

INDUSTRIAL STORMWATER

FACT SHEET SERIES

Sector C: Chemical and Allied Products Manufacturing and Refining



U.S. EPA Office of Water
EPA-833-F-06-018
February 2021

What is the NPDES stormwater permitting program for industrial activity?

Activities, such as material handling and storage, equipment maintenance and cleaning, industrial processing or other operations that occur at industrial facilities are often exposed to stormwater. The runoff from these areas may discharge pollutants directly into nearby waterbodies or indirectly via storm sewer systems, thereby degrading water quality.

In 1990, the U.S. Environmental Protection Agency (EPA) developed permitting regulations under the National Pollutant Discharge Elimination System (NPDES) to control stormwater discharges associated with eleven categories of industrial activity. As a result, NPDES permitting authorities, which may be either EPA or a state environmental agency, issue stormwater permits to control runoff from these industrial facilities.

What types of industrial facilities are required to obtain permit coverage?

This fact sheet specifically discusses stormwater discharges from chemical and allied products manufacturing facilities as described by Standard Industrial Classification (SIC) Major Group 28. Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit:

- ◆ Industrial inorganic chemicals (SIC 2812-2819)
- ◆ Plastics, synthetics, and resins (SIC 2821-2824)
- ◆ Medicinal chemicals and botanical products; pharmaceutical preparations in vitro and in vivo diagnostic substances; biological products, except diagnostic substances (SIC 2833-2836)
- ◆ Soaps, detergents, cosmetics, and perfumes (SIC 2841-2844)
- ◆ Paints, varnishes, lacquers, enamels, and allied products (SIC 2851)
- ◆ Industrial organic chemicals (SIC 2861-2869)
- ◆ Agricultural chemicals (SIC 2873-2879)
- ◆ Miscellaneous chemical products (SIC 2891-2899)
- ◆ Inks and paints, including china painting enamels, India ink, drawing ink, platinum paints for burnt wood or leather work, paints for china painting, artist's paints, and artist's watercolors (SIC 3952)
- ◆ Petroleum refining (SIC 2911)

What does an industrial stormwater permit require?

Common requirements for coverage under an industrial stormwater permit include development of a written stormwater pollution prevention plan (SWPPP), implementation of control measures, and submittal of a request for permit coverage, usually referred to as the Notice of Intent or NOI. The SWPPP is a written assessment of potential sources of pollutants in stormwater runoff and control measures that will be implemented at your facility to minimize the discharge of these pollutants in

runoff from the site. These control measures include site-specific best management practices (BMPs), maintenance plans, inspections, employee training, and reporting. The procedures detailed in the SWPPP must be implemented by the facility and updated as necessary, with a copy of the SWPPP kept on-site. The industrial stormwater permit also requires collection of visual, analytical, and/or compliance monitoring data to determine the effectiveness of implemented BMPs. For more information on EPA’s industrial stormwater permit and links to State stormwater permits, go to www.epa.gov/npdes/stormwater and click on “Industrial Activity.”

What pollutants are associated with my facilities activities?

Pollutants conveyed in stormwater discharges from facilities involved with the manufacturing of chemical and allied products will vary. There are a number of factors that influence to what extent industrial activities and significant materials can affect water quality.

- ◆ Geographic location
- ◆ Topography
- ◆ Hydrogeology
- ◆ Extent of impervious surfaces (e.g., concrete or asphalt)
- ◆ Type of ground cover (e.g., vegetation, crushed stone, or dirt)
- ◆ Outdoor activities (e.g., material storage, loading/unloading, vehicle maintenance)
- ◆ Size of the operation
- ◆ Type, duration, and intensity of precipitation events

The activities, pollutant sources, and pollutants detailed in Table 1 are commonly found at chemical and allied products manufacturing facilities.

Table 1. Common Activities, Pollutants Sources, and Associated Pollutants at Chemical and Allied Products Manufacturing and Refining Facilities

| Activity | Pollutant Source | Pollutant |
|--|---|---|
| Material Handling and Storage | Equipment storage | Pollutant dependent upon those at particular facility |
| | Storage of materials in tanks, either below or above ground | |
| | Storage of cylinders used to contain industrial gases | |
| | Storage of empty or full drums | |
| | Material handling and warehousing | |
| | Loading/unloading | |
| | Bagging of materials/products | |
| | Blending and mixing of chemicals | |
| | Packaging of chemicals | |
| | Crushing, milling, shredding, granulation, and grinding of materials | |
| | Distribution of products | |
| Vehicle Fueling and Maintenance | Vehicle fueling | TSS, TDS, oil and grease, gasoline, diesel, acid, coolant |
| | Vehicle maintenance | |
| Waste Treatment, Disposal, and Cleanup | Washing of drums | Pollutant dependent upon those at particular facility |
| | Waste dumpster or compactor | |
| | Hazardous waste temporary storage or operation of RCRA treatment, storage, or disposal facility | |
| | Landfills or temporary refuse site | |
| | Wastewater treatment | |

