

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 75-14061

Exam Date: 10/3/2012

1. Current Owner: VESSEY FISHING & TRADING LLC
PO BOX 981865
PARK CITY UT 84098
(435)640-5627

Permit assigned to Vessey Fishing & Trading in 2010. Mr. Jerry Myers is the best point of contact. He has been the ranch manager for many years. ISOS shows the permit holder is in good standing and identified by #W90333.

2. Accompanied by: Jerry Myers, ranch manager, Indian Creek Guest Ranch. Mr. Myers is also the Upper Salmon Project Manager for Trout Unlimited.

Mr. Myers' phone no: (208)-394-2126

Guest ranch address: 194 Indian Cr Rd, North Fork, ID 83466

Relationship to Permit Holder: Mr. Myers is an employee of the permit holder

Assisted by Sandra Thiel who took measurements and photos and created the system diagram.

3. SOURCE

INDIAN CREEK

TRIBUTARY

SALMON RIVER

B. OVERLAP REVIEW

1. Other water rights with the same place of use: none (The place of use is the power house).
2. Other water rights with the same point of diversion: 75-4379C

Decreed right 75-4379C for irrigation and this permit (75-14061) for hydropower share a diversion and some distribution pipe.

C. DIVERSION AND DELIVERY SYSTEM1. LOCATION OF POINT(S) OF DIVERSION:

INDIAN CREEK

NE1/4NE1/4 Sec. 12, Twp 24N, Rge 19E, B.M.

LEMHI County

Method of Determination:

The official surveyed address for the Indian Creek Guest Ranch is Homestead Entry Survey (H.E.S.) #194, 196 and 197 not the Public Land Survey System address. Vessey Fishing & Trading LLC is not listed as the patent holders for these H.E.S.

GPS coordinates for the penstock intake and the powerhouse were recorded during the site visit. The POD had tag A00014926. It was found and documented to be within H.E.S. #196.

2.

PLACE OF USE:

<u>PLACE OF USE:</u>			POWER																
Twp	Rge	Sec	NE				NW				SW				SE				
24N	19E	12	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>Totals</u>

Method of Determination:

GPS coordinates for the penstock intake and the turbine/generator house were recorded during the site visit. The POU was also confirmed by consultation over aerial photography with Mr. Myers. The POU was found and documented to be within H.E.S. #194.

- 3.
- ☒ Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.
- ☒ Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.
- ☒ Aerial Photo Attached (required for irrigation of 10+ acres).
- ☒ Photo of Diversion and System Attached

4.

Well or Diversion ID: A0014926; Spatial data ID: 380057; GPS'd by IDWR personnel.

<u>Turbine Make</u>	<u>Discharge (cfs)</u>	<u>Generator Description.</u>	<u>Size (W or kW)</u>
Canyon Hydro 751-2 Pelton;	7/8 inch needle nozzle, 1.4 cfs (design);	MagnaPlus synchronous, s/n LM -371596	7 kW

(see attached spec sheets)

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

D. FLOW MEASUREMENTS

1.

<u>Measurement Equipment</u>	<u>Type</u>	<u>Make</u>	<u>Model No./Serial No.</u>	<u>Size</u>	<u>Calib. Date</u>

2.

Measurements:

The proof statement said that a measuring device was installed. A Pelton-wheel hydro turbine and generator was installed at this site and a turbine can be considered a measurement device. The turbine has two jet nozzles but at the time of the exam, only one of the two nozzles was being used.

The pressure reading was recorded as ~53 psi. Therefore the dynamic head is 122.4 ft. The only nozzle in use has a 7/8 inch orifice.

At the time of the exam the generator was generating 13 amps of current. For standard household voltage, (120 volts), this would be ~1560 Watts. (amps x volts = Watts)

E. FLOW CALCULATIONS

Additional Computation Sheets Attached

Measured Method:

At 53 psi (122.4 ft of dynamic head), the flow was a little more than 166.5 gpm (or ~ 0.37 cfs) by interpolation of the attached nozzle discharge table.

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation: not applicable

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

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

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

2. Volume Calculations for Other Uses:

Power Use

This is a run-of-river hydro. There is minimal stilling pool area and no diversion dam. A volume may not be required for the license.

This system is supplying electricity to a single residence year-round and to guest houses 2-4 weeks/year.

Data from Idaho Power Company shows that the max, weather-adjusted power use in 2002 was 13084 kWh per residential customer. This reduces to a daily average of 1.49 kW per customer. (The calculation is 13084 kWh / (365 days x 24 hr/day) = 1.49 kW.) The Indian Creek Guest Ranch powerplant can generate this daily average kW and a little more using approximately 0.37 cfs, the rate confirmed in use during the site visit.

If a volume is required I recommend 268 AF. The volume calculation is 1.9835 x 365 days x 0.37 cfs = 267.87 AF.

G. NARRATIVE/REMARKS/COMMENTS

The intended diversion structure was an infiltration gallery designed by the NRCS. That structure failed within the first year of operation and has been abandoned. The current diversion structure is a Coanda screen (see attached illustration). This type of diversion is less intrusive than a diversion dam constructed across the creek so it is fish friendly. Indian Creek is steelhead habitat.

The power use and the SRBA decreed right 75-4379C for irrigation use, share the Coanda screen diversion and much of the same piping. Only a portion of Indian Creek is diverted for these uses. The water is conveyed through common, mostly buried piping, from the diversion to a junction near the power house. The irrigation piping continues further south to the remainder of the ranch property. The water discharged from the turbine daylights a few feet from the power house and flows overland ~70 ft where it returns to Indian Creek.

Power is delivered to a separate building nearer to the residences where the dump load, (a resistance heater and fans) and the charge controllers are housed. The penstock, power house and transmission lines begin and end on Indian Creek Guest Ranch property. Therefore FERC has no jurisdiction.

The instantaneous flow reading was not representative of the turbine's maximum discharge. According to the manufacturer this turbine would be capable of utilizing ~1.4 cfs. Only one of two spear jets was found to be in use. Therefore I am recommending less rate and volume than the design expected. Should the turbine capacity be more fully utilized at some future date, an additional permit will be required.

Because the irrigation system and power generation share the same piping, power generation would be reduced when the sprinklers were engaged. Solar panels provide supplemental power during those times.

Beneficial use for power generation was confirmed during the exam. The power plant can provide ~1500 Watts of continuous generation in real-time. The power is used onsite. There is no access to any utility company's power distribution/transmission grid. Therefore the PUC has no involvement in this right.

The place-of-use for this right is located at approximately 3800 ft elevation, and approximately 6.6 miles, as the crow flies, Northeast of Shoup, Idaho. The Indian Creek Guest Ranch property is a chain three adjacent Homestead Entry Surveys (H.E.S.) adjoined by Salmon-Challis National Forest on three sides. Copies of the G.L.O. maps are attached.

The official surveyed address for this property is H.E.S. #194, 196, and 197. Because the IDWR forms and database configuration expect a PLSS address for the POU and the POD, the H.E.S. have been overlaid with a virtual Public Land Survey grid. The PLSS addresses assigned by the permit and this report, are only for ease in locating features important to this water right. They are not intended to replace the official survey record. The PLSS address for the POD is the NENE. The PLSS for the POU is the SWSE.

I created the POU shape based on the GPS point provided by S Thiel.

This power right should be term-limited and made subordinate to any subsequent rights also served by Indian Creek. This right and 75-4379C are limited to a combined total of 1.28 cfs.

Have conditions of permit approval been met? ☒ Yes ☐ No

H. RECOMMENDATIONS**1. Recommended Amounts**

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
POWER	01/01 to 12/31	0.370 CFS	267.9 AF
<u>Totals:</u>		0.370 CFS	

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 Mitchell D. Lee Date 11/9/2012

Reviewer _____ Date _____

MAGNAPLUS GENERATOR

280 -- 430 Frame Installation, Operation and Maintenance Manual

FRAME # 282
MODEL # 282 PDL 1503
SERIAL # LM 371596-0402

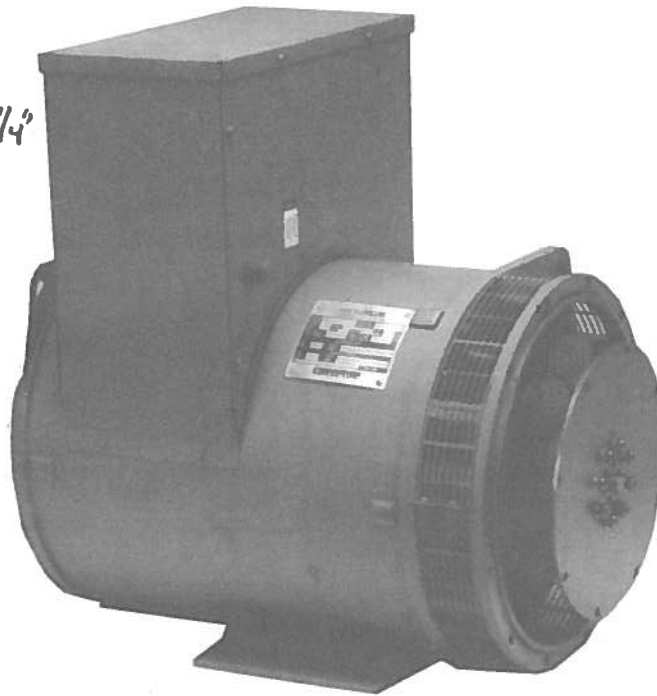
TURBINE SHV 8 1/2"
GEN SHV 5 1/8"

BELT SIZE 5L 470

CENTER TO CENTER - 14 1/4"

INDIAN CREEK
GENERATOR

SUPPLIES 13 AMPS
AT 120 VOLTS AC



NEW
MODEL 282 PDL 17

MAGNAPLUS SERVICE
CENTERS 3/7/05

JM 3/05

LIST PR - 2,800
SHV - 5%
\$1405

IDAHO FALLS - ROSSITER
ELECTRIC 208 529-3665

MAGNAPLUS BEARINGS
ON I.C. APPLICATION
SHOULD RUN 100,000 HRS
OR MORE. NO OTHER
MOVING PARTS. ROTATE
UNIT BY HAND EVERY
MONTH DURING SHUT DOWN
PERIOD. (LUBES BEARINGS)

ONSITE POWER
303 690-8
Aurora, CO DE

MISSOULA - ELECTRO SERVICE
406 549-4115

CANYON INDUSTRIES, INC.

5500 BLUE HERON LANE
P.O. BOX 36
DEMING, WA 98244

May 2002

INSTALLATION AND OPERATION

INDIAN CREEK HYDROELECTRIC SYSTEM

For

MIKE HATCHER - SUNSAVERS II
80 FLOWING SPRINGS ROAD
BOISE, IDAHO 83716-3036
(208) 344-2945

INDIAN CREEK

WATER TURBINE

(DRIVES MARATHON
MAGNA PLUS GENERATOR)

Static Head: 140 feet

Net Head and Flow Rate to be determined

COMPONENT DESCRIPTION:

Turbine: Canyon Custom 751-2 Pelton, S/N 023032, manganese bronze runner, double nozzle.

Nozzle: (1) manually operated needle nozzle (upper).
(1) fixed interchangeable nozzle (lower)
7/8" needle installed

Main Bearings: (2) Canyon 100MB (roller bearing type).

Seal Assembly: (2) Canyon 100SL (labyrinth type).

Deflector Bearings: (2) Fafnir SCJT - 3/4".

Deflector Seals: (2) CR #7439

Intake: ASTM 6" 150 lb. flange

Generator: Marathon, S/N LM-371596, M/N 282PDL1503, 120/240 VAC, single phase, synchronous, 60 hertz, 7 KW, 12 lead

Governor: THES Product A-2, S/N 02A810

Frequency Guard: THES Product E, S/N 02E256

Water Flow Information for Pumping and Hydroelectric Design

Flow Through Nozzles

The table below shows the flow in gallons per minute (gpm) through various diameter nozzles at a range of heads from 5 feet to 400 feet. Use table to choose what nozzle size to use and how many nozzles a turbine must have to give the required flow to use all of the water available in the system.

