STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 95-16962
Exam Date: 07/07/2020

1. Current Owner:
HAYDEN LAKE IRRIGATION DISTRICT 2160 W DAKOTA AVE HAYDEN ID 83835-5122

2. Accompanied by: Branden Rose
Phone No: 208-772-2616
Address: Same as above
Relationship to permit Holder: Permit holder's representative - District Administrator.

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
95-7234	Groundwater	Municipal	Decreed
95-7800	Groundwater	Municipal	Decreed
95-8269	Groundwater	Municipal	Decreed
95-8273	Groundwater	Municipal	Decreed
95-8279	Groundwater	Municipal	Decreed
95-8581	Groundwater	Municipal	Decreed
95-9242	Groundwater	Municipal	Decreed
95-12512	Groundwater	Irrigation	Decreed
95-9212	Groundwater	Municipal	License

Comments: 95-7234, 95-7800, 95-8269, 95-8273, 95-8279, 95-8581, 95-9212, and 95-9242 are all municipal beneficial use rights that overlap this right's POU. Condition X35 is not recommended for use in the licensing of Permit 95-16962, as each of the listed water rights and this permit's maximum diversion rates are additive in nature. Right 95-12512 is an irrigation beneficial use right with POU that overlaps this right's POU. The groundwater source is separate from this right, and it is not being considered as concern for overlap with the municipal use water system in place under Permit 95-16962.

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

Water Right No.	Source	Purpose of Use	Basis
95-7800	Groundwater	Municipal	Decreed
95-8581	Groundwater	Municipal	Decreed
95-8269	Groundwater	Municipal	Decreed
95-8273	Groundwater	Municipal	Decreed
95-8279	Groundwater	Municipal	Decreed
95-9242	Groundwater	Municipal	Decreed
95-9212	Groundwater	Municipal	License

Comments: the 7 water rights listed above all share one or more PODs with Permit 95-16962. Condition F06 was added to this permit during licensing review to describe the diversion of water through shared PODs.

C. DIVERSION AND DELIVERY SYSTEM

1. **LOCATION OF POINT(S) OF DIVERSION:**

GROUND WATER NE¼ NE¼, Sec. 14, Twp 51N, Rge 04W, B.M. KOOTENAI County
Lacey well located at -116°47.475, 47°46.226; 95-78-N-21.
GROUND WATER SW¼ SE¼, Sec. 15, Twp 51N, Rge 04W, B.M. KOOTENAI County
Dakota #1 well located at -116°48.941, 47°45.698; D0067888.
GROUND WATER NW¼ SE¼, Sec. 16, Twp 51N, Rge 04W, B.M. KOOTENAI County
Carrington well located at -116°50.382, 47°45.784; 95-77-N-167.
GROUND WATER SW¼ SE¼, Sec. 15, Twp 51N, Rge 04W, B.M. KOOTENAI County
Dakota #2 well located at -116°48.913, 47°45.667; 95-88-N-112.
GROUND WATER SW¼ SE¼, Sec. 15, Twp 51N, Rge 04W, B.M. KOOTENAI County
Dakota #3 well located at -116°48.905, 47°45.709; 95-88-N-111.
GROUND WATER NE¼ NW¼, Sec. 27, Twp 51N, Rge 04W, B.M. KOOTENAI County
Larix well located at -116°49.289, 47°44.481; 95-78-N-24.

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.

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
95-78-N-21 (Lacey well)	Western Land Roller	300		UNKOWN	
D0067888 (Dakota #1 well)	General Electric	300		American Marsh	
95-77-N-167 (Carrington well)	UNKOWN	600		UNKOWN	
95-88-N-112 (Dakota #2 well)	UNKOWN	600		Worthington	
95-88-N-111 (Dakota #3 well)	UNKOWN	300		Worthington	
95-78-N-24 (Larix well)	General Electric	300		American Marsh	

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
FLOWMETER(s)						

2. Measurements: Hayden Lake Irrigation District (HLID) has uses a sophisticated SCADA water management system that enables read out of instantaneous flow from each of the wells linked to the system reading from installed flow meters at each well's pump station. HLID provided pump performance curves for each well that show pump technical specification pump curves, as well as 'observed' pump performance curves for each well's pump. The six well's combined diversion rate equals 1,850 gpm (Lacey) + 1,754 gpm (Larix) + 1,800 gpm (Dakota #1) + 4,100 gpm (Dakota #2) + 2,100 gpm (Dakota #3) + 1,800 gpm (Carrington) = 13,404 gpm or 29.9 cfs, considering Department rounding standards.

E. FLOW CALCULATIONS

X Additional Computation Sheets Attached

Measured Method:
HLID provided pump performance test results for six well pumps = 1,850 gpm (Lacey) + 1,754 gpm (Larix) + 1,800 gpm (Dakota #1) + 4,100 gpm (Dakota #2) + 2,100 gpm (Dakota #3) + 1,800 gpm (Carrington) = 13,404 gpm or 29.9 cfs, considering Department rounding standards.

F. VOLUME CALCULATIONS

1. Volume Calculations for irrigation: N/A
2. Volume Calculations for Other Uses:

Municipal beneficial use is for a municipality; there is no annual or maximum diversion volume applied to this water right license.

G. NARRATIVE/REMARKS/COMMENTS

Field exam performed on 7/7/2020 with the applicant's representative, Branden Rose – District Superintendent, showed six groundwater wells servicing municipal use for Hayden Lake Irrigation District (HLID). HLID services the city of Hayden, linking this water right as serving a municipality. The water system infrastructure includes the 6 wells that are covered under this permit. The permit authorized development for up to 5.0 cfs which is intended to add instantaneous diversion rate capacity to the water system. At each POD, the main trunk line from each respective well day-lights inside a pump station, where installed flow meters provide system management using SCADA software. Mr. Rose demonstrated he is able to track and manage all the wells for the system using any of the pump station SCADA controls. Flow measurements were provided by the applicant, in the form of pump performance curves (tested – observed), which provide the following flow rates:

- Lacy well (300 HP pump motor) = 1,850 gpm
- Larix well (300 HP pump motor) = 1,754 gpm
- Dakota #1 well (300 HP pump motor) = 1,800 gpm
- Dakota #2 well (600 HP pump motor) = 4,100 gpm
- Dakota #3 well (300 HP pump motor) = 1,800 gpm
- Carrington well (600 HP pump motor) = 1,800 gpm
- TOTAL flow rate = 13,404 gpm or 29.9 cfs, considering department rounding standards.

Performance data demonstrates any of the six wells is capable of greater diversion rates than the permit authorized value. The total diversion rate of 29.9 is an additive value, which represents multiple water rights associated with the six wells covered under permit 95-16962 (see backfile to field exam report for calculation data sheet). The applicant's prior water rights with common infrastructure have a total authorized diversion rate equal to 25.88 cfs. The water system total diversion rate equals 29.9 cfs, and I'm only able to recommend **4.02 cfs** out of the 5.0 cfs permitted toward licensing this right considering that 29.9 cfs – 25.88 cfs = 4.02 cfs.

The Hayden Lake Irrigation District's municipal water system POU is a large are POU, and includes sections 11-16, 21-24, and 26-27 located within Township 51 North, Range 04 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, HLID can request a service area POU update as their water system continues to grow in the future.

At time of licensing, the permitted POD(s) for one of the groundwater wells was found to be inaccurate with field exam determined legal description location; see below:

POD: authorized on permit = one of two GROUNDWATER 51N04W**14NENE**.
POD: verified at time of licensing = one of two changed to GROUNDWATER 51N04W**15SWSE**.

An Application for Amendment was initiated and mailed with cover letter to the applicant on 17 May 2024. The applicant returned the amendment with the required fee received on 23 May 2024.

Conditions 046, and 190 were removed from the permit during licensing review as they'd been complied with by the applicant. Condition X35 was removed, the combined total diversion rate of separate prior Rights and this Right are additive in nature negating need for a combined use condition. Condition F06 was added to describe shared PODs between water rights 95-7234, 95-7800, 95-8269, 95-8273, 95-8279, 95-8581, 95-9242, 95-9212, and this right 95-916962. Condition 175 was added describing requirements for the diversion of water from the Rathdrum Prairie Ground Water Management Area (RPGWMA). All other conditions form the permit will remain on the license.

Overlap concerns: 95-7234, 95-7800, 95-8269, 95-8273, 95-8279, 95-8581, 95-9242, and 95-9212 are all municipal beneficial use rights that overlap this right's POU. Condition X35 was not recommended for use in the licensing of Permit 95-16962, as each of the listed water rights and this permit's maximum diversion rates are additive in nature. Right 95-12512 is an irrigation beneficial use right with POU that overlaps this right's POU. The groundwater source is separate from this right, and it is not being considered as concern for overlap with the municipal use water system in place under Permit 95-16962. There are multiple other overlapping water right POUs located within the municipal POU served by HLID, but as they are not connected to HLID for their respective uses, they are not a concern for overlap with this permit. There are no other overlap concerns with this water right.

Have conditions of permit approval been met? _X_ Yes ____ No

H. RECOMMENDATIONS

1. Recommended Amounts

Beneficial Use	Period of Use	Rate of Diversion
MUNICIPAL	01/01 to 12/31	4.02 CFS
	Totals:	4.02 CFS

2. Recommended Amendments

_X_ 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 _X_ None

I. AUTHENTICATION

Luke Bates – Sr Water Resource Agent

Field Examiner's Name _____ Date 5/28/2024

Reviewer _____ Date 2/20/2025

State of Idaho
Department of Water Resources

Attachment to Field Exam

95-16962

This map depicts the MUNICIPAL system diagram.



