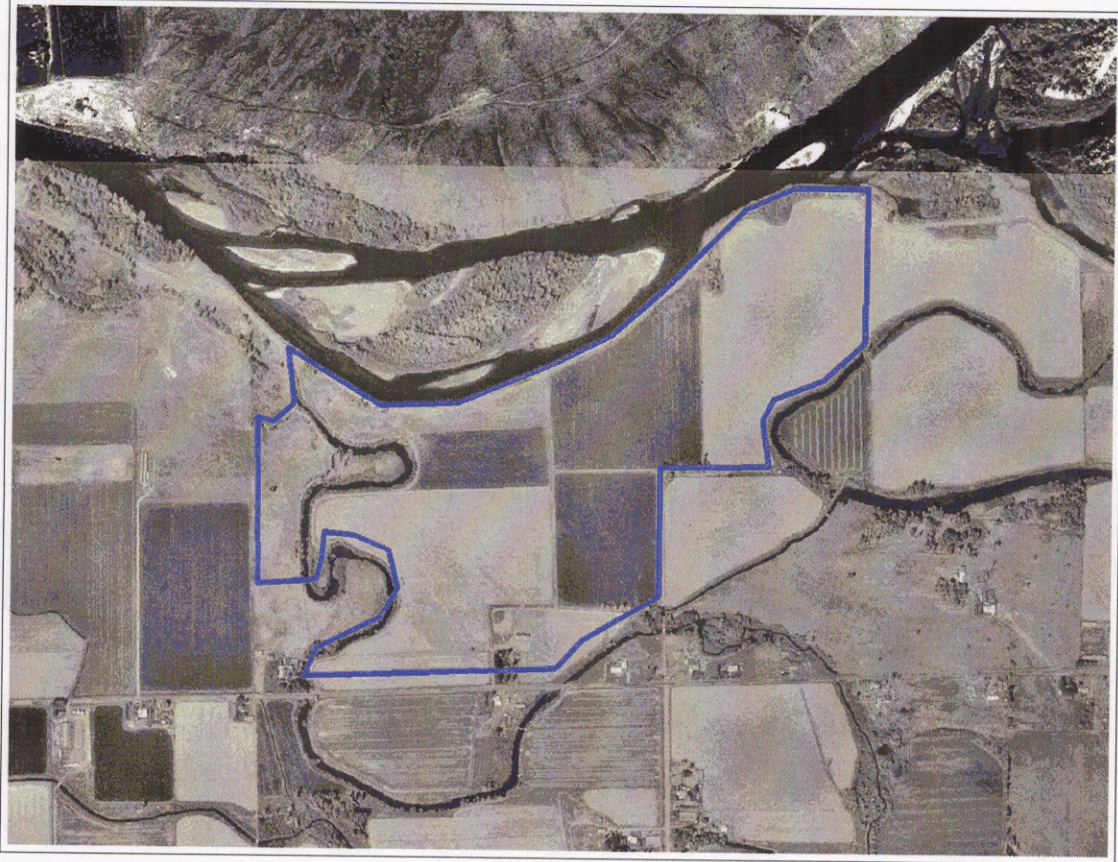


IRRIGATION REQUIREMENT ANALYSIS

25-277, 25-278, 25-13989

Claimants: Sheppard, Riggs, and Clark



Scott King

Idaho Department of Water Resources

Adjudication Bureau

September 17, 2003

INTRODUCTION

This report presents a determination of Field Irrigation Requirements (FIR) for a farm located south of the Menan Buttes in Basin 25. Identified SRBA water right claims include 25-277, 25-278, and 25-13989. These claims identify diversion from the Hyrum Poole Slough for irrigation of 144.5 acres in Sections 22 and 23 of T5N R38E. Based on the Hubble analysis, this farm has field irrigation requirements of 0.023 cfs per acre.

ANALYSIS

FIELDS

Fourteen individual fields were identified based interpretation of 1987 and 1992 aerial photography (see Figures 1 & 2). Furrow direction was determined from photo inspection, and furrow length ranged from 500 to 1400 feet (see Figure 3). Slope was estimated at 0.005 based on topographic maps, and this value was used for analysis of all fields.

