National Pollutant Discharge Elimination System Permit Renewal Fact Sheet

100-J General Permit

State of Oregon Department of Environmental Quality
Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232

Proposed permit action:

100-J permit renewal. Registrants with coverage under the administratively extended NPDES 100-J issued on August 28, 1996, are required to reapply for coverage under this permit. Following the application period, the Oregon Department of Environmental Quality will issue assignment letters and any existing coverage under the administratively extended permit will terminate.

Permit category:

National Pollutant Discharge Elimination System General Permit

Source location:

Statewide

Activities covered under this permit:

Non-contact cooling water from industrial facilities

This permit applies to non-contact cooling water wastewater discharges to waters of the state. A discharge may occur as once-through non-contact cooling water, recycled non-contact cooling water, defrost water, heat pump transfer water and cooling tower blowdown. Recycled non-contact cooling water is discharged as blowdown or bled off to prevent a buildup of solid material in the non-contact cooling water system. Water replacement, blowdown and chemical addition are practices that are done to keep equipment operating efficiently.

This water is typically supplied from a water treatment facility (potable water), or groundwater and is used to transfer heat to maintain equipment but is not in direct contact with any raw material or material used in production.

Sources seeking coverage through this permit may include industrial and commercial facilities that use water to cool machinery and equipment.

Cooling water and sump pump discharges from hydroelectric facilities

This permit applies to hydroelectric facilities that discharge various types of cooling water and sump wastewater discharges commonly found at hydroelectric facilities.

Cooling water may be used to cool turbine bearings, guide bearings, air compressors, HVAC units, power transformers and other equipment at a hydroelectric facility. Cooling water at a hydroelectric facility is typically withdrawn from surface water. The source of the cooling water may be the same surface water used in the turbine to generate power.

Sump pump-drainage wastewater and pump unwatering wastewater may collect from floor drains, unwatering, roof drains, air compressor condensation, cooling water, equipment valves and seal leakage. “Unwatering” refers to water removed to access equipment submersed in water.

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Appendix Ⅰ: Applicable Temperature TMDL Requirements

1. Introduction

As required by Oregon Administrative Rule 340-045-0035, this fact sheet describes the basis and methodology used in developing the permit. The permit is divided into several sections:

Schedule A1 – Waste discharge limitations for industry
Schedule A2 – Waste discharge limitations for a hydroelectric facility
Schedule B – Minimum monitoring and reporting requirements
Schedule C – Not applicable
Schedule D1 – Special conditions for industry
Schedule D2 – Special conditions for a hydroelectric facility
Schedule E – Not applicable
Schedule F – General conditions

A summary of the basis for major changes to the permit are listed below:

- DEQ's 2003 and subsequent water quality temperature criteria and thermal plumes
- EPA approved Total Maximum Daily Loads
- EPA's 2014 cooling water intake structure requirements
- Water quality-based effluent limits for total residual chlorine
- A regulatory mixing zone based on low stream flow
- Land application requirements

2. Cover Page

DEQ develops and issues general permits for certain categories of minor source discharges or minor activities that are more appropriately controlled under a general permit. Per Oregon Administrative Rule 340-045-0033(2), a general permit is for a category of sources with similar or substantially similar types of operations, similar types of wastes and contains similar monitoring conditions. This general permit meets the requirements of OAR 340-045-0033(2).

Permit coverage for the type of effluent (discharge or wastewater) generated is the same as the existing 100-J permit issued on August 28, 1996. Air-water heat exchangers, coolant-water heat exchangers and oil-water heat exchangers are used at industrial and hydroelectric facilities. Waste heat is removed. Wastewater at industrial facilities can include non-contact cooling water, cooling tower blow down, defrost water and heat pump transfer water. Wastewater at a hydroelectric facility includes cooling water and sump pump type discharges.

2.1 Industrial Facility

The source of non-contact cooling water at an industrial facility is typically from potable water or groundwater. In general, non-contact cooling water is distributed through pipes, jackets, tubes, or coils for heat exchange. Non-contact cooling water is cooling water that does not come in direct contact with any raw material, intermediate product, waste product or finished product. However, chemicals may be added in some non-contact cooling water systems. Chemicals may be added to soften hard water, prevent or treat deposit buildup (de-scaling), prevent corrosion, or prevent micro-organisms from accumulating which may lead to corrosion. Potable water contains a chlorine residual. Recirculated water is treated to prevent build up by removing water (e.g., blowdown, bleed off), adding make up water and/or adding chemicals.

2.2 Hydroelectric Facility

Cooling water at a hydroelectric facility is typically sourced from surface water. The source of the cooling water may be the same surface water used through a turbine to generate power. Within a hydroelectric facility, equipment that is cooled with non-contact cooling water can include a turbine hydro-generator, HVAC unit, turbine shaft bearings (e.g., thrust and guide), turbine speed governor, transformers and other equipment associated with turbine power generation and transmission. This cooling water may be discharged with tailrace waters.

Equipment and floor drain wastewater (sump pump wastewater) may consist of lubricants (hydraulic oil and insulating oils) that escape from seals and hydraulic valves, unwatering wastewater drainage to access submersed equipment, navigation lock seeps and spillway seeps. These types of wastewaters are discharged through discrete outfalls and typically not with tailrace wastewater.

2.3 Coverage and Eligibility

This permit does not provide coverage for all waters of the state and does not extend permit coverage to all industrial and hydroelectric facilities.

2.3.1 Outstanding Resource Waters

Pursuant to OAR 340-041-0004(8), this general permit does not authorize a discharge to waters designated as Outstanding Resource Waters. A recent list of these waters includes North Fork Smith River including its tributaries and associated wetlands (OAR 340-041- 0305(4)), Waldo Lake and associated wetlands (OAR 340-041-0345(7)) and Crater Lake (OAR 340-041-0185(6)). A general permit issued in water that is designated in the future as an Outstanding Resource Water may require that future permit coverage be through an individual permit.

2.3.2 Oceans and Bays

Oceans and bays are large and tidal with multi-directional fluctuations. Due to the ambient nature of the water, a mixing zone that adequately addresses critical flow conditions is more appropriately developed using a site-specific analysis. Therefore, permit conditions for ocean and bay discharges are more appropriately contained in an individual permit.

2.3.3 Cooling Water Intake Structures

Section 316(b) of the CWA requires EPA to issue regulations on the design and operation of cooling water intake structures, to minimize adverse impacts from impingement and entrainment of fish and other aquatic organisms. In 2014, EPA established definitions and requirements that apply to cooling water intake structures found in 40 CFR Part 125 Subpart J to implement the Act.

40 CFR Part 125.92(f) defines a cooling water intake structure as the total physical structure and any associated constructed waterways used to withdraw cooling water from surface water. The cooling water intake structure extends from the point at which water is first withdrawn, including the intake pumps. Per 40 CFR Part 125.91(c), cooling water obtained from a public water system[1], reclaimed water from wastewater treatment facilities or desalination plants,

[1] Safe Drinking Water Act 1401(4) - A public water system means a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves at least twenty-five individuals. Such term includes (i) any collection treatment, storage and distribution facilities under control of the operator of such system and used primarily in connection with such system and (ii) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system.

treated effluent from a manufacturing facility, or cooling water that is used in a manufacturing process either before or after it is used for cooling as process water, is not considered use of a cooling water intake structure for purposes of this rule.

