Annex L

Cattle Watering Facilities Modification Plan

Table L1 Cattle Watering Reservations and Facilities

Annex L: Cattle Watering Facilities Modification Plan

L.1 General

Many of the land acquisition agreements for the Snake River reservoirs provide landowners with guaranteed river access for cattle watering. After drawdown, it would not be practical to provide access to the river for cattle watering. Environmental concerns about cattle waste in the river and the need to extend fences out into the river make providing river access impractical. To meet the legal obligation to provide for cattle watering after drawdown, water must be provided to the cattle.

L.2 Methods

This study team evaluated all available water supply alternatives. The basic criterion used in evaluating these alternatives was that the water source provide a dependable water supply for cattle watering. The following approaches were considered:

- Drilling wells at each cattle watering site
- Connecting to HMU irrigation water supply systems
- Obtaining water from existing wells
- Obtaining water from tributaries to the Snake River

After thoroughly evaluating all of these alternatives, the study team concluded that drilling wells at each watering site is the only alternative that would provide a dependable source of water. The other alternatives were not considered dependable for the following reasons:

- Tributaries to the Snake River may not be dependable water sources during the dry summer and fall months.
- Existing wells would be significantly affected by the drawdown and might become inoperable.
- HMU irrigation systems would operate only during the irrigation season.

L.3 Well Drilling

To provide water for cattle, a well must be drilled and a pump and water tank installed at each of the watering sites. Anticipated well drilling depths range from 21 meters (70 feet) to 88 meters (290 feet) and are shown in the "well depth" column in Table L1. Subsurface materials would consist of alluvial sand, gravel and silt, and/or basalt bedrock. The study team assumed that most wells would be drilled in the alluvium.

Each site would require an 11,250-liter (3,000-gallon) water tank to provide an adequate volume of water for the cattle. Assuming that the complete recharge time for each tank is 48 hours (1,000 head per day at 7.5 liters [2 gallons] each = 7,500 liters [2,000 gallons] per day), the pump capacity required would be approximately 19 liters (5 gallons) per minute. At this estimated rate of use, the pump would run 40 percent of each day to maintain the desired water volume in the tank. Since most of the cattle watering sites are remote, solar power would be required to operate the pumps. Watering sites that have electricity available are noted in Table L1.

L.4 Schedule

Well drilling at each of the cattle watering sites would be completed after drawdown, when groundwater conditions have stabilized. During drawdown and until a permanent water supply can be established, temporary water system will be provided where necessary. For cost estimating purposes, the temporary system consists of a water truck supplying stock tanks on a periodic frequency.

Table L1. Cattle Watering Reservations and Facilities

Facility No.	Location	Facility Type	Horizontal Distance (ft)	Vertical Distance (ft)	Well Depth (ft)	Remarks
			Ice Harbor Reservoir			
104-6a	S1/2 S23, T10N, R32E RM 19					Use location 104-6c.
104-6b	S1/2 S23, T10N, R32E RM 19.1					Use location 104-6c.
104-6c	S1/2 S23, T10N, R32E RM 19.5	Well	2,200	80	250	Recommend combining 104-6a, b, c into one well facility at 104-6c location. Anticipate well mostly in bedrock. Proximite wells encountered water at 250 to 400 feet. Road access available.
104-8	S.7, T.10N., R.33E., RM 22.2	Well	3,000	80	150	Drill well on landside of railroad. Anticipate drilling mostly in alluvium. Road access available.
104-11	S.23, T.11N., R.33E., MP 29	Well	1,400	180	250	Any proposed water line must cross road and railroad. Road access available for drilling. Suggest shallow well. Drilling half in alluvium and half in bedrock anticipated.
104-16	SE1/4S.13, T.11N., R.33E, MP 30	Well	300	10		Recommend using existing well. Construct small overflow line and tank about 300 feet from existing well.
104-20a	NW1/4S.13, T.11N., R.33E., MP 30.8	Well	500	100	170	Recommend drilling shallow well. Drilling anticipated in alluvium. Road access available.
104-10a	S.11, T.11N., R.33E., MP 31.5	Well	900	200	270	Recommend drilling shallow well. All equipment will have to transported by barge and well drilled prior to drawdown. Install solar pump and tank
104-10b	SW 1/4S.1, T.11N., R.33E., MP 32.2	Well	1,300	220	290	Recommend drilling a well on gently sloping ground between road and railroad. Well anticipated to drilled mostly in alluvium
104-20b	E1/2S.1, T.11N., R.33E., MP 32.8	Well	2,000	60	130	Recommend drilling a shallow well. Most drilling anticipated in alluvium. Road access provided.
104-13	SW1/4 S.19, T.12N, R34E. MP 35.4	Well	1,000	70	140	Recommend drilling a shallow well. Most drilling anticipated to be in alluvium. Road access provided.

