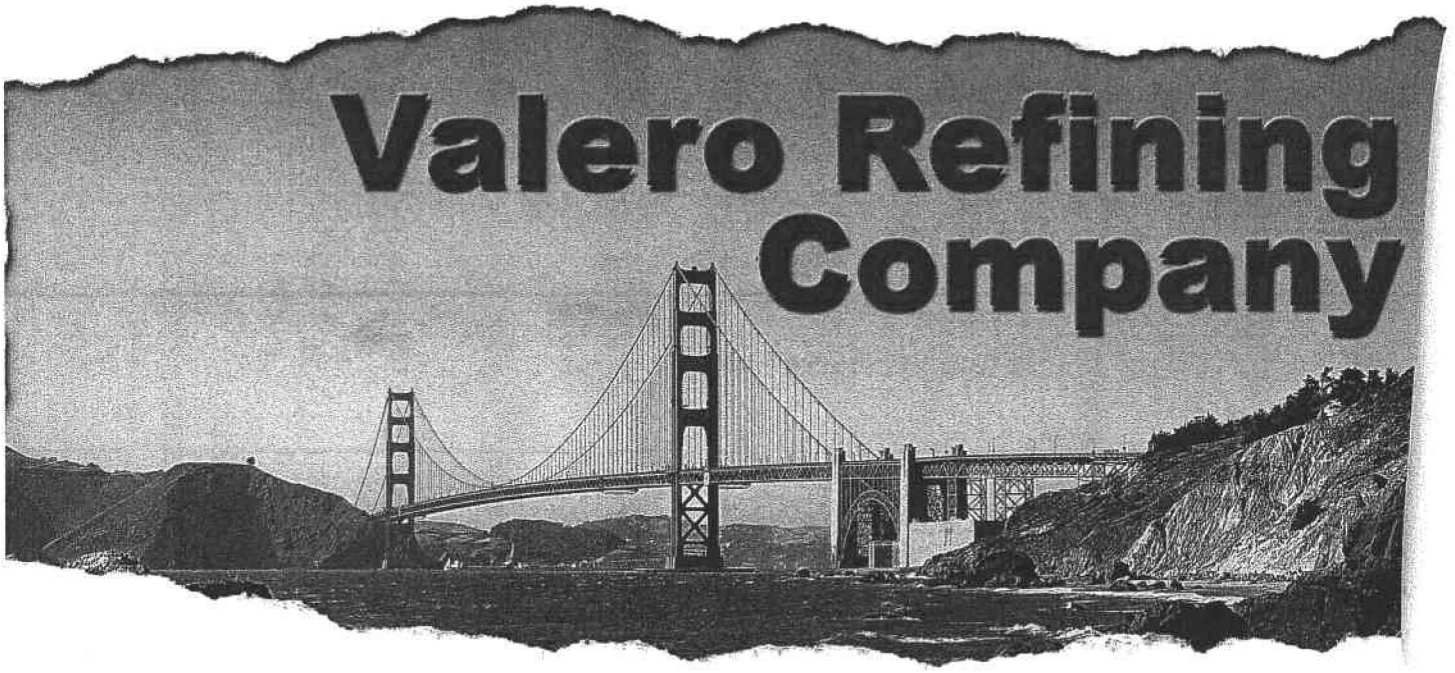

STORM WATER POLLUTION PREVENTION PLAN

VALERO BENICIA REFINERY

MAY 2002

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STORM WATER POLLUTION PREVENTION PLAN

Name and Type of Facility: Valero Benicia Refinery – Petroleum Refining
Location of Facility: 3400 East Second Street
Benicia, California 94510

Name and Address of Owner/Operator: Valero Refining Company – CA
3400 East Second Street
Benicia, California 94510

Name and Address of Manager: John U. Roach, Vice President and General Manager
3400 East Second Street
Benicia, California 94510

Designated Person Accountable for Storm Water Pollution Prevention at Facility
Name and Title: A. R. Middleton, Environmental and Safety Director

---

PLAN 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 ensure that qualified personnel have properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed 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.

Approved and Endorsed by:

Signature: Alfred R. Middleton
Name: A. R. Middleton
Title: Environmental and Safety Director

PREPARER'S CERTIFICATION

I hereby certify that this plan has been prepared in accordance with the requirements of the Clean Water Act Amendments found in 40 CFR 122, 123, and 124 and the California State Wide General Permit No. CAS 000001, San Francisco Bay Regional Water Quality Control Board Order Numbers 96-068 and 97-03-DWQ. This plan has been prepared based on site inspections and company personnel interviews, and to the best of my knowledge is true and correct.

Randall E. Marx, P.E.
State of California Registered Professional Engineer
No. C31936

Signature of Registered Professional Engineer

Date 5/8/02

VALERO BENICIA REFINERY
STORM WATER POLLUTION PREVENTION PLAN

Prepared for:

Valero Benicia Refinery
3400 East Second Street
Benicia, CA 94510

Prepared by:

URS Corporation
2520 Venture Oaks Way, Suite 250
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May 2002

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LIST OF ACRONYMS

AHM	acutely hazardous material
BMP	Best Management Practice
CFR	Code of Federal Regulations
DAF	dissolved air flotation
DHS	State of California Department of Health Services
EPA	U.S. Environmental Protection Agency
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NURP	National Urban Runoff Program
O&G	oil and grease
RMPP	Risk Management and Prevention Program
RWQCB	San Francisco Bay Regional Water Quality Control Board
SC	specific conductance
SEAOC	Structural Engineering Association of California
SIC	Standard Industrial Classification
SPCC	Spill Prevention Control and Countermeasure
SWMRPP	Storm Water Monitoring and Reporting Program Plan
SWRCB	State Water Resources Control Board
SWPPP	Storm Water Pollution Prevention Plan
TOC	total organic carbon
TSD	Technical Services Department
TSS	total suspended solids
UBC	Uniform Building Code
USGS	U.S. Geological Survey

1.0 INTRODUCTION

Under contract to the Valero Refining Company (Valero), URS Corporation (URS) has updated this Storm Water Pollution Prevention Plan (SWPPP). This plan was originally prepared by IT Corporation in 1996 in accordance with the requirements of the San Francisco Bay Regional Water Quality Control Board (RWQCB) Order No. 96-068 (NPDES Permit No. CA0005550) for the Valero Benicia Refinery (Figure 1-1). This SWPPP revises the previous SWPPP, prepared in October 2000 by URS. Since the original version of the SWPPP, Valero purchased the Benicia Refinery from the Exxon Company, U.S.A.

1.1 Regulatory Background

In 1972, the Federal Clean Water Act was amended to require National Pollutant Discharge Elimination System (NPDES) permits for point source discharges to surface waters. This initial attempt to protect the nation's surface waters mainly focused on discharges of treated process and wastewater from industries and industrial and municipal wastewater treatment plants. However, the U.S. Environmental Protection Agency (U.S. EPA) recognized that a significant amount of pollution was entering surface waters as a result of point and nonpoint source discharges of stormwater that had received minimal or no treatment.

From 1978 to 1983, U.S. EPA obtained voluntary cooperation from a number of municipalities across the country to participate in a study of the potential impact of stormwater discharges on surface water quality. The study, titled National Urban Runoff Program (NURP), determined that stormwater runoff was a significant contributor to the pollutant loads discharged to surface waters. Illegal dumping into the storm sewers was identified as a problem that needed to be addressed. Also, the discharge of non-stormwater flows as a result of crossed connections between the sanitary, industrial, and storm sewers was contributing unnecessarily to pollutant loads.

U.S. EPA promulgated draft regulations for stormwater in October 1987. The final federal regulations were issued in November 1990. The regulations were comprehensive, identifying 12 categories of industries and industrial activities that would be required to obtain permits for point source discharges of stormwater associated with industrial activity. The categories identified are:

- Manufacturing facilities (chemical and industrial);
- Mining and oil and gas production;
- Hazardous waste treatment, storage, and disposal facilities;
- Landfills, land application sites, and open dumps;
- Recycling facilities, scrap yards, battery reclaimers, salvage yards, and auto junkyards;
- Steam electric-generating facilities;
- Transportation facilities;
- Sewage treatment plants;
- Certain facilities if materials are exposed to stormwater;
- Facilities subject to stormwater effluent guidelines identified in Title 40 Code of Federal Regulations (CFR) 400-466 (Subchapter N);
- Construction activities involving five acres or more; and
- Logging activities.

The specific industries that are required to obtain permits for point source discharges of stormwater are identified by Standard Industrial Classification (SIC) in the federal regulations (40 CFR Parts 122, 123, 124).

Valero reports under SIC 2911 (Petroleum Refining). This category is captured under the federal regulations in 40 CFR 122.26(b)(14)(i). This paragraph reads: "Facilities subject to storm water effluent limitations guidelines, new source performance standards, or

toxic pollutant effluent standards under 40 CFR subchapter N (except facilities with toxic pollutant effluent standards which are exempted under category (xi) in paragraph (b)(14) of this section)." The Valero Benicia Refinery is also captured under 40 CFR 122.26(b)(14)(ii), which reads: "Facilities classified as Standard Industrial Classifications 24 (except 2434), 26 (except 265 and 267), 28 (except 283), 29, 311, 32 (except 323), 33, 3441, 373."

The State of California is authorized by the U.S. EPA to implement the NPDES program at the state level. Two options exist for California industry to comply with the federal stormwater regulations: (1) apply for an individual NPDES permit or (2) apply for coverage under a general permit. The state has developed a General Permit for industrial stormwater that meets the requirements of the federal regulations. The General Permit was promulgated in State Water Resources Control Board (SWRCB) Order No. 97-03-DWQ, "Waste Discharge Requirements (WDRs) for Discharges of Storm Water Associated with Industrial Activities (Excluding Construction Activities)" (SWRCB, 1997).

The State of California elected to issue a statewide General Permit to regulate industrial stormwater discharges rather than issue group general permits or individual permits (both of which are allowed under the federal regulations). A General Permit reduces the burden on the state of implementing the program and makes compliance for affected industries simpler. Locally, the San Francisco Bay RWQCB has been authorized by the U.S. EPA and the SWRCB to implement the NPDES program and issue NPDES permits at the state level.

The General Permit requires a facility to submit an initial Notice of Intent (NOI) application requesting coverage under the General Permit. An industry is considered appropriately permitted and to be in compliance as long as it complies and continues to comply with the conditions of the General Permit.

The Valero Benicia Refinery (then owned by Exxon) filed an NOI on 30 March 1992 to cover 11 stormwater outfalls. Four stormwater outfalls were already covered under the refinery NPDES permit.

The General Permit requires a facility to develop an SWPPP that details the administrative and operational procedures that the facility has implemented to prevent stormwater pollution. A monitoring plan must also be developed that details the specific monitoring a facility will perform to confirm the effectiveness of the SWPPP. The refinery developed an SWPPP in 1992 to satisfy this requirement.

On 15 May 1996, NPDES Permit No. CA0005550 (RWQCB Order No. 96-068) (Appendix A) was revised and issued with an expiration date of 15 May 2001. Valero submitted an application to revise this permit prior to the 15 May 2001 expiration date. This permit is still currently in effect, as Valero and the RWQCB are still negotiating a revised NPDES permit. This permit, which supersedes both the former NPDES permit and the General Permit, covers all the stormwater outfalls previously covered under the former NPDES permit (outfalls 002, 003, 005, and 006) and the General Permit (outfalls 004 and 007 through 016). Thus, under the NPDES permit, the Valero Benicia Refinery currently monitors 15 stormwater outfalls (11 former General Permit outfalls, and 4 former NPDES-permitted outfalls). Permit requirements are summarized in Table A-1.

One of the key elements of the stormwater pollution prevention program is the use of best management practices (BMPs). Dischargers who use, manufacture, store, or handle the chemicals listed as toxic under section 307(a)(1) of the Clean Water Act are required by 40 CFR 125.105 to establish objectives for the control of toxic and hazardous pollutants. They are further required by 40 CFR 125.105 to establish specific BMPs to meet these objectives. The BMPs are required to address each component or system capable of causing the release of significant amounts of toxic or hazardous pollutants to the waters of the United States. This plan identifies and describes those BMPs that are used to protect stormwater quality.

1.2 Facility Description

The Valero Benicia Refinery began operations in 1969. Refined petroleum products, including gasoline, jet fuels, diesel, coke, sulfur, and liquefied petroleum gas, are produced at the refinery. The refinery has a crude-run throughput of 135,000 barrels per day and

is classified as a cracking refinery by the U.S. EPA in 40 CFR 419.20. Refinery operations are conducted 24 hours per day, 365 days per year. Figure 1-2 is a scaled drawing of the refinery that shows the five real estate parcels within which most site operations take place. The five real estate parcels are:

- Parcel 1: contains the administration building, marketing area, main processing units, 5.1 million barrels of oil storage, and the main storage area for hazardous materials and waste (referred to as the Refinery Proper in this plan).

- Parcel 2: contains 2.1 million barrels of crude oil storage (referred to as the Crude Field). This parcel also contains diked areas that provide containment capacity for approximately 25 million gallons of treated refinery effluent water.

- Parcel 3: contains the wastewater treatment plant (referred to as the Wastewater Treating area). Wastewater composed of process wastes, cooling tower and boiler blowdown, ballast water, sour water, raw water treatment backwash, and stormwater runoff is treated at this area.

- Parcel 4: contains two wastewater/rainwater diversion tanks.

- Parcel 5: contains the Refinery Dock, which is located on the Carquinez Strait. The dock is connected by pipelines to the Refinery Proper and the Crude Field, and is used to transfer crude oil, intermediates, and petroleum products between barges and ships.

In addition to these five real estate parcels, there is a leased coke-loading facility and an inactive ballast water tank at the refinery (see Figure 1-2). The coke-loading facility (referred to as the Coke Silos) is the receptacle for processed coke prior to ship transfer. The facility consists of a rail spur, four storage silos, and a ship conveyance system. This facility, which is operated by a lessee, is located approximately one-quarter mile west of the Refinery Dock on the Carquinez Strait.

The inactive ballast water tank was previously used for transfer of ballast water from incoming ships. Currently, the tank is sealed and not in use. The ballast water tank site is located off Highway 780, approximately three-quarters of a mile northwest of the Martinez-Benicia Bridge.

2.0 SITE LOCATION AND BACKGROUND INFORMATION

2.1 Site Location

The Valero Benicia Refinery is located in the southeast corner of the city of Benicia, in Solano County, California (see Figure 1-1). The site is bounded on the west by the city of Benicia, on the north and east by Sulphur Springs Creek, and on the south by Highway 680. The Wastewater Treating area, the Refinery Dock, and the Coke Silos are not part of the Refinery Proper. The Wastewater Treating area is located on Suisun Bay south of Highway 680 at the Industrial Park Road exit, and the Refinery Dock and Coke Silos are approximately one-quarter mile west of the Martinez-Benicia Bridge.

2.2 Topography, Surface Water, and Hydrology

Figure 1-1 is a 1:24000 scale U.S. Geological Survey (USGS) topographic map that illustrates the site and the area within a quarter mile of the site boundary.

According to the USGS topographic map, the surface waters that have potential for receiving stormwater or wastewater from the Valero Benicia Refinery include Suisun Bay, Sulphur Springs Creek, and Beaver Creek.

A total of approximately 100 groundwater monitoring wells have been installed at the Valero Benicia Refinery. Because highly impermeable seals have been incorporated into the construction of these wells, stormwater intrusion is not expected to be a problem. A review of regulatory files and the USGS map indicated that there are no registered domestic groundwater supply wells within a quarter mile of the Valero Benicia Refinery.

2.3 Summary of Previous Sampling Results

The Valero Benicia Refinery has an ongoing Storm Water Monitoring and Reporting Program Plan in accordance with NPDES Permit No. CA0005550 (Appendix A). This plan was implemented in 1996, and the full text of the plan and a summary of the analytical results for the past four years can be found in Appendix B.

Sampling and analysis for outfall 001 are done according to the guidelines in Table 1 in the NPDES permit. Because stormwater and other process wastewaters are all discharged at this sample point, this outfall is regulated differently than the other outfalls. The effluent limitations for the discharge from outfall 001 can be found on pages 13 and 15 of the NPDES permit. Reporting for outfall 001 is done monthly and summarized annually (on 30 January).

Stormwater discharges from outfalls 002 through 016 consist entirely of stormwater. The effluent limitations in the NPDES permit for discharges from these outfalls are listed in Table 2-1. There have been no violations of these limits in the last four years (see Table B-1). Valero is currently (as of May 2002) working with the RWQCB to revise the NPDES permit, with a revised NPDES permit expected to be issued in the second half of 2002. This revised NPDES permit could result in different effluent limitations.

Table 2-1

Effluent Limitations for Outfalls 002 through 016

Constituent	Limitation
pH	Within 6.5 to 8.5
Oil & grease (O&G)	Daily maximum of 15 mg/L
Total organic carbon (TOC)	Daily maximum of 110 mg/L
Visible oil	None may be observed
Visible color	None may be observed

mg/L= milligrams per liter

For constituents not specified in the NPDES permit, benchmark values have been established by the RWQCB (RWQCB, 1994). The benchmarks for total suspended solids (TSS) and specific conductance (SC) are shown in Table 2-2. These parameters are nonspecific tests that may indicate whether pollutants are present in runoff. To identify possible issue areas, the sampling results were compared with the benchmark values. If potential issue areas exist, additional BMPs may need to be established or existing BMPs may need to be updated.

Table 2-2

Pollutant Benchmark Levels[a]

Analyte	Concern: Possible Investigation Required	Follow-up Investigation Recommended
TSS	greater than 30–50 mg/L	greater than 100 mg/L
SC	greater than 50 µmho/cm	greater than 300–500 µmho/cm

[a] These benchmark levels could change when the Valero NPDES permit is revised in 2002.

µmho/cm = micromho per centimeter
mg/L = milligrams per liter
SC = specific conductance
TSS = total suspended solids

The revised NPDES permit approved on 15 May 1996 called for monitoring phenolics and selected metals at outfall E-005 for one year in addition to the normal stormwater monitoring. This additional monitoring was requested because intermittent elevated levels were found prior to permit renewal. As a result of this monitoring, it was determined that runoff from the five training areas could enter E-005 because of a partially blocked drain in the refinery process sewer. This drain has been repaired, but Valero continued to do the additional monitoring for one additional wet season (the 1998–99 wet season).

In addition to the effluent limitations specified in the NPDES permit, the discharge of stormwater cannot cause any of the following conditions to exist in waters of the state at any place at levels that cause nuisance or adversely affect beneficial uses:

- Floating, suspended, or deposited macroscopic particulate matter or foam;

- Bottom deposits or aquatic growths;
- Alteration of temperature, turbidity, or apparent color beyond present natural background levels;
- Visible, floating, suspended, or deposited oil or other product of petroleum origin; and
- Toxic or deleterious substances to be present in concentrations or quantities which will cause deleterious effects on aquatic biota, wildlife, or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentration.

The wet and dry season visual observations during the 1996–1997, 1997–1998, 1998–1999, and 1999–2000, 2000–2001, and 2001–2002 water years reported no violations of these regulations.

3.0 STORMWATER POLLUTION PREVENTION STRATEGY

3.1 Strategy

The goal of this SWPPP is to prepare a plan that minimizes stormwater pollution, improves water quality, and complies with the stormwater regulations in NPDES Permit No. CA0005550. The strategy to achieve this goal is to implement BMPs, wet season observations, dry season observations, an annual site inspection, and appropriate responses to the inspections and sampling.

Table 3-1 outlines the strategy for preventing stormwater pollution at the Valero Benicia Refinery. A flowchart of the Storm Water Pollution Prevention Program for water year 2000–2001 is presented in Figure 3-1. The 2000–2001 water year is defined as 1 July 2000 to 30 June 2001.

3.1.1 Dry Season Observations

The NPDES Permit requires that at least two visual observations shall be made at all discharge locations during the dry season (May through September) to identify potential non-stormwater discharges. The staff performing these observations shall use the form in Appendix C to note any stains, sludges, odors, or other abnormal conditions. Additional testing (e.g., dye tests, video surveys, etc.) may be necessary if an unacceptable discharge is observed. When sufficient data have been collected, Valero will develop BMPs to eliminate any unacceptable discharge that is identified.

3.1.2 Wet Season Observations

The NPDES Permit requires that once per month during the wet season (October through April) visual observations shall be made of all stormwater discharge locations during the first hour of a storm event. The form in Appendix C will be used to document the presence

Table 3-1

Strategy for the Storm Water Pollution Prevention Program at Valero Benicia Refinery

Goal			
Minimize stormwater pollution, improve water quality, and comply with stormwater regulations per NPDES Permit No. CA0005550 under the Clean Water Act.			
Strategy	**Objectives**	**Actions**	**Metrics**
Prepare and maintain SWPPP and SWMRPP.	Meet permit requirements for the SWPPP and the SWMRPP.	Identify potential sources of pollution to stormwater.	Did the operators find the BMPs feasible and easy to implement?
	Establish a program to minimize stormwater pollution.	Design BMPs to minimize each potential source of pollution.	Did the RWQCB provide positive feedback on the SWPPP and the SWMRPP, if reviewed?
	Maintain discussion within the refinery and with regulators on stormwater issues.	Design an inspection and sampling program to monitor the effectiveness of the BMPs.	Did results of inspection and monitoring indicate that the BMPs are effective and that stormwater is not being polluted?
Train the operators at each facility site.	Ensure that personnel understand the importance of stormwater pollution prevention measures.	Incorporate SWPPP/BMP requirements into technician training program.	Did facility operators use the designated BMPs in their day-to-day operations?
	Ensure that personnel are aware of stormwater pollution sources and the means for minimizing pollution.	Conduct a follow-up investigation to ensure proper use of BMPs and to address questions.	Did the results of inspection and monitoring confirm the proper implementation of BMPs?
	Establish communication channels between managers and facility operators to address stormwater pollution prevention issues.	Environmental Section, TSD to provide technical and regulatory support to operators on stormwater issues.	

Table 3-1

(Continued)

Goal			
Minimize stormwater pollution, improve water quality, and comply with stormwater regulations per NPDES Permit No. CA0005550 under the Clean Water Act.			
Strategy	**Objectives**	**Actions**	**Metrics**
Monitor potential pollution to stormwater.	Confirm effectiveness of the BMPs. Ensure that the SWPPP addresses all potential stormwater pollution sources. Obtain information necessary to modify the SWPPP or SWMRPP.	Conduct dry season inspections per the SWMRPP. Conduct wet season inspections per the SWMRPP. Conduct sampling and analysis per the SWMRPP. Conduct annual inspections per the SWPPP.	Were the sampling and inspection procedures described in the SWMRPP followed?
Evaluate stormwater monitoring data and BMP inspection reports, and respond if data suggest stormwater may have been impacted.	Eliminate illicit discharges. Respond effectively to accidental discharges. Reduce or eliminate other discharges.	Control inappropriate dumping through outreach, inspection, training, and enforcement. Identify responsible parties for initiating cleanup actions and establish cleanup and notification procedures. Train employees for proper response and establish procedures for monitoring, recordkeeping, and reporting. Identify and effectively manage discharges associated with maintenance activities and construction activities.	Were non-stormwater discharges identified and eliminated? Were accidental discharges handled effectively and in a timely manner?

Table 3-1

(Continued)

Goal			
Minimize stormwater pollution, improve water quality, and comply with stormwater regulations per NPDES Permit No. CA0005550 under the Clean Water Act.			
Strategy	**Objectives**	**Actions**	**Metrics**
Evaluate and update SWPPP.	Identify need to update the SWPPP and the SWMRPP for water year 2000-2001.	Evaluate results of inspections and sampling to determine if BMPs are adequate and if all industrial pollution has been addressed by the SWPPP and SWMRPP. Update SWPPP and SWMRPP if needed. Submit updates to RWQCB by 1 July.	Did the results of sampling and inspections confirm that the SWPPP and the SWMRPP are adequate for water year 2000-2001?
Report to RWQCB.	Comply with report requirements.	Submit annual report for the refinery to RWQCB by 1 July of each year.	Are annual reports submitted before 1 July of each year?

BMP = Best management practice
NPDES = National Pollutant Discharge Eliminàtion System
RWQCB = San Francisco Bay Regional Water Quality Control Board
SWMRPP = Storm Water Monitoring and Reporting Program Plan
SWPPP = Storm Water Pollution Prevention Plan
TSD = Technical Services Department

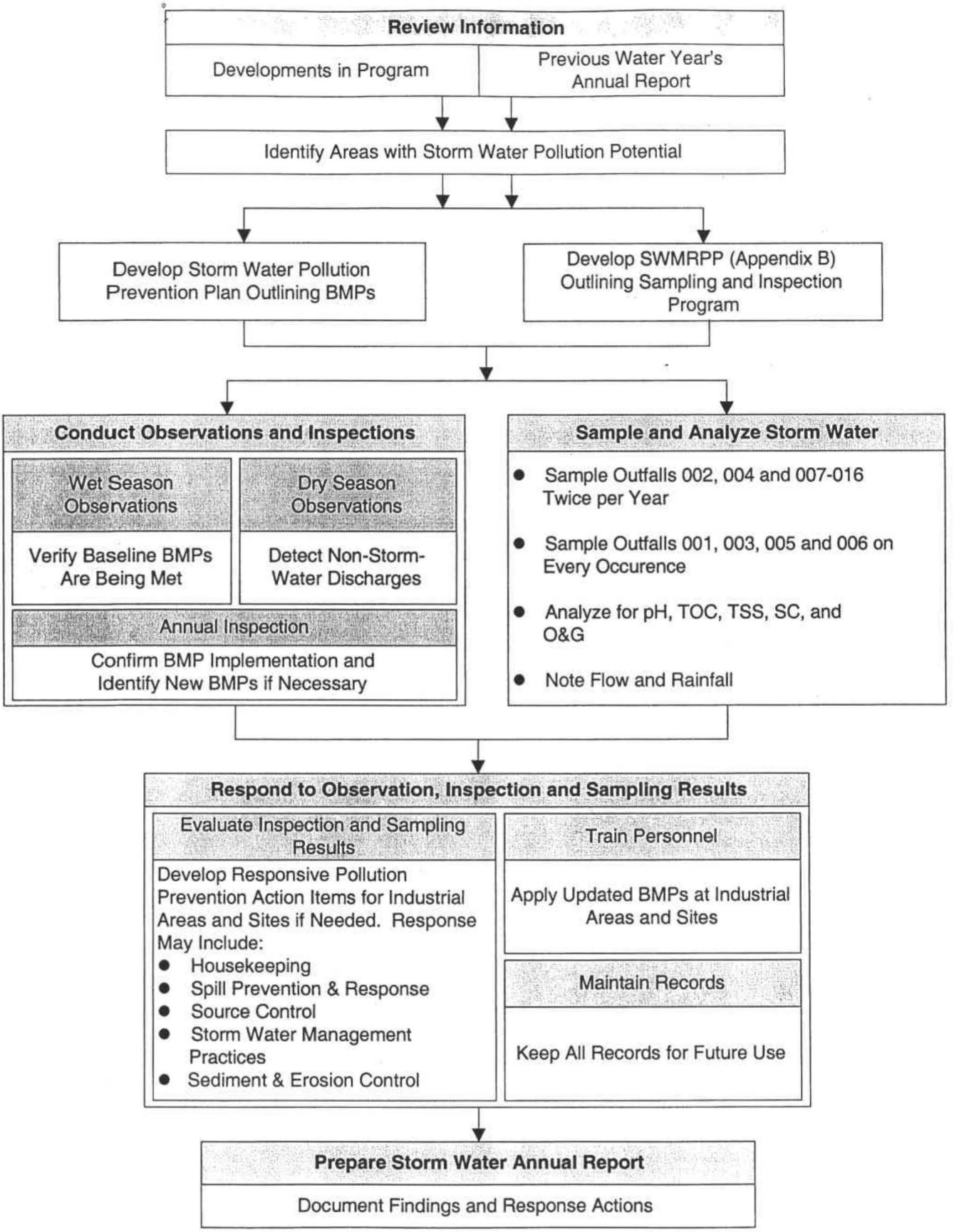


Figure 3-1
Pollution Prevention Strategy Flow Chart

of floating and suspended materials, oil and grease, discoloration, turbidity, or odor in the stormwater discharge. Before a storm event may be observed, it must produce significant stormwater discharge. The General Permit defines "significant storm water discharge" as a continuous discharge of stormwater for approximately one hour. The NPDES permit requires that visual observations of outfalls 003, 005, and 006 be conducted for every storm event during the wet season.

3.1.3 Sampling and Analysis

3.1.3.1 Methods

Sample collection, storage, and analysis shall be performed according to 40 Code of Federal Regulations (CFR) Section 136 or other methods approved and specified by the executive officer of the RWQCB. Water and waste analysis shall be performed by a laboratory approved for these analyses by the California Department of Health Services (DHS) or a laboratory waived by the executive officer of the RWQCB from the necessity of obtaining a certification for these analyses from the DHS.

3.1.3.2 Collection

Outfalls 002, 004, and 007 through 016 will be sampled twice per year. Outfalls 003, 005, and 006 are to be sampled at each storm event with significant stormwater discharge. Grab samples of stormwater that produce a significant discharge must be collected and analyzed for pH, TSS, SC, TOC, and O&G. In addition, the flow must be approximated for each discharge point. Flow volumes are estimated based on rainfall data, runoff coefficients, and drainage areas.

Samples should be taken within the first thirty minutes after determining that a storm event is significant. If collection of samples during the first thirty minutes is impractical, samples may be taken during the first hour of the discharge, and an explanation as to why samples could not be taken during the first thirty minutes is required in the annual report.

3.1.4 Annual Site Inspection

The NPDES Permit requires that the facility be inspected annually to identify industrial activities that are affecting stormwater discharge and to evaluate whether the BMPs to reduce pollutant loadings identified in the SWPPP are adequate and properly implemented in accordance with the terms of the permit. The annual site inspection is also used to verify that all elements of the SWPPP are accurate and up to date. If the BMPs are inadequate or improperly implemented, additional control measures may be needed. Section 4.0 describes the BMPs in detail and Table 4-2 provides a summary list of all BMPs that can be used in the annual site inspection.

During the annual site inspection, all elements of the SWPPP, including the site map, potential pollutant sources, structural and non-structural controls to reduce pollutants, and changes in activity, are verified for accuracy. Observations that require a response and the appropriate response to the observation are recorded and retained as part of this plan. All inspections shall be conducted by qualified and trained personnel. The Environmental Section Supervisor ensures that a tracking and follow-up procedure will be implemented and that the correction of any deficiencies shall be appropriately documented.

During the annual site inspection, the stormwater drainage system, including conveyances and structures, is also visually inspected for signs of deterioration, physical stress, accumulation of debris, etc.

3.1.5 Responses to Observations, Inspections, and Monitoring

Valero maintains all observation, sampling, and monitoring records for a period of five years. Refinery staff will respond to abnormal conditions or sampling results with appropriate BMPs.

3.1.6 Annual Report

An annual report covering data for the previous wet season for the identified stormwater discharge points is due on 1 July of each year. The annual stormwater report will include:

- A tabulated summary of all sampling results and a summary of the visual observations taken during the inspections;
- A comprehensive discussion of the compliance record and the corrective actions taken or planned for full compliance with the NPDES permit;
- A comprehensive discussion of the progress of source identification and control programs for non-effluent limited parameters; and
- Recent modifications to the SWPPP.

3.2 Roles and Responsibilities

The Environmental Section Supervisor ensures that a stormwater pollution prevention team is organized to respond to stormwater-related tasks. These tasks include conductance of BMP/stormwater inspections, preparation of the annual report, conductance of the annual inspection, and collection of stormwater samples.

The Valero Benicia Refinery has a standing Environmental Steering Committee to manage environmental issues at the refinery. Specifically, the Environmental Steering Committee is responsible for:

- Setting refinery priorities and strategy regarding work with government and industry groups (Valero supports the timely development of effective environmental laws and regulations based on sound science while considering risks, costs, and benefits.);
- Improving environmental performance and regulatory compliance;

- Identifying the environmental risks associated with the operation of the refinery and ensuring that procedures and practices are consistent with minimizing or eliminating these risks as well as Valero policy; and

- Ensuring that the plans and practices of the refinery are current and that they meet legislative, regulatory, and business requirements.

The Environmental Steering Committee convenes at least quarterly to periodically evaluate the activities conducted in accordance with environmental programs (including the SWPPP). The members of the Environmental Steering Committee include key Valero Environmental Section members, department heads, site operations managers, and a legal representative.

4.0 SITE DESCRIPTION AND BMPS FOR INDUSTRIAL ACTIVITY SITES

Nine areas require source identification or possible regulation under this SWPPP. The areas are:

- The Refinery Dock;
- The Crude Transfer Pipeline;
- The Coke Silos Area;
- The Burma Road and Fire Training Surface Drainage Area;
- The Raw Water Break Tank Surface Drainage Area;
- The Avenue A Surface Drainage Area;
- The Buffalo Wallow Surface Drainage Area;
- The Wastewater Treatment Surface Drainage Area; and
- The Marketing Terminal.

A detailed description of these sites is provided in Sections 4.3–4.11.

A figure has been prepared for each area to depict features, as required by the NPDES permit Standard Provisions and Reporting Requirements, Section B [Standard Storm Water Provisions], Provision 2.b, Sections i through vii. Table 4-1 lists the features that the NPDES permit requires the figures to show.

4.1 Baseline BMPs

Baseline BMPs are non-site-specific; they pertain to most industrial activities. Table 4-2 lists the baseline BMPs and actions for implementing each BMP. Appendix D presents excerpts of pertinent BMPs from the BMP Guidance Manual (U.S. EPA, 1993).

Table 4-1

Features Required by the Permit to be Shown on Maps[a]

Permit Section[b]	Map Requirements	Item(s) Shown on the Valero Site Plan
i	Stormwater conveyance, drainage, and discharge structures	Berms, dikes, channels, and culverts that divert stormwater flow (described for each topic area).
ii	Outline of the stormwater drainage areas for each stormwater discharge point	Potential pooling areas and/or receiving surface waters.
iii	Paved areas and buildings	All paved areas and buildings.
iv	Areas of pollutant contact with stormwater, actual or potential	Areas shown on site plans are described in Section 4.0 of the SWPPP.
v	Location of existing stormwater structural control measures (berms, coverings, etc.)	Areas shown on map are described in Sections 4.0 and 5.0 of the SWPPP.
vi	Surface water locations, including springs and wetlands	Relevant surface water locations, including springs and wetlands.
vii	Vehicle service areas	None of the areas contains vehicle maintenance areas.

[a] NPDES Permit No. CA0005550.
[b] Standard Provisions and Reporting Requirements for NPDES Surface Water Discharge Permits, Section B, Provision 2.b.

NPDES = National Pollutant Discharge Elimination System
SWPPP = Storm Water Pollution Prevention Plan

Table 4-2

Baseline BMPs

BMP Category	BMP
Good housekeeping	When stormwater contacts rubbish, litter, and other uncovered materials, it may wash away residues and materials that may pollute receiving waters. To control this type of stormwater contamination, outdoor areas at Valero should be kept neat and clean. Personnel should attempt to prevent littering and should promptly remove any waste materials to avoid contact with stormwater. Those materials that must be stored outdoors should be covered with tarps or moved into a covered area. Good housekeeping also includes other types of practices. Sensitive materials (e.g., petroleum, oil, and lubricants; chemicals; cleaning agents; and fuels) should be clearly labeled for use and disposal. Indoor areas should remain uncluttered so that work does not take place outdoors, and leaks and spills can be quickly detected and controlled.
Covering trash dumpsters	Trash in an open bin can bring pollutants into contact with stormwater. All trash dumpsters should be covered.
Source control	Source controls include measures such as eliminating or reducing the use of toxic pollutants, covering pollutant areas, sweeping paved areas, containing potential pollutants, and stenciling all storm drain inlets with "No Dumping" signs. Discharges associated with maintenance activities, maintenance facilities, or construction activities (including vehicle and equipment wash water discharges) and discharges associated with waste disposal or the repair/replacement of paved surfaces should be reduced through prevention or effective management.
Preventive maintenance	Materials, buildings, and equipment that are in disrepair are more likely to become stormwater hazards than those that operate smoothly. Leaky roofs, broken shed doors, cracked pavement and berms, and any other enclosure defects that compromise stormwater protection should be repaired promptly. Similarly, equipment that regularly leaks oil, fuel, or other contaminants should be repaired promptly. Roads, parking lots, and landscaping should not be allowed to degrade to the point where they erode and contaminate runoff. Most important, these types of activities should be undertaken before problems arise, so stormwater pollution is minimized.
Control of illicit discharges	The requirements of this SWPPP provide a means for controlling potential illicit discharge through inspections, training, and enforcement.
Spill and accidental discharge prevention and response	Valero has an oil and hazardous substance Spill Prevention Control and Countermeasure (SPCC) Plan. This plan includes measures and recommendations to reduce the likelihood and extent of spills. Because outdoor spills are a major source of stormwater pollution, care should be taken to prevent such spills, equipment should be readily available to mitigate a spill if it occurs, and personnel should receive training on the use of the equipment. These measures are especially important in field training areas, where personnel might incorrectly consider small spills to be harmless. Field trainees should be fully trained in the use and importance of spill control equipment and cleanup procedures.

Table 4-2

(Continued)

BMP Category	BMP
Spill and accidental discharge prevention and response (continued)	Engineering control features such as berms and containments should be constructed around all sensitive material storage areas, so that spills can be easily detected and controlled. The SPCC Plan defines a mechanism for responding to accidental spills, including identifying parties responsible for initiating immediate cleanup actions; establishing cleanup procedures; notifying appropriate agencies; training employees to identify and react to accidental discharge scenarios; ensuring that properly credentialed contractors are hired for cleanup; and establishing procedures for monitoring, records management, and reporting.
Training	Training BMPs are an integral part of the overall stormwater pollution prevention program. Personnel should be thoroughly trained in pollution prevention measures pertaining to their day-to-day activities. Training should be tailored to each industrial activity at Valero (e.g., fueling personnel should receive specialized training in fuel spill control). Refinery personnel should receive constructive feedback on their efforts through periodic inspections and reviews.
Inspections	As part of the stormwater monitoring program, the stormwater pollution prevention team should conduct inspections of each industrial activity and stormwater discharge point. The inspections should verify that BMPs are being implemented correctly in each area. The team should also check for signs of stormwater pollution (e.g., stains, damaged materials, or oil sheen on runoff or standing water) and should identify ways to correct these problems.

BMP = Best management practice
SPCC = Spill Prevention Control and Countermeasure
SWPPP = Storm Water Pollution Prevention Plan

4.2 Site-Specific BMPs

In addition to baseline BMPs and Valero's site-wide earthquake preparedness program (see Section 6.3), Valero has identified site-specific BMPs for all industrial activities that can impact stormwater quality. As discussed in Section 5.0, runoff in the Refinery Proper is contained and pumped to the Wastewater Treatment Plant. Activities in these areas cannot affect stormwater quality. Specific sites and their corresponding BMPs are discussed in the following sections and summarized in Table 4-3.

4.3 Refinery Dock

4.3.1 Site Description

The Refinery Dock is located on the Carquinez Strait approximately a quarter mile northwest of the Martinez-Benicia Bridge (Figure 4-1). No outdoor storage (including aboveground or underground tanks), manufacturing, and/or processing facilities are associated with the Refinery Dock. Dock operating procedures and contingencies are documented in the on-site Dock Operations Manual. Containment curbing, catch basins, a sump, and a sump pumping system, located beneath the dock transfer equipment, are used to collect rainwater and also act as an emergency backup for spills. The sump is pumped to the Crude Transfer Pipeline, which conveys the material into one of the refinery's aboveground storage tanks for later treatment.

Because there are no point source discharges from the Refinery Dock, no samples of stormwater can be collected.

Table 4-3

Summary of BMPs

BMP	Explanation
Baseline BMPs (per Table 4-2) • Good housekeeping • Covering trash dumpsters • Source control • Preventative maintenance • Control of illicit discharge • Spill and accidental discharge prevention and response • Training • Inspections	Implemented as appropriate at all sites.
Refinery Dock	
Bermed vapor recovery system	The berm surrounding the vapor recovery system is approximately 1.5 feet high and drains to a sump the end of the dock that has an approximate capacity of 3,000 gallons.
Catch basins and sumps	In case of a spill, sumps and catch basins are used to collect runoff and a sump pumping system discharges the runoff to the treatment plant.
Spill Prevention Controls and Countermeasures Plan	The refinery's SPCC plan contains procedures for preventing and responding to spills at the refinery dock.
Dock Operations Manual	The Dock Operations Manual provides procedures to prevent and respond to spills.
Crude Transfer Pipeline	
Cathodic protection	Transfer lines are equipped with cathodic protection to prevent corrosion.
Check valves	The transfer line is equipped with check valves to limit the size of spills.
Containment	The asphalt berms and collection sumps contain stormwater runoff. Runoff is visually inspected before it is released to the sewer system or surface water.
Hydrocarbon leak detection system	Conductivity sensors are used to monitor for spills. The leak detection system sounds an alarm at the central control house.

