

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 95-16580
Exam Date: 08/11/2020

1. Current Owner:
CITY OF COEUR D'ALENE WATER DEPT
710 E MULLAN AVE COEUR D'ALENE ID 83814
2. Accompanied by: Terry Pickel
Phone No: 208-769-2210
Address: 3820 Ramsey RD, Coeur D'Alene ID 83815
Relationship to permit Holder: City of Coeur D'Alene Water Superintendent

3. **SOURCE:**
GROUND WATER

Method of Determination: Arcmap and DRG

B. OVERLAP REVIEW

1. Other water rights with the same place of use: YES Overlap

Water Right No.	Source	Purpose of Use	Basis
95-2111	GROUNDWATER	MUNICIPAL	DECREED
95-2133	GROUNDWATER	MUNICIPAL	DECREED
95-2164	GROUNDWATER	MUNICIPAL	DECREED
95-2198	GROUNDWATER	MUNICIPAL	DECREED
95-7142	GROUNDWATER	MUNICIPAL	DECREED
95-7181	GROUNDWATER	MUNICIPAL	DECREED
95-8565	GROUNDWATER	MUNICIPAL	DECREED
95-8647	GROUNDWATER	MUNICIPAL	DECREED
95-8672	GROUNDWATER	MUNICIPAL	DECREED
95-8938	GROUNDWATER	MUNICIPAL	DECREED
95-9007	GROUNDWATER	MUNICIPAL	DECREED

Comments: The eleven (11) water rights listed above overlap this rights POU; all of the rights are integrated in the City of Coeur D'Alene's municipal water system ID No. 1280053. Condition X35 was added describing the combined municipal use for the 12 (total) rights including this right (95-16580), and their overall diversion rate limitations.

2. Other water rights with the same point-of-diversion: YES Overlap

Water Right No.	Source	Purpose of Use	Basis
95-2111	GROUNDWATER	MUNICIPAL	DECREED
95-2133	GROUNDWATER	MUNICIPAL	DECREED
95-2164	GROUNDWATER	MUNICIPAL	DECREED
95-2198	GROUNDWATER	MUNICIPAL	DECREED
95-7142	GROUNDWATER	MUNICIPAL	DECREED
95-7181	GROUNDWATER	MUNICIPAL	DECREED
95-8565	GROUNDWATER	MUNICIPAL	DECREED
95-8647	GROUNDWATER	MUNICIPAL	DECREED
95-8672	GROUNDWATER	MUNICIPAL	DECREED
95-8938	GROUNDWATER	MUNICIPAL	DECREED
95-9007	GROUNDWATER	MUNICIPAL	DECREED

Comments: The eleven (11) water rights listed above and this right (95-16580) ALL incorporate the 10 wells listed below as PODs for the City of Coeur D'Alene's municipal water system. Condition F06 was added to describe that the 12 total water rights have the same PODs listed below.

C. DIVERSION AND DELIVERY SYSTEM**1. LOCATION OF POINT(S) OF DIVERSION:**

GROUND WATER SW¼ SW¼, Sec. 27, Twp 51N, Rge 04W, B.M. KOOTENAI County
Ralph Capaul (RC) well located at -116°49.730, 47°43.908; D0061673.

GROUND WATER SW¼ SW¼, Sec. 1, Twp 50N, Rge 04W, B.M. KOOTENAI County
4th ST well located at -116°46.881, 47°42.103; D0046175.

GROUND WATER L1 (NE¼ NE¼), Sec. 4, Twp 50N, Rge 04W, B.M. KOOTENAI County
Atlas well located at -116°49.802, 47°42.821; D TAG UNKOWN.

GROUND WATER L6 (SW¼ NW¼), Sec. 12, Twp 50N, Rge 04W, B.M. KOOTENAI County
Annie AVE well located at -116°47.017, 47°41.704; D0033505.

GROUND WATER L5 (NW¼ SW¼), Sec. 12, Twp 50N, Rge 04W, B.M. KOOTENAI County
Locust ST well located at -116°47.090, 47°41.591; D TAG UNKOWN.

GROUND WATER L4 (SW¼ SW¼), Sec. 12, Twp 50N, Rge 04W, B.M. KOOTENAI County
Linden ST well located at -116°47.043, 47°41.334; D0010137.

GROUND WATER SW¼ NE¼, Sec. 26, Twp 51N, Rge 04W, B.M. KOOTENAI County
Prairie well located at -116°47.824, 47°44.271; D0005794.

GROUND WATER NE¼ NE¼, Sec. 28, Twp 51N, Rge 04W, B.M. KOOTENAI County
Landings well located at -116°49.800, 47°44.167; D0033506.

GROUND WATER NW¼ NW¼, Sec. 35, Twp 51N, Rge 04W, B.M. KOOTENAI County
Hanley well located at -116°48.185, 47°43.770; 95-90-N-16

GROUND WATER SE¼ SW¼, Sec. 36, Twp 51N, Rge 04W, B.M. KOOTENAI County
Honeysuckle well located at -116°46.644, 47°42.944; 95-96-N-71

Method of Determination: Well locations identified using GPS. Well locations verified using Arcmap aerial imagery and prior water right license POD layer. See above for detailed well NAME and GPS coordinates. The new well added to City of CDA's water system is the Ralph Capaul (RC) well – D-tag No. D0061673 located at -116°49.730, 47°43.908

3.

Delivery System Diagram Attached (required). Indicate all major components and distances between components.

X Indicate weir size/pipe as applicable.

Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be

X 1:24,000 or greater.

X Aerial Photo Attached (required for irrigation of 10+ acres).

X Photo of Diversion and System Attached

4.

Well or Diversion ID No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
D0061673 (RC WELL) *new well*	US Motor	600			
D0046175 (4 TH ST WELL)	UNKOWN	400			
ATLAS WELL	UNKOWN	600			
D0033505 (ANNIE AVE WELL)	UNKOWN	350			
LOCUST WELL	UNKOWN	350			
D0010137 (LINDEN ST WELL)	UNKOWN	350			
D0005794 (PRAIRIE WELL)	UNKOWN	500			
D0033506 (LANDING WELL)	UNKOWN	500			
95-90-N-16 (HANLEY WELL)	UNKOWN	500			
95-96-N-71 (HONEYSUCKLE WELL)	UNKOWN	250			

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
RC Well FLOWMETER	Siemens	SITRANS FM MAG 5100 W	7ME658	188301U224	18 INCH	12-SEP-16

2. Measurements: In response to a memorandum from IDWR filed by Ashley Ritter, the City of Coeur D'Alene (City of CDA) contracted Welsh Comer to conduct a field exam on 2/22/2019. Necia Maiani, P.E., an engineer from Welsh Comer, and a City of CDA representative, Dion Holton. 10 wells were examined and flow rate measurements completed at that time, and subsequently published in a memorandum from Welsh Comer to IDWR dated 3/8/2019.

During the field exam performed by Necia Maiani P.E., flow meters were used to derive flow rates for each of the 10 wells – see the attached *TABLE 1: 2/22/19 EXAM RESULTS* document. Due to the Ralph Capaul (RC) well serving as the only new groundwater well for which this permit's diversion of water is being licensed for, the data listed above is for RC well's flow measurement. The flow measurement completed by Necia Maiani P.E. equals 3,915 gpm. Calculating for a diversion rate in cfs: 3,915 gpm / 448.83 gpm per 1.0 cfs = 8.7 cfs, considering department rounding standards.

Prior to Welsh Comer's field exam, the City of CDA provided flow rates for each well using system SCADA readings on 8/5/2018, which derived a diversion rate of 4,275 gpm for the RC well production rate. Referencing the attached *TABLE 2: 2/22/2019 Exam Results Versus 8/5 SCADA* document, the diversion rate for the RC well on that date equaled 4,275 gpm / 448.83 gpm per 1.0 cfs = 9.5 cfs, considering department rounding standards.

E. FLOW CALCULATIONS

 X Additional Computation Sheets Attached

Measured Method:

- Water system SCADA results (8/5/2018) = 4,275 gpm / 448.83 gpm per 1.0 cfs = 9.5 cfs, considering department rounding standards.
- Flowmeter results (2/22/2019) = 3,915 gpm / 448.83 gpm per 1.0 cfs = 8.7 cfs, considering department rounding standards.
- Historic Peak Production Data (Doc Date 1/22/2019, Received Date 3/11/2019) located in water right backfile:
RC Well Pump Capacity (gpm) =
 - 4,000 gpm (year 2015) / 448.83 gpm per 1.0 cfs = 8.9 cfs
 - 3,940 gpm (year 2016) / 448.83 gpm per 1.0 cfs = 8.8 cfs
 - 4,010 gpm (year 2017) / 448.83 gpm per 1.0 cfs = 8.9 cfs
 - 4,025 gpm (year 2018) / 448.843 gpm per 1.0 cfs = **9.0 cfs** considering department rounding standards.

