

CONSTRUCTION GUIDANCE DOCUMENT:

PREPARING A STORMWATER MANAGEMENT PLAN

A. INTRODUCTION

Stormwater Management Plans (SWMPs) are a required item under the Construction Stormwater Discharge Permit. This document is designed to help you develop a SWMP for your construction project. It explains what each of the SWMP requirements means, and gives some options for you to consider in developing Best Management Practices (BMPs) that are best suited to your site **during construction**.

This guidance document primarily addresses the SWMP requirements in the construction general permit. Other requirements and limitations, such as chemical use, sampling, annual reporting, etc., are detailed in the permit. Also note that the SWMP and the stormwater permit only cover discharges of **stormwater**.

Construction dewatering is a separate issue, and must be covered by the Division's general permit for construction dewatering (regardless of the size of the construction project). Pumping or draining groundwater that has infiltrated into an excavation requires a construction dewatering permit. Stormwater that mixes with groundwater in an excavation is subject to the controls in the construction dewatering permit.

This guidance document assumes that the SWMP will be completed and implemented at the time the project breaks ground, and will be revised if necessary as construction proceeds.

6 Stormwater Management Plan (SWMP) Goal: to improve water quality by reducing pollutants in stormwater discharges.

B. GENERAL GUIDANCE

Construction activities produce many different kinds of pollutants which may cause stormwater contamination problems. The main pollutant of concern at construction sites is sediment. Grading activities remove grass, rocks, pavement and other protective ground covers, resulting in the exposure of underlying soil to the elements. The soil is then easily picked up by wind and/or washed away by rain or snow melt. When the water carrying these particles reaches a lake or stream and slows down, the particles fall out and build up layers of sediment in the stream beds. This chokes the river channel and covers the areas where fish spawn and plants grow. These particles also cloud waters, causing aquatic respiration problems, and can kill fish and plants growing in the river.

In addition, the construction of buildings and roads may require the use of toxic or hazardous materials such as petroleum products, fertilizers, pesticides and herbicides, and building materials such as asphalt, sealants and concrete, which may pollute stormwater. These materials can be harmful to humans, plants and aquatic life.

BMPs: Best Management Practices (BMPs) can describe a wide range of management procedures, schedules of activities, prohibitions on practices, and other management practices. BMPs also include operating procedures, treatment requirements and practices to control site runoff, drainage from materials storage, spills or leaks, etc.

Nonstructural BMPs, such as preventive maintenance or preserving natural vegetation, are mainly definitions of operational or managerial techniques. In addition, there are a multitude of structural BMPs which should be considered, depending upon the construction activity. Structural BMPs include physical processes ranging from diversion structures to silt fences to retention ponds.

Most of the BMPs referenced here are widely used in the construction industry. They generally involve a simple and low cost approach, and can be very effective when properly installed and maintained.

The stormwater permit requires the use of self-designed SWMPs. These plans are based on the use of BMPs. For construction sites, there are several types of BMPs: those that prevent erosion, those which prevent pollutants from the construction materials from mixing with stormwater, and those which trap pollutants before they can be discharged.

Sediment controls typically include:

- ! minimizing the amount of disturbed soil
- ! preventing runoff from off-site areas from flowing across disturbed areas
- ! slowing down the runoff flowing across the site
- ! removing sediment from on-site runoff before it leaves the site

Implementation: While erosion and sediment controls are not new ideas in construction, the timing of installation may now differ. The SWMP focus is primarily on controls used **during** earth disturbing activities. This means that hay bales, silt fences, etc. should be in place **before** grading begins, not after.

Common Sense Approach: Your SWMP is intended to be a usable document, not a paper exercise. Therefore, do not include measures which may sound good, but are unreasonable or not feasible for your site. Failure to implement your SWMP, even if the BMPs listed do not make sense, puts you in automatic violation of your permit. For example, a blanket statement that runoff from **all** disturbed areas will be controlled by silt fences, even if the slope or channels are too steep/narrow for this particular BMP, would be unreasonable.

On the other hand, if a particular BMP is listed in the SWMP, but then later turns out to be impractical or ineffective, the SWMP should be amended to reflect the changes/improvements made.