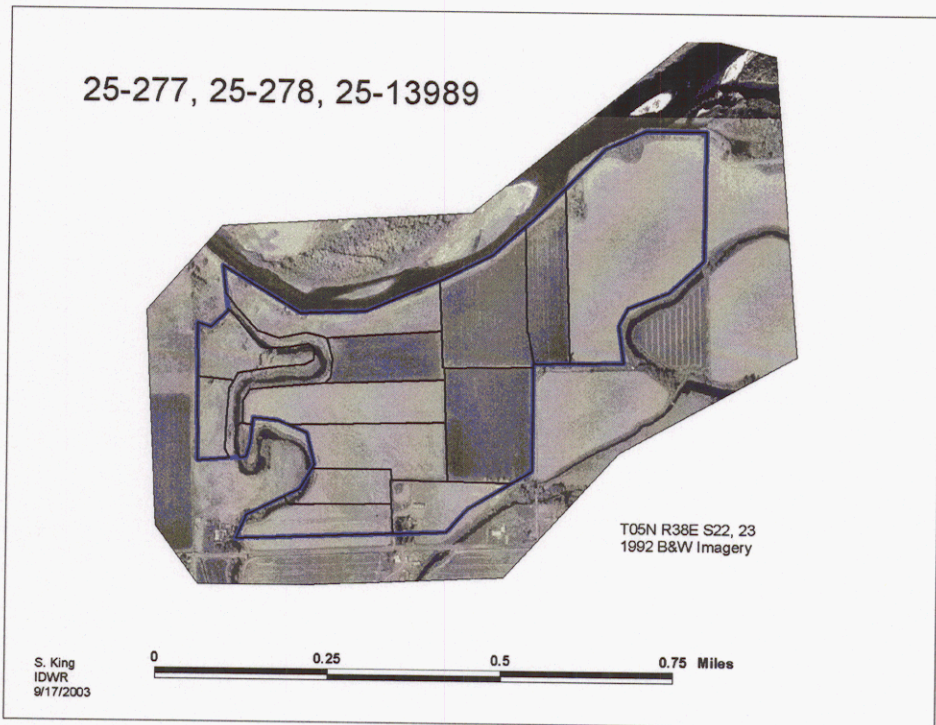


Figure 1. Field boundaries and 1992 image.

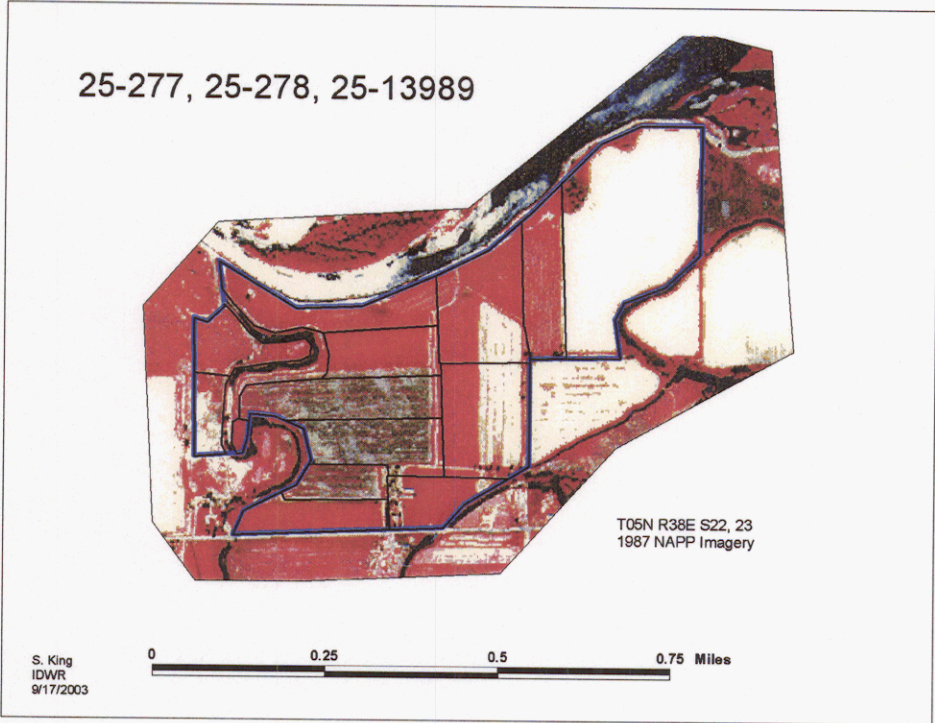


Figure 2. Fields boundaries and 1987 NAPP image.

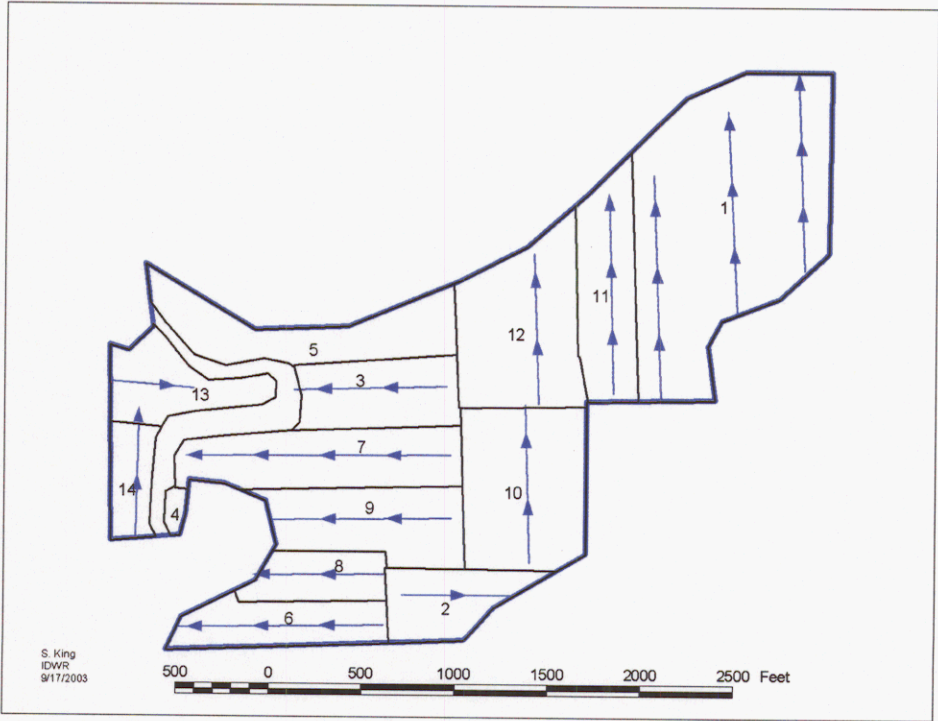


Figure 3. Field ID number and furrow direction.