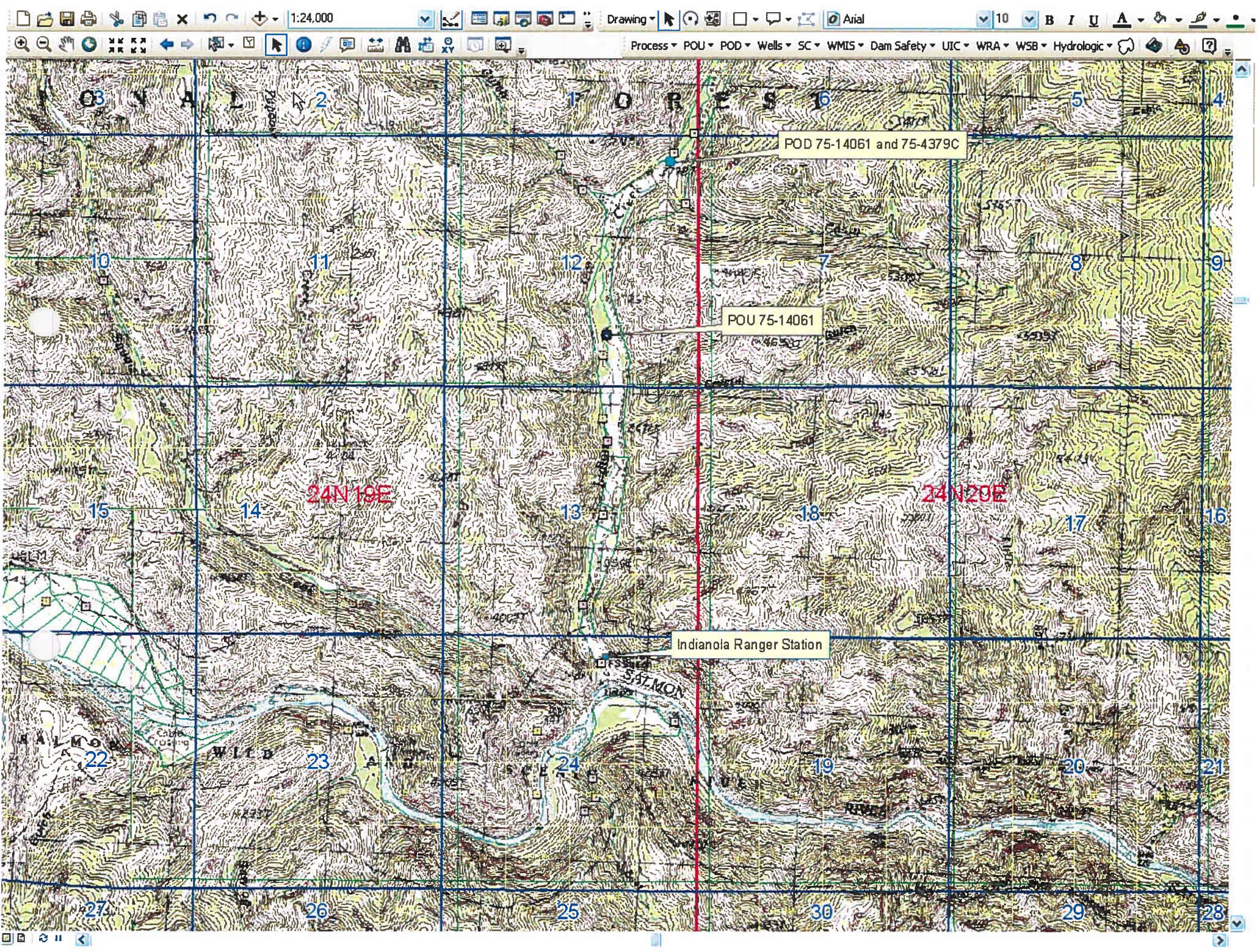
Head		Flow in gpm through these nozzle diameters:											Rpm for 4" turbine
feet	psi	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	7/8"	1.0"	
5	2.2	-	-	-	-	6.18	8.4	11	17.1	24.7	33.6	43.9	460
10	4.3	-	-	3.88	6.05	8.75	11.6	15.6	24.2	35	47.6	62.1	650
15	6.5	-	2.68	4.76	7.4	10.7	14.6	19	29.7	42.8	58.2	76	800
20	8.7	1.37	3.09	5.49	8.56	12.4	16.8	22	34.3	49.4	67.3	87.8	925
30	13	1.68	3.78	6.72	10.5	15.1	20.6	26.9	42	60.5	82.4	107	1140
40	17.3	1.94	4.37	7.76	12.1	17.5	23.8	31.1	48.5	69.9	95.1	124	1310
50	21.7	2.17	4.88	8.68	13.6	19.5	26.6	34.7	54.3	78.1	106	139	1470
60	26	2.38	5.35	9.51	14.8	21.4	29.1	38	59.4	85.6	117	152	1600
80	34.6	2.75	6.18	11	17.1	24.7	33.6	43.9	68.6	98.8	135	176	1850
100	43.3	3.07	6.91	12.3	19.2	27.6	36.6	49.1	76.7	111	150	196	2070
120	52	3.36	7.56	13.4	21	30.3	41.2	53.8	84.1	121	165	215	2270
150	65	3.76	8.95	15	23.5	33.8	46	60.1	93.9	135	184	241	2540
200	86.6	4.34	9.77	17.4	27.1	39.1	53.2	69.4	109	156	213	278	2930
250	108	4.86	10.9	19.9	30.3	43.6	59.4	77.6	121	175	238	311	3270
300	130	5.32	12	21.3	33.2	47.8	65.1	85.1	133	191	261	340	3590
400	173	6.14	13.8	24.5	38.3	55.2	75.2	98.2	154	221	301	393	4140

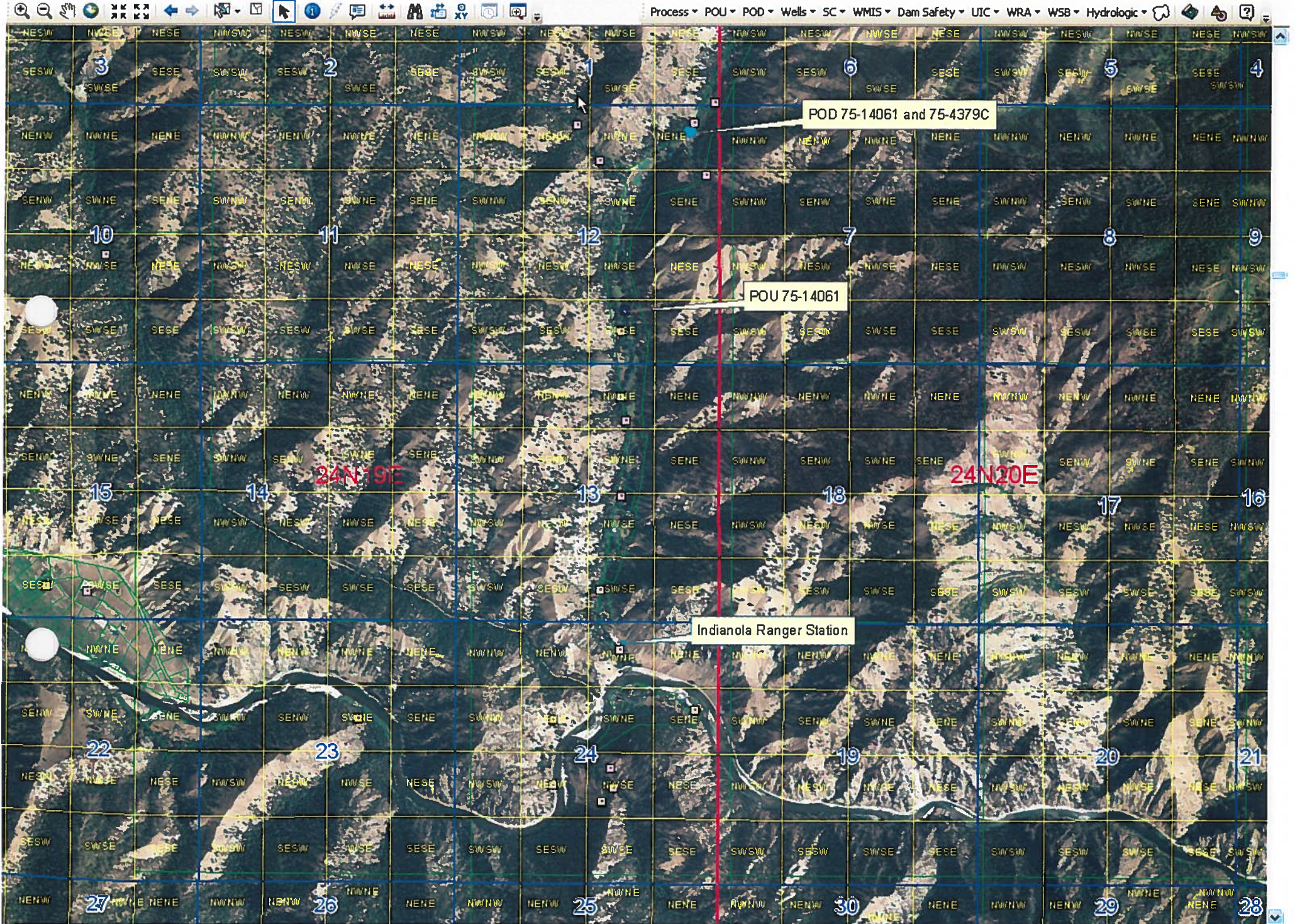
PVC Pipe Loss Table

Use the table below to determine what pipe size is required to efficiently allow necessary flow for your power need. Once you know the required flow for your system (gpm), find the head loss for various pipe sizes. Multiply the head loss number by the length of the pipe divided by 100 and you will get the loss of head for that pipe size. The actual head minus the head loss will give you the effective dynamic head in the system.

interpolation 146.52 = .37

Pipe Friction Loss Table – Head Loss in Feet per 100 Feet of Schedule 40 PVC Pipe																								
		Flow (gallons per minute)																						
		1	2	3	4	5	7	10	15	20	25	30	40	50	60	70	80	100	150	200	250	300	400	500
Pipe diameter (Inches)	1/2	2.08	4.16	8.7	14.8	23.5	43																	
	3/4	0.51	1.02	2.2	3.7	5.73	10.5	20.1	42.5															
	1	0.1	0.55	0.68	1.15	1.72	3.17	6.02	12.8	21.8	32.9	46.1												
	1-1/4	0.03	0.14	0.19	0.31	0.44	0.81	1.55	3.28	5.59	8.45	11.9	22	30.5	45.6									
	1-1/2		0.07	0.08	0.13	0.22	0.38	0.72	1.53	2.61	3.95	5.53	9.43	14.3	20	28.6	36.7							
	2			0.03	0.05	0.07	0.11	0.21	0.45	0.76	1.15	1.62	2.75	4.16	5.84	7.76	9.94	15.1	34.8	59.3				
	2-1/2				0.03	0.04	0.05	0.09	0.19	0.32	0.49	0.68	1.16	1.75	2.46	3.27	4.19	6.33	13.4	25.0	37.8	46.1		
	3						0.02	0.03	0.07	0.11	0.17	0.23	0.4	0.6	0.85	1.13	1.44	2.18	4.63	7.88	11.9	18.4	40.1	
	4										0.04	0.06	0.11	0.16	0.22	0.3	0.38	0.58	1.22	2.08	3.15	4.41	7.52	
	5											0.03	0.04	0.05	0.07	0.1	0.13	0.19	0.4	0.69	1.05	1.46	2.49	3.76
	6													0.02	0.03	0.04	0.05	0.08	0.16	0.28	0.43	0.6	1.01	1.53





From: Thiel, Sandra
Sent: Wednesday, October 24, 2012 12:02 PM
To: Edl, Michele
Subject: 75-14061
Attachments: PhotoNarrative14061.docx; Water Distribution System Permit Number 75_14061.docx

Hello, The attached documents are the photo narrative and the system diagram and accompanying narrative. I put the remaining photos on my P drive under your name and the water right number. I started piecing the photos together but left the electrical system for you to complete. I'm still new at this and I would appreciate feedback so don't hesitate to send me an email explaining what I need to change for next time.