Table 4-3

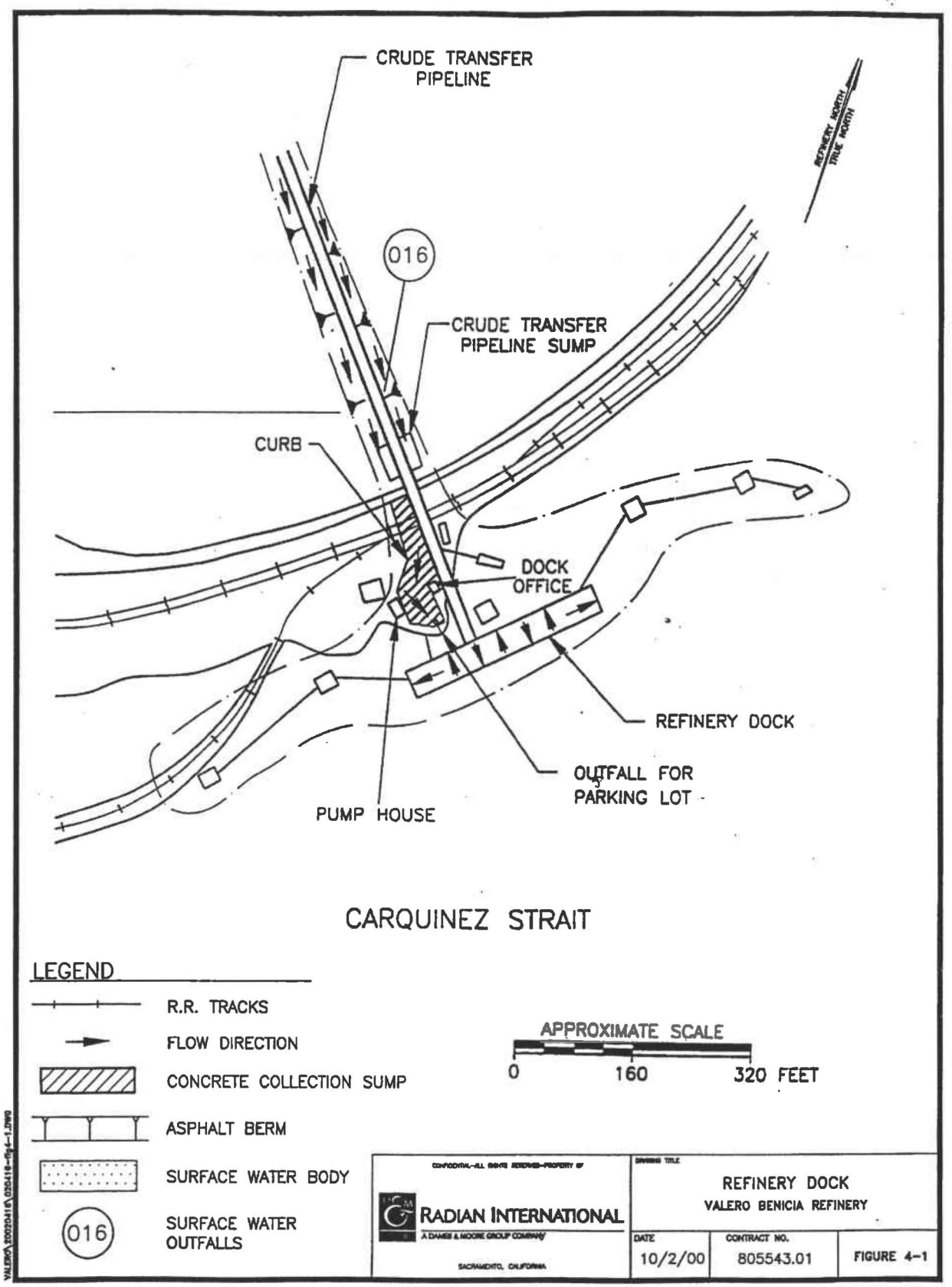
(Continued)

BMP	Explanation
Fence around leak detection system	Designed to prevent vandalism to the detection system.
Inspections	The Crude Transfer Pipeline is visually inspected for leaks once per shift.
SPCC Plan	The SPCC Plan provides procedures for responding to spills from the Crude Transfer Pipeline.
Coke Silos Area	
Catch trays and tarps	Provide containment for coke dust under the conveyor belt.
Vacuum system	Applied to contain coke dust during unloading of bottom-dump rail cars.
Wind barrier	Prevents stray coke dust from leaving the site.
Burma Road and Fire Training Surface Drainage Area	
Bermed training area with discharge to the Wastewater Treatment Plant	Stormwater in the training area is collected and treated.
Erosion controls	BMPs will be applied to control erosion (see Section 5.0).
Operational procedures	Designed to prevent the storage of hazardous materials.
New metal fence	Designed to prevent airborne chemicals from leaving the site.
Raw Water Break Tank Surface Drainage Area	
Erosion controls	BMPs will be applied as needed to control erosion (see Section 5.0).
Avenue A Surface Drainage Area	
Erosion controls	BMPs will be applied as needed to control erosion (see Section 5.0).
SPCC Plan	Provides procedures for responding to spills in the roadway.
Buffalo Wallow Surface Drainage Area	
Erosion controls	BMPs will be applied as needed to control erosion (see Section 5.0).
Berms and sumps	Constructed at the Pump Pad and Gate 4 to contain spills and discharge them to the API sewer.

Table 4-3

(Continued)

Wastewater Treatment Surface Drainage Area	
Dike	Controls drainage within the Wastewater Treatment Plant. Collected runoff is treated prior to discharge.
Marketing Terminal	
Tank overflow prevention	Provides procedures to prevent overflow.
Tank leakage prevention	Specifies maintenance and inspections to minimize leakage.
Loading tank design	Existing tank is designed to send overflow to refinery oily water sewer system.
Vapor recovery system containment	Contains spills in contained area.


CRUDE TRANSFER PIPELINE
REFINERY NORTH
TRUE NORTH
016
CRUDE TRANSFER PIPELINE SUMP
CURB
DOCK OFFICE
REFINERY DOCK
OUTFALL FOR PARKING LOT
PUMP HOUSE
CARQUINEZ STRAIT
LEGEND
R.R. TRACKS
FLOW DIRECTION
CONCRETE COLLECTION SUMP
ASPHALT BERM
SURFACE WATER BODY
016
SURFACE WATER OUTFALLS
APPROXIMATE SCALE
0
160
320 FEET
RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY
SACRAMENTO, CALIFORNIA
REFINERY DOCK
VALERO BENICIA REFINERY
DATE
10/2/00
CONTRACT NO.
805543.01
FIGURE 4-1

4.3.1.1 Buildings

There is one building on the Refinery Dock. This building is used as a dock services office for dock employees. The dock services office covers an area of approximately 300 square feet. Wastewater lines from this building are associated with employee rest rooms connecting to the sanitary sewer. The dock services office does not include any industrial activities and, therefore, is not a potential source of stormwater pollution. For this reason, this office is not subject to the requirements of the SWPPP.

Additional structures at this site include a fire water pump house and a small covered dock for harboring small boats. Stormwater runoff from the dock services office and the fire water pump house runs onto the employee parking lot (described in more detail in Section 4.3.1.3). Stormwater runoff from the small covered dock flows off of the A-frame roof directly into Carquinez Strait.

4.3.1.2 Loading/Unloading Areas

The primary purpose of the Refinery Dock is to unload incoming ships filled with crude oil and intermediates. The main portion of the dock is 350 feet long and 50 feet wide. It is constructed of pipe piling and reinforced concrete. Product transfer equipment consists of three 16-inch hydraulically operated unloading arms, three 10-inch hydraulically operated loading/ unloading arms, one 12-inch vapor unloading arm and manifold, and a vapor recovery unit. This equipment is surrounded by a curb and drains to a segregated collection system consisting of a 2,380-gallon sump and a 50-gallon-per-minute pump. Also situated on the dock outside of this curbed/contained area are the tie-up crew shelter, the gangway and operating controls, a fire system, and mooring hooks. The dock is normally manned 24 hours a day.

4.3.1.3 Site Paving and Drainage

Approximately 20% of the Refinery Dock site is covered with impervious surfaces, including paved areas and roofed buildings. The unpaved areas of the site consist of areas around the perimeter of the site that are landscaped, the dock itself, which is constructed from concrete, and the shoreline, which is lined with cemented riprap.

Stormwater runoff from the areas of the dock that do not contain transfer equipment flows out from the center of the dock, in the form of sheet flow, to outlets along the sides, and is not directed into any storm drains or channels.

A small employee parking lot at the dock entrance has a drain that channels stormwater to Suisun Bay. Because this parking lot is used solely for employee vehicles, no monitoring of the effluent water is required by the NPDES permit.

4.3.1.4 Process Wastewater and Sanitary Sewer System

Underground utility maps are available for the Refinery Dock and it is believed that all lavatories, shower rooms, and personnel sinks are plumbed to the City of Benicia sanitary sewer. The City of Benicia inspected the integrity of this system on issuing the Building and Occupancy Permits. Other non-stormwater discharges appear to be contained, collected, and controlled.

No process wastewater is generated at the Refinery Dock; however, ballast water from incoming ships has, in the past, been generated. Due to updates in the design of today's oil tankers, the necessity to store and treat ballast water has been eliminated. For this reason, the ballast water storage tank has been sealed and is currently inactive.

4.3.2 Storm Drain System

General operation, maintenance, and cleanup practices are implemented so that minimal liquid waste is created in the Refinery Dock area. Valero employees follow strictly enforced spill prevention and control practices, which are described in the Valero Dock Operations Manual. Because all stormwater at the Refinery Dock is either captured or flows directly into the Carquinez Strait, no stormwater drain systems are present at this site.

4.3.3 Site-Specific BMPs

The Refinery Dock presents a significant potential for spills to surface waters.

Potential pollutants at the refinery dock include:

- Crude oil, intermediates, petroleum products (pipeline leak only).

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Bermed vapor recovery system.** The berm surrounding the vapor recovery system is approximately 1.5 feet high and drains to a sump the end of the dock that has an approximate capacity of 3,000 gallons.
- **Catch basins and sumps.** In case of a spill, sumps and catch basins are used to collect runoff and a sump pumping system discharges the runoff to the treatment plant.
- **Spill Prevention Controls and Countermeasures Plan.** The refinery's SPCC plan contains procedures for preventing and responding to spills at the Refinery Dock.
- **Dock Operations Manual.** The Dock Operations Manual provides procedures to prevent and respond to spills.

4.4 Crude Transfer Pipeline

4.4.1 Site Description

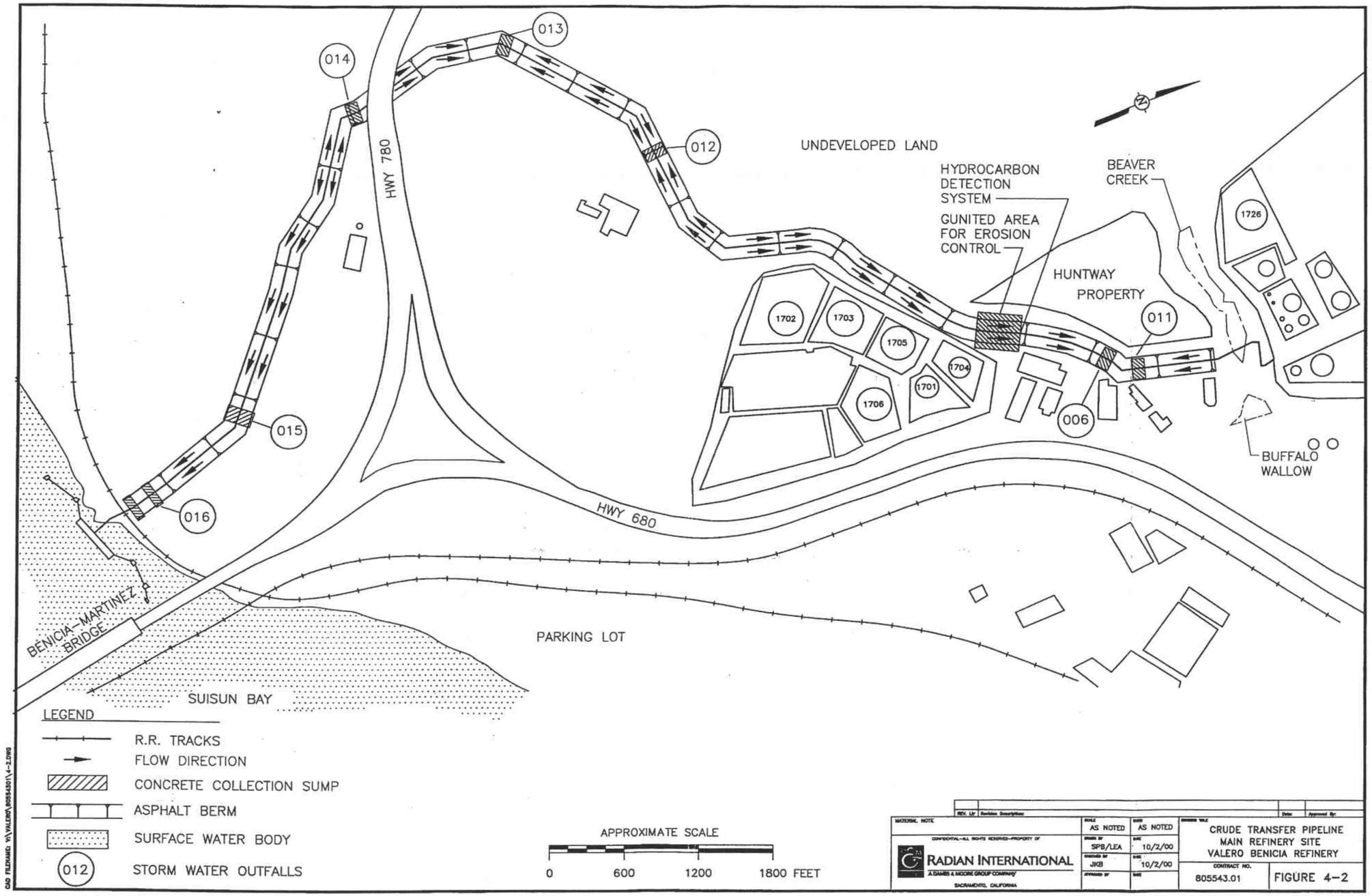
The Crude Transfer Pipeline extends from the Refinery Dock to the Refinery Proper (Figure 4-2). There are no buildings, storage (including aboveground or underground tanks), manufacturing, and/or processing areas associated with the Crude Transfer Pipeline. The primary loading and unloading facility associated with the Crude Transfer Pipeline is the Refinery Dock, which is described in detail in Section 4.3. In addition, no wastewater or sanitary sewer lines are associated with the Crude Transfer Pipeline.

Several outfalls are located along the pipe alley of the Crude Transfer Pipeline. Outfalls 011 through 016 are located along the pipeline and outfall 006 is located at the foot of the pipe alley on the south side of the Refinery Proper.

4.4.1.1 Site Paving and Drainage

The area beneath the Crude Transfer Pipeline (approximately 10,000 linear feet) is primarily underlain with graded, compacted natural soil. One portion of the pipeline extends over a natural earthen swale. This portion extends from the southwest corner of the crude tank field to the northeast along the perimeter of the tank field and Park Road. As indicated on Figure 4-2, one area beneath the pipeline was recently paved with asphalt. Areas immediately adjoining the pipeline consist of landscaped slopes. These areas are maintained on a regular basis to minimize potential erosion. Asphalt berms running parallel with the pipeline channel stormwater into seven separate collection sumps located along the length of the pipeline (see Figure 4-2).

The sumps are constructed from concrete with valved piping connections to the municipal stormwater sewer system; the sumps were designed to contain releases from a leak or rupture of the pipeline, or runoff from a 10-year, 24-hour storm. One of the sumps located near the Refinery Dock on the north side of Bayshore Road pumps contained rainwater into the Crude


013
014
012
HWY 780
UNDEVELOPED LAND
HYDROCARBON DETECTION SYSTEM
GUNITED AREA FOR EROSION CONTROL
BEAVER CREEK
1726
HUNTWAY PROPERTY
011
1702
1703
1705
1704
1701
1706
006
015
016
BUFFALO WALLOW
HWY 680
BENICIA-MARTINEZ BRIDGE
PARKING LOT
SUISUN BAY
LEGEND
R.R. TRACKS
FLOW DIRECTION
CONCRETE COLLECTION SUMP
ASPHALT BERM
SURFACE WATER BODY
012
STORM WATER OUTFALLS
APPROXIMATE SCALE
0
600
1200
1800 FEET
RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY
SACRAMENTO, CALIFORNIA
AS NOTED
AS NOTED
SPB/LEA
10/2/00
JKB
10/2/00
CRUDE TRANSFER PIPELINE
MAIN REFINERY SITE
VALERO BENICIA REFINERY
805543.01
FIGURE 4-2

Transfer Line (similar to the dock sump). Four of the remaining seven sumps' (outfalls 011, 013, 014, and 016 in Figure 4-2) containment valves (normally kept closed) are equipped with hydrocarbon detectors that sound an alarm at a central control house in the event of a hydrocarbon release. Rainwater collected in these sumps is visually inspected prior to release to the municipal sewer system or nearest surface water body. The containment valves for three of the sumps (outfalls 006, 012, and 015 in Figure 4-2) are normally left open to accommodate flow from natural springs. The valves for these sumps are motor operated and can be automatically closed by a signal from the adjacent hydrocarbon detectors or remotely from central control. Further details of the sumps' design are documented in Process Specification Number 31-29 of the Valero Off-site Piping Oil Spill Prevention/Mitigation Project Plan.

4.4.1.2 Storm Drain System

The collection sumps associated with the Crude Transfer Pipeline contain stormwater runoff from immediately below and around the pipeline. This stormwater is channeled via the asphalt berms (illustrated in Figure 4-2) to the collection sumps. Following visual inspection, clean stormwater from this area is released into the municipal sewer system or nearest surface water body. If an oil sheen is observed during the visual inspection, the contaminated stormwater is collected via vacuum truck and directed into the refinery oily water treatment system.

Drainage from outside the Crude Transfer Pipeline is captured in various stormwater inlets that drain to municipal stormwater sewers.

4.4.2 Site-Specific BMPs

Line failure in the pipe alley due to flange separation could result in leakage. This material could find its way to receiving waters by travelling approximately a quarter mile through a piped drainage system, which is preceded by a sump and underflow weir, to Sulphur Springs Creek. However, there are hydrocarbon monitors at this sump, which would alert control house personnel when hydrocarbons are present.

Valero employees assigned to pipeline maintenance attend regular training for spill prevention and containment. In addition, established procedures have been prepared to respond to potential spills or releases. Valero's oil spill prevention and contingency plans can be found in the on-site Spill Prevention Control and Countermeasures (SPCC) Plan.

Specific details of source controls and inspection procedures for the Crude Transfer Pipeline are also listed in this SPCC Plan.

Potential pollutants in the Crude Transfer Pipeline area include:

- Crude oil, intermediates, and petroleum products.

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Cathodic protection.** Transfer lines are equipped with cathodic protection to prevent corrosion.
- **Check valves.** The transfer line is equipped with check valves to limit the size of any spills.
- **Containment.** The asphalt berms and collection sumps contain stormwater runoff. Runoff is visually inspected before it is released to the sewer system or surface water.
- **Hydrocarbon leak detection system.** Conductivity sensors are used to monitor for spills. The leak detection system sounds an alarm at the central control house.
- **Fence around the leak detection system.** Designed to prevent vandalism to the detection system.
- **Inspections.** The Crude Transfer Pipeline is visually inspected for leaks once per shift.
- **Spill Prevention Controls and Countermeasures Plan.** The SPCC Plan provides procedures for responding to spills from the Crude Transfer Pipeline.

4.5 Coke Silos Area

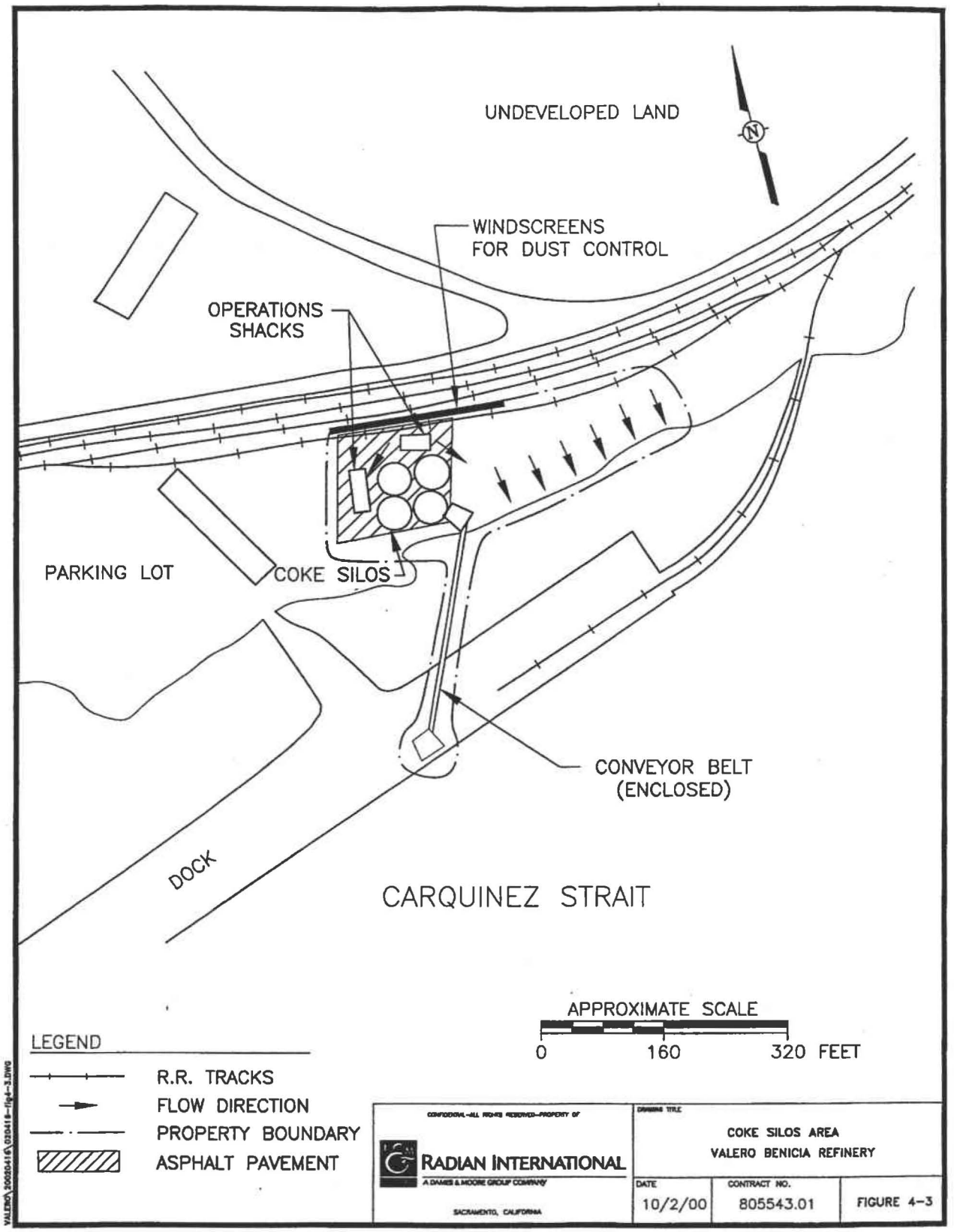
4.5.1 Site Description

The Coke Silos are located on the Carquinez Strait approximately a quarter mile west of the Refinery Dock (Figure 4-3). Four silos at this site receive and store processed coke—a petroleum-based powder used for fuel—until it can be loaded onto ships. Coke is transferred to the silos by rail cars, which are loaded in the refinery. Once the rail cars reach the Coke Silos, telescoping extraction tubes are connected to remove their contents. An underground pneumatic system transfers the coke to the four silos pending ship loading.

The Coke Silos and associated transfer systems are constructed and operated in a manner that minimizes or eliminates airborne particulates. A vacuum system is employed at the base of bottom-dump rail cars while off-loading coke to the silos. The vacuum system helps draw the coke dust from the rail cars and minimizes potential airborne coke particulates. Coke dust that accumulates at the rail car unloading area is vacuumed up manually. A wind barrier was constructed along the cyclone fence to the immediate north to prevent stray coke dust from leaving the site.

A conveyor belt transfers coke from the silos to waiting ships. The north end of the conveyor belt is completely enclosed to prevent airborne particulates from leaving the site. In addition, a vacuum truck is used to capture airborne particulates while transferring coke from the silos to the ships. The vacuum truck draws airborne coke dust from around the conveyor belt into a portable bin. The bin is transported back to the refinery when full and emptied to accommodate future loading events.

Due to the absence of point stormwater discharge sources at the Coke Silos Area, no monitoring of effluent stormwater is possible. In addition, no storm drain systems are associated with the Coke Silos. Stormwater exits this site in the form of sheet flow.


UNDEVELOPED LAND
N
WINDSCREENS
FOR DUST CONTROL
OPERATIONS
SHACKS
PARKING LOT
COKE SILOS
CONVEYOR BELT
(ENCLOSED)
DOCK
CARQUINEZ STRAIT
APPROXIMATE SCALE
0
160
320 FEET
LEGEND
R.R. TRACKS
FLOW DIRECTION
PROPERTY BOUNDARY
ASPHALT PAVEMENT
RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY
SACRAMENTO, CALIFORNIA
COKE SILOS AREA
VALERO BENICIA REFINERY
DATE
10/2/00
CONTRACT NO.
805543.01
FIGURE 4-3

A shower and lavatory facility at the operations shelter is connected to the Benicia sanitary sewer system. No storage tanks are associated with the Coke Silos.

4.5.1.1 Buildings

There are two small operations shacks at the Coke Silos from where contract employees control loading and unloading operations. Stormwater runoff from the operations shack flows onto the ground and toward the Carquinez Strait. The lavatory facilities in one of the shacks are connected to the municipal sanitary sewer system.

4.5.1.2 Outdoor Storage, Manufacturing, and/or Processing Areas

The Coke Silos are used to store processed coke. No other storage, manufacturing, and/or processing areas are associated with the Coke Silos.

4.5.1.3 Loading/Unloading Areas

The Coke Silos are loaded by an underground conveyance system from rail cars. The coke is transferred from these silos via an enclosed aboveground conveyor belt that extends to an adjacent dock. Because this multi-purpose dock is used by several organizations and is not owned by Valero, it is not covered in detail in this SWPPP.

4.5.1.4 Site Paving and Drainage

A small portion of the Coke Silos site, approximately 10%, is covered by asphalt. The asphalt covers an area between the railroad spur and the storage silos. The remainder of the Coke Silos Area is covered with ¾"-inch gravel.

Drainage of this area is via sheet flow, which runs south into the Carquinez Strait.

4.5.2 Storm Drain System

No storm drains exist in this area. Drainage of this area is via sheet flow.

4.5.3 Site-Specific BMPs

The Coke Silos Area has the potential to contaminate surface water when coke dust is not contained. A small surface water inlet exists near the conveyor belt, which has the potential to become contaminated with coke dust if the coke dust is not handled appropriately.

Potential pollutants in the Coke Silos Area include:

- Coke dust (TSS, metals, and hydrocarbons).

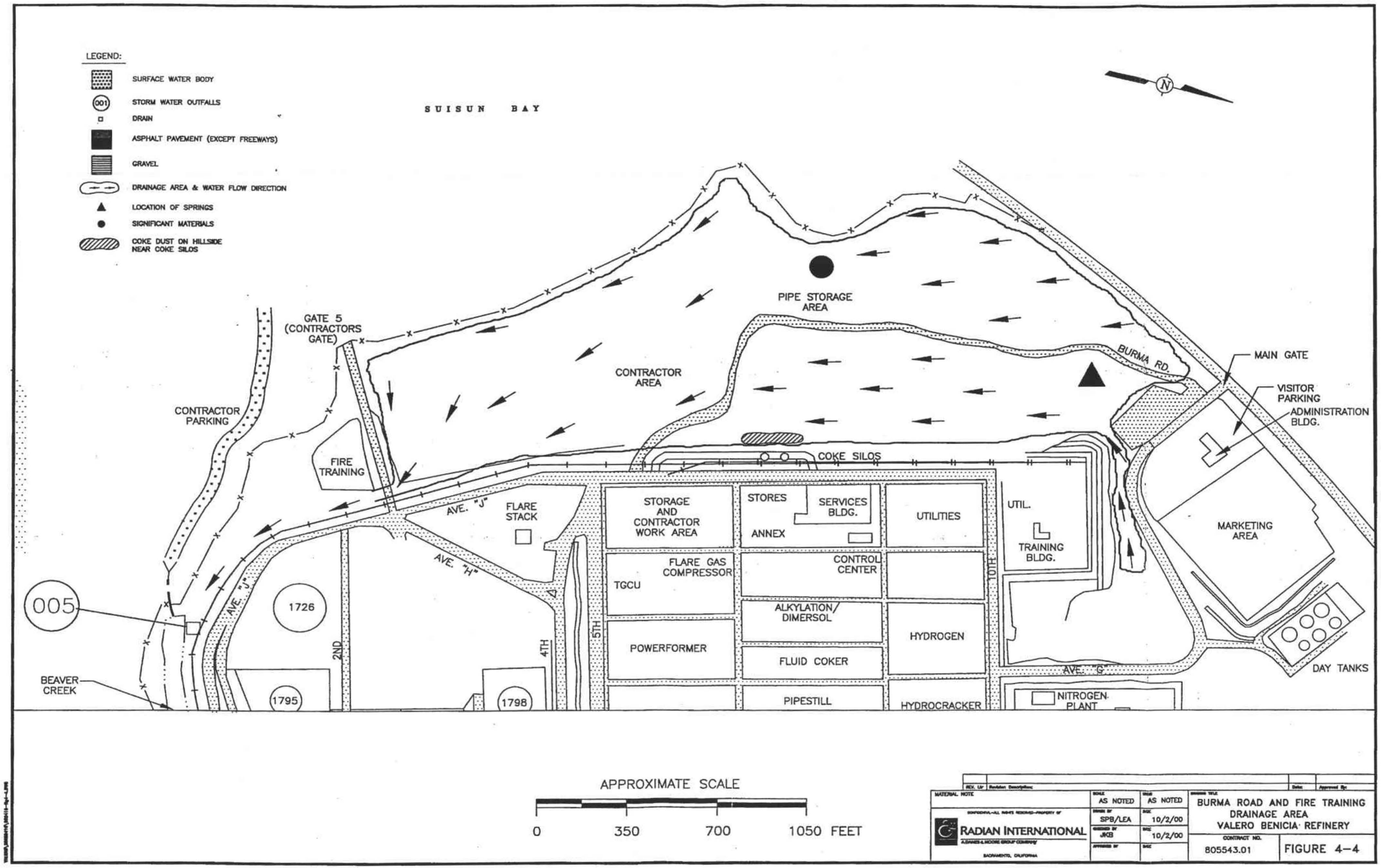
BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Catch trays.** Provide containment for coke dust under the conveyor belt.
- **Vacuum system.** Applied to contain coke dust during unloading of bottom-dump railcars.
- **Wind barrier.** Prevents stray coke dust from leaving the site.

4.6 Burma Road and Fire Training Surface Drainage Area

4.6.1 Site Description

The Burma Road and Fire Training Surface Drainage Area is located immediately west of the Refinery Proper and extends to the western Valero property boundary (Figure 4-4). The 69-acre area is primarily unpaved (1% is paved surface), and consists of roads, parking,


LEGEND:
SURFACE WATER BODY
STORM WATER OUTFALLS
DRAIN
ASPHALT PAVEMENT (EXCEPT FREEWAYS)
GRAVEL
DRAINAGE AREA & WATER FLOW DIRECTION
LOCATION OF SPRINGS
SIGNIFICANT MATERIALS
COKE DUST ON HILLSIDE NEAR COKE SILOS
SUISUN BAY
N
PIPE STORAGE AREA
GATE 5 (CONTRACTORS GATE)
CONTRACTOR AREA
BURMA RD.
MAIN GATE
VISITOR PARKING
ADMINISTRATION BLDG.
CONTRACTOR PARKING
FIRE TRAINING
COKE SILOS
AVE. "J"
FLARE STACK
STORAGE AND CONTRACTOR WORK AREA
STORES
SERVICES BLDG.
ANNEX
UTILITIES
UTIL.
TRAINING BLDG.
MARKETING AREA
AVE. "H"
FLARE GAS COMPRESSOR
TGCU
CONTROL CENTER
10TH
005
1726
ALKYLATION/ DIMERSOL
HYDROGEN
2ND
4TH
5TH
POWERFORMER
FLUID COKER
AVE. "G"
DAY TANKS
BEAVER CREEK
1795
1798
PIPESTILL
HYDROCRACKER
NITROGEN PLANT
APPROXIMATE SCALE
0
350
700
1050 FEET
MATERIAL NOTE
AS NOTED
AS NOTED
SPB/LEA
10/2/00
JKB
10/2/00
RADIAN INTERNATIONAL
SACRAMENTO, CALIFORNIA
BURMA ROAD AND FIRE TRAINING DRAINAGE AREA
VALERO BENICIA REFINERY
CONTRACT NO.
805543.01
FIGURE 4-4

and temporary administration buildings for contractors. This area of the refinery has more topographical relief than the rest of the refinery. The steep banks in this area are subject to erosion.

The Burma Road area is also used as a laydown area for miscellaneous equipment and materials. The runoff is discharged west of Gate Number 4, on the south side of the refinery processing area, via a spillway into the western end of Beaver Creek. Beaver Creek routes the stormwater via outfall 005 to Buffalo Wallow and, in turn, to Sulphur Springs Creek and Suisun Bay. A natural spring also discharges to this drainage.

There are no manufacturing and/or processing areas or storage tanks associated with this surface drainage area. No industrial process wastes or wastewaters were discovered to be associated with this surface water drainage area.

4.6.1.1 Buildings

Buildings at the Burma Road and Fire Training Surface Drainage Area are limited to trailers used by Valero employees and subcontractors while conducting work at the refinery.

4.6.1.2 Outdoor Storage, Manufacturing, and/or Processing Areas

The primary use of the Burma Road and Fire Training Surface Drainage Area is outdoor storage and fire training. Subcontractors routinely store equipment and supplies at the site until needed (loading and unloading is infrequent). Valero also uses part of the area for storage of piping and potentially salvageable equipment and materials. Outdoor storage areas compose approximately 20% of the 69-acre area. Approximately a quarter-acre is used for fire training. The remainder of the area consists of steep, vegetated banks and paved access roads.

4.6.1.3 Site Paving and Drainage

One percent of the Burma Road and Fire Training Surface Drainage Area is paved. The paved areas are limited to access roads. Sheet flow from Burma Road and most of the Fire Training Surface Drainage Area is directed toward Beaver Creek by topography and concrete channels. Drainage from a portion of the Fire Training Area is collected and drained to the Wastewater Treatment Plant to prevent the migration of runoff from training exercises to surface water.

4.6.2 Storm Drain System

The surface drainage area is the primary channel for stormwater in the immediate area. This area drains directly to Beaver Creek and subsequently to Suisun Bay via Sulphur Springs Creek. The storm drain clogged during heavy rains in 1997 and 1998, but has since been cleaned and modified to ensure that drainage controls function as designed.

A concrete and asphalt fire training pad exists in this area. The fire training pad drains independently to the Wastewater Treatment Plant.

4.6.3 Site-Specific BMPs

Contamination in stormwater in this area is of greatest concern in the Fire Training Area, which drains to the Wastewater Treatment Plant. However, in the event of a backup in the drainage system the discharge overflows to the storm drain.

Potential pollutants in the Burma Road and Fire Training Surface Drainage Area include:

- Herbicide applications;
- Phenols and metals (in the Fire Training Surface Drainage Area); and

- TSS from erosion.

BMPs used to prevent potential pollutants from entering surface water include:

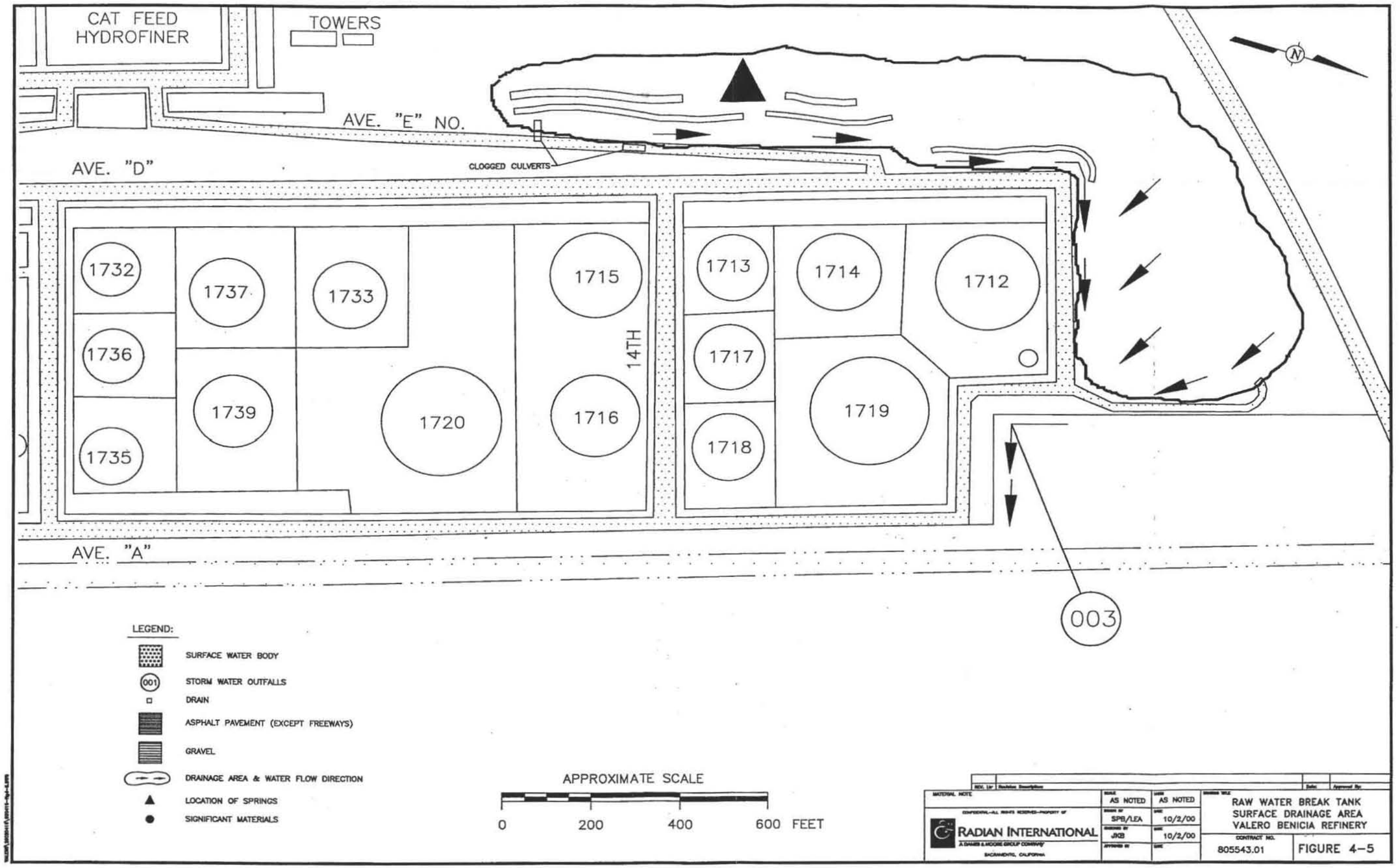
- **Baseline BMPs.** Implemented as appropriate.
- **Bermed training area with discharge to the Wastewater Treatment Plant.** Stormwater in the training area is collected and treated.
- **Erosion controls.** BMPs will be applied to control erosion (see Section 5.0).
- **Operational procedures.** Designed to prevent the storage of hazardous materials.
- **New metal fence.** A metal fence was recently constructed at the edge of the fire training area to prevent airborne dry chemicals from leaving the site.

4.7 Raw Water Break Tank Surface Drainage Area

4.7.1 Site Description

The Raw Water Break Tank Surface Drainage Area is near the Raw Water Break Tank at the north end of Avenue A (Figure 4-5). Sheet flow is directed toward the outfall (003) from the 19-acre, unpaved area. The outfall flow is directed to Sulphur Springs Creek via a culvert. A spring also discharges to this drainage. This site has significant topographical relief and the effectiveness of erosion controls must be monitored.

No buildings are associated with this surface drainage area. Also, no storage (including aboveground or underground tanks), manufacturing, processing, or loading/unloading areas are associated with this surface drainage area. In addition, no industrial process wastes or wastewaters were discovered to be associated with this surface water drainage area.


CAT FEED HYDROFINER
TOWERS
AVE. "E" NO.
AVE. "D"
CLOGGED CULVERTS
1732
1737
1733
1715
1713
1714
1712
1736
1717
14TH
1739
1720
1716
1719
1718
1735
AVE. "A"
003
LEGEND:
SURFACE WATER BODY
001
STORM WATER OUTFALLS
DRAIN
ASPHALT PAVEMENT (EXCEPT FREEWAYS)
GRAVEL
DRAINAGE AREA & WATER FLOW DIRECTION
LOCATION OF SPRINGS
SIGNIFICANT MATERIALS
APPROXIMATE SCALE
0
200
400
600 FEET
RADIAN INTERNATIONAL
AS NOTED
AS NOTED
SPB/LEA
10/2/00
JKB
10/2/00
RAW WATER BREAK TANK
SURFACE DRAINAGE AREA
VALERO BENICIA REFINERY
805543.01
FIGURE 4-5

4.7.1.1 Site Paving and Drainage

Sheet flow from the Raw Water Break Tank Surface Drainage Area is directed into Sulphur Springs Creek through a culvert. Sulphur Springs Creek ultimately conveys the stormwater to the Carquinez Strait.

No paving is found in this surface drainage area.

4.7.2 Storm Drain System

The surface water drainage area is the primary channel for stormwater in the area. This area drains directly to Sulphur Springs Creek.

4.7.3 Site-Specific BMPs

Stormwater runoff from this area is discharged near the refinery water service entrance box at the northeast corner of the refinery (in the processing area at the Raw Water Break Tank) via a culvert that discharges into a ditch tributary to Sulfur Springs Creek. Because of the location of the drains in the Refinery Proper (the drains lead to the API and Chem Sewers) it is unlikely that drainage from this area would contain hazardous materials. The only potential for a direct discharge into this runoff would be from aboveground piping south of the Main Substation in this area.

Potential pollutants in the Raw Water Break Tank Surface Drainage Area include:

- TSS from erosion.

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.

- **Erosion controls.** BMPs will be applied as needed to control erosion (see Section 5.0).

4.8 Avenue A Surface Drainage Area

4.8.1 Site Description

A small surface water drainage area is present on Avenue A in the Refinery Proper (Figure 4-6). Stormwater from this area drains to outfalls 009 and 010 before flowing to Sulphur Springs Creek. No buildings, storage (including aboveground or underground tanks), manufacturing and/or processing, or loading and unloading areas are associated with this surface drainage area. In addition, no industrial process wastes or wastewaters were discovered to be associated with this surface water drainage area.

