

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 36-15959
Exam Date: 12/15/2011

1. Current Owner: IDAHO WATER RESOURCE BOARD
PO BOX 83720
BOISE ID 83720-0098
(208)287-4800

2. Accompanied by:

Phone No:

Address:

Relationship to Permit Holder:

3. SOURCE

WARM CREEK

TRIBUTARY

SNAKE RIVER

B. OVERLAP REVIEW

1. Other water rights with the same place of use: none
2. Other water rights with the same point of diversion: 36-15378, dam at lower settling pond is also impoundment for power production.

C. DIVERSION AND DELIVERY SYSTEM

1. LOCATION OF POINT(S) OF DIVERSION:

WARM CREEK

L13 SW1/4SE1/4

Sec. 19, Twp 09S, Rge 17E, B.M.

JEROME County

Method of Determination: aerial photography

2.

PLACE OF USE: POWER

Twp	Rge	Sec	NE				NW				SW				SE				
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	Totals
09S	17E	19															X		
																	L 13		

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$$
$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 =$$
$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} =$$

2. Volume Calculations for Other Uses:

G. NARRATIVE/REMARKS/COMMENTS

Permit authorizes power production from lower Warm Creek. This plant diverts all flows entering Pristine Springs, flows from the Sunnybrook Spring complex, and any springs which arise in the settling pond. The penstock exits the lower end of the final settling pond, and discharges directly into the Snake River. The on-stream impoundment above the power plant is licensed under 36-15378 for aesthetic and water quality improvement storage at Pristine Springs. The design of this plant is low-head and unconventional; due to fluctuating river flows a single operational curve is not available. A theoretical formula representing maximum diversions at low river stage has been developed and used for licensing.

There is no measurement device. Because of the flow computation made by IDWR staff, the measurement condition has technically been met. As there is no suitable location for a device above the power plant, I suggest the measurement requirement should be waived.

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	216.00 CFS	
<u>Totals:</u>		216.00 CFS	

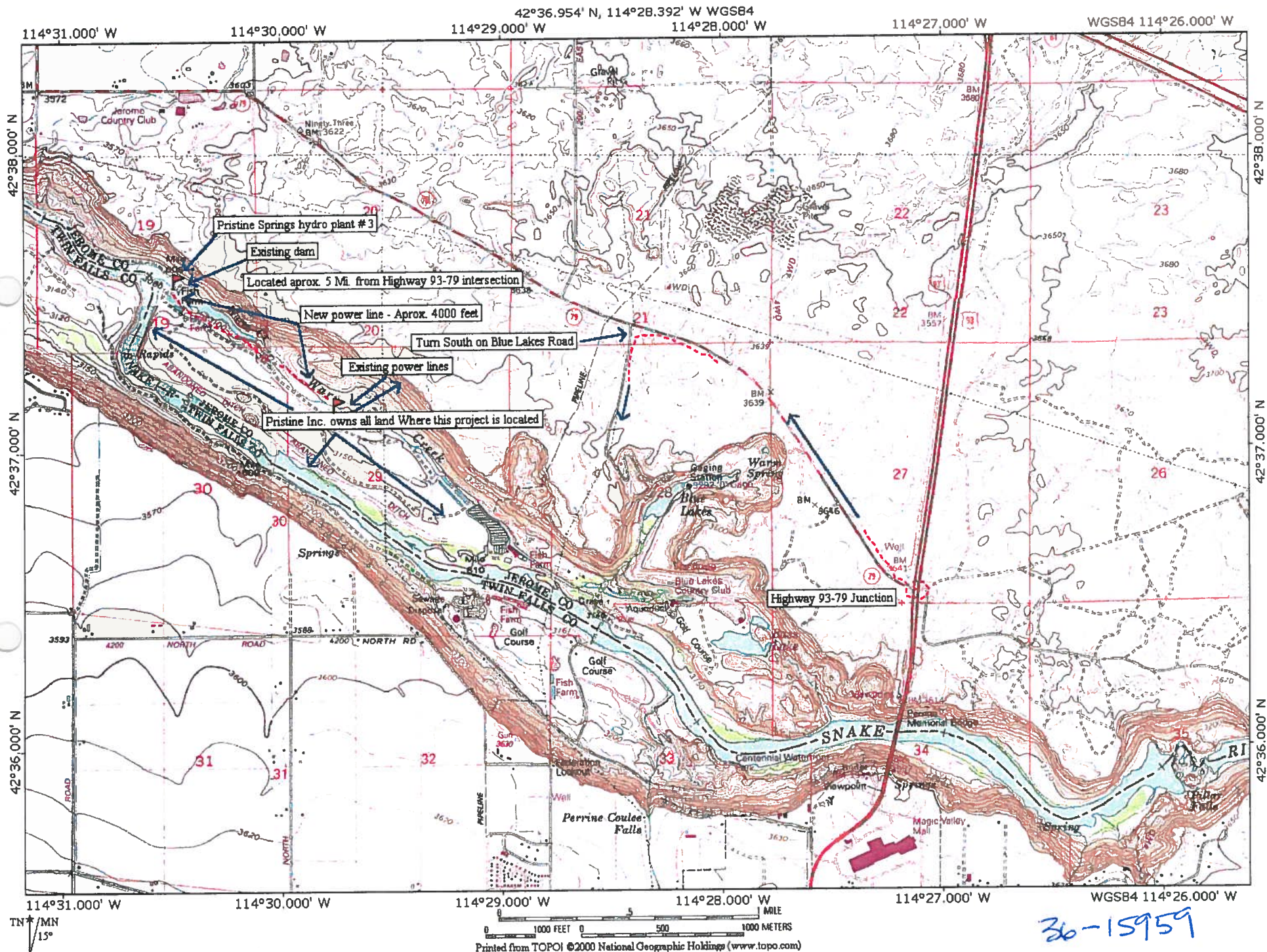
2. Recommended Amendments

☐ 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 Cyenter Date 2.25.2014
Reviewer _____ Date _____

