

645

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Paul L. Arrington, ISB #7198
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RECEIVED

JUN 16 2010

DEPARTMENT OF
WATER RESOURCES

Attorneys for Magic Irrigators, Inc.

**IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT
OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS**

	)	
	)	Case No. 47-17541
In Re SRBA	)	
	)	AFFIDAVIT OF G. ERICK POWELL
Case No. 39576	)	
	)	
	)	
	)	
	)	
	)	

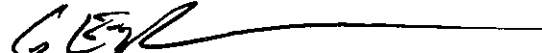
G. ERICK POWELL, being first duly sworn upon oath, deposes and states as follows:

1. I am over the age of 18 and state the following based upon my personal knowledge.
2. I have a B.S. and M.S. from Brigham Young University in Civil and Environmental Engineering. I have a Ph.D. from Ohio State University in Agricultural Engineering. I am licensed in the State of Idaho as a Professional Engineer in civil engineering.
3. I was contacted by Paul Arrington, attorney for Magic Irrigators, Inc. and was asked to review power records for the pumps associated with water rights 47-2384 and 47-2415. I reviewed the information and prepared a *Theoretical Estimate of Irrigation Maximum Diverted*

Discharge & Seasonal Volume from 1987 Power usage for Water Right Nos. 47-2389 and 47-2415. A copy of this report is attached to my affidavit as Exhibit A.

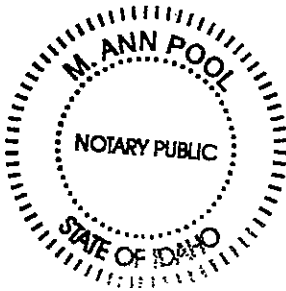
FURTHER YOUR AFFIANT SAYETH NAUGHT.

DATED this 9 day of June, 2010.


G. ERICK POWELL

STATE OF IDAHO)
) ss.
County of Twin Falls)

On this 9 day of June, 2010, before me, a Notary Public for said County and State, personally appeared G. ERICK POWELL, known or identified to me the person whose name is subscribed to the within instrument, and acknowledged to me that he executed the same




NOTARY PUBLIC FOR IDAHO
Residing at: Twin Falls County
My commission expires: 4/5/2016

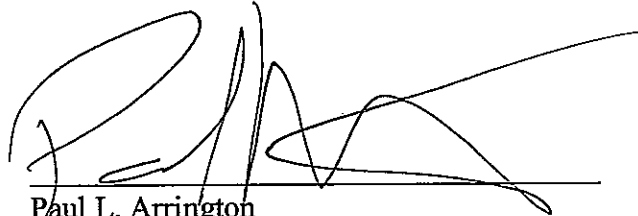
CERTIFICATE OF SERVICE

I certify that on this 17th day of June, 2010, I served a copy of the foregoing **AFFIDAVIT OF G. ERICK POWELL**, including all attachments, to the following persons by mailing the original and/or copies, postage prepaid and addressed as follows:

IDWR Document Depository
PO Box 83720
Boise, ID 83720-0098

Chief, Natural Resources Division
Office of the Attorney General
State of Idaho
PO Box 44449
Boise, ID 83711-4449

United States Department of Justice
Environment and Natural Resource Division
550 West Fort Street, MSC 033
Boise, ID 83724



Paul L. Arrington

Exhibit A

Theoretical Estimate of Irrigation Maximum Diverted Discharge and Seasonal Volume from 1987 Power Usage for Water Right nos. 47-2384 and 47-2415

Prepared for Magic Irrigators, Inc.
Barker, Rosholt, and Simpson, LLP

Prepared by Brockway Engineering, PLLC
G. Erick Powell, Ph.D., P.E.

June 7, 2010

Introduction

Brockway Engineering was retained by Mr. Paul Arrington of Barker, Rosholt, and Simpson, LLP to evaluate the theoretical irrigation diversion based on 1987 historical power records for water right nos. 47-2384 and 47-2415 issued to Magic Irrigators, Inc. The following narrative outlines the approach and data used to develop the theoretically flow, a theoretical power consumption coefficient (PCC), and the estimated 1987 diversion volume.

The Idaho Department of Water Resources recognizes use of power records as an alternative measurement method for closed conduit water diversions (IDWR, 2009). The use of power records as a flow measurement approach requires a derived relationship (PCC) between power demand and the flow under normal operating conditions. Typically, this PPC ratio is determined from on-site flow measurements and relates the power (in kilowatt-hours) required to pump an acre-foot of water (IDWR, 2009). The PPC ratio will vary over time, as the pump and motor efficiencies vary and the total dynamic head changes. IDWR (2009) recommends that the PPC ratio be reviewed and calibrated at regular intervals, typically every three years. No PPC ratio has been developed for the pump/motors used to divert water right nos. 47-2384 and 47-2415.

Water Right Summary

IDWR issued water right licenses for water right nos. 47-2384 and 47-2415 on 2/25/1969 and 1/30/1969, respectively. Table 1 contains a summary of the pertinent water right information, including priority date, diversion rate, irrigated area, and source, as currently recommended to the SRBA court. These rights are contested cases within the SRBA court. The SRBA water right recommendations can be found in Appendix A.

Table 1: Summary of water rights, as recommended to SRBA court.

Water Right	Priority	Flow (cfs)	Acres	Source
47-2384	1/14/1966	2.36	205	Salmon Falls Creek
47-2415	4/3/1961	2.64	230	Salmon Falls Creek
Combined Total		5.00	435	Salmon Falls Creek

Diversion Design

Layne Pumps, Inc originally installed the pumps at the point of diversion for the water rights listed in Table 1. Originally, a seven stage pump consisting of 6 stages of pump model number 7T13 was combined with a single stage of pump model number 7T17 to

provide 2250 gpm at 500 feet of total dynamic head. In 1984, the pump arrangement was changed to provide 2250 gpm at 560 feet of total dynamic head. The 1984 pump consists of 7 stages, which included 2 stages of pump model number 7T17 and 5 stages of pump model number 7T13. The corresponding pump curves can be found in Appendix B: A 350 hp motor was installed to drive the pump combination.

