



Oregon

Tina Kotek, Governor

Department of Environmental Quality
Northwest Region Portland Office/Water Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5696
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TTY 711

June 17, 2024

Michael Dimmick
City of Seaside
989 Broadway Street
Seaside, OR 97138-7826

Re: NPDES Permit Public Notice Period
Comments Due: July 24, 2024, 5 p.m.
File no. 79929
Permit no. 102579
EPA no. OR0020401
Facility: Seaside WWTP, 1821 N. Franklin Street, Seaside
Clatsop County

Enclosed please find the Public Notice drafts for your proposed National Pollutant Discharge Elimination System Permit including a copy of the public notice, permit, fact sheet, and mercury minimization plan. Please be aware that the city may provide additional comment on the permit during this time and submit to:

Trinh Hansen, Water Quality Permit Coordinator
DEQ Western Region
4026 Fairview Industrial Way Dr. SE
Salem, OR 97302
trinh.hansen@deq.oregon.gov

Your comments **must be received by 5 p.m. on July 24, 2024**. DEQ will hold a public hearing if DEQ receives written requests for a hearing during the public comment period from at least 10 people, or from an organization representing 10 or more people. DEQ gives equal weight to written and oral comments. When the public participation period has ended, DEQ will take final action on your application.

Please contact me at 503-378-5055 with any questions about permitting processing.

Sincerely,

Trinh Hansen
Water Quality Permit Coordinator
Western Region, Salem Office

cc: Source File, Portland Office, DEQ
Mike Pinney, Portland, DEQ
ORMS



PUBLIC NOTICE

Date posted: 6/17/24

DEQ Requests Comments on Proposed City of Seaside Wastewater Treatment Plant's Water Quality Permit Renewal

HOW TO PROVIDE PUBLIC COMMENT

Facility name: City of Seaside Wastewater Treatment Plant

Permit type: National Pollutant Discharge Elimination System Domestic

Comments due by: Wed., July 24, 2024 at 5 p.m.

Send written comments to:

By mail: Trinh Hansen, Oregon DEQ
4026 Fairview Industrial Drive SE, Salem, OR 97302

By email: WQPermit.NWR@deq.oregon.gov

The Oregon Department of Environmental Quality invites the public to provide written comments on the conditions of the City of Seaside Wastewater Treatment Plant's proposed water quality permit, known officially as a National Pollutant Discharge Elimination System permit.

Summary

Subject to public review and comment, DEQ intends to renew the proposed water quality permit, which allows the City of Seaside Wastewater Treatment Plant to discharge wastewater to the Necanicum River.

About the facility

The City of Seaside has applied for a water quality permit renewal for its Wastewater Treatment Plant located at 1821 N Franklin Street in Seaside. DEQ last renewed this permit on Dec. 6, 2018.

The facility treats wastewater collected by Seaside's sanitary sewer system. The wastewater mostly comes from residences, about 91%, with the remainder being from commercial and light industrial sources. The treated wastewater contains several regulated pollutants such as biochemical oxygen demand, total suspended solids, and bacteria.

The facility discharges to the Necanicum River at River Mile 1.3 approximately 1,000 feet downstream of the 12th Avenue Bridge. The river is listed as impaired (Category 4 or 5) for several pollutants according to the most recent U.S. Environmental Protection Agency-approved Integrated Report for Oregon.

The proposed permit reflects effluent limits established through reasonable potential analysis, best available technology or the North Coast Subbasins Total Maximum Daily Load for temperature and bacteria.

The most recent DEQ inspection of the facility was on December 1, 2021. DEQ did not identify violations during this inspection. The City of Seaside Wastewater Treatment Plant has had two water quality violations in the past permit term. The issues related to these past compliance issues have been resolved.

The facility holds no other permits from DEQ.

Translation or other formats

[Español](#) | [한국어](#) | [繁體中文](#) | [Русский](#) | [Tiếng Việt](#) | [العربية](#)

800-452-4011 | TTY: 711 | deqinfo@deq.oregon.gov

What types of pollutants does the permit regulate?

This permit sets conditions for how the facility deals with the following pollutants: biochemical oxygen demand, total suspended solids, bacteria, and pH, as well as biochemical oxygen demand and total suspended solids removal efficiency.

The facility produces biosolids for beneficial reuse under a biosolids management plan approved by DEQ. The permit requires the City of Seaside to update the biosolids management plan during the next permit term of five years. Although the City of Seaside does not currently operate a recycled water reuse program, the permit allows the facility to develop such a program. The permit requires the City of Seaside to develop an approved recycled water use plan before distributing recycled water.

The current permit required the City of Seaside to develop a Mercury Minimization Plan. The plan has been submitted to DEQ and is available for public comment along with the proposed permit.

Would the draft permit change the amount of pollution the facility is allowed to release?

Yes. The draft water quality permit does change the amount of pollution the facility can discharge by setting new limits for enterococcus bacteria.

Pollutant	Change
Enterococcus bacteria	New limit

How did DEQ determine permit requirements?

DEQ evaluates types and amounts of pollutants and the water quality of the surface water or groundwater where the pollutants are proposed to be discharged. DEQ then determines permit requirements to ensure the proposed discharges will meet applicable statutes, rules, regulations and effluent guidelines of Oregon and the Clean Water Act.

For this proposed permit action, DEQ evaluated the City of Seaside's water quality permit renewal application, annual reports, Total Maximum Daily Loads requirements and discharge monitoring reports. In addition, DEQ evaluated water quality data provided by the City of Seaside and from all DEQ monitoring station located on the Necanicum River. These materials may be viewed in-person at the DEQ Northwest Region office located at: 700 NE Multnomah Street, Suite 600 in Portland.

DEQ relied solely on these documents and made no other discretionary decisions for the permit action.

How does DEQ monitor compliance with the permit requirements?

This permit will require the facility to monitor pollutants discharged using approved monitoring practices and standards. DEQ reviews the facility's discharge monitoring reports to check for compliance with permit limits.

What happens next?

Submit comments by sending an email or using mail service addressed to the permit coordinator listed in the "how to provide public comment" box above.

DEQ will hold a public hearing if it receives written requests for a hearing during the public comment period from at least 10 people or from an organization representing at least 10 people.

DEQ will consider and respond to all comments received and may modify the proposed permit based on comments.

For more information

Find more information by reviewing draft permit documents attached to this notice, or contact Trinh Hansen, at WQPermit.NWR@deq.oregon.gov with questions or to view documents in person at a DEQ office. Visit the [Your DEQ Online Help page](#) for more information on how to access public notice documents and submit comments through this platform.

Non-discrimination statement

DEQ does not discriminate on the basis of race, color, national origin, disability, age or sex in administration of its programs or activities. Visit DEQ's [Civil Rights and Environmental Justice page](#).



NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM WASTE DISCHARGE PERMIT

Oregon Department of Environmental Quality
Northwest Region – Portland Office
700 NE Multnomah St., Suite 600
Portland, OR 97232
Telephone: 503-229-5263

Issued pursuant to ORS 468B.050 and the federal Clean Water Act.

ISSUED TO:

City of Seaside
989 Broadway Street
Seaside, OR 97138

SOURCES COVERED BY THIS PERMIT:

Type of Waste	Outfall Number	Outfall Location
Treated Wastewater	001A	46.0042/-123.9211
Recycled Water Reuse	002	Specified in Recycled Water Use Plan
Biosolids	N/A	Specified in Biosolids Management/Land Application Plan

FACILITY LOCATION:

City of Seaside Wastewater Treatment Plant
1821 N. Franklin Street
Seaside, Oregon 97138
County: Clatsop

EPA Permit Type: Major

RECEIVING STREAM INFORMATION:

Receiving stream/NHD name: Necanicum River
USGS 12-Digit HUC: 171002010103
OWRD Administrative Basin: North Coast
NHD Reach Code & % along reach:
17100201000136 – 27.1%
ODEQ LLID & RM: 123927746011 – RM: 1.3
Integrated Report Assessment Unit ID:
OR_EB_1710020101_01_107210

Issued in response to Application No. 948260 received July 14, 2023. This permit is issued based on the land use findings in the permit record.

DRAFT

Tiffany Yelton-Bram, Water Quality
Manager, Northwest Region

DRAFT

Issuance Date

DRAFT

Effective Date

PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, the permittee is authorized to: 1) operate a wastewater collection, treatment, control and disposal system; and 2) discharge treated wastewater to waters of the state only from the authorized discharge point or points in Schedule A in conformance with the requirements, limits, and conditions set forth in this permit.

Unless specifically authorized by this permit, by another NPDES or Water Pollution Control Facility permit, or by Oregon statute or administrative rule, any other direct or indirect discharge of pollutants to waters of the state is prohibited.

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Public Notice

SCHEDULE A: WASTE DISCHARGE LIMITS

1. Outfall 001A – Permit Limits

During the term of this permit, the permittee must comply with the limits in the following table:

Table A1: Permit Limits

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum
BOD ₅ (May 1 – October 31) (See note a.)	mg/L	20	30	-
	lb/day	380	560	750
	% removal	85	-	-
TSS (May 1 – October 31) (See note a.)	mg/L	20	30	-
	lb/day	380	560	750
	% removal	85	-	-
BOD ₅ (November 1 – April 30) (See note a.)	mg/L	30	45	-
	lb/day	560	840	1100
	% removal	85	-	-
TSS (November 1 – April 30) (See note a.)	mg/L	30	45	-
	lb/day	560	840	1100
	% removal	85	-	-
pH	SU	Instantaneous limit between a daily minimum of 6.0 and a daily maximum of 9.0		
<i>E. coli</i> (See note b.)	#/100 mL	Must not exceed a monthly geometric mean of 126, no single sample may exceed 406		
Enterococcus Bacteria	#/100 mL	Must not exceed a monthly geometric mean of 35, not more than 10% of the samples may exceed 130		
Notes:				
a. In accordance with OAR 340-041-0061(9)(a)(C), on any day that the daily flow to the sewage treatment facility exceeds the lesser hydraulic capacity of the secondary treatment portion of the facility or twice the design average dry weather flow, the daily mass load limit does not apply. The permittee must operate the treatment facility at highest and best practicable treatment and control. Average dry weather design flow for the facility is 2.25 million gallons per day (MGD).				
b. If a single sample exceeds 406 organisms/100 mL, the permittee may take at least 5 consecutive re-samples at 4-hour intervals beginning within 28 hours after the original sample was taken. A geometric mean of the 5 re-samples that is less than or equal to 126 <i>E. coli</i> organisms/100 mL demonstrates compliance with the limit.				

2. Regulatory Mixing Zone

Pursuant to OAR 340-041-0053, the permittee is granted a regulatory mixing zone as described below:

The RMZ is defined as that portion of the Necanicum River encompassing the following area: One hundred fifty feet (150) upstream and downstream of the outfall diffuser and fifteen (15) feet inshore and twenty-five (25) feet off-shore of the diffuser. The Zone of Initial Dilution (ZID) is that portion of the allowable RMZ that is within fifteen (15) feet of the diffuser.

3. Use of Recycled Water – Outfall 002

The permittee is authorized to distribute recycled water if it is:

- a. Treated and used according to the criteria listed in Table A2.
- b. Managed in accordance with its DEQ-approved Recycled Water Use Plan unless exempt as provided in Schedule D.
- c. Used in a manner and applied at a rate that does not adversely affect groundwater quality.
- d. Applied at a rate and in accordance with site management practices that ensure continued agricultural, horticultural, or silvicultural production and does not reduce the productivity of the site.
- e. Irrigated using sound irrigation practices to prevent:
 - i. Offsite surface runoff or subsurface drainage through drainage tile;
 - ii. Creation of odors, fly and mosquito breeding, or other nuisance conditions; and
 - iii. Overloading of land with nutrients, organics, or other pollutants.

Table A2: Recycled Water Limits

Class	Level of Treatment (after disinfection unless otherwise specified)	Beneficial Uses
A	Class A recycled water must be oxidized, filtered and disinfected. Before disinfection, unless otherwise approved in writing by DEQ, turbidity may not exceed: • An average of 2 NTUs within a 24-hour period. • 5 NTUs more than five percent of the time within a 24-hour period. • 10 NTUs at any time. After disinfection, total coliform may not exceed: • A median of 2.2 organisms per 100 mL based on daily sampling over the last 7 days that analyses have been completed. • 23 organisms per 100 mL in any single sample.	Class A recycled water may be used for: • Class B, Class C, Class D, and non-disinfected uses. • Irrigation for any agricultural or horticultural use. • Landscape irrigation of parks, playgrounds, school yards, residential landscapes, or other landscapes accessible to the public. • Commercial car washing or fountains when the water is not intended for human consumption. • Water supply source for non-restricted recreational impoundments.
B	Class B recycled water must be oxidized and disinfected. Total coliform may not exceed: • A median of 2.2 organisms per 100 mL, based on the last 7 days that analyses have been completed. • 23 total coliform organisms per 100 mL in any single sample.	Class B recycled water may be used for: • Class C, Class D, and non-disinfected uses. • Stand-alone fire suppression systems in commercial and residential building, non-residential toilet or urinal flushing, or floor drain trap priming. • Water supply source for restricted recreational impoundments.
C	Class C recycled water must be oxidized and disinfected. Total coliform may not exceed: • A median of 23 total coliform organisms per 100 mL, based on results of the last 7 days that analyses have been completed. • 240 total coliform organisms per 100 mL in any two consecutive samples.	Class C recycled water may be used for: • Class D and non-disinfected uses. • Irrigation of processed food crops; irrigation of orchards or vineyards if an irrigation method is used to apply recycled water directly to the soil. • Landscape irrigation of golf courses, cemeteries, highway medians, or industrial or business campuses. • Industrial, commercial, or construction uses limited to: industrial cooling, rock crushing, aggregate washing, mixing concrete, dust control, nonstructural firefighting using aircraft, street sweeping, or sanitary sewer flushing.

Class	Level of Treatment (after disinfection unless otherwise specified)	Beneficial Uses
D	Class D recycled water must be oxidized and disinfected. <i>E. coli</i> may not exceed: • A 30-day geometric mean of 126 organisms per 100 mL. • 406 organisms per 100 mL in any single sample.	Class D recycled water may be used for: • Non-disinfected uses. • Irrigation of firewood, ornamental nursery stock, Christmas trees, sod, or pasture for animals.
Non-disinfected	Non-disinfected recycled water must be oxidized.	Non-disinfected water may be used for: • Irrigation for growing commercial timber, fodder, fiber or seed crops not intended for human ingestion.

4. Biosolids

The permittee may land apply biosolids or provide biosolids for sale or distribution, subject to the following conditions:

- Biosolids Management Plan** - The permittee must manage biosolids in accordance with its DEQ-approved Biosolids Management Plan and Land Application Plan (see Schedule D).
- Agronomic Rates for Nutrient Loading** - The permittee must apply biosolids at or below the agronomic rates approved by DEQ to minimize potential groundwater degradation. At the time of sale or distribution of the exceptional quality biosolids, the origin must be identified and biosolids analyses must be available to applicators or users of the biosolids.
- Land Application Site Authorization** - The permittee must obtain written site authorization from DEQ for each land application site prior to land application (see Schedule D) and follow the site-specific management conditions in the DEQ-issued site authorization letter. This requirement does not apply for exceptional quality biosolids, which may be land applied as any other fertilizer or soil amendment.
- Pathogen and Vector Attraction Reduction** - Prior to application, the permittee must ensure that biosolids meet one of the pathogen reduction standards under 40 CFR 503.32 and one of the vector attraction reduction standards under 40 CFR 503.33. For exceptional quality biosolids, the biosolids must meet one of the Class A pathogen reduction requirements in 40 CFR 503.32(a) and one of the vector attraction reduction requirements in 40 CFR 503.33(b)(1) through (b)(8) prior to land application.
- Pollutants** - The permittee must not apply biosolids containing pollutants in excess of the ceiling concentrations shown in Table A3. The permittee may apply biosolids containing pollutants in excess of the pollutant concentrations. However, the total quantity of these pollutant(s) cannot exceed the cumulative pollutant loading rates in Table A3. For biosolids to be managed as exceptional quality biosolids, the biosolids cannot exceed any of the ceiling concentration limits or the pollutant concentration limits in Table A3.
- Approval to Apply Cumulative Pollutant Loading Rates** – If the permittee’s biosolids are subject to the cumulative pollutant loading rates as described in Section e. above, the permittee must obtain specific approval from DEQ to land apply these biosolids in accordance with their Biosolids Management Plan and Land Application Site Authorization (see Schedule D).

Table A3: Biosolids Limits

Pollutant (See note a.)	Ceiling Concentration Limits (mg/kg)	Pollutant Concentration Limits Monthly Average (mg/kg)	Cumulative Pollutant Loading Rates (kg/ha)
Arsenic	75	41	41
Cadmium	85	39	39
Copper	4300	1500	1500
Lead	840	300	300
Mercury	57	17	17
Molybdenum	75	—	—
Nickel	420	420	420
Selenium	100	100	100
Zinc	7500	2800	2800
Note:			
a. Biosolids pollutant limits are described in 40 CFR 503.13, which uses the terms <i>ceiling concentrations</i> , <i>pollutant concentrations</i> , and <i>cumulative pollutant loading rates</i> .			

5. Chlorine Usage

The permittee is prohibited from using chlorine or chlorine compounds for effluent disinfection purposes. Chlorine residual in effluent resulting from chlorine or chlorine-containing chemicals used for maintenance or other purposes is also prohibited.

6. Mercury Minimization Plan

- a. By the date listed in Table B1, the permittee must submit an updated MMP (Mercury Minimization Plan) to DEQ for review and approval.
- b. The permittee must use DEQ MMP template for final plans and modifications unless authorized in writing by DEQ to use an alternative.
- c. If DEQ comments on the MMP, the permittee must respond to DEQ's comments in writing within 30 calendar days by submitting an updated MMP.
- d. After resolving comments (if any) on the plan, DEQ will post the MMP to solicit public comment for a minimum of 35 days.
- e. The permittee must begin implementation of the plan within 90 calendar days after being notified in writing that the public comment period has ended and DEQ has approved the plan.
- f. The MMP must include:
 - i. Facility name and permit number
 - ii. Name and signature of party responsible for developing or reviewing the plan
 - iii. Plan submittal date
 - iv. Identification and evaluation of current and potential mercury sources, including industrial, commercial, and residential sources

- v. An implementation plan that includes specific methods for reducing mercury
 - vi. Mercury sample results for samples collected during the past five years
 - vii. Annual average effluent mercury concentrations and mass loads
 - viii. Annual average biosolids concentrations and mass loads
 - ix. Changes (if any) that may affect mercury, such as changes to operations, treatment and chemicals used
 - x. Summary of mercury reduction activities implemented during the past five years
- g. If DEQ determines that the MMP is not effective at reducing mercury concentrations, DEQ may require further changes to the MMP and may reopen the permit to modify the permit conditions.

SCHEDULE B: MINIMUM MONITORING AND REPORTING REQUIREMENTS

1. Reporting Requirements

The permittee must submit to DEQ monitoring results and reports as listed below.

Table B1: Reporting Requirements and Due Dates

Reporting Requirement	Frequency	Due Date (See note a.)	Report Form (See note b.)	Submit To:
Mercury Minimization Plan Update (see Schedule A)	One time	Submit with renewal application.	One electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Tables B2, B3 and B4 Influent Monitoring, Effluent Monitoring, and Necanicum River Monitoring	Monthly	By the 15th of the following month	Specified in Schedule B. Section 2 of this permit	Electronic reporting as directed by DEQ
Tables B5 – B8: Metals, Cyanide, and Hardness; Volatile Organic Compounds; Acid Extractable Compounds; and Base Neutral Compounds	Quarterly for 3 years starting Q4 of 2024 until 12 samples are collected. (See note c.)	By the 15th of the month following each quarter	Electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Tables B9 and B10: Pesticides and PCBs; and Other Parameters with Water Quality Criteria	Quarterly for one year starting Q4 of 2024 until 3 samples are collected.	By the 15 th of the month following each quarter	Electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Table B11: WET Test Monitoring (See note c.)	Once every 3rd quarter starting Q4 of 2024 until 4 samples are collected (See note d.)	With the first DMR submittal after receipt of the test results	Electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Inflow and infiltration report (see Schedule D)	Annually	February 15	Electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Mixing Zone Study (see Schedule D)	One time	Submit by December 15, 2028	Electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ
Recycled Water Annual Report (see Schedule D) - Only required if the permittee distributes recycled water under a recycled water use plan	Annually	January 15	Electronic copy in a DEQ-approved format	Attached via electronic reporting as directed by DEQ Electronic copy to DEQ Water Reuse Program Coordinator

Reporting Requirement	Frequency	Due Date (See note a.)	Report Form (See note b.)	Submit To:
Biosolids annual report (see Schedule D)	Annually	By February 19 of the following year	Electronic copy in a DEQ- approved form POTW Design Flow $\geq$ 1 MGD: EPA NeT CDX web-based reporting tool	Attached via electronic reporting as directed by DEQ DEQ Biosolids Program Coordinator For POTW Design Flow $\geq$ 1 MGD: Via electronic reporting as directed by DEQ
Hauled Waste Annual Report (see Schedule D) - Only required if facility has a Hauled Waste Control Plan, or otherwise accepts hauled waste.	Annually	January 15	Electronic copy in a DEQ- approved format	Attached via electronic reporting as directed by DEQ
Industrial User Survey (see Schedule D)	Once per permit cycle	Submit by no later than 24 months after permit effective date	1 electronic copy and 1 hard copy in a DEQ approved format	• 1 Hard copy to DEQ Pretreatment Coordinator • 1 Electronic copy to Compliance Officer
Outfall Inspection Report (see Schedule D)	Once per permit cycle	Submit by 12/15/2027 In the 3 rd year of the permit.	Electronic copy in a DEQ- approved format	Attached via electronic reporting as directed by DEQ
Notes: a. For submittals that are provided to DEQ by mail, the postmarked date must not be later than the due date. b. All reporting requirements are to be submitted in a DEQ-approved format, unless otherwise specified in writing. c. Quarters are defined as: Q1: Jan – Mar, Q2: Apr – June, Q3: Jul – Sept, Q4: Oct – Dec. If no discharge occurs during the quarter, collect the sample in the following quarter. WET tests and toxics characterization testing must be collected on the same day. d. WET tests to be conducted concurrent with toxics characterization testing in Q4 of 2024, Q3 of 2025 and Q2 of 2026 and Q1 of 2027.				

2. Monitoring and Reporting Protocols

a. Electronic Submissions

The permittee must submit to DEQ the results of monitoring indicated in Schedule B in an electronic format as specified below.

- i. The permittee must submit monitoring results required by this permit via DEQ-approved web-based Discharge Monitoring Report (DMR) forms to DEQ via electronic reporting. Any data used to calculate summary statistics must be submitted as a separate attachment approved by DEQ via electronic reporting.
- ii. The reporting period is the calendar month.
- iii. The permittee must submit monitoring data and other information required by this permit for all compliance points by the 15th day of the month following the reporting period unless specified otherwise in this permit or as specified in writing by DEQ.

b. Test Methods

The permittee must conduct monitoring according to test procedures in 40 CFR 136 and 40 CFR 503 for biosolids or other approved procedures as per Schedule F.

c. Detection and Quantitation Limits

- i. **Detection Level (DL)** – The DL is defined as the minimum measured concentration of a substance that can be distinguished from method blank results with 99% confidence. The DL is derived using the procedure in 40 CFR 136 Appendix B and evaluated for reasonableness relative to method blank concentrations to ensure results reported above the DL are not a result of routine background contamination. The DL is also known as the Method Detection Limit (MDL) or Limit of Detection (LOD).
- ii. **Quantitation Limits (QLs)** – The QL is the minimum level, concentration or quantity of a target analyte that can be reported with a specified degree of confidence. It is the lowest level at which the entire analytical system gives a recognizable signal and acceptable calibration for the analyte. It is normally equivalent to the concentration of the lowest calibration standard adjusted for sample weights, volumes, preparation and cleanup procedures employed. The QL as reported by a laboratory is also sometimes referred to as the Method Reporting Limit (MRL) or Limit of Quantitation (LOQ).

d. Sufficient Sensitivity of Quantitation Limits

- i. The Laboratory QLs (adjusted for any dilutions) for analyses performed to demonstrate compliance with permit limits or as part of effluent characterization, must meet at least one of the requirements below:
 - (A) The QL is at or below the level of the water quality criterion for the measured parameter.
 - (B) The QL is above the water quality criterion but the amount of the pollutant in a facility's discharge is high enough that the method detects and quantifies the level of the parameter in the discharge.
 - (C) The QL has the lowest sensitivity of the analytical methods procedure specified in 40 CFR 136.
 - (D) The QL is at or below those defined in Oregon DEQ list of quantitation limits posted online at DEQ permitting website.

- ii. Matrix effects are present that prevent the attainment of QLs and these matrix effects are demonstrated according to procedures described in EPA's "*Solutions to Analytical Chemistry Problems with Clean Water Act Methods*", March 2007. If using alternative methods and taking appropriate steps to eliminate matrix effects does not eliminate the matrix problems, DEQ may authorize in writing re-sampling or allow a higher QL to be reported.
- e. Quality Assurance and Quality Control
 - i. Quality Assurance Plan – The permittee must develop and implement a written Quality Assurance Plan that details the facility sampling procedures, equipment calibration and maintenance, analytical methods, quality control activities and laboratory data handling and reporting. The QA/QC program must conform to the requirements of 40 CFR 136.7.
 - ii. If QA/QC requirements are not met for any analysis, the permittee must re-analyze the sample. If the sample cannot be re-analyzed, the permittee must re-sample and analyze at the earliest opportunity. If the permittee is unable to collect a sample that meets QA/QC requirements, then the permittee must include the result in the discharge monitoring report (DMR) along with a notation (data qualifier). In addition, the permittee must explain how the sample does not meet QA/QC requirements. The permittee may not use the result that failed the QA/QC requirements in any calculation required by the permit unless authorized in writing by DEQ. If these method criteria are not met for BOD₅, the permittee must: 1) report the daily BOD₅ values with data qualifiers; 2) include these BOD₅ values in the summary statistic calculations (e.g., weekly averages, monthly averages, % removal); and 3) report the BOD₅ summary statistics with data qualifiers.
 - iii. Flow measurement, field measurement, and continuous monitoring devices - The permittee must:
 - (A) Establish verification and calibration frequency for each device or instrument in the quality assurance plan that conforms to the frequencies recommended by the manufacturer.
 - (B) Verify at least once per year that flow-monitoring devices are functioning properly according to manufacturer's recommendation. Calibrate as needed according to manufacturer's recommendations.
 - (C) Verify at least weekly that the continuous monitoring instruments are functioning properly according to manufacturer's recommendation unless the permittee demonstrates a longer period is sufficient and such longer period is approved by DEQ in writing.
 - iv. The permittee must develop a receiving water sampling and analysis plan that incorporates QA/QC prior to sampling. This plan must be kept at the facility and made available to DEQ upon request.
- f. Reporting Sample Results
 - i. The permittee must report the laboratory DL and QL as defined above for each analyte, with the following exceptions: pH, temperature, BOD, CBOD, TSS, Oil & Grease, hardness, alkalinity, bacteria, and nitrate-nitrite. For temperature and pH, neither the QL nor the DL need to be reported. For the other parameters listed above, the permittee is only required to report the QL and only when the result is ND.

- ii. The permittee must report the same number of significant digits as the permit limit for a given parameter.
 - iii. Chemical Abstracts Service (CAS) Numbers. CAS numbers (where available) must be reported along with monitoring results.
 - iv. (For Discharge Monitoring Reports) If a sample result is above the DL but below the QL, the permittee must report the result as the DL preceded by DEQ's data code "e". For example, if the DL is 1.0 µg/l, the QL is 3.0 µg/L and the result is estimated to be between the DL and QL, the permittee must report "e1.0 µg/L" on the DMR. This requirement does not apply in the case of parameters for which the DL does not have to be reported.
 - v. (For Discharge Monitoring Reports) If the sample result is below the DL, the permittee must report the result as less than the specified DL. For example, if the DL is 1.0 µg/L and the result is ND, report "<1.0" on the discharge monitoring report (DMR). This requirement does not apply in the case of parameters for which the DL does not have to be reported.
- g. Calculating and Reporting Mass Loads

The permittee must calculate mass loads on each day the parameter is monitored using the following equation:

Example calculation: Flow (in MGD) X Concentration (in mg/L) X 8.34 = Pounds per day

- i. Mass load limits all have two significant figures unless otherwise noted.
- ii. When concentration data are below the DL: To calculate the mass load from this result, use the DL. Report the mass load as less than the calculated mass load. For example, if flow is 2 MGD and the reported sample result is <1.0 µg/L, report "<0.02 lb/day" for mass load on the DMR (1.0 µg/L x 2 MGD x conversion factor = 0.017 lb/day).
- iii. When concentration data are above the DL, but below the QL: To calculate the mass load from this result, use the DL. Report the mass load as the calculated mass load preceded by "E". For example, if flow is 2 MGD, the DL is 1.0 µg/L, the QL is 5 µg/L and the reported sample result is E3.5 µg/L, report "E0.017 lb/day" for mass load on the DMR (1.0 µg/L x 2 MGD x conversion factor = 0.017 lb/day,).

3. Monitoring and Reporting Requirements

- a. The permittee must monitor influent after the headworks screen and prior to any return flows and report results in accordance with Table B1 and the table below.

Table B2: Influent Monitoring Requirements

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type / Required Action (See note a.)	Report Statistic (See note b.)
Flow (50050)	MGD	Year-round	Daily	Metered	1. Monthly Average 2. Daily Maximum
BOD ₅ (00310)	mg/L	Year-round	3/week	24-hour composite	Monthly Average
TSS (00530)	mg/L	Year-round	3/week	24-hour composite	Monthly Average
pH (00400)	SU	Year-round	Daily	Grab	1. Monthly Maximum 2. Monthly Minimum

Notes:

- a. In the event of equipment failure or loss, the permittee must notify DEQ and deploy new equipment to minimize interruption of data collection. If new equipment cannot be immediately deployed, the permittee must perform grab measurements.
- b. When submitting DMRs electronically, the permittee must submit all data used to determine summary statistics in a DEQ-approved format as a spreadsheet via electronic reporting unless otherwise directed by DEQ.

