Fact Sheet

Public Comment Start Date: January 26, 2007
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Proposed Issuance of a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA)

United States Department of the Interior
Bureau of Reclamation
Elwha Water Treatment Plant

EPA Proposes To Issue an NPDES Permit
EPA proposes to issue an NPDES permit for the facility referenced above. The draft permit places conditions on the discharge of pollutants from the water treatment plant to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility.

This Fact Sheet includes:
- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

401 Certification
EPA is requesting that the Washington State Department of Ecology (Ecology) certify the NPDES permit for this facility, under Section 401 of the Clean Water Act. Comments regarding the certification should be directed to:

Washington State Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Public Comment
Persons wishing to comment on, or request a Public Hearing for the draft permit for this facility may do so in writing by the expiration date of the Public Comment period. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be in writing and should be submitted to EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Office of Water and Watersheds will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If substantive comments are received, EPA will address the comments and issue the permit. The permit will become effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days.

Documents are Available for Review
The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday at the address below. The draft permits, fact sheet, and other information can also be found by visiting the Region 10 NPDES website at "http://epa.gov/r10earth/waterpermits.htm."

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OWW-130
Seattle, Washington 98101
(206) 553-0523 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permit are also available at:

United States Environmental Protection Agency
Washington Operations Office
300 Desmond Drive SE
Lacey, Washington 98503

Elwha Restoration Project Office
826 East Front Street Suite A
Port Angeles, Washington 98362

Table of Contents

Acronyms **5**

I. Applicant **7**

A. General Information 7

II. Facility Information **7**

III. Receiving Water **7**

A. Low Flow Conditions 7
B. Water Quality Standards 8

IV. Effluent Limitations **9**

A. Basis for Effluent Limitations 9
B. Proposed Effluent Limitations 9

V. Monitoring Requirements **10**

A. Basis for Effluent and Surface Water Monitoring 10
B. Effluent Monitoring 11
C. Surface Water Monitoring 12

VI. Other Permit Conditions **12**

A. Quality Assurance Plan 12
B. Best Management Practices Plan 12
C. Standard Permit Provisions 13

VII. Other Legal Requirements **13**

A. Endangered Species Act and Essential Fish Habitat 13
B. State Certification 13
C. Washington Coastal Zone Management Program 13
D. National Environmental Policy Act and State Environmental Policy Act 14
E. Permit Expiration 14

VIII. References **14**

Appendix A: Facility Information **A-1**

Appendix B: Maps **B-1**

Appendix C: Basis for Effluent Limits **C-1**

A. Technology-Based Effluent Limits 1
B. Water Quality-based Effluent Limits 1
C. Facility-Specific Water Quality-based Limits 2
D. References 3

Appendix D: Reasonable Potential and Effluent Limit Calculations for Total Suspended Solids **D-1**

A. Reasonable Potential Analysis..... 1
B. Calculation of Water Quality-based Effluent Limits..... 2
C. References 5

Acronyms

1B3	Biologically-based design flow intended to ensure an excursion frequency of less than once every three years, for a 1-day average flow.
4B3	Biologically-based design flow intended to ensure an excursion frequency of less than once every three years, for a 30-day average flow.
AML	Average Monthly Limit
BA	Biological Assessment
BE	Biological Evaluation
BO or BiOp	Biological Opinion
BOD_5	Biochemical oxygen demand, five-day
BMP	Best Management Practices
ºC	Degrees Celsius
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EWTP	Elwha Water Treatment Plant
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
HUC	Hydrologic Unit Code
lbs/day	Pounds per day
mg/L	Milligrams per liter
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit or Method Detection Limit
N	Nitrogen
NEPA	National Environmental Policy Act

NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OWW	Office of Water and Watersheds
PCS	Permit Compliance System
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
SEPA	State Environmental Policy Act
SS	Suspended Solids
s.u.	Standard Units
TSD	*Technical Support Document for Water Quality-based Toxics Control* (EPA/505/2-90-001)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WAC	Washington Administrative Code
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WQS	Water Quality Standards
WTP	Water treatment plant

I. Applicant

A. General Information

This fact sheet provides information on the draft NPDES permit for the following entity:

United States Department of the Interior, Bureau of Reclamation
Elwha Water Treatment Plant
NPDES Permit # WA-002666-2

Physical Address:
Crown Z Water Road
Port Angeles, WA 98362

Mailing Address:
826 East Front Street Suite A
Port Angeles, WA 98362

Contact:
Dick Bauman, USBR

II. Facility Information

The United States Department of the Interior, Bureau of Reclamation, has applied to EPA for an NPDES permit to discharge pollutants to the Elwha River from the Elwha Water Treatment Plant (EWTP). The purpose of the water treatment plant is to remove sediment from the intake water from the Elwha River, in order to make the water suitable for domestic, industrial and aquaculture water supply. The proposed permit will authorize the return of the removed sediment to the river. Additional information about the facility can be found in Appendix A.

III. Receiving Water

This facility will discharge to the Elwha River near Port Angeles in Clallam County, Washington. A map of the discharge location can be found in Appendix B.

A. Low Flow Conditions

The *Technical Support Document for Water Quality-Based Toxics Control* (hereafter referred to as the TSD) (EPA, 1991) and the Washington Water Quality Standards (WQS) recommend the flow conditions for use in calculating water quality-based effluent limits (WQBELs) using steady-state modeling. The TSD recommends that that WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years (7Q10) or the biologically-based 4B3 flow rate for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years (1Q10) or the biologically-based 1B3 for acute criteria.

The operation of the EWTP will not begin until after the removal of the Elwha and Glines Canyon dams has begun. Flow data collected from the Elwha River after construction of the

Elwha Dam began in 1910 may not be representative of the flow rates that will be observed once the dams are removed.

The only available flow data for the Elwha River collected before the dams were constructed were collected at USGS Station #12045500, located upstream of the proposed discharge, from 1897 through 1901. This period of record is too short to allow for calculations of the 1Q10 and 7Q10 flows, but it is adequate to allow for calculations of the 1B3 and 4B3 flows. For most rivers, the 1B3 flow rate is roughly equivalent to the 1Q10 flow rate and the 4B3 flow rate is roughly equivalent to the 7Q10 flow rate (EPA, 1986). For the unregulated Elwha River, the 1B3 flow rate is 330 CFS and the 4B3 flow rate is 357 CFS, as calculated by EPA's DFLOW 3 computer program[1].

