

[illegible]

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

See Attached Grid sheet

- ☒ Copy of USGS Quadrangle attached showing location(s) of point(s) of diversion and place(s) of use *(required)*.
☒ Aerial photo attached *(required for irrigation of 10+ acres)*.
☒ Photo of diversion and system attached.

4.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
Well #1 (north)	Franklin	3.0	n/a	Sta-Rite	Model 40P4H
Well #2 (barn)	Unknown	5.0	n/a	Sta-Rite	Model 70P4J

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calibration
Portable meter	Sonic	Fuji	Portaflow X		n/a	March 2009

2. Measurements: Well #1: 29.9 gpm, would be 34 gpm if pressure could have been held at low set point.
Well #2: 48.5 gpm. Total 81.5 gpm (0.18 cfs) maximum capacity. See narrative for more information.

E. NARRATIVE / REMARKS / COMMENTS

See attached narrative.

Have conditions of permit approval been met? ☐ Yes ☒ No

F. FLOW CALCULATIONS

☐ Additional Computation Sheets Attached

Measured Method: _____

G. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

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

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

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

2. Volume Calculations for Other Uses:

Attached LCO water usage worksheet indicates that an annual volume of 36.0 afa is required based on the estimated
configuration of the dairy in 1993. See attached narrative.

H. RECOMMENDATIONS

1. Recommended Amounts

Beneficial Use	Period of Use		Rate of Diversion Q (cfs)	Annual Volume V (afa)
	From	To		
<u>Stockwater</u>	<u>1/1</u>	<u>12/31</u>	<u>0.18</u>	<u>36.0</u>
<u>Commercial</u>	<u>1/1</u>	<u>12/31</u>	<u>0.18</u>	<u>36.0</u>
_____	_____	_____	_____	_____
TOTALS:			<u>0.18</u>	<u>36.0</u>

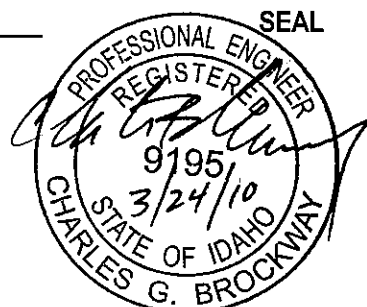
2. Recommended Amendments

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

I. AUTHENTICATION

Field Examiner's Name: Charles G. Brockway, P.E. Date: 3/24/10

Reviewer: _____ Date: _____



Beneficial Use Field Exam Narrative

Permit 37-8662 / Bokma

Charles G. Brockway, P.E.
March 24, 2010

This permit authorized development of groundwater for stockwater and commercial uses in a dairy located within NWSW Section 20, T.7S., R.14E. The permit was approved on December 1, 1992 with a proof date of January 3, 1994. Proof was filed on November 16, 1993. The Department has not conducted a field examination on this permit. At this time, it is necessary to carry the permit to the license stage in order to allow a pending transfer application to proceed. Therefore, even though the examination fee was paid with the proof, the Department has agreed to allow a private examination to be completed.

The dairy was apparently developed in the late 1980s, but a water permit was not obtained until 1992. The permit indicates that two wells would be utilized for a commercial dairy with 500 milking cows and also provide water for 500 range cattle. The owner of the dairy in 1992 was Gary Coleman, who sold to Harry Bokma in 2000. Joey Bokma has been the manager of the dairy since 2000 and has first-hand knowledge of activities since then, and some knowledge of Coleman's operations. Gary Coleman was also contacted and interviewed to determine the status and configuration of the dairy as of the filing of the proof in 1993. An aerial photo from 1993 was obtained from the FSA field office in Gooding and is included with this report.

Based on information from Joey Bokma and Gary Coleman, it was determined that the present dairy (as of 2010) is similar to the 1993 operation, with the following differences:

- In 1993, 500 head were being milked, with approximately 110 dry cows and 390 heifers. Today, 750 head are being milked.
- An additional corral for milking cows has been added on the east end of the dairy. This was done to reduce the density of cows rather than house additional cows. Heifer corrals have been added on the north side of the dairy.
- The dairy barn structure is the same but the milking parlor has been converted to a double-20 parallel configuration from a double-16 herringbone configuration.
- The milk cooling process has been altered to use a separate plate cooler prior to the milk storage tank rather than a cooler integral to the tank.
- A new 10,000-gallon stainless steel milk storage tank in a vertical configuration has been installed to replace the original horizontal tank of similar size.

