FACT SHEET

The United States Environmental Protection Agency (EPA)
Plans To Reissue A National Pollutant Discharge Elimination System (NPDES) Permit to the following facility:

Warm Spring Forest Products Industries
and
Warm Springs Biomass Project, LLC
Warm Springs, Oregon 97761
and
the Confederated Tribes of the Warm Springs Reservation of Oregon

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EPA Proposes To Reissue NPDES Permit

EPA proposes to reissue the NPDES permit to the facility referenced above. The draft permit places conditions on the discharge of pollutants from the facility 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 locations
- technical material supporting the conditions in each permit

401 Certification for Facilities that Discharge to Tribal Waters

EPA is requesting the CTWSRO certify the NPDES permit for the Warm springs Biomass LLC (formerly the Warm Springs Forest Products Industries (WSFPI)) facility, under section 401 of the Clean Water Act.

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 will make a final decision regarding permit reissuance. 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 comments are received, EPA will address the comments and issue the permit. The permit will become effective 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 (see address below). The draft permit, fact sheet, and other information can also be found by visiting the Region 10 website at "www.epa.gov/r10earth/water.htm."

United States Environmental Protection Agency
Oregon Operations Office
811 SW 6th Avenue, 3rd Floor
Portland, Oregon 97204
(503) 326-2653

The Fact Sheet and draft permit are also available at:

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-8414 or 1-800-424-4372 (within Region 10)

Tribal Administration Building
Mail Reception Desk
1233 Veterans Street
Warm Springs, Oregon 97761
(541) 553-1161

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1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
AML	Average Monthly Limit
BOD_5	Biochemical oxygen demand, five-day
BE	Biological evaluation
°C	Degrees Celsius
cfs	Cubic feet per second
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
I/I	Inflow and Infiltration
lbs/day	Pounds per day
LTA	Long Term Average
mg/L	Milligrams per liter
ml	milliliters
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit
MPN	Most Probable Number
N	Nitrogen
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
OW	Office of Water
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
s.u.	Standard Units
TMDL	Total Maximum Daily Load
TRE	Toxicity Reduction Evaluation
TSD	Technical Support document (EPA, 1991)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Services

UV	Ultraviolet radiation
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WWTP	Wastewater treatment plant

I. APPLICANTS

Warm Springs Forest Products Industries and Warm Springs Biomass Project, LLC (WSFPI/WSB)
NPDES Permit No.: OR-002405-8

P.O. Box 810
Warm Springs, Oregon 97761

Contacts: Mark Jackson, WSFPI (541) 553-1131
Cal Mukumoto, WSB (541) 553-1131

II. FACILITY INFORMATION

The Warm Springs Forest Products Industries/Warm Springs Biomass Project, LLC (WSFPI/WSB, formerly simply Warm Springs Forest Products Industries) facility is located on the Warm Springs Indian Reservation at the confluence of Shitike Creek and the Deschutes River. The facility consists of a former wood processing mill and an attendant boiler and power plant, which uses wood by-products and waste from the manufacturing process to generate power.

An NPDES permit was issued to WSFPI on April 30, 1976. This permit expired on May 30, 1981. The company continued to monitor the discharge as required by this original permit until the permit was reissued on January 14, 1988. This permit expired on January 13, 1993, and the facility submitted an application for renewal of this permit on January 6, 1993. The 1988 permit was administratively extended pursuant to 40 CFR 122.6 and remains fully effective and enforceable until the permit can be reissued.

Facility operations and ownership have changed since the 1993 application was completed, and an updated permit application was received from WSFPI on February 9, 2007. In this application, the permittee requested that the new permit be issued to jointly to WSFPI and Warm Springs Biomass Project LLC, (WSB) of which WSFPI is a member. Planned operational changes at WSFPI necessitate this permit transfer. WSFPI plans to transfer ownership and operation of the existing boiler to WSB, a Delaware Limited Liability Company. WSB also plans on acquiring and operating a new boiler. This will require an increase in the authorized non-contact cooling water discharges from Outfall 001. WSB and WSFPI are co-applicants in the application upon which this permit is based. Therefore, the facility will be referred to as the WSFPI/WSB facility throughout this document.

Discharges from the facility as it currently operates consist of the following:

Outfall 001: Non-contact turbine cooling water, which is discharged to the Deschutes River through a diffuser. Under previous permits, WSFPI was also authorized to

discharge compressing cooler water and boiler blowdown water through Outfall 001, but current operations no longer require these discharges.

In its current permit application, WSFPI/WSB is requesting an increase in the allowable discharge volume from Outfall 001 from 8.9 mgd to 17.5 mgd. The increased flow is required for the new WSFPI/WSB Power Plant, which has been approved by the CTWSRO and is currently under construction. The draft permit proposes a maximum daily flow limit of 17.5 mgd.

In October, 2006 EPA Region 10 received an e-mail from WSFPI's consultant, TSS Consultants in Rancho Cordova, California, regarding the proposal to increase the cooling water removal and discharge back to the Deschutes River from the previously permitted 8.9 MGD to approximately 18 MGD. As part of their proposal, WSFPI and TSS Consultants are re-evaluating the temperature impact on the river from the discharge. In March 2000, a river water evaluation was conducted by WSFPI for submission to the Warm Springs Reservation Natural Resources Department. This evaluation used the minimum river water flow to evaluate the maximum water temperature in the river from the discharge of 9 MGD. This evaluation revealed an extremely low increase in temperature (slightly over 0.1 °F). However, EPA has performed its own evaluation for temperature and has reached a different conclusion (see Appendix B).

Outfall 002: This outfall has been eliminated. This outfall consisted of rainwater drainage from the truck scales sump which was discharged to Shitike Creek intermittently. However, during a site visit to WSFPI on October 11, 2006, EPA personnel were told that this discharge had been eliminated. The updated permit application confirmed that this discharge was eliminated in 1995 when the truck scale and sump were physically removed from the site. Stormwater from the facility is collected in a pond which does not discharge to surface water.

Outfall 003: This outfall previously discharged log pond overflow to Shitike Creek. The permit application indicates that the discharge was significantly reduced when the old sawmill was shut down and demolished in 1994. The former log pond is now used only as a fire control water storage pond in which clean water is stored for mill-wide fire protection and to supply the existing turbine condensers with non-contact cooling water. Calcium hypochlorite is added to the water reservoir on the suction side of the turbine condenser circulating pumps and the fire pumps to inhibit algal growth in the Power Plant cooling systems and the WSFPI mill site fire main.

During a site visit on October 11, 2006, EPA personnel were told that discharges from the fire control water pond are very infrequent (a WSFPI employee stated that the pond simply stores water drawn from the Deschutes River and that the pond discharged about once per year). The pond has a weir on the outlet side, and whenever the water level rises above the level of the weir, the overflow is discharged to Shitike Creek. The volume of

the pond is 250,000 gallons.