B. Water Quality Standards

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards. Federal regulations at 40 CFR 122.4(d) require that the conditions in NPDES permits ensure compliance with the water quality standards of all affected States. A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses (such as drinking water supply, contact recreation, and aquatic life) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the State to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

EPA has approved certain portions of Washington's July 2003 revision of its water quality standards (WQS). For those portions of the 2003 revision that were not approved, the corresponding portions of the 1997 revision of the standards remain in effect.

The Elwha River is designated as a "Class AA" waterbody in the 1997 version of the WQS. Uses characteristic of Class AA waterbodies include, but are not limited to:

- domestic, industrial and agricultural water supply;
- stock watering;
- migration, rearing, spawning and harvesting of salmonids and other fish;
- rearing, spawning and harvesting of clams, mussels, and oysters;
- rearing, spawning and harvesting of crustaceans and other shellfish;
- wildlife habitat;
- recreation including primary contact recreation, sport fishing, boating, and aesthetic enjoyment;
- commerce and navigation.

The relevant water quality criteria which protect these beneficial uses are as follows:

Table 1: Water Quality Criteria for the Elwha River

Parameter	Criteria
Temperature	Temperature shall not exceed 16 ºC due to human activities. When natural conditions exceed 16 ºC, no temperature increases shall be allowed which will raise the receiving

[1] Information about DFLOW and a download link can be found at http://epa.gov/waterscience/dflow.

Table 1: Water Quality Criteria for the Elwha River	
Parameter	**Criteria**
	water temperature by greater than 0.3 ºC. Incremental temperature increases resulting from point source activities shall not, at any time, exceed t=23/(T+5)[1]
Dissolved Oxygen	Dissolved oxygen shall exceed 9.5 mg/L.
pH	pH shall be within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.2 units.
Turbidity	Turbidity shall not exceed 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Fecal Coliform Bacteria	Fecal coliform organism levels shall both not exceed a geometric mean value of 50 colonies/100 mL and not have more than 10 percent of all samples obtained for calculating the geometric mean value exceeding 100 colonies/100 mL.

Notes:
1. For purposes hereof, "t" represents the maximum permissible temperature increase measured at a mixing zone boundary; and "T" represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge.

IV. Effluent Limitations

A. Basis for Effluent Limitations

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a waterbody are being met and may be more stringent than technology-based effluent limits. The basis for the effluent limits proposed in the draft permit is provided in Appendices C and D.

B. Proposed Effluent Limitations

Below are the proposed effluent limits that are in the draft permit. The effluent limits for TSS are tiered based on influent (or background) turbidity. The limit in effect when the influent turbidity is less than or equal to 50 NTU is 22 pounds per CFS of stream flow per day. The stream flow rate for use with this effluent limitation is the daily average total flow rate of the Elwha River (including side channels) immediately downstream from the discharge. This flow rate may be directly measured or calculated using known inflows and diversions. Effluent limits in effect when the influent turbidity is greater than 50 NTU are as follows:

1. On calendar days when the daily average influent turbidity is greater than 50 NTU, the maximum daily total suspended solids loading, measured in pounds per day, must not exceed the value given by the following equation:

a) $Limit_{lb/day} = C_i(0.54Q_u + 5.9Q_e)$

b) In the equation above, the variables are defined as follows:

(i) C_i means daily average influent concentration in mg/L.

(ii) Q_u means daily total river flow rate (including side channels) immediately upstream of the discharge. This river flow rate may be directly measured or calculated using known inflows and diversions.

(iii) Q_e means daily average effluent flow rate in CFS.

2. Effluent TSS loading and concentration must be reported to EPA and Ecology as follows:

a) On the monthly DMR, the permittee must report TSS loadings and concentrations measured on calendar days when the daily average influent turbidity is less than or equal to 50 NTU separately from effluent TSS loadings and concentrations measured on calendar days when the daily average influent turbidity is greater than 50 NTU. For each influent turbidity tier, the permittee must calculate and report the average monthly and maximum daily TSS loadings and concentrations on the monthly DMR using effluent values measured when that influent turbidity tier was applicable and excluding effluent values measured when the other influent turbidity tier was applicable.[2]

b) In addition to the monthly DMR, the permittee must submit a table of the numeric values of the effluent loading limit given by the equation in I.B.3.a. and the corresponding daily discharge of TSS for every calendar day in which the daily average influent turbidity is greater than 50 NTU. This table must be postmarked by the 10th day of the month following the monitoring month. The permittee must report violations of the maximum daily TSS effluent limits within 24 hours from the time the permittee becomes aware of the violation.

c) The permittee must report violations of the maximum daily TSS effluent limits at the time that DMRs are submitted.

Table 2: Proposed Effluent Limits

Parameter	Units	Effluent Limits	
		Average Monthly Limit	**Maximum Daily Limit**
Total Suspended Solids Daily average influent turbidity > 50 NTU	lb/day	Report	See Above
Total Suspended Solids Daily average influent turbidity ≤ 50 NTU	pounds per CFS of stream flow per day	Report	22
pH	s.u.	6.5 - 8.5	

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require effluent monitoring in permits to determine compliance with effluent limitations. The permit also requires the permittee to gather effluent and surface water data, which EPA will use to determine if

[2] For example, if the daily average influent turbidity was less than or equal to 50 NTU for the first five days of a calendar month but greater than 50 NTU for the balance of the month, the permittee must report the average and maximum loadings and concentrations measured during the first five days separately from the average and maximum loadings measured during the balance of the month.

additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality.

The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) or on the application for renewal, as appropriate, to the U.S. Environmental Protection Agency (EPA) and Ecology.

B. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA-approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits are less than the effluent limits.

