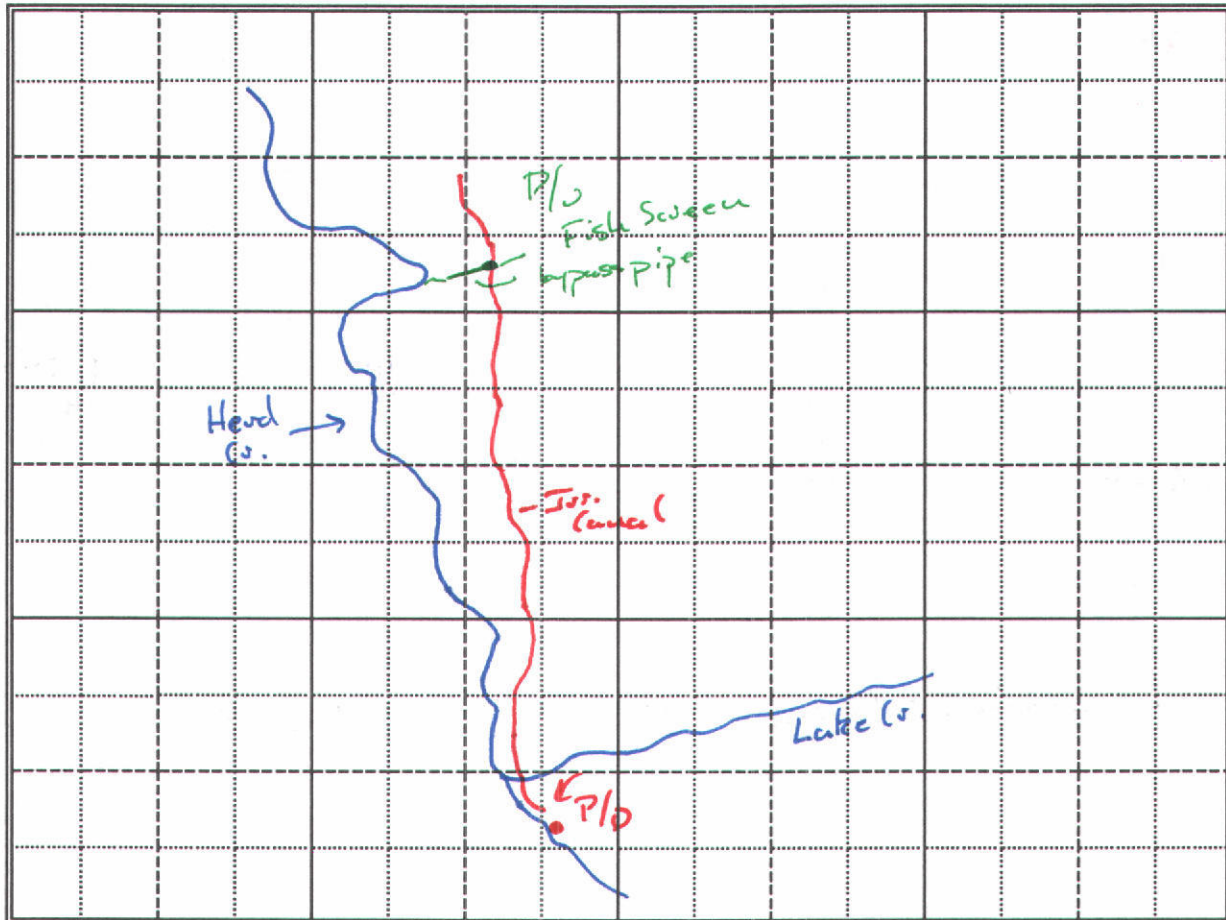


3. **Delivery System Diagram:** Indicate all major components and distances between components. Indicate weir size/ditch size/pipe i.d. as applicable.



Scale: 1" = _____.

☒ Copy of USGS Quadrangle Attached Showing location(s) of point(s) of diversion and place(s) of use (required).

☐ Aerial Photo Attached (required for irrigation of 10+ acres)

☒ Photo of Diversion and System Attached

4.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
N/A					

*Code to correspond with No. on map and aerial photo

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
Nowe						

2. Measurements: Nowe

OCT 31 1994

RECEIVED

718 430 000 FEET 12 MI 17 U S 93 R 19 E

114° 15'

721000m E.

