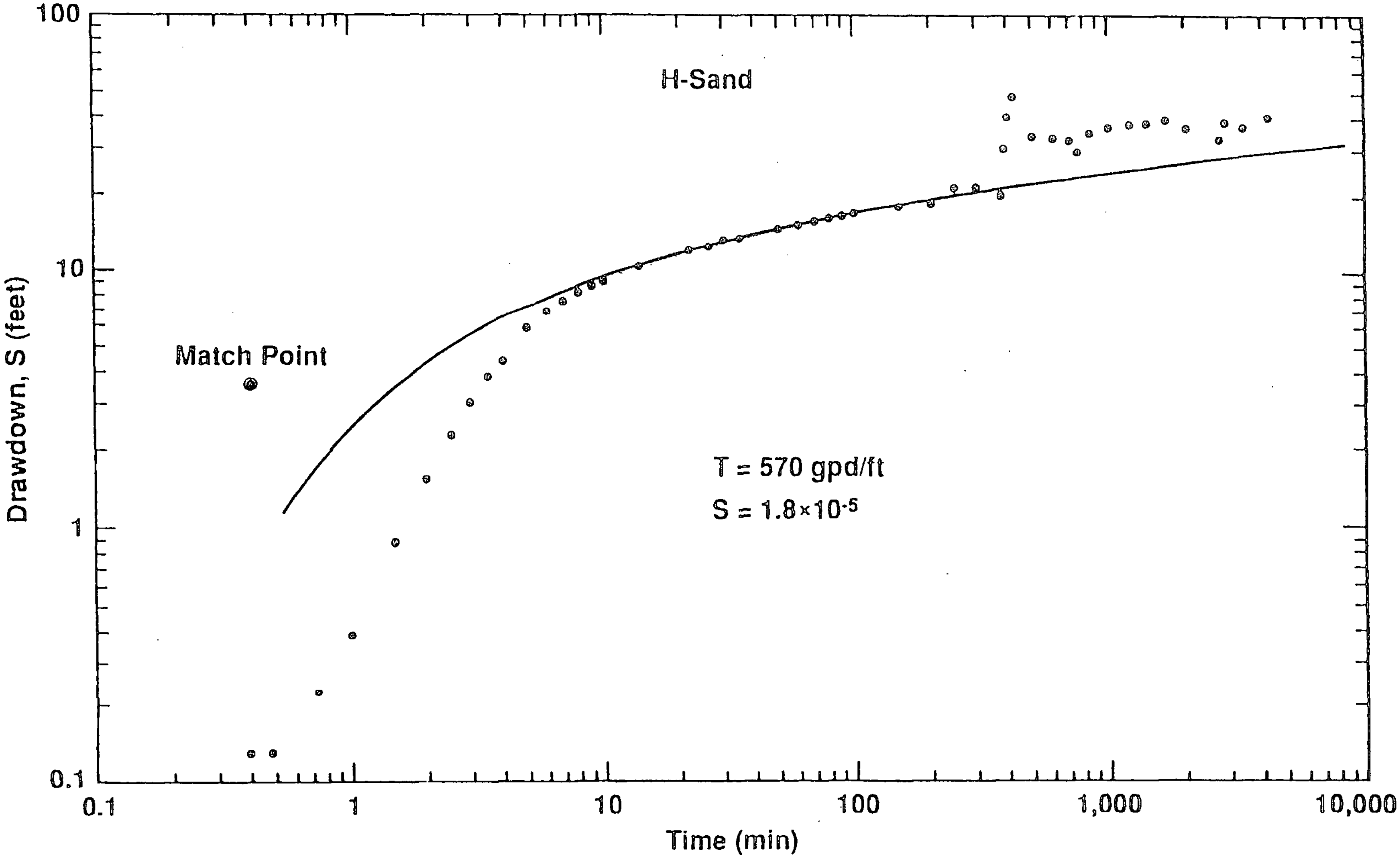


Figure D6-A1-8. SMC Pumping Test 1, Well 1064 (Log-Log, Pumping Phase)

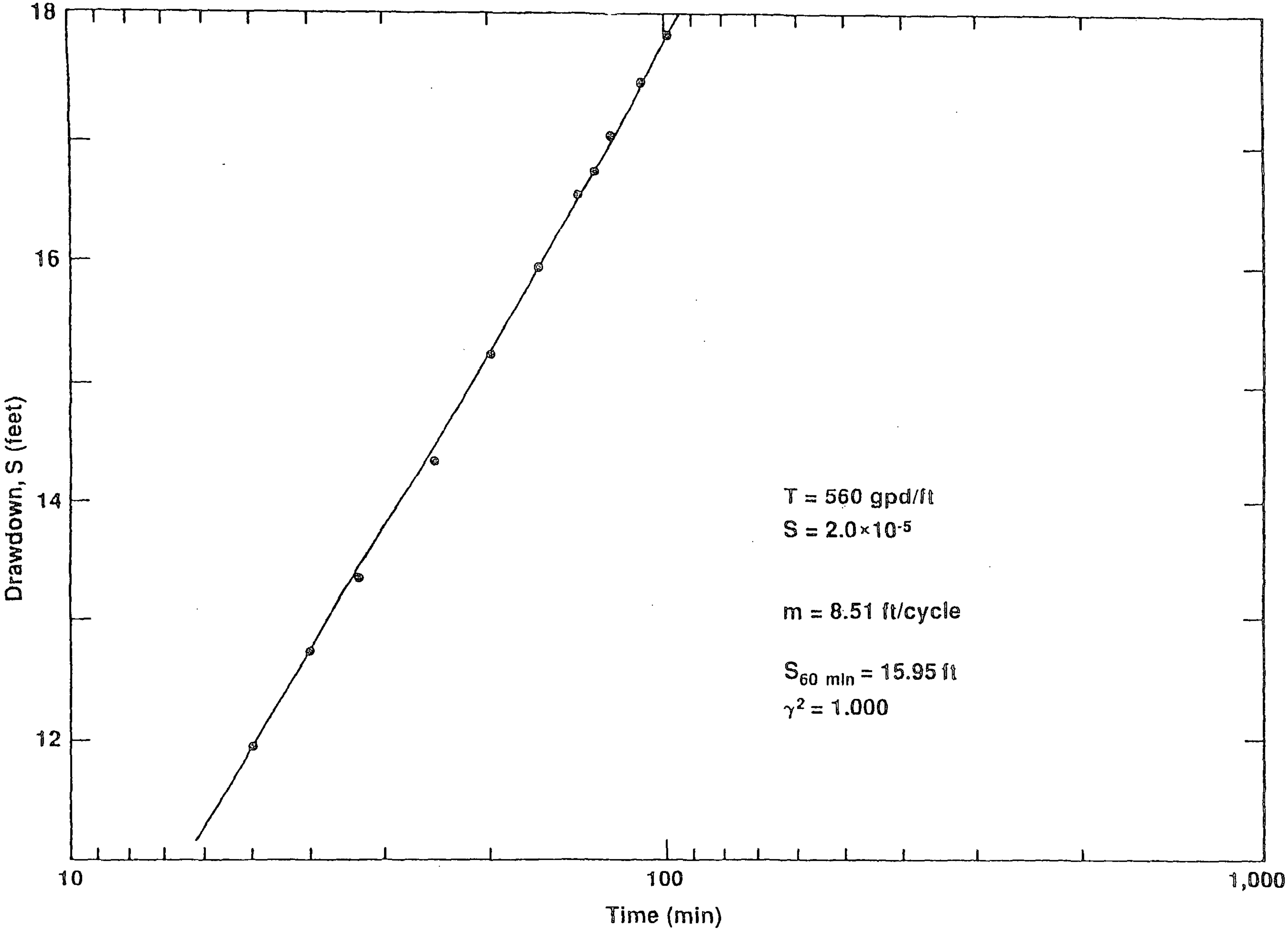


Figure D6-A1-9. SMC Pumping Test 1, Well 1064 (Semi-Log, Pumping Phase)

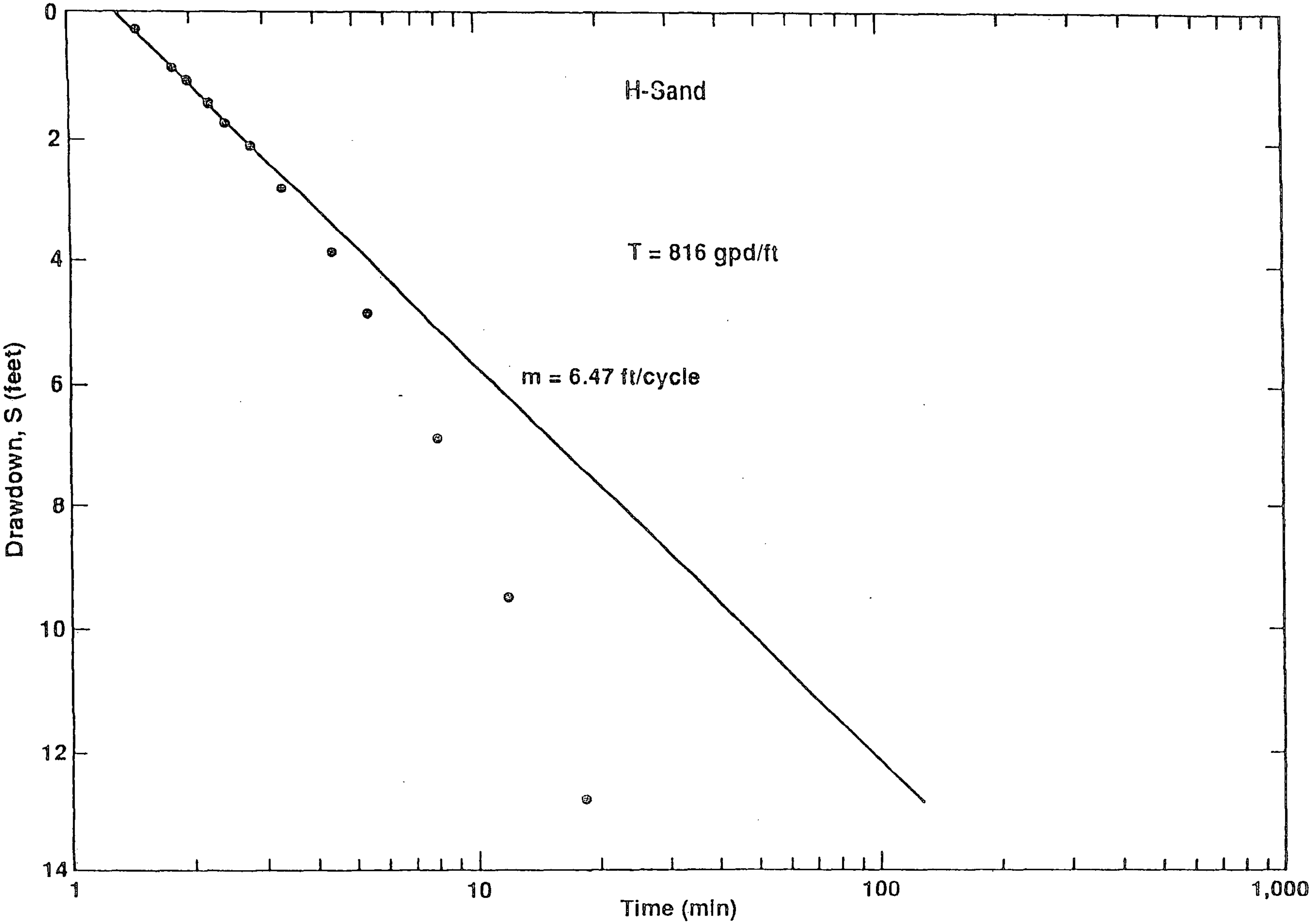


Figure D6-A1-10. SMC Pumping Test 1, Well 1064 (Semi-Log, Recovery Phase)

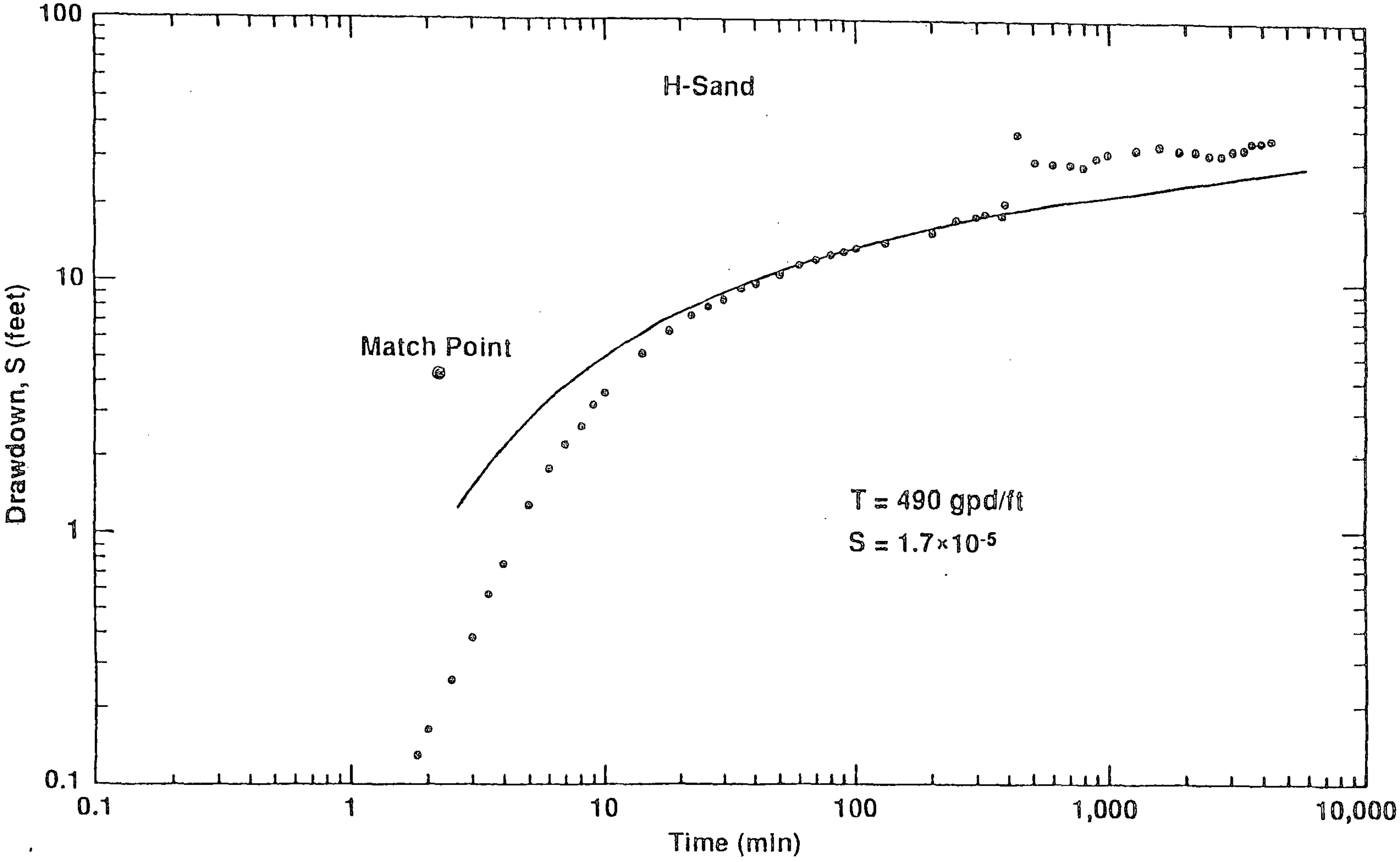


Figure D6-A1-11. SMC Pumping Test 1, Well 1065 (Log-Log, Pumping Phase)

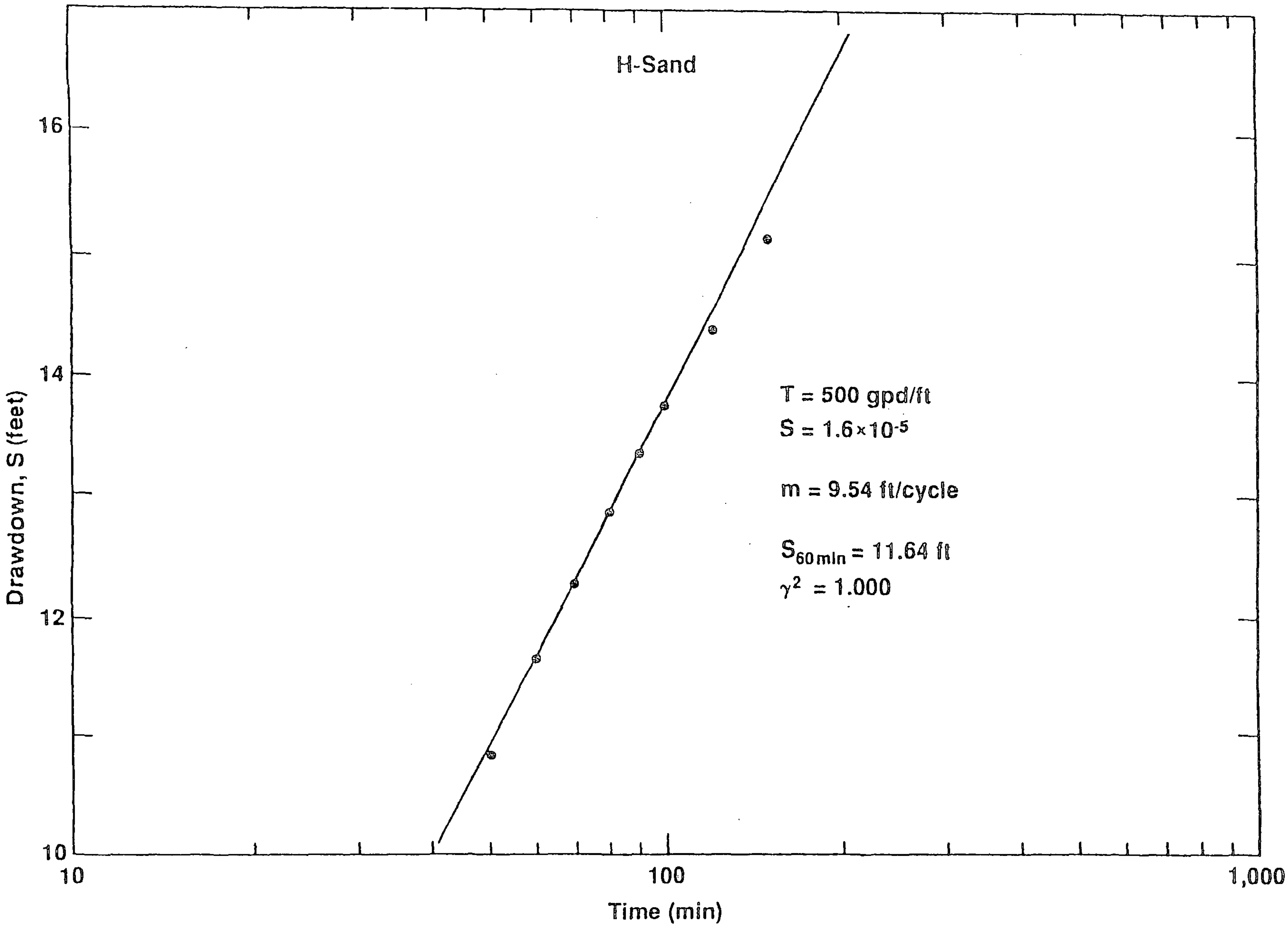


Figure D6-A1-12. SMC Pumping Test 1, Well 1065 (Semi-Log, Pumping Phase)

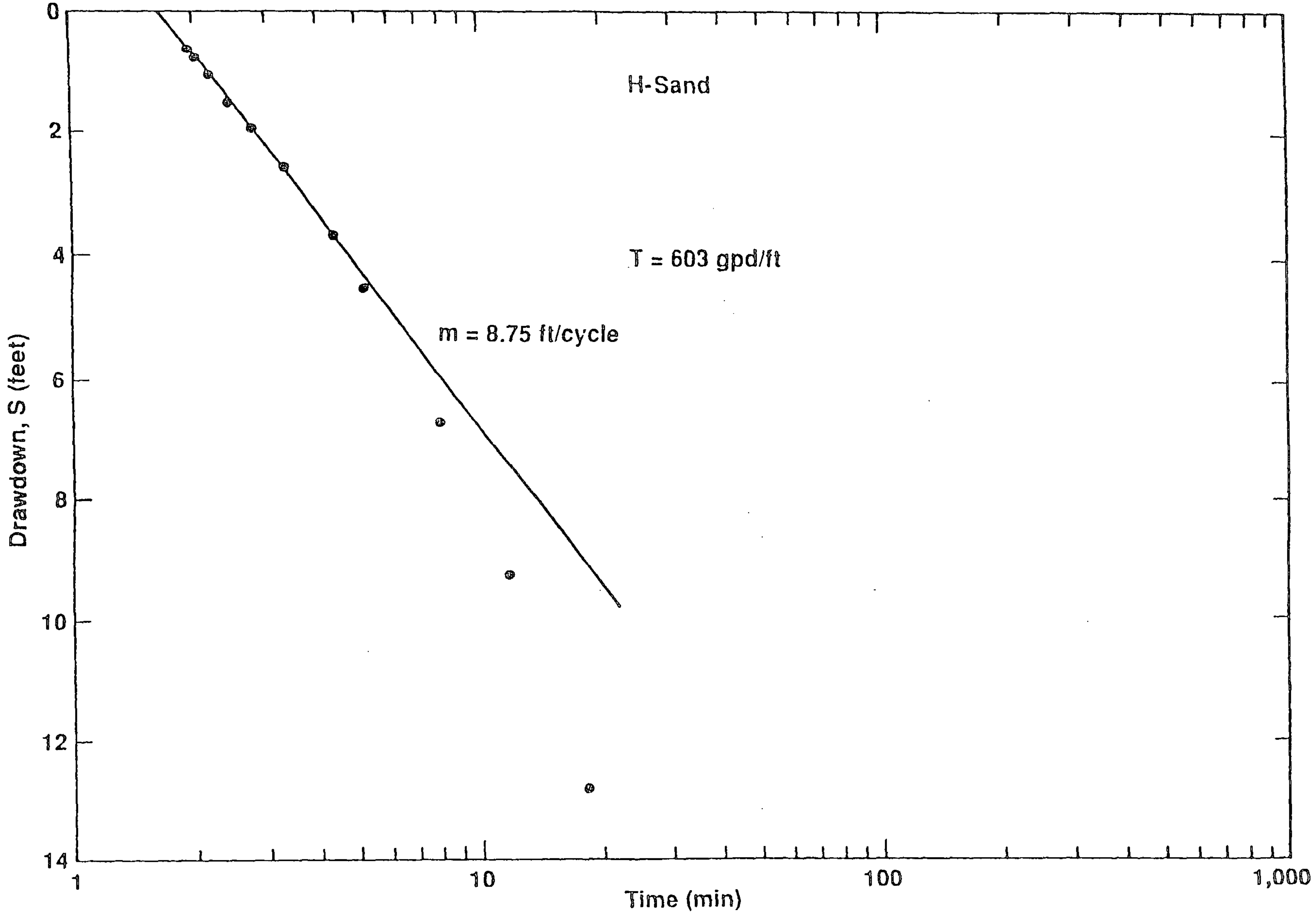


Figure D6-A1-13. SMC Pumping Test 1, Well 1065 (Semi-Log, Recovery Phase)

