

City of Gresham

Mercury Minimization Plan

July 2016

INTRODUCTION

The following Mercury Minimization Plan for the City of Gresham, Oregon follows the Oregon Department of Environmental Quality, Internal Management Directive for Implementation of Methylmercury Criterion in NPDES Permits, Section 5. Mercury Minimization Plans, dated January 1, 2013. This satisfies the City's NPDES Permit #102523 page 25-26, Schedule D, Section 11 Mercury Minimization Plan (permit excerpt attached).

Contact Information

Facility: City of Gresham Wastewater Treatment Plant
NPDES permit #102523
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Identification of Potential Sources of Mercury

Potential Industrial Sources

- None of the permitted industrial users in Gresham have processes that use or generate mercury.

Potential Commercial Sources

- Dental Facilities (53)
- Medical Facilities
 - Mt. Hood Legacy Hospital
 - Medical Offices (87)
 - Extended Care Facilities (4)
- Educational Institutions
 - Mt. Hood Community College
 - Gresham/Barlow School District
 - Centennial School District
 - Reynolds School District
- Automotive Business (~200)

Potential Residential Sources

- Medications – The Food and Drug Administration website lists over the counter medications containing mercury.
- Homes with fluorescent and compact fluorescent lights.
- Thermostats

Identification of Conditions that Promote Methylation

Gresham Collection System

The City of Gresham wastewater collection system consists of 308 miles of pipe and seven pump stations. Of those 308 miles, 302 miles are gravity with the remaining 6 miles under pressure. DEQ's IMD for *Implementation of Methylmercury Criterion in NPDES Permits* states "of particular interest are scenarios where un-treated surface or ground waters are used in a manner that generally creates reducing conditions in conjunction with high levels of microbial activity."

The City of Gresham has proactive infiltration reduction and maintenance programs that minimize favorable conditions for methylation in the collection system. These programs consist of the following activities.

- Annual CCTV inspections of collection system.
- Pressure cleaning and vacuuming of sewer pipe.
- Capital improvement program focused on replacing or rehabilitating sewer pipe prior to failure.

Wet wells from pump stations can accumulate sediments and be a potential methylation source.

Mercury methylation in wet wells is minimized through the following practices.

- Gresham's Capital Improvement Plan emphasizes the use of gravity systems minimizing the use of pump stations. This has been a successful strategy with only seven permanent pump stations used in the system.
- Pump stations are designed with pumps that reduce sediment accumulations.

Gresham Wastewater Treatment Plant

According to DEQ's IMD for *Implementation of Methylmercury Criterion in NPDES Permits*, 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. Natural treatment systems like wetlands, ponds, and lagoons are conducive to these conditions.

The City's Wastewater Treatment Plant (WWTP) is a secondary treatment plant utilizing activated sludge. The treatment train consists of screening, grit removal, primary clarification, aeration basins, secondary clarification and chlorination/dechlorination. Treated effluent is then discharged to the main stem of the Columbia River.

According to a study cited in DEQ's IMD, referring to the San Jose/Santa Clara Water Pollution Control Plant secondary treatment facilities, "Although anoxic conditions are present during some process steps of secondary treatment, the conditions were not sufficient to promote methylation of mercury." Also, noted in this study was that there is a strong affinity between methyl mercury and solids. Therefore,

methyl mercury entering the WWTP will likely be removed during the two clarification processes. This was confirmed in a 2011 study of the total mercury removal rate at the Gresham WWTP. That study found that the average daily removal rate for total mercury is 98.9%.

Given that Gresham does not utilize any natural treatment systems and it has a high total mercury remove rate, there is little potential for discharge of methyl mercury to the receiving stream.

Action Plan

The City of Gresham’s Regulatory Water Services Program is responsible for monitoring and regulating wastewater, stormwater, groundwater, and potable water quality. The Program has a system for identifying and categorizing businesses by their potential to generate pollutants.

The Regulatory Water Services Program is integrated into the City’s economic development, plan review, and building business licensing processes. Staff reviews all building permits, new business licenses, and new development. New businesses with the potential to discharge pollutants are required to complete an environmental survey before a license or permit is given.

