File NR S1-28720
WR Doc ID 5121065

DEPARTMENT OF ECOLOGY
State of Washington

State of Washington
REPORT OF EXAMINATION
FOR WATER RIGHT APPLICATION

PRIORITY DATE
2/14/2012

WATER RIGHT NUMBER
S1-28720A

MAILING ADDRESS
PUGET SOUND ENERGY
10885 NE 4TH STREET PSE-09N
BELLEVUE WA 98004

SITE ADDRESS (IF DIFFERENT)
PSE UPPER BAKER DEVELOPMENT

Quantity Authorized for Diversion

DIVERSION RATE	UNITS	ANNUAL QUANTITY
500	Cubic Feet per Second (cfs)	Not specified (Non-consumptive)

PURPOSE	DIVERSION RATE			PERIOD OF USE (mm/dd)
	ADDITIVE	NON-ADDITIVE	UNITS	
Hydropower	500	0	cfs	01/01 - 12/31

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
WHATCOM	BAKER LAKE	BAKER & SKAGIT RIVERS	4-UPPER SKAGIT

SOURCE NAME	PARCEL	TWP	RNG	SEC	QUARTER SEC	LATITUDE	LONGITUDE
BAKER LAKE	3709313364	37N	09E	31	SW	48.649306	-121.691453

Datum: NAD83/WGS84

Place of Use

PARCEL
3709313364

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE
SW1/4 of Section 31, Township 37 North, Range 9 East, W.M.

Proposed Works

Puget Sound Energy (PSE) is requesting an additional water right for non-consumptive hydropower

purposes in the amount of 500 cubic feet per second to be used at their existing Upper Baker Development. No modifications will be made to the dam or powerhouse. This request is to allow PSE to maximize their current generating capabilities.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	Completed	December 31, 2023

Measurement of Water Use

How often must water use be measured?	Weekly
How often must water use data be reported to Ecology?	Annually (January 31)
What rate should be reported?	Peak Rate of Diversion (cfs)

Provisions

Measurements, Monitoring, Metering and Reporting
An approved measuring device shall be installed and maintained for the source identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173.

Recorded water use data shall be submitted via the Internet. To set up an Internet reporting account, contact the Northwest Regional Office. If you do not have Internet access, you can still submit hard copies by contacting the Northwest Regional Office for forms to submit your water use data.

WAC 173-173 describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

Department of Fish and Wildlife Requirement
The intake shall be screened in accordance with Department of Fish and Wildlife screening criteria (pursuant to RCW 77.57.010, RCW 77.57.070, and RCW 77.57.040). Contact the Department of Fish and Wildlife, 600 Capitol Way N, Olympia, WA 98501-1091. Attention: Habitat Program, Phone: (360) 902-2534 if you have questions about screening criteria. http://wdfw.wa.gov/about/contact/

Proof of Appropriation
The water right holder shall file the notice of Proof of Appropriation of water (under which the certificate of water right is issued) when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The certificate will reflect the extent of the project perfected within the limitations of the permit. Elements of a proof inspection may include, as appropriate, the source, system instantaneous capacity, beneficial use, place of use, and satisfaction of provisions.

Schedule and Inspections
Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times to the project location, and to inspect at reasonable times, records of water use, diversions, and measuring devices for compliance with water law.

Annual Hydropower License Fee
This authorization is subject to the annual hydropower license fee required by RCW 90.16.

Findings of Facts

Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I concur with the investigator that water is available from the source in question, there will be no impairment of existing rights, the purpose of use is beneficial, and there will be no detriment to the public interest.

Therefore, I ORDER approval of Application S1-28720A, subject to existing rights and the provisions specified above.

Your Right To Appeal

You have a right to appeal this Order to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of the Order.

File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.
- You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW Ste 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Signed at Bellevue, Washington, this 26 day of February, 2014.

Jacqueline Klug, Section Manager
Water Resources Program NWRO

For additional information visit the Environmental Hearings Office Website: http://www.eho.wa.gov. To find laws and agency rules visit the Washington State Legislature Website: http://www1.leg.wa.gov/CodeReviser.

This report serves as the written findings of fact for Water Right Application S1-28720A filed by Puget Sound Energy, Incorporated (PSE) of Bellevue, Washington.