Water diverted from Salmon Falls Creek is pumped approximately 1100 feet through a 12-inch pipe to the water right place of use, which includes an elevation rise of approximately 500 ft, according to the water right examiner (Reynolds, 1968). The estimated friction head loss of conveying 5 cfs through a 12-inch steel pipe was estimated to be approximately 16 feet. Additional minor headloss, which includes pump loss, fixture loss, and exit loss, was estimated to be approximately 10 feet. The estimated total head was 526 feet.

Theoretical Estimate of Diversion Flow

A theoretical estimate of the diverted flow was calculated based on available, estimated, and assumed data. The horsepower motor driving the pumps was stated to be a 350 hp motor, and was assumed to be functioning correctly to provide maximum power of 350 hp to the pumps. The pumps installed in 1984 should be working close to their designed efficiencies in 1987; according to the pump curves the pumps should be operating at approximately 80% efficiency. The electrical efficiency of a 350-hp motor converting to the electrical power to mechanical power was estimated to be approximately 92% (NEMA, 2010). Given the total head of 526 feet, as discussed previously, the total theoretical diversion flow was estimated to be approximately 4.34 cfs. Spreadsheet calculations can be found in Appendix C.

The corresponding theoretical PCC for this diversion arrangement was estimated to be 729.2 kWh/acft, which then can be applied to historical power records to determine the volume of irrigation water delivered to the place of use. Power records from 1987 were supplied to estimate the total irrigation volume diverted through this pump system. Power records provided are shown in Table 2. It should be noted that no power records was available for the period of 7/13 through 8/12, which corresponds to the maximum crop water demand, according to ET and P_{def} data published by Allen and Robison (2010). An approximation of probable power consumption for 7/13 through 8/12 was included, based on the relationship of reference ET data at the Buhl, Idaho National Weather Service station.

Table 2: Power records from 1987 provided for the pump configuration. ^aNo power records were available for the period 7/13 – 8/12, and this value was estimated based on the reference ET data.

Period (1987)	Power Consumption (kWh)
4/21 - 5/12	54,800
5/12 - 6/11	159,920
6/11 - 7/13	188,080
7/13 - 8/12	263,280
8/12 - 9/11	46,080
9/11 - 10/12	0
10/12 - 10/15	0
Total	651,880

The theoretical PCC value, as determined previously, was 729.2 kWh/acft. If the total power consumption for the 1987 irrigation season was 651,880 kWh, then the total volume diverted during the season was 894 acft. The water rights allow for 435 acres of irrigation under these water rights, which calculates to 2.06 ft applied to each acre.

References

- Allen, R.G. and C.W. Robison. 2009. Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho: Supplement updating the Time Series through December 2008. Research Technical Completion Report. Kimberly Research and Extension Center. University of Idaho. Moscow, Idaho.
- IDWR. 2009. State of Idaho Department of Water Resources. Minimum Acceptable Standards for Open Channel and Closed Conduit Measuring Devices. 10/2009. Boise, Idaho.
- NEMA, 2009. National Electrical Manufacturers Association Design B Electrical Motors. Minimum Nominal Efficiency. <http://www.nema.org>
- Reynolds, D. 1968. State of Idaho Department of Reclamation. Report of Engineer. Permit No. 29605 (47-2415). July 1968. Boise, Idaho.

Appendix A
SRBA Water Right Recommendations

Close

IDAHO DEPARTMENT OF WATER RESOURCES
Adjudication Recommended Right Report

6/7/2010

WATER RIGHT NO. 47-2384

<u>Owner Type</u>	<u>Name and Address</u>
Current Owner	MAGIC IRRIGATORS INC 716B E 4900 N BUHL, ID 83316 (208)543-5098
Attorney	JOHN A ROSHOLT BARKER ROSHOLT & SIMPSON LLP 113 MAIN AVE W STE 303 PO BOX 485 TWIN FALLS, ID 83303-0485 (208)733-0700
Attorney	PAUL L ARRINGTON
Attorney	TRAVIS L THOMPSON BARKER ROSHOLT & SIMPSON LLP 113 MAIN AVE WEST STE 303 PO BOX 485 TWIN FALLS, ID 83301-0485 (208)733-0700

Priority Date: 01/14/1966

Basis: License

Status: Active

<u>Source</u>	<u>Tributary</u>
SALMON FALLS CREEK	SNAKE RIVER

<u>Beneficial Use</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	10/31	2.36 CFS	
Total Diversion			2.36 CFS	

Location of Point(s) of Diversion:

SALMON FALLS CREEK|SWNESW|Sec. 01|Township 09S|Range 13E|TWIN FALLS County

IRRIGATION Use:

Acre Limit: 205

Place(s) of use:

Place of Use Legal Description: IRRIGATION TWIN FALLS County

<u>Township</u>	<u>Range</u>	<u>Section</u>	<u>Lot</u>	<u>Tract</u>	<u>Acres</u>	<u>Lot</u>	<u>Tract</u>	<u>Acres</u>	<u>Lot</u>	<u>Tract</u>	<u>Acres</u>	<u>Lot</u>	<u>Tract</u>	<u>Acres</u>
08S	13E	14		SWSW	39									
		15		SESE	41									
		22		NENE	37		SENE	33						
				NESE	41		NWSE	34		SWSE	41		SESE	41
		23		NENE	33		NWNE	39		SWNE	40		SENE	40
				NENW	40		NWNW	40		SWNW	40		SENW	40
				NESW	40		NWSW	40		SWSW	40		SESW	40
				NESE	40		NWSE	40		SWSE	40		SESE	40
		24		NWNW	35		SWNW	40						
				NWSW	40		SWSW	40						
		26		NENE	38		NWNE	40		SWNE	40			
				NENW	40		NWNW	40		SWNW	40		SENW	40
				NESW	40		NWSW	40		SWSW	33		SESW	40
				NWSE	40		SWSE	38						
		27		NENE	41		NWNE	41		SWNE	41		SENE	41
				NENW	41		NWNW	40		SWNW	40		SENW	40
				NESW	35		NWSW	39		SWSW	41		SESW	32
				NESE	41		NWSE	41		SWSE	34		SESE	35
		28		NESE	38		SESE	38						