- b. The permittee must monitor effluent discharged at Outfall 001A following disinfection and report results in accordance with Table B1 and the table below:

Table B3: Effluent Monitoring Requirements

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action (See note a.)	Report Statistic (See note b.)
Flow (50050)	MGD	Year-round	Daily	Metered	1. Monthly Average 2. Daily Maximum
BOD ₅ (00310)	mg/L	Year-round	3/week	24-hour composite	1. Monthly Average 2. Maximum Weekly Average
BOD ₅ (00310)	lb/day	Year-round	3/week	Calculation	1. Daily Maximum 2. Monthly Average 3. Maximum Weekly Average
BOD ₅ percent removal (81010) (See note c.)	%	Year-round	Monthly	Calculation based on monthly average BOD ₅ concentration values	Monthly Average
TSS (00530)	mg/L	Year-round	3/week	24-hour composite	1. Monthly Average 2. Maximum Weekly Average
TSS (00530)	lb/day	Year-round	3/week	Calculation	1. Daily Maximum 2. Monthly Average 3. Maximum Weekly Average
TSS percent removal (81011) (See note c.)	%	Year-round	Monthly	Calculation based on monthly average TSS concentration values	Monthly Average
pH (00400)	SU	Year-round	Daily	Grab	1. Daily Maximum 2. Daily Minimum
Temperature (00010)	°C	Year-round	Daily	Continuous (See note d.)	1. Daily Maximum 2. Monthly Average 3. 7-day Rolling Average of Daily Maximum
<i>E. coli</i> (51040)	#/100 mL	Year-round	3/week	Grab	1. Daily Maximum 2. Monthly Geometric Mean
Enterococci (61211)	#/100 mL	Year-round	3/week	Grab	1. Daily Maximum 2. Monthly Geometric Mean

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action (See note a.)	Report Statistic (See note b.)
Enterococci % Samples exceeding limit (51937)	%	Year-round	1/Month	Calculation	Monthly percent over 130
Mercury, Total Recoverable (MMP) (71901) (See note e.)	µg/L	First year of the permit cycle and every third year thereafter	Quarterly	24-hour composite	Quarterly Value
Total ammonia (as N) (00610)	mg/L	Year-round	Monthly	24-hour composite	Monthly Maximum
Alkalinity as CaCO ₃ (00410)	mg/L	Year-round	Quarterly	24-hour composite	Quarterly Maximum
UV dose	mJ/cm ²	Year-round	Daily	Calculation OR from manufacturer's table	Maintain records on-site
Dissolved Oxygen (00300)	mg/L	Third year of permit cycle [2027]	Quarterly	24-hour composite (See note f.)	Quarterly Minimum
Total Kjeldahl Nitrogen (TKN) (00625)	mg/L	Third year of permit cycle [2027]	Quarterly	24-hour composite	Quarterly Maximum
Nitrate (NO ₃) Plus Nitrite (NO ₂) Nitrogen (00630)	mg/L	Third year of permit cycle [2027]	Quarterly	24-hour composite	Quarterly Maximum
Oil and Grease (00556)	mg/L	Third year of permit cycle [2027]	Quarterly	Grab	Quarterly Maximum
Total Phosphorus (00665)	mg/L	Third year of permit cycle [2027]	Quarterly	24-hour composite	Quarterly Maximum
Total Dissolved Solids (70295)	mg/L	Third year of permit cycle [2027]	Quarterly	24-hour composite	Quarterly Maximum

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action (See note a.)	Report Statistic (See note b.)
Notes: a. In the event of equipment failure or loss, the permittee must notify DEQ and deploy new equipment to minimize interruption of data collection. If new equipment cannot be immediately deployed, the permittee must perform grab measurements. If the failure or loss is for continuous temperature monitoring equipment, the permittee must perform grab measurements daily between 12 PM and 5 PM until continuous monitoring equipment is redeployed. b. When submitting DMRs electronically, all data used to determine summary statistics must be submitted in a DEQ-approved format as a spreadsheet via electronic reporting unless otherwise directed by DEQ. c. Percent Removal must be calculated on a monthly basis using the following formula: $\text{Percent Removal} = \frac{[\text{Influent Concentration}] - [\text{Effluent Concentration}]}{[\text{Influent Concentration}]} \times 100$ Where: Influent Concentration = Corresponding Monthly average influent concentration based on the analytical results of the reporting period. Effluent Concentration = Corresponding Monthly average effluent concentration based on the analytical results of the reporting period. d. The permittee may report the hourly average maximum temperature if continuous monitoring of temperature is performed at less than hourly intervals. e. Example: If permit effective date is March 1, 2024; Monitoring is required quarterly from April 1, 2024 to March 31, 2025; and quarterly from April 1, 2027 to March 31, 2028; and continuing every three years until permit renewal. f. For Dissolved Oxygen, the permittee must collect and analyze at least four discrete grab samples over the operating day with samples collected no less than one hour apart. The analytical results for all samples in a day must be averaged for reporting purposes.					

- c. The permittee must monitor the Necanicum River upstream of Outfall 001A in accordance with Table B1 and the table below. The permittee must collect samples such that the effluent does not impact the samples (e.g., upstream for riverine discharges).

Table B4: Necanicum River Monitoring.

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type / Required Action (See notes a and b.)	Report Statistic (See note c.)
Temperature (00010)	°C	Year-round	Daily	Continuous	1. Monthly Maximum 2. Daily Maximum 3. 7-day Rolling Average of Daily Maximum
pH (00400)	SU	Year-round	Monthly	Grab	Monthly Value
Total ammonia (as N) (00610)	mg/L	Year-round	Monthly	Grab	Monthly Maximum

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type / Required Action (See notes a and b.)	Report Statistic (See note c.)
Alkalinity as CaCO ₃ (00410)	mg/L	Year-round	Quarterly	Grab	Quarterly Maximum
Notes: a. In the event of equipment failure or loss, the permittee must notify DEQ and deploy new equipment to minimize interruption of data collection. If new equipment cannot be immediately deployed, the permittee must perform grab measurements. If the failure or loss is for continuous temperature monitoring equipment, the permittee must perform grab measurements daily between 12 PM and 5 PM until continuous monitoring equipment is redeployed. b. Permittee must conduct river monitoring at location upstream of Outfall 001A. The location must be outside the upstream extent of the effluent plume for Outfall 001A. River temperature shall be measured using a continuous temperature monitoring device. Temperature shall be recorded at intervals no longer than 30-minutes. The daily maximum ambient temperature is the maximum 1-hour average from the continuous monitoring data. c. When submitting DMRs electronically, all data used to determine summary statistics must be submitted in a DEQ-approved format as a spreadsheet via electronic reporting unless otherwise directed by DEQ.					

4. Effluent Toxics Characterization Monitoring

The permittee must collect and analyze effluent samples for the parameters listed in the tables below. The permittee must collect effluent samples after disinfection and prior to discharge to Outfall 001A on the dates listed in Table B1.

Samples must be 24-hour composites, except as noted in the tables below for total cyanide, free cyanide and volatile organic compounds. Sample results must be reported in µg/L unless otherwise specified and submitted to DEQ using approved electronic format.

Table B5: Metals and Cyanide

Pollutant (See note a.)	CAS (See note b.)	Pollutant (See note a.)	CAS (See note b.)
Antimony, total	7440360	Lead, total and dissolved	7439921
Arsenic, total	7440382	Mercury, total	7439976
Arsenic, total inorganic	7440382	Nickel, total and dissolved	7440020
Arsenic, total inorganic dissolved	7440382	Selenium, total and dissolved	7782492
Cadmium, total and dissolved	7440439	Silver, total and dissolved	7440224
Chromium, total and dissolved	7440473	Thallium, total	7440280
Chromium III, total and dissolved (See note c.)	16065831	Zinc, total and dissolved	7440666
Chromium VI, dissolved	18540299	Cyanide, free (See notes d & e.)	57125
Copper, total and dissolved	7440508	Cyanide, total (See note e.)	57125

Pollutant (See note a.)	CAS (See note b.)	Pollutant (See note a.)	CAS (See note b.)
Notes: a. The term “total” used in reference to metals is intended to cover all EPA-accepted standard digestion methods and is considered to be equivalent to the term “total recoverable”. b. Chemical Abstract Service c. There is no analytical method to test for Chromium III, results are obtained by subtracting Chromium VI from Chromium. d. There are multiple approved methods for testing for free cyanide. For more information, refer to DEQ’s analytical memo on the subject of cyanide monitoring at https://www.oregon.gov/deq/FilterDocs/sToxiccyanide.pdf e. Cyanide (free and total) must be collected as a grab sample according to 40 CFR 122. Twenty-four-hour composite samples are not required for this analyte.			

Table B6: Volatile Organic Compounds

Pollutant (See note a.)	CAS	Pollutant (See note a.)	CAS
Acrolein (See note b.)	107028	1,2-trans-dichloroethylene (See note e.)	156605
Acrylonitrile (See note b.)	107131	1,1-dichloroethylene (See note f.)	75354
Benzene	71432	1,2-dichloropropane	78875
Bromoform	75252	1,3-dichloropropylene (See note g.)	542756
Carbon tetrachloride	56235	Ethylbenzene	100414
Chlorobenzene	108907	Methyl Bromide (See note h.)	74839
Chlorodibromomethane (See note c.)	124481	Methyl Chloride (See note i.)	74873
Chloroethane	75003	Methylene chloride	75092
2-Chloroethylvinyl ether (See note b.)	110758	1,1,2,2-tetrachloroethane	79345
Chloroform	67663	Tetrachloroethylene (See note j.)	127184
Dichlorobromomethane (See note d.)	75274	Toluene	108883
1,2-Dichlorobenzene (o)	95501	1,1,1-trichloroethane	71556
1,3-Dichlorobenzene (m)	541731	1,1,2-trichloroethane	79005
1,4-Dichlorobenzene (p)	106467	Trichloroethylene (See note k.)	79016
1,1-dichloroethane	75343	Vinyl chloride	75014
1,2-dichloroethane	107062		
Notes: a. VOC's must be collected as a grab sample according to 40 CFR 122. Twenty-four-hour composite samples are not required for this analyte. b. Acrolein, Acrylonitrile, and 2-Chloroethylvinyl ether must be tested from an unacidified sample. c. Chlorodibromomethane is identified as Dibromochloromethane in 40 CFR 136.3, Table 1C. d. Dichlorobromomethane is identified as Bromodichloromethane in 40 CFR 136.3, Table 1C. e. 1,2-Trans-dichloroethylene is identified as Trans-1,2-dichloroethene in 40 CFR 136.3, Table 1C. f. 1,1-Dichloroethylene is identified as 1,1-Dichloroethene in 40 CFR 136.3, Table 1C. g. 1,3-Dichloropropylene consists of both cis-1,3-Dichloropropene and Trans-1,3-dichloropropene. Both must be reported individually. h. Methyl bromide is identified as Bromomethane in 40 CFR 136.3, Table 1C. i. Methyl chloride is identified as Chloromethane in 40 CFR 136.3, Table 1C. j. Tetrachloroethylene is identified as Tetrachloroethene in 40 CFR 136.3, Table 1C. k. Trichloroethylene is identified as Trichloroethene in 40 CFR 136.3, Table 1C.			

Table B7: Acid-Extractable Compounds

Pollutant	CAS	Pollutant	CAS
p-chloro-m-cresol (See note a.)	59507	2-nitrophenol	88755
2-chlorophenol	95578	4-nitrophenol	100027
2,4-dichlorophenol	120832	Pentachlorophenol	87865
2,4-dimethylphenol	105679	Phenol	108952
4,6-dinitro-o-cresol (See note b.)	534521	2,4,5-trichlorophenol (See note c.)	95954
2,4-dinitrophenol	51285	2,4,6-trichlorophenol	88062
Notes:			
a. p-chloro-m-cresol is identified as 4-Chloro-3-methylphenol in 40 CFR 136.3, Table 1C.			
b. 4,6-dinitro-o-cresol is identified as 2-Methyl-4,6-dinitrophenol in 40 CFR 136.3, Table 1C.			
c. To monitor for 2,4,5-trichlorophenol, use EPA Method 625.1.			

Table B8: Base-Neutral Compounds

Pollutant	CAS	Pollutant	CAS
Acenaphthene	83329	Dimethyl phthalate	131113
Acenaphthylene	208968	2,4-dinitrotoluene	121142
Anthracene	120127	2,6-dinitrotoluene	606202
Benzidine	92875	1,2-diphenylhydrazine (See note c.)	122667
Benzo(a)anthracene	56553	Fluoranthene	206440
Benzo(a)pyrene	50328	Fluorene	86737
3,4-benzofluoranthene (See note a.)	205992	Hexachlorobenzene	118741
Benzo(ghi)perylene	191242	Hexachlorobutadiene	87683
Benzo(k)fluoranthene	207089	Hexachlorocyclopentadiene	77474
Bis(2-chloroethoxy)methane	111911	Hexachloroethane	67721
Bis(2-chloroethyl)ether	111444	Indeno(1,2,3-cd)pyrene	193395
Bis(2-chloroisopropyl)ether (See note b.)	108601	Isophorone	78591
Bis (2-ethylhexyl)phthalate	117817	Napthalene	91203
4-bromophenyl phenyl ether	101553	Nitrobenzene	98953
Butylbenzyl phthalate	85687	N-nitrosodi-n-propylamine	621647
2-chloronaphthalene	91587	N-nitrosodimethylamine	62759
4-chlorophenyl phenyl ether	7005723	N-nitrosodiphenylamine	86306
Chrysene	218019	Pentachlorobenzene (See note d.)	608935
Di-n-butyl phthalate	84742	Phenanthrene	85018
Di-n-octyl phthalate	117840	Pyrene	129000
Dibenzo(a,h)anthracene	53703	1,2,4-trichlorobenzene	120821
3,3-Dichlorobenzidine	91941	Tetrachlorobenzene,1,2,4,5 (See note d.)	95943
Diethyl phthalate	84662		

Pollutant	CAS	Pollutant	CAS
Notes:			
a. 3,4-benzofluoranthene is listed as Benzo(b)fluoranthene in 40 CFR 136.			
b. Also known as Chloroisopropyl Ether bis 2, and 2,2'-oxybis(2-chloro-propane) Bis(2-chloroisopropyl)ether is listed as 2,2'-oxybis(1-chloropropane) in 40 CFR 136."			
c. 1,2-diphenylhydrazine is difficult to analyze given its rapid decomposition rate in water. Azobenzene (a decomposition product of 1,2-diphenylhydrazine), must be analyzed as an estimate of this chemical.			
d. To analyze for Pentachlorobenzene and Tetrachlorobenzene 1,2,4,5, use EPA 625.1.			

Table B9: Pesticides and PCBs

Pollutant	CAS	Pollutant	CAS
Aldrin	309002	Endrin Aldehyde	7421934
BHC Technical (Hexachlorocyclohexane) (See note a.)	608731	Guthion (See note b.)	86500
BHC-alpha (See note a.)	319846	Heptachlor	76448
BHC-beta (See note a.)	319857	Heptachlor Epoxide	1024573
BHC-delta (See note a.)	319868	Malathion	121755
BHC-gamma (Lindane) (See note a.)	58899	Methoxychlor	72435
Chlordane	57749	Mirex	2385855
Chlorpyrifos (See note b.)	2921882	Parathion (See note b.)	56382
Demeton	8065483	Toxaphene	8001352
DDD 4,4'	72548	PCB- Aroclor 1254	11097691
DDE 4,4'	72559	PCB- Aroclor 1232	11141165
DDT 4,4'	50293	PCB- Aroclor 1260	11096825
Dieldrin	60571	PCB- Aroclor 1242	53469219
Endosulfan alpha (See note c.)	959988	PCB- Aroclor 1221	11104282
Endosulfan beta (See note d.)	33213659	PCB- Aroclor 1248	12672296
Endosulfan sulfate	1031078	PCB- Aroclor 1016	12674112
Endrin	72208		
Notes:			
a. There is no analytical method for Technical BHC. Instead, the four major isomers (alpha, beta, delta and gamma) must be separately analyzed and then added together to compare to the BHC Technical criteria.			
b. Analytical Methods: Chlorpyrifos use EPA 625.1 or 608.3; Parathion and Guthion use EPA 614, 622 or 625.1. Parathion is listed as ethyl parathion in 40 CFR 136. Guthion is identified in 40 CFR 136.3, Table 1D as Azinphos methyl.			
c. Endosulfan alpha is identified as Endosulfan I in 40 CFR 136.3, Table 1D.			
d. Endosulfan beta is identified as Endosulfan II in 40 CFR 136.3, Table 1D.			

Table B10: Other Parameters with State Water Quality Criteria

Pollutant	CAS	Pollutant	CAS
Barium, total (See note a.)	7440393	Dioxin 2,3,7,8-TCDD (See note e.)	1746016
Manganese, total (include for discharge to marine waters only)	7439965	N-Nitrosodibutylamine	924163
Sulfide-hydrogen sulfide (See note b.)	7783064	N-Nitrosodiethylamine	55185
2,4,5-TP [2-(2,4,5-Trichloro- phenoxy) propanoic acid] (See note c.)	93721	N-Nitrosopyrrolidine	930552
2,4-D (2,4-Dichlorophenoxyacetic acid) (See note d.)	94757		
Notes: a. Barium, Total is identified as Barium-Total in 40 CFR 136.3, Table 1B. b. Report Sulfide-Hydrogen Sulfide as Dissolved Sulfide as S. c. This chemical is listed as Chlorophenoxy Herbicide (2,4,5-TP) in Table 40. d. This chemical is listed as Chlorophenoxy Herbicide (2,4-D) in Table 40 e. Dioxin 2,3,7,8-TCDD is identified as 2,3,7,8-Tetrachloro-dibenzo-p-dioxin in 40 CFR 136.3, Table 1C.			

5. Additional Receiving Stream and Effluent Characterization Monitoring (Tier 2 Monitoring)

If additional ambient or effluent monitoring is needed, DEQ will notify the permittee through a request for supplemental information/data. The need for additional monitoring will be determined after DEQ's evaluation of the effluent toxics characterization (Tier 1 monitoring in Schedule B4) results.

6. Whole Effluent Toxicity (WET) Requirements

The permittee must monitor final effluent for whole effluent toxicity as described in the table below using the testing protocols specified in Schedule D, Whole Effluent Toxicity Testing for Saltwater for Outfall 001A must be collected at the location specified below.

Table B11: WET Test Monitoring

Parameter	Sample Type/Location	Minimum Frequency	Report
Acute toxicity	For acute toxicity: 24-hr composite taken after disinfection and prior to the effluent flume to Outfall 001A.	See Table B1	Report must include test results and backup information such as bench sheets sufficient to demonstrate compliance with permit requirements. Report must include a statement certifying that the results do or do not show toxicity.
Chronic toxicity	For chronic toxicity: 24-hr composite, taken after disinfection and prior to the effluent flume to Outfall 001A.		

7. Recycled Water Monitoring Requirements: Outfall 002

The permittee must monitor recycled water for Outfall 002 as listed below. The samples must be representative of the recycled water delivered for beneficial reuse at a location identified in the Recycled Water Use Plan.

Table B12: Recycled Water Monitoring

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action	Report (See note a.)
Total flow (50050)	MGD	Year-round	Daily	Measure	Monthly Total
Quantity irrigated (51789)	in/ac	Year-round	Daily	Calculate	Monthly Total
pH (00400)	SU	Year-round	2/Week	Grab	1. Monthly Minimum 2. Monthly Maximum
UV dosage (61938)	mJ/cm ²	Year-round	Daily	Calculate based on UVI grab and average daily flow	Monthly Minimum
Turbidity (00070)	NTU	Year-round	Hourly (Class A)	Measure	1. Daily Average 2. Daily Maximum
Turbidity, time above limit (61736)	%	Year-round	Daily (Class A)	Calculate	Daily Maximum
Total coliform (74056)	#/100 mL	Year-round	Daily (Class A) 3/Week (Class B) Weekly (Class C)	Grab (See note b.)	1. 7-Day Median 2. Maximum Single Sample
<i>E. coli</i> (51040)	#/100 mL	Year-round	Weekly (Class D)	Grab	1. Monthly Geometric Mean 2. Maximum Single Sample
Total Kjeldahl, Nitrogen (00625)	mg/L	Year-round	Quarterly	Grab	Value
Nitrite + Nitrate (NO ₂ +NO ₃) (00630)	mg/L	Year-round	Quarterly	Grab	Value
Total Ammonia [as N] (00610)	mg/L	Year-round	Quarterly	Grab	Value
Total Phosphorus (00665)	mg/L	Year-round	Quarterly	Grab	Value
Nitrogen Loading Rate	lb/acre-year	Year-round	Annually	Calculate	Value for each field

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action	Report (See note a.)
Notes: a. All data collected should be included in the Recycled Water Annual Report in addition to monthly and quarterly reporting as indicated. b. Calculations of the median total coliform levels in Classes A – C are based on the results of the last seven days that analyses have been completed.					

8. Biosolids Monitoring Requirements

The permittee must monitor biosolids land applied or produced for sale or distribution as listed below. The samples must be representative of the quality and quantity of biosolids generated and undergo the same treatment process used to prepare the biosolids. Results must be reported as required in the biosolids management plan described in Schedule D.

Table B13: Biosolids Monitoring

Item or Parameter	Minimum Frequency	Sample Type
Nutrient and conventional parameters (% dry weight unless otherwise specified): Total Kjeldahl Nitrogen (TKN) Nitrate-Nitrogen (NO ₃ -N) Total Ammonia-Nitrogen (NH ₃ -N) Total Phosphorus (P) Potassium (K) pH (S.U.) Total Solids Volatile Solids	As described in DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B14.	As described in DEQ-approved Biosolids Management Plan
Pollutants: As, Cd, Cu, Hg, Pb, Mo, Ni, Se, Zn, mg/kg dry weight	As described in DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B14.	As described in DEQ-approved Biosolids Management Plan
Pathogen reduction	As described in DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B14.	As described in DEQ-approved Biosolids Management Plan
Vector attraction reduction	As described in DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B14.	As described in DEQ-approved Biosolids Management Plan
Record of biosolids land application: date, quantity, location.	Each event	Record the date, quantity, and location of biosolids land applied on site location map or equivalent electronic system, such as GIS.

Table B14: Biosolids Minimum Monitoring Frequency

Quantity of biosolids land applied or produced for sale or distribution per calendar year		Minimum Sampling Frequency
(dry metric tons)	(dry U.S. tons)	
Less than 290	Less than 320	Once per year
290 to 1,500	320 to 1,653	Once per quarter (4x/year)
1,500 to 15,000	1,653 to 16,535	Once per 60 days (6x/year)
15,000 or more	16,535 or more	Once per month (12x/year)

SCHEDULE C: COMPLIANCE SCHEDULE

A compliance schedule is not part of this permit.

Public Notice

SCHEDULE D: SPECIAL CONDITIONS

1. Inflow and Infiltration

The permittee must submit to DEQ an annual inflow and infiltration report on a DEQ-approved form as directed in Table B1. The report must include the following:

- a. An assessment of the facility's I/I issues based on a comparison of summer and winter flows to the plant.
- b. Details of activities performed in the previous year to identify and reduce inflow and infiltration.
- c. Details of activities planned for the following year to identify and reduce inflow and infiltration.
- d. A summary of sanitary sewer overflows that occurred during the previous year. This should include the following: date of the SSO, location, estimated volume, cause, follow-up actions and if performed, the results of receiving stream monitoring.

2. Mixing Zone Study

By no later than the date in Schedule B1, the permittee must submit a Level 2 Mixing Zone Study. The new study must follow the Level 2 Mixing Zone Study requirements as described in DEQ's Mixing Zone Internal Management Directive.

3. Emergency Response and Public Notification Plan

The permittee must develop an Emergency Response and Public Notification Plan ("plan"), or ensure the facility's existing plan is current and accurate, per Schedule F, Section B, and Condition 8 within 6 months of permit effective date. The permittee must update the plan annually to ensure all information contained in the plan, including telephone and email contact information for applicable public agencies, is current and accurate. An updated copy of the plan must be kept on file at the facility for DEQ review. The latest plan revision date must be listed on the plan cover along with the reviewer's initials or signature.

4. Recycled Water Use Plan

In order to distribute recycled water, the permittee must develop and maintain a DEQ-approved Recycled Water Use Plan meeting the requirements in OAR 340-055-0025. The permittee must submit this plan or any significant modifications to DEQ for review and approval with sufficient time to clear DEQ review and a public notice period prior to distribution of recycled water. The permittee is prohibited from distributing recycled water prior to receipt of written approval of its Recycled Water Use Plan from DEQ. The permittee must keep the plan updated. All plan revisions require written authorization from DEQ and are effective upon permittee's receipt of DEQ written approval. No significant modifications can be made to a plan for an administratively extended permit (after the permit expiration date). Conditions in the plan are enforceable requirements under this permit. DEQ will provide an opportunity for public review and comment on any significant plan modifications prior to approving or denying. Public review is not required for minor modifications, changes to utilization dates or changes in use within the recycled water class.

- a. Recycled Water Annual Report – If the permittee distributes recycled water under a recycled water use plan, the permittee must submit a recycled water annual report by the date specified in Table B1: Reporting Requirements and Due Dates. The permittee must use DEQ approved recycled water annual report form. This report must include the monitoring data and analytical laboratory reports for the previous year’s monitoring required under Schedule B.

5. Exempt Wastewater Reuse at the Treatment System

Recycled water used for landscape irrigation within the property boundary or in-plant processes at the wastewater treatment system is exempt from the requirements of OAR 340-055 if all of the following conditions are met:

- a. The recycled water is an oxidized and disinfected wastewater.
- b. The recycled water is used at the wastewater treatment system site where it is generated or at an auxiliary wastewater or sludge treatment facility that is subject to the same NPDES or WPCF permit as the wastewater treatment system.
- c. Spray and/or drift from the use does not migrate off the site.
- d. Public access to the site is restricted.

6. Biosolids Management Plan

The permittee must update and maintain a Biosolids Management Plan and Land Application Plan meeting the requirements in OAR 340-050-0031. The permittee must submit these plans and any significant modification of these plans to DEQ for review and approval with sufficient time to clear DEQ review and a public notice period prior to implementing any significant changes to the biosolids program. The permittee must keep the plans updated. All plan revisions require written authorization from DEQ and are effective upon permittee’s receipt of DEQ written approval. No significant modifications can be made to a plan for an administratively extended permit (after the permit expiration date). Conditions in the plans are enforceable requirements under this permit.

a. Annual Report

The permittee must submit a Biosolids Annual Report by February 19 each year documenting biosolids management activities of the previous calendar year as described in OAR 340-050-0035(6). The permittee must use the DEQ approved Biosolids Annual report form. This report must include the monitoring data and analytical laboratory reports for the previous year’s monitoring specified under Schedule B.

b. Site Authorization

The permittee must obtain written authorization from DEQ for each land application site prior to its use. Conditions in site authorizations are enforceable requirements under this permit. The permittee is prohibited from land applying biosolids to a DEQ-approved site except in accordance with the site authorization, while this permit is effective and with the written approval of the property owner. DEQ may modify or revoke a site authorization following the procedures for a permit modification described in OAR 340-045-0055.

c. Public Participation

- i. DEQ will provide an opportunity for public review and comment on any significant plan modifications prior to approving or denying. Public review is not required for minor modifications or changes to utilization dates.

- ii. No DEQ-initiated public notice is required for continued use of sites identified in DEQ-approved biosolids management plan.
 - iii. For new sites that fail to meet the site selection criteria in the biosolids management plan or that are deemed by DEQ to be sensitive with respect to residential housing, runoff potential, or threat to groundwater, DEQ will provide an opportunity for public comment as directed by OAR 340-050-0030(2).
 - iv. For all other new sites, the permittee must provide for public participation following procedures in its DEQ-approved land application plan.
- d. **Exceptional Quality Biosolids**

The permittee is exempt from the requirements in Condition 6.b above, if:

- i. Pollutant concentrations of biosolids are less than the pollutant concentration limits in Schedule A, Table A3;
- ii. Biosolids meet one of the Class A pathogen reduction alternatives in 40 CFR 503.32(a); and
- iii. Biosolids meet one of the vector attraction reduction options in 40 CFR 503.33(b)(1) through (8).

7. Wastewater Solids Transfers

- a. *Within state.* The permittee may transfer wastewater solids including Class A and Class B biosolids, to another facility permitted to process or dispose of wastewater solids, including but not limited to: another wastewater treatment facility, landfill, or incinerator. The permittee must satisfy the requirements of the receiving facility. The permittee must report the name of the receiving facility and the quantity of material transferred in the wastewater solids or biosolids annual report identified in Schedule B.
- b. *Out of state.* If wastewater solids, including Class A and Class B biosolids, are transferred out of state for use or disposal, the permittee must obtain written authorization from DEQ, meet Oregon requirements for the use or disposal of wastewater solids, notify in writing the receiving state of the proposed use or disposal of wastewater solids, and satisfy the requirements of the receiving state.

8. Hauled Waste Control Plan

The permittee may accept hauled wastes at discharge points designated by the POTW after receiving written DEQ-approval of a Hauled Waste Control Plan. Hauled wastes may include wastewater solids from another wastewater treatment facility, septage, grease trap wastes, portable and chemical toilet wastes, landfill leachate, groundwater remediation wastewaters and commercial/industrial wastewaters. A Hauled Waste Control Plan is not required in the event biological seed must be added to the process at the POTW to facilitate effective wastewater treatment.

9. Hauled Waste Annual Report

If the permittee has a Hauled Waste Control Plan, or otherwise accepts hauled waste, the permittee must submit an annual report of hauled waste received by the POTW. This report, if required, must be submitted as described in Table B1. This report must include the date, time, type, and amount received each time the POTW accepts hauled waste. Hauled waste must be described in the permittee's Hauled Waste Control Plan.

10. Whole Effluent Toxicity Testing for Saltwater

- a. The permittee must conduct whole effluent toxicity (WET) tests as specified here and in Schedule B of this permit.
- b. Acute Toxicity Testing - Organisms and Protocols
 - i. The permittee must conduct 48-hour static renewal tests with *Holmesimysis costata* (mysid shrimp) and 96-hour static renewal tests with *Atherinops affinis* (Topsmelt). *Americamysis (Mysidopsis) bahia* may be substituted if *H. costata* is not available. *Menidia beryllina* may be substituted if *A. affinis* is not available.
 - ii. All test methods and procedures must be in accordance with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, EPA-821-R-02-012, October 2002, or the most recent version of this publication if such edition is available. If the permittee wants to deviate from the bioassay procedures outlined in this method, the permittee must submit a written request to DEQ for review and written approval prior to use.
 - iii. Treatments to the final effluent samples (for example, dechlorination, ammonia removal), except those included as part of the methodology, may not be performed by the laboratory unless approved in writing by DEQ prior to analysis.
 - iv. WET acute testing must be conducted using a dilution series based upon the effluent percentage at the ZID (EPZID) in the following manner: 100% effluent; 55%, 10%, 5%, 2.5% and a lab control (0%).
 - v. A WET test shows acute toxicity if there is a statistically significant difference in survival between the control and 10 percent effluent reported as the No Observable Effect Concentration (NOEC) <10%.
- c. Chronic Toxicity Testing - Organisms and Protocols
 - i. The permittee must conduct tests with: *Holmesimysis costata* (mysid shrimp) for reproduction and survival test endpoint, *Atherinops affinis* (topsmelt) for growth and survival test endpoint, and *Macrocystis pyrifera* (giant kelp) for growth test endpoint. The specified species are preferred as these are West Coast species. However, *Americamysis (Mysidopsis) bahia*, *Menidia beryllina* (inland silverside), and *Champia parvula* (red macroalga) may be substituted if the corresponding West Coast species is not available.
 - ii. All test methods and procedures must be in accordance with Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, Third Edition, EPA-821-R-02-014, October 2002 or Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, First Edition, EPA/600/R-95-136, August 1995 based on species selection in Condition 10.c.i. above. If the permittee wants to deviate from the bioassay procedures outlined in the applicable method, the permittee must submit a written request to DEQ for review and approval prior to use.
 - iii. Treatments to the final effluent samples (for example, dechlorination, ammonia removal), except those included as part of the methodology, may not be performed by the laboratory unless approved by DEQ in writing prior to analysis.
 - iv. WET chronic testing must be conducted using a dilution series based upon the effluent percentage at the RMZ (EPRMZ) in the following manner: 100%, 51.9%, 3.8%, 1.9%, 0.95% effluent and a lab control (0%).