Water right 75-4379C does share the pipe system with permit 75-14061. Jerry Meyers said that in 2002 they moved the point of diversion on Indian Creek to make sure that it is on the Vessey Property. He said that if the pod were on Forest Service they would be required to have a special use permit. They do have a special use permit for their domestic and irrigation diversion on Cow Gulch. My gps point confirms that there are within the parcel data.

The photos of the name plates presented some problems. The generator nameplate was almost against the back wall of the turbine house. I tried several angles to take a picture and nothing turned out with a visible image. You can see the results in img_1058. There was no nameplate on the turbine. We got down on our hands and knees and looked. Jerry did send me back with documentation on the generator and the turbine. I've included those papers in the file.

Under flow measurements: The Proof statement says a measuring device is installed. That device could be the turbine. If it's something separate from the turbine take a measurement. There is a 7/8 inch nozzle with a full pressure of 55 pounds. I collected a pressure reading of 53 psi. I believe that gives us 123 gallons per minute or 0.27 cfs. Jerry indicated that the turbine was on 123 gpm or less.

The hydro site was generating power at 13 amps. They leave the system set for 13 amps because if they generate more the pressure drops and the system shuts down. There is a dump load mechanism in the building shown in the photo narrative. The electric duct heater and its fan are also in the shed.

There are five buildings on the property. However only one is full time. Jerry indicated that only one of the others is used seasonally and that is limited to 2-4 weeks per year.

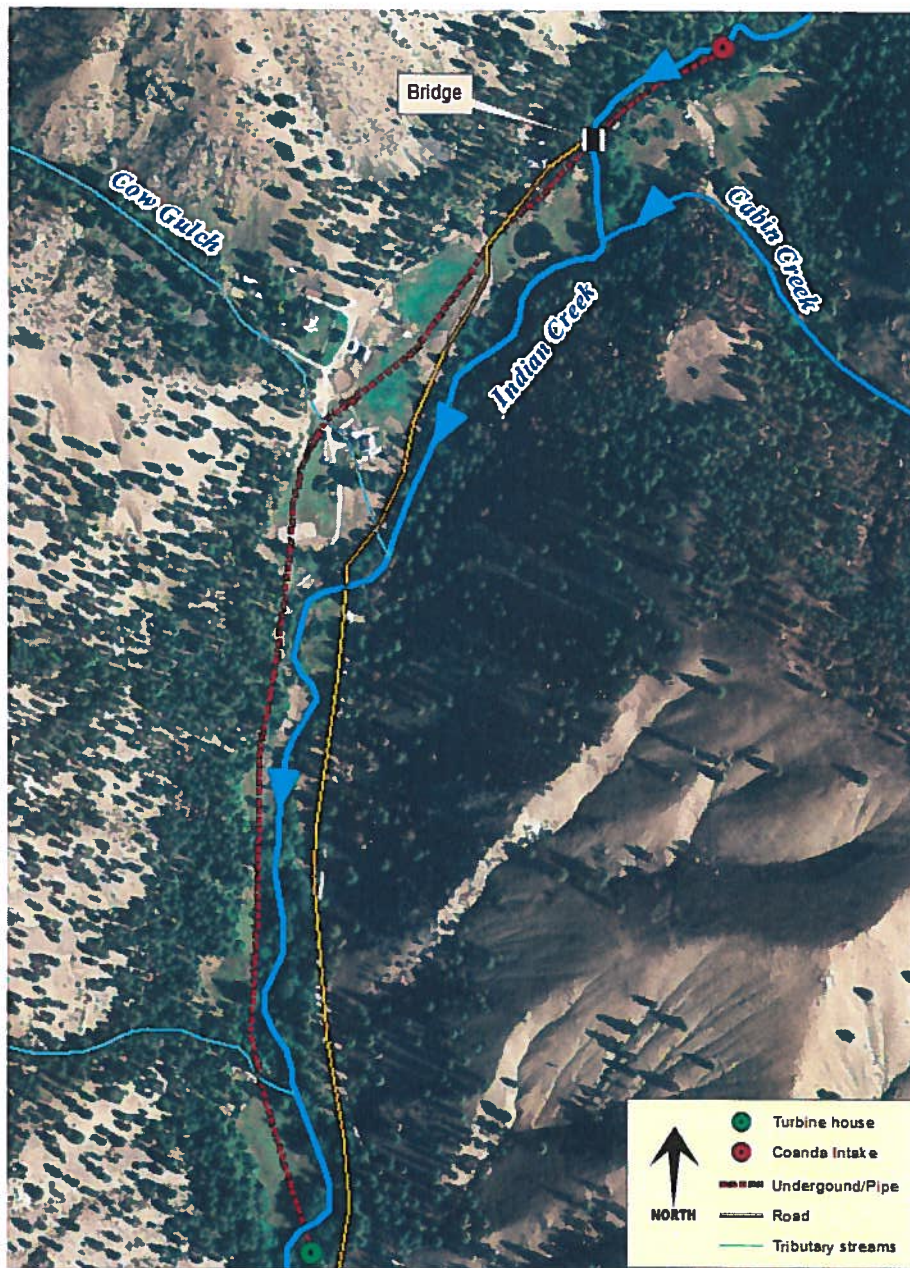
I wanted to also comment on the photo of the Coanda Intake. I was unable to get a broader picture of the intake because the area was so overgrown. The photos that you already have might be more useful in your report.

I included two maps in Water Distribution System Permit Number 75_14061.docx. The first at the top of the page has the 2011 NAIP for a background. If you scroll down to the bottom of the document you will find a second map/diagram without the NAIP.

I realize that my narrative is not the same as being there but I hope this is useful.

Sandra Beer Thiel
Idaho Department of Water Resources
322 East Front Street
Boise, Idaho 83720-0098
(208)287-4881
sandra.thiel@idwr.idaho.gov

Water Distribution System Permit Number 75-1461

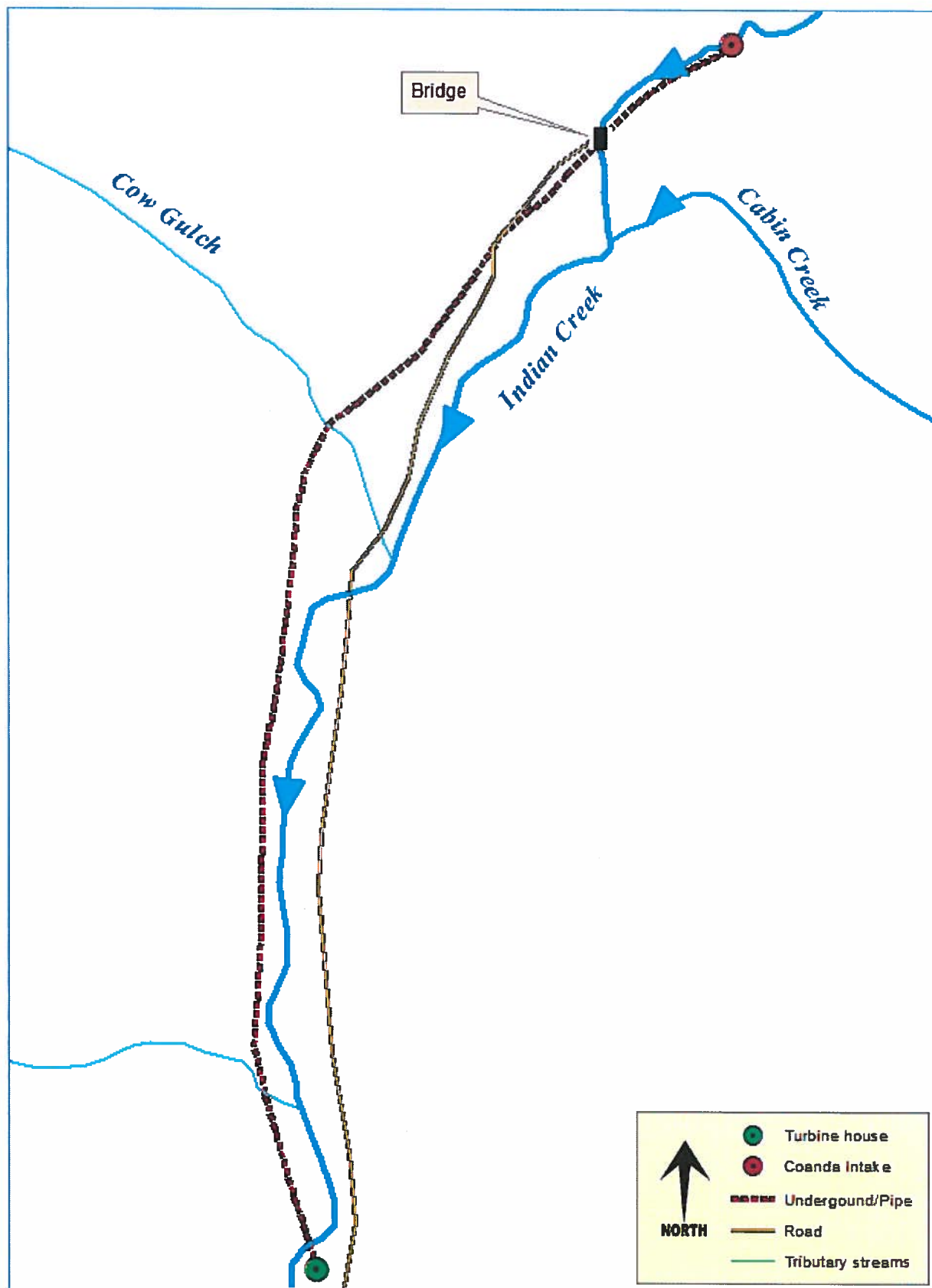


A Coanda intake, shown at the top of the page as a red dot, located in T24 N R19 E Section 12, NE $\frac{1}{4}$ NE $\frac{1}{4}$, supplies water for a hydropower turbine located in T24 N R19 E Section 12, SW $\frac{1}{4}$ SE $\frac{1}{4}$. The identification tag at the Coanda diversion is A0014926. From the intake a pipe carries water to the west, southwest and crosses Indian Creek twice. The pipe is attached to the side of the bridge identified at the top of the image above. The second crossing is just north of the turbine house shown, shown as a green dot at the bottom of the image.

The pipe crosses the road, shown as an orange line, travels between the ranch manager's house and a guest houses to a point west of the house. From there the water pipe for, irrigation and hydropower, and the electrical system share the same trench parallel to Indian Creek on the west side. The water

flows down to the turbine house and the electrical cable travels back uphill to a building just west of the main house. This building houses the power conversion center, battery bank and the electric duct heater that acts as the load dump.