Table 3, below, presents the proposed effluent monitoring requirements for the Elwha Water Treatment Plant. The effluent sampling location must be immediately prior to discharge to the receiving water. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

Based on toxicity information submitted to EPA and Ecology for the coagulant to be used (polyaluminum chloride or PAC), the type of facility, and on Chapter 173-205-030 and 040 of the Washington Administrative Code (WAC), EPA has determined that whole effluent toxicity testing is not necessary for this discharge. The discharge does not meet any of the criteria for discharges that generally have a risk for aquatic toxicity in WAC 173-205-040(1).

Table 3: Effluent Monitoring Requirements

Parameter	Units	Sample Location	Sample Frequency	Sample Type
Flow	CFS	Influent, Effluent	Continuous	Recording
Turbidity	NTU	Influent	Continuous	Recording
Fecal Coliform	#/100 ml	Influent, Effluent	10/month	Grab
pH	s.u.	Influent, Effluent	5/week	Grab
Temperature	ºC	Influent, Effluent	5/week	Grab
Total Suspended Solids (TSS)	mg/L	Influent, Effluent	Daily	24-hour composite
	lb/day	Influent, Effluent	Daily	calculation[2]
Settleable Solids	ml/L	Influent, Effluent	1/month	24-hour composite
Five-Day Biochemical Oxygen Demand (BOD_5)	mg/L	Effluent	1/month	24-hour composite
	lb/day	Effluent	1/month	24-hour composite
Alkalinity	mg/L as $CaCO_3$	Effluent	1/month	24-hour composite
Total Dissolved Solids	mg/L	Influent, Effluent	1/month	24-hour composite
Total Aluminum	mg/L	Influent, Effluent	1/month	24-hour composite
	lb/day			
Dissolved Oxygen	mg/L	Influent	1/month	Grab

Notes:
1. The permittee must report the minimum and average effluent dilution ratios observed during the month.
2. Loading is calculated by multiplying the concentration in mg/L by the flow in mgd and a conversion factor of 8.34.
3. Quarters are defined as January through March, April through June, July through September, and October through December.

C. Surface Water Monitoring

Table 4 presents the proposed surface water monitoring requirements for the draft permit. Note that, except for flow rate, only downstream monitoring is required. This is because the intake water for the Elwha WTP is drawn from the river upstream from the point of discharge, which means that influent monitoring will be effective in measuring the concentrations of pollutants of concern upstream of the point of discharge. Surface water monitoring reports are to be reported annually to EPA and Ecology.

As discussed in Appendix D, the effluent limits for TSS are based in part on an observed linear relationship between TSS concentrations in mg/L and turbidity in NTU. In order to determine if this relationship remains valid for the higher TSS and turbidity concentrations that are expected during dam removal, the permit requires the permittee to collect weekly downstream samples for TSS and turbidity for one year, and include a discussion of the relationship between turbidity and TSS concentrations in the annual surface water monitoring report for the first year.

Table 4: Receiving Water Monitoring Requirements

Parameter (units)	Sample Locations	Sample Frequency	Sample Type
Flow (CFS)	Upstream	Continuous	Recording
pH (s.u.)	Downstream	Monthly	Grab
TSS (mg/L)	Downstream	Monthly	Grab
Turbidity (NTU)	Downstream	Monthly	Grab
Settleable Solids (ml/L)	Downstream	Monthly	Grab
Temperature, (ºC)	Downstream	Monthly	Grab
Fecal Coliform Bacteria (#/100 ml)	Downstream	Monthly	Grab
Dissolved Oxygen (mg/L)	Downstream	Monthly	Grab

Notes:
1. Upstream samples must be taken from the Elwha river at a location outside the influence of the EWTP discharge.
2. Downstream samples must be taken from the Elwha river at a location where the effluent and receiving water are completely mixed.

VI. Other Permit Conditions

A. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The Bureau of Reclamation is required to develop and implement a Quality Assurance Plan for the EWTP on or before the effective date of the final permit. The Quality Assurance Plan shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

B. Best Management Practices Plan

Federal regulations at 40 CFR 122.44(k) require the use of Best Management Practices (BMP) conditions in permits when numeric effluent limitations are infeasible or when the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the Clean Water Act. The permit requires the permittee to

develop a best management practices plan on or before the effective date of the final permit. The permit also contains specific best management practices requirements intended to reduce the impact of the discharge on the receiving water.

C. Standard Permit Provisions

Sections III, IV, and IV of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because these requirements are based directly on NPDES regulations, they cannot be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VII. Other Legal Requirements

A. Endangered Species Act and Essential Fish Habitat

NOAA Fisheries has completed a biological opinion for the entire Elwha River recovery project, including the removal of both dams and the construction and operation of the Elwha Water Treatment Plant. The issuance of this NPDES permit is considered part of the larger "federal action" of the recovery project, and as such, is not subject to separate consultation under the Endangered Species Act or the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Fisheries determined, in a biological opinion dated November 20, 2006, that the project would not jeopardize the continued existence of Puget Sound Chinook salmon or Steelhead, and will not adversely modify or destroy designated Chinook critical habitat, nor will it adversely modify or destroy designated critical habitat for bull trout.

EPA will provide copies of the draft permit and fact sheet to NOAA Fisheries during the public comment period and will consider any comments made by NOAA Fisheries on the draft permit prior to issuance of a final permit.

B. State Certification

Section 401 of the CWA requires EPA to seek State certification before issuing a final permit. As a result of the certification, the State may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards, or treatment standards established pursuant to any State law or regulation.

C. Washington Coastal Zone Management Program

EPA has determined that the draft permit is consistent with the enforceable policies of Washington's approved coastal management program and has requested the State's concurrence with this determination.

D. National Environmental Policy Act and State Environmental Policy Act

Several environmental impact statements (EIS) have been completed for the Elwha restoration project.[3] Similar to ESA and EFH consultation, the construction and operation of the Elwha water treatment plant was considered as part of the environmental impact statements; a separate EIS was not prepared specifically for the Elwha Water Treatment Plant. EPA reviewed the environmental impact statements and had no objections to the project. On October 26th, 2006, Clallam County, the lead State Environmental Policy Act agency, announced its decision to adopt the National Environmental Policy Act documents.

