Appendix P. Storm Water Permits

Most storm water permits do not have specific implementation for mercury, except when specified by a Total Maximum Daily Load (TMDL). However, many of the existing general requirements in permits can help reduce mercury in storm water. This appendix explains how those existing requirements can control mercury, in more detail than in the Staff Report, Section 6.11. This appendix also contains more justification for the requirements in the Staff Report, Section 6.11.

While some additional requirements for some storm water discharges are included in the Provisions (Staff Report, Section 6.11), many of the requirements in the current permits are sufficient to control mercury, at least for implementation of the mercury water quality objective. For a mercury-impaired water body, a TMDL with additional controls for mercury in storm water may be necessary. Some storm water general permits have been recently revised and have new requirements that will help to control mercury.

P.1 MS4s

Phase 1 and 2 MS4s have some existing requirements for public education outreach, pollution prevention, sediment controls for construction areas, and low impact development (LID). The requirements are general and do not specify controls for "mercury or "methylmercury", but they include programs that can help reduce mercury in storm water (e.g. a municipality establishing or promoting a hazardous waste drop off, fluorescent tube and battery collections).

P.1.1 National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit Waste Discharge Requirements (WDRs) for State of California Department of Transportation (Caltrans); NPDES No. CAS000003

Caltrans is required to take action specifically to control mercury by the mercury TMDLs in which Caltrans has been identified as a responsible party. For these specified water bodies, Caltrans "shall implement control measures to prevent or minimize erosion and sediment discharge. This can be achieved by protecting hillsides, intercepting and filtering runoff, avoiding concentrated flows in natural channels and drains, and not modifying natural runoff flow patterns." (Section IIIB, Attachment IV, Order 2014-0077-DWQ).

Additionally the same requirements apply for waters for which there are TMDLs for sediment, nutrients, siltation and turbidity. Moreover, the North Coast Region has an additional sediment control plan because there are many sediment impaired water bodies in the region. This area is also naturally enriched in mercury and is the prime area where enhanced sediment controls are desirable to control naturally mercury enriched sediments.

In addition to TMDL requirements, Caltrans has developed a Best Management Practice (BMP) program for control of pollutants from existing facilities and for new and reconstructed facilities (Construction actives related to transportation that include less than one acre of land are not coved under the Construction Activities General Permit). Erosion control BMPs are typically used on construction sites (Order No. 2012-0011-DWQ, Section E.2.f), although some are also permanent, post-construction BMPs (*Ibid.* Section E.2.f.2). As part of the highway maintenance activities Caltrans must "identify road segments with slopes that are prone to erosion and sediment discharge and stabilize these slopes to control the discharge of pollutants" (*Ibid.* Section E.2.h.3.iii). Also, the post-construction treatment requirements in the Caltrans Permit include infiltration and Low Impact Development, if feasible (*Ibid.* Section E.2.d.2.b). Low Impact Development helps to reduce transport of mercury by reducing runoff, which can transport mercury. All of these actions will help to control mercury.

P.1.2 National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Associated with Construction and Land Disturbance Activities ; NPDES No. CAS000002

Dischargers whose projects disturb one or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the Construction General Permit (CGP) are required to develop and implement Storm Water Pollution Prevention Plans (SWPPPs) for project sites for all pollutants and their sources, including sources of sediment. Sites must implement post-construction standards that require completed sites to match pre-project hydrology, which is analogous in principle to LID requirements. LID helps reduce the transport of mercury by reducing run-off and sediment transport.

In the 2012 CGP sites are categorized as Risk Levels 1, 2 or 3, with the highest risk at sites with Risk Level 3. The Risk Levels are determined based on the potential of the site to deliver sediment to sensitive receiving waters. All sites are required to implement sediment controls with higher risk sites required to implement more stringent sediment controls. Many areas of the North Coast Region and the Coast Range have high risk receiving waters which means that sites in these areas will be at Risk Level 2 or 3. Some of these areas have high background levels of mercury and are prime areas where enhanced sediment controls will reduce sediment transport and the associated mercury transport.

The permit requires sediment controls to reduce mercury transport to receiving waters which are sufficient to implement the mercury water quality objective.

P.1.3 NPDES General Permit for Storm Water Discharges Associated with Industrial Activities ; CAS000001

Industrial storm water dischargers covered by the Industrial General Permit (IGP) are required to include a description of potential pollution sources in the Storm Water Pollution Prevention Plan. The assessment of pollution sources shall include the pollutants likely to be present in industrial storm water discharges and authorized non-storm water discharges (Order 2014-

0057-DWQ, Section X.G.2.a.ii. (p29)). All dischargers are required to implement to the extent practicable, minimum BMPs, which include good housekeeping, preventive maintenance, spill and leak prevention and response, material handling as waste management, and erosion controls.