The pipe is underground from the bridge to the turbine. The distance between the spring and the turbine is approximately 0.8 miles (4,229 feet). The pipe becomes increasingly smaller as it flows down hill, decreasing in size from 10 inches to eight and six inches. At the turbine house the pipe for both the irrigation and the turbine water supply are four inches



PHOTOGRAPHER AND DATE OF PHOTOS: Sandy Thiel, October 3, 2012

FILE NUMBER: 75-14061



Coanda water intake



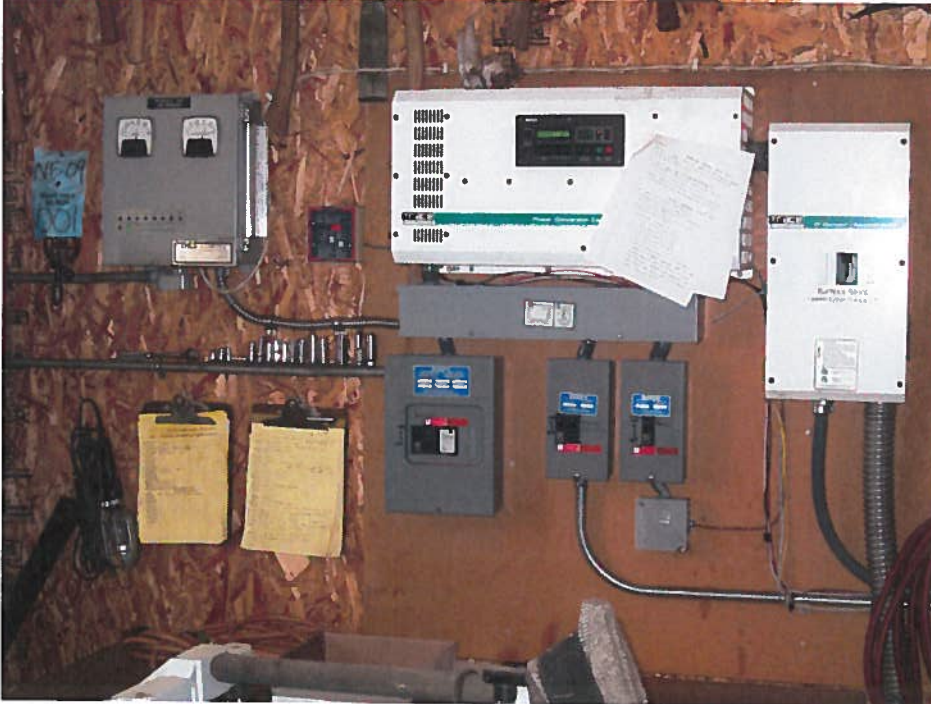
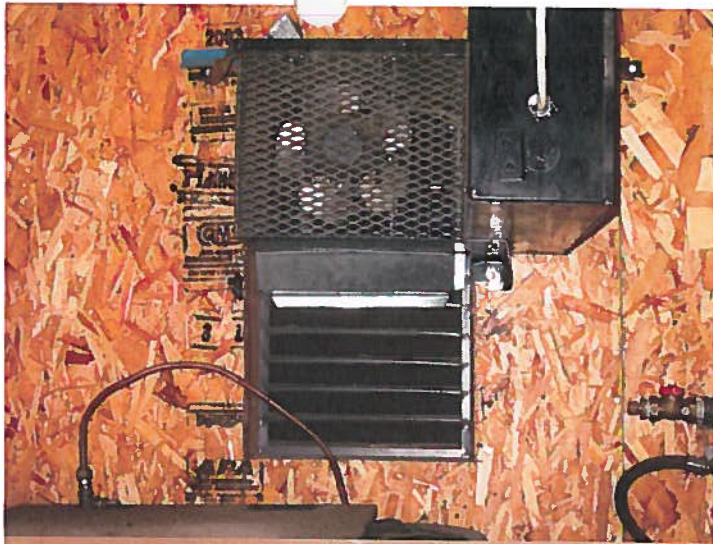
Pipe through beaver dam complex



The two pipes shown left cross originate at the springs. The smaller pipe flows into the pond and the larger continues downstream to provide water for the turbine. The stream is Indian Creek.



The building houses the power conversion center, battery bank and the electric duct heater that acts as the load dump.



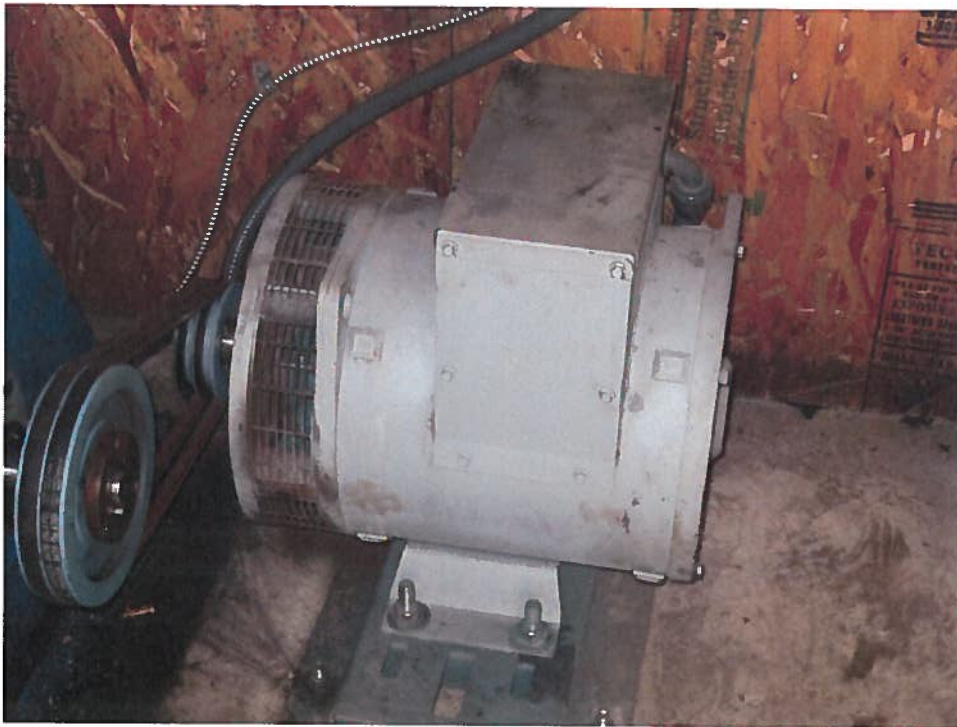
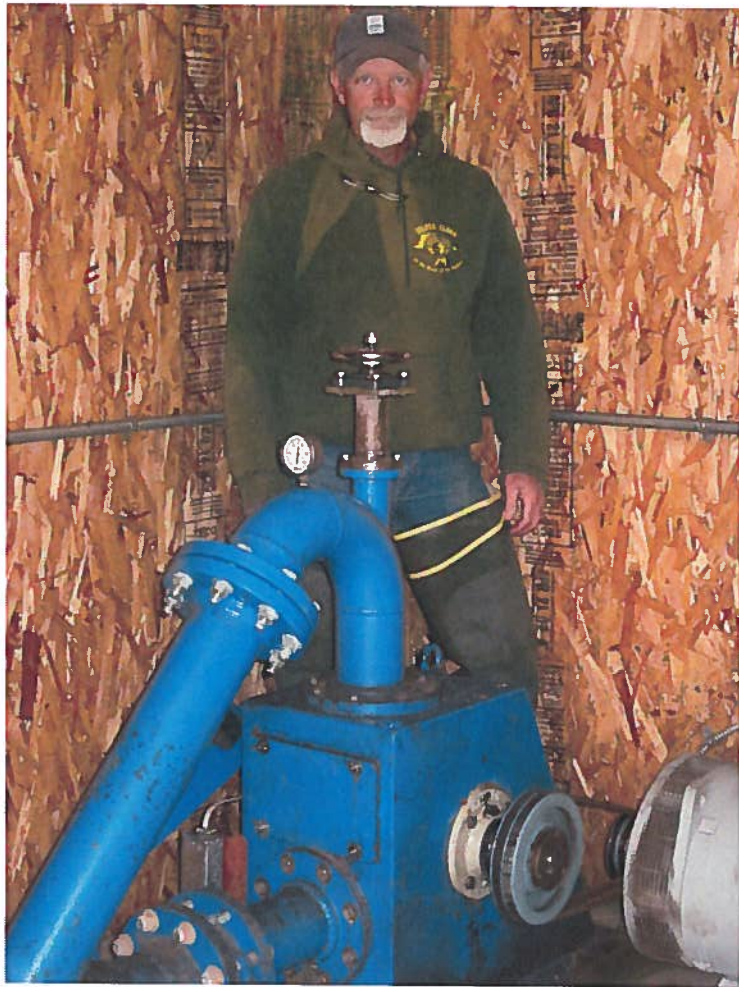
These photos were taken from inside the building on the last page

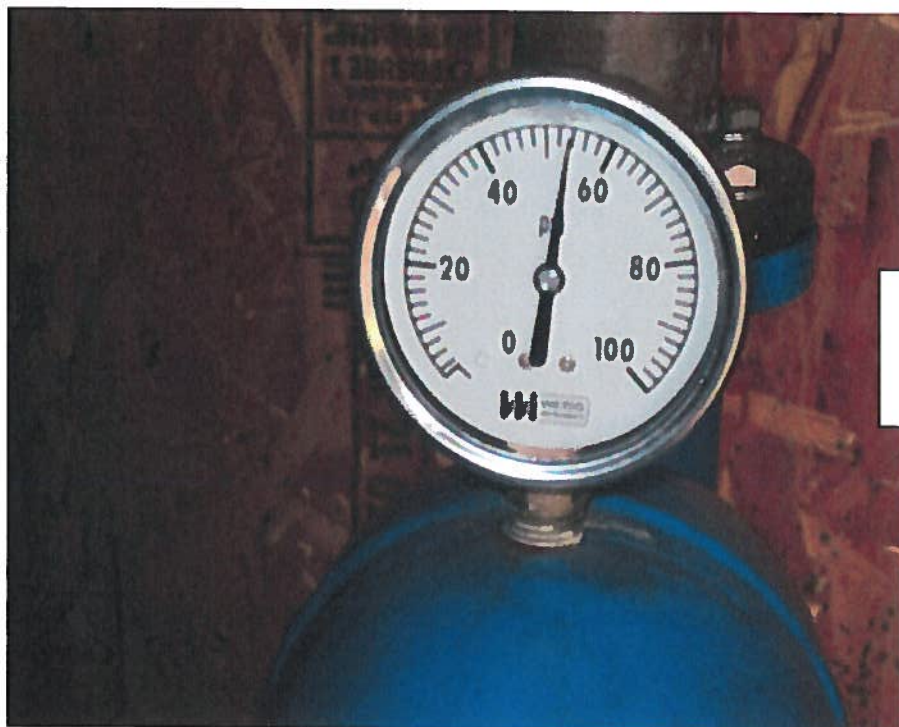


The water pipe and the electrical system share the same trench parallel to Indian Creek on the west side. This is at the upper end, downhill from the building on the previous page.



This looks upstream from the turbine house. Indian Creek is the water in the top half of the photo. The water at the bottom is the outflow from the turbine. The blue and white pipe near the fence post in the center is the valve for the turnoff.





Inside the turbine house





The irrigation system and the turbine share the same water supply. There is a re-diversion for irrigation at the turbine house.



Water from the turbine house flows west into Indian Creek, approximately 70 ft downstream.

Edl, Michele

From: Rob James [rob.james@canyonhydro.com]
Sent: Monday, September 24, 2012 9:14 AM
To: Edl, Michele
Subject: Indian Creek Ranch

Hello Michele,

The Indian Creek Ranch Pelton turbine was designed to operate at about 1.4 CFS maximum flow.

Please contact me if you require any additional information.

Regards,

Rob James
Canyon Hydro
5500 Blue Heron Lane
Deming, Wa. 98244
(360) 592-5552 ph
(360) 592-2235 fax

Edl, Michele

From: Edl, Michele
Sent: Monday, September 17, 2012 4:04 PM
To: 'info@canyonhydro.com'
Subject: info request - Indian Cr Guest Ranch

Dear customer service,

As you can tell by the email address, I work for the Idaho Department of Water Resources. A Canyon Hydro turbine has been installed on Indian Creek and serves the Indian Creek Guest Ranch in east central Idaho. The ownership of the ranch has changed since this micro hydro was designed. Your file may be in the name Patrick Farrell. I am working with a Mr. Jerry Myers, who has been the ranch manager for many years.