PERMIT 72-07485 INIT B.P.B.
T. R. S. Q/Q
P/D ORW ME 18 SESE
SCALE _____
PHOTO ID. _____

P/O

18

P/D

Creek

Lake Cr

BOUNDARY

Pine

NATIONAL

Bull

Sagebrush

Creek

Sagebrush Cr

East Pass

Creek

RECORDED
OCT 31 1994

O R E S T

Sec. 12

Sec. 7

9N, 19E

SURVEYED BY

OLUF E. PETERSON

IN 1910

Sec. 13

Sec. 18

Sec. 24

Sec. 25

Sec. 8

656.76

Sec. 9

640

Sec. 17

Sec. 16

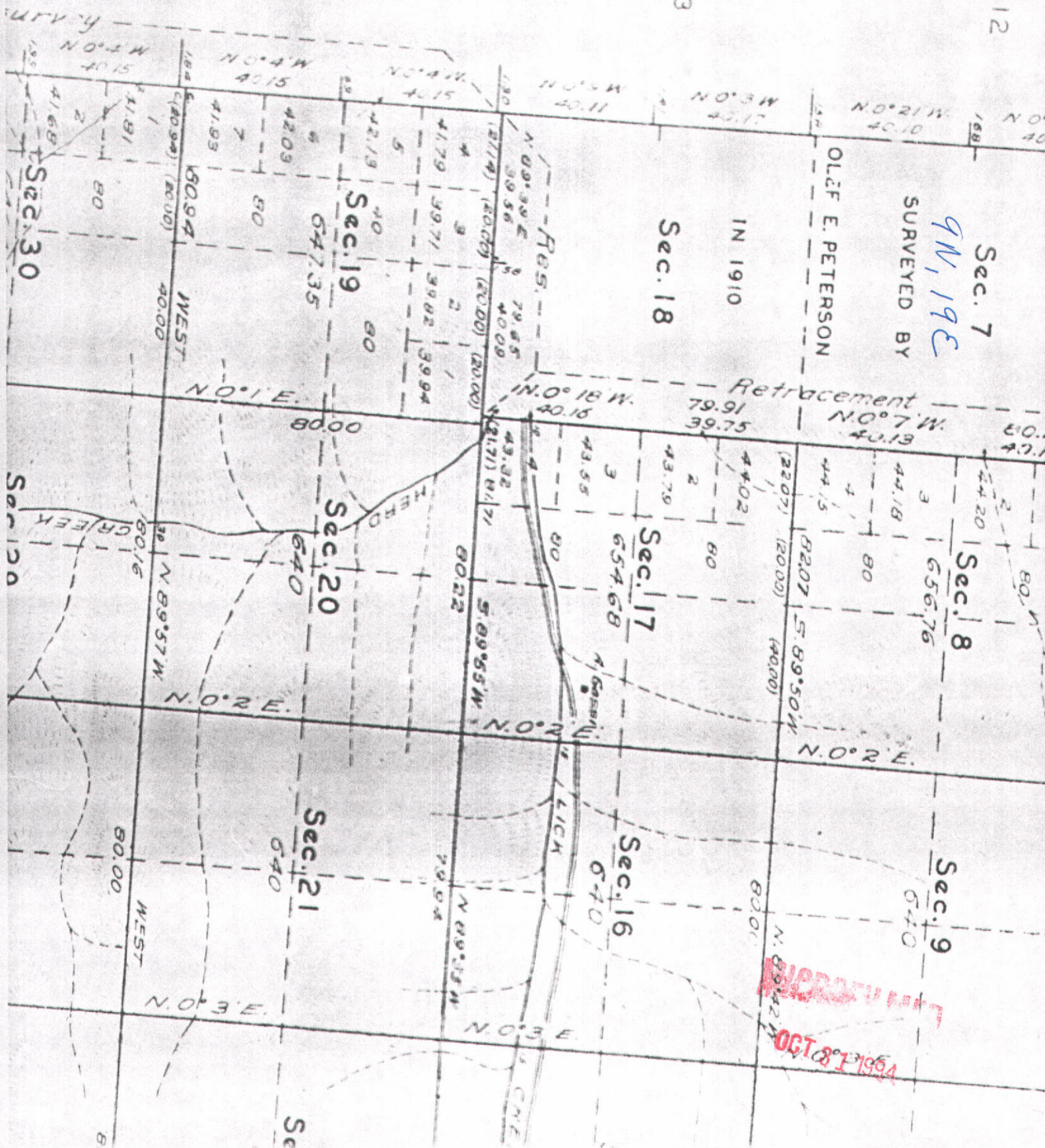
640

Sec. 20

Sec. 21

640

Sec. 30



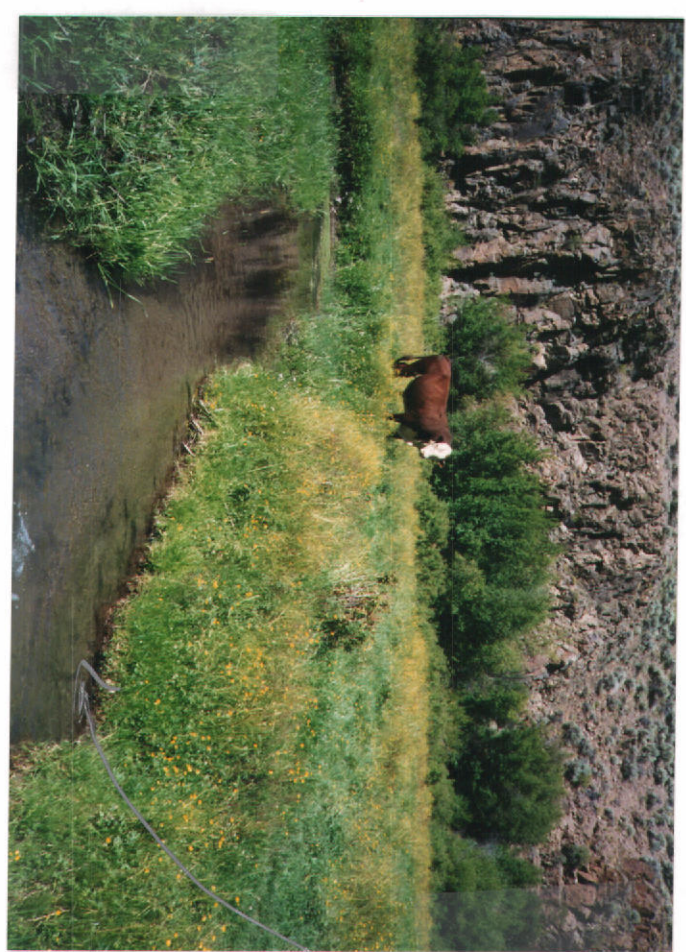
72-07485
 These photos were
 taken on 8-17-93.



P/O

P/O is approximately
 1/2 mile upstream
 of canal at Head
 Creek

4" inlet is located
 below bench



6" outlet
 runs into excess bypass ditch which runs
 into Head Creek

MURDERED
 bypass ditch
 OCT 31 1994

State of Idaho
Department of Water Resources

WATER RIGHT LICENSE

WATER RIGHT NO. 72-07485

Priority: June 9, 1992

Maximum Diversion Rate:

0.71 CFS

This is to certify, that STATE OF IDAHO
DEPT OF FISH & GAME
PO BOX 25
BOISE ID 83707

has complied with the terms and conditions
of the permit, issued pursuant to Application for Permit dated June 9, 1992; and
has submitted Proof of Beneficial Use on January 13, 1993. An examination indicates
that the works have a diversion capacity of .710 cfs of water from:

HERD CREEK

tributary to SALMON RIVER, EAST FORK

source, and a water right has been established as follows:

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>RATE OF DIVERSION</u>	<u>ANNUAL VOLUME</u>
FISH PROPAGATION	04/15 to 10/15	0.71 CFS	

LOCATION OF POINT(S) OF DIVERSION:

SESE, Sec. 18, Township 09N, Range 19E
CUSTER County

PLACE OF USE: FISH PROPAGATION

TWN RGE SEC

09N 19E 18

SESE

CONDITIONS/REMARKS:

1. This water right is appurtenant to the described place of use.
2. This right is subject to all prior water rights and may be forfeited by five years of non-use.
3. Modifications to or variance from this license must be made within the limits of Section 42-222, Idaho Code, or the applicable Idaho law.
4. Use of water under this right shall be non-consumptive.
5. The issuance of this right in no way grants any right-of-way or easement across the land of another.
6. Fish propagation use is for fish protection through the installation of a deflecting screen at a diversion canal entrance and a bypass pipe to flush the fish back to Herd Creek.

This license is issued pursuant to the provisions of Section 42-219, Idaho Code.
Witness the seal and signature of the Director, affixed at Boise, this 9th
day of SEPTEMBER, 1994.

OCT 31 1994

Acting for: Keith Higginson, Director

APPROVED

State of Idaho
Department of Water Resources

APPLICATION FOR AMENDMENT
(For Licensing Purposes)
WATER RIGHT NO. 72-07485

Date of Priority: June 9, 1992
Comes now STATE OF IDAHO
DEPT OF FISH & GAME
PO BOX 25
BOISE ID 83707

Maximum Diversion Rate: 0.71 CFS

and represents to the Director of the

Idaho Department of Water Resources:

That he is the owner and holder of Permit to Appropriate the Public Waters of the State of Idaho No. 72-07485, and requests that the permit be changed as follows:

Source: HERD CREEK tributary to SALMON RIVER, EAST FORK

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>RATE OF DIVERSION</u>	<u>ANNUAL VOLUME</u>
FISH PROPAGATION	04/15 to 10/15	0.71 CFS	

LOCATION OF POINT(S) OF DIVERSION: SESE , Sec. 18, Township 09N, Range 19E
CUSTER County

PLACE OF USE: FISH PROPAGATION
TWN RGE SEC
09N 19E 18 SENE

Permit holder asserts that no one will be injured by such change and that such change will be made at permit holder's own risk.

Signed at SALMON, IDAHO, this 8th day of AUGUST, 1994.

OCT 31 1994

[Signature]
(Signature)
Construction Supervisor
Idaho Dept of Fish & Game

State of Idaho
Department of Water Resources

APPLICATION FOR AMENDMENT
(For Licensing Purposes)
WATER RIGHT NO. 72-07485

FOR DEPARTMENT USE ONLY

Preliminary check by R Fee = 20.00 Received by RT # C031030 Date 8-12-94 ✓

ACTION OF THE DEPARTMENT OF WATER RESOURCES

I, R. Keith Higginson, of the Department of Water Resources hereby approve the
above Application for Amendment for Permit No. 72-07485 with the following;

CONDITIONS/REMARKS:

1. This water right is appurtenant to the described place of use.
2. This right is subject to all prior water rights and may be forfeited by five years of non-use.
3. Modifications to or variance from this license must be made within the limits of Section 42-222, Idaho Code, or the applicable Idaho law.
4. Use of water under this right shall be non-consumptive.
5. The issuance of this right in no way grants any right-of-way or easement across the land of another.
6. Fish propagation use is for fish protection through the installation of a deflecting screen at a diversion canal entrance and a bypass pipe to flush the fish back to Herd Creek. This right is subordinate to all existing water rights at the point of diversion.

Witness my hand this 9TH day of September, 1994.

Norm C. Young
Acting for R. Keith Higginson, Director

RECEIVED
SEP 15 1994

RECEIVED

JAN 13 1993

Department of Water Resources

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

OFFICE USE ONLY
Amt. of Fee \$ 100.00
Date 1-14-93
Receipt No. C926514
Receipt by [Signature]

PROOF OF BENEFICIAL USE

The Idaho Department of Water Resources considers this form a statement that the permit holder(s) has/have completed all development that will occur under this permit and that water has been applied according to the provisions of the permit for the beneficial use(s) described below. This form must be accompanied by a license examination fee, when necessary, or a completed field examination report prepared by a certified water right examiner who has been appointed by the department.

1. Permit No. 72-07485 Telephone No. (208) 334-3700
2. Name(s) of Permit Holder(s): Idaho Department of Fish and Game
3. Mailing Address: 600 S. Walnut, Boise, Idaho 83707
4. Source of Water: Herd Creek, tributary of Salmon River, East Fork

If GROUNDWATER, Well Driller's Name: _____ Date Drilled: _____

OPTIONAL:

Pump horsepower: _____ Pressure (psi): _____ Dynamic pumping level (ft.): _____

5. Extent of Use (as authorized by the permit):

Domestic _____ (No. of households) Stockwater _____ (No. and type of stock)

Irrigation _____ (No. of acres) Other Fish Propagation

6. Total rate and/or volume for which proof is submitted 0.80 cfs OR _____ acre/feet

7. Refer to the approval conditions on your permit and respond accordingly:

Measuring device: Required? _____ Yes X No Installed? _____ Yes _____ No

OR

Flow Measurement Port: Required? _____ Yes X No Installed? _____ Yes _____ No

8. Fee Enclosed: \$ 100.00 (See License Fee Schedule on back of Instruction Sheet)

9. Person to contact to accompany the Department representative during field examination of the water system.

Jim Blake (208) 756-2271
Name Telephone No.

