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Stormwater Understanding the New 2008 MSGP for Stormwater Discharges Associated with Industrial Activity

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Industrial Stormwater

Fact Sheet Series

Sector A: Timber Products Facilities

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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 timber products facilities as described by Standard Industrial Classification (SIC) Major Group 24 – identified in EPA's Multi-Sector General Permit as Sector A, Timber Products Facilities. This includes all facilities that produce lumber and wood products, except furniture. Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit:

- Log storage and handling (wet deck storage areas only authorized if no chemical additives are used in the spray water or applied to the logs) (SIC 2411)
- General sawmills and planing mills (SIC 2421)
- Hardwood dimension and flooring mills (SIC 2426)
- Special product sawmills not elsewhere classified (SIC 2429)
- Millwork, veneer, plywood, and structural wood (SIC 2431-2439
  - *Not included are wood kitchen cabinet manufacturers (SIC 2434) which are instead addressed in the Fact Sheet for wood and metal furniture and fixture manufacturing.*
- Wood containers (SIC 2441-2449)
- Wood buildings and mobile homes (SIC 2451 and 2452)
- Wood preserving (SIC 2491)
- Reconstituted wood products (SIC 2493)
- Wood products, not elsewhere classified (SIC 2499)

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 activities at my facility?

Pollutants conveyed in stormwater discharges from facilities involved with the manufacturing of timber 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 timber products manufacturing facilities.

Table 1. Common Activities, Pollutants Sources, and Associated Pollutants at Timber Products Facilities

Activity	Pollutant Source	Pollutant
Log storage and handling	Exposure of lumber to precipitation	Bark and wood debris, total suspended solids (TSS), and leachates (which can contain high levels of TSS and biochemical oxygen demand (BOD))
Untreated lumber and residue generation activities and untreated wood materials storage	Exposure of lumber and residues to precipitation	Bark and wood debris, TSS, and leachates (which can contain high levels of TSS and BOD)
Wood surface protection activities and chemicals and surface protected materials storage	Spills from surface protection areas and storage and mixing tank areas; treated wood drippage, transport, and storage; and fugitive emissions from spraying	Chemicals (used for surface protection), BOD, chemical oxygen demand (COD), and TSS
Wood preservation activities and chemicals and preserved wood material storage	Drippage after pressurized treatment; washing after preservation: spills and leaks from process equipment and preservative tanks; fugitive emissions; and kick-back	Chemicals (specific toxics dependant on the preserving formulations used), BOD, TSS, oil, and grease

Table 1. Common Activities, Pollutants Sources, and Associated Pollutants at Timber Products Facilities (continued)

Activity	Pollutant Source	Pollutant
Wood assembly/fabrication activities and final fabricated wood product storage	Exposure of lumber, residues, and vehicles/equipment to precipitation	BOD, TSS, oil, and grease
Equipment/vehicle maintenance, repair, and storage	Parts cleaning	Solvents, oil, heavy metals, acid/alkaline wastes
	Waste disposal of oily rags, oil and gas filters, batteries, coolants, degreasers	Oil, heavy metals, solvents, acids
	Fluid replacement including hydraulic fluid, oil, transmission fluid, radiator fluids, and grease	Oil and grease, arsenic, lead, cadmium, chromium, COD, and benzene
Vehicle fueling	Diesel fuel	Diesel, gasoline, oil

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 timber products 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.

EPA requires that all timber products facilities implement BMPs in the following areas of the site:

- Log, lumber, and other wood product storage areas
- Residue storage areas
- Loading, and unloading areas
- Material handling areas
- Chemical and liquid fuel storage areas
- Equipment/vehicle maintenance, storage, and repair areas

Facilities that surface protect and/or preserve wood products are also required to address specific BMPs for wood surface protection and preserving activities.

BMPs must be selected and implemented to address the following:

Good Housekeeping Practices

Good housekeeping is the practical, cost-effective way to maintain a clean and orderly facility and keep contaminants out of stormwater discharges. It includes establishing protocols to reduce the possibility of mishandling materials or equipment and training employees in good housekeeping techniques. Common problem areas at a facility include areas around trash containers, storage areas, and loading docks. Good housekeeping measures 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 their continued implementation.

Additional good housekeeping practices for timber products facilities in storage, loading/unloading and material handling areas include:

- Limiting the discharge of wood debris by confining to restricted locations, and by keeping it cleaned up in non-designated areas
- Cleaning up air-borne dusts that have settled in other areas
- Chemical management

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.

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.

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 timber 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 timber products 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 Timber Products Facilities

Pollutant Source	BMPs
Log, lumber and wood product storage areas	❑ Divert stormwater around storage areas with vegetated swales, and/or berms. A properly designed vegetated swale can also provide infiltration benefits. ❑ Locate storage areas on stable, well-drained soils with slopes of 2–5 percent to prevent ponding and to convey stormwater leachate to treatment. Sloping should be limited to prevent erosion. Slopes should be stabilized. ❑ Line storage areas with crushed rock or gravel or porous pavement to promote infiltration, minimize discharge, and provide sediment and erosion control. ❑ Practice good housekeeping measures such as frequent removal of debris, bark, and wood waste. Cleanup methods may include mobile sweepers, scrapers, brow logs, or scoops. ❑ Use properly designed basins for collection, containment, and recycling of log spraying materials. ❑ Use sedimentation measures such as silt fence to control sediment from leaving storage area. ❑ Cover piles to prevent contact with stormwater (use roofs, canopies, soils, sheds, etc.). ❑ For solid wastes use covered containers such as dumpsters or garbage cans that are durable, corrosion resistant, non-absorbent, and/or non-leaking.
Residual storage areas	❑ Locate stored residues away from drainage pathways and surface waters. ❑ Avoid contamination of residues with oil, solvents, chemically treated wood, trash, etc. ❑ Limit storage time of residues to prevent degradation and generation of leachates. ❑ Divert stormwater around residue storage areas with vegetated swales, and/or berms. ❑ Consolidate piles to minimize surface areas exposed to precipitation. ❑ Spray surfaces with water to reduce windblown dust and residue particles. ❑ Place materials on raised pads of compacted earth, clay, shale, or stone and collect and properly treat contaminated runoff and leachate. ❑ Cover and/or enclose stored residues to prevent contact with precipitation using silos, van trailers, shed, roofs, buildings, or tarps. ❑ Limit slopes of storage areas to minimize velocities of runoff which may transport residues. Keep slopes stabilized. ❑ Use check dams in drainage ways. ❑ Use steel or plastic drums that are rigid and durable, corrosion resistant, non-absorbent, watertight, and equipped with a close fitting cover. ❑ Train employees in proper residuals management.
Loading and unloading areas; material handling areas	❑ Provide diversion berms, dikes or grassed swales around the perimeter of the area to limit run-on. ❑ Slope the impervious concrete floor or pad to collect spills and leaks and convey them to proper containment and treatment. ❑ Cover loading and unloading areas and perform these activities on an impervious pad at a dock with a door skirt. ❑ Enclose material handling systems for wood wastes. ❑ Cover materials entering and leaving areas. ❑ Provide good housekeeping measures to limit debris. ❑ Provide dust control. When controlling dust, sweep and/or apply water or materials which will not impact surface or ground water.

Table 2. BMPs for Potential Pollutant Sources at Timber Products Facilities (continued)

Pollutant Source	BMPs
Loading and unloading areas; material handling areas (continued)	❑ Provide paving in spill-prone areas to enable easy collection of spilled materials. ❑ For rail transfer, use a drip pan installed within the rails to collect spillage from the tank. ❑ Train employees in spill prevention and control.
Chemical storage areas	❑ Provide secondary containment around chemical storage areas. 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. ❑ Properly dispose of chemicals that are no longer in use. ❑ Provide fluid level indicators. ❑ Inventory fluids to identify leakage. ❑ Locate storage areas away from high traffic areas and surface waters. ❑ Develop and implement spill prevention, containment, and countermeasure (SPCC) plans. ❑ Cover and/or enclose chemical storage areas. ❑ Provide drip pads/pans to allow for recycling of spills and leaks. ❑ Store and handle reactive, ignitable, or flammable liquids in compliance with applicable local fire codes, local zoning codes, and the National Electric Code. ❑ Train employees in spill prevention and control.
Liquid fuel storage areas	❑ If area is uncovered, connect sump outlet to sanitary sewer (if possible) or an oil/water separator, catch basin filter, etc. If connecting to a sanitary sewer check with the system operator to ensure that the discharge is acceptable. If implementing separator or filter technologies ensure that regular inspections and maintenance procedures are in place. Above ground tanks ❑ Use secondary containment, such as dikes, 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). 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. ❑ Use double-walled tanks. ❑ Keep liquid transfer nozzles/hoses in secondary containment area. ❑ Include overflow protection. ❑ Store drums indoors when possible. ❑ 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 stormwater). ❑ Clearly label drum with its contents.
Wood surface protection and preserving activities	❑ Extend drip time in process areas before moving to storage areas. ❑ Pave and berm areas used by equipment that has come in contact with treatment chemicals. ❑ Dedicate equipment that is used for treatment activities to that specific purpose to prevent the tracking of treatment chemicals to other areas on the site. ❑ Locate treatment chemical loading and unloading areas away from high traffic areas where tracking of the chemical may occur. ❑ Provide drip pads under conveyance equipment from treatment process areas.

Table 2. BMPs for Potential Pollutant Sources at Timber Products Facilities (continued)

Pollutant Source	BMPs
Wood surface protection and preserving activities (continued)	❑ Provide frequent visual inspections of treatment chemical loading and unloading areas during and after activities occur to identify any spills or leaks needing cleanup. ❑ Cover and/or enclose treatment areas or apply log treating chemicals on impervious containment pad. ❑ Provide containment in treated wood storage areas. ❑ Cover storage areas to prevent contact of treated wood products with precipitation. ❑ Elevate stored, treated wood products to prevent contact with run-on/runoff. ❑ Store freshly treated logs on impervious containment pad, in a building or under a roof. ❑ Do not vent volatile or mist-laden exhaust containing log treating chemicals to the outside without proper collection or filtration. ❑ Inspect processing areas, transport areas, and treated wood storage areas monthly to assess usefulness of practices to minimize the deposit of treatment chemicals on unprotected soils and in areas that will come in contact with stormwater discharges.
Vehicle and equipment maintenance, storage, and repair areas	Good Housekeeping ❑ 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. ❑ Prevent and contain spills and drips. ❑ Use drip pans, drain boards, and drying racks to direct drips back into a fluid holding tank for reuse. ❑ Drain all parts of fluids prior to disposal. Oil filters can be crushed and recycled. ❑ 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. ❑ Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly. ❑ Store batteries and other significant materials inside. ❑ Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries). ❑ Maintain an organized inventory of materials. ❑ Eliminate or reduce the number and amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. ❑ Clean up leaks, drips, and other spills without using large amounts of water. Use absorbents for dry cleanup whenever possible. ❑ Prohibit the practice of hosing down an area where the practice would result in the discharge of pollutants to a stormwater system. ❑ Clean without using liquid cleaners whenever possible. ❑ Conduct all cleaning at a centralized station so the solvents stay in one area. ❑ If parts are dipped in liquid, remove them slowly to avoid spills. ❑ Do not pour liquid waste into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections. Minimizing Exposure ❑ 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. ❑ If operations are uncovered, perform them on a concrete pad that is impervious and contained.

Table 2. BMPs for Potential Pollutant Sources at Timber Products Facilities (continued)

Pollutant Source	BMPs
Vehicle and equipment maintenance, storage, and repair areas (continued)	Minimizing Exposure ❑ Park vehicles and equipment indoors or under a roof whenever possible and maintain proper control of oil leaks/spills. ❑ Check vehicles closely for leaks and use pans to collect fluid when leaks occur. Management of Runoff ❑ Use berms, curbs, or other diversion measures to ensure that stormwater runoff from other parts of the facility do not flow over the maintenance area. ❑ 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. Inspections and Training ❑ Inspect the maintenance area regularly for proper implementation of control measures. ❑ Train employees on proper waste control and disposal procedures.

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 present Multi-Sector General Permits and from the following sources:

- USEPA, Office of Wastewater Management. *NPDES Stormwater Multi-Sector General Permit for Industrial Activities (MSGP)*.
  www.epa.gov/npdes/stormwater/msgp
- USEPA, 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
- USEPA, Office of Water. 1999. *Storm Water Management Fact Sheet—Dust Control*. EPA 832-F-99-003.
  www.epa.gov/owm/mtb/dustctr.pdf

Industrial Stormwater

Fact Sheet Series

Sector U: Food and Kindred Products Facilities

U.S. EPA Office of Water
EPA-833-F-06-036
December 2006

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 food and kindred products facilities as defined by Standard Industrial Classification (SIC) Major Code 20. This includes facilities manufacturing or processing foods, beverages, and related products for human consumption and prepared feeds for animals and fowls. Establishments engaged in manufacturing cigarettes, cigars, and other tobacco products are also included. Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit:

- Meat Products (SIC 2011, 2013, and 2015)
- Dairy Products (SIC 2021, 2022, 2023, 2024, and 2026)
- Canned, Frozen, and Preserved Fruits, Vegetables, and Food Specialties (SIC 2032, 2033, 2034, 2035, 2037, and 2038)
- Grain Mill Products (SIC 2041, 2043, 2044, 2045, 2046, 2047, and 2048)
- Bakery Products (SIC 2051, 2052, and 2053)
- Sugar and Confectionery Products (SIC 2061, 2062, 2063, 2064, 2066, 2067, and 2068)
- Fats and Oils (SIC 2074, 2075, 2076, 2077, and 2079)
- Beverages (SIC 2082, 2083, 2084, 2085, 2086, and 2087)
- Miscellaneous Food Preparations and Kindred Products (SIC 2091, 2092, 2095, 2096, 2097, 2098, and 2099)
- Tobacco Products (SIC 2111, 2121, 2131, and 2141)

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 food and kindred 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 (i.e., 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

Each of these factors interacts to influence the quantity and quality of stormwater runoff. For example, flour/oil particulate emissions from vents (e.g., from baking operations) may be a significant source of pollutants at some facilities, while material storage may be a primary source at others. Similarly, a facility with all stormwater from exposed industrial activity diverted to the sanitary sewer would have less of an impact than a facility not practicing this control option. In addition, sources of pollutants other than stormwater, such as illicit connections, spills, and improperly dumped materials, may increase the pollutant loadings discharged in the receiving stream.

The nature of the business, and the required sanitary conditions, require that raw materials through final product be protected from stormwater. As such, the contamination of stormwater from these activities are primarily from the loading and unloading of products and raw materials; spillage and leaks from tanks and containers stored outdoors; waste management practices; pest control; and improper connections to the storm sewer.

The activities, pollutant sources, and pollutants detailed in Table 1 are commonly found at food and kindred products facilities.

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Food and Kindred Product Facilities

Activity	Pollutant Source	Pollutant
Raw material unloading/ product loading	Container defects (bags, drums, bottles, crates)	Biochemical oxygen demand (BOD), total suspended solids (TSS), oil and grease, pH, nitrogen (TKN)
	Spills and leaks during unloading/loading (tanks, rail cars)	
	Failed connections (hoses and couplings)	
	Washdown of unloading/loading area	
Liquid storage containers (i.e., above ground storage tanks)	Failed piping and connections (couplings, flanges, hoses, and valves)	BOD, TSS, oil and greases, pH
	External corrosion and structural failure	
	Spills and overflows due to operator error	

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Food and Kindred Product Facilities (continued)

Activity	Pollutant Source	Pollutant
Liquid storage containers (drums, carboys, and gallon jugs)	Outside containers	BOD, TSS, oil and greases, pH
	Open containers	
	External corrosion of the containers	
	Operator handling and transporting	
	Spills and leaks from damaged containers	
Solid storage containers (soils, holding bins, fiber drums, etc.)	Dust and particulates	BOD, TSS, pH
	Operator handling and transporting	
	Spills and leaks	
Air emissions	Oven emissions	BOD, TSS, oil and greases, pH
	Vents	
	Fine solids handling	
Solid waste	Dumpsters and trash cans	
Spent equipment, scraps, etc	BOD, TSS, oil and greases, pH, copper, manganese	
Wastewater	Treatment processes (e.g., hydraulic overflow)	BOD, TSS, oil and greases, pH, fecal coliform
	Outside piping and connections (couplings, flanges, hoses, valves, and pumps)	
Pest control	Outside application of pesticides, rodenticides, and insecticides	Miscellaneous insecticides, rodenticides, pesticides, etc., TKN
Illicit connections to the storm sewer	Process wastewaters	BOD, TSS, oil and greases, pH
	Process floor drains	
	Sanitary sewers	
	USTs	

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 food and kindred products 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.

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.

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.

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 food and kindred 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 food and kindred 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 Food and Kindred Product Facilities

Pollutant Source	BMPs
Raw material unloading/product loading	❑ Situate loading/unloading areas indoors or in a covered area. ❑ Confine loading/unloading activities to designated areas outside drainage pathways and away from surface waters. ❑ Ensure that a facility representative is present during unloading/loading activities. ❑ Close storm drains during loading/unloading activities in surrounding area. ❑ Use a dead-end sump where materials could be directed. ❑ Use rubber seals in truck loading dock areas to contain spills. ❑ Inspect all containers for leaks or damage prior to unloading/loading of any raw or spent materials. ❑ Avoid loading/unloading materials in the rain or provide cover or other protection for loading docks. ❑ Provide diversion berms, dikes or grassed swales around the perimeter of the area to limit run-on. ❑ Cover loading and unloading areas and perform these activities on an impervious pad to enable easy collection of spilled materials. Provide overhangs or door skirts to enclose trailer ends at truck loading/unloading docks. ❑ For rail transfer, a drip pan shall be installed within the rails to collect spillage from the tank. ❑ Where liquid or powdered materials are transferred in bulk to/from truck or rail cars, ensure hose connection points at storage containers are inside containment areas, or drip pans are used in areas where spillage may occur which are not in a containment area. ❑ Drain hoses back into truck, railcar, etc. after loading/unloading materials. ❑ Install high level alarm on tanks to prevent overfilling. ❑ Use dry cleanup methods rather than washing the areas down.
Raw material unloading/product loading (continued)	❑ Regularly sweep area to minimize debris on the ground. ❑ Provide dust control if necessary. When controlling dust, sweep and/or apply water or materials that will not impact surface or ground water. ❑ Train employees in spill prevention, control, cleanup, and proper materials management techniques. ❑ Train employees on proper unloading/loading techniques. ❑ Initiate an inventory control for all raw and spent materials.
Liquid storage	❑ Cover and/or enclose storage areas to minimize exposure of tanks and the collection of stormwater inside the curbed/diked area. ❑ If area is uncovered, connect sump outlet to sanitary sewer (if possible) or an oil/water separator, catch basin filter, etc. If connecting to a sanitary sewer check with the system operator to ensure that the discharge is acceptable. ❑ Surround above-ground liquid storage tanks with curbs/dikes to provide secondary containment storage. The enclosed volume should be the greater of either 10% of the total tank volume or 110% of the volume contained in the largest tank. ❑ 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 Food and Kindred Product Facilities (continued)

Pollutant Source	BMPs
Liquid storage (continued)	❑ Install impervious surface for the floor of the storage area and slope it to a lined sump for the collection of spills. ❑ Use drip pans when loading and unloading liquid materials and place at locations where spillage may occur (hose connections, hose reels, filler nozzles, and opened tanks/drums). ❑ Bulkhead liquid storage tanks indoors (i.e., tank outlets located inside buildings). ❑ Inspect the external condition (corrosion, leaks) of the containers. ❑ Inspect the general area around the containers. ❑ Use double-walled tanks. ❑ Develop and implement spill plans. ❑ Train employees in spill prevention, control, proper storage, handling and transportation techniques (e.g., filling and transferring contents).
Liquid storage (drums, carboys, and gallon jugs)	❑ Store containers indoors when possible. ❑ Store containers, including empty or used containers, in secondary containment with a roof or cover (including temporary cover such as a tarp that prevents contact with precipitation). ❑ Store containers, including empty or used containers, in secondary containment with a roof or cover (including temporary cover such as a tarp that prevents contact with precipitation). ❑ 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). ❑ Clearly label containers with its contents. ❑ Ensure that all containers are closed (e.g., valves shut, lids and manways sealed, caps closed). ❑ Wash containers indoors before storing empty containers outdoors. ❑ If outside or in a covered area, minimize run-on of stormwater into a storage area by grading area to ensure that stormwater runs "off" and not "on." ❑ Maintain an inventory control of all raw and spent materials. ❑ Employ measures to protect against spillage from the overflows (e.g., high level sensors, alarms). ❑ Train employees in spill prevention and control.
Waste management - wastewater	❑ Develop a leak prevention program for valves, pumps, and piping equipment. ❑ Inspect the outside pipe connections (couplings, valve seals and gaskets, flanges, etc.) of the treatment system for leaks, corrosion, and poor maintenance upkeep. ❑ Use dry cleanup methods.
Waste management - solid waste (paper, wood pellets, scrap metals, refuse, etc.)	❑ Inspect the general area around the solid waste storage (e.g., look for signs of leaching). ❑ Store waste so that it is physically contained (dumpsters, drums, bags). Store waste in an enclosed/covered area. ❑ If outside or in a covered area, minimize exposure to stormwater by grading the area to ensure that stormwater runs "off" and not "on." ❑ Ensure hazardous waste disposal practices are performed in accordance with federal, state, and local requirements. ❑ Route trash compactor leakage to treatment system or sanitary sewer.