In the past, the log pond discharged excess water to Shitke Creek on a continuous basis. In 1986, the company filled in the majority of the old mill pond to create solid ground for the construction of the Small Log Sawmill. During that process, a headgate and culvert system that previously supplied water from Shitike Creek to the old mill pond was removed. The water supply for the old mill pond was then changed to the supply line from the Deschutes River Pumping Station. This is the same system and operational method that is currently in effect. The Shitike Creek Pumping Station was installed during this period and was piped to what remains of the old mill pond, but has always been used as an intermittent, or backup system and is not run on a continuous basis.

The mill's sanitary wastewater is now treated by the town's sewer system. The mill no longer treats sanitary wastewater on-site as it did when the previous permit was issued. The plywood and veneer operations have been shut down.

The facility's previous permit required monitoring for temperature from Outfall 001. Effluent monitoring from May 2002 to February 2006 was evaluated to determine compliance with the facility's current permit limits. The facility reported two violations of the temperature limit for Outfall 001 (July and October 2004). The facility did not report monitoring data in multiple months (January through March, May – June, August – September, and December 2004; May and August 2005; and January and February, 2006).

Summary information on the facility is provided in Appendix A.

III. RECEIVING WATER

Outfall 001 from the WSFPI facility discharges to the Deschutes River, and Outfall 003 discharges to Shitike Creek. Designated beneficial uses of these waters are found in Tables 1 and 4 of the Tribe's water quality standards and include industrial water supply; salmonid fish rearing and spawning; resident fish and aquatic life; wildlife and hunting; fishing; and water contact recreation.

A. Low Flow Conditions

Flow data from the United States Geological Survey (USGS) were used to determine the flow conditions for each of the receiving waters. Low flow conditions are used to perform reasonable potential analyses, and to calculate water quality based effluent limits (see Appendix B).

EPA used United States Geological Survey (USGS) data from 1925 through 2006 from USGS Station 14092500 (Deschutes River near Madras, OR) in the DFLOW program (version 3.1b) to calculate several low flow values for this reach of the

Deschutes River. These low flow values are seasonally-based 7 day, 10 year low values that were used in subsequent CORMIX modeling to evaluate temperature discharges into the Deschutes. EPA did not calculate 1Q10 flows for the Deschutes River, because temperature is the main pollutant of concern. It is appropriate to use 7Q10 flow rates for evaluating the discharge's effect on temperature using a 7-day low flow rate, because the temperature criteria are expressed as 7-day averages of the daily maximum temperatures (7DADM). The 7Q10 values calculated using DFLOW are summarized in Table 1 below:

Table 1
Seasonal Low Flow Values in the Deschutes River near the Warm Springs Biomass Facility

Time of Year	7Q10 (CFS)
October	3,280
November – March (except October) (fish spawning season)	3,270
April – September (fish rearing season)	3,260

United States Geological Survey (USGS) data from 1913 through 2005 (Station 14093000) indicate that the 7Q10 for this reach of Shitike Creek is 28 cubic feet per second (cfs) and the 1Q10 is 27 cfs.

B. Water Quality Standards

Because the receiving waters are within the Warm Springs Reservation, the permit was written to meet the water quality standards set by the CTWSRO Tribal Council. The Tribe's water quality standards are at least as stringent as the State of Oregon's water quality standards for the Deschutes River and Shitike Creek. Therefore, effluent limits based on the Tribal water quality standards will also be protective of the State of Oregon's water quality standards in waters of the State of Oregon that are adjacent to or downstream of the Tribal waters.

An NPDES permit must ensure that the discharge from the facility complies with the Tribe's water quality standards. A Tribe'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 cold water biota, contact recreation, etc.) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the Tribe 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.

Analysis of effluent monitoring data from the facility, the permit application, and computer modeling results that analyze the impact of the discharge on temperature in the Deschutes River indicate that the facility requires updated

permit limits. Because the effluent limits in the draft permit are derived from and comply with water quality standards, the discharges as authorized in the draft permit will not result in degradation of the receiving water.

C. Water Quality Limited

Any waterbody for which the water quality does not, and/or is not expected to meet, applicable water quality standards is defined as a "water quality limited segment."

Section 303(d) of the Clean Water Act (CWA) requires states to develop a Total Maximum Daily Load (TMDL) management plan for water bodies determined to be water quality limited segments. The TMDL documents the amount of a pollutant a waterbody can assimilate without violating a state's water quality standards and allocates that load to known point sources and nonpoint sources. The allocations for point sources are then incorporated into the NPDES permit.

Segments of the Deschutes River were listed in the 1998 303(d) list as limited for temperature. However, the segment of the Deschutes River to which the WSFPI/WSB facility discharges has not been listed. According to Oregon Department of Environmental Quality's website, a Total Maximum Daily Load (TMDL) assessment addressing temperature and sedimentation will be completed for the Lower Deschutes River in 2007. However, there are currently no TMDL requirements on the lower Deschutes River.

A search of Oregon DEQ's 2002 303(d) database indicated that Shitike Creek had been assessed in 2002 and was found to be water quality limited for habitat modification. However, a TMDL was not required. There was insufficient data available during the 1998 assessment to evaluate temperature, dissolved oxygen, nutrients, sedimentation or pesticides in Shitike Creek. The CTWSRO has not yet developed a 303(d) list. Based on these findings, there are no additional requirements relevant to the WSFPI/WSB discharge from water quality limited segments or TMDLs in Shitike Creek.

IV. EFFLUENT LIMITATIONS

A. Basis for Permit Effluent Limits

In general, the CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent 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 of a waterbody are being met and they may be more stringent than technology-based effluent limits. The bases

for the proposed effluent limits in the draft permit are provided in Appendix B.

B. Proposed Effluent Limitations

The following summarizes the proposed effluent limitations that are in the draft permit.

1. There must be no discharge of floating, suspended or submerged matter such that it impairs designated beneficial uses.
2. There must be no discharge of oil and grease that could cause discoloration, scum, oily sleek or floating solids, or coating of aquatic life with oil films.
3. There must be no discharge of wastewater from cold deck log sprinkling, air scrubber, filter backwash or steam vat condensate which are retained in a non-overflowing pond or recycled.
4. There must be no discharge of biocides, domestic sewage, chromium compounds, copper, or zinc.
5. Discharges which will violate water quality standards adopted in the Warm Springs Tribal Code Chapter 432 outside the mixing zones, defined for Outfall 001 as 10 feet upstream to 400 feet downstream and 100 feet from shore and for Outfall 003 from the shore to midstream, downstream 100 feet, and upstream 5 feet, are not authorized by this permit.
6. There must be no discharge of process wastewater from the facility.

Tables 2 and 3 below present the proposed effluent limits for Outfalls 001 and 003.

Table 2
Monthly, Weekly, and Maximum Daily Effluent Limitations, Outfall 001

Parameters	Maximum Daily Limit
Flow, mgd	17.5
Temperature, °C	32
Net Rate of Addition of Heat, million BTU/day (October only)	673
pH, s.u.	6.5 – 8.5 at all times

Table 3
Monthly, Weekly, and Maximum Daily Effluent Limitations, Outfall 003

Parameter	Limit
pH, s.u.	6.5 – 8.5 at all times

C. Basis for Less Stringent Effluent Limit for Flow

Section 402(o) of the Act generally prohibits "backsliding" in NPDES permits but

provides limited exceptions to this prohibition. Section 402(o)(1) of the CWA states that a permit may not be reissued with less-stringent limits established based on Sections 301(b)(1)(C), 303(d) or 303(e) (i.e. water quality-based limits or limits established in accordance with State treatment standards) except in compliance with Section 303(d)(4). Section 402(o)(1) also prohibits backsliding on technology-based effluent limits established using best professional judgment (i.e. based on Section 402(a)(1)(B)).