SWMP Items, Format: When preparing your plan, make sure to **address each item**. If it is not applicable to your site, briefly explain why. A simple "Not Applicable" is not enough.

In addition, your SWMP should follow the same format as the SWMP requirements listed in Part C, below. That is, even if you are using an existing document (such as plans and specs) which includes the SWMP items somewhere within it, you **must** also include a cover sheet that cross-references each of the SWMP items, and indicates where it can be found in your existing document.

Existing Controls: Note that the SWMP should include any existing stormwater controls at your site, not just new or proposed ones. It can also include any erosion, sediment or drainage controls which are required by other regulations, such as local erosion and sediment control ordinances.

SWMP Availability: A copy of the SWMP **must be kept on site**, for ready availability to the operator, and so that Division personnel can review it during an inspection.

SWMP Administrator: It is helpful to have a designated SWMP Administrator, so that dealings with the Division, and changes to the plan, can be coordinated. The SWMP Administrator becomes the contact for all SWMP-related issues and is the person responsible for its accuracy, completeness, and implementation. Therefore, the SWMP Administrator should be a person in an authoritative position.

Additional Items: In this document, the text in ***bold italics*** is quoted directly from the Construction general permit. The text in standard typeface is provided as guidance in the preparation of your SWMP. The references (Part I.B.1.d, for example) correspond to the location of the item in the Construction general permit.

C. INDIVIDUAL SWMP ITEMS

I.B. STORMWATER MANAGEMENT PLAN - CONTENTS AND REQUIREMENTS

The SWMP shall be prepared in accordance with good engineering, hydrologic and pollution control practices. (The SWMP need not be prepared by a registered engineer.) The main objective of the plan shall be to identify Best Management Practices (BMPs) which when implemented will meet the terms and conditions of the general permit.

The plan shall identify potential sources of pollution (including sediment) which may reasonably be expected to affect the quality of stormwater discharges associated with construction activity from the facility. In addition, the plan shall describe and ensure the implementation of BMPs which will be used to reduce the pollutants in stormwater discharges associated with construction activity. Construction operations must implement the provisions of the SWMP required under this part as a condition of this permit.

Facilities must implement the provisions of the SWMP required under this part as a condition of their permit. The Division reserves the right to review those plans, and to require additional measures to prevent and control pollution as needed.

The SWMP shall include the following items, at a minimum:

I.B.1. Site Description

Each plan shall provide a description of the following:

- a) A description of the construction activity.*
- b) The proposed sequence for major activities.*
- c) Estimates of the total area of the site, and the area of the site that is expected to undergo clearing, excavation or grading.*
- d) An estimate of the runoff coefficient of the site before and after construction activities are completed and any existing data describing the soil, soil erosion potential or the quality of any discharge from the site.*
- e) A description of the existing vegetation at the site and an estimate of the percent vegetative ground cover.*
- f) The location and description of any other potential pollution sources, such as vehicle fueling, storage of fertilizers or chemicals, etc.*
- g) The location and description of any anticipated non-stormwater components of the discharge, such as springs and landscape irrigation return flow.*
- h) The name of the receiving water(s) and the size, type and location of any outfall or, if the discharge is to a municipal separate storm sewer, the name of that system, the location of the storm sewer discharge, and the ultimate receiving water(s).*

This part describes the overall scope and physical characteristics of the project, as follows:

- a) A description of the industrial activities at and final disposition of the site; for example, a summary of the grading activities, installation of utilities, paving, excavation, landscaping, etc.
- b) Describe the sequence of events involved in the construction project, such as grading, excavation, etc.
- c) This information, which is also required in the application, is useful in determining the extent of control measures needed.
- d) The runoff coefficient ("C" value) is the percentage of precipitation volume which will not be absorbed by the surface. For example, for a 1" rainfall onto a paved surface, 85% of the water may run off. Tables with this information are available from the U.S. Soil Conservation Service or hydrology textbooks. Typical "C" values as provided in EPA's guidance manual are shown in Appendix A.
- e) It is necessary to include the percentage of existing vegetative ground cover in order to determine, after construction, when the site has been finally stabilized. See Part I.B.4 of the permit (also page 7 of this document), for final stabilization criteria. Final stabilization of the site is necessary before coverage under the permit can be terminated.
- f) Describe the activities which will take place at the site which may have an impact on stormwater. These may include such things as the following: equipment or vehicle washing; fertilizers, chemicals, or other materials storage; vehicle maintenance or fueling; waste incineration, treatment, storage or disposal; haul roads; off-site vehicle tracking; loading/unloading areas, etc.
- g) Will there be any discharge from the project site, during construction, which is not from stormwater? If so, describe the source and how it will be handled.

