

STATE OF WASHINGTON  
**DEPARTMENT OF ECOLOGY**  
**DRAFT**  
**RESERVOIR**  
**REPORT OF EXAMINATION**

TO CONSTRUCT A RESERVOIR AND STORE FOR BENEFICIAL USE  
WATERS OF THE STATE OF WASHINGTON

PRIORITY DATE February 12, 2009	APPLICATION NUMBER R2-30508	PERMIT NUMBER	CERTIFICATE NUMBER
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NAME  
City of Tacoma, Department of Public Utilities, dba Tacoma Power

ADDRESS (STREET) 3628 South 35th Street	(CITY) Tacoma	(STATE) Washington	(ZIP CODE) 98409-3192
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Lake Cushman Reservoir; NOPL = Elevation 738 feet (Cushman Datum).

**Note: NOPL means Normal Operating Pool Level**

NAME OF STREAM OR OTHER SOURCE FOR RESERVOIR SUPPLY North Fork Skokomish River	TRIBUTARY OF (IF SURFACE WATERS) Skokomish River
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NUMBER OF ACRE FEET STORED WHEN RESERVOIR IS FULL An additional 263,350 acre-feet for a total of 453,350 acre feet	USE(S) TO BE MADE OF IMPOUNDED WATER Power Generation
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**LOCATION OF IMPOUNDING STRUCTURE**

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)  
NE ¼ of the SW ¼

SECTION 5	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 4 W	W.R.I.A. 16	COUNTY Mason
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LEGAL SUBDIVISIONS OF LANDS IN WHICH THE SUBMERGED AREA IS TO BE LOCATED

Portions of: Sections 5, 6 and 7, T. 22 N., R. 4 W., W.M.; Sections 7, 18, 19, 20, 29, 30, 31 and 32, T. 23 N., R. 4 W., W.M.; Sections 9, 10, 11, 12, 13, 14, 15, 24 and Tract 37 located within Sections 3 and 4, T. 23 N., R. 5 W., W.M.

**LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED IF DIFFERENT THAN ABOVE**

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**CONSTRUCTION OF IMPOUNDING STRUCTURE**

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HEIGHT OF DAM (FEET) 260	LENGTH ON TOP (FEET) 890	WIDTH ON TOP (FEET) 8
SLOPE OF FRONT OR WATER SIDE (Number of feet horizontal to one foot vertical): 0.19	SLOPE OF BACKSIDE (Number of feet horizontal to one foot vertical): Vertical	
HEIGHT OF DAM ABOVE WATER LINE AT NOPL (FEET) 7		

**TYPE OF CONSTRUCTION OF DAM AND CONSTRUCTION MATERIALS**Concrete arch and gravity fill

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**LOCATION AND APPROXIMATE DIMENSIONS OF SPILLWAY INCLUDING CREST LENGTH**

The spillway is located 1,750 feet southwest of the dam and is designed to spill water around the dam. Its dimensions are 514 feet long including soil-cement cut-off walls by 85 feet tall. The spillway chute is 90 feet wide with an approach channel crest at elevation 700 feet (Cushman datum).

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**LOCATION, SIZE AND TYPE OF VALVE AND OUTLET CONDUIT STRUCTURE**

Two submerged tainter gates, each 40 feet wide and 20 feet maximum height of opening. One river outlet of a 62-inch needle valve

NUMBER OF ACRES SUBMERGED WHEN RESERVOIR IS FILLED TO NOPL 4,058	MAXIMUM DEPTH (FEET) AT NOPL 265	APPROXIMATE AVERAGE DEPTH (FEET) 112
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**DEVELOPMENT SCHEDULE**

BEGIN PROJECT BY THIS DATE: Begun	COMPLETE PROJECT BY THIS DATE: Complete	WATER PUT TO FULL USE BY THIS DATE: In Use
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**REPORT**

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**BACKGROUND**

The Cushman Hydroelectric Project (Federal Energy Regulatory Commission [FERC] Project No. 460) is located on the North Fork Skokomish River in Mason County, Washington and has two dams: Cushman No. 1 Dam at Lake Cushman and Cushman No. 2 Dam at Lake Kokanee. Electricity generated at the Cushman Hydroelectric Project moves to Tacoma on a 40-mile-long transmission line, which crosses the Tacoma Narrows. The project is owned and operated by the Public Utilities Department of the City of Tacoma (doing business as [dba] Tacoma Power).