- The original water-cooled vacuum pumps have been replaced with air-cooled units.
- The sprinkler system for cow washing in the holding pen, which was in place in 1993, has been eliminated. The holes where the sprinkler heads stood are still evident. There were 50 impact sprinklers, double-nozzle with a 9/64" large nozzle and 3/32" small nozzle (Gary looked at one of the old sprinkler heads in his junkpile).

The two wells serving the facility are hydraulically interconnected, but each has its own pressure tank system. Well #1 primarily serves the northern corrals and Well #2 primarily serves the barn. There is a 1" line connecting the two wells. An old domestic well is situated about 45 feet south-southwest of Well #1 and is used for the residence. This well was drilled many decades ago (perhaps in the 1920s) and no log exists. It has its own pressure tank in the basement of the home, but is also connected to the Well #1 system for the purposes of providing an emergency backup. According to Coleman this connection was made after 1993, and so this well cannot be included in the license.

Drinking water is provided by watering troughs in each corral. In the barn, water is diverted through the plate cooler and into a 10,000-gallon storage tank. It is then pumped from the tank when needed for wash-down of the milking parlor and holding pen – this water is therefore second-use after the cooler. Wash-down occurs using a 2" hose in the holding pen and the sprinklers. Wash water in the milkroom and for equipment cleansing is first-use water.

Well drilling records were found for the two wells. The logs indicate similar construction, depths, and water levels.

Well #1 (north)

Drilled in 1992

6-inch steel casing with sanitary cap

Total depth 128 feet

SWL at time of drilling 106 feet

3.0 HP pump, according to Eaton Drilling a Sta-Rite 40P4H was installed in 1992.

Franklin Electric control box

Pumping water level on 3/18/10 was 108.80 feet (pump was running).

Pressure at tanks 58 psi at time of inspection; set points 40 / 60 psi.

Two pressure tanks located in small wellhouse, Grundfos PC244R, 81 gallons

Well #2 (south near barn)

6-inch steel casing with sanitary cap

Total depth 130 feet

SWL at time of drilling 105 feet

Static water level on 3/18/10 110.82 feet (pump not running).

5.0 HP pump, according to Eaton Drilling a Sta-Rite 70P4J was installed in 1987.

Three-phase controller.

Pressure at tank 58 psi at time of inspection; set points 40 / 60 psi.
Two pressure tanks in electrical/utility room of barn, Well XTrol WX360

Domestic well

Drilled at least 20 years prior to Coleman's acquisition of the house in 1976. No log is available.

6-inch steel casing with sanitary cap

1.5 HP Sta-Rite pump (no model # available)

Total depth unknown

SWL at time of drilling unknown

Static water level on 3/18/10 110.48 feet (pump not running).

Pressure at tank 55 psi.

One pressure tank in basement of house, Grundfos PC266R, 85 gallons

Diversion Rate Calculation

No flow measuring devices or ports exist at any point in the system. The piping is such that a flow measurement using a portable ultrasonic meter was obtainable. Flow was measured with the pressure held near the minimum set point in order to determine the maximum capacity of each well pump. On Well #1, the pressure could not be held lower than 47 psi due to the cows not drinking much at the time of the exam.

The flow meter used was a Fuji Portaflow X. Field data sheets for each measurement are included with this report. Totalizer readings were obtained under steady conditions for 6 minutes on Well #1 and 8 minutes on Well #2. In both cases the reading was solid and steady. The flow rate was 29.9 gpm from Well #1 and 48.5 gpm from Well #2.

Double-Check of Diversion Rate with Pump Curves

It is believed that the well pumps currently installed are the same pumps as were in place in 1993, or at least the same make and model. Joey Bokma indicated that the barn well pump had been replaced several years ago, but the same make and model was installed. As a check, the pumps that were in place as of 1993 were verified and the pump curves were used to estimate the flow rate given the calculated total dynamic head. Eaton Drilling, who did all of Gary Coleman's well and pump work, consulted Mr. Coleman's files and provided confirmation of the installed pumps as of 1993 and curves for the pumps. For each well, the total dynamic head was calculated from the measured lift and discharge pressure, and assuming a head loss in the pump column using Darcy-Weisbach friction with $f = 0.016$, as follows:

