

Considered: _____

Vested Right
WATER PERMIT NO. 1394-1

MAP No. Same

Name of Applicant Kemper Ditch c/o James Jennings

Post Office Address RR1, Box 182C, Spearfish, SD 57783

Amount of Water Claimed 33.0 cfs Total Acres 544.7

Source of Water Supply Spearfish Creek

Water to be used for irrigation County Lawrence & Butte

About 5 miles N of Spearfish.

PROOF OF PUBLICATION: Received _____ Not Received _____

APPLICATION: Approved _____ Subject to _____

F.F. & C.L. Adopted _____ Not Approved _____ Deferred _____

PRIORITY _____ Date Received Dec. 30, 1986 Fee 15.00 Remarks _____

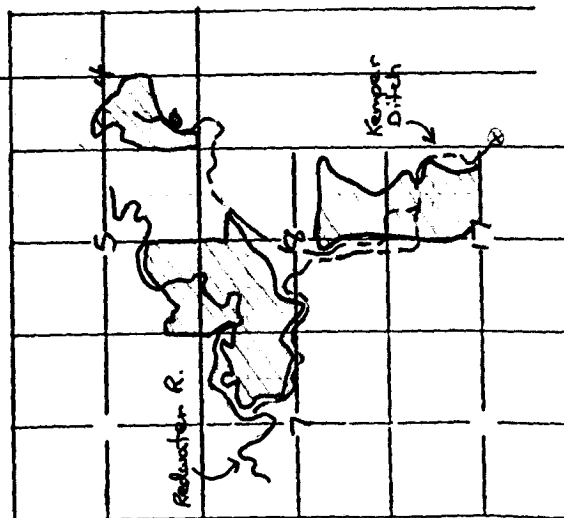
Corrected Application Received _____ Period of Annual Use Apr 1 - Nov 30

WATER QUALITY APPROVAL RECEIVED NA APPROVED/CONDITIONAL (Circle one)

WI-1 Description same as Application YES _____ NO _____ REMARKS _____

Diversion Point Spearfish Creek: NW $\frac{1}{4}$ SW $\frac{1}{4}$
section 16 - T7N-R2E

Land to be Irrigated SW $\frac{1}{4}$, S $\frac{1}{2}$ NW $\frac{1}{4}$ sec. 4; S $\frac{1}{2}$ SW $\frac{1}{4}$,
NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec 5; NE $\frac{1}{4}$ sec. 7; SE $\frac{1}{4}$, NW $\frac{1}{4}$ NE $\frac{1}{4}$, NW $\frac{1}{4}$
sec 8; NE $\frac{1}{4}$ section 17; all in T7N-R2E



Well Log: Driller NA Licensed YES _____ NO _____

Depth of Well _____ REMARKS _____

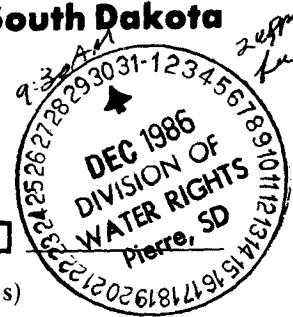
Type of Map aerial photo PREPARED BY Rassool Ahadi Reviewed and the Number
assigned on June 19, 1987 By Ron Duvall

No. 1394-1 Hydrologic Unit 10120203
 Map No. _____ Basin Belle Fourche River
 Newspaper Queen City Mail, Box 7, Spearfish, (Wed)

Belle Fourche Daily Post, 1004 5th Ave.

Application For Permit To Appropriate Water Within The State Of South Dakota

Type of Application: Check one or more of the following:

New ☐ Vested Right ☒ Future Use ☐☐ Application to amend Permit No. _____ with old priority date retained☐ Change diversion point(s) ☐ Add diversion point(s) ☐ Change acreage ☐ Other ☐☐ Application to: ☐ Change use ☐ Change diversion point(s) ☐ Add diversion point(s)☐ Add Acreage ☐ Increase diversion rate ☐ Other _____ See Permit No. _____☐ Application to: ☐ Use ☐ Transfer water reserved by Future Use Permit No. _____1. Name of Applicant Kemper Ditch/James Jennings Phone No. 642-2146Post Office Address RR#1 Box /182C Spearfish, South Dakota State 57783
(Street, RR or Box) Zip Code2. Amount of water claimed (c.f.s) 33 Total acres irrigated 544.73. Source of Water supply Spearfish Creek4. Location of point of diversion Approximately 2200 ft N 70 ft E from SW Corner of Section 16,
T7N-R2ECounty Lawrence5. Counties where water will be used Lawrence and Butte6. Annual period during which water is to be used April 1 - November 30

7. List below each forty acre subdivision, or lot, or fraction thereof and show number of acres to be irrigated in each.

Land Description	No. Acres Irr.
SEE ATTACHED SHEET	

Land Description	No. Acres Irr.

Attach sheet if more space is needed

8. Give a brief description of proposed project. When available include any preliminary engineering report or other reports or information that will help explain the project. (Attach sheet if more space is needed)

This application is to file a vested right claim pursuant to SDCL 46-5-49

Attachments: Attach Form 2A if diversion from a well or dugout, or if storage of water, is proposed. Attach map (see instruction)

STATE OF SOUTH DAKOTA)
County of Butte)^{ss}I, James Jennings the applicant, certify that I have read the foregoing application, have examined the attached map and that the matters therein stated are true and that I intend, and am able to complete the necessary construction.Signed James JenningsSubscribed and sworn to before me this 23rd day of December 1986KIM A. HABECK, Notary Public
My Commission Expires 11-1-92Kim A. Habeck
Notary Public (or other qualified officer)

NOT TO SCALE

Batts

Batts

NOT TO SCALE

8.5
7.8

5.4
8.9

7.9
18.17

8.1
17.1

104.8

Russell A. Hard
NR Engineer
12/22/06

14.6

7-2

7L

92.5

V.R. Appl No. 1394-1

SOUTH DAKOTA

VESTED WATER RIGHT NO. 1394-1 FOR IRRIGATION

Date of Receipt of Claim December 30, 1986.

Date of Validation February 27, 1991.

The Water Management Board validated Vested Water Right Claim No. 1394-1 for irrigation purposes for Kemper Ditch, RR 1, Box 182C, Spearfish, SD 57783 with the following limitations, conditions and qualifications:

1. Vested Water Right No. 1394-1 validates a vested right claim to appropriate 24.0 cubic feet of water per second from Spearfish Creek to irrigate 544.7 acres via the Kemper Ditch. The Spearfish Creek diversion point for the Kemper Ditch is located in the NW1/4 SW1/4 Section 16, T7N, R2E. The irrigated acreage is located in the SW1/4, S1/2 NW1/4 Section 4; S1/2 SW1/4, NE1/4 SW1/4 Section 5; NE1/4 Section 7; SE1/4, NW1/4 NE1/4, NW1/4 Section 8; NE1/4 Section 17; all in T7N, R2E.
2. The appropriation may not exceed the amount of water needed for beneficial use for irrigation. The appropriation may not exceed 3 acre feet per irrigated acre per year. The water is to be used during the following annual period: April 1 - November 30.
3. The priority date of the Vested Water Right is July 31, 1885.
4. The water use system has been constructed and water has been applied to beneficial use.
5. Water rights obtained in compliance with the laws of the State of South Dakota may not be unlawfully impaired by this appropriation.

QUALIFICATIONS

1. That Vested Right No. 1394-1 is subject to domestic use rights. Diversion of water under Water Right No. 1394-1 is contingent upon supplies being available first to domestic users.
2. That the flow measuring device on Kemper Ditch continue to be maintained and records of diversions be kept as directed by the Chief Engineer and reported to the Chief Engineer annually.

WATER MANAGEMENT BOARD

By: 
Chief Engineer

APR 25 1991

date

Division of Water Rights
Dept. of Water and Natural Resources

Affidavit of Water Use

No. _____

(Type or Print in Ink)

Note: This Form is supplemental to Form 2 and is to be used when an affidavit pertaining to construction and water use already constructed is needed, primarily with vested right claims.

**Affidavit Of Construction Of Water Use System
And Application Of Water To Beneficial Use**

Name of Applicant (Same as Form 2) Kemper Ditch/James Jennings

Post Office Address RR#1 Spearfish South Dakota 57783
(Street, RR or Box) (State) (Zip Code)

A. Notice of Appropriation N/A Date of Posting N/A

Date of recording July 31, 1885 Recording date Lawrence County 38 181
Where Book Page

B. Date of start of construction of water supply system 1885C. Date that water was first applied to beneficial use July 31, 1885

D. Name of owner of original water supply system B. F. Waiters, David M. Dorsat, Bernard
Kemper, E. D. Ralph, John M. McVey

E. Amount of water originally applied to beneficial use 5000 MIF. Present Use of Water - Amount of water now being used 33 cfs for irrigation of cropsDate that this water was first used July 31, 1885

G. Chronological History of Water Use

I can attest to the continuous use of the Kemper Ditch water for irrigation use since 1962. Neighbors who have lived a lifetime in this area claim the ditch has been used each year.

Attach to this Form 2B any copies of notices, postings, filings, publications, affidavits, or other records that apply. You may also attach any written statement by you, or by others, that you deem pertinent.

State of South Dakota)

County of Butte) ss

I, James Jennings the applicant, certify that I have read the foregoing
(print or type)
 and that the matters therein stated are true.

Signed James JenningsSubscribed and sworn to before me December 23rd, 1986

KIM A. HABECK, Notary Public
 My Commission Expires 11-1-92

Notary Public or other qualified officer

I, the undersigned do hereby certify that I know about the water use system described above, that I have read the foregoing, and that the matters therein stated are true.

Albert Jeffery 12-23 1986
(Print name) ALBERT JEFFERY
Walter W. McVey 12-23 1986
(Print name) WALTER McVEY

RECEIPT

Division of Water Rights

410678

South Dakota Department of Water and Natural Resources

Pierre, DECEMBER 30, 19 86
Box 182C

RECEIVED OF Kemper Ditch/James Jennings, RR 1, Spearfish, SD 57783

the following amount in fees for services rendered as provided for by law:

Fee for Application for Permit No. <u>1394-1</u> to Appropriate Water, to construct works and to put water to beneficial use _____	15	00
Fee for Application for Permit No. _____ to Appropriate Water for Future Use _____		
Fee to retain Future Use Permit No. _____ after period of seven years.		
Fee for Inspecting Constructed Works, confirming beneficial use and issuing Water License No. _____		
Fee for Filing Transfer Form _____		
Fee for Filing Extension Request _____		
Fee for Certified Copy of _____		
Fee for Print Copy of Map _____		
Fee for Certifying _____		
Fee for _____		
(Any Other Work Provided by Law)	Total	15 00

By John Hatch
Chief Engineer JOHN HATCH/MS

Samuel G. Flickinger

Jack Plunkett

Mat Plunkett

25.060

Location Certificate

Water Right

to

Bernard Kemper et al

Filed July 31st 1885

at 5³⁰ O'clock P.M.

John Baker Register of Deeds.

To all whom it may concern.

This is to certify that we Barnard Kemper,
E D Ralph, John B McWay, B F Watters, and

David M Darsel Citizens of the United States
and residents of Lawrence County Dakota

Territory claim five thousand miners inches
of the Water of Spearfish Creek for irrigating
purposes. That we have complied with law in

Turning the said Water out of its Natural Channel and Conducting
the same through our ditch said Water is taken out of Spearfish Creek
near the North West Corner of Section 16. Township 7. Range two in
Lawrence County Dakota Territory.

COPY

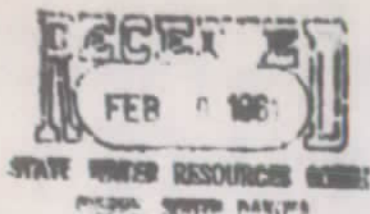
Bernard Kemper

E D Ralph

John B McWay

David M Darsel

B F Watters



Route 1
Opportunity, S. Dak.
Feb. 7, 1961

Mr. J. L. Armes
Chief Engineer & Executive Officer
State Water Resources Commission
Pierre, South Dakota

Dear Sir:

His letter refers to my land in Sec. 4-7A-2E which is irrigated by Kinsack Brothers. You give 107.5 as acreage and the postscript on your letter states, "We understand that the field indicated on the enclosed map is irrigated both from the Kemper Ditch and from the spring as is specified in Water Right 147-1."

The postscript is only partly correct as some parts of this land are irrigated by only one of these ditches while some can be irrigated from either one.

The Spring Branch Ditch comes into the ranch slightly east of the SE corner of the field along the boundary between Sec. 4 and Sec. 6, then from the first curve to the NW of this field the ditch begins to follow the edge of the field. Although the application for this Spring Branch Ditch designated 94.5 acres that could be irrigated I doubt that it has ever irrigated that number of acres. Through the years the Kemper Ditch has been the main source of the water used.

There are some irregular areas in the 107.5 acres onto which water would not go without levelling. This area is made up of several different fields.

Either the Kinsack Brothers or I will be glad to provide any information we can concerning this ranch and irrigation on it either by letter or in person.

Sincerely,

Armanjon A. Rayburne
Mr. J. L. Armes

SOUTH DAKOTA
State Water Resources Commission

STATE OFFICE BUILDING
PIERRE, SOUTH DAKOTA

December 14, 1961

Mrs. Mattie Cvey
Box 1
Pearfish, S. Dak.

Mr. Harry Wilson
Box 1
Pearfish, S. Dak.

Mr. Max Schuft
1102 5th
Belle Fourche, S. Dak.

Kissack Brothers
Box 1
Pearfish, S. Dak.

Mrs. George Jeffery
c/o Mr. Albert Jeffery
Box 2
Pearfish, S. Dak.

Mr. W. W. Williams
Box 1
Pearfish, S. Dak.

Mrs. Charles H. Wayburne
Pearfish, S. Dak.

Re: Kemper ditch

The State Water Resources Commission has been making a study of water use pertaining to the surface flows of Red-water River and its tributaries in South Dakota.

As a part of this study, a search has been made for written records and documents which pertain to the diversions of the water. The Commission found the following pertaining to the Kemper ditch:

A Location Certificate, filed July 31, 1885, in Book 38, page 181, Lawrence County, claiming 5000 miner's inches of the water of Pearfish Creek.

There being no Court case of record that was found which interpreted, determined or established your water right, the record, as outlined above, indicates an appropriative water right with a priority of July 31, 1885, and recorded as claiming 5000 miner's inches.

In an appropriative water right, the amount claimed, in your case 5000 miner's inches, is not necessarily the amount of water which you are entitled to divert. You are entitled to divert that amount of water put to beneficial use, not exceeding 5000 miner's inches, providing that amount is available after holders of prior water rights have obtained their allocation of the water.

DATE RECORDED

JAN 10 1962

Mrs. Mattie McVey
Mr. Harry Hitzel
Mr. Max Schuff
Kissack Brothers
Mrs. George Jeffery
Mr. H. A. Williams
Mrs. Charles E. Mayburne

December 14, 1961

It would be advisable for you to check to see if you can locate additional records that pertain to the Kemper ditch. The Water Resources Commission would appreciate being informed about any additional data you find that you deem applicable, in order to obtain as complete a record as possible, and would arrange to have a representative meet with you to discuss the information contained in this letter and such additional information as you might find, if you so desire.

A letter dated January 16, 1961 was sent to you enclosing a map showing fields reported to be irrigated and the acreages of these fields. With your help these fields and acreages have been revised. Enclosed, for your information, is a copy of the revised map and the revised list of owners and acreages.

You will note on the enclosed map field "4" of 107.3 acres. Water Right Number 147-1, on file in the office of the Water Resources Commission in Pierre, also covers 94.5 acres of this field "4" and authorizes the diversion of 1.35 cubic feet second of water from the spring located south of field "4", under priority date of May 28, 1928.

Sincerely,

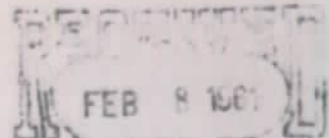
J. W. GRIMES
Executive Officer and
Chief Engineer

Enclose: Map and List

William G. "Bill" Schuft

801 LAWRENCE STREET
BELLE FOURCHE, SOUTH DAKOTA

February 7, 1960



STATE WATER RESOURCES COMMISSION
PIERRE, SOUTH DAKOTA

Water Resource Commission
State Capitol
Pierre, South Dakota

Gentlemen

Re: Kemper Irrigation Ditch

On the map and in the computing of the number of acres from the Kemper Ditch, approximately thirty (30) acres have been left out of our irrigable land from the Kemper Ditch.

Please have one of your representatives call on me at your convenience.

Thanking you, I am

Yours truly

A handwritten signature in cursive script, appearing to read "Max Schuft".

Max Schuft

KEMPER DITCH

<u>Name</u>	<u>Field</u>	<u>Acreage</u>	<u>Total</u>
Mrs. Mattie McVey	A	78.5	117.7
	B	39.2	
G. A. Williams	C	66.2	66.2
Harry Hitzel	D	9.9	60.2
	E	11.8	
	F	31.5	
	G	7.0	
Max Schuft	H	33.1	92.2
	I	27.6	
	J	31.5	
Mrs. George Jeffery	K	80.0	80.0
Kissack Bros.	L	6.4	6.4
Mrs. Charles Rayburne	M	107.3	<u>119.2</u>
	N	3.5	
	O	8.4	
Ditch Total			541.9

KEMPER DITCH

R.R. 1 Box 182C

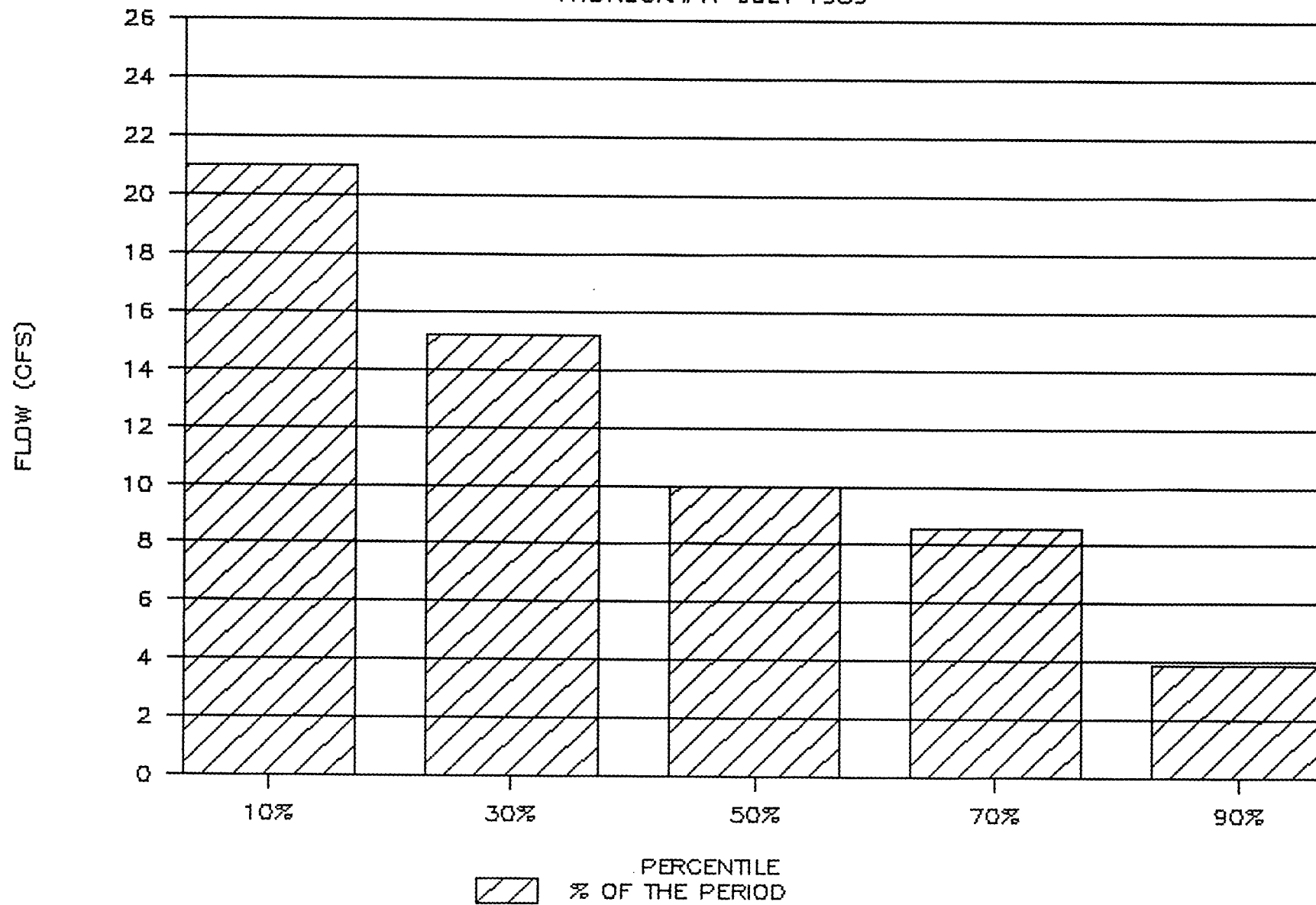
DIVERSION POINT SW $\frac{1}{4}$ NW $\frac{1}{4}$ SEC 16 T 7 R 2 E

MAXIMUM DIVERSION RATE 125 C.F.S.

