NASA Ames Research Center
Ames Environmental Procedural Requirements

Chapter 12 - Storm Water Management

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12.1 Applicability

This instruction is applicable to all civil servants and contractor employees, NASA Research Park Partners and tenant personnel at Ames Research Center (Ames) and Crows Landing Flight Facility (Crows Landing).

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12.2 Purpose

This chapter establishes minimum requirements for an Ames Storm Water Pollution Prevention Plan (SWPPP) management program to protect human health and the environment and comply with applicable Federal, state, and local regulations.

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12.3 Policy

It is the policy of the Ames Research Center to:

1. Comply with all pertinent statutory and regulatory requirements and Executive Orders related to storm water pollution prevention management. Ames recognizes and will comply with applicable Federal, state, and local regulations.
2. Consult with Federal, state, and local agencies, as appropriate, about the best techniques and methods to manage storm water pollution prevention, including:
    - U.S. Environmental Protection Agency (EPA)
    - Regional Water Quality Control Board (RWQCB)
    - State Water Resources Control Board (SWRCB)
    - State of California Department of Fish and Game
    - Santa Clara Valley Water District (SCVWD)
3. Promote employee awareness of storm water pollution prevention management through training and active information dissemination.

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12.4 Authority

All relevant Federal, state, and local laws and regulations related to storm water management:

1. Title 40, Code of Federal Regulations, Parts 122, 123, and 124
2. Federal Water Pollution Control Act (Clean Water Act), Section 402(p)
3. Executive Order 12088, amended by Executive Order 12580, Federal Compliance with Pollution Control Standards
4. State and local laws and regulations related to storm water management:
    - California Oil Pollution Control Act
    - California Porter-Cologne Water Quality Control Act
    - National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Associated with Industrial Activity in Santa Clara County to South San Francisco Bay or Its Tributaries (General Permit No. CAS000001).
    - NPDES General waste discharge requirements for discharge or reuse of extracted and treated groundwater resulting from the cleanup of groundwater contaminated by volatile organic compounds ([redacted] .

5. NASA Policy Directive 8800.16, NASA Environmental Management
6. Environmental Excellence for the Twenty-First Century, NASA Strategy Document
7. Ames Management Instruction 8800.4, Ames Environmental Programs

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12.5 Responsibilities

12.5.1 Environmental Services Office, Code QE, (Environmental Office)

1. Identify laws and regulations to which Ames must adhere.
2. Develop Ames policy to comply with the identified laws and regulations.
3. Provide oversight and direction.
4. Provide consultation, services, and support.
5. Prepare the SWPPP and the Ames Storm Water Monitoring Plan.
6. Submit the Storm Water Annual Report to the appropriate regulatory agency.
7. Maintain permits and pay fees.
8. Conduct annual inspections of industrial areas for storm water compliance.
9. Collect and analyze storm water samples.
10. Collect and analyze sample(s) of discharge from emergency pumps during storm or flood events.
11. Collect and analyze samples of Eastern Diked Marsh downgradient of sediment basin for same analysis as sludge.

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12.5.2 All Personnel

1. Conduct all operations in compliance with all applicable storm water regulations, requirements, and permit conditions.
2. Maintain and make available required records, as requested by the Environmental Office, and/or regulatory agencies.
3. Participate and provide input in order to complete plans and reports on time.
4. Provide access for inspections, assessments, and audits by the Environmental Office, and/or regulatory agencies.
5. Implement corrective actions, if required.
6. Obtain training, as required.

7. Maintain training records.
8. Maintain operations in accordance with the Ames SWPPP.
9. Inform the Environmental Office of changes in operations affecting storm water pollution prevention.
10. Maintain good housekeeping procedures in all outdoor areas.

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12.5.3 Facilities Engineering, Code FEF

[redacted]

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12.5.4 Plant Engineering Branch, Code JFP

[redacted]

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12.5.5 Line Management and Contracting Officers Technical Representatives

[redacted]

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12.6 Definitions

12.6.1 Best Management Practice (BMP)

Any program, technology, process, citing criteria, operating method, measure, or device that controls, prevents, removes, or reduces pollution.

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12.6.2 Dry Season

The time period from June 1 to September 30 of each year.

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12.6.3 Effluent

Any gas or liquid emerging from a pipe or similar outlet.

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12.6.4 Groundwater

The part of the subsurface water that is in the zone of saturation.

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12.6.5 Storm Water

Surface runoff associated with a rain fall.

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12.6.6 Storm Water Monitoring Plan

A component of the National Pollutant Discharge Elimination System General Storm Water Permit in which methods and means of sampling storm water are discussed.

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12.6.7 SWPPP

Storm Water Pollution Prevention Plan.

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12.6.8 Storm Water Settling Basin

A human-made basin constructed to slow the movement of storm water in order to allow pollutants to settle out.

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12.6.9 Wet Season

The time period from approximately October 1 to May 31 of each year.

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12.7 Affected Operations

Any outdoor operation that may directly or indirectly come in contact with storm water. Some examples of affected operations are vehicle and equipment maintenance, aircraft maintenance, painting operations, concrete cutting, construction, and landscaping projects.

A threat to the quality of storm water may take many forms. Examples of some potential threats include contamination by solvents, heavy metals, oils, paints, and by erosion and concrete-cutting runoff activities. Even very small amounts of any of these contaminants can have a profound impact on the quality of storm

water runoff.

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12.8 General Management Requirements

Storm water pollution prevention must be managed at all levels according to the hazards present. The following are general storm water pollution prevention management requirements:

1. Keep all hazardous materials away from storm drain access.
2. Maintain and promote good housekeeping measures in all applicable areas.
3. Implement storm water BMPs, as appropriate.
4. Appropriate spill cleanup materials and personal protective equipment must be available in areas where hazardous or other inappropriate materials may come in contact with storm water.
5. Releases must be cleaned up immediately by trained personnel and all releases must be documented.
6. All storage areas must be free of debris and rainwater.
7. All storage areas must be labeled and secured.
8. Dumpsters must remain closed.

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12.9 Specific Management Requirements

12.9.1 Storm Water Best Management Practices

Source control BMPs are operational practices that prevent pollution by reducing potential pollutants at the source. They typically do not require additional maintenance or construction, but can be implemented through common-sense precautions and modest changes in routine operations or maintenance practices.

Ames has developed and implemented storm water best management practices for industrial activities onsite. The BMPs can be found in Appendix A of this chapter.

For information regarding construction activities, the California Storm Water Best Management Practices Handbook for Construction Activity may be obtained through the Environmental Office.

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12.9.2 Employee Training

Employee training, like equipment maintenance, is not so much a best management practice as it is a method by which to implement BMPs. This highlights the importance of training and of integrating the elements of employee training from the individual source control measures into a comprehensive training program.

1. General requirements
    - Integrate training regarding storm water quality management with existing training programs.
    - Identify and implement BMPs.
    - Promote employee ownership of problems and the solutions.
    - Integrate employee feedback into training and BMP implementation.
2. BMP employees shall become familiar with BMPs that relate to their jobs.
3. SWPPP is included in ongoing training programs, including all hazardous waste and hazardous materials management classes.

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12.9.3 Good Housekeeping

1. General requirements
    - Maintain dry and clean floors and ground surfaces.
    - Regularly pick up and dispose of garbage, debris, and waste material.
    - Make sure that equipment is working properly.
    - Routinely inspect for leaks or conditions that could lead to discharges of chemicals or contact of storm water with raw materials, intermediate materials, waste materials, or products.
    - Ensure that spill cleanup procedures are understood by employees.
2. Material storage practices
   Improper storage can result in the release of materials and chemicals that can cause storm water runoff pollution. Proper storage techniques include:
    - Provide adequate aisle space to facilitate material transfer and easy access for inspections.
    - Store containers, drums, and bags away from direct traffic routes

to prevent accidents.
- Stack containers according to manufacturer's instructions to avoid damaging the containers from improper weight distribution.
- Store containers on pallets or similar devices to prevent container corrosion, which can result from moisture on the ground.

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12.9.4 Erosion Prevention

Erosion prevention measures must be employed during any construction and/or grounds maintenance activities.

1. Leave as much vegetation (plants) onsite as possible.
2. Minimize the time that soil is exposed. Water the exposed areas to control dust.
3. Prevent runoff from flowing across disturbed areas (divert the flow to vegetated area).
4. Stabilize the disturbed soils as soon as possible.
5. Slow down the runoff flowing across the site.
6. Provide drainage ways for the increased runoff (use grassy swales rather than concrete drains).
7. Remove sediment from storm water runoff before it leaves the site.

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12.9.5 Spill Prevention and Response

Spills and leaks are a large source of industrial storm water pollutants, and in most cases they are avoidable. Establishing standard operating procedures, along with proper employee training, can reduce accidental releases. Refer to Chapter 13 in this handbook, Spill Prevention Control and Countermeasures and Facility Response Plan.

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12.9.6 Buildings and Grounds Maintenance

Buildings and grounds maintenance includes taking care of landscaped areas around the facility, cleaning parking lots and pavement other than in the area of industrial activity, and cleaning the storm drainage system. Certain normal maintenance activities can generate materials that must be properly disposed

of. Other maintenance activities can enhance water quality if they are carried out more frequently and with a view to avoiding storm water pollution.

1. General requirements
   Prevent or reduce the discharge of pollutants to storm water from buildings and grounds maintenance by washing and cleaning up with as little water as possible, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the storm water collection system.
2. Pesticide/fertilizer management
   - Proper use of pesticides and fertilizers will reduce the risk of discharge to storm water.
   - Pesticide applicators must be licensed with the California Department of Pesticide Regulation and county agricultural commissioners.
   - No person shall:
     - Pollute water supplies or waterways while loading, mixing, or applying pesticides on NASA property.
     - Transport, handle, store, load, apply, or dispose of any pesticide, container, or apparatus in such a manner as to pollute water supplies or waterways, or cause damage or injury to land, humans, plants, or animals.
   - Do not apply pesticides/fertilizers during the wet season, as they may be carried from the site by the next storm.
   - Avoid overwatering, not only to conserve water, but also to avoid the discharge of water that may have become contaminated with nutrients and pesticides.
   - Store pesticides and application equipment in a responsible manner.
   - Properly dispose of used containers.

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12.9.7 Elimination of Non-storm Water Discharges

The Industrial Storm Water General Permit generally prohibits discharges of anything except storm water to the storm drainage system. There are many ways in which nonstorm water from industrial plants can enter the storm drainage system. In most cases, the discharges result from practices that are now illegal, even though they may have been inadvertent or permissible in the past. Discharging industrial process water, building

wastewater, and water from other sources is prohibited, with few exceptions. Unauthorized discharges take two forms:

1. **Illicit connections -**Improper permanent connections that allow wastewater to enter storm drains. Connections that allow sanitary or process wastewater to enter the storm drain are prohibited, including all storm drain connections from indoor drains and sinks.
2. **Illegal dumping -** Releasing of water that has been exposed to industrial activities to the properly connected storm drainage system. Pollutants can be introduced to the storm drains inadvertently, by routine practices that discharge water outdoors, or by routinely discharging wastes, wash water, and other materials to storm drains, catch basins, and other conveyance facilities. A large part of this improper discharge results from employees' lack of understanding, coupled with a lack of readily available, proper routes of discharge. Call the Environmental Office whenever you do not know what to do.

Examples of nonstorm water discharges to the storm water collection system include any water used directly in the manufacturing process (process water), noncontact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, sink and drinking fountain wastewater, sanitary wastes, or other wastewater.

1. General requirements
    - Provide well-marked, proper disposal or collection methods for wastewater wherever you frequently use wash water, discharge cooling water, or produce a liquid waste that might otherwise reach the storm drain.
    - Employee training should especially emphasize proper disposal of non-storm water. Ensure that employees understand that storm drains connect directly to streams and the bay without treatment.
2. Illicit connections
    - Illicit connections to the storm drain system must be corrected as soon as possible. Upon discovery of an illicit connection, immediately notify the Environmental Office.
    - Report schedule for correcting illicit connections to the Environmental Office.
    - Ames reports all illicit connections to the Regional Water Quality Control Board.
3. Recommendations for utilities connected to the storm drain:

- Plug or disconnect/remove all floor drains.
- Remove obsolete sinks, equipment, etc.
- Reroute required connections to the sanitary sewer.

To summarize, the Industrial Storm Water General Permit generally prohibits discharges of anything except storm water to the storm drains. If you have a question regarding a nonstorm water discharge, contact the Environmental Office.