Table 2. BMPs for Potential Pollutant Sources at Food and Kindred Product Facilities (continued)

Pollutant Source	BMPs
Waste management - air emissions	❑ Clean around vents and stacks to atmosphere from process and storage areas. ❑ Place tubs around vents and stacks for easy collection of settling particles. ❑ Remove fugitive dust accumulations on ledges, walls, floors, and equipment. If you use compressed air to clean up dust, shut down your machinery and other potential ignition sources. ❑ Inspect air emission control systems (e.g., baghouses) regularly and repair and replace as necessary. ❑ Route overflows/condensates from process vents to on-site treatment system or to the sanitary sewer. ❑ Minimize free-fall height to reduce fugitive-dust losses. ❑ Locate fabric dust-filter collectors outside the facility if possible. If fabric dust-filter collectors are inside the facility, place them in an area protected by an explosion-protection system.
Pest control	❑ Follow manufacturer's directions for application of pest control materials to site. ❑ Time application for dry weather conditions. ❑ Store partially full containers indoors or undercover. ❑ Apply insecticides during breeding months. ❑ Protect rat bait houses from stormwater.
Improper connections to the storm sewer	❑ Perform smoke or dye testing to determine if interconnections exist between the sanitary and storm sewers. ❑ Plug all floor drains leading to storm sewers. ❑ Update facility schematics to accurately reflect all plumbing connections.
Meat products - operation of meat packaging plants including animal holding pens (beef, chicken)	❑ Enclose/cover fowl hanging area. ❑ Enclose/cover the animal holding pens. ❑ Grade the areas around the animal holding pens to ensure stormwater "runs off" and not "on" to the holding pen. And regularly inspect area around animal holding pens for stormwater runoff or run-on. ❑ Store materials from cleanup activities in appropriate containers in an enclosed/covered area. ❑ Area for trailers holding empty bird cages should have stormwater run-on/runoff controls in place. ❑ Use mechanical sweepers around site to clean up fugitive feathers, dust, and manure. ❑ Decrease total lot area when animal numbers are low to decrease total stormwater runoff. ❑ Direct run-off to storage lagoons and holding ponds until it can be land applied or evaporated or discharged to a municipal treatment system. If connecting to a sanitary sewer check with the system operator to ensure that the discharge is acceptable. ❑ Train employees on proper material (i.e., hide, hair, feathers, and animal parts) cleanup procedures around and within the animal holding pens.
Manure management	❑ Place animal manure in grassy area as far as possible from water courses so seepage has a chance to be filtered and absorbed by the grass before entering creek or stream. For land with a slope of greater than one percent, plant a dense, sod forming grass at least 20 feet wide around the downgradient side of any manure stockpile. ❑ Use grass filter strips, filter fencing, or straw bales to filter solids and nutrients from runoff. ❑ Store manure in bermed or covered areas.

Table 2. BMPs for Potential Pollutant Sources at Food and Kindred Product Facilities (continued)

Pollutant Source	BMPs
Dairy products - manufacturing and storage of packaged dairy products (including spoiled and broken product containers)	❑ Store aged/spoiled dairy products in enclosed storage area on an impervious or contained pad and under a roof or canopy where possible. ❑ Use dry cleanup methods instead of washing the areas down. ❑ Ensure that all aged/spoiled products (e.g., bottles, cartons, plastic containers) are disposed of in a proper manner (bagged, covered). ❑ Keep foam from going into sewers because it contains milk solids. Common sources of excessive foaming are open-type separators, splashing when filling tanks, air sucked in through leaky connections in lines under partial vacuum, through leaky packing and through faulty rotary seals or pumps. ❑ Inspect storage area for leaks and spills and to monitor housekeeping and runoff prevention practices. ❑ Train employees on spill prevention, control and proper disposal methods for all aged/spoiled dairy products.
Canned frozen and preserved fruits, vegetables, and frozen specialties - fruit and vegetable storage and disposal	❑ Store all fruits and vegetables in appropriate containers (e.g., bins, bushels, baskets, buckets) and in enclosed/covered areas. ❑ Minimize fruit and vegetable storage time outdoors. ❑ Store empty fruit and vegetable containers in an enclosed/covered area. ❑ Use particulates emission control systems for all cooking processes to reduce particulate matter. ❑ Inspect all fruit and vegetable storage areas to monitor BMP implementation. ❑ Train employees on proper handling/disposal methods for fresh/rotten fruits and vegetables.
Grain mills - grain handling, storage, and mixing	❑ Store all grain in appropriate containers (e.g., silos, hoppers) in an enclosed/covered area. ❑ Use a vacuum control system in all grain mixing areas to minimize fugitive dust. ❑ Inspect the general area around the grain storage to monitor BMP implementation. ❑ Train employees on grain handling procedures.
Bakery products - ingredient storage and mixing	❑ Store all ingredients (e.g., corn sweeteners, flour, shortening, syrup, vegetable oils) in appropriate containers (e.g., tanks, drums, bags) in an enclosed/covered area. ❑ Inspect ingredient storage areas for BMP implementation.
Bakery products - baking process	❑ Remove flour/oil dust accumulation around ventilation exhaust systems. ❑ Install an air emission control system for all baking processes to reduce particulate matter.
Sugar and confectionery - sugar handling	❑ Use a vacuum control system in all granular and powdered processing areas.
Fats and oils - storage and disposal	❑ Store all fats and oils, (e.g., butcher shop materials, hair, hide, tallow, bone meal, and offal) in enclosed/covered areas. ❑ Ensure all fats and oils are physically contained. ❑ Inspect all fats and oils storage areas for BMP implementation.
Beverages - materials storage and mixing	❑ Ensure grain is stored in enclosed/covered area. ❑ Use a particulates emission control system for all grain handling and brewing processes. ❑ Protect reusable beverage containers that are stored outdoors from stormwater contact.

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**.

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

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Industrial Stormwater

Fact Sheet Series

Sector N: Scrap Recycling and Waste Recycling Facilities

U.S. EPA Office of Water
EPA-833-F-06-029
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What is the NPDES stormwater 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 various industries including scrap recycling and waste recycling facilities as defined by Standard Industrial Classification (SIC) Major Group Code 50 (5093). Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit:

- *Scrap and waste recycling facilities (non-source separated, non-liquid recyclable materials)* engaged in processing, reclaiming, and wholesale distribution of scrap and waste materials such as ferrous and nonferrous metals, paper, plastic, cardboard, glass, and animal hides.
- *Waste recycling facilities (liquid recyclable materials)* engaged in reclaiming and recycling liquid wastes such as used oil, antifreeze, mineral spirits, and industrial solvents.
- *Recycling facilities* that only receive source-separated recyclable materials primarily from non-industrial and residential sources (i.e., common consumer products including paper, newspaper, glass, cardboard, plastic containers, aluminum and tin cans); including recycling facilities commonly referred to as material recovery facilities (MRF).

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 activities at my facility?

Pollutants conveyed in stormwater discharges from scrap recycling and waste recycling facilities 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

Each scrap recycling and waste recycling facility is unique in regards to sources, type, and volume of contaminated stormwater discharges. Sources of pollutants other than stormwater, such as illicit connections, spills, and other improperly dumped materials, may increase pollutant loadings in discharges. Each of the three types of facilities included in the scrap recycling and waste recycling facilities group are dissimilar from one another in the operations and types of materials handled. As a result, there is variation in pollutants for which BMPs may be necessary to address.

The activities, pollutant sources, and pollutants detailed in Table 1 are commonly found at scrap recycling and waste recycling facilities.

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Scrap Recycling and Waste Recycling Facilities

Activity	Pollutant Source	Pollutant
Scrap and Waste Recycling Facilities (non-source separated, non-liquid recyclable materials)		
Stockpiling and storage of materials (including loading and unloading)	Leaking of various fluids from used automotive engines, radiators, brake fluid reservoirs, transmission housings, other vehicle parts, and lead-acid from batteries	PCBs, oil and grease, lubricants, paint pigments or additives, heavy metals, ionizing radioactive isotopes, transmission and brake fluids, fuel, battery acid, lead acid, antifreeze, benzene, chemical residue, heating oil, petroleum products, solvents, ionizing radioactive isotopes, infectious/bacterial contamination, asbestos, metals, total Kjeldahl nitrogen (TKN), battery acid, oily wastes, chemical residue
	Deterioration/corrosion of materials	
Material processing: Air pollution equipment (including incinerators, furnaces, wet scrubbers, filter houses, and bag houses)	Normal equipment operations that include the collection and disposal of filter bag material and ash, process wastewater from scrubbers, accumulation of particulate matter around leaking joint connections, malfunctioning pumps and motors (e.g., leaking gaskets, seals or pipe connections, leaking oil-filled transformer casings)	Hydraulic fluids, oils, fuels, grease and other lubricants, accumulated particulate matter, chemical additives, and PCBs from oil-filled electrical equipment.

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Scrap Recycling and Waste Recycling Facilities (continued)

Activity	Pollutant Source	Pollutant
Material processing: Combustion engines	Spills and/or leaks from fuel tanks, spills/leaks from oil/hydraulic fuel reservoirs, faulty/leaking hose connections, worn gaskets, leaking transmissions, crankcases, and brake systems (if applicable), leaking battery casings and/or corroded terminals	Accumulated particulate matter, oil/lubricants, gas/diesel fuel, fuel additives, antifreeze (ethylene glycol), battery acid, and products of incomplete combustion
Material processing: Material handling systems (forklifts, cranes, and conveyors)	Spills and leaks from fuel tanks, hydraulic and oil reservoirs due to malfunction parts (e.g., worn gaskets and parts, leaking hose connections, and faulty seals).	Hydraulic fluids, oils, fuels and fuel additives, grease and other lubricants, accumulated particulate matter, chemical additives, mercury, lead, battery acid
	Damaged or faulty electrical switches (mercury filled).	
	Damaged or leaking battery casings, including exposed corroded battery terminals.	
	Damaged or worn bearing housings	
Material processing: Stationary scrap processing facilities (balers, briquetters, shredders, shearers, compactors, engine block/cast iron breakers, wire chopper, turnings crusher)	Leaks from hydraulic reservoirs, hose and fitting connections, worn gaskets, spills or leaks from fuel tanks, particulates/residue from scrap processing, malfunctioning pumps and motors (e.g., leaking gaskets, seals or pipe connections, leaking oil-filled transformer casings)	Heavy metals (e.g., zinc, copper, lead, cadmium, chromium) and hydraulic fluids, PCBs
Material processing: Hydraulic equipment and systems, balers/briquetter, shredders, shearers, compactors, engine block/cast iron breaker, wire chopper, turnings crusher	Particulate/residue from material processing, spills and/or leaks from fuel tanks, spills/leaks from oil/hydraulic fuel reservoirs, faulty/leaking hose connections/fittings, leaking gaskets	Hydraulic fluids/oils, lubricants, particulate matter from combustion engines, PCBs (oilfilled electrical equipment components), heavy metals (nonferrous, ferrous)
Material processing: Electrical control systems (transformers, electrical switch gear, motor starters)	Oil leakage from transformers, leakage from mercury float switches, faulty detection devices	PCBs, mercury (float switches), ionizing radioactive material (fire/smoke detection systems)
Material processing: Torch cutting	Residual/accumulated particulates	Heavy metal fragments, fines
Material handling systems	Spills and/or leaks from fuel tanks, spills/leaks from oil/hydraulic fuel reservoirs, faulty/leaking hose connections/fittings, leaking gaskets	Accumulated particulate matter (ferrous and nonferrous metals, plastics, rubber, other), oil/lubricants, PCBs (electrical equipment), mercury (electrical controls), lead/battery acids
Vehicle maintenance	Parts cleaning, waste disposal of rags, oil filters, air filters, batteries, hydraulic fluids, transmission fluids, brake fluids, coolants, lubricants, degreasers, spent solvents	Gas/diesel fuel, fuel additives, oil/lubricants, heavy metals, brake fluids, transmission fluids, chlorinated solvents, arsenic
Vehicle fueling	Spills and leaks during fuel transfer, spills due to "topping off" tanks, runoff from fueling areas, washdown of fueling areas, leaking storage tanks, spills of oils, brake fluids, transmission fluids, engine coolants	Gas/diesel fuel, fuel additives, oil, lubricants, heavy metals
Vehicle and equipment cleaning and washing	Washing and steam cleaning	Solvent cleaners, oil/lubricants/additives, antifreeze (ethylene glycol)

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Scrap Recycling and Waste Recycling Facilities (continued)

Activity	Pollutant Source	Pollutant
Waste Recycling Facilities (liquid recyclable materials)		
Drum/individual container storage and handling	Leaks or spills due to faulty container/ drum integrity (e.g., leaking seals or ports). Container materials incompatible with waste material. Improper stacking and storage of containers	Mineral spirits, industrial solvents, immersion cleaners, dry cleaner, solvents, paint solvents, spent antifreeze
Return and fill stations	Leaks, spills, or overflows from tanker truck transfer of wastes and hose drainage. Leaking pipes, valves, pumps, worn or deteriorated gaskets or seals	Mineral spirits, industrial solvents, immersion cleaners, dry cleaner, solvents, paint solvents, spent antifreeze
Storage tank operations	Overfill of storage tanks, leaking pipes, valves, worn or deteriorated pumps seals. Leaking underground storage tanks.	Mineral spirits, industrial solvents, immersion cleaners, dry cleaner, solvents, paint solvents, spent antifreeze
Material handling equipment	Leaking fuel lines, worn gaskets, leaking hydraulic lines and connections	Fuel, hydraulic fluid, oil and grease
Vehicle and equipment maintenance (if applicable)	Replacement of fluids such as transmission and brake fluids, antifreeze, oil and other lubricants, washdown of maintenance areas, dumping fluids down floor drains connected to storm sewer system, outside storage of fluids and oily rags and waste material	Oil and grease, fuel, accumulated particulate matter, antifreeze
Vehicle or equipment washing (if applicable)	Wash water or steam cleaning	Oil, detergents, chlorinated solvents, suspended solids and accumulated particulate matter
Recycling Facilities		
Unknowing acceptance of nonrecyclable materials and/or small quantities of household hazardous wastes	Inbound recyclable materials	Dependant on material
Outdoor material storage	Deterioration of wastepaper and unprocessed aluminum beverage containers	Biochemical oxygen demand (BOD)
Processing and storage	Illicit connections or improper dumping to floor drains discharging to a storm sewer system Washing down tipping floor areas	Dependant on material
Vehicle maintenance	Replacement of fluids such as transmission and brake fluids, antifreeze, oil and other lubricants, washdown of maintenance areas, dumping fluids down floor drains connected to storm sewer system, outside storage of fluids and oily rags and waste material	Oil and grease, gas/diesel fuel, accumulated particulate matter, antifreeze (ethylene glycol)

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 scrap recycling and waste recycling 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.

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.

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.

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 scrap recycling and waste recycling 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 scrap recycling and waste recycling 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 Scrap Recycling and Waste Recycling Facilities

Activity	BMPs
Scrap and Waste Recycling Facilities (non-source separated, non-liquid recyclable materials)	
Inbound recyclable and waste material control	❑ Provide information/education to suppliers of scrap and recyclable waste materials on draining and properly disposing of residual fluids (e.g., from vehicles and equipment engines, radiators and transmissions, oil filled transformers, and individual containers or drums), prior to delivery to your facility. ❑ Create a written list of materials that will not be accepted at the facility and materials that will be accepted, but require special handling procedures. ❑ Train employees engaged in the inspection and acceptance of inbound recyclable materials. ❑ Inspect incoming materials for items on the prohibited materials/ special handling list. Have truck drivers picking up loads offsite conduct preliminary inspections for items on the list before hauling. ❑ Check incoming scrap materials for potential fluid contents and batteries. ❑ Drain all fluids from vehicles upon arrival at the site. Segregate the fluids and properly store or dispose of them. Drain fluids only in designated area over impervious surfaces or drip pans. Contain the area to prevent stormwater run-on and runoff. Cover area with roofs or tarps. ❑ Keep waste streams separate (e.g., waste oil and mineral spirits). ❑ Store liquid wastes, including used oil, in materially compatible and non-leaking containers and disposed or recycled in accordance with RCRA. Nonhazardous substances that are contaminated with a hazardous substance are considered a hazardous substance. ❑ Recycle antifreeze, gasoline, used oil, mineral spirits, and solvents. ❑ Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly. ❑ Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries). ❑ Drain oil filters before disposal or recycling. ❑ Store cracked batteries in a nonleaking secondary container. ❑ 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. ❑ Do not pour liquid waste down floor drains, sinks, or outdoor storm drain inlets.

Table 2. BMPs for Potential Pollutant Sources at Scrap Recycling and Waste Recycling Facilities (continued)

Activity	BMPs
Inbound recyclable and waste material control (continued)	❑ Plug floor drains that are connected to the storm or sanitary sewer. If necessary, install a sump that is pumped regularly. ❑ Inspect the maintenance area regularly for proper implementation of control measures. ❑ Filter stormwater discharges with devices such as oil/water separators. ❑ Train employees on proper waste control and disposal procedures. ❑ Establish and implement procedures to educate auto scrap providers of need to remove mercury switches from hood and trunk lighting units and anti-lock break system units.
Outside scrap material storage: (liquids)	❑ Use drip pans under all vehicles and equipment waiting for processing. ❑ Store batteries on impervious surfaces. Curb, dike, or berm this area. ❑ Confine storage to designated areas. ❑ Cover all storage areas with a permanent (e.g., roofs) or temporary cover (e.g., canvas tarps). ❑ Install diversion devices such as curbing, berms, containment trenches, culverts, or dikes around storage areas. ❑ Install oil/water separators, sumps, and dry absorbents for areas where potential sources pf residual fluids are stockpiled (e.g., automobile engine storage areas). ❑ Inspect the storage yard for filled drip pans and other problems regularly. ❑ Train employees on procedures for storage and inspection items.
Scrap material storage: (bulk solid materials)	❑ Minimize runoff from coming into areas where significant materials are stored (e.g., diversion structures such as curbing, berms, containment trenches, surface grading, and elevated concrete pads) or other equivalent measure. ❑ Use adsorbents or collect leaks or spills of oil, fuel, transmission, and brake fluids (e.g., dry absorbent, drip pans). ❑ Locate spill pans under stored vehicles. ❑ Install media filters such as catch basin and sand filters. ❑ Install oil/water separator in storage areas with vehicle transmissions and engines. ❑ Provide nonrecyclable waste storage bins and containers. ❑ Conduct periodic inspections. Conduct preventative maintenance as necessary. ❑ Provide equipment operator training to minimize damage to controls (e.g., curbing and berms).
Other storage: (lightweight materials)	❑ Maintain good integrity of all storage containers. ❑ Install safeguards (such as diking or berming) against accidental releases. ❑ Inspect storage tanks to detect potential leaks and perform preventive maintenance. ❑ Inspect piping systems (pipes, pumps, flanges, couplings, hoses, and valves) for failures or leaks. ❑ Train employees on proper filling and transfer procedures.
Scrap processing operations	❑ Provide containment bins or equivalent for shredded material, especially lightweight materials such as fluff (preferably at the discharge of these materials from the air classification system). ❑ Provide cover over hydraulic equipment and combustion engines. Provide dry-cleanup materials (e.g., dry-adsorbents, drip pans, etc.) to prevent contact of hydraulic fluids, oils, fuels, etc., with stormwater runoff.