Well #1 TDH = 108.8 (lift) + 108.4 (pressure head at 47 psi) + 16.9 (friction loss in 1.25" column) = 234.1 feet

Well #2 TDH = 115 (est. lift) + 94.6 (pressure head at 41 psi) + 4.7 (friction loss in 2" column) = 214.3 feet

For Well #1, the pump in 1993 was a 3HP Sta-Rite 40P4H. The attached curve indicates a discharge of 30 gpm at a TDH of 234 feet, which agrees exactly with the measurement. If the pressure could have been held at the low set point of 40 psi to measure the maximum capacity, the flow would have been 34 gpm according to the pump curve.

The Well #2 pump was a 5HP Sta-Rite 70P4J. The attached curve indicates a discharge of 52 gpm at a TDH of 214 feet. This flow is slightly higher but well within the margin of error of the measured flow.

From this analysis, it appears that the currently-installed pumps are very likely the same pumps that were installed in 1993.

The recommended flow rate to be licensed is $34 + 48.5 = 82.5$ gpm (0.18 cfs). The permit allows 0.24 cfs for stockwater and 0.20 for commercial. It is recommended that the right be licensed for 0.18 cfs stockwater and 0.18 cfs commercial, with a total of 0.18 cfs.

Annual Volume Calculation

Annual diversion volume that should be licensed was calculated using the LCO Water Usage Worksheet developed by Brockway Engineering for estimating dairy water requirements. Default typical values for factors such as animal weight, milk fat percentage, and annual milk yield per animal were used since this information is not available as of 1993. A herd size of 500 milking cows, 110 dry cows, and 390 heifers was used. Commercial cleaning and flushing volumes are typical values based on inspection of the barn washing regime and information provided by Coleman. Second-use water (for flushing after use in the plate cooler) is accounted for in the worksheet to prevent double-counting. Note that the components of this worksheet related to consumptive use, land application, and equivalent acreage are not applicable to the calculation for permit 36-8662.

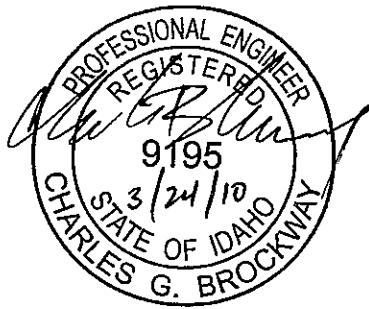
The calculated annual volume requirement is 36.0 afa. On a per-head basis this equates to 64 gpd per milking cow, which is in the range expected for facilities when sprinkler flushing is utilized. The spreadsheet was also run to estimate current water usage with 750 head milking, 160 head dry, and 390 heifers, but no sprinklers in the holding pen. Annual usage was calculated to be 36.1 afa, almost exactly the same as the estimated 1993 usage.