Table 1. Common Activities, Pollutants Sources, and Associated Pollutants at Chemical and Allied Products Manufacturing and Refining Facilities (continued)

| Activity | Pollutant Source | Pollutant |
|----------------------------------|--|---|
| Manufacturing Process Components | Thermal oxidation | Pollutant dependent upon those at particular facility |
| | Cooling towers | |
| | Steam boilers | |
| | Hot oil system for cooling/heat exchange | |
| | Use of machinery to process materials | |
| Miscellaneous Activities | Plant yard and areas of past industrial activity | TSS |
| | Access roads and rail tracks | |

Note: Activities may have additional pollutant sources that contain PFAS and can come into contact with stormwater discharges. Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that include PFOA, PFOS, GenX, and many other chemicals.

What BMPs can be used to minimize contact between stormwater and potential pollutants at my facility?

A variety of BMP options may be applicable to eliminate or minimize the presence of pollutants in stormwater discharges from chemical and allied product manufacturing facilities. You will likely need to implement a combination or suite of BMPs to address stormwater runoff at your facility. Your first consideration should be for pollution prevention BMPs, which are designed to prevent or minimize pollutants from entering stormwater runoff and/or reduce the volume of stormwater requiring management. Prevention BMPs can include regular cleanup, collection and containment of debris in storage areas, and other housekeeping practices, spill control, and employee training. It may also be necessary to implement treatment BMPs, which are engineered structures intended to treat stormwater runoff and/or mitigate the effects of increased stormwater runoff peak rate, volume, and velocity. Treatment BMPs are generally more expensive to install and maintain and include oil-water separators, wet ponds, and proprietary filter devices.

BMPs must be selected and implemented to address the following:

Good Housekeeping Practices

Good housekeeping is a practical, cost-effective way to maintain a clean and orderly facility to prevent potential pollution sources from coming into contact with stormwater. It includes establishing protocols to reduce the possibility of mishandling materials or equipment and training employees in good housekeeping techniques. Common areas where good housekeeping practices should be followed include trash containers and adjacent areas, material storage areas, vehicle and equipment maintenance areas, and loading docks. Good housekeeping practices must include a schedule for regular pickup and disposal of garbage and waste materials and routine inspections of drums, tanks, and containers for leaks and structural conditions. Practices also include containing and covering garbage, waste materials, and debris. Involving employees in routine monitoring of housekeeping practices has proven to be an effective means of ensuring the continued implementation of these measures. Industrial facilities can conduct activities that use, store, manufacture, transfer, and/or dispose of PFAS-containing materials. Successful good housekeeping practices to minimize PFAS exposure to stormwater could include inventorying the location, quantity, and method of storage; using properly designed storage and transfer techniques; providing secondary containment around chemical storage areas; and using proper techniques for cleaning or replacement of production systems or equipment.

Minimizing Exposure

Where feasible, minimizing exposure of potential pollutant sources to precipitation is an important control option. Minimizing exposure prevents pollutants, including debris, from coming into contact with precipitation and can reduce the need for BMPs to treat contaminated stormwater runoff. It can also prevent debris from being picked up by stormwater and carried into drains and surface waters. Examples of BMPs for exposure minimization include covering materials or activities with temporary structures (e.g., tarps) when wet weather is expected or moving materials or activities to

existing or new permanent structures (e.g., buildings, silos, sheds). Even the simple practice of keeping a dumpster lid closed can be a very effective pollution prevention measure. Another example could include locating PFAS-containing materials and residues away from drainage pathways and surface waters.

Erosion and Sediment Control

BMPs must be selected and implemented to limit erosion on areas of your site that, due to topography, activities, soils, cover, materials, or other factors are likely to experience erosion. Erosion control BMPs such as seeding, mulching, and sodding prevent soil from becoming dislodged and should be considered first. Sediment control BMPs such as silt fences, sediment ponds, and stabilized entrances trap sediment after it has eroded. Sediment control BMPs should be used to back-up erosion control BMPs.