4.8.1.1 Site Paving and Drainage

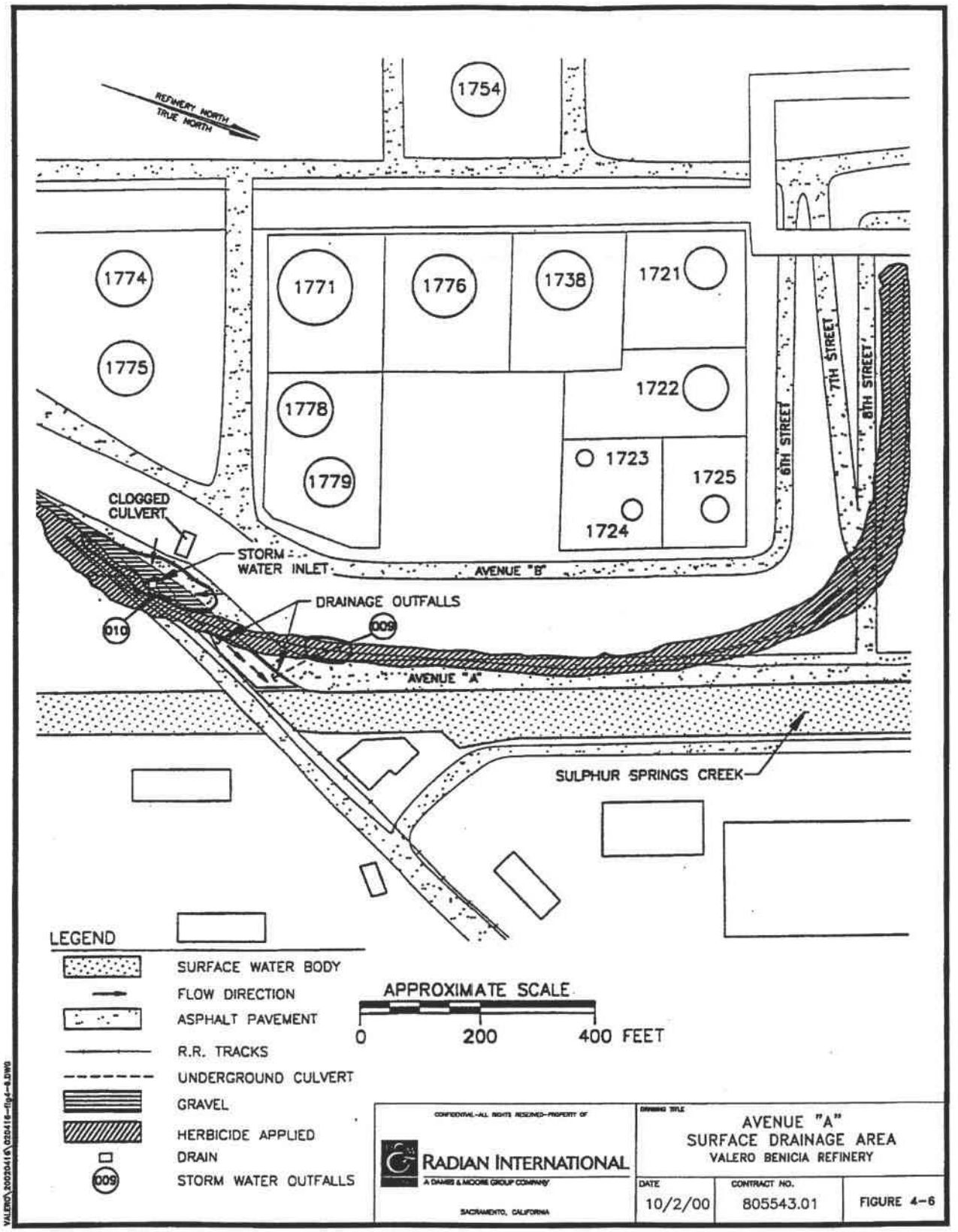
Sheet flow from Avenue A and the adjacent railroad is directed toward three storm drains and channeled below ground to surface drainage leading into Sulphur Springs Creek. The main purpose of this drainage area is to control erosion and the flooding of a small access road that bisects the locality.

4.8.2 Storm Drain System

The surface water drainage area is the primary channel for stormwater in the immediate area. This area drains directly to Sulphur Springs Creek.

4.8.3 Site-Specific BMPs

It is unlikely that a spill or discharge could occur in this area. Runoff from Avenue A could only be impacted by direct discharge if a spill occurred on the roadway.


REFINERY NORTH
TRUE NORTH
1754
1774
1775
1771
1776
1738
1721
1722
1778
1779
1723
1724
1725
6TH STREET
7TH STREET
8TH STREET
CLOGGED CULVERT
STORM WATER INLET
AVENUE "B"
DRAINAGE OUTFALLS
010
009
AVENUE "A"
SULPHUR SPRINGS CREEK
LEGEND
SURFACE WATER BODY
FLOW DIRECTION
ASPHALT PAVEMENT
R.R. TRACKS
UNDERGROUND CULVERT
GRAVEL
HERBICIDE APPLIED
DRAIN
009
STORM WATER OUTFALLS
APPROXIMATE SCALE
0
200
400 FEET
CONFIDENTIAL-ALL RIGHTS RESERVED-PROPERTY OF
RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY
SACRAMENTO, CALIFORNIA
DRAWING TITLE
AVENUE "A"
SURFACE DRAINAGE AREA
VALERO BENICIA REFINERY
DATE
10/2/00
CONTRACT NO.
805543.01
FIGURE 4-6

Potential pollutants in the Avenue A surface drainage area include:

- TSS from erosion (minimal); and
- Urban runoff from the road.

BMPs used to prevent potential pollutants from entering surface water include:

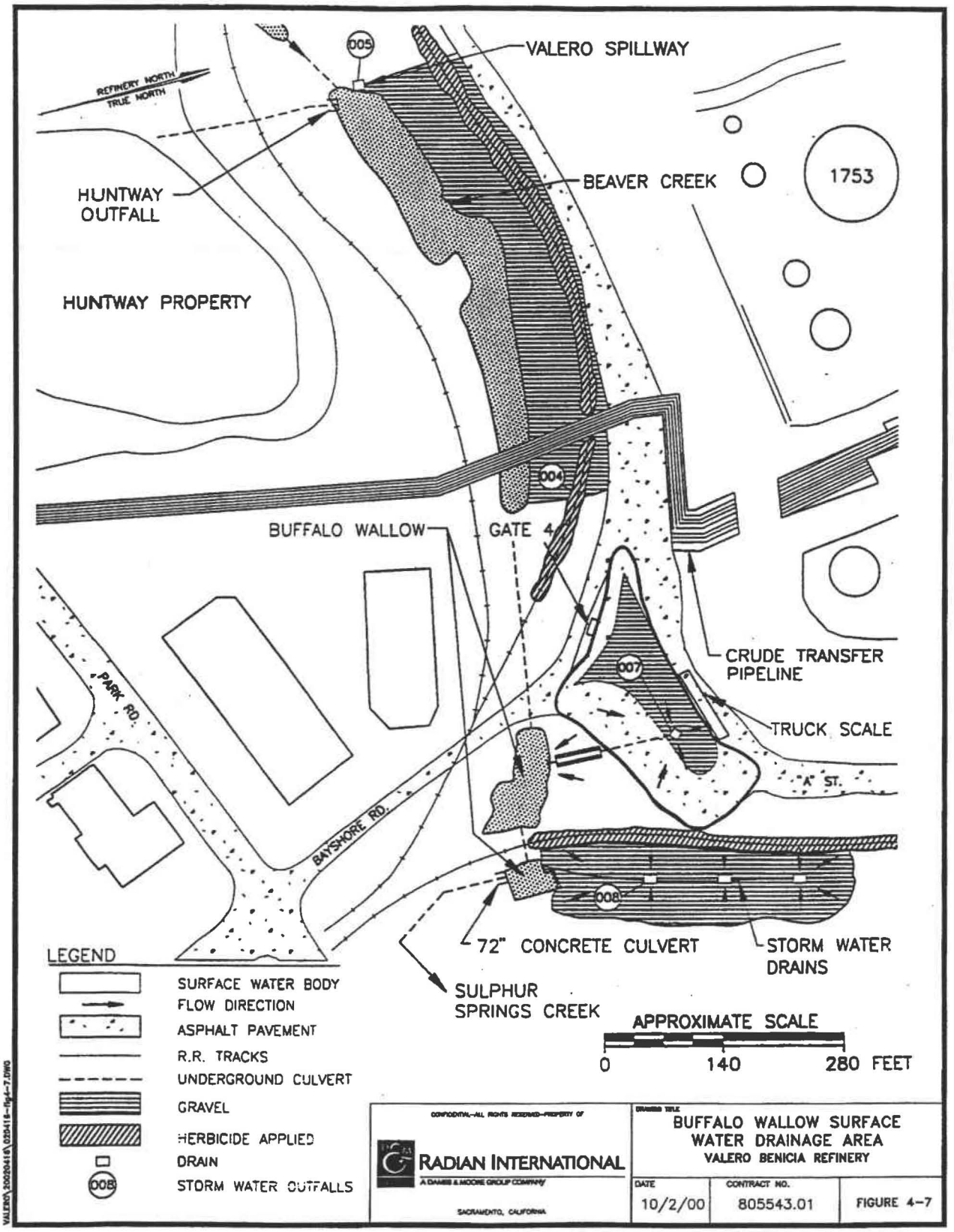
- **Baseline BMPs.** Implemented as appropriate.
- **Erosion controls.** BMPs will be applied as needed to control erosion (see Section 5.0).
- **Spill Prevention Controls and Countermeasures Plan.** Provides procedures for responding to spills in the roadway.

4.9 Buffalo Wallow Surface Drainage Area

4.9.1 Site Description

A surface water collection area is located near Gate 4 in the Refinery Proper (Figure 4-7). Valero has designated this area as the Buffalo Wallow Area. This area serves as a receptacle for surface water runoff originating adjacent to Beaver Creek and in a small area surrounding an adjacent truck scale and approximately 650 feet of railway. Stormwater from outfalls 004, 007, and 008 is diverted at this point into a 72-inch concrete culvert, which channels the stormwater to Sulphur Springs Creek.

There are no buildings, storage (including aboveground or underground tanks), manufacturing and/or processing, or loading and unloading areas associated with the Buffalo Wallow Area. In addition, no industrial process wastes or wastewaters were discovered to be associated with this area.


VALERO SPILLWAY
005
REFINERY NORTH
TRUE NORTH
HUNTWAY OUTFALL
BEAVER CREEK
1753
HUNTWAY PROPERTY
004
BUFFALO WALLOW
GATE 4
CRUDE TRANSFER PIPELINE
007
TRUCK SCALE
PARK RD.
"A" ST.
BAYSHORE RD.
008
72" CONCRETE CULVERT
STORM WATER DRAINS
SULPHUR SPRINGS CREEK
LEGEND
SURFACE WATER BODY
FLOW DIRECTION
ASPHALT PAVEMENT
R.R. TRACKS
UNDERGROUND CULVERT
GRAVEL
HERBICIDE APPLIED
DRAIN
STORM WATER OUTFALLS
APPROXIMATE SCALE
0
140
280 FEET
RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY
SACRAMENTO, CALIFORNIA
BUFFALO WALLOW SURFACE WATER DRAINAGE AREA
VALERO BENICIA REFINERY
DATE
10/2/00
CONTRACT NO.
805543.01
FIGURE 4-7

4.9.1.1 Site Paving and Drainage

Sheet flow from an adjacent asphalt truck turnaround area drains into the Buffalo Wallow Area via a storm drain and soil drainage swale. Surface water drainage also enters Buffalo Wallow in the form of sheet flow from the immediate area, which is directed by a slight inward grade on all sides of the area.

In addition, drainage is directed to the Buffalo Wallow area from a series of stormwater inlets. These inlets receive surface water from isolated areas located parallel to a nearby railroad spur. Drainage at each of these isolated areas flows inward toward the inlets, which is facilitated by slight grades in each of the immediate areas.

4.9.2 Storm Drain System

The truck turnaround area storm drain is located north of Buffalo Wallow, just past the northern edge of the asphalt turnaround area. An underground culvert channels flow underneath the truck turnaround area to a drainage swale located on the north side of Buffalo Wallow.

A second storm drain system, mentioned above, uses three inlets to receive and direct stormwater to the diversion area. The stormwater from this system is diverted directly to Sulphur Springs Creek.

4.9.3 Site-Specific BMPs

Drainage at the south side of Parcel 1 is discharged at the pump pad into one or both of two sumps, from which the collected material is pumped to slop tankage or the API sewer. A discharge of hazardous materials could potentially go off-site at this point and enter Beaver Creek. The most likely source of discharge would be petroleum product from the pump pad. Discharges at the pump pad (e.g., during transfer of materials) enter a sump, from which the

collected material is pumped to the API sewer. In addition, a berm has been constructed at Gate 4 to contain releases within the refinery.

Potential pollutants in the Buffalo Wallow Area include:

- TSS from erosion (minimal);
- Urban runoff from the road; and
- Petroleum products.

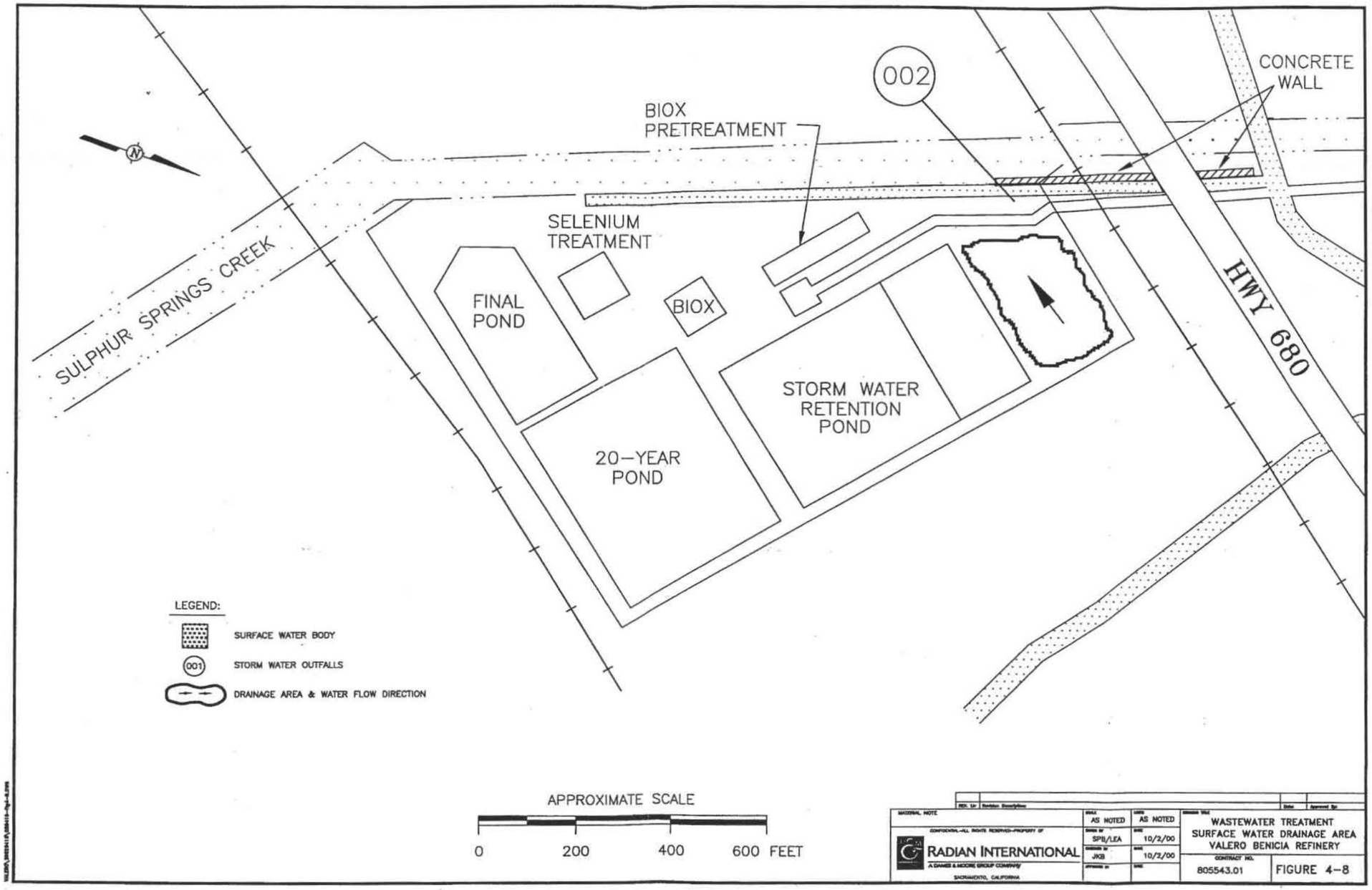
BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Erosion controls.** BMPs will be applied as needed to control erosion (see Section 5.0).
- **Berms and sumps.** Constructed at the Pump Pad and Gate 4 to contain spills and discharge them to the API sewer.

4.10 Wastewater Treatment Surface Drainage Area

4.10.1 Site Description

Wastewater composed of process wastes, cooling tower and boiler blowdown, ballast water, stripped sour water, raw water treatment backwash, and stormwater runoff is treated at the Wastewater Treatment Plant (Figure 4-8). This parcel is bordered on the west by a dike; the access road to the Wastewater Treating Area sits on top of the dike. Immediately west of the dike is Sulphur Springs Creek. The road continues around the southern portion of the Wastewater Treating Area. The eastern portion contains the final pond (fully treated wastewater that is discharged to Suisun Bay), the retention pond, and the equalization pond. Runoff within the diked area is collected and treated. Areas outside the perimeter of the diked area are discussed below.


002
CONCRETE WALL
BIOX PRETREATMENT
SELENIUM TREATMENT
SULPHUR SPRINGS CREEK
FINAL POND
BIOX
STORM WATER RETENTION POND
20-YEAR POND
HWY 680
LEGEND:
SURFACE WATER BODY
001
STORM WATER OUTFALLS
DRAINAGE AREA & WATER FLOW DIRECTION
APPROXIMATE SCALE
0
200
400
600 FEET
RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY
SACRAMENTO, CALIFORNIA
AS NOTED
AS NOTED
SPB/LEA
10/2/00
JKB
10/2/00
WASTEWATER TREATMENT
SURFACE WATER DRAINAGE AREA
VALERO BENICIA REFINERY
805543.01
FIGURE 4-8

The API and Chem Sewer Lines enter this parcel at the northern corner. Two culverts drain to Sulphur Springs Creek from this area; the valves are kept closed until water is treated. Thus, spillage of untreated wastewater or hazardous materials used at the treatment plant could potentially be discharged to Sulphur Springs Creek. In addition, the equalization and retention ponds could contain untreated stormwater commingled with untreated wastewater after a storm event.

A 1.8-acre, unpaved site along the western boundary of the Wastewater Treatment Surface Drainage Area drains surface water via outfall 002 to Sulphur Springs Creek. The area is occasionally used to store equipment and is separated from the Wastewater Treatment Plant by a dike.

There are no buildings, aboveground or underground tanks, or loading and unloading areas associated with the 1.8-acre area. No industrial process wastes or wastewaters were discovered to be associated with the Wastewater Treatment Surface Drainage Area.

Another area subject to potential BMP incidents is the point at which the API and Chem Sewer Lines cross Sulphur Springs Creek on their way to the Wastewater Treating Area. Leaks from these lines could spill directly into the creek.

4.10.1.1 Outdoor Storage, Manufacturing, and/or Processing Areas

The Wastewater Treatment Surface Drainage Area is occasionally used to store equipment. No manufacturing and/or processing areas are associated with this surface water drainage area.

4.10.1.2 Site Paving and Drainage

The Wastewater Treatment Surface Drainage Area is unpaved. Drainage is discharged through a ditch and several pipes into Sulphur Springs Creek, which is contiguous with Suisun Bay.

4.10.2 Storm Drain System

The Wastewater Treatment Surface Drainage Area is the primary channel for stormwater in the immediate area. This area drains through a ditch and several pipes into Sulphur Springs Creek.

4.10.3 Site-Specific BMPs

Runoff within the Wastewater Treatment Plant is contained and treated. Additional BMPs have been developed to address runoff outside of the contained area.

Potential pollutants in the Wastewater Treating Area include:

- Untreated wastewater from the API and Chem Sewer collection systems.

BMPs used to prevent potential pollutants from entering surface water include:

- **Baseline BMPs.** Implemented as appropriate.
- **Dike.** Controls drainage within the Wastewater Treatment Plant. Collected runoff is treated prior to discharge.

4.11 Marketing Terminal

4.11.1 Site Description

The Marketing Terminal is located immediately to the north of the main refinery administration building on East Second Street (Figure 4-9). Truck and trailer vehicles enter the terminal to load product from the refinery for transport off-site.

The Marketing Terminal rack operation is restricted and requires card access for control of the truck or trailer transfer operation. All trucks loading at the rack are required to have overfill protection to shut off the flow of product into the tank truck to prevent spills. Connection of ground and product hoses is monitored automatically. Transfer operations can only commence with all connections correctly connected.

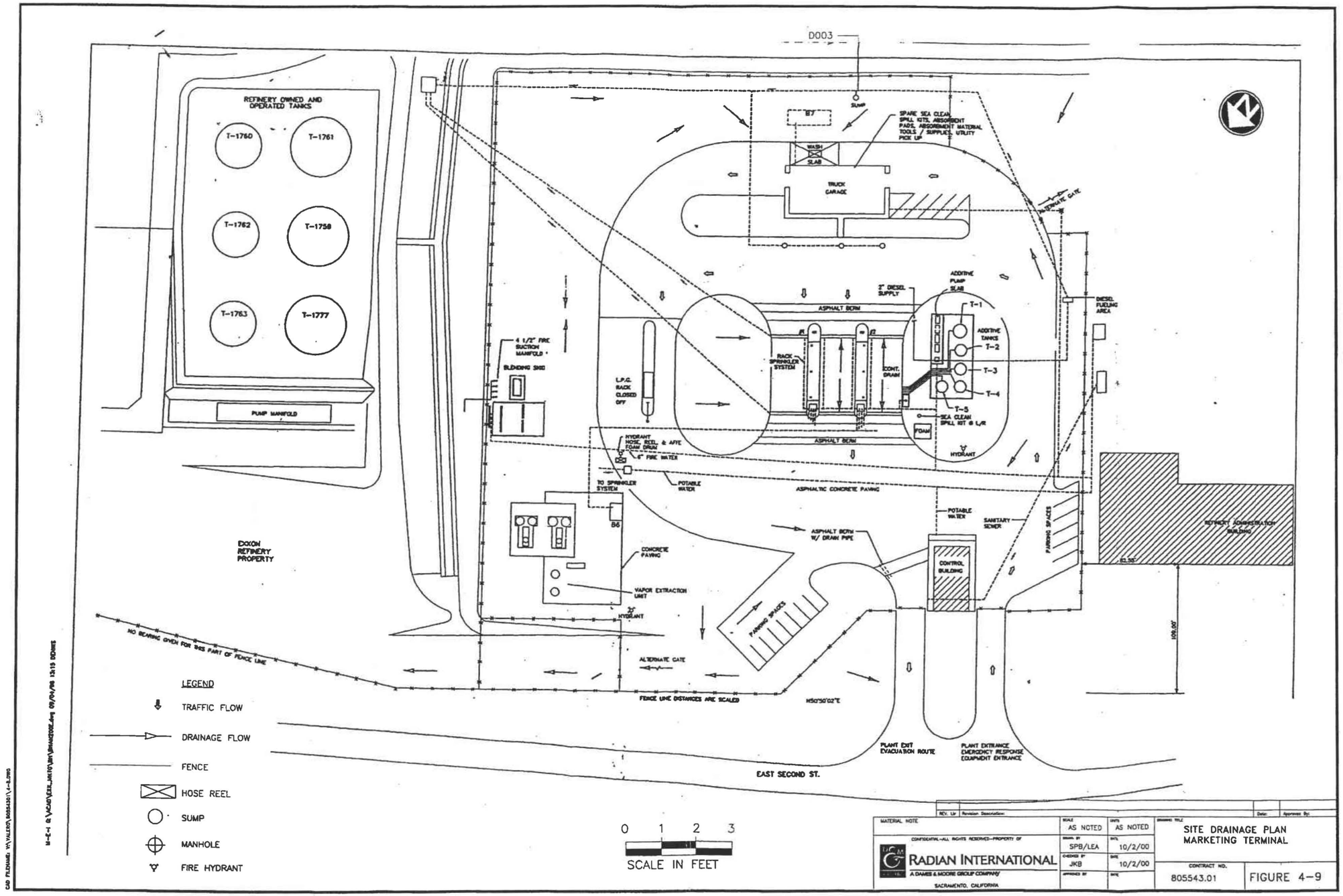
4.11.2 Storm Drain System

The area of the terminal is completely paved with asphaltic concrete. All sheet flow in open areas subject to rainwater drains to a sump located at the south portion of the terminal. This sump drains to the Raw Water Break Tank Surface Drainage Area. This sheet flow is then directed toward outfall D003.

Any spill at the loading rack would flow to the drain sumps at the rack islands which flow to the refinery oily water sewer system. Emergency cutoff switches are located at the loading rack to shut off the flow from the transfer pumps to the rack area.

4.11.3 Site-Specific BMPs

Stormwater runoff is contained in the paved area and transported to the sump at the south end of the terminal. This sump drains to the Raw Water Break Tank Surface Drainage Area and leaves the site through outfall D003. However, all hazardous material storage areas in the Marketing Terminal are in areas which drain to the refinery oily water sewer system, not the


D003
REFINERY OWNED AND OPERATED TANKS
T-1760
T-1761
T-1762
T-1758
T-1763
T-1777
PUMP MANIFOLD
EXXON REFINERY PROPERTY
SLUMP
B7
WASH SLAB
TRUCK GARAGE
SPARE SEA CLEAN SPILL KITS, ABSORBENT PADS, ABSORBENT MATERIAL TOOLS / SUPPLIES, UTILITY PICK UP
ALTERNATE GATE
DIESEL FUELING AREA
ADDITIVE PUMP SLAB
3" DIESEL SUPPLY
ASPHALT BERM
ADDITIVE TANKS
T-1
T-2
T-3
T-4
T-5
RACK SPRINKLER SYSTEM
CONT. DRAIN
SEA CLEAN SPILL KIT @ L/R
FOAM
HYDRANT
4 1/2" FIRE SUCTION MANIFOLD
BLENDING SHED
L.P.G. RACK CLOSED OFF
HYDRANT HOSE, REEL, & AFFF FOAM DRAIN
6" FIRE WATER
TO SPRINKLER SYSTEM
POTABLE WATER
ASPHALTIC CONCRETE PAVING
POTABLE WATER
SANITARY SEWER
PARKING SPACES
REFINERY ADMINISTRATION BUILDING
EL.58'
ASPHALT BERM W/ DRAIN PIPE
CONCRETE PAVING
CONTROL BUILDING
VAPOR EXTRACTION UNIT
HYDRANT
PARKING SPACES
ALTERNATE GATE
NO BEARING GIVEN FOR THIS PART OF FENCE LINE
FENCE LINE DISTANCES ARE SCALED
N50°50'02"E
105.00'
PLANT EXIT EVACUATION ROUTE
PLANT ENTRANCE EMERGENCY RESPONSE EQUIPMENT ENTRANCE
EAST SECOND ST.
LEGEND
TRAFFIC FLOW
DRAINAGE FLOW
FENCE
HOSE REEL
SUMP
MANHOLE
FIRE HYDRANT
0 1 2 3
SCALE IN FEET
MATERIAL NOTE
AS NOTED
AS NOTED
SPB/LEA
10/2/00
JKB
10/2/00
RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY
SACRAMENTO, CALIFORNIA
SITE DRAINAGE PLAN
MARKETING TERMINAL
CONTRACT NO.
805543.01
FIGURE 4-9

stormwater sump. Thus, hazardous constituents are not likely to be present in the sheet flow runoff.

Site-specific BMPs used to prevent potential pollutants from entering surface water include:

- **Tank Overflow Prevention** – Overflow is prevented through practices and operational procedures for regularly gauging tanks to ensure that overflow is prevented. Any overflow would be contained in the diked area. Also, trucks are required to have overfill protection and interlocks to ensure all connections are made properly.

- **Tank Leakage Prevention** – The likelihood of tank leakage is minimized by periodic maintenance activities and inspections according to API 653. All tanks are equipped with cathodic protection. Leaked materials would be contained in the concrete containment area.

- **Loading Rack Design** – Any spill at the loading rack would flow to the drain sumps at the rack islands, which discharge to the refinery oily water sewer system. Emergency cutoff switches are located at the loading rack to shut off the flow from the transfer pumps to the rack area.

- **Vapor Recovery Design** – Spills or leaks in the tank or recovery area would be contained by the concrete containment.

5.0 BMPS FOR EROSION CONTROL AND CONSTRUCTION ACTIVITIES

5.1 BMPs for Erosion Control

To prevent erosion, earthen banks with the potential for severe erosion problems should be graded and landscaped as needed. Landscaping vegetation should be deep rooted and suitable to prevent erosion. The vegetation should be maintained in a manner that will prevent future erosion. In addition to the vegetation, a geotextile fabric may be appropriate for use on the earthen banks to enhance erosion resistance.

For earthen banks where vegetation cannot be planted, the hillsides may be covered with a gravel layer or gunite.

The areas covered in this SWPPP are occupied by a combination of buildings and/or structures, paving or gravel, and landscaping or natural ground cover. The paving should be inspected for cracks and wear and repaired as needed. Areas that are not paved should be maintained with ground cover or natural foliage, as appropriate, to prevent erosion and improve the aesthetic character of the facility. A landscaping contractor maintains the site vegetation. Watering of the vegetation should be conducted as needed.

Other BMPs for erosion control that can be applied as needed include:

- **Silt fence** (see Appendix D, p. A-33). A silt fence consists of a filter fabric that is entrenched and attached to supporting poles. It may also be supported or reinforced by a wire fence. Silt fences are typically used in areas where sheet flow runoff occurs. The area should have a level contour, so water does not pond more than 1.5 feet deep at any point. This control measure also requires an area upstream of the fence for sediment disposition. Silt fences are generally ineffective at locations where stormwater flows are concentrated.

- **Straw bale barrier** (see Appendix D, p. A-38). This type of barrier consists of straw bales placed end to end along a level contour in a shallow trench. Each bale is secured with stakes. The barrier detains runoff, creating ponded areas upstream of the barrier to facilitate sedimentation processes. The bales also act as filters. Straw bales are typically used in areas where sheet or rill

erosion occurs. Because straw bales decompose, they cannot be used effectively for extended periods of time.

- **Sandbag barrier** (see Appendix D, p. A-42). This type of erosion control consists of sandbags stacked along a level contour to detain sediment-laden water. Sandbags may be installed around catch basins to restrict suspended sediment from entering the storm drain system. Sandbag barriers are typically used for trapping sediment in areas of strong flows where silt fences and straw bale barriers are ineffective. An area should be provided behind the barrier for runoff to pond and for sediment processes to occur. With routine inspection and cleaning, sandbags may be used for extended periods of time.

5.2 BMPs for Construction Activities

Most construction activities at the Valero Benicia Refinery would occur within the drainage area of one of the NPDES-permitted outfalls. Any construction permit executed in a drainage area that is not covered under the NPDES permit will be performed in a way consistent with the requirements of the General Permit for Construction Activities. Construction activities within the drainage areas covered by the NPDES permit may employ, as needed, the erosion control BMPs presented in this SWPPP.

5.3 BMPs for Remedial Activities

Appropriate erosion control measures should be included as integral parts of work plans involving the excavation and handling of any contaminated soil. Control practices may involve:

- Scheduling soil movement activities to avoid exposure to rainwater (see Appendix D, p. A-45);
- Covering soil stockpiles with impervious materials (e.g., Visqueen®) (see Appendix D, p. A-49);
- Properly backfilling and compacting excavated areas;
- Properly locating soil stockpiles to avoid steep areas subject to severe stormwater runoff;

- Properly cleaning soil-moving equipment and vehicles before leaving project areas to avoid spreading the sediment into other areas (see Appendix D, p. A-51);

- Preparing spill response plans to address transportation accidents (see Appendix D, pp. A-47 and A-52);

- Installing sediment traps at downstream locations to minimize the sediment entering storm drains; or

- Inspecting areas routinely and training personnel (see Appendix D, p. A-54).

5.4 Cogeneration Project Erosion Control Plan

In early 2002, Valero implemented the Valero Cogeneration Project (VCP) to construct a cogeneration unit at the facility. The VCP is located at the corner of 10th and G Streets (refer to Figure 1-2). The VCP is within the refinery proper area for which storm water drains to the refinery Waste Water Treatment Plant (WWTP), rather than in the outlying drainage areas for which the refinery has established BMPs in this SWPPP. Thus, any contaminated storm water would be adequately treated at the WWTP. As the VCP is located in the refinery proper, it does not require specific evaluation in this SWPPP. However, the construction and operation of the VCP could cause erosion at the site, and thus is evaluated in this subsection.

refer to construction as past tense

Construction and operation of the VCP will involve leveling of the project site creating two levels separated by cut slope. The maximum elevation difference along the cut slope is about 22 feet with an average elevation difference of about 14 feet. During the site grading and construction of the unit there is a potential for stormwater runoff to contribute to erosion and sedimentation as well as transport pollutants off-site. During plant operation stormwater runoff could contribute to erosion of the cut slope and could transport contaminants from the pavement to off-site areas. An erosion control plan, presented in this subsection, for the cogeneration unit, and the associated transmission lines, pipelines, lay-down areas, staging/storage areas, has been prepared to address these issues.

The California Energy Commission (CEC) in their review of Valero's application to construct the VCP, recognized these concerns and made the following comments during the permit application process:

" Provide a draft erosion control plan that identifies all measures that will be implemented at various locations of the project during construction and operation of the proposed VCP. The draft erosion control plan shall identify all permanent and temporary measures in written form and depicted on a construction drawing(s) of appropriate scale. The purpose of the plan is to minimize the area disturbed, to protect disturbed and sensitive areas, to retain sediment on-site and to minimize off-site effects of stormwater runoff. The elements of the plan shall include specific best management measures to be employed to control stormwater runoff during construction and operation at identified locations. In addition, any measures necessary to address Nationwide Permits, as required, should be identified. The plan should also identify maintenance and monitoring efforts for all erosion control measures.

"Include in the erosion control plan a discussion and description of how this plan will address any contaminated soil that may be excavated or contaminated groundwater that may be encountered during construction. Specifically address how stormwater coming into contact with any contaminated materials will be collected, treated, and discharged."

"Provide acreage estimates for both the permanently and temporarily disturbed areas for the project. Include all areas to be used in construction, staging/laydown, and stockpile storage areas. Provide estimates for the total area disturbed by the installation of the transmission lines, any water lines, and fuel (gas and natural gas) supply lines. Please provide the proposed lengths of these linears. Provide draft revisions to the Storm Water Pollution Prevention Plan (SWPPP) for the Valero Refinery property that include site modifications necessary to accommodate the VCP."

The VCP erosion control plan that Valero prepared in response to the CEC comments is presented below, and is incorporated into this SWPPP:

VALERO COGENERATION PROJECT EROSION CONTROL PLAN

<u>During Construction</u>

Sediment and Erosion Control

All storm water falling on the refinery property is managed according to the SWPPP for the refinery. Water is collected in storm drains and the water is treated at the Waste Water Treatment Plant (WWTP). The VCP will involves grading a little less that 2 acres creating two terraces separated by a slope with a maximum grade of 2:1. Off-site elements of the project include a 12 kV Power House occupying a very small area and about 1,000 feet of underground conduit.

During construction the primary concern will be erosion of the slope and the transport of sediment off the site. Contaminated soil and groundwater is not expected at the site, but a contingency plan for managing the contaminated soil and groundwater has been prepared.
To minimize the amount of storm water affecting the site, a storm water diversion swale will be built along the uphill side of the project site to divert storm water around the site. A road exists at the approximate location of the planned diversion swale. The edge of the road will be used to the maximum extent possible to divert storm water. The diversion swale will minimize the amount of water flowing over the upper terrace of the site thus minimizing the amount of water that could erode the slope face.

To arrest the energy of the water flowing over the terrace slope face, a silt fence will be placed at the toe of the terrace slope. The drainage along the silt fence will be directed toward the south minimizing the flow of water across the lower terrace. Silt traps consisting of hay bales will be placed along the silt fence to capture silt and to minimize the velocity of the water.
Silt fences and hay bales will be placed along the existing drainage swales that are located adjacent to G Street and 10th Street (the two streets forming the lower perimeter of the VCP site). Silt fences will be used as necessary when working with the conduits and the power house to prevent off-site movement of silt. As a final measure to prevent sediment migration into the sewer system, hay bales will be placed around the storm sewer inlets.

Contaminated Soil and Groundwater Contingency Plan

Contaminated soil and groundwater are not expected at the VCP site. In the event contaminated soil is discovered the soil will be excavated according to the grading plan and stockpiled. Samples of the stockpiled soil will be collected and analyzed to determine the disposal requirements. Analyses will include fuel constituents and the flash point. Based on the analytical results the contaminated soil will be disposed at an appropriate waste site.

If contaminated groundwater is encountered during the grading, the water will be pumped into a portable tank. The water sampled and the samples analyzed for fuel hydrocarbons and MTBE. If the analytical results do not show any constituents that could interfere with the WWTP, the water will be pumped into the sewer and treated at the refinery WWTP. If there are constituents in the water that could create problems at the plant, the water will be sent off site for disposal.

Post Construction

The area of the VCP will be paved so silt movement will not be a problem once the construction is completed. The project does not involve the outside storage of hazardous materials so no action is needed to segregate storm water falling on the site. All storm water falling on the site will flow toward storm sewers that lead to the WWTP where the water will be treated.

In addition to the above erosion control plan, Valero also prepared a specific SWPPP for construction of the VCP. This document is entitled, *"Storm Water Pollution Prevention Plan for the Valero Refining Company Co-Gen Project"*, Cullen Engineering Associates, Inc., September 2001. This SWPPP provides a specific listing, description, and site drawings of all the BMPs that were selected and applied during construction of the VCP. These BMPs included seeding and planting, mulching, dust control, stabilized construction entrances, silt fences, straw bale barriers, and storm drain inlet protection. This document should be referenced for further details on these BMPs. The erosion control plan presented above, together with the implementation of the VCP SWPPP, allowed the construction of the VCP, which is scheduled for completion in June 2002, to be completed with minimal erosion of site soils.

6.0 OTHER STORMWATER CONTROLS

The Valero Benicia Refinery has a variety of training programs, plans, manuals, and maintenance procedures to prevent and respond to the release of hazardous materials to the environment. These programs are an important element of Valero's overall stormwater pollution prevention strategy.

6.1 Spill Prevention and Response

For the regular employee, spill prevention and response training focuses on both prevention and response to emergency situations. Specialized personnel responsible for handling spill response and mitigation receive this training plus additional training in safe handling, regulatory requirements, policies, and procedures governing the handling and transport of contaminants.

Specific procedures for responding to an emergency, detailed in the Valero SPCC Plan (reference) and BMP Manual (HLA, 1991), are regularly reinforced through refresher training. The purpose of the SPCC Plan is to reduce the risks of oil spills, provide comprehensive spill response procedures, and ameliorate the consequences of a spill. This plan is revised on a three-year cycle. Requirements for these plans are found in 40 CFR Part 112. Additional procedures for handling and responding to any incident involving spills and containment are maintained in the subject areas and are readily accessible to those personnel trained and working in this area.

Valero provides a comprehensive on-site interactive training system for each employee. This training system uses standardized video modules to cover specific topics, coupled with hands-on training for specific materials and/or equipment. A specialized training crew performs both initial training and regular refresher training.

6.2 Hazardous Materials Management Plan

Hazardous material inventories and business plans are required of businesses that handle quantities of hazardous materials above regulatory thresholds. The Valero Benicia Refinery's Business Plan, the *Emergency Procedures Manual*, has been developed to address response to, mitigation of, and prevention of hazardous material incidents. The Hazardous Materials Inventory for the refinery lists the amounts and types of hazardous materials handled at the Valero Benicia Refinery. This inventory, which is also compiled to meet the federal community right-to-know requirements of the Superfund Amendments and Reauthorization Act (SARA) Title III, is updated annually. The specific requirements for business plans and inventories are found in California Health and Safety Code Section 25503.5.

6.3 Other Plans and Manuals

Other plans and manuals at the Valero Benicia Refinery include:

6.3.1 Hazardous Waste Contingency Plan and Hazardous Waste Emergency Procedures

Generators of hazardous waste must develop and implement procedures that minimize the possibility of a fire, explosion, or release of hazardous constituents. The refinery's *Hazardous Waste Contingency Plan and Hazardous Waste Emergency Procedures*, which is found in Section IX of the *Emergency Procedures Manual*, has been developed to address materials defined as federal or state-only hazardous waste. This manual is revised as necessary.

6.3.2 Risk Management and Prevention Plan

Risk Management and Prevention Programs (RMPPs) are required of businesses that handle acutely hazardous materials (AHMs) in quantities above regulatory thresholds. RMPPs are intended to improve existing emergency response and risk reduction or risk

minimization plans or programs established for a facility. An RMPP has been developed at the Valero Benicia Refinery to address the AHMs handled at the site.

