Municipal Pump Monitor Demonstration Project

Energy Division

January 1991

FINAL REPORT

Municipal Pump Monitor Demonstration Project

to

Idaho Department of Water Resources
Energy Division

by

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DISCLAIMER

Any opinions, findings, conclusions or recommendations including the mention of brand names of equipment expressed herein are those of the author and do not necessarily reflect the views or endorsement of IDWR.

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ABSTRACT

This report covers the demonstration of electronic pump efficiency monitoring demonstrated on two municipal water supply wells in Idaho. One of the wells monitored was a variable speed pump and the other was a fixed speed pump. Both of the monitoring systems were operated for a five month period during the summer and fall of 1989. The efficiency data collected showed that the fixed speed pump was operated at an average energy efficiency of 65 percent. The energy efficiency of the variable speed pump ranged from 9 to 65 percent. The variable speed pump was operated by the municipal water department to maintain a constant pressure in the water supply system. The wire to water energy efficiency of the pump was closely related to pump speed and consequently the discharge rate.

The efficiency monitors demonstrated were constructed from readily available components, and can be assembled by local electronic hobbyists. The system consists of HP41CX programmable calculator, CMT–200 HP/IL interface, a signal conditioning unit and various sensors. In addition to energy efficiency, the system tracks discharge, pressure, water level, input energy, pump speed and production costs.

INTRODUCTION

Since the mid 1980's the University of Idaho has been involved in monitoring energy efficiencies of agricultural water supplies. The University developed several low cost electronic systems which allowed the irrigators to monitor and examine their energy efficiency on a real time basis. These monitors were demonstrated on irrigation systems located along the Snake River. In the late 1980's the monitoring systems were revised to function as data collection platforms for Water District #1, providing time tagged flow data for water accounting purposes. In 1988, a cooperative project with the Idaho Department of Water Resources was initiated to demonstrate these monitors on municipal pumping systems, especially variable speed pumping systems.

An electronic pump efficiency monitor consists of a micro processor and sensors for electrical input power, discharge pressure, suction lift and flow. The micro processor converts the sensor signals into numerical form and combines the values into a single number which represents the amount of input energy transferred to the water leaving the pumping system.

OBJECTIVES

The demonstration project entered into by the University of Idaho called for demonstration of two pump monitor systems on municipal systems located in southern Idaho. The objectives of the project were:

1. To demonstrate the electronic monitoring equipment and usage on two municipal water supply wells.

2. To evaluate the energy efficiency of variable speed pumps in a municipal water supply system.

3. To conduct two tours of the demonstration sites for interested groups.

4. To prepare an operation manual for the electronic monitors.

SITE SELECTION

During the fall and winter of 1988, municipal water supply systems were examined and visited for possible selection as the demonstration sites. Due to funding constraints the criteria for pump system selection were:

1. Location

2. Existing instrumentation

3. Operator co—operation

4. Pump operation

After reviewing several systems from American Falls to Mountain Home, Sun Valley Well Number 7 and Ketchum Northwoods Well were selected as the two demonstration sites.

KETCHUM NORTHWOODS WELL

The City of Ketchum's Northwoods production well consists of a variable speed motor and pump capable of producing 1885 gpm at a total dynamic head of 230 ft. The well is located northeast of the Warm Springs Bridge over the Big Wood River. Existing instrumentation at the Northwoods Well included a working flow meter with electronic output signal, motor speed signal and a working air tube for determining the water level in the well. The pump house was sufficiently large for installation of the pump monitor equipment.

The operational objective of the Ketchum Northwoods Well is to maintain a pressure of 92 psi in the water distribution system at the Northwoods connection. As the pressure in the distribution system changes, the motor/pump controller changes the pump speed resulting in a change in the pump discharge. The system uses an Emerson speed controller which varies the pump speed from 70 percent to 110 percent of rated speed based on the delivery system pressure.

SUN VALLEY WELL NO. 7

The City of Sun Valley's production well number 7 is located to the south of Ketchum on River Road just west of the Elkhorn Road intersection with State Highway 75. The pump and well is capable of producing 1050 gpm at a total dynamic head of 464 feet. Existing instrumentation at this location included a Sparling propellor flow meter with electrical signal output and an water level air tube.

Sun Valley operates this production well as second in line with three other production wells located along River Road. These wells lift water to storage tanks located near

Elkhorn on Dollar Mountain. As the water level fluctuates in the storage tanks, the pumps automatically turn on and off.

ELECTRONIC MONITORS

The electronic efficiency monitoring package is comprised of three major systems: operating and data storage, sensor interface and conditioning, and sensors. Besides controlling the data collection, the monitor performs energy efficiency and pumping cost calculations. The energy efficiency of the pumping system is calculated by the monitor using the following equation:

$$E = 100 * \frac{62.4 * Q * (DP - PL)}{550 * IP} \qquad [1]$$

where

E	energy efficiency, %
Q	flow rate, ft^3/sec
DP	discharge pressure head, ft
PL	pumping lift, ft
IP	input power, hp

The pumping cost computations are performed with the following equation.

$$Cost = k * \frac{EC * IP}{3600 * Q} \qquad [2]$$

where

Cost	Pumping cost, $
k	Conversion factor for pumping cost units
	43560 for $/acre foot
	133.68 for $/thousand gallons
	133680 for $/million gallons
EC	Energy cost, $/kwh
IP	Input Power, kw
Q	flow rate, ft^3/sec

Operating and Data Storage System

The heart of the package is the operating and storage system. The operating system consists of a HP–41CX programmable calculator with 2 extended memory modules. The calculator comes with a standard clock and alarm system which allows the system to automatically scan the various inputs and summarize the data from the sensors. The extended memory modules allow for the intermediate storage of the summarized data until it can be dumped to a printer or transferred to other storage media. Currently, the extended memory modules allow for the collection of 20 minute interval data for a period of two days. As the interval is increased, the time between data transfers increases.

Sensor Interface and Signal Conditioning System

The calculator accesses sensor data through the interface and conditioning units. This system consists of a CMT–200 data acquisition unit from Corvallis Microtechnologies Inc. and a custom signal conditioning unit, MADD. The CMT–200 provides the necessary data format conversion to and from HP to binary, an 8 bit output and input bus for the MADD unit and pulse timing functions.

The MADD unit provides the sensor power, analog to digital conversions and sensor multiplexing. As instructed by the operating program in the HP–41CX via the CMT–200, the MADD unit scans each sensor and provides a digital value or sends a pulse train. This unit is custom designed depending on the sensors used.

SENSOR PACKAGE

The sensor package for a pumping station is tailored to meet that specific pumping system. The package consists of a minimum of four sensor systems: input power, flow rate, discharge pressure and pumping lift. Each sensor parameter is unique on individual systems and the type of sensor used depends on the system and how the pumping system is defined.

Input Power

The input power to a pump system is typically detected with the power supplier's watt hour meter. The utility can usually supply a watt hour meter with a pulse initiator circuit. A problem sometimes faced when using the meter provided by the utility is that it may be measuring power consumed by more than just the pump, such as building heaters, ventilation fans, and other equipment. If there are energy loads other than the pump and associated pump controllers measured by the utility meter then a separate meter with a pulse initiator circuit and associated current transformers will be required. A qualified electrician is usually needed for installation.

Flow Rate

The discharge or flow rate of municipal pumping systems is typically measured with some form of in–line flow meter. The pump monitor can accommodate any type of flow meter – propellor, impellor, venturi, or orfice plate – as long as the flow measurement system provides an electronic output signal indicating the flow. Currently, the pump monitors are designed to process pulsed signals. One of the limitations of any flow meter is the accuracy of the measurement. Most flow meters are not better than 5 percent, and probably closer to 10 percent accurate depending on their installation. Except for affecting the meter's accuracy, the location of the meter in the pipe system does not impact the measurement of the energy efficiency.

Discharge Pressure

The discharge pressure of municipal systems is typically measured with a mechanical pressure gauge. These pressure gauges do not provide an electronic output signal which can be used for input to the pump monitor. Commercial pressure transducers are readily available which interface with the current monitor design. The monitor is currently setup for strain gauge type transducers which require a filtered 10 volt DC power supply and output a millivolt signal proportional to the pressure. The installation location of the discharge pressure transducer is critical to the energy efficiency measurement since it defines a boundary of the pumping system. All

energy losses associated with pipe, pipe fittings and valves upstream of this sensor will be included in the energy efficiency of the pumping system. The accuracy of the transducers are typically one percent of full scale.

Pumping Lift

The pumping lift or pumping level is typically the depth to water in the supply well on municipal systems. Most municipal systems are equipped with air lines to measure the depth to water and are readily incorporated into the pump monitor system. An inexpensive pressure transducer with a needle valve, air supply and miscellaneous fittings will adapt an existing air line for use by the monitor. If the pumping system consists of an in–line pump then a pressure transducer is required on the inlet side of the pump. The location of the "pumping lift" transducer is important because, like the discharge pressure transducer, it defines a boundary of the pumping system. All energy losses associated with the pipe, trash screens, intake/inlet fittings downstream to the pump are included in the energy efficiency of the pumping system.

EQUIPMENT AND INSTALLATION

Installation of the pump monitoring equipment on the Ketchum Northwoods Well and Sun Valley Well Number 7 commenced during the spring of 1989. Additional watthour meters were required for both installations and their acquisition and installation created delays.

KETCHUM NORTHWOODS WELL

At the Northwoods well, the existing flow meter, air tube and speed controller were used for the monitoring system. The Micrometer Flow meter was equipped with a recording chart module which additionally had a 0 to 5 volt pulsing output. The pumping lift sensing system required an air compressor for the air supply, a needle valve for controlling the rate of air and a low pressure transducer, 0 to 15 psi, for monitoring the pressure in the air line. A high pressure transducer was required for the discharge pressure parameter. It was installed upstream of the flow meter and downstream of the control valving for pump start up and shut down.

Due to the other power loads in the pump house, an additional digital watthour meter was required and installed. The voltage taps and current transformers were installed on the input to the speed controller. This arrangement included any energy losses due to the speed controller in the energy efficiency of the pumping system.

Because the Northwoods pump is a variable speed pump, the monitor was retrofitted to include speed as a parameter. The speed of the motor was obtained from a 0 to 10 volt output signal from the speed controller.

SUN VALLEY WELL NUMBER 7

At the Sun Valley Well Number 7, the existing flow meter was used. The Sparling metering system included a pulsed 110 volt AC signal output. The monitor interface was retrofitted to handle the high voltage signal transforming it to a 0 to 5 volt DC pulse train. Originally, the air line was to be used; however, due to problems with

determining the length of the air line and leaks in the line, another air line was installed in the well in addition to the air supply, needle valve and low pressure transducer. The discharge pressure transducer was installed upstream of the flow meter on an existing hose tap used for irrigation.

Due to other power loads in the pump house, a digital watthour meter was required and installed. The voltage taps and current transformers were installed on the leads entering the pump control panel.

OPERATION

The monitors were operated at the two locations from mid June to November 1989. During the period of operation the monitors were programmed to gather data on various frequencies. Initially, the monitors were setup to determine the energy efficiency every fifteen minutes and to store the average efficiency hourly. Later the monitors were reprogrammed to collect efficiency data on twenty minute intervals and to store the average efficiency out on a four hour interval. Twice during the period of operation, the monitors were programmed to scan and determined the energy efficiency on a five minute interval and to store the resulting average energy efficiency out on a fifteen minute basis.

Several interruptions in the operation of the monitors were encountered due to errors in monitor operator error, pump motor failures and pump controller failures.

KETCHUM NORTHWOODS WELL

During the operation of the pump efficiency monitor at the Northwoods well, the pump motor failed for a two week period. Near the end of the monitoring period the pump again failed. Since the pump was required to be out of service during installation and removal of the monitoring equipment, it was suggested by the Ketchum Water Department the efficiency monitor be removed at that time instead of waiting for the end of December. For this reason, a five month data collection and demonstration period was achieved instead of the planned six months.

DEMONSTRATION TOUR

A demonstration of the pump monitors was held July 14, 1989 in conjunction with an Idaho Technical Committee on Hydrology (ITCH) meeting in Sun Valley. Invitations were sent to 56 water supervisors, agency personnel and contractors; however, only 12 attended the demonstration, of which 10 were associated with the ITCH committee. The tour also included a demonstration of an ultrasonic closed–conduit flow meter by the USGS. The discharge indicated by the ultrasonic meter agreed well with that of the in–line flow meter reported by the pump monitor.

PRESENTATIONS

Due to poor attendance at the demonstration tour, a presentation of the project's methods and results was made to the Idaho Municipal Water and Wastewater Operators Conference in Post Falls, Idaho during May 1990. The attendance at the presentation was limited. Only five operators attended the presentation.

RESULTS

The monitors installed on the two municipal production wells recorded energy efficiencies from 9 to 70 percent. The monitors were able to document the diurnal fluctuations in the discharge and energy efficiency of both systems and provided meaningful data.

KETCHUM NORTHWOODS WELL

The variable speed pump at the Northwoods well displayed a well defined relationship between discharge and speed as shown Figure 1. At lower speeds the pump appears to 'hunt' for the proper flow rate. The energy efficiency of the pumping system is very dependent on the discharge of the system as shown in Figure 2. The pump achieved an energy efficiency of 63 percent when discharging at its maximum capacity of 4 cfs or full speed. As the pump speed decreased to maintain the appropriate discharge pressure, the discharge and energy efficiency decreased. The lowest efficiency observed was 5 percent at a flow rate of .2 cfs, 89.8 gpm, were the pump was operating at 1200 rpm or 67 percent of full speed.

During the demonstration period the pump monitor was able to track the diurnal fluctuations in the discharge, speed and efficiency of the system. The discharge and efficiency from the Northwoods well during a short period of the demonstration period is shown in Figure 3. The efficiency tracks the discharge from the well consistently. From the figure, it is apparent that the Ketchum water supply system experiences two demand peaks each day, once during the morning, and another during the late evening.

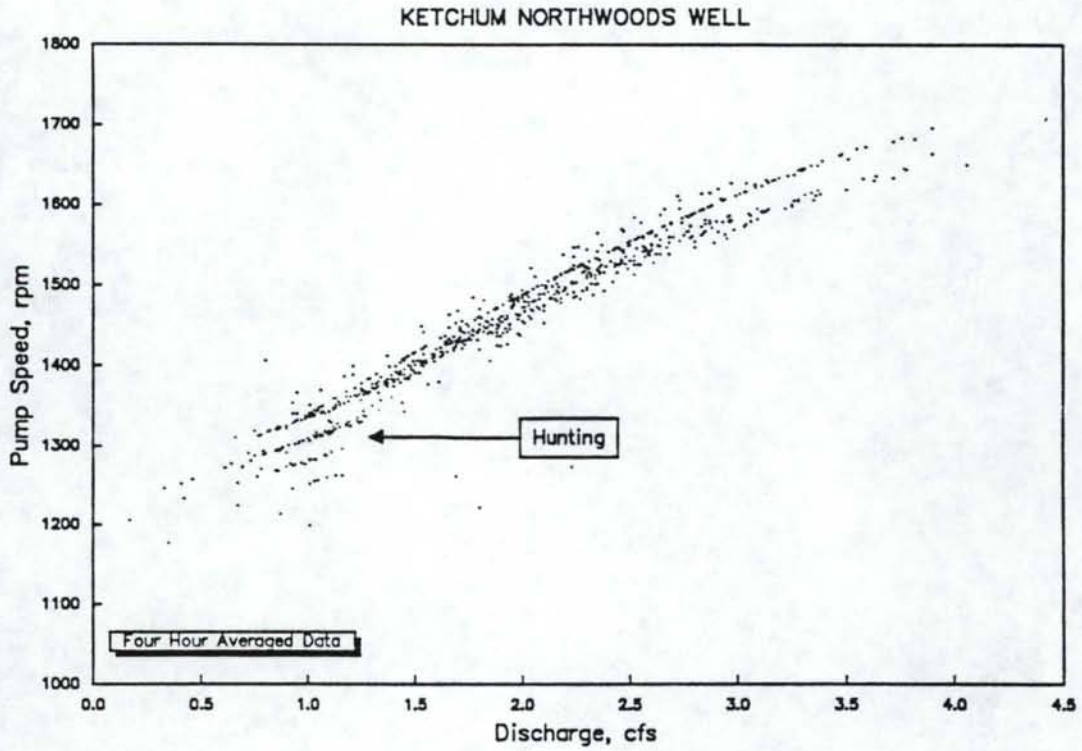

Figure 1. Northwoods Relationship between Discharge and Speed.

Over the entire monitoring period these daily fluctuations were observed as shown in Figure 4. The fall demand on the pump is quite different from the summer demand. Throughout the demonstration period, the other production wells for Ketchum were turned on and off depending on the total system demand.

During the period from June through July, the Northwoods Well was operated in conjunction with Ketchum Wells No. 1 (200 hours), No. 2 and Bigwood. In August, the operation consisted of Northwoods, Bigwood, No. 1 (230 hours) and No. 2 (400 hours). During September, Bigwood (300 hours) and Well No. 1 (200 hours) were operated with the Northwoods Well. From October through November 8th, Northwoods and Trail Creek wells were the primary supply with minor assistance from Well No. 1. After November 8th, Northwoods was shut down due to low flows.

The energy cost associated with production from the Northwoods Well is shown in Figure 5. As expected, at the lower flow rates the cost for pumping increases. The cost of producing 1000 gallons of water ranged from $0.04 to $0.46. The cost of production increases substantially for flow rates below 1.5 cfs.