Table 2. BMPs for Potential Pollutant Sources at Scrap Recycling and Waste Recycling Facilities (continued)

Activity	BMPs
Scrap processing operations (continued)	❑ Site process equipment on elevated concrete pads or provide runoff diversion structures around process equipment, berms, containment trenches surface grading, or other equivalent measure. Discharge runoff from within bermed areas to a sump, oil/water separator, media filter, or discharge to sanitary sewer. ❑ Stabilize high traffic areas (e.g., concrete pads, gravel, and pavement around processing equipment) where practicable. ❑ Provide alarm, pump shutoff, or sufficient containment for hydraulic reservoirs in the event of a line break. ❑ Provide site gages or overfill protection devices for all liquid and fuel storage reservoirs and tanks. ❑ Schedule frequent cleaning of accumulated fluids and particulate residue around all scrap processing equipment. ❑ Schedule frequent inspections of equipment for spills or leakage of fluids, oil, fuel, and/or hydraulic fluids due to malfunctioning, worn, or corroded parts or equipment. ❑ Conduct routine preventive maintenance of equipment per original manufacturer's equipment (OME) recommendations. Replace worn or malfunctioning parts. ❑ Conduct periodic maintenance and clean out of all sumps, oil/water separators, and/or media filters. Dispose of residual waste materials properly (e.g., according to RCRA). ❑ Install retention/detention ponds or basins, sediment traps, vegetated swales or strips for pollutant settling/filtration. ❑ Establish spill prevention and response procedures, including employee training. ❑ Provide training to equipment operators on how to minimize exposure of runoff to scrap processing areas.
Scrap lead acid battery program	❑ Store batteries indoors on an impervious surface. Raise batteries off the floor with pallets or store in covered, leak-proof containers. ❑ Separate all scrap batteries from other scrap materials. ❑ Establish procedures for the collection, storage, handling, and disposition of cracked or broken batteries in accordance with applicable Federal regulations (e.g., RCRA). ❑ Establish special handling procedures for cracked or broken batteries. Neutralize acid leaks with sodium carbonate, soda ash, or other absorbent materials. ❑ Establish inspection and acceptance procedures for scrap lead-acid batteries. Provide supplier training on acceptance practices for scrap batteries. ❑ Provide employee training on the safe handling, storage, and disposition of scrap batteries.
Supplies for Process Equipment	❑ Locate storage drums containing liquids, including oils and lubricants indoors. Alternatively, site palletized drums and containers on an impervious surface and provide sufficient containment around the materials. Provide sumps and/or oil/water separators, if necessary. ❑ Conduct periodic inspections of containment areas and containers/drums for corrosion. ❑ Perform preventive maintenance of BMPs, as necessary. ❑ Instruct employees on proper material handling and storage procedures.
Vehicle and equipment maintenance	Good Housekeeping ❑ Plug floor drains that are connected to the storm or sanitary sewer; if necessary, install a sump that is pumped regularly. ❑ Maintain an organized inventory of materials used in the maintenance shop.

Table 2. BMPs for Potential Pollutant Sources at Scrap Recycling and Waste Recycling Facilities (continued)

Activity	BMPs
Vehicle and equipment maintenance (continued)	Good Housekeeping (continued) ❑ Use drip plans, drain boards, and drying racks to direct drips back into a sink or fluid holding tank for re-use. ❑ Drain all parts of fluids prior to disposal. Oil filters can be crushed and recycled. ❑ 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. ❑ Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly. ❑ Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries). ❑ Maintain an organized inventory of materials. ❑ Eliminate or reduce the number or amount of hazardous materials and waste by substituting nonhazardous or less hazardous materials. ❑ Clean up leaks, drips, and other spills without using large amounts of water. ❑ Prohibit the practice of hosing down an area where the practice would result in the exposure of pollutants to stormwater. ❑ Clean without using liquid cleaners whenever possible. ❑ Do all cleaning at a centralized station so the solvents stay in one area. ❑ If parts are dipped in liquid, remove them slowly to avoid spills. ❑ Do not pour liquid waste down floor drains, sinks, outdoor storm drain inlets, other storm drains, or sewer connections. Minimizing Exposure ❑ 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. ❑ If operations are uncovered, perform them on concrete pad that is impervious and contained. ❑ Park vehicles and equipment indoors or under a roof whenever possible where proper control of oil leaks/spills is maintained and exposure to stormwater is prevented. ❑ Watch vehicles closely for leaks and use pans to collect fluid when leaks occur. Management of Runoff ❑ Use berms, curbs, or similar means to ensure that stormwater runoff from other parts of the facility does not flow over the maintenance area. ❑ Collect the stormwater runoff from the cleaning area and providing 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 recycled on-site. DO NOT discharge washwater to a storm drain or surface water. Inspections and Training ❑ Inspect the maintenance area regularly for proper implementation of control measures. ❑ Train employees on proper waste control and disposal procedures.

Table 2. BMPs for Potential Pollutant Sources at Scrap Recycling and Waste Recycling Facilities (continued)

Activity	BMPs
Vehicle fueling	❑ Conduct fueling operations (including the transfer of fuel from tank trucks) on an impervious or contained pad or under a roof or canopy where possible. Covering should extend beyond spill containment pad to prevent rain from entering. ❑ When fueling in uncovered area, use a concrete pad (not asphalt which is not chemically resistant to the fuels being handled). ❑ Use drip pans where leaks or spills of fuel can occur and where making and breaking hose connections. ❑ Use fueling hoses with check valves to prevent hose drainage after filling. ❑ Use spill and overflow protection devices. ❑ Clean up spills and leaks immediately. ❑ Minimize/eliminate run-on onto fueling areas with diversion dikes, berms, curbing, surface grading or other equivalent measures. ❑ Collect stormwater runoff and provide treatment or recycling. ❑ Use dry cleanup methods for fuel area rather than hosing the fuel area down. ❑ Perform preventive maintenance on storage tanks to detect potential leaks before they occur. ❑ Inspect the fueling area to detect problems before they occur. ❑ Train personnel on proper fueling procedures. ❑ Provide curbing or posts around fuel pumps to prevent collisions during vehicle ingress and egress. ❑ Discourage "topping off" of fuel tanks.
Outdoor vehicle parking and storage	❑ Cover vehicle and equipment storage areas. ❑ Use drip pans under all equipment and vehicles waiting maintenance. ❑ Conduct inspections of storage and parking areas for leaks and filled drip pans. ❑ Provide employee training.
Vehicle and equipment washing	❑ Designate an area for cleaning activities. ❑ Use detergent or water-based cleaning systems in place of organic solvent degreasers. ❑ Use phosphate-free biodegradable detergents. ❑ Avoid washing parts or equipment outside. ❑ Use auto shutoff valves on washing equipment. ❑ Provide vehicle wash rack with dedicated sediment trap and oil/water separator. ❑ Install curbing, berms, or dikes around cleaning areas. ❑ Inspect cleaning area regularly. ❑ Train employees on proper washing procedures. ❑ Contain steam cleaning washwaters. Discharge to sanitary sewer in compliance with POTW pre-treatment standards, dispose via licensed waste hauler, or discharge under an applicable NPDES permit.

Table 2. BMPs for Potential Pollutant Sources at Scrap Recycling and Waste Recycling Facilities (continued)

Activity	BMPs
Vehicle and equipment painting (where applicable)	❑ Conduct sanding and painting in nonexposed areas (e.g., under cover) in accordance with OSHA standards. ❑ Minimize overspraying. ❑ Clean up accumulated particulate matter. ❑ Dispose or recycle paint, solvents, and thinner properly. ❑ Keep paint and solvents away from traffic areas. ❑ Conduct periodic inspections of paint spraying areas. ❑ Provide training on control procedures for employees.
Erosion and sediment control	❑ Minimize run-on from adjacent properties using diversion dikes, berms, or equivalent. ❑ Trap sediment at down gradient locations and outlets serving unstabilized areas. This may include filter fabric fences, gravel outlet protection, sediment traps, vegetated or riprap swales, vegetated strips, diversion structures, catch-basin filters, and retention/detention basins or equivalent. ❑ Stabilize all high traffic areas, including all vehicle entrances and exit points. Conduct periodic sweeping of all traffic areas. Conduct inspections of BMPs. ❑ Perform preventative maintenance as needed on BMPs. ❑ Provide employee training on the proper installation and maintenance of erosion and sediment controls.
Waste Recycling Facilities (liquid recyclable materials)	
Individual drum/container storage	❑ Ensure container/drums are in good condition. Store waste materials in materially compatible drums. Use containers that meet National Fire Protection Association (NFPA) guidelines. ❑ Put individual containers on pallets. Limit stack height of individual containers/drums. Provide straps, plastic wrap, or equivalent around stacked containers to provided stability. ❑ Label/mark drums. Segregate hazardous and flammable wastes. Comply with NFPA guidelines for segregation of flammable wastes. ❑ Provide adequate clearance to allow material movement and access by material handling equipment. ❑ Provide semipermanent or permanent cover over wastes. ❑ Establish clean up procedures, including the use of dry adsorbents, in the event of spills or leaks. Prohibit washing down of material storage areas. Disconnect or seal all floor drains from storm sewer system. ❑ Provide secondary containment, dikes, berms, containment trench, sumps, or other equivalent measure, in all storage areas. Provide proper sizing of containment with sufficient capacity for precipitation. ❑ Develop SPCC procedures for all liquid container storage areas. Ensure employees are familiar with SPCC procedures. Schedule/conduct periodic employee training.
Bulk liquid storage	❑ Use welded pipe connections versus flange connections. Inspect all flange gaskets for deterioration. ❑ Apply corrosion inhibitors to exposed metal surfaces. ❑ Provide high level alarms for storage tanks. ❑ Provide redundant piping, valves, pumps, motors, as necessary, at all pumping stations. Provide manually activated shutoff valves in the event of spill. Install visible and/or audible alarms in the event of a spill.

Table 2. BMPs for Potential Pollutant Sources at Scrap Recycling and Waste Recycling Facilities (continued)

Activity	BMPs
Bulk liquid storage (continued)	❑ Install manually activated drainage values, or equivalent, versus flapper-type drain values. ❑ Provide adequate security against vandalism and tampering. ❑ Provide secondary containment around all bulk storage tanks, including berms, dikes, surface impoundments, and/or equivalent. Ensure surfaces of secondary containment areas are adequately sealed to prevent leaks. ❑ Provide stationary boxes around all return and fill stations to eliminate/minimize hose drainage and minor waste transfer spills.
Waste transfer areas	❑ Provide cover over liquid waste transfer areas. ❑ Provide secondary containment or equivalent measures around all liquid waste transfer facilities. ❑ Establish cleanup procedures for minor spills including the use of dry absorbents or a wet vacuum system. ❑ Train employees on proper transfer procedures and spill response.
Vehicle and equipment maintenance (if applicable)	*See BMPS under Scrap and Waste Recycling Facilities above*
Vehicle and equipment washing (if applicable)	❑ Avoid washing parts or equipment outside. ❑ Use phosphate-free biodegradable detergents. ❑ Provide vehicle wash rack with dedicated sediment trap and oil/water separator. ❑ Use auto shut-off valves on washing equipment. ❑ Use detergent or water-based cleaning systems in place of organic solvent degreasers. ❑ Designate an area for cleaning activities. ❑ Contain steam cleaning washwaters or discharge under an applicable NPDES permit. ❑ Ensure that washwaters drain well. ❑ Inspect cleaning area regularly. ❑ Install curbing, berms, or dikes around cleaning areas. ❑ Train employees on proper washing procedures.
Recycling Facilities	
Inbound recyclable materials control	❑ Provide public education brochures to inform suppliers of recyclable materials which are acceptable and which are not. ❑ Educate curbside pick-up drivers on acceptable materials. Reject unacceptable materials at the source. ❑ Clearly marking public drop-off containers regarding which materials can be accepted. ❑ Develop procedures for handling and disposal of non-recyclable material. ❑ Implement employee training. ❑ Provide totally-enclosed drop-off containers for public.
Storage	❑ Conduct processing operations indoors. Clean up residual fluids. ❑ Schedule routine preventive maintenance on all processing equipment. ❑ Store equivalent of the average daily volume of recyclable materials indoors. ❑ Direct tipping floor washwaters to sanitary sewer system if permitted by local sanitary authority.

Table 2. BMPs for Potential Pollutant Sources at Scrap Recycling and Waste Recycling Facilities (continued)

Activity	BMPs
Storage (continued)	❑ Provide good housekeeping. ❑ Disconnect all floor drains from storm sewer system. ❑ Prohibit illicit discharges and illegal dumping to floor drains that are connected to the storm sewer.
Outdoor material storage	❑ Provide totally enclosed drop-off containers for the public. ❑ Store only processed materials (i.e., baled plastic, aluminum, and glass cullet). ❑ Provide covers over containment bins, dumpsters, and roll-off boxes. ❑ Use tarpaulins or covers over bales of wastepaper. ❑ Provide dikes and curbs around bales of recyclable wastepaper. ❑ Divert surface water runoff away from outside material storage areas. ❑ Conduct regularly scheduled sweeping of storage areas to minimize particulate buildup. ❑ Provide containment pits with sumps pumps that discharge to sanitary sewer system. Prevent discharge of residual fluids to storm sewer.
Residual non-recyclable materials	❑ Store residual non-recyclable materials in covered containers for transport to a proper disposal facility. ❑ Bale residual non-recyclable materials and cover with tarpaulin or equivalent.
Vehicle fueling	❑ Conduct fueling operations (including the transfer of gas/diesel fuel from tank trucks) on an impervious, contained pad, or under a roof or canopy where possible. Covering should extend beyond spill containment pad to prevent rain from entering. ❑ When fueling in uncovered area, use concrete pad (not asphalt which is not chemically resistant to the fuels being handled). ❑ Use drip pans where leaks or spills of gas/diesel fuel can occur and where making and breaking hose connections. ❑ Use fueling hoses with check valves to prevent hose drainage after filling. ❑ Clean up spills and leaks immediately. ❑ Minimize/eliminate run-on onto fueling areas with diversion dikes, berms, curbing, surface grading or other equivalent measures. ❑ Collect stormwater runoff and provide treatment or recycling. ❑ Use dry cleanup methods for fuel area rather than hosing the fuel area down. ❑ Perform preventive maintenance on storage tanks to detect potential leaks before they occur. ❑ Inspect the fueling area to detect problems before they occur. ❑ Train personnel on proper fueling procedures. ❑ Provide curbing or posts around fuel pumps to prevent collisions during vehicle ingress and egress. ❑ Discourage "topping off" of gas/diesel fuel tanks.
Illicit connection to storm sewer	❑ Plug all floor drains if it is unknown whether the connection is to storm sewer or sanitary sewer systems. Alternatively, install a sump that is pumped regularly. ❑ Perform dye testing to determine if interconnections exist between sanitary water system and storm sewer system. ❑ Update facility schematics to accurately reflect all plumbing connections.

Table 2. BMPs for Potential Pollutant Sources at Scrap Recycling and Waste Recycling Facilities (continued)

Activity	BMPs
Illicit connection to storm sewer (continued)	❑ Install a safeguard against vehicle washwaters and parts cleaning waters entering the storm sewer unless permitted. ❑ Maintain and inspect the integrity of all underground storage tanks, replace when necessary. ❑ Train employees on proper disposal practices for all materials.
Equipment/vehicle maintenance	Good Housekeeping ❑ Plug floor drains that are connected to the storm or sanitary sewer; if necessary, install a sump that is pumped regularly. ❑ Use drip pans, drain boards, and drying racks to direct drips back into a sink or fluid holding tank for re-use. ❑ Drain all parts of fluids prior to disposal. Oil filters can be crushed and recycled. ❑ 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. ❑ Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly. ❑ Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries). ❑ Maintain an organized inventory of materials. ❑ Eliminate or reduce the number and amount of hazardous materials and waste by substituting nonhazardous or less hazardous materials. ❑ Clean up leaks, drips, and other spills without using large amounts of water. Use absorbents for dry cleanup whenever possible. ❑ Prohibit the practice of hosing down an area where the practice would result in the discharge of pollutants to the stormwater collection system. ❑ Clean without using liquid cleaners whenever possible. ❑ Do all cleaning at a centralized station so the solvents stay in one area. ❑ If parts are dipped in liquid, remove them slowly to avoid spills. ❑ Do not pour liquid waste into floor drains, sinks, outdoor storm drain inlets, other storm drains, or sewer connections. Minimizing Exposure ❑ 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. ❑ If operations are uncovered, perform them on concrete pad that is impervious and contained. ❑ Park vehicles and equipment indoors or under a roof whenever possible and maintain proper control of oil leaks/spills. ❑ Check vehicles closely for leaks and use pans to collect fluid when leaks occur. Management of Runoff ❑ Use berms, curbs, or similar means to ensure that stormwater runoff from other parts of the facility does not flow over the maintenance area. ❑ 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 surface water.

Table 2. BMPs for Potential Pollutant Sources at Scrap Recycling and Waste Recycling Facilities (continued)

Activity	BMPs
Equipment/vehicle maintenance (continued)	Inspections and Training ❑ Inspect the maintenance area regularly for proper implementation of control measures. ❑ Train employees on proper waste control and disposal procedures.
Outdoor Vehicle and Equipment Storage	❑ Inspect area for leaking engines, chipping/corroding bumpers, chipping paint, galvanized metal

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:

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- U.S. EPA. The National Vehicle Mercury Switch Recovery Program.
  www.epa.gov/mercury/switch.htm
- Wisconsin Department of Natural Resources. "General Permit to Discharge under the Wisconsin Pollutant Discharge Elimination System, Recycling of Scrap and Waste Materials."
  http://dnr.wi.gov/org/caer/cea/assistance/scrap/stormwater/scrap/permit.pdf

Industrial Stormwater

Fact Sheet Series

Sector M: Automobile Salvage Yards

U.S. EPA Office of Water
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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 automobile salvage yards as defined by Standard Industrial Classification (SIC) and includes battery reclaimers, salvage yards, and automobile recyclers (Primary SIC 5015). Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit:

- Activities related to dismantling of used motor vehicles for the purpose of selling parts
- Wholesale or retail distribution of used motor vehicle parts

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 facility's activities?

Pollutants conveyed in stormwater discharges from automobile salvage yards 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 (i.e., 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 automobile salvage yards.