P.O. Box 1336, Highway 93 N, Salmon, Idaho 83467
Address

10. The above information is my true statement of the extent to which the above numbered permit has been developed and I relinquish any undeveloped portion of the permit to the state of Idaho.

Date

12-10-92

Signature (and title, if on behalf of a company or organization)

Jim Blake Const. Supervisor, I.D.F.&G.

FEB 05 1993

State of Idaho
Department of Water Resources

Permit To Appropriate Water

NO. 72-07485

Proposed Priority: June 9, 1992 Maximum Diversion Rate: 0.80 CFS

This is to certify, that **STATE OF IDAHO**
DEPT OF FISH & GAME
PO BOX 25
BOISE ID 83707

has applied for a permit to appropriate water from:

HERD CREEK tributary of **SALMON RIVER, EAST FORK**

and a permit is **APPROVED** for development of water as follows:

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>RATE OF DIVERSION</u>
FISH PROPAGATION	03/15 to 11/15	0.80 CFS

LOCATION OF POINT(S) OF DIVERSION: SESE , Sec. 18, Township 09N, Range 19E
CUSTER County

PLACE OF USE: FISH PROPAGATION
TWN RGE SEC

09N 19E 18 SWNE

CONDITIONS/REMARKS:

1. Proof of construction of works and application of water to beneficial use shall be submitted on or before **November 1, 1993**.
2. Subject to all prior water rights.
3. Use of water under this right shall be non-consumptive.
4. The issuance of this right in no way grants any right-of-way or easement across the land of another.
5. Fish propagation use is for fish protection through the installation of a deflecting screen at a diversion canal entrance and a bypass pipe to flush the fish back to Herd Creek.

This permit is issued pursuant to the provisions of Section 42-204, Idaho Code.
Witness the signature of the Director, affixed at Boise, this

24th day of September, 1992

[Signature]
for R. Keith Higginson, Director

MICROFILMED

DEC 10 1992

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
APPLICATION FOR PERMIT

RECEIVED

To appropriate the public waters of the State of Idaho JUL 10 1992

Department of Water Resources

Southern Field Office

Phone 334-3700

1. Name of applicant Idaho Department of Fish and Game
Post office address 600 S. Walnut, P.O. Box Boise, ID. 83707
2. Source of water supply Herd Creek which is a tributary of E.F. Salmon River
3. Location of point of diversion is _____ 1/4 of SE 1/4 of SE 1/4, Govt. Lot _____
Sec. 18 Township 9N Range 19E B.M. Custer County; additional
points of diversion if any: _____
4. Water will be used for the following purposes:
Amount 0.8 for fish propagation purposes from 3/15 to 11/15 (both dates inclusive)
(cfs or acre-feet per annum)
Amount _____ for _____ purposes from _____ to _____ (both dates inclusive)
(cfs or acre-feet per annum)
Amount _____ for _____ purposes from _____ to _____ (both dates inclusive)
(cfs or acre-feet per annum)
Amount _____ for _____ purposes from _____ to _____ (both dates inclusive)
(cfs or acre-feet per annum)
5. Total quantity to be appropriated is (a) 0.8 and/or (b) _____
cubic feet per second acre feet per annum
6. Proposed diverting works:
 - a. Description of ditches, flumes, pumps, headgates, etc. Concrete structure with metal screen to prevent fish from entering irrigation ditch. Structure includes a bypass pipe which returns fish and water to creek
 - b. Height of storage dam _____ feet; active reservoir capacity _____ acre-feet; total reservoir capacity _____ acre-feet; period of year when water will be diverted to storage: _____ to _____ inclusive.
 - c. Proposed well diameter is _____ inches; proposed depth of well is _____ feet.
 - d. Is ground water with a temperature of greater than 90°F being sought? no
7. Time required for the completion of the works and application of the water to the proposed beneficial use is Screen built in 1981 and has been operated since that time
1 years (minimum 1 year).

RECEIVED

DEC 10 1992

8. Description of proposed uses (if irrigation only, go to item 9):

- Hydropower; show total feet of head and proposed capacity in KW. _____
- Stockwatering; list number and kind of livestock. _____
- Municipal; show name of municipality. _____
- Domestic; show number of households. _____
- Other; describe fully. Fish propagation - screen prevents fish from entering irrigation ditch and bypass pipe returns fish to creek

9. Description of place of use:

- If water is for irrigation, indicate acreage in each subdivision in the tabulation below.
- If water is used for other purposes, place a symbol of the use (example: *D* for *Domestic*) in the corresponding place of use below. See instructions for standard symbols.

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTALS
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
9N	19E	18			H														

Total number of acres to be irrigated _____

10. Describe any other water rights used for the same purposes as described above. none

- Who owns the property at the point of diversion? E.E. Cape and H. Spencer
- Who owns the land to be irrigated or place of use? same as above
- If the property is owned by a person other than the applicant, describe the arrangement enabling the applicant to make this filing. Easement agreement (instrument no. 91583) recorded at Custer Co courthouse on 11/10/58 for screen EF-HC-3

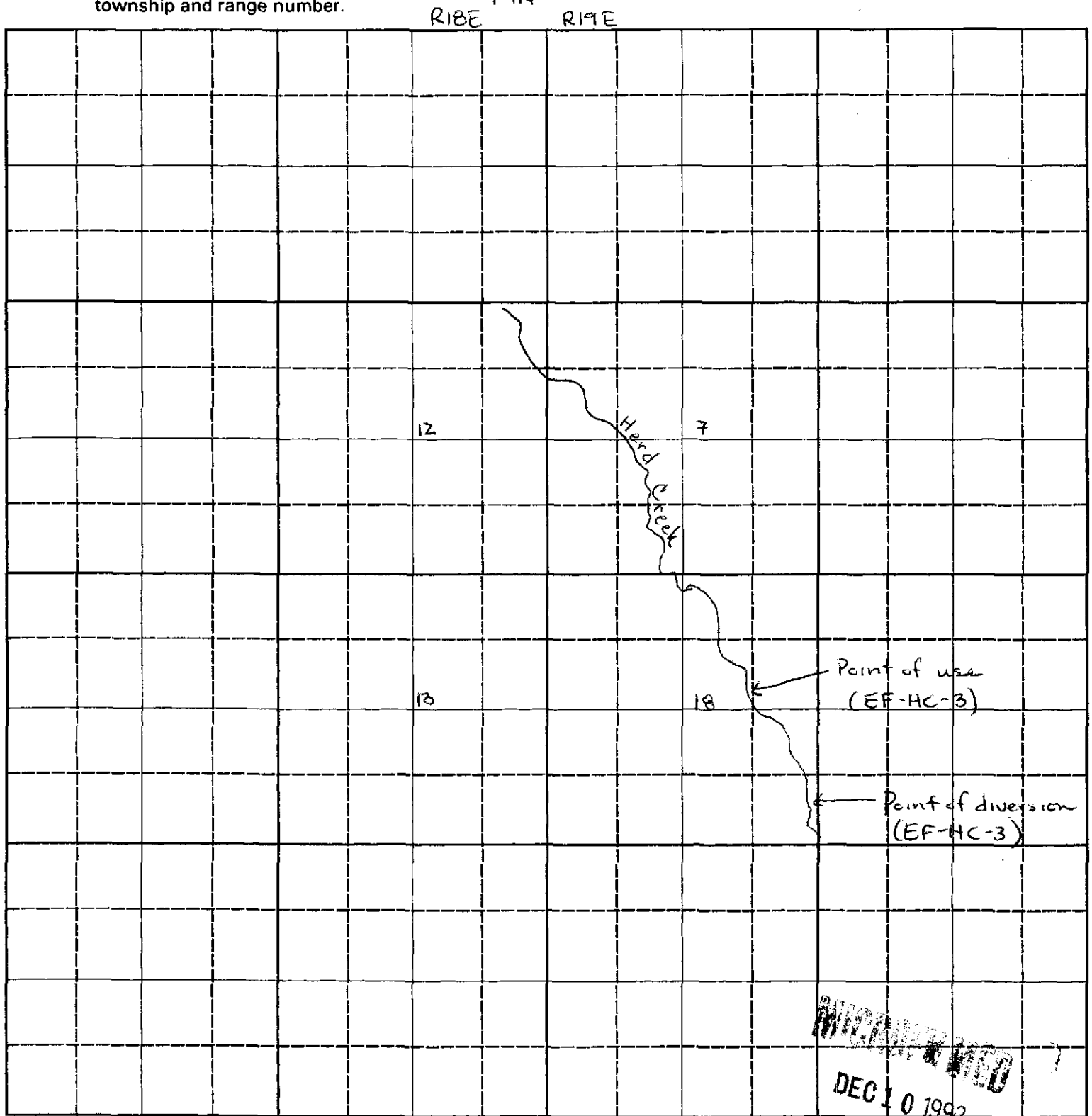
12. Remarks: _____

RECORDED

DEC 10 1992

72-7485

13. Map of proposed project: show clearly the proposed point of diversion, place of use, section number, township and range number.