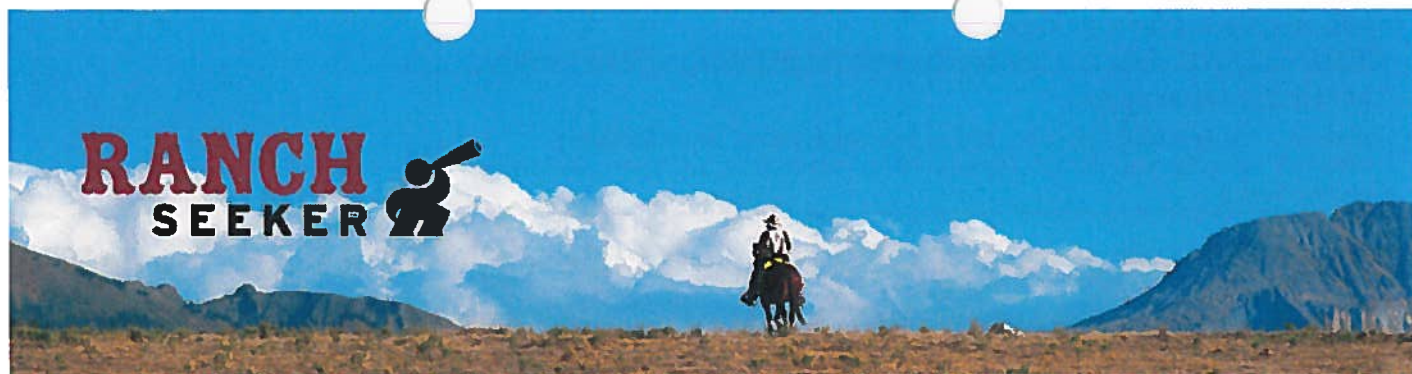
I have been provided one photo of the turbine. It appears to be a dual jet pelton and it would have been installed sometime between 2002 and 2003. I do not have a serial /model number but the turbine is your distinctive blue color.

The original diversion structure for this project has failed. But I believe that the turbine has been operating successfully since its installation. Because I hope to issue a water right for the water use I am interested in the hydraulic capacity of the turbine in this setting.

Please assist me by providing me a copy of the turbine specs or other information which would help me determine the rate of water that this turbine can utilize.

Respectfully,

Michele Edl, associate engineer


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Indian Creek Guest Ranch

Short Description:

Nestled in the rugged Rocky Mountains of Idaho near the Salmon River, Indian Creek Guest Ranch offers personalized outdoor experiences including guided horse and river activities, natural history interpretation and myriad mountain experiences.

Category: Guest Ranch

Full Address: 194 Indian Creek Rd., North Fork, Idaho, United States, 83466

Geographical Area: USA - South West

URL:


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[VISIT OUR BLOG](#) [B](#)

in the spotlight...

SEND ENQUIRY

To send an enquiry to Indian Creek Guest Ranch, [click here.](#)



[Send Enquiry](#)

CONTACT INFORMATION

Destination: Indian Creek Guest Ranch

Email Address:

Reservation: 1-866-394-2126

Fax:

FULL DESCRIPTION OF LISTING

Indian Creek Guest Ranch offers quiet, secluded accommodations May through October. The ranch's four cabins are handsomely furnished and designed for singles, couples, families or small groups. Comfortable lodging, excellent meals, individualized ranch activities, and outdoor experiences are all part of your stay.

LISTING DETAILS

Max.No.Guest(non group): 15

Minimum Stay(days): 5

Max.No.Guest(group):

Transportation: Arrangements can be made for pickup from Missoula, Mt./Idaho Falls, MT. or from

Accommodations: The ranch's four handsomely furnished cabins vary in size, sleeping 2-6, each having its own bathroom and shower. The main lodge, with its large dining area, sitting room, deck and wood fired hot tub provide a friendly gathering place.

Dining: Indian Creek has a long standing tradition of fine dining. Tempting meals served family style combine western and gourmet cuisine. Dutch oven cookouts and barbecues occur weekly. Picnic lunches are available. Enjoy our evening beer/wine selection.

Conference Capacity: 10 to 20

Nearest Airport(Hrs): 3 hrs.

AirStrip at Ranch: No

On Site Medical: First Aid Personnel Present, Hospital Nearby

Nearest Hospital(Hrs): 45 mins.

Membership: Idaho Rivers United, Trout Unlimited, Quail Unlimited, Rocky Mountain Elk Foundation

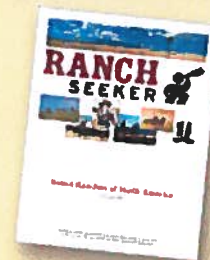
Months Open: May, June, July, August, September, October

Exception to Months Open:

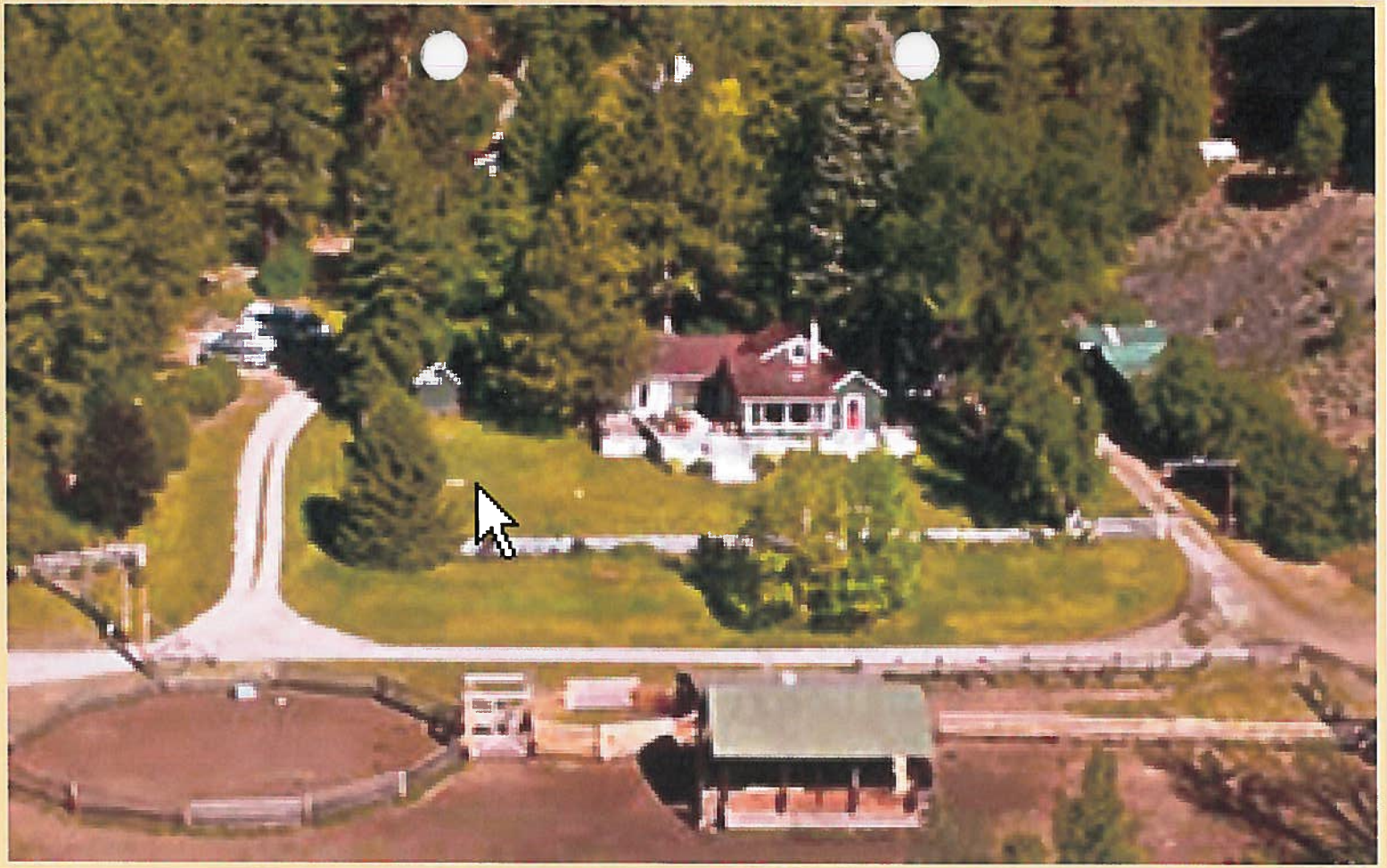
Languages:

Credit Cards: Master Card, American Express

New: Printable Ranch Guidebooks!



[Click here to download your free copy](#)



PATENTED

PLAT OF
HOMESTEAD ENTRY SURVEY No. 196
in the
SALMON NATIONAL FOREST,
in
approx.
Sections 1-12, unsurveyed, T. 24 N. R. 19 E.,
Section 6, unsurveyed, T. 24 N. R. 20 E.

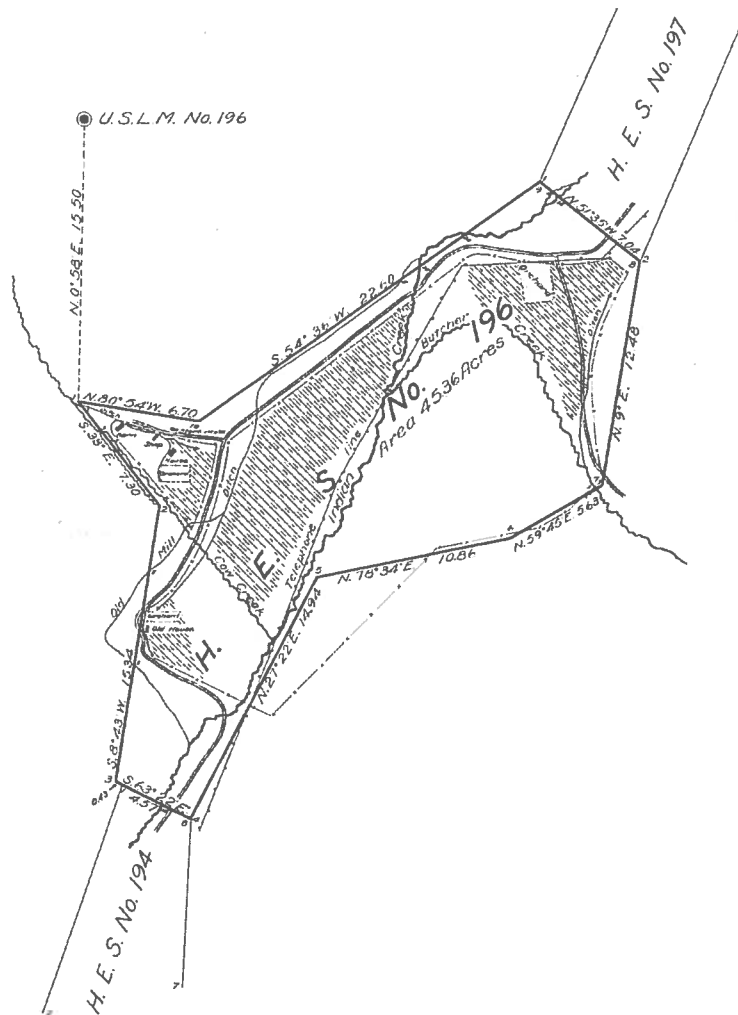
of the
Boise Meridian,
IDAHO,
NIELS O. MARSING,
Claimant.

This plat of Homestead Entry Survey No. 196, situated in Sections 1-12 unsurveyed, in Township 24 North of Range 19 East and in Section 6, unsurveyed, in Township 24 North of Range 20 East and in Section — surveyed, in Township — of Range — and in Section — surveyed, in Township — of Range — of the — Boise Meridian, is strictly conformable to the field notes of the Survey thereof, on file in this office, which have been examined and approved

Office of U.S. Surveyor General,
Boise, Idaho, March 30, 1914.