E. Permit Expiration

The permit will expire five years from the effective date. If the permittee intends to continue the pemitted activity, an application for renewal of the permit must be received by EPA within 180 days of the expiration date of the final permit.

VIII. References

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control.* US Environmental Protection Agency, Office of Water, EPA/505/2-90-001.

EPA. 1986. *Technical Guidance Manual for Performing Wasteload Allocations: Book VI - Design Conditions: Chapter 1 - Stream Design Flow for Steady-State Modeling.* US Environmental Protection Agency, Office of Water, PB92-231778.

[3] The environmental impact statements can be downloaded from the National Park Service website at the following address: http://www.nps.gov/olym/naturescience/elwha-restoration-docs.htm.

Appendix A: Facility Information

General Information

NPDES ID Number:	WA-002666-2
Physical Address:	Crown Z Water Road
Mailing Address:	826 East Front Street Suite A Port Angeles, WA 98362
Facility Background:	The facility is a new discharger and this is the first NPDES permit issued to the facility

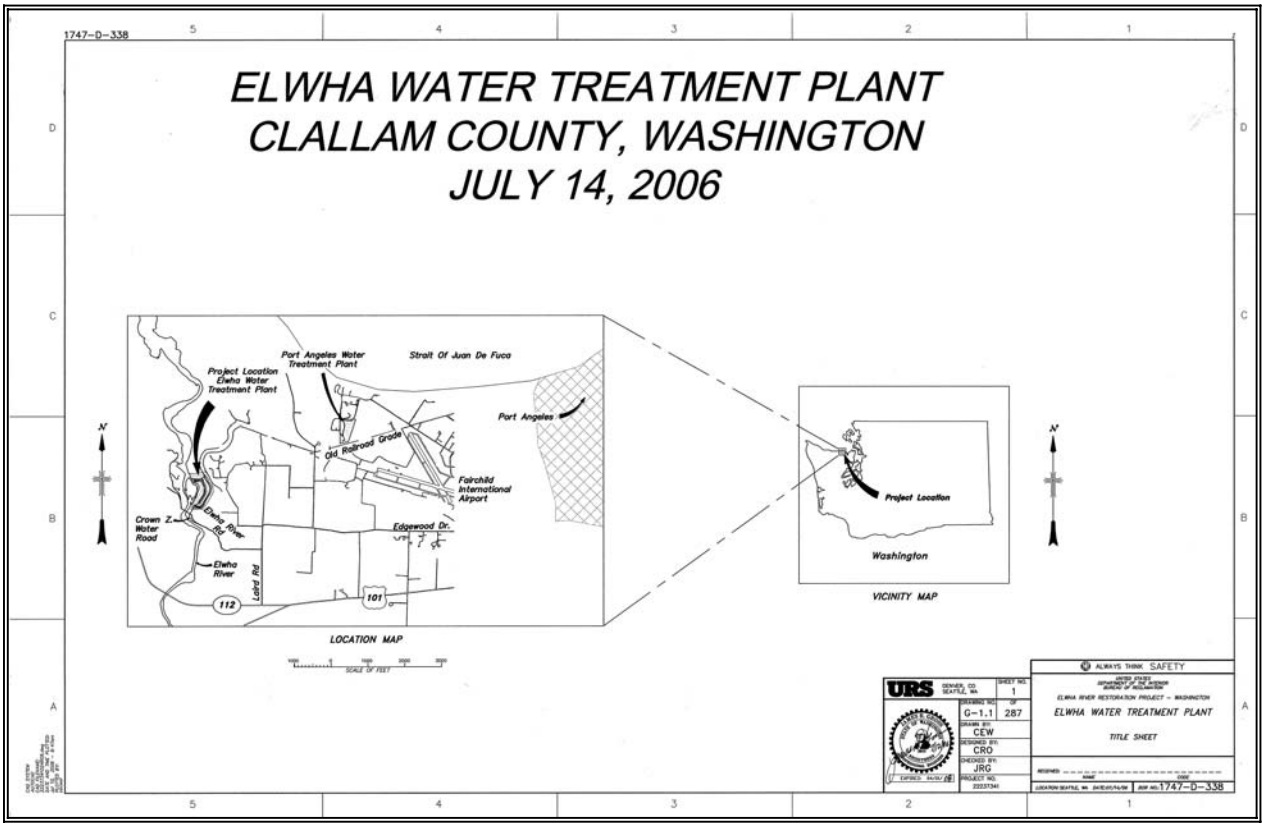
Facility Information

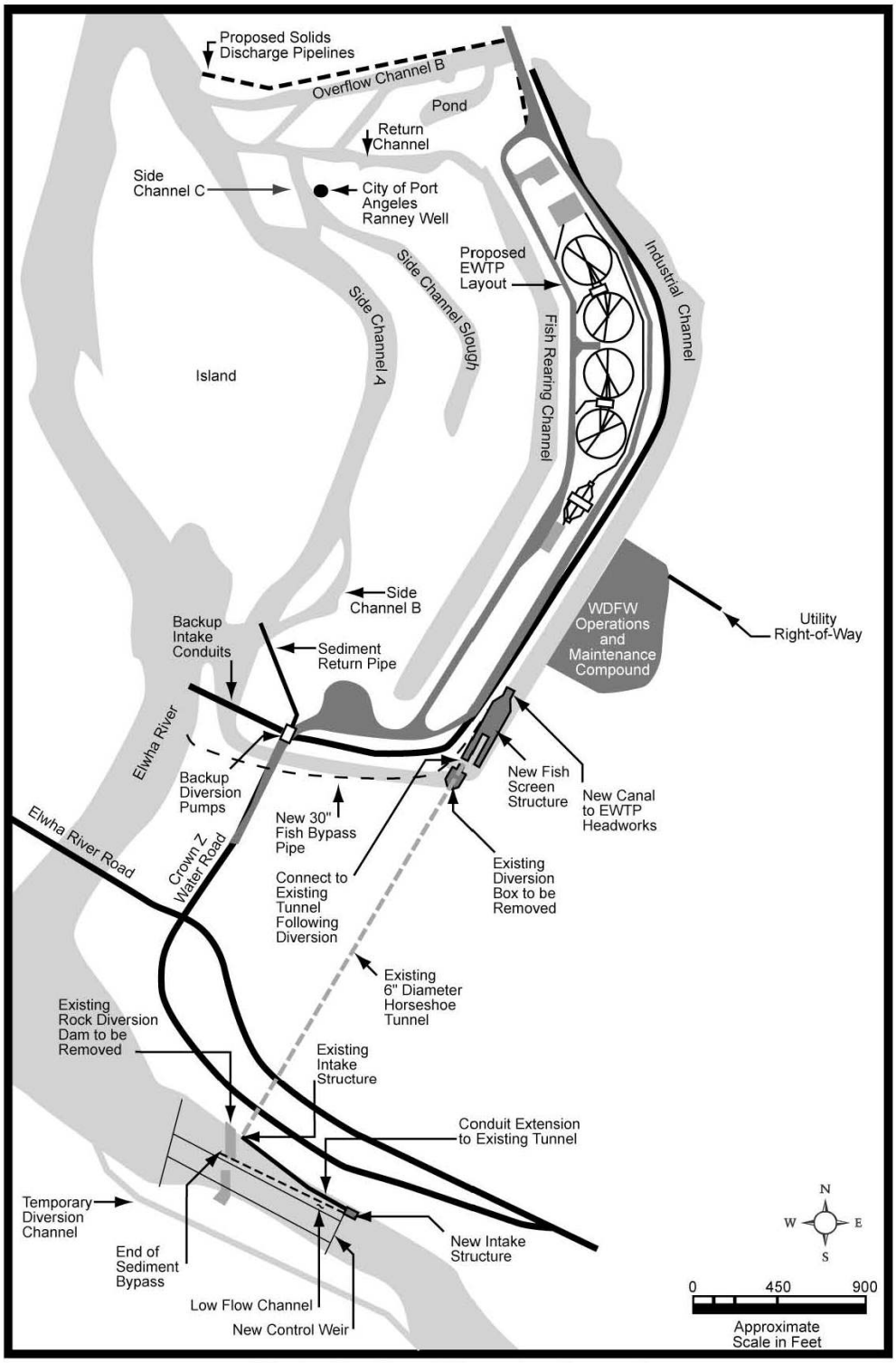
Type of Facility:	Water Treatment Plant
Flow:	2-18 CFS
Outfall Location:	latitude 48° 7' 10" N; longitude 123° 33' 7" W

Receiving Water Information

Receiving Water:	Elwha River
Watershed:	Dungeness-Elwha (HUC 17110020)
Beneficial Uses:	• domestic, industrial and agricultural water supply; • stock watering; • migration, rearing, spawning and harvesting of salmonids and other fish; • rearing, spawning and harvesting of clams, mussels, and oysters; • rearing, spawning and harvesting of crustaceans and other shellfish; • wildlife habitat; • recreation including primary contact recreation, sport fishing, boating, and aesthetic enjoyment; • commerce and navigation.

Appendix B: Maps





Elwha Surface Water Intake and Elwha Water Treatment Plant Conceptual Designs

Source: National Parks Service, U.S. Department of the Interior. *Elwha River Ecosystem Rehabilitation Implementation: Final Supplement to the Final Environmental Impact Statement.* July 2005.

Appendix C: Basis for Effluent Limits

The following discussion explains in more detail the statutory and regulatory basis for the technology and water quality-based effluent limits in the draft permit. Part A discusses technology-based effluent limits, Part B discusses water quality-based effluent limits in general, and Part C discusses facility specific water quality-based effluent limits.

A. Technology-Based Effluent Limits

There are no federal effluent limit guidelines for facilities of this type. The State of Washington has developed technology-based limits for settleable solids from water treatment plants (Ecology 2004), however, these technology-based limits are not applicable to the Elwha facility. The intake water for the EWTP will exhibit considerably higher turbidity and solids concentrations than that of a typical water treatment plant, and therefore the effluent water will also exhibit high turbidity and solids