- h) This information is also required in the application. For example, "runoff from the east side of the site will go to a roadside ditch which discharges to Jimmy Smith Gulch; runoff from the west side of the site will go to an unnamed tributary to Westerly Creek."

1.B.2. Site Map

Each plan shall provide a generalized site map or maps which indicate:

- construction site boundaries***
- all areas of soil disturbance***
- areas of cut and fill***
- areas used for storage of building materials, soils or wastes***
- location of any dedicated asphalt or concrete batch plants***
- location of major erosion control facilities or structures***
- springs, streams, wetlands and other surface waters***
- boundaries of 100-year flood plains, if determined***

A site map must be developed for each construction project. The site map must show those items listed above. It does not need to be drawn to scale, but it should be legible and easy to read. Two examples of a site map are shown in Appendix B.

The construction plans may be used, if they are amended to include all required information. Local municipalities may also have maps suitable as bases to begin mapping procedures. If no other suitable base maps are available, one must be developed. Regardless of the source of the base map, the site map needs to be of suitable scale to show the construction portion of the site and the features within it.

In addition to the items specifically mentioned above, it is useful to also indicate on the map the following:

! Drainage basins for each outfall:

Field inspection can usually accomplish this task with acceptable accuracy. Look for high areas such as crests of hills, parking lots, roads, etc. which would form the division between drainages. Gullies and swales are indicators of stormwater flow direction. Obviously, if runoff is observed during a storm, most uncertainties can be eliminated. The drainage areas shown should include the portions of the site where the activities described in I.B.1.f (above) occur, as well as those portions (such as upslope areas) contributing stormwater that mixes with runoff from the construction area.

! Surface water bodies (including dry water courses):

Mark on the site map any surface water bodies, including lakes, streams, springs, wetlands, detention ponds, roadside or irrigation ditches, etc. These do not necessarily need to be within the construction portion of the site, but may be adjacent to it or impacted by stormwater runoff. Also include any existing storm sewers.

! Existing and planned structural stormwater pollution control measures:

Show on the map the location of any structural stormwater pollution control measures, such as detention ponds, diversion ditches, covered material storage areas, fuel farm secondary containment structures, etc.

! Areas where industrial activities take place, as identified in Part I.B.1.a, above.

! Paved and unpaved areas where the runoff coefficient may be different.

In addition, other features could be included to make the SWMP a more comprehensive and usable plan. For example, a later section of the SWMP includes requirements for material handling and spill prevention procedures, which could include a site map showing where materials are stored. By including materials handling, loading and storage areas on the site map, all information would be in one place on a single base map.

1.B.3. BMPs for Stormwater Pollution Prevention

The plan shall include a narrative description of appropriate controls and measures that will be implemented before and during construction activities at the facility. The plan shall clearly describe the relationship between the phases of construction and the implementation and maintenance of controls and measures. For example, which controls will be implemented during

each of the following stages of construction: clearing and grubbing necessary for perimeter controls, initiation of perimeter controls, remaining clearing and grubbing, road grading, storm drain installation, final grading, stabilization, and removal of control measures.

The description of controls shall address the following minimum components:

a) *Erosion and Sediment Controls*

- 1) *Structural Practices. A description of structural site management practices which will minimize erosion and sediment transport. Such practices may include: straw bales, silt fences, earth dikes, drainage swales, sediment traps, subsurface drains, pipe slope drains, inlet protection, outlet protection, gabions, and temporary or permanent sediment basins.*
- 2) *Non-Structural Practices. A description of interim and permanent stabilization practices, including site-specific scheduling of the implementation of the practices. Site plans should ensure that existing vegetation is preserved where possible and that disturbed areas are stabilized. Non-structural practices may include: temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, and preservation of mature vegetation.*

Best Management Practices (BMPs)

This is the key part of the SWMP - a narrative description of the appropriate stormwater management practices for the permittee's site.