6.3.3 Earthquake Preparedness

The earthquake preparedness program at the Valero Benicia Refinery includes measures to protect surface water quality. Various emergency conditions resulting from a major earthquake could cause untreated wastewater discharges to public waters, potentially via the storm drain system or outfalls. Incidents could include fires, utility failures, and hydrocarbon leakage. The refinery's program to prevent and effectively deal with emergency conditions resulting from earthquake events includes:

- Maintenance of on-site fire-fighting equipment and a well-trained fire-fighting response team of refinery technicians and operating staff directed by the refinery Shift Superintendent.
- The training of all personnel in basic fire-fighting techniques and the cross-training of refinery technicians in the operation of several process units create support for those handling shutdowns and other needed services.
- Refinery technicians carry portable two-way radios and are in direct contact with other technicians and the refinery's control center. Supervisors, rescue teams, and designated others have radios available to them. In addition, the refinery's internal telephone system operates independently of the Pacific Bell System with a battery backup power supply that is capable of operating for four hours.
- The refinery's on-site warehouse stores general and repair materials to meet emergency needs. In addition, a 20-day supply of polymer and up to a three-month supply of dissolved air flotation (DAF) floc (ISF floc) chemical is maintained.

At the time of its design in 1966 and 1967, the Valero Benicia Refinery was built to the most severe prevailing earthquake standard of the Uniform Building Code (UBC) and the Structural Engineering Association of California (SEAOC). Since then, the UBC and SEAOC standards have been upgraded and revised. Valero's internal standards have kept pace with the revised standards. Valero's internal standards require refinery structures and equipment to be

designed for larger earthquake forces than specified to account for the structures' different responses, performances, and functions in an earthquake.

No facility modifications or operational changes were found to be necessary for improvement of refinery safety or reliability as a consequence of the 17 October 1989 Loma Prieta Earthquake. This result partly reflects the strict design criteria used since the initial construction of the refinery. In addition, the Earthquake Engineering Research Institute prepared a report on the effects of the earthquake, which supports the findings that no further modifications or operational changes are necessary.

6.3.4 Accident Prevention Manual

This manual provides refinery personnel with detailed procedures for reporting health and safety incidents or releases of hazardous materials and conducting follow-up investigations.

6.3.5 Refinery Task Manuals

The task manuals for each of the refinery's units list the tasks to be performed and include checklists to be completed.

6.3.6 Housekeeping Manuals

Housekeeping manuals for each of the refinery's units provide checklists to be completed.

6.3.7 Refinery Modifications

Various facility modifications to the Valero's Benicia Refinery, planned or considered, are described in this plan.

6.4 Maintenance

Valero performs regular maintenance on storm drains and conveyance structures as required due to plugging or structural damage. Most of the areas covered by the SWPPP are paved, left natural, landscaped, or covered by buildings. Landscaping and ground cover is periodically maintained as needed by a landscaping contractor. The use of fertilizers and pesticides is generally not necessary, though herbicides are used for controlling vegetation (see Figures 1-2, 4-6, and 4-7 for locations of herbicide applications). When these chemicals are used, the manufacturers' instructions are followed and only the minimum quantity needed is applied.

A plan for regular inspections of the stormwater drains and/or conveyance structures is presented in Section 3.1.

6.5 Employee Environmental and Safety Training

Refinery technicians are provided quarterly safety/environmental training through interactive software training sessions. Additional training is conducted in both classroom and field emergency simulation drills. Special safety and environmental topics are periodically presented through both in-house and off-site seminars and courses.

Valero employees are trained in refinery safety at the beginning of employment and during yearly recurrent training. Employee training is performed using a comprehensive, interactive video training system that is presented by Valero's specialized training department. Training modules are prepared by Valero on specific subjects and are required aspects of an employee's job. These modules are viewed by the employee in a fully equipped classroom and are reinforced with open forum discussions afterwards. Regular training reviews Valero's emergency procedures, right-to-know requirements, BMPs (Appendix D), and other pertinent and required topics.

Certain specialists responsible for handling emergency response receive additional training. The training includes corporate procedures for the handling of unique refinery hazards, regulatory requirements, and emergency procedures.

Further details of Valero's training procedures and policies are documented in the BMP manual, the SPCC Plan, and the Hazard Communications Program Manual.

The Valero Benicia Refinery training department retains personnel training records on site for Valero employees that have completed training classes.

6.6 Waste Collection, Recycling, and Disposal Practices

In general, wastes are collected at or near their source(s) and are isolated to prevent exposure to stormwater.

6.7 Recordkeeping and Reporting Procedures

The Environmental Section Supervisor maintains records and plans (including this plan and all documents incorporated by reference). Other records maintained at the Valero Benicia Refinery that are pertinent to the implementation of this plan include:

- Oil Spill Prevention Plan;
- Spill Prevention Control and Countermeasures (SPCC) Plan;
- Hazardous Materials Management Plan;
- Risk Management and Prevention Plan (RMPP);
- Dock Operations Manual;
- Accident Prevention Manual;
- Refinery Task Manuals;

- Refinery Modifications Manual;
- Housekeeping Manuals;
- Documentation related to any spills requiring regulatory reporting;
- Hazardous Waste Manifests;
- Material Safety Data Sheets;
- Worker Right-to-Know Information;
- Inspection Records;
- Training Records; and
- Employee Records.

These plans and/or records will be retained at the site and made available to regulatory agencies and inspectors as required by law.

6.6 Security

Entrance to the site can be gained via a primary gate and two contractor gates. The primary gate is located on East Second Street at the Valero administration building. East Second Street is an exit from Highway 780 approximately one mile northwest of the Martinez-Benicia Bridge. The contractor gates can be accessed on Industrial Park Road and East Second Street. Security guards are posted at all three of these entrances to the facility.

Access to and movement within the site is restricted to employees and pre-authorized contractors. The entire site is fenced to maintain security.

7.0 CERTIFICATION OF THE ELIMINATION OF NON-STORMWATER DISCHARGES

Five monitoring locations, 003, 005, 006, 012, and 015, are associated with natural springs located at the Valero Benicia Refinery (see Figure 1-2). In addition, a steam condensate trap provides additional discharge through monitoring location 006. Although these discharges are considered non-stormwater discharges, no specific BMPs are deemed necessary due to the quality and quantity of the discharge; the quality and quantity do not warrant diversion to containment areas or other similar control measures. The natural spring and steam condensate discharges were previously reported to the RWQCB.

8.0 REFERENCES

Valero Storm Water Pollution Prevention Plan (2002).

Valero Best Management Practices Plan (1991).

Valero Oil Spill Contingency Plan (1996).

Valero Spill Prevention Control and Countermeasure (SPCC) Plan (2000).

Valero Dock Operations Manual (1996).

Valero Off-Site Piping Oil Spill Prevention/Mitigation Project Process Specification No. 31-29.

Valero documentation related to any spills requiring regulatory reporting.

Code of Federal Regulations Title 40, Parts 122, 123, 129.

General Industrial Storm Water Permit (CAS000001), State Board Order 91-113-DWQ.

Hydrology and Drainage Design Procedure, County of Solano (October 1977).

Radian International Storm Water Monitoring and Reporting Program Plan (May 2002).

APPENDIX A

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD ORDER NO. 96-068: NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT NO. CA0005550

Table A-1

Summary of Stormwater Requirements in the NPDES Permit

Requirement	Reference
Allocations for pollutants ($BOD_{5\text{-day}}$, TSS, COD, oil and grease, phenolic compounds, total chromium, and hexavalent chromium) discharged in stormwater runoff to Outfall 001 are specified.	Section B.2, Order 96-068
Allocations for pollutants (pH, oil and grease, TOC, visible oil, and visible color) discharged to outfalls 002 through (and including) 0016 are specified.	Section B.2, Order 96-068
An SWPPP is required that includes: • A map with storm drains, paved areas, surface water locations, discharge locations, vehicle maintenance areas, and a description of the areas with the potential for pollutants in runoff; • Discussion of the feasibility of containment or treatment of stormwater; • Erosion control measures for steep, unvegetated areas; • A narrative description of wastewater treatment, management practices to minimize stormwater, material storage areas, loading and unloading areas, structural and nonstructural control measures, and on-site storage and disposal methods; and • A description of management controls, including personnel, housekeeping, spill prevention and response, source control, management practices, sediment control, employee training, inspections, and recordkeeping.	Section D.3, Order 96-068 and Section B, Standard Provisions and Reporting Requirements
The SWPPP should be updated by 1 July each year, or sooner if there is a change of operation in the facility that may substantially affect the quality of stormwater.	Section D.3, Order 96-068
Visual observations of stormwater locations should be conducted for at least one storm event each month.	Section 3.a, Self Monitoring Program Part A
The total volume of stormwater discharge should be measured or estimated and samples from at least two storm events each wet season should be collected and analyzed.	Section 3.b and d, Self Monitoring Program Part A
Two observations should be performed during the dry season (May to September) to identify any non-stormwater discharges.	Section 3.c, Self Monitoring Program Part A
Records of all monitoring information and reports should be maintained for a period of at least 3 years.	Section 3.e, Self Monitoring Program Part A
Annual facility inspection to verify that all elements of the SWPPP are accurate and up to date.	Section B.4, Reporting Requirements

BOD = biological oxygen demand
COD = chemical oxygen demand
SWPPP = Storm Water Pollution Prevention Plan
TOC = total organic carbon
TSS = total suspended solids

May 24, 1996

TO: W. R. Arnold, EBSI
R. G. Balmer, ER&E
G. R. Biddinger
J. T. Capps
R. A. Dirckx, Houston
D. B. Gentry
D. W. Johnston
C. P. Kraus
C. M. Schinner, ER&E
K. K. Smock
A. W. Trott

Env. File: 8.3.009F

FROM: A. R. Middleton

SUBJECT: Benicia NPDES Permit

Attached is a copy of the final NPDES permit for the Benicia Refinery which was approved May 15, 1996 by the San Francisco Regional Water Quality Control Board. The permit is valid for five years and will expire on May 15, 2001. We will be required to file an application to renew the permit at least 180 days prior to the expiration date.

ARM:arm
Attachment

c - w/o attachments
P. L. Boas
J. M. Kenney

STATE OF CALIFORNIA PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
101 WEBSTER STREET, SUITE 500
OAKLAND, CA 94612
(510) 286-1255
FAX (510) 286-1380

Certified Mail No.
Return Receipt Requested

MAY 21 1996

File No. 2129.2004A (LWT)

Mr. Al Middleton
Environmental Control Engineer
Exxon Corporation, Benicia Refinery
3400 East Second Street
Benicia, CA 94510

Notice: The items indicated by an "X" are enclosed herewith:

☒ A. One certified copy of an Order adopted by the Board on the date shown therein.

☐ B. Attachment to Order containing Requirements and Recommendations of other agencies.

☐ C. One copy of Executive Officer Summary Report which was considered by the Board on the date shown therein. The Motion(s) recommended therein was (were) adopted by the Regional Board on that date.

☐ D. Other -

Please note that the attached was amended in several places to correct typographical errors. Specifically, the descriptions in Finding 5 of "Biological Oxygen Demand" for the discharges have been corrected to "Biochemical Oxygen Demand." Also, Findings 5.k. and 5.l. was changed from "The runoff is discharges into..." to "The runoff discharges into ..." Please call Lila Tang at (510) 286-0911 if you have any questions.

Sincerely,

Lawrence P. Kolb
for
LORETTA K. BARSAMIAN
Executive Officer

Enclosure
copy to: USEPA Region IX, Permits and Compliance Branch (W-5-1)

PART B

DESCRIPTION OF SAMPLING STATIONS
AND
SCHEDULE OF SAMPLING, ANALYSIS & OBSERVATIONS
FOR
EXXON CORPORATION, BENICIA REFINERY
NPDES NO. CA0005550

I. Description of Sampling Stations

A. EFFLUENT

Station	Description
E-001	At any point in the outfall from the treatment facilities for Waste 001 between the point of discharge and the point at which all wastes tributary to the outfall are present.
E-002	At any point in the outfall for Waste 002 between the point of discharge and the point at which all storm water tributary to that discharge is present.
E-003	Same as above except discharge is for Waste 003.
E-004	Same as above except discharge is for Waste 004.
E-005	Same as above except discharge is for Waste 005.
E-006	Same as above except discharge is for Waste 006.
E-007	Same as above except discharge is for Waste 007.
E-008	Same as above except discharge is for Waste 008.
E-009	Same as above except discharge is for Waste 009.
E-010	Same as above except discharge is for Waste 010.
E-011	Same as above except discharge is for Waste 011.
E-012	Same as above except discharge is for Waste 012.
E-013	Same as above except discharge is for Waste 013.
E-014	Same as above except discharge is for Waste 014.
E-015	Same as above except discharge is for Waste 015.
E-016	Same as above except discharge is for Waste 016.

B. RECEIVING WATERS

Station	Description
C-NF	At a point in Suisun Bay located 5 meters southwest of the diffuser for Waste 001.
C-MF	At a point in Carquinez Strait located 20 meters southwest of the diffuser for Waste 001.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

EXXON CORPORATION
BENICIA REFINERY
SOLANO COUNTY

NPDES NO. CA0005550
ORDER NO. 96-068

CONSISTS OF

PART A dated August 1993
PART B, Adopted: May 15, 1996

TABLE B-3
TOXICITY TEST REQUIREMENTS FOR STAGE ONE SCREENING PHASE

REQUIREMENTS	RECEIVING WATER CHARACTERISTICS		
	DISCHARGES TO COAST	DISCHARGES TO SAN FRANCISCO BAY‡	
	Ocean	Marine	Freshwater
Taxonomic Diversity	1 plant 1 invertebrate 1 fish	1 plant 1 invertebrate 1 fish	1 plant 1 invertebrate 1 fish
Number of tests of each salinity type			
Freshwater†	0	1 or 2	3
Marine	4	3 or 4	0
Total number of tests	4	5	3

† The fresh water species may be substituted with marine species if:

1) the salinity of the effluent is above 5 parts per thousand (ppt) greater than 75% of the time, or

2) the ionic strength (TDS or conductivity) of the effluent at the test concentration used to determine compliance is documented to be toxic to the test species.

‡ Marine refers to receiving water salinities greater than 5 ppt at least 75% of the time during a normal water year. Fresh refers to receiving water with salinities less than 5 ppt at least 75% of the time during a normal water year.

TABLE B-2
CRITICAL LIFE STAGE TOXICITY TESTS FOR FRESH WATERS

SPECIES	EFFECT	TEST DURATION	REFERENCE
fathead minnow (Pimephales promelas)	survival; growth rate	7 days	4
water flea (Ceriodaphnia dubia)	survival; number of young	7 days	4
alga (Selenastrum capricornutum)	cell division rate	4 days	4

TOXICITY TEST REFERENCE .

4. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Third edition. EPA/600/4-91/002. July 1994

TABLE B-1
CRITICAL LIFE STAGE TOXICITY TESTS FOR ESTUARINE WATERS

SPECIES	EFFECT	TEST DURATION	REFERENCE
alga (Skeletonema costatum) (Thalassiosira pseudonana)	growth rate	4 days	1
red alga (Champia parvula)	number of cystocarps	7-9 days	3
giant kelp (Macrocystis pyrifera)	percent germination; germ tube length	48 hours	2
abalone (Haliotis rufescens)	abnormal shell development	48 hours	2
oyster (Crassostrea gigas) mussel (Mytilus edulis)	abnormal shell development; percent survival	48 hours	2
Echinoderms (urchins - Strongylocentrotus purpuratus); (sand dollar - Dendraster excentricus)	percent fertilization	1 hour	2
shrimp (Mysidopsis bahia)	percent survival; growth	7 days	3
shrimp (Holmesimysis costata)	percent survival; growth	7 days	2
Topsmelt (Atherinops affinis)	percent survival; growth	7 days	2
silversides (Menidia beryllina)	larval growth rate; percent survival	7 days	3

TOXICITY TEST REFERENCES

1. American Society for Testing Materials (ASTM). 1990. Standard Guide for conducting static 96-hour toxicity tests with microalgae. Procedure E 1218-90. ASTM, Philadelphia, PA.

2. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms. EPA/600/R-95/136. August 1995

3. Short-term Methods for Eestimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. EPA-600/4-90/003. July 1994

B. Design of the screening phase shall, at a minimum, consist of the following elements:

- Use of test species specified in Table B-1 and B-2 (attached), and use of the protocols referenced in those tables, or as approved by the Executive Officer;

- Two stages:

  Stage 1 shall consist of a minimum of one battery of tests conducted concurrently. Selection of the type of test species and minimum number of tests shall be based on Table B-3 (attached); and

  Stage 2 shall consist of a minimum of two test batteries conducted at a monthly frequency using the three most sensitive species based on the Stage 1 test results and as approved by the Executive Officer.

- Appropriate controls; and

- Concurrent reference toxicant tests.

C. The discharger shall submit a screening phase proposal to the Executive Officer for approval. The proposal shall address each of the elements listed above.

ATTACHMENT B

CHRONIC TOXICITY

I. DEFINITION OF NO OBSERVED EFFECT LEVEL

A. No observed effect level (NOEL) for compliance determination is equal to IC_{25} or EC_{25}. If the IC_{25} or EC_{25} cannot be statistically determined, the NOEL shall be equal to the NOEC derived using hypothesis testing.

B. Effective concentration (EC) is a point estimate of the toxicant concentration that would cause an adverse effect on a quantal, "all or nothing," response (such as death, immobilization, or serious incapacitation) in a given percent of the test organisms. If the effect is death or immobility, the term lethal concentration (LC) may be used. EC values may be calculated using point estimation techniques such as probit, logit, and Spearman-Karber. EC_{25} is the concentration of toxicant (in percent effluent) that causes a response in 25% of the test organisms.

C. Inhibition Concentration (IC) is a point estimate of the toxicant concentration that would cause a given percent reduction in a non-lethal, non-quantal biological measurement, such as growth. For example, an IC_{25} is the estimated concentration of toxicant that would cause a 25% reduction in average young per female or growth. IC values may be calculated using a linear interpolation method such as USEPA's Bootstrap Procedure.

D. No observed effect concentration (NOEC) is the highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specific time of observation. It is determined using hypothesis testing.

II. SCREENING PHASE MONITORING REQUIREMENTS

A. The discharger shall perform screening phase compliance monitoring:

1. subsequent to any significant change in the nature of the effluent discharged through changes in sources or treatment, except those changes resulting from reductions in pollutant concentrations attributable to pretreatment, source control, and waste minimization efforts, or

2. prior to Permit reissuance. Screening phase monitoring data shall be included in the NPDES Permit application for reissuance. The information shall be as recent as possible, but may be based on screening phase monitoring conducted within 5 years before the permit expiration date.

ATTACHMENT A

DEFINITION OF TERMS
FOR CHEMICAL CONSTITUENTS

PAHs (polynuclear aromatic hydrocarbons) shall mean the following constituents. Each constituent shall be limited individually at 0.49 µg/l as indicated below.

Constituent	Unit	Monthly Average Effluent Limit
Benz(a)Anthracene	µg/l	0.49
3,4-Benzo(b)Fluoranthene	µg/l	0.49
Benzo(k)Fluoranthene	µg/l	0.49
Benzo(g,h,i)Perylene	µg/l	0.49
Benzo(a)Pyrene	µg/l	0.49
Chrysene	µg/l	0.49
Dibenz(a,h)Anthracene	µg/l	0.49
Indeno(1,2,3-cd)pyrene	µg/l	0.49

PCBs (polychlorinated biphenyls) shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, and Aroclor-1260.

TCDD Equivalents shall mean the sum of the concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity equivalence factors, as shown in the table below.

Isomer Group	Toxicity Equivalence Factor
2,3,7,8-tetra CDD	1.0
2,3,7,8-penta CDD	0.5
2,3,7,8-hexa CDDs	0.1
2,3,7,8-hepta CDD	0.01
octa CDD	0.001
2,3,7,8-tetra CDF	0.1
1,2,3,7,8-penta CDF	0.05
2,3,4,7,8-penta CDF	0.5
2,3,7,8-hexa CDFs	0.1
2,3,7,8-hepta CDFs	0.01
octa CDF	0.001

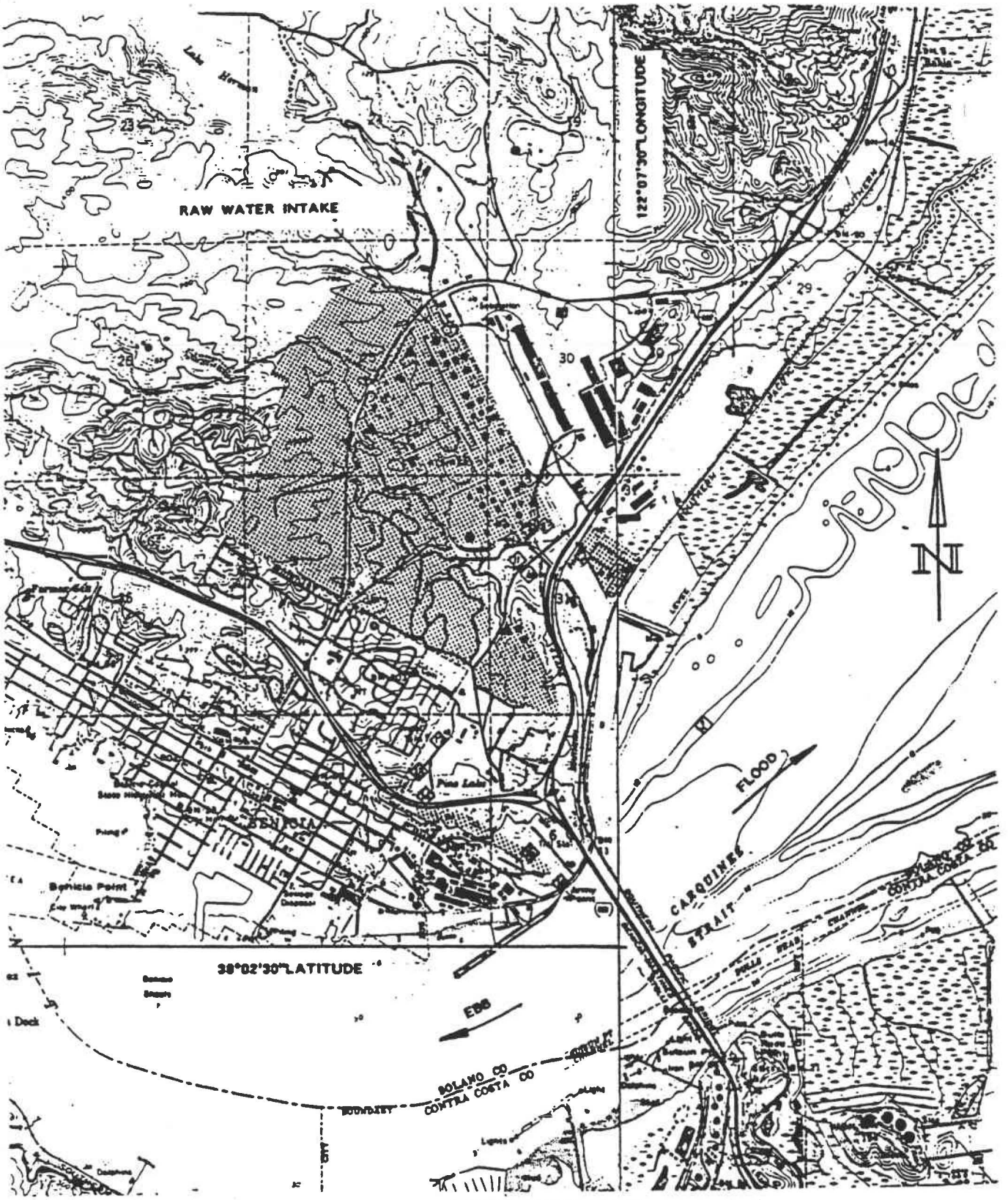


FIGURE 4

LOCATION MAP

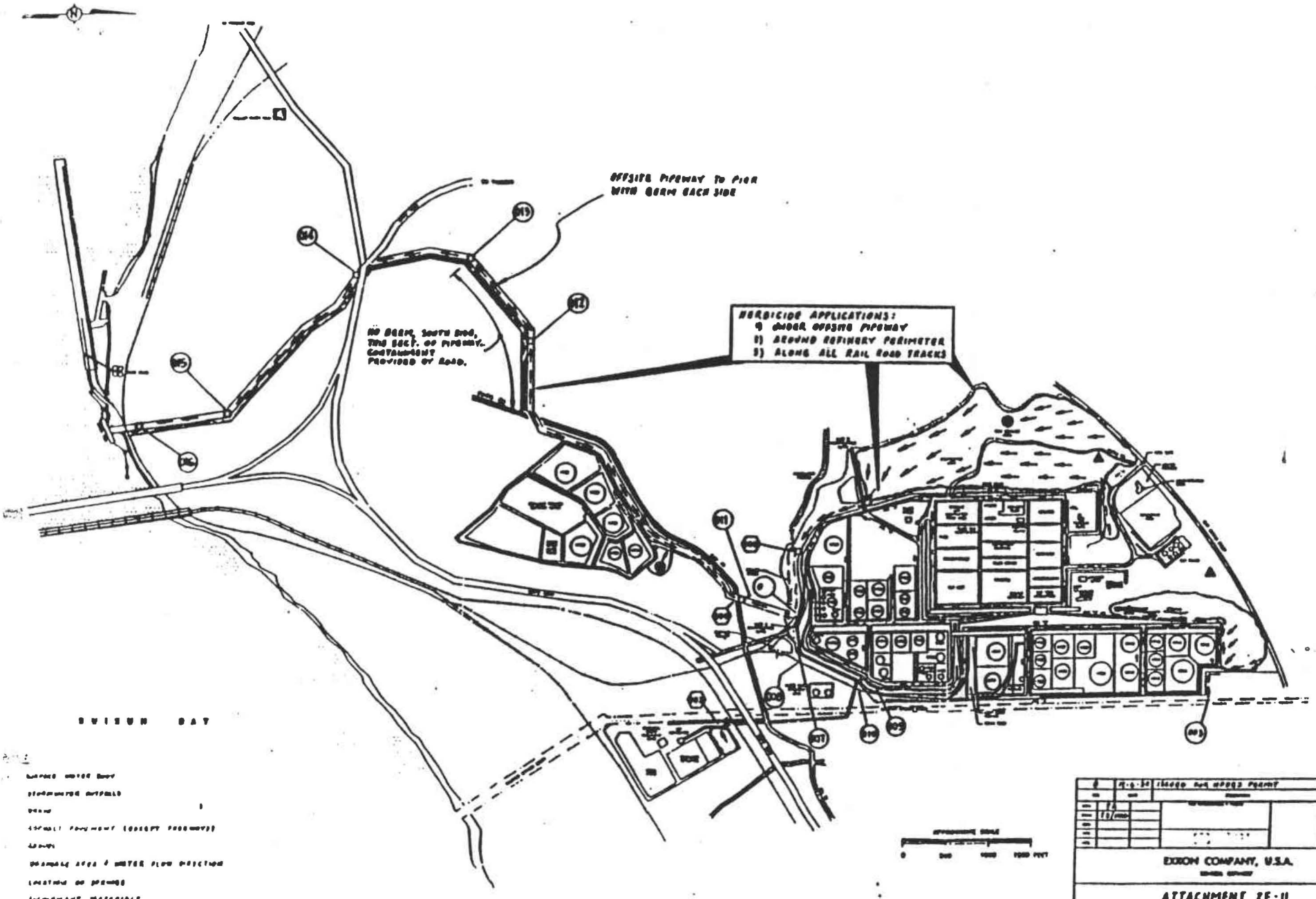
FROM U.S. GEOLOGICAL SURVEY MAPS
BENICI A / VINE HILL, CALIF.

EXXON CO., U.S.A.

SOLANO COUNTY
BENICIA, CALIFORNIA
DECEMBER 5, 1994, PAGE 1 OF 1

Control Number	Latitude Deg	Min	Sec	Longitude Deg	Min	Sec
001	38	02	18	122	07	07
002	38	03	32	122	07	27
003	38	04	49	122	08	12
004	38	03	59	122	07	34
005	38	03	34	122	08	07
006	38	03	30	122	07	37
007	38	04	02	122	07	34
008	38	04	03	122	07	32
009	38	04	[illegible]	[illegible]	[illegible]	37
010	[illegible]	34	[illegible]	[illegible]	[illegible]	[illegible]

FIGURE 3



EXXON COMPANY, U.S.A.

ATTACHMENT 2F-11
FORM 2F, ITEM III, SITE MAP

33 ·17C-22300 0

FIGURE 2

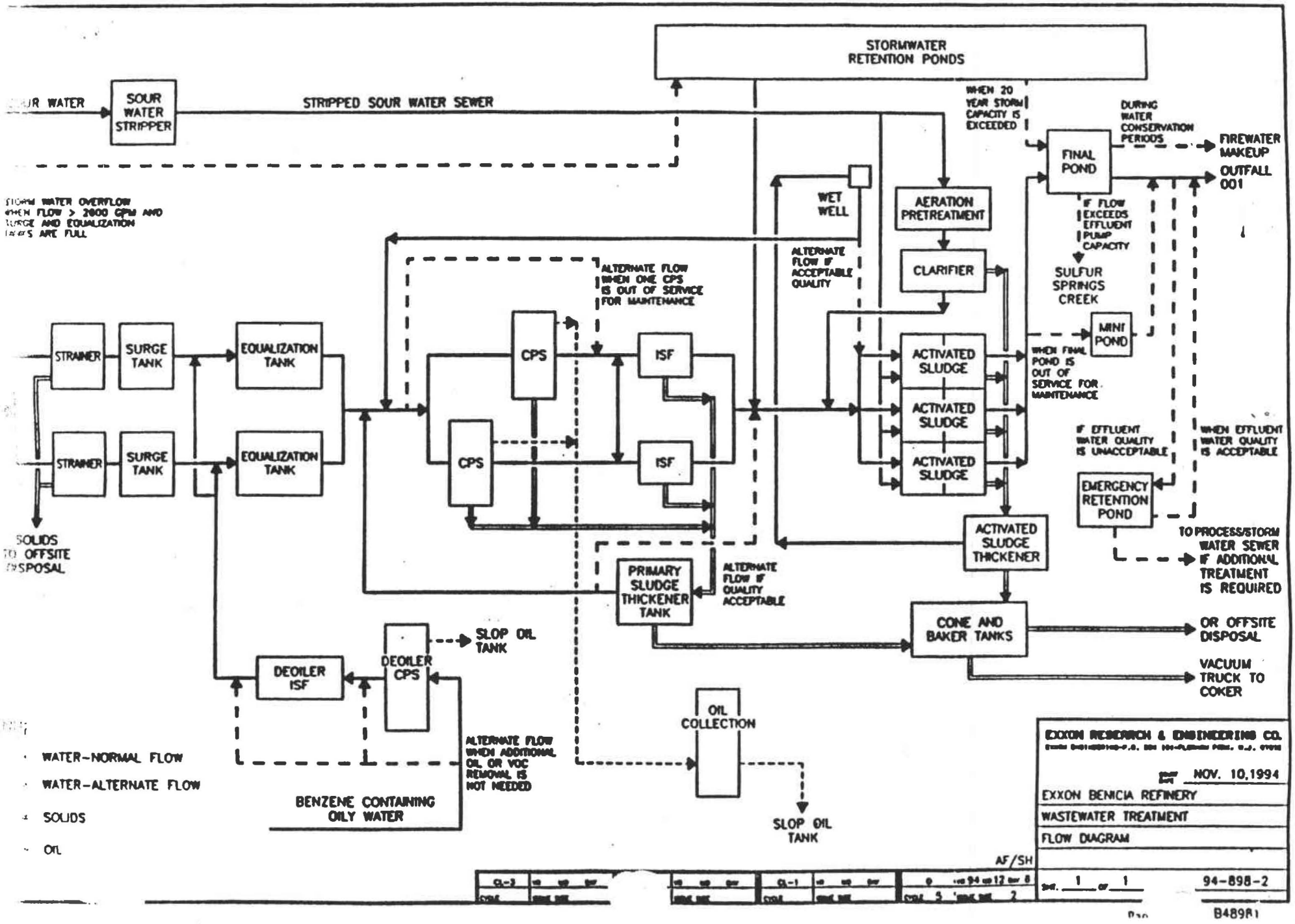
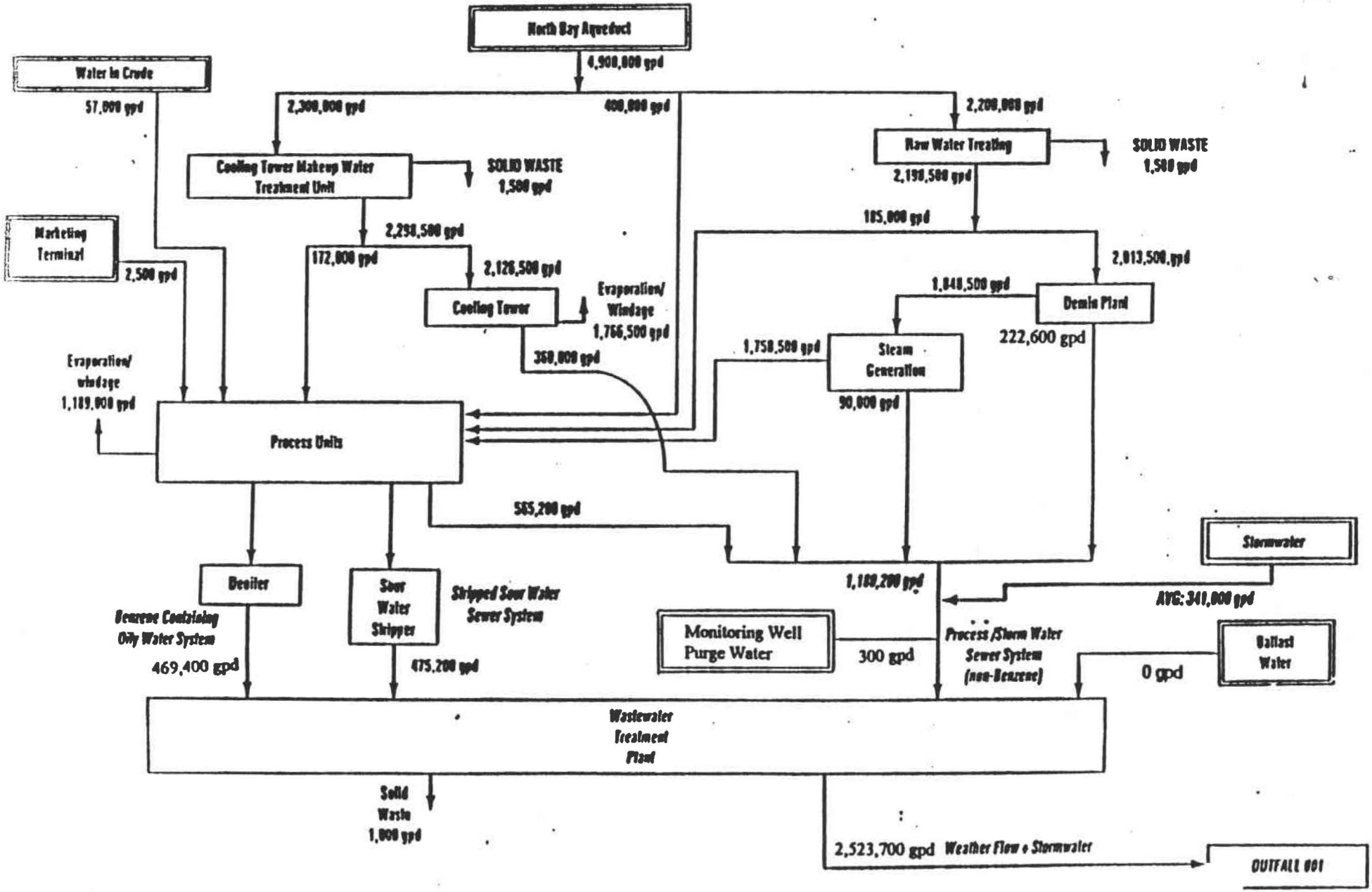

STORMWATER RETENTION PONDS
SOUR WATER
SOUR WATER STRIPPER
STRIPPED SOUR WATER SEWER
WHEN 20 YEAR STORM CAPACITY IS EXCEEDED
DURING WATER CONSERVATION PERIODS
FIREWATER MAKEUP
FINAL POND
OUTFALL 001
WET WELL
AERATION PRETREATMENT
CLARIFIER
IF FLOW EXCEEDS EFFLUENT PUMP CAPACITY
SULFUR SPRINGS CREEK
MINI POND
ALTERNATE FLOW IF ACCEPTABLE QUALITY
ALTERNATE FLOW WHEN ONE CPS IS OUT OF SERVICE FOR MAINTENANCE
STRAINER
SURGE TANK
EQUALIZATION TANK
CPS
ISF
ACTIVATED SLUDGE
WHEN FINAL POND IS OUT OF SERVICE FOR MAINTENANCE
IF EFFLUENT WATER QUALITY IS UNACCEPTABLE
WHEN EFFLUENT WATER QUALITY IS ACCEPTABLE
EMERGENCY RETENTION POND
TO PROCESS/STORM WATER SEWER IF ADDITIONAL TREATMENT IS REQUIRED
SOLIDS TO OFFSITE DISPOSAL
ACTIVATED SLUDGE THICKENER
PRIMARY SLUDGE THICKENER TANK
ALTERNATE FLOW IF QUALITY ACCEPTABLE
CONE AND BAKER TANKS
OR OFFSITE DISPOSAL
VACUUM TRUCK TO COKER
SLOP OIL TANK
DEOILER ISF
DEOILER CPS
OIL COLLECTION
ALTERNATE FLOW WHEN ADDITIONAL OIL OR VOC REMOVAL IS NOT NEEDED
BENZENE CONTAINING OILY WATER
WATER-NORMAL FLOW
WATER-ALTERNATE FLOW
SOLIDS
OIL
EXXON RESEARCH & ENGINEERING CO.
NOV. 10,1994
EXXON BENICIA REFINERY
WASTEWATER TREATMENT
FLOW DIAGRAM
AF/SH
94-898-2
B489R1

FIGURE 1

ATTACHMENT 2C-I
ITEM II A
LINE DRAWING OF WATER FLOW THROUGH EXXON CO., U.S.A. BENICIA REFINERY 135 Kb bl/day CRUDE OIL THROUGHPUT



4-17-96

I, Loretta K. Barsamian, Executive Officer do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region on May 15, 1996.

for
LORETTA K. BARSAMIAN
Executive Officer

Attachments:

Figures 1& 2 - Wastewater Flow Diagrams
Figure 3 - Storm Water Drainage Areas
Figure 4 - Discharge Locations
Attachment A - Definition of Terms for Chemical Constituents
Attachment B - Chronic Toxicity Screening Phase Monitoring Requirements
Standard Provisions & Reporting Requirements, August 1993
Self-Monitoring Program

a. include effluent limitations for toxic constituents determined to be present in significant amounts in the discharge through a more comprehensive monitoring program included as part of this Order, or

b. revise the definition of the NOEL contained in Attachment A of this Order based on guidance or policy from the State Board.

11. Signatory and Certification: All applications, reports, or information submitted to the Board shall be signed and certified pursuant to USEPA regulations 40 CFR 122.41(k).

12. Notification on Changes: Pursuant to USEPA regulations, 40 CFR 122.41(a), the discharger shall notify the Board as soon as it knows or has reason to believe 1) that they have begun or expect to begin, use or manufacture of a toxic pollutant not reported in the permit application, or 2) a discharge of a toxic pollutant not limited by this permit has occurred, or will occur, in concentrations that exceed the specified limits in 40 CFR 122.42(a).

13. Standard Provisions: This Order includes all items of the attached "Standard Provisions, Reporting Requirements" dated August 1993. In part, these Standard Provisions require submittal within 90 days of adoption of this Order, of reports on Safeguards to Electric Power Failure and Spill Prevention and Contingency Plan.

14. Effective Date of Permit: This Order shall serve as National Pollutant Discharge Elimination System permits pursuant to Section 402 of the Federal Water Pollution Control Act, or amendments thereto, and shall become effective on the date of adoption provided the Regional Administrator, Environmental Protection Agency, has no objection. If the Regional Administrator objects to its issuance, the permit shall not become effective until such objection is withdrawn.

15. Permit Expiration: This Order expires on May 15, 2001. The discharger must file a Report of Waste Discharge in accordance with Title 23 of the California Code of Regulations, not later than 180 days in advance of such date as application for issuance of new waste discharge requirements.

16. Rescission of Previous Orders: This Order supersedes the requirements of Order Nos. 90-095, 91-026, 91-099 and 92-099. Order No. 92-099 is hereby rescinded. Order Nos. 90-095, 91-026, 91-099 are hereby rescinded except as they relate to implementation and enforcement of the above described Settlement Agreement and Cease and Desist Order No. 94-015. The Settlement agreement and Order No. 94-015 shall apply to this Order.

17. The discharger shall comply with all sections of this Order immediately upon adoption.

days develop and initiate a source identification and reduction investigation acceptable to the Executive Officer. During this time, compliance with the B.4 effluent limits shall be determined at the former analytical quantification limits specified in the Self-Monitoring Program provided the discharger is aggressively pursuing the source investigation.

5. TRE for Chronic Toxicity: If there is a violation of the chronic toxicity effluent limitation, the discharger shall conduct a chronic toxicity reduction evaluation (TRE), which shall initially involve a toxicity identification evaluation (TIE). The TIE shall be in accordance with a work plan acceptable to the Executive Officer. The TIE shall be initiated within 30 days of the date of violation. The objective of the TIE shall be to identify the chemical or combination of chemicals that are causing the observed toxicity. Every effort using currently available TIE methodologies shall be employed by the discharger. As toxic constituents are identified or characterized, the discharger shall continue the TRE by determining the source(s) of the toxic constituent(s) and evaluating alternative strategies for reducing or eliminating the constituent(s) from the discharge. All reasonable steps shall be taken to reduce toxicity to the required level. The Board recognizes that identification of causes of chronic toxicity may not be successful in all cases. Consideration of enforcement action by the Board will be based in part on the discharger's actions in identifying and reducing sources of consistent toxicity.

6. Screening Phase for Chronic Toxicity: The discharger shall conduct a screening phase compliance monitoring under either of these two conditions described in Attachment B of this Order. The discharger shall conduct screening phase compliance monitoring in accordance with a proposal acceptable to the Executive Officer. The proposal shall contain, at a minimum, the elements specified in Attachment B of this Order. The purpose of the screening is to determine the most sensitive test species for subsequent routine compliance monitoring for chronic toxicity.