The City of Tacoma was issued a Project license by FERC on July 30, 1998. The license was appealed and settlement negotiations with the Skokomish Indian Tribe were engaged. A Settlement Agreement resulting in an Amended FERC License, extends the license term to July 30, 2048, and was made and entered by and among:

- City of Tacoma, Washington;
- United States Department of Commerce, National Marine Fisheries Service (NMFS);
- United States Department of Agriculture, Forest Service (USFS);
- United States Department of the Interior, Fish and Wildlife Service (FWS);
- United States Department of the Interior, Bureau of Indian Affairs (BIA);
- Washington Department of Fish and Wildlife (WDFW);
- Washington State Department of Ecology (Ecology); and
- Skokomish Indian Tribe.

Terms included action by the City of Tacoma to work expeditiously with Ecology to secure all needed water rights for Cushman Hydroelectric Project operations and implementation of the "Proposed License Articles."

The impoundment of surface water by Cushman No. 1 Dam forms Lake Cushman Reservoir, the larger of the two reservoirs. Lake Cushman is 9.6 miles long and has 23 miles of shoreline. Cushman No. 1 Dam was built on the North Fork Skokomish River by the City of Tacoma and dedicated in 1926. The dam is 890 feet long, 8 feet wide at the top and 50 feet wide at the base. The normal maximum operating pool level is approximately Elevation 738 feet (Cushman datum). Cushman No. 1 Powerhouse generates on average 127 million kilowatt-hours per year. The Amended FERC License regulates minimum levels of Lake Cushman among other operational obligations.

**INVESTIGATION**

The examination of Reservoir Water Right Application R2-30508, submitted by City of Tacoma, Department of Public Utilities (dba Tacoma Power), was led by consultants from GeoEngineers, Inc. contracted as part of the Ecology's water right cost reimbursement program to facilitate the phased processing of the application. Phil

Crane of the Water Resources Program, Ecology (Southwest Region), oversaw the examination and provided review.

The investigation included, but was not limited to, the review of:

- The State Water Code, specifically Title 173 Washington Administrative Code (WAC) and Title 90 Revised Code of Washington (RCW).
- United States Geological Survey (USGS) topographic maps.
- Aspect Consulting, 2005, WRIA 16 Instream Flow Studies, Jefferson and Mason Counties, Washington. Prepared for WRIA 16 Planning Unit.  
<[http://www.ecy.wa.gov/programs/eap/wrias/Planning/docs/wria16\\_isf\\_122305.pdf](http://www.ecy.wa.gov/programs/eap/wrias/Planning/docs/wria16_isf_122305.pdf)>
- Aspect Consulting, 2009, River and Stream Impairment Analysis, WRIA 16 and 14b, Skokomish-Dosewallips Planning Area. Prepared for WRIA 16 Planning Unit.  
<[http://www.ecy.wa.gov/programs/eap/wrias/Planning/docs/wria16\\_ir\\_63009.pdf](http://www.ecy.wa.gov/programs/eap/wrias/Planning/docs/wria16_ir_63009.pdf)>
- Golder Associates, Inc. and Economic & Engineering Services, Inc., 2002, Draft Skokomish-Dosewallips Watershed (WRIA 16) Phase II – Level 1 Assessment, Data Compilation and Preliminary Assessment. Prepared for WRIA 16 Planning Unit Steering Committed, Shelton, Washington.  
<<http://www.ecy.wa.gov/biblio/0306014.html>>
- Tabor, R.W. and Cady, W.M., 1978, Geologic map of the Olympic Peninsula, U.S. Geological Survey Miscellaneous Investigations Map 994, scale 1:125,000.
- Washington State Department of Ecology, 2010, Washington State Well Log Viewer website, <<http://apps.ecy.wa.gov/wellog/index.asp>> (Accessed May 2010).
- Washington State Department of Ecology, 2010, Water Rights Tracking System (WRTS) website <<http://www.ecy.wa.gov/programs/wr/rights/tracking-apps.html>> (Accessed January 2010).
- WRIA 16 Planning Unit, 2006, Watershed Management Plan Skokomish-Dosewallips Water Resource Inventory Area (WRIA 16) including the WRIA 14 South Shore Sub-Basin.  
<[http://www.ecy.wa.gov/programs/eap/wrias/Planning/docs/WRIA%2016%20Draft%205\\_lo\\_res.pdf](http://www.ecy.wa.gov/programs/eap/wrias/Planning/docs/WRIA%2016%20Draft%205_lo_res.pdf)>
- Tacoma Public Utilities website <<http://www.mytpu.org/>> (Accessed February 5, 2010).
- Settlement Agreement for the Cushman Project, FERC Project No. 460, January 12, 2009.  
<<http://www.mytpu.org/files/library/cushman-dam-settlement.pdf>>
- Order on Remand and an Offer of Settlement, Amending License, Authorizing New Powerhouse, and Lifting Stay, City of Tacoma, FERC Project Nos. 460-033, 460-040 and 460-021, issued July 15, 2010.  
<[http://elibrary.ferc.gov/idmws/file\\_list.asp?accession\\_num=20100715-3017](http://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20100715-3017)>
- Information submitted by and conversations and/or meetings with Sarah Hahn and Steve Fisher of Tacoma Power.
- A site visit on May 17, 2010.

### Cushman No. 1 Project Description

Reservoir Water Right Application R2-30508 is a request for the storage of 263,350 acre-feet of water related to the power generation at Cushman No. 1 Powerhouse. This application is in addition to the existing 190,000 acre-feet Reservoir Water Right (R2-\*00354CWRIS) issued for the Cushman No. 1 Hydroelectric Project. Tacoma Power submitted two other applications related to the Cushman No. 1 project: Surface Water Application S2-27419 for 1,500 cfs; and Surface Water Application S2-30504 for 300 cfs, both for power generation. These applications, together with the existing Surface Water Right S2-\*00353BSCWRIS for 1,000 cfs, would bring the total surface water rights to 2,800 cfs for power generation by the Cushman No. 1 project.

This application is one of eight water right applications filed by Tacoma Power in Mason County, Washington. Tacoma Power submitted multiple water right applications in 1988 and 2009. The water right applications submitted in 2009 were pursuant to the Settlement Agreement resolving the outstanding issues related to the FERC’s relicensing of the Cushman Hydroelectric Project. In addition to the surface water and reservoir water right applications directly related to operation of the Cushman Project, Tacoma Power submitted a groundwater right application for fish propagation activities that will be required by the Amended FERC License Articles.

In total, the Tacoma Power applications include requests for surface water (S2-27419, S2-27420, S2-30504, S2-30505 and S2-30506), groundwater (G2-30507) and reservoir (R2-30508 and R2-30509) rights associated with the Lake Cushman and Lake Kokanee reservoirs and the proposed Saltwater Park Hatchery near the shoreline of Hood Canal. These related applications are summarized in Table 1.