- v. A WET test shows chronic toxicity if the IC₂₅ (25% inhibition concentration) occurs at dilutions equal to or less than the dilution that is known to occur at the edge of the regulatory mixing zone, that is $IC_{25} \leq 3.8\%$.
- d. Dual End-Point Tests
 - i. WET tests may be dual end-point tests in which both acute and chronic end-points can be determined from the results of a single chronic test. The acute end-point must be based on 48-hours for the *Holmesimysis costata* (mysid shrimp) or *Americamysis bahia* and 96-hours for the *Menidia beryllina* (inland silverside) or *Atherinops affinis* (topsmelt).
 - ii. All test methods and procedures must be in accordance with Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, Third Edition, EPA-821-R-02-014, October 2002. Any deviation of the bioassay procedures outlined in this method must be submitted in writing to DEQ for review and written approval prior to use.
 - iii. Tests run as dual end-point tests must be conducted on a control (0%) and the following dilution series: 0.95%, 3.8%, 10%, 51.9%, 55% and 100% effluent.
 - iv. Toxicity determinations for dual end-point tests must correspond to the acute and chronic tests described in conditions 10.b.v and 10.c.v above.
- e. Sampling Requirements

At the time of WET sampling, the permittee must collect and analyze effluent samples for the parameters listed in Tables B5 – B8.
- f. Evaluation of Causes and Exceedances
 - i. If any test exhibits toxicity as defined, the permittee must conduct another toxicity test using the same species and DEQ-approved methodology within two weeks unless an extension is granted in writing by DEQ.
 - ii. If two consecutive WET test results indicate acute or chronic toxicity, the permittee must immediately notify DEQ of the results. DEQ will work with the permittee to determine the appropriate course of action to evaluate and address the toxicity.
- g. Quality Assurance / Reporting
 - i. Quality assurance criteria, statistical analyses, and data reporting for the WET tests must be in accordance with the EPA documents stated in this condition.
 - ii. For each test, the permittee must provide a bioassay laboratory report prepared according to the EPA method documents referenced in this Schedule. The report must include all QA/QC documentation, statistical analysis for all conducted tests, standard reference toxicant test (SRT) conducted on each species required for the toxicity tests and completed Chain of Custody forms for the samples including time of sample collection and receipt.
 - iii. The report must include all endpoints measured in the test: NOEC (No Observed Effects Concentration), LOEC (Lowest Observed Effects Concentration), and IC₂₅ (chronic effect 25% inhibition concentration).
 - iv. The permittee will make available to DEQ upon request the written standard operating procedures they or the laboratory performing the WET tests use for all toxicity tests required by DEQ.

h. Reopener

DEQ may reopen and modify this permit to include new limits, monitoring requirements, or conditions as determined by DEQ to be appropriate, and in accordance with procedures outlined in OAR Chapter 340, Division 45 if:

- i. WET testing data indicate acute and/or chronic toxicity.
- ii. The facility undergoes any process changes.
- iii. Discharge monitoring data indicate a change in the reasonable potential to cause or contribute to an exceedance of a water quality standard.
- i. Circumstances not addressed in this section, or that require deviation from the requirements of this section, must be approved in writing by DEQ before changes are implemented.

11. Operator Certification

a. Definitions

- i. “Supervise” means to have full and active responsibility for the daily on-site technical operation of a wastewater treatment system or wastewater collection system.
- ii. “Supervisor” or “designated operator”, means the operator delegated authority by the permittee for establishing and executing the specific practice and procedures for operating the wastewater treatment system or wastewater collection system in accordance with the policies of the owner of the system and any permit requirements.
- iii. “Shift Supervisor” means the operator delegated authority by the permittee for executing the specific practice and procedures for operating the wastewater treatment system or wastewater collection system when the system is operated on more than one daily shift.
- iv. “System” includes both the collection system and the treatment systems.

b. The permittee must comply with OAR Chapter 340, Division 49, “Regulations Pertaining to Certification of Wastewater System Operator Personnel” and designate a supervisor whose certification corresponds with the classification of the collection and/or treatment system as specified in DEQ Supervisory Wastewater Operator Status Report. DEQ may revise the permittee’s classification in writing at any time to reflect changes in the collection or treatment system. This reclassification is not considered a permit modification and may be made after the permit expiration date provided the permit has been administratively extended by DEQ. If a facility is re-classified, a certified letter will be mailed to the system owner from DEQ Operator Certification Program. Current system classifications are publicized on DEQ Supervisory Wastewater Operator Status Report found on DEQ Wastewater Operator Certification Homepage.

- c. The permittee must have its system supervised full-time by one or more operators who hold a valid certificate for the type of wastewater treatment or wastewater collection system, and at a grade equal to or greater than the wastewater system’s classification.
- d. The permittee's wastewater system may be without the designated supervisor for up to 30 consecutive days if another person supervises the system, who is certified at no more than one grade lower than the classification of the wastewater system. The permittee must delegate authority to this operator to supervise the operation of the system.

When compliance with this section is not possible or practicable because the system supervisor is not available or the position is vacated unexpectedly, and another certified operator is not qualified to assume supervisory responsibility, the Director may grant a time extension for compliance with the requirements in response to a written request from the system owner. The Director will not grant an extension longer than 120 days unless the system owner documents the existence of extraordinary circumstances.

- e. If the wastewater system has more than one daily shift, the permittee must have another properly certified operator available to supervise operation of the system. Each shift supervisor must be certified at no more than one grade lower than the system classification.
- f. The permittee is not required to have a supervisor on site at all times; however, the supervisor must be available to the permittee and operator at all times.
- g. The permittee must notify DEQ in writing of the name of the system supervisor by completing and submitting the Supervisory Wastewater System Operator Designation Form. The most recent version of this form may be found on DEQ Wastewater Operator Certification homepage *NOTE: This form is different from the Delegated Authority form. The permittee may replace or re-designate the system supervisor with another properly certified operator at any time and must notify DEQ in writing within 30 days of replacement or re-designation of the operator in charge. As of this writing, the notice of replacement or re-designation must be sent to Water Quality Division, Operator Certification Program, 700 NE Multnomah St, Suite 600, Portland, OR 97232-4100. This address may be updated in writing by DEQ during the term of this permit.

12. Industrial User Survey

- a. By the date listed in Table B1, the permittee must conduct an industrial user survey as described in 40CFR 403.8(f)(2)(i-iii) to determine the presence of any industrial users discharging wastewaters subject to pretreatment and submit a report on the findings to DEQ. The purpose of the survey is to identify whether there are any industrial users discharging to the POTW, and ensure regulatory oversight of these discharges to state waters.
- b. Should DEQ determine that a pretreatment program is required, the permit must be reopened and modified in accordance with 40 CFR 403.8(e)(1) to incorporate a compliance schedule for development of a pretreatment program. The compliance schedule must be developed in accordance with the provisions of 40 CFR 403.12(k), and must not exceed twelve (12) months.

13. Outfall Inspection

The permittee must inspect Outfall 001A including the submerged portion of the outfall line and diffuser to document its integrity and to determine whether it is functioning as designed. The inspection must determine whether diffuser ports are intact, clear and fully functional. The inspection must verify the latitude and longitude of the diffuser. The permittee must submit a written report to DEQ regarding the results of the outfall inspection by the date in Table B1. The report must include a description of the outfall as originally constructed, the condition of the current outfall and identify any repairs needed to return the outfall to satisfactory condition.

SCHEDULE E: PRETREATMENT ACTIVITIES

A pretreatment program is not part of this permit.

Public Notice

SCHEDULE F: NPDES GENERAL CONDITIONS

DOMESTIC FACILITIES October 1, 2015 Version

SECTION A. STANDARD CONDITIONS

A1. Duty to Comply with Permit

The permittee must comply with all conditions of this permit. Failure to comply with any permit condition is a violation of Oregon Revised Statutes (ORS) 468B.025 and the federal Clean Water Act and is grounds for an enforcement action. Failure to comply is also grounds for DEQ to terminate, modify and reissue, revoke, or deny renewal of a permit.

A2. Penalties for Water Pollution and Permit Condition Violations

The permit is enforceable by DEQ or EPA, and in some circumstances also by third-parties under the citizen suit provisions of 33 USC § 1365. DEQ enforcement is generally based on provisions of state statutes and Environmental Quality Commission (EQC) rules, and EPA enforcement is generally based on provisions of federal statutes and EPA regulations.

ORS 468.140 allows DEQ to impose civil penalties up to \$25,000 per day for violation of a term, condition, or requirement of a permit.

Under ORS 468.943, unlawful water pollution in the second degree, is a Class A misdemeanor and is punishable by a fine of up to \$25,000, imprisonment for not more than one year, or both. Each day on which a violation occurs or continues is a separately punishable offense.

Under ORS 468.946, unlawful water pollution in the first degree is a Class B felony and is punishable by a fine of up to \$250,000, imprisonment for not more than 10 years, or both.

The Clean Water Act provides that any person who violates permit condition, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed \$25,000 per day for each violation.

The Clean Water Act provides that any person who negligently violates any condition, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of \$2,500 to \$25,000 per day of violation, or imprisonment of not more than 1 year, or both.

In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than \$50,000 per day of violation, or by imprisonment of not more than 2 years, or both.

Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of \$5,000 to \$50,000 per day of violation, or imprisonment for not more than 3 years, or both.

In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than \$100,000 per day of violation, or imprisonment of not more than 6 years, or both.

Any person who knowingly violates section any permit condition, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than \$250,000 or imprisonment of not more than 15 years, or both.

In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than \$500,000 or by imprisonment of not more than 30 years, or both.

An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than \$1,000,000 and can be fined up to \$2,000,000 for second or subsequent convictions.

Any person may be assessed an administrative penalty by the Administrator for violating any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act.

Administrative penalties for Class I violations are not to exceed \$10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed \$25,000.

Penalties for Class II violations are not to exceed \$10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed \$125,000.

A3. Duty to Mitigate

The permittee must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit. In addition, upon request of DEQ, the permittee must correct any adverse impact on the environment or human health resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

A4. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and have the permit renewed. The application must be submitted at least 180 days before the expiration date of this permit.

DEQ may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

A5. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:

- a. Violation of any term, condition, or requirement of this permit, a rule, or a statute.
- b. Obtaining this permit by misrepresentation or failure to disclose fully all material facts.
- c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.
- d. The permittee is identified as a Designated Management Agency or allocated a wasteload under a total maximum daily load (TMDL).
- e. New information or regulations.
- f. Modification of compliance schedules.
- g. Requirements of permit reopener conditions
- h. Correction of technical mistakes made in determining permit conditions.
- i. Determination that the permitted activity endangers human health or the environment.
- j. Other causes as specified in 40 CFR §§ 122.62, 122.64, and 124.5.
- k. For communities with combined sewer overflows (CSOs):
 - (1) To comply with any state or federal law regulation for CSOs that is adopted or promulgated subsequent to the effective date of this permit.

- (2) If new information that was not available at the time of permit issuance indicates that CSO controls imposed under this permit have failed to ensure attainment of water quality standards, including protection of designated uses.
- (3) Resulting from implementation of the permittee's long-term control plan and/or permit conditions related to CSOs.

The filing of a request by the permittee for a permit modification, revocation or reissuance, termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

A6. Toxic Pollutants

The permittee must comply with any applicable effluent standards or prohibitions established under Oregon Administrative Rule (OAR) 340-041-0033 and section 307(a) of the federal Clean Water Act for toxic pollutants, and with standards for sewage sludge use or disposal established under section 405(d) of the federal Clean Water Act, within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

A7. Property Rights and Other Legal Requirements

The issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, or authorize any injury to persons or property or invasion of any other private rights, or any infringement of federal, tribal, state, or local laws or regulations.

A8. Permit References

Except for effluent standards or prohibitions established under section 307(a) of the federal Clean Water Act and OAR 340-041-0033 for toxic pollutants, and standards for sewage sludge use or disposal established under section 405(d) of the federal Clean Water Act, all rules and statutes referred to in this permit are those in effect on the date this permit is issued.

A9. Permit Fees

The permittee must pay the fees required by OAR.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

B1. Proper Operation and Maintenance

The permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

B2. Need to Halt or Reduce Activity Not a Defense

For industrial or commercial facilities, upon reduction, loss, or failure of the treatment facility, the permittee must, to the extent necessary to maintain compliance with its permit, control production or all discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced or lost. It is not a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

B3. Bypass of Treatment Facilities

a. Definitions

- (1) "Bypass" means intentional diversion of waste streams from any portion of the treatment facility. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, provided the diversion is to allow essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs b and c of this section.
- (2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Prohibition of bypass.

- (1) Bypass is prohibited and DEQ may take enforcement action against a permittee for bypass unless:
 - i. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 - ii. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventative maintenance; and
 - iii. The permittee submitted notices and requests as required under General Condition B3.c.
- (2) DEQ may approve an anticipated bypass, after considering its adverse effects and any alternatives to bypassing, if DEQ determines that it will meet the three conditions listed above in General Condition B3.b.(1).

c. Notice and request for bypass.

- (1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, a written notice must be submitted to DEQ at least ten days before the date of the bypass.
- (2) Unanticipated bypass. The permittee must submit notice of an unanticipated bypass as required in General Condition D5.

B4. Upset

- a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operation error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.
- b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of General Condition B4.c are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
- c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - (1) An upset occurred and that the permittee can identify the causes(s) of the upset;
 - (2) The permitted facility was at the time being properly operated;
 - (3) The permittee submitted notice of the upset as required in General Condition D5, hereof (24-hour notice); and
 - (4) The permittee complied with any remedial measures required under General Condition A3 hereof.
- d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

B5. Treatment of Single Operational Upset

For purposes of this permit, a single operational upset that leads to simultaneous violations of more than one pollutant parameter will be treated as a single violation. A single operational upset is an exceptional incident that causes simultaneous, unintentional, unknowing (not the result of a knowing act or omission), temporary noncompliance with more than one federal Clean Water Act effluent discharge pollutant parameter. A single operational upset does not include federal Clean Water Act violations involving discharge without a NPDES permit or noncompliance to the extent caused by improperly designed or inadequate treatment facilities. Each day of a single operational upset is a violation.

B6. Overflows from Wastewater Conveyance Systems and Associated Pump Stations

- a. Definition. "Overflow" means any spill, release or diversion of sewage including:
 - (1) An overflow that results in a discharge to waters of the United States; and
 - (2) An overflow of wastewater, including a wastewater backup into a building (other than a backup caused solely by a blockage or other malfunction in a privately owned sewer or building lateral), even if that overflow does not reach waters of the United States.
- b. Reporting required. All overflows must be reported orally to DEQ within 24 hours from the time the permittee becomes aware of the overflow. Reporting procedures are described in more detail in General Condition D5.

B7. Public Notification of Effluent Violation or Overflow

If effluent limitations specified in this permit are exceeded or an overflow occurs that threatens public health, the permittee must take such steps as are necessary to alert the public, health agencies and other affected entities (for example, public water systems) about the extent and nature of the discharge in accordance with the notification procedures developed under General Condition B8. Such steps may include, but are not limited to, posting of the river at access points and other places, news releases, and paid announcements on radio and television.

B8. Emergency Response and Public Notification Plan

The permittee must develop and implement an emergency response and public notification plan that identifies measures to protect public health from overflows, bypasses, or upsets that may endanger public health. At a minimum the plan must include mechanisms to:

- a. Ensure that the permittee is aware (to the greatest extent possible) of such events;
- b. Ensure notification of appropriate personnel and ensure that they are immediately dispatched for investigation and response;
- c. Ensure immediate notification to the public, health agencies, and other affected public entities (including public water systems). The overflow response plan must identify the public health and other officials who will receive immediate notification;
- d. Ensure that appropriate personnel are aware of and follow the plan and are appropriately trained;
- e. Provide emergency operations; and
- f. Ensure that DEQ is notified of the public notification steps taken.

B9. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must be disposed of in such a manner as to prevent any pollutant from such materials from entering waters of the state, causing nuisance conditions, or creating a public health hazard.

SECTION C. MONITORING AND RECORDS

C1. Representative Sampling

Sampling and measurements taken as required herein must be representative of the volume and nature of the monitored discharge. All samples must be taken at the monitoring points specified in this permit, and must be taken, unless otherwise specified, before the effluent joins or is diluted by any other waste stream,

body of water, or substance. Monitoring points must not be changed without notification to and the approval of DEQ. Samples must be collected in accordance with requirements in 40 CFR part 122.21 and 40 CFR part 403 Appendix E.

C2. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices must be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices must be installed, calibrated and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected must be capable of measuring flows with a maximum deviation of less than ± 10 percent from true discharge rates throughout the range of expected discharge volumes.

C3. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR part 136 or, in the case of sludge (biosolids) use and disposal, approved under 40 CFR part 503 unless other test procedures have been specified in this permit.

For monitoring of recycled water with no discharge to waters of the state, monitoring must be conducted according to test procedures approved under 40 CFR part 136 or as specified in the most recent edition of Standard Methods for the Examination of Water and Wastewater unless other test procedures have been specified in this permit or approved in writing by DEQ.

C4. Penalties for Tampering

The federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit may, upon conviction, be punished by a fine of not more than \$10,000 per violation, imprisonment for not more than two years, or both. If a conviction of a person is for a violation committed after a first conviction of such person, punishment is a fine not more than \$20,000 per day of violation, or by imprisonment of not more than four years, or both.

C5. Reporting of Monitoring Results

Monitoring results must be summarized each month on a discharge monitoring report form approved by DEQ. The reports must be submitted monthly and are to be mailed, delivered or otherwise transmitted by the 15th day of the following month unless specifically approved otherwise in Schedule B of this permit.

C6. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR part 136 or, in the case of sludge (biosolids) use and disposal, approved under 40 CFR part 503, or as specified in this permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the discharge monitoring report. Such increased frequency must also be indicated. For a pollutant parameter that may be sampled more than once per day (for example, total residual chlorine), only the average daily value must be recorded unless otherwise specified in this permit.

C7. Averaging of Measurements

Calculations for all limitations that require averaging of measurements must utilize an arithmetic mean, except for bacteria which must be averaged as specified in this permit.

C8. Retention of Records

Records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities must be retained for a period of at least 5 years (or longer as required by 40 CFR part

503). Records of all monitoring information including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit and records of all data used to complete the application for this permit must be retained for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of DEQ at any time.

C9. Records Contents

Records of monitoring information must include:

- a. The date, exact place, time, and methods of sampling or measurements;
- b. The individual(s) who performed the sampling or measurements;
- c. The date(s) analyses were performed;
- d. The individual(s) who performed the analyses;
- e. The analytical techniques or methods used; and
- f. The results of such analyses.

C10. Inspection and Entry

The permittee must allow DEQ or EPA upon the presentation of credentials to:

- a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by state law, any substances or parameters at any location.

C11. Confidentiality of Information

Any information relating to this permit that is submitted to or obtained by DEQ is available to the public unless classified as confidential by the Director of DEQ under ORS 468.095. The permittee may request that information be classified as confidential if it is a trade secret as defined by that statute. The name and address of the permittee, permit applications, permits, effluent data, and information required by NPDES application forms under 40 CFR § 122.21 are not classified as confidential [40 CFR § 122.7(b)].

SECTION D. REPORTING REQUIREMENTS

D1. Planned Changes

The permittee must comply with OAR 340-052, "Review of Plans and Specifications" and 40 CFR § 122.41(l)(1). Except where exempted under OAR 340-052, no construction, installation, or modification involving disposal systems, treatment works, sewerage systems, or common sewers may be commenced until the plans and specifications are submitted to and approved by DEQ. The permittee must give notice to DEQ as soon as possible of any planned physical alternations or additions to the permitted facility.

D2. Anticipated Noncompliance

The permittee must give advance notice to DEQ of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.

D3. Transfers

This permit may be transferred to a new permittee provided the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of the permit and EQC rules. No permit may be transferred to a third party without prior written approval from DEQ. DEQ may require modification, revocation, and reissuance of the permit to change the name of the permittee and

incorporate such other requirements as may be necessary under 40 CFR § 122.61. The permittee must notify DEQ when a transfer of property interest takes place.

D4. Compliance Schedule

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date. Any reports of noncompliance must include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements.

D5. Twenty-Four Hour Reporting

The permittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally (by telephone) to the DEQ regional office or Oregon Emergency Response System (1-800-452-0311) as specified below within 24 hours from the time the permittee becomes aware of the circumstances.

a. Overflows.

(1) Oral Reporting within 24 hours.

- i. For overflows other than basement backups, the following information must be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311. For basement backups, this information should be reported directly to the DEQ regional office.
 - (a) The location of the overflow;
 - (b) The receiving water (if there is one);
 - (c) An estimate of the volume of the overflow;
 - (d) A description of the sewer system component from which the release occurred (for example, manhole, constructed overflow pipe, crack in pipe); and
 - (e) The estimated date and time when the overflow began and stopped or will be stopped.
- ii. The following information must be reported to the DEQ regional office within 24 hours, or during normal business hours, whichever is earlier:
 - (a) The OERS incident number (if applicable); and
 - (b) A brief description of the event.

(2) Written reporting postmarked within 5 days.

- i. The following information must be provided in writing to the DEQ regional office within 5 days of the time the permittee becomes aware of the overflow:
 - (a) The OERS incident number (if applicable);
 - (b) The cause or suspected cause of the overflow;
 - (c) Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
 - (d) Steps taken or planned to mitigate the impact(s) of the overflow and a schedule of major milestones for those steps; and
 - (e) For storm-related overflows, the rainfall intensity (inches/hour) and duration of the storm associated with the overflow.

DEQ may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

b. Other instances of noncompliance.

(1) The following instances of noncompliance must be reported:

- i. Any unanticipated bypass that exceeds any effluent limitation in this permit;
- ii. Any upset that exceeds any effluent limitation in this permit;
- iii. Violation of maximum daily discharge limitation for any of the pollutants listed by DEQ in this permit; and
- iv. Any noncompliance that may endanger human health or the environment.

- (2) During normal business hours, the DEQ regional office must be called. Outside of normal business hours, DEQ must be contacted at 1-800-452-0311 (Oregon Emergency Response System).
- (3) A written submission must be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain:
 - i. A description of the noncompliance and its cause;
 - ii. The period of noncompliance, including exact dates and times;
 - iii. The estimated time noncompliance is expected to continue if it has not been corrected;
 - iv. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and
 - v. Public notification steps taken, pursuant to General Condition B7.
- (4) DEQ may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

D6. Other Noncompliance

The permittee must report all instances of noncompliance not reported under General Condition D4 or D5 at the time monitoring reports are submitted. The reports must contain:

- a. A description of the noncompliance and its cause;
- b. The period of noncompliance, including exact dates and times;
- c. The estimated time noncompliance is expected to continue if it has not been corrected; and
- d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

D7. Duty to Provide Information

The permittee must furnish to DEQ within a reasonable time any information that DEQ may request to determine compliance with the permit or to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit. The permittee must also furnish to DEQ, upon request, copies of records required to be kept by this permit.

Other Information: When the permittee becomes aware that it has failed to submit any relevant facts or has submitted incorrect information in a permit application or any report to DEQ, it must promptly submit such facts or information.

D8. Signatory Requirements

All applications, reports or information submitted to DEQ must be signed and certified in accordance with 40 CFR § 122.22.

D9. Falsification of Information

Under ORS 468.953, any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, is subject to a Class C felony punishable by a fine not to exceed \$125,000 per violation and up to 5 years in prison per ORS chapter 161. Additionally, according to 40 CFR § 122.41(k)(2), any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit including monitoring reports or reports of compliance or non-compliance will, upon conviction, be punished by a federal civil penalty not to exceed \$10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

D10. Changes to Indirect Dischargers

The permittee must provide adequate notice to DEQ of the following:

- a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of the federal Clean Water Act if it were directly discharging those pollutants and;
- b. Any substantial change in the volume or character of pollutants being introduced into the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
- c. For the purposes of this paragraph, adequate notice must include information on (i) the quality and quantity of effluent introduced into the POTW, and (ii) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

SECTION E. DEFINITIONS

- E1. *BOD* or *BOD₅* means five-day biochemical oxygen demand.
- E2. *CBOD* or *CBOD₅* means five-day carbonaceous biochemical oxygen demand.
- E3. *TSS* means total suspended solids.
- E4. *Bacteria* means but is not limited to fecal coliform bacteria, total coliform bacteria, *Escherichia coli* (*E. coli*) bacteria, and *Enterococcus* bacteria.
- E5. *FC* means fecal coliform bacteria.
- E6. *Total residual chlorine* means combined chlorine forms plus free residual chlorine
- E7. *Technology based permit effluent limitations* means technology-based treatment requirements as defined in 40 CFR § 125.3, and concentration and mass load effluent limitations that are based on minimum design criteria specified in OAR 340-041.
- E8. *mg/l* means milligrams per liter.
- E9. *µg/l* means microgram per liter.
- E10. *kg* means kilograms.
- E11. *m³/d* means cubic meters per day.
- E12. *MGD* means million gallons per day.
- E13. *Average monthly effluent limitation* as defined at 40 CFR § 122.2 means the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.
- E14. *Average weekly effluent limitation* as defined at 40 CFR § 122.2 means the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.
- E15. *Daily discharge* as defined at 40 CFR § 122.2 means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge must be calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge must be calculated as the average measurement of the pollutant over the day.
- E16. *24-hour composite sample* means a sample formed by collecting and mixing discrete samples taken periodically and based on time or flow.
- E17. *Grab sample* means an individual discrete sample collected over a period of time not to exceed 15 minutes.
- E18. *Quarter* means January through March, April through June, July through September, or October through December.
- E19. *Month* means calendar month.
- E20. *Week* means a calendar week of Sunday through Saturday.
- E21. *POTW* means a publicly-owned treatment works.



State of Oregon
Department of
Environmental
Quality

National Pollutant Discharge Elimination System Permit Fact Sheet City of Seaside

Permittee	City of Seaside 989 Broadway Seaside, Oregon 97138
Existing Permit Information	File Number: 79929 Permit Number: 102579 EPA Reference Number: OR0020401 Category: Domestic Class: Major Expiration Date: November 30, 2023
Permittee Contact	Andrew Grant Wastewater Treatment Contractor 708-606-52409 989 Broadway Seaside, Oregon 97138
Receiving Water Information	Receiving stream/NHD name: Necanicum River NHD Reach Code & % along reach: 17100201000136-27.1% USGS 12-digit HUC: 171002010103 OWRD Administrative Basin: North Coast ODEQ LLID & River Mile: 123927746011-1.3 Integrated Report Assessment Unit ID: OR_EB_1710020101_01_107210
Proposed Action	Permit Renewal Application Number: 948260 Date Application Received: July 14, 2023
Permit Writer	Mark W. Hynson 503-229-5295 Date Prepared: June 13, 2023

NPDES Permit Fact Sheet

City of Seaside Wastewater Treatment Plant

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NPDES Permit Renewal Fact Sheet

City of Seaside Wastewater Treatment Plant

1. Introduction

The Department of Environmental Quality (DEQ) proposes to renew the National Pollutant Discharge Elimination System (NPDES) wastewater permit for the City of Seaside Wastewater Treatment Plant (WTP) located at 1821 N Franklin Street in the City of Seaside, Clatsop County, Oregon. This permit allows and regulates the discharge of treated wastewater directly to the Necanicum River at River Mile (RM) 1.3.¹ The permit also authorizes the City of Seaside to recycle the treated effluent as recycled water to qualified users. Lastly, the permit allows the City of Seaside to produce Class A and Class B biosolids for beneficial land application.

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 A – Waste discharge limitations
- Schedule B – Minimum monitoring and report requirements
- Schedule C – Compliance conditions and schedules
- Schedule D – Special conditions
- Schedule E – Pretreatment conditions
- Schedule F – General conditions

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

- Schedule A (Waste Discharge Limits) – This schedule has been updated to reflect current DEQ permit format.
- Schedule B (Minimum Monitoring and Reporting Requirements) – General monitoring and reporting requirements have been updated to include new summary statistics to be included with web-based electronic Net Discharge Monitoring Reports (NetDMR). Influent and effluent monitoring frequencies have been revised to reflect the latest requirements in DEQ's Monitoring Matrix. The outfall inspection requirement has been moved from Schedule B to Schedule D.
- Schedule D (Special Conditions) – Several special conditions related to biosolids management and land application, Whole Effluent Toxicity (WET) testing, operator certification and spill/emergency response planning have been updated in this schedule. This schedule includes a condition for the permittee to update the existing mixing zone study in the next permit term.

¹ This is the distance upstream from the mouth of the Necanicum River, where it meets the Pacific Ocean.

- Schedule E (Program Requirements) – There are no pretreatment program requirements associated with this permit.
- Schedule F (General Conditions) – Includes the latest version of the NPDES General Conditions.

2. Facility Description

2.1 Wastewater Facility

The Seaside WTP is located at 1821 N Franklin Street in the City of Seaside, Clatsop County, Oregon. Treated effluent is discharged year-round into the Necanicum River at RM 1.3 (Figure 2-1). The average dry weather design flow is 2.25 million gallons per day (MGD). Actual flows reported during the 2018-2022 dry seasons (May 1 – October 31) averaged 1.2 MGD while 2018-2022 wet season discharges (November 1 – April 30) averaged 1.9 MGD. The origin of the wastewater processed is approximately 91 percent domestic, 9 percent commercial, and 1 percent light industrial. The permittee reports a permanent service population of 6,040 residents. Summer seasonal and weekend tourist populations result in an average daily population of 9,935 individuals.



Aerial Photo Source: Google Earth, 2023

Figure 2-1: Facility and Outfall Location

The permittee's original wastewater treatment facility was constructed at the present site in the 1930s. Major plant and process upgrades occurred in the 1960s and 1986. The 1986 improvements included the installation of the existing Orbal oxidation ditch. Other minor improvements include the addition of UV disinfection in 2001 and improvements to the screening headworks in 2010. In 2017, the facility installed a biosolids dryer for producing Exceptional Quality ("EQ") biosolids for beneficial land application.

The permittee's WTP consists of the headworks with automated mechanical screening and grit removal, two oxidation basins, two secondary clarifiers, an ultraviolet (UV) light disinfection channel, two gravity thickeners, and two anaerobic digesters. A general flow schematic of the WTP is included in Appendix A.

Screening and grit removal occurs in the headworks. Raw sewage influent initially enters the headworks structure through a 16-inch diameter pipe. Flows are measured via magnetic meter beneath the headworks structure. A step screen and grit removal system in the headworks removes large solids and grit from the influent stream. Screenings are deposited into a dumpster that is hauled off-site for disposal. From the headworks, the screened influent flows by gravity to the oxidation basins.

The WTP operates two oxidation basins, each rated for 1.1 MGD. The basins can operate in parallel, series, step-aeration, sludge-reaeration and reduced sludge inventory configurations, and employ a circular and linear path to provide long retention times for the removal of biochemical oxygen demand (BOD), total suspended solids (TSS) and ammonia. Each basin is equipped with aerators for mixing, solids suspension and oxygen transfer. Additional details on solids processing are present in Section 4.2.

