

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

RECEIVED**APR 01 2009**

DEPARTMENT OF WATER RESOURCES

A. GENERAL INFORMATIONPermit No. 63-124201. Owner: Micron Technology, Inc. Phone No.: 208-368-4000Current Address: P.O. Box 6, Boise, ID 83707-00062. Accompanied by: Brian Brown and Larry Woodington EXAM DATE: March 10, 2009Address: P.O. Box 6, Boise, ID 83707-0006 Phone No. 208-368-4000Relationship to Permit Holder: pumping station and water treatment plant operators - Micron Technology, Inc.3. Source: Boise River tributary to Snake River**B. OVERLAP REVIEW**1. Other water rights with the same place of use: United Water Idaho, Nampa & Meridian Irrigation District, 63-8992, 63-9029, 63-9357, 63-10208, 63-11293, 63-311832. Other water rights with the same point of diversion: United Water Idaho, Nampa & Meridian Irrigation District, 63-161BN, 63-12399, Boise Valley Irrigation Ditch Company,**C. DIVERSION AND DELIVERY SYSTEM****1. Point(s) of Diversion:**

Ident No.	Gov't Lot	¼	¼	¼	Sec.	Twp.	Rge.	County	Method of Determination/Remarks
	6		NW	NE	4	2N	3E	Ada	Field Exam, Topo Map, GIS

2. Place(s) of Use:Indicate Method of Determination Field Exam, Topo Map, GIS

TWP	RGE	SEC	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
2N	3E	6											Lot 7 I	I			I		
2N	3E	7		I	I, E		I	I		I	I					I			

I = Industrial, E = ground water recharge

3. **Delivery System Diagram:** Indicate all major components and distances between components. Indicate weir size/ditch size/pipe id as applicable.

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
Pump Station Flow Meter (total pump station flow)	magnetic	Marsh Multi- Mag	284	MS070125	30- inch	Weekly calibration check by comparison of 30- inch meter to sum of other meters
Blg 22 Flow Meter (direct industrial use)	magnetic	Emco Magflo	161F211000	164512T16 6		"
Well 5 flow meter (ground- water recharge)	ultrasonic	Poly- sonics	DCT-1088	47948		"
Micron Irrigation (post heat exchanger use from B22)	magnetic	Emco Magflo	141F211000	147312T15 6		"
Micron Irrigation (post heat exchanger use from B31)	ultrasonic	Poly- sonics	DCT-1088	44014		"

2. Measurements:

Flow measurements are logged on the Micron SCADA system (supervisory control and data acquisition system). Flows are logged continuously, and can be accessed in real time.

E. NARRATIVE/REMARKS/COMMENTS

Permit 63-12420 authorizes diversion of 15 cfs from the Boise River for industrial purposes (5 cfs) and groundwater recharge purposes (15 cfs).

Water is diverted from a pump station on the Boise River through buried pipeline to the Micron Technology campus. The pump station is jointly owned by Micron Technology, J.R. Simplot Company, Surprise Valley Subdivision, and United Water Idaho. United Water shares the surface water intake but utilizes separate pumps and pipeline.

The pump station includes a trash rack for exclusion of large debris, an FMC traveling screen for exclusion of small debris, and a wet well with pump bays for 12 pumps (six on each side). The United Water pumps are located on the south side of the pump station. The Micron, Simplot, and Surprise Valley pumps are located on the north side of the pump station.

The pumping equipment utilized by Micron, Simplot, and Surprise Valley consists of two variable speed 200-hp line-shaft turbine pumps and two constant speed 400-hp line-shaft turbine pumps. The system normally operates at 175 psi discharge pressure. The pump performance curves indicate that the pumps are rated to produce approximately 22 cfs (9900 gpm) with a total dynamic head (TDH) of approximately 404 feet. TDH required is 404 feet (175 psi). Therefore, the pumps will produce in excess of the 15 cfs permit rate.

The Micron, Simplot, and Surprise Valley pumps discharge to a buried steel manifold pipe on the north side of the building. From there, the pipeline is 30-inch ductile iron for approximately one mile, which then reduces to 24-inch HDPE for one mile, and then to 20-inch HDPE for approximately ½ mile within the Micron campus. The pipeline route crosses beneath the New York Canal, and then parallels State Highway 21 to the intersection with Technology Way. The pipe follows Technology Way and terminates on the Micron campus. Between Micron Technology campus and the river pump station, taps located at Surprise Way and Grand Forest Drive provide water to Surprise Valley Subdivision and J.R. Simplot Company (Columbia Village Subdivision and Simplot Sports Complex) for irrigation purposes under separate water rights.

Water delivered to the Micron Campus under this permit is utilized for both industrial and

ground water recharge purposes. The industrial water uses include cooling, as a portion of the delivered water is diverted through a heat exchanger system. After the heat exchanger, the water is delivered to use for irrigation or treated for ground-water recharge or direct industrial uses.

The water treatment consists of a membrane ultrafiltration system. The ultrafiltration process removes bacteria and virus-sized particles, so that the treated water contains virtually no bacteria or suspended solids prior to injection at Micron Well 5. The treatment system is located in Micron Building 31 and consists of three membrane treatment "skids", with a nominal combined capacity of approximately 1500 gpm (3.34 cfs). The treated water is either utilized for groundwater recharge through an injection well (Micron Well 5 at Building 31) or it is delivered back to the plant (Building 22) for industrial uses that require treated water, such as cooling towers and manufacturing of semiconductor products.

The capacity of Micron Well 5 for injection exceeds 10 cfs, but ground-water recharge rate is currently limited by nominal treatment capacity to approximately 3.34 cfs. Monitoring shows that recharge rates of 1500 gpm are routinely achieved, but with only short-term excursions above 1500 gpm.

Total diversion by Micron, Simplot, and Surprise Valley is measured in the 30-inch pipeline at the pump station using a Marsh Multi-Mag Flow Meter. The Multi-Mag Flow Meter is located in a meter vault outside of the pump station building. Additional flow meters are located at (1) the Surprise Valley tap, (2) the Columbia Village tap, (3) Micron Building 22 for direct industrial use, (4) Well 5 for ground water recharge, Micron Building 22 for irrigation, and (6) Micron Building 31 for irrigation. Water use by Micron is determined by subtracting the Surprise Valley and Columbia Village uses from the total flow in the 30-inch pipeline.

Calibration of the flow meters is checked weekly by comparing the sum of the individual meters to the total flow measured by the 30-inch meter. During the first part of 2008, the 30-inch meter performance was erratic, and flow was based on the individual meters. The 30-inch meter was subsequently repaired, and from July through December 2008, the meter comparison showed an average calibration of 0.9% between the 30-inch meter and the sum of the individual meters, with a maximum daily variation of 1.7%.

