



3628 South 35th Street  
Tacoma, Washington 98409-3192

TACOMA PUBLIC UTILITIES

April 17, 2006

Electronic Filing

Secretary  
Federal Energy Regulatory Commission  
888 First Street NE  
Washington, DC 20426

**Re: City of Tacoma, Cowlitz River Project, FERC No. 2016  
License Article 410 Water Quality Monitoring Plan  
Turbidity Study Addendum and Washington Department of Ecology Approval**

Dear Secretary:

Tacoma Power filed a water quality monitoring plan entitled *Lower Cowlitz River Water Quality Monitoring Plan* pursuant to license Article 410 on September 9, 2005. On February 16, 2006, the Commission requested that Tacoma Power obtain approval of the plan from the Washington Department of Ecology (WDOE) pursuant to Section E of the 401 water quality certification. This approval was required within 60 days of the date of that letter.

Tacoma Power promptly contacted WDOE to seek that approval. WDOE informed Tacoma Power that they wanted a plan to study turbidity in Riffe Lake to be included in the plan in order to satisfy their requirements and obtain their approval of the overall plan. After meeting with WDOE it was decided to prepare the turbidity study plan as an addendum to the original water quality plan. This plan was developed in consultation with WDOE. That plan, entitled *Cowlitz River Turbidity Monitoring Plan, Addendum to the Lower Cowlitz River Water Quality Monitoring Plan* is enclosed. Also enclosed is a letter from WDOE approving the turbidity study plan and the initially filed Lower Cowlitz River Water Quality Monitoring Plan.

If you have any questions regarding this submittal, please do not hesitate to contact Debbie Young, Natural Resource Manager, at (253) 502-8340 or Tom Martin, License Implementation Coordinator, at (253) 502-8298.

Sincerely,

Patrick D. McCarty  
Generation Manager

Enclosures

cc: Federal Energy Regulatory Commission, Portland Regional Office (w/attachment)  
Erich Gaedeke, Federal Energy Regulatory Energy Regulatory Commission-PRO  
(w/attachment)  
Michelle Day, NOAA Fisheries (w/attachment)  
Chris Maynard, Washington Department of Ecology (w/attachment)  
Deborah Cornett, Washington Department of Ecology (w/attachment)  
Fisheries Technical Committee (w/attachment)  
Debbie Young (w/attachment)  
Tom Martin (w/attachment)

**City of Tacoma,  
Department of Public Utilities, Light Division  
Cowlitz River Project  
FERC No. 2016**

**License Article 410**

**Cowlitz River Turbidity Monitoring Plan  
Addendum to the Lower Cowlitz River Water Quality Monitoring Plan**

**1. INTRODUCTION**

On March 16, 2006 Tacoma Power met with Washington Department of Ecology (WDOE) to discuss the addition of turbidity monitoring to the Lower Cowlitz River Water Quality Monitoring Plan for the Cowlitz River Hydroelectric Project. WDOE representatives (Deborah Cornett, Chris Maynard) indicated that they would like Tacoma Power to develop a turbidity monitoring plan in cooperation with WDOE. The following plan describes the shoreline turbidity monitoring Tacoma Power proposes, in conjunction with WDOE, to establish in 2006 following approval by FERC.

This Turbidity Monitoring Plan is intended to be an addendum to the Lower Cowlitz Water Quality Monitoring Plan previously prepared in compliance with the requirements of License Article 410 of the Federal Energy Regulatory Commission's (FERC) Order Amending New License for FERC Project No. 2016, issued and effective July 9, 2004. The Water Quality Monitoring Plan was previously submitted to FERC on September 8, 2005 via electronic filing.

**2. OBJECTIVE**

WDOE has requested that Tacoma Power develop a turbidity monitoring program to determine if the Washington State water quality criterion for turbidity is being exceeded within Riffe Lake (Mossyrock Dam reservoir). The objective of the proposed monitoring plan is to document any increased localized turbidity conditions caused by exposed shoreline substrate within Riffe Lake during major reservoir drawdown events.

Riffe Lake is designated by WDOE (WAC 173-201A-200), as:

**"Lakes"** shall be distinguished from riverine systems as being water bodies, including reservoirs, with a mean detention time<sup>1</sup> of greater than fifteen days.

Riffe Lake has aquatic life uses for salmon and trout. The turbidity criteria for these life uses are:

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<sup>1</sup> **Mean detention time**" means the time obtained by dividing a reservoir's mean annual minimum total storage by the thirty-day ten-year low-flow from the reservoir.

**Aquatic life turbidity criteria.** Turbidity is measured in "nephelometric turbidity units" or "NTUs."

Turbidity shall not exceed:

- 5 NTU over background when the background is 50 NTU or less; or
- A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.

### 3. BACKGROUND

Turbidity in Riffe Lake is potentially the result of multiple sources, with the majority likely the result of turbidity present in water discharging into Riffe Lake from its tributaries, principally the Cowlitz River. Smaller tributaries contribute much smaller amounts of water, but also contribute to the turbidity within the lake. Turbidity may also result from wind and rain forces acting on exposed shorelines during periods when the reservoir is drawn down below normal operating elevations.

Periodic measurements of the turbidity entering Riffe Lake and discharged from Mossyrock Dam to Mayfield Lake were made by Tacoma Power between December 1996 and April 1999 in support of its relicensing efforts for the Project. Table 1 reflects values collected during the May 1997 through April 1999 sampling period and shows the frequency of turbidity measures that were greater than 5.0 NTU. Data collected during the December 1996 through April 1997 period are not included as the sampling sites differed; thereby limiting any comparison between the two periods. Turbidity measured during this monitoring period ranged from near zero NTU to 37 NTU, with most of the measurements less than 5 NTU. These monitoring data demonstrate that Riffe Lake and its outflow commonly have turbidity levels lower than the major inflow to the reservoir.