Secondary treatment is provided by the two aeration basins. Secondary clarification occurs in two clarifiers located downstream of the oxidation basins. The primary purpose of the clarifiers are to separate wastewater solids through settling and surface skimming of floatable solids. Each circular clarifier is equipped with a rotating bottom sludge collector and a rotating surface skimming arm to remove floatables. Secondary effluent from the oxidation basins flows by gravity through the center column of each clarifier and over a circulate feed well into the clarifier basin. Clarified secondary effluent overflows around the circumference of an exterior circular weir and flows by gravity to the WTP's disinfection system. Returned Activated Sludge (RAS) that settles within the secondary clarifiers is pumped back to the upstream oxidation basins for recycling. Waste Activated Sludge is pumped from the clarifiers to aerobic digesters.

The WTP uses a medium pressure, high intensity ultraviolet (UV) treatment system with four 8-lamp modules for effluent disinfection. Secondary effluent from the clarifiers flows by gravity into the UV disinfection channel that exposes the waste stream to UV light. The disinfected effluent is discharged by gravity through a 32-inch diameter outfall pipe to the Necanicum River. Monitoring of the treated effluent for permit compliance is conducted just downstream of the UV treatment system.

2.2 Outfalls

The WTP's point of discharge into the Necanicum River (Outfall 001A) is located approximately 400 feet southeast of the WTP along the west side of the Necanicum River channel at approximate RM 1.3 (Figure 2-1). Constructed in 2011, Outfall 001A replaced the WTP's original Outfall 001 that discharged approximately 820 feet downstream (north) of the existing Outfall 001A location. The existing outfall was designated as Outfall 001A in previous permits and this designation is being maintained with the permit renewal to avoid confusion with the decommissioned Outfall 001.

Outfall 001A consists of a buried 32-inch diameter pipe that terminates with a three-port diffuser. The diffuser section consists of three 10-inch risers at a 10-foot spacing, with a check valve port on each riser. The diffuser ports are oriented 45 degrees downstream from the diffuser axis, pointing offshore and at 0 degrees horizontal. The outfall discharges at a depth of approximately 2.75 feet below mean low low water (MLLW) and 5.5 feet below the mean tide level (MTL) .

The proposed permit provides the Seaside WTP with the option for discharging recycled water through a new Outfall 002 when a recycled water use plan is developed and approved by DEQ. Under the current permit term, the permittee has not developed a recycled water use plan. The proposed permit allows the option for the Seaside WTP to develop its recycled water reuse program and to discharge recycled water through Outfall 002. Outfall 002 will likely be located within the WTP downstream of UV disinfection where the facility can distribute the recycled water.

Table 2-1: List of Outfalls

Outfall Number	Type of Waste	Lat/Long	Design Flow¹ (mgd)	Existing Flow² (mgd)
001A	Treated Wastewater	46.0042 N/-123.9211 W	2.25	1.2
002	Recycled Water	To be determined	N/A	N/A
1. Design Flow = design average dry weather flow 2. Existing Flow = existing average monthly dry weather flow from 2018-2023 DMRs.				

2.3 Stormwater

The 1200-Z Industrial Stormwater general permit is required for wastewater treatment facilities with a design flow of 1 MGD or more unless all facility stormwater is collected, treated, and discharged as part of its treated wastewater. DEQ's industrial stormwater program will engage the permittee to determine applicability. Discharges of industrial stormwater are not authorized by this permit.

2.4 Industrial Pretreatment

Based upon information submitted with the permittee's permit renewal application, no categorical industrial users are known to discharge into the facility's collection system. A DEQ-approved industrial pretreatment program is not needed for this facility.

The proposed permit requires the permittee to conduct and submit to DEQ an Industrial User Survey (Survey) within one year of permit issuance. DEQ will review the Survey results and, if DEQ determines that a pretreatment program is required, the permit may be reopened and modified to require development of a pretreatment program.

2.5 Wastewater Classification

OAR 340-049 requires all permitted municipal wastewater collection and treatment facilities receive a classification based on the size and complexity of the systems. DEQ evaluated the classifications for the treatment and collection system, which are publicly available at: <https://www.deq.state.or.us/wq/opcert/Docs/OpcertReport.pdf>.

3. Schedule A: Effluent Limit Development

Effluent limits serve as the primary mechanism in NPDES permits for controlling discharges of pollutants to receiving waters. 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.

3.1 Existing Effluent Limits

The table below show the limits contained in the existing permit.

Table 3-1: Existing Effluent Limits

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum
BOD ₅ (May 1 – October 31)	mg/L	20	30	
	lb/day	380	560	750
	% removal	85	-	-
TSS (May 1 – October 31)	mg/L	20	30	
	lb/day	380	560	750
	% removal	85	-	-
TSS (November 1 - April 30)	mg/L	30	45	
	lb/day	560	840	1100
	% removal	85	-	-
TSS (November 1 – April 30)	mg/L	30	45	-
	lb/day	560	840	1100
	% removal	85	-	-
pH (See note a.)	SU	Between 6.0 and 9.0		
<i>E. Coli</i> Bacteria (See note b.)	#/100 mL	126 (See note c.)		406
Notes: a. May not be outside the range of 6.0 to 9.0 Standard Units (S.U.) b. No single <i>E. coli</i> sample may exceed 406 organisms per 100 mL. The permittee may take at least 5 consecutive re-samples at 4-hour intervals beginning as soon as practicable (preferably within 28 hours) after the original sample was taken and the geometric mean of the 5 re-samples is less than or equal to 126 <i>E. coli</i> organisms/100 mL to demonstrate compliance with the limit. c. Reported as a monthly geometric mean.				

Additional information for the limits in Table 3-1:

- (A) Average dry weather design flow to the facility equals 2.25 MGD and mass load limits are based on 2.25 MGD.
- (B) In accordance with OAR 340-041-0061(9)(a)(C), on any day that the daily flow to a sewage treatment facility exceeds the lesser hydraulic capacity of the secondary treatment portion of the facility or twice the design average dry weather flow, the daily mass load limit does not apply. The permittee must operate the treatment facility at highest and best practicable treatment and control.

3.2 Technology-Based Effluent Limit Development

40 CFR 122.44(a)(1) requires publicly owned treatment works (POTW) to meet technology-based effluent limits, for five-day biochemical oxygen demand (BOD₅), total suspended solids (TSS) and pH (i.e., federal secondary treatment standards). Substitution of 5-day carbonaceous oxygen demand (CBOD₅) for BOD₅ is allowed. The numeric standards for these pollutants are contained in 40 CFR 133.102. In addition, DEQ has developed minimum design criteria for BOD₅ and TSS that apply to specific watershed basins in Oregon. These are listed in the basin-specific criteria sections under OAR 340-041-0101 to 0350. During the summer low flow months as defined by OAR, these design criteria are more stringent than the federal secondary treatment standards. The basin-specific criteria are not effluent limits, but are implemented as design criteria for new or expanded wastewater treatment plants. The table below shows a comparison of the federal secondary treatment standards and the basin-specific design criteria for the North Coast Basin.

Table 3-2: Comparison of TBELs for Federal Secondary Treatment Standards and Oregon Basin-Specific Design Criteria

Parameter	Federal Secondary Treatment Standards		North Coast Basin-Specific Design Criteria (OAR 340-041-0235)
	30-Day Average	7-Day Average	Monthly Average
BOD ₅ (mg/L)	30	45	Low Stream Flow (approximately May 1 – October 31): 20 mg/L – BOD ₅ and TSS High Stream Flow (approximately November 1 – April 30): Minimum of secondary treatment or equivalent control
TSS (mg/L)	30	45	
pH (S.U.)	6.0 – 9.0. (instantaneous)		N/A
BOD ₅ and TSS % Removal	85%	N/A	N/A

The limits for BOD₅ and TSS shown in the table above are concentration-based limits. The existing concentration-based BOD₅ and TSS TBELs applicable during the May through October period, as listed in Table 3-1 above, were previously established based on the regulations and policies in place at that time. DEQ is retaining these limits in the proposed permit. Mass-based limits are required in addition to the concentration-based limits per OAR 340-041-0061(9).

For any facility that has not expanded their average dry weather treatment capacity after June 30, 1992, OAR 340-041-0061(9)(a) requires that the mass load limits be calculated using the following equations:

$$\text{Monthly Avg Mass Load} = \text{Design Flow}^* \times \text{Monthly Concentration Limit} \times \text{Unit Conversion Factor}$$

$$\text{Weekly Average Mass Load} = 1.5 \times \text{Monthly Average Mass Load Limit}$$

Daily Maximum Mass Load = 2 x Monthly Average Mass Load Limit

* Design flow is the design average dry weather flow (DADWF) or the design average wet weather flow (DAWWF)

The following table lists the effluent flows and concentration limits used for the calculations.

Table 3-3: Design Flows and Concentrations Limits

Season	Design Flow (mgd)	Monthly TSS Concentration Limit (mg/L)	Monthly BOD ₅ Concentration Limit (mg/L)
Dry Weather	2.25	20	20
Wet Weather	2.25	30	30
Design flow comments: Average dry weather design flow used for both dry and wet weather discharge conditions.			

The permittee's low stream flow (summer) mass load limits for BOD₅ and TSS (monthly and weekly average and daily maximum) are based on the current permit's average dry weather design flow of 2.25 MGD and a concentration of 20 mg/L. Utilizing the equation presented above, the low stream flow calculations for BOD₅ and TSS are:

Monthly Average: $2.25 \text{ MGD} \times 20 \text{ mg/L} \times 8.34 = 375 \text{ lbs/day}$ (380 lbs/day – rounded to two significant figures)

Weekly Average: $380 \text{ lbs/day monthly average} \times 1.5 = 570 \text{ lbs/day}$

Daily Maximum: $380 \text{ lbs/day monthly} \times 2 = 760 \text{ lbs/day}$

The facility's high stream flow (winter) mass limits (monthly and weekly average and daily maximum) for BOD₅ and TSS are based on the flow of 2.25 MGD and a concentration of 30 mg/L. The winter calculations are:

Monthly Average: $2.25 \text{ MGD} \times 30 \text{ mg/L} \times 8.34 = 563 \text{ lbs/day}$ (rounded to 560 lbs/day)

Weekly Average: $560 \text{ lbs/day monthly average} \times 1.5 = 840 \text{ lbs/day}$

Daily Maximum: $560 \text{ lbs/day monthly average} \times 2 = 1120 \text{ lbs/day}$ (rounded to 1100 lbs/day)

The existing 2018 permit used a slightly different procedure for calculating the mass load limits, resulting in slightly lower summer limits. To satisfy anti-degradation and anti-backsliding requirements, the existing BOD₅ and TSS mass loading limits will be retained in the proposed permit.

Since the Seaside WTP has not been significantly upgraded since 1986, state regulations allow for a waiver of the daily mass load limits under certain conditions. Per OAR 340-041-0061(9)(a)(C), on any day that the daily flow to a sewage treatment facility exceeds the lesser hydraulic capacity of the secondary treatment portion of the facility or twice the design average dry weather flow, the daily mass load limit does not apply. However, the permittee must operate the treatment facility at the highest and best practicable treatment and control. Schedule A of the existing permit includes the waiver allowed by this regulation. The proposed permit retains this waiver.

The proposed BOD₅ and TSS limits are listed in the following table. These limits are the same as in the existing 2018 permit.

Table 3-4: BOD₅ and TSS Technology Based Effluent Limits

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum
BOD ₅ (May 1 – October 31)	mg/L	20	30	NA
	lb/day	380	560	750
	% removal	85	NA	NA
TSS (May 1 – October 31)	mg/L	20	30	NA
	lb/day	380	560	750
	% removal	85	NA	NA
BOD ₅ (November 1 – April 30)	mg/L	30	45	NA
	lb/day	560	840	1100
	% removal	85	NA	NA
TSS (November 1 – April 30)	mg/L	30	45	NA
	lb/day	560	840	1100
	% removal	85	NA	NA

3.3 Water Quality-Based Effluent Limit Development

40 CFR 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 a site-specific 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 that have a reasonable potential to exceed a criterion. The analyses are discussed below.

3.3.1 Designated Beneficial Uses

NPDES permits issued by DEQ must protect the following designated beneficial uses of the Necanicum River. These uses are listed in OAR-340-041-0230 for the North Coast Basin. The Seaside WTP discharges into a section of the Necanicum River that is considered estuarine. The beneficial uses for estuaries and adjacent marine waters of the North Coast Basin, as listed in OAR 340-041 Table 230A, include the following:

- Industrial water supply
- Fish and aquatic life (including salmonid rearing, migration and spawning)
- Wildlife and hunting
- Fishing
- Boating
- Water contact recreation
- Aesthetic quality, and
- Commercial navigation and transportation

3.3.2 303d Listed Parameters and Total Maximum Daily Loads

The following table lists the parameters that are on the 2022 303(d) list (Category 5) within the discharge's stream reach. The table also lists any parameters with a TMDL wasteload allocation assigned to the facility (Category 4).

Table 3-5: 303d and TMDL Parameters

Water Quality Limited Parameters (Category 5)	
AU ID:	OR_EB_1710020101_01_107210
AU Name:	Necanicum River
AU Status:	Impaired
Year Listed	2004
Year Last Assessed	2018
303d Parameters (Category 5)	None
TMDL Parameters (Category 4)	
Fecal Coliform	

3.3.3 TMDL Wasteload Allocations

DEQ issued a TMDL for the North Coast Basin which addressed the fecal coliform listing for the Necanicum River. The TMDL determined that the bacteria limits listed at OAR 340-041-0009(6)(b) for discharges into freshwaters (e.g., meeting a monthly geometric mean of 126 *E. coli* per 100 mL, with no single sample exceeding 406 *E. coli* per 100 mL) will be protective of shellfish harvest in the Necanicum Estuary and water contact recreation. No additional limitations are required of the facility. Refer to Section 3.3.8 for additional discussion on proposed bacteria limits.

3.3.4 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 permittee's processes.
- Knowledge about the receiving stream water quality.
- Pollutants identified by applicable federal effluent limitation guidelines.

Based on EPA's NPDES permit application requirements, toxic pollutants of concern for domestic facilities are listed in the following table.

Table 3-6: Domestic Toxic Pollutants of Concern

Flow Rate	Pollutants
< 0.1 mgd	Total Residual Chlorine
> 0.1 mgd and < 1.0 mgd	Total Residual Chlorine, Total Ammonia Nitrogen
> 1.0 mgd	Total Residual Chlorine, Total Ammonia Nitrogen, Metals, Volatile Organic Compounds, Acid Extractable Compounds, Base Neutral Compounds

DEQ identified the following pollutants of concern for this facility listed in the following table.

Table 3-7: Pollutants of Concern

Pollutant	How was pollutant identified?
pH	Effluent Monitoring
Temperature	Effluent Monitoring
<i>E. coli</i>	Effluent Monitoring
Total Residual Chlorine	Effluent Monitoring
Total Ammonia Nitrogen	Effluent Monitoring
Metals	Application Requirement
Volatile Organic Compounds	Application Requirement
Acid Extractable Compounds	Application Requirement
Base-Neutral Compounds	Application Requirement

The sections below discuss the analyses that were conducted for the pollutants of concern to determine if water quality-based effluent limits are needed to meet water quality standards.

3.3.5 Regulatory Mixing Zone

The proposed permit contains a mixing zone as allowed per OAR 340-041-0053. The proposed mixing zone remains unchanged from the existing permit and is described as follows:

The regulatory mixing zone is defined as that portion of the Necanicum River encompassing the following area: 150 upstream and downstream of the outfall diffuser and 15 feet inshore and 25 feet off shore of each diffuser edge. The zone of initial dilution is that portion of the allowable regulatory mixing zone that is within 15 feet of the diffuser.

The dilutions at the edge of the zone of initial dilution and mixing zone are shown in the table below. These dilutions are based on a 2012 mixing zone study submitted by the permittee and reviewed by DEQ. These dilutions are the reasonable, worst-case dilutions that are expected to occur over the course of a tidal cycle. Schedule D of the permit requires the permittee to submit an updated mixing zone study during the next permit cycle.

Table 3-8: Outfall 001A Dilution Summary

Dilution Summary – Year-Round						
Water Quality Standard	Velocity Percentile		Effluent Flow (mgd)		Dilution	Location
	Statistic	Ft/s	Statistic	Flow		
Aquatic Life, Acute	10 th	0.26	☐ ADWDF x PF ☒ Max Daily Avg ☐ Other	1.8	10	ZID
Aquatic Life, Chronic	50 th	1.3	☒ ADWDF ☐ Max Monthly Avg ☐ Other	1.6	26	MZ
Human Health, Non-Carcinogen	50 th	1.3	☐ ADWDF ☐ Max Monthly Avg ☒ Other Monthly Annual Max	1.8	31	MZ
Human Health, Carcinogen	50 th	1.3	☐ Annual Avg Design ☒ Annual Avg ☐ Other	1.8	31	MZ
ADWDF = Average dry weather design flow PF = Peaking factor						

3.3.6 pH

The pH criterion for this basin is 6.5 – 8.5 for both estuarine and freshwater per OAR 340-041-0235. The federal secondary treatment standards allow the permittee to discharge effluent with a pH between 6.0 and 9.0. This pH range was utilized in a reasonable potential analysis along with effluent data collected from January 2019 to April 2023. Ambient pH data used in the analysis was collected from May 2013 to December 2013 from a DEQ monitoring station on the Necanicum River. DEQ also used ambient temperature data collected by the permittee just upstream of the facility from June 2022 to July 2023. The facility is located on the Lower Necanicum River in which flows are tidally influenced. Conductivity data from the area indicated that the 90th percentile of salinity is above 10 PSU. Therefore, the RPA for pH was conducted under saltwater receiving stream conditions.

DEQ determined there is no reasonable potential for the discharge to exceed the pH criterion at the edge of the mixing zone. As such, the proposed permit will retain the existing permit limit of 6.0 – 9.0 for pH. These limits are considered to be TBELs. The following tables provides a summary of the data used for the analysis.

Table 3-9: pH Reasonable Potential Analysis (Saltwater)

INPUT	Lower pH Criteria	Upper pH Criteria
1. Dilution at mixing zone boundary	26	26
2. Upstream characteristics		
a. Temperature (deg C)	20.4	11.5
b. pH	7.2	8.0
c. Alkalinity (mg CaCO ₃ /L)	17.8	17.8
3. Effluent characteristics		
a. Temperature (° C)	21.3	11.9
b. pH (S.U.)	6.0	9.0
c. Alkalinity (mg CaCO ₃ /L)	71.8	71.8
4. Applicable pH criteria	6.5	8.5
pH at mixing zone boundary	6.6	8.2
Is there reasonable potential?	No	No
Proposed effluent limits	6.0	9.0
Effluent data source: Discharge Monitoring Reports from January 2019 to April 2023.		
Ambient data source: AWQMS - DEQ Monitoring Station 13654 (Necanicum River at 12th Street Approach/Bridge) from May 2013 to December 2013. City of Seaside ambient temperature monitoring June - November 2022 and April - July 2023 at 12th Street Bridge.		

3.3.7 Temperature

3.3.7.1 Temperature Criteria OAR 340-041-0028

The following table summarizes the temperature criteria that apply at the discharge location along with whether the receiving stream is water quality-limited for temperature and whether a TMDL wasteload allocation has been assigned. Using this information, DEQ performed several analyses to determine if effluent limits were needed to comply with the temperature criteria.

Table 3-10: Temperature Criteria Information

Applicable Temperature Criterion	Rearing/Migration 18°C (OAR 340-041-0028(4)(c))
Applicable dates: Year-Round	
Salmon/Steelhead Spawning 13 °C? OAR 340-041-0028(4)(a)	☐ Yes ☒ No
Applicable dates: N/A	
WQ-limited?	☐ Yes ☒ No
TMDL wasteload allocation assigned?	☐ Yes ☒ No
Applicable dates: N/A	
TMDL based on natural conditions criterion?	☐ Yes ☒ No
Cold water summer protection criterion applies?	☐ Yes ☒ No
Cold water spawning protection applies?	☐ Yes ☒ No
Comments:	

As noted above and in Section 3.5, the Necanicum River is not listed as water quality limited for temperature. In 2003, DEQ issued the North Coast Subbasins TMDL to address a temperature impairment.² The TMDL identified the City of Seaside as a point source that discharges to estuarine waters and stated that “(f)acilities that discharge into estuarine waters are required to meet a different standard for temperature. These facilities discharge to waterbodies that are not listed as water quality limited, and do not receive an allocation in the TMDL” and “These sources are regulated under a standard requiring no significant increase over background temperature.”³ Since the issuance of the TMDL, this portion of the temperature standard has been modified to address “oceans and bays” (as opposed to “estuarine waters”). To ensure that the proposed permit is consistent with the assumptions and requirements of the TMDL, an analysis was performed to determine if the discharge from meets this portion of the rule (OAR 340-041-0028(7)). In addition, DEQ also performed an analysis to ensure the discharge meets the salmon and steelhead rearing/migration criteria for the receiving water. The results of these analyses are discussed below.

² An addendum that was completed for this TMDL in November 2006 did not modify the analysis or conclusions related to this facility.

³ North Coast Subbasins Total Maximum Daily Load (TMDL). Prepared by Oregon Department of Environmental Quality. Page 56 and Table 13 on page 57. June 2003.

3.3.7.2 Reasonable Potential Analysis for Temperature

DEQ conducted an analysis to determine if the Seaside WTP effluent temperatures are consistent with the requirements of the TMDL. As indicated above, this equates to performing an analysis against the criterion listed at OAR 340-041-0028(7) (Oceans and Bays). The analysis was conducted for both the high stream flow (winter) period from November 1 to April 30 and the low stream flow (summer) period of May 1 to October 31. The analysis used effluent data from January 2019 – October 2023 and ambient temperature data collected by the permittee just upstream of the facility in 2022 and 2023. The maximum seven-day average effluent temperature and the lowest seven-day average ambient river temperatures recorded during both the high and low streamflow periods were used in the analysis.

The results indicate that, during critical conditions, the Seaside WTP discharge complies with the criterion and will not result in a greater than 0.3 °C increase over natural background conditions. A summary of this analysis is presented in Appendix B: Attachments B-1 and B-2.

DEQ also conducted an analysis to determine if the applicable criterion listed at OAR 340-041-0028 (4)(c) will be met. This analysis used the maximum recorded effluent temperature from January 2019 – October 2023 (23.3 °C) and applied the 18 °C criterion. The maximum effluent temperatures for the Seaside WTP typically occur during the mid to late summer low stream flow critical period. During the remainder of the year, effluent temperatures are generally much lower than 18 °C. The results of these analyses indicate that the Seaside WTP discharge has no potential to exceed the temperature standard (See Appendix B: Attachment B-3)

Based on these analyses, no temperature limit associated with the applicable temperature criteria is included in the proposed permit.

3.3.7.3 Thermal Plume 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. The discharge was evaluated for compliance with these provisions as follows:

- 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.

Seaside WTP Discharge: Based on the North Coast Basin fish use and salmonid spawning use maps contained in OAR 340-041 (Figures 230A and 230B, respectively), the designated fish use for this segment of the Necanicum River is salmon and trout rearing & migration (year-round) and no spawning use. Therefore, the discharge will not cause impairment of an active salmonid spawning area.

- 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.

Seaside WTP Discharge: Based on a review of January 2019 to October 2023 effluent data, the maximum effluent temperature at Outfall 001 was 23.3 °C in June 2021. Thus, anticipated peak temperatures are expected to be well below 32 °C and are not expected to cause an acute impairment or instantaneous lethality due to the thermal plume.

- 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 water body.

Seaside WTP Discharge: Based on a review of January 2019 to August 2023 effluent data, the maximum effluent temperature at Outfall 001A was 23.3 °C in June 2021. Thus, anticipated peak temperatures are expected to be below 25 °C which will prevent or minimize thermal shock due to the thermal plume.

- 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 water body.

Seaside WTP Discharge: The migration rule is based primarily on the USEPA guidance document, *EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards* (April 2003)⁴. Section V.3 of the document gives guidance on protecting salmonids from thermal plume impacts and provides this discussion on migration blockage:

Adult migration blockage conditions can occur at 21 °C. Therefore, EPA suggests that the cross-sectional area of a river at or above 21 °C be limited to less than 25% or, if upstream temperature exceeds 21 °C, the thermal plume be limited such that 75% of the cross-sectional area of the river has less than a de minimis (e.g., 0.25°C) temperature increase.

DEQ considers a de minimis temperature increase to be 0.3 °C or less (see DEQ's *Temperature Water Quality Standard Implementation – A DEQ Internal Management Directive*, April 2008). The maximum 7-day average ambient temperature recorded upstream of the discharge location is 20.9 °C recorded in August 2022 (data from 2022 and 2023). An analysis related to migration blockage indicates that when the receiving water temperature is 20.9 °C and effluent temperature is at the maximum recorded 7-day average value of 22.7 °C (recorded in August 2022 and 2023), the effluent plume, when it reaches 25% of the receiving stream's cross-sectional area, will be 21.23 °C (See Appendix B: Attachment B-4). This 0.23 °C over the upstream temperature is considered a de minimis increase that prevents or minimizes migration blockage. In addition, the maximum effluent temperatures used in the analysis were recorded in August - before the

⁴ U.S. Environmental Protection Agency. 2003. *EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards*. EPA 910-B-03-002. Region 10 Office of Water, Seattle. WA. Pages 33 -34.

peak fall migration period for fish in this portion of the Necanicum River (October through December). Fish migrating past the facility during the fall migration season are exposed to cooler effluent temperatures which further minimizes and reduces fish migration blockage.

Based upon the analysis presented above, the proposed permit will not require a limit for temperature. However, additional ambient river data is necessary to support future analysis. As such, the proposed permit will include a requirement for continued daily monitoring of ambient river conditions at a location upstream of the Outfall 001A. The daily monitoring of ambient river conditions will begin within one year of the effective date of the permit and must be conducted outside of the influence of the effluent plume. The 12th Avenue Approach Bridge over the Necanicum River is a possible location for ambient river monitoring.

3.3.8 Bacteria

Based upon Water Contact Recreation Designated Use Maps contained in OAR 340-041-0230 (Figure 230C), the portion of the Necanicum River the permittee discharges into is designated as Coastal Contact Recreation. OAR 340-041-0009(6)(a) requires discharges of bacteria into coastal waters meet a monthly geometric mean of 35 enterococcus organisms per 100 mL, with no more than 10 percent of samples exceeding 130 enterococcus organisms per 100 mL. The following table includes the proposed permit limits and apply year-round.

Table 3-11: Proposed Enterococcus Limits

Enterococcus (#/100 ml)	Geometric Mean	No more than 10% exceed
Existing Limit	NA	NA
Proposed Limit	35	130

The North Coast Subbasins TMDL contains a WLA for *E. coli* of a monthly geometric mean of 126 *E. coli* per 100 mL, with no single sample exceeding 406 *E. coli* per 100 mL. If a single sample exceeds 406 *E. coli* per 100 mL, then the permittee may take five consecutive re-samples. If the geometric mean of the five re-samples is less than or equal to 126, a violation is not triggered. The re-sampling must be taken at four-hour intervals beginning within 28 hours after the original sample was taken. The following table includes the proposed permit limits and apply year-round. This WLA is considered protective of the shellfish beneficial use according to the TMDL.

Table 3-12: Proposed *E. coli* Limits

<i>E. coli</i> (#/100 ml)	Geometric Mean	Maximum
Existing Limit	126	406
Proposed Limit	126	406

3.3.9 Toxic Pollutants

DEQ typically performs the reasonable potential analysis for toxics according to EPA guidance provided in the Technical Support Document for Water Quality-Based Toxics Control (TSD) (Office of Water Enforcement and Permits, U.S. EPA, March 1991). The factors incorporated into this analysis include:

1. Effluent concentrations and variability
2. Water quality criteria for aquatic life and human health
3. Receiving water concentrations
4. Receiving water dilution (if applicable)

DEQ performs these analyses using spreadsheets that incorporate EPA's statistical methodology. The following sections describe the analyses for various toxic pollutants below.

3.3.9.1 Total Ammonia Nitrogen

DEQ's ammonia criteria vary with changes in pH and temperature. DEQ performed a reasonable potential analysis that accounts for changes in the effluent and receiving water pH and temperature to determine the appropriate ammonia criteria. Since conductivity data from the area indicated that the 90th percentile of salinity is above 10 PSU the RPA for ammonia was conducted under saltwater discharge conditions.

The analysis used effluent data reported through the facility's discharge monitoring reports from January 2019 through April 2023. Ambient river data was obtained from a DEQ monitoring station located on the Necanicum River and from sampling conducted by the permittee upstream of the facility.

The results of the analysis indicated that there is no reasonable potential to exceed water quality standards for ammonia during dry (May 1 – October 31) or wet (November 1 to April 30) season discharges. No ammonia limit is necessary with the permit renewal. However, ammonia monitoring will be conducted year-round in the next permit renewal.

The following tables provides a summary of the data used for the ammonia analysis and the results of the analysis:

Table 3-13: Ammonia Analysis Information (Saltwater – Summer)

	Acute	Chronic	
		4-day	30-day
Dilution	10	26	31
Ammonia Criteria	5.2	0.8	--
Effluent Data Used			
Ammonia (mg/L)	18.2	18.2	
pH (SU)	7.4	7.4	
Temperature (°C)	21.9	21.9	
Alkalinity (mg/L CaCO3)	22.6	22.6	
Receiving Stream Data Used			
Ammonia (mg/L)	0.1	0.1	
pH (SU)	8.0	8.0	
Temperature (°C)	20.3	20.3	
Alkalinity (mg/L CaCO3)	79.0	79.0	
Ammonia Limit Needed?	No		
Calculated Limits	AML	MDL	
Ammonia (mg/L)	N/A	N/A	
Effluent data source			
Discharge Monitoring Reports from May through October for the years of 2020 through 2023.			
Ambient data source			
WQMS - DEQ Monitoring Station 13654 (Necanicum River at 12th Street Approach/Bridge) from May 2013 to December 2013. City of Seaside ambient temperature monitoring June - November 2022 and April -July 2023 at 12th Street Bridge.			

Table 3-14: Ammonia Analysis Information – (Saltwater – Winter)

	Acute	Chronic	
		4-day	30-day
Dilution	10	26	31
Ammonia Criteria	48.0	8.5	--
Effluent Data Used			
Ammonia (mg/L)	25.0	25.0	
pH (SU)	7.5	7.5	
Temperature (°C)	15.3	15.3	
Alkalinity (mg/L CaCO3)	69.0	69.0	
Receiving Stream Data Used			
Ammonia (mg/L)	0.0	0.0	
pH (SU)	7.2	7.2	
Temperature (°C)	11.3	11.3	
Alkalinity (mg/L CaCO3)	11.0	11.0	
Ammonia Limit Needed?	No		
Calculated Limits	AML	MDL	
Ammonia (mg/L)	N/A	N/A	
Effluent data source			
Discharge Monitoring Reports from January 2019 to April 2023.			
Ambient data source			
WQMS - DEQ Monitoring Station 13654 (Necanicum River at 12th Street Approach/Bridge) from May 2013 to December 2013. City of Seaside ambient temperature monitoring June - November 2022 and April -July 2023 at 12th Street Bridge.			

3.3.9.2 Priority Pollutant Toxics

DEQ conducted a reasonable potential analysis for the group of toxics listed in the following table.