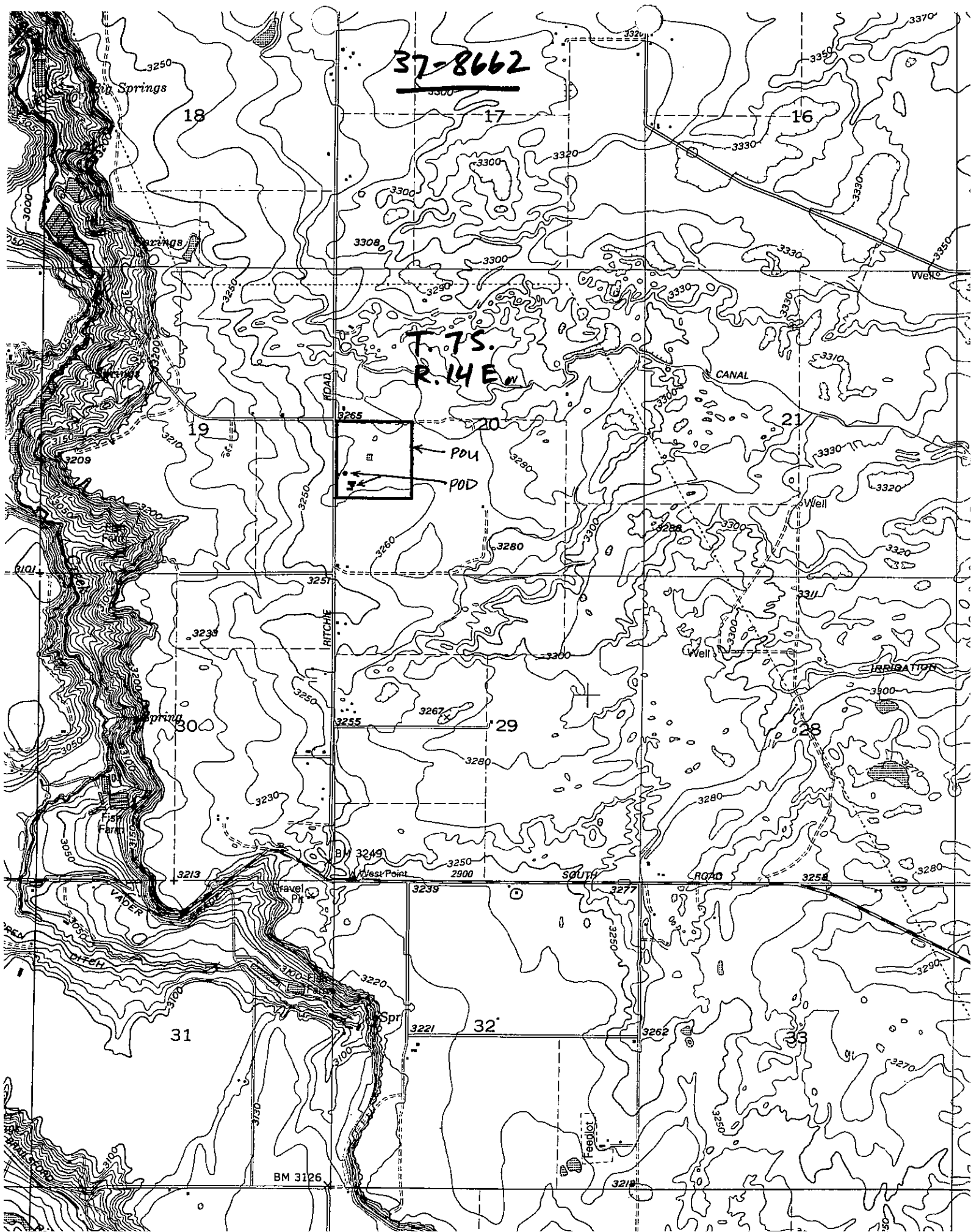
Condition Compliance

The permittee has complied with all conditions except the requirement to install a flow measurement port or other device. An ultrasonic meter can be utilized to make spot

measurements as performed for this field exam. Since the licensed diversion rate is less than 0.25 cfs, it is recommended that the measuring device condition be waived. If the Department so directs, flow meters could be installed on both wells and would provide reasonable accuracy.

In keeping with current Department policy, the cow numbers should not be carried over as a condition or remark on the license. The permittee should be allowed any number or type of animal within the diversion rate and volume limits of the right.