7. Regional Monitoring Program: The discharger shall continue to participate in the Regional Monitoring Program (RMP) for trace substances in San Francisco Bay in lieu of more extensive effluent and receiving water self-monitoring requirements that maybe imposed by the Executive Officer.

8. Wastewater Reuse: The discharger may reuse a portion of Waste 001 for the purpose of on-site landscape irrigation, and in the Benicia Refinery firewater system provided Waste 001 is in compliance with the effluent limitations. Reuse for irrigation may occur only during the dry weather season from June to September exclusive of a one-week period following any rainstorm. The reuse shall occur in such a manner as to not result in runoff that can enter State Waters. All water released from the refinery's firewater system shall be captured and retreated in the wastewater treatment plant.

9. Self-Monitoring Program: The discharger shall conduct monitoring in accordance with the attached Self-Monitoring Program as adopted by the Board. The Self-Monitoring Program may be amended by the Executive Officer pursuant to USEPA regulations 40 CFR 122.62, 122.63, and 124.5.

10. Permit Reopener: Pursuant to USEPA regulations 40 CFR 122.44, 122.62, and 124.5, this permit may be modified prior to the expiration date to

	identify and investigate other removal measures which would be necessary to achieve compliance as needed.	
b.	Submit quarterly status reports on the work performed pursuant to Task 1.a. and described in detail in Provision D.2.	15 days following the end of each calendar quarter. The first report is due on July 15, 1996.
c.	Achieve full compliance with Effluent Limit B.4 monthly average limit for mercury of 0.21 µg/l.	July 31, 1999

2. **Status Reports on Selenium and Mercury Removal Technology**: The discharger shall submit status reports quarterly which at a minimum describes a) the status and results of pilot tests of chosen technology(ies) for removal of selenium and mercury, b) the status and results of other studies being conducted or undertaken by the discharger to reduce selenium and mercury in the discharge, and c) the progress of contracting, construction or implementation activities, and foreseeable delays and actions taken or will be taken to minimize those delays. The status reports are due 15 days following the end of each calendar quarter.

3. **Storm Water Pollution Prevention Plan**: The discharger shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) acceptable to the Executive Officer. The SWPPP shall cover the entire facility owned and operated by the discharger. It shall describe the management and handling of storm water runoff from the facility, and measures taken to prevent contamination of storm water or discharge of pollutants with the storm water. As part of the SWPPP, the discharger shall 1) identify on a map of appropriate scale the areas which contribute runoff to the permitted discharge points, 2) describe the activities on each area and the potential for contamination of the runoff, and 3) address the feasibility for containment and/or treatment of the storm water. The discharger shall submit an updated SWPPP by September 1, 1996 to reflect the discharge points covered under this permit. The SWPPP shall specifically address measures for erosion control of steep unvegetated areas which drain to the discharge points.

   Henceforth, the discharger shall evaluate and update the SWPPP by July 1 of each year, or sooner if there is a change in the operation of the facility which may substantially affect the quality of the storm water discharged from the facility. The annual update shall be timed with the preparation and submittal of the annual storm water report required in the Self-Monitoring Program. The discharger shall submit revisions to the Executive Officer.

4. **Compliance Schedule for Detection Limited Constituents**: If the analytical methods for PCBs and TCDD Equivalents are improved or new methods developed which improves (or lowers) the analytical quantification limit beyond those specified in the Self-Monitoring Program, and the discharger using the new or improved methods finds either of the above pollutants present at levels above their effluent limits specified in B.4, but below the former analytical quantification limits established, the discharger shall notify the Executive Officer, accelerate monitoring for the pollutant of concern to characterize the discharge, and within 60

c. Alteration of temperature, turbidity, or apparent color beyond present natural background levels;

d. Visible, floating, suspended, or deposited oil or other products of petroleum origin;

e. Toxic or deleterious substances to be present in concentrations or quantities which will cause deleterious effects on aquatic biota, wildlife, or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentration.

2. The discharge of waste shall not cause the following limits to be exceeded in waters of the State in any place within one foot of the water surface:

a.	Dissolved oxygen:	7.0 mg/l minimum. The median dissolved oxygen concentrations for any three consecutive months shall not be less than 80 percent of the dissolved oxygen content at saturation.
b.	Dissolved sulfide:	0.1 mg/l maximum.
c.	pH:	The pH shall not be depressed below 6.5 nor raised above 8.5, nor caused to vary from normal ambient pH levels by more than 0.5 units.
d.	Un-ionized ammonia (as N):	0.025 mg/l Annual Median, and 0.16 mg/l Maximum at any time.

3. The discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the Board or the State Board as required by the Federal Water Pollution Control Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal Water Pollution Control Act or amendments thereto, the Board will revise and modify this Order in accordance with such more stringent standards.

D. PROVISIONS

1. Compliance Schedule for Mercury: The discharger shall comply with the monthly average effluent limit of 0.21 µg/l specified in B.4 for mercury in accordance with the following tasks and time schedule:

Task	Compliance Date
a. Continue with pilot studies on the effectiveness of selenium removal technologies for removal of mercury from stripped sour water process streams. Evaluate treatment options for non-stripped sour water process streams, and	Upon adoption of this Order

[3] A bioassay test showing survival of less than 70 percent represents a violation of this effluent limit, if one or more of the past ten or less tests shows less than 70 percent survival.

7. Waste 001, as discharged shall meet both of the following chronic toxicity limitations:

a. an eleven sample median value[1] of 10 TUc[2]; and

b. a 90 percentile value[3] of 20 TUc[2].

[1] A test sample showing chronic toxicity greater than 10 TUc represents consistent toxicity and a violation of this limitation, if five or more of the past ten or less tests show toxicity greater than 10 TUc.

[2] A TUc equals 100/NOEL. The NOEL is the no observable effect level, determined from IC, EC, or NOEC values. These terms and their usage in determining compliance with the limitations are defined in Attachment B of this Order. The NOEL shall be based on a critical life stage test using the most sensitive test species as specified by the Executive Officer. The Executive Officer may specify two compliance species if test data indicate that there is alternating sensitivity between the two species. If two compliance test species are specified, compliance shall be based on the maximum TUc value for that discharge sample based on a comparison of TUc values obtained through concurrent testing of the two species.

[3] A test sample showing chronic toxicity greater than 20 TUc represents consistent toxicity and a violation of this limitation, if one or more of the past ten or less tests shows toxicity greater than 20 TUc.

8. The discharge of Wastes 002, through and including 016 containing constituents in excess or outside of the following limits is prohibited:

Constituent	Units	Limitation
pH	standard units	within 6.5 to 8.5
Oil & Grease	mg/l	daily maximum of 15
TOC	mg/l	daily maximum of 110
visible oil	-	none observed
visible color	-	none observed

C. RECEIVING WATER LIMITATIONS

1. The discharge of wastes shall not cause the following conditions to exist in waters of the State at any place at levels that cause nuisance or adversely affect beneficial uses:

a. Floating, suspended, or deposited macroscopic particulate matter or foam;

b. Bottom deposits or aquatic growths;

Constituent	Units	Monthly Average	Daily Average
Benzene	mg/l	0.21	--
Toluene	mg/l	3,000	--
Fluoranthene	μg/l	420	--

[1] The discharger shall comply with the monthly average limit for mercury in accordance with the tasks and time schedule specified in Provision D.1 of this Order.

[2] The discharger may, at their option, meet the limit for cyanide as free cyanide, simple alkali metal cyanides, and weakly complexed organometallic cyanides. These forms of cyanide shall be measured using the Weak Acid Dissociable Cyanide method described in the most recent edition of Standard Methods, or another method approved by the Executive Officer.

[3] See Attachment A for definition of terms.

[4] At the present time, the analytical reporting limits available from commercial laboratories using approved USEPA protocols are not low enough to determine compliance with the above limits for PCBs, and TCDD Equivalents. Until the analytical protocols are improved or new ones developed to allow measurement of these pollutants at lower levels, compliance with these limits shall be determined at the analytical quantification limits specified in the Self-Monitoring Program. Because analytical quantification limits may be improved, the Executive Officer may change these quantification limits prior to the expiration date of this permit. If quantification limits are improved and analyses show the presence of PCBs, or TCDD Equivalents at levels above the effluent limitation, the discharger shall continue to determine compliance at the former quantification limits, and shall immediately implement the conditions of Provision 4 of this Order.

5. Waste 001 shall not be discharged with a pH outside the range of 6.0 to 9.0.

Whole Effluent Toxicity

6. Waste 001, as discharged, shall meet the following acute toxicity limitation:

The survival of test fish[1] in parallel 96-hour flow-through bioassays of Waste 001 as discharged shall be an eleven sample[2] median value of not less than 90 percent survival, and an eleven sample 90 percentile[3] value of not less than 70 percent survival.

[1] Test fishes as specified by the Executive Officer in the Self-Monitoring Program.

[2] A bioassay test showing survival of less than 90 percent represents a violation of this effluent limit, if five or more of the past ten or less bioassay tests show less than 90 percent survival.

The total effluent limitation is the sum of the storm water runoff allocation, the ballast water allocation and the mass limits contained in B.1. The discharger shall compute the total effluent limitation (both maximum and average) on a monthly basis as shown in Part B of the Self-Monitoring Program.

Selenium

3. The discharge of Waste 001 containing selenium constituents in excess of the following limits is prohibited:

Concentration Limit: (Daily maximum)[1]	Mass Emission Limit: (Running annual average)[1,2]
50 µg/l	0.96 lb/day

[1] These limits are effective immediately. Additionally, the Settlement Agreement and Cease and Desist Order No. 94-015 (which contains an interim mass emission rate of 2.07 lb/day as a running annual average) remain in effect.

[2] Mass emission rate for selenium shall be based on running annual averages. Running annual averages shall be calculated by taking the arithmetic average of the current daily mass loading value, and all of the previous year's values. For this calculation, the daily mass loading value may be determined using a daily flow based on the average for the week.

Toxic and Conventional Pollutants

4. The discharge of Waste 001 containing constituents in excess of the following concentration limits is prohibited:

Constituent	Units	Monthly Average	Daily Average
Copper	µg/l	--	36
Mercury[1]	µg/l	0.21[1]	1
Nickel	µg/l	--	65
Zinc	µg/l	--	580
Cyanide[2]	µg/l	--	25
Oil & Grease	mg/l	8	15
Total Phenols	µg/l	--	500
Settleable Solids	ml/l-hr	0.1	0.2
PAHs[3]	µg/l	0.49	--
PCBs, total[3]	µg/l	0.0007[4]	0.3[4]
TCDD Equivalents[3]	pg/l	0.14[4]	--

Constituent	Units	Monthly Average	Daily Maximum
Total Chromium	lb/day	13.8	39.8
	kg/day	6.25	18.1
Hexavalent Chromium	lb/day	1.13	2.55
	kg/day	0.512	1.16

Storm Water Runoff and Ballast Water Allocations

2. In addition to the monthly average and daily maximum pollutant weight allowances shown in B.1, allocations for pollutants attributable to storm water runoff discharged as a part of Waste 001 are permitted in accordance with the following schedules:

STORM WATER RUNOFF ALLOCATION

Constituent	Units	Monthly Average	Daily Maximum
BOD (5-day @ 20C)	mg/l	26	48
TSS	mg/l	21	33
COD	mg/l	180	360
Oil & Grease	mg/l	8	15
Phenolic Compounds	mg/l	0.17	0.35
Total Chromium	mg/l	0.21	0.60
Hexavalent Chromium	mg/l	0.028	0.062

BALLAST WATER ALLOCATION

Constituent	Units	Monthly Average	Daily Maximum
BOD	mg/l	26	48
TSS	mg/l	21	33
COD	mg/l	240	470
Oil & Grease	mg/l	8	15
pH		within the range of 6.0 to 9.0	

IT IS HEREBY ORDERED that the discharger, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Federal Water Pollution Control Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. DISCHARGE PROHIBITIONS

1. The discharge of Waste 001 at any point at which the wastewaters do not receive an initial dilution of at least 10:1 is prohibited. The discharger may reuse a portion of Waste 001 for on-site landscape irrigation or in the facilities firewater system provided the discharger comply with the provision for reuse specified D.8 of this Order.

2. The bypass or overflow of untreated or partially treated Waste 001 to waters of the State, either at the treatment plant or from the collection system is prohibited. This prohibition specifically includes the bypass of treatment units listed in Finding 5 above. Standard Provisions (attached) Section A.12. addresses bypass conditions and is applicable to the discharger.

B. EFFLUENT LIMITATIONS

Production Based Mass Emission Limits

1. The discharge of Waste 001 containing constituents in excess of any of the following mass loading limits is prohibited:

Constituent	Units	Monthly Average	Daily Maximum
BOD (5-day @ 20C)	lb/day	1,890	3,410
	kg/day	859	1,550
TSS	lb/day	1,520	2,380
	kg/day	687	1,080
COD	lb/day	13,300	25,500
	kg/day	6,000	11,600
Oil & Grease	lb/day	551	1,030
	kg/day	250	469
Phenolic Compounds	lb/day	11.9	25.5
	kg/day	5.40	11.6
Ammonia as N	lb/day	1,030	2,270
	kg/day	469	1,030
Sulfide	lb/day	9.99	22.4
	kg/day	4.53	10.2

Local Effects Monitoring Program

26. The discharger was required as a provision of the previous permit to study the potential for accumulation of metallic and organic compounds, and selenium in San Francisco Bay organisms and sediment. These studies are called the Local Effects Monitoring Program (LEMP). Subsequent to a pilot LEMP conducted in 1991 at the Unocal Refinery in Rodeo, California, the discharger initiated a similar program in 1993 with the bioaccumulation in organisms component conducted as part of a multi-refinery study implemented by the Western States Petroleum Association (WSPA).

27. The discharger submitted a report entitled "Evaluation of Concentrations of Trace Elements and Hydrocarbons in Sediments Adjacent to the Outfall of the Benicia Refinery, Exxon Company U.S.A." dated October 12, 1995. The report concluded that of the 17 trace elements and 72 hydrocarbons analyzed, only cobalt showed significant difference compared to a reference site. However, the cobalt data did not show any spatial trends away from the diffuser.

28. WSPA submitted a report entitled "Local Monitoring Program for Refinery Effluents in the San Francisco Bay-Delta System, Bioaccumulation component (Phase II)" dated January 31, 1996. This report was received by the Board on April 30, 1996, and is currently being reviewed by Board staff.

Regional Monitoring Program

29. On April 15, 1992, the Regional Board adopted Resolution No. 92-043 endorsing the concept of the the Regional Monitoring Plan for San Francisco Bay and directed the Executive Officer to develop and implement a Regional Monitoring Program. Subsequent to a public hearing and various meetings, the Regional Board staff requested major permit holders in this region, under authority of California Water Code Section 13267, to report on the water quality of the estuary. These permit holders, including the discharger, responded to this request by participating in a collaborative effort, through the San Francisco Estuary Institute (formerly the Aquatic Habitat Institute). This effort has come to be known as the San Francisco Bay Regional Monitoring Program for Trace Substances (RMP). The RMP involves collection of data on pollutants and toxicity in water, sediment and biota of the estuary. Annual reports from the RMP has been referenced elsewhere in this Order. In return for the discharger's participation in the RMP, the effluent and receiving water self-monitoring requirements have been reduced for the discharger. For this reason, this order specifies that the discharger shall continue to participate in the RMP.

CEQA AND PUBLIC NOTICE OF ACTION

30. The reissuance of waste discharge requirements for this discharge is exempt from the provisions of Chapter 3 (commencing with Section 21000 of Division 13) of the Public Resources Code (CEQA) pursuant to Section 13389 of the California Water Code.

31. The Board has notified the discharger and interested agencies and persons of its intent to reissue waste discharge requirements, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

32. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

Holmesimysis costata. The discharger will be required in this permit to perform concurrent testing with *Holmesimysis costata* to determine if it is appropriate to change the compliance species to a west coast shrimp.

Benicia Clean Fuels

23. In compliance with new requirements for cleaner burning fuels in California, the discharger constructed and put on-line several new production units. This project is called the Benicia Clean Fuels (BCF) project. These new units include a Methyl Tertiary Butyl Ether (MTBE) plant, saturation plants, and separation towers. A Negative Declaration dated January 1993 was issued for the MTBE Plant and an Environmental Impact Report dated May 1993 was issued for the BCF units. Based on these documents, the new units increase the volume of wastewater discharge by about 181,000 gallons per day, and increase the amount of selenium discharge by 0.04 lb/day. With improvements to the wastewater treatment plant, the current plant capacity accommodated the increase in flows. The slight increase in selenium discharge would be adequately addressed by the interim and final discharge limits specified in Order Nos. 91-026 and 91-099. Therefore, these changes were determined to be insignificant.

Effluent Limits Deleted from Previous Permit

24. Effluent concentration limits for arsenic, cadmium, hexavalent chromium, lead and silver in Waste 001 specified in Order No. 90-095 have been deleted from the list of effluent limits of this Order. Mass emission limits for chromium as required by 40CFR419B have not been removed. The basis for the deletion is that the discharge of these pollutants by the discharger do not pose a reasonable potential to cause, or contribute to an excursion above any numeric or narrative water quality objective. This conclusion is based on consideration of ambient receiving water data and self-monitoring data. The receiving water data relied upon are contained in Annual Report for San Francisco Bay Estuary Regional Monitoring Program for Trace Substances (1993 and 1994), Trace Element Cycles in the S.F. Bay Estuary [Flegal et al., 1991], and Contaminant Levels in Fish Tissue From San Francisco Bay (Final Report June 1995). The self-monitoring data considered was from the past five years (1991 to 1995), and Board staff compliance inspection data from the past three years (1993 to 1995). These data show that the discharge concentrations of arsenic, cadmium and hexavalent chromium are not at ambient levels of concern. These constituents are not used in the manufacturing process by the discharger. The discharge data consistently show either very low levels or non-detect levels below the effluent limit. Monitoring for these constituents will remain in the permit to ensure there are no impacts on these constituent from the Clean Fuels Project changes. A re-opener provision is part of this Order that requires the discharger to notify the Board of material changes in its manufacturing and treatment processes and that would allow the Board to amend the permit as appropriate.

25. The daily average effluent concentration limit of 150 µg/l for PAHs in Waste 001 specified in Order No. 90-095 have been deleted because this limit is superseded by the more stringent monthly average limit for PAHs specified in this Order. Additionally, past discharge data show that the daily average limit is not necessary because there is no reasonable potential for the discharger to exceed the limit. Past data consistently shows levels below 1 µg/l.

is specified for mercury. This is discussed in more detail below. For PAHs, PCBs, and dioxins, the discharge data show non-detects for these pollutants at the analytical reporting limit. However the analytical reporting limit is above the new effluent limits specified. This is discussed in more detail below.

Mercury

19. A monthly average effluent for mercury in Waste 001 is specified in this permit that is more stringent than in the previous permit. Discharge data show that the discharger is currently not able to comply with more stringent limit. This Order specifies a permit compliance schedule in accordance with the Basin Plan. The discharger's preliminary investigation indicates that the source is the crude oil that is processed at the refinery. Also, the discharger reports that current technology being investigated for the removal of selenium may also be effective in removing mercury. The schedule specified takes this into consideration by specifying compliance with the new mercury limit by July 31, 1999.

Analytical Detection Limits

20. At the present time, the analytical quantification limits available from commercial laboratories using approved USEPA protocols are not low enough to determine compliance with the effluent limits for PCBs, and dioxins (TCDD Equivalents). This Order will require compliance with these effluent limits to be determined at the higher analytical quantification limits specified in the Self-Monitoring Program. This is in accordance with policy established in the Basin Plan, and USEPA guidance provided in the NTR and other documents.

21. Because analytical quantification limits may improve, this Order specifies that the Executive Officer may change the quantification limits prior to the expiration date of this permit. However, if quantification limits are improved and analyses show the presence of PCBs, or TCDD Equivalents at levels above the effluent limitation, the discharger may continue to determine compliance at the former quantification limits. In this case, the discharge will be required to implement a source identification study and investigate feasible methods for reducing the pollutant in order to achieve compliance with the effluent limit. This provision to trigger a compliance investigation instead of immediate permit violation is consistent with the Basin Plan policy for compliance schedules in cases where the discharger's current performance has not worsened but the limits have become more stringent and treatment modifications are needed to improve performance.

Chronic Toxicity

22. Pursuant to the requirements of Order No. 92-099, the discharger performed a screening phase monitoring study to determine the most appropriate and sensitive organism for chronic toxicity monitoring. The discharger submitted the results in a report titled "Exxon Company, USA, Benicia Refinery 1994 Screening Phase Monitoring Program" January 1995. Based on the results of this testing, it was determined that a shrimp, the *Mysidopsis bahia*, was an appropriate organism for compliance monitoring for this Permit. This is the same compliance species currently specified in the discharger's permit. The USEPA has recently published Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, August 1995. This document includes a new protocol for a west coast shrimp,

sensitive designated use of San Francisco Bay marine waters with respect to copper: habitat for aquatic organisms. The criterion is based on the Regional Board's study to develop a site-specific objective for copper, which employed the "water effect ratio" approach developed by the USEPA. This approach provides a measure of the binding capacity of natural waters (dependent on particulate matter) relative to the binding capacity of reference waters (filtered oceanic water). The study and associated staff analysis are described in a September 25, 1992, Board staff report entitled "Revised Report on Proposed Amendment to Establish a Site Specific Objective for Copper for San Francisco Bay."

Selenium

15. On February 20, 1991, and June 19, 1991, the Board adopted Order Nos. 91-026 and 91-099, respectively, amending the NPDES permits for all six refineries in the region, including the discharger, to add concentration and mass emission rate limitations for selenium. Order No. 91-026 specified a limit of 50 ppb as a daily maximum. Order No. 91-099 specified an interim limit for the discharger of 2.07 lb/day as a running annual average, and a schedule for compliance with a final limit of 0.96 lb/day by December 12, 1993.

16. On October 16, 1992, the Western States Petroleum Association (WSPA) filed a Petition with the Superior Court for the County of Solano on behalf of the six oil refineries seeking to set aside Order Nos. 91-026 and 91-099. On January 19, 1994, the Board adopted Resolution No. 94-016 which approves the Settlement Agreement between WSPA and the Board. Additionally, the Board adopted Cease and Desist Order No. 94-015 for the three oil refineries not in compliance with the limits specified in Order Nos. 91-026 and 91-099. The discharger is one of these refineries. CDO No. 94-015 set forth a schedule for compliance with the limits by July 31, 1998. This Order reiterates the requirements of Order Nos. 91-026, 91-099. Additionally, the Settlement Agreement and Cease and Desist Order No. 94-015 referenced above remain in effect.

Effluent Limits Added

17. Effluent limits for benzene, toluene, fluoranthene, PCBs, and dioxins (expressed as TCDD Equivalents), and a more stringent monthly limit for mercury and PAHs have been added to the discharger's permit by this Order. Limits on these pollutants are warranted because there are potential sources of these pollutants in the discharger's process wastewater. Mercury, PCBs, dioxins, and PAHs have been measured in San Francisco Bay waters, sediments and/or fish tissue at levels of concern. This last finding is based on data contained in Annual Report for San Francisco Bay Estuary Regional Monitoring Program for Trace Substances (1993 and 1994), and Contaminant Levels in Fish Tissue From San Francisco Bay (Final Report June 1995). Furthermore, the California Office of Environmental Health Hazard Assessment issued in December 1994, an interim Health Advisory on Catching and Eating Fish due to health concerns from exposure to sport fish contaminated with methylmercury, PCBs, and dioxins. The new effluent limits are based on levels necessary to protect the most sensitive beneficial use: human consumption of fish.

18. Discharge data show that the discharge is within the new effluent limits for benzene, toluene, and fluoranthene. So the limits for these constituents are effective immediately. Discharge data also show that the discharge is not within the more stringent limit for mercury. A compliance schedule

8. This Order contains effluent limitations based on recent production rates at this facility. The Board is aware that production can vary in the future and will expedite reissuance of a new permit pursuant to 40 CFR 122.62 and 124.5 upon receipt of an application with new production data.

9. Effluent limitations and toxic effluent standards established pursuant to Sections 208(b), 301, 304, and 307 of the Federal Water Pollution Control Act and amendments thereto are applicable to the discharge.

10. Pursuant to 40 CFR 122.44, "Establishing Limitations, Standards, and Other Permit Conditions," NPDES permits should also include toxic pollutant limitations if the discharger uses or manufactures a toxic pollutant as an intermediate or final product or byproduct. This permit may be modified prior to the expiration date, pursuant to 40 CFR 122.62 and 124.5, to include effluent limitations for toxic constituents determined to be present in significant amounts in the discharge through a more comprehensive monitoring program included as a part of this Order.

BENEFICIAL USES

11. The beneficial uses of Suisun Bay, Carquinez Strait and contiguous waters are:

    a. Water contact recreation
    b. Non-contact water recreation
    c. Navigation
    d. Commercial and sport fishing
    e. Wildlife habitat
    f. Estuarine habitat
    g. Fish spawning and migration
    h. Industrial service supply
    i. Preservation of rare and endangered species

BASIS FOR REQUIREMENTS

12. Effluent and receiving water limitations in this Order are based on the plans, policies, and water quality objectives and criteria of the Basin Plan, *Quality Criteria for Water* (EPA/5-86-001, 1986; Gold Book), applicable Federal Regulations (40 CFR Parts 122 through 131), the National Toxics Rule (57 FR 60848, 22 December 1992; NTR), and best professional judgement.

13. The establishment of many of the chemical specific limitations depend upon the salinity characteristics of the receiving waters. Data contained in the 1993 and 1994 Annual Report for San Francisco Estuary Regional Monitoring Program for station BF10, and data from the Department of Water Resources (for the years 1993, 1992, 1986, 1985 and 1984) for station D6 located close to the Benicia Bridge show that the salinity of the receiving water is above 5 parts per thousand greater than ninety-five percent of the time. Based on these data, the salinity in the vicinity of the discharges is brackish and marine in character.

14. The effluent limit for copper included in this permit is based on 4.9 µg/l copper as an interpretation of the narrative toxicity objective in the Basin Plan, based on best professional judgement. From a technical standpoint, 4.9 µg/l is currently the best available criterion that is protective of the most

m. Waste 015 consists of storm water runoff from a 0.50 acre unpaved area under the crude pipeline southeast of Outfall 014. Runoff collects in a concrete sump equipped with an automatic valve, and hydrocarbon detector which alarms at a central control house in the event of a hydrocarbon release. The runoff is discharges into the city of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°02'50", long. 122°07'55"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	<3	--	--
Chemical Oxygen Demand, mg/l	47.7	--	71.4
Total Suspended Solids, mg/l	9.8	--	29
Total Kjeldahl Nitrogen, mg/l	0.54	--	2.2
Oil and Grease, mg/l	<1	--	<1
Total Organic Carbon, mg/l	8.5	--	12.4
pH (standard units)	--	7.5	7.9

n. Waste 016 consists of storm water runoff from a 0.07 acre unpaved area under the crude pipeline south of Outfall 015, near the refinery dock. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector which alarms at a central control house in the event of a hydrocarbon release. The runoff discharges via a culvert into the Carquinez Strait (lat. 38°02'44", long. 122°07'45"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	3	--	--
Chemical Oxygen Demand, mg/l	8.95	--	17.9
Total Suspended Solids, mg/l	63	--	144
Total Kjeldahl Nitrogen, mg/l	0.43	--	0.85
Oil and Grease, mg/l	<1	--	<1
Total Organic Carbon, mg/l	4	--	4.7
pH (standard units)	--	7.2	8.0

APPLICABLE PLANS, POLICIES AND REGULATIONS

6. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21, 1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board (State Board) and the Office of Administrative Law on July 20 and November 13, respectively, of 1995. A summary of regulatory provisions is contained in Title 23 of the California Code of Regulations at Section 3912. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface and ground waters.

7. Effluent limitation guidelines requiring the application of best available technology economically achievable (BAT) have been promulgated by the USEPA for the Integrated Subcategory of the Petroleum Refining Point Source Category 40 CFR Part 419 on October 18, 1982, and amended on July 12, 1985. These limitations are applicable to the discharge.

j. **Waste 012** consists of storm water runoff from a 0.78 acre primarily gravel area (10% paved) under a section of the crude pipeline southwest of the crude tank field. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector which alarms at a central control house in the event of a hydrocarbon release. The runoff discharges into the city of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°03'15", long. 122°08'19"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	<3	--	--
Chemical Oxygen Demand, mg/l	17.6	--	19.2
Total Suspended Solids, mg/l	25.7	--	86
Total Kjeldahl Nitrogen, mg/l	1.13	--	1.6
Oil and Grease, mg/l	<1	--	<1
Total Organic Carbon, mg/l	8.1	--	16.9
pH (standard units)	--	7.1	8.0

k. **Waste 013** consists of storm water runoff from a 1.2 acre (5 % paved) area under the crude pipeline southwest of Outfall 012. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector which alarms at a central control house in the event of a hydrocarbon release. The runoff discharges into the city of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°03'08", long. 122°08'25"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	3	--	--
Chemical Oxygen Demand, mg/l	62.6	--	89.8
Total Suspended Solids, mg/l	216	--	562
Total Kjeldahl Nitrogen, mg/l	4.1	--	7.1
Oil and Grease, mg/l	<1	--	<1
Total Organic Carbon, mg/l	16	--	41.6
pH (standard units)	--	7.3	8

l. **Waste 014** consists of storm water runoff from a 0.35 acre unpaved area under the crude pipeline south of Outfall 013. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector which alarms at a central control house in the event of a hydrocarbon release. The runoff discharges into the city of Benicia municipal sewer system and ultimately into the Carquinez Strait (lat. 38°03'03", long. 122°08'23"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	3	--	--
Chemical Oxygen Demand, mg/l	32.6	--	41.6
Total Suspended Solids, mg/l	123.7	--	374
Total Kjeldahl Nitrogen, mg/l	2	--	3.3
Oil and Grease, mg/l	<1	--	<1
Total Organic Carbon, mg/l	9.2	--	16.2
pH (standard units)	--	6.9	7.9

h. **Waste 009** consists of storm water runoff from a 0.25 acre 50% gravel and 50% paved area, located between the railway and Avenue "A". The runoff is discharged along Avenue "A" on the southeast side of the processing area via a culvert into Sulfur Springs creek and ultimately to Suisun Bay (lat. 38°04'12", long. 122°07'53"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	5	--	--
Chemical Oxygen Demand, mg/l	53.1	--	78.5
Total Suspended Solids, mg/l	29.3	--	63
Total Kjeldahl Nitrogen, mg/l	1.9	--	2.5
Oil and Grease, mg/l	<1	--	<1
Total Organic Carbon, mg/l	11.4	--	15.7
pH (standard units)	--	7.4	7.9

h. **Waste 010** consists of storm water runoff from a 0.84 acre gravel and paved area that is 30% paved. This area is located between the railway and Avenue "A". The runoff is discharged along Avenue "A" on the southeast side of the processing area via a culvert into Sulfur Springs creek and ultimately Suisun Bay (lat. 38°04'12", long. 122°07'53"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	5	--	--
Chemical Oxygen Demand, mg/l	35.7	--	44.9
Total Suspended Solids, mg/l	7.6	--	152
Total Kjeldahl Nitrogen, mg/l	1.1	--	1.1
Oil and Grease, mg/l	<1	--	<1
Total Organic Carbon, mg/l	8.4	--	10.8
pH (standard units)	--	7.4	7.9

i. **Waste 011** consists of storm water runoff from a 0.38 acre unpaved area under and along the crude pipeline on the north side of Park Road. Runoff collects in a concrete sump equipped with a containment valve, normally kept closed, and with a hydrocarbon detector which alarms at a central control house in the event of a hydrocarbon release. The runoff is discharged on the north side of Park Road, where the refinery crude pipeline crosses Park road, via a culvert that discharges into Sulfur Springs creek and ultimately to Suisun Bay (lat. 38°03'52", long. 122°07'57"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	3	--	--
Chemical Oxygen Demand, mg/l	25.5	--	31.5
Total Suspended Solids, mg/l	671	--	1640
Total Kjeldahl Nitrogen, mg/l	1.5	--	2
Oil and Grease, mg/l	<1	--	<1
Total Organic Carbon, mg/l	5.7	--	10
pH (standard units)	--	6.9	7.9

pipeline, starting at the southwest corner of the crude tank field and running northeast along the perimeter of the tank field and Park Road. It includes runoff from the adjacent city road. The runoff collects in a concrete sump equipped with a containment valve and a hydrocarbon detector which alarms at t central control house and automatically closes the containment valve in the event of a leak. Waste 006 discharges to a ditch to Sulfur Springs Creek and ultimately Suisun Bay (lat. 38°03'50", long. 122°07'57"). A natural spring also discharges to this drainage. The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	4	--	--
Chemical Oxygen Demand, mg/l	27.1	--	28.3
Total Suspended Solids, mg/l	920.8	--	4620
Total Kjeldahl Nitrogen, mg/l	2.5	--	3.1
Oil and Grease, mg/l	0.3	--	5.1
Total Organic Carbon, mg/l	10.3	--	98.9
pH (standard units)	--	6.2	8.2

f. **Waste 007** consists of storm water runoff from a 0.69 acre gravel and paved area that is about 60% paved. This area forms part of the access road to the refinery and is used for temporary parking of vehicles accessing the facility. The runoff discharges just east of Gate 4 via a tributary ditch (Buffalo Wallow) followed by a 72-inch culvert into Sulfur Springs Creek and ultimately to Suisun Bay (lat. 38°04'02", long. 122°07'54"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	9	--	--
Chemical Oxygen Demand, mg/l	91	--	145
Total Suspended Solids, mg/l	324	--	636
Total Kjeldahl Nitrogen, mg/l	1.6	--	1.7
Oil and Grease, mg/l	0.9	--	1.7
Total Organic Carbon, mg/l	9.6	--	14.6
pH (standard units)	--	7.8	7.9

g. **Waste 008** consists of storm water runoff from a 0.92 acre graveled railway area. This area is located east of the processing area. The runoff is discharged east of Gate No. 4 via a Culvert, into a ditch (Buffalo Wallow), followed by a 72-inch culvert into Sulfur Springs creek and ultimately Suisun Bay (lat. 38°04'02", long. 122°07'53"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	<3	--	--
Chemical Oxygen Demand, mg/l	26	--	28.9
Total Suspended Solids, mg/l	71.7	--	298
Total Kjeldahl Nitrogen, mg/l	1.2	--	1.2
Oil and Grease, mg/l	<1	--	<1
Total Organic Carbon, mg/l	5.3	--	10.8
pH (standard units)	--	7.4	7.9

	Average	Minimum	Maximum
Oil and Grease, mg/l	0.5	--	4.6
Total Organic Carbon, mg/l	9.8	--	49.8
pH (standard units)	--	7.1	8

c. **Waste 003** consist of storm water runoff from a 19 acre unpaved area. The discharge is near the Raw Water Break Tank at the north end of Avenue "A" via a culvert to Sulfur Springs Creek which is contiguous with Suisun Bay (lat. 38°04'49", long. 122°08'12"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	4	--	--
Chemical Oxygen Demand, mg/l	32.8	--	38.8
Total Suspended Solids, mg/l	312.3	--	1160
Total Kjeldahl Nitrogen, mg/l	0.7	--	1.3
Oil and Grease, mg/l	0.4	--	9.6
Total Organic Carbon, mg/l	8.5	--	40.8
pH (standard units)	--	5.9	8.5

d. **Waste 004** consists of storm water runoff from a 0.51 acre gravel area between First Street and the railway, on the south side of First Street. The runoff is discharged west of Gate No. 4 into the eastern end of a ditch (Beaver Creek), followed by a culvert, another ditch (Buffalo Wallow), and a 72-inch culvert into Sulfur Springs Creek and ultimately Suisun Bay (lat. 38°03'59", long. 122°07'58"). This is a new discharge point permitted under this Permit. The Waste 004 designation may have been used for a different discharge in previous permits. No data are currently available on the quality of this discharge. Monitoring will be required as part of this Order.

e. **Waste 005** consists of storm water runoff from a 69 acre area that is primarily unpaved (1 % paved surface). This area is located west of the processing area. The area is primarily open space, and consists of roads, parking and administration buildings for contractors, and laydown area for miscellaneous equipment. The runoff is discharged west of Gate No. 4, on the south side of the processing area via a spillway into the western end of a ditch (Beaver Creek), followed by a culvert, another ditch (Buffalo Wallow), and a 72-inch culvert into Sulfur Springs creek and ultimately Suisun Bay (lat. 38°03'58", long. 122°08'05"). A natural spring also discharges to this drainage. The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	9	--	--
Chemical Oxygen Demand, mg/l	51.5	--	75.6
Total Suspended Solids, mg/l	808.5	--	2690
Total Kjeldahl Nitrogen, mg/l	1.5	--	1.9
Oil and Grease, mg/l	2.5	--	4.6
Total Organic Carbon, mg/l	9.1	--	27.8
pH (standard units)	--	7.5	8.4

f. **Waste 006** consists of condensate from steam traps on the crude pipeline, groundwater seepage, and storm water runoff from a 3.5 acre unpaved area along and under the crude

a. **Waste 001** consists of 2.52 million gallons per day (MGD) on average of treated process wastes including stripped sour water, cooling tower and boiler blowdown, and raw water treatment backwash, ballast water, storm water runoff from process areas, extracted groundwater from on-site remediation activities, and monitoring well purge water from off-site service stations owned by the discharger. Figure 1 shows the wastewater sources of Waste 001.

Oily wastewater streams of Waste 001 are first treated in corrugated plate separators (CPS), and induced static flotation (ISF) units to remove oils and solids. This stream is then combined with non-oily waste streams from the sour water stripper and treated in three parallel activated sludge biological treatment units to which powder activated carbon is added. Treatment continues with three clarifiers in parallel. A portion of the non-oily waste streams are pretreated in an aeration tank followed by a clarifier. Finally, treatment is completed with sedimentation and equalization in a final polishing pond. The reported hydraulic capacity of this treatment plant is 3.74 MGD. Figure 2 shows the wastewater flow diagram for the treatment plant.

Waste 001 is discharged to Suisun Bay (lat. 38°03'18", long. 122°07'07") at a depth of 18 feet about 1,100 feet offshore, west of the Suisun Reserve Fleet Anchorage, through a 12-inch diameter outfall with 3 diffusion ports. The diffuser provides at least 10:1 initial dilution. The general quality of this discharge based on the past 3 to 4 years of data is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	11	<3	50
Chemical Oxygen Demand, mg/l	64	28	133
Total Suspended Solids, mg/l	23	1	103
Ammonia as N, mg/l	0.5	<0.02	4
Oil and Grease, mg/l	1.2	<0.6	7
Total Phenols, mg/l	0.018	<0.005	0.18
pH (standard units)	--	6.3	8.6

The Order approves the discharger's reuse of treated effluent for on-site landscape irrigation, and in the refinery firewater system as a water conservation measure. This reuse is approved provided no irrigation water runoff from the facility occurs, and all water in the firewater system is captured and retreated in the discharger's wastewater treatment plant.

b. **Waste 002** consists of storm water runoff from an unpaved area of approximately 1.8 acres, located along the western boundary of the discharger's wastewater treatment plant. The area is occasionally use to store equipment and is separated from the plant by a dike. The discharge is through a ditch and several pipes into Sulfur Springs Creek which is contiguous with Suisun Bay (lat. 38°03'53", long. 122°07'37"). The general quality of this discharge based on data presented in the application is as follows:

	Average	Minimum	Maximum
Biochemical Oxygen Demand, mg/l	6	--	--
Chemical Oxygen Demand, mg/l	34.1	--	37.2
Total Suspended Solids, mg/l	97.8	--	444
Total Kjeldahl Nitrogen, mg/l	1.3	--	1.5

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 96-068
NPDES NO. CA0005550

WASTE DISCHARGE REQUIREMENTS FOR:

EXXON CORPORATION
BENICIA REFINERY
SOLANO COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board), finds that:

1. Exxon Corporation (hereinafter called the discharger), by application (Report of Waste Discharge) .. dated December 15, 1994, and subsequent amendments dated February 3, 1995, and April 30, 1996, has applied for reissuance of National Pollutant Discharge Elimination System (NPDES) permit No. CA0005550.

FACILITY DESCRIPTION

2. The discharger owns and operates the Benicia Refinery, a petroleum refinery with an average crude-run throughput of approximately 135,000 barrels per day. The discharger manufactures hydrocarbon products, byproducts and intermediates, and is classified as a cracking refinery as defined by the U.S. Environmental Protection Agency (USEPA) in 40 CFR 419.20.

PURPOSE OF ORDER

3. This NPDES permit regulates the discharge of effluent from the discharger's wastewater treatment plant and the discharges of all storm water associated with industrial activity from the refinery to Suisun Bay and Carquinez Straits, both waters of the United States. These discharges are currently governed by Waste Discharge Requirements specified in Order No. 90-096, adopted by the Board on June 20, 1990. Order No. 90-096 was amended by Order Nos. 91-026 (adopted February 20, 1991), 91-099 (adopted June 19, 1991), and 92-099 (adopted August 19, 1992). The conditions of Order No. 90-096 as amended, were continued in effect past the expiration date, in accordance with NPDES regulations, by letter of the Executive Officer dated June 14, 1995.

4. The USEPA and the Board have classified this discharger as a major discharger.

DISCHARGE DESCRIPTION

5. The discharges are described below and are based on information contained in the Report of Waste Discharge and recent self-monitoring reports. Figures 1 and 2 of this Order show the flow diagram for the process wastewater system. Figures 3 and 4 show the drainage areas and discharge locations for the discharges.

C-FF	At a point in Carquinez Strait located 150 meters southwest of the diffuser for Waste 001.

II. SCHEDULE OF SAMPLING AND ANALYSIS

A. The schedule of sampling and analysis shall be that given in Table 1 (attached).

B. Sample collection, storage, and analyses shall be performed according to requirements in the latest 40 CFR 136, in the Permit, or as specified by the Executive Officer.

III. MODIFICATIONS TO PART A

A. Exclude paragraphs C.3.b., c., and d.; D.4; E.3; and E.5.

B. Paragraph C.2.a. is modified as follows:

Composite samples of effluent shall be collected on random weekdays and on any day when substantial changes in flow occur during dry weather conditions.