F. VOLUME CALCULATIONS

1. Volume Calculations for irrigation: N/A

$$V_{IR} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$$

$$V_{DR} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 =$$

$$V = \text{Smaller of } V_{IR} \text{ and } V_{DR} =$$

2. Volume Calculations for Other Uses:

NO DIVERION VOLUME IS APPLIED TO THIS MUNICIPAL WATER RIGHT.

G. NARRATIVE/REMARKS/COMMENTS

Field exam performed on 8/11/2020 with the applicant's representative, Terry Pickel – City of Coeur D'Alene Water Superintendent, showed a new groundwater well being used for municipal purposes for the City of Coeur D'Alene (City of CDA). The water system infrastructure includes 10 groundwater wells which were applied for under this permit, however the diversion rate applied for is associated with the new groundwater well identified as the Ralph Capaul (RC) well D0061673. At the POD, the RC well is situated within a pump house, and a 600 HP US motor with water main pipelines routing water to the City of CDA's municipal water delivery system. Extensive review of permit 95-16580's backfile data provides multiple flow measurements that derive varied instantaneous flow rate results as follows:

- Flowmeter results (2/22/2019) measurement completed by Necia Maiani P.E. (Welch Comer Engineer) and Dion Holton (City of CDA representative) equals 3,915 gpm. Calculating for a diversion rate in cfs = $3,915 \text{ gpm} / 448.83 \text{ gpm per 1.0 cfs} = 8.7 \text{ cfs}$, considering department rounding standards.
- Water system SCADA data for RC well performance results (8/5/2018) = $4,275 \text{ gpm} / 448.83 \text{ gpm per 1.0 cfs} = 9.5 \text{ cfs}$, considering department rounding standards.
- Historic Peak Production Data (Doc Date 1/22/2019, Received Date 3/11/2019) located in water right backfile: RC Well Pump Capacity (gpm) =
 - $4,000 \text{ gpm (year 2015)} / 448.83 \text{ gpm per 1.0 cfs} = 8.9 \text{ cfs}$
 - $3,940 \text{ gpm (year 2016)} / 448.83 \text{ gpm per 1.0 cfs} = 8.8 \text{ cfs}$
 - $4,010 \text{ gpm (year 2017)} / 448.83 \text{ gpm per 1.0 cfs} = 8.9 \text{ cfs}$
 - $4,025 \text{ gpm (year 2018)} / 448.843 \text{ gpm per 1.0 cfs} = 9.0 \text{ cfs}$ considering department rounding standards.

While historic well performance indicates the 600 HP pump in the RC well is capable of and has produced larger diversion rates than the permit approved 9.0 cfs, the applicant is limited to the permit approved value. As such, **9.0 cfs** is recommended as the maximum diversion rate that will be applied when licensing this permit.

Included with the submission of Proof of Beneficial Use received by IDWR on 3/8/2019, the applicant's provided details pertaining to well performance and diversion rates at the RC well – see last page of referenced document. Within it the applicant asserts that the pump performance has exceeded 9.0 cfs during peak summer use, but it is reasonable to see from historical pump performance data that normal operating flow rates do not exceed 9.0 cfs. In a department memorandum from Ashley Ritter, dated 12/21/2018, Ashley states the maximum instantaneous flow rate captured by the flowmeter installed at the RC well equaled $4,243 \text{ gpm} = 9.5 \text{ cfs}$ considering department rounding standards. This data was provided by the applicants, and supports concerns that the diversion rate from the RC well will exceed the 9.0 cfs that right 95-16580 authorizes on an annual basis.

The City of CDA's municipal water system POU is a large area POU, and includes multiple sections located in Township(s) 50 and 51 North, Range(s) 3 and 4 West. Arcmap aerial imagery was used to trace out the municipal POU, and the permit approved POU shape was used during licensing review and is recommended to be carried forward to the license. As a municipal license, the City of CDA can request a service area POU update as their water system continues to grow in the future.

Condition 046 and 190 were removed from the permit during licensing review. Condition 126 was replaced with condition 124 describing the POU is within the service area of the City of Coeur D Alene municipal water supply system as provided for under Idaho Law. Condition F06 was added to describe the following rights which share the same PODs: 95-2111, 95-2133, 95-2164, 95-2198, 95-7142, 95-7181, 95-8565, 95-8647, 95-8672, 95-8938, 95-9007, and 95-16580. Condition X35 remains on license, and describes that the 12 rights mentioned above when combined shall not exceed a total diversion rate of 61.4 cfs.

The City of CDA has provided SCADA well production data that illustrates their water system is capable of producing maximum instantaneous flow rates of 71.0 cfs during summer operations. This exceeds the maximum license(s) combined maximum diversion rate of 61.4 cfs by 9.6 cfs. During licensing review, conversations between IDWR staff and Mr. Pickel discussed the overage of diversion rate associated with City of CDA's water system. The City of CDA has a permit (95-17815) which is approved for an additional 9.0 cfs of diversion from a new groundwater source (Huetter) that will enable the City of CDA to cycle their resources while continuing to meet peak demands throughout summer months. Mr. Pickel stated the RC well and the new Huetter well are more efficient wells with regard to production, and the city will be focusing their discharge from these wells in the future as primary production sources allowing some of the other wells to be cycled less in summer months. This will reduce the combined diversion rate during peak operation, and reduces the concern for enlargement due to overages in diversion rates. Additionally, the City of CDA has two older irrigation water rights they are working to transfer to the city's existing groundwater sources and change the nature of use from irrigation to municipal. This will reduce the overages from maximum diversion rate observed during the licensing of this water right.

The City of CDA has eleven (11) water rights that overlap this rights POU; all of the rights are integrated in the City of Coeur D'Alene's municipal water system ID No.1280053. Condition X35 was added describing the combined municipal use for the 12 (total) rights including this right (95-16580), and their overall diversion rate limitations. There are no other overlap concerns for this right.

Have conditions of permit approval been met? X Yes No

H. RECOMMENDATIONS

1. Recommended Amounts

<u>Beneficial Use</u>	<u>Period of Use</u>	<u>Rate of Diversion</u>
MUNICIPAL	01/01 to 12/31	9.00 CFS

Totals: 9.00 CFS

2. Recommended Amendments

Change P.D. as reflected above Add P.D. as reflected above X None

Change P.U. as reflected above Add P.U. as reflected above X None

I. AUTHENTICATION

Luke Bates - Water Resource Agent

Field Examiner's Name SSS Date 12/14/2020

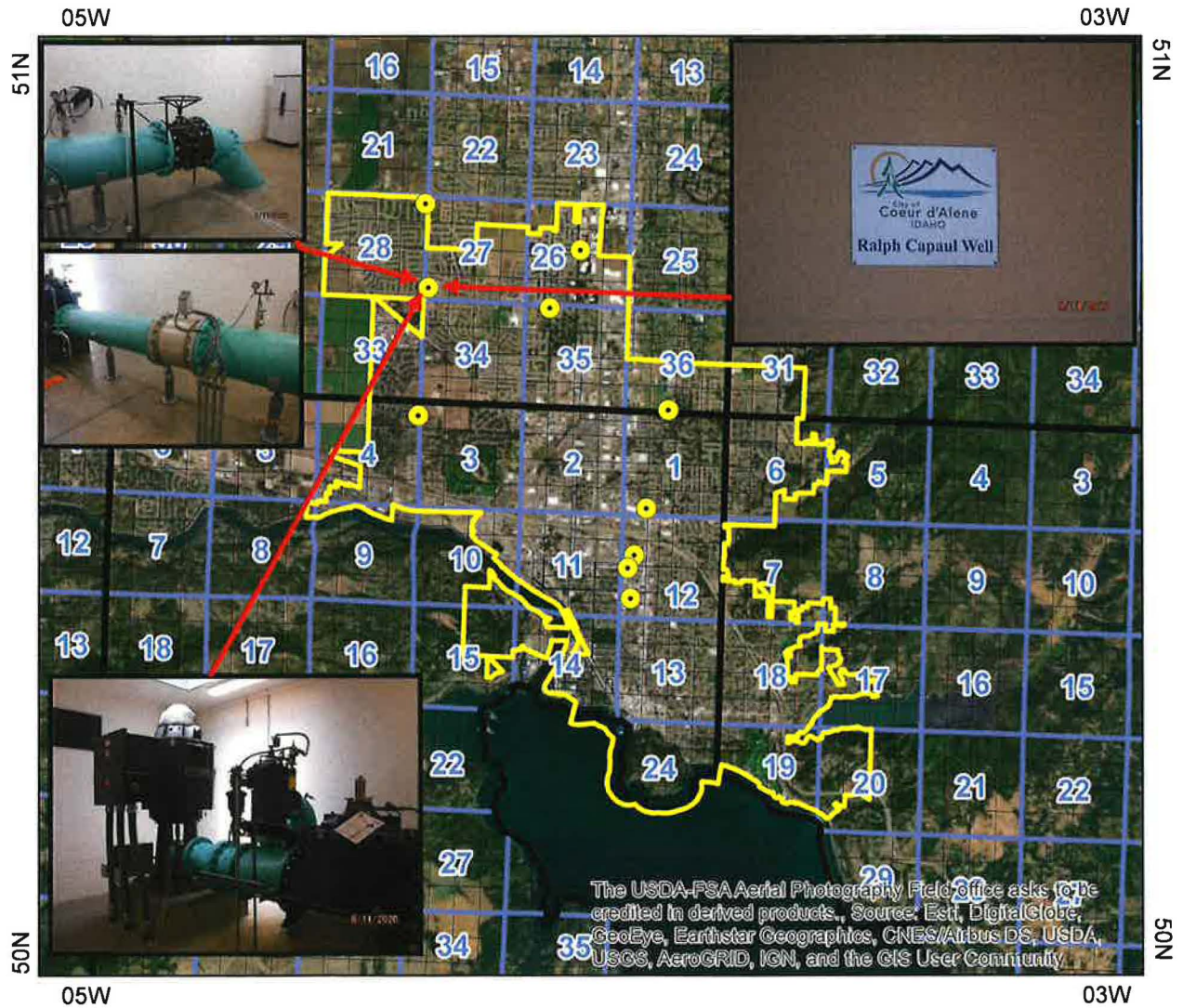
Reviewer Adh F. [Signature] Date 12/14/2020

City Of Coeur D Alene

Attachment to Field Exam

95-16580

MUNICIPAL system diagram.