Information in this report was obtained from PSE's *Baker River Hydroelectric Project Initial Consultation Document* (March 2002) filed with the Federal Energy Regulatory Commission (FERC) as part of PSE's relicensing process for the Baker River Hydroelectric Project (License No. 2150). Additional information was obtained from PSE's FERC license agreement (*Order on Offer of Settlement, Issuing New License, and Dismissing Amendment Application as Moot*) issued on October 17, 2008, and from PSE's State Environmental Policy Act (*SEPA*) checklist filed with the Department of Ecology on November 1, 2013.

BACKGROUND INFORMATION

PSE is an investor-owned utility that provides electric service to approximately 900,000 individuals and businesses and natural gas service to approximately 560,000 individuals and businesses in the state of Washington. These customers are located in a service territory that covers approximately 6,300 square miles, including the greater Everett/Seattle/Bellevue/Tacoma, Bellingham, and Olympia areas. PSE-owned generating plants produce roughly one-quarter of the electricity consumed by its customers. The remainder comes from various sources including mid-Columbia PUDs, the Bonneville Power Administration, and non-utility generators.

One of the generating facilities PSE owns and operates is the Baker River Hydroelectric Project (project) located in Whatcom and Skagit counties (see Figure 1). This project, which consists of the Lower Baker Development (constructed in 1925) and the Upper Baker Development (constructed in 1959), was originally licensed for fifty years (effective June 4, 1956) by the Federal Power Commission (now known as the Federal Energy Regulatory Commission (FERC)). The project was relicensed by FERC for an additional 50 years on October 17, 2008. The project, as licensed, is capable of generating enough electricity to serve approximately 59,400 homes.

The project is located within the Baker River watershed (tributary to the Skagit River). This watershed covers 297 square miles and ranges in elevation from the summit of Mt. Baker (10,775 feet above mean sea level (amsl)(datum NGVD29)) to the confluence of the Baker and Skagit Rivers near Concrete, Washington (elevation 170 feet amsl). This watershed, which is largely uninhabited, is located within a relatively mountainous region west of the crest of the Cascade Mountains. The watershed is generally very steep, with slopes from 20 to 40 percent over most of its area, with the exception of the valley bottom along the Baker River and some of its major tributary streams.

Precipitation variations in the Baker River watershed are typical of mountainous basins within western Washington. Average annual precipitation ranges from about 70 inches at Concrete to greater than 150 inches at some of the higher elevations.