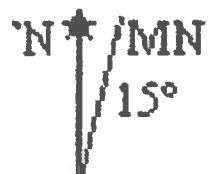


36-15959

36-15959

36-1595-9

42°38,000' N

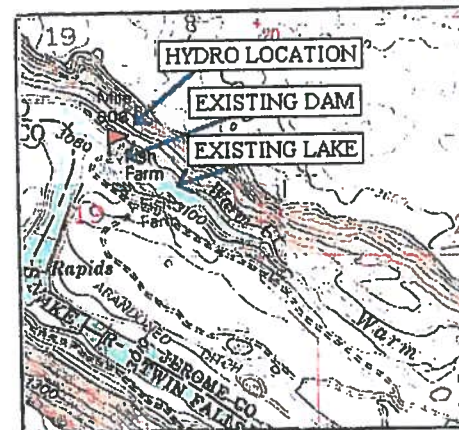


36-15959

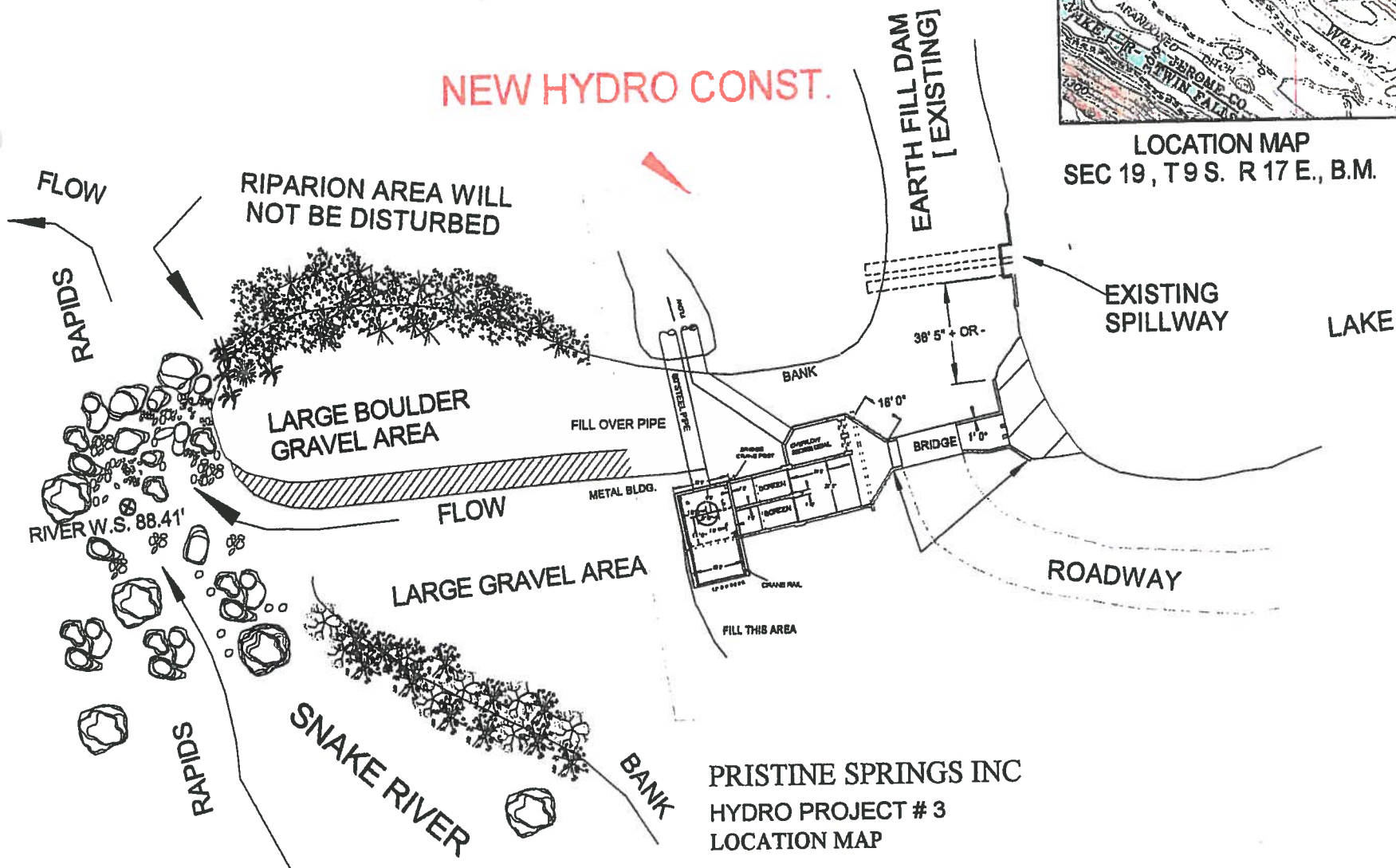
Printed from TROPIC @2000 National Geographic Holdings (www.national-geo.com)



NEW HYDRO CONST.