Section 303(d)(4) of the Act states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, WQBELs may be revised as long as the revision is consistent with the State's antidegradation policy. Additionally, Section 402(o)(2) contains exceptions to the general prohibition on backsliding in 402(o)(1). In accordance with the U.S. EPA NPDES Permit Writers' Manual (EPA-833-B-96-003), EPA generally views the 402(o)(2) exceptions as applicable to WQBELs (except for 402(o)(2)(B)(ii) and 402(o)(2)(D)) and they are independent of the requirements of 303(d)(4).

Therefore, it may be appropriate to relax water quality-based effluent limits as long as either the 402(o)(2) exceptions or the requirements of 303(d)(4) are satisfied. EPA believes that the relaxation of the flow limit is compliant with Section 402(o)(2)(B)(i) of the CWA ("new information"). The flow limit is based on new information provided in the most recent permit application, which was not available at the time the 1988 permit was issued.

Even if the requirements of Sections 303(d)(4) or 402(o)(2) of the Act are satisfied, Section 402(o)(3) of the Act prohibits backsliding which would result in violations of water quality standards or effluent limit guidelines. The requirements of Section 402(o)(3) are satisfied because the discharge, as authorized in the draft permit, will not result in water quality standards violations, nor would it violate effluent limit guidelines (see Appendix B).

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 monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if 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) to the U.S. Environmental Protection Agency (EPA).

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 (MDLs) are less than the effluent limits.

Review of hourly effluent data provided by the facility show that the effluent temperature can vary significantly within a calendar day. Therefore, a single grab sample per day may not be representative of the "daily discharge" as defined in 40 CFR 122.2, and EPA has therefore required the permittee to begin continuous monitoring of effluent temperature and flow within 1 year of the effective date of the final permit.

Tables 4 and 5 present the monitoring requirements for the permittee in the draft permit. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

Table 4
Effluent Monitoring Requirements, Outfall 001

Parameter	Unit	Sample Location	Sample Frequency	Sample Type
Flow Until 1 year after the effective date of the final permit	mgd	Influent and Effluent	daily	measure
Temperature Until 1 year after the effective date of the final permit	°C	Influent and Effluent	daily	grab
Flow After 1 year after the effective date of the final permit	mgd	Influent and Effluent	continuous	recording
Temperature After 1 year after the effective date of the final permit	°C	Influent and Effluent	continuous	recording
pH	standard units	Effluent	1/week	grab

Table 5 Effluent Monitoring Requirements, Outfall 003				
Parameter	**Unit**	**Sample Location**	**Sample Frequency**	**Sample Type**
pH	standard units	Effluent	weekly when discharging	grab
Total organic carbon	mg/L	Effluent	1/year	grab
Chemical oxygen demand	mg/L	Effluent	1/year	grab
Zinc	mg/L	Effluent	1/year	grab

C. Surface Water Monitoring

Table 6 presents the proposed surface water monitoring requirements for the draft permit. The permittee should work with the CTWSRO to establish the appropriate upstream and downstream monitoring locations.

Table 6 Surface Water Monitoring Requirements			
Parameter	**Sample Location**	**Sample Frequency**	**Sample Type**
Temperature, °C	Upstream and downstream of Outfall 001	1/month	grab

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 permittee is required to develop and implement a Quality Assurance Plan within 180 days of 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. The plan shall be retained on site and made available to EPA and CTWSRO upon request.

B. Operation and Maintenance Plan

The permit requires the permittee to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other

permit requirements at all times. The permittee is required to develop and implement an operation and maintenance plan for the facility within 180 days of the effective date of the final permit. The plan shall be retained on site and made available to EPA and CTWSRO upon request.

C. Additional Permit Provisions

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

VIII. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. A Biological Evaluation (BE) analyzing the effects of the discharge from the treatment facility on listed endangered and threatened species in the vicinity of the facilities was prepared. The BE is available upon request. In the BE, EPA determined that reissuance of this permit may affect, but is not likely to adversely affect the listed fish species (bull trout and steelhead) in the vicinity of the discharge. EPA will seek concurrence from USFWS and NMFS on the not likely to adversely affect determination.

B. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with the National Marine Fisheries Service (NMFS) when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. EFH was evaluated in the BE described above. EPA concludes that the issuance of this permit is not likely to adversely affect EFH for Chinook salmon and coho salmon. EPA will seek concurrence from NMFS on the not likely to adversely affect determination.

C. Tribal Certification

Section 401 of the CWA requires EPA to seek Tribal certification before issuing a final permit. As a result of the certification, the Tribe may require more stringent

permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards.

D. Permit Expiration

This permit will expire five years from the effective date of the permit.

Appendix A - Facility Information

Warm Springs Forest Products Industries and Warm Springs Biomass Project, LLC.	
NPDES ID Number:	OR-002405-8
Mailing Address:	P.O. Box 810 Warm Springs, Oregon 97661
Facility Background:	The facility's existing permit became effective January 14, 1988 and expired on January 13, 1993. The current permit application was received in February 2007.
Facility Information	
Treatment Train:	None. Outfall 001 consists of non-contact turbine and compressor cooling water. Outfall 003 consists of overflows from a raw water reservoir holding pond that is dosed with calcium hypochlorite to reduce algal growth. It discharges
Design Flow:	Outfall 001: 17.5 mgd Outfall 003: batch discharge
Existing Flow:	8.64 mgd (average daily flow rate) Outfall 003: batch discharge approximately once/year
Months when Discharge Occurs:	Outfall 001: continuous Outfall 003: batch discharge, approximately once/year
Outfall Location:	Outfall 001 latitude: 44° 46' 00" N, latitude: 121° 13' 30" W Outfall 003 latitude: 44° 46' 00" N, latitude: 121° 13' 30" W
Receiving Water Information	
Receiving Water:	Outfall 001: Deschutes River Outfall 003: Shitike Creek
Subbasin:	Lower Deschutes (HUC 17070306)
Beneficial Uses:	Deschutes River: Public water supply; industrial water supply; irrigation; livestock watering, anadramous fish passage; salmonid fish rearing and spawning; resident fish and aquatic life; wildlife and hunting; fishing; boating and rafting; water contact recreation; aesthetic quality; and cultural and religious practices. Shitike Creek: Industrial water supply; salmonid fish rearing and spawning; resident fish and aquatic life; wildlife and hunting; fishing; and water contact recreation.
Water Quality Limited Segment:	None
Low Flow:	**Deschutes River (7Q10 values):** October = 3,280 cfs November – March = 3,270 cfs April – September = 3,260 cfs **Shitike Creek:** 1Q10 is 27 cfs 7Q10 is 28 cfs