C. Section F.5. is modified as follows:

F.5. Annual Reporting

a. Process Wastewaters: By January 30 of each year, the discharger shall submit an annual report to the Regional Board covering the previous calender year for Waste 001. The report shall contain:

1) Both tabular and graphical summaries of the monitoring data for all parameters monitored during the previous year.

2) A comprehensive discussion of the compliance record and the corrective actions taken or planned which may be needed to bring the discharger into full compliance with the waste discharger requirements.

3) List of Approved Analyses to include:

a) a list of analyses for which the discharger is approved by the California Department of Health Services,

b) a list of analyses performed for the discharger by another approved laboratory shall also be submitted as part of the report, and

c) a list of "waived" analyses, as approved.

b. **Storm Water:** The discharger shall submit an annual report by July 1 of each year covering data for the previous wet weather season for the identified storm water discharge points. The annual storm water report shall include:

1) a tabulated summary of all sampling results and a summary of visual observations taken during the inspections;

2) a comprehensive discussion of the compliance record and the corrective actions taken or planned which may be needed to bring the discharger into full compliance with the waste discharger requirements; and

3) a comprehensive discussion of the progress and/or success of source identification and control programs for non-effluent limited parameters.

IV. CHRONIC TOXICITY MONITORING REQUIREMENT

A. Test Species and Frequency: The discharger shall collect 24-hour composite samples at E-001 on consecutive days for critical life stage toxicity testing as specified in Table 1.

B. Conditions for Accelerated Monitoring: The discharger shall accelerate the frequency of monitoring to monthly (or as otherwise specified by the Executive Officer) when there is an exceedance of either of the following conditions:

1. three sample median value of 10 TUc, or
2. single sample maximum value of 20 TUc

C. Methodology: Sample collection, handling and preservation shall be in accordance with EPA protocols. The test methodology used shall be in accordance with the references cited in the Permit, or as approved by the Executive Officer. A concurrent reference toxicant test shall be performed for each test.

D. Dilution Series: The discharger shall conduct tests at 100%, 50%, 25%, 10%, 5%, and 2.5%. The "%" represents percent effluent as discharged. The 100% dilution may be omitted if the marine test species specified is sensitive to artificial sea salts.

V. CHRONIC TOXICITY REPORTING REQUIREMENTS

A. Routine Reporting: Toxicity test results for the current reporting period shall include at a minimum, for each test

1. sample date(s)
2. test initiation date
3. test species
4. end point values for each dilution (e.g. number of young, growth rate, percent survival)
5. NOEC value(s) in percent effluent
6. IC_{15}, IC_{25}, IC_{40}, and IC_{50} values (or EC_{15}, EC_{25} ... etc.) in percent effluent

7. TUc values (100/NOEC, 100/IC_{25}, and 100/EC_{25})
8. Mean percent mortality (±s.d.) after 96 hours in 100% effluent (if applicable)
9. NOEC and LOEC values for reference toxicant test(s)
10. IC_{50} or EC_{50} value(s) for reference toxicant test(s)
11. Available water quality measurements for each test (ex. pH, D.O., temperature, conductivity, hardness, salinity, ammonia)

B. Compliance Summary: Each self-monitoring report shall include a summary table of chronic toxicity data from at least eleven of the most recent samples. The information in the table shall include the items listed above under Section A item numbers 1, 3, 5, 6(IC_{25} or EC_{25}), 7, and 8.

C. Reporting Raw Data in Electronic Format: On a quarterly basis, by February 15, May 15, August 15, and November 15 of each year, the discharger shall report all chronic toxicity data for the previous calendar quarter in the format specified in "Standardized Electronic Reporting Format for Monitoring Effluent Toxicity," October 1994, SWRCB. The data shall be submitted in high density, double sided 3.5-inch floppy diskettes.

VI. MISCELLANEOUS REPORTING

A. The discharger shall record the rainfall on each day of the month and submit the data with each report.

B. The discharger shall determine the storm water runoff/ballast water allocation (daily & monthly) for its discharge using the method described in attached Form A. Form A shall be submitted with the monthly self-monitoring report. The daily maximum allocation must be computed for each day Waste 001 is monitored.

C. The discharger shall retain and submit (when required by the Executive Officer) the following information concerning the monitoring program for organic and metallic pollutants.

a. Description of sample stations, times, and procedures.

b. Description of sample containers, storage, and holding time prior to analysis.

c. Quality assurance procedures together with any test results for replicate samples, sample blanks, and any quality assurance tests, and the recovery percentages for the internal surrogate standard.

D. The discharger shall submit in the self-monitoring report the metallic & organic test results together with the quantification limits for all constituents approved for analysis under those protocols (including unidentified peaks). All unidentified (non-Priority Pollutant) peaks detected in the USEPA 624, 625 (or 8240, 8270) test methods shall be identified and semi-quantified. Hydrocarbons detected at <10 μg/l based on the nearest internal standard may be appropriately grouped and identified together as aliphatic, aromatic and unsaturated

hydrocarbons. All other hydrocarbons detected at >10 $\mu g/l$ based on the nearest internal standard shall be identified and semi-quantified.

E. Ballast water treated and discharged as part of Waste 001 shall be metered and the volume recorded in attached Form A for each calendar day. The 30-day average shall be the sum of the daily values in a calendar month divided by the number of days in that month. Ballast-water allocations shall be calculated by multiplying the volume of ballast water, determined above by the appropriate volume of ballast water, determined above by the appropriate concentration listed under Effluent Limitation B.2. in the permit.

F. The discharger shall submit with each report a sketch showing the location of all ponds, and treatment facilities of waste discharge. This shall be updated by the discharger as changes occur.

G. The volume of Waste 001 reused for irrigation shall be recorded and reported in the Self-Monitoring reports. The data to report are the day(s) on which reuse occurred and the total volume used for the month.

I, Loretta K. Barsamian, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in Order No. 96-068.

2. Is effective on the date shown below.

3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger and revisions will be ordered by the Executive Officer, pursuant to 40 CFR 122.62 and 124.4.

Lawrence P. Kolb
for
LORETTA K. BARSAMIAN
Executive Officer

Effective Date: May 15, 1996

Attachments:

Table 1 - Schedule of Sampling, Measurement and Analysis
Form A - Storm Water/Ballast Water Allocation Procedure

TABLE 1
SCHEDULE OF SAMPLING, ANALYSIS & OBSERVATIONS

Station	Constituent	Unit	Sample Type	Frequency of Analysis
E-001	Flow	MGD	Continuous	Continuous
	BOD	mg/l kg/day	Composite	Monthly
	TSS	mg/l kg/day	Composite	Weekly
	Settleable Matter	ml/l/hr	Grab	Weekly
	Oil & Grease	mg/l kg/day	Grab [1,6]	Weekly
	Ammonia N	mg/l kg/day	Composite	Monthly
	Total Sulfides	mg/l	Grab [6]	Monthly
	COD	mg/l kg/day	Composite	Monthly
	Acute Fish Toxicity [10]	%Surv	Composite	Weekly
	Crit. Life Stage Tox. Test [11]	[11]	Composite	Quarterly
	pH [2]	-	Continuous	Continuous
	Temperature	Celsius	Continuous	Continuous
	Aluminum	mg/l kg/day	Composite	Monthly
	Arsenic [12]	"	Composite	Monthly
	Cadmium	"	Composite	Monthly
	Chromium, total	"	Composite	Monthly
	Cobalt	"	Composite	Monthly
	Copper	"	Composite	Monthly
	Lead	"	Composite	Monthly
	Silver	"	Composite	Monthly
	Vanadium	"	Composite	Monthly
	Hexavalent Chromium	mg/l kg/day	Composite	Monthly
	Mercury	"	Composite	Monthly
	Nickel	"	Composite	Monthly
	Selenium [9]	"	Composite	Weekly
	Zinc	"	Composite	Weekly
	Cyanide [13]	"	Composite	Weekly
	Total Phenols	"	Composite	Weekly
	PAH's [7]	mg/l kg/day	Composite	Monthly
	PCBs [4]	µg/l	Grab [6]	Yearly
	TCDD Equiv. [4]	pg/l	Grab [6]	Yearly

Station	Constituent	Unit	Sample Type	Frequency of Analysis
E-001 (cont.)	Benzene [5]	µg/l	Grab [6]	Yearly
	Toluene [5]	µg/l	Grab [6]	Yearly
	Fluoranthene [5]	µg/l	Grab [6]	Yearly
	Standard Observations	-	--	Daily
E-005	Oil & Grease	mg/l	Grab	On each occurrence
	pH	-	"	"
	TOC	mg/l	"	"
	Flow [14]	gallons	Continuous	"
	Specific Conductance	µmhos/cm	Grab	"
	TSS	mg/l	Grab	"
	Copper	mg/l	Grab	"(for first year)[16]
	Nickel	mg/l	Grab	"(for first year)[16]
	Zinc	mg/l	Grab	"(for first year)[16]
	Chromium	mg/l	Grab	"(for first year)[16]
	TPH [15]	mg/l	Grab	"(for first year)[16]
	Total Phenols	mg/l	Grab	"(for first year)[16]
	Standard Observations	-	--	"
E-003, and E-006	Oil & Grease	mg/l	Grab	On each occurrence
	pH	-	"	"
	TOC	mg/l	"	"
	Flow [14]	gallons	Continuous	"
	Specific Conductance	µmhos/cm	Grab	"
	TSS			"
	Standard Observations	mg/l -	Grab --	"
E-002, and E-004, and E-007 through E-016	Oil & Grease	mg/l	Grab	Twice Per Year
	pH	-	"	"
	TOC	mg/l	"	"
	Flow [14]	gallons	Continuous	"
	Specific Conductance	µmhos/cm	Grab	"
	TSS	mg/l	Grab	"
	Standard Observations	-	--	"
C Stations	(Receiving water monitoring is suspended in lieu of the discharger's participation in the Regional Monitoring Program)			

Footnotes for Table 1:

1. Oil and grease sampling shall consist of 3 grab samples taken at 2 hour intervals during the sampling day, with each being collected in a glass container. The entire volume of each sample shall be composited prior to analysis. Each glass container used for sample collection or mixing shall be thoroughly rinsed with solvent rinsings as soon as possible after use, and the solvent rinsings shall be added to the composite wastewater sample for extraction and analysis.

2. Daily minimum and maximum for pH shall be reported.

3. Receiving water analysis for sulfides should be run when dissolved oxygen is less than 5.0 mg/l.

4. The latest versions of USEPA Methods 608 (or 8080) shall be used that to determine compliance with the limits for Total PCBs. The discharger shall attempt to achieve the lowest detection limits commercially available using this method and shall achieve the maximum quantification limit listed below:

Constituent	Quantification Limit
Each Aroclor group	1 µg/l

The latest version of USEPA Method 1613 shall be used to determine compliance with the limit for TCDD Equivalents. The discharger shall attempt to achieve the lowest detection limits commercially available and shall achieve the maximum quantification limits listed below. Analysis results at or below the quantification limits listed below may be considered zero for use in the calculations for compliance determination with the TCDD Equivalents limit.

Isomer Group	Quantification Limit
2,3,7,8-tetra CDD	5 pg/l
2,3,7,8-penta CDD	5 pg/l
2,3,7,8-hexa CDDs	10 pg/l
2,3,7,8-hepta CDD	10 pg/l
octa CDD	25 pg/l
2,3,7,8-tetra CDF	5 pg/l
1,2,3,7,8-penta CDF	5 pg/l
2,3,4,7,8-penta CDF	5 pg/l
2,3,7,8-hexa CDFs	10 pg/l
2,3,7,8-hepta CDFs	10 pg/l
octa CDF	25 pg/l

If the analysis performed for PCBs and dioxins/furans cannot achieve the quantification limits specified above, the discharger shall provide an explanation in the self-monitoring program.

Another sample shall be analyzed if the reported quantification limits are significantly above the limits specified above.

5. The latest versions of USEPA Methods 624 (or 8240), and 625 (or 8270) shall be used. The results from USEPA Method 624 shall be used to determine compliance with the effluent limits for benzene and toluene. The results from USEPA Method 625 shall be used to determine compliance with the effluent limits for fluoranthene. Additionally, all data results from these analyses shall be reported as specified under Section VI.D. of the Self-Monitoring Program.

6. Grab Samples shall be collected coincident with composite samples collected for the analysis of regulated parameters.

7. Polynuclear aromatic hydrocarbons shall be analyzed using the latest version of USEPA Method 610 (8100 or 8310). The discharger shall attempt to achieve the lowest detection limits commercially available. If an analysis cannot achieve a quantification limit for a particular sample at or below the effluent limits for PAHs, the discharger shall provide an explanation in the self-monitoring report. Note that the samples must be collected in amber glass containers. These samples shall be collected for the analysis of the regulated parameters. An automatic sampler which incorporates glass sample containers and keeps the samples refrigerated a 4°C and protected from light during compositing may be used. The 24-hour composite samples may consist of eight grab samples collected at 3-hour intervals. The analytical laboratory shall remove flow-proportioned volumes from each sample vial or container for the analysis.

8. (Not used)

9. Selenium must be analyzed for only by the atomic absorption, gaseous hydride procedure (EPA method No. 270.3/ Standard Method No. 303E).

10. Rainbow trout, and three-spine stickleback are to be tested to determine compliance with Effluent Limitation B.8. The discharge may use the Third Edition of the USEPA Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms until otherwise specified by the Executive Officer. The discharger may substitute the three-spine stickleback with fathead minnow if stickleback are not available. In this case, the discharger shall document in the self-monitoring report their attempts to obtain stickleback for testing.

11. Critical Life Stage Toxicity Test to determine compliance with the chronic toxicity limit shall be performed using *Mysidopsis bahia*. Compliance with the effluent limit shall be determined using the more sensitive of the growth and survival endpoints. Within 24 months of adoption of this Permit, the discharger shall perform a minimum of six concurrent tests with *Holmesimysis costata* and submit the data in a report due no later than July 1, 1998.

12. Arsenic must be analyzed for only by the atomic absorption, gaseous hydride procedure (EPA Method 206.3/ Standard Method No. 303E).

13. The discharger may, at their option, analyze for cyanide as Weak Acid Dissociable Cyanide using protocols specified in Standard Method No. 4500-CN-I, latest edition.

14. Flow volumes for storm water discharges may be 1) determined using flow measuring devices, or 2) estimated from rainfall data, runoff coefficients and drainage areas, if measuring devices are impracticable.

15. Total Petroleum Hydrocarbons (TPH) for gasoline and diesel, shall be analyzed and characterized by GCFID with fused capillary column. The samples are to be prepared by using EPA Methods 5030 and 3510.

16. Copper, chromium, nickel, and zinc shall be monitored in E-005 for at least the first wet weather year (96/97) following adoption of this permit. If this first year of monitoring does not yield a total of at least ten samples, the discharger shall continue to monitor for these constituents during the following year(s) until a collective total of ten discharge events have been sampled. Samples for TPH and phenols shall be limited to discharges during the first wet weather year or a total of ten samples which ever occurs first.

FORM A

STORMWATER/BALLAST WATER ALLOCATION PROCEDURE

This procedure uses a bankbook to inventory stormwater. Any stormwater in excess of the estimated processed stormwater is inventoried. Stormwater allocations are calculated using the actual processed stormwater developed in the attached table.

Definitions:

Dry Weather Season - The months of June to September exclusive of a one-week period following any rainstorm.

Estimated Dry Weather Process Wastewater Flow - The average effluent flowrate during the previous dry weather season.

Stormwater Runoff - The product of the inches of rainfall and the runoff factor.

Estimated Processed Stormwater - The difference between the actual effluentflowrate and the ballast water plus dry weather flowrate.

Stormwater Bankbook - Calculated inventoried stormwater.

Actual Process Stormwater - If the stormwater bankbook is not zero, the actual processed stormwater equals the estimated flow. If the bankbook is zero, the actual processed stormwater is equal to the stormwater runoff for that day plus the bankbook for the previous day.

STORMWATER/BALLAST WATER ALLOCATION PROCEDURE

	(A) Rainfall (in.)	(B) Stormwater Runoff (MGal/D)	(C) Effluent Flow (MGal/D)	(D) Dry Weather Effluent Flow (MGal/D)	(E) Estimated Processed Stormwater (MGal/D)	(F) Stormwater Bankbook (MGal)	(G) Actual Processed Stormwater (MGal/D)	(H) Ballast Water (MGal/D)
						Previous Month's Bankbook=		
1								
2								
3								
.								
.								
.								
30								
TOTAL								
AVERAGE								
MAXIMUM								

Column (B) = Column (A) X Runoff Factor

Column (E) = Column (C) - Column (D) - Column (H).

Column (F): Column (F) = Column (F)(Previous Day) + Column (B) - Column (E).
Column (F) = 0 if Column (F) <0.

Column (G): If Column (F) >0, then Column (G) = Column (E).
If Column (F) = 0, then Column (G) = Column (B) + Column (F) previous day.

COLUMN (D)= (Dry-Weather Effluent Flow)
+
(Documented Process Water Increment)

DATE	MAXIMUM DAILY LIMITS						
	BOD (KG/D)	TSS (KG/D)	(KG/D)	O&G (KG/D)	PHENOL (KG/D)	TOTAL CHROME (KG/D)	HEX. CHROME (KG/D)

Maximum Daily Limit = Effluent Limit E.1. (Daily Max in kg/day) + Stormwater Allocation (Daily Max)

Stormwater Allocation = Effluent Limit E.2. (Daily Max in mg/l) x Daily Processed Stormwater (in mgd) x 3.785 l/gal

Date	Rainfall (Inches)	Storm Runoff Flow (Inches x Runoff Factor) Gallons	Ballast Flow in gallons
1-2			
2-3			
3-4			
4-5			
5-6			
6-7			
7-8			
8-9			
9-10			
10-11			
11-12			
12-13			
13-14			
14-15			
15-16			
16-17			
17-18			
18-19			
19-20			
20-21			
21-22			
22-23			
23-24			
24-25			
25-26			
26-27			
27-28			
28-29			
29-30			
30-31			
31-1			
Total			
Monthly Average			

YEAR:

	Monthly Average Storm Runoff+Ballast Water Flow (expressed in thousand Gals/day)		Allocation Factor (kg /1000 Gals.)	= (kg /day)	+ E.I. Effluent Limits (kg /day)	= Total Effluent Limit (kg/day)
30-Day Average					+	=
BOD5		x	0.098	=		
TSS		x	0.079	=	+	=
TOC		x	0.22		+	=
COD		x	0.68	=		
O&G		x	0.03	=	+	=
PHENOL		x	0.00064	=	+	=
TOTAL CHROME		x	0.00079	=	+	=
HEX CHROME		x	0.0001	=	+	=

August 1993

SELF-MONITORING PROGRAM
PART A

NPDES PERMITS

A. BASIS AND PURPOSE

Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13268, 13383 and 13387(b) of the California Water Code and this Regional Board's Resolution No. 73-16.

The principal purposes of a monitorig program by a waste discharger, also referred to as self-monitoring program, are: (1) to document compliance with waste discharge requirements and prohibitions established by this Regional Board, (2) to facilitate self-policing by the waste discharger in the prevention and abatement of pollution arising from waste discharge, (3) to develop or assist in the development of effluent or other limitations, discharge prohibitions, national standards of performance, pretreatment and toxicity standards, and other standards, and (4) to prepare water and wastewater quality inventories.

B. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analyses shall be performei aocording to the 40 CFR S136 or other methods approved and specified by the Executive Officer of this Regional Board (See Part B).

Water and waste analyses shall be performed by a laboratory approved for these analyses by the State Department of Health Services (DOHS) or a laboratory waived by the Executive Officer from obtaining a certification for these analyses by the DOHS. The director of the laboratory whose name appears on the certification or his/her laboratory supervisor who is directly responsible for analytical work performed shall supervise all analytical work including appropriate quality assurance/quality control procedures in his or her laboratory and shall sign all reports of such work submitted to the Regional Board.

All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

C. SPECIFICATIONS FOR SAMPLING AND ANALYSES

The discharger is required to perform sampling and analyses according to the schedule in Part B in accordance with the following conditions:

1. Influent

Composite samples of influent shall be collected on varying days selected at random and shall not include any plant recirculation or other sides stream wastes. Deviation from this must be approved by the Executive Officer.

2. Effluent

a. Composite samples of effluent shall be collected on days coincident with influent composite sampling unless otherwise stipulated. At least one sampling day in each seven shall reflect one day of weekend discharge, one day of peak loading and during major unit operation shutdown or startup. The Executive Officer may approve an alternative sampling plan if it is demonstrated to the EO's

satisfaction that expected operating conditions for the facility warrant a deviation from the standard sampling plan.

b. Grab samples of effluent shall be collected during periods of maximum peak flows and shall coincide with effluent composite sample days.

c. Fish bioassay samples shall be collected on days coincident with effluent composite sampling.

   1) Bioassay tests should be performed on effluent samples after chlorination-dechlorination.

   2) Total ammonia nitrogen shall be analyzed and un-ionized ammonia calculated whenever fish bioassay test results fail to meet the specified percent survival.

d. If two consecutive samples of a constituent monitored on a weekly or monthly basis in a 30 day period exceed the monthly average effluent limit for any parameter, (or if the required sampling frequency is once per month and the monthly sample exceeds the monthly average limit), the sampling frequency shall be increased to daily until the additional sampling shows that the most recent 30-day moving average is in compliance with the monthly average limit.

e. If any maximum daily limit is exceeded, the sampling frequency shall be increased to daily until two samples collected on consecutive days show compliance with the maximum daily limit.

f. If the final or intermediate results of any single bioassay test indicate a threatened violation (i.e. the percentage of surviving test organisms is less than the required survival percentage), a new test will begin and the discharger shall investigate the cause of the mortalities and report the finding in the next self-monitoring report.

g. Chlorine residual analyzers shall be calibrated against grab samples as frequently as necessary to maintain accurate control and reliable operation. If an effluent violation is detected, grab samples shall be collected at least every 30 minutes until compliance is achieved.

h. When any type of bypass occurs, composite samples shall be collected on a daily basis for all constituents at all affected discharge points which have effluent limits for the duration of the bypass.

3. **Storm Water**

If all storm water is not directed back to the headworks during the wet season (October 1 to April 30) the discharger shall:

a. Conduct visual observations of the storm water discharge locations on at least one storm event per month that produces significant storm water discharge to observe the presence of floating and suspended materials, oil and grease, discoloration, turbidity, and odor, etc.

b. Measure (or estimate) the total volume of storm water discharge and collect and analyze grab samples of storm water discharge from at least two storm events that produce significant storm water discharge for: oil and grease, pH, total suspended solids (TSS), specific conductance, and toxic chemicals and other pollutants that have a reasonable potential to be present in storm water discharge in significant quantities.

The grab sample(s) shall be taken during the first thirty minutes of the discharge. If the collection of the grab sample(s) during the first 30 minutes is impracticable, grab sample(s) can be taken during the first hour of the discharge, and the discharger shall explain in the annual monitoring report why the grab sample(s) could not be taken in the first 30 minutes.

c. Testing for the presence of non-storm water discharges shall be conducted no less than twice during the dry season (May to September) at all storm water discharge locations. Tests may include visual observations of flows, stains, sludges, odors, and other abnormal conditions; dye tests; TV line surveys; and/or analysis and validation of accurate piping schematics. Records shall be maintained of the description of the method used, date of testing, locations observed, and test results.

d. Samples shall be collected from all locations where storm water is discharged. Samples must represent the quality and quantity of storm water discharged from the facility. If a facility discharges storm water at multiple locations, the discharger may sample a reduced number of locations if it is established and documented in the monitoring program that storm water discharges from different locations are substantially identical.

e. Records of all storm water monitoring information and copies of all reports required by this permit shall be retained for a period of at least three years from the date of sample, observation, or report.

4. **Receiving Waters:**

a. Receiving water samples shall be collected on days coincident with composite sampling of effluent.

b. Receiving water samples shall be collected at each station on each sampling day during the period within 1 hour following low slack water. Where sampling at lower slack water period is not practical, sampling shall be performed during higher slack water period. Samples shall be collected within the discharge plume and down current of the discharge point so as to be representative, unless otherwise stipulated.

c. Samples shall be collected within one foot below the surface of the receiving water body, unless otherwise stipulated.

5. **Bottom Sediment Samples and Sampling and Reporting Guidelines**

a. Bottom sediment sample means: (1) a separate grab sample taken at each sampling station for the determination of selected physical-chemical parameters, or (2) four grab samples collected from different locations in the immediate vicinity of a sampling station while the boat is anchored and analyzed separately for macroinvertibrates.

Physical-chemical sample analyses include as a minimum:

1) pH

2) TOC (Total Organic Carbon)

3) Grease analysis:

(a) Mg grease per kg sediment

(b) Percent fraction of hydrocarbon in grease

4) Selected metals (depending on industrial input) mg/kg dry wt (and soluble metals in mg/l).

5) Particle size distribution, i.e., % sand, % silt-clay

6) Depth of water at sampling station in meters

7) Water salinity and temperature in the water column within one meter of the bottom.

D. STANDARD OBSERVATIONS

1. Receiving Water

a. Floating and suspended materials of waste origin (to include oil, grease, algae, and other macroscopic particulate matter: presence or absence, source, and size of affected area.

b. Discoloration and turbidity: description of color, source, and size of affected area.

c. Odor: presence or absence, characterization, source, distance of travel, and wind direction.

d. Evidence of beneficial water use: presence of water–associated waterfowl or wildlife, fishermen, and other recreational activities in the vicinity of the sampling stations.

e. Hydrographic condition:

1) Time and height of corrected high and low tides (corrected to nearest NOAA location for the sampling date and time of sample and collection).

2) Depth of water columns and sampling depths.

f. Weather conditions:

1) Air temperatures.

2) Wind – direction and estimated velocity.

3) Total precipitation during the previous five days and on the day of observation.

2. Wastewater Effluent

a. Floating and suspended material of waste origin (to include oil, grease, algae, and other macroscopic particulate matter): presence or absence

b. Odor: presence or absence, characterization , source, distance of travel.

3. Beach and Shoreline

a. Material of waste origin: presence or absence, description of material, estimated size of affected area, and source.

b. beneficial use: estimate number of people sunbathing, swimming, water-skiing, surfing, etc.

4. Land Retention or Disposal Area

This applies both to liquid and solid wastes confined or unconfined.

a. For each impoundment determine amount of the freeboard at lowest point of dikes confining liquid wastes.

b. Evidence of leaching liquid from area of confinement and estimated size of affected area. Show affected area on a sketch and volume of flow (gpm, etc.)

c. Odor: presence or absence, characterization, source, and distance of travel.

d. Estimated number of waterfowl and other water-associated birds in the disposal area and vicinity.

5. Periphery of Waste Treatment and/or Disposal Facilities

a. Odor: presence or absence, characterization, source, and distance of travel.

b. Weather condition: wind direction and estimated velocity

E. RECORDS TO BE MAINTAINED

1. Written reports, strip charts, calibration and maintenance records, and other records shall be maintained by the discharger and accessible (at the waste treatment plant), and retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Board or Regional Administrator of the USEPA, Region IX. Such records shall show the following for each sample:

a. Identity of sampling and observation stations by number.

b. Date and time of sampling and/or observations.

c. Method of composite sampling (See Section G -Definition of Terms)

d. Type of fish bioassay test (96 hour static or flow-through bioassay)

e. Date and time that analyses are started and completed, and name of personnel performing the analyses.

f. Complete procedure used, including method of preserving sample and identity and volumes of reagents used. A reference to specific section of Standard Methods is satisfactory.

g. Calculations of results.

h. Results of analyses ard/or observations.

2. A tabulation shall be maintained showing the following flow data for influent and effluent stations and disposal areas:

   a. Total waste flow or volume, for each day.

   b. Maximum and minimum daily flows for each month.

3. A tabulation shall be maintained showing the following information for all other plant wastes and disposal areas:

   a. Total monthly volume of grit, skimming, and undigested sludge (in cubic yards or cubic feet) from each treatment unit and the disposal site location

   b. Total monthly volume and solids content of dewatered sludge from each treatment unit (in cubic yards or cubic feet) and the disposal site location.

4. A tabulation reflecting bypassing and accidental waste spills shall be maintained showing information items listed in Sections E -1 and E-2 for each occurrence.

5. A chronological log for each month shall be maintained of the effluent disinfection and bacterial analyses, showing the following:

   a. Date and time each sample is collected and waste flow rate at time of collection.

   b. Chlorine residual, contact time, and dosage (in kilograms per day and parts per million).

   c Coliform count for each sample

   d. Moving median coliform of the number of samples specified by waste discharge requirements.

F. REPORTS TO BE FILED WITH THE REGIONAL BOARD

1. Spill Reports

A report shall be made of any spill of oil or other hazardous material. Spills shall be reported to this Regional Board, at (510) 286-1255 on weekdays during office hours from 8 AM to 5 PM, and to the Office of Emergency Services at (800) 852-7550 during non office hours, and the U.S. Coast Guard at (415) 437-3091 (if the spill is into navigable waters) by telephone immediately after occurrence . A written report shall be filed with the Regional Board within five (5) working days and shall contain information relative to:

a. nature of waste or pollutant,

b. quantity involved,

c. duration of incident,

d. cause of spill,

e. SPCC Spill Prevention and Containment Plan in effect, if any,

f. estimated size of affected area,

g. nature of effects (i.e., fishkill, discoloration of receiving water, etc.),

h corrective measures that have been taken or planned, and a schedule of these activities, and

i. persons notified.

2. Reports of Plant Bypass, Treatment Unit Bypass and Permit Violation

In the event the discharger violates or threatens to violate the conditions of the waste discharge requirements and prohibitions or intends to experience a plant bypass or treatment unit bypass due to:

a. Maintenance work, power failures, or breakdown of waste treatment equipment, or

b. accidents caused by human error or negligence, or

c. other causes, such as acts of nature,

the discharger shall notify the Regional Board office by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within 7 working days of the telephone notification . The written report shall include time and date, duration and estimated volume of waste bypassed, method used in estimating volume and person notified of the incident. The report shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps were taken to prevent the problem from recurring.

In addition, the waste discharger shall promptly accelerate his monitoring program to analyze the discharge at least once every day (Section C.2.h). Such daily analyses shall continue until such time as the effluent limits have been attained, until bypassing stops or until such time as the Executive Officer determines to be appropriate. The results of such monitoring shall be included in the regular Self-Monitoring Report.

3. The discharger shall file a written technical report to be received at least 30 days prior to advertising for bid (60 days prior to construction) on any construction project which would cause or aggravate the discharge of waste in violation of requirements; said reports shall describe the nature, cost, and scheduling of all actions necessary to preclude such discharge. In no case will any discharge of wastes in violation of permit and order be permitted unless notification is made to the Executive Officer and approval obtained from the Regional Board.

4. Self-Monitoring Reports

Written reports shall be filed regularly for each calendar month (unless specified otherwise) and filed no later than the fifteenth day of the following month. The reports shall be comprised of the following:

a. Letter of Transmittal:

A letter transmitting self-monitoring reports should accompany each report. Such a letter shall include:

1) Identification of all violations of waste discharge requirements found during the reporting period,

2) Details of the magnitude, frequency, and dates of all violations,

3) The cause of the violations, and

4) Discussion of the corrective actions taken or planned and the time schedule for completion. If the discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to the correspondence transmitting such schedule will be satisfactory.

Monitoring reports and the letter transmitting reports shall be signed by a principal executive officer or ranking elected official of the discharger, or by a duly authorized representative of that person.

The letter shall contain the following certification:

"I certify under penalty of law that this document and all attachments are 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 managed 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."

b. Compliance Evaluation Summary

Each report shall be accompanied by a compliance evaluation summary sheet prepared by the discharger. The report format will be prepared using the example shown in Part B. The discharger will prepare the format using those parameters and requirement limits for receiving water and effluent constituents specified in his permit.

c. Map or Aerial Photograph

A map or aerial photograph shall accompany the report showing sampling and observation station locations.

d. Results of Analyses and Observations

Tabulations of the results from each required analysis specified in Part B by date, time, type of sample, detection limit and station, signed by the laboratory director. The report format will be prepared using the examples shown in Part B.

1) If the discharger monitors any pollutant more frequently than required by this permit using test procedures approved under 40 CFR Part 136 or as specified in this Permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Self-Monitoring Report.

2) Calculations for all limitations that require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit..

e. Effluent Data Summary

Summary tabulations of the data shall include for each constituent total number of analyses, maximum, minimum, and average values for each period. The report format will be the NPDES Discharge Monitoring Report., EPA Form 3320-1. Flow data shall be included. The original is to be submitted to:

Executive Officer
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, CA 94612

f. Flow Data

The tabulation pursuant to Section F-2.

5. Annual Reporting

By January 30 of each year, the discharger shall submit an annual report to the Regional Board covering the previous calendar year. The report shall contain :

a. Both tabular and graphical summaries of the monitoring data during the previous year.

b. A comprehensive discussion of the compliance record and the corrective actions taken or planned which may be needed to bring the discharger into full compliance with the waste discharge requirements.

c List of Approved Analyses

1) Listing of analyses for which the discharger is approved by the State Department of Health Services.

2) List of analyses performed for the discharger by another approved laboratory (and copies of reports signed by the laboratory director of that laboratory shall also be submitted as part of the report).

3) List of "waived" analyses, as approved.

The report format shall be prepared by using the examples shown in Part B.

G. DEFINITION OF TERMS

1. A grab sample is defined as an individual sample collected in a short period of time not exceeding 15 minutes. Grab samples shall be collected during normal peak loading conditions for the parameter of interest, which may or may not be during hydraulic peaks. It is used primarily in determining compliance with daily maximum limits and instantaneous maximum limits. Grab samples represent only the condition that exists at the time the wastewater is collected.

2. A composite sample is defined as a sample composed of individual grab samples mixed in proportions varying not more than plus or minus five percent from the instantaneous rate (or highest concentration) of waste flow corresponding to each grab sample collected at regular intervals not greater than one hour, or collected by the use of continuous automatic sampling devices capable of attaining the proportional accuracy stipulated above throughout the period o f discharge for 8 consecutive or of 24 consecutive hours, whichever is specified in Table 1 of Part B

3. A flow sample is defined as the accurate measurement of the average daily flow volume using a properly calibrated and maintained flow measuring device.

4. Duly authorized representative is one whose:

   a. Authorization is made in writing by a principal executive officer or ranking elected official;

   b. Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as general partner in a partnership, sole proprietor in a sole proprietorship, the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

5. Average values for daily and monthly values is obtained by taking the sum of all daily values divided by the number of all daily values measured during the specified period.

6. Median of an ordered set of values is that value below and above which there is an equal number of values, or which is the arithmetic mean of the two middle values, if there is no one middle value.

   a. A 5-day median value for coliform bacteria is the third highest count of 5 daily counts obtained from 5 consecutive sampling days. A 7-day median value is the fourth highest of 7 daily counts obtained from 7 consecutive sampling days.

   b. A 5-day moving median value for coliform bacteria is the median value calculated for each consecutive sampling day based upon the period from the sample day and the previous 4 sampling days.

   c. A 7-day moving median is calculated for each consecutive sampling day based upon the period from the sample day and the previous 6 sampling days. Moving median values for the beginning of the month shall be calculated using the previous month's counts (i.e. the last four counts for a 5-day moving median and the last seven counts for a 7-day moving median from the previous month).

7. A 6-month median means a moving median of daily values for any 180 day period in which daily values represent flow-weighted average concentrations within a daily or 24-hour period. For intermittent discharges, the daily value shall be considered to equal zero for days on which no discharge occurred.

8. The geometric mean is anti log of log mean. Used for determining compliance with bacteriological standards, the lcg mean is calculated with the following equation:

$$\text{Log Mean} = \frac{1}{N} \sum_{i=1}^{N} \text{Log } C_i$$

in which "N" is the number of days samples that were analyze during the period and "C_i" is the concentration of bacteria (MPN/100 ml) found on each day of sampling.

9. Daily Maximum limit is the total discharge in a calendar day for pollutants measured by mass or the average measurement obtained for other pollutants.

10. Instantaneous Maximum is defined as the highest measurement obtained for the calendar day, as determined by a grab sample..

11. A depth-integrated sample is defined as a water or waste sample collected by allowing a sampling device to fill during a vertical traverse in the waste or receiving water body being sampled and shall be collected in such a manner that the collected sample will be representative of the waste or water body at that sampling point.

12. Bottom sediment sampling and reporting guidelines mean those guidelines developed by the Regional Board staff to provide for standard bottom sampling, laboratory, and reporting procedures.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
August 1993

STANDARD PROVISIONS AND REPORTING REQUIREMENTS

for

NPDES SURFACE WATER DISCHARGE PERMITS

A. GENERAL PROVISIONS

1. Neither the treatment nor the discharge of pollutants shall create a pollution, contamination, or nuisance as defined by Section 13050 of the California Water Code.

2. All discharges authorized by this Order shall be consistent with the terms and conditions of this Order.

3. Duty to Comply

   a. If a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307 (a) of the Clean Water Act, or amendments thereto, for a toxic pollutant which is present in the discharge authorized herein and such standard or prohibition is more stringent than any limitation upon such pollutant in a Board adopted Order, discharger must comply with the new standard or prohibition. the Board will revise or modify the Order in accordance with such toxic effluent standard or prohibition and so notify the discharger.

   b. If more stringent applicable water quality standards are approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the discharger must comply with the new standard. The Board will revise and modify this Order in accordance with such more stringent standards.

   c. The filing of a request by the discharger for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. [40 CFR 122.41(f)]

4. Duty to Mitigate

   The discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this order and permit which has a reasonable likelihood of adversely affecting public health or the environment, including such accelerated or additional monitoring as requested by the Board or Executive Officer to determine the nature and impact of the violation. [40 CFR 122.41(d)]

5. Pursuant to U.S. Environmental Protection Agency regulations the discharger must notify the Regional Board as soon as it knows or has reason to believe (1) that they have begun or expect to begin, use or manufacture of a pollutant not reported in the permit application, or (2) a discharge of toxic pollutants not limited by this permit has occurred, or will occur, in concentrations that exceed the limits specified in 40 CFR 122.42(a).

6. The discharge of any radiological, chemical, or biological warfare agent waste is prohibited.

7. All facilities used for transport, treatment, or disposal of wastes shall be adequately protected against overflow or washout as the result of a 100-year frequency flood.

8. Collection, treatment, storage and disposal systems shall be operated in a manner that precludes public contact with wastewater, except where excluding the public is inappropriate, warning signs shall be posted.

9. Property Rights

This Order and Permit does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, nor protect the discharger from liabilities under federal, state or local laws, nor create a vested right for the discharge to continue the waste discharge or guarantee the discharger a capacity right in the receiving water. [40 CFR 122.41(g)]

10. Inspection and Entry

The Board or its authorized representatives shall be allowed:

a. Entry upon premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of the order and permit;

b. Access to and copy at reasonable times any records that must be kept under the conditions of the order and permit;

c. To inspect at reasonable times any facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under the order and permit; and

d. To photograph, sample, and monitor at reasonable times for the purpose of assuring compliance with the order and permit or as otherwise authorized by the Clean Water Act any substances or parameters at any locations. [40 CFR 122.41(i)]

10. Permit Actions

This Order and Permit may be modified, revoked and reissued, or terminated in accordance with applicable State and/or Federal regulations. Cause for taking such action includes, but is not limited to any of the following:

a. Violation of any term or condition contained in the Order and Permit;

b. Obtaining the Order and Permit by misrepresentation, or by failure to disclose fully all relevant facts;

c. Endangerment to public health or environment that can only be regulated to acceptable levels by order and permit modification or termination; and

d. Any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

11 Duty to Provide Information

The discharger shall furnish, within a reasonable time, any information the Board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit. The discharger shall also furnish to the Board, upon request, copies of records required to be kept by its permit. [40 CFR 122.41(h)]

11 Duty to Provide Information

The discharger shall furnish, within a reasonable time, any information the Board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit. The discharger shall also furnish to the Board, upon request, copies of records required to be kept by its permit. [40 CFR 122.41(h)]

12. Bypass (the intentional diversion of waste streams from any portion of a treatment facility) is prohibited. The Board may take enforcement action against the discharger for plant bypass unless:

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage. (Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.);

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment down time. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

c. The discharger submitted advance notice of the need for a bypass to the Board. If the discharger knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass. The discharger shall submit notice of an unanticipated bypass as required by 40 CFR 122.41(l)(6) (24 hour notice), as required in paragraph E.6.d.

The discharger may allow a bypass to occur that does not cause effluent limitations to be exceeded, but only if it is for essential maintenance to assure efficient operation.

13. Availability

A copy of this permit shall be maintained at the discharge facility and be available at all times to operating personnel.

14. Continuation of Expired Permit

This permit continues in force and effect until a new permit is issued or the Board rescinds the permit. Only those dischargers authorized to discharge under the expiring permit are covered by the continued permit.

B. STANDARD STORM WATER PROVISIONS

These provisions apply to facilities which do not direct all storm water flows to the wastewater treatment plant headworks.

1. The Storm Water Pollution Prevention Plan (SWPP Plan) shall be designed in accordance with good engineering practices and shall address the following objectives:

2. Source Identification

The SWPP Plan shall provide a description of potential sources which may be expected to add significant quantities of pollutants to storm water discharges, or which may result in non-storm water discharges from the facility. The SWPP Plan shall include, at a minimum, the Following items:

a. A topographical map (or other acceptable map if a topographical map in unavailable), extending one-quarter mile beyond the property boundaries of the facility, showing: the wastewater treatment facility process areas, surface water bodies (including springs and wells), and the discharge point(s) where the facility's storm water discharges to a municipal storm drain system or other points to waters of the State. The requirements of this paragraph may be included in the site map required under the following paragraph if appropriate.

b. A site map showing:

   i. Storm water conveyance, drainage, and discharge structures;
   ii. An outline of the storm water drainage areas for each storm water discharge point;
   iii. Paved areas and buildings;
   iv. Areas of pollutant contact with storm water or release to storm water, actual or potential, including but not limited to outdoor storage, and process areas, material loading, unloading, and access areas, and waste treatment, storage, and disposal areas;
   v. Location of existing storm water structural control measures (i.e., berms, coverings, etc.);
   vi. Surface water locations, including springs and wetlannds;
   vii. Vehicle service areas.

c. A narrative description of the following:

   i. Wastewater treatment process activity areas;
   ii. Materials, equipment, and vehicle management practices employed to minimize contact of significant materials of concern with storm water discharges;
   iii. Material storage, loading, unloading, and access areas;
   iv. Existing structural and non-structural control measures (if any) to reduce pollutants in storm water discharge;
   v. Methods of on-site storage and disposal of significant materials.

d. A list of pollutants that have a reasonable potential to be present in storm water discharge in significant quantities.