0 0.5 1 2 Miles

Water Service Area Boundary
Townships
PLS Sections
Quarter Quarters
Point of Diversion

N

HAYDEN LAKE IRRIGATION DISTRICT – CURRENT WATER RIGHTS as of 05/28/2024

Basin	Sequence	Version Number	Process	Basis	Status	Draft	RightID	Priority Date	Diversion Rate	Source List	Water Use List	Current Owner	Approval Date	Total Acres	Volume
95	7234		Water Right	Decreed	Active	N	636193	1/29/1973	0.50	GROUND WATER	MUNICIPAL	HAYDEN LAKE IRRIGATION DISTRICT			16.8
95	7800		Water Right	Decreed	Active	N	631042	11/16/1977	3.80	GROUND WATER	MUNICIPAL	HAYDEN LAKE IRRIGATION DISTRICT			2,751.1
95	8269		Water Right	Decreed	Active	N	630995	3/11/1983	1.56	GROUND WATER	MUNICIPAL	HAYDEN LAKE IRRIGATION DISTRICT			146.6
95	8273		Water Right	Decreed	Active	N	631070	3/16/1983	2.00	GROUND WATER	MUNICIPAL	HAYDEN LAKE IRRIGATION DISTRICT			374.5
95	8279		Water Right	Decreed	Active	N	631066	4/1/1983	3.00	GROUND WATER	MUNICIPAL	HAYDEN LAKE IRRIGATION DISTRICT			553.0
95	8581		Water Right	Decreed	Active	N	631059	4/25/1988	12.92	GROUND WATER	MUNICIPAL	HAYDEN LAKE IRRIGATION DISTRICT			4,537.0
95	9212		Water Right	License	Active	N	630954	8/7/2002	1.34	GROUND WATER	MUNICIPAL	HAYDEN LAKE IRRIGATION DISTRICT	5/14/2010		
95	9242	1	Water Right	Decreed	Active	N	631088	3/9/1966	1.26	GROUND WATER	MUNICIPAL	HAYDEN LAKE IRRIGATION DISTRICT			371.0
95	12512		Water Right	Decreed	Active	N	634590	10/23/1964	1.09	GROUND WATER	IRRIGATION	HAYDEN LAKE IRRIGATION DISTRICT		77.0	269.5
95	16962		Water Permit	Licensing Review	Active	N	673026	1/29/2015	4.02	GROUND WATER	MUNICIPAL	HAYDEN LAKE IRRIGATION DISTRICT	2/13/2015		
								GREEN HIGHLIGHTED RIGHT(S) TOTAL DIVERSION RATE =	29.90	(0.50 cfs + 1.090 cfs = 1.59 cfs subtracted from MUNICIPAL use total)					

NOTE:
1. HLID owns an IRRIGATION water right No. 95-12512, which has not been transferred to MUNICIPAL use at time of licensing PERMIT No. 95-9212; excluded from TOTAL diversion rate.
2. Right 95-7234's POD is not associated with the shared wells for 95-7800, 95-8269, 95-8273, 95-8279, 95-8581, 95-9242 (transfer), and 95-9212 (permit); excluded from Total diversion rate.
3. 29.9 cfs = combined diversion rate for right(s) 95-7800, 95-8269, 95-8273, 95-8279, 95-8581, 95-9242 (transfer), 95-9212, and 95-16962 (permit) which all share one or more of the six (6) wells associated with 95-16962.
4
5

Permit 95-16962 uses 6 groundwater production wells associated with their Municipal demands. Pump performance curves for each of the wells provided by HLID during licensing that demonstrate the following flow rate capacities:

Hayden Lake Irrigation District MUNICIPAL Production Wells

Well	Pump (HP)	Capacity (gpm)	Diversion Rate (cfs)
LACEY	300	1850	4.12
LARIX	300	1754	3.91
DAKOTA #1	300	1800	4.01
DAKOTA #2	600	4100	9.13
DAKOTA #3	300	2100	4.68
CARRINGTON	600	1800	4.01
	TOTAL(S)	13404	29.9

29.9 cfs is the total pump(s) performance capacity, considering Department rounding standards.

2.4.2 Source

All of the District's wells draw water from the Spokane Valley-Rathdrum Prairie Aquifer (SVRPA). The aquifer was designated as a "Sole-Source Aquifer" by the Environmental Protection Agency in 1978. The aquifer is supplied by several large surface water sources including Lake Coeur d'Alene, the Spokane River, Lake Pend Oreille, and Hayden Lake. Other small lake watersheds such as Hauser, Spirit, and Twin supply the balance of the surface water input to the aquifer. The Panhandle Health District estimates that precipitation supplies the aquifer with one third of its water (2000).

The SVRPA is comprised of a thin layer of soil overlaying 200 to 400 feet of coarse sands and gravels. The alluvial material was deposited by Ice Age floods from Glacial Lake Missoula about 12,000 years ago. The depth to groundwater in the District is approximately 300 feet and consistent to within about 20 feet at any given time.

The SVRPA provides excellent water quality for the District and surrounding water purveyors. The District regularly monitors water quality within the system. No treatment is required for the District at this time.

2.4.2.1 Existing Operations

The District has five active well sources on three well sites and one well currently under HLID ownership for future use (Carrington Well No. 5). All wells draw water from the Rathdrum Prairie Aquifer. Well construction information from the driller's logs, hydrogeological reports, and the 2016 Drinking Water Supply Report (DEQ) are listed in **Table 2-11**, well logs are included in **Appendix D.**

Table 2-11 – HLID Well Construction Information

Well	Total Well Depth (ft)	Static Water Level (ft)	Screen Depth From/To (ft)	(ft)	Well Seal Depth (ft)	Casing Depth (ft)	Casing Diameter (inch)	Capacity (gpm)	Backup Power Generation
Lacey	440	313	341	419	100	422	20	1,800	Yes
Larix	372	302	346	372	20	346	16	1,800	Yes
Dakota No. 1	449	287	388	448	60	387	16	1,800	Yes, effective fall 2018
Dakota No. 2	450	305	389	445	20	393	20	3,600	No
Dakota No. 3	415	307	359	410	20	362	16	1,800	Yes
Carrington No. 5 ~~(Future Well)~~	363	285	333	363	Not Available	333	16	NA	NA

The Lacey Well

The Lacey Well utilizes a Western Land Roller pump that was installed in 1982. This pump has a 300-horsepower motor with a 7-stage bowl assembly, and is rated to operate against a head of 525 feet. The line shaft bearings are lubricated by a food grade mineral oil drip tube. This pump is also equipped with a Saftronics soft start, while using the original starter as a bypass. The well house is in fair condition, but space within the facility is limited, making it difficult to access some of the electrical

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components located in the building. Avista Utilities provides 480-volt overhead electrical service to the Lacey Well. The well house is also equipped with a diesel generator so that the pump can still operate during a power outage.

The District anticipates an additional future well to be constructed at this site to support growth.

Dakota Well No. 1

Dakota Well 1 utilizes a General Electric premium efficiency motor, inverter-duty type that is rated at 300 hp for 460-volt, three-phase electrical power supply (Model 5KS447DAJ6029). The motor drives an American Marsh (Model 14LC-6 VT) six stage, line-shaft, vertical turbine pump with 367-feet of 10-inch steel column discharge pipe. The pump motor operates with a Square D/Schneider Electric (Model ATV630) variable frequency drive controller to provide variable flow and pressure that, in conjunction with the other District wells, matches the distribution system needs at any given time. Dakota Well No. 1 is located just south of the District's office on Dakota Avenue.

Dakota Well No. 2

Dakota Well 2 utilizes a Worthington pump with a 600-horsepower motor and a 7-stage bowl assembly. It is rated to operate against a head of 478 feet. Line shaft bearings receive system water pre-lubrication and product water lubrication during operation. The pump is equipped with an Allen-Bradley soft start with no bypass. The well house that serves Dakota Well 2 is located approximately 200 feet north of Dakota Well 3, located at the District's office on Dakota Avenue. A Worthington pump is also installed in Dakota 3.

Dakota Well No. 3

Dakota Well 3 utilizes a Worthington pump with a 300-horsepower motor with a 5-stage bowl assembly, and is capable of operating against a head of 495 feet. Line shaft bearings receive system water pre-lubrication and produce water lubrication during operation. The well house that serves Dakota 3 is located approximately 200 feet south of Dakota 3 located at the District's Office on Dakota Avenue. Dakota 3 is equipped with a Caterpillar generator similar to that at the Lacey Well. The District rebuilt the pump and motor bearings in Dakota 3 in the spring of 2000. The work completed at that time may account for the high pump system efficiency in Dakota 3.

Larix Well No. 4

The Larix Well was upgraded during the winter of 2017 through summer of 2018. The upgrade doubled the Larix Well pumping capacity. The upgraded Larix Well utilizes a General Electric premium efficiency motor, inverter-duty type that is rated at 300 hp for 460-volt, three-phase electrical power supply. The motor drives an America Marsh six stage, line-shaft, vertical turbine pump with 260- feet of 10-inch stainless steel column discharge pipe. The pump motor operates with a variable frequency drive controller to provide variable flow and pressure that, in conjunction with the four other District wells, matches the distribution system needs at any given time. The Larix Well is located in Sunshine Meadows at 2626 W. Larix Court in the City of Coeur d'Alene, Idaho.

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Carrington Well No. 5

The District currently has a water right that expires in 2020 for the purposes of providing irrigation water for 78 acres in the district service area. The District is currently in the design phase to convert the existing irrigation well to a municipal well site. The existing well, also referred to as the Carrington well, is located in the west of Atlas Road and north of Hayden Avenue.

System Operations and Existing Pressures

The District's pumps operate in response to floats located in the reservoir outside of the District's boundary. Due to the flat terrain, the District has a single pressure zone controlled by the existing tank. Because of the small storage volume and high system demands during max day and peak hour, the District operates the tank level in a tight band at all times such that the systems pressures remain between 60 and 80 psi throughout the day. **Appendix A-2** shows system pressures, on a 24-hour basis, during maximum demand.

The District has three timeframes in which different pump operation patterns occur. The three timeframes are as follows:

- Morning Peak (3:00 a.m. to 9:00 a.m.)
- Evening Peak (9:00 a.m. to 6:00 p.m.)
- Night Operations (6:00 p.m. to 3:00 a.m.)

The District adjusts each timeframe pump operation pattern to account for the large fluctuation of water use throughout the day. The goal for the District's operating pattern is to run no more than four pumps at a time while keeping the tank level around 17.0 feet. Because the demand in the District is highly volatile and storage is minimal, the District has the ability to adjust pump start and stop levels easily. **Table 2-12** shows the pump operation patterns for summer of 2018.

Table 2-12– Summer 2018 Pump Operation Set Points

Pump	3:00 AM to 9:00 AM		9:00 AM to 6:00 PM		6:00 PM to 3:00 AM	
	Start (ft)	Stop (ft)	Start (ft)	Stop (ft)	Start (ft)	Stop (ft)
Lacey	9.0	19.0	9.0	18.5	10.0	19.0
Larix	6.5	17.0	6.5	17.0	9.0	17.0
Dakota No. 1	10.0	20.0	10.0	19.0	10.0	19.5
Dakota No. 2	8.0	17.0	12.0	20.0	9.0	18.0
Dakota No. 3	11.0	18.0	11.0	18.0	12.0	19.5

During the winter months, the District produces an average 4.89 million gallons per day. Because the water consumption rate is much lower, the District historically only needed to operate the Larix Well. The Larix Well operates continuously on a VFD matching the demand, while maintaining a system-wide pressure of 70.5 psi and tank level of 15.5 feet.

An existing pump station and intake is located at Hayden Lake that was used to serve the water system in its early years. This station was utilized from about 1957 until 1989. This surface water source was chlorinated, and then delivered directly to the distribution system. The water main from the lake pumps is still connected to the storage tank, however it is isolated from the system with closed valves. Recently

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the District transferred the water right for the lake source to the Dalton Irrigation District, since the Hayden Lake Irrigation District no longer has a need for the lake water.

2.4.2.2 Observed Deficiencies

- The total supply capacity of the system with the largest well out of service (Dakota Well No. 2) is 7,200 gpm. The peak hour flow during the summer months is 11,040 gpm shown in **Table 2-4.** The existing supply (with the largest source out of service) is not currently able to support the growth the District is expecting.
- Total system supply is 10,800 gpm which is less than the 2017 peak hour demand (PHD) of 11,040 as noted in **Table 2-4**. During the summer of 2018, the District invoked mandatory odd-even watering days in order to sustain peak hour demands until additional supply is online.
- The supply for the District is centrally located, but growth for the District is expected on the West side.