SOILS

Soil information is provided by the Natural Resource Conservation Service digital SSURGO database. Figure 4 identifies the soil types with Blackfoot Silt Loam clearly dominating. An analysis of Blackfoot Silt Loam is shown in Figure 5, and is also included in the appendix. The loamy soils identified have a furrow intake family value in the 0.5 to 0.56 range, which is considered moderate. Water infiltrates slowly into low intake family soils, and quickly when the intake family is high (heavy clay = 0.3; sand = 0.8). The soil is deep and has a good water holding capacity (AWC).

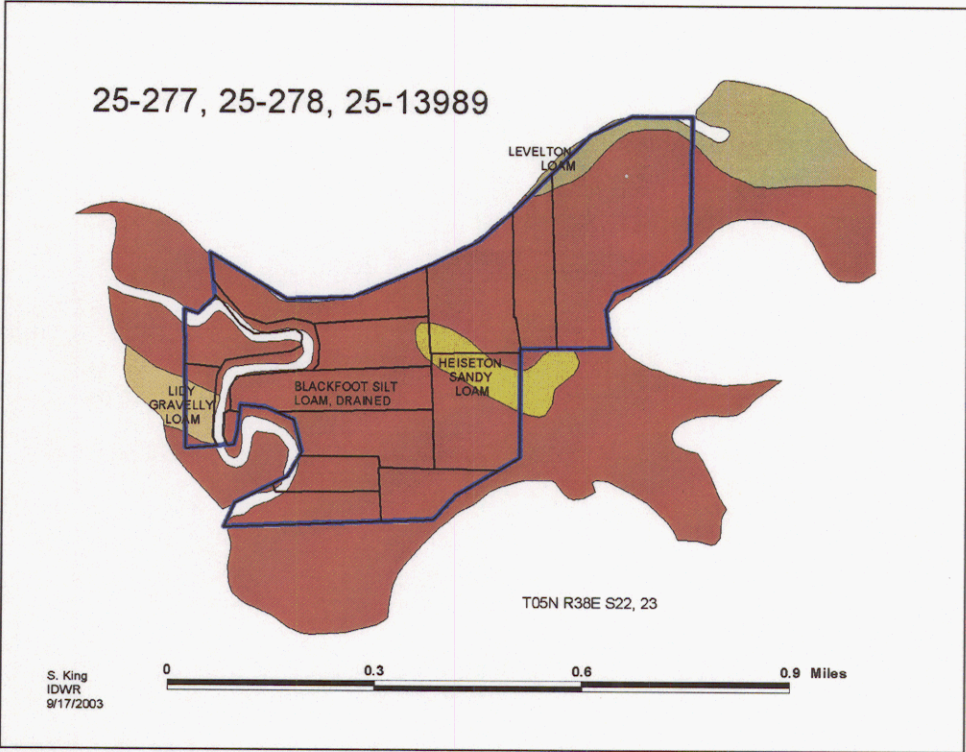


Figure 4. Soil types identified by NRCS.

SOIL CHARACTERISTICS				initials: sk		date: Sept 16, 2003					
Soil Name = Blackfoot Silt Loam, Drained											
Soil Type = 0-10" = Silt loam; 10-16" = Loam, silt loam; 16-22" = Silty clay loam, 22-60" = Stratified fine sandy loam / silty clay loam											
Source of Soils Data = SSURGO Digital Soils Database, ToClip											
soil depth (inches)		AWC (in/in)		PH		organic (%)		soil AWC depth (inches) (ft)		intake family	
lower	upper	lower	upper	lower	upper	lower	upper			flood	furrow
0	10	0.19	0.21	7.4	8.4	1	3	1	2.34	1 5	0.5
10	16	0.16	0.18					2	4.56		
16	22	0.19	0.21					3	6.60		
22	60	0.13	0.21					4	8.64	alternate	
								5	10.68	method	
										2	0.56
Management Allowed Deficit (MAD)											
crop		root depth (ft)		stress point		MAD (inches)					
alfalfa (hay or seed)		5		0.5		5.34					
corn (field or silage)		4		0.5		4.32					
grain (winter or spring)		4		0.5		4.32					
pasture (or grass hay)		3		0.5		3.30					
other (enter below)											

Figure 5. Blackfoot silt loam soil characteristics.

CROPS

Grain is the primary crop identified and was used for the farm except for 19 acres of pasture for fields 4, 5, 13 and 14. This cropping pattern was provided as being representative of historic growing practices. Other cropping patterns may result in higher or lower irrigation requirements.

CLIMATE

The Idaho Falls FAA weather station was used as the basis for crop evapotranspiration (ET) requirements for this farm. 80th percentile values of monthly ET for this station are included in the Appendix.