● Point of Diversion

Water Service Area Boundary

Townships

PLS Sections

Quarter Quarters

0 1 2 4 Miles



Pump Capacity (gpm)

<u>Year</u>	Atlas Well	Hanley Well	oneysuckle We	Landings Well	Linden Well	Locust Well	Prairie Well	RC Well	4th St. Well	Huetter Well
	4070	3400	1960	3200	2725	3600	3040	0	2525	
	4130	3515	1915	3655	2195	3460	2980	0	2280	
	4060	3440	1740	3610	3080	3360	2990	0	2000	
	4070	3445	2100	2480	2115	2650	3140	0	3780	
	3970	3425	1795	2945	2700	2860	3170	0	2540	
	3860	3907	1530	2975	2260	3060	3190	0	3605	
	4040	3515	1685	3030	2255	3120	3255	0	2615	
	4000	3985	1635	3010	2195	3130	3215	0	2565	
	4090	3550	1665	3040	2225	2930	3170	0	2530	
	4080	3480	1625	3085	2170	3010	3190	0	2285	
2015	4070	3525	1675	3080	2115	3080	3205	4000	2580	
2016	3965	3500	1565	3850	2340	2860	3200	3940	3290	
2017	3750	3550	1675	3650	3275	2900	3270	4010	3050	
2018	4010	3550	1685	3750	3250	2870	3250	4025	3010	

City of Coeur d'Alene
Water Right Examination 95-16580

Table 1: 2/22/19 Exam Results

Date	Time Start (a.m.)	Well	Flowmeter					Pressure		Flow (gpm)	System Conditions	
			Type	Make	Model/Serial	Size (inch)	Last Meter Certification	Start (psi) (Before Pump Start)	End (psi)		Tank Levels' (feet)	Other Wells Operating
2/22/2019	9:56	Linden Well	Siemens	SITRANS FM MAG 5100 W	593103U356	16	12-Sep-16	54	63	3239	17.5	Honeysuckle/ 4th
2/22/2019	9:40	Locust Well	Data Industrial Transmitter	510-10	510/000580	16	12-Sep-16	58	65	3030	17.5	Honeysuckle/ 4th
2/22/2019	9:15	4th Street Well	Siemens	SITRANS FM MAG 5100 W	577503U514	16	12-Sep-16	On	78	2590	17.5	Honeysuckle/ 4th
2/22/2019	9:05	Honeysuckle Well	Data Industrial Transmitter	510-10	510/000570	12	12-Sep-16	On	80	1550	143.7	Honeysuckle/ 4th
2/22/2019	8:49	Hanley Well	Sparling		127125	16	12-Sep-16	63	65	3404	143.7	Honeysuckle/ 4th
2/22/2019	8:35	Prairie Well	Sparling		131843	16	12-Sep-16	62	63	3219	143.4	Honeysuckle/ 4th
2/22/2019	7:47	Atlas Well	Siemens	SITRANS FM MAG 5000	593003U356	16	12-Sep-16	41314	Not Recorded	3730	3737	Honeysuckle/ 4th
2/22/2019	8:01	Ralph Capaul Well	Siemens	SITRANS FM MAG 5100 W	7ME658 188301U224	18	12-Sep-16	62	70	3915	142	Honeysuckle/ 4th
2/22/2019	9:28	Annie Well	Data Industrial Transmitter	510-10	510/000571	16	12-Sep-16	52	61	2023	17.5	Honeysuckle/ 4th
2/22/2019	8:18	Landing Well	Data Industrial Transmitter	510-10	510/000602	16	12-Sep-16	55	68	3300	142	Honeysuckle/ 4th

Total
(gpm) 30007
Total (cfs) 66.9

Examiner: Necia Maiani, PE
CDA Representative: Dion Holton

1. Tank Levels for Linden, Locust, 4th Street, and Annie reflect Tubbs Hill. Tank Levels for Honeysuckle, Hanley and Prairie reflect Prairie Standpipe. Tank Levels for Atlas, Ralph Capaul and Landings reflect Industrial Standpipe.

City of Coeur d'Alene
Water Right Examination 95-16580

Table 2: 2/22/2019 Exam Results Versus 8/5 SCADA

Well	Well Pump HP	8/5/2018 Flow (from SCADA)			2/22/2019 Exam	
		Flow Rate (gpm)	Total (gallons)	Discharge Pressure (psi)	Measured Flow Rate (gpm)	Discharge Pressure (psi)
Linden Well	350	3,330	6,993,000	60	3,239	63
Locust Well	350	2,958	2,058,768	57	3,030	65
4th Street Well	400	2,862	1,803,060	62	2,590	78
Honeysuckle Well	250	1,709	2,645,532	56	1,550	80
Hanley Well	500	3,707	3,825,624	46	3,404	65
Prairie Well	500	3,246	5,589,612	50	3,219	63
Atlas Well	600	3,705	2,845,440	66	3,737	Not Recorded
Ralph Capaul Well	600	4,275	5,694,300	51	3,915	70
Annie Well	350	2,083	2,449,608	57	2,023	61
Landing Well	500	3,998	6,708,240	49	3,300	68

Total (gpm)	31,873
Total (cfs)	71.0

Total (gpm)	30,007	
Total (cfs)	66.9	

Ralph Capaul Well

Customer : Flowserve
 Item number :
 Service : Coeur D' Alene - Atlas
 Flowserve reference : Default 0.1
 Date : February 10, 2014