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12.9.8 Outdoor Loading/Unloading of Materials

The loading/unloading of materials usually takes place outside. Loading or unloading of materials occurs in two ways: materials in containers or direct liquid transfer. Materials leaked, spilled, or lost during loading/unloading may collect in the soil or on other surfaces and be carried away in runoff or when the area is cleaned.

1. When materials are received, they shall remain in the travel path only for a time reasonably necessary to transport the materials, but no longer than 24 hours.
2. Use a written operations plan that describes procedures for loading and/or unloading. Encourage the use of drip plans during transfers.
3. Have an emergency spill cleanup plan readily available.
4. Employees trained in spill containment and cleanup should be present during the loading/unloading.
5. Establish depots of cleanup materials next to or near each loading/unloading area, and train employees in their use.
6. Park delivery vehicles so that spills or leaks can be contained.
7. Cover the loading/unloading docks to reduce exposure of materials to rain, if possible.
8. Cover the storm drain inlet during transfer if it is in the proximity of the loading/unloading area.

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12.9.9 Outdoor Process Equipment Operations and Maintenance

Storm water can accumulate pollutants by exposure to numerous small leaks, spills, and other discharges of outdoor equipment.

Large equipment may require specifically designed structural or advanced BMPs to reduce the potential for storm water to contact pollutants. Ordinary precautions, such as those that follow, may suffice for smaller equipment.

Outdoor equipment includes rooftop cooling towers or air conditioners, rooftop air vents for industrial equipment, outdoor air compressors and other service equipment, indoor wet processes where leaks or discharges may discharge to outdoor areas, and material transfer areas, such as loading areas where forklifts or trucks may carry pollutants outdoors on their tires.

1. General requirements
    - Inspect equipment on a regular basis for leaks, malfunctions, and staining on and around the equipment, and other evidence of leaks and discharges.
    - Assign an inspector the responsibility of reporting a spill to the Environmental Office.
    - Develop a routine for taking actions on the report of a spill, cleaning up the spill, and repairing the leak to prevent future spills.
    - If absorbent material is used on a spill, sweep and dispose of material immediately.
    - Place equipment on an impermeable surface, or install a drip pan beneath potential leak points.
    - Construct a simple roof to minimize the amount of rainwater that contacts the equipment and install a berm to prevent runon and runoff. Contact a Fire Protection Engineer to ensure that Uniform Building Code and Uniform Fire Code requirements are met, if required.
2. Air compressors
   Air compressors and other equipment produce small quantities of automatic blowdown water, which commonly contains lubricating oil or other potential pollutants.
    - Blowdown water may not be discharged to any outside areas that flow to the storm drain.
    - Blowdown water must be discharged to the sanitary sewer or into landscaping that is capable of absorbing the quantity of water that is routinely discharged.
3. Electrical Equipment
    - Take care in tapping oil-containing equipment. Avoid drips and leaks whenever possible.
    - Place an absorbent pad with the impervious lining side down under electrical equipment prior to tapping. The absorbent material will retain small drips with

impervious backing inhibiting leakage.

- Properly dispose of oil-contaminated materials. Any PCB-contaminated absorbent materials must be bagged, labeled, and disposed of in accordance with 40 CFR 761.
- For all PCB-containing electrical equipment, follow Ames Procedures for PCB Management found in Chapter 9 of this handbook, Polychlorinated Biphenyl Management. If you have any questions regarding the PCB Program, contact the Environmental Office.

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12.10 Metrics

a. Percent compliance with federal, state, and local storm water regulations

   Goal: 100% compliance

b. Percent of required inspections/observations completed

   Goal: 100% compliance

c. Percent change in discharge of storm water due to redevelopment (volume, flow or discharge of sediment or contaminants into impaired waters)

   Goal: No net increase

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12.11 Sources of Additional Information or Assistance

1. Environmental Office [redacted]
2. Environmental Office (WWW Home Page at http://q.arc.nasa.gov)
3. Ames Storm Water Pollution Prevention Plan
4. California Storm Water Best Management Practices for Construction Activity

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Appendix A: Best Management Practices: Non-Structural

Employee Training Best Management Practices

Description

This Best Management Practice includes training of all personnel who are responsible for: (1) implementing activities identified in the Storm Water Pollution Prevention Plan (SWPPP); (2) conducting inspections, sampling and visual observations and (3) managing storm water. Training should address topics such as good housekeeping, material-handling procedures, preventive maintenance, spill response and actions necessary to implement all Best Management Practices identified in the SWPPP. The SWPPP identifies periodic dates for this training, which is annually offered at Ames Research Complex. Records are maintained of all training sessions held. Employee training, like equipment maintenance, is not so much a best management practice as it is a method by which to implement Best Management Practices. This highlights the importance of training and of integrating the elements of employee training from the individual source control measures into a comprehensive training program.

Targeted Constituents

- Sediments
- Nutrients
- Floatable Materials
- Oxygen Demanding Substances
- Heavy Metals
- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

1. Integrate training regarding storm water quality management with existing training programs.
2. Promote employee ownership of problems and the solutions.
3. Integrate employee feedback into training and Best Management

Practice implementation.

4. Employees shall be trained on the SWPPP, existing Best Management Practices and potential new Best Management Practices.
5. Environmental Compliance / Safety Trainers are employed under the Safety, Health and Medical Services Office, Code QH, and Environmental Services Office, Code QE. Regularly scheduled safety and environmental courses are available to all civil servants at Ames Research Complex and to contract employees on a space-available basis.

Erosion Control And Site Stabilization
Storm Water Best Management Practices

Description

This includes a description of all sediment and erosion control activities. This may include the planting and maintenance of vegetation, diversion of run-on and runoff, placement of sandbags, silt screens or other sediment control devices, etc. Any site where soils are exposed to water and wind can have soil erosion and sedimentation problems. Erosion is a natural process in which soil and rock materials is loosened and removed. Sedimentation occurs when soil particles are suspended in surface runoff or wind and are deposited in streams and other water bodies.

Human activities can accelerate erosion by removing vegetation, compacting or disturbing the soil, changing natural drainage patterns and by covering the ground with impermeable surfaces (pavement, concrete, and buildings). When the land surface is developed or "hardened" in this manner, storm water can not seep into or "infiltrate" the ground. The result is in larger amounts of water moving more quickly across the site, which can carry more sediment and other pollutants to creeks and streams. Because the vegetation primarily consists of marshlands and grasslands, soil erosion prevention is not required in many areas of Ames Research Complex. However, erosion prevention measures are considered during any construction and / or grounds maintenance activities.

Targeted Constituents

- Sediment
- Heavy Metals

- Toxic Materials

Applicability

This Best Management Practice is applicable to all building, construction and landscaping activities at Ames Research Complex.

Requirements

1. Identify areas which, due to topography, activities or other factors, have a high potential for significant soil erosion, and identify structural, vegetative, and / or stabilization measures used to limit erosion,
2. Retain as much vegetation (plants) onsite as possible.
3. Minimize the time that soil is exposed. Water exposed areas to control dust.
4. Prevent runoff from flowing across disturbed areas (divert the flow to vegetated areas).
5. Stabilize the disturbed soils as soon as possible by planting vegetation or hydroseeding.
6. Slow down the run-off flowing across site (regrading, silt fences, planting).
7. Provide drainage ways for the increased run-off (use grassy swales rather than concrete drains).
8. Remove sediment from storm water run-off before it leaves the site.
9. For large piles of soil where tarps or other covers are not feasible, place filtering media (e.g. straw bales, rocks, silt fences, etc.) around the base of each pile or at the storm drain inlet to remove these materials from rainwater run-off.

Good Housekeeping
Best Management Practices

Description

Good housekeeping practices are designed to maintain a clean and orderly work environment. Often the most effective first step towards preventing pollution in storm water from industrial sites simply involves using good common sense to improve the facility's basic housekeeping methods. Poor housekeeping can result in more waste being generated than necessary and an increased potential for storm water contamination. A clean and orderly work area reduces the possibility of accidental spills caused by mishandling of chemicals and equipment, thereby reducing safety

hazards. Well maintained material and chemical storage areas should minimize discharges of materials / pollutants that could contaminate storm water. Simple procedures can be used to promote good housekeeping, including improved operation and maintenance of industrial machinery and processes, material storage practices, material inventory controls, routine and regular clean-up schedules, maintaining well organized work areas, and educational programs.

It is the policy of NASA Ames Research Center that managers as well as line supervisors are responsible for ensuring that personnel are educated in proper environmental hazards management, including storm water pollution prevention.

Targeted Constituents

- Sediments
- Nutrients
- Floatable Materials
- Oxygen Demanding Substances
- Heavy Metals
- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

1. Conduct formal monthly inspections of all buildings and surrounding areas to ensure the following:
    a. Outside areas are cleaned and organized;
    b. Drips, leaks, or evidence of such, from equipment or pipes are contained;
    c. Adequate space in work areas to minimize spill potential;
    d. Garbage removed regularly;
    e. Walkways and passageways easily accessible;
    f. Walkways and passageways free of materials that could be spilled;
    g. Evidence of dust from painting, sanding, or other industrial activities; and
    h. Cleanup procedures for spilled materials exist.

An inspection log should be maintained in order to feed other

environmental reporting requirements at Ames Research Complex. Moreover, a formal annual inspection of Ames Research Complex should be conducted to verify industrial activities in Storm Water Pollution Prevention Plan and identify new activities and Best Management Practices.

2. Conduct annual inventory of chemical substances, including hazardous materials and pollutants that are present on-site. This inventory shall meet the requirements of the OSHA-required inventory of chemicals and toxic substances.
3. Maintain a current file of all MSDS for chemicals and toxic substances.
4. Label chemical containers in accordance with OSHA, EPA, DOT and other applicable federal, state and local requirements.
5. Maintain dry and clean floors and ground surfaces by using brooms, shovels, vacuum cleaners, and cleaning machines.
6. Regularly pickup and dispose of garbage, debris and waste material.
7. Make sure equipment is working properly.
8. Routinely inspect for leaks or conditions that could lead to discharges of chemicals or contact of storm water with raw materials, intermediate materials, waste materials, or products.
9. Ensure that all employees understand spill cleanup procedures.
10. Improper storage can result in the release of materials and chemicals that can cause storm water runoff pollution. Proper storage techniques include:
    a. Providing adequate aisle space to facilitate material transfer and easy access for inspections;
    b. Storing containers, drums and bags away from direct traffic routes to prevent accidental containers from improper weight distribution;
    c. Stacking containers according to manufacturer's instructions to avoid damaging the containers from improper weight distribution; and
    d. Storing containers on pallets or similar devices to prevent container corrosion, which can result from moisture on the ground.
11. Maintain an up-to-date inventory of all materials (hazardous and non-hazardous). This inventory helps to keep material costs down caused by overstocking, enables the tracking of materials stored and handled on site, and identifies which materials and activities pose the most risk to the environment.
12. Clearly mark on the inventory hazardous materials that require special handling, storage, use, and disposal considerations.
13. Keep the work site clean and orderly. Removing debris in a timely fashion. Sweep the area.
14. Cover materials of particular concern such as hazardous materials or sand piles that must remain outdoors, particularly during the rainy,

season.
15. Educate employees who are doing the work.
16. Inform on-site contractors of NASA Ames Research Center policy. Include appropriate provisions in their contract to make certain proper housekeeping and disposal practices are implemented.
17. Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.
18. Do not dump waste liquids down the storm drain.
19. Advise concrete truck drivers to not wash their truck over the storm drain.
20. Cleaning equipment or tools over catch basins is prohibited.

Inspections
Best Management Practices

Description

This Best Management Practice includes, in addition to the preventative maintenance inspections identified in the General Permit, an inspection schedule of all potential pollutant sources. Tracking and follow-up procedures shall be described to ensure adequate corrective actions are taken and Storm Water Pollution Prevention Plans are made.

Targeted Constituents

- Heavy Metals
- Toxic Materials
- Floatable Materials
- Oxygen Demanding Substances
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

1. Identify buildings, facilities and conditions at Ames Research Complex that have a potential to contaminate storm water. This list shall be included in the Storm Water Pollution Prevention Plan and Best Management Practices Handbook.
2. Visually inspect and verify that measures used to eliminate storm

water pollution are working effectively.