LOCATION MAP
SEC 19, T9 S. R 17 E., B.M.

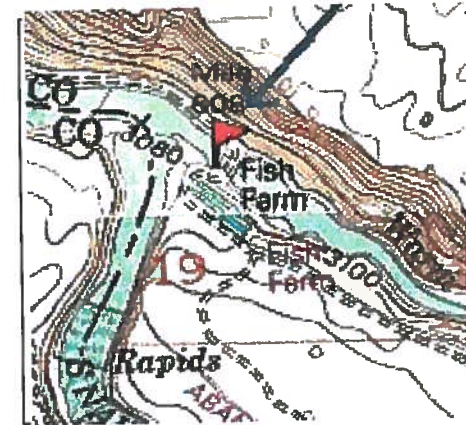


PRISTINE SPRINGS INC
HYDRO PROJECT # 3
LOCATION MAP

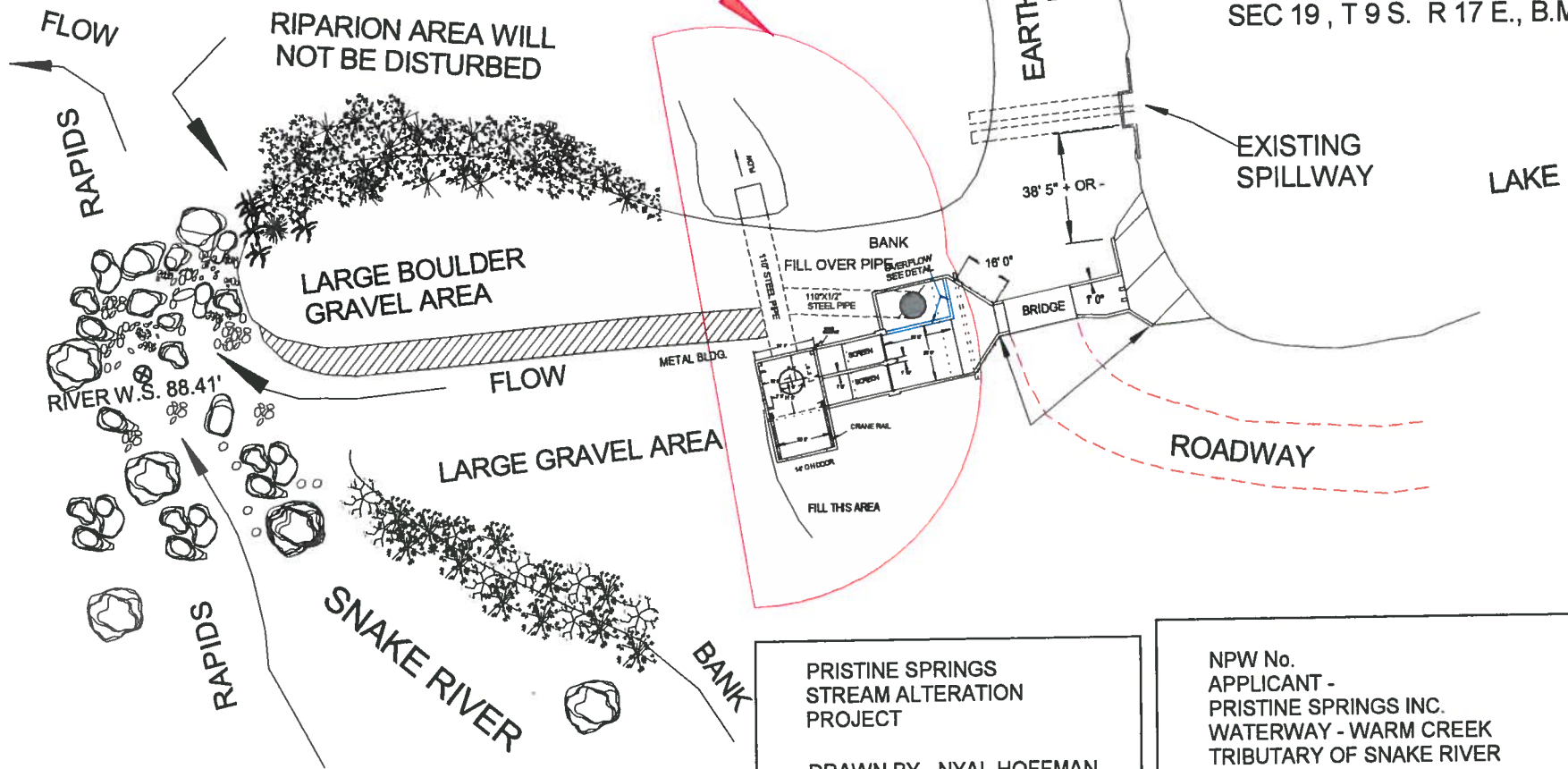
PLOT PLAN OF PROJECT
IN RESPECT TO EXISTING
FACILITIES AND AREA.

36-15959

NEW HYDRO CONST.



LOCATION MAP
SEC 19, T 9 S. R 17 E., B.M.