2.4.3 Storage

2.4.3.1 Existing Operations

The District has one elevated steel reservoir with a capacity of 75,000 gallons that the Bureau built in 1955. The reservoir is located on the east side of the intersection of Lacey Avenue and Strahorn Road in the City of Hayden Lake. It connects to the system by a 27-inch reinforced concrete cylinder pipe. The reservoir support legs are located at an elevation of 2,302 feet above mean sea level according to the 1958 Bureau of Reclamation as-built drawings. The base of the storage portion of the tank is located at an elevation of 2,438 feet. The top of the tank is at an elevation of approximately 2,460 feet.

Components of finished water storage, as defined by the Idaho Administrative Code (IDAPA) 58.01.08, for the District are summarized below.

1. Dead Storage – Storage that is either not available for use in the system or can provide only substandard flows and pressures. All of the District's storage is available for use in the system to provide adequate flows and pressures. Therefore, the District does not need to account for any Dead Storage.
2. Effective Storage – Storage other than dead storage, including operational, equalization, fire suppression, and standby.
3. Operational Storage – Storage that supplies water when, under normal operating conditions, the sources are off. This component is the larger of 1) the volume required to prevent excess pump cycling and to ensure that the Equalization Storage, Fire Suppression Storage, and Standby Storage components are full and ready for use when needed or 2) the volume needed to compensate for the sensitivity of the water level sensors.
    a. The District does not need to account for any operational storage because the system is continuously pumping.
4. Equalization Storage – Storage required to compensate for the difference between a water system's maximum firm supply capacity and peak hour demand. Peak hour demand is estimated at 2.45 times the average day production based on diurnal information calculated from August 2017 data (reference **Table 2-4**). The District's firm supply capacity (i.e., capacity with the largest

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USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Administration

WELL DRILLER'S REPORT

Lacey Well

State law requires that this report be filed with the Director, Department of Water Administration within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Hayden Lake Irrigation Dist.

Address Hayden Lake Idaho

Owner's Permit No. 95-78-N-21

2. NATURE OF WORK

■ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☒ Domestic ■ Irrigation ☐ Test ☐ Other (specify type)

☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED

■ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 20 inches Total depth 422 feet

Casing schedule: ■ Steel ☐ Concrete

Thickness	Diameter	From	To
.375 inches	2 inches	+2 feet	384.9 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ Inches	_____ inches	_____ feet	_____ feet

Was a packer or seal used? ■ Yes ☐ No

Perforated? ☐ Yes ■ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ■ Yes ☐ No

Manufacturer's name Jas Johnson

Type Stainless Steel Model No. Roll

Diameter 10 Slot size 200 Set from 341 feet to 361 feet

Diameter 20 Slot size 150 Set from 361 feet to 376 feet

18" Blank 140 50 391 406

Gravel packed? ☐ Yes ☐ No Size of gravel 4119

Placed from _____ feet to _____ feet

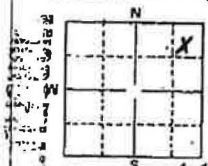
Bottom w/ 30 cu. yds. 376 to 422 w/ Cement 2109

Surface seal depth 100 Material used in seal ☐ Cement grout ■ Puddling clay ☐ Well cuttings

Sealing procedure used ☐ Slurry pit ■ Temporary surface casing ☐ Overbore to seal depth

6. LOCATION OF WELL

Sketch map location must agree with written location. 95



Subdivision Name _____

Lot No. _____ Block No. _____

County Kootenai

NE ¼ NE ¼ Sec. 14, T. 51 N/S, R. 4 E/W

7. WATER LEVEL

Static water level 313 feet below land surface

Flowing? ☐ Yes ■ No G.P.M. flow _____

Temperature _____° F. Quality _____

Artesian closed-in pressure _____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

■ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped
2146	37	4½

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
24	0	19	Large Gravel & Sand		✓
	19	30	Boulders		✓
24	30	30	Gravel & Sand		✓
30	30	48	Gravel w/ Sand		✓
	48	68	Gravel		✓
	68	88	Gravel 2" minus		✓
	88	90	Gravel 10" minus		✓
	90	101	Gravel 3" minus		✓
	101	150	Gravel Coarse		✓
	150	283	Gravel & Sand		✓
	283	286	Boulders		✓
	286	309	Gravel 1½" minus		✓
	309	311	Gravel Tight		✓
	311	319	Gravel w/ water flow 313	✓	
	319	334	Gravel 1½" minus	✓	
	334	331	Sand Coarse	✓	
	331	342	Sand Fine w/ Clay		✓
	342	343	Sand Coarse	✓	
	343	351	Sand Fine w/ some Clay	✓	
	351	360	Gravel 1" minus	✓	
	360	373	Gravel 3" minus	✓	
	373	381	Gravel 1" minus	✓	
	381	393	Sand Very Fine	✓	
	393	397	Sand Coarse w/ Pea Gravel	✓	
	397	409	Sand Coarse w/ Pea Gravel	✓	
	409	417	Sand Fine	✓	
	417	432	Sand Coarse	✓	
4"	432	427	Sand Fine w/ Clay	✓	
f	427	433	Sand Fine w/ Blue Clay	✓	
e	433	440	Clay Blue		✓
s					
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RECEIVED
AUG 16 1978
Department of Water Resources

10.

Work started Dec. 13 - 1977 finished June 27 - 1978

11. DRILLERS CERTIFICATION

Firm Name E.H. Holman Drilling Co. Firm No. 105

Address Col. A. Rivers Rd. Post Falls Idaho Date June 27, 78

Signed by (Firm Official) J. E. Holman

and

(Operator) Dave Koch

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE COPY TO THE DEPARTMENT

HLID Pump System Efficiencies - Lacey, Well #1

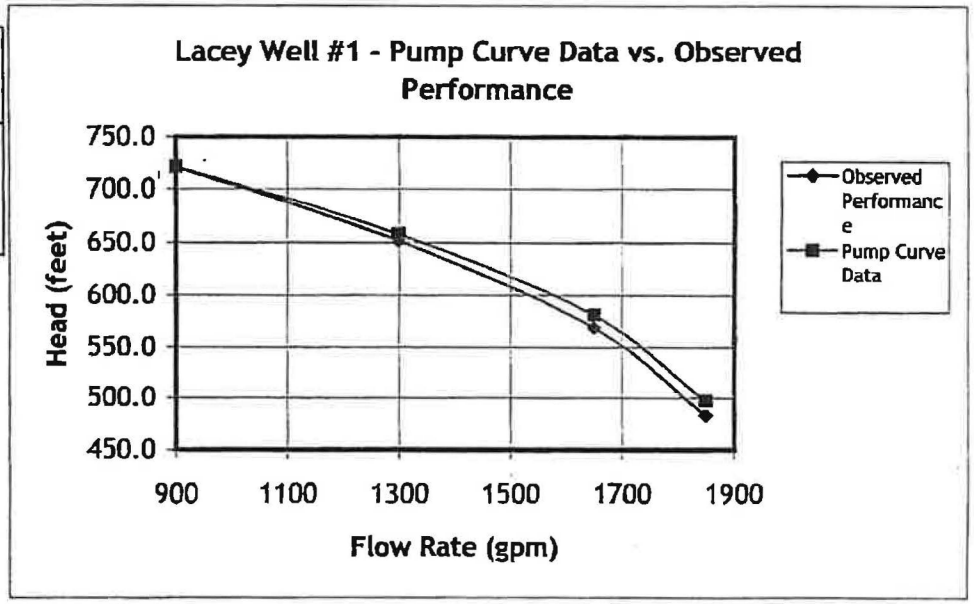
Note: gpm and pressure data taken by Paul Klatt during pump tests, kW verified by Craig Meredith of Avista

Static water level: 313 Feet below grade
Column Dia.(in): 10
Minor losses: 0.5 (90 deg bend + ent.)
f (friction factor): 0.021 (from Moody diagram)

Lacey, Well #1 300 HP pump motor
95-78-N-21

GPM	Flow (cfs)	PSI	kW (delivered to motor)	Pressure Head (feet)	Velocity Head (feet)	Elevation Head (feet)	Pipe & Fitting losses (feet)	Total Head (feet)	Hydraulic Power Output (kW)	System Efficiency
1850	4.12	70	258	161.54	0.89	313	7.44	482.87	124.20	0.481
1650	3.68	108	259	249.23	0.71	313	5.92	568.85	130.50	0.504
1300	2.90	145	249	334.62	0.44	313	3.67	651.73	117.80	0.473
900	2.01	176	224	406.15	0.21	313	1.76	721.12	90.24	0.403

Observed performance		Pump Curve Data	
Total Head (feet)	GPM	Head	GPM
482.9	1850	497	1850
568.9	1650	581	1650
651.7	1300	658	1300
721.1	900	721	900



Larix Well Log and Pump Installation Report

LL POINT PEN

partment of Water Resources

WELL DRILLER'S REPORT

RECEIVED

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

MAY 1 1978

LL 1

mr. LEROY ARMSTRONG

dress First Box 203 Coeur d'Alene

ency's Permit No. 95-78-N-24 33814 ID.

TURE OF WORK

New well ☐ Deepened ☐ Replacement

Abandoned (describe method of abandoning)

POSED USE

Domestic ☒ Irrigation ☐ Test ☐ Other (specify type)

Municipal ☐ Industrial ☐ Stock ☐ Waste disposal or injection

THOD DRILLED

Cable ☐ Rotary ☐ Dug ☐ Other

ELL CONSTRUCTION

Diameter of hole 16 inches Total depth 372 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
.375 inches	16 inches	3 feet	345 feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet

Is casing drive shoe used? ☒ Yes ☐ No

Was a packer or seal used? ☒ Yes ☐ No

Was it drilled? ☐ Yes ☒ No

Were perforations? ☐ Factory ☐ Knife ☐ Torch

Type of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☒ Yes ☐ No

Manufacturer's name JOHNSON

Type STAINLESS STEEL Model No. STANDARD

Diameter 16 Slot size 100 Set from 345 feet to 355 feet

Diameter 16 Slot size 100 Set from 355 feet to 372 feet

Gravel packed? ☐ Yes ☒ No Size of gravel _____

Gravel from _____ feet to _____ feet

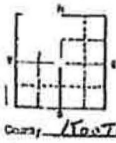
Surface seal depth 30 ft. Material used to seal ☒ Cement grout ☐ Puddling clay ☐ Well cuttings

Sealing procedure used ☐ Slurry pit ☒ Temporary surface casing ☒ Overbore to seal depth

90

LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____

Lot No. _____ Block No. _____

County KOOTENAI

¼E ¼NE ¼ Sec. 27 T. 51 N/S, R 4 E/W

USE ADDITIONAL SHEETS IF NECESSARY

7 WATER LEVEL

Department of Water Resources

Static water level 302 feet below land surface

Flowing? ☐ Yes ☒ No G.P.M. Flow _____

Temperature 48 ° F. Quality Good

Artesian closed in pressure _____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA No Test

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
20	0	20	GRAVEL + SAND 2" MIX		X
16	20	89	" " "		X
16	89	110	GRAVEL + SAND 1" MIX		X
16	110	182	GRAVEL + SAND 2" MIX		X
16	182	189	BOULDERS 10" MIX		X
16	189	256	GRAVEL 3" MIX		X
16	256	297	GRAVEL + SAND 1" MIX		X
16	297	310	COARSE SAND & CLAY		X
16	310	322	CLAY		X
16	322	341	COARSE SAND + CLAY		X
16	341	372	BED GRAVEL & SAND	X	