Management of Runoff

Your SWPPP must contain a narrative evaluation of the appropriateness of stormwater management practices that divert, infiltrate, reuse, or otherwise manage stormwater runoff so as to reduce the discharge of pollutants. Appropriate measures are highly site-specific, but may include, among others, vegetative swales, collection and reuse of stormwater, inlet controls, snow management, infiltration devices, and wet retention measures. Incorporating treatment like granular activated carbon may be helpful to remove certain pollutants like PFAS.

A combination of preventive and treatment BMPs will yield the most effective stormwater management for minimizing the offsite discharge of pollutants via stormwater runoff. Though not specifically outlined in this fact sheet, BMPs must also address preventive maintenance records or logbooks, regular facility inspections, spill prevention and response, and employee training.

All BMPs require regular maintenance to function as intended. Some management measures have simple maintenance requirements, others are quite involved. You must regularly inspect all BMPs to ensure they are operating properly, including during runoff events. As soon as a problem is found, action to resolve it should be initiated immediately.

Implement BMPs, such as those listed below in Table 2 for the control of pollutants at chemical and allied products manufacturing facilities, to minimize and prevent the discharge of pollutants in stormwater. Identifying weaknesses in current facility practices will aid the permittee in determining appropriate BMPs that will achieve a reduction in pollutant loadings. BMPs listed in Table 2 are broadly applicable to chemical and allied product manufacturing facilities; however, this is not a complete list and you are recommended to consult with regulatory agencies or a stormwater engineer/consultant to identify appropriate BMPs for your facility.

Table 2. BMPs for Potential Pollutant Sources at Chemical and Allied Products Manufacturing and Refining Facilities

| Pollutant Source | BMPs |
|-------------------------------|---|
| Material handling and storage | <ul style="list-style-type: none"> <input type="checkbox"/> Cover handling and storage areas with roofs, covers, or other appropriate forms of protection. <input type="checkbox"/> Confine storage to designated and labeled areas outside of drainage pathways and away from surface waters. <input type="checkbox"/> Divert stormwater around storage areas with vegetated swales, and/or berms. <input type="checkbox"/> Store materials on concrete pads to allow for cleanup of spills or leaks. <input type="checkbox"/> Provide secondary containment for storage tanks and drum storage. <input type="checkbox"/> If containment structures have drains, ensure that the drains have valves, and that valves are maintained in the closed position. Institute protocols for checking/testing stormwater in containment areas prior to discharge. |

Table 2. BMPs for Potential Pollutant Sources at Chemical and Allied Products Manufacturing and Refining Facilities (continued)

| Pollutant Source | BMPs |
|---|--|
| Material handling and storage (continued) | <ul style="list-style-type: none"> <input type="checkbox"/> Use double-walled tanks. <input type="checkbox"/> Locate storage areas away from high traffic areas and surface waters. <input type="checkbox"/> Inspect storage tanks and piping systems (pipes, pumps, flanges, couplings, hoses, and valves) for failures or leaks and perform preventive maintenance. <input type="checkbox"/> Maintain an inventory of fluids to identify leakage. <input type="checkbox"/> Provide fluid level indicators. <input type="checkbox"/> Properly dispose of chemicals that are no longer in use. <input type="checkbox"/> Store and handle reactive, ignitable, or flammable liquids in compliance with applicable local fire codes, local zoning codes, and the National Electric Code. <input type="checkbox"/> Provide drip pads/pans where chemicals are transferred from one container to another to allow for recycling of spills and leaks. <input type="checkbox"/> Develop and implement spill plans or spill prevention, containment, and countermeasure (SPCC) plans, if required for your facility. <p>Portable containers/drums</p> <ul style="list-style-type: none"> <input type="checkbox"/> Develop and implement spill plans or spill prevention, containment, and countermeasure (SPCC) plans, if required for your facility. <input type="checkbox"/> Store drums indoors when possible. <input type="checkbox"/> Store drums, including empty or used drums, in secondary containment with a roof or cover (including temporary cover such as a tarp that prevents contact with precipitation). <input type="checkbox"/> Provide secondary containment, such as dikes or portable containers, with a height sufficient to contain a spill (the greater of 10 percent of the total enclosed tank volume or 110 percent of the volume contained in the largest tank). <input type="checkbox"/> Clearly label drum with its contents. <input type="checkbox"/> Provide transfer of PFAS containing materials and their proper collection and disposal methods in the event of a release from their container. <input type="checkbox"/> Train employees in spill prevention and control and proper materials management. <input type="checkbox"/> Empty containment units with manually operated pumps or ejectors. <input type="checkbox"/> If facility drainage is not engineered as listed above, equip the final discharge point of all facility sewers to prevent discharge in the event of an uncontrolled spill. |
| Loading/unloading areas | <ul style="list-style-type: none"> <input type="checkbox"/> Confine loading/unloading activities to designated areas outside drainage pathways and away from surface waters. <input type="checkbox"/> Inspect containers for leaks or damage prior to loading/unloading. <input type="checkbox"/> Avoid loading/unloading materials in the rain or provide cover or other protection for loading docks. <input type="checkbox"/> Provide diversion berms, dikes or grassed swales around the perimeter of the area to limit run-on. <input type="checkbox"/> Cover loading and unloading areas and perform these activities on an impervious pad to enable easy collection of spilled materials. <input type="checkbox"/> Slope the impervious concrete floor or pad to collect spills and leaks and convey them to proper containment and treatment. <input type="checkbox"/> Provide overhangs or door skirts to enclose trailer ends at truck loading/unloading docks. <input type="checkbox"/> For rail transfer, a drip pan shall be installed within the rails to collect spillage from the tank. |