CWIS technology requirements for industrial facilities and hydroelectric facilities are implemented through NPDES permits under 40 CFR Part 125.90(b). Any facility that uses surface water for cooling is required to provide the appropriate documentation for permit coverage.

An industrial facility is required to provide DEQ with an inspection letter from Oregon Department of Fish and Wildlife for its CWIS or its contracted source of cooling water. Per Oregon Revised Statute 498.321, ODFW determines whether an intake structure is appropriately equipped.

DEQ will use EPA's July 2022 memorandum, *Transmittal of the Revised Framework for Best Professional Judgement for Cooling Water Intake Structures at Hydroelectric Facilities*, to evaluate a hydroelectric facility's CWIS.

See Sections 15.3 and 16.2 below for more information on CWIS requirements.

2.3.4 Total Maximum Daily Load: New Discharges

In general, permit limits must be included to address the wasteload allocations contained in applicable TMDLs. This general permit will not be available for a new discharge to waters as identified in the TMDLs in Table 1 of the Coverage and Eligibility section.

If no wasteload is allocated to a source, then a discharge is not allowed. Certain TMDLs do not contain WLAs for new sources. In other TMDLs, reserve capacity may not be available. Access to reserve capacity, if one exists, is necessary to allow a new source to discharge. In basins where unused WLAs are not provided in the TMDL, or a TMDL does not provide a process to assign a WLA for new sources, general permit coverage is not available.

In the Mainstem Willamette River TMDL, small source "bubble" allocations for the Lower, Middle and Upper Willamette River segments can be assigned to a limited number of 0.5 MGD 100-J discharges. Once that limited number is assigned, coverage under this general permit will not be available for that segment.

2.3.5 Steam Electric Effluent Limit Guidelines and Hydroelectric Facilities that adjoin two states

This permit does not provide permit coverage for steam electric power generating facilities that are required to meet effluent limit guidelines at 40 CFR Part 423. Steam electric power generating facilities typically must obtain coverage under individual permits.

This permit does not provide permit coverage for hydroelectric facilities that span the border between Oregon and a neighboring state. These facilities either have individual permit coverage or have submitted applications for individual permit coverage.

2.3.6 Natural Lakes

This permit does not provide permit coverage for a new or increased discharge to a natural lake. A permit for a new discharge or increased discharge to a lake must contain additional analysis as required in OAR 340-041-0004. These requirements are more appropriately addressed through an individual permit.

Natural lakes are addressed in the temperature criterion contained in OAR 340-041-0028(6). Further information on natural lakes and this temperature criterion is available in the Temperature Water Quality Standard Implementation IMD (April 2008) on DEQ's Internal Management Directives web page at https://www.oregon.gov/deq/Get-Involved/Pages/imd.aspx.

2.3.7 Limitations on Coverage (OAR 340-045-0033(10))

Pursuant to OAR 340-045-0033(10), situations when an individual permit may be required include:

- A discharge or activity is a significant contributor of pollution or creates other environmental problems;
- Failure to comply with, or is not currently in compliance with, the terms and conditions of the general permit, submitted false information, or the registrant is in violation of any applicable law;
- A change occurs in the availability of demonstrated technology or practices for the control or abatement of pollutants being discharged;
- Effluent limitation guidelines are promulgated for point sources covered by this general permit and the guidelines are not already in the general permit;
- Circumstances have changed so that the discharge or activity is no longer appropriately controlled under a general permit, or circumstances necessitate either temporarily or permanently reducing or eliminating the authorized discharge; or
- Any other relevant factors.

For example, any discharge with the potential to exceed in-stream water quality criteria under this permit may not qualify and an individual permit would be required. DEQ may request additional sampling.

3. Registration for Permit Coverage

All existing operations are required to notify DEQ of their intent to apply for this permit within 60 days after the effective date of this permit. Unless the application fee was previously paid, application fees are due with the notification.

All applicants, including existing operations, are required to submit an application for permit coverage. This is to provide up-to-date information to determine eligibility and/or conditions necessary for permit assignment. A complete application consists of a Land Use Compatibility Statement, EPA Form 1, EPA Form 2E and a DEQ form with applicable attachments. Fees are also required.

This permit allows the following existing operations a period of up to three years after the effective date of the permit to submit an application with current information. As specified in Section 3 of the permit.

- a registrant with administratively extended 1996 100-J permit coverage
- an existing operation that submitted an application for permit coverage prior to Jan. 1, 2023
- an existing operation without individual permit coverage that notifies DEQ of its intent to seek permit coverage within 60 days after the effective date of this permit.

Within at least one year prior to filing an application, an existing operation must notify DEQ of its intent to provide spawning bed documentation, cooling water intake structure documentation, a land application plan, ambient natural lake temperature or a downstream effects analysis and

the method of assessment proposed. See Sections 15 and 16 of this fact sheet for further descriptions.

A request for permit coverage from a new applicant is required at least 180 days prior to the discharge. Application fees are due with the application.

DEQ will process applications so that the number of registrations is consistent with mainstem Willamette River small source bubble allocations. DEQ will accept and process applications from permit holders with complete applications based on the availability of a bubble allocation. Applicants with administratively extended permit coverage that are listed in the TMDL will be given priority for a bubble allocation over existing discharges for which DEQ received an application between Jul. 31, 2001 and Jan. 1, 2023. Any additional applications received will be processed in order of receipt and only after considering availability reserved for administratively extended and existing discharges.

The failure to act on registration requirements may result in the termination of permit coverage.

4. Designated Beneficial Uses

Under the CWA, DEQ is required to establish protective water quality standards for all waters in Oregon, including identifying the beneficial uses. DEQ develops permits to ensure these water quality standards are implemented. With a few exceptions for hydro-power, industrial water supply and commercial navigation and transport, most basins have the following statewide beneficial uses listed below:

- Public and private domestic water supply
- Industrial water supply
- Irrigation and livestock watering
- Fish and aquatic life (including salmonid rearing, migration and spawning)
- Wildlife and hunting
- Fishing
- Boating
- Water contact recreation
- Aesthetic quality
- Hydro power
- Commercial navigation and transportation

The effluent limits and best management practices in this general permit will be protective of water quality standards, including beneficial uses in the receiving surface waters in the state.

5. Antidegradation

DEQ's antidegradation rules and policies are in place to protect existing water quality when existing water quality meets or exceeds standards and to restore water quality limited water. Antidegradation requires the protection and maintenance of existing uses and the level of water quality necessary to protect those uses and limits when new or increased pollutants may be allowed. The conditions in this permit are consistent with rules, policies and memos. EPA's August 2013 review of DEQ's antidegradation approach for general permits available on DEQ's Antidegradation and Outstanding Resource Waters web page at https://www.oregon.gov/deq/wq/Pages/WQ-Standards-Policies.aspx.

The proposed permit contains the same or more stringent discharge loadings as the existing permit. Permit renewals with the same or more stringent discharge loadings as the previous permit are not considered to lower water quality from the existing condition. DEQ is not aware of any information that existing limits are not protecting the receiving streams' designated beneficial uses. DEQ is also not aware of any existing uses present within the water bodies that are not currently protected by standards developed to protect the most sensitive designated use. Therefore, DEQ has determined that the proposed discharge complies with DEQ's antidegradation policy.