	NAME	LOCATION	ACREAGE	COMMENTS
1	WALTER McVEY	17-7-2	117.7	
2	JENNINGS Ranch Co	SE $\frac{1}{4}$ 8-7-2	66.2	
3	JOR HITZEL	58-7-2	62.3	
4	MAX SCHUTT Trust	74-8-7-2	92.2	
5	ALBERT JEFFERY	11-7-2	80.0	
6	PHIL KISSACK	3-7-2	6.4	
7	DONALD KISSACK	4-7-2	119.2	
		TOTAL	544.0	

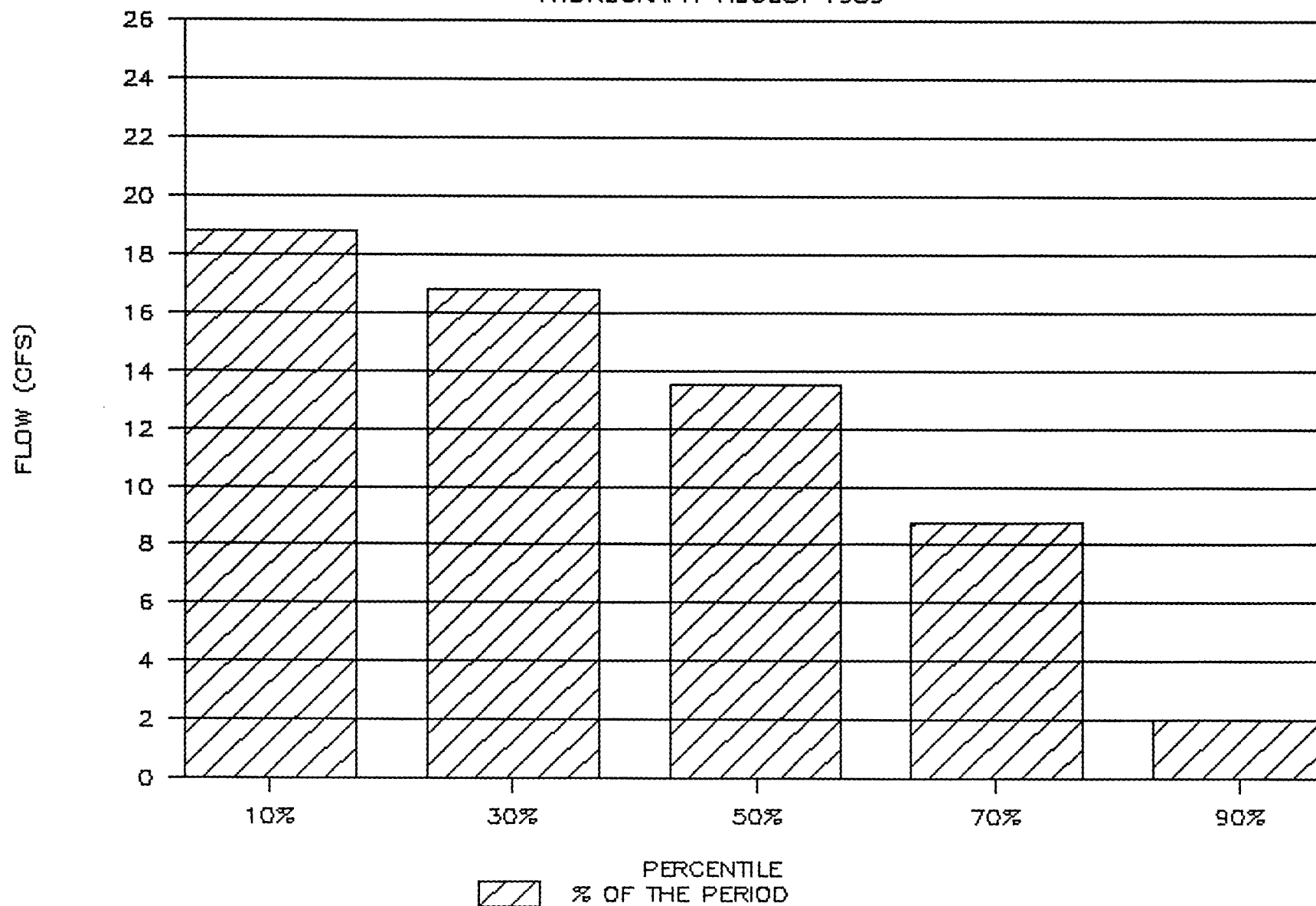
KEMPER DITCH

HYDROGRAPH—JULY 1989



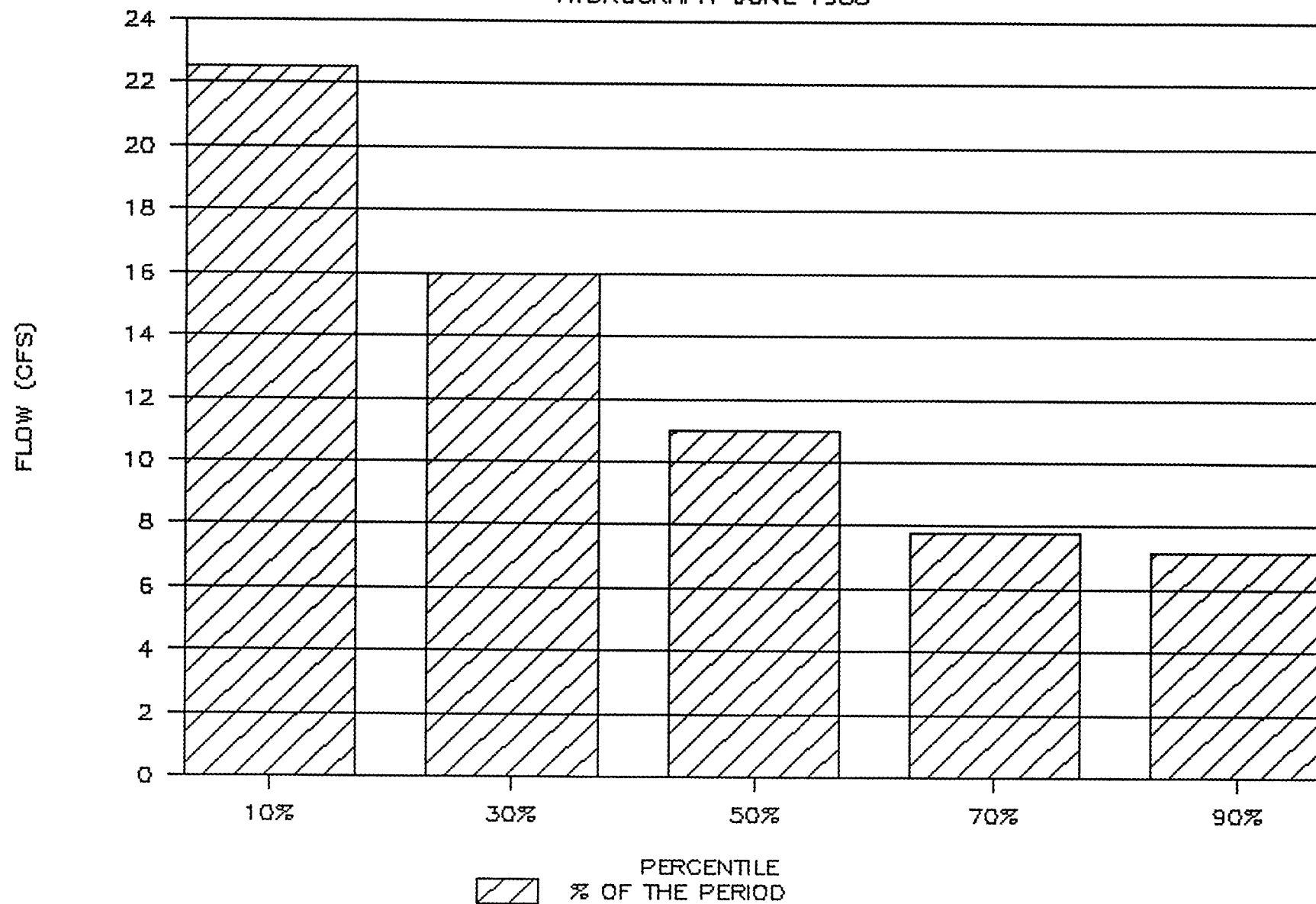
KEMPER DITCH

HYDROGRAPH—AUGUST 1989



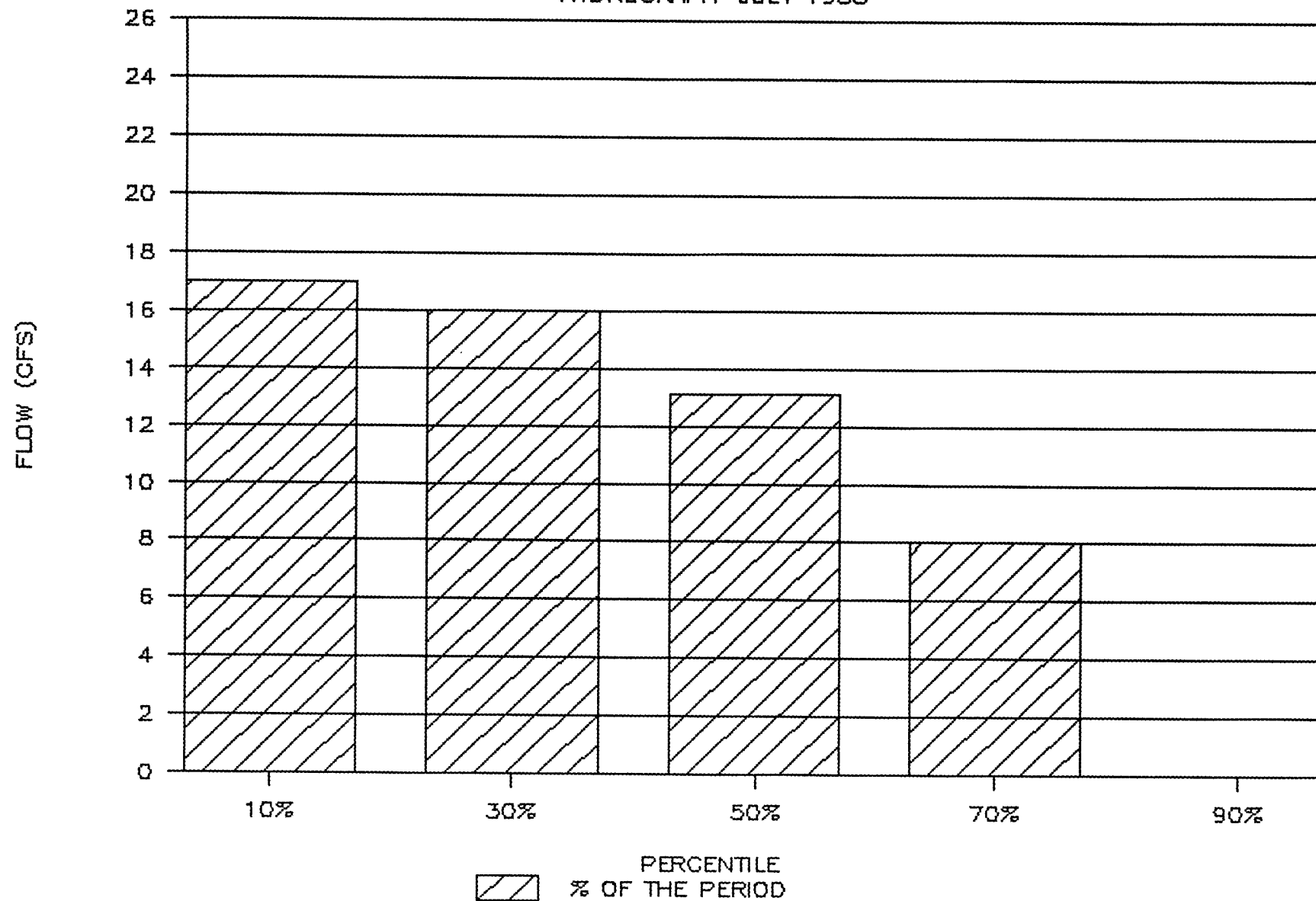
KEMPER DITCH

HYDROGRAPH-JUNE 1988



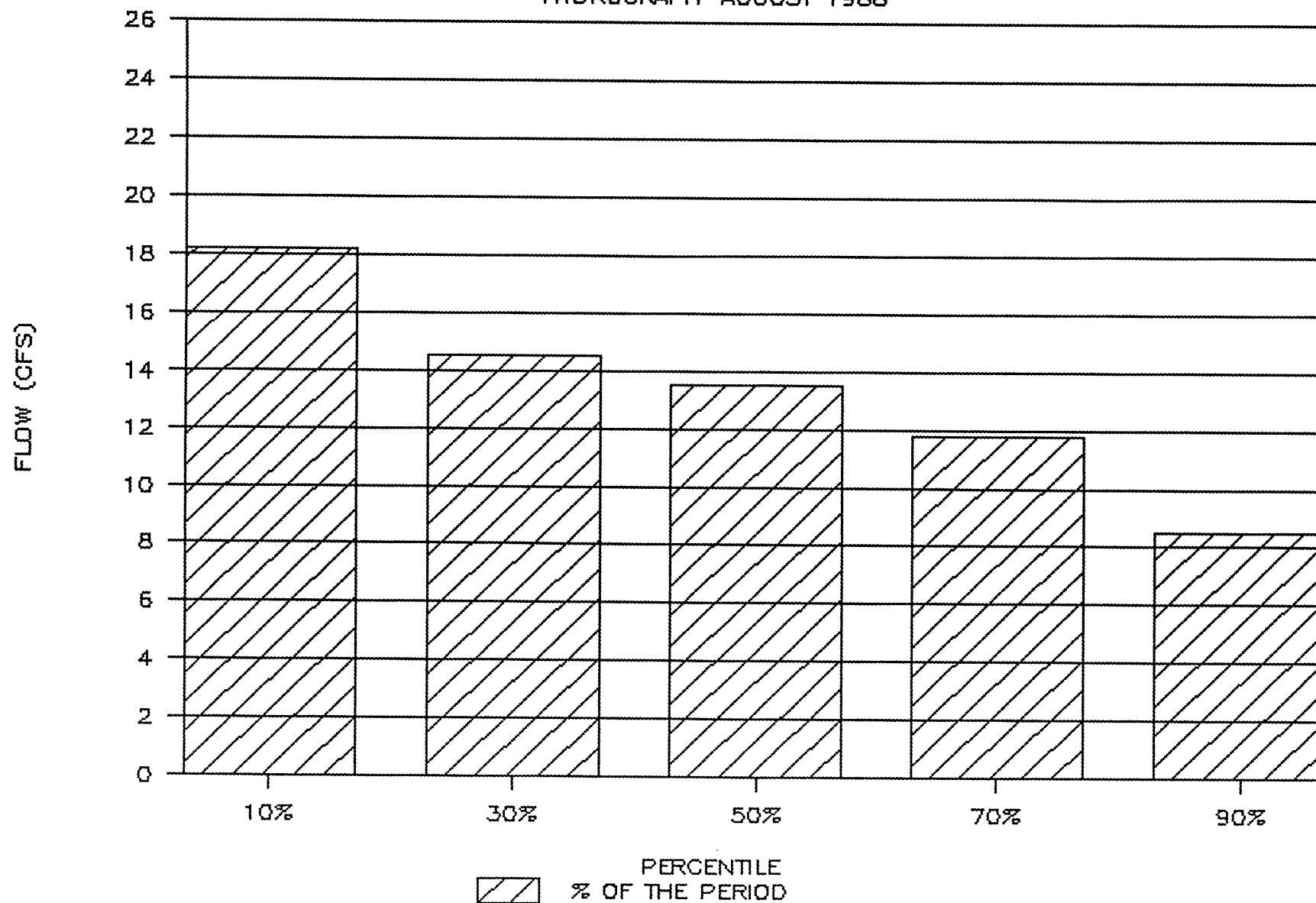
KEMPER DITCH

HYDROGRAPH—JULY 1988



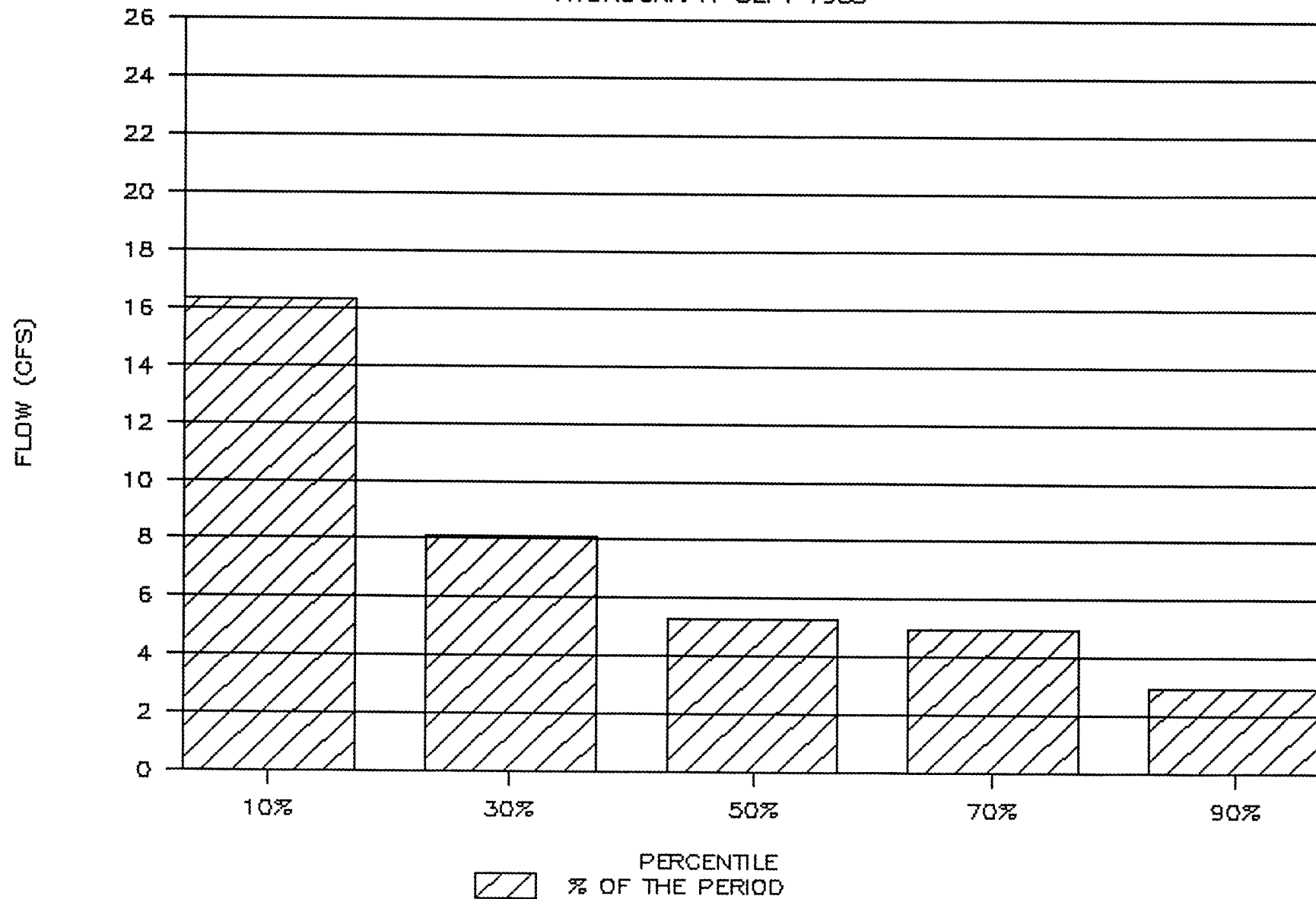
KEMPER DITCH

HYDROGRAPH—AUGUST 1988



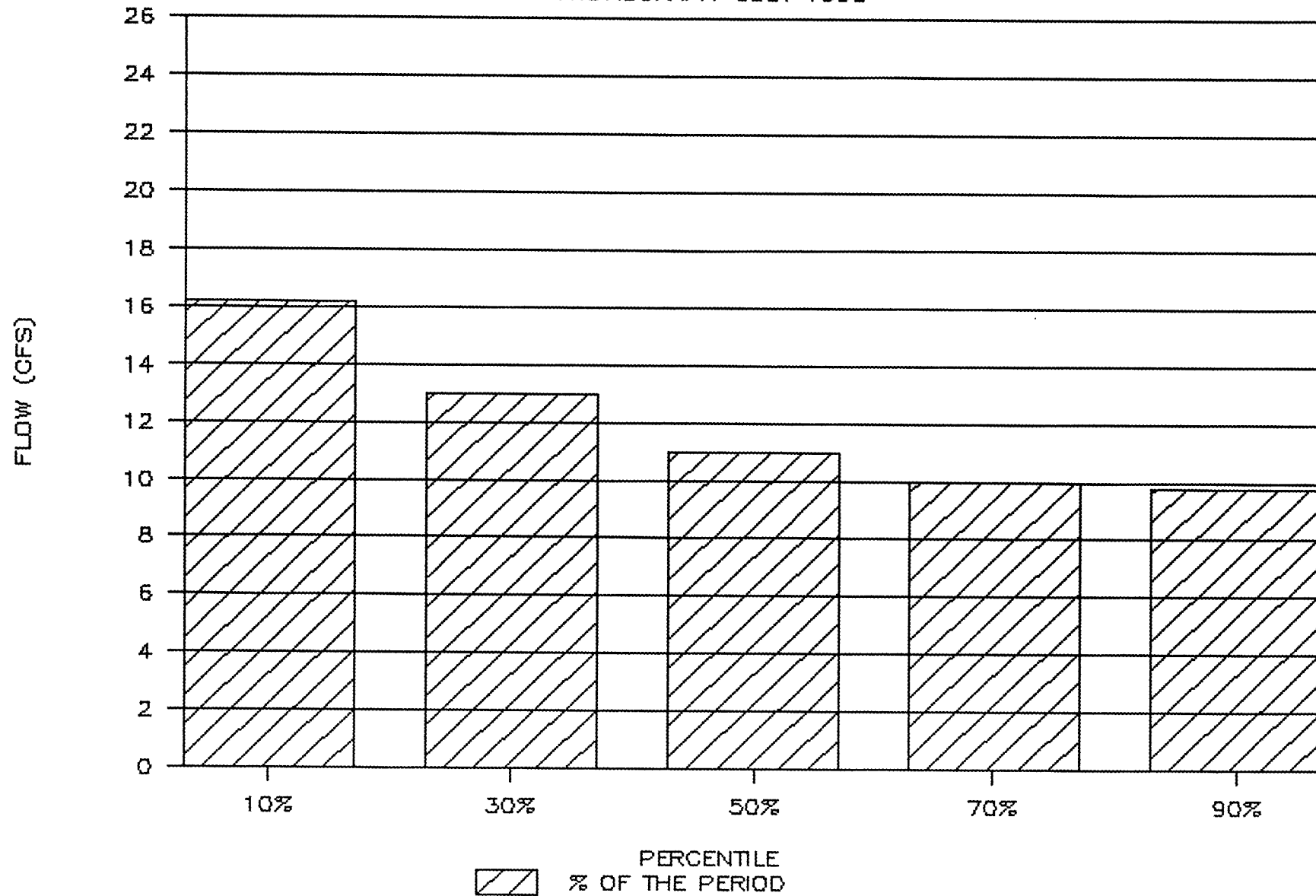
KEMPER DITCH

HYDROGRAPH—SEPT 1988



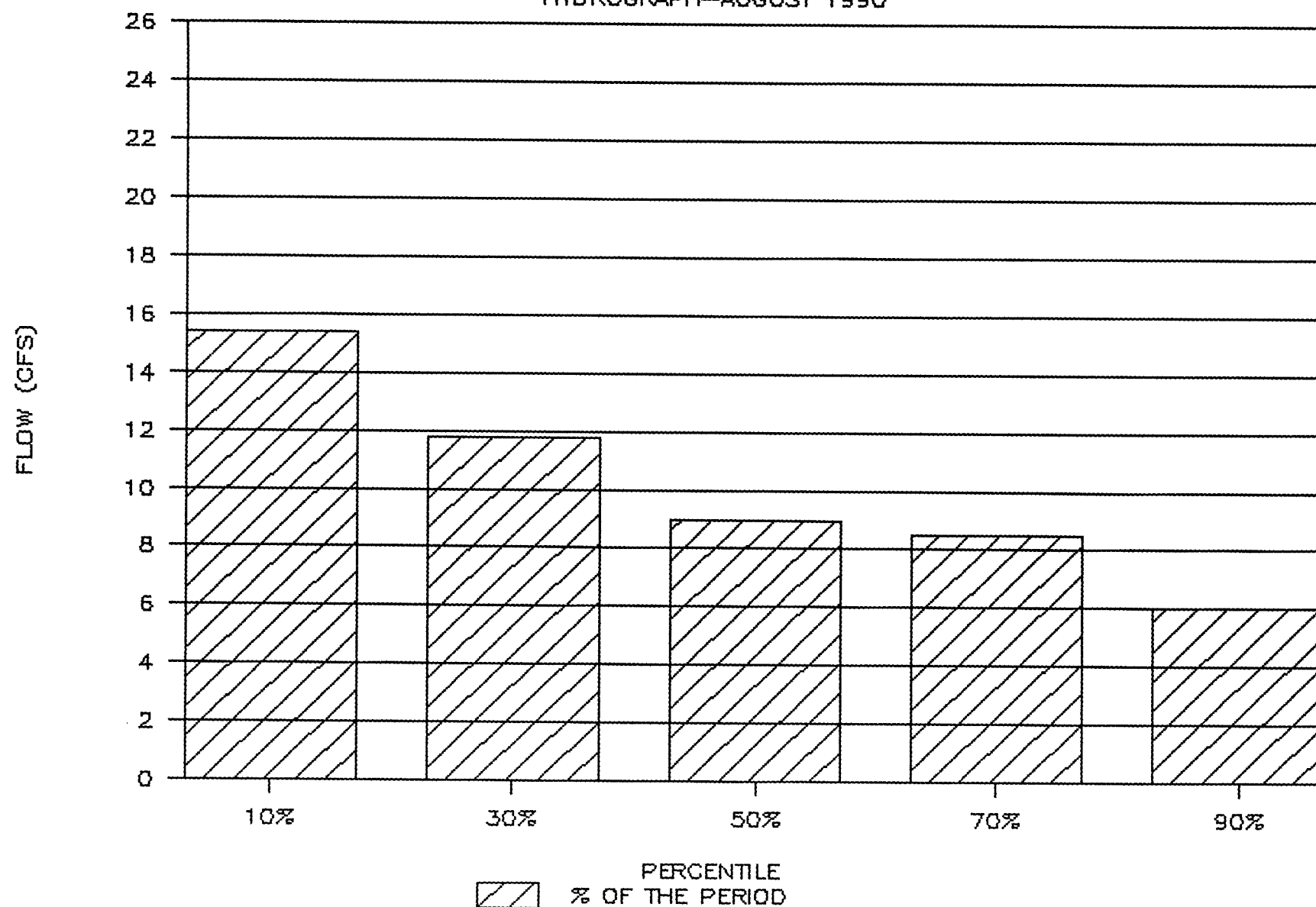
KEMPER DITCH

HYDROGRAPH—JULY 1990



KEMPER DITCH

HYDROGRAPH—AUGUST 1990



DIVERSION DITCH SERVICE

NAME OF THE DITCH: *Kemper Ditch*

ADDRESS: *RR 1 Box 182C*

DIVERSION POINT: *NW 1/4 SW 1/4 SEC. 16 T7N-R2E*

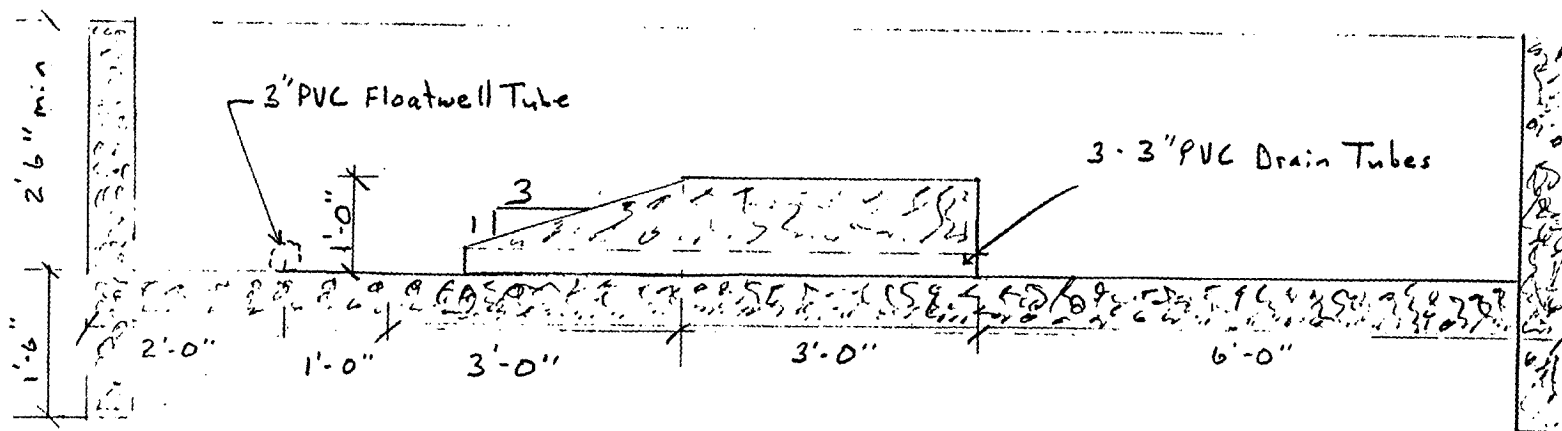
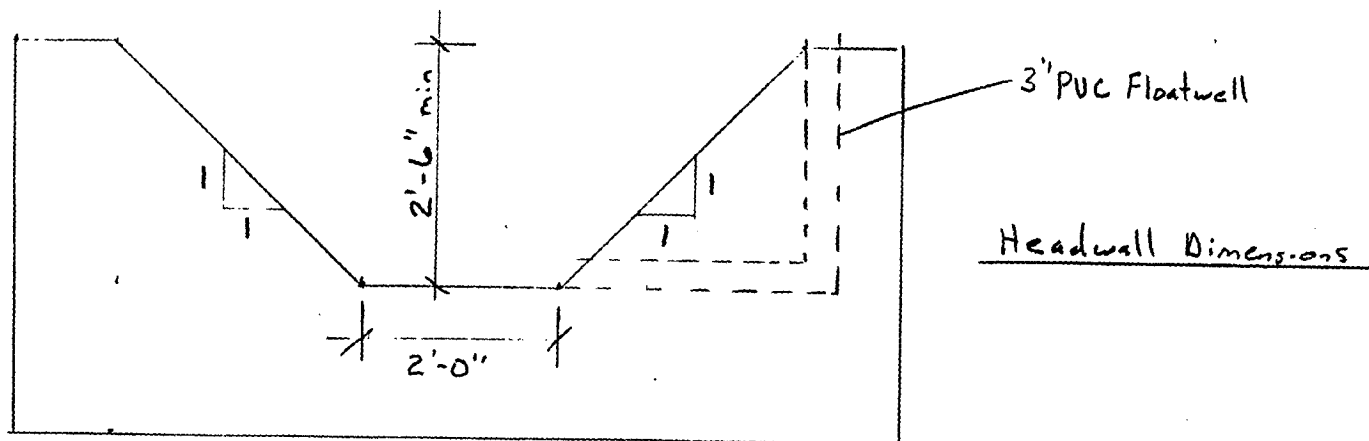
MAXIMUM DIVERSION RATE: *125 C.F.S.*

ACREAGE SERVED: *544.0 ACRES*

LANDOWNER'S NAME	LOCATION OF LAND BEING IRRIG. BY THIS DITCH	ACREAGE	COMMENTS
---------------------	---	---------	----------

<i>Phil Kirsch for</i>	<i>8-7-2</i>	<i>6.4</i>	<i>6/8/86</i>
<i>Albert Jeffery</i>	<i>8-7-2</i>	<i>80</i>	<i>6/8/86</i>
<i>Walter W. McVey</i>	<i>17-7-2</i>	<i>117.7</i>	<i>9/26/86</i>
<i>Burne M. Carlson</i>	<i>7-7-2</i>	<i>9.22</i>	<i>6/26/86</i>
	<i>8-7-2</i>		
<i>Plot D 12.2 SAC</i>	<i>8-7-2</i>		
<i>Jack Hitzel</i>	<i>9-7-2</i>	<i>62.3</i>	<i>6/30/86</i>

LANDOWNER'S NAME	LOCATION OF LAND BEING IRRIG. BY THIS DITCH	ACREAGE	COMMENTS



Flume FB-1

~~Flume FB-1~~ Ditch

Constructing Simple Measuring Flumes For Irrigation Canals

Albert J. Clemmens and John A. Replogle¹

Introduction

Poor irrigation water management causes many serious water-supply and water-quality problems. Farmers and other water users are being encouraged to develop their own water management plans or improve existing ones. A major step in implementing any plan is measuring the amount of irrigation water applied. Correct application depends on accurate discharge rate information, both for the main irrigation stream entering the field and for runoff leaving the field.

Typical water-measuring devices—sharp- and broad-crested weirs and flumes such as the parshall, cutthroat, and short- and long-throated trapezoidal that are used in open channels or ditches—are cumbersome and expensive. Since most of these measuring devices require laboratory calibration, flumes used in the field are limited to the particular shapes and sizes for which these calibrations are available.

Issued March 1980

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

Stock No. 001-000-04119-3

¹Research hydraulic engineers, Science and Education Administration, Agricultural Research, U.S. Water Conservation Laboratory, Phoenix, Ariz. 85040.

Flume Design Criteria

The profile and cross section of the b-c-w flume are shown in figure 3. The important design dimensions are the sill height, S , and the sill length, L . The sill represents the floor of the throat section for these flumes. The sides of the throat section are the existing channel walls. The sill length is less important for design and need not be considered in selecting sizes for the new style measuring flume. There are certain conditions, however, under which the sill length limits the design. If it is too short, the flow lines will not be parallel enough in the throat section and the flume ratings may deviate by as much as 10 percent from those presented in this publication (see p.9). When this condition exists, the rating tables are marked to indicate that a longer throat would be used.

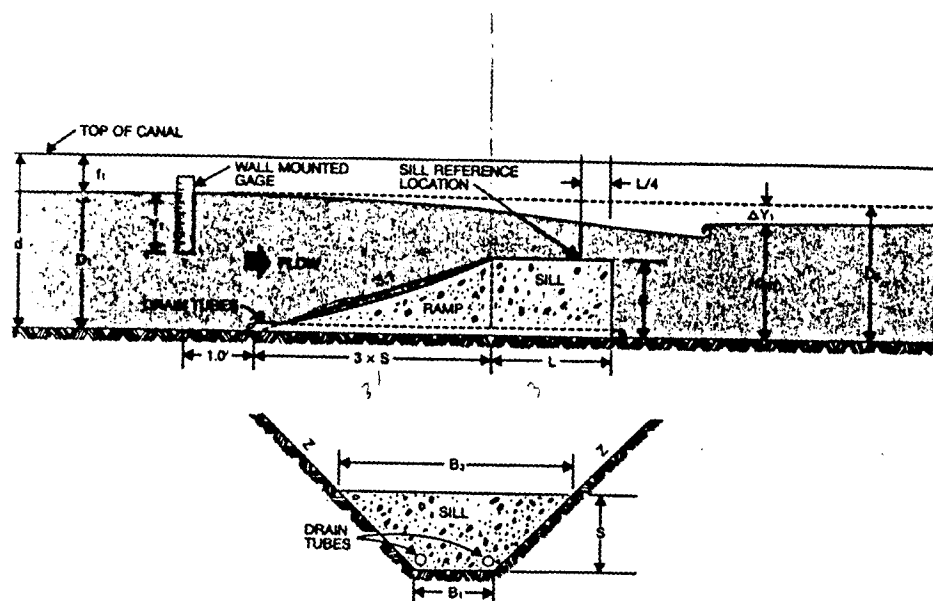


FIGURE 3.—Flume dimensions in profile (top) and cross section (bottom).
 Abbreviations used in the profile are as follows: d = constructed depth; D_1 = upstream water depth; f_1 = actual freeboard; Y_1 = sill-referenced flow depth; L = sill length; ΔY_1 = actual increase in water depth caused by the flume; S = sill height; d_m = flow depth; $3 \times S$ = three times the sill height (ramp length).
 Abbreviations used in the cross section (bottom) are as follows: B_3 = sill width; B_1 = canal bottom width; Z = sideslopes; S = sill height.

The sill height is the most important design dimension for controlling the water levels in the ditch. The sill must be high enough so that it obstructs the usual flow in the ditch, causing the water surface upstream from the flume to rise as shown in figure 3. Field and laboratory experience with this style of flume has shown that flumes will operate satisfactorily at 85 percent submergence. For example, the downstream water depth should be no more than 85 percent of the upstream water depth, both measured from the elevation of the top of the sill. Thus, one criterion for design is that the required minimum depth change caused by the flume at maximum flow should be 15 percent of the sill reference depth, Y_1 .

Another criterion of sill height is that it not cause so much of an obstruction in flow that the ditch upstream from the flume is overtopped. The Soil Conservation Service recommends that the freeboard for stable subcritical flow in trapezoidal channels be 20 percent of the energy head at normal depth. (This is approximately 20 percent of the flow depth for canals with very slow-moving flow.) Because of the stable nature of the flow upstream from the b-c-w flumes, the free board requirement there can usually be reduced from 20 percent of D_1 to 20 percent of Y_1 , which is the sill reference depth (fig. 3). These two criteria must be met for the full range of expected flow conditions. The conditions for both criteria are most crucial at the maximum expected flow rate, Q_m , for these shapes of flumes. Thus, the design is based on the maximum expected discharge and the associated depth, d_m . Since this water depth is important to the design, some engineering assistance may be required to get accurate maximum depth-discharge relationships.

Three selected sill heights have been chosen to accommodate the usual range of flows for three standard-sized slipformed canals. Design and selection of a flume is a simple, straightforward procedure.

Flume Design Procedure