Table 2. BMPs for Potential Pollutant Sources at Chemical and Allied Products Manufacturing and Refining Facilities (continued)

| Pollutant Source | BMPs |
|-------------------------------------|--|
| Loading/unloading areas (continued) | <ul style="list-style-type: none"> <input type="checkbox"/> Where liquid or powdered materials are transferred in bulk from truck or rail cars: <ul style="list-style-type: none"> - Hose connection points at storage containers to be inside containment areas. - Drip pans used in areas which are not in containment area where spillage may occur. <input type="checkbox"/> Enclose material handling systems. <input type="checkbox"/> Cover materials entering and leaving areas. <input type="checkbox"/> Regularly sweep area to minimize debris on the ground. <input type="checkbox"/> Provide dust control if necessary. When controlling dust, sweep and/or apply water or materials that will not impact surface or ground water. <input type="checkbox"/> Develop and implement spill prevention, containment, and countermeasure (SPCC) plans. <input type="checkbox"/> Train employees in spill prevention, control, cleanup and proper materials management techniques. |
| Manufacturing Process Components | <ul style="list-style-type: none"> <input type="checkbox"/> Use curbing, dikes and gutters to contain and collect spills. <input type="checkbox"/> Keep spill cleanup materials readily available. <input type="checkbox"/> Clean up spills and leaks immediately. <input type="checkbox"/> Use dry cleanup methods where appropriate. Sweep up absorbents as soon as spilled substances have been absorbed. <input type="checkbox"/> Develop and implement spill prevention, containment, and countermeasure (SPCC) plans. <input type="checkbox"/> Train employees in spill prevention, control, and cleanup. |
| Vehicle maintenance | <p>Good Housekeeping</p> <ul style="list-style-type: none"> <input type="checkbox"/> Eliminate floor drains that are connected to the storm or sanitary sewer; if necessary, install a sump that is pumped regularly. Collected wastes should be properly treated or disposed of by a licensed waste hauler. <input type="checkbox"/> Use drip pans, drain boards, and drying racks to direct drips back into a fluid holding tank for reuse. <input type="checkbox"/> Drain all parts of fluids prior to disposal. Oil filters can be crushed and recycled. <input type="checkbox"/> Promptly transfer used fluids to the proper container; do not leave full drip pans or other open containers around the shop. Empty and clean drip pans and containers. <input type="checkbox"/> Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers in compliance with RCRA regulations. <input type="checkbox"/> Store batteries and other significant materials inside. <input type="checkbox"/> Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries). <input type="checkbox"/> Maintain an organized inventory of materials. <input type="checkbox"/> Eliminate or reduce the number and amount of hazardous materials and waste by substituting nonhazardous or less hazardous materials. <input type="checkbox"/> Clean up leaks, drips, and other spills without using large amounts of water. Use absorbents for dry cleanup whenever possible. <input type="checkbox"/> Prohibit the practice of hosing down an area where the practice would result in the discharge of pollutants to a stormwater system. <input type="checkbox"/> Clean without using liquid cleaners whenever possible. <input type="checkbox"/> Do all cleaning at a centralized station so the solvents stay in one area. <input type="checkbox"/> If parts are dipped in liquid, remove them slowly to avoid spills. <input type="checkbox"/> Do not pour liquid waste into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections. |