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Automobile Salvage Yards

Activity	Pollutant Source	Pollutant
Vehicle Dismantling	Oil, anti-freeze, batteries, gasoline, diesel fuel, hydraulic fluids, electrical switches	Oil and grease, ethylene glycol, heavy metals, mercury
Used Parts Storage	Batteries, chrome bumpers, wheel balance weights, tires, rims, filters, radiators, catalytic converters, engine blocks, hub caps, doors, drivelines, galvanized metals, mufflers	Sulfuric acid, galvanized metals, oil and grease, heavy metals, petroleum hydrocarbons, total suspended solids (TSS)
Outdoor Vehicle and Equipment Storage	Leaking engines, chipping/corroding bumpers, chipping paint, galvanized metal	Oil and grease, arsenic, organics, heavy metals, total suspended solids (TSS)
Vehicle and Equipment Maintenance	Parts cleaning	Chlorinated solvents, oil and grease, heavy metals, acid/alkaline wastes
	Waste disposal of greasy rags, oil filters, air filters, batteries, hydraulic fluids, transmission fluids, radiator fluids, degreasers	Oil, heavy metals, chlorinated solvents, acid/alkaline wastes oil, heavy metals, chlorinated solvents, acid/alkaline wastes, ethylene glycol
	Spills of oil, degreasers, hydraulic fluids, transmission fluid, and radiator fluids	Oil, arsenic, heavy metals, organics, chlorinated solvents, ethylene glycol
	Fluids replacement, including oil, hydraulic fluids, transmission fluid, and radiator fluids	Oil, arsenic, heavy metals, organics, chlorinated solvents, ethylene glycol
Vehicle, Equipment, and Parts Washing Areas	Washing and steam cleaning waters	Oil and grease, detergents, heavy metals, chlorinated solvents, phosphorus, salts, suspended solids
Liquid Storage in Above Ground Storage Tanks	External corrosion and structural failure	Fuel, oil and grease, heavy metals, materials being stored
	Installation problems	
	Spills and overfills due to operator error	
Illicit Connection to Storm Sewer	Sanitary water	Bacteria, biochemical oxygen demand (BOD), suspended solids
	Floor drains	Oil and grease, heavy metals, chlorinated solvents, fuel, ethylene glycol
	Vehicle washwaters	Oil and grease, detergents, metals, chlorinated solvents, phosphorus, suspended solids
	Radiator flushing wastewater	Ethylene glycol
	Leaking underground storage tanks	Materials stored or previously stored

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 automobile salvage yards. 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.

The management practices discussed herein are well suited mechanisms to prevent or control the contamination of stormwater discharges associated with automobile salvage yards. In general, it is important to develop a stormwater management policy statement, review the policy with employees, and keep it posted. Additionally, identifying weaknesses in current facility practices will aid the permittee in determining appropriate BMPs that will achieve a reduction in pollutant loadings.

All facilities should implement BMPs in the following areas of the site:

- Vehicle dismantling and maintenance areas
- Vehicle, parts, and equipment storage areas
- Material storage areas
- Vehicle, parts, and equipment cleaning areas

Mercury switch used in vehicle. Be aware: specific permit requirements may vary according to permitting authority so it is important to reference the requirements applicable of the state in which your facility is located. For instance, many states are now addressing the issue of mercury switch removal to prevent mercury releases that occur from automobile recycling. Mercury switches have been used until recently for hood, trunk, or door lights.

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.

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.

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.

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.

Specific runoff management practices for automobile salvage facilities include the installation/use of:

- Berms or drainage ditches on the property line (to prevent run-on from neighboring properties
- Berms for uncovered outdoor storage of soiled parts, engine blocks, and above-ground liquid storage
- Detention ponds
- Filtering devices and oil/water separators

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 automobile salvage yards, 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 automobile salvage yards; 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 Automobile Salvage Yards

Activity	BMPs
Dismantling and vehicle maintenance	Minimize exposure ❑ Installation of a consolidated processing area, including a covered and bermed impermeable concrete surface equipped with a drain, where all fluids are drained. Fluid and Parts Removal ❑ Drain all fluids from vehicles upon arrival at the site. Segregate the fluids and properly store or dispose of them. ❑ Drain oil filters (and all vehicle parts) before disposal or recycling.

Table 2. BMPs for Potential Pollutant Sources at Automobile Salvage Yards (continued)

Activity	BMPs
Dismantling and vehicle maintenance (continued)	Fluid and Parts Removal (continued) ❑ Inspect vehicles for leaks as soon as possible once they arrive on-site. Inspect vehicles quarterly for signs of leakage. Check for unwanted material that could have been placed in the vehicle. ❑ When pulling parts from vehicles in the yard, employ a catch sled or tray to recover the majority of fluids which will be released. Place drip pans, large plastic sheets, or canvas under vehicles or equipment during maintenance and dismantling activities. Where drip pans are used, they should not be left unattended to prevent accidental spills. ❑ Engine oil should be drained and stored in clearly labeled tanks or containers. Tanks and containers must be kept in good operating condition, free of any visible spills or leaks, structural damage, or deterioration. ❑ Remove battery as soon as feasible after vehicle enters the facility. ❑ Promptly transfer used fluids to the proper container. ❑ Empty and clean drip pans and containers; do not leave full drip pans or other open containers around the shop. ❑ Remove all mercury switches as soon as possible making sure not to puncture the mercury container during removal. Ship switches to End of Life Vehicle Solutions (ELVS). Vehicle Processing ❑ Maintain an organized inventory of materials used in the maintenance shop. ❑ Designate one person to keep track of parts in the yard. As soon as a hulk is salvaged to its minimum extent, it should be processed for shredding to minimize the dripping of fluids and clutter in the yard. Material Storage ❑ Nonhazardous substances that are contaminated with a hazardous substance are considered a hazardous substance. ❑ Store cracked batteries in a nonleaking secondary container. ❑ Keep waste streams separate (e.g., waste oil and mineral spirits). Recycling and Disposal ❑ Recycle anti-freeze, gasoline, used oil, mineral spirits, windshield washer fluid, and solvents. ❑ Label and track the recycling of waste material (e.g., used oil, spent solvents, and batteries). ❑ Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly. Discharges ❑ Know where your sumps and drains discharge to. Do not pour liquid waste down floor drains, sinks, or outdoor storm drain inlets. ❑ Plug floor drains that are connected to the storm or sanitary sewer. If necessary, install a sump that is pumped regularly. ❑ Screen out sludges and solids before they reach the waste sump. Use an absorbent pad around the perimeter of sumps to prevent unwanted hazardous materials from entering. ❑ Prohibit the practice of hosing down the shop floor, using dry cleanup methods, and/or collecting the stormwater runoff from the maintenance area and providing treatment. ❑ Treat stormwater discharges with devices such as oil-water separators.
Outdoor vehicle, equipment, and parts storage	Minimizing Exposure ❑ Cover all storage areas with a permanent cover (e.g., roofs) or temporary cover (e.g., canvas tarps). ❑ Store lead parts in a covered container that is capable of handling the excessive weight of lead. If storing lead tire weights with batteries, make sure weights are not placed under batteries or allowed to roll around as that could puncture batteries.

Table 2. BMPs for Potential Pollutant Sources at Automobile Salvage Yards (continued)

Activity	BMPs
Outdoor vehicle, equipment, and parts storage (continued)	Runoff Minimization ❑ Install curbing, berms, or dikes around storage areas. ❑ Install berms or drainage ditches on the property line. ❑ Install berms for uncovered outdoor storage of oily parts, engine blocks, and above ground liquid storage. ❑ Install filtering devices and oil/water separators. ❑ Use drip pans, large sheets of plastic, or canvas under all vehicles and equipment waiting for and during maintenance. ❑ Store mercury switches in covered, leak-proof containers in a way that prevents the glass capsule from breaking. (Manage mercury switches as hazardous waste. Containers should be labeled with "Hazardous Waste - Spent Mercury Switches") ❑ Use secondary containment for stored liquids such as oil, gas, and antifreeze, as well as for lead acid batteries. Good Housekeeping ❑ Tank storage should be secured and locked. ❑ Do not stockpile old tires as they are both a fire hazard and a breeding ground for mosquitoes and rodents. Use indoor tire racks. ❑ Confine storage of parts, equipment, and vehicles to designated areas. ❑ Vehicles of similar make and model should be located in a common area. Vehicles whose parts have higher demand should be in a common area and easily accessible. ❑ Repair malfunctioning equipment that is responsible for any leak or spill as soon as possible. ❑ Store batteries on impervious surfaces. Store batteries inside on a pallet or outside in a leak proof container. Curb, dike, or berm this area.
Vehicle, equipment, and parts washing areas	❑ Designate an area for cleaning activities. ❑ Perform all parts cleaning operations indoors or cover and berm outside cleaning areas. ❑ Clean parts using minimal amounts of solvents or detergents. ❑ Recycle and reuse cleaning fluids where practical. ❑ Use phosphate-free biodegradable detergents. ❑ Use detergent-based or water-based cleaning systems in place of organic solvent degreasers. ❑ Contain steam cleaning washwaters or discharge under an applicable NPDES permit. ❑ Ensure that washwaters drain well. ❑ Inspect cleaning area regularly. ❑ Install curbing, berms, or dikes around cleaning areas. ❑ Remove or deploy airbags prior to crushing or other maintenance activities. ❑ Be certain all fluids have been drained from vehicle prior to crushing. ❑ Fluid should be collected in a covered container, tested, and disposed of accordingly.
Vehicle crushing activities	❑ Capture crusher fluids to prevent spillage. Collect this mixture of fluids in a spill-proof covered container and dispose of it properly. It should not be allowed to drain onto the ground. Keep the drain within the crusher clean so that the fluids do not collect and overflow from the crusher onto the ground.

Table 2. BMPs for Potential Pollutant Sources at Automobile Salvage Yards (continued)

Activity	BMPs
Vehicle crushing activities (continued)	❑ Installation of an engineering fabric, such as geotextiles, followed by gravel, or a bermed impermeable concrete surface would be ideal as a foundation under the crusher. ❑ Develop a preventative maintenance program that involves timely inspections and/or maintenance of the crusher and facility equipment and vehicles. ❑ Keep the crusher equipment clean.
Automotive wastes	❑ Fuel - Drain fuel tanks, using air or hand pumps, into double-walled storage tanks. "Good" fuels can be reused on-site; "bad" fuels must be disposed of. ❑ Antifreeze - Reclaim and re-use, if possible. ❑ Freon (CFCs) - Voluntarily recapture, in anticipation of new regulations. ❑ Used motor oil - Drain and store in double-walled tanks. Re-use on-site or send offsite for refining/fuel blending. Accepted practice to leave oil in the engine during storage. Oil filters should drain for 24-hours. Empty filters return to vehicle for scrap metal reclamation. ❑ Other fluids and oils - Drain as completely as mechanically possible. Do not burn used oil unless approved. ❑ Asbestos Brake Shoes and Clutches - If handled, should be wetted down to prevent asbestos particulates from becoming airborne. ❑ Mercury switches - Remove promptly and avoid breakage. Store as hazardous waste. ❑ Do not use vehicle fluids, oil, or fuels for dust or weed control.
Liquid storage in above ground containers	❑ Maintain good integrity of all storage containers. ❑ Install safeguards (such as diking, berming, or permanent secondary containment) against accidental releases at the storage area. ❑ Valves on permanent secondary containment should be kept in the "off" position and locked at all times, except when collected water is removed. ❑ Inspect storage tanks to detect potential leaks and perform preventive maintenance. ❑ Inspect piping systems (pipes, pumps, flanges, couplings, hoses, and valves) for failures or leaks.
Illicit connection to storm sewer	❑ Plug all floor drains if it is unknown whether the connection is to storm sewer or sanitary sewer systems. Alternatively, install a sump that is pumped regularly. ❑ Perform dye testing to determine if interconnections exist between sanitary water system and storm sewer system. ❑ Update facility schematics to accurately reflect all plumbing connections. ❑ Install a safeguard against vehicle washwaters and parts cleaning waters entering the storm sewer unless permitted. ❑ Maintain and inspect the integrity of all underground storage tanks; replace when necessary.

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**.

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

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Industrial Stormwater

Fact Sheet Series

Sector J: Mineral Mining and Processing Facilities

U.S. EPA Office of Water
EPA-833-F-06-025
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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 that have been exposed to significant materials from active and inactive mineral mining and processing facilities as defined by Standard Industrial Classification (SIC) Major Group 14. Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit:

- Potash, Soda, and Borate Minerals (SIC Code 1474)
- Phosphate Rock (SIC Code 1475)
- Chemical and Fertilizer Mineral Mining (SIC Code 1479)
- Dimension Stone (SIC Code 1411)
- Crushed and Broken Limestone (SIC Code 1422)
- Crushed and Broken Granite (SIC Code 1423)
- Crushed and Broken Stone (SIC Code 1429)
- Construction Sand and Gravel (SIC Code 1442)
- Industrial Sand and Gravel (SIC Code 1446)
- Kaolin and Ball Clay (SIC Code 1455)
- Clay, Ceramic, and Refractory Minerals (SIC Code 1459)
- Miscellaneous Nonmetallic Minerals, Except Fuels (SIC Code 1499).

Contact your permitting authority for any additional requirements or limitations, as industrial stormwater permit coverage may or may not cover or be required for certain discharges from mineral mining and processing facilities.

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 activities at my facility?

Pollutants conveyed in stormwater discharges from active and inactive mineral mining and processing facilities will vary. There are a number of factors that influence to what extent industrial activities and significant materials can affect water quality.

- Geographic location
- Hydrogeology
- Topography
- Mineralogy of the extracted resource and the surrounding rock
- How the mineral was extracted (e.g., quarrying/open face, dredging, solution, or underground mining operations)
- 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 mineral mining and processing facilities.

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Mineral Mining and Processing Facilities

Activity	Pollutant Source	Pollutant
Site Preparation	Road construction	Dust, total suspended solids (TSS), total dissolved solids (TDS), turbidity
	Removal of overburden	
	Removal of waste rock to expose the mineral body	
Mineral Extraction	Blasting activities	Dust, TSS
Mineral Processing Activities	Rock sorting	Dust, TSS, TDS, turbidity, fines
	Rock crushing	Dust, TSS, TDS, turbidity, fines
	Rock washing	TSS, TDS, turbidity, pH
	Raw material storage	Dust, TSS, TDS, turbidity
	Waste rock storage	Dust, TSS, TDS, turbidity, pH
	Raw material loading	Dust, TSS, TDS, turbidity
	Processing materials unloading	Diesel/gas fuel, oil, lime
	Raw or waste material transportation	Dust, TSS, TDS, turbidity

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Mineral Mining and Processing Facilities (continued)

Activity	Pollutant Source	Pollutant
Other Activities	Sedimentation pond upsets	TSS, TDS, turbidity, pH
	Sedimentation pond sludge removal and disposal	Dust, TSS, TDS, turbidity, pH
	Air emission control cleaning	Dust, TSS, TDS, turbidity
Equipment/Vehicle Maintenance	Fueling activities	Diesel/gas fuel, oil
	Parts cleaning	Solvents, oil, heavy metals, acid/alkaline wastes
	Waste disposal of oily rags, oil and gas filters, batteries, coolants, degreasers	Oil, heavy metals, solvents, acids
	Fluid replacement including hydraulic fluid, oil, transmission fluid, radiator fluids, and grease	Oil, arsenic, lead, cadmium, chromium, benzene, TCA, TCE, PAHs, solvents
Reclamation Activities	Site preparation for stabilization	Dust, TSS, TDS, turbidity
	Fertilizers	Nitrogen, phosphorus

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 mineral mining and processing 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.

Discharges from mining operations are in some ways dissimilar to other types of industrial facilities. Mining facilities are often in remote locations and may operate only seasonally or intermittently, yet need year-round controls because significant materials remain exposed to precipitation when reclamation is not completed. These characteristics make resource intensive end-of-pipe management controls less desirable.

EPA believes that the most appropriate means of stormwater management at mineral mining and processing facilities are source reduction BMPs. Source reduction BMPs are methods by which discharges of contaminants are controlled with little or no required maintenance. Examples of source reduction controls include diversion dikes, vegetative covers, and berms. These practices are typically low in cost and relatively easy to implement. In some instances, more resource intensive treatment BMPs, including sedimentation ponds, may be necessary depending upon the type of discharge, types and concentrations of contaminants, and volume of flow.

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.

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.

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. For mine sites requiring additional sources of water for processing operations, rainfall events and stormwater run-on can be managed for use in dust suppression, processing, and washing activities.

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 mineral mining and processing 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 mineral mining and processing 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 Mineral Mining and Processing Facilities

Pollutant Source	BMPs
Site preparation: General	❑ Install temporary or permanent discharge diversions to prevent uncontaminated (or less contaminated) flows from contacting sources of pollutants. Examples of BMPs include: - Install dikes, curbs, and berms for discharge diversions. - Use check dams, rock outlet protection, level spreaders, stream alternation and drop structures for runoff dispersion. ❑ Install temporary or permanent diversions to direct contaminated flows to sediment ponds or other treatment facilities. Examples of BMPs include: - Install conveyance systems such as channels, gutters, culverts, rolling dips and road sloping, and/or roadway water deflectors. - Install gabions, riprap, native rock retaining walls, straw bale barriers, sediment traps/catch basins, and vegetated buffer strips for sediment control and collection.
Site preparation: Haul and access roads	❑ Construction of haul roads should be supplemented by BMPs that divert runoff from road surfaces, minimize erosion, and direct flow to appropriate channels for discharge to treatment areas. Examples of BMPs include: - Install dikes, curbs, and berms for discharge diversions. - Install conveyance systems such as channels, gutters, culverts, rolling dips and road sloping, and/or roadway water deflectors. - Use check dams, rock outlet protection, level spreaders, stream alternation and drop structures for runoff dispersion. - Install gabions, riprap, native rock retaining walls, straw bale barriers, sediment traps/catch basins, and vegetated buffer strips for sediment control and collection. - Keep as much vegetation as possible when building roads and seed as necessary. Stabilize soil via willow cutting establishment. ❑ Place as far as possible from natural drainage areas, lakes, ponds, wetlands, or floodplains ❑ Width and grade of roads should be minimal and should be designed to match the natural contours of the area. ❑ Frequently inspect all stabilization and structural erosion control measures and perform all necessary maintenance and repairs.
Mineral extraction: Pits/quarries or underground mines	❑ Install dikes, curbs, and berms for discharge diversions. ❑ Install conveyance systems such as channels and gutters. ❑ Use serrated slopes, benched slopes, contouring, and stream alteration to direct uncontaminated discharges away from a pit or quarry. ❑ Install sediment settling ponds, straw bale barrier, and siltation berms. ❑ Keep as much vegetation as possible when excavating and seed as necessary to minimize exposed soils.
Mineral extraction and processing: Overburden, waste rock, and raw material piles	❑ Install dikes, curbs, and berms for discharge diversions. ❑ Install conveyance systems such as channels and gutters. ❑ Overburden, topsoil, waste rock, raw material, or intermediate and final product stockpiles should be located away from surface waters and other sources of water, as well as geologically unstable areas. ❑ Use serrated slopes, benched slopes, contouring, and stream alteration around piles for sediment control and collection. ❑ Install plastic matting, plastic netting, erosion control blankets, mulch straw, compaction, sediment/settling ponds, silt fences, and siltation berms for sediment control and collection.