3. Specific red flags to visually inspect include:
    a. Corroded drums;
    b. Drums without plugs or covers;
    c. Corroded or damaged tanks, tank supports or tank drain plugs;
    d. Torn bags or bags exposed to rainwater;
    e. Corroded or leaking pipes;
    f. Leaking valves or fittings;
    g. Leaking pumps / hose / nozzle connections;
    h. Broken / cracked dikes, walls, or other containment systems;
    i. Chemicals / dust / materials blown by wind;
    j. Improperly maintained or defective dry chemical conveying systems; and
    k. Recent or ongoing construction activities.

Material Handling and Storage Best Management Practices

Description

This Best Management Practice includes all procedures to minimize the potential for spills and leaks and to minimize exposure of significant materials to storm water and authorized non-storm water discharges. Accidental releases of materials from underground liquid storage tanks, aboveground storage tanks, drums, containers, and dumpsters present the potential for contaminated storm waters with many different pollutants. Materials spilled, leaked or released from storage containers and dumpsters may accumulate in soils or on the surfaces. The materials may then be carried away by storm water runoff. Currently, hazardous materials are stored outdoors at Ames Research Complex. They are secured in secondary contained and roofed chemical storage facilities or lockers. Standard Operating Procedures (SOPs) for each of the materials prohibit materials from contacting storm water runoff in the event of an accident or spill.

This Best Management Practice also addresses the loading and unloading of materials, which usually takes place outside at the NASA Ames Supply Support Facility at [redacted], the Naval Air Reserve Hazardous Materials Warehouse at Moffett Federal Airfield [redacted] and the California Air National Guard [redacted]. Loading or unloading of materials occurs in two ways: Materials in containers or direct liquid transfer. Materials leaked,

spilled or lost during loading / unloading may collect in the soil or on other surfaces and be carried away by runoff or when the area is cleaned. Rainfall may wash pollutants from machinery used to unload or move materials. The loading or unloading may involve rail or truck transfer.

Targeted Constituents

- Floatable Materials
- Oxygen Demanding Substances
- Heavy Metals
- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex, in particular, those areas where containers storing liquid materials are located outside of buildings. It should be noted that the storage of reactive, ignitable or flammable liquids must comply with the California Health and Safety Code, the Santa Clara County Hazardous Materials Storage Ordinance and the Local Fire code.

Requirements

1. Prevent or reduce the discharge of pollutants to storm water from outdoor container storage areas by storing hazardous substances in chemical storage lockers or facilities, installing safeguards against accidental releases, providing secondary containment, conducting weekly inspections and training employees in standard operating procedures and small spill cleanup techniques.
2. Protect materials from rainfall, runoff and wind dispersal by implementing controls such as:
    a. Store materials indoors or in a chemical storage locker;
    b. Cover the storage area with a roof; and
    c. Minimize storm water run-on by enclosing the area or providing a berm.
3. Storage of oil and hazardous materials must meet specific federal, state and local standards including:
    a. Spill Prevention Control and Countermeasure Plan (SPCC);
    b. Secondary containment, integrity and leak detection monitoring; and
    c. Emergency preparedness plans.
4. Operator must be trained in proper storage.
5. All hazardous materials storage areas and hazardous waste

accumulation areas must be inspected weekly. Hazardous materials and hazardous waste inspections must be documented. Documentation must be kept on file for a period of five (5) years. Inspections must include the following questions:

a. Are all materials correctly segregated?
b. Are hazardous materials / waste storage areas clearly identified, describing hazard class(es) of materials in storage?
c. Are all containers (and secondary containment, if needed) labeled to identify the material / waste hazard?
d. Is the secondary containment free of liquid or debris?
e. Are all containers in good condition?
f. Are MSDSs available for all hazardous materials in inventory?

6. Hazardous materials shall be properly stored:
   a. Hazardous materials should be placed in a designated area;
   b. The designated storage area should be covered with a roof;
   c. Designated areas should be paved, free of cracks and gaps and liquid tight in order to contain leaks and spills;
   d. Liquid materials should be secondarily contained to hold 10 percent of the volume of all the containers or 110 percent of the volume of the largest container, whichever is greater;
   e. Drums stored in an area where unauthorized persons may gain access must be secured to prevent accidental spillage, pilferage or any unauthorized use; and
   f. Employees trained in emergency spill cleanup procedures should be present with dangerous waste, liquid chemicals or other wastes are loaded or unloaded.
7. Using engineering safe guards and thus reducing accidental releases of pollutants can prevent operator errors. Safeguards include:
   a. Overflow protection devices on tank systems to warn the operator to automatically shutdown transfer pumps when the tank reaches full capacity;
   b. Protective guards (bollards) around tanks and aboveground piping to prevent vehicle or forklift damage; and
   c. Clearly tagging or labeling all values to reduce human error.
8. Weekly inspections should be conducted to include:
   a. A check for external corrosion and structural failure;
   b. A check for spills and overfills due to operator error;
   c. A check for failure of piping system (pipes, pumps, flanges, coupling, hoses and valves);
   d. A check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa;
   e. Visual inspection of new tank or container installation, loose fittings, loose valves, poor welding and improper or poorly fitted gaskets; and
   f. Inspect tank foundations, connections, coatings, tank walls and exposed piping system. Look for corrosion, leaks, cracks,

scratches and other physical damage that may weaken the tank or container system.

9. Proper use of pesticides and fertilizers will reduce the risk of loss to storm water. In addition:
    a. Pesticide applicators must be licensed with the California Department of Pesticide Regulation and county agricultural commissioners;
    b. No person shall pollute water supplies or waterways while loading, mixing or applying pesticides on Ames Research Complex property;
    c. No person shall transport, handle, store, load, apply or dispose of any pesticide, container or apparatus in such a manner as to pollute water supplies or waterways, or cause damage or injury to land, humans, plants or animals;
    d. Pesticides / fertilizers should not be applied during the wet season as they may be carried from the site by the next storm;
    e. Avoid over-watering not only to conserve water but to avoid the discharge of water which may have become contaminated with nutrients and pesticides;
    f. Store pesticides and application equipment in a responsible manner; and
    g. Properly dispose of the used containers.
10. Storm water from parking lots may contain undesirable concentrations of oil, grease, suspended particulates and metals such as copper, lead, cadmium and zinc, as well as the petroleum byproducts of engine combustion. Deposition of air particulates, generated by the facility or by adjacent industries, may contribute significant amounts of pollutants. Therefore, the following maintenance operations shall occur:
    a. Sweeping of main streets shall be conducted monthly and sweeping of parking lots shall be conducted quarterly. Sweeping should be conducted with a vacuum sweeper, rather than a mechanical brush sweeping device which is not as effective at removing the fine particulates;
    b. Cleaning of catch basins and building laterals shall be conducted annually;
    c. Maintain painted stencils that mark storm drain inlets "No Dumping! Flows to Bay." This stencil will minimize inadvertent dumping of liquid wastes; and
    d. Debris will be disposed of off-center at an approved landfill site.
11. Prevent or reduce the discharge of pollutants to storm water from outdoor loading / unloading of materials through implementation of the following:
    a. When materials are received, they shall remain in the travel path only for a time reasonably necessary to transport the materials but no longer than 24 hours;

b. Use a written operations plan that describes procedures for loading and / or unloading;
c. Have an emergency spill cleanup plan readily available;
d. Employees trained in spill containment and cleanup should be present during the loading / unloading;
e. Establish depots of cleanup materials next to or near each loading / unloading area and train employees in their use;
f. Park delivery vehicles so that spills or leaks can be contained; and
g. Cover the loading / unloading docks to reduce exposure of materials to rain.

Preventive Maintenance
Best Management Practices

Description

Preventative maintenance includes the regular inspection and maintenance of structural storm water controls (catch basins, oil / water separators, etc.) as well as other facility equipment and systems. Certain normal maintenance activities can enhance water quality if they are carried out more frequently and /or in a more deliberate fashion.

Targeted Constituents

- Sediments
- Nutrients
- Floatable Materials
- Oxygen Demanding Substances
- Heavy Metals
- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

1. Prevent or reduce the discharge of pollutants to storm water from buildings and grounds maintenance by washing and cleaning up with as little water as possible, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and

maintaining the storm water collection system.

2. Conduct an inventory of each facility / system / equipment that upon failure could result in discards which may contaminate storm water runoff.
3. Conduct monthly informal inspections of the inventoried equipment that could result in storm water contamination.
4. Equipment to be inspected as part of the preventative maintenance Best Management Practice includes things such as:
    - Pipes
    - Storage tanks and bins
    - Process handling equipment
    - Storm water management devices (oil/water separators, catch basins, and other structural Best Management Practices)
    - Pumps
    - Pressure vessels
    - Secondary containment devices
    - Fuel dispensing pumps
    - Fuel dispensing nozzles.

Quality Assurance
Best Management Practices

Description

This Best Management Practice includes the procedures to ensure that all elements of the Storm Water Pollution Prevention Plan and Monitoring Program are adequately conducted.

Targeted Constituents

- Sediments
- Heavy Metals
- Toxic Materials
- Floatable Materials
- Oxygen Demanding Substances
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

1. Identify buildings, facilities and conditions at Ames Research Complex that have a potential to contaminate storm water. This list shall be included in the Storm Water Pollution Prevention Plan.
2. Visually inspect and verify that measures used to eliminate storm water pollution are working effectively.
3. Annually complete a multi-media compliance self-assessment administered by the NASA Environmental Services Office, Code QE.

Recordkeeping and Internal Reporting Best Management Practices

Description

This Best Management Practice includes the procedures to ensure that all records of inspections, spill maintenance activities, corrective actions, visual observations, etc., are developed, retained, and provided, as necessary, to the appropriate facility personnel.

Targeted Constituents

- Heavy Metals
- Toxic Materials
- Floatable Materials
- Oxygen Demanding Substances
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

1. Records and internal reports are performed regularly as determined by the federal, state and local standards.
2. Internal reports include such information as:
    a. The location of stored materials are proper whether indoors or in a chemical storage locker;
    b. Are all materials correctly segregated;
    c. Are all containers labeled to identify the material / waste and hazard; and
    d. Is the secondary containment free of liquid or debris.
    e. Are all containers in good condition

   f. Are MSDSs available for all hazardous materials in inventory.
3. Weekly inspections of tanks and containers of hazardous materials should be conducted to include:
   a. A check for external corrosion and structural failure;
   b. A check for spills and overfills due to operator error;
   c. A check for failure of piping system (pipes, pumps, flanges, coupling, hoses and valves)
   d. A check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa;
   e. Visual inspection of new tank or container installation, loose fittings, loose valves, poor welding and improper or poorly fitted gaskets; and
   f. Inspect tank foundations, connections, coatings, tank walls and exposed piping system. Look for corrosion, leaks, cracks, scratches and other physical damage that may weaken the tank or container system.
4. Daily inspections of tanks and containers of hazardous waste should be conducted to include:
   a. A check for external corrosion and structural failure;
   b. A check for spills and overfills due to operator error;
   c. A check for failure of piping system (pipes, pumps, flanges, coupling, hoses and valves)
   d. A check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa;
   e. Visual inspection of new tank or container installation, loose fittings, loose valves, poor welding and improper or poorly fitted gaskets; and
   f. Inspect tank foundations, connections, coatings, tank walls and exposed piping system. Look for corrosion, leaks, cracks, scratches and other physical damage that may weaken the tank or container system.

Spill Response And Prevention
Best Management Practices

Description

This includes spill clean-up procedures and necessary clean-up equipment based upon the quantities and locations of significant materials that may spill or leak. Spills and leaks together are one of the largest industrial sources of storm water pollutants, and in most cases are avoidable. The most common causes of unintentional releases and spills include the following:

- Lack of awareness regarding proper hazardous materials handling procedures;
- External corrosion and structural failure of storage containers;
- Improper equipment or facility installation;
- Spills and overfills due to operator error;
- Failure of piping systems (pipes, pumps, couplings, hoses, valves); and
- Leaks during pumping of liquids or gases from trucks to a storage facility and vice-versa.

Establishing standard operating procedures such as safety and spill prevention procedures along with proper employee training can reduce these accidental releases. Avoiding spills and leaks is preferable to cleaning them up after they occur, not only from an environmental standpoint, but also because spills cause increased operating costs and lower productivity.