PRISTINE SPRINGS
STREAM ALTERATION
PROJECT

DRAWN BY - NYAL HOFFMAN
SCALE 1" = 720'
11 / 18 / 01

NPW No.
APPLICANT -
PRISTINE SPRINGS INC.
WATERWAY - WARM CREEK
TRIBUTARY OF SNAKE RIVER
JEROME COUNTY, IDAHO
~~Sheet No. 2 of 3~~

56-15457

Yenter, Cindy

From: Edl, Michele
Sent: Wednesday, January 22, 2014 11:02 AM
To: Yenter, Cindy
Subject: term date for Pristine Springs hydros

Cindy,

I am doing some follow-up today. In our last meeting with Southern, I think I promised to verify that the sales agreement should be used for the term and that the agreement is visible to you. Although only the downstream hydro, Pristine Springs Hydro #3, is the target of the sales agreement, I would use the term date of that agreement for both hydros. My thought is that the two hydros are connected. The water used by the upstream hydro appears at the downstream hydro.

I located the scanned agreement. It's been profiled under my rate and volume memo for 36-15959. The sales agreement has a 10 year term, (see item 5.1 on p. 6 of the agreement). The agreement was signed and made effective on February 18, 2005. Therefore the term date for both licenses should be February 18, 2015.

Michele

December 17, 2013

Pristine Springs Development Timeline
Cindy Yenter, Watermaster WD130

This narrative supplements an earlier Water Right Overlap Analysis dated 10.23.2002, and describes the sequential development of rights at Pristine Springs.

36-2603C. Priority 4.17.1964, 25.3 cfs, Decreed 1998. This is a split from 36-2603B also resulting in right no 36-2603D. This portion of the right is diverted from Alpheus Creek (aka Warm Creek) at a shared diversion with Blue Lakes Trout (BLT). A 1958 right no 36-2356 in the amount of 100 cfs had already been developed by BLT and was also being diverted and used at the time. Combined flows under the three rights originally travelled down an open ditch and later a closed pipeline to just above the BLT raceways where they were separated; 25.3 cfs fresh water was bypassed around BLT and delivered directly to Pristine where it was used in the first set of ponds, and later in developed raceways, named "ABC". The 25.3 cfs was discharged into the Warm Creek channel in Lot 14 Section 29. USGS topo maps show the original location of the Warm Creek channel to the north of the ABC raceways. It is unclear where the BLT effluent was being discharged during this period, but there is an abandoned ditch which runs along the south side of the Pristine property which may have been the BLT waste ditch. Based on comments found in 36-200, BLT effluent was not discharged to Warm Creek until after 1970 or so.

36-2603D. Priority 4.17.1964, 1.9 cfs, Decreed 1997. This split of 36-2603B is diverted from Sunnybrook Springs and used in a hatchery building. The Sunnybrook complex consists of a number of springs emanating from the canyon wall and collecting in Warm Creek beginning approximately ½ mile below the ABC raceways.

36-7130. Priority 5.6.1970, 4.5 cfs, Decreed 1998, geothermal ground water. Originally licensed for 6.0 cfs, the license was reduced to 4.5 cfs as a result of a settlement in the Twin Falls moratorium area. The right was obtained to raise catfish in ponds, although raceways were later constructed. These raceways are now known as "Big C". These flows were also discharged to Warm Creek.

36-200. Priority 9.30.1970, 40 cfs from Sunnybrook Springs and Warm Creek. File comments indicate that the source of water for this right is the 25.3 cfs waste water from 36-2603C, 4.5 cfs waste runoff from the hot well, and 1.9 cfs waste water from 36-2603D, plus other springs arising in the Sunnybrook complex. This seems to infer that there was not any other flow in Warm Creek at the time.

36-15378. Priority 10.27.1977, Decreed 1998. Storage for an on-stream impoundment on Warm Creek. Diversions under 36-200 and re-diversions under 36-7757 are taken at various points in the impound area.

36-7757. Priority 10.27.1977. Permit was protested and not approved until 1991. By this time the application had been amended twice to change both pod and pou. New raceways on the west end of the property had been included in the pou. Raceway blocks DEFG and IJK appear on aerial photography shortly after 1991, and both receive water under the permit. This permit authorized up to 215 cfs diversion of Alpheus Creek flow, diverted as effluent or waste water only at the discharge of Blue Lakes Trout Farm (BLT). Prior to 1977, BLT developed two additional rights from Alpheus Creek, thus increasing their discharges. The discharge channel from BLT was re-routed so flows could be

diverted at Pristine just past the property line. Waste flows were delivered first to the Big C raceways, then discharged into Warm Creek. BLT effluent in excess of that used in Big C raceways is bypassed around the Big C raceways in a 42" pipe and discharged to Warm Creek. The Warm Creek channel below ABC and Big C raceways was enlarged to form the Pristine Main Canal. Waste flows in the Pristine canal travel northwesterly through the property for approximately 0.3 mile. An old ditch appeared to delivered water to the DEFG raceways situated on the south side of Warm Creek; that ditch has since been replaced with a 42" pipe. The balance of the water in the canal is injected into the original Warm Creek channel and commingled with the spring flows in the Sunnybrook complex. Commingled water is rediverted at two additional locations from the Sunnybrook impound. All discharge from lower raceways enters a large settling pond at the lower (west end of the property)

36-8094. Priority 6.28.1982. Permit was not approved until 1992. Authorizes geothermal ground water for power production. Permitted for 7 cfs, but diversions are limited by beneficial use for heat value. The only right developed for that purpose from this source is 36-7130 so licensing under this right limits diversions to 4.56 cfs, which recognizes fish propagation use of 4.5 cfs under 36-7130 and 0.6 cfs domestic use added to 36-8094 under license amendment.