6. Antibacksliding

The proposed permit complies with the antibacksliding provisions of CWA sections 402(o) and 303(d)(4) and 40 CFR Part 122.44(l). The proposed limits are the same or more stringent than the existing permit so the antibacksliding provision is satisfied.

7. Schedule A: Permit Limit Development

Effluent limits serve as the primary mechanism in NPDES permits for controlling discharges of pollutants to receiving waters. The receiving water is where a discharge first enters a water of the state. Effluent limitations can be based on either the technology available to control the pollutants or limits that are protecting the water quality standards for the receiving water. DEQ refers to these two types of permit limits as technology-based effluent limitations (TBELs) and water quality-based effluent limits (WQBELs) respectively. When a TBEL is not restrictive enough to protect the receiving stream, DEQ must include a WQBEL in the permit.

7.1 Existing Effluent Limits

The existing 1996 100-J permit primarily contains limits for a discharge of heated wastewater from heat exchange equipment at industrial and hydroelectric facilities. The permit also includes sump pump type discharges at hydroelectric facilities. For industrial facilities discharge flow was limited to 0.5 MGD or less to ensure that large cooling water discharges are not covered by the permit. This flow limit did not apply to hydroelectric facilities.

The existing permit included a screening tool to assign the permit which was based on water quality standards in effect at the time of permit issuance in OAR 340-041-026(3)(a)(D)(i). Coverage under the permit was not assigned if the discharge did not meet a minimum dilution requirement. Flow in the receiving stream had to be at least four (4) times that of the discharge flow for each degree Fahrenheit difference between the temperature of the discharge and the receiving stream. The following example illustrates the use of this minimum dilution requirement:

Given: A discharge flow of 0.1 MGD at 100°F and a receiving stream temperature of 60°F, the receiving stream flow must be at least 16 MGD.

[(Effluent temperature °F – Temperature of receiving stream °F) x 4] x effluent flow MGD
[(100-60) x 4] x 0.1 MGD = 16 MGD

The table below contains the limits for flow, temperature, pH and toxics.

Table 7-1: 100-J Existing Effluent Limits

Parameter	Units	Limitations Daily Maximum
Flow	MGD	0.5
Flow (for hydropower facilities)	MGD	No Limit
Flow (MGD) x Temperature (°F)	Load Calculation	25
Flow (MGD) x Temperature (°F) (for hydropower facilities)	Load Calculation	No Limit
Temperature	°F	100 (See note 1)
Total Residual Chlorine	mg/L	0.5
pH	SU	Shall be within the range 6.0-9.0
Other Pollutants		No biocides or water treatment chemicals containing chromium, copper, zinc, chlorinated phenols or other priority pollutants shall be discharged. (See note 2)

Notes:

1. The Department may allow discharges up to 150 degrees F to an irrigation canal. The mixing zone as established in condition 4 below shall not extend into streams that support cool or cold water fisheries. All other terms and conditions of this permit would apply.
2. If chlorine is used as a biocide, the chlorinated water must either be dechlorinated prior to discharge or adequate detention time must be provided to allow the chlorine to dissipate prior to discharge. Dechlorination must be sufficiently effective or detention time sufficiently long to reduce total residual chlorine concentrations to the level stated above. Alternatively, the permittee can explore non-discharge options such as discharge to sanitary sewer and land application.

7.1.1 Existing Mixing Zone

The existing permit contains the following mixing zone description:

Notwithstanding the effluent limitations established by this permit except as provided in OAR 340-045-080, no wastes shall be discharged and no activities shall be conducted which will violate water quality standards as adopted in OAR Chapter 340 Division 41 except in the following defined mixing zone:

> The allowable mixing zone shall not extend downstream beyond a distance of 30 feet from the point of discharge and shall not exceed one-half the width of the receiving stream.

Added restrictions are noted in Table 7-1 above.

7.1.2 Existing Temperature Limits

The existing permit contains two limits associated with temperature. These are a daily maximum temperature limit of 100°F (37.8°C) and a flow (MGD) times temperature (°F) daily maximum limit of 25. The flow times temperature limit of 25 did not apply to hydroelectric facilities. The permit allowed effluent with temperatures up to 150°F (65.6°C) for discharges to irrigation canals.

7.1.3 Existing pH, Total Residual Chlorine and Toxics

A pH limit of 6 to 9 SU and total residual chlorine limit of 0.5 mg/L are contained in the permit.

The permit prohibits the discharge of biocides and water treatment chemicals containing chromium, copper, zinc, chlorinated phenols or other priority pollutants.

7.1.4 Existing Land Application

Land application of wastewater was provided as an option at times when a discharge could not meet the temperature requirements. Written approval was required for land application to occur. Land application was allowed provided there was no surface runoff or discharge to surface water from the site and provided the application rates did not exceed the hydraulic loading rate of the soil.

7.2 Pollutants of Concern

To ensure that a permit is protecting water quality, DEQ must identify pollutants of concern. These are pollutants that are expected to be present in the effluent at concentrations that could adversely impact water quality. DEQ uses the following information to identify pollutants of concern:

- Effluent monitoring data.
- Knowledge about the processes.
- Knowledge about the receiving stream water quality.
- Pollutants identified by applicable federal effluent limitation guidelines.

DEQ identified pollutants of concern for these types of facilities.

7.2.1 Industrial Facilities

Pollutants of concern include heat (e.g. temperature, thermal load), pH and pollutants from chemical use, such as chlorine. Chlorine may also be present in potable water used for cooling. A discharge of toxic pollutants from biocides or water treatment chemicals containing chromium, copper, zinc, chlorinated phenols or other priority pollutants is prohibited. There may be a potential for oil and grease from lubricants.

7.2.2 Hydroelectric Facilities

Pollutants of concern from sump pump type discharges at hydroelectric facilities include temperature, pH and oil and grease. The main pollutant of concern from cooling water is heat (temperature, thermal load). Cooling water discharges are not typically expected to change pH because the source of the water is the same as the receiving water and typically there is no chemical use. Oil and grease are not expected to be present in a cooling water discharge.

7.3 Regulatory Mixing Zone

The proposed permit contains mixing zones as allowed per OAR 340-041-0053.

The previous mixing zone included specific boundaries. The proposed mixing zone is flow-based, which is more appropriate for a general permit. The proposed permit includes a regulatory mixing zone of 25% of the receiving stream and zone of initial dilution that is 10% of the receiving stream. These are based on a critical low flow, typically a 7Q10 low flow of the stream. The delineation of the mixing zone allows for fish passage, as well as efficient and effective implementation of temperature criteria and total maximum daily loads for temperature.

A critical mixing zone dilution value (S_{MZ}) for temperature facilitates limit derivations and ensures significant reductions in assimilative capacity do not occur. A critical mixing zone dilution (S_{MZ}) assigned by DEQ at the time of permit coverage will be the lower of the calculated value of S_{25} or the S_{MZ} Max. These critical mixing zone dilution values are addressed in Section 8.3 of this fact sheet describing the temperature limits, below.

The dilutions at the edge of the zone of initial dilution and mixing zone for the rivers, creeks and streams (non-natural lake discharges) will be representative of the critical receiving water flow for that discharge location and the allowable discharge flow. The dilution equations for certain scenarios are presented in the table below.