09S	29		NENE 37	NWNE 39	SWNE 40	SENE 40
			NENW 37	NWNW 40	SWNW 40	SENW 40
			NESW 40	NWSW 41	SWSW 41	SESW 40
			NESE 40	NWSE 40	SWSE 40	SESE 39
	30		NESE 41	NWSE 41	SWSE 40	SESE 41
			NESE 40	NWSE 40	SWSE 32	SESE 39
	31		NESE 40	NWSE 40	SWSE 32	SESE 39
			NENE 30	NWNE 40	SWNE 40	SENE 29
	32		NENW 40	NWNW 40	SWNW 40	SENW 40
			NESW 40	NWSW 40	SWSW 38	SESW 38
	33		NESE 33	NWSE 40	SWSE 38	SESE 31
			NENE 39	SENE 40		
	34		NESE 40	NWSE 36	SWSE 36	SESE 31
			NENE 35	NWNE 36	SWNE 34	SENE 39
	35		NENW 35	NWNW 41	SWNW 41	SENW 33
			NESW 41	NWSW 40	SWSW 34	SESW 40
	36		NESE 39	NWSE 38	SWSE 40	SESE 39
			NWNE 0.3			
	1		NENW 33	NWNW 32	SWNW 34	SENW 26
			NWSW 38	SWSW 38		
	2		NWSW 38	SWSW 27		
		1	NENE 13	NWNE 7.8	SWNE 39	SENE 39
	3		NENW 52	NWNW 52	SWNW 40	SENW 31
			NESW 38	NWSW 39	SWSW 32	SESW 16
	4		NESE 40	NWSE 27	SWSE 18	SESE 40
		1	NENE 51	NWNE 53	SWNE 40	SENE 35
	5		NENW 53	NWNW 52	SWNW 39	SENW 40
			NESW 40	NWSW 39	SWSW 39	SESW 40
	6		NESE 39	NWSE 40	SWSE 40	SESE 39
		1	NENE 53	NWNE 53	SWNE 41	SENE 40
	7		SENE 24			
			NESW 9.3	SESW 26		
	8		NESE 40	NWSE 40	SWSE 40	SESE 40
			NENE 36	NWNE 40	SWNE 39	SENE 38
	9		NENW 28			
			NESE 31	SESE 14		
	10		NENE 38	NWNE 39	SWNE 40	SENE 39
			NENW 40	NWNW 39	SWNW 40	SENW 40
	11		NESW 40	NWSW 37	SWSW 31	SESW 28
			NESE 38	NWSE 40		
	12		NENW 1.4	NWNW 39	SWNW 38	

Total Acres: 7382.8

Conditions of Approval:

1. K06 This right is limited to the irrigation of 205 acres within the place of use described above in a single irrigation season.
2. E56 The rights listed below are limited to the irrigation of a combined total of 7403.6 acres in a single irrigation season. Combined Right Nos.: 47-2269, 47-2384, 47-2415, 47-10261
3. C18 This partial decree is subject to such general provisions necessary for the definition of the rights or for the efficient administration of the water rights as may be ultimately determined by the Court at a point in time no later than the entry of a final unified decree. Section 42-1412(6), Idaho Code.
The use of water for irrigation under this right may begin as early as March 15 and may continue to as late as November 15, provided other elements of the right are not exceeded. The use of water before April 1 and after October 31 under this remark is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than the date a partial decree is entered for this right.
4. S40 of water before April 1 and after October 31 under this remark is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than the date a partial decree is entered for this right.
5. E52 The rights listed below are limited to a total combined diversion rate of 101.7 cfs. Combined Right Nos.: 47-2269, 47-2384, 47-2415, 47-10261

Dates:

Other Information:

State or Federal: S
Owner Name Connector:
Water District Number: 47G
Generic Max Rate per Acre:
Generic Max Volume per Acre:
Swan Falls Trust or Nontrust:
Swan Falls Dismissed:
DLE Act Number:
Cary Act Number:
Mitigation Plan: False

Close

Close

IDAHO DEPARTMENT OF WATER RESOURCES
Adjudication Recommended Right Report

6/7/2010

WATER RIGHT NO. 47-2415

<u>Owner Type</u>	<u>Name and Address</u>
Current Owner	MAGIC IRRIGATORS INC 716B E 4900 N BUHL, ID 83316 (208)543-5098
Attorney	JOHN A ROSHOLT BARKER ROSHOLT & SIMPSON LLP 113 MAIN AVE W STE 303 PO BOX 485 TWIN FALLS, ID 83303-0485 (208)733-0700
Attorney	PAUL L ARRINGTON
Attorney	TRAVIS L THOMPSON BARKER ROSHOLT & SIMPSON LLP 113 MAIN AVE WEST STE 303 PO BOX 485 TWIN FALLS, ID 83301-0485 (208)733-0700

Priority Date: 04/03/1961

Basis: License

Status: Active

<u>Source</u>	<u>Tributary</u>
SALMON FALLS CREEK	SNAKE RIVER

<u>Beneficial Use</u>	<u>From</u>	<u>To</u>	<u>Diversion Rate</u>	<u>Volume</u>
IRRIGATION	04/01	10/31	2.64 CFS	
Total Diversion			2.64 CFS	

Location of Point(s) of Diversion:

SALMON FALLS CREEK|SWNESW|Sec. 01|Township 09S|Range 13E|TWIN FALLS County

IRRIGATION Use:

Acre Limit: 230

Place(s) of use:

Place of Use Legal Description: IRRIGATION TWIN FALLS County

<u>Township</u>	<u>Range</u>	<u>Section</u>	<u>Lot</u>	<u>Tract</u>	<u>Acres</u>	<u>Lot</u>	<u>Tract</u>	<u>Acres</u>	<u>Lot</u>	<u>Tract</u>	<u>Acres</u>	<u>Lot</u>	<u>Tract</u>	<u>Acres</u>
08S	13E	14		SWSW	39									
		15		SESE	41									
		22		NENE	37		SENE	33						
				NESE	41		NWSE	34		SWSE	41		SESE	41
		23		NENE	33		NWNE	39		SWNE	40		SENE	40
				NENW	40		NWNW	40		SWNW	40		SENW	40
				NESW	40		NWSW	40		SWSW	40		SESW	40
				NESE	40		NWSE	40		SWSE	40		SESE	40
		24		NWNW	35		SWNW	40						
				NWSW	40		SWSW	40						
		26		NENE	38		NWNE	40		SWNE	40			
				NENW	40		NWNW	40		SWNW	40		SENW	40
				NESW	40		NWSW	40		SWSW	33		SESW	40
				NWSE	40		SWSE	38						
		27		NENE	41		NWNE	41		SWNE	41		SENE	41
				NENW	41		NWNW	40		SWNW	40		SENW	40
				NESW	35		NWSW	39		SWSW	41		SESW	32
				NESE	41		NWSE	41		SWSE	34		SESE	35
		28		NESE	38		SESE	38						

09S	29		NENE 37	NWNE 39	SWNE 40	SENE 40
			NENW 37	NWNW 40	SWNW 40	SENW 40
			NESW 40	NWSW 41	SWSW 41	SESW 40
			NESE 40	NWSE 40	SWSE 40	SESE 39
	30		NESE 41	NWSE 41	SWSE 40	SESE 41
			NESE 40	NWSE 40	SWSE 32	SESE 39
	31		NENE 30	NWNE 40	SWNE 40	SENE 29
			NENW 40	NWNW 40	SWNW 40	SENW 40
			NESW 40	NWSW 40	SWSW 38	SESW 38
			NESE 33	NWSE 40	SWSE 38	SESE 31
	33		NENE 39	SENE 40		
			NESE 40	NWSE 36	SWSE 36	SESE 31
	34		NENE 35	NWNE 36	SWNE 34	SENE 39
			NENW 35	NWNW 41	SWNW 41	SENW 33
			NESW 41	NWSW 40	SWSW 34	SESW 40
			NESE 39	NWSE 38	SWSE 40	SESE 39
	35		NWNE 0.3			
			NENW 33	NWNW 32	SWNW 34	SENW 26
			NWSW 38	SWSW 38		
	1		NWSW 38	SWSW 27		
			NENE 13	NWNE 7.8	SWNE 39	SENE 39
	2	1	NENW 52	NWNW 52	SWNW 40	SENW 31
		3	NESW 38	NWSW 39	SWSW 32	SESW 16
	3		NESE 40	NWSE 27	SWSE 18	SESE 40
		1	NENE 51	NWNE 53	SWNE 40	SENE 35
		3	NENW 53	NWNW 52	SWNW 39	SENW 40
			NESW 40	NWSW 39	SWSW 39	SESW 40
	4		NESE 39	NWSE 40	SWSE 40	SESE 39
		1	NENE 53	NWNE 53	SWNE 41	SENE 40
			SENW 24			
			NESW 9.3	SESW 26		
	9		NESE 40	NWSE 40	SWSE 40	SESE 40
			NENE 36	NWNE 40	SWNE 39	SENE 38
			NENW 28			
	10		NESE 31	SESE 14		
			NENE 38	NWNE 39	SWNE 40	SENE 39
			NENW 40	NWNW 39	SWNW 40	SENW 40
			NESW 40	NWSW 37	SWSW 31	SESW 28
	11		NESE 38	NWSE 40		
			NENW 1.4	NWNW 39	SWNW 38	

Total Acres: 7382.8

Conditions of Approval:

1. S40 The use of water for irrigation under this right may begin as early as March 15 and may continue to as late as November 15, provided other elements of the right are not exceeded. The use of water before April 1 and after October 31 under this remark is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than the date a partial decree is entered for this right.
2. E52 The rights listed below are limited to a total combined diversion rate of 101.7 cfs. Combined Right Nos.: 47-2269, 47-2384, 47-2415, 47-10261
3. C18 This partial decree is subject to such general provisions necessary for the definition of the rights or for the efficient administration of the water rights as may be ultimately determined by the Court at a point in time no later than the entry of a final unified decree. Section 42-1412(6), Idaho Code.
4. E56 The rights listed below are limited to the irrigation of a combined total of 7403.6 acres in a single irrigation season. Combined Right Nos.: 47-2269, 47-2384, 47-2415, 47-10261
5. K06 This right is limited to the irrigation of 230 acres within the place of use described above in a single irrigation season.

Dates:

Other Information:

State or Federal: S

Owner Name Connector:

Water District Number:

Generic Max Rate per Acre:

Generic Max Volume per Acre:

Swan Falls Trust or Nontrust:

Swan Falls Dismissed:

DLE Act Number:

Cary Act Number:

Mitigation Plan: False

[Close](#)

STATE OF IDAHO
DEPARTMENT OF RECLAMATION
BOISE, IDAHO
REPORT OF ENGINEER

Permit No. 29605, pt.

This proof is for Completion of Works & Beneficial Use In Water District No.