Samuel A. Utter
U.S. Surveyor General

The Meridian



Scale
5 Chains equal 1 inch

Orig by F.D.M.
Initials This copy F.C.H.

Surveys Designated	By Whom Surveyed	Instructions or Order no.	When Surveyed	Date of
H.E. Survey No. 196	Frank D. Maxwell		Sept 23, 1913	Sept 23, 1913
	Surveyor Forest Service		Oct 16, 1913	Oct 20, 1913

Areas	
H. E. Survey No. 196	Conflicts
In Section	
In Section	
In Section	
In Section	
Total	4.536

List No 4-682 Date March 6, 1911
Act of June 11, 1906; Act of March 4, 1913
Latitude 45° 27' N. } At Cor. No. 1.
Longitude 114° 7 1/2' W.
Mean Mag. Decl. 20° 35' E.

PLAT OF
HOMESTEAD ENTRY SURVEY No. 197
in the
SALMON NATIONAL FOREST

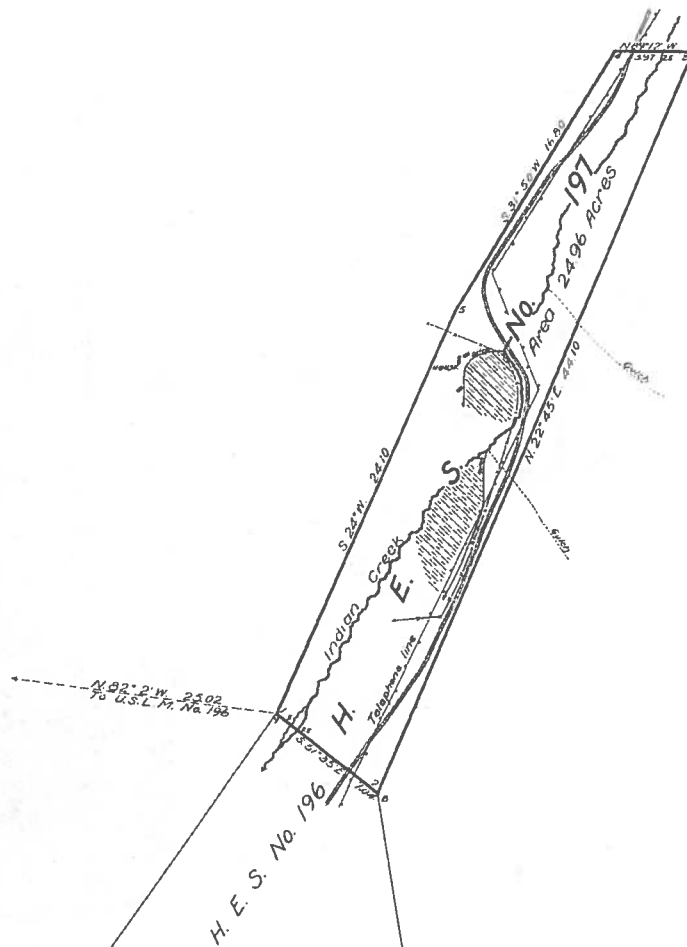
in approx.
Section 1, unsurveyed, T. 24N. R. 19 E.
Section 6, unsurveyed, T. 24N. R. 20 E.

of the
Boise Meridian,
IDAHO,
MARTIN A. FLETCHER,
Claimant.

This plat of Homestead Entry Survey No. 197, situated in Section 1, unsurveyed, in Township 24 North, of Range 19 East and in Section 6, unsurveyed, in Township 24 North, of Range 20 East and in Section surveyed, in Township of Range and in Section surveyed, in Township of Range of the Boise Meridian, is strictly conformable to the field notes of the Survey thereof, on file in this office, which have been examined and approved

Office of U.S. Surveyor General,
Boise, Idaho. May 11, 1914.

Darius A. Utter
U.S. Surveyor General



Scale
5 Chains equal 1 inch

Orig by F.D.M.
Initials This copy F.G.H.

Surveys Designated	By Whom Surveyed	Instructions or Detach		When Surveyed		Date of Approval
		No.	Date	Begin	Completed	
H.E. Survey No. 197	Frank D. Maxwell, Surveyor Forest Service.		Sept 23, 1913	Oct 20, 1913	Oct 21, 1913	

Areas			
H. E. Survey No. 197		Conflicts	
In Section			
In Section			
In Section			
Total	24.96		

List No 4-697 Date March 13, 1911
Act of June 11, 1906, Act of March 4, 1913

Latitude 45° 26' 1/2" N.
Longitude 114° 7' W
Mean Mag Decl. 20° 35' E } At Corner 1.

Amended Aug 20, 1915

PLAT OF
HOMESTEAD ENTRY SURVEY No. 194
in the
SALMON NATIONAL FOREST,

in
approx.
Section 12, unsurveyed, T. 24 N. R. 19 E.,
Section — surveyed, T. —, R. —.

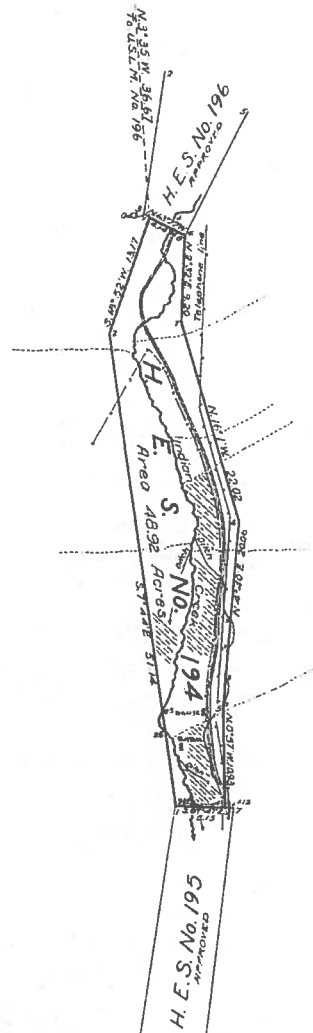
of the
Boise Meridian,
IDAHO,
LEE LADOUCEUR,
Claimant

This plat of Homestead Entry Survey No. 194, situated in Section 12, unsurveyed, in Township 24 North of Range 19 East and in Section — surveyed, in Township — of Range — and in Section — surveyed, in Township — of Range — and in Section — surveyed, in Township — of Range — of the Boise Base and Meridian, is strictly conformable to the field notes of the Survey thereof, on file in this office, which have been examined and approved

Office of U.S. Surveyor General.

Boise, Idaho, April 15, 1914.

James A. Utter
U.S. Surveyor General



TRUE MERIDIAN

Scale
10 Chains equal 1 inch

Initials Orig by F.D.M.
This copy F.C.H.

Surveys Designated	By Whom Surveyed	Instructions or Order No.	Date	When Surveyed	Date of Approval
H.E. Survey No. 194	Frank D. Maxwell		Sept. 23, 1913	Oct. 14, 1913	Oct. 15, 1913
	Surveyor, Forest Service.				

Areas			
H.E. Survey No. 194		Conflicts	
In Section			
In Section			
In Section			
Total	48.92		

List No 4-330 Date Feb. 5, 1910.
Act of June 11, 1906 Act of March 4, 1913
Latitude 45° 26' 1/2" N. } At Corner 1.
Longitude 114° 7' 1/2" W
Mean Mag. Decl. 20° 39' E.

accepted Aug 29, 1915

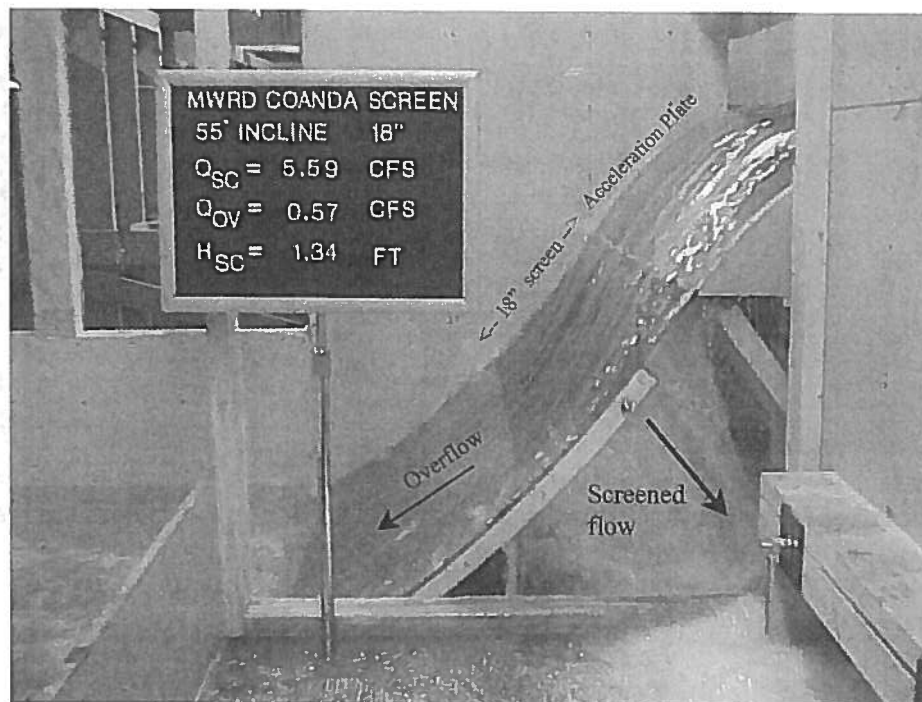


Figure 2. A prototype-size Coanda-effect screen structure tested in the hydraulic laboratory.

(fig. 3). A computer program implementing this model is available from the Bureau of Reclamation at <www.usbr.gov/pmts/hydraulics_lab>

This research report presents the results of a study that used this computer program to model a variety of screen configurations to provide planners and designers with quantitative information about screen capacities and the effects of varying the many available design parameters.

BACKGROUND

The concept of delivering water across an inclined screen to separate liquids and solids and promote transport of solids toward the downstream end of the screen has been applied for many years in a variety of screen designs used in the mining and wastewater treatment industries. Most of these screens utilize standard wedge-wire screen panels in

which the top surface of each wire is parallel to the plane of the complete screen. Coanda-effect screens are an evolution of this screen design utilizing a tilted-wire screen panel, and in recent years have been applied to problems of debris and fish screening at irrigation diversions and small hydropower intakes. One specific Coanda-effect screen configuration has been marketed under the trade name Aqua Shear Static Intake Screen by Aquadyne, Inc., Healdsburg, CA. Some aspects of this screen design are described in U.S. Patent 4,415,462 (Finch and Strong 1983).

The primary features of a Coanda-effect screen installation are illustrated in figure 1. The screen is installed on the downstream face of an overflow weir. Flow passes over the crest of the weir, across a solid acceleration plate, and then across the screen panel, which is constructed of wedge-wire with the wires oriented horizontally,

Coanda Water Intake

Basics

Introduction

The Coanda Intake is a self-cleaning type of water Intake. It uses a tilted wedge-wire screen partly down an Ogee-shaped slope (Fig 11). A solid acceleration plate forms the ogee slope above the screen and creates the high sweeping velocities necessary for self cleaning.

The simplest type of wedge-wire screen is flat wedge-wire (Fig 1). The wedge-shaped wires are welded onto backing rods below the screen.

The close spacing of the wires (slot opening) allows the fluid to pass while stopping solids. Depending on the slot opening, Coanda intakes will reliably screen out 1.0mm debris with minimal maintenance. Wedge wire screens are widely used in industry.

How they work

Figure 2 shows how a Wedge-wire screen will stop all particles larger than the slot opening. As the fluid passes through the screen, the slot opening gets larger (due to the wedge shape of the wires). Particles larger than the slot openings can have only two points of contact with the wedge-wires (Fig 2). The two points of contact combined with the inward-opening of the slots make it difficult for anything to get stuck.

Debris and screens

When screens are oriented flat, the screened-out debris will collect on top (Fig. 3). Although the screen openings would still not plug, the depth of debris would slow the flow of water through the screen.