Table 7-2: Facility Dilution Summary

Receiving Stream Type	Design Effluent Flow (Q_{ed}, MGD)	Receiving Stream Flow (Q_a, cfs)	Regulatory Mixing Zone Dilution (S_{25})	Zone of Initial Dilution
Rivers, creeks, streams	Q_{ed}	Q_a	$[(Q_{ed}*1.5472) + (0.25*Q_a)]/Q_{ed}*1.5472$	$[(Q_{ed}*1.5472) + (0.10*Q_a)]/Q_{ed}*1.5472$

Notes:
1. Q_{ed} is the maximum design effluent flow from the facility for all cooling water outfalls (MGD). Total maximum daily design flow is not to exceed 0.5 MGD at an industrial facility.
2. Q_a is the critical low flow of the receiving stream, usually the 7Q10 low flow (cfs).

There is no mixing zone or zone of initial dilution for a discharge to a natural lake. A discharge limitation is met with no dilution at the point of discharge.

DEQ has set a maximum effluent temperature of 32°C to prevent harm to aquatic organisms and to ensure conditions that allow passage of fish and other organisms.

7.4 Technology-Based Effluent Limit Development

Technology-based effluent limitations (TBELs) aim to prevent pollution by requiring a minimum level of effluent quality that is attainable using demonstrated technologies for reducing discharges of pollutants. TBELs are developed independently of the potential impact of a discharge on the receiving water, which is addressed through water quality standards and water quality-based effluent limitations (WQBELs).

EPA is required to develop TBELs for categories of industrial facilities. These limits are called effluent limitation guidelines (ELGs). EPA established these based on available treatment technologies for facilities within an industrial category or subcategory.

EPA has not established ELGs solely for cooling water discharges.

7.5 Water Quality-Based Effluent Limit Development

40 CFR Part 122.44(d) requires that permits include limitations more stringent than technology-based requirements where necessary to meet water quality standards. Water quality-based effluent limits may be in the form of a wasteload allocation required as part of a Total Maximum Daily Load (TMDL). They may also be required if an analysis indicates the discharge has the reasonable potential to cause or contribute to an exceedance of a water quality criterion. DEQ establishes effluent limits for pollutants in a general permit that may have a reasonable potential to exceed a criterion. These effluent limits are discussed below.

7.6 Impaired Waterbodies and TMDLs

7.6.1 Impaired Waterbodies

DEQ regularly assesses whether waterbodies are meeting applicable water quality standards. DEQ puts assessed water bodies into categories based on whether the waterbody is impaired. Waterbodies identified as impaired (not meeting water quality standards) are listed in Category 5, known as the 303(d) list. Category 4A includes water bodies that have clean-up plans (also called TMDLs) that will result in the waterbody meeting water quality standards and supporting beneficial uses.

7.6.1.1 Impaired waters without a TMDL, Category 5.

DEQ lists water quality limited water by stream segment and lists stream segments as water quality limited in a watershed. DEQ's current 303(d) list of water quality limited waters (approved or established by EPA in September 2022) can be found on DEQ's web site at https://www.oregon.gov/deq/wq/Pages/epaApprovedIR.aspx.

Pollutants of concern in Category 5 that may also be on DEQ's 303(d) list of water quality limited water include temperature and pH.

This permit requires a discharge to meet a pH water quality criterion at end of pipe in the following situations:

- a stream or stream segment is water quality limited for that pollutant,
- that pollutant of concern, as listed in the permit, is present in the discharge and
- a total maximum daily load has not been developed.

This permit requires a discharge to meet temperature criteria set forth in OAR 340-041-028(12)(b)(A) in impaired water as explained in Section 8.3 below.

7.6.1.2 Total Maximum Daily Loads with Assigned Temperature Wasteload Allocations, Category 4A

Permits must be consistent with the assumptions and requirements of any applicable TMDL. DEQ reviewed each of the EPA-approved Total Maximum Daily Loads within Oregon to determine the temperature requirements for facilities covered under this permit. Temperature TMDL requirements and how they are addressed within the proposed permit, are discussed in Section 8.4, below.

7.6.1.3 Total Maximum Daily Loads for pH

TMDLs are established for pH. A discharge will be required to meet a wasteload allocation for pH established in a TMDL. DEQ will require treatment for pH, as necessary to be consistent with the requirements of a TMDL wasteload allocation.

8. Schedule A1: Temperature Effluent Limits for Industrial Facilities

8.1 Temperature Criteria OAR 340-041-0028

In the period since the existing permit was developed, DEQ has adopted new temperature and thermal plumes standards. The biologically based numeric temperature criteria that apply to receiving waters across Oregon are contained in OAR 340-041-0028 and are summarized in the table below. In addition to these criteria, OAR 340-041-0028 also includes other criteria, including those protecting cold water (OAR 340-041-0028(11)).

Table 8-1: Temperature Criteria Information

Beneficial Use/Receiving Stream	Criterion (°C as a 7DADM)	Use Identification
Salmon & Steelhead Spawning	13.0	Tables and figures within OAR 340-041-0101 to -340
Core Cold Water Habitat	16.0	
Salmon & Steelhead Rearing & Migration	18.0	
Migration Corridor	20.0	
Lahontan Cutthroat Trout or Redband Trout	20.0	
Bull Trout Spawning and Juvenile Rearing	12.0 (See note 1)	
Unidentified Tributaries	Same as nearest downstream waterbody	
Oceans, Bays and Natural Lakes (See note 2)	Maximum of 0.3 increase above natural condition	
Cool Water Species	No increase that would impair cool water species (See note 3)	Tables and figures within OAR 340-041-0101 to -340
Borax Lake Chub	Maximum of 0.3 decrease below natural condition	State waters in the Malheur Lake Basin supporting Borax Lake chub

Notes:
1. See other criteria in OAR 340-041-0028(4)(f).
2. For the purposes of this permit, the temperature criteria for a natural lake is its ambient temperature per OAR 340-041-0028(6). See Section 15.6 for more information.
3. Also, see OAR 340-041-0185 for the Klamath River.

The temperature criteria for the protection of cold water are contained in OAR 340-041-0028(11). Subsection (a) of this rule section pertains to protection of waters that, during the summer, remain colder than the applicable biologically based criteria. Subsection (b) of this rule section pertains to protection of waters that are colder than the applicable biologically based criteria during the period when salmon & steelhead spawning is a designated beneficial use.

8.2 Thermal Plumes OAR 340-041-0053(2)(d)

In addition to compliance with the temperature criteria, OAR 340-041-0053(2)(d) contains thermal plume limitation provisions designed to prevent or minimize adverse effects to salmonids that may result from thermal plumes. These provisions are:

- OAR 340-041-0053(2)(d)(A): Impairment of an active salmonid spawning area where spawning redds are located or likely to be located. This adverse effect is prevented or minimized by limiting potential fish exposure to temperatures of 13°C or more for salmon and steelhead and 9°C or more for bull trout.

- OAR 340-041-0053(2)(d)(B): Acute impairment or instantaneous lethality is prevented or minimized by limiting potential fish exposure to temperatures of 32°C or more to less than 2 seconds.