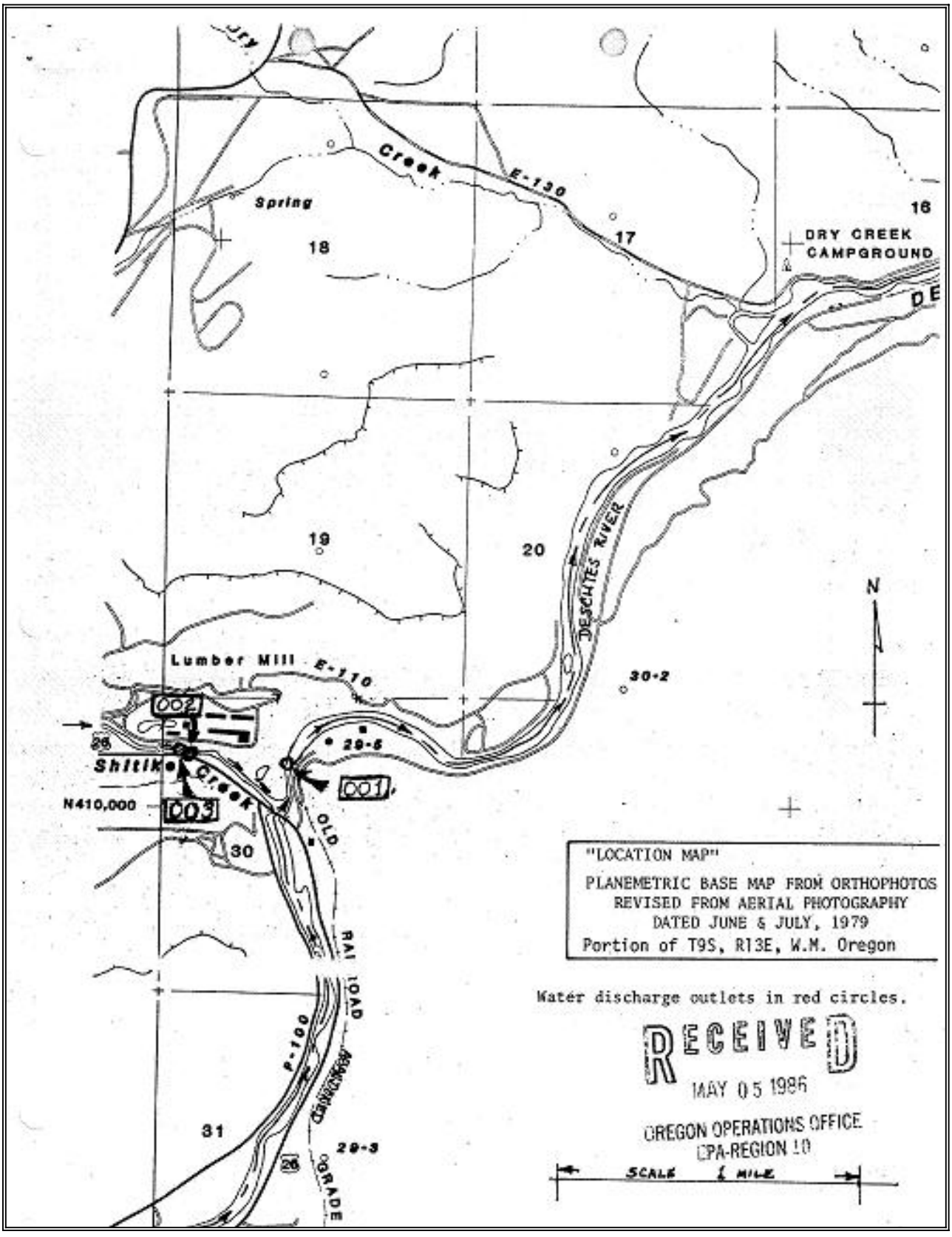

Figure A-1 Location Map (note that Outfall 002 has been eliminated).

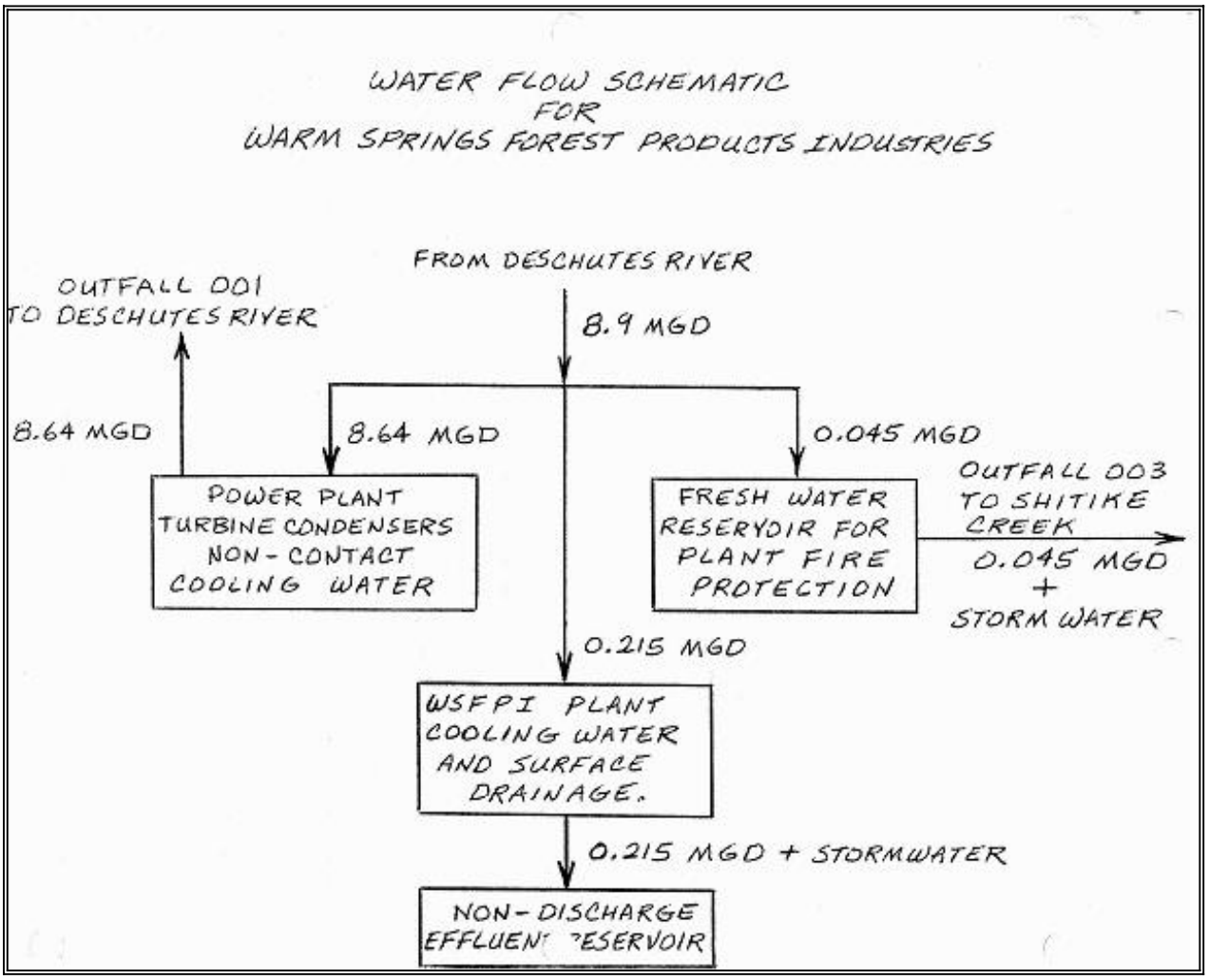

Figure A-2 Process Schematic
(Note: Cooling water effluent flow rate has increased to a maximum of 17.5 mgd, and outfall 003 no longer contains storm water.)

