STORM WATER POLLUTION PREVENTION PLAN

NAVAL SUPPORT ACTIVITY
PANAMA CITY, FLORIDA

February 1996
Revised June 2001
Revised July 2006
Revised October 2010
Revised May 2012

Prepared by

NAVAL FACILITIES ENGINEERING COMMAND
SOUTHEAST
ENVIRONMENTAL DEPARTMENT
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AIR & WATER SECTION

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EXECUTIVE SUMMARY

This Storm Water Pollution Prevention Plan (SWPPP) has been written according to OPNAVINST 5090.1A which requires that all Naval facilities comply with the requirements of the Clean Water Act. Because the Naval Support Activity, Panama City, Florida (NSA Panama City) has industrial activities as defined in 40 CFR 122, the Environmental Protection Agency's (EPA's) final rule regarding NPDES storm water permitting, a Florida Department of Environmental Protection (FDEP) storm water permit is being issued by FDEP which requires the development and implementation of a SWPPP. FDEP has been granted authority by EPA to implement the NPDES stormwater program in Florida. Effective October 22, 2000, Florida adopted EPA's Muti-Sector General Permit for Stormwater Discharge Associated with Industrial Activity (MSGP) under Rule 62-621.300(5), Florida Administrative Code.

This SWPPP is an engineering and management strategy prepared specifically for NSA Panama City to improve the quality of the storm water runoff and thereby improve the quality of the receiving waters. NSA Panama City is to implement this SWPPP in accordance with the base instructions as found in Appendix 2.

A storm water pollution prevention team (SWPPT) has been created to 1) determine the adequacy of the SWPPP, 2) ensure implementation of Best Management Practices (BMPs), 3) perform all record keeping and documentation as required within the SWPPP and, 4) perform the annual updating and certifications of the SWPPP.

The SWPPP has three major components that are to be implemented:

- Storm Water Monitoring
- BMP Implementation; and
- Site Compliance Evaluations.

NSA Panama City has been divided into 37 drainage basins; 28 of which contain industrial activities. Drainage basins that contain non-industrialized storm water are not discussed in the SWPPP. Visual storm water monitoring will be performed quarterly at the designated outfall (where storm water exists on NSA Panama City property) for each drainage basin.

Various BMPs are to be implemented in an effort to reduce the amount of potential pollutants that enter storm water. BMPs can be of a non-structural or structural nature.

Thirteen (13) illicit discharge connections were identified in the "Final Illicit Discharge Engineering Study" dated February 1996. All of the illicit discharge connections have been eliminated, connected to the sanitary sewer or permitted. The updated "Final Illicit Discharge Engineering Study" dated July 2006 found no new illicit discharge connections.

The SWPPT is responsible for evaluating and updating the SWPPP yearly. To assist them in the evaluation, a checklist of BMPs is included that each team member is to complete for his/her responsible area. The full checklist should be reviewed and completed annually but an abbreviated checklist can be used for quarterly inspections. The SWPPT shall meet a minimum of twice a year to evaluate the effectiveness of the BMPs and determine if additional BMPs need incorporating at any area or activity.

SWPPP CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Authorized Signatory(s)	Title	Phone No.	Date

(Registered Professional Engineer signs below, only if required by EPCRA, Section 313, Reporting Requirements)

_____

(Registered Professional Engineer stamps seal above, only if required by EPCRA, Section 313, Reporting Requirements)

This SWPPP has been examined by a licensed professional engineer familiar with the NPDES permit rules and regulations. It should be clearly noted that there is no legal guarantee associated with the SWPPP, but is a statement that, to the best of his knowledge, the plan has been prepared in accordance with good engineering practices. No other warranties, expressed or implied, are provided. This statement shall in no way relieve NSA Panama City of their duty to prepare or fully implement this plan.

REVIEW CERTIFICATION SHEET

Date of Review	Person Making the Change	Review Status or Changes
February 2012	NAVFAC SE	Revised SWPPP provided by NAVFAC SE
May 2012	Richard Lee	Update BMP Checklist and Spill History

40 CFR 122 requires a review and evaluation of this SWPPP at least once a year. Chapter 1 of this SWPPP provides details of the review procedures.

As a result of this review, this activity may be required by 40 CFR 122 to amend this SWPPP to include more effective pollution prevention technology and BMPs, if such technology is field proven and if implementation of the technology will significantly reduce the likelihood of the contamination of storm water.

The SWPPT Leader is assigned the responsibility of ensuring that this plan will be reviewed and amended in accordance with 40 CFR 122.

RECORD OF AMENDMENTS

40 CFR 122 requires an activity to amend their SWPPP whenever there is a change in facility design, construction, operation, or maintenance which materially affects the facilities' potential to contaminate storm water. Any amendment must be implemented no later than six months after such change occurs and if SARA Title III, Section 313 water priority chemicals are present in reportable quantities the revision must be certified by a professional engineer.

This record sheet is provided to summarize amendments to the SWPPP. The SWPPT leader will be responsible for ensuring that the SWPPP is amended in strict accordance with 40 CFR 122.

Date of Review or Change	Person Making the Change	Summary of Changes
February 2012	NAVFAC SE	Revised SWPPP provided by NAVFAC SE
May 2012	Richard Lee	Update BMP Checklist and Spill History

USER ACKNOWLEDGEMENT SHEET

My signature below certifies that I have read this SWPPP and clearly understand my SWPPP responsibilities concerning the prevention of potential pollutants entering storm drainage systems and this command's dedication to the quality of water which exits NSA Panama City.

DATE	PERSONNEL NAME	SIGNATURE	RANK/CODE

SECTION 1.0
STORM WATER POLLUTION PREVENTION PLAN
TEAM REPRESENTATIVES AND REQUIREMENTS

1.1 INTRODUCTION

Environmental Protection Agency (EPA) regulations in 40 CFR 122 require that industrial and construction activities apply for a National Pollutant Discharge Elimination System (NPDES) permit for storm water discharged to surface waters of the United States. Associated with the permitting is the need to characterize the storm drainage areas, monitor the storm water quality and implement Best Management Practices (BMPs) to improve storm water quality. BMPs include structural and operational (non-structural) practices. Non-structural practices are also referred to as source controls. In addition, the activity is required to have spill containment procedures, drainage control, and security measures. Personnel involved with industrial activities are to be instructed on proper pollution prevention procedures and requirements. Standardized written operating procedures are to be implemented, inspections are to be routinely performed, and records are to be maintained to document the successful implementation of these requirements

This Storm Water Pollution Prevention Plan (SWPPP) has been prepared to comply with the EPA NPDES program under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 USC 1251 *et seq*.). The SWPPP has been developed utilizing information provided by the EPA regarding preparation of a SWPPP (*Storm Water Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices*, dated September 1992).

Naval Support Activity (NSA) Panama City filed a Notice of Intent (NOI) and received coverage under the Multi Sector General Permit (MSGP) for storm water discharges associated with industrial activities issued September 29, 1995 with subsequent corrections and modifications. Coverage under the current NOI became effective on January 15, 2011 and expires on January 14, 2016. A copy of the letter from the FDEP acknowledging coverage under the MSGP is included in Appendix 4. EPA delegated authority to implement the NPDES Storm Water Program to FDEP on October 22, 2000 in all parts of the State of Florida except Indian country lands. FDEP has notified all permit holders to file a NOI to be covered by the Florida Generic Permit, which is included in FDEP Chapter 62-621. This permit adopts the existing MSGP issued by EPA in Federal Register/Vol. 60, No. 189/Friday, September 29, 1995/Notices. The regulatory contact at EPA and FDEP for storm water permitting is:

Gwendolyn Keyes Fleming
US EPA Region 4
Sam Nunn Atlanta Federal Center
Atlanta, Georgia 30303
404-562-8357

Eric Livingston
NPDES Stormwater Administrator
Florida Department of Environmental
2600 Blairstone Road, MS #2510
Tallahassee, Florida 32399
850-245-7522

1.1.1 GOALS OF STORM WATER MANAGEMENT

Federal, state, and local storm water management programs have one common goal:

To improve water quality by reducing pollutants contained in storm water discharges.

Meeting this goal can be a difficult challenge for many reasons. For example, the original sources of pollutants transported in storm water can be diffused or spread out over a wide area. Small oil and grease spills at different activities within a single facility can collectively represent a major pollution problem. In addition, the nature of storm water is such that the amount of pollutants that enters the receiving waters will vary in accordance with the frequency, intensity, duration of rainfall and the nature of the drainage patterns.

The pollution prevention approach in this SWPPP focuses on three major objectives:

1) Identify sources of pollution affecting the quality of storm water discharges from the facility associated with industrial activity.

2) Describe and ensure implementation of practices to minimize and control pollutants in storm water discharges from the facility associated with industrial activity.

3) Ensure compliance with the terms and conditions of the permit.

1.1.2 PURPOSE

Storm water discharges have been increasingly identified as a significant source of water pollution in numerous nationwide studies on water quality. To address this problem, the Clean Water Act amendments of 1987 required EPA to publish regulations to control storm water discharges under the NPDES permit program. EPA published storm water regulations on November 16, 1990, which require certain discharges of storm water to waters of the United States to apply for NPDES permits. "Waters of the United States" is generally defined as surface waters including lakes, rivers, streams, wetlands, and coastal waters. NPDES storm water discharge permits are intended to allow the states and EPA to track and monitor sources of storm water pollution. According to the November 16, 1990 final rule, facilities with a "storm water discharge associated with industrial activity" are required to apply for a Storm water permit. EPA has identified 29 sectors of industrial activity in the MSGP. Industrial activities at NSA Panama City have been reviewed in regard to the MSGP. The sectors of the MSGP that apply to NSA Panama City are as follows:

Sector P	Land Transportation and Warehousing
Sector Q	Water Transportation
Sector S	Air Transportation

1.1.3 ELEMENTS OF A STORM WATER POLLUTION PREVENTION PLAN

A SWPPP consists of a series of steps and activities to identify potential sources of storm water pollution or contamination and implement BMPs. BMPs are processes, procedures, and schedules of activities, prohibitions on practices, and other management practices that could prevent or reduce the amount of pollutants in storm water runoff.

This SWPPP has been prepared in accordance with standard engineering practices and identifies potential sources of pollution, which may be reasonably expected to impact the quality of storm water runoff. This plan describes and recommends the implementation of BMPs to be used to reduce the pollutants in storm water discharges associated with industrial activities at NSA Panama City to the maximum extent practicable and to ensure compliance with the terms and conditions of the permit.

In order to implement, evaluate, and make adjustments to the SWPPP, a Storm Water Pollution Prevention Team (SWPPT) has been formed. The SWPPT is described in detail in Section 1.2.

1.1.4 HOW TO USE THE SWPPP

Section 1 contains information specifically for the SWPPT. The section is general in nature and includes requirements for the entire base. Each team member should be thoroughly familiar with the requirements contained in this section. Section 2 contains information that is area specific. NSA Panama City has been subdivided into 10 areas in which regulated industrial activity has been identified. The various areas identified based on tenant command and activities performed are as follows:

- Small Craft Operations
- Morale Welfare and Recreation (MWR)
    - Marina
- Fire Department
- Industrial Areas
    - Airborne Mine Countermeasure Fleet Readiness Branch
    - Special Operations Division
    - Dockside Activities
    - Amphibious Warfare Test Facility
- Air Operations
- Public Works Department

- Transportation
- Oil/Water Separator and Oily Waste Dump Station
- Hazardous Waste Storage

- Fleet Industrial Supply Center (FISC)

- No Exposure From Industrial Activities
    - Auto Skills
    - Prototype Fabrication Facility
    - Paint Shop
    - Navy Environmental Diving Unit
    - Naval Diving and Salvage Training Center

Each SWPPT member is responsible for a certain area or areas.

Section 2 is designed so that the portion that applies to the specific area of responsibility of a SWPPT member can be copied and distributed to all implementers in that area. BMPs are identified for each area based on activities performed by personnel within that area. Each SWPPT member must ensure all personnel within his/her designated area are trained on proper BMP usage and evaluation. All BMPs that are identified for the area must be implemented if not already in practice.

The SWPPT members must:

1) Conduct an annual evaluation for his/her area,
2) Complete the BMP Checklists,
3) Forward all evaluations to the SWPPT leader, and
4) Maintain records of all evaluations within his/her area.

The SWPPT will meet, as discussed in Section 1.2.2, to evaluate the SWPPP and determine what changes, if any, need to be incorporated into the plan.

1.2 POLLUTION PREVENTION TEAM

1.2.1 PURPOSE OF THE TEAM

The purpose of the SWPPT is to assist in the implementation, evaluation, and revision of the SWPPP. Individuals selected to serve on the team represent industrial and administrative activities at NSA Panama City and will provide proper coordination of the military commands and support activities.

In general, implementation of the SWPPP involves certification, existing BMP evaluation, BMP implementation including associated design and construction activities, personnel training,

inspections, and establishment of required records. The implementation phase of the SWPPP will involve all members of the team and all facilities that are addressed in the SWPPP.

Implementation of the BMPs described in the SWPPP is the responsibility of the individual operating units, working under the direction of a designated SWPPT member. As with the other environmental programs at NSA Panama City, Facilities and Environmental Department personnel will provide assistance and coordination as described herein.

1.2.2 ORGANIZATION OF THE TEAM

The individual responsible for all activities at NSA Panama City, including the SWPPP, is the Commanding Officer (CO). However, the SWPPP requires many detailed actions at all levels that are best handled by the SWPPT. In order to accommodate the military chain-of-command, the SWPPT is organized to follow established command structures and includes all levels of responsibility from office to work center personnel.

The organizational arrangement of the SWPPT is presented schematically in Figure 1.2.1. The SWPPT leader will assist in coordinating the compliance activities of each command by providing guidance, training coordination, site inspections, and detailed assistance as required. The SWPPT will meet within 30 days of the effective date of the SWPPP and at least twice per year thereafter. Meeting minutes will become part of the required documentation showing implementation of the SWPPP. Meeting minutes will be filed in Appendix 7.

1.2.3 RESPONSIBILITIES OF THE TEAM MEMBERS

CO/XO

1) Implement the initial SWPPP at all command levels at NSA Panama City.

2) Ensure compliance with the SWPPP at each activity and ensure the SWPPT meets at a minimum frequency of twice per year.

3) Certify the SWPPP and approve revisions based on annual site compliance evaluations for all facilities.

SWPPT Leader

1) Assist the CO/XO in implementing the SWPPP.

2) Serve as chairperson of the SWPPT.

3) Coordinate with the SWPPT members to verify compliance with SWPPP implementation and operating requirements.

4) Coordinate with the SWPPT members to verify that qualified personnel conduct compliance evaluations at appropriate intervals as specified in the SWPPP.

5) Prepare annual revisions of the SWPPP based on the SWPPT member recommendations.

6) Review and forward to the CO/XO for approval, the annual update of the SWPPP covering all industrial facilities. Annual updates must include all incidents of non-compliance. If there are no incidents of non-compliance, a certification statement that NSA Panama City is in compliance shall be forwarded to the CO/XO.

7) Verify the adequacy of SWPPT member response actions for spills, leaks, or other discharges covered by the SWPPP.

8) Verify that SWPPT members utilize proper record maintenance, updating and retention practices within their area of responsibility as required by the SWPPP.

9) Coordinate recommendations for SWPPP revisions based on quarterly BMP evaluations with the SWPPT members.

10) Coordinate annual SWPPP compliance inspections and evaluations of the designated units within each command as specified in the SWPPP including:

    a) Evidence of pollutant discharges;
    b) Use of pollutant reduction measures;
    c) Maintenance and condition of spill response equipment; and,
    d) Records maintenance and updating.

11) Monitor the activities of facility personnel on a random basis as needed to assure compliance with the SWPPP.

12) Prepare and forward to SWPPT members a report summarizing the results of each annual compliance inspection and evaluation.

13) Assure proper implementation of a storm water-monitoring program in accordance with the NPDES Storm Water Permit.

14) Review plans and drawings related to industrial facilities for new construction or remodeling for erosion control, maintenance, and recommended BMPs, to determine if a revision to the SWPPP is required.

15) Ensure that within six months after a change in design, construction operations, or maintenance of a facility, any modifications, which are required to achieve compliance with the SWPPP, are implemented.

16) Provide technical guidance for training in storm water pollution prevention.

SWPPT Member

1) Implement the SWPPP requirements within designated area of responsibility.

2) Ensure compliance with the SWPPP.

3) Perform or direct qualified personnel to complete compliance evaluations, visual monitoring forms and BMP forms at the intervals specified in Sections 1.5 and 1.7.

4) Oversee facility personnel to assure compliance with the SWPPP.

5) Provide recommendations for the SWPPP revisions based on quarterly and annual site compliance inspections.

6) Designate and direct qualified personnel to conduct and document appropriate response action for spills, leaks, or other discharges covered by the SWPPP.

7) Assure that proper records maintenance, updating, and retention practices are followed at each facility within their area of responsibility.

8) Provide training and technical guidance for SWPPP compliance.

Resident Officer in Charge of Construction (ROICC)

1) Responsible for filing a Notice of Intent (NOI) according to Section 1.11 for all construction projects that disturbs 1.0 acre or more. Storm water construction permits are required from both FDEP and EPA Region 4.

Implementers

1) Execute the SWPPP requirements at unit level as directed by the SWPPT member.
2) Oversee daily operations of facility staff to assure compliance with the SWPPP implementation and operation.

3) Assist with compliance inspections.

4) Revise facility operations to assure consistency with the SWPPP based on site compliance inspections.

5) Prepare and forward to the appropriate SWPPT member a report summarizing the pertinent details of any spills, leaks, or other discharges in accordance with the SPCC Plan for inclusion in the SWPPP.

6) Maintain, update, and retain records at the unit level of all relevant aspects of unit operations, as required by the SWPPP and provide copies upon request to the SWPPT member and SWPPT leader.

7) Identify and coordinate the number and types of personnel requiring training. Assure that new employees are trained within 30 days from the date they enter the unit.

8) Initiate corrective actions for deficiencies found during inspections.

Facility/Unit Personnel

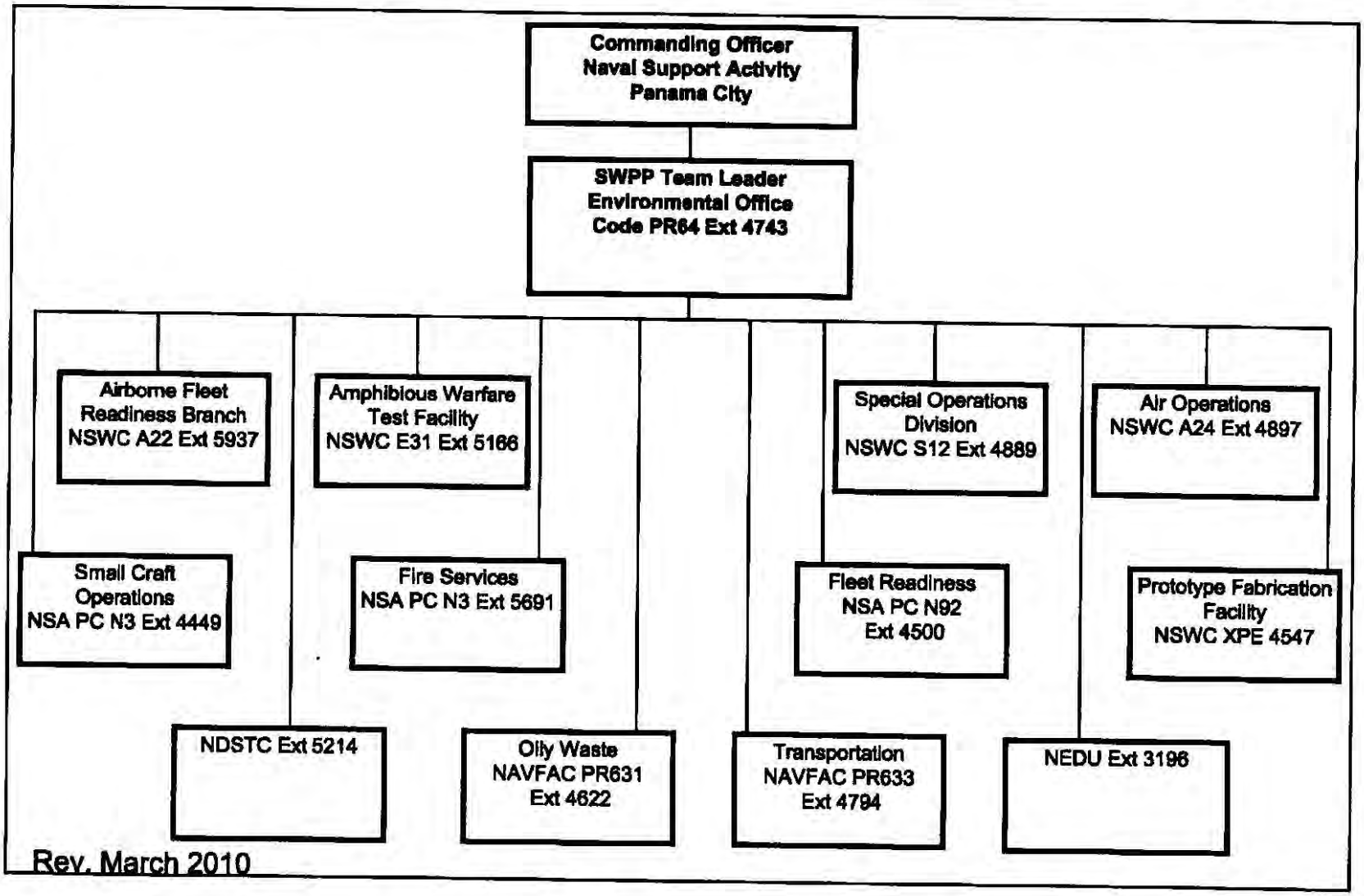
1) Properly handle significant materials to ensure that pollutants are not allowed to enter the storm sewer system.

2) Understand and implement unit designated SWPPP policies and BMPs.

1.2.4 POLLUTION PREVENTION TEAM MEMBERS

To ensure proper implementation, operation and updating of the SWPPP, specific individuals are identified to serve on the SWPPT. The SWPPT leader will continually identify members for areas that have changes in personnel. Names, areas of responsibility, and telephone numbers must be included. The designated individuals and organization structure are indicated on Figure 1.2.1

FIGURE 1.2.1 Storm Water Pollution Prevention Team Organization Chart



Rev. March 2010

1.3 BASE INDUSTRIAL ACTIVITY OVERVIEW

1.3.1 SITE ASSESSMENT

Industrial activities at NSA Panama City have been reviewed in regard to the MSGP. The sectors of the MSGP that apply to NSA Panama City are the ground transportation vehicle maintenance sector (Sector P), water transportation (Sector Q), and aircraft maintenance sector (Sector S). These sectors are formally defined in the Final NPDES MSGP for Industrial Activities, dated September 29, 1995.

Land Transportation and Warehousing (Sector P)

"Vehicle maintenance or equipment cleaning areas at motor freight transportation facilities, passenger transportation facilities, petroleum bulk oil stations and terminals, rail transportation facilities and the United States Postal Service (USPS)", Permit Section VIII.P.

Discharges covered under this sector include vehicle and equipment fluid changes, mechanical repairs, parts cleaning, sanding, refinishing, painting, fueling, storage of vehicles and equipment waiting for repair or maintenance, and storage of the related materials and waste materials, such as oil, fuel, batteries, tires, or oil filters. Equipment cleaning operations include area where the following types of activities take place: vehicle exterior wash down, interior trailer washouts, tank washouts, and rinsing of transfer equipment.

Water Transportation (Sector Q)

"Vehicle maintenance and/or equipment cleaning operations located at water transportation facilities", Permit Section VIII.Q.

Discharges commonly identified under this sector are water transportation facilities classified as SIC Code 44 that have vehicle and equipment maintenance shops and equipment cleaning operations. Vehicle or equipment maintenance include: vehicle and equipment rehabilitation, mechanical repairs, painting, fueling and lubrication. Equipment cleaning operations include areas where vessel and vehicle exterior wash down occur.

Air Transportation (Sector S)

"Vehicle maintenance areas, equipment cleaning areas, or deicing area located at air transportation facilities", Permit Section VIII.S.

Discharges covered under this sector are transportation facilities classified as SIC Code 45

(airports, airport terminals and flying fields) that have vehicle and equipment maintenance shops, equipment cleaning operations or airport deicing operations. Only those portions of the facility that are either involved in vehicle or equipment maintenance (including vehicle and equipment rehabilitation, mechanical repairs, painting, fueling and lubrication), equipment cleaning operations, or airport deicing operations are considered associated with industrial activity.

Copies of these Sectors are included in ***Appendix 3***.

The SWPPT is also responsible for obtaining a permit for discharging storm water from construction sites greater than one acre on the facility. A permit must be obtained from ***both*** FDEP and EPA Region 4. The application for the permit must be filed at least 48 hours prior to start of construction activity. Procedures for filing a notice of intent (NOI) are discussed in Section 1.11. In addition,

construction activity must be operated in accordance with approved state and federal sediment and erosion or storm water management plans. The SWPPT must also submit signed copies or the NOIs to the state and federal agency that approves such plans.

1.3.1.1 Site Information

NSA Panama City is located in Bay County on St. Andrews Bay between Panama City and Panama City Beach, Florida. The St. Andrews Bay bounds NSA Panama City to the east and U.S. Highway 98 to the north. County Road 757, also known as Thomas Drive, borders the base on the west side. County Road 747, south of Alligator Bayou, borders the base on the southern side.

1.3.1.2 Site Description

The primary mission of NSA Panama City is to conduct research, develop prototypes, to test and evaluate equipment, and train divers for all services to be used by the Navy during coastal operations. Three major units are tenants of the Center: the Naval Diving and Salvage Training Center, also known as NDSTC; the Navy Experimental Diving Unit, also known as NEDU; and Naval Surface Warfare Center PC Division, also known as NSWC.

NSA Panama City encompasses approximately 664.76 acres. NSA Panama City serves as the home to three Government-owned/Contractor operated research vessels; two USN diving/salvage training support craft; 2 USN "yard" floating cranes', and three helicopters.

1.3.1.3 Site Drainage

Storm water runoff from NSA Panama City drains primarily to two (2) different areas:

- St. Andrews Bay; and

- Alligator Bayou, which connects to St. Andrews Bay.

Within these two (2) predominate areas, there are approximately twenty six (26) direct discharges either through drainage pipes or concentrated ditch flows. In addition, there are two (2) drainage basins that either sheet flow to low points with no apparent outfall or sheet flow off-site with no concentrated outfall. These twenty eight (28) basins are described as follows:

Drainage Basin "A" - Drainage Basin "A" is located along the western edge of St. Andrews Bay, east of Solomons Drive and is comprised of approximately 5.38 acres. Areas of industrial activity within this basin include:

the Marina (311);
Boat wash area (539);
Boathouse (378); and,
a fueling area at the marina.

Drainage water within this basin flows through a series of open swales and enters St. Andrews Bay at the marina (Outfall #1).

Drainage Basin "B" - Drainage Basin "B" is located along the western edge of St. Andrews Bay, east and west of Solomons Drive near the center of the NSA property and is comprised of approximately 19.24 acres. Areas of industrial activity within this basin include:

waste fuel storage (439);
bulk fuel storage (362);
a portion of cold storage/dry provisions (290);
fueling station (supply) (406);
property disposal and salvage office (98); and,
a portion of supply (99);

Drainage water within this basin flows easterly through a series of open swales, area drains and sub-surface pipes, eventually discharging to St. Andrews Bay, although there is no specific outfall point. The outfall point of this drainage basin is considered to be a low point east of the site of the former wastewater treatment plant (Outfall #2).

Drainage Basin "C" - Drainage Basin "C" is located west of St. Andrews Bay, east and west of Solomons Drive and includes a small portion of the northern extreme of Bullfinch Road, and is comprised of approximately 35.89 acres. Areas of industrial activity within this basin include:

Amphibious Warfare Test Facility (319);
Airborne Mine Countermeasure Fleet Readiness Facility (323);
a portion of the project equipment building (301);
transportation (5);
Special Operations Division (89);
NSWC SDV Detachment (292);

two HAZMAT lockers north of building 319
supply (100);
a portion of supply (99);
controlled humidity warehouse (408);
hazardous waste storage (361);
the mechanical/environmental lab (399);
computations and analysis lab (470); and,
HAZMIN Center (T2051).

Drainage water within this basin flows through a series of open swales, area drains, and sub-surface pipes, eventually discharging to the western portion of St. Andrews Bay. The outfall for this basin is just north of a 36" x 66" pipe (Outfall #3).

Drainage Basin "D" - Drainage Basin "D" is located along the western edge of St. Andrews Bay, east of Bullfinch Road, and is comprised of approximately 2.39 acres. Areas of industrial activity within this basin include: the helicopter hangar (147);
aircraft ground support building (318); and,
the aircraft washrack (367).

Drainage water within this basin flows easterly through a series of underground pipe culverts, eventually discharging to St. Andrews Bay through an 18 inch pipe (Outfall #4).

Drainage Basin "E" - Drainage Basin "E" is located along the western edge of St. Andrews Bay, near the northern portion of the entrance to Alligator Bayou, and is comprised of approximately 0.43 acres.

Drainage water within this basin surface flows to an area drain, which discharges to St. Andrews Bay through an 18 inch pipe (Outfall #5).

Drainage Basin "F" - Drainage Basin "F" is located along the western edge of St. Andrews Bay, near the entrance to Alligator Bayou, east of Bullfinch Road, and is comprised of approximately 2.67 acres. Areas of industrial activity within this basin include:

a portion of the experimental diving facility (321); and
a portion of the transportation parking area (5).

Drainage water within this basin surface flows to a series of area drains and sub-surface pipes, eventually discharging to St. Andrews Bay through a 24 inch and an 18 inch pipe (Outfall #6).

Drainage Basin "G" - Drainage Basin "G" is located at the entrance of Alligator Bayou along the western edge of St. Andrews Bay, east of Solomons Drive, west and east of Bullfinch Road, and is comprised of approximately 6.67 acres. Areas of industrial activity within this basin include:

a portion of the experimental diving facility (321);
a portion of the diving support/scuba locker and fabrication shop (331);
a portion of the recompression chamber rework facility (415);
clean room (407); and
ocean pressure simulation facility (300).

Drainage water within this basin surface flows to a series of area drains and sub-surface pipes, eventually discharging to the St. Andrews Bay through an 18 inch pipe (Outfall #7).

Drainage Basin "H" - Drainage Basin "H" is located along the east dock at the northern portion of the entrance to Alligator Bayou and is comprised of approximately 0.23 acres. Areas of industrial activity within this basin include the pier and it's associated activities. Drainage water within this basin surface flows to an area drain along the pier which discharges to Alligator Bayou through a 10 inch pipe (Outfall #8).

Drainage Basin "I" - Drainage Basin "I" is located along the east dock at the northern edge of Alligator Bayou and is comprised of approximately 0.31 acres. Areas of industrial activity within this basin include the immediate area of the pier and it's associated various activities including a contained diesel fuel dispenser island, UB-1. Drainage water within this basin surface flows to an area drain along the pier and discharges to Alligator Bayou through a 10 inch pipe (Outfall #9).

Drainage Basin "J" - Drainage Basin "J" is located along the east dock at the northern portion of Alligator Bayou and is comprised of approximately 0.33 acres. Areas of industrial activity within this basin include:

the immediate area of the pier and it's associated various activities; and,
a portion of the diving support/scuba locker and fabrication shop (331).

Drainage water within this basin flows to an area drain along the pier and discharges to Alligator Bayou through a 10 inch pipe (Outfall #10).

Drainage Basin "K" - Drainage Basin "K" is located along the east dock at the northern edge of Alligator Bayou and is comprised of approximately 1.39 acres. Areas of industrial activity within this basin include:

the immediate area of the pier and it's associated activities;
a portion of OSF equipment (310);
a portion of the diving support/scuba locker and fabrication shop (331); and
a fuel dispensing station, UB-2, and tanks adjacent to the dock (277 and 278).

Drainage water within this basin surface flows to an area drain along the pier and discharges to Alligator Bayou through a 10 inch pipe (Outfall #11).

Drainage Basin "L" - Drainage Basin "L" is located along the intersection of the east and south

dock at the northern edge of Alligator Bayou and is comprised of approximately 0.72 acres. Areas of industrial activity within this basin include the immediate area of the pier and it's associated activities. Drainage water within this basin flows to an area drain along the pier and discharges to Alligator Bayou through a 10 inch pipe (Outfall #12).

Drainage Basin "M" - Drainage Basin "M" is located along the south dock at the northern edge of Alligator Bayou and is comprised of approximately 0.37 acres. Areas of industrial activity within this basin include the immediate area of the pier and diesel fueling station UB-3 and it's associated activities. An aboveground diesel tank is located in this basin for use with the pump station generator. Drainage water within this basin surface flows to an area drain along the pier and discharges to Alligator Bayou through a 10 inch pipe (Outfall #13).

Drainage Basin "N" - Drainage Basin "N" is located along the south dock at the northern portion of Alligator Bayou and is comprised of approximately 0.42 acres. Areas of industrial activity within this basin include the immediate area of the pier and its associated activities including contained boat fuel dispensing islands. Drainage water within this basin surface flows to an area drain along the pier and discharges to Alligator Bayou through a 10 inch pipe (Outfall #14).

Drainage Basin "O" - Drainage Basin "O" is located along the south dock at the northern portion of Alligator Bayou and is comprised of approximately 0.55 acres. Areas of industrial activity within this basin include the immediate area of the pier and its associated activities. An aboveground diesel tank for the generators is located south of building 9. Drainage water within this basin surface flows to an area drain along the pier and discharges to Alligator Bayou through a 10 inch pipe (Outfall #15).

Drainage Basin "P" - Drainage Basin "P" is located along the south dock at the northern edge of Alligator Bayou, east and west of Solomons Drive, and is comprised of approximately 2.13 acres. Areas of industrial activity within this basin include:

UB-4 Diesel fuel station
the immediate area of the pier and its associated activities; and,
a portion of the prototype fabrication facility (431).

Drainage water within this basin surface flows to a series of area drains and sub-surface pipes along the pier area and Solomons Drive and discharges to Alligator Bayou through two pipes; one 14 x 23 inch pipe, and one 10 inch pipe. It appears that the 14 x 23 inch pipe is the primary or low flow outlet (Outfall #16A), while the 10 inch pipe appears to be a secondary or high flow outfall (Outfall #16B).

Drainage Basin "Q" - Drainage Basin "Q" is located along the south dock at the northern edge of Alligator Bayou, south of Solomons Drive and is comprised of approximately 0.57 acres. Areas of industrial activity within this basin include:

the immediate area of the pier and it's associated activities;
a portion of the boat shed (302); and

a portion of the prototype fabrication facility (431).

Drainage water within this basin surface flows to a area drain along the pier area and discharges to Alligator Bayou through a 10 inch pipe (Outfall #18).

Drainage Basin "R" - Drainage Basin "R" is located along the south dock at the northern edge of Alligator Bayou and is comprised of approximately 0.18 acres. Areas of industrial activity within this basin include:

the immediate area of the pier and its associated activities; and,
a portion of the boast shed (302).

Drainage water within this basin surface flows to an area drain along the pier and discharges to Alligator Bayou through a 10 inch pipe (Outfall #19).

Drainage Basin "S" - Drainage Basin "S" is located along the northern edge of Alligator Bayou and is comprised of approximately 0.18 acres. Areas of industrial activity within this basin include:

the immediate area of the pier and its associated activities; and,
a portion of the Boat Shed (302).

Drainage water within this basin surface flows to an area drain along the pier and discharges to Alligator Bayou through a 10 inch pipe (Outfall #20).

Drainage Basin "T" - Drainage Basin "T" is located along the west dock at the northeast portion of the northern leg of Alligator Bayou and is comprised of approximately 0.70 acres. Areas of industrial activity within this basin include:

the immediate area of the pier and its associated activities; and,
the Small Craft Operations (92).

Drainage water within this basin surface flows directly into Alligator Bayou. There are no drainage structures within this basin which direct water to a specific point outfall.

Drainage Basin "U" - Drainage Basin "U" is located along the west dock, east of the northern leg of Alligator Bayou, east and west of Solomons Drive, west of Bullfinch Road, and is comprised of approximately 8.11 acres. Areas of industrial activity within this basin include:

the paint shop (47);
paint storage locker (84) and its associated laydown yard;
general warehouse (86);
a small area of the pier and its associated activities; and,
containment from fueling station west dock.

Drainage water within this basin surface flows through a series of open swales and sub-surface pipes, eventually discharging to Alligator Bayou through a 18 inch pipe (Outfall #21). There is one OWS located north of the recovery boom storage rack (333). The OWS receive runoff from the contained boat fuel station on the west dock, the recovery boom wash rack and from the contained and covered hazardous material storage room area (307). Runoff that enters pipe utility trenches in basins S, T, U and W is also pumped to the OWSs. The OWS discharges to the sanitary sewer.

Drainage Basin "V" - Drainage Basin "V" is located north and south of Mockingbird Drive, north and south of Sandpiper, south of Solomons Drive near the northernmost point of Alligator Bayou and is comprised of approximately 10.03 acres. There are no buildings within this basin that have industrial activity.

Drainage water within this basin surface flows through a series of open swales and sub-surface pipes, eventually discharging to Alligator Bayou through a 24 inch pipe (Outfall #22).

Drainage Basin "W" - Drainage Basin "W" is located along the west dock at the northeast edge of the northern leg of Alligator Bayou and is comprised of approximately 0.67 acres. Areas of industrial activity within this basin include:

a portion of the pier and its associated activities; and,
storage building (293).

Drainage water within this basin surface flows directly into Alligator Bay. There are no specific drainage structures within this drainage basin.

Drainage Basin "X" - Drainage Basin "X" is located north of the northern leg of Alligator Bayou, west of Solomons Drive, north and south of Vernon Avenue, east of Thomas Drive, and is comprised of approximately 55.55 acres. Areas of industrial activity within this basin include:

MWR maintenance warehouse (309);
un-manned water research lab (436);

Drainage water within this basin surface flows towards the center of the basin to a series of small ponds, which are interconnected. The water then drains southerly towards Alligator Bayou. The outfall of this basin is a 48 inch pipe at the northwest portion of Alligator Bayou (Outfall #23).

Drainage Basin "Y" - Drainage Basin "Y" is located along the western edge of Alligator Bayou, east of Thomas Drive and is comprised of approximately 1.48 acres. Areas of industrial activity within this basin include:

the EOD/MCD small craft storage (369); and,
a portion of the applied instruction building (438).

Drainage water within this basin surface flows to a series of area drains and sub-surface pipes,

eventually discharging to Alligator Bayou through a 24 inch pipe (Outfall #24).

Drainage Basin "Z" - Drainage Basin "Z" is located along the western edge of Alligator Bayou, east of Thomas Drive and is comprised of approximately 1.60 acres. Areas of industrial activity within this basin include:

bottle gas farm (352);
small craft maintenance building (353);
pier side support building (356); and
a portion of the Naval diving and salvage training center (350).

Drainage water within this basin surface flows to a series of area drains and sub-surface pipes, eventually discharging to Alligator Bayou through a 12 inch pipe (Outfall #25).

Drainage Basin "AA" - Drainage Basin "AA" is located along the western edge of the northern portion of Alligator Bayou and is comprised of approximately 0.48 acres. Areas of industrial activity within this basin include a portion of the training pool (351). Drainage water within this basin surface flows to an area drain and sub-surface pipe which discharges to Alligator Bayou (Outfall #26).

Drainage Basin "AB" - Drainage Basin "AB" is located along the northern edge of Alligator Bayou at the south dock and is comprised of approximately 0.60 acres. Areas of industrial activity within this basin include:

the immediate area of the pier and its associated activities; and
a portion of the prototype fabrication facility (431).

Drainage water within this basin surface flows to an area drain and sub-surface pipe, eventually discharging to Alligator Bayou through a 10 inch pipe (Outfall #17).

Drainage Basin "AC" - Drainage basin "AC" is located east of Thomas Drive, south of the residential section on Peacock Drive extended to Parrot Road and north of Gull Circle extending west to the ball fields. This drainage area is comprised of approximately 74.28 acres. Areas of industrial activity include:

open storage areas 1-4; and,
OWS Contractor staging area (96).

Drainage water within this basin basically surface flows by sheet flow and open channel flow to St. Andrews Bay (Outfall #27).

The site plan represents information obtained from USGS quadrangle maps, aerial topography as provided by the NSA Panama City public works department, portions of existing NSA Panama City mapping, and on-site observations (***See Figure 1.3 in map pocket at the end of this SWPPP***).

The facility site plan is an illustration of the overall site indicating location, approximate property boundaries, buildings and operation or process areas, as well as information on drainage, storm water control structures, and receiving streams. This plan specifically indicates the following:

- An outline of the drainage basin, direction of surface flows, and each of the storm water outfalls;

- Surface water bodies including wetlands; and,

- Locations for each of the following activities where potential pollutants are exposed to storm water:

    - fueling stations;
    - vehicle and equipment maintenance and/or cleaning areas;
    - aircraft and equipment maintenance and/or cleaning areas;
    - loading/unloading areas;
    - waste storage area;
    - liquid storage tanks; and,
    - process areas.

Individual site maps in Section 2 depict this information in greater detail.

For areas of the facility that generate storm water discharges associated with industrial activity that have a reasonable potential to contain significant amounts of pollutants, the map indicates the probable direction of storm water flows.

1.4 RECORD KEEPING AND REPORTING

The SWPPP will be maintained on-site at the office of the SWPPT leader. *The SWPPP and the site will undergo a comprehensive compliance evaluation at least annually and the SWPPP will be updated as necessary.* The SWPPT leader will maintain a record, which summarizes the results of all inspections and a certification that the facility is in compliance with the SWPPP (indicating implementation of BMPs), or identify any incident(s) of non-compliance.

The Marina must perform monthly inspections and all other areas must perform quarterly inspections, which will include completing the BMP checklist for their particular area. Each area must complete the BMP checklist as referenced in Section 2. Blank copies of the BMP checklist are included in Appendix 6. Completed BMP checklists will be forwarded to the SWPPT leader for review and filing in Appendix 7.

All accompanying reports and changes to the SWPPP will be retained for at least three (3) years after the most recent update.

Compliance with the recommendations of the SWPPP will be within the time allotted. Additional time may be allowed if structural BMPs are recommended in the SWPPP. The portions of a plan addressing BMP construction requirements provide for compliance with the plan as soon as practicable, but in no case later than three (3) years from the effective date of the permit.

NSA Panama City is not required to submit the SWPPP for review unless requested by FDEP. FDEP can require NSA Panama City to amend the SWPPP at any time. The Director or authorized representative may notify NSA Panama City at any time that the plan does not meet one or more of the minimum requirements. Such notification shall identify those provisions of the permit, which are not being met by the plan, and identify which provisions of the plan require modifications in order to meet the minimum requirements. Within 30 days of such notification from the Director, (or as otherwise provided by the Director), or authorized representative, the SWPPT leader shall make the required changes to the plan and shall submit to the Director a written certification that the requested changes have been made.

For a federal or public agency, either must sign the SWPPP:

1) The principal executive officer or ranking official, which includes the chief executive officer; or
2) The senior officer having responsibility for the overall operations of a principal geographic unit.

At NSA Panama City, the person having signature authority is the CO. In signing the SWPPP, the CO acknowledges the information is complete and accurate. This signature provides a basis for an enforcement action to be taken against the person signing the SWPPP and related reports.

1.5 PERSONNEL TRAINING

Personnel training is essential for effective implementation of the SWPPP. Personnel at all levels of responsibility must be trained in the components and goals of the NPDES program and the SWPPP. Training will address each component of the SWPPP, including how and why tasks are to be implemented.

At a minimum, the following will be part of the training program:

1) Personnel will be trained to identify and **manage potential spills** that can occur from equipment and containers containing petroleum products (i.e., gas, diesel fuel, oil, grease, hydraulic fluids, etc.). Training will include who to call and use of spill kits.

2) All employees will be trained in **proper good housekeeping practices** which include:

    a) Regular vacuuming and/or sweeping;

b) Cleaning up spilled materials;
c) Identifying where broom, vacuums, sorbents, foams, neutralizing. Agents, and other good housekeeping and spill response equipment are located;
d) Instruction on securing drums and containers; and,
e) Frequently checking for leaks and spills of various materials.

3) All personnel will be trained to **recognize toxic and hazardous substances** located at the facility. Personnel will be trained in:

a) Proper organization and storage of materials; and,
b) Identification of toxic and hazardous substances stored, handled, and produced on-site.

Personnel refresher training will be held on an annual basis. New personnel will receive training within thirty (30) days of assignment. All personnel training will be documented on the User Acknowledgement Sheet found in and maintained as part of the SWPPP. The SWPPT leader will coordinate training for all SWPPT members in the elements of the SWPPP and all required annual updates. The **Employee Training Program** form found in Appendix 7 can be used for the yearly training. The SWPPT members will coordinate training for all area personnel within their jurisdiction on the proper implementation of BMPs.

1.6 MONITORING REQUIREMENTS

Storm water discharge monitoring will be performed at the designated outfall points (discharge points) as noted enclosed out-fall location map. The monitoring will be performed in accordance with the requirements of the MSGP for Sectors P, Q and S that represent industrial activities at NSA Panama City. The MSGP monitoring requirements state that quarterly visual monitoring is required for Sectors P, Q and S. Sector Q also requires quarterly analytical monitoring in years two and four of the permit.

1.6.1 CO-LOCATED INDUSTRIAL MONITORING REQUIREMENTS

The MSGP addresses co-located industrial activities at an industrial facility which supports the facility's primary industrial activity. The monitoring requirements for storm water discharges at NSA Panama City must comply with the requirements for Sectors P, Q and S. Under the MSGP the monitoring requirements are additive in drainage areas where multiple industrial activities co-exist. By monitoring the discharges from these different industrial activities, NSA Panama City can determine the effectiveness of the BMPs and SWPPP to control the quality of storm water runoff from these areas.

1.6.2 VISUAL MONITORING

FDEP has determined that the potential for storm water discharges to contain pollutants above benchmark levels, because of industrial activities and materials exposed to precipitation, does not support analytical sampling at facilities covered under Sector P and S since de-icing activities are not performed. As part of Sector Q requirements, visual inspections are required. Implementation of the SWPPP, use of recommended BMPs, and monitoring of storm water discharges in accordance with the proposed MSGP requirements will help ensure storm water contamination is minimized.

Visual inspection, where required, must be of a grab sample collected at each designated storm water outfall as indicated on the enclosed site plan. The visual examination will include observations of:

- color
- odor
- turbidity (clarity)
- floating solids
- settled solids
- suspended solids
- foam
- oil sheen
- other obvious indicators of storm water pollution

A Visual Monitoring Report, located in Appendix 3, shall be used for the discharge monitoring documentation.

The inspection must be conducted in a well lit area. No analytical tests are required to be performed on visual samples.

The inspection will be made by a member of the SWPPT and must be made at least once in each quarter of the permit term, during daylight hours, unless there is insufficient rainfall for runoff to occur. The same individual will attempt to conduct the visual monitoring throughout the term of the permit to ensure the greatest degree of consistency. The visual examinations must be conducted in the following quarters:

-
- January - March;
- April - June;
- July - September; and
- October - December

The grab sample for the visual examination will be collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed one hour) of when runoff occurs. The person responsible for monitoring will document observations. All such samples must be collected from a discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event.

When a sample cannot be collected over the course of the monitoring period as a result of adverse climatic conditions, the reason for not performing the visual examination must be documented. Adverse weather conditions which may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricanes, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended rainfalls, etc.).

Visual observation reports must be maintained on-site. Appendix 7 of the SWPPP has been set aside for this record keeping. The report will include the examination date and time, examination personnel, the nature of the discharge, visual quality of the storm water discharge, presence of suspected non-storm water discharges and probable sources of any observed storm water contamination.

The results of the monitoring will be used to determine the effectiveness of existing as well as any BMPs implemented as a result of the SWPPP. Visual examinations will not assess chemical properties of the storm water; however, it will provide results on which the activity may react quickly. The quarterly monitoring will allow for timely adjustments to the SWPPP. If the BMPs are not effective, corrective action must be implemented as soon as practical.

1.6.3 ANALYTICAL MONITORING

As part of the Sector Q requirements for the Marina, analytical monitoring will be performed quarterly in years two and four of the MSGP. If the average concentration of the year two samples is less than or equal to the cut-off concentrations, the permittee may not be required to perform testing in year four. Implementation of the SWPPP, use of recommended BMPs, and monitoring of storm water discharges in accordance with the proposed MSGP requirements will help ensure storm water contamination is minimized.

The samples should be taken from a representative location of the site. The pollutants of concern and cut-off concentrations to be tested for are as follows, unless otherwise specified on the Discharge Monitoring Report (DMR) form:

Total Recoverable Aluminum…… …0.75 mg/l
Total Recoverable Iron…….……1.0 mg/l
Total Recoverable Lead …….……0.0816 mg/l
Total Recoverable Zinc…….……0.065 mg/l.

The analytical samples must be pulled in the following quarters:

- January - March;
- April - June;
- July - September; and
- October - December

The grab sample will be collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed one hour) of when runoff occurs. All such samples must be collected from a discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event.

Permittees are required to submit the results of years two and four within 3 months of the conclusion of the sampling periods. Typically, this will be by March 31st of years three and five. The following information should be included in the submittal: date and duration (in hours) of the storm event sampled; a measurement or estimate of the total precipitation (in inches); time between storm events sampled; volume of runoff; and peak flow rate of runoff for each storm event sampled.

When a sample cannot be collected over the course of the monitoring period as a result of adverse climatic conditions, the reason for not performing the analytical sampling must be documented. Also, the discharger shall collect a substitute sample from a separate qualifying event in the next period and submit the data along with data for the routine sample in that period. Adverse weather conditions which may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricanes, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended rainfalls, etc.).

1.7 ALLOWABLE NON-STORM WATER DISCHARGES

The MSGP does not allow non-storm water discharges that are mixed with storm water except as provided below:

- discharges from firefighting activities
- fire hydrant flushings
- potable water sources, including waterline flushings
- irrigation drainage
- lawn watering
- routine external building washdown without detergent or other compounds
- pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used.
- air conditioning condensate
- compressor condensate
- uncontaminated springs
- uncontaminated ground water and
- foundation or footing drains where flows are not contaminated with process materials

such as solvents.

In addition to the above, NSA obtained authorization from EPA Region 4 on 14 June 1995 for the following non-storm water discharges.

- drinking water fountains and emergency eyewash/showers that discharge to the ground or onto impervious surfaces where the discharge percolates or evaporates before reaching the storm water sewer;
- scuba gear rinse water with no detergents.

1.8 SPECIAL REQUIREMENTS

There are special SWPPP requirements for certain permittees subject to reporting requirements under Section 313 of EPCRA (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA)). Presently, NSA Panama City is not subject to reporting requirements under Section 313 of EPCRA. In the future, if EPCRA313 requirements are fully implemented, the SWPPP must be revised according to the following section.

1.8.1 SPECIAL REQUIREMENTS FOR FACILITIES SUBJECT TO EPCRA SECTION 313 REQUIREMENTS

There are special requirements for certain permittees subject to reporting requirements under Section 313 of EPCRA (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA)). Section 313 of EPCRA requires operators of certain facilities that manufacture (including import), process or otherwise use listed toxic chemicals to report annually their releases of those chemicals to any environmental media. Listed toxic chemicals include more than 300 chemicals listed in 40 CFR part 372.

The criteria for facilities that must report under Section 313 are given in 40 CFR 372.22. A facility is subject to the annual reporting provisions of Section 313 if it meets all three of the following criteria for a calendar year:

1) It is included in SIC Codes 20 through 39;

2) It has 10 or more full-time employees; and,

3) It manufactures (including imports), processes, or otherwise uses a chemical listed in 40 CFR 372.65 in amounts greater than "threshold" quantities specified in 40 CFR 372.25.

For the purposes of the SWPPP, Section 313 water priority chemicals are defined as chemicals or chemical categories that:

1) Are listed in 40 CFR 372.65 pursuant to EPCRA Section 313;

2) Are manufactured, processed, or otherwise used at or above threshold levels at a facility subject to EPCRA Section 313 reporting requirements; and

3) Meets at least one of the following criteria:

   a) Are listed in Appendix D of 40 CFR Part 122 or either Table II (organic priority pollutants), Table III (certain metals, cyanides, and phenols), or Table V (certain toxic pollutants or hazardous substances);

   b) Are listed as hazardous substance pursuant to Section 311(b)(2)(A) of the CWA in 40 CFR 116.4; or

   c) Are pollutants for which EPA has published acute or chronic toxicity criteria.

The SWPPT must compile a list of water priority chemicals used at NSA Panama City for inclusion in the SWPPP.

1.8.2 SUMMARY OF SPECIAL REQUIREMENTS

These requirements reflect the best available technology for controlling storm water discharges of water priority chemicals. Appropriate containment, drainage control and/or diversionary structures must be provided for in areas where Section 313 water priority chemicals are exposed to storm water. ***The SWPPT must evaluate the usage of one or more of the following preventative systems for use in all areas where Section 313 water priority chemicals are identified:***

1) Curbs, culverts, gutters, sewers, or other forms of drainage control to prevent or minimize the potential for storm water run-on to come in contact with significant sources of pollutants; and,

2) Roofs, covers, or other forms of appropriate protection to prevent storage piles from exposure to storm water and wind.

In addition, these special requirements also apply to priority areas of the facility, which include the following:

1) Liquid storage areas where storm water comes into contact with any equipment, tank container, or other vessel used for Section 313 water priority chemicals;

2) Material storage areas for Section 313 water priority chemicals other than liquids;

3) Truck and rail car loading and unloading areas for liquid Section 313 water priority

chemicals; and,

4) Areas where Section 313 water priority chemicals are transferred, processed, or otherwise handled.

1.8.3 REQUIREMENTS FOR PRIORITY AREAS

Valves or other positive means to prevent the discharge of a spill or other excessive leakage of Section 313 water priority chemicals must restrain discharge from priority areas. Where containment units are employed, pumps or ejectors may empty such units; however, these must be manually activated.

Flapper-type drain valves must not be used to drain containment areas, as these will not effectively control spills.

Records must be kept of the frequency and estimated volume (in gallons) of discharges from containment areas. ***The SWPPT must designate on the enclosed site plan all areas where Section 313 water priority chemicals are utilized or stored***.