Table 3-15: Toxic Pollutants Analyzed

Toxic Group
Metals
Volatile Organic Compounds
Acid Extractable Compounds
Base-Neutral Compounds
Pesticides
Effluent data source: Seaside STP
Receiving water data source: DEQ Monitoring Station No. 13645 (Necanicum River at 12 Street Approach/Bridge)

The RPA used the results of effluent monitoring for toxic substances that was conducted by the permittee from March 2022 through November 2022. The effluent monitoring data was obtained from the permittee's contract laboratory in an electronic data delivery format and supported by a review of the analytical lab reports summarizing the results of the effluent monitoring. The monitoring for toxic substances included both wet and dry discharge seasons. Since conductivity data from the area indicated that the 90th percentile of salinity is above 10 PSU, the RPA was conducted under saltwater discharge conditions. The flows and dilutions used in the analysis are presented on Table 3-8. A summary discussion on the results of the RPA relative to toxic metals and organics is presented below:

Metals - The RPA analysis was conducted for priority pollutant metals for both the aquatic life and human health criteria. The aquatic toxicity saltwater RPA analysis identified copper and zinc as potential pollutants of concern at the end-of-pipe discharge (with no consideration for in-stream dilution). The human health saltwater RPA identified arsenic as a potential pollutant of concern for end-of-pipe discharges.

When the ambient concentrations for pollutants of concern and dilution values were entered into the analysis, the completed RPAs indicated that there was "no reasonable potential" for the identified pollutants of concern to cause aquatic toxicity or exceed human health criteria at the edge of mixing zones or zones of initial dilution. Therefore, the proposed permit will not require limits for priority pollutant metals.

Priority Pollutant Organics – The Seaside STP conducts monitoring for volatile organic, acid extractable and base neutral compounds. The human health RPA identified several acid-extractable and base-neutral compounds as potential pollutants of concern for end-of-pipe discharges. However, when ambient concentrations and dilution values were entered into the analysis, the RPA did not result in any priority pollutant organics exceeding water quality standards either at the end of the regulatory mixing zones. As such, the permit will not require limits for these parameters.

3.3.9.3 Mercury – Human Health Criterion

Oregon’s human health water quality criterion for mercury is expressed in terms of a fish tissue concentration rather than a water column concentration. Because of this, DEQ’s approach to performing the reasonable potential analysis for mercury is different from that for other parameters. This approach is described in DEQ’s “Implementation of Methylmercury in NPDES Permits” internal management directive.

According to the IMD, “Any facility contributing significant and consistent concentrations of total mercury to the receiving water body is considered to have the reasonable potential to exceed the water quality criterion unless a site-specific survey determines otherwise.” Because the water quality criterion for mercury is a fish tissue-based concentration rather than a water column concentration, permit limits for mercury cannot be expressed in terms of a concentration. Therefore, when mercury is present in treated effluent on a consistent basis, the permit needs to contain mercury monitoring, plus a narrative effluent limit that consists of a Mercury Minimization Plan (MMP).

A review of effluent monitoring data indicates that total mercury is present in the discharge and therefore there is a reasonable potential to cause or contribute to the exceedance of the water quality standard. Accordingly, the proposed permit requires the facility to monitor for mercury (in Schedule B) and develop and implement a mercury minimization plan. This requirement is contained in Schedule A of the permit. Once the plan is submitted to DEQ for review, it must go on public notice for public review and is incorporated into the permit by reference.

This permittee recently developed a Mercury Minimization Plan and this plan is available for public comment along with the proposed permit. The permittee will implement the plan once the new permit is issued. Therefore, the proposed permit includes a requirement (in Schedule A) for the permittee to review and update the Mercury Minimization Plan during the last year of the permit cycle, and to submit the revisions with their next permit application. The proposed permit also includes (in Schedule B) monitoring associated with the Mercury Minimization Plan.

3.4 Antibacksliding

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

3.5 Antidegradation

DEQ must ensure the permit complies with Oregon’s antidegradation policy found in OAR 340-041-0004. This policy is designed to protect water quality by limiting unnecessary degradation from new or increased sources of pollution.

DEQ has performed an antidegradation review for this discharge. 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 stream's designated beneficial uses. DEQ is also not aware of any existing uses present within the water body that are not currently protected by standards developed to protect the designated uses. Therefore, DEQ has determined that the proposed discharge complies with DEQ's antidegradation policy. DEQ's antidegradation worksheet for this permit renewal is available upon request.

3.6 Whole Effluent Toxicity

Whole effluent toxicity (WET) tests are used to determine the treated wastewater's aggregate toxic effect on aquatic organisms. Wastewater samples are collected and aquatic organisms are subjected to a range of concentrations in controlled laboratory experiments. EPA recommends that WET tests be used in NPDES permits together with requirements based on chemical-specific water quality criteria.

WET tests are used to determine the percentage of effluent that produces an adverse effect on a group of test organisms. The measured effect may be fertilization, growth, reproduction, or survival. EPA's methodology includes both an acute test and a chronic test. An acute WET test is considered to show toxicity if adverse effects occur at effluent concentrations less than what is found at the edge of the zone of immediate dilution (ZID). A chronic WET test is considered to show toxicity if adverse effects occur at effluent concentration less than what is known to occur at the edge of the mixing zone.

3.7 Groundwater

No groundwater concerns have been identified in association with this facility. All treatment operations occur in water-tight basins and the liquid storage of stabilized biosolids occurs in sealed tanks and digesters. The treatment facility does not have the potential to leach into the groundwater. No groundwater monitoring or limits are required.

4. Schedule A: Other Limitations

4.1 Mixing Zone

Schedule A describes the regulatory mixing zone as discussed above in Section 3.

4.2 Biosolids

The permittee currently produces Class A and B biosolids for beneficial land application and this permit allows the facility to continue to produce these types of biosolids. DEQ reviewed and approved a 2017 biosolids management plan and land application plan. The permittee is required to update these plans during the next permit term (Schedule D). DEQ will review the plans and provide an opportunity for public comment on the proposed land application activity. Once

approved, conditions in the biosolids management plan and land application plan will become permit conditions.

Schedule A of the permit requires the facility to apply biosolids according to their biosolids management plan. In addition, Schedule A requires the following:

- Apply at or below agronomic rates and in accordance with best management practices where exceptional quality biosolids are land applied.
- The permittee must have written site authorization for each location from DEQ before land applying and abide by the restrictions for each site. For exceptional quality biosolids, these biosolids may be land applied as any other fertilizer or soil amendment to any type of land.
- Prior to application, the permittee must ensure that biosolids meet one of the pathogen reduction standards under 40 CFR 503.32 and one of the vector attraction reduction standards under 40 CFR 503.33. For exceptional quality biosolids, the biosolids must meet one of the Class A pathogen reduction requirements in 40 CFR 503.32(a) and one of the vector attraction reduction requirements in 40 CFR 503.33(b)(1) through (b)(8) prior to land application.
- The permittee must not apply biosolids containing pollutants in excess of any one of the ceiling concentrations for the nine metals shown in Schedule A of the permit. For biosolids to be managed as exceptional quality biosolids, the biosolids must also not exceed any of the pollutant concentrations shown in Schedule A of the permit.

4.3 Recycled Water or Irrigation of Industrial Wastewater

The permittee does not currently operate a recycled water program, but may develop one during the term of this permit. If the permit holder chooses to develop a recycled water program, a comprehensive recycled water use plan meeting the requirements in OAR 340-055 will be submitted to DEQ for review and approval; appropriate actions must also be made to OHA and WRD. The recycled water use plan, including the locations of any proposed irrigation projects will be made available for public comment.

Schedule A of the permit requires the permittee to apply recycled water according to their recycled water use plan. Schedule A also restricts the application of recycled water to prevent the following:

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

4.4 Chlorine Usage

Schedule A of the permit prohibits the permittee from using chlorine or chlorine compounds for effluent disinfection purposes.

5. Schedule B: Monitoring and Reporting Requirements

Schedule B of the permit describes the minimum monitoring and reporting necessary to demonstrate compliance with the proposed effluent limits. In addition, monitoring for other parameters is required to better characterize the effluent quality and the receiving stream. This data will be used during the next permit renewal. Detailed 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 DEQ's monitoring and reporting matrix guidelines, permit writer judgment, and to ensure the needed data is available for the next permit renewal.

6. Schedule C: Compliance Schedule

The permittee is expected to meet all effluent limits once the permit becomes effective and therefore a compliance schedule is not needed.

7. Schedule D: Special Conditions

The proposed permit contains the following special conditions. The conditions include the following:

7.1 Inflow and Infiltration

A requirement to submit an updated inflow and infiltration report in order to reduce groundwater and stormwater from entering the collection system.

7.2 Mixing Zone Study

A requirement to submit an updated mixing zone study.

7.3 Emergency Response and Public Notification Plan

A requirement to develop and submit an emergency and spill response plan or ensure the existing one is current per General Condition B.8 in Schedule F.

7.4 Recycled Water Use Plan

A condition requiring the permit holder to develop and maintain a recycled water use plan that meet the requirements in OAR 340-055-0025. The plan must also include location-specific information describing where and how recycled water is managed to protect public health and the environment.

7.5 Exempt Wastewater Reuse at the Treatment System

A condition that exempts the permittee from the recycled water requirements in OAR 340-055, when recycled water is used for landscape irrigation at the treatment facility or for in-plant processes, such as in plant maintenance activities.

7.6 Biosolids Management Plan

A requirement to manage all biosolids in accordance with a DEQ-approved biosolids management plan and land application plan. The biosolids management plan and the land application plan must meet the requirements in OAR 340-050-0031 and describe where and how the land application of biosolids is managed to protect public health and the environment.

This condition also requires the permittee to submit a Biosolids Annual Report each year documenting the production, use, disposal, or storage of facility biosolids. This report must be submitted to DEQ by February 19 of each year and cover facility activities during the previous calendar year.

7.7 Wastewater Solids Transfers

A condition that allows the facility to transfer treated or untreated wastewater solids to other in-state or out-of-state facilities that are permitted to accept the wastewater solids.

7.8 Hauled Waste Control Plan

A condition that allows the acceptance of hauled waste according to a DEQ-approved hauled waste plan. The hauled waste plan ensures waste is not accepted that could negatively impact the treatment capabilities of the facility.

7.9 Hauled Waste Annual Report

A condition requiring submittal of an annual hauled waste report that summarizes hauled waste accepted at the facility during the previous year.

7.10 Whole Effluent Toxicity Testing for Saltwater

The permittee is required to perform WET testing to ensure the aggregate of toxics is not negatively impacting aquatic life. This condition describes the test procedures and requirement for the WET testing. A dilution series has been specified on the basis of the mixing zone analysis.

7.11 Operator Certification

The permit holder is required to have a certified operator consistent with the size and type of treatment plant covered by the permit per OAR 340-049-0005. This special condition describes the requirements relating to operator certification.

7.12 Industrial User Survey

This condition requires the permittee to conduct an industrial user survey. The purpose of the survey is to identify whether there are any categorical industrial users discharging to the POTW, and ensure regulatory oversight of these discharges.

7.13 Outfall Inspection

A condition that requires the permittee to inspect the outfall and submit a report regarding its condition.

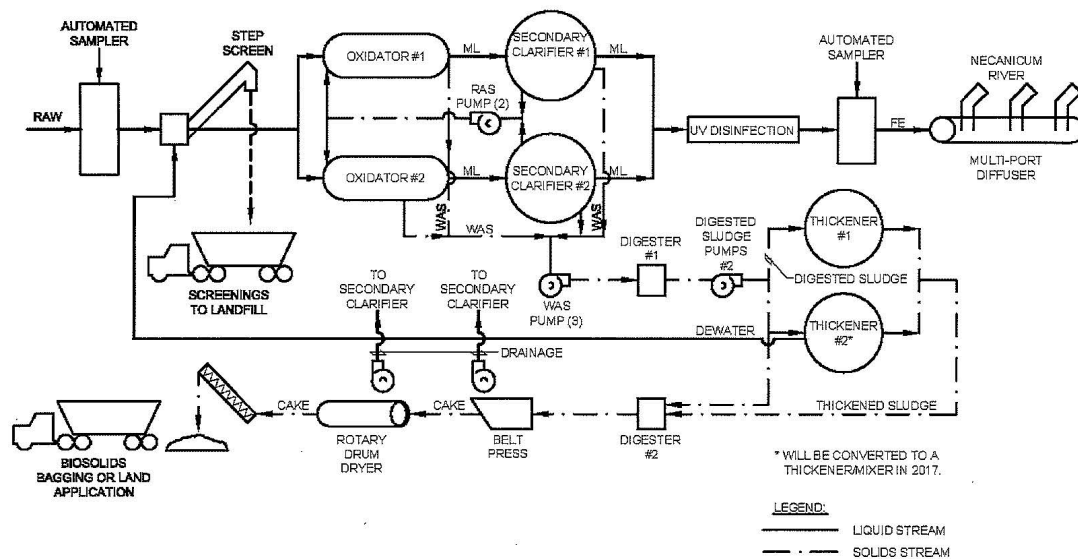
8. Schedule F: NPDES General Conditions

Schedule F contains the following general conditions that apply to all NPDES permittees. These conditions are reviewed by EPA on a regular basis.

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

Appendix A: Facility Flow Schematic

APPENIX A: Liquids and Solids Process Flow Schematic



Appendix B: Temperature Reasonable Potential Analysis

Attachment B-1: Discharge to Natural Lakes and Oceans/Bays (Summer)

Discharge to Natural Lakes (OAR 340-041-0028(6)) and Ocean/Bays (OAR 340-041-0028(7)) Analysis at Edge of Mixing Zone Section 5.7 of the Temperature IMD

Note: This spreadsheet is generally only appropriate for analyses of effluent from minor domestic facilities. For other facilities, an analysis using paired seasonal ambient and effluent data is more appropriate.

Facility Name: City of Seaside STP

Date: December 7, 2023

Enter data into white cells below:

Mixing Zone Dilution = 26

Ambient Temperature = 15.1 °C

Effluent Temperature = 22.7 °C

Allowable Increase = 0.3 °C

Effluent Flow = 1.8 mgd

Data Metric/Source

Mixing Zone Dilution from MZ study
Lowest 7dMA ambient temp summer season 2022 and 2023 - early to mid Sept. 2022

Max. 7dMA effluent temps 2019-2023 - late August - early Sept. 2022.

MMax. 7dMA effluent temps - late August - early Sept. 2022.

Equation used to calculate ΔT at edge of MZ

$$\Delta T_{mz} = \frac{T_e + (S - 1)T_a}{S} - T_a$$

Equation used to calculate thermal load limit

$$TLL = 3.7854 Q_e S \Delta T_{all} C_p \rho$$

Where:

Q_e = Effluent Flow in mgd

S = Dilution

ΔT_{all} = Allowable temperature increase

at edge of MZ (°C)

C_p = Specific Heat of Water (1 cal/g °C)

ρ = Density of Water (1 g/cm³)

3785.41 = Flow conversion from mgd to m³/day

ΔT at MZ edge = 0.29 °C

No Reasonable Potential

Thermal Load Limit = N/A Million Kcals

Note: If Reasonable Potential is indicated, use a more refined analysis (e.g. paired temperature analysis) to make the final RP determination.

Attachment B-2: Discharge to Natural Lakes and Oceans/Bays (Winter)

Discharge to Natural Lakes (OAR 340-041-0028(6)) and Ocean/Bays (OAR 340-041-0028(7)) Analysis at Edge of Mixing Zone Section 5.7 of the Temperature IMD

Note: This spreadsheet is generally only appropriate for analyses of effluent from minor domestic facilities. For other facilities, an analysis using paired seasonal ambient and effluent data is more appropriate.

Facility Name: City of Seaside WTP

Date: 12/7/2023

Enter data into white cells below:

Mixing Zone Dilution = 26

Ambient Temperature = 7.8 °C

Effluent Temperature = 15.5 °C

Allowable Increase = 0.3 °C

Effluent Flow = 2.25 mgd

Data Metric/Source

Mixing Zone Dilution from
MZ study

Lowest 7dMA ambient
temp for winter-mid
November 2022

Max. 7dMA effluent temps
for winter -mid November
2020. Max for Nov. 2022
15.4 C

Max. wet weather design
flow.

ΔT at MZ edge= 0.30 °C

No Reasonable Potential

Thermal Load Limit = N/A Million Kcals

Note: If Reasonable Potential is indicated, use a more refined analysis (e.g. paired temperature analysis) to make the final RP determination.

Equation used to calculate ΔT at edge of MZ

$$\Delta T_{mz} = \frac{T_e + (S-1)T_a}{S} - T_a$$

Equation used to calculate thermal load limit

$$TLL = 3.7854 Q_e S \Delta T_{all} C_p \rho$$

Where:

Q_e = Effluent Flow in mgd

S = Dilution

ΔT_{all} = Allowable temperature increase

at edge of MZ (°C)

C_p = Specific Heat of Water (1 cal/g °C)

ρ = Density of Water (1 g/cm³)

3785.41 = Flow conversion from mgd to m³/day

Attachment B-3: Water Quality Criterion RPA

Stream Meets Water Quality Criterion (OAR 340-041-0028(4))

For situations where the criterion is met (the waterbody is not listed as impaired for temperature) - Analysis at Edge of Mixing Zone
Section 5.4 of the Temperature IMD

Facility Name: City of Seaside WTP Date: 11/28/2023
Applicable Criterion Salmon/Steelhead Rearing and Migration 18°C - Year Round
and Season:

Enter data into white cells below:		Data Metric/Source
Mixing Zone Dilution =	26	Mixing Zone Dilution from MZ study
Ambient Temperature =	17.9 °C	Ambient temp set below criteria for conservative analysis. Max. 7dMA river temp is 20.9C in July 2022 from permittee 2022-2023 river temp data.
Effluent Temperature =	23.3 °C	Used max. effluent temp recorded from Jan. 2019 - October 2023 for conservative analysis. Higher than 7dMA.
Applicable Temperature Criterion =	18 °C	
Effluent Flow =	1.8 mgd	Max. dry weather design flow. Avg. dry season flows 2018-2022: 1.2 MGD.

ΔT at MZ edge=	0.2 °C	No Reasonable Potential
Temperature at MZ edge=	18.1 °C	

Thermal Load Limit =	N/A	Million Kcals (7-day Rolling Avg.)
(relative to the ambient temperature used above)		

--

Equation used to calculate ΔT at edge of MZ

$$\Delta T_{mz} = \frac{T_e + (S - 1)T_a}{S} - T_a$$

Equation used to calculate thermal load limit

$$TLL = 3.7854 Q_e S \Delta T_{all} C_p \rho$$

Where:

Q_e = Effluent Flow in mgd

S = Dilution

ΔT_{all} = Allowable temperature increase

at edge of MZ (°C)

C_p = Specific Heat of Water (1 cal/g °C)

ρ = Density of Water (1 g/cm³)

3785.41 = Flow conversion from mgd to m³/day

Attachment B-4: Thermal Plumes RPA

Temperature Thermal Plume Limitations within the Mixing Zone Rule (OAR 340-041-0053(2)(d))

Sections 5.6 and 6.5 of Temperature IMD

This rule only applies to receiving streams with salmonid uses. For migration blockage, applies to upstream migration of anadromous salmonids (See associated notes in the "Thermal Plumes Instructions".) This spreadsheet assesses compliance with OAR 340-042-0053(2)(d) subparts C and D. Subparts A and B need to be assessed separately (see Thermal Plumes Instructions).

Facility Name: City of Seaside

Date: November 28, 2023

OAR 340-041-0053(2)(d)(C): Thermal Shock 25 deg C at 5% of the stream cross section	
Enter data into white cells below:	Data Metric/Source
7Q10 = cfs	
Ambient Temperature = °C	
Effluent Flow = mgd	
Max Daily Effluent Temperature = °C	
5% of 7Q10 = 0.0 cfs 5% dilution = #DIV/0! dilution = (Qr*0.05)/Qe + 1	
Temperature at 5% cross section = #DIV/0! °C	#DIV/0!
Notes:	

OAR 340-041-0053(2)(d)(D): Migration Blockage 21 deg C at 25% of the stream cross section	
Enter data into white cells below:	Data Metric/Source
7Q10 = 50 cfs	From Mixing Zone Memo
Ambient Temperature = 20.9 °C	Max. 7dMA of river temps August 2022
Effluent Flow = 1.8 mgd	Maximum daily average from MZ Study
Max 7dAM Effluent Temperature = 22.7 °C	Max. 7dMA of effluent temps from August 2022 and 2023
25% of 7Q10 = 12.5 cfs 25% dilution = 5 dilution = (Qr*0.25)/Qe + 1	
Temperature at 25% cross section = 21.2 °C	No Reasonable Potential
ΔT at 25% Stream Flow = 0.3 °C	



**CITY OF
SEASIDE**

Mercury Minimization Plan 2024



NPDES Permit No. 102579

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1. Facility Information

1.1 Basic Facility and MMP contact information

			Date (mm/dd/yyyy):	02/28/2024	
Facility name: Facility address: City: Preparer name: Preparer organization: Technical contact name: Legal contact name:	City of Seaside STP		Permit No.:	102579	
	1821 N Franklin Street				
	Seaside	State:	OR	ZIP code:	97138
	Shannon Joseph		Preparer's telephone:	541-982-4382	
	Civil West Engineering Services, Inc.		Preparer's email:	sjoseph@civilwest.net	
	Andrew Grant		Technical contact telephone:	708-606-5249	
	Spencer Kyle		Legal contact telephone:	503-738-5511	

1.2 Summary of information on wastewater service territory, facilities and NPDES

The City of Seaside has one Wastewater Treatment Plant (WWTP), with an average dry weather design flow of 2.25 million gallons per day (MGD). The City of Seaside's sewage collection systems collects and transport raw sewage from residences and businesses to the municipality's wastewater treatment facility. The City's collection system consists of 30 miles of gravity sewer main, 9 miles of sanitary force main and 25 pump stations. The wastewater processed is approximately 91 percent domestic, 9 percent commercial and 1 percent light industrial. The City of Seaside's permanent service population consists of 6,585 residents with an estimated summer seasonal and weekend tourist populations averaging 9,935 individuals daily.

The City of Seaside WWTP's current National Pollutant Discharge Elimination System (NPDES) permit was issued by Oregon Department of Environmental Water Quality (DEQ) was issued on December 6, 2018. DEQ has included in the permit a requirement to develop and implement a Mercury Minimization Plan (MMP). The current permit is in the renewal

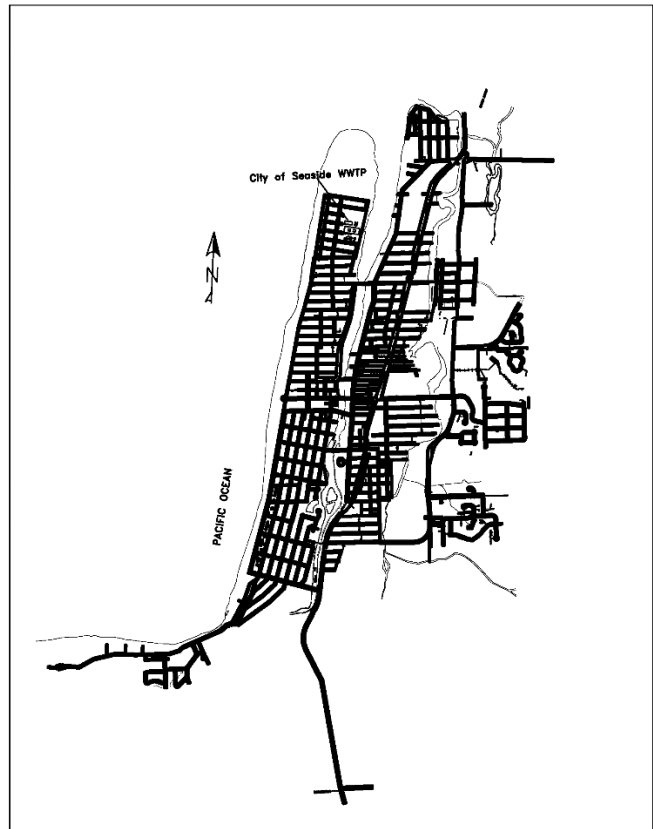


Figure 1. Map of City of Seaside's Wastewater Treatment and Collection System Service Territory

process with DEQ with an application submitted on July 14, 2023 and DEQ issued an administrative extension past the expiration of November 30, 2023.

Per this permit, DEQ stipulates that, at a minimum, the MMP must include the following:

- Identification and evaluation of current and potential mercury (both MeHg and total) sources
- Identification and evaluation of conditions (i.e., anaerobic conditions) that might contribute to the methylation of elemental mercury in the collection and treatment systems
- Identification of industrial, commercial and residential sources of mercury
- A monitoring plan to confirm current or potential sources of mercury (Monitoring Plan)
- Identification of potential methods for reducing or eliminating mercury.
- Ongoing monitoring of effluent to enable evaluation of the effectiveness and implementation of the MMP.

This document addresses the aforementioned elements and constitutes the City's mercury minimization plan.

2. Mercury Sources

2.1 Mercury in the Environment

Mercury is a naturally occurring element found in cinnabar deposits and areas of geothermal activity. In Oregon, mercury was mined commercially and used extensively in gold and silver amalgamation. Mercury has been used in fungicide formulations and can still be found in many commercial products including fluorescent lights, thermometers, automobile switches and dental amalgam. Mercury is also naturally present in trees and fossil fuels such as coal, natural gas, diesel fuel and heating oil. The mercury in these fuel sources is released into the atmosphere upon combustion. Mercury released into the atmosphere has an atmospheric lifetime of about 6-12 months, which allows for its widespread distribution prior to deposition (DEQ, 2019).

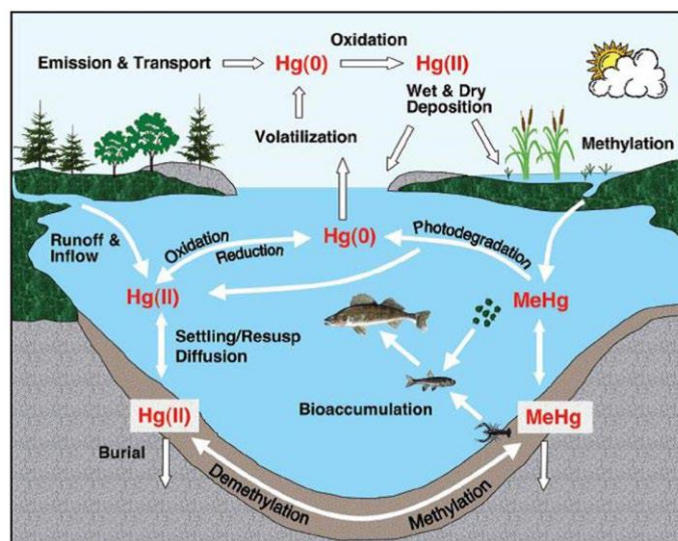


Figure 2. Mercury Cycle

Mercury can be present in various physical and chemical forms in the environment (Figure 2). The most common form is inorganic or elemental mercury, which can be converted to organic or methyl mercury by sulfate-reducing bacteria. Methyl mercury production is affected by physical and chemical factors including temperature, redox potential, dissolved oxygen levels, organic carbon, sediment particle size, alkalinity, sulfate concentration and pH. Methyl mercury, once formed, represents the most bioaccumulative form of mercury in fish tissue that is of primary concern for human consumers (DEQ, 2019). Accordingly, DEQ has adopted fish tissue criteria for methylmercury to protect human health.

2.2 Sources of Mercury in Wastewater

In 2019, a watershed-scale analysis of mercury sources was conducted for the Willamette Basin Mercury Total Maximum Daily Load (TMDL). The TMDL notes that 98 percent of the mercury contributions in the Willamette River Basin are from air deposition, mostly from global sources. The historic and current air deposition of mercury is then conveyed into streams through surface runoff, sediment erosion and groundwater. Small quantities are attributed to municipal wastewater treatment facilities, abandoned mines and industrial discharges. Municipal wastewater treatment facilities were estimated to contribute about 1 percent of the mercury load to the Willamette River system. While the City of Seaside does not fall within the Willamette River Basin, the total mercury loading from WWTPs for basins outside the Willamette Basin has not been fully analyzed by DEQ. The best available data in the state is found in the DEQ Willamette TMDL document.

Municipal WWTPs with secondary and tertiary treatment systems are extremely effective at removing total mercury and methyl mercury. The San Jose/Santa Clara Water Pollution Control Plant Mercury Fate and Transport Study (2007) demonstrated the strong affinity between mercury and total suspended solids. The study documented a 96.4% decrease in mercury concentrations after the activated sludge secondary process and a nearly 99% decrease after the final tertiary treatment processes. Based on these findings, the most practical way to reduce the additional remaining mercury in effluent is through source reduction actions.

Anthropogenic sources of mercury in wastewater can come from the residential, commercial or industrial sectors. In a 2002 study, the Association of Metropolitan Sewerage Agencies (AMSA now known as National Association of Clean Water Agencies) listed the most common sources of mercury, which are presented in Table 1 (AMSA, 2002).

Table 1: Common Sources of Mercury in Wastewater (National Association of Clean Water Agencies, 2002)

Commercial	Residential	Industrial
• Dental offices • Hospitals • Laboratories • Universities/schools • Medical clinics • Vehicle service facilities • Industrial activities	• Human waste (amalgam) • Human waste (dietary) • Laundry graywater • Household products • Improper disposal of mercury thermometers	• Chlorine production • Portland cement • Mining – i.e., gold mining • Caustic soda • Sulfuric acid

Mercury is present in a variety of consumer and commercial products including dental amalgam, batteries, compact fluorescent lights, jewelry, skin creams, paint, thermometers, switches/relays, etc. While many of these products have a low probability of reaching the sanitary sewer system in large quantities, their removal from the environment is still beneficial. A summary of mercury source details in commercial products can be found in Appendix A (DEQ MMPRC).

A 2008 report estimated that 50 percent of the nation's mercury in wastewater comes from the dental sector (USEPA, 2008). In its Effluent Limitations Guidelines and Standards for the Dental

Category, EPA noted that dental offices discharge 5.1 tons of mercury waste to WWTPs annually (USEPA, 2016).

2.3 Identification of Methylation Conditions

Methylation in the Natural Environment

As mentioned previously, the methylation of mercury poses a significant environmental threat. Methylation of mercury occurs mainly under anaerobic conditions and is greatly affected by the availability of inorganic mercury, pH, organic matter concentration, microbial activity, redox potential, sulfate concentration and temperature. The methylation of mercury is seasonally/temperature-dependent, with methyl mercury levels likely to increase in summer and fall and decrease in winter and spring (DEQ, 2013).

In natural ecosystems, the methylation of mercury occurs through one of the following pathways:

- Biological activity by various species of microorganisms, mainly bacteria
- Chemical reactions in soils or water that may occur through contact with organic matter and hemic substances
- Photochemical processes (DEQ, 2013)

Mercury methylation is generally thought to be facilitated by sulfate-reducing bacteria, which thrive in organic- rich, anaerobic sediments of many aquatic systems (e.g., wetland soils, lake sediments). Accordingly, it is widely recognized that wetlands, especially those rich in organic matter and receiving appreciable atmospheric mercury inputs, may be important sites of methyl mercury production.

However, recent monitoring in California has shown that not all wetlands are sources of methyl mercury and that some wetlands can act as sinks or are neutral in regard to methyl mercury production, emphasizing the point that site specific characteristics and water quality do influence the methylation of mercury in the environment (DEQ, 2013).