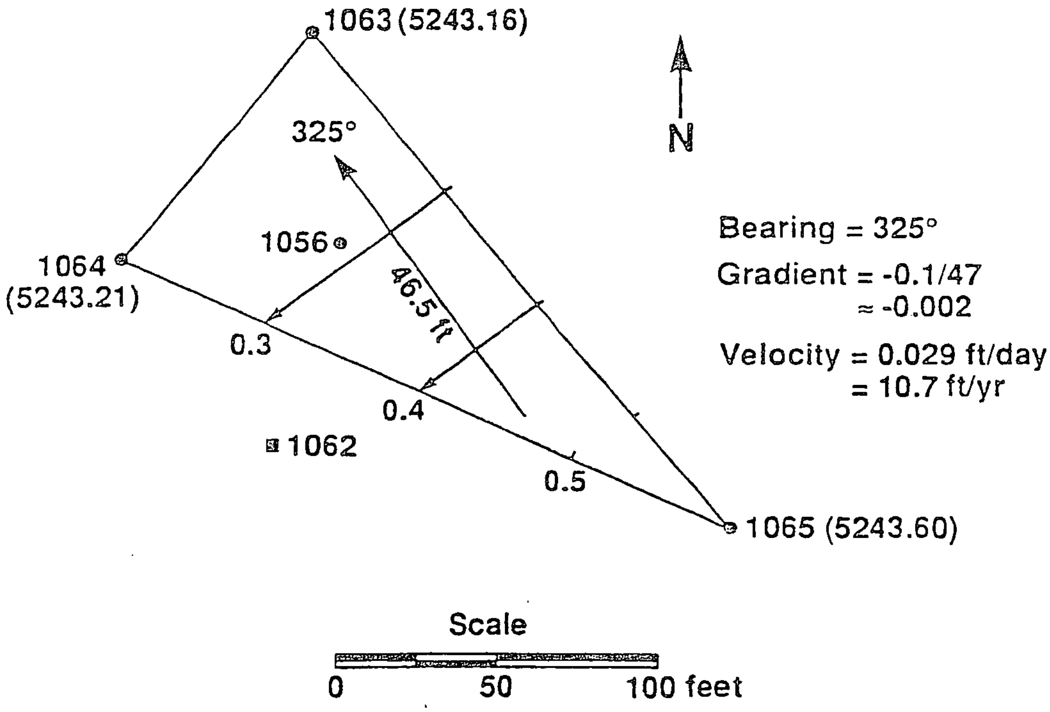
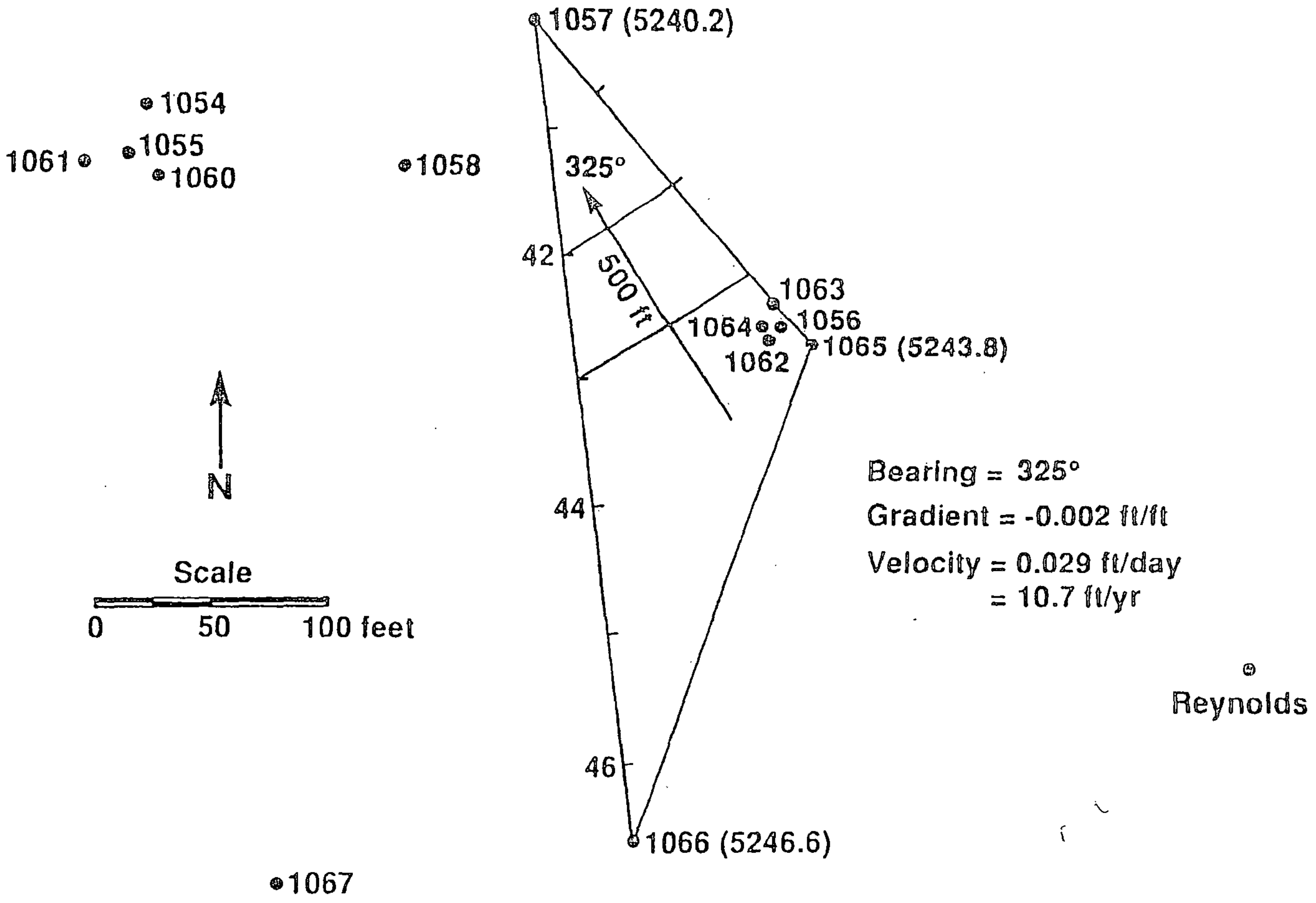


Figure D6-A1-14. Determination of H-Sand Aquifer Direction and Gradient of Ground Water Flow: 10 January 1989

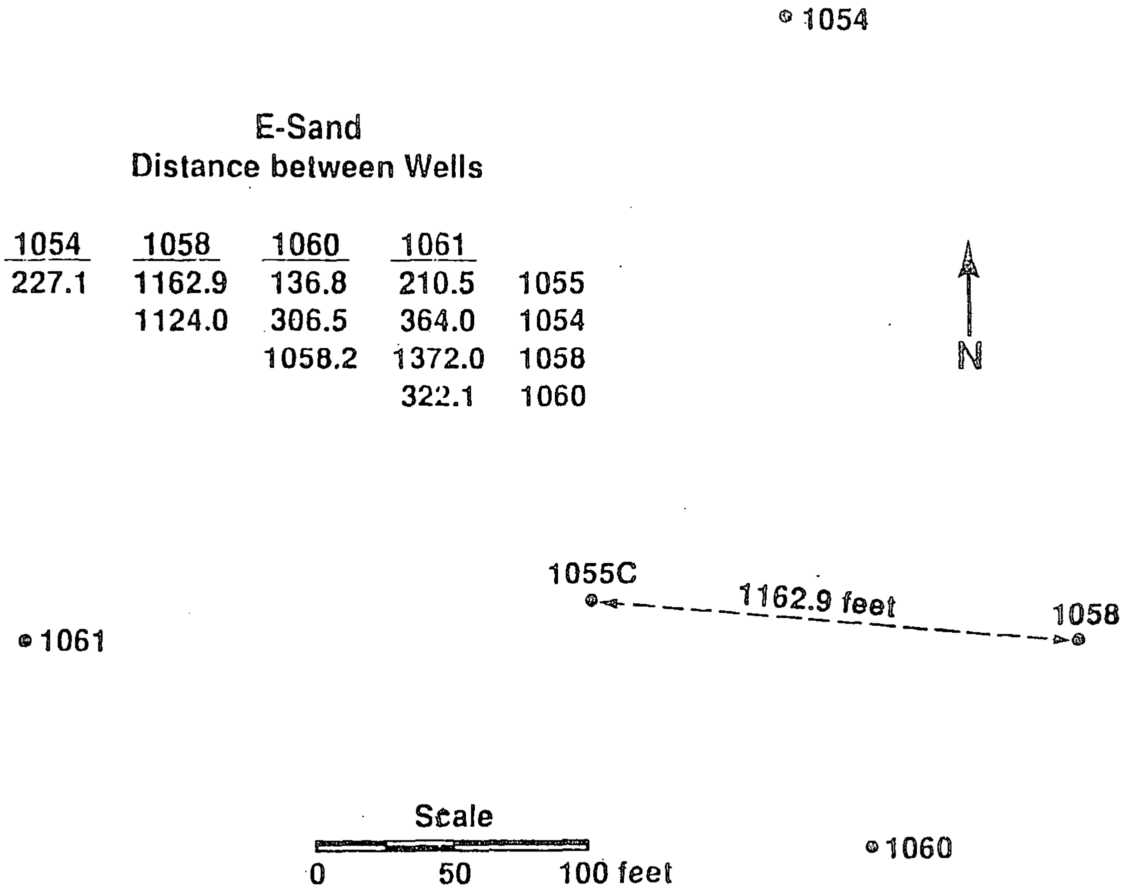


Bearing = 325°

Gradient = -0.002 ft/ft

Velocity = 0.029 ft/day
= 10.7 ft/yr

Figure D6-A1-15. Determination of H-Sand Aquifer Direction and Gradient of Ground Water Flow: 6-7 July



E-Sand
Distance between Wells

1054	1058	1060	1061	
227.1	1162.9	136.8	210.5	1055
	1124.0	306.5	364.0	1054
		1058.2	1372.0	1058
			322.1	1060

Figure D6-A1-16. E-Sand Pumping Test 2 Well Configuration.

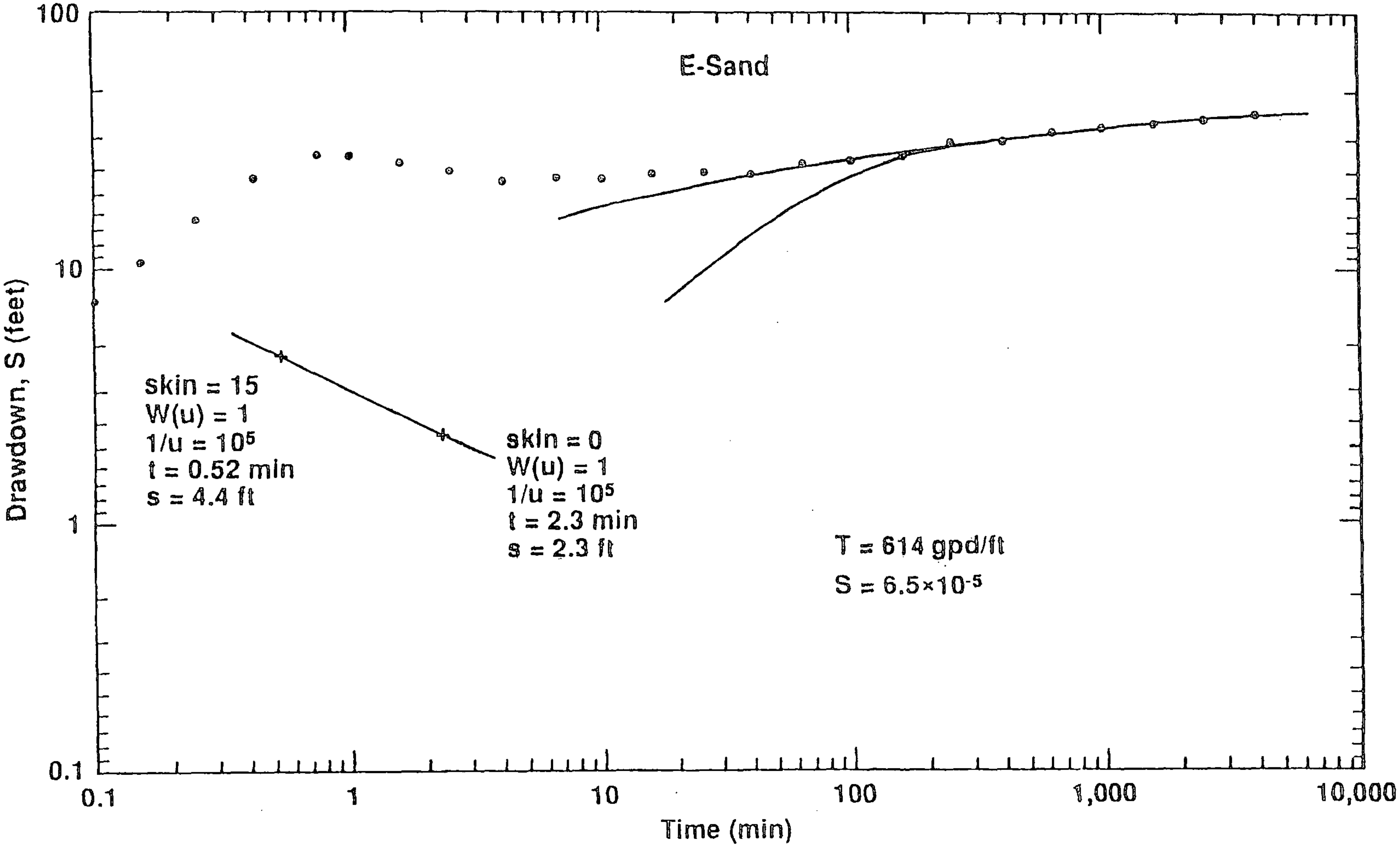


Figure D6-A1-17. SMC Pumping Test 2, Well 1055 (Log-Log, Pumping Phase)

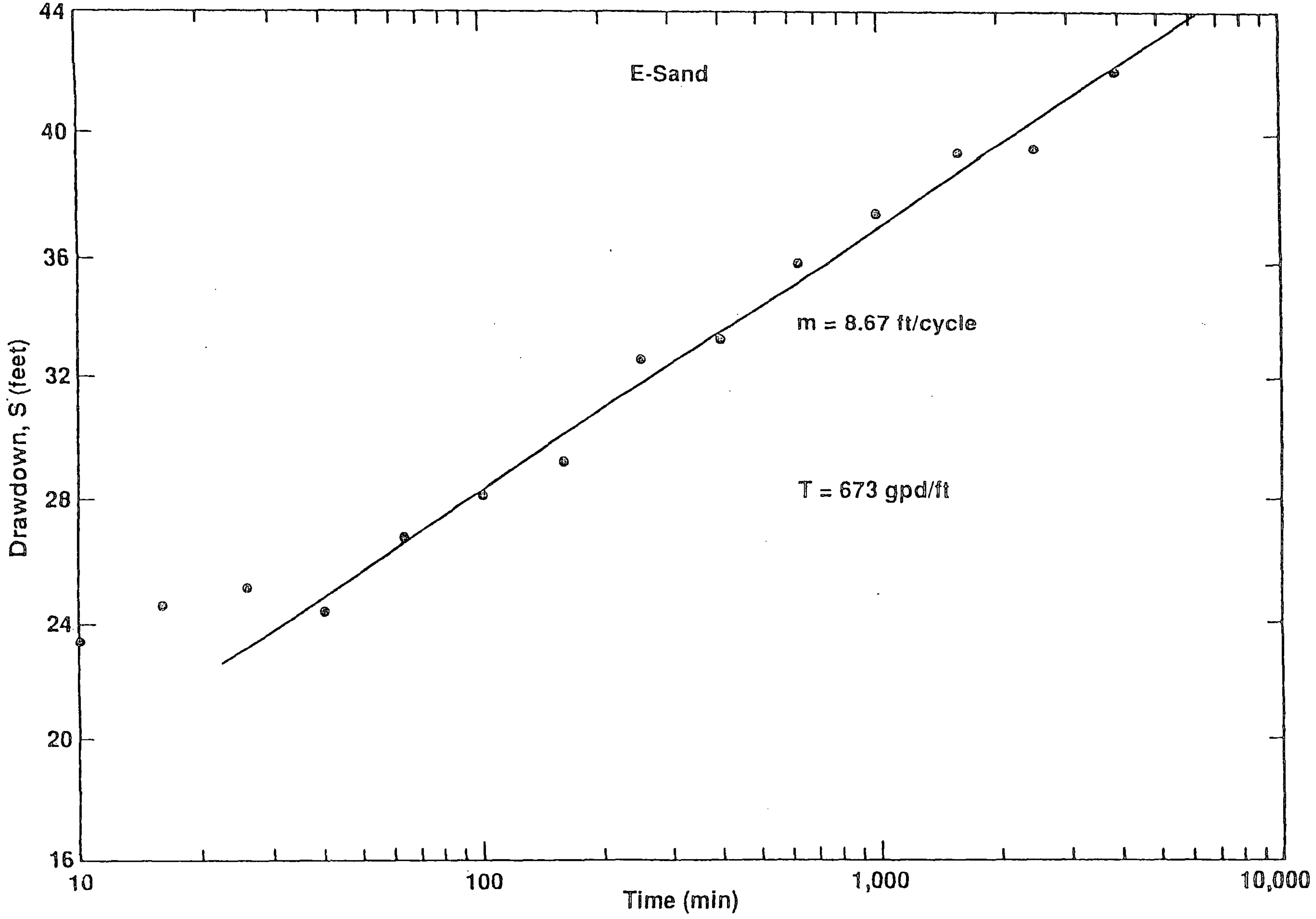


Figure D6-A1-18. SMC Pumping Test 2, Well 1055 (Semi-Log, Pumping Phase)

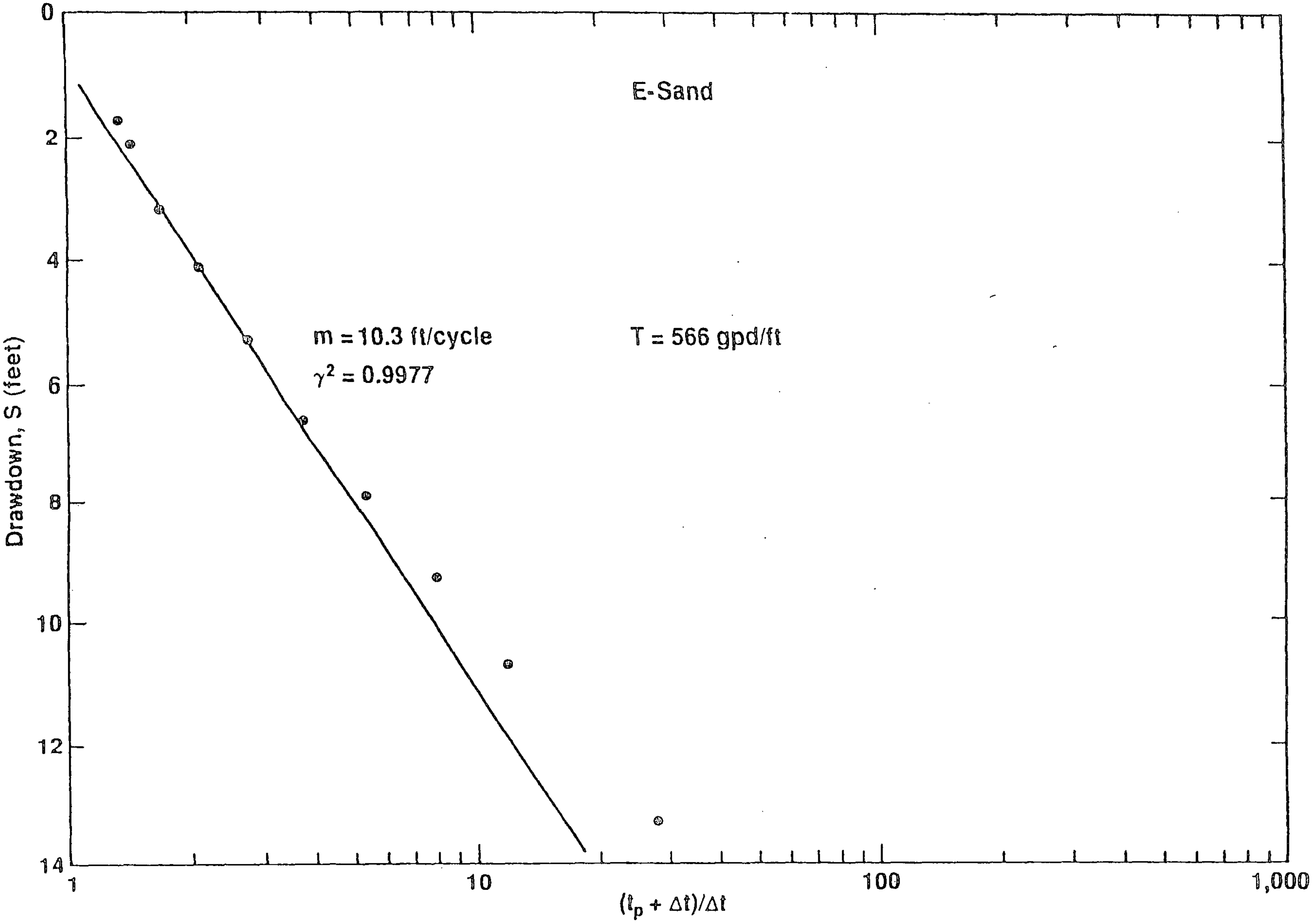


Figure D6-A1-19. SMC Pumping Test 2, Well 1055 (Semi-Log, Recovery Phase)

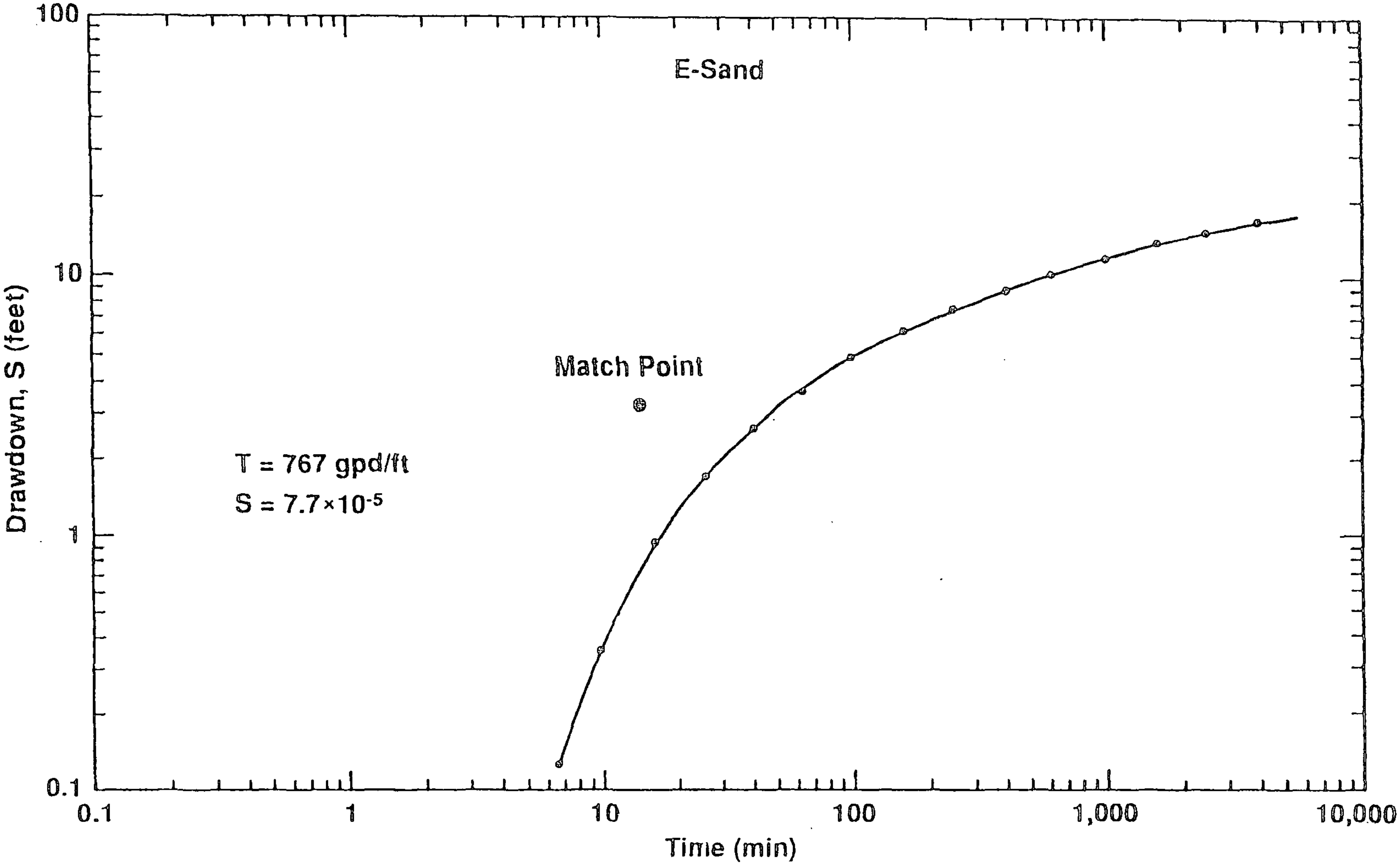


Figure D6-A1-20. SMC Pumping Test 2, Well 1054 (Log-Log, Pumping Phase)