Targeted Constituents

- Floatable Materials
- Heavy Metals
- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

1. Hazardous materials are segregated according to hazard class, stored in secondary containment to prevent accidental release, labeled according to the container's contents and the material's hazard, and accurately inventoried for reporting to the Environmental Services Office, and to federal, state and local regulatory agencies.
2. Hazardous materials storage areas are equipped with emergency spill response equipment appropriate to the types of materials in use and storage.
3. The hazardous materials storage areas are inspected weekly to ensure that storage requirements are being satisfied.
4. It is the responsibility of managers and supervisors at Ames Research Complex to ensure employee training in these areas:
    a. safe handling of hazardous materials in the employee's work place including spill response, segregation, and secondary containment;

   b. proper disposal of hazardous waste including sewer discharge prohibitions; pickup procedures, and Emergency Response and First Responder Training.
5. Building Emergency Action Plans (BEAPs) are available at each building and include a Hazardous Substance Plan. The Hazardous Substance Plan details the chemical inventory of the building, hazardous substance spill procedure, and hazardous chemicals training.
6. The NASA-Ames Research Center Site Contingency Plan is the guideline for emergency response to incidents involving hazardous materials / hazardous waste and / or hazardous waste constituents. The emergency coordination and notification for incidents involving hazardous waste and / or hazardous materials shall be in accordance with federal, state, and local statutory and regulatory requirements. Contact the Environmental Services Office at [redacted] for additional information.
7. In the event of a spill near a storm drain: block, dike, divert and / or cover the storm drain to prevent a release from entering the storm water system.
8. In the event of a spill that cannot be cleaned up by two people within 1/2 hour with cleanup materials available on the scene, call Ames Dispatch at [redacted] immediately.

Waste handling/Recycling
Best Management Practices

Description

This Best Management Practice includes the procedures or processes to handle, store or dispose of waste materials or recyclable materials. Hazardous waste is accumulated at Ames Facility [redacted] and Moffett Federal Airfield [redacted]. The containment structure of the accumulation areas prohibits materials from contacting storm water runoff. Rainwater captured within the containment structures is pumped to portable holding tanks and the water is characterized. The water is either discharged to the sanitary sewer system or managed as a hazardous waste, as determined from the characterization.

Targeted Constituents

- Heavy Metals
- Toxic Materials
- Floatable Materials
- Oxygen Demanding Substances

- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

1. Prevent or reduce the discharge of pollutants to storm water from outdoor container storage areas by storing hazardous substances in chemical storage lockers or facilities, installing safeguards against accidental releases, providing secondary containment, conducting weekly inspections and training employees in standard operating procedures and small spill cleanup techniques.
2. Protect materials from rainfall, runoff and wind dispersal by implementing controls such as:
   a. Store materials indoors or in a chemical storage locker;
   b. Cover the storage area with a roof; and
   c. Minimize storm water run-on by enclosing the area or providing a berm.
3. Storage of oil and hazardous materials must meet specific federal, state and local standards including:
   a. Spill Prevention Control and Countermeasure Plan (SPCC).
   b. Secondary containment, integrity and leak detection monitoring; and
   c. Emergency preparedness plans.
4. Waste materials and recyclables are segregated according to hazard class, stored in secondary containment to prevent accidental release, labeled according to the container's contents and the material's hazard and accurately inventoried for reporting to the Environmental Services Office and to federal, state and local regulatory agencies.
5. Waste materials and recyclables storage areas are equipped with emergency spill response equipment appropriate to the types of materials.
6. The waste materials and storage areas are inspected weekly to ensure that storage requirements are being satisfied. Hazardous waste inspections must be documented. Documentation must be kept on file for a period of five (5) years. Inspections must include the following questions:
   a. Are all materials correctly segregated?
   b. Are hazardous materials / waste storage areas clearly identified, describing hazard class(es) of materials in storage?
   c. Are all containers (and secondary containment, if needed) labeled to identify the waste material and hazard class?
   d. Are all containers intact and in good condition?

e. It is the responsibility of managers and supervisors at Ames Research Complex to ensure employee training in these areas:
   a. safe handling of hazardous materials in the employee's work place including spill response, segregation and secondary containment;
   b. proper disposal of hazardous waste including sewer discharge prohibitions; pickup procedures, and
   c. Emergency Response and First Responder Training.
f. Building Emergency Action Plans (BEAPs) are available at each building and include a Hazardous Substance Plan. The Hazardous Substance Plan details the chemical inventory of the building, hazardous substance spill procedure and hazardous chemicals training.
g. The NASA-Ames Research Center Site Contingency Plan is the guideline for emergency response to incidents involving hazardous materials / hazardous waste and /or hazardous waste constituents. The emergency coordination and notification for incidents involving hazardous waste and / or hazardous materials shall be in accordance with federal, state and local statutory and regulatory requirements. Contact the NASA Environmental Services Office, [redacted].

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Appendix B: Best Management Practices--Structural

Control Devices
Best Management Practices

Description

This Best Management Practice includes berms or other devices that channel or route run-on and runoff storm water away from pollutant sources.

Targeted Constituents

- Sediments
- Nutrients
- Floatable Materials
- Oxygen Demanding Substances
- Heavy Metals

- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

1. Identify conditions at Ames Research Complex where control device channels or reroutes storm water.
2. Visually inspect and verify that the control device integrity has not been breached.
3. Maintain the storm water drainage system, both the east and west side drainage systems.

Overhead Coverage
Best Management Practices

Description

This Best Management Practice includes structures that provide horizontal coverage of materials, chemicals and pollutant sources from contact with storm water and authorized non-storm water discharges. Materials spilled, leaked or lost from storage containers may accumulate in soils or on the surfaces and be carried away by storm water run-off. It should be noted that the storage of reactive, ignitable, or flammable liquids must comply with fire codes.

Targeted Constituents

- Sediments
- Nutrients
- Floatable Materials
- Oxygen Demanding Substances
- Heavy Metals
- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial

activities at Ames Research Complex where materials are stored out doors [redacted].

Requirements

1. Identify horizontal covered structures at Ames Research Complex that contain materials with the potential to contaminate storm water. This list shall be included in the Storm Water Pollution Prevention Plan.
2. Prevent or reduce the discharge of pollutants to storm water from outdoor storage areas by installing safeguards against accidental releases, installing secondary containment, conducting regular inspections, and training employees in standard operating procedures and spill cleanup techniques.
3. Building Emergency Action Plans (BEAPs) are available at each building and include a Hazardous Substance Plan. The Hazardous Substance Plan details the chemical inventory of the building, hazardous substance spill procedure, and hazardous chemicals training.
4. Weekly inspections will be conducted for hazardous material storage locations. In particular attention will be given to storm water in these locations and proper disposal of storm water.
    a. If rainwater accumulates in the covered area, but does not contain a visible sheen and has not come in contact with any spilled material, it is permissible to discharge the accumulated water onto a grassy or otherwise vegetated area.
    b. If grassy or vegetated areas are not in the proximity of the covered area, it may be permissible for the water to be discharged to the sanitary sewer system. NASA's Environmental Services Office must be notified and grant approval for any discharge of rainwater to the sanitary sewer system.
    c. If water in the covered area does exhibit a visible sheen, or if the potential for pollutants is present, the water must be removed from the area and containerized in drums, tanks, totes, etc. Contact NASA Environmental Services Office to request sampling and analysis and proper disposal procedures.
    d. In the event of spilled materials or rainwater overflow of the covered area, contact the Environmental Office.
5. Other applicable Best Management Practices include
    a. Good Housekeeping
    b. Material Handling and Storage
    c. Spill Response
    d. Waste Handling/Recycling
    e. Employee Training

Retention Ponds
Best Management Practices

Description

This Best Management Practice includes basins, ponds, surface impoundments, bermed areas, etc., which do not allow storm water to discharge from the facility.

Targeted Constituents

- Sediments
- Nutrients
- Floatable Materials
- Oxygen Demanding Substances
- Heavy Metals
- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to the Storm Water Settling Basin and the Storm Water Retention Ponds located on the northwest end of Ames Research Complex.

Requirements

1. The Storm Water Settling Basin passively treats storm water run-off. The storm water flows through the settling basin and pollutants are removed as they adhere to particulates in the water. These particulates then settle out and form sludge at the bottom of the settling basin. An absorbent boom is strung across the settling basin to help trap floating contaminates.
2. Maintenance of the Storm Water Settling Basin will include:
    a. Removal of accumulated sediment should be cleaned before the wet weather season, by mid-August.
    b. Sampling of the sediment and including the results in the Settling Basin Sludge Report.
    c. Replacement of absorbent boom when it is full of oil and visibly heavier, and floats lower in the water.
    d. Sample storm water at the influent and effluent locations during the first storm fall and the last storm fall of the season. Results will be included in the Storm Water Annual Report.
3. The Storm Water Retention Pond collects and passively treats storm water run-off. It is essentially a small lake with rooted wetland

vegetation along the perimeter. The permanent pool of water provides a quiescent volume for continued settling of particulate contaminants and uptake of dissolved contaminants by aquatic plants between storms. The wetland vegetation is present to improve the removal of dissolved contaminants and to reduce the formation of algal mats. The Storm Water Retention Pond helps where the removal of the dissolved constituent fraction is of concern, particularly nutrients and metals. Dissolved contaminants are removed by a combination of processes: physical adsorption to bottom sediments and suspended fine sediments, natural chemical flocculation, and uptake by aquatic plants.

4. Other appropriate Best Management Practices include:
   A. Preventive Maintenance
   B. Material Handling and Storage
   C. Recordkeeping and Internal Reporting
   D. Inspections
   E. Control Devices
   F. Water Treatment

Secondary Containment
Best Management Practices

Description

This Best Management Practice includes containment structures around storage tanks and other areas for the purpose of collecting any leaks or spills. Secondary containment is defined as a level of containment external to, and separate from, the primary containment. Secondary containment must be large enough to contain 110% of the volume of a primary container, or in the case of multiple containers, 150% of the volume of the largest container, or 10% of the aggregate internal volume of all containers. If the storage facility is open to rainfall, the secondary containment must also be able to accommodate the volume of a twenty-four hour rainfall. Rainwater, which accumulates in secondary containments, should be removed as soon as possible. However, pursuant to local regulatory requirements:

- The disposal of rainwater from secondary containment areas directly into the storm drain is prohibited, and
- The disposal of rainwater from secondary containment areas into the sanitary sewer system must be approved by the NASA Environmental Services Office, Code QE, and local regulatory agency.

The Santa Clara County Hazardous Materials Storage Ordinance promotes the protection of life, health, resources and property through prevention and control of unauthorized discharges of hazardous materials. An integral portion of this ordinance involves the use of secondary containment. Complying with local regulations and adopting the requirements listed on the following page to ensure secondary containment areas are clean and pollutant-free and enable the discharge of rainwater from these areas with minimal effort. If operators have any questions or concerns regarding secondary containment, or removal of rainwater from secondary containment, contact the Environmental Office.

Targeted Constituents

Listed below are the targeted constituents that should be prevented from contaminating rainwater that enters secondary containments.

- Heavy Metals
- Toxic / Hazardous Materials
- Oxygen Demanding Substances
- Heavy, Solid, fibrous Matter, or Viscous Substances

Applicability

This Best Management Practice is applicable to all locations where secondary containments exist throughout Ames Research Complex.

Requirements

The following procedures have been developed to ensure that rainwater, which collects in secondary containment, is handled in an appropriate manner. Operators must follow these procedures to ensure that any discharges of rainwater from secondary containments to the environment comply with all applicable regulations:

1. Protect hazardous materials and hazardous material storage areas from rainfall, run-off and wind dispersal when possible.
2. Perform regular inspections to ensure that secondary containment areas are free of spilled materials, trash and rubbish.
3. Train personnel in good housekeeping techniques, standard

operating procedures and any other training which may apply.

4. If rainwater accumulates in secondary containment, but does not contain a visible oily sheen and has not come in contact with any spilled material, it is permissible to discharge the accumulated water onto a grassy or otherwise vegetated area.

   If grassy or vegetated areas are not in the proximity of the secondary containment structure, it may be permissible for the water to be discharged to the sanitary sewer system. NASA Environmental Services Office must be notified and grant approval for any discharge of rainwater to the sanitary sewer.

5. If water in the secondary containment does exhibit a visible sheen, or if the potential for pollutants is present, the water must be removed from the secondary containment and containerized in drums, tanks, totes, etc. Contact the NASA Environmental Services Office to request sampling and analysis and proper disposal procedures.
6. In the event spilled materials or rainwater overflow the secondary containment area, contact the NASA Environmental Services Office.

