

# **BIG HORN RIVER**

**Big Horn Canal**

**Bluff**

**Fritz**

**Highland Hanover**

**Kirby**

**Lower Hanover**

**Lucerne**

**Tillard**

**Upper Hanover**

## DESCRIPTION AND OPERATION MEMORANDUM

### BIG HORN CANAL

USGS ID 44108 D1, 44108 C1, 44107 C8, 44108 A1 USGS Name Rairden, Worland, Orchard Bench, Greybull South, Manderson, Neiber, Schuster Flat

#### DIVERSION DESCRIPTION

Coffer dam in Bighorn River with sliding steel gates in concrete structure for headgate.

#### DIVERSION LOCATION

Source: Big Horn River  
Tract 64 A R.S. or SW 1/4 SE 1/4 Section 20 o.s., Township 46 N, Range 93 W, 6th PM

#### CONVEYANCE DESCRIPTION

Open dirt canal approximately 55 miles long with screw type headgates for delivery to laterals, sublaterals and farm fields; serves approximately 23,000 acres and over 200 users, including small subdivision acreages around the towns of Worland and Basin.

#### WYOMING WATER RIGHTS

Priority Date	Permit Number	Permit Use	Acres	Flow(cfs)	(af)	Cumulative Flow(cfs)	Comments
2/27/1901	3045	Irr.,Dom.	667.50	9.54		9.54	
8/30/1901	3471	Irr.,Dom.,Stk.	19190.82	281.65		291.19	
6/22/1904	1220E	Irr.,Dom.	1740.34	24.72		315.91	
4/15/1911	2444E	Irr.,Dom.	167.96	2.38		318.29	
10/06/1922	4326E	Irr.	18.00	0.26		318.55	
2/27/1928	4574E	Irr.	17.40	0.25		318.80	
3/27/1937	5120E	Irr.	18.00	0.26		319.06	
8/10/1979	6860E	Irr.	0.34				
2/01/1986	4343E	Irr.	2.20	0.03		319.09	

#### STORAGE RIGHTS

Boysen contract for 13,300 A.F. annually.

#### ESTIMATED CANAL LOSSES

Varies with time of year, estimated 25% at peak.

#### IRRIGATION PRACTICES

Conventional flood irrigation practices, some concrete lined delivery ditches, some pipe systems, some sprinklers, and gated pipe. Serves approximately 216 users on 23,000 irrigated acres.

#### CROP TYPES / CONSUMPTIVE USE

Pasture, alfalfa hay, small grains, corn, sugar beets, lawns and gardens.

#### RETURN FLOWS

100 % to Bighorn River, some directly, some via constructed drains, some via Tenmile Creek, some via Elk Creek, some via Greybull River.

#### OTHER OPERATIONAL INFORMATION

Managed by company officials - employs canal manager and ditch riders. Delivers municipal water to Town of Basin.

#### CONTACT INFORMATION

Russell Dooley  
1179 Hwy. 20 South  
Basin, WY 82410  
(307)347-6374

#### PHOTO LOG

Information collected from files available at Division 3 Office of the State Engineer Office in Riverton, WY, and from the ditch contact person when available.

#### DIVERSION RECORD

**Monthly Summary (ac-ft)**

Year	Discharge (ac-ft)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973				10,070	24,466	27,695	28,800	28,540	19,343	5,123			138,914
1974				16,397	27,515	25,734	32,200	29,516	20,138				151,499
1975					14,577	24,807	30,893	30,159	23,819				124,254
1976				10,074	26,519	20,789	25,859	25,263	18,924				127,428
1977				10,415	21,283	20,608	20,801	20,525	19,545				113,177
1978				7,049	14,795	21,622	27,269	21,751	19,611				112,096
1979				5,133	24,551	26,134	23,226	25,799	23,587				128,430
1980				0	24,444	25,400	28,213	24,042	22,183				124,282
1981				18,440	22,270	24,490	25,440	25,490	22,300				138,430
1982				18,180	25,100	25,780	31,520	26,810	23,700				151,090
1983				14,950	26,700	25,890	24,140	28,860	26,660				147,200
1984				12,950	25,920	29,540	32,610	28,200	24,150				153,370
1985				15,030	26,090	27,910	31,900	27,560	20,680				149,170
1986				12,040	26,510	31,580	33,720	30,060	25,380				159,290
1987													
1988													
1989				14,330	25,300	27,880	33,300	26,470	23,800				151,080
1990				12,270	26,110	27,410	30,320	27,140	24,840				148,090
1991				12,020	26,650	26,150	33,530	29,820	22,790				150,960
1992				11,540	28,600	25,290	27,130	27,490	23,720				143,770
1993				9,180	23,800	28,740	32,750	31,380	26,810				152,660
1994				9,850	31,470	29,920	30,350	27,250	19,070				147,910
1995				12,110	26,250	29,050	33,080	31,200	24,570				156,260
1996				8,780	28,010	29,050	35,420	29,940	24,540				155,740
1997				16,240	30,550	23,780	32,770	28,800	24,790				156,930
1998				5,820	32,430	31,030	35,360	29,280	24,760				158,680
1999				19,130	27,350	33,010	35,750	32,180	26,330				173,750
2000				20,490	24,170	28,840	31,580	25,150	20,570				150,800
2001				11,360	27,640	27,670	27,210	22,010	17,700				133,590
Total				12,071	25,521	26,881	30,190	27,433	22,752	5,123			144,849