36-8414. Priority 3.7.1989. Permit seeks an additional 20 cfs from Sunnybrook Springs for fish propagation. The intent behind this permit may have been to appropriate some of the waste water injected into Warm Creek from 36-7757 to cover diversions to lower raceways. However, the Springs and not Warm Creek are listed as the source. This amount of water is simply not available from the springs proper and there is no evidence that additional beneficial use was made from this source above that authorized under 36-200.

36-8573. Priority 12.21.1990. Permit authorizes diversion of waste water for water quality improvement purposes, in the form of land application for irrigation. Water is pumped at two sludge separation stations located below the upper and lower sets of raceways, into pivots and large stationary water canons. Sludge liquids are mixed with waste water directly from the raceways to provide adequate dilution and flow. Water is land applied to approximately 150 acres of pasture. In winter when irrigation is not occurring, pumps are used to move sludge liquids to a small settling pond at the lower end of the property.

36-15959. Priority 10.18.2001. Authorizes power production from lower Warm Creek. This plant diverts all flows entering Pristine Springs, flows from the Sunnybrook Spring complex, and any springs which arise in the settling pond. The penstock exits the lower end of the final settling pond, and discharges directly into the Snake River. The design of this plant is low-head and unconventional; due to fluctuating river flows a single operational curve is not available. IDWR was able to develop a theoretical curve for maximum diversions.

In 2003, a transfer was filed on 36-7130, expanding the pou of the geothermal ground water right for fish propagation to include the DEFG raceways on the northwest end of the property. However, after transfer approval the owners used the warm water strictly in raceways DEFG and the brood ponds in Lot 10 Sec 29. This moved the discharge point of the warm water from just below the Big C raceways, to lower Warm Creek below the Sunnybrook area, and shifted the distribution of flows under 36-7757 so that nearly all of the reused flow was being injected into Warm Creek and only 5-7 cfs was being diverted to DEFG as cooling water.

**PRISTINE SPRINGS DESCRIPTION OF DIVERSION WORKS
AND SUMMARY OF WATER RIGHT OVERLAPS
October 23, 2002**

Cindy Yenter, Sr. Water Resource Agent, Watermaster Water District 130

Partial licensing examinations have been conducted for permit nos. 36-8094, 36-8573, 36-7757 and 36-8414. This summary has been prepared to supplement the eventual license recommendations and also to aid in the processing of an application for transfer filed pursuant to water right no. 36-7130.

Facility Overview

Pristine Springs Inc operates an aquaculture facility and a hydropower generation plant in the Snake River Canyon in Jerome County. Both trout and warm-water tilapia are raised. Power generated is used at the Sunnybrook Hatchery and sold back to Idaho Power under terms of Pristine's FERC license. The sources of water are Alpheus Creek, Warm Creek, Sunnybrook Springs, geothermal ground water from an on-site well, and waste water from their facility and from Blue Lakes Trout, immediately upstream on Alpheus Creek. A land application system is used to spread solid waste from raceways.

Diversion Works and Measuring Devices (Current Configuration)

There are two primary diversions into the upper end of the facility. The first diversion is a pipeline which conveys first-priority Alpheus Creek water from the Blue Lakes Trout (BLT) pipeline directly into the Pristine ABC raceways. The Blue Lakes Trout facility is situated directly above Pristine Springs on the Alpheus drainage. Total flows in the pipeline are measured at the BLT diversion point over a 14-foot broad-crested weir. Flows to Pristine, amounting to 25.3 cfs under 36-3603C, are rediverted to a 6" pipeline just above the BLT raceways. Rediverted flows are measured through a submerged orifice installed in the 6" pipeline. Discharge from the ABC raceways is also measured over a 16' rectangular weir.

The second and largest upper diversion is a canal which captures tailwater from BLT. Flows in the canal are entirely derived from Alpheus Creek waters which have been diverted and used by BLT. A portion of the canal flow is taken into the Pristine Big C raceways, and the balance is diverted around the raceways in a 42" bypass pipeline. The Big C raceway discharge is measured over a 20' rectangular contracted weir. A weir at the head of the bypass pipeline is not functional due to submergence. Bypassed flows return to an exit canal below the Big C weir, joining discharges from the ABC raceways.

Note: Total flows measured over the BLT weir include both the Pristine first-priority and the BLT second-priority rights from Alpheus Creek. The Pristine first-priority amount is subtracted from the total to determine the BLT net diversion, which is also the amount delivered to the Pristine main canal. Total flows in the canal below the ABC discharge should equal the initial flow measured over the BLT weir.

The exit canal conveys all discharged and bypassed flows from the upper raceways to a point just above the Sunnybrook Hatchery, at the confluence with the old Warm Creek channel, where flows are again split. A portion of flows are diverted into a small impoundment on the Warm Creek drainage, below the Sunnybrook Hatchery. The remainder are placed in a 42"

pipeline and sent to lower raceways. There are no measuring devices at this divergence, although there is a control gate.

Cold water from the canal pipeline is mixed with hot water from the geothermal well and used at the DEFG raceways, situated south of the Warm Creek channel. Flows from the well are conveyed in a 21" pipeline to the main mixing box. The mixing box serves raceways DEFG, a hatch house and spawning ponds. It also receives recirculated warm water from below the raceways and is used to balance and maintain accurate temperature in the warm water raceways. The balance of the cold water goes to cold-water raceways in the same block. At present, 2 raceway runs are used for cold-water rearing, and 8 runs are used for warm-water rearing. Recycled flows are returned to the mixing box with 3, 20hp and 1, 10hp turbine pumps located at the end of the warm raceways and below the spawning ponds. All discharged flows from DEFG are sent to an upper settling pond (above and to the south of the Warm Creek channel), then into a lower settling pond on Warm Creek, and finally into the Snake River. There are no measuring devices at the DEFG raceways.