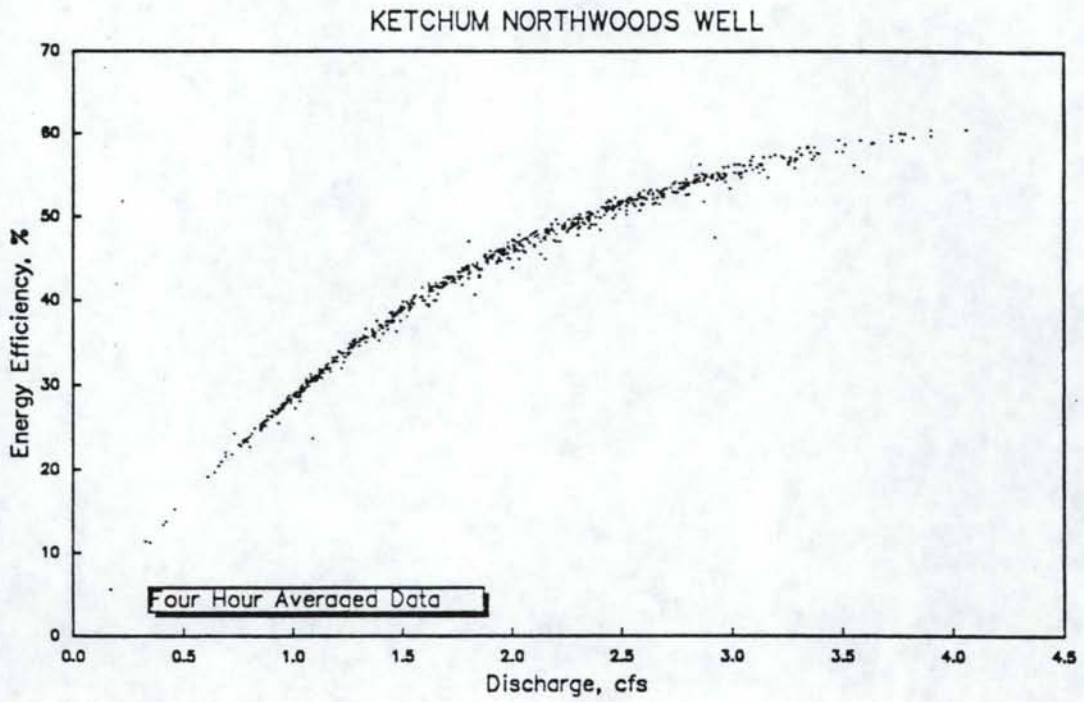

Figure 2. Northwoods Efficiency as function of Discharge.

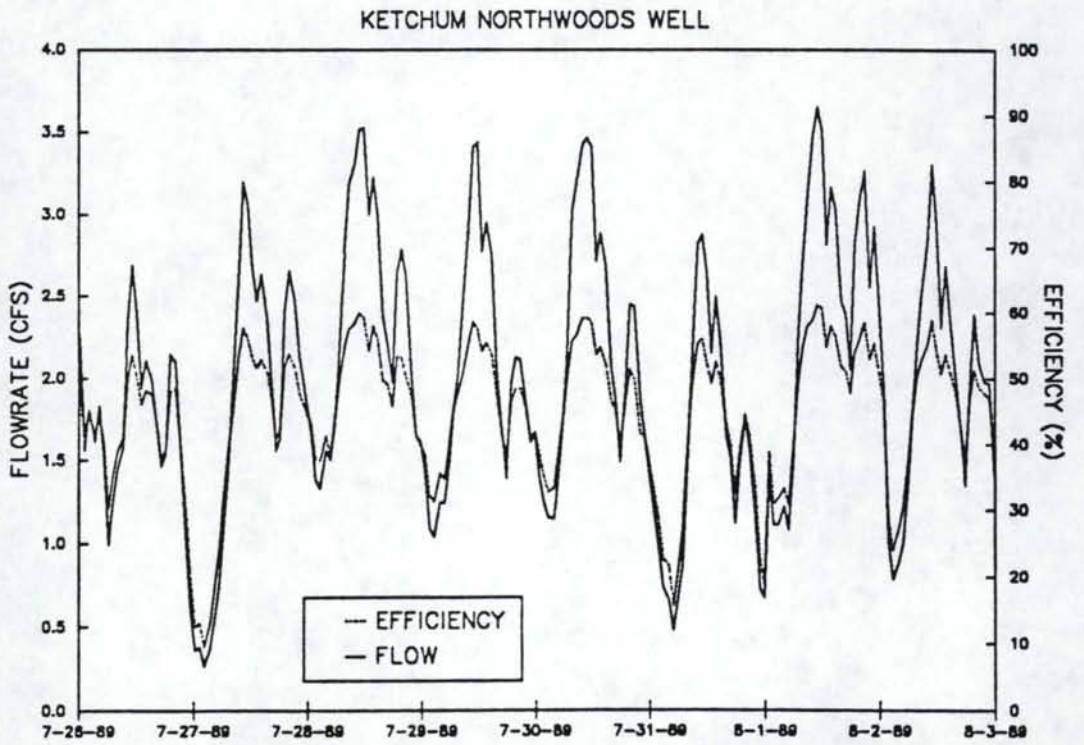

Figure 3. Northwoods Diurual Fluctuations in Flow and Efficiency.

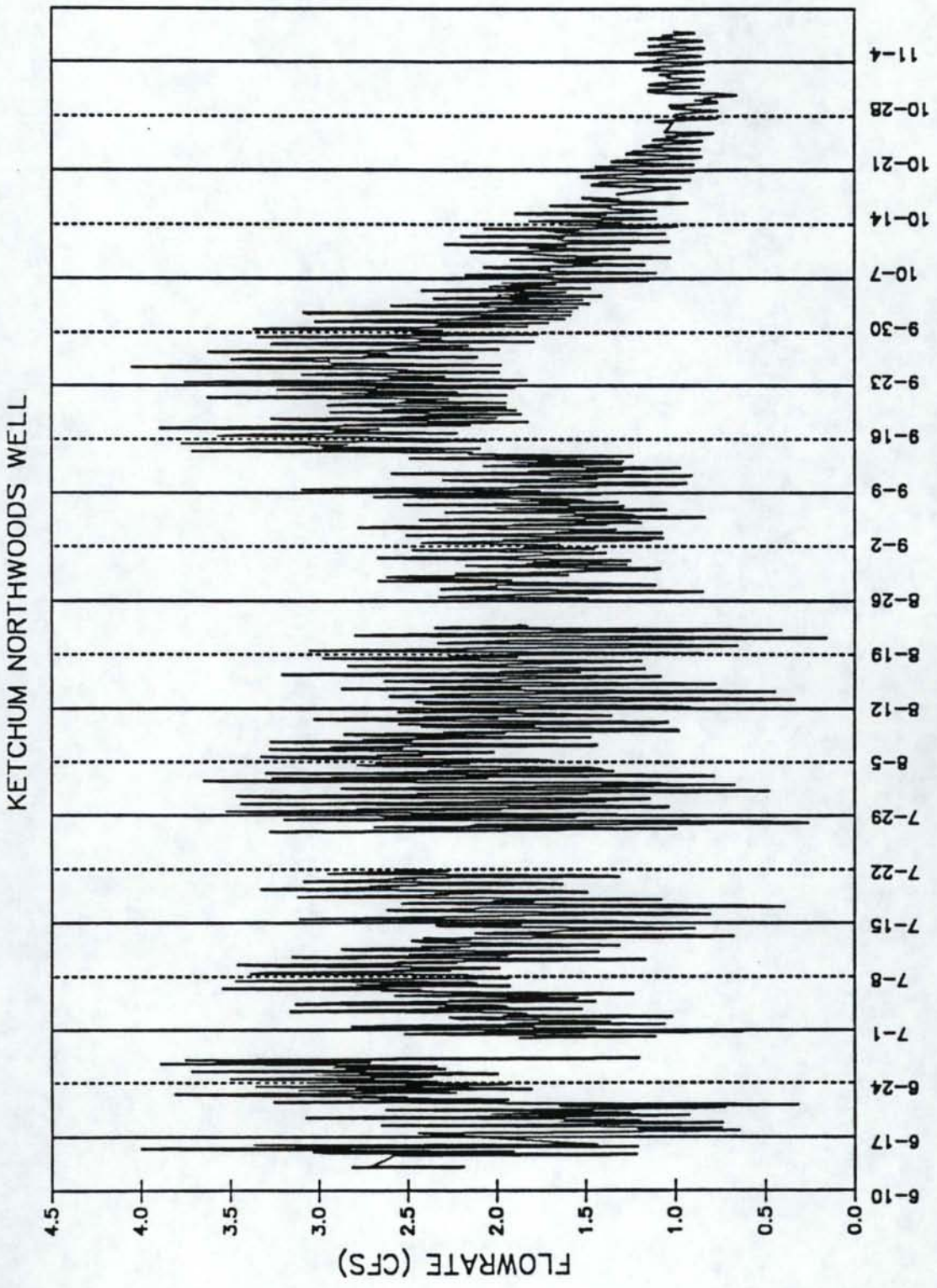

Figure 4. Northwoods Well Production.

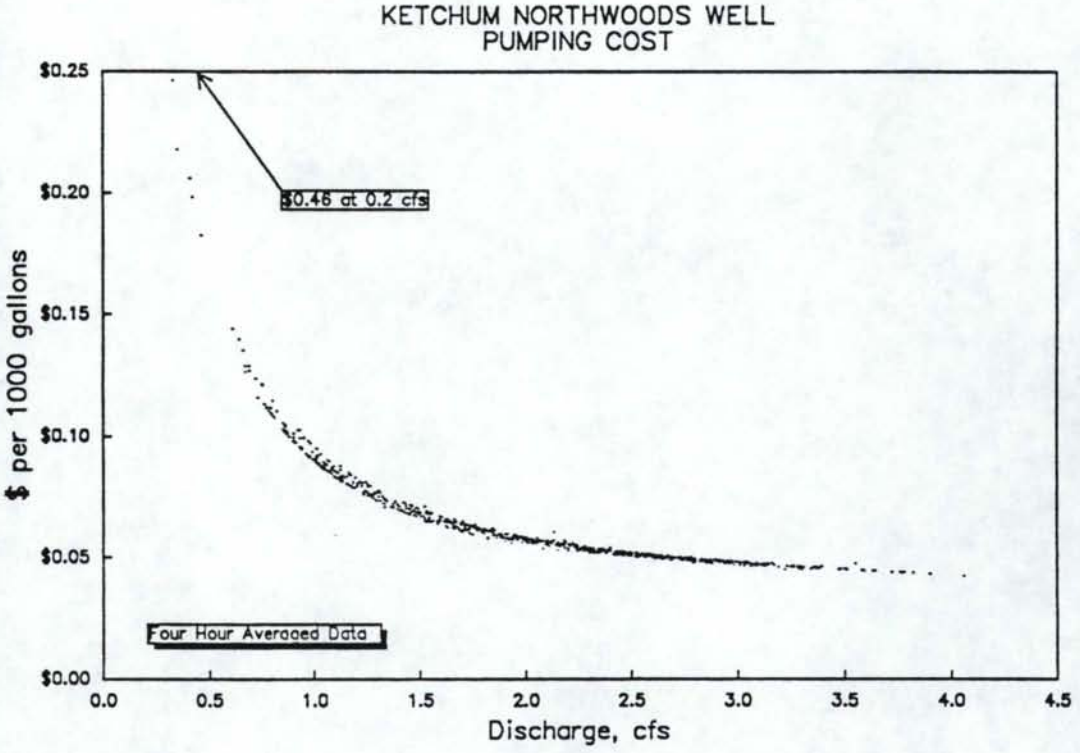

Figure 5. Northwoods Production Costs versus Discharge.

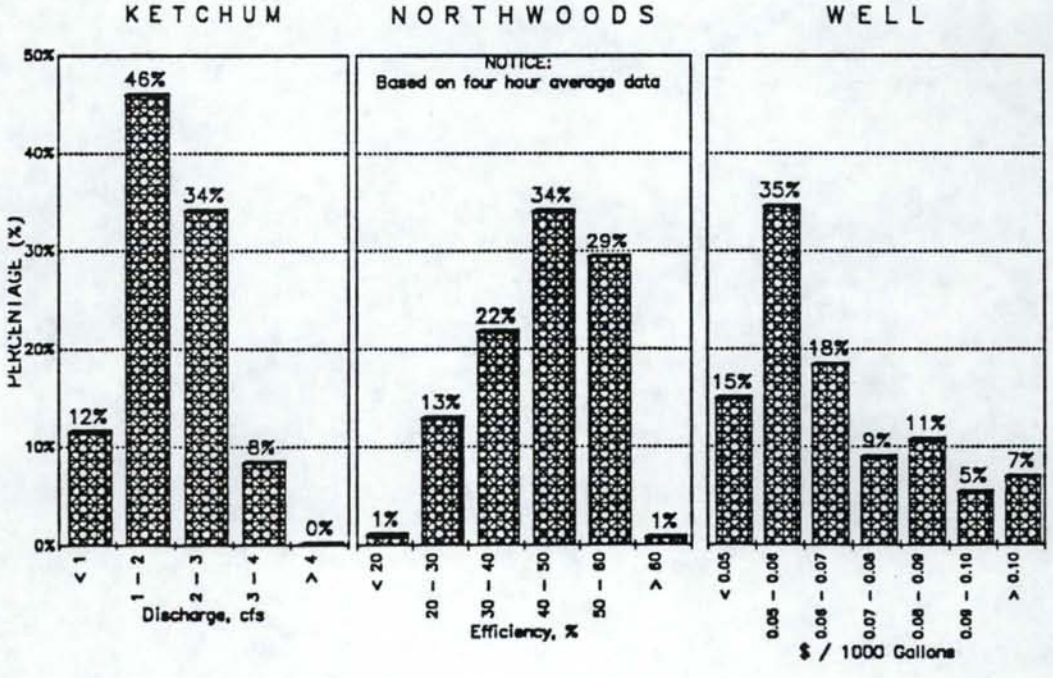

Figure 6. Frequency of Occurrence for Northwoods Well.

An analysis of the percentage of time that the Northwoods well was operating at various discharges, efficiencies and costs was performed and the results are shown in Figure 6. As shown in the figure, over fifty percent of the operational time the pump is producing less than 2.0 cfs, (897.6 gpm). Energy efficiencies for the pump are under 50 percent over two–thirds of the operational time. The production cost of 1000 gallons of water is between 5 and 6 cents 35 percent of the time.

SUN VALLEY WELL NO. 7

The fixed speed pump at Sun Valley Well No. 7 consistently produced energy efficiencies in the high 60's. The monitor did pick up a trend of steady improvement in the energy efficiency of the system during the course of the project as shown in Figure 7. This steady improvement of efficiency is not explainable by project personnel. From figure 7, a steady increase in the operational pressure of the system can be observed, along with some outlying observations. The outlying pressure observations have been attributed to the monitor scans during startup and shut down of the pump. Project personnel physically observed pressure fluctuations of the magnitude shown when the pump started and stopped. The steady increase in the discharge pressure head can not be explained. The water distribution system is fixed with elevated storage tanks. There may have been sensor drift during the study; however, during servicing of the monitor the sensor output was checked against the pressure gauge installed on the system.

The apparent energy efficiency of this well is 65 percent and the cost of pumping 1000 gallons of water is approximately 7 cents.

CONCLUSIONS AND RECOMMENDATIONS

Overall, the pump efficiency monitors perform best and provide more meaningful data on variable speed pumps because of continuous operation. The monitor at the Sun Valley Well No. 7 experienced problems due to the intermittent operation of the pump. Additional programming would be required to eliminate recording of parameters during start up and shut down of the pump. The monitors were Originally designed for pumping systems which operate continuously.

The data from the monitors was prepared for presentation to the managers of the various water departments. The Ketchum manager was very interested in the results of the monitoring. The computed production cost tracked with the power bills for the station. The Northwoods' production pump has a production cost of 7 cents or less two thirds of the time. The average production cost during the monitoring of the pump was 7.7 cents per 1000 gallons. To improve the overall efficiency of this pump, the city would need to prevent pump operation during low demand periods, less than 1.5 cfs (673 gpm), by operating other pumps or by developing elevated storage. These options were discussed with the manager, and various alternatives are being evaluated by the city including additional well sources.

Available operational alternatives to improve the efficiency and reduce costs of the Sun Valley well system are limited. Well No. 7 operates second in line and pumps against a fixed head. The City of Sun Valley has selected the order of operation of these wells in the Wood River field on the basis of efficiency and pump performance. Improvement of Well No. 7 to operate above an average efficiency of 65 percent is not likely.