Water Treatment
Best Management Practices

Description

This Best Management Practice includes groundwater treatment systems, inlet controls, infiltration devices, oil/water separators, retention ponds, vegetative swales, etc., that reduce the pollutants in storm water discharges and authorized non-storm water discharges.

Targeted Constituents

- Sediments
- Floatable Materials
- Oxygen Demanding Substances
- Heavy Metals
- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

1. Identify buildings, facilities and conditions at Ames Research Complex that have a potential for malfunction and contaminate storm water. This list shall be included in the Storm Water Pollution Prevention Plan.
2. Control potential pollutants before discharging water to the storm drain system with the use of oil-absorbent booms. The absorbent material preferentially absorbs oil, and does not fill with water. It can be used on storm water with small concentrations of oily materials. When the boom is spent, it is full of oil and visibly heavier, and floats lower in the water. The booms are inexpensive enough that they may easily be replaced whenever the absorbent is saturated.
3. Maintain oil / water separators regularly to retain its effectiveness and to avoid spilling oily wastes. The separator should be pumped out periodically and replaced with clean water. The separator should be cleaned once before the wet weather season, by mid-September, and then periodically between storms. For inlets that do not carry much flow, three cleanings per year are sufficient: once before the rainy season to remove materials that have accumulated; once after the first major storm; and once at the end of the rainy season to prevent slow loss or evaporation of the collected oily wastes. If flows are heavy, monthly cleaning may be necessary.
4. Groundwater treatment systems effluent that discharges to the storm drain system must comply with general NPDES permit requirements.
   a. Inspect the facility weekly for external corrosion, structural failure, failure of piping system, leaks or spills, loose fittings, loose valves, and other physical damage that may weaken the treatment system.
   b. Functional tests should be performed regularly on equipment to ensure that alarm systems are working properly.
   c. Sampling of influent and effluent waters for constituents of concern shall be done regularly per NPDES permit requirements
5. [redacted] pump station is located at [redacted]. Storm and surface waters are pumped out of the [redacted] concrete vault and into the [redacted]. [redacted] operates with one main and one auxiliary pump. Water level dictates whether one or two pumps operate.
   a. Inspect the facility daily for equipment failure, failure of the piping system, leaks or spills, loose fittings, loose valves, and other physical damage that may weaken the pumping system.

   b. Functional tests should be performed regularly to ensure that systems are working properly.
6. Other applicable Best Management Practices include
   A. Good Housekeeping
   B. Spill Response
   C. Employee Training
   D. Recordkeeping and Internal Reporting
   E. Inspections
   F. Control Devices
   G. Outdoor Process Equipment Operations and Maintenance

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Appendix C: Stormwater Best Management Practices--Site Specific

Aircraft Exhaust and Fueling

Description

Spills from fueling aircraft or from the transfer of fuels to storage tanks can be a significant source of pollution. Fuels carry contaminants of particular concern to human health and wildlife, such as heavy metals, toxic materials, and oil and grease, which are not easily removed by storm water treatment devices. Consequently, control at the source is particularly important. Adequate control can be achieved with careful design of the initial installations, retrofitting of existing installations, and proper spill control and cleanup procedures.

Targeted Constituents

- Oil and Grease
- Petroleum Products
- Antifreeze
- Toxic Materials
- Heavy Metals
- LOCATION
- NASA Fueling Pits
- High Speed Fueling Hydrants
- Aircraft Tarmac

Requirements

1. Prevent fuel spills and leaks, and reduce their impacts to storm water.

2. All aircraft fueling, with the exception of over-the wing fueling of [redacted], is done using single point closed fueling equipment. This equipment prevents vapor release during fueling.
3. All aircraft fueling is done on the concrete ramp. This provides protection to the enviroment in case of spills or leaks
4. Mobile fueling trucks are used to fuel the [redacted] but all fueling is done on the concrete ramp.
5. Clean up of any fuel overflows and spills are done by using dry cleanup methods. Spills are characterized by the actual cleanup requirements and size of spill. Only persons trained in fuel spill cleanup can provide spill response.
6. Post signs that instruct pump operators not to "top off" or overfill gas tanks. Keep dry cleanup materials in the fueling area, and instruct employees in the dry clean up methods described in Section, as seen below. Assign someone responsibility to check the area daily for gasoline, motor oil, or other fluids that may have leaked.
7. NASA Aircraft Fueling and Defueling
    - Follow Code O aircraft fueling and defueling procedures.
    - Cover any storm drains in the vicinity with PIG™ drain blankets.
8. Moffett Aircraft Fueling and Defueling
    - Follow DESC "Personnel Qualifications Standards" for fueling and defueling procedures.
    - Berm surrounding storm drain catch basins - Keep discharge valve in the closed, locked position.
    - During the wet season, monitor water accumulation in bermed area. Discharge only if no sheen is visible on the surface of the water.
9. Reportable Spill
    - A reportable spill is any actual or threatened release of a hazardous material which enters the environment. Examples include:
        - A spill enters a storm drain or ditch.
        - A spill enters the sanitary sewer.
        - A spill contacts soil.
        - Potential injury
    - A spill that results in real or potential injury to persons or the environment is considered reportable. Examples are:
        - A release of a gas, mist or fume which impacts soil, water, or biota.
        - A spill that cannot be cleaned up by two people within 1/2 hour with cleanup materials available on the scene. One example is: a release of a full 55-gallon drum on a shop floor.
10. In the Event of a Reportable Spill
    - Evacuate and deny entry to the affected area. Create barriers or

designate guards to control access and traffic.
    - Call [redacted] and provide all available information. Ames Dispatch will dispatch the on-site spill response team.
    - Ames Dispatch will also notify the Environmental Services Office, who will make the necessary regulatory agency notifications.
11. Non-Reportable Spill
    - Does not escape to the environment.
    - Will not pose a health risk to individuals in the immediate area.
    - Can be controlled and contained with on-hand spill response materials appropriate to the task.
    - The properties of the material are well known to the person(s) to be controlling and containing the spill.
    - The person(s) controlling and containing the spill have had appropriate training.
    - To control and contain the spill requires less than 1/2 hour for two people.
    - Record the event.
12. In the event of a small, non-reportable (but still recordable) spill:
    - Contain and control the spill with available appropriate spill response equipment.
    - Manage spill containment materials as hazardous waste.
    - Record the event.

Aircraft Maintenance

Description

Aircraft maintenance is performed both indoors and outdoors. This Best Management Practice addresses engine testing. The Ames Vertical Take Off and Landing (VTOL) Pad, [redacted], is used to test flight systems in a low-hover or test mode for flight dynamics, acoustics and pilot familiarization. The Outdoor Aerodynamic Research Facility (OARF), [redacted], is used to obtain a wide range of ground-based hover and noise data on full-scale or small-scale rotorcraft, on Vertical/Short Takeoff and Landing aircraft and on propulsion systems. Building [redacted] is the proposed location for engine testing.

Targeted Constituents

- Heavy Metals
- Toxic Materials

- Hydraulic Fuel
- Oil and Grease
- Petroleum Products
- Antifreeze

Applicability

[redacted] - OARF
VTOL Pad
[redacted]--Engine Test Stand

Requirements

Prevent fuel spills and leaks, and reduce their impacts to storm water by:

Install vapor recovery nozzles to help control drips as well as air pollution;

Use a paved area or provide a concrete slab for the fueling area. Concrete is preferred because fuel and oils cause asphalt to deteriorate;

Clean up fuel overflows and spills using dry methods;

Do not allow spills to run off or evaporate;

Do not flush the spill away with a hose. Spread adsorbent material, sweep it up with a broom and dispose of it as hazardous waste;

Keep dry cleanup materials in the fueling area, and instruct employees in the dry clean up methods described below; and

Assign someone responsibility to check the area every day for jet fuel, gasoline, motor oil or other fluids that may have leaked.

Spill cleanup from vehicle and equipment fueling should be performed in the following manner:

Small spills are those which can be wiped up with a shop rag. Store shop rags in a covered rag bin indoor. Do not saturate rags with gasoline, solvents or other volatile liquids;

Medium spills are too large to wipe up with a rag. Contain and soak up a liquid using dry absorbent material. Absorbent "snakes"

may be used as temporary booms to contain and soak up the liquid. Sweep up the used adsorbent and snakes and dispose of them appropriately (contact NASA Environmental Services Office);

Large spills must be contained and then cleaned up. For non-hazardous spills, take steps to contain and clean up the liquid, and minimize the wash water used in cleanup. Shut off or plug storm drain inlets or sewer inlets where the spill may enter.

Comply with the Spill Prevention and Response BMP.

For hazardous materials spills that cannot be cleaned up by two people within 1/2 hour with cleanup materials available on the scene, call Ames Dispatch at [redacted] immediately. For all other hazardous materials spills contact NASA Environmental Services Office at [redacted].

Aircraft Washing And Rinsing

Description

The California State Water Resources Control Board, under authorization of the Environmental Protection Agency (EPA), issues either general or individual permits to regulate industrial storm water discharges. The San Francisco Bay Regional Water Quality Control Board (RWQCB) has issued Moffett Federal Airfield a General Permit for Discharges of Storm Water Associated with Industrial Activity in Santa Clara County to South San Francisco Bay or its Tributaries.

Per the requirements of the General Permit, there are no allowable discharges into the storm drain system other than storm water. Exceptions must be granted by the RWQCB. In order to ensure a high quality of storm water effluent at Moffett Federal Airfield, the following Best Management Practice (BMP) for the washing of display planes has been developed. If any questions arise concerning the following information, please contact the NASA Environmental Services Office (Code QE).

Targeted Constituents

Listed below are the targeted constituents that should be prevented from entering the storm drain system during washing procedures.

- Heavy Metals
- Toxic / Hazardous Materials
- Oxygen Demanding Substances

Applicability

This Best Management Practice is applicable to all locations where planes are washed throughout Ames Research Complex.

Requirements

The following procedures have been developed to ensure that no contaminants enter the storm drain system during the washing of display planes. Operators must follow these procedures to ensure that the quality of storm water discharges from Ames Research Complex is not adversely impacted.

Protect all storm drain inlets from potentially contaminated run-off generated by washing. Storm drain inlets should be securely covered with visqueen, plastic or other such material, prior to any washing activities.

Use only biodegradable soap products. Contact the NASA Environmental Services Office, Code QE, prior to use of any product so that the Material Safety Data Sheet (MSDS) may be reviewed.

Train personnel in good housekeeping techniques, standard operating procedures and any other training which may apply.

If run-off from the washing activities accumulates on the storm water inlet, pump the material into an appropriate container. Contact the Environmental Office in order to ascertain the proper method of disposal.

In the event that contaminated run-off enters the storm drain system, immediately contact the Environmental Office.

Building And Grounds Maintenance

Description

Building and grounds maintenance includes taking care of landscaped areas around the facility, cleaning of parking lots and

pavement other than in the areas of industrial activity, and the cleaning of the storm drainage system. Certain nominal maintenance activities can generate materials that must be properly disposed. Other maintenance activities can enhance water quality if they are carried out more frequently and / or in a more deliberate fashion.

General Maintenance at Ames Research Complex is managed by the Plant Engineering Branch. Maintenance operations are provided by an Ames contractor, Johnson Controls. Facility maintenance is performed in accordance with the guidelines Johnson Controls developed in its Environmental Pollutant Plan, a Maintenance Support Services and Construction Report Requirement.

Targeted Constituents

- Heavy metals
- Oil and grease
- Nutrients
- Hydraulic fluid
- Fuel products
- Pesticides
- Herbicides
- Sediments

Applicability

This Best Management Practice is applicable to all landscaped and industrial activity areas at Ames Research Complex.

Requirements

Prevent or reduce the discharge of pollutants to storm water from buildings and grounds maintenance by washing and cleaning up with as little water as possible, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the storm water collection system.

Pesticide applicators must be licensed with the California Department of Pesticide Regulation and county agricultural commissioners.

No person shall:

Pollute water supplies or waterways while loading,

mixing, or applying pesticides at Ames Research Complex.

Transport, handle, store, load, apply or dispose of any pesticide, container, or apparatus in such a manner as to pollute water supplies or waterways, or cause damage or injury to land, humans, plants, or animals.

Pesticides / fertilizers should not be applied during the wet season as they may be carried from the site by the next storm.

Avoid over-watering not only to conserve water but also to avoid the discharge of water, which may have become contaminated with nutrients and pesticides.

Store pesticides and application equipment in a responsible manner and properly dispose of the used containers.

Use integrated pest management where appropriate.