At the Sunnybrook Hatchery, the flows of Sunnybrook Spring are diverted via pipeline directly into the hatchery building. Discharge from the hatchery building is measured over an 8' rectangular weir and into the impoundment on Warm Creek, joining the waste flows from the upper hatchery. Also collected here are seeps and overflow from Sunnybrook springs which are not used in the hatchery. Flows below Sunnybrook are diverted into a canal leading to the IJK raceways situated north of the Warm Creek channel. Discharges from the IJK raceways occur at three locations into lower Warm Creek, where they flow into the lower settling pond and then into the Snake River. There are no measuring devices at the IJK raceways or in the diversion canal.

The geothermal flowing well at Pristine is equipped with an impeller-type Aquamaster in-line flowmeter, installed in the 12" discharge line from the well. The flowmeter was calibrated by IDWR on 11-14-2001 and found to be operating within $\pm 5\%$ of a standard polysonic meter. Geothermal flows are sent through a horizontal turbine generator prior to being used for fish propagation.

Solid waste from all raceways is pumped to one of two on-site sludge processing stations, situated below the Big C raceways, and below the DEFG raceways. A small amount of tailwater also flows through the sludge stations to help convey the waste to holding sites. During the irrigation season, solid waste is mixed with waste water and land-applied to pasture lands owned by Pristine. Land-applied flows are delivered using a 50hp turbine pump (at upper station) and 60hp turbine pump (at lower station) through pressurized mainline to solid-set or hand line sprinklers.

Water Right Overlap Analysis and Licensing Recommendations

Alpheus Creek

36-2603C is decreed for 25.3 cfs. This is the first-priority diversion on Alpheus Creek used directly in the ABC raceways in Lot 14 (SWNE) Sec 29. It may be measured in two locations: at the bypass orifice at BLT and at the ABC discharge weir. Historically, discharges appear to have been made directly to Warm Creek and were picked up below Sunnybrook under other rights (see below). This is still occurring, except discharges are now commingled with later in time flows, and first travel down a canal before reaching Warm Creek at the Sunnybrook facility. On the day of the exam, the discharge weir indicated a flow of 27.1 cfs.

Permit 36-7757 authorizes diversions of up to 215 cfs which are limited to the diversion of tailwater from Blue Lakes Trout. Diversions may be measured at the BLT weir (total flow minus first-priority bypass). It has been requested that the BLT weir be used as the primary measuring device for this right, and that should be acceptable provided that all of the diversions at Blue Lakes Trout are entirely from Alpheus Creek. POU under this right is shown at Big C raceways in Lot 14, and also in Lot 11. Secondary uses below Big C are actually at DEFG raceways, or in return flows to Warm Creek. There can be no specific use attributed to IJK raceways because the contribution to Warm Creek is not quantified. There is no use in Lot 11. The DEFG raceways are not included in the place of use of this permit and will be recommended to be added through licensing amendment. The highest recorded flow through the BLT raceways in 2000 was 209 cfs. Data from 2001 are incomplete because the measuring device was under reconstruction.

Sunnybrook Springs and Warm Creek

Warm Creek is a dry channel which only flows below Sunnybrook springs due to the influx from the springs, and return flows from the Pristine Canal.

Decreed right 36-2603D, 1.9 cfs, is diverted directly from Sunnybrook Springs and is used in the Sunnybrook hatchery building. The original location of this hatchery may have been in Lot 11. Its present location is in Lot 9 (NENW) Section 29.

Decreed right 36-200, 40 cfs, lists springs and Warm Creek as a source. Its POU is listed and shown as the Sunnybrook hatchery in Lot 9, raceways IJK in Lot 10 (NWNW) Sec 29 and Lot 4 (SWSW) Sec 20, and raceways DEFG in Lot 8 (NENE) Section 30, although flows from this source do not reach the DEFG block.

Permit 36-8414, 20 cfs, from Sunnybrook Springs, includes places of use for Sunnybrook Hatchery and IJK raceways. Flows from Sunnybrook Springs are not diverted directly to IJK. Rather, flows tributary to Warm Creek, including Sunnybrook Springs and the returned flows from Alpheus Ck, are diverted to IJK. Flows under this right are not really needed in the Sunnybrook hatchery, as the maximum reported flows over the Sunnybrook weir are around 8 or 9 cfs, and the earlier rights cover that amount. However, they may be needed to cover maximum diversions at IJK. Possible licensing amendments may include modifying the water source to Warm Creek.

Recommended right 36-15378, 748 acre-feet. This right is for the impounded flows in the settling pond on lower Warm Creek.

Flows from this complex are measured only over the Sunnybrook hatchery weir. Incoming return flows from the Alpheus canal are not measured. There is no device on the canal to IJK raceways. On the day of the exam, the Sunnybrook weir indicated a flow of 9.44 cfs.