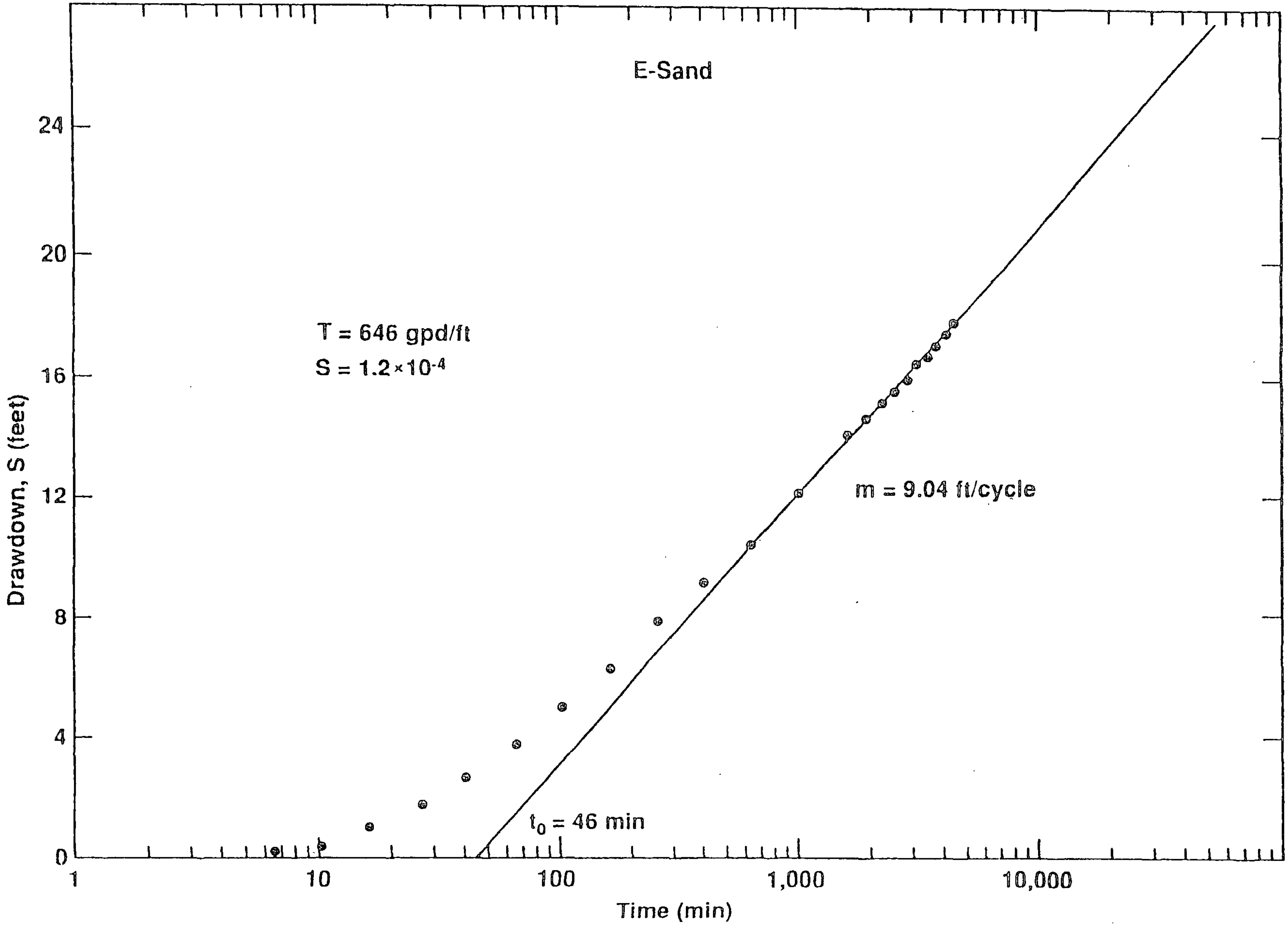


Figure D6-A1-21. SMC Pumping Test 2, Well 1054 (Semi-Log, Pumping Phase)

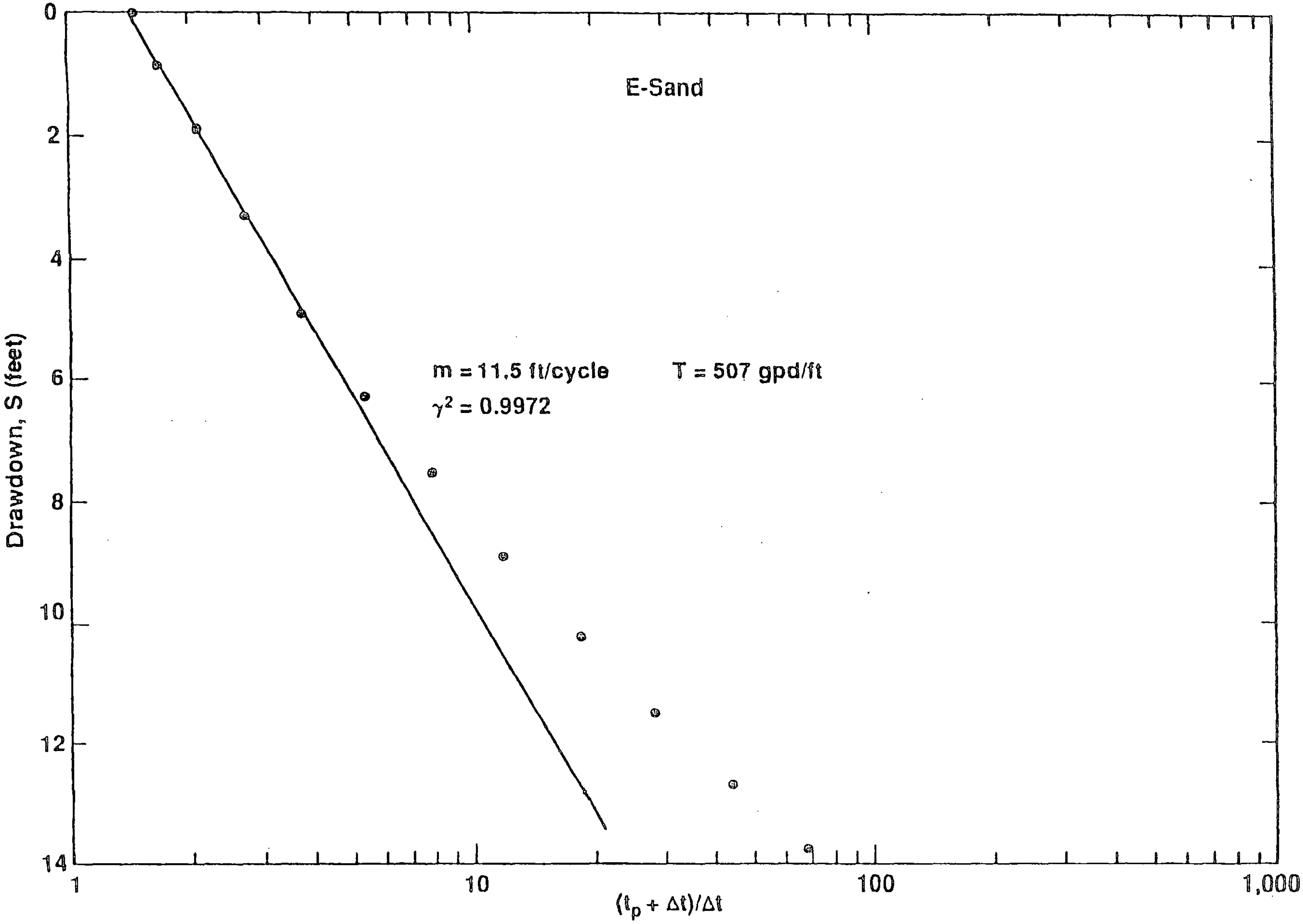


Figure D6-A1-22. SMC Pumping Test 2, Well 1054 (Semi-Log, Recovery Phase)

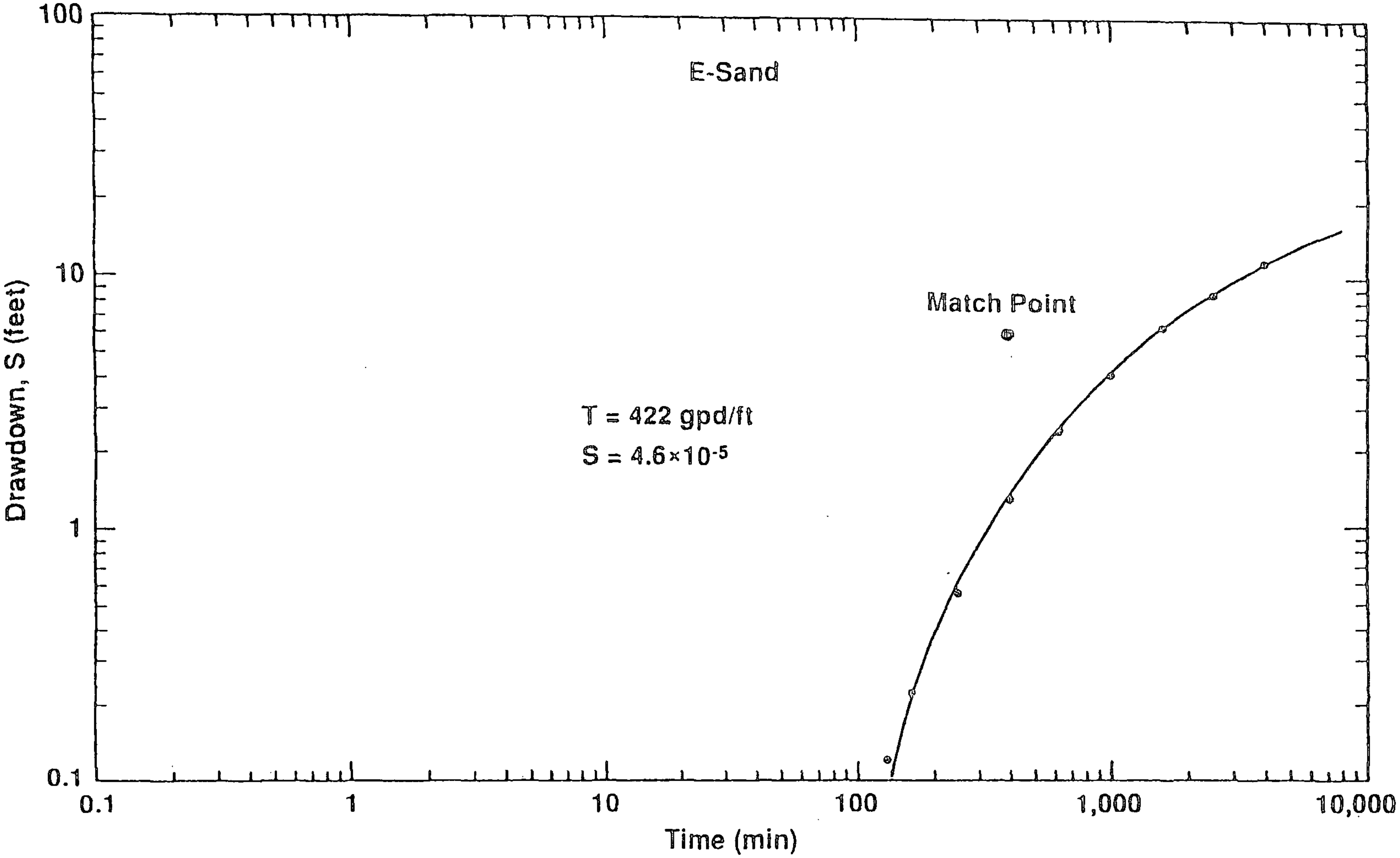


Figure D6-A1-23. SMC Pumping Test 2, Well 1058 (Log-Log, Pumping Phase)

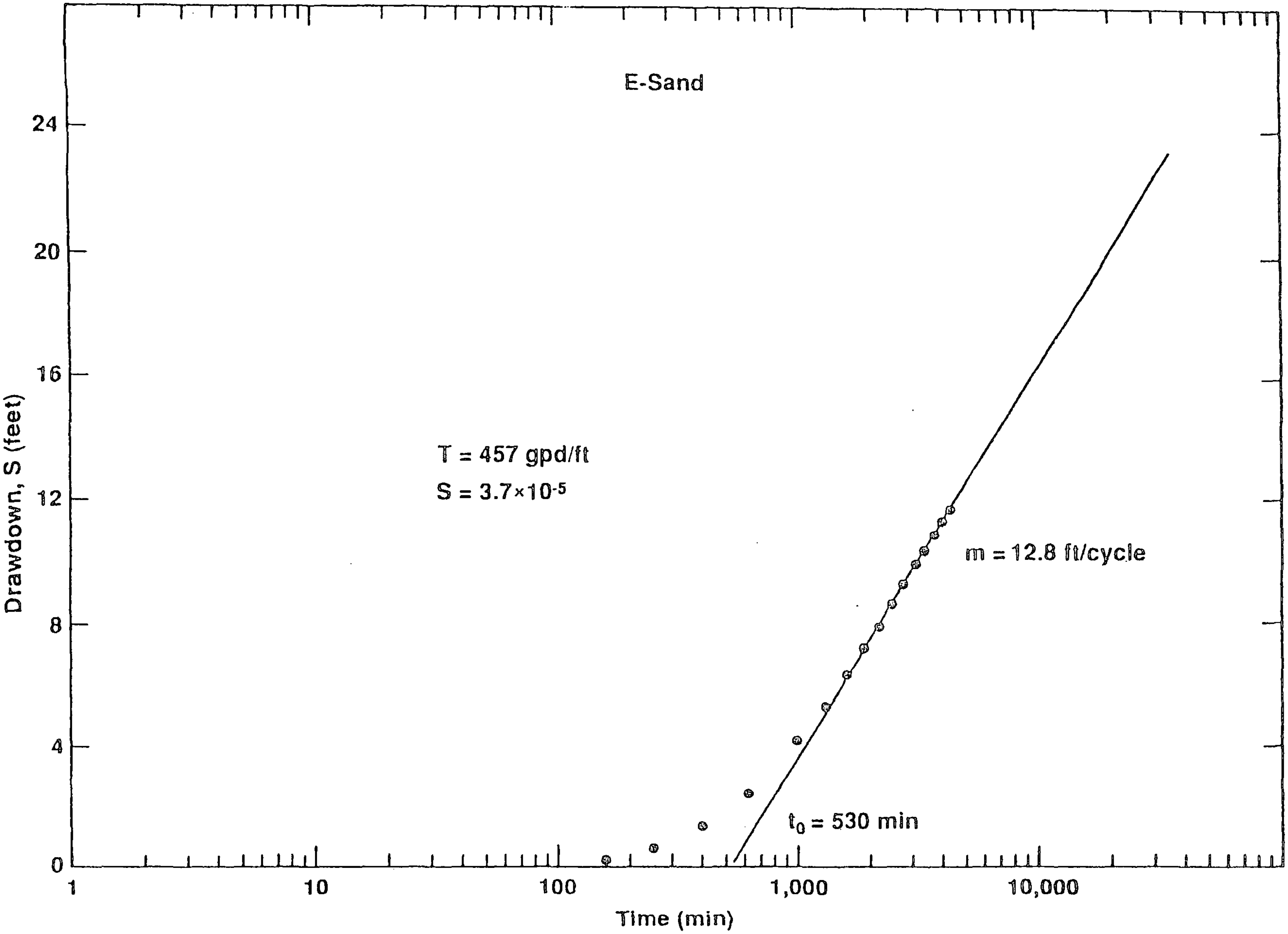


Figure D6-A1-24: SMC Pumping Test 2, Well 1058 (Semi-log, Pumping Phase)

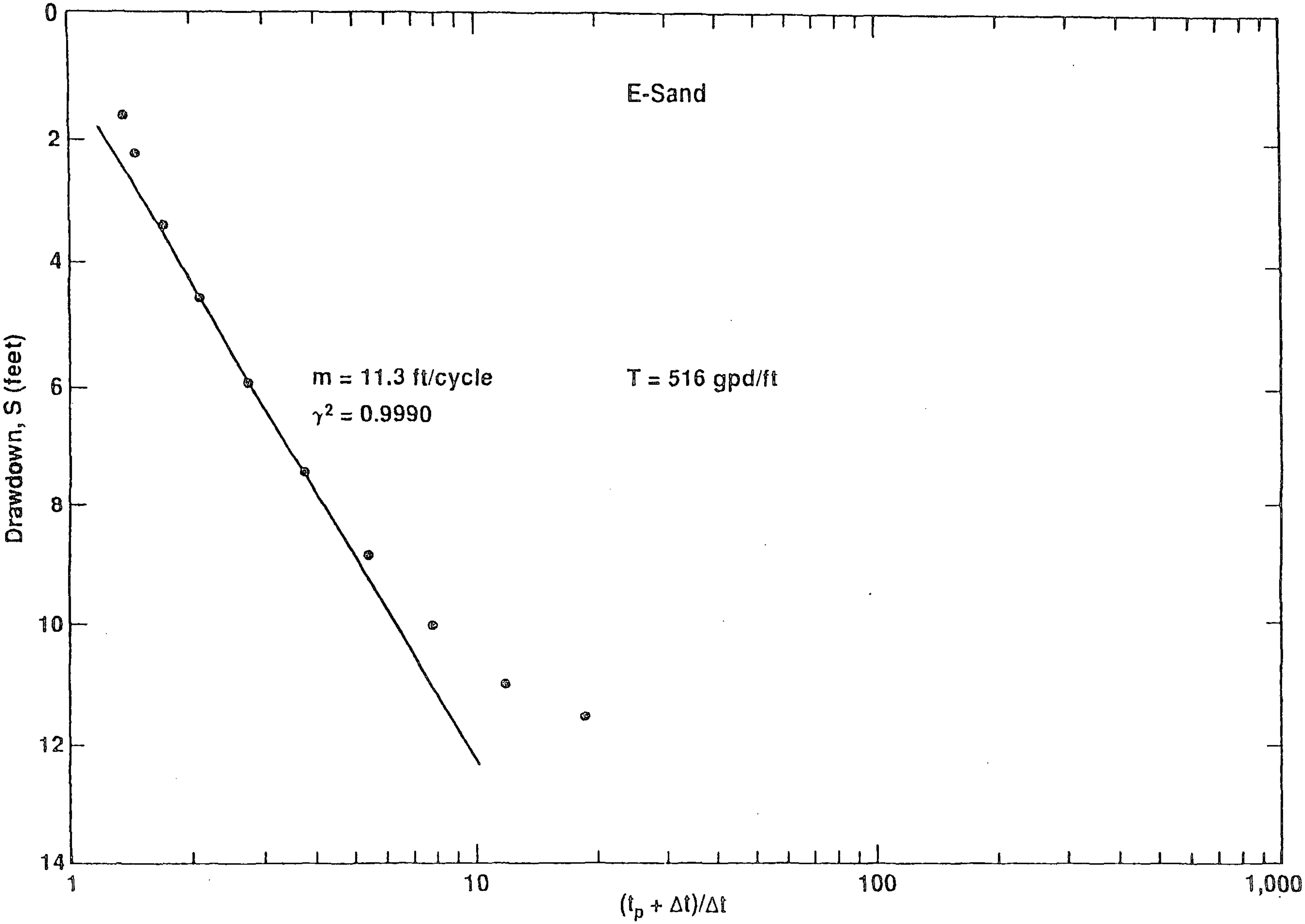


Figure D6-A1-25. SMC Pumping Test 2, Well 1058 (Semi-Log, Recovery Phase)

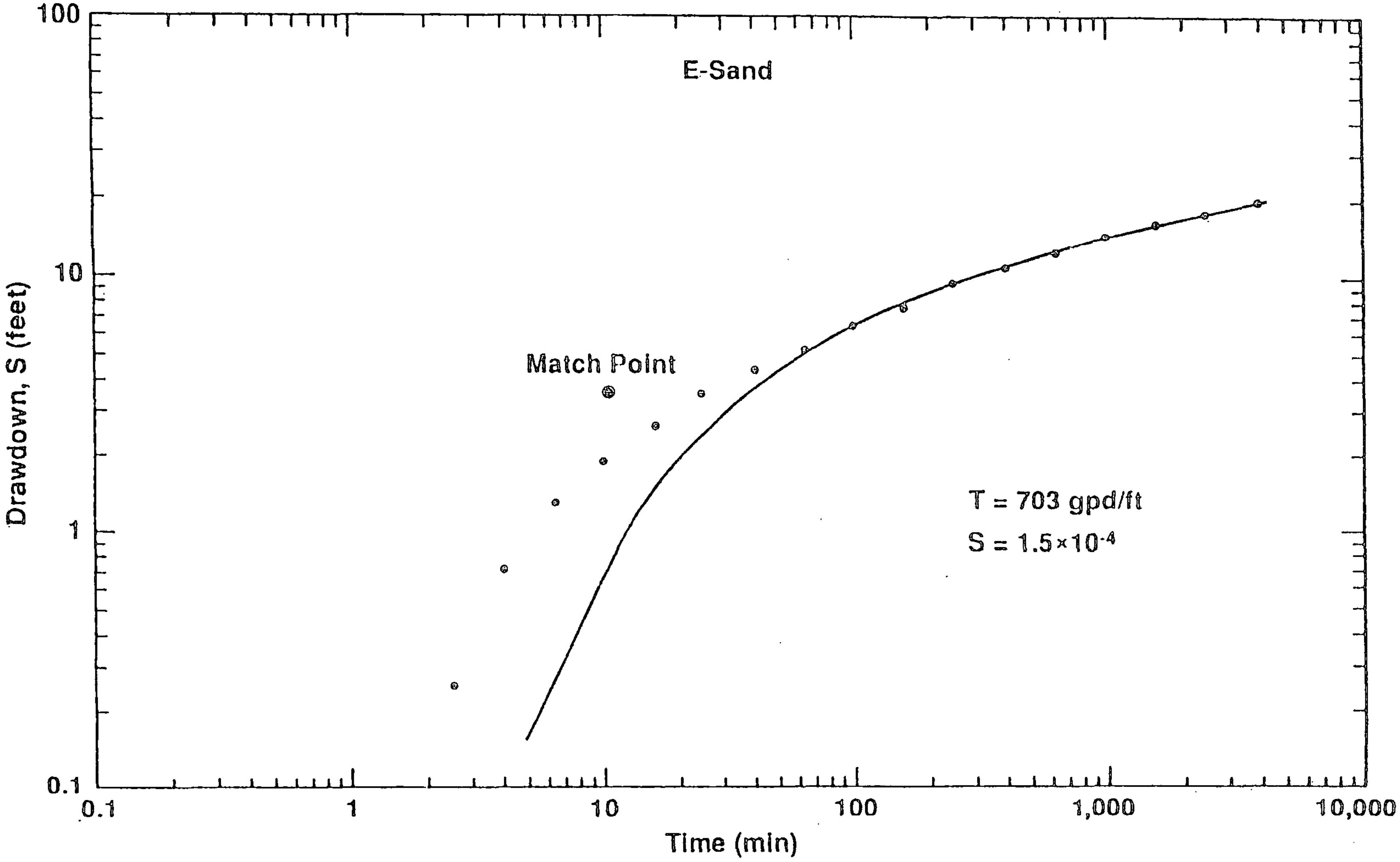


Figure D6-A1-26. SMC Pumping Test 2, Well 1060 (Log-Log, Pumping Phase)