Sweeping of main streets should be conducted monthly and sweeping of parking lots quarterly. Sweeping should be conducted with a vacuum sweeper, rather than a mechanical brush sweeping which is not as effective at removing the fine particulates.

Cleaning of catch basins and building laterals should be conducted annually.

Maintain painted stencils that mark storm drain inlets "No Dumping! Flows to Bay." This will minimize inadvertent dumping of liquid wastes.

Proper disposal of wash water, sweepings and sediments will be conducted at all times.

Maintain regular equipment maintenance to prevent the release of vehicle fluids (e.g. hydraulic oil, fuel, antifreeze)

Other applicable Best Management Practices include:>

Good Housekeeping

Inspections (tanks, e.g. Emergency Fuel Tanks)

Vehicle/Equipment Maintenance and Repair

Vehicle and Equipment Washing

Building Repair, Remodeling and Construction

Construction, Demolition And Excavation Operations

Description

Construction, demolition and excavation projects generate a great deal of dust, debris, waste materials and wastewaters that when improperly managed can result in prohibited discharges to the storm drainage system. Various construction projects occur at Ames Research Complex throughout the year. A Storm Water Pollution Prevention Plan is required in all contractor specifications. Furthermore, the California Storm Water Best Management Practice Handbook for Construction Activity is made available to construction contractors working at Ames Research Complex.

Targeted Constituents

- Sediment
- Heavy Metals
- Toxic Materials
- Floatable Materials
- Oil and Grease
- Petroleum Products
- Contaminated Groundwater

Applicability

This Best Management Practice is applicable to all construction, demolition and excavation activities at Ames Research Complex that could potentially release pollutants to the storm water.

Requirements

Each job site should be managed in such a manner to avoid discharges of prohibited substances to the storm drain system.

Routine inspection of job site should be performed to ensure that construction, demolition and excavation materials (liquid or solid) are not entering the storm drain system.

Cleaning equipment or tools over catch basins is prohibited.

Keep the job site tidy and clean up debris regularly.

Storm drain catch basins should be covered to prevent pollutants and sediments from entering the storm drain system.

Special precautions should be employed if rain is forecast or if water is applied. These precautions should include, but are not limited to:

Increased monitoring frequency for storm drains and to rectify ongoing releases or to identify and prevent any possible release; and

Reduction in activities that can cause material to come into contact with rain water

Following all construction, demolition and excavation activities; the job site should be swept to remove debris and residue. Catch basins should be vacuumed to remove sediment and debris.

Construction, demolition and excavation materials (gravel, sand, lumber, cement, chemicals, contaminated equipment, etc.) should be stored under a roof or structure or covered with a tarp or plastic visqueen. Covered items should be secured with ropes, sandbags, bricks, etc. to prevent or minimize contact with rainwater. For large piles of soil or other construction materials where tarps or other covers are not feasible, place filtering media (e.g. straw bales, rocks, silt fences, etc.) around the base of each pile or at the storm drain inlet to remove these materials from rainwater run-off. Do not store items near catch basins.

Wet concrete and concrete cutting waters should be conducted to prevent discharge to the storm drains. Blocking off or plugging drains in the vicinity may be warranted. This can be done in a number of ways: placing weighted plastic visqueen over drain, using sandbags or spill control PIGS, etc..

Equipment and machinery that contain residual concrete and concrete / asphalt cutting effluent should not be discharged to the storm drain. Estimate the amount of wastewater that will be generated and arrange to have a storage container (tank) available. Properly dispose of wastewater off-site.

Outdoor concrete work should be postponed if rain is forecast unless precautions are taken to prevent discharge of wet concrete and other construction debris to the storm drain.

During paint scraping operations, use impermeable ground cloths, such as plastic sheeting, to collect dust, paint chips, etc.

Use impermeable ground cloths while painting. Place in-use paint buckets in a pan or over plastic sheeting to ensure that accidental spills are not discharged to the storm drain.

Mixing of paint should take place indoors or in a place that is not exposed to the elements.

At the end of the workday, store paint buckets and other equipment away from contact with storm water in a secured, secondarily contained area.

Treat a paint spill as a chemical spill. Capture the material before it flows to the storm drain. Clean it up promptly. Report the event to NASA Environmental Services Office, [redacted].

Outdoor Sandblasting should comply with the following:

Tarpaulin or ground cloths should be placed beneath work area to capture the blasting medium and particles from the surface being cleaned;

Consider curtailing sandblasting on a windy day, or if rain is forecast to minimize the amount of area that will require clean-up and to avoid sand waste from being washed into the storm drain; and

Vacuum work area when job is complete.

If sandblasting lead paint, comply with the following:

Obtain approval from the Environmental Services Office and the Occupational Safely, Health and Medical Services Office at [redacted];

Follow measures outline in "Outdoor Sandblasting" listed above;

Air monitoring is required; and

Follow OSHA regulations for worker safety.

For broken lines that contain anything other than potable water, the operator shall immediately notify the Environmental Office and initiate the following actions immediately:

Berm the area to prevent run-off to storm drain; and

Immediately block off adjacent storm drain catch basins.

Other applicable General Best Management Practices include:

Good Housekeeping
Erosion Control
Material Handling and Storage
Source Reduction

Display Aircraft Washing And Rinsing

Description

Wash water can contain high concentrations of oil and grease, phosphates (detergents) and metals. These and other potentially harmful substances can pollute storm water when deposited on the ground where they can be picked up by rainfall runoff. The following procedures have been developed to ensure that no contaminants enter the storm drain system during the washing of display planes. Operators must follow these procedures to ensure that the quality of storm water discharges from Moffett Federal Airfield is not adversely impacted.

Targeted Constituents

Listed below are the targeted constituents that should be prevented from entering the storm drain system during washing procedures.

- Heavy Metals
- Toxic / Hazardous Materials
- Oil and Grease
- Sediments
- Floatable Materials
- Oxygen Demanding Substances

Applicability

This Best Management Practice is applicable to the display planes located [redacted].

Requirements

Display planes should be stationed in an area of coarse gravel. The coarse gravel will help protect the area from surface runoff from washing and rinsing activities.

Protect all storm drain inlets from potentially contaminated run-off generated by washing display planes. Storm drain inlets should be securely covered with visqueen, plastic or other such material, prior to any washing activities.

Use only biodegradable soap products. Contact the NASA Environmental Services Office, Code QE, prior to use of any product so that the Material Safety Data Sheet (MSDS) may be reviewed.

If run-off from the washing activities accumulates in the storm water inlet, pump the material into an appropriate container. Contact the NASA Environmental Office in order to ascertain the proper method of disposal.

In the event that contaminated run-off enters the storm drain system, immediately contact the NASA Environmental Office.

Train personnel in good housekeeping techniques, standard operating procedures and any other training which may apply.

Elimination of Non-storm Water Discharges

Description

The Industrial Storm Water General Permit generally prohibits discharges of *anything but storm water* to the storm drainage system. There are many ways in which non-storm water from industrial plants can enter the storm drainage system. In most cases, the discharge results from practices, which are now illegal, even though they may be inadvertent or may have been permissible in the past. Industrial process water, building wastewater and water from other sources are prohibited, with a few exceptions. Inspect your work area(s) to be sure no unauthorized discharges enter the storm drains.

Unauthorized discharges take two forms. **Illicit connections** are improper permanent connections that allow wastewater to enter the storm drains, including some that may have been allowed in the past. Connections that allow sanitary or process wastewater to enter the storm drain are prohibited, including all storm drain connections from indoor drains and sinks. **Illegal dumping** is water that has been exposed to industrial activities, and then released to the properly connected storm drainage system. Pollutants may be introduced to the storm drains inadvertently, by routine practices that discharge water outdoors; or by routinely discharge wastes, wash water and other materials to storm drains, catch basins and other conveyance facilities. A large part of this improper discharge results from employees' lack of understanding, coupled with a lack of readily available proper routes of discharge.

Non-storm water discharges to the storm water collection system may include any water used directly in the manufacturing process (process water). Air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, sink and drinking fountain wastewaters, sanitary wastes or other wastewaters.

Targeted Constituents

- Sediments
- Nutrients
- Floatable Materials
- Oxygen Demanding Substances
- Heavy Metals
- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

Provide well-marked proper disposal or collection methods for wastewater wherever you frequently use wash water, discharge cooling water or produce a liquid waste that might otherwise reach the storm drain.

Employee training should especially emphasize proper disposal of non-storm water. Educate employees to understand that storm drains connect directly to streams and the bay without treatment.

Maintain label on storm drain inlets and catch basins stating "No dumping - Flows to Bay."

Periodically inspect and maintain storm drain inlets. Full inspection of storm water conveyance system shall occur every five years.

Vacuum catch basins and building laterals annually and properly dispose of wastewater.

Illicit connections to the storm drain system must be corrected as soon as possible. Upon discovery of an illicit connection, immediately notify the Environmental Services Office. Report schedule for correcting illicit connections to the Environmental Services Office. NASA will report all illicit connections to the Regional Water Quality Control Board.

Recommendations for Utilities Connected to the Storm Drain:

Plug all floor drains;

Remove obsolete sinks, equipment, etc.; and

Reroute required connections to the sanitary sewer. Notify NASA Environmental Services Office, Code QE, of any industrial discharge to the sanitary sewer.

Ensure employees are properly trained and keep in mind that in general, the Industrial Storm Water General Permit prohibits discharges of anything but storm water to the storm drains.

Fire Department Equipment Testing and Training

Description

The Fire Department is located at Moffett Federal Airfield Facility [redacted] and is operated by the California Air National Guard under contract by the Ames Security Office. The Fire Department is required to test fire-fighting trucks monthly for light water capability. The average quantity of water and Aqueous Film-

Forming Foam (AFFF) solution discharged per truck is 500 gallons. Additional water is added in order to dissipate the foam after it has been dispensed on to a surface area. Discharges from the fire-fighting activities and training are authorized non-storm water discharges per the Regional Water Quality Control Board.

Targeted Constituents

- Heavy Metals
- Oil and Grease
- Antifreeze
- Hydraulic Fuel
- Toxic / Hazardous Materials
- Floatable Materials
- Oxygen Demanding Substances
- Sediments

Applicability

This Best Management Practice is applicable to all areas associated with testing fire equipment and training activities.

Requirements

Minimize water use and direct to landscape when feasible.

Prior to and following the testing or training exercise, the area should be swept to remove debris and residue.

All storm drains in the vicinity of the training exercise must be covered and blocked to prevent discharge of the water from fire suppression activities into the storm drain system.

For training exercises, contact NASA Safety, Health and Medical Services Office, Code QH, to determine if building has any hazardous components; i.e. PCB's, lead and/or asbestos.

If building has any hazardous components, it is requested that they be removed before the training exercise is to commence.

If building has any hazardous components, the water must be collected for sampling and analyzed for its hazardous components.

If water must be contained, postpone training and testing operations if rain is forecast.

For contaminated training water;

Make arrangements to have containers available for the water;

Notify the NASA Environmental Services Office, Code QE, (Environmental Office) to schedule sampling and disposal of water;

During training and testing operations, contain the water (visqueen plastic and / or berms) and pump to a holding container;

If water has been determined to be sewerable by NASA Environmental Office, pump the water to a sanitary sewer manhole; and

If the water has been determined to be non-sewerable, contact the NASA Environmental Office to dispose of off-site.

If the training water is clean, direct training water to landscaping strips when feasible. If this is not feasible and the water has been determined to be sewerable by NASA Environmental Office, collect and pump the water to the sanitary sewer.

If use of landscaping is not feasible or the water has been determined to be non-sewerable, estimate the amount of wastewater that will be generated during the training exercise and arrange to have containers available.

Occupants of buildings downwind of a training burn must be notified in advance, since the smoke may pose a risk. Prevailing winds at Ames Research Complex are from the north.

Fleet Parking

Description

Storm water can accumulate pollutants by exposure to numerous small leaks, spills, and other discharges of parked vehicles. A designated area should be proposed for the parking of fleet vehicles. Designated parking must be at a paved and (preferably) covered facility.

Targeted Constituents

- Oil and Grease
- Heavy Metals
- Antifreeze
- Petroleum Products

Applicability

This Best Management Practice is applicable to all fleet parking at Ames Research Complex [redacted].

Requirements

Inspect vehicles / equipment in the yard for fluid leaks regularly--perhaps with a walk-by inspection for ground staining every day, and a closer visual inspection once a week.