Ground Water

Decreed right 36-7130, 4.5 cfs for fish propagation. POD and POU shown in Lot 14 (SWNE) Sec 29, also the location of the Big C raceways. Historical use of this right was in an earthen pond also in this location (*see Affidavit of Wendell Stark, attached*). However, present use is only in the DEFG raceways in Lot 10 (NENE) Sec 30. A transfer is pending to add Lot 10 as a place of use under this right.

Permit 36-8094, 7.0 cfs for power production. A condition of use on this permit limits diversions for power to the amount which may be beneficially used for the heat value of the water. POD and POU are incorrectly shown on permit as in NWNE Sec 29 and must be amended.

Claim 36-15218 for aesthetic storage was disallowed.

Waste Water

Permit 36-8573, 4.0 cfs for water quality improvement, through land application of fish waste. A license exam has not been conducted for this permit.
Claim 36-15336 was disallowed.

ALPHEUS CREEK
DIVERSION

UPPER SYSTEM

OFFICE
BLUE LAKES
TROUT

FRESH WATER
BYPASS (25.3 42)
Settling Pond
WEIR (Submerged)
42" BYPASS LINE

ABC
Receivings

Big C
Receivings

W
HOT
WELL

Sludge
P

WEIR

WEIR

IRRIGATION
PUMP

*
DEVICE
READ

LOWER
SYSTEM

ALPHEUS
BYPASS

SUNNYBROOK
HATCHERY

WEIR

* Sunnybrook
flows cannot be
diverted to
DEFG.

RECIRC

Hot
Hse

Ⓟ

Receivings
DEFG

Ⓟ

MIXING
BOX

HOT
COLD

JK
CANAL

*
DEVICE
READ

JK
Receivings

Sludge
P

IRRIGATION
PUMP

Settling

Settling

TO SNAKE RIVER (VIA HYDRO PLANT)

PRISTINE
SPRINGS

Distribution
System
Schematic
(NOT TO SCALE)

C. J. J. J.
5-11-04

MEMORANDUM

Date: November 13, 2013
To: Water Right File 36-15959
From: Michele Edl
Re: rate and volume recommendations

Background

I have been asked to contribute to the licensing of the permits associated with the Pristine Springs Inc complex by recommending rate and volume for one of two hydroelectric plants sited on the property.

In 2012, I was asked to locate and provide data which confirmed that power was generated during the development period of both of the hydro-power projects. As a result of filling that request, I found that the two hydro projects were attached to Idaho Power Company's grid and under Idaho Public Utilities Commission jurisdiction. The hydroelectric project developed under this permit, (36-15959) is the lower, downstream power plant.

Idaho Power Company identifies it as Pristine Springs Hydro #3 (31415165).
FERC identifies it as conduit, exempt project # P-12144.

Method options

The rate of water beneficially used for power is intimately tied to the capacity of the turbine. The best confirmation of a beneficial flow rate for hydropower use is the maximum turbine discharge that accompanies power generation. That maximum discharge does not necessarily occur at peak generation.

When turbine discharge flow rates and companion generation are unknown, then a second-best method can be used. The method recognizes that the design hydraulic capacity of a turbine will provide a reasonable basis for the maximum rate for a license. The design flow and other specifications are often displayed on the turbine nameplate. However, if the turbine was not designed for the specific setting wherein it is found, then additional nameplate or design information must be obtained. Nameplate elevation and generation information must be collected and compared with the actual conditions of the site.

If information for either of the above methods is unavailable, then the flow can be estimated from the equation $P = Q \times H \times e / 11.81$. Rearranged to solve for Q, the equation is $Q = (P \times 11.81) / (H \times e)$ where:

Q is flowrate in cfs
P is power in kW
H is elevation change (often called head) in ft
e is efficiency in decimal format
11.81 is a constant of conversion

To avoid simultaneously solving four equations for the four unknowns, at least two of the parameters should be known or measured and e can be estimated.

The available contents of this water right file were insufficient to make a rate determination through any of the above methods. Additional information was required.

Information search

I discussed the information needed and reviewed the project data and photos that had already been collected by planning bureau staff.

I found that the headwater pool of this hydro-project was also the impoundment behind a dam under the jurisdiction of IDWR's Dam Safety Section. I reviewed the information available in the dam safety file for this project.

Unfortunately, the routine FERC inspections were not part of any of the Department's files and not available to the public from their website. I solicited and received CEII (Critical Energy Infrastructure Information) documents related to this project from FERC personnel. In addition to copies of FERC inspection reports, I received as-built plans.

Because the upstream aquaculture complex requires water quality monitoring, I discussed the water quality monitoring requirements with IDEQ personnel.

I discussed the turbine-generator set with the current manager of the Pristine Hydro #3 project (Scott Kastor, of Hydro Plus). Mr. Kastor provided me the turbine type and size.

Finally, I researched the internet to find specs for the turbine.

Results

Operation records

A single, turbine-generator set was installed and has been producing electricity at this facility since August 2003.

No turbine discharge-generation relationship is being used by current operators to identify atypical or unexpected operations. The available operator's logs have primarily tracked forced outages, shut-downs and similar incidents.

Power generation

Routine submittals of generation data is typically required by power sales contracts with Idaho Power Company. Although historical data is available, the data is in monthly time-steps and is not granular enough to compare with any available instantaneous or daily flow records.

Limited analysis of generation data from 2003 – 2005 indicates that the generator was not delivering the generation authorized by the FERC exemption. The FERC order which granted this project an exemption from licensing, expected that a new, 500-kW, turbine-generator unit would be installed. Instead, the installed turbine and generator are used. The as-built plans made available through FERC show a 250 Hp generator. (250 Hp = 186,500 Watts.) But to be consistent with the monthly generation records obtained from Idaho Power Company, it is likely that this turbine-generator set is capable of 200 kW.