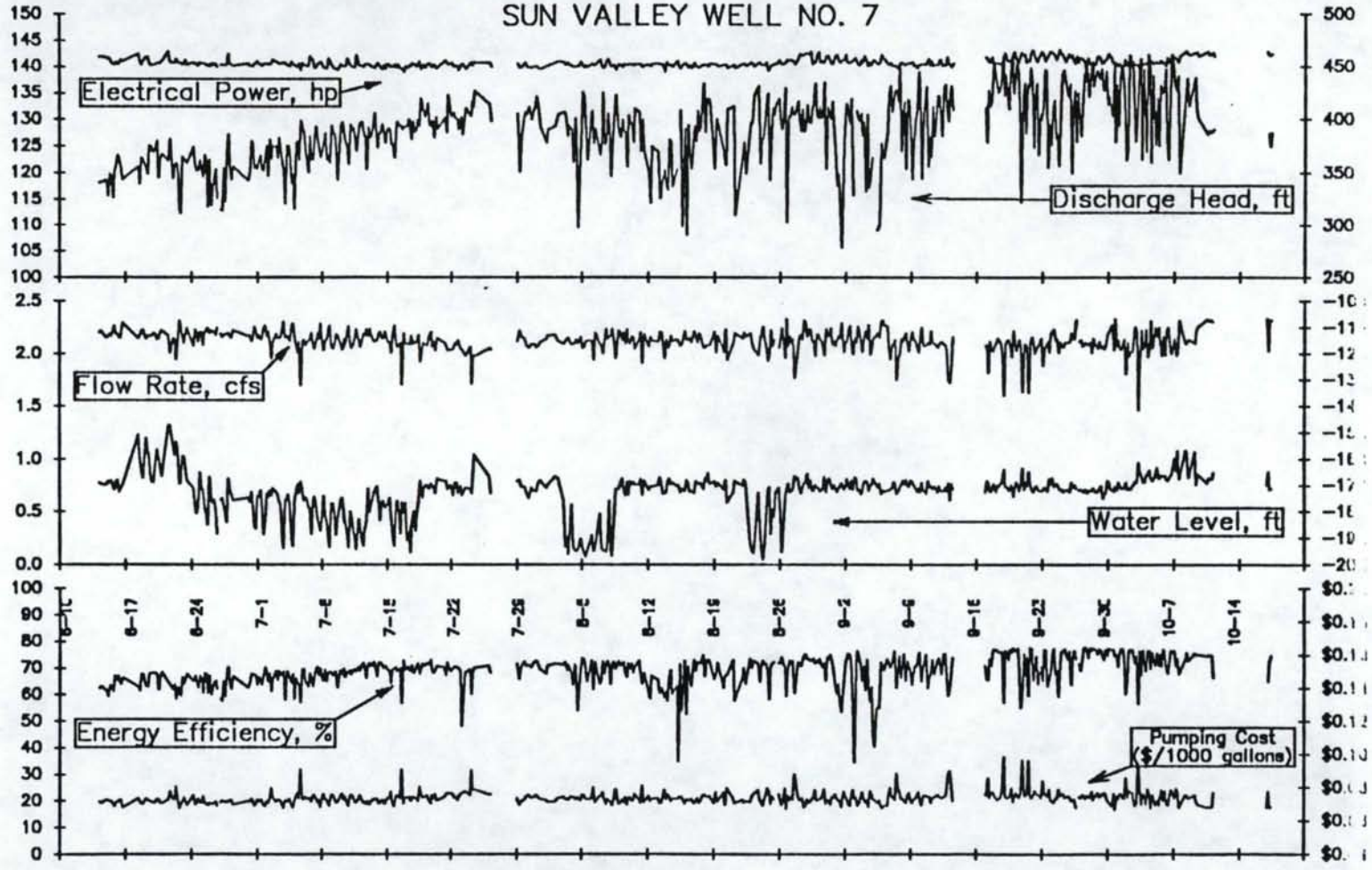

Figure 7. Sun Valley Well No. 7 Operation

Appendix 1

ATTENDANCE

PUMP MONITOR DEMONSTRATION TOUR
City of Sun Valley and
City of Ketchum Wells

July 14, 1989

Joe Baldwin	Idaho Department of Health and Welfare Division of Environmental Quality
Tim Mosko	Idaho Department of Health and Welfare Division of Environmental Quality
Alan Robertson	Idaho Department of Water Resources
Scott Larrondo	Idaho Power Company
Jerry Lindholm	U.S. Geological Survey
Ted Day	U.S. Bureau of Reclamation
Gerry Galinato	Idaho Department of Water Resources
Rich Sterling	Idaho Department of Water Resources
G. Dixon	City of Chubbuck
Pat Cooley	City of Ketchum
C.E. Brockway	University of Idaho
C.W. Robison	University of Idaho
J.S. Kolar	University of Idaho

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
6/14/89	04	142.0	2.2	-16.9	340.7	62.4
6/14/89	09	141.9	2.2	-16.9	341.5	63.1
6/14/89	22	141.8	2.2	-17.0	343.5	61.6
6/15/89	03	141.6	2.2	-16.8	328.3	59.5
6/15/89	07	141.6	2.2	-16.9	348.9	63.6
6/15/89	11	140.7	2.2	-16.8	347.1	63.1
6/15/89	16	140.5	2.2	-17.1	326.8	61.4
6/15/89	20	140.4	2.3	-17.2	350.5	67.1
6/16/89	00	141.0	2.2	-16.8	358.1	65.5
6/16/89	04	140.5	2.2	-16.8	366.5	67.2
6/16/89	08	140.7	2.2	-17.2	363.4	65.6
6/16/89	12	141.3	2.2	-17.1	356.4	64.0
6/16/89	16	141.1	2.3	-17.0	344.0	66.4
6/18/89	07	142.5	2.1	-15.1	356.0	62.9
6/18/89	11	141.2	2.2	-15.8	340.4	61.6
6/18/89	15	140.4	2.2	-16.4	364.3	67.7
6/18/89	19	141.2	2.2	-16.7	361.7	67.5
6/19/89	03	141.9	2.1	-15.2	355.5	63.2
6/19/89	07	141.8	2.2	-15.8	349.4	63.0
6/19/89	11	140.8	2.2	-15.8	375.4	67.7
6/19/89	15	140.4	2.2	-16.7	374.9	68.1
6/19/89	19	140.4	2.2	-16.9	371.0	68.1
6/19/89	23	140.4	2.2	-16.9	369.9	68.3
6/20/89	03	140.4	2.2	-16.1	372.4	68.2
6/20/89	07	140.8	2.1	-15.6	379.4	67.5
6/20/89	11	140.7	2.1	-15.9	345.8	62.1
6/20/89	15	140.9	2.2	-16.3	362.0	66.6
6/20/89	19	141.0	2.2	-16.6	368.1	68.4
6/21/89	11	143.0	2.2	-14.8	361.3	64.5
6/21/89	15	140.9	2.0	-14.7	381.2	63.7
6/21/89	23	140.8	2.1	-15.5	345.1	62.1
6/22/89	03	140.8	2.1	-15.8	356.3	63.8
6/22/89	07	141.6	2.0	-15.3	359.1	58.6
6/22/89	11	141.0	2.1	-15.6	357.0	62.7
6/22/89	15	140.8	2.3	-16.9	316.9	61.9
6/22/89	19	140.7	2.3	-16.9	312.5	59.7
6/22/89	23	140.5	2.2	-15.9	364.5	66.4
6/23/89	03	140.6	2.1	-15.9	362.1	63.9
6/23/89	07	141.3	2.2	-16.3	362.1	65.7
6/23/89	11	140.4	2.2	-16.8	359.5	67.7
6/24/89	03	140.8	2.1	-17.1	373.9	65.0
6/24/89	07	140.5	2.2	-17.8	357.5	67.1

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
6/24/89	11	140.6	2.2	-18.0	352.2	65.4
6/24/89	15	140.2	2.1	-17.8	352.0	62.6
6/24/89	19	140.8	2.2	-16.5	361.7	67.0
6/24/89	23	140.6	2.2	-17.1	353.7	65.8
6/25/89	03	140.6	2.1	-17.2	346.8	61.0
6/25/89	07	140.6	2.2	-17.9	366.2	68.0
6/25/89	11	140.3	2.2	-18.1	360.2	67.5
6/25/89	15	140.4	2.2	-18.5	318.3	60.8
6/25/89	19	140.1	2.2	-16.7	361.7	67.1
6/25/89	23	140.6	2.2	-17.5	319.3	60.0
6/26/89	03	140.3	2.2	-17.7	331.0	62.1
6/26/89	07	140.6	2.2	-17.5	346.7	64.6
6/26/89	11	140.4	2.2	-18.0	353.4	65.0
6/26/89	15	139.9	2.2	-18.8	326.2	62.3
6/26/89	19	140.2	1.6	-16.8	363.4	48.8
6/26/89	23	140.4	2.2	-17.5	314.8	58.4
6/27/89	03	140.4	2.2	-17.5	314.4	57.7
6/27/89	07	140.3	2.2	-17.7	355.0	65.1
6/27/89	11	140.3	2.2	-18.0	322.9	59.4
6/27/89	15	140.4	2.2	-18.4	367.3	67.7
6/27/89	19	142.4	2.2	-16.8	385.3	70.1
6/27/89	23	140.7	2.2	-17.1	357.5	64.8
6/28/89	03	140.4	2.1	-17.3	343.9	62.3
6/28/89	07	140.2	2.2	-17.6	356.0	66.8
6/29/89	23	140.7	2.2	-17.5	342.9	62.6
6/30/89	03	140.2	2.2	-17.6	349.8	64.1
6/30/89	07	140.2	2.1	-17.3	379.3	67.7
6/30/89	11	140.1	2.1	-17.7	375.2	67.7
6/30/89	15	140.5	2.3	-18.6	354.4	67.6
6/30/89	19	140.7	2.2	-18.6	357.8	67.1
6/30/89	23	141.0	2.1	-17.4	353.9	63.7
7/1/89	03	140.5	2.2	-17.4	362.3	66.6
7/1/89	07	140.5	2.1	-17.2	366.1	65.7
7/1/89	11	140.2	2.1	-17.6	353.9	63.9
7/1/89	15	140.6	2.2	-18.8	351.9	66.7
7/1/89	19	140.6	2.3	-18.3	366.8	70.0
7/1/89	23	140.5	2.2	-17.3	374.8	68.1
7/2/89	03	140.6	2.2	-17.5	347.5	64.8
7/2/89	07	140.4	2.1	-17.2	380.7	67.9
7/2/89	11	140.7	2.0	-17.4	363.0	61.4
7/2/89	15	141.4	2.1	-17.1	374.8	65.6
7/2/89	23	141.0	2.2	-17.2	375.1	68.9

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
7/3/89	03	140.8	2.1	-17.4	364.0	65.6
7/3/89	07	140.6	2.1	-17.6	382.2	68.8
7/3/89	11	140.6	2.2	-17.7	371.1	67.4
7/3/89	15	140.8	2.2	-19.1	359.8	68.1
7/3/89	19	140.6	2.3	-19.4	352.5	68.6
7/3/89	23	140.8	2.1	-17.6	320.8	58.3
7/4/89	03	140.3	2.2	-17.5	375.2	68.6
7/4/89	07	140.2	2.1	-17.4	374.8	67.9
7/4/89	11	140.0	2.1	-17.7	369.2	66.0
7/4/89	15	141.0	2.2	-18.9	340.4	64.5
7/4/89	19	140.4	2.3	-19.3	348.5	67.6
7/4/89	23	140.4	2.2	-17.7	316.2	58.6
7/5/89	03	140.0	2.1	-17.3	378.2	66.2
7/5/89	07	140.0	2.0	-17.0	379.3	64.1
7/5/89	11	140.6	2.1	-17.3	362.6	64.3
7/5/89	15	139.3	1.7	-16.9	398.8	57.2
7/5/89	19	140.8	2.1	-17.2	392.4	69.4
7/5/89	23	140.4	2.1	-17.6	388.4	69.4
7/6/89	03	140.3	2.1	-17.4	372.7	65.3
7/6/89	07	140.1	2.1	-17.5	362.4	64.3
7/6/89	11	140.2	2.1	-17.8	351.0	63.1
7/6/89	15	142.0	2.1	-17.9	383.8	67.9
7/6/89	19	141.5	2.2	-18.8	362.6	66.5
7/6/89	23	141.1	2.1	-17.7	362.6	63.4
7/7/89	03	139.8	2.0	-17.5	382.5	66.2
7/7/89	07	139.9	2.1	-17.7	393.2	69.7
7/7/89	11	140.5	2.2	-18.3	380.4	70.3
7/7/89	15	140.7	2.1	-18.5	374.5	67.3
7/7/89	19	140.9	2.3	-18.7	364.4	69.9
7/7/89	23	140.3	2.1	-18.1	369.9	66.2
7/8/89	03	139.9	2.0	-17.4	379.3	65.3
7/8/89	07	139.6	2.1	-18.1	387.0	69.1
7/8/89	11	139.7	2.1	-18.4	362.7	65.2
7/8/89	15	141.5	2.2	-19.1	365.9	68.4
7/8/89	19	141.0	2.3	-19.3	359.6	68.5
7/8/89	23	140.4	2.1	-17.7	393.6	68.3
7/9/89	03	139.9	2.0	-17.7	387.3	67.1
7/9/89	07	139.6	2.1	-18.0	385.7	68.2
7/9/89	11	139.6	2.2	-18.9	371.4	68.5
7/9/89	15	139.4	2.2	-18.3	343.7	62.9
7/9/89	23	140.4	2.1	-17.6	393.2	69.0
7/10/89	03	140.0	2.0	-17.5	397.0	68.1

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
7/10/89	07	140.0	2.1	-18.4	385.7	69.6
7/10/89	11	140.1	2.1	-18.5	376.5	66.5
7/10/89	03	140.0	2.0	-17.5	397.0	68.1
7/10/89	07	140.0	2.1	-18.4	385.7	69.6
7/10/89	11	140.1	2.1	-18.5	376.5	66.5
7/10/89	15	141.5	2.2	-18.7	375.9	68.4
7/10/89	19	141.0	2.3	-19.4	358.6	68.2
7/10/89	23	140.3	2.1	-18.0	394.9	69.1
7/11/89	03	140.1	2.1	-18.2	389.8	67.7
7/11/89	07	139.8	2.1	-18.7	392.2	68.9
7/11/89	11	140.0	2.2	-19.0	381.8	69.5
7/11/89	15	142.1	2.2	-19.4	371.1	68.8
7/11/89	22	140.4	2.1	-18.3	394.7	70.3
7/12/89	02	140.2	2.1	-18.5	396.8	69.1
7/12/89	06	140.2	2.1	-19.1	397.4	71.0
7/12/89	10	140.0	2.2	-19.3	387.7	71.8
7/12/89	14	140.5	2.2	-18.6	383.9	70.3
7/12/89	18	140.5	2.2	-18.4	353.9	66.5
7/12/89	22	140.5	2.2	-17.1	392.3	71.2
7/13/89	02	140.3	2.2	-18.0	382.6	71.9
7/13/89	06	140.1	2.2	-17.8	385.2	70.8
7/13/89	10	140.0	2.1	-17.5	393.7	71.0
7/13/89	14	139.7	2.1	-17.2	405.9	72.4
7/13/89	22	140.7	2.1	-17.0	373.7	67.1
7/14/89	02	140.3	2.2	-17.8	388.0	72.0
7/14/89	06	140.0	2.2	-18.3	386.8	72.1
7/14/89	10	139.6	2.1	-17.6	395.0	71.7
7/14/89	14	140.2	2.1	-17.6	387.4	70.0
7/14/89	18	139.6	2.2	-17.9	378.2	70.7
7/14/89	22	140.5	2.2	-17.8	389.3	70.5
7/15/89	02	140.5	2.1	-17.7	391.2	69.2
7/15/89	06	140.0	2.1	-17.5	389.1	69.0
7/15/89	10	140.0	2.0	-18.2	376.6	64.5
7/15/89	14	140.0	2.2	-18.9	376.1	69.6
7/15/89	18	140.4	2.3	-19.3	364.9	69.8
7/15/89	22	139.9	2.1	-17.8	397.5	70.3
7/16/89	02	140.4	2.1	-17.6	397.0	68.7
7/16/89	06	139.8	2.1	-18.0	393.6	69.1
7/16/89	10	139.7	2.1	-18.8	394.1	70.0
7/16/89	14	139.7	1.7	-17.7	390.2	57.0
7/16/89	18	139.0	2.2	-18.1	393.2	72.8
7/16/89	22	140.1	2.1	-17.7	392.3	69.2

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
7/17/89	02	139.8	2.1	-19.1	394.5	69.9
7/17/89	06	140.1	2.1	-19.0	399.9	70.6
7/17/89	10	140.1	2.1	-19.1	388.3	69.1
7/17/89	14	140.7	2.2	-19.5	382.1	69.7
7/17/89	18	140.5	2.1	-18.4	398.4	71.0
7/17/89	22	140.5	2.1	-18.0	388.5	68.2
7/17/89	06	140.1	2.1	-19.0	399.9	70.6
7/17/89	10	140.1	2.1	-19.1	388.3	69.1
7/17/89	14	140.7	2.2	-19.5	382.1	69.7
7/17/89	18	140.5	2.1	-18.4	398.4	71.0
7/17/89	22	140.5	2.1	-18.0	388.5	68.2
7/18/89	02	139.9	2.1	-18.7	390.0	69.4
7/18/89	06	140.2	2.1	-18.1	399.4	70.7
7/18/89	10	141.0	2.2	-17.6	394.3	71.7
7/18/89	14	139.6	1.9	-16.8	419.0	67.8
7/18/89	22	140.4	2.1	-17.5	408.0	71.7
7/19/89	02	139.7	2.1	-17.0	402.6	70.8
7/19/89	10	140.7	2.1	-17.0	414.8	71.9
7/19/89	14	140.7	2.2	-17.1	394.5	71.4
7/19/89	19	139.8	2.2	-16.9	393.6	72.9
7/19/89	22	140.4	2.1	-17.0	399.1	69.2
7/20/89	02	140.4	2.1	-17.0	384.0	68.1
7/20/89	06	139.7	2.0	-17.3	402.0	69.0
7/20/89	10	139.9	2.1	-16.8	391.2	70.7
7/21/89	06	141.2	2.1	-16.8	401.6	70.4
7/21/89	10	140.7	2.1	-16.8	388.7	67.5
7/21/89	14	140.4	2.0	-17.1	422.4	72.0
7/21/89	23	140.8	2.0	-17.0	402.9	68.7
7/22/89	04	140.0	2.0	-17.4	406.5	69.8
7/22/89	09	140.2	2.1	-16.9	400.7	70.6
7/22/89	15	140.0	2.1	-16.9	400.3	70.3
7/22/89	16	139.4	2.1	-17.3	390.9	70.4
7/23/89	00	140.4	2.0	-17.0	402.6	68.9
7/23/89	03	140.6	2.0	-17.4	386.5	48.5
7/23/89	11	139.5	2.0	-17.1	410.6	68.4
7/24/89	00	140.7	2.1	-17.1	403.7	69.5
7/24/89	04	140.2	1.7	-17.3	416.8	60.6
7/24/89	07	140.8	2.0	-16.6	412.3	68.1
7/24/89	10	140.8	2.0	-15.8	426.9	70.0
7/26/89	00	140.7	2.1	-16.7	414.5	71.0
7/26/89	04	140.0	2.0	-17.3	398.4	68.3
7/29/89	01	140.5	2.1	-16.8	405.0	71.6