Additional special requirements are related to the types of industrial activities that occur within the priority area. These requirements are summarized in the following paragraphs.

Liquid Storage Areas

When storm water comes into contact with equipment, tank, container, or other vessel used for Section 313 water priority chemicals, the material and construction of tanks or containers must be compatible with the material stored and conditions of storage, such as temperature and pressure. Liquid storage areas for Section 313 water priority chemicals must be operated to minimize discharges of Section 313 chemicals. Appropriate measures to minimize discharges of Section 313 chemicals may include secondary containment provided for at least the entire contents of the largest single tank plus sufficient freeboard to allow for precipitation, a strong spill contingency and integrity testing plan, and/or equivalent measures.

A strong spill contingency plan would typically contain, at a minimum, a description of response plans, personnel needs, and methods of mechanical containment (such as sorbents, booms, collection devices, etc.). Included also are steps to take for removal of spill chemicals or materials, and procedures to ensure access to and availability of sorbents and other equipment. The testing component of the plan would provide for conducting integrity testing of storage tanks at set intervals such as once every five years, and conducting integrity and leak testing of valves and piping at a minimum frequency, such as once per year. In addition, a strong plan would include a written and actual commitment of manpower, equipment, and materials required to comply with the permit and to expeditiously control and remove any quantity of spilled or leaked chemicals that may result in a toxic discharge.

Other Material Storage Areas

Material storage areas for Section 313 water priority chemicals other than liquids that are subject to runoff, leaching, or wind must incorporate drainage or other control features to minimize the discharge of these chemicals by reducing their contact with storm water. Appropriate measures could include storage lockers, storage inside closed buildings and self contained pallets.

Truck and Rail Car Loading and Unloading Areas

Truck and rail car loading and unloading areas for liquid Section 313 water priority chemicals must be operated to minimize discharges of these chemicals. Appropriate measures may include:

1) Placement and maintenance of drip pans (appropriate disposal of materials collected in the drip pans) where spillage may occur (such as hose connections, hose reels, filler nozzles, etc.) or when making or breaking hose connections;

2) Inclusion of a strong spill contingency and integrity plan; and/or,

3) Other equivalent measures.

Other Transfer, Process, or Handling Areas

Processing equipment and materials handling equipment must be operated to minimize discharges of Section 313 water priority chemicals. Appropriate measures may include:

1) Materials used in piping and equipment must be compatible with the substances handled;

2) Drainage from process and materials handling areas must minimize storm water contact with these chemicals;

3) Additional protection such as covers or guards to prevent exposure to wind, spraying, or releases from pressure relief vents to prevent a discharge of these chemicals to the drainage system, and overhangs or door skirts to enclose trailer ends at truck loading/unloading docks must be provided as appropriate; and,

4) Visual inspections or leak tests must be provided for piping conveying these chemicals without secondary containment.

Monitoring

Under the proposed MSGP, there are no monitoring requirements for storm water discharges from Section 313 reporting facilities.

1.9 CONSTRUCTION ACTIVITY: PERMIT APPLICATION REQUIREMENTS

The SWPPT is responsible for applying for coverage under a permit for storm water discharges from construction activities, which disturb greater than one (1) acre at NSA Panama City. Coverage must be obtained from both FDEP and EPA Region 4.

To obtain coverage under the FDEP generic permit for construction sites, the SWPPT must file a Notice of Intent (NOI) as provided in Rule 62-621.300(4), F.A.C. To obtain coverage under the EPA Region 4 general permit for construction sites, the SWPPT must file a Notice of Intent (NOI) as provided in EPA Region 4 General Permit (65 FR 25122).

The Resident Office in Charge of Construction (ROICC) SWPPT member will file the NOI within 48 hours of commencement of construction activities (initial disturbance of soils). The ROICC is also responsible for keeping the SWPPT up to date on ongoing as well as future construction activities on the base. The exact requirements for a NOI are described in the generic permit. NOIs for the generic permit must contain the following information:

1) Name, mailing address, and location for the facility;

2) Standard Industrial Classification (SIC) code that represents the principal activities at the facility;

3) Operator's name, address, telephone number, ownership status, and status as federal, state, private, public, or other entity;

4) Permit number of additional NPDES permits for any discharges from the site that currently are authorized by an NPDES permit;

5) Name of receiving waters;

6) An indication of whether NSA Panama City has existing quantitative data describing the concentration of pollutants in storm water discharges;

7) NSA Panama City group number (1256);

8) Certification that a SWPPP has been prepared;

9) Brief description of the project;

10) Estimated timetable for major activities;

11) Estimate of number of acres of the site on which soil will be disturbed; and,

12) Certification that the SWPPP provides compliance with approved state or local sediment and erosion site plans or storm water management plans.

The SWPPT must also submit signed copies of the NOIs to any state or local agency that approves such plans.

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SECTION 2.0

STORM WATER POLLUTION PREVENTION PLAN ASSESSMENT AND REQUIREMENTS FOR INDUSTRIAL AREAS

2.1 BMP ASSESSMENT

This section is to be utilized to determine the effectiveness of storm water pollution prevention measures. Potential storm water pollution is controlled through the use of Best Management Practices (BMPs).

FDEP emphasizes the implementation of pollution prevention measures and BMPs that reduce possible pollutant discharges at the source. Source reduction measures include, among others, preventive maintenance, chemical substitution, spill prevention, good housekeeping, training, and proper materials management. Where such practices are not appropriate to a particular source or do not effectively reduce pollutants in storm water discharges, FDEP supports the use of source control measures and BMPs such as material segregation or covering, water diversion, and dust control. Like source reduction measures, source control measures and BMPs are intended to keep pollutants out of storm water. The remaining classes of BMPs, which involve recycling or treatment of storm water, allow the reuse of storm water or attempt to lower pollutant concentrations prior to discharge.

2.2 BMPs IN-USE AND PROPOSED BMP IMPLEMENTATION

The following narrative describes industrial activities that occur at each building/area that is covered by the SWPPP and lists existing BMPs that are presently employed. A site map showing building location, existing structural BMPs, and general storm water runoff patterns precedes each building/area description. A BMP table showing BMPs applicable to each building/area follows the site map. During the required quarterly evaluations, applicable BMP checklists must be completed for each building/area.

BMPs are to be implemented to the maximum extent practicable (MEP). Due to changing technology, MEP is an ever-changing goal. The SWPPT will continue to review activities at NSA PC to determine what additional BMPs, if any, are to be implemented at the various facilities. Additional BMP needs could result from changes in activities performed in the building or on the apron areas. Personnel changes may result in some of the items on the existing BMP lists to move to the implementation BMP lists if training is not performed regularly.

Some of the recommended BMPs are structural in nature (requiring construction) while others are non-structural (source control). The SWPPT team will review the recommended structural BMPs and provide an implementation time frame. Those BMPs that are non-structural can normally be implemented more easily while the structural BMPs require funding and a construction timetable.

Non-structural BMPs are to be implemented within 3 months of the date of this SWPPP. Structural BMPs are to be programmed and budgeted for construction as soon as possible; however, in no circumstance shall structural BMPs not be completed within 36 months of the date of this SWPPP. If the BMPs proposed cannot be implemented or constructed, written documentation shall be submitted by the SWPPT member responsible to the SWPPT leader for incorporation into this SWPPP.

The BMPs on the checklist are :

1. Good Housekeeping
2. Preventative Maintenance
3. Visual Inspection
4. Spill Prevention and Response
5. Sediment and Erosion Control
6. Runoff Management/Pollution Prevention
7. Personnel Training and Record Keeping
8. Fueling
9. Vehicle, Aircraft and Equipment Maintenance
10. Painting Operations
11. Vehicle, Aircraft and Equipment Washing
12. Loading and Unloading Materials
13. Liquid Storage in Above Ground Tanks
14. Waste Management Areas
15. Outside Storage Areas
16. Site Specific Practices

The following is a list of BMPs that were found to be a part of standard operating procedures implemented throughout NSA PC.

- All spills are reported to the NSA PC fire department and the Navy on the Scene Commanders Office through the NSA PC Emergency Communication Dispatch Center.

- For the most part, hazardous materials areas are under roof, are in covered secondary containment, or are within concrete containment basins which are valved. Discharge from valved containment is inspected prior to release.

- The 24" and 48" outfalls, numbers 22 and 23 respectively, that discharge into Alligator Bayou have floating booms installed at the outfall ends of the pipes to contain any oil that is discharged through these outfalls.

- Decals have been added to storm drains to notify personnel that storm drains drain to St. Andrews Bay but most are currently unreadable and should be replaced.

- Dumpster lids are to remain closed at all times to prevent rainfall from coming in contact with the contents of the dumpster.

- Drain valves for containment areas are to remain closed and locked at all times until the area is inspected for the presence of oil sheens or other contaminants. Signs are to be posted in the vicinity of all valves instructing that the valve is only to be operated by authorized personnel. An inspection program shall be implemented after each rainfall event to inspect and properly drain all containment areas.

- A regular inspection program shall be implemented for all containment basins. The basins are to be inspected for cracks, valve operation, locks, and for proper storage volumes based on the containment basin size. Basins found to be in violation of 40CFR 264.175 are to be corrected immediately.

- A spill kit shall be readily available at all storage areas. This kit is to be well labeled and easily accessible by all personnel. Personnel are to be trained in proper use and disposal of spill kit materials.

- Segregate materials stored in containment area according to content. Place all drums on pallets.

- Water shall not be used to clean concrete surfaces. Sweeping up the area is a better BMP.

- Copies of all pertinent environmental management plans are to be distributed to all applicable tenants. These plans are to be implemented as standard operating procedures along with any specialized procedures maintained by the individual tenant.

A fresh water rinse to remove salt water from equipment is conducted in the following outdoor locations:

Building	**Equipment**	**Comments**
UB-1	Remote Minehunting System (RMS)	Rinse water accumulates on the concrete and is blocked from entering the storm drains using a drain blocking mat. The water is left to evaporate in the sun and air.
400	Remote Minehunting System (RMS)	Rinse occurs outside the building on the East side of the asphalt approach to the high bay. A saddle in the asphalt approach drains the water to the soil to the South of the approach, where the rinse water soaks into the soil. The water has no means of entering the storm drain system.

2.2.1 NSA PC Small Craft Operations

Sector Q: Water Transportation Maintenance and Washing

Small Craft Operations is located one block north of the South Dock, north of Alligator Bayou on Bullfinch Road. Personnel at Small Craft Operations are responsible for all port operations as well as maintaining the small boats that are used in support and security activities for NSA PC.

The buildings and facilities associated with Small Craft Operations include:

97 Small Craft Operations/Repair Shop
302 Boat Shed - South Dock
326 Spill Response Storage

Personnel from Small Craft Operations are responsible for fleet liaisons. When ships are fueled by FISC, personnel are responsible for placing booms around the ships.

Building 97 houses the administrative offices and the maintenance area for small engine work. Outboard motors can be removed and repaired inside the facility. Small boats (up to 22') may be pulled into the shop area for repairs. The majority of all maintenance activities, including painting, are performed inside, but tall boats that cannot fit into the building are maintained outdoors on the west side of the building. Boats are rinsed with fresh water in this area, but are washed with detergent at the Marina wash rack. A storm drain in this area could potentially receive pollutants from these activities and should be covered during while these work processes are performed.

Building 302 is the boat shed which is a covered inlet where boats are stored and docked.

Building 326 stores supplies and equipment for spill response.

Potential pollutants located at this facility include POLs, glycol, and paint.

Best Management Practices (BMPs)

Area	2.2.1 - Small Craft Operations	SWPPPT Member				
Activity	NSA Panama City	Walter Dybis				
Inspectors Initials						
Date of Inspection						
Year of Inspection		2012	JAN/ MAR	APR/ JUN	JUL/ SEP	OCT/ DEC
BMP #	BMP Description					
1	Good Housekeeping					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	Preventative Maintenance					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	Visual Inspection					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	Spill Prevention and Response					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	Sediment and Erosion Control					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	Runoff Management/Pollution Prevention					
BMP #7	Personnel Training and Record Keeping					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #8	Fueling					
8.3	Dry cleanup methods (sorbent, drip pans, or pads) are used for fuel spills or leaks.					
8.4	Spill control awareness signs are visible.					
8.5	Portable fuel tanks are stored properly.					
8.6	Fuel tanks are not topped off.					

Best Management Practices (BMPs)						
Area	**2.2.1 - Small Craft Operations**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Walter Dybis**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT/ DEC**
BMP #	**BMP Description**					
8.7	Fueling areas are protected from rain and run-on.					
8.8	Oil/water separators or oil/grease traps are installed prior to storm drains.					
8.9	Pollution prevention measures are discussed with personnel.					
BMP #9	**Vehicle, Aircraft and Equipment Maintenance**					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					
9.9	Wrecked vehicles and aircraft are stored properly.					
BMP #10	**Painting Operations**					
10.1	Painting activities are per9formed in designated areas.					
10.2	Paint overspray is prevented from contact with storm water.					
10.3	Parts are inspected prior to being painted to ensure they are dry, clean and rust free.					
10.4	Wastes from sanding are contained.					
10.5	Paint waste and solvents are stored properly.					
10.6	Paint, paint thinner, and solvents are recycled.					
BMP #11	**Vehicle, Aircraft and Equipment Washing**					
11.1	Detergents used are phosphate-free biodegradable detergents.					
11.2	Outside washing is done at an approved washrack.					
11.3	Wash water is contained and kept out of the storm drainage system.					
11.4	Wash water is recycled where practical.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #13	**Liquid Storage in Above Ground Tanks**					
13.1	The above ground tanks are included in other environmental management plans.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					

Best Management Practices (BMPs)						
Area	**2.2.1 - Small Craft Operations**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Walter Dybis**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT/ DEC**
BMP #	**BMP Description**					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.2 Morale, Wellness and Recreation (MWR)

The NSA PC MWR department has several areas that are considered to contain industrial activities which are grouped together in this section. The areas that are included in this group are:

- Marina and Outdoor Recreation
- Auto Skills

Other areas of MWR that are not considered industrial activities are listed below
.

- Galley
- Main Deck Club
- Market Street Grill
- Fleet Readiness Maintenance and Warehouse
- Swimming Pool

BMPs which have been implemented at the non-industrial areas of MWR include:

- Majority of work is performed under indoors;
- Good housekeeping and preventative measures have been implemented;
- Routine inspections for leaks and conditions that could lead to contact with storm water are conducted;
- Sorbents are readily available for use in the even of a spill;
- Personnel are trained in spill prevention measures and techniques and storm water pollution prevention;
- Personnel know whom to notify in the event of a spill. Post signs as a reminder.
- Grease traps monthly and cleaned as necessary;
- Mop waste waters are discharged to the sanitary sewer, not dumped on the ground;
- Concrete surfaces are not cleaned with water that discharges to the storm drain.
- Dumpster covers are closed at all times;

. In addition to the applicable BMPs listed above, this department must implement the following:

- Do not allow visitors to wash vehicles or perform vehicle maintenance in parking lots.

2.2.2.1 Marina

Sector Q: Water Transportation Maintenance and Washing

The Marina is located east of Solomons Drive adjacent to St. Andrews Bay. The buildings and facilities associated with the Marina include:

327 Marina Support Building
378 Boathouse (Marina)
539 Wash Rack
541 Boat Rack
542 Boat Rack
546 Rigging Shop

The marina is operated by Fleet Readiness. The facilities are made available for military personnel and their families for their own personal use. The marina maintains boat slips and boats that can be rented. A fueling island is located at the end of the pier for gasoline purchases. Preventative maintenance activities are performed in the Marina Support Building. Spark plug changes and electronics work is performed on a designated rack located east of Facility 542. Any large maintenance or painting jobs are performed offsite at a contractor location.

The covered boat wash area is located at the marina for washing small boats on trailers and vehicles. The area flows through an OWS which discharges to the sanitary sewer. Boats are also rinsed with fresh water and washed with Simple Green on a concrete area next to the boat slip area. The concrete is sloped and the discharge collected and pumped to an upland grassy area. Kayaks and canoes are rinsed with fresh water on a grassy area near the Rigging Shop.

Potential pollutants located at this facility include: POLs from maintenance activities and refueling.

Following is a list of tanks that are used or maintained by the Marina:

Tank No.	Capacity	Contents	Type
327 C	2,000 gal	Unleaded	AST (Double-Walled)

Boat Rack
542
Marina
1A
Boat Rack
541
AST (Double-Walled)
Rigging shop
Boathouse
378
546
Washrack
539
327
Marina Support Building
T-2068
T-2069
T-2064
T-2065
T-2066
T-2067
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Marina - SWPPP Buildings
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0
40
80
Feet
1 inch = 80 feet
Aerial Photo Date: January 2009
Marina

Best Management Practices (BMPs)						
Area	**2.2.2.1 - Marina**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Andy Noda**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	**Sediment and Erosion Control**					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #8	**Fueling**					
8.1	Spill/overflow prevention equipment is installed, maintained and operating properly at fuel delivery areas.					
8.2	Fuel areas are contained to prevent spills from directly entering the storm sewer.					
8.3	Dry cleanup methods (sorbent, drip pans, or pads) are used for fuel spills or leaks.					
8.4	Spill control awareness signs are visible.					
8.5	Portable fuel tanks are stored properly.					
8.6	Fuel tanks are not topped off.					

8.7	Fueling areas are protected from rain and run-on.					
8.8	Oil/water separators or oil/grease traps are installed prior to storm drains.					
8.9	Pollution prevention measures are discussed with personnel.					
BMP #9	**Vehicle, Aircraft and Equipment Maintenance**					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					
9.9	Wrecked vehicles and aircraft are stored properly.					
BMP #10	**Painting Operations**					
10.1	Painting activities are peformed in designated areas.					
10.2	Paint overspray is prevented from contact with storm water.					
10.3	Parts are inspected prior to being painted to ensure they are dry, clean and rust free.					
10.4	Wastes from sanding are contained.					
10.5	Paint waste and solvents are stored properly.					
10.6	Paint, paint thinner, and solvents are recycled.					
BMP #11	**Vehicle, Aircraft and Equipment Washing**					
11.1	Detergents used are phosphate-free biodegradable detergents.					
11.2	Outside washing is done at an approved washrack.					
11.3	Wash water is contained and kept out of the storm drainage system.					
11.4	Wash water is recycled where practical.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #13	**Liquid Storage in Above Ground Tanks**					
13.1	The above ground tanks are included in other environmental management plans.					
13.2	There are overflow protection devices on tanks.					
13.3	There are protective guards around tanks and pipes.					
13.4	Valves are clearly tagged, labeled, and oriented properly.					
13.5	The tank systems are inspected and tested regularly.					
13.6	Tanks are surrounded by a secondary containment system that includes a berm.					
13.7	Drain valve(s) are properly located and normally in closed and locked position.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.3 FIRE DEPARTMENT

Sector Q: Water Transportation Maintenance and Washing

The Fire Department, Bldg. 540, is located on Solomons Drive north of Supply's building 98.

The fire department responds to all fire related hazards, is the first responder for fuel and hazardous substance spills at NSA PC, and is responsible for the servicing of all fire extinguisher cylinders. Processes performed include inspections of fire extinguishers and general maintenance of fire equipment.

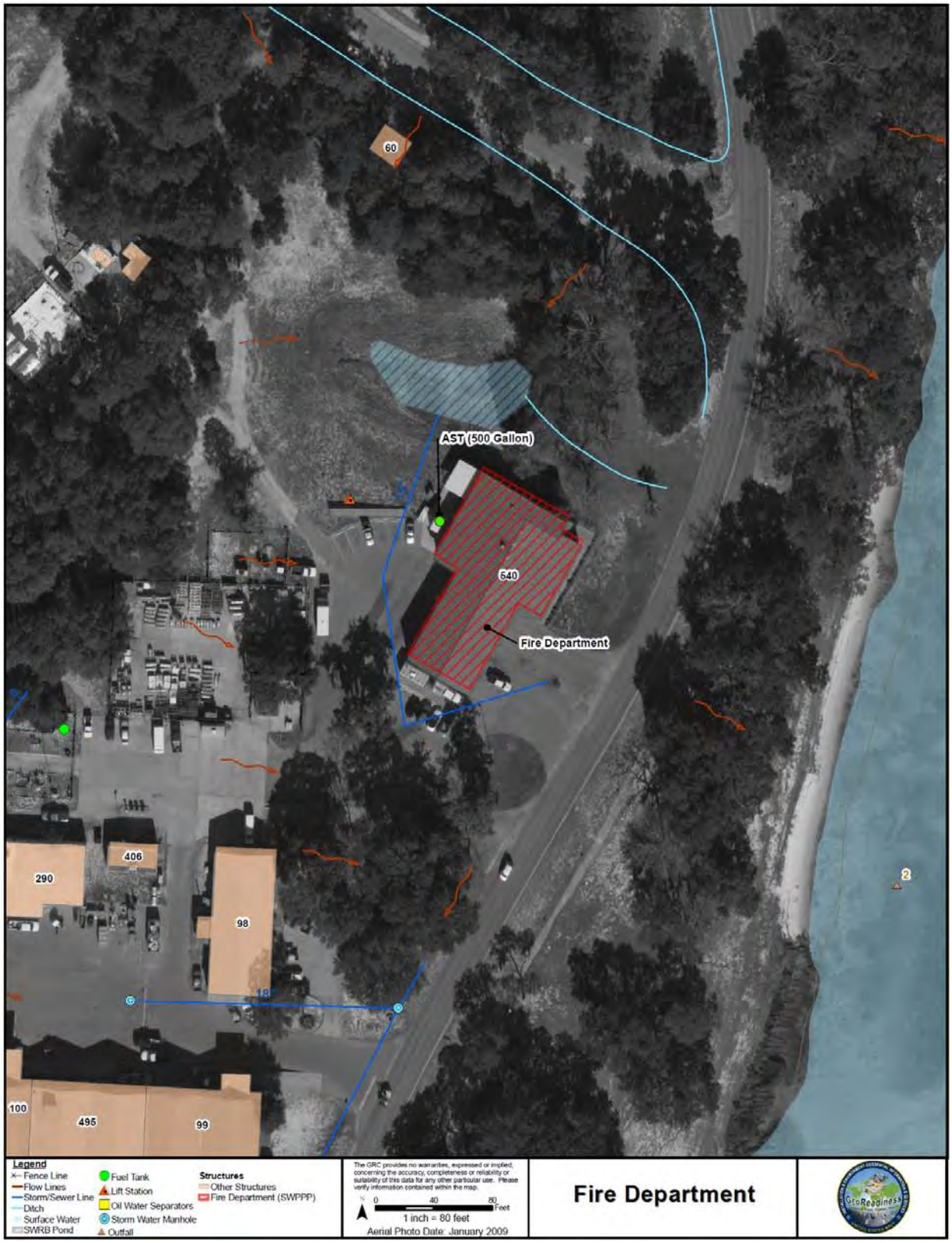
All vehicle washing is performed outside of building 540 on the asphalt pavement. A fresh water rinse takes place daily, with a detergent wash occurring weekly. Runoff flows into the storm drain which discharges into a retention pond located on the west side of the building. The building was originally designed for washings to occur inside the building with the wastewater discharging to the sanitary sewer through drains located in the floor. Because of storage of garments, weight equipment, and hazardous materials inside the building, the washings now take place directly outside the building.

An emergency generator and double walled fuel tank are stored west of the building. Team members should include inspection of the integrity of the piping between the generator and tank in their quarterly inspections.

Potential pollutants at this facility include: POLs, and wastewater and suspended solids from vehicle washing.

Following is a list of tanks that are used or maintained by the Fire Department:

Tank No.	Capacity	Contents	Type
G540	500 gal	Diesel	AST


60
AST (500 Gallon)
640
Fire Department
406
290
98
100
495
99
2
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
SWRB Pond
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Fire Department (SWPPP)
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 40 80 Feet
1 inch = 80 feet
Aerial Photo Date: January 2009
Fire Department

Best Management Practices (BMPs)						
Area	**2.2.3- Fire Department**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Chief James Elston**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/MAR**	**APR/JUN**	**JUL/SEP**	**OCT/DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	**Sediment and Erosion Control**					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
8.9	Pollution prevention measures are discussed with personnel.					
BMP #9	**Vehicle, Aircraft and Equipment Maintenance**					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					

Best Management Practices (BMPs)						
Area	**2.2.3- Fire Department**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Chief James Elston**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/MAR**	**APR/JUN**	**JUL/SEP**	**OCT/DEC**
BMP #	**BMP Description**					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					
BMP #11	**Vehicle, Aircraft and Equipment Washing**					
11.1	Detergents used are phosphate-free biodegradable detergents.					
11.2	Outside washing is done at an approved washrack.					
11.3	Wash water is contained and kept out of the storm drainage system.					
11.4	Wash water is recycled where practical.					
BMP #13	**Liquid Storage in Above Ground Tanks**					
13.1	The above ground tanks are included in other environmental management plans.					
13.2	There are overflow protection devices on tanks.					
13.3	There are protective guards around tanks and pipes.					
13.4	Valves are clearly tagged, labeled, and oriented properly.					
13.5	The tank systems are inspected and tested regularly.					
13.6	Tanks are surrounded by a secondary containment system that includes a berm.					
13.7	Drain valve(s) are properly located and normally in closed and locked position.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.4 Airborne Mine Countermeasures (AMCM) Fleet Readiness Branch

Sector P: Outdoor equipment storage and parking

The AMCM Fleet Readiness Branch is located on the southwest corner of Bullfinch Road and Sandpiper Drive. Personnel are responsible developing minesweeping equipment for the fleet and are an Inter-Service Engineering Agency for airborne minesweeping equipment.

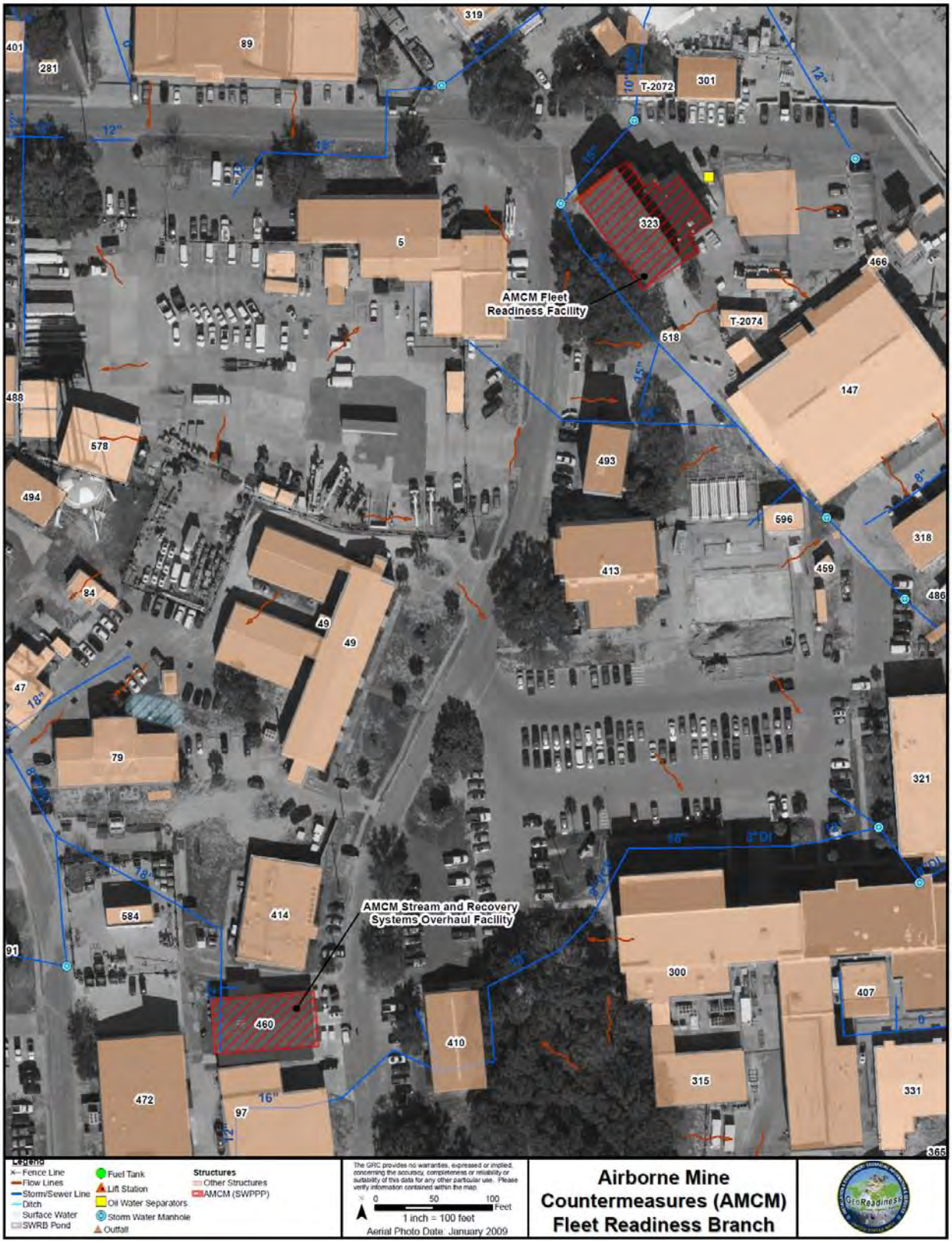
The buildings and facilities associated with the AMCM Fleet Readiness Branch include:

323 AMCM Fleet Readiness Facility
460 AMCM Stream and Recovery Systems Overhaul Facility

The main industrial activities that occur at the AMCM Fleet Readiness Branch center around various types of minor fabrication work and occur in building 323. Large projects that require milling, welding, electrical wiring, and/or painting are performed at other facilities at NSA PC. Two Rigid Hull Inflatable Boats are utilized as chase boats. The majority of the work performed occurs under roof. Fabrication of small items, small aerosol painting jobs and maintenance of the boats is performed inside. Fueling of equipment takes place on the concrete driveway located south of the building. A fresh water rinse of the boats and minesweeping equipment takes place outside of the building, but does not enter the storm drainage system. Detergent washes takes place at the Transportation wash rack.

Building 460 houses the AMCM Stream and Recovery Systems Overhaul Facility for the maintenance of the winch program. All work at this facility is performed indoors. A hazardous waste collection point for waste sandblast is located outdoors under cover on the south side of the building.

Potential pollutants located at both facilities include POLs. Used oil is stored outside building 323 in secondary containment drums.


AMCM Fleet Readiness Facility
AMCM Stream and Recovery Systems Overhaul Facility
319
401
281
89
T-2072
301
323
5
466
T-2074
518
147
488
578
493
494
596
318
413
459
486
84
49
49
47
79
321
584
414
91
460
410
300
407
315
331
472
97
365
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
SWRB Pond
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
AMCM (SWPPP)
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 50 100 Feet
1 inch = 100 feet
Aerial Photo Date: January 2009
Airborne Mine Countermeasures (AMCM) Fleet Readiness Branch

Best Management Practices (BMPs)						
Area	**2.2.4 - Airborne Mine Countermeasures Fleet Readiness Branch**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Corey Fife**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	**Sediment and Erosion Control**					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #9	**Vehicle, Aircraft and Equipment Maintenance**					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					

Best Management Practices (BMPs)						
Area	**2.2.4 - Airborne Mine Countermeasures Fleet Readiness Branch**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Corey Fife**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
9.9	Wrecked vehicles and aircraft are stored properly.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.5 Special Operations Division

Sector Q: Water Transportation Maintenance and Washing

The Special Operations Division is located south of Skylark Drive and on the West Dock. Personnel at the Special Operations Division are responsible for developing new components Seal Delivery Vehicles (SDVs) and other Special Operation Projects.

The buildings and facilities associated with the Special Operations Division include:

582 Special Operations Division

The industrial activities that occur at the Special Operations Division center around various types of minimal fabrication work such as milling, welding and electrical wiring, all which occurs indoors. A battery room is located on the south side of the building, where silver-zinc and lithium ion battery technologies are utilized. Silver-zinc batteries are shipped dry and filled in this room. Batteries are returned to the manufacturer for recycling in a wet state so that no draining of batteries occurs. The majority of the work is performed at this facility occurs inside.

A concrete paved area is located west of the building to the Bayou. SDV are rinsed with fresh water in this area. No washing of the vehicle with detergents takes place.

Small crafts in support of other projects are stored and maintained under cover along the east and south sides of the building. Crafts may be rinsed with fresh water in this area, but all washes with detergent take place at the Transportation or Marina wash racks.

A test pool is located on the east side of the building, which when emptied, drains to the sanitary sewer.

Potential pollutants located at this facility include POLs and battery electrolyte.

445
436
618
608
76
404
400
276
104
107
543
Special Operation Division
582
293
393
333
77
307
534
589
22
21
356
25
94
431
487
350
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
SWRB Pond
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Special Operation Division
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 40 80 Feet
1 inch = 80 feet
Aerial Photo Date: January 2009
Special Operations Division

Best Management Practices (BMPs)						
Area	**2.2.5 - Special Operations Division**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Michael Doctor**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	**Sediment and Erosion Control**					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #9	**Vehicle, Aircraft and Equipment Maintenance**					

Best Management Practices (BMPs)						
Area	**2.2.5 - Special Operations Division**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Michael Doctor**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					
9.9	Wrecked vehicles and aircraft are stored properly.					
BMP #11	**Vehicle, Aircraft and Equipment Washing**					
11.1	Detergents used are phosphate-free biodegradable detergents.					
11.2	Outside washing is done at an approved washrack.					
11.3	Wash water is contained and kept out of the storm drainage system.					
11.4	Wash water is recycled where practical.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.6 Dockside Activities

Sector Q: Water Transportation Maintenance and Washing

Dockside activities occur along the east dock, south dock, and west dock. These activities center around the Athena fleet and NSWC Test, Evaluation and Facilities Branch. The Sea Fighter is also docked in this area. Visiting ships moor at one or more of the docks and also utilize the facilities. The NSA PC small craft and Security's patrol craft are docked under cover at FAC 302. Buildings associated with the Dockside Activities include:

589 NSWC Boathouse
597 Sea Fighter Support

The Athena fleet works with the NSWC Test, Evaluation and Facilities Branch in testing equipment at sea. The fleet consists of two government-owned/contractor operated research vessels and three Project Support Craft. When in port, the vessels are moored at the south and east docks. An additional nine chase boats are stored on trailers in the area. Drainage at these docks flows into catch basins prior to being discharged through multiple culverts into St. Andrew Bay.

Industrial activities that occur at the docks include: on-loading and off-loading the prototypes, supplies and materials; fueling, which is performed by FISC, and ship maintenance.

Used oil and antifreeze are stored in covered containment in this area.

Potential pollutants located in this area include POLs from maintenance and paint.

A diesel and gasoline fuel pump island is located on the west dock that is used to fuel the boats. The storm water is routed to the OWS north of the boom storage. Five steel bollards are placed around the pumps to protect them from vehicle traffic. Diesel is delivered via a 2000-gallon tanker truck by FISC when needed.

NSWC Boathouse
Sea Fighter Support
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
SWRB Pond
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Dockside Activities (SWPPP)
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
N 0 60 120 Feet
1 inch = 125 feet
Aerial Photo Date: January 2009
Dockside Activities

Best Management Practices (BMPs)						
Area	**2.2.6 - Dockside Activities**	**SWPPPT Member**				
Activity	**NSA Panama City**	**John Schnoerig**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #9	**Vehicle, Aircraft and Equipment Maintenance**					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					
9.9	Wrecked vehicles and aircraft are stored properly.					
BMP #10	**Painting Operations**					
10.1	Painting activities are peformed in designated areas.					
10.2	Paint overspray is prevented from contact with storm water.					
10.4	Wastes from sanding are contained.					
10.5	Paint waste and solvents are stored properly.					
10.6	Paint, paint thinner, and solvents are recycled.					
BMP #11	**Vehicle, Aircraft and Equipment Washing**					
11.2	Outside washing is done at an approved washrack.					
11.3	Wash water is contained and kept out of the storm drainage system.					
11.4	Wash water is recycled where practical.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					

16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.7 AMPHIBIOUS WARFARE TEST FACILITY

Sector Q: Water Transportation Maintenance and Washing

The Amphibious Warfare Test Facility is located north of the intersection between Bullfinch Road and Sandpiper Drive adjacent to St. Andrews Bay.

The buildings and facilities associated with the Amphibious Warfare Test Facility include:

319 Amphibious Warfare Test Facility
556 Hazardous Material Storage Area

Building 319 is the maintenance hanger for the Landing Craft Air Cushion (LCAC). Up to six LCACs may be stationed at NSA PC. When a new LCAC is received from the contractor, it is tested and evaluated at NSA PC prior to deployment to the fleet. Maintenance is also performed on the LCACs.

Some maintenance is performed inside, but the majority of the maintenance is accomplished outdoors. The LCACs are parked on the apron between building 319 and St. Andrew Bay and on the LCAC landing pad north of this area. The area around the building is paved with concrete. Drains located inside of building 319 are not plugged.

A staging area for support equipment is located on the pavement southeast of building 319. The hazardous material storage area, Facility 556, is located northeast of building 319. This contained area is used to store new and used POLs and cleaning solvents as well as vacuums that are used to remove oily waste from bilges. The valve at this containment area has been removed but accumulated rain water is pumped out by the Oily Waste contractor‘s vacuum truck.

Waste metals are stored in uncovered bins east of building 319 which are exposed to precipitation. Adjacent to, and south of building 319 is a fenced, uncovered metal storage area. This area is exposed to precipitation. There is a flammable locker located west of building 319 adjacent to the fence.

LCACs are rinsed on the ramps after each mission is completed. No washing with detergents takes place. FISC transports fuel in a 5000 gallon JP-5 tanker truck to this area and assists the LCAC personnel with the fueling operations.

Two trench drains located on the northern most LCAC parking area are no longer functioning and have been filled with concrete. Any spill runoff will be discharged to the St. Andrew Bay. Part of refueling procedure at north ramp is to lay out land booms as a preventative measure to capture any possible spills.

134
467
390
465
544
Hazardous Materials Storage Area
556
T-2078
T-2079
292
Amphibious Warfare Test Facility
319
89
T-2072
301
323
5
466
147
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
SWRB Pond
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Amphibious Warfare Test Facility
The ORC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 40 80 Feet
1 inch = 80 feet
Aerial Photo Date: January 2009
Amphibious Warfare Test Facility

Best Management Practices (BMPs)						
Area	**2.2.7- Amphibious Warfare Test Facility**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Gary Brown/Scott Feenstra**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #8	**Fueling**					
8.1	Spill/overflow prevention equipment is installed, maintained and operating properly at fuel delivery areas.					

Best Management Practices (BMPs)						
Area	**2.2.7- Amphibious Warfare Test Facility**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Gary Brown/Scott Feenstra**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
8.2	Fuel areas are contained to prevent spills from directly entering the storm sewer.					
8.3	Dry cleanup methods (sorbent, drip pans, or pads) are used for fuel spills or leaks.					
8.4	Spill control awareness signs are visible.					
8.5	Portable fuel tanks are stored properly.					
8.6	Fuel tanks are not topped off.					
8.7	Fueling areas are protected from rain and run-on.					
8.8	Oil/water separators or oil/grease traps are installed prior to storm drains.					
8.9	Pollution prevention measures are discussed with personnel.					
BMP #9	**Vehicle, Aircraft and Equipment Maintenance**					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					
9.9	Wrecked vehicles and aircraft are stored properly.					
BMP #10	**Painting Operations**					
10.1	Painting activities are performed in designated areas.					
10.2	Paint overspray is prevented from contact with storm water.					
10.3	Parts are inspected prior to being painted to ensure they are dry, clean and rust free.					
10.4	Wastes from sanding are contained.					
10.5	Paint waste and solvents are stored properly.					
10.6	Paint, paint thinner, and solvents are recycled.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.8 AIR OPERATIONS

Sector S: Air transportation facility

Air Operations is located between Bull Finch Road and St. Andrews Bay, just north of NEDU. The air operations facility is the home base for several helicopters that are used in testing mine detection equipment at NSA PC.

The buildings and facilities associated with Air Operations include:

147 Hanger
318 Aircraft Ground Support Equipment
3187 Diesel Tank
367 Aircraft Wash Rack
486 Hazardous Materials Storage
449 Helicopter Landing Pad

The industrial activity at this area centers around the maintenance of the aircraft. The aircraft are generally serviced and maintained inside the hanger, but may be serviced outside on the landing pad. Fueling of the aircraft is accomplished on the landing pad. Ground support equipment (GSE) is stored southeast of the wash rack and maintained in building 318. GSE is fueled from a 250 gallon diesel tank located on the south side of building 318. Small touch-up painting is performed within the maintenance shops or outside on the landing pad.

Aircraft are periodically cleaned on the wash rack. Drainage from the wash rack flows to either the storm sewer or through an OWS to the sanitary sewer. Two post indicator valves are located at the wash rack. All personnel are trained on the proper positioning of the valves. When aircraft are being washed, the flow is designed to be directed to the OWS and into the sanitary sewer. At all other times to flow is diverted to the storm sewer. A sign, which is not legible, is posted with proper directions for use of the valve, but not in proximity of the valves. The valves are also not labeled.

Waste liquids are stored at the hazardous materials storage area. Battery acid is also stored in a corrosive locker in this area. This storage area has a concrete floor and curb, and a valved discharge. Personnel were unaware that this area was valved, however valves were found to be in the locked position. The area is under roof and surrounded by a locked fence. Flammable materials are stored in a nearby flammable storage locker.

A hazardous waste collection point for waste paints and solvents is located in this storage area.

Potential pollutants that are present at Air Operations include fuels, POLs, glycol, brake fluid, paint, and solvents.

Helicopter Landing Pads
NAVAL SURFACE WARFARE CENTER
PANAMA CITY
319
T-2072
301
323
466
T-2074
518
Hanger
147
367
Aircraft Wash Rack
493
Aircraft Ground
Support Operations
318
596
3187
Diesel Tank
413
459
486
Hazardous Material Storage
JP-5 Fuel Tanks
321
581
454
569
300
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Air Operations (SWPPP)
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 50 100 Feet
1 inch = 102 feet
Aerial Photo Date: January 2009
Air Operations

Best Management Practices (BMPs)						
Area	**2.2.8 - Air Operations**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Christopher Polk**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	**Sediment and Erosion Control**					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #8	**Fueling**					

Best Management Practices (BMPs)						
Area	**2.2.8 - Air Operations**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Christopher Polk**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
8.1	Spill/overflow prevention equipment is installed, maintained and operating properly at fuel delivery areas.					
8.2	Fuel areas are contained to prevent spills from directly entering the storm sewer.					
8.3	Dry cleanup methods (sorbent, drip pans, or pads) are used for fuel spills or leaks.					
8.4	Spill control awareness signs are visible.					
8.5	Portable fuel tanks are stored properly.					
8.6	Fuel tanks are not topped off.					
8.7	Fueling areas are protected from rain and run-on.					
8.8	Oil/water separators or oil/grease traps are installed prior to storm drains.					
8.9	Pollution prevention measures are discussed with personnel.					
BMP #9	**Vehicle, Aircraft and Equipment Maintenance**					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					
BMP #10	**Painting Operations**					
10.1	Painting activities are peformed in designated areas.					
10.2	Paint overspray is prevented from contact with storm water.					
10.3	Parts are inspected prior to being painted to ensure they are dry, clean and rust free.					
10.4	Wastes from sanding are contained.					
10.5	Paint waste and solvents are stored properly.					
10.6	Paint, paint thinner, and solvents are recycled.					
BMP #11	**Vehicle, Aircraft and Equipment Washing**					
11.1	Detergents used are phosphate-free biodegradable detergents.					
11.2	Outside washing is done at an approved washrack.					
11.3	Wash water is contained and kept out of the storm drainage system.					
11.4	Wash water is recycled where practical.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or					

Best Management Practices (BMPs)						
Area	**2.2.8 - Air Operations**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Christopher Polk**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
	enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.9 Public Works Department

The Public Works Department (NAVFAC SE) has several areas that are considered to contain industrial activities which are grouped together in this section. The areas that are included in this group are:

- Transportation;
- Oil/Water Separator and Oily Waste Dump Station; and
- Hazardous Waste Storage Facility

2.2.9.1 Transportation

Sector P: Vehicle and equipment maintenance

Transportation, building 5, is located on the southwest corner of Bullfinch Road and Sandpiper Road. Personnel at Transportation are responsible for maintenance and operation of vehicles at NSA PC.

The transportation area consist of offices and maintenance garage bays located in building 5 and a fenced vehicle parking area south and west of the building. NSA PC vehicles are maintained at this facility. Personnel perform fluid changes, tire changes and repair, brake repair, engine, and drive train repair and general bodywork. Maintenance is generally performed in the maintenance bays, but vehicles that are too large are serviced outside on the pavement.

The entire lot is covered with a combination of asphalt and concrete pavement and surrounded by a security fence. Vehicles that are awaiting maintenance and vehicles that belong to transportation are stored on the pavement.

New POL and hazardous materials are stored in a covered area with concrete secondary containment at the south end of building 5 adjacent to the maintenance bays. The drain in this area flows through the OWS adjacent to building 323 which discharges to the sanitary sewer.

Currently, a covered area is under construction to be used to repair and perform maintenance on large vehicles. Pressure washing of large vehicles also occurs in this area. Another drain located in this area flows through the same OWS as mentioned above.

Adjacent to this area, is a metal storage bin used for storage of waste metal parts.

A wash rack is located just south of this covered area. This area is drained to the OWS adjacent to building 323. Wash buckets, brushes, and mops are stored adjacent to the wash area. The detergent that is used at the wash areas does not contain any phosphates or surfactants.

One fully loaded 5000-gallon JP-5 tanker truck, one 5000- gallon diesel tanker truck and a fully loaded 2000-gallon diesel tanker truck are stored in a spill containment area in the parking lot.

This area drains to a 500-gallon underground tank which is emptied by the oily waste contractor.

Generators used for projects are also stored in the parking area in a covered, valved containment area. Since the valves are higher than ground level of the containment area and covered by sand, the oily waste contractor empties accumulated storm water from this area using a vacuum truck.

Potential pollutants that are present at Transportation include: POLs, glycols, solvents, brake fluids, and suspended solids, that will result from the washing activities.

319
89
T-2072
Sandpiper Road
Bullfinch Rd
323
5
Transportation
493
49
413
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Transportation (SWPPP)
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 25 50 Feet
1 inch = 50 feet
Aerial Photo Date: January 2009
Transportation

Best Management Practices (BMPs)						
Area	**2.2.9.1 - Transportation**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Kevin Tylee**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #8	**Fueling**					
8.1	Spill/overflow prevention equipment is installed, maintained and operating properly at fuel delivery					

Best Management Practices (BMPs)						
Area	**2.2.9.1 - Transportation**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Kevin Tylee**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
	areas.					
8.2	Fuel areas are contained to prevent spills from directly entering the storm sewer.					
8.3	Dry cleanup methods (sorbent, drip pans, or pads) are used for fuel spills or leaks.					
8.4	Spill control awareness signs are visible.					
8.5	Portable fuel tanks are stored properly.					
8.6	Fuel tanks are not topped off.					
8.7	Fueling areas are protected from rain and run-on.					
8.8	Oil/water separators or oil/grease traps are installed prior to storm drains.					
8.9	Pollution prevention measures are discussed with personnel.					
BMP #9	**Vehicle, Aircraft and Equipment Maintenance**					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					
9.9	Wrecked vehicles and aircraft are stored properly.					
BMP #10	**Painting Operations**					
10.1	Painting activities are peformed in designated areas.					
10.2	Paint overspray is prevented from contact with storm water.					
10.3	Parts are inspected prior to being painted to ensure they are dry, clean and rust free.					
10.4	Wastes from sanding are contained.					
10.5	Paint waste and solvents are stored properly.					
10.6	Paint, paint thinner, and solvents are recycled.					
BMP #11	**Vehicle, Aircraft and Equipment Washing**					
11.1	Detergents used are phosphate-free biodegradable detergents.					
11.2	Outside washing is done at an approved washrack.					
11.3	Wash water is contained and kept out of the storm drainage system.					
11.4	Wash water is recycled where practical.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					

Best Management Practices (BMPs)						
Area	**2.2.9.1 - Transportation**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Kevin Tylee**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.9.2 Oil/Water Separator and Oily Waste Dump Station

Sector P: POL storage in above ground storage

The Oil/Water Separator and Oily Waste Dump Station is located off Gull Circle just west of bunker 60. This new facility, #591, receives oily waste from all oil/water separators, used oil and oily bilge water from dockside pier support operations.

Oily waste that is collected from sites throughout NSA PC is transported to the area by a contractor owned and operated vacuum truck. The truck is positioned within a concrete spill containment truck stand, flow diversion valves are switched to direct spills to an 10,000 gallon underground Spill Containment Tank (#6), hose connections are then made to a dump station which acts as a flow-through sediment basin. From the sediment basin, the wastewater gravity flows to an underground 10,000 gallon Oil Waste Holding Tank (#5) where the wastewater is then pumped up to a 5,000 gallon about ground Oily Waste Holding Tank (#3), the oily waste is then gravity drained from the bottom of the tank at a controlled rate through the oil/water separator system where the oil phase is skimmed off into a 800 gallon underground Reclaimed Oil Sump Tank (#4), which pumps up to one of two 6,000 gallon above ground Reclaimed Oil Collection Tanks (#1 or #2). Water effluent from the separator flows into an underground Clean Water Sump Tank (#7) where it is then pumped to the sanitary sewer system for treatment.

Drums of Antifreeze, sludge and oil filters is stored at facility 486 awaiting recycling/disposal.

Potential pollutants located at this facility include POLs.

Following is a list of tanks that are used or maintained at the Oily Waste Dump Station:

Tank No.	Capacity	Contents	Type
Tank #1	6,000 gal	Reclaimed Oil	AST
Tank #2	6,000 gal	Reclaimed Oil	AST
Tank #3	5,000 gal	Oily Waste	AST
Tank #4	800 gal	Oil Sump	UST
Tank #5	10,000 gal	Oily Waste Holding	UST
Tank #6	10,000 gal	Spill Containment	UST
Tank #7	600 gal	Clean Water Sump	UST
Tank #8	5,000 gal	Oily Waste	AST

455
87
603
453
349
Unknown
Unknown
Unknown
88
62
441
61
Cull Circle
60
AST (500 Gallon)
Unknown
Unknown
B - 591 Oil/Water Separator and
Oily Waste Dump Station
537
540
361
489
T-2053 T-2064
T-2052
T-2058
T-2059
T-2060
290
406
399
98
Solomons Drive
408
100
495
99
373
372
Vernon
134
110
447
268
544
467
390
465
556
T-2078
T-2079
375
292
364
319
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
SWRB Pond
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
AMCM (SWPPP)
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 80 160 Feet
1 inch = 198 feet
Aerial Photo Date: January 2009
Oil/Water Separator &
Oily Waste Dump Station
GeoReadiness

Best Management Practices (BMPs)						
Area	**2.2.9.2 - Oil/Water Separator and Oily Waste Dump Station**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Scot Williams**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	**Sediment and Erosion Control**					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #10	**Painting Operations**					
10.1	Painting activities are peformed in designated areas.					
10.2	Paint overspray is prevented from contact with storm water.					

Best Management Practices (BMPs)						
Area	**2.2.9.2 - Oil/Water Separator and Oily Waste Dump Station**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Scot Williams**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
10.3	Parts are inspected prior to being painted to ensure they are dry, clean and rust free.					
10.5	Paint waste and solvents are stored properly.					
10.6	Paint, paint thinner, and solvents are recycled.					
BMP #11	**Vehicle, Aircraft and Equipment Washing**					
11.1	Detergents used are phosphate-free biodegradable detergents.					
11.2	Outside washing is done at an approved washrack.					
11.3	Wash water is contained and kept out of the storm drainage system.					
11.4	Wash water is recycled where practical.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #13	**Liquid Storage in Above Ground Tanks**					
13.1	The above ground tanks are included in other environmental management plans.					
13.2	There are overflow protection devices on tanks.					
13.4	Valves are clearly tagged, labeled, and oriented properly.					
13.5	The tank systems are inspected and tested regularly.					
13.6	Tanks are surrounded by a secondary containment system that includes a berm.					
13.7	Drain valve(s) are properly located and normally in closed and locked position.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.9.3 Hazardous Waste Storage

Sector P: Liquid storage in above ground storage

The Hazardous Waste Storage facility is located north of the parking lot on Vernon Avenue, west of the FISC facilities. The permitted RCRA Part B facility was closed in 1996. NSA PC now operates as a small quantity generator and stores waste for up to 180 days.

The building and facilities associated with the Hazardous Waste Storage area include:

361 Hazardous Waste Storage
489 Hazardous Waste Office

This two part storage facility is a three (3) sided covered structure that is divided into seven (7) separate storage bays that are separated by concrete block walls. The west structure contains five (5) storage bays and the east structure contains two (2) storage bays. The floor of the facility is concrete that slopes to the rear of each storage bay to a recessed pit for spill or leak containment. The pavement in front of the building is sloped away from the entrance to each storage bay so that storm water is directed away from the containment storage bays.

Materials that are brought to the facility are segregated according to their contents and placed in the appropriate storage bays. The storage bays are divided as follows from west to east:

(West Structure) Storage Bay 1	Caustics
(West Structure) Storage Bay 2	Halogenated Organics
(West Structure) Storage Bay 3	Toxics
(West Structure) Storage Bay 4	Non-Hazardous Industrial Wastes
(West Structure) Storage Bay 5	Acids - Oxidizers and Corrosives
(East Structure) Storage Bay 6	Ignitables
(East Structure) Storage Bay 7	Non-Hazardous Waste

The NSA PC Public Works Department operates the Hazardous Waste Storage facility. A locked fence for security surrounds the entire facility. Access to the facility is only permitted when Public Works personnel are present. Hazardous wastes that are accumulated throughout NSA PC are brought to the facility for storage and ultimate disposal.

When materials are first brought to the facility, materials that are known hazardous waste are placed in the appropriate storage bay. Materials that are awaiting hazardous waste analysis are stored in the most appropriate bay. Once the analysis determines the material to be either hazardous or non-hazardous, the container is placed in the appropriate storage bay. Disposal of the materials is contracted to an outside vendor through DRMO. Also located in this area is a waste lithium battery storage locker. This storage locker is a self contained, locker designed with containment in the event of a release.

537
Hazardous Waste Storage
Hazardous Waste Office
361
489
T-2053
T-2064
T-2052
T-2058
T-2059
T-2060
290
399
408
100
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Hazardous Waste (SWPPP)
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 25 50 Feet
1 inch = 50 feet
Aerial Photo Date: January 2009
Hazardous Waste Storage

Best Management Practices (BMPs)						
Area	**2.2.9.3 - Hazardous Waste Storage**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Dwight Tippit**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT/ DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
BMP #2	**Preventative Maintenance**					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance.					