Maximum 24-hour average delivery in 2008 into the Micron Campus from the Boise River pump station was 3.98 cfs (1,786 gpm) which occurred on September 1, 2008. Maximum instantaneous river water industrial use rate in 2008 was 2318 gpm (5.16 cfs) on September 30, 2008.

Water delivered under this water right permit is available only during flood control releases on the Boise River. During other times, water is diverted for the purposes described above under other water rights, including Nampa & Meridian District water rights 63-199B and 63-200B.

Total industrial (i.e., non-potable) water use at the Micron facility from all sources (on-site wells, re-use, river water) during a field examination of Micron permit 63-31183 on August 20, 2008 was 14.24 cfs. Total river water diversion volume to the Micron campus in 2008 was 2,060 acre feet.

Have conditions of permit approval been met? X yes ___ no

F. FLOW CALCULATIONS

Additional Computation Sheets Attached (Pump Curve)

Measured Method:

1. Pump Curves. Pump performance curves indicate a system capacity of 22 cfs. A portion of this system capacity is shared with other users during the irrigation season. During the non-irrigation season, all of this capacity is available for Micron use. The 20-inch pipe entering the Micron campus has capacity for approximately 10 cfs at 6 fps.

(See Flow Measurements, Item D. and Narrative/Remarks/Comments).

2. Flow Meters. The maximum 24-hour diversion rate that was recorded from the flow meter at the River pumping station in 2008 was 9.15 cfs which occurred on August 28, 2008. The diversion rate to the Micron facility can be calculated based on the total pumping station flow minus the flow diverted through the Surprise Valley and Columbia Village flow meters. Maximum 24-hour delivery to the plant in 2008 based on this method was 3.98 cfs which was measured on September 1, 2008. Instantaneous diversion rates vary throughout the day, and will obviously exceed the 24-hour rate. Maximum 24-hour delivery to the plant while permit 63-12420 was in priority in 2008 was 3.62 cfs on June 10, 2008.

Maximum industrial use of river water in 2008 was 5.16 cfs, which exceeds the permit rate of 5.00 cfs. Therefore, a rate of 5.00 cfs is recommended for industrial purposes.

Maximum ground water recharge rate is based on treatment capacity, and is approximately 3.34 cfs. Therefore, a rate of 3.34 cfs is recommended for ground water recharge.

Capacity of the delivery system is approximately 10 cfs. Therefore, a total diversion rate based on the sum of industrial and ground water recharge, or 8.34 cfs, is recommended.

G. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$$

$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation Season}) \times 1.9835 =$$

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} =$$

2. Volume Calculations for Other Uses:

$$\text{Industrial } V = 5.00 \text{ cfs} \times 365 \text{ days} \times 1.9835 \text{ cfs/day} = 3,619.9 \text{ af}$$

$$\text{Recharge } V = 3.34 \text{ cfs} \times 365 \text{ days} \times 1.9835 \text{ cfs/day} = 2,418.1 \text{ af}$$

$$\text{Total } V = 3,619.9 + 2,418.1 = 6,038 \text{ af}$$

H. RECOMMENDATIONS

1. Recommended Amounts

Beneficial Use	Period of Use		Rate of Diversion Q (cfs)	Annual Volume V (afa)
	From	To		
Industrial	1/1	12/31	5.00	3,619.9
Ground Water Recharge	1/1	12/31	3.34	2,418.1

Total Diversion

8.34 cfs and 6,038.0 afa

2. Recommended Amendments

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☒ None
☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☐ Other

I. AUTHENTICATION

Field Examiner's Name Terry M. Scanlan, P.E., Certified Water Right Examiner No.09-129 Date 3/31/09