IRRIGATION EFFICIENCY

The FURROW program written by the NRCS is used to estimate irrigation efficiency based on the following input parameters:

- irrigation application depth (inches of water, equivalent to MAD in Figure 5)
- irrigation type (corrugate or furrow)
- furrow length (ft)
- furrow spacing (ft)
- furrow slope (ft/ft)
- soil intake family (dimensionless)
- furrow inflow rate (gpm)
- application time (hours)

Inflow rate is adjusted for application times in 12 hour increments in order to determine the optimum efficiency. For the Blackfoot silt loam, soil intake family values of 0.50 and 0.56 were both used, and the lower resulting efficiency used for final analysis. Irrigation efficiency is determined for every field.

FIELD IRRIGATION REQUIREMENT

Table 1 provides a summary of conditions for each field including furrow length, representative soil type, field size, crop type, and irrigation efficiency (or field application efficiency, FAE). FAE values are the result of Furrow program runs; results of these runs are included in the appendix.

FIELD ID	FURROW LENGTH (ft)	REPRESENTATIVE SOIL	ACRES	CROP	FAE (%)
1	1100	Blackfoot Silt Loam	32.0	Grain	55
2	600	Blackfoot Silt Loam	5.7	Grain	64
3	800	Blackfoot Silt Loam	7.2	Grain	67
4	500	Blackfoot Silt Loam	0.6	Pasture	70
5	500	Blackfoot Silt Loam	9.3	Pasture	70
6	1100	Blackfoot Silt Loam	6.3	Grain	55
7	1400	Blackfoot Silt Loam	10.6	Grain	52
8	650	Blackfoot Silt Loam	4.4	Grain	65
9	950	Blackfoot Silt Loam	9.2	Grain	68
10	850	Blackfoot Silt Loam	13.2	Grain	67
11	1050	Blackfoot Silt Loam	8.4	Grain	56
12	800	Blackfoot Silt Loam	12.7	Grain	67
13	500	Blackfoot Silt Loam	5.8	Pasture	70
14	650	Lidy Gravelly Loam	3.3	Pasture	38
			128.9		

Table 1. Summary of furrow length, soil, area, and FAE for each field.

Figures 6 and 7 present spreadsheets used to determine the irrigation requirements based on crop ET requirements, net irrigation application (equivalent to MAD values from the soil analysis spreadsheet, Figure 5), and FAE. Figure 6 includes grain crops at various furrow lengths for the Blackfoot silt loam soil. Figure 7 shows pasture crops with 500 ft furrows in Blackfoot silt loam, and 650 ft furrows in Lidy gravelly loam. Total on-farm irrigation requirement from both Figures 6 and 7 is $2.60 + 0.35 = 2.95$ cfs; a total acreage of $109.7 + 19 = 128.7$ acres; and resulting in an on-farm average of $2.95 \div 128.7 = 0.023$ cfs per acre.

FIELD IRRIGATION REQUIREMENT														
initials:	SNK		Claimant = 25-277, 25-278, 25-13989 (Sheppard, Riggs, & Clark)											
date:	09/16/03		Weather Station = Idaho Falls FAA											
crop	acres	irrig. system	eff. (%)	mar	apr	may	Monthly ET (mm/day)				ave ir season (mm/yr)	net irrig. app. (in)	ET ratio	irrig. freq. (days)
							jun	jul	aug	sep				
grain 600'	5.7	cor	64		1.44	3.09	7.53	8.13	2.97					
grain 650'	4.4	cor	65		1.44	3.09	7.53	8.13	2.97		739	4.32	1.06	12.7
grain 800'	19.9	cor	67		1.44	3.09	7.53	8.13	2.97		739	4.32	1.06	12.7
grain 850'	13.2	cor	67		1.44	3.09	7.53	8.13	2.97		739	4.32	1.06	12.7
grain 950'	9.2	cor	68		1.44	3.09	7.53	8.13	2.97		739	4.32	1.06	12.7
grain 1050'	8.4	cor	56		1.44	3.09	7.53	8.13	2.97		739	4.32	1.06	12.7
grain 1100'	39.3	cor	55		1.44	3.09	7.53	8.13	2.97		739	4.32	1.06	12.7
grain 1400'	10.6	cor	56		1.44	3.09	7.53	8.13	2.97		739	4.32	1.06	12.7
Summary	109.7													
Peak Gross Irrigation Application (mm/day) =							14.31							
On-Farm Irrigation Requirement (cfs/acre) =							0.024							
Total On-Farm Irrigation Requirement (cfs) =							2.60							
Irrigation Diversion Volume (ft/yr) =							4.03							
Total Irrigation Diversion Volume (ac-ft/yr) =							441.69							

Figure 6. Field irrigation requirement spreadsheet for grain fields.