Table 2. BMPs for Potential Pollutant Sources at Mineral Mining and Processing Facilities (continued)

Pollutant Source	BMPs
Mineral extraction and processing: Overburden, waste rock, and raw material piles (continued)	❑ Stabilize and recontour (if necessary) piles. ❑ Vegetate as many piles as possible (involves topsoiling, seedbed preparation, and/or seeding).
Reclamation	❑ Install dikes, curbs, and berms for discharge diversions. ❑ Install conveyance systems such as channels and gutters. ❑ Use check dams, rock outlet protection, level spreaders, stream alternation, drop structures, serrated slopes, benched slopes, contouring, and stream alteration for runoff dispersion. ❑ Install gabions, riprap, native rock retaining walls, straw bale barriers, sediment traps/catch basins, biotechnical stabilization, silt fences, siltation berms, brush sediment barriers and vegetated buffer strips for sediment control and collection. ❑ Recontouring and vegetation should be performed to stabilize soils and prevent erosion in mined out portions or inactive areas of the site as active mining moves to new areas (includes topsoiling, seedbed preparation, seeding, willow cutting establishment). ❑ If a quarry is being converted into a reservoir or recreational area, disturbed areas above the quarry rim must still be reclaimed. ❑ Use overburden and topsoil stockpiles to fill in a pit or quarry (when practical).
Equipment/vehicle maintenance	❑ 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. ❑ If operations are uncovered, perform them on a concrete pad that is impervious and contained. Use berms, curbs, or similar means to ensure that stormwater runoff from other parts of the facility does not flow over the maintenance area. ❑ Collect the stormwater runoff from the cleaning area and provide treatment or recycling. Discharge vehicle wash or rinse water to the sanitary sewer (if available and 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. ❑ 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. ❑ Use drip pans, drain boards, and drying racks to direct drips back into a fluid holding tank for reuse. ❑ Drain all parts of fluids prior to disposal. Oil filters can be crushed and recycled. ❑ 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. ❑ Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly. ❑ Store batteries and other significant materials inside. ❑ Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries). ❑ Maintain an organized inventory of materials. ❑ Eliminate or reduce the number and amount of hazardous materials and waste by substituting nonhazardous or less hazardous materials. ❑ Clean up leaks, drips, and other spills without using large amounts of water. Use absorbents for dry cleanup whenever possible. ❑ Prohibit the practice of hosing down an area where the practice would result in the discharge of pollutants to a stormwater system.

Table 2. BMPs for Potential Pollutant Sources at Mineral Mining and Processing Facilities (continued)

Pollutant Source	BMPs
Equipment/vehicle maintenance (continued)	❑ Clean without using liquid cleaners whenever possible. ❑ Do all cleaning at a centralized station so the solvents stay in one area. ❑ If parts are dipped in liquid, remove them slowly to avoid spills. ❑ Do not pour liquid waste into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections. ❑ Park vehicles and equipment indoors or under a roof whenever possible and maintain proper control of oil leaks/spills. ❑ Check vehicles closely for leaks and use pans to collect fluid when leaks occur. ❑ Inspect the maintenance area regularly for proper implementation of control measures. ❑ Train employees on proper waste control and disposal procedures.
Fueling activities	❑ Conduct fueling operations (including the transfer of fuel from tank trucks) on an impervious or contained pad or under a roof or canopy where possible. Covering should extend beyond spill containment pad to prevent rain from entering. ❑ When fueling in uncovered area, use a concrete pad (asphalt is not chemically resistant to the fuels being handled). ❑ Use drip pans where leaks or spills of fuel can occur and where making and breaking hose connections. ❑ Use fueling hoses with check valves to prevent hose drainage after filling. ❑ Use spill and overflow protection devices. ❑ Keep spill cleanup material readily available. Clean up spills and leaks immediately. ❑ Minimize/eliminate run-on into fueling areas with diversion dikes, berms, curbing, surface grading or other equivalent measures. ❑ Collect stormwater runoff and provide treatment or recycling. ❑ Use dry cleanup methods for fuel area rather than hosing down the fuel area. Follow procedures for sweeping up absorbents as soon as spilled substances have been absorbed. ❑ Perform inspection and preventive maintenance on fuel storage tanks to detect potential leaks before they occur. ❑ Inspect the fueling area to detect problems before they occur. ❑ Train personnel on proper fueling procedures. ❑ Provide curbing or posts around fuel pumps to prevent collisions from vehicles. ❑ Discourage "topping off" of fuel tanks.

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:

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- Idaho Department of Lands in conjunction with Other State and Federal Agencies. Best Management Practices for Mining in Idaho.
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- Pierce County Public Works and Utilities. "Best Management Practices for Commercial and Industrial Activities."
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Industrial Stormwater

Fact Sheet Series

Sector G: Metal Mining (Ore Mining and Dressing) Facilities

U.S. EPA Office of Water
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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 discusses stormwater discharges from metal mining (ore mining and dressing) facilities as defined by Standard Industrial Classification (SIC) Major Group 10. Metal mining is defined here as all ore mining and/or dressing and beneficiating operations performed at mills operated in conjunction with the mines served or at mills (i.e., custom mills) operated separately. Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit if discharges of stormwater have come into contact with any overburden, raw material, intermediate products, finished product, byproduct or waste products located on the site of such operations:

- Iron Ores (SIC 1011)
- Copper Ores (SIC 1021)
- Lead and Zinc Ores (SIC 1031)
- Gold Ores (SIC 1041)
- Silver Ores (SIC 1044)
- Ferroalloy Ores, Except Vanadium (SIC 1061)
- Uranium-Radium-Vanadium Ores (SIC 1094)
- Miscellaneous Metal Ores, Not Elsewhere Classified (SIC 1099)

Permit coverage is required of all phases of mining operations, whether active or inactive, as long as there is exposure to significant materials. This includes land disturbance activities such as the expansion of current extraction sites, active and inactive mining stages, and reclamation activities at those establishments primarily engaged in mining, developing mines, or exploring for metallic minerals (ores).

A stormwater permit generally is not appropriate for the following types of mines:

- Sites or parts of sites which are determined to cause or contribute to water quality standards violations
- Active facilities and those under reclamation, which have discharges subject to effluent limitation guidelines under NPDES, including other non-stormwater discharges such as from floor drains in maintenance buildings and preparation plant areas
- Pollutant seeps or underground drainage from inactive mines and refuse disposal areas that do not result from precipitation events.

For these types of sites, contact the EPA or state NPDES permitting authority to determine if and what type of discharge permit may be necessary.

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 facility's activities?

Pollutants conveyed in stormwater discharges from metal mining (ore mining and dressing) facilities 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

Because of the land-disturbing nature of the ore mining and dressing industry, contaminants of concern generated by industrial activities include total suspended solids (TSS), total dissolved solids (TDS), turbidity, acid drainage, and heavy metals. Although there are many activities that occur at a facility, this fact sheet only covers those activities that occur outdoors and where activities or materials may be exposed to precipitation.

The activities, pollutant sources, and pollutants detailed in Table 1 are commonly found at metal mining (ore mining and dressing) facilities.

Table 1: Common Activities, Pollutant Sources, and Pollutants at Metal Mining (Ore Mining and Dressing) Facilities

Activity	Pollutant Source	Pollutant
Site preparation	Road construction	Dust, TSS, TDS, turbidity
	Removal of overburden	
	Removal of waste rock to expose the metal	
Mineral extraction	Blasting activities	Dust, TSS, nitrate/nitrite
Beneficiation activities	Milling	Dust, TSS, TDS, pH, turbidity, fines, heavy metals
	Flotation	Dust, TSS, TDS, pH, turbidity, fines, chemical reagents, acids, heavy metals
	Gravity concentration	TSS, TDS, pH, turbidity, heavy metals
	Amalgamation	Dust, TSS, TDS, pH, turbidity, heavy metals, mercury
	Waste rock storage	Dust, TSS, TDS, pH, turbidity, heavy metals
	Raw material loading	Dust, TSS, TDS, turbidity, heavy metals
	Process materials unloading	Diesel fuel, oil, gasoline, chemical reagents
	Raw waste material transportation	Dust, TSS, TDS, turbidity, heavy metals
Leaching	Heap leach piles	Dust, TSS, TDS, pH, turbidity, heavy metals, cyanide
Other activities	Sedimentation pond upsets	TSS, TDS, turbidity, pH, heavy metals
	Sedimentation pond sludge removal and disposal	Dust, TSS, TDS, turbidity, pH, heavy metals
	Air emission control device cleaning	Dust, TSS, TDS, turbidity, metals
Equipment/vehicle fueling and maintenance	Fueling activities	Gas/diesel fuel, oil
	Parts cleaning	Solvents, oil, heavy metals, acid/alkaline wastes
	Waste disposal of oily rags, oil and gas filters, batteries, coolants, and degreasers	Oil, heavy metals, solvents, acids
	Fluid replacement including hydraulic fluid, oil, transmission fluid, radiator fluids, and grease	Oil and grease, arsenic, lead, cadmium, chromium, chemical oxygen demand (COD), and benzene
Reclamation activities	Site preparation for stabilization	Dust, TSS, TDS, turbidity, heavy metals

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 metal mining 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.

Sediment ponds, discharge diversion techniques, as well as methods of runoff dispersion, are control strategies often used to minimize impacts of significant materials on stormwater. For mine sites

requiring additional sources of water for processing operations, rainfall events as well as stormwater run-on will be managed for use in dust suppression, processing, and washing activities. Many mine sites are already equipped with sedimentation ponds and other established process wastewater treatment methods in order to meet effluent limitation guidelines. Additional stormwater management practices used at metal mining facilities are described further in this fact sheet.

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.

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.

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.

Because ore mining and dressing is largely a land disturbance activity, BMPs that minimize erosion and sedimentation will be most effective if installed at the inception of operations and maintained throughout active operations and reclamation of the site. From the construction of access and haul roads, to closure and reclamation activities, implementation of BMPs is often essential to minimizing long-term environmental impacts to an area.

A number of structural collection devices have been developed to remove sediment from runoff before it leaves the site. Several methods of removing sediment from site runoff involve diversion mechanisms previously discussed, supplemented by a trapping or storage device. Structural practices typically involve filtering diffuse stormwater flows through temporary structures such as straw bale dikes, silt fences, brush barriers, or vegetated areas.

Structural practices are typically low in cost yet require periodic removal of sediment to remain functional. As such, they may not be appropriate for permanent use at inactive mines. However, these practices may be effectively used as temporary measures during active operation and/or prior to the final implementation of permanent measures.

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.

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.

BMPs for Metal Mining Facilities

EPA has identified a wide variety of best management practices (BMPs) that may be used to mitigate discharges of contaminants at mines. Many of the practices focus on sediment and erosion control and are similar to BMPs used in the construction industry. These controls to prevent erosion and control sedimentation are the most effective if they are installed at the inception of operations and maintained throughout active operations and reclamation of the site. For more details on the use and implementation of these practices you are encouraged to obtain a copy of one or more of the many good sediment and erosion control books available on the market. The following categories describe best management practice options for reducing pollutants in stormwater discharges at metal mining facilities.

- **Discharge Diversions.** Discharge diversions provide the first line of defense in preventing the contamination of discharges, and subsequent contamination of receiving waters. Discharge diversions are temporary or permanent structures installed to divert flow, store flow, or limit stormwater run-on and runoff.

  These diversion practices have several objectives. First, diversion structures can be designed to prevent otherwise uncontaminated (or less contaminated) water from crossing disturbed areas or areas containing significant amounts of contaminated materials, where contact may occur between run-on and site materials. These source reduction measures may be particularly effective for metal mining facilities because they prevent run-on of uncontaminated discharges from contacting exposed materials and/or reduce the flow across disturbed areas, thereby lessening the potential for erosion. Second, diversion structures can be used to collect or divert waters for later treatment, if necessary. The usefulness of these control measures are limited by such factors as the size of the area to be controlled and the type and nature of materials exposed and nature of precipitation events.

  Diversion dikes, curbs, and berms are temporary or permanent diversion structures that prevent runoff from passing beyond a certain point, and divert runoff away from its intended path. Dikes, curbs or berms may be used to surround and isolate areas of concern, diverting flow around piles of overburden, waste rock, and storage areas, to minimize discharge contact with contaminated materials and to limit discharges of contaminated water from confined areas.

- **Drainage/Stormwater Conveyance Systems.** Drainage or stormwater conveyance systems can provide either a temporary or a permanent management practice which functions to channel water away from eroded or unstabilized areas, convey runoff without causing erosion, and/or carry discharges to more stabilized areas. The use of drainage systems as a permanent measure may be most appropriate in areas with extreme slopes, areas subject to high velocity runoff, and other areas where the establishment of substantial vegetation is infeasible or impractical.

For instance, several BMPs may be useful stormwater and erosion control methods. Some examples of drainage/stormwater conveyance systems include:

- *Channels or gutters*
- *Open top box culverts and waterbars*
- *Rolling dips and road sloping*
- *Roadway surface water deflector*
- *Culverts*

- **Runoff Dispersion.** Drainage systems are most effective when used in conjunction with runoff dispersion devises designed to slow the flow of water discharged from a site. These devices also aid stormwater infiltration into the soil and flow attenuation. Some examples of velocity dissipation devices include:
  - *Check dams*
  - *Rock outlet protection*
  - *Level spreaders*
  - *Serrated slopes and benched slopes*
  - *Contouring*
  - *Drop structures*

- **Sediment Control and Collection.** Erosion and sediment controls limit movement and retains sediments, preventing transportation offsite. Several structural collection devices have been developed to remove sediment from runoff before it leaves the site. Several methods of removing sediment from site runoff involve diversion mechanisms previously discussed, supplemented by a trapping or storage device. Structural practices typically involve filtering diffuse stormwater flows through temporary structures such as straw bale dikes, silt fences, brush barriers or vegetated areas.

  Structural practices are typically low in cost. However, structural practices require periodic removal of sediment to remain functional. As such, they may not be appropriate for permanent use at inactive mines. However, these practices may be effectively used as temporary measures along haul roads and access roads. Several examples of sediment control and collection BMPs include:
  - *Gabions, riprap, and native rock retaining walls*
  - *Biotechnical stabilization*
  - *Straw bale barrier*
  - *Vegetated buffer strips*
  - *Silt fence/filter fence*
  - *Siltation berms*
  - *Brush sediment barriers*
  - *Sediment traps or catch basins*
  - *Sediment/settling ponds*

- **Vegetation Practices.** Vegetation practices involve establishing a sustainable ground cover by permanent seeding, mulching, sodding, and other such practices. A vegetative cover reduces the potential for erosion of a site by: absorbing the kinetic energy of raindrops which would otherwise impact soil; intercepting water so it can infiltrate into the ground instead of running off and carrying contaminated discharges; and by slowing the velocity of runoff to promote on-site deposition of sediment. These practices include:
  - *Topsoiling*
  - *Broadcast seeding and drill seeding*

- *Willow cutting establishment*
- *Plastic matting, plastic netting and erosion control blankets*
- *Mulch-straw or wood chips*
- *Compaction*

Typically, the costs of vegetative controls are low relative to other discharge mitigation practices. Given the limited capacity to accept large volumes of runoff, and potential erosion problems associated with large concentrated flows, vegetative controls should typically be used in combination with other management practices.

- **Capping.** Capping or sealing of waste materials is designed to prevent infiltration, as well as to limit contact between discharges and potential sources of contamination. Ultimately, capping should reduce or eliminate the contaminants in discharges. In addition, by reducing infiltration, the potential for seepage and leachate generation may also be lessened.

  In some cases, the elimination of a pollution source through capping contaminant sources may be the most cost effective control measure for discharges from inactive ore mining and dressing facilities. Depending on the type of management practices chosen the cost to eliminate the pollutant source may be very high. Once completed, however, maintenance costs will range from low to nonexistent.

- **Treatment.** In some cases (e.g., low pH and/or high metals concentrations), BMPs, and sediment and erosion controls may not be adequate to produce an acceptable quality of stormwater discharge. Under those circumstances additional physical or chemical treatment systems may be necessary to protect the receiving waters. Treatment practices are those methods of control which normally are thought of as being applied at the "end of the pipe" to reduce the concentration of pollutants in stormwater before it is discharged. This is in contrast to many BMPs, where the emphasis is on keeping the water from becoming contaminated. Treatment practices may be required where flows are currently being affected by exposed materials and other BMPs are insufficient to meet discharge goals. These practices are usually the most resource intensive as they often require significant construction costs and monitoring and maintenance on a frequent and regular basis.

  Treatment options may involve a range of maintenance controls. High maintenance treatment techniques require manpower to operate and maintain the BMP. Low maintenance cost techniques have initial capital costs but operate with low long-term maintenance after being implemented. At a few sites, treatment measures other than high maintenance measures may be appropriate to address specific pollutants. Several examples of treatment BMPs include chemical or physical treatment, oil/water separators, and artificial wetlands.

  An example of a high maintenance technology that is found at many active metal mining facilities is chemical/physical treatment. The most common type of chemical/physical treatment involves the addition of lime or other such caustics to remove metals. Metals may be removed from stormwater by raising the pH of the stormwater to precipitate them out as hydroxides. After metals precipitation, the addition of some form of acid or carbon dioxide may be required to reduce the pH to acceptable levels. Polymer addition may be required to enhance the settling characteristics of the metal hydroxide precipitate. In general, this practice requires significant operator participation to ensure proper neutralization and/or precipitation and thus may not be cost effective for most stormwater discharges.

  Another example of a high maintenance treatment technology is an oil/water separator. An American Petroleum Institute (API) oil/water separator or similar type of treatment device skims oil and settles sludge to remove oil from water. This type of BMP system can be effective for improving water quality either alone or in conjunction with other treatment practices.

  The use of artificial wetlands is another method of treating process wastewater from inactive mines. There has been extensive research on the use of artificial wetlands as a means of mitigating acid mine drainage. They can be an effective system for improving water quality either alone or in conjunction with other treatment practices. The complex hydrologic,

biological, physical, and chemical interactions that take place within a wetland result in a natural reduction and cleansing of influent pollutants. Wetland processes are able to filter sediments and absorb and retain chemical and heavy metal pollutant through biological degradation, transformation, and plant uptake.

Artificial wetlands are designed to maintain a permanent pool of water. Properly installed and maintained retention structures (also known as wet ponds) and artificial wetlands will be most cost-effective when used to control runoff from larger, intensively developed sites. These artificial wetlands are created to provide treatment but also provide a wildlife habitat, and may enhance recreation and landscape amenities.

BMPs for Site Activities

A number of sites and activities found at metal mining facilities require the implementation of BMPs to prevent the contamination of stormwater. Implementation of BMPs are required not only for mineral extraction sites and material piles, but for discharges from roads accessing these sites. Additionally, restabilization must occur with any disturbed areas. An overview of additional BMPs that may be applicable at haul or access roads; pits or quarries; overburden, waste rock, and raw material piles; and reclamation activities are discussed below.

- **Haul Roads and/or Access Roads.** Placement of haul roads or access roads should occur as far as possible from natural drainage areas, lakes, ponds, wetlands, or floodplains where soil will naturally be less stable for heavy vehicle traffic. If a haul road must be constructed near water, as little vegetation as possible should be removed from between the road and the waterway, as vegetation is a useful buffer against erosion and is an efficient sediment collection mechanism. The width and grade of haul or access roads should be minimal and designed to match natural contours of the area. Construction of haul roads should be supplemented by BMPs that divert runoff from road surfaces, minimize erosion, and direct flow to appropriate channels for discharge to treatment areas or other well-stabilized areas.
- **Equipment/Vehicle Fueling and Maintenance.** Fueling and maintenance activities should be conducted indoors or under cover on an impermeable surface. Berms, curbs, or similar means should be used to ensure that stormwater runoff from other parts of the facility does not flow over maintenance and fueling areas. Runoff from fueling and maintenance areas should be collected and treated or recycled. Proper waste management and spill prevention and response procedures should be implemented. Select good housekeeping procedures to minimize the amount of contaminated runoff generated (e.g. use dry cleanup methods, use drip pans, and drain parts of fluids before disposal). Conduct inspections of fueling areas to prevent problems before they occur.
- **Pits or Quarries.** Excavation of a pit or quarry must be accompanied by BMPs to minimize impacts to area surface waters. As little vegetation as possible should be removed from these areas during excavation activities to minimize exposed soils. In addition, stream channels and other sources of water that may discharge into a pit or quarry should be diverted around that area to prevent contamination.

  BMPs can be used to control total suspended solids levels in runoff from unvegetated areas. These can include sediment/settling ponds, check dams, silt fences, and straw bale barriers.
- **Overburden, Waste Rock, and Raw Material Piles.** Overburden, topsoil, and waste rock, as well as raw material and intermediate and final product stockpiles, should be located away from surface waters, other sources of water and from geologically unstable areas. In addition surface waters and stormwater should be diverted around the piles. As many piles as possible should be revegetated, (even if only on a temporary basis). At closure, remaining piles should be reclaimed.
- **Reclamation Activities.** When a mineral deposit is depleted and operations cease, a mine site must be reclaimed according to appropriate state or federal standards. Closure activities typically include restabilization of disturbed areas such as access or haul roads, pits or

quarries, sedimentation ponds or work-out pits, and remaining waste piles. Overburden and topsoil stockpiles may be used to fill in a pit or quarry (where practical). Recontouring and revegetation should be performed to stabilize soils and prevent erosion.