Best Management Practices (BMPs)						
Area	**2.2.9.3 - Hazardous Waste Storage**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Dwight Tippit**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT/ DEC**
BMP #	**BMP Description**					
	2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.10 Fleet Industrial Supply Center (FISC)

Sector P: Fueling Activities

FISC is located west of Solomons Drive and north of Vernon Avenue. FISC receives materials that arrive at NSA PC, ships materials off base, manages the disposal of excess property, and manages the Hazardous Minimization (HAZMIN) Center. FISC is also responsible for maintaining fuel in all bulk fuel storage tanks, the transportation of fuel on base, and the operation of all bulk fuel dispensing.

The buildings and facilities associated the FISC include:

99	Main Supply Warehouse
100	Main Supply Warehouse
172	Gasoline Fuel Storage
277	Lube Oil Pump Station
278/279	Diesel Fuel Storage
290	Cold Storage/Dry Provisions
362	Bulk Fuel Storage
399	Shipping and HAZMIN Center
406	Fueling Station
408	Controlled Humidity Warehouse
455	Property Disposal Office
551A/B	JP5 Bulk Fuel Storage
557	Diesel Fuel Storage
T2051-3	HAZMIN Center Lockers
OS1	Outside Storage Area
OS2	Outside Storage Area
OS3	Outside Storage Area

With the recent reorganization of the facilities between FISC, NSWC, and DLA, responsibilities and points of contact should be established and updated.

Area 362 is the Bulk Fuel Storage where FISC loads the fuel 2000 gallon tank wagon. The tanks contain diesel and unleaded gasoline. The loading and unloading area consists of concrete pavement surrounded by a concrete curb. The discharge from the containment area is a valved pipe that typically discharges to a 6000-gallon spill containment tank. Rainfall is periodically pumped out of this tank following rainfall events.

FISC personnel are also responsible for transportation of fuel (JP-5), stored in tanks two 30,000-gallon tanks, for the helicopters at Air Operations and LCACs at the Amphibious Warfare System area. Air Ops personnel and LCACs personnel, respectively, assist FISC personnel perform the fueling operation of the helicopters and the LCACs on their respective landing pads. The Fire Department is always on site during hot fueling operations to provide immediate response to emergencies.

A fuel island is located just north of building 406. The island is not covered or contained. Steel bollards are placed around the fuel island to protect it from vehicle traffic. There are three fuel dispensers; one is for diesel and two for unleaded gas. The fueling island is for the use of NSA PC vehicles only.

FISC operates and maintains four dockside fuel dispensing stations for fueling ships. The diesel is supplied from two 14000-gallon USTs (278AR1 and 278BR1). Each fueling station contains dispensing hoses, meters, and valves that have stainless steel spill pans beneath each, mainly for maintenance and repair work. The Facility 278 fuel off-loading area incorporates spill containment with a Post Indicator Valve to direct flow into a 6,000-gallon spill containment tank when fuel is being delivered; otherwise, flow is directed onto the dock.

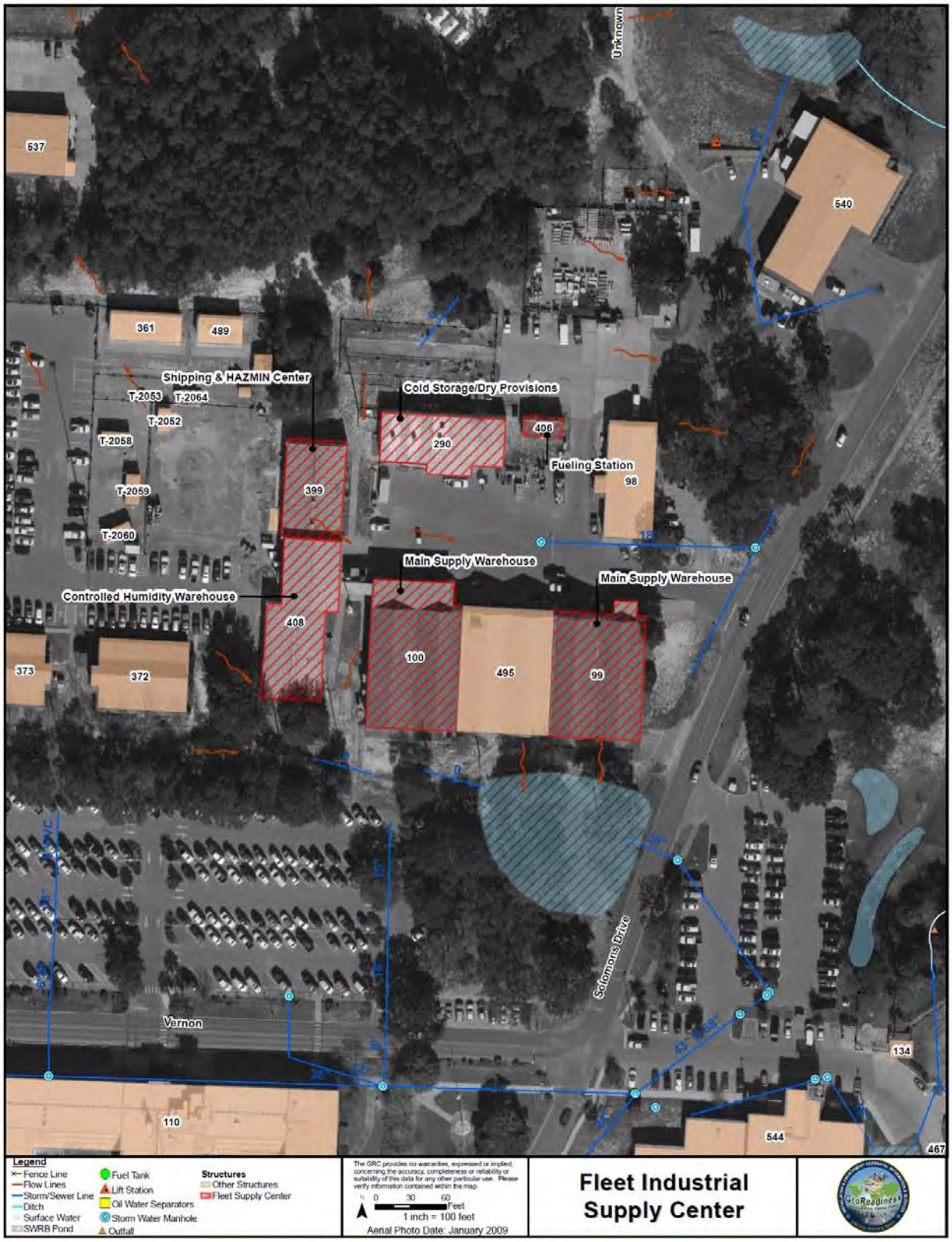
There are several outside storage areas. OS-1 and OS-3 A-D are located on Pirate Place. These storage areas are segregated into material that can be reutilized, recycled, or excessed. All fluids from vehicles are drained before storage in this area. OS-2 is located east of the bulk fuel storage and is presently under the control of the Armory. This area is a storage area for mines. The area is not covered or contained.

HAZMIN operations are located west of Bldg. 399 in another outside storage area. The HAZMIN Center consists of four lockers. Each locker is a temperature controlled unit with secondary containment in the event of a spill and are located in a locked fenced area. Newly arrived hazardous materials are temporarily stored in these lockers until the materials are delivered to customers. Also stored in this area is a lithium battery storage locker, under the control of NSWC. It is self contained, temperature controlled locker with secondary containment in the event of a release.

Potential pollutants located at this facility include POLs from the bulk fuel storage area.

Following is a list of tanks that are used or maintained by FISC:

Tank No.	Capacity	Contents	Type
278 AR1	15,000 gal	Diesel	UST
278 BR1	15,000 gal	Diesel	UST
318	250 gal	Diesel	AST
362 A	12,000 gal	Diesel	UST
362 B	12,000 gal	Diesel	UST
362 C	12,000 gal	Diesel	UST
362 D	12,000 gal	Unleaded	UST
551 A	30,000 gal	JP 5	AST
551 B	30,000 gal	JP 5	AST
172	2,000 gal	Fuel	AST
172R1	2,000 gal	Premium	AST
577	2,000 gal	Diesel	AST


Unknown
537
540
361
489
Shipping & HAZMIN Center
T-2053
T-2064
T-2052
T-2058
T-2059
T-2060
Cold Storage/Dry Provisions
290
406
Fueling Station
98
399
Main Supply Warehouse
Main Supply Warehouse
Controlled Humidity Warehouse
408
100
495
99
373
372
Solomons Drive
Vernon
134
110
544
467
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
SWRB Pond
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Fleet Supply Center
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 30 60 Feet
1 inch = 100 feet
Aerial Photo Date: January 2009
Fleet Industrial Supply Center

Best Management Practices (BMPs)						
Area	**2.2.10 -– FISC**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Ryan Olive**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	**Sediment and Erosion Control**					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #8	**Fueling**					

Best Management Practices (BMPs)						
Area	**2.2.10 -– FISC**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Ryan Olive**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
8.1	Spill/overflow prevention equipment is installed, maintained and operating properly at fuel delivery areas.					
8.2	Fuel areas are contained to prevent spills from directly entering the storm sewer.					
8.3	Dry cleanup methods (sorbent, drip pans, or pads) are used for fuel spills or leaks.					
8.4	Spill control awareness signs are visible.					
8.5	Portable fuel tanks are stored properly.					
8.6	Fuel tanks are not topped off.					
8.7	Fueling areas are protected from rain and run-on.					
8.8	Oil/water separators or oil/grease traps are installed prior to storm drains.					
8.9	Pollution prevention measures are discussed with personnel.					
BMP #9	**Vehicle, Aircraft and Equipment Maintenance**					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					
9.9	Wrecked vehicles and aircraft are stored properly.					
BMP #11	**Vehicle, Aircraft and Equipment Washing**					
11.1	Detergents used are phosphate-free biodegradable detergents.					
11.2	Outside washing is done at an approved washrack.					
11.3	Wash water is contained and kept out of the storm drainage system.					
11.4	Wash water is recycled where practical.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #13	**Liquid Storage in Above Ground Tanks**					
13.1	The above ground tanks are included in other environmental management plans.					
13.2	There are overflow protection devices on tanks.					
13.3	There are protective guards around tanks and pipes.					
13.4	Valves are clearly tagged, labeled, and oriented properly.					
13.5	The tank systems are inspected and tested regularly.					
13.6	Tanks are surrounded by a secondary containment system that includes a berm.					
13.7	Drain valve(s) are properly located and normally in closed and locked position.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					

Best Management Practices (BMPs)						
Area	**2.2.10 -– FISC**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Ryan Olive**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.11 NO EXPOSURE FROM INDUSTRIAL ACTIVIES

Completion of the Best Management Practice (BMP) checklist is optional for these activities.

2.2.11 Auto Skills

No exposure from industrial activity - All industrial materials and activities are not regulated, or are protected by a storm resistant shelter to prevent exposure to rain, snow, snowmelt and/or runoff.

The MWR Auto Skills shop, Bldg. 537, is located northwest of Bldg. 361 and east of Bldg. 484.

The hobby shop is operated by MWR. The hobby shop has eight maintenance bays that are made available for use by NSA PC personnel to service their personal vehicles. Vehicle maintenance takes place inside the building only. The area around the building is concrete. Used oil is stored in 55 gallon barrels on the east side of the building in contained storage units which has secondary containment.

Potential pollutants located at this facility include POLs, glycol, and solvents.

Best Management Practices (BMPs)						
Area	**2.2.11- Auto Skills**	**SWPPPT Member**				
Activity	**NSA Panama City**					
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/MAR**	**APR/JUN**	**JUL/SEP**	**OCT/DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	**Sediment and Erosion Control**					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #8	**Fueling**					
8.1	Spill/overflow prevention equipment is installed, maintained and operating properly at fuel delivery areas.					
8.2	Fuel areas are contained to prevent spills from directly entering the storm sewer.					
8.3	Dry cleanup methods (sorbent, drip pans, or pads) are used for fuel spills or leaks.					

Best Management Practices (BMPs)						
Area	**2.2.11- Auto Skills**	**SWPPPT Member**				
Activity	**NSA Panama City**					
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/MAR**	**APR/JUN**	**JUL/SEP**	**OCT/DEC**
BMP #	**BMP Description**					
8.4	Spill control awareness signs are visible.					
8.5	Portable fuel tanks are stored properly.					
8.6	Fuel tanks are not topped off.					
8.7	Fueling areas are protected from rain and run-on.					
8.8	Oil/water separators or oil/grease traps are installed prior to storm drains.					
8.9	Pollution prevention measures are discussed with personnel.					
BMP #9	**Vehicle, Aircraft and Equipment Maintenance**					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					
9.9	Wrecked vehicles and aircraft are stored properly.					
BMP #10	**Painting Operations**					
10.1	Painting activities are peformed in designated areas.					
10.2	Paint overspray is prevented from contact with storm water.					
10.3	Parts are inspected prior to being painted to ensure they are dry, clean and rust free.					
10.4	Wastes from sanding are contained.					
10.5	Paint waste and solvents are stored properly.					
10.6	Paint, paint thinner, and solvents are recycled.					
BMP #11	**Vehicle, Aircraft and Equipment Washing**					
11.1	Detergents used are phosphate-free biodegradable detergents.					
11.2	Outside washing is done at an approved washrack.					
11.3	Wash water is contained and kept out of the storm drainage system.					
11.4	Wash water is recycled where practical.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #13	**Liquid Storage in Above Ground Tanks**					
13.1	The above ground tanks are included in other environmental management plans.					
13.2	There are overflow protection devices on tanks.					
13.3	There are protective guards around tanks and pipes.					
13.4	Valves are clearly tagged, labeled, and oriented properly.					
13.5	The tank systems are inspected and tested regularly.					
13.6	Tanks are surrounded by a secondary containment system that includes a berm.					
13.7	Drain valve(s) are properly located and normally in closed and locked position.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					

Best Management Practices (BMPs)						
Area	**2.2.11- Auto Skills**	**SWPPPT Member**				
Activity	**NSA Panama City**					
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/MAR**	**APR/JUN**	**JUL/SEP**	**OCT/DEC**
BMP #	**BMP Description**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.12 Prototype Fabrication Facility

No exposure from industrial activity - All industrial materials and activities are not regulated, or are protected by a storm resistant shelter to prevent exposure to rain, snow, snowmelt and/or runoff.

The Prototype Fabrication Facility, building 431, is located just north of the south dock at the end of Solomons Drive. Personnel at the Prototype Fabrication Facility are responsible for developing and fabricating experimental underwater countermeasures for Naval Surface Warfare Center Panama City.

The main activities that occur in the facility center around various types of fabrication work such as milling, welding, electrical wiring, and limited painting. The majority of the work performed at this facility occurs inside. Large fabrication projects that are too big to be assembled inside are assembled outside in a paved area between the building and the south dock.

Various metals and bottled gasses are stored at the outside assembly area. This area consists of a covered shed where smaller fabrication occurs, a storage area for bottled gases used in welding and cutting, and a metal letdown area.

Scrap metal is segregated into three storage bins that are located outside a rollup door between the building and the south dock. .

A material storage area is located northwest of the building adjacent to the south and west dock confluence. This is a covered, fenced area that contains old fabricated parts, new material storage, and electrical wire.

Another fenced material storage area is located east of the building along the west dock. New metal, parts awaiting completion, and final projects waiting for pickup are stored in the area. The area is not under cover.

The building contains a battery room where batteries are charged and stored. This room is attached to the south side of the building and has a containment area for spills. The area drain in the room flows through an acid neutralization tank that is connected to the sanitary sewer.

A hazardous waste collection point, waste solvents, and waste towels containing solvents, is located indoors. Waste sandblast is turned in as hazardous waste when removed from two “gloved” boxes.

Potential pollutants located at this facility include solvents, paints, machine oil, battery acid, and heavy metals. Because the majority of the activities are performed under roof, these potential pollutants are not normally exposed to storm water. If an area contributes to storm water pollution, suggested BMPs to be implemented have been added.

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431
Prototype Fabrication Facility
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16B
16A
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Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
SWRB Pond
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Prototype Facility (SWPPP)
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 50 100 Feet
1 inch = 100 feet
Aerial Photo Date: January 2009
Prototype Fabrication Facility

Best Management Practices (BMPs)						
Area	2.2.12 - Prototype Fabrication Facility	SWPPPT Member				
Activity	NSA Panama City	David Guthrie				
Inspectors Initials						
Date of Inspection						
Year of Inspection		2012	JAN/ MAR	APR/ JUN	JUL/ SEP	OCT /DEC
BMP #	BMP Description					
1	Good Housekeeping					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	Preventative Maintenance					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	Visual Inspection					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	Spill Prevention and Response					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	Sediment and Erosion Control					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #7	Personnel Training and Record Keeping					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #12	Loading and Unloading Materials					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #14	Waste Management Areas					
14.1	A waste assessment study has been conducted for the					

Best Management Practices (BMPs)						
Area	**2.2.12 - Prototype Fabrication Facility**	**SWPPPT Member**				
Activity	**NSA Panama City**	**David Guthrie**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
	facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.13 Paint Shop

No exposure from industrial activity - All industrial materials and activities are not regulated, or are protected by a storm resistant shelter to prevent exposure to rain, snow, snowmelt and/or runoff.

The Paint Shop, building 47, is scheduled to be replaced in 2012 but currently it is located on the east side of Solomons Drive just west of the elevated water tank. Paint shop personnel are responsible for painting fabricated assemblies that are assembled for research and development projects at NSA PC.

The paint shop contains both a spray booth and three sand blasting "glove boxes". Spray painting, brush painting, and sand blasting operations are performed inside building 47.. A hazardous waste collection point for waste sandblast, waste paint, and used towels containing solvents is located indoors. Used paint filters from the spray booth are bagged and turned in as hazardous waste.

Potential pollutants that are found at the Paint Shop include; paint, thinners, solvents, and used sand blasting media. Because most of the operations are performed inside, the likelihood of these potential pollutants being exposed to storm water is minimal. However, when brush painting is performed outside without the use of drop cloths or storm drain covers, this likelihood greatly increases.

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Paintshop
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Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
SWRB Pond
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Paint Shop (SWPPP)
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 25 50 Feet
1 inch = 50 feet
Aerial Photo Date: January 2009
Paint Shop

Best Management Practices (BMPs)						
Area	**2.2.13 - Paint Shop**	**SWPPPT Member**				
Activity	**NSA Panama City**	**David Guthrie**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	**Sediment and Erosion Control**					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #10	**Painting Operations**					
10.1	Painting activities are peformed in designated areas.					
10.2	Paint overspray is prevented from contact with storm water.					
10.3	Parts are inspected prior to being painted to ensure they are dry, clean and rust free.					
10.4	Wastes from sanding are contained.					

Best Management Practices (BMPs)						
Area	**2.2.13 - Paint Shop**	**SWPPPT Member**				
Activity	**NSA Panama City**	**David Guthrie**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
10.5	Paint waste and solvents are stored properly.					
10.6	Paint, paint thinner, and solvents are recycled.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.14 NAVY EXPERIMENTAL DIVING UNIT

No exposure from industrial activity - All industrial materials and activities are not regulated, or are protected by a storm resistant shelter to prevent exposure to rain, snow, snowmelt and/or runoff.

The Navy Experimental Diving Unit (NEDU) is located west of St. Andrews Bay, east of Bullfinch Road, south of the Air Operations hanger. NEDU is an experimental facility where divers train and test experimental equipment at simulated under water depths.

The buildings and facilities associated with NEDU include:

300 Ocean Pressure Simulation Facility (OSF)
315 OSF Bottlefield
321 Experimental Diving Facility
331 Fabrication Shop
398 Hyperbaric Research Facility
407 Clean Room
415 Recompression Chamber Refit Facility

The majority of the operations that occur at NEDU are centered around testing in the deep dive test tank. Other operations include classroom test and training, indoor pool testing and training or pressurized testing of equipment. These operations occur inside the OSF and building 321. Some of the tanks and pools are periodically drained to the sanitary sewer. A 700-gallon tank of water is located in building 321 discharges to a graveled area northeast of the building.

A hyperbaric fabrication shop is located in building 415. Metal fabrication and plumbing for high pressure gases occurs inside the shop to support the various testing operations. An additional fabrication shop is located in building 331. Metal and wood fabrication also occurs inside this shop as well as sandblasting operations in a “gloved” box. An outside metal storage area is located east of the shop with uncovered metal bins for storage of scrap metal. A hazardous waste collection point for waste sandblast and Oxygen Sensors is located indoors in building 331.

Building 407 is the Clean Room. This is a covered area where class B water is produced for dive system component cleaning for the dive tanks in the OSF. Potable water is used in a reverse osmosis system and the resultant wastewater is discharged into the sanitary sewer. One hazardous material locker, as well as covered and contained acid and solvent storage is located in this area.

The Gas King area is located on the east side of building 300. A 100-gallon glycol tank is stored in this area on an uncovered secondary containment. Two flammable lockers are located on the south side of building 300. Used oil is stored in this area in covered secondary containment. Waste Sodasorb in 55-gallon drums is also stored in this area on pallets and under cover.

Potential pollutants located at this facility include: POLs that are used for the equipment and in the machine shops and chlorine that is used in the tanks and pools in the OSF. Activities that use or produce these pollutants all occur under roof. The discharge from the two large tanks in the OSF is drained to the sanitary sewer.

Following is a list of tanks that are used or maintained by NEDU:

Tank No.	**Capacity**	**Contents**	**Type**
G300RI	1000 gal	Diesel	AST

413
459
318
486
JP-5 Fuel Tanks
24"
Experimental Diving Facility
321
581
454
Diesel Generator
Integrated Tank
569
Ocean Pressure
Simulation Facility (OSF)
300
407
Clean Room
Diesel Tank
for Generator
24" HDPE
410
Recompression Chamber
Refit Facility
315
OSF Bottlefield
331
415
Fabrication Shop
Hyperbaric
Research Center
365
T-2075
398
446
398A
277
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Experimental Diving (SWPPP)
1 inch = 79 feet
Aerial Photo Date: January 2009
Navy Experimental
Diving

Best Management Practices (BMPs)						
Area	**2.2.14 - Navy Experimental Diving Unit**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Franco Nora**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
1	**Good Housekeeping**					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	**Preventative Maintenance**					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	**Visual Inspection**					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	**Spill Prevention and Response**					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	**Sediment and Erosion Control**					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	**Runoff Management/Pollution Prevention**					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	**Personnel Training and Record Keeping**					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					

Best Management Practices (BMPs)						
Area	**2.2.14 - Navy Experimental Diving Unit**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Franco Nora**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
BMP #8	**Fueling**					
8.1	Spill/overflow prevention equipment is installed, maintained and operating properly at fuel delivery areas.					
8.2	Fuel areas are contained to prevent spills from directly entering the storm sewer.					
8.3	Dry cleanup methods (sorbent, drip pans, or pads) are used for fuel spills or leaks.					
8.4	Spill control awareness signs are visible.					
8.5	Portable fuel tanks are stored properly.					
8.6	Fuel tanks are not topped off.					
8.9	Pollution prevention measures are discussed with personnel.					
BMP #10	**Painting Operations**					
10.1	Painting activities are peformed in designated areas.					
10.2	Paint overspray is prevented from contact with storm water.					
10.3	Parts are inspected prior to being painted to ensure they are dry, clean and rust free.					
10.4	Wastes from sanding are contained.					
10.5	Paint waste and solvents are stored properly.					
10.6	Paint, paint thinner, and solvents are recycled.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #13	**Liquid Storage in Above Ground Tanks**					
13.1	The above ground tanks are included in other environmental management plans.					
13.2	There are overflow protection devices on tanks.					
13.3	There are protective guards around tanks and pipes.					
13.4	Valves are clearly tagged, labeled, and oriented properly.					
13.5	The tank systems are inspected and tested regularly.					
13.6	Tanks are surrounded by a secondary containment system that includes a berm.					
13.7	Drain valve(s) are properly located and normally in closed and locked position.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					

Best Management Practices (BMPs)						
Area	**2.2.14 - Navy Experimental Diving Unit**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Franco Nora**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

2.2.15 NAVAL DIVING AND SALVAGE TRAINING CENTER

No exposure from industrial activity - All industrial materials and activities are not regulated, or are protected by a storm resistant shelter to prevent exposure to rain, snow, snowmelt and/or runoff.

The Naval Diving and Salvage Training Center (NDSTC) is located along the south side of Alligator Bay, east of Thomas Drive west of the U. S. Coast Guard facility. NDSTC is a training facility where navy divers are trained in various activities including salvage operations.

The buildings and facilities associated with NDSTC include:

350	Naval Diving and Salvage Training Center (includes the Welding and Carpenter Shops)
351	Training Pool (Dive Pool #1)
352	Bottled Gas Farm
353	Small Craft Maintenance
354	Bob Barth Assent Tower (BBAT) Mechanical Room
355	Bob Barth Assent Tower Facility (BBATF)
356	Pier Side Support Building
358	Diving and Salvage Bays
369	Craft Storage
416	Hazardous Materials Storage and Machine Shop
437	Training Wing
438	Applied Instruction Building
550	Calibrate Equipment

There are no industrial activities at buildings 437, 438 and 550.

Because the facility is a training facility, most of the activities are centered around classroom or pool training; therefore, very few activities are considered industrial. The Bob Barth assent tower (BBAT), and the pressurized vessel assemblies (PVA) and open tanks in building 350 are periodically drained into a backwash pond located on the north side of the facility beginning in 2001. This discharge was originally identified in the Illicit Discharge Report dated February 1996 since it emptied into Alligator Bayou.

A backwash pond was constructed in 2001 and upgraded in 2007 with a new design which can receive 25,000 gallons of backwash from the PVAs and open tanks. The pond captures suspended solids from the filters on this equipment which was originally discharged to Alligator Bayou. The training pool (Dive Pool #1) and the BBATF both drain into collection system that discharge to a sprayfield at the non mage area (Back 40)

Personnel at the Small Craft Maintenance Building perform maintenance and repairs on outboard motors and on small boats. Most maintenance activities are performed inside. POLs, solvents, and flammable materials are stored in buildings 369 and 416. The floor drains flow through an OWS which discharges to the sanitary sewer.

Building 416 is the hazardous materials storage facility. All materials are stored on pallets or shelves. The floor of each compartment slopes to a sump for spill or leak containment. Materials are logged in and out by the designated supply person.

A minimal amount of student welding is performed at a rate of 6 hours per quarter at building 350. The future plan is to connect the awnings of building 350 and 353 to enable the wielding to be accomplished under a covered area.

Two Yard Tender Diver (YTD) boats operate from the NDSTC dock area. A salvage training boat remains at the dock at all times. While in port, the boats can connect to the oily waste/waste oil (OW/WO) system to empty their bilges. The OW/WO system has an OWS located on the east end of the dock that drains to a holding tank. The oily waste contractor periodically pumps the contents of this tank. Boats are fueled at the South Dock.

Potential pollutants located at the facility include POLs, glycol, solvents, and paint. Maintenance and repair operations that use the materials are generally performed inside and, therefore, the likelihood of pollutants being exposed to storm water is minimal.

Hazardous Materials Storage and Machine Shop
416
Bob Barth Assent Tower (BBAT) Mechanical Room
Craft Storage
369
Small Craft Maintanance
353
354
602
Bottled Gas Farm
Pier Side Support Building
356
352
550
438
Applied Instruction Building
Calibrate Equipment
Diving and Salvage Bays
Unknown
Naval Diving and Salvage Training Center
350
391
351
Training Pool (Dive Pool #1)
100-Gallon Diesel Tank
350B
Training Wing
437
Alligator Bayou
104
107
582
293
333
534
30
23
22
24
25
26
21
Legend
Fence Line
Flow Lines
Storm/Sewer Line
Ditch
Surface Water
SWRB Pond
Fuel Tank
Lift Station
Oil Water Separators
Storm Water Manhole
Outfall
Structures
Other Structures
Navy Salvage Diving (SWPPP)
The GRC provides no warranties, expressed or implied, concerning the accuracy, completeness or reliability or suitability of this data for any other particular use. Please verify information contained within the map.
0 60 120 Feet
1 inch = 125 feet
Aerial Photo Date: January 2009
Navy Diving Salvage Training Center

Best Management Practices (BMPs)		(				
Area	2.2.15 - Naval Diving and Salvage Training Center	SWPPPT Member				
Activity	NSA Panama City	Ray Davis/Paul Gurisko				
Inspectors Initials						
Date of Inspection						
Year of Inspection		2012	JAN/ MAR	APR/ JUN	JUL/ SEP	OCT /DEC
BMP #	BMP Description					
1	Good Housekeeping					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	Preventative Maintenance					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	Visual Inspection					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	Spill Prevention and Response					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	Sediment and Erosion Control					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	Runoff Management/Pollution Prevention					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	Personnel Training and Record Keeping					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					

Best Management Practices (BMPs)		(				
Area	**2.2.15 - Naval Diving and Salvage Training Center**	**SWPPPT Member**				
Activity	**NSA Panama City**	**Ray Davis/Paul Gurisko**				
Inspectors Initials						
Date of Inspection						
Year of Inspection		**2012**	**JAN/ MAR**	**APR/ JUN**	**JUL/ SEP**	**OCT /DEC**
BMP #	**BMP Description**					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					
	SOUTHDIV BMP FORM - 1/31/02, REV. 8/14/02					

2.3 SPILL HISTORY

NSA PC Spill History Synopsis for the past 19 years is listed below:

Date	Pollutant	Source	Quantity	Location	Cause
12/30/1991	Bilge Oil	Bilge	< 1 gal	Alligator Bayou	Bilge pump left on
3/6/1992	Waste Oil	#363 OWS	100 gal	St. Andrews Bay	Truck stand valve turned wrong way
6/6/1992	Diesel	Athena II	10-15 gal	South Dock	Fueling overfill
6/30/1992	Oil	#10 Boat	< 1 pint	West Dock	VRO system malfunction
10/20/1992	Hydraulic Oil	Pole Truck	< 4 gal	Bldg. 5 Parking	Hydraulic line burst
11/5/1992	Hydraulic Oil	Defender	< 1 gal	South Dock	Outside equipment maintenance
12/1/1992	Hydraulic Oil	PW Crane	5 gal	Bldg. 415	Hydraulic line burst
12/18/1992	Diesel	Truck Hose	1 gal	South Dock	Dispensing nozzle in locked position
3/15/1993	Diesel	IR Contamination	Unknown	East Dock	
7/6/1994	Diesel	Athena II	60 gal	South Dock	Overfill during onboard transfer
12/96	Hydraulic Oil	Crane	5-10 gal	West Dock	Improperly capped line
2/97	Bilge Waste	Vessel	1 gal	South Dock	Hose accidentally disconnected
7/97	Diesel	Storm Drain	20-55 gal	Alligator Bayou	From double walled piping
7/97	Diesel	Storm Drain	1 gal	Alligator Bayou	Same as above
4/98	Diesel	Fuel Line	1 oz	South Dock	Failure of expansion joint on fuel line
9/98	Hydraulic Oil	Vessel	0.5 gal	West Dock	Crane seal broke aboard vessel
2/99	Hydraulic Oil	Vessel	2 oz	South Dock	Hydraulic fitting leak while loading vessel
02/09/99	Sewage Sludge	WWTP	1500-2000 gal	WWTP	Washed out from drying bed
10/99	Bilge Water	Vessel	< 5 gal	South Dock	Misaligned valves during transfer
03/28/00	Hydraulic Oil	Crane	4-5 gal	South Dock	Hydraulic line on shore
04/26/01	Hydraulic Oil	Code A22 Winch	35 gal	Bldg. 431 Driveway	Dropped during transport

Date	Pollutant	Source	Quantity	Location	Cause
06/18/01	Hydraulic Oil	Winch	5 gal	Bldg. 400 Storm Drain	Winch dropped during transport
06/19/01	Hydraulic Oil	Winch	1 gal	Athena	Burst gasket on pier
07/05/01	Sewage		3000-5000 gal	Retention Pond Bldg. 537	PCB 8" force main line
07/11/01	Diesel	Compressor	5 gal	Alligator Bayou	NDSTC salvage ship listed. Fuel tank into Bayou
08/07/01	Bilge	NDSTC YDT 18	< 1 cup	Alligator Bayou	NDSTC dropped bilge hose into water
08/13/01	Hydraulic Oil	NDSTC Compressor	40 gal	NDSTC Pier	Line burst. Oil escaped from bldg and into trench
11/20/01	Oil	Dumpster	1 gal	Marina	Unknown disposal action in dumpster
11/27/01	Hydraulic Oil	Backhoe	2-3 gal	Bldg. 319	Line burst on concrete and soil
04/15/02	Oil	Diving Bell	1 gal	NEDU	Leak
04/25/02	Gasoline	Gas Can	1 quart	West Dock	Leaking gas can
05/10/02	Hydraulic Oil	Forklift		Bldg. 277	Line burst
08/27/02	Hydraulic Oil	Winch	1 cup	NDSTC Pier	Line burst
10/09/02	Hydraulic Oil	Forklift	20 gal	OS4	Line burst
5/1/2003	Fuel	Contractor Tanker	27 gal	Marina	Line burst
5/22/2003	Hydraulic Oil	AC Unit	2 gal	NDSTC Pier	Line burst. Oil escaped from bldg and into trench
6/19/2003	Latex Paint	Brush Washing		NDSTC	Untrained personnel
8/6/2003	Latex Paint	Paint Can	1 gal	Supply	Can fell off of forklift
1/30/2004	Clorinated Water	Contractor Renovation	100-1000 gal	NDSTC	Water from BDAT Tower removed for renovation
2/7/2004	Hydraulic Fluid	Submersible Pump	12 gal	NDSTC	Line burst
2/18/2004	Hydraulic Fluid	Elevator	60 gal	B-89	Leak from elevator
3/23/2004	JP5	Helo	85 gal	Helo Pad	Probe inserted to test fuel and fuel released

Date	Pollutant	Source	Quantity	Location	Cause
5/12/2004	Gasoline	POV	8 gal	VRC	Spill from POV
7/5/2004	Gasoline	POV	15 gal	VRC	Spill from POV
6/22/2004	Hydraulic Fluid	PW Crane	3 gal	South Dock	Line burst
9/2/2004	Diesel	Fuel Dispenser	2 gal	B-406	Broken pump at fuel dispenser
10/1/2004	Hydraulic Fluid	Contractor Vehicle	Unknown	B-49, 323, 319,544,100,540	Line burst
10/4/2004	Oily Waste	Spill Trench	1500 gal	B-416	Eye wash was left on and filled spill trench containing oily residue
10/21/2004	Paint Chips	Coast Guard Maintenance	Unknown	South Dock	Paint chips drifted to NSA PC
4/19/2005	Hydraulic Fluid	Contractor Vehicle	10 gal	South Dock	Line burst
5/13/2005	Hydraulic Fluid	Contractor Vehicle	Unknown	NEDU	Line burst
6/15/2005	JP5	HAZMAT Storage	Unknown	B-81	Corroded drum leaked contents in secondary containment and mixed with rainwater
9/5/2005	JP5	LCAC	1 gal	LCAC Ramp	Fuel leak
8/26/2006	Non-Hazardous Powder	OS-1	5 lbs mixed w/ rainwater	OS-1	Emergency Aviation Marker stored improperly mixed with rainwater
1/30/2007	Diesel	Unknown	.5 gal	West Dock	Unknown
2/12/2007	Oil	POV	2 quarts	B-435	Unknown
9/11/2007	Latex Paint	Brush Washing	Unknown	B-110	Untrained contractor personnel
12/28/2007	Hydraulic Fluid	PSC-12	1 cup	West Dock	Newly replaced hydraulic line blew loose
8/14/2008	Antifreeze/Water Mixture	Refuse Truck	25 gal	B-349, 308, 453	Material was either already in truck when truck entered base or picked up from dumpster on base and when truck compacted the trash, material was released from the truck.
8/15/2008	Hydraulic Oil	RMAs	.25 gal	Alligator Bayou	Unknowingly spilled

Date	Pollutant	Source	Quantity	Location	Cause
2/11/2009	Fuel Oil	Newton's Support Boat Pier at low tide	<1 gal	Alligator Bayou	Seepage from under Pier during low tide
9/21/2010	Diesel	USAV El Caney	4 gal	St. Andrews Bay	Internal Fuel Transfer: Mechanical filure of avavle on fuel transfer system.
10/29/2010	Oil	Personal Vehicle at Building B-484	18 inch spot	B-484 Parking Lot	Personal vechicle oil leak
5/18/2011	Diesel	Tanker Truck Loading at 362	75 gal	B-362 Containment Ramp	Feul Operators were filling tanker. High level shutoff failed, overflowed tanker. Valves were misaligned and diesel went to the ground. ~90 yds of soil removed.
7/21/2011	Oil	Private Boat	1 gal	Marina Ramp	PLEASURE CRAFT HAD JUST BEEN PLACED INTO THE WATER FROM THE BOAT TRAILER BY A MARINA CUSTOMER. SPILL CAUSE: OILY WASTE LIQUIDS WERE BEING RELEASED KNOWINGLY FROM THE BILGE BY A CUSTOMER.
7/28/2011	Diesel/Water	Drips from containment tarp	1 Quart	PN118	Excess diesel fuel that had dried on the outside of the truck washed off into the contained area and created a film on top of the puddle.
8/9/2011	Latex Paint	Contractor	<1 gal.	B-552, Front Gate	Contractor opened side door of van during inspection and a 5-gallon bucket of latex paint spilled. Less than 1 gallon of paint was spilled on the asphalt.
10/20/2011	Motor Oil	Transportaion	1/2 gal.	B-552, Front Gate	1 gallon oil container fell off a truck. Approximatel 1/2 gallon of oil spilled. Material was cleaned up with absorbent.

Date	Pollutant	Source	Quantity	Location	Cause
5/15/2012	Water/Garbage	Trash Truck	5 to 10 gal.	Skylark and Vernon	Approximatley 5 gallons of garbage contaminated water leaked onto the street. Liquid was recovered with absorbent.

ACRONYMS AND ABBREVIATIONS

The following is a list of acronyms and abbreviations that may be used in reference to the Navy's Storm Water Pollution Prevention Program.

AMCM	Airborne Mine Countermeasure
AST	Above Ground Storage Tanks
Bldg.	Building
BMPs	Best Management Practices
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act.
CFR	Code of Federal Regulations
CO	Commanding Officer
CSS	Coastal Systems Station
DRMO	Defense Reutilization and Marketing Office
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
FDEP	Florida Department of Environmental Protection
HAZMAT	Hazardous Material
HAZWASTE	Hazardous Waste
MSGP	Multi Sector General Permit
MWR	Moral Welfare and Recreation
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center (1-800-424-8802)
OSHA	Occupational Safety and Health Administration
OPNAVINST	Chief of Naval Operations Instruction
OWS	Oil-Water Separator
POL	Petroleum, Oil and Lubricants
PWO	Public Works Officer
RCRA	Resource Conservation and Recovery Act
ROICC	Resident Officer in Charge of Construction
SOUTHDIV	Southern Division, Naval Facilities Engineering Command
SPCC	Spill Prevention, Control and Countermeasures
SWPPP	Storm Water Pollution Prevention Plan
SWPPT	Storm Water Pollution Prevention Team
UST	Underground Storage Tanks

DEFINITIONS

Baseline General Permit is a storm water permit (issued under the NPDES program) intended to initially cover the majority of storm water discharges associated with industrial activities. For example, EPA is planning to issue two baseline general permits: NPDES General Permits for Storm Water Discharges From Construction Activities that are classified as "Associated with Industrial Activity" and NPDES General Permits for Storm Water Discharges from Industrial Activities that are classified as "Associated with Industrial Activities." EPA is also encouraging delegated States which have an approved general program to issue baseline general permits.

Berm is an earthen mound used to direct the flow of runoff around or through a structure.

Best Management Practices (BMPs) means a practice or a combination or series of practices and measures designed to prevent or minimize the amount of pollution generated from sources such as access roads and haul roads, spoil storage and stockpile areas, site preparation, installation of culverts, steam crossings and bridges, and other related activities.

Boom is a floating device used to contain oil on a body of water.

Buffer Strip or Zone is a strip of grass or other erosion-resistant vegetation between a waterway and an area of more intensive land use.

By-product is material, other than the principal product, that is generated as a consequence of an industrial process.

Clean Water Act or *Act* means the Federal Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972), as amended.

Conduit is any channel or pipe for transporting the flow of water.

Conveyance is any natural or manmade channel or pipe in which concentrated water flows.

Culvert is a covered channel or a large-diameter pipe that directs water flow below the ground level.

Daily Maximum Concentration is a limitation on the average concentrations in milligrams per liter, of the discharge during any calendar day.

(a) When a proportional-to-flow composite sampling device is used, the daily concentration is the concentration of that 24-hour composite.

(b) When other sampling means are used, the daily concentration is the arithmetic mean of the concentrations of equal volume samples collected during any calendar day or sampling period.

Denuded is land stripped of vegetation such as grass, or land that has had vegetation worn down due to impacts from the elements or humans.

Dike is an embankment to confine or control water, often built along the banks of a river to prevent overflow of lowlands; a levee.

Discharge is a release or flow of storm water or other substance from a conveyance or storage container.

Erosion is the wearing away of land surface by wind or water. Erosion occurs naturally from weather or runoff but can be intensified by land-clearing practices related to farming, residential or industrial development, road building, or timber-cutting.

Filter Fabric is textile of relatively small mesh or pore size that is used to (a) allow water to pass through while keeping sediment out (permeable), or (b) prevent both runoff and sediment from passing through (impermeable).

Filter Strip is usually long, relatively narrow area of undisturbed or planted vegetation used to retard or collect sediment for the protection of watercourses reservoirs, or adjacent properties.

Grab Sample means an individual sample of at least 100 milliliters collected at a randomly-selected time over a period not exceeding 15 minutes.

Grading is the cutting and/or filling of the land surface to a desired sloe or elevation.

Hazardous Substances (1) are any materials that pose a threat to human health and/or the environment. Hazardous substances can be toxic, corrosive, ignitable, explosive or chemically reactive. (2) Any substance named required by EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or if otherwise emitted into the environment.

Hazardous Waste is by-products of human activities that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Holding Pond is a pond or reservoir, usually made of earth, built to store polluted runoff for a limited time.

Illicit Connection is any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges authorized by an NPDES permit (other than the NPDES permit for discharges from the municipal separate storms sewer) and discharges resulting from fire fighting activities.

Inlet is an entrance into a ditch, storm sewer, or other waterway.

Jute is a plant fiber used to make rope, mulch, netting, or matting.

Landfills (1) Sanitary landfills are land disposal sites for non-hazardous solid wastes at which the waste is spread in layers, compacted to the smallest practical volume, and cover material applied at the end of each operating day. (2) Secure chemical landfills are disposal sites for hazardous waste. They are selected and designed to minimize the chance of release hazardous substances into the environment.

Leaching is the process by which soluble constituents are dissolved in a solvent such as water and carried down through the soil.

Liner (1) a relatively impermeable barrier designed to prevent leachate from leaking from a landfill. Liner materials include plastic and dense clay. (2) An insert or sleeve for sewer pipes to prevent leakage or infiltration.

Liquid Level Detector is a device that provides continuous measures of liquid levels in liquid storage areas or containers to prevent overflows.

Material Storage Areas are on-site locations where raw materials, products, final products, by-products, or waste materials are stored.

Monthly Average Concentration is a limitation on the discharge concentration in milligrams per liter, as the arithmetic mean of all daily concentrations determined in a one-month period.

National Pollutant Discharge Elimination System (NPDES) means the Federal Environmental Protection Agency's (EPA) national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing water quality permits. The term includes an "approved state program."

Notice of Intent (NOI) is an application to notify the permitting authority of a facility's intention to be covered by a general permit; exempts a facility from having to submit an individual or group application.

NPDES Permit An authorization, license, or equivalent control document issued by EPA or an approved State agency to implement the requirements of the NPDES program.

Oil Sheen is a thin, glistening layer of oil on water.

Oil/Water Separator is a device installed, usually at the entrance to a drain, which removes oil and grease from water flows entering the drain.

Outfall is the point, location, or structure where wastewater or drainage discharges from a sewer pipe, ditch, or other conveyance to a receiving body of water.

Point Source is any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged.

Pollutant is any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 (U.S.C. 2011 et seg.)), heat, wrecked or discharged equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water. It does not mean: (i) Sewage from vessels; or (ii) Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by the authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Precipitation is any form of rain or snow.

Preventative Maintenance Program is a schedule of inspections and testing at regular intervals intended to prevent equipment failures and deterioration.

Process Wastewater is water that comes into direct contact with or results from the reduction or use of any raw material, intermediate product, finished product, by-product, waste product, or wastewater.

Raw Material is any product or material that is converted into another material by processing or manufacturing.

Regional Administrator means the Administrator for the Environmental Protection Agency or his authorized representative.

Reportable Quantity (RQ) is the quantity of a hazardous substance or oil that triggers reporting requirements under CERCLA or the Clean Water Act. If a substance is released in amounts exceeding its RQ, the release must be reported to the National Response Center, the State Emergency Response Commission, and community emergency coordinators for areas likely to by affected.

Residual is an amount of pollutant remaining in the environment after a natural or technological process has taken place, e.g., the sludge remaining after initial wastewater treatment, or particulates remaining in air after the air passes through a scrubbing or other pollutant removal process.

Retention is the holding of runoff in a basin without release except by means of evaporation, infiltration, or emergency bypass.

Retrofit is the modification of storm water management systems in developed areas through the construction of wet ponds, infiltration systems, wetland plantings, stream bank stabilization, and other BMP techniques for improving water quality. A retrofit can consist of the construction of a new BMP in the developed area, the enhancement of an older storm water management structure, or a combination of improvement and new construction.

Rill Erosion is the formation of numerous, closely spread streamlets due to uneven removal of surface soils by storm water or other water.

Run On is storm water surface flow or other surface flow which enters property other than that where it originated.

Runoff is that part of precipitation, snow met, or irrigation water that runs off the land into streams or other surface water. It can carry pollutants from the air and land into the receiving waters.

Sanitary Sewer is a system of underground pipes that carries sanitary waste or process wastewater to a treatment plant.

Sanitary Waste is domestic sewage.

Scour is the clearing and digging action of flowing water, especially the downward erosion caused by stream water in sweeping away mud and silt from the stream bed and outside bank of a curved channel.

Secondary Containment are structures, usually dikes or berms, surrounding tanks or other storage containers and designed to catch spilled material from the storage containers.

Sediment Trap is a device for removing sediment from water flows; usually installed at outfall points.

Sedimentation is the process of depositing soil particles, clays, sands, or other sediments that were picked up by flowing water.

Sediments are soil, sand, and minerals washed from land into water, usually after rain. They pile up in reservoirs, rivers, and harbors, destroying fish-nesting areas and holes of water animals and cloud the water so that needed sunlight might not reach aquatic plants. Careless farming, mining, and building activities will expose sediment materials, allowing them to be washed off the land after rainfalls.

Sheet Erosion is the erosion of thin layers of surface materials by continuous sheets of running water.

Sheetflow is runoff which flows over the ground surface as a thin, even layer, not concentrated in a channel.

Significant materials, as defined at 122.26(b)(12) include, but are not limited to:

> Raw materials; fuels; materials such as solvents, detergents and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); any chemical the facility is required to report pursuant to section 313 of Title III of the Superfund Amendments and Reauthorization Act (SARA); fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have a potential to be released with storm water discharges.

Soil is the unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of plants.

Source Control is a practice or structural measure to prevent pollutants from entering storm water runoff or other environmental media.

Spill Prevention Control and Countermeasures Plan (SPCC) is a plan consisting of structures, such as curbing, and action plans to prevent and respond to spills of hazardous substances as defined in the Clean Water Act.

Storm Drain is a slotted opening leading to an underground pipe or an open ditch for carrying surface runoff.

Storm Water is runoff from a storm event, snow melt runoff, or surface runoff and drainage.

Storm Water Discharge Associated with Industrial Activity is the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. Industrial facilities (including industrial facilities that are Federally, State, or municipally owned or operated that meet the description of the facilities listed in this paragraph (i)-(xi) include those facilities designated under the provision of 122. 26(a)(1)(v).

Surface Water is all water naturally open to the atmosphere (rivers, lakes, reservoirs, streams, wetlands impoundments, seas, estuaries, etc.); also refers to springs, wells, or other collectors which are directly influenced by surface water.

Swale is an elongated depression in the land surface that is at least seasonally wet, is usually heavily vegetated, and is normally without flowing water. Swales direct storm water flows into primary drainage channels and allow some of the storm water to infiltrate into the ground surface.

Tarp is a sheet of waterproof canvas or other material used to cover and protect materials, equipment, or vehicles.

Ten Year, 24-Hour Precipitation Event means the maximum 24-hour precipitation event with a probable recurrence interval of once in 10 years as defined by the National Weather Service and Technical Paper No. 40, "Rainfall Frequency Atlas of the U.S., " May 1961, and subsequent amendments or equivalent regional or rainfall probability information developed therefrom.

Topography is the physical feature of a surface area including relative elevations and the position of natural and human-made features.

Toxic Pollutants are any pollutants listed as toxic under Section 501 (a)(1) or, in the case of "sludge use or disposal practices," any pollutant identified in regulations implementing Section 405(d) of the CWA. Please refer to 40 CFR Part 122 Appendix D.

Treatment is the act of applying a procedure or chemicals to a substance to remove undesirable pollutants.

Tributary is a river or stream that flows into a larger river or stream.

Underground Storage Tanks (USTs) are storage tanks with at least 10 percent or more of its storage capacity underground (the complete regulatory definition is at 40 CFR Part 280.12).

Waste is unwanted materials left over from a manufacturing or other process.

Water Table is the depth or level below which the ground is saturated with water.

Wetlands is an area that is regularly saturated by surface or ground water and subsequently is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. Examples include: swamps, bogs, fens, marshes, and estuaries.

Wind Break is any device designed to block wind flow and intended for protection against any ill effects of wind.

From: Commanding Officer, Naval Support Activity Panama City
To: Distribution

Subj: STORM WATER POLLUTION PREVENTION PLAN

Ref: (a) Rule 621.300(5) F.A.C, Multi-Sector Generic Permit for Storm Water Discharge Associated with Industrial Activity

(b) Storm Water Pollution Prevention Plan for Naval Support Activity Panama City

1. Purpose. To comply with references (a) through the implementation of the program defined in reference (b), and to ensure the protection of the quality of storm water runoff from Navy owned property at the Naval Support Activity Panama City (NSA PC) to the maximum extent practicable.

2. Policy. Reference (a) states that specific industrial activities are potentially significant sources of pollutants in storm water runoff and must therefore be subject to a storm water discharge permit issued under the National Pollutant Discharge Elimination System (NPDES). Storm water runoff from areas of identified industrial activities at NSA PC will be managed in accordance with a program of source and structural controls identified in the facility's Storm Water Pollution Prevention Plan (SWPPP).

3. Discussion. Storm water runoff carries pollutants that have accumulated on surfaces that are exposed to rainfall. The accumulation of pollutants is a result of the atmospheric deposition of wind-borne pollutants, the disturbance of naturally occurring pollutants, the deposition of pollutants from on-site activities, and pollutant exposure due to leaks, spills, or dumping. The opportunity to minimize the exposure of these pollutants to storm water runoff is referred to as a source control. Source controls include good housekeeping practices, preventative maintenance, containment, inspections, and training/education programs for staff. The cost of a program of source controls will be significantly less than the cost of end-of-pipe controls, mitigation, and/or fines for non-compliance with environmental regulations.

4. Discharge Criteria. The U.S. Environmental Protection Agency (EPA) has prohibited the discharge of non-storm water to the waters of the United States. As part of developing the SWPPP for NSA PC, a non-storm water discharge investigation was performed in 1996 where several illicit connections were discovered and corrected. An additional illicit discharge survey was conducted in 2006 reviewing discharges from buildings built since the 1996 survey. No new illicit connections were discovered.

EPA has identified three groups of industrial activities that apply to NSA PC. One group of activities is the maintenance, fueling, washing, and servicing of aircraft. The second group includes vehicle and equipment maintenance shops (rehabilitation, mechanical repairs, painting, fueling and lubrication) and cleaning operations. EPA's review of representative sampling data for facilities in each of these groups resulted in the determination that pollutants in storm water runoff from some of these activities do not warrant numerical limitations, and therefore analytical sampling is not being required. Visual monitoring is required on a quarterly basis to determine whether or not the SWPPP is successful in the control of pollutants in the storm water runoff at the NSA PC. The third group of activities includes water transportation facilities that have maintenance shops and equipment cleaning operations. EPA determined that these activities do warrant numerical limitations and require quarterly analytical monitoring. Monthly visual monitoring is also required for the marina area.

5. Compliance. To ensure that the SWPPP is being implemented and adhered to, regular inspections will be performed by the Storm Water Pollution Prevention Team (SWPPT). The SWPPT will be responsible for ensuring that the SWPPP is implemented by performing inspections of areas of industrial activity on either a monthly or on a quarterly basis, depending on the type of operation being performed at a specific location. The SWPPT will also be responsible for performing a comprehensive environmental compliance audit of NSA PC on an annual basis. SWPPT members will also be responsible for the visual monitoring of storm water discharges in their assigned areas. All inspection and monitoring logs will become permanent parts of the SWPPP.

When non-compliance is observed the SWPPT will inform the SWPPT Leader. The responsible activity will be notified and will in turn inform the SWPPT of corrective actions and a time frame for those actions. The SWPPT will again inspect the activity when the time frame for corrective action has elapsed. In any case where non-compliance leads to environmental violations at NSA PC the responsible activity will be held accountable for any punitive damages incurred.

6. Responsibilities. The following individuals or groups of individuals are responsible for seeing that the SWPPP is implemented and that the components of the plan are actually providing the control of storm water pollution that is intended.

a. The SWPPT Leader is ultimately responsible for the proper implementation of the SWPPP. The duties of the facility SWPPT Leader are enumerated in Section 1.2.3 of reference (b).
b. The SWPPT members assist the SWPPT Leader in the implementation of the SWPPP and in monitoring compliance with the program. The responsibilities of the SWPPT members are defined in Section 1.2.3 of reference (b).
c. The "facility coordinators" are the building-level personnel that are designated to assure that the SWPPP is implemented and complied with in their activity areas. The responsibilities of the facility coordinators are described in Section 1.2.3 of reference (b).

d. NSA PC personnel are responsible for complying with the SWPPP and assisting the facility coordinators, SWPPT, or SWPPT Leader as needed.