**Table 1.** Summary of Tacoma Power Water Right Applications.

Project	Control Number	Purpose of Use	Priority Date	Quantity (Qi)	Point of Withdrawal/Diversion	Place of Use Location
Cushman No. 1	S2-27419	Power Generation	7/29/1988	1,500 cfs	22N/4W-5L	22N/4W-5L
	S2-30504	Power Generation	2/12/2009	300 cfs	22N/4W-5L	22N/4W-5L
	R2-30508	Power Generation	2/12/2009	263,350 ac-ft	22N/4W-5L	22N/4W-5L
Cushman No. 2	S2-27420	Power Generation	7/29/1988	1,700 cfs	22N/4W-16F	22N/4W-26E
	S2-30505	Power Generation and Fish Propagation	2/12/2009	300 cfs	22N/4W-16F	22N/4W-26E
	R2-30509	Power Generation and Fish Propagation	2/12/2009	700 ac-ft	22N/4W-16F	22N/4W-26E
North Fork	S2-30506	Power Generation	2/12/2009	350 cfs	22N/4W-16F	22N/4W-16F

Powerhouse						
Saltwater Park Hatchery	G2-30507	Fish Propagation	2/12/2009	3,142 gpm	22N/4W-26D, 26E	22N/4W-26F

A map showing the location of the existing impounding structure of Cushman No. 1 Dam, the Place of Use (POU) at Cushman No. 1 Powerhouse, and Lake Cushman reservoir is provided as Attachment 1.

### Site Description

Lake Cushman reservoir lies on the southeastern part of the Olympic peninsula and is located approximately 3.5 miles northwest of the community of Potlatch, which is located on the shoreline of Hood Canal. Cushman No. 1 Dam is located in the NE ¼ of the SW ¼ of Sec. 5, T. 22 N., R. 4 W. Willamette Meridian (W.M.). Lake Cushman occupies 4,058 acres, with a maximum depth of 265 feet and an average depth of 112 feet, impounding 453,350 acre-feet of water when full to the peak operating level of Elevation 738 feet (Tacoma Cushman Datum). Cushman No. 1 Powerhouse, located approximately 600 feet downstream from the dam, contains two single-runner, vertical-shaft Francis turbines with a hydraulic capacity of 2,800 cfs and a total installed generating capacity of about 50 megawatts.

### Lake Level Management

As part of the Amended FERC License, minimum impoundment elevations (Article 405) are to be maintained for Lake Cushman at between Elevation 735 and 738 feet (Tacoma Cushman Datum) from Memorial Day weekend through Labor Day weekend and also a minimum impoundment elevation in Lake Cushman of 690 feet from November 1 through March 31.

Managing reservoir levels requires a balance between meeting downstream flow requirements, accommodating recreation, and producing power in conjunction with variable weather conditions, snow pack levels, and runoff rates. These lake-level management considerations are not always complimentary and the challenge of achieving each of them is compounded by weather variability. For prudent project operations, Tacoma Power is obligated to maintain some unused storage capacity beyond Memorial Day, given the potential for receiving a significant runoff event in June.

Requirements for management of the river stage downstream of Cushman No. 1 also have an impact on the lake level, and are set forth in Article 411 of the Amended FERC License, and result in limitations on changes in the release rate from the reservoir, expressed as constraints on North Fork Skokomish River upramping and downramping as measured at USGS gaging station 12058790 (shown on Attachment 1).

### FERC License Operational Conditions

As part of the Amended FERC License, Tacoma Power is obligated (Article 407) to release 115,835 acre-feet of the managed 160,000-acre-feet water budget as instantaneous minimum flows from the Cushman Project into the Lower North Fork of the Skokomish River, in accordance with the following schedule:

<u>Month</u>	<u>Instantaneous Minimum Flow Release Schedule:</u>
January	150 cfs
February	150 cfs
March	180 cfs
April	180 cfs
May	180 cfs
June	170 cfs
July	100 cfs
August	100 cfs
September	170 cfs
October	180 cfs
November	180 cfs
December	180 cfs