2.4 Methylation Potential in Wastewater Collection and Treatment Systems

Wastewater Collection System

The City of Seaside wastewater collection system consists of 30 miles of gravity sewer main and 9 miles of sanitary force main. City Public Works crews periodically perform several maintenance activities on the sanitary collection system that help decrease organic matter and sediment buildup within the system that could facilitate the methylation of mercury. These activities include line cleaning and repair, manhole maintenance, root control, and inspection.

The City of Seaside's sanitary collection system also operates and maintains 25 pump stations. In order to prevent sediment buildup in the City's pump stations, Public Works staff routinely clean the pipelines and pump down the wet wells to stir up and flush out any sediment that may have settled there. The City's maintenance activities decrease organic matter and sediment build up within the collection system that could facilitate the methylation of mercury.

Wastewater Treatment Facilities

The City of Seaside's WWTP provide treatment that consists of mechanical screening and grit removal, activated sludge, secondary clarification, and UV disinfection, before the treated water is discharged to the Necanicum River.

Studies have shown that modern advanced wastewater treatment plants incorporating activated sludge processes are able to significantly reduce the amount of total mercury from wastewater. Some of the sludge thickening and anaerobic digestion processes have the capacity to cause the methylation of mercury, but this is typically offset by the demethylation that occurs during the sludge removal and aeration processes. According to a study at the San Jose/Santa Clara Water Pollution Control Plant, "although anoxic conditions are present during some process steps of secondary treatment, the conditions were not sufficient to promote methylation of mercury." (SJ/SC, 2007, DEQ, 2013)

2.5 Inventory Summary potential sources of mercury wastewater discharges within the WWTP's service territory

As noted previously, DEQ adopted water quality criteria for methyl mercury in fish tissue, but there is limited data regarding methyl mercury in WWTP effluent. Methyl mercury concentrations in wastewater, receiving waters, and fish tissue can be calculated from total mercury with additional information and a series of "translators."

A literature review conducted by the EPA for the Proposed Effluent Limitation Guidelines for the Dental Category estimates that WWTP treatment efficiency for methylated mercury is roughly 90% (EPA 2014). The San Jose/Santa Clara Water Pollution Control Plant (SJ/SC WPCP or "Plant") conducted a multi-year study regarding the fate and transport of mercury at the Plant. The study focused on examining the efficiency and primary mechanisms of mercury removal in various Plant processes and whether net production of more toxic forms of mercury (e.g., methyl mercury) occurs in the Plant. The study found that concentrations were reduced nearly 99% for total mercury and 97% for methyl mercury. There was no evidence of a net production of methyl mercury across the WWTP (SJ/SC, 2007).

Thus, it is important to understand that publicly owned WWTPs receive mercury and, therefore, are pathways to water discharges of mercury rather than originating sources.

A preliminary review of potential sources of mercury in the City of Seaside's wastewater collection and treatment system is presented in Appendix B and is summarized in the table below.

Table 2. Source Summary

Source Categories	Mercury			Number
	Current	Potential	N/A	
Hospitals/Medical Facilities	☐	☒	☐	18
Veterinary Facilities	☐	☒	☐	1
Funeral Homes	☐	☒	☐	2
Dental Facilities	☐	☒	☐	4
Schools	☐	☒	☐	5
HVAC	☐	☒	☐	26
Electrician	☐	☒	☐	18
Vehicle Service	☐	☒	☐	9
Fabricated Metal Shops	☐	☒	☐	2
Warehouse	☐	☒	☐	1

3. Mercury Monitoring (total mercury)

The City of Seaside performs total mercury monitoring of its effluent and biosolids as part of its NPDES Permit requirements. A summary of this data from the last year in Table 3 and Table 4 below illustrates the low levels of mercury in Seaside effluent and below permit limits.

Table 3. Effluent Total Mercury Results

Effluent Total Mercury Results	
Date	Results
6/1/2023	0.00131 ug/L

Table 4. Biosolids Total Mercury Results

Biosolids Total Mercury Results		
Ceiling Concentration Limit	Pollutant Concentration Limit	Cumulative Pollutant Loading Limit
57 mg/Kg	17 mg/Kg	17 mg/Kg
Date	Results	
11/14/2023	<0.34 mg/Kg	

4. Implementation Plan for Mercury Management and Reduction Measures for (at least) the Next Five Years

Effluent and biosolids sample results for the City of Seaside WWTP shows a quantifiable amount of total mercury in the discharge. Facilities with consistent concentrations of total mercury in the discharge have the potential to exceed the methyl-mercury criterion in the effluent's receiving water. For this reason the WWTP NPDES permit requires the city to develop and begin implementation of a DEQ approved mercury minimization plan (MMP).

The first priority for this MMP is to onboard and integrate the plan to Public Works staff, allowing for continued discussion and plan expansion through the duration of the permit period. As this is the first MMP for the City of Seaside, it is important that Public Works staff begin to familiarize

themselves with potential sources of mercury in the system to better understand the role the MMP plays in reducing total mercury in the wastewater system effluent and biosolids in a productive and consistent manner. Public Works staff often engage the wastewater system users directly through their line of work. Thus, becoming familiar with the plan will allow them to educate others as a natural part of their role and keep in mind to consider new potential sources when conducting work around the City. This approach follows the DEQ expectation that MMPs will expand and MMP actions will increase with each NPDES permit renewal cycle.

While research has shown that wastewater treatment plants that utilize activated sludge processes, like the City of Seaside WWTP, can remove substantial amounts of mercury from wastewater, the only cost-effective way to reduce mercury in the discharge is to remove mercury before it is released to the wastewater system (SJ/SC, 2007, DEQ, 2013). The traditional approach to this issue would be to develop and implement a mercury discharge permit system that requires periodic wastewater sampling and analysis to determine compliance with the sewer use limits for mercury and an enforcement programs to force changes or installation of technology to achieve compliance. Monitoring and administrative cost for these procedures are substantial, and the city would need the permitted users of the treatment plant to pay for this kind of a program.

This MMP uses an alternative practice for mercury reduction: mercury-using facilities that agree to implement Best Management Practices (BMP) for mercury and demonstrate to be in compliance with the city's wastewater discharge permit. This approach is an appropriate first step with current limitations of staffing and costs that will require only enough oversight by the city to ensure that the BMPs are in being shared and implemented.

As this is the City of Seaside's first MMP, the City will prioritize their outreach focus on dental clinics, based on the 2008 USEPA report's estimation that 50 percent of the nation's mercury in wastewater comes from the dental sector (USEPA, 2008). The second priority focus will be to connect with the major medical facilities in the City.

4.1 Mercury Minimization Implementation Plan For Common Sources

The table below summarizes actions that the City of Seaside will take to reduce or control mercury discharges to wastewater from common commercial, institutional, and industrial sectors.

Table 3: City of Seaside Mercury Minimization Implementation Plan Summary

Sector/Partner Groups	Actions	Timeline	Performance Measure	Goal
City Public Works Staff Training/Awareness	• Distribute the City of Seaside's Mercury Minimization Plan to City Public Works staff • Conduct routine maintenance of the City's collection pump stations • Conduct an internal inventory of mercury-containing devices and identify ways to eliminate or minimize the use of such devices at the City of Seaside WWTP Laboratory • Practice good Laboratory Housekeeping with use and disposal practices for mercury-containing items at the WWTP • Conduct an annual Mercury meeting with sewer services staff to review the MMP, discuss new and emerging commercial and institutional sources of mercury, and incorporate mercury implementation plan activities into scheduling and to discuss new activities for mercury reduction. A meeting template is available in Appendix H • Review and update the City's Industrial User Survey	Ongoing and Beginning upon date of permit issuance	• Participation numbers • Internal Inventory of mercury-containing devices produced	• Increased awareness • Mercury-free wherever practicable • Minimize mercury discharges

Sector/Partner Groups	Actions	Timeline	Performance Measure	Goal
Dental Clinics	• Conduct Site Visit and Survey of dental clinics using the Dental Facility Mercury Checklist (Appendix C) • Reference and digitally distribute appropriate BMP literature, including the Oregon Dental Association's Environmentally Responsible Dental Office BMP Guide (Appendix D) • Consult DEQ's list of dental offices that have submitted separator certifications for future BMP outreach opportunities and to determine which dentists still need to comply with the federal requirement	Within five years from date of permit issuance	• % of dental clinics visited in the City of Seaside • % of dental clinics with installed amalgam separators that use amalgam • X number of dental clinics received BMP literature • Date, content of distribution	• Capture and recycle mercury used or generated • Minimize mercury discharges.
Medical Facilities - Major	• Conduct visit with the major medical facilities in Seaside using the Medical Facility Mercury Checklist (Appendix E) • Digitally distribute, or reference information from, best management practices (BMP) literature, such as the USEPA <i>Eliminating Mercury in Hospitals</i> (Appendix F) or Sustainable Hospitals Project Eliminating Mercury in Helathcare or <i>Mercury Spill Management</i> (Appendix G)	Within five years from date of permit issuance	• % of major medical facilities visited in the City of Seaside • X number of medical facilities received BMP literature • Date, content of distribution	• Mercury-free wherever practicable • Spill management • Minimize mercury discharges

Sector/Partner Groups	Actions	Timeline	Performance Measure	Goal
Schools	• Contact ACWA at Admin@oracwa.org to obtain the organization's Mercury School Outreach Toolkit and materials • Have resources available for digital distribution of BMP materials	Within five years from date of permit issuance	• Date, content, and numbers of schools requesting materials	• Resource availability
General Public	• Promote mercury waste collection events or drop-off locations	As Available	• Participation levels at events	• Reduced use of mercury containing products. • Recycling of mercury products.
	• Make City of Seaside Mercury Minimization Plan readily available on City website	Within two months from date of plan approval	• MMP link hits	• Increased public awareness
New and Emerging Commercial and Institutional Sources of Mercury Identified During the Permit Term	• Outreach and technical assistance materials and engagement actions will be digitally distributed to newly identified sources • Implementation resources will be shifted from sectors listed above to new sources if plan goals and objectives have been achieved earlier or with fewer resources than originally expected.	Ongoing	• Date, content of distribution of materials • Reduction progress	• Increased resource availability • Reduced mercury use • Spill management • Recycling of waste

5. References

AMSA, 2002. Mercury Source Control and Pollution Prevention Program, Association of Metropolitan Sewerage Agencies, 2002.

DEQ, 2013. Implementation of Methyl Mercury Criterion in NPDES Permits, Oregon Department of Environmental Quality, January 2013.

DEQ, 2019. Willamette Basin TMDL, Oregon Department of Environmental Quality, November 2019.

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SJ/SC, 2007. San Jose/Santa Clara Water Pollution Control Plant Mercury Fate and Transport Study, California Regional Water Control Board, San Francisco Region, 2007.

USEPA, 2008. Health Services Industry Detailed Study: Dental Amalgam. United States Environmental Protection Agency. EPA-821-R-08-014. August 2008.

USEPA, 2017. Effluent Limitations Guidelines and Standards for the Dental Category; Final Rule. 40 C.F.R. § 441, United States Environmental Protection Agency, 2017.

Appendices

Appendix A. Mercury Source Details (from State of Oregon Department of Environmental Quality Mercury Minimization Plan Review Checklist)

Appendix A: Source Details

Automobiles and other vehicles

- Vehicle trunk and hood light switches often contain mercury. If the light goes on when the lid is partially up, or if the bulb housing is mounted at an angle to the hood, a mercury switch is probably being used. Collision sensors may contain mercury. A variety of manufacturing processes use relays to control power to heater or pumps. Relays that contain mercury switches activate airbags, anti-lock brakes (primarily found in four-wheel drive vehicles), some seat belt systems, and some automatically adjusting suspension systems. Some agricultural equipment, military vehicles, mass transit vehicles, and fire hook and ladder equipment also contain mercury switches.

Batteries and battery chargers

- Mercury containing batteries provide a compact and precise voltage source to power metering electronics. Mercuric oxide (mercury zinc) batteries and button batteries are the only batteries made in the United States that may contain added mercury. Mercuric oxide batteries offer a reliable and constant rate of power discharge and are made in a wide variety of sizes intended for use in electronic devices. New equipment models generally require zinc air batteries. The shelf life of mercuric oxide batteries is up to ten years.

Bilge pumps

- The float switches within the bilge pump may contain mercury.

Boilers

- Small boiler rooms often contain tube thermometers and other thermometers. Oil level gauges for remote measurements are also common.

Cathode ray tubes

- Mercury is contained within the fluorescent tubes that provide the source of light in the Liquid Crystal Displays (LCD). Mercury is used in the LCD backlights.
- No mercury is required in CRT fabrication. Although the quantities of mercury are not large, they cannot be discounted given the toxicity of mercury to both human health and the environment.

Combustion sources

- Combustion sources include utility boilers, medical waste incinerators, municipal waste combustors, commercial/industrial boilers, hazardous waste combustors, residential boilers, wood combustion, sewage sludge incinerators and crematories. Mercury emissions from these sources (excluding wood-fired residential heaters) account for an estimated 125 Mg/yr (138 tons/yr) or 87 percent of the mercury emissions generated annually in the United States.

Cosmetics

- Historically mercury has been added to cosmetics as a skin-whitening additive. Today, the use of mercury compounds as cosmetic preservative ingredients is limited to eye area cosmetics at concentrations not exceeding 65 parts per million of mercury calculated as the metal (about 100 ppm or 0.01% phenylmercuric acetate or nitrate) and provided no other effective and safe preservative is available for use. Mercury compounds are readily absorbed through the skin on topical application and have the tendency to accumulate in the body. They may cause allergic reactions, skin irritation or neurotoxic manifestations.

Dishwashers and parts washers (electrical switches)

- Temperature gauges and various mercury-containing switches are installed in dishwashers and in industrial parts washers.

Drains and old waste pipes

- In dental surgeries and other premises where mercury is used, amalgam and metallic mercury may have collected in waste pipes, leaching mercury into the sewer system.

Dyes and pigments

- Mercury sulfide has been incorporated into organic pigments used to make paints and inks. The mercury is primarily found in the red (vermilion) color family.

Electrical distribution boxes and electric installations

- Mercury is often found in relays located in distribution boxes in buildings, such as for regulating stair lights.

Electronics

- Liquid crystal displays (such as in cameras and camcorders) may contain mercury. Printed circuit cards in electrical components in machinery and equipment can contain mercury. Companies specializing in dismantling electronic equipment should handle this in an environmentally safe way.

Float switches and level meters

- Float switches are used in factories, sewage plants and sump pumps to maintain a given level of liquid. The float switch is a round or cylindrical float with a switch attached to it. The switch keeps the circuit closed until the float reaches a certain height. Then the mercury slides down, opening the circuit and shutting off the pump.

Flow meters

- Flow meters are used for measuring liquid (water, sewage or product) flow. Some flow meters contain large quantities of mercury - 5 kilograms and more.

Freezers and refrigerators

- Freezers and refrigeration equipment may have mercury switches in the internal lid light within the light socket. If a chest freezer has a light in the cover and no visible mechanical switch, then it contains a mercury switch. This device senses when the lid is raised and turns on the light.

Fungicides

- At one time mercury chloride was one of the active ingredients used in fungicide chemicals.

Gauges: manometers, barometers, and vacuum gauges

- Many barometers and vacuum gauges found in machinery contain mercury. Liquid mercury in the gauges responds to air pressure in a precise way that can be read on a calibrated scale. Several mercury-free alternatives are available.
- Some operate on the same principle as mercury gauges but use mercury-free liquids in the tube.
- Needle or bourdon gauges operate under a vacuum with a needle indicator. Electronic gauges can be used to measure pressure, but they must be calibrated with a mercury manometer. Equipment manufacturers recommend that service technicians use a needle or digital gauge to test the systems they are servicing, but that they calibrate the gauges they use in the field with a mercury manometer kept at their shop.
- Mercury manometers occasionally need servicing to maintain their accuracy, and elemental mercury often remains as a waste. If the manometer is hard to read because of dirt and moisture in the tube, the mercury needs to be removed and replaced.

Heating, ventilation and air conditioning equipment (HVAC)

- Manometers, thermostats, thermometers, relays, and so on may contain mercury.
- Flame sensors in furnaces may contain mercury. The metal flame sensor consists of a metal bulb and thin tube attached to a gas-control valve. The mercury is contained inside the tube and expands or contracts to open and shut the valve.
- Gas meters installed before 1961 contain a mercury regulator attached to the gas meter.
- Many electric and gas appliances (such as ranges, ovens, clothes dryers, water heaters, furnaces, and space heaters) have pilot lights that use mercury-containing heat or flame sensors.
- Large housing estates and industrial areas often have a central heating plant with mercury-containing flue-gas meters, tube thermometers, thermostats, pressure switches, oil level gauges, flow meters, and so on.

Interlock switches

- Mercury switches consist of a mercury-filled tube with electrodes at each end. When the tube is tilted the mercury flows to either end cutting off the circuit on one end while opening it on the other side. They often function as on/off switches.

Industrial chemicals

- Caustic Soda
- The majority of sodium hydroxide (caustic soda) is commercially produced through electrolytic cell processing. The balance is produced through chemical processes. The electrolytic cells used to make the caustic soda contain mercury.

Laboratory reagents

- Mercury is used as a preservative in laboratory reagents and related chemicals. In laboratories, hospitals, and schools mercury has been used as a reagent for different analyses, as well as in thermometers and other measuring instruments.

Lamps

- Fluorescent and HID lighting is an excellent business and environmental choice because they can use up to 50 percent less electricity than incandescent lighting. However, used fluorescent lamps, mercury vapor lamps, metal halide lamps, high pressure sodium lamps, and neon lamps must be managed properly because they contain mercury. Some HID lamps may also be hazardous due to lead content, primarily due to the use of lead solder.
- Disposal Options for Mercury Containing Lamps:
- Businesses should manage and dispose of mercury-containing lamps as universal wastes, for which the regulatory requirements are much simpler than hazardous wastes.
- Mark the lamp storage area with the words "Fluorescent lamps for recycling". Do not break or crush lamps because mercury may be released. If lamps are accidentally broken, store them in a sealed container. Pick up spilled powder and add it to the sealed container. Arrange with a lamp transporter to pick them up.

Lifts for disabled

- Various electrical switches contained in the lift mechanism contain mercury.

Measuring and control instruments

- A number of types of machinery and equipment can contain mercury. Examples include level indicators in skylifts and mobile ladders, industrial welding equipment, forestry machinery, gas-operated relays in transformers and manufacturing machinery.
- Mercury switches are found in a variety of items ranging from chest freezers to sump pumps. Mercury-containing tilt switches are found in or under the lids of clothes washers and chest

freezers. They stop the spin cycle or turn on a light. They are also found in motion sensitive and position-sensitive safety switches in clothes irons and space heaters. If a mechanical switch is not visible in these items, a mercury switch is probably being used. Float switches are commonly used in sump pumps and bilge pumps to turn the equipment on and off when the water is at a certain level. These switch devices are often visible.

Paint additives

- Mercury sulfide has been incorporated into organic pigments used to make paints and inks. The mercury is primary found in the red (vermilion) color family. (Suspended in 1991)

Pesticides

- Methyl mercury is a key ingredient in pesticides and fungicides used to treat grains and seeds.

Pharmaceuticals

- Mercury is used as a preservative for human and animal medical products (for example, vaccines).

Rubber flooring

- The type frequently used in gyms and sport facilities in the 1970's. Rubber flooring installed in gymnasiums during the early 1970s contained a mercury catalyst (3M Brand Tartan Track, and other brands).

Sumps and tanks

- In low-lying areas in buildings, for example, you may find pumping equipment regulating the water level with sender level switches that can contain mercury. Tanks and cisterns can also have switches containing mercury.

Switches – Tilt switches, volumeters, time switches, landing switches

- Mercury is contained in temperature-sensitive switches and mechanical tilt switches. Mercury tilt switches are small tubes with electrical contacts at one end of the tube. As the tube tilts, the mercury collects at the lower end, providing a conductive path to complete the circuit. When the switch is tilted back, the circuit is broken. Reed switches are small circuit controls that are used in electronic devices. Their electronic contacts are wetted with mercury to provide an instantaneous circuit when the switch is closed and then an instantaneous current interruption when the circuit is broken.

Skylifts

- Skylifts may have level indicators or switches that contain mercury.

Sprinkler systems (old)

- Many of the pressure gauges on these older systems contain mercury.

Thermometers

- In a mercury or alcohol thermometer, the liquid expands as it is heated and contracts when it is cooled, so the length of the liquid column is longer or shorter depending on the temperature.

Thermostats

- Mercury-containing thermostat probes may be found in several types of gas-fired appliances that have pilot lights, such as ranges, ovens, clothes dryers, water heaters, furnaces, or space heaters. The metal probe consists of a metal bulb and thin tube, referred to as an ampoule, attached to a gas-control valve. The mercury is inside the tube and expands or contracts to open and shut the valve. Although non-mercury thermostat probes have been used in these appliances, you should treat all probes as though they contain mercury, unless you know that they do not.
- Mercury thermostat probes, also known as flame sensors or gas safety valves, are most commonly present as part of the safety valve that prevents gas flow if the pilot light is not lit. In this application the bulb of the thermostat probe projects into or near the pilot light. These are commonly present in gas ovens and may be present in any other appliance with a pilot light. A mercury thermostat probe may also be present as part of the main temperature-controlling gas valve. In this application, the probe is in the air or water that is being heated and is not directly in contact with any flame. These are typically found in older ovens, clothes dryers, water heaters, and space heaters.
- Mercury-containing tilt switches have been used in thermostats in homes and offices for more than 40 years. They provide accurate and reliable temperature control, require little or no maintenance, and do not require a power source. However, each switch contains approximately 3 grams of mercury.
- Mercury-free thermostats are available. Electronic thermostats, for example, provide many of the same features as mercury thermostats.

Transformers

- Mercury arc rectifiers within electrical transformers operate based on an arc between a pool of mercury and a metal anode that only allows current to pass in one direction. Multiple anodes are typically used, fed from a multiple-phase transformer, the arc jumping from the cathode pool to each anode in sequence. There may be three, six or even twelve transformer phases, each feeding one anode.

Appendix B. Inventory of Potential Sources of Mercury in Seaside, OR - 2024

Medical facilities

Major Medical Facilities

1	PROVIDENCE SEASIDE HOSPITAL	725 S WAHANNA RD.
2	PROVIDENCE SEASIDE CLINIC	727 S WAHANNA RD.
3	CMH-OHSU HEALTH MEDICAL PRIMARY CARE CLINIC AND URGENT CARE	111 N. ROOSEVELT DR.

Assisted Care Facilities

1	NEAWANNA BY-THE-SEA	20 N WAHANNA
2	AVAMERE AT SEASIDE	2500 S ROOSEVELT
3	SUZANNE ELISE ASSISTED LIVING	101 FOREST DR
4	AWAKENINGS BY THE SEA	1325 N HOLLADAY

Eye Clinic

1	COASTAL EYE CARE	819 S HOLLADAY
2	SEASIDE VISION	852 BROADWAY

Naturopathic

1	A NATURAL PATH	620 S HOLLADAY DR
2	OREGON COAST ACUPUNCTURE AND NATURAL HEALTH CLINIC, LLC	600 BROADWAY ST #9
3	GIBBS NATURAL HEALING CENTRE, PC – SEASIDE	45 N HOLLADAY DR
4	DRAGONHEART HERBS AND NATURAL MEDICINE	735 BROADWAY ST #2

Rehabilitation

1	COAST REHABILITATION SERVICES	1226 AVENUE B
2	AWAKENINGS BY THE SEA	1325 N HOLLADAY DR
3	CLATSOP BEHAVIORAL HEALTHCARE	1005 BROADWAY ST
4	LITTLE YELLOW HOUSE	715 3RD AVE

Veterinary Facilities

1	NORTH COAST PET CLINIC	900 24TH AVE
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Funeral Homes

1	CALDWELL'S FUNERAL & CREMATION	113 N HOLLADAY
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2	HUGHES-RANSOM MORTUARY	220 N HOLLADAY
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Dental facilities

1	MONTE L BAUMGARTNER D.D.S	508 N HOLLADAY
2	SANTOS SCOTT, DDS	2283 N ROOSEVELT
3	SEASIDE DENTAL CLINIC	729 S HOLLADAY
4	ADVANTAGE DENTAL ORAL HEALTH	1111 N ROOSEVELT #110

Schools

1	PACIFIC RIDGE ELEMENTARY SCHOOL	2000 SPRUCE DR
2	SEASIDE HIGH SCHOOL	2600 SPRUCE DR
3	SEASIDE MIDDLE SCHOOL	2600 SPRUCE DR
4	SEASIDE HEAD START	1225 2ND AVE
5	CLATSOP COMMUNITY COLLEGE – SOUTH COUNTY CENTER	1455 N ROOSEVELT DR

Automotive Repair

1	MASON AUTOBODY INC	1202 S HOLLADAY
2	SEASIDE MUFFLER AND OFF ROAD	1701 S ROOSEVELT
3	DOC'S AUTO REPAIR LLC	905 AVENUE S #E
4	MARK'S AUTO SERVICE	1570 LEWIS & CLARK #3
5	PERICO'S AUTO SHOP	720 AVENUE R
6	ALL STAR DEALER LLC	1300 S HOLLADAY
7	VALVOLINE LLC	1109 S HOLLADAY DR
8	LINE-X OF CLATSOP COUNTY	781 AVENUE A
9	MCCALL TIRE CENTER INC	2155 S ROOSEVELT

Fabricated Metal, Warehouse, Millwork Facilities

1	SOPKO WELDING INC	2375 N HOLLADAY
2	KEITH'S WELDING & REPAIR	430 HILLSIDE LOOP
3	MILLWORK SOLUTIONS LLC	835 AVENUE S #D
4	WILCOX & FLEGEL FUEL OIL CO	941 24TH AVE

Heating, Ventilation and Air Conditioning (HVAC)

1	TOTAL SYSTEM SERVICES INC	1712 S ROOSEVELT
2	COOLSYS COMMERCIAL & IND INC	145 S STATE COLLEGE BLVD #200
3	COLUMBIA HOUSEWARMERS	1706 S ROOSEVELT
4	HEATING SOLUTIONS LLC	1394 8TH ST
5	P & L JOHNSON MECHANICAL INC	429 GATEWAY
6	S & H HVAC	91879 RIDGE RD

7	COAST HEATING & COOLING	84790 FRONTAGE RD #E
8	DIAMOND HEATING INC	1425 N ROOSEVELT
9	GUYETTE HEATING LLC	421 12TH AVE
10	WHITE'S HEATING & SHEET METAL	2964 HWY 101 N
11	PRECISION HEATING INC	2085 SE 12TH PLACE
12	AMERICAN HEATING INC	5035 SE 24TH AVE
13	JACOBS HEATING & AIR	4474 SE MILWAUKIE AVE
14	SUN GLOW INC	2428 SE 105TH AVE
15	THE HEAT PUMP STORE	11933 NE SUMNER ST
16	HMS COMMERCIAL SERVICE INC	4103 SE INTERNATIONAL WAY #300
17	MHC HEATING & COOLING	4 NE 202ND AVE
18	JET INDUSTRIES INC	1935 SILVERTON RD
19	COMFORT FLOW HEATING	1951 DON ST
20	MACDONALD MILLER FACILITY INC	7717 DETROIT AVE SW
21	AMERICOOOL HEATING & A/C LLC	17929 IRWIN ST SW
22	TWIN CITY SERVICE CO INC	1710 S PACIFIC
23	NORMAND MECHANICAL	319 PARPOLA RD
24	APOLLO MECHANICAL CONTRACTOR	1207 W COLUMBIA DR
25	NORTHWEST CONTROL CO	8750 SE MCLOUGHLIN BLVD

Electricians

1	C LAZZERI ELECTRIC	89961 LEWIS & CLARK RD
2	CASTLE GUARD ELECTRIC LLC	92460 MAKI RD
3	WADSWORTH ELECTRIC	1715 EXCHANGE
4	CANNON BEACH ELECTRIC INC	264 CHILKOOT TRAIL
5	INLAND ELECTRIC INC	1725 N ROOSEVELT
6	BORLAND COASTAL ELECTRIC INC	1200 G STREET
7	GREEN ELECTRIC SHOP INC	36454 HWY 26
8	JJ ELECTRIC SERVICE LLC	712 S HOLLADAY
9	BOGH ELECTRIC	155 SE 1ST
10	EC COMPANY	2121 NW THURMAN
11	OEG INC	3200 NW YEON AVE
12	STONER ELECTRIC INC	1904 SE OCHOCO ST
13	COCHRAN INC	12500 AURORA AVE N
14	RENAUD ELECTRIC INC	802 VANDERCOOK WAY
15	PRAIRIE ELECTRIC INC	27050 NE 10TH AVE
16	PORTLAND ELECTRIC LLC	1915 E 5TH ST #D
17	HASKIN ELECTRIC INC	5317 NE ST JOHNS RD #C
18	CENTRIC ELEVATOR OF OREGON	2855 SE 9TH AVE

Appendix C. Dental Clinic Mercury Practice and Awareness Checklist

Best Management Practices are those defined by the ADA.

Compliance with the ADA recommended mercury management practices plus the installation and maintenance of an amalgam separation meeting ISO 11143 standards may be considered as compliance with the limiting of mercury.

Facility Name: _____ Contact Person: _____

Phone number: _(____)_____-____ Email: _____

Yes	No	Date	Best Management Practice
			1. Has all bulk mercury been eliminated from your stock at your dental office?
			2. Does your dental office use precapsulated alloys?
			3. Does your dental office recycle disposable amalgam capsules?
			4. Does your dental office capture and recycle non-contact scrap amalgam?
			5. Does your dental office capture and recycle contact amalgam including the contents of chair-side traps?
			6. Does your dental office recycle contact amalgam retained by the vacuum pump filter?
			7. Does your dental office disinfect and recycle extracted teeth with amalgam fillings?
			8. Does your dental office use non-chlorine, non-bleach line cleaners that minimize the dissolution of amalgam?
			9. Does your dental office have and maintain an amalgam separator meeting ISO standards?
			Manufacture: _____
			Model: _____
			10. Does your dental office recycle florescent bulbs?**

** May not affect wastewater Actions:

Comments:

Appendix D. Dental Clinic BMP Distribution



The Environmentally Responsible Dental Office

A Guide to Best Management Practices of Dental Wastes

April, 2008

Office Practices to Avoid

- **NEVER** use bulk mercury for amalgam;
- **NEVER** pour bulk elemental mercury waste in the garbage, red bag or down the drain;
- **NEVER** place amalgam waste of any kind (including extracted teeth with amalgams) in the biohazard (red) bag. Biohazard bags are incinerated and/or treated and placed in conventional landfills that do not have liners. Both types of disposal can lead to mercury entering the environment;
- **NEVER** rinse traps, filters, or screens over or down the drain or into a waste basket- Use disposable traps only.
- **NEVER** disinfect teeth or any item containing amalgam with any method that uses heat;
- **NEVER** dump spent fixer down the drain;
- **NEVER** throw lead foil from x-rays in the trash (for liability reasons, it is not recommended that lead foil be given to patients, staff or others).