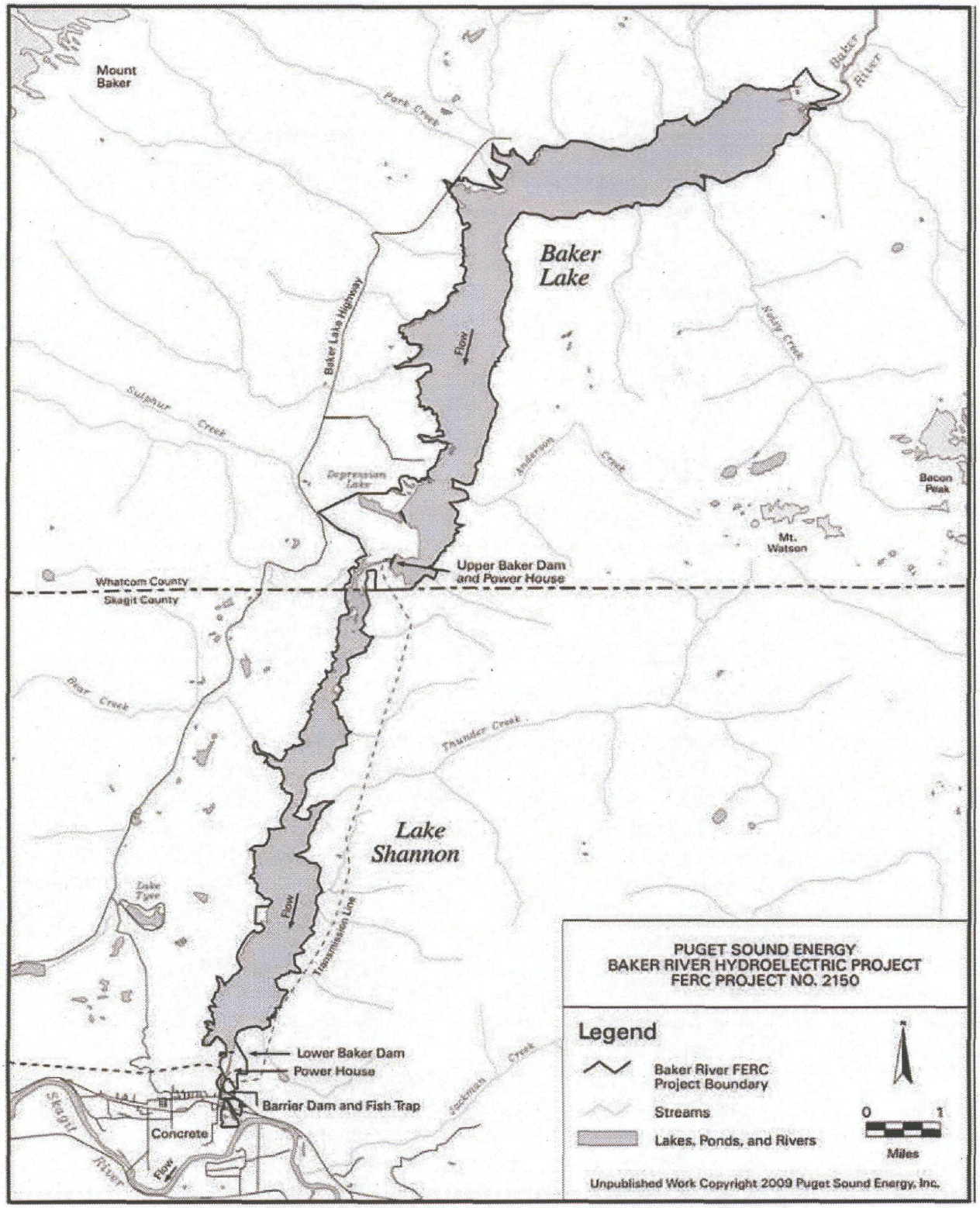


Figure 1: Baker River Hydroelectric Project, northeast of the town of Concrete, WA.

Runoff within the watershed exhibits a strong seasonal pattern in response to both precipitation and snowmelt. The largest volumes of runoff, and hence the largest sustained streamflows, occur from the late spring to early summer, mostly as a result of snowmelt timing. Maximum annual flood flows more typically occur from November through January, as a result of heavy rainfall, often supplemented by snowmelt.

Application Details

The subject water right application pertains only to the Upper Baker Development. PSE has requested a new water right for non-consumptive hydropower purposes in the amount of 500 cubic feet per second (cfs) from Baker Lake. PSE currently holds rights for 4800 cfs for the Upper Baker Development.

Table 1 Summary of Requested Water Right

Applicant Name:	Puget Sound Energy, Incorporated
Date of Application:	2/14/2012
Place of Use	The SW¼ of Section 31, Township 37 North, Range 9 East, W.M.

County	Waterbody	Tributary To	WRIA
Whatcom	Baker Lake	Baker & Skagit Rivers	4-Upper Skagit

Purpose	Rate	Unit	Afy	Begin Season	End Season
Hydropower	500	cfs	Not specified	01/01	12/31

Source Name	Parcel	Twp	Rng	Section	Q Section	Latitude	Longitude
Baker Lake	3709313364	37N	09E	31	SW	48.649306	-121.691453

W.M. = Willamette Meridian; WRIA = Water Resource Inventory Area; cfs = cubic feet per second; Afy = acre-feet per year; Twp = Township, Rng = Range, Q Section = Quarter section; Datum is NAD83/WGS84

Priority Processing

This application is being priority processed because it qualified under the criteria in which an application may be processed prior to competing applications (WAC 173-152). Specifically, this request qualifies under WAC 173-152-050(2)(c) because it is non-consumptive and the overall project (in accordance with the FERC relicense order) will substantially enhance and protect the quality of the natural environment (i.e., new fish-friendly ramping rates in the Baker River, improved fish passage facilities, a new hatchery facility, more natural instream flows, improved flood protection measures, habitat improvements, ESA-listed species protections, etc.).