The first thing to do is assess the potential of various sources at the site to contribute pollutants to stormwater discharges associated with industrial activity. In addition to the actual construction and ground disturbance activities, evaluate the following types of activities for the reasonable potential for contributing pollutants to runoff: loading and unloading operations; outdoor storage activities; vehicle and equipment maintenance and fueling; significant dust or particulate generating processes; and on-site waste disposal practices. Some of the factors to consider include the quantity of chemicals used or discharged, site conditions (slope, soil permeability, etc.), and the likelihood of contact with stormwater.

6 In each case where stormwater pollution potential exists, appropriate preventive measures (that is, BMPs) must be taken and documented.

When selecting BMPs, the most important ones to evaluate first are those which limit the source of the pollutant. It is much more efficient, from both a cost and environmental standpoint, to prevent the pollution in the first place than to clean up contaminated stormwater. For example, mulching disturbed ground to reduce erosion, in most cases, is easier and more effective than trying to capture and treat the sediment-laden runoff before it reaches state waters. As another example, a BMP requiring that any vehicle maintenance that involves fluid exchange must take place under a roof, results in the removal of a pollutant source (i.e., oil/hydraulic fluids) from possible contact with stormwater.

Once source reduction BMPs have been evaluated, then more costly options, such as mitigation of impacts, or stormwater treatment through detention storage, should be considered if necessary. The BMPs selected are up to the judgment of the individual permittee, based on the conditions at the site. However, it is important to keep in mind that a fully implemented SWMP will constitute compliance with Best Available Technology (BAT) and Best Conventional Technology (BCT), as mandated under the Federal Clean Water Act. Basically, this means that, in order to comply with your permit, the appropriate measures **must** be taken in keeping with the pollutant(s) involved and the risk potential at the facility.

Based on an assessment of the potential of various sources at the site to contribute pollutants to stormwater, the plan should describe the control measures that are reasonable and appropriate. Estimated dates of compliance for the chosen BMPs to be implemented and maintained are also needed. Any existing controls should also be discussed. The plan shall identify both structural and non-structural control measures that are necessary to limit erosion.

A list of common BMPs, for construction and other industrial activities, is provided in Appendix C. There are many other BMPs available as well. A list of available documents to help you in selecting BMPs for your site is included in Appendix D.

I.B.3.b) Materials Handling and Spill Prevention

The SWMP shall identify any procedures or significant materials handled at the site that could contribute pollutants to runoff. These could include: exposed storage of building materials, fertilizers or chemicals; waste piles; and equipment maintenance or fueling procedures. Areas or procedures where potential spills can occur shall have spill prevention and response procedures identified.

Measures to control stormwater pollution from dedicated concrete batch plants or dedicated asphalt batch plants covered by this certification, must be identified in the SWMP.

This area will involve all industrial activities at the site (except construction practices covered under the erosion and sediment controls) which have the potential to contaminate stormwater. This includes routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc. It is a good idea to discuss each activity separately. Judge the potential for the material to be found in stormwater using, at a minimum, the following criteria:

- ! the intensity of the activity (i.e., does it occur every day, or just once a month, etc.) Can it be scheduled to occur only during dry weather?
- ! the size of the area over which the activity takes place, the surface type (pavement, gravel, vegetation, etc.), and other physical characteristics such as slope
- ! ability of product storage and loading/unloading facilities (fuel tanks, drum storage, etc.) to contain spills and leaks
- ! the concentration and toxicity of materials which can be expected to be found in the site's stormwater runoff
- ! the contamination of storage facilities with the substances being stored (e.g, used oil drums or tanks coated with spilled oil)

(Obviously, if no chemicals, fuels or other materials are stored or handled on site, the part of the SWMP dealing with potential spills is not necessary. The SWMP should then include a statement to this effect.)

Where materials can impact stormwater runoff, existing and planned practices that reduce the potential for contamination shall be described. For example, materials should be stored and handled in covered areas to prevent contact with stormwater, and chemicals should be stored within berms or secondary containment devices to prevent leaks and spills from entering stormwater runoff.