Using data from the environmental survey, applicable businesses are placed in one of five sub-programs to control sources of pollutants and hazardous materials: Industrial Pretreatment (IP), Toxic Metals Management (TMM), Auto Related Businesses (ARB), Fats, Oils and Grease (FOG), and Well Field Protection (WFP). Information concerning these programs, the types of businesses and target pollutant and hazardous materials are found in the following table.

Under Intergovernmental Agreements, businesses within the nearby cities of Fairview and Wood Village are also monitored and/or regulated by the City of Gresham.

Programs and Regulated businesses within the City of Gresham.				
Program	Year Established	Businesses regulated	Pollutants Regulated	Businesses Regulated
IP	1983	Industries meeting the definitions of Significant Industrial User, Non-significant Industrial User, and Non-significant Categorical Industrial User.	EPA’s priority pollutants	15
TMM	2013	Dentists and businesses conducting x-ray or photographic development.	Mercury, silver, zinc	45
ARB	2012	All businesses conducting automobile and other vehicle repair, washing, and recovery.	Petroleum hydrocarbons, suspended solids, heavy metals, solvents, detergents	168
FOG	2008	Food service establishments	Fats, oils and grease	350
WFP	2003	Businesses located within designated well field protection areas that use, store, produce or transport hazardous materials.	EPA’s hazardous List of Lists	112

Mercury Reduction Activities

The City of Gresham has many methods for reducing its environmental impact and minimizing or eliminating the introduction of mercury. These methods include reduction activities, policies and code for residential and commercial customers, permitted industrial dischargers, and City-owned buildings and infrastructure.

Residential Customers

- Solid Waste & Recycling – Gresham’s Solid Waste and Recycling Program has proactive programs implemented that address sorting materials for recycling and proper hazardous waste disposal (biological, chemical, and material). Public outreach is done via mailers, personal contact, and through the City’s website. Annual earth day collection and recycling events are held along with year round drop off sites and resources for proper disposal of all types of materials that may contain pollutants of concern which include mercury.
- Unused Pharmaceuticals Collection - Gresham citizens can anonymously dispose of unused, expired or unwanted prescription drugs in an eco-friendly manner by depositing them in the safety box at the Gresham Police Department. Police officers collect the contents and prepare them for disposal in accordance with federal and state laws.

Commercial Customers

- GREAT Business Program – The City developed the GREAT Business program. Its goal is to assess a business for its ability to get as close to a zero waste facility as possible. This comes with a plan and annual certification to remain a GREAT business. A list of these businesses is published by the city to show those in our community who endeavor to safeguard environmental health and quality.
- Well Field Protection Program – Protection regulations for new and existing businesses that use and store hazardous materials that pose a threat to groundwater. To protect this valuable drinking water source, the cities of Gresham, Portland and Fairview share the same well head protection regulations. The City provides free, on-site assistance in the management of toxic products, including toxic product reduction, product containment, cleaning protocols and materials for in-house training. The City and neighboring municipalities developed a groundwater protection program for the Columbia South Shore and Cascade Protection Area. This source of groundwater supplements water supplies from Bull Run, in addition groundwater is necessary in the event of an emergency. The City is committed to preventing groundwater contamination.
- Automotive Related Businesses – The Auto Related Business program inspects all auto/vehicle repair and wash facilities as well as salvage yards to assess risk from automotive fluids, parts storage, salvage storage, solvents and detergents. Facilities that pose a risk are required to put in place measures to mitigate those risks. New ARB’s are inspected within the first six months of their business opening while existing businesses are re-inspected once every three years or more frequently if at a higher risk for impactation water quality.
- Toxic Metals Management (TMM) – The TMM Program was developed in conjunction with the Oregon Dental Association and Multnomah Dental Society. The program requires all dentists to

follow ODA best management practices (BMP). In 2014, dental offices were asked to provide documentation as proof that BMPs were followed and amalgam waste was properly disposed of. Annual certification will be required beginning in 2016.

Permitted Industrial Dischargers

Although none of Gresham's industrial dischargers have mercury in their processes or as a byproduct, mercury local limits apply and they routinely sample to verify its absence. Additionally permitted industries are offered assistance through our pretreatment and recycling programs in reducing or eliminating all possible waste and pollutants. Most businesses in Gresham meet or exceed recycling and green practices. The general culture is to go above and beyond in the protection of our public health and environment.