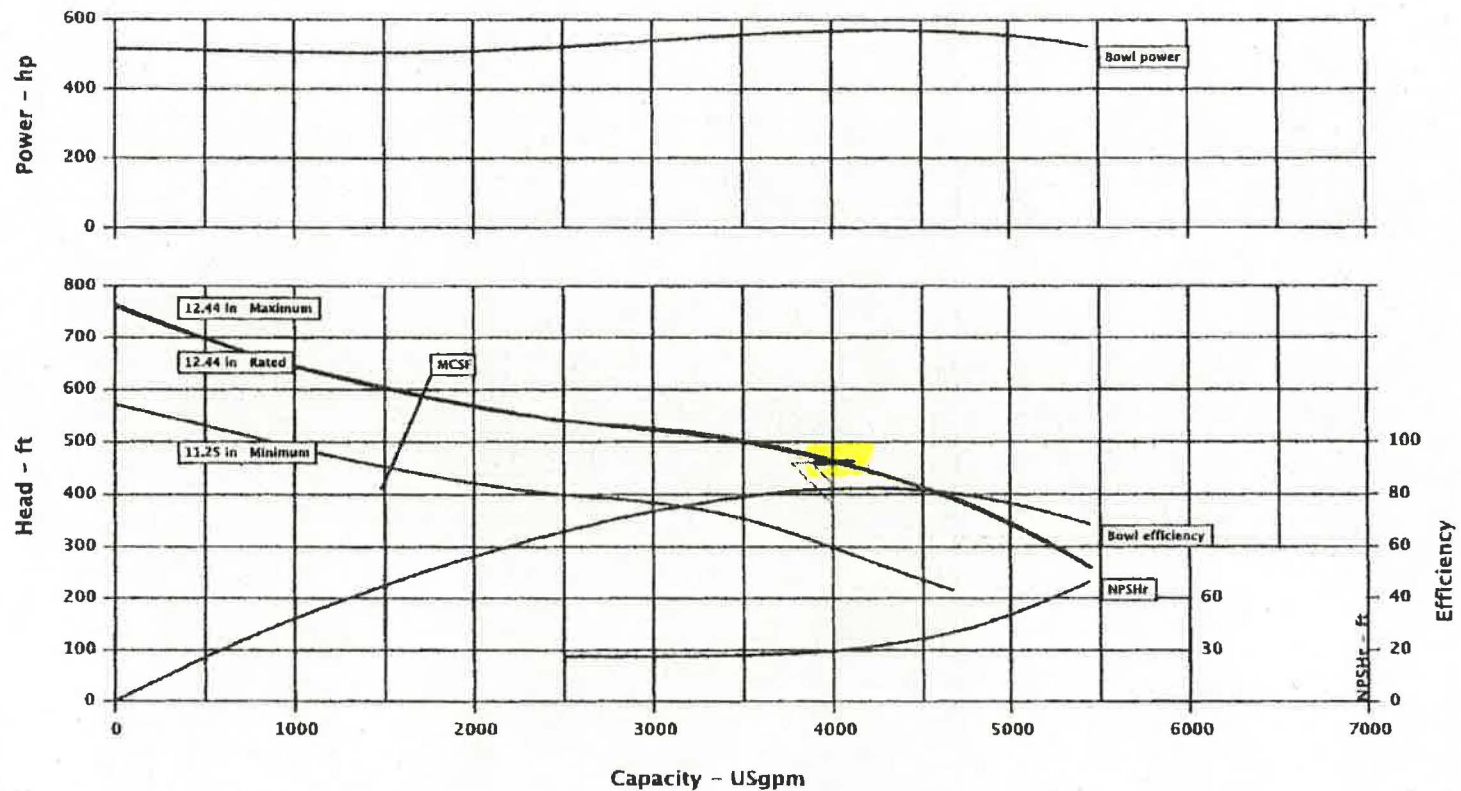


Pump size & type : 16ENH
 Based on curve no. : EC-1822
 Number of stages : 5
 Test tolerance : Hydraulic Institute Level A

Capacity : 4000.0 USgpm
 Head : 461.00 ft
 Specific gravity : 1.000
 Pump speed : 1785 rpm

CURVES ARE APPROXIMATE. PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS: CAPACITY, HEAD AND EFFICIENCY.

Bowl performance shown below is corrected for materials, viscosity and construction.



Bowl head of 463.05 ft corresponds with 461.0 ft head at low liquid level adjusted for elevation and friction losses.

Customer : FLOWSERVE PUMP DI...
 Item number : 4TH ST WELL
 Service :
 Flowserve reference : 475072974
 Date : December 8, 2015

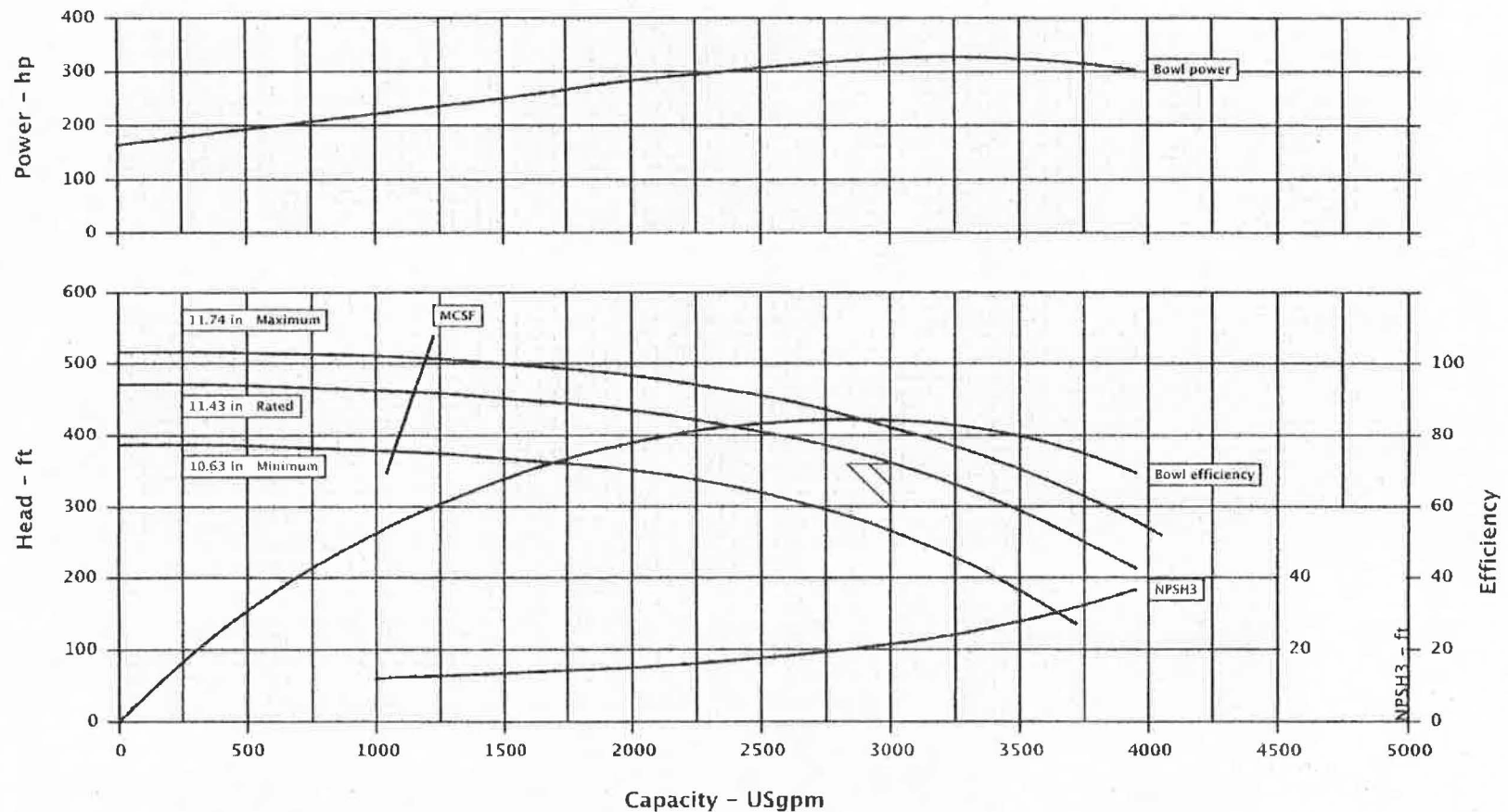


Pump size & type : 15EHM
 Based on curve no. : EC-2392
 Number of stages : 4
 Test tolerance : Hydraulic Institute Level A

Capacity : 3000.0 USgpm Specific gravity : 1.000
 Head : 361.00 ft Pump speed : 1775 rpm

CURVES ARE APPROXIMATE. PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS: CAPACITY, HEAD, AND EFFICIENCY.

Bowl performance shown below is corrected for materials, viscosity and construction.