1. Name of applicant Vernon L. Herzinger2. Source of water supply: Salmon Falls Creek, tributary Snake River3. Location of point of diversion: Is in the NE1/4SW1/4 of Section 1T. 9 S. R. 13 E., B.M. County of Twin Falls

4. Describe works as they exist, giving dimensions and capacities of same: Pump at Salmon Falls Creek 350 H.P. Hollow shaft Sec. # 1381017
12" discharge 1100' long into open ditch 500' lift.
12" C.U. — Pump at Res. where they divert any
Water not used 100 H.P. Hollow shaft 1368325
Logan 44325 10" C.U.

5. Water is used for: Irrigation

6. State whether or not water has been turned into works of diversion: _____

7. List legal subdivisions of lands to be irrigated. If proof is for beneficial use, give exact number of acres under cultivation in each forty-acre tract. (Describe manner and place of use if other than irrigation):

SE1/4NW1/4, NE1/4SW1/4, SW1/4NE1/4, NW1/4SW1/4, Sec. 2; NE1/4SE1/4, Sec. 10;

W1/4NW1/4, Sec. 11, T. 9 S., R. 13 E., B.M.

(Submit map on attached plat, showing location and details of above description.)

8. What large stream would the water here appropriated finally reach?

Remarks: Speeding water 300 ft. in 60 sec.

$$\frac{300}{60} = 5 \text{ c.f.s.}$$

IRRIGATION REQUIREMENT = 4.0 c.f.s. / acre / season

NOTE PERMIT 31585 DRC

Point of diversion not marked - only six subdivisions
3.0 c.f.s. is all that was admitted

This examination was made on the _____

(Signed)

day of July, 19 68
Don Reynolds Examiner.
12-25-68

29605

Plot
at

Appendix B
Magic Irrigators Installed Pump Curves

CURVE NO.
18-148
8-1-77

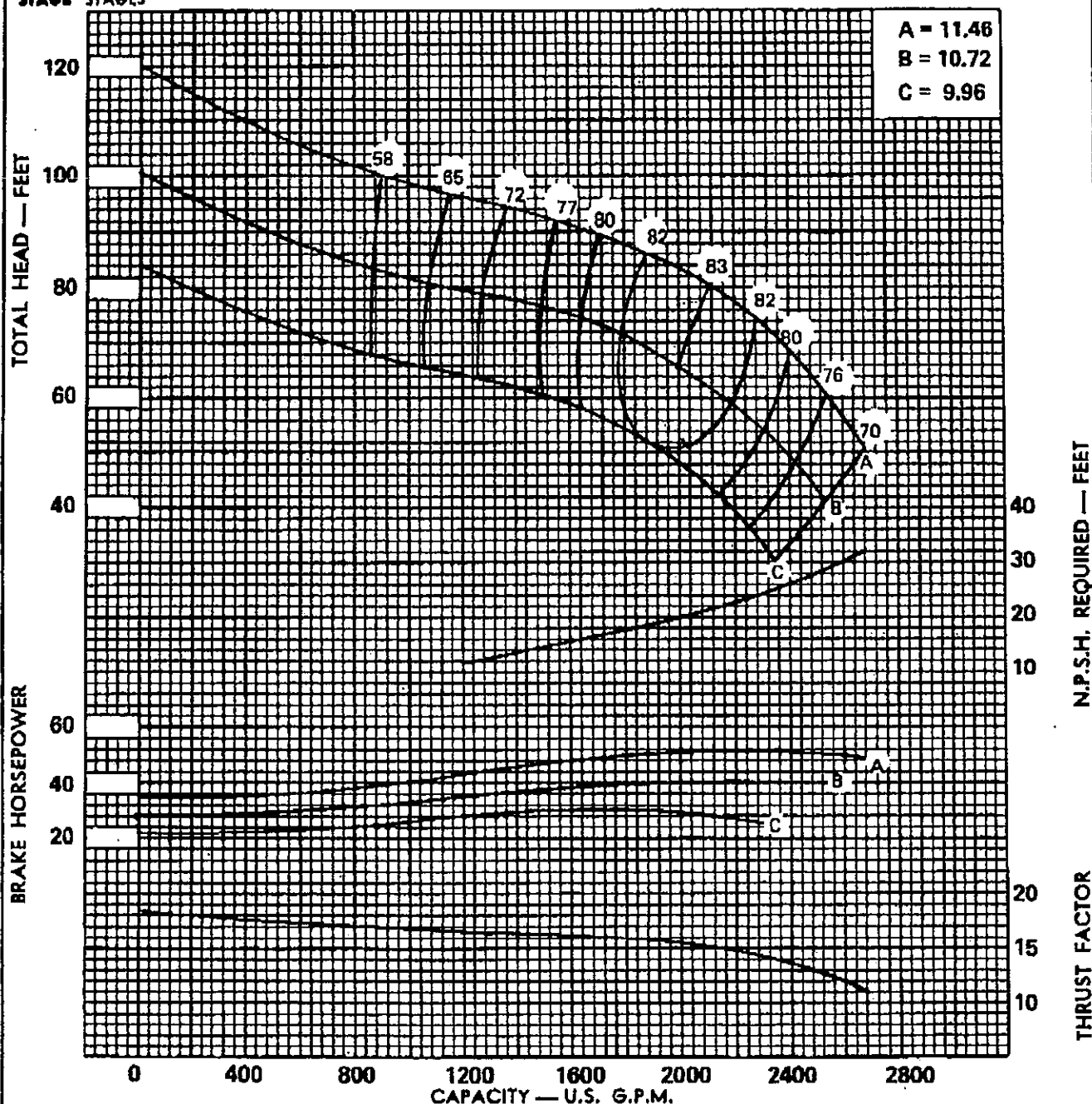
No. Stages	Eff. Change	MATERIAL	Eff. Change
1	-2	IMP.—C.I.	-1
2	0	IMP.—NI-R	-2
3		BOWL—BRZ.	-1
4		BOWL—NI-R.	-1

14 TLC

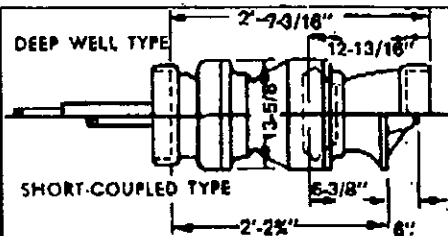
1770 R.P.M.