Legal Requirements for Application Processing

Public Notice

RCW 90.03.280 requires that notice of a water right application be published once a week, for two consecutive weeks, in a newspaper of general circulation in the county or counties where the water is to be stored, diverted, and used. A 30 day protest period follows the second date of publication. Notice of the subject application was published in the Skagit Valley Herald on November 14 and 21, 2013. No protests were received.

State Environmental Policy Act (SEPA)

A SEPA review is required for water right applications requesting 1.0 cfs or greater (50 cfs or greater for agricultural irrigation). Therefore, a SEPA review was required for this request. Ecology was the lead agency for review and decision-making. On November 6, 2013, Jacqueline Klug, Northwest Regional Office Water Resources Section Manager, issued the following Determination of Non-Significance (DNS).

> ***Description of Proposal:***
> *Puget Sound Energy (PSE) has submitted an application for water rights to the Department of Ecology for a non-consumptive use of surface water for power generation at the Upper Baker Hydroelectric Facility (Federal Energy Regulatory Commission (FERC) License Project Nos. P-2150-033, 027). PSE began operation of the Upper Baker Hydroelectric Facility in 1959. The facility includes a powerhouse containing two turbine-generator units. These generation units have existing water rights for non-consumptive use for a total of 4,800 cubic feet per second (cfs). PSE upgraded Unit 1 in 1997 which increased the maximum generation capacity at the Upper Baker facility from 4,800 cfs to up to 5,300 cfs. PSE submitted an application (S1-28720A) on February 14, 2012, for water rights for an additional 500 cfs surface water diversion. The additional water has been used approximately 5% of the time in the past 3 years.*
>
> *No change would be made to the point of diversion or point of discharge back to the Baker system at Lake Shannon. This proposal does not require any new diversion structures or any modifications to the current structures or facilities. No change is proposed to the operation of the Upper Baker facility as it is currently operated under the 2008 FERC license and 2004 Settlement Agreement.*
>
> ***Location of Proposal:***
> *Whatcom County Parcel No. 3709313364 located within the SW¼ of Section 31, Township 37 North, Range 9 East.*
>
> ***Lead Agency:*** *State of Washington Department of Ecology*
>
> ***Public Comment Period:*** *November 8 to November 22, 2013. Comments will be accepted by email, US Mail, or fax.*
>
> *The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030 (2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.*
>
> *This DNS is issued under WAC 197-11-340(2). The lead agency will not act on this proposal until14 days after the start of the comment period.*
>
> *Comments must be submitted by November 22, 2013.*

No comments were received on the SEPA Determination of Non-Significance.

Consultation with the Department of Fish and Wildlife

The Department of Ecology (Ecology) must give notice to the Washington Department of Fish and Wildlife (WDFW) of applications to divert, withdraw, or store water. Steve Boessow (WDFW water rights specialist) was notified (via email) of the subject application on November 22, 2013. Mr. Boessow did not provide comments.

INVESTIGATION

The Upper Baker Development begins at river mile (RM) 9.35 of the Baker River (approximately 8 miles northeast of the town of Concrete). This development covers 5,795 acres and is located entirely in Whatcom County (the Lower Baker Development is entirely in Skagit County). The development consists of a concrete gravity dam (Upper Baker Dam), an earthen dam, Baker Lake, a powerhouse, fish passage facilities, a substation, artificial spawning beaches, Depression Lake, a water recovery pumping station, and miscellaneous maintenance buildings. Construction of the Upper Baker Development began in June 1956, and the plant began commercial operation in October 1959.

The Upper Baker powerhouse contains two generating units with a combined authorized installed capacity of 90.7 megawatts (MW). Baker Lake, the reservoir behind the Upper Baker Dam, is about 9 miles long and covers an area of about 4,800 acres at normal full pool (elevation 724 feet amsl). Roughly 285,000 acre-feet of water are stored in Baker Lake at normal full pool.

The primary dam at the Upper Baker Development (see Photos 1 & 2) is a concrete gravity dam 312 feet high and about 1,200 feet long, including the spillway, non-overflow section, and intake structure. The roadway over the dam has a clear width of 12 feet and is at elevation 732 feet amsl. An inspection gallery running nearly parallel to the rock abutments and foundation is provided inside the dam. The downstream face of the dam is sloped 7 to 10 (horizontal to vertical).