10. Work started FEB 24-78 finished MARCH 17-78

11. DRILLER'S CERTIFICATION

10A

Firm Name HOLMAN DRILLING CO. INC. No. 27

Address E3410 9TH AVE SPOKANE WASH Date APRIL 1-78

Signed by (Pres. or Officer) Arnold E. Holman Jr.

and

(Operator) Arnold E. Holman

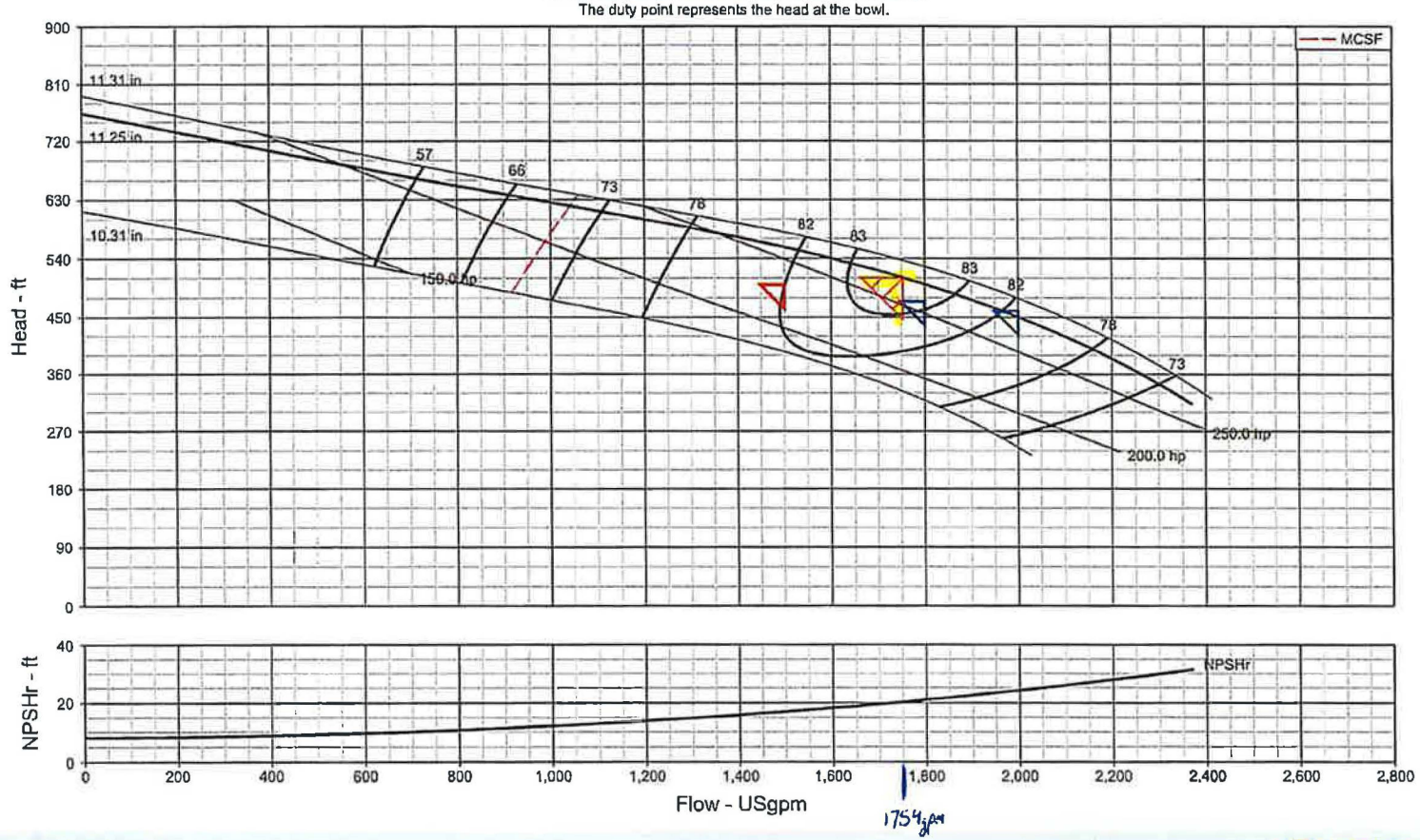
Customer Reference LARIX WELL

Pump Performance Curve

American-Marsh Pumps Quotation System 18.2.4.0

Larix Well - 300 HP Pump Motor
95-78-N-24

Bowl performance. Adjusted for construction and viscosity.
The duty point represents the head at the bowl.



Item number	: 035	Size	: 14LC	Flow, rated	: 1,754.1 USgpm
Service	:	Stages	: 6	Differential head / pressure, rated	: 510.9 ft
Quantity	: 1	Speed, rated	: 1780 rpm	NPSH required	: 20.37 ft
Quote number	: 309338	Based on curve number	: 14LC	Fluid density, rated / max	: 1.000 / 1.000 SG
Date last saved	: 13 Jul 2018 4:04 PM	Efficiency (bowl / pump)	: 83.36 / 79.25 %	Viscosity	: 1.00 cP
		Power (bowl / pump)	: 271 / 279 hp	Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00

2M Company Inc. · P.O. Box 80770 · Billings, MT 59101
phone: 406-245-1490 · fax: 406-259-7281 · mfasching@2mco.com

Dakota Well No. 1

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0006788

Drilling Permit No.

Water right or injection well #

2. OWNER: Hayden Lake Irrigation District

Name

Address 2160 West Dakota Avenue

City Hayden State Id Zip 83835

3. WELL LOCATION:

Twp. 51N North ☐ or South ☐ Rge. 4W East ☐ or West ☐

Sec. 15 10 acres 1/4 40 acres 1/4 160 acres 1/4

Gov't Lot County

Lat. 47 ° 45 42.74 N (Deg. and Decimal minutes)

Long. 116 ° 48 53.84 W (Deg. and Decimal minutes)

Address of Well Site 2160 West Dakota Avenue

(Street first name of road • Distance to road or Landmark) City Hayden

Lot. Blk. Sub. Name

4. USE:

☐ Domestic ☒ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK:

☒ New well ☐ Replacement well ☐ Modify existing well ☐ Abandonment ☐ Other

6. DRILL METHOD:

☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
3/8 Bent.	0	60		poured

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/ Schedule	Material	Casing	Liner	Threaded	Welded
16"	+2	387	.375	Steel	☐	☐	☐	☒
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 387

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method

Manufactured screen ☒ Y ☐ N Type Stainless Steel

Method of installation

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
448	438	.100	10'		S.S.	
438	418	.070	20'		S.S.	
* 418	388	.100	30'		S.S.	

* Length of Headpipe 10' 0 Length of Tailpipe 0'

Packer ☒ Y ☐ N Type (tight wind)

10. FILTER PACK: NONE

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method

11. FLOWING ARTESIAN:

Flowing Artesian? ☐ Y ☒ N Artesian Pressure (PSIG)

Describe control device

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 300 Static water level (ft) 287' 5"

Water temp. (°F) Bottom hole temp. (°F)

Describe access port 2-2"CAPS.

Well test:

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)

Test method: Pump ☐ Bailer ☐ Air ☐ Flowing artesian ☐

Water quality test or comments:

13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	Water N
20"	0	15	Gravels, brown dirt		✓
20"	15	95	Gravels, SAND		✓
16"	95	100'	boulders		✓
16"	100	272	Gravels, SAND		✓
16"	272	280	SAND, little gravels		✓
16"	280	300	SAND	✓	
16"	300	372	GRAVELS, SAND	✓	
16"	372	435	GRAVELS, SAND	✓	
16"	435	449	GRAVELS, FAN	✓	
			RUSTY LOOKING SAND	✓	
			GOOD WATER FROM 375' DOWN.		

Completed Depth (Measurable): 448

Date Started: Sep 29, 14 Date Completed:

14. DRILLER'S CERTIFICATION:

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name O'Keefe Drilling Co. No.

*Principal Driller Larry Wagner Date 12-2-14

*Driller Date

*Operator II Date

Operator I Date

* Signature of Principal Driller and rig operator are required.

* Based on video of completed well PAK May 2017

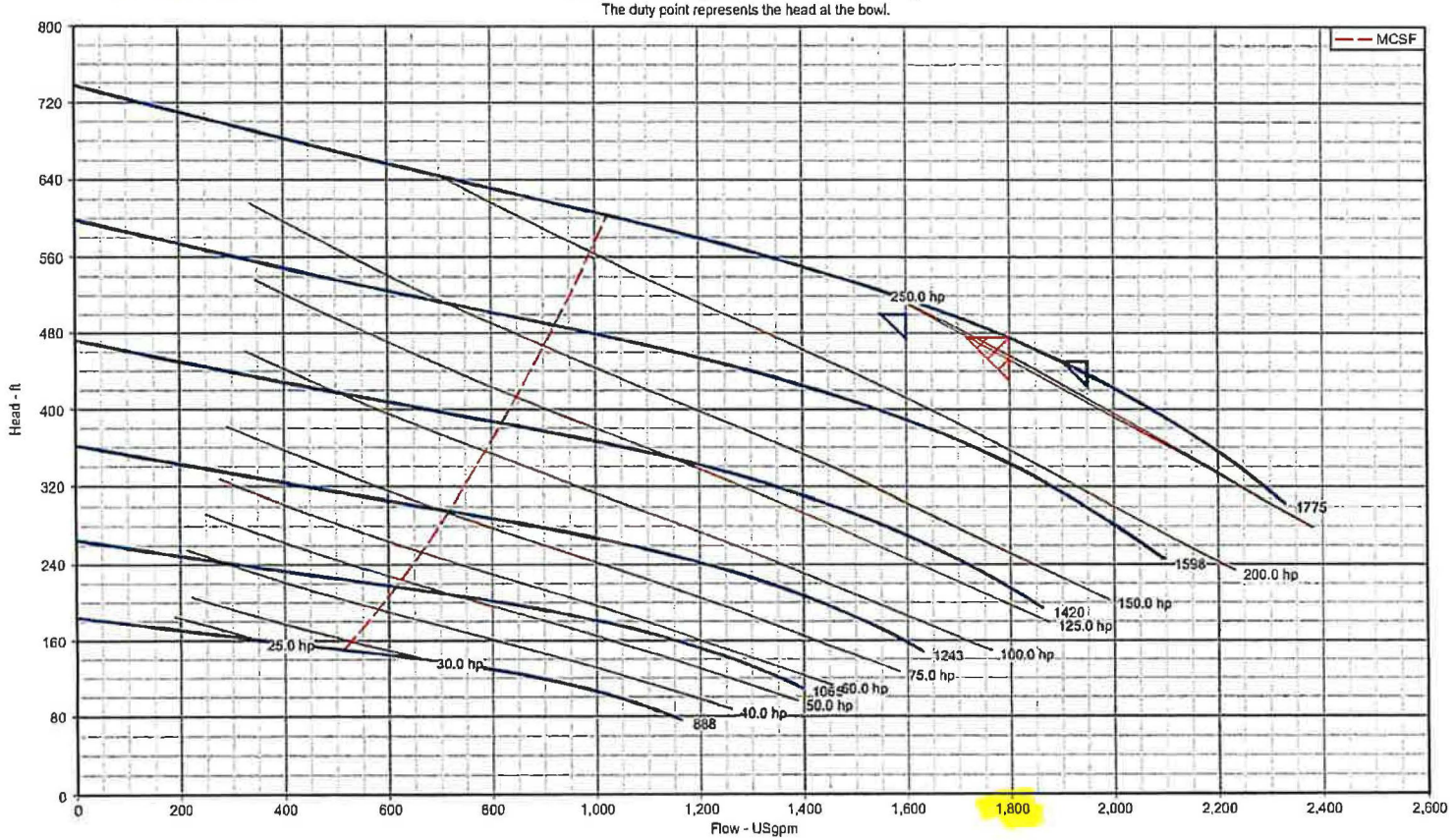
Customer : UNITED CROWN PUMP
Reference :

Multi-Speed Performance Curve

American-Marsh Pumps Quotation System 16.1.6.0

DAKOTA WELL NO 1 : 300 HP pump MOTOR
D0067888

Bowl performance. Adjusted for construction and viscosity.
The duty point represents the head at the bowl.