SINGLE STAGE LAB PERFORMANCE WITH STANDARD MATERIALS. EFFICIENCY SHOWN FOR 2 OR MORE STAGES. HORSE POWER SHOWN FOR ONE STAGE BASED ON 2 STAGE EFFICIENCY. CORRECTIONS SHOULD BE MADE FOR STAGES AND MATERIAL.

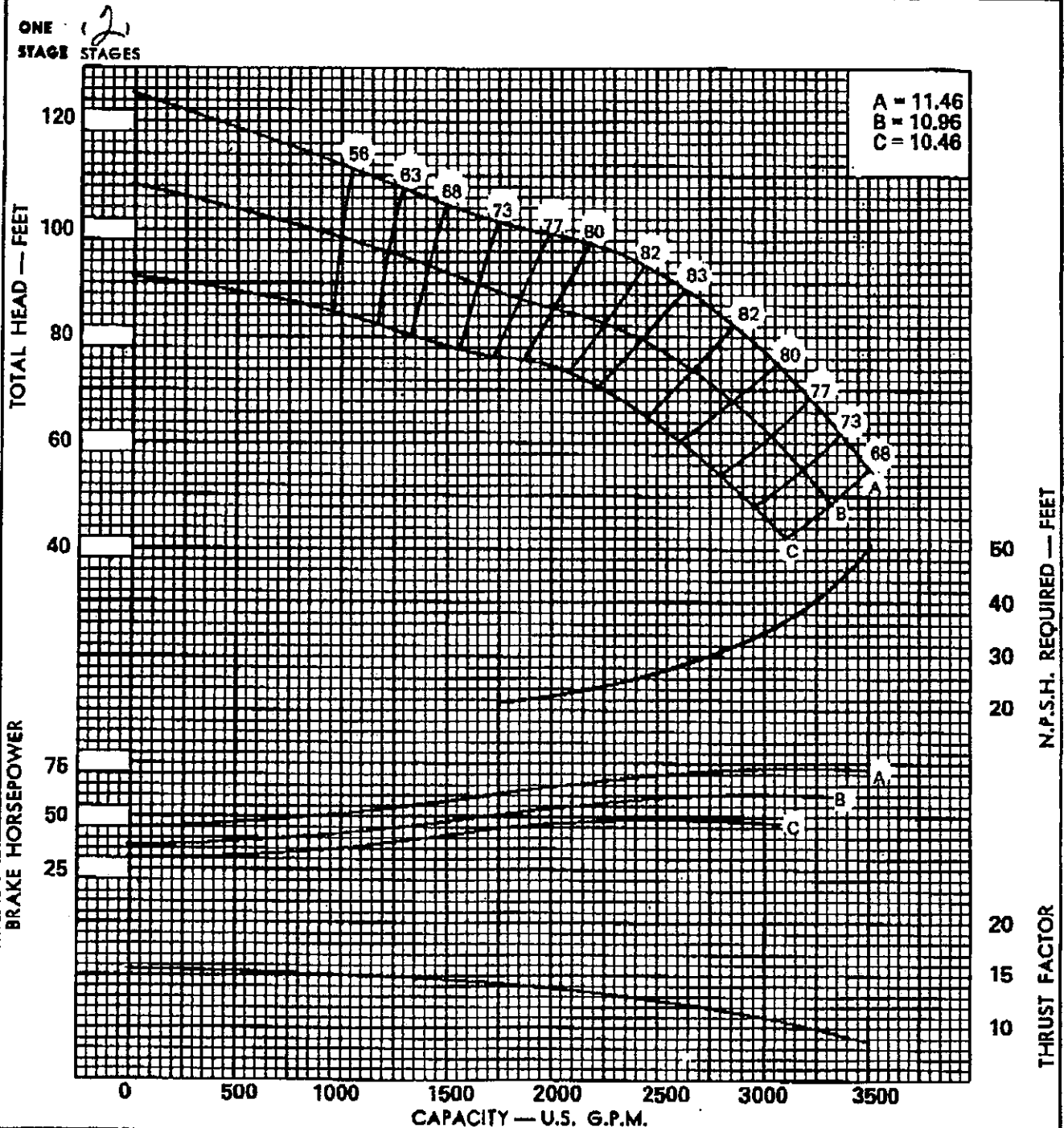
ONE (5)
STAGE STAGES



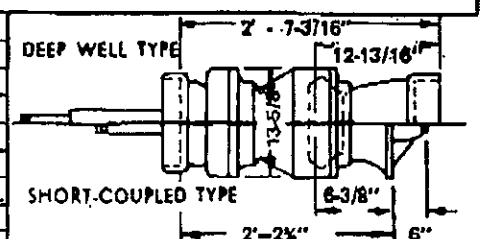
EYE AREA — SQ. IN. = 34.26	IMPELLER WT.-LBS. = 32.1
WR ² PER IMPELLER = 2.22 LB.-FT. ²	ONE STAGE WT.-LBS. = 435
MAX. SPHERE SIZE = 1.25 in.	ADD'L STAGE WT.-LBS. = 184
MAX. NO. STD. STAGES = 7	IMPELLER NUMBER = 7T13
MAX. OPERATING P.S.I. = 380	DISCH. SIZES = 10, 12
STD. LATERAL = 0.78 in.	SUCTION SIZES = 10
STD. SHAFT DIA. = 1.937 in.	MAX. LATERAL = 1.28 in.
MAX. SHAFT DIA. = 2.187 in.	BOWL CONN. FLANGED COLLETS
MIN. SUBMERGENCE = 36 in.	ADD 13 " PER ADDITIONAL STAGE.