Major reclamation activities such as recontouring roads and filling in a pit or quarry can only be performed after operations have ceased. However, reclamation activities such as stabilization of banks, reseeding, and revegetation should be implemented in mined out portions, or inactive areas of a site as active mining moves to new areas.

EPA recognizes that quarries are frequently converted into reservoirs, or recreational areas, after the mineral deposit is depleted. However, this does not preclude the reclamation of disturbed areas above the quarry rim.

Typically, the costs of stabilization controls are low relative to other discharge mitigation practices. Given the limited capacity to accept large volumes of runoff, and potential erosion problems associated with large concentrated flows, stabilization controls should typically be used in combination with other management practices. These measures have been documented as particularly appropriate for mining sites.

BMPs for Various Extraction Techniques

Metals are recovered by three basic extraction techniques: surface mining; underground mining; and placer mining. Each type of extraction method may be followed by varying methods of beneficiation and processing. Due to similarities in mining operations for many of the minerals within this industry, activities, significant materials, and materials management practices are fairly uniform.

- **Surface mines.** Materials management practices at surface mines are typically designed to control dust emissions and soil erosion from extraction activities, and offsite transport of significant materials. Settling ponds and impoundments are commonly used to reduce TSS and other contaminants in process generated wastewaters. These controls may also be used to manage stormwater runoff and run-on with potentially few alterations to on-site drainage systems.

  Impoundments are used to manage tailings generated at facilities engaged in flotation or heavy media separation operations. These impoundments are used to manage beneficiation/processing wastewaters generated at the facility and may also be used to manage stormwater runoff.
- **Underground mines.** Materials management practices for significant materials at the surface of underground mining facilities are similar to those materials management practices used at surface mining operations. However, waste rock or mill tailings are in some cases being returned to the mine as fill for the mined-out areas or may be directed to a disposal basin.
- **Placer mines.** Settling ponds are used to manage process wastewaters and are, in some cases, being used to manage contaminated stormwater runoff.
- **Inactive mines.** Inactive mine sites also require implementation of BMPs. Inactive ore mining and dressing operations are those where industrial activities are no longer occurring. When active, mineral extraction could have occurred from surface mines, solution mines, placer operations, or underground mines. These sites require permit coverage until reclaimed because significant materials may remain on-site, and, if exposed, are potential sources of stormwater contamination. Due to the seasonal nature of this industry, mine sites can become temporarily inactive for extended periods of time. Temporarily inactive sites are not viewed the same as permanently inactive sites.

Implement BMPs, such as those listed below in Table 2 for the control of pollutants at metal mining 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 metal mining

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 Metal Mining (Ore Mining and Dressing) Facilities

Pollutant Source	BMPs
Haul Roads and/or Access Roads	❑ Construction of haul roads should be supplemented by BMPs that divert runoff from road surfaces, minimize erosion, and direct flow to appropriate channels for discharge to treatment areas. Examples of BMPs include: - Install dikes, curbs, and berms for discharge diversions. - Install conveyance systems such as channels, gutters, culverts, rolling dips and road sloping, and/or roadway water deflectors. - Use check dams, rock outlet protection, level spreaders, stream alternation and drop structures for runoff dispersion. - Install gabions, riprap, native rock retaining walls, straw bale barriers, sediment traps/catch basins, and vegetated buffer strips for sediment control and collection. - Keep as much vegetation as possible when building roads and seed as necessary. Stabilize soil via willow cutting establishment. ❑ Place as far as possible from natural drainage areas, lakes, ponds, wetlands, or floodplains ❑ Width and grade of roads should be as small as possible to meet regulatory requirements and designed to match the natural contours of the area. ❑ Frequently inspect all stabilization and structural erosion control measures and perform all necessary maintenance and repairs.
Pits/Quarries or Underground Mines	❑ Install dikes, curbs, and berms for discharge diversions. ❑ Install conveyance systems such as channels and gutters to control runoff and run-on. ❑ Use serrated slopes, benched slopes, contouring, and stream alteration to direct uncontaminated discharges away from a pit or quarry. ❑ Install sediment settling ponds, straw bale barrier, and siltation berms. ❑ Keep as much vegetation as possible when excavating and seed as necessary to minimize the amount of exposed soils.
Overburden, Waste Rock, and Raw Material Piles	❑ Overburden, topsoil, waste rock, raw material, or intermediate and final product stockpiles should be located away from surface waters and other sources of run-on, as well as geologically unstable areas. ❑ Install dikes, curbs, and berms for discharge diversions to control runoff and run-on. ❑ Install conveyance systems such as channels and gutters to control runoff and run-on. ❑ Use serrated slopes, benched slopes, contouring, and stream alteration around piles for sediment control and runoff dispersion. ❑ Install plastic matting, plastic netting, erosion control blankets, mulch straw, sediment/settling ponds, silt fences, siltation berms, and/or compaction for sediment control and collection. ❑ Stabilize and recontour piles as necessary. ❑ Vegetate as many piles as possible (involves topsoiling, seedbed preparation, and/or seeding).
Reclamation	❑ Install dikes, curbs, and berms for discharge diversions. ❑ Install conveyance systems such as channels and gutters. ❑ Use check dams, rock outlet protection, level spreaders, stream alternation, drop structures, serrated slopes, drain fields, benched slopes, contouring, and stream alteration for runoff dispersion.

Table 2. BMPs for Potential Pollutant Sources at Metal Mining (Ore Mining and Dressing) Facilities (continued)

Pollutant Source	BMPs
Reclamation (continued)	❑ Install gabions, riprap, native rock retaining walls, straw bale barriers, sediment traps/catch basins, biotechnical stabilization, silt fences, siltation berms, brush sediment barriers, and vegetated buffer strips for sediment control and collection. ❑ Recontouring and vegetation should be performed to stabilize soils and prevent erosion in mined out portions or inactive areas of the site as active mining moves to new areas (includes topsoiling, seedbed preparation, seeding, and willow cutting establishment). ❑ If a quarry is being converted into a reservoir or recreational area, disturbed areas above the quarry rim must still be reclaimed. ❑ Use overburden and topsoil stockpiles to fill in a pit or quarry (when practical).
Equipment/vehicle maintenance	Minimizing Exposure ❑ 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. ❑ If operations are uncovered, perform them on a concrete pad that is impervious and contained. ❑ Park vehicles and equipment indoors or under a roof whenever possible and maintain proper control of oil leaks/spills. ❑ Check vehicles closely for leaks and use pans to collect fluid when leaks occur. Management of Runoff ❑ Use berms, curbs, or other diversion measures to ensure that stormwater runoff from other parts of the facility do not flow over the maintenance area. ❑ Collect the stormwater runoff from the cleaning area and provide treatment or recycling. Discharge vehicle wash or rinse water to the sanitary sewer (if available and 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. Inspections and Training ❑ Inspect the maintenance area regularly for proper implementation of control measures. ❑ Train employees on proper waste control and disposal procedures. Good Housekeeping ❑ 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. ❑ Use drip pans, drain boards, and drying racks to direct drips back into a fluid holding tank for reuse. ❑ Drain all parts of fluids prior to disposal. Oil filters can be crushed and recycled. ❑ 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. ❑ Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly. ❑ Store batteries and other significant materials inside. ❑ Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries). ❑ Maintain an organized inventory of materials. ❑ Eliminate or reduce the number and amount of hazardous materials and waste by substituting nonhazardous or less hazardous materials.

Table 2. BMPs for Potential Pollutant Sources at Metal Mining (Ore Mining and Dressing) Facilities (continued)

Pollutant Source	BMPs
Equipment/vehicle maintenance (continued)	Good Housekeeping (continued) ❑ Clean up leaks, drips, and other spills without using large amounts of water. Use absorbents for dry cleanup whenever possible. ❑ Prohibit the practice of hosing down an area where the practice would result in the discharge of pollutants to a stormwater system. ❑ Clean without using liquid cleaners whenever possible. ❑ Do all cleaning at a centralized station so the solvents stay in one area. ❑ If parts are dipped in liquid, remove them slowly to avoid spills. ❑ Do not pour liquid waste into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
Fueling activities	❑ Conduct fueling operations (including the transfer of fuel from tank trucks) on an impervious or contained pad or under a roof or canopy where possible. Covering should extend beyond spill containment pad to prevent rain from entering. ❑ When fueling in uncovered area, use a concrete pad (asphalt is not chemically resistant to the fuels being handled). ❑ Use drip pans where leaks or spills of fuel can occur and where making and breaking hose connections. ❑ Use fueling hoses with check valves to prevent hose drainage after filling. ❑ Use spill and overflow protection devices. ❑ Keep spill cleanup material readily available. Clean up spills and leaks immediately. ❑ Minimize/eliminate run-on into fueling areas with diversion dikes, berms, curbing, surface grading or other equivalent measures. ❑ Collect stormwater runoff and provide treatment or recycling. ❑ Use dry cleanup methods for fuel area rather than hosing down the fuel area. Follow procedures for sweeping up absorbents as soon as spilled substances have been absorbed. ❑ Perform inspection and preventive maintenance on fuel storage tanks to detect potential leaks before they occur. ❑ Inspect the fueling area to detect problems before they occur. ❑ Train personnel on fueling procedures in the SWPPP. ❑ Provide curbing or posts around fuel pumps to prevent collisions from vehicles. ❑ Discourage "topping off" of fuel tanks.

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**.

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

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Industrial Stormwater

Fact Sheet Series

Sector E: Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities

U.S. EPA Office of Water
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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 discusses stormwater discharges from glass, clay, cement, concrete, and gypsum product manufacturing facilities as described by Standard Industrial Classification (SIC) Major Group 32. Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit:

- Flat glass (SIC 3211)
- Glass containers (SIC 3221)
- Pressed and blown glass, not elsewhere classified (SIC 3229)
- Hydraulic cement (SIC 3241)
- Brick and structural clay tile (SIC 3251)
- Ceramic wall and floor tile (SIC 3253)
- Clay refractories (SIC 3255)
- Structural clay products, not elsewhere classified (SIC 3259)
- Vitreous china plumbing fixtures and china and earthenware fittings (SIC 3261)
- Vitreous table and kitchen articles (SIC 3262)
- Fine earthenware (whiteware) table and kitchen articles (SIC 3263)
- Porcelain electrical supplies (SIC 3264)
- Pottery products, not elsewhere classified (SIC 3269)
- Concrete block and brick (SIC 3271)
- Concrete products, except block and brick (SIC 3272)
- Ready-mix concrete (SIC 3273)
- Gypsum products (SIC 3275)
- Minerals and earths, ground or otherwise treated (SIC 3295)
- Non-clay refractories (SIC 3297)

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 facility's activities?

Pollutants conveyed in stormwater discharges from facilities involved with the manufacturing of glass, clay, cement, concrete, and gypsum product 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 glass, clay, cement, concrete, and gypsum product manufacturing facilities.

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities

Activity	Pollutant Source	Pollutant
Glass Manufacturing		
Storage of materials	Exposed or spilled sand, soda ash, limestone, cullet, and petroleum products	Total suspended solids (TSS), chemical oxygen demand (COD), oil and grease (O&G), pH, lead
Clay Product Manufacturing		
Storage of materials	Exposed ceramic parts, pryophyllite ore, shale, ball clay, fire clay, kaolin, tile, silica, graphite, coke, coal, brick, sawdust, waste oil, and used solvents	TSS, COD, O&G, pH, lead, aluminum, zinc
Material handling, including loading/ unloading	Exposed ceramic parts, liquid chemicals, ammonia, waste oil, used solvents, pryophyllite ore, shale, ball clay, fire clay, kaolin, tile, alumina, silica, graphite, coke, coal, olivine, magnesite magnesium carbonate, brick, sawdust, and wooden pallets	TSS, COD, BOD, TKN, O&G, pH, lead, aluminum, zinc
Forming/drying clay products	Clay, shale, slag, cement, and lime	TSS, pH

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities (continued)

Activity	Pollutant Source	Pollutant
Cement Manufacturing		
Storage of materials	Exposed kiln dust, limestone, shale, coal, clinker, gypsum, clay, slag, and sand	TSS, pH, COD, potassium, sulfate
Material handling	Exposed kiln dust, limestone, shale, coal, clinker, gypsum, clay, slag, anhydrite, and sand	TSS, pH, COD, potassium, sulfate, O&G
Crushing/grinding	Settled dust and ground limestone, cement, oyster shell, chalk, and clinker	TSS, pH
Concrete Product Manufacturing		
Storage of materials	Exposed aggregate (sand and gravel), concrete, shale, clay, limestone, slate, slag, and pumice	TSS, COD, pH
Material handling	Exposed aggregate, concrete, shale, clay, limestone, slate, slag, and pumice as well as spills or leaks of cement, fly ash, admixtures and baghouse settled dust	TSS, COD, pH, lead, iron, zinc
Mixing concrete	Spilled aggregate, cement, and admixture	TSS, pH, COD, lead, iron, zinc
Casting/forming concrete products	Concrete, aggregate, form release agents, reinforcing steel, latex sealants, and bitumastic coatings	TSS, pH, O&G, COD, BOD
Vehicle and equipment washing	Residual aggregate, concrete, admixture, O&G in washwater	TSS, pH, COD, O&G
Gypsum Manufacturing		
Storage of materials	Exposed gypsum rock, synthetic gypsum, recycled gypsum and wallboard, stucco, perlite ore/expanded perlite, and coal	TSS, COD, pH
Material handling	Exposed or spilled gypsum rock, synthetic gypsum, recycled gypsum and wallboard, stucco, perlite ore/expanded perlite, and coal	TSS, pH, COD
Crushing/grinding of gypsum rock	Exposed or spilled gypsum rock and dust	TSS, pH
All Facilities		
Equipment/vehicle maintenance	Leaks or spills of gasoline, diesel, fuel, and fuel oil	O&G, BOD, COD
	Parts cleaning	COD, BOD, O&G, pH
	Waste disposal of solvents, oily rags, oil and gas filters, batteries, coolants, and degreasers	O&G, lead, iron, zinc, aluminum, COD, pH
	Fluid replacement including lubricating fluids, hydraulic fluid, oil transmission fluid, radiator fluids, solvents, and grease	O&G, arsenic, lead, cadmium, chromium, COD, benzene
	Vehicle fueling	Gas/diesel fuel, fuel additives

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 glass, clay, cement, concrete, and gypsum 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.

Pavement Washwaters

A primary source of pollutants in the stormwater discharges from glass, clay, cement, concrete, and gypsum product manufacturing facilities are spilled materials or settled dust from material handling processes. As these materials have the potential for being conveyed in pavement washwater, a primary focus of the pollution prevention plan requirements for these facilities are good housekeeping measures, in particular, sweeping the paved portions of the site surrounding the material handling areas.

When mixed with stormwater, pavement washwaters are authorized under an industrial stormwater permit. However, the accumulated fly ash, cement, aggregate, kiln dust, clay, concrete, or other dry significant materials handled at the facility must be removed in a dry form from the pavement by measures such as sweeping or vacuuming. Washing the paved areas without first removing the accumulated solids may result in the discharge of these pollutants in the washwater unless it is contained on-site or otherwise collected without discharge. Washwaters may be collected into a BMP designed to remove solids prior to discharge, such as sediments basins, retention basins, and other equivalent measures. Where possible, pavement washwater shall be directed to process wastewater treatment or recycling systems.

A number of facilities in the concrete products industry maintain washwater recycle/retention ponds which receive the process wastewater from equipment cleaning and other operations. There ponds may also receive a portion or all of the runoff from the industrial site. These facilities are required to provide an estimate of the depth of the 24-hour duration storm event that would cause the recycle/retention pond to overflow and discharge to receiving waters. Methods to make this estimate can include, but are not limited to, the original design calculations for the recycle/retention pond or historical observation.

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.

Specific good housekeeping practices for glass, clay, cement, concrete, and gypsum product manufacturing facilities include:

- Preventing or minimizing the discharge of spilled cement; aggregate (including sand or gravel); kiln dust; fly ash; settled dust; or other significant material in stormwater from paved portions of the site that are exposed to precipitation.
- Using regular sweeping or other equivalent measures to minimize the presence of these materials.

- Preventing the exposure of fine granular solids (cement, fly ash, kiln dust, etc.) to stormwater where practicable, by storing these materials in enclosed silos/hoppers, buildings, or under other covering.

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.

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.

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 glass, clay, cement, concrete, and gypsum product 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 glass, clay, cement, concrete, and gypsum 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 Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities

Pollutant Sources	BMPs
Storing dry bulk materials including sand, gravel, clay, cement, fly ash, kiln dust, and gypsum	❑ Store materials in an enclosed silo or building. ❑ Cover material storage pile with a tarp or awning. ❑ Confine storage to designated and labeled areas outside of drainage pathways and away from surface waters. ❑ Practice good stockpiling practices such as: storing materials on concrete or asphalt pads; surrounding stockpiles with diversion dikes or curbs to limit run-on and to slow runoff. ❑ Install sediment basins, silt fence, vegetated filter strips, or other sediment removal measures downstream/downslope. ❑ Only store washed sand and gravel outdoors.
Handling bulk materials including sand, gravel, clay, cement, fly ash, kiln dust, and gypsum	❑ Use dust collection systems (e.g., bag houses) to collect airborne particles generated as a result of handling operations. ❑ Promptly dispose of waste materials from dust collection systems and other operations. ❑ Remove spilled material and settled dust from paved portions of the facility by shoveling and sweeping on a regular basis. ❑ Periodically clean material handling equipment and vehicles to remove accumulated dust and residue. ❑ Install sediment basins, silt fence, vegetated filter strips, or other sediment removal measures downstream/downslope. ❑ Train employees in good housekeeping, spill prevention and control, and materials management.
Mixing operations	❑ Use dust collection systems (e.g., bag houses) to collect airborne particles generated as a result of mixing operations. ❑ Remove spilled material and settled dust from the mixing area by shoveling and sweeping on a regular basis. ❑ Clean exposed mixing equipment after mixing operations are complete. ❑ Install sediment basins, silt fence, vegetated filter strips, or other sediment removal measures downstream/downslope. ❑ Train employees in good housekeeping, spill prevention and control, and materials management procedures.
Dust collection	❑ Schedule maintenance of dust collection system and baghouse. ❑ Regularly remove and recycle or dispose of collected dust to minimize exposure to precipitation.
Pouring and curing pre-cast concrete products	❑ Pour and cure precast products in a covered area. ❑ Clean forms in a designated area designed to prevent the discharge of waste materials. ❑ Clean forms before storing outdoors.
Vehicle fueling	❑ Conduct fueling operations (including the transfer of fuel from tank trucks) on an impervious or contained pad or under a roof or canopy where possible. Covering should extend beyond spill containment pad to prevent rain from entering. ❑ When fueling in an uncovered area, conduct fueling operations on a concrete pad (asphalt is not chemically resistant to the fuels being handled). ❑ Use drip pans where leaks or spills of fuel can occur and where making and breaking hose connections. ❑ Use fueling hoses with check valves to prevent hose drainage after filling.