The hydropower intake structure is located in the center of the dam and is of concrete gravity construction. The intake provides two water passages into the powerhouse. Each water passage has a bell-mouth entrance, intake gate slot, emergency stoplog slot, and a penstock. The steel intake gates are of the fixed-wheel type, 20 feet high by 16 feet wide. Each gate is raised or lowered by an electrically-operated drum-type hoist and has remote control capability. Each hoist is mounted on a platform in a housing above the deck to permit raising the gates above deck level for maintenance. Emergency stoplogs may be used in the slots upstream of the gates. The intake gate lower seat is at elevation 634 feet amsl and the intake gate upper seat is at elevation 654 feet amsl, permitting reservoir drafting to elevation 674 feet amsl for power generation. Each steel penstock is 13.5 feet in diameter by 320 feet long. The hydraulic height is 297 feet.

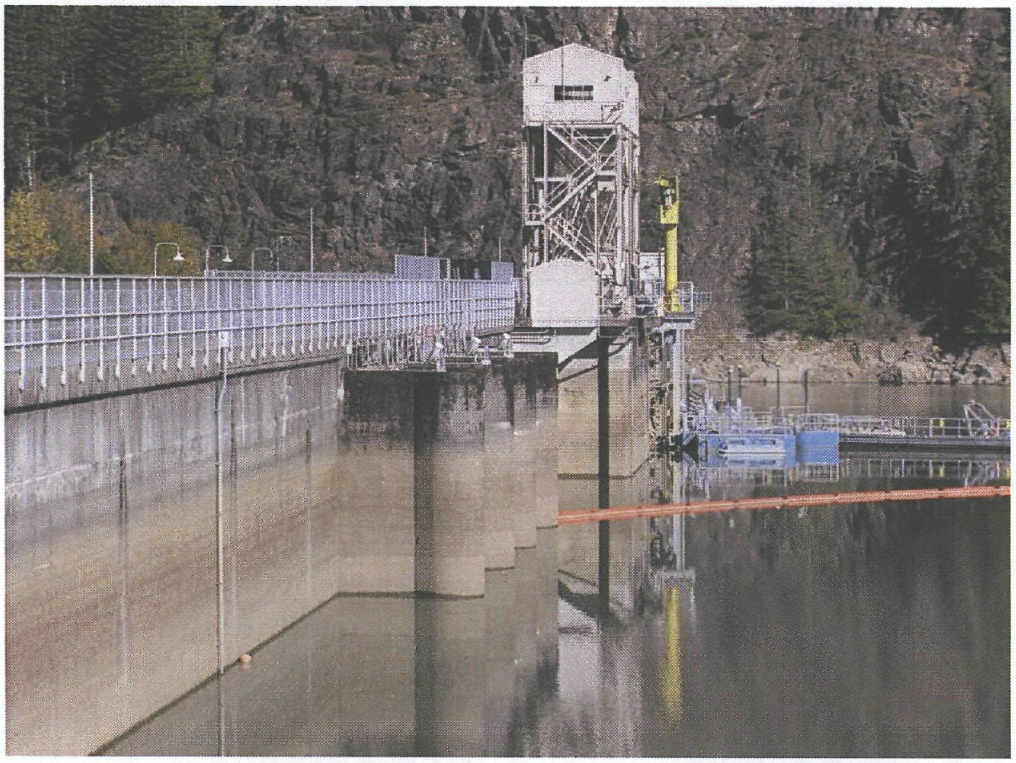


Photo 1: Upstream side of the concrete gravity dam and the hydropower intake structure.

