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## Improving the EPA Multi-Sector General Permit for Industrial Stormwater Discharges

*As part of its work under the Clean Water Act, the Environmental Protection Agency (EPA) oversees a permit program—the Multi-Sector General Permit (MSGP)—that requires industries to manage onsite stormwater to minimize discharges of pollutants to the environment. Concerns about the effectiveness of efforts to date resulted in a legal agreement between EPA, industry organizations, and environmental groups to review and improve certain aspects of the program, with a focus on monitoring and retention standards. This report offers guidance to inform the next revision of the MSGP, expected in 2020.*



Three permit programs under the Clean Water Act are used to regulate discharges of stormwater to local waters—for municipalities, industrial facilities, and construction sites. Of these, industrial stormwater is particularly challenging to control because of the wide range of industrial sectors that are included, each of which produces a unique suite of contaminants in stormwater.

Industrial stormwater derives from precipitation and/or runoff that comes in contact with industrial manufacturing, processing, storage, or material overburden and then runs offsite and enters drainage systems or receiving waters. The EPA issued the first Multi-Sector General Permit (MSGP) in 1995 to provide permit coverage for the full range of industrial stormwater facilities, grouped by industrial activity. Permittees submit a “notice of intent” and implement a self-certified stormwater pollution prevention plan, which includes stormwater control measures (SCMs) to reduce pollution levels.

Science continues to advance understanding of the environmental and human health impacts of industrial stormwater, while technologies for water quality monitoring, stormwater treatment, and modeling are advancing at rapid rates. Bearing in mind those advances and with input from stakeholders, this report recommends several ways EPA can strengthen the MSGP to provide its intended environmental protection while balancing the overall burden of monitoring on industry.

## IMPROVING POLLUTANT MONITORING REQUIREMENTS AND BENCHMARK THRESHOLDS

The primary purpose of the MSGP monitoring program is to ensure that industries are complying with the terms of the permit and appropriately managing stormwater onsite to minimize discharges of harmful stormwater pollutants to the local environment. Monitoring requirements are described in Box 1.

An analysis of several industrial sectors showed inconsistencies and inadequacies of benchmark monitoring requirements. The report recommends that EPA implement a process to periodically review and update sector-specific benchmark monitoring requirements to incorporate new scientific information. This process should consider updated industry fact sheets, published literature and industry data, advances in monitoring technology, and other available information, so that the monitoring programs adequately address the classes of pollutants used on site and their potential for environmental contamination.

The effectiveness of SCM implementation could be broadly assessed by requiring industry-wide monitoring of pH, TSS, and COD. These parameters can serve as general indicators of problems with site management practices. Industry-wide monitoring of these parameters would also provide a baseline understanding of industrial stormwater management across all sectors. These additional analyses are relatively inexpensive, minimizing the additional monitoring cost burden.

### Recommended Improvements to Benchmark Threshold

MSGP benchmark thresholds are “the pollutant concentrations above which EPA determined represents a level of concern” that could “potentially impair, or contribute to impairing, water quality or affect human health from ingestion of water or fish.” Given the episodic nature of stormwater and the likelihood of dilution and attenuation, MSGP benchmarks should be based on the criteria designed to protect aquatic ecosystems from adverse impacts from short term or intermittent exposures, which to date have generally been acute criteria. Iron, arsenic, and selenium benchmarks are currently based on chronic criteria and should be revisited. Based on little evidence of adverse effects to aquatic organisms at common concentrations, EPA should suspend or remove the benchmarks for magnesium and

### Box 1. Monitoring Requirements

Under the MSGP, all industrial facilities are required to conduct quarterly site inspections performed by the permittee and visual assessments of stormwater samples. In addition, approximately 55 percent of permittees are required to conduct chemical-specific benchmark monitoring (determined by industrial sector) through quarterly grab samples. If the average of the four quarterly samples exceeds the EPA-established benchmark threshold, monitoring must be continued for another year. Sampling continues until the facility’s data show one year in which the average of the four quarterly samples meets the benchmark. A benchmark exceedance (based on an average of four samples) is not a permit violation, unless no corrective action is undertaken and exceedances persist.

iron until acute aquatic life criteria are established or benchmarks are developed based on chronic effects from intermittent exposure.

### Monitoring the Effectiveness of Stormwater Control Measures

Publicly available stormwater data from industrial sites are currently insufficient to determine if there are specific conditions under which industries cannot meet the benchmarks using conventional stormwater treatment systems (e.g., sedimentation, filtration), or if other non-treatment SCMs could reduce concentrations on these sites. Based on limited available performance data, it appears that most standard treatment SCMs can meet the benchmark in at least 50 percent of storm events for total suspended solids and for many pollutants at lower inflow concentrations associated with municipal stormwater.

Limited data suggest that benchmark compliance is more difficult at industrial sites for iron, aluminum, copper, and soft-water conditions than for lead and zinc; inadequate data are available for other pollutants. To improve our understanding of SCM performance and technical achievability under industrial stormwater conditions and to inform future decision making, industries should collect scientifically rigorous performance data for common SCMs. EPA should encourage industries to collect these data and make them publicly available.