**Monthly Summary (cfs)**

Year	Discharge (cfs)												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973				169	398	465	468	464	325	83			382
1974				276	447	432	524	480	338				416
1975					237	417	502	490	400				409
1976				169	431	349	421	411	318				350
1977				175	346	346	338	334	328				311
1978				118	241	363	443	354	330				308
1979				86	399	439	378	420	396				353
1980				0	398	427	459	391	373				341
1981				310	362	412	414	415	375				381
1982				306	408	433	513	436	398				416
1983				251	434	435	393	469	448				405
1984				218	422	496	530	459	406				422
1985				253	424	469	519	448	348				410
1986				202	431	531	548	489	427				438
1987													
1988													
1989				241	411	469	542	430	400				415
1990				206	425	461	493	441	417				407
1991				202	433	439	545	485	383				415
1992				194	465	425	441	447	399				395
1993				154	387	483	533	510	451				420
1994				166	512	503	494	443	320				406
1995				204	427	488	538	507	413				429
1996				148	456	488	576	487	412				428
1997				273	497	400	533	468	417				431
1998				98	527	521	575	476	416				436
1999				321	445	555	581	523	442				478
2000				344	393	485	514	409	346				415
2001				191	450	465	443	358	297				367
Average				203	415	452	491	446	382	83			353

Notes:

- 1 Data from SEO Hydrographers Reports, USGS Gage Data and WRDS electronic data.
- 2 Monthly summaries are summarized from daily data. Missing readings interpolated from readings immediately before and after missing data.

## DESCRIPTION AND OPERATION MEMORANDUM

### BLUFF CANAL

USGS Name Banjo Flats West, Neiber

#### DIVERSION DESCRIPTION

Bifurcation works approximately 2.5 miles down Upper Hanover Canal, manually operated screw type gates.

#### DIVERSION LOCATION

Source: Big Horn River

SE 1/4 NE 1/4 Section 16, Township 45 N, Range 94, 6th PM, S 24° 39' W, 2285' from NE corner Section 16

#### CONVEYANCE DESCRIPTION

Open dirt canal with screw type individual headgate turnouts. Capacity of 130 c.f.s, approwimately 12 miles long. Numerous pumps along canal, two main pumps lift water into lateral 1 and Lateral 2 of Upper Bluff Irrigation system, total of 6440 acres served.

#### WYOMING WATER RIGHTS

Priority Date	Permit Number	Permit Use	Acres	Flow(cfs)	(af)	Cumulative Flow(cfs)	Comments
12/02/1903	5686 6684	Irr.	2779.70	39.64		39.64	
5/03/1906	1537E	Irr.	54.00	0.77		40.41	
4/08/1907	1750E	Irr.	82.10	1.17		41.58	
8/09/1907	1768E	Irr.	100.00	1.42		43.00	
3/04/1911	2438E	Irr.	6.80	0.09		43.09	
3/20/1939	6054E	Irr.	1265.00	18.07		61.16	
2/16/1948	5455E	Irr.	138.30	1.98		63.14	
4/15/1952	5611E	Irr.	40.50	0.58		63.72	
7/18/1962	6112E	Irr.	39.70	0.57		64.29	
7/31/1962	6074E		143.00	2.04		66.33	
2/13/1973	6443E	Irr.	25.50	0.36		66.69	

#### STORAGE RIGHTS

Occasional temporary Boysen Reservoir contract on as-needed basis; carries full service Boysen contract water to Upper Bluff Irrigation District.

#### ESTIMATED CANAL LOSSES

Varies with time of year, approximately 20%

#### IRRIGATION PRACTICES

Conventional flood irrigatoin practices, concrete delivery ditches, considerable use of pipe and sprinklers.

#### CROP TYPES / CONSUMPTIVE USE

Alfalfa hay, small grains, sugar beets, corn, lawns and gardens.

#### RETURN FLOWS

100% to Big Horn River, some intercepted by Big Horn Canal

#### OTHER OPERATIONAL INFORMATION

Managed by irrigation district board - employs manager and ditch rider. Carries water for Upper Bluff as well.

#### CONTACT INFORMATION

Bill Glanz  
Worland, WY  
(307)347-3730

#### PHOTO LOG

Information collected from files available at Division 3 Office of the State Engineer Office in Riverton, WY, and from the ditch contact person when available.

#### DIVERSION RECORD

**Monthly Summary (ac-ft)**

Year	Discharge (ac-ft)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973				2,372	5,236	6,056	6,067	6,087	5,282	1,341			31,101
1974				3,537	6,089	5,950	6,476	6,260	5,224				33,537
1975				4,203	5,919	6,349	6,303	6,303	5,318				28,092
1976				2,438	5,764	5,841	6,337	6,309	5,030				31,720
1977				2,404	6,710	6,292	5,944	4,877	4,102				30,329
1978				1,862	4,068	6,198	7,648	7,069	6,244				33,090
1979				1,436	6,141	6,795	7,329	6,906	6,048				34,655
1980				359	6,323	6,073	6,793	6,565	5,225				31,338
1981				6,310	5,960	6,780	7,060	7,550	7,330				40,990
1982				3,376	6,841	6,998	7,533	6,966	5,889				37,603
1983				1,450	5,820	6,800	7,630	6,060	5,580				33,340
1984				1,760	6,020	7,510	7,910	7,510	5,560				36,270
1985				3,150	6,930	7,280	6,740	5,800	4,080				33,980
1986				2,450	6,060	6,240	7,440	6,650	4,580				33,420
1987				2,940	6,700	5,020	7,060	7,210	4,620				33,550
1988													
1989				3,090	5,790	5,700	6,960	5,990	4,920				32,450
1990				1,570	5,480	6,790	6,660	5,700	4,570				30,770
1991				2,220	5,020	6,450	7,210	6,860	4,580				32,340
1992				2,960	6,410	5,300	5,830	5,770	4,110				30,380
1993				2,250	3,920	5,470	6,330	6,550	4,350				28,870
1994				3,000	5,980	5,760	5,840	5,560	2,720				28,860
1995													
1996				1,020	5,830	5,740	6,580	6,010	5,430				30,610
1997				1,980	5,720	5,670	6,860	6,830	5,700				32,760
1998				820	5,560	6,100	7,400	6,070	4,650				30,600
1999				3,070	4,890	6,300	6,550	5,670	4,880				31,360
2000				5,630	4,890	6,480	6,610	5,380	3,630				32,620
2001				1,080	6,110	6,490	6,370	6,020	3,850				29,920
Total				2,482	5,721	6,222	6,797	6,316	4,945	1,341			32,483