Keep the equipment yard clean and clear of debris, using dry sweeping methods. Do not hose off the area or wash with water because any run-off becomes an illegal discharge to the storm drain.

Develop a routine for taking actions on the report; cleaning up the spill, and repairing the leak to prevent future spills.

If absorbent material is used on a spill, sweep and dispose of material in a timely manner.

Place equipment on an impermeable surface or install a drip pan beneath potential leak points.

Maintain the yard's storm drain inlet with special care. Be sure that they are cleaned on a regular schedule. Pay attention to the kinds of potential pollutants that accumulate so that you can identify the source and take measure to control the sources.

Construct a simple roof to minimize the amount of rainwater that contacts the equipment and install a berm to prevent run-on and run-off.

Fuel Tank Vehicles

Description

Vehicle tank trucks are defined as self propelled vehicles, full trailers, and semi-trailers with or without motive power and carrying part or all of the load as defined in the Uniform Fire Code 9.1222. Releases from tank trucks during aircraft fueling, from the transfer of fuels to or from tank trucks, and from leaking equipment can be a significant source of pollution. Fuels carry contaminates of particular concern to human health and wildlife, such as heavy metals, toxic materials, and oil and grease, which are not easily removed by storm water treatment devices. Consequently, control at the source is particularly important. Adequate control can be achieved through secondary containment of tank vehicles and proper spill control and cleanup procedures.

Targeted Constituents

- Hydraulic Fuel
- Oil and Grease
- Petroleum Products
- Antifreeze

Applicability

NASA Fueling Pits
Moffett Federal Airfield Fueling Pits
[redacted] - Tank Truck Filling Rack
- Moffett Air Operations Facility

Requirements

Prevent fuel spills and leaks, and reduce their impacts to storm water.

Do not park tank vehicles on unpaved surfaces.

Spill kits must be readily available for use by trained personnel.

Tank Vehicles remaining stationary in excess of 72 continuous hours must have a secondary containment system for the tank vehicle. The secondary containment must be large enough to hold 110% of the tank vehicle's fuel storage capacity. Containment systems such as tank truck parking "pads" may be purchased.

For hazardous materials spills that cannot be cleaned up by two people within 1/2 hour with cleanup materials available on the scene, call Ames Dispatch at [redacted] immediately. For all other hazardous materials spills contact NASA Environmental

Services Office at [redacted];

Other appropriate Best Management Practices include:

Good Housekeeping
Aircraft Fueling
Vehicle and Equipment Fueling

Golf Course Maintenance

Description

Onizuka Air Force Base maintains the golf course and performs maintenance on golf course vehicles and equipment. The golf course maintenance yard is located at [redacted]. Facility maintenance is performed in accordance with the guidelines developed in its Environmental Pollutant Plan, a Maintenance Support Services and Construction Report Requirement.

Targeted Constituents

- Heavy metals
- Oil and grease
- Nutrients
- Hydraulic fluid
- Fuel products
- Pesticides
- Herbicides
- Sediment

Applicability

This Best Management Practice is applicable to the Onizuka golf course at Ames Research Complex.

Requirements

Prevent or reduce the discharge of pollutants to storm water from buildings and grounds maintenance by washing and cleaning up with as little water as possible, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the storm water collection system.

Pesticide applicators must be licensed with the California

Department of Pesticide Regulation and county agricultural commissioners.

No person shall:

Pollute water supplies or waterways while loading, mixing, or applying pesticides at NASA Ames Research Complex.

Transport, handle, store, load, apply or dispose of any pesticide, container, or apparatus in such a manner as to pollute water supplies or waterways, or cause damage or injury to land, humans, plants, or animals.

Pesticides / fertilizers should not be applied during the wet season as they may be carried from the site by the next storm.

Avoid over-watering not only to conserve water but also to avoid the discharge of water, which may have become contaminated with nutrients and pesticides.

Store pesticides and application equipment in a responsible manner and properly dispose of the used containers.

Use integrated pest management where appropriate.

Proper disposal of wash water, sweepings and sediments will be conducted at all times.

Maintain regular equipment maintenance to prevent the release of vehicle fluids (e.g. hydraulic oil, fuel, antifreeze)

Other applicable Best Management Practices include:

Good Housekeeping
Inspections (tanks, e.g. Emergency Fuel Tanks)
Vehicle/Equipment Maintenance and Repair
Vehicle and Equipment Washing
Building and Grounds Maintenance

Outdoor Process Equipment Operations and Maintenance

Description

Outdoor equipment includes rooftop cooling towers or air conditioners, rooftop air vents for industrial equipment, outdoor air compressors and other service equipment. Indoor wet processes where leaks or discharges may discharge to outdoor areas, and material transfer areas, such as loading areas where forklifts or trucks may carry pollutants outdoors on their tires. Ordinary precautions, such as those below, may suffice for smaller equipment.

Targeted Constituents

- Oil and Grease
- Heavy Metals
- Antifreeze

Applicability

This Best Management Practice is applicable to all areas with outside process equipment at Ames Research Complex.

Requirements

Inspect equipment on a regular basis for leaks malfunctions, and staining on and around the equipment, and other evidence of leaks and discharges.

Assign the inspector the responsibility of reporting a spill.

Develop a routine for taking actions on the report; cleaning up the spill, and repairing the leak to prevent future spills.

If absorbent material is used on a spill, sweep and dispose of material in a timely manner.

Place equipment on an impermeable surface or install a drip pan beneath potential leak points.

Construct a simple roof to minimize the amount of rainwater that contacts the equipment and install a berm to prevent run-on and run-off.

Air compressors and other equipment produce small quantities of automatic blowdown water, which commonly contains lubricating oil or other potential pollutants. Blowdown water may not be discharges to any outside areas or to the storm drain system. Blowdown water must be discharged to the sanitary sewer.

Electrical Equipment should be managed to:

Take care in tapping oil-containing equipment. Avoid drips and leaks whenever possible;

Place an absorbent pad with the impervious lining side down under electrical equipment prior to tapping. The absorbent material will retain small drips with impervious backing in limiting leakage;

Properly dispose of oil-contaminated materials. Any PCB contaminated absorbent materials must be bagged, labeled, and disposed of in accordance with 40 CFR 761; and

For all PCB containing electrical equipment, follow NASA Ames Research Center Procedures for PCB Management. If you have any questions regarding the PCB Program, call the Environmental Services Office at [redacted].

Building Repair, Remodeling and Construction

Description

Building repair, remodeling and / or construction activity may vary from minor and normal building repair to major remodeling or the installation of a new facility on currently open space. These activities can generate pollutants that can reach storm water if proper care is not taken. The sources of these contaminants may be solvents, paints, paint and varnish removers, finishing residues, spent thinners, soap cleaners, kerosene, asphalt and concrete materials, adhesive residues and old asbestos installation.

Targeted Constituents

- Sediment
- Heavy Metals
- Toxic Materials
- Floatable Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all facilities at Ames Research Complex.

Requirements

Prevent or reduce the discharge of pollutants to storm water from building repair, remodeling and construction by using soil erosion controls, enclosing or covering building material storage areas, covering and / or diking storm drain catch basins, using good housekeeping practices, using safer alternative products and training employees.

Each job site should be managed in such a manner to avoid discharges of prohibited substances to the storm drain system.

Routine inspection of job site should be performed to ensure that construction, demolition and excavation materials (liquid or solid) are not entering the storm drain system.

Keep the job site tidy and clean up debris regularly.

Storm drain catch basins should be covered to prevent pollutants and sediments from entering the storm drain system.

Special precautions should be employed if rain is forecast or if water is applied. These precautions should include, but are not limited to:

Increased monitoring frequency for storm drains and to rectify ongoing releases or to identify and prevent any possible release; and

Reduction in activities that can cause material to come into contact with rainwater.

Painting operations should follow:

Application of lead based paint is prohibited;

Painting operations should be properly enclosed or covered to avoid drift;

Use temporary scaffolding to hang drop cloths or draperies to prevent drift. Use application equipment that minimizes overspray;

If painting requires scraping or sand blasting of the existing surface, use a ground cloth to collect the chips. Dispose of the residue properly;

If the paint contains lead or tributyl tin, it requires classification as a hazardous waste;

Mix paint indoors before using so that any spill will not be exposed to rain. Do so even during dry weather because cleanup of a spill will never be 100% effective. Dried paint will erode from a surface and be washed away by storms; and

Properly store or dispose leftover paints.

Other applicable General Best Management Practices include:

Good Housekeeping
Erosion Control
Material Handling and Storage And
Source Reduction

Source Reduction

Description

Reducing pollutants at the source is one of the most direct ways of reducing storm water pollution. Source control Best Management Practices are operational practices, that prevent pollution by reducing potential pollutants at the source. They typically do not require maintenance or construction. Source reduction can be achieved through source control; inventory control, material substitution and a Hazardous Waste Source Reduction Plan.

Targeted Constituents

- Nutrients
- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all industrial activities at Ames Research Complex.

Requirements

Source control Best Management Practices are operational practices that prevent pollution by reducing potential pollutants at the source. They typically do not require maintenance or construction. At a minimum, they include good housekeeping, preventative maintenance, spill prevention and control, and sediment and erosion prevention.

Inventory control and procurement of hazardous materials at NASA Ames Research Complex is managed by the Environmental Services Office. Considerations given to hazardous materials procurement include materials substitution and "just-in-time" ordering. Material substitution is recommended by the Hazardous Materials / Hazardous Waste Specialist.

The Hazardous Materials / Hazardous Waste Specialist reviews hazardous materials procurement to ensure that a less hazardous or non-hazardous material is used in place of hazardous material whenever possible. The ordering of chemicals occurs as they are needed versus bulk orders and results in the reduction of hazardous materials and waste present on the facility.

Many solvent cleaners are harmful and must be disposed of as hazardous waste. Cleaning without using liquid cleaners (e.g., wire brush) whenever possible reduces waste.

Perform all liquid cleaning at a centralized station so the solvents and residues stay in one area. This will help prevent spills and drips of solvents and cleansers to the shop floor.

Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for re-use.

If possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials.

Use non-caustic detergents instead of caustic cleaning agents for parts cleaning.

Use detergent-based or water-based cleaning systems in place of organic solvent degreasers. Wash water may require treatment before it can be discharged to the sanitary sewer.

Replace chlorinated organic solvents (1,1,1-trichloroethane,

methylene chloride, etc.) with non-chlorinated organic solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly.

Choose cleaning agents that can be recycled.

Other appropriate Best Management Practices include:

Good Housekeeping
Preventative Maintenance
Material Handling and Storage
Waste Handling / Recycling

Stanford University In-Situ Biodegradation

Description

Since 1986, Stanford University has been investigating the in-situ biodegradation of chlorinated solvents at Moffett Federal Airfield. Several different projects have been conducted. The current project is EPA CR822029-01, which requires a field demonstration experiment to study the degradation of volatile halogenated compounds under controlled and well-monitored conditions in the groundwater. The field experiment entails the injection and extraction of small quantities of groundwater. After treatment to meet discharge requirements, the groundwater is discharged to the storm drain system. These discharges occur in compliance with the NPDES permit requirements.

Targeted Constituents

- Sediments
- Toxic Materials

Applicability

This Best Management Practice is applicable to the Stanford University Research Site located at [redacted] at Ames Research Complex.

Requirements

Stanford University (Civil Engineering Department) operates a field site at Ames Research Complex where it investigates the in-situ biodegradation of chlorinated solvents. Effluent that

discharges to the storm drain system must comply with general NPDES permit requirements.

Inspect the facility daily for equipment failure, failure of the piping system, leaks or spills, loose fittings, loose valves, and other physical damage that may weaken the pumping system.

Functional tests should be performed regularly to ensure that systems are working properly.

Other applicable Best Management Practices include:

Good Housekeeping
Spill Response
Employee Training
Recordkeeping And Internal Reporting
Inspections
Control Devices

Transportation Control Measures (TCMs)

Description

NASA Ames Research Center has developed a Commute Alternatives Program, which offers employees a variety of commute alternatives including bicycle commuting, carpooling, shuttle services and subsidies for using mass transit. Implementation of Transportation Control Measures (TCMs) aims to reduce pollutant loading from urban transportation to storm water, as well as reduce air pollution and traffic congestion.

Targeted Constituents

- Oil and Grease
- Petroleum Products
- Antifreeze

Applicability

This Best Management Practice is applicable to all areas at Ames Research Complex.