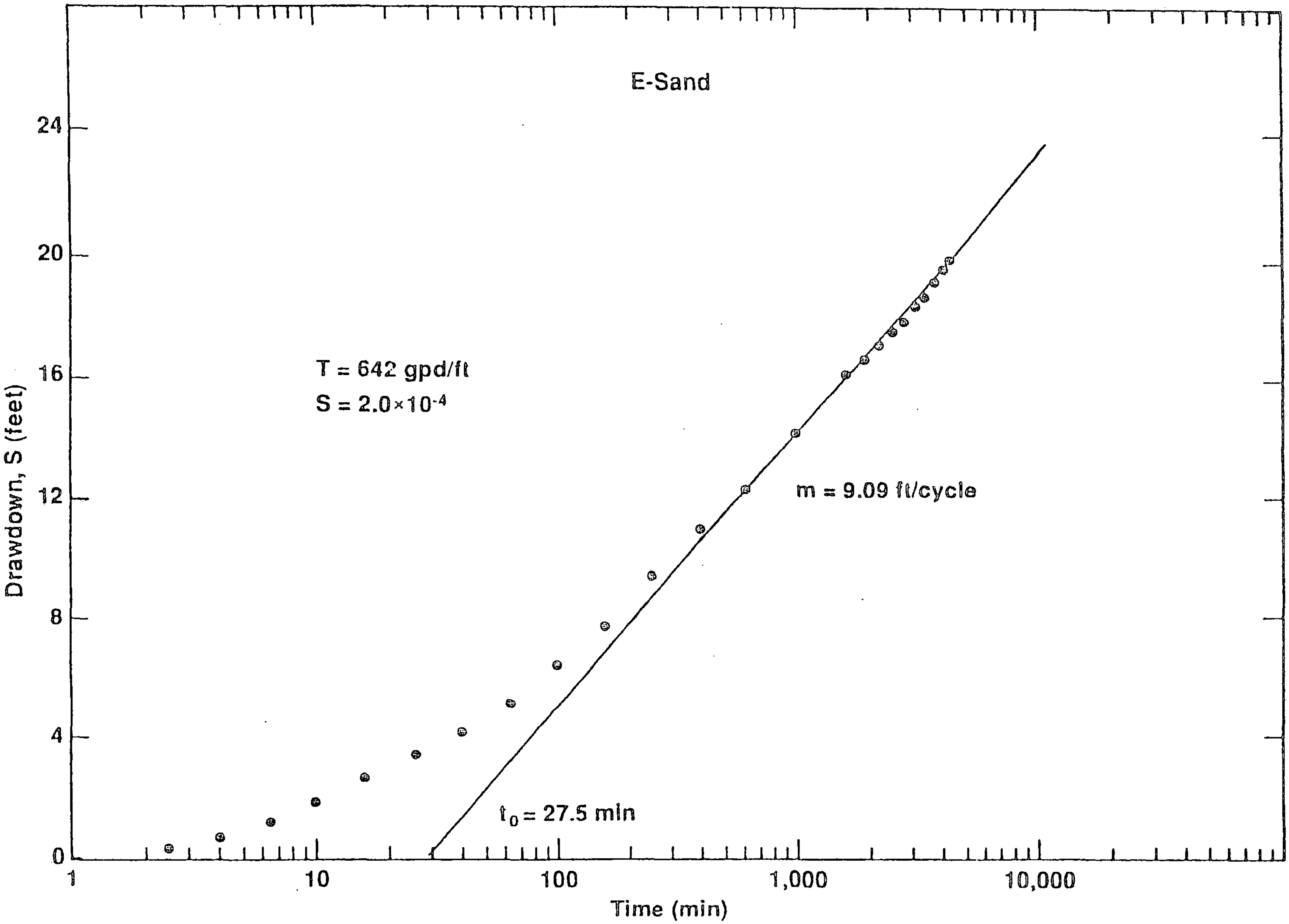


Figure D6-A1-27. SMC Pumping Test 2, Well 1060 (Semi-Log, Pumping Phase)

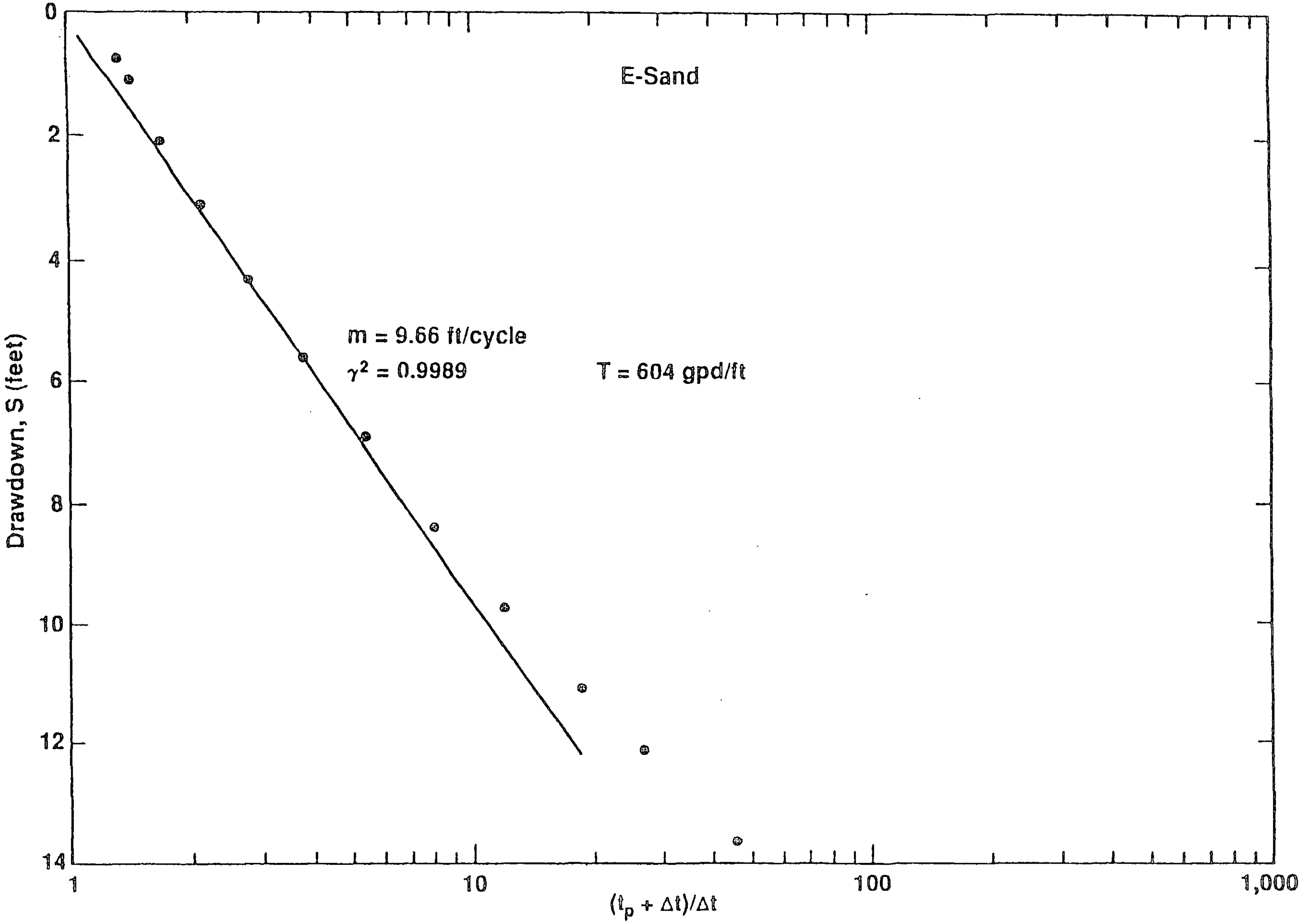


Figure D6-A1-28. SMC Pumping Test 2, Well 1060 (Semi-Log, Recovery Phase)

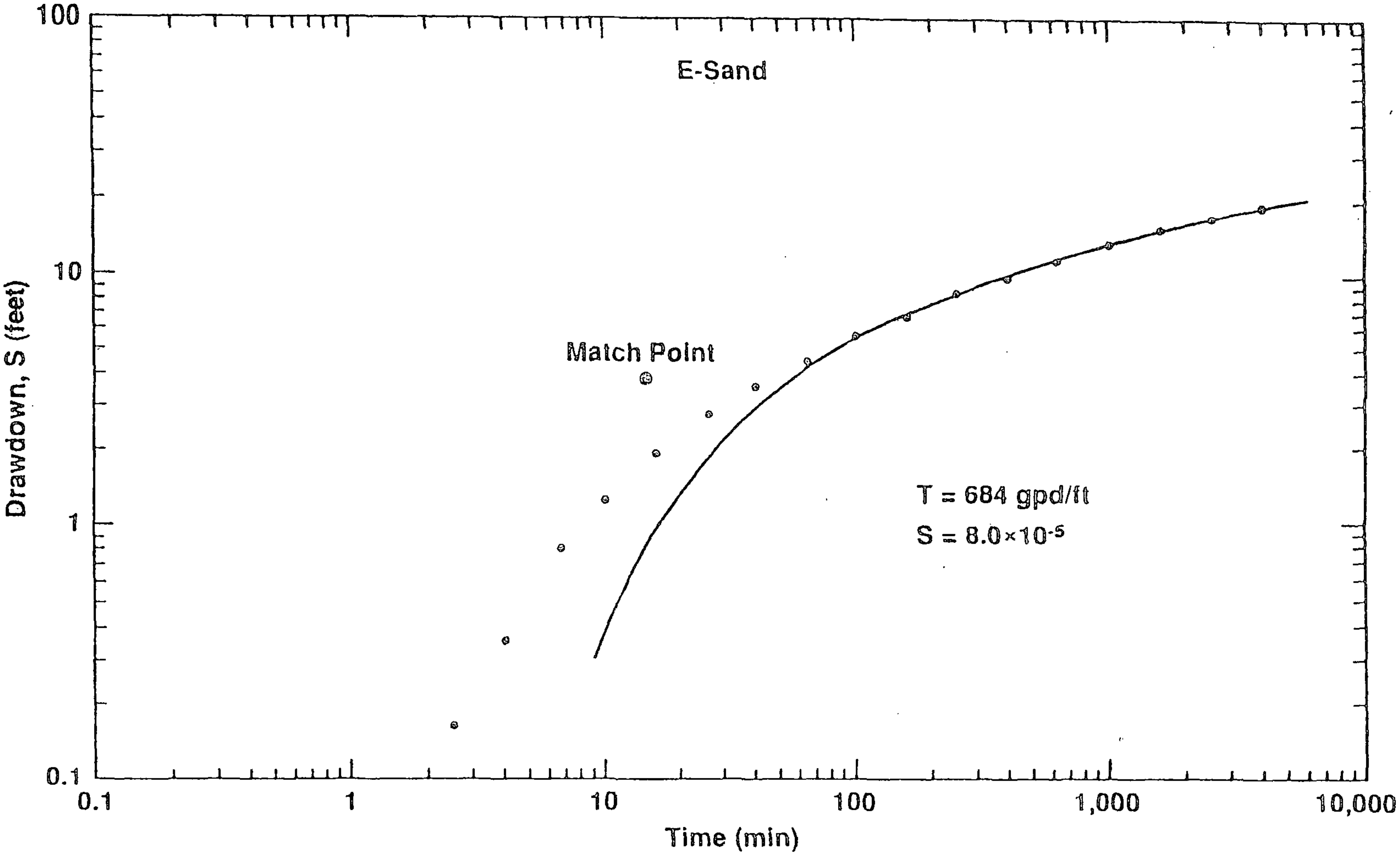


Figure D6-A1-29. SMC Pumping Test 2, Well 1061 (Log-Log, Pumping Phase)

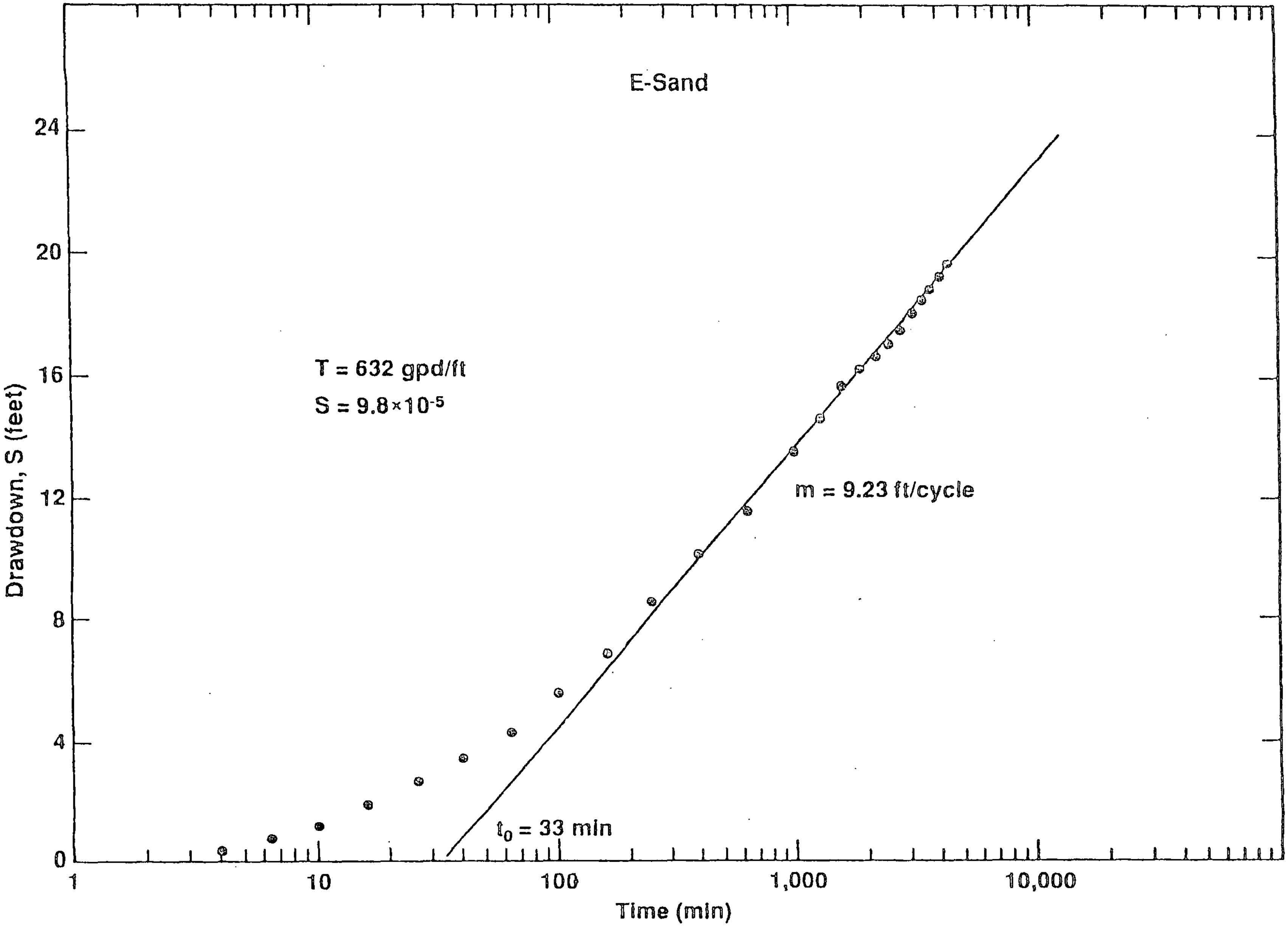


Figure D6-A1-30. SMC Pumping Test 2, Well 1061 (Semi-Log, Pumping Phase)

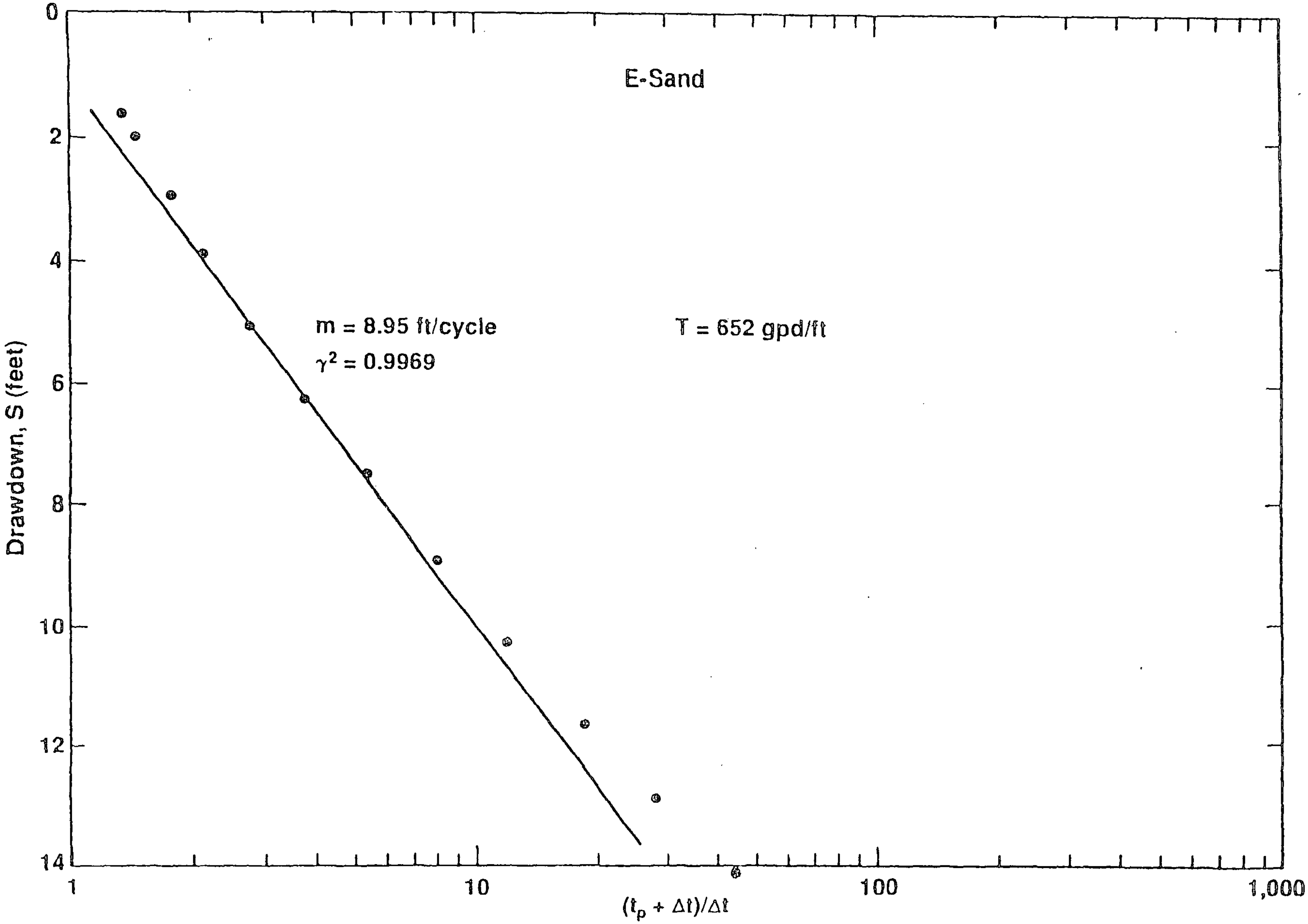


Figure D6-A1-31. SMC Pumping Test 2, Well 1061 (Semi-Log, Recovery Phase)

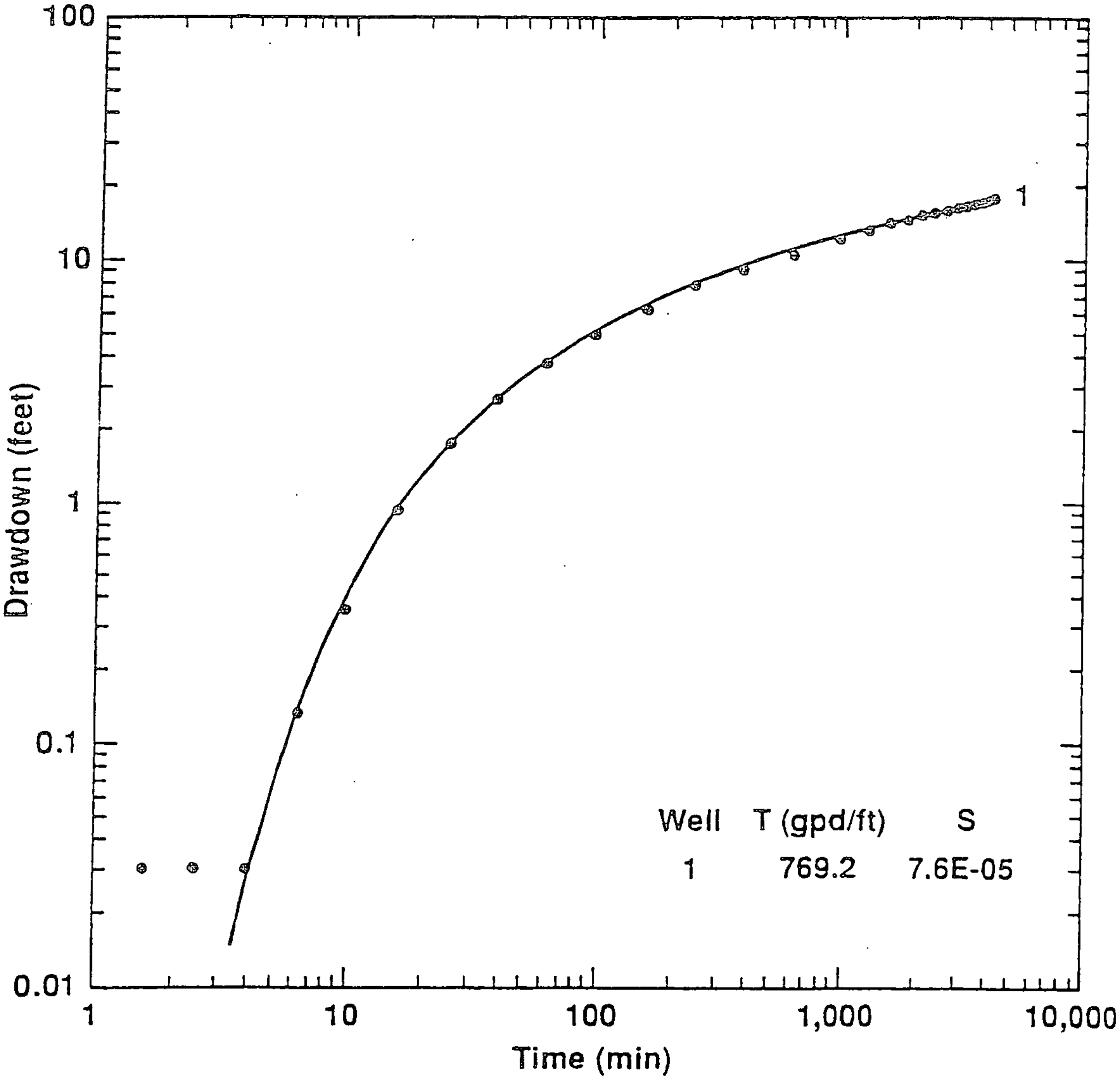


Figure D6-A1-32. SMC Pumping Test 2, Theis Curve Automated Matching, Well 1054 (Pumping Phase)

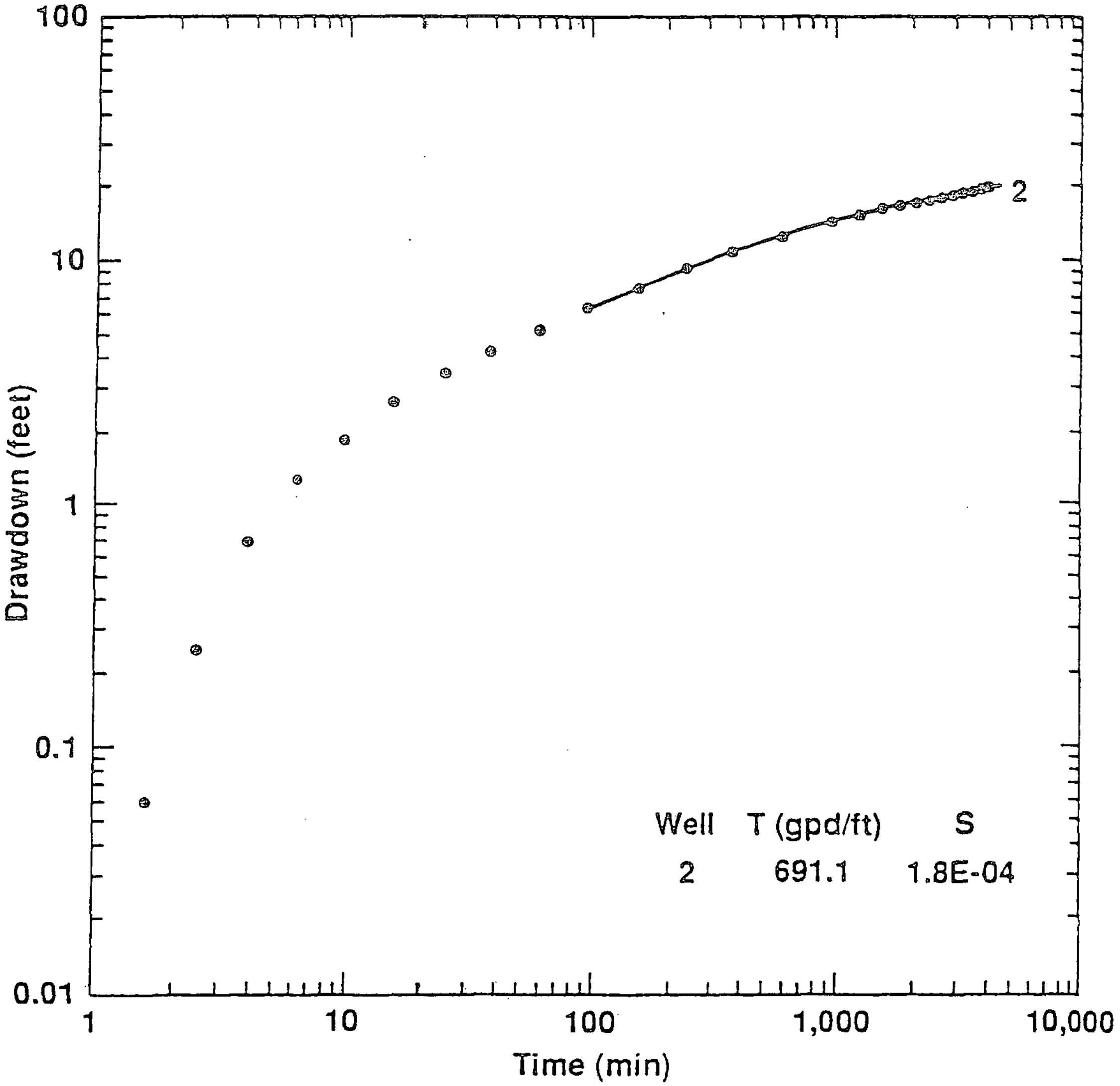


Figure D6-A1-33. SMC Pumping Test 2, Theis Curve Automated Matching, Well 1060 (Pumping Phase)