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
7/29/89	06	139.8	2.2	-16.8	351.3	65.9
7/29/89	11	139.9	2.2	-17.0	385.8	70.3
7/29/89	20	140.7	2.1	-17.0	406.7	72.6
7/30/89	01	139.9	2.1	-17.3	404.8	70.7
7/30/89	06	139.8	2.1	-17.5	411.7	71.2
7/30/89	13	139.7	2.1	-17.1	400.3	70.4
7/30/89	20	140.0	2.1	-17.2	410.1	72.0
7/31/89	01	140.1	2.1	-17.2	421.4	72.8
7/31/89	06	139.7	2.1	-16.9	413.2	72.1
7/31/89	11	139.5	2.1	-16.8	392.5	69.7
8/1/89	04	140.1	2.1	-17.1	378.4	68.0
8/1/89	07	140.2	2.2	-17.0	390.4	71.0
8/2/89	02	140.8	2.2	-16.7	393.7	71.7
8/2/89	09	141.0	2.1	-16.7	404.8	71.6
8/3/89	00	140.8	2.1	-17.6	406.6	71.1
8/3/89	05	140.3	2.1	-19.3	405.0	72.3
8/3/89	10	140.7	2.1	-18.9	384.8	69.1
8/3/89	12	140.4	2.1	-19.6	394.3	71.2
8/3/89	21	140.1	2.1	-17.8	390.7	68.6
8/4/89	01	139.9	2.1	-19.3	360.3	63.8
8/4/89	05	139.9	2.1	-19.5	400.8	71.1
8/4/89	09	140.1	2.1	-19.5	388.1	69.9
8/4/89	13	139.9	2.1	-19.4	298.8	54.1
8/4/89	21	140.9	2.2	-19.0	380.3	69.1
8/5/89	01	140.2	2.1	-19.4	425.2	73.6
8/5/89	05	139.8	2.1	-19.6	420.2	73.2
8/5/89	09	140.2	2.1	-19.7	397.9	71.1
8/5/89	13	139.9	2.1	-19.5	362.2	65.1
8/6/89	01	140.5	2.1	-18.9	407.1	72.8
8/6/89	05	140.2	1.9	-19.5	377.7	62.4
8/6/89	09	140.4	2.2	-19.3	390.7	72.1
8/6/89	21	141.3	2.1	-18.1	367.7	64.2
8/7/89	01	140.1	2.1	-19.4	378.7	66.3
8/7/89	05	139.6	2.0	-19.5	424.5	72.2
8/7/89	09	139.8	2.1	-19.5	376.9	67.9
8/7/89	13	141.0	2.2	-19.5	379.7	71.3
8/7/89	17	141.4	2.1	-19.1	405.9	72.5
8/7/89	21	140.6	2.2	-17.6	393.2	71.4
8/8/89	01	140.0	2.2	-19.4	347.0	64.2
8/8/89	05	140.1	2.2	-19.6	374.6	70.9
8/8/89	09	140.3	2.1	-18.4	400.7	72.2
8/8/89	13	139.4	2.0	-17.1	422.4	69.8

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
8/8/89	21	140.4	2.2	-17.1	388.7	72.5
8/9/89	01	140.3	2.2	-16.9	383.8	71.0
8/9/89	05	139.8	2.1	-16.8	399.7	71.5
8/9/89	09	140.4	2.2	-17.2	389.9	72.0
8/9/89	14	140.3	2.1	-17.4	387.6	68.4
8/9/89	17	140.2	2.2	-16.9	356.7	66.9
8/9/89	21	140.4	2.1	-17.4	403.2	71.5
8/10/89	01	140.4	2.1	-16.9	396.4	69.7
8/10/89	05	140.4	2.2	-17.0	396.0	71.7
8/10/89	09	140.2	2.1	-16.9	378.8	68.3
8/10/89	13	140.4	2.0	-17.0	410.1	70.4
8/11/89	00	140.4	2.1	-17.0	406.4	72.7
8/11/89	04	140.3	2.2	-16.8	370.5	68.7
8/11/89	08	139.9	1.9	-17.4	399.1	64.2
8/11/89	12	140.2	2.2	-16.8	370.5	68.2
8/12/89	00	140.3	2.1	-17.2	350.5	61.3
8/12/89	04	140.0	2.2	-17.0	321.8	58.7
8/12/89	08	140.4	2.1	-17.1	374.4	67.0
8/13/89	00	140.5	2.1	-17.0	369.2	65.5
8/13/89	05	140.3	2.2	-16.7	326.1	60.8
8/13/89	08	140.4	2.2	-17.0	337.7	62.4
8/13/89	12	140.1	2.1	-17.3	345.0	61.4
8/13/89	16	139.0	2.0	-17.3	352.7	58.9
8/13/89	20	140.7	2.1	-17.3	337.0	61.1
8/14/89	00	140.4	2.1	-16.9	334.0	57.8
8/14/89	04	140.1	2.1	-16.7	380.3	66.3
8/14/89	08	140.4	2.2	-17.0	377.7	69.0
8/14/89	12	139.9	2.1	-16.9	337.5	60.4
8/15/89	00	141.0	2.1	-17.0	353.3	63.3
8/15/89	04	140.0	2.1	-17.0	191.4	35.1
8/15/89	08	139.5	2.1	-17.3	407.8	71.2
8/15/89	12	140.2	2.1	-17.1	299.4	54.1
8/15/89	20	140.6	2.2	-17.2	390.9	72.6
8/16/89	00	140.2	2.1	-16.8	291.1	52.9
8/16/89	04	139.7	2.1	-16.9	394.0	70.6
8/16/89	08	140.2	2.1	-17.2	368.0	66.7
8/16/89	12	139.7	2.1	-17.2	354.1	63.3
8/16/89	20	140.6	2.2	-17.3	393.2	73.0
8/17/89	00	140.0	2.2	-16.8	380.3	69.1
8/17/89	04	139.9	2.1	-16.9	408.0	72.3
8/17/89	08	139.8	2.2	-16.9	388.6	71.8
8/17/89	12	140.1	2.2	-16.9	393.2	71.7

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
8/17/89	20	140.3	2.1	-17.1	433.7	74.7
8/18/89	00	140.2	2.1	-16.7	388.0	67.1
8/18/89	04	140.3	2.1	-16.8	419.1	73.0
8/18/89	08	140.0	2.1	-16.6	419.4	73.1
8/18/89	12	140.6	2.1	-16.9	416.4	72.5
8/19/89	00	140.4	2.2	-16.8	354.5	65.9
8/19/89	04	140.3	2.0	-17.1	400.2	67.6
8/19/89	08	140.0	2.2	-16.9	393.9	71.9
8/20/89	00	140.3	2.0	-17.2	368.1	62.6
8/20/89	05	140.3	2.2	-16.8	357.5	67.2
8/20/89	08	139.6	1.9	-17.6	409.3	67.3
8/21/89	00	140.3	2.1	-17.3	412.1	72.9
8/21/89	04	139.6	2.2	-16.8	310.0	57.8
8/22/89	00	140.6	2.1	-17.0	368.5	66.5
8/22/89	04	140.4	2.2	-16.8	378.1	69.9
8/22/89	08	140.1	2.2	-16.9	350.1	64.1
8/22/89	20	140.7	2.2	-19.2	396.9	73.3
8/23/89	00	140.7	2.1	-19.5	396.3	70.1
8/23/89	04	140.0	2.0	-19.6	421.9	72.7
8/23/89	16	140.8	2.0	-17.3	431.4	71.6
8/23/89	20	140.5	2.1	-18.6	359.3	65.0
8/24/89	00	140.3	2.2	-19.3	381.3	70.0
8/24/89	04	140.3	2.3	-19.8	382.2	72.8
8/24/89	08	140.3	2.1	-19.2	399.3	71.5
8/24/89	12	140.8	2.1	-18.3	412.3	71.7
8/24/89	16	139.2	1.9	-17.2	423.5	69.4
8/24/89	20	139.7	2.0	-17.1	343.7	58.5
8/25/89	00	140.2	2.2	-18.8	374.9	70.5
8/25/89	04	140.2	2.1	-17.9	411.2	71.7
8/25/89	08	140.6	2.1	-18.2	404.2	72.4
8/25/89	12	140.4	1.3	-17.3	412.7	47.6
8/25/89	20	141.2	2.1	-17.1	419.4	71.9
8/26/89	00	140.5	2.2	-18.1	395.9	71.9
8/26/89	04	140.4	2.2	-19.5	390.9	74.1
8/26/89	08	140.5	2.1	-18.6	402.4	71.9
8/26/89	12	140.8	2.0	-17.5	429.2	70.6
8/26/89	16	141.3	2.3	-17.2	303.3	59.7
8/26/89	20	141.0	2.1	-16.9	402.9	69.7
8/27/89	00	141.3	2.2	-17.3	402.0	72.7
8/27/89	04	141.1	2.1	-17.2	411.7	71.9
8/27/89	08	141.0	2.1	-17.2	405.0	72.4
8/27/89	12	140.4	1.8	-16.7	404.7	60.6

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
8/27/89	21	141.5	2.1	-16.8	416.3	72.0
8/28/89	00	142.3	2.2	-17.1	400.4	71.8
8/28/89	04	142.2	2.2	-17.3	389.1	70.6
8/28/89	08	142.0	2.1	-17.1	409.6	72.4
8/28/89	12	142.4	2.3	-16.9	389.0	74.6
8/28/89	16	142.5	2.3	-16.9	396.9	75.1
8/28/89	20	142.5	2.2	-16.6	413.4	73.6
8/29/89	00	142.2	2.2	-17.1	397.5	73.5
8/29/89	04	142.8	2.2	-16.8	397.0	72.8
8/29/89	08	140.4	2.1	-17.2	411.6	72.9
8/29/89	12	141.0	2.1	-17.2	414.2	73.6
8/29/89	16	140.8	2.0	-17.0	433.7	71.8
8/29/89	20	142.4	2.2	-17.1	402.7	72.7
8/30/89	00	142.7	2.2	-17.1	401.1	72.2
8/30/89	04	140.7	2.1	-17.2	412.1	73.3
8/30/89	08	141.1	2.1	-17.2	400.9	71.3
8/30/89	12	140.7	2.0	-17.1	409.5	70.2
8/30/89	16	141.0	2.0	-16.7	434.8	71.9
8/30/89	20	141.9	2.2	-17.2	354.2	65.6
8/31/89	00	142.0	2.2	-16.8	411.7	74.1
8/31/89	04	141.4	2.2	-16.8	407.0	73.5
8/31/89	08	140.5	2.2	-16.9	400.4	75.0
8/31/89	12	140.4	2.1	-17.1	416.2	72.6
8/31/89	16	141.5	2.1	-17.0	387.9	68.1
8/31/89	20	142.0	2.1	-17.1	372.4	64.2
9/1/89	00	142.2	2.1	-17.2	337.9	60.4
9/1/89	04	140.8	2.2	-17.1	348.9	63.9
9/1/89	08	140.7	2.1	-17.1	315.6	57.7
9/1/89	12	141.1	2.3	-16.9	279.3	53.8
9/1/89	18	141.2	2.0	-17.2	377.1	63.8
9/1/89	22	142.1	2.1	-17.1	410.2	71.7
9/2/89	02	140.8	2.1	-16.8	414.5	73.2
9/2/89	06	140.6	2.2	-17.0	403.9	75.4
9/2/89	10	140.8	2.3	-17.1	396.4	75.0
9/2/89	14	140.9	2.1	-16.8	418.5	73.0
9/2/89	18	141.2	2.0	-17.2	329.3	55.5
9/2/89	22	141.6	2.2	-16.7	185.8	34.8
9/3/89	02	140.9	2.1	-16.8	407.8	71.7
9/3/89	06	140.3	2.3	-17.2	402.7	76.2
9/3/89	10	140.2	2.2	-17.1	398.4	74.0
9/3/89	14	141.3	2.1	-17.3	404.9	71.1
9/3/89	18	140.7	2.0	-17.2	385.1	65.3

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
9/3/89	22	141.9	2.1	-16.9	397.7	70.8
9/4/89	02	141.2	2.2	-16.8	332.8	61.7
9/4/89	07	140.0	2.1	-16.9	404.2	73.0
9/4/89	10	140.8	2.3	-17.2	336.2	63.7
9/4/89	14	140.2	2.0	-17.0	343.7	57.5
9/4/89	18	140.7	2.1	-17.0	364.0	62.9
9/4/89	22	141.1	2.2	-16.8	245.2	45.2
9/5/89	02	141.0	2.2	-16.9	221.4	40.8
9/5/89	06	140.5	2.2	-17.0	295.2	54.4
9/5/89	10	140.4	2.2	-17.1	296.7	55.2
9/5/89	14	140.6	2.2	-16.9	300.6	55.1
9/5/89	18	142.2	2.3	-17.3	377.1	72.0
9/5/89	22	141.5	2.3	-17.2	367.6	71.0
9/6/89	02	141.4	2.3	-17.2	364.3	69.2
9/6/89	10	140.4	2.3	-17.2	388.7	73.5
9/6/89	14	140.3	2.1	-17.2	422.4	72.8
9/6/89	18	140.6	2.0	-17.1	431.4	70.4
9/6/89	22	140.1	2.1	-17.1	407.2	71.3
9/7/89	02	140.1	2.1	-16.9	420.2	74.0
9/7/89	06	140.1	2.1	-16.9	427.6	76.3
9/7/89	10	139.7	1.8	-17.3	427.5	63.0
9/7/89	14	139.6	2.0	-17.2	417.5	69.6
9/7/89	18	140.5	2.0	-17.1	447.5	74.4
9/7/89	22	140.8	2.1	-17.0	370.7	66.4
9/8/89	02	140.4	2.1	-16.8	405.8	71.8
9/8/89	06	140.2	2.2	-17.0	416.0	75.2
9/8/89	10	140.5	2.2	-16.8	354.0	65.5
9/8/89	14	140.5	2.1	-17.0	418.2	72.6
9/8/89	18	140.6	2.0	-17.0	417.2	70.6
9/8/89	22	140.7	2.1	-16.8	388.9	69.5
9/9/89	02	140.7	2.2	-16.9	344.4	64.0
9/9/89	06	140.1	2.1	-17.0	382.3	68.5
9/9/89	10	140.2	2.1	-17.1	399.3	71.3
9/9/89	14	139.7	2.1	-17.2	408.5	70.8
9/9/89	18	140.3	2.0	-17.1	444.5	74.9
9/9/89	22	140.3	2.1	-17.3	423.5	75.9
9/10/89	02	140.4	2.2	-16.9	345.0	65.3
9/10/89	06	140.4	2.1	-17.2	404.8	70.7
9/10/89	10	140.3	2.1	-17.2	416.8	72.1
9/10/89	14	140.6	2.1	-17.3	430.3	74.8
9/10/89	18	141.4	2.1	-16.8	356.5	62.8
9/10/89	22	140.2	2.1	-17.1	384.0	67.2

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
9/11/89	02	141.0	2.2	-17.0	365.4	67.5
9/11/89	06	140.0	2.1	-17.1	411.8	72.9
9/11/89	10	140.3	2.1	-17.0	384.2	68.1
9/11/89	20	140.4	2.1	-17.3	421.9	72.8
9/11/89	22	141.2	2.1	-17.0	422.0	73.6
9/12/89	02	141.3	2.1	-17.1	408.7	71.7
9/12/89	06	140.0	2.1	-17.2	384.6	67.9
9/12/89	10	140.3	2.1	-17.2	429.9	75.1
9/12/89	14	140.2	2.1	-17.1	432.3	75.3
9/12/89	18	141.7	2.0	-17.2	413.1	69.7
9/12/89	22	140.5	1.8	-16.9	398.7	59.9
9/13/89	02	140.1	1.7	-17.6	423.4	62.2
9/13/89	06	139.9	1.8	-16.9	430.9	67.1
9/13/89	10	140.5	2.2	-17.1	408.9	73.9
9/16/89	21	141.8	2.1	-17.3	411.2	70.9
9/17/89	01	141.5	2.1	-16.8	379.0	66.1
9/17/89	05	140.8	1.8	-16.9	426.6	65.8
9/17/89	09	140.8	2.1	-17.3	412.1	73.3
9/17/89	13	141.7	2.0	-17.2	417.7	70.9
9/17/89	17	140.5	2.0	-16.9	452.5	76.5
9/17/89	21	140.7	2.1	-17.0	445.8	77.1
9/18/89	01	140.6	2.1	-17.3	436.6	77.0
9/18/89	05	140.6	2.1	-17.0	425.3	76.5
9/18/89	09	140.4	2.1	-17.1	426.9	76.1
9/18/89	13	140.6	2.1	-16.9	432.5	76.3
9/18/89	17	140.4	2.0	-16.8	458.4	76.1
9/18/89	21	142.5	1.6	-16.4	422.4	57.1
9/19/89	01	142.0	2.1	-17.1	442.1	76.4
9/19/89	05	141.0	2.1	-17.1	427.2	76.0
9/19/89	09	141.2	2.1	-17.2	410.0	73.2
9/19/89	13	140.9	2.1	-17.2	442.6	76.8
9/19/89	17	141.2	2.0	-17.0	460.6	75.8
9/19/89	21	142.7	2.2	-17.4	424.6	77.6
9/20/89	01	142.1	2.1	-17.2	436.2	76.9
9/20/89	05	141.2	2.0	-16.9	452.2	76.4
9/20/89	09	140.7	2.1	-17.0	443.2	77.4
9/20/89	13	141.6	2.1	-17.2	413.4	73.2
9/20/89	17	142.6	2.1	-17.0	322.0	55.3
9/20/89	21	142.2	1.6	-16.4	422.8	59.1
9/21/89	01	142.3	2.1	-17.2	434.2	75.1
9/21/89	05	140.8	2.1	-16.9	387.3	67.3
9/21/89	09	141.3	2.1	-17.0	432.4	74.2