Scale: 2 inches equal 1 mile.

BE IT KNOWN that the undersigned hereby makes application for permit to appropriate the public waters of the State of Idaho as herein set forth.

Cynthia Robertson 10FG
(Applicant)

Received by SC Date 6/9/92 Time 2:30 Preliminary check by MTS
Fee \$ 45⁰⁰ Received by SC # C024477 Date 6/10/92 fee rec'd 6/9
Publication prepared by MB Date 7/8/92 Published in Challin Messenger
Publication approved MBaldwin Date 8-24-92

ACTION OF THE DIRECTOR, DEPARTMENT OF WATER RESOURCES

This is to certify that I have examined Application for Permit to appropriate the public waters of the State of Idaho No. _____, and said application is hereby _____.

1. Approval of said application is subject to the following limitations and conditions:

a. SUBJECT TO ALL PRIOR WATER RIGHTS.

b. Proof of construction of works and application of water to beneficial use shall be submitted on or before _____, 19 ____.

c. The rate of diversion, if water is to be used for irrigation under this permit, when combined with all other water rights for the same land shall not exceed 0.02 cubic feet per second for each acre of land.

d. The water right acquired under this permit if for hydropower purposes shall be junior and subordinate to all rights to the use of water, other than hydropower, within the State of Idaho that are initiated later in time than the priority of this permit and shall not give rise to any right or claim against any future rights to the use of water, other than hydropower, within the State of Idaho initiated later in time than the priority of this permit.

e. Other:

RECORDED

DEC 10 1992



State of Idaho
DEPARTMENT OF WATER RESOURCES

1301 North Orchard Street, Statehouse Mail, Boise, Idaho 83720-9000
Phone: (208) 327-7900 FAX: (208) 327-7866

CECIL D. ANDRUS
GOVERNOR

R. KEITH HIGGINSON
DIRECTOR

September 12, 1994

STATE OF IDAHO
DEPT OF FISH & GAME
PO BOX 25
BOISE ID 83707

RE: WATER RIGHT NO. 72-07485

Dear Water Right Holder(s):

Enclosed herewith is a copy of the Water Right License issued on the above referenced permit along with a copy of your approved Application for Amendment.

Should you have any questions regarding these documents, please feel free to contact this office.

Sincerely,

Shelley W. Keen
Water Rights Supervisor

SK:dc

Enclosure

RECEIVED

OCT 31 1994



State of Idaho

DEPARTMENT OF WATER RESOURCES

1301 North Orchard Street, Statehouse Mail, Boise, Idaho 83720-9000

Phone: (208) 327-7900 FAX: (208) 327-7866

CECIL D. ANDRUS
GOVERNOR

R. KEITH HIGGINSON
DIRECTOR

August 11, 1994

STATE OF IDAHO
DEPT OF FISH & GAME
PO BOX 25
BOISE ID 83707
ATTN: CINDY ROBERTSON

RE: WATER RIGHT NOS. 72-07495, 72-07483, 72-07499, 72-07485 and
72-07490

Dear Water Right Holder(s):

I previously forwarded to you Applications for Amendment of Permit on the above referenced water rights. We have not received the amendments back yet, but I understand your process may take a little more time to return the amendments. Please consider this letter a reminder letter, in case the amendments have been overlooked.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jim Johnson', written over the typed name and title.

JIM JOHNSON, Manager
Water Right Permits Section

JJ:dc



OCT 31 1994



State of Idaho

DEPARTMENT OF WATER RESOURCES

1301 North Orchard Street, Statehouse Mail, Boise, Idaho 83720-9000

Phone: (208) 327-7900 FAX: (208) 327-7866

CECIL D. ANDRUS
GOVERNOR

R. KEITH HIGGINSON
DIRECTOR

June 22, 1994

STATE OF IDAHO
DEPT OF FISH & GAME
PO BOX 25
BOISE ID 83707

RE: WATER RIGHT NO. 72-07485

Dear Water Right Holder(s):

The above referenced water right is in the process of being licensed. However, before a license can be issued, your permit must be amended to correspond with the findings of the Department's field examiner.

The enclosed Application for Amendment contains information that will be included on the license when it is issued. The amendment reflects a change in the location of the place(s) of use description. Please review carefully and if you concur, sign the amendment and return with the \$20.00 filing fee within 60 days.

The last page of the Application for Amendment form contains a list of CONDITIONS/REMARKS proposed for the license when it is issued. These conditions/remarks may be modified upon further administrative review.

If you do not concur or have any questions with this information, please contact me as soon as possible. My telephone number is (208) 327-7947.

Sincerely,


JIM JOHNSON
Water Rights Supervisor

JJ:dc

Enclosure

JUN 24 1994

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

RECEIVED
JUN 17 1994
Department of Water Resources

A. GENERAL INFORMATION

Permit No. 72-07485

1. Owner: State of Idaho - Dept. of Fish & Game Phone No. 334-3700

Current Address: 600 S. Walnut, P.O. Box 25 Boise 83707

2. Accompanied by: Mel Schulte, IDWR EXAM DATE: 8-17-93

Address: _____ Phone No. _____

Relationship to Permit Holder: _____

3. Source: Herd Creek tributary to Salmon River, East Fork

B. OVERLAP REVIEW

1. Other water rights with the same place of use: NONE

2. Other water rights with the same point of diversion: R72-00218, R72-04060

C. DIVERSION AND DELIVERY SYSTEM

1. Point(s) of Diversion:

Ident No.	Gov't Lot	1/4	1/4	1/4	Sec.	Twp.	Rge.	County	Method of Determination/Remarks
			SE	SE	18	09W	19E	Custer	USGS Topo, Inspection

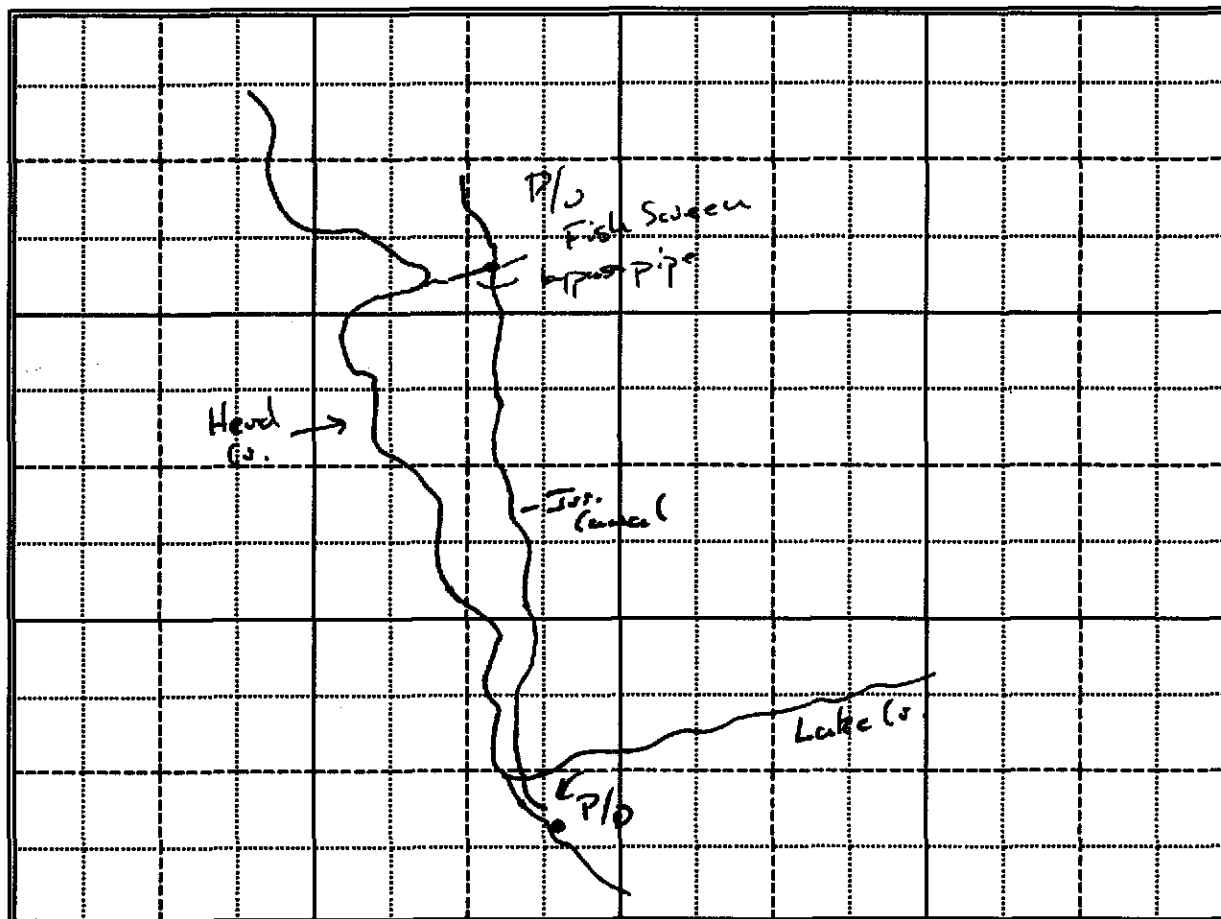
2. Place(s) of Use:

Indicate Method of Determination USGS Topo Inspection

TWP	RGE	SEC	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
09W	19E	18				H													H

OCT 31 1994

3. **Delivery System Diagram:** Indicate all major components and distances between components. Indicate weir size/ditch size/pipe I.d. as applicable.



Scale: 1" = _____

☒ Copy of USGS Quadrangle Attached Showing location(s) of point(s) of diversion and place(s) of use (required).

☐ Aerial Photo Attached (required for irrigation of 10+ acres)

☒ Photo of Diversion and System Attached

4.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
N/A					

*Code to correspond with No. on map and aerial photo

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
None						

2. Measurements: None

OCT 31 1984

RECEIVED

E. NARRATIVE/REMARKS/COMMENTS

The bypass ^{pipe} runs west 101' to an excess bypass ditch that runs into Head Creek. A 4" inlet is flush with the concrete structure at the fish screen. A 6" outlet is open discharge into the bypass ditch. The outlet is not 100% full and difference in head between the inlet & outlet is minimal.

Therefore, the only way to obtain a measurement is to treat the system as a submerged orifice with a certain amount of head above the orifice. A calculation of this measurement & the relationship of the orifice coefficient are attached on additional sheets.

The used water shall be non-consumptive only.

This water right is subordinate to all existing water rights at the point of diversion.

Water returns to Head Creek in the SENE, S18, 9N, 19E

Have conditions of permit approval been met? ☒ yes ☐ no

OCT 31 1994

F. FLOW CALCULATIONS

Measured Method:

☒ Additional Computation Sheets Attached

G. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation: *w/a*

$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$ _____

$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation Season}) \times 1.9835 =$ _____

$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} =$ _____

2. Volume Calculations for Other Uses:

For Non-Consumptive Use Only

H. RECOMMENDATIONS

1. Recommended Amounts

Beneficial Use	Period of Use		Rate of Diversion Q (cfs)	Annual Volume V (afa)
	From	To		
<i>Fish Propagation</i>	<i>8/15</i>	<i>7/15</i>	<i>0.71 cfs</i>	<i>—</i>
	<i>* ~~4/15~~</i>	<i>~~10/15~~ OK</i>		
	<i>5-1</i>	<i>9-30</i>		
Totals:			<i>0.71 cfs</i>	<i>—</i>

2. Recommended Amendments

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☐ None
☒ Change P.U. as reflected above ☐ Add P.U. as reflected above ☐ Other

I. AUTHENTICATION

Field Examiner's Name *Brett Baring* Date *8-23-93*

Reviewer _____ Date _____

** Adjusted to current season for the area. ~~BC~~*



OCT 31 1994

MEMORANDUM

TO: File 72-7485
FROM: Brenda Chapman
DATE: 6-21-94
RE: Adjustments Made

=====

* A season of use, rate or volume adjustment was recommended based on the information below.

- ☐ The stockwater rate was adjusted to the current Field Examiner's Handbook recommended rate.
- ☐ The stockwater rate was reduced based on a 24 hours a day spring diversion rather than a 2 hour per day groundwater diversion.
- ☐ The irrigation season and volume rates were adjusted to the current Field Headgate Requirement and Season of Use chart's recommendations.
- ☒ The Period of Use was modified to coincide with the standard irrigation season for that area.

RECEIVED
OCT 31 1994

DATE: August 20, 1993
FROM: Brett Barry
TO: Files 72-074: 82,83,84,85,88,90,91,92,93,95
SUBJECT: Fish Screens - Measurement

In the Salmon River drainage basin, the IDFG has built a fish screen on almost every major irrigation canal that diverts water from a river or creek that possess a spawning fish population.

The IDFG filed adjudication claims on these fish screens but then withdrew some of their claims. These permits are taking the place of the withdrawn claims.

On August 16,17, and 18, I conducted the field examinations for the above water permits. Kelly Christenson or Mel Schulte also helped conduct the examination. Each fish screen, or permit, had a unique structure and bypass pipe. The water permit was for the diversion of water from the irrigation canal to the bypass pipe at the fish screen.

Most of the permits contained bypass pipes that were underground from the entrance at the fish screen to the outlet at the river or creek, therefore, a polysonic ultrasound measurement was usually not possible.

Loren Holmes, manager of Southern Regional office, suggested we survey the structure and obtain the difference in elevation between the water surfaces. This enables us to find the amount of head(energy per unit weight) consumed in the bypass pipe. Once the amount of head consumed is found, the flow can be calculated by estimating the relative roughness of the pipe or by estimating a Manning's coefficient.

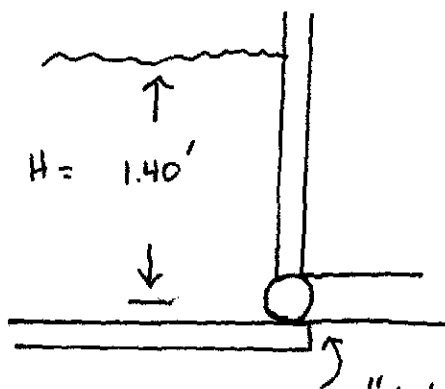
The actual calculation involves using the Manning's equation for head loss in a pipe and the minor losses caused by inlets, outlets, and transitions, and the velocity head generated by an open discharge. This calculation was completed with the use of a program developed by Allen Merritt and myself on LOTUS 1-2-3.

The program is very useful for calculating the discharge on longer pipes. But, when the bypass pipes are very short, the minor losses control the head loss and cannot be estimated accurately enough for predictable results.

Therefore, on very short bypass pipes and where the discharge at the outlet of the bypass pipe is not full, a measurement was obtained by treating the system as an orifice with a certain amount of head.

RECEIVED
OCT 31 1994

Measurement Calculation - P72-7485



see attached sheet
for orifice definitions
& relationships

4" inlet that is flush with concrete structure

square edged orifice

$$K = 0.82$$

$$\begin{aligned} Q &= 0.82 A \sqrt{2gH} \\ &= 0.82 \left(\pi \left(\frac{4}{12} \right)^2 \right) \sqrt{2(32.2)(1.40')} \\ &= 0.1 \text{ cfs} \end{aligned}$$

Because the pipe outlet was not 100% full, it was useless to measure the head difference between inlet & outlet.

The system had to be treated as an orifice in order to obtain a measurement.

OCT 31 1994

P72-7485

Prepared by Brett Barry
on 9-3-93

145. Orifice Relationships.—Formulas (45) and (46) can be used to develop a formula for flow through an orifice (a hole in the side or bottom of a container of water (fig. 107)). To find the velocity of flow in the orifice, use formula (46), $v = \sqrt{2gh}$. Then using the size or area of the hole, the quantity of water being discharged, Q , can be determined using formula

310

WATER MEASUREMENT MANUAL

(45), $Q = Av$. This can be accomplished in one step, however, if the two formulas are combined.

Inserting the value $\sqrt{2gh}$ for v in $Q = Av$ gives

$$Q = A\sqrt{2gh} \quad (47)$$

the formula for the theoretical discharge through an orifice. This formula assumes that the water is frictionless and is an ideal fluid. Since water is not an ideal fluid, a correction must be made.