Table 1 can be used as a design aid for selecting the appropriate flume. The example shown in table 1 is for a 36-inch ditch with a 2-foot bottom and 1:1 slopes that is used to carry a maximum of 20 cubic feet per second (cfs). If the ditch flows about 25 inches deep at this discharge, what sill height should be selected? To use the table for this example, begin by entering in the basic information about the canal or ditch where the flume is to be located (lines 1-3). Line 1 is simply the vertical depth of the canal, d , line 2 is the width of the canal bottom, B_1 , and line 3 is the canal wall sideslope, Z , expressed as a ratio of horizontal to vertical distance. Line 4 is the maximum discharge rate. Line 5 is the flow depth. Line 6 is the existing freeboard in the ditch prior to flume construction (line 1 minus line 5).

Once this information is obtained, the selection procedure is straightforward. Table 2 gives flume calibrations for three sizes of flumes (sill heights) for each of three ditch shapes. To begin the selection procedure, select the ditch shape in table 2 (A, B, or C) that matches lines 2 and 3 in table 1. In this example, the ditch shape corresponds to canal shape B. Choose any one of the three flume sizes from that group. For this example, FB1 was tried first. Record the information from table 2 for that flume size in the blanks provided for lines 7 through 12 on table 1. (The repetition of some information in table 1 assures that the appropriate flume group and size are used from table 2.)

The remaining section of table 1 is a check on the flow conditions that would exist if the trial flume size were installed. Figure 3 shows a profile of the flume and a typical water surface resulting from flume placement. From the appropriate column of table 2, find the sill-referenced flow depth, Y_1 , for the design discharge, Q_m and enter it under line 13 in table 1. For the example, $Y_1 = 1.143$, for $Q_m = 20$. Add lines 12 and 13 to obtain the total ditch water depth, line 14, $D_1 = S + Y_1$. Subtract line 5 from line 14 to get the actual rise in water level caused by the flume, line 15, $\Delta Y_1 = D_1 - d_m$ (fig. 3).

Next, calculate the rise in water surface that the flume must cause so that it can operate properly, line 16, $\Delta Y_2 = 0.15 Y_1$. If the actual increase in water depth, ΔY_1 , is less than that required, ΔY_2 ($\Delta Y_1 - \Delta Y_2 = \Delta Y_3 < 0$) then the flume cannot be expected to operate properly (line 17), because it will be submerged, as for FB1 of the example.

This limit on the flume submergence assures that the water depth downstream from the flume will not affect the water depth reading upstream from the flume at the gage location. If ΔY_3 is negative, a higher sill must be used, so lines 7-17 are repeated for a higher sill height, as for FB2. For this flume size, ΔY_3 is positive and the design criteria have been met. Where the selection produces a ΔY_3 that is greater than about 3 inches, a lower and more economical sill should be tried.

Table 1. Broad-crested weir design and selection

Canal Data

1. Constructed depth— d = 3 ft. = 36 in.
2. Bottom width— B_1 = 2 ft. = 24 in.
3. Sideslopes— Z = 1/1

Flow Data for Canal Without Weir in Place

4. Maximum discharge rate— Q_m = 20 cfs
5. Flow depth for Q_m — d_m = 2.08 ft. = 25 in.
6. Freeboard— f_b = 0.92 ft. = 11 in.
(line 1 minus line 5)

Weir Selection Using Tables

7. Trial flume identification:

8. Bottom width, B_1 (matches line 2) —
9. Sill width, B_2 —
10. Sideslopes, Z (matches line 3) —
11. Critical section (sill) length, L —
12. Trial sill height, S —

Submergence - Freeflow Check, Weir in Place

13. Sill-referenced flow depth for Q_m , (tables) —
14. Upstream water depth (line 12 plus line 13) —
15. Actual increase in water depth: (line 14 minus line 5) —
16. Required increase in water depth: $(15\% \times \text{line 13})$ —
17. Submergence check: (line 15 minus line 16) —
(If negative a higher sill must be used, and repeat lines 7-17 with a new trial).
(If positive, this flume is okay, but a lower sill might also be used).
18. Actual freeboard: (line 1 minus line 14) —
19. Required freeboard: $(20\% \times \text{line 13})$ —
20. Freeboard check: (line 18 minus line 19) —
(If negative, try a lower sill and repeat lines 7-20)
(If positive, this flume is okay, but a higher sill might also be used).
21. Flume selection: If both checks, (lines 17 and 20), are okay, use that trial.
If one or the other are not met, repeat lines 7-20 for a new trial.
If none of the standard flumes works, see text.

22. Flume selected FB3

Comments FB3 was chosen due to uncertainty about the actual water depths. Since ΔY_3 and f_b are both fairly large, FB3

Location

Example Problem

How were Q_m and d_m determined? Estimated

The actual freeboard with the flume in place, line 1 minus line 14, is entered in line 18. The required freeboard, 20 percent $\times$ line 13, is entered in line 19. If the actual freeboard, f_1 , is less than the required freeboard, f_2 , $-f_2 = f_3 < 0$ then the freeboard requirement has not been met (line 20). If the criteria outlined for lines 17 and 29 are both met ($\Delta Y_3 > 0$ and $f_3 > 0$), in the example for FB2, then the flume trial will work for that situation. If one or the other is not met, a different flume size (sill height) should be tried. In the example, flume FB2 could have been selected; however, if FB3 had been tried first, as shown in trial 3 of table 1, it also would satisfy the criteria of line 19 and could be selected.

For individual situations, the selection may be based on the certainty of the values used for Q_m and d_m . Here, if d_m were actually 27 inches (2.25 ft), f_3 for flume FB2 would be $-0.073'$, and the flume would be submerged. In flume FB3 would probably be chosen, since there is still plenty of freeboard (line 20, table 1). If two trials work and neither is close to the two limits, then in general, select the lowest sill that satisfies the criteria; in this case FB2 would have been chosen. The reason for choosing the lower sill is that it will cause the least head loss in the canal if it works, and if it doesn't work, the sill can easily be raised by capping it with new concrete. If the highest sill height had been used and the design flow rate had been too low, the canal might overtop and the sill height would be difficult to lower.

In some situations, more than one sill height will work. In other situations one or more of the flume sizes given here will work. If the highest sill is too low or the lowest sill too high, try another location along the ditch where the flow conditions are different. If a suitable location cannot be found, a new flume can be computed that will be tailored to the particular site. If a flume sill is too low and the next largest sill is too high, either look for a location where a lower sill can be used or use the larger sill and add additional sidewall height to the ditch upstream from the flume.