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
9/21/89	13	140.9	1.6	-16.5	430.5	59.9
9/21/89	17	142.4	2.1	-16.9	448.3	77.5
9/21/89	21	143.1	2.2	-17.2	434.8	77.2
9/22/89	01	142.1	2.1	-17.3	374.2	65.5
9/22/89	05	141.6	2.0	-17.1	420.9	70.2
9/22/89	09	140.9	2.0	-17.0	433.6	74.2
9/22/89	13	141.7	2.1	-17.2	367.6	64.2
9/22/89	18	142.2	2.1	-17.2	405.5	70.7
9/22/89	21	142.7	2.1	-17.2	399.2	70.8
9/23/89	01	142.3	1.9	-17.2	412.1	65.4
9/23/89	05	140.9	2.1	-17.1	446.7	76.8
9/23/89	09	141.5	2.1	-17.1	444.6	76.5
9/23/89	13	142.0	2.1	-17.2	355.6	63.3
9/23/89	17	142.8	2.0	-16.8	395.4	66.0
9/23/89	21	142.7	2.2	-16.9	377.0	68.5
9/24/89	01	142.5	2.2	-16.7	406.8	74.3
9/24/89	05	142.2	2.2	-17.0	417.5	77.2
9/24/89	09	141.3	2.1	-16.9	382.4	68.1
9/24/89	13	141.7	2.1	-16.9	386.2	69.1
9/24/89	17	143.2	2.0	-17.1	357.2	59.6
9/24/89	21	142.4	2.1	-17.2	409.2	71.7
9/25/89	01	142.4	2.1	-17.1	441.7	76.0
9/25/89	05	141.6	2.1	-17.2	446.2	76.4
9/25/89	09	140.9	2.1	-17.2	436.4	77.0
9/25/89	17	142.2	2.1	-17.2	422.1	73.4
9/25/89	21	141.8	2.1	-17.2	432.9	76.2
9/26/89	01	142.2	2.2	-16.9	350.1	63.9
9/26/89	05	141.2	2.1	-17.1	408.9	73.2
9/26/89	09	140.5	2.1	-17.0	426.3	76.4
9/26/89	14	141.9	2.3	-17.1	379.5	73.4
9/26/89	17	140.8	1.0	-16.1	424.6	37.7
9/26/89	21	141.7	2.1	-17.2	407.1	71.8
9/27/89	01	141.5	2.1	-17.2	385.0	69.2
9/27/89	05	141.2	2.1	-17.2	420.9	73.1
9/27/89	09	141.1	2.1	-17.2	443.4	77.3
9/27/89	13	139.1	2.1	-17.2	436.5	77.7
9/27/89	17	141.5	2.1	-17.3	443.8	76.8
9/27/89	21	140.8	2.1	-17.2	422.0	74.1
9/28/89	01	140.4	2.1	-17.2	439.8	77.5
9/28/89	05	140.1	2.0	-17.2	454.3	76.7
9/28/89	09	140.2	2.1	-17.1	431.8	77.6
9/28/89	13	140.4	2.1	-17.3	439.7	77.1

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
9/28/89	17	141.8	2.1	-17.3	446.2	77.0
9/28/89	21	141.9	2.0	-17.3	442.6	75.4
9/29/89	01	141.6	2.1	-17.1	438.4	77.0
9/29/89	05	140.5	2.1	-17.0	447.1	76.7
9/29/89	09	140.7	2.1	-17.5	428.5	74.5
9/29/89	13	141.2	2.0	-17.3	427.5	73.1
9/29/89	17	141.3	2.1	-17.3	444.9	76.9
9/29/89	21	142.3	2.2	-16.8	413.6	75.0
9/30/89	01	142.1	2.2	-16.9	422.1	77.3
9/30/89	05	141.7	2.2	-17.1	413.4	77.2
9/30/89	09	140.7	2.3	-17.2	403.6	77.0
9/30/89	13	140.5	2.0	-17.2	450.3	76.8
9/30/89	17	140.7	2.3	-17.0	379.5	74.4
9/30/89	21	140.0	2.1	-17.2	433.0	75.2
10/1/89	01	140.5	2.1	-16.9	394.3	70.8
10/1/89	05	140.1	2.0	-17.0	439.0	75.3
10/1/89	09	140.1	2.0	-17.1	450.1	77.1
10/1/89	13	140.1	2.1	-17.1	436.3	77.1
10/1/89	17	141.2	2.1	-17.1	418.8	74.4
10/1/89	21	140.2	1.8	-16.9	362.5	60.5
10/2/89	01	140.8	2.1	-17.2	373.2	66.0
10/2/89	05	139.8	2.0	-17.1	460.1	76.5
10/2/89	09	140.4	2.0	-17.2	454.2	76.9
10/2/89	13	140.2	2.0	-17.0	454.3	76.9
10/2/89	17	140.4	2.2	-17.0	408.5	74.6
10/2/89	21	140.4	2.2	-16.8	379.9	71.9
10/3/89	01	140.3	2.2	-16.9	404.9	74.7
10/3/89	05	139.6	1.5	-16.2	443.8	56.9
10/3/89	09	140.0	2.0	-16.5	457.1	76.1
10/3/89	13	140.5	2.2	-16.6	363.3	67.5
10/3/89	17	140.4	2.0	-16.9	447.1	76.3
10/3/89	21	140.6	2.1	-16.9	412.4	71.6
10/4/89	01	140.7	2.2	-16.6	370.4	69.1
10/4/89	05	140.2	2.0	-16.6	460.6	76.2
10/4/89	09	140.6	2.1	-16.4	445.3	76.5
10/4/89	13	141.0	2.3	-16.7	360.4	69.8
10/4/89	17	140.5	2.1	-16.8	440.8	75.8
10/5/89	01	140.8	2.2	-16.6	376.6	71.0
10/5/89	05	140.6	2.2	-16.4	419.8	75.6
10/5/89	09	140.7	2.2	-16.8	375.4	70.9
10/5/89	13	141.0	2.1	-16.7	431.8	75.2
10/5/89	17	140.6	2.0	-16.6	424.6	70.7

Four Hour Average Monitor Data
for
Sun Valley Well No. 7

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	ENERGY EFF (%)
10/5/89	21	140.7	2.2	-16.7	425.8	76.7
10/6/89	01	140.1	2.0	-16.6	447.1	74.6
10/6/89	05	141.6	2.2	-16.8	381.2	70.1
10/6/89	09	140.8	2.2	-16.8	362.4	68.2
10/6/89	17	141.7	2.0	-16.6	460.6	76.4
10/7/89	01	141.7	2.1	-16.0	432.3	76.4
10/7/89	05	141.3	2.0	-16.5	427.5	70.7
10/7/89	09	140.8	2.0	-15.7	440.4	73.7
10/7/89	13	142.0	2.3	-16.7	350.5	67.8
10/8/89	05	142.9	2.1	-15.7	427.3	73.5
10/8/89	09	142.5	2.1	-15.8	438.1	75.8
10/8/89	13	142.2	2.1	-16.7	412.7	72.7
10/9/89	05	142.6	2.1	-15.8	438.9	75.6
10/9/89	09	142.6	2.2	-17.0	409.2	74.8
10/9/89	13	142.0	2.3	-16.6	400.9	75.1
10/10/89	13	142.8	2.3	-16.9	386.0	74.6
10/10/89	17	142.1	2.3	-16.7	389.1	75.0
10/10/89	21	142.3	2.3	-16.8	387.8	75.0
10/11/89	01	142.6	2.3	-16.7	389.2	74.5
10/11/89	05	141.9	2.1	-16.5	390.2	66.7
10/14/89	09	142.0	2.3	-16.6	389.9	75.0
10/16/89	21	142.8	2.3	-17.0	154.1	31.8
10/17/89	01	142.1	2.0	-16.5	386.4	65.0
10/17/89	05	142.1	2.3	-17.1	374.8	72.8
10/17/89	09	142.4	2.3	-17.1	387.1	74.7

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
6/14/89	04	102.7	1.9	-14.6	198.9	1488	45.2
6/14/89	08	109.0	2.1	-14.8	197.7	1511	45.3
6/14/89	13	129.1	2.9	-17.6	199.8	1617	52.2
6/14/89	17	117.7	2.5	-16.3	199.1	1569	52.6
6/14/89	22	151.7	3.6	-20.9	199.9	1674	55.7
6/15/89	02	129.8	2.8	-18.3	199.4	1583	56.5
6/15/89	07	99.4	1.8	-14.0	198.6	1473	47.3
6/15/89	11	131.6	2.9	-17.9	194.3	1610	47.8
6/16/89	23	117.1	2.4	-15.5	200.1	1548	51.2
6/17/89	03	80.5	0.9	-11.0	197.2	1369	27.5
6/17/89	07	74.3	0.7	-10.2	199.7	1313	20.7
6/17/89	11	85.4	1.2	-11.3	199.8	1365	34.0
6/17/89	15	76.3	0.7	-10.1	199.4	1290	23.2
6/17/89	19	94.8	1.7	-12.4	199.8	1466	42.0
6/17/89	23	123.4	2.7	-16.4	198.3	1597	52.6
6/18/89	03	82.0	1.1	-11.4	201.4	1372	30.9
6/18/89	07	76.1	0.7	-10.8	200.2	1321	23.2
6/18/89	11	95.4	1.7	-12.7	199.5	1456	42.5
6/18/89	15	84.7	1.2	-11.5	201.7	1392	34.3
6/18/89	19	97.2	1.8	-13.1	196.1	1487	43.2
6/18/89	23	135.7	3.1	-18.3	200.2	1624	56.4
6/19/89	03	85.0	1.2	-11.7	196.8	1389	32.3
6/19/89	07	81.5	0.9	-10.9	200.1	1356	27.1
6/19/89	11	104.4	2.0	-14.2	199.5	1523	47.4
6/19/89	15	87.0	1.3	-11.9	200.6	1346	34.8
6/19/89	19	92.6	1.5	-12.8	197.5	1444	39.5
6/19/89	23	121.9	2.6	-16.8	198.4	1590	52.9
6/20/89	03	80.3	0.9	-11.7	199.7	1343	28.1
6/20/89	07	69.6	0.7	-10.7	196.5	1284	24.5
6/20/89	11	95.6	1.7	-13.3	200.2	1450	41.8
6/20/89	15	64.3	0.3	-9.5	198.3	1248	11.6
6/20/89	19	98.1	1.7	-13.7	201.3	1471	42.2
6/20/89	23	141.3	3.3	-19.6	198.4	1640	57.4
6/21/89	03	106.5	2.1	-15.1	194.7	1514	46.0
6/21/89	07	104.1	1.9	-14.5	198.0	1491	45.0
6/21/89	11	127.5	2.8	-17.9	199.5	1616	54.8
6/21/89	15	119.7	2.5	-16.7	197.5	1586	51.1
6/21/89	19	140.6	3.2	-19.6	199.7	1639	57.3
6/21/89	23	158.6	3.8	-21.9	195.7	1685	59.8
6/22/89	03	111.2	2.2	-16.4	198.7	1528	49.1
6/22/89	07	115.9	2.4	-16.5	197.4	1543	50.2
6/22/89	11	137.9	3.1	-19.8	198.8	1633	56.5

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
6/22/89	15	98.8	1.8	-14.4	199.8	1484	44.5
6/22/89	19	110.6	2.2	-15.6	198.3	1549	49.2
6/22/89	23	144.6	3.4	-20.5	200.3	1651	58.6
6/23/89	03	111.5	2.2	-16.4	199.0	1538	49.1
6/23/89	07	103.4	1.9	-15.1	198.9	1477	45.7
6/23/89	11	134.9	3.1	-19.5	199.9	1627	57.0
6/23/89	15	114.9	2.3	-16.2	199.4	1567	49.9
6/23/89	19	119.9	2.5	-17.1	198.2	1579	51.9
6/23/89	23	149.7	3.5	-21.3	199.1	1659	59.0
6/24/89	03	118.2	2.5	-17.4	199.8	1571	51.3
6/24/89	07	114.6	2.4	-17.0	198.6	1552	50.6
6/24/89	11	135.2	3.0	-19.4	197.6	1630	55.5
6/24/89	15	103.2	2.0	-15.3	201.0	1496	47.6
6/24/89	19	111.3	2.3	-15.9	196.4	1550	48.9
6/24/89	23	155.2	3.7	-21.5	197.6	1681	60.1
6/25/89	03	131.8	2.9	-19.2	199.8	1622	54.9
6/25/89	07	113.0	2.3	-16.5	198.8	1547	49.7
6/25/89	11	133.0	3.0	-19.2	198.6	1629	55.4
6/25/89	15	114.4	2.3	-16.6	199.7	1544	50.4
6/25/89	19	125.4	2.7	-17.9	200.4	1613	53.8
6/25/89	23	161.1	3.9	-21.8	195.5	1698	60.1
6/26/89	03	126.5	2.7	-18.5	199.0	1608	53.3
6/26/89	07	125.5	2.7	-18.1	197.4	1598	53.3
6/26/89	11	157.8	3.8	-22.1	199.9	1687	60.4
6/26/89	15	112.2	2.2	-16.6	198.6	1540	47.5
6/26/89	19	85.8	1.2	-12.6	201.9	1402	34.2
6/29/89	10	100.2	1.9	-15.2	198.3	1475	45.4
6/29/89	14	83.0	1.1	-12.7	198.6	1361	32.2
6/29/89	18	93.6	1.5	-13.9	202.2	1427	40.5
6/29/89	22	119.4	2.5	-17.5	199.0	1560	52.0
6/30/89	02	102.1	1.8	-15.3	201.1	1469	44.1
6/30/89	06	74.3	0.6	-11.5	197.0	1280	20.0
6/30/89	10	106.4	2.1	-15.5	200.6	1501	47.7
6/30/89	14	92.4	1.5	-13.9	198.6	1423	39.6
6/30/89	18	91.1	1.5	-13.7	196.0	1413	37.9
6/30/89	22	128.4	2.8	-18.9	201.8	1596	55.2
7/1/89	02	107.5	2.0	-16.4	197.9	1498	46.2
7/1/89	06	82.5	1.1	-12.8	197.4	1353	30.7
7/1/89	10	102.5	2.0	-15.6	197.4	1485	46.0
7/1/89	14	88.1	1.4	-13.6	200.9	1401	37.8
7/1/89	18	93.9	1.6	-14.3	199.0	1437	41.6
7/1/89	22	110.4	2.2	-16.4	201.1	1520	49.4

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
7/2/89	02	112.5	2.3	-17.2	197.6	1528	49.3
7/2/89	06	81.9	1.0	-12.6	194.7	1346	29.4
7/2/89	10	103.3	2.0	-15.4	200.2	1488	46.7
7/2/89	14	99.3	1.8	-15.1	196.0	1469	44.3
7/2/89	18	100.6	1.9	-15.3	201.6	1474	45.7
7/2/89	22	139.4	3.2	-20.2	201.8	1634	57.5
7/3/89	02	127.3	2.8	-19.0	201.1	1591	54.8
7/3/89	06	92.5	1.5	-14.2	200.4	1425	40.2
7/3/89	10	113.6	2.3	-17.0	200.6	1536	50.8
7/3/89	14	101.8	2.0	-15.9	198.3	1485	46.6
7/3/89	18	104.4	2.0	-16.0	199.9	1494	47.2
7/3/89	18	104.4	2.0	-16.0	199.9	1494	47.2
7/3/89	22	138.9	3.1	-20.5	202.7	1630	57.4
7/4/89	02	128.6	2.8	-19.5	198.8	1596	54.7
7/4/89	06	91.7	1.5	-14.5	200.4	1413	38.5
7/4/89	10	113.4	2.3	-16.9	200.6	1528	49.6
7/4/89	14	94.1	1.6	-14.5	202.0	1437	42.0
7/4/89	18	93.1	1.5	-13.9	202.7	1427	40.8
7/4/89	22	121.3	2.6	-17.9	202.0	1567	53.2
7/5/89	02	109.5	2.1	-16.8	200.4	1512	48.4
7/5/89	06	85.8	1.2	-13.3	197.4	1381	34.5
7/5/89	10	112.5	2.3	-16.6	200.2	1528	49.6
7/5/89	14	122.5	2.7	-18.2	198.8	1575	53.4
7/5/89	18	116.7	2.4	-17.4	202.9	1549	52.3
7/5/89	22	160.7	3.5	-21.9	202.2	1672	56.5
7/6/89	02	132.5	2.9	-19.7	200.9	1608	55.5
7/6/89	06	102.8	1.9	-16.1	199.7	1483	46.1
7/6/89	10	128.6	2.8	-19.1	201.1	1597	55.3
7/6/89	14	107.1	2.1	-16.3	196.3	1508	47.7
7/6/89	18	109.8	2.2	-16.6	202.5	1516	49.4
7/6/89	22	149.1	3.5	-21.7	201.8	1666	59.5
7/7/89	02	134.8	3.0	-20.3	198.6	1617	55.6
7/7/89	06	103.5	1.9	-16.1	200.2	1484	46.0
7/7/89	13	113.1	2.2	-22.0	201.0	1516	48.8
7/7/89	17	110.8	2.2	-20.5	201.4	1515	49.4
7/7/89	21	150.3	3.4	-21.7	203.2	1657	57.9
7/8/89	01	143.8	3.3	-21.5	202.1	1648	58.5
7/8/89	05	111.9	2.3	-17.4	197.0	1527	49.3
7/8/89	09	122.2	2.6	-18.2	200.1	1568	52.6
7/8/89	13	104.0	2.0	-16.2	202.0	1491	47.4
7/8/89	17	110.9	2.3	-17.0	199.8	1525	50.0
7/8/89	21	139.9	3.2	-20.8	201.1	1636	57.7