The remaining 44,165 acre-feet shall be released in accordance with a release schedule developed prior to each water budget year (July 1 – June 30) in consultation with the Fisheries and Habitat Committee (FHC), a body established to advise Tacoma Power on fisheries and habitat issues, as specified in the Amended FERC License for the Cushman Hydroelectric Project. If a consensus is not reached with the FHC regarding the release of the 44,165 acre-feet by 15 days before the start of the water budget year, the following flow regime will be implemented:

<u>Month</u>	<u>Default Instantaneous Flow Release Schedule:</u>
January	230 cfs
February	215 cfs
March	215 cfs
April	220 cfs
May	240 cfs
June	230 cfs
July	220 cfs

August	200 cfs
September	200 cfs
October	210 cfs
November	225 cfs
December	235 cfs

Tacoma Power is allowed fluctuations of up to 5 percent of the scheduled flow release as measured at USGS gaging station 12058790 to account for monitoring imprecision and release equipment variability.

Additional releases are required from the reservoir under the Amended FERC License (Article 407) in the event of flood conditions and to test whether sediment transport is significantly improved downstream by extending the duration of the high flow events at slightly less than bank-full capacity.

**APPLICATION EVALUATION**

Chapters 90.03 and 90.44 RCW authorize the appropriation of public water for beneficial use and describe the process for obtaining water rights. Laws governing the water right permitting process are contained in RCW 90.02.250 through 90.03.050. In accordance with RCW 90.02.290, determinations must be made on the following four criteria in order for an application for water rights to be approved:

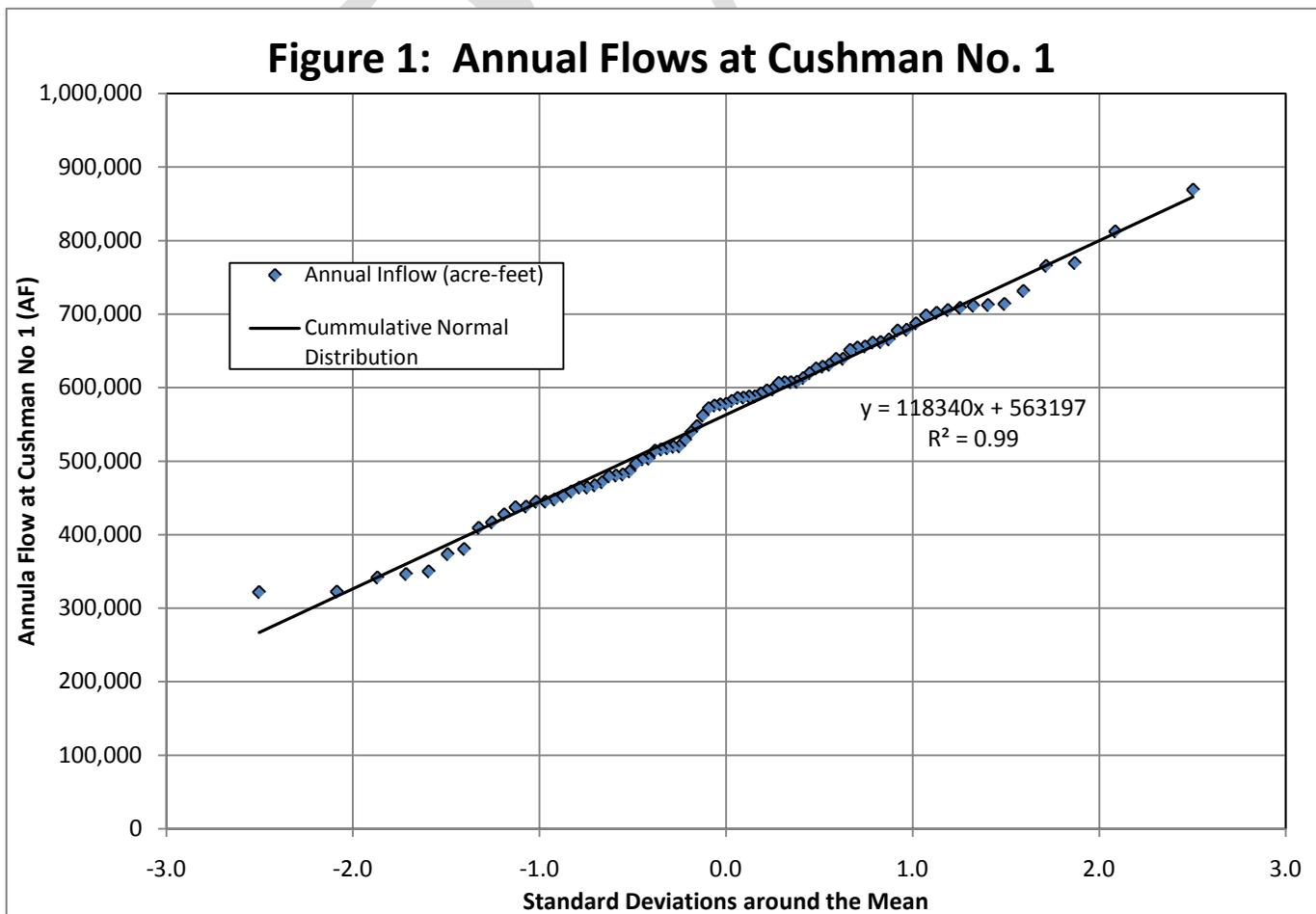
- (1) Water must be available;
- (2) There must be no impairment of existing rights;
- (3) The water use must be beneficial; and
- (4) The water use must not be detrimental to the public interest.