Screen Slope

In order to keep the top area free from debris, the screens are installed on a slope (Fig. 4). Some of the water flows through the slot openings and some of the water sweeps debris down the screen. Coanda Intakes need minimum water-speeds across the screens for sweeping debris off.

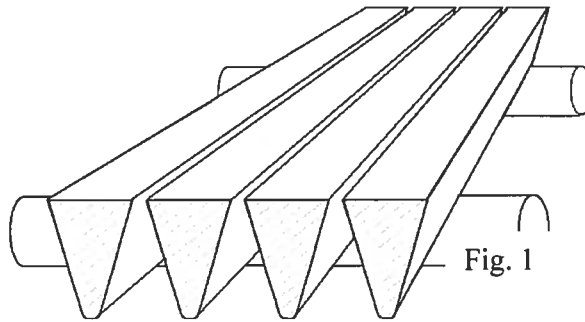


Fig. 1

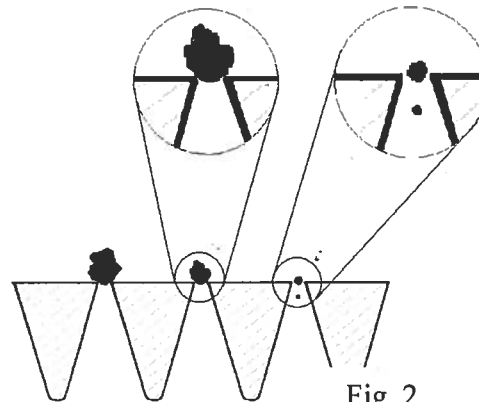


Fig. 2

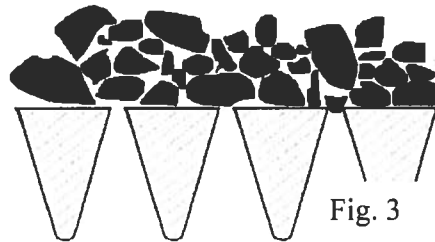


Fig. 3

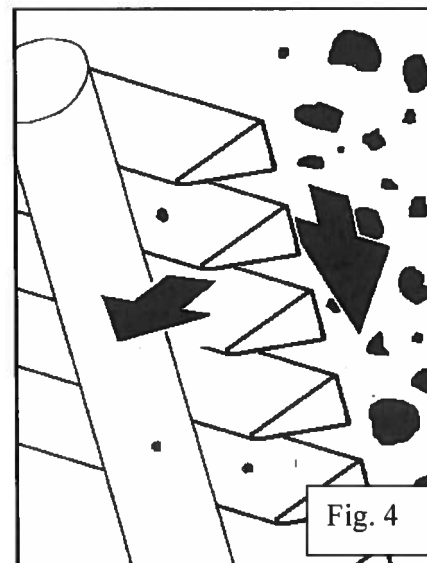


Fig. 4

Acceleration Plate

The acceleration plate drop (H_a) (Fig 5) creates the minimum water speeds needed for self cleaning. The acceleration plate is a solid smooth plate above the screen. The acceleration plate also smoothes the water and delivers the smooth, accelerated water to the screen at the correct angle.

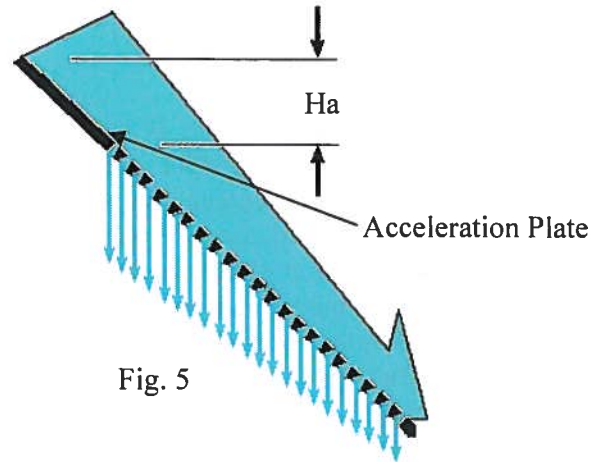


Fig. 5

Flat Wedge-wire

The wedge-wire screens shown thus far are Flat Wedge-wire. The weight (depth) of water above the screen pushes the water through the slot openings. This is called Orifice flow (Fig 6). When a flat wedge-wire screen is sloped to shed debris, the flow speed across the screen increases, and the orifice flow (through the screen) decreases. The high sweeping velocity Coanda intakes need for self cleaning results in less flow through the flat-wire screens.

Orifice Flow

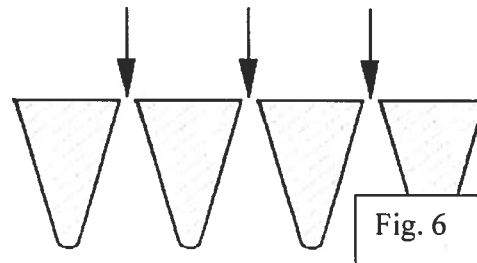


Fig. 6

Tilted Wedge wire

The solution for high velocities vs. screen flow, is to use Tilted Wedge-wire. Tilted Wedge-wire screens use the same wedge-shaped wires as flat screen. The difference is the tilt of each wire. The wires are welded to the backing rods on a tilt. The leading edge of each wedge-wire sticks up into the flow (Fig 7), and cuts a section of water above it (Fig 8). This is called Shearing flow. As the water speed across the screen increases, shearing flow (through the screen) also increases. Figure 8 shows the flow difference where water is flowing across the face of the two types of screen. This difference is much greater as the water speed increases across the screen face.

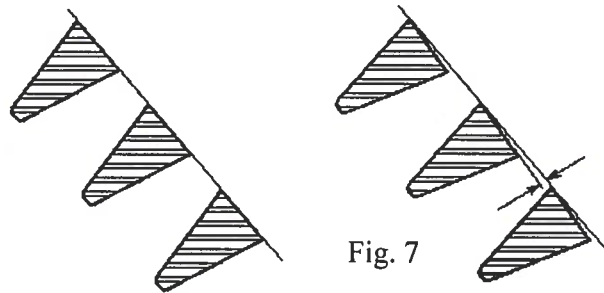


Fig. 7

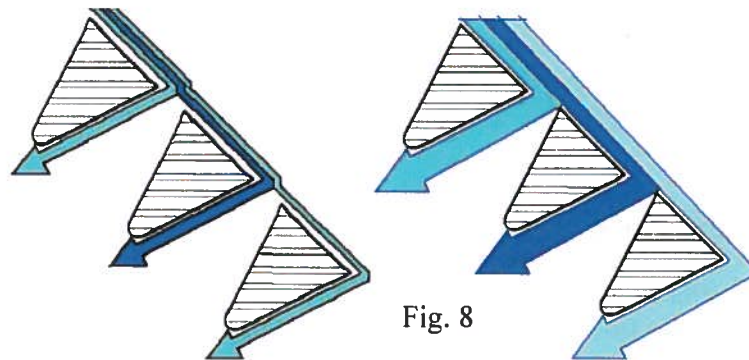


Fig. 8

For this reason, all Coanda Intakes use Tilted wedge-wire screens and high sweeping velocities across the face of the screens.

Water flow through the intake

Water flows through the tilt wire screen into a collection chamber underneath (Fig 9). The collection chamber flows into a stilling chamber (not shown) then into a pipe (penstock). The wedge-wire screen keeps debris above the screen and allows it to be swept downstream.

On most creeks and rivers the amount of debris in the water is minimal during low flow times. Larger amounts of debris occur during spring runoff or after heavy rains. At these times there is also excess water to sweep the debris off of the screens and carry it downstream.

Screen approach

A properly designed acceleration plate ensures that smooth water (at the appropriate speed) meets the screen at the correct angle. When the water reaches the screen with laminar flow and the correct minimum speed, screens will perform to their capacity.

Figure 10 shows an intake profile with flow problems. The paths onto and off the screen are sharp. The water flow is unstable, turbulent and the water misses the top screen section. Screen performance will suffer as a consequence of this design. The unstable water flow off the screen will also erode the stream bed below the intake.

A proper approach and exit is shown in Figure 11. The top of the front wall (weir) and the acceleration plate form a smooth approach onto a curved screen. As the water flows down the acceleration plate it becomes smooth and fast. The discharge water (off the bottom of the screen) is close to level. The acceleration plate drop and curvature are designed for the site conditions of the intake.

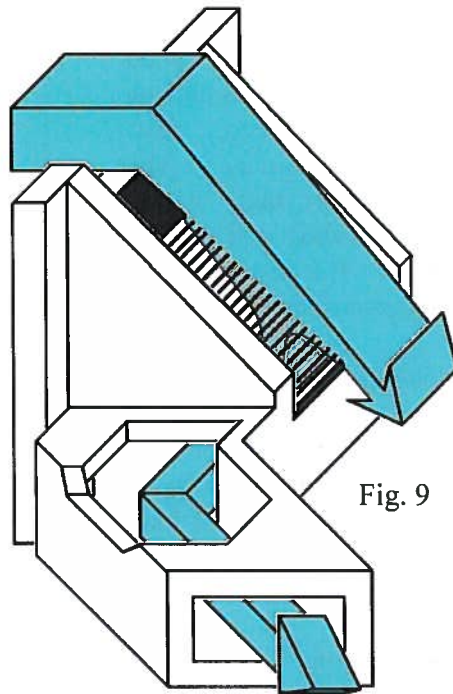


Fig. 9

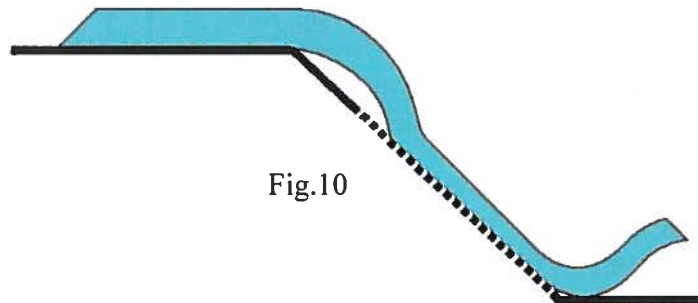


Fig.10

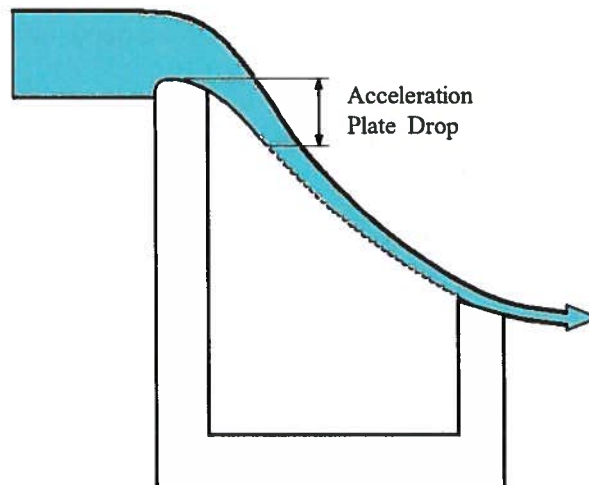
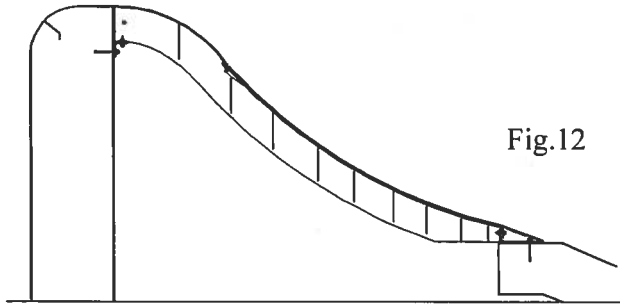


Fig.11

Site Design

Figure 12 shows a Coanda Intake design for a narrow site with deep, fast-flowing water. The acceleration plate has a longer radius and surface length. The screen has a longer surface length also.