- OAR 340-041-0053(2)(d)(C): Thermal shock caused by a sudden increase in water temperature is prevented or minimized by limiting potential fish exposure to temperatures of 25°C or more to less than 5% of the cross-section of 100% of the 7Q10 flow of the waterbody.

- OAR 340-041-0053(2)(d)(D): Unless ambient temperature is 21°C or greater, migration blockage is prevented or minimized by limiting potential fish exposure to temperatures of 21°C or more to less than 25% of the cross-section of 100% of the 7Q10 flow of the waterbody.

8.3 Effluent Limits to Address Temperature Criteria and Thermal Plumes Limitations

To determine the appropriate temperature effluent limits for the proposed permit, many factors must be considered, including:

- Applicable criteria
- Receiving stream conditions (flow and temperature impairment status)
- Existence of TMDL requirements (addressed in next section)
- Existing permit limits
- Effluent flow

As noted in the sections above, the applicable temperature criteria are dependent on site-specific factors such as the designated fish use(s) for the receiving stream. Additionally, rule requirements for implementing the temperature criteria are dependent on whether or not the receiving stream is listed as water quality impaired for temperature and whether or not a temperature TMDL has been developed to address the applicable criteria (see OAR 340-041-0028(12)).

To efficiently address each potential implementation scenario, temperature limits in this permit are based on the conservative assumption that each receiving stream is listed as water quality impaired for temperature. Therefore, the implementation requirements set forth in OAR 340-041-0028(12)(b)(A), which allow for an increase of 0.3°C after mixing with 25% of the stream flow or the temperature mixing zone, were used to ensure compliance with the temperature criteria. As noted in Section 7.3 above, the regulatory mixing zone for this permit has been set to 25% of the critical low flow, e.g., 7Q10 low stream flow for a non-natural lake discharge. This

corresponds with the 25% mix value in the temperature implementation rule. A natural lake discharge temperature mixing zone is set equal to a mix value of one (1).

The assumption that each receiving stream is listed as water quality impaired for temperature also ensures that other requirements are addressed concurrently. This approach addresses:

- The significant number of the surface waters in Oregon that are listed as water quality impaired for temperature, but where a TMDL has not yet been developed,
- The derivation of effluent limits to address the applicable biologically based criteria for streams that are not listed as water quality impaired for temperature (where the criteria need to be met at the edge of the mixing zone),
- The TMDL waste load allocations that essentially equate to the limits derived while considering this assumption,
- The cold-water protection requirements of the temperature rule that are addressed concurrently,
- Limits for two of the thermal plumes requirements which are derived in a similar manner (see discussion below), and
- DEQ's antidegradation rule.

8.3.1 Cold Water Protection

The temperature criteria for the protection of cold water are contained in OAR 340-041-0028(11). An analysis indicates that an effluent limit based on the "pre-TMDL" section of the temperature rule will also ensure that the cold water protection portions of Oregon's temperature rule will also be met in almost all potential discharge scenarios.

8.3.2 Thermal Plumes Limitations

The four thermal plumes limitations noted above in Section 8.2 are addressed for this permit in the following manner:

- Spawning area impairment portion of the thermal plumes rule (OAR 340-041-0053(2)(d)(A)): This requirement is addressed in the proposed permit through a condition to either document that impairment to an active salmonid spawning area where spawning redds are located or likely to be located is prevented or minimized, or to directly implement the applicable criterion as an effluent limit. Because the effluent limits derived in the previous section ensure that the applicable biologically based numeric criteria are met outside of the mixing zone, these permit requirements will ensure this portion of the thermal plumes limitations requirements is met. See Section 15.2, below, for a more detailed discussion of this permit requirement.
- Acute impairment/instantaneous lethality portion of the thermal plumes rule (OAR 340-041-0053(2)(d)(B)): This requirement is addressed by including a daily maximum temperature limit of 32°C for all discharges, ensuring potential fish exposure to temperatures of 32°C or more is less than 2 seconds.
- Thermal shock and migration blockage (OAR 340-041-0053(2)(d)(C) and (D)): Compliance with the thermal shock and migration blockage portions of the thermal plumes requirements is attained by restricting dilution as described in the section below.

8.3.3 Dilution

Dilution of the effluent within the receiving water must also be considered for implementation of both the biologically based criteria and the thermal plumes requirements.

A limitation on the maximum dilution ensures that any temperature limit derived to address the biologically based criteria will also ensure compliance with the thermal shock and migration

blockage portions of the thermal plumes requirements (OAR 340-041-0053(2)(d)(C) and (D)). This limitation on the allowable dilution also ensures that discharges to large streams do not have excessively large thermal loads that may use up significant portions of a stream's assimilative capacity.

To determine the applicable dilution for a discharge, the maximum design effluent flow and critical (conservative) receiving water flow, e.g., 7Q10 low flow must be provided in an application and approved by DEQ. Flow monitoring requirements will ensure that the effluent flow is consistent with the maximum design effluent flow.

Table 8-2: Temperature Limits

Limit Type	Limit	Rationale for Limit
Thermal Load (See notes 1 and 2)	25	Anti-backsliding (existing limit for non-hydropower facilities)
Excess Thermal Load (Mkcal/day, 7-day rolling average) (See notes 3 and 4)	Q_{ed} * (0.3*S_{MZ}) * 3.78541 or Q_{ed} * S_{MZ}* 1.14	Implements the 'Pre-TMDL' section of the temperature rule and Thermal Plumes Requirements
Temperature (°C, daily maximum)	32	Implements the Acute Impairment Thermal Plumes requirements
Narrative	1) Required documentation that no active spawning beds are likely to be impaired, or 2) Where the above documentation is not provided, no discharge above 13.3°C (for salmon and steelhead) or 9.3°C (for Bull trout) in receiving streams where/when spawning is a beneficial use.	Implements the Spawning Thermal Plumes requirements

Notes:

1. Only applicable to non-hydroelectric facilities in water with fish use designation(s).
2. [Q_e * (T_e * 1.8+32)], where Q_e is the actual effluent flow and T_e is the effluent temperature in °C,
3. Q_{ed} is the maximum design effluent flow from the facility for all cooling water outfalls (MGD). A total maximum daily design flow is not to exceed 0.5 MGD for an industrial facility.
4. S_{MZ} is the critical mixing zone dilution. For natural lake discharges, the critical dilution is 1. For other discharges, the S_{MZ} will be the lower of the S_{25} or S_{MZ} Max. S_{25} = [(Q_a*0.25)+(Q_{ed}*1.5472)]/(Q_{ed}*1.5472), where Q_a is the critical low flow of the receiving stream, usually the 7Q10 low flow (cfs). S_{MZ} Max is a mixing zone maximum dilution.

Mixing Zone Maximum Dilution	
S_{25}	**S_{MZ} Max**
≤38	22
>38 and ≤51	24

>51 and ≤63	27
>63 and ≤76	29
>76 and ≤101	32
>101 and ≤126	37
>126 and ≤251	42
>251	67

8.4 Limits to Address Temperature TMDL Requirements

As noted in Section 7.6.1.2, above, there are a number of temperature TMDLs that have been adopted for basins in Oregon. These TMDLs often contain waste load allocations (WLAs) or other requirements that are applicable to discharges under this permit and are reflected in permit conditions (e.g., the 0.5 MGD discharge limitation). TMDL requirements, summarized in Appendix Ⅰ, vary by subbasin and are often dependent on whether or not a facility was covered by the 100-J permit at the time of TMDL adoption. The TMDL requirements are addressed in the proposed permit as noted below.