FIELD IRRIGATION REQUIREMENT															
initials:	SNK		Claimant = 25-277, 25-278, 25-13989 (Sheppard, Riggs, & Clark)												
date:	09/16/03		Weather Station = Idaho Falls FAA												
crop	acres	irrig. system	eff. (%)	Monthly ET (mm/day)								AVE IR season (mm/yr)	net irrig. app. (in)	ET ratio	irrig. freq. (days)
				mar	apr	may	jun	jul	aug	sep	oct				
past 500'	15.7	cor	70		2.52	5.01	6.03	6.33	5.06	3.91	2.56	801	3.30	1.08	12.3
past 650'	3.3	cor	38		2.52	5.01	6.03	6.33	5.06	3.91	2.56	801	1.08	1.11	6.8
Summary				19											
Peak Gross Irrigation Application (mm/day) =							11.28								
On-Farm Irrigation Requirement (cfs/acre) =							0.019								
Total On-Farm Irrigation Requirement (cfs) =							0.35								
Irrigation Diversion Volume (ft/yr) =							4.30								
Total Irrigation Diversion Volume (ac-ft/yr) =							81.763								

Figure 7. Field irrigation requirement spreadsheet for pasture fields.

RESULTS & CONCLUSIONS

The above analysis indicates an average field irrigation requirement of 0.023 cfs per acre, slightly above the standard of 0.02 cfs per acre. The silt loam soils present on this farm appear to be well suited for surface irrigation. System efficiency could be increased somewhat by splitting fields longer than 1000 feet.

SOIL CHARACTERISTICS

initials: sk

date: Sept 16, 2003

Soil Name = Blackfoot Silt Loam, Drained

Soil Type = 0-10" = Silt loam; 10-16" = Loam, silt loam; 16-22" = Silty clay
22-60" = Stratified fine sandy loam / silty clay loam

Source of Soils Data = SSURGO Digital Soils Database, ToClip

soil depth (inches)		AWC (in/in)		PH		organic (%)		soil depth (ft)	AWC (inches)	intake family	
lower	upper	lower	upper	lower	upper	lower	upper			flood	furrow
0	10	0.19	0.21	7.4	8.4	1	3	1	2.34	1.5	0.5
10	16	0.16	0.18					2	4.56		
16	22	0.19	0.21					3	6.60		
22	60	0.13	0.21					4	8.64	alternate	
								5	10.68	method	
										2	0.56

Management Allowed Deficit (MAD)

crop	root depth (ft)	stress point	MAD (inches)
alfalfa (hay or seed)	5	0.5	5.34
corn (field or silage)	4	0.5	4.32
grain (winter or spring)	4	0.5	4.32
pasture (or grass hay)	3	0.5	3.30
other (enter below)			

Intake Family

choose base number for intake family from table below based on texture
base number (#'s 1 through 7) = 3

Intake Family

#	flood	furrow	texture
1	0.3	0.3	heavy clays, silty clay (> 60% clay)
2	0.5	0.35	clays, slit loam (lake laid), sandy clay
3	1	0.4	silty clay loam, clay loam, sandy clay loam, silt loam (stream laid)
4	1.5	0.5	silt loam (wind laid), loam, very fine sandy loam
5	2	0.55	sandy loam, fine sandy loam, gravelly loam
6	3	0.7	very fine sand, loamy sands, gravelly sandy loam
7	4	0.85	sand

If you wish to assign intake family by an alternate method (from Table A-3 in Hubble Report or other) enter your selection below.
Enter a value for both flood and furrow if known, otherwise enter zero.
If you do not wish to assign intake family by an alternate method enter zero for both values.

intake family (flood) = 2
intake family (furrow) = 0.56

SOIL CHARACTERISTICS

initials: sk

date: Sept 16, 2003

Soil Name = Lidy Gravelly Loam

Soil Type = 0-5" = Gravelly loam; 5-29" = Sandy loam; 29-60" = Sand and gravel

Source of Soils Data = SSURGO Digital Soils Database, ToClip

soil depth (inches)		AWC (in/in)		PH		organic (%)		soil depth (ft)	AWC (inches)	intake family	
lower	upper	lower	upper	lower	upper	lower	upper			flood	furrow
0	5	0.11	0.13	7.9	8.4	1	2	1	1.44	2	0.55
5	29	0.11	0.13					2	2.88		
29	60	0.03	0.05					3	3.76		
								4	4.24	alternate	
								5	4.72	method	
										#N/A	#N/A

Management Allowed Deficit (MAD)

crop	root depth (ft)	stress point	MAD (inches)
alfalfa (hay or seed)	5	0.5	2.36
corn (field or silage)	4	0.5	2.12
grain (winter or spring)	4	0.5	2.12
pasture (or grass hay)	3	0.5	1.88
other (enter below)			
turf	1	0.5	0.72
orchard	5	0.5	2.36

Intake Family

choose base number for intake family from table below based on texture
base number (#'s 1 through 7) = 5

#	flood	furrow	texture
1	0.3	0.3	heavy clays, silty clay (> 60% clay)
2	0.5	0.35	clays, slit loam (lake laid), sandy clay
3	1	0.4	silty clay loam, clay loam, sandy clay loam, silt loam (stream laid)
4	1.5	0.5	silt loam (wind laid), loam, very fine sandy loam
5	2	0.55	sandy loam, fine sandy loam, gravelly loam
6	3	0.7	very fine sand, loamy sands, gravelly sandy loam
7	4	0.85	sand

If you wish to assign intake family by an alternate method (from Table A-3 in Hubble Report or other) enter your selection below.
Enter a value for both flood and furrow if known, otherwise enter zero.
If you do not wish to assign intake family by an alternate method enter zero for both values.