There are some limitations on these flumes that are related to the ratio between the throat or sill length, L , and the upstream depth, Y_1 , presented in the discussion of parallel flow in the section on Flume Design Criteria (p.4). In table 2, several columns have a horizontal dashed line near the bottom indicating the column (that is, for FA3, between 0.720 and 0.773). If flow depths corresponding to discharges below these lines (higher values) are used, about 6 inches should be added to the throat length, L . This will not have a significant effect on the other discharge ratings as listed above the dashed

Table 2. Flume calibrations—water depth at gage location referenced to weir crest (in feet)

Flow rate (ft ³ /s)	CANAL SHAPE A B = 1.0' Z = 1:1			CANAL SHAPE B B ₁ = 2.0' Z = 1:1			CANAL SHAPE C B ₁ = 2.0' Z = 125:1		
	FA1 B ₂ = 2.50' L = 2.00' S = 0.75'	FA2 B ₂ = 3.00' L = 1.00' S = 1.00'	FA3 B ₂ = 3.50' L = 1.00' S = 1.25'	FB1 B ₂ = 4.50' L = 2.00' S = 1.25'	FB2 B ₂ = 5.00' L = 2.00' S = 1.50'	FB3 B ₂ = 5.50' L = 2.00' S = 1.75'	FC1 B ₂ = 5.125' L = 3.50' S = 1.25'	FC2 B ₂ = 5.75' L = 3.00' S = 1.50'	FC3 B ₂ = 6.375' L = 2.50' S = 1.75'
0.5	0.160	0.143	0.130	0.175	0.164	0.152	0.252	0.234	0.217
0.6	0.179	0.161	0.146	0.271	0.254	0.238	0.387	0.362	0.340
0.7	0.197	0.177	0.161	0.350	0.328	0.308	0.495	0.465	0.437
0.8	0.214	0.192	0.175	0.418	0.393	0.368	0.589	0.554	0.523
0.9	0.230	0.207	0.189	0.480	0.452	0.425	0.673	0.634	0.599
1.0	0.246	0.221	0.202	0.536	0.506	0.476	0.749	0.708	0.670
1.2	0.275	0.248	0.226	0.589	0.556	0.521	0.819	0.776	0.735
1.4	0.302	0.273	0.249	0.638	0.604	0.566	0.885	0.839	0.796
1.6	0.327	0.296	0.271	0.685	0.649	0.608	0.947	0.899	0.854
1.8	0.351	0.318	0.292	0.729	0.691	0.649	1.006	0.956	0.909
2.0	0.374	0.340	0.312	0.771	0.732	0.689	1.061	1.010	0.962
2.5	0.427	0.389	0.358	0.812	0.771	0.727	1.115	1.062	1.012
3.0	0.476	0.434	0.400	0.851	0.809	0.764	1.166	1.112	1.061
3.5	0.520	0.477	0.440	0.889	0.845	0.799	1.215	1.159	1.107
4.0	0.562	0.516	0.477	0.925	0.881	0.834	1.26	1.206	1.153
4.5	0.601	0.553	0.512	0.960	0.915	0.867	1.31	1.25	1.196
5.0	0.638	0.588	0.546	0.994	0.948	0.900	1.35	1.29	1.24
6.0	0.707	0.654	0.608	1.027	0.980	0.930	1.40	1.34	1.28
7.0	0.771	0.715	0.666	1.091	1.042	0.990	1.44	1.38	1.32
8.0	0.829	0.772	0.720	1.152	1.101	1.049	1.48	1.42	1.36
9.0	0.885	0.825	0.773	1.21	1.158	1.104	1.51	1.45	1.40
10.0	0.937	0.875	0.821	1.27	1.21	1.155	1.58	1.51	1.45
11.0	0.986	0.923	0.867	1.32	1.26	1.206	1.67	1.60	1.54
12.0	1.033	0.968	0.911	1.37	1.31	1.25	1.75	1.69	1.62
13.0	1.078	1.014	0.954	1.42	1.37	1.31	1.84	1.77	1.70
14.0	1.121	1.056	0.994	1.47	1.41	1.36	1.92	1.85	1.78
15.0	1.162	1.096	1.034	1.52	1.46	1.41	1.99	1.92	1.85
16.0	1.20	1.135	1.071	1.56	1.50	1.45	2.06	1.99	1.92
17.0	1.24	1.173	1.108	1.60	1.55	1.50	2.13	2.06	1.99

Flume Construction

Once a satisfactory flume design has been chosen, flume construction is simple and straightforward. The flume has two sections—a ramp and a sill (throat section) (fig. 3). The sill should be level with no large irregularities. The width of the sill, B_s , should be as close to the value given in table 2 as the desired accuracy of measurement (that is, a 1 percent error in B_s will produce roughly a 1 percent error in discharge). With the wide sills used here, an error of one-half inch in sill width would cause about a 1 percent error. Within limits, the sill length in the flow direction has very little effect on the discharge reading. Errors of 2 or 3 inches in length would cause virtually no change in discharge reading, especially if the error makes the throat longer. While the sill height is of prime importance to design because it controls the water surface elevation and submergence properties, precise vertical location of the sill is not critical to discharge rating, except when it causes the flume width dimension to deviate significantly. For example, an error of one-half inch in sill height, which can be caused by irregularities in the channel bottom, would change the sill width by 1 inch for a channel with 1:1 slopes. This would cause only about a 2 percent error. The flume dimensional tolerances thus allow flumes to be placed in slipform ditches, which vary slightly in shape from the standard. These tolerances should not, however, be an excuse for sloppy or poor construction but can make construction quick and easy.

The upper edge of the ramp should join the sill edge such that it does not rise above the sill to cause unpredictable flow separation. Precision edge matching of the two sections or slight rounding of the joint corner is desirable. When the ramp is hand-troweled into place avoid making large lumps or bumps. The ramp should be fairly uniform across with an approximate 3:1 slope. The ramp may be slightly concave as shown in figure 3. The ramp need not taper to zero thickness but can be ended abruptly when it becomes 2 to 3 inches thick.

Drain tubes should be installed as shown in figure 3 to allow the ditch to drain for mosquito control. Flow through the drain tubes will usually be negligible compared with flow through the flume. If tubes 2 to 3 inches in diameter or larger are used, the upper ends can be plugged to stop the flow. Sediment, which tends to accumulate at the base of the ramp, may plug the drains and should be cleaned out periodically. Sediment will not significantly accumulate in the ditch behind the flume if it did not normally accumulate in the ditch previously. Special flumes can be designed for sediment-laden ditches where 6 inches or more of sediment is normally deposited between cleanout periods.

Cast-in-place construction is straightforward. Cut out two pieces of plywood, each matching the cross section of the sill as shown in figure 3, with the corners cut out for inserting the drain tubes (cutting out the corners is necessary anyway since few slipform ditches have distinct corners). Cut 2- by

2-inch spacers to length, L , for holding the two forms apart. With the spacers between the two plywood forms, wire tie the plywood forms together. This makes the form for pouring the sill. Next, clean out a section of the ditch and place the forms on the bottom of the ditch. Insert the drain tubes and shim the forms so that the tops are level in the cross-ditch direction and with respect to each other. It is easy to see whether the form closely matches the ditch. Small errors are not important. As the form is filled with concrete, remove the 2- by 2-inch spacers. The concrete will hold the plywood apart. Use the plywood forms as screed edges for screeding and troweling the sill to a smooth, level surface.

After the concrete in the sill has taken initial set, the upstream form can be removed and the ramp hand-troweled into place (fig. 4). Both the ramp and sill can be broom-finished.

For single-pour construction, the upstream form can be made of a metal frame constructed from angle iron. This frame provides the upstream screeding edge for finishing the sill and is left permanently in place within the flume structure. Thus, both the sill and the ramp can be constructed at the same time, without waiting or returning to the site.

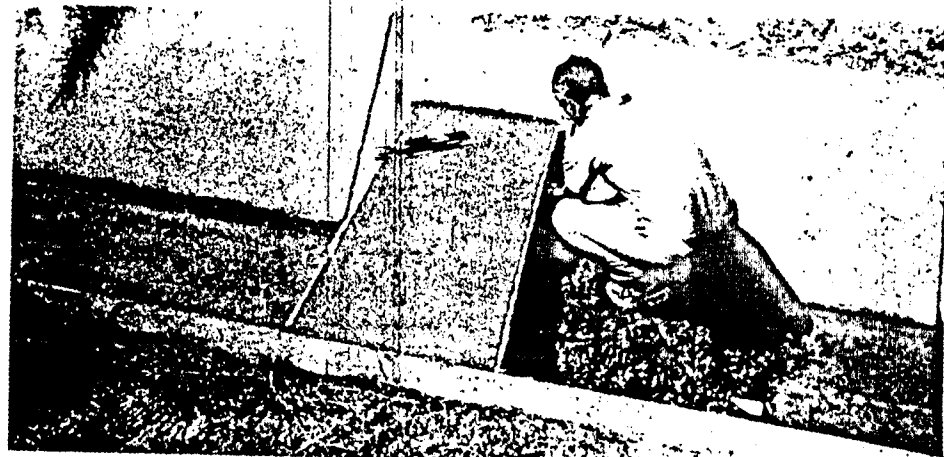


FIGURE 4. — Construction of b-c-w flume FB3 installed in a 30-in ditch near Tacna, Ariz. The sill (throat section) has been poured. The upstream form is being removed so that the ramp can be poured (flow will be from right to left).

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Gage Construction and Placement

A convenient type of gage to use is one marked in discharge units and attached to the canal wall. Gages can be constructed of 0.125- by 1.5-inch aluminum bar stock and stamped with a chisel, hammer, and a metal-amping die set. The gages must be cleaned with a wire brush periodically to remove deposits. Since baked enamel gages are easier to read but must be custom ordered, they are considerably more expensive (fig. 5). The gage is placed on the sidewall and the vertical depths given in table 2 must be converted to sloping distances by multiplying the vertical depths by 1.414,

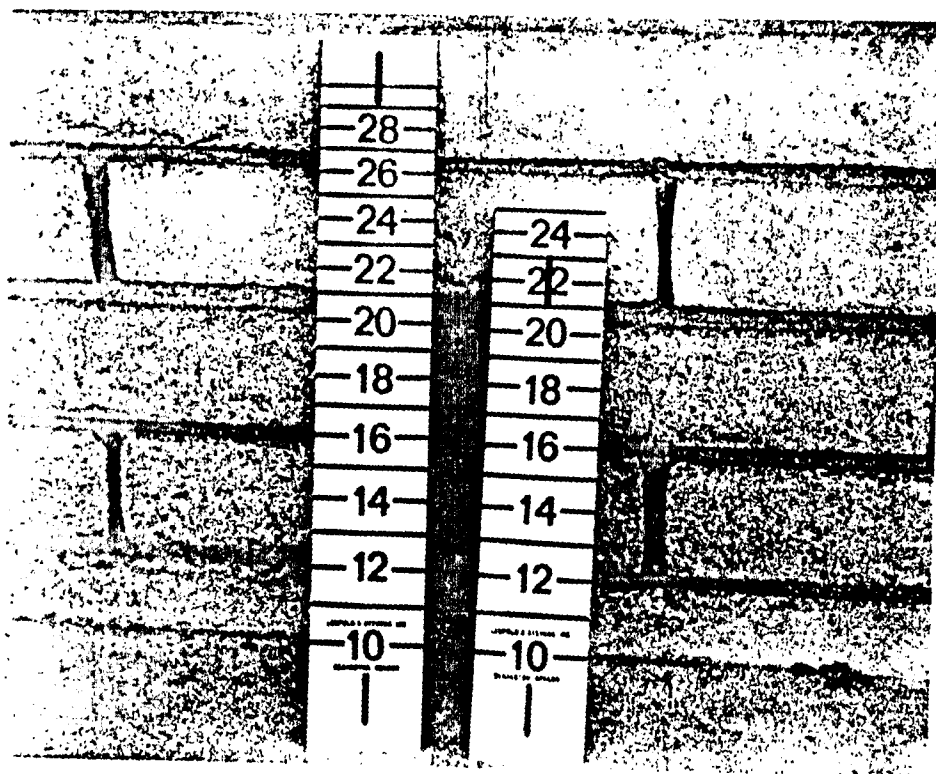


FIGURE 5.—Commercially available baked enamel, wall-mounted gages marked in 1/2 in. The slotted holes make gage placement easier.

PN-6554

1.414, and 1.601 for ditch shapes A, B, and C, respectively. The discharge values are then marked on the gage at these calculated distances from the gage zero (the zero point need not be marked on the gage).

To obtain accurate discharge ratings, the gage must be carefully surveyed into place with a surveyor's level and rod. The reference elevation for mounting the gage is along the centerline of the canal on top of the sill at about L/4 from the downstream end of the flume (fig. 3). This eliminates errors caused by a nonlevel sill. Often the ditch sideslopes are not exactly as intended, thus a wall-mounted gage could be in error. To eliminate most of the error, the gage is referenced and mounted so that the gage is most accurate at the most commonly used discharge. The greatest errors will then occur at gage readings which are seldom used. Mount the gage so that the mark for the most commonly used discharge is at a vertical distance, Y_1 , above the sill reference location, corresponding to the same discharge in table 2.

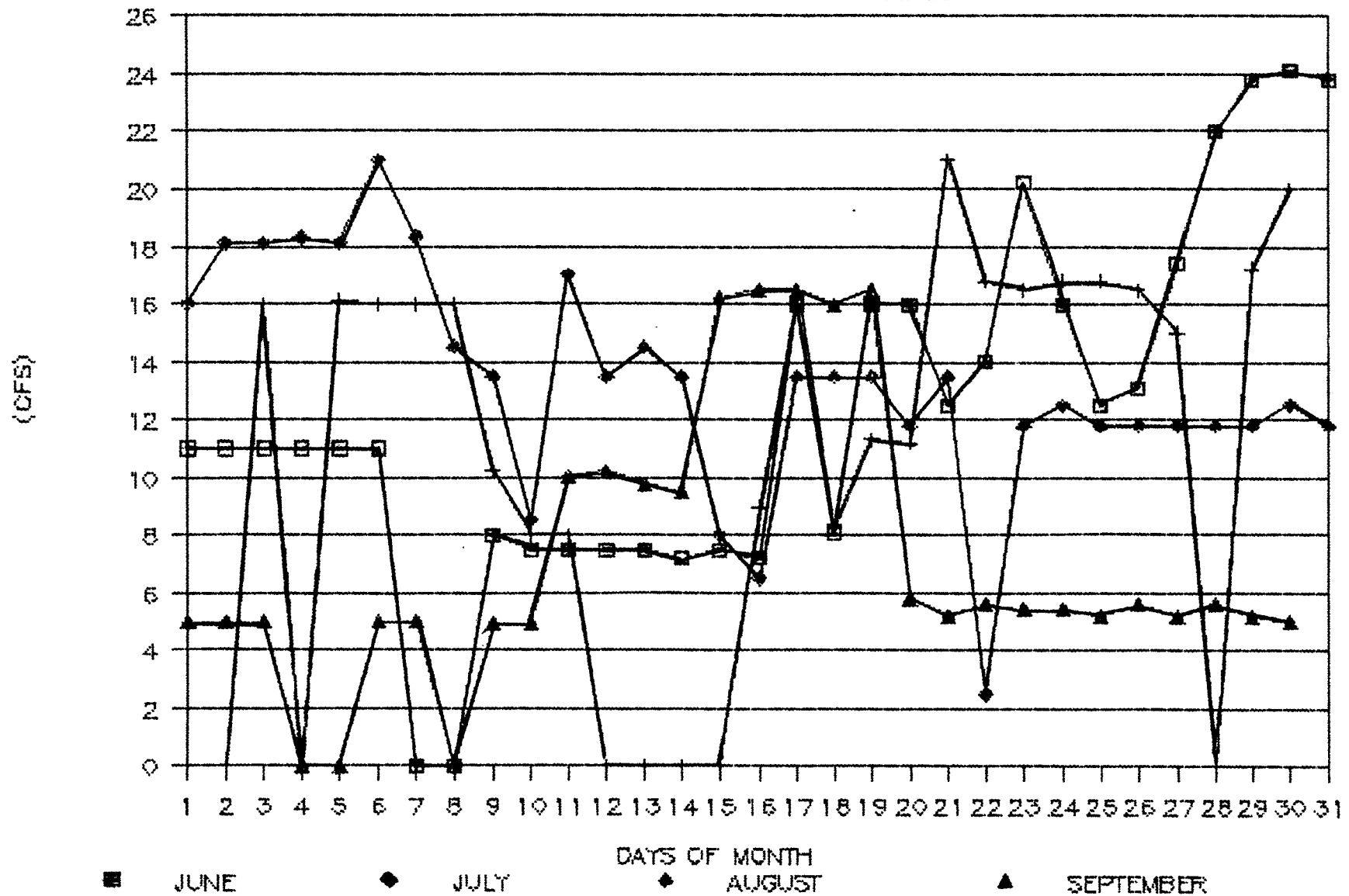
The gage can be mounted on the wall with lead anchors and screws. A slotted hole can be used to adjust the gage to the proper elevation, or the holes can be drilled in the gage after the anchors are in place. Always check the gage after it has been fastened to make sure that it hasn't slipped. Because of the controlled error in the design and construction processes, which can hold the basic uncertainty of the device to less than ± 2 percent, most of the introduced error will be in the final gage reading. The wall-mounted gage is easily read to within ± 5 percent at most all flows, and for the midrange and higher flows ± 5 percent of the true discharge is easily accomplished. If the water surface is choppy, a skimmer can be placed upstream to reduce the surface waves. Use a stilling well and point gage if greater accuracy is desired.

KEMPER DITCH-DIVERSION RATES (CFS)-1988 IRRIGATION SEASON

	JUNE	JULY	AUGUST	SEPTEMBER
1	11.0	0.0	16.0	5.0
2	11.0	0.0	18.1	5.0
3	11.0	16.0	18.1	5.0
4	11.0	0.0	18.3	0.0
5	11.0	16.1	18.1	0.0
6	11.0	16.0	21.0	5.0
7	0.0	16.0	18.3	5.0
8	0.0	16.0	14.5	0.0
9	8.0	10.2	13.5	4.9
10	7.5	8.0	8.5	4.9
11	7.5	8.0	17.0	10.0
12	7.5	0.0	13.5	10.2
13	7.5	0.0	14.5	9.8
14	7.2	0.0	13.5	9.5
15	7.5	0.0	8.0	16.2
16	7.2	9.0	6.5	16.5
17	16.0	16.0	13.5	16.5
18	8.1	8.3	13.5	16.0
19	16.0	11.3	13.5	16.5
20	16.0	11.2	11.8	5.8
21	12.5	21.0	13.5	5.2
22	14.0	16.8	2.5	5.6
23	20.2	16.5	11.8	5.4
24	16.0	16.8	12.5	5.4
25	12.5	16.8	11.8	5.2
26	13.1	16.5	11.8	5.6
27	17.4	15.0	11.8	5.2
28	22.0	0.0	11.8	5.6
29	23.8	17.2	11.8	5.2
30	24.1	20.0	12.5	5.0
31	23.8		11.8	
AVE.	13.4	18.2	13.3	8.0
MAX.	24.1	21.0	21.0	16.5

KEMPER DITCH

DIVERSION RATE - 1988 IRRIGATION SEASON



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10/31/88

DIVERSION RATE RECORD

Ditch Company KEMPER

Month JULY

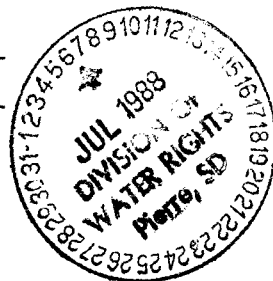
Ditch President _____

Year 1988

Type of Measuring Device?

☐ A) Parshall Flume: Throat Width _____ ft.

☐ B) Weir: Crest Length _____ ft. ☐ C) Other: _____



Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
June 1	6:15 PM	9 3/4		WM	
2	8:15 AM	9 3/4		WM	
3	7:20 AM	9 3/4		WM	Clear - 50°
4	1:45 PM	9 7/8		WM	Clear 98°
5	9:00 AM	9 3/4		WM	Clear 70°
6	7:30 AM	9 3/4		WM	Clear 65°
7					
8					
9	7:00 AM	8.0		WM	overcast 62°
10	11:50 AM	7 3/4		WM	overcast 60°
11	9:30 AM	7 3/4		WM	clear 60°
12	7:30 AM	7 3/4		WM	overcast 60°
13	9:30 AM	7 3/4		WM	Clear 60°
14	8:15 AM	7 5/8		WM	pt. cloudy 48°
15	7:30 AM	7 3/4		WM	clear 65°
16	7:30 AM	7 5/8		WM	pt. cloudy - 60°
17	8:00 PM	12.0		WM	clear 80° pt. cloudy
18	3:15 PM	8 1/4		WM	pt. cloudy - Windy - 90°
19	6:15 PM	12.0		WM	Clear - 86°
20	12:10 PM	12.0		WM	pt. cloudy - 94°
21	7:00 PM	10.5		WM	pt. cloudy 90° - 100% of creek used
22	9:00 AM	10 7/8		WM	pt. cloudy - 80° 100% " "
23	9:15 AM	14.0		WM	1" rain @ 11 PM - 80°
24	8:05 PM	12.0		WM	Clear - 95° 100% of creek used
25	11:00 AM	10 1/2		WM	Clear " "
26	7:15 PM	11.0		WM	Clear " "
27	7:05 AM	12 3/4		WM	clear - 80° " "
28	6:00 PM	14 1/2		WM	pt. cloudy - 74° .9" of rain last nite
29	8:00 PM	15		WM	Clear -
30	7:30 AM	15 1/4		WM	cloudy - .5" rain in nite - 48°
31	7:30 AM	15		WM	54° pt cloudy

Record of Diversion Rates

Month of _____

Ditch Company Kemper

Ditch President _____

Type of Measuring Device?

☐ A) Parshall Flume: Throat Width _____ ft.
☐ B) Weir: Crest Length _____ ft.


Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1					
2					
3	9 24	12"		Jennings	
4					
5	8 05	12 1/4		Jennings	
6	7 15	12		Jennings	
7	6 25	12		Jennings	
8	7 18	12			
9	6 52	9 1/2			
10	7 48	8			
11	6 10	8			
12	6 20				Ditch shut down
13					
14					
15					
16	7 25	8 3/4			
17	6 20	12			
18	6 25	8 1/8			
19	6 20	10			
20	6 05	10 1/8			
21	6 05	14 1/8			
22	7 10	12 3/8			
23	6 02	12 1/4			
24	6 19	12 3/8			
25	5 55	12 1/8			
26	5 55	12 1/4			
27	5 55	11 3/4			
28					
29	6 20	12 3/4			
30	6 00	13 3/4			
31					

DIVERSION RATE RECORD

Ditch Company Kemper

Month August

Ditch President _____

Year 1988

Type of Measuring Device?

☐ A) Parshall Flume: Throat Width _____ ft.

☒ B) Weir: Crest Length _____ ft. ☐ C) Other: _____



Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1	8:10	12"		Jerry Jeffery	
2	8:00	13"		Jerry Jeffery	
3	8:55	13"		Jerry Jeffery	
4	9:05	13.5"		Jerry Jeffery	
5	9:10	13"		Jerry Jeffery	
6	9:10	14"		Jerry Jeffery	
7	6:10	13.5"		Jerry Jeffery	
8	8:50	11.5"		Jerry Jeffery	
9	8:10	11"		Jerry Jeffery	
10	8:12	8.5"		Jerry Jeffery	
11	8:05	12.5"		Jerry Jeffery	
12	8:30	11"		Jerry Jeffery	
13	8:30	11.5"		Jerry Jeffery	
14	6:45	11"		Jerry Jeffery	
15	8:40	8"		Jerry Jeffery	
16	7:30	7"		Jerry Jeffery	
17	8:45	11"		Jerry Jeffery	
18	7:10	11"		Jerry Jeffery	
19	9:35	11"		Jerry Jeffery	
20	10:15	10"		Jerry Jeffery	
21	8:40	11"		Albert Jeffery	
22	7:30	4"		Jerry Jeffery	
23	8:45	10"		Jerry Jeffery	
24	10:15	10.5"		Jerry Jeffery	
25	11:05	10"		Jerry Jeffery	
26	9:00	10"		Jerry Jeffery	
27	8:05	10"		Jerry Jeffery	
28	6:00	10"		Jerry Jeffery	
29	8:35	10"		Jerry Jeffery	
30	10:25	10.5"		Jerry Jeffery	
31	6:15	10		Jennings	

DIVERSION RATE RECORD

Ditch Company Kemper

Month Sept

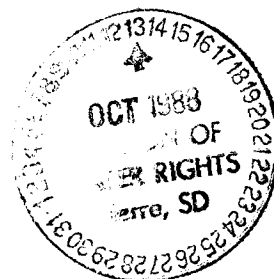
Ditch President _____

Year 1988

Type of Measuring Device?

☐ A) Parshall Flume: Throat Width _____ ft.