This Report of Examination addresses these subjects in the above referenced order. Fulfillment of the four requirements determines the decision of Ecology.

**Water Availability**

The average inflow to Lake Cushman is 563,197 acre-feet per year based on the 81 years of operating record provided by Tacoma Power for annual flows at Cushman No. 1 Dam.

In wetter years, when more water than the average quantity is available, additional inflows tributary to Lake Cushman will be available at the Cushman No. 1 Powerhouse, where flow can be utilized for power generation up to the maximum capacity of the installed turbines. A statistical analysis of the inflow data for Cushman No. 1 dam, shows that annual flows are normally distributed (Figure 1) with a standard deviation of 118,340 afy. On this basis, the 10-year peak annual flow (10 percent probability of exceedance) is around 710,000 acre-feet and the 100-year peak annual flow (1 percent probability of exceedance) is approximately 920,000 acre-feet.



Therefore, water is physically available to the extent that inflows reflect variable basin yield, storage within Lake Cushman is exercised, and water releases and other operational requirements contained in the Amended FERC License are observed.

There are no closures on surface water bodies in WRIA 16. Therefore, surface water is legally available for appropriation.

### **Potential for Impairment**

RCW 90.03.290 requires a determination that a new appropriation will not impair existing rights. The water supplies from some wells along the shoreline of Lake Cushman and down gradient locations are dependent upon the maintenance of lake levels and minimum instream flows downstream. There appears to be no potential for impairment if the lake level management, releases for minimum instream flow, and downramping and upramping plans are implemented per the Amended FERC License.

### **Beneficial Use**

In accordance with RCW 90.54.020(1), the proposed use of the impounded water for hydroelectric power production represents a beneficial use of water.

### **Public Interest**

RCW 90.03.290 requires that a proposed appropriation not be detrimental to the public interest. The 1971 Water Resources Act provides the most comprehensive list of legislative policies that guide the consideration of public interest in the allocation of water. These policies generally require a balancing of the state's natural resources and values with the state's economic well-being. Specifically, the policies require allocation of water in a manner that preserves instream resources, protects the quality of the water, provides adequate and safe supplies of water to serve public need, and makes water available to support the economic well-being of the state and its citizens.

The year-round impoundment of an additional 263,350 acre feet in Lake Cushman for a total of 453,350 acre feet for power generation at the Cushman No. 1 Powerhouse is consistent with state policy without adversely impacting instream flows or other public needs and values. No detriment to public interest could be identified during the examination of the subject application.