In general, spill prevention and response procedures should include the following:

- ! notification procedures to be used in the event of an accident. At the very least, the SWMP Administrator should be notified. Depending on the nature of the spill and the material involved, the Colorado Dept. of Health, downstream water users, or other agencies may also need to be notified.
- ! instructions for clean-up procedures
- ! provisions for absorbents to be made available for use in fuel areas, and for containers to be available for used absorbents.
- ! prohibition on the washing of concrete trucks and other equipment into the storm drainage system

I.B.4. Final Stabilization and Longterm Stormwater Management

A description of the measures used to achieve final stabilization and measures to control pollutants in stormwater discharges that will occur after construction operations have been completed.

Final stabilization is reached when all soil disturbing activities at the site have been completed, and uniform vegetative cover has been established with a density of at least 70 percent of pre-disturbance levels or equivalent

permanent, physical erosion reduction methods has been employed. The Division may, after consultation with the permittee and upon good cause, amend the final stabilization criteria for specific operations.

Typically, the stormwater discharge associated with construction activity is eliminated when the site is finally stabilized. As soon as practicable after construction activities have been completed in a disturbed area, permanent stabilization should be started to prevent further erosion of soil from that area. All disturbed areas (except those portions covered by pavement or a structure) should be finally stabilized once all construction activities are completed.

Stormwater management controls to prevent or control pollution of stormwater after construction is completed should be addressed here. They typically include retention or detention ponds, infiltration measures, vegetative swales, and natural depressions.

New developments, buildings, etc., will incorporate elements of stormwater quality control into their design. The SWMP must be prepared consistent with these structural and nonstructural controls. Many of the temporary controls used for sediment control can be modified into permanent structural controls. Where possible, permanent stormwater quality controls can be constructed at the initial stages of construction, or modified at the end of construction. This can increase the efficiency of the controls by using them during both the building and operational phases of the project.

I.B.5. Other Controls

A description of other measures to control pollutants in stormwater discharges, including plans for waste disposal and limiting off site soil tracking.

See the discussion in Appendix C.

I.B.6. Inspection and Maintenance

A description of procedures to inspect and maintain in good and effective operating condition the vegetation, erosion and sediment control measures and other protective measures identified in the SWMP.

The permit requires that a thorough inspection of the stormwater management system be performed at least every 14 days, **and** after any precipitation or snowmelt event that causes surface erosion. Part I.C.6 of the permit outlines the inspection requirements.

Additionally, this part of the SWMP should also include maintenance of the BMPs which are discussed in Part 4.f. Set up a schedule appropriate to the activity and the BMP. Preventive maintenance should be coupled with periodic inspections. If there are already inspections/preventive maintenance programs or practices or equipment in place, include them here.

Preventive maintenance involves the regular inspection and testing of site equipment and operational systems. These inspections should uncover conditions, such as cracks or slow leaks, which could cause breakdowns or failures that result in discharge of pollutants to storm sewers and surface waters. The program should prevent breakdowns and failures by adjustment, repair or replacement of equipment. An effective preventive maintenance program should include the following elements, at a minimum:

- ! identification of equipment, sediment and erosion controls, and site areas that should be inspected
- ! appropriate and timely maintenance, repair or replacement of control measures and equipment
- ! maintenance of complete records on inspections, equipment, and systems

In order to adequately define a preventive maintenance program, review the information gathered so far in terms of materials handling, risk assessment, etc., to determine where equipment failure could result in spills or leaks of contaminants. This section will be highly specific to each site.

An effective and efficient recordkeeping system is an important item of the SWMP because it will serve many functions. Perhaps the easiest way of setting up a good recordkeeping system is to create a SWMP Daily Log in which all items can be entered. Entries into the log could include anything relating to the SWMP, stormwater contamination, contacts with suppliers, etc.

Keeping accurate and complete records serves several functions. First, keeping records of spills, leaks, SWMP implementation, etc. is a requirement of the general permit; therefore, enforcement action, including fines, could result if records are not adequate. Second, by keeping accurate and detailed records, you will have documentation of events which could prove invaluable should complications arise concerning the permit, lawsuits, etc. And third, it will make compiling your annual report to the Division much easier.