The jet of water, after passing through the orifice, continues to contract, and if the orifice edges are sharp, the jet will appear as shown in figure 108. The maximum jet contraction occurs at a distance of one-half the orifice diameter, or $d/2$, downstream from the sharp edge, and the cross-sectional area of the jet will be only about six-tenths of the area of the orifice. Accordingly, formula (47) must contain a coefficient, C , to accurately determine the quantity of water being discharged. Thus, in actual practice,

$$Q = CA\sqrt{2gh} \quad (48)$$

For a sharp-edged orifice where full contraction occurs, the coefficient is about 0.61, and the formula becomes

$$Q = 0.61A\sqrt{2gh}$$

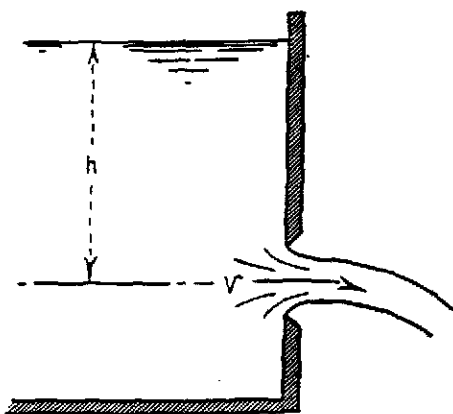


Figure 107.—Orifice flow. 103-D-986.

Water Measurement
Manual

United States Department of Interior
Bureau of Reclamation Denver 1967 pgs 309-310

TUBES, CULVERTS, AND SIPHONS

Cylindrical Tubes. A short cylindrical tube $2\frac{1}{2}$ to 3 diameters in length with sharp upstream corners (Fig. 43) is called a *standard short tube*. The sharp corner causes the jet to contract, but it soon expands and fills the tube. The space s surrounding the contracted jet is filled with air and eddying water. Since the velocity at m in the contracted

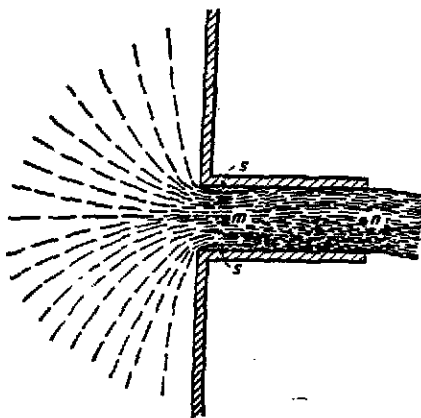


FIG. 43. Standard short tube.

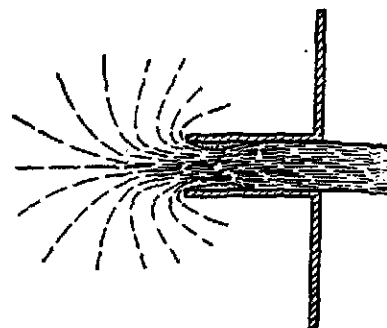


FIG. 44. Reentrant tube.

jet is greater than at the outlet n where pressure is atmospheric, it can be shown by Bernoulli's equation that the pressure at m is less than atmospheric pressure. The discharge of this tube is therefore greater than the discharge of a sharp-edged orifice of the same diameter under the same head. Since the tube flows full, the coefficient of contraction is unity, and the coefficient of discharge [Eq. (54)] equals the coefficient of velocity. From experiments, the average coefficient of discharge C is 0.82. Substituting this value of C , or C_v , in Eq. (58) gives as the head lost in discharge

$$h_f = 0.50 \frac{v^2}{2g} \quad (65)$$

where v is the mean velocity in the tube. The conditions of flow in a short tube correspond to the conditions at the entrance to a pipe.

A tube projecting into a body of water (Fig. 44) is called a *reentrant tube*. The contraction produced by this tube is greater than for the standard short tube. The behavior of the water in the two kinds of tubes is otherwise similar. From experiments, the coefficient of discharge $C = 0.75$ and the lost head $h_f = 0.78v^2/2g$.

Civil Engineering Handbook
Orghardt, Leonard
McGraw-Hill Book Company, Inc.
1959 pgs. 309-310

OCT 31 1994

718 430 000 FEET 12 MI. 1311 S. 93 R 19 E

114° 15'

721000m.E.

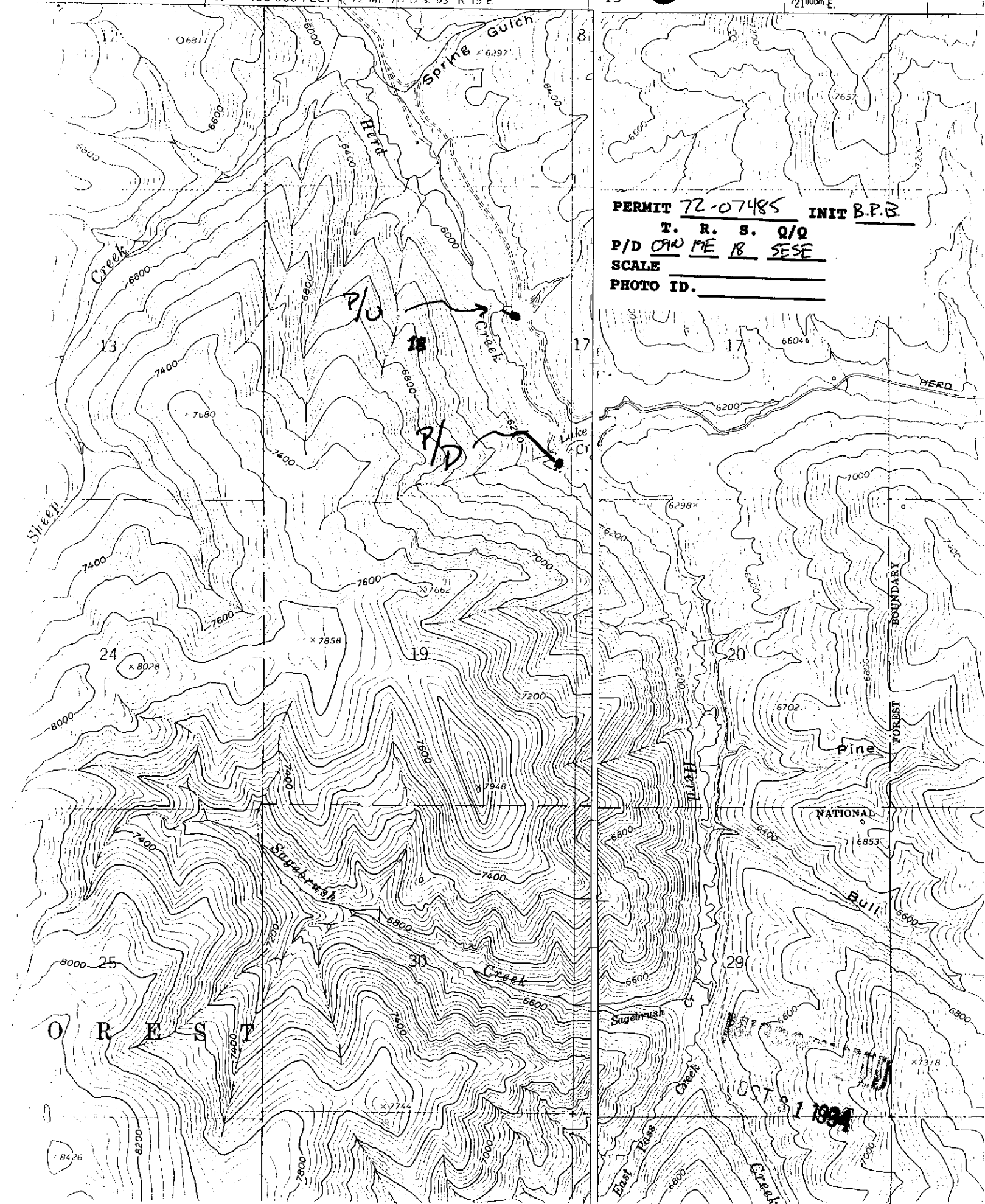
PERMIT 72-07485 INIT B.P.B.

T. R. S. Q/Q

P/D CAN ME B SESE

SCALE

PHOTO ID.