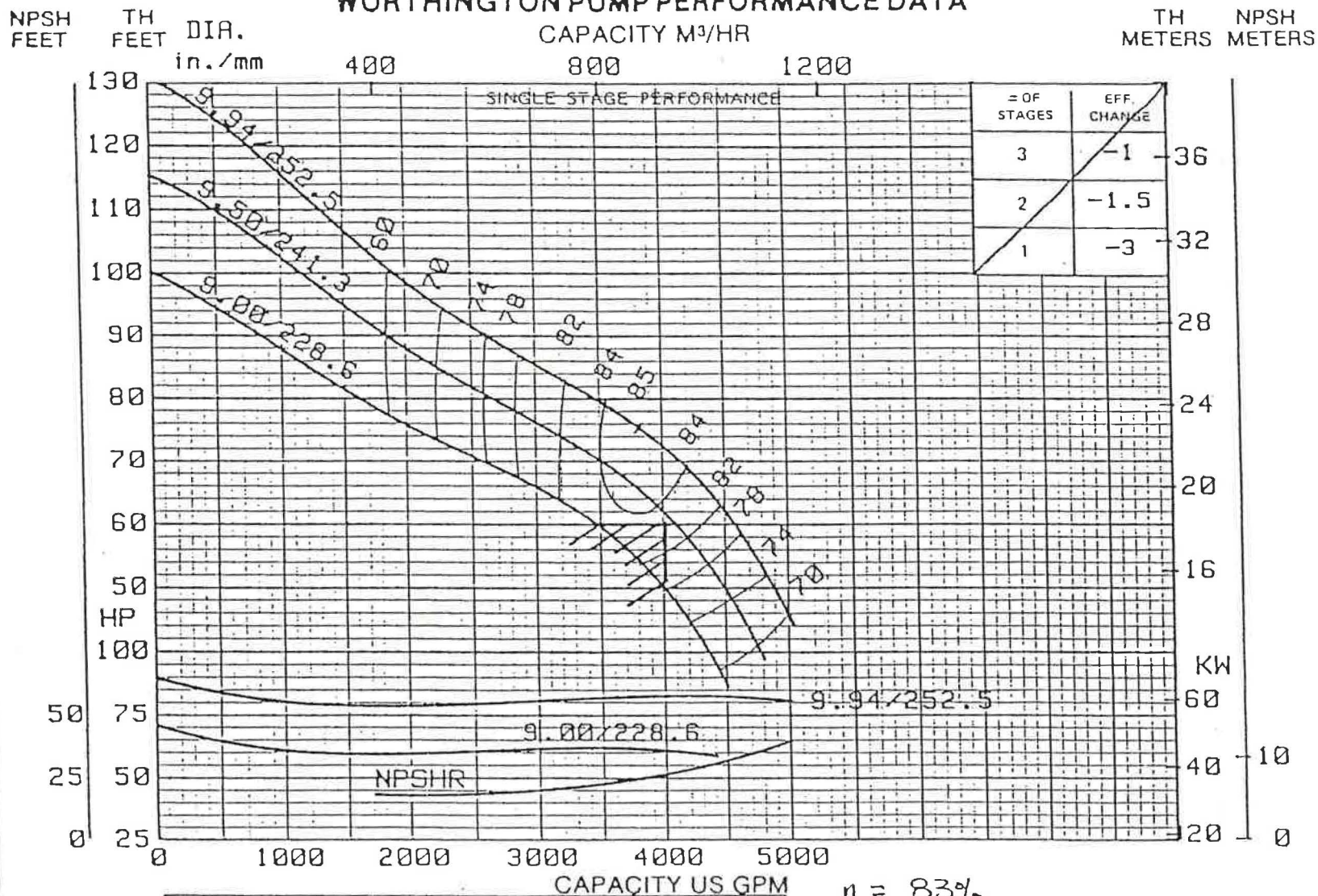


Bowl head of 361.87 ft corresponds with 361 ft head at low liquid level adjusted for elevation and friction losses.

Atlas Well

Customer R.C. West Company Project City Worthington S.O. Portland
 Cust. Proposal/Order No. 0000984 Mr. D. Allen Proposal/Order No. 5-80303
 Customer Item No. ATLAS WELL Date 1-12-88 Certified By T. Knappich
 Liquid/Service Water Sp. Gr. 1.0 Visc. - SSU
 Capacity 4000 Head 420 Temp. 60 °C

WORTHINGTON PUMP PERFORMANCE DATA



NO. OF STAGES	EFF. CHANGE
3	-1
2	-1.5
1	-3

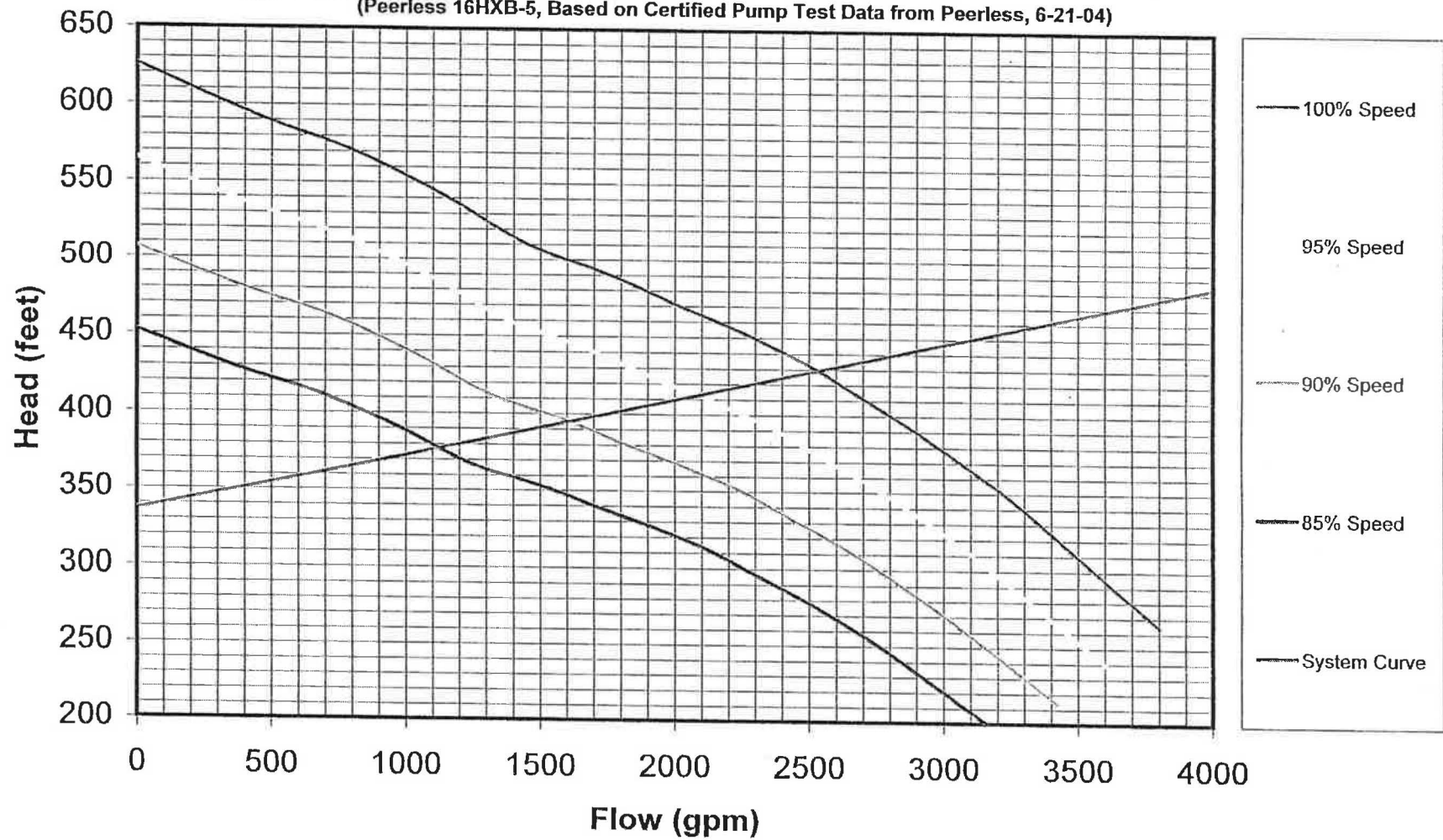
CURVE NO.	SIZE	RPM
A-24172	15HH410-7	1775

$\eta = 83\%$
 NPSHR = 25'
 DUP - 511/174

WORTHINGTON

Figure 2-2
Annie Well Pump- System Curve and VFD Curves

(Peerless 16HXB-5, Based on Certified Pump Test Data from Peerless, 6-21-04)





Sterling Fluid Systems (USA), Inc

P O Box 7026, Indianapolis, Indiana, 46202

Customer : Welch Comer
1626 Lincoln Way
Couer d' Alene, ID
83814

Project : Locust Well for the City of Couer d' Alene
Quote No. : US-6965-8 Page No : 1

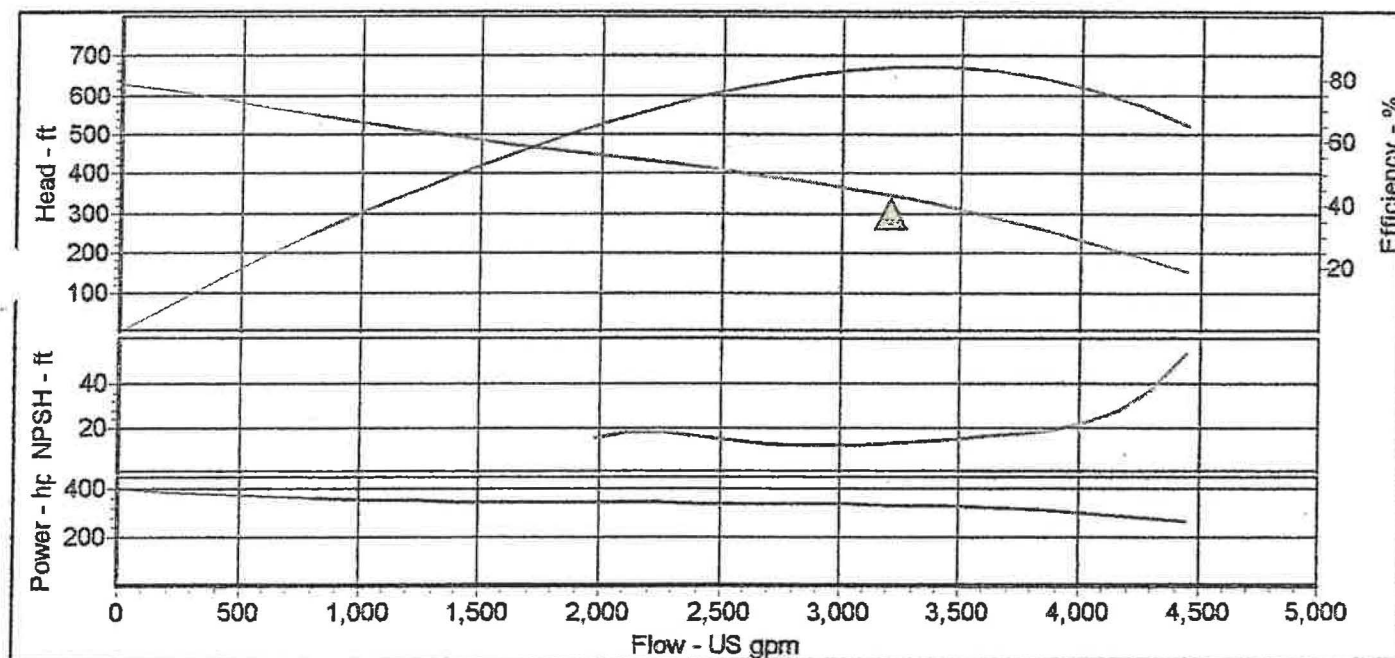
Contact : Steve Cordes
Phone : 208-664-5946 Fax : 208-664-9382
Date : Tuesday, January 21, 2003