City of Gresham

The City has policies and code in place that help reduce all pollutants including mercury. These include required local limits, industrial wastewater discharge permits, Best Management Practices, onsite visits to verify proper management of materials that contain chemicals which can impact the quality of wastewater, stormwater, groundwater, and potable water. Additionally, the City is proactive in protecting the environment and eliminating or reducing potential pollutants and hazards. Examples are listed below.

- LED Street Light Replacement – A recent project performed by the City was its LED Street Light Replacement. In 2014, this project replaced HID lamps with energy efficient LEDs. While, significantly reducing Gresham's energy consumption may not have a direct affect on mercury reduction, the reduction in power demand reduced the City's overall environmental impact and the pollutants produced by power generating facilities. Plus, the metal salt containing bulbs are no longer used in the City thereby eliminating a pollutant generating source and accidental releases caused by breakage during disposal.
- Fluorescent Light Replacement – The City cycled through all fluorescents with smaller more efficient and longer service life bulbs. This reduced the City's generation of mercury containing bulbs as a waste and with this reduction also the risk accidental release of mercury into the environment through the disposal process.
- Net ZERO at WWTP – Gresham's Wastewater Treatment Plant is the first in the Pacific Northwest to reach energy Net ZERO. In 2015, the treatment plant reached its energy Net ZERO status. Achieving this status means that the plant makes about the same or more electricity than it consumes, saving tax dollars and protecting the environment. The treatment plant got to net zero in two ways. It made its operations and equipment more efficient (cutting energy consumption), but mostly by producing renewable energy on site. Fats, oils and grease collected by regional restaurants and food service establishments comes in on trucks from three haulers - about 10,000 gallons a day. FOG is fed into digesters and the natural byproduct, biogas, is captured, treated and converted into heat and electricity by the co-generators. The co-generators are powerful gas engines that convert the biogas into heat and electricity - enough to heat the plant and produce 5.2 million kWh of electricity a year. A solar array made up of 1,904 panels operates 365 days a year, producing 475 kWh, or 8% of the renewable power

produced at the treatment plant. Clean energy can be used on site or sent back to the grid. Gresham saves \$500,000 a year on electricity. Gresham's plant is one of only a handful in the United States to achieve net zero status.

Monitoring Plan

The City of Gresham performs monitoring of its influent, effluent, and biosolids as part of its NPDES Permit requirements. In addition there are regulatory samples taken of permitted industries to further confirm compliance. A summary of this data from the last two years was performed to illustrate the low levels of mercury in Gresham and the high removal rate occurring at Gresham's WWTP.

As can be seen in the following results Gresham is well below any permit limits and in some cases even the required sampling Quantitation Level of 0.005 µg/L as noted on page 2 of the Implementation of Methylmercury Criterion in NPDES Permits guide.

The City monitors influent and effluent with 24-hour composite samples quarterly.

2014 Hg Results				
Influent (QL 0.01)		Effluent (QL 0.01)		
Date	Concentration mg/L	Date	Concentration mg/L	
01/13/14	0.0000234	01/13/14	0.00000192	
01/14/14	0.0000326	01/14/14	0.00000247	
01/15/14	0.0000368	01/15/14	0.0000024	
04/07/14	0.0000291	04/07/14	0.00000225	
04/08/14	0.000054	04/08/14	0.00000234	
04/09/14	0.00003	04/09/14	0.00000285	
07/14/14	0.0000572	07/14/14	0.00000221	
07/15/14	0.0000483	07/15/14	0.00000215	
07/16/14	0.0000686	07/16/14	0.00000206	
10/20/14	0.0000939	10/20/14	0.00000422	
10/21/14	0.0000645	10/21/14	0.00000492	
10/22/14	0.0000786	10/22/14	0.00000436	