☐ B) Weir: Crest Length _____ ft. ☐ C) Other: _____



Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1	6:45	6			
2	11:30	6"		Jennings	
3	8:30	6 1/8			
4					
5					
6	6:11	6"		Jennings	
7	6:12	6"		"	
8					
9	6:18	5 3/8		Jennings	
10	6:15	5 7/8		"	
11	11:59	9 1/4		"	
12	9:50	9 3/8		"	
13	6:05	9 1/8		"	
14	6:14	9		"	
15	7:06	12 1/8		"	
16	6:28	12 1/4		"	
17	7:01	12 1/4		"	
18	7:30	12			
19	8:53	12 1/4		Jennings	
20	7:24	6 3/4		"	
21	6:20	6 1/4			
22	7:45	6 5/8		Jennings	
23	6:10	6 1/2			
24	7:30	6 1/2			
25	6:30	6 1/4			
26	7:50	6 3/8		Jennings	
27	9:00	6 1/4		"	
28	7:35	6 3/8		"	
29	16:30	6 1/4			
30	15:20	6			
31					

DIVERSION RATE RECORD

Ditch Company Kemper

Month May

Ditch President Jim Thompson

Year 1969

Type of Measuring Device?

☐ A) Parshall Flume: Throat Width _____ ft.

☐ B) Weir: Crest Length _____ ft. ☐ C) Other: _____



date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					Tunnel on Ditch
25	6 10	6"		Jennings	1 hour irrigation
26	6 05	6"		Jennings	
27	6 38	9		Jennings	
28	5 2	15"		Jennings	
29	6 32	15 9/8		Jennings	Drizzle
30	6 33	12 9/8		Jennings	
31	6 40	12 9/8		Jennings	

DIVERSION RATE RECORD

Ditch Company Kemper

Month June

Ditch President Jim Jennings

Year 1989

Type of Measuring Device?

☐ (A) Parshall Flume: Throat Width _____ ft.

☐ (B) Weir: Crest Length _____ ft. ☐ (C) Other: _____



Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1	6:42	5 7/8		Jennings	
2	6:41	6 1/2		Jennings	
3		↑			
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19		↓			
20	6:00 pm	6 1/2		Jennings	
21	6:22 pm	6 1/4		Jennings	
22	6:46 pm	6 3/4		Jennings	
23	7:04 pm	6		Jennings	
24	7:19 pm	6 5/16		Jennings	
25	7:30 pm	6 1/4		Jennings	
26	7:51 pm	6		Jennings	
27		↑			
28					
29					
30		↓			
31					

DIVERSION RATE RECORD

Ditch Company KENDLER

Month July

Ditch President Jim Jennings

Year 1989

Type of Measuring Device?

☐ A) Parshall Flume: Throat Width _____ ft.

☐ B) Weir: Crest Length _____ ft. ☐ C) Other: _____



Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1	5:00 PM	9.0		WM	
2	7:00 PM	9.25			
3	6:00 PM	9.25		WM	
4	7:30 PM	9.0		WM	
5	9:00 PM	8 5/8		WM	
6	7:00 PM	8 3/4		WM	
7	6:30 PM	8 9/16		WM	
8	9:15 PM	9 3/4		WM	all water in creek used
9	8:30 PM	12 1/4		WM	
10	9:00 PM	12 1/8		WM	
11	9:00 PM	12.0		WM	
12	9:15 PM	12.0		WM	
13	8:15 PM	12 5/8		WM	
14	8:00	14 1/2		WM	
15	7:30 PM	15.0		WM	
16	8:30 PM	15.5		WM	
17	8:30 PM	15.5		WM	
18	7:30 PM	5.5		WM	
19	8:00 PM	5.5		WM	
20	7:30 PM	5 1/4		WM	
21	8:10 PM	5 1/3		WM	
22	8:00 PM	5 1/4		WM	
23	8:30 PM	5.25		WM	
24	4:00 PM	8 1/8		WM	
25	3:00 PM	8 1/4		WM	
26	7:15 PM	9 3/8		WM	
27	6:30 AM	9 1/2		WM	
28	7:00 AM	9 1/16		WM	
29	6:00 AM	10 3/8		WM	
30	9:00 PM	7 1/4		WM	
31	7:00 AM	11.0		WM	

DIVERSION RATE RECORD

Ditch Company Kemper

Month Aug

Ditch President Jim Jennings

Year 1989

Type of Measuring Device?

☐ A) Parshall Flume: Throat Width _____ ft.

☐ B) Weir: Crest Length _____ ft. ☐ C) Other: _____



Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1	11 27	1 2		Jennings	
2	2 14 PM	11			
3	2 47	10 3/4			
4	6 12	6 3/8			
5	4 58	9 2/8			
6	5 02	8 7/8			
7	4 53	8 7/8			
8	4 50	8 7/8			
9	4 54	7			
10	6 20	8 1/4			
11		0			shut down
12		0			
13		0			
14		0			
15	6 55	9 1/8		Jim Jennings	
16	6 00	9 3/8			
17	4 57	12 1/2			
18	7 05	12 1/4			
19	6 21	12 3/8			
20	4 52	13 3/8			
21	6 35	12 1/2			
22	6 16	12 5/8			
23	6 40	11 5/8			
24	5 47	11 3/8			
25	6 04	13 1/4			
26	7 52	12 7/8			
27	6 05	13 3/4			
28	7 21	12 3/4			
29					
30	6 43	11 5/8			
31	7 15	11 3/8			

DIVERSION RATE RECORD

Ditch Company Kemper
 Ditch President Jim Jennings
 Type of Measuring Device?

Month Sept
 Year 1989



☐ A) Parshall Flume: Throat Width _____ ft.
☐ B) Weir: Crest Length _____ ft. ☐ C) Other: _____

Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1	730	8 3/8		Jim Jennings	
2	1112	8 1/8			
3	944	8 1/4			
4					Shut - off
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22	940	6 1/4		Jim Jennings	
23	815	"			
24	122	"			
25	612	"			
26	559	"			
27	555	"			
28	603	"			
29	611	"			
30	615	"			
31	745	"			

DIVERSION RATE RECORD

Ditch Company _____

Month _____

Ditch President _____

Year _____

Type of Measuring Device?

☐ A) Parshall Flume: Throat Width _____ ft.

☐ B) Weir: Crest Length _____ ft. ☐ C) Other: _____



Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28		9.2			
29					
30					
31					

DIVERSION RATE RECORD

Ditch Company Turnings
 Ditch President Jim Turnings
 Type of Measuring Device?

Month Aug
 Year 1990



- ☐ A) Parshall Flume: Throat Width _____ ft.
☐ B) Weir: Crest Length _____ ft. ☐ C) Other: _____

Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1		8 3/8		Jim Turnings	Creek flow has been
2		9 1/2			at this station
3		9 1/2			above that water level
4		10 1/4			
5		11 7/8			
6		12			
7		11 1/8			
8		11 1/8			
9		11 1/2			
10		12 3/4			
11		11 1/2			
12		10 1/4			
13		9 7/8			
14		9 7/8			
15	948	10			
16	845	9 3/4			
17	1057	9 3/4			
18	1148	9 1/4			
19	818	9 7/8			
20	1048	12 3/4			Rain
21	701	12 1/4			
22	1011	7 7/8			
23	759	13 1/4			
24	745	7 7/8			
25	702	9			
26	301 PM	9			
27	656	9 1/4			
28	755	9 1/4			
29	110	9			
30	150	9			
31	758	7			

DIVERSION RATE RECORD

Ditch Company KERRILL

Month Aug

Ditch President Jim Springer

Year 1990

Type of Measuring Device?

☐ A) Parshall Flume: Throat Width _____ ft.

☐ B) Weir: Crest Length _____ ft. ☐ C) Other: _____



Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1	658	5 1/2		Jim Springer	
2	636	9		"	
3	649	9		"	
4	756	9		"	
5	720	9		"	
6	657	10 3/4		"	
7	622	12 1/4		"	
8	639	11 3/4		"	
9	604	12 3/4		"	
10				"	
11	605	8 3/8		"	
12				"	
13	665	11 3/4		"	
14	650	11 3/4		"	
15	740	12		"	
16	830	11 3/4		"	
17	717	8 1/2		"	
18	610	8 1/2		"	
19	1207	8 1/2		"	
20	639	8 7/8		"	
21	602	8 7/8		"	
22	606	8 7/8		"	
23	607	8 7/8		"	
24	710	8 1/2		"	
25	637	8 3/4		"	
26	922	8 7/8		"	
27	657	8 3/4		"	
28	615	8 7/8		"	
29	701	11 1/4		"	
30	655	11		"	
31	642	8		"	

DIVERSION RATE RECORD

Ditch Company KETTER

Month Sept

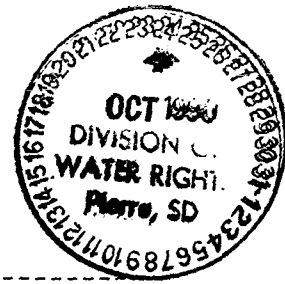
Ditch President Wm. H. H. H.

Year 1990

Type of Measuring Device?

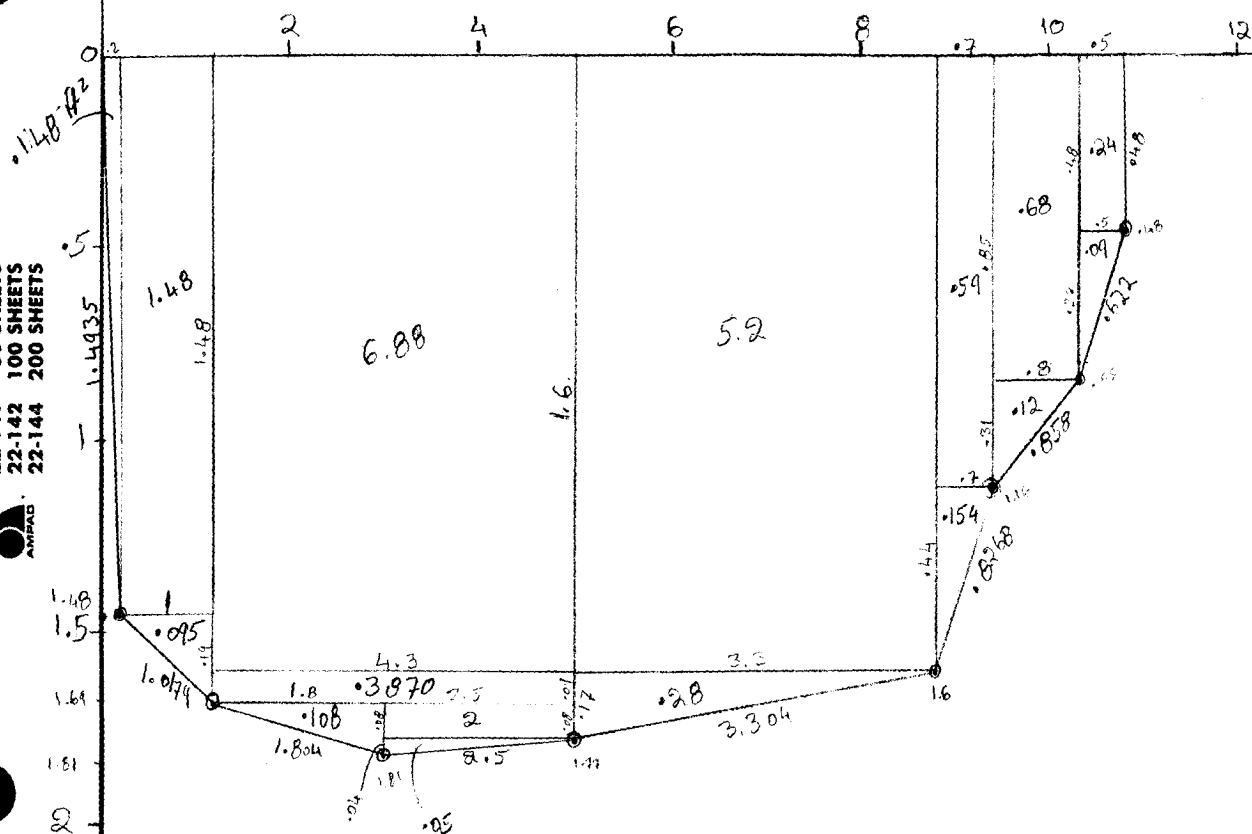
☐ A) Parshall Flume: Throat Width _____ ft.

☐ B) Weir: Crest Length _____ ft. ☐ C) Other: _____



Date	Time	Head (ft.)	No. of Acres Being Irrigated	Name of the Gauge Reader	Remarks
1	840	7 1/8		Sennings	
2	995	8			
3	703	8 1/2			
4	705	8 3/4			
5	614	5 1/4			
6	615	5 3/8			
7	630	5 3/8			
8	612	5 3/8			
9	615	5 3/8			
10	609	5 3/8			
11	559	5 3/8			
12	622	5 1/8			
13		5 1/8			
14		5 1/8			
15		5 1/8			
16		5			
17		5			
18		5			
19	646	7 1/4			
20	651	7 3/8			
21	655	7 1/8			
22	649	7 3/8			
23	636	7 3/8			
24	702	7 3/8			
25	625	7 3/8			
26	642	7 3/8			
27	642	7 3/8			
28	658	7 3/8			
29	653	7 3/8			
30	642	7 3/8			
31	615	7 3/8			

31 (6:15)



Ditch Capacity:

$$Q = V \cdot A$$

$$V = \frac{1.49}{n} R^{2/3} S^{1/2}$$

$$n = .035$$

$$S = .0042 \text{ ft/ft}$$

$$R = \frac{A}{w_p} = \frac{18.502 \text{ ft}^2}{12.9062 \text{ ft}} = 1.4336 \text{ ft}$$

$$V = \frac{1.49}{0.35} (1.4336)^{2/3} (0.0042)^{1/2} \quad v = 3.5077 \text{ fps}$$

$$Q = 3.5077 \text{ F/s} \times 18.502 \text{ F}^2 \Rightarrow Q = \underline{65 \text{ CFS}}$$

Gate Capacity:

$$R = C_d (b - 2nH_1) \sqrt{g} H_1^{3/2}$$

$$Q = \underline{114.4 \text{ LFS}}$$

where: $H_1 = 4.5 \text{ ft}$

$$\eta = 0.1$$

$$C_1' = -587$$

$$g = 32.2 \text{ FPS}^2$$

Ditch Capacity $Q = \underline{65 \text{ CFS}}$

Gate Capacity $Q = \underline{114.4 \text{ CFs}}$

Vested Right $Q = 125 \text{ CFs}$



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

July 1, 1987

Kemper Ditch
c/o James Jennings
RR 1, Box 182C
Spearfish SD 57783

Dear Mr. Jennings:

This letter is to inform you that the vested right claim for Kemper Ditch has been reviewed. A report on the investigation of the vested right claim is being prepared. When the report is finalized your application will be complete pursuant to SDCL 46-2A-2. A recommendation will then be prepared and notice of hearing will be given stating the time and place the Water Management Board will consider the vested right claim. Tentatively, the hearing is to be scheduled for December 2 and 3, 1987 in the Black Hills area.

Please contact us if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Ron Duvall".

RON DUVALL
Water Resources Engineer
605 773-3352

Report on the Kemper Ditch (Spearfish Creek)
Vested Water Right Application No. 1394-1
September 8, 1987

Background

Pursuant to SDCL 46-5-49 and ARSD 74:02:01:20, the Kemper Ditch has filed an application to validate a vested right claim. The application claims 33 cfs of Spearfish Creek water to irrigate 544.7 acres of land located in the Sections 4, 5, 7, 8, and 17, T7N-R2E in Lawrence County. The headgate is located in the NW1/4 NW1/4 Section 16, T7N-R2E.

Document Search

The following document was found pertaining to the Kemper Ditch Claim:
Location Certificate No. 25060, filed July 31, 1885, in Book 38, Page 181, Lawrence County, claimed 5000 miner's inches of Spearfish Creek water. There is no record of any court case which interpreted, determined, or established the Kemper Ditch water right.

Discussion

The Water Resources Commission investigated the irrigation from Kemper Ditch in early 1960's. At that time, 541.9 acres were mapped as being irrigated from the ditch.

The recent investigations by Water Rights Division engineers have found that 544.7 acres of land are being irrigated from the Kemper Ditch. The headgate is capable of diverting more water than the amount claimed and the ditch can carry 65 cfs. The acreage difference of 2.8 acres from that of the 1960's survey is the result of small areas within the ditch boundaries being included which water will overflow that were apparently omitted from the 1960's survey work. These areas include some grave areas where trees are watered.

To determine the amount of water needed to irrigate 544.7 acres, two different methods were used:

- 1) State Law, SDCL 46-5-6 allows 1.0 cfs for each 70 acres of irrigation. If 1.0 cfs of water is necessary to irrigate 70 acres, 7.78 cfs of water will be used to irrigate 544.7 acres. Considering the loss of water due to the irrigation system, which according to SCS for this area is 50%, the required diversion rate will be 15.5 cfs.

RECOMMENDATION OF CHIEF ENGINEER FOR VALIDATION OF VESTED WATER
RIGHT APPLICATION NO. 1394-1, Kemper Ditch

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Division, Department of Water and Natural Resources concerning Validation of Vested Water Right Application No. 1394-1, Kemper Ditch, c/o James Jennings, RR 1, Box 182C, Spearfish, South Dakota.

The Chief Engineer is recommending VALIDATION of Application No. 1394-1 for 15.5 cfs and that the applicable portions of Location Certificate No. 25060 have been incorporated into No. 1394-1 and the abandoned portions of Certificate No. 25060 have been cancelled, because 1) water has been appropriated as described for irrigation use with a priority date of July 31, 1885, 2) the use has been developed without unlawful impairment of existing rights, 3) the use is a beneficial use and 4) it is in the public interest with the following qualifications.

1. That Vested Water Right No. 1394-1 is subject to domestic use rights. Diversion of water under Water Right No. 1394-1 is contingent upon supplies being available first to domestic users.
2. That a flow measuring device be installed at or near the point of diversion for Kemper Ditch within one year of validation of Vested Water Right No. 1394-1. The measuring device shall be permanently installed. The design shall be approved prior to construction by the chief engineer.

See the attached report for additional information.



JOHN HATCH, Chief Engineer
October 15, 1987

SOUTH DAKOTA Department of
Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

October 22, 1987

NOTE: TO BE SURE OF PUBLICATION ON
THE CORRECT DATES, CONTACT THE
NEWSPAPERS RIGHT AWAY.

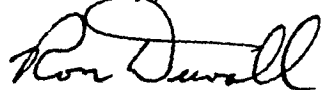
Kemper Ditch
c/o James Jennings
RR 1, Box 182C
Spearfish SD 57783

Dear Mr. Jennings:

Your Application No. 1394-1 for a vested water right claim has been examined and found to comply with the South Dakota Water Laws and applicable rules. A notice of your claim has been sent to the Publishers of the QUEEN CITY MAIL printed at Spearfish and the BELLE FOURCHE DAILY POST printed at Belle Fourche. For your information, a copy of the notice, the recommendation of the Chief Engineer and a report on the application are enclosed. Please review the notice and notify this office, if you have any corrections or questions.

Be sure to contact the above newspapers to authorize publication of your notice of hearing to validate a vested right and to arrange for payment. Early contact with the papers can eliminate delays. The publishers have been instructed to publish your notice once each week for two consecutive weeks with the last publication to occur twenty days before the board meeting. We must receive Proof of Publication before the application can be considered by the Water Management Board.

Sincerely,



Ron Duvall
Natural Resources Engineer
605 773-3352

enclosures

**South Dakota
Department of
Game, Fish and Parks**

Division of Wildlife
Sigurd Anderson Building
445 East Capitol
Pierre, South Dakota 57501-3185
(605) 773-3381

November 16, 1987



Mr. John Hatch, Chief Engineer
Division of Water Rights
S.D. Department of Water & Natural Resources
Joe Foss Building
Pierre, SD 57501

Dear Mr. Hatch:

Pursuant to the notice provided by the Chief Engineer under SDCL 46-2A-4 the South Dakota Department of Game, Fish and Parks intends to be a party to water right claim 1394-1 on Spearfish Creek, Lawrence & Butte County.

GF&P is an interested and potentially affected party by virtue of statutory authority to manage fish and wildlife resources of the state (SDCL Chapter 41). The pending water right claim could affect the quantity of water available for natural resource management.

Thank you for the opportunity to comment on this pending water right application.

Sincerely,

Richard J. Beringson
Secretary

RJB/ld

cc: Kemper Ditch & James Jennings



R.R. 1 Box 182C
Spearfish, S.D. 57783

November 16, 1987

John Hatch, Chief Engineer
Water Rights Division
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

Dear John;

As an irrigator deriving water from Spearfish Creek via the Kemper ditch, I wish to oppose the reduction of the requested diversion rate of 33 cfs to 15.5 cfs. Said reduction refers to application No.1394-1.

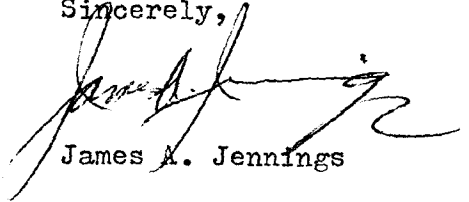
The reasons for the opposition are:

1. The type of soil irrigated requires more water than your allocation.
2. Because of the length of the main ditches and the type of soil they pass through, the water loss in the delivery system exceeds the 50% factor.

I would like an opportunity to express my opposition to the board at the December 2 hearing.

Thank you.

Sincerely,



James A. Jennings

November 24, 1987
(date)

page 1

Parties of Record before Water Management Board regarding Vested Right
Application No 1394-1, Kemper Ditch

For :

Interested

James Jennings
Kemper Ditch
RRI, Box 182C
Spearfish SD 57783-
9615

Richard Beringson, Secretary
SD Dept. of Game, Fish & Parks
Anderson Bldg., 445 E. Capitol
Pierre SD 57501

Against :

B.E. Martin, Regional Director
Bureau of Reclamation
Missouri Basin Region
PO Box 36900
Billings MT 59107-6900

Bruce Layman
U.S. Bureau of Reclamation
P.O. Box 226
Newell SD 57760



United States Department of the Interior
BUREAU OF RECLAMATION
Missouri Basin Region
P.O. Box 36900
Billings, Montana 59107-6900



IN REPLY
REFER TO: MB-450
870.

John Hatch, Chief Engineer
Water Rights Division
Joe Foss Building
Pierre, SD 57301

NOV 19 1987

Dear Mr. Hatch:

Pursuant to South Dakota Civil Law 1-26, we hereby make known our objections to Applications to Validate Vested Water Rights (applications) Nos. 1388-1, 1390-1, 1394-1, 1395-1, 1399-1, 1400-1, 1402-1, 1405-1, 1408-1, 1409-1, 1410-1, 1411-1, 1412-1, 1413-1, 1415-1, 1417-1, 1423-1, and 1425-1. These applications are scheduled for consideration by the Water Management Board in Rapid City, South Dakota, on December 2, 1987, at 1:00 pm.