Pump Model: **Peerless Vertical - 14HH 7 Stages**
Nom. Speed: **1770 RPM, 60 Hz Electric**
Market : **Vertical Turbine Pump**
Impeller No.: **2621959 / HC**
Material Spec. Group: **A - B: CIE; I: Brz = Standard**

Item : 1 Fluid: Water
Your Ref. : Viscosity: 1.007 cSt
Sp. Gravity: 1

Flow rate Q: 3200 US gpm
Bowl Total Head: 337 ft
Efficiency : 84.1 %
Power Required : 332.73 hp
NPSH Required : 12.944 ft

Performance curve according to Hyd Inst-Peerless Std



Comments

Refer to factory for all single point bowl performance guarantees. Pumps must be selected with Hydraulic Institute-Peerless Std. See Std Hydraulic Performance document in RAPID for testing tolerances & contractual guarantees.

Flow (US gpm)	Head (ft)	Pump Efficiency (%)	Power Required (hp)	NPSH Required (ft)	Thrust (lb)
0.0	628.79	0.0	403.58		18543.09
555.4	576.40	21.9	369.85		16224.61
1110.8	520.45	41.3	353.49		13845.84
1666.2	472.23	57.5	345.70		12213.16
2221.6	430.58	70.7	341.65	18.06	10977.54
2777.0	386.90	80.3	337.97	12.28	9531.95
3332.4	330.18	84.2	330.13	13.91	7503.65
3887.8	252.02	79.8	309.91	19.31	5036.94
4443.2	151.66	64.7	282.82	52.83	2702.14

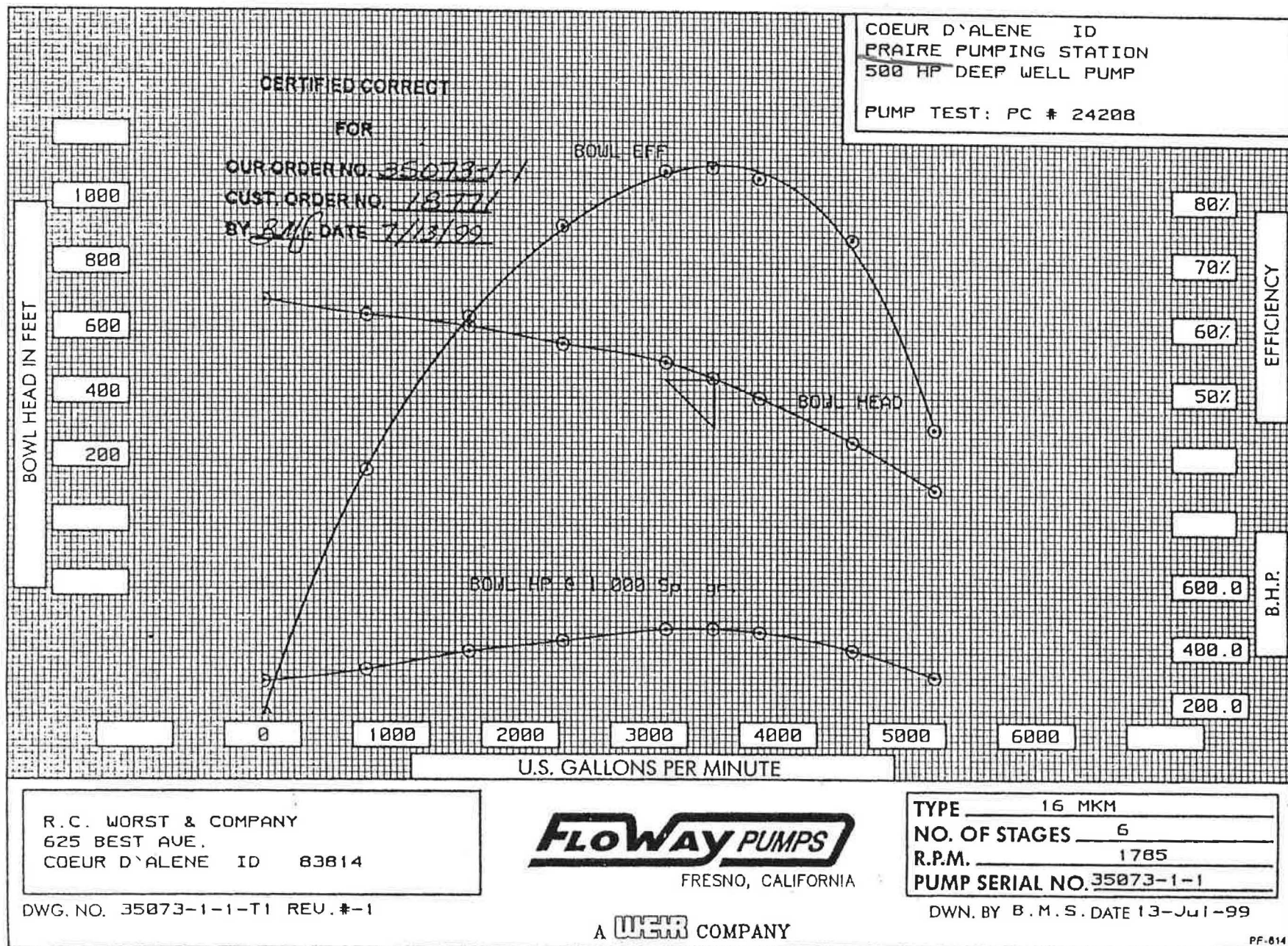
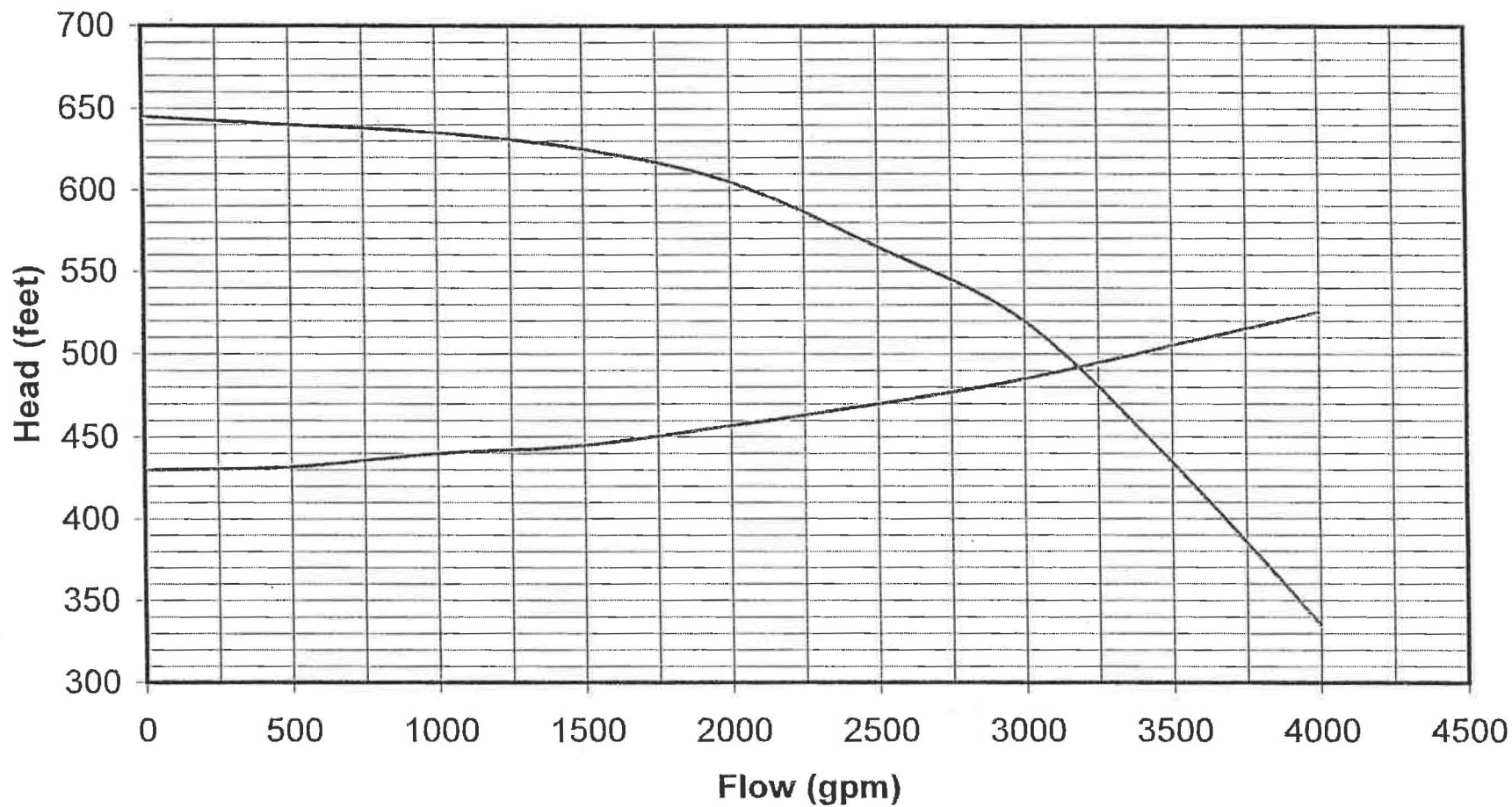