### **Consideration of Protests and Comments**

Article VI of the Tacoma/Skokomish Tribe Settlement Agreement, Tribe Support for Amended Project License and Water Right Applications, states that the Tribe withdrew any pending objections to Tacoma Power's water right applications. See Attachment 2.

No other protests or comments were received in lieu of the comprehensive Settlement Agreement that was successfully negotiated amongst various stakeholders, the terms of which are embodied in the Amended FERC License.

## **CONCLUSIONS**

### ***Water must be available.***

Water for this water right is considered physically available.

No legal constraints to the use of the water by this right were identified, and the water is considered legally available.

### ***There must be no impairment of existing rights.***

The requested impoundment and storage is not expected to interrupt or interfere with the availability of water to an existing right.

### ***The water use must be beneficial.***

Power generation is considered a beneficial use in accordance with RCW 90.54.020.

### ***The water use must not be detrimental to the public interest.***

No considerations that are detrimental to the public interest were identified for the proposed impoundment and storage.

## **RECOMMENDATION**

I recommend an approval of application R2-30508 and issuance of a permit to allow additional storage of up to 263,350 acre-feet of water, for a total of 453,350 acre-feet in the Lake Cushman reservoir contingent upon compliance with the conditions of the Amended FERC License.

Report Reviewed by: \_\_\_\_\_ Date \_\_\_\_\_  
Phil Crane

## **FINDINGS OF FACT AND DECISION**

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for storage subject to existing rights.

Therefore, I ORDER a permit be issued under Reservoir Application Number R2-30508, subject to existing rights and indicated provisions, to allow the storage of public water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this \_\_\_\_\_ day of \_\_\_\_\_, 2011.

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Thomas Loranger  
Water Resources Supervisor  
Southwest Regional Office

DRAFT

ARTICLE VI

**TRIBE SUPPORT FOR AMENDED PROJECT LICENSE AND WATER RIGHT APPLICATIONS**

- 6.1 Amended Project License. Within thirty (30) days of execution of the Agreement, the Tribe agrees to deliver a letter to FERC, executed by the Tribal Council, notifying FERC of the Tribe's full support for: (1) FERC's incorporation, without modification, of the Settlement License Articles as enforceable articles of the Amended Project License; and (2) the term of the license being extended to June 30, 2048. The Tribe will cooperate fully with Tacoma to obtain an Amended Project License which is consistent with the Amended License Settlement Agreement. The Tribe agrees that, so long as this Agreement remains in effect, it will refrain from taking any position publicly or privately that indicates Tacoma's relicensing application should be denied or that the Settlement License Articles are deficient.
- 6.2 Washington Department of Ecology Approval. From and after the Effective Date, the Tribe covenants to withdraw any pending objections to Tacoma's application for water rights (Washington Department of Ecology Water Right Application Numbers S2-27419 and S2-27420) and to not object to additional water right applications necessary to store or divert water for the Project's existing hydroelectric generation, the North Fork Powerhouse (FERC Settlement Agreement, Appendix 8) or to implement the Settlement License Articles. Within sixty (60) days of the Effective Date, the Tribe agrees to deliver a letter to WDOE, executed by the Tribal Council, notifying WDOE of the Tribe's withdrawal of any objections relating to Tacoma's application for water rights (Washington Department of Ecology Water Right Application Numbers S2-27419 and S2-27420) and that the Tribe does not object to additional water right applications necessary to store or divert water for the Project's existing hydroelectric generation, the North Fork Powerhouse (FERC Settlement Agreement, Appendix 8) and Amended Project License fish supplementation facilities. Nothing in this Agreement shall have, or be construed to have, any effect on the existence, extent, or quantity of the Tribe's federally reserved water rights. Tacoma expressly acknowledges and agrees that this Agreement has no past, present, or future impact or effect of any kind on the Tribe's federally reserved water rights.