**Monthly Summary (cfs)**

Year	Discharge (cfs)												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973				40	85	102	99	99	89	22			86
1974				59	99	100	105	102	88				92
1975					68	99	103	103	89				93
1976				41	94	98	103	103	85				87
1977				40	109	106	97	79	69				83
1978				31	66	104	124	115	105				91
1979				24	100	114	119	112	102				95
1980				6	103	102	110	107	88				86
1981				106	97	114	115	123	123				113
1982				57	111	118	123	113	99				103
1983				24	95	114	124	99	94				92
1984				30	98	126	129	122	93				100
1985				53	113	122	110	94	69				93
1986				41	99	105	121	108	77				92
1987				49	109	84	115	117	78				92
1988													
1989				52	94	96	113	97	83				89
1990				26	89	114	108	93	77				85
1991				37	82	108	117	112	77				89
1992				50	104	89	95	94	69				83
1993				38	64	92	103	107	73				79
1994				50	97	97	95	90	46				79
1995													
1996				17	95	96	107	98	91				84
1997				33	93	95	112	111	96				90
1998				14	90	103	120	99	78				84
1999				52	80	106	107	92	82				86
2000				95	80	109	107	87	61				90
2001				18	99	109	104	98	65				82
Average				42	93	105	111	103	83	22			80

Notes:

- 1 Data from SEO Hydrographers Reports, USGS Gage Data and WRDS electronic data.
- 2 Monthly summaries are summarized from daily data. Missing readings interpolated from readings immediately before and after missing data.

**DESCRIPTION AND OPERATION MEMORANDUM**

FRITZ (AND PFEIFFER) DITCH

**DIVERSION DESCRIPTION**

One 6' screwtype sliding metal gate in concrete headwall.

**DIVERSION LOCATION**

Source: Big Horn River  
N 43° 30' W, 1420' from the South quarter corner of Section 8, Township 48N, Range 92W, and is in the SE 1/4 SW 1/4 Section 8.

**CONVEYANCE DESCRIPTION**

Open dirt ditch approximately 8.5 miles long delivering water to approximately 1200 acres and 7 users. Ditch capacity is approximately 30 c.f.s. Includes all water for original Pfeiffer ditch water rights.

**WYOMING WATER RIGHTS**

Priority Date	Permit Number	Permit Use	Acres	Flow(cfs)	(af)	Cumulative Flow(cfs)	Comments
1/01/1888	Terr.	Irr.	178.00	2.54		2.54	
9/29/1896	1365	Irr.	595.00	8.48		11.02	
7/09/1904	1225E	Irr.	110.00	1.57		12.59	
11/01/1905	1457E	Irr.	120.00	1.71		14.30	
4/05/1909	2032E	Irr.	22.00	0.31		14.61	
4/10/1911	2443E	Irr.	70.00	1.00		15.61	
11/22/1912	2725E	Irr.	65.00	0.93		16.54	

**STORAGE RIGHTS**

None

**ESTIMATED CANAL LOSSES**

Varies with time of year; estimated 30-35% at peak.

**IRRIGATION PRACTICES**

Conventional flood irrigation practices, enhanced by lined delivery ditches and irrigation pipe. Some sprinklers.

**CROP TYPES / CONSUMPTIVE USE**

Alfalfa hay, small grains, pasture, row crops, lawns and gardens.

**RETURN FLOWS**

Moderate all to Big Horn River.

**OTHER OPERATIONAL INFORMATION**

**CONTACT INFORMATION**

Milton Woods  
Worland, WY  
(307)347-8761

**PHOTO LOG**

Information collected from files available at Division 3 Office of the State Engineer Office in Riverton, WY, and from the ditch contact person when available.

**DIVERSION RECORD**

**DESCRIPTION AND OPERATION MEMORANDUM**

HIGHLAND HANOVER CANAL

**DIVERSION DESCRIPTION**

Two sets of pumps lift water out of Upper Hanover for delivery into mains of Highland Canal. Capacity of carrier canal 700 c.f.s.

**DIVERSION LOCATION**

Source: Bighorn River via Upper Hanover Canal  
Pump No. 1 - Lot 2 Section 27, Township 46N, Range 93W. Pump No. 2 - Tract 75B, Section 26, Township 46N, Range 93N.

**CONVEYANCE DESCRIPTION**

1441 feet of pipe from Pump No. 1 to main canal No. 1, then dumps into open ditch and serves 859 acres. 1537 feet of pipe in two segments from Pump No. 2 to main canal No. 2 dumping into open ditch to serve 5728 acres, Main Canal No.1 is 2.5 miles long; Main Canal No.2 is 12 miles long with 4.5 miles of laterals.

**WYOMING WATER RIGHTS**

Priority Date	Permit Number	Permit Use	Acres	Flow(cfs)	(af)	Cumulative Flow(cfs)	Comments
8/05/1939	6025E	Dom.,Irr.,Stk.	4371.90	62.50		62.50	
3/25/1957	6026E	Dom.,Irr.,Stk.	1123.00	16.04		78.54	

**STORAGE RIGHTS**

Boysen Reservoir - Contract for full supply, no specific quantity.

**ESTIMATED CANAL LOSSES**

Varies with time of year  
Est. 20% at peak

**IRRIGATION PRACTICES**

6,415 irrigated acres with 50 users, some sprinklers, remainder flood methods, considerable pipe.

**CROP TYPES / CONSUMPTIVE USE**

Alfalfa hay, small grains, sugar beets, corn, beans, lawns and gardens.

**RETURN FLOWS**

Some to Upper Hanover Canal, some to Big Horn River via Nowater Creek, some via Slick Creek.

**OTHER OPERATIONAL INFORMATION**

Managed by irrigation board, employs canal manager and ditch rider.

**CONTACT INFORMATION**

Ron Weir  
Worland, WY  
(307)347-8911

**PHOTO LOG**

Information collected from files available at Division 3 Office of the State Engineer Office in Riverton, WY, and from the ditch contact person when available.