Appendix B - Basis for Effluent Limitations

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 and Part B discusses water quality based effluent limits.

A. Technology Based Effluent Limits

1. Limits Based on Effluent Guidelines

In 1981, EPA promulgated effluent limit guidelines for the timber products industry in 40 CFR Part 429. The effluent limit guidelines for sawmills and planning mills appear in 40 CFR Part 429, Subpart K. These effluent limit guidelines prohibit discharge of process wastewater to waters of the United States. Discharges of non-contact cooling water, material storage yard runoff, boiler blowdown, and fire control water are excluded from the definition of "process wastewater" in 40 CFR 429.11(c). Therefore, the effluent limit guidelines do not prohibit the discharge of such waters, or other discharges that are not "process wastewater" as defined in 40 CFR 122.2. Consistent with the effluent limit guidelines, the proposed permit prohibits discharges of process wastewater.

Previously, the facility was also subject to effluent limit guidelines promulgated for wet storage of logs, which appear in 40 CFR Part 429, Subpart I. These effluent limit guidelines require that the pH of wastewater from wet storage logs be no less than 6.0 and no greater than 9.0 standard units. The effluent limit guidelines also prohibit the discharge of debris, which is defined as "woody material, such as bark, twigs, branches, heartwood and sapwood that will not pass through a 1-inch diameter round opening and is present in the discharge from a wet storage facility."

These effluent limit guidelines were previously applicable to Outfall 003. However, the facility has indicated that Outfall 003 no longer functions as a wet storage area for logs, and so these guidelines no longer apply to Outfall 003 or any other outfall.

Draft Permit Limits:
Monitoring data for WSFPI/WSB from May 2002 through February 2006 was examined to determine if any considerations were necessary in updating effluent limits. The facility violated the temperature limit for effluent from Outfall 001 twice during the previous permit (July and October, 2004), although, in a 5 year period of effluent data, there were 12 months for which no data were reported. An analysis of 9,931 hourly effluent temperature data points collected between January 1, 2005 and December 22, 2006 shows a 95th percentile temperature of

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27.2 ºC, a 99th percentile temperature of 29.4 ºC, and a maximum effluent temperature of 32.2 ºC. The facility had no violations of its pH limits for either Outfall 001 or Outfall 003 during the time period evaluated, although twelve records were missing for each pH evaluation.

Based on these evaluations, the WSFPI/WSB facility can meet the limits in the expired permit, although the flow rate will increase above the effluent limit in the expired permit. Compliance with the reporting requirements will be emphasized during the current permit cycle.

B. Water Quality-Based Effluent Limits

The following discussion is divided into four sections. Section 1 discusses the statutory basis for including water quality based effluent limits in NPDES permits, section 2 discusses the procedures used to determine if water quality based effluent limits are needed in an NPDES permit, section 3 discusses the procedures used to develop water quality based effluent limits, and section 4 discusses the specific water quality based limits.

1. Statutory Basis for Water Quality-Based Limits

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 Tribal waters must also comply with limitations imposed by the Tribe as part of its certification of NPDES permits under section 401 of the CWA.

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 Tribal water quality standard, including State/Tribal narrative criteria for water quality.

The regulations require that this evaluation be made 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.

2. Reasonable Potential Analysis

When evaluating the effluent to determine if water quality-based effluent limits are needed based on chemical specific numeric criteria, a projection of the receiving water concentration (downstream of where the effluent enters the

receiving water) for each pollutant of concern is made. The chemical specific concentration of the effluent and receiving water and, if appropriate, the dilution available from the receiving water are factors used to project the receiving water concentration. If the projected concentration of the receiving water exceeds the numeric criterion for a specific chemical, then there is a reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it is appropriate to allow a small area of 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 decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and the receiving water is below the chemical specific numeric criterion necessary to protect the designated uses of the water body. Mixing zones must be authorized by the CTWSRO.

3. Procedure for Deriving Water Quality-Based Effluent Limits

The first step in developing a water quality based permit 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 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 or Tribe does not authorize one, the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permittee will not contribute to an exceedance of the criterion.

4. Specific Water Quality-Based Effluent Limits

(a) Floating, Suspended or Submerged Matter

Section 432.100(4) of the Tribe's WQS requires surface waters on the reservation to be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses.

(b) Oil and Grease

Section 432.100(4) of the Tribe's WQS requires surface waters on the reservation to be free from oil or scum in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses.

(c) pH

Section 432.100(2)(d) of the Tribe's WQS requires that ambient pH be within the range of 6.5 – 8.5 standard units. This requirement is reflected in the draft permit.

(d) Temperature

WSFPI/WSB discharges non-contact turbine cooling water through Outfall 001 to the Deschutes River through a diffuser. The primary concern regarding once-through cooling systems is the development and dissipation of thermal plumes. The Deschutes River is designated under the Tribal Water Quality Standards for the beneficial uses of public water supply; industrial water supply; irrigation; livestock watering, anadromous fish passage; salmonid fish rearing and spawning; resident fish and aquatic life; wildlife and hunting; fishing; boating and rafting; water contact recreation; aesthetic quality; and cultural and religious practices.

WSFP/WSB submitted a report entitled "Deschutes River Water Evaluation" (prepared by H. Dettinger, March 15, 2000) as part of the permit application package. The purpose of this report was to determine the temperature rise of the river water at the point of discharging the cooling water back into the river. The report evaluated the increase in temperature in the Deschutes River according to the equation:

$$\text{Combined Temperature} = \frac{(\text{River Flow})*(\text{River Temp})}{\text{River Flow}} + \frac{(\text{Efflnt Flow})*(\text{Efflnt Temp})}{\text{Efflnt Flow}}$$

The report used a Deschutes River flow value of 3,450 cfs, a river temperature of 14.4º C (58º F), an effluent flow of 17.5 mgd (27.1 cfs) and an effluent temperature of 32.2º C (90º F). Based on these values, the projected increase in temperature for the Deschutes River is 0.18º C (0.249º F) to a downstream temperature of 14.58º C (58.25º F). The report also provides a graph which shows projected temperature increases for Deschutes River flow rates of 3,000 to 6,500 cfs for various steam production rates. The permit application cites this report and states that the results indicate that there will be no measurable temperature increase in the River as a result of the changes requested in the application. However, the report does not use the low flow values recommended by EPA (e.g. 7Q10), which are lower than those used in these equations, and it does not consider the effects of the thermal plume, due to incomplete mixing of the discharge with the receiving water. These effects were evaluated by EPA using the CORMIX model, as described below.