- Several of the TMDLs do not provide any thermal load allowance for facilities not previously covered under the 100-J permit, requiring the facilities to access TMDL reserve capacity (if available). Accessing TMDL reserve capacity adds complexity to permit assignment. Discharges that require access to reserve capacity will not be eligible for coverage under this permit. This is noted in the "Coverage and Eligibility" section of the permit.
- Several of the TMDLs require excess thermal load effluent limits that are equal to the "pre-TMDL" limits derived above. Since these limits are already included under the proposed permit as noted in the above section, no additional limits to address the TMDLs in these basins are required.
- Some of the TMDLs include specific WLAs in the form of excess thermal loads. Since limits to address these WLAs may be more stringent than the limits derived in the above section, additional limits to address these WLAs are included in Appendix A of the permit.
- Earlier basin TMDLs contain WLAs based on Oregon's temperature standard in effect at that time. These WLAs allow an increase in stream temperature of no more than 0.25°F (0.14°C) after the effluent mixes with 25% of the receiving stream at low flow. Since limits to address these WLAs may be more stringent than the limits derived in the above section, additional limits to address these WLAs are included in Appendix A of the permit.
- For discharges to only the mainstem Willamette River, the applicable TMDL provided a small source bubble WLA to a limited number of industrial facilities. This WLA allows each of these covered facilities to discharge a thermal load consistent with the 1996 100-J permit conditions. Since the proposed permit includes temperature limits at least as stringent as the existing permit, no additional limits associated with the WLAs are required. Coverage and Eligibility and Appendix A of the permit address the TMDL requirement to limit the number of facilities allowed under the bubble WLA.

9. Schedule A1: pH and Toxics for Industry

This permit retains the pH permit limit of 6.0 to 9.0 SU for industrial discharges. However, additional information is required. Discharge monitoring will be required for pH and alkalinity. Alkalinity of a discharge affects pH. Alkalinity of water determines its ability to buffer pH.

The pH criterion for each basin varies with minimums of 6.0 and 7.0 SU and maximums of 8.5 and 9.0 SU. A complete list of basin specific pH is contained in OAR 340-041-0101 through 340-041-0350 at this web page: https://secure.sos.state.or.us/oard/displayChapterRules.action?selectedChapter=80.

In a basin that is water quality limited for pH, a discharge will be required to meet that basin standard for pH.

TMDLs are established for pH. A discharge will be required to meet a wasteload allocation for pH established in a TMDL. DEQ will require treatment for pH, as necessary to be consistent with requirements of a TMDL wasteload allocation prior to discharge.

9.1.1 Toxics

Chemicals may be added to maintain equipment used for non-contact cooling water. Treatment chemicals may be added to inhibit biological growth, adjust water properties to prevent corrosion and control the build-up of solids.

This permit prohibits the discharge of biocides and water treatment chemicals that contain chromium, copper, zinc, chlorinated phenols or other priority pollutants. A list of priority pollutants is currently available at this EPA web page: https://www.epa.gov/sites/default/files/2015-09/documents/priority-pollutant-list-epa.pdf

9.1.1.1 Total Residual Chlorine

The aquatic life criteria for chlorine in freshwater is expressed as “total residual chlorine.” The chronic criteria is 0.011 mg/L and acute criteria is 0.019 mg/L.

Each registrant will be required to meet criteria at end of pipe with no dilution to protect beneficial uses in any receiving stream.

This limit ensures discharges comply with water quality criteria for chlorine. Potable water sources typically are chlorinated to minimize or eliminate pathogens. For example, 40 CFR Part 141.72 requires that a public water system’s residual disinfection concentration cannot be less than 0.2 mg/L for more than 4 hours. The discharge of potable water from a public water supply has the potential to exceed water quality standards for chlorine.

Total residual chlorine limits will not apply to a facility when its application indicates:

- chlorine is not added,
- potable (i.e., chlorinated) water is not used as a source of non-contact cooling water, or
- the source water for non-contact cooling water has a total residual chlorine concentration that is less than the quantitation limit.

9.1.2 Oil and Grease

OAR 340-041-007(12) is narrative criteria that prohibits a visible oily sheen.

10. Schedule A1: Water Reuse

Water reuse means using water again that has been previously used for another purpose. The quality of reused water determines how it can be used to ensure protection of public health and the environment. Beneficial reuse of industrial water can be suitable for irrigation or other limited

uses. Water reuse activities are limited to non-drinking water purposes, such as, land irrigation of crops and pastureland, land irrigation of urban landscapes (e.g., golf courses, playing fields, business parks), industrial cooling, boiler blowdown, toilet flushing and street sweeping.

Specific water reuse activities depend on the water treatment and resulting quality. This permit allows for land application as an option at times when a discharge to surface water does not meet permit limits. Process water that meets certain benchmarks may be suitable for reuse as irrigation water provided the facility develops and adheres to a DEQ-approved land application plan.

10.1 Irrigation of Industrial Water

Schedule A of the permit identifies the conditions that must be met to land apply irrigation water. This includes development and approval of a land application plan. Schedule A also identifies restrictions to the land application of reuse water to prevent the following:

- Irrigating above agronomic rates,
- Adverse effects to groundwater,
- Offsite surface runoff or subsurface drainage through drainage tile,
- Creation of odors, fly or mosquito breeding, or other nuisance conditions.

Monitoring and best management practices are required for the beneficial use of land applied wastewater. Benchmarks established for wastewater and monitoring will ensure the wastewater is appropriate for the growth of vegetation. Best management practices include site selection and setbacks to prevent surface runoff or hydrologic connection to waters of the state.

11. Schedule A2: Temperature Effluent Limit Development for Hydroelectric Facilities.

11.1 Temperature Criteria

See Section 8 above for a discussion on temperature.

12. Schedule A2: pH and Oil and Grease for Hydroelectric Facilities

This permit retains the pH permit limits of 6.0 to 9.0 SU for hydroelectric facility discharges. Sump pump type discharges from a hydroelectric facility will be required to meet a pH limit of 6.0 to 9.0 SU. This limit is typically protective of the range of pH criteria with minimums that range from 6.0 to 7.0 SU and maximums that range from 8.5 to 9.0 SU in Oregon basins.

Oil and grease are used on bearings, turbines and other moving parts within a powerhouse at a hydroelectric facility. The proposed permit includes a daily maximum oil and grease limit of 10 mg/L for the sump pump type discharges. OAR 340-041-007(12) prohibits oily sheens in waters of the state, which is a water quality-based narrative criterion applicable to sump pump type discharges.

13. Schedule B: Monitoring and Reporting Requirements

Monitoring frequency and reporting requirements are in Schedule B of the proposed permit. The required monitoring, reporting and frequency for many of the parameters are based on the existing permit and to ensure the needed representative data is available for the next permit renewal. Schedule B also includes an option for reduced monitoring for specific parameters.

DEQ may require a registrant to conduct additional monitoring. For example, additional monitoring may be required to determine if a discharge contains a pollutant for which a waterbody is impaired in a Category 5, 303(d) listed water.