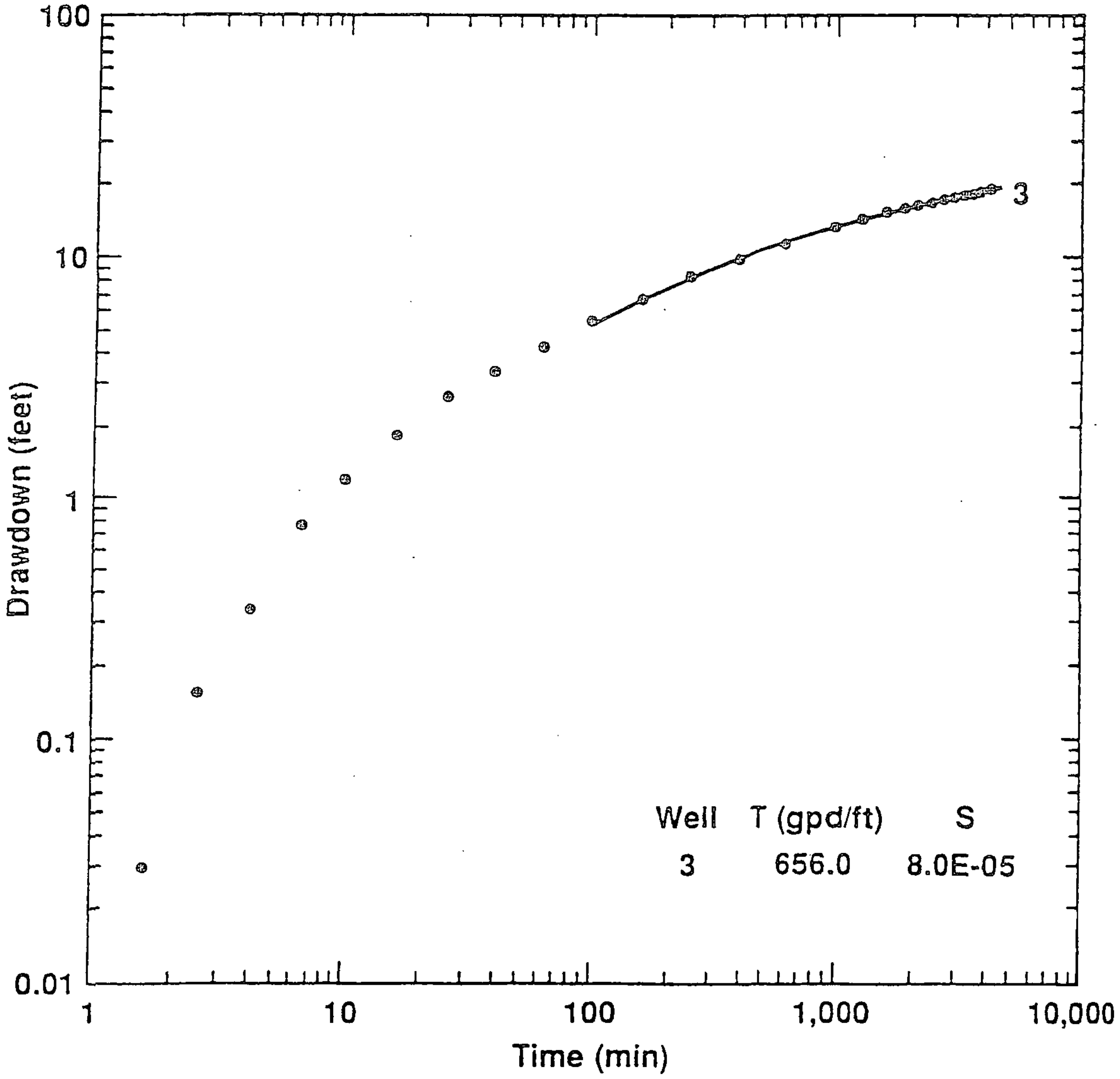


Figure D6-A1-34. SMC Pumping Test 2, Theis Curve Automated Matching, Well 1061 (Pumping Phase)

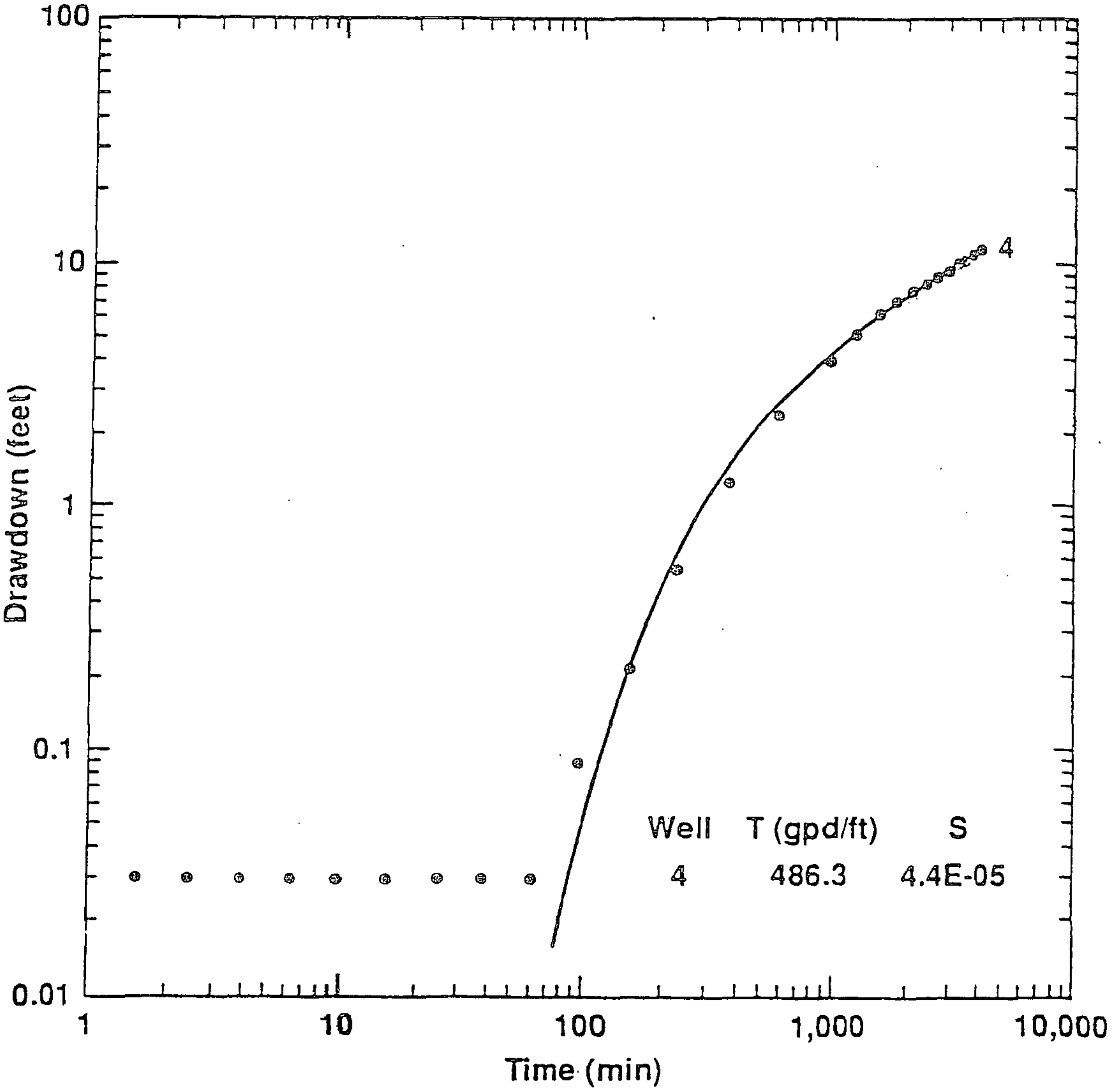


Figure D6-A1-35. SMC Pumping Test 2, Theis Curve Automated Matching, Well 1058 (Pumping Phase)

E-Sand
Distance between Wells

1054	1058	1060	1061	
227.1	1162.9	136.8	210.5	1055
	1124.0	306.5	364.0	1054
		1058.2	1372.0	1058
			322.1	1060

Gradient = -0.0043 ft/ft

Velocity = 0.61 ft/day
= 22 ft/yr

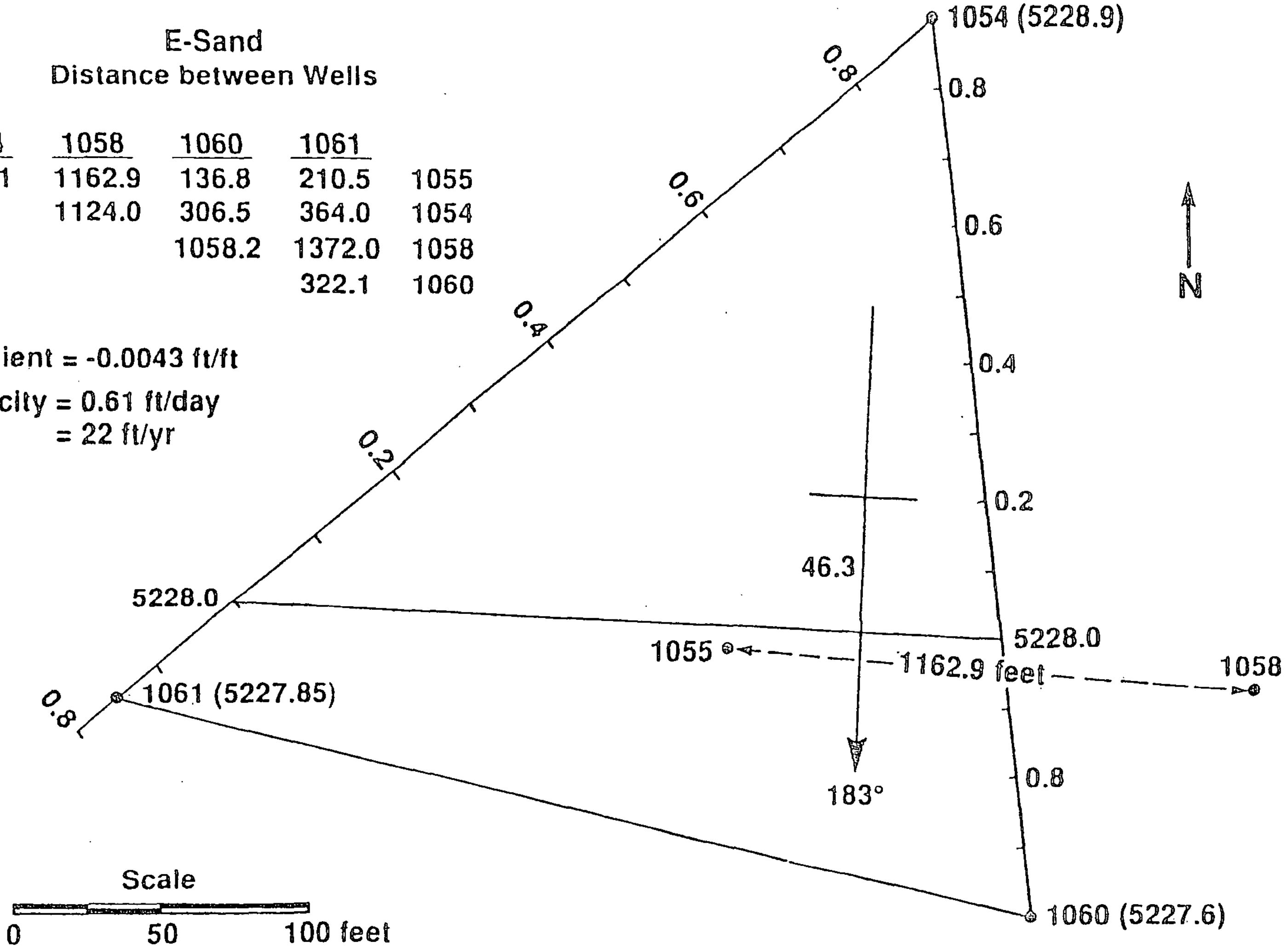


Figure D6-A1-36. Determination of E-Sand Aquifer Direction and Gradient of Ground Water Flow: 26 January 1989, Pumping Test 2

ATTACHMENT D6-2

BASELINE GROUNDWATER AND SURFACE WATER DATA

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1054 (O-SAND)

rameter	Units	Detection Limit	Sample Collection Dates						
ELD MEASUREMENTS			30-May-80	12-Nov-80	20-Apr-81	8-Jul-81	28-Oct-81	27-Apr-89	25-May-
SWL (measured)	ft							294.3	298.2
Static Water Level	ft msl	N/A	5188.3	N.D.	N.D.	N.D.	5186.9	5229.7	5225.8
Casing Volume	gal	N/A	N.D.	N.D.	N.D.	N.D.	N.D.	65	62
Volume Pumped	gal	N/A	N.D.	N.D.	N.D.	N.D.	N.D.	810	182
Casing Displacement	units	N/A	N.D.	N.D.	N.D.	N.D.	N.D.	12.5	2.9
Temperature	C	0.1	N.D.	N.D.	19.9	17	16	14.1	13.7
pH	units	0.01	N.D.	7.6	7.05	6.64	6.5	8.45	7.5
Conductivity	umho/cm	1	N.D.	N.D.	790	910	950	1095	1040
Flow	g/min	1	N.D.	N.D.	21.4	9.1	21.4	27	26
AJOR IONS:									
Calcium	mg/l	0.05	110	130	130	150	140	147	141
Magnesium	mg/l	0.01	25	27	26	31	31	14.1	26.3
Sodium	mg/l	0.05	38	37	39	37	40	42.8	43
Potassium	mg/l	0.1	11	10.6	14	9.4	9.9	15.7	11.7
Carbonate	mg/l	0.1	0	0	0	0	0	0	0
Bicarbonate	mg/l	0.1	130	250	264	200	200	85.4	220
Hydroxyl	mg/l	0.1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Sulfate	mg/l	0.5	290	389	370	385	388	293	366
Chloride	mg/l	0.1	<3	4	9	<3	4	119	7
Ammonium (as N)	mg/l	0.05	N.D.	N.D.	N.D.	N.D.	N.D.	0.92	0.12
Nitrite (as N)	mg/l	0.01	N.D.	N.D.	N.D.	N.D.	N.D.	<0.01	0.01
Nitrate (as N)	mg/l	0.01	0.09	<0.05	<0.05	<0.05	<0.05	<0.01	0.01
Fluoride	mg/l	0.1	0.2	0.03	0.03	0.02	N.D.	0.16	0.17
Silica	mg/l	1	N.D.	N.D.	N.D.	N.D.	N.D.	6.6	16.9
TDS @ 180 C	mg/l	1	520	771	711	815	780	748	722
onductivity	umho/cm	1	N.D.	N.D.	N.D.	N.D.	N.D.	1096	1033
kalinity	CaCO3 mg/l	0.1	110	210	218	166	N.D.	70	180
pH	units	1-14	N.D.	N.D.	N.D.	N.D.	N.D.	8.03	7.52
TRACE METALS:									
Aluminum	mg/l	0.1	<0.5	<0.5	<0.5	<0.1	0.6	<0.10	0.14
Arsenic	mg/l	0.001	0.002	0.005	<0.005	<0.005	<0.005	<0.001	<0.001
Barium	mg/l	0.1	<0.2	<0.2	<0.2	<0.2	<0.1	<0.10	<0.10
Boron	mg/l	0.1	<0.1	0.2	0.1	0.1	0.2	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	0.02	0.012	<0.01	<0.01
Chromium	mg/l	0.05	<0.02	<0.01	<0.02	<0.02	0.038	<0.05	<0.05
Copper	mg/l	0.01	<0.02	0.03	<0.05	<0.05	<0.005	<0.01	<0.01
Iron	mg/l	0.05	0.33	0.5	0.26	0.38	0.42	<0.05	0.39
Lead	mg/l	0.05	0.007	0.028	0.068	<0.005	<0.005	<0.05	<0.05
Manganese	mg/l	0.01	0.04	0.03	<0.05	<0.05	0.02	0.01	0.04
Mercury	mg/l	0.001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.005	0.012	<0.005	0.006	0.015	<0.10	<0.10
Nickel	mg/l	0.05	<0.05	<0.04	<0.05	0.07	0.03	<0.05	<0.05
Selenium	mg/l	0.001	<0.002	<0.005	<0.005	0.007	<0.005	0.001	0.001
Vanadium	mg/l	0.1	0.005	<0.005	<0.005	<0.005	0.17	<0.10	<0.10
Zinc	mg/l	0.01	0.75	2.1	2.32	1.08	0.898	0.41	1.3
RADIOMETRIC SPECIES:									
Uranium	mg/l	0.0003	0.03	0.012	0.026	0.019	0.024	0.0166	0.0265
Radium	pCi/l	0.2	119±11	63±8	49±10	28±6	39±3	35.2±2	75.2±2.5
QUALITY ASSURANCE DATA:									
Anion	meg	—						10.87	11.44
Cation	meg	—						10.93	11.55
A/C Balance	units	0.95-1.05						0.994	0.991
WDEQ A/C Balance	%	-5 - +5						0.29	0.47
Calc'd TDS	mg/l	—						683	725
TDS A/C Balance	units	0.9-1.10						1.095	0.996

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1054 (O-SAND)

8-Jun-89	21-Jun-89	6-Jul-89	2-Aug-89	13-Sep-89	5-Dec-89	27-Jul-90
294.1	293.8	294.7	293.7	293.7	293.4	N.D.
5229.9	5230.2	5229.3	5230.3	5230.3	5230.6	N.D.
65	65	65	65	65	65	N.D.
480	360	330	780	286	875	1404
7.39	5.53	5.11	11.96	4.39	13.38	N.D.
16.2	16	16.1	16.8	15.5	16.3	N.D.
7.36	7.27	7.18	7.27	7.34	7.18	N.D.
1050	1040	980	989	1013	N.D.	N.D.
30	30	30	26	26	25	39
135	149	140	150	135	140	147
31.2	33.6	29	29	31.4	31	30.7
40	39.2	41.3	37.1	38.7	40.6	38.3
9.6	10.5	10.5	10.1	16.4	16.6	11.2
0	0	0	0	0	0	0
234	232	193	232	227	248	246
N.D.	N.D.	N.D.	0	0	0	0
371	393	394	382	366	354	376
2.7	3	4.5	3.4	3.7	2.1	2.2
0.05	0.09	0.09	0.07	0.09	0.08	0.36
0.01	0.01	<0.01	0.01	0.01	0.01	<0.01
0.03	0.04	0.02	0.34	0.01	0.03	<0.01
0.18	0.18	0.16	0.2	0.1	0.22	0.15
18.2	18.2	20.8	19	20.8	18.2	18
719	736	684	746	746	758	710
1036	1043	943	989	992	1015	1041
192	190	158	190	186	203	202
7.5	7.37	7.92	7.1	7.2	7.56	7.62
<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
0.19	0.23	0.06	0.3	0.35	0.24	0.13
<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
0.02	0.02	0.02	0.03	0.02	0.03	0.03
<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<0.10	<0.10	<0.01	<0.01	<0.01	<0.01	<0.01
<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
0.18	0.12	0.03	0.16	0.09	0.07	0.06
0.0197	0.0321	0.018	0.0234	0.027	0.0232	0.0222
85.8±3.6	74.6±1.4	62.1±1.9	82.8±5.6	73.6±1.9	99.5±3.8	96.8±4.4
11.65	12.09	11.51	11.89	11.46	11.51	11.94
11.36	12.25	11.49	11.87	11.55	11.86	11.96
1.026	0.987	1.001	1.002	0.992	0.971	0.998
-1.29	0.65	-0.07	-0.09	0.42	1.46	0.08
726	763	737	749	727	728	748
0.991	0.964	0.928	0.995	1.026	1.041	0.949

WELL SMC-1058 (O-SAND)

neter	Units	Detection Limit	Sample Collection Dates						
FIELD MEASUREMENTS			2-May-89	25-May-89	8-Jun-89	21-Jun-89	7-Jul-89	2-Aug-89	13-Sep-89
SWL (measured)	ft		258.2	258	257.5	257.1	257.7	256.7	256.5
Static Water Level	ft msl	N/A	5228.8	5229	5229.5	5229.9	5229.3	5230.3	5230.5
Casing Volume	gal	N/A	153	153	154	154	154	154	154
Volume Pumped	gal	N/A	374	1092	960	390	690	832	1430
Casing Displacement	units	N/A	2.4	7.12	6.24	2.53	4.49	5.39	9.26
Temperature	C	0.1	14.8	16.4	16.2	15.9	16.1	16.9	16.5
pH	units	0.01	12.38	8.45	7.98	9.07	7.74	7.73	7.41
Conductivity	umho/cm	1	3900	848	858	704	878	860	915
Flow	g/min	1	34	26	24	30	30	26	22
MAJOR IONS:									
Calcium	mg/l	0.05	242	109	122	87	118	118	117
Magnesium	mg/l	0.01	<0.1	16.6	21.9	14.9	22	24.6	26.1
Sodium	mg/l	0.05	82.8	41.6	38.9	41.3	39.2	37.1	36
Potassium	mg/l	0.1	101	17	11.9	22.4	11.5	11.9	16.3
Carbonate	mg/l	0.1	387	0	0	0	0	0	0
Bicarbonate	mg/l	0.1	30	184	215	116	183	215	221
Hydroxyl	mg/l		47.9	N.D.	N.D.	N.D.	N.D.	0	0
Sulfate	mg/l	0.5	74.6	289	292	286	321	307	297
Chloride	mg/l	0.1	17	2.7	2	3	3.2	2.9	1.8
Ammonium (as N)	mg/l	0.05	0.4	0.06	0.07	0.07	0.08	0.06	0.05
Nitrite (as N)	mg/l	0.01	0.01	0.01	0.01	<0.01	<0.01	<0.01	0.01
Nitrate (as N)	mg/l	0.01	0.02	0.01	0.12	0.04	0.01	0.06	0.04
Fluoride	mg/l	0.1	2.48	0.17	0.15	0.17	0.15	0.17	0.1
Silica	mg/l	1	5.6	16.7	17.8	13.3	17.8	18.4	19.3
TDS @ 180 C	mg/l	1	952	566	600	499	598	623	622
ductivity	umho/cm	1	3606	855	866	700	857	860	847
ity	CaCO3 mg/l	0.1	811	151	176	95	150	176	181
	units	1-14	11.45	7.77	7.62	7.35	7.86	7.65	7.3
TRACE METALS:									
Aluminum	mg/l	0.1	0.56	0.12	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	mg/l	0.1	0.34	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Boron	mg/l	0.1	0.63	<0.10	<0.10	0.13	<0.10	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	0.05	0.08	<0.05	<0.05	<0.05	0.12
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	mg/l	0.01	<0.01	0.02	<0.01	<0.01	0.01	0.01	0.02
Mercury	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.01	<0.01	<0.01
Nickel	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	mg/l	0.001	0.042	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	mg/l	0.01	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	mg/l	0.01	0.01	0.01	0.02	<0.01	0.01	0.02	<0.01
RADIOMETRIC SPECIES:									
Uranium	mg/l	0.0003	0.0018	0.0372	0.0194	0.0076	0.0059	0.0044	0.01
Radium	pCi/l	0.2	61.6±4.2	15.3±0.6	23.6±1	18.6±0.7	12.4±0.7	7.8±1.9	8.3±0.7
QUALITY ASSURANCE DATA:									
Anion	meq	—	18.38	9.12	9.68	7.96	9.79	10.02	9.87
Cation	meq	—	18.59	9.15	9.93	8	9.74	9.93	10.07
A/C Balance	units	0.95-1.05	0.989	0.997	0.975	0.994	1.005	1.009	0.98
WDEQ A/C Balance	%	-5 - +5	0.58	0.14	1.28	0.29	-0.24	-0.43	1.02
Calc'd TDS	mg/l	—	930	586	615	526	625	629	625
A/C Balance	units	0.9-1.10	1.024	0.966	0.976	0.948	0.958	0.991	0.995