Section 432.100(4) of the Tribal Water Quality Standards allows for a mixing zone at the Tribe's discretion. The previous permit (1988) allowed a mixing zone of approximately one-third the width of the river (100 feet) extending 400 feet downstream from the diffuser. The previous permit assumed that this mixing zone would represent one-third of the flow of the river. EPA has assumed that the Tribe will authorize a mixing zone with the same dimensions for the current reissuance of this permit. If the Tribe authorizes a larger or smaller mixing zone in its final Clean Water Act Section 401 certification of this permit, or does not authorize a mixing zone, the effluent limits in the final permit will be recalculated accordingly.

The Confederated Tribes of Warm Springs Reservation of Oregon WQS 432.025 states that no measurable surface water temperature increase resulting from anthropogenic activities is allowed unless a management plan has been reviewed and approved by the Tribe. This standard applies to the following:

(i) In a water body for which salmonid fish rearing (Table 4 CTWSRO WQS) is a designated beneficial use, and in which surface water temperatures exceed 64.0°F (17.8°C); or
(ii) In waters and periods of the year determined by the Tribe, (listed in Table 4 CTWSRO WQS, and Figure 1), to support native salmonid spawning, egg incubation, and fry emergence from the egg and from the gravels in a reach which exceeds 55.0°F(12.8°C); or
(iii) In waters determined by the Tribe to support or to be necessary to maintain the viability of native Oregon bull trout, (listed in Table 4 CTWSRO WQS, and Figure 1) when surface water temperatures exceed 50.0°F (10.0°C); or
(iv) In waters determined by the Tribe to be ecologically significant cold-water refugia (Table 4 CTWSRO WQS); or
(v) In stream segments containing federally listed Threatened and Endangered species.

In order to determine the compliance of the discharge with these water quality standards, EPA ran several modeling scenarios simulating mixing of the Warm Springs Biomass discharge in the Deschutes River. These scenarios, which were run with a CORMIX model, were also evaluated to determine the ability of the Warm Springs Biomass discharge to comply with the thermal plume provisions in the *EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards*

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(EPA, 2003, referred to as the EPA Region 10 Temperature Guidance[1]), as well as the Tribal water quality standards (including mixing zone restrictions). The EPA Region 10 Temperature Guidance discusses the following impacts of thermal discharges on aquatic life:

1. Exposures of less than 10 seconds can cause instantaneous lethality at 32°C. Therefore, EPA used the model to determine if the maximum temperature within the plume, after 2 seconds of plume travel from the point of discharge, does not exceed 32°C and therefore will not cause instant lethality.
2. Thermal shock leading to increased predation can occur when salmon and trout exposed to near optimal temperatures (e.g., 15 °C) experience a sudden temperature increase to 26 – 30 °C for a short period of time. Therefore, EPA used the model to determine if more than 5 percent of the cross sectional area of the river would exceed 25 °C, to ensure that the discharge will not cause thermal shock to aquatic life leading to increased predation.
3. Adult migration blockage conditions can occur at 21°C. Therefore, EPA used the model to determine if more than 25 percent of the cross-sectional area of the river would exceed 21 ºC, to ensure that migration of adult salmonids will not be impeded by the discharge.
4. Adverse impacts on salmon and trout spawning, egg incubation, and fry emergence can occur when the temperatures exceed 13°C. Therefore, EPA used the model to determine if the temperature of the river at the edge of the authorized mixing zone would be raised above 13 ºC as a result of the discharge. If the upstream temperature was above 13 ºC, EPA evaluated the difference between the upstream temperature and the temperature at the edge of the mixing zone.

The CORMIX Model

The Cornell Mixing Zone (CORMIX) Model version 5.0 was used to calculate dilution in this study. CORMIX is an 'expert system' that classifies discharges according to a complex system of length scale calculations using discharge and receiving water characteristics. Once classified, plume dilution and trajectory are calculated using the appropriate analytical solution, developed from extensive prior laboratory and field studies. The CORMIX mixing zone model was used for the following reasons:

[1] http://yosemite.epa.gov/r10/water.nsf/Water+Quality+Standards/TempGuidFinal

- CORMIX is applicable to a wide variety of discharge and receiving water conditions and has been validated under a variety of actual field conditions; and
- CORMIX is supported by EPA and generally supported by State regulatory agencies and has been applied throughout the U.S. to evaluate existing and proposed discharges.

Scenarios considered

To evaluate the reasonable potential for the Warm Springs Biomass thermal discharge to violate the Tribe's water quality standards, three scenarios were developed based on the various life stages of Chinook in the Deschutes River (which is designated for fall Chinook spawning and incubation in the vicinity of the discharge) and a review of available river temperature data.

Part 432.100(b) of the CTWSRO's standards define the Tribe's temperature criteria. Numeric criteria are expressed as seven-day averages of the daily maximum temperatures (7DADM). Waters designated for salmonid spawning and incubation have a 7DADM criterion of 12.8 ^{o}C, which applies during periods of time when spawning and incubation are occurring. The spawning and incubation period for fall Chinook is October 1 through March 31 (beginning of spawning through the end of fry emergence). The "rearing" criterion (7DADM of 17.8 ºC) applies during the remainder of the year.

Review of two years of river temperature data collected at the intake for the turbine cooling water by Warm Springs Forest Products between January 1, 2005 and December 22, 2006 indicates that ambient river temperatures meet criteria, except during the month of October.

In instances where river temperatures exceed the criterion, point source compliance is defined based on whether the point source causes a measurable increase, defined as 0.14ºC (0.25ºF), in the temperature of the receiving water (personal communication with Deepak Sehgal, Confederated Tribes of the Warm Springs Reservation of Oregon Tribal Environmental Office, 2007) at the edge of the authorized mixing zone. In all other cases, compliance with the temperature standards occurs if the discharge does not increase the river temperature above the applicable criterion at the edge of the authorized mixing zone.

The three scenarios evaluated in the reasonable potential analysis for temperature are explained in Table B-1, below:

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Table B-1
Scenarios for Warm Springs Biomass Reasonable Potential Analysis for Temperature

Scenario	7Q10 Flow (cfs)	Upstream Temperature (^{o}C)	Basis of Upstream Temperature	Criterion (^{o}C)	Compliance with Criterion
October	3280	12.8	Spawning criterion	12.8	<0.14 ^{o}C (0.25 ^{o}F) increase above background
Rearing	3260	16.3	95th percentile seven-day average of the daily maximum temperatures (7DADM) observed when the "rearing" criterion applies (April to September).	17.8	River temperature not greater than 17.8 ^{o}C
Spawning, without October	3270	11.3	95th percentile 7DADM temperature observed when the "spawning" criterion applies (November to March, excluding October because of separate scenario above)	12.8	River temperature not greater than 12.8 ^{o}C

Two compliance points were evaluated for each scenario to comply with tribal mixing zone provisions: 400 feet downstream of the Warm Springs discharge and the distance where the plume extends to one-third (1/3) of the channel width.