Industrial storm water discharges enrolled in the Industrial Activities General Permit are not responsible for any pollutants from atmospheric deposition. However, if a discharger believes that atmospheric mercury is causing an exceedance of the mercury Numeric Action Level, then discharger must demonstrate that they are not the source of the mercury in order to be absolved of requirements to control the mercury. The discharger must submit a Non-Industrial Source Pollutant Demonstration as part of their Level 2 Exceedance Response Action Technical Report to demonstrate that the presence of a pollutant causing a Numeric Action Level exceedance is attributable solely to pollutants originating from non-industrial pollutant sources (e.g. aerial deposition) (Order 2014-0057-DWQ, Finding M.66.).

Monitoring requirements for dischargers include specific parameters dependent on the facility Standard Industrial Classification (SIC) code(s), which are listed in Table 1 in the Industrial Activities General Permit. For mercury, only Hazardous Waste Facilities have an automatic mercury monitoring requirement. All dischargers are required to monitor "parameters identified by the discharger on a facility-specific basis that serve as indicators of the presence of all industrial pollutants identified in the pollutant source assessment (Order 2014-0057-DWQ, section X.G.2)." Additionally dischargers are required to monitor applicable industrial parameters related to receiving waters with 303(d) listed impairments Order 2014-0057-DWQ, section XI.B.6.e.). Therefore, for a discharge to a water body that is listed as impaired for mercury, if the discharge is from a facility with potential sources of mercury (other than the atmosphere), then the discharger shall add mercury to the list of parameters that they must monitor in the storm water discharge. Essentially, any discharger with the potential to discharge significant amounts of mercury should be monitoring mercury, according to all of these requirements.

P.2 The Numeric Action Level for mercury

Any mercury monitoring data must be compared with an applicable Numeric Action Level (Table 2 in the Industrial Activities General Permit). If Numeric Action Levels are exceeded, the discharger is required perform "Exceedance Response Actions" (Order 2014-0057-DWQ, section XI.B.7 and section XII). The Exceedance Response Actions identify potential sources of the pollutant and determine BMPs for those sources that will reduce the pollutant in storm water and implement those BMPs. Monitoring is required four times per permit term (four samples in about five years, Order 2014-0057-DWQ, section XI.B.2), except if the Numeric Action Level is exceeded then more samples may be required.

The current Numeric Action Level for mercury is 1400 ng/L total mercury. This threshold and all of the Numeric Action Levels in the Industrial Activities General Permit are from the U.S. EPA 2008 Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity

(U.S. EPA 2008). The value of 1400 ng/L total mercury is originally from an outdated aquatic life criterion for mercury established in 1997 (62 FR 42169). The Numeric Action Levels in the Industrial Activities General Permit are meant to be economically feasible with current technology. They are not meant to be water quality standards, objectives or criteria. The development of the Numeric Action Levels incorporated the fact that pollutants will be diluted by large volumes of other storm water. The recent U.S. EPA recommended analytical methods for mercury are method 1631 E with a quantitation limit of 0.5 ng/L, or method 245.7 with a quantitation limit of 5.0 ng/L (Hanlon 2007, U.S. EPA 2010). However, mercury methods 1631 and 245.7 are very expensive compared to methods for other metals.

P.2.1 The Recommended Criterion for Mercury

A criterion of 300 ng/L is included in the Provisions because the existing Numeric Action Level (1400 ng/L) is outdated and relatively high. The concentration of 300 ng/L is the lowest the Numeric Action Level could be without changing the analytical method. Requiring the use of the newer, more sensitive mercury analytical method would be much more expensive, and Numeric Action Levels are technology based, not water quality based. The concentration of 200 ng/L is the quantitation limit of the old method (Method 245.1, U.S. EPA 1994).

Industries that can be sources of mercury emissions to the atmosphere do not have categorical Numeric Action Levels in the current Industrial Activities General Permit (Order 2014-0057-DWQ, Table 1), such as power plants, cement plants, etc. Many of these industries do have federal air emissions regulations (see Appendix E). Also the Reservoir Program (see Staff Report, Section 1.6, State Water Board 2014) is contemplating negotiating a Memorandum of Understanding (MOU) with the Air Resources Board (ARB) and U.S. EPA to monitor and model atmospheric deposition of mercury to California.

P.2.2 Are Current Dischargers Likely to Exceed the Numeric Action Level (300 ng/L)?