The following list includes the types of activities and information you may want to include in a SWMP Log Book:

- ! records of spills, leaks, or overflows, including time and date, weather conditions, etc.
- ! implementation of specific items in the SWMP
- ! training events (given or attended)
- ! events involving materials handling and storage
- ! contacts with regulatory agencies and personnel
- ! notes of employee activities, contact, notifications, etc.
- ! maintenance and repair of stormwater management controls
- ! preventive maintenance activities
- ! inspection activities

Additional information such as dated photographs, field notebooks, drawings and maps, etc. can also be included where appropriate.

D. REFERENCES

"A Guide to Industrial Stormwater BMPs," William Ruzzo, 1992.

California Stormwater Best Management Practice Handbook - Construction Activity, as prepared for CA Stormwater Quality Task Force, by CDM, 3/93.

Compliance Manual for NPDES Stormwater Permits for Colorado Airports, as prepared for the Colorado Division of Aeronautics, by Resource Consultants & Engineers, Inc., 11/92.

Stormwater Management During Construction, Training Course Student Workbook, Red Rocks Community College, 1993.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA Publication No. 832-R-92-005, 9/92.

APPENDIX A

Sample Maps, not available on electronic version.

APPENDIX B

Table 2.1 Typical “C” Values (ASCE 1960)

Description of Area	Runoff Coefficients
Business Downtown areas Neighborhood areas	0.70 – 0.95 0.50 – 0.70
Residential Single-family areas Multiunits, detached Multiunits, attached	0.30 – 0.50 0.40 – 0.60 0.60 – 0.75
Residential (suburban)	0.25 – 0.40
Apartment dwelling areas	0.50 – 0.70
Industrial Light areas Heavy areas	0.50 – 0.80 0.60 – 0.90
Parks, cemeteries	0.10 – 0.25
Playgrounds	0.20 – 0.35
Railroad yard areas	0.20 – 0.40
Unimproved areas	0.10 – 0.30
Streets Asphalt Concrete Brick	0.70 – 0.95 0.80 – 0.95 0.70 – 0.85
Drives & walks	0.75 – 0.85
Roofs	0.75 – 0.95
Lawns – coarse textured soil (greater than 85% sand) Slope: Flat, 2% Average, 2-7% Steep, 7%	0.05 – 0.10 0.10 – 0.15 0.15 – 0.20
Lawns – fine textured soil (greater than 40% clay) Slope: Flat, 2% Average, 2-7% Steep, 7%	0.13 – 0.17 0.18 – 0.22 0.25 – 0.35

APPENDIX C

BEST MANAGEMENT PRACTICES (BMPs)

Below is a list of typical BMPs for construction sites:

! Sediment and erosion controls

- Ptemporary or permanent seeding
- Ptemporary or permanent swales
- Psodding
- Ppreserve natural vegetation
- Pminimize bare soil exposure
- Pslope protection (surface roughening, gradient terraces)
- Pdivert flow around exposed areas (interceptor dikes, swales)
- Pmulching, matting, geotextile/netting and chemical soil stabilization
- Preduce surface runoff velocity (channel slope, check dams)
- Pstream bank protection
- Ppipe slope drains
- Psub-surface drains
- Psewer outlet protection

! Sediment removal from runoff

- Pfilter (silt) fence
- Pstraw bale barrier
- Pbrush barrier
- Pgravel/stone filter berm
- Pstorm drain inlet protection
- Ptemporary or permanent sediment trap/basin

! Traditional stormwater management practices

- Pvegetated swale
- Pnatural depressions
- Pstormwater detention or retention pond
- Pconstructed wetlands
- Psnow removal/storage activities
- Pcatch basin design
- Poil/water/grit separators
- Pbuffer zones
- Pinfiltration (trenches, swales, basins, porous pavement)
- Plevel spreaders

! Segregating or diverting flow around activity

- Pchannels (grass, concrete, rock lined)
- Pdikes and berms
- Psurface grading and paving

! Good housekeeping

- Proutine trash/debris removal
- Pscheduled maintenance
- Pcleaning storm drains, grates and inlets
- Psigns and labels
- Psecurity system

! Visual inspec

- Pregular inspections and testing
- Pidentify illegal dumping activities

! Preventive maintenance

- Pnon-scheduled maintenance

! Spill prevention

- Pmaterial handling procedures

APPENDIX C (cont.)