37-8662

T. 7 S.
R. 14 E. W.



POU

POD

Ria Springs

18

17

16

19

20

21

30

29

28

31

32

33

VADER

Travel Pt

West Point

SOUTH

ROAD

Well

IRRIGATION

Well

BM 3126

3220

3221

3262

3218

3250

3270

3290

3310

3320

3330

3300

CANAL

3300

3280

3267

3255

3230

3238

3209

3265

3300

3300

3320

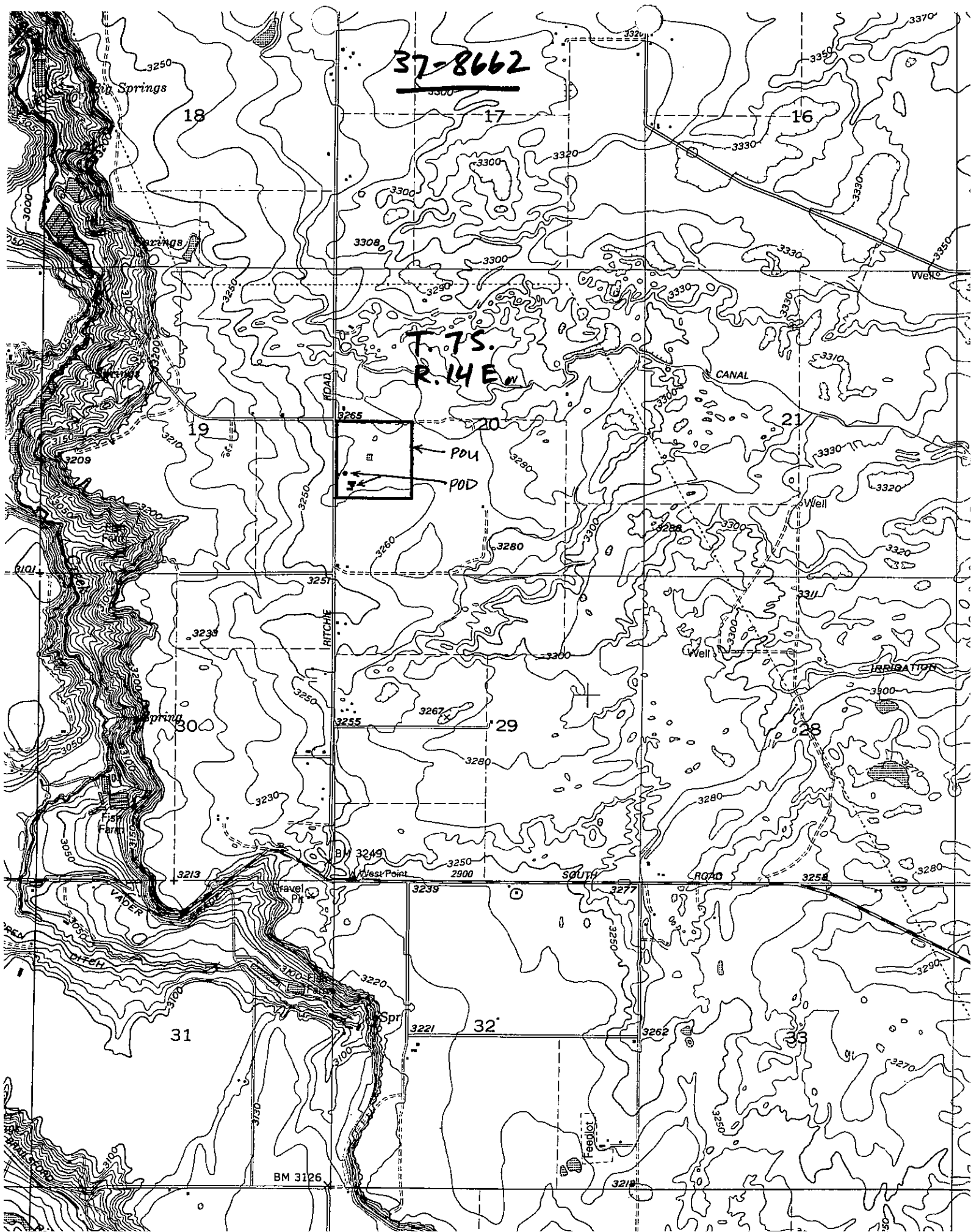
3330

3330

3330

3350

3370





1 inch equals 300 feet

**BOKMA, HARRY
PERMIT 37-8662
FSA 1993 AERIAL**

Legend

- t07s14e Dairy_POU
- sections Wells





1 inch equals 300 feet

BOKMA, HARRY
PERMIT 37-8662
NAIP 2004 AERIAL PHOTO

Legend

- t07s14e
- sections
- Dairy_POU
- Wells





Location :

0.154

Remarks:

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[illegible]

Calibration Multiplier = (Test / Subject) :

FACSIMILE COVER SHEET

Eaton Drilling & Pump Service, Inc.
 P.O. Box 230
 495 South Idaho St.
 Wendell, Idaho 83355-0230
 Serving Magic Valley Since 1907
 (208) 536-2223
 (208) 535-2024 fax



Send to:	From:
Brookway Eng.	Larry
Attention:	Date:
Chuck Gr.	3-23-10
Fax Number:	Phone:
736-8506	

☐ Urgent
 ☐ Reply ASAP
 ☐ Please Comment
 ☐ Please Review
 ☒ For your information