Table 2. BMPS for Potential Pollutant Sources at Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities (continued)

Pollutant Sources	BMPs
Vehicle fueling (continued)	❑ Use spill and overflow protection devices. ❑ Keep spill cleanup materials readily available. Clean up spills and leaks immediately. ❑ Minimize/eliminate run-on into fueling areas with diversion dikes, berms, curbing, surface grading or other equivalent measures. ❑ Collect stormwater runoff and provide treatment or recycling. ❑ Use dry cleanup methods for fuel area rather than hosing down the fuel area. Follow procedures for sweeping up absorbents as soon as spilled substances have been absorbed. ❑ Provide curbing or posts around fuel pumps to prevent collisions from vehicles. ❑ Discourage "topping off" of fuel tanks. ❑ Regularly inspect and perform preventive maintenance on fuel storage tanks to detect potential leaks before they occur. ❑ Inspect the fueling area for leaks and spills. ❑ Train personnel on vehicle fueling BMPs.
Vehicle and equipment washing	Good Housekeeping ❑ Confine vehicle and equipment washing to designated areas outside of drainage pathways, away from surface waters and that drain to recycle ponds or process wastewater treatment systems. ❑ Clean washwater residue from portions of the site that drain offsite. ❑ Train employees on proper procedure for washing vehicles and equipment including a discussion of the appropriate location for vehicle washing.
Vehicle and equipment maintenance	Good Housekeeping ❑ 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. ❑ Do all cleaning at a centralized station so the solvents stay in one area. ❑ If parts are dipped in liquid, remove them slowly to avoid spills. ❑ Use drip pans, drain boards, and drying racks to direct drips back into a fluid holding tank for reuse. ❑ Drain all parts of fluids prior to disposal. Oil filters can be crushed and recycled. ❑ 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. ❑ Clean up leaks, drips, and other spills without using large amounts of water. Use absorbents for dry cleanup whenever possible. ❑ Prohibit the practice of hosing down an area where the practice would result in the discharge of pollutants to a stormwater system. ❑ Do not pour liquid waste into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections. ❑ Maintain an organized inventory of materials. ❑ Eliminate or reduce the number and amount of hazardous materials and waste by substituting nonhazardous or less hazardous materials. ❑ Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries).

Table 2. BMPS for Potential Pollutant Sources at Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities (continued)

Pollutant Sources	BMPs
Vehicle and equipment maintenance (continued)	Good Housekeeping (continued) ❑ Store batteries and other significant materials indoors. ❑ Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers in compliance with RCRA regulations. Minimizing Exposure ❑ 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. ❑ If operations are uncovered, perform them on concrete pad that is impervious and contained. ❑ Park vehicles and equipment indoors or under a roof whenever possible and maintain proper control of oil leaks/spills. ❑ Check vehicles closely for leaks and use pans to collect fluid when leaks occur. Management of Runoff ❑ 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. ❑ 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 surface water. Inspections and Training ❑ Inspect the maintenance area regularly to ensure BMPs are implemented ❑ Train employees on proper waste control and disposal procedures.

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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.

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Where do I get more information?

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References

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Industrial Stormwater

Fact Sheet Series

Sector B: Paper and Allied Products Manufacturing Facilities

U.S. EPA Office of Water
EPA-833-F-06-017
December 2006

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 paper and allied products manufacturing facilities as defined by Standard Industrial Classification (SIC) Major Group Code 26. Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit:

- Pulp mills (SIC 2611)
- Paper mills (SIC 2621)
- Paperboard mills (SIC 2631)
- Paperboard containers and boxes (SIC 2652-2657)
- Converted paper and paperboard products, except containers and boxes (SIC 2671-2679)

Products manufactured by these facilities include newsprint, printing and writing papers, bleached and unbleached packaging paper, glassine, tissue papers, vegetable parchment, greaseproof papers, bleached and unbleached paperboard, special industrial papers, and pulp.

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 measures that will be implemented at your facility to minimize the discharge of these pollutants in runoff from the site. These 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 facility's activities?

Pollutants conveyed in stormwater discharges from facilities involved with the manufacturing of paper 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
- Hydrogeology
- Topography
- Extent of impervious surfaces (e.g., concrete or asphalt)
- Type of ground cover (e.g., vegetation, crushed stone, or dirt)
- 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 paper and allied products manufacturing facilities.

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Paper and Allied Products Manufacturing Facilities

Activity	Pollutant Source	Pollutant
Raw material preparation	Exposure of the generated wood chips, sawdust, and other wood debris	Total suspended solids (TSS) and biochemical oxygen demand (BOD5)
Pulping	Storage of materials used for reclamation of useful pulp	Detergents, solvents, TSS, and BOD
Bleaching	Storage of chemicals used for bleaching of pulp	Hydrosulfite, hypochlorite, chlorine, oxygen, and peroxides
Papermaking	Storage of coatings, when exposed to stormwater	Some mixture of starches, latices, polyvinylacetate, recoverable solvents, TSS, and BOD
Materials loading and unloading, storage, and waste management and disposal	Spills and leaks of materials	Solvents, glues, fuels, oils, lubricants, alcohol, starch, wooden pallets, paper rollstock, waxes, air emissions from solvent recovery processes, baled waste paper, dyes, inks, ammonia, biocides, miscellaneous materials removed during pulping, final products, adhesives, paper wastes, dust and particulates from cyclones used in paper trim activities, resins/polymers, clay slurries
Equipment/vehicle maintenance, repair, and storage	Spills and leaks of materials	Solvents, glues, fuels, oils, lubricants, alcohol, starch, wooden pallets, paper rollstock, waxes, air emissions from solvent recovery processes, baled waste paper, dyes, inks, ammonia, biocides, miscellaneous materials removed during pulping, final products, adhesives, paper wastes, dust and particulates from cyclones used in paper trim activities, resins/polymers, clay slurries
	Parts cleaning	Solvents, oil, heavy metals, acid/alkaline wastes
	Waste disposal of oily rags, oil and gas filters, batteries, coolants, degreasers	Oil, heavy metals, solvents, acids
	Fluid replacement including hydraulic fluid, oil, transmission fluid, radiator fluids, and grease	Oil and grease, arsenic, lead, cadmium, chromium, chemical oxygen demand (COD), and benzene
Vehicle fueling	Diesel fuel	Diesel, gasoline, oil

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 paper 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.

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.

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.

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 paper and allied product 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 paper 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 Paper and Allied Products Manufacturing Facilities

Pollutant Source	BMPs
Loading and unloading areas	❑ Confine storage to designated and labeled areas outside of drainage pathways. ❑ Cover storage areas with a roof or tarp. ❑ Divert stormwater around storage areas with vegetated swales, and/or berms. ❑ Provide secondary containment for storage tanks and drum storage. ❑ Cover dumpsters used for waste paper and other materials. ❑ Store materials on concrete pads to allow for cleanup of spills or leaks. ❑ Expedite recycling process for exposed scrap paper. ❑ Develop and implement spill plans. ❑ Provide for dust and debris collection where cyclones are utilized. ❑ Train employees in spill prevention and control
Storing logs, lumber, and other timber products	❑ Divert stormwater around storage areas with vegetated swales, and/or berms. ❑ Locate storage areas on stable, well-drained soils with slopes of 2–5 percent to prevent ponding. Slopes should be stabilized. ❑ Line storage areas with crushed rock or gravel or porous pavement to promote infiltration, minimize discharge, and provide sediment and erosion control. ❑ Practice good housekeeping measures such as frequent removal of debris, bark, and wood waste. Cleanup methods may include mobile sweepers, scrapers, brow logs, or scoops. ❑ Use properly designed basins for collection, containment, and recycling of log spraying materials. ❑ Use sedimentation measures such as silt fence to control sediment from leaving storage area. ❑ Cover piles to prevent contact with stormwater (use roofs, canopies, soils, sheds, etc.). ❑ For solid wastes use covered containers such as dumpsters or garbage cans that are durable, corrosion resistant, non-absorbent, and/or non-leaking. ❑ For log storage piles, develop a leachate collection system to capture and treat discharges (do not allow leachate to discharge to the storm drain system) ❑ Sweep the log storage yard on a regular basis. ❑ Train employees in good housekeeping measures.

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

Pollutant Source	BMPs
Storing logs, lumber, and other timber products (continued)	❑ Provide secondary containment for chemical storage areas. 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.
Storing chemicals	❑ Properly dispose of chemicals that are no longer in use by taking them to a Hazardous Waste Recycling Center or contracting with a qualified disposal company. ❑ Clearly identify accumulation dates on the outside of waste chemical storage units. ❑ Maintain an inventory of fluid levels to identify leakage. ❑ Locate storage areas away from high traffic areas and surface waters. ❑ Develop and implement spill prevention, containment, and countermeasure (SPCC) plans, if required for your facility. ❑ Provide drip pads/pans where chemicals are transferred from one container to another to allow for recycling of spills and leaks. ❑ Store and handle reactive, ignitable, or flammable liquids in compliance with applicable local fire codes, local zoning codes, and the National Electric Code. ❑ Train employees in spill prevention and control.
Storing liquid fuels	❑ If area is uncovered, connect sump outlet to sanitary sewer (if possible) or to an oil/water separator, catch basin filter, etc. If connecting to a sanitary sewer check with the system operator to ensure that the discharge is acceptable. Above ground tanks ❑ Use secondary containment, such as dikes, 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). 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. ❑ Use double-walled tanks with overflow protection. ❑ Keep liquid transfer nozzles/hoses in secondary containment area. Portable containers/drums ❑ Store drums indoors when possible. ❑ 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 stormwater). ❑ Clearly label drum with its contents.
Vehicle fueling	❑ 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. ❑ When fueling in an uncovered area, conduct fueling operations on a concrete pad (asphalt is not chemically resistant to the fuels being handled). ❑ Use drip pans where leaks or spills of fuel can occur and when making and breaking hose connections. ❑ Use fueling hoses with check valves to prevent hose drainage after filling. ❑ Keep spill cleanup materials readily available. ❑ Clean up spills and leaks immediately. ❑ Use spill and overflow protection devices. ❑ Use curbs or berms to minimize stormwater run-on to fueling areas.

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

Pollutant Source	BMPs
Vehicle fueling (continued)	❑ 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. ❑ Perform inspections and preventive maintenance on fuel storage tanks to detect potential leaks before they occur. ❑ Inspect the fueling area for leaks or spills. ❑ Train personnel on vehicle fueling BMPs. ❑ Provide curbing or posts around fuel pumps to prevent collisions from vehicles. ❑ Discourage "topping off" of fuel tanks.
Equipment/vehicle maintenance	Good Housekeeping ❑ Eliminate floor drains 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. ❑ Prevent and contain spills and drips. ❑ Use drip pans, drain boards, and drying racks to direct drips back into a fluid holding tank for reuse. ❑ Drain all parts of fluids prior to disposal. Oil filters can be crushed and recycled. ❑ 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. ❑ Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers by taking them to a disposal site (check your Phone Book under Hazardous Materials and Waste Services). ❑ Store batteries and other significant material inside. ❑ Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries). ❑ Maintain an organized inventory of materials. ❑ Eliminate or reduce the number and amount of hazardous materials and waste by substituting nonhazardous or less hazardous materials. ❑ Clean up leaks, drips, and other spills without using large amounts of water or liquid cleaners. Use absorbents for dry cleanup whenever possible. ❑ Prohibit the practice of hosing down an area where the practice would result in the discharge of pollutants to a stormwater system. ❑ Conduct all cleaning at a centralized station so the solvents stay in one area. ❑ If parts are dipped in liquid, remove them slowly to avoid spills. ❑ Do not pour liquid waste into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections. Minimizing Exposure ❑ 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. ❑ If operations are uncovered, perform them on concrete pad that is impervious and contained. ❑ Park vehicles and equipment indoors or under a roof whenever possible and maintain proper control of oil leaks/spills. ❑ Check vehicles closely for leaks and use pans to collect fluid when leaks occur.

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

Pollutant Source	BMPs
Equipment/vehicle maintenance (continued)	Management of Runoff ❑ Use berms, curbs, or other diversion measures to ensure that stormwater runoff from other parts of the facility does not flow over the maintenance area. ❑ 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. Inspections and Training ❑ Inspect the maintenance area regularly to ensure above BMPs are implemented. ❑ Train employees on waste control and disposal procedures.

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:

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  www.epa.gov/npdes/stormwater/msgp

Industrial Stormwater

Fact Sheet Series

Sector V: Textile Mills, Apparel, and Other Fabric Product Manufacturing Facilities

U.S. EPA Office of Water
EPA-833-F-06-037
December 2006

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 textile facilities as described by Standard Industrial Classification (SIC) Major Groups 22, 23, and 31 which includes all facilities that produce textiles. Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit:

- Textile mill product facilities (SIC 2211-2299), which typically receive and prepare fibers, transform these materials into fabric or related products, and finish the materials before packaging.
- Apparel facilities (SIC 2311-2399), which typically receive woven or knitted fabric for cutting, sewing, and packaging.
- Leather and leather products (SIC 3131-3199), except leather tanning and finishing (SIC 3111).

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 textile facilities 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 textile facilities.

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Textile Facilities

Activity	Pollutant Source	Pollutant
Outdoor material loading/ unloading	Wooden pallets, spills/leaks from material handling equipment, raw materials, finished products, solvents, dyes	Total suspended solids (TSS), pH, oil and grease, chemical oxygen demand (COD), biochemical oxygen demand (BOD5), heavy metals
Raw material storage and handling	Wool, cotton, synthetics, rayon, other fibers, coal/wood piles, fuels, oil, and/or lubricants	BOD5, COD, TSS, , pH, oil and grease, lead, chromium, and/or benzene
Storage and handling of materials for dyeing	Dyes, dye preservatives, and/or pigments	Copper, phenols, lead, chromium, zinc, aluminum, and/or acids
Storage and handling of materials for scouring and cleaning	Wool, scouring agents, and/or detergents	BOD5, COD, TSS, oil and grease, sulfides, phenols, pH, and/or chromium
Storage and handling of materials for bleaching, printing, finishing, and other activities	Dyes, bleaches, detergents, finishing agents, and/or printing products	BOD5, COD, TSS, oil and grease, sulfides, phenols, pH, chromium, chromium peroxide, and/or acids
Vehicle and equipment fueling	Spills and leaks during fuel transfer, spills due to "topping off" tanks, runoff from fueling areas, washdown of fueling areas, leaking storage tanks, spills of oils, brake fluids, transmission fluids, engine coolants	Gas/diesel fuel, fuel additives, oil, lubricants, heavy metals

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 textile 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.

Specific good housekeeping practices for textile mills, apparel, and other fabric product manufacturing facilities include:

- Plainly labeling and storing all containerized materials (e.g., fuels, petroleum products, solvents, dyes, etc.) in a protected area, away from drains
- Using containment areas or enclosures for materials stored outdoors
- Use an inventory control plan to prevent excessive purchasing of potentially hazardous substances
- For storing empty chemical drums/containers, ensuring the drums/containers are clean (e.g., triple-rinsing) and there is no contact of residuals with precipitation/runoff. Collecting and disposing of washwater from these cleanings properly.
- Regularly cleaning above ground storage tank areas
- Using dry cleanup methods in above ground storage tank areas and fueling areas
- Addressing the replacement or repair of leaking connections, valves, transfer lines, and pipes that may carry chemicals, dyes, or wastewater where applicable

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.

Specific exposure minimization practices for textile mills, apparel, and other fabric product manufacturing facilities include covering fueling areas and covering or enclosing areas where transfer of materials may occur. Since, many processes are typically conducted indoors at textile mills, apparel, and other fabric product manufacturing facilities, then changes in the manufacturing process, such as a switch to less toxic chemicals, can lessen the amount of contamination in stormwater discharges.

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.

Specific runoff management practices for textile mills, apparel, and other fabric product manufacturing facilities include:

- Minimizing runoff of stormwater from areas adjacent to above ground storage tank and fueling areas
- Inserting filters in catch basins adjacent to above ground storage tank areas
- Treating and/or recycling stormwater runoff collected from fueling areas

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 textile 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 textile 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 Textile Facilities

Pollutant Source	BMPs
Outdoor material loading and unloading	❑ Confine loading/unloading activities to a designated area outside drainage pathways and away from surface waters. ❑ Load/unload indoors or in a covered area. ❑ Cover loading/unloading area with permanent cover (e.g., roofs) or temporary cover (e.g., tarps). ❑ Close storm drains during loading/unloading activities in surrounding areas. ❑ Avoid loading/unloading materials in the rain. ❑ Slope the impervious concrete floor or pad to collect spills and leaks and convey them to proper containment and treatment.

Table 2. BMPs for Potential Pollutant Sources at Textile Facilities (continued)

Pollutant Source	BMPs
Outdoor material loading and unloading (continued)	❑ Provide overhangs or door skirts to enclose trailer ends at truck loading/unloading docks. ❑ For rail transfer, a drip pan shall be installed within the rails to collect spillage from the tank. ❑ Where liquid or powdered materials are transferred in bulk to/from truck or rail cars, ensure hose connection points at storage containers are inside containment areas, or drip pans are used in areas where spillage may occur which are not in a containment area. ❑ Install an oil/water separator in catch basins. ❑ Inspect all containers prior to loading/unloading of any raw or spent materials. ❑ Provide diversion berms, dikes or grassed swales around the perimeter of the area to limit run-on. ❑ Dead-end sump where spilled materials could be directed. ❑ Use dry cleanup methods instead of washing the areas down. ❑ Train employees on proper loading/unloading techniques and spill prevention and response.
Chemical storage	❑ Store materials indoors when possible. ❑ Store permanent tanks in a paved area surrounded by a dike system which provides sufficient containment for the larger of either 10 percent of the volume of all containers or 110 percent of the volume of the largest tank. ❑ 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. ❑ Plainly label and store all containerized materials (e.g., fuels, petroleum products, solvents, dyes, etc.) in a protected area, away from drains. ❑ Implement an inventory control plan to prevent excessive purchasing of potentially hazardous substances. ❑ Ensure that empty drums/containers that are being stored are clean and there is no contact of residuals with precipitation/runoff. Collect and dispose of washwater from these cleanings properly. ❑ Store reactive, ignitable, or flammable liquids in compliance with the local fire code, and the National Electric Code. ❑ Regularly clean chemical storage areas. ❑ Restrict access to the chemical storage areas. ❑ Insert filters in adjacent catch basins. ❑ Permanently seal drains within critical areas that may discharge to a storm drain. ❑ Develop and implement spill plans or spill prevention, containment, and countermeasure (SPCC) plans, if required for your facility. ❑ Train employees in spill prevention and control and proper materials management.
Coal pile management	❑ Confine storage to areas outside of drainage pathways and away from surface waters. ❑ Divert stormwater around storage areas with vegetated swales, and/or berms. ❑ Practice good housekeeping measures such as frequent removal of dust and debris. Cleanup methods may include mobile sweepers, scrapers, or scoops. ❑ Use properly designed basins for collection, containment, and recycling of pile spraying materials. ❑ Use control measures such as berms, silt fences or waddles to control sediment from leaving storage area. ❑ Train employees in good housekeeping measures.

Table 2. BMPs for Potential Pollutant Sources at Textile Facilities (continued)

Pollutant Source	BMPs
Material handling: bulk liquid fuel storage	❑ Cover/enclose areas where the transfer of material may occur. ❑ Store permanent tanks in a paved area surrounded by a dike system that provides containment for the larger of either 10 percent of the volume of all containers or 100 percent of the volume of the largest tank. ❑ Tanks should be placed in gravel or concrete paved areas, away from natural drainage paths to waterways (such as parking lot drains). ❑ 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. ❑ Use double-walled tanks with overflow protection. ❑ Keep liquid transfer nozzles/hoses in secondary containment area. ❑ Inspect storage tanks to detect potential leaks and perform preventive maintenance. ❑ Inspect piping systems (pipes, pumps, flanges, couplings, hoses, valves) for failures or leaks. Develop and implement spill plans. ❑ Train employees on proper filling and transfer procedures, spill prevention and control.
Material handling: containerized material storage	❑ Store drums indoors when possible. ❑ 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). ❑ 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). ❑ If storing empty chemical drums, triple-rinse containers and collect discharge waters from washings. ❑ Clearly label drum with its contents. ❑ Educate personnel for proper storage, use, cleanup, and disposal of materials.
Material handling: designated material mixing areas	❑ Cover and enclose areas where the transfer of materials may occur. ❑ Mix solvents in designated areas away from drains, ditches, and surface waters. ❑ Never wash drums in the mix kitchen or dispose of obsolete dyes and chemicals down the drain. ❑ When a new drum is opened, the old drum should be emptied or drained thoroughly into the new drum.
Waste management	❑ Store waste in enclosed and/or covered areas. ❑ Store wastes in covered, leak proof containers (e.g., dumpsters, drums). ❑ Cover the dumpsters or move them indoors. ❑ Use linked dumpsters that do not leak. ❑ Provide a lining for the dumpsters. ❑ Direct runoff to on-site retention pond. ❑ Ensure hazardous and solid waste disposal practices are performed in accordance with applicable federal, state, and local requirements. ❑ Ship all wastes to offsite licensed landfills or treatment facilities.