concentrations. The water treatment plants to which technology-based limits have been applied through Washington's general permit (WAG-64) generally discharge filter backwash in batches, as opposed to the EWTP's continuous discharge of removed solids from its sedimentation tanks. Ecology's fact sheet for its general permit for water treatment plants states that the general permit "does not cover water treatment plant (WTP) discharges that are significantly different from typical filter backwash." As such, the State of Washington's technology-based effluent limits for settleable solids from WTPs, which are implemented through its general permit for WTPs, are not applicable to this facility. EPA has included BMPs in the permit, requiring the permittee to control or abate the discharge of solids, turbidity, and coagulants.

B. Water Quality-based Effluent Limits

Statutory and Regulatory Basis

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to State or Tribal waters must also comply with limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the CWA. Federal regulations at 40 CFR 122.4(d) prohibit the issuance of an NPDES permit that does not ensure compliance with the water quality standards of all affected States. The NPDES regulation (40 CFR 122.44(d)(1)) implementing Section 301(b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State or Tribal water quality standard, including narrative criteria for water quality.

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation.

Reasonable Potential Determination

When evaluating the effluent to determine if water quality-based effluent limits are needed based on numeric criteria, EPA projects the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern. EPA uses the concentration of the pollutant in the effluent and receiving water and, if appropriate, the dilution available from the receiving water, to project the receiving water concentration. If the projected concentration of the pollutant in the receiving water exceeds the numeric criterion for that specific chemical, then the discharge has the reasonable potential to cause or contribute to an exceedance of the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it is appropriate to allow a small area of the receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body and will decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and when the receiving water meets the criteria necessary to protect the designated uses of the water body. Mixing zones must be authorized by Ecology. The water quality-based TSS effluent limits in this permit have been calculated using a mixing zone, but the water quality-based pH limits have not. If Ecology does not grant a mixing zone for TSS in its final Clean Water Act Section 401 certification of this permit, the water quality-based effluent limits will be recalculated such that the criteria are met before the effluent is discharged to the receiving water. If Ecology grants a mixing zone for pH, the water quality-based effluent limits will be recalculated such that water quality criteria for pH are met at the edge of the authorized mixing zone.