Field Examiner's Signature 

Reviewer _____ Date _____

SEAL



2006 Aerial Photo

T3N R3E

T2N R3E

24" Pipe

30" Pipe

Legend



Point of Diversion



Place of Use



Injection Well



Sections



40-acre Tracts

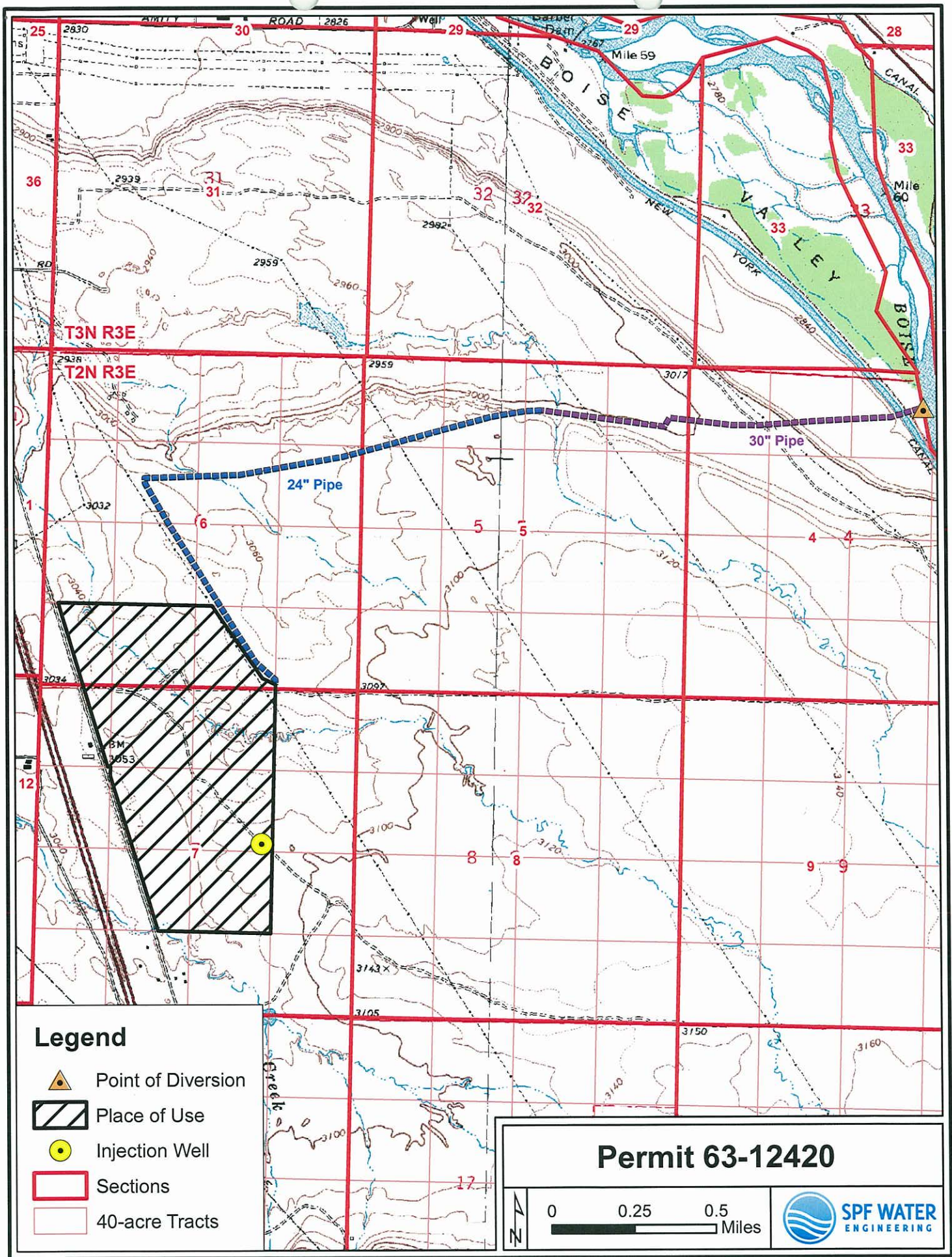
Permit 63-12420

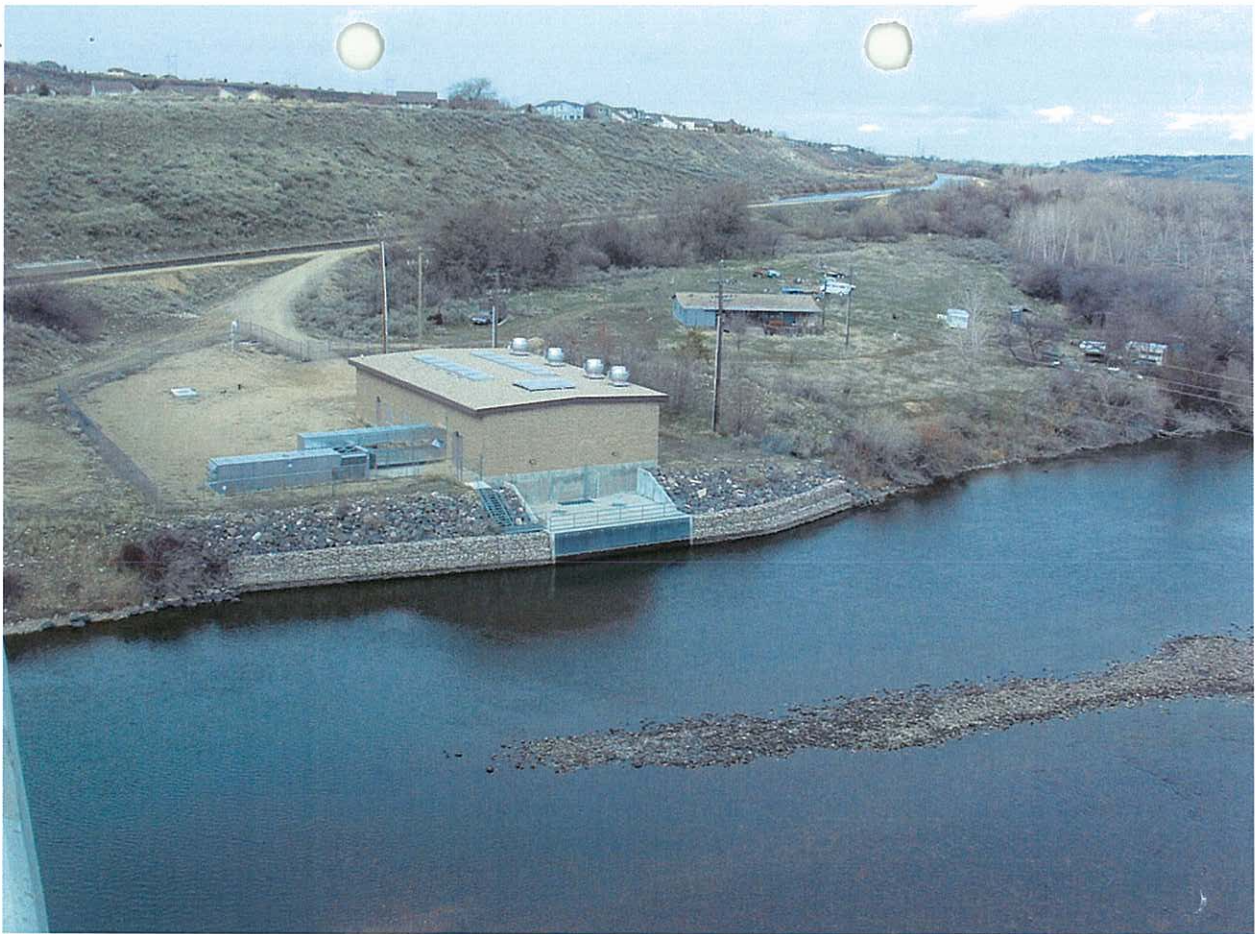


0 0.25 0.5
Miles



SPF WATER
ENGINEERING





Pump station viewed from Highway 21 bridge. Boise River in foreground. New York Canal and Surprise Valley Subdivision in background.



Traveling screen enclosure within pump station.