Requirements

Bicycling: A bicycle advisory committee is working to make bicycle commuting to Ames safer and easier. Storage lockers and racks are placed throughout the center. In addition, many projects provide bicycles for employees to use around Ames Research Complex

Carpooling: To encourage carpooling, Ames offers a ride-matching service. Administered by RIDES for Bay Area Commuters, the database is used to match interested employees who want to carpool.

Mass Transit Subsidy: The mass transit subsidy program provides a monthly subsidy to those who commute to Ames Research Complex on mass transit. This includes county buses, trains, and BART. Transit ticked can be purchased at NASA Ames Gift Shop [redacted].

A Shuttle Service: A shuttle service between Ames and the CalTrain Station in Mountain View and between Ames Research Complex and the Lockheed bus terminal during peak commute hours is provided for commuters. Express bus service from Gilroy and from Fremont to the Lockheed bus terminal is available.

Utility Vault Dewatering

Description

Utility Vaults are located throughout Ames Research Complex with the majority of them placed below ground surface. Rainwater and surface water can flow into these utility vaults. The A1 aquifer lies at a depth of 5 to 35 feet below ground surface and the groundwater infiltrates into the utility vaults. Many utility vaults are located in areas where the concentrations of contaminates in the groundwater are above water quality criteria for the protection of aquatic life.

Targeted Constituents

- Sediments
- Floatable Materials
- Oxygen Demanding Substances
- Heavy Metals

- Toxic Materials
- Oil and Grease

Applicability

This Best Management Practice is applicable to all locations where utility vaults exist throughout Ames Research Complex.

Requirements

Contact NASA Environmental Services Office, Code QE to determine if the utility vault is in a known area of contamination.

If the utility vault is in a known area of contamination, the water must be collected for sampling and analyzed for its hazardous components.

If water must be contained, postpone dewatering if rain is forecast.

For contaminated utility vault water;

Make arrangements to have containers available for the water;

During dewatering of the utility vault, pump to a holding container;

Notify the NASA Environmental Office for sampling parameters and approval for the proper disposal of water;

If water has been determined to be sewerable by NASA Environmental Office, pump the water to a sanitary sewer manhole; and

If the water has been determined to be non-sewerable, contact the NASA Environmental Office to dispose of water off-site.

If the utility vault water is clean, direct water to landscaping strips when feasible. If this is not feasible and the water has been determined to be sewerable by NASA Environmental Office, collect and pump the water to the sanitary sewer.

Vehicle And Equipment Fueling

Description

Spills from fueling or from the transfer of fuels to storage tanks can be a significant source of pollution. Fuels carry contaminants of particular concern to human and wildlife, such as heavy metals, toxic materials and oil and grease, which are not easily removed by storm water treatment devices. Consequently, control at the source is particularly important. Adequate control can be achieved with careful design of the initial installations, retrofitting of existing installations, and proper spill control and cleanup procedures.

Targeted Constituents

- Heavy Metals
- Toxic Materials
- Hydraulic Fuel
- Oil and Grease
- Petroleum Products
- Antifreeze

Applicability

[redacted] - NASA Motor Pool
[redacted] - DESC Truck Filling Station
[redacted] - DESC Filling Station
[redacted] - NEX Gas Station

Requirements

Prevent fuel spills and leaks, and reduce their impacts to storm water by:

Install vapor recovery nozzles to help control drips as well as air pollution;

Use a paved area or provide a concrete slab for the fueling area. Concrete is preferred because fuel and oils cause asphalt to deteriorate;

Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas;

Clean up gasoline overflows and spills using dry methods;

Do not allow spills to run off or evaporate;

Do not flush the spill away with a hose. Spread adsorbent material, sweep it up with a broom and dispose of it as hazardous waste;

Post signs that instruct pump operators not to "top off" or overfill gas tanks;

Keep dry cleanup materials in the fueling area, and instruct employees in the dry clean up methods described below;

Assign someone responsibility to check the area every day for gasoline, motor oil or other fluids that may have leaked; and

Use a damp cloth to clean the pumps and a damp mop to clean the pavement during routine cleaning rather than spraying with a hose to minimize run off of water to the storm drain.

Spill cleanup from vehicle and equipment fueling should be performed in the following manner:

Small spills are those which can be wiped up with a shop rag. Store shop rags in a covered rag bin indoor. Do not saturate rags with gasoline, solvents or other volatile liquids;

Medium spills are too large to wipe up with a rag. Contain and soak up a liquid using dry absorbent material. Absorbent "snakes" may be used as temporary booms to contain and soak up the liquid. Sweep up the used adsorbent and snakes and dispose of them appropriately (contact NASA Environmental Services Office);

Large spills must be contained and then cleaned up. For non-hazardous spills, take steps to contain and clean up the liquid, and minimize the wash water used in cleanup. Shut off or plug storm drain inlets or sewer inlets where the spill may enter.

Comply with the Spill Prevention and Response BMP.

For hazardous materials spills that cannot be cleaned up by two people within 1/2 hour with cleanup materials available on the scene, call Ames Dispatch at [redacted] immediately. For all other hazardous materials spills contact NASA Environmental Services Office at [redacted].

Vehicle and Equipment Washing

Description

Washing vehicles and equipment outdoors or in areas where wash water runoff can pollute storm water. Wash water can contain high concentrations of oil and grease, phosphates (detergents) and metals. These and other potentially harmful substances can pollute storm water when deposited on the ground where they can be picked up by rainfall runoff.

Targeted Constituents

- Sediment
- Nutrients
- Heavy Metals
- Toxic Materials
- Oil and Grease
- Petroleum Products
- Oxygen Demanding Substances

Applicability

This Best Management Practice is applicable to [redacted] NASA Motor Pool Washrack; [redacted] CANG Vehicle Washrack; and [redacted] CANG Support Equipment Washrack.

Requirements

Prevent or reduce the discharge of pollutants to storm water from vehicle and equipment washing by implementation of the following:

Use designated wash areas;

Berm area to contain wash area;

Discharge wash water to sanitary sewer with permit from the local sewer authority.

Coordinate discharge with the NASA Environmental Services Office, Code QE (Environmental Office).

Filter wash water

Educate employees on pollution prevention measures;

Prohibit wash water from entering the storm drain; and

Prohibit use of solvents.

Mobile Equipment that is being cleaned to be placed back into service should be washed at the following locations with permission from the Environmental Office:

[redacted], Motor Pool Wash Rack; and

[redacted], CANG Vehicle Wash Rack.

Vehicle/Equipment Maintenance And Repair

Description

Vehicle or equipment maintenance is a potentially significant source of storm water pollution. Activities that can contaminate storm water include engine repair and service (parts cleaning, spilled fuel, oil, etc.), replacement of fluids, and outdoor equipment storage and parking (dripping engines).

Targeted Constituents

- Heavy Metals
- Toxic Materials
- Oil and Grease

Applicability

[redacted]

Requirements

Prevent or reduce the discharge of pollutants to storm water from vehicle and equipment maintenance and repair by running a dry shop.

Keep equipment clean. Don't allow excessive build-up of oil and grease.

Keep drip pans or containers under the areas that might drip.

Do not change motor oil or perform equipment maintenance in non-appropriate areas.

Use a vehicle maintenance area designed to prevent storm water pollution.

Inspect equipment for leaks on a regular basis.

Segregate wastes.

Make sure oil filters are completely drained and crushed before recycling or disposal.

Make sure incoming vehicles are checked for leaking oil and fluids.

Do not pour materials down drains or hose down work areas.

Use dry sweeping cleanup methods.

Store idle equipment under cover.

Drain all fluids from wrecked vehicles.

Recycle greases, used oil, oil filters, antifreeze, cleaning solution, automotive batteries, hydraulic, and transmission fluids.

Switch to non-toxic chemicals for maintenance when possible.

Clean small spills with rags. Conduct general clean-up with damp mops. Apply absorbent material to larger spills.

Train employees.

Minimize use of solvents.

Many solvent cleaners are harmful and must be disposed of as hazardous waste. Cleaning without using liquid cleaners (e.g., wire brush) whenever possible reduces waste. Prevent spills and drips of solvents and cleansers to the shop floor. Do all liquid cleaning at a centralized station so the solvents and residues stay in one area. Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for re-use.

If possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example:

Use non-caustic detergents instead of caustic cleaning agents for parts cleaning.

Use detergent-based or water-based cleaning systems in place of organic solvent degreasers. Wash water may require treatment before it can be discharged to the sewer. Contact the Environmental Services Office at [redacted] for more information.

Replace chlorinated organic solvents (1, 1, 1-trichloroethane, methylene chloride, etc.) with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated.

Choose cleaning agents that can be recycled.

Contact the Environmental Services Office for more waste minimization ideas.

Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents.

Separating wastes allows for easier recycling and may reduce treatment costs. Keep hazardous and non-hazardous wastes separate. Do not mix use oil and solvents. Keep chlorinated solvents (e.g. 1, 1, 1-trichloroethane) separate from non-chlorinated solvents (e.g. kerosene and mineral spirits).

Avoid using water to clean leaks, drips, and other spills. Use rags for small spills, a damp mop for general cleanup, and dry absorbent material for larger spills. Use the following three-step method for cleaning floors:

Clean spills with rags or other absorbent materials.

Sweep floor using dry absorbent material.

Mop floor. Mop water may be discharged to the sanitary sewer via a toilet or sink.

Implement the following measures:

Avoid hosing down your work areas. Avoid using solvents to clean floors. If work areas are washed, direct wash water to sanitary sewer.

Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.

Keep a drip pan under the vehicle while you unclip hoses, unscrew filters, or remove other parts. Use a drip pan under any vehicle that might leak while you work on it to keep splatters or drips off the shop floor.

Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.

Do not pour liquid waste to floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections. Used or leftover cleaning solutions, solvents, automotive fluids, and oil are toxic and should not be discharged to the sanitary sewer.

Oil filters disposed of in trash cans or dumpsters can leak oil and contaminate storm water. Most municipalities prohibit or discourage disposal of these items in solid waste facilities.

Place the oil filter in a funnel over the waste oil recycling or disposal collection tank to completely drain excess oil before disposal. Oil filters can be crushed and recycled. Contact the Environmental Services Office for more information about recycling oil filters.

Put pans under leaks to collect fluids for proper recycling or disposal. Keeping leaks off the ground reduces the potential for storm water contamination and reduces cleanup time and costs. If the vehicle or equipment is to be stored outdoors, oil and other fluids should be drained prior to storage.

Designate a special area to drain and replace motor oil, coolant, and other fluids. Select a location where there are no connections to the storm drain or the sanitary sewer. The location should allow for the easy cleanup of drips and spills.

Washing of Exterior Building Surfaces and Fixed Outdoor Equipment

Description

Washing exterior building surfaces and fixed outdoor equipment can pollute storm water. In general, water from exterior building surfaces is an allowable discharge. No cleaning chemicals may be used. However, if you suspect the wash water to be contaminated (high lead or zinc concentrations). Make the provisions to contain and properly dispose of the wash water.

Targeted Constituents

- Heavy Metals
- Toxic Materials
- Oxygen Demanding Substances

Applicability

This Best Management Practice is applicable to all industrial activities associated with washing of exterior building surfaces and fixed outdoor equipment.

Requirements

Using detergents or other cleaning compounds is prohibited (if water is discharged to landscape or storm drain).

Minimize water use and direct to landscape.

Filter prior to entering storm drain catch basin.

Following the washing operation, the area should be swept to remove debris and residue.

For contaminated wash water;

Make arrangements to have containers available for wash water;

Notify the NASA Environmental Services Office, Code QE, (Environmental Office) to schedule sampling and disposal of water;

During washing operations, contain the water (visqueen plastic

and / or berms) and pump to a holding container;

If water has been determined to be sewerable by the Environmental Office, pump the water to a sanitary sewer connection; and

If the water has been determined to be non-sewerable, contact the NASA Environmental Office to dispose of off-site.

If water must be contained, postpone washing operations if rain is forecast.

If the wash water is clean, direct wash water to landscaping strips when feasible. If this is not feasible and the water has been determined to be sewerable by Environmental Office, collect and pump the water to the sanitary sewer.

If use of landscaping is not feasible or the water has been determined to be non-sewerable, estimate the amount of wastewater that will be generated during washing operation and arrange to have containers available.

If containers are to be used, appropriately dispose of wastewater.

Following the washing operation, the area should be swept to remove debris and residue.

Washing of exterior building surfaces and fixed outdoor equipment should be postponed if rain is forecast.

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