We concur with the Chief Engineer's recommendations regarding the diversion rates for the applications listed above and would object to increases in the diversion rates above those recommended by the Chief Engineer. The Bureau of Reclamation (Bureau) is the owner of water rights for the Belle Fourche Irrigation Project (Project) located on the Belle Fourche River. Most of the vested rights (with the exception of application No. 1423-1) have points of diversion located on tributaries to the Belle Fourche River upstream of the Project diversion dam. The Project could be adversely impacted if the applications are validated with flow rates in excess of those historically utilized.

Finally, we request that you send a copy of the Chief Engineer's recommendation regarding each of the applications listed above to Bruce Laymon who will be representing the Bureau's interests at the hearings. His mailing address is listed below.

U.S. Bureau of Reclamation
Attention: Bruce Laymon
Belle Fourche Project Office
P.O. Box 226
Newell, SD 57760

If you have any questions regarding our interest in these matters, please contact Dave Nelson at (406) 657-6639 or Bob Pike at (406) 657-6469.

Sincerely yours,


Donald R. Glaser

For B. E. Martin
Regional Director

Enclosure

Identical letters sent to attached listing

Mr. Ralph Bahm
RR 1, Box 196
Spearfish, SD 57783

Ms. Della Crago
RR 1, Box 24
Belle Fourche, SD 57717

Mr. Dick Cundy
St. Onge Road
Spearfish, SD 57783

Homestake Mining Company
P.O. Box 875
Lead, SD 57754

Mr. Albert Jeffery
RR 1
Spearfish, SD 57783

Mr. Leland Johnson
Mr. Keith Johnson
RR 1, Box 1011
Spearfish, SD 57783

Mr. Richard Lausser
RR 1, Box 195
Spearfish, SD 57783

Redwater Irrigation Association
P.O. Box 351
Belle Fourche, SD 57717

Mr. R. Thornton Vallery
Star Route, Box 188
Nisland, SD 57762

Mr. James Chenowith
Box 248
Woodrow, CO 80757

Mr. Ralph Crago
RR 1, Box 52B
St. Onge, SD 57779

Mr. Melvin Delzer
Box 1045
Spearfish, SD 57783

Mr. Robert Humphrey
Rt. 1, Box 170
Spearfish, SD 57783

Mr. James Jennings
RR 1, Box 182C
Spearfish, SD 57783

Mr. William Lambert
Box 335
Beulah, WY 82712

Mr. Josef Meier
421 Meier Street
Spearfish, SD 57783

Mr. Wesley W. Thompson
Rt. 1, Box 198A
Spearfish, SD 57783

**South Dakota
Department of
Game, Fish and Parks**

**Division of Wildlife
Sigurd Anderson Building
445 East Capitol
Pierre, South Dakota 57501-3185
(605) 773-3381**

November 20, 1987

Mr. John Hatch, Chief Engineer
Division of Water Rights
S.D. Department of Water & Natural Resources
Joe Foss Building
Pierre, SD 57501



Dear Mr. Hatch:

Pursuant to the filings made by the S.D. Department of Game, Fish and Parks to the attached list of applicants, some confusion exists regarding the intent of the filings. For your information when dealing with inquiries to the nature of the GF&P interest in the upcoming hearings the following information should be useful.

GF&P intends to participate in the upcoming water right validations by supporting the water rights staff recommendations that will bring each water right into legal compliance with existing laws, e.g. appropriate quantities of water for the land base, appropriately sized and gauged headgates for the right in question, abandonment of unused quantities of water, etc. GF&P filed with your office and each applicant so that we would officially be parties to the hearing process and be able to carry out the mandated duties of the Department under SDCL Chapter 41. We also are of the opinion that the Department would have been negligent in not participating in proceedings that relate to water resource allocation directly affecting waters that support fish and wildlife values.

I hope this information will aid you in describing the nature of the interest the Department of Game, Fish and Parks has in the upcoming proceedings. If you have any questions you can contact me at 773-5511.

Sincerely,

A handwritten signature in dark ink, appearing to read "Ron Koth".

Ron Koth
Water Permits Coordinator

RK/lid

SOUTH DAKOTA
Department of
Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

December 9, 1987

NOTICE

TO: Kemper Ditch, c/o James Jennings, RR 1, Box 182C, Spearfish SD 57783
and Parties of Record (see attached list)

FROM: John Hatch, Chief Engineer
Water Rights Division
605 773-3352



SUBJECT: Deferral of Consideration on Vested Right Application No. 1394-1, Kemper Ditch

The Water Management Board deferred Vested Right Application No. 1394-1 at the December 2 and 3, 1987 Board meeting in Rapid City. The Board deferred consideration of the application to allow collection of flow data for Kemper Ditch during the 1988 irrigation season. Notice will be given when Application No. 1394-1 is rescheduled for hearing. The Board included in the motion to defer, that a permanent flow measuring device is to be installed on Kemper Ditch at or near the point of diversion. Design is subject to approval by the Chief Engineer. The device is to be used for measuring ditch flows during the 1988 irrigation season. After approval of the device design, a method of record-keeping will then be determined, cooperatively, between the Division of Water Rights and Kemper Ditch. A measuring device design will need to be submitted to the Chief Engineer by February 1, 1988 to ensure approval of the design and installation of the device prior to the beginning of the 1988 irrigation season.

cc: Harold Deering, Assistant Attorney General
John Guhin, Assistant Attorney General

CERTIFICATION

I hereby certify that on December 9, 1987 I have personally deposited with the U.S. Mail, postage prepaid envelopes containing Notice of Deferral of Consideration on Vested Right Application No. 1394-1, Kemper Ditch addressed as stated on the Parties of Record sheet.

Karen Schlaak

KAREN SCHLAACK
Senior Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 11th day of December, 1987.



John Hatch
Notary Public



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

March 11, 1988

Kemper and Cook-Burns Ditch
c/o Jim Jennings
RR 1, Box 182C
Spearfish SD 57783

RE: Diversion Rate Records, Vested Water Right Application
Nos. 1399-1 and 1394-1

Dear Mr. Jennings:

I am writing to ask for your comments on the enclosed draft of a "Diversion Rate Record" form for recording your ditch flow measurements. The Water Management Board at the December 2 and 3, 1987, Board Meeting in Rapid City, deferred your vested right claims until ditch flows could be measured during the 1988 irrigation season. The Board's motion required a permanent flow measuring device to be installed on the ditch at or near the point of diversion. The motion also stated that a method of record keeping will cooperatively be determined between the Division of Water Rights and the Ditch Company.

The flow measurements will need to be made when water is being diverted and on a daily basis. If the flow is to be recorded following opening or closing the headgate, the gauge reader will need to wait for the flow to stabilize before reading the gauge. The recording time and name of the gauge reader must be recorded. If possible, the number of acres being irrigated should be recorded. The "Remarks" column is provided for any comments you may have during data collection, i.e. "Rainy day, no diversion" etc.

The diversion rate records will need to be submitted to us at the end of each month. If you have any questions or comments regarding the "Diversion Rate Record" form or any suggested changes, please let us know.

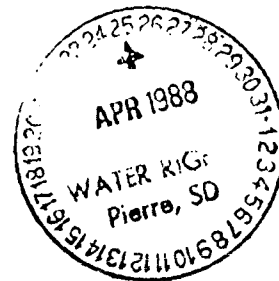
Very truly yours,

A handwritten signature in cursive script that reads "John Hatch". The signature is written in dark ink and is positioned above the typed name and title.

JOHN HATCH, Chief Engineer
Water Rights Division
605 773-3352

April 22, 1988

South Dakota Department of Water & Natural Resources
Joe Foss Office Building
Pierre, SD 57501-3181



Attn: Rassool Ahadi

Re: Measuring Flume Design - Cookburns, Kemper & Bowman Ditches

Dear Rassool:

Please find enclosed dimensional information for the flumes for the referenced ditches. These ditch companies are planning to use the long-throated weir, trapezoidal channel style flume for water measurement. Flume design is in accordance with USDA literature.

This flume design was selected because it offers relatively simple installation and low operating head loss. All of the referenced ditches have extremely shallow slope at the source end and therefore the use of higher head loss devices, such a parshall flume is not acceptable.

For the Cookburns ditch, we have selected a type FB1 flume as described by the USDA literature. This flume uses a 2-foot bottom width, 1:1 side slopes and a 1-foot high weir. A dimensional sketch is enclosed. Discharge rating will be in accordance with Table 2 of the literature, flume style FB1.

The Kemper ditch flume will be similar to the Cookburns flume. For these flumes, measurement of flow in the 10 to 25 cfs range is in the middle of the useful range of flow measurement as described by the literature.

The Bowman ditch will use a type FA1 flume. This will provide a bottom width of 1-foot, 1:1 side slopes and a 9-inch high weir. Measurements of flows from 5 to 12 cfs fall in the mid range of the rating for this flume as described by Table 2.

We do not prepare specifications for this project. Instructions to the installing contractor were to use 3,500 psi concrete and to provide 1/2-inch steel enforcing bars on 12-inch centers. Float-well tubes will be Schedule 40 PVC. No other materials are anticipated for the project.

Mr. Rassool Ahadi
April 22, 1988
Page Two

I have requested a base map on which to illustrate flume location but I do not have it available at this time. Flume location for the Cookburns ditch will be downstream of the existing steel flume and upstream of the hard surface road. Location of the Kemper ditch flume will be immediately upstream of the hard surface road nearest the head gate. Location of the Bowman ditch flume will be immediately north of the Jim Jennings' residence, downstream of the long steel culvert. Each of these locations was chosen as the nearest location to the head gate which provided adequate elevation change to provide flume submergence. We will provide map information when base maps are available.

It is my understanding that ditch owners are proceeding with construction of these flumes immediately. I apologize for not providing you more detailed information earlier. We would appreciate your review at your earliest convenience.

Sincerely,

DEWILD GRANT RECKERT
& ASSOCIATES COMPANY


Bruce Jennings, P.E.

BAJ:ldb



R.R. 1 Box 182C
Spearfish, SD 57783
January 19, 1989

John Hatch, Chief Engineer
Division of Water Rights
SD Department of Water and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

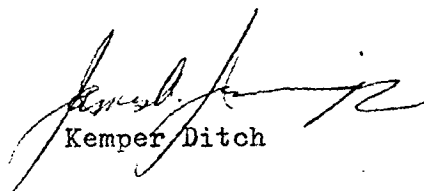
Dear John;

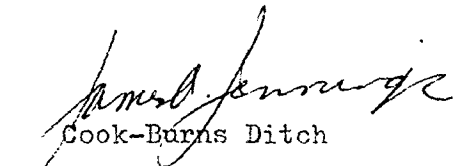
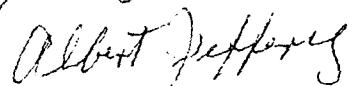
In 1988, at considerable expense to the ditch owners, measuring devices were placed in each ditch. This resulted in being able, for the first time in the history of the ditches, to determine the actual amount of water used on any given day. Records were kept and supplied to your office.

Due to the lack of rainfall during the 1988 growing season, Lawrence county was declared a disaster area. The lack of rainfall resulted in diminished stream flow, above normal water usage by the irrigators above us on the creek, and reduced underground return flow to the creek. The result was insufficient water in the creek to supply our ditches.

Because of the sub-normal 1988 season, we request an additional year's measurement of water diverted before the final ditch allotments are made.

Sincerely yours,


Kemper Ditch


Cook-Burns Ditch

Bowman Ditch



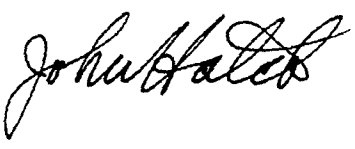
Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

January 24, 1989

NOTICE

TO: Kemper Ditch
c/o James Jennings
RR 1, Box 182C
Spearfish SD 57783
and Parties of Record (see attached list)

FROM: John Hatch, Chief Engineer
Water Rights Division
605 773-3352 

SUBJECT: Reconsideration of Deferred Vested Right Application
No. 1394-1

The Water Management Board will reconsider Vested Right Application No. 1394-1 at 11:00 am, March 1, 1989 in the Roosevelt Room, Howard Johnson's, I-90 and La Crosse, Rapid City SD. The agenda time is an estimate. The actual time of hearing may be later than 11:00 am due to prior agenda items. The Board deferred Application No. 1394-1 for one year at the March 2 and 3, 1988 Board meeting to allow collection of flow data for the ditch during the 1988 irrigation season.

The Chief Engineer is recommending that Application No. 1394-1 remain in deferred status due to dry conditions in 1988 and allow collection of additional flow data for another irrigation season. Applicable provisions of the Notice of Hearing published on October 28 and November 3, 1987 in the Belle Fourche Daily Post and October 28 and November 4, 1987 in the Queen City Mail will still apply at this hearing.

cc: Larry Donovan, Assistant Attorney General



CERTIFICATION

I hereby certify that on January 24, 1989 I have personally deposited with the U.S. Mail postage prepaid envelopes containing a Notice of Reconsideration of Deferred Vested Right Application No. 1394-1 addressed as shown on the Parties of Record sheet.

Karen Schlaak
KAREN SCHLAAK
Senior Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 26th day of January, 1989.



John Hatch
Notary Public



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

March 8, 1989

NOTICE

TO: Kemper Ditch
c/o James Jennings
RR 1, Box 182C
Spearfish SD 57783
and Parties of Record (see attached list)

FROM: John Hatch, Chief Engineer 
Water Rights Division
605 773-3352

SUBJECT: Deferral of Vested Right Application No. 1394-1

On March 1, 1989, the Water Management Board allowed Application No. 1394-1 to remain in deferred status to allow collection of additional flow data during the 1989 irrigation season. Application No. 1394-1 will then be rescheduled for consideration by the Board after the 1989 irrigation season. Notice will be given of the time and place of hearing.

cc: Larry Donovan, Assistant Attorney General

CERTIFICATION

I hereby certify that on March 8, 1989 I have personally deposited with the U.S. Mail postage prepaid envelopes containing 1394-1 a Notice of Deferral of Vested Right Application No. addressed as stated on the Parties of Record sheet.

Karen Schlaak
KAREN SCHLAACK
Senior Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 9th day of March, 1989.



John Hatch
Notary Public

 **Department of
Water & Natural Resources**

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Kemper Ditch

1394-1

May 4, 1989

James Jennings
RR1, Box 182C
Spearfish, SD 57783

Dear Jim,

Enclosed you will find the diversion rate record forms you requested. I also sent you envelopes you could use to send us the records.

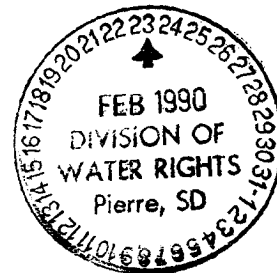
If you have any questions, please contact me.

Sincerely,



M. RASSOOL AHADI
Natural Resources Engineer.
(605) 773-3352





February 22, 1990

To: John Hatch
Water Rights Division
Joe Foss Building
523 East Capitol
Pierre, SD 57501

From: Kemper Ditch
R.R. 1 Box 182C
Spearfish, SD 57783

Dear John;

Kemper Ditch irrigators would appreciate deferral of application No. 1394-1 until March of 1991. This will allow the collection of flow data for the 1990 irrigating season. We will then have three year's data.

After the 1990 irrigating season we would like to meet with you or your representative to determine the amount and rate of flow of water to be allotted to the ditch.

Sincerely yours,



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

February 26, 1990

NOTICE

TO: Kemper Ditch
c/o James Jennings
RR 1, Box 182C
Spearfish SD 57783
and Parties of Record (see attached list)

FROM: John Hatch, Chief Engineer
Water Rights Division
605 773-3352

SUBJECT: Reconsideration of Deferred Vested Right Application
No. 1394-1

The Water Management Board will reconsider Vested Water Right Application No. 1394-1 at 10:30 am, March 7, 1990, Roosevelt/Jefferson Room, Howard Johnson's, 2211 LaCrosse Street, Rapid City SD. The agenda time is an estimate. The actual time of hearing may be later than 10:30 am due to prior agenda items. The Board deferred Application No. 1394-1 for one year at the March 2 & 3, 1988 Board meeting to allow collection of flow data during the 1988 irrigation season.

The Chief Engineer is recommending that Application No. 1394-1 remain in deferred status due to dry conditions in 1988 and 1989 and allow collection of additional flow data for another irrigation season. Applicable provisions of the Notice of Hearing published on October 28 and November 3, 1987 in the Belle Fourche Daily Post and October 28 and November 4, 1987 in the Queen City Mail will still apply at this hearing.

cc: John Haak, Assistant Attorney General

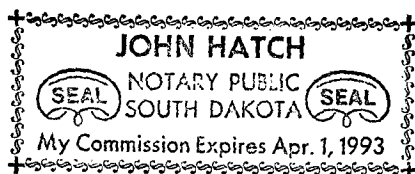
CERTIFICATION

I hereby certify that on February 26, 1990 I have personally deposited with the U.S. Mail postage prepaid envelopes containing a Notice of Hearing on Reconsideration of Deferred Vested Right Application No. 1394-1 addressed as stated on the parties of record sheet.

Karen Schlaak
KAREN SCHLAACK
Senior Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 5th day of March, 1990.



John Hatch
Notary Public



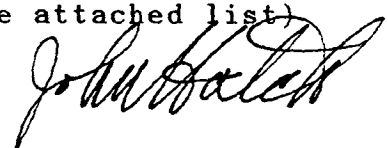
Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

March 12, 1990

NOTICE

TO: Kemper Ditch
c/o James Jennings
RR 1, Box 182C
Spearfish SD 57783
and Parties of Record (see attached list)

FROM: John Hatch, Chief Engineer 
Water Rights Division
605 773-3352

SUBJECT: Deferral of Vested Right Application No. 1394-1

On March 7, 1990, the Water Management Board allowed Application No. 1394-1 to remain in deferred status to allow collection of additional flow data during the 1990 irrigation season. Application No. 1394-1 will then be rescheduled for consideration by the Board after the 1990 irrigation season. Notice will be given of the time and place of hearing.

cc: John Haak, Assistant Attorney General

CERTIFICATION

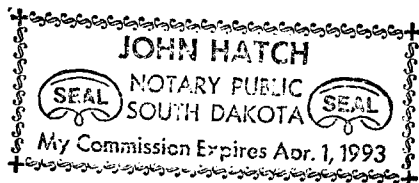
I hereby certify that on March 12, 1990 I have personally deposited with the U.S. Mail postage prepaid envelopes containing a Notice of Hearing on Deferral of Vested Right Application No. 1394-1 addressed as stated on the parties of record sheet.

Karen Schlaak

KAREN SCHLAACK
Senior Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 13th day of March, 1990.



John Hatch
Notary Public



Kemper

Rassool Ahadi
South Dakota Department of Water and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Dear Rassool;

The irrigators have approved the diversion rates from Spearfish Creek as follows:

Cook-Burns	17.8 cfs
Kemper	24 cfs
Bowman	8 cfs

I assume you will recommend these diversion rates to your board for approval at their December meeting in Rapid City.

I would appreciate receiving copies of the 1990 diversion rate records for each of the ditches. I also would like a copy of your graph illustrating water useage of cfs by days.

The notice in th Queen City Mail listed Homestake as applying for the time extension relative to the change of point of diversion for the Ramsdell ditch.

Sincerely yours,



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

Kemper

November 14, 1990

Jim Jennings
RR 1, Box 182C
Spearfish, SD 57783

Dear Jim,

Enclosed please find copies of the diversion rates for Kemper, Cook-Burns, and the Bowman Ditches for the 1990 irrigation season as you requested. Enclosed you will also find copies of the hydrographs for Kemper and Cook-Burns Ditches. Please note that there was not enough data for Bowman Ditch to make a hydrograph for it.

If you have any other questions, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "M. Rassool Ahadi".

M. RASSOOL AHADI
Natural Resources Engineer
(605)773-3352

enclosures

Instruction to Newspaper - Publish first publication of the following Notice on or before October 28, 1987 with 2nd publication 1 week later. The applicant is responsible for payment.

NOTICE OF HEARING To Validate
Vested Right Application No. 1394-1 to Appropriate Water

Notice is hereby given that Kemper Ditch, c/o James Jennings whose mailing address is RR 1, Box 182C, Spearfish, South Dakota has filed an application to validate a vested right claim to appropriate 33.0 cubic feet of water per second (cfs) from Spearfish Creek to irrigate 544.7 acres via the Kemper Ditch with a claimed priority date of July 31, 1885. The Spearfish Creek diversion point for the Kemper Ditch is located in the NW 1/4 SW 1/4 Section 16, T7N, R2E. The irrigated acreage is located in the SW 1/4, S 1/2 NW 1/4 Section 4; S 1/2 SW 1/4, NE 1/4 SW 1/4 Section 5; NE 1/4 Section 7; SE 1/4, NW 1/4 NE 1/4, NW 1/4 Section 8; NE 1/4 Section 17; all in T7N, R2E.

Pursuant to SDCL 46-2A-2 the Chief Engineer of the Water Rights Division recommends VALIDATION of Vested Water Right Application No. 1394-1 for 15.5 cfs and that the applicable portions of Location Certificate No. 25060 will be incorporated into No. 1394-1 and that the abandoned portions of No. 25060 be cancelled, because 1) water has been appropriated as described for irrigation with a priority date of July 31, 1885, 2) the use has been developed without unlawful impairment of existing rights, 3) it is a beneficial use of water and 4) it is in the public interest.

Validation of this application will be considered by the Water Management Board at Howard Johnson's, Roosevelt and Jefferson Rooms, Rapid City SD, December 2, 1987 at 1:00 pm.

The recommendation of the Chief Engineer is not final or binding upon the Board and the Board is authorized to 1) approve validation, 2) approve the validation with qualifications, 3) defer, or 4) deny validation of the application after it reaches a conclusion based upon facts presented at the public hearing. Any interested person who may be affected by a Board decision and who intends to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, must file a written petition with BOTH the applicant and the Chief Engineer by November 20, 1987. The petition may be informal, but it must include a statement describing the petitioner's interest in the application, the reasons for the petitioner's opposition to or support of the application, and the signature and mailing address of the petitioner or his legal counsel if legal counsel is obtained. The applicant need not file a petition.

This application is made pursuant to the provisions of SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15, 46-2A-18; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30.2, 46-5-30.4, 46-5-31, 46-5-49; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15 and 74:02:01:19 thru 74:02:01:22.

This hearing is an adversary proceeding. The applicant or any person, after filing a petition, has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

Any person wishing a copy of the Chief Engineer's recommendation, further information on this application or to assure access to the hearing by the handicapped can contact the Water Rights Division, Joe Foss Bldg, Pierre SD (605 773-3352) for assistance prior to the hearing date. The time of the hearing will be automatically extended for at least twenty days upon written request of the applicant or person who has filed a petition to oppose or support the application. The request for extension must be filed with the Chief Engineer by November 20, 1987.