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
7/9/89	01	149.2	3.5	-21.8	197.4	1664	58.1
7/9/89	05	110.9	2.2	-17.4	196.4	1523	48.8
7/9/89	09	121.8	2.6	-18.4	196.0	1567	51.7
7/9/89	13	99.6	1.8	-15.8	198.8	1464	43.9
7/9/89	17	84.4	1.2	-13.3	199.4	1371	33.6
7/9/89	21	127.5	2.8	-19.1	193.6	1591	52.9
7/10/89	01	143.0	3.2	-20.9	197.9	1632	55.0
7/10/89	05	103.1	1.9	-16.3	199.8	1484	46.3
7/10/89	09	117.8	2.5	-18.1	198.3	1557	52.2
7/10/89	13	100.0	1.7	-15.4	199.8	1455	42.4
7/10/89	17	90.0	1.4	-14.3	200.6	1410	38.8
7/10/89	21	128.2	2.8	-19.0	199.0	1594	54.4
7/11/89	01	130.1	2.9	-20.2	199.4	1602	55.3
7/11/89	05	114.7	2.2	-17.2	198.4	1521	47.3
7/11/89	09	116.8	2.4	-17.7	200.1	1548	51.4
7/11/89	13	88.6	1.3	-14.2	200.3	1393	36.1
7/11/89	23	120.8	2.4	-17.9	198.4	1544	48.7
7/12/89	03	118.2	2.5	-18.2	198.3	1528	51.6
7/12/89	07	108.6	2.2	-16.9	199.9	1495	48.9
7/12/89	11	116.3	2.4	-18.0	199.5	1506	51.3
7/12/89	15	85.2	1.2	-13.8	198.9	1328	33.7
7/12/89	19	74.4	0.7	-12.3	202.0	1276	22.2
7/12/89	23	106.4	2.0	-16.1	199.9	1462	46.8
7/13/89	03	112.1	2.1	-16.8	195.6	1488	45.7
7/13/89	07	96.7	1.7	-15.3	198.9	1434	43.2
7/13/89	11	95.0	1.6	-15.1	197.9	1419	41.4
7/13/89	15	84.6	1.1	-13.1	200.3	1357	32.7
7/13/89	19	78.4	0.9	-12.5	198.2	1325	27.2
7/13/89	23	113.9	2.3	-17.1	199.1	1505	50.0
7/14/89	03	113.9	2.3	-17.6	200.2	1522	50.9
7/14/89	07	101.2	1.9	-15.9	200.4	1428	45.3
7/14/89	11	119.5	2.1	-17.0	200.7	1486	47.3
7/14/89	15	89.3	1.2	-13.6	199.6	1332	33.5
7/14/89	19	93.7	1.6	-14.5	203.5	1417	41.8
7/14/89	23	137.8	3.1	-20.5	199.4	1593	56.6
7/15/89	03	123.1	2.6	-19.1	201.3	1552	53.5
7/15/89	07	112.5	2.2	-17.2	200.6	1497	48.3
7/15/89	11	100.7	1.8	-16.0	199.9	1423	43.5
7/15/89	15	77.7	0.8	-12.7	200.2	1322	25.2
7/15/89	19	82.3	1.1	-12.8	201.2	1290	31.6
7/15/89	23	117.2	2.4	-17.7	202.0	1528	52.1
7/16/89	03	123.2	2.6	-18.8	201.3	1541	53.3

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
7/16/89	07	108.4	2.1	-17.0	196.3	1501	47.7
7/16/89	11	108.1	2.1	-16.8	195.7	1471	46.7
7/16/89	15	70.1	0.4	-12.1	199.5	1255	13.7
7/16/89	19	75.7	0.7	-11.8	200.6	1276	21.8
7/16/89	23	120.2	2.5	-18.1	201.4	1528	52.7
7/17/89	03	119.3	2.5	-18.6	200.5	1533	52.1
7/17/89	07	99.5	1.8	-15.7	193.6	1448	42.9
7/17/89	11	106.1	2.0	-16.5	200.8	1478	47.0
7/17/89	15	83.6	1.1	-13.3	199.1	1290	31.2
7/17/89	19	98.4	1.7	-15.3	199.4	1444	43.2
7/17/89	23	137.8	3.1	-20.7	198.1	1595	56.5
7/18/89	03	132.3	2.9	-20.1	201.2	1568	55.3
7/18/89	07	113.0	2.3	-17.3	197.6	1520	49.3
7/18/89	11	115.0	2.4	-17.7	200.8	1519	50.7
7/18/89	15	92.0	1.5	-14.5	203.1	1404	40.1
7/18/89	19	99.0	1.8	-15.5	201.8	1444	44.3
7/18/89	23	144.5	3.3	-21.3	201.1	1617	58.6
7/19/89	03	129.9	2.8	-19.6	200.6	1567	54.8
7/19/89	07	121.2	2.6	-18.7	199.7	1550	52.4
7/19/89	11	125.8	2.7	-19.7	200.5	1557	54.2
7/19/89	15	95.3	1.6	-15.4	200.2	1429	42.0
7/19/89	19	98.5	1.8	-15.3	201.0	1441	43.8
7/19/89	23	136.8	3.1	-20.6	202.7	1597	57.5
7/20/89	03	128.1	2.8	-19.8	200.5	1561	54.3
7/20/89	07	118.1	2.5	-18.6	199.8	1531	51.7
7/20/89	11	122.7	2.6	-19.0	200.6	1539	52.6
7/20/89	15	87.8	1.3	-14.3	197.0	1380	35.9
7/20/89	19	94.3	1.6	-14.9	203.2	1426	42.3
7/20/89	23	133.0	3.0	-20.0	202.1	1589	56.2
7/21/89	03	129.8	2.8	-19.9	199.5	1564	54.4
7/21/89	07	112.8	2.3	-17.8	200.5	1525	50.2
7/21/89	11	120.9	2.6	-18.9	200.5	1538	52.9
7/26/89	08	145.2	3.3	-22.2	199.9	1646	57.3
7/26/89	09	136.3	3.0	-20.9	194.4	1614	53.7
7/26/89	10	121.3	2.5	-19.1	195.8	1559	50.6
7/26/89	11	117.3	2.4	-18.7	202.2	1548	51.9
7/26/89	12	126.5	2.7	-19.7	198.9	1578	52.7
7/26/89	17	97.4	1.7	-15.6	199.0	1264	42.0
7/26/89	22	93.6	1.5	-15.1	200.7	1451	39.1
7/27/89	03	112.0	2.2	-17.5	200.2	1276	49.1
7/27/89	08	99.8	1.8	-16.0	197.6	1224	43.4
7/27/89	13	79.0	0.8	-12.9	202.2	1409	23.0

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
7/27/89	18	74.4	0.6	-12.0	206.7	1275	19.4
7/27/89	23	119.5	2.5	-18.1	200.3	1546	50.1
7/28/89	04	118.3	2.4	-18.3	201.5	1547	51.1
7/28/89	09	109.7	2.1	-17.3	200.6	1509	47.9
7/28/89	14	96.0	1.6	-15.3	201.3	1439	41.4
7/28/89	19	104.7	2.0	-16.4	201.2	1483	45.6
7/29/89	00	145.6	3.3	-22.1	201.0	1648	57.8
7/29/89	05	122.3	2.6	-19.4	198.8	1561	51.6
7/29/89	10	116.1	2.3	-18.3	196.9	1535	49.0
7/29/89	15	87.6	1.3	-14.4	200.6	1387	35.4
7/29/89	20	100.4	1.8	-15.9	201.1	1462	43.6
7/30/89	01	139.3	3.1	-21.2	200.2	1626	56.1
7/30/89	06	106.0	2.0	-17.0	199.7	1486	45.3
7/30/89	11	101.7	1.9	-16.3	199.1	1474	44.9
7/30/89	16	87.2	1.3	-14.3	202.1	1386	35.7
7/30/89	21	127.1	2.7	-19.6	200.8	1580	53.2
7/31/89	02	137.9	3.0	-21.2	200.6	1619	55.6
7/31/89	07	104.9	2.0	-16.9	199.5	1486	45.8
7/31/89	10	105.5	2.0	-16.8	197.2	1489	44.1
7/31/89	17	75.9	0.7	-12.5	198.2	1294	22.0
7/31/89	22	106.4	2.0	-16.3	201.2	1488	45.2
8/1/89	03	111.5	2.2	-17.4	200.8	1522	49.3
8/1/89	08	91.7	1.5	-15.0	200.9	1418	39.4
8/1/89	13	82.0	1.0	-13.3	199.7	1344	28.9
8/1/89	18	90.8	1.4	-14.3	200.0	1406	36.8
8/1/89	23	141.4	3.3	-21.2	201.0	1645	58.6
8/2/89	04	127.1	2.8	-19.6	200.5	1589	54.4
8/2/89	09	126.4	2.8	-19.7	198.7	1587	53.9
8/2/89	14	101.7	1.8	-16.4	199.7	1458	41.0
8/2/89	19	90.7	1.4	-14.5	202.2	1409	38.1
8/3/89	00	127.3	2.8	-19.5	200.2	1590	54.3
8/3/89	05	105.9	2.0	-17.0	201.3	1492	46.4
8/3/89	10	106.0	2.1	-17.0	200.9	1503	48.3
8/3/89	17	91.6	1.5	-14.8	199.8	1419	39.1
8/3/89	21	121.3	2.6	-18.4	202.5	1569	53.5
8/4/89	01	127.6	2.8	-19.4	199.5	1592	54.1
8/4/89	05	108.4	2.2	-17.0	197.9	1513	48.3
8/4/89	09	123.6	2.7	-18.8	199.1	1580	53.6
8/4/89	13	96.0	1.7	-15.6	198.7	1450	42.9
8/4/89	17	98.4	1.8	-15.6	199.6	1463	44.1
8/4/89	21	133.3	3.0	-20.3	201.1	1616	56.5
8/5/89	01	143.8	3.3	-22.2	201.2	1651	58.7

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
8/5/89	05	116.5	2.4	-18.7	199.3	1548	51.2
8/5/89	09	124.0	2.7	-19.3	197.4	1579	53.0
8/5/89	13	108.9	2.2	-17.4	201.8	1518	49.9
8/5/89	17	104.0	2.0	-16.8	201.7	1495	48.1
8/5/89	21	129.7	2.9	-19.9	202.6	1600	55.5
8/6/89	01	142.6	3.3	-22.0	200.9	1646	58.1
8/6/89	05	119.8	2.5	-19.0	199.3	1562	52.3
8/6/89	09	131.6	2.9	-20.4	198.0	1609	55.2
8/6/89	13	90.6	1.5	-15.3	199.1	1415	38.9
8/6/89	17	90.5	1.4	-14.8	201.6	1412	39.0
8/6/89	21	125.4	2.7	-19.2	202.2	1586	54.5
8/7/89	01	142.5	3.3	-21.7	197.3	1645	56.9
8/7/89	05	118.2	2.5	-18.7	200.3	1555	51.9
8/7/89	09	126.5	2.8	-19.6	200.6	1588	54.3
8/7/89	13	108.4	2.1	-17.4	200.4	1512	48.4
8/7/89	17	90.7	1.5	-15.2	201.2	1417	39.6
8/7/89	21	123.0	2.6	-19.0	196.3	1575	51.9
8/8/89	01	129.9	2.9	-20.3	201.7	1600	55.3
8/8/89	05	103.6	2.0	-16.9	198.7	1486	45.9
8/8/89	09	112.8	2.3	-17.8	200.6	1532	50.2
8/8/89	13	81.6	1.0	-13.5	200.9	1340	28.7
8/8/89	17	81.0	1.0	-13.2	199.6	1342	29.0
8/8/89	21	102.0	1.9	-15.7	201.8	1479	45.4
8/9/89	01	116.7	2.4	-17.8	201.7	1548	51.4
8/9/89	05	98.6	1.8	-15.9	200.1	1463	44.2
8/9/89	09	120.5	2.6	-18.5	201.0	1564	52.4
8/9/89	13	84.4	1.1	-14.0	199.4	1363	31.1
8/9/89	17	82.8	1.0	-13.3	199.8	1350	29.7
8/9/89	21	118.2	2.5	-18.0	201.1	1556	51.7
8/10/89	01	134.5	3.0	-20.8	201.4	1619	56.6
8/10/89	05	104.5	2.0	-16.8	199.9	1492	46.7
8/10/89	09	116.6	2.4	-18.2	198.1	1546	50.5
8/10/89	13	88.8	1.4	-14.9	197.6	1415	36.4
8/10/89	20	96.4	1.7	-15.6	201.4	1458	43.1
8/11/89	00	120.7	2.6	-18.6	200.3	1544	52.3
8/11/89	04	101.4	1.9	-16.5	200.5	1427	45.6
8/11/89	08	116.2	2.4	-18.1	200.9	1495	49.3
8/11/89	12	113.4	2.3	-18.4	197.5	1500	48.1
8/11/89	16	81.1	0.9	-13.4	200.2	1343	25.7
8/11/89	20	83.4	1.1	-13.9	201.9	1334	30.7
8/12/89	00	115.4	2.4	-17.8	200.2	1507	51.4
8/12/89	04	103.7	2.0	-16.5	199.6	1458	47.0

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
8/12/89	08	117.3	2.5	-18.1	198.4	1532	51.1
8/12/89	12	82.1	1.0	-13.9	201.0	1353	27.5
8/12/89	16	62.5	0.3	-11.5	200.8	1180	11.5
8/12/89	20	82.3	1.0	-13.0	201.1	1320	29.5
8/13/89	00	121.9	2.6	-18.5	199.6	1530	52.4
8/13/89	04	112.3	2.3	-17.5	198.1	1495	49.3
8/13/89	08	114.2	2.3	-17.7	198.1	1521	49.7
8/13/89	12	86.9	1.2	-14.5	202.5	1374	32.3
8/13/89	16	71.0	0.5	-11.9	207.0	1260	15.5
8/13/89	20	96.3	1.6	-15.1	202.5	1432	40.3
8/14/89	00	129.6	2.9	-19.8	200.1	1573	55.1
8/14/89	04	100.8	1.9	-16.2	200.6	1448	45.4
8/14/89	08	115.1	2.4	-18.0	199.4	1518	50.3
8/14/89	12	92.6	1.5	-15.0	198.4	1389	36.6
8/14/89	16	76.7	0.8	-12.6	198.6	1296	23.9
8/14/89	20	91.8	1.5	-14.5	201.3	1408	39.4
8/15/89	00	122.8	2.6	-18.8	200.3	1541	53.1
8/15/89	04	105.1	2.0	-16.9	198.1	1473	46.9
8/15/89	08	102.6	1.9	-16.4	198.4	1430	45.0
8/15/89	12	88.9	1.3	-14.4	199.4	1377	35.4
8/15/89	16	83.1	1.1	-13.6	195.4	1320	24.0
8/15/89	20	138.8	3.2	-20.4	201.1	1597	57.6
8/16/89	00	120.0	2.5	-18.4	200.8	1539	51.6
8/16/89	04	92.8	1.5	-15.1	198.2	1408	39.4
8/16/89	08	105.3	2.0	-16.5	201.3	1441	45.2
8/16/89	12	90.8	1.4	-14.8	201.0	1396	37.7
8/16/89	16	84.8	1.2	-13.8	201.9	1364	33.1
8/16/89	20	101.8	1.9	-16.0	200.9	1453	44.7
8/17/89	00	128.8	2.8	-19.8	200.6	1569	55.0
8/17/89	04	105.0	2.0	-16.9	198.1	1469	46.1
8/17/89	08	102.2	1.9	-16.7	198.1	1455	45.4
8/17/89	12	91.7	1.5	-15.0	201.4	1398	39.2
8/17/89	16	86.7	1.2	-13.7	203.7	1364	33.0
8/17/89	20	115.4	2.4	-18.0	201.4	1532	51.4
8/18/89	00	132.7	3.0	-20.6	201.3	1571	56.3
8/18/89	04	101.9	1.9	-16.5	200.1	1452	45.2
8/18/89	08	112.2	2.3	-17.8	199.3	1486	49.0
8/18/89	12	101.6	1.9	-16.6	201.1	1440	44.9
8/18/89	16	78.2	0.9	-12.9	198.4	1270	25.9
8/18/89	20	93.2	1.6	-14.9	199.8	1417	40.7
8/19/89	00	135.3	3.1	-20.4	198.3	1589	55.8
8/19/89	04	114.1	2.3	-18.0	199.9	1504	50.3