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1058 (O-SAND)

5-Dec-89	27-Jul-90
256.7	255
5230.3	5232
154	155
700	528
4.54	3.4
15.6	N.D.
7.75	N.D.
N.D.	N.D.
25	24
103	48.4
25.9	10.7
38.3	38.3
18.4	10.4
0	0
201	83
0	0
283	190
1.9	<0.1
<0.05	0.44
0.01	<0.01
0.55	0.03
0.19	0.16
17.5	15.5
594	357
825	530
164	68.4
7.92	8.05
<0.10	<0.10
<0.001	<0.001
<0.10	<0.10
<0.10	0.35
<0.01	<0.01
<0.05	<0.05
<0.01	<0.01
<0.05	<0.05
<0.05	<0.05
0.01	<0.01
<0.001	<0.001
<0.01	<0.01
<0.05	<0.05
0.002	<0.001
<0.10	<0.10
<0.01	0.01
0.0049	0.0021
8.9±0.6	5.3±0.6
9.29	5.33
9.51	5.43
0.978	0.983
1.13	0.88
592	357
1.004	1

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1060 (O-SAND)

Parameter	Units	Detection Limit	Sample Collection Dates							
FIELD MEASUREMENTS			5-May-89	25-May-89	8-Jun-89	21-Jun-89	6-Jul-89	3-Aug-89	13-Sep-89	5-D
SWL (measured)	fr		247.5	247.4	248.2	247.8	247.6	246.8	247.5	246.4
Static Water Level	ft msl	N/A	5229.5	5229.6	5228.8	5229.2	5229.4	5230.2	5229.5	5230.6
Casing Volume	gal	N/A	160	160	160	160	160	161	160	161
Volume Pumped	gal	N/A	756	1080	930	816	544	442	624	364
Casing Displacement	units	N/A	4.7	6.74	5.82	5.1	3.4	2.75	3.89	2.26
Temperature	C	0.1	16	15.8	16.0	16.1	16.5	16.8	17	15.7
pH	units	0.01	11.21	9.04	8.71	8.59	9.03	10.67	9.71	11.67
Conductivity	umho/cm	1	910	848	898	860	810	688	626	N.D.
Flow	g/min	1	27	30	30	34	32	26	24	26
MAJOR IONS:										
Calcium	mg/l	0.05	68.8	106	126	140	110	78.4	66.2	70.1
Magnesium	mg/l	0.01	0.8	11.7	15.5	15.1	8.4	3.8	6.6	0.2
Sodium	mg/l	0.05	42.8	47.1	48.9	49	45.7	40.7	39.8	26.8
Potassium	mg/l	0.1	24	19.1	15.8	17.1	17.1	15.9	14	19.8
Carbonate	mg/l	0.1	40.3	0	0	0	0	9.86	0.6	66.2
Bicarbonate	mg/l	0.1	10	110	179	149	53.9	15.5	24.9	12.5
Hydroxyl	mg/l	0.1	14.8	N.D.	N.D.	N.D.		2.35	0	19.5
Sulfate	mg/l	0.5	165	328	332	386	368	276	260	94.6
Chloride	mg/l	0.1	4.7	2.7	2	2.1	2.2	3.25	3.7	1
Ammonium (as N)	mg/l	0.05	0.17	0.14	0.25	0.12	0.1	0.13	0.11	0.09
Nitrite (as N)	mg/l	0.01	<0.01	0.01	0.01	0.01	<0.01	0.01	0.01	0.01
Nitrate (as N)	mg/l	0.01	0.05	0.01	0.09	0.02	0.01	0.09	0.01	0.01
Fluoride	mg/l	0.1	0.35	0.24	0.19	0.23	0.23	0.28	0.2	0.43
Silica	mg/l	1	10.7	14.1	16.1	15.4	13.3	11.6	14.3	10.9
TDS @ 180 C	mg/l	1	378	540	645	664	544	442	414	326
ductivity	umho/cm	1	885	843	887	915	780	623	628	634
alinity	CaCO3 mg/l	0.1	119	90.2	147	122	44.2	36	21.6	17
pH	units	1-14	10.94	7.93	7.51	7.15	7.9	10.14	8.7	11.
TRACE METALS:										
Aluminum	mg/l	0.1	<0.10	0.33	0.18	0.13	<0.10	<0.10	0.11	<0.10
Arsenic	mg/l	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	0.13	0.14	0.43
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	mg/l	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.01	<0.01	<0.01	<0.01
Nickel	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Vanadium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	mg/l	0.01	0.01	0.02	0.01	0.01	<0.01	<0.01	<0.01	<0.01
RADIOMETRIC SPECIES:										
Uranium	mg/l	0.0003	<0.0003	0.023	0.0142	0.022	0.0112	0.0011	0.008	<0.0003
Radium	pCi/l	0.2	13.3±0.6	82.3±2.9	54.9±3	53.6±1.2	52.7±1.8	30.1±2.1	43.6±2.9	19.7±0.9
QUALITY ASSURANCE DATA:										
Anion	meg	——	5.97	8.73	9.92	10.56	8.63	6.58	5.96	5.58
Cation	meg	——	6.06	8.91	10.16	10.85	8.63	6.49	6.03	5.35
A/C Balance	units	0.95-1.05	0.986	0.979	0.977	0.973	0.999	1.015	0.989	1.043
EQ A/C Balance	%	-5 - +5	0.73	1.05	1.18	1.37	0.05	-0.72	0.56	-2.11
c'd TDS	mg/l	——	364	585	647	700	592	449	419	297
DS A/C Balance	units	0.90-1.10	1.04	0.923	0.997	0.949	0.919	0.985	0.989	1.09

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1060 (O-SAND)

27-Jul-90
246.8
5230.2
161
494
3.07
N.D.
N.D.
N.D.
26
62.1
0.25
37.2
13.8
17.9
2.4
26.9
142
0.7
0.98
<0.01
0.07
0.31
13.7
292
599
111
11.2
0.2
<0.001
<0.10
0.34
<0.01
<0.05
<0.01
<0.05
<0.05
<0.01
<0.001
<0.10
<0.05
0.001
<0.10
0.03
<0.0003
9.5±0.7
5.22
5.31
0.983
0.85
292
1.001

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1067 (O-SAND)

meter	Units	Detection Limit	Sample Collection Dates							
FIELD MEASUREMENTS			3-May-89	26-May-89	8-Jun-89	22-Jun-89	6-Jul-89	3-Aug-89	12-Sep-89	5-Dec-
SWL (measured)	ft		281	281.1	280.7	280.6	280.6	280.3	269.4	280.5
Static Water Level	ft msl	N/A	5229	5228.9	5229.3	5229.4	5229.4	5229.7	5240.6	5229.5
Casing Volume	gal	N/A	313	313	314	314	314	314	330	314
Volume Pumped	gal	N/A	1170	1408	N.D.	819	528	594	306	480
Casing Displacement	units	N/A	3.74	4.5	N.D.	2.61	1.68	1.89	0.93	1.53
Temperature	C	0.1	15.2	15.8	15.4	15.9	15.8	15.9	14.8	15.2
pH	units	0.01	10.83	8.57	7.78	7.87	7.88	7.92	9.39	7.4
Conductivity	umho/cm	1	825	898	922	943	889	952	725	N.D.
Flow	g/min	1	18	22	19	21	16	18	9	7.5
MAJOR IONS										
Calcium	mg/l	0.05	35.1	94	125	120	130	123	76.5	125
Magnesium	mg/l	0.01	2.9	12.7	18	20.8	25	26.9	19	31
Sodium	mg/l	0.05	61.1	52.7	43.4	40.2	39.2	38.3	39.8	40.6
Potassium	mg/l	0.1	63.3	33.1	19.1	18.6	15.1	14.1	35.6	19.7
Carbonate	mg/l	0.1	27	0	0	0	0	0	0	0
Bicarbonate	mg/l	0.1	13.1	158	200	178	176	193	112	219
Hydroxyl	mg/l	0.1	7.6	N.D.				0	0	0
Sulfate	mg/l	0.5	217	301	328	342	378	362	295	340
Chloride	mg/l	0.1	2.6	2.7	2	2	2.4	1.9	2.7	2.5
Ammonium (as N)	mg/l	0.05	0.37	0.16	0.14	0.14	0.11	0.55	0.14	0.34
Nitrite (as N)	mg/l	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	0.01
Nitrate (as N)	mg/l	0.01	0.01	0.03	0.05	0.04	0.01	0.23	0.01	0.02
Fluoride	mg/l	0.1	0.32	0.18	0.16	0.19	0.16	0.15	0.1	0.19
Silica	mg/l	1	13.5	16.3	16.5	15.8	15.6	15.2	16.7	17.5
TDS @ 180 C	mg/l	1	454	610	657	659	694	675	517	706
nductivity	umho/cm	1	805	878	924	924	898	909	723	913
inity	CaCO3 mg/l	0.1	78	130	164	146	144	158	92	180
	units	1-14	10.65	7.85	7.85	7.5	7.93	7.68	7.9	7.75
TRACE METALS:										
Aluminum	mg/l	0.1	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic	mg/l	0.001	0.002	0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001
Barium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.01	<0.10	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.15	0.15
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	mg/l	0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01	0.01	0.02
Mercury	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.01	<0.01	<0.01	<0.01
Nickel	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Vanadium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	mg/l	0.01	0.02	0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01
RADIOMETRIC SPECIES:										
Uranium	mg/l	0.0003	0.0025	0.167	0.0573	0.0474	0.0472	0.061	0.043	0.0212
Radium	pCi/l	0.2	174±4.3	2598±13	2022±16.5	1771±12.9	1790±16.3	1680±17	821±12	2361±19
QUALITY ASSURANCE DATA:										
Anion	meg	——	6.17	8.95	10.18	10.11	10.84	10.78	8.06	10.76
Cation	meg	——	6.37	8.98	10.14	9.97	10.68	10.52	8.13	11.2
A/C Balance	units	0.95-1.05	0.97	0.996	1.004	1.014	1.014	1.025	0.991	0.96
WDEQ A/C Balance	%	-5 - +5	1.53	0.19	-0.21	-0.71	-0.71	-1.25	0.43	2.03
Calc'd TDS	mg/l	——	431	593	653	649	694	680	542	687
TDS A/C Balance	units	0.90-1.10	1.054	1.029	1.007	1.015	1	0.992	0.953	1.027

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1067 (O-SAND)

27-Jul-90
275.5
5234.5
321
66
0.21
N.D.
N.D.
N.D.
2
132
0.01
36.9
28
46.2
1.9
89.2
103
5.9
0.29
<0.01
<0.01
0.26
16.6
369
1575
341
11.72
1.12
<0.001
0.21
0.68
<0.01
<0.05
<0.01
<0.05
<0.05
<0.01
<0.001
<0.10
<0.05
0.002
<0.10
0.01
0.0011
27±7.8
9.15
9.28
0.985
0.74
372
0.991

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1057 (O-SAND)

neter	Units	Detection Limit	Sample Collection Dates						
FIELD MEASUREMENTS			5-May-89	25-May-89	8-Jun-89	21-Jun-89	7-Jul-89	3-Aug-89	13-Sep-89
SWL (measured)	ft		294.4	294.5	294.4	294.8	294.8	294.7	294.9
Static Water Level	ft msl	N/A	5240.6	5240.5	5240.6	5240.2	5240.2	5240.3	5240.1
Casing Volume	gal	N/A	29	29	29	29	29	29	29
Volume Pumped	gal	N/A	336	2464	2170	1152	1122	392	1120
Casing Displacement	units	N/A	11.6	85.19	74.85	40.1	39.05	13.61	39.07
Temperature	C	0.1	13.2	14.1	14.2	13.8	14.4	14.5	15.1
pH	units	0.01	11.44	9.72	9.2	9.2	9.1	10.8	9.34
Conductivity	umho/cm	1	750	502	533	545	542	534	480
Flow	g/min	1	28	28	31	32	34	28	28
MAJOR IONS:									
Calcium	mg/l	0.05	57	47	64.8	68	51.9	35	40.2
Magnesium	mg/l	0.01	3.1	9.6	12.9	7.9	12	6.15	12
Sodium	mg/l	0.05	30.3	31.6	32.3	32.6	31	25	28.8
Potassium	mg/l	0.1	13	10.9	8.9	9.8	9.6	9.13	8.7
Carbonate	mg/l	0.1	36.1	0	0	0	0	15.2	0
Bicarbonate	mg/l	0.1	9	110	183	148	103	19.9	93.8
Hydroxyl	mg/l	0.1	14.8	N.D.				2.82	0
Sulfate	mg/l	0.5	114	133	140	156	154	120	137
Chloride	mg/l	0.1	3	3.4	3.3	3.3	4.2	3.1	3.2
Ammonium (as N)	mg/l	0.05	0.08	0.06	0.1	0.07	0.05	0.06	0.08
Nitrite (as N)	mg/l	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	0.01
Nitrate (as N)	mg/l	0.01	0.05	0.01	0.04	0.04	0.02	0.18	0.03
Fluoride	mg/l	0.1	0.2	0.23	0.23	0.26	0.22	0.24	0.2
Silica	mg/l	1	10.1	12.4	13.9	13.9	13.9	9.4	14.3
TDS @ 180 C	mg/l	1	268	306	369	350	328	234	280
ductivity	umho/cm	1	729	461	482	500	483	401	445
nity	CaCO3 mg/l	0.1	111	90.4	150	121	84.4	50	76.9
	units	1-14	10.94	8	7.71	7.51	8.07	10.22	7.85
TRACE METALS:									
Aluminum	mg/l	0.1	<0.10	0.28	0.13	0.11	<0.10	<0.10	<0.10
Arsenic	mg/l	0.001	0.006	0.004	0.04	0.005	0.005	0.003	0.003
Barium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	0.18
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	mg/l	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.01	<0.01	<0.01
Nickel	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	mg/l	0.01	<0.01	0.02	0.02	0.01	<0.01	0.01	<0.01
RADIOMETRIC SPECIES:									
Uranium	mg/l	0.0003	<0.0003	0.0091	0.0117	0.0144	0.0077	0.001	0.009
Radium	pCi/l	0.2	3.2±0.4	4.3±0.3	4.6±0.6	4.7±0.4	3.6±0.5	4.1±1.9	19.5±1
QUALITY ASSURANCE DATA:									
Anion	meg	—	4.7	4.68	6.03	5.79	5.03	3.61	4.5
Cation	meg	—	4.83	4.89	5.97	5.74	5.19	3.65	4.56
A/C Balance	units	0.95-1.05	0.973	0.957	1.009	1.007	0.968	0.991	0.987
WDEQ A/C Balance	%	-5 - +5	1.38	2.18	-0.46	-0.35	1.6	0.46	0.67
Calc'd TDS	mg/l	—	272	304	368	366	329	235	292
A/C Balance	units	0.90-1.10	0.984	1.006	1.002	0.956	0.998	0.997	0.958

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1057 (O-SAND)

5-Dec-89	27-Jul-90
294.5	294.5
5240.5	5240.5
29	29
522	165
18.05	5.69
13.8	N.D.
9.11	N.D.
N.D.	N.D.
29	24
31	30.6
7.2	6.6
29.1	29.5
15.4	10.9
6.6	0
70.2	52
0	0
115	136
1.6	2.4
<0.05	0.36
<0.01	<0.01
0.58	0.02
0.25	0.19
11.1	12.8
240	261
349	408
69.6	42.5
9.31	8.15
<0.10	0.1
0.002	0.002
<0.10	<0.10
<0.10	<0.10
<0.01	<0.01
<0.05	<0.05
<0.01	<0.01
<0.05	<0.05
<0.05	<0.05
<0.01	<0.01
<0.001	<0.001
<0.01	<0.10
<0.05	<0.05
0.001	<0.001
<0.10	<0.10
<0.01	0.01
0.002	0.0021
1.9±0.3	0.3±0.3
3.87	3.77
3.87	3.73
0.999	1.009
0.06	-0.46
256	256
0.939	1.019

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1062 (U/S-SAND)

meter	Units	Detection Limit	Sample Collection Dates						
FIELD MEASUREMENTS			2-May-89	26-May-89	9-Jun-89	21-Jun-89	6-Jul-89	2-Aug-89	12-Sep-89
SWL (measured)	ft		242.5	244	243.9	244.1	242.9	242.8	242.9
Static Water Level	ft msl	N/A	5242.5	5241	5241.1	5240.9	5242.1	5242.2	5242.1
Casing Volume	gal	N/A	93	92	92	92	93	93	93
Volume Pumped	gal	N/A	387	400	555	294	378	420	360
Casing Displacement	units	N/A	4.2	4.33	6.01	3.19	4.06	4.51	3.87
Temperature	C	0.1	14.8	14.5	14.8	14.6	15.4	15.4	14.5
pH	units	0.01	9.2	9.16	8.22	8.56	8.43	7.87	8
Conductivity	umho/cm	1	395	460	538	504	503	527	524
Flow	g/min	1	9	10	15	14	18	12	12
MAJOR IONS:									
Calcium	mg/l	0.05	26	40.8	62.5	52.4	56.8	64.5	62.7
Magnesium	mg/l	0.01	5.9	6.8	10	7.7	8.1	9.9	11.4
Sodium	mg/l	0.05	31.4	30.5	29	29.3	28.2	25.2	27.7
Potassium	mg/l	0.1	20	14.9	10.3	13.1	11.1	10.1	17.2
Carbonate	mg/l	0.1	2.5	0	0	0	0	0	0
Bicarbonate	mg/l	0.1	86.5	121	183	149	160	190	199
Hydroxyl	mg/l	0.1	N.D.	N.D.				0	0
Sulfate	mg/l	0.5	103	101	103	104	113	111	109
Chloride	mg/l	0.1	3.3	5	3.5	2.9	4.8	3.4	3.8
Ammonium (as N)	mg/l	0.05	0.09	0.08	0.62	0.11	0.05	0.07	0.07
Nitrite (as N)	mg/l	0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.01	0.01
Nitrate (as N)	mg/l	0.01	0.01	0.01	0.06	0.02	0.01	0.04	0.02
Fluoride	mg/l	0.1	0.22	0.22	0.27	0.25	0.21	0.2	0.2
Silica	mg/l	1	13.9	14.8	15.4	14.3	14.8	15.2	16.3
TDS @ 180 C	mg/l	1	258	260	319	302	329	332	316
uctivity	umho/cm	1	413	460	509	473	474	501	501
inity	CaCO3 mg/l	0.1	75.4	99	150	122	131	156	163
pH	units	1-14	8.8	8	7.65	7.48	8.07	7.79	7.6
TRACE METALS:									
Aluminum	mg/l	0.1	<0.10	0.13	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic	mg/l	0.001	0.005	0.006	0.003	0.006	0.005	0.003	0.003
Barium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05	<0.05	0.17	<0.05	<0.05	<0.05
Manganese	mg/l	0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01	<0.01
Mercury	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.01
Nickel	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	mg/l	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01
RADIOMETRIC SPECIES:									
Uranium	mg/l	0.0003	0.16	0.0735	0.0655	0.0733	0.13	0.0385	0.035
Radium	pCi/l	0.2	5.9±0.6	12.3±0.8	19.1±1.8	13.8±1.6	15.6±1	14.4±2	20.6±1
QUALITY ASSURANCE DATA:									
Anion	meg	—	3.75	4.24	5.26	4.71	5.12	5.54	5.65
Cation	meg	—	3.74	4.39	5.53	4.88	5.03	5.47	5.79
A/C Balance	units	0.95-1.05	1.003	0.966	0.952	0.964	1.018	1.013	0.976
WDEQ A/C Balance	%	-5 - +5	-0.14	1.72	2.46	1.85	-0.9	-0.62	1.24
Calc'd TDS	mg/l	—	250	275	327	299	317	335	349
/C Balance	units	0.90-1.10	1.03	0.944	0.977	1.01	1.037	0.99	0.907

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1062 (U/S-SAND)

5-Dec-89	27-Jul-90
243.3	243.4
5241.7	5241.6
93	93
135	330
1.46	3.56
13.4	N.D.
8.36	N.D.
N.D.	N.D.
15	15
48.1	49.7
7.5	9.7
29	30.6
13	13.1
0	1.9
146	179
0	0
101	98.5
3.3	0.4
0.08	0.37
0.01	<0.01
0.06	<0.01
0.27	0.19
14.8	16
292	299
449	481
120	150
8.12	8.35
<0.10	<0.10
0.004	<0.001
<0.10	<0.10
<0.10	<0.10
<0.01	<0.01
<0.05	<0.05
<0.01	<0.01
<0.05	<0.05
<0.05	<0.05
<0.01	<0.01
<0.001	<0.001
<0.01	<0.10
<0.05	<0.05
0.003	<0.001
<0.10	<0.10
0.01	0.01
0.106	0.0464
17.4±0.8	12.8±0.9
4.61	5.07
4.69	5.05
0.983	1.004
0.87	-0.22
291	311
1.003	0.962

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1064 (U/S-SAND)

neter	Units	Detection Limit	Sample Collection Dates						
FIELD MEASUREMENTS			2-May-89	26-May-89	9-Jun-89	21-Jun-89	6-Jul-89	2-Aug-89	12-Sep-89
SWL (measured)	ft		237	238.2	237.9	237.9	239	236.6	237
Static Water Level	ft msl	N/A	5243	5241.8	5242.1	5242.1	5241	5243.4	5243
Casing Volume	gal	N/A	73	73	73	73	72	74	73
Volume Pumped	gal	N/A	1394	1189	660	1125	2025	1000	1520
Casing Displacement	units	N/A	19.1	16.36	9.06	15.44	28.07	13.57	20.69
Temperature	C	0.1	14.5	13.8	13.7	14.0	14.3	14.3	14.1
pH	units	0.01	8.02	7.63	7.61	7.52	7.63	7.55	7.28
Conductivity	umho/cm	1	553	538	570	557	560	525	594
Flow	g/min	1	34	41	44	45	45	40	40
MAJOR IONS:									
Calcium	mg/l	0.05	70	71	63.2	59.2	62.2	68	64.4
Magnesium	mg/l	0.01	11.3	12.9	14.6	13.5	13	14.6	15.4
Sodium	mg/l	0.05	30.2	31.6	33.4	33.7	32.6	31	31
Potassium	mg/l	0.1	10.4	8.7	7.3	7.6	7.6	7.7	12.2
Carbonate	mg/l	0.1	0	0	0	0	0	0	0
Bicarbonate	mg/l	0.1	206	194	203	205	183	205	210
Hydroxyl	mg/l	0.1	N.D.	N.D.				0	0
Sulfate	mg/l	0.5	121	134	123	115	130	132	126
Chloride	mg/l	0.1	3.9	4	3.1	3.3	4.6	3.1	3.8
Ammonium (as N)	mg/l	0.05	<0.05	0.05	0.45	0.05	0.05	0.11	0.06
Nitrite (as N)	mg/l	0.01	<0.01	<0.01	0.01	0.01	<0.01	0.01	<0.01
Nitrate (as N)	mg/l	0.01	0.01	0.72	1.02	0.03	0.22	0.09	0.02
Fluoride	mg/l	0.1	0.18	0.31	0.21	0.22	0.19	0.2	0.2
Silica	mg/l	1	15.6	16.3	15.8	16.3	16.1	15.8	16.5
180 C	mg/l	1	366	360	357	362	340	362	358
ctivity	umho/cm	1	582	569	576	571	560	559	556
Alkalinity	CaCO3 mg/l	0.1	169	159	166	168	150	168	171
pH	units	1-14	7.99	7.78	7.71	7.38	8.08	7.42	7.2
TRACE METALS:									
Aluminum	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic	mg/l	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	0.11	0.06	0.09	<0.05	0.08	0.09
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	mg/l	0.01	0.01	0.03	0.01	0.02	0.02	0.02	0.02
Mercury	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.01	<0.01	<0.01
Nickel	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	mg/l	0.01	0.01	0.02	0.01	0.02	0.03	0.01	<0.01
ADIOMETRIC SPECIES:									
Uranium	mg/l	0.0003	0.0539	0.0321	0.0238	0.0259	0.0248	0.0204	0.026
Radium	pCi/l	0.2	51.1±3.3	66.3±1.7	74.2±3.2	62.4±1.3	52.7±1.8	55.8±2.4	69.7±2
UALITY ASSURANCE DATA:									
Anion	meg	——	6.02	6.15	6.06	5.86	5.86	6.22	6.19
Cation	meg	——	6.09	6.29	6.05	5.76	5.81	6.23	6.23
alance	units	0.95-1.05	0.988	0.978	1.002	1.019	1.009	0.998	0.993
A/C Balance	%	-5 - +5	0.58	1.13	-0.08	-0.93	-0.45	0.12	0.34
Calc'd TDS	mg/l	——	366	380	367	352	359	376	375
TDS A/C Balance	units	0.90-1.10	0.999	0.948	0.972	1.029	0.947	0.963	0.954