Due to concerns about potential impacts to threatened and endangered species, compliance with the thermal plume provisions in the EPA Region 10 Temperature Guidance was also evaluated for each of the three scenarios in addition to evaluation of compliance with the tribal water quality standards and mixing zone provisions as described above.

The following provisions of the guidance were evaluated for each of the three scenarios:

Table B-2
EPA Region 10 Temperature Guidance Considerations

Condition	^{o}C	Compliance Point
Instantaneous lethality	32	2 seconds of travel time from the point of discharge
Thermal shock	25	Downstream distance where plume encompasses 5% of channel cross-sectional area
Adult migration blockage	21	Downstream distance where plume encompasses 25% of channel cross-sectional area

Input assumptions

The CORMIX model requires inputs for effluent conditions (flow and temperature), discharge configuration, and ambient conditions (including channel characteristics, wind speed, flow, and temperature). CORMIX inputs for the three temperature scenarios described in Table B-1 are presented in Table B-3 below. The model inputs were structured to match the idealized assumptions inherent to the CORMIX model.

Table B-3
Summary of CORMIX2 Model Inputs for Warm Springs Biomass Discharge

Effluent Information	
flow rate = 17.5 MGD	effluent temperature = 32 ºC (maximum effluent temperature)
Discharge Information	
nearest bank = left	contraction ratio = 1
diffuser length = 12.8 m	total # openings = 84
distance to one endpoint = 7.10 m	alignment angle = 135º
distance to other endpoint = 16.16 m	diffuser arrangement = unidirectional
port height = 0.45 m	vertical = 22.5 º
port diameter = 0.0762 m	horizontal = 45 º
	relative orientation = 90 º
Ambient Information	
water temperature = Deschutes River temperature corresponding to scenario (see Table B-1)	width = 58 m
average depth = 1.6 m	Manning's n = 0.03
discharge depth = 1.6 m	wind speed = 2 m/s
flow rate = Deschutes River 7Q10 flow corresponding to scenario (see Table B-1)	

Information about the diffuser (number of ports, angles, etc.) was obtained from a detailed diffuser drawing provided by the Tribe. Channel information (average depth, width, and Manning's n) was also provided by the Tribe.

Water temperatures for the "Rearing" and "Spawning, without October" scenarios were calculated based on the 95th percentile 7DADM (7 day average of the daily maximum) temperatures for the Deschutes River, except for the October scenario, where the water quality criterion was used. Deschutes River 7Q10 flows were calculated with EPA's model DFLOW, version 3.1b using the available period of record for the United States Geological Survey stream gauge on the Deschutes at Madras, Oregon (Station 14092500).

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Results

Results for the reasonable potential analysis for temperature indicate that the Warm Springs Biomass discharge has reasonable potential to cause or contribute to excursions above applicable water quality standards when discharging at 32°C and 17.5 MGD during the month of October. The discharge is predicted to result in compliance with water quality standards and EPA temperature guidance for all other conditions evaluated in the scenarios. Therefore, except during the month of October, the temperature limit will be 32 ºC, and the flow limit will be 17.5 mgd, as simulated by the model.

For the "October" scenario (refer to Table B-7), an increase of 1.01 °C is predicted at the mixing zone boundary of 400 feet. In addition, an increase of 0.47 °C is predicted at the point where the plume extends to 1/3 the channel width or 19.3 m (located at a downstream distance of 1985 m). Both of these predicted temperature increases violate water quality standards for temperature. Therefore, additional restrictions must be imposed on the discharge in the month of October.

Predicted dilution factors, river temperatures, and plume locations for each of the three initial scenarios are shown in Table B-4.

Table B-4
Reasonable Potential Model Results for Temperature
(Effluent Temperature = 32 ºC)

Plume Location	Criterion or Guidance Value (°C)	Predicted Dilution Factor	Predicted Temperature (°C)	Increase over Criterion or Threshold (°C)	Distance Downstream (m)	Meets Criterion or Guidance Value?
October (Ambient temperature = 12.8 °C, River Flow = 3280 cfs)						
Mixing zone length = 400 ft	12.8	19	13.8	**1.01**	122	**No**
Mixing zone width = 1/3 channel width	12.8	41	13.3	**0.47**	1985	**No**
Instantaneous Lethality (2 seconds travel time from discharge)	32	8.1	15.2	-16.8	2	Yes
Thermal shock (5% channel cross-sectional area)	25	6.3	15.8	-9.15	1	Yes
Adult migration	21	31	13.4	-7.57	476	Yes

Table B-4 Reasonable Potential Model Results for Temperature (Effluent Temperature = 32 °C)						
Plume Location	**Criterion or Guidance Value (°C)**	**Predicted Dilution Factor**	**Predicted Temperature (°C)**	**Increase over Criterion or Threshold (°C)**	**Distance Downstream (m)**	**Meets Criterion or Guidance Value?**
blockage (25% channel cross-sectional area)						
Rearing (Ambient temperature = 16.3 °C, River Flow = 3260 cfs)						
Mixing zone length = 400 ft	17.8	19	17.1	-0.67	122	Yes
Mixing zone width = 1/3 channel width	17.8	40	16.7	-1.11	1917	Yes
Instantaneous Lethality (2 seconds travel time from discharge)	32	8.1	18.2	-13.8	2	Yes
Thermal shock (5% channel cross-sectional area)	25	6.3	18.8	-6.21	1	Yes
Adult migration blockage (25% channel cross-sectional area)	21	30	16.8	-4.18	476	Yes
Spawning, without October (Ambient temperature = 11.3 °C, River Flow = 3280 cfs)						
Mixing zone length = 400 ft	12.8	19	12.4	-0.41	122	Yes
Mixing zone width = 1/3 channel width	12.8	40	11.8	-0.99	1917	Yes
Instantaneous Lethality (2 seconds travel time from discharge)	32	8.1	13.9	-18.1	2	Yes
Thermal shock (5% channel cross-sectional area)	25	6.3	14.6	-10.4	1	Yes
Adult migration blockage (25% channel cross-sectional area)	21	30	12.0	-9.02	476	Yes

Predicted temperatures in the tables above were calculated from the following dilution equation:

$$T = T_{eff}/S + T_{amb}*[(S-1)/S]$$

Where T = edge of plume temperature, T_{amb} = ambient temperature, T_{eff} = effluent temperature, and S = model predicted dilution factor at a given point.

Calculation of Effluent Limits for October

Dilution factors predicted for each of the three scenarios are almost identical. Therefore, the effluent temperature required to cause no measurable increase in water quality water temperature at 400 feet downstream from the discharge can be calculated based on the following equation.

$$T_{eff} = S \times T - (S-1) \times T_{amb}$$

Using this equation, given a dilution factor (S) at 400 feet of 19 (Table B-4), required edge of mixing zone temperature (T) of 12.94 ^{o}C (0.14 ^{o}C over the 12.8 ^{o}C "spawning" criterion), and an ambient temperature (T_{amb}) of 12.8 ^{o}C, the effluent temperature required for compliance with the tribe's water quality standards and EPA Region 10 Temperature Guidance for the month of October was calculated to be 15.46 ^{o}C. However, during the month of October, EPA has chosen to express the effluent limits in terms of temperature, flow rate, and a net rate of addition of heat, as described below.