Procedure for Deriving Water Quality-based Effluent Limits

The first step in developing a water quality-based effluent limit is to develop a wasteload allocation (WLA) for the pollutant. A wasteload allocation is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water.

In cases where a mixing zone is not authorized, either because the receiving water already exceeds the criterion, the receiving water flow is too low to provide dilution, or the State does not authorize one, the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permittee will not cause or contribute to an exceedance of the criterion. The following discussion details the specific water quality-based effluent limits in the draft permit.

C. Facility-Specific Water Quality-based Limits

Total Suspended Solids

EPA has determined that the discharge has the reasonable potential to cause or contribute to violations of Washington's water quality criteria for turbidity. In most cases, this would cause EPA to include an effluent limitation for turbidity. See Appendix D for a discussion of how the water quality-based turbidity limits were calculated.

pH

Washington's water quality criteria for pH in Class AA freshwater are a range of 6.5 to 8.5 standard units, with a human-caused variation within the above range of 0.2 standard units. The draft permit requires that the pH range requirement be met before the effluent is discharged to the receiving water. EPA does not expect that the discharge will have more than a 0.2 standard unit effect on the pH of the river as a whole. The permit requires monitoring of the effluent and the river for pH and alkalinity.

If these data show that the discharge can have more than a 0.2 standard unit impact on the pH of the river as a whole, EPA may require more stringent effluent limits in future permits. Conversely, if the data show that the discharge does not cause more than a 0.2 standard unit change in the pH of the river as a whole and will not cause the pH of the river as a whole to be less than 6.5 standard units or more than 8.5 standard units, a mixing zone may be granted for pH, allowing the pH limits to be relaxed in future permits.

Polyaluminum Chloride

EPA concurs with Ecology's finding that the polyaluminum chloride coagulant to be used at the Elwha Water Treatment Plant is "highly unlikely to have adverse effects in the river," at the expected dosing level and there is currently no EPA-approved analytical method that can quantitatively measure the amount of polyaluminum chloride in the effluent (Marshall, 2005). Therefore, the permit does not contain a water quality-based effluent limit for polyaluminum chloride. However, the permit does contain a best management practices condition requiring the permittee to minimize the amount of coagulants in the discharge, and contains influent and effluent monitoring requirements for total aluminum.

D. References

Ecology. 2004. *Fact Sheet for NPDES General Permit: Water Treatment Plants – Wastewater Discharge.* Washington State Department of Ecology. June 16, 2004.

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control.* US Environmental Protection Agency, Office of Water, EPA/505/2-90-001.

Marshall, Randall. 2005. "Evaluation of Toxicity Test Results on Sediments Treated with Polyaluminum Chloride Executive Summary." July 20, 2005. Washington State Department of Ecology Water Quality Program.

Appendix D: Reasonable Potential and Effluent Limit Calculations for Total Suspended Solids

The following discussions explains why EPA has determined that the discharge authorized in the draft permit has the reasonable potential to cause or contribute to a violation of Washington's federally approved water quality standards for turbidity, and how water quality based effluent limits were calculated to ensure that turbidity standards are met downstream of the discharge.

A. Reasonable Potential Analysis

Because the Elwha Water Treatment Plant will be operated to remove sediment from water taken from the Elwha River, and then return sediment to the river at a high concentration, two of the pollutants of concern for the EWTP discharge are sediment and turbidity.

Applicable Water Quality Criteria

Washington's water quality standards do not have criteria for sediment concentrations, but do have criteria for turbidity, which is related to sediment concentrations. The relevant narrative turbidity criterion is as follows: "Turbidity shall not exceed 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU."

Because background sediment concentrations are expected to be high during and after the removal of the dams (in fact, it is these elevated sediment concentrations that necessitate the new water treatment plant), EPA expects that the background turbidity will be more than 50 NTU most of the time. Therefore, the relevant criterion will generally be the requirement that turbidity not be increased by more than 10% above background turbidity.

TSS and Turbidity Correlation

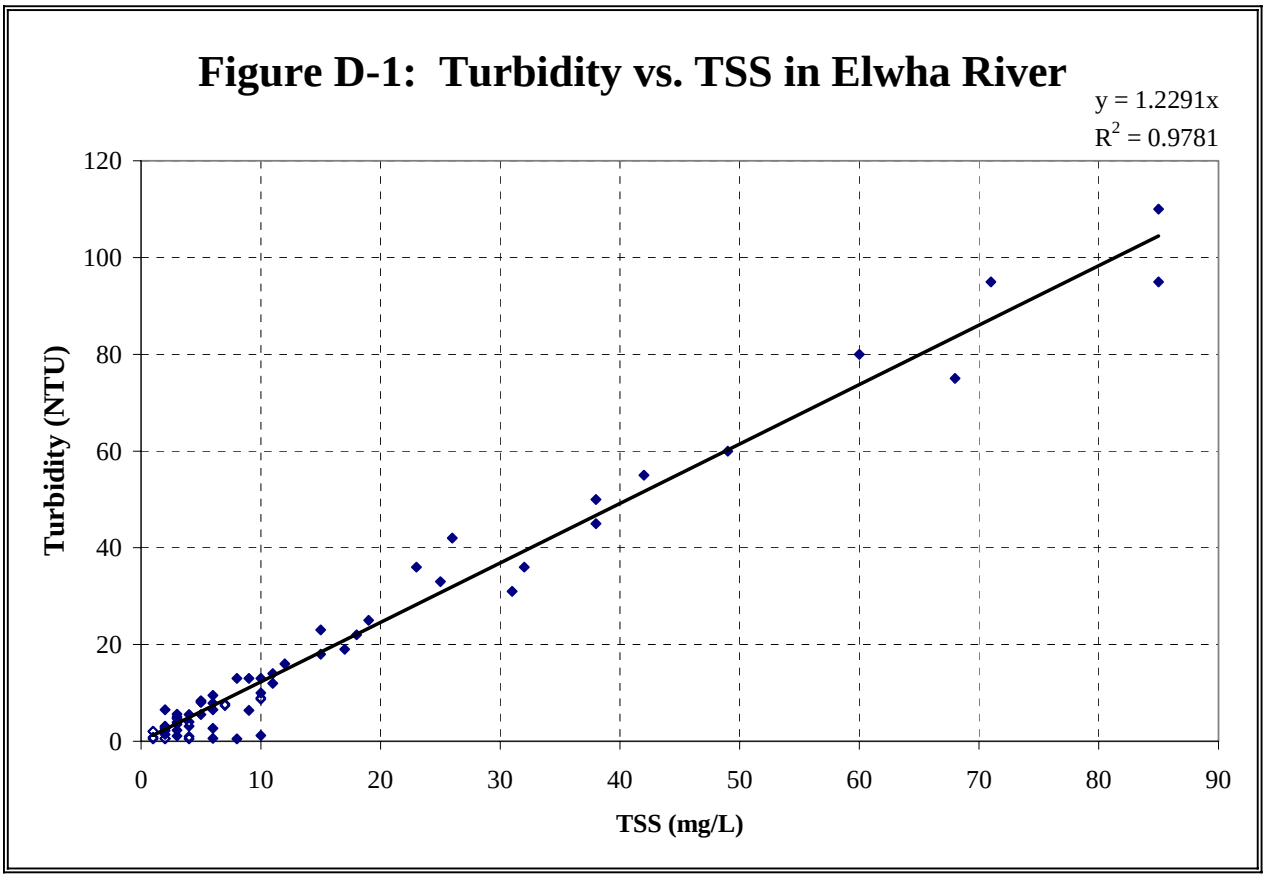
EPA has determined that there is a strong, linear correlation between turbidity in NTU and TSS concentrations in mg/L in the Elwha River. Turbidity and TSS data for this analysis were obtained from Ecology's water quality monitoring station on the Elwha River (18B070)[1]. See Figure D-1, below, for an illustration of the relationship between TSS and turbidity. This means that a 10% increase in TSS concentrations in the river will be equivalent to a 10% increase in turbidity.

