

Jackie: Please send a
copy of this to be filed
in 13-2080 ~~to route~~
~~the original to Glen,~~

Dave

RECEIVED

DEC 22 1980

Department of Water Resources

M E M O R A N D U M

TO: Caribou Development Project File
THROUGH: ¹⁴⁴ Glen Saxton, ^{PSR} Phil Rassier, ^{KDH} Keith Hessing
FROM: Dave Tuthill ^{DTA}
DATE: December 22, 1980
RE: Possibilities Of Amending Permit No. 13-2080 To Include Cooling Use For A Thermal Power Generation Plant.

Pursuant to a request by Keith Hessing of the Project and Engineering Section I have reviewed the above referenced file and analyzed the possibility of an amendment in nature of use.

The rate of flow shown on the permit is 40,000 AF. The uses are identified as irrigation, municipal and industrial. The municipal and industrial uses have not been accurately quantified; however these uses can be assumed to be negligible as compared with the irrigation use. A quantification of consumptive use anticipated by the permit can be computed by assuming that all 40,000 AF are to be used for irrigation purposes.

Per a conversation with Keith Hessing, the Last Chance Canal Company can demonstrate a need for all 40,000 AF as supplemental water in addition to their existing water rights. For example, in 1961, Last Chance purchased 42,973 AF from Utah Power and Light Company for supplemental irrigation use.

The attached documentation can be utilized to assist in quantification of the amount of water consumptively used. Note that the canals with an X to the left are portions of the Last Chance system. The conveyance systems are generally shown to be 70% efficient and the on farm systems are shown to be 65% efficient. Therefore, the total efficiency from point of diversion to use by the crop is 45.5%. If all 40,000 AF were diverted for irrigation, then 18,200 AF would be consumptively used.

As a verification of this computation, we know that the average annual diversion is 2.98 AF per acre (per Keith Hessing's calcs.). From Bulletin 516, consumptive Irrigation Requirements for Crops in Idaho, the average 80 percentile irrigation requirement for all crops near Grace is 14.12 inches (see attachment). If this crop requirement is divided by the annual diversion, the efficiency factor is computed as 40%. This figure is close to the previously calculated 45%, but is not as reliable because we are not sure about the actual number of acres irrigated, so it is shown as verification only.

If Permit No. 13-2080 is amended to include a totally consumptive "cooling" use, then a condition should be applied to the amendment that "no more than 18,200 AF consumptive use is allowed by this permit".