Industrial storm water data from 2013-1014 were checked for industrial dischargers that exceeded 200 ng/L (200 ng/L is the detection limit of the analytical method). Data were obtained from the State Water Board's database: Storm Water Multiple Application and Report Tracking System (SMARTS). Most storm water discharges were below 200 ng/L. Measurements of mercury above this threshold usually seemed erroneous. Three types of instances were found:

1) In several cases, another analytical method to measure mercury was used besides the method required by the Industrial Activities General Permit (Method 245.1). The method used had a higher detection limit and the detection limit is incorrectly reported as a measured concentration in SMARTS. In the annual report from the discharger, this data is reported as a non-detect.
2) In a couple cases, a concentration above 200 ng/L was measured, but the method cited is not for mercury (the method was E231.2, which appears to be the method for gold).
3) There was one instance of a refuse system reporting a very high value, but two months later the mercury level was down to below detectable levels.

Data from the peer review literature also suggested that mercury concentrations in rain should not exceed 300 ng/L. Maximum concentrations in rain and fog have been reported as 29 ng/L total mercury, with averages of 2-13 ng/L in the California Central Coast (Weiss-Penzias et al. 2012), and a maximum of 40 ng/L total mercury with averages 12 ng/L and 6 ng/L of in San Jose and Santa Cruz, respectively (Steding and Flegal 2002) 40 ng/L. A storm water catchment in the greater Toronto metropolitan area in Ontario, Canada found storm event mean concentrations up to 37 ng/L total mercury, with instantaneous mercury concentrations associated with suspended particles of up to 70 ng/L (Eckley and Branfireun 2008).

The Mercury Deposition Network provides data on mercury concentrations in rain from all over the United States in order to calculate wet deposition of mercury from the atmosphere (http://nadp.sws.uiuc.edu/MDN/). Only 0.1% of samples from the nation exceeded 200 ng/L (1998-2015). In California, only one sample exceeded 200 ng/L out of 904 data points. The sample was collected near San Jose in 2003 and the measure mercury concentration was 250 ng/L. The 99.8th percentile of mercury concentrations in rain measures in a nationwide network of 189 monitoring stations was 174 ng/L. The median and average concentrations in the United States were 9 ng/L and 13 ng/L. The median and average concentrations in California were 6 ng/L and 12 ng/L.

Additionally, the Numeric Action Level for suspended solids should provide some control for mercury, if mercury in the discharge is from contaminated sediments. The new criterion for mercury should not require more suspended solids controls than already required to meet the Numeric Action Level for suspended solids. If the discharger is meeting the 100 mg/L Numeric Action Level for suspended solids where mercury in the soil is fairly high at 1 mg/kg, the resulting mercury in the discharge would be 100 ng/L, which is sufficient to meet the new mercury criterion of 300 ng/L (calculated from 100 mg/L Hg multiplied by 1 mg Hg/kg solids).

P.2.3 Sampling Costs

Several labs were contacted by Water Board staff to obtain cost estimates for methods 245.1, 245.7 and 1631 to measure mercury in storm water. The labs were certified by the Environmental Laboratory Accreditation Program (ELAP). Estimates for method 245.1 ranged from $18-$35. Estimates for method 245.7 ranged widely. This method requires the clean hands technique to avoid sample contamination. At the lower end, large commercial laboratories reported costs ranging from $20 to $70 per sample. A smaller municipal laboratory, however, reported a cost of over $1,000, due to the low volume of samples being processed for this method versus operation and labor costs. Furthermore, there are currently few laboratories in the state that are ELAP certified for this method. Estimates for method 1631 ranged from $115 to greater than $200. Method 1631 also requires the clean hands technique that may add another $100-$150 to the sampling cost.

P.2.4 Requirements for New Dischargers Applying for Coverage Under the 2014 IGP

According to the 2014 IGP, new dischargers applying for coverage under the IGP that will be discharging to a water body on the 303(d) list due to mercury need to meet one of three conditions to be are eligible for coverage. Dischargers have to provide a demonstration of one of the following: 1) The discharger has eliminated all exposure to storm water of the pollutant(s); 2) The pollutant for which the water body is impaired is not present at the facility; 3) The discharge of any listed pollutant will not cause or contribute to an exceedance of a water quality standard (or other conditions if there is a TMDL, Order 2014-0057-DWQ, Section VII. B).

The third requirement may create a conundrum for dischargers trying to enroll in the IGP, since the Provisions do not include a water column objective for mercury. Without a water column concentration to compare monitoring data to, there is no obvious way for a discharger to show their discharge to an impaired water body is in compliance with the water quality objective. There are many mercury impaired waters throughout the state with no TMDL where this issue could come up. To avoid confusion, Section 6.11 of the Staff Report explains that compliance with the mercury criterion is sufficient for demonstration of compliance with mercury water quality objectives for coverage under the IGP. This may also need to be repeated in the regulatory language for clarity.

The tributary rule does not apply for these requirements of the IGP, so a discharge to a non-impaired water body upstream of an impaired water body does not trigger these requirements.

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