CURVE NO. 18-151 11-1-77	No. Stages	Eff. Change	MATERIAL	Eff. Change	14 THC	1770 R.P.M.
	1	-1	IMP.—C.I.	-1	SINGLE STAGE LAB PERFORMANCE WITH STANDARD MATERIALS. EFFICIENCY SHOWN FOR 2 OR MORE STAGES. HORSE POWER SHOWN FOR ONE STAGE BASED ON 2 STAGE EFFICIENCY. CORRECTIONS SHOULD BE MADE FOR STAGES AND MATERIAL.	
	2	0	IMP.—NI-NI	-2		
	3		BOWL—BRZ.	-1		
	4		BOWL—NI-R.	-1		



EYE AREA — SQ. IN. = 35.81	IMPELLER WT.-LBS. = 31.8
WR ² PER IMPELLER = 2.75 LB.-FT. ²	ONE STAGE WT.-LBS. = 426
MAX. SPHERE SIZE = 1.25 in.	ADD'L STAGE WT.-LBS. = 164
MAX. NO. STD. STAGES = 7	IMPELLER NUMBER = 7T17
MAX. OPERATING P.S.I. = 390	DISCH. SIZES = 10, 12
STD. LATERAL = 0.76 in.	SUCTION SIZES = 10
STD. SHAFT DIA. = 1.937 in.	MAX. LATERAL = 1.28 in.
MAX. SHAFT DIA. = 2.187 in.	BOWL CONN. FLANGED-COLLET
MIN. SUBMERGENCE = 47 in.	ADD 13 " PER ADDITIONAL STAGE.



Appendix C
Theoretical Water Diversion Calculations

Estimate of Well Withdrawal Volume from Power Usage

Brockway Engineering, PLLC
G.E. Powell, P.E.

7-Jun-10

Pump: Magic Irrigators

A power consumption coefficient (PCC) has not been developed for this well.
Use pumping water level and efficiency to develop theoretical PCC.

Motor HP: 350 Access port: None
Pump make: 2-7T17 full diameter impellers with 5-7t13 full diameter impellers
Pump model:
Design flow: 2250 gpm
Design head: 560 feet

SWL 455 feet
Pumping level: 500 feet
Total well depth: 550 feet
Pump column loss: 26 feet
Discharge pressure at wellhead: 0 psi
Discharge line diameter: 12 inches
Pump efficiency 80%
Electrical efficiency 92%

Theoretical Q at max HP: 4.34 cfs = 1946 gpm
Discharge line velocity: 5.52 ft/s
TDH = lift + column loss + press. H + vel. H 526.5 feet
Theoretical PCC: 729.2 KWH / ac-ft

Season	KWH	Vol (ac-ft)
1987	651880	894.0

Peak Volume	894.0	ac-ft	2.055194
Average Volume	894.0	ac-ft	

47-2415	230 ac
47-2384	205 ac
	435 ac



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543-4384 1007 MAIN, BUHL

CUSTOMER IDENTIFICATION									
CUSTOMER NAME			SERVICE LOCATION						
MAGIC IRRIGATORS INC			30850E 4625N 0515						
CUSTOMER NUMBER			TYPE OF SERVICE						
1154-002899-0			IRRIGATION						
ACCOUNT INFORMATION AS OF MAY 20, 1987									
BALANCE FORWARD ▶									
METER NUMBER OR NUMBER OF LAMPS	R A T E	SERVICE FROM TO	D A Y S	METER READING PREVIOUS	METER READING PRESENT	METER CONSTANT	BILLING DEMAND	BILLING ENERGY KILOWATT HOURS	
76303816624		4/21 5/12	21	10883	1573	80	322	54800	158066
ACCOUNT BALANCE									153066

COMPARE YOUR AVERAGE DAILY USE WITH LAST YEAR		LEVEL PAY AMOUNT	PLEASE PAY THIS AMOUNT
DAYS	BILLING PERIOD		
	THIS MONTH THIS YEAR		1580.66
	THIS MONTH LAST YEAR		

TO AID ASSISTANCE PROGRAM (PROJECT SHARE), PLEASE ADD \$1.00.

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CUSTOMER IDENTIFICATION									
CUSTOMER NAME		SERVICE LOCATION							
MAGIC IRRIGATORS INC		80850E 4625N 0515							
CUSTOMER NUMBER		TYPE OF SERVICE							
1154-002899-0		IRRIGATION							
ACCOUNT INFORMATION AS OF JUNE 16, 1987									
BALANCE FORWARD ▶									
METER NUMBER OR NUMBER OF LAMPS	R A T E	SERVICE		METER READING		METER CONSTANT	BILLING DEMAND	BILLING ENERGY KILOWATT HOURS	
		FROM	TO	PREVIOUS	PRESENT				
76303816024		512	611	011571	13572	80	322	159920	465324
ACCOUNT BALANCE									465324

COMPARE YOUR AVERAGE DAILY USE WITH LAST YEAR				LEVEL PAY AMOUNT	PLEASE PAY THIS AMOUNT
DAYS	BILLING PERIOD	KWH BILLED	KWH PER DAY		
	THIS MONTH THIS YEAR				
	THIS MONTH LAST YEAR				4653.24

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CUSTOMER IDENTIFICATION									
CUSTOMER NAME			SERVICE LOCATION						
MAGIC IRRIGATORS INC			B0850E 4625N 0515						
CUSTOMER NUMBER			TYPE OF SERVICE						
1154-002899-0			IRRIGATION						
ACCOUNT INFORMATION AS OF JULY 17, 1987									
BALANCE FORWARD									
METER NUMBER OR NUMBER OF LAMPS	R A T E	SERVICE		D A S	METER READING		METER CONSTANT	BILLING DEMAND	BILLING ENERGY KILOWATT HOURS
		FROM	TO		PREVIOUS	PRESENT			
76303816624		611	713		013572	15923	80	320	188080
536467									
ACCOUNT BALANCE 536467									