**DIVERSION RECORD**

**Monthly Summary (ac-ft)**

Year	Discharge (ac-ft)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973													
1974													
1975													
1976													
1977													
1978													
1979													
1980													
1981													
1982													
1983													
1984													
1985													
1986													
1987													
1988													
1989													
1990													
1991													
1992													
1993													
1994													
1995				1,710	5,800	5,260	7,210	6,730	3,140				29,850
1996				0	4,000	5,330	7,710	5,540	1,400				23,980
1997				460	5,100	3,110	6,530	5,780	3,170				24,150
1998				420	4,610	5,470	7,640	7,870	5,310				31,320
1999				2,460	3,900	6,640	8,610	8,050	6,360				36,020
2000				2,840	4,970	6,715	7,290	7,150	3,920				32,885
2001				1,090	6,280	7,510	7,660	7,750	4,370				34,660
Total				1,283	4,951	5,719	7,521	6,981	3,953				30,409

**Monthly Summary (cfs)**

Year	Discharge (cfs)												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973													
1974													
1975													
1976													
1977													
1978													
1979													
1980													
1981													
1982													
1983													
1984													
1985													
1986													
1987													
1988													
1989													
1990													
1991													
1992													
1993													
1994													
1995				29	94	88	117	109	53				82
1996				0	65	90	125	90	24				66
1997				8	83	52	106	94	53				66
1998				7	75	92	124	128	89				86
1999				41	63	112	140	131	107				99
2000				48	81	113	119	116	66				90
2001				18	102	126	125	126	73				95
Average				22	81	96	122	114	66				83

Notes:

- 1 Data from SEO Hydrographers Reports, USGS Gage Data and WRDS electronic data.
- 2 Monthly summaries are summarized from daily data. Missing readings interpolated from readings immediately before and after missing data.



## DESCRIPTION AND OPERATION MEMORANDUM

### KIRBY CANAL

USGS ID 43108 F2 USGS Name Thermopolis, Kirby

#### DIVERSION DESCRIPTION

Manually operated sliding gate in concrete headwall, rock diversion dam.

#### DIVERSION LOCATION

Source: Big Horn River  
Section 19, Township 43, Range 94

#### CONVEYANCE DESCRIPTION

Open dirt ditch canal 9.5 miles long, screw type headgates deliver to main laterals and individual fields. Approximately 45 canal turnouts serve approximately 20 users on around 2860 acres. Approximately 900 feet of main canal is concrete lined. Ditch capacity ~ 115 c.f.s. including Warm Springs and Walter Ditch Rights.

#### WYOMING WATER RIGHTS

Priority Date	Permit Number	Permit Use	Acres	Flow(cfs)	(af)	Cumulative Flow(cfs)	Comments
3/31/1892	255	Irr.	209.00	2.99		2.99	
9/08/1894	84E	Irr.	350.00	5.00		7.99	
10/01/1896	1322	Irr.	204.00	2.91		10.90	
4/19/1904	6200	Irr.	1687.12	19.09		29.99	
7/19/1904	1241E	Irr.	146.00	2.08		32.07	
9/30/1909	2127E	Irr.	6.00	0.09		32.16	
1/24/1910	2198E	Irr.	15.20	0.22		32.38	
7/21/1913	2833E	Irr.	198.00	2.83		35.21	
7/07/1949	5479E	Irr.	100.00	1.42		36.63	
4/18/1952	5618E	Irr.	76.50	SS			
12/11/1972	6448E	Irr.	21.00	0.30		36.93	

#### STORAGE RIGHTS

Occasional temporary contract for Boysen Reservoir storage.

#### ESTIMATED CANAL LOSSES

Varies with time of year, 20-25% at peak.

#### IRRIGATION PRACTICES

Conventional flood irrigation practices through dirt delivery laterals, some gated pipe, some sprinklers.

#### CROP TYPES / CONSUMPTIVE USE

Pasture, alfalfa hay, grass hay, small grain, corn, lawn and gardens.

#### RETURN FLOWS

100% to Bighorn River, some directly, some through constructed drains, some via Kirby Creek

#### OTHER OPERATIONAL INFORMATION

Management by canal company board, company manager and ditch rider.

#### CONTACT INFORMATION

Tom Linnan  
Thermopolis, WY  
(307)864-2919

#### PHOTO LOG

Information collected from files available at Division 3 Office of the State Engineer Office in Riverton, WY, and from the ditch contact person when available.

#### DIVERSION RECORD

**Monthly Summary (ac-ft)**

Year	Discharge (ac-ft)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973						3,564	2,327	2,598	2,221	119			10,711
1974					1,583	3,350	4,651	4,602	3,598				17,784
1975						2,233	3,967	3,342	4,296				13,839
1976					702	2,426	3,039	2,959	1,154				10,280
1977					1,948	2,844	2,130	16	1,444				8,382
1978					63	1,962	4,034	3,775	2,168				12,002
1979				0	662	3,269	3,763	4,054	2,471	280			14,219
1980				0	1,396	2,888	3,255	2,807	938				11,284
1981				400	2,420	3,030	4,410	3,430	2,350				16,040
1982				0	3,426	4,276	6,141	3,475	1,224				18,542
1983				236	4,880	4,840	3,370	4,080	3,270				20,676
1984				0	2,280	4,840	4,700	3,500	3,830				19,150
1985				450	4,480	4,870	5,160	5,490	5,210				25,660
1986				932	3,680	5,120	5,340	4,860	4,630				24,562
1987				0	5,710	4,730	4,900	4,240	0				19,580
1988				0	5,120	4,140	4,590	3,730	2,840				20,420
1989				1,950	5,290	4,300	4,650	4,790	4,690				25,670
1990				630	5,250	4,990	4,190	4,540	3,140				22,740
1991				0	3,420	4,860	5,300	4,940	4,770				23,290
1992				310	3,640	3,170	3,440	3,290	3,070				16,920
1993				0	2,930	5,290	4,760	3,710	4,810				21,500
1994				450	3,920	4,220	4,330	3,630	1,900				18,450
1995				170	3,710	4,410	4,490	3,460	2,990				19,230
1996				0	3,590	5,100	5,800	4,760	4,040				23,290
1997				0	3,430	4,440	4,660	4,010	4,290				20,830
1998				0	3,080	4,180	4,750	4,560	4,320				20,890
1999				0	2,830	3,370	2,890	2,940	2,570				14,600
2000				930	2,290	3,000	2,680	4,060	2,510				15,470
2001					2,555	1,948	3,429	3,378	1,773				13,083
Total				294	3,122	3,850	4,177	3,760	2,983	200			18,186