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
8/19/89	08	105.0	2.0	-16.9	196.1	1482	46.1
8/19/89	12	81.7	1.0	-13.6	200.1	1343	29.2
8/19/89	16	74.2	0.7	-12.1	200.3	1227	21.2
8/19/89	20	86.2	1.2	-13.6	199.9	1360	34.6
8/20/89	00	113.4	2.3	-17.5	199.7	1515	50.2
8/20/89	04	107.4	2.1	-16.8	201.4	1456	47.9
8/20/89	08	101.1	1.9	-16.1	198.8	1460	45.7
8/20/89	12	82.2	1.0	-13.5	201.1	1347	29.9
8/20/89	16	61.8	0.2	-11.0	204.3	1209	5.8
8/20/89	20	83.7	1.1	-13.1	200.4	1332	31.1
8/21/89	00	127.0	2.8	-19.2	199.8	1549	54.3
8/21/89	04	111.6	2.2	-17.3	197.6	1489	48.5
8/21/89	08	100.6	1.9	-16.0	199.5	1454	45.3
8/21/89	12	90.2	1.4	-14.6	200.2	1391	35.5
8/21/89	16	70.1	0.4	-11.5	201.1	1235	14.1
8/21/89	20	92.2	1.5	-14.4	199.0	1408	37.8
8/22/89	00	114.3	2.3	-17.5	199.7	1504	50.3
8/22/89	04	99.6	1.8	-15.9	198.6	1443	44.3
8/22/89	08	100.9	1.9	-16.1	198.6	1460	45.0
8/25/89	20	91.1	1.5	-14.1	200.3	1393	39.5
8/26/89	00	113.0	2.3	-17.2	194.9	1491	49.4
8/26/89	04	104.2	2.0	-16.2	197.5	1471	46.3
8/26/89	08	101.1	1.9	-15.8	199.0	1444	44.9
8/26/89	12	92.2	1.6	-14.6	201.3	1379	40.9
8/26/89	16	78.6	0.9	-12.5	198.9	1324	25.9
8/26/89	20	91.9	1.5	-14.1	200.4	1402	40.3
8/27/89	00	112.6	2.3	-16.9	198.4	1513	50.0
8/27/89	04	109.1	2.2	-16.7	198.7	1495	48.5
8/27/89	08	103.3	2.0	-16.4	199.8	1455	47.4
8/27/89	12	103.3	2.0	-16.4	199.8	1455	47.4
8/27/89	12	83.1	1.1	-13.1	200.3	1350	32.2
8/27/89	20	98.6	1.8	-15.4	201.8	1444	44.2
8/28/89	00	123.5	2.7	-18.7	199.7	1541	53.4
8/28/89	04	102.0	1.9	-16.2	201.6	1462	46.2
8/28/89	08	110.7	2.2	-17.0	196.7	1506	48.5
8/28/89	12	122.4	2.6	-18.4	199.9	1564	53.0
8/28/89	16	117.0	2.5	-17.9	199.3	1534	51.6
8/28/89	20	95.3	1.6	-15.0	198.4	1383	39.8
8/29/89	00	110.0	2.2	-17.1	199.1	1487	49.5
8/29/89	04	95.7	1.7	-15.2	199.9	1422	42.4
8/29/89	08	93.5	1.6	-15.0	198.0	1408	40.3
8/29/89	12	84.1	1.1	-13.5	198.3	1331	31.7

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
8/29/89	16	83.2	1.1	-13.0	199.5	1322	31.2
8/29/89	20	97.3	1.7	-15.3	201.2	1429	42.7
8/30/89	00	109.3	2.2	-16.9	201.2	1481	48.9
8/30/89	04	87.2	1.3	-13.8	200.1	1368	34.9
8/30/89	08	100.9	1.8	-15.5	198.8	1409	43.1
8/30/89	12	98.3	1.8	-15.4	201.7	1445	44.1
8/30/89	16	86.1	1.3	-13.7	200.3	1341	35.1
8/30/89	20	98.4	1.8	-15.3	202.0	1435	44.4
8/31/89	00	123.6	2.7	-18.5	198.4	1555	53.1
8/31/89	04	103.0	1.9	-16.2	198.6	1445	44.7
8/31/89	08	98.5	1.8	-15.6	197.3	1447	42.1
8/31/89	12	95.2	1.7	-15.4	199.7	1436	42.1
8/31/89	16	89.7	1.4	-14.1	199.1	1377	37.2
8/31/89	20	106.7	2.1	-16.5	200.5	1499	48.0
9/1/89	00	118.1	2.5	-18.2	201.4	1538	52.0
9/1/89	04	91.0	1.5	-14.8	198.8	1387	38.3
9/1/89	08	100.9	1.9	-15.6	200.3	1453	44.1
9/1/89	12	96.0	1.7	-15.4	198.7	1424	43.1
9/1/89	18	95.0	1.6	-14.3	202.5	1420	42.4
9/1/89	22	115.9	2.4	-16.5	200.4	1530	51.0
9/2/89	02	113.0	2.3	-16.4	199.8	1515	49.5
9/2/89	06	84.3	1.1	-12.9	199.8	1358	32.2
9/2/89	10	102.8	2.0	-15.3	197.3	1443	45.9
9/2/89	14	82.8	1.1	-12.7	201.7	1321	30.9
9/2/89	18	83.8	1.1	-12.5	201.6	1324	31.9
9/2/89	22	118.4	2.5	-17.0	201.0	1516	52.3
9/3/89	02	106.3	2.0	-16.0	200.9	1471	46.7
9/3/89	06	82.9	1.1	-12.3	201.6	1292	31.2
9/3/89	10	95.0	1.7	-14.1	197.2	1425	41.8
9/3/89	14	88.9	1.4	-13.2	199.8	1386	36.3
9/3/89	18	87.9	1.3	-13.0	199.8	1388	35.9
9/3/89	22	125.6	2.8	-18.1	198.2	1564	54.0
9/4/89	02	119.2	2.5	-17.5	199.4	1528	51.6
9/4/89	06	89.6	1.4	-13.7	200.9	1363	37.4
9/4/89	10	101.3	1.9	-15.2	199.3	1464	45.7
9/4/89	14	85.0	1.2	-12.8	199.3	1328	33.5
9/4/89	18	86.0	1.3	-12.9	201.9	1368	35.5
9/4/89	22	116.0	2.4	-17.0	200.4	1528	51.6
9/5/89	02	96.6	1.6	-14.6	198.4	1430	40.3
9/5/89	06	78.2	0.8	-11.8	200.3	1272	25.4
9/5/89	10	95.8	1.7	-14.3	200.6	1437	43.1
9/5/89	14	86.1	1.2	-12.8	197.8	1367	33.5

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
9/5/89	18	88.0	1.3	-12.9	200.4	1347	35.9
9/5/89	22	112.0	2.3	-16.3	200.2	1497	50.0
9/6/89	02	101.1	1.9	-15.0	198.9	1443	44.0
9/6/89	06	82.8	1.1	-12.5	201.9	1351	30.5
9/6/89	10	104.1	2.0	-15.5	199.0	1476	46.5
9/6/89	14	88.7	1.3	-13.3	200.8	1360	35.9
9/6/89	18	87.4	1.3	-12.9	200.6	1379	35.4
9/6/89	22	119.0	2.5	-17.2	201.7	1548	52.5
9/7/89	02	100.6	1.8	-15.4	197.9	1445	43.9
9/7/89	06	88.2	1.3	-13.2	200.6	1383	36.0
9/7/89	10	101.0	1.9	-15.0	201.1	1449	46.0
9/7/89	14	91.1	1.5	-13.9	200.4	1393	40.2
9/7/89	18	95.4	1.7	-14.3	200.4	1434	42.4
9/7/89	22	124.1	2.7	-17.8	200.3	1562	53.7
9/8/89	02	113.6	2.3	-16.8	200.5	1511	50.1
9/8/89	06	90.4	1.4	-13.9	201.0	1382	37.8
9/8/89	10	118.1	2.5	-17.3	202.2	1523	52.1
9/8/89	14	99.4	1.8	-14.8	200.8	1436	42.9
9/8/89	18	98.1	1.8	-14.7	202.2	1446	43.8
9/8/89	22	136.4	3.1	-19.8	198.8	1593	56.3
9/9/89	02	107.9	2.1	-16.4	199.5	1477	46.9
9/9/89	06	90.8	1.4	-13.9	201.8	1386	38.7
9/9/89	10	101.2	1.9	-15.2	200.9	1439	45.5
9/9/89	14	81.5	1.0	-12.4	199.1	1344	29.2
9/9/89	18	80.2	0.9	-12.0	199.3	1335	27.8
9/9/89	22	108.3	2.2	-15.6	200.6	1504	48.5
9/10/89	02	112.4	2.3	-16.4	201.8	1523	50.6
9/10/89	06	90.6	1.4	-13.7	201.1	1391	38.4
9/10/89	10	96.6	1.7	-14.5	200.4	1447	42.8
9/10/89	14	81.0	1.0	-12.2	201.3	1335	28.2
9/10/89	18	79.7	0.9	-11.8	199.1	1281	26.8
9/10/89	22	121.2	2.6	-17.3	201.3	1554	52.7
9/11/89	02	101.2	1.8	-15.1	197.8	1454	43.2
9/11/89	06	87.6	1.3	-12.9	201.9	1353	35.7
9/11/89	10	99.1	1.8	-14.8	198.8	1449	44.3
9/11/89	14	85.1	1.2	-12.6	200.5	1358	33.2
9/11/89	18	80.9	1.0	-11.8	202.0	1310	29.0
9/11/89	22	106.2	2.1	-15.3	199.9	1492	47.2
9/12/89	02	102.2	1.9	-15.1	200.3	1444	45.2
9/12/89	06	87.5	1.3	-13.2	200.4	1374	35.8
9/12/89	10	102.5	1.9	-15.2	197.6	1453	45.0
9/12/89	14	87.3	1.3	-13.2	197.6	1375	34.9

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
9/12/89	18	95.4	1.5	-13.5	203.1	1394	38.4
9/12/89	22	118.0	2.5	-17.2	199.8	1552	51.9
9/13/89	02	96.3	1.7	-14.7	199.7	1430	41.0
9/13/89	06	86.7	1.2	-12.8	198.7	1374	34.0
9/13/89	10	108.7	2.2	-15.9	199.0	1493	48.2
9/13/89	17	108.9	2.1	-15.8	200.3	1491	47.5
9/13/89	21	154.9	3.7	-21.4	197.0	1636	59.4
9/14/89	01	143.6	3.3	-20.6	201.0	1615	57.7
9/14/89	05	106.9	2.1	-16.3	201.9	1492	48.4
9/14/89	09	133.4	3.0	-19.4	197.5	1583	54.4
9/14/89	13	135.5	3.0	-19.9	201.6	1591	56.4
9/14/89	17	129.7	2.8	-19.0	200.3	1579	54.5
9/14/89	21	157.6	3.8	-22.1	199.5	1647	60.3
9/15/89	01	135.0	3.0	-20.1	199.8	1575	55.6
9/15/89	05	105.8	2.1	-16.3	198.4	1476	47.4
9/15/89	09	115.1	2.4	-17.3	200.3	1516	49.4
9/15/89	13	121.7	2.6	-17.9	198.7	1541	51.0
9/15/89	17	128.7	2.8	-18.5	201.1	1577	53.7
9/15/89	21	151.8	3.6	-21.5	201.3	1635	59.5
9/16/89	01	145.5	3.4	-21.0	198.0	1614	57.2
9/16/89	05	110.8	2.2	-17.1	199.5	1505	49.3
9/16/89	09	132.0	2.9	-19.7	198.4	1580	54.7
9/16/89	13	130.4	2.9	-19.5	200.3	1582	54.8
9/16/89	17	124.3	2.7	-18.5	194.8	1571	51.8
9/16/89	21	161.5	3.9	-22.1	199.6	1666	60.7
9/17/89	01	139.0	3.1	-20.8	198.3	1597	55.9
9/17/89	05	108.4	2.2	-16.7	199.1	1484	48.6
9/17/89	09	130.1	2.9	-19.1	199.8	1579	54.6
9/17/89	13	106.9	2.1	-16.3	201.2	1502	48.5
9/17/89	17	99.5	1.8	-15.1	197.8	1451	44.2
9/17/89	21	132.1	3.0	-19.1	200.5	1588	55.5
9/18/89	01	142.7	3.3	-20.7	199.6	1607	57.2
9/18/89	05	104.1	2.0	-16.0	199.4	1482	46.8
9/18/89	09	121.2	2.6	-17.7	201.9	1546	52.7
9/18/89	13	112.7	2.3	-16.8	195.9	1523	48.9
9/18/89	17	99.4	1.9	-15.2	199.0	1473	45.6
9/18/89	21	132.0	2.9	-19.2	200.6	1565	55.4
9/19/89	01	120.7	2.5	-18.1	201.6	1528	52.3
9/19/89	05	100.9	1.9	-15.3	201.7	1457	46.2
9/19/89	09	123.2	2.7	-18.1	199.8	1549	53.1
9/19/89	13	102.4	2.0	-15.6	198.6	1478	46.2
9/19/89	17	102.7	2.0	-15.3	199.4	1480	46.2

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
9/19/89	21	131.7	3.0	-19.2	199.3	1580	55.5
9/20/89	01	129.0	2.8	-18.9	201.0	1575	54.4
9/20/89	05	102.6	2.0	-15.9	199.1	1484	46.3
9/20/89	09	121.4	2.6	-18.2	200.9	1548	52.4
9/20/89	13	120.5	2.6	-18.1	199.9	1545	52.3
9/20/89	17	110.7	2.3	-16.7	199.4	1518	50.1
9/20/89	21	153.3	3.6	-21.2	199.6	1638	59.2
9/21/89	01	133.7	3.0	-20.1	200.9	1582	55.2
9/21/89	05	102.8	1.9	-15.8	199.7	1474	46.2
9/21/89	09	130.9	2.9	-19.1	201.0	1581	55.1
9/21/89	13	111.4	2.2	-16.8	200.1	1507	49.0
9/21/89	17	111.1	2.2	-16.6	199.9	1494	49.3
9/21/89	21	140.7	3.2	-20.6	197.1	1603	56.8
9/22/89	01	132.9	2.9	-19.7	199.6	1561	55.0
9/22/89	05	101.8	1.9	-15.8	200.1	1457	45.6
9/22/89	09	126.7	2.7	-18.8	198.8	1564	53.2
9/22/89	13	123.4	2.6	-18.3	196.0	1551	51.8
9/22/89	17	114.8	2.4	-17.2	200.1	1528	50.6
9/22/89	21	156.4	3.8	-21.5	197.1	1648	59.5
9/23/89	01	137.9	3.1	-20.3	199.7	1594	55.6
9/23/89	05	99.8	1.8	-15.7	198.7	1468	44.6
9/23/89	09	123.4	2.7	-18.3	196.8	1562	52.7
9/23/89	13	118.8	2.5	-17.6	198.6	1550	51.2
9/23/89	17	112.4	2.3	-16.9	199.9	1525	50.2
9/23/89	21	137.3	3.1	-20.1	199.1	1595	56.1
9/24/89	01	127.7	2.8	-19.0	199.8	1569	53.6
9/24/89	05	104.1	2.0	-16.1	201.1	1475	47.0
9/24/89	09	120.8	2.6	-17.9	201.1	1549	52.5
9/24/89	13	119.7	2.5	-17.7	201.3	1532	52.1
9/24/89	17	127.0	2.8	-18.7	199.7	1575	53.9
9/24/89	21	164.1	4.1	-22.2	194.7	1652	60.8
9/25/89	01	141.0	3.2	-20.4	199.0	1600	56.6
9/25/89	05	103.7	2.0	-16.1	198.2	1466	46.4
9/25/89	09	132.9	3.0	-19.4	199.1	1583	54.9
9/25/89	17	133.3	2.9	-19.8	198.8	1587	54.8
9/25/89	21	149.2	3.5	-21.6	197.2	1621	58.1
9/26/89	01	146.5	3.4	-21.1	200.5	1621	57.6
9/26/89	05	107.8	2.1	-16.8	200.1	1494	48.2
9/26/89	09	127.3	2.8	-19.0	199.9	1568	53.7
9/26/89	13	122.4	2.6	-18.4	200.5	1564	53.1
9/26/89	17	123.4	2.6	-18.3	198.4	1559	52.4
9/26/89	21	153.0	3.6	-21.7	198.2	1633	59.1