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1064 (U/S-SAND)

5-Dec-89	27-Jul-90
236.9	242.7
5243.1	5237.3
74	70
1804	608
24.54	8.72
13.6	N.D.
7.3	N.D.
N.D.	N.D.
44	38
66	61.2
15	12
30	32
12.5	9.7
0	0
216	204
0	0
121	123
3.8	1.6
2.25	0.31
0.01	<0.01
0.34	<0.01
0.23	0.17
15.8	16.2
370	342
551	565
177	167
7.86	8.05
<0.10	<0.10
<0.001	<0.001
<0.10	<0.10
<0.10	<0.10
<0.01	<0.01
<0.05	<0.05
<0.01	<0.01
0.09	<0.05
<0.05	<0.05
0.02	<0.01
<0.001	<0.001
<0.01	<0.10
<0.05	<0.05
0.001	<0.001
<0.10	<0.10
<0.01	<0.01
0.0193	0.0179
60.7±2.9	46.2±3.3
6.21	5.96
6.4	5.79
0.97	1.031
1.51	-1.5
377	359
0.981	0.953

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1065 (U/S-SAND)

ameter	Units	Detection Limit	Sample Collection Dates						
FIELD MEASUREMENTS			2-May-89	25-May-89	9-Jun-89	21-Jun-89	6-Jul-89	2-Aug-89	12-Sep-89
SWL (measured)	ft		235.1	235.1	235.2	235.1	235.2	234.7	234.9
Static Water Level	ft msl	N/A	5243.9	5243.9	5243.8	5243.9	5243.8	5244.3	5244.1
Casing Volume	gal	N/A	103	103	103	103	103	104	103
Volume Pumped	gal	N/A	319	475	1162	364	434	260	460
Casing Displacement	units	N/A	3.1	4.6	11.26	3.52	4.2	2.51	4.45
Temperature	C	0.1	14.2	14.4	15.1	15.6	15.4	15.6	13.2
pH	units	0.01	11.23	9.18	N.D.	8.13	8.07	8.7	8.9
Conductivity	umho/cm	1	696	530	596	573	561	485	543
Flow	g/min	1	11	12.5	14	14	14	13	20
MAJOR IONS:									
Calcium	mg/l	0.05	15.6	48.6	68	56.2	65	51	61
Magnesium	mg/l	0.01	1.82	8	13	11.1	12	10.3	13.8
Sodium	mg/l	0.05	43.9	37.1	35.6	34.8	34.8	33.6	33.2
Potassium	mg/l	0.1	54.7	21.1	11.3	12.5	11.6	12.5	17.5
Carbonate	mg/l	0.1	33.1	0	0	0	0	0	0
Bicarbonate	mg/l	0.1	14.3	153	217	168	185	138	194
Hydroxyl	mg/l	0.1	8.5	N.D.				0	0
Sulfate	mg/l	0.5	113	129	125	130	134	134	127
Chloride	mg/l	0.1	4.7	3.7	3.7	3.7	4.1	3.1	3.4
Ammonium (as N)	mg/l	0.05	0.17	0.07	0.23	0.08	0.05	0.1	0.08
Nitrite (as N)	mg/l	0.01	<0.01	0.01	0.01	<0.01	<0.01	0.01	0.01
Nitrate (as N)	mg/l	0.01	0.02	0.02	0.06	0.01	0.01	0.08	0.25
Fluoride	mg/l	0.1	0.18	0.15	0.22	0.22	0.18	0.2	0.2
Silica	mg/l	1	12.8	15.2	16.9	15.6	16.1	15.2	16.7
TDS @ 180 C	mg/l	1	300	334	358	360	364	326	350
Conductivity	umho/cm	1	636	523	561	541	542	482	517
inity	CaCO3 mg/l	0.1	92	125	178	138	152	112	159
	units	1-14	10.7	8.06	7.71	7.6	8.18	7.87	7.6
TRACE METALS:									
Aluminum	mg/l	0.1	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001
Barium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	mg/l	0.01	<0.01	0.02	0.01	<0.01	<0.01	<0.01	<0.01
Mercury	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.01	<0.01	<0.01
Nickel	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	mg/l	0.001	0.002	<0.001	<0.001	<0.001	<0.001	0.003	0.001
Vanadium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	mg/l	0.01	0.01	0.02	0.04	0.02	0.04	0.01	0.01
RADIOMETRIC SPECIES:									
Uranium	mg/l	0.0003	0.0012	0.0882	0.0601	0.0862	0.0708	0.102	0.067
Radium	pCi/l	0.2	3.3±0.6	11±0.5	6.5±0.7	6.5±0.4	8.1±0.8	8.5±1.9	15.4±0.9
QUALITY ASSURANCE DATA:									
Anion	meg	—	4.34	5.31	6.28	5.58	5.95	5.16	5.95
Cation	meg	—	4.32	5.33	6.34	5.58	6.07	5.26	6.16
A/C Balance	units	0.95-1.05	1.004	0.997	0.991	1	0.981	0.981	0.966
WDEQ A/C Balance	%	-5 - +5	-0.21	0.17	0.46	-0.02	0.97	0.95	1.71
Calc'd TDS	mg/l	—	288	340	383	348	370	330	372
TDS A/C Balance	units	0.90-1.10	1.042	0.981	0.935	1.033	0.982	0.988	0.942

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER QUALITY DATA

WELL SMC-1065 (U/S-SAND)

5-Dec-89	27-Jul-90
234.7	388.7
5244.3	5090.3
104	3
378	506
3.65	146.88
13.8	N.D.
8.33	N.D.
N.D.	N.D.
21	23
60.3	59.3
13.5	13.2
33.7	33.6
17.6	11.5
0	0
195	192
0	0
124	130
3.3	2.8
0.17	0.79
0.01	<0.01
0.02	0.02
0.22	0.15
15.6	17.1
360	334
533	568
160	157
8.12	8.25
<0.10	<0.10
0.001	<0.001
<0.10	<0.10
<0.10	0.1
<0.01	<0.01
<0.05	<0.05
<0.01	<0.01
<0.05	<0.05
<0.05	<0.05
<0.01	<0.01
<0.001	<0.001
<0.01	<0.10
<0.05	<0.05
0.004	0.005
<0.10	<0.10
0.01	0.01
0.057	0.0422
23.2±1.8	6.9±0.7
5.89	5.94
6.13	5.94
0.961	1.001
2.01	-0.03
367	365
0.982	0.914

WELL SMC-1066 (U/S-SAND)

Parameter	Units	Detection Limit	Sample Collection Dates						
FIELD MEASUREMENTS			2-May-89	26-May-89	8-Jun-89	22-Jun-89	6-Jul-89	2-Aug-89	12-Sep-89
SWL (measured)	ft		211.3	211.1	211.1	211.5	211.4	211.5	211.1
Static Water Level	ft msl	N/A	5246.7	5246.9	5246.9	5246.5	5246.6	5246.5	5246.9
Casing Volume	gal	N/A	269	269	269	268	268	268	269
Volume Pumped	gal	N/A	1008	1000	924	2240	644	624	702
Casing Displacement	units	N/A	3.75	3.72	3.44	8.35	2.4	2.33	2.61
Temperature	C	0.1	13.2	13.5	13.3	14.0	14.3	13.6	12.5
pH	units	0.01	9.7	8.41	7.7	7.37	7.71	7.53	8.02
Conductivity	umho/cm	1	511	551	530	574	545	503	554
Flow	g/min	1	36	25	28	28	28	26	26
MAJOR IONS:									
Calcium	mg/l	0.05	15.5	55.5	65.1	54.8	66	60.9	58.4
Magnesium	mg/l	0.01	6.5	10.5	13.6	15	16	14.6	15.6
Sodium	mg/l	0.05	37.1	29.4	26.7	26	23.8	22.9	24.4
Potassium	mg/l	0.1	33.8	18.4	11.8	10.9	10.1	10.4	16.7
Carbonate	mg/l	0.1	5	0	0	0	0	0	0
Bicarbonate	mg/l	0.1	114	191	217	210	220	205	212
Hydroxyl	mg/l	0.1	N.D.	N.D.				0	0
Sulfate	mg/l	0.5	86.1	94.6	101	98.8	105	104	100
Chloride	mg/l	0.1	2.7	4.3	4	4	4.7	3.5	3.5
Ammonium (as N)	mg/l	0.05	0.09	0.06	<0.05	0.07	0.06	0.1	0.15
Nitrite (as N)	mg/l	0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.01	<0.01
Nitrate (as N)	mg/l	0.01	0.02	0.05	1.04	0.05	0.02	0.02	0.01
Fluoride	mg/l	0.1	0.19	0.21	0.19	0.21	0.22	0.22	0.2
Silica	mg/l	1	15.6	17.1	16.7	17.5	16.9	15	17.1
TDS @ 180 C	mg/l	1	248	304	343	338	340	337	328
uctivity	umho/cm	1	427	533	554	523	528	505	491
nity	CaCO3 mg/l	0.1	102	156	178	172	180	168	174
pH	units	1-14	8.98	7.88	7.99	7.4	7.9	7.71	7.66
TRACE METALS:									
Aluminum	mg/l	0.1	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	0.13	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	<0.05
Manganese	mg/l	0.01	<0.01	0.03	0.02	0.02	0.02	0.02	0.02
Mercury	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.01
Nickel	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	mg/l	0.01	0.01	0.02	0.01	0.02	0.01	<0.01	<0.01
RADIOMETRIC SPECIES:									
Uranium	mg/l	0.0003	0.0012	0.03	0.0207	0.0327	0.0254	0.0253	0.03
Radium	pCi/l	0.2	3.3±0.6	351±4	375±7.5	317±5.5	268±4	262±7.4	265±6.8
QUALITY ASSURANCE DATA:									
Anion	meg	—	4.34	5.24	5.86	5.63	5.94	5.64	5.67
Cation	meg	—	4.32	5.48	5.85	5.41	5.93	5.59	5.78
A/C Balance	units	0.95-1.05	1.004	0.957	1.001	1.041	1.001	1.009	0.981
Q A/C Balance	%	-5 - +5	-0.21	2.21	-0.05	-2	-0.05	-0.44	0.96
d TDS	mg/l	—	288	327	352	333	353	335	343
TDS A/C Balance	units	0.90-1.10	1.042	0.931	0.974	1.016	0.963	1.006	0.957

REYNOLDS RANCH PROJECT BASELINE GROUNDWATER

WELL SMC-1066 (U/S-SAND)

5-Dec-89	27-Jul-90
210.8	211
5247.2	5247
269	269
N.D.	374
N.D.	1.39
14.9	N.D.
8.33	N.D.
N.D.	N.D.
N.D.	22
61	54.2
14	11
25	26.6
14.5	13.1
0	2
212	189
0	0
94	97
3.8	<0.1
0.08	0.33
0.01	<0.01
0.03	<0.01
0.24	0.18
15.8	16.3
338	304
505	519
173	158
8.2	8.35
<0.10	<0.10
<0.001	<0.001
<0.10	<0.10
<0.10	0.11
<0.01	<0.01
<0.05	<0.05
<0.01	<0.01
<0.05	<0.05
<0.05	<0.05
0.01	0.01
<0.001	<0.001
<0.01	<0.10
<0.05	<0.05
0.001	<0.001
<0.10	<0.10
<0.01	0.01
0.0175	0.0169
323±7	172±6.3
5.56	5.2
5.74	5.21
0.968	0.998
1.62	0.09
335	316
1.008	0.962

STOCKWELL UW28416P (Sec 31, T37N, R73W) (Stock/Potable)

Parameter	Units	Detection Limit	Sample Collection Dates						
			17-Apr-80	16-Jul-81	22-Sep-81	25-Jan-82	4-May-89	25-May-89	8-Jun-
FIELD MEASUREMENTS									
SWL (measured)	ft	N/A					98	N.D.	97.3
Static Water Level	ft msl	N/A	5293.4	N.D.	N.D.	N.D.	5294	N.D.	5294.7
Casing Volume	gal	N/A	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Volume Pumped	gal	N/A	N.D.	N.D.	N.D.	N.D.	240	70	150
Casing Displacement	units	N/A	N.D.	N.D.	N.D.	N.D.	—	N.D.	N.D.
Temperature	C	0.1	N.D.	14.0	11.0	10.0	10.8	10.6	10.9
pH	units	0.01	7.6	7.4	7.2	7.5	7.43	7.85	7.67
Conductivity	umho/cm	1	500	315	345	350	452	430	458
Flow	g/min	1	N.D.	25	20	23	10	10	10
MAJOR IONS:									
Calcium	mg/l	0.05	76	50	60	57	61	57.5	55.3
Magnesium	mg/l	0.01	17	14	16	16	16	15.7	14.1
Sodium	mg/l	0.05	5	9.4	7.8	7.9	8	7.2	10.1
Potassium	mg/l	0.1	3	8	5.1	4	5.7	5.1	4.3
Carbonate	mg/l	0.1	0	0	0	0	0	0	0
Bicarbonate	mg/l	0.1	268	196	194	192	220	205	215
Hydroxyl	mg/l	0.1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Sulfate	mg/l	0.5	58	52	51	51	51.2	54.4	51.5
Chloride	mg/l	0.1	8	<3	<3	<3	3.3	3.6	2.7
Ammonium (as N)	mg/l	0.05	N.D.	N.D.	N.D.	N.D.	<0.05	<0.05	0.06
Nitrite (as N)	mg/l	0.01	N.D.	N.D.	N.D.	N.D.	<0.01	0.01	0.01
Nitrate (as N)	mg/l	0.01	0.89	0.4	0.05	<0.05	0.03	0.02	0.03
Fluoride	mg/l	0.1	0.23	0.4	N.D.	N.D.	0.32	0.35	0.35
Silica	mg/l	1	N.D.	N.D.	N.D.	N.D.	12.2	11.1	12
TDS @ 180 C	mg/l	1	282	239	279	272	264	244	257
Conductivity	umho/cm	1	N.D.	N.D.	N.D.	N.D.	459	447	479
Alkalinity	CaCO3 mg/l	0.1	220	162	161	158	180	168	176
pH	units	1-14	N.D.	N.D.	N.D.	N.D.	7.78	7.66	7.88
TRACE METALS:									
Aluminum	mg/l	0.1	<0.1	<0.5	<0.5	<0.5	<0.10	<0.10	<0.1
Arsenic	mg/l	0.001	<0.01	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001
Barium	mg/l	0.1	<0.05	<0.2	<0.2	0.2	<0.10	<0.10	<0.10
Boron	mg/l	0.1	<1.0	0.1	0.1	0.1	<0.10	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	0.01	0.006	<0.005	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.02	<0.01	0.01	<0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.02	<0.05	0.017	0.27	<0.01	<0.01	<0.01
Iron	mg/l	0.05	0.53	0.04	0.19	0.27	0.35	0.46	0.31
Lead	mg/l	0.05	<0.05	<0.005	<0.005	<0.005	<0.05	<0.05	<0.05
Manganese	mg/l	0.01	0.19	<0.05	0.031	0.081	0.05	0.07	0.05
Mercury	mg/l	0.001	<0.001	0.0004	<0.0001	<0.0001	<0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	0.1	<0.005	<0.005	<0.005	<0.10	<0.10	<0.10
Nickel	mg/l	0.05	<0.04	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05
Selenium	mg/l	0.001	0.08	<0.005	0.022	0.006	0.005	0.005	0.006
Vanadium	mg/l	0.01	<0.05	<0.005	<0.005	0.011	<0.10	<0.10	<0.10
Zinc	mg/l	0.01	0.29	0.04	0.135	0.21	0.21	0.26	0.21
RADIOMETRIC SPECIES:									
Uranium	mg/l	0.0003	0.3	0.041	0.16	0.16	0.0829	0.0784	0.0737
Radium	pCi/l	0.2	5.4±0.65	0.8±0.6	1.8±0.6	1.2±0.4	1.5±0.2	2±0.3	2.3±0.5
QUALITY ASSURANCE DATA:									
Anion	meg	—					4.79	4.62	4.69
Cation	meg	—					4.97	4.73	4.52
A/C Balance	units	0.95-1.05					0.963	0.976	1.039
WDEQ A/C Balance	%	-5 - +5					1.88	1.19	-1.89
Calc'd TDS	mg/l	—					269	259	259
TDS A/C Balance	units	0.90-1.10					0.981	0.942	0.993

STOCKWELL UW28416P (Sec 31, T37N, R73W) (Stock/Potable)

21-Jun-89	6-Jul-89	2-Aug-89	12-Sep-89	5-Dec-89	27-Jul-90
N.D.	97.6	N.D.	N.D.	97.1	not sampled
N.D.	5294.4	N.D.	N.D.	5294.9	
N.D.	N.D.	N.D.	N.D.	N.D.	
N.D.	N.D.	N.D.	N.D.	N.D.	
N.D.	N.D.	N.D.	N.D.	N.D.	
11.8	11.9	14	10.4	10.4	
7.15	7.32	7.39	6.8	7.05	
451	455	410	427	N.D.	
N.D.	N.D.	10	2.75	N.D.	
61.2	61	54.9	56.7	57.8	
15.7	16	13.8	16	16.1	
9.6	8.5	7.4	9	10.7	
5.1	4.9	5.1	9	9	
0	0	0	0	0	
215	217	207	218	226	
N.D.	N.D.	0	0		
58.5	55.9	41	52.5	52.5	
2.9	3.7	3.4	3.9	2.6	
0.06	<0.05	0.1	0.07	0.84	
0.01	<0.01	0.01	<0.01	0.01	
0.02	0.02	0.02	0.04	0.04	
0.38	0.37	0.36	0.3	0.4	
14.3	12.2	15	14.3	13.1	
268	264	241	246	274	
460	430	452	444	420	
176	178	170	179	186	
7.18	8.22	7.68	7.26	7.81	
<0.10	<0.10	<0.10	<0.10	<0.10	
<0.001	<0.001	<0.001	<0.001	<0.001	
<0.10	<0.10	<0.10	<0.10	<0.10	
<0.10	<0.10	<0.10	<0.10	<0.10	
<0.01	<0.01	<0.01	<0.01	<0.01	
<0.05	<0.05	<0.05	<0.05	<0.05	
<0.01	<0.01	<0.01	<0.01	<0.01	
0.19	0.25	0.08	0.18	0.24	
<0.05	<0.05	<0.05	<0.05	<0.05	
0.05	0.05	0.04	0.05	0.04	
<0.001	<0.001	<0.001	<0.001	<0.001	
<0.10	<0.10	<0.10	<0.01	<0.01	
<0.05	<0.05	<0.05	<0.05	<0.05	
0.002	0.002	<0.001	0.003	0.008	
<0.10	<0.10	<0.10	<0.10	<0.10	
0.16	0.2	0.03	0.2	0.2	
0.0646	0.0738	0.0264	0.063	0.0855	
2.3±0.3	9.5±0.8	3.8±1.8	8±0.7	2.6±0.4	
4.85	4.85	4.36	4.8	4.9	
4.94	4.9	4.42	4.87	5.07	
0.981	0.989	0.988	0.985	0.967	
0.94	0.56	0.6	0.75	1.69	
276	272	245	272	277	
0.972	0.972	0.982	0.905	0.987	

REYNOLDS RANCH PROJECT BASELINE GROUND WATER Q

MASON WELL UW17315P (Sec 31, T37N, R74W) (Stock/Potable)

Parameter	Units	Detection Limit	Sample Collection Dates						
			4-May-89	26-May-89	9-Jun-89	22-Jun-89	6-Jul-89	2-Aug-89	13-Sep-89
FIELD MEASUREMENTS									
Static Water Level	ft msl	N/A	not sampled	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Casing Volume	gal	N/A		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Volume Pumped	gal	N/A		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Casing Displacement	units	N/A		N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Temperature	C	0.1		13.8	13.9	13.4	13.5	13.9	12.1
pH	units	0.01		7.83	7.66	7.59	6.98	7.51	7.34
Conductivity	umho/cm	1		825	872	788	822	765	799
Flow	g/min	1		1.8	N.D.	N.D.	N.D.	N.D.	0.33
MAJOR IONS:									
Calcium	mg/l	0.05		108	102	98	100	105	95.1
Magnesium	mg/l	0.01		26.5	30.4	24.4	30	31	29.2
Sodium	mg/l	0.05		30.5	29	26	27.1	27	27.7
Potassium	mg/l	0.1		3.3	2.9	3	3	3.04	5.2
Carbonate	mg/l	0.1		0	0	0	0	0	0
Bicarbonate	mg/l	0.1		275	279	271	266	264	275
Hydroxyl	mg/l	0.1		N.D.				0	0
Sulfate	mg/l	0.5		150	149	125	159	158	136
Chloride	mg/l	0.1		28.6	29.1	22.6	30	33.2	27.4
Ammonium (as N)	mg/l	0.05		<0.05	0.15	0.07	0.05	<0.05	0.06
Nitrite (as N)	mg/l	0.01		<0.01	0.01	<0.01	<0.01	0.01	0.01
Nitrate (as N)	mg/l	0.01		3.6	5.4	4	5.7	8.7	6.1
Fluoride	mg/l	0.1		0.35	0.38	0.36	0.35	0.35	0.3
Silica	mg/l	1		14.1	13.7	13.7	13.3	12.4	14.1
TDS @ 180 C	mg/l	1		540	522	473	476	527	500
Conductivity	umho/cm	1		826	815	735	787	791	754
Alkalinity	CaCO3 mg/l	0.1		225	229	222	218	216	226
pH	units	1-14		7.82	7.74	7.35	8.17	7.51	7.3
CE METALS:									
Aluminum	mg/l	0.1		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic	mg/l	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	mg/l	0.1		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Boron	mg/l	0.1		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	mg/l	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/l	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/l	0.05		0.11	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	mg/l	0.01		0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury	mg/l	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	0.01		<0.10	<0.10	<0.10	<0.10	<0.10	<0.01
Nickel	mg/l	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	mg/l	0.001		0.028	0.032	0.023	0.016	0.029	0.028
Vanadium	mg/l	0.1		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	mg/l	0.01		0.11	0.15	0.12	0.13	0.08	0.17
RADIOMETRIC SPECIES:									
Uranium	mg/l	0.0003		0.216	0.191	0.185	0.159	0.183	0.206
Radium	pCi/l	0.2		22±1	4.7±0.6	2.5±0.3	17.2±1.1	8.4±1.9	8.6±0.7
QUALITY ASSURANCE DATA:									
Anion	meg.	——		8.72	8.9	7.99	8.94	9.2	8.57
Cation	meg	——		9.1	8.99	8.15	8.77	9.15	8.6
A/C Balance	units	0.95-1.05		0.958	0.991	0.98	1.02	1.005	0.996
WDEQ A/C Balance	%	-5 - +5		2.15	0.47	1.03	-1	-0.23	0.19
Calc'd TDS	mg/l	——		516	520	467	521	541	501
TDS A/C Balance	units	0.90-1.10		1.047	1.003	1.014	0.913	0.973	0.999

MASON WEST WELL UW17314P (Sec 35, T37N, R74W) (Stock/Potable)

Parameter	Units	Detection Limit	Sample Collection Dates	
ASUREMENTS			7-Jul-89	11-Oct-89
Static Water Level	ft msl	N/A	N.D.	N.D.
Casing Volume	gal	N/A	N.D.	N.D.
Volume Pumped	gal	N/A	N.D.	N.D.
Casing Displacement	units	N/A	N.D.	N.D.
Temperature	C	0.1	18	11.9
pH	units	0.01	6.72	7.43
Conductivity	umho/cm	1	665	535
Flow	g/min	1	5gal/14min	N.D.
MAJOR IONS:				
Calcium	mg/l	0.05	91	76.7
Magnesium	mg/l	0.01	28.3	21.4
Sodium	mg/l	0.05	11.8	9.6
Potassium	mg/l	0.1	5.5	8.7
Carbonate	mg/l	0.1	0	0
Bicarbonate	mg/l	0.1	268	284
Hydroxyl	mg/l	0.1		0
Sulfate	mg/l	0.5	147	82.7
Chloride	mg/l	0.1	5	3.5
Ammonium (as N)	mg/l	0.05	<0.05	0.07
Nitrite (as N)	mg/l	0.01	0.01	<0.01
Nitrate (as N)	mg/l	0.01	0.03	0.03
Fluoride	mg/l	0.1	0.26	0.28
Silica	mg/l	1	10.5	16.7
TDS @ 180 C	mg/l	1	401	366
Conductivity	umho/cm	1	641	591
Alkalinity	CaCO3 mg/l	0.1	220	232
pH	units	1-14	8.11	7.9
TRACE METALS:				
Aluminum	mg/l	0.1	<0.10	<0.10
Arsenic	mg/l	0.001	<0.001	<0.001
Barium	mg/l	0.1	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	0.89
Lead	mg/l	0.05	<0.05	<0.05
Manganese	mg/l	0.01	0.13	0.11
Mercury	mg/l	0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.01	<0.01
Nickel	mg/l	0.05	<0.05	<0.05
Selenium	mg/l	0.001	0.001	<0.001
Vanadium	mg/l	0.1	<0.10	<0.10
Zinc	mg/l	0.01	0.75	0.06
RADIOMETRIC SPECIES:				
Uranium - D	mg/l	0.0003		0.0125
Uranium - T	mg/l	0.0003	0.026	0.0135
Ra226 - D	pCi/l	0.2		2.8±0.4
Ra226 - T	pCi/l	0.2	2.5±0.5	1.7±0.3
Th230 - D	pCi/l	0.2		<0.2
Th230 - T	pCi/l	0.2		38.6±4.4
Pb210 - D	pCi/l	0.2		<1.0
Pb210 - T	pCi/l	0.2		1.6±1
Po210 - D	pCi/l	0.2		1±0.2
Po210 - T	pCi/l	0.2		16.2±1.8
UALITY ASSURANCE DATA:				
Anion	meg	—	7.61	6.49
Cation	meg	—	7.59	6.37
A/C Balance	units	0.95-1.05	1.003	1.019
WDEQ A/C Balance	%	-5 - +5	-0.15	-0.95
Calc'd TDS	mg/l	—	434	363
TDS A/C Balance	units	0.90-1.10	0.923	1.007