Oregon Dental Waste BMPs

1. Use **pre-capsulated alloys** only (do not put capsules in red bag)
2. Salvage, store and recycle **non-contact amalgam** (amalgam left over from a capsule not used in restoration)
3. Recycle/dispose of **extracted teeth with amalgam** in one of the following ways:
 - Disinfect (in bleach) and give to patient,
 - Check with amalgam recycler/disposal services to see if they will accept teeth (store in sealed container following disinfection)-Check ODA recycling list on ODA website for recycler list www.oregondental.org

DO NOT PUT EXTRACTED TEETH WITH AMALGAM IN THE RED BAG!
DO NOT PUT EXTRACTED TEETH WITH AMALGAM IN THE STERILIZER!
4. **Extracted teeth with no amalgam** can be put in the red bag!
5. Use **disposable chair side traps** only. Recycle traps – Check ODA recycle list.
6. Replace **screens, traps, & vacuum pump filters** regularly – do not rinse and re-use traps and filters.
7. Handle chair-side traps and vacuum filters as **amalgam waste**.
8. Store amalgam wastes in **separate airtight, labeled containers**.
DO NOT PLACE AMALGAM UNDER FIXER! STORE DRY!
9. Recycle **all** amalgam wastes through an amalgam recycler or a Mercury collection event.
10. Train staff members in mercury/amalgam **spill clean up procedures**.
11. **Recycle used lead foil** (*Due to potential liability, we do not recommend giving lead to patients, staff or others*).
12. **Do not** dump spent fixer down the drain. **Recover and recycle**.

Visit www.oregondental.org for a list of recycler/disposal services that includes statewide pick-up, mail disposal or offer drop-off services at their location.

Definitions

- **AMSA:** Association of Metropolitan Sewerage Agencies
- **Bioaccumulation:** The concentration of a particular substance in the bodies of organisms, increasing with the animal's level in the food chain.
- **Bioavailability:** The degree to which or rate at which a substance is absorbed or becomes available at the site of physiological activity
- **Biosolids:** Solid or semisolid material obtained from treated wastewater, often used as fertilizer
- **Combined Sewer Systems:** Systems that carry sewerage from facilities/residences, as well as storm water
- **Indirect Dischargers:** Facilities that discharge wastewater to municipal sewer systems (rather than directly to a water body)
- **Life Cycle Costing:** Cost evaluation that takes into account both initial costs and future costs and benefits (savings) of an investment over some period of time
- **Mixing Zone:** The area in which a sewerage plant's discharge initially combines with the surrounding water
- **NPDES:** National Pollutant Discharge Elimination System (permits POTW discharges)
- **POTW:** Publicly Owned Treatment Works (your local wastewater and sewage treatment plants)
- **PPB:** Parts per billion: one pinch of salt in one thousand tons of potato chips
- **PPM:** Parts per million; a pinch of salt in one ton of potato chips is also one part (salt) per million parts (chips).
- **RCRA:** Resource Conservation and Recovery Act (governs handling of hazardous wastes)

Oregon Dental Association's

Guide to Best Management Practices (BMP's) of Dental Wastes

- I. **Introduction.** The following recommendations were developed in 1998 by the ODA Office Safety Committee in cooperation with the City of Portland Bureau of Environmental Services and other water/environmental agencies throughout the state of Oregon. The ODA and its component dental societies have worked with Oregon water/environmental agencies to accept these recommendations in lieu of further regulation and permitting requirements. Senate Bill 704 (2007 legislation) now requires all Oregon dental offices to implement these practices.

ODA expresses many thanks to the City of Portland, the Association of Clean Water Agencies and the Oregon Department of Environmental Quality for working with the ODA on management of dental office hazardous waste. We also wish to thank the principal authors of this document: Beryl Fletcher, ODA Director, Professional Affairs, Murray Bartley DMD, Ph.D., Chair, Office Safety Committee and John G. Colasurdo D.M.D. Additional thanks are extended to the Western Lake Superior Sanitary District for resource information provided to our authors.

- II. **Background.** The Oregon Dental Association has developed this guide to assist dentists in managing the disposal of dental office wastes. Reduction of toxic substances at the source is the pollution prevention goal of the U. S. Environmental Protection Agency and Oregon's Department of Environmental Quality (DEQ). Local city and county wastewater agencies are required to implement programs to reduce toxic wastes from entering our streams, sewers and landfills. The Oregon Dental Association, Oregon DEQ, the League of Oregon Cities, the Oregon Board of Dentistry and the Association of Clean Water Agencies are asking local and county agencies to work with the ODA and dentists in their communities to implement ODA's Best Management Practices Program for dental offices. This program can be helpful to these agencies in implementation of a toxics reduction program in response to another legislative bill (Senate Bill 737 – 2007 legislation)

In late 1996, ODA began discussions with DEQ and the City of Portland Bureau of Environmental Services as they were reviewing local discharge limits for silver and other hazardous substances. Of key interest to these agencies was mercury including amalgam, (Federal EPA includes amalgam in the mercury category), x-ray fixer (silver) and lead foil. Also of interest, was the use and disposal of chemiclave materials. The agencies encourage the conversion from chemiclaves to autoclaves. (Not mandatory and only as old equipment is needed to be replaced)

ODA and its component dental societies continue to work with Oregon wastewater agencies and dental offices whereby dentists will implement, "Best Management Practices" (BMP's) for recycling of amalgam, lead foil and x-ray fixer. With the passage of Oregon Senate Bill 704, all dental offices must implement the BMP's where previously it was a voluntary effort.

ODA strongly encourages all dental offices to recycle mercury, amalgam, lead foil and x-ray fixer. If dental offices recycle these materials there will be no need to enact further and more costly regulation of dental offices.

III. **Recycling assistance.** Companies have been identified which will assist dental offices in recycling of these materials. ODA does not endorse or recommend any particular company. A few suggestions to help dental offices to implement the BMP Program and where to look for recycling assistance include:

1. The attached list of recycling/recovery vendors.
2. Review the yellow pages of your local telephone book under "recyclers" or "hazardous waste."
3. Contact your nearest DEQ hazardous waste station for collection events in your area. Outside the Portland Metro area, some events are sponsored by DEQ and in some areas they are sponsored locally. You may also want to check with your local county waste management department or local garbage hauler for events in your area. For DEQ events check www.deq.state.or.us/lq/mercurycollection.htm

For additional assistance on who provides recycling assistance you may review the ODA recycler list on ODA's website at: www.oregondental.org or on DEQ's website at: <http://www.deq.state.or.us/lq/hw/miscindustries.htm>

4. METRO in Portland, 1-800-732-9253 is available for disposal. METRO's recycling stations are located at:
 1. Central Transfer Station at 6161 N. W. 61st. Street in Portland or
 2. Oregon City Transfer Station at 2001 Washington Street, Oregon City.There is no fee for amalgam or liquid mercury. You must complete a DEQ application form and bring it in with the amalgam or mercury. A form is available at <http://www.deq.state.or.us/lq/pubs/forms/sw/MercuryApplicationForm.pdf>
5. There are also mail-service recycling and other companies which may accept or pick-up your wastes. Make sure you follow guidelines from each company for packaging, preparation and/or mailing. Always keep a record of what, how much and when you ship. You may refer to the recycling list on ODA's website at www.oregondental.org

IV. **Amalgam (Mercury) Waste.** In order to meet EPA's pollution prevention goal, the Oregon Dental Association's Best Management Practices (BMP's) prevent amalgam waste from entering the air, sewage system or the garbage. Amalgam wastes include:

Amalgam particles are a potential source of mercury not only in the sewer, but ground water, streams and rivers. (EPA) Amalgam particles are created when old fillings are removed and new fillings are mixed. Dental offices recapture amalgam particles with chair side screens or traps, suction pump filters, (use only disposable screens/traps and filters) and avoid disposal of amalgam down the drain, in the trashcan, or in the red bag.

Unused amalgam in a capsule following a restoration being placed is another item to be recycled. Process the unused amalgam and store dry in a sealed container. The empty capsules should also be recycled.

Extracted teeth with amalgam also should be disposed of with other amalgam wastes.

For your reference, a list of recyclers is on ODA's website.. You may wish to consult with the company of your choice, as to specifications for storage and disposal preparation of amalgam particles. ODA does not endorse or recommend any particular company.

Some simple techniques to properly collecting, storing and transporting amalgam include:

1. Install amalgam traps chair-side and in the suction line just before the vacuum pump. Clean the trap area and bowl and recycle using only disposable traps on a regular basis to ensure equipment efficiency. Follow proper recycling method by recycling whole trap with wastes either at a DEQ sponsored collection event or with one of the recyclers listed on ODA's recycling list. Many recyclers will take the whole trap. (Do not have staff pick through trap. This creates other OSHA exposure issues.) Do not put traps or filters in with red bag (infectious or sharps) wastes. Replacing the traps and filters regularly will improve the suction and extend the life of your vacuum pump.
2. Flush the vacuum system with line solution before changing the chair-side trap. (Do it before you go home, and then change the trap the first thing in the morning.) Check with your manufacturer for the type of line solution to be used. (If you have an amalgam separator that requires a specific solution be used, check with your chair/equipment manufacturer to see the solution suggested will not void any equipment warranty.)
3. Unused amalgam in a capsule following a restoration being placed is another item to be recycled. Process the unused amalgam and store dry in a sealed container. (Do not store under fixer.) Recycle the empty capsules as well with amalgam wastes.
4. Extracted teeth with amalgam should not be put in the red bag (infectious or incinerated wastes) or the sterilizer. Disinfect (with bleach) and either give to the patient, or check with amalgam recyclers that take traps and filters to see if they will accept. Store in sealed container following disinfection. Do not store under fixer. Check ODA's website for up-to-date recycling list for all BMP wastes.
5. Use barrier techniques such as gloves, glasses and mask when handling traps. (chair-side or vacuum pump) Use utility gloves for cleaning up and handling these wastes.
6. Disposal/ Recycling services
 - a. Some disposal/recycling services allow you to dispose of gloves, bags and paper towels used in collecting the used amalgam. If allowed, pull the cuff of the glove over the amalgam trap, and off hand and fingers, inverting the glove and collecting the amalgam trap inside. Tie a knot in the glove to secure the trap inside. If not allowed, you will need to check with recycling service to obtain information on what to do with contaminated gloves, paper towels etc. Many times if contaminated with human tissue and/or body fluid, gloves and towels can be put in red bag. But traps and suction pump filters should never be put in red bag.
 - b. Some disposal/recycling services require that the amalgam waste be disinfected and also documented in some way that it was disinfected prior to disposal pick up. You may use your normal disinfectant solution. Check with your disposal/recycler for any special form to document the waste was disinfected or check to see if you may simply include a statement on your letterhead that the amalgam waste has been disinfected. **DO NOT HEATSTERILIZE ANY AMALGAM WASTES!!**
7. Keep all containers with recycled waste, in cool, dry area. Avoid sunlight and high humidity. **DO NOT KEEP AMALGAM STORED WITH FIXER.** Most recyclers of amalgam want the material as dry as possible. They do not want fixer (which contains silver) mixed with the amalgam. Contact recycler for their instructions.

8. Some recyclers pay for clean scrap amalgam, but may not pay for amalgam that is mixed with other wastes from traps. These recyclers request that clean scrap amalgam and mixed amalgam be kept separate to aid the ease of recycling. You can send waste amalgam to the recycler via common carrier (i.e. UPS) in a strong suitable container with proper labeling, storage, manifesting prior to shipping. You may also wish to contact:
 - a. DEQ'S website for free mercury collection events:
<http://www.deq.state.or.us/lq/mercurycollection.htm>. DEQ has paperwork that must be completed prior to disposal. An application is available on this website.
 - b. Check ODA's website for a BMP recycler list at www.oregondental.org

Some recyclers who accept other materials may also accept amalgam if using their service to dispose of x-ray fixer, gold or other dental wastes. (E.g. these same recyclers may also take extracted teeth with amalgam)

9. The American Dental Association recommends that small amounts of elemental mercury can be made into amalgam by reacting with alloy. This amalgam scrap should be placed in a sealed container and recycled. ADA no longer recommends that amalgam be stored under fixer. Store amalgam dry in a tightly sealed container.
10. Some recyclers of amalgam accept contaminated elemental mercury spills, and absorbents from cleaning up spills of mercury. This material should be managed as a hazardous waste, with proper labeling, storage, manifesting, and shipping. Check DEQ's website www.deq.state.or.us or American Dental Association at www.ada.org for spill clean up procedures.
11. The ODA and ADA recommend that all dentists use encapsulated amalgam vs. mixing restorative material from bulk sources.
12. Used (empty) amalgam capsules should be recycled. Many recyclers allow you to place in the same container for recycling as other amalgam wastes.

V. X-ray Fixer

1. X-ray fixer is considered a hazardous waste because of its high silver content. However, fixer is easily recyclable. Recycling is the management method recommended by regulatory agencies. There are two suitable methods of managing fixer waste:
 - a. You may use a silver recovery unit¹ for your developing system; or
 - b. You may give, sell, or pay someone that operates a silver recovery unit to take your fixer.
2. For your reference, a list of silver recyclers is included on ODA's website. If you dispose of your fixer off-site, collect and store it in a closed plastic container labeled: Hazardous Waste— Used Fixer—Contains only fixer. Many recyclers want to be sure that the liquid does not contain developer. If it does, it could actually remove silver from the recycling

¹ Silver recovery units only make economic sense if the flow is 2 or 3 gallons of fixer per week. These small recovery units have an operating life of only about six months. They are filled with iron wool and will rust over time. Once rusted, the unit does not pick up silver. The problem with silver removal equipment is most dental offices generate only small amounts of silver and the cost of the silver recovery equipment can be expensive. The smallest known unit was Kodak's Chemical Recovery Cartridge, Junior Model II. This model will most likely need to be changed out approximately every six months depending upon the flow volume and rust development. While this unit will treat up to 100 gallons in that time period, only a large dental office would generate such a large flow of fixer. The option to purchase a silver recovery unit might only be possible if several dentists found it feasible to collectively share a unit.

equipment. The liquid that has run through a recovery unit can be disposed of down the drain.

3. Many local photo developing companies will accept x-ray fixer from dental offices. You may wish to check with those companies in your area.

VI. X-ray Developer. Developer solutions should not be mixed with fixer solutions. Waste developer can be washed down the drain, if it is not mixed with fixer. Flush the drain thoroughly as you discharge developer down the drain. Some units mix the fixer and developer after they are spent. The resulting solution is hazardous. However, you may purchase an adapter kit to keep the fixer and developer separate. Check with your equipment manufacturer for adapter kits. You may also wish to check with your local DEQ hazardous waste disposal site as to whether they also may take used developer.

VII. Lead Foil or Lead Shields. Lead foil that shields X-ray film or protective lead shields should not be disposed of in the garbage. These materials are hazardous waste unless they are recycled for their scrap metal content.

Many of the Les Schwab Tire Centers will accept lead foil from dental offices. This is acceptable to DEQ as Les Schwab is approved for making their tire weights. Check with the local Les Schwab Center to see if they will accept your lead foil. Other companies also accept lead waste. There are many mail-in programs for dentists to recycle lead foil. A list of lead re-claimers/recyclers is listed on ODA's website.

It is also noted that some dental offices use the lead foil themselves or give it to patients to melt down for fishing weights or make buckshot. This is not a recommended BMP. Dental offices are especially encouraged not to give the lead foil to staff, patients or other persons due to potential for liability for handling and/or disposal by those persons.

VIII. Chemiclave Waste. Normal use and discharge of chemiclave solutions is acceptable although discouraged. Agencies would like to encourage dentists to move away from chemiclave sterilization to autoclaves. Normal use and sewer disposal of solutions (in normal use) is acceptable. Flush following disposal with several gallons of water so that it does not sit in the sink trap or does not give a slug of material to the sewer system.

We recommend that dental offices buy only the amount of chemical sterilizer that they need; this will eliminate the need to dispose of the excess material.

If a dental office switches to an autoclave and has a supply of unused formaldehyde, it is recommended they give the unused chemicals to a dentist who still uses a chemiclave. The agencies would like to avoid a large "slug" of formaldehyde at any one time down the sewer line.

IX. Labeling. The container in which you store your hazardous waste must be labeled with the words "hazardous waste" with a description of the waste. Example: "Hazardous Waste - Used fixer - contains only fixer."

The date you start filling the container should be written on the container or on a label. Standard labels are commercially available. Make sure you keep a written record of any material you send or deliver to a recycling entity. Be sure to request a "Certificate of

Recycling or Disposal". This could be simply a note on their letterhead that they received "x" gallons of fixer and that it would be processed in their silver recovery unit.

You may wish to refer to labeling instructions in the appendix of the *ODA Dental Office Safety and Health Manual* and any OR-OSHA requirements for employee safety in handling or disposal.

Dental Waste Best Management Practices

Waste	Source	Management Practice(s)
Amalgam particles	Traps, Screens, Excess mix	• Send to a recycler. Do not incinerate or put in with red bag wastes. Dispose of as hazardous waste. Refer to ODA recycler list.
Waste Mercury	Bottled mercury, spills, spill cleanup	Manage as hazardous waste - recycle (<i>see ODA recycle list</i>) Check ADA or DEQ web sites for clean up procedures
Extracted Teeth	Extracted teeth with amalgam	Manage as hazardous waste - Do not put in Red Bag or sharps container. Disinfect (w/bleach). Store dry in sealed container (No Fixer) Check with trap and filter recyclers for disposal.
Empty Amalgam capsules Partially filled Amalgam capsules		• Dispose of with an amalgam recycler or DEQ collection event. • Mix and recycle unused portion of amalgam capsule prior to recycling.
Fixer	X-ray processing	• Sell, give away (many photofinishers will take) or pay to have silver reclaimed • Buy silver recovery system • Recycle with hazardous waste disposal service or agency
Developer	X-ray processing	• Discharge to sewer system
Combined fixer and developer	X-ray processing	• Purchase adapter kit to separate and follow methods listed above
X-ray Film Packets	Patient x-rays	• Send lead foil to re-claimer. Do not give to patients, staff or others
Chemiclave	Sterilizer	• Replacement with autoclave recommended when needed; discourage use of formaldehyde
	Chemiclave used chemicals	• Discharge to sewer & flush with several gallons of water.
	Chemiclave unused chemicals:	• Use hazardous waste disposal service or give to another office that uses a Chemiclave.

Questions to Ask Your Recycling or Disposal Company:

1. What kind of amalgam waste do you accept?
 - ☐ Contact amalgam (traps, filters, gloves)
 - ☐ Non-contact amalgam (scrap amalgam)
 - ☐ Extracted teeth with amalgam:
 - ☐ Must decontaminate; or
 - ☐ Decontamination not necessary
 - ☐ Empty amalgam capsules
2. Do your services include pick up of amalgam waste from dental offices?
 - ☐ Yes ☐ No If 'No', can amalgam waste be shipped to you? ☐ Yes ☐ No
3. Do you provide packaging for storage, pick up or shipping of amalgam waste?
 - ☐ Yes ☐ No
4. If packaging is not provided, how should the waste be packaged?

5. What types of wastes can be packaged together?

6. Do you accept whole filters from the vacuum pump for recycling?
 - ☐ Yes ☐ No
7. Is decontamination/disinfection required for amalgam waste?
 - ☐ Yes ☐ No
8. How much do your services cost?

9. Do you pay for clean non-contact amalgam (scrap)?
 - ☐ Yes ☐ No
10. Do you accept empty amalgam capsules and/or extracted teeth with amalgam restorations?
 - Extracted teeth ☐ Yes ☐ No
 - Empty amalgam capsules ☐ Yes ☐ No
11. What type of licenses or certifications (e.g. EPA) does your company hold to recycle or dispose of wastes?
Type of License(s): _____
License #(s) _____
12. Does your company use the proper forms required by EPA and other state or local agencies for conducting business and disposal?

☐ Yes ☐ No

What forms (include agency and form #'s) are required? _____

13. What type of certification is provided to document that the material was properly recycled?

14. Where does the waste collected from dental offices go?

15. What type of contracts do you have with other waste recyclers/disposal services or landfills?

16. How long has your company been in business? _____

17. Where do you ship or dispose of mercury wastes for recycling or disposal?

18. Where do you dispose of silver or lead wastes *(if you also accept these wastes)*?

19. What do you do with extracted teeth waste (if you accept them)?

20. What is the level of your environmental liability insurance?

21. Can you provide customer references to us? Please list two or three?

22. Is proper protective equipment available and used by employees?

☐ Yes ☐ No

Appendix E. Medical Facility Mercury Practice and Awareness Checklist

Best Management Practices are those defined by the AHA/EPA/Sustainable Hospitals Project.

Compliance with these BMPs may be considered as compliance with reducing mercury.

Facility Name: _____ Contact Person: _____

Phone number: _(____)_____ - _____ Email: _____

Yes	No	Date	Best Management Practice
			1. Has your facility established a mercury plan and timeline for the reduction and eventual elimination for mercury-containing equipment and chemicals?
			2. Has your facility implemented an Environmentally Preferable Purchasing (EPP) policy for mercury products and process to regularly review mercury use reduction and elimination progress?
			3. Has your facility established mercury management protocols for safe handling, mercury spill clean-up procedures, disposal procedures, and education and training of employees?
			4. Has your facility replaced patient mercury thermometers?
			5. Has your facility replaced all or majority (75%) of mercury sphygmomanometers?
			6. Has your facility replaced all or majority (75%) of Mercury clinical devices (bougies, miller-abbott tubes, dilators, etc.)?
			7. Has your facility inventoried and labeled all mercury-containing facility devices (switches, thermostats, etc.)?*
			8. Has your facility implemented a program to recycle fluorescent lamps?*
			9. Has your facility implemented battery collection program?*
			10. Has your facility replaced all or majority (75%) of mercury lab thermometers?
			11. Has your facility replaced B5/Zenkers stains with non-mercury substitute?
			12. Has your facility inventoried mercury-containing lab chemicals?

* May not affect wastewater Actions:

Comments:

Appendix F. Eliminating Mercury in Hospitals



Eliminating Mercury in Hospitals

Environmental Best Practices for Health Care Facilities | November 2002

JCAHO Environment of Care
Standards 1.3, 2.3, 4.0

How Pervasive and Harmful is Mercury in the Environment?

Mercury is a toxic pollutant and is listed as one of 12 priority chemicals by the EPA Persistent, Bioaccumulative, and Toxic (PBT) Chemical Program. Consuming fish from mercury-polluted water bodies can severely affect the central nervous system; impair hearing, speech and gait; and cause blindness, tremors, insomnia, emotional instability, paralysis, loss of muscular control, and even death.¹ Fish consumption advisories for mercury have been issued for thousands of water bodies nationwide, including all the Great Lakes and their connecting waters, more than 79,000 other lakes and more than 485,000 miles of rivers. In 2001, 49 states had issued mercury advisories for lakes, rivers, and other water bodies.²

Neonatal exposure to mercury has been linked to several serious birth defects and recent research suggests that prenatal effects occur at mercury intake levels 5 to 10 times lower than that of adults. Additionally, a National Academies of Science report from July 2000 showed that 60,000 children are born in the U.S. each year with neurological problems because of exposure to methylmercury in utero.³

Numerous cases of mercury poisoning, primarily through inhalation, have been documented in the workplace. In a survey conducted by the National Institute for Occupational Safety and Health, researchers estimated that 70,000 American workers might be exposed to mercury vapors on the job, including nurses, lab technicians, and others working in health care facilities.⁴ In addition, families of these workers were identified to be at risk of exposure from mercury-contaminated work clothes brought home by workers.⁵

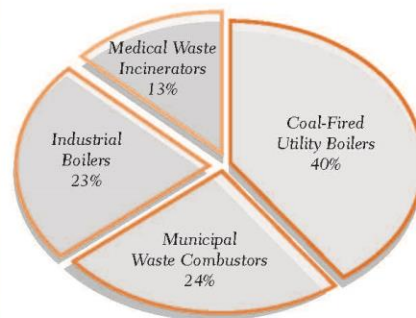
What Are The Industrial Sources Of Mercury?

Although mercury is naturally occurring in volcanoes, natural deposits, and oceanic volatilization, human activities have substantially increased the amount of mercury cycling through the ecosystem. A 1997 EPA study⁶ identifying industrial processes that contributed heavily to atmospheric mercury found that medical waste incinerators (MWI) contribute 13% (the fourth-largest source) of the anthropogenic mercury emissions to the environment. Additionally, hospitals contribute 4 to 5% of the total wastewater mercury load in some communities.⁷ Many local wastewater treatment plants have identified hospitals as industrial pollution sources and have imposed strict wastewater limits for mercury (see Case Study 2). Eliminating or reducing mercury use not only lowers compliance costs, but also minimizes the potential for expensive spill cleanups. (For more information on mercury sources and health effects, see www.h2e-online.org/about/mercury.htm.)

Mercury Exposure Pathways

- In utero
- Consuming mercury-contaminated fish
- Inhaling mercury vapors in the workplace
- Handling work clothes contaminated with mercury

Atmospheric Mercury Contributions by Industry Sector (1997, EPA)



continues

Why Commit to Being Mercury-Free?

Public Health—

Hospitals most frequently commit to becoming mercury-free based on an ethical motivation to protect human health and the environment. This desire often supports the hospitals' mission statements which commonly include a goal of "assessing and improving community health." As significant users of products containing mercury, hospitals have an opportunity to play a key role in protecting public health by minimizing the use and release of mercury into the environment.

Regulations—

Mercury waste is regulated under the Resource Conservation Recovery Act (RCRA), which requires all hazardous waste handlers to have specially trained staff and equipment on hand in case of a spill or release. Additionally, these facilities must meet special storage, handling, disposal, waste tracking, and reporting requirements. Failure to meet any of these requirements can result in fines up to \$25,000 per day.

By August 2002,
over 300 health care facilities
nationwide had already taken
the "Hospitals for a Healthy
Environment Pledge."

For more information see
www.h2e-online.org

Voluntary Agreements—

Because of health care's contribution of mercury to the environment, EPA and the American Hospital Association (AHA) signed a memorandum of understanding in 1998 committing to the virtual elimination of mercury from hospitals by 2005.¹

The following sections of this fact sheet present information about mercury-containing devices and chemicals, alternatives to mercury-containing products, vendor information, and case studies of successful mercury elimination programs. This fact sheet also contains links to other important resources for completing a mercury inventory, setting up a mercury elimination program, and taking the steps necessary to eliminate mercury at your hospital.

¹ EPA Mercury White Paper: www.epa.gov/ttn/carp/gtl3/memoranda/whitepaper.pdf

² EPA Listing of Fish and Wildlife Advisories, May 2002: www.epa.gov/waterscience/fish/

³ National Academies of Science, National Research Council, July 2000, "Toxicological Effects of Methylmercury."

⁴ Anne Haddalavularen, "Our Global Environment: A Health Perspective", 1995.

⁵ Guy Williams, "Mercury Pollution Prevention in Healthcare" National Wildlife Federation, July 1997.

⁶ EPA, EPA-452/R-97-004, "Mercury Study Report to Congress, Volume II: An Inventory of Anthropogenic Mercury Emissions in the United States", December 1997.

⁷ "Making Medicine Mercury-Free: A Resource Guide for Mercury-Free Medicine," Health Care Without Harm, 2001.

⁸ Health Care Without Harm, in partnership with the U.S. Environmental Protection Agency, the American Hospital Association and the American Nurses Association, has launched Hospitals for a Healthy Environment (H2E). www.h2e-online.org

Where Is Mercury Found in Hospitals?

Although mercury is found in many places within hospitals, a mercury elimination plan should include a prioritized list of targets. For example, the California Department of Health Services (CA DHS)⁹ conducted mercury inventories at six northern California hospitals in 1999 and found that sphygmomanometers and gastroenterology instruments accounted for 89 percent of the mercury in these hospitals.

Most mercury-containing equipment have a mercury-free alternative. Although some mercury-free alternatives may initially cost more, facilities often find that their initial capital costs are outweighed by the total costs associated with mercury: clean-up equipment, spill costs and liabilities, and handling and disposal costs and liabilities (see Table 1, page 5).

Mercury can be found in many commonly-used hospital devices and materials including:

Thermometers

- Contain about 0.5 gram of mercury (laboratory thermometers contain 2 to 10 grams of mercury)
- Generally account for a small percentage of total mercury at hospitals



Two recent independent studies^{10,11} have found significant accuracy problems associated with mercury thermometers:

- 25% of new mercury thermometers were inaccurate by at least ± 0.2 degrees C
- 28% of mercury thermometers were inaccurate by at least ± 0.1 degree C

[The ASTM standard for glass/mercury medical thermometers specifies a maximum allowable error of ± 0.1 C in the cited range.]

Mercury Thermometers:
Prone To Inaccuracies

Mercury Sphygs:
Worthy of Gold Standard Status?

A study¹² of 444 mercury sphygs found:

- 55% showed zero level between 10 and 20 mm Hg
- 38% had dirty columns that obscured readings
- 20% of the columns were not vertical
- 5% had blocked air filters
- 3 units had visible mercury droplets outside the mercury tube



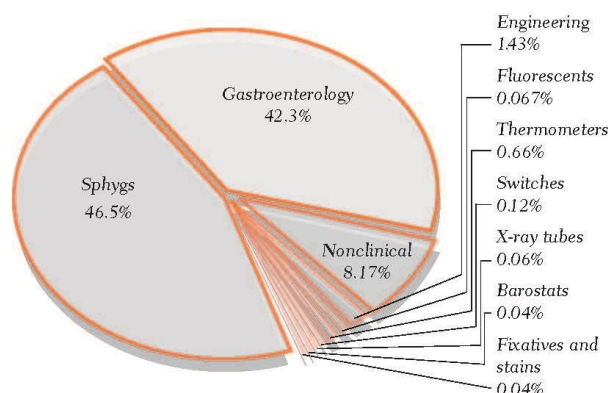
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- An important source of mercury contamination of nonhazardous waste streams because they are often disposed of improperly
- In contact with staff and patients more than any other medical device
- Broken thermometers inappropriately disposed of in red bags or sharps containers may be incinerated and release mercury into the environment
- A UCLA Medical Center study found that broken mercury thermometers were the most common sources of mercury spills—accounting for over 55% of incidents
- Alternatives are readily available (see thermometer inset that contains detailed data on the efficacy, cost, and features of both mercury and mercury-free fever thermometers)

Sphygmomanometers (blood pressure monitors)

- Contain 70 to 90 grams of mercury
- Typically located in heavily used areas including patient rooms, waiting areas, triage centers, and offices where the potential for patient or health care worker exposure to mercury is high
- The equipment at hospitals that often contain the largest amount of mercury
- Without regular maintenance, mercury sphygs can be inaccurate
- Alternatives are readily available (see sphyg insert that contains detailed data on the efficacy, cost, and features of both mercury and mercury-free sphygs)

Mercury Sources in Seven Northern California Hospitals
(California Department of Health Services, September, 2000)



Cantor and Miller Abbot tubes (also called esophageal bougies and Sengstaken-Blakemore tubes)— Used to clear gastrointestinal [GI] restrictions

- The equipment at hospitals that often contain the second largest concentration of mercury
- A single set of bougie tubes can contain up to 454 grams of mercury
- FDA device failure database shows 58 incidents from 1991 to 2000 in which GI tubes broke and released mercury inside patients¹³
- Alternatives are readily available; some substitutes are weighted with air or water while others are preweighted with tungsten; because the mercury in GI tubes functions as a weight, rather than a measurement device, the performance of alternatives is less questionable, and tungsten-weighted devices are considered just as effective
- Additionally, tungsten-weighted alternatives have the advantage of being opaque in X-rays, allowing detection of the dilator as it moves through the body

Non-Clinical Mercury Sources (sphyg repair kits, barometers, switches, etc.)