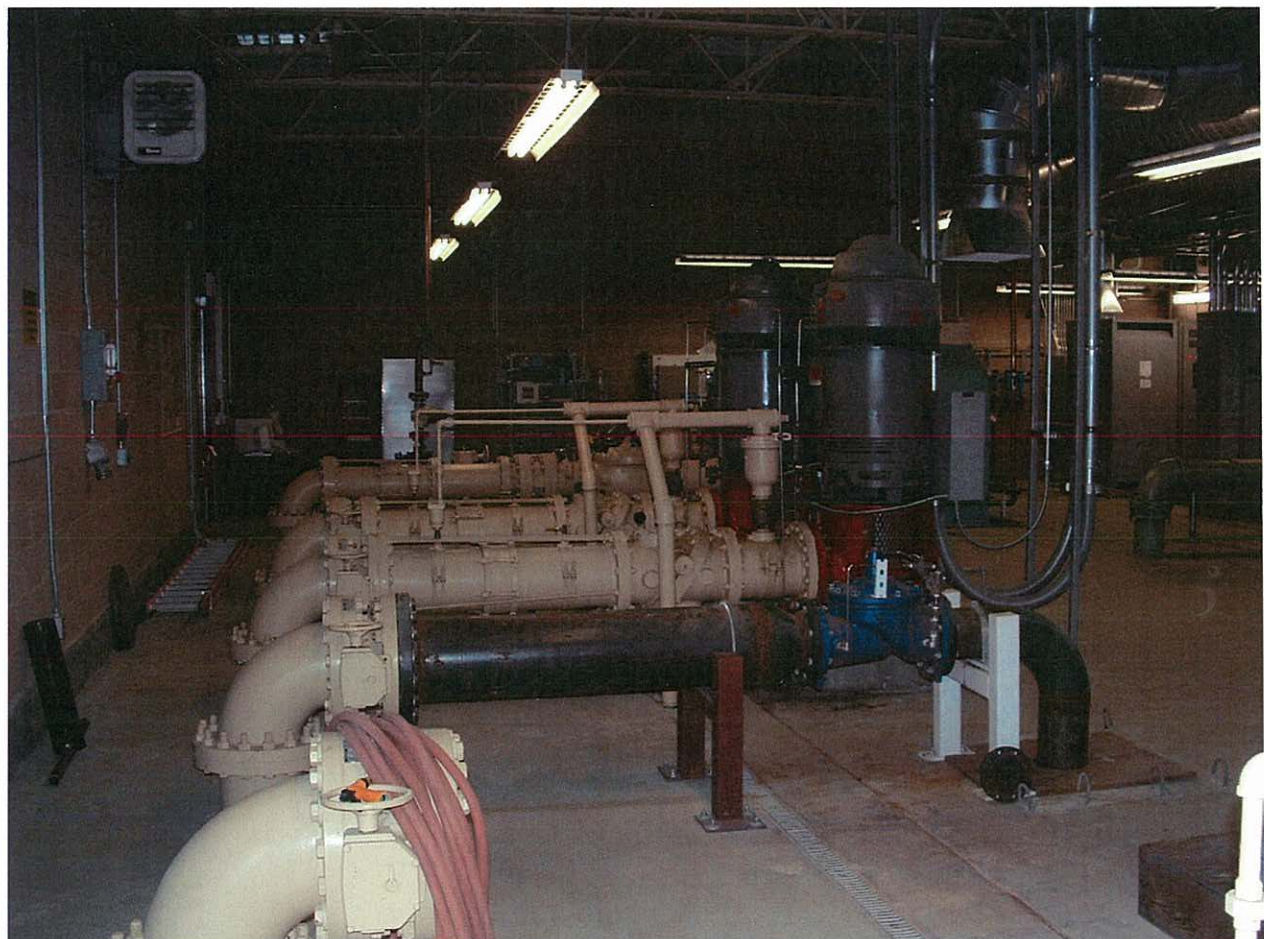
View of four pumps. River water pumps 5 and 6 in foreground. Pumps 1 and 2 in background.



River water pump 1, 200-hp variable speed motor.



River water pump 2, 200-hp variable speed motor.



River water pumps 5 and 6. These two pumps each have 400-hp constant speed motors.



Flow meter tap on 30-inch diameter pipe in flow meter vault.



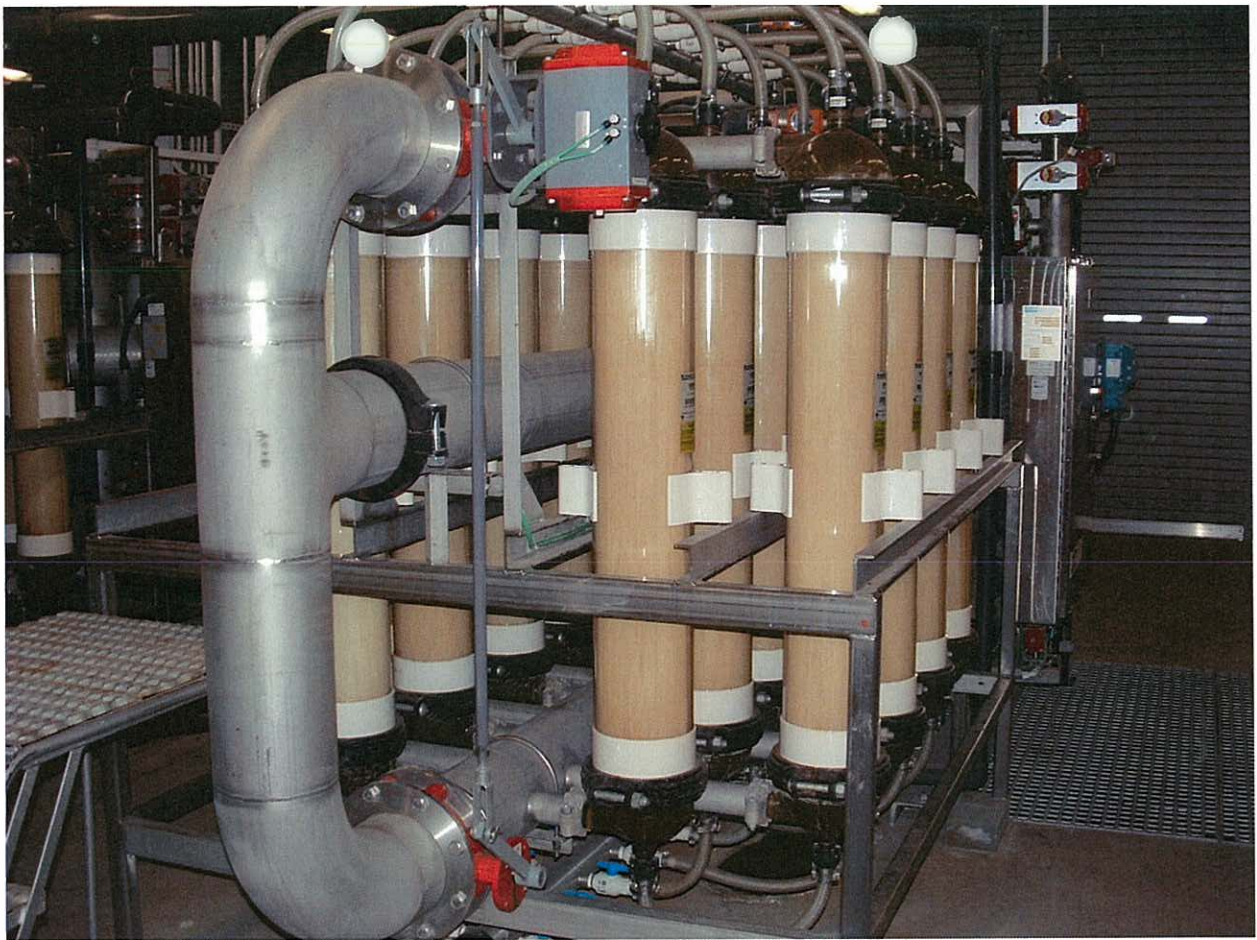
Flow meter vault on west side of Boise River pump station.