**Monthly Summary (cfs)**

Year	Discharge (cfs)												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973						60	38	42	37	2			44
1974					26	56	76	75	60				59
1975						38	65	54	72				57
1976					11	41	49	48	19				34
1977					32	48	35	0	24				28
1978					1	33	66	61	36				39
1979				0	11	55	61	66	42	5			39
1980				0	23	49	53	46	16				31
1981				7	39	51	72	56	39				44
1982				0	56	72	100	57	21				51
1983				4	79	81	55	66	55				57
1984				0	37	81	76	57	64				53
1985				8	73	82	84	89	88				71
1986				16	60	86	87	79	78				68
1987				0	93	79	80	69	0				53
1988				0	83	70	75	61	48				56
1989				33	86	72	76	78	79				71
1990				11	85	84	68	74	53				62
1991				0	56	82	86	80	80				64
1992				5	59	53	56	54	52				46
1993				0	48	89	77	60	81				59
1994				8	64	71	70	59	32				51
1995				3	60	74	73	56	50				53
1996				0	58	86	94	77	68				64
1997				0	56	75	76	65	72				57
1998				0	50	70	77	74	73				57
1999				0	46	57	47	48	43				40
2000				16	37	50	44	66	42				43
2001					42	33	56	55	30				43
Average				5	51	65	68	61	50	3			43

Notes:

- 1 Data from SEO Hydrographers Reports, USGS Gage Data and WRDS electronic data.
- 2 Monthly summaries are summarized from daily data. Missing readings interpolated from readings immediately before and after missing data.

**DESCRIPTION AND OPERATION MEMORANDUM**

LOWER HANOVER CANAL

USGS Name Rairden, Worland, Banjo Flats West

**DIVERSION DESCRIPTION**

Concrete coffer dam, manually operated sliding steel gates, spill gate about 1 mile downstream.

**DIVERSION LOCATION**

Source: Big Horn River  
SE 1/4 NW 1/4 Section 15, Township 46 N, Range 93 W

**CONVEYANCE DESCRIPTION**

Open earthen canal approximately 22 miles long runs directly through town of Worland, serves 13,685 acres and approximately 150 users.

**WYOMING WATER RIGHTS**

Priority Date	Permit Number	Permit Use	Acres	Flow(cfs)	(af)	Cumulative Flow(cfs)	Comments
10/26/1904	6287	Irr.,Dom.,Stk.	8578.17	181.80		181.80	

**STORAGE RIGHTS**

Opportunity for temporary Boysen contract on as-needed basis, no long term contract.

**ESTIMATED CANAL LOSSES**

Approximately 15%

**IRRIGATION PRACTICES**

Conventional flood irrigation practices, some concrete delivery ditches, some buried pipe, gated pipe, few sprinklers, numerous pumps.

**CROP TYPES / CONSUMPTIVE USE**

Alfalfa hay, pasture, sugar beets, corn, small grains, lawns and gardens.

**RETURN FLOWS**

100% to Big Horn River, directly and through constructed drains, and via Slick Creek.

**OTHER OPERATIONAL INFORMATION**

Managed by a formal ditch association; employs manager and ditch riders, recieves some return flows from Upper Hanover Canal.

**CONTACT INFORMATION**

Terry Glanz  
P.O. Box 885  
Worland, WY 82401  
(307)347-3134

**PHOTO LOG**

Information collected from files available at Division 3 Office of the State Engineer Office in Riverton, WY, and from the ditch contact person when available.

**DIVERSION RECORD**

**Monthly Summary (ac-ft)**

Year	Discharge (ac-ft)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973	8	8	8	2,547	8,176	7,404	8,711	8,717	6,432				42,012
1974				3,515	8,087	8,428	11,667	10,437	6,611				48,744
1975					2,112	9,509	11,802	10,772	7,277				41,472
1976				2,598	9,618	9,156	11,976	9,227	5,278				47,853
1977				2,388	9,437	9,558	9,394	9,334	6,022				46,134
1978					1,073	8,557	11,173	9,314	6,230				36,347
1979				1,071	7,634	9,316	11,588	9,461	6,446	571			45,516
1980				379	9,130	10,554	12,367	9,927	7,680				50,037
1981				5,230	8,900	9,070	10,060	9,160	5,130				47,550
1982				3,693	9,150	7,992	10,150	8,690	4,990				44,665
1983				2,660	7,690	8,360	11,060	7,610	4,970				42,350
1984				2,540	7,970	8,450	10,180	9,260	5,620				44,020
1985				4,460	9,240	9,520	10,080	8,960	5,600				47,860
1986				6,400	8,640	10,340	11,100	9,800	4,200				50,480
1987													
1988													
1989				5,060	9,560	9,390	11,530	9,440	5,390				50,370
1990				4,580	9,980	10,750	12,220	10,640	6,630				54,800
1991				4,730	8,180	8,630	11,060	8,580	3,820				45,000
1992				5,860	10,230	7,490	7,720	9,110	4,780				45,190
1993				3,500	7,600	8,340	9,540	8,670	5,490				43,140
1994				4,800	10,390	11,710	10,220	10,100	5,360				52,580
1995				4,350	6,880	8,990	11,500	11,590	6,660				49,970
1996				2,970	8,200	9,350	11,700	9,670	5,720				47,610
1997				5,140	8,890	9,230	11,740	9,920	8,040				52,960
1998				1,780	9,850	9,360	11,770	9,780	6,960				49,500
1999				6,130	7,030	12,070	12,810	11,170	5,960				55,170
2000				9,630	9,590	12,500	11,560	9,930	7,210				60,420
2001				3,610	10,610	11,370	11,620	10,890	7,920				56,020
Total	8	8	8	3,985	8,291	9,459	10,974	9,636	6,016	571			48,384