- Pmaterial storage practices
- Ploading/unloading by air pressure or vacuum
- Ppreventive monitoring of materials
- Pvehicle positioning for materials transfer
- ! Employee training
- ! Recordkeeping and Reporting
 - Pinspections
 - Pmaintenance
 - Pinventory of materials
- ! Chemical substitution
- ! Dust control
 - Pirrigation
 - Pminimize denuded areas
 - Pwind breaks
 - Ptillage
- ! Covering activity - roofs, tarps
- ! Containment
 - Pberming, curbing or diking around activity
- ! Recycling vehicle/equipment washwater
- ! Spill response
 - Pidentify procedures and equipment
 - Pmanual clean-up (sweeping, shoveling, etc.)
 - Premoval of contaminated materials by excavation
 - Premoval of contaminated materials by vacuum or pump systems
 - Psorbents
 - Pgelling agents
- ! Drip pans
- ! Collection basins
- ! Sumps
- ! Vehicle/equipment washing

As an example of the level of detail that any of the above categories can generate, the following focuses on the Good Housekeeping aspect of BMPs:

Good Housekeeping/Operation and Maintenance Techniques:

Good housekeeping is an important pollution control measure. It requires the maintenance of a clean, orderly site. This part of the SWMP should address cleaning and maintenance schedules, trash disposal and collection practices, grounds maintenance, etc.

Most construction operations already adhere to some form of "Good Housekeeping" routine, whether they realize it or not. Permittees must now put these practices down in writing and ensure that they are adequate to meet the needs of the site. To prepare this section, begin by summarizing any activities which already take place, such as trash removal, oil recycling, etc.

Most good housekeeping practices involve simple common sense. The basic pollution prevention concept is that a clean site will have less potential for stormwater contamination. The following checklist can serve as a starting point for the assessment of existing or needed good housekeeping practices. Since each project is different, include any additional items pertinent to your site.

- ! is there evidence of drips or leaks from equipment or machinery at the site?
- ! is garbage/trash/construction debris removed regularly?

APPENDIX C (cont.)

- ! are proper clean-up procedures used for spilled materials?
- ! are there abandoned machinery, parts, etc. around the site?
- ! is every effort made to order only materials that are required, thus minimizing the amounts of materials stored?
- ! what other practices routinely performed constitute good housekeeping?
- ! are signs posted at appropriate locations indicating where to dispose of waste oils and refuse?
- ! are locations where spill clean-up equipment and materials are stored appropriately marked?
- ! are fertilizers and other chemicals applied to landscaped areas judiciously applied, using only that quantity required?
- ! are portable toilet facilities properly maintained?

The following good housekeeping BMPs are recommended methods for the storage of materials, including lubricants, hydraulic fluids, grounds revegetation materials (fertilizers, pesticides, herbicides, etc.), refuse, etc.:

Material Storage and Inventory:

- ! the centralized used oil tank shall be emptied frequently enough to ensure it never reaches capacity (e.g., at least once per month). This area will be kept free of trash and spilled oil.
- ! all refuse dumpsters and receptacles shall be equipped with functional lids to prevent precipitation from entering.
- ! storage containers, drums, and bags shall be stored away from direct traffic routes to prevent accidental spills.
- ! empty drums shall be covered to prevent collection of precipitation.
- ! containers shall be stored on pallets or similar devices to prevent corrosion of the containers, which can result when containers come in contact with moisture on the ground.
- ! all chemical substances present at the site shall be identified.
- ! all of the chemical substances used in the workplace shall be listed, and the Material Safety Data Sheet (MSDS) obtained for each. The MSDSs will be readily available for use; i.e., posted at the locations where the materials are stored and handled.
- ! all containers shall be labeled to show the name and type of substance, stock number, expiration date, health hazards, including reactivity, corrosivity, ignitability and toxicity, suggestions for handling, and first aid information. (This information can usually be found on the MSDS. Unlabeled chemicals and chemicals with deteriorated labels are often disposed of unnecessarily or improperly.)

Employee Training: An important non-structural BMP is training of facility personnel. Even the most comprehensive SWMP is useless if no one knows about it. In order to make the SWMP an effective management tool, personnel must be informed of the procedures and how they are to be implemented. Any training session should include actual field observations of the BMPs being discussed.