COMPARE YOUR AVERAGE DAILY USE WITH LAST YEAR			
DAYS	BILLING PERIOD	KWH BILLED	KWH PER DAY
	THIS MONTH THIS YEAR		
	THIS MONTH LAST YEAR		
LEVEL PAY AMOUNT		PLEASE PAY THIS AMOUNT	
		5364.67	

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IMPORTANT

PAYMENT MUST BE
RECEIVED BY OUR
LOCAL OFFICE BY
FINAL DATE

TO AVOID
TERMINATION ACTION

TERMINATION NOTICE

FINAL DATE
8-14-87

NOTICE DATE
8- 5-87

TOTAL AMOUNT DUE
5364.67

H

A

MAGIC IRRIGATORS INC

RT 3

BUHL, ID 83316

11540028990 000536467 000000000 000536467 0805 6

PLEASE DETACH HERE AND RETURN THIS PORTION WITH YOUR PAYMENT

PLEASE BRING ENTIRE NOTICE WHEN PAYING AT OUR LOCAL OFFICE

CUSTOMER IDENTIFICATION	
CUSTOMER NAME	SERVICE LOCATION
MAGIC IRRIGATORS INC	B0850E 4625N 0515
CUSTOMER NUMBER	TYPE OF SERVICE
1154-002899-0	IRRIGATION

AT THE TIME OF MAILING THIS NOTICE OUR RECORDS SHOW THAT YOUR ACCOUNT IS UNPAID.

FINAL DATE

UNLESS THE TOTAL AMOUNT DUE IS PAID OR SATISFACTORY CREDIT ARRANGEMENTS ARE MADE BY

8-14-87

YOUR SERVICE WILL BE DISCONTINUED AND A RECONNECT PAYMENT WILL BE REQUIRED BEFORE SERVICE IS RESUMED.

IF YOU HAVE A QUESTION PLEASE CALL

OR CONTACT OUR LOCAL OFFICE AT



543-4384 1007 MAIN, BUHL

P.S. — IF PAYMENT HAS BEEN
MADE, THANK YOU AND PLEASE
DISREGARD THIS NOTICE. IT
WOULD BE APPRECIATED IF YOU
WOULD SO ADVISE OUR LOCAL
OFFICE.

TERMINATION NOTICE

CUSTOMER COPY — PLEASE RETAIN

TOTAL AMOUNT DUE
5364.67



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CUSTOMER IDENTIFICATION									
CUSTOMER NAME		SERVICE LOCATION							
MAGIC IRRIGATORS INC		B0850E 4625N 0513							
CUSTOMER NUMBER		TYPE OF SERVICE							
1154-002899-0		IRRIGATION							
ACCOUNT INFORMATION AS OF SEPTEMBER 16, 1987									
BALANCE FORWARD ▶									
METER NUMBER OR NUMBER OF LAMPS	R A T E	FROM	TO	SERVICE	D A Y S	* METER READING PREVIOUS	METER CONSTANT	BILLING DEMAND	BILLING ENERGY KILOWATT HOURS
763033166	24	812	911		S	01677817354	80	322	46080
									195990
ACCOUNT BALANCE									195990

COMPARE YOUR AVERAGE DAILY USE WITH LAST YEAR		LEVEL PAY AMOUNT	PLEASE PAY THIS AMOUNT
DAYS	BILLING PERIOD		
	THIS MONTH THIS YEAR		
	THIS MONTH LAST YEAR		1959.90

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CUSTOMER IDENTIFICATION									
CUSTOMER NAME			SERVICE LOCATION						
MAGIC IRRIGATORS INC			B0850E 4625N 0515						
CUSTOMER NUMBER			TYPE OF SERVICE						
1154-002899-0			IRRIGATION						
ACCOUNT INFORMATION AS OF OCTOBER 15, 1987									
BALANCE FORWARD ▶									
METER NUMBER OR NUMBER OF LAMPS	R A E	SERVICE FROM TO	D A Y S	*	METER READING		METER CONSTANT	BILLING DEMAND	BILLING ENERGY KILOWATT HOURS
					PREVIOUS	PRESENT			
76303816624		9/11/012			017354	17354	80		1500MN
ACCOUNT BALANCE									1500

COMPARE YOUR AVERAGE DAILY USE WITH LAST YEAR			
DAYS	BILLING PERIOD	KWH BILLED	KWH PER DAY
	THIS MONTH THIS YEAR		
	THIS MONTH LAST YEAR		
LEVEL PAY AMOUNT			PLEASE PAY THIS AMOUNT
			15.00

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CR- CREDIT AV- AVERAGE MN- MINIMUM



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FOR ACCOUNT INQUIRIES CALL OR CONTACT YOUR LOCAL OFFICE AT
543-4384 1007 MAIN, BUHL

CUSTOMER IDENTIFICATION									
CUSTOMER NAME		SERVICE LOCATION							
MAGIC IRRIGATORS INC		30850E 4625N 0515							
CUSTOMER NUMBER		TYPE OF SERVICE							
1154-002899-0		IRRIGATION							
ACCOUNT INFORMATION AS OF OCTOBER 28, 1987									
BALANCE FORWARD ▶									
METER NUMBER OR NUMBER OF LAMPS	R A T E	SERVICE FROM TO		D A T E	METER READING PREVIOUS PRESENT	METER CONSTANT	BILLING DEMAND	BILLING ENERGY KILOWATT HOURS	
76303816624	10	12	10	15	301735417354	80			250MN
CLOSING BILL									
ACCOUNT BALANCE									
250									

PLEASE PAY THIS AMOUNT
2.50

LEVEL PAY AMOUNT

COMPARE YOUR AVERAGE DAILY USE WITH LAST YEAR			
DAYS	BILLING PERIOD	KWH BILLED	KWH PER DAY
	THIS MONTH THIS YEAR		
	THIS MONTH LAST YEAR		

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CR- CREDIT AV- AVERAGE MN- MINIMUM

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