

[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
EAST WELL	FRANKLIN	7.5	8LB6	SUBMERSIBLE	?
WEST WELL	?	5	L40P4J5	SUBMERSIBLE	?

(Information provided by Eaton Drilling)

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calibration

2. Measurements: Calibrated 55 gallon drum, timed volume measurements taken in field.

E. NARRATIVE / REMARKS / COMMENTS

West well – Under tire, submersible, photographed & GPS location taken, Sanitary cap – piped to meter. No IDWR tag.
East well – submersible drilled Feb 1983 8" hole, in tire, All power for wells in Barn 1 circuit panel where well could be isolated.
Flow meter, Muster Meter 2659046, Range 0-100 GPM 2" meter. Totalizer 100 Gal. Read at 069321 Q=approx. 23 GPM (
(timed second hand)

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:

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>.1</u>	<u>43.8</u>
<u>Commercial</u>	<u>1/1</u>	<u>12/31</u>	<u>.1</u>	<u>19.3</u>
_____	_____	_____	_____	_____
TOTALS:			<u>.1</u>	<u>63.1</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

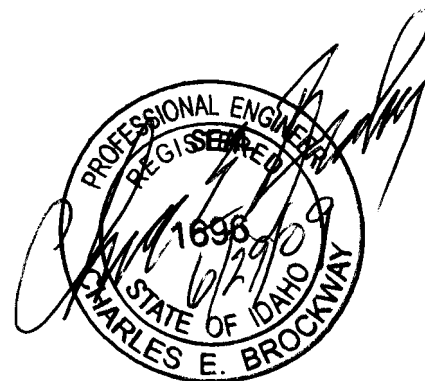
I. AUTHENTICATION

Field Examiner's Name: Charles E. Brockway

Date: 6/9/09

Reviewer: _____

Date: _____



Livestock Confinement Operations

Water Requirements and Consumptive Use Worksheet

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PRELIMINARY

COMPLETE BLUE HIGHLIGHTED SECTIONS ONLY

Prepared for: Four Brothers
Lincoln County

Revision: 9801
Run Date: 5/4/09 ALR

Remarks: CALCULATED PASSED ON HEAD AND CURRENT APPLICATION LCO APPLICATION

Herd Information - User Input

Number of milking cows 1200 Breed: Large
Number of dry cows 0
Number of other adult dry animals 0

Calves at age: Heifers at age:
1 month 0 5 months 0
2 months 0 15 - 18 months 0
3 months 0 18 - 24 months 0
4 months 0

ANIMAL INFORMATION

Use defaults or enter values if known

Average body weight 1400 lbs Nearest weather station Shoshone
Milk fat percentage 3.5 % Number of milkings/day 3
Average days dry 60
Annual milk yield per animal 21000 lbs/year Check: Total herd size based on days dry 0
Percent dry matter in ration 90 % HERD SIZE NOT CONSISTENT WITH DAYS DRY

Lagoon Information - User Input

Lagoon Number	Top width	Top length	SS (h:v)	Max depth	Average depth factor	% days with water	Top Area	Bottom Area	Average Area
1	400	525	2	8	0.5	100	210000	195456	202728
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
TOTAL ACRES							4.82	4.49	4.65

Facility Information - User Input

	Holding Pen 1	Holding Pen 2
Holding pen active	1	0 (0 = not used or nonexistent)
Number of sprinklers in pen	0	0
Average line pressure	40	60 psi
Sprinkler nozzle size - primary	5/32	5/32 inches
Sprinkler nozzle size - secondary	3/32	0 (enter 0 for single-nozzle sprinklers)
Daily operation time of sprinklers	0	0 minutes
Percent of days per year cows are washed	100	0 %
Number of free stalls	0	
Length of each free stall	1000 feet	
Width of each free stall	50 feet	
Is the feeding area flushed to lagoon?	No	
Is this housing area flushed to lagoon?	No	
	Barn	Feeding Housing
Flushing recycle rate	0	0 0

CLEANING / FLUSHING VOLUMES

Use defaults or enter manufacturer volumes

Cleaning parlor floor	996 gal	Cleaning pipeline	192 gal
Cleaning milkroom	60 gal	Cleaning equipment	900 gal
Cleaning bulk tank	600 gal		
Additional flush of holding pen (opt.)	780 gal		

Land Application Information - User Input

Type of system	Center Pivot
Predominant cropping	Alfalfa
Percent of waste water which goes to meet crop irrigation requirement	90 %

Stockwater Component

Drinking Water Calculation for Lactating Cows

4% fat-corrected milk yield	19425 lbs/year
Daily average FCM yield	63.69 lbs/day
Daily average milk yield	68.85 lbs/day
Estimated DMI	46.95 lbs/day

METHOD 1: Kertz

Estimated total water intake (TWI)	277.1 lbs/day or 33.2 gal/day
As-fed feed daily intake	52.2 as-fed lb/day
Water content of feed	5.22 lb/day in feed
Drinking water intake	271.9 lb/day or 32.6 gal/day
Drinking water requirement for lactating cows	39120 gal/day 43.8 ac-ft/year

Maximum drinking water requirement 43.8 ac-ft/year

Drinking Water Calculation for Dry Cows

Estimated DMI	26.6 lbs/day
Average drinking water intake	13 gal/day

Average drinking water requirement 0 gal/day
0.0 ac-ft/year

Drinking Water Calculation for Replacement Herd (Calves and Heifers)