A registrant is required to notify Oregon Emergency Response System (OERs) in the event of a spill or release, or threatened spill or release. DEQ's How to Report a Spill web page contains information on reportable quantities at https://www.oregon.gov/deq/Hazards-and-Cleanup/er/Pages/How-To-Report-A-Spill.aspx. A reportable quantity includes any quantity of oil that would produce a visible film, sheen, oily slick, oily solids, or coat aquatic life, habitat or property with oil.

To ensure there is no visible oily sheen, there is a visual monitoring requirement.

An annual report and monitoring is required for land application.

14. Schedule C

This permit does not contain a compliance schedule.

15. Schedule D1: Special Conditions for Industrial Facilities

15.1 Outfall Verification

A facility is required to be aware of its outfall location by conducting an inspection and providing the latitude and longitude of the outfall at its point of discharge to its receiving water. For example, identifying the latitude and longitude of a discharge to a receiving stream after it is conveyed through a storm sewer.

15.2 Spawning Habitat

OAR 340-041-0053(2)(d)(A) is a thermal plumes requirement that does not allow impairment of an active salmonid spawning area where spawning redds are located or likely to be located. This adverse effect is prevented or minimized by limiting potential fish exposure to temperatures of 13°C or more for salmon and steelhead and 9°C or more for bull trout.

In a receiving water where spawning is a designated use, temperature limits of either 9.3°C or 13.3°C apply unless spawning bed documentation, as required in Schedule D1.2 and D2.1, is submitted and approved by DEQ. Where the required documentation is provided, the excess thermal load limit for that spawning period will ensure the spawning criterion is met.

One of three methods can be used to document that impairment of an active salmonid spawning area where spawning redds are located or likely to be located is prevented or minimized.

An applicant may use Table D1 or D2 in the permit to delineate a distance downstream from an outfall. DEQ developed the values contained in Table D1 and D2 of the permit as reasonably conservative estimates of the distances downstream of a discharge that would encompass the regulatory mixing zone. An applicant may use the set distance included in the Schedule D permit conditions as the distance downstream of the discharge location.

For example, using Table D1 or D2, an applicant that discharges to a receiving stream with a 7Q10 of 34 cfs is required to have an assessment conducted by a fisheries biologist concluding that there is no active spawning area, where spawning redds are located or likely to be located, within a 50 ft distance downstream from the outfall.

Alternatively, an applicant may provide an analysis certified by a registered professional engineer that delineates the edge of the regulatory mixing zone. This regulatory mixing zone is the same as provided in Schedule A1.3 and A2.4: 25% of the receiving stream, with a 7Q10 low flow during the temperature criteria designated spawning period and total maximum daily design flow. If a fisheries biologist determines that there is no active spawning area where redds are located or likely to be located within that regulatory mixing zone distance, then temperature limits for spawning will not apply.

As a third method, an applicant may provide an analysis determining that in the area where there are active spawning redds located or likely to be located, there is not a temperature increase of more than 0.3°C above the spawning temperature criteria. To make this determination, a dilution study certified by a registered professional engineer would include the 7Q10 low flow stream conditions during the temperature criteria designated spawning period, a total maximum daily design flow and a maximum discharge temperature.

In each case, an assessment of the location of a spawning area must be determined by a fisheries biologist.

Information on dilution analysis can be found in DEQ's Regulatory Mixing Zone Internal Management Directive, Part Two: Reviewing Mixing Zone Studies (2013) at https://www.oregon.gov/deq/Filtered%20Library/RMZIMDpart2.pdf.

15.3 Cooling Water Intake Structure

DEQ requires that the location, design, construction and capacity of cooling water intake structures reflect the Best Technology Available for minimizing adverse environmental impact. DEQ has determined that ODFW's process to review and assess intake structures and resulting documentation, satisfies the NPDES requirements for best professional judgement.

15.4 Land Application

The proposed permit contains special conditions for land application of industrial water. Process water management plan requirements are included in this section. To distribute water for irrigation, a land application plan must be developed, approved by DEQ, maintained and implemented.

15.5 Spill Plan

A spill plan is required to be maintained and implemented.

15.6 Ambient Natural Lake Temperature

An existing facility that discharges to a lake will determine the ambient temperature of the lake in the vicinity of the discharge. An applicant will follow the basic requirements in the permit to develop a monitoring protocol for DEQ approval before collecting data. The application for permit coverage will include the ambient temperature monitoring results.

15.7 Downstream Effects Analysis.

A permit for a discharge to a water with no fish use designation must consider water quality standards of the downstream water. West Division Main Canal – constructed channel referenced in OAR 340-041-0310 is an example of a surface water with a site-specific beneficial use that does not include fish use. This site-specific designation also requires that the permitting process for discharges to this water ensures protection of the applicable fish use criteria downstream.

This permit requires a downstream effects analysis for a discharge to a receiving water with no fish use designation to ensure these discharges will not cause or contribute to an exceedance of temperature water quality criteria in the next downstream receiving water.

16. Schedule D2: Special Conditions for Hydroelectric Facilities

16.1 Spawning Habitat

See section 15.2 above.

16.2 Cooling Water Intake Structure

In 2022, EPA developed a final framework[2] to consider Best Technology Available requirements using Best Professional Judgement for hydroelectric facilities. EPA determined that it did not intend that the 2014 rule's substantive provisions would apply to dams, specifically hydroelectric plant withdrawals for electricity generation. However, pursuant to 40 CFR Part 125.90(b), CWIS at hydroelectric facilities are subject to determinations of BPJ.

DEQ will use EPA's framework to make a BPJ determination for a hydroelectric facility. DEQ will require an applicant to submit Federal Energy Regulatory Commission or Biological Opinion documentation to support a BPJ analysis to determine whether BTA requirements have been satisfied. DEQ may also request additional information. This permit will provide coverage for hydropower facility applicants that meet BTA requirements. This permit is not available for applicants without FERC or BO documentation.

As explained in EPA's July 2022 *Revised Framework for Considering Existing Hydroelectric Facility Technologies in Establishing Case-by-Case, Best Professional Judgment Clean Water Act § 316(b) NPDES Permit Conditions*:

[2] Revised Framework for Considering Existing Hydroelectric Facility Technologies in Establishing Case-by-Case, Best Professional Judgment Clean Water Act § 316(b) NPDES Permit Conditions https://www.epa.gov/sites/default/files/2021-01/documents/transmittal_of_framework_for_bpj_for_cwis_at_hydroelectric_facilities_final_memo.pdf

EPA generally expects that hydroelectric facilities' existing controls are technologies that can be determined to satisfy the CWA requirements to minimize entrainment and impingement mortality. EPA is also aware that many hydroelectric facilities are required to implement measures that reduce impacts of the dam, including the impacts to passage of aquatic life through the dam, as conditions of a license issued by the Federal Energy Regulatory Commission or a Biological Opinion issued by US Fish and Wildlife Service or the National Marine Fisheries Service. While these are not technologies employed at the CWIS, these measures minimize the passage of aquatic life past the intake structures inside the penstocks of the dam and thus minimize entrainment and impingement mortality.