Item number	: 001	Size	: 14LC	Flow, rated	: 1,800.0 USgpm
Service	:	Stages	: 6	Differential head / pressure, rated	: 475.0 ft
Quantity	: 1	Speed, rated	: 1775 rpm	NPSH required	: 21.00 ft
Quote number	: 541732	Based on curve number	: 14LC	Fluid density, rated / max	: 1.000 / 1.000 SG
Date last saved	: 03 May 2016 10:13 AM	Efficiency (bowl / pump)	: 83.13 / 78.99 %	Viscosity	: 1.00 cP
		Power (bowl / pump)	: 260 / 266 hp	Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
				Impeller diameter, rated	: 11.13 in

Form 238-7
1/78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

Dakota well No. 2

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name HAYDEN LAKE IRRIGATION DIST.

Address LACY + HIGHWAY 95
HAYDEN LAKE IDAHO

Owner's Permit No. 95-88-N-112

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☐ Domestic ☒ Irrigation ☐ Test ☒ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☐ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☒ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.375 Inches	20 Inches +	2 feet	393 feet
.375 Inches	18 Inches	445 feet	450 feet
_____ Inches	_____ Inches	_____ feet	_____ feet
_____ Inches	_____ Inches	_____ feet	_____ feet

Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☒ Yes ☐ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☒ Yes ☐ No
Manufacturer's name JOHNSON
Type STAINLESS STEEL Model No. TELESCOPE
Diameter 20 Slot size .080 Set from 389 feet to 445 feet
Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 20FT Material used in seal: ☒ Cement grout ☐ Puddling clay ☐ Well cuttings
Sealing procedure used: ☐ Slurry pit ☒ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port 2" pipe + CAP WELDED ON CASING

6. LOCATION OF WELL

Sketch map location must agree with written location.

N / W / E / S

Subdivision Name HAYDEN LAKE IRRIGATED TRACT
Lot No. W/2 169 Block No. _____
County KOOTENAI
SW ¼ SE ¼ Sec. 15, T. 51 N, R. 4 E W

7. WATER LEVEL

Static water level 305.6 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 42 °F. Quality GOOD

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
2000	312.5	1
3000	316.75	3
3500	319.1	4
4000	321.5	5

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
24	0	40	GRAVEL 2" MINUS		X
20	40	310	GRAVEL + SAND 2" MINUS		X
20	310	387	GRAVEL + SAND 2" MINUS	X	
20	387	409	GRAVEL 1" MINUS + COARSE SAND SOME CLAY	X	
20	409	450	GRAVEL 2" MINUS + COARSE SAND SOME CLAY LENSES	X	

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MAY 09 1989
NORTHERN REGION
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MAY 11 1989
Department of Water Resources

G13638

MICROFILMED
AUG 13 1990

10.

Work started JAN 16-89 finished MARCH 24-89

DRILLERS CERTIFICATION

DL

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name HOLMAN DRILLING CORPORATION Firm No. 108
Address E3410 9TH AVE SPOKANE WA. Date MAY 2-89
Signed by (Firm Official) Arnold E. Holman, PRESIDENT
and
(Operator) Leslie Phinney

HLID Pump System Efficiencies - Dakota Well, #2

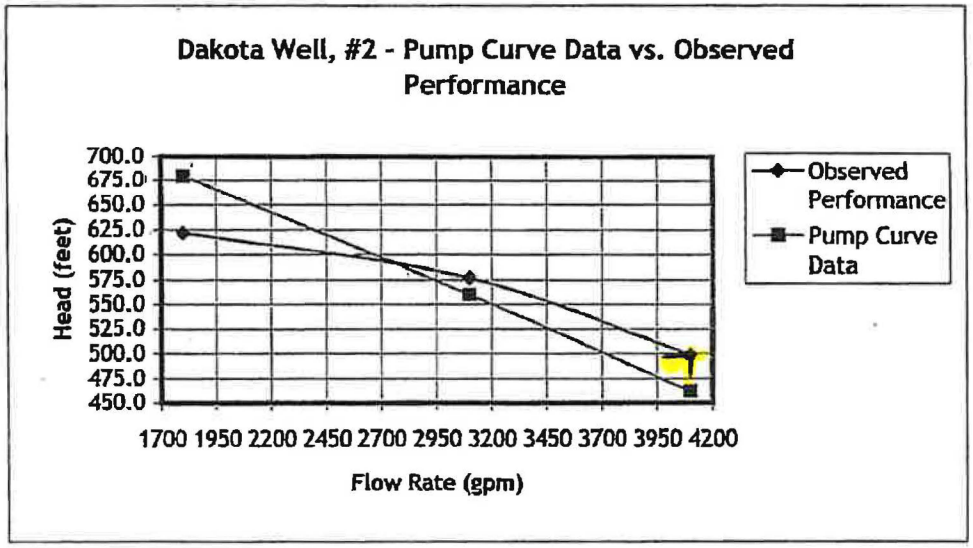
Note: gpm and pressure data taken by Paul Klatt during pump tests, kW verified by Craig Meredith of Avista

Static water level: 305 Feet below grade
Column Dia.(in): 12
Minor losses: 0.5 (90 deg bend + ent.)
f (friction factor): 0.021 (from Moody diagram)

Dakota, Well #2 600 HP Pump Motor.
95-88-N-112

GPM	Flow (cfs)	PSI	kW (delivered to motor)	Pressure Head (feet)	Velocity Head (feet)	Elevation Head (feet)	Pipe & Fitting losses (feet)	Total Head (feet)	Hydraulic Power Output (kW)	System Efficiency
4100	9.14	77	401	177.69	2.10	305	14.51	499.30	284.63	0.710
3100	6.91	113	386	260.77	1.20	305	10.07	577.04	248.72	0.644
1800	4.01	136	388	313.85	0.40	305	3.40	622.65	155.83	0.402
0	0.00	0	0	0.00	0.00	0	0.00	0.00	0.00	#DIV/0!

Observed performance		Pump Curve Data	
Total Head (feet)	GPM	Head	GPM
499.0	4100.0	462.0	4100.0
577.0	3100.0	560.0	3100.0
622.0	1800.0	679.0	1800.0
0.0	0.0	0.0	0.0



Dakota Well No. 3

Form 238-7
1/78

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name HAYDEN LAKE IRRIGATION DIST

Address LACY & HIGHWAY 95
HAYDEN LAKE IDAHO

Owner's Permit No. 95-88-N-111

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning) _____

3. PROPOSED USE

☐ Domestic ☒ Irrigation ☐ Test ☒ Municipal
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☐ Rotary ☐ Air ☐ Hydraulic ☐ Reverse rotary
☒ Cable ☐ Dug ☐ Other _____

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness		Diameter		From		To	
.375	inches	16	inches +	2	feet	362	feet
.375	inches	14	inches	410	feet	415	feet
_____	inches	_____	inches	_____	feet	_____	feet
_____	inches	_____	inches	_____	feet	_____	feet

Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☒ Yes ☐ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number		From		To	
_____	perforations	_____	feet	_____	feet
_____	perforations	_____	feet	_____	feet
_____	perforations	_____	feet	_____	feet

Well screen installed? ☒ Yes ☐ No
Manufacturer's name JOHNSON
Type STAINLESS STEEL Model No. TELESCOPE
Diameter 16 Slot size VARI Set from 359 feet to 410 feet
Diameter ____ Slot size ____ Set from ____ feet to ____ feet
Gravel packed? ☐ Yes ☒ No ☐ Size of gravel _____
Placed from _____ feet to _____ feet
Surface seal depth 20FT Material used in seal: ☒ Cement grout ☐ Puddling clay ☐ Well cuttings
Sealing procedure used: ☐ Slurry pit ☒ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☐ Threaded ☒ Welded ☐ Solvent Weld ☐ Cemented between strata
Describe access port 2" PIPE W/CAP WELDED TO CASING

6. LOCATION OF WELL

Sketch map location must agree with written location.

N / W / E / S

Subdivision Name HAYDEN LAKE IRRIGATED TRACT
Lot No. W/2 169 Block No. _____

County KOOTENAI

SW ¼ SE ¼ Sec. 15, T. 51 N, R. 4 E (M)

7. WATER LEVEL

Static water level 307.7 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 45 °F. Quality GOOD

8. WELL TEST DATA

☒ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped
1200	325	1
1600	332.7	3
1900	353.8	5
2250	338.9	6

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
20	0	40	GRAVEL & SAND 2" MIN		X
16	40	312	GRAVEL & SAND 2" MIN		X
16	312	330	GRAVEL & SAND 1" MIN. SOME CLAY LENSES	X	
16	330	359	GRAVEL & SAND 3" MIN SOME CLAY LENSES	X	
16	359	369	GRAVEL 1" MINUS & COARSE SAND	X	
16	369	383	GRAVEL 3" MINUS & COARSE SAND	X	
16	383	393	GRAVEL 1" MINUS & COARSE SAND SOME CLAY	X	
16	393	408	COARSE SAND & CLAY LENSES	X	
16	408	415	GRAVEL 1" MINUS & COARSE SAND	X	

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MAY 09 1989
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MAY 11 1989
Department of Water Resources

013637

10.