Table 2. BMPs for Potential Pollutant Sources at Chemical and Allied Products Manufacturing and Refining Facilities (continued)

| Pollutant Source | BMPs |
|---------------------------------|---|
| Vehicle maintenance (continued) | <p>Minimizing Exposure</p> <ul style="list-style-type: none"> <input type="checkbox"/> Perform all cleaning operations indoors or under covering when possible. Conduct the cleaning operations in an area with a concrete floor with no floor drainage other than to sanitary sewers or treatment facilities. <input type="checkbox"/> If operations are uncovered, perform them on concrete pad that is impervious and contained. <input type="checkbox"/> Park vehicles and equipment indoors or under a roof whenever possible and maintain proper control of oil leaks/spills. <input type="checkbox"/> Check vehicles closely for leaks and use pans to collect fluid when leaks occur. <p>Management of Runoff</p> <ul style="list-style-type: none"> <input type="checkbox"/> Use berms, curbs, grassed swales, or other diversion measures to ensure that stormwater runoff from other parts of the facility does not flow over the maintenance area. <input type="checkbox"/> Collect the stormwater runoff from the cleaning area and provide treatment or recycling. Discharge vehicle wash or rinse water to the sanitary sewer (if allowed by sewer authority), wastewater treatment, a land application site, or recycle on-site. DO NOT discharge washwater to a storm drain or to surface water. <p>Inspections and Training</p> <ul style="list-style-type: none"> <input type="checkbox"/> Inspect the maintenance area regularly to ensure BMPs are implemented and maintained. <input type="checkbox"/> Train employees on waste control disposal procedures. |
| Vehicle and equipment fueling | <ul style="list-style-type: none"> <input type="checkbox"/> Conduct fueling operations (including the transfer of fuel from tank trucks) on an impervious or contained pad and under a roof or canopy where possible. Covering should extend beyond spill containment pad to prevent rain from entering. <input type="checkbox"/> When fueling in an uncovered area, conduct fueling operations on a concrete pad (asphalt is not chemically resistant to the fuels being handled). <input type="checkbox"/> Use drip pans where leaks or spills of fuel can occur and where making and breaking hose connections. <input type="checkbox"/> Use fueling hoses with check valves to prevent hose drainage after filling. <input type="checkbox"/> Keep spill cleanup materials readily available. <input type="checkbox"/> Clean up spills and leaks immediately. <input type="checkbox"/> Use dry cleanup methods for fuel area rather than hosing down the fuel area. Sweep up absorbents as soon as spilled substances have been absorbed. <input type="checkbox"/> Do not "top off" fuel tanks. <input type="checkbox"/> Minimize/eliminate run-on into fueling areas with diversion dikes, berms, curbing, surface grading or other equivalent measures. <input type="checkbox"/> Collect stormwater runoff and provide treatment or recycling. <input type="checkbox"/> Provide curbing or posts around fuel pumps to prevent collisions from vehicles. <input type="checkbox"/> Regularly inspect and perform preventive maintenance on fuel storage tanks to detect potential leaks before they occur. <input type="checkbox"/> Inspect the fueling area for leaks and spills. <input type="checkbox"/> Train personnel on vehicle fueling BMPs. |

What if activities and materials at my facility are not exposed to precipitation?

The industrial stormwater program requires permit coverage for a number of specified types of industrial activities. However, when a facility is able to prevent the exposure of ALL relevant activities and materials to precipitation, it may be eligible to claim no exposure and qualify for a waiver from permit coverage.

If you are regulated under the industrial permitting program, you must either obtain permit coverage or submit a no exposure certification form, if available. Check with your permitting authority for additional information as not every permitting authority program provides no exposure exemptions.

Where do I get more information?

For additional information on the industrial stormwater program see www.epa.gov/npdes/stormwater/msgp.

A list of names and telephone numbers for each EPA Region or state NPDES permitting authority can be found at www.epa.gov/npdes/stormwatercontacts.

References

Information contained in this Fact Sheet was compiled from EPA's past and current Multi-Sector General Permits and from the following sources:

- ◆ City of Phoenix, Street Transportation Department, Storm Water Management Section. 2004. Prevent Stormwater Contamination Best Management Practices Section C - Chemical and Allied Products Manufacturing. SIC Codes 2812-99, 3952.
<http://phoenix.gov/STREETS/chemprod.pdf>
- ◆ U.S. EPA. Office of Science and Technology. 1999. Preliminary Data Summary of Urban Stormwater Best Management Practices. EPA-821-R-99-012
www.epa.gov/OST/stormwater/
- ◆ U.S. EPA, Office of Wastewater Management. *NPDES Stormwater Multi-Sector General Permit for Industrial Activities (MSGP)*.
www.epa.gov/npdes/stormwater/msgp