TABLE 4 IRRIGATION CONVEYANCE SYSTEM INVENTORY SUMMARY, BY COMPANY, 1974,
BEAR RIVER BASIN, CARIBOU COUNTY, IDAHO

GROUP OR COMPANY	AREA SERVED (acres)	CROPS	EFFICIENCY		LENGTH (feet)	CANAL SIZE		CAP (cfs)	OPEN (feet)	LINING		WATER SOURCE	WATER RIGHTS	CONDITION OF CANALS
			CONVEY. (%)	ON-FARM (%)		FEET	SIZE			PIPE	PIPE			
✓ Bailey Creek	300	H.G.P.	50	40	5,000	Natural Cr.		--	--	--	--	Bailey Creek	--	Natural
✓ Bench Canal Co.	6,320	H.G.P.P.	70	65	36,000	16'-4"D	240	4,000	--	--	--	Last Chance	240 cfs	Good
✓ Brown Ditch Co.	2,800	H.G.P.P.	70	65	32,000	8'-3"D	60	--	--	--	--	Last Chance & Bench Canal	30 cfs	Good
✓ Cherry Allen Ditch	900	H.G.P. P.	70	65	6,100	11'-3"D	20	--	--	700	--	(")	14.65 cfs	Good
✓ East Branch Canal Co.	2,670	H.G.P.P.	70	65	37,000	12'-2 1/2"D	110	846	--	--	--	Last Chance	90 cfs	Good
✓ Farmers Land & Irrig. Co.	3,000	H.G.P.P.	70	65	95,000	14'-4"D	45	--	--	--	--	Soda Creek	85 cfs	Fair
✓ Formation Spring Canal	600	H.G.P.	50	65	27,000	7'-2"D	8	--	--	--	--	Formation Spring	--	Poor
✓ First West Lateral Canal Company	3,600	H.G.P.P.	70	65	22,500	8'-4"D	60	2,258	700	--	--	Last Chance & Bench Canal	45.46 cfs	Good
✓ Gentle Valley Canal Co.	2,200	H.G.P.	70	50	49,300	12'-2 1/2"D	74	150	70	--	--	Bear River	84.1 cfs	Fair
✓ Honest End Canal	900	H.G.P.	70	65	26,500	5'-2"D	20	--	--	--	--	Last Chance & Bench Canal	11 cfs	Fair
✓ Last Chance Canal Co.	--	--	75 (only 1 mi.)	50	6,000	22'-4"D	450	1,500	400	--	--	Bear River	440 cfs	Good
✓ Ledge Creek	230	H.G.P.	50	50	14,000	6'-2"D	4	--	--	--	--	Ledge Creek	--	Natural
✓ Luchl-Burgin Ditch	80	H.G.P.P.	90	65	3,100	18" I.D.	10	--	--	1,700	--	Last Chance & Bench Canal	6 cfs	Good
✓ Nicer Canal Company	3,000	H.G.P.P.	70	65	16,500	10'-3"D	120	1,800	--	--	--	Last Chance	46.6 cfs	Good
✓ North Extension Canal Co.	3,700	H.G.P.P.	50	65	37,000	18'-3 1/2"D	210	600	--	--	--	Last Chance	143 cfs	Fair
✓ North Fork Trout Creek Water Users	516	H.G.P.P.	70	65	4,000	4'-2 1/2"D	15	--	--	--	--	Trout Creek	All	Good
✓ Peterson-Bansen Ditch Co.	900	H.G.P.P.	80	65	8,200	6'-3 1/2"D	20	--	--	4,000	--	Last Chance & Bench Canal	13.6 cfs	Good
✓ Sorenson Ditch	1,700	H.G.P.	70	65	18,000	10'-3"D	30	--	--	--	--	Trout Creek	19.3 cfs	Good
✓ Tanner Canal Co.	1,880	H.G.P.P.	70	65	30,000	10'-3 1/2"D	45	--	--	--	--	Last Chance & Bench Canal	35 cfs	Good
✓ Thatcher Canal Co.	1,700	H.G.P.	60	45	24,000	10'-3 1/2"D	60	--	--	--	--	Gentle Vly. Canal	47 cfs	Fair
✓ Turner Canal	4,300	H.G.P.P.	70	65	32,000	12'-3 1/2"D	95	1,350	--	--	--	Last Chance & North Extension	86 cfs	Good
✓ West Branch Canal Co.	2,000	H.G.P.P.	70	65	63,500	12'-3"D	60	--	--	--	--	Bear River	40 cfs	Fair
✓ Whiskey Creek	1,726	H.G.P.	70	65	32,000	6'-3 1/2"D	20	--	--	--	--	Whiskey Creek	23.8 cfs	Good
TOTAL	45,022	H.G.P.P.	67.2 %	63.2 %	624,700	9.4'-3"D (avg)	80.72 (avg)	12,504 2%	7,570 1.21%	--	--	--	78.97 cfs (avg)	Good

CROPS - R-Hay; P-Pasture; P-Potato; C-Corn; T-Truck Crops; L-City Lot; C-Crain.

1/ 1 Acres x On-Farm Eff.

2/ 1 Feet x Convey. Eff.

Source: Irrigation Conveyance Systems

SCS Working Paper April 1976

Table 24. Consumptive irrigation requirement in acre inches per acre at Grace, Idaho, 17 years of record.