3. Storm Water Management Controls

The SWPP Plan shall describe the storm water management controls appropriate for the facility and a time schedule for fully implementing such controls. The appropriateness and priorities of controls in the SWPP Plan shall reflect identified potential sources of pollutants. The description of storm water management controls to be implemented hall include, as appropriate:

a. Storm Water Pollution Prevention Personnel

   Identify specific individuals (and job titles) who are responsible for developing, implementing, and reviewing the SWPP Plan.

b. Good Housekeeping

Good housekeeping requires the maintenance of clean, orderly facility areas that discharge storm water. Material handling areas shall be inspected and cleaned to reduce potential for pollutants to enter the storm drain conveyance system.

c. Spill Prevention and Response

Identify areas where significant materials can spill into or otherwise enter the storm water conveyance systems and their accompanying drainage points. Specific material handling procedures, storage requirements, cleanup equipment and procedures should be identified, as appropriate. The necessary equipment to implement a clean-up shall be available and personnel trained in proper response, containment and cleanup of spills. Internal reporting procedures for spills of significant materials shall be established.

d. Source Control

Source controls, such as elimination or reduction of the use of toxic pollutants, covering of pollutant source areas, sweeping of paved areas, containment of potential pollutants, labeling all storm drain inlets with "No Dumping" signs, isolation/separation of industrial from non-industrial pollutant sources so that runoff from these areas does not mix, etc.

e. Storm Water Management Practices

Storm water management practices are practices other than those which control the sources of pollutants. They include treatment/conveyance structures such as drop inlets, channels, retention/detention basins, treatment vaults, infiltration galleries, filters, oil/water separators, etc. Based on assessment of the potential of various sources to contribute pollutants to storm water discharges in significant quantities, additional storm water management practices to remove pollutants from storm water discharges shall be implemented and design criteria shall be described.

f. Sediment and Erosion Control

Measures to minimize erosion around the storm water drainage and discharge points such as riprap, revegetation, slope stabilization, etc. shall be described and implemented.

g. Employee Training

Employee training programs shall inform all personnel responsible for implementing the SWPP Plan. Training should address spill response, good housekeeping, and material management practices. New employee and refresher training schedules should be identified.

h. Inspections

All inspections shall be done by trained personnel. Material handling areas shall be inspected for evidence of, or the potential for, pollutants entering storm water discharges. A tracking or follow up procedure shall be used to ensure appropriate response has been taken in response to an inspection. Inspections and maintenance activities shall be documented and recorder. Inspection records shall be retained for five years.

i. Records

A tracking and follow-up procedure shall be described to ensure that adequate response and corrective actions have been taken in response to inspections.

4. An annual facility inspection shall be conducted to verify that all elements of the SWPP Plan are accurate and up to date. This results of this review shall be reported in the annual report to the Board on October 1 of each year.

C. SLUDGE MONITORING AND REPORTING

1. When sewage sludge is either sent to a landfill or applied to land as a soil amendment it should be monitored as follows:

a. Sewage sludge disposal shall be monitored at the following frequency:

Metric tons sludge/365 days	Frequency
0-290	Once per year
290-1500	Quarterly
1500-15,000	Six times per year
Over 15,000	Once per month

(Metric tons are on a dry weight basis)

b. Sludge shall be monitored for the following constituents:

Land Application: As, Cd, Cr, Cu, Hg, Mo, Ni, Pb, Se, Zn
Municipal Landfill: Paint filter test (persuant 40 CFR 258)
Sludge-only Landfill: As, Cd, Ni, (if no liner and leachate system)

2. The sludge must meet the following requirements prior to land application. The discharger must either demonstrate compliance or, if it sends the sludge to another party for further treatment and/or distribution, must give the recipient the information necessary to assure compliance.

a. Exceptional quality sludge: Sludge that meets the pollutant concentration limits in Table III of 40 CFR Part 503.13, Class A pathogen limits, and one of the vector attraction reduction requirements in 503.33(b)(1)-(b)(8) is exceptional quality sludge and does not have to be tracked further for compliance with general requirements (503.12) and management practices (503.14).

b. Sludge used for agricultural land, forest, or reclamation shall meet the pollutant limits in Table I (ceiling concentrations) and Table II or Table III (cumulative loadings or pollutant concentration limits) of 503.13. It shall also meet the general requirements (503.12) and management practices (503.14) (if not exceptional quality), Class A or Class B pathogen levels with associated access restrictions (503.32) and one of the 10 vector attraction reduction requirements in 503.33(b)(1)-(b)(10).

c. Sludge used for lawn or home gardens must meet exceptional quality sludge limits.

d. Sludge that is sold or given away in a bag or other container shall meet the pollutant limits in either Table III or Table IV (pollutant concentration limits or annual pollutant loading rate limits) of 503.13. If Table IV is used, a label or information sheet must be attached that explains Table IV (see 503.14). The sludge must also meet the Class A pathogen limits and one of the vector attraction reduction requirements in 503.33(b)(1)-(b)(8).

D. TREATMENT RELIABILITY

1. The discharger shall, at all times, properly operate and maintain all facilities and systems of treatment disposal and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with this order and permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. All of these procedures shall be described in an Operation and Maintenance Manual. The discharger shall keep in a state of readiness all systems necessary to achieve compliance with the conditions of this order and permit. All systems, both those in service and reserve, shall be inspected and maintained on a regular basis. Records shall be kept of the tests and made available to the Board. [40 CFR 122.41(e)]

2. Safeguard to electric power failure:

   a. The discharger shall, within ninety (90) days of the effective date of this permit, submit to the Board for approval a description of the existing safeguards provided to assure that, should there be reduction, loss, or failure of electric power, the discharger shall comply with the terms and conditions of its Order. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures or other means. A description of the safeguards provided shall include an analysis of the frequency, duration, and impact of power failures experienced over the past five years on effluent quality and on the capability of the discharger to comply with the terms and conditions of the Order. The adequacy of the safeguards is subject to the approval of the Regional Board.

   b. Should the Board not approve the existing safeguards, the discharger shall, within ninety (90) days of having been advised by the Board that the existing safeguards are inadequate, provide to the Board and the U.S. Environmental Protection Agency a schedule of compliance for providing safeguards such that in the event of reduction, loss, or failure of electric power, the permittee shall comply with the terms and conditions of this permit. The schedule of compliance shall, upon approval of the Board Executive Officer, become a condition of the Order.

   c. If the discharger already has approved plan(s), the plan shall be revised and updated as specified in the plan or whenever there has been a material change in design or operation. A revised plan shall be submitted to the Board within ninety (90) days of the material change.

3. POTW facilities subject to this order and permit shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Division 4, Chapter 14, Title 23 of the California Code of Regulations.

E. GENERAL REPORTING REQUIREMENTS

1. Signatory Requirements

   a. All reports required by the order and permit and other information requested by the Board or USEPA Region 9 shall be signed by a principal executive officer or ranking elected official of the discharger, or by a duly authorized representative of that person. [40 CFR 122.22(b)]

b. Certification

All reports signed by a duly authorized representative under Provision E.1.a. shall contain the following certification:

"I certify under penalty of law that this document and all attachments are 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 managed 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. [40 CFR 122.22(d)]

2. Should the discharger discover that it failed to submit any relevant facts or that it submitted incorrect information in any report, it shall promptly submit the missing or correct information. [40 CFR 122.41(l)(8)]

3. False Reporting

Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall be subject to enforcement procedures as identified in Section F of these Provisions.

4. Transfers

a. This permit is not transferable to any person except after notice to the Board. The Board may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

b Transfer of control or ownership of a waste discharge facility under an National Pollutant Discharge Elimination System permit must be preceded by a notice to the Board at least 30 days in advance of the proposed transfer date. The notice must include a written agreement between the existing discharger and proposed discharger containing specific dates for transfer of responsibility, coverage, and liability between them. Whether an order and permit may be transferred without modification or revocation and reissuance is at the discretion of the Board. If order and permit modification or revocation and reissuance is necessary, transfer may be delayed 180 days after the Board's receipt of a complete application for waste discharge requirements and an NPDES permit.

5. Spill Prevention and Contingency Plans

The discharger shall file with the Board, for Executive Officer review and approval within ninety (90) days after the effective date of this Order, a technical report or a statement that the existing plan(s) was reviewed and updated, as appropriate, on preventive (failsafe) and contingency (cleanup) plans for controlling accidental discharges, and for minimizing the effect of such events. The technical report or updated revisions should:

a. Identify the possible sources of accidental loss, untreated or partially treated waste bypass, and polluted drainage. Loading and storage areas, power outage, waste treatment unit outage, and failure of process equipment, tanks and pipes should be considered.

b. Evaluate the effectiveness of present facilities and procedures and state when they became operational.

c. Predict the effectiveness of the proposed facilities and procedures and provide an implementation schedule containing interim and final dates when they will be constructed, implemented, or operational.

This Board, after review of the technical report or updated revisions, may establish conditions which it deems necessary to control accidental discharges and to minimize the effects of such events. Such conditions may be incorporated as part of this Order, upon notice to the discharger. If the discharger already has an approved plan(s) he shall update them as specified in the plan(s).

6. Compliance Reporting

a. Planned Changes

The discharger shall file with the Board a report of waste discharge at least 120 days before making any material change or proposed change in the character, location or volume of the discharge.

b. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final compliance dates contained in any compliance schedule shall be submitted within 10 working days following each scheduled date unless otherwise specified within this order and permit. If reporting noncompliance, the report shall include a description of the reason for failure to comply , a description and schedule of tasks necessary to achieve compliance and an estimated date for achieving full compliance. A final report shall be submitted within 10 working days of achieving full compliance, documenting full compliance

c. Anticipated Non-compliance

All POTWs must provide adequate notice to the Board of:

1) Any introduction of new pollutants into the POTW from an indirect discharger that would be subject to Sections 301 or 306 of the Clean Water Act if it were directly discharging those pollutants.

2) Any substantial or material change in the volume or character of pollutants being introduced into that POTW by an input source at the time of issuance of the permit.

Adequate notice shall include information on the quality and quantity of influent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

d. Non-compliance Reporting (Twenty-four hour reporting:)

1) The discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five working days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times and, if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps

taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

2) The following shall be included as information that must be reported within 24 hours under this paragraph:

i. Any unanticipated bypass that exceeds any effluent limitation in the permit.

ii. Any upset that exceeds any effluent limitation in the permit.

iii. Violation of a maximum daily discharge limitation for any of the pollutants listed in this permit to be reported within 24 hours.

3) The Board may waive the above-required written report on a case-by-case basis.

F. ENFORCEMENT

1. The provision contained in this enforcement section shall not act as a limitation on the statutory or regulatory authority of the Board.

2. Any violation of the permit constitutes violation of the California Water Code and regulations adopted thereunder and the provisions of the Clean Water Act, and is the basis for enforcement action, permit termination, permit revocation and reissuance, denial of an application for permit reissuance; or a combination thereof.

3. The Board may impose administrative civil liability, may refer a discharger to the State Attorney General to seek civil monetary penalties, may seek injunctive relief or take other appropriate enforcement action as provided in the California Water Code or federal law for violation of Board orders.

4. It shall not be a defense for a discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this order and permit.

5. A discharger seeking to establish the occurrence of any upset (See Definitions, G. 24) has the burden of proof. A discharger who wishes to establish the affirmative defense of any upset in an action brought for noncompliance shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:

a. an upset occurred and that the permittee can identify the cause(s) or the upset;

b. the permitted facility was being properly operated at the time of the upset;

c. the discharger submitted notice of the upset as required in paragraph E.6.d.; and

d. the discharger complied with any remedial measures required under A.4.

No determination made before an action for noncompliance, such as during administrative review of claims that noncompliance was caused by an upset, is final administrative action subject to judicial review.

In any enforcement proceeding, the discharger seeking to establish the occurrence of any upset has the burden of proof. [40 CFR 122.41(n)]

G. DEFINITIONS

1. Bypass means the intentional diversion of waste streams from any portion of treatment facility.

2. Daily discharge means:

   a. For flow rate measurements, the average flow rate measured during a calendar day or during any 24-hour period reasonably representative of the calendar day for purposes of sampling.

   b. For pollutant measurements, the concentration or mass emission rate measured during a calendar day or during any 24-hour period reasonably representative of the calendar day for purposes of sampling.

3. Daily Maximum Limit means the maximum acceptable daily discharge. For pollutant measurements, unless otherwise specified, the results to be compared to the daily maximum limit are based on composite samples.

4. DDT and Derivatives shall mean the sum of the p,p' and o,p' isomers of DDT, DDD (TDE), and DDE.

5. Duly authorized representative is one whose:

   a. Authorization is made in writing by a principal executive officer or ranking elected official;

   b. Authorization specifies either an individual or a position having responsibililty for the overall operation of the regulated facility or activity, such as general manager in a partnership, manager, operator of a well or a well field, superintendent, positon of equivalent responsibility, or an individual or positon having overall r esponsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named positon.); and

   c. Written authorization is submitted to the and USEPA Region 9. If an authorization becomes no longer accurate because a different individual or positon has responsibililty for the overall operation of the facility, a new authorization satisfying the requirements above must be submitted to the Board and USEPA Region 9 prior to or together with any reports, information, or applications to be signed by an authorized representative.

6. Hazardous substance means any substance designated under 40 CFR 116 pursuant to Section 311 of the Clean Water Act.

7. HCH shall mean the sum of the alpha, beta, gama (Lindane), and delta isomers of hexachlorocyclohexane.

8. Inadequately Treated Waste is wastewater receiving partial treatment but failing to meet discharge requirements.

9. Incompatible pollutants are:

   a. Pollutants which create a fire or explosion hazard in the POTW;

   b. Pollutants which will cause corrosive structural damage to the POTW, or wastewaters with pH lower than 5.0 pH units, unless the facilities are specifically designed to accommodate such wastewater;

c. Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in interference;

d. Any pollutant, including oxygen-demanding pollutants (e.g., BOD) released into the wastewater system at a flow rate and/or pollutant concentration which will cause interference with the POTW.

e. Heat in amounts which will inhibit biological activity in the POTW and result in interference, or heat in such quantities that the temperature at the POTW treatment plant exceeds 40°C (104°F) unless the works is designed to accommodate such heat or the Board approves alternate temperature limits.

10. Indirect discharger means a non-domestic discharger introducing pollutants into a publicly owned treatment and disposal system.

11. Initial dilution is the process which results in the rapid and irreversible turbulent mixing of wastewater with receiving water around the point of discharge.

12. Mass emission rate is obtained from the following calculation for any calendar day:

$$\text{Mass emission rate (lb/day)} = \frac{8.345}{N} \sum_{i=1}^{N} Q_i C_i$$

$$\text{Mass emission rate (kg/day)} = \frac{3.785}{N} \sum_{i=1}^{N} Q_i C_i$$

in which 'N' is the number of samples analyzed in any calendar day. 'Q_i' and 'C_i' are the flow rate (MGD) and the constituent concentration (mg/L), respectively, which are associated with each of the 'N' grab samples which may be taken in any calendar day. If a composite sample is taken, 'C_i' is the concentration measured in the composite sample and 'Q_i' is the average flow rate occurring during the period over which samples are composited. The daily concentration measured over any calendar day of all constituents shall be determined from the flow- weighted average of the same constituents in the combined waste streams as follows:

$$C_d = \text{Average daily concentration} = \frac{1}{Q_t} \sum_{i=1}^{N} Q_i C_i$$

in which 'N' is the number of component waste streams. 'Q' and 'C' are the flow rate (MGD) and the constituent concentration (mg/L), respectively, which are associated with each of the 'N' waste streams. 'Q_t' is the total flow rate of the combined waste streams.

13. Maximum allowable mass emission rate, whether for a 24-hour, weekly 7-day, monthly 30-day, or 6-month period, is a limitation expressed as a daily rate determined with the formulas in paragraph above, using the effluent concentration limit specified in the order and permit for the period and the specified allowable flow. (Refer to Section C of Part A of Self- Monitoring Program for definitions of limitation period)

14. Overflow is defined as the intentional or unintentional spilling or forcing out of untreated or partially treated wastes from a transport system (e.g. through manholes, at pump stations, and at collection points) upstream from the plant headworks or from any treatment plant facilities.

15. POTW means Publicly Owned Treatment Works.

16. POTW Removal efficiency is expressed as the percentage of the ratio of pollutants removed by the treatment facilities to pollutants entering the treatment facilities. Removal efficiencies of a treatment plant shall be determined using monthly averages of pollutant concentration of influent and effluent samples collected at about the same time and using the following equation (or its equivalent):

    Removal Efficiency (%) = 100 X [1-(Effluent Conc./Influent Conc.)]

    When preferred, the discharger may substitute mass loadings and mass emissions for the concentrations.

17. Priority pollutants are those constituents referred to in 40 CFR S122, Appendix D and listed in the USEPA NPDES Application Form 2C, (dated 6/80) Items V-3 through V-9.

18. Sludge means the solids, semi-liquid suspensions of solids, residues, screenings, grit, scum, and precipitates separated from, or created in wastewater by the unit processes of a treatment system. It also includes but is not limited to, all supernatant, filtrate, centrate, decantate, and thickener overflow/underflow in the solids handling parts of the wastewater treatment system.

19. Storm Water means storm water runoff, snow melt runoff, and surface runoff and drainage. It excludes infiltration and runoff from agricultural land.

20. Toxic pollutant means any pollutant listed as toxic under Section 307(a)(1) of the Clean Water Act or under 40 CFR S401.15.

21. Total Identifiable Chlorinated hydrocarbons (TICH) shall be measured by summing the individual concentrations of DDT, DDD, DDE, aldrin, BHC, chlordane, endrin, heptachlor, lindane, dieldrin, PCBs and other identifiable chlorinated hydrocarbons.

22. Severe property damage means substantial physical damage to property, damage to the t treatment facilities which causes them to become inoperable or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass or overflow. It does not mean economic loss caused by delays in production.

23. Untreated waste is defined as raw wastewater.

24. Upset means an exceptional incident in which there is unintentional temporary noncompliance with effluent technology based permit limitations in the order and permit because of factors beyond the reasonable control of the discharger. It does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

25. Waste, waste discharge, discharge of waste, and discharge are used interchangeably in this order and permit. The requirements of this order and permit are applicable to the entire volume of water, and the material therein, which is disposed of to surface and ground waters of the State of California.

APPENDIX B

STORM WATER MONITORING AND REPORTING PROGRAM PLAN (SWMRPP)

STORM WATER MONITORING AND REPORTING PROGRAM PLAN

Prepared for:

Valero Benicia Refinery
3400 East Second Street
Benicia, California 94510

Prepared by:

URS Corporation
2520 Venture Oaks Way, Suite 250
Sacramento, California 95833

May 2002

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B-1 Storm Water Contaminant Concentration Summary

1.0 Introduction

This plan documents the basis for and fulfills the requirements of developing a Storm Water Monitoring and Reporting Program Plan (SWMRPP) for the Valero Company U.S.A. refinery located in Benicia, California (see Figure 1-1 of the SWPPP), in compliance with the provisions of the Federal Clean Water Act and the California State Water Resources Control Board. These provisions are currently regulated under Valero Benicia Refinery National Pollutant Discharge Elimination System (NPDES) permit number CA0005550.

Under contract to Valero, URS Corporation (URS) has prepared this SWMRPP in accordance with the provisions of the State Water Resources Control Board General Industrial Storm Water Permit and the current refinery NPDES permit. The SWMRPP was prepared for Valero based on facility inspections, interviews with Valero refinery personnel, and the previous SWMRPP (URS, 2000).

2.0 Identification of Sampling Locations

Monitoring locations for this facility are noted on Figure 1-2 of the SWPPP. All areas described in this plan were identified to require monitoring under the refinery NPDES permit. Designated outfalls are as follows for the monitored areas:

- Seven independent stormwater discharge points (outfalls 006 and 011 through 016 on Figure 1-2 of the SWPPP) will be monitored along the length of the Crude Transfer Pipeline. These seven stormwater discharge points consist of the concrete containment sumps constructed to capture releases should a leak or rupture occur in the pipeline. As a result of the design of these containment sumps, stormwater is collected and managed in accordance with the Valero Spill Prevention Control and Countermeasures Plan.

- One stormwater monitoring point (outfall 005 on Figure 4-4 of the SWPPP) was identified at the Burma Road and Fire Training Surface Drainage Area. The area borders the northern extent of the Refinery Proper.

- One stormwater monitoring point (outfall 003 on Figure 4-5 of the SWPPP) was identified near the Raw Water Break Tank Surface Drainage Area. The area is located at the northeast corner of the Refinery Proper.

- Two stormwater monitoring points (outfalls 009 and 010 on Figure 4-6 of the SWPPP) were identified at the Avenue A Surface Drainage Area, located near the northeast corner of the Refinery Proper.

- Three stormwater monitoring points (outfalls 004, 007, and 008 on Figure 4-7 of the SWPPP) were identified at the Buffalo Wallow Surface Drainage Area, located at the south end of the Refinery Proper, east of Gate 4.

- A final stormwater monitoring point (outfall 002 on Figure 4-8 of the SWPPP) was identified at the Wastewater Treatment Surface Drainage Area. The Wastewater Treatment facility is located south of Highway 680 near the Industrial Parkway exit.

These 15 stormwater monitoring locations will provide the best and most representative samples of the quality of stormwater leaving the refinery. The two remaining topic areas described in the SWPPP were simply cited to document their evaluation. The Refinery Dock and the Coke Silo Area were found to provide no routed or channeled stormwater diversions where adequate flow was available for monitoring. As a result, these areas are not included in this plan.

3.0 Monitoring, Sampling, and Analysis Protocols

The State General Permit established baseline parameters for dry and wet season visual observations during a "significant storm water discharge." A "significant storm water discharge" is a continuous discharge of stormwater for approximately one hour or more.

Current regulation of the dry and wet season observations is covered under the refinery NPDES permit. This section of the SWMRPP discusses the procedures to be used for these observations. Appropriate stormwater sample collection and analysis is also referenced.

3.1 Dry Season Observations

The NPDES permit requires that no less than twice during the dry season (May through September), all dischargers shall observe and/or test for the presence of non-stormwater discharges at all stormwater discharge locations. At a minimum, all dischargers shall conduct visual observations of flows to determine the presence of stains, sludges, odors, and other abnormal conditions. Dye tests, TV line surveys, and/or analysis and validation of accurate piping schematics may be conducted if appropriate.

3.2 Wet Season Observations

The NPDES permit requires that during the wet season (October through April), all dischargers shall conduct visual observations of all stormwater discharge locations during the first hour of one storm event per month that produces significant stormwater discharge to observe the presence of floating and suspended materials, oil and grease, discolorations, turbidity, and odor, etc. An additional stipulation of the Valero NPDES permit requires the documentation of visual observations at outfalls 003, 005, and 006 for every storm event. It should be noted that the General Industrial Storm Water Permit states "dischargers are required to perform visual observations only within daylight hours." Valero will follow the NPDES requirement. Estimated flow for each monitored storm event requires an estimate of generated outfall discharge quantities. Criteria used in calculating outfall discharge quantities is taken partially from the County of *Solano Hydrology and Drainage Design Procedure* manual dated October 1977. The volume of discharge from a given area will be computed by the equation:

$$V = CRA$$

where

V is the volume of stormwater draining from a given area in gallons,
C is a dimensionless runoff coefficient,
R is the rainfall in feet, and
A is the area tributary to the design point, in square feet (also called the drainage area).

The selected runoff coefficient range (.60 to .90 for heavy industry) is for a 10-year return period. The range for heavy industry was utilized for a conservative volume estimate. For areas with less impervious surfaces, such as the compacted soil beneath the Crude Transfer Pipeline, a higher runoff coefficient will be utilized.

An example calculation of the stormwater discharge quantity for outfalls 009 and 010 is done as follows:

Avenue A Surface Drainage Area (includes outfalls 009 and 010):

$$V = 0.75\ (C) \times 0.95\ ft\ (R) \times 47{,}370\ ft^2\ (A) \times 7.48\ gal/ft^3 = 252{,}458\ gallons$$

3.3 Stormwater Sampling and Analysis

The Valero Benicia Refinery is currently covered under NPDES permit number CA0005550. Fifteen outfalls that receive stormwater from the refinery are regulated under this permit. Stipulations and monitoring criteria for the outfalls are an integral part of the NPDES permit, which has been attached to the SWPPP as Appendix A for reference.

3.4 Additional Requirements

Additional requirements of the refinery NPDES permit for site monitoring include the following:

- Conduct an annual inspection of the facility site to identify areas contributing to a stormwater discharge associated with industrial activity and to evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. A record of the annual inspection must include the date of the inspection, the individual(s) who performed the inspection, and the observations.

- Certify, based on the annual site inspection, that the facility is in compliance with the requirements of this plan and its SWPPP. The certification and inspection records must be signed and certified as illustrated in Section 9.0 of this plan. Any noncompliance shall be reported in accordance with Section 8.0 of this plan.

- Perform dry season observations as identified in Section 3.1 of this plan.

- Perform wet season observations as identified in Section 3.2 of this plan.

4.0 Records Retention

All stormwater monitoring information and copies of all reports required by this permit are to be retained for at least five years from the date of the sample, observation, measurement, or report.

These records include:

- The date, place, and time of site inspections, sampling, visual observations, and/or measurements;
- The individual(s) who performed the site inspections, visual observations, and/or measurements;
- Volume measurements or estimates (if required);
- Dry season observations and wet season visual observation records;
- Visual observation exception records;
- All calibration and maintenance records of on-site instruments used; and
- All original strip chart recordings for continuous monitoring instrumentation.

5.0 Exception Documentation

When Valero is unable to perform visual observations due to adverse climatic conditions (drought, extended freeze, dangerous weather conditions, etc.), a description of why the visual observations could not be conducted, including documentation of all significant stormwater discharge events, must be submitted along with the annual monitoring report.

Valero is required to perform visual observations only if significant stormwater discharges commence during scheduled facility operating hours, or within two hours following scheduled facility operating hours.

"Scheduled facility operating hours" are the time periods when the facility is staffed to conduct any function related to industrial activity, including routine maintenance, but excluding time periods where only emergency response, security, and/or janitorial services are performed.

6.0 Noncompliance Reporting

Within 30 days of identification of an instance of noncompliance, Valero must notify the San Francisco Bay Regional Water Quality Control Board. The notification will identify the type of noncompliance, describe the actions necessary to achieve compliance, and present a timetable for achieving compliance. The compliance timetable is subject to modification by the Regional Water Quality Control Board.

A noncompliance notification is also required when Valero cannot certify compliance in the annual report and when other instances of noncompliance occur.

7.0 Annual Reporting

By 1 July of each year, Valero will submit to the Executive Officer of the Regional Water Quality Control Board, a report summarizing the visual observations and sampling results for the previous year. Valero will provide, in the annual report, certification that "based on the annual site inspection, the facility is in compliance with the requirements of this permit and its Storm Water Pollution Prevention Plan." The annual report should also include any documentation pertaining to the usage by Valero of the visual observation exception as detailed in Section 5.0 of this plan.

All reports, certifications or information required by the permit or requested by the Regional Board, State Water Board, U.S. EPA, or local stormwater management agency shall be signed by a responsible corporate officer or by a duly authorized representative.

A responsible corporate officer means:

- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

- The manager of the facility if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

A person is a duly authorized representative if:

- The authorization is made in writing by a person described above and retained as part of the Storm Water Pollution Prevention Plan.

- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

- If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be attached to the Storm Water Pollution Prevention Plan prior to submittal of any reports, certifications, or information signed by the authorized representative.

The signatory page for all submittals required by the permit or requested by the Regional Board, State Water Board, U.S. EPA, or local stormwater management agency shall contain the following statement:

"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 ensure that qualified personnel properly gather and evaluate 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."

8.0 Amending the SWMRPP

Amendments to the plan may include changes and/or revisions by regulatory agencies to the permits, changes in the activities conducted by Valero, changes in the ownership of the company, changes in the event of significant spills or releases that require modifications to the sampling protocol, if required by a regulatory agency, or any changes that may affect the overall stormwater quality discharged by the facility. The revisions will be approved by a designated corporate official. A copy of the plan or amended plan shall be retained on site and made available to regulatory agencies or inspectors as required by law.

9.0 REFERENCES

Valero Storm Water Pollution Prevention Plan (2002).

Valero Best Management Practices Plan (1991).

Valero Oil Spill Contingency Plan (1996).

Valero Spill Prevention Control and Countermeasure (SPCC) Plan (2000).

Valero Dock Operations Manual (1996).

Valero Off-Site Piping Oil Spill Prevention/Mitigation Project Process Specification No. 31-29.

Valero documentation related to any spills requiring regulatory reporting.

Code of Federal Regulations Title 40, Parts 122, 123, 129.

General Industrial Storm Water Permit (CAS000001), State Board Order 91-113-DWQ.

Hydrology and Drainage Design Procedure, County of Solano (October 1977).

Table B-1

Storm Water Contaminant Concentration Summary

1996-1997 Water Year Results Summary

Location	Outfall	Area (ft^2)	Runoff Coeff	TOC (mg/L)			O&G (mg/L)			TSS (mg/L)		
				Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Ave "A"	009, 010	47,370	0.75	4.2	6.5	5.4	1.8	5	<3.4	<4.0	133.2	<68.6
Buffalo Wallow	004, 007, 008	27,440	0.75	2.2	23.8	10.2	<1.0	5	<2.8	3.6	1,598.0	155.7
Burma Road Fire Training	005	2,535,628	0.75	2.5	46.9	<17.1	<1.0	<5.0	<1.9	<4.5	1,598.0	<203.6
Crude Transfer Pipeline	006, 011, 012, 013, 014, 015, 016	810,778	0.85	3.8	28.9	<12.4	<1.0	<5.0	<1.4	4.5	782.0	<85.9
East Parcel 1	003	525,000	0.75	5.2	54.7	<18.2	<1.0	<5.0	<2.0	36.0	498.0	120.0
Waste Water Treatment	002	24,872	0.75	3.9	30.5	17.2	<1.0	<1.0	<1.0	12.7	24.4	18.6

1997-1998 Water Year Results Summary

Location	Outfall	Area ft^2	Runoff Coeff	TOC (mg/L)			O&G (mg/L)			TSS (mg/L)		
				Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Ave "A"	009, 010	47,370	0.75	9.8	19	<13.8	<1.0	1.3	<1.1	14	97.5	59.6
Buffalo Wallow	004, 007, 008	27,440	0.75	<10	40.6	<18.4	1	3	1.3	11.2	115.5	52.5
Burma Road Fire Training	005	2,535,628	0.75	<1.3	25.5	<11.3	<1.0	1.4	<1.0	4.4	1,289	203.9
Crude Transfer Pipeline	006, 011, 012, 013, 014, 015, 016	810,778	0.85	<2.8	30.5	<12.0	<1.0	2.1	<1.1	4.8	5,250	637.2
East Parcel 1	003	525,000	0.75	<3.3	19.6	<10.2	<1.0	1.2	<1.0	3.2	599	123.6
Waste Water Treatment	002	24,872	0.75	17.6	21.6	19.6	<1.0	<1.0	<1.0	59	3,656	1857.5

O&G = oil and grease

TOC = total organic carbon

TSS = total suspended solids

Table B-1 (Continued)

Storm Water Contaminant Concentration Summary

1998-1999 Water Year Results Summary

Location	Outfall	Area (ft^2)	Runoff Coeff	TOC (mg/L)			O&G (mg/L)			TSS (mg/L)		
				Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Ave "A"	009, 010	47,370	0.75	12.0	28.3	17.8	<1.0	1.2	<1.1	15.7	407.0	238.7
Buffalo Wallow	004, 007, 008	27,440	0.75	0.0	29.2	<9.1	<1.0	3.7	<1.5	<10.0	345.0	<186.4
Burma Road Fire Training	005	2,535,628	0.75	<0.5	29.2	<10.6	<1.0	<1.0	<1.0	<4.0	171.5	<41.8
Crude Transfer Pipeline	006, 011, 012, 013, 014, 015, 016	810,778	0.85	0.0	23.8	<11.8	<1.0	1.6	<1.0	<4.0	1,582.0	259.9
East Parcel 1	003	525,000	0.75	<0.9	28.3	<12.5	<1.0	2.7	<1.2	<10.0	195.5	<56.6
Waste Water Treatment	002	24,872	0.75	5.0	17.0	11.0	<1.0	<1.0	<1.0	<10.0	142.0	<76.0

1999-2000 Water Year Results Summary

Location	Outfall	Area ft^2	Runoff Coeff	TOC (mg/L)			O&G (mg/L)			TSS (mg/L)		
				Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Ave "A"	009, 010	47,370	0.75	4.8	31.6	16.8	<1.0	1.0	<0.5	31.0	425.0	180.3
Buffalo Wallow	004, 007, 008	27,440	0.75	<3.8	70.2	<26.9	<1.0	14.0	<3.6	34.8	1,434.0	345.6
Burma Road Fire Training	005	2,535,628	0.75	2.5	44.3	19.5	<1.0	<1.0	<1.0	5.8	256.5	110.6
Crude Transfer Pipeline	006, 011, 012, 013, 014, 015, 016	810,778	0.85	<5.7	36.8	<18.1	<1.0	<1.0	<1.0	<4.0	925.0	<124.2
East Parcel 1	003	525,000	0.75	3.6	75.4	25.0	<1.0	<1.0	<1.0	<4.0	885.0	<219.2
Waste Water Treatment	002	24,872	0.75	13.4	36.5	21.87	<1.0	7.7	3.2	<4.0	404.0	<188.7

O&G = oil and grease

TOC = total organic carbon

TSS = total suspended solids

Table B-1

Storm Water Contaminant Concentration Summary

1996-1997 Water Year Results Summary

Location	Outfall	Area (ft^2)	Runoff Coeff	TOC (mg/L)			O&G (mg/L)			TSS (mg/L)		
				Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Ave "A"	009, 010	47,370	0.75	4.2	6.5	5.4	1.8	5	<3.4	<4.0	133.2	<68.6
Buffalo Wallow	004, 007, 008	27,440	0.75	2.2	23.8	10.2	<1.0	5	<2.8	3.6	1,598.0	155.7
Burma Road Fire Training	005	2,535,628	0.75	2.5	46.9	<17.1	<1.0	<5.0	<1.9	<4.5	1,598.0	<203.6
Crude Transfer Pipeline	006, 011, 012, 013, 014, 015, 016	810,778	0.85	3.8	28.9	<12.4	<1.0	<5.0	<1.4	4.5	782.0	<85.9
East Parcel 1	003	525,000	0.75	5.2	54.7	<18.2	<1.0	<5.0	<2.0	36.0	498.0	120.0
Waste Water Treatment	002	24,872	0.75	3.9	30.5	17.2	<1.0	<1.0	<1.0	12.7	24.4	18.6

1997-1998 Water Year Results Summary

Location	Outfall	Area ft^2	Runoff Coeff	TOC (mg/L)			O&G (mg/L)			TSS (mg/L)		
				Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Ave "A"	009, 010	47,370	0.75	9.8	19	<13.8	<1.0	1.3	<1.1	14	97.5	59.6
Buffalo Wallow	004, 007, 008	27,440	0.75	<10	40.6	<18.4	1	3	1.3	11.2	115.5	52.5
Burma Road Fire Training	005	2,535,628	0.75	<1.3	25.5	<11.3	<1.0	1.4	<1.0	4.4	1,289	203.9
Crude Transfer Pipeline	006, 011, 012, 013, 014, 015, 016	810,778	0.85	<2.8	30.5	<12.0	<1.0	2.1	<1.1	4.8	5,250	637.2
East Parcel 1	003	525,000	0.75	<3.3	19.6	<10.2	<1.0	1.2	<1.0	3.2	599	123.6
Waste Water Treatment	002	24,872	0.75	17.6	21.6	19.6	<1.0	<1.0	<1.0	59	3,656	1857.5

O&G = oil and grease
TOC = total organic carbon
TSS = total suspended solids

Table B-1 (Continued)

Storm Water Contaminant Concentration Summary

1998-1999 Water Year Results Summary

Location	Outfall	Area (ft^2)	Runoff Coeff	TOC (mg/L)			O&G (mg/L)			TSS (mg/L)		
				Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Ave "A"	009, 010	47,370	0.75	12.0	28.3	17.8	<1.0	1.2	<1.1	15.7	407.0	238.7
Buffalo Wallow	004, 007, 008	27,440	0.75	0.0	29.2	<9.1	<1.0	3.7	<1.5	<10.0	345.0	<186.4
Burma Road Fire Training	005	2,535,628	0.75	<0.5	29.2	<10.6	<1.0	<1.0	<1.0	<4.0	171.5	<41.8
Crude Transfer Pipeline	006, 011, 012, 013, 014, 015, 016	810,778	0.85	0.0	23.8	<11.8	<1.0	1.6	<1.0	<4.0	1,582.0	259.9
East Parcel 1	003	525,000	0.75	<0.9	28.3	<12.5	<1.0	2.7	<1.2	<10.0	195.5	<56.6
Waste Water Treatment	002	24,872	0.75	5.0	17.0	11.0	<1.0	<1.0	<1.0	<10.0	142.0	<76.0

1999-2000 Water Year Results Summary

Location	Outfall	Area ft^2	Runoff Coeff	TOC (mg/L)			O&G (mg/L)			TSS (mg/L)		
				Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Ave "A"	009, 010	47,370	0.75	4.8	31.6	16.8	<1.0	1.0	<0.5	31.0	425.0	180.3
Buffalo Wallow	004, 007, 008	27,440	0.75	<3.8	70.2	<26.9	<1.0	14.0	<3.6	34.8	1,434.0	345.6
Burma Road Fire Training	005	2,535,628	0.75	2.5	44.3	19.5	<1.0	<1.0	<1.0	5.8	256.5	110.6
Crude Transfer Pipeline	006, 011, 012, 013, 014, 015, 016	810,778	0.85	<5.7	36.8	<18.1	<1.0	<1.0	<1.0	<4.0	925.0	<124.2
East Parcel 1	003	525,000	0.75	3.6	75.4	25.0	<1.0	<1.0	<1.0	<4.0	885.0	<219.2
Waste Water Treatment	002	24,872	0.75	13.4	36.5	21.87	<1.0	7.7	3.2	<4.0	404.0	<188.7

O&G = oil and grease
TOC = total organic carbon
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APPENDIX B

STORM WATER MONITORING AND REPORTING PROGRAM PLAN (SWMRPP)

STORM WATER MONITORING AND REPORTING PROGRAM PLAN

Prepared for:

Valero Benicia Refinery
3400 East Second Street
Benicia, California 94510

Prepared by:

URS Corporation
2520 Venture Oaks Way, Suite 250
Sacramento, California 95833

May 2002

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B-1 Storm Water Contaminant Concentration Summary

1.0 Introduction

This plan documents the basis for and fulfills the requirements of developing a Storm Water Monitoring and Reporting Program Plan (SWMRPP) for the Valero Company U.S.A. refinery located in Benicia, California (see Figure 1-1 of the SWPPP), in compliance with the provisions of the Federal Clean Water Act and the California State Water Resources Control Board. These provisions are currently regulated under Valero Benicia Refinery National Pollutant Discharge Elimination System (NPDES) permit number CA0005550.

Under contract to Valero, URS Corporation (URS) has prepared this SWMRPP in accordance with the provisions of the State Water Resources Control Board General Industrial Storm Water Permit and the current refinery NPDES permit. The SWMRPP was prepared for Valero based on facility inspections, interviews with Valero refinery personnel, and the previous SWMRPP (URS, 2000).

2.0 Identification of Sampling Locations

Monitoring locations for this facility are noted on Figure 1-2 of the SWPPP. All areas described in this plan were identified to require monitoring under the refinery NPDES permit. Designated outfalls are as follows for the monitored areas:

- Seven independent stormwater discharge points (outfalls 006 and 011 through 016 on Figure 1-2 of the SWPPP) will be monitored along the length of the Crude Transfer Pipeline. These seven stormwater discharge points consist of the concrete containment sumps constructed to capture releases should a leak or rupture occur in the pipeline. As a result of the design of these containment sumps, stormwater is collected and managed in accordance with the Valero Spill Prevention Control and Countermeasures Plan.

- One stormwater monitoring point (outfall 005 on Figure 4-4 of the SWPPP) was identified at the Burma Road and Fire Training Surface Drainage Area. The area borders the northern extent of the Refinery Proper.

- One stormwater monitoring point (outfall 003 on Figure 4-5 of the SWPPP) was identified near the Raw Water Break Tank Surface Drainage Area. The area is located at the northeast corner of the Refinery Proper.

- Two stormwater monitoring points (outfalls 009 and 010 on Figure 4-6 of the SWPPP) were identified at the Avenue A Surface Drainage Area, located near the northeast corner of the Refinery Proper.

- Three stormwater monitoring points (outfalls 004, 007, and 008 on Figure 4-7 of the SWPPP) were identified at the Buffalo Wallow Surface Drainage Area, located at the south end of the Refinery Proper, east of Gate 4.

- A final stormwater monitoring point (outfall 002 on Figure 4-8 of the SWPPP) was identified at the Wastewater Treatment Surface Drainage Area. The Wastewater Treatment facility is located south of Highway 680 near the Industrial Parkway exit.

These 15 stormwater monitoring locations will provide the best and most representative samples of the quality of stormwater leaving the refinery. The two remaining topic areas described in the SWPPP were simply cited to document their evaluation. The Refinery Dock and the Coke Silo Area were found to provide no routed or channeled stormwater diversions where adequate flow was available for monitoring. As a result, these areas are not included in this plan.