Total pages, including cover sheet: 3

COMMENTS

Sending Pump Curves I had in Gary
 Coleman's file

Larry

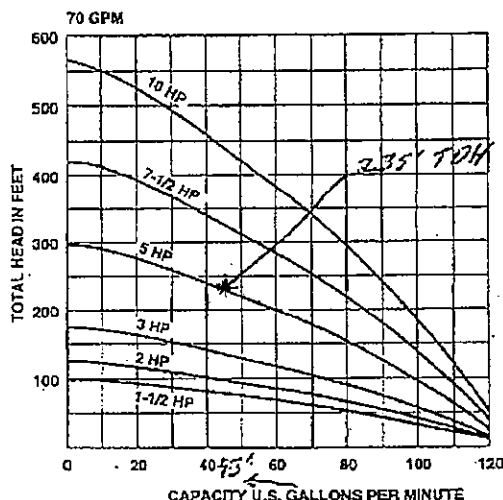
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4" Submersible Pumps

70 GPM

Design Series

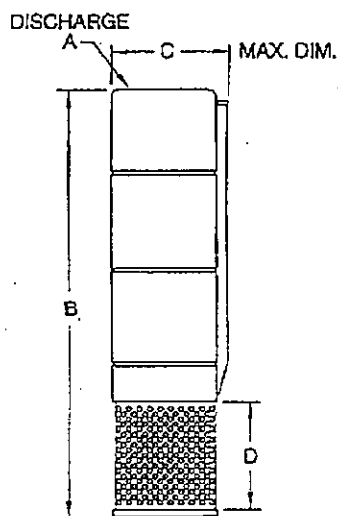
Pump Performance



Pumping level 120'
 & friction loss
 50' Pressure = 115'
 T.D.H. 235'

Tested and rated in accordance with Water Systems Council Standards.

NOTE: Pumps installed with a CON-AIRE® tank require a 100 PSI relief valve. Pumps installed with a conventional tank require a 75 PSI relief valve. Relief valve must be capable of relieving entire flow of pump at relief pressure. Specifications and subject to change without notice.



Catalog No.	HP	A	B	C	D
L70F4	1-1/2	2	20-25/32	3-3/8	3-7/8
L70G4	2	2	24-1/16	3-3/8	3-7/8
L70H4	3	2	30-5/8	3-3/8	3-7/8
L70J4	5	2	47-1/32	3-3/8	3-7/8
L70K4	7-1/2	2	63-7/16	3-3/8	3-7/8
L70L4	10	2	83-1/8	3-3/8	3-7/8

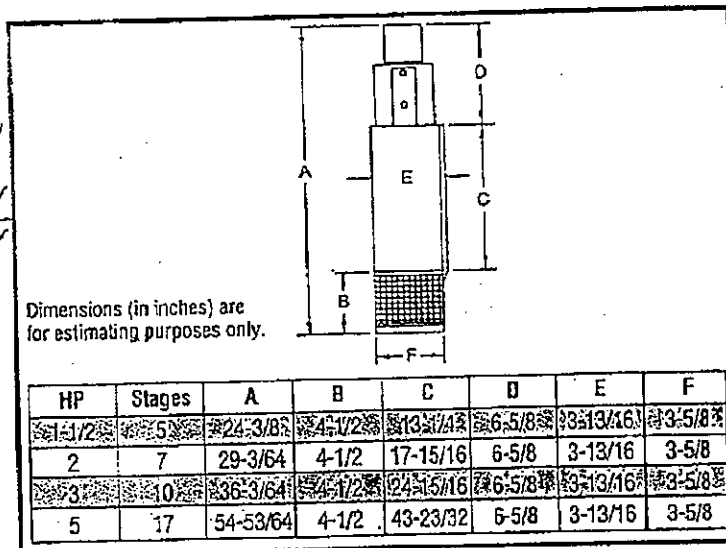
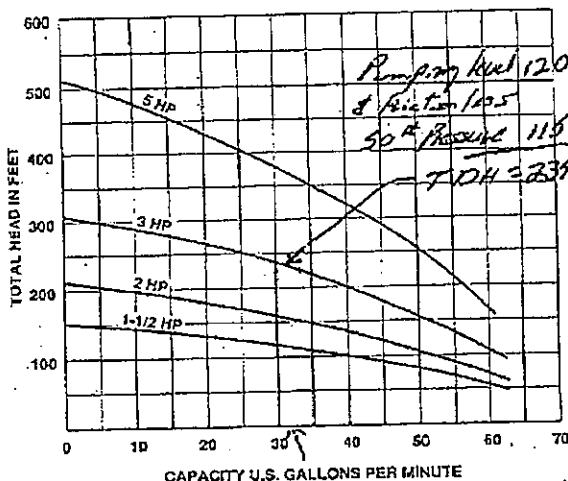
Dimensions (in inches) are for estimating purposes only.