Sec. 12

Sec. 7

Q.N. 19E

SURVEYED BY

OLF E. PETERSON

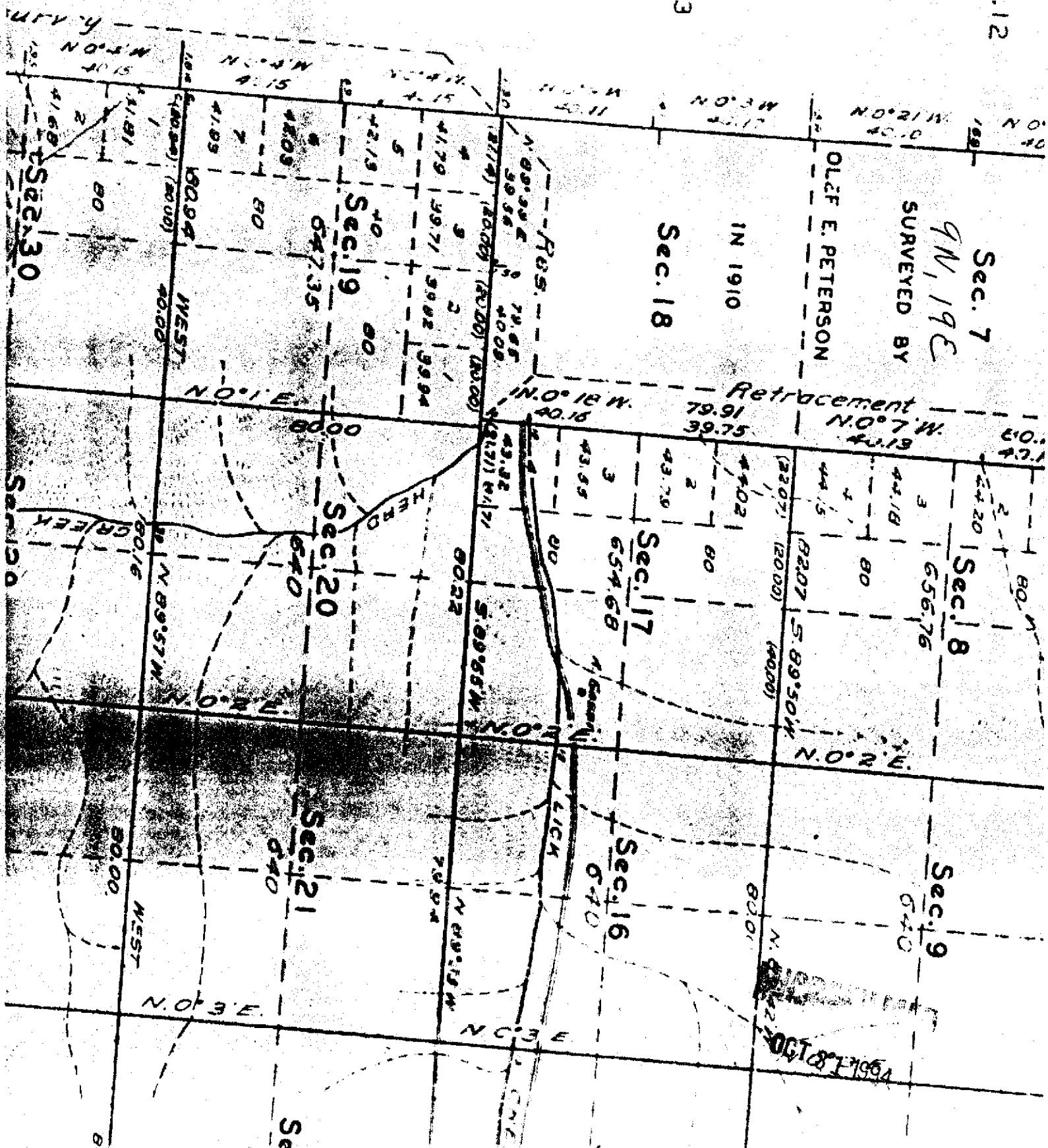
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Sec. 13

Sec. 18

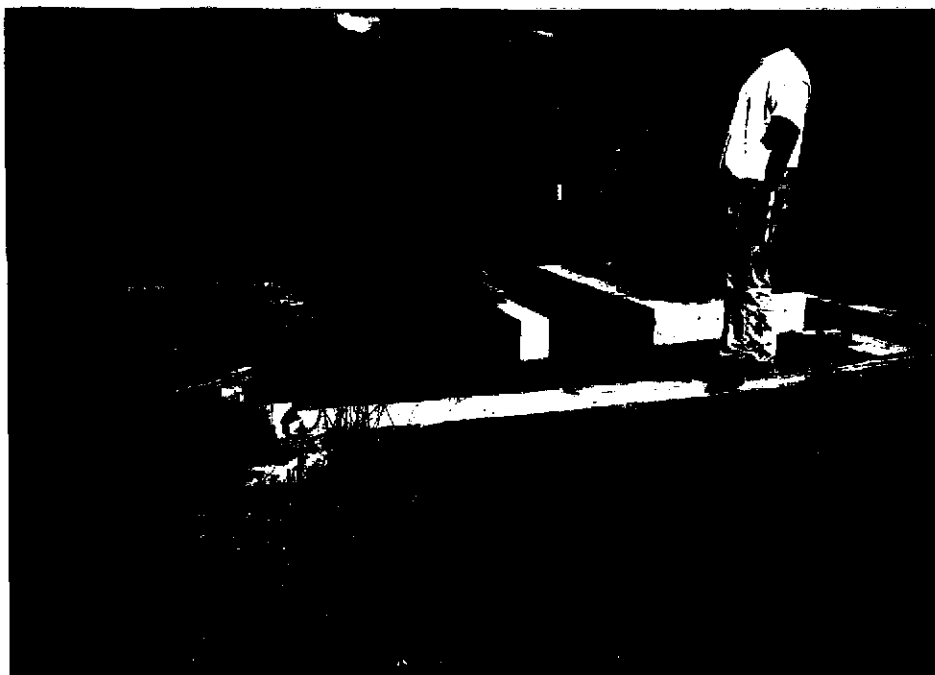
Sec. 24

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72-07485

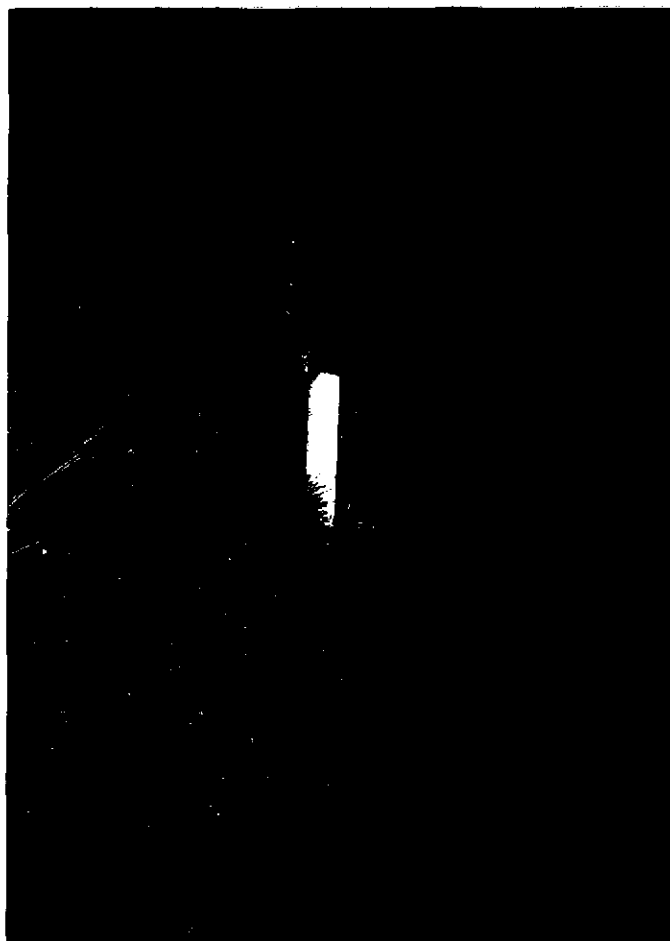
These photos were
taken on 8-17-93.



P/O

P/O is approximately
1/2 mile upstream
of canal at Head
Creek

4" inlet is located
below bow of



6" outlet
runs into excess bypass ditch which runs
into Head Creek

bypass
ditch

OCT 31 1994

January 15, 1993

STATE OF IDAHO
DEPT OF FISH & GAME
PO BOX 25
BOISE ID 83707

PROOF ACKNOWLEDGMENT LETTER

RE: PERMIT NO. 72-07485

Dear Permit Holder:

The department acknowledges receipt of the proof of beneficial use form submitted for the above referenced permit. The next step in the process of developing a water right is for the department to conduct a field examination to determine and confirm the use being made of the water.

If you have questions concerning this matter, please feel free to contact the SOUTHERN Regional Office in Twin Falls at (208)736-3033.