Work started NOV 10-88 finished JAN 10-89

11. DRILLERS CERTIFICATION

DL

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name HOLMAN DRILLING CORP Firm No. 108
Address E3410 9TH AVE SPOKANE WA Date 2-10-89
Signed by (Firm Official) Arnold E Holman PRES.
and
(Operator) Ernest Simmons

MICROFILMED AUG 1 1990

HLID Pump System Efficiencies - Dakota Well #3

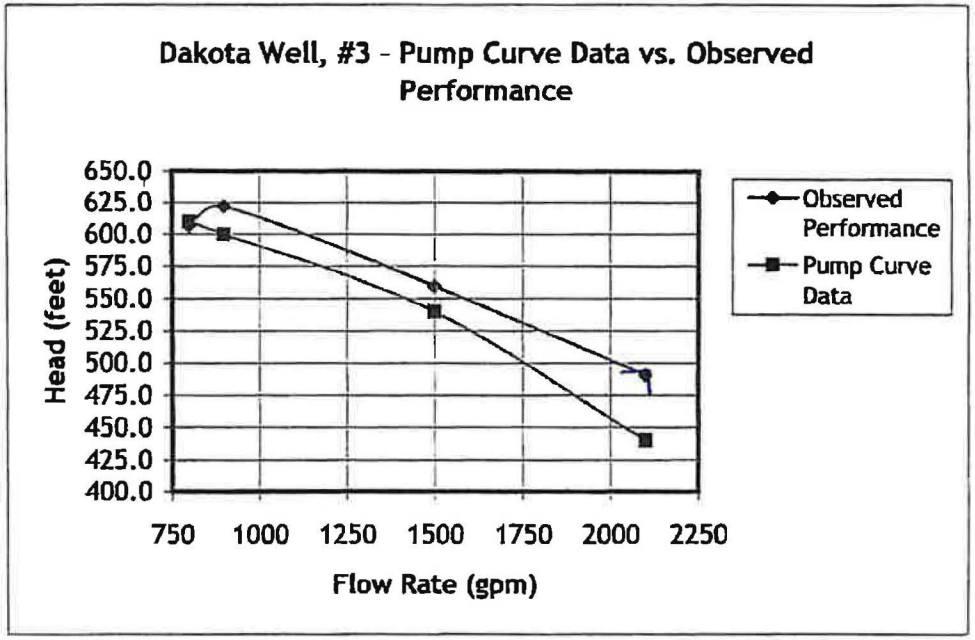
Note: gpm and pressure data taken by Paul Klatt during pump tests, kW verified by Craig Meredith of Avista

Static water level: 307 Feet below grade
Column Dia.(in): 10
Minor losses: 0.5 (90 deg bend + ent.)
f (friction factor): 0.021 (from Moody diagram)

Dakota, Well #3 300 HP Pump MOTOR
95-88-N-111

GPM	Flow (cfs)	PSI	kW (delivered to motor)	Pressure Head (feet)	Velocity Head (feet)	Elevation Head (feet)	Pipe & Fitting losses (feet)	Total Head (feet)	Hydraulic Power Output (kW)	System Efficiency
2100	4.68	76	157	175.38	1.14	305	9.41	490.94	143.34	0.913
1500	3.34	108	145	249.23	0.58	305	4.80	559.62	116.71	0.805
900	2.01	124	136	286.15	0.21	305	1.73	593.09	74.22	0.546
800	1.78	130	126	300.00	0.17	305	1.37	606.53	67.46	0.535

Observed performance Total Head (feet)	GPM	Pump Curve Data Head	GPM
490.9	2100.0	440.0	2100.0
559.6	1500.0	540.0	1500.0
622.0	900.0	600.0	900.0
606.5	800.0	610.0	800.0



Well #2
Carrington
Meadows

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Resources

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name Roy ARMSTRONG
Address Rt #1 Box 203
Coeur d'Alene ID. 83814
Owner's Permit No. 95-77-N-167

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☐ Domestic ☒ Irrigation ☐ Test ☐ Other (specify type)
☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 16 inches Total depth 363 feet
Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
.375 inches	16 inches	+ 2 feet	333 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was casing drive shoe used? ☒ Yes ☐ No
Was a packer or seal used? ☒ Yes ☐ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch
Size of perforation _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

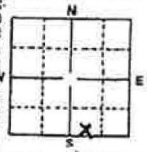
Well screen installed? ☒ Yes ☐ No
Manufacturer's name JOHNSON
Type STAINLESS Model No. STD.
Diameter 16 Slot size 50 Set from 333 feet to 363 feet
Diameter ___ Slot size ___ Set from _____ feet to _____ feet

Gravel packed? ☐ Yes ☒ No Size of gravel _____
Placed from _____ feet to _____ feet

Surface seal depth 28 Material used in seal ☒ Cement grout ☐ Puddling clay ☐ Well cuttings
Seating procedure used ☐ Slurry pit ☒ Temporary surface casing ☐ Overbore to seal depth

6. LOCATION OF WELL

Sketch map location must agree with written location.



Subdivision Name _____
Lot No. _____ Block No. _____
County KOOTENAI
SW ¼ SE ¼ Sec. 16 T. 51 N S, R. 4 E W

7. WATER LEVEL

Static water level 285 feet below land surface
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Temperature 48° F. Quality GOOD
Artesian closed-in pressure _____ p.s.i.
Controlled by ☐ Valve ☐ Cap ☐ Plug

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped
1000	Unknown	

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
20	0	28	GRAVEL 3" MIN		X
16	28	44	GRAVEL 3" MIN		X
16	44	99	GRAVEL 4" MIN		X
16	99	112	GRAVEL 3" MIN		X
16	112	198	GRAVEL 4" MIN		X
16	198	256	GRAVEL 2" MIN		X
16	256	270	GRAVEL + SAND 1" MIN		X
16	270	285	GRAVEL 2" MIN		X
16	285	332	GRAVEL 2" MIN	X	
16	332	363	GRAVEL + SAND 1" MIN	X	

RECEIVED
MAR 3 1978
Department of Water Resources
Northern District Office

10. Work started April 23-77 finished MAY-27-77

11. DRILLERS CERTIFICATION

Firm Name HOLMAN DRILLING CORP Firm No. 109
Address E3410 9TH AVE Date JUNE 20-77
Signed by (Firm Official) Arnold E. Holman
and
(Operator) PRES (SAME)

USE ADDITIONAL SHEETS IF NECESSARY FORWARD THE WHITE COPY TO THE DEPARTMENT

Pump Data Sheet - Hydroflo Pumps USA, Inc.

Company: PumpTech Inc.
Name:
Date: 3/15/2019

Thrust Bearing Loss: .4 HP, Line Shaft Bearing Loss: (1.4 HP / 100') x 3.1 = 4.3, Column Friction Loss: 8.928, Bowl Effic: 82%, Overall Effic: 78.8%. No Motor/VFD Effic included

CARRINGTON WELL - 600HP
95-77-N-167

Hydroflo Pumps Fluid Solutions
A Xylem Group Company

Pump:

Size: 14LH (6 stage)

Type: Vertical
Synch Speed: 1800 rpm

Speed: 1770 rpm
Dia: 10.785 in

Curve: 121110

Impeller: 14LH SS ENCL.

Specific Speeds:

Ns: ---
Nss: ---

Dimensions:

Suction: 10 in
Discharge: 12 in

Vertical Turbine:

Bowl Size: 14 in
Max Lateral: 0.875 in
Thrust K Factor: 8.41 lbf/ft

Pump Limits:

Temperature: 140 °F
Pressure: 300 psi g
Sphere Size: 0.5 in

Power: 600 hp
Eye Area: 25.3 in²

Search Criteria:

Flow: 1800 US gpm

Head: 475 ft

Fluid:

Water
Density: 62.32 lb/ft³
Viscosity: 0.9946 cP

Temperature: 68 °F
Vapor Pressure: 0.3391 psi a
Atm Pressure: 14.7 psi a

NPSHa: ---

Motor:

Standard: NEMA
Enclosure: WP1

Size: 300 hp
Speed: 1800 rpm
Frame: 447T

Sizing Criteria: Max Power on Design Curve

Pump Selection Warnings:

Pump shutoff dP exceeds limit for the pump.

---- Duty Point ----

Flow:	1800 US gpm
Head:	475 ft
Eff:	82.4%
Power:	262 hp
NPSHr:	15.4 ft

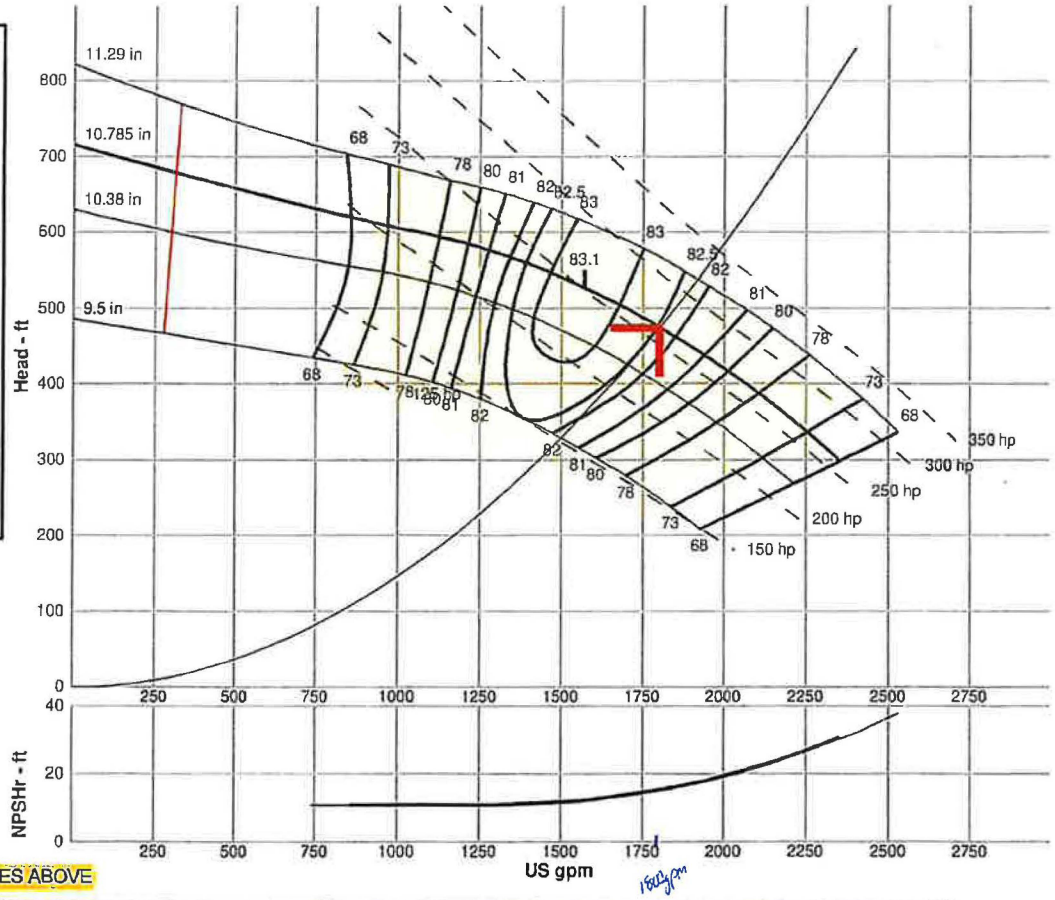
---- Design Curve ----

Shutoff Head:	715 ft
Shutoff dP:	310 psi
Min Flow:	314 US gpm
BEP:	83.1% @ 1570 US gpm