The FERC inspections did not report a consistent generation capacity for this facility. But I did not pursue equipment specs for the generator.

Head

The spillway of Pristine Springs Dam (NID # ID00692) was modified and repurposed in 2002 to function as the intake to the Pristine Springs Hydro #3 powerhouse. The headwater pool of this hydro-project is the water impounded behind this dam.

Corey Skinner (IDWR Dam Safety section) provided surveys of the dam and the spillway/intake works which were measured as part of a dam safety inspection. In the 2003 survey, the total gross head was measured at 15.54 feet. This is the vertical distance from the top of the discharge pipe to the top of the overflow wall which surrounds the north and west sides of powerhouse. Some head would be lost due to friction developed at the wicket gate entrance to the turbine, so the effective head available to the turbine would be somewhat less than 15.54 feet

Water storage in the headwater pool is authorized by decreed right 36-15378 for water quality and aesthetic use. According to IDEQ, the impoundment provides temperature dampening for the geothermal water which is one source of water used in the complex. The impoundment is not required to treat any other property the water.

Flow rate

The intake-dam spillway which is the point-of-diversion for this right can easily provide 240.3 cfs, the total rate permitted by right 36-15959.

There is no device measuring the flow through the concrete intake channel and IDWR personnel have not been successful in taking spot measurements of the inflow.

Although IDEQ monitors water quality at several points in the aquiculture complex, dilution calculations are not required for the discharge. Therefore IDEQ does not take a discharge measurement.

FERC inspections from 2006, and 2009 reported instantaneous generation and flow. The generation readings would have been available from instrument displays in the powerhouse but the flows must have been provided by Pristine Springs personnel. They are lower flow rates than predicted by the power equation calculations for this hydro power facility and therefore, are likely measurements taken from the weir on Alpheus Creek which is some distance upstream.

Warm Creek may not be the sole source of water flowing through this powerhouse. The FERC application states that the source water is Warm Creek and unnamed springs located along the north side of the property. Nevertheless, this hydro-power use is the last use of the water flowing through the Pristine Springs aquiculture complex before it is discharged into the Snake River at river mile 608.

Turbine spec and efficiency

I was able to match pictures of the turbine-generator set with similar pictures on the internet and located a copy of the power table developed for this turbine. Based on that design table, recovered from <http://www.frenchriverland.com>, the maximum flowrate is 13000 cubic feet per minute or 216.6 cfs.

Francis turbines are 80-82% efficient if operating within their preferred range. There is no evidence that this turbine-generator has ever operated so inefficiently that it utilized the full rate authorized by the permit.

Power equation confirmation

From Idaho Power generation records, this powerhouse generated an average of 193.6 kW per hour in December 2003. If the effective head is 15 feet and we assume that the turbine is operating in the range it can be most efficient, then by the power equation, the flow rate is 186 cfs. The mathematics looks like this

$$Q = (P \times 11.81) / (H \times e) = (193.6 \times 11.81) / (15.1 \times 0.82) = 185.8 \text{ cfs}$$

However, it is reasonable to assume that as a used turbine, retrofit into this powerhouse setting, it may be only 70% efficient. The mathematics now looks like this: $(193.6 \times 11.81) / (15 \times 0.71) = 216 \text{ cfs}$

Conclusions

Rate

The turbine appears to be a Leffel 33-inch 'Z', vertical-shaft, Francis turbine. It has been installed in a water chamber rather than in a pressurized scroll casing.

The effective head at this powerhouse is approximately 15 feet.

The flow for a turbine of this size and type, in a setting with 15 feet of effective head is approximately 216 cfs.

Volume

This hydro-project is operated in run-of-river mode. The headwater storage is authorized for water quality and aesthetics, not power.

Effective 3/29/2012, the Beneficial Use Examination Rules exempt on-stream, run-of-the-river, power generation from the volume reporting requirement. This facility qualifies.

Term limit

This is an FERC exempt project and therefore not subject to any license renewal timelines. Therefore the term date should be set to coincide with the term date of the active sales agreement. That date is February 18, 2015.

Recommendations

I recommend the design capacity of this turbine in a 15 foot setting as the license flow rate. I recommend 216 cfs

No volume is required for the license of an on-stream, run-of-river, hydroelectric plant, so I am not recommending a volume.

Project Booked Kwh Monthly with Plant Size

Start Date 1/1/2002
End Date 12/31/2005

Project Number	Project Name	Contract Status	Calendar Year	Plant Size (KW)	Total YTD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31415165	Pristine Springs Hydro #3	Active and Online	2003	200	376,836	0	0	0	0	0	0	0	71,724	32,904	0	128,184	144,024
31415165	Pristine Springs Hydro #3	Active and Online	2004	200	1,515,852	137,592	126,420	131,124	122,892	117,000	110,544	117,012	125,244	132,300	134,652	132,888	128,184
31415165	Pristine Springs Hydro #3	Active and Online	2005	200	1,412,376	125,244	111,132	127,008	112,308	111,720	99,960	87,024	105,252	125,832	133,476	133,476	139,944
					3,305,064	262,836	237,552	258,132	235,200	228,720	210,504	204,036	302,220	291,036	268,128	394,548	412,152