7. Actions. The following actions will be taken to comply with the SWPPP:

a. The SWPPT will advise the staff members of NSA PC and of the tenant activities identified in reference (b) of their duties and obligations under the SWPPP. The SWPPT will provide copies of the tenant and facility coordinator's respective portions of the SWPPP.
b. The staff of NSA PC and of the identified tenant activities will comply with the requirements of the SWPPP.
c. The SWPPT will perform inspections of the facility's activities and document compliance with the SWPPP.
d. Each tenant and facility coordinator will document and maintain records of inspections performed and actions taken.

Florida Department of
Environmental Protection
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Mimi A. Drew
Secretary

January 15, 2011

Jessica Pfefferkorn
Naval Support Activity Panama City, Officer In Charge
101 Vernon Ave
Panama City Beach, FL 32407

RE: **Facility ID: FLR05G134**
Naval Support Activity - Panama City
County: Bay

Dear Permittee:

The Florida Department of Environmental Protection has received and processed your *Notice of Intent to Use Multi-Sector Generic Permit for Stormwater Discharge Associated with Industrial Activity* (NOI) and the accompanying processing fee. This letter acknowledges that:

- your NOI is complete;
- your processing fee is paid-in-full; and
- you are covered under the *Multi-Sector Generic Permit for Stormwater Discharge Associated with Industrial Activity* (MSGP).

Your facility identification number is **FLR05G134**. Please include this number on all future correspondence to the Department regarding this permit.

This letter is not your permit. A copy of your permit is available online at **www.dep.state.fl.us/water/stormwater/npdes/industrial5.htm** or by contacting the NPDES Stormwater Notices Center. Your facility falls under **Sectors P, Q and S** of the MSGP.

Your permit coverage became effective **January 15, 2011** and will expire **January 14, 2016**. To terminate coverage prior to this expiration date, you must file a *National Pollutant Discharge Elimination System (NPDES) Stormwater Notice of Termination,* DEP Form 62-621.300(6). To renew your coverage beyond the expiration date, you must submit a new NOI and processing fee to the Department no later than two days before coverage expires.
Until your permit coverage is terminated, modified, or revoked, you are authorized to

discharge stormwater from your facility to surface waters in accordance with the terms and conditions of the MSGP. Three key conditions of the MSGP are:

- implementing your stormwater pollution prevention plan (SWPPP);
- retaining the records required by the permit (including your SWPPP) at your facility; and
- conducting your required monitoring.

Required Monitoring:

Analytical Monitoring

Analytical samples of your stormwater discharge(s) must be collected and analyzed at least once each calendar quarter after a qualifying rain event during the periods of January through March, April through June, July through September, and October through December during years **two** and **four** of your permit cycle for the parameters specified in your Sector(s).

Analytical monitoring must be conducted in accordance with the following schedule:

- Year **two monitoring period** begins January 1, 2012 and ends December 31, 2012

- Year **four monitoring period** begins January 1, 2014 and ends December 31, 2014

The samples must be analyzed by a laboratory that has been certified by the Department of Health Environmental Laboratory Certification Program (DOH ELCP). At the end of the monitoring year, you must average your quarterly Discharge Monitoring Report (DMR) results and record the quarterly average on an annual DMR form. If there is no stormwater discharged from your facility after a qualifying rain event during a calendar quarter, you must still complete and sign a DMR form for that quarter indicating "No Discharge" by checking the box at the top of the form.

DMR Forms

Quarterly and Annual DMR forms are attached to this acknowledgement letter. These forms are all also available online at:
www.dep.state.fl.us/water/stormwater/npdes/industrial6.htm. You must complete the applicable forms and send them to the following address by March 31st of the year following your monitoring period or year. For example, analytical monitoring results for 2008 would be due no later than March 31st, 2009.

NPDES Stormwater MSGP DMR, MS #2511

Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

If you have any questions concerning this acknowledgment letter, please contact the NPDES Stormwater Notices Center at (866) 336-6312.

Sincerely,

Derby Bernadel
Data Quality Control Specialist
NPDES Stormwater Program

DB

SECTOR P

SECTOR P

P. Storm Water Discharges Associated With Industrial Activity From Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, Rail Transportation Facilities, and United States Postal Service Transportation Facilities

1. Discharges Covered Under This Section. Storm water discharges from ground transportation facilities and rail transportation facilities that have vehicle and equipment maintenance shops (vehicle and equipment rehabilitation, mechanical repairs, painting, fueling and lubrication) and/or equipment cleaning operations are eligible for coverage under this section. The facilities covered by this section of today's proposed permit are commonly identified by standard Industrial Classification (SIC) codes 40, 41, 42, 43, and 5171 or any other facility with vehicle and equipment maintenance shops or cleaning operations.

When an industrial facility, described by the above eligibility provisions of this section, has industrial activities being conducted on-site that meet the description(s) of industrial activities in another section(s), that industrial facility shall comply with any and all applicable monitoring and pollution prevention plan requirements of the other section(s) in addition to all applicable requirements in this section. The monitoring and SWPPP terms and conditions of this multi-sector permit sector are additive for industrial activities being conducted at the same industrial facility (co-located industrial activities). The operator of the facility shall determine which other monitoring and SWPPP section(s) of this permit (if any) are applicable to the facility.

If monitoring and SWPPP requirements of another industrial activity section of this permit apply to co-located industrial activities at an industrial facility, the eligibility provisions of that industrial activity section shall not preclude the operator of the industrial facility from complying with the applicable monitoring and SWPPP requirements of that section.

2. Special Conditions. Prohibition of Non-storm Water Discharges. Prohibited non-storm water discharges, including vehicle and equipment washwaters, are not authorized by this permit. The operators of such discharges must obtain coverage under a separate NPDES permit if discharged to waters of the United States or through a municipal separate storm sewer system or comply with applicable industrial pretreatment requirements if discharged to a municipal sanitary sewer system.

3. SWPPP Requirements

a. Contents of the Plan. The plan shall include, at a minimum, the following items:

(1) Pollution Prevention Team. Each plan shall identify a specific individual or individuals within the facility organization as members of a storm water Pollution Prevention Team who are responsible for developing the SWPPP and assisting the facility or plant manager in its

implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's storm water pollution prevention plan.

(2) Description of Potential Pollutant Sources. Each plan shall provide a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges or which may result in the discharge of pollutants during dry weather from separate storm sewers draining the facility. Each plan shall identify all activities and significant materials which may potentially be significant pollutant sources. Each plan shall include, at a minimum:

(a) Drainage—A site map indicating the location of each point of discharge of storm water associated with industrial activity, an outline of the portions of the drainage area of each storm water outfall that are within the facility boundaries (with a prediction of the direction of flow), each existing structural control measure to reduce pollutants in storm water runoff, surface water bodies, locations where significant materials are exposed to precipitation, locations where major spills or leaks have occurred, and the locations of the following activities: fueling stations, vehicle and equipment maintenance and/or cleaning areas, storage areas for vehicles and equipment awaiting maintenance, loading/unloading areas, locations used for the treatment, storage or disposal of wastes, liquid storage tanks, processing areas, storage areas, and all monitoring locations.

(b) Inventory of Exposed Materials—An inventory of the types of materials handled at the site that potentially may be exposed to precipitation. Such inventory shall include a narrative description of significant materials that have been handled, treated, stored or disposed in a manner to allow exposure to storm water between the time of three (3) years prior to the date of the issuance of this permit and the present; method and location of on-site storage or disposal; dirt or gravel parking areas for storage of vehicles to be maintained; materials management practices employed to minimize contact of materials with storm water runoff between the time of three (3) years prior to the date of the issuance of this permit and the present; the location and a description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of any treatment the storm water receives.

(c) Spills and Leaks—A list of significant spills and significant leaks of toxic or hazardous pollutants that occurred at areas that are exposed to precipitation or that otherwise drain to a storm water conveyance at the facility after the date of three (3) years prior to the effective date of this permit. Such list shall be updated as appropriate during the term of the permit.

(d) Sampling Data—A summary of existing discharge sampling data describing pollutants in storm water discharges from the facility, including a summary of sampling data collected during the term of this permit.

(e) Summary of Potential Pollutant Sources—A narrative description of the potential pollutant sources from the following activities associated with vehicle and equipment

maintenance and equipment cleaning: fueling stations; maintenance shops; equipment or vehicle cleaning areas; paved dirt or gravel parking areas for vehicles to be maintained; loading and unloading operations; outdoor storage activities; outdoor manufacturing or processing activities; significant dust or particulate generating processes; and on-site waste disposal practices. The description shall specifically list any significant potential source of pollutants at the site and for each potential source, any pollutant or pollutant parameter (e.g., oil and grease, etc.) of concern shall be identified.

(3) Measures and Controls. Each facility covered by this permit shall develop a description of storm water management controls appropriate for the facility, and implement such controls. The appropriateness and priorities of controls in a plan shall reflect identified potential sources of pollutants at the facility. The description of storm water management controls shall address the following minimum components, including a schedule for implementing such controls:

(a) Good Housekeeping—All areas that may contribute pollutants to storm water discharges shall be maintained in a clean, orderly manner. The following areas must be specifically addressed:

i) Vehicle and Equipment Storage Areas—The storage of vehicles and equipment awaiting maintenance must be confined to designated areas (delineated on the site map). The plan must describe measures that prevent or minimize contamination of the storm water runoff from these areas. The facility shall consider the use of drip pans under vehicles and equipment, indoor storage of the vehicles and equipment, installation of berming and diking of this area, use of absorbents, roofing or covering storage areas, cleaning pavement surface to remove oil and grease, or other equivalent methods.

ii) Fueling Areas—The plan must describe measures that prevent or minimize contamination of the storm water runoff from fueling areas. The facility shall consider covering the fueling area, using spill and overflow protection and cleanup equipment, minimizing runon/runoff of storm water to the fueling area, using dry cleanup methods, collecting the storm water runoff and providing treatment or recycling, or other equivalent measures.

iii) Material Storage Areas—Storage units of all materials (e.g., used oil, used oil filters, spent solvents, paint wastes, radiator fluids, transmission fluids, hydraulic fluids) must be maintained in good condition, so as to prevent contamination of storm water, and plainly labeled (e.g., "used oil," "spent solvents," etc.). The plan must describe measures that prevent or minimize contamination of the storm water runoff from such storage areas. The facility shall consider indoor storage of the materials, installation of berming and diking of the area, minimizing runon/runoff of storm water to the areas, using dry cleanup methods, collecting the storm water runoff and providing treatment, or other equivalent methods.

iv) Vehicle and Equipment Cleaning Areas—The plan must describe measures that prevent or minimize contamination of the storm water runoff from all areas used for vehicle and equipment cleaning. The facility shall consider performing all cleaning operations indoors,

covering the cleaning operation, ensuring that all washwaters drain to the intended collection system (i.e., not the storm water drainage system unless NPDES permitted), collecting the storm water runoff from the cleaning area and providing treatment or recycling, or other equivalent measures. The discharge of vehicle and equipment wash waters, including tank cleaning operations, are not authorized by this permit and must be covered under a separate NPDES permit or discharged to a sanitary sewer in accordance with applicable industrial pretreatment requirements.

v) Vehicle and Equipment Maintenance Areas—The plan must describe measures that prevent or minimize contamination of the storm water runoff from all areas used for vehicle and equipment maintenance. The facility shall consider performing all maintenance activities indoors, using drip pans, maintaining an organized inventory of materials used in the shop, draining all parts of fluids prior to disposal, prohibiting wet clean up practices where the practices would result in the discharge of pollutants to storm water drainage systems, using dry cleanup methods, collecting the storm water runoff from the maintenance area and providing treatment or recycling, minimizing runon/runoff of storm water areas or other equivalent measures.

vi) Locomotive Sanding (loading sand for traction) Areas—The plan must describe measures that prevent or minimize contamination of the storm water runoff from areas used for locomotive sanding. The facility shall consider covering sanding areas, minimizing storm water runon/runoff, appropriate sediment removal practices to minimize the off-site transport of sanding material by storm water, or other equivalent measures.

(b) Preventive Maintenance—A preventive maintenance program shall include timely inspection and maintenance of storm water management devices (e.g., cleaning oil/water separators, catch basins, drip pans, vehicle-mounted drip containment devices) as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems.

(c) Spill Prevention and Response Procedures—Areas where potential spills could contribute pollutants to storm water discharges, and their accompanying drainage points, shall be clearly identified. Where appropriate, specifying material handling procedures, storage requirements, and use of equipment such as diversion valves in the plan should be considered. Procedures and equipment for cleaning up spills shall be identified in the plan and made available to the appropriate personnel.

(d) Inspections—Qualified facility personnel shall be identified to inspect designated equipment and areas of the facility on a monthly basis. The following areas shall be included in all inspections: storage area for vehicles and equipment awaiting maintenance, fueling areas, vehicle and equipment maintenance areas (both indoors and outdoors), material storage areas, vehicle and equipment cleaning areas, and loading and unloading areas. Follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records

of inspections shall be maintained. The use of a checklist should be considered by the facility.

(e) Employee Training—Employee training programs shall inform personnel responsible for implementing activities identified in the SWPPP or otherwise responsible for storm water management of the components and goals of the SWPPP. Training should address topics such as spill response, good housekeeping and material management practices. The SWPPP shall identify how often training will take place; at a minimum, training must be held at least semiannually (twice per calendar year). Employee training must, at a minimum, address the following areas when applicable to a facility: summary of the facility's SWPPP requirements; used oil management; spent solvent management; spill prevention, response and control; fueling procedures; general good housekeeping practices; proper painting procedures; and used battery management.

(f) Recordkeeping and Internal Reporting Procedures—A description of incidents (such as spills, or other discharges), along with other information describing the quality and quantity of storm water discharges shall be included in the plan required under this part. Inspections and maintenance activities shall be documented and records of such activities shall be incorporated into the plan.

(g) Non-storm Water Discharges

i) The plan shall include a certification that the discharge has been tested or evaluated for the presence of non-storm water discharges. The certification shall include the identification of potential significant sources of non-storm water at the site, a description of the results of any test and/or evaluation for the presence of non-storm water discharges, the evaluation criteria or testing method used, the date of any testing and/or evaluation, and the on-site drainage points that were directly observed during the test. Certifications shall be signed in accordance with the Signatory Requirements of this permit. Such certification may not be practical if the facility operating the storm water discharge associated with industrial activity does not have access to an outfall, manhole, or other point of access to the ultimate conduit which receives the discharge. In such cases, the source identification section of the SWPPP shall indicate why the certification required by this part was not practical, along with the identification of potential significant sources of non-storm water at the site. A discharger that is unable to provide the certification required by this paragraph must notify the Director in accordance with Failure to Certify portion of the SWPPP.

ii) Except for flows from fire fighting activities, sources of non-storm water that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

iii) A copy of the NPDES permit issued for vehicle and equipment washwaters or, if an NPDES permit has not yet been issued, a copy of the pending application must be attached to or referenced in the plan. For facilities that discharge vehicle and equipment washwaters to the sanitary sewer system, the operator of the sanitary system and associated treatment plant must be

notified. In such cases, a copy of the notification letter must be attached to the plan. If an industrial user permit is issued under a pretreatment program, a copy of that permit must be attached in the plan. In all cases, any permit conditions or pretreatment requirements must be considered in the plan. If the washwaters are handled in another manner (e.g., hauled off-site), the disposal method must be described and all pertinent documentation (e.g., frequency, volume, destination, etc.) must be attached to the plan.

iv) Failure to Certify—Any facility that is unable to provide the certification required (testing for non-storm water discharges), must notify the Director **270 days after permit issuance** or, for facilities which begin to discharge storm water associated with industrial activity after **270 days after permit issuance**, 180 days after submitting an NOI to be covered by this permit. If the failure to certify is caused by the inability to perform adequate tests or evaluations, such notification shall describe: the procedure of any test conducted for the presence of non-storm water discharges; the results of such test or other relevant observations; potential sources of non-storm water discharges to the storm sewer; and why adequate tests for such storm sewers were not feasible. Non-storm water discharges to waters of the United States which are not authorized by an NPDES permit are unlawful, and must be terminated.

(h) Sediment and Erosion Control—The plan shall 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 to be used to limit erosion.

i) Management of Runoff—The plan shall contain a narrative consideration of the appropriateness of storm water management practices (practices other than those which control the generation or source(s) of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. The plan shall provide for the implementation and maintenance of measures that the permittee determines to be reasonable and appropriate. The potential of various sources at the facility to contribute pollutants to storm water discharges associated with industrial activity shall be considered when determining reasonable and appropriate measures. Appropriate measures may include: vegetative swales and practices, reuse of collected storm water (such as for a process or as an irrigation source), inlet controls (such as oil/water separators), snow management activities, infiltration devices, and wet detention/retention devices. If a facility determines that other management measures can attain the same water quality in the storm water discharges as an oil/water separator, the justification must be included in the plan.

(4) Comprehensive Site Compliance Evaluation. Qualified personnel shall conduct comprehensive site compliance evaluations at appropriate intervals specified in the plan, but, in no case less than once a year. Such evaluations shall provide:

(a) Areas contributing to a storm water discharge associated with industrial activity shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Measures to reduce pollutant loadings shall be evaluated to determine whether they are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. Structural storm water management measures, sediment and

erosion control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure that they are operating correctly. A visual inspection of equipment needed to implement the plan, such as spill response equipment, shall be made.

(b) Based on the results of the inspection, the description of potential pollutant sources identified and pollution prevention measures and controls identified in the plan shall be revised as appropriate within two (2) weeks of such inspection and shall provide for implementation of any changes to the plan in a timely manner, but in no case more than twelve (12) weeks after the inspection.

(c) A report summarizing the scope of the inspection, personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken shall be made and retained as part of the storm water pollution prevention plan for at least one (1) year after coverage under this permit terminates. The report shall identify any incidents of noncompliance. Where a report does not identify any incidents of noncompliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed.

(d) Where compliance evaluation schedules overlap with inspections required, the compliance evaluation may be conducted in place of one such inspection.

4. Numeric Effluent Limitations. There are no additional numeric effluent limitations beyond those described in Part V. of this permit.

5. Monitoring and Reporting Requirements

a. Monitoring Requirements

(1) Quarterly Visual Examination of Storm Water Quality. Facilities shall perform and document a visual examination of a representative storm water discharge associated with industrial activity exposed to storm water. The examination must be made at least once in each designated period [described in (a), below] during daylight hours unless there is insufficient rainfall or snow melt to produce a runoff event.

(a) Examinations shall be conducted in each of the following periods for the purposes of visually inspecting storm water quality associated with storm water runoff or snow melt: December to February; March to May; June to August; and September to November.

(b) Examinations shall be made of samples collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed one hour) of when the runoff or snowmelt begins discharging. The examinations shall document observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution. The inspection must be conducted in a well lit area. No analytical tests are

required to be performed on the samples. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. EPA expects that whenever practicable the same individual will carry out the collection and examination of discharges for the life of the permit.

When a discharger is unable to collect samples over the course of the monitoring period as a result of adverse climatic conditions, the discharger must document the reason for not performing the visual examination. Adverse weather conditions which may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricanes, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

(c) Visual observation reports must be maintained on-site in the SWPPP. The report shall include the examination date and time, examination personnel, the nature of the discharge (i.e., runoff or snow melt), visual quality of the storm water discharge (including observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution), and probable sources of any observed storm water contamination.

(d) When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may collect a sample of effluent of one of such outfalls and report that the observation data also applies to the substantially identical outfalls provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explaining in detail why the outfalls are expected to discharge substantially identical effluents. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area [e.g., low (under 40 percent), medium (40 to 65 percent), or high (above 65 percent)] shall be provided in the plan.

Sector Q

Water Transportation Facilities That Have Vehicle Maintenance Shops and/or Equipment Cleaning Operations Permit Language

The Permit Language section contains sector-specific requirements for each industrial sector, including:

- Discharges covered under the sector;
- Special Conditions
- Storm Water Pollution Prevention Plan Requirements;
- Numeric Effluent Limitations, if any; and
- Monitoring and Reporting Requirements.

Further guidance and discussion can be found in the Fact Sheet associated with this sector.

Q. Storm Water Discharges Associated With Industrial Activity From Water Transportation Facilities That Have Vehicle Maintenance Shops and/or Equipment Cleaning Operations

1. Discharges Covered Under This Section

Special conditions have been developed for water transportation facilities that have vehicle and equipment maintenance shops (vehicle and equipment rehabilitation, mechanical repairs, painting, fueling, and lubrication) and equipment cleaning operations. Vehicle and equipment maintenance is a broad term used to include the following activities: vessel and equipment fluid changes, mechanical repairs, parts cleaning, sanding, blasting, welding, refinishing, painting, fueling, and storage of the related materials and waste materials, such as oil, fuel, batteries, or oil filters. Equipment cleaning operations include areas where vessel and vehicle exterior washdown takes place. The conditions in this section apply to storm water discharges from vehicle and equipment maintenance shops or cleaning operations located at water transportation facilities covered under the storm water application regulations (40 CFR 122.26) and applying for coverage under today's permit.

The storm water application regulations define storm water discharges associated with industrial activity at 40 CFR 122.26(b)(14). Category (viii) of this definition includes transportation facilities classified as Standard Industrial Classification (SIC) codes 40, 41, 42 (except 4221–25), 43, 44, 45, and 5171 that have vehicle and equipment maintenance shops, equipment cleaning operations, or airport deicing operations. The category further states that only those portions of the facility that are either involved in vehicle and equipment maintenance (including vehicle and equipment rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, or airport deicing operations are associated with industrial activity. The conditions in this section only apply to water transportation facilities.

When an industrial facility, described by the above coverage provisions of this section, has industrial activities being conducted onsite that meet the description(s) of industrial activities in another section(s), that industrial facility shall comply with any and all applicable monitoring and pollution prevention plan requirements of the other section(s) in addition to all applicable requirements in this section. The monitoring and pollution prevention plan terms and conditions of this multi-sector permit are additive for industrial activities being conducted at the same industrial facility (co-located industrial activities). The operator of the facility shall determine which other monitoring and pollution prevention plan section(s) of this permit (if any) are applicable to the facility.

Facilities covered by this section of today's permit are commonly identified by SIC code major group 44.

SIC code 44 includes facilities primarily engaged in furnishing water transportation services. The following types of facilities are examples of those covered under SIC code 44:

a. Deep Sea Foreign Transportation of Freight (SIC 4412).

b. Deep Sea Domestic Transportation of Freight (SIC 4424).

c. Freight Transportation on the Great Lakes—St. Lawrence Seaway (SIC 4432).

d. Water Transportation of Freight, Not Elsewhere Classified (SIC 4449). Including: canal barge operations; canal freight transportation; intracoastal

freight transportation lake freight transportation, except on the Great Lakes; log rafting and towing; river freight transportation, except on the St. Lawrence Seaway; and transportation of freight on bays and sounds of the oceans.

e. Deep Sea Transportation of Passengers, Except by Ferry (SIC 4481).

f. Ferries (SIC 4482). Including: car lighters (ferries); and railroad ferries.

g. Water Transportation of Passengers, Not Elsewhere Classified (SIC 4489). Including: airboats (swamp buggy rides); excursion boat operations; passenger water transportation on rivers and canals; sightseeing boats; and water taxis.

h. Marine Cargo Handling (SIC 4491). Including: docks, including buildings and facilities; loading vessels; marine cargo handling; piers, including buildings and facilities; ship hold cleaning; stevedoring; unloading vessels; and waterfront terminal operation.

i. Towing and Tugboat Services (SIC 4492). Including: docking of ocean vessels; shifting of floating equipment within harbors; towing services, marine; tugboat service; and undocking of ocean vessels.

j. Marinas (SIC 4493).[97] Including: boat yards, storage and incidental repair; and yacht basins.

k. Water Transportation Services, Not Elsewhere Classified (SIC 4499). Including: boat cleaning; boat hiring, except pleasure; boat livery, except pleasure; boat rental, commercial; canal operation; cargo salvaging, from distressed vessels; chartering of commercial boats; dismantling ships; lighterage; marine railways for drydocks; marine salvaging; marine surveyors, except cargo; marine wrecking, ships for scrap; piloting vessels in and out of harbors; ship cleaning, except hold cleaning; ship registers: survey and classification of ships and marine equipment; and steamship leasing.

2. Pollutants Found in Storm Water Discharges

Table Q–1 lists potential pollutant source activities that commonly take place at water transportation vehicle maintenance and equipment cleaning operations.

TABLE Q–1.—INDUSTRIAL ACTIVITIES, POLLUTANT SOURCES, AND POLLUTANTS

Activity	Pollutant source	Pollutant
Pressure Washing	Wash water	Paint solids, heavy metals, suspended solids.
Surface Preparation Paint Removal Sanding	Sanding; mechanical grinding; abrasive blasting; paint stripping.	Spent abrasives, paint solids, heavy metals, solvents, dust.
Painting	Paint and paint thinner spills; spray painting; paint stripping; sanding; paint cleanup.	Paint solids, spent solvents, heavy metals, dust.
Engine Maintenance and Repairs	Parts cleaning; waste disposal of greasy rags, used fluids, and batteries; use of cleaners & degreasers; fluid spills; fluid replacement.	Spent solvents, oil, heavy metals, ethylene glycol, acid/alkaline wastes, detergents.
Material Handling: Transfer Storage Disposal	Fueling: spills; leaks; and hosing area	Fuel, oil, heavy metals.
	Liquid Storage in Above Ground Storage: spills and overfills; external corrosion; failure of piping systems.	Fuel, oil, heavy metals, material being stored.
	Waste Material Storage and Disposal: paint solids; solvents; trash; spent abrasives, petroleum products.	Paint solids, heavy metals, spent solvents, oil.
Shipboard Processes improperly discharged to storm sewer or into receiving water.	Process & cooling water; sanitary waste; bilge & ballast water.	Biochemical oxygen demand (BOD), bacteria, suspended solids, oil, fuel.

Sources: EPA, Office of Water and Hazardous Materials. December 1979. ''Draft Development Document for Proposed Effluent Limitations Guidelines and Standards for the Shipbuilding and Repair Industry.'' EPA/440/1–79/076–b.

University of South Alabama, College of Engineering. September 1992. ''Best Management Practices for the Shipbuilding and Repair Industry and for Bridge Maintenance Activities.'' College of Engineering Report No. 92–2.

NPDES Storm Water Group Applications—Part 1. Received by EPA March 18, 1991, through December 31, 1992.

EPA, Office of Research and Development. October 1991. ''Guides to Pollution Prevention—The Automotive Refinishing Industry.'' EPA/625/7–91/016.

EPA, Office of Research and Development. October 1991. ''Guides to Pollution Prevention—The Automotive Repair Industry.'' EPA/625/7–91/013.

EPA, Office of Research and Development. May 1992. ''Facility Pollution Prevention Guide.'' EPA/600/R–92/088.

EPA, Office of Water. September 1992. ''Storm Water Management for Industrial Activities—Developing Pollution Prevention Plans and Best Management Practices.'' EPA 832–R–92–006.

U.S. Postal Service. May 1992. ''NPDES/Storm Water Guide.'' AS–554.

Based on the similarities of the facilities included in this sector in terms of industrial activities and significant materials, EPA believes it is appropriate to discuss the potential pollutants at water transportation facilities having vehicle maintenance and/or equipment cleaning operations as a whole and not subdivide this sector. Therefore, Table Q–2 lists data for selected parameters from facilities in the water transportation sector. These data include the eight pollutants that all facilities were required to monitor for under Form 2F, as well as the pollutants that EPA determined merit further monitoring.

[97] ''Guidelines for the Determination of Regulatory Status of Marinas and Related Operations.'' Facilities that are ''primarily engaged'' in operating marinas are best classified as SIC 4493—marinas. These facilities rent boat skips, store boats and generally perform a range of other marine services including boat cleaning and incidental boat repair. They frequently sell food, fuel, fishing supplies and may sell boats. For facilities classified as 4493 that are involved in vehicle (vessel) maintenance activities (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication) or equipment cleaning operations, those portions of the facility that are involved in such vehicle maintenance activities are considered to be associated with industrial activity and are covered under the storm water regulations.

Facilities classified as 4493 that are not involved in equipment cleaning or vessel maintenance activities (including vehicle rehabilitation, mechanical repairs, painting, and lubrication) are not intended to be covered under 40 CFR Section 122.26(b)(14)(viii) of the storm water permit application regulations. The retail sale of fuel alone at marinas, without any other vessel maintenance or equipment cleaning operations, is not considered to be grounds for coverage under the storm water regulations.

TABLE Q–2.—STATISTICS FOR CONVENTIONAL POLLUTANTS AND STORM WATER [i] (IN mg/L UNLESS OTHERWISE INDICATED)

Pollutant Sample type	No. of Facilities		No. of Samples		Mean		Minimum		Maximum		Median		95th Percentile		99th Percentile	
	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp	Grab	Comp
BOD_5	15	14	15	14	8.6	6.0	0.0	0.0	39.0	11.0	7.0	6.0	36.3	13.4	76.3	18.7
COD	15	14	15	14	130.9	75.8	0.0	10.0	500.0	203.0	93.0	50.5	588	254.8	1327.6	496.8
Nitrate + Nitrite Nitrogen	15	14	15	14	4.23	0.66	0.00	0.00	54.00	1.61	0.60	0.65	8.61	1.89	23.9	3.07
Total Kjeldahl Nitrogen	15	14	15	14	2.64	9.41	0.00	0.00	16.00	118.00	1.60	0.75	9.72	16.96	20.67	51.31
Oil & Grease	15	N/A	15	N/A	11.9	N/A	0.0	N/A	96.0	N/A	2.0	N/A	40.9	N/A	109.9	N/A
pH (s.u)	15	11	15	N/A	N/A	N/A	4.1	N/A	8.8	N/A	7.0	N/A	9.5	N/A	10.8	N/A
Total Phosphorus	15	14	15	14	0.27	0.15	0.00	0.00	1.20	0.32	0.10	0.17	1.32	0.51	3.19	.90
Total Suspended Solids	15	14	15	14	634	224	3	5	4330	944	135	68	3906	1116	1635.2	3351
Aluminum	4	3	4	3	3.1	2.2	0.2	0.2	6.3	5.4	3.0	1.0	24.4	14.2	81.2	40.9
Iron	4	3	4	3	26.7	5.0	0.2	0.4	94.0	8.9	6.3	5.7	N/A	40.6	40.9	122.8
Lead	4	3	4	3	0.2	0.1	0.0	0.0	0.7	0.1	0.1	0.1	N/A	.1	N/A	0.2
Zinc	4	3	4	3	0.7	0.4	0.1	0.2	2.2	0.9	0.2	0.2	N/A	1.3	N/A	2.4

[i] Mean, Maximum, Minimum, Median, and Percentiles include all detects and nondetects.
[ii] Composite samples.
Note: There is no information for 95th percentile columns.

3. Options for Controlling Pollutants

The measures commonly implemented to reduce pollutants in storm water associated with water transportation vehicle maintenance and/or equipment cleaning operations are generally simple to implement and are uncomplicated practices. Table Q–3 identifies Best Management Practices (BMPs) associated with different activities that routinely take place at water transportation facilities with vehicle maintenance and equipment cleaning operations.

TABLE Q–3.—INDUSTRIAL ACTIVITIES AND POTENTIAL BEST MANAGEMENT PRACTICES

Activity	BMPs
Pressure washing	Collect discharge water and remove all visible solids before discharging to a sewer system, or where permitted, to a drainage system, or receiving water. Perform pressure washing only in designated areas where wash water containment can be effectively achieved. Use no detergents or additives in the pressure wash water. Direct deck drainage to a collection system sump for settling and/or additional treatment. Implement diagonal trenches or berms and sumps to contain and collect wash water at marine railways. Use solid decking, gutters, and sumps at lift platforms to contain and collect wash water for possible reuse.
Surface preparation, sanding, and paint removal.	Enclose, cover, or contain blasting and sanding activities to the extent practical to prevent abrasives, dust, and paint chips from reaching storm sewers or receiving water. Where feasible, cover drains, trenches, and drainage channels to prevent entry of blasting debris to the system. Prohibit uncontained blasting or sanding activities performed over open water. Prohibit blasting or sanding activities performed during windy conditions which render containment ineffective. Inspect and clean sediment traps to ensure the interception and retention of solids prior to entering the drainage system. Sweep accessible areas of the drydock to remove debris and spent sandblasting material prior to flooding. Collect spent abrasives routinely and store under a cover to await proper disposal.
Painting	Enclose, cover, or contain painting activities to the maximum extent practical to prevent overspray from reaching the receiving water. Prohibit uncontained spray painting activities over open water. Prohibit spray painting activities during windy conditions which render containment ineffective. Mix paints and solvents in designated areas away from drains, ditches, piers, and surface waters, preferably indoors or under cover. Have absorbent and other cleanup items readily available for immediate cleanup of spills. Allow empty paint cans to dry before disposal. Keep paint and paint thinner away from traffic areas to avoid spills. Recycle paint, paint thinner, and solvents. Train employees on proper painting and spraying techniques, and use effective spray equipment that delivers more paint to the target and less overspray.
Drydock maintenance	Clean and maintain drydock on a regular basis to minimize the potential for pollutants in the storm water runoff. Sweep accessible areas of the drydock to remove debris and spent sandblasting material prior to flooding. If hosing must be used as a removal method, collect wash water to remove solids and potential metals. Clean the remaining areas of the dock after a vessel has been removed and the dock raised. Remove and properly dispose of floatable and other low-density waste (wood, plastic, insulations, etc.).
Drydocking	Use plastic barriers beneath the hull, between the hull and drydock walls for containment. Use plastic barriers hung from the flying bridge of the drydock, from the bow or stern of the vessel, or from temporary structures for containment.

TABLE Q–3.—INDUSTRIAL ACTIVITIES AND POTENTIAL BEST MANAGEMENT PRACTICES—Continued

Activity	BMPs
Nondrydock containment	Weight the bottom edge of the containment tarpaulins or plastic sheeting during a light breeze. Use plywood and/or plastic sheeting to cover open areas between decks when sandblasting (scuppers, railings, freeing ports, ladders, and doorways). Install tie rings or cleats, cable suspension systems, or scaffolding to make implementation containment easier. Hang tarpaulin from the boat, fixed, or floating platforms to reduce pollutants transported by wind. Pave or tarp surfaces under marine railways. Clean railways before the incoming tide. Haul vessels beyond the high tide zone before work commences or halt work during high tide. Place plastic sheeting or tarpaulin underneath boats to contain and collect waste and spent materials and clean and sweep regularly to remove debris. Use fixed or floating platforms with appropriate plastic or tarpaulin barriers as work surfaces and for containment when work is performed on a vessel in the water to prevent blast material or paint overspray from contacting storm water or the receiving water. Sweep, rather than hose, debris present on the dock.
Engine maintenance and repairs	Maintain an organized inventory of materials used in the maintenance shop. Dispose of greasy rag, oil filters, air filters, batteries, spent coolant, and degreasers properly. Label and track the recycling of waste material (i.e., used oil, spent solvents, batteries). Drain oil filters before disposal or recycling. Store cracked batteries in a nonleaking secondary container. Promptly transfer used fluids to the proper container; do not leave full drip pans or other open containers around the shop. Empty and clean drip pans and containers. Do not pour liquid waste down floor drains, sinks, or outdoor storm drain inlets. Plug floor drains that are connected to the storm or sanitary sewer; if necessary, install a sump that is pumped regularly. Inspect the maintenance area regularly for proper implementation of control measures. Train employees on proper waste control and disposal procedures.
Material Handling: Bulk liquid storage and containment.	Store permanent tanks in a paved area surrounded by a dike system which provides sufficient containment for the larger of either 10 percent of the volume of all containers or 110 percent of the volume of the largest tank. Maintain good integrity of all storage tanks. Inspect storage tanks to detect potential leaks and perform preventive maintenance. Inspect piping systems (pipes, pumps, flanges, couplings, hoses, valves) for failures or leaks. Train employees on proper filling and transfer procedures.
Material Handling: Containerized material storage.	Store containerized materials (fuels, paints, solvents, etc.) in a protected, secure location and away from drains. Store reactive, ignitable, or flammable liquids in compliance with the local fire code. Identify potentially hazardous materials, their characteristics, and use. Control excessive purchasing, storage, and handling of potentially hazardous materials. Keep records to identify quantity, receipt date, service life, users, and disposal routes. Secure and carefully monitor hazardous materials to prevent theft, vandalism, and misuse of materials. Educate personnel for proper storage, use, cleanup, and disposal of materials. Provide sufficient containment for outdoor storage areas for the larger of either 10 percent of the volume of all containers or 110 percent of the volume of the largest tank. Use temporary containment where required by portable drip pans. Use spill troughs for drums with taps.
Material Handling	Mix paints and solvents in designated areas away from drains, ditches, piers, and surface waters. Locate designated areas preferably indoors or under a shed.
Designated material mixing areas	If spills occur, • Stop the source of the spill immediately. • Contain the liquid until cleanup is complete. • Deploy oil containment booms if the spill may reach the water. • Cover the spill with absorbent material. • Keep the area well ventilated. • Dispose of cleanup materials properly. • Do not use emulsifier or dispersant.
Shipboard process water handling	Keep process and cooling water used aboard ships separate from sanitary wastes to minimize disposal costs for the sanitary wastes. Keep process and cooling water from contact with spent abrasives and paint to avoid discharging these pollutants. Inspect connecting hoses for leaks.
Shipboard sanitary waste disposal	Discharge sanitary wastes from the ship being repaired to the yard's sanitary system or dispose of by a commercial waste disposal company. Use appropriate material transfer procedures, including spill prevention and containment activities.
Bilge and Ballast water	Collect and dispose of bilge and ballast waters which contain oils, solvents, detergents, or other additives to a licensed waste disposal company.

Sources: University of South Alabama, College of Engineering. September 1992. ''Best Management Practices for the Shipbuilding and Repair Industry and for Bridge Maintenance Activities.'' College of Engineering Report No. 92–2.

NPDES Storm Water Group Applications—Part 1. Received by EPA March 18, 1991 through December 31, 1992.
EPA, Office of Water. January 1993. ''Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters.'' 840–B–92–002.

4. Pollutant Control Measures Required Through Other EPA Programs

EPA recognizes that the Resource Conservation and Recovery Act (RCRA) and the Underground Storage Tank (UST) programs require careful management of materials used at Water Transportation Facilities and Boat Building & Repairing Facilities.

Under the RCRA program, on September 10, 1992, EPA promulgated standards in 40 CFR Part 279 for the management of used oils that are recycled (57 FR 41566). These standards include requirements for used oil generators, transporters, processors/re-refiners, and burners. The standards for used oil generators apply to all generators, regardless of the amount of used oil they generate. Do-it-yourself (DIY) generators which generate used oil from the maintenance of their personal vehicles, however, are not subject to the management standards (Section 279.20(a)(1)).

The requirements for used oil generators were designed to impose a minimal burden on generators while protecting human health and the environment from the risks associated with managing used oil. Under Subpart C of 40 CFR Part 279, used oil generators must not store used oil in units other than tanks, containers, or units subject to regulation under Part 264 or 265 of 40 CFR (Section 279.22(a)). In other words, generators may store used oil in tanks or containers that are not subject to Subpart J (Hazardous Waste Tanks) or Subpart I (Containers) of Parts 264/265, as long as such tanks or containers are maintained in compliance with the used oil management standards. This does not preclude generators from storing used oil in Subpart J tanks or Subpart I containers or other units, such as surface impoundments (Subpart K), that are subject to regulation under Part 264 or 265.

Storage units at generator facilities must be maintained in good condition and labeled with the words ''used oil.'' Upon detection of a release of used oil to the environment, a generator must take steps to stop the release, contain the released used oil, and properly manage the released used oil and other materials (Section 279.22(b) to (d)). Generators storing used oil in underground storage tanks are subject to the UST regulations (40 CFR Part 280).

If used oil generators ship used oil offsite for recycling, they must use a transporter who has notified EPA and obtained an EPA identification number (Section 279.24).

The technical standards for USTs at 40 CFR Part 280 require that new UST systems (defined as systems for which installation commenced after December 12, 1988) use overfill prevention equipment that will: (1) Automatically shut off flow into the tank when the tank is no more than 95 percent full; or (2) alert the transfer operator when the tank is no more than 90 percent full by restricting the flow into the tank or triggering a high level alarm. The preceding requirements do no apply to systems that are filled by transfers of no more than 25 gallons at one time. Existing UST systems (defined as systems for which installation has commenced on or before December 12, 1988) are required to have installed the described overfill prevention equipment by December 12, 1998.

5. Special Conditions

a. Prohibition of Non-storm Water Discharges. In addition to the non-storm water discharges prohibited in part III.A of the permit, this section specifically prohibits the following: bilge and ballast water, pressure wash water, sanitary wastes, and cooling water originating from vessels are not authorized by this section. The operators of such discharges must obtain coverage under a separate NPDES permit if discharged to waters of the U.S. or through a municipal separate storm sewer system. Certain non-storm water discharges, however, may be authorized by this permit. Part III.A.2 of today's permit lists these discharges.

This section does not authorize the non-storm water discharge of pressure wash water. Pressure washing is used to remove marine growth from vessels. EPA has found that unpermitted releases of pressure wash water is a habitual problem at water transportation facilities. Marine growths and paint debris found in the wash water can contain significant quantities of heavy metals, and this water cannot be discharged.

6. Storm Water Pollution Prevention Plan Requirements

The conditions that apply to water transportation facilities with vehicle maintenance and/or equipment cleaning operations build upon the requirements set forth in the baseline conditions permit for storm water discharges from industrial activities discussed previously.

a. Contents of the Plan.

(1) Description of Potential Pollutant Sources.

Under the description of potential pollutant sources in the storm water pollution prevention plan requirements, permittees are required to include the location(s) on their facility site map where engine maintenance and repair work, vessel maintenance and repair work, and pressure washing are performed. This requirement is the same as the permit conditions listed in the front section of this factsheet, which are based on the baseline general permit of September 9, 1992 Here it is expressed in more appropriate terms for the water transportation industry. The baseline general permit includes ''vehicle and equipment maintenance and/or cleaning areas.'' The language ''processing areas'', as described under the baseline general permit, has been specified to include painting, blasting, welding, and metal fabrication for this section. EPA believes that this specificity is appropriate for the water transportation industry and that these areas may potentially be a significant source of pollutants to storm water. Rather than requiring the location of ''storage areas'' as in the baseline general permit, this storm water pollution prevention plan specifies that the location of liquid storage areas (i.e., paint, solvents, resins) and material storage areas (i.e., blasting media, aluminum, steel) be shown. This again is the same requirement, but it is expressed in more specific terms for this industry. In addition, the site map must also indicate the outfall locations and the types of discharges contained in the drainage areas of the outfalls (e.g. storm water and air conditioner condensate). In order to increase the readability of the map, the inventory of the types of discharges contained in each outfall may be kept as an attachment to the site map.

(2) Measures and Controls.

Under the description of measures and controls in the storm water pollution prevention plan requirements, this section requires that all areas that may contribute pollutants to storm waters discharges shall be maintained in a clean, orderly manner. This section also requires that the following areas must be specifically addressed:

(a) Pressure Washing Area—When pressure washing is used to remove

marine growth from vessels, the discharge water must be permitted by an NPDES permit. The plan must describe the measures to collect or contain the discharge from the pressure washing area, detail the method for the removal of the visible solids, describe the method of disposal of the collected solids, and identify where the discharge will be released (i.e., the receiving waterbody, storm sewer system, sanitary sewer system).

(b) Blasting and Painting Areas—The facility must consider containing all blasting and painting activities to prevent abrasives, paint chips, and overspray from reaching the receiving water or the storm sewer system. The plan must describe measures taken at the facility to prevent or minimize the discharge of spent abrasive, paint chips, and paint into the receiving waterbody and storm sewer system. The facility may consider hanging plastic barriers or tarpaulins during blasting or painting operations to contain debris. Where required, a schedule for cleaning storm systems to remove deposits of abrasive blasting debris and paint chips should be addressed within the plan. The plan should include any standard operating practices with regard to blasting and painting activities. Such included items may be the prohibition of performing uncontained blasting and painting over open water or blasting and painting during windy conditions which can render containment ineffective.

(3) Material Storage Areas—All stored and containerized materials (fuels, paints, solvents, waste oil, antifreeze, batteries) must be stored in a protected, secure location away from drains and plainly labeled. The plan must describe measures that prevent or minimize contamination of the storm water runoff from such storage areas. The facility must specify which materials are stored indoors and consider containment or enclosure for materials that are stored outdoors. Above ground storage tanks, drums, and barrels permanently stored outside must be delineated on the site map with a description of the containment measures in place to prevent leaks and spills. The facility must consider implementing an inventory control plan to prevent excessive purchasing, storage, and handling of potentially hazardous materials. Those facilities where abrasive blasting is performed must specifically include a discussion on the storage and disposal of spent abrasive materials generated at the facility.

(d) Engine Maintenance and Repair Areas—The plan must describe measures that prevent or minimize contamination of the storm water runoff from all areas used for engine maintenance and repair. The facility may consider performing all maintenance activities indoors, maintaining an organized inventory of materials used in the shop, draining all parts of fluids prior to disposal, prohibiting the practice of hosing down the shop floor, using dry cleanup methods, and/or collecting the storm water runoff from the maintenance area and providing treatment or recycling.

(e) Material Handling Areas—The plan must describe measures that prevent or minimize contamination of the storm water runoff from material handling operations and areas (i.e., fueling, paint & solvent mixing, disposal of process wastewater streams from vessels). The facility may consider covering fueling areas; using spill and overflow protection; mixing paints and solvents in a designated area, preferably indoors or under a shed; and minimizing runon of storm water to material handling areas. Where applicable, the plan must address the replacement or repair of leaking connections, valves, pipes, hoses, and soil chutes carrying wastewater from vessels.

(f) Drydock Activities—The plan must address the routine maintenance and cleaning of the drydock to minimize the potential for pollutants in the storm water runoff. The plan must describe the procedures for cleaning the accessible areas of the drydock prior to flooding and final cleanup after the vessel is removed and the dock is raised. Cleanup procedures for oil, grease, or fuel spills occurring on the drydock must also be included within the plan. The facility should consider items such as sweeping rather than hosing off debris and spent blasting material from the accessible areas of the drydock prior to flooding and having absorbent materials and oil containment booms readily available to contain and cleanup any spills.

(g) General Yard Area—The plan must include a schedule for routine yard maintenance and cleanup. Scrap metal, wood, plastic, miscellaneous trash, paper, glass, industrial scrap, insulation, welding rods, packaging, etc., must be routinely removed from the general yard area. The facility may consider such measures as providing covered trash receptacles in each yard, on each pier, and on board each vessel being repaired.

These seven areas are the common sources of pollutants in storm water runoff from water transportation facilities which have vehicle maintenance and/or equipment cleaning activities. Based upon the September 1992 ''Best Management Practices for the Shipbuilding and Repair Industry and for Bridge Maintenance Activities'' prepared by the College of Engineering at the University of South Alabama, the suggested management measures are commonly used at water transportation facilities. EPA believes that the incorporation of management practices such as those suggested will substantially reduce the potential that these activities and areas will significantly contribute to the pollution of storm water discharges. In addition, EPA believes that these requirements continue to provide the necessary flexibility to address the variable risk for pollutants in storm water discharges associated with different facilities. Further, many facilities will find that management measures that they have already incorporated into the facility's operation, such as the installation of overfill protection equipment and labelling and maintenance of used oil storage units, that are already required under existing EPA programs will meet the requirements of this section.

Under the preventive maintenance requirements of the storm water pollution prevention plan elements, the plan specifically includes the routine inspection of sediment traps to ensure that spent abrasives, paint chips, and solids will be intercepted and retained prior to entering the storm drainage system. Because of the nature of operations such as abrasive blasting which occur at water transportation facilities, specific routine attention needs to be placed on the collection and proper disposal of spent abrasive materials, paint chips, and other solids.

Under the inspection requirements of the storm water pollution prevention plan elements, qualified facility personnel shall be identified to inspect designated equipment and areas of the facility, at a minimum, on a monthly basis. The following areas shall be included in all inspections: pressure washing area, blasting and painting areas, material storage areas, engine maintenance and repair areas, material handling areas, drydock area, and general yard area. A set of tracking or follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records shall be maintained.

The purpose of the inspections is to check on the implementation of the storm water pollution prevention plan. The inspections allow facility personnel to monitor the success or failure of elements of the plan on a regular basis. The use of an inspection checklist is highly encouraged. The checklist will ensure that all required areas are

inspected, as well as help to meet the record keeping requirements.

Under the employee training component of the storm water pollution prevention plan requirements, the permittee is required to identify at least annual (once per year) dates for such training. Employee training must, at a minimum address the following areas when applicable to a facility: used oil management; spent solvent management; proper disposal of spent abrasives; proper disposal of vessel wastewaters, spill prevention and control; fueling procedures; general good housekeeping practices; proper painting and blasting procedures; and used battery management. Employees, independent contractors, and customers must be informed about BMPs and be required to perform in accordance with these practices. The facility must consider posting easy to read descriptions or graphic depictions of BMPs and emergency phone numbers in the work areas. Unlike some industrial operations, the industrial activities associated with water transportation facilities that may affect storm water quality require the cooperation of all employees. EPA, therefore, is requiring that employee training take place at least once a year to serve as: (1) Training for new employees; (2) a refresher course for existing employees; (3) training for all employees on any storm water pollution prevention techniques recently incorporated into the plan; and (4) a forum for the facility to invite independent contractors and customers to inform them on pollution prevention procedures and requirements.

Monitoring and Reporting Requirements

a. Analytical Monitoring Requirements. Under the revised methodology for determining pollutants of concern for the various industrial sectors water transportation facilities must perform analytical monitoring. Facilities must collect and analyze samples of their storm water discharges for the pollutants listed in Table Q–4. The median levels of the pollutants listed in Table Q–4 were found to be above benchmark levels for water transportation facilities that submitted quantitative data in the group application process. EPA is requiring monitoring after the pollution prevention plan has been implemented to ensure that a reduction of pollutants is realized.

At a minimum, storm water discharges from water transportation facilities must be monitored quarterly during the second year of permit coverage. Samples must be collected at least once in each of the following periods: January through March; April through June; July through September; and October through December. At the end of the second year of permit coverage, a facility must calculate the average concentration for each parameter listed in Table Q–4. If the permittee collects more than four samples in this period, then they must calculate an average concentration for each pollutant of concern for all samples analyzed.

TABLE Q–4.—INDUSTRY MONITORING REQUIREMENTS

Pollutants of concern	Cut-off concentration
Total Recoverable Aluminum	0.75 mg/L.
Total Recoverable Iron	1.0 mg/L.
Total Recoverable Lead	0.0816 mg/L.
Total Recoverable Zinc	0.065 mg/L.

If the average concentration for a parameter is less than or equal to the value listed in Table Q–4, then the permittee is not required to conduct quantitative analysis for that parameter during the fourth year of the permit. If, however, the average concentration for a parameter is greater than the cut-off concentration listed in Table Q–4, then the permittee is required to conduct quarterly monitoring for that parameter during the fourth year of permit coverage. Monitoring is not required during the first, third, and fifth year of the permit. The exclusion from monitoring in the fourth year of the permit is conditional on the facility maintaining industrial operations and BMPs that will ensure a quality of storm water discharges consistent with the average concentrations recorded during the second year of the permit. The schedule of monitoring is presented in Table Q–5.

TABLE Q–5.—SCHEDULE OF MONITORING

2nd Year of Permit Coverage	• Conduct quarterly monitoring. • Calculate the average concentration for all parameters analyzed during this period. • If average concentration is greater than the value listed in Table Q–5, then quarterly sampling is required during the fourth year of the permit. • If average concentration is less than or equal to the value listed in Table Q–5, then no further sampling is required for that parameter.
4th Year of Permit Coverage	• Conduct quarterly monitoring for any parameter where the average concentration in year 2 of the permit is greater than the value listed in Table Q–5. • If industrial activities or the pollution prevention plan have been altered such that storm water discharges may be adversely affected, quarterly monitoring is required for all parameters of concern.

In cases where the average concentration of a parameter exceeds the cut-off concentration, EPA expects permittees to place special emphasis on methods for reducing the presence of those parameters in storm water discharges. Quarterly monitoring in the fourth year of the permit will reassess the effectiveness of the adjusted pollution prevention plan.

EPA realizes that if a facility is inactive and unstaffed it may be difficult to collect storm water discharge samples when a qualifying event occurs. Today's final permit has been revised so that inactive, unstaffed facilities can exercise a waiver of the requirement to conduct quarterly chemical sampling.

b. Alternative Certification. Throughout today's permit, EPA has included monitoring requirements for facilities which the Agency believes have the potential for contributing significant levels of pollutants to storm water discharges. The alternative described below is necessary to ensure that monitoring requirements are only imposed on those facilities that do, in fact, have storm water discharges containing pollutants at concentrations of concern. EPA has determined

that if materials and activities are not exposed to storm water at the site, then the potential for pollutants to contaminate storm water discharges does not warrant monitoring.