Department of Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

October 22, 1987

BELLE FOURCHE DAILY POST
1004 5th Ave
Belle Fourche SD 57717

Dear Sir:

Enclosed is a Notice of Hearing to Validate Vested Right Application No. 1394-1. Please publish this notice once each week for two consecutive weeks in your paper. The first publication should be on or before October 28, 1987.

The APPLICANT MUST VERIFY TO YOU THAT THE NOTICE IS TO BE PUBLISHED, before you make the first publication. Please BILL the APPLICANT for the cost of publication. The APPLICANT is Kemper Ditch, c/o James Jennings, RR 1, Box 182C, Spearfish SD 57783.

A copy of BOTH publications must be SENT to the WATER RIGHTS DIVISION. IMMEDIATELY return the FIRST publication with the FIRST Transmittal form on the bottom of this page. The first copy is needed to check the publication for errors so any corrections can be made in the second publication. Publication errors can invalidate the public notice and cause the applicant costly delays.

Please be sure the SECOND publication is returned IMMEDIATELY with the enclosed Proof of Publication form. DO NOT WAIT until the end of the month or the billing cycle. The permit application cannot be considered by the Water Management Board until proof of publication has been received.

Sincerely,

Ron Duvall
Natural Resources Engineer
605 773-3352

enclosures

-----CUT HERE-----

FIRST TRANSMITTAL NOTICE

TO: Water Rights Division
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter of _____ enclosing Notice of Hearing to Validate A Vested Right Application which was first published in our issue of _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name

Newspaper

**SOUTH Dakota Department of
Water & Natural Resources**

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

October 22, 1987

QUEEN CITY MAIL
Box 7
Spearfish SD 57783

Dear Sir:

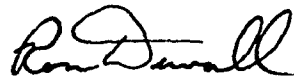
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The APPLICANT MUST VERIFY TO YOU THAT THE NOTICE IS TO BE PUBLISHED, before you make the first publication. Please BILL the APPLICANT for the cost of publication. The APPLICANT is Kemper Ditch, c/o James Jennings, RR 1, Box 182C, Spearfish SD 57783.

A copy of BOTH publications must be SENT to the WATER RIGHTS DIVISION. IMMEDIATELY return the FIRST publication with the FIRST Transmittal form on the bottom of this page. The first copy is needed to check the publication for errors so any corrections can be made in the second publication. Publication errors can invalidate the public notice and cause the applicant costly delays.

Please be sure the SECOND publication is returned IMMEDIATELY with the enclosed Proof of Publication form. DO NOT WAIT until the end of the month or the billing cycle. The permit application cannot be considered by the Water Management Board until proof of publication has been received.

Sincerely,



Ron Duvall
Natural Resources Engineer
605 773-3352

enclosures

-----CUT HERE-----

FIRST TRANSMITTAL NOTICE

TO: Water Rights Division
Joe Foss Building
Pierre SD 57501-3181

Date _____

We are in receipt of your letter of _____ enclosing Notice of Hearing to Validate A Vested Right Application which was first published in our issue of _____. ENCLOSED IS A COPY OF THIS FIRST PUBLICATION.

Name

Newspaper

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA }
County Lawrence } ss.

I, Jimmie R. Stephenson hereby

certify that the annexed printed copy of Notice of Intent to Appropriate

Water was taken from the Queen City Mill

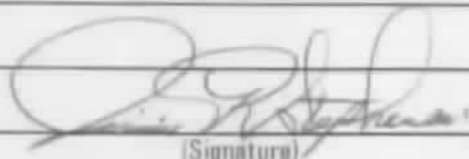
A newspaper which during the whole time of publication of said notice
herein after stated, has been and is printed and published in the

City of Spearfish

County of Lawrence and State of South Dakota;
that the said notice was published in said newspaper on the following
two dates:

October 28th

November 4th


(Signature)

Publisher

(Title)

11-6-87

(Date Signed)

Cost of Printing: _____

112 x .2564 = 28.72

112 x .2051 = 22.98

Total = 51.70



NOTICE OF HEARING
TO VALIDATE VESTED
RIGHT APPLICATION
NO. 1394-1 TO
APPROPRIATE WATER

Notice is hereby given that Kemper Ditch, c/o James Jennings whose mailing address is RR 1, Box 182C, Spearfish, South Dakota has filed an application to validate a vested right claim to appropriate 33.0 cubic feet of water per second (cfs) from Spearfish Creek to irrigate 544.7 acres via the Kemper Ditch with a claimed priority date of July 31, 1885. The Spearfish Creek diversion point for the Kemper Ditch is located in the NW 1/4 SW 1/4 Section 16, T7N, R2E. The irrigated acreage is located in the SW 1/4, S 1/2 NW 1/4 Section 4; S 1/2 SW 1/4, NE 1/4 SW 1/4 Section 5; NE 1/4 Section 7; SE 1/4, NW 1/4 NE 1/4, NW 1/4 Section 8; NE 1/4 Section 17; all in T7N, R2E.

Pursuant to SDCL 46-2A-2 the Chief Engineer of the water Rights Division recommends VALIDATION of Vested Water Right Application No. 1394-1 for 15.5 cfs and that the applicable portions of Location Certificate No. 25060 will be incorporated into No. 1394-1 and that the abandoned portions of No. 25060 be cancelled, because 1) water has been appropriated as described for irrigation with a priority date of July 31, 1885, 2) the use has been developed without unlawful impairment of existing rights, 3) it is a beneficial use of water and 4) it is in the public interest.

Validation of this application will be considered by the Water Management Board at Howard Johnson's, Roosevelt and Jefferson Rooms, 2211 LaCrosse, Rapid City SD, December 2, 1987 at 1:00 pm.

The recommendation of the Chief Engineer is not final or binding upon the Board and the Board is authorized to 1) approve validation, 2) approve the validation with qualifications, 3) defer, or 4) deny validation of the application after it reaches a conclusion based upon facts presented at the public hearing. Any interested person who may be affected by a Board decision and who intends to participate in the hearing before the board and present evidence or cross-examine witnesses according to SDCL 1-26, must file a written petition with BOTH the applicant and the Chief Engineer by November 20, 1987. The petition may be informal, but it must include a statement describing the petitioner's interest in the application, the reasons

let the petitioner's opposition to or support of the application, and the signature and mailing address of the petitioner or his legal counsel if legal counsel is obtained. The applicant need not file a petition.

This application is made pursuant to the provisions of SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 46-2-3, 46-2-9, 46-2-11, 46-2-13, 46-2-17, 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15, 46-2A-18; 46-5-1 thru 46-5-11, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30, 2, 46-5-30.4, 46-5-31, 46-5-49; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15 and 74:02:01:19 thru 74:02:01:22.

This hearing is an adversary proceeding. The applicant or any person, after filing a petition, has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

Any person wishing a copy of the Chief Engineer's recommendation, further information on this application or to assure access to the hearing by the handicapped can contact the Water Rights Division, Joe Foss Bldg., Pierre SD (605 773-3352) for assistance prior to the hearing date. The time of the hearing will be automatically extended for at least twenty days upon written request of the applicant or person who had filed a petition to oppose or support the application. The request for extension must be filed with the Chief Engineer by November 1, 1987.

Oct 28 Nov 4

PROOF OF PUBLICATION

STATE OF SOUTH DAKOTA)
County Butte) ss.

I, Marion Lucas hereby

certify that the annexed printed copy of Notice of Intent to Appropriate

Water was taken from the Belle Fourche Daily Post

A newspaper which during the whole time of publication of said notice
herein after stated, has been and is printed and published in the

City of Belle Fourche

County of Butte and State of South Dakota;
that the said notice was published in said newspaper on the following
two dates:

October 28, 1987

November 3, 1987

Marion Lucas
(Signature)

Editor
(Title)

November 3, 1987
(Date Signed)

Cost of Printing: \$43.75

130 L - 2 times



NOTICE OF HEARING
TO VALIDATE
Vested Right Application
No. 1394-1

to Appropriate Water

Notice is hereby given that Kemper Ditch, c/o James Jennings whose mailing address is RR 1, Box 182C, Spearfish, South Dakota has filed an application to validate a vested right claim to appropriate 33.0 cubic feet of water per second (cfs) from Spearfish Creek to irrigate 544.7 acres via the Kemper Ditch with a claimed priority date of July 31, 1885. The Spearfish Creek diversion point for the Kemper Ditch is located in the NW 1/4 SW 1/4 Section 16, T7N, R2E. The irrigated acreage is located in the SW 1/4, S 1/2 NW 1/4 Section 4; S 1/2 SW 1/4, NE 1/4 SW 1/4 Section 5; NE 1/4 Section 7; SE 1/4, NW 1/4 NE 1/4, NW 1/4 Section 8; NE 1/4 Section 17; all in T7N, R2E.

Pursuant to SDCL 46-2A-2 the Chief Engineer of the Water Rights Division recommends VALIDATION of Vested Water Right Application No. 1394-1 for 15.5 cfs and that the applicable portions of Location Certificate No. 25060 will be incorporated into No. 1394-1 and that the abandoned portions of No. 25060 be cancelled, because 1) water has been appropriated as described for irrigation with a priority date of July 31, 1885, 2) the use has been developed without unlawful impairment of existing rights, 3) it is a beneficial use of water and 4) it is in the public interest.

Validation of this application will be considered by the Water Management Board at Howard Johnson's, Roosevelt and Jefferson Rooms, 2211 LaCrosse, Rapid City, SD, December 2, 1987 at 1:00 p.m.

The recommendation of the Chief Engineer is not final or binding upon the Board and the Board is authorized to 1) approve validation, 2) approve the validation with qualifications, 3) defer, or 4) deny validation of the application after it reaches a conclusion based upon facts presented at the public hearing. Any interested person who may



be affected by a Board decision and who intends to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, must file a written petition with BOTH the applicant and the Chief Engineer by November 20, 1987. The petition may be informal, but it must include a statement describing the petitioner's interest in the application, the reasons for the petitioner's opposition to or support of the application, and the signature and mailing address of the petitioner or his legal counsel if legal counsel is obtained. The applicant need not file a petition.

This application is made pursuant to the provisions of SDCL 46-1-1 thru 46-1-9, 46-1-12 thru 46-1-15; 46-2-3, 1, 46-2-9, 46-2-11, 46-2-13, 46-2-17; 46-2A-1 thru 46-2A-10, 46-2A-12, 46-2A-14, 46-2A-15, 46-2A-18; 46-5-1 thru 46-5-14, 46-5-13 thru 46-5-15, 46-5-24, 46-5-25, 46-5-30, 2, 46-5-30.3, 46-5-31, 46-5-49; and Board Rules ARSD 74:02:01:01 thru 74:02:01:15 and 74:02:01:19 thru 74:02:01:22.

This hearing is an adversary proceeding. The applicant or any person, after filing a petition, has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

Any person wishing a copy of the Chief Engineer's recommendation on this application or to assure access to the hearing by the handicapped can contact the Water Rights Division, Joe Foss Bldg., Pierre SD (605 773-3352) for assistance prior to the hearing date. The time of the hearing will be automatically extended for at least twenty days upon written request of the applicant or person who filed a petition to oppose the application. The request for extension must be filed with the Chief Engineer by November 20, 1987.

2/10/28-11/3

REVISED RECOMMENDATION OF CHIEF ENGINEER FOR VALIDATION OF
VESTED WATER RIGHT APPLICATION NO. 1394-1, Kemper Ditch

Pursuant to SDCL 46-2A-2, the following is the revised recommendation of the Chief Engineer, Water Rights Division, Department of Water and Natural Resources concerning Validation of Vested Water Right Application No. 1394-1, Kemper Ditch, c/o James Jennings, RR #1 Box 182C, Spearfish SD.

The Chief Engineer is recommending VALIDATION of Application No. 1394-1 for 24.0 cfs and that the applicable portions of Location Certificate No. 25060 be incorporated into No. 1394-1 and the abandoned portions of Certificate No. 25060 be cancelled, because 1) water has been appropriated as described for irrigation use with a priority date of July 31, 1885, 2) the use has been developed without unlawful impairment of existing rights, 3) the use is a beneficial use and 4) it is in the public interest with the following qualifications.

1. That Vested Water Right No. 1394-1 is subject to domestic use rights. Diversion of water under Water Right No. 1394-1 is contingent upon supplies being available first to domestic users.
2. That the flow measuring device on Kemper Ditch continue to be maintained and records of diversions be kept and reported to the Chief Engineer annually.

See the report on application for additional information.



JOHN HATCH, Chief Engineer
November 20, 1990

Revised Report on Vested Water Right Application No. 1394-1
Kemper Ditch (Spearfish Creek)
November 14, 1990

Background

The Water Management Board, at the December 2 and 3, 1987 Board meeting in Rapid City, deferred consideration of Application No. 1394-1 to allow collection of flow data for Kemper Ditch during the 1988 irrigation season. The Division of Water Rights had recommended a diversion rate of 15.5 cubic feet of water per second for Kemper Ditch from Spearfish Creek. The ditch company, however, was not satisfied with the Division's recommendation and requested time to collect flow data to establish a diversion rate base for actual water use. Because of low flow conditions, the ditch company did not believe the data collected during the 1988 irrigation season represented actual conditions. The ditch company requested that collection of flow data be continued during the 1989 and 1990 irrigation seasons.

Discussion

The recommended 15.5 cfs was based on 1.0 cfs for irrigation of 70 acres plus 50% water losses due to the method of irrigation and seepage from the ditch.

According to the applicant, the recommended 15.5 cfs diversion rate is not enough to adequately irrigate all of the land.

Daily flow records were collected, by the ditch company, for three consecutive irrigation seasons. The maximum diversion rate recorded was 25.9 cubic feet per second (cfs) for a short time during May of 1989. The diversion rates vary from as low as 2.5 cfs to as high as 25.9 cfs. A diversion rate of 24.0 cfs, however, was diverted most frequently and can be used as the actual maximum diversion rate. The hydrographs for the last three irrigation seasons show a median diversion rate of 12.0 cfs.

To prevent excessive water loss using a gravity irrigation system, a higher diversion rate is required to reach all parts of the land. The travel time to cover the irrigated land is greater for 15.5 cfs than for 24.0 cfs. During application of water to the land, there will be greater water losses with the lower diversion rate.

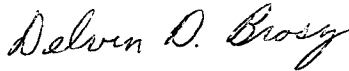
Conclusions

1. The frequency of a diversion rate of 24.0 cfs during the last three irrigation seasons shows that this rate is the actual maximum diversion rate required.
2. The headgate should be controlled in such a manner that the diversion rate does not exceed the recommended rate.
3. Kemper Ditch Company is responsible for maintaining the ditch in its entirety and improvement of the irrigation system so that water losses are kept minimal.
4. Vested Water Right Application No. 1394-1 should be validated for a diversion rate of 24.0 cfs with a priority date of July 31, 1885, for irrigation of 544.7 acres as described in Application No. 1394-1.
5. The flow measuring device on Kemper Ditch should continue to be maintained and monitored as required by the Chief Engineer.



M. RASSOOL AHADI
Natural Resources Engineer II

Approved By:



DELVIN D. BROSZ, P.E.
Natural Resources Engineer IV



Water & Natural Resources

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

November 21, 1990

NOTICE

TO: Kemper Ditch
c/o James Jennings
RR 1, Box 182C
Spearfish, SD 57783
and Parties of Record (see attached list)

FROM: John Hatch, Chief Engineer 
Water Rights Division
605 773-3352

SUBJECT: Validation of Vested Right Claim No. 1394-1, Kemper Ditch

The Water Management Board will consider Validation of Vested Right Claim No. 1394-1 at 9:15 am, December 5, 1990 at the Hilton Inn, Deerfield Room, 445 Mt. Rushmore Road, Rapid City SD. The agenda time is an estimate. The actual time of the hearing may be later than 9:15 am due to prior agenda items. Applicable provisions of the Notice of Hearing published on October 28 and November 3, 1987 in the Belle Fourche Daily Post and October 28 and November 4, 1987 in the Queen City Mail will still apply at this hearing.

The Water Management Board originally deferred Vested Right Claim No. 1394-1 at their December 2 and 3, 1987 meeting to allow collection of flow data for Kemper Ditch. A copy of the revised report and Chief Engineer's revised recommendation are attached.

This hearing is an adversary proceeding. Any person having filed a petition and the Vested Right Claim holder have the right to be represented by a lawyer. These and other due process rights will be forfeited if not exercised. Decisions of the Board may be appealed to the Circuit Court and the State Supreme Court as provided by law.

cc: John Haak, Assistant Attorney General

attachment

CERTIFICATION

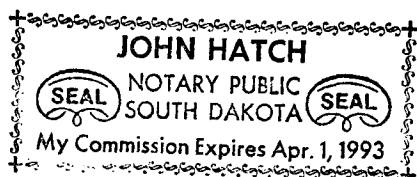
I hereby certify that on November 21, 1990 I have personally deposited with the U.S. Mail postage prepaid envelopes containing a Notice of Validation of Vested Right Claim No. 1394-1, Kemper Ditch addressed as stated on the Parties of Record sheet.

Mark P. Arthur

Marie R. Arthur
Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 27th day of November, 1990.



John Bates
Notary Public



DEPARTMENT OF WATER & NATURAL RESOURCES

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

GREAT FACES. GREAT PLACES.

December 11, 1990

NOTICE

TO: James Jennings
Kemper Ditch
RR 1 Box 182C
Spearfish, SD 57783
(and Parties of Record)

FROM: John Hatch, Chief Engineer
Water Rights Division
605 773-3352 

SUBJECT: Preparation of Findings of Fact, Conclusions of Law and
Final Decision

The Water Management Board has directed John Guhin, the Board's attorney to prepare proposed Findings of Fact, Conclusions of Law and a Final Decision on validation of Vested Right Application No. 1394-1. The Board will consider the proposed Findings, Conclusions and Final Decision at 1:00 pm, Meeting Room, Governor's Inn, 700 W Sioux, Pierre SD. The agenda time is an estimate. The actual time of consideration may be delayed due to prior agenda items.

The Board has requested that a copy of the proposed Findings, Conclusions and Final Decision be mailed to each Board member and all Parties of Record (copy enclosed) by February 7, 1991. Any comments pertaining to the proposed Findings, Conclusions and Decision are to be mailed to each Board member, the Board attorney and all Parties of Record by February 18, 1991.

The public hearing was completed December 5, 1990. No additional testimony will be received on February 27, 1991.

cc: John Guhin, Deputy Attorney General
John Haak, Assistant Attorney General

CERTIFICATION

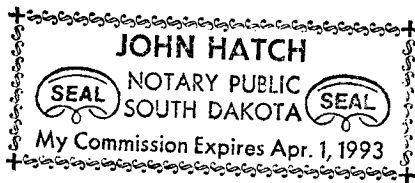
I hereby certify that on December 11, 1990, I have personally deposited with the U.S. Mail postage prepaid envelopes containing a Notice regarding Vested Right Application No. 1394-1 addressed as stated on the Notice.

Jaci Konop

JACI KONOP
Senior Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 13th day of December, 1990.



John Bates
Notary Public



DEPARTMENT OF WATER & NATURAL RESOURCES

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

January 23, 1991

AMENDED NOTICE

TO: James Jennings
Kemper Ditch
RR 1 Box 182C
Spearfish, SD 57783
(and Parties of Record)

FROM: John Hatch, Chief Engineer
Water Rights Division
605 773-3352

SUBJECT: Preparation of Findings of Fact, Conclusions of Law and
Final Decision for Vested Right Claim No. 1394-1

The Notice of December 11, 1990, failed to include the date of the Water Management Board meeting at the Governors Inn in Pierre. This Amended Notice is to advise the parties that the Board will consider Findings of Fact, Conclusions of Law and Final Decision at 1:00 pm, February 27, 1991, Meeting Room, Governors Inn, 700 W Sioux, Pierre, SD.

Applicable provisions of the Notice of Preparation of Findings of Fact, Conclusions of Law and Final Decision dated December 11, 1990, will still apply at this time.

cc: John Guhin, Deputy Attorney General
John Haak, Assistant Attorney General

CERTIFICATION

I hereby certify that on January 23, 1991, I have personally deposited with the U.S. Mail postage prepaid envelopes containing an Amended Notice regarding Vested Right Application No. 1394-1 addressed as stated on the Amended Notice.

Jaci Konop

JACI KONOP
Senior Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 23rd day of January, 1990.

Karin Schlaak
Notary Public





DEPARTMENT OF WATER & NATURAL RESOURCES

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

March 12, 1991

NOTICE

TO: James Jennings
Kemper Ditch
RR 1 Box 182C
Spearfish, SD 57783
(and Parties of Record)

FROM: John Hatch, Chief Engineer
Water Rights Division
605 773-3352

SUBJECT: Adoption of Findings of Fact, Conclusions of Law and
Final Decision

This is to notify you that a Final Decision, including Findings of Fact, Conclusions of Law were adopted by the Water Management Board for Vested Right Application No. 1394-1 which was considered at the February 27, 1991, meeting.

A copy of the signed final Decision, Findings and Conclusion is enclosed for the applicant. Copies will be furnished to anyone else upon request. South Dakota Statutes provide that the decision of the Board may be appealed to the Courts.

cc: Diane Best, Assistant Attorney General

CERTIFICATION

I hereby certify that on March 12, 1991, I have personally deposited with the U.S. Mail, postage prepaid envelopes containing a Notice regarding Adoption of Findings of Fact, Conclusions of Law and Final Decision on Vested Right Application No. 1394-1 addressed as stated on the Notice.

Jaci R Konop

JACI R. KONOP
Senior Secretary

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 13th day of March, 1991.



John Hatch
Notary Public



DEPARTMENT OF WATER & NATURAL RESOURCES

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

GREAT FACES. GREAT PLACES.

APR 25 1991

1394-1

James Jennings
Kemper Ditch
RR 1 Box 182C
Spearfish, SD 57783

Dear Mr. Jennings:

Enclosed are your Validated Vested Water Right and Water License No. 1394-1. As long as you use the water beneficially, as stated in the Water License, the State Water Laws provide that you have a continuing right to use the water.

Very truly yours,

A handwritten signature in cursive script, appearing to read "John Hatch".

JOHN HATCH, Chief Engineer
Water Rights Division
(605) 773-3352

enclosures



DEPARTMENT OF WATER & NATURAL RESOURCES

Joe Foss Building
523 East Capitol
Pierre, South Dakota 57501-3181

1394-1

May 6, 1991

TO: Spearfish Creek Water Right Owners
(See Attached List With Priority Dates)

FROM: John Hatch, Chief Engineer
Division of Water Rights
(605) 773-3352

SUBJECT: Diversions from Spearfish Creek

If drought conditions continue in the Black Hills area during 1991, we expect another irrigation season with very low flows in Spearfish Creek. As I understand it, during the 1990 irrigation season, there were short periods of time when there were no flows in Spearfish Creek at different locations.