Figure 3-2
Landings Pump Curve
(Flowserve ~~15EHM~~/15H277, 5-Stage)





Sterling Fluid Systems (USA), Inc

P O Box 7026, Indianapolis, Indiana, 46202

Customer : Welch Comer
1626 Lincoln Way
Coeur d' Alene, ID
83814

Project : Hanley Well for the city of Coeur d' Alene
Quote No. : US-8965-11 Page No : 1

Contact : Steve Cordes
Phone : 208-664-5946 Fax : 208-664-9382
Date : Tuesday, January 21, 2003

Pump Model: Peerless Vertical - 16HXB 5 Stages

Nom. Speed: 1770 RPM, 60 Hz Electric

Market : Vertical Turbine Pump

Impeller No.: 4601399

Material Spec. Group: A - B: CIE; I: Brz = Standard

Item : 1

Fluid: Water

Your Ref. :

Viscosity: 1.007 cSt

Sp. Gravity: 1

Flow rate Q: 3500 US gpm

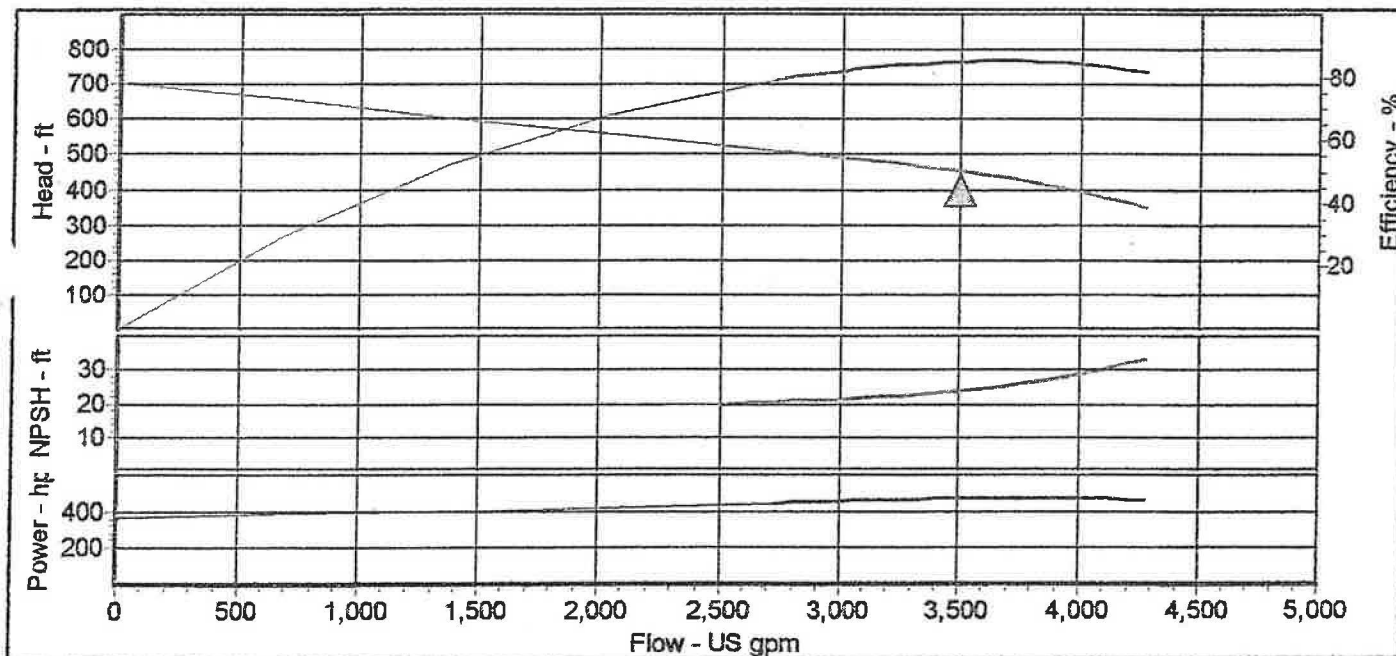
Bowl Total Head: 440 ft

Efficiency : 85 %

Power Required : 469.69 hp

NPSH Required : 23.788 ft

Performance curve according to Hyd Inst-Peerless Std



Comments

Refer to factory for all single point bowl performance guarantees. Pumps must be selected with Hydraulic Institute-Peerless Std. See Std Hydraulic Performance document in RAPID for testing tolerances & contractual guarantees.

Flow (US gpm)	Head (ft)	Pump Efficiency (%)	Power Required (hp)	NPSH Required (ft)	Thrust (lb)
0.0	702.51	0.0	360.45		17745.65
534.7	665.07	23.9	376.21		15724.84
1069.5	626.24	43.0	392.96		14223.36
1604.2	587.06	58.2	408.37		12977.86
2138.9	549.35	70.0	424.07		11693.23
2673.6	513.39	78.4	442.10	20.34	10178.14
3208.4	475.59	83.5	461.26	22.01	8348.87
3743.1	426.12	85.1	473.50	25.77	6192.16
4277.8	346.62	81.3	460.29	33.20	3765.26