Under EPA's framework, any of the four factors below, individually or in combination, may be used in a BPJ analysis to determine whether BTA requirements have been satisfied for hydroelectric facilities. A discussion of these four factors are provided below:

1) Volume of cooling water used relative to other power generation facilities and relative to total water use at the facility
    - Many power generating facilities use a steam turbine to generate electricity. Significant amounts of cooling water are needed to condense the steam. This is markedly different than the electric power generation at hydroelectric facilities, which use falling water or river currents to spin a turbine. Hydroelectric facilities do not use a steam loop and do not generate the excessive waste heat associated with steam electric power plants. As a result, hydroelectric facilities require relatively low volumes of cooling water as compared to steam electric generators. Thus, the overall low volume of cooling water withdrawn could be a factor that informs the degree of potential entrainment. Cooling water use by a hydroelectric plant is typically limited to cooling the turbine bearings, generator bearings and gearboxes. The cooling water at hydroelectric facilities is typically withdrawn from falling water that has already been screened for debris. See Section 4.2 of the Technical Development Document for the Final Section 316(b) Existing Facilities Rule (TDD) for more information.
    - Based on the cooling water used relative to cooling water use in other industries and as a proportion of the total flow of water diverted through the facility, facilities may be deemed to comply with BTA requirements to minimize entrainment. The volume of water used for cooling at some hydroelectric facilities is a fraction of the cooling water as compared to other electrical generating units, such as steam electric generating units. For facilities that withdraw cooling water from within the dam structure (e.g., from the penstock or scroll case), an applicant could demonstrate that impingement and entrainment are minimized based on the minimal volume of water withdrawn for cooling in proportion to the water drawn into the penstock. For example, the cooling water volume of many hydroelectric facilities is less than 0.1% of the volume drawn through the dam (calculated as: (volume of cooling water/volume of turbine capacity) multiplied by 100).

2) Cooling water withdrawn relative to waterbody flow
    - In previous rulemakings, EPA stated that "Entrainment is generally considered to be proportional to flow and therefore a reduction in flow results in a proportional reduction in entrainment, as EPA assumes for

purposes of national rulemaking that entrainable organisms are uniformly distributed throughout the source water. EPA has consistently applied this assumption throughout the 316(b) rulemaking process… and continues to assume that it is broadly applicable on a national scale…" (79 Fed. Reg. 48,300 at 48,331 n.48, citations omitted. August 15, 2014).

Thus, using a low percentage of the mean annual flow of the waterbody for cooling could be a factor that informs the degree of potential entrainment. A facility that uses a very low percentage of the mean annual flow of a river or stream may be deemed to meet BTA requirements to minimize entrainment after consideration of the potential cumulative impacts with co-located cooling water intakes and other relevant factors. Cooling water withdrawn at hydroelectric facilities is typically a small fraction of the overall river flow (to account for flow through fish passage structures or over spillways), often less than 1%.

Proportional flow requirements only address entrainment as most passive floating organisms that are addressed by this factor are not of impingeable size. Thus, EPA will consider proportional flow as a factor for entrainment, but not for impingement.

3) Location of the intake structure

- Hydroelectric facilities vary significantly in terms of design and configuration, especially when it comes to the pipes and structures that divert water for purposes of cooling. Generally, water diverted for cooling is primarily sourced from three locations within the hydroelectric facility: (1) the penstock – a closed conduit or pipe that conveys water from the reservoir to the turbine, (2) the turbine scroll case – a spiral-shaped steel structure distributing water flow through the wicket gates located just prior to the turbine, or (3) a water inlet port located on the face of the dam. There may be other location-specific designs or configurations, because each facility has a unique, location-specific design to take maximum advantage of the hydraulics of that location.
- EPA identified that the location of the intake could be a factor that minimizes both impingement and entrainment. Location of the intake in areas with lower densities of impingeable or entrainable organisms will minimize the adverse impacts associated with the use of the CWIS.
- Generally, dams are designed such that the location of the penstock openings on the dam face are at a depth with a lower density of organisms to reduce entrainment through the dam thus minimizing impacts from the operations of the turbine. As the CWIS is within the dam, there is a similar reduction in the density of organisms as compared to an intake on the face of the dam or in the waterbody itself.
- As described above, some dams have water inlet ports on the face of the dam or in the waterbody so this may not be applicable to all hydroelectric facilities. Even in these cases, the permitting authority may determine that no further controls are necessary, based on BPJ, to meet BTA requirements to minimize entrainment.

4) Technologies at the facility

- Design of the facility can also be a factor the permitting authority can consider in determining whether there are technologies that are sufficient to minimize impingement and entrainment. For example, many hydroelectric facilities have some form of technology at the inlet of the dam; generally this was intended for debris protection, but depending on the intake velocity, it could also provide a level of protection, compared to an open pipe, for organisms that are able swim away.
- Most hydroelectric facility cooling water intakes rely upon a passive gravity feed that in some cases might result in a lower initial intake velocity than a pumped system. In such a case, organisms may have enough motility that when they sense the opening of the intake, they have an avoidance response that allows them to swim away and avoid being drawn into the intake. In addition, for cooling water intakes located in a penstock or turbine scroll case, the velocity of water moving through the system to drive turbines may be higher than the velocity into the cooling water intake. This higher velocity along the opening of the cooling water intake may result in organisms being swept past the intake, thus minimizing impingement.

EPA recommends that permit writers consider the four factors as relevant to determining the BTA for a hydroelectric facility on a BPJ basis. The weight given to each of the factors may be assigned by the permitting authority. As described above, EPA generally expects that a hydroelectric facility's existing controls are technologies that can be determined to satisfy the BTA requirement to minimize entrainment and impingement mortality. As also noted above, EPA expects that, in most cases, existing documentation may be used to evaluate these factors and that the selection and use of documentation and data for this purpose will be relatively straightforward.

DEQ will request information that supports CWIS BTA requirements for hydroelectric facilities with the permit application.

16.3 Operation and Maintenance

Proper operation and maintenance may include minimizing the oil/water discharges through equipment maintenance and practices to minimize contact with materials that may enter floor drainage wastewater. Practices may include proper handling of material and waste, good housekeeping practices, routine inspection and instrument readings.

An oil and grease best management plan will be kept on site to address oil to water interfaces including bearings, lubricated wire ropes and other in-line equipment, being used at the facility. The plan will include environmentally acceptable lubricants in use at the facility and planned for use, as technologically feasible.

16.4 Trash Rack Debris Disposal

Facilities are expected to properly dispose of solid material removed from the river flow trash racks.

A trash racks captures solid materials including naturally occurring materials to prevent that material from entering the water intake system. Trash racks differ, for example, some facility's sluice the debris around the dam or have other configurations. This condition is a best

management practice that is meant to prevent the reentry of any solid material that is removed (physically or mechanically) from existing trash racks to the receiving water. This condition does not prohibit passing woody debris and other material that collects on a trash rack downstream instead of removing it from the stream.

16.5 Spill Plan

A spill plan is required to be maintained and implemented.

17. Schedule E:

This permit does not contain pretreatment requirements.

18. Schedule F: NPDES General Conditions

Schedule F contains the following general conditions that apply to all NPDES permit holders.

- Section A. Standard Conditions
- Section B. Operation and Maintenance of Pollution Controls
- Section C. Monitoring and Records
- Section D. Reporting Requirements
- Section E. Definitions