I believe that a short reach of the creek channel below Cook Ditch's diversion received the most attention from the news media. Although state law does not require instream flows for fish and wildlife and aesthetic purposes, state law does give preference to water for domestic use which includes livestock watering.

We would like to work with you to maintain minimum flows in the creek for domestic use during 1991. Maintenance of minimum flows should reduce news media attention to Spearfish Creek.

If you have any questions, please contact Del Brosz or Rassool Ahadi, Division of Water Rights, 523 E. Capitol, Pierre, SD 57501. Phone: (605) 773-3352

cc: Representative Harvey Krautschun

SPEARFISH CREEK WATER RIGHTS

PERMIT NO.	NAME	PRIORITY DATE	RATE (CFS)
*43-1	Homestake Mining Co	01/04/1909	100.00
138-1	City of Spearfish	11/12/1917	0.50
141-1	City of Spearfish	03/01/1919	1.10
148-1	City of Spearfish	01/27/1930	1.50
150-1	City of Spearfish	01/27/1930	1.00
+1041-1	US Bur Sport & Fish	02/19/1937	6.66
X1385-1	Homestake Mining Co	10/01/1876	1.67
1386-1	Walton-Schuler Ditch	03/20/1887	8.50
1387-1	Tonn-Evans Ditch	05/01/1876	14.40
1388-1	Bowman Ditch	06/11/1877	8.0
1389-1	Cook Ditch	06/10/1877	21.60
1392-1	Mann Ditch	03/21/1878	1.45
1394-1	Kemper Ditch	07/31/1881	33.00
1399-1	Cook-Burns Ditch	06/15/1881	33.0
1400-1	Owens-Gay Ditch	03/01/1877	1.74
1403-1	Ramsdell Ditch	10/01/1876	2.00
1416-1	Richard Cundy	04/01/1920	0.20

* - Power Generation, non-consumptive

+ - Fish Hatcher in City of Spearfish

X - For municipal use, City of Spearfish

STATE OF SOUTH DAKOTA

BEFORE THE WATER MANAGEMENT BOARD

IN THE MATTER OF THE VALIDA-	)	FINDINGS OF FACT,
TION OF VESTED WATER RIGHT	)	CONCLUSIONS OF LAW
APPLICATION NO. 1394-1,	)	AND FINAL DECISION
KEMPER DITCH	)	

FINDINGS OF FACT

I

This is an application by Kemper Ditch to validate a vested water right for 33.0 cfs of Spearfish Creek water to irrigate 544.7 acres of land in Lawrence County with a priority date of July 31, 1885.

II

The 544.7 acres have been continuously irrigated pursuant to South Dakota law.

III

The ditch company claimed a diversion rate of 33.0 cfs; the original recommendation of the Department was for 15.5 cfs. The Board, after hearing in 1987, required additional data, and data from 1988 through 1990 has been collected and presented to the Board.

IV

The ditch company demonstrated, to the satisfaction of the Board, that a diversion rate of 24.0 cfs is justified.

V

Several factors combine to justify this conclusion and the diversion rate of 24.0 cfs. First, the ditch

company demonstrated that the actual use of water at the 24.0 cfs rate was reasonably frequent during the three-year period of data collection ordered by the Board; this established a reasonable historical foundation for the claimed diversion rate.

VI

Second, the type of irrigation used and the nature of the soil and water in the area justify the diversion rate of 24.0 cfs. The type of irrigation now used in the area is flood irrigation, the same type of irrigation used under this claimed right for more than 100 years. The soils in the area are sandy and are underlain by gravel. When water travels over these lands slowly and at a low diversion rate, it tends to be absorbed quickly and does not reach the end of a large field until the soil near the diversion point is highly saturated. If, on the other hand, a higher rate of diversion is allowed, the water moves more speedily and the water will not be so easily absorbed and will reach the end of the field more quickly. The result is that the allowance of a higher diversion rate, if properly monitored, will result in more efficient use of water.

VII

Third, the Board finds that the hydrology of the area is conducive to the return of excess flows to the stream and to the support of springs in the area. In practical terms, therefore, the allowance of a greater

diversion rate does not mean that a greater amount of water is lost to the hydrologic system of the area.

VIII

The Board finds that the opponent of the right failed to show a significant adverse effect from recognition of this right on fish and wildlife. The diversion is from a cold water fishery, Spearfish Creek, but it is also near the point at which that creek empties into Redwater Creek. No portion of the stream which is in the Black Hills National Forest will be affected by the diversion. Moreover, at no time during the three-year study did the irrigators dry up the creek. In addition, the opponent of the right failed to demonstrate that there was any significant public access to Spearfish Creek below the point of diversion of the ditch company. Finally, the recharge of springs caused by the irrigation itself provides positive wildlife benefits, including the support of wetlands.

CONCLUSIONS OF LAW

I

The Board has jurisdiction of this matter.

II

The amount of water provided for in the Final Decision has been appropriated for irrigation use since July 31, 1885.

III

The use has been developed without unlawful impairment of existing rights.

IV

The use for irrigation is a beneficial use.

V

SDCL 46-5-6 is not applicable to this claimed right because the claimed right predates the passage of the act in 1907.

VI

The use is in the public interest as qualified in the Final Decision.

FINAL DECISION

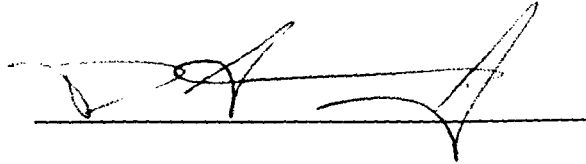
The application for validation of Vested Water Right No. 1394-1, Kemper Ditch, is approved for 24.0 cfs with a priority date of July 31, 1885, with the qualifications set out below. The applicable portions of Location Certificate No. 25060 are incorporated into No. 1394-1, and the abandoned portions of Location Certificate No. 25060 are cancelled.

1. That Vested Right No. 1394-1 is subject to domestic use rights. Diversion of water under Water Right No. 1394-1 is contingent upon supplies being available first to domestic users.
2. That the flow measuring device on Kemper Ditch continue to be maintained and records of diversions be kept as directed by the

Chief Engineer and reported to the Chief
Engineer annually.

Dated this 26th day of March, 1991.

BY THE BOARD:

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke, positioned above a solid horizontal line.

d-pld204.jpg

STATE OF SOUTH DAKOTA

VESTED RIGHT WATER LICENSE NO. 1394-1 FOR IRRIGATION

(1) Kemper Ditch of RR 1 Box 182C, Spearfish, SD 57783 made Application No. 1394-1, December 30, 1986 for validation of a vested right claim to appropriate 33.0 cubic feet of water per second from Spearfish Creek, Lawrence County, South Dakota for irrigation purposes. Vested Water Right No. 1394-1 was validated February 27, 1991 with a priority date of July 31, 1885. Construction of the described water supply system and application of water to beneficial use has been completed and complies with applicable provisions of South Dakota State Law.

The applicable portions of Location Certificate No. 25060 were incorporated into Validated Vested Water Right No. 1394-1 with the abandoned portions of Certificate No. 25060 cancelled.

(2) The applicant is entitled to divert 24.0 cubic feet of water per second for beneficial use. The Spearfish Creek diversion point for the Kemper Ditch is located approximately 2200' N and 70' E from the SW of Section 16, T7N, R2E (NW 1/4 SW 1/4).

The location of the irrigated acreage is:

Kemper Ditch

Section 4 T7N-R2E

SW 1/4 SW 1/4	28.3 Acres		
NW 1/4 SW 1/4	35.3 Acres		
NE 1/4 SW 1/4	36.8 Acres		
SE 1/4 SW 1/4	2.5 Acres	Subtotal	102.9 Acres

SE 1/4 NW 1/4	1.6 Acres		
SW 1/4 NW 1/4	4.5 Acres	Subtotal	6.1 Acres

Section 5 T7N-R2E

SE 1/4 SW 1/4	37.3 Acres		
SW 1/4 SW 1/4	26.7 Acres		
NE 1/4 SW 1/4	1.3 Acres	Subtotal	65.3 Acres

Section 7 T7N-R2E

SW 1/4 NE 1/4	7.3 Acres		
SE 1/4 NE 1/4	29.3 Acres		
NW 1/4 NE 1/4	7.8 Acres		
NE 1/4 NE 1/4	20.0 Acres	Subtotal	64.4 Acres

Section 8 T7N-R2E

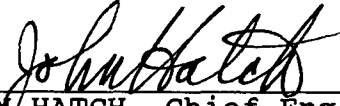
SW 1/4 SE 1/4	38.0 Acres		
SE 1/4 SE 1/4	4.0 Acres		
NW 1/4 SE 1/4	19.0 Acres		
NE 1/4 SE 1/4	6.0 Acres	Subtotal	67.0 Acres
NW 1/4 NE 1/4	7.0 Acres	Subtotal	7.0 Acres
SE 1/4 NW 1/4	15.0 Acres		
SW 1/4 NW 1/4	30.0 Acres		
NE 1/4 NW 1/4	38.0 Acres		
NW 1/4 NW 1/4	32.0 Acres	Subtotal	115.0 Acres

Section 17 T7N-R2E

SW 1/4 NE 1/4	40.0 Acres		
SE 1/4 NE 1/4	22.5 Acres		
NW 1/4 NE 1/4	39.0 Acres		
NE 1/4 NE 1/4	15.5 Acres	Subtotal	<u>117.0 Acres</u>

Total Acreage For Kemper Ditch	544.7 Acres
--------------------------------	-------------

(3) Pursuant to Section 46-5-30.1 Kemper Ditch of RR 1, Box 182C, Spearfish, SD 57783 the holder(s) and/or owner(s) of Vested Water Right No. 1394-1 is issued a license to appropriate 24.0 cubic feet of water per second from Spearfish Creek with a priority date of July 31, 1885 from the location specified in (2) of this license. The water is to be used for the purpose of irrigation. This license is subject to any limitations, conditions or qualifications listed in Vested Water Right No. 1394-1 and subject to South Dakota State Law.



JOHN HATCH, Chief Engineer
Water Rights Division
Department of Water and Natural
Resources

APR 25 1991

1394-1

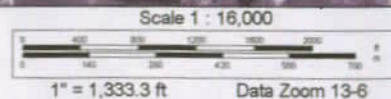
Kemper Ditch

Flume

Broken Flume

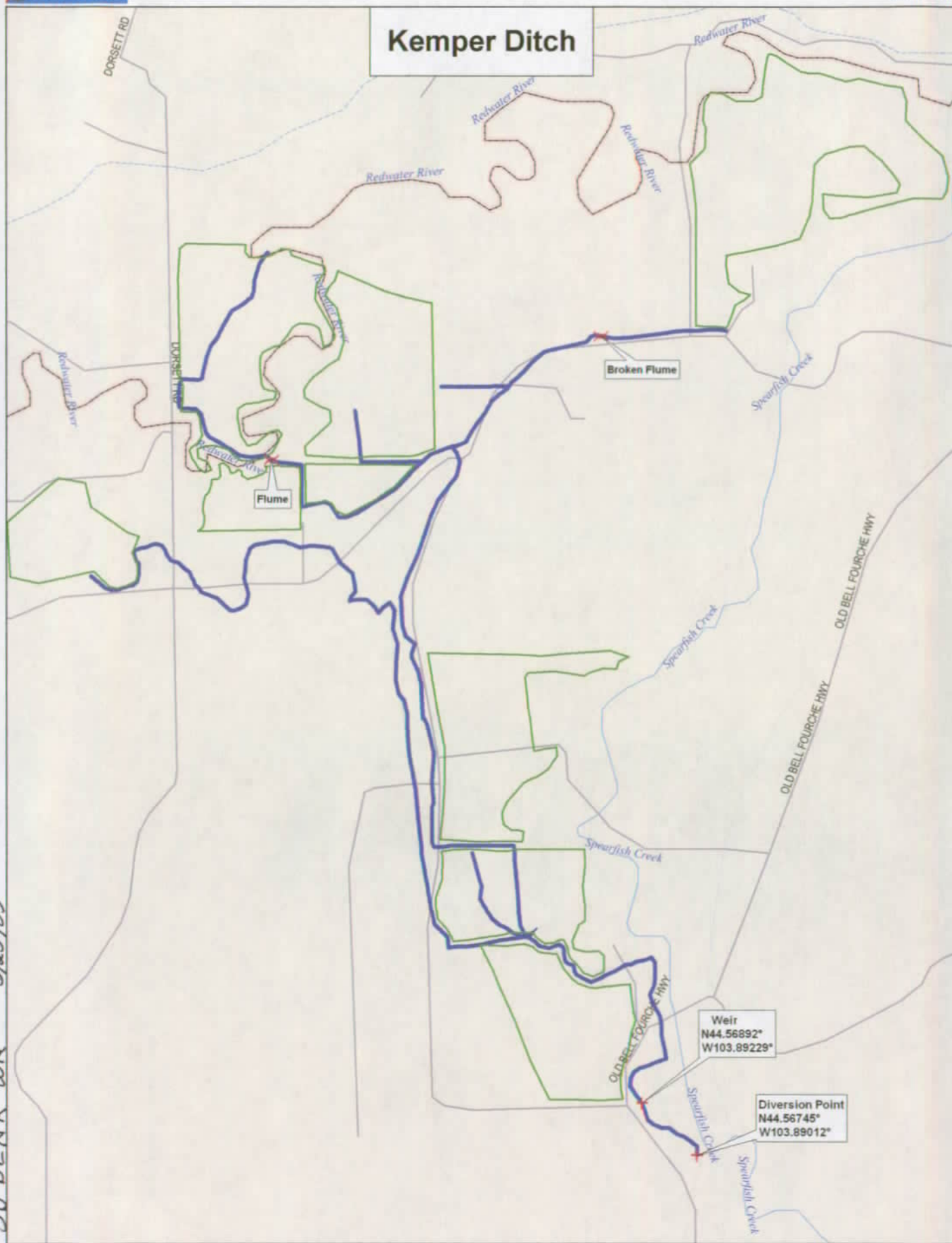
Weir
N44.56892°
W103.89229°

Diversion Point
N44.56745°
W103.89012°



Don Stoupe Donald E. Stoupe
SD DENR WA 3/25/05

1399-1



Don Strop WA
3/25/05
Don Strop WA



**DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES**

PMB 2020
JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182

denr.sd.gov

1394-1

OCT 22 2010

Kemper Ditch
c/o Eric Jennings
19488 Creekside Loop
Spearfish SD 57783

Dear Mr. Jennings:

Enclosed is Reissued Vested Right Water License No. 1394-2. On September 6, 2010, Water Permit No. 1917-1 was approved to sever 1.0 cfs from the Ditch's water right and the diversion of this rate be directly from Spearfish Creek located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 4 for irrigation of 68.1 acres located in the W $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 4; all in T7N-R2E. The vested right is being reissued to reflect this reduction.

As long as you use the water beneficially, as stated in the Water License, the State Water Laws provide that you have a continuing right to use the water. If you have any questions, please contact our office.

Sincerely,

A handwritten signature in black ink that reads "Garland Erbele". The signature is written in a cursive, flowing style.

Garland Erbele, Chief Engineer
Water Rights Program
(605) 773-3352

enclosures

STATE OF SOUTH DAKOTA
REISSUED VESTED RIGHT WATER LICENSE NO. 1394-1
FOR IRRIGATION

(1) Kemper Ditch, 19488 Creekside Loop, Spearfish SD 57783 was issued Water Right No. 1394-1, April 25, 1991 for validation of a vested right claim to appropriate 24.0 cubic feet of water per second (cfs) from Spearfish Creek, Lawrence County, South Dakota, for irrigation purposes. Vested Water Right No. 1394-1 was validated February 27, 1991 with a priority date of July 31, 1885.

On September 6, 2010, Water Permit No. 1917-1 was approved to sever 1.0 cfs from the Ditch's water right and the diversion of this rate be directly from Spearfish Creek located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 4 for irrigation of 68.1 acres located in the W $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 4; all in T7N-R2E. The vested right is being reissued to reflect this reduction.

(2) The water supply system has been completed and water applied to beneficial use in accordance with South Dakota State Law. Pursuant to South Dakota Codified Law 46-5-30.1, the holder and/or owner of Vested Water Right No. 1394-1 is reissued a license, bearing a priority date of July 31, 1885 to appropriate 23.0 cubic feet of water per second from Spearfish Creek to irrigate 476.6 acres.

The Spearfish Creek diversion point for Kemper Ditch is located approximately 2,200 feet north and 70 feet east from the southwest corner of Section 16-T7N-R2E (NW $\frac{1}{4}$ SW $\frac{1}{4}$). The acres authorized for irrigation are as follows:

Section 4-T7N-R2E

NE $\frac{1}{4}$ SW $\frac{1}{4}$	36.8 acres		
SE $\frac{1}{4}$ SW $\frac{1}{4}$	2.5 acres	Subtotal	39.3 acres
SE $\frac{1}{4}$ NW $\frac{1}{4}$	1.6 acres	Subtotal	1.6 acres

Section 5-T7N-R2E

SE $\frac{1}{4}$ SW $\frac{1}{4}$	37.3 acres		
SW $\frac{1}{4}$ SW $\frac{1}{4}$	26.7 acres		
NE $\frac{1}{4}$ SW $\frac{1}{4}$	1.3 acres	Subtotal	65.3 acres

Section 7-T7N-R2E

SW $\frac{1}{4}$ NE $\frac{1}{4}$	7.3 acres		
SE $\frac{1}{4}$ NE $\frac{1}{4}$	29.3 acres		
NW $\frac{1}{4}$ NE $\frac{1}{4}$	7.8 acres		
NE $\frac{1}{4}$ NE $\frac{1}{4}$	20.0 acres	Subtotal	64.4 acres

(continued)

Section 8-T7N-R2E

SW ¼ SE ¼	38.0 acres		
SE ¼ SE ¼	4.0 acres		
NW ¼ SE ¼	19.0 acres		
NE ¼ SE ¼	6.0 acres	Subtotal	67.0 acres
NW ¼ NE ¼	7.0 acres	Subtotal	7.0 acres
SE ¼ NW ¼	15.0 acres		
SW ¼ NW ¼	30.0 acres		
NE ¼ NW ¼	38.0 acres		
NW ¼ NW ¼	32.0 acres	Subtotal	115.0 acres

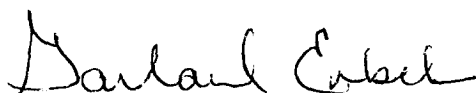
Section 17-T7N-R2E

SW ¼ NE ¼	40.0 acres		
SE ¼ NE ¼	22.5 acres		
NW ¼ NE ¼	39.0 acres		
NE ¼ NE ¼	15.5 acres	Subtotal	117.0 acres

Total acreage for Kemper Ditch 476.6 acres

(3) This reissued license is subject to South Dakota Water Law, any limitations or conditions listed in Vested Water Right No. 1394-1 including the following now applicable qualifications:

- That Vested Right No. 1394-1 is subject to domestic use rights. Diversion of water under Water Right No. 1394-1 is contingent upon supplies being available first to domestic users.
- That the flow measuring device on Kemper Ditch continue to be maintained and records of diversions be kept as directed by the Chief Engineer and reported to the Chief Engineer annually.



Garland Erbele, Chief Engineer
Water Rights Program
Department of Environment and Natural Resources

OCT 22 2010

date



SPEARFISH CREEK IRRIGATION DITCHES - CONTACT INFORMATION

Updated 7/8/14

1392-1	<table><tr><td>MANN DITCH</td></tr><tr><td>Edgar Burr</td></tr><tr><td>209 Evans Ln</td></tr><tr><td>Spearfish, SD</td></tr><tr><td>605-642-7963</td></tr></table>	MANN DITCH	Edgar Burr	209 Evans Ln	Spearfish, SD	605-642-7963	<table><tr><td>COOK DITCH</td></tr><tr><td>Mike McGuigan</td></tr><tr><td>2350 Dairy Ln</td></tr><tr><td>Spearfish, SD</td></tr><tr><td>605-641-2052</td></tr></table>	COOK DITCH	Mike McGuigan	2350 Dairy Ln	Spearfish, SD	605-641-2052	1389-1	
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1403-1	<table><tr><td>RAMSDELL DITCH</td></tr><tr><td>Mike Kyte</td></tr><tr><td>1121 N. Main St.</td></tr><tr><td>Spearfish, SD</td></tr><tr><td>605-642-4932</td></tr></table>	RAMSDELL DITCH	Mike Kyte	1121 N. Main St.	Spearfish, SD	605-642-4932	<table><tr><td>SPRING BRANCH DITCH</td></tr><tr><td>Ross Delzer</td></tr><tr><td>19481 US Hwy 85</td></tr><tr><td>Belle Fourche, SD</td></tr><tr><td>605-642-3778</td></tr></table>	SPRING BRANCH DITCH	Ross Delzer	19481 US Hwy 85	Belle Fourche, SD	605-642-3778	1424-1	
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Mike Kyte														
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**1387-1 is actually listed in the name of Spearfish Tonn-Evans Ditch



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182

denr.sd.gov

September 8, 2017

Eric Jennings
Kemper-Cook-Burns Ditches
19488 Creekside Loop
Spearfish, SD57783

Kemper-Cook-Burns Ditches, Vested Water Right No. 1399-1 and 1394-1

Dear Mr. Jennings:

The hydroelectric facility that diverts Spearfish Creek flow near Maurice for power generation is undergoing construction activity. Specifically the city will be replacing the existing redwood penstock located above the hydro plant in the area between the forebay pond and the standpipe structure. This will result in a staged bypass into the natural creek channel at the Maurice dam. There will be a short period when all diversion into the hydro plant's tunnel will cease and the creek will flow freely below Maurice resulting in reduced flows in the creek downstream from the hydro generating plant near the city park.

A bypass at the Maurice dam of 20 cubic feet of water per second into the natural creek channel will begin approximately September 14, 2017. Total bypass into the natural creek channel will occur later in the month with a contractor scheduled completion date of October 3, 2017. While this will likely result in a temporary reduced flow, the city's goal is to keep water flowing through Spearfish and downstream areas without interruption.

While the irrigation season is winding down there are likely Spearfish Creek irrigation ditches still operating from the creek. Please notify others on your ditch of the potential temporary reduction of flow in Spearfish Creek through September to early October. We all know Spearfish Creek is a valuable resource to the area for irrigation, domestic use, aesthetics, and the fishery. As this construction project progresses DENR asks that everyone be mindful to maintain minimum flows in Spearfish Creek from Spearfish to the Redwater River to protect the resource.

If you have any questions please contact either Eric Gronlund of my staff at (605) 773-3352 or Cheryl Johnson, Spearfish Public Works Director at (605) 642-1333.

Thank you,


Jeanne Goodman, Chief Engineer
Water Rights Program

1392-1, 1403-1, 1386-1, 1388-1,
1389-1, 1424-1, 1399-1, 1394-1,
1412-1

SPEARFISH CREEK IRRIGATION DITCHES - CONTACT INFORMATION

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