Filters at entrance to Micron plant at Building 22, upstream from heat exchangers.



Heat exchangers in Building 22. All water diverted to plant goes through the heat exchangers.



Ultrafiltration skid No. 500 at Building 31.



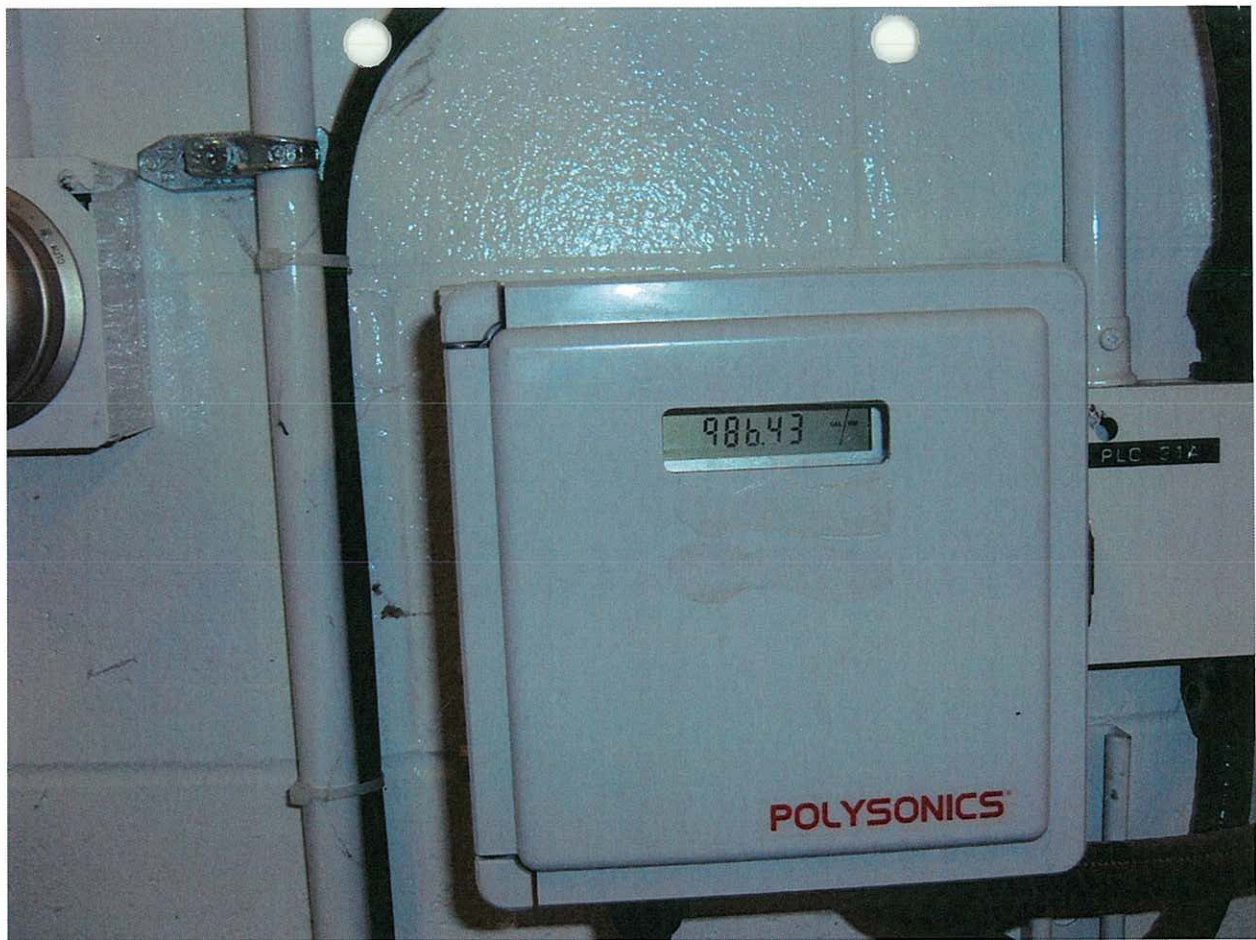
Ultrafiltration skid No. 100 at Building 31.



Ultrafiltration skid No. 200 at Building 31.



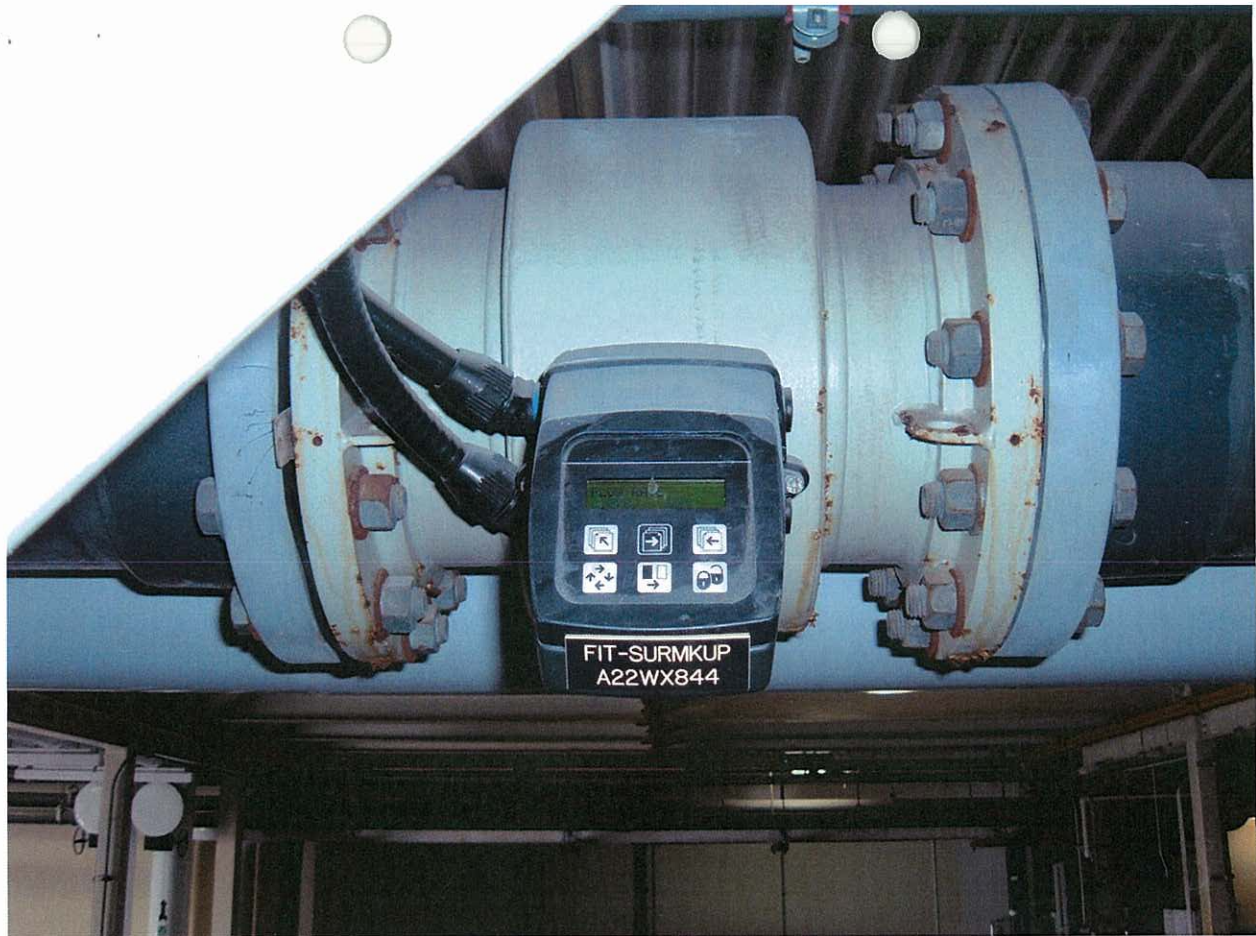
Micron Well No. 5 (injection) wellhead (on left) for ground-water recharge at Building 31.