4" Submersible Pumps

40 GPM

Design Series

Pump Performance



Pump Performance

HP	Series	PSI	Pumping Depth in Feet																
			20'	40'	60'	80'	100'	125'	150'	175'	200'	250'	300'	350'	400'	450'	500'	550'	600'
			Capacity — Gallons Per Minute																
1-1/2	40	0			59.3	50.8	40.0	24.0	14.4										
		30	46.6	35.5	22.0	9.1													
		40	33.1	18.8	1.5														
		50	16.0																
		60																	
2	40	0	—	—	63.1	58.5	52.8	46.0	33.1	21.5	8.0								
		30	56.4	50.0	42.4	34.0	24.8	11.5											
		40	48.8	40.8	32.0	22.8	12.4												
		50	40.0	31.1	21.5	10.8													
		60	29.5	20.0	9.1														
3	40	0					61.0	56.4	51.4	45.5	38.4	23.0	14.0						
		30	63.0	59.5	60.0	51.8	47.1	40.4	32.8	23.5	16.4								
		40	58.8	55.0	50.8	46.4	40.4	33.1	25.4	17.1	7.4								
		50	54.4	50.4	45.5	39.5	33.0	25.0	17.0	8.0									
		60	49.5	46.8	38.8	32.8	26.8	18.4	19.0										
5	40	0	—	—	—	—	—	—	59.1	54.7	50.6	43.7	35.3	26.1	16.0	4.2	—		
		30	—	—	—	—	59.7	57.0	54.3	51.2	48.1	40.5	32.0	22.3	12.0	—	—		
		40	—	—	—	59.2	57.2	54.5	51.7	48.3	44.9	36.9	27.9	17.9	6.9	—	—		
		50	—	—	59.0	56.9	54.9	51.8	48.5	45.0	41.0	33.0	23.2	13.0	—	—	—		
		60	60.7	58.7	56.5	54.3	51.9	48.6	45.3	41.3	37.1	21.6	18.1	7.3	—	—	—	—	

CAUTION: DO NOT use pump at flow rates indicated by the symbol —. To do so can cause premature failure of unit. Pump warranty void when failure occurs under these conditions.

Tested and rated in accordance with Water Systems Council Standards.

NOTE: Pumps installed with a CON-AIRE® tank require a 100 PSI relief valve. Pumps installed with a conventional tank require a 75 PSI relief valve. Relief valve must be capable of relieving entire flow of pump at relief pressure.

Specifications are subject to change without notice.