NOL Power:
265 hp @ 2010 US gpm

-- Max Curve --

Max Power:
321 hp @ 2147 US gpm

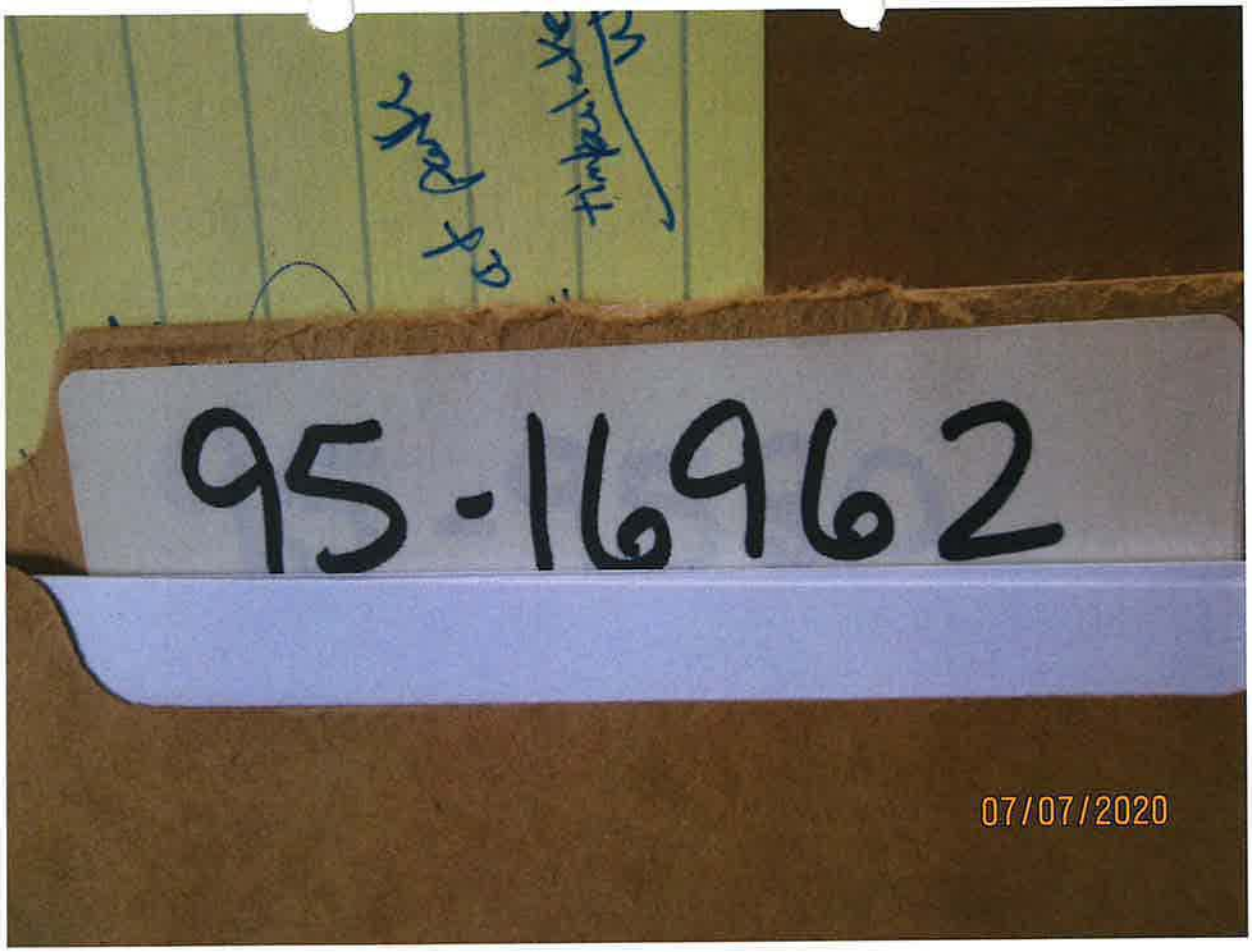


BASIS OF PUMP CURVES ABOVE

Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
2160	1770	369	76.1	264	24.1
1800	1770	475	82.4	262	15.4
1440	1770	552	82.8	242	11.6
1080	1770	598	76.6	213	11
720	1770	635	61.9	189	11