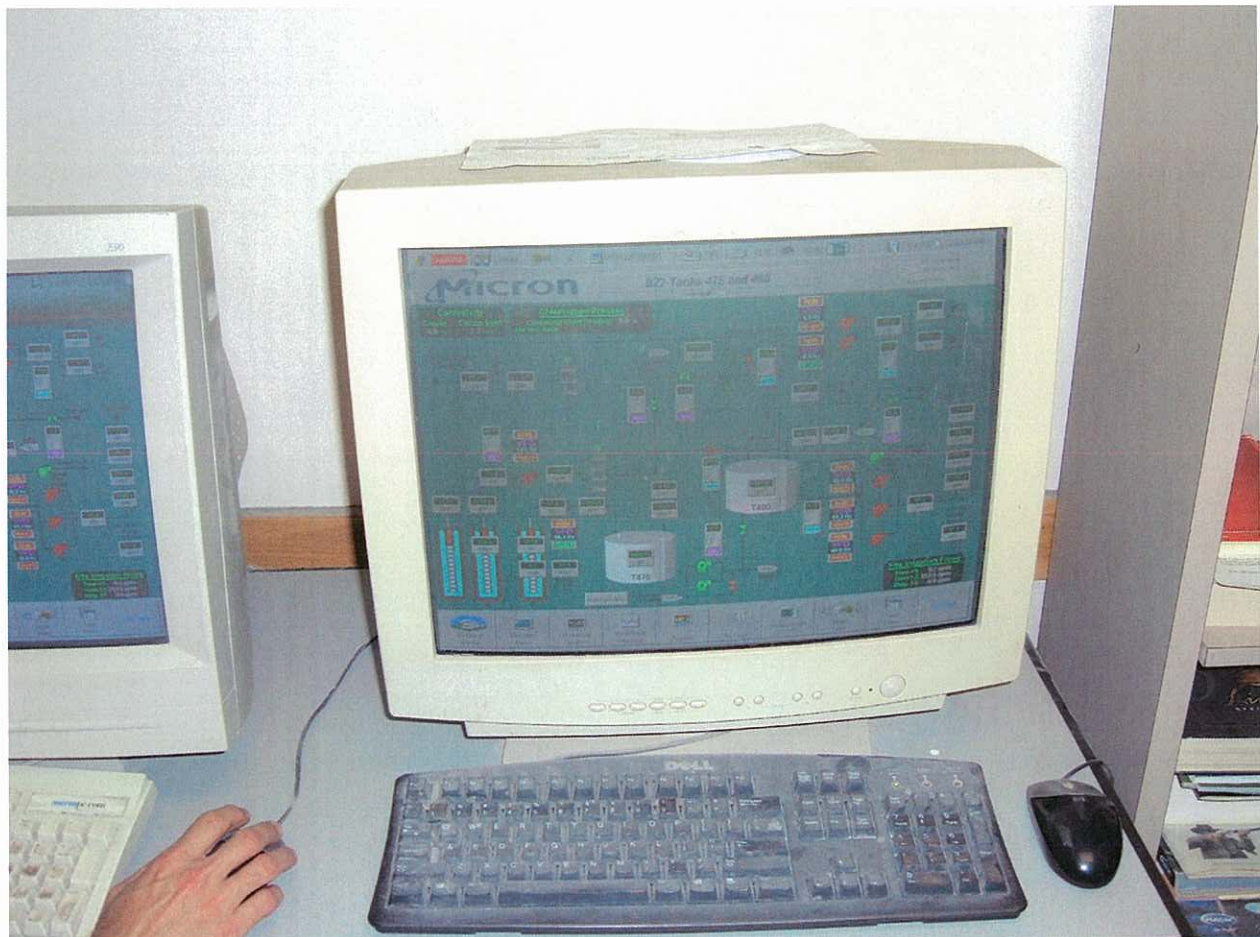
Well 5 (injection rate for ground water recharge) flow meter display at Building 31



Well 5 ultrasonic flow meter at Building 31.



Building 22 flow meter (treated water for industrial use).



SCADA system screen in Building 22.