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
9/27/89	01	131.8	2.9	-19.8	200.1	1554	54.1
9/27/89	05	104.6	2.0	-16.1	201.7	1487	46.9
9/27/89	09	122.0	2.6	-18.1	197.2	1551	51.8
9/27/89	13	115.7	2.4	-17.5	201.3	1526	50.9
9/27/89	17	108.7	2.2	-16.5	199.9	1500	48.6
9/27/89	21	142.6	3.3	-20.5	195.7	1609	56.1
9/28/89	01	142.7	3.3	-20.8	200.1	1607	57.0
9/28/89	05	99.0	1.8	-15.4	201.7	1454	44.4
9/28/89	09	117.7	2.5	-17.5	196.0	1542	50.5
9/28/89	13	117.4	2.4	-17.5	199.7	1549	51.3
9/28/89	17	113.4	2.3	-17.0	198.8	1517	49.6
9/28/89	21	144.6	3.3	-21.3	199.5	1608	58.0
9/29/89	01	128.1	2.8	-19.4	196.7	1557	53.0
9/29/89	05	98.0	1.8	-15.4	199.1	1460	43.9
9/29/89	09	117.9	2.5	-17.4	201.1	1545	51.5
9/29/89	13	116.8	2.4	-17.3	201.2	1518	51.6
9/29/89	17	113.1	2.3	-16.9	195.7	1518	49.1
9/29/89	21	145.3	3.4	-21.1	199.3	1616	57.9
9/30/89	01	136.6	3.0	-20.1	199.5	1578	55.0
9/30/89	05	99.8	1.8	-15.6	200.6	1457	44.8
9/30/89	09	114.2	2.3	-17.1	198.4	1521	50.1
9/30/89	13	113.9	2.4	-17.3	199.5	1534	50.6
9/30/89	17	96.9	1.7	-14.9	198.0	1432	42.5
9/30/89	21	134.6	3.0	-19.8	198.4	1577	55.4
10/1/89	01	122.4	2.6	-18.3	199.6	1543	51.9
10/1/89	05	94.4	1.6	-14.7	200.8	1419	41.8
10/1/89	09	109.7	2.2	-16.4	201.2	1491	49.4
10/1/89	13	103.1	2.0	-15.9	199.8	1465	46.6
10/1/89	17	93.8	1.6	-14.3	198.6	1414	40.7
10/1/89	21	135.1	3.1	-19.7	199.4	1582	55.8
10/2/89	01	137.8	3.1	-20.1	201.2	1585	55.9
10/2/89	05	93.9	1.6	-14.9	199.7	1417	40.8
10/2/89	09	105.7	2.1	-15.9	201.4	1484	47.7
10/2/89	13	102.6	2.0	-15.7	200.8	1466	47.2
10/2/89	17	93.0	1.5	-14.3	199.0	1405	39.9
10/2/89	21	121.2	2.6	-18.0	199.1	1547	52.7
10/3/89	01	112.1	2.2	-16.8	201.0	1505	48.9
10/3/89	05	91.6	1.5	-14.1	198.1	1396	38.9
10/3/89	09	106.6	2.1	-15.9	199.8	1478	47.9
10/3/89	13	97.4	1.7	-14.7	198.4	1437	43.2
10/3/89	17	92.9	1.5	-13.9	198.4	1405	39.4
10/3/89	21	114.3	2.4	-16.6	201.1	1525	50.6

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
10/4/89	01	103.2	2.0	-15.5	200.9	1467	46.3
10/4/89	05	90.1	1.4	-13.8	196.5	1386	37.3
10/4/89	09	104.7	2.0	-15.4	201.0	1465	47.3
10/4/89	13	97.8	1.8	-14.7	201.4	1441	44.1
10/4/89	17	94.2	1.6	-14.2	199.1	1420	41.3
10/4/89	21	115.6	2.4	-16.8	197.9	1526	50.9
10/5/89	01	103.8	2.0	-15.7	198.4	1461	45.8
10/5/89	05	91.2	1.5	-13.9	198.2	1401	38.9
10/5/89	09	104.6	2.0	-15.7	199.9	1482	47.7
10/5/89	13	101.6	1.9	-15.4	199.4	1448	46.4
10/5/89	17	95.5	1.7	-14.5	197.2	1431	41.8
10/5/89	21	102.7	2.0	-15.6	199.8	1482	46.8
10/6/89	01	94.2	1.6	-14.4	196.7	1423	40.3
10/6/89	05	84.8	1.2	-12.7	201.0	1299	32.8
10/6/89	09	96.7	1.7	-14.4	201.0	1445	43.1
10/6/89	17	95.9	1.7	-14.5	198.0	1428	42.2
10/6/89	21	108.6	2.2	-16.2	199.9	1486	49.0
10/7/89	01	98.3	1.8	-15.0	201.7	1441	43.1
10/7/89	05	84.5	1.1	-12.8	198.9	1350	31.4
10/7/89	09	96.6	1.7	-14.4	198.6	1444	42.9
10/7/89	13	97.3	1.8	-14.8	198.4	1434	43.6
10/7/89	17	95.8	1.7	-14.6	200.2	1434	43.1
10/7/89	21	105.2	2.1	-15.8	199.7	1486	48.0
10/8/89	01	95.5	1.6	-14.7	201.3	1434	42.0
10/8/89	05	85.2	1.2	-12.9	201.4	1330	33.4
10/8/89	09	92.6	1.5	-13.9	200.5	1417	40.0
10/8/89	13	95.6	1.7	-14.5	201.9	1434	43.0
10/8/89	17	90.6	1.4	-13.7	198.3	1357	37.8
10/8/89	21	101.2	1.9	-15.2	200.1	1465	46.2
10/9/89	01	91.7	1.4	-13.9	201.3	1345	37.6
10/9/89	05	82.5	1.0	-12.2	200.3	1314	30.0
10/9/89	09	95.2	1.7	-14.4	200.3	1430	42.0
10/9/89	13	97.2	1.7	-14.6	199.9	1452	43.7
10/9/89	17	99.1	1.8	-15.0	200.9	1452	44.6
10/9/89	21	107.6	2.1	-16.1	199.9	1485	48.7
10/10/89	01	96.8	1.7	-14.7	199.9	1431	42.4
10/10/89	05	87.3	1.3	-13.1	200.6	1366	34.8
10/10/89	09	101.3	1.9	-14.9	199.7	1461	44.1
10/10/89	13	96.9	1.7	-14.8	197.4	1435	42.8
10/10/89	17	94.5	1.6	-14.3	197.2	1425	40.8
10/10/89	21	113.3	2.3	-16.6	197.2	1512	48.9
10/11/89	01	90.8	1.4	-14.0	197.2	1402	36.4

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
10/11/89	05	81.8	1.0	-12.4	198.4	1346	30.3
10/11/89	09	96.1	1.7	-14.3	200.3	1432	42.4
10/11/89	13	96.3	1.7	-14.5	199.9	1427	42.5
10/11/89	17	94.5	1.6	-14.4	199.7	1416	41.6
10/11/89	21	110.3	2.2	-16.3	192.9	1499	47.3
10/12/89	01	94.8	1.6	-14.5	193.0	1414	39.8
10/12/89	05	82.5	1.1	-12.5	199.6	1317	30.7
10/12/89	09	96.1	1.7	-14.4	199.5	1438	41.9
10/12/89	13	97.0	1.7	-14.6	198.2	1435	42.6
10/12/89	17	93.0	1.5	-14.0	198.2	1409	39.8
10/12/89	21	105.7	2.1	-15.8	197.2	1473	47.2
10/13/89	01	86.9	1.2	-13.2	201.2	1364	33.7
10/13/89	05	81.9	1.0	-12.1	200.8	1312	29.0
10/13/89	09	95.6	1.6	-14.1	197.0	1414	39.6
10/13/89	13	89.0	1.4	-13.6	194.4	1381	35.9
10/13/89	17	88.3	1.3	-13.2	201.2	1374	35.7
10/13/89	21	98.6	1.8	-14.9	198.6	1445	44.5
10/14/89	01	92.0	1.5	-13.9	201.0	1391	38.9
10/14/89	05	84.0	1.1	-12.5	200.6	1323	31.8
10/14/89	09	89.4	1.4	-13.6	198.6	1383	37.4
10/14/89	13	93.5	1.6	-14.2	198.8	1412	40.6
10/14/89	17	89.7	1.4	-13.6	198.1	1385	37.1
10/14/89	21	101.2	1.9	-15.1	200.5	1464	45.6
10/15/89	01	87.2	1.2	-13.1	196.6	1371	33.8
10/15/89	05	84.1	1.1	-12.4	199.6	1350	31.6
10/15/89	09	87.3	1.3	-13.2	199.3	1371	35.4
10/15/89	13	89.5	1.4	-13.5	197.6	1386	36.8
10/15/89	17	89.2	1.4	-13.5	197.8	1377	36.6
10/15/89	21	96.0	1.7	-14.5	200.6	1436	43.0
10/16/89	01	90.3	1.4	-13.7	198.0	1395	37.0
10/16/89	05	80.8	0.9	-12.0	200.6	1279	27.9
10/16/89	09	87.0	1.3	-13.1	199.0	1370	34.9
10/16/89	13	91.4	1.5	-13.8	199.4	1403	38.6
10/16/89	17	88.4	1.3	-13.4	199.4	1377	35.9
10/16/89	21	92.0	1.5	-13.9	199.9	1409	40.0
10/17/89	09	86.5	1.3	-12.4	199.9	1369	37.0
10/18/89	01	83.4	1.1	-12.4	197.6	1345	30.2
10/18/89	05	81.3	1.0	-12.1	197.9	1309	28.5
10/18/89	09	87.0	1.3	-13.2	199.3	1371	35.3
10/18/89	13	91.8	1.5	-13.8	200.4	1386	38.7
10/18/89	17	90.1	1.4	-13.8	197.6	1394	37.8
10/18/89	21	90.1	1.4	-13.9	196.1	1392	37.3

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
10/19/89	01	82.2	1.0	-12.4	195.0	1342	29.0
10/19/89	05	80.1	0.9	-12.0	199.1	1331	27.4
10/19/89	09	88.0	1.3	-13.1	198.8	1340	34.6
10/19/89	13	91.7	1.5	-14.1	199.0	1403	39.8
10/19/89	17	92.3	1.5	-14.2	197.5	1408	39.5
10/19/89	21	88.7	1.4	-13.6	199.8	1383	36.8
10/20/89	01	84.3	1.1	-12.7	198.8	1327	31.5
10/20/89	05	80.6	0.9	-12.2	198.7	1277	26.4
10/20/89	09	87.4	1.3	-13.1	197.9	1372	34.2
10/20/89	13	88.9	1.4	-13.7	196.0	1383	36.2
10/20/89	17	90.2	1.4	-13.8	198.7	1393	37.8
10/20/89	21	90.6	1.4	-13.9	197.2	1398	38.0
10/21/89	01	84.3	1.1	-12.9	198.4	1354	31.8
10/21/89	05	79.9	0.9	-12.0	200.8	1303	27.1
10/21/89	09	85.7	1.2	-12.9	200.1	1333	33.1
10/21/89	13	89.0	1.4	-13.5	198.9	1379	36.5
10/21/89	17	87.9	1.3	-13.5	197.8	1375	35.8
10/21/89	21	83.7	1.1	-12.7	199.9	1322	31.9
10/22/89	01	80.2	0.9	-12.1	200.4	1248	27.6
10/22/89	05	79.1	0.9	-11.8	197.8	1326	25.6
10/22/89	09	83.2	1.1	-12.6	199.1	1320	30.6
10/22/89	13	87.1	1.3	-13.3	199.9	1368	35.2
10/22/89	17	86.4	1.2	-13.1	196.4	1333	34.0
10/22/89	21	86.0	1.2	-13.1	197.9	1338	34.0
10/23/89	01	82.0	1.0	-12.3	200.3	1309	29.3
10/23/89	05	79.4	0.9	-11.9	199.1	1326	26.0
10/23/89	09	84.5	1.1	-12.5	198.2	1321	31.3
10/23/89	13	85.3	1.2	-12.8	198.8	1328	33.0
10/23/89	17	84.3	1.1	-12.8	197.8	1321	31.6
10/23/89	21	82.7	1.1	-12.4	199.0	1315	30.6
10/24/89	01	79.8	0.9	-12.0	200.6	1303	27.2
10/24/89	05	78.9	0.9	-11.7	198.7	1298	25.7
10/24/89	09	84.0	1.1	-12.2	198.1	1265	31.8
10/24/89	13	82.4	1.1	-12.1	198.6	1316	30.5
10/24/89	17	81.7	1.0	-11.9	201.0	1339	29.2
10/24/89	21	82.5	1.1	-11.9	199.6	1315	30.4
10/25/89	01	78.8	0.9	-11.7	200.4	1300	26.6
10/25/89	05	77.5	0.8	-11.4	197.9	1292	24.2
10/25/89	09	82.8	1.1	-12.0	198.8	1344	30.4
10/26/89	16	81.8	1.0	-12.1	197.6	1342	29.5
10/26/89	20	83.1	1.1	-12.2	199.5	1348	32.0
10/27/89	00	80.0	0.9	-11.9	198.8	1277	27.5

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
10/27/89	04	76.8	0.8	-11.4	198.9	1315	23.8
10/27/89	08	81.8	1.0	-11.9	200.4	1309	29.4
10/27/89	12	81.7	1.0	-12.1	198.6	1201	29.3
10/27/89	16	81.6	1.0	-12.0	198.9	1339	29.2
10/27/89	20	80.5	1.0	-11.8	199.7	1281	28.7
10/28/89	00	78.3	0.9	-11.6	196.3	1296	25.7
10/28/89	04	76.7	0.8	-11.4	196.1	1315	23.5
10/28/89	08	79.2	0.9	-11.7	197.8	1327	26.7
10/28/89	12	81.6	1.0	-12.1	198.8	1285	29.9
10/28/89	16	80.4	1.0	-11.9	199.1	1308	28.3
10/28/89	20	81.7	1.0	-12.1	199.6	1313	30.2
10/29/89	00	78.9	0.9	-11.8	197.2	1299	26.2
10/29/89	04	77.0	0.8	-11.6	197.9	1316	23.7
10/29/89	09	77.0	0.8	-11.7	199.4	1273	23.9
10/29/89	12	79.4	0.9	-11.8	198.1	1294	26.6
10/29/89	16	78.0	0.8	-11.6	199.3	1320	24.6
10/29/89	20	78.4	0.8	-11.7	198.1	1296	25.4
10/30/89	00	76.8	0.8	-11.9	196.1	1263	23.1
10/30/89	04	74.9	0.7	-11.3	200.2	1256	21.2
10/30/89	08	77.2	0.8	-11.6	194.8	1292	23.5
10/30/89	12	83.8	1.1	-12.4	195.8	1295	30.9
10/30/89	16	84.4	1.1	-12.6	197.8	1357	32.4
10/30/89	20	84.8	1.2	-12.6	197.4	1265	32.2
10/31/89	00	82.0	1.0	-12.2	199.1	1313	30.0
10/31/89	04	78.9	0.9	-11.8	197.8	1300	26.1
10/31/89	08	81.5	1.0	-12.2	198.1	1285	29.2
10/31/89	12	84.2	1.1	-12.7	197.0	1326	32.2
10/31/89	16	82.9	1.1	-12.4	198.2	1346	31.4
10/31/89	20	82.0	1.0	-12.4	197.0	1315	29.6
11/1/89	00	80.6	0.9	-12.0	199.1	1333	27.5
11/1/89	04	78.5	0.8	-12.0	194.3	1271	25.1
11/1/89	08	81.9	1.0	-12.2	199.4	1341	29.5
11/1/89	12	82.3	1.0	-12.4	195.7	1259	30.0
11/1/89	16	82.3	1.0	-12.4	197.8	1316	29.8
11/1/89	20	83.3	1.1	-12.6	196.7	1317	31.0
11/2/89	00	81.5	1.0	-12.3	199.1	1340	29.9
11/2/89	04	78.5	0.8	-11.9	193.3	1323	24.9
11/2/89	08	81.7	1.0	-12.3	197.4	1286	28.9
11/2/89	12	84.7	1.2	-13.0	196.5	1329	32.9
11/2/89	16	83.3	1.1	-12.8	197.3	1319	31.2
11/2/89	20	83.7	1.1	-12.8	198.7	1350	32.0
11/3/89	00	81.2	1.0	-12.2	194.3	1280	28.2

Four Hour Average Monitor Data
for
Ketchum Northwoods Production Well

Date	Time	INPUT ENERGY (hp)	FLOW (cfs)	WATER LEVEL (ft)	OUTPUT HEAD (ft)	PUMP SPEED (rpm)	ENERGY EFF (%)
11/3/89	04	78.6	0.8	-12.0	199.0	1324	25.7
11/3/89	08	81.2	1.0	-12.2	196.8	1336	28.5
11/3/89	12	85.0	1.2	-12.8	192.9	1356	31.9
11/3/89	16	83.4	1.1	-12.7	197.5	1317	31.1
11/3/89	20	83.7	1.1	-12.8	197.2	1320	31.2
11/4/89	00	81.8	1.0	-12.3	198.9	1255	29.3
11/4/89	04	78.8	0.9	-11.8	194.7	1297	25.5
11/4/89	08	80.2	0.9	-12.0	196.0	1305	27.3
11/4/89	12	85.5	1.2	-13.1	191.2	1334	33.0
11/4/89	16	83.7	1.1	-12.7	196.7	1319	31.1
11/4/89	20	82.7	1.1	-12.5	195.2	1316	30.0
11/5/89	00	80.6	1.0	-12.2	196.7	1308	28.0
11/5/89	04	78.2	0.8	-11.8	194.2	1296	25.1
11/5/89	08	78.7	0.9	-11.9	199.1	1216	26.1
11/5/89	12	84.5	1.1	-12.6	198.3	1354	32.4
11/5/89	16	82.2	1.0	-12.4	197.6	1285	29.9
11/5/89	20	82.9	1.1	-12.5	196.4	1263	30.8
11/6/89	00	80.3	1.0	-12.2	198.1	1335	28.5
11/6/89	04	78.7	0.9	-11.9	195.3	1297	25.4
11/6/89	08	80.4	1.0	-12.3	197.5	1306	28.0
11/6/89	12	84.5	1.1	-12.7	198.8	1326	32.5
11/6/89	16	82.0	1.0	-12.5	193.4	1258	29.0
11/6/89	20	83.0	1.1	-12.5	198.1	1344	30.7
11/7/89	00	81.7	1.0	-12.4	189.2	1341	28.4
11/7/89	04	79.5	0.9	-12.0	196.6	1327	26.7
11/7/89	08	81.4	1.0	-12.4	196.8	1340	29.1