HORNBUCKLE WELL (Sec 3, T36N, R74W) (Stock/Potable)

Parameter	Units	Detection Limit	Sample Collection Dates	
SUREMENTS			7-Jul-89	11-Oct-89
Static Water Level	ft msl	N/A	N.D.	N.D.
Casing Volume	gal	N/A	N.D.	N.D.
Volume Pumped	gal	N/A	N.D.	N.D.
Casing Displacement	units	N/A	N.D.	N.D.
Temperature	C	0.1	14.1	15.4
pH	units	0.01	6.84	7.56
Conductivity	umho/cm	1	453	425
Flow	g/min	1	N.D.	N.D.
MAJOR IONS:				
Calcium	mg/l	0.05	57.4	53.4
Magnesium	mg/l	0.01	16	14.8
Sodium	mg/l	0.05	10.7	10.7
Potassium	mg/l	0.1	4.7	7.2
Carbonate	mg/l	0.1	0	0
Bicarbonate	mg/l	0.1	224	228
Hydroxyl	mg/l	0.1		0
Sulfate	mg/l	0.5	48.5	40
Chloride	mg/l	0.1	5.1	3.2
Ammonium (as N)	mg/l	0.05	0.05	0.07
Nitrite (as N)	mg/l	0.01	<0.01	0.01
Nitrate (as N)	mg/l	0.01	0.01	0.2
Fluoride	mg/l	0.1	0.35	0.37
Silica	mg/l	1	16.1	16.7
TDS @ 180 C	mg/l	1	292	244
Conductivity	umho/cm	1	419	462
Alkalinity	CaCO3 mg/l	0.1	184	187
pH	units	1-14	8.09	8
CE METALS:				
Aluminum	mg/l	0.1	<0.10	<0.10
Arsenic	mg/l	0.001	<0.001	<0.001
Barium	mg/l	0.1	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05
Manganese	mg/l	0.01	0.07	0.08
Mercury	mg/l	0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.01	<0.01
Nickel	mg/l	0.05	<0.05	<0.05
Selenium	mg/l	0.001	<0.001	<0.001
Vanadium	mg/l	0.1	<0.10	<0.10
Zinc	mg/l	0.01	0.02	<0.01
RADIOMETRIC SPECIES:				
Uranium - D	mg/l	0.0003		0.0078
Uranium - T	mg/l		0.0133	0.0083
Ra226 - D	pCi/l	0.2		1.8±0.4
Ra226 - T	pCi/l	0.2	2.8±0.4	1.7±0.4
Th230 - D	pCi/l	0.2		2.4±2.3
Th230 - T	pCi/l	0.2		1±0.5
Pb210 - D	pCi/l	1.0		<1.0
Pb210 - T	pCi/l	1.0		<1.0
Po210 - D	pCi/l	1.0		<1.0
Po210 - T	pCi/l	1.0		1.4±0.3
QUALITY ASSURANCE DATA:				
Anion	meg	—	4.85	4.7
Cation	meg	—	4.8	4.62
A/C Balance	units	0.95-1.05	1.01	1.017
WDEQ A/C Balance	%	-5 - +5	-0.51	-0.82
Calc'd TDS	mg/l	—	271	262
TDS A/C Balance	units	0.90-1.10	1.077	0.931

WELL 1074 (Sec 25, T37N, R74W) (Stock/Potable)

Parameter	Units	Detection Limit	Sample Collection Dates	
ASUREMENTS			22-Jun-89	11-Oct-89
Static Water Level	ft msl	N/A	5451.3	12
Casing Volume	gal	N/A	N.D.	N.D.
Volume Pumped	gal	N/A	N.D.	N.D.
Casing Displacement	units	N/A	N.D.	N.D.
Temperature	C	0.1	11.9	13.9
pH	units	0.01	7.64	6.75
Conductivity	umho/cm	1	460	440
Flow	g/min	1	N.D.	N.D.
MAJOR IONS:				
Calcium	mg/l	0.05	64.4	65
Magnesium	mg/l	0.01	13.3	15.5
Sodium	mg/l	0.05	4.1	3.9
Potassium	mg/l	0.1	1.3	1.9
Carbonate	mg/l	0.1	0	0
Bicarbonate	mg/l	0.1	229	253
Hydroxyl	mg/l	0.1		0
Sulfate	mg/l	0.5	30.7	32.7
Chloride	mg/l	0.1	4.1	4.8
Ammonium (as N)	mg/l	0.05	0.1	0.06
Nitrite (as N)	mg/l	0.01	0.01	0.01
Nitrate (as N)	mg/l	0.01	0.88	0.93
Fluoride	mg/l	0.1	0.21	0.27
Silica	mg/l	1	10.1	11.6
TDS @ 180 C	mg/l	1	243	264
Conductivity	umho/cm	1	457	471
Alkalinity	CaCO3 mg/l	0.1	188	208
pH	units	1-14	7.67	7.83
TRACE METALS:				
Aluminum	mg/l	0.1	<0.10	<0.10
Arsenic	mg/l	0.001	<0.001	<0.001
Barium	mg/l	0.1	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05
Manganese	mg/l	0.01	<0.01	<0.01
Mercury	mg/l	0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.10	<0.01
Nickel	mg/l	0.05	<0.05	<0.05
Selenium	mg/l	0.001	0.017	0.029
Vanadium	mg/l	0.1	<0.10	<0.10
Zinc	mg/l	0.01	0.05	0.01
RADIOMETRIC SPECIES:				
Uranium - D	mg/l	0.0003	0.0372	0.0399
Uranium - T	mg/l			0.0367
Ra226 - D	pCi/l	0.2	3.8±0.4	0.2±0.2
Ra226 - T	pCi/l	0.2		<0.2
Th230 - D	pCi/l	0.2	0.6±0.2	4.5±2.5
Th230 - T	pCi/l	0.2		12.4±3
Pb210 - D	pCi/l	1.0	2.6±2.3	<1.0
Pb210 - T	pCi/l	1.0		11.7±1.3
Po210 - D	pCi/l	1.0	<1.0	2.8±0.6
Po210 - T	pCi/l	1.0		10±1.4
QUALITY ASSURANCE DATA:				
Anion	meg	—	4.58	5.05
Cation	meg	—	4.55	4.82
A/C Balance	units	0.95-1.05	1.008	1.046
WDEQ A/C Balance	%	-5 - +5	-0.38	-2.26
Calc'd TDS	mg/l	—	247	267
TDS A/C Balance	units	0.90-1.10	0.984	0.989

WELL 1075 (Sec 25, T37N, R74W) (Stock/Potable)

Parameter	Units	Detection Limit	Sample Collection Dates	
ASUREMENTS			22-Jun-89	11-Oct-89
Static Water Level	ft msl	N/A	5475	24.1
Casing Volume	gal	N/A	N.D.	N.D.
Volume Pumped	gal	N/A	N.D.	N.D.
Casing Displacement	units	N/A	N.D.	N.D.
Temperature	C	0.1	11.9	10.5
pH	units	0.01	7.77	6.93
Conductivity	umho/cm	1	384	444
Flow	g/min	1	N.D.	N.D.
MAJOR IONS:				
Calcium	mg/l	0.05	49	58.6
Magnesium	mg/l	0.01	16.4	20.9
Sodium	mg/l	0.05	2.1	2.9
Potassium	mg/l	0.1	2.75	5.3
Carbonate	mg/l	0.1	0	0
Bicarbonate	mg/l	0.1	217	284
Hydroxyl	mg/l	0.1		0
Sulfate	mg/l	0.5	11.5	7.9
Chloride	mg/l	0.1	1.2	1.6
Ammonium (as N)	mg/l	0.05	0.1	0.17
Nitrite (as N)	mg/l	0.01	<0.01	0.01
Nitrate (as N)	mg/l	0.01	1.02	1.64
Fluoride	mg/l	0.1	0.16	0.14
Silica	mg/l	1	9.6	10.1
TDS @ 180 C	mg/l	1	204	248
Conductivity	umho/cm	1	381	482
Alkalinity	CaCO3 mg/l	0.1	178	233
pH	units	1-14	7.39	7.85
TRACE METALS:				
Aluminum	mg/l	0.1	<0.10	0.11
Arsenic	mg/l	0.001	<0.001	<0.001
Barium	mg/l	0.1	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05
Copper	mg/l	0.01	<0.01	<0.01
Iron	mg/l	0.05	<0.05	0.18
Lead	mg/l	0.05	<0.05	<0.05
Manganese	mg/l	0.01	<0.01	0.06
Mercury	mg/l	0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.10	<0.01
Nickel	mg/l	0.05	<0.05	<0.05
Selenium	mg/l	0.001	0.003	0.002
Vanadium	mg/l	0.1	<0.10	<0.10
Zinc	mg/l	0.01	0.06	0.01
RADIOMETRIC SPECIES:				
Uranium - D	mg/l	0.0003	0.0113	0.0142
Uranium - T	mg/l	0.0003		0.0032
Ra226 - D	pCi/l	0.2	1.4±0.2	0.4±0.3
Ra226 - T	pCi/l	0.2		0.8±0.3
Th230 - D	pCi/l	0.2	1.3±0.3	3.1±2.4
Th230 - T	pCi/l	0.2		3.8±2.5
Pb210 - D	pCi/l	1.0	2.8±2.3	2.8±1.1
Pb210 - T	pCi/l	1.0		4.5±1.1
Po210 - D	pCi/l	1.0	1.4±0.9	3±0.6
Po210 - T	pCi/l	1.0		2.4±0.5
QUALITY ASSURANCE DATA:				
Anion	meg	—	3.91	4.99
Cation	meg	—	3.99	5.01
A/C Balance	units	0.95-1.05	0.981	0.995
WDEQ A/C Balance	%	-5 - +5	0.96	0.24
Calc'd TDS	mg/l	—	206	258
TDS A/C Balance	units	0.90-1.10	0.991	0.962

WINDMILL SEC. 36 (Sec 36, T37N, R74W) (Stock/Potable)

Parameter	Units	Detection Limit	Sample Collection Dates					
LD MEASUREMENTS			4-May-89	26-May-89	8-Jun-89	6-Jul-89	2-Aug-89	12-Sep-89
Static Water Level	ft msl	N/A	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Casing Volume	gal	N/A	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Volume Pumped	gal	N/A	3360	N.D.	N.D.	N.D.	N.D.	N.D.
Casing Displacement	units	N/A	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Temperature	C	0.1	10.3	12.0	11.6	14.2	13.9	10.6
pH	units	0.01	7.42	7.47	7.53	7.18	7.44	7.13
Conductivity	umho/cm	1	470	494	501	488	493	475
Flow	g/min	1	2.3	2	N.D.	N.D.	2	1.25
MAJOR IONS:								
Calcium	mg/l	0.05	69.5	67.7	67.7	74	69.3	72
Magnesium	mg/l	0.01	15.9	16.2	17.6	18	16.6	17.9
Sodium	mg/l	0.05	4	2.7	5.7	5.8	2.62	4.6
Potassium	mg/l	0.1	2.7	2.6	2.4	2.4	2.8	2.6
Carbonate	mg/l	0.1	0	0	0	0	0	0
Bicarbonate	mg/l	0.1	248	232	248	247	239	251
Hydroxyl	mg/l	0.1	N.D.	N.D.	N.D.	N.D.	0	0
Sulfate	mg/l	1	45.9	48	47.5	53.8	51.3	50.5
Chloride	mg/l	0.1	3.1	2.7	2	10.1	2.7	1.9
Ammonium (as N)	mg/l	0.05	0.16	0.08	<0.05	<0.05	0.07	0.09
Nitrite (as N)	mg/l	0.01	0.03	0.01	0.02	0.02	0.02	0.03
Nitrate (as N)	mg/l	0.01	0.45	0.16	0.5	0.21	0.27	1.01
Fluoride	mg/l	0.1	0.32	0.35	0.36	0.35	0.35	0.3
Silica	mg/l	1	12.6	12.6	12.4	12.6	13.7	12.6
TDS @ 180 C	mg/l	1	278	270	266	304	286	276
Conductivity	umho/cm	1	496	477	516	490	471	460
Alkalinity	CaCO3 mg/l	0.1	204	190	203	202	196	206
pH	units	0.01	7.65	7.6	7.4	8.04	7.27	7
E METALS:								
Aluminum	mg/l	0.1	<0.10	0.16	<0.10	<0.10	<0.10	<0.10
Arsenic	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Boron	mg/l	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	mg/l	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/l	0.05	4.9	1.1	0.45	0.28	0.21	0.35
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Manganese	mg/l	0.01	0.06	0.08	0.06	0.06	0.07	0.06
Mercury	mg/l	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Molybdenum	mg/l	0.1	<0.10	<0.10	<0.10	<0.01	<0.01	<0.01
Nickel	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	mg/l	0.001	0.019	0.015	0.018	0.014	0.023	0.02
Vanadium	mg/l	0.01	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	mg/l	0.01	0.11	0.03	0.02	0.05	0.04	0.04
RADIOMETRIC SPECIES:								
Uranium	mg/l	0.0003	0.349	0.152	0.24	0.165	0.176	0.224
Radium	pCi/l	0.2	2.9±0.3	13.8±0.4	6.4±0.6	8.4±0.7	7.8±2	35.3±1.4
QUALITY ASSURANCE DATA:								
Anion	meg	——	5.16	4.91	5.17	5.49	5.1	5.31
Cation	meg	——	5.39	5.06	5.19	5.54	5.11	5.45
A/C Balance	units	——	0.957	0.971	0.995	0.991	0.998	0.975
WDEQ A/C Balance	%	——	2.2	1.48	0.26	0.43	0.11	1.27
Calc'd TDS	mg/l	——	286	272	283	302	281	294
TDS A/C Balance	units	——	0.971	0.994	0.941	1.006	1.017	0.94

WINDMILL SEC. 36 (Sec 36, T37N, R74W) (Stock/Potable)

5-Dec-89	27-Jul-90
N.D.	N.D.
N.D.	N.D.
N.D.	N.D.
N.D.	N.D.
10.7	N.D.
7.24	N.D.
N.D.	N.D.
3	N.D.
65.2	66.1
16.6	18.3
6.1	5.2
4.6	3.6
0	0
246	250
0	0
45	51
1.9	1.8
0.11	0.66
0.01	0.01
0.16	0.16
0.42	0.27
11.3	13.1
282	275
431	481
202	205
7.6	8.01
<0.10	<0.10
<0.001	<0.001
<0.10	<0.10
<0.10	<0.10
<0.01	<0.01
<0.05	<0.05
<0.01	<0.01
0.87	<0.05
<0.05	<0.05
0.06	0.07
<0.001	<0.001
<0.01	<0.10
<0.05	<0.05
0.014	0.025
<0.10	<0.10
0.03	<0.01
0.183	0.3906
7±0.6	5.6±0.7
5.06	5.24
5.14	5.27
0.983	0.994
0.84	0.31
277	287
1.019	0.958

WINDMILL SEC. 32 (Sec 32, T37N, R73W) (Stock/Potable)

Parameter	Units	Detection Limit	Sample Collection Dates						
			5-Nov-89	20-May-90					
RADIOMETRIC SPECIES:									
Uranium - D	mg/l	0.0003	0.023	0.003					
Uranium - T	mg/l	0.0003	0.056	0.0077					
Ra226 - D	pCi/l	0.2	3.4±0.4	1.6±0.4					
Ra226 - T	pCi/l	0.2	8.2±0.5	1.7±0.4					
Th230 - D	pCi/l	0.2	<0.2	<0.2					
Th230 - T	pCi/l	0.2	<0.2	<0.2					
Pb210 - D	pCi/l	1.0	<1.0	<1.0					
Pb210 - T	pCi/l	1.0	52.2±3.2	<1.0					
Po210 - D	pCi/l	1.0	<1.0	<1.0					
Po210 -T	pCi/l	1.0	<1.0	<1.0					

WINDMILL SEC. 1 (Sec 1, T36N, R74W) (Stock/Potable)

Parameter	Units	Detection Limit	Sample Collection Dates						
			6-Nov-89	20-May-90					
RADIOMETRIC SPECIES:									
Uranium - D	mg/l	0.0003	0.012	0.0065					
Uranium - T	mg/l	0.0003	0.014	0.0071					
Ra226 - D	pCi/l	0.2	<0.2	<0.2					
Ra226 - T	pCi/l	0.2	0.9±0.2	0.5±0.3					
Th230 - D	pCi/l	0.2	<0.2	<0.2					
Th230 - T	pCi/l	0.2	<0.2	2.3±2.3					
Pb210 - D	pCi/l	1.0	1.4±1	<1.0					
Pb210 - T	pCi/l	1.0	7.7±1.1	<1.0					
Po210 - D	pCi/l	1.0	<1.0	<1.0					
Po210 -T	pCi/l	1.0	<1.0	<1.0					

STOCKPOND SEC. 31 (Sec 31, T37N, R73W) (Surface Water)

Parameter	Units	Detection Limit	Sample Collection Dates		
			6-Jul-89	11-Oct-89	20-May-90
F[illegible] MEASUREMENTS					
Temperature	C	0.1	N.D.	14.4	N.D.
pH	units	0.01	N.D.	7.82	N.D.
Conductivity	umho/cm	1	N.D.	247	N.D.
Flow	g/min	1	N.D.	N.D.	N.D.
MAJOR IONS:					
Calcium	mg/l	0.05		30	32.1
Magnesium	mg/l	0.01		5.2	5.1
Sodium	mg/l	0.05		1	1.3
Potassium	mg/l	0.1		8.8	9.9
Carbonate	mg/l	0.1		0	0
Bicarbonate	mg/l	0.1		124	144
Hydroxyl	mg/l	0.1		0	0
Sulfate	mg/l	1		17.4	2.6
Chloride	mg/l	0.1		<0.1	<1.0
Ammonium (as N)	mg/l	0.05		1.46	0.69
Nitrite (as N)	mg/l	0.01		0.01	0.01
Nitrate (as N)	mg/l	0.01		0.32	0.03
Fluoride	mg/l	0.1		0.14	0.14
Silica	mg/l	1		13.1	6.63
TDS @ 180 C	mg/l	1		138	134
Conductivity	umho/cm	1		282	276
Alkalinity	CaCO3 mg/l	0.1		273	118
pH	units	1-14		7.72	7.5
TRACE METALS:					
Aluminum	mg/l	0.1		0.43	<0.10
Arsenic	mg/l	0.001		0.008	0.002
Barium	mg/l	0.1		<0.10	<0.10
Boron	mg/l	0.1		<0.10	<0.10
Cadmium	mg/l	0.01		<0.01	<0.01
Chromium	mg/l	0.05		<0.05	<0.05
Copper	mg/l	0.01		<0.01	0.07
Iron	mg/l	0.05		1.1	<0.05
Lead	mg/l	0.05		<0.05	<0.05
Manganese	mg/l	0.01		0.47	<0.01
Mercury	mg/l	0.001		<0.001	<0.001
Molybdenum	mg/l	0.1		<0.01	<0.10
Nickel	mg/l	0.05		<0.05	<0.05
Selenium	mg/l	0.001		<0.001	0.001
Vanadium	mg/l	0.01		<0.10	<0.10
Zinc	mg/l	0.01		0.01	0.04
RADIOMETRIC SPECIES:					
Uranium - D	mg/l	0.0003		0.0029	0.0024
Uranium - T	mg/l	0.0003	0.0136	0.0017	0.003
Ra226 - D	pCi/l	0.2		0.4±0.2	<0.2
Ra226 - T	pCi/l	0.2	24.2±1.0	0.7±0.3	<0.2
Th230 - D	pCi/l	0.2		4.5±2.5	<0.2
Th230 - T	pCi/l	0.2	12.3±4.6	2.8±2.4	<0.2
Pb210 - D	pCi/l	1		1.3±1	<0.1
Pb210 - T	pCi/l	1	11.2±4.6	1.3±1	<0.1
Po210 - D	pCi/l	1		2±0.5	<0.1
Po210 - T	pCi/l	1	7.2±1.3	1.6±0.4	<0.1
UALITY ASSURANCE DATA:					
Anion	meg	—		2.43	2.45
Cation	meg	—		2.48	2.46
A/C Balance	units	0.95-1.05		0.981	0.999
WDEQ A/C Balance	%	-5 - +5		0.94	0.04
Calc'd TDS	mg/l	—		143	133
TDS A/C Balance	units	0.90-1.10		0.963	1.011

SILVER SPOON RES. (Sec ~~31~~ 12, T37N, R73W) (Surface Water)

Parameter	Units	Detection Limit	Sample Collection Dates						
			6-Nov-89	20-May-90					
RADIOMETRIC SPECIES:									
Uranium - D	mg/l	0.0003	0.0003	0.0006					
Uranium - T	mg/l	0.0003	0.0006	0.0006					
Ra226 - D	pCi/l	0.2	<0.2	<0.2					
Ra226 - T	pCi/l	0.2	0.7±0.2	0.3±0.3					
Th230 - D	pCi/l	0.2	<0.2	<0.2					
Th230 - T	pCi/l	0.2	6.5±4.6	<0.2					
Pb210 - D	pCi/l	1.0	1.8±1	<1.0					
Pb210 - T	pCi/l	1.0	1.2±1	<1.0					
Po210 - D	pCi/l	1.0	3.7±0.2	<1.0					
Po210 -T	pCi/l	1.0	12.2±0.5	<1.0					

MARTIN SPRINGS (Sec 31, T37N, R73W) (Surface Water)

Parameter	Units	Detection Limit	Sample Collection Dates						
			6-Nov-89	20-May-90					
RADIOMETRIC SPECIES:									
Uranium - D	mg/l	0.0003	0.296	0.174					
Uranium - T	mg/l	0.0003	0.312	0.182					
Ra226 - D	pCi/l	0.2	0.3±0.2	<0.2					
Ra226 - T	pCi/l	0.2	6.8±0.5	<0.2					
Th230 - D	pCi/l	0.2	<0.2	<0.2					
Th230 - T	pCi/l	0.2	122±19	<0.2					
Pb210 - D	pCi/l	1.0	<1.0	<1.0					
Pb210 - T	pCi/l	1.0	<1.0	<1.0					
Po210 - D	pCi/l	1.0	<1.0	<1.0					
Po210 -T	pCi/l	1.0	8.4±0.4	<1.0					

BROWN SPRINGS CREEK (Sec·31, T37N, R73W) (Surface Water)

Parameter	Units	Detection Limit	Sample Collection Dates						
			5-Nov-89	20-May-90					
RADIOMETRIC SPECIES:									
Uranium - D	mg/l	0.0003	0.056	0.0266					
Uranium - T	mg/l	0.0003	0.056	0.0277					
Ra226 - D	pCi/l	0.2	<0.2	<0.2					
Ra226 - T	pCi/l	0.2	<0.2	<0.2					
Th230 - D	pCi/l	0.2	<0.2	<0.2					
Th230 - T	pCi/l	0.2	14.9±5.2	1.2±1.2					
Pb210 - D	pCi/l	1.0	<1.0	<1.0					
Pb210 - T	pCi/l	1.0	<1.0	1.2±1.2					
Po210 - D	pCi/l	1.0	<1.0	<1.0					
Po210 -T	pCi/l	1.0	<1.0	<1.0					

Note: Samples collected at the intersection of Ross Road and Brown Springs Creek.