MONTH	MIN	20	40	PERCENTILE 50	60	80	MAX	MEAN CIR	MEAN PPT	FREQ
SUGAR BEETS										
APR	-0.59	-0.57	-0.29	0.03	0.05	0.10	0.11	-0.18	0.37	29.4
MAY	-2.40	-0.76	-0.35	-0.06	0.16	0.34	0.57	-0.26	1.27	88.2
JUN	-2.30	-1.12	0.80	1.49	1.84	2.57	3.52	1.07	1.74	100.0
JUL	3.68	4.53	5.10	5.26	5.35	5.65	6.21	5.16	0.75	100.0
AUG	3.43	4.35	4.75	4.98	5.23	5.65	5.85	4.56	1.02	100.0
SEP	0.71	1.16	1.76	1.80	1.91	2.50	3.83	1.52	0.60	94.1
SEASONAL	7.75	10.63	12.43	12.76	13.51	15.15	15.84	12.77	5.46	
CORN SILAGE										
MAY	-0.38	-0.13	0.03	0.07	0.14	0.37	0.49	0.09	0.39	64.7
JUN	-3.13	-0.96	0.35	0.88	1.20	1.73	2.57	0.47	1.68	100.0
JUL	2.57	3.32	4.02	4.41	4.62	4.95	5.46	4.18	0.75	100.0
AUG	2.70	3.70	4.01	4.37	4.50	4.82	4.95	4.22	1.03	100.0
SEP	0.46	0.74	1.36	1.40	1.45	1.66	1.64	1.25	0.35	100.0
SEASONAL	6.48	8.17	10.07	10.37	10.60	12.04	13.07	10.18	4.10	
SPRING GRAIN										
MAY	-2.28	-1.53	-0.61	-0.36	-0.15	0.15	0.52	-0.60	1.27	100.0
JUN	-1.54	-0.42	1.33	1.97	2.45	3.15	3.53	1.58	1.75	100.0
JUL	4.84	5.26	6.16	6.40	6.87	7.01	7.55	6.22	0.75	100.0
AUG	1.45	1.94	2.84	2.98	3.51	3.54	4.13	3.06	1.02	100.0
SEP	-0.54	-0.25	0.15	0.34	0.35	0.43	0.48	0.15	0.30	76.5
SEASONAL	7.24	8.77	9.98	10.25	10.67	12.32	13.77	10.47	5.06	
POTATOES										
MAY	-1.16	-0.88	-0.29	-0.23	-0.05	0.21	0.34	-0.28	0.64	100.0
JUN	-2.95	-1.47	0.31	0.88	1.26	1.92	2.16	0.41	1.75	100.0
JUL	4.11	4.83	5.44	5.54	5.82	6.25	7.11	5.61	0.75	100.0
AUG	3.65	4.51	5.27	5.55	5.81	6.36	6.50	5.44	1.02	100.0
SEP	0.62	0.96	1.38	1.46	1.51	2.67	2.65	1.55	0.48	76.5
SEASONAL	7.87	11.10	12.13	12.42	13.34	13.83	15.33	12.40	4.56	
WINTER GRAIN										
MAY	0.08	0.23	0.77	0.85	1.50	2.21	2.36	1.15	0.39	64.7
JUN	0.15	2.26	3.95	4.29	5.08	5.64	6.92	4.08	1.68	100.0
JUL	4.84	5.66	6.33	6.52	6.52	7.34	7.73	6.55	0.75	100.0
AUG	0.98	1.30	2.71	2.79	3.16	3.91	3.95	2.75	0.88	100.0
SEASONAL	10.64	12.28	14.12	14.60	14.72	15.98	17.00	14.16	3.61	
ALFALFA										
MAY	0.06	0.13	0.51	0.64	0.84	1.42	1.49	0.74	0.39	64.7
JUN	-1.04	1.08	2.69	3.11	3.75	4.25	5.30	2.75	1.68	100.0
JUL	4.12	4.37	5.15	5.55	5.88	6.08	6.37	5.41	0.75	100.0
AUG	2.61	3.55	3.95	4.28	4.45	4.77	4.94	4.14	1.02	100.0
SEP	0.62	1.09	1.46	1.59	1.62	2.68	3.18	1.61	0.60	94.1
SEASONAL	9.52	11.87	12.48	14.26	15.20	16.90	17.55	14.36	4.45	
GRASS PASTURE										
APR	-0.42	-0.41	-0.20	0.05	0.09	0.18	0.19	-0.09	0.37	29.4
MAY	-1.45	-0.20	0.26	0.43	0.53	1.41	1.52	0.46	1.27	88.2
JUN	-1.65	0.09	2.01	2.70	3.07	3.51	4.44	2.12	1.74	100.0
JUL	3.34	3.56	4.32	4.73	4.97	5.15	5.41	4.52	0.75	100.0
AUG	1.58	2.48	2.75	3.18	3.38	3.61	3.77	3.02	1.02	100.0
SEP	0.01	0.22	0.57	0.65	0.74	1.01	1.61	0.65	0.60	94.1
SEASONAL	6.85	9.02	9.44	10.68	11.01	12.68	13.75	10.57	5.48	

Ave = 14.13"