The Bureau of Reclamation predicts that, under most circumstances, the operation of the EWTP will cause less than a 10% increase in sediment concentrations in the Elwha River (Interior, 2004). EPA believes the discharge will therefore cause less than a 10% increase in turbidity in the river under most conditions, and will therefore not cause excursions above Washington's turbidity criteria under those conditions.

However, when river flows are low and river sediment concentrations and demand for clean water are high, there is a chance that sediment concentrations in the river could be increased by more than 10% as a result of the EWTP discharge. The regulations require that reasonable potential analyses consider "the variability of the pollutant or pollutant parameter in the

[1]These data can be downloaded from http://www.ecy.wa.gov/apps/watersheds/riv/station.asp?sta=18B070.

effluent," therefore it is appropriate to consider this "worst case" scenario for river sediment impact in the reasonable potential analysis. Because of the linear relationship between TSS concentrations and turbidity, this would result in a violation of Washington's water quality criteria for turbidity. Therefore, EPA has determined that water quality-based effluent limits are necessary to ensure that turbidity criteria are met in the Elwha River downstream from the discharge.



B. Calculation of Water Quality-based Effluent Limits

Mixing Zone

In most cases, Washington's mixing zone rules (173-201A-100 WAC) restrict the size of mixing zones. However, 173-201A-100(12) allows the numeric size restrictions to be waived in limited cases. The State of Washington, Department of Ecology, has indicated that it intends to waive all numeric size restrictions on the mixing zone for this discharge. Therefore, effluent limits have been calculated using 100% of the receiving stream flow for mixing. If Ecology does not grant a mixing zone, or grants a smaller mixing zone, the effluent limits will be recalculated such that water quality standards are met at the end-of-pipe or at the edge of the smaller mixing zone.

Basis for Use of an Indicator Parameter

There are two methods for measuring turbidity that are approved for use with NPDES permits. EPA method number 180.1 can be used for water with turbidity less than 40 NTU, and USGS-

NWQL method number I-3860 can be used for water with turbidity less than 100 NTU. Because the turbidity of the discharge is expected to be much greater than 100 NTU, it is not possible to directly measure turbidity in the effluent. In contrast, EPA method 160.2 for measurement of total suspended solids can be used for water with TSS concentrations as high as 20,000 mg/L, which, based on the relationship shown in Figure D-1, is equivalent to a turbidity of 24,600 NTU.

The federal regulation 40 CFR 122.44(d)(1)(vi)(C) sets forth the following requirements for establishing an effluent limitation for an indicator parameter:

- The permit must identify which pollutants are intended to be controlled by the use of the effluent limitation.
- The fact sheet must set forth the basis for the limit, including a finding that compliance with the effluent limit will result in controls on the pollutant of concern which are sufficient to attain and maintain applicable water quality standards
- The permit must require effluent and ambient monitoring necessary to show that during the term of the permit, the limit on the indicator parameter continues to attain and maintain applicable water quality standards.
- The permit must contain a reopener clause allowing the permitting authority to modify or revoke and reissue the permit if the limits on the indicator parameter no longer attain and maintain applicable water quality standards.

EPA believes that compliance with the TSS effluent limits in the proposed permit will ensure compliance with applicable water quality standards for turbidity at the edge of a mixing zone incorporating 100% of the flow of the Elwha River at the point of discharge. There is a clear, linear correlation between turbidity and TSS concentrations, as shown by Figure D-1. Therefore, an effluent limitation on total suspended solids will result in controls on turbidity which are sufficient to attain and maintain water quality standards.

The permit contains the required reopener clause and clearly states that the TSS effluent limitations are intended to control turbidity. The permit requires influent monitoring of turbidity and TSS. The influent water is drawn from the Elwha River upstream of the point of discharge; therefore, the influent turbidity and TSS concentrations will be equal to the background (upstream) turbidity and TSS concentrations. The permit requires downstream receiving water monitoring for turbidity and TSS as well, and requires the permittee to submit a comparison between influent and downstream turbidity and TSS data and show the relationship between turbidity and TSS concentrations. Because both turbidity and TSS concentrations will be measured upstream and downstream of the discharge, EPA will be able to determine if the correlation between TSS and turbidity remains valid throughout the life of the permit and, in turn, whether the limit on TSS continues to attain and maintain applicable water quality standards.