Basis for Limit on Net Rate of Addition of Heat

In instances where river temperatures exceed the criterion, point source compliance is defined based on whether the point source causes a measurable increase, defined as 0.14 ºC (0.25 ºF), in the temperature of the receiving water. Therefore, compliance is therefore not determined using a fixed receiving water temperature, rather, it is determined using a fixed interval above the ambient temperature.

Because compliance is determined using a fixed interval above the ambient temperature, it is possible to express the effluent limit using a limit on addition of heat to the river, as opposed to temperature. Water has a heat capacity that is essentially constant over the range of temperatures and pressures observed in the environment. Therefore, a

given amount of heat discharged to the river, at a given river flow rate, will raise the temperature of the river by a fixed amount.

As a first approximation, the rate of addition of heat limit was calculated by determining the amount of energy that would be necessary to raise the temperature of the facility's intake water from an initial temperature of 12.8 ºC to an effluent temperature of 15.46 ºC, if the flow rate was 17.5 mgd, consistent with the calculation described above. This is calculated using the following equation:

$Q = mC_p\Delta T$

Where:
Q = Energy, as heat, imparted to the receiving water
m = Mass flow rate of the effluent
= 17,500,000 gallons/day × 8.34 lb_m/gallon = 145,950,000 lb/day
C_p = Specific heat capacity of water at constant pressure
= 1 BTU/(lb×ºF)
ΔT = Temperature change between intake and effluent
= 2.66 ºC × 1.8 ºF/ºC = 4.79 ºF

Q = 145,950,000 lb/day × 1 BTU/(lb × ºF) × 4.788 ºF
= 699,000,000 BTU/day.

To determine if an effluent limit of 699,000,000 BTU/day would be protective under all combinations of effluent flow rates and temperatures, EPA ran two additional CORMIX simulations. The "high effluent flow" scenario used an effluent temperature of 15.46 ºC and an effluent flow rate of 17.5 mgd, and the "low effluent flow" scenario used an effluent temperature of 32 ºC and an effluent flow of 3.22 mgd (which was the lowest effluent flow rate that could be used without the model becoming unstable).

The "high effluent flow" scenario showed that a discharge of 17.5 mgd of water at 15.46 ºC would be protective of water quality standards (i.e. it would cause only a 0.14 ºC increase above background) at the edge of the mixing zone. However, for the "low effluent flow" scenario, it would be necessary to reduce the effluent temperature to 26.73 ºC in order to comply with the 0.14 ºC allowable increase at the edge of the mixing zone. With the flow rate of 3.22 mgd, this corresponds to 673,000,000 BTU/day of heat, which is about 4% lower than the heat limit calculated from the "high effluent flow" scenario. The more restrictive heat limit of 673,000,000 BTU/day is proposed in the draft permit, and this limit will be protective of water quality for all allowable combinations of effluent

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flow rate and temperature. Results of the modeling scenarios are described in Table B-5, below.

Table B-5
Effluent Limit Calculation Model Results for October Heat Rate Limit

Plume Location	Criterion or Guidance Value (°C)	Predicted Dilution Factor	Predicted Temperature (°C)	Increase over Criterion or Threshold (°C)	Distance Downstream (m)	Meets Criterion or Guidance Value?
October High Effluent Flow (Effluent Temperature 15.46 °C, Effluent Flow 17.5 mgd, Ambient temperature = 12.8 °C, River Flow = 3280 cfs)						
Mixing zone length = 400 ft	12.8	19	12.94	0.14	122	Yes
Mixing zone width = 1/3 channel width	12.8	41	12.89	0.09	1985	Yes
Instantaneous Lethality (2 seconds travel time from discharge)	32	0	15.46	-16.54	0	Yes
Thermal shock (5% channel cross-sectional area)	25	0	15.46	-9.54	0	Yes
Adult migration blockage (25% channel cross-sectional area)	21	0	15.46	-5.54	0	Yes
October Low Effluent Flow with Maximum Temperature (Effluent Temperature 32 °C, Effluent Flow 3.22 mgd, Ambient temperature = 12.8 °C, River Flow = 3280 cfs)						
Mixing zone length = 400 ft	12.8	99.5	**12.99**	0.19	122	**No**
Mixing zone width = 1/3 channel width	12.8	162	12.92	0.12	1917	Yes
Instantaneous Lethality (2 seconds travel time from discharge)	32	38.4	13.3	-18.7	2	Yes
Thermal shock (5% channel cross-sectional area)	25	27.9	13.49	-11.51	1	Yes
Adult migration blockage (25% channel cross-sectional area)	21	162	12.92	-8.08	409	Yes
October Low Effluent Flow with Reduced Temperature (Effluent Temperature 26.73 °C, Effluent Flow 3.22 mgd, Ambient temperature = 12.8 °C, River Flow = 3280 cfs)						
Mixing zone length = 400 ft	12.8	99.5	12.94	0.19	122	Yes
Mixing zone width = 1/3 channel width	12.8	162	12.89	0.09	409	Yes
Instantaneous Lethality (2 seconds travel time from discharge)	32	0	26.73	-5.27	0	Yes

Table B-5 Effluent Limit Calculation Model Results for October Heat Rate Limit						
Plume Location	**Criterion or Guidance Value (°C)**	**Predicted Dilution Factor**	**Predicted Temperature (°C)**	**Increase over Criterion or Threshold (°C)**	**Distance Downstream (m)**	**Meets Criterion or Guidance Value?**
Thermal shock (5% channel cross-sectional area)	25	27.9	13.3	-11.7	1	Yes
Adult migration blockage (25% channel cross-sectional area)	21	162	12.89	-8.11	476	Yes

In compliance with the anti-backsliding provisions of the Act and in order to prevent instantaneous lethality to salmonid fish, the 32 ºC limit on the effluent temperature is retained during the month of October. The net rate of addition of heat limit of 673,000,000 BTU/day is imposed in addition to the 32 ºC temperature limit in October. The permittee must comply with both the heat limit and the temperature limit. This means that the permittee may discharge effluent at a temperature of 32 ºC, if the effluent flow rate is sufficiently low such that they can meet the heat load limit.

Conclusions

Based on the preceding analysis, the Warm Springs Biomass discharge has the reasonable potential to cause or contribute to excursions above water quality standards for temperature, so effluent limits have been imposed for temperature and (during the month of October) heat. For all months of the year except October, the effluent limits were set equal to the temperature and flow rate simulated in the CORMIX model, 32 ºC and 17.5 mgd. The model predicted that the river would meet water quality standards at the edge of the Tribe's authorized mixing zone.

For October, the mixing model was applied to determine the amount of heat that the discharge could add to the river without causing a measurable increase in the temperature of the river. The net rate of addition of heat limit of 673,000,000 BTU/day is an additional restriction on the discharge which applies during October. The 32 ºC temperature effluent limit from the previous permit has been retained year-round.