Table 2. BMPs for Potential Pollutant Sources at Textile Facilities (continued)

Pollutant Source	BMPs
Vehicle and equipment fueling	❑ Conduct fueling operations (including the transfer of fuel from tank trucks) on an impervious or contained pad or under a roof or canopy where possible. Covering should extend beyond spill containment pad to prevent rain from entering. ❑ When fueling in uncovered area, use concrete pad (not asphalt). ❑ Use drip pans where leaks or spills of fuel can occur and where making and breaking hose connections. ❑ Use fueling hoses with check valves to prevent hose drainage after filling. ❑ Minimize/eliminate run-on onto fueling areas with diversion dikes, berms, curbing, surface grading or other equivalent measures. ❑ Collect stormwater runoff and provide treatment or recycling. ❑ Use dry cleanup methods for fuel area rather than hosing the fuel area down. Clean up spills and leaks immediately. ❑ Discourage topping off of fuel tanks. ❑ Regularly inspect and perform preventive maintenance on storage tanks to detect potential leaks before they occur. ❑ Inspect the fueling area for leaks and spills. ❑ Train personnel on fueling BMPs. ❑ Provide curbing or posts around fuel pumps to prevent collisions during vehicle ingress and egress.

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:

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Industrial Stormwater

Fact Sheet Series

Sector AA: Fabricated Metal Products Manufacturing Facilities

U.S. EPA Office of Water
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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 the fabricated metal products manufacturing facilities as defined by Standard Industrial Classification (SIC) Major Groups 34 and 39. Facilities and products in this group fall under the following categories, all of which require coverage under an industrial stormwater permit:

- Fabricated metal products, except machinery and transportation equipment and cutting (SIC 3411-3499)
- Jewelry, silverware, and plated ware (SIC 3911-3915)
- Coating, engraving, and allied services (SIC 3479)

This fact sheet does not cover discharges from establishments not requiring permit coverage including those engaged in manufacturing and rolling of ferrous and nonferrous metals, forgings or stampings, electrolytic, or other processes for refining copper from ore.

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 facility's activities?

Pollutants conveyed in stormwater discharges from facilities involved with the manufacturing of fabricated metal 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 fabricated metal products manufacturing facilities.

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Fabricated Metal Products Manufacturing Facilities

Activity	Pollutant Source	Pollutant
Tool workpiece interface/ shaving, chipping	Used metal working fluid with fine metal dust	Total suspended solids (TSS), chemical oxygen demand (COD), oil and grease
Parts/tools cleaning, sand blasting, metal surface cleaning, removal of applied chemicals	Solvent cleaners, abrasive cleaners, alkaline cleaners, acid cleaners, rinse waters	Spent solvents, TSS, acid/alkaline waste, oil
	Solvents, cold and hot dips, cleaning parts, degreasing	Acid, coolants, clean composition, degreaser, mineral spirits, pickle liquor, spent caustic, sludge.
Making structural components	Cuttings, scraps, turnings, fines	Metals
Painting operations	Paint and paint thinner spills, sanding, spray painting	Paints, spent solvents, heavy metals, TSS
	Empty containers, paint application wastes, spills, over spraying, storage areas	Paint wastes, thinner, varnish, heavy metals, spent chlorinated solvents
Cleanup of spills and drips	Used absorbent materials	TSS, spilled material
Transportation or storage of materials	Wood dunnage/pallets	BOD, TSS
Metal preparation	Grinding, welding, sawing, shaving, brazing, bending, cutting, etching	Steel scraps, aluminum scraps, brass, copper, dust, chips and borings, steel scale, teflon, manganese.
Surface treatment	Finishing, plating, case hardening, chemical coating, coating, polishing, rinsing, abrasive cleaning, electroplating	Acid, aromatic solvent, corn cob, lubricants, sand, oil, pH, nitrates, nitrites, carbon, phosphates, borates, nitrogen, oily sludge, nickel, chromium, hydrofluoric acid.
Galvanizing	Spills, leaks, transporting materials	Acid solution, phosphates, zinc chromate, hexavalent chromium, nickel.
Heavy equipment use and storage	Leaking fluids, fluids replacement, washing equipment, use on poor surface area, soil disturbance	Oil, heavy metals, organics, fuels, TSS, hydraulic oil, diesel fuel, gasoline
Equipment/vehicle maintenance	Leaking fluids, fluids replacement, washing equipment	Oil, grease
	Vehicle fueling	Gas/diesel fuel, fuel additives

Table 1. Common Activities, Pollutant Sources, and Associated Pollutants at Fabricated Metal Products Manufacturing Facilities (continued)

Activity	Pollutant Source	Pollutant
Storage of uncoated structural steel	Stored on porous pavement	Aluminum, lead, zinc, copper, iron, oxide, oil, nickel, manganese.
Storing galvanized steel directly on the ground	Galvanizing material drippage or leaching	Metals: zinc, nickel, cadmium, chromium.
Vehicle/equipment traffic	Soil disturbance and erosion	TSS from erosion, hydraulic fluid loss/spillage
Cleaning equipment/vehicles	Chemicals disposed improperly, spillage	Oil, grease, surfactants, chromates, acid, hydroxide, nitric acid

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 fabricated metal products 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.

Measures to control pollutants at metal fabricating operations should focus primarily on the storage of waste and raw materials, chemical storage areas, and equipment storage and service areas. Since most of the operations occur indoors, procedures are often only needed to minimize exposure of pollutants to stormwater runoff in association with the handling and transporting of materials. Of primary importance is the control of activities and use of chemicals that have been identified as potential sources of pollutants.

The most effective discharge controls for these facilities are BMPs targeted toward source control. This includes utilizing inside storage as much as possible and implementing programs for recycling scrap materials. Many of these practices require the use of covers, indoor storage, and indoor operations. Some structural measures would provide an additional control to reduce the potential for exposure at these facilities. These include source reduction diversion dikes, grass swales, vegetative covers, and sedimentation ponds. Preventive controls are typically low in cost and relatively easy to implement, as the majority of the facilities in this industry already employ these practices. In addition, directing flows to privately owned treatment works or retention ponds will be the most effective measure.

The industry also must give consideration to the non-stormwater discharges associated with improper disposal of materials from the indoor processes due to the extensive use of chemicals in the preparation and finishing phases of metal preparation and fabrication. The industry also involves grinding, welding, and sanding operations that will require special consideration to control potential pollutants that could accumulate and be subject to stormwater runoff.

Most of the measures commonly implemented to reduce pollutants in stormwater associated with the fabricated metals industry are generally uncomplicated practices. Some of the practices may be predicated on the size of the operation, the types of processes that are exercised from a full-scale plant operation to a more specialized company that conducts only a portion of the operations usually found in the fabricating industry.

All fabricated metal products facilities should implement BMPs in the following areas of the site:

- Metal fabricating areas
- Storage areas for raw metal
- Receiving, unloading, and loading areas
- Heavy equipment storage
- Metal working fluid areas
- Unprotected liquid storage tanks
- Chemical cleaners and rinse water
- Raw steel collection areas
- Paints and painting equipment
- Vehicle and equipment maintenance areas
- Hazardous waste storage areas
- Transporting chemicals to storage areas
- Finished products (galvanized)
- Wooden pallets and empty drums

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.

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.

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.

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 fabricated metal product 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 fabricated metal 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 Fabricated Metal Products Manufacturing Facilities

Pollutant Source	BMPs
Metal fabricating areas	❑ Sweep fabrication areas frequently to avoid heavy accumulation of steel ingots, fines, and scrap. ❑ Absorb dust through a vacuum system to avoid accumulation on roof tops and onto the ground. ❑ Sweep all accessible paved areas on a regular basis. ❑ Maintain floors in a clean and dry condition using dry cleanup techniques. ❑ Remove waste and dispose of regularly. ❑ Train employees on good housekeeping measures.
Raw material storage areas	❑ Store materials in a covered area whenever possible. ❑ Organize storage areas so there is easy access in case of a spill. ❑ Label stored materials to aid in identifying spill contents. ❑ Minimize the amount of material stored to avoid corrosive activity from long-term exposed materials. ❑ Dike or berm the area to prevent or minimize run-on. ❑ Keep area neat and orderly; stack neatly on pallets or off the ground. ❑ Cover exposed materials.
Receiving, unloading, and loading areas	❑ Confine loading/unloading activities to designated areas outside drainage pathways and away from surface waters. ❑ Close storm drains during loading/unloading activities in surrounding areas.

Table 2. BMPs for Potential Pollutant Sources at Fabricated Metal Products Manufacturing Facilities (continued)

Pollutant Source	BMPs
Receiving, unloading, and loading areas (continued)	❑ Use a dead-end sump where materials could be directed. ❑ Inspect containers for leaks or damage prior to loading/unloading. ❑ Avoid loading/unloading materials in the rain or provide cover or other protection for loading docks. ❑ Provide diversion berms, dikes or grassed swales around the perimeter of the area to limit run-on. ❑ Cover loading and unloading areas and perform these activities on an impervious pad to enable easy collection of spilled materials. ❑ Slope the impervious concrete floor or pad to collect spills and leaks and convey them to proper containment and treatment. ❑ Provide overhangs or door skirts to enclose trailer ends at truck loading/unloading docks ❑ For rail transfer, a drip pan shall be installed within the rails to collect spillage from the tank. ❑ Where liquid or powdered materials are transferred in bulk to/from truck or rail cars, ensure hose connection points at storage containers are inside containment areas, or drip pans are used in areas where spillage may occur which are not in a containment area. ❑ Enclose material handling systems. ❑ Cover materials entering and leaving areas. ❑ Use dry cleanup methods instead of washing the areas down. ❑ Regularly sweep area to minimize debris on the ground. ❑ Provide dust control if necessary. When controlling dust, sweep and/or apply water or materials that will not impact surface or ground water. ❑ Develop and implement spill prevention, containment, and countermeasure (SPCC) plans. ❑ Train employees in spill prevention, control, cleanup, and proper materials management techniques.
Heavy equipment storage areas	❑ Vehicles should be stored indoors when possible. ❑ If stored outdoors, use gravel, concrete, or other porous surfaces to minimize or prevent heavy equipment from creating ditches or other conveyances that would cause sedimentation runoff and increase TSS loadings. ❑ Provide covering for outdoor storage areas. ❑ Divert drainage to the grass swales, filter strips, retention ponds, or holding tanks. ❑ Direct drainage systems away from high traffic areas into collection systems. ❑ Clean equipment prior to storage.
Metal working fluid areas	❑ Store used metal working fluid with fine metal dust indoors. ❑ Use tight sealing lids on all fluid containers. ❑ Use straw, clay absorbents, sawdust, or synthetic absorbents to confine or contain any spills. ❑ Establish recycling programs for used fluids when possible. ❑ Conduct daily inspections of each machine to identify problems and trends and reduce fluid waste.

Table 2. BMPs for Potential Pollutant Sources at Fabricated Metal Products Manufacturing Facilities (continued)

Pollutant Source	BMPs
Metal working fluid areas (continued)	❑ Use pumps, spigots, and funnels when transferring metal working fluid to reduce the amount of lost fluid and the risk of spilling fluids. ❑ Fix leaking seals and gadgets to prevent leaks.
Unprotected liquid storage tanks	❑ If area is uncovered, connect sump outlet to sanitary sewer (if possible) or an oil/water separator, catch basin filter, etc. If connecting to a sanitary sewer check with the system operator to ensure that the discharge is acceptable. If implementing separator or filter technologies ensure that regular inspections and maintenance procedures are in place. ❑ Develop and implement spill plans. ❑ Train employees in spill prevention and control. Above ground tanks ❑ Provide secondary containment, such as dikes, 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). ❑ 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. ❑ Use double-walled tanks. ❑ Keep liquid transfer nozzles/hoses in secondary containment area. ❑ Include overflow protection. Portable containers/drums ❑ Store drums indoors when possible. ❑ 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). ❑ 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). ❑ Clearly label drum with its contents.
Chemical cleaners and rinse water	❑ Use drip pans and other spill devices to collect spills or solvents and other liquid cleaners. ❑ Recycle wastewater. ❑ Store recyclable waste indoors or in covered containers. ❑ Substitute nontoxic cleaning agents when possible.
Raw steel collection areas	❑ Keep collection areas clean. ❑ Keep materials in a covered storage bin or inside until pickup. ❑ Collect scrap metals, fines, iron dust and store under cover and recycle.
Paints and painting equipment	❑ Paint and sand indoors when possible. ❑ If done outside, enclose sanding and painting areas with tarps or plastic sheeting. ❑ Avoid painting and sandblasting operations outdoors in windy weather conditions. ❑ Use tarps, drip pans, or other spill collection devices to contain and collect spills. ❑ Use effective spray equipment that delivers more paint to the target and less overspray. ❑ Mix paints and solvents in designated areas away from drains, ditches, piers, and surface waters, preferably indoors or under cover.

Table 2. BMPs for Potential Pollutant Sources at Fabricated Metal Products Manufacturing Facilities (continued)

Pollutant Source	BMPs
Paints and painting equipment (continued)	❑ Have absorbent and other cleanup items readily available for immediate cleanup of spills. ❑ Allow empty paint cans to dry before disposal. ❑ Keep paint and paint thinner away from traffic areas to avoid spills. ❑ Recycle paint, paint thinner, and solvents. ❑ Establish and implement effective inventory control to reduce paint waste, including tracking date received and expiration dates. ❑ Use water-based paints when possible. ❑ Train employees to use the spray equipment properly.
Metal chip storage areas	❑ Store waste chips indoors, if possible. ❑ Cover outdoors chip storage containers. ❑ Place chip storage containers on asphalt or concrete surfaces. ❑ Be sure fluid has completely drained before placing chips in storage containers. ❑ Continue draining fluids, if necessary. This can be done as simply as tilting containers towards one end and allowing excess fluids to drain through a hole into a residue container. ❑ Inspect area for leaks or spills. ❑ Monitor and maintain containers on a regular basis. Empty storage or residue containers and do not allow them to overflow.
Hazardous waste storage areas	❑ Cover and/or enclose storage areas (including temporary cover such as a tarp that prevents contact with precipitation). ❑ All hazardous waste must be stored in sealed drums. ❑ Establish centralized satellite drum-storage areas. ❑ Provide secondary containment around chemical storage areas. ❑ 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. ❑ Check for corrosion and leakage of storage containers. ❑ Label materials clearly. ❑ Properly dispose of outdated materials. ❑ Dike or use grass swales, ditches, or other containment to prevent run-on or runoff in case of spills. ❑ Post notices prohibiting dumping of materials into storm drains. ❑ Store containers, drums, and bags away from high traffic routes and surface waters. ❑ Do not stack containers in such a way as to cause leaks or damage to the containers. ❑ Use pallets to store containers when possible. ❑ Store materials with adequate space for traffic without disturbing drums. ❑ Maintain low inventory level of chemicals based on need. ❑ Train employees in spill prevention and control and proper hazardous waste management

Table 2. BMPs for Potential Pollutant Sources at Fabricated Metal Products Manufacturing Facilities (continued)

Pollutant Source	BMPs
Equipment/vehicle maintenance areas	Good Housekeeping ❑ Eliminate floor drains that are connected to the storm or sanitary sewer; if necessary, install a sump that is pumped regularly. ❑ Prevent spills and drips. ❑ Use drip plans, drain boards, and drying racks to direct drips back into a sink or fluid holding tank for reuse. ❑ Drain all parts of fluids prior to disposal. Oil filters can be crushed and recycled. ❑ 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. ❑ Dispose of greasy rags, oil filters, air filters, batteries, spent coolant, and degreasers properly. ❑ Label and track the recycling of waste material (e.g., used oil, spent solvents, batteries). ❑ Maintain an organized inventory of materials. ❑ Eliminate or reduce the number or amount of hazardous materials and waste by substituting nonhazardous or less hazardous materials. ❑ Clean up leaks, drips, and other spills without using large amounts of water. ❑ Prohibit the practice of hosing down an area where the practice would result in the exposure of pollutants to stormwater. ❑ Clean without using liquid cleaners whenever possible. ❑ Perform all cleaning at a centralized station so the solvents stay in one area. ❑ If parts are dipped in liquid, remove them slowly to avoid spills. ❑ Do not pour liquid waste down floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections. Minimizing Exposure ❑ 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. ❑ If operations are uncovered, perform them on concrete pad that is impervious and contained. ❑ Park vehicles and equipment indoors or under a roof whenever possible and maintain proper control of oil leaks/spills ❑ Inspect vehicles closely for leaks and use pans to collect fluid when leaks occur. Management of Runoff ❑ Use berms, curbs, grassed swales or similar means to ensure that stormwater runoff from other parts of the facility does not flow over the maintenance area. ❑ Collect the stormwater runoff from the cleaning area and providing 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 recycled on-site. DO NOT discharge washwater to a storm drain or to surface water. Inspections and Training ❑ Inspect the maintenance area regularly to insure BMPs are implemented. ❑ Train employees on proper waste control and disposal procedures.

Table 2. BMPs for Potential Pollutant Sources at Fabricated Metal Products Manufacturing Facilities (continued)

Pollutant Source	BMPs
Vehicle fueling	❑ Conduct fueling operations (including the transfer of fuel from tank trucks) on an impervious or contained pad or under a roof or canopy where possible. Covering should extend beyond spill containment pad to prevent rain from entering. ❑ When fueling in uncovered area, use a concrete pad (not asphalt - not chemically resistant to the fuels being handled). ❑ Use drip pans where leaks or spills of fuel can occur and where making and breaking hose connections. ❑ Use fueling hoses with check valves to prevent hose drainage after filling. ❑ Use spill and overflow protection devices. ❑ Cleanup spills and leaks immediately. ❑ Minimize/eliminate run-on onto fueling areas. ❑ Collect stormwater runoff and provide treatment or recycling. ❑ Use dry cleanup methods for fuel area rather than hosing the fuel area down. Sweep up absorbents as soon as spilled substances have been absorbed. ❑ Regularly inspect and perform preventive maintenance on storage tanks to detect potential leaks before they occur. ❑ Inspect the fueling area for leaks and spills. ❑ Provide curbing or posts around fuel pumps to prevent collisions from vehicles. ❑ Discourage "topping off" of fuel tanks. ❑ Train personnel on vehicle fueling BMPs.
Vehicle and equipment cleaning	❑ Designate vehicle and equipment wash areas that drain to recycle ponds or process wastewater treatment systems. ❑ Conduct vehicle washing operation indoors or in a covered area. ❑ Clean washwater residue from portions of the site that drain to stormwater discharges. ❑ Train employees on proper procedure for washing vehicles and equipment including a discussion of the appropriate location for vehicle washing.
Transporting chemicals to storage areas	❑ Store drums as close to operational building as possible. ❑ Label all drums with proper warning and handling instructions. ❑ Forklift operators should be trained to avoid puncturing drums.
Finished products (galvanized) storage	❑ Store finished products indoors, on a wooden pallets concrete pad, gravel surface, or other impervious surface.
Wooden pallets and empty drums	❑ Clean contaminated wooden pallets. ❑ Cover empty drums. ❑ Cover contaminated wooden pallets. ❑ Store drums and pallets indoors. ❑ Clean empty drums. ❑ Store pallets and drums on concrete pads.

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 present Multi-Sector General Permits and from the following sources:

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