## IMPROVING SAMPLING AND DATA COLLECTION

The current MSGP benchmark monitoring requirement focuses on low-cost, coarse indicators of site problems, and the usefulness of the data frequently is hampered by its variability. Stormwater monitoring data display variability that originates from many different sources, including precipitation intensity within and among storms and changes in operations over time. Recommended improvements in sampling design and procedures, laboratory analysis accreditation programs, and improved data management can reduce error and improve the reliability of monitoring results, all of which support improved stormwater management. To improve the quality of monitoring data, EPA should consider a training or certificate program in stormwater collection and monitoring to ensure that the information obtained is representative of stormwater leaving the site to the greatest extent possible.

### Monitoring Methods and Frequency

EPA should also allow and promote the use of composite sampling for benchmark monitoring for all pollutants except those affected by storage time. Multiple composite sampling techniques are available that provide more consistent and reliable quantification of stormwater pollutant discharges compared to a single grab sample.

Quarterly stormwater event samples collected over one year are inadequate to characterize industrial stormwater discharge or describe industrial SCM performance over the permit term. For permittees with average results that meet the benchmark, the MSGP should require a minimum of continued annual sampling, to ensure appropriate stormwater management throughout the remainder of the permit term. Extended sampling over the course of the permit would provide greater assurance of continued effective stormwater management and help identify adverse effects from modifications in facility operation and personnel over time.

### A Tiered Approach to Monitoring

A tiered approach to monitoring recognizes the variable stormwater risks associated with the range of industrial activities. This approach would improve the overall quality of monitoring data to inform future iterations of the MSGP while balancing the overall burden

to industry and permitting agencies. The report proposes four categories:

- 1. Inspection only.** Low-risk facilities could opt for permit-term inspection by a certified inspector or the permitting authority in lieu of monitoring. Facilities could be classified as low-risk based on facility size, recognizing that size may not fully represent the risk profile, or more accurately based on a detailed assessment of the type and intensity of industrial activities conducted on site, or a hybrid approach.
- 2. Industry-wide monitoring only.** All facilities in sectors that do not merit additional pollutant monitoring would conduct industry-wide monitoring for pH, TSS, and COD. These data would provide broad, low-cost indicators of the effectiveness of SCMs on site.
- 3. Benchmark monitoring.** Sectors that merit additional pollutant monitoring, based on the most recent data and industry literature review, would conduct sector-specific benchmark monitoring in addition to pH, TSS, and COD.
- 4. Enhanced monitoring.** Facilities with repeated benchmark exceedances or those characterized by the permitting authority as large complex sites with high pollutant discharge potential would conduct more rigorous monitoring, in consultation with the permitting authority. These facilities could collect volume-weighted composite samples and utilize additional modeling tools and monitoring strategies, such as dissolved metal sampling, as appropriate.

## STORMWATER RETENTION TO MINIMIZE POLLUTANT LOADS

Stormwater retention for infiltration or beneficial use helps minimize discharge of pollutant loads to receiving waters. Because industrial stormwater can contain hazardous pollutants in toxic amounts, infiltration can pose serious risks to groundwater. Based on the potential environmental benefits, the committee encourages the use of industrial stormwater retention with infiltration or beneficial use under conditions where groundwater is protected.

Rigorous permitting, (pre)treatment, and monitoring requirements are needed along with careful site characterization and designs to ensure groundwater

protection in industrial stormwater infiltration systems. In lieu of other information on the attenuation of contaminants in groundwater before they are transported to the site boundary, infiltrated water should be required to meet primary drinking water standards for inorganic chemicals and organic chemicals, and secondary standards for chloride and total dissolved solids (TDS). Water quality should be monitored and evaluated in the infiltration device or at the base of the vadose zone.

Although national retention standards are infeasible given the site-specific considerations, EPA should consider incentives to encourage industrial stormwater infiltration or capture and use where appropriate, including determining appropriate relief from corrective actions with episodic bypass during extreme storms. EPA also should develop guidance for retention and infiltration of industrial stormwater for protection of groundwater.

## LOOKING AHEAD

The scientific understanding of industrial stormwater continues to improve. Along with advances in monitoring and treatment, new tools are being developed to improve toxicological assessments and data management and visualization. As electronic reporting of industrial stormwater monitoring data becomes fully implemented and integrated for all states, large amounts of valuable industrial stormwater data will be available for analysis, evaluation, and identifying areas for improvement. In general, EPA has been slow to adopt new knowledge into its MSGP permit revisions, but the MSGP should not be a static enterprise. Both permitted facilities and the nation's waters would be best served by a progressive and continuously improving MSGP based on analysis of new data and focused data gathering efforts, advances in industrial stormwater science and technology, and structured learning to develop and evaluate permit improvements.

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## COMMITTEE ON IMPROVING THE NEXT-GENERATION EPA MULTI-SECTOR GENERAL PERMIT FOR INDUSTRIAL STORMWATER DISCHARGES DEVELOPING A RESEARCH AGENDA FOR UTILIZATION OF GASEOUS CARBON WASTE STREAMS

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**For More Information . . .** This Consensus Study Report Highlights was prepared by the National Academies of Sciences, Engineering, and Medicine based on the Consensus Study Report *Improving the EPA Multi-Sector General Permit for Industrial Stormwater Discharges* (2018). The study was sponsored by the Environmental Protection Agency. Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project. Copies of the Consensus Study Report are available from the National Academies Press, (800) 624-6242; <http://www.nap.edu> or via the Water Science and Technology Board web page at <http://www.nationalacademies.org/wstb>.

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