PUMP DATA SHEET VERTI-LINE

Catalog: V-L60 v. 1.1

CURVE: 9PC-119434

TYPE - SPEED: VERT. TURBINE - 1800

PUMP Size: 14RL; - 6 stages

Speed: 1770 rpm

Imp dia: 10.625 in

Max Temperature: - °F

Max Pressure: - psi_g

Max Sphere Size: - in

Specific Speed Ns: -

Suction Nss: -

Suction size: - in

Discharge size: - in

FLUID Water tmp: 60 °F

SG: 1

vsc: 1.122 cP

vapor: 0.2568 psi

atm: 14.7 psi

NPSHa: - ft

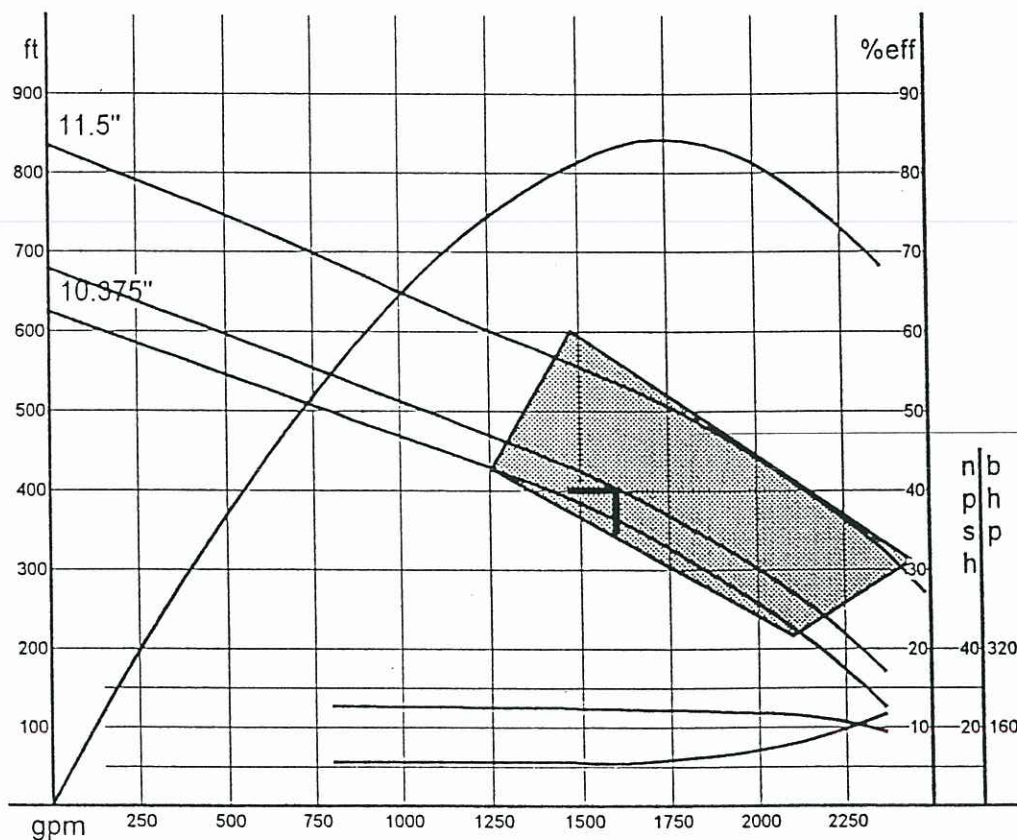
PIPING Pressure: - psi

Suction elev: - ft

size: - in

Discharge size: - in

DESIGN POINT
~ Flow: 1600 gpm
Head: 400 ft
DATA POINT
Flow: 1600 gpm
Head: 402 ft
Eff: 83 %
Power: 196 bhp
NPSHr: 11.0 ft
DESIGN CURVE
Shutoff Head: 678 ft
Pressure: 294 psi _g
Min Flow: - gpm
BEP: 84 %eff @ 1680
Max: 240 bhp @ 160
MAX DIAMETER
Max: 273 bhp @ 1423



PERFORMANCE EVALUATION

Flow gpm	Speed rpm	Head ft	Pump %eff	Power bhp	NPSHr ft	Motor %eff	Power kW	Hrs/yr	Cost
1920	1770	323	83	189	13.1				
1600	1770	402	83	196	11.0				
280	1770	463	75	200	11.0				
960	1770	518	62	203	11.0				
640	Flow Rate is Out of Range for this Pump								

Pump 2

H2Optimize ver: 5.03

File: (untitled)