- Barometers contain about 800 grams of mercury and can be replaced with a 1-millibar precision aneroid for less than \$250 or simply rely on a local airport or weather station for data
- Eliminating mercury sphygs renders a repair kit containing mercury obsolete

Other Sources

- Staining solutions and laboratory reagents (thimerosal, mercury chloride, immusal, and carbol-fuchin)
Check the mercury content of your chemical at www.1netcasters.com/mercury/
- Tissue fixatives (Zenker's solution and B5)
- Thermostats
- Batteries
- Manometers on medical equipment
- Esophageal dilators (also called Maloney or Hurst bougies)
- Fluorescent and high-intensity lamps
- Cleaning solutions

continues

Taking the Leap....

How do you get a mercury reduction program rolling? Here's a step-by-step plan for making mercury reduction a priority at your hospital (also see Case Study 1, page 6):

Step 1 - Make A Commitment

Get support from the top. Talk to your hospital leadership, and get a signed statement to be mercury-free.

Establish a mercury-free team. Designate a program leader who will be enthusiastic and dedicated to the program and would identify a person in each department who has the authority to make departmental changes in order to build support.

Step 2 - Conduct A Mercury Inventory

Create a baseline inventory of mercury-containing products in your hospital against which progress can be measured.

Mercury inventory tools are widely available on the Internet. The Mercury Assessment Toolkit produced by the CA DHS is particularly comprehensive, easy to adapt to hospital-specific conditions, easy to use, and tracks reductions automatically.

See www.dhs.ca.gov/ps/ddwem/environmental/med_waste/med-wasteindex.htm for additional information.

Step 3 - Evaluate Alternatives

Evaluate mercury-free alternatives in the context of your hospital.

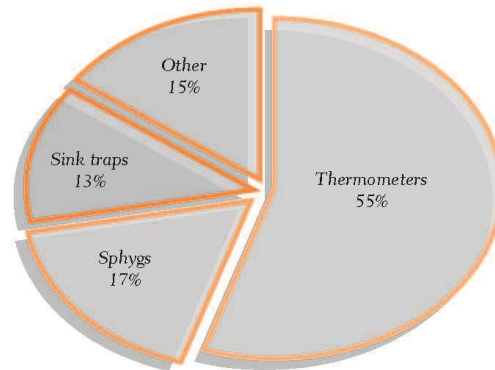
- Is the performance comparable?
- What is the purchase cost for alternatives? For accessories? For maintenance?
- Are these costs offset by lower handling, disposal, and liability costs?

Contact the vendors listed at the end of this fact sheet for more information on mercury-free alternatives to common hospital devices, or check out these web sites: www.sustainablehospitals.org and abe.www.ecn.purdue.edu/~mercury/src/devicepage.htm

Step 4 - Establish Goals And Implementation Plans

Set short-term, measurable goals that match your hospital's resources. Reasonable goals, such as the elimination of mercury sphygmomanometers within 2 years, are easily measured and proposed as part of a hospital's business plan. Once attained, the goals can provide a springboard for new mercury reduction projects.

UCLA Mercury Spill Frequency (1997-1999)
(average of 18 mercury spills per year)



- Spill cleanup costs: Labor: approximately \$10,000/year
Disposal: approximately \$34/pound
- 42% of the hazardous material unit incidents involved mercury
- Hazardous material unit spent 90 hours/year responding to mercury-related spills
- Hazardous material team cost \$100 per hour resulting in a labor cost alone of \$28,059 for the 3-year period

continues

Matching Mercury Replacement Strategies with Budgets

Targeted Device	Financially Strapped	Capital Budgets Allocated
Sphygmomanometers	Replace at servicing intervals	Replace as many as possible with available funding, then phase out remaining devices when broken
Gastrointestinal Tubes	Replace when expired	Replace immediately
Thermometers	Replace a set percentage each quarter or year targeting departments with high breakage first	Implement a one-time mass replacement

Step 5 - Institute Best Management Practices

- Educate staff regarding the hazards of mercury and proper handling and disposal.
- Eliminate mercury-containing equipment and products.
- Establish and monitor mercury-free purchasing policies.

Step 6 - Measure Success

Use your mercury inventory (from Step 2) to re-evaluate your facility. Identify your successes and modify your plan as necessary. Most importantly, get the message out to hospital staff members that they are making a difference!

Step 7 - Keep The Mercury Out

Work with your purchasing department to make sure that mercury products do not find their way back into the hospital. Require vendors to disclose the mercury content of products that you intend to purchase. See "Tools for Change" at www.sustainablehospitals.org for an example of a vendor product mercury-content disclosure agreement and mercury-free purchasing policy language.

(Table 1)

Mercury Spill Training and Equipment¹³

Training	Cost
Trainees (3 employees x 2 hrs x \$15/hr)	\$90 + loss of productivity
Trainer (2 hrs x \$20/hr)	\$40 + loss of productivity
Equipment	Cost
Spill Kit and Draeger Mercury Sniffer	\$519
Total Cost: \$649	

Mercury Spills

Depending on the type and size of the spill and the facility, mercury cleanups at hospitals are sometimes handled by staff if they are trained and available, or otherwise addressed by cleanup contractors. While mercury spill data from a wide variety of health care facilities including large and small, urban and rural, emergency, research and clinical facilities are generally unavailable or incomplete, the best available data comes from a large hospital at the University of California, Los Angeles (UCLA) between 1997 and 1999 (see summary on previous page).

What Does It Cost To Prepare For and Clean Up Mercury Spills?

Because of health and safety considerations and the environmental impact of mercury, any hospital that stores and uses mercury-containing devices within its facility is required by federal regulations to be prepared to handle mercury spills. Table 1 shows costs for mercury spill training and equipment that a hospital *will incur*, and Table 2 lists liability costs that a hospital *might incur*. Actual cleanup costs for several spill scenarios are itemized in the sphyg and thermometer inserts.

(Table 2)

Human Health and Environmental Liability

Exposures, Workers' Compensation, Lost Time, and Lawsuits	} Case-specific
Fines and Lawsuits for Improper Cleanups And Disposal	
	} Up to \$75,000 + possible jail sentence

⁹ California Department of Health Services. 2000. A Guide to Mercury Assessment and Elimination in HealthCare Facilities. www.dhs.ca.gov/medicalwaste

¹⁰ Leick-Rude, M.K. and Bloom, L.F. 1998. A Comparison of Temperature-Taking Methods in Neonates. Neonatal Network, Volume 17, Number 5, Pages 21-37.

¹¹ Mayfield, S. R. et al. 1984. Temperature Measurements in Term and Preterm Neonates. Journal of Pediatrics, Volume 104, Number 2, Pages 271-275 as cited in Leick-Rude, M.K. and Bloom, L.F. 1998.

¹² N.K. Markandu, F. Witcher, A. Arnold and C. Carney. "The Mercury Sphygmomanometer Should Be abandoned Before it is Proscribed." Journal of Human Hypertension, Volume 14, pages 31 through 36. 2000.

¹³ Holly J. Barron. HealthSystem Minnesota Mercury Reduction. "MnTAP Intern Project Report." 2000.

continues

The following three case studies are summarized in terms of "Impetus," "Actions," and "Results" to help identify the challenges faced by hospitals and the solutions they employed to start eliminating mercury. While each hospital is unique, these case studies may help you anticipate hurdles and estimate costs associated with mercury elimination.

case study 01 | Mercury Costs Prompt Elimination Program in Rochester, NY

Impetus: The 750-bed Strong Memorial Hospital (SMH) is the primary teaching hospital of the University of Rochester Medical School and is a regional trauma center. Since 1997, SMH has implemented a focused mercury reduction plan to eliminate the problems associated with spill response, disposal, and training.

Actions:

Executive involvement and support:

- SMH signed a memorandum of understanding with the Monroe County Health Department
- CEO assigned program personnel and resources

Staff training and involvement:

- Trained staff in program objectives and mercury awareness
- Multidisciplinary teams identified mercury-containing devices and mercury use
- Developed a mercury training poster for newly hired nurses
- Developed and distributed a mercury use and disposal pamphlet
- Added a mercury-specific training unit to the annual Resource Conservation and Recovery Act (RCRA) training, including a "show-and-tell" for different mercury-containing items encountered during routine maintenance
- Included questions on Joint Commission on Accreditation of Healthcare Organization (JCAHO) safety surveys about proper mercury disposal and a check box noting the presence of mercury-filled sphygmomanometers
- Added a hazardous materials section (including mercury) to the project manager's renovation and construction manual

Mercury Collection:

- Developed and implemented procedures to improve staff use of mercury collection facilities including:
 - Placing specially-labeled collection containers for mercury thermometers within patient care units
 - Adding labels on or near sharps containers to remind staff members not to place thermometers in the medical waste containers
 - Establishing easy-to-access battery drop-off locations
 - Establishing a centralized collection point for used fluorescent lamps

Year	Thermometers	Sphygmomanometers
Pre-1997	9,444	900
1997	7,706	500
2001	524	0

Results:

- Replaced all mercury sphygmomanometers
- Reduced mercury thermometer use by over 90% – encountered difficulty replacing thermometers in the neonatal intensive care unit due to infection control concerns
- SMH's program cited as an example of a quality improvement initiative during the 1998 JCAHO survey
- Eliminated annual disposal of 45 pounds of mercury-filled GI tubing by purchasing only tungsten-filled GI tubing since the program began
- Histopathology and other clinical laboratories discontinued use of mercury compounds

case study 02 | Wastewater Violations Force Change in Boston, MA

Impetus: Beth Israel Deaconess Hospital began its mercury reduction program in 1993 when the local sewer district lowered mercury limits in industrial wastewater to 1 part per billion (ppb) resulting in subsequent fines of \$118,000 for exceedences. Beth Israel's wastewater contained approximately 360 ppb mercury.

Actions:

- Trained staff on mercury sources and proper disposal methods, posted wastewater data, and changed the collection process for mercury-laden chemicals including the fixatives B5 and Zenker's solution
- Infrastructure upgrades: cleaned traps and pipes
- End-of-pipe treatment: installed a sand filter (\$40,000) and a dewatering unit (\$60,000) both requiring minimal maintenance
- Instituted a wastewater sampling program to establish a baseline for measuring its progress

Results: (Baseline Wastewater Mercury Content: 360 ppb mercury)

- Training, awareness and lab chemical replacement reduced mercury content to 100 ppb
- Trap and pipe cleaning reduced content to 4–8 ppb
- Improved wastewater treatment reduced content to < 1 ppb

case study 03 | Spills Prompt Mercury-Free Commitment in Grand Rapids, MI

Impetus: Butterworth Hospital with 529 beds made a commitment to eliminate mercury after three separate mercury spills cost the hospital over \$6,000. In 1995, the hospital estimated that there was 1.5 pounds of mercury per bed.

Actions:

- Replaced all existing sphygmomanometers and esophageal dilators containing mercury
- Instituted a policy banning the purchase of mercury-containing thermometers, sphygmomanometers, esophageal dilators, and batteries

Results:

- Removed 300 pounds of mercury
- No longer sends mercury-containing devices overseas as part of its humanitarian efforts

continues

Resources

Mercury-Free Thermometers

Alaris/IVAC
(800) 854-7128
www.alarismed.com

Braun
(800) 327-7226

Geratherm
(888) 596-9498
www.thermometer.com

Medical Indicators
(888) 930-4599
www.medicalindicators.com

Omron Healthcare*
www.omron.com/ohi

Welch Allyn
www.welchallyn.com

3M Healthcare
(800) 228-3957
www.3m.com/healthcare

Mercury-Free Sphygmomanometers

Alco Classic*
(800) 323-4282

American Diagnostic Corporation
(631) 273-9600
www.adctoday.com/

Omron Healthcare*
www.omron.com/ohi

Tips On Procurement
www.state.ma.us/ota/pubs/epp-march01.htm#/tips

Trimline
(800) 526-3538
www.trimlinemed.com

W.A. Baum
(888) 281-6061
(631) 226-3940

Welch Allyn*
www.welchallyn.com

Mercury-Free Gastrointestinal Devices

Miller Abbot Tubes
Anderson
(800) 523-1276, x 292

Bard Medical Services
(800) 227-3357

Rusch
(800) 553-5214
www.ruschinc.com

Bougie Tubes
Pilling
(800) 523-6507

Cantor Tubes
Anderson
(800) 523-1276, x 292

Mercury-Free Vital Signs Monitors

Alaris
(800) 854-7128
www.alarismed.com

Welch Allyn
www.welchallyn.com

Mercury-Free Laboratory Chemicals

For alternatives see the list at
www.sustainablehospitals.org

Consider taking the "Hospitals for a Healthy Environment Pledge." Find out more at www.h2e-online.org

* Companies with a mercury exchange program to help defray the cost of replacing mercury-containing devices.

See www.state.ma.us/ota/pubs/eppmarch01.htm#/tips for tips on procuring non-mercury sphygmomanometers.



This fact sheet was produced by the Environmental Protection Agency (EPA) Region 9 Pollution Prevention Program. Mention of trade names, products, or services does not convey, and should not be interpreted as conveying, official EPA approval, endorsement, or recommendation.

Sphygmomanometer Cost Comparison¹³

Environmental Best Practices for Health Care Facilities

Eliminating Mercury in Hospitals

Sphygmomanometer Cost Comparison				
Costs Over 5-Year Period				
	Mercury Unit	Aneroid Unit		Electronic Unit
		Wall Unit	Mobile Unit	Vital Signs Monitor
Purchase and Training				
Purchase Cost ¹⁴	\$129	\$152	\$264	\$1,250 to \$3,000
Batteries	NA	NA		\$30
Training ¹⁵	\$20	\$20		\$80
Calibration				
Biomedical Engineer (15 minutes/calibration x \$40/hour) = \$10/calibration	\$100 ¹⁶ (every 6 months)	\$100 ¹⁶ (every 6 months)		\$10 (every 5 years or if damaged)
Storage, Handling and Cleanup				
Shipping, Handling and Disposal ¹⁷	\$34 as hazardous waste	\$0.03 as solid waste		\$0.017 as solid waste
Mercury Spill Training and Equipment (see table below)	\$649	NA		
5-Year Usage Cost Totals	\$932	\$272	\$384	\$1,370 –\$3,120

Mercury Sphygmomanometer Spill Cleanup Costs ¹⁸		
Hard Floor/Early Detection	Mercury Spill Kit	\$325
	3 Hours of Staff Time	\$45
	Disposal Of 5-gallon Bucket	\$620
	Total	\$990
Hard Floor/Late Detection	Mercury Spill Kit	\$325
	10 Hours of Staff Time	\$150
	Disposal Of 5-gallon Bucket	\$620
	Total	\$1,095
Carpeted/Early Detection	Mercury Spill Kit	\$325
	10 Hours Staff Time	\$150
	27 Sq. Ft. Carpet Replacement	\$48
	Disposal Of 55-gallon Drum	\$1,000
	Total	\$1,523
Carpeted/Late Detection	Mercury Spill Kit	\$325
	20 Hours Staff Time	\$300
	90 Sq. Ft. Carpet Replacement	\$160
	Disposal Of 55-gallon Drum	\$1,000
	Total	\$1,785
Average Cost per Spill¹⁹ =		\$1,539

¹³ Unless noted, costs are from Holly J. Barron. HealthSystem Minnesota Mercury Reduction "MnTAP Intern Project Report." 2000.

¹⁴ Purchase costs are for mercury-free sphygs: Welch Allyn wall unit, Trimline mobile unit, and Alaris/IVAC vital signs monitor (4200 or 4400 Series)

¹⁵ Trainee (4 employees x 0.25 hour x \$15/hour); trainer (0.25 hour x \$20/hour); 1 hour training for vital signs monitor

¹⁶ Assumes one 15 minute calibration takes place every 6 months over the 5 year period (15 min/calibration x \$40/hour x 2 calibrations/year x 5 years).

¹⁷ Varies by region; hazardous waste (\$34 per pound or \$895 - \$1,200 per 55 gallon drum); solid waste (approx. \$0.03 per pound, or \$68 per ton); see www.epa.gov/epaoswer/non-hw/recycle/recmeas/docs/guide_b.pdf

¹⁸ Average for 13 mercury sphygmomanometer spills

Sphygmomanometer Efficacy			
	Mercury	Aneroid	Vital Signs Monitor
Accuracy	• +/- 3 mm Hg conforms to AAMI standards • Operator must understand and account for mercury meniscus • Oxidized mercury can make the column appear dirty and make readings difficult	• +/- 3 mm Hg conforms to AAMI standards • Includes a self-bleeding deflation valve for increased reading accuracy	• +/- 3 mm Hg conforms to AAMI standards • Digital display removes operator error and bias • Automatic deflation rate improves accuracy
Calibration	• Required every 6 months • Adjusted only at the zero point	• Required every 6 months • Requires specialized tools and technical skills to calibrate the mechanism at several pressure points, including zero	• Recommended every 5 years or if the device has been dropped • Usually provided at no cost by the manufacturer
Installation	• Mercury tube must be perfectly vertical in its unit and perpendicular to the ground	• No specific orientation required	• No specific orientation required
Use	• Requires excellent technique to read the meniscus of a mercury column	• Easier to read than mercury column	• Digital display standardize measurements • Automatic inflation and deflation improves staff efficiency
Maintenance	• Without proper maintenance, accuracy of the device could be considerably diminished • Frequent filter replacement needed to avoid mercury column "lag," a delay in mercury response, that contributes to inaccuracies	• Easy to see if aneroid needle is off zero when not in use • Calibration is harder than with mercury units	• Battery replacement as necessary (approximately every 350 uses)
View Window	• 0 to 300 mm Hg with no stop pin	• 0 to 300 mm Hg with no stop pin	NA
Measurement Technique	• Relies on the auscultatory technique	• Relies on the auscultatory technique	• Relies on oscillometric technique
Other Features	—	—	• Unit can also measure temperature, pulse rate, blood pressure

AAMI - Association for the Advancement of Medical Instruments
mm Hg = millimeter mercury column

Thermometer Cost Comparison

Environmental Best Practices for Health Care Facilities

Eliminating Mercury in Hospitals

Fever Thermometer Cost Comparison ¹⁹					
Costs Over 5-Year Useful Life (estimate 35,000 uses; approximately 20/day)					
	Mercury	Liquid-In-Glass	Digital	Tympanic	Dot Matrix/single use
Purchase/Training					
Purchase Cost ¹⁹	\$2.00	\$13.75	\$180	\$296	\$3,500
Probe Covers ²⁰	NA	NA	\$1,960 (\$28 per 500)	\$2,100 (\$30 per 500)	NA
Batteries (\$5 x replaced every 5,000 uses)	NA	NA	\$35	\$35	NA
Training	NA	NA	\$20 ²¹		NA
Calibration					
Biomedical Engineering (15 min/calibration x \$40/hour)	NA	NA	\$70 ²²	NA	NA
Storage/Handling/ Cleanup					
Shipping, Handling and Disposal ¹⁷	\$45.00 as hazardous waste	<\$0.01 as solid waste	\$0.02 as solid waste	\$70.02 as solid waste	\$3.00 as solid waste
Mercury Spill Training and Equipment (see table below)	\$649	NA			
5-Year Cost	\$695	\$13.76	\$2,265	\$2,511	\$3,503

Mercury Thermometer Spill Cleanup Costs		
Hard Floor/ Early Detection	Mercury Spill Kit	\$195
	3 Hours of Staff Time	\$45
	Disposal of 5-gallon Bucket	\$620
	Total	\$860
Hard Floor/ Late Detection	Mercury Spill Kit	\$195
	10 Hours of Staff Time	\$150
	Disposal of 5-gallon Bucket	\$620
	Total	\$965
Carpeted/ Early Detection	Mercury Spill Kit	\$195
	10 Hours of Staff Time	\$150
	27 Sq. Ft Carpet Replacement	\$48
	Disposal of 55-gallon Drum	\$1,000
	Total	\$1,393
Carpeted/ Late Detection	Mercury Spill Kit	\$195
	20 Hours of Staff Time	\$300
	90 Sq. Ft Carpet Replacement	\$160
	Disposal of 55-gallon Drum	\$1,000
	Total	\$1,655
Average Number of Breakages/Year ²³ = 3.4 per 100 beds		
Average Cost/Spill ²⁴ = \$270		

¹⁹ Unless noted, costs are from Holly J. Barron. HealthSystem Minnesota Mercury Reduction "MnTAP Intern Project Report." 2000.

¹⁷ Varies by region; hazardous waste (\$34 per pound or \$895 to \$1200 per 55-gallon drum); solid waste (approx. \$0.03 per pound, or \$68 per ton); see www.epa.gov/epaoswer/non-hw/recycle/recmeas/docs/guide_b.pdf

¹⁹ Purchase and disposal cost for mercury and liquid-in-glass thermometers is for five thermometers (replaced once per year); digital and tympanic thermometer is for one unit; dot matrix are single use and cost \$10 per 100; liquid-in-glass thermometer purchase cost from Geratherm

²⁰ Average taken from various medical suppliers

²¹ Trainee (4 employees x 0.25 hour x \$15/hour); trainer (0.25 hour x \$20/hour)

²² Assumes one 15 minute calibration takes place every 9 months over the 5 year period (15 min/calibration x \$40/hour x 6.66 calibrations/5 years).

²³ Average breakage data for four facilities.

²⁴ Average provided by major SF Bay Area Medical Center

Thermometer Efficacy					
	Mercury	Liquid-in-Glass	Digital	Tympanic	Dot Matrix
Accuracy (see below for ASTM standards)	Requires some skill to account for meniscus in reading	Requires some skill to account for meniscus in reading	Digital display standardizes measurements, eliminating user error	Digital display standardizes measurements, eliminating user error	Easier to read than a mercury column
Time Required For Reading	Oral - 3 minutes Rectal - 3 minutes Axillary - 4 minutes	Oral - 3 minutes Rectal - 3 minutes Axillary - 4 minutes	Oral - 4 seconds Rectal - 15 seconds Axillary - 10 seconds	Ear - 1 second	Oral - 1 minute Axillary - 3 minutes
Calibration	NA	NA	NA	6 – 12 months	6 – 12 months
Temperature Range	94 to 108°F	94 to 108°F	84 to 108°F	Varies significantly	96 to 104.8°F
Battery	NA	NA	3 AA alkaline cells good for 5,000 to 6,000 readings	3-volt lithium or 9-volt alkaline good for 5,000 to 8,000 readings	NA
Other Considerations	- Often not left in place long enough to obtain accurate reading - Can be easily broken as a result of rectal perforation, especially for neonates and young children		- Quick, accurate readings - Minimally invasive - works well with children - Requires probe covers for hospital use		- Single use prevents cross-contamination - Single use increases waste generation - Ideal for isolation patients

Medical thermometers are tested to voluntary standards set by the American Society for Testing and Materials (ASTM) and shown in following table. There are non-mercury alternatives that meet these standards — ask your vendor whether the non-mercury alternative you choose for your facility meets the ASTM standards for its class.

Mercury in Glass – ASTM E667-86 Electronic – ASTM E-1112-86					
Range	< 96.4°F	96.4° to 98.0°F	98.0° to 102.0 °F	< 102.0° to 106.0°F	> 106°F
Max. error allowed:	±0.4°F	±0.3°F	±0.2°F	±0.3°F	±0.4°F
Max. error allowed:	±0.5°F	±0.3°F	±0.2°F	±0.3°F	±0.5°F

Appendix G. Mercury Spills – Hospitals



Mercury Spills – How Much Do They Cost?

The cost of mercury spills is a topic of interest because some hospitals gain support for mercury reduction programs by using spill cost avoidance as a justification for change. In general, the true costs of mercury spills are not well documented and tend to be anecdotal. Here are several references to help you recognize potential costs.

Cost Estimate for Clean-up	Reference & Description
Small spill - \$1000 Large spill - \$tens of thousands	http://www.middlecities.org/PDF/mercury_bulletin.pdf "Mercury Contamination Risk Control", Middle Cities Risk Management Trust, Okemos, MI "A typical thermometer contains ½ to 3 grams (.018 to .11 ounces) of mercury. A typical household mercury fever thermometer contains approximately 1 gram of mercury. A typical barometer contains 1 pound (454 grams) of mercury and poses a significant spill risk. The cost of cleaning up a spill will vary by the size of the spill and the degree of exposure to property and people. Small spill clean-ups usually cost around \$1,000 and large spills can go into the tens of thousands of dollars."
3 oral fever thermometers - \$5000 Not uncommon... to exceed \$25,000	http://cc.ysu.edu/eohs/bulletins/MERCURY.htm "The Hazards of the Element Called Mercury", Youngstown State University "Unfortunately, it does not take a large amount of mercury to produce a problem. In one specific instance, three oral fever thermometers were broken. The mercury fell onto the floor in an office that was approximately ten square feet in size. Following the accident, the mercury vapors present in the air of that room were about three times that permitted by OSHA. Consequently, the room had to be decontaminated, all carpeting had to be discarded at a total cost of about \$5000. This was a very small mercury spill. It is not uncommon for cleanup costs of mercury spills to exceed \$25,000."
Reported costs went up to \$130,000	http://www.des.state.nh.us/nhppp/hospital_survey.htm NH Mercury Reduction Project: Hospital Baseline Survey 1999 PRELIMINARY SURVEY RESULTS New Hampshire Department of Environmental Services "Spills and Breakages – Seven hospitals indicated some kind of mercury spill or equipment breakage and release during 1998. The actual number of spills may be higher, as small spills and breakages may not always be reported. Most hospitals did not have any idea of the cost of clean-up, but reported costs went up to \$130,000!!"
~\$5000 for 1 broken sphygmomanometer	http://dnr.metrokc.gov/swd/bizprog/waste_pre/MIRTsem8.htm Medical Industry Waste Prevention Round Table REDUCING MERCURY in Hospitals and Biomedical Facilities (A MIRT Seminar, May 23, 2001), King County, Seattle, WA "Economic Considerations · Clean up costs - It often costs ~\$5,000 for 1 broken sphygmomanometer – you could buy 30 or 40 non-mercury ones for that cost. One local hospital recently spent \$10,054 dollars to clean up a spilled sphygmomanometer. · Regulatory Costs - 30-ppt pretreatment level in some places (fines) · Hazardous Waste training costs · JCAHO compliance – JCAHO is starting to ask questions"

Cost for	Reference & Description, cont'd
\$10,054 for one broken barometer	http://www.pprc.org/pprc/pubs/topics/healthcare.html#mercury Northwest Guide to Pollution Prevention by the Healthcare Sector "a large barometer fell and broke in a 60 square foot office in a Medical Center located in the Puget Sound Region. The barometer was used to calibrate instruments used in treatment of patients. No one knew when the barometer fell and broke in the office. The office has carpet..." "The following are costs associated with the mitigation of the spilled mercury in this 60 square foot office area: Outside Vendor Cleanup Company – Time, Materials and Labor: \$ 4,094.00 Replacement of Mercury Spill Vacuum: \$ 3,200.00 Medical Follow up (Blood Testing) For Hospital Staff: \$ 260.00 Mercury Disposal Costs: (Will Vary Per Vendor Used) \$ 1,600.00 Labor Hours Cost for Hospital Personnel Involved Est.: \$ 1,000.00 Total Costs for Spill Mitigation: \$ 10,054.00" <i>(Note: the full case study is online at the website listed above)</i>
\$570,000 to clean up after sink trap work Environmental service (alone) for any spill costs \$1000-1500	http://dnr.metrokc.gov/swd/bizprog/waste_pre/MIRTsem8.htm "Question: How did you get voluntary switch-out of Hg? Answer: VA People remember the Hg spills and are willing to work to avoid going through it again. UW always calls in Foss Env for any spills. Just for Foss's services costs \$1000-\$1500. Someone at Bowling Green University changed their sink traps, piled them up and carried them across campus. Mercury was spread everywhere. Cost \$570,000 to clean up."
\$350,000 to clean up contamination and restore building to original condition	http://204.178.120.25/library/college.htm "Spill Spreads Mercury Contamination – A large university in Ohio contracted plumbing work on one of its science labs. While dismantling laboratory piping, the contractor discovered an existing mercury spill that resulted in mercury contamination throughout the building. Costs to clean up the contamination and restore the building to its original condition were \$350,000."
\$5000 to dispose of a lab oven contaminated by a broken mercury thermometer	A major educational institution shared this experience with the SHP: A mercury thermometer broke in a convection oven in the hospital laboratory. The mercury volatilized, then recondensed when the oven was cooled down. Testing with a Jerome meter showed high levels of mercury, which resulted in the entire oven being removed as hazardous waste. This cost slightly over \$5000, not including the replacement cost of the oven.

Note: Information was retrieved from the designated websites on April 30, 2003.

For more information on mercury and alternatives, visit the Sustainable Hospitals website at <http://www.sustainablehospitals.org> or contact the SHP by phone (978-934-3386) or email (shp@uml.edu).

More information is available on the SHP Website:
www.sustainablehospitals.org

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Sustainable Hospitals Project
Phone: 978-934-3386
Email: shp@uml.edu
Mercury Spill Cost.doc, 050703

Appendix H. Wastewater Staff Annual Mercury Meeting

Wastewater Staff Annual Mercury Meeting Log and Discussion

Facility: Seaside WWTP

Date: _____

Meeting Time: _____

Meeting Attendance Count: _____

Topic 1: Review the Mercury Minimization Plan

- ☐ All attendees have received the MMP
- ☐ All attendees have read the MMP
- ☐ All attendees know where the current version of the MMP is digitally stored
- ☐ All attendees understand the purpose of the MMP

Topic 2: Mercury Reduction Activities Scheduled or Completed

- ☐ WWTP Mercury-Containing Device Inventory Completed or Scheduled/Assigned
 - ☐ Alternates to Mercury-Containing Devices Discussed
- ☐ Site Visits - *See List of Potential Sources in Appendix B*

Site Visits Scheduled/Assigned:

- Dental Facilities ☐ 1 ☐ 2 ☐ 3 ☐ 4
- Major Medical Facilities ☐ 1 ☐ 2 ☐ 3

Site Visits Completed:

Survey filled out and scanned into Digital Storage. BMP Information Digitally Distributed.

- Dental Facilities ☐ 1 ☐ 2 ☐ 3 ☐ 4
- Major Medical Facilities ☐ 1 ☐ 2 ☐ 3
- ☐ Contacted ACWA for mercury distribution materials
- ☐ Check and promote for any upcoming mercury waste collection events

Topic 3: Discuss New Mercury Reduction Activities Ideas and Identify New/Emerging Sources of Mercury

- ☐ Review Industrial User Survey
- ☐ Industrial User Survey Updates Discussed
- ☐ Review List of Potential Mercury Sources (Appendix A)
- ☐ Discuss new ideas for the mercury minimization plan

- ☐ Schedule/Assign/Discuss Strategy for Mercury Minimization Plan update for next Permit Renewal

6. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Preparer

(please print): SHANNON JOSEPH

Authorized

agent

(if different): _____

Title: STAFF ENGINEER

Date: 3/8/2024

Title: _____

Date: _____

Signature: _____

Signature: _____

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