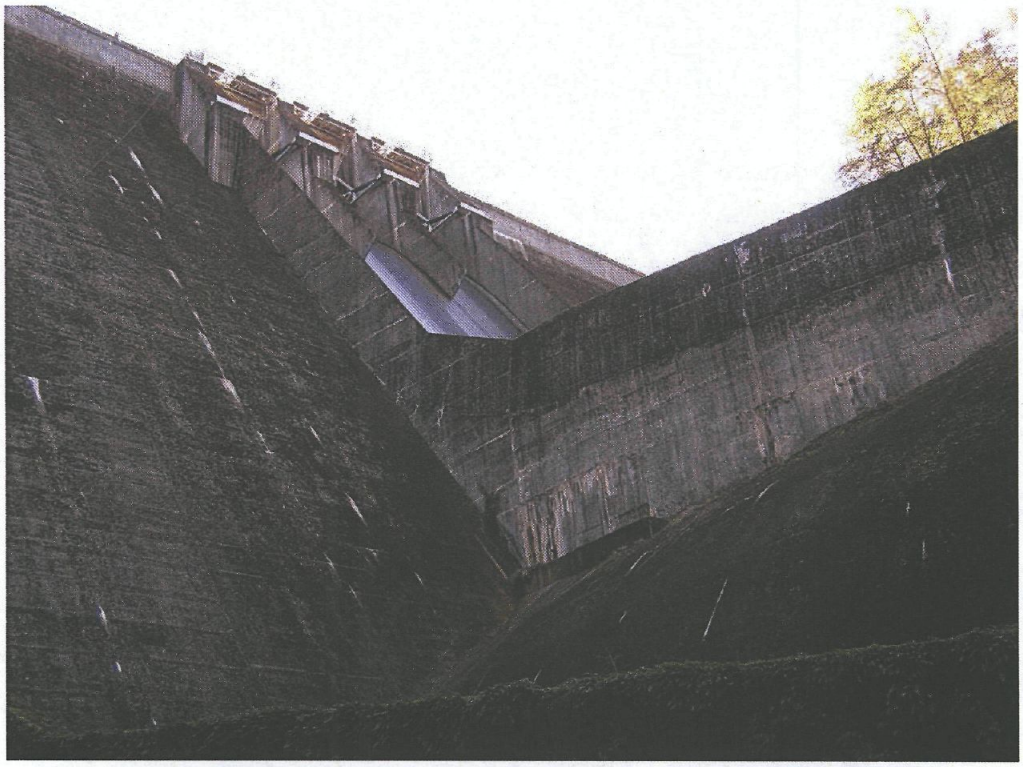


Photo 2: Downstream side of the concrete gravity dam and spillway structure.

The Upper Baker powerhouse (see Photo 3) is located on the north side of the Baker riverbed. The superstructure of the powerhouse is a combined reinforced concrete and structural steel building approximately 122 feet long and 59 feet wide. The substructure is of mass and reinforced concrete.

Photo 3: Powerhouse building (left) and dam spillway (center).

The generator room floor is at elevation 449 feet amsl. This floor contains two generators, an electrical bay, and control room. Stairways provide access to the turbine room below. The turbine room floor has two Francis turbines (see Photo 4).

Photo 4: One of the two Francis turbines within the powerhouse.

The foundation of the powerhouse totally encases the two elbow-type draft tubes and tailrace. The draft tubes and tailrace discharge directly to the Baker River channel. The channel follows the natural riverbed downstream of the powerhouse (see Photo 5) and terminates in Lake Shannon (within the Lower Baker Development).

Photo 5: Baker River Channel below the dam (Lake Shannon is immediately downstream).

Proposed Use and Basis of Water Demand

On October 23, 2013, I met with Jory Oppenheimer (PSE Water Resources – Licensing) and Russ Heard (Upper Baker Powerhouse Plant Operator) at the Upper Baker Development. We toured the dam and powerhouse. Two turbine generator units are the primary equipment in the powerhouse. When installed in 1958, Unit 1 and Unit 2 were identical. The turbines were each I.P. Morris Vertical Shaft Francis-style turbines manufactured by Baldwin-Lima-Hamilton Corp. Each of the turbines operates at 200 rpm through an operating head range of 240 feet to 290 feet. The rated net head of each unit is 285 feet. Total maximum plant hydraulic capacity at full gate is about 5,300 cfs. (As noted previously PSE has existing rights for 4800 cfs for this development, thus the request for an additional 500 cfs.)

In 1996, the Unit 2 turbine was repaired and the wicket gates and servo-motors were refurbished. At rated net head, Unit 2 at best gate position (65 percent) produces 53,600 horsepower or 40.0 MW power with 92 percent efficiency. Rated flow is about 1,800 cfs at efficient gate setting and rated net head.