Calculation of effluent limits when background turbidity is less than or equal to 50 NTU

When the background turbidity is less than or equal to 50 NTU, Washington's water quality criterion for turbidity allows for a 5 NTU increase above background turbidity. Based on the relationship between TSS concentrations and turbidity shown in Figure D-1, a 5 NTU increase in turbidity is equivalent to a 4.07 mg/L increase in TSS concentration. Therefore, to calculate an

effluent limit for TSS that is protective of applicable water quality standards when the background turbidity is less than or equal to 50 NTU, EPA has calculated the effluent loading of TSS that will impart a 4.07 mg/L increase to the river TSS concentration, for a given stream flow, then expressed that loading as an effluent limitation in pounds per CFS of stream flow per day.

The effluent limit calculation begins with the following mass-balance equation:

$$C_dQ_d = C_eQ_e + C_uQ_u \quad \text{(Equation D-1)}$$

where,

C_d = Receiving water concentration downstream of the effluent discharge (that is, the concentration at the edge of the mixing zone)
C_e = Effluent concentration
C_u = Measured receiving water upstream concentration
Q_d = Receiving water flow rate downstream of the effluent discharge
Q_e = Effluent flow rate
Q_u = Receiving water flow rate immediately upstream of the discharge

In this case, the downstream concentration must be no more than 4.07 mg/L greater than the upstream concentration, therefore:

$$C_d = C_u + 4.07 \text{ mg/L} \quad \text{(Equation D-2)}$$

Also, the flow downstream of the discharge is equal to the sum of the flow immediately upstream of the discharge and the effluent flow:

$$Q_d = Q_u + Q_e \quad \text{(Equation D-3)}$$

It is possible to substitute Equations D-2 and D-3 into Equation D-1 and simplify as follows:

$$Q_d(C_u + 4.07 \text{ mg/L}) = C_uQ_u + C_eQ_e$$
$$C_eQ_e = Q_d(C_u + 4.07) \text{ mg/L} - C_uQ_u$$
$$C_eQ_e/Q_d = C_u + 4.07 \text{ mg/L} - C_uQ_u/Q_d$$
$$C_eQ_e/Q_d = C_u + 4.07 \text{ mg/L} - [C_u(Q_d - Q_e)]/Q_d$$
$$C_eQ_e/Q_d = C_u + 4.07 \text{ mg/L} - C_u + C_uQ_e/Q_d$$
$$C_eQ_e/Q_d = 4.07 \text{ mg/L} + C_uQ_e/Q_d$$

We now have an equation that expresses the allowable effluent loading in units of mass flow rate in the effluent (the numerator of the left hand side of the last equation above has units of mass concentration multiplied by volumetric flow rate, which is equivalent to a mass flow rate) per stream flow rate (Q_d). These are the dimensions in which the effluent limit will be expressed.

Since the effluent flow (Q_e) will generally be much smaller than the downstream flow (Q_d), and because C_u will also be relatively small when the upstream turbidity is less than 50 NTU, the C_uQ_e/Q_d term is negligible, so it is appropriate to make the following approximation. Note that this approximation is conservative because the C_uQ_e/Q_d term, while small, will always be a positive number.

$$C_eQ_e/Q_d \approx 4.07 \text{ mg/L} \quad \text{(Equation D-4)}$$

To express this as an effluent limit, the only remaining task is a unit conversion. If Q_e has units of CFS and C_e has units of mg/L, the numerator of the left hand side of the equation has units of mg-ft^3/L-sec. To convert the numerator to units of lb/day:

$$1\frac{mg \cdot ft^3}{L \cdot s} \times \frac{28.32L}{ft^3} \times \frac{86{,}400s}{day} \times \frac{lb}{453{,}592mg} = 5.39lb/day$$

Therefore:

$$\frac{5.39lb \cdot L \cdot s}{day \cdot mg \cdot ft^3} = 1$$

Multiplying this conversion factor by the right hand side of equation D-4, we find that:

$$Limit_{lb/CFS-day} = \frac{C_e Q_e}{Q_d} = 4.07\frac{mg}{L} \times 5.39\frac{lb \cdot L \cdot s}{day \cdot mg \cdot ft^3} = 22\frac{lb \cdot s}{day \cdot ft^3} = 22\frac{lb}{CFS \cdot day}$$

(Equation D-5)

Calculation of effluent limit when background turbidity is greater than 50 NTU

When the background turbidity is greater than 50 NTU, the allowable downstream turbidity is not a constant interval above the background turbidity. Instead, the downstream turbidity may be 10% higher than the than the background turbidity. Because the relationship between turbidity and TSS is linear, a 10% increase in TSS is equivalent to a 10% increase in turbidity.

To calculate effluent limits for this situation, we begin with the mass-balance equation above (Equation D-1). Equation D-3, for the flow rates, is also valid. If the downstream turbidity can be 10% higher than the background turbidity, this means that:

$C_d = 1.1C_u$ (Equation D-6)

Substituting into the mass balance equation and rearranging yields the following:

$Q_eC_e = C_u(1.1Q_d - Q_u)$

Substituting Equation D-3 into this equation yields:

$Q_eC_e = C_u[1.1(Q_u+Q_e) - Q_u]$
$Q_eC_e = C_u(1.1Q_u + 1.1Q_e - Q_u)$
$QeCe = C_u(1.1Q_e + 0.1Q_u)$ (Equation D-7)

Then, make the same units conversion made to equation D-4 above:

$$Limit_{lb/day} = C_e Q_e = C_u(1.1Q_e + 0.1Q_u) \times 5.39\frac{lb \cdot L \cdot s}{day \cdot mg \cdot ft^3} = Cu(0.54Q_u + 5.9Q_e)$$

(Equation D-8)

C. References

United States Department of the Interior. 2004. *Predicted Effects of Sediment Discharge from the Elwha Water Treatment Plant.* Bureau of Reclamation. Water Resources Services Division. Sedimentation and River Hydraulics Group. Technical Service Center. Denver, Colorado. April, 2004.