**Table 1. Summary of turbidity measurements (NTU) and the frequency of turbidity greater than 5 NTU, Riffe Lake and tributaries, May 1997 through April 1999.**

Monitoring Site	Min	Max	Average	Frequency >5 NTU
<b>Riffe Lake Tributaries</b>				
Cowlitz R. upstream of Riffe Lake (COKOS)	0.8	17	5.6	42%
Rainey Cr. At Glenoma Trout Farm intake (RAINT)	0.1	37	2.2	4%
<b>Riffe Lake (Mossyrock Reservoir)</b>				
Riffe Lake, upper end (RIFLU)	0.4	8.8	1.6	4%
Riffe Lake, middle (RIFLM)	0.4	6.9	1.6	4%
Riffe Lake, lower end (RIFLL)	0.4	3.8	1.5	0%
<b>Riffe Lake Outflow</b>				
Mossyrock tailrace (MOSPH)	0.4	16	2.6	8%

#### **4. ROUTINE TURBIDITY MONITORING**

Tacoma Power will install two continuous monitoring stations as part of its routine water quality monitoring; the first on the Cowlitz River at the Fishing Bridge at the head of Riffe Lake and the second immediately downstream from Mossyrock Dam at the Onion Rock Bridge. Monitoring turbidity at these two locations will document incoming and outgoing turbidity conditions over the next five-year period of Project operation. This monitoring will document both general background conditions as well as the effect of specific weather events on the reservoir water. The monitoring stations will be discontinued following the five-year period unless data review indicates a need for continued monitoring.

#### **5. WEATHER MONITORING**

Weather records will be obtained annually for the nearest NOAA recording station (Glenoma or other). These records will document precipitation and wind conditions in the general vicinity of Riffe Lake during the periods when monitoring is conducted.

#### **6. SHORELINE TURBIDITY MONITORING PLAN**

Tacoma Power will work with WDOE to more fully develop the shoreline turbidity monitoring plan that will include manual sampling of multiple shoreline areas to document turbidity conditions during major precipitation and wind events that coincide with substantial reservoir drawdown periods.

Initially, Tacoma Power will assess the relative potential for shoreline erosion below 720 feet by reviewing available information on the reservoir's bathymetry and bed sediments. This assessment will focus on large exposed areas of shoreline that would be susceptible to erosion by wind and rain during major drawdowns. These areas will then be evaluated based on the amount of exposed area, presence of fine sediment, steepness of the slope, and probable wind fetch exposure (wave action). We anticipate that one to three areas will be established where bathymetry data and pre-reservoir inundation topography indicate substantial areas of fine-grained sediments may be exposed by major reservoir drawdowns.

Each of the selected areas will be monitored using the following procedures. At each manual sampling area turbidity readings will be taken at a depth of approximately 3 feet at five adjacent positions along a line parallel to the shoreline to document the variability of turbidity. Tacoma Power will attempt to space each of these stations approximately 50 feet from the adjacent stations. At each area, one or more transects that are perpendicular to the shoreline will be monitored to document the extent of turbidity offshore. Manual sampling stations will include sites within 50 feet of the shoreline (when safe and practical), at the edge of areas of turbidity (if visible), and near the mid-line of the reservoir. Positions of turbidity sampling sites will be recorded with a hand-held GPS meter. Actual positions of the sampling sites will depend on reservoir elevations at the time turbidity sampling is conducted. Data (turbidity, Riffe Lake water elevation, rainfall, and wind) obtained for each of the monitoring events will be evaluated to determine differences that occur between the near-shore and near mid-line reservoir sites under the varied rainfall and wind conditions.

Tacoma Power will inspect historical records of reservoir water surface elevations to identify periods when major reservoir drawdown is likely to occur. A manual sampling program will be implemented during this period based on actual reservoir surface elevations and predicted storm events. Manual sampling will be conducted when reservoir surface elevations are below 720 feet.

The monitoring will be discontinued after three sampling events for each types of weather event, i.e. high wind or rain, unless data review, done in consultation with WDOE, indicates the need for additional monitoring.

## **7. MONITORING REPORT**

Tacoma Power will include the results of the turbidity monitoring in its Water Quality Monitoring Plan annual report required by license article 410 and provided to FERC and the Cowlitz Fisheries Technical Committee by January 31 annually.



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

April 13, 2006

Mr. Thomas E. Martin  
License Implementation Coordinator /Tacoma Power  
City of Tacoma  
Department of Public Utilities, Light Division Generation  
3 NW 3628 South 35 Street  
Tacoma, WA 98409-3192

Dear Mr. Martin:

RE: Cowlitz River Project FERC No. 2016 License Article 410/ Cowlitz River Turbidity  
Monitoring Plan Addendum to the Lower Cowlitz River Water Quality Monitoring Plan

The Department of Ecology has reviewed the proposed Lower Cowlitz River Monitoring Plan Addendum. This turbidity monitoring plan is intended to be an addendum to the Lower Cowlitz Water Quality Monitoring Plan previously prepared in compliance with the requirements of License Article 410 of the Federal Energy Regulatory Commission's (FERC) Order Amending New License for FERC Project No. 2016, issued and effective July 9, 2004. The proposed addendum addresses the issues that were discussed for additional monitoring. The Lower Cowlitz Water Quality Monitoring Plan and this addendum are approved.

If you have any questions, please call me at 360/407-7269.

Sincerely,

Deborah Cornett  
Watershed Unit Supervisor  
SWRO Water Quality Program

cc: Chris Maynard, Ecology