3.0 Monitoring, Sampling, and Analysis Protocols

The State General Permit established baseline parameters for dry and wet season visual observations during a "significant storm water discharge." A "significant storm water discharge" is a continuous discharge of stormwater for approximately one hour or more.

Current regulation of the dry and wet season observations is covered under the refinery NPDES permit. This section of the SWMRPP discusses the procedures to be used for these observations. Appropriate stormwater sample collection and analysis is also referenced.

3.1 Dry Season Observations

The NPDES permit requires that no less than twice during the dry season (May through September), all dischargers shall observe and/or test for the presence of non-stormwater discharges at all stormwater discharge locations. At a minimum, all dischargers shall conduct visual observations of flows to determine the presence of stains, sludges, odors, and other abnormal conditions. Dye tests, TV line surveys, and/or analysis and validation of accurate piping schematics may be conducted if appropriate.

3.2 Wet Season Observations

The NPDES permit requires that during the wet season (October through April), all dischargers shall conduct visual observations of all stormwater discharge locations during the first hour of one storm event per month that produces significant stormwater discharge to observe the presence of floating and suspended materials, oil and grease, discolorations, turbidity, and odor, etc. An additional stipulation of the Valero NPDES permit requires the documentation of visual observations at outfalls 003, 005, and 006 for every storm event. It should be noted that the General Industrial Storm Water Permit states "dischargers are required to perform visual observations only within daylight hours." Valero will follow the NPDES requirement. Estimated flow for each monitored storm event requires an estimate of generated outfall discharge quantities. Criteria used in calculating outfall discharge quantities is taken partially from the County of *Solano Hydrology and Drainage Design Procedure* manual dated October 1977. The volume of discharge from a given area will be computed by the equation:

$$V = CRA$$

where

V is the volume of stormwater draining from a given area in gallons,
C is a dimensionless runoff coefficient,
R is the rainfall in feet, and
A is the area tributary to the design point, in square feet (also called the drainage area).

The selected runoff coefficient range (.60 to .90 for heavy industry) is for a 10-year return period. The range for heavy industry was utilized for a conservative volume estimate. For areas with less impervious surfaces, such as the compacted soil beneath the Crude Transfer Pipeline, a higher runoff coefficient will be utilized.

An example calculation of the stormwater discharge quantity for outfalls 009 and 010 is done as follows:

Avenue A Surface Drainage Area (includes outfalls 009 and 010):

$$V = 0.75\ (C) \times 0.95\ ft\ (R) \times 47{,}370\ ft^2\ (A) \times 7.48\ gal/ft^3 = 252{,}458\ gallons$$

3.3 Stormwater Sampling and Analysis

The Valero Benicia Refinery is currently covered under NPDES permit number CA0005550. Fifteen outfalls that receive stormwater from the refinery are regulated under this permit. Stipulations and monitoring criteria for the outfalls are an integral part of the NPDES permit, which has been attached to the SWPPP as Appendix A for reference.

3.4 Additional Requirements

Additional requirements of the refinery NPDES permit for site monitoring include the following:

- Conduct an annual inspection of the facility site to identify areas contributing to a stormwater discharge associated with industrial activity and to evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. A record of the annual inspection must include the date of the inspection, the individual(s) who performed the inspection, and the observations.

- Certify, based on the annual site inspection, that the facility is in compliance with the requirements of this plan and its SWPPP. The certification and inspection records must be signed and certified as illustrated in Section 9.0 of this plan. Any noncompliance shall be reported in accordance with Section 8.0 of this plan.

- Perform dry season observations as identified in Section 3.1 of this plan.

- Perform wet season observations as identified in Section 3.2 of this plan.

4.0 Records Retention

All stormwater monitoring information and copies of all reports required by this permit are to be retained for at least five years from the date of the sample, observation, measurement, or report.

These records include:

- The date, place, and time of site inspections, sampling, visual observations, and/or measurements;
- The individual(s) who performed the site inspections, visual observations, and/or measurements;
- Volume measurements or estimates (if required);
- Dry season observations and wet season visual observation records;
- Visual observation exception records;
- All calibration and maintenance records of on-site instruments used; and
- All original strip chart recordings for continuous monitoring instrumentation.

5.0 Exception Documentation

When Valero is unable to perform visual observations due to adverse climatic conditions (drought, extended freeze, dangerous weather conditions, etc.), a description of why the visual observations could not be conducted, including documentation of all significant stormwater discharge events, must be submitted along with the annual monitoring report.

Valero is required to perform visual observations only if significant stormwater discharges commence during scheduled facility operating hours, or within two hours following scheduled facility operating hours.

"Scheduled facility operating hours" are the time periods when the facility is staffed to conduct any function related to industrial activity, including routine maintenance, but excluding time periods where only emergency response, security, and/or janitorial services are performed.

6.0 Noncompliance Reporting

Within 30 days of identification of an instance of noncompliance, Valero must notify the San Francisco Bay Regional Water Quality Control Board. The notification will identify the type of noncompliance, describe the actions necessary to achieve compliance, and present a timetable for achieving compliance. The compliance timetable is subject to modification by the Regional Water Quality Control Board.

A noncompliance notification is also required when Valero cannot certify compliance in the annual report and when other instances of noncompliance occur.

7.0 Annual Reporting

By 1 July of each year, Valero will submit to the Executive Officer of the Regional Water Quality Control Board, a report summarizing the visual observations and sampling results for the previous year. Valero will provide, in the annual report, certification that "based on the annual site inspection, the facility is in compliance with the requirements of this permit and its Storm Water Pollution Prevention Plan." The annual report should also include any documentation pertaining to the usage by Valero of the visual observation exception as detailed in Section 5.0 of this plan.

All reports, certifications or information required by the permit or requested by the Regional Board, State Water Board, U.S. EPA, or local stormwater management agency shall be signed by a responsible corporate officer or by a duly authorized representative.

A responsible corporate officer means:

- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

- The manager of the facility if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

A person is a duly authorized representative if:

- The authorization is made in writing by a person described above and retained as part of the Storm Water Pollution Prevention Plan.

- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

- If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be attached to the Storm Water Pollution Prevention Plan prior to submittal of any reports, certifications, or information signed by the authorized representative.

The signatory page for all submittals required by the permit or requested by the Regional Board, State Water Board, U.S. EPA, or local stormwater management agency shall contain the following statement:

"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 ensure that qualified personnel properly gather and evaluate 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."

8.0 Amending the SWMRPP

Amendments to the plan may include changes and/or revisions by regulatory agencies to the permits, changes in the activities conducted by Valero, changes in the ownership of the company, changes in the event of significant spills or releases that require modifications to the sampling protocol, if required by a regulatory agency, or any changes that may affect the overall stormwater quality discharged by the facility. The revisions will be approved by a designated corporate official. A copy of the plan or amended plan shall be retained on site and made available to regulatory agencies or inspectors as required by law.

9.0 REFERENCES

Valero Storm Water Pollution Prevention Plan (2002).

Valero Best Management Practices Plan (1991).

Valero Oil Spill Contingency Plan (1996).

Valero Spill Prevention Control and Countermeasure (SPCC) Plan (2000).

Valero Dock Operations Manual (1996).

Valero Off-Site Piping Oil Spill Prevention/Mitigation Project Process Specification No. 31-29.

Valero documentation related to any spills requiring regulatory reporting.

Code of Federal Regulations Title 40, Parts 122, 123, 129.

General Industrial Storm Water Permit (CAS000001), State Board Order 91-113-DWQ.

Hydrology and Drainage Design Procedure, County of Solano (October 1977).

Table B-1

Storm Water Contaminant Concentration Summary

1996-1997 Water Year Results Summary

Location	Outfall	Area (ft^2)	Runoff Coeff	TOC (mg/L)			O&G (mg/L)			TSS (mg/L)		
				Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Ave "A"	009, 010	47,370	0.75	4.2	6.5	5.4	1.8	5	<3.4	<4.0	133.2	<68.6
Buffalo Wallow	004, 007, 008	27,440	0.75	2.2	23.8	10.2	<1.0	5	<2.8	3.6	1,598.0	155.7
Burma Road Fire Training	005	2,535,628	0.75	2.5	46.9	<17.1	<1.0	<5.0	<1.9	<4.5	1,598.0	<203.6
Crude Transfer Pipeline	006, 011, 012, 013, 014, 015, 016	810,778	0.85	3.8	28.9	<12.4	<1.0	<5.0	<1.4	4.5	782.0	<85.9
East Parcel 1	003	525,000	0.75	5.2	54.7	<18.2	<1.0	<5.0	<2.0	36.0	498.0	120.0
Waste Water Treatment	002	24,872	0.75	3.9	30.5	17.2	<1.0	<1.0	<1.0	12.7	24.4	18.6

1997-1998 Water Year Results Summary

Location	Outfall	Area ft^2	Runoff Coeff	TOC (mg/L)			O&G (mg/L)			TSS (mg/L)		
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O&G = oil and grease

TOC = total organic carbon

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Table B-1 (Continued)

Storm Water Contaminant Concentration Summary

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Ave "A"	009, 010	47,370	0.75	4.8	31.6	16.8	<1.0	1.0	<0.5	31.0	425.0	180.3
Buffalo Wallow	004, 007, 008	27,440	0.75	<3.8	70.2	<26.9	<1.0	14.0	<3.6	34.8	1,434.0	345.6
Burma Road Fire Training	005	2,535,628	0.75	2.5	44.3	19.5	<1.0	<1.0	<1.0	5.8	256.5	110.6
Crude Transfer Pipeline	006, 011, 012, 013, 014, 015, 016	810,778	0.85	<5.7	36.8	<18.1	<1.0	<1.0	<1.0	<4.0	925.0	<124.2
East Parcel 1	003	525,000	0.75	3.6	75.4	25.0	<1.0	<1.0	<1.0	<4.0	885.0	<219.2
Waste Water Treatment	002	24,872	0.75	13.4	36.5	21.87	<1.0	7.7	3.2	<4.0	404.0	<188.7

O&G = oil and grease
TOC = total organic carbon
TSS = total suspended solids

APPENDIX C

SAMPLE FORMS

Anual SWPPP Facility Inspection Form
Valero Refining Company, U.S.A.
Valero Benicia Refinery

Inspector: _____ Date: _____

	Yes	No
Have there been any spills and/or releases in SWPPP topic areas ?		
Have any significant levels of contamination been detected in SWMRPP samples ?		
Have any of the SWPPP topic areas been re-routed or diverted ?		
Has there been a change in construction or maintenance which may effect storm, surface and/or ground water ?		
Have any additional runoff areas been added to existing SWPPP monitoring locations ?		
Are there any new point source discharges not covered under the NPDES monitoring plan ?		
Does vegetation on banks and/or slopes appear healthy ?		
Do surface drainage swales, dikes and/or channels show signs of wear or failure ?		
Are there any signs of significant wear or degradation of site pavement ?		
Does any secondary containment for the facility show signs of wear or failure ?		
Upon reviewing the SWPPP, do any sections require updating ?		

If the answer to any of the above questions was yes, please elaborate in the space provided below.

_____

_____

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Signature: _____

SWMRPP Site Inspection Form
Valero Refining Company, U.S.A.
Valero Benicia Refinery

Site Name/ID: _____ Date: _____

Inspector: _____

Dry Season Observations (May through September)

	Yes	No
Does there appear to have been a discharge of water at the location recently ?		
Is there any soil staining ?		
Are there any sludges present possibly generated by storm water flow ?		
Are there any odors eminating from the area ?		
Are there any other abnormal conditions at the area ?		

Wet Season Observations (October through April)

	Yes	No
Are there any floating or suspended materials in flowing or stagnant water ?		
Is there any visible oil and grease in flowing or stagnant water ?		
Is there any discoloration visible in flowing or stagnant water ?		
Is there a significant level of turbidity in flowing or stagnant water ?		
Are there any odors eminating from water or soil ?		
Are there any other abnormal conditions at the area ?		

If the answer to any of the above questions was yes, please elaborate in the space provided below.

_____
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Signature: _____

APPENDIX D

SUGGESTED TRAINING ELEMENTS AND EXCERPTS FROM THE BMP GUIDANCE MANUAL

Table D-1

Recommended Elements of Stormwater Pollution Prevention Training Program

Define stormwater pollution.
Summarize regulatory requirements (Clean Water Act, NPDES permit, RWQCB documents).
Present overall strategy (Figure 3-1 in the SWPPP) and describe each element.
Discuss roles and responsibilities of management and operators.
Identify and briefly discuss related programs, manuals, and training that are integrated into the stormwater pollution prevention program (e.g., SPCC Plan, Hazardous Waste Management Plan, etc.).
Introduce baseline BMPs—making sure these get implemented is everyone's responsibility. The attached excerpts from BMP guidance manuals are good reference materials and may be used as handouts during training.
Identify specific areas of concern around the plant and affected outfalls.
Review the list of site-specific BMPs (Table 4-3 of the SWPPP). The attached excerpts from BMP guidance manuals are good reference materials and may be used as handouts during training.
Solicit input on existing BMPs that are not documented in the SWPPP or suggestions for new BMPs that should be implemented.
Discuss annual inspection (confirms that BMPs are in place).

BMP = Best Management Practice
NPDES = National Pollutant Discharge Elimination System
RWQCB = (San Francisco Bay) Regional Water Quality Control Board
SPCC = Spill Prevention Control and Countermeasure
SWPPP = Storm Water Pollution Prevention Plan

Excerpts from BMP Guidance Material

Sources: Pages A-2 through A-21, Kennedy/Jenks Consultants, 1995.

Pages A-22 through A-26, Camp Dresser and McKee, et al., 1993a.

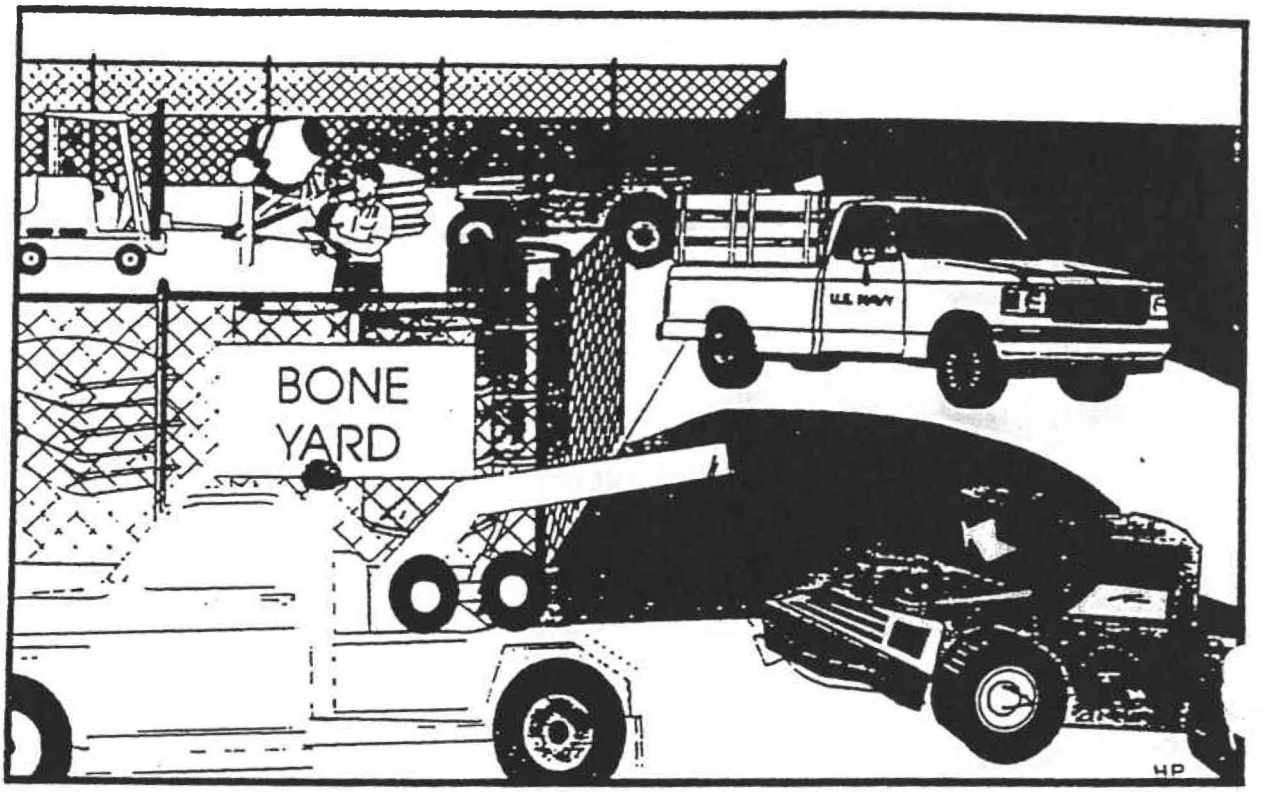
Pages A-27 through A-32, Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

Pages A-33 through A-48, Camp Dresser and McKee, et al., 1993b.

Pages A-49 through A-50, Camp Dresser and McKee, et al., 1993a.

Pages A-51 through A-55, Camp Dresser and McKee, et al., 1993b.

BMP 032 - Dispose of Obsolete Equipment, Inoperable Vehicles, and Surplus Materials



Description of Potential Pollutant and Source: Obsolete equipment, inoperable vehicles, and surplus materials are often stored in areas not subject to routine inspection. These materials often leak a variety of fluids which can be exposed to storm water.

Description of BMP: Proper off-site disposal of obsolete equipment, inoperable vehicles, and surplus materials reduces the chances of pollutants reaching storm water.

Application Guidance: This practice will be implemented quarterly.

The frequency for implementing of this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementers to make judgements based on facility operations and conditions. To assign frequencies other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low.

If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. However, the goal of implementing this BMP will be to minimize exposure of pollutants to storm water.

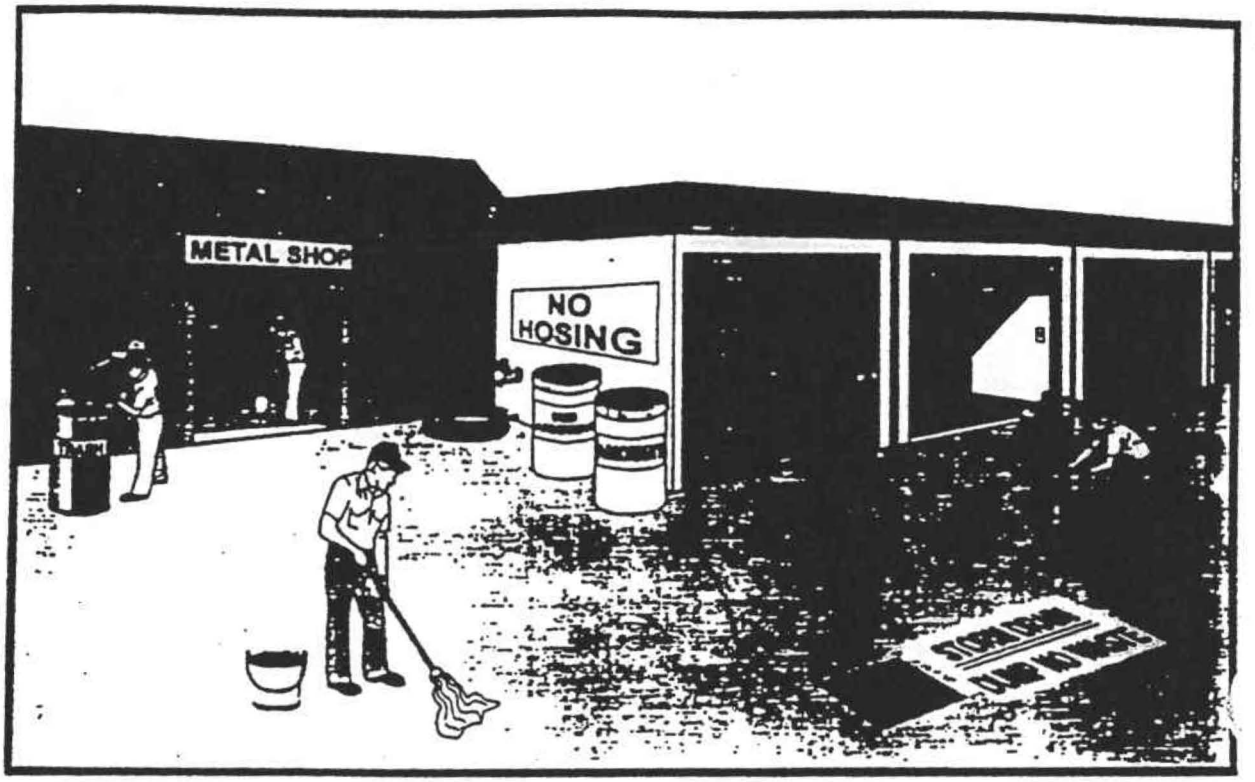
CRITERIA	RATING H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Quantity of significant materials potentially exposed	
Toxicity of significant materials potentially exposed	
Evidence of exposure (e.g., stains on pavement, evidence of significant material in drainage system)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: N/A

Effectiveness and Cost: Disposing of unused equipment and supplies is a highly effective, moderate-cost BMP.

Limitations: None

BMP 004 - Avoid Hosing Down the Site



Description of Potential Pollutant and Source: Cleaning work sites by hosing down causes wash water to transport pollutants to the storm drain where it can be exposed to storm water.

Description of BMP: Cleaning the work site by hosing down will be avoided and dry methods of cleaning will be used. Dry methods include sweeping or using damp rags or mops. If possible or practical, hoses will be removed. If hosing down is unavoidable, the downstream drain will be temporarily plugged as described in the following BMPs:

- BMP 023 - Place Portable Rubber Mats Over Storm Drain Inlets
- BMP 024 - Insert Filter In Catch Basin
- BMP 025 - Place Absorbent Blankets In Catch Basin

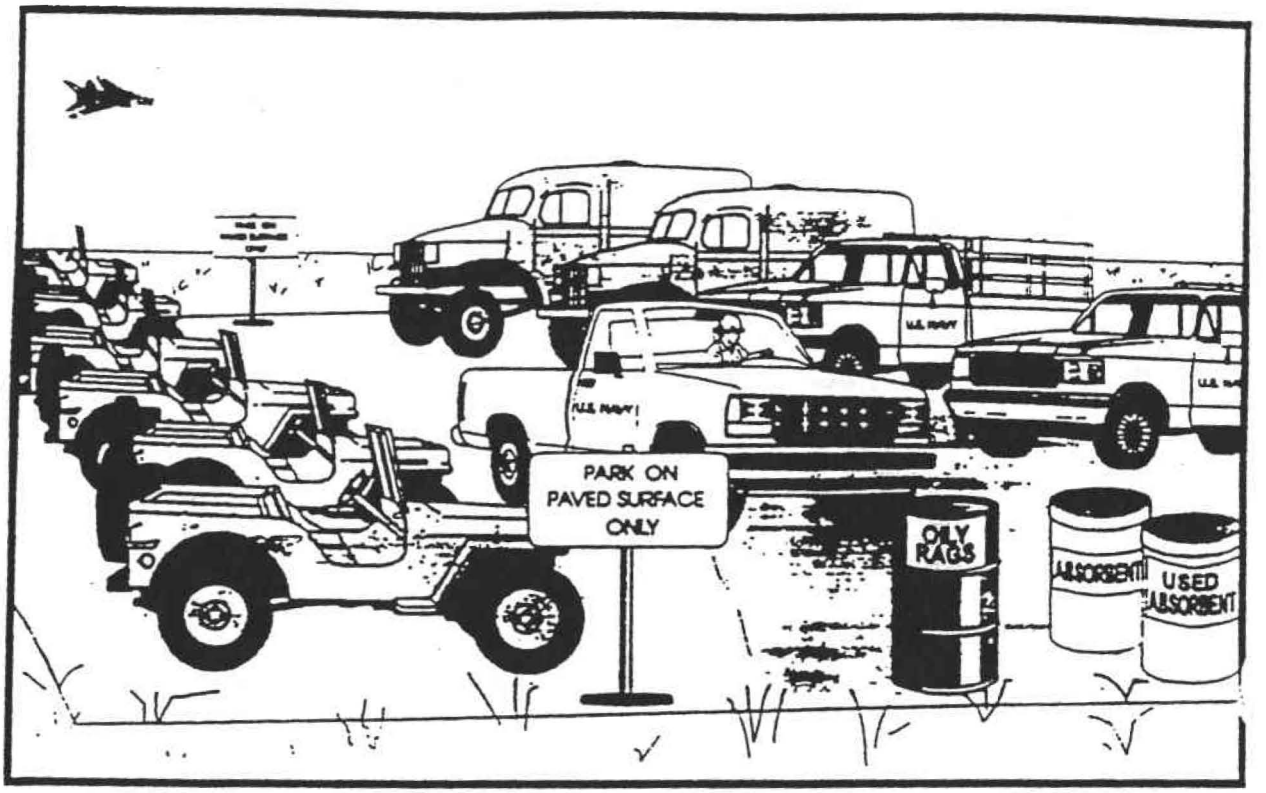
Application Guidance: Methods of dry cleaning will be used whenever possible at all work stations, loading/unloading sites, maintenance sites, storage areas, and parking lots.

Training: New personnel will be notified of the policy; signs should be posted. If possible or practical, hoses should be removed.

Effectiveness and Cost: Eliminating hosing down is a highly effective, low-cost BMP.

Limitations: None

BMP 037 - Park Vehicles on an Impervious Surface



Description: Pollutants leaking or spilled onto the ground surface from vehicles can infiltrate into the soil. These pollutants (i.e., oil, fuel, etc.) may then be exposed to storm water and transported to surface water.

Description of BMP: Vehicles will be parked on an impervious surface. For this BMP, an impervious surface is defined as a surface that cannot be readily penetrated by rainfall, such as concrete and asphalt pavement. Leaks and spills will be cleaned from these surfaces.

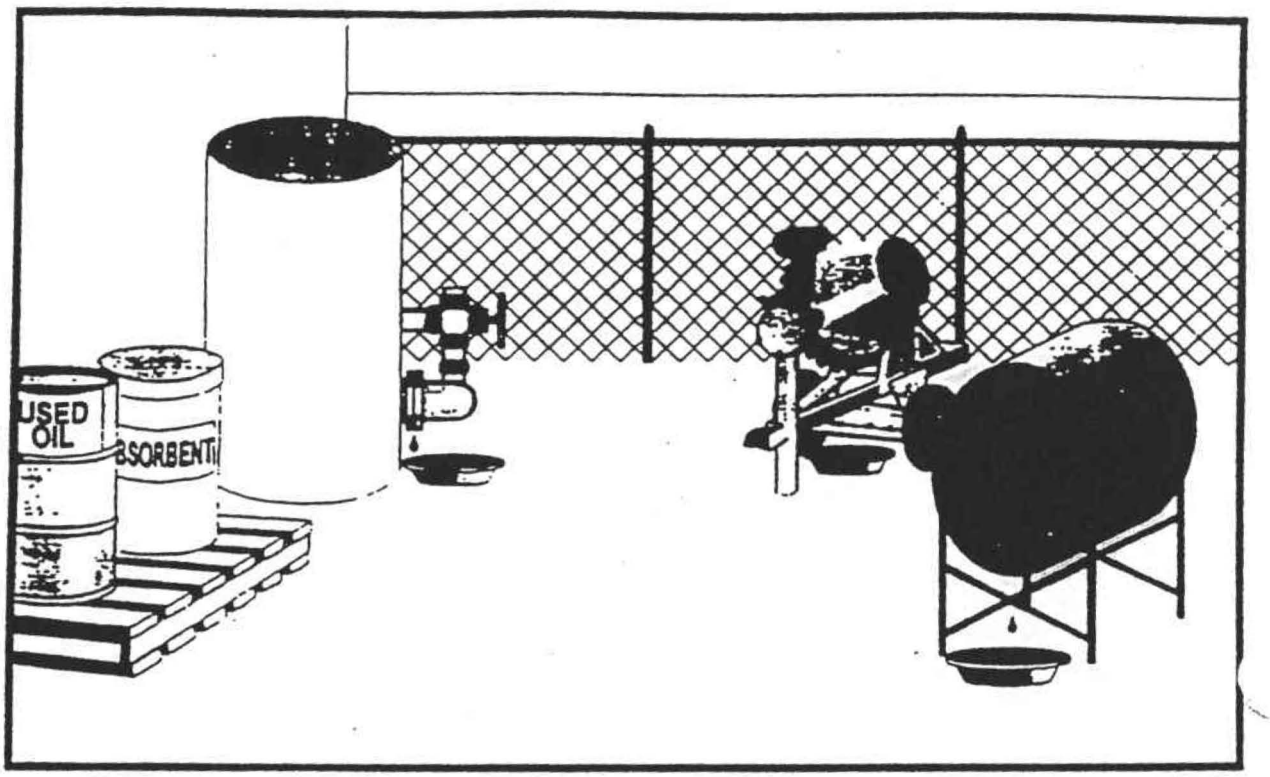
Application Guidance: Vehicles will always be parked on impervious surfaces, especially during the rainy season.

Training: Signs will be posted to remind personnel that all vehicles are to be parked on paved surfaces.

Effectiveness and Cost: Parking vehicles on impervious surfaces is a moderately effective, low-cost BMP.

Limitations: Very large traffic volumes may make implementation of this BMP difficult.

BMP 044 - Use Drip Pans under Leaking Equipment



Description of Potential Pollutants and Source: Equipment such as pumps, air conditioners, and boilers may leak fluids. These fluids typically contain pollutants that may be exposed to storm water and transported into the storm sewer system if they are not collected.

Description of BMP: Drip pans will be placed under leaking equipment to collect any leaking fluid. This temporary BMP will be used until the equipment is properly repaired or replaced.

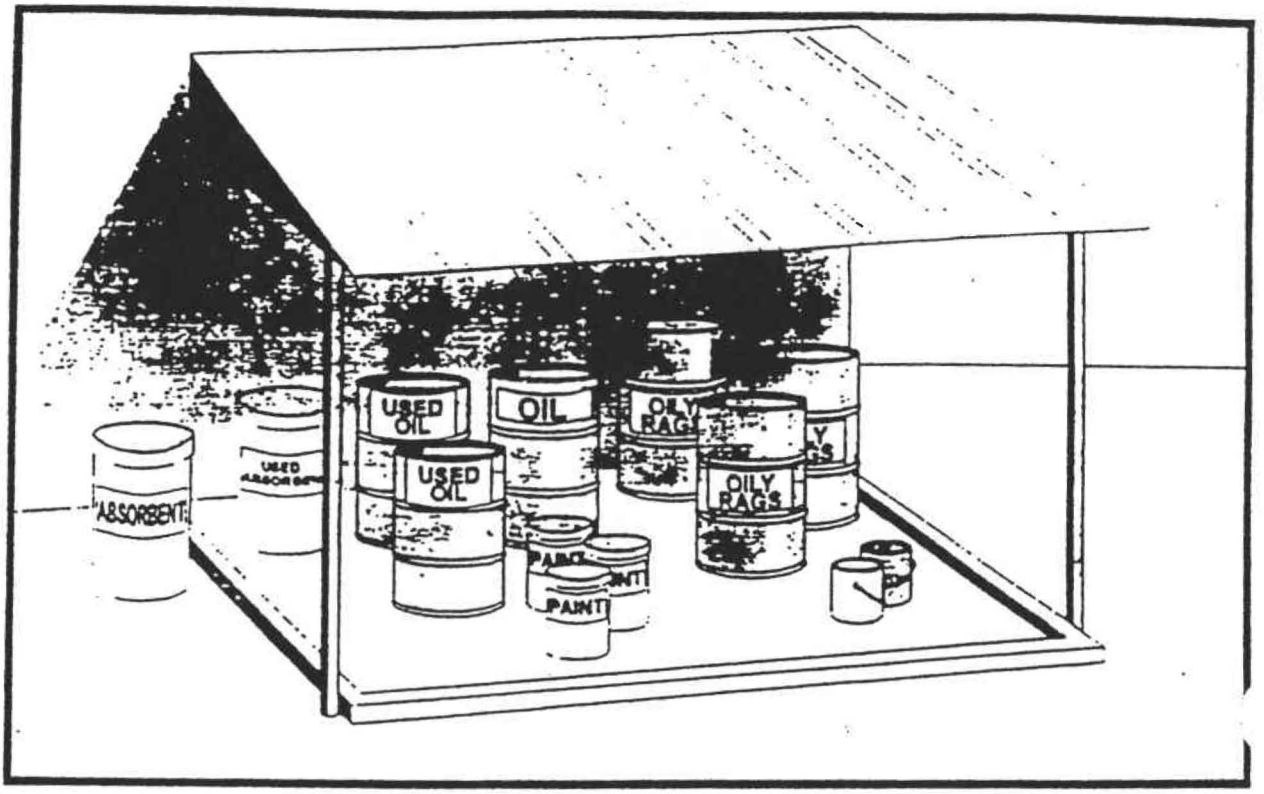
Application Guidance: Any equipment which is leaking fluid will be repaired or replaced. However, until the leak is stopped, a drip pan will be used to collect the fluid.

Training: Personnel will be trained to immediately place a drip pan under leaking equipment and notify the appropriate maintenance personnel. The drip pan will be routinely checked and the collected material disposed properly.

Effectiveness and Cost: This is a highly effective, low-cost BMP.

Limitations: None

BMP 061B - Store Liquids and Significant Materials within a Building or Covered Area



Description of Potential Pollutant and Source: Many significant materials may be leaked or spilled during storage, handling, or transport. If significant materials are stored outside, in covered areas, these materials can be exposed to storm water, which can transport the leaked or spilled material into the storm drain system.

Description of BMP: To the extent practical, significant materials will be stored within a building or covered area. The materials will be stored on an impervious surface, such as a concrete pad. Rainfall runoff from the pad will be directed to a storm water treatment facility or contained. Leaks and spills will be cleaned up as soon as possible using rags or dry absorbents (see BMP 006). Used rags and absorbents will be disposed of properly. Any wash water from cleaning the floor will be disposed of in the sanitary sewer (see BMP 042).

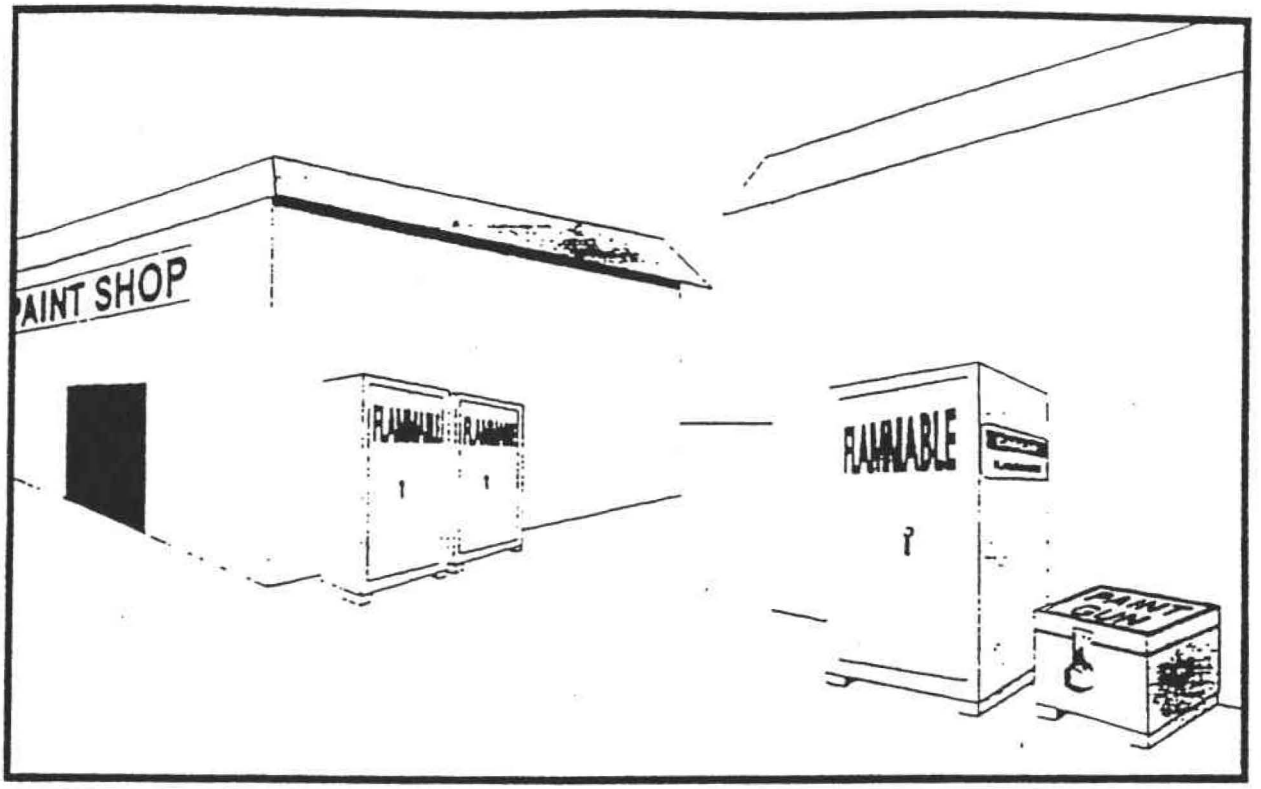
Application Guidance: All significant materials will be stored within a building or covered area.

Training: Personnel will be trained to store significant materials in designated areas.

Effectiveness and Cost: This is a moderately effective BMP. The cost will vary based on whether a building for storing the substances is available.

Limitations: None

BMP 115 - Store Containers Inside Secondary Containment



Description of Potential Pollutant and Source: Improper storage of containers of significant materials can result in the release of materials and chemicals that can cause storm water runoff pollution. Secondary containment can prevent storm water runoff pollution.

Description of BMP: Containers will be properly stored. Containers of significant materials will be stored inside secondary containment cabinets appropriate to the size and quantity of the substances stored. Cabinets will have covered shelves and provide secondary containment for spills of the substances that spill inside the cabinets. In many instances the cabinets will be locked to restrict access to the substances. Metal lockers typically used to store flammable substances are usually appropriate for preventing contact between significant materials and storm water.

The secondary containment will be placed away from vehicle traffic routes to reduce the potential for mechanical impact and accidental spills.

A manifest list of the materials stored inside the locker should be posted on or inside the locker.

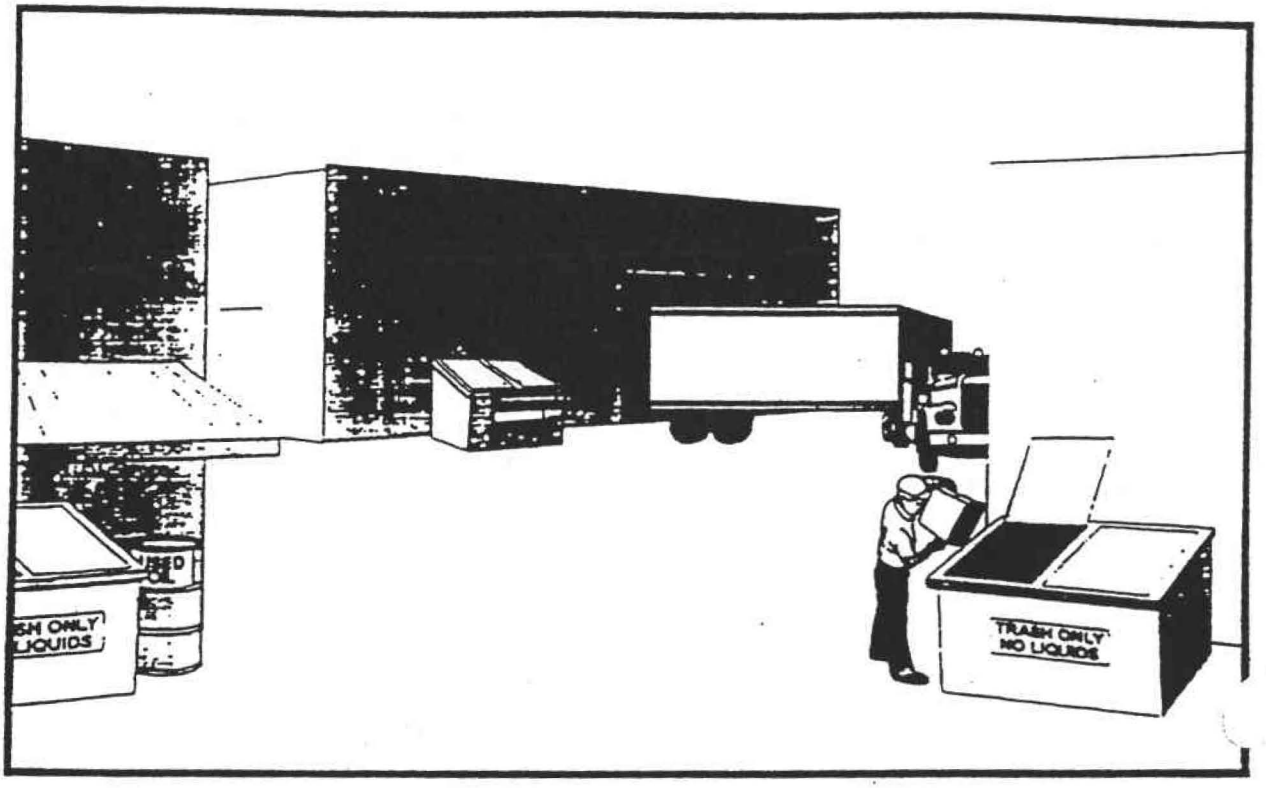
Application Guidance: Containers will always be properly stored.

Training: Personnel will be trained in preventing substances stored outside from entering the storm water and storing substance effectively.

Effectiveness and Cost: This is a moderately effective, low-cost BMP.

Limitations: None

BMP 007 - Place Trash Receptacles at Appropriate Locations



Description of Potential Pollutant and Source: Improperly located or insufficient numbers of trash receptacles will promote poor housekeeping practices. This will increase the opportunity for pollutants from all source areas to reach storm water.

Description of BMP: Proper and frequent placement of trash receptacles will promote the proper disposal of waste materials. This reduces the opportunity for pollutants to reach storm water. Trash receptacles will be easily accessible for personnel.