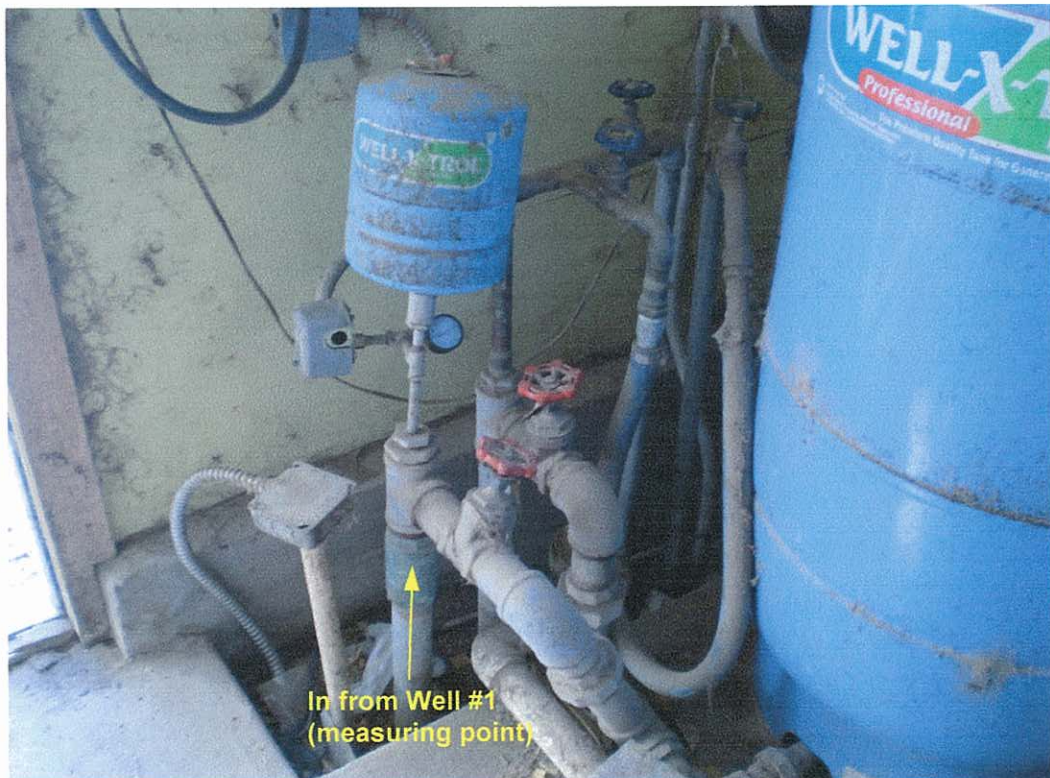
Well #1 and wellhouse



Well #1 inside house.



Well #2



Well #2 piping inside barn.



10,000 gallon tank and booster. 4" pipe on lower right leads to a second, larger booster pump.



Barn containing holden pen and milking parlor. Milk tank visible on the right.



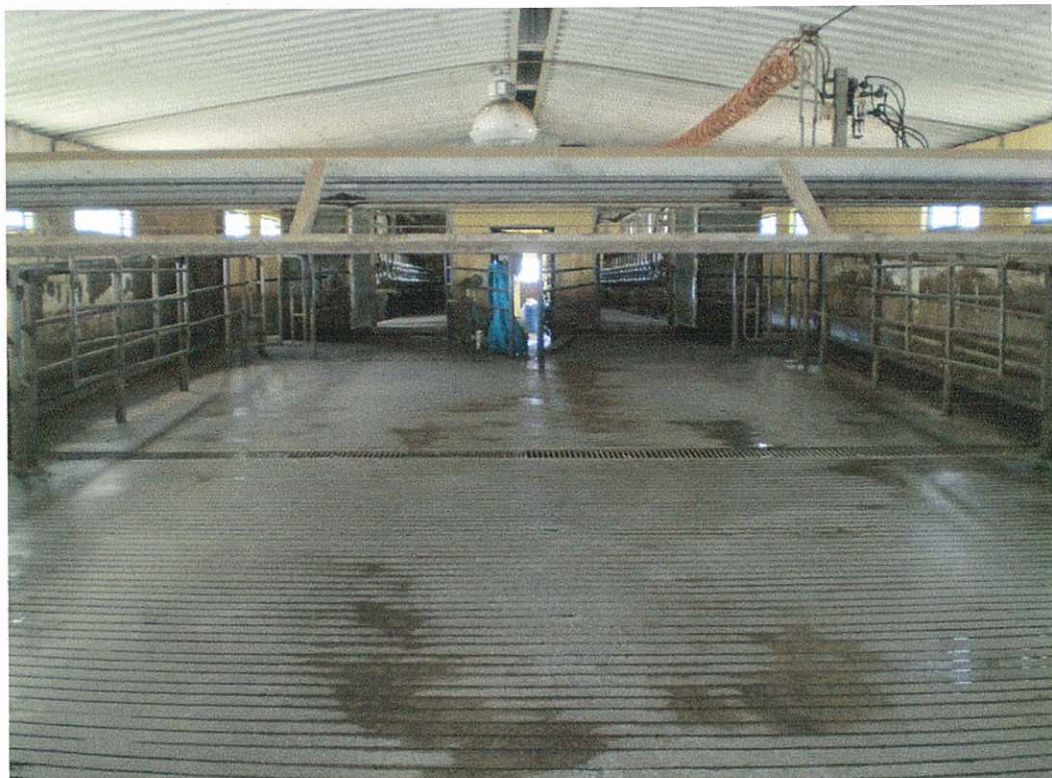
Plate cooler



Milking parlor. Several hoses in this room are used for flushing and clean-up.



Holding pen. 1-1/2" hose used for flushing and clean-up.



Holding pen. Former sprinkler locations (patched holes) visible on floor.



Typical corral. Portion of lagoon to the right.



Corrals.