Some intake sites have large boulders in the water during floods. The intakes designed for these locations use thicker metal for the construction, heavier screens, and bars welded to the top of the screens (as well as other features).

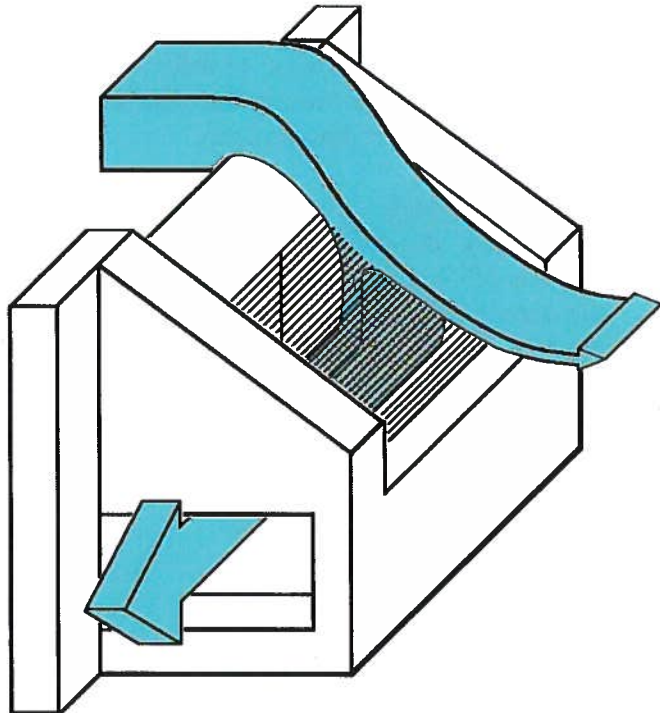
Conclusion

Coanda Intakes have been in operation for over 25 years. They are well proven to self clean using fine slot openings. The Coanda intake is a cost-effective, low-maintenance method of excluding fine debris at the intake itself.

Most Coanda intakes are custom designed for each site.

This pamphlet is a short introduction to the technology.

Please contact the author for more in-depth information.



Author

The author has worked on Coanda Intake design since 1998.

Stuart Douglass

Coanda Intakes, Ltd.

164 Bestwick Drive,

Kamloops B.C. Canada, V2C-1M8

Phone: 250-828-1110

Fax: 250-828-1133

Cell: 250-318-6050

stuard@coandaintakes.com

www.coandaintakes.com



From: Jerry Myers [JMyers@tu.org]
Sent: Monday, June 25, 2012 2:21 PM
To: Edl, Michele
Cc: Terry Myers; angela@haverfordgroup.com
Subject: Permit #75-14061
Attachments: GoogleEarth_Image.jpg; Coanda Screen diversion box.JPG; Canyon Turbine.JPG; Turbine shed & discharge.JPG; Tubine house valves.JPG; Power Water Right permit.pub

Hello Michelle

I am working on getting the information you requested, however, it appears a site visit would be the best way to document our turbine system. The design that NRCS supplied is hand drawn and incomplete. an actual "As Built" design does not exist but I could diagram the turbine plumbing if needed. You will find attached:

1) Google Earth Image

This shows the path of the buried pipe from the diversion in Indian Creek (north) to the Turbine Shed (south). The GPS location (taken from Google Earth Imagery) is the following;

The diversion point is located at 45 25' 50.34"N - 114 10' 01.46W. Elevation = 3827. The turbine is located at 45 25' 12.15"N 114 10' 01.46W. Elevation 3698.

2) Diversion Box

This photo shows the diversion box that was installed soon after the in channel infiltration gallery designed by NRCS failed. This box gathers our total water right for irrigation and for power and conveys the water right in a single pipe to the junction with the turbine and then continues approximately another two thousand feet to the lower end of our irrigation place of use.

There are no design drawings as I designed and installed it without NRCS assistance. The screen The original infiltration gallery was abandoned and left buried in channel below scour depth.

3) Canyon Turbine

This shows the Canyon Turbine Model #751-2 Pelton and the coupled Marathon generator Model #282 PDL 1503. You can also see a pressure gauge installed inline at the pelton headway. Since the irrigation and power water is conjoined in a single pipe, my operating head pressure is 42 psi up to 52 psi depending on the number of irrigation sprinklers I have in operation. At full psi delivered to the turbine head (52 psi through a 1" pelton nozzle) my power water use is approximately 160 to 170 gpm.

4) Turbine shed

This photo shows the exterior of the turbine shed and the discharge flow (my dog is standing in it) from the turbine housing after the flow leaves the Pelton housing. Indian Creek is in the background.

5) Turbine valves

The photo shows the gate valve to the turbine head so that the turbine can be shut off while the irrigation line stays open. We can also shut the irrigation line off and still operate the turbine (see the second gate valve to right). A red based spring valve is the pressure release to avoid water hammer damage to the piping and turbine.

6) Permit to Appropriate Water

Our permit for 0.38 cfs. Priority - 02/13/2002

I'll keep working as time permits on the "As Built" diagrams but I do think a site visit may help get this taken care of.

Thanks for the help.

Jerry

Jerry Myers
Upper Salmon Project Manager
Trout Unlimited

(208) 394-2111
jmyers@tu.org

"Quit wishin, go fishin."

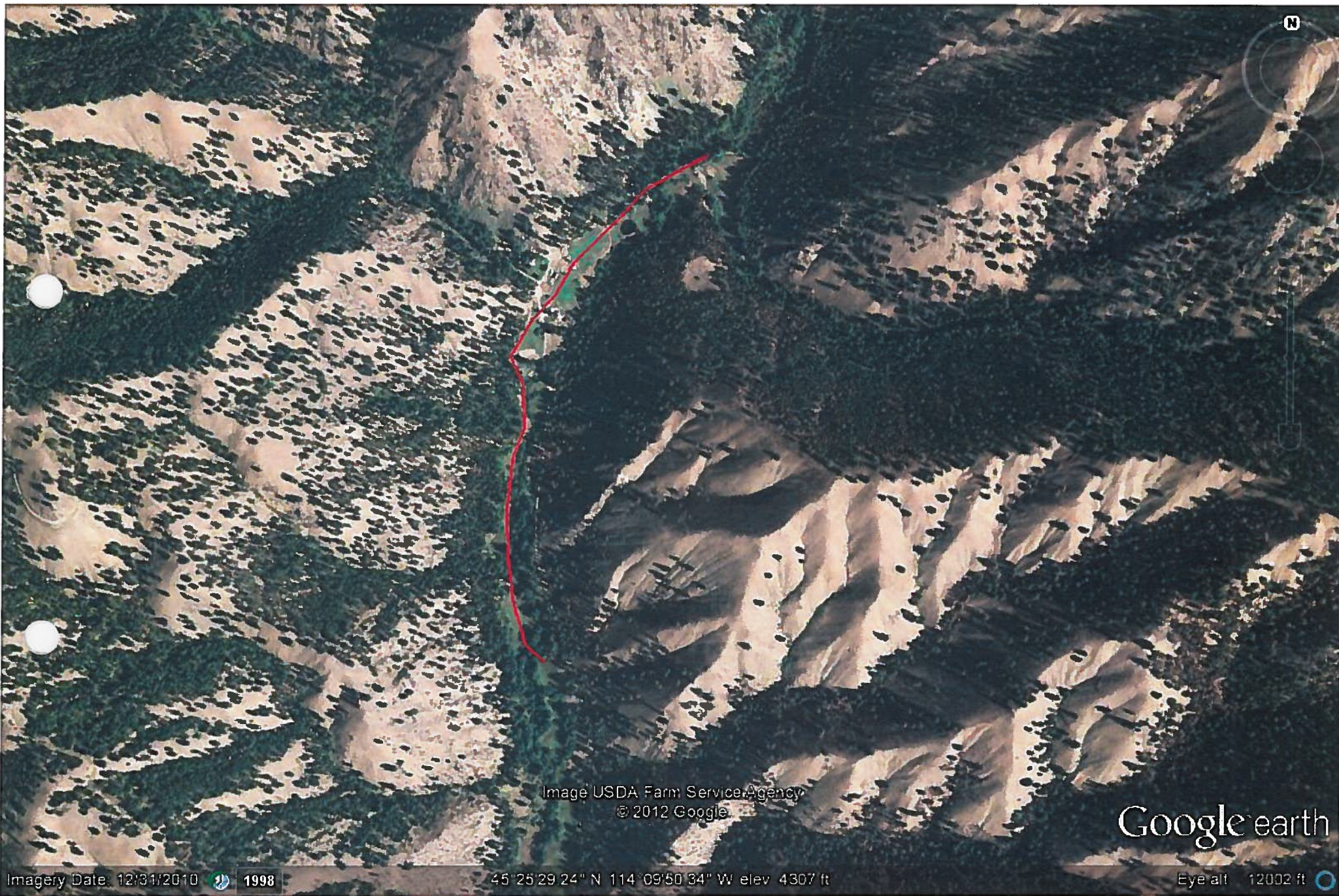


Image USDA Farm Service Agency
© 2012 Google

Google earth

Imagery Date: 12/31/2010  1998

45°25'29.24" N 114°09'50.34" W elev 4307 ft

Eye alt 12002 ft 

Coanda Screen diversion box, JPR





Canyon Turbine, JFG



Turbine shed & discharge. JPG



Turbine house valves. JFG

From: Edl, Michele
Sent: Wednesday, June 13, 2012 1:21 PM
To: 'JNTMyers@gmail.com'
Subject: permit 75-14061

Mr. Myers,

Thank you for agreeing to assist me with collecting the information that I need for licensing of water right permit 75-14061.

I understand that the diversion is different than the NRCS design and therefore it may be different than was authorized by this permit. Most differences can be corrected by amending the permit to match the actual development. But they could make a field visit necessary.

So that you and I can more easily discuss the differences, we need to be looking at the same information. Do you have a copy of permit 75-14061 and of the attachments that were submitted with that application for permit? If not, IDWR has scanned these documents and made them available for viewing from our website and I would be happy to guide through the steps to viewing them online.

I have attached a jpg which is a computer screen shot of the area showing 2011 aerial photography overlaid by PLSS address labels: township, range, section and quarter-quarter. Permit 75-14061 authorized the place-of-use (the powerhouse) located in the SW quarter of the SE quarter (SWSE) and the point of diversion located in the NENE. I had expected that the NRCS would have taken GPS coordinates for either or both of those locations. If you have GPS coordinates for those locations, great! If not, we can confer over this photo and place them.

From the permit application documents, I understood that the same diversion and distribution piping would serve both the hydropower permit 75-14061 and an existing decreed water right 75-4379C in the name of Patrick J Farrell Jr. for irrigation use. Is that still true? I need a cradle-to-grave schematic of the water path through the systems. The file sketch would be a good starting point for that schematic. I understand that the penstock-irrigation pipeline is buried as was expected and resembles the design submitted with the permit application.

Confirmation of the turbine capability may be the easiest part of this information request. I expect that the turbine-generator is an inline turgo or pelton wheel type, that the system is battery based, with an inverter and a "dump" load and that it provides the power to the ranch buildings. You said you could provide me with the specs for the turbine and photos of the installation. I would welcome them.

One condition of the permit required installation of measuring device to determine the instantaneous flow. A turbine could be considered a measuring device. Is there another mechanism for measuring the flow? And can you provide me companion readings of flow and watts?

Another condition of the permit required compliance with IDF&G fish screening requirements. As a member of Trout Unlimited, I expect that you are more familiar with the requirements in this reach of the river and creek than I am. Can you provide me with the diversion design specs or other documentation which would confirm compliance with that condition?

With that we have come full circle and are back to the point-of-diversion. The reconstructed diversion for this system is the big unknown. I am hoping that the documentation I request in the paragraphs above will answer all my questions.

Sincerely,

Michele Edl



75-14061.jpg