**Monthly Summary (cfs)**

Year	Discharge (cfs)												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973	0	0	0	43	133	124	142	142	108				77
1974				59	132	142	190	170	111				134
1975					34	160	192	175	122				137
1976				44	156	154	195	150	89				131
1977				40	153	161	153	152	101				127
1978					17	144	182	151	105				120
1979				18	124	157	188	154	108	9			125
1980				6	148	177	201	161	129				137
1981				88	145	152	164	149	86				131
1982				62	149	134	165	141	84				123
1983				45	125	140	180	124	84				116
1984				43	130	142	166	151	94				121
1985				75	150	160	164	146	94				131
1986				108	141	174	181	159	71				139
1987													
1988													
1989				85	155	158	188	154	91				138
1990				77	162	181	199	173	111				151
1991				79	133	145	180	140	64				124
1992				98	166	126	126	148	80				124
1993				59	124	140	155	141	92				118
1994				81	169	197	166	164	90				144
1995				73	112	151	187	188	112				137
1996				50	133	157	190	157	96				131
1997				86	145	155	191	161	135				146
1998				30	160	157	191	159	117				136
1999				103	114	203	208	182	100				152
2000				162	156	210	188	161	121				166
2001				61	173	191	189	177	133				154
Average	0	0	0	67	135	159	178	157	101	9			81

Notes:

- 1 Data from SEO Hydrographers Reports, USGS Gage Data and WRDS electronic data.
- 2 Monthly summaries are summarized from daily data. Missing readings interpolated from readings immediately before and after missing data.

**DESCRIPTION AND OPERATION MEMORANDUM**

LOWER AND UPPER LUCERNE (ENL. CYCLONE, LUCERNE PUMPS 1&2, LUCERNE PUMPS 3 & 4)

**DIVERSION DESCRIPTION**

Four 20 c.f.s. pumps out of Enlarged Cyclone ditch lift water into concrete lined canal rock diversion dam in Bighorn River.

**DIVERSION LOCATION**

Source: Bighorn River  
SW 1/4 NE 1/4 Section 18, Township 43 N, Range 94 W, 6th PM

**CONVEYANCE DESCRIPTION**

Two trapezoidal concrete lined canal turning into open dirt ditches. One runs 6.5 miles to the end of ditch, and the other runs 2 1/2 miles in the line of the old Dempsey Canal to end. Serves 1753 acres.

**WYOMING WATER RIGHTS**

Priority Date	Permit Number	Permit Use	Acres	Flow(cfs)	(af)	Cumulative Flow(cfs)	Comments
3/18/1935	5039E	Irr.	2364.60	S.S.			
3/25/1957	6055E	Dom.,Irr.,Stk.	3311.09	7.34		7.34	

**STORAGE RIGHTS**

Full supply contract from Boysen Reservoir.  
Exchange storage from Anchor Reservoir.

**ESTIMATED CANAL LOSSES**

Varies with time of year  
Est. 20% at peak

**IRRIGATION PRACTICES**

Conventional flood irrigation practices through open laterals, some buried pipe, some gated pipe, few small sprinklers.

**CROP TYPES / CONSUMPTIVE USE**

Hay, pasture, corn, small grains, lawns and gardens.

**RETURN FLOWS**

100% to Bighorn River, some directly, some via Owl Creek.

**OTHER OPERATIONAL INFORMATION**

Managed by formal irrigation district (Lucerne Pumps Irrigation District) as somewhat of a sub district to Owl Creek Irrigation District. Employs pumper/manager and ditch rider.

**CONTACT INFORMATION**

Merlin Heinze  
Thermopolis, WY  
(307)864-3015

**PHOTO LOG**

Information collected from files available at Division 3 Office of the State Engineer Office in Riverton, WY, and from the ditch contact person when available.

**DIVERSION RECORD**



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1973					865	2,063	2,460	2,460	555				8,402
1974					1,864	1,825	2,380	2,380	1,230				9,679
1975					738	1,107	1,678	1,678	1,107				6,307
1976					1,000	928	2,089	1,357	678				6,052
1977				742	2,295	2,174	2,271	1,638	817				9,937
1978				571	301	1,226	1,579	1,168	825				5,671
1979				0	534	2,317	2,456	2,102	823				8,232
1980				0	708	1,615	2,017	1,624	238				6,202
1981													
1982				141	1,839	1,474	2,085	2,183	597				8,319
1983													
1984													
1985				0	2,100	2,630	2,000	2,020	327				9,077
1986													
1987													
1988													
1989													
1990													
1991													
1992													
1993													
1994													
1995													
1996													
1997													
1998													
1999													
2000													
2001													
<b>Total</b>				242	1,224	1,736	2,101	1,861	720				7,885

**Monthly Summary (cfs)**

Year	Discharge (cfs)												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973					14	35	40	40	9				28
1974					30	31	39	39	21				32
1975					12	19	27	27	19				21
1976					16	16	34	22	11				20
1977				12	37	37	37	27	14				27
1978				10	5	21	26	19	14				16
1979				0	9	39	40	34	14				23
1980				0	12	27	33	26	4				17
1981													
1982				2	30	25	34	36	10				23
1983													
1984													
1985				0	34	44	33	33	5				25
1986													
1987													
1988													
1989													
1990													
1991													
1992													
1993													
1994													
1995													
1996													
1997													
1998													
1999													
2000													
2001													
<b>Average</b>				4	20	29	34	30	12				22

Notes:

- 1 Data from SEO Hydrographers Reports, USGS Gage Data and WRDS electronic data.
- 2 Monthly summaries are summarized from daily data. Missing readings interpolated from readings immediately before and after missing data.