intake family (flood) = 0
intake family (furrow) = 0

80th Percentile Values of Monthly ET (mm/day)

Station: Idaho Falls FAA AP

		ETR	ALFH	ALFS	BEANS	F CRN	SILGE	S CRN	PEAS	POTAT	SBEET	SGRAN	WGRAN	PAST	ORCHD	VEGES	ONION	HOPS
March	AVE ET	1.32		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00
March	STDD ET	0.54		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00
March	80PCT ET	1.77	U	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.58</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
April	AVE ET	4.35	S	0.00	0.00	0.00	0.00	0.00	1.31	0.00	1.31	1.31	3.25	2.28	0.00	0.00	0.00	0.00
April	STDD ET	0.54	E	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16	0.16	0.40	0.28	0.00	0.00	0.00	0.00
April	80PCT ET	4.80		<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>1.44</u>	<u>0.00</u>	<u>1.44</u>	<u>1.44</u>	<u>3.59</u>	<u>2.52</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
May	AVE ET	6.07	E	0.00	0.00	0.00	1.82	0.00	2.63	1.83	1.82	2.88	6.01	4.67	0.00	0.00	0.00	0.00
May	STDD ET	0.53	T	0.00	0.00	0.00	0.16	0.00	0.23	0.16	0.16	0.25	0.52	0.40	0.00	0.00	0.00	0.00
May	80PCT ET	6.52	R	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>1.95</u>	<u>0.00</u>	<u>2.82</u>	<u>1.96</u>	<u>1.95</u>	<u>3.09</u>	<u>6.45</u>	<u>5.01</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
June	AVE ET	7.43	F	0.00	0.00	0.00	2.40	0.00	6.31	4.37	2.65	7.13	7.43	5.72	0.00	0.00	0.00	0.00
June	STDD ET	0.49	O	0.00	0.00	0.00	0.16	0.00	0.41	0.29	0.17	0.47	0.49	0.37	0.00	0.00	0.00	0.00
June	80PCT ET	7.84	R	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>2.53</u>	<u>0.00</u>	<u>6.66</u>	<u>4.61</u>	<u>2.79</u>	<u>7.53</u>	<u>7.84</u>	<u>6.03</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
July	AVE ET	8.00		0.00	0.00	0.00	6.02	0.00	3.72	6.71	6.86	7.91	7.83	6.16	0.00	0.00	0.00	0.00
July	STDD ET	0.26	A	0.00	0.00	0.00	0.20	0.00	0.12	0.22	0.23	0.26	0.26	0.20	0.00	0.00	0.00	0.00
July	80PCT ET	8.22	L	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>6.19</u>	<u>0.00</u>	<u>3.82</u>	<u>6.90</u>	<u>7.05</u>	<u>8.13</u>	<u>8.05</u>	<u>6.33</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
August	AVE ET	6.33	F	0.00	0.00	0.00	5.99	0.00	1.02	5.00	6.29	2.86	2.26	4.87	0.00	0.00	0.00	0.00
August	STDD ET	0.30	A	0.00	0.00	0.00	0.28	0.00	0.05	0.24	0.30	0.13	0.11	0.23	0.00	0.00	0.00	0.00
August	80PCT ET	6.58	L	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>6.23</u>	<u>0.00</u>	<u>1.06</u>	<u>5.20</u>	<u>6.54</u>	<u>2.97</u>	<u>2.35</u>	<u>5.06</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
September	AVE ET	4.73	A	0.00	0.00	0.00	3.97	0.00	0.00	3.01	4.28	0.00	0.00	3.64	0.00	0.00	0.00	0.00
September	STDD ET	0.41		0.00	0.00	0.00	0.35	0.00	0.00	0.26	0.37	0.00	0.00	0.32	0.00	0.00	0.00	0.00
September	80PCT ET	5.08	H	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>4.26</u>	<u>0.00</u>	<u>0.00</u>	<u>3.23</u>	<u>4.59</u>	<u>0.00</u>	<u>0.00</u>	<u>3.91</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
October	AVE ET	3.03	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.21	0.00	0.00	2.33	0.00	0.00	0.00	0.00
October	STDD ET	0.35	Y	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.27	0.00	0.00	0.00	0.00
October	80PCT ET	3.32		<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>2.42</u>	<u>0.00</u>	<u>0.00</u>	<u>2.56</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>

ET and standard deviation data (AVE ET and STDD ET) taken from Appendix E (unpublished) of Brockway, C.E., and R.G. Allen, 1983, Estimating Consumptive Irrigation Requirements for Crops in Idaho, Idaho Water and Energy Resources Research Institute.

80th Percentile ET values (80PCT ET) calculated based on Waipole, R.E., and R.H. Meyers, 1985, third edition, PROBABILITY AND STATISTICS FOR ENGINEERS AND SCIENTISTS, New York: Macmillan Publishing Company, pp. 132-144 and 574.