Age	GPD	Ac-Ft/year
1 mo	0	0.00
2 mo	0	0.00
3 mo	0	0.00
4 mo	0	0.00
5 mo	0	0.00
15-18 mo	0	0.00
18-24 mo	0	0.00

Drinking water requirement
for replacement herd 0 gpd 0.00 ac-ft/year

METHOD 2: Holter and Urban

Regression equation with DMI, milk production, and dry matter %

Drinking water intake 99.5 liters/day
26.3 gal/day

31554 gal/day
35.3 ac-ft/year

TOTAL STOCKWATER COMPONENT 43.8 AC-FT/YEAR

Commercial Component

Milking Parlor Water Usage Calculation

Volume needed **per milking** in each parlor for:

Cleaning parlor floor	996 gal	Cleaning pipeline	192 gal
Cleaning milkroom	60 gal	Cleaning equipment	900 gal
Cleaning bulk tank	00 gal	Cleaning cows	3000 gal

Total milking parlor volume	17244 gal/day
Second milking parlor volume	0 gal/day
Recycled water	0 gal/day
	19.32 ac-ft/year

Holding Pen Water Usage Calculation

	Pen 1	Pen 2
Output of primary nozzle	0	0 gpm
Output of secondary nozzle	0	0 gpm
Holding pen flushing volume	0	0 gal
Additional flush volume	0	0 gal
Sprinkler volume	0	0 gal/day

Total holding pen volume	0	0 gal/day
Recycled water	0	0 gal/day

0.00 ac-ft/year

Other Flushing Water Calculation

Daily volume needed for:

Feeding area flushing	0 gal/day
Housing area flushing	0 gal/day

Total other flushing volume	0 gal/day
Recycled water	0

0.00 ac-ft/year

TOTAL COMMERCIAL COMPONENT

19.3 AC-FT/YEAR

Consumptive Use Calculation

A. Lagoon Evaporation

Annual reference ET (Allen & Brockway , 1983)	4.52 feet	
Annual open water coeff (Kohler Nordenson Fox)	0.90	
Annual open water (lagoon) evaporation	4.07 feet	
Manual override: Input annual lagoon evap	feet	
Total lagoon water surface area at full	210000 sq. ft.	
Total lagoon bottom area	195456 sq. ft.	
Average surface area when water is present	202728 sq. ft. =	4.65 ac

Total lagoon evaporation 18.92 ac-ft/year

B. Animal usage: milk, metabolism, and excretion loss

	Milking	Dry
Waste excretion volume per cow	1.3	1.3 ft ³ /day/1000lb
Water content	87.5	88.4 %
Total water volume in excrement	14294	0 gal/day
Percent of excrement flushed to lagoons	15 %	(based on areas which are flushed)
Consumptive use (evap.) of water in excrement	85 %	
Consumptive use (evap.) volume	12150 gal/day	
Excrement c.u. attributable to drinking water	11921 gal/day	
Total milk production - assume 100% leaves site	82623 lbs/day or	9907 gal/day
Water content of milk	8619 gal/day	
Water content attributable to drinking water	8457 gal/day	
Water use for animal metabolism	16957 gal/day	
Metabolism water attributable to drinking water	16638 gal/day	

Consumptive use - replacement herd (100%) 0 gal/day

Total animal consumptive use from drinking water 37016 gal/day or 41.5 ac-ft/year
Percent of drinking water intake 94.6 %

C. Parlor/holding pen cleanup

Average sprinkler washing system evap loss	2 %	
Free stall total area	0 sq. ft. =	0.00 acres
Length of time free stall concrete is wet	1 hr/day	
Average evaporation from wet concrete	0.15 in./day	

Sprinkler system loss volume 0.00 ac-ft/year
Free stall evaporation volume 0.00 ac-ft/year

Total cleanup loss 0.00 ac-ft/year

D. Land application site

Crop evapotranspiration	3.26 ac-ft/ac/year
Irrigation diversion volume	4.08 ac-ft/ac/year
System efficiency	80 %
Waste water volume to lagoons	21.7 ac-ft/year
Waste water volume available for land application	2.8 ac-ft/year

Total crop consumptive use of waste water 2.0 ac-ft/year

Summary

Drinking Water

Milking herd	43.8
Non-milking herd (dry cows)	0.0
Replacement herd (calves and heifers)	0.0

Total drinking water volume	43.8 ac-ft/year
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Commercial

Milking parlor	19.32
Holding pen and cleanup	0.0
Other flushing water	0.00

Total commercial volume	19.3 ac-ft/year
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TOTAL DIVERSION VOLUME REQUIREMENT	63.1 AC-FT/YR
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Consumptive Use

Lagoon evaporation	18.92
Animal milk, excretion, & metabolism	41.5
Parlor and holding pen cleanup	0.00
Crop consumptive use on land application	2.0

Total consumptive use	62.4 ac-ft/year
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Percent of diversion volume consumed	98.8 %
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Annual crop consumptive use - IDWR allowable	3.4 afa
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Equivalent irrigated acres	18.3 acres
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Diversion volume to acres conversion factor	3.40 ac-ft/ac
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