Table L1 continued. Cattle Watering Reservations and Facilities

Facility No.	Location	Facility Type	Horizontal Distance (ft)	Vertical Distance (ft)	Well Depth (ft)	Remarks
			Lower Monumental Reservoir			
71-6	SE1/4 S34, T12N, R34E	Well	1,400	160	230	Suggest drilling a well to 230 feet. Road access appears to be established. Anticipated subsurface materials to be alluvium.
104-13a	SE1/4SE1/4 S.27, T.13N., R.43E.					Suggest using 104-13b location and well to serve 13a and b.
104-13b	SE1/4NE1/4 S.26, T.13N., R.34E., MP 43.6	Well				Suggest using 104-13b location and well to serve 13a and b. Establish small line overflow from existing well. The cost of deepening the existing 12" well has been estimated under well development portion of study.
104-13c	N1/2 S.25,T.13N. R.34E. MP 44.3	Well	300	20		Suggest using 104-13c location and well to serve 13b and c. Establish small line overflow from existing well. The cost of deepening the existing 12" well has been estimated under well development portion of study.
104-13d	SE1/4NW1/4NW1/4 S.19, T.13N., R.35E.	Well	1,000	65	135	Recommend drilling shallow well. All equipment will have to transported by barge and well drilled prior to drawdown.
104-13e	SE1/4NW1/4 S.19. T.13N., R.35E.	Well	1,000	65	135	Recommend drilling shallow well. All equipment will have to transported by barge and well drilled prior to drawdown. Install solar pump and tank.
104-15a	NW1/4 S20, T13N, R35E	Well	1,000	65	135	Recommend drilling shallow well. All equipment will have to transported by barge and well drilled prior to drawdown. Install solar pump and tank.
104-15b	NWSW S21, T13N, R35E		200			Construct small-line overflow from existing pump station to supply water to livestock. Install 200 feet of line.
104-15c	NE1/4 S28, T13N, R35E	Line	200			Extent existing irrigation line 200 feet to establish watering facility. Use overflow. Install tank.
104-15d	NE1/4 S.27, T.13N., R.35E.	Well	1,300	100	170	Recommend drilling shallow well. All equipment will have to transported by barge and well drilled prior to drawdown. Install solar pump and tank.

Table L1 continued. Cattle Watering Reservations and Facilities

Facility No.	Location	Facility Type	Horizontal Distance (ft)	Vertical Distance (ft)	Well Depth (ft)	Remarks
80-28a	NW1/4NW1/4 S.19, T.13N., R.36E.	Well	700	65	135	Recommend drilling shallow well. All equipment will have to transported by barge and well drilled prior to drawdown. Install solar pump and tank.
104-10a	NW1/4SE1/4 S.19, T.13N., R.36E	Well	1,000	70	170	Recommend drilling shallow well. All equipment will have to transported by barge and well drilled prior to drawdown.
104-23	SW1/4 S.16, T13N., R.36E.	Well	1,500	130	200	Recommend drill well to 200 feet and installing solar pump and tank upslope from road.
80-28c	NENE S21, T13N, R36E					Recommend using site 104-10b for watering facility due to proximity.
104 10b	E1/2 S22, T13N, R36E	Well	1,100	80	150	Recommend drilling well to 150 feet. Anticipate alluvium for full well depth. Road access available. Install solar pump and tank.
104-12	NENE S27, T13N, R36E	Well	1,600	200	270	Recommend drilling well to 270 feet. Anticipate alluvium for full well depth. Road access available. Install solar pump and tank.
78-33	NE1/4,SW1/4 S30, T13N, R37E	Well		100	170	Recommend drilling well to 170 feet. Road access available. Anticipate drilling entirely in alluvial material. Install tank and solar pump facility.
104-16a	SE1/4NW1/4 S29, T13N, R37E	Well	700	65	135	Recommend drilling shallow well. No electrical power or road access available. Transport equipment by barge prior to drawdown.
104-3	NE1/4SE1/4, S32, T13N, R37E	Pipe and tank	300			Area of current reservation is very congested due to highway and railroad. Recommend establishing watering facility near well 257 by constructing small pipe overflow and tank. Use 3,000 gallon tank and 300 feet of piping.
104-16b	NE1/4SW1/4 S33, T13N, R37E	Well	800	40	110	Recommend drilling shallow well. Transport equipment by barge and drill well prior to drawdown. No electrical power or road access available.
104-16c	NE1/4NW1/4 S3, T12N, R37E	Well	600	40	110	Recommend drilling shallow well. Transport equipment by barge and drill well prior to drawdown. No electrical power or road access available.