Blackfoot Silt Loam
Grain

S = 0.005
IF = 0.50

INTAKE FAMILY	DESIGN APPLIC.	FURROW SLOPE	FURROW SPACING	FURROW LENGTH	INFLOW RATE	APPROXIMATE INFLOW TIME	ADVANCE TIME	GROSS	NET			DEEP PERC.	IRRIGATION EFFICIENCY
								IRRIGATION APPLICATION	IRRIGATION APPLICATION	RUNOFF			
	Inches	Ft/Ft	Feet	Feet	Gpm	Hours	Minutes	Inches	Inches	Inches	In.	%	
0.50	4.32	.005	2.00	500	6.0	12	82.0	6.93	4.35	2.32	0.29	62.34	
0.50	4.32	.005	2.00	500	3.0	24	351.4	6.93	5.62	0.33	2.28	62.34	
0.50	4.32	.005	2.00	600	7.0	12	102.6	6.74	4.38	2.01	0.41	64.12	
0.50	4.32	.005	2.00	600	3.5	24	458.3	6.74	5.35	0.05	2.37	64.12	
0.50	4.32	.005	2.00	650	7.5	12	113.0	6.66	4.39	1.88	0.46	64.83	
0.50	4.32	.005	2.00	650	4.0	24	424.8	7.11	5.62	0.24	2.55	60.78	
0.50	4.32	.005	2.00	800	9.0	12	144.5	6.50	4.40	1.58	0.60	66.50	
0.50	4.32	.005	2.00	800	5.0	24	500.5	7.22	5.54	0.13	2.77	59.85	
0.50	4.32	.005	2.00	950	10.5	12	176.5	6.38	4.37	1.34	0.72	67.68	
0.50	4.32	.005	2.00	950	6.0	24	577.3	7.29	5.40	0.03	2.95	59.22	
0.50	4.32	.005	2.00	1050	11.5	12	197.9	6.32	4.33	1.22	0.79	68.30	
0.50	4.32	.005	2.00	1050	7.0	24	551.6	7.70	5.69	0.19	3.19	56.11	
0.50	4.32	.005	2.00	1100	12.5	12	195.7	6.56	4.43	1.36	0.89	65.83	
0.50	4.32	.005	2.00	1100	7.5	24	545.2	7.87	5.80	0.26	3.30	54.86	
0.50	4.32	.005	2.00	1200	13.5	12	216.8	6.50	4.38	1.23	0.94	66.50	
0.50	4.32	.005	2.00	1200	8.0	24	630.4	7.70	5.47	0.06	3.32	56.11	
0.50	4.32	.005	2.00	1400	16.0	12	246.9	6.60	4.37	1.18	1.10	65.46	
0.50	4.32	.005	2.00	1400	10.0	24	617.6	8.25	5.81	0.24	3.69	52.37	

Blackfoot

 $i = 0.56$

Grain

 $S = 0.005$

INTAKE FAMILY	DESIGN APPLIC.	FURROW SLOPE	FURROW SPACING	FURROW LENGTH	INFLOW RATE	APPROXIMATE INFLOW TIME	ADVANCE TIME	GROSS	NET		DEEP	IRRIGATION
								IRRIGATION	IRRIGATION	RUNOFF		
	Inches	Ft/Ft	Feet	Feet	Gpm	Hours	Minutes	Inches	Inches	Inches	In.	%
0.56	4.32	.005	2.00	500	5.0	12	123.7	5.77	4.40	0.92	0.54	74.81 (70)
0.56	4.32	.005	2.00	500	3.5	24	277.0	8.08	6.70	0.52	3.25	53.43
0.56	4.32	.005	2.00	600	6.0	12	148.5	5.77	4.42	0.78	0.67	74.81 (70)
0.56	4.32	.005	2.00	600	4.0	24	380.1	7.70	6.41	0.04	3.34	56.11
0.56	4.32	.005	2.00	650	6.5	12	160.8	5.77	4.42	0.72	0.74	74.81 (70)
0.56	4.32	.005	2.00	800	8.0	12	197.9	5.77	4.40	0.56	0.90	74.81 (70)
0.56	4.32	.005	2.00	1000	10.5	12	226.3	6.05	4.48	0.58	1.16	71.25 (70)
0.56	4.32	.005	2.00	1000	7.5	24	463.1	8.65	6.83	0.13	4.21	49.87
0.56	4.32	.005	2.00	1050	11.0	12	238.5	6.05	4.45	0.53	1.20	71.41 (70)
0.56	4.32	.005	2.00	1050	8.0	24	467.6	8.80	6.90	0.16	4.32	49.09
0.56	4.32	.005	2.00	1100	8.5	24	473.2	8.92	6.96	0.18	4.42	48.41
0.56	4.32	.005	2.00	1200	9.5	24	487.0	9.14	7.06	0.21	4.61	47.25
0.56	4.32	.005	2.00	1400	11.5	24	521.3	9.49	7.17	0.23	4.94	45.54

Blackfoot Silt Team Pasture

INTAKE FAMILY	DESIGN APPLIC. Inches	FURROW SLOPE Ft/Ft	FURROW SPACING Feet	FURROW LENGTH Feet	INFLOW RATE Gpm	APPROXIMATE INFLOW TIME Hours	ADVANCE TIME Minutes	GROSS	NET	DEEP	IRRIGATION	
								IRRIGATION APPLICATION Inches	IRRIGATION APPLICATION Inches			RUNOFF Inches
0.50	3.30	.005	2.00	500	4.0	12	169.7	4.62	3.62	0.44	0.88	71.43 70
0.50	3.30	.005	2.00	500	3.0	24	351.4	6.93	5.62	0.33	3.30	47.62
0.55	3.30	.005	2.00	500	4.0	12	193.0	4.62	3.80	0.11	1.21	71.43 70
0.55	3.30	.005	2.00	500	3.5	24	268.9	8.08	6.62	0.64	4.15	40.82