New or temporary personnel and sub-contractors working at the site also need to be trained in the SWMP procedures as soon as possible. Sub-contractors should be provided with a copy, as well as being informed if they are liable for conditions set forth within it.

APPENDIX D

LIST OF AVAILABLE DOCUMENTS/GUIDANCE

1. Available from EPA - (202) 260-7786

A. Regulations

- < 11/16/90 Federal Register (55 FR 47990) - NPDES Permit Application Requirements for Stormwater Discharges - Final Rule.
-Summary of 11/16/90 Rule
- < 8/16/91 Federal Register (56 FR 40948) - NPDES General Permits and Reporting Requirements for Stormwater Discharges Associated with Industrial Activity - Proposed Rule.
-Summary of 8/16/91 Stormwater Implementation Rule
-8/16/91 Stormwater Implementation Rule Package Fact Sheet
- < 4/2/92 Federal Register (57 FR 11394) - Application Deadlines, General Permit Requirements and Reporting Requirements, Final Rule.
-4/2/92 Stormwater Program Rule Fact Sheet
- < 12/18/92 Federal Register (57 FR 60444) - Permit Issuance and Permit Compliance Deadlines for Phase I Discharges, Final Rule.

B. Program Summaries

- < Overview of the Stormwater Program (11/92)
- < Question and Answer Document (3/92)

C. Guidance

- < **Summary:** Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices (10/92)
- < **Summary:** Stormwater Management for Industrial Activities, Developing Pollution Prevention Plans and Best Management Practices (10/92)
- < Draft - Sediment and Erosion Control; an Inventory of Current Practices (EPA, OWEC, 4/20/90)
- < Draft - Construction Site Stormwater Discharge Control; an Inventory of Current Practices (6/26/91)

D. Miscellaneous

- < Ninth Circuit United States Court of Appeals Opinion regarding American Mining Congress v. EPA (5/27/92), and NRDC v. EPA (6/4/92)
-Ninth Circuit Stormwater Decision Fact Sheet (9/3/92)

APPENDIX D (cont.)

2. **NOT Available from EPA**

A. **EPA Documents**

- <<< Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices (EPA-832-R-92-005, 9/92)
 - Call NTIS (703)+487-4650, order number PB 92-235951 (\$35), or
 - Education Resource Information Center/Clearinghouse (614)+292-6717, order number 482N (\$22.50)
- < Stormwater Management for Industrial Activities, Developing Pollution Prevention Plans and Best Management Practices (EPA-832-R-92-006, 9/92)
 - Call NTIS (703)+487-4650, order number PB 92-235969 (\$35), or
 - Education Resource Information Center/Clearinghouse (614)+292-6717, order number 477N (\$26.75)

B. **Local and Other Documents**

B. **Local and Other Documents**

- < Urban Storm Drainage Criteria Manual, Vol. 3 - Best Management Practices, Stormwater Quality - Urban Drainage and Flood Control Dist., Denver (11/92)
 - Write to Urban Drainage and Flood Control Dist., 2480 W. 26th Ave., Ste. 156B, Denver, CO 80211-5500, (303)+455-6277 (\$40 plus shipping)
- < Erosion Control and Stormwater Quality Guide (6/95) - Colo. Dept. of Transportation. Call (303)+757-9343
- < California Stormwater Best Management Practice Handbooks (3/93). Municipal Handbook (\$12.50), Construction Handbook (\$12.00), Industrial/Commercial Handbook (\$13.00), plus shipping.
 - Call Alameda County Public Works Agency, (510)+444-6771

3. **Class: "Stormwater Management During Construction"**

- < Topics: **6** Stormwater Management and Construction
- 6** Regulatory Requirements
- 6** Erosion and Sediment Control
- 6** Best Management Practices
- 6** Field Trip (second day)
- < Class held at Red Rocks Community College, Lakewood
- < 12 day training course
- < \$150/person (group discounts available), plus optional \$25 fee for certification
- < Course Information: Scott Olson, Course Instructor, (303) 914-6282

(Note: Other on-going training opportunities will be listed as information becomes available to the Division.)