2015 Hg Results				
Influent (QL 0.01)		Effluent (QL 0.01)		
Date	Concentration mg/L	Date	Concentration mg/L	
01/12/15	0.0000393	01/12/15	0.00000377	
01/13/15	0.0000562	01/13/15	0.00000357	
01/14/15	0.0000581	01/14/15	0.00000354	
04/06/15	0.0000342	04/06/15	0.00000355	
04/07/15	0.0000339	04/07/15	0.00000321	
04/08/15	0.0000861	04/08/15	0.00000315	
07/13/15	0.0000722	07/13/15	0.000004	
07/14/15	0.0000851	07/14/15	0.00000382	
07/15/15	0.000076	07/15/15	0.0000037	
10/12/15	0.0000691	10/12/15	0.00000305	
10/13/15	0.000046	10/13/15	0.00000305	
10/14/15	0.0000846	10/14/15	0.00000287	

Gresham samples biosolids monthly to ensure compliance with its NPDES permit. A summary of sample data for the last two years can be seen in the following tables. The most recent Biosolids Annual Report is available upon request.

2014 Biosolids Hg Results		
Ceiling Concentration Limit	Pollutant Concentration Limit	Cumulative Pollutant Loading Limit
57 mg/Kg	17 mg/Kg	17 mg/Kg
Date	Results	
01/08/14	0.591	
02/04/14	0.572	
03/04/14	0.492	
04/01/14	0.478	
05/07/14	0.426	
06/03/14	0.520	
07/08/14	0.700	
08/05/14	0.827	
09/04/14	0.680	
10/07/14	0.751	
11/18/14	0.628	
12/02/14	2.43	

2015 Biosolids Hg Results		
Ceiling Concentration Limit	Pollutant Concentration Limit	Cumulative Pollutant Loading Limit
57 mg/Kg	17 mg/Kg	17 mg/Kg
Date	Results	
01/06/15	0.609	
02/03/15	0.458	
03/03/15	0.544	
04/07/15	0.451	
05/05/15	0.699	
06/03/15	1.01	
07/07/15	0.651	
08/04/15	0.833	
09/01/15	0.935	
10/06/15	0.404	
11/03/15	0.308	
12/10/15	0.390	

The City monitors all significant industrial users for effluent and are sampled to monitor for any possible sources of pollutants of concern which include mercury. Samples for the past two years were reviewed and displayed below. These samples are from the City's compliance sampling and do not include the additional data from each facility's permit requirements that in some cases require sampling as frequently as weekly for pollutants.

Industry	Process	Hg Results 2014-2015 Local Limit 0.10 mg/L	
		2014	2015
Advanced Precision Anodizing	Metal Finishing	0.0007	0.0013
Boeing Company	Metal Finishing	<0.0002	<0.0002
CAG Logistics Management	Film Processing	0.00003	<0.0002
Cascade Corporation	Metal Finishing	<0.0002	<0.0002
Evonik Corporation	Colloidal Silica Production	<0.001	0.003
International Paper Company	Manufacture Corrugated Boxes	0.0013	0.0004
Microchip Technology Incorporated	Manufacture Semiconductor Devices	<0.0002	<0.0002
ON Semiconductor	Semiconductor Wafer Fabrication	<0.0002	<0.0002
Oregon Crystal Technologies	Electronic Crystal Manufacturer	<0.0002	<0.0002
Portland Specialty Bakery	Industrial Bakery	<0.0002	<0.0002
Teeny Foods	Industrial Bakery	<0.0002	<0.0002
Townsend Farms	Frozen Fruit Packaging	<0.001	<0.0002
Trailblazer	Canned Fruits, Preserves, Jams, Jellies, and Sauces	<0.0002	<0.0002

The City plans to continue with the current sampling and monitoring plan. Upon detection of any unusual or high results, the City will investigate the potential cause and determine methods to remedy the situation.

CONCLUSION

The City of Gresham strives to use practical, efficient approaches to achieve regulatory compliance with a variety of EPA and DEQ programs. In addition to meeting regulatory requirements, programs support Council Goals for a safe and healthy environment, and work within adopted budgets and allocated resources.

Copies of all supporting raw data, annual Biosolids, and Industrial Pretreatment Reports are available upon request.

With a long history of demonstrated programs and projects that eliminate or reduce the introduction of pollutants, including mercury and hazardous materials, into waste streams and water sources, the City plans to continue work that meets all regulatory requirements and serve as a steward for the protection of our environment.

Attachment: NPDES Permit Excerpt, Schedule D, Section 11 Mercury Minimization Plan.