Table L1 continued. Cattle Watering Reservations and Facilities page 4 of 5

Facility No.	Location	Facility Type	Horizontal Distance (ft)	Vertical Distance (ft)	Well Depth (ft)	Remarks
104-21	SE1/4, NE1/4, S3, T12N, R37E					Very steep access. Reservation seems impractical.
104-10a	SE1/4NW1/4 S11,T12N,R37E	Well	800	20	90	Recommend drilling shallow well and installing pump and tank. Power available adjacent to site. Anticipate alluvial subsurface materials.
104-9	SE1/4,SW1/4,S31,T13N, R38E	Well	1,300	100	170	Recommend drilling well to 170 feet and installing pump and tank. Power available near site. Anticipate alluvium in subsurface.
104-10b	NE1/4,NE1/4,S31,T13N,R38E	Well	1,200	100	170	Recommend drilling well to 120 feet and installing pump and tank. Power available near site.
104-4	NW1/4NE1/4 S19, T13N R38E	No effect				Alkalai Creek
104-18	NE1/4, NE1/4, S30, T13N, R38E	No effect				Alkalai Creek
104-10c	NW1/4NW1/4 S33, T13N, R38E	Well	1,000	130	200	Recommend drilling shallow well. No electrical power or road access available. Transport equipment by barge prior to drawdown.
104-15	NW1/4, NW1/4, S27, T13N, R38E	Well	1,200	160	230	Recommend drilling shallow well to 230 feet. Anticipate alluvial subgrade. Power available to the site.
			Little Goose Reservoir			
79-4a	SE1/4NW1/4, S25, T13N, R38E	Well	1,500	130	200	Recommend drilling a shallow well to 200 feet and installing a solar pump and tank. Road access available. Alluvial subsurface.
79-4b	NW1/4SW1/4 S30, T13N, R39E	Well	2,200	130	200	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
79-4c,d	SE1/4, NE1/4, S30, T13N, R38E					Use 79-4d location to service 79-4c and 4d.
104-3	NW1/4SW1/4 S20, T13N, R39E	Well	800	130	200	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.

Table L1 continued. Cattle Watering Reservations and Facilities page 5 of 5

Facility No.	Location	Facility Type	Horizontal Distance (ft)	Vertical Distance (ft)	Well Depth (ft)	Remarks
104-20	NW1/4SE1/4 S21, T13N, R39E	Well	1,500	100	170	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-4a	SW1/4, NE1/4,S.28, T13N. R39E	Well	1,000	65	135	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-4b	NW1/4SW1/4 S27, T13N, R39E	Well	1,500	65	135	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-22a	SW1/4NE1/4 S30, T13N, R39E	Well	700	65	135	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-24a	NE1/4SW1/4 S24, T13N, R39E	Pump and tank	300	10		Install solar pump and tank with N.Y. Gulch Creek as the source of water. Too much distance for line from river after drawdown.
104-24b	CENTER S13, T13N, R39E	Pump and tank	200	10		Recommend using N.Y. Bar well for water supply. Reservation at least 2500 ft from river after dd. Subsurface material is bedrock. Install small-pipe overflow and tank. Power available.
104-22b	SW1/4SE1/4 S7, T13N, R40E	Pump and tank	200	10		Recommend using existing irrigation lines from New York Bar HMU. Install overflow pipe and tank.
104-24c	SW1/4SW1/4 S8, T13N, R40E	Well	800	65	135	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-22c	NW1/4NE1/4 S16, T13N, R40E	Well	500	40	110	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-7a	NW1/4, NW1/4, S15, T13N, R40E	Well	700	10	70	Recommend drilling a shallow well. Road access available.
104-6	SW1/4, NE1/4, S12 T13N, R39E	Well	1,000	100	170	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-7	NW1/4, NW1/4, S15, T13N, R40E	Well	1,300	100	170	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-19	N1/2, NE1/4, S 17, T14N, R41E	Pump and tank	1,200	50	120	Recommend installing a pump and tank. Electric power available within 500 feet. No road access.
104-14	SW1/4NW1/4 S25, T14N, R41E	Well	500	80	150	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.

Table L1 continued. Cattle Watering Reservations and Facilities

Facility No.	Location	Facility Type	Horizontal Distance (ft)	Vertical Distance (ft)	Well Depth (ft)	Remarks
104-12a	NW1/4NW1/4 S29, T14N, R42E	Well	1,000	80	150	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-12c	NW1/4NE1/4 S29, T14N, R42E	Well	900	80	150	Recommend drilling shallow well. No road access available. Use locations 104-12a and c and delete location 104-12b.
			Lower Granite Reservoir			
104-15	SE1/4SE1/4, S33, T14N, R43E	Well	1,800	60	130	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
78-16	NW1/4NE1/4 S3, T13N, R43E	Well	1,100	80	150	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-3a	UNSURVEYED	Well	800	60	130	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-3b	SE1/4NE1/4 S3, T 12N,R44E	Well	1,400	80	150	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-9	SW1/4SE1/4 S2, T12N, R44E	Well	700	60	130	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.
104-16	NW1/4NW1/4 S8, T11N, R45E	Well	1,700	90	160	Drill well to level of bottom of main river channel. Access is from Steptoe Creek Road.
104-12a	SE1/4NW1/4 S20, T11N, R45E	Well	1,000	90	160	Recommend drilling shallow well and installing pump and tank. Power available nearby.
104-12b	SW1/4SW1/4 S15, T11N, 45E	Well	600	90	160	Recommend drilling shallow well. Transport equipment by barge prior to drawdown.