Selected from catalog: Hydroflo VS Pumps.60 Vers: 18.3





POD – LARIX WELL



LARIX WELL SYSTEM



LARIX WELL 75 PSI

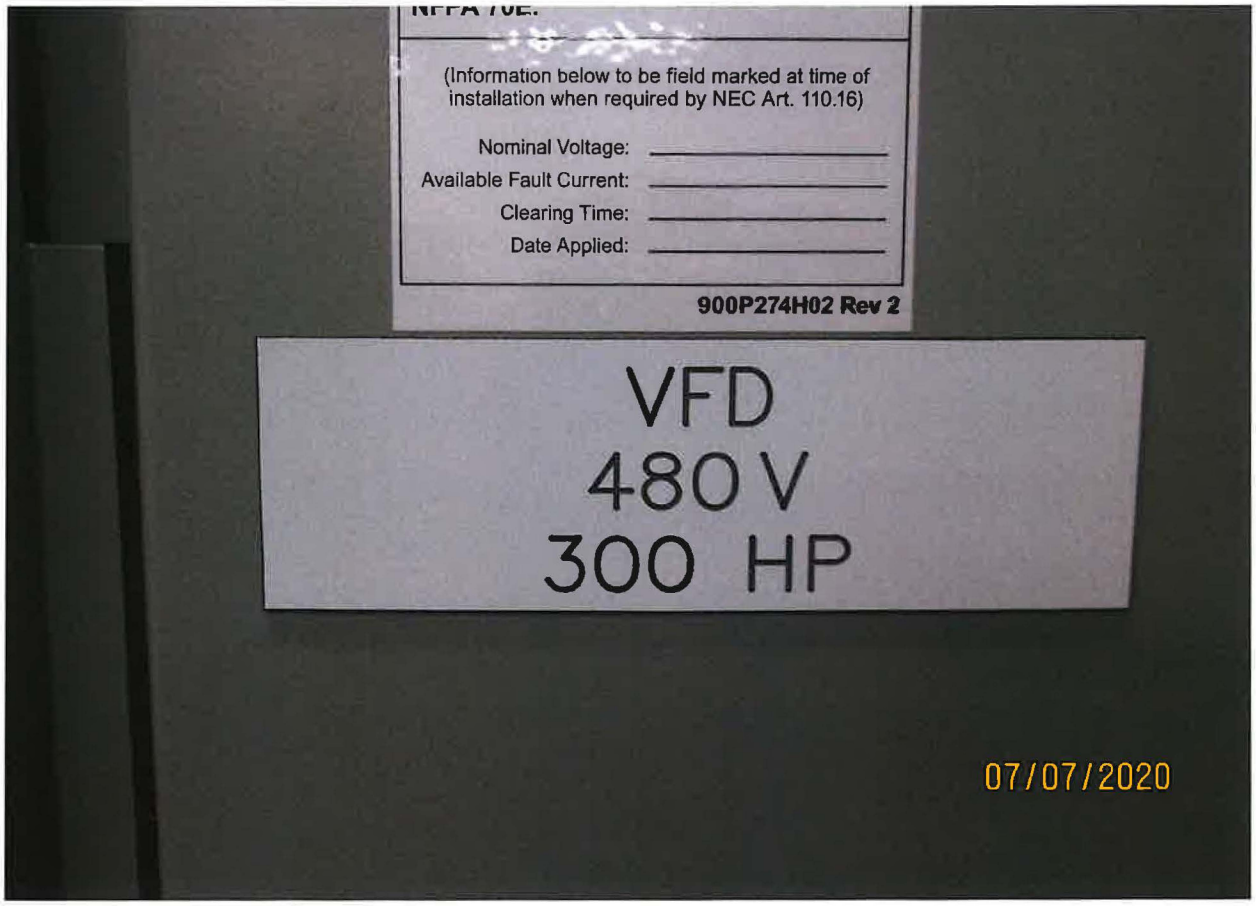


CARRINGTON WELL SITE

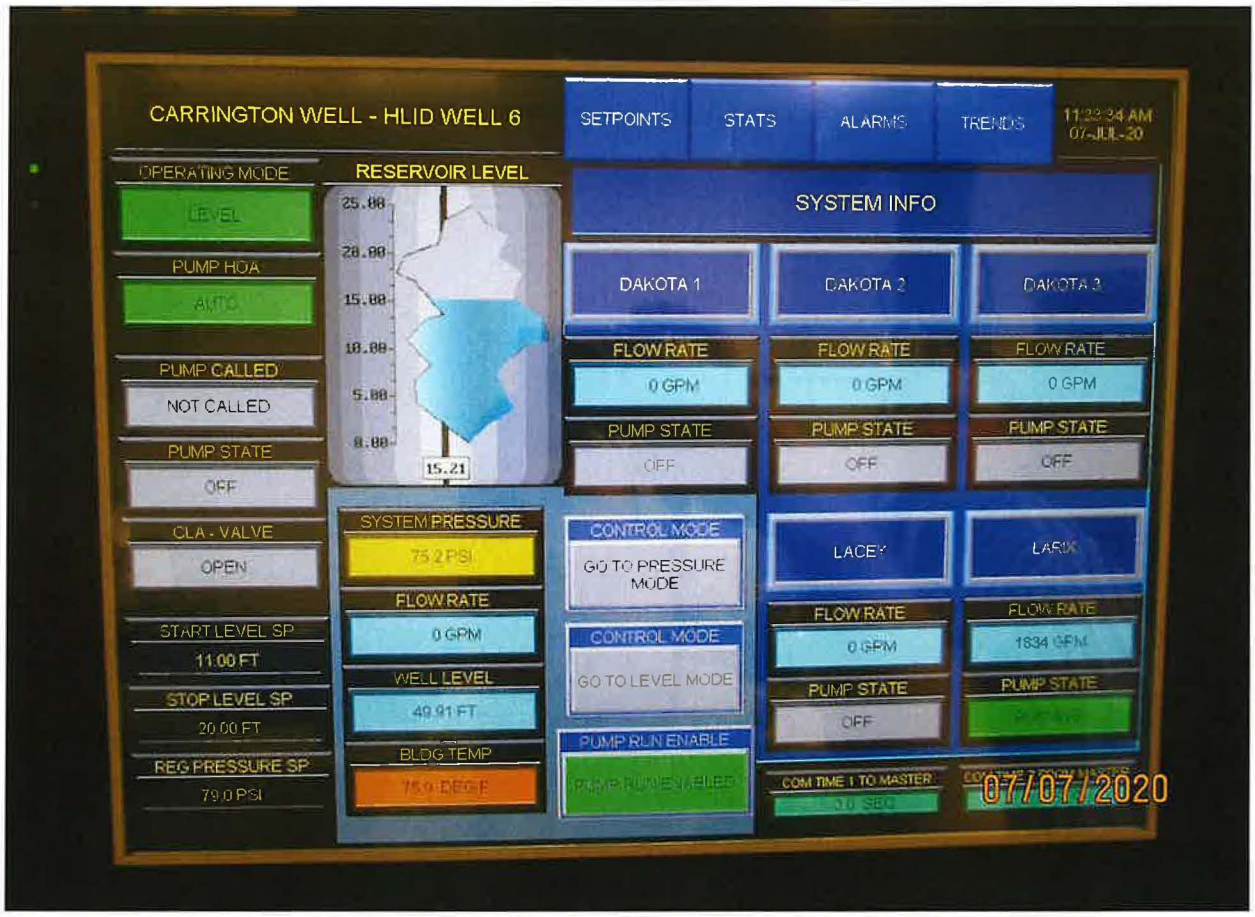




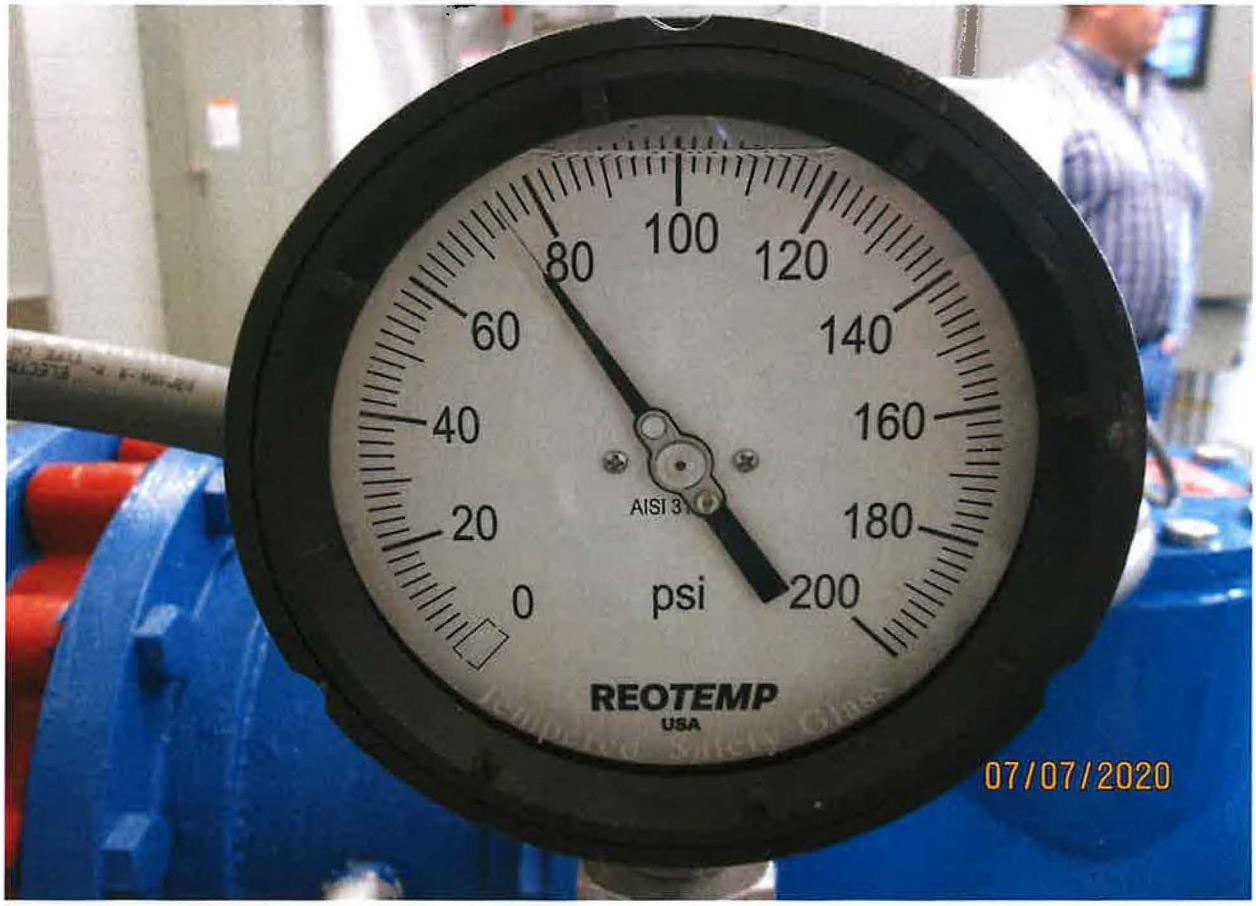
POD – CARRINGTON WELL



CARRINGTON WELL 300 HP PUMP



CARRINGTON WELL PROGRAM MONITORING SYSTEM



CARRINGTON WELL PSI GAUGE



LACEY WELL SITE



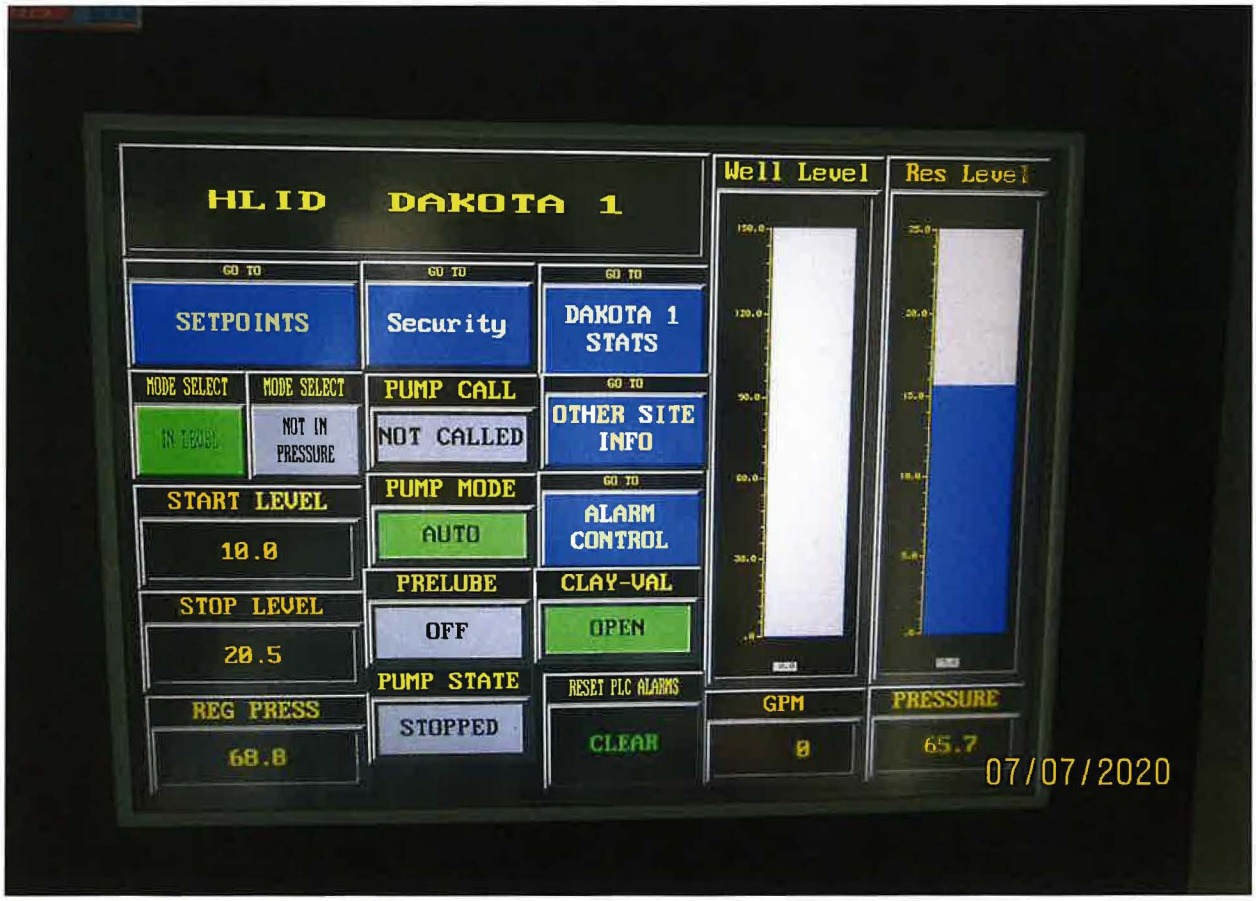


POD – LACEY WELL





POD – DAKOTA WELL #1



DAKOTA WELL #1 SYSTEM MONITORING PANEL



DAKOTA WELL #1 PSI GUAGE



POD – DAKOTA WELL #2



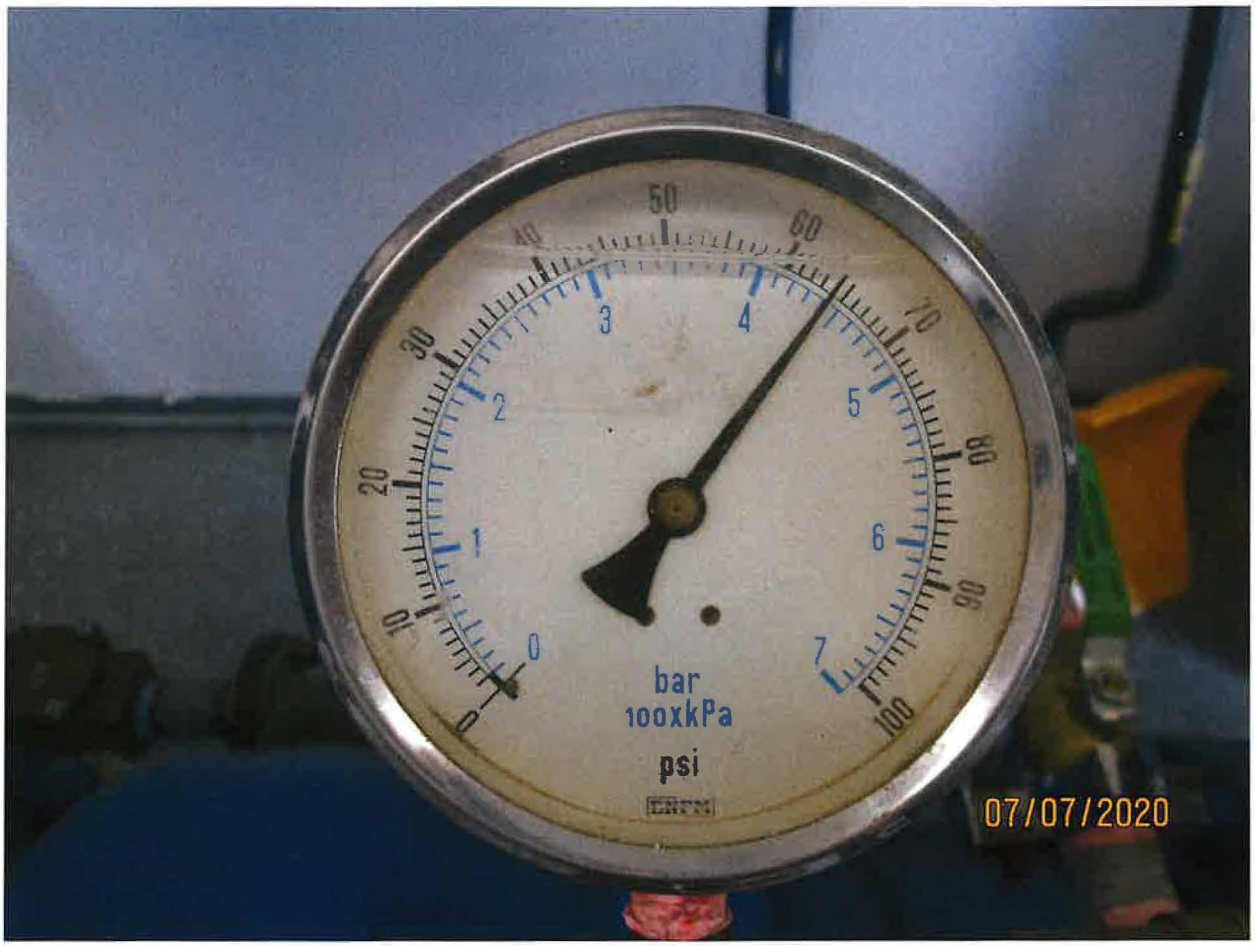
DAKOTA WELL #3 SITE



POD – DAKOTA WELL #3



DAKOTA WELL #3 SYSTEM PANEL



DAKOTA WELL #3 PSI GUAGE