HONEY/SUCKLE WELL

P.03

P.3/4

2007724892

MAY - 9-97 FRI 14:34 H2O WELL SERVICE

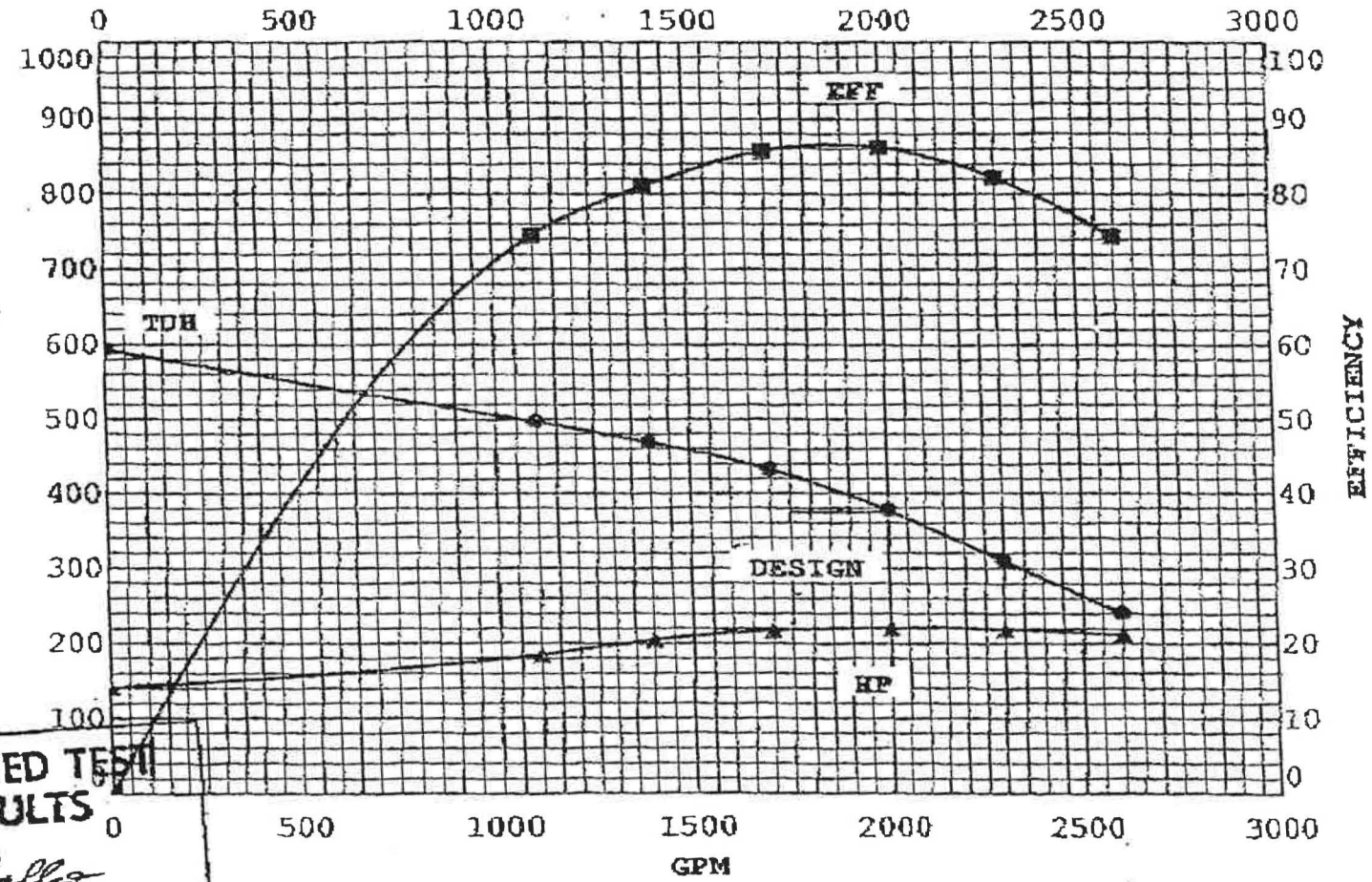
MAY 09 1997 02:00PM GOULDS TTD

GOULDS PUMPS INC WTG-TURBINE DIVISION

CUSTOMER: H2O WELL SERVICE
P/O: 18209

DATE: 05/08/97
DRAWN BY: R. LEWIS

TDH = FEET
HORSEPOWER



CERTIFIED TEST RESULTS
BY *Don Haller*
TITLE *Engineer*
DATE *May 9, 1997*
GOULDS PUMPS
TEXAS DIVISION

MODEL: 14RJMC
STAGES: 5
SG: 1.00

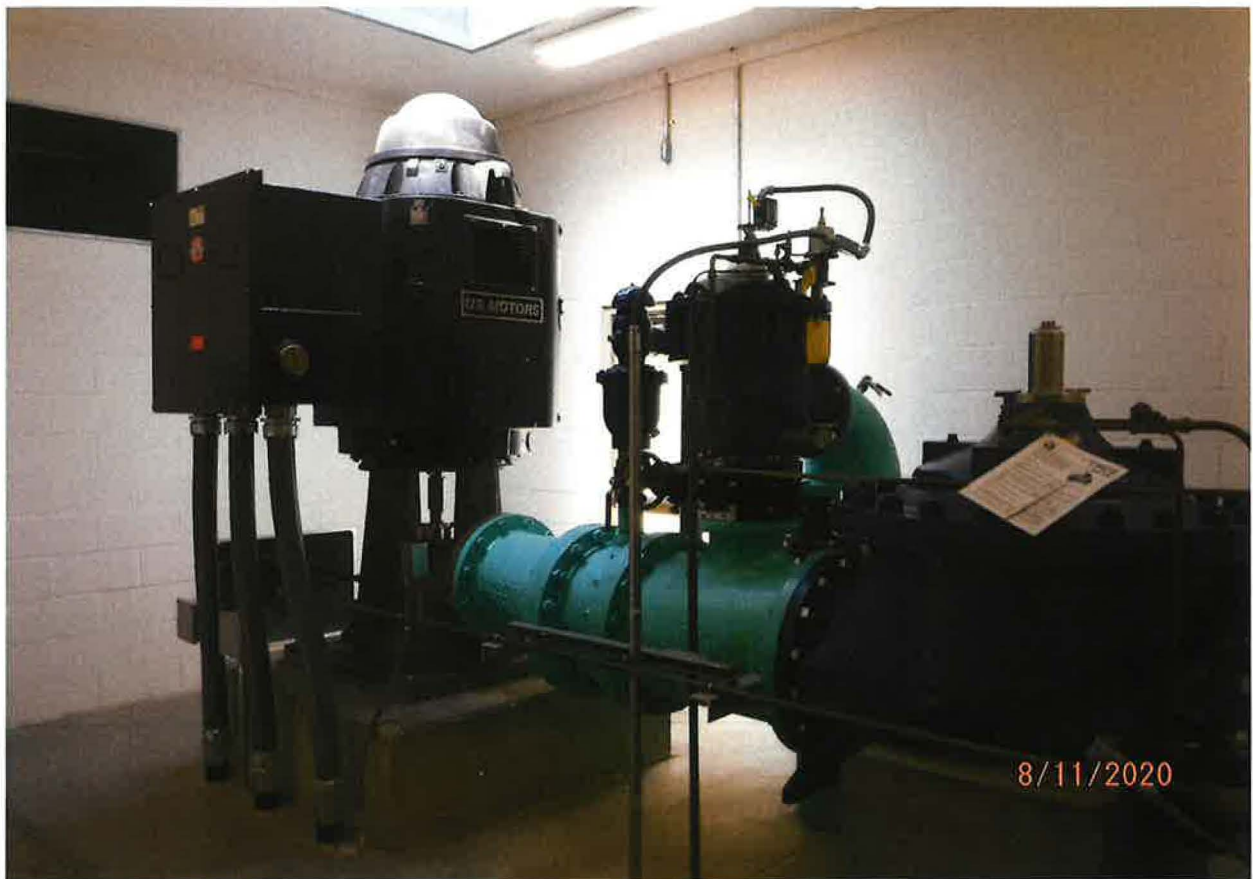
RPM: 1770

S/O: 385209
IMP DIA: 9.82
VISC: 32

HP Readings are adjusted by SG



POD – WELL/PUMP HOUSE FOR RALPH CAPAUL WELLSITE



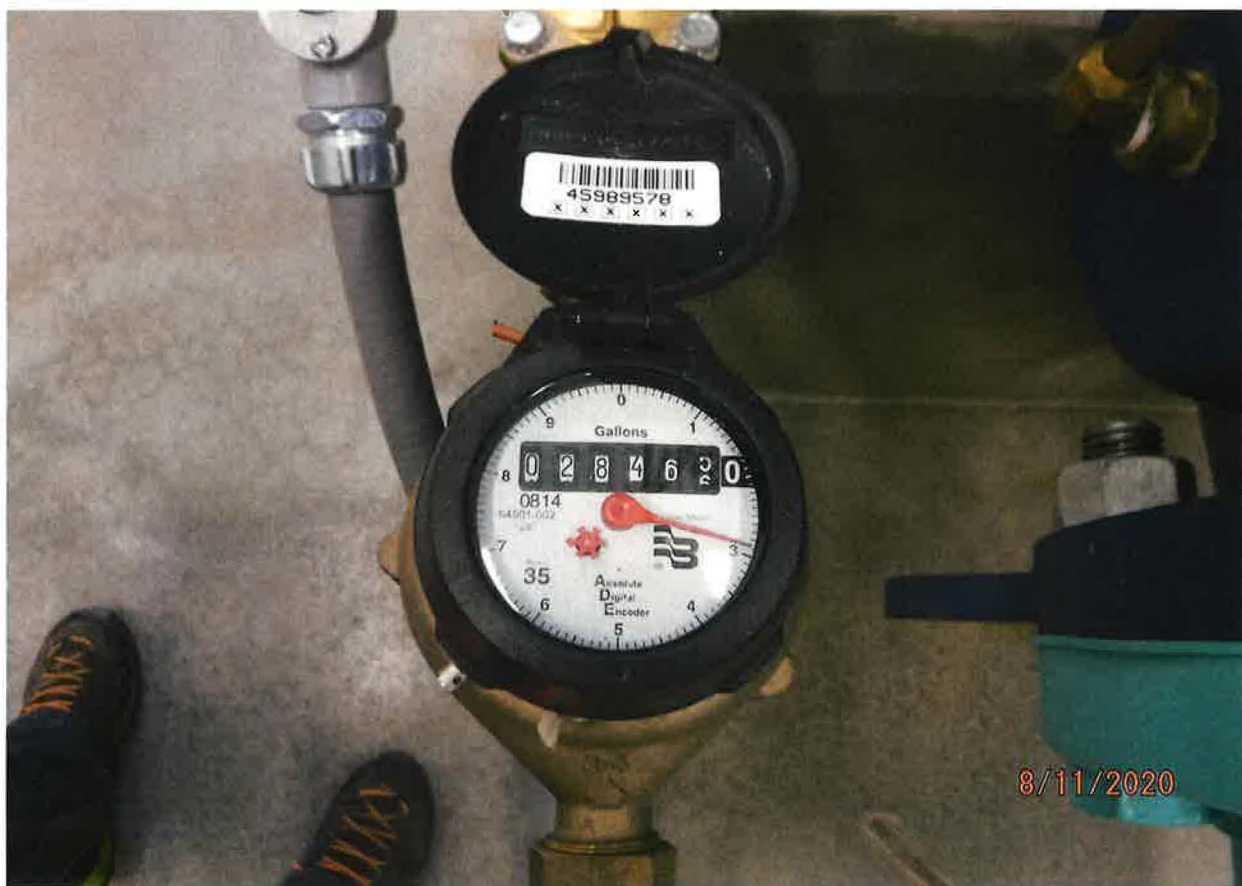
POD – WELL D0061673



FLOW METER INSTALLED ON WATER SYSTEM



WATER SYSTEM PIPING



MEASURING DEVICE INSTALLED FOR WELL D0061673