Lucerne pumps 3&4

**Monthly Summary (ac-ft)**

Year	Discharge (ac-ft)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973					635	1,974	2,340	1,626	476				7,051







1979													
1980													
1981													
1982													
1983													
1984													
1985													
1986				246	2,080	2,290	2,440	2,440	1,630				11,126
1987				99	2,260	1,790	2,184	1,630	1,360				9,323
1988				486	1,550	2,600	2,480	2,560	2,690				12,366
1989				30	2,010	2,170	2,330	2,310	2,110				10,960
1990				40	1,730	2,320	2,510	2,360	1,620				10,580
1991				0	960	1,160	2,580	2,380	1,600				8,680
1992				0	2,180	1,880	1,860	2,120	1,860				9,900
1993				0	1,210	1,640	1,970	2,300	2,390				9,510
1994				40	1,910	2,170	2,480	2,090	2,020				10,710
1995				0	1,350	1,250	1,930	2,260	1,910				8,700
1996				0	1,750	2,470	2,640	2,580	1,490				10,930
1997				0	1,310	2,380	2,290	1,600	1,890				9,470
1998				0	1,310	1,860	2,440	2,200	1,550				9,360
1999				0	520	1,990	2,250	2,560	1,110				8,430
2000				1,684	2,520	2,280	2,420	1,890	1,340				12,134
2001				145	2,208	2,154	2,448	2,414	1,277				10,646
Total				173	1,679	2,025	2,328	2,231	1,740				10,177

**Monthly Summary (cfs)**

Year	Discharge (cfs)												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1973													
1974													
1975													
1976													
1977													
1978													
1979													
1980													
1981													
1982													
1983													
1984													
1985													
1986				4	34	38	40	40	27				31
1987				2	37	30	36	27	23				26
1988				8	25	44	40	42	45				34
1989				1	33	36	38	38	35				30
1990				1	28	39	41	38	27				29
1991				0	16	19	42	39	27				24
1992				0	35	32	30	34	31				27
1993				0	20	28	32	37	40				26
1994				1	31	36	40	34	34				29
1995				0	22	21	31	37	32				24
1996				0	28	42	43	42	25				30
1997				0	21	40	37	26	32				26
1998				0	21	31	40	36	26				26
1999				0	8	33	37	42	19				23
2000				28	41	38	39	31	23				33
2001				2	36	36	40	39	21				29
Average				3	27	34	38	36	29				28

Notes:

- 1 Data from SEO Hydrographers Reports, USGS Gage Data and WRDS electronic data.
- 2 Monthly summaries are summarized from daily data. Missing readings interpolated from readings immediately before and after missing data.

**DESCRIPTION AND OPERATION MEMORANDUM**

TILLARD CANAL

**DIVERSION DESCRIPTION**

8'x16' concrete pump gallery with two pumps lifting water from the Big Horn River into the canal. One pump is a 16" centrifugal with a 75 HP motor, and the other is a 12" centrifugal with a 40 HP motor.

**DIVERSION LOCATION**

Source: Big Horn River  
N 87° 28' W, 2462' from corner 2 of Lot 53, R.S., Township 51N, Range 93W, and is in Lot 53.

**CONVEYANCE DESCRIPTION**

Open earthen canal approximately 6 1/2 miles long delivering water to approximately 1850 acres and 15 users. Canal capacity is approximately 40 c.f.s.

**WYOMING WATER RIGHTS**

Priority Date	Permit Number	Permit Use	Acres	Flow(cfs)	(af)	Cumulative Flow(cfs)	Comments
10/14/1896	1444	Irr.	1626.76	23.21		23.21	
6/02/1913	2804E	Irr.	52.57	0.75		23.96	

**STORAGE RIGHTS**

None

**ESTIMATED CANAL LOSSES**

Varies with time of year; estimated 30-35% at peak.

**IRRIGATION PRACTICES**

Conventional flood irrigation practices enhanced by lined delivery ditches, and irrigation pipe. Some use of sprinklers.

**CROP TYPES / CONSUMPTIVE USE**

Alfalfa hay, pasture, small grain, corn, lawns and gardens.

**RETURN FLOWS**

Minimal; all to Big Horn River

**OTHER OPERATIONAL INFORMATION**

**CONTACT INFORMATION**

Frank Stulc (Tillard Canal Company)  
Basin, WY  
(307) 568-2849

**PHOTO LOG**

Information collected from files available at Division 3 Office of the State Engineer Office in Riverton, WY, and from the ditch contact person when available.

**DIVERSION RECORD**

## DESCRIPTION AND OPERATION MEMORANDUM

### UPPER HANOVER CANAL

USGS ID 44107 B7, 43108 H2 USGS Name Worland, Banjo Flats West, Neiber, McDermotts Butte Kirby, Chimney Gulch, Rairden, Cedar Mountain

#### DIVERSION DESCRIPTION

Sliding steel gates in concrete headwall.

#### DIVERSION LOCATION

Source: Big Horn River

NE 1/4 SE 1/4 Section 19, Township 45N, Range 94W, 6th PM, S 13° 50' , W 3960' from NE corner Section 19

#### CONVEYANCE DESCRIPTION

Open dirt canal 35 miles long serving approximately 13,200 acres. Screw type headgates deliver water to numerous laterals and sublaterals along entire length. Canal is a common carrier for Bluff and Upper Bluff Canal water for first 2.5 miles, and for Highland Hanover Canal water for first 4+ miles. Approximately 170 turnouts, 30 check structures, 25 pumps. Capacity ~ 580 c.f.s.