Pasture
Lidy Gravelly Loam

210g Gravelly Loam								GROSS	NET				
INTAKE	DESIGN	FURROW	FURROW	FURROW	INFLOW	APPROXIMATE	ADVANCE	IRRIGATION	IRRIGATION		DEEP	IRRIGATION	
FAMILY	APPLIC.	SLOPE	SPACING	LENGTH	RATE	INFLOW TIME	TIME	APPLICATION	APPLICATION	RUNOFF	PERC.	EFFICIENCY	
	Inches	Ft/Ft	Feet	Feet	Gpm	Hours	Minutes	Inches	Inches	Inches	In.	%	
0.55	1.88	.005	2.00	650	5.5	12	221.0	4.89	3.88	0.14	2.87	38.47	
0.55	1.88	.005	2.00	650	4.5	24	360.0	8.00	6.53	0.29	5.83	23.51	

FIELD IRRIGATION REQUIREMENT

initials: SNK

date: 09/16/03

Claimant = 25-277, 25-278, 25-13989 (Sheppard, Riggs, & Clark)

Weather Station = Idaho Falls FAA

crop	acres	irrig. system	eff. (%)	Monthly ET (mm/day)												net irrig. app. (in)	AVE IR season (mm/yr)	irrig. freq. (days)	Gross Irrigation Application (peak period ET/eff. in mm/day)												season (mm/yr)
				mar	apr	may	jun	jul	aug	sep	oct	ratio	mar	apr	may				jun	jul	aug	sep	oct								
grain 600'	5.7	cor	64	1.44	3.09	7.53	8.13	2.97					739	4.32	1.06	12.7					2.39	5.12	12.47	13.47	4.92					1155	
grain 650'	4.4	cor	65	1.44	3.09	7.53	8.13	2.97					739	4.32	1.06	13.7					2.35	5.04	12.28	13.26	4.84					1137	
grain 800'	19.9	cor	67	1.44	3.09	7.53	8.13	2.97					739	4.32	1.06	12.7					2.28	4.89	11.91	12.86	4.70					1103	
grain 850'	13.2	cor	67	1.44	3.09	7.53	8.13	2.97					739	4.32	1.06	12.7					2.28	4.89	11.91	12.86	4.70					1103	
grain 950'	9.2	cor	68	1.44	3.09	7.53	8.13	2.97					739	4.32	1.06	12.7					2.24	4.82	11.74	12.67	4.63					1087	
grain 1050'	8.4	cor	56	1.44	3.09	7.53	8.13	2.97					739	4.32	1.06	12.7					2.73	5.85	14.25	15.39	5.62					1320	
grain 1100'	38.3	cor	55	1.44	3.09	7.53	8.13	2.97					739	4.32	1.06	12.7					2.78	5.96	14.51	15.67	5.72					1344	
grain 1400'	10.6	cor	56	1.44	3.09	7.53	8.13	2.97					739	4.32	1.06	12.7					2.73	5.85	14.25	15.39	5.62					1320	
Summary	109.7																			2.53	5.44	13.25	14.31	5.23					1227		

Summary 109.7

Peak Gross Irrigation Application (mm/day) =	14.31
On-Farm Irrigation Requirement (cfs/acre) =	0.024
Total On-Farm Irrigation Requirement (cfs) =	2.60
Irrigation Diversion Volume (ft/yr) =	4.03
Total Irrigation Diversion Volume (ac-ft/yr) =	441.69

1227

FIELD IRRIGATION REQUIREMENT

initials: SNK Claimant = 25-277, 25-278, 25-13989 (Sheppard, Riggs, & Clark)
date: 09/16/03 Weather Station = Idaho Falls FAA

crop	acres	irrig. system	eff. (%)	Monthly ET (mm/day)							net irrig. app.		irrig. freq. (days)	Gross Irrigation Application (peak period ET/eff. in mm/day)							season (mm/yr)		
				mar	apr	may	jun	jul	aug	sep	oct	AVE IR season (mm/yr)		ET ratio	mar	apr	may	jun	jul	aug		sep	oct
past 500'	15.7	cor	70		2.52	5.01	6.03	6.33	5.06	3.91	2.56	801	3.30	1.08	12.3	3.89	7.73	9.30	9.77	7.81	6.03	3.95	1144
past 650'	3.3	cor	38		2.52	5.01	6.03	6.33	5.06	3.91	2.56	801	1.88	1.11	6.8	7.36	14.63	17.61	18.49	14.78	11.42	7.48	2108

Summary 19

Peak Gross Irrigation Application (mm/day) = 11.28
On-Farm Irrigation Requirement (cfs/acre) = 0.019
Total On-Farm Irrigation Requirement (cfs) = 0.35
Irrigation Diversion Volume (ft/yr) = 4.30
Total Irrigation Diversion Volume (ac-ft/yr) = 81.763

4.49 8.93 10.75 11.28 9.02 6.97 4.56 1312