Aug 28, 1997

PUMP DATA SHEET VERTI-LINE

Catalog: V-L60 v. 1.1

TYPE - SPEED: VERT. TURBINE - 1800

PUMP Size: 14RM; - 5 stages

Speed: 1770 rpm

Imp dia: 10.6875 in

Max Temperature: - °F

Max Pressure: - psi_g

Max Sphere Size: - in

Specific Speed N_s: -

Suction N_{ss}: -

Suction size: - in

Discharge size: - in

FLUID Water tmp: 60 °F

SG: 1

vsc: 1.122 cP

vapor: 0.2568 psi

atm: 14.7 psi

NPSHa: - ft

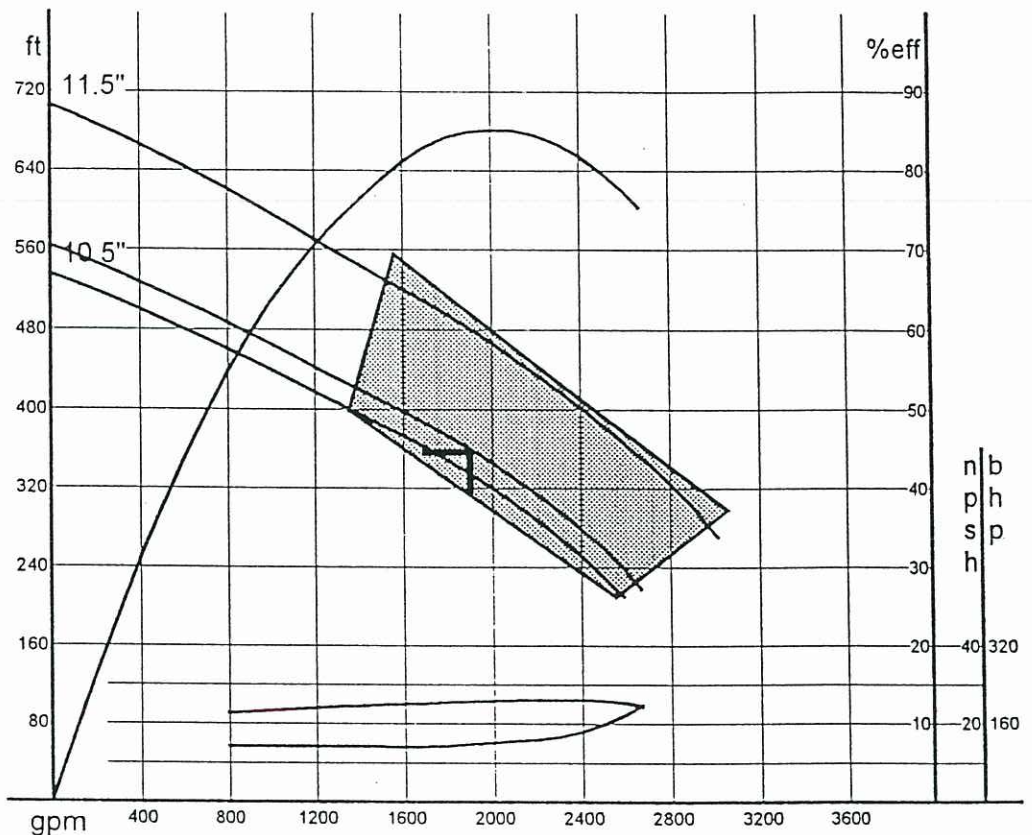
PIPING Pressure: - psi

Suction elev: - ft

size: - in

Discharge size: - in

DESIGN POINT
Flow: 1900 gpm
Head: 356 ft
DATA POINT
Flow: 1900 gpm
Head: 359 ft
Eff: 84 %/86%
Power: 205 bhp/200 bhp
NPSHr: 14.6 ft
DESIGN CURVE
Shutoff Head: 563 ft
Pressure: 244 psi _g
Min Flow: - gpm
BEP: 85 %eff @ 2003
Max: 208 bhp @ 2337
MAX DIAMETER
Max: 290 bhp @ 2525



PERFORMANCE EVALUATION

Flow gpm	Speed rpm	Head ft	Pump %eff	Power bhp	NPSHr ft	Motor %eff	Power kW	Hrs/yr	Cost
2280	1770	300	83/85	208/203	16.2				
1900	1770	359	84/86	205/200	14.6				
1520	1770	405	79/81	197/192	14.0				
1140	1770	448	67/69	193/187	14.0				
760									

Flow Rate is Out of Range for this Pump

VERTI LINE HAS STATED WHEN THEY TEST THIS PUMP, EFFICIENCY WILL 86%. PREVIOUS TESTS HAVE SHOWN BOOK CURVES TO BE LOW.

Verify with Factory performance test and supply data to Engineer

Pumps 5 & 6

H2Optir ver: 5.03
File: (untitled)
July 8, 1997

PUMP DATA SHEET VERTI-LINE

Catalog: V-L60 v. 1.1

IRVE: 18-177

TYPE - SPEED: VERT. TURBINE - 1800

PUMP Size: 16AWM - 4 stages

Speed: 1770 rpm

Imp dia: 12.6875 in

Max Temperature: - °F

Max Pressure: - psi_g

Max Sphere Size: - in

Specific Speed N_s: -

Suction N_{ss}: -

Suction size: 17.2 in

Discharge size: 12 in

FLUID: Water tmp: 60 °F

SG: 1

vsc: 1.122 cP

vapor: 0.2568 psi

atm: 14.7 psi

NPSHa: - ft

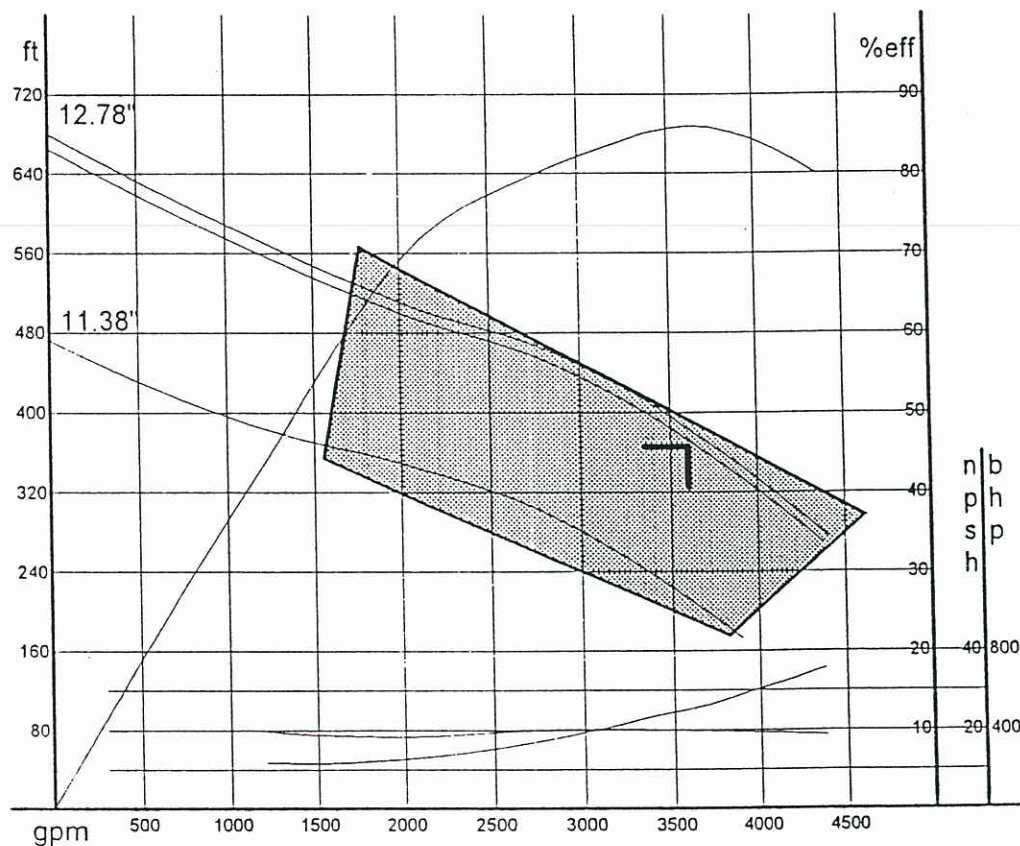
PIPING Pressure: - psi

Suction elev: - ft

size: - in

Discharge size: - in

DESIGN POINT
~ Flow: 3600 gpm
Head: 365 ft
DATA POINT
Flow: 3600 gpm
Head: 372 ft
Eff: 86 %
Power: 393 bhp
NPSHr: 25.3 ft
DESIGN CURVE
Shutoff Head: 665 ft
Pressure: 288 psi _g
Min Flow: - gpm
BEP: 86 %eff @ 3675
Max: 403 bhp @ 3040
MAX DIAMETER
Max: 415 bhp @ 2960



PERFORMANCE EVALUATION

Flow gpm	Speed rpm	Head ft	Pump %eff	Power bhp	NPSHr ft	Motor %eff	Power kW	Hrs/yr	Cost
4320	1770	277	81	373	34.8				
3600	1770	372	86	393	25.3				
2880	1770	445	81	400	18.2				
2160	1770	490	72	371	13.4				
1440	1770	541	51	386	12.1				