In November 1997, Unit 1 was refurbished and the original runner was replaced with one manufactured by Voith Hydro. The new configuration, at best gate position and rated net head,

produces 72,314 horsepower or 54.2 MW power with 93 percent efficiency. The flow through Unit 1 at rated net head and best gate position is about 2,400 cfs.

The highest rate of flow through Unit 1 has been 2530 cfs and for Unit 2 has been 2769 cfs, for a combined rate of approximately 5300 cfs.

Other Rights Appurtenant to the Development

PSE currently holds the following water rights for the Upper Baker Development.

Table 2 Summary of Existing Water Rights

Tracking #	Cert #	Priority Date	Purpose	Qi (cfs)	Qa (af)	WRIA	County	Twp/Rng/Sec	Source
S1-*13629C	8225	10/13/1955	Hydropower	4300		4	Whatcom	T37N R9E S31	Baker R
S1-*14637C	8226	1/17/1958	Hydropower	500		4	Whatcom	T37N R9E S31	Baker R
R1-*13630C	8391	10/13/1955	Storage		298000	4	Whatcom	T37N R9E S31	Baker R

Additional Information

PSE operates Baker Lake to provide 16,000 acre-feet of storage space for flood regulation between October 15 and March 1 as replacement for the valley storage eliminated by the development. Utilization of this storage space is directed by the District Engineer, United States Army Corps of Engineers (Corps). In addition to the above-specified 16,000 acre-feet, PSE provides reservoir space for flood control during the storage drawdown season (about September 1 to April 15) up to a maximum of 58,000 acre-feet (for a total of 74,000 acre-feet) as may be requested by the District Engineer, provided that suitable arrangements have been made to compensate PSE for lost revenue.

The Corps assumes operation of the Upper Baker Dam for flood control operations when natural flows for the Skagit River at Concrete (USGS Gage 12194000) are forecast to exceed 90,000 cfs within 8 hours.

DETERMINATIONS

Impairment Considerations

Impairment is an adverse impact on the physical availability of water for a beneficial use that is entitled to protection. A water right application may not be approved if it would:

- Interrupt or interfere with the availability of water at the authorized point of diversion of another water right holder.
- Interrupt or interfere with the flow of water allocated by rule, water rights, or court decree to instream flows.

The requested water will come out of storage from Baker Lake. After being run through the turbines the water will exit the tailrace and discharge into the channel that flows directly into Lake Shannon. There are no intervening water rights or instream flows within this channel, so there is no possibility for impairment. PSE does have FERC license requirements regarding the timing, ramping rates, and flows released from Lake Shannon. However, this request will have no adverse impact on these requirements.

Water Availability

For water to be available for appropriation, it must be both physically and legally available.

Physical availability

For water to be physically available for appropriation there must be surface water present in quantities on a sufficiently frequent basis to provide a reasonably reliable source for the requested beneficial use.

Baker Lake has a total storage capacity of about 285,000 acre-feet at normal full pool. Baker Lake can be drawn down to an elevation of 655 feet amsl, which is considered the minimum operating pool. The usable storage between the minimum operating pool and normal full pool is about 221,000 acre-feet. The annual minimum pool elevation averages about 685 amsl, which represents a drawdown of 39 feet below the normal full pool elevation. Because of the large volume of reservoir inflow and storage, physical availability for the subject request should not be a problem.

Legal availability

There are no regulatory closures or legal restrictions affecting water availability within the Baker River watershed. In addition, the subject request is entirely non-consumptive. Water passed through the turbines discharges into Lake Shannon for storage and additional hydropower use in accordance with PSE's FERC license. Therefore, legal availability is not an issue.

Beneficial Use

Hydroelectric power production is defined in statute as a beneficial use (RCW 90.54.020(1)). The rate of water requested will allow PSE to fully utilize their existing hydropower capacity in accordance with their FERC license. This rate is both reasonable and feasible.