#### WYOMING WATER RIGHTS

Priority Date	Permit Number	Permit Use	Acres	Flow(cfs)	(af)	Cumulative Flow(cfs)	Comments
4/09/1902	7609	Irr.,Dom.	13818.91	356.66		356.66	
11/07/1932	4811E	Irr.	13.40	0.19		356.85	
3/20/1939	6054E	Irr.,Dom.,Stk.	1265.00	18.07		374.92	
8/05/1939	6025E	Irr.,Dom.,Stk.	4371.90	62.50		437.42	
7/18/1962	6112E	Irr.	39.70	0.57		437.99	
7/31/1962	6064E	Irr.	143.00	2.04		440.03	
1/16/1963	6063E	Irr.	104.50	1.49		441.52	
1/16/1963	6064E	Irr.	146.40	2.09		443.61	
1/14/1971	6379E	Supply					
12/09/1971	6407E	Irr.	35.40	0.51		444.12	
12/13/1973	6443E	Irr.	25.50	0.36		444.48	
7/09/1973	6466E	Irr.	26.70	0.38		444.86	
7/09/1973	6467E	Irr.	30.40	0.43		445.29	
8/12/1974	6538E	Irr.	87.60	1.25		446.54	
4/19/1985	6825E	Irr.	58.40	0.83		447.37	
4/19/1985	6826E	Irr.	18.70	0.27		447.64	
2/23/1994	7225E	Irr.	26.00	0.37		448.01	

#### STORAGE RIGHTS

Boysen Reservoir - 7300 acre feet permanent annual contract.

#### ESTIMATED CANAL LOSSES

Varies with time of year, 20-30% at peak

#### IRRIGATION PRACTICES

Primarily conventional flood irrigation practices some concrete lined delivery ditches, some sprinklers, some gated pipe.

#### CROP TYPES / CONSUMPTIVE USE

Pasture, alfalfa hay, small grains, sugar beets, beans, corn, lawn and gardens, golf course.

#### RETURN FLOWS

Some directly into the Bighorn River via constructed drains, some via Nowater Creek, some via Slick Creek, and some return flows intercepted by Lower Hanover Canal.

#### OTHER OPERATIONAL INFORMATION

Managed by Irrigation district board, district manager and employed ditch riders. Carrier for Highland Hanover, Bluff, Upper Bluff, and Worland Municipal Golf Course water.

**CONTACT INFORMATION**

Terry Glanz  
P.O. Box 965  
Worland, WY  
(307) 347-3134

**PHOTO LOG**

Information collected from files available at Division 3 Office of the State Engineer Office in Riverton, WY, and from the ditch contact person when available.

**DIVERSION RECORD**

**Monthly Summary (ac-ft)**

Year	Discharge (ac-ft)												Total		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
1973				8,055	24,248	28,774	29,718	28,998	22,802						142,596
1974				14,598	26,093	26,459	32,202	31,285	25,200	5,855					155,837
1975					20,987	26,469	29,633	28,808	26,783						132,680
1976				10,342	24,393	27,225	28,249	27,362	26,507						144,077
1977				8,936	26,305	25,019	24,754	23,141	21,987						130,141
1978				7,129	14,495	23,490	29,944	26,489	24,058						125,605
1979				5,371	24,280	26,364	28,608	27,233	24,974	7,573					136,830
1980				1,626	26,450	27,055	29,875	28,725	22,098						135,829
1981				25,550	26,150	27,650	28,400	28,260	27,780						163,790
1982				6,322	27,720	27,660	30,320	28,880	24,220						145,122
1983				10,240	25,860	30,390	32,810	25,980	22,350						147,630
1984				8,960	27,610	30,460	32,430	29,290	22,430						151,180
1985				12,040	28,780	29,740	30,490	26,580	18,770						146,400
1986				16,760	27,670	31,370	33,430	31,210	22,690						163,130
1987				12,460	29,420	22,500	30,160	28,260	20,170						142,970
1988															
1989				12,920	25,730	26,910	32,420	26,870	21,730						146,580
1990				12,010	26,540	31,540	31,120	26,460	23,850						151,520
1991				13,320	27,870	30,680	32,760	30,700	20,470						155,800
1992				9,030	21,820	19,470	19,600	20,240	14,740						104,900
1993				8,380	21,240	27,690	32,470	30,350	26,620						146,750
1994				16,780	30,030	29,900	27,520	26,520	15,270						146,020
1995				10,790	21,960	28,360	33,440	29,910	23,280						147,740
1996				7,210	27,160	29,230	33,270	29,120	23,320						149,310
1997				14,150	29,390	25,900	32,710	30,740	25,130						158,020
1998				4,650	29,260	30,050	33,200	29,550	25,540						152,250
1999				19,750	24,410	31,930	32,690	29,590	23,380						161,750
2000				23,320	22,310	30,380	32,080	26,940	18,780						153,810
2001				7,250	26,860	28,650	29,490	26,740	19,380						138,370
Total				11,405	25,537	27,904	30,493	28,008	22,654	6,714					146,002

**Monthly Summary (cfs)**

Year	Discharge (cfs)												Average		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
1973				135	394	484	483	472	383						392
1974				245	424	445	524	509	423	95					428
1975					341	445	482	469	450						437
1976				174	397	458	459	445	445						396
1977				150	428	420	403	376	369						358
1978				120	236	395	487	431	404						345
1979				90	395	443	465	443	420	123					376
1980				27	430	455	486	467	371						373
1981				429	425	465	462	460	467						451
1982				106	451	465	493	470	407						399
1983				172	421	511	534	423	376						406
1984				151	449	512	527	476	377						415
1985				202	468	500	496	432	315						402
1986				282	450	527	544	508	381						449
1987				209	478	378	490	460	339						393
1988															
1989				217	418	452	527	437	365						403
1990				202	432	530	506	430	401						417
1991				224	453	516	533	499	344						428
1992				152	355	327	319	329	248						288
1993				141	345	465	528	494	447						403
1994				282	488	502	448	431	257						401

1995				181	357	477	544	486	391				406
1996				121	442	491	541	474	392				410
1997				238	478	435	532	500	422				434
1998				78	476	505	540	481	429				418
1999				332	397	537	532	481	393				445
2000				392	363	511	522	438	316				423
2001				122	437	481	480	435	326				380
Average				192	415	469	496	456	381	109			360

Notes:

- 1 Data from SEO Hydrographers Reports, USGS Gage Data and WRDS electronic data.
- 2 Monthly summaries are summarized from daily data. Missing readings interpolated from readings immediately before and after missing data.