Therefore, a discharger is not subject to the monitoring requirements of this Part provided the discharger makes a certification for a given outfall, on a pollutant-by-pollutant basis in lieu of monitoring reports required under paragraph *c* below under penalty of law, signed in accordance with Part VII.G. (Signatory Requirements), that material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, industrial machinery or operations, significant materials from past industrial activity, that are located in areas of the facility that are within the drainage area of the outfall are not presently exposed to storm water and will not be exposed to storm water for the certification period. Such certification must be retained in the storm water pollution prevention plan and submitted to EPA. In the case of certifying that a pollutant is not present, the permittee must submit the certification along with the monitoring reports required under paragraph (*c*) below. If the permittee cannot certify for an entire period, they must submit the date exposure was eliminated and any monitoring required up until that date. This certification option is not applicable to compliance monitoring requirements associated with effluent limitations. EPA does not expect facilities to be able to exercise this certification for indicator parameters, such as TSS and BOD.

c. Reporting Requirements. Permittees are required to submit all monitoring results obtained during the second and fourth year of permit coverage within 3 months of the conclusion of each year. For each outfall, one signed Discharge Monitoring Report Form must be submitted per storm event sampled. For facilities conducting monitoring beyond the minimum requirements an additional Discharge Monitoring Report Form must be filed for each analysis. The permittee must include a measurement or estimate of the total precipitation, volume of runoff, and peak flow rate of runoff for each storm event sampled.

d. Sample Type. All discharge data shall be reported for grab samples. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. The required 72-hour storm event interval is waived where the preceding measurable storm event did not result in a measurable discharge from the facility. The required 72-hour storm event interval may also be waived where the permittee documents that less than a 72-hour interval is representative for local storm events during the season when sampling is being conducted. The grab sample shall be taken during the first 30 minutes of the discharge. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the discharger shall submit with the monitoring report a description of why a grab sample during the first 30 minutes was impracticable. If storm water discharges associated with industrial activity commingle with process or nonprocess water, then where practicable permittees must attempt to sample the storm water discharge before it mixes with the non-storm water discharge.

e. Representative Discharge. When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may test the effluent of one of such outfalls and report that the quantitative data also applies to the substantially identical outfall(s) provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explains in detail why the outfalls are expected to discharge substantially identical effluent. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area [e.g., low (under 40 percent), medium (40 to 65 percent), or high (above 65 percent)] shall be provided in the plan.

f. Quarterly Visual Examination of Storm Water Quality. Quarterly visual examinations of storm water discharges from each outfall are required at water transportation facilities. The examination must be of a grab sample collected from each storm water outfall. The examination of storm water grab samples shall include any observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, or other obvious indicators of storm water pollution. The examination must be conducted in a well lit area. No analytical tests are required to be performed on these samples.

The examination must be made at least once in each of the designated periods during daylight unless there is insufficient rainfall or snow-melt to runoff. Where practicable, the same individual should carry out the collection and examination of discharges throughout the life of the permit to ensure the greatest degree of consistency possible. Grab samples shall be collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed 60 minutes) of when the runoff begins discharging. Reports of the visual examination include: the examination date and time, examination personnel, visual quality of the storm water discharge, and probable sources of any observed storm water contamination. The visual examination reports must be maintained onsite with the pollution prevention plan. The visual examination must be conducted in each of the following periods: January through March; April through June; July through September; and October through December.

When a discharger is unable to collect samples over the course of the visual examination period as a result of adverse climatic conditions, the discharger must document the reason for not performing the visual examination and retain such documentation on-site with the results of the visual examinations. Adverse weather conditions which may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

EPA realizes that if a facility is inactive and unstaffed it may be difficult to collect storm water discharge samples when a qualifying event occurs. Today's final permit has been revised so that inactive, unstaffed facilities can exercise a waiver of the requirement to conduct quarterly visual examination.

EPA believes that this quick and simple assessment will allow the permittee to approximate the effectiveness of his/her plan on a regular basis at very little cost. Although the visual examination cannot assess the chemical properties of the storm water discharged from the site, the examination will provide meaningful

results upon which the facility may act quickly. The frequency of this visual examination will also allow for timely adjustments to be made to the plan. If BMPs are performing ineffectively, corrective action must be implemented. A set of tracking or follow-up procedures must be used to ensure that appropriate actions are taken in response to the inspections. The visual examination is intended to be performed by members of the pollution prevention team. This hands-on examination will enhance the staff's understanding of the storm water problems on that site and the effects of the management practices that are included in the plan.

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Sector Q

Water Transportation Facilities That Have Vehicle Maintenance Shops and/or Equipment Cleaning Operations Permit Language

The Permit Language section contains sector-specific requirements for each industrial sector, including:

- Discharges covered under the sector;
- Special Conditions
- Storm Water Pollution Prevention Plan Requirements;
- Numeric Effluent Limitations, if any; and
- Monitoring and Reporting Requirements.

Further guidance and discussion can be found in the Fact Sheet associated with this sector.

Q. Storm Water Discharges Associated With Industrial Activity From Water Transportation Facilities That Have Vehicle Maintenance Shops and/or Equipment Cleaning Operations

1. Discharges Covered Under This Section

The requirements listed under this section shall apply to storm water discharges from water transportation facilities that have vehicle (vessel) maintenance shops and/or equipment cleaning operations. The water transportation industry includes facilities engaged in foreign or domestic transport of freight or passengers in deep sea or inland waters; marine cargo handling operations; ferry operations; towing and tugboat services; and marinas (facilities commonly identified by Standard Industrial Classification (SIC) code Major Group 44).

When an industrial facility, described by the above coverage provisions of this section, has industrial activities being conducted onsite that meet the description(s) of industrial activities in another section(s), that industrial facility shall comply with any and all applicable monitoring and pollution prevention plan requirements of the other section(s) in addition to all applicable requirements in this section. The monitoring and pollution prevention plan terms and conditions of this multi-sector permit are additive for industrial activities being conducted at the same industrial facility (co-located industrial activities). The operator of the facility shall determine which other monitoring and pollution prevention plan section(s) of this permit (if any) are applicable to the facility.

2. Special Conditions

a. Prohibition of Non-storm Water Discharges. In addition to the general discharge prohibitions in part III.A, this section specifically prohibits non-storm water discharges of wastewaters, such as bilge and ballast water, sanitary wastes, pressure wash water, and cooling water originating from vessels. The operators of such discharges must obtain coverage under a separate NPDES permit if discharged to waters of the United States or through a municipal separate storm sewer system.

3. Storm Water Pollution Prevention Plan Requirements

a. Contents of Plan. The plan shall include, at a minimum, the following items:

(1) Pollution Prevention Team. Each plan shall identify a specific individual or individuals within the facility organization as members of a storm water Pollution Prevention Team who are responsible for developing the storm water pollution prevention plan and assisting the facility or plant manager in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's storm water pollution prevention plan.

(2) Description of Potential Pollutant Sources. Each plan shall provide a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges or which may result in the discharge of pollutants during dry weather from separate storm sewers draining the facility. Each plan shall identify all activities and significant materials which may potentially be significant pollutant sources. Each plan shall include, at a minimum:

(a) Drainage.

(i) A site map indicating an outline of the portions of the drainage area of each storm water outfall that are within the facility boundaries, each existing structural control measure to reduce pollutants in storm water runoff, surface water bodies, locations where significant materials are exposed to precipitation, locations where major spills or leaks identified under Part XI.Q.3.a.(2)(c) (Spills and Leaks) of this section have occurred, and the locations of the following activities where such activities are exposed to precipitation: fueling, engine maintenance and repair, vessel maintenance and repair, pressure washing, painting, sanding, blasting, welding, metal fabrication, loading/unloading areas, locations used for the treatment, storage or disposal of wastes; liquid storage tanks, liquid storage areas (i.e., paint, solvents, resins), and material storage areas (i.e., blasting media, aluminum, steel, scrap iron). In addition, the map must indicate the outfall locations and the types of discharges contained in the drainage areas of the outfalls.

(ii) For each area of the facility that generates storm water discharges associated with industrial activity with a reasonable potential for containing significant amounts of pollutants, a prediction of the direction of flow, and an identification of the types of pollutants which are likely to be present in storm water discharges associated with industrial activity. Factors to consider include the toxicity of chemical; quantity of chemicals used, produced or discharged; the likelihood of contact with storm water; and history of significant leaks or spills of toxic or hazardous pollutants. Flows with a significant potential for causing erosion shall be identified.

(b) Inventory of Exposed Materials—An inventory of the types of materials handled at the site that potentially may be exposed to precipitation. Such inventory shall include a narrative description of significant materials that have been handled, treated, stored or disposed in a manner to allow exposure to storm water between the time of 3 years prior to the date of the submission of a Notice of Intent (NOI) to be covered under this permit and the present; method and location of onsite storage or disposal; materials management practices employed to minimize contact of materials with storm water runoff between the time of 3 years prior to the date of the submission of a Notice of Intent (NOI) to be covered under this permit and the present; the location and a description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of any treatment the storm water receives.

(c) Spills and Leaks—A list of significant spills and significant leaks of toxic or hazardous pollutants that occurred at areas that are exposed to precipitation or that otherwise drain to a storm water conveyance at the facility after the date of 3 years prior to the date of the submission of a Notice of Intent (NOI) to be covered under this permit. Such list shall be updated as appropriate during the term of the permit.

(d) Sampling Data—A summary of existing discharge sampling data describing pollutants in storm water discharges from the facility, including a summary of sampling data collected during the term of this permit.

(e) Risk Identification and Summary of Potential Pollutant Sources—A narrative description of the potential pollutant sources from the following activities if applicable: loading and unloading operations; outdoor storage activities; outdoor manufacturing or processing activities (i.e., welding, metal fabricating); significant dust or particulate generating processes (i.e., abrasive blasting, sanding, painting); loading/unloading areas; and onsite waste disposal practices. The description shall specifically list any significant potential source of pollutants at the site and for each potential source, any pollutant or pollutant parameter (e.g., biochemical oxygen demand, etc.) of concern shall be identified.

(3) Measures and Controls. Each facility covered by this permit shall develop a description of storm water management controls appropriate for the facility, and implement such controls. The appropriateness and priorities of controls in a plan shall reflect identified potential sources of pollutants at the facility. The description of storm water management controls shall address the following minimum components, including a schedule for implementing such controls:

(a) Good Housekeeping—Good housekeeping requires the maintenance of areas which may contribute pollutants to storm water discharges in a clean, orderly manner. The following areas must be specifically addressed, when applicable at a facility:

(i) Pressure Washing Area—When pressure washing is used to remove marine growth from vessels, the discharge water must be permitted by an NPDES permit. The pollution prevention plan must describe the measures to collect or contain the discharge from the pressure washing area, detail the method for the removal of the visible solids, describe the method of disposal of the collected solids, and identify where the discharge will be released (i.e., the receiving waterbody, storm sewer system, sanitary sewer system).

(ii) Blasting and Painting Areas—The facility must consider containing all blasting and painting activities to prevent abrasives, paint chips, and overspray from reaching the receiving water or the storm sewer system. The plan must describe measures taken at the facility to prevent or minimize the discharge of spent abrasive, paint chips, and paint into the receiving waterbody and storm sewer system. The facility may consider hanging plastic barriers or tarpaulins during blasting or painting operations to contain debris. Where required, a schedule for cleaning storm water conveyances to remove deposits of abrasive blasting debris and paint chips should be addressed within the plan. The plan should include any standard operating practices with regard to blasting and painting activities. Such included items may be the prohibition of performing uncontained blasting and painting over open water or blasting and painting during windy conditions which can render containment ineffective.

(iii) Material Storage Areas—All stored and containerized materials (fuels, paints, solvents, waste oil, antifreeze, batteries) must be stored in a protected, secure location away from drains and plainly labeled. The plan must describe measures that prevent or minimize contamination of the storm water runoff from such storage areas. The facility must specify which materials are stored indoors and consider containment or enclosure for materials that are stored outdoors. Above ground storage tanks, drums, and barrels permanently stored outside must be delineated on the site map with a description of the containment measures in place to prevent leaks and spills. The facility must consider implementing an inventory control plan to prevent excessive purchasing, storage, and handling of potentially hazardous materials. Those facilities where abrasive blasting is performed must specifically include a discussion on the storage and disposal of spent abrasive materials generated at the facility.

(iv) Engine Maintenance and Repair Areas—The plan must describe measures that prevent or minimize contamination of the storm water runoff from all areas used for engine maintenance and repair. The facility may consider performing all maintenance activities indoors,

maintaining an organized inventory of materials used in the shop, draining all parts of fluids prior to disposal, prohibiting the practice of hosing down the shop floor, using dry cleanup methods, and/or collecting the storm water runoff from the maintenance area and providing treatment or recycling.

(v) Material Handling Areas—The plan must describe measures that prevent or minimize contamination of the storm water runoff from material handling operations and areas (i.e., fueling, paint and solvent mixing, disposal of process wastewater streams from vessels). The facility may consider covering fueling areas; using spill and overflow protection; mixing paints and solvents in a designated area, preferably indoors or under a shed; and minimizing runon of storm water to material handling areas or other equivalent measures. Where applicable, the plan must address the replacement or repair of leaking connections, valves, pipes, hoses, and soil chutes carrying wastewater from vessels.

(vi) Drydock Activities—The plan must address the routine maintenance and cleaning of the drydock to minimize the potential for pollutants in the storm water runoff. The plan must describe the procedures for cleaning the accessible areas of the drydock prior to flooding and final cleanup after the vessel is removed and the dock is raised. Cleanup procedures for oil, grease, or fuel spills occurring on the drydock must also be included within the plan. The facility should consider items such as sweeping rather than hosing off debris and spent blasting material from the accessible areas of the drydock prior to flooding and having absorbent materials and oil containment booms readily available to contain and cleanup any spills or other equivalent measures.

(vii) General Yard Area—The plan must include a schedule for routine yard maintenance and cleanup. Scrap metal, wood, plastic, miscellaneous trash, paper, glass, industrial scrap, insulation, welding rods, packaging, etc., must be routinely removed from the general yard area. The facility may consider such measures as providing covered trash receptacles in each yard, on each pier, and on board each vessel being repaired.

(b) Preventive Maintenance—A preventive maintenance program shall involve timely inspection and maintenance of storm water management devices (e.g., cleaning oil/water separators, sediment traps to ensure that spent abrasives, paint chips, and solids will be intercepted and retained prior to entering the storm drainage system) as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems.

(c) Spill Prevention and Response Procedures—Areas where potential spills which can contribute pollutants to storm water discharges can occur, and their accompanying drainage points shall be identified clearly in the storm water pollution prevention plan. Where appropriate, specifying material handling procedures, storage requirements, and use of equipment such as diversion valves in the plan should be considered. Procedures for cleaning up spills shall be identified in the plan and made available to the appropriate personnel. The necessary equipment to implement a clean up should be available to personnel.

(d) Inspections—Qualified facility personnel shall be identified to inspect designated equipment and areas of the facility on a monthly basis. The following areas shall be included in all inspections: pressure washing area; blasting, sanding, and painting areas; material storage areas; engine maintenance and repair areas; material handling areas; drydock area; and general yard area. A set of tracking or follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections shall be maintained.

(e) Employee Training—Employee training programs shall inform personnel responsible for implementing activities identified in the storm water pollution prevention plan or otherwise responsible for storm water management at all levels of responsibility of the components and goals of the storm water pollution prevention plan. Training should address topics such as spill response, good housekeeping and material management practices. The pollution prevention plan shall identify how often training will take place, but in all cases training must be held at least annually (once per calendar year). Employee training must, at a minimum, address the following areas when applicable to a facility: used oil management; spent solvent management; proper disposal of spent abrasives; proper disposal of vessel wastewaters, spill prevention and control; fueling procedures; general good housekeeping practices; proper painting and blasting procedures; and used battery management. Employees, independent contractors, and customers must be informed about BMPs and be required to perform in accordance with these practices. The facility must consider posting instructions, easy to read descriptions or graphic depictions of BMPs, spill control/clean-up equipment and emergency phone numbers in the work areas.

(f) Recordkeeping and Internal Reporting Procedures—A description of incidents (such as spills, or other discharges), along with other information describing the quality and quantity of storm water discharges shall be included in the plan required under this part. Inspections and maintenance activities shall be documented and records of such activities shall be incorporated into the plan.

(g) Non-storm Water Discharges.

(i) The plan shall include a certification that the discharge has been tested or evaluated for the presence of non-storm water discharges. The certification shall include the identification of potential significant sources of non-storm water at the site, a description of the results of any test and/or evaluation for the presence of non-storm water discharges, the evaluation criteria or testing method used, the date of any testing and/or evaluation, and the onsite drainage points that were directly observed during the test. Certifications shall be signed in accordance with Part VII.G. of this permit. Such certification may not be feasible if the facility operating the storm water discharge associated with industrial activity does not have access to an outfall, manhole, or other point of access to the ultimate conduit which receives the discharge. In such cases, the source identification section of the storm water pollution prevention plan shall indicate why the certification required by this part was not feasible, along with the identification of potential significant sources of non-storm water at the site. A discharger that is unable to provide the certification required by this paragraph must notify the Director in accordance with paragraph XI.Q.3.a.(3)(g)(iii) (below).

(ii) Except for flows from fire fighting activities, sources of non-storm water listed in Part III.A.2 (Prohibition of Non-storm Water Discharges) of this permit that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

(iii) Failure to Certify—Any facility that is unable to provide the certification required (testing for non-storm water discharges), must notify the

Director by [Insert date 270 days after permit issuance] or, for facilities which begin to discharge storm water associated with industrial activity after [Insert date 270 days after permit issuance], 180 days after submitting an NOI to be covered by this permit. If the failure to certify is caused by the inability to perform adequate tests or evaluations, such notification shall describe: the procedure of any test conducted for the presence of non-storm water discharges; the results of such test or other relevant observations; potential sources of non-storm water discharges to the storm sewer; and why adequate tests for such storm sewers were not feasible. Non-storm water discharges to waters of the United States which are not authorized by an NPDES permit are unlawful, and must be terminated.

(h) Sediment and Erosion Control—The plan shall 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 to be used to limit erosion.

(i) Management of Runoff—The plan shall contain a narrative consideration of the appropriateness of traditional storm water management practices (practices other than those which control the generation or source(s) of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. The plan shall provide that measures that the permittee determines to be reasonable and appropriate shall be implemented and maintained. The potential of various sources at the facility to contribute pollutants to storm water discharges associated with industrial activity [see paragraph XI.Q.3.a.(2) of this section (Description of Potential Pollutant Sources)] shall be considered when determining reasonable and appropriate measures. Appropriate measures or equivalent measures may include: vegetative swales and practices, reuse of collected storm water (such as for a process or as an irrigation source), inlet controls (such as oil/water separators), snow management activities, infiltration devices, and wet detention/retention devices.

(4) Comprehensive Site Compliance Evaluation. Qualified personnel shall conduct site compliance evaluations at appropriate intervals specified in the plan, but in no case less than once a year. Such evaluations shall provide:

(a) Areas contributing to a storm water discharge associated with industrial activity (pressure washing area, blasting and sanding areas, painting areas, material storage areas, engine maintenance and repair areas, material handling areas, and drydock area) shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Measures to reduce pollutant loadings shall be evaluated to determine whether they are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. Structural storm water management measures, sediment and erosion control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure that they are operating correctly. A visual inspection of equipment needed to implement the plan, such as spill response equipment, shall be made.

(b) Based on the results of the evaluation, the description of potential pollutant sources identified in the plan in accordance with paragraph XI.Q.3.a.(2) of this section (Description of Potential Pollutant Sources) and pollution prevention measures and controls identified in the plan in accordance with paragraph XI.Q.3.a.(3) of this section (Measures and Controls) shall be revised as appropriate within 2 weeks of such evaluation and shall provide for implementation of any changes to the plan in a timely manner, but in no case more than 12 weeks after the evaluation.

(c) A report summarizing the scope of the evaluation, personnel making the evaluation, the date(s) of the evaluation, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance with paragraph XI.Q.3.a.(4)(b) (above) of the permit shall be made and retained as part of the storm water pollution prevention plan for at least 3 years from the date of the inspection. The report shall identify any incidents of noncompliance. Where a report does not identify any incidents of noncompliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed in accordance with Part VII.G. (Signatory Requirements) of this permit.

(d) Where compliance evaluation schedules overlap with inspections required under 3.a.(3)(d), the compliance evaluation may be conducted in place of one such inspection.

4. Numeric Effluent Limitations

There are no additional numeric effluent limitations beyond those described in Part V.B of this permit.

5. Monitoring and Reporting Requirements

a. Analytical Monitoring Requirements. During the period beginning [insert date 1 year after permit issuance] lasting through [insert date 2 years after permit issuance] and the period beginning [insert date 3 years after permit issuance] lasting through [insert date 4 years after permit issuance], permittees with water transportation facilities must monitor their storm water discharges associated with industrial activity at least quarterly (4 times per year) during years 2 and 4 except as provided in paragraphs 5.a.(3) (Sampling Waiver), 5.a.(4) (Representative Discharge), and 5.a.(5) (Alternative Certification). Water transportation facilities are required to monitor their storm water discharges for the pollutants of concern listed in Table Q–1 below. Facilities must report in accordance with 5.b. (Reporting). In addition to the parameters listed in Table Q–1 below, the permittee shall provide the date and duration (in hours) of the storm event(s) sampled; rainfall measurements or estimates (in inches) of the storm event that generated the sampled runoff; the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and an estimate of the total volume (in gallons) of the discharge sampled.

TABLE Q–1.—MONITORING REQUIREMENTS

Pollutants of concern	Monitoring cut-off concentration
Total Recoverable Aluminum	0.75 mg/L
Total Recoverable Iron	1.0 mg/L
Total Recoverable Lead	0.0816 mg/L
Total Recoverable Zinc	0.065 mg/L

(1) Monitoring Periods. Water transportation facilities shall monitor samples collected during the sampling periods of: January to March, April to June, July to September, and October to December for the years specified in paragraph a. (above).

(2) Sample Type. A minimum of one grab sample shall be taken. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm

event. The required 72-hour storm event interval is waived where the preceding measurable storm event did not result in a measurable discharge from the facility. The required 72-hour storm event interval may also be waived where the permittee documents that less than a 72-hour interval is representative for local storm events during the season when sampling is being conducted. The grab sample shall be taken during the first 30 minutes of the discharge. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the discharger shall submit with the monitoring report a description of why a grab sample during the first 30 minutes was impracticable. If storm water discharges associated with industrial activity commingle with process or non-process water, then where practicable permittees must attempt to sample the storm water discharge before it mixes with the non-storm water discharge.

(3) Sampling Waiver.

(a) Adverse Conditions—When a discharger is unable to collect samples within a specified sampling period due to adverse climatic conditions, the discharger shall collect a substitute sample from a separate qualifying event in the next period and submit the data along with data for the routine sample in that period. Adverse weather conditions that may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

(b) Low Concentration Waiver—When the average concentration for a pollutant calculated from all monitoring data collected from an outfall during the monitoring period [insert date 1 year after permit issuance] lasting through [insert date 2 years after permit issuance] is less than the corresponding value for that pollutant listed in Table Q–1 under the column Monitoring Cut-off Concentration, a facility may waive monitoring and reporting requirements in the monitoring period beginning [insert date 3 years after permit issuance] lasting through [insert date 4 years after permit issuance]. The facility must submit to the Director, in lieu of the monitoring data, a certification that there has not been a significant change in industrial activity or the pollution prevention measures in area of the facility which drains to the outfall for which sampling was waived.

(c) When a discharger is unable to conduct quarterly chemical storm water sampling at an inactive and unstaffed site, the operator of the facility may exercise a waiver of the monitoring requirements as long as the facility remains inactive and unstaffed. The facility must submit to the Director, in lieu of monitoring data, a certification statement on the DMR stating that the site is inactive and unstaffed so that collecting a sample during a qualifying event is not possible.

(4) Representative Discharge. When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may test the effluent of one of such outfalls and report that the quantitative data also applies to the substantially identical outfall(s) provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explains in detail why the outfalls are expected to discharge substantially identical effluents. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area [e.g., low (under 40 percent), medium (40 to 65 percent), or high (above 65 percent)] shall be provided in the plan. The permittee shall include the description of the location of the outfalls, explanation of why outfalls are expected to discharge substantially identical effluents, and estimate of the size of the drainage area and runoff coefficient with the Discharge Monitoring Report.

(5) Alternative Certification. A discharger is not subject to the monitoring requirements of this section provided the discharger makes a certification for a given outfall or on a pollutant-by-pollutant basis in lieu of monitoring reports required under paragraph b below, under penalty of law, signed in accordance with Part VII.G. (Signatory Requirements), that material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, industrial machinery or operations, or significant materials from past industrial activity that are located in areas of the facility within the drainage area of the outfall are not presently exposed to storm water and are not expected to be exposed to storm water for the certification period. Such certification must be retained in the storm water pollution prevention plan, and submitted to EPA in accordance with Part VI.C. of this permit. In the case of certifying that a pollutant is not present, the permittee must submit the certification along with the monitoring reports required under paragraph (*b*) below. If the permittee cannot certify for an entire period, they must submit the date exposure was eliminated and any monitoring required up until that date. This certification option is not applicable to compliance monitoring requirements associated with effluent limitations.

b. Reporting. Permittees with water transportation facilities shall submit monitoring results for each outfall associated with industrial activity [or a certification in accordance with Sections (3), (4), or (5) above] obtained during the reporting period beginning [insert date 1 year after permit issuance] lasting through [insert date 2 years after permit issuance] on Discharge Monitoring Report Form(s) postmarked no later than the 31st day of the following March [insert the date 2 years after permit issuance]. Monitoring results [or a certification in accordance with Sections (3), (4), or (5) above] obtained during the period beginning [insert date 3 years after permit issuance] lasting through [insert date 4 years after permit issuance] shall be submitted on Discharge Monitoring Report Form(s) postmarked no later than the 31st day of the following March. For each outfall, one signed Discharge Monitoring Report form must be submitted to the Director per storm event sampled. Signed copies of Discharge Monitoring Reports, or said certifications, shall be submitted to the Director of the NPDES program at the address of the appropriate Regional Office listed in Part VI.G. of the fact sheet.

(*1*) *Additional Notification.* In addition to filing copies of discharge monitoring reports in accordance with paragraph b (above), water transportation facilities with at least one storm water discharge associated with industrial activity through a large or medium municipal separate storm sewer system (systems serving a population of 100,000 or more) must submit signed copies of discharge monitoring reports to the operator of the municipal separate storm sewer system in accordance with the dates provided in paragraph b (above).

c. Quarterly Visual Examination of Storm Water Quality. Facilities shall perform and document a visual examination of a storm water discharge associated with industrial activity from each outfall, except discharges

exempted below. The examination must be made at least once in each designated period [described in paragraph (*1*) below] during daylight hours unless there is insufficient rainfall or snow melt to produce a runoff event.

(*1*) Examinations shall be conducted in each of the following periods for the purposes of visually inspecting storm water quality associated with storm water runoff or snowmelt: January through March; April through June; July through September; and October through December.

(*2*) Examinations shall be made of samples collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed 1 hour) of when the runoff or snowmelt begins discharging. The examinations shall document observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution. The examination must be conducted in a well lit area. No analytical tests are required to be performed on the samples. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. Where practicable, the same individual should carry out the collection and examination of discharges for entire permit term.

(3) Visual examination reports must be maintained onsite in the pollution prevention plan. The report shall include the examination date and time, examination personnel, the nature of the discharge (i.e., runoff or snow melt), visual quality of the storm water discharge (including observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution), and probable sources of any observed storm water contamination.

(*4*) When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may collect a sample of effluent of one of such outfalls and report that the examination data also applies to the substantially identical outfall(s) provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explains in detail why the outfalls are expected to discharge substantially identical effluents. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area [e.g., low (under 40 percent), medium (40 to 65 percent), or high (above 65 percent)] shall be provided in the plan.

(*5*) When a discharger is unable to collect samples over the course of the visual examination period as a result of adverse climatic conditions, the discharger must document the reason for not performing the visual examination and retain this documentation onsite with the records of the visual examination. Adverse weather conditions which may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

(*6*) When a discharger is unable to conduct visual storm water examinations at an inactive and unstaffed site, the operator of the facility may exercise a waiver of the monitoring requirement as long as the facility remains inactive and unstaffed. The facility must maintain a certification with the pollution prevention plan stating that the site is inactive and unstaffed so that performing visual examinations during a qualifying event is not feasible.

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SECTOR S

SECTOR S

S. Storm Water Discharges Associated With Industrial Activity From Vehicle Maintenance Areas, Equipment Cleaning Areas, or Deicing Areas Located at Air Transportation Facilities

1. Discharges Covered Under This Section. The requirements listed under this section shall apply to storm water discharges from airports, air terminals and flying fields generally classified under Standard Industrial Classification (SIC) code 45 which have vehicle maintenance shops, material handling facilities, equipment cleaning operations or airport deicing operations.

a. Eligibility. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, or deicing operations are addressed under this section.

When an industrial facility, described by the above eligibility provisions of this section, has industrial activities being conducted on-site that meet the description(s) of industrial activities in another section(s), that industrial facility shall comply with any and all applicable monitoring and pollution prevention plan requirements of the other section(s) in addition to all applicable requirements in this section. The monitoring and pollution prevention plan terms and conditions of this multi-sector permit are additive for industrial activities being conducted at the same industrial facility (co-located industrial activities). The operator of the facility shall determine which other monitoring and pollution prevention plan section(s) of this permit (if any) are applicable to the facility.

If monitoring and pollution prevention plan requirements of another industrial activity section of this permit apply to co-located industrial activities at an industrial facility, the eligibility provisions of that industrial activity section shall not preclude the operator of the industrial facility from complying with the applicable monitoring and pollution prevention plan requirements of that section.

2. Special Conditions

a. Prohibition of Non-storm Water Discharges. Non-storm water discharges including aircraft, ground vehicle, runway and equipment washwaters, and dry weather discharges of deicing/anti-icing chemicals are not authorized by this permit. Operators of such discharges must obtain coverage under a separate National Pollutant Discharge Elimination System (NPDES) permit if discharged to waters of the U.S. or through a municipal separate storm sewer system.

3. Storm Water Pollution Prevention Plan Requirements. The permittee shall ensure

that SWPPPs are developed and implemented for areas of the facility occupied by tenants of the airport who conduct operations which result in storm water discharges associated with industrial activity. For the purposes of the permit, tenants of the airport facility includes airline companies, fixed based operators and other parties which have contracts with the airport authority to conduct business operations on airport property which result in storm water discharges associated with industrial activity as described in paragraph 1 of this section. Plans developed for areas occupied by tenants shall include the requirements specified in this section, and be integrated with the SWPPP for the entire airport.

a. Contents of Plan. Each plan shall include, at a minimum, the following items:

(1) Pollution Prevention Team. Each plan shall identify a specific individual or individuals as member(s) of a storm water Pollution Prevention Team who are responsible for developing the SWPPP and assisting the facility management in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's SWPPP.

(2) Description of Potential Pollutant Sources. Each plan shall provide a description of potential sources which may reasonably be expected to add significant amounts of pollutants to storm water discharges or which may result in the discharge of pollutants during dry weather from separate storm sewers draining the facility. Each plan shall identify all activities and significant materials which may potentially be significant pollutant sources. Each plan shall include, at a minimum:

(a) Drainage

i) A site map indicating an outline of the drainage area of each storm water outfall within the facility boundaries, each existing structural control measure to reduce pollutants in storm water runoff, surface water bodies, locations where significant materials are exposed to precipitation, locations where major spills or leaks have occurred, and the locations of the following activities where such activities are exposed to precipitation: aircraft and runway deicing/anti-icing operations; fueling stations; aircraft, ground vehicle and equipment maintenance and/or cleaning areas; storage areas for aircraft, ground vehicles and equipment awaiting maintenance; loading/unloading areas; locations used for the treatment, storage or disposal of wastes, liquid storage tanks, processing areas and storage areas.

ii) For each area of the facility that generates storm water discharges associated with industrial activity with a reasonable potential for containing significant amounts of pollutants, a prediction of the direction of flow, and an identification of the types of pollutants which are likely to be present in storm water discharges associated with industrial activity. Factors to consider include the toxicity of chemical; quantity of chemicals used, produced or discharged; the likelihood of contact with storm water; and history of significant leaks or spills of toxic or hazardous pollutants. Flows with a significant potential for causing erosion shall be identified.

iii) The site map developed for the entire airport shall indicate the location of each tenant of

the facility that conducts industrial activities, and incorporate information from the tenants site map (including a description of industrial activities, significant materials exposed, and existing management practices).

(b) Inventory of Exposed Materials—An inventory of the types of materials handled at the site that potentially may be exposed to precipitation. Such inventory shall include a narrative description of significant materials that have been handled, treated, stored or disposed in a manner to allow exposure to storm water between the time of three (3) years prior to the date of the issuance of this permit and the present; method and location of on-site storage or disposal; materials management practices employed to minimize contact of materials with storm water runoff between the time of three (3) years prior to the date of the issuance of this permit and the present; the location and a description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of any treatment of storm water runoff.

(c) Spills and Leaks—A list of significant spills and significant leaks of toxic or hazardous pollutants that occurred at areas that are exposed to precipitation or that otherwise drain to a storm water conveyance at the facility after the date of three (3) years prior to the effective date of this permit. Such list shall be updated as appropriate during the term of the permit.

(d) Sampling Data—A summary of existing discharge sampling data describing pollutants in storm water discharges from the facility, including a summary of sampling data collected during the term of this permit.

(e) Risk Identification and Summary of Potential Pollutant Sources—A narrative description of the potential pollutant sources from the following activities: aircraft, runway, ground vehicle and equipment maintenance and cleaning; aircraft and runway deicing/anti-icing operations (including apron and centralized aircraft deicing stations, runways, taxiways and ramps); outdoor storage activities; loading and unloading operations; and on-site waste disposal. The description shall specifically list any significant potential source of pollutants at the facility and for each potential source, any pollutant or pollutant parameter [e.g., biochemical oxygen demand (BOD_5), oil and grease, etc.] of concern shall be identified.

Facilities which conduct deicing operations shall maintain a record of the types [including the Material Safety Data Sheets (MSDS)] and monthly quantities of deicing/anti-icing chemicals used by all parties conducting deicing operations at the airport facility.

(3) Measures and Controls. Each facility covered by this permit shall develop a description of storm water management controls appropriate for the facility, and implement such controls. The priority in selecting controls shall reflect identified potential sources of pollutants at the facility. The description of storm water management controls shall address the following minimum components, including a schedule for implementing such controls:

(a) Good Housekeeping—Good housekeeping requires the maintenance of areas which may contribute pollutants to storm water discharges in a clean, orderly manner.

i) Aircraft, Ground Vehicle and Equipment Maintenance Areas—The permittee should ensure the maintenance of equipment is conducted in designated areas only and clearly identify these areas on the ground and delineate them on the site map. The plan must describe measures that prevent or minimize the contamination of the storm water runoff from all areas used for aircraft, ground vehicle and equipment maintenance (including the maintenance conducted on the terminal apron and in dedicated hangars). Management practices such as performing maintenance activities indoors, maintaining an organized inventory of materials used in the maintenance areas, draining all parts of fluids prior to disposal, preventing the practice of hosing down the apron or hangar floor, using dry cleanup methods, and/or collecting the storm water runoff from the maintenance area and providing treatment or recycling should be considered.

ii) Aircraft, Ground Vehicle and Equipment Cleaning Areas—The permittee should ensure that cleaning of equipment is conducted in designated areas only and clearly identify these areas on the ground and delineate them on the site map. The plan must describe measures that prevent or minimize the contamination of the storm water runoff from all areas used for aircraft, ground vehicle and equipment cleaning. Management practices such as performing cleaning operations indoors, and/or collecting the storm water runoff from the cleaning area and providing treatment or recycling should be considered.

iii) Aircraft, Ground Vehicle and Equipment Storage Areas—The storage of aircraft, ground vehicles and equipment awaiting maintenance must be confined to designated areas (delineated on the site map). The plan must describe measures that prevent or minimize the contamination of the storm water runoff from these areas. Management practices such as indoor storage of aircraft and ground vehicles, the use of drip pans for the collection of fluid leaks, and perimeter drains, dikes or berms surrounding storage areas should be considered.

iv) Material Storage Areas—Storage units of all materials (e.g., used oils, hydraulic fluids, spent solvents, and waste aircraft fuel) must be maintained in good condition, so as to prevent or minimize contamination of storm water, and plainly labeled (e.g., "used oil," "Contaminated Jet A," etc.). The plan must describe measures that prevent or minimize contamination of the storm water runoff from storage areas. Management practices such as indoor storage of materials, centralized storage areas for waste materials, and/or installation of berming and diking around storage areas should be considered for implementation.

v) Airport Fuel System and Fueling Areas—The plan must describe measures that prevent or minimize the discharge of fuels to the storm sewer resulting from fuel servicing activities or other operations conducted in support of the airport fuel system. Where the discharge of fuels into the storm sewer cannot be prevented, the plan shall indicate measures that will be employed to prevent or minimize the discharge of the contaminated runoff into receiving surface waters. Management practices such as implementing spill and overflow practices (e.g., placing sorptive materials beneath aircraft during fueling operations), using dry cleanup methods, and/or collecting the storm water runoff should be considered.

(b) Preventive Maintenance—A preventive maintenance program shall involve timely inspection and maintenance of storm water management devices (e.g., cleaning oil/water separators, removing debris from catch basins) as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems.

(c) Spill Prevention and Response Procedures—Areas where potential spills which can contribute pollutants to storm water discharges can occur, and their accompanying drainage points shall be identified clearly in the storm water pollution prevention plan. The plan shall describe material handling procedures, storage requirements, and consider the use of equipment such as diversion valves. Procedures for cleaning up spills shall be identified in the plan and made available to the appropriate personnel. The necessary equipment to implement a clean up should be available to personnel.

(d) Source Reduction—Facilities which conduct aircraft and/or runway (including taxiways and ramps) deicing/anti-icing operations shall evaluate present operating procedures to consider alternative practices to reduce the overall amount of deicing/anti-icing chemicals used and/or lessen the environmental impact of the pollutant source.

i) With regard to runway deicing/anti-icing operations, facilities, at a minimum, shall evaluate: present application rates to ensure against excessive over application; metered application of deicing/anti-icing chemical; pre-wetting dry chemical constituents prior to application; installation of runway ice detection systems; implementing anti-icing operations as a preventive measure against ice buildup; and the use of substitute deicing compounds such as potassium acetate in lieu of ethylene glycol and/or urea.

ii) In considering alternative management practices for aircraft deicing operations, facilities should evaluate current application rates and practices to ensure against excessive over application, and pre-treating aircraft with hot water prior to the application of a deicing chemical, thus reducing the overall amount of chemical used per operation.

Source reduction measures that the facility determines to be reasonable and appropriate shall be implemented and maintained. The plan shall provide a narrative explanation of the options considered and the reasoning for whether or not to implement them.

(e) Management of Runoff—The plan shall contain a narrative consideration of the appropriateness of traditional storm water management practices (practices other than those which prevent or reduce source(s) of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. The potential of various sources at the facility to contribute pollutants to storm water discharges associated with industrial activity shall be considered. Appropriate measures may include: vegetative swales, reuse of collected storm water (such as for a process or as an irrigation source), inlet controls (such as oil/water separators), snow management activities, infiltration devices, and wet detention/retention devices. Measures that the permittee determines

to be reasonable and appropriate shall be implemented and maintained.

i) Facilities which conduct aircraft and/or runway deicing/anti-icing operations shall also provide a narrative consideration of management practices to control or manage contaminated runoff from areas where deicing/anti-icing operations occur to reduce the amount of pollutants being discharged from the site. Structural controls such as establishing a centralized aircraft deicing facility, and/or collection of contaminated runoff for treatment or recycling should be considered. Collection and treatment alternatives include, but are not limited to, retention basins, detention basins with metered controlled release, Underground Storage Tanks (USTs) and/or disposal to Publicly Owned Treatment Works (POTW) by way of sanitary sewer or hauling tankers. Runoff management controls that the facility determines to be reasonable and appropriate shall be implemented and maintained. The plan should consider the recovery of deicing/anti-icing materials when these materials are applied during non-precipitation events. The plan shall provide a narrative explanation of the controls considered and the reasoning for whether or not to implement them.

(f) Inspections—In addition to or as part of the comprehensive site evaluation required, qualified facility personnel shall be identified to inspect designated equipment and areas of the facility specified in the plan. The inspection frequency shall be specified in the plan, but at a minimum be conducted once per week during deicing/anti-icing application periods for areas where deicing/anti-icing operations are being conducted. A set of tracking or follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections shall be maintained. The use of a checklist developed by the pollution prevention team is encouraged.

(g) Pollution Prevention Training—Pollution prevention training programs shall be developed to inform airport management and tenant personnel responsible for implementing activities identified in the storm water pollution prevention plan of the components and goals of the plan. Training should address topics such as spill response, good housekeeping, aircraft and runway deicing/anti-icing procedures, and material management practices. The SWPPP shall identify periodic dates for such training.

(h) Recordkeeping and Internal Reporting Procedures—A description of incidents (such as spills, or other discharges), along with other information describing the quality and quantity of storm water discharges shall be included in the plan. Inspections and maintenance activities shall be documented and records shall be incorporated into the plan.

(i) Non-storm Water Discharges

i) The plan shall include a certification that the discharge points have been tested or evaluated for the presence of non-storm water discharges. The certification shall include the identification of potential significant sources of non-storm water at the site, a description of the results of any test and/or evaluation for the presence of non-storm water discharges, the evaluation criteria or testing method used, the date of any testing and/or evaluation, and the on-site drainage points that were directly observed during the test. Certifications shall be signed.

Such certification may not be feasible if the facility operating the storm water discharge associated with industrial activity does not have access to an outfall, manhole, or other point of access to the ultimate conduit which receives the discharge. In such cases, the source identification section of the storm water pollution plan shall indicate why the certification required by this part was not feasible, along with the identification of potential significant sources of non-storm water at the site. A discharger that is unable to provide the certification required by this paragraph must notify the Director in accordance with paragraph 3.a.(3)(iii) (below).

ii) Except for flows from fire fighting activities, other sources of non-storm water listed in Part III.A. (Prohibition of Non-storm Water Discharges) of this permit that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

iii) Failure to Certify—Any facility that is unable to provide the certification required (testing for non-storm water discharges), must notify the Director by **270 days after permit issuance** or, for facilities which begin to discharge storm water associated with industrial activity after **270 days after permit issuance**, 180 days after submitting a notice of intent to be covered by this permit. If the failure to certify is caused by the inability to perform adequate tests or evaluations, such notification shall describe: the procedure of any test conducted for the presence of non-storm water discharges; the results of such test or other relevant observations; potential sources of non-storm water discharges to the storm sewer; and why adequate tests for such storm sewers were not feasible. Non-storm water discharges to waters of the United States which are not authorized by an NPDES permit are unlawful, and must be terminated.

(j) Sediment and Erosion Control—The plan shall 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 to be used to limit erosion.

(4) Comprehensive Site Compliance Evaluation. Qualified personnel shall conduct site compliance evaluations during periods of deicing/anti-icing operations at appropriate intervals specified in the plan, but in no case less than once a year. Such evaluations shall provide:

(a) Areas contributing to a storm water discharge associated with industrial activity shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Measures to reduce pollutant loadings shall be evaluated to determine whether they are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. Structural storm water management measures, sediment and erosion control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure that they are operating correctly. A visual inspection of equipment needed to implement the plan, such as spill response equipment, shall be made.

(b) Based on the results of the inspection, the description of potential pollutant sources

identified in the plan in accordance with paragraph 3.a.(2) of this section (Description of Potential Pollutant Sources) and pollution prevention measures and controls identified in the plan in accordance with paragraph 3.a.(3) of this section (Measures and Controls) shall be revised as appropriate within two (2) weeks of such inspection and shall provide for implementation of any changes to the plan in a timely manner, but in no case more than twelve (12) weeks after the inspection.

(c) A report summarizing the scope of the inspection, personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance with paragraph 3.a.(4)(b) (above) of the permit shall be made and retained as part of the storm water pollution prevention plan for at least one (1) year after coverage under this permit terminates. The report shall identify any incidents of noncompliance. Where a report does not identify any incidents of noncompliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed.

(d) Where compliance evaluation schedules overlap with inspections required under 3.a.(3)(f), the compliance evaluation may be conducted in place of one such inspection.

4. Numeric Effluent Limitations. There are no additional numeric effluent limitations beyond those in Part 5 of this permit.

5. Monitoring and Reporting Requirements

a. During the period beginning on the effective date and lasting through the expiration date of this permit, facilities which conduct aircraft and/or runway deicing/anti-icing operations:

(1) Shall prepare estimates for annual pollutant loadings resulting from discharges of spent deicing chemicals from the facility. The loading estimates shall reflect the amounts of deicing chemicals discharged to separate storm sewer systems or surface waters, prior to and after implementation of the facility's storm water pollution prevention plan. Such estimates shall be reviewed by a Registered Professional Engineer, and certified by such engineer. By means of the certification, the engineer, having examined the facility's, deicing procedures, and proposed control measures described in the storm water pollution prevention plan, shall attest that the loading estimates have been prepared in accordance with good engineering practices. Certified loading estimates are to be retained at the airport facility and attached to the storm water pollution prevention plan.

b. Analytical Monitoring Requirements. During the period beginning **1 year after permit issuance** lasting through **2 years after permit issuance** and the period beginning **3 years after permit issuance** lasting through **4 years after permit issuance**, airports that use more than 100,000 gallons of glycol-based deicing chemicals and/or 100 tons or more of urea on an average annual basis shall monitor outfalls from the facility that collect runoff from areas where deicing/anti-icing activities occur 4 times during months of deicing (November to March), except as provided in paragraphs 5.a.(3) (Sampling Waiver), 5.a.(4) (Representative Discharge), and 5.a.(5) (Alternative Certification). Airports which are subject to these monitoring requirements must sample their storm water discharges for the pollutants of concern listed in Table A3.1 below. Such facilities must report in accordance with 5.b. (Reporting). In addition to the parameters listed in Table A3.1 below, the permittee shall provide the date and duration (in hours) of the storm event(s) sampled; rainfall measurements or estimates (in inches) of the storm event that generated the sampled runoff; the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and an estimate of the total volume (in gallons) of the discharge sampled.

TABLE S.1
MONITORING REQUIREMENTS

Pollutants of Concern	**Monitoring Cut-Off Concentration**
Biochemical Oxygen Demand (BOD_5)	9 mg/L
Chemical Oxygen Demand (COD)	65 mg/L
Total Kjeldahl Nitrogen (TKN)	1.50 mg/L
pH	6.5 to 9 s.u.

For the purposes of the permit, the "average annual" usage rate of deicing/anti-icing chemicals is determined by averaging the amounts of deicing/anti-icing chemicals used at the facility in the three (3) previous calendar years.

(1) Monitoring Periods. Airports that use more than 100,000 gallons of glycol-based deicing chemicals and/or 100 tons or more of urea on an average annual basis shall monitor outfalls from the facility that collect runoff from areas where deicing/anti-icing activities occur four times per year during periods when deicing/anti-icing activities occur (November to March), in the years specified in paragraph n. (above).

(2) Sample Type. A minimum of one grab sample shall be taken. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. The grab sample shall be taken during the first 30 minutes of the

discharge. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the discharger shall submit with the monitoring report a description of why a grab sample during the first 30 minutes was impracticable. If storm water discharges associated with industrial activity commingle with process or non-process water, then where practicable permittees must attempt to sample the storm water discharge before it mixes with the non-storm water discharge.

(3) Sampling Waiver

(a) Adverse Conditions—When a discharger is unable to collect samples during one of the monitoring periods specified in paragraph b. (Monitoring Periods) because of adverse climatic conditions, the discharger may collect two samples from the two separate qualifying events in the next monitoring period and submit this data. Adverse weather conditions that may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

(b) Low Concentration Waiver—When the average concentration for a pollutant calculated from all monitoring data collected from an outfall during the monitoring period **1 year after permit issuance** lasting through **2 years after permit issuance** is less than the corresponding value for that pollutant listed in Table S-1 under the column Monitoring Cut-off Concentration, a facility may waive monitoring and reporting requirements in the monitoring period beginning **3 years after permit issuance** lasting through **4 years after permit issuance**. The facility must submit to the Director, in lieu of the monitoring data, a certification that there has not been a significant change in industrial activity or the pollution prevention measures in area of the facility which drains to the outfall for which sampling was waived.

(4) Representative Discharge. When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may test the effluent of one of such outfalls and report that the quantitative data also applies to the substantially identical outfall(s) provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explains in detail why the outfalls are expected to discharge substantially identical effluents. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area [e.g., low (under 40 percent), medium (40 to 65 percent), or high (above 65 percent)] shall be provided in the plan. The permittee shall include the description of the location of the outfalls, explanation of why outfalls are expected to discharge substantially identical effluents, and estimate of the size of the drainage area and runoff coefficient with the Discharge Monitoring Report.

(5) Alternative Certification. A discharger is not subject to the monitoring requirements of

this section provided the discharger makes a certification for a given outfall, on an annual basis, under penalty of law, signed in accordance with the signatory requirements, that material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, industrial machinery or operations, or significant materials from past industrial activity that are located in areas of the facility within the drainage area of the outfall are not presently exposed to storm water and are not expected to be exposed to storm water for the certification period. Such certification must be retained in the storm water pollution prevention plan, and submitted to EPA.

c. Reporting. Airports shall submit monitoring results for each outfall associated with industrial activity [or a certification in accordance with Sections (3), (4), or (5) above] obtained during the reporting period beginning **1 year after permit issuance** lasting through **2 years after permit issuance** on Discharge Monitoring Report Form(s) postmarked no later than the 31st day of the following March **2 years after permit issuance**. Monitoring results (or a certification in accordance with Sections (3), (4), or (5) above] obtained during the period beginning **3 years after permit issuance** lasting through **4 years after permit issuance** shall be submitted on Discharge Monitoring Report Form(s) postmarked no later than the 31st day of the following March. A separate Discharge Monitoring Report Form is required for each quarterly sampling period. Signed copies of Discharge Monitoring Reports, or said certifications, shall be submitted to the Director of the NPDES program at the address of the appropriate Regional Office.

(1) Additional Notification. In addition to filing copies of discharge monitoring reports in accordance with paragraph b (above), facilities with at least one storm water discharge associated with industrial activity through a large or medium municipal separate storm sewer system (systems serving a population of 100,000 or more) must submit signed copies of discharge monitoring reports to the operator of the municipal separate storm sewer system in accordance with the dates provided in paragraph b (above).

MSGP MONITORING REQUIREMENTS

A3.1 VISUAL MONITORING REQUIREMENTS

The quarterly visual monitoring requirements for industrial activity associated with aircraft and vehicle maintenance are shown in Table A3.1.

Since the monitoring requirements for this activity could be modified as the result of comments solicited on the proposed monitoring requirements for the general permit, the baseline general permit monitoring requirements are listed below. The annual monitoring shall begin on the effective date and last through the expiration date of the permit. In addition to the parameters listed below, the date and duration (in hours) of the storm events sampled; rainfall measurements or estimates (in inches) of the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and an estimate of the total volume (gallons) of the discharge sampled must be documented.

TABLE A3.1
BASELINE GENERAL PERMIT MONITORING REQUIREMENTS

PARAMETER	UNIT	FREQUENCY	SAMPLE TYPE
Total Flow	Gallons	Annual	Estimated
Oil and Grease	mg/l	Annual	Grab
Total Suspended Solids (TSS)	mg/l	Annual	Grab
Chemical Oxygen Demand (COD)	mg/l	Annual	Grab
Surfactants (MBAS)	mg/l	Annual	Grab
pH	Standard	Annual	Grab

The grab sample shall be collected in the first 30 minutes of the discharge or as soon thereafter as practical, but not to exceed 60 minutes.

The analysis for surfactants is required only for storm water discharges from vehicle or equipment cleaning areas.

Table A3.2 VISUAL MONITORING REPORT

Completed By:		Last Rainfall > 0.1"
Title :		Rainfall Amount (in)
Date:	Time:	Rainfall Duration (hrs)
Location:		
Nature of discharge:	runoff snow melt	

Parameter:

Color	Clear, Green, Gray, Brown, Other		
Odor	Septic, Rotten egg, Other		
Clarity	Clear, Slightly cloudy, Mostly cloudy, Opaque		
Floating Solids	Yes,	No	List
Settled Solids	Yes,	No	
Suspended Solids	Yes,	No	
Foam	Yes,	No	
Oil Sheen	Yes,	No	Coverage: Slight, Heavy
Other			

Problems encountered during sample collection

If storm water contamination exist, list probable source of pollutants:

NOTE: Use the form in Appendix 5 for reporting purposes.

A3.2 RUNOFF VOLUMES

The drainage basins of COASTSYSTA Panama City discharge through a network of grass-lined ditches, concrete ditches, and culverts to St. Andrews Bay and Alligator Bayou.

There are 29 distinct drainage basins within COASTSYSTA which involve industrial activity. The outfalls from these basins have been designated numerically based on a concentrated outfall point. Basins which do not have a numeric outfall are primarily sheet flow. A description of each drainage basin with it's assigned outfall is discussed in Section 1.3.1.3.

A3.2.1 Time of Concentration

The time of concentration (Tc) is the time it takes runoff to move from the hydraulically most distant point in the drainage area to the outlet. The longest flow path (time not particularly distance) of each basin was divided into three segments to determine Tc.

For most of the drainage basins, a Tc was previously calculated by Hendon Engineering. These Tc's were used when available, while unavailable Tc's were computed using the following method.

The three segments are overland flow, shallow concentrated flow, and channel flow. The longest flow path in each basin was estimated/delineated and a travel time for each segment of the longest flow path was determined by utilizing 1"=100' and 1"=600' topographic maps provided by COASTSYSTA, USGS Quadrangle Maps, and field reconnaissance.

The overland flow and shallow concentrated flow segments occur through woods, lawns, or concrete. The equation for computing the overland flow segment is a function of the length, ground slope, surface roughness, and the 2-year, 24 hour rainfall depth for each basin. Contour maps of the area assisted in the development of these parameters.

The travel times through channel sections were computed by using an average velocity with the Manning equation and dividing by the length of the channel. Parameters for the Manning equation are roughness, flow area, wetted perimeter, and channel slope.

A spreadsheet was developed to compute each of the incremental travel times and their sum to derive the total travel time.

A3.2.2 Peak Flows by the Rational Method

The rational method is one of the simplest and best-known methods routinely applied in urban hydrology. The equation is as follows:

$$Qp=(kc)(C)(i)(A)$$

Qp = peak flow (cfs)
C = runoff coefficient
i = rainfall intensity (in/hr)
A = drainage area (acres)
kc = conversion factor (1.008 to convert ac-in/hr to cfs)

Areas for each drainage basin were planimetered from the topographic drawing of the Coastal Systems Station site map. The site map is a composite of field reconnaissance, existing mapping, and other building specific mapped plans. The industrial related basins contained an estimated total of 159.2 acres. The totals are given in Table A3.3.

Each of these basins contain a certain percentage of pervious and impervious areas estimated from existing mapping and field investigations. A runoff coefficient (C) was also estimated for each area, based on pervious and impervious sections of the drainage basin area. A rainfall intensity was derived for each subasin based on the Tc for each basin. The intensity used was taken from the **State of Florida Department of Transportation Drainage Manual, Volume 2-Procedures**. The storm event used was the two year, twenty-four hour event. This intensity was obtained from the idf curve derived for the Bay County, Florida area. The variables for the rational formula with flow results are given in the following table.