Public Interest Considerations

The granting of the requested right will in no way change the terms and conditions of PSE's relicensing settlement agreement and the resulting FERC license. These terms and conditions were agreed upon by the Baker River Coordinating Committee. This committee of stakeholders is composed of PSE, the U.S. Forest Service, the U.S. Fish and Wildlife Service, the National Park Service, NOAA Fisheries, the Upper Skagit Indian Tribe, the Sauk-Suiattle Indian Tribe, the Swinomish Indian Tribal Community, Ecology, WDFW, the Washington Department of Natural Resources, Skagit County, the City of Anacortes, the Town of Concrete, the Public Utility District No. 1 of Skagit County, the Interagency Committee for Outdoor Recreation, The Nature Conservancy of Washington, the North Cascades Conservation Council, the North Cascades Institute, the Rocky Mountain Elk Foundation, the Skagit Fisheries Enhancement Group, the Washington Council of Trout Unlimited, the Wildcat Steelhead Club, and Skagit County resident Bob Helton. This committee receives an annual report from PSE documenting progress made towards meeting all their obligations required under their FERC license. Because of this ongoing stakeholder involvement and oversight, no potential for detriment to the public interest is anticipated.

Consideration of Protests and Comments

No protests or comments were filed against this application.

Conclusions

As a result of my investigation and determinations, I conclude the following:

- Water is both physically and legally available
- There will be no impairment of existing rights
- The use will be beneficial and the requested instantaneous rate is reasonable
- There will be no detriment to the public interest

RECOMMENDATIONS

Based on the above investigation, determinations, and conclusions, I recommend the subject request for water rights be approved in the amounts and within the limitations listed below and subject to the provisions listed on pages 2 and 3.

Purpose of Use and Authorized Quantities

The amount of water recommended is a maximum limit and the water user may only use that amount of water within the specified limit that is reasonable and beneficial:

Diversion Rate: 500 cubic feet per second
Annual Volume: Not specified (all non-consumptive)
Purpose of Use: Hydropower purposes
Period of Use: Year-round
Point of Diversion: SW1/4 of Section 31, Township 37 North, Range 9 East, W.M.
Place of Use: SW1/4 of Section 31, Township 37 North, Range 9 East, W.M.

State of Washington
Hydrogeologist
1479
Licensed Geologist

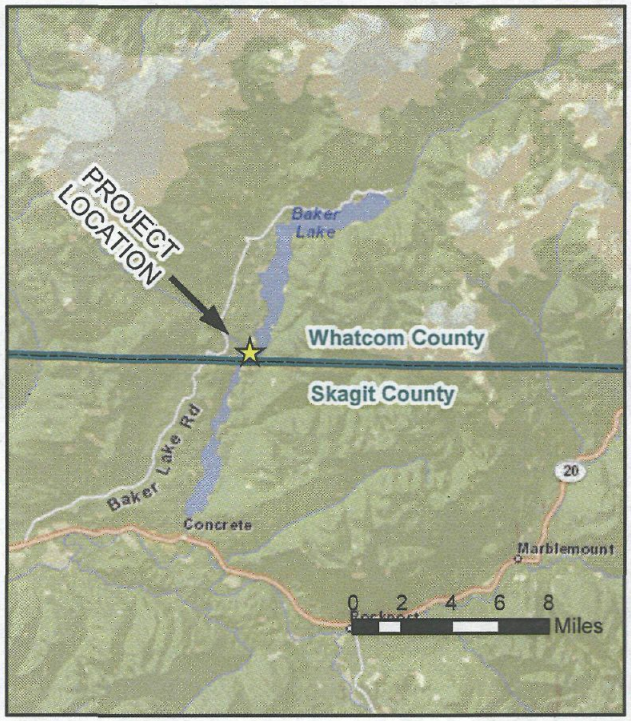
J. R. "BUCK" SMITH

Buck Smith 2/25/2014

Buck Smith, WA State Licensed Hydrogeologist No. 1479 *Date* *Stamp*

If you need this publication in an alternate format, please call Water Resources Program at (360) 407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

Puget Sound Energy
Water Right S1-28720
Section 31 T37N R09E W.M.
WRIA 4 - Whatcom County



Legend

- Townships
- Sections
- County Boundary

0 250 500 1,000 1,500 2,000 Feet

DEPARTMENT OF ECOLOGY State of Washington

Map Date: 11/27/2013

Place of use and point(s) of diversion/withdrawal are as defined on the cover sheet under the headings,'LOCATION OF DIVERSION/WITHDRAWAL' and 'LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED.'

ATTACHMENT 1