Sincerely,

Karen L. Gustafson
Secretary/Records Manager

c: IDWR - Region

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FEB 05 1993



State of Idaho

DEPARTMENT OF WATER RESOURCES

1301 North Orchard Street, Statehouse Mail, Boise, Idaho 83720-9000

Phone: (208) 327-7900 FAX: (208) 327-7866

CECIL D. ANDRUS
GOVERNOR

R. KEITH HIGGINSON
DIRECTOR

September 28, 1992

STATE OF IDAHO
DEPT OF FISH & GAME
PO BOX 25
BOISE ID 83707

PERMIT APPROVAL NOTICE

RE: PERMIT NO. 72-07485

Dear Permit Holder:

Enclosed is a copy of your approved application for permit. We direct your attention to the conditions of approval on the final page.

Enclosed is a form entitled "Instructions for Proof of Beneficial Use". Please read the instructions carefully since you must take further action to develop this permit. Also enclosed is a form entitled "Proof of Beneficial Use". If your project is already completed you should complete and submit this form immediately.

Sincerely,

BRENDA L. MILLER
Water Resource Agent

BLM:cz

Enclosures

MICROFILMED

DEC 10 1992

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STATEMENT

AUG 24 1992



Department of Water Resources

Custer Publishing, Inc.

Phone 879-4445

P.O. Box 405

Challis, Idaho 83226

Dept. of Water
232 Shoshone St. East
Jurn Falls, Id 83301

Job No.	Date	DESCRIPTION	Amount
544 lines	8-20-92	Notice of Application for Water Right 8/6/13/92 # 71-07146, 71-07147, 71-07148, 71-07149, 71-07150, 71-07151, 71-07152, 71-07153, 71-07154, 71-07155, 71-07156, 71-07157, 71-07158, 71-07159, 71-07161, 71-07162, 71-07163, 71-07164, 71-07317, 71-07318, 72-07482, 72-07483, 72-07484, 72-07485, 72-07486, 72-07487, 72-07488, 72-07489, 72-07490, 72-07491, 72-07492, 72-07493, 72-07494, 72-07495, 72-07496, 72-07497, 72-07498, 72-07499	\$ 312.80 OK MB 8-24-92

A finance charge of 1½ percent (annual percentage rate of 18%) with a minimum charge of 50¢ will be charged to all accounts not paid within 30 days of billing.

MICROFILMED

DEC 10 1992

NOTICE OF APPLICATION FOR WATER RIGHT

The Following application(s) have been filed to appropriate the public waters of the State of Idaho:

72-07485

STATE OF IDAHO
DEPT OF FISH & GAME
PO BOX 25
BOISE, ID 83707

Source: HERD CREEK

Tributary: SALMON RIVER, EAST FORK

Diversion Pt: SESE Sec 18 T 09N R 19E in CUSTER County.

Use: FISH PROPAGATION (.800 CFS)
Total Diversion: (.800 CFS)

Date Filed: 6/ 9/1992

In: CUSTER County
T09N R19E S18 SWNE

The permit(s) will be subject to all prior water rights. Protests must be filed with the Director, Dept. of Water Resources, Southern Region, 222 Shoshone Street East, Twin Falls, ID 83301 on or before AUGUST 24, 1992.

R. KEITH HIGGINSON, Director

Published: 8/ 6/1992 & 8/13/1992

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DEC 10 1992

DEC 10 1992
NIPPOEN MED

Legal ok in
8/6/92 name 2cm
8-11-92

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
Southern Region
222 Shoshone Street East
Twin Falls, ID 83301
(208) 736-3033

JULY 8, 1992

CUSTER PUBLISHING COMPANY
PO BOX 405
CHALLIS, ID 83226

Gentlemen:

Enclosed you will find a legal notice which we wish to have published on the dates indicated (once a week for two consecutive weekly issues) in your newspaper. If you cannot publish the notice on the proposed dates, please contact us immediately.

An affidavit of publication must be submitted to the Department along with the publication bill. Your cooperation is appreciated.

Please send the affidavit of publication and publication billing to this office before AUGUST 24, 1992.

Yours truly,

Mary Baldwin
Secretary/Office Coordinator

Enclosure

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DEC 10 1992



State of Idaho

DEPARTMENT OF WATER RESOURCES

Southern Region, 222 Shoshone St. East, Twin Falls, Idaho 83301 (208) 736-3033

CECIL D. ANDRUS
Governor

08-Jul-1992

R. KEITH HIGGINSON
Director

ATTN CINDY ROBERTSON
FISHERY BIOLOGIST
IDAHO FISH & GAME
PO BOX 25
BOISE ID 83707-0025

Re: Applications for Permit Nos. 71-07146 thru 71-07166,
72-07482 thru 72-07499

Dear Ms. Robertson:

The Department of Water Resources acknowledges receipt of 39 water right applications for permit. Each application has been assigned an identification number. Please refer to this number in all further correspondence. A computer produced proof report for each application is enclosed for your information and reference.

This office will be advertising the applications with points of diversion located within Custer County in the Challis Messenger on 8/6 & 8/13/92. Application No. 71-07160 will be advertised in the Wood River Journal on 8/5 & 8/12/92 because it has a point of diversion located within Blaine County. A period of ten days following the second publication will be allowed for the submittal of protests.

If an application is protested you will be sent a copy of the protest. The protest must be resolved before the application is approved or denied. If the protest is not resolved voluntarily, this Department will conduct a conference and/or hearing on the matter.

If the application is not protested, it will be forwarded to our State Office in about five weeks. State office personnel will conduct a complete review prior to final processing of the application and will notify you of the outcome of this review. When a permit is issued, you will be sent a copy. A

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DEC 10 1992

Idaho Fish & Game
Page 2
08-Jul-1992

typical processing time for an unprotested application is about eight weeks.

Please feel free to contact this office if you have any questions regarding this procedure.

Very truly yours,

Mel Schulte
Water Right Agent

MS:MB

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DEC 10 1992



IDAHO FISH & GAME

600 South Walnut
P.O. Box 25
Boise, ID 83707-0025

June 3, 1992

Mr. Jim Johnson
Idaho Department of Water Resources
STATEHOUSE MAIL
Boise, ID 83720

Re: Water Right Application for Fish Screens

Dear Mr. Johnson:

I have enclosed 33 applications for permit and a check for \$1,485.00 for fish screens in the Salmon River Basin. These applications are for nonconsumptive uses of water. The screens prevent fish from entering irrigation ditches and becoming stranded. The fish are shunted into bypass pipes near the screens and are returned back to the stream below the irrigation ditch.

I have had several conversations with Water Resources personnel regarding the need to apply for water right permits for these fish screens and have received conflicting responses. When I filed our Department's claims for the Snake River Basin Adjudication, I was told that we should file claims for existing fish screens and applications for permit for screens that were built after 1971. Conversely, since filing our adjudication claims, I have been told that because the use of the water is nonconsumptive and no additional water is diverted down the ditches to run the screens, we do not need a water right to use them.

Could you clarify for me whether or not we need to file applications for the fish screens? If we do not need to file the enclosed applications, please return them to me with the check. If we are required to file applications, then you have them and the payment for processing them. If I can provide you with any further information regarding these applications, please call me at 334-2597. Thank you in advance for your help in this matter.

Sincerely,

Cindy Robertson

Cindy Robertson
Fishery Biologist

CR:tlv

Enclosure

cc: Jim Blake, Salmon
Lee VanDeBogart, Engineering

Cecil D. Andrus / Governor
Jerry M. Conley / Director

Equal Opportunity Employer



Working for wildlife - since 1939

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DEC 10 1992

APPLICATIONS FOR WATER RIGHT PERMITS FOR FISH SCREENS
IN THE SALMON RIVER BASIN

<u>Screen Number</u>	<u>Cost</u>
EF-14 ✓	\$45.00
EF-20	45.00
EF-22	45.00
EF-24	45.00
EF-HC-3	45.00
S-1	45.00
S-8	45.00
S-20	45.00
S-21	45.00
S-21A	45.00
S-23	45.00
S-24	45.00
S-28	45.00
S-32	45.00
S-33	45.00
S-38	45.00
S-39	45.00
S-39A	45.00
S-40	45.00
S-41	45.00
S-42	45.00
S-43	45.00
S-44	45.00
S-45	45.00
S-47	45.00
S-PC-1	45.00
S-VC-1	45.00
S-VC-2	45.00
S-VC-3	45.00
S-VC-4	45.00
S-VC-6	45.00
S-WSC-1	45.00
S-WCS-2	45.00

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DEC 10 1992

DEC 10 1992