TABLE A3.3 DRAINAGE INFORMATION

BASIN	AREA (acres)	C	Tc (min)	i (in/hr)	Total Q (cfs)
A	5.4	.45	44.0	2.9	7.05
B	19.2	.41	49.0	2.7	21.38
C	35.9	.60	8.0	6.0	129.24
D	2.4	.75	8.0	6.0	10.80
E	0.4	.75	20.0	4.2	1.26
F	2.7	.79	8.0	6.0	12.76
G	6.7	.75	22.0	4.0	20.10
H	0.2	.79	8.0	6.0	0.95
I	0.3	.79	8.0	6.0	1.42
J	0.3	.75	8.0	6.0	1.35

BASIN	AREA (acres)	C	Tc (min)	i (in/hr)	Total Q (cfs)
K	1.4	.79	8.0	6.0	6.62
L	0.7	.75	8.0	6.0	3.15
M	0.4	.79	8.0	6.0	1.89
N	0.4	.79	8.0	6.0	1.89
O	0.6	.79	8.0	6.0	2.84
P	2.1	.83	8.0	6.0	10.40
Q	0.6	.75	8.0	6.0	2.70
R	0.1	.83	8.0	6.0	0.50
S	0.2	.83	8.0	6.0	.0.90
T	0.7	.83	8.0	6.0	3.47
U	8.1	.75	12.0	5.2	31.59
V	10.0	.64	8.0	6.0	38.25
W	0.7	.83	8.0	6.0	3.47
X	55.5	.60	46.0	2.8	93.24
Y	1.5	.75	8.0	6.0	6.75
Z	1.6	.79	8.0	6.0	7.56
AA	0.5	.83	8.0	6.0	2.48
AB	0.6	.79	8.0	6.0	2.84
AC	72.8	.41	71.0	2.6	78.08

BASIN	AREA	% IMP	C (imp)	C (per)	Cw	Tc (min)	i (inh/r)	Q
A	5.4	40	0.9	0.15	0.45	44	2.9	7.05
B	19.2	35	0.9	0.15	0.41	49	2.7	21.38
C	35.9	60	0.9	0.15	0.60	8	6	129.24
D	2.4	80	0.9	0.15	0.75	8	6	10.80
E	0.4	80	0.9	0.15	0.75	20	4.2	1.26
F	2.7	85	0.9	0.15	0.79	8	6	12.76
G	6.7	80	0.9	0.15	0.75	22	4	20.10
H	0.2	85	0.9	0.15	0.79	8	6	0.95
I	0.3	85	0.9	0.15	0.79	8	6	1.42
J	0.3	80	0.9	0.15	0.75	8	6	1.35
K	1.4	85	0.9	0.15	0.79	8	6	6.62
L	0.7	80	0.9	0.15	0.75	8	6	3.15
M	0.4	85	0.9	0.15	0.79	8	6	1.89
N	0.4	85	0.9	0.15	0.79	8	6	1.89
O	0.6	85	0.9	0.15	0.79	8	6	2.84
P	2.1	90	0.9	0.15	0.83	8	6	10.40
Q	0.6	80	0.9	0.15	0.75	8	6	2.70
R	0.1	90	0.9	0.15	0.83	8	6	0.50
S	0.2	80	0.9	0.15	0.75	8	6	0.90
T	0.7	90	0.9	0.15	0.83	8	6	3.47
U	8.1	80	0.9	0.15	0.75	12	5.2	31.59
V	10	65	0.9	0.15	0.64	8	6	38.25
W	0.7	90	0.9	0.15	0.83	8	6	3.47
X	55.5	60	0.9	0.15	0.60	46	2.8	93.24
Y	1.5	80	0.9	0.15	0.75	8	6	6.75

BASIN	AREA	% IMP	C (imp)	C (per)	Cw	Tc (min)	i (inh/r)	Q
Z	1.6	85	0.9	0.15	0.79	8	6	7.56
AA	0.5	90	0.9	0.15	0.83	8	6	2.48
AB	0.6	85	0.9	0.15	0.79	8	6	2.84
AC	72.8	35	0.9	0.15	0.41	71	2.6	78.08

A3.2.3 Predicted Volumes for Measured Rain Events

Volumes were predicted for each of the basins for rain events measuring from .1 inches to 3.0 inches using .1 inch increments. These volumes were estimated using the following equation:

$$V = (Cw)(A)(R)(K)$$

V = Volume of Runoff (gallons)
Cw = weighted runoff coefficient
A = catchment area (acres)
R = measured rainfall (inches)
K = conversion constant = 27152.4 gal/acre-inch

Figures A3.1 - A3.29 show the volume vs. rainfall relationship. From these figures volumes can be obtained from any measurable rain event up to 3.0 inches.

GENERAL AND ACTIVITY SPECIFIC BMPs

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INTRODUCTION

Best Management Practices (BMPs) are measures used to prevent or reduce pollution from any type of activity. BMPs may include processes, procedures, schedules of activities, prohibitions on practices, and other additional management practices to prevent or reduce water pollution. They are anything which may be identified as a method; inexpensive or costly, short of actual treatment, to curb water pollution. BMPs can be almost anything that prevents toxic or hazardous substances from entering the environment.

The purpose of this volume of the Storm Water Pollution Prevention Plan (SWPPP) is to describe some basic BMPs required to be included in the SWPPP and offer some guidelines about how to select BMPs that apply to the specific pollutant sources on a particular site.

Implementation of these or other BMPs should be documented and maintained as part of the overall SWPPP. The effectiveness of the BMPs selected should be evaluated annually or when conditions warrant additional evaluations.

1. GOOD HOUSEKEEPING

Good housekeeping involves using common sense to identify ways to maintain a clean and orderly facility and keep contaminants out of storm sewers. It includes establishing procedures to reduce the possibility of mishandling chemicals or equipment and training personnel in good housekeeping techniques.

Good housekeeping requires that areas, which may contribute pollutants to storm water discharges, are maintained in a clean, orderly manner.

Operation and Maintenance

These practices make sure that processes and equipment are working well. Basic operation and maintenance BMPs incorporated in the good housekeeping program are:

- Regular pickup and disposal of loose garbage and waste material on-site;
- Make sure equipment is working properly (Refer to Maintenance BMPs);
- 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 (Refer to Visual Inspection BMPs); and,
- Ensure that spill cleanup procedures are understood by personnel (Refer to Spill Prevention and Response BMPs).

Material Storage Practices

Improper storage can result in the release of materials and chemicals that can cause storm water runoff pollution. Proper storage technique BMPs incorporated into the good housekeeping program are:

- Provide adequate space to facilitate material transfer and easy access for inspections;
- Store containers, drums, and bags away from direct traffic routes to prevent accidental spills;
- Stack containers according to manufacturers' instructions to avoid damaging the containers from improper weight distribution;
- Store containers on pallets or similar devices to prevent corrosion of the containers which can result when containers come in contact with moisture on the ground; and,
- Assign the responsibility of hazardous material inventory to a limited number of people who are trained to handle hazardous materials.

Material Inventory Procedures

Improved material tracking and inventory practices can reduce the waste that results from overstocking

and the disposal of outdated materials. Careful tracking of all ordered materials may also result in efficient materials use. Material Inventory Procedures incorporated in the good housekeeping program are listed below:

- Identify all chemical substances present at the facility. Review the site and the purchase orders for the previous year. List all of the chemical substances used at the facility, and then obtain the Material Safety Data Sheets (MSDSs) for each. Maintain updated MSDSs available to all personnel;

- Label all containers to show the name and type of substance, stock number, expiration date, health hazards, suggestions for handling, and first aid information; and,

- Clearly mark on the inventory hazardous materials that require special handling, storage, use, and disposal considerations.

The emergency control system should determine the amount of hazardous materials stored at a facility. Make sure that storage areas are designed to contain spills.

Personnel Participation

Personnel should be trained regularly in good housekeeping practices to reduce mishandling of chemicals/equipment.

2. PREVENTATIVE MAINTENANCE

The preventive maintenance program includes:

- Timely inspection and maintenance of storm water management devices (for example, cleaning catch basins);
- Inspection and testing of facility equipment and systems to uncover conditions that could cause breakdown or failures resulting in discharges of pollutants to surface waters; and,
- Proper maintenance of facility equipment and systems.

Preventive maintenance involves the regular inspection and testing of facility equipment and operational systems. These inspections should identify conditions such as cracks or slow leaks which could cause breakdowns or failures which may result in discharges of chemicals to storm sewers/surface waters. The program should prevent breakdowns and failures by adjustment, repair or replacement of equipment. The preventive maintenance program includes the following elements:

- Identification of equipment, systems, and facilities and surrounding areas that must be inspected;
- Schedule for periodic inspections or tests of these equipment and systems; and,
- Appropriate and timely adjustment, repair or replacement of equipment and systems.
- Maintenance and updating of complete records on inspections, equipment and systems.

Identification of Equipment to Inspect

The first step is to identify which systems or equipment may malfunction and cause spills, leaks, or other situations that could lead to storm water runoff contamination. Identification of equipment as a Best Management Practice (BMP) will include inspection of the following as a minimum:

- Pipes;
- Pumps;
- Storage tanks and bins;
- Pressure vessels;
- Pressure release valves;
- Process and material handling equipment; and,
- Storm water management devices (catch basins, or other structural or treatment BMPs).

Schedule Routine Preventive Maintenance Inspections

Schedules will be set for routine inspections once equipment and areas have been identified. Examination for leaks, corrosion, support or foundation failure, or other forms of deterioration or leaks should be included. Look for spots or puddles of chemicals or fluid leaks and document any detection of smoke, fumes, or other indications of leaks. Periodic testing of facility equipment for structural soundness is a key element of preventive maintenance.

Preventive maintenance inspections must be conducted as part of regular visual inspections.

Equipment Repair or Replacement

Promptly repair or replace defective equipment found during inspections and testings.

Records on Preventive Maintenance

- **Complete an equipment inspection form monthly;**
- **Record test results and follow up with corrective action;**
- **Make sure records are complete and detailed; and,**
- **These records will be kept with other visual inspection records as part of this SWPPP.**

3. VISUAL INSPECTIONS

Regular visual inspections are performed to verify that all of the elements of the plan are in place and working properly. The visual inspection program must include the following:

- Identification of qualified facility personnel who will inspect equipment and areas at appropriate intervals in the plan;
- Verification of corrective action; and,
- Maintenance of all inspection/records.

Areas to Inspect

- Areas around all equipment;
- Areas where spills and leaks have occurred in the past;
- Material storage areas (tank farms, drum storage);
- Outdoor material processing areas;
- Material handling areas (loading, unloading, transfer); and,
- Waste generation, storage, treatment and disposal areas.

INSPECTION OF THESE AREAS WILL BE MADE AND DOCUMENTED ON A MONTHLY BASIS.

Implementation of a Visual Inspection Plan

If the facility has no established inspection program, then a plan must be developed. Appropriate personnel are responsible for conducting the inspections. It is important to remember that the personnel implementing the visual inspection program should be properly trained, familiar with the storm water pollution prevention program, and knowledgeable about proper record keeping and reporting procedures.

Records of Inspections

Inspection records will note:

- When inspections were done;
- Who conducted the inspection;
- What areas were inspected;
- What problems were found;

- Corrective action; and,
- Who has been notified.

These records should be kept with the SWPPP. The Environmental Protection Agency's (EPA) General Permit requires that records be kept until at least one year after coverage under the permit expires.

Visual Inspection Checklist

Note the minimum inspection items below:

- Corroded drums or drums without plugs or covers;
- Corroded or damaged tanks, tank supports, and tank drain valves;
- Corroded or leaking pipes;
- Leaking or improperly closed valves and valve fittings;
- Leaking pumps and/or hose connections;
- Broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials;
- Windblown dry chemicals; and,
- Leaking or corroded components.

4. SPILL PREVENTION AND RESPONSE

Spills and leaks together are one of the largest industrial sources of storm water pollutants, and are in most cases avoidable. Establishing standard operating procedures such as safety and spill prevention procedures along with proper personnel training can reduce accidental releases. Avoiding spills and leaks is preferable to cleaning them up, not only from an environmental standpoint, but because spills increase operating costs and lower productivity.

Identify Potential Spill Areas

As part of this SWPPP, a list or inventory of materials handled, used, and disposed of, and a site map indicating the drainage area of each storm water outfall is included. Refer to drainage map with the locations of areas and activities with high material spill potential to determine where spills will most likely occur. Spill potential also depends on how materials are handled, the types and volumes of materials handled, and how materials are stored.

Material Handling Procedures and Storage Requirements

Through the process of developing various spill scenarios, ideas for eliminating or minimizing the spill or its impact will emerge. These solutions should be prioritized and adopted according to conditions of effectiveness, cost, feasibility, and ease of implementation. Following is a list of some suggested activities that may reduce the potential that spills will occur/impact storm water quality:

- Expand ways to recycle, reclaim, and/or reuse materials to reduce the volume brought into the facility;
- Install leak detection devices, overflow controls, and diversion berms;
- Use effective housekeeping practices;
- Perform regular visual inspections to identify signs of wear on tanks, drums, containers, and berms and to identify messy housekeeping or other clues that could lead to potential spills;
- Perform preventive maintenance on storage tanks, valves, pumps, pipes and other equipment that may be present;
- Use filling procedures for tanks/other equipment that minimize spills;
- Use material transfer procedures that reduce the chance of leaks/spills;
- Substitute less toxic or non-toxic materials for toxic materials; and,
- Provide appropriate security.

5. SEDIMENT AND EROSION AND PREVENTION PRACTICES

Sites where soils are exposed to water, wind or ice can have erosion and sedimentation problems. Sedimentation occurs when soil particles are suspended in surface runoff or wind and are deposited in streams or 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, buildings). When the land surface is developed or "hardened" in this manner, storm water cannot infiltrate. This results in larger amounts of water moving more quickly across a site which can carry more sediment and other pollutants to streams and rivers.

Areas that may have a high potential for soil erosion are noted in the enclosed plan. This plan also includes areas with such heavy activity that plants cannot grow, soil stockpiles, stream banks, steep slopes, construction areas, demolition areas, and any area where the soil is disturbed, denuded (stripped of plants), and subject to wind and water erosion.

Seven ways to limit and control sediment and erosion:

- Leave as much vegetation (plants) on-site as possible;
- Minimize the time that soil is exposed;
- Prevent runoff from flowing across disturbed areas (divert the flow to vegetated areas);
- Stabilize the disturbed soils as soon as possible;
- Slow down the runoff flowing across the site;
- Provide drainage ways for the increased runoff (use grassy swales rather than concrete drains; refer to Grassed Swales BMP); and,
- Remove sediment from storm water runoff before it leaves the site.

Using these measures to control erosion and sedimentation is an important part of storm water management. Selecting the best set of sediment and erosion prevention measures depends upon the nature of the activities on-site and other site-specific conditions.

The local Soil Conservation Service Office or County Extension Office can provide information on any special measures necessary to promote vegetation on severely eroded soils.

Vegetation Practices

Preserving existing vegetation or revegetating disturbed soil as soon as possible after construction is the most effective way to control erosion.

Four ways vegetation reduces erosion:

- Shields the soil surface from direct erosive impact of rain;
- Improves the soil's water storage porosity and capacity so more water can infiltrate into the ground;
- Slows the runoff and allows sediment deposits; and,
- Physically holds the soil in-place with plant roots.

Vegetation cover can be grass, trees, shrubs, bark, mulch, or straw. Grasses are the most common type of cover used for revegetation because they grow quickly and provide erosion protection within days. Straw or mulch may be used during non-growing seasons to prevent erosion. Keep existing shrubs and trees because their established root systems help prevent erosion.

Vegetation and other site stabilization practices can be either temporary or permanent controls. Temporary controls provide a cover for exposed or disturbed areas for short periods of time or until permanent erosion controls are put in place. Permanent vegetative practices are used when activities that disturb the soil are completed or when erosion is occurring on a site that is otherwise stabilized.

6. MANAGEMENT OF RUNOFF

Management of runoff is the consideration of appropriate traditional storm water management practices (practices other than those which control the source of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. Procedures determined to be reasonable and appropriate must be implemented and maintained. The potential of various sources at the facility to contribute pollutants to storm water discharges from industrial activity must be considered when determining reasonable and appropriate measures. Appropriate measures may include:

- Vegetated swales (vegetated depression used to transport, filter, and remove sediment);
- Reuse of collected storm water (such as for a process or as an irrigation source);
- Inlet controls (such as oil/water separators);
- Snow management activities;
- Infiltration devices; and,
- Wet detention/retention devices.

Many BMPs are measures to reduce pollutants at the source before they have an opportunity to contaminate storm water runoff. Traditional storm water management practices can be used to direct storm water away from areas of exposed materials/potential pollutants. Traditional storm water management practices can be used to direct storm water that contains pollutants to natural or other types of treatment locations. For example, using an oil/water separator on storm water that has oil and grease will remove some of the oil and grease before the storm water leaves the site. Permits will generally not require specific storm water management practices since these practices must be selected on a case-by-case basis depending on the activities at the site.

7. PERSONNEL TRAINING

Personnel training programs must inform personnel at all levels of responsibility of the components and goals of the SWPPP. Training should address each component of the SWPPP, including how and why tasks are to be implemented. Similar Best Management Practice (BMP) topics include:

- Spill prevention and response;
- Good housekeeping; and,
- Material management practices.

Personnel training is essential for effective implementation of the SWPPP. The purpose of a training program is to teach personnel at all levels of responsibility the components and goals of the SWPPP.

The following sections discuss how to create an effective storm water pollution prevention training program.

Spill Prevention and Response

Spills can occur from equipment and containers containing petroleum products (gas, diesel fuel, oil, lubricating grease, hydraulic fluids). **Spills from these services must be repaired and cleaned up in accordance with accepted local, state and federal standards.**

Good Housekeeping

All personnel must be trained in proper good housekeeping practices. Training must include a thorough discussion with all personnel on an annual basis. New personnel must receive instruction prior to beginning work. Each personnel must be briefed on the items below:

- Require regular vacuuming and/or sweeping of interior spaces; sweeping and/or wetting;
- Promptly clean up spilled materials to prevent polluted runoff;
- Identify places where brooms, vacuums, sorbents, foams, neutralizing agents, and other good housekeeping and spill response equipment are stored;
- Display signs reminding personnel of the importance and procedures of good housekeeping;
- Discuss updated procedures and report on the progress of practicing good housekeeping at every meeting; and,
- Provide instruction on securing drums and containers and frequently checking for leaks and spills.

Materials Management Practices

All personnel must be trained to recognize all toxic and hazardous substances located at the facility. Personnel must be trained on:

- Proper organization and storage of materials; and,
- Identification of all toxic and hazardous substances stored, handled, and produced on-site.

All personnel training must be documented on the appended form and maintained as a part of this SWPPP.

8. RECORD KEEPING

Incidents such as spills or other discrepancies with other information describing the quality and quantity of storm water discharges must be included in the records. Inspections and maintenance activities must be documented and recorded in the plan. **Records must be maintained for three years after the permit expires.**

Record Keeping and Reporting Procedures for Spills, Leaks, and Other Discharges

Records must include the following:

- The date and time of the incident, weather conditions, duration, cause, environmental problems, response procedures, parties notified, recommended revisions of the BMP program, operating procedures/equipment needed to prevent recurrence;

- Formal written reports. **(Document all reports called in to the National Response Center in the event of a reportable quantity discharge);** and,

- A list of the procedures for notifying the appropriate personnel and the names and telephone numbers of responsible personnel.

All inspections must be kept on file as directed by the pollution prevention team. The team will be responsible for reviewing the inspection records and when necessary implement correction measures.

Records Retention

Records of spills, leaks, or other discharges, inspections, and maintenance activities must be retained for at least three (3) years after coverage expires under the permit.

9. FUELING STATIONS

When storm water mixes with fuel spilled or leaked onto the ground, it becomes polluted with chemicals that are harmful to humans and to fish and wildlife. The following will help identify activities that can contaminate storm water and suggest BMPs to reduce or eliminate storm water contamination from fueling stations. (Refer to Exposure Minimization BMP).

Fuel station activities that can contaminate storm water:

- Spills and leaks that happen during fuel or oil delivery.

  Fuel overflows during storage tank filling are a major source of spills. Overflows can be prevented. Watch the transfer constantly to prevent overfilling and spills. Overfill prevention equipment automatically shuts off flow, restricts flow, or sounds an alarm when the tank is almost full. Federal regulations require overfill prevention equipment on all Underground Storage Tanks (USTs) installed after December 1988. For USTs installed before December 1988, overfill prevention equipment is required by 1998. Consider installing overflow prevention equipment sooner than the required deadline as part of the SWPPP.

  Spills should be controlled immediately. Small spills can be contained using sorbent material such as oil dry or equivalent, straw, or sawdust. Do not wash petroleum spills into the storm drain or sanitary sewer. (Refer to Containment Diking and Curbing BMPs).

- Spills caused by "topping off fuel tanks".

  Gas pumps automatically shut off when the vehicle fuel tank is almost full to prevent spills. Trying to completely fill the tanks or topping off the tank often results in overfilling the tank and spilling fuel. Discourage topping off by training personnel and posting signs.

- Allowing rainfall on the fuel area or storm water to run onto the fuel area.

  Fueling areas can be designed to minimize spills, leaks, and incidental losses of fuel, such as vapor loss, from coming into contact with rain water:

  - Build a roof over the fuel area.

  - Pave the fuel area with concrete instead of asphalt. Asphalt soaks up fuel or can be slowly dissolved by fuel, engine fluids, and other organic liquids and the asphalt itself can become a source of storm water contamination.

- Allowing runon to the fuel areas.

  Runon is storm water generated from other areas that flows or "runs on" to COASTSYSTA property or site. Runon flowing across fueling areas can wash contaminants into storm drains. Runon can be **minimized** by:

  - Grading, berming, or curbing the area around the fuel site to direct runon away from the fuel area

  - Locating roof downspouts so storm water is directed away from fueling areas;

  - Using valley gutters to route storm water around fueling area; and,

- Hosing or washing down the fuel area.

Cleaning the fueling area with running water should be **avoided** because the wash water will transport fuel, oil, and grease and may potentially enter the storm water. Consider using a damp cloth on the pumps and a damp mop on the pavement rather than a hose. **Check with the local sewer authority about any treatment required before discharging the mop water or wash water to the sanitary sewer.**

The key to a successful SWPPP is getting personnel interested in reducing waste generation.

Discuss pollution prevention with personnel. They are most familiar with the operations that generate wastes and may have helpful waste reduction suggestions. Consider setting up an personnel reward program to promote pollution prevention.

Wash water and storm water in fueling areas drain directly into the storm sewer without adequate treatment. Some types of oil/water separators installed at these locations can provide treatment to discharges from oil contaminated pavements, but this equipment is only effective when properly maintained.

SUMMARY OF FUELING STATION BMPs

- Consider installing spill and overflow protection;
- Discourage topping off of fuel tanks;
- Reduce exposure of the fuel area to storm water;
- Use dry cleanup methods for the fuel area;
- Use proper petroleum spill control; and,
- Encourage personnel participation.

10. VEHICLE AND EQUIPMENT MAINTENANCE

Many vehicle and equipment maintenance operations use materials or create wastes that are harmful to humans and the environment. Storm water runoff from areas where these activities occur can become polluted by a variety of contaminants such as solvents and degreasing products, waste automotive fluids, oils, greases, acids, and caustic wastes. These and other harmful substances in storm water can enter water bodies through storm drains or through small streams where they can harm fish and wildlife.

The following will help find sources of storm water contamination from vehicle and equipment maintenance operations and to help personnel choose BMPs that can reduce or eliminate these sources.

Activities that can Contaminate Storm Water

Engine repair and service:

- Parts cleaning;
- Shop cleanup;
- Spilled fuel, oil, or other materials; and,
- Replacement of fluids (oil, oil filters, hydraulic fluids, transmission fluid, and radiator fluids).

Outdoor vehicle and equipment storage and parking:

- Dripping engine and automotive fluids from parked vehicles and equipment.

Disposal of materials or process wastes:

- Greasy rags;
- Oil filters;
- Air filters;
- Batteries; and,
- Spent coolant, degreasers, etc.

Parts Cleaning

Parts are often cleaned using solvents such as trichloroethylene, 1,1,1-trichloroethane or methylene chloride. Many of these cleaners are harmful and must be disposed of as a hazardous waste. Cleaning without using liquid cleaners whenever possible reduces waste. Scrape parts with a wire brush, or use a bake oven if one is available. Prevent spills and drips of solvents and cleansers to the shop floor. Perform all liquid cleaning at a centralized station so the solvents and residues stay in one area. If parts are dipped in liquid, remove them slowly to avoid spills. Locate drip pans, drain boards, and drying racks to direct drips back into a sink or fluid holding tank for reuse.

Nontoxic or Less Toxic Cleaners or Solvents

Eliminate or reduce the number or amount of hazardous materials and waste by substituting nonhazardous or less hazardous materials, if possible. For example:

- Use non-caustic (non-corrosive) detergents instead of caustic cleaning agents for parts cleaning (ask suppliers about alternative cleaning agents);
- Use detergent-based or water-based cleaning systems in place or organic solvent degreasers;
- 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 but are by no means harmless themselves. Check the list of active ingredients to see whether it contains chlorinated solvents; and,
- Choose cleaning agents that can be recycled.

Contact suppliers or trade journals for more product specific waste minimization suggestions.

Work Areas and Spills that are Washed or Hosed Down with Water

Clean up leaks, drips, and other spills without using large amounts of water. Use rags for small spills, a damp mop for general cleanup, and dry absorbent material for larger spills. Consider the following BMPs:

- Avoid hosing down work areas;
- Collect leaking or dripping fluids in drip pans or containers. If different liquids are kept separate, the fluids are easier to recycle;

- Keep a drip pan under the vehicle while unclipping hoses, unscrewing filters, or removing other parts. Use a drip pan under any vehicle that might leak while it is being worked on to keep splatters or drips off the shop floor;

- Promptly transfer used fluids to the proper waste or recycling drums. Do not leave full drip pans or other open containers lying around; and,

- Locate waste and recycling drums in properly controlled areas of the yard, preferably areas with a concrete slab and secondary containment.

Spills or Materials that are Washed or Poured Down the Drain

Do not pour liquid waste into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections. Used or leftover cleaning solutions, solvents, and automotive fluids and oil are often toxic and should not be put into the sanitary sewer. Be sure to dispose of these materials properly or find opportunities for reuse and recycling. **If it is uncertain of how to dispose of chemical wastes, contact state hazardous waste management agency or the Resource Conservation and Recovery Act (RCRA) hotline at 1-800-424-9346.** Post signs at sinks to remind personnel, and paint stencils at outdoor drains to notify personnel and others not to pour liquid waste down drains.

Oil Filters Should Be Completely Drained Before Recycling or Disposal

Oil filters disposed of in trash cans or dumpsters can leak oil and subsequently contaminate storm water. Place the oil filter in a funnel over the waste oil recycling or disposal collection tank to drain excess oil before disposal. Oil filters can be crushed and recycled; ask oil suppliers or recyclers about recycling oil filters as an alternative to disposal.

Incoming Vehicles and Equipment Should be Checked For Leaking Oil and Fluids

Park vehicles indoors or under a roof, if possible, so storm water does not contact the area. If vehicles are parked outdoors prior to repair, watch them closely for leaks.

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 first.

Designate a special area to drain and replace motor oil, coolant, and other fluids, where there are no connections to the storm drain/sanitary sewer and drips and spills can be easily cleaned up.

Wrecked Vehicles or Damaged Equipment That Are Stored On-site

Be especially careful with wrecked vehicles, whether kept indoors or out, as well as with vehicles kept on-site for scrap or salvage. Wrecked or damaged vehicles often drip oil and other fluids for several days.

- As the vehicles arrive, place drip pans under them immediately, even if suspected that all fluids have leaked out before the vehicles reaches the shop;
- Build a shed or temporary roof over areas where parked vehicles await repairs or salvage, especially if wrecked vehicles are handled. Build a roof over vehicles kept for parts;
- Drain all fluids, including air conditioner coolant, from wrecked vehicles and "parts" vehicles. Drain engines, transmissions, and other used parts; and,
- **Store cracked batteries in a non-leaking secondary container.** Do this with all cracked batteries, event if all the acid has been suspected to have drained out. **If a battery is dropped, treat it as if it is cracked.** Put in into the containment area along with absorbent material until it is verified that it is not leaking.

Recycle Any Or All Of The Following:

- Degreasers;
- Used oil or oil filters;
- Antifreeze;
- Cleaning solutions;
- Automotive batteries; and,
- Hydraulic fluid.

All of these materials can be either recycled on-site or sent off-site for recycling. Some recycling options, ranked by level of effort required, follow:

Least Effort:

- Arrange for collection and transportation of batteries, used oil and other fluids, cleaning solutions, and degreasers to a commercial recycling facility. This requires that wastes are separated and stored until they are picked up by the recycling company.
- "Dirty" solvent can be reused. Presoak dirty parts in used solvent before cleaning the parts in fresh solvent.

Moderate Effort:

- Used oil, antifreeze, and cleaning solutions can be recycled on-site using a filtration system that removes impurities and allows the fluid to be reused. Filtration systems are commercially available.

Most Effort:

- Install an on-site solvent recovery unit. If the facility creates large volumes of used solvents, consider purchasing or leasing an on-site still to recover the solvent for reuse. **Contact the state hazardous waste management agency for more information about on-site recycling of used solvents.**

Reduce the Number of Different Solvents Used

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

Separate Wastes

Separating wastes allows for easier recycling and may reduce treatment costs. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents (like 1,1,1-trichloroethane) separate from non-chlorinated solvents (kerosene and mineral spirits). Proper labeling of all wastes and materials will help accomplish this goal (Refer to Signs and Labels BMP).

Recycled Products

Many products made of recycled (refined or purified) materials are available. Engine oil, transmission fluid, antifreeze, and hydraulic fluid are available in recycled form. Buying recycled products supports the market for recycled materials.

SUMMARY OF VEHICLE MAINTENANCE AND REPAIR BMPs

- Check for leaking oil and fluids;
- Use nontoxic or low-toxicity materials;
- Drain oil filters before disposal or recycling;
- Do not pour liquid waste down drains;
- Recycle engine fluids and batteries;
- Isolate and label wastes; and,
- Buy recycled products.

11. PAINTING OPERATIONS

Many painting operations use materials or create wastes that are harmful to humans and the environment. Storm water runoff from areas where these activities occur can become polluted by a variety of contaminants such as solvents and dusts from sanding and grinding that contain toxic metals like cadmium and mercury. These and other potentially harmful substances in storm water can enter water bodies directly through storm drains where they can harm fish and wildlife.

The following will help identify potential sources of storm water contamination from painting operations on site and BMPs that can reduce or eliminate these sources. Implementing this section can help eliminate, reduce, or recycle pollutants that may otherwise contaminate storm water.

Painting Activities that can Contaminate Storm Water:

- Painting and paint removal;
- Sanding or paint stripping; and,
- Spilled paint or paint thinner.

Prevent Paint Wastes from Contaminating Storm Water Runoff

Use tarps and vacuums to collect solid wastes produced by sanding or painting. Tarps, drip pans, or other spill collection devices should be used to collect spills of paints, solvents, or other liquid materials. These wastes should be disposed of properly to keep them from contaminating storm water.

Contain Wastes From Sanding

Prevent paint chips from coming into contact with storm water. Paint chips may contain hazardous metallic pigments or biocides(pesticides). Reduce contamination of storm water with paint dust and chips from sanding by the following practices:

- Avoid sanding in windy weather when possible;
- Enclose outdoor sanding areas with tarps or plastic sheeting. Be sure to provide adequate ventilation and personal safety equipment. After sanding is complete, collect the waste and dispose of it properly;
- Keep workshops clean of debris and grit so that the wind will not carry any waste into areas where it can contaminate storm water; and,
- Move the activity indoors if it can be performed safely.

Inspect Parts Before Painting

Inspect the part or vehicle to be painted to ensure that it is dry, clean, and rust free. Paint sticks to dry, clean surfaces, which in turn means a better, longer-lasting paint job.

Use Painting Equipment that Creates Little Waste

As little as 30 percent of the paint may reach the target from conventional airless spray guns; the rest is lost as overspray. Paint solids from overspray are deposited on the ground where they can contaminate storm water. Other spray equipment that delivers more paint to the target and less overspray should be used:

- Electrostatic spray equipment;
- Air-atomized spray guns;
- High-volume/low-pressure spray guns; and,
- Gravity-feed guns.

Train Personnel to Use Spray Equipment Correctly

Operator training can reduce overspray and minimize the amount of paint solids that can contaminate storm water. Correct spraying techniques also reduce the amount of paint needed per job. If possible, avoid spraying on windy days. When spraying outdoors, use a drop cloth or ground cloth to collect and dispose of overspray.

Recycle Paint, Paint Thinner and/or Solvents

These materials can either be recycled on-site or sent off-site for recycling. Some recycling options ranked by the level of effort required are listed below.

Least Effort:

- Dirty solvent can be reused for cleaning dirty spray equipment and parts before equipment is cleaned in fresh solvent; and,
- Give small amounts of leftover paint to the customer for touchup.

Moderate Effort:

- Arrange for collection and transportation of paints, paint thinner, or spent solvents to a commercial recycling facility.

Most Effort:

- Install an on-site solvent recovery unit. If the facility creates large volumes of used solvents, paint, or paint thinner, consider buying or leasing an on-site still to recover used solvent for reuse. Contact the state hazardous waste management agency for more information about on-site recycling of used solvents.

Separate Wastes

Separating wastes makes recycling easier and may reduce treatment costs. Keep hazardous and nonhazardous wastes separate, and keep chlorinated solvents (like 1,1,1-trichloroethane) separate from non-chlorinated solvents (like petroleum distillate and mineral spirits). Check the Materials Safety Data Sheet (MSDS) for ingredients, or talk with waste haulers or recycling companies to learn which waste types can be stored together and which should be separated.

Reduce the Number of Solvents Used

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

Use Recycled Products

Many products made of recycled (refined or purified) materials are available. Buying recycled paints, paint thinner, or solvent products helps build the market for recycled materials.

SUMMARY OF PAINTING OPERATION BMP

- Inspect parts prior to painting;
- Contain sanding wastes;
- Prevent paint waste from contacting storm water;
- Proper interim storage of waste paint, solvents, etc.;
- Evaluate efficiency of equipment;
- Recycle paint, paint thinner, and solvents;
- Segregate wastes; and,
- Buy recycled products.

12. VEHICLE AND EQUIPMENT WASHING

Washing vehicles and equipment outdoors or in areas where wash water flows onto the ground can pollute storm water. Wash water can contain high concentrations of oil and grease, phosphates, and high suspended solid loads (these and other potentially harmful substances can pollute storm water when deposited on the ground where they can be picked up by rainfall runoff). Vehicle wash water is considered to be a process wastewater and needs to be covered by a National Pollutant Discharge Elimination System (NPDES) permit.

The following will help find sources of storm water contamination from vehicle and equipment washing and to select BMPs to reduce those sources. This section can help eliminate, reduce, or recycle pollutants that otherwise may contaminate storm water. (Refer to Vehicle Washing BMP).

Vehicle and Equipment Washing Activities That Can Contaminate Storm Water

- Outside equipment or vehicle cleaning (washing or steam cleaning); and,
- Wash water discharged directly to the ground or storm water drain.

Consider Using Phosphate-Free Biodegradable Detergents

Phosphates, which are plant nutrients, can cause excessive growth of nuisance plants in water when they enter lakes or streams in wash water. Contact suppliers about phosphate-free biodegradable detergents that are available on the market.

Vehicles, Equipment, or Parts that are Washed Over the Open Ground

Used wash water may contain high concentrations of solvents, oil and grease, detergents, and metals. Try not to wash parts or equipment outside. Washing over impervious surfaces like concrete, blacktop, or hardpacked dirt allows wash water to enter storm drains directly or deposits contaminants on the ground, where they are washed into storm drains when it rains. Washing over pervious ground such as sand soils potentially can pollute ground water. Therefore, small parts and equipment washing should be done over a parts washing container where the wash water can be collected and recycled or disposed of properly.

If washing large equipment or vehicles take place, and it is necessary to wash outside; designate a specific area for washing. This area should be bermed to collect the wastewater and graded to direct the wash water to a treatment facility. Consider filtering and recycling vehicle wash water. If recycling is not practical, the wastewater can be discharged to the sanitary sewer.

SUMMARY OF VEHICLE AND EQUIPMENT WASHING BMPs

- Consider use of phosphate-free detergents;
- Use designated cleaning areas; and,
- Consider recycling wash water.

Personnel Involvement is the Key

Getting personnel interested in reducing waste is the key to a successful SWPPP. Discuss pollution prevention with personnel. They are most familiar with the operations that generate wastes and may have helpful waste reduction suggestions. Consider setting up a personnel award program to promote pollution prevention.

13. LOADING AND UNLOADING MATERIALS

Loading/unloading operations usually take place outside on docks or terminals. Materials spilled, leaked, or lost during loading/unloading may collect in the soil or on other surfaces and be carried away by rainfall runoff or when the area is cleaned. Rainfall may wash off pollutants from machinery used to unload or load materials. The following will help find sources of storm water contamination from loading and unloading materials and choose BMPs to reduce or eliminate those sources. (Refer to Loading and Unloading by Air Pressure or Vacuum BMP).

Loading and Unloading Activities that can Contaminate Storm Water

- Pumping of liquids or gases from barge, truck or rail car to a storage facility or vice versa;
- Pneumatic transfer of dry chemicals to or from the loading and unloading vehicles;
- Transfer by mechanical conveyor systems; and,
- Transfer of bags, boxes, drums, or other containers by forklift, trucks, or other material handling equipment.

Tank Trucks and Material Delivery Vehicles Should Be Located Where Spills or Leaks Can Be Contained

Loading and unloading equipment and vehicles should be located so that leaks can be contained in existing containment and flow diversion systems.

Loading/Unloading Equipment Should Be Checked Regularly For Leaks

Check vehicles and equipment regularly for leaks, and fix any leaks promptly. Common areas for leaks are valves, pumps, flanges, and connections. Look for dust or fumes. These are signs that material is being lost during unloading/loading operations.

Loading/Unloading Docks or Areas Should Be Covered to Prevent Exposure to Rainfall

Covering loading and unloading areas, such as building overhangs at loading docks, can reduce exposure of materials, vehicles, and equipment to rain.

Loading/Unloading Areas Should Be Designed to Prevent Storm Water Runon

Runon is storm water created from other areas that flows or "runs on" to the property or site. Runon flowing across loading/unloading areas can wash contaminants into storm drains. Runon can be **minimized** by:

- Grading, berming, or curbing the area around the loading area to direct runon away from the area; and,
- Placing roof downspouts so storm water is directed from loading sites and equipment and preferably

to a grassy or vegetated area where the storm water can soak into the ground.

SUMMARY OF LOADING/UNLOADING OPERATION BMPs

- Contain leaks during transfer;
- Check equipment regularly for leaks;
- Limit exposure of material to rainfall;
- Prevent exposure of material to rainfall; and,
- Prevent storm water runon.

14. LIQUID STORAGE IN ABOVE-GROUND TANKS

Accidental releases of chemicals from above-ground liquid storage tanks can contaminate storm water with many different pollutants. Materials spilled, leaks, or lost from storage tanks may accumulate in soils or on other surfaces and be carried away by rainfall runoff. The following can help find sources of storm water contamination from aboveground storage tanks and select BMPs to reduce or eliminate those sources. (Refer to the BMPs on Exposure Minimization and Exposure Mitigation).

The most common causes of unintentional releases from tanks:

- External corrosion and structural failure;
- Installation problems;
- Spills and overfills due to operator error;
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves); and,
- Leaks or spills during pumping of liquids or gases from barges, trucks, or rail cars to a storage facility.

Storage Tanks That Contain Liquid Hazardous Materials, Hazardous Wastes, or Oil

Storage of oil and hazardous materials must meet specific standards set by Federal and state laws. These standards include Spill Prevention Control and Countermeasure (SPCC) plans, secondary containment, installation, integrity and leak detection monitoring, and emergency preparedness plans. Federal regulations set specific standards for preventing runon and collecting runoff from hazardous waste storage, disposal, or treatment areas. These standards apply to container storage areas and other areas used to store, treat, or dispose of hazardous waste. If the collected storm water is a hazardous waste, it must be managed as a hazardous waste in accordance with all applicable state and Federal environmental regulations. **To find out more about storage requirements, call the toll-free Environmental Protection Agency's (EPA) Resource Conservation and Recovery Act (RCRA) hotline at 1-800-424-9346 or contact the state hazardous waste management agency.**

Operators Should be Trained in Correct Operating Procedures and Safety Activities

Well-trained personnel can reduce human errors that lead to accidental releases or spills.

Safeguards Should be Implemented Against Accidental Releases

Engineered safeguards can help prevent operator errors that may cause the accidental release of pollutants. Safeguards include:

- Overflow protection devices on tank systems to warn the operator or to automatically shut down transfer pumps when the tank reaches full capacity;
- Protective guards around tanks and piping to prevent vehicle or forklift damage; and,
- Clearly tagging or labeling of valves to reduce human error.

Tank Systems Should be Inspected and Tank Integrity Tested Regularly

Visually inspect the tank system to identify problem areas before they lead to a release. Correct any problems or potential problems as soon as possible. An audit of a newly installed tank system by a registered and specially trained professional engineer can identify and correct potential problems such as loose fittings, poor welding, and improper or poorly fitted gaskets. Operators should visually inspect the tank system on a routine basis after installation. Areas to inspect include tank foundations, connections, coatings, tank walls, and the piping system. Look for corrosion, leaks, straining of tank support structures from leaks, cracks, scratches in protective coatings, or other physical damage that may weaken the tank system. **Integrity testing should be done periodically by a qualified professional.**

Tanks Should be Bermed or Surrounded by a Secondary Containment System

A secondary containment system around both permanent and temporary tanks allows leaks to be more easily detected and contains spills or leaks. Methods include berms, dikes, liners, vaults, and double-walled tanks.

SUMMARY OF BMPS FOR LIQUID STORAGE IN ABOVE-GROUND TANKS

- Comply with applicable state and federal laws;
- Properly train personnel;
- Install safeguards against accidental releases;
- Routinely inspect tanks and equipment; and,
- Consider installing secondary containment.

15. INDUSTRIAL WASTE MANAGEMENT AREAS AND OUTSIDE MANUFACTURING

Storm water runoff from areas where industrial waste is stored, treated, or disposed of can be polluted. Outside manufacturing activities can also contaminate storm water runoff. Activities such as rock

grinding or crushing, painting or coating, grinding or sanding, degreasing or parts cleaning, or operations that use hazardous materials are particularly dangerous. Wastes spilled, leaked, or lost from waste management areas or outside manufacturing activities may build-up in soils or on other surfaces and be carried away by rainfall runoff. There is also a potential for liquid wastes from lagoons or surface impoundments to overflow to surface waters or soak the soil where they can be picked up by storm water runoff. Possible storm water contaminants include toxic compounds, oil and grease, paints or solvents, heavy metals, and high levels of suspended solids.

The best way to reduce the potential for storm water contamination from both waste management areas and outside manufacturing activities is to reduce the amount of waste that is created and, as a result, the amount that must be stored or treated. The following will help determine BMPs that can eliminate or reduce the amount of toxicity of industrial wastes as well as minimize contamination of storm water from existing waste management areas. Waste reduction BMPs are appropriate for a wide range of industries and are designed to provide ideas on ways to reduce wastes.

Industrial waste management activities or areas that can contaminate storm water:

- Landfills;
- Waste piles;
- Wastewater and solid waste treatment and disposal:
    - Waste Pumping,
    - Additions of treatment chemicals,
    - Mixing,
    - Aeration,
    - Clarification, and,
    - Solids dewatering; and
- Land application.

Look for Ways to Reduce Waste at the Facility

The first step to reducing wastes is to assess activities at the facility. The assessment is designed to find situations at the facility where you can eliminate or reduce waste generation, emissions, and environmental damage. Starting a waste reduction program has many potential benefits. Some of these benefits are direct (cost savings from reduced raw material use), while others are indirect (avoided waste disposal fees).

Outside manufacturing activities or situations that can contaminate storm water:

- Processes or equipment that generate dusts, vapors, or emissions;
- Outside storage of hazardous materials or raw materials;
- Dripping or leaking fluids from equipment or processes; and,

- Liquid wastes discharged directly onto the ground or into the storm sewer.

Consider Waste Reduction BMPs

There are many different types of BMPs that can help eliminate or reduce the amount of industrial waste generated the facility. Some of these BMPs are listed below:

- Production planning and sequencing;
- Process or equipment modification;
- Raw material substitution or elimination;
- Loss prevention and housekeeping;
- Waste segregation and separation;
- Closed-loop recycling;
- Training and supervision; and,
- Reuse and recycling.

Industrial Waste Management and Outside Manufacturing Areas Should Be Checked Often for Spills and Leaks

By checking waste management areas for leaking containers or spills, you can prevent wastes from contaminating storm water. Look for containers that are rusty, corroded, or damaged. Transfer wastes from these damaged containers into safe containers. Close the lids on dumpsters to prevent rain from washing wastes out of holes or cracks in the bottom of the dumpster. In outside areas, look for leaking equipment (valves, lines, seals, or pumps) and fix leaks promptly. Inspect rooftop and other outdoor equipment (HVAC devices, air pollution control devices, transformers, piping) for leaks or dust concentrations.

Industrial Waste Management Areas or Manufacturing Activities Should Be Covered, Enclosed or Bermed

The best way to **avoid** contaminating storm water from existing waste management and manufacturing areas is to prevent storm water runon or rain from entering or contracting these areas. This can be done by:

- Preventing direct contact with rain;
- Moving the activity indoors after ensuring that all safety concerns such as fire hazard and ventilation are addressed;

- Covering the area with a permanent roof;

- Covering waste piles with a temporary covering material such as a reinforced tarpaulin, polyethylene, polyurethane, polypropylene, or Hypalon; and,

- Minimizing storm water runon by enclosing the area or building a berm around the area.

Vehicles Used to Transport Wastes to the Land Disposal or Treatment Site Should Be Equipped with Anti-Spill Equipment

Equipment transport vehicles equipped with spill prevention equipment can prevent spills of wastes during transport. Examples include:

- Vehicles equipped with baffles for liquid wastes;

- Trucks with sealed gates and spill guards for solid wastes; and,

- Trucks with tarps.

Use Loading Systems That Minimize Spills and Fugitive Losses Such as Dust or Mists

Wastes lost during loading or unloading can contaminate storm water. Vacuum transfer systems minimize waste loss.

Sediments or Wastes Should be Prevented From Being Tracked Off-site

Waste and sediment tracked off-site can end up on the streets where they are picked up by storm water runoff. Avoid this by using vehicles with specially designed tires, washing vehicles in a designated area before they leave the site, and controlling the wash water by providing a drainage system.

Minimized Storm Water Runoff From Land Disposal Sites

Take precautions to minimize the runoff of polluted storm water from land application sites. Some precautions are detailed as follows:

- Choose the land application site carefully. Characteristics that help prevent runoff include: slopes under six (6) percent, permeable soils, a low water table, locations away from wetlands or marshes, and closed drainage systems;

- Avoid applying waste to the site when raining, the ground is frozen or saturated with water. Grow grasses on areas dedicated to land disposal to stabilize the soils and reduce the volume of surface water runoff from the site;

- Maintain adequate barriers between the land application site and receiving waters;

- Erosion control techniques including mulching and matting, filter fences, straw bales, diversion terracing, or sediment basins; and,

- Perform routine maintenance to make sure that erosion control or site stabilization measures are working.

SUMMARY OF INDUSTRIAL WASTE MANAGEMENT AND OUTSIDE MANUFACTURING BMPS

- Conduct a waste reduction assessment;
- Institute industrial waste source reduction and recycling BMPs;
- Prevent runoff and runon from contacting the waste management area; and,
- Minimize runoff from land application sites.

16. OUTSIDE STORAGE OF RAW MATERIALS, BY-PRODUCTS, OR FINISHED PRODUCTS

Raw materials, by-products, finished products, containers, and material storage areas exposed to rain/runoff can pollute storm water. Storm water can become contaminated by a wide range of contaminants (metals, oil, and greases) when solid materials wash off or dissolve into water, or by spills or leaks. Potential sources of storm water contamination and select BMPs that can reduce or eliminate those sources are listed below.

Materials Should Be Protected From Rainfall, Runon and Runoff

The best way to avoid contaminating storm water from outside material storage areas is to prevent rain or storm water runon from coming in contact with the material(s). This can be done by:

- Storing the material indoors;
- Covering the area with a roof;
- Covering the material with a temporary covering made of polyethylene, polyurethane, polypropylene, or Hypalon; and,
- Minimizing storm water runon by enclosing the area or building a berm around the area.

These materials should not be stored outside or in areas where they can contaminate storm water:

- Fuels
- Raw materials;
- By-products;
- Intermediates;
- Final products; and,
- Process residuals.

SUMMARY OF BMPs FOR OUTSIDE STORAGE OF RAW MATERIALS, BY-PRODUCTS, OR FINISHED PRODUCTS

- Cover or enclose materials.

17. STORM WATER CONVEYANCES (Channels/Gutters/Drains/Sewers)

Storm water conveyances such as channels, gutters, drains, and sewers, collect storm water runoff and direct its flow. Storm water conveyances can be used for two different purposes; first, to keep uncontaminated storm water from coming in contact with areas of an industrial site where it may become contaminated with pollutants and second, to direct the contaminated runoff to a treatment facility.

Storm water conveyances can be constructed or lined with many different materials, including: concrete, clay tiles, asphalt, plastics, metals, riprap, compacted soils, and vegetation. The type of material used depends on the function of the conveyance, which can be temporary or permanent.

Storm water conveyances usually work well at most industrial sites. Storm water can be directed away from industrial areas by collecting it in channels or drains before it reaches these areas. Additionally, conveyances can be used to collect storm water downhill from industrial areas and keep it separate from runoff that has not been in contact with those areas. When potentially contaminated storm water is collected in a conveyance like this, it can be directed to a treatment facility on the site if necessary. (If a pollutant is spilled, is should **NOT** be allowed to enter a storm water conveyance or drain system).

Conveyance systems are most easily installed during construction of a facility. Use of existing grades will decrease costs. Grades should be positive to allow for the continued movement of the runoff through the conveyance system; however, grades should not create an increase in velocity that increases erosion.

Storm water conveyances should be inspected for debris removal within 24 hours of rainfall. During periods of prolonged rainfall, inspect the conveyances daily, since heavy storms may clog or damage them. Repair damages to these structures as soon as possible.

Advantages of Storm Water Conveyances (Channels/Gutters/Drains/Sewers)	Disadvantages of Storm Water Conveyances (Channels/Gutters/Drains/Sewers)
• Direct storm water flows around industrial areas; • Prevent temporary flooding of industrial site; • Require low maintenance; • Provide erosion resistant conveyance of storm water runoff; and, • Provide long-term control of storm water flows.	• Once flows are concentrated in storm water conveyances, they must be routed through stabilized structures all the way to their discharge to the receiving water or treatment plant to minimize erosion; • May increase flow rates; • May be impractical if there are space limitations; and, • May not be economical, especially for small facilities or after a site has already been constructed.

18. DIVERSION DIKES

Diversion dikes or berms are structures used to block runoff from passing beyond a certain point. Temporary dikes are usually made with compacted soil and permanent dikes are constructed out of concrete, asphalt or similar materials.

Diversion dikes are used to prevent the flow of storm water runoff onto industrial areas. Limiting the volume of flow across industrial areas reduces the volume of storm water that may carry pollutants from the area, requiring treatment for pollutant removal. This BMP is suitable for industrial sites where significant volumes of storm water runoff tend to flow onto active industrial areas. Typically, dikes are built on slopes just uphill from an industrial area together with some sort of a conveyance such as a swale. The storm water conveyance is necessary to direct the water away from the dike so that the water will not pool and seep through the dike.

In planning for the installation of dikes, consider the slope of the drainage area, the height of the dike, the size of rainfall event it will need to divert, and the type of conveyance that will be used with the dikes. Steeper slopes result in higher volumes of runoff and higher velocities; therefore, the dike must be constructed to handle this situation. Remember that dikes are limited in their ability to manage large volumes of runoff.

Ideally, dikes are installed before industrial activity begins. However, dikes can be easily constructed at any time. Temporary dikes (usually made of soil) generally only last for 18 months or less, but they can be made into permanent structures by stabilizing them with vegetation. Vegetation is crucial for preventing the erosion of the dike.

Dikes should be inspected regularly for damage. This is especially important after storm events since a heavy rain may wash parts of a temporary dike away. Any necessary repairs should be made immediately to make sure the structure continues to function.

Advantages of Diversion Dikes	Disadvantages of Diversion Dikes
• Effectively limit storm water flows over industrial areas; • Can be installed at any time; • Are economically temporary structures, when built from soil on-site; and, • Can be converted from temporary to permanent at any time.	• Are not suitable for large drainage areas unless there is a gentle slope; and, • May require maintenance after heavy rains.

19. GRADED AREAS FOR PAVEMENT

Land surfaces can be graded or graded and paved so that storm water runoff is directed away from

industrial activity areas. The slope of the grade allows the runoff to flow, but limits the runoff from washing over areas that may be contaminated with pollutants. Like conveyances and dikes, graded areas can prevent runoff from contacting industrial areas and becoming contaminated with pollutants from these areas. Grading can be a permanent or temporary control measure.

Grading land surfaces is appropriate for any industrial site that has outdoor activities that may contaminate storm water runoff, such as parking lots or outdoor storage areas. Grading is often used with other practices, such as coverings, buffer zones, and other practices to reduce the runoff velocity and provide infiltration of the uncontaminated runoff, or to direct pollutant runoff to storm water treatment facilities.

Control and containment of runoff flows should be considered in the overall concept. The grading should control the uncontaminated flow by diverting it around areas that may have pollutants. The grading should also contain the contaminated flows or divert them to treatment facilities.

When regrading and paving an industrial area, the use of concrete paving instead of asphalt should be considered. This is especially important in potential spill sites or hazardous material storage areas. Asphalt absorbs organic pollutants and can be slowly dissolved by some fluids, thus becoming a possible source of contaminants itself. This control measure should be used with a cover, such as a roof, in areas where contaminants are of concern so that precipitation does not fall on the area and wash the contaminants down slope.

Inspect paving regularly for cracks that may allow contaminants to seep into the ground. Also, check to make sure that the drains receiving the storm water flow from the paved area remain unclogged with sediment or other debris so that low areas do not flood and wash over the areas where the contaminants may exist.

Advantages of Graded Areas and Pavement	**Disadvantages of Graded Areas and Pavement**
• Is effective in limiting storm water contact with contaminants; and, • Is relatively inexpensive and easily implemented.	• May be uneconomical to regrade and resurface large areas; and, • May not be effective during heavy precipitation.

20. CONTAINMENT DIKING

Containment dikes are temporary or permanent earth or concrete berms or retaining walls that are designed to hold spills. Diking, one of the most common types of containment, is an effective method of pollution prevention for above-ground liquid storage tanks and rail car or tank truck loading and unloading areas. Diking can provide one of the best protective measures against the contamination of storm water because it surrounds the area of concern and holds the spill, keeping spill materials separated from the storm water outside of the diked area.

Diking can be used at any industrial facility but is most commonly used for controlling large spills or releases from liquid storage areas and liquid transfer areas.

Containment dikes should be large enough to hold an amount equal to the largest single storage tank at the particular facility plus the volume of rainfall. For rail car and tank truck loading and unloading operations, the diked area should be capable of holding an amount equal to any single tank truck compartment. Materials used to construct the dike should be strong enough to safely hold spilled materials. The materials used usually depend on what is available on-site and the substance to be contained, and may consist of earth (soil or clay), concrete, synthetic materials (liners), metal or other impervious materials. In general, strong acids and bases may react with metal containers, concrete, and some plastics, so where spills may consist of these substances, other alternatives should be considered. Some of the more reactive organic chemicals may also need to be contained with special liners. If there are any questions about storing chemicals in certain dikes because of their construction materials, refer to the Material Safety Data sheets (MSDSs).

Containment dikes may need to be designed with impervious materials to prevent leaking or contamination of storm water, surface, and ground water supplies.

Similarly, uncontrolled overflows from dikes areas containing spilled materials or contaminated storm water should be prevented to protect nearby surface waters or ground waters. Therefore, dikes should have either pumping systems (Refer to Sumps BMPs) or vacuum trucks available to remove the spilled materials. When evaluating the performance of the containment system, you should pay special attention to the overflow system, since it is often the source of uncontrolled leaks. If overflow systems do not exist, accumulated storm water should be released periodically. Contaminated storm water should be treated prior to release. Mechanical parts, such as pumps or even manual systems (slide gates, stopcock valves), may require regular cleaning and maintenance.

When considering containment diking as a BMP, consult local authorities about any regulations governing construction of such structures to comply with local and State requirements. Facilities located in a flood plain should contact their local flood control authority to ensure that construction of the dikes is permitted.

Inspections of containment dikes should be conducted during or after significant storms or spills to check for washouts or overflows. In addition, regular checks of containment dikes (testing to ensure that dikes are capable of holding spills) is recommended. Soil dikes may need to be inspected on a more frequent basis.

Changes in vegetation, inability of the structure to retain storm water dike erosion, or soggy areas indicate

problems with the dike's structure. Damaged areas should be patched and stabilized immediately, where necessary. Earthen dikes may require special maintenance of vegetation, such as mowing and irrigation.

Advantages of Containment Diking	Disadvantages of Containment Diking
• Contains spills, leaks, and other releases and prevent them from flowing into runoff conveyances, nearby streams, or underground water supplies; • Permits materials collected in dikes to be recycled; and, • Is a common industry practice for storage tanks and already required for certain chemicals.	• May be too expensive for some smaller facilities; • Requires maintenance; and, • Could collect contaminated storm water, possibly resulting in infiltration of storm water to ground water.

21. CURBING

Like containment diking, curbing is a barrier that surrounds an area of concern. Curbing functions in a similar way to prevent spills and leaks from being releases to the environment by routing runoff to treatment or control areas. The terms curbing and diking are sometimes used interchangeably.

Because curbing is usually small scale, it cannot contain large spills like diking can, however, curbing is common at many facilities in small areas where handling and transferring liquid materials occur.

Curbing can be used at all industrial facilities. It is particularly useful in areas where liquid materials are transferred and as a storm water runoff control.

Common materials for curbing include earth, concrete, synthetic materials, metal, or other impenetrable materials. Asphalt is also a common material used in curbing.

For maximum efficiency of curbing, spilled materials should be removed immediately, to allow space for future spills. Curbs should have pumping systems, rather than drainage systems, for collecting spilled materials. Manual or mechanical methods, such as those provided by sump systems can be used to remove the material (Refer to Sumps BMP). Curbing systems should be maintained through curb repair (patching and replacement).

When using curbing for runoff control, facilities should protect the berm by limiting traffic and installing reinforced berms in areas of concern.

Spills of materials that are stored within a curbed area can be tracked outside of that area when personnel and equipment leave the area. This tracking can be minimized by grading within the curbing to direct the spilled materials to a downslope of the curbing. This will keep the materials away from personnel and equipment that pass through the area. It will allow the materials to accumulate in one area making cleanup much easier.

Inspections should also be conducted before forecasted rainfall events and immediately after storm events. If spilled or leaked materials are observed, cleanup should start immediately. This will prevent overflows/contamination of storm water runoff. In addition, prompt cleanup of materials will prevent dilution by rainwater, which can adversely affect recycling opportunities. Inspection of curbed areas should be conducted regularly, to clear clogging debris. Because curbing is sized to contain small spill volumes, maintenance should also be conducted frequently to prevent overflow of any spilled materials.

Advantages of Curbing	Disadvantages of Curbing
• Excellent method to control runon; • Inexpensive; • Easily installed;	• Not effective for holding large spills; and, • May require more maintenance than diking.

• Materials spilled within curbed areas can be recycled; and, • Exists as a common industry practice.	

22. DRIP PANS

Drip pans are small depressions or pans used to contain very small volumes of leaks, drips, and spills that occur at a facility. Drip pans can be depressions in concrete, asphalt, or other impenetrable materials or they can be made of metals, plastic, or any material that does not react with the dripped chemicals. Drip pans can be temporary or permanent.

Drip pans are used to catch drips from motors, valves, pipes, etc. so that the materials or chemicals can be cleaned up easily or recycled before they can contaminate storm water. Although leaks and drips should be repaired and eliminated as part of a preventive maintenance program, drip pans can provide a temporary solution where repair or replacement must be delayed. In addition, drip pans can be an added safeguard when they are positioned beneath areas where leaks and drips may occur.

Drip pans can be used at any industry where valves and piping are present and the potential for small volume leakage and dripping exist. When using drip pans, consider the location of the drip pan, weather conditions, the type of material to be used for the drip pan, and how it will be cleaned.

The location of the drip pan is important, because they must be inspected and cleaned frequently. Drip pans must be easy to reach and remove. In addition, take special care to avoid placing drip pans in precarious positions such as next to walkways, on uneven pavement/ground, or sitting on pipelines. Drip pans in these locations are easily overturned and may present a safety hazard, as well as an environmental hazard.

Weather conditions are also important factors. Heavy winds and rainfall move or damage drip pans because of their small size and their light weight (if not built-in). To prevent this, secure the pans by installing or anchoring them. Drip pans may be placed on platforms or behind wind blocks or tied down.

Personnel must pay attention to the pans and empty them when they are nearly full for drip pans to be effective. Because of their small holding capacities, drip pans will easily overflow if not emptied. Also, recycling efforts can be affected if storm water accumulates in drip pans and dilutes the spilled material. It is important to have clearly specified and easily followed practices of reuse/recycle and/or disposal, especially the disposal of hazardous materials. Many facilities dump the drip pan contents into a nearby larger volume storage container and periodically recycle the contents of the storage container.

Frequent inspection of the drip pans is necessary due to the possibility of leaks in the pan itself or in piping or valves that may occur randomly or irregular slow drips that may increase in volume. Conduct inspections **before** forecasted rainfall events to remove accumulated materials and **immediately** after storm events to empty storm water accumulations.

Advantages of Drip Pans	Disadvantages of Drip Pans
• Inexpensive; • Easily installed and simple to operate; • Allow for reuse/recycling of collected	• Contain small volumes only; • Must be inspected and cleaned frequently; • Must be secured during poor weather

material; and, • Empty or discarded containers may be reused as drip pans.	conditions; and, • Contents may be disposed of improperly unless facility personnel are trained in proper disposal methods.

23. COLLECTION BASINS

Collection basins, or storage basins, are permanent structures where large spills or contaminated storm water are contained and stored before cleanup or treatment. Collection basins are designed to receive spills, leaks, etc. that may occur and prevent these materials from being released to the environment. Unlike containment dikes, collection basins can receive and contain materials from many locations across a facility.

Collection basins are commonly confused with treatment units such as ponds, lagoons, and other containment structures. Collection basins differ from these structures because they are designed to temporarily store storm water rather than treat it.

Collection basins are appropriate for all industrial sites where space allows. Collection basins are particularly useful for areas that have a high spill potential.

The design and installation considerations for collection basins include sizing the basin either to hold a certain amount of spill or a certain size storm, or both. In designing the collection system, the type of material for the conveyances, compatibility of various materials to be carried through the system, and requirements for compliance with state and local regulations should be considered. Ideally, the system should function to route the materials quickly and easily to the collection basin.

When spills occur, the collection system must route the spill or storm water immediately to the collection basin. The collection system and basin may require cleaning after a spill is contained. Remove the collection basin contents immediately to prevent an unintentional release and recycle the spilled material as much as possible. Inspect the structure on a regular basis and after storm events or spills. Depending upon the types of pollutants that may be in the storm water, or are collected as spills, design of the basin may require a liner to prevent infiltration into the ground water. **Make sure that the installation of this Best Management Practice (BMP) does not violate State ground water regulations.**

It is possible that the collection basin may handle combustible or flammable spilled materials, explosion-proof pumping equipment and controls or other appropriate precautions should be taken to prevent explosions or fires. **Consult Occupational Safety and Health Administration (OSHA) and local safety codes/standards for specific requirements and guidance.**

Advantages of Collection Basins	Disadvantages of Collection Basins
• Store contaminated storm water until directed to a treatment facility; and, • Collect spills for recycling where materials are separated.	• May need a conveyance system for increased effectiveness; • May collect materials that are not compatible; • May reduce the potential for recycling materials by collecting storm water which dilutes the materials; and, • May create ground water problems if pollutants infiltrate into ground.

24. SUMPS

Sumps are holes or low areas that are structured so that liquid spills or leaks will flow down toward a particular part of a containment area. Frequently, pumps are placed in a depressed area and are turned on automatically to transfer liquids away from the sump when the level of liquids gets too high. Sumps can be temporary or permanent.

Sumps can be used at all facilities. Sumps are used with other spill containment and treatment measures and can be located almost anywhere on-site. Sumps are frequently located in low lying areas within material handling or storage areas.

When designing and installing a sump system, consider the pump location, function, and system alarms. Design and install the sump in the lowest lying area of a containment structure, allowing for materials to gather in the area of the sump. Construct the sump of impenetrable materials and provide a smooth surface so that liquids are funneled toward the pump. It may be appropriate to house the pumps in a shed or other structure for protection and stabilization.

There are numerous factors that should be considered when purchasing a pump. Base the size of the pump on the maximum expected volume to be collected in the containment structure. In some cases, more than one pump may be appropriate. Typically, pumps that can be submerged under the spill are the most appropriate for areas where large spills may occur and that may submerge the sump area. The viscosity (resistance to flow) of the material and the distance that the material must be pumped are also important considerations. Install pumps according the manufacturer's recommendations.

An alarm system can be installed for pumps that are used to remove collected materials. An alarm system can indicate that a pump should be operated by hand or that an automatically operated pump has failed to function. Ultimately, facility personnel should have some mechanism to take action to prevent spills from bypassing and overflowing containment structures.

The pumps and the alarm system used in the sump generally require regular inspections for service and maintenance of parts based on manufacturers' recommendations.

If it is possible that the sump may handle combustible or flammable spilled materials, explosion-proof pumping equipment and controls or other appropriate precautions should be taken to prevent explosions or fires. **Consult Occupational Safety and Health Administration (OSHA) and local safety codes/standards for specific requirements and guidance.**

Advantages of Sumps	Disadvantages of Sumps
• Provide a simple and quick collection method for recycling, reusing, or treating materials in a containment structure; and, • Commonly used at industrial facilities.	• Pumps may clog easily if not designed correctly; • May require maintenance/servicing agreements with pump dealers; and, • Costs for purchasing/replacing pumps may be high.

25. COVERING

Covering is the partial or total physical enclosure of materials, equipment, process operations, or activities. Covering certain areas or activities prevents storm water from coming into contact with potential pollutants and reduces material loss from wind blowing. Tarpaulins, plastic sheeting, roofs, buildings, and other enclosures are examples of covering that are effective in preventing storm water contamination. Covering can be temporary or permanent.

Covering is appropriate for outdoor material storage piles (stockpiles of dry materials, gravel, sand, compost, sawdust, wood chips, de-icing salt, and building materials) and areas where liquids and solids in containers are stored or transferred. Although it may be too expensive to cover or enclose all industrial activities, cover high-risk areas (identified during the storm water pollutant source identification). For example, cover chemical preparation areas, vehicle maintenance areas, areas where chemically treated products are stored, and areas where salts are stored.

If covering or enclosing the entire activity is not possible, the high-risk part of the activity can often be separated from other processes and covered. Another option that reduces the cost of building a complete enclosure is to build a roof over the activity. A roof may also eliminate the need for ventilation and lighting systems.

Evaluate the strength and longevity of the covering, as well as its compatibility with the material or activity being enclosed. When designing an enclosure, consider access to materials, their handling, and transfer. Materials that pose environmental and safety dangers because they are radioactive, biological, flammable, explosive, or reactive require special ventilation and temperature considerations.

Covering alone may not protect exposed materials from storm water contact. Place the material on an elevated, impermeable surface or build curbing around the outside of the materials to prevent problems from runon of uncontaminated storm water from adjacent areas.

Frequently inspect covering, such as tarpaulins, for rips, holes, and general wear. Anchor the covering with stakes, tie-down ropes, large rocks, tires, or other easily available heavy objects.

Practicing proper materials management within an enclosure or underneath a covered area is essential. For example, floor drainage within an enclosure should be properly designed and connected to the wastewater sewer where appropriate and allowed. **If connection to an off-site wastewater sewer is considered, the local Publicly Owned Treatment Works (POTW) should be consulted to find out if there are any pretreatment requirements or restrictions that must be followed.**

Advantages of Covering	Disadvantages of Covering
• Simple and effective; and, • Usually inexpensive.	• Requires frequent inspection; and, • May pose health or safety problems if enclosure is built over certain activities.

26. VEHICLE POSITIONING

Vehicle positioning is the practice of locating trucks or rail cars while transferring materials to prevent spills of materials onto the ground surface, which may then contaminate storm water runoff. Vehicle positioning is a simple and effective method of material spill prevention and yet it is commonly overlooked.

Vehicle positioning can be used at all types of industrial facilities. This practice is appropriate for any area where materials are transferred from or to vehicles, such as loading and unloading areas, storage areas, and material transfer areas. Use vehicle positioning in conjunction with other practices such as covering, sumps, drip pans, or loading and unloading by air pressure or vacuum where chemical spills are of concern.

The purpose of vehicle positioning is to locate vehicles in a stable and appropriate position to prevent problems, such as spills resulting from broken material storage containers, spills caused by vehicle movement during materials transfer activities, and spills caused by improperly located vehicles. Vehicles should also be positioned near containment or flow diversion systems to collect unexpected spills from leaks in transfer or connections. The following activities are included in this practice:

- Constructing walls that help in positioning the vehicles;
- Positioning vehicle either over a drain or on a sloped surface that drains to a containment structure;
- Outlining required vehicle positions on the pavement;
- Using wheel guards or wheel blocks;
- Posting signs requiring the use of emergency brakes; and,
- Requiring vehicles to shut off engines during materials transfer activities.

Advantages of Vehicle Positioning	Disadvantages of Vehicle Positioning
• Inexpensive; and, • Easy and effective.	• May require redesign of loading and unloading areas.

27. LOADING AND UNLOADING BY AIR PRESSURE OR VACUUM

Air pressure and vacuum systems are commonly used for transporting and loading and unloading materials. These systems are simple to use and effective in transferring dry chemicals or solids from one area to another, but are less effective as the particles of material become more dense.

In an air pressure system, a safety-relief valve and a dust collector are used to separate the dry materials from the air and then release the air accumulated during transfer operations. In a vacuum system, a dust collection device and an air lock, such as a rotary gate or trap door feeder, are typically used.

The use of mechanical equipment that involves enclosed lines, such as those provided by air pressure (also referred to as pneumatic) and vacuum loading systems, are effective methods for minimizing releases of pollutants into the environment. Because of the enclosed nature of the system, pollutants are not exposed to wind or precipitation and therefore have less potential to contaminate storm water discharges.

Air pressure and vacuum systems can be used at all types of industrial facilities. This equipment is located in material handling areas to use for storing, loading and unloading, transporting, or conveying materials.

Unlike many of the other BMPs discussed in this manual, air pressure and vacuum systems may be expensive because of the costs of purchasing the system and retrofitting the system to existing materials handling procedures. In many cases, these systems can be shipped to a facility and be installed on-site without contractor help. Manufacturer's recommendations should be followed closely to ensure proper installation. In other cases, systems may have to be designed specifically for a site. Proper design and installation are very important for air pressure and vacuum systems to be as effective as possible. The equipment may be weatherproof or, if not, consider enclosing or covering the equipment.

Conduct routine inspections of air pressure and vacuum systems. Regular maintenance is required of these systems, especially the dust collectors. Conduct maintenance activities based on manufacturers' recommendations. **Inspect air pressure systems more frequently due to the greater potential for leaks to the environment.**

Advantages of Loading and Unloading by Air Pressure or Vacuum	Disadvantages of Loading and Unloading by Air Pressure or Vacuum
• Quick and simple; • May be economical if materials can be recovered; and, • Minimizes exposure of pollutants to storm water.	• May be costly to install and maintain; • May not be appropriate for some denser materials; • May require site-specific design; and, • Dust collectors may need an installation permit under the Clean Air Act .

28. SWEEPING

Sweeping with brooms, squeegees, or other mechanical devices is used to remove small quantities of dry chemicals and dry solids from areas that are exposed to rain or storm water runoff. These areas may include dust or contaminant covered bags, drums containing remaining materials on their lids, areas containing enclosed or covered materials, and spills of dry chemicals/solids. Cleaning by sweeping with brooms is a low-cost practice that can be performed by all personnel and require no special equipment or training.

Sweeping can be used at many material handling areas and process areas. Timing is an important consideration for all mitigative practices. To be effective as a storm water control, cleanup must take place before rainfall or contact with storm water runoff or before an outside area is hosed down.

Do not limit cleanup activities to those outside activities that are exposed to rainfall. In many cases, tracking of materials to the outside from areas that are enclosed or covered (on shoes) may also occur.

Store brooms appropriately and do not expose them to precipitation. In addition, rules of compatibility also apply. Do not use the same broom to clean up two chemicals that are incompatible. Determine the compatibility between the brooms themselves and the chemical of concern before using this practice. If necessary, consult appropriate Material Safety Data Sheet (MSDS) information.

Advantages of Sweeping	Disadvantages of Sweeping
• Inexpensive; • Requires no special training; and, • Provides recycling opportunities.	• Labor-intensive practice; and, • Limited to small releases of dry materials.

29. SHOVELING

Shoveling is another manual cleanup method that is simple and low cost. Generally, shoveling can be used to remove larger quantities of dry chemicals and dry solids, as well as to remove wetter solids and sludges. Shoveling is also useful in removing accumulated materials from sites not accessible by mechanical cleanup methods.

Shoveling provides an added advantage over sweeping because cleanup methods are not limited to dry materials. In many cases, accumulated solids and sludges that are in ditches, sumps, or other facility locations can be effectively and quickly removed by shoveling.

Shovels can also be used to clean up contaminated frozen precipitation. Timing is an important consideration in any pollution reduction practice. Materials that could contaminate storm water runoff should be removed before any storm event.

Clean and store shovels properly. Plan for the transport and disposal or reuse of the shoveled materials.

Advantages of Shoveling	Disadvantages of Shoveling
• Inexpensive; • Provides recycling opportunities; and, • Can remediate larger releases and is effective for dry and wet materials.	• Labor-intensive; and, • Not an appropriate practice for large spills.

30. EXCAVATION PRACTICES

Excavation (removal of contaminated material) of released materials is typically conducted by mechanical equipment, such as BobCats and backhoes.

Excavation removes the materials of concern and any deposition of contaminants reducing the potential for storm water contamination. Mechanical cleanup methods are typically less precise than manual cleanup methods, resulting in reduced opportunities for recycle and reuse.

Excavation practices are most useful for large releases of dry materials and for areas contaminated by liquid material releases. In excavation, be sure that all of the contaminated material is removed. The excavated area should be stabilized as soon as possible after excavation is completed (paving, establishing vegetation).

Timing is an important consideration for all pollution reduction practices to be effective as a storm water control. Cleanup must take place **before** a rainfall event.

Conduct inspections, operations and maintenance in accordance with a manufacturer's recommendations, which may include the following:

- A schedule for inspection, maintenance, and servicing of the equipment;
- Parts replacement, rotation, and lubrication specifications; and,
- Procedures for evaluating all parts.

For any equipment used during cleanup, other considerations apply, including the following:

- Plows and backhoes should be stored appropriately with no exposure to precipitation; and,
- Excavated materials should be properly handled and disposed of properly.

Advantages of Excavation Practices	Disadvantages of Excavation Practices
• Cost effective method for cleaning up dry materials release; and, • Common and simple.	• Less precise, resulting in less recycling and reuse opportunities.

31. VACUUM AND PUMP SYSTEMS

Vacuum and pump systems are effective for cleaning up spilled or exposed materials.

The benefits of vacuum and pump cleanup systems are simplicity and speed. With such systems, only the spilled materials need be collected. Also, these systems are often portable and can be used at many locations to clean up releases to the environment. Portable systems can usually be rented.

Vacuum and pump systems can be used at any industrial facility; wet/dry materials can be collected with these systems. Vacuum systems can be used in material handling areas and process areas.

Consider the area of use and the most appropriate size for the system since these systems can be portable.

Advantages of Vacuum and Pump Systems	Disadvantages of Vacuum and Pump Systems
• Remove materials by air pressure or vacuum quickly and simply; • Collect materials accurately; and, • Offer good recycling opportunities.	• Initial capital cost; and, • Require equipment maintenance.

32. SORBENTS

Sorbents are materials that are capable of cleaning up spills through the chemical processes of adsorption and absorption. Sorbents adsorb (an attraction to the outer surface of a material) or absorb (taken in by the material like a sponge) only when they come in contact with the sorbent materials. The sorbents must be mixed with a spill or the liquid must be passed through the sorbent. Often the particles are held together in structures called booms, pads, or socks. Sorbents include, but are not limited to, the following:

- Common Materials (clays, sawdust, straw, and fly ash) - Generally come in small particles that can be thrown onto a spill that is on a surface. The materials absorb the spill by taking up the liquid;

- Polymers (polyurethane and polyolefin) - Come in the form of spheres, beads, or foam tablets. These materials absorb a chemical spill by taking up the liquid into their open-pore structure;

- Activated Carbon - Comes in a powdered or granular form and can be mixed with liquids to remove pollutants. This sorbent works by adsorbing the organics to its surface and can be recycled and then reused by a process called regeneration; and,

- "Universal Sorbent Material" - Is a silicate glass foam consisting of rounded particles that can absorb the material.

Sorbents are useful BMPs for facilities with liquid materials on-site. Timing is important for these practices to be effective as a storm water BMP. Cleanup must take place before a rainfall. Sorbents are often used in conjunction with curbing or other similar features to provide cleanup of small spills within a contained area.

"Universal Sorbent Materials" are suitable for use on many compounds including acids, alkalis, alcohols, aldehydes, arsenate, ketones, petroleum products, and chlorinated solvents.

Activated carbon is useful for adsorbing many organic compounds. Organics that are diluted in water can be passed through a column that is filled with the activated carbon material to remove the organics, or the activated carbon can be mixed in the water and can then be filtered out.

Polyurethane is good with chemical liquids such as benzene, chlorinated solvents, epichlorohydrin, and phenol. Polyolefin is used to remove organic solvents, such as phenol and various chlorinated solvents. The beads and spheres are usually mixed into a spill by use of a blower and then area skimmed from the top surface by use of an oil broom.

More common materials such as clay, sawdust, straw, and fly ash can be used for a liquid spill on a surface that is relatively impenetrable, and are usually spread over the spill area with shovels.

Booms, pads, and socks are also useful in areas where there are small liquid spills or drips or where small amounts of solids may mix with small amounts of storm water runoff. They can function both to absorb the pollutants from the storm water and restrict the movement of a spill. Socks are often used together with curbing to clean up small spills.

Because sorbents work by a chemical or physical reaction, some sorbents are better than others for certain types of spills. Therefore, the use of sorbents requires that personnel know the properties of the spilled material(s) to know which sorbent is appropriate. To be effective, sorbents must adsorb the material spilled but must **NOT** react with the spilled material to form hazardous or toxic substances. Always follow the manufacturers' recommendations.

For sorbents to be effective, they must be applied immediately in the release area. The use of sorbent material is generally very simple: the sorbent is added to the area of release, mixed well, and allowed to adsorb or absorb. Many sorbents are not reusable once they have been used. Proper disposal is required.

Advantages of Sorbents	**Disadvantages of Sorbents**
• Work in water environments (booms and socks); and, • Offer recycling opportunities (some types of sorbents).	• Require a knowledge of the chemical makeup of a spill (to choose the best sorbent); • Offer no recycling opportunities (some types of sorbents); • May be expensive practice for large spills; and, • May create disposal problems and increase disposal costs by creating a solid waste and potentially a hazardous waste.

33. GELLING AGENTS

Gelling agents are materials that interact with liquids either physically or chemically (thickening or polymerization). Some of the typical gelling agents are polyetlectrolytes, polyacrylamide, butyistyrene copolymers, polyacryionitrile, polyethylene oxide, and a gelling agent referred to as the universal gelling agent which is a combination of these synthetics.

Gelling interacts with a material by concentrating and congealing it to become semisolid. The semisolid gel later forms a solid material, which can then be cleaned up by manual or mechanical methods. The Best Management Practice (BMP) of using a gelling agent is one of the few ways to effectively control a liquid spill before it reaches a receiving water or infiltrates into the soil and then ground water.

Gelling agents are useful for facilities with significant amounts of liquid materials stored on-site. **Gels cannot be used to clean up spills on surface water unless authorized by the U.S. Coast Guard or EPA Regional Response Team.**

Gels can be used to stop the liquid's flow on land, prevent its seeping into the soil, and reduce the surface spreading of a spill. Because of these properties, gels can reduce the need for extensive cleanup methods and reduce the possibility of storm water contamination from an uncontrolled industrial spill. As with sorbents, the use of gels simply involves the addition of the gel to the area of the spill, mixing well, and allowing the mass to congeal. To use gels correctly, however, personnel need to know the properties of the spilled materials so that they can choose the correct gel.

Timing is particularly important for gelling agent use. Gelling agents must be applied immediately after the spill to prevent the movement of materials. The use of gelling agents results in a large bulk of congealed mass that usually cannot be separated. As a result, this mass will need to be cleaned up by manual or mechanical methods and disposed of properly.

Advantages of Gelling Agents	Disadvantages of Gelling Agents
• Stop the movement of spilled or released liquid materials; and, • Require no permanent structure.	• May require knowledge of the spilled materials to select correct gelling agents; • Usually offer no recycling opportunities; • May be difficult to clean up; and, • May create disposal problems/increase disposal costs by creating a solid waste and potentially a hazardous waste.

34. PREVENTATIVE MONITORING PRACTICES

Preventive monitoring practices include the routine observation of a process or piece of equipment to ensure its safe performance and may also include the chemical analysis of storm water before discharge to the environment. Several types of monitoring systems are described below:

Automatic Monitoring System - In areas where overflows, spills and catastrophic leaks are possible, an automatic monitoring system is recommended. Some federal, state and local laws require such systems to be present if threats exist to the health and safety of personnel and the environment. For material management areas, monitoring may include liquid level detectors, pressure and temperature gauges, and pressure-relief devices. In material transfer, process, and material handling areas, automatic monitoring systems can include pressure drop shut off devices, flow meters, thermal probes, valve position indicators, and operation lights. Loading and unloading operations might use these devices for measuring the volume of tanks before loading, for weighing vehicles or containers, and for determining rates of flow during loading and unloading.

Automatic Chemical Monitoring - Measures the quality of plant runoff to determine whether discharge is appropriate or whether diversion to a treatment system is warranted. Such systems might monitor pH, turbidity, or conductivity. These parameters might be monitored in diked areas, sewers, drainage ditches, or holding ponds. Systems can also be designed to signal automatic diversion of contaminated storm water runoff to a holding pond (a valve or a gate could be triggered by a certain pollutant in the storm water runoff).

Manned Operations - In material transfer areas and process areas, personnel can be stationed to watch over the operations so that any spills or mismanagement of materials can be corrected immediately. This is particularly useful at loading and unloading areas where vehicles or equipment must be maneuvered into the proper position to unload.

Nondestructive Testing - Some situations require that a storage tank or a pipeline system be tested without being physically moved or disassembled. The structural integrity of tanks, valves, pipes, joints, welds, or other equipment can be tested using nondestructive methods. Acoustic emission tests use high frequency sound waves to draw a picture of the structure to reveal cracks, malformations, or other structural damage. Another type of testing is hydrostatic pressure testing. During pressure testing, the tank or pipe is subjected to pressures several times the normal pressure. A loss in pressure during the testing may indicate a leak or some other structural damage. Tanks and containers should be pressure tested as required by federal, state or local regulations.

Automated monitoring systems should be placed in an area where personnel can easily observe the measurements. Alarms can be used in conjunction with the measurement display to warn personnel. Manned operations should have communication systems available for getting help in case spills or leaks occur. Especially sensitive or spill prone areas may require back-up instrumentation in case the primary instruments malfunction.

Mechanical and electronic equipment should be operated and maintained according to the manufacturers' recommendations. Equipment should be inspected regularly to ensure proper and accurate operation.

The SWPPT, in consultation with a certified safety inspector, should evaluate system monitoring requirements to decide which systems are appropriate based on hazard potential.

Advantages of Preventive Monitoring Practices	Disadvantages of Preventive Monitoring Practices
• Pressure and vacuum testing can locate potential leaks or damage to vessels early. The primary benefit of such testing is in ensuring the safety of personnel, but it also has secondary benefits including prevention of storm water contamination; • Automatic system monitors allow for early warnings if a leak, overflow, or catastrophic incident is imminent; • Manning operations, especially during loading and unloading activities, is effective and generally inexpensive; and, • The primary benefit of nondestructive testing is in ensuring the safety of personnel, but it also has secondary benefits including early detection of the potential for contaminating storm water runoff.	• Plant personnel often do not have the expertise to maintain automatic equipment; • Automatic equipment can fail without warning; and, • Automated process control and monitoring equipment may be expensive to purchase and operate.

35. DUST CONTROL (LAND DISTURBANCE AND DEMOLITION AREAS)

Dust controls for land disturbance and demolition areas are any controls that reduce the potential for particles being carried through air or water. Types of dust control are:

- Irrigation - Irrigation is a temporary measure involving a light application of water to moisten the soil surface. The process should be repeated as necessary;

- Minimization of Denuded Areas - Minimizing soil exposure reduces the amount of soil available for transport and erosion. Soil exposure can be lessened by temporary or permanent soil stabilization controls, such as seeding, mulching, topsoiling, crushed stone or coarse gravel spreading, or tree planting. Maintaining existing vegetation on a site will also help control dust;

- Wind Breaks - Wind breaks are temporary or permanent barriers that reduce airborne particles by slowing wind velocities (slower winds do not suspend particles). Leaving existing trees and large shrubs in place will create effective wind breaks. More temporary types of wind breaks are solid board fences, snow fences, tarp curtains, hay bales, crate walls, and sediment walls;

- Tillage - Deep plowing will roughen the soil surface to bring up to the surface cohesive clods of soil, which in turn rest on top of dusts, protecting them from wind and water erosion. This practice is commonly practiced in arid regions where establishing vegetation may take time; and,

- Chemical Soil Treatment (palliatives) - These are temporary controls that are applied to soil surfaces in the form of spray-on adhesives, such as anionic asphalt emulsion, latex emulsion, resin-water emulsions, or calcium chloride. The palliative is the chemical used. These should be used with caution as they may create pollution if not used correctly.

Dust controls can be used on any site where dust may be generated and where the dust may cause on-site and off-site damage. Dust controls are especially critical where reduced rainfall levels expose soil particles for transport by air and runoff. Dust control should be used in conjunction with other sedimentation controls such as traps.

Exposure of soil should be limited to control dust during land disturbance and at demolition area. Work that causes soil disturbance or involves demolition should be done in phases and accompanied by temporary stabilization measures, when possible. These precautions will minimize the amount of soil that is disturbed at any one time and help control dust.

Oil should not be used to control dust because of its high potential for polluting storm water discharges.

Irrigation will be most effective if site drainage systems are checked to ensure that the right amount of water is used. Too much water can cause runoff problems.

Chemical treatment is only effective on mineral soils, as opposed to muck soils, because the chemicals bond better to mineral soils. Vehicular traffic should be routed around chemically treated areas to avoid tracking of the chemicals. Certain chemicals may be inappropriate for some types of soils or application areas. Local governments usually have information about restrictions on the types of palliatives that may be used. Special consideration must be given to preserving ground water quality whenever chemicals are applied to the land.

Since most of these techniques are temporary controls, sites should be inspected often and materials should be reapplied when needed. The frequency for these inspections depends on site-specific conditions, weather conditions, and the types of technique used.

Advantages of Dust Control (Land Disturbance and Demolition Areas)	**Disadvantages of Dust Control (Land Disturbance and Demolition Areas)**
• Can help prevent wind-and-water based erosion of disturbed areas and will reduce respiratory problems in personnel; • Some types can be implemented quickly at low cost and effort (except wind breaks); • Helps preserve the aesthetics of the site and screens certain activities from view (wind breaks); and, • Vegetative wind breaks are permanent and an excellent alternative to chemical use.	• Some types are temporary and must be reapplied or replenished regularly; • Some types are expensive (irrigation and chemical treatment) and may be ineffective under certain conditions; • May result in health/environmental hazards, if over-application of the chemicals leaves large amounts exposed to wind and rain erosion or ground water contamination; • May create excess runoff that the site was not designed to control (irrigation); • May cause increased off-site tracking of mud (irrigation); and, • Is not as effective as chemical treatment or mulching and seeding; requires land space that may not be available at all locations (wind breaks).

36. DUST CONTROL (INDUSTRIAL)

Dust controls for material handling areas are controls that prevent pollutants from entering storm water discharges by reducing the surface and air transport of dust caused by industrial activities. Consider the following types of controls:

- Water spraying;
- Negative pressure systems (vacuum systems);
- Collector systems (bag and cyclone);
- Filter systems; and,
- Street sweeping.

The purpose of industrial dust control is to collect or contain dusts to prevent storm water runoff from carrying the dusts to the sewer collection system or to surface waters.

Dust control is useful in any process area, loading and unloading area, material handling areas, and transfer areas where dust is generated. Street sweeping is limited to areas that are paved.

Mechanical dust collection systems are designed according to the size of dust particles and the amount of air to be processed. Manufacturers' recommendations should be followed for installation (as well as the design of the equipment).

If water sprayers are used, dust-contaminated waters should be collected and taken for treatment. Areas will probably need to be re-sprayed to keep dust from spreading.

Two kinds of street sweepers are common: brush and vacuum. Vacuum sweepers are more efficient and work best when the area is dry.

Mechanical equipment should be operated according to the manufacturers' recommendations and should be inspected regularly.

Advantages of Dust Control (Industrial)	Disadvantages of Dust Control (Industrial)
• May cause a decrease of respiratory problems in personnel around the site; • May cause less material to be lost and may therefore save money; and, • Provides efficient collection of larger dust particles (street sweepers).	• Generally more expensive than manual systems; • May be impossible to maintain by plant personnel (the more elaborate equipment); and, • Labor and equipment intensive and may not be effective for all pollutants (street sweepers).

37. SIGNS AND LABELS

Signs and labels identify problem areas or hazardous materials at a facility. Warning signs, often found at industrial facilities, are a good way to suggest caution in certain areas. Signs and labels can also provide instructions on the use of materials and equipment. Labeling is a good way to organize large amounts of materials, pipes, and equipment.

Labels tell material type and container contents. Accurate labeling can help quickly identify the type of material released so facility personnel can respond correctly.

Two effective labeling methods include color coding and Department of Transportation (DOT) labeling. Color coding is easily recognized by facility personnel and simply involves painting/coating or applying an adhesive label to the container. Color codes must be consistent throughout the facility to be effective, and signs explaining the color codes should be posted in all areas.

The DOT requires that labels be prominently displayed on transported hazardous and toxic materials. Labeling required by the DOT should be expanded to piping and containers, making it easy to recognize materials that are corrosive, radioactive, reactive, flammable, explosive, or poisonous.

Areas where they are particularly useful are material transfer areas, equipment areas, loading and unloading areas, or anywhere information might prevent contaminants from being releases to storm water.

Signs and labels should be visible and easy to read. Useful signs and labels might provide the following information:

- Names of facility and regulatory personnel, including emergency phone numbers, to contact in case of an accidental discharge, spill, or other emergency;
- Proper uses of equipment that could cause release of storm water contaminants;
- Types of chemicals used in high-risk areas;
- The direction of drainage lines/ditches and their destination: color, treatment or discharge;
- Information on a specific material; and,
- Refer to Occupational Safety and Health Administration (OSHA) standards for sizes and numbers of signs required for hazardous material labeling.

Hazardous chemicals might be labeled as follows:

- Danger
- Combustible
- Warning
- Caution
- Flammable
- Poisonous
- Caustic
- Corrosive
- Volatile
- Explosive

Periodic checks can ensure that signs are still in place and labels are properly attached. Signs and labels should be replaced and repaired as often as necessary.

Advantages of Signs and Labels	Disadvantages of Signs and Labels
• Inexpensive and easy to use.	• Must be updated and maintained so they are legible.

38. SECURITY

Setting up a security system will prevent an accidental or intentional release of materials to storm water runoff as a result of vandalism, theft, sabotage, or other improper uses of facility property. Security personnel should be trained about the specifics of the SWPPP. Routine patrol, lighting, and access control are discussed below as possible measures to include in the facility's security system and are measures that can be used at any facility.

Security information should be included in the existing training required to instruct personnel about where and how to patrol areas within the facility. Instruction should also include what to look for in problem areas and how to respond to problems. During routine patrol, security personnel can actively search the facility for indications of spills, leaks, or other discharges; respond to any disturbance resulting from intruders or inappropriate facility operations; and generally work as a safeguard to prevent unexpected events.

Sufficient lighting throughout the facility during daytime and night hours make it easier to get to equipment during checks and will make it easy to detect spills and leaks that might otherwise be hidden. Routine patrols are easier with proper lighting.

Controlling site access is an important part of security, activity and traffic control. Signs, fencing, guard houses, and visitor clearance requirements should be considered to control site access.

- Signs are the simplest, most inexpensive method of access control, but they are limited in their actual control since they provide no physical barriers and require that people obey them voluntarily;

- Fencing provides a physical barrier to the facility site and an added means of security;

- Guard houses used with visitor rules make sure that only authorized personnel enter the site; and,

- Traffic signs are also useful. Restricting vehicles to paved roads and providing direction and warning signs can help prevent accidents. Where restricting vehicles to certain pathways is not possible, it is important to ensure that all above-ground valves and pipelines are well marked.

Advantages of Security	Disadvantages of Security
• Provides a preventive safeguard to operational malfunctions or other facility disturbances (routine patrols); • Allows easier detection of vandals or thieves (lighting); • Prevents spills by providing good visibility (lighting); and, • Prevents unauthorized access to facility (access control).	• May not be feasible for smaller facilities; • May be costly (installation of lighting systems); • May increase energy costs as a result of additional lighting; and, • May not be feasible to have extensive access controls at smaller facilities.

39. AREA CONTROL PROCEDURES

The activities conducted at an industrial site often result in the materials being deposited on clothes or footwear and then being carried throughout the facility site. As a result, these materials may find their way into the storm water runoff.

Area control procedures involves practicing good housekeeping measures such as maintaining indoor or covered material storage and industrial processing areas. If the area is kept clean, the risk of accumulating material on footwear and clothing is reduced. In turn, the chance of left- over pollutants making contact with storm water and polluting surface water is minimized.

Area control measures can be used at any facility where materials may be tracked into areas where they can come in contact with storm water runoff. Areas can include material handling/storage/process areas.

Materials storage areas and industrial processing areas should be checked regularly to ensure that good housekeeping measures are being implemented. Cover-garments, foot mats, and other devices used to collect residual material near the area should be cleaned regularly.

Other effective practices include the following:

- Brushing off clothing before leaving the area;
- Stomping feet to remove material before leaving the area;
- Using floor mats at area exits;
- Using coveralls, smocks, and other overgarments in areas where exposure to material is of greatest concern (personnel should remove the overgarments before leaving the area); and,
- Posting signs to remind personnel about these practices.

Advantages of Area Control Procedures	Disadvantages of Area Control Procedures
• Are easy to implement; and, • Result in a cleaner facility and improved work environment.	• May be seen as tedious by personnel and therefore may not be followed.

40. VEHICLE WASHING

Materials that accumulate on vehicles and then scatter across industrial sites represent an important source of storm water contamination. Vehicle washing removes materials such as site-specific dust and spilled materials that have accumulated on the vehicle. If not removed, residual material will be spread by gravity, wind, snow, or rainfall as the vehicles move across the facility site and off the site.

This practice is appropriate for any facility where vehicles come into contact with raw materials on site. If possible, vehicle washing areas should be located where the most vehicle activity occurs. Wastewater from vehicle washing should be directed away from process materials to prevent contact. Those areas include material transfer areas, loading and unloading areas, or areas located just before the site exit.

When considering the method of vehicle washing, consideration should be given to using a high-pressure water spray with no detergent additives. In general, water will adequately remove contaminants from the vehicle. If detergents are used, they may cause other environmental impacts. Phosphate or organic-containing compounds should be avoided.

All washwater should be directed into a sanitary sewer system when available. If the washwater is directed into the storm sewer system it will result in a non-storm water discharge, thus requiring an application for a National Pollution Discharge Elimination System (NPDES) permit to cover the discharge.

Blowers or vacuums should be considered where the materials are dry and easily removed by air.

Advantages of Vehicle Washing	**Disadvantages of Vehicle Washing**
• Prevents dispersion of materials across the facility site; and, • Is necessary only where methods for transferring contained materials and minimizing exposure have not been successfully adopted and implemented.	• May be costly to construct a truck washing facility; and, • May require a NPDES permit.

41. SEDIMENT AND EROSION PREVENTION PRACTICES

Any site where soils are exposed to water, wind or ice can have soil erosion and sedimentation problems. 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, buildings). When the land surface is developed or "hardened" in this manner, storm water cannot infiltrate. This results in larger amounts of water moving more quickly across a site which can carry more sediment and other pollutants to streams and rivers.

There are seven ways to limit and control sediment and erosion:

- Leave as much vegetation (plants) on site as possible;
- Minimize the time that soil is exposed;
- Prevent runoff from flowing across disturbed areas (divert the flow to vegetated areas);
- Stabilizing the disturbed soils as soon as possible;
- Slow down the runoff flowing across the site;
- Provide drainage ways for the increased runoff, use grassy swales (vegetated depressions used to transport sediment rather than concrete drains (Refer to Grassed Swales BMP); and,
- Remove sediment from storm water runoff before it leaves the site.

Using these measures to control erosion and sedimentation is an important part of storm water management. Selecting the best set of sediment and erosion prevention measures depends upon the nature of the activities on site and other site-specific conditions.

The local Soil Conservation Service Office or County Extension Office can provide information on any special measures necessary to promote the establishment of vegetation on severely eroded soils.

42. VEGETATION PRACTICES

Preserving existing vegetation or revegetating disturbed soil as soon as possible after construction is the most effective way to control erosion.

A vegetation cover reduces erosion potential in four ways:

- By shielding the soil surface from direct erosive impact of rain;
- By improving the soil's water storage porosity and capacity so more water can infiltrate into the ground;
- By slowing the runoff and allowing the sediment to drop out or deposit; and,
- By physically holding the soil in place with plant roots.

Vegetative cover can be grass, trees, shrubs, bark, mulch, or straw. Grasses are the most common type of cover used for revegetation because they grow quickly, providing erosion protection within days. Other soil stabilization practices such as straw or mulch may be used during non-growing seasons to prevent erosion. Newly planted shrubs and trees establish root systems more slowly, so keeping existing ones is a more effective practice.

Vegetative and other site stabilization practices can be either temporary or permanent controls. Temporary controls provide a cover for exposed or disturbed areas for short periods of time or until permanent erosion controls are put in place. Permanent vegetative practices are used when activities that disturb the soil are completed or when erosion is occurring on a site that is otherwise stabilized.

43. PRESERVATION OF NATURAL VEGETATION

The preservation of natural vegetation (existing trees, vines, brushes, and grasses) provides natural buffer zones. By preserving stabilized areas, it minimizes erosion potential, protects water quality, and provides aesthetic benefits. This practice is used as a permanent control measure.

This technique is applies to all types of sites. Areas where preserving vegetation can be particularly beneficial are floodplains, wetlands, stream banks, steep slopes, and other areas where erosion controls would be difficult to establish, install, or maintain.

Preservation of vegetation on a site should be planned before any site disturbance begins. Preservation requires good site management to minimize the impact of construction activities on existing vegetation. Clearly mark the trees to be preserved and protect them from ground disturbances around the base of the tree. Proper maintenance is important to ensure healthy vegetation that can control erosion. Different species, soil types, and climatic conditions will require different maintenance activities such as mowing, fertilizing, lining, irrigation, pruning, and weed and pest control.

Maintenance should be performed regularly, especially during construction. **Some state/local regulations require natural vegetation to be preserved in sensitive areas. Consult the appropriate State/local agencies for more information on their regulations.**

Advantages of Preservation of Natural Vegetation	Disadvantages of Preservation of Natural Vegetation
• Can handle higher quantities of storm water runoff than newly seeded areas • Does not require time to establish (effective immediately) • Increases the filtering capacity because the vegetation and root structure are usually denser in preserved natural vegetation than in newly seeded or base areas; • Enhances aesthetics; • Provides areas for infiltration, reducing the quantity and velocity of storm water runoff; • Allows areas where wildlife can remain undisturbed; • Provides noise buffers and screens for on-site operations; and, • Usually requires less maintenance (irrigation, fertilizer) than planting new vegetation.	• Requires planning to preserve and maintain the existing vegetation; • May not be cost effective with high land costs; and, • May construct area available for construction activities.

44. BUFFER ZONES

Buffer zones are vegetated strips of land used for temporary or permanent water quality benefits. Buffer zones are used to decrease the velocity of storm water runoff, which in turn helps to prevent soil erosion. Buffer zones are different from vegetated filter strips because buffer zone effectiveness is not measured by its ability to improve infiltration. The buffer zone can be an area of vegetation that is left undisturbed during construction, or it can be newly planted.

Buffer zones technique can be used at any site that can support vegetation. Buffer zones are particularly effective on floodplains, next to wetlands, along stream banks, and on steep, unstable slopes.

If buffer zones are preserved, existing vegetation, good planning, and site management are needed to protect against disturbances such as grade changes, excavation, damage from equipment, and other activities. Establishing new buffer strips requires the establishment of a good dense turf, trees, and shrubs. Careful maintenance is important to ensure healthy vegetation. The need for routine maintenance such as mowing, fertilizing, liming, irrigating, pruning, and weed and pest control will depend on the species of plants and trees involved, soil types, and climatic conditions. Maintaining planted areas may require debris removal and protection against unintended uses or traffic.

Many state/local storm water program or zoning agencies have regulations which define required or allowable buffer zones especially near sensitive areas such as wetlands. Contact the appropriate state/local agencies for their requirements.

Advantages of Buffer Zones	Disadvantages of Buffer Zones
• Provide aesthetic as well as water quality benefits; • Provide areas for infiltration, which reduces amount and speed of storm water runoff; • Provide areas for wildlife habitat; • Provide areas for recreation; • Provide buffers and screens for on-site noise if trees or large brushes are used; • Low maintenance requirements; and, • Low cost when using existing vegetation.	• May not be cost effective to use if the cost of land is high; • Are not feasible if land is not available; and, • Require plant growth before they are effective.

45. STREAM BANK STABILIZATION

Stream bank stabilization is used to prevent stream bank erosion from high velocities and quantities of storm water runoff. Typical methods include the following:

- Riprap - Large angular stones placed along the stream bank or lake;
- Gabion - Rock-filled wire cages used to create a new stream bank;
- Reinforced Concrete - Concrete bulkheads and retaining walls that replace natural stream banks and create a non-erosive surface;
- Log Cribbing - Retaining walls built of logs to anchor the soils against erosive forces; usually built on the outside of stream bends;
- Grid Pavers - Precast or poured-in-place concrete units placed along stream banks to stabilize the stream bank and create open spaces where vegetation can be established; and,
- Asphalt - Asphalt paving placed along the natural stream bank to create a non-erosive surface.

Stream bank stabilization is used where vegetative stabilization practices are not practical and where the stream banks are subject to heavy erosion from increased flows or disturbance during construction. Stabilization should occur before any land development in the watershed area. Stabilization can also be retrofitted when erosion of a stream bank occurs.

Stream bank stabilization structures should be planned and designed by a licensed professional engineer. **Applicable Federal, State and local requirements should be followed, including Clean Water Act Section 404 regulations**. An important design feature of stream bank stabilization methods is the foundation of the structure; the potential for the stream to erode the sides and bottom of the channel should be considered to make sure the stabilization measure will be supported properly. Structures can be designed to protect and improve natural wildlife habitats. Only pressure-treated wood should be used in log structures. Permanent structures should be designed to handle expected flood conditions. A well-designed layer of stone can be used in many ways and in many locations to control erosion and sedimentation. Riprap is either a uniform size or graded (different sizes) and is usually applied in an even layer throughout the stream. Reinforced concrete structures may require positive drainage behind the bulkhead or retaining wall to prevent erosion around the structure. Gabion and grid pavers should be installed according to manufacturers' recommendations.

Stream bank stabilization structures should be inspected during and after each large storm event. Structures should be maintained as installed. Structural damage should be repaired as soon as possible to prevent further damage or erosion to the stream bank.

Advantages of Stream Bank Stabilization	Disadvantages of Stream Bank Stabilization
• Can provide control against erosive forces caused by the increase in storm water flows	• Does not provide the water quality or aesthetic benefits that vegetative practices

created during land development; • Usually will not require as much maintenance as vegetative erosion controls; • May provide wildlife habitats; and, • Forms a dense, flexible, self-healing cover that will adapt well to uneven surfaces (rip-raps).	could; • Should be designed by qualified professional engineers, which may increase project costs; • May be expensive (materials costs); • May require additional permits for structure; • May alter stream dynamics which cause changes in the channel downstream; and, • May cause negative impact to wildlife habitats.

46. MULCHING, MATTING, AND NETTING

Mulching is a temporary soil stabilization or erosion control practice where materials such as grass, hay, woodchips, wood fibers, straw or gravel are placed on the soil surface. In addition to stabilizing soils, mulching can reduce the speed of storm water runoff over an area. When used together with seeding or planting, mulching can aid in plant growth by holding the seeds, fertilizers, and topsoil in place, by preventing birds from eating seeds, helping to retain moisture, and by insulating against extreme temperatures. Mulch mattings are materials (jute or other wood fibers) that have been formed into sheets of mulch that are more stable than normal mulch. Netting is typically made from jute, other wood fiber, plastic, paper, or cotton and can be used to hold the mulching and matting to the ground. Netting can also be used alone to stabilize soils while the plants are growing; however, it does not retain moisture or temperature well. Mulch binders (either asphalt or synthetic) are sometimes used instead of netting to hold loose mulches together.

Mulching is often used alone in areas where temporary seeding cannot be used because of the season or climate. Mulching can provide immediate, effective, and inexpensive erosion control. On steep slopes and critical areas such as waterways, mulch matting is used with netting or anchoring to hold it in place.

Mulch seeded and planted areas where slopes are steeper than 2:1, where runoff is flowing across the area, or when seedlings need protection from bad weather.

Use of mulch may or may not require a binder, netting, or the tacking of mulch to the ground. Effective netting and matting require firm, continuous contact between the materials and the soil. If there is no contact, the material will not hold the soil and erosion will occur underneath the material. Final grading is not necessary before mulching. Mulched areas should be inspected often to find where mulched material has been loosened or removed. Such areas should be reseeded (if necessary) and the mulch cover replaced immediately. Mulch binders should be applied at rates recommended by the manufacturer or, if asphalt is used, at rates of approximately 480 gallons per acre.

Advantages of Mulching, Matting, and Netting	Disadvantages of Mulching, Matting, and Netting
• Provide immediate protection to soils that are exposed and that are subject to heavy erosion; • Retain moisture, which may minimize the need for watering; and, • Require no removal because of natural deterioration of mulching and matting.	• May delay germination of some seeds because cover reduces the soil surface temperature; and, • Netting should be removed after usefulness is finished, than landfilled or composted.

47. TEMPORARY SEEDING

Temporary seeding means growing a short-term vegetative cover (plants) on disturbed site areas that may be in danger of erosion. The purpose of temporary seeding is to reduce erosion and sedimentation by stabilizing disturbed areas that will not be stabilized for long periods of time or where permanent plant growth is not necessary or appropriate. This practice uses fast-growing grasses whose root systems hold down the soils so that they are less apt to be carried off-site by storm water runoff or wind. Temporary seeding also reduces the problems associated with mud and dust from bare soils surfaces during construction.

Temporary seeding should be performed on areas which have been disturbed by construction and which are likely to be redisturbed, but not for several weeks or more. Typical areas might include denuded areas, soil stockpiles, dikes, dams, sides of sediment basins and temporary road banks. Temporary seeding should take place as soon as practicable after the last land disturbing activity in an area. Temporary seeding may not be an effective practice in arid and semi-arid regions where the climate prevents fast plant growth, particularly during the dry seasons. In those areas, mulching or chemical stabilization may be better for the short-term (Refer to Mulching BMP and Chemical Stabilization BMP).

Proper seed bed preparation and the use of high-quality seed are needed to grow plants for effective erosion control. Soil that has been compacted by heavy traffic or machinery may need to be loosened. Successful growth usually requires that the soil be tilled before the seed is applied. Topsoiling is not necessary for temporary seeding; however, it may improve the chances of establishing temporary vegetation in an area. Seed bed preparation may also require applying fertilizer/lime to the soil to make conditions more suitable for plant growth. Proper fertilizer, seeding mixtures, and seeding rates vary depending on the location of the site, soil types, slopes, and season. Local suppliers, State and local regulatory agencies, and the United States Department of Agriculture (USDA) Soil Conservation Service will supply information on the best seed mixes and soil conditioning methods.

Seeded areas should be covered with mulch to provide protection from the weather. Seeding on slopes of 2:1 or more, in adverse soil conditions, during excessively hot or dry weather, or where heavy rain is expected should be followed by spreading mulch (Refer Mulching BMP).

Frequent inspections are necessary to check that conditions for growth are good. If the plants do not grow quickly or thick enough to prevent erosion, the area should be reseeded as soon as possible. Seeded areas should be kept adequately moist. If normal rainfall is insufficient the seeded area should be watered. Watering rates should be watched so that over-irrigation (which can cause erosion itself) does not occur.

Advantages of Temporary Seeding	Disadvantages of Temporary Seeding
• Generally inexpensive and easy to do; • Establishes plant cover fast when conditions are good; • Stabilizes soils well, is aesthetic, and can provide sedimentation controls for other site areas; and, • May help reduce costs of maintenance on other erosion controls (sediment basins may need to be cleaned out less often).	• Depends heavily on the season and rainfall rate for success; • May require extensive fertilizing of plants grown on some soils, which can cause problems with local water quality; • Requires protection from heavy use, once seeded; and, • May produce vegetation that requires irrigation and maintenance.

48. PERMANENT SEEDING AND PLANTING

Permanent seeding of grass and planting trees and brush provides stabilization to the soil by holding soil particles in place. Vegetation reduces sediment and runoff to downstream areas by slowing the velocity of runoff and permitting greater infiltration of the runoff. Vegetation also filters sediments, helps the soil absorb water, improves wildlife habitats, and enhances the aesthetics of a site.

Permanent seeding and planting is appropriate for any grades or cleared area where long-lived plant cover is desired. Some areas where permanent seeding is especially important are filter strips, buffer areas, vegetated swales, steep slopes, and stream banks. This practice is effective on areas where soils are unstable because of their texture, structure, a high water table, high winds, or steep slope. When seeding in northern areas during fall or winter, cover the area with mulch to provide a protective barrier against cold weather (Refer to Mulching BMP). Seeding should also be mulched if the seeded area slopes 4:1 or more, if soil is sandy or clayey, or if weather is excessively hot or dry. Plant when conditions are most favorable for growth. When possible, use low-maintenance local plant species. Install all other erosion control practices such as dikes, basins, and surface runoff control measures before planting.

For this practice to work, it is important to select appropriate vegetation, prepare a good seedbed, properly time planting, and water and fertilize. Planting local plants during their regular growing season will increase the chances for success and may lessen the need for watering. Check seeded areas frequently for proper watering and growth conditions.

Topsoil should be used on areas where topsoils have been removed, where the soils are dense or impermeable, or where mulching and fertilizers alone cannot improve soil quality. Topsoiling should be coordinated with the seeding and planting practices and should not be planned while the ground is frozen or too set. Topsoil layers should be at least 2 inches deep (or similar to the existing topsoil depth).

Remove as little existing topsoil as possible to minimize erosion and sedimentation. All site controls should be in place before the topsoil is removed. If topsoils are brought in from another site, it is important that its texture is compatible with the subsoils on-site; for example, sandy topsoils are not compatible with clay subsoils.

Stockpiling of topsoils on-site requires good planning so soils will not obstruct other operations. If soil is to be stockpiled, consider using temporary seeding, mulching, or silt fencing to prevent or control erosion. Inspect the stockpiles frequently for erosion. After topsoil has been spread, inspect it regularly, and reseed or replace areas that have eroded.

Advantages of Permanent Seeding and Planting	Disadvantages of Permanent Seeding and Planting
• Improves the aesthetics of a site; • Provides excellent stabilization; • Provides filtering of sediments; • Provides wildlife habitat; and, • Relatively inexpensive.	• May require irrigation to establish vegetation; and, • Depends initially on climate and weather for success.

49. SODDING

Sodding stabilizes an area by establishing permanent vegetation, providing erosion and sedimentation controls, and providing areas where storm water can infiltrate the ground.

Sodding is appropriate for any grades or cleared area that might erode and where a permanent, long-lived plant cover is needed immediately. Examples of where sodding can be used are buffer zones, stream banks, dikes, swales, slopes, outlets, level spreaders, and filter strips.

The soil surface should be fine-graded before laying down the sod. Topsoil may be needed in areas where the soil textures are inadequate (Refer to Permanent Seeding and Planting BMP). Lime and fertilizers should be added to the soil to promote good growth conditions. Sodding can be applied in alternating strips or other patterns, or alternate areas can be seeded to reduce expense. Sod should not be planted during very hot or wet weather. Sod should not be placed on slopes that are greater than 3:1 if they are to be mowed. If placed on steep slopes, sod should be laid with staggered joints/be pegged. In areas such as steep slopes or next to running waterways, chicken wire, jute, or other netting can be placed over the sod for extra protection against lifting (Refer to Mulching, Matting, and Netting BMP). Rolled or compact immediately after installation to ensure firm contact with the underlying topsoil. Inspect the sod frequently after it is first installed, especially after large storm events, until it is established as permanent cover. Remove and replace dead sod. Watering may be necessary after planting and during periods of intense heat/lack of rain.

Advantages of Sodding	Disadvantages of Sodding
• Can provide immediate vegetative cover and erosion control; • Provide more stabilizing protection than initial seeding through dense cover formed by sod; • Produces lower week growth than seeded vegetation; • Can be used for site activities within a shorter time than can seeded vegetation; and, • Can be placed at any time of the year as long as moisture conditions in the soil area favorable, except when the ground is frozen.	• Purchase and installation costs are higher than for seeding; and, • May require continued irrigation if the sod is placed during dry seasons or on sandy soils.

50. CHEMICAL STABILIZATION

Chemical stabilization practices, often referred to as a chemical mulch, soil binder, or soil palliative (Refer to Dust Control BMP), are temporary erosion control practices. Materials made of vinyl, asphalt, or rubber are sprayed onto the surface of the soil to hold in place and protect against erosion from storm water runoff and wind. Many of the products used for chemical stabilization are human-made, and many different products are on the market.

Chemical stabilization can be used as an alternative in areas where temporary seeding practices cannot be used because of the season or climate. It can provide immediate, effective, and inexpensive erosion control anywhere erosion is occurring on a site.

The application rates and procedures recommended by the manufacturer of a chemical stabilization product should be followed as closely as possible to prevent the products from forming ponds and from creating large areas where moisture cannot get through.

Advantages of Chemical Stabilization	Disadvantages of Chemical Stabilization
• Easily applied to the surface of the soil; • Effective in stabilizing areas where plants will not grow; and, • Provides immediate protection to soils that are in danger of erosion.	• Can create impervious surfaces (where water cannot get through), which may in turn increase the amount and speed of storm water runoff; • May caused harmful effects on water quality if not used correctly; and, • Usually more expensive than vegetative cover.

51. INTERCEPTOR DIKES AND SWALES

Interceptor dikes (ridges of compacted soil) and swales (excavated depression) are used to keep up-slope runoff from crossing areas where there is a high risk of erosion. They reduce the amount and speed of flow and then guide it to a stabilized outfall (point of discharge) or sediment trapping area. (Refer to Outlet Protection BMP; Level Spreaders BMP; Vegetated Filter Strips BMP; Sediment Traps BMP; and Temporary Sediment Basins BMP). Interceptor dikes and swales divert runoff using a combination of earth dike and vegetated swale (Refer to Grassed Swales BMP). Runoff is channeled away from locations where there is a high risk of erosion by placing a diversion dike or swale at the top of a sloping disturbed area. Dikes and swales also collect overland flow, changing it into concentrated flows (flows that are combined). Interceptor dikes and swales can be either temporary or permanent storm water control structures.

Interceptor dikes and swales are generally built around the perimeter of a construction site before any major soil disturbing activity takes place. Temporary dikes or swales may also be used to protect existing buildings; areas, such as stockpiles; or other small areas that have not yet been fully stabilized. When constructed along the up-slope perimeter of a disturbed or high-risk area (though not necessarily all the way around it), dikes or swales prevent runoff from uphill areas from crossing the unprotected slope. Temporary dikes or swales constructed on the down slope side of the disturbed or high-risk area will prevent runoff that contains sediment from leaving the site before sediment is removed. For short slopes, a dike or swale at the top of the slope reduces the amount of runoff reaching the disturbed area. For longer slopes, several dikes or swales are placed across the slope at intervals. This practice reduces the amount of runoff that accumulates on the face of the slope and carries the runoff safely down the slope. In all cases, runoff is guided to a sediment trapping area or a stabilized outfall before release.

Temporary dikes and swales are used in areas of overland flow; if they remain in place longer than 15 days, they should be stabilized. Runoff channeled by a dike or swale should be directed to an adequate sediment trapping area or stabilized outfall. Care should be taken to provide enough slope for drainage but not too much slope to cause erosion due to high runoff flow speed. Temporary interceptor dikes and swales may remain in place as long as 12 to 18 months (with proper stabilization) or be rebuilt at the end of each day's activities. Dikes or swales should remain in place until the area they were built to protect is permanently stabilized. Interceptor dikes and swales can be permanent controls. However, permanent controls should be designed to handle runoff after construction is complete; should be permanently stabilized; and should be inspected and maintained on a regular basis. Temporary and permanent control measures should be inspected once each week on a regular schedule and after every storm. Repairs necessary to the dike and flow channel should be made promptly.

Advantages of Interceptor Dikes and Swales	Disadvantages of Interceptor Dikes and Swales
• Are simple and effective for channeling runoff away from areas subject to erosion; • Can handle flows from large drainage areas; and, • Are inexpensive because they use materials and equipment normally found on-site.	• If constructed improperly, can cause erosion and sediment transport since flows are concentrated; • May cause problems to vegetation growth if water flow is too fast; and, • Require additional maintenance, inspections, and repairs.

52. PIPE SLOPE DRAINS

Pipe slope drains reduce the risk of erosion by discharging runoff to stabilized areas. Made of flexible or rigid pipe, they carry concentrated runoff from the top to the bottom of a slope that has already been damaged by erosion or is at high risk for erosion. They are also used to drain saturated slopes that have the potential for soil slides. Pipe slope drains can be either temporary or permanent depending on the method of installation and material used.

Pipe slope drains are used whenever it is necessary to convey water down a slope without causing erosion. They are especially effective before a slope has been stabilized or before permanent drainage structures are ready for use. Pipe slope drains may be used with other devices, including diversion dikes or swales, sediment traps, and level spreaders (used to spread out storm water runoff uniformly over the surface of the ground). Temporary pipe slope drains, usually flexible tubing or conduit, may be installed prior to the construction of permanent drainage structures. Permanent slope drains may be placed on or beneath the ground surface; pipes, sectional downdrains, paved chutes, or clay tiles may be used.

Paved chutes may be covered with a surface of concrete or other impermeable material. Subsurface drains can be constructed of concrete, PVC, clay tile, corrugated metal, or other permanent material.

The drain design should be able to handle the volume of flow. The effective life span of a temporary pipe slope drain is up to 30 days after permanent stabilization has been achieved. The maximum recommended drainage area for pipe slope drains is ten (10) acres.

The inlets and outlets of a pipe slope drain should be stabilized. This means that a flared end section should be used at the entrance of the pipe. The soil around the pipe entrance should be fully compacted. The soil at the discharge end of the pipe should be stabilized with riprap (a combination of large stones, cobbles, and boulders). The riprap should be placed along the bottom of a swale which leads to a sediment trapping structure or another stabilized area.

Pipe slope drains should be inspected on a regular schedule and after any major storm. Be sure that the inlet from the pipe is properly installed to prevent bypassing the inlet and undercutting the structure. If necessary, install a headwall, riprap, or sandbags around the inlet. Check the outlet point for erosion and check the pipe for breaks or clogs. Install outlet protection (Refer to Outlet Protection BMP) if needed and promptly clear breaks and clogs.

Advantages of Pipe Slope Drains	Disadvantages of Pipe Slope Drains
• Can reduce or eliminate erosion by transporting runoff down steep slopes or by draining saturated soils; and, • Easy to install and require little maintenance.	• Require that the area disturbed by the installation of the drain should be stabilized or it, too, will be subject to erosion; and, • May clog during a large storm.

53. SUBSURFACE DRAINS

A subsurface drain is a perforated pipe or conduit placed beneath the surface of the ground at a designed depth and grade. It is used to drain an area by lowering the water table. A high water table can saturate soils and prevent the growth of certain types of vegetation. Saturated soils on slopes will sometimes "slip" down the hill. Installing subsurface drains can help prevent these problems.

There are two types of subsurface drains: relief drains and interceptor drains. Relief drains are used to de-water an area where the water table is high. They may be placed in a gridiron, herringbone, or random pattern. Interceptor drains are used to remove water where sloping soils are excessively wet or subject to slippage. They are usually placed as single pipes instead of in patterns. Generally, subsurface drains are suitable only in areas where the soil is deep enough for proper installation. They are not recommended where they pass under heavy vehicle crossings.

Drains should be placed so that tree roots will not interfere with drainage pipes. The drain design should be adequate to handle the volume of flow. Areas disturbed by the installation of a drain should be stabilized or they, too, will be subject to erosion. The soil layer must be deep enough to allow proper installation.

Backfill immediately after the pipe is placed. Material used for backfill should be open granular soil that is highly permeable. The outlet should be stabilized and should direct sediment-laden storm water runoff to a sediment trapping structure or another stabilized area.

Inspect subsurface drains on a regular basis and check for evidence of pipe breaks or clogging by sediment, debris, or tree roots. Remove blockage immediately, replace any broken sections, and re-stabilize the surface. If the blockage is from tree roots, it may be necessary to relocate the drain. Check inlets and outlets for sediment or debris. Remove and dispose of these materials properly.

Advantages of Subsurface Drains	Disadvantages of Subsurface Drains
• Provide an effective method for stabilizing wet sloping soils; and, • An effective way to lower the water table.	• May be pierced and clogged by tree roots; • Should not be installed under heavy vehicle crossings; and, • Cost more than surface drains because of the expenses of excavation for installation.

54. FILTER FENCE

A filter fence, also called "silt fence" is a temporary measure for sedimentation control. It usually consists of posts with filter fabric stretched across the posts and sometimes with a wire support fence. The lower edge of the fence is vertically trenched and covered by backfill. A silt fence is used in small drainage areas to detain sediment. These fences are most effective where there is overland flow or in

minor swales or drainageways. They prevent sediment from entering receiving waters. Silt fences are also used to catch wind blown sand. Aside from the traditional wooden post and filter fabric method, there are several variations of silt fence installation including silt fence which can be purchased with pockets pre-sewn to accept use of steel fence posts.

A silt fence should be installed prior to major soil disturbance in the drainage area. Such a structure is only appropriate for drainage areas of 1.0 acre or less with velocities of 0.5 cfs (cubic feet per second) or less. The fence should be placed across the bottom of a slope or minor drainageway along a line of uniform elevation (perpendicular to the direction of flow) and can be used at the outer boundary of the work area. The fence does not have to surround the work area completely. In addition, a silt fence is effective where sheet and rill (small watercourse that has steep sides and is usually on a few inches deep) erosion may be a problem. Silt fences should not be constructed in streams or swales. Install silt fences in accordance with the manufacturer's recommendations.

A silt fence is not appropriate for a large area or where the flow rate is greater than 0.5 cfs. This type of fence can be more effective than a straw bale barrier if properly installed and maintained and may be used in combination with other erosion/sediment practices.

The effective life span for a silt fence is approximately six (6) months. During this period, the fence requires frequent inspection and prompt maintenance to maintain its effectiveness. Inspect the fence after each rainfall. Check for areas where runoff eroded a channel beneath the fence, or where the fence was caused to sag or collapse by runoff flowing over the top. Remove and properly dispose of sediment when it is one-third to one-half the height of the fence or after each storm.

Advantages of Filter Fence	Disadvantages of Filter Fence
• Remove sediments and prevents downstream damage from sediment deposits; • Reduces the speed of runoff flow; • Minimal clearing and grubbing required for installation; and, • Inexpensive.	• May result in failure from improper choice of pore size in the filter fabric or improper installation; • Should not be used in streams; • Only appropriate for small drainage areas with overland flow; and, • Frequent inspection and maintenance is necessary to ensure effectiveness.

55. STRAW BALE BARRIERS

Straw bales can be used as temporary sediment barrier. They are placed end to end in a shallow excavated trench (with no gaps in between) and staked into place. If properly installed, they can detain sediment and reduce flow velocity from small drainage areas. A straw bale barrier prevents sediment from leaving the site by trapping the sediment in the barrier while allowing the runoff to pass through. It can also be used to decrease the velocity of sheetflow or channel flows of low-to-moderate levels.

A straw bale barrier should be installed prior to major soil disturbance in the drainage area. This type of barrier is placed perpendicular to the flow, across the bottom of a slope or minor drainageway where there is sheetflow. It can be used at the perimeter of the work area, although it does not have to surround it completely. It can also be very effective when used in combination with other erosion and sediment control practices. A straw bale barrier may be used where the length of slope behind the barrier is less than 100 feet and where the slope is less than 2:1.

The success of a straw bale barrier depends on proper installation. The bales must be firmly staked into the entrenchment ditch and the ditch must be properly backfilled. To function effectively, the bales must be placed end to end and there can be no gaps between the bales.

Straw bale barriers are useful for approximately 3 months. They must be inspected and repaired immediately after each rainfall or daily if there is prolonged rainfall. Damaged straw bales require immediate replacement. After each storm, or on a regular basis,trapped sediments must be removed and disposed of properly.

Advantages of a Straw Bale Barrier	Disadvantages of a Straw Bale Barrier
• Can help prevent downstream damage from sediment deposits if properly installed, used, and maintained; and, • Can be an inexpensive way to reduce or prevent erosion.	• May not be used in a stream or large swales; • Poses s risk of washouts if the barrier is installed improperly or a storm is severe; • Short life span and a high inspection and maintenance requirement; • Appropriate for only small drainage areas; and, • Easily subject to misuse and can contribute to sediment problems.

56. BRUSH BARRIER

A brush barrier is a temporary sediment barrier constructed from materials resulting from on-site clearing and grubbing. It is usually constructed at the bottom perimeter of the disturbed area. Filter fabric is sometimes used as an anchor over the barrier to increase its filtering efficiency. Brush barriers are used to trap and retain small amounts of sediment by intercepting the flow from small areas of soil disturbance.

A brush barrier should only be used to trap sediment from runoff which is from a small drainage area. The slope which the brush barrier is placed across should be very gentle. Do not place a brush barrier in a swale or any other channel. Brush barriers should be constructed below areas subject to erosion.

The construction of a brush barrier should be started as soon as clearing and grubbing has produced enough material to make the structure. Wood chips should not be included in the material used for the barrier because of the possibility of leaching. When the site has been stabilized and any excess sediment has been disposed of properly, the filter fabric can be removed. Over time, natural vegetation will establish itself within the barrier, and the barrier itself will decompose.

It should not be necessary to maintain the brush barrier unless there is a very large amount of sediment being deposited. If used, the filter fabric anchor should be checked for tears and the damaged sections replaced promptly. The barrier should be inspected after each rainfall and checked for areas breached by concentrated flow. If necessary, repairs should be made promptly and excess sediment removed and disposed of properly.

Advantages of a Brush Barrier	**Disadvantages of a Brush Barrier**
• Can help prevent downstream damage from sediment deposits; • Constructed of cleared on-site materials and, thus, is inexpensive; and, • Usually requires little maintenance, unless there are very heavy sediment deposits.	• Does not replace a sediment trap or basin; • Appropriate for only small drainage areas; and, • Very limited sediment retention.

57. GRAVEL OR STONE FILTER BERMS

A gravel or stone filter berm is a temporary ridge constructed of loose gravel, stone, or crushed rock. It slows and filters flow, diverting it from an exposed traffic area. Diversions constructed of compacted soil may be used where there will be little or no construction traffic. They are also used for directing runoff to a stabilized outlet.

This method is appropriate where construction will accommodate vehicular traffic. Berms are meant for use in areas with shallow slopes. They may also be used at traffic areas within the construction site.

Berm material should be well graded gravel or crushed rock. The spacing of the berms will depend on the steepness of the slope: berms should be placed **closer together as the slope increases.** The diversion should be inspected daily, after each rainfall, or if breached by construction or other vehicles. All needed repairs should be performed immediately. Accumulated sediment should be removed and properly disposed of and the filter material replaced, as necessary.

Advantages of a Gravel or Stone Filter Berm	Disadvantages of a Gravel or Stone Filter Berm
• Very efficient method of sediment control.	• More expensive than methods that use on-site materials; • Very limited life span; and, • Difficult to maintain because clogging from mud and soil.

58. STORM DRAIN INLET PROTECTION

Storm drain inlet protection is a filtering measure placed around any inlet or drain to trap sediment. This mechanism prevents the sediment from entering inlet structures. Additionally, it serves to prevent the silting-in (clogging) of inlets, storm drainage systems, or receiving channels. Inlet protection may be composite of gravel and stone with a wire mesh filter, block and gravel, filter fabric, or sod.

This type of protection is appropriate for small drainage areas where storm drain inlets will be ready for use before final stabilization. Storm drain inlet protection is also used where a permanent storm drain structure is being constructed on-site. Straw bales are not recommended for this purpose. Filter fabric is used for inlet protection when storm water flows are relatively small with low velocities. This practice cannot be used where inlets are paved because the filter fabric should be staked. Block and gravel filters can be used where velocities are higher. Gravel and mesh filters can be used where flows are higher and subject to disturbance by site traffic. Sod used for inlet filters is generally used where sediments in the storm water runoff are low.

Storm drain inlet protection is not meant for use in drainage areas exceeding one (1) acre or for large concentrated storm water flows. Installation of this measure should take place before any soil disturbance in the drainage area. The type of material used will depend on site conditions and the size of the drainage area. Inlet protection should be used in combination with other measures, such as small impoundments or sediment traps, to provide more effective sediment removal. **Inlet protection structures should be inspected regularly, especially after a rainstorm.** Repairs and silt removal should be performed as necessary. Storm drain inlet protection structures should be removed only after the disturbed areas are completely stabilized.

Advantages of Storm Drainage Inlet Protection	Disadvantages of Storm Drain Inlet Protection
• Prevents clogging of existing storm drainage systems and the siltation of receiving waters; and, • Reduces the amount of sediment leaving the site.	• May be difficult to remove collected sediment; • May cause erosion elsewhere if clogging occurs; and, • Practical only for low sediment, low volume flows.

59. SEDIMENT TRAP

A sediment trap is formed by excavating a pond or by placing an earthen embankment across a low area or drainage swale (vegetated depressions used to transport, filter, and remove sediments). (Refer to Grassed Swales BMP). An outlet or spillway is constructed using large stones or aggregate to slow the release of runoff. The trap retains the runoff long enough to allow most of the silt to settle out.

A temporary sediment trap may be used in conjunction with other temporary measures, such as gravel construction entrances, vehicle wash areas, slope drains, diversion dikes and swales, or diversion channels. This device is appropriate for sites with short time schedules.

Sediment traps are suitable for small drainage areas, usually no more than ten (10) acres, that have no unusual drainage features. The trap should be large enough to allow the sediments to settle and should have a capacity to store the collected sediment until it is removed. The volume of storage required depends upon the amount and intensity of expected rainfall and on estimated quantities of sediment in the storm water runoff.

A sediment trap is effective for approximately 18 months. During this period, the trap should be readily accessible for periodic maintenance and sediment removal. Traps should be inspected after each rainfall and cleaned when no more than half the design volume has been filled with collected sediment. The trap should remain in operation and be properly maintained until the site area is permanently stabilized by vegetation/when permanent structures are in place.

Advantages of a Sediment Trap	Disadvantages of a Sediment Trap
• Protects downstream areas from clogging or damage due to sediment deposits; • Inexpensive and simple to install; and, • Can simplify the design process by trapping sediment at specific spots on-site.	• Suitable only for a limited area; • Effective only if properly maintained; • Will not remove very fine silts and clays; and, • Short life span.

60. TEMPORARY SEDIMENT BASINS

A temporary sediment basin is a settling pond with a controlled storm water release structure used to collect and store sediment produced by construction activities. A sediment basin can be constructed by excavation or by placing an earthen embankment across a low area or drainage swale (vegetated depressions used to transport, filter, and remove sediments). (Refer to Grassed Swales BMP). Sediment basins can be designed to maintain a permanent pool or to drain completely dry. The basin detains sediment-laden runoff from larger drainage areas long enough to allow most of the sediment to settle out.

The pond has a gravel outlet or spillway to slow the release of runoff and provide some sediment filtration. By removing sediment, the basin helps prevent clogging of off-site conveyance systems and sediment-loading of receiving waterways which helps prevent destruction of waterway habitats.

A temporary sediment basin should be installed before clearing and grading is undertaken. It should not be built on an embankment in an active stream. The creation of a dam in such a site may result in the destruction of aquatic habitats. Dam failure can also result in flooding. A temporary sediment basin should be located only where there is sufficient space and appropriate topography. The basin should be made large enough to handle the maximum expected amount of site drainage. Fencing around the basin may be necessary for safety or vandalism reasons.

A temporary sediment basin used in combination with other control measures, such as seeding or mulching, is especially effective for removing sediments.

Temporary sediment basins are usually designed for disturbed areas larger than five acres. The pond should be large enough to hold runoff long enough for sediment to settle. Sufficient space should be allowed for collected sediments. The useful life of a temporary sediment basin is about 12 to 18 months.

Sediment trapping efficiency is improved by providing the maximum surface area possible. Because finer silts may not settle out completely, additional erosion control measures should be used to minimize release of fine silt. **Runoff should enter the basin as far from the outlet as possible to provide maximum retention time.**

Sediment basins should be readily accessible for maintenance and sediment removal. They should be inspected after each rainfall and be cleaned out when about half the volume has been filled with sediment. The sediment basin should remain in operation and be properly maintained until the site area is permanently stabilized by vegetation/when permanent structures are in place. The embankment forming the sedimentation pool should be well compacted and stabilized with vegetation. If the pond is located near a residential area, it is recommended for safety reasons that a sign be posted and that the area be secured by a fence. A well-built temporary sediment basin that is large enough to handle the postconstruction runoff volume may later be converted to use as a permanent storm water management structure.

Advantages of a Temporary Sediment Basin	Disadvantages of a Temporary Sediment Basin

• Protects downstream areas from clogging or damage due to sediment deposits generated during construction activities; and, • Can trap smaller sediment particles than sediment traps can because of the longer detention time.	• Generally suitable for small areas; • Requires regular maintenance and cleaning; • Will not remove very fine silts and clays unless used in conjunction with other measures; • More expensive way to remove sediment than several other methods; • Requires careful adherence to safety practices since ponds are attractive to children.

61. OUTLET PROTECTION

Outlet protection reduces the speed of concentrated storm water flows and reduces erosion or scouring at storm water outlets and paved channel sections. Outlet protection also lowers the potential for downstream erosion. This type of protection can be achieved through a variety of techniques, including stone or riprap, concrete aprons, paved sections and settling basins installed below the storm drain outlet.

Outlet protection should be installed at all pipe, interceptor dike, swale, or channel section outlets where the velocity of flow may cause erosion at the pipe outlet and in the receiving channel. Outlet protection should also be used at outlets where the velocity of flow at the design capacity may result in plunge pools (small permanent pools located at the inlet to or the outfall from applied BMPs). Outlet protection should be installed early during construction activities, but may be added at any time, as necessary.

The exit velocity of the runoff as it leaves the outlet protection structure should be reduced to levels that minimize erosion. Outlet protection should be inspected on a regular schedule to look for erosion and repairs should be made promptly.

Advantages of Outlet Protection	Disadvantages of Outlet Protection
• Provides, with riprap-line apron (the most common outlet protection), a relatively low cost method that can be installed easily on most sites; • Removes sediment in addition to reducing flow speed; • Can be used at most outlets where the flow speed is high; • Inexpensive but effective measure; and, • Requires less maintenance than many other measures.	• May be unsightly; • May cause problems in removing sediment (without removing and replacing the outlet protection structure itself); and, • May require frequent maintenance for rock outlets with high velocity flows.

62. CHECK DAMS

A check dam is a small, temporary or permanent dam constructed across a drainage ditch, swale, or channel to lower the speed of concentrated flows. Reduced runoff speed reduces erosion and gully formation in the channel which allows sediments and other pollutants to settle out.

A check dam should be installed in steeply sloped swales, or in swales where adequate vegetation cannot be established. A check dam may be built from logs, stone, or pea gravel-filled sandbags.

Check dams should be used only in small open channels that drain ten (10) acres or less. The dams should not be placed in streams (unless approved by appropriate state authorities).

The center section of the check dam should be lower than the edges. Dams should be spaced so that the toe of the upstream dam is at the same elevation as the top of the downstream dam.

After each significant rainfall, check dams should be inspected for sediment and debris accumulation. Sediment should be removed where it reaches one half the original dam height. Check for erosion at edges and repair promptly as required. After construction is complete, all stone and riprap should be removed if vegetative erosion controls will be used as a permanent erosion control measure. It will be important to know the expected erosion rates and runoff flow rate for the swale (vegetated depressions used to transport, filter, and remove sediments). (Refer to Grassed Swales BMP) in which this measure is to be installed. A licensed professional engineer should design this type of BMP.

Advantages of Check Dams	Disadvantages of Check Dams
• Are inexpensive and easy to install; • May be used permanently if designed properly; • Allow a high proportion of sediment in the runoff to settle out; • Reduce velocity and provide aeration of the water; and, • May be used where it is not possible to divert the flow or otherwise stabilize the channel.	• May kill grass linings in channels if the water level remains high after it rains or if there is significant sedimentation; and, • Useful only for drainage areas of 10 acres or less.

63. SURFACE ROUGHENING

Surface roughening is a temporary erosion control practice. The soil surface is roughened by the creation of horizontal grooves, depressions, or steps that run parallel to the contour of the land. Slopes that are not fine-graded and that are left in a roughened condition can also control erosion. Surface roughening reduces the speed of runoff, increases infiltration, and traps sediment. Surface roughening also helps establish vegetative cover by reducing runoff velocity and giving seed an opportunity to take hold and grow.

Surface roughening is appropriate for all slopes. To slow erosion, roughening should be done as soon as possible after the vegetation has been removed from the slope. Roughening can be used with both seeding and planting and temporary mulching to stabilize an area. For steeper slopes and slopes that will be left roughened for longer periods of time, a combination of surface roughening and vegetation is appropriate.

Different methods can be used to roughen the soil surface on slopes. They include stair-step grading, grooving (using disks, spring harrows, or teeth on a front-end loader), and tracking (driving a crawler tractor up and down a slope, leaving the cleat imprints parallel to the slope contour). The selection of an appropriate method depends on the grade of the slope, mowing requirements after vegetative cover is established, whether the slope was formed by cutting or filling, and types of equipment available.

Cut slopes with a gradient steeper than 3:1 but less than 2:1 should be stair-step graded or groove cut. Stair-step grading works well with soils containing large amounts of small rock. Each step catches material discarded from above and provides a level site where vegetation can grow. Stairs should be wide enough to work with standard earth moving equipment. Grooving can be done by any implement that can be safely operated on the slope, including those described above. Grooves should not be less than 3 inches deep nor more than 15 inches apart. Fill slopes with a gradient steeper than 3:1 but less than 2:1 should be compacted every 9 inches of depth. The face of the slope should consist of loose, un-compacted fill 4 to 6 inches deep that can be left rough or can be grooved as described above, if necessary.

Any cut or filled slope that will be mowed should have a gradient less than 3:1. Such a slope can be roughened with shallow grooves parallel to the slope contour by using normal tilling. Grooves should be close together (less than 10 inches) and not less than 1 inch deep. Any gradient with a slope greater than 2:1 should be stair-stepped.

It is important to avoid excessive compacting of the soil surface, especially when tracking, because soil compaction inhibits vegetation growth and causes higher runoff speed. It is best to limit roughening with tracked machinery to sandy soils that do not compact easily and to avoid tracking on clay soils. Surface roughened areas should be seeded as quickly as possible. Regular inspections should be made of all surface roughened areas, especially after storms. If rills, (small watercourses that have steep sides and are usually only a few inches deep) appear, they should be filled, graded again, and reseeded immediately. Proper dust control procedures should be followed when surface roughening.

Advantages of Surface Roughening	Disadvantages of Surface Roughening

• Provides a degree of instant erosion protection for bare soil while vegetative cover is being established; and, • Inexpensive and simple for short-term erosion control.	• Limited effectiveness in anything more than a gentle rain; and, • Only temporary; if roughening or vegetative cover is washed away in a heavy storm or the vegetation does not take hold, the surface will have to be re-roughened and new seed laid.

64. GRADIENT TERRACES

Gradient terraces are earth embankments or ridge-and-channels constructed with suitable spacing and with an appropriate grade. They reduce erosion damage by capturing surface runoff and directing it to a stable outlet at a speed that minimizes erosion.

Gradient terraces are usually limited to use on land that has no vegetation with a water erosion problem, or where it is expected that water erosion will be a problem. Gradient terraces should not be constructed on slopes with sandy or rocky soils. They will be effective only where suitable runoff outlets are or will be made available.

Gradient terraces should be designed and installed according to a plan determined by an engineering survey and layout. It is important that gradient terraces are designed with adequate outlets, such as a grassed waterway, vegetated area, or tile outlet. Every outlet should direct the runoff from the terrace system to a point where the outflow will not cause erosion or other damage. Vegetative cover should be used in the outlet where possible. The design elevation of the water surface of the terrace should not be lower than the design elevation of the water surface in the outlet at their junction, when both are operating at design flow. **Terraces should be inspected regularly at least once a year and after major storms.** Proper dust control procedures should be followed while constructing these features (Refer to Dust Control BMP).

Advantages of Gradient Terraces	Disadvantages of Gradient Terraces
• Reduce runoff speed and increase the distance of overland runoff flow; and, • Hold moisture better than do smooth slopes and minimize sediment loading of surface runoff.	• May significantly increase cut and fill cost and cause sloughing if excessive water infiltrates the soil; and, • Not practical for sandy, steep, or shallow soils.

65. VEGETATED FILTER STRIPS

Vegetated filter strips are gently sloping areas of natural vegetation or are graded and artificially planted areas used to provide infiltration, remove sediments and other pollutants, and reduce the flow and velocity of the storm water moving across the terrain. Vegetated filter strips provide permanent storm water control measures on a site.

Vegetative filter strips are suited for areas where the soils are well drained or moderately well drained and where the bedrock and the water table are well below the surface. Vegetated filter strips will not function well on steep slopes, in hilly areas, or in highly paved areas because of the high velocity of runoff. Sites with slopes of 15 percent or more may not be suitable for filtering storm water flows. However, they should still be vegetated. This practice can be put into place at any time, provided that climatic conditions allow for planting.

A filter strip must be approximately 20 feet wide, minimum, to function well. The length of the strip should be approximately 50 to 75 feet. Where slopes become steeper, the length of the strip must be increased. Forested strips are always preferred to vegetated strips, and existing vegetation is preferred to planted vegetation. In planning for vegetated strips, consider climatic conditions, since vegetation may not take hold in especially dry/cold regions.

Regular inspections are necessary to ensure the proper functioning of the filter strips. Removing sediments and replanting may be necessary on a regular basis. The entire area should be examined for damage due to equipment and vehicles. Vegetation should be dense. The portions of the strip where erosion may have created ponding of runoff should be inspected and this situation can be eliminated by grading.

Advantages of Vegetated Filter Strips	Disadvantages of Vegetated Filter Strips
• Provide low to moderate treatment of pollutants in storm water while providing a natural look to a site; • Can provide habitat for wildlife; • Can screen noise and views if trees or high shrubs are planted on the filter strips; • Easily constructed and implemented; and, • Inexpensive.	• Not effective for high velocity flows (large paved areas or steep slopes); • Require significant land space; and, • May have a short useful life due to clogging by sediments and oil and grease.

66. GRASSED SWALES

Grassed swales are vegetated depressions used to transport, filter, and remove sediments. Grassed swales control high runoff rates by reducing the speed of the runoff and by reducing the volume of the runoff through infiltration of the storm water. Pollutants are removed because runoff travels slowly and infiltrates into the soil and because the vegetation in the grass swale works as a filter or strainer.

Grassed swales are suitable for most areas where storm water runoff is low. Certain factors will affect the operation of grassed swales, including soil type, land features, and the depth of the soil from the surface to the water table (top of the drenched portion of the soil or bedrock layer). The soil must be permeable for runoff to be able to infiltrate well. Sandy soils will not hold vegetation well nor from a stable channel structure. Steep slopes will increase runoff rates and create greater potential for erosion. Storm water flows will not be easily absorbed where the water table is near the surface. Swales are most useful for sites smaller than 10 acres. Even without highly permeable soils, swales reduce velocity and are used for that reason.

Grassed swales usually do not work well for construction runoff because the runoff has high sediment loads.

The channel of the swale should be as level as possible to maximize infiltration. Side slopes in the swale should be designed to no steeper than 3:1 to minimize channel erosion. Plans should consider:

- Use of existing topography and existing drainage patterns; and,
- Highest flow rate is expected from a typical storm to determine the most practical size for the swale (in keeping with state or local requirements).

The swale should be lightly tilled before grass is planted, and a dense cover of grasses (seed or sod) should be planted. The location of the swale will determine the best type of vegetation.

Check dams may be installed in the swales to reduce runoff speed and increase infiltration.

Maintenance activities for the swales include those practices needed to maintain healthy, dense vegetation and to retain efficient infiltration and movement of the storm water into and through the swale. Periodic mowing, reseeding, and weed control are required to maintain pollutant removal efficiency. The swale and channel outlet should be kept free from sediment build-up, litter, brush, or fallen tree limbs.

Periodic inspections will identify erosion problems or damaged areas. Damaged or eroded areas of the channel should be repaired as soon as possible. Areas with damaged vegetation should be reseeded/replanted immediately.

Advantages of Grassed Swales	Disadvantages of Grassed Swales
• Easily designed and constructed; • Provide moderate removal of sediments if	• Cannot control runoff from very large storms;

properly constructed and maintained; • May provide a wildlife habitat; • Inexpensive; • Can replace curb and gutter systems; and, • Can last for long periods of time if well maintained.	• If they do not drain property between storms, can encourage nuisance problems such as mosquitos, ragweed, dumping, and erosion; • Not capable of removing significant amounts of soluble nutrients; and, • Cannot treat runoff with high sediment loadings.

67. LEVEL SPREADERS

Level spreaders are devices used at storm water outlets to spread out collected storm water flows into sheetflow (runoff that flows over ground surface in a thin, even layer). Typically, a level spreader consists of a depression in the soil surface that spreads the flow onto a flat area across a gentle slope. Level spreaders then release the storm water flow onto level areas stabilized by vegetation to reduce speed and increase infiltration.

Level spreaders are most often used as an outlet for temporary or permanent storm water conveyances or dikes. Runoff that contains high sediment loads should be treated in a sediment trapping device prior to release into a level spreader.

The length of the spreader depends upon the amount of water that flows through the conveyance. Larger volumes of water need more spread to even out. Level spreaders are generally used with filter strips (Refer to Vegetated Filter Strips BMP). The depressions are then seeded with vegetation (Refer to Permanent Seeding BMP).

Level spreaders should not be used on soil that might erode easily. They should be constructed on natural soils and not on fill material. The entrance to the spreader should be level so that the flow can spread out evenly.

The spreader should be inspected after every large storm event to check for damage. Heavy equipment and other traffic should be kept off the level spreader because these vehicles may compact the soil or disturb the grade of the slope. If ponding erosion channels develop, the spreader should be regraded. Dense vegetation should be maintained and damaged areas reseeded as needed.

Advantages of Level Spreaders	Disadvantages of Level Spreaders
• Reduce storm water flow velocity, encourage sedimentation and infiltration; and, • Relatively inexpensive to install.	• Can easily develop "short circuiting" (concentration of flows into small streams instead of sheetflow over the spreader) because of erosion or other disturbance; and, • Cannot handle large quantities of sediment-laden storm water.

68. INFILTRATION TRENCHES

An infiltration trench usually consists of a long, narrow excavation ranging from 3 to 12 feet deep. The trench is filled with stone, which allows for temporary storage of storm water runoff in the open spaces between the stones. The stored storm water infiltrates into the surrounding soil or drains into underground pipes through holes and is then routed to an outflow point. Infiltration trenches are designed to remove both fine sediments and soluble pollutants instead of larger, coarse pollutants.

Infiltration trenches should be restricted to areas with certain soil, ground water slope, area, and pollutant conditions. Infiltration trenches will not operate well in soils that have high clay contents, silt/clay soils, sandy/clay loams, or soils that have been compacted. Trenches should not be sited over fill soils because such soils are unstable. Hardened soils are often not suitable for infiltration trenches because these types of soils do not easily absorb water. Infiltration practices in general should not be used to manage contaminated storm water.

The drainage area contributing runoff to a single trench should not exceed five (5) acres. Construction of trenches should not start until after all land-disturbing activities have ceased so that runoff with high levels of sediment does not fill in the structure.

If slopes draining into the trench are steeper than five (5) percent, the runoff will enter the trench too fast and will overwhelm the infiltration capacity of the soil, casing overflow. The depth from the bottom of the trench to the bedrock layer and the seasonal high water table must be at least three feet. Infiltration trenches may not be suitable in areas where there are cold winters and deep frost levels.

Pretreatment of runoff before it is channeled to the trench is important to efficient operation because pretreatment removes sediment, grit, and oil. Reducing the pollutant load in the runoff entering the trench lengthens trench life. One method of pretreatment is to install a buffer zone just above the trench to act as a filter (Refer to Buffer Zones BMP). In addition, a layer of filter fabric 1 foot below the bottom of the trench can be used to trap the sediments that get through the buffer strip. If excavation around the trenches is necessary, the use of light duty equipment will avoid compacting which could cause a loss of infiltration capability.

Infiltration trenches should be inspected at least once per year and after major rainfall events. Debris should be removed from all areas of the trench, especially the inlets and overflow channels. Dense vegetative growth should be maintained in buffer areas surrounding the trench.

Test wells can be installed in every trench to monitor draining times and provide information on how well the system is operating. **Daily test well monitoring is necessary, especially after large storm events.** If the trench does not drain after 3 days, it usually means that the trench is clogged.

Advantages of Infiltration Trenches	Disadvantages of Infiltration Trenches
• Preserve the natural water balance of the site; • Effective for small sites; and,	• Require high maintenance when sediment loads are heavy; • Have short life span, especially if not

• Remove pollutants effectively.	maintained properly; and, • May be expensive (cost of excavation and fill material).

69. POROUS PAVEMENTS/CONCRETE GRIDS AND MODULAR PAVEMENTS

Porous pavement, concrete grids, and modular pavements allow storm water to infiltrate so that the speed and amount of runoff from a site can be reduced.

Porous pavement can be constructed of either asphalt or concrete. With porous asphalt pavement, runoff infiltrates through a porous asphalt layer into a stone "reservoir" layer. Storm water runoff filters through the stone reservoir into the underlying subsoil or drains into underground pipes through holes and is routed away. The bottom and sides of the stone reservoir are lined with filter fabric to prevent the movement of soils into the reservoir area.

Porous concrete pavement is made out of a special concrete mix that has a high number of open spaces between the particles and a coarse surface texture. These open spaces allow runoff to pass through the surface to lower levels. This type of pavement can be placed directly on graded soils. When a sub-base is used for stability, six (6) inches of sand is placed under the concrete mixture. Up to six (6) inches of storm water can be held on the surface of the pavement and within the concrete.

Concrete grids and modular pavement are made out of precast concrete, poured-in-place concrete, brick, or granite. These types of pavements can also reduce the loading and concentration of pollutants in the runoff. Concrete grids and modular pavements are designed and/or constructed so that they have open spaces within the pavement through which storm water can infiltrate into the ground. These open spaces can be filled with gravel/sand/vegetation.

These structures are usually only suitable for low-volume parking areas (1/4 acre to 10 acres) and lightly used access roads. Areas that are expected to get moderate or high volumes of traffic or heavy equipment can use conventional pavements (for the heavy traffic areas) that are sloped to drain to areas with the porous pavements. These pavements are not effective in drainage areas that receive runoff containing high levels of sediment.

The soil types over which concrete grids and modular pavement are to be placed should allow for rapid drainage through the pores in the pavement. These pavements are not recommended for sites with slopes steeper than five (5) percent or sites with high water tables, shallow bedrock, fill soils, or localized clay lenses, which are conditions that would limit the ability of the runoff to infiltrate into surface soils. For example, the water table and bedrock should be at least three (3) feet below the bottom of the stone reservoir. Porous pavement will not operate well in windy areas where sediment will be deposited on the porous pavement.

Construction of these pavements should be timed so that installation occurs on the site after other construction activities are finished and the site has been stabilized. As a result, sediments are less likely to be tracked or carried on to the surface.

Proper installation of these pavements requires a high level of construction expertise and workmanship. Only contractors who are familiar with the installation of these pavements should be used.

Designers of porous pavement areas should consider sediment and erosion control. Sediments must kept away from the pavement area because they can clog the pores. Controls to consider for sediments include

a diversion berm (earthen mound) around the edge of the pavement area to block the flow of runoff from certain drainages onto the pavement, or other filtering controls such as silt fences. De-icing salt mixtures, sands, or ash also may clog pores and should not be used for snow removal. Signs should be posted to prohibit these activities.

The infiltration of storm water runoff may contaminate ground water sources, these pavements are not suitable for areas close to drinking water wells (at least 100 feet away is recommended).

Maintenance of the surface is very important. For porous pavements, this includes vacuum sweeping at least four times per year followed by high-pressure hosing to reduce the chance of sediments clogging the pores of the top layer. Potholes and cracks can be filled with typical patching mixes unless more than ten (10) percent of the surface area needs repair. Spot clogging may be fixed by drilling half-inch holes through the porous pavement layer every few feet.

The pavement should be inspected several times the first few months after installation and then annually. **Inspections after large storms are necessary to check for pools of water.** These pools may indicate clogging. The condition of adjacent vegetated filter strips, silt fences, or diversion dikes should also be inspected.

Concrete grids and modular pavements should be designed in accordance with manufacturers' recommendations. Designers also need information on soils, depth to the water table, and storm water runoff quantity and quality.

Maintenance of concrete grids and modular pavements is similar to that of the porous pavements; however, turf maintenance such as mowing fertilizing, and irrigation may be needed where vegetation is planted in the open spaces.

Advantages of Porous Pavements/Concrete Grids and Modular Pavements	Disadvantages of Porous Pavements/Concrete Grids and Modular Pavements
• Provide erosion control by reducing the speed and quantity of the storm water runoff from the site; • Provide some treatment to the water by removing pollutants; • Reduce the need for curbing and storm sewer installation and expansion; • Improve road safety by providing a rough surface; • Provide some recharge to local aquifers; and, • Cost effective because they replace more expensive/complex treatment systems.	• Can be more expensive than typical pavements; • Easily clogged with sediment/oil; however, pretreatment and proper maintenance will prevent this problem; • May cause ground-water contamination; • Not structurally suited for high-density traffic or heavy equipment; • Asphalt pavements may break down if gasoline is spilled on the surface; and, • Less effective when the subsurface is frozen.

Best Management Practices (BMPs)						
Area		SWPPPT Member				
Activity						
Inspectors Initials						
Date of Inspection						
Year of Inspection		12	13	14	15	16
BMP #	BMP Description					
1	Good Housekeeping					
1.1	Loose garbage and waste material are picked up and disposed of regularly.					
1.2	Equipment is kept in good working condition.					
1.3	There is routine inspection for leaks or conditions that could lead to contact with storm water.					
1.4	Employees understand spill cleanup procedures.					
1.5	Adequate space is provided for material transfer and storage, easy access for inspections and to prevent accidental spills.					
1.6	Containers are stacked according to manufacturer's instructions on pallets and above ground level to avoid corrosion due to moisture buildup.					
1.7	All chemical substances are identified on material usage lists.					
1.8	MSDS sheets are readily available.					
1.9	All containers are labeled to show the name and type of substance, stock number, expiration date, health hazards, etc.					
BMP #2	Preventative Maintenance					
2.1	A system is in place including documentation to identify equipment that upon failure could result in a leak or spill of potential pollutants that could enter the storm system.					
2.2	There are timely inspections and maintenance of storm water management devices (cleaning catch basin, etc.).					
BMP #3	Visual Inspection					
3.1	Area is absent of corroded drums, dumpsters without bungs, plugs or covers					
3.2	Area is absent of corroded or damaged tanks, tank supports and tank drain valves.					
3.3	Area is absent of torn bags or bags exposed to rain water.					
3.4	Area is absent of corroded or leaking pipes.					
3.5	Area is absent of broken or cracked dikes, walls or other physical barriers designed to prevent storm water from reaching stored materials.					
3.6	Area is absent of leaking pumps and/or hose connections.					
3.7	Area is absent of illicit discharges or cross connections.					
3.8	Area is absent of windblown dry chemicals.					
BMP #4	Spill Prevention and Response					
4.1	Potential spill areas have been identified and documented.					
4.2	The SPCC plan is being implemented properly.					
BMP #5	Sediment and Erosion Control					
5.1	The structural sediment/control or vegetative measures are in place, maintained and functioning properly.					
BMP #6	Runoff Management/Pollution Prevention					
6.1	There are flow and/or pollution control measures in place, maintained and functioning properly (I.e. swales, detention basins, and oil water separators).					
BMP #7	Personnel Training and Record Keeping					
7.1	A SWPPP employee training program is in place.					
7.2	Employees are specifically trained in the areas of spill prevention and response, good housekeeping, and material management practices.					

Best Management Practices (BMPs)						
Area		SWPPPT Member				
Activity						
Inspectors Initials						
Date of Inspection						
Year of Inspection		12	13	14	15	16
BMP #	BMP Description					
7.3	Inspection and monitoring records are retained for a minimum of 3 years.					
BMP #8	Fueling					
8.1	Spill/overflow prevention equipment is installed, maintained and operating properly at fuel delivery areas.					
8.2	Fuel areas are contained to prevent spills from directly entering the storm sewer.					
8.3	Dry cleanup methods (sorbent, drip pans, or pads) are used for fuel spills or leaks.					
8.4	Spill control awareness signs are visible.					
8.5	Portable fuel tanks are stored properly.					
8.6	Fuel tanks are not topped off.					
8.7	Fueling areas are protected from rain and run-on.					
8.8	Oil/water separators or oil/grease traps are installed prior to storm drains.					
8.9	Pollution prevention measures are discussed with personnel.					
BMP #9	Vehicle, Aircraft and Equipment Maintenance					
9.1	Vehicles, aircraft and equipment are checked for leaking fluids.					
9.2	Nontoxic or low toxicity materials are used.					
9.3	Oil filters are completely drained before recycling/disposal.					
9.4	Liquid wastes are not poured down drains.					
9.5	Engine fluids and batteries are recycled.					
9.6	Wastes are properly segregated, labeled and discarded.					
9.7	Recycled products used where possible.					
9.8	Maintenance activities are performed in covered areas.					
9.9	Wrecked vehicles and aircraft are stored properly.					
BMP #10	Painting Operations					
10.1	Painting activities are peformed in designated areas.					
10.2	Paint overspray is prevented from contact with storm water.					
10.3	Parts are inspected prior to being painted to ensure they are dry, clean and rust free.					
10.4	Wastes from sanding are contained.					
10.5	Paint waste and solvents are stored properly.					
10.6	Paint, paint thinner, and solvents are recycled.					
BMP #11	Vehicle, Aircraft and Equipment Washing					
11.1	Detergents used are phosphate-free biodegradable detergents.					
11.2	Outside washing is done at an approved washrack.					

Best Management Practices (BMPs)						
Area		**SWPPPT Member**				
Activity						
Inspectors Initials						
Date of Inspection						
Year of Inspection		**12**	**13**	**14**	**15**	**16**
BMP #	**BMP Description**					
11.3	Wash water is contained and kept out of the storm drainage system.					
11.4	Wash water is recycled where practical.					
BMP #12	**Loading and Unloading Materials**					
12.1	Delivery vehicles are parked where spills/leaks can be contained.					
12.2	Loading and unloading equipment are checked regularly for leaks.					
12.3	Loading and unloading areas are covered to minimize exposure to rainfall.					
12.4	Area is designed to minimize storm water run-on.					
BMP #13	**Liquid Storage in Above Ground Tanks**					
13.1	The above ground tanks are included in other environmental management plans.					
13.2	There are overflow protection devices on tanks.					
13.3	There are protective guards around tanks and pipes.					
13.4	Valves are clearly tagged, labeled, and oriented properly.					
13.5	The tank systems are inspected and tested regularly.					
13.6	Tanks are surrounded by a secondary containment system that includes a berm.					
13.7	Drain valve(s) are properly located and normally in closed and locked position.					
BMP #14	**Waste Management Areas**					
14.1	A waste assessment study has been conducted for the facility.					
14.2	Industrial waste source reduction and recycling BMPs are being implemented.					
14.3	Run-on and runoff from the site is managed properly.					
BMP #15	**Outside Storage Areas**					
15.1	Fuels, raw materials, by-products, intermediates, finished products or process residuals are covered or enclosed.					
BMP #16	**Site Specific Practices**					
16.1	Containment dikes/curbing are functioning properly.					
16.2	Drip pans are in place to contain leaks.					
16.3	Materials that contain potential pollutant sources are covered.					
16.4	Proper dust control measures are in place.					
16.5	SWPPP awareness signage is properly displayed.					
16.6	Appropriate security measures are in place.					
	NOTES: 1) Y - Yes, BMP applies and area is in compliance. 2) N - No, BMP applies and area is not in compliance. 3) REC - Recommendation is either nonstructural (12 weeks to complete) or structural (3 years to complete). The structural is shown in red bold italics.					

EMPLOYEE TRAINING PROGRAM

Date: _____

Employee Training Topic:		
Name	***Job Title***	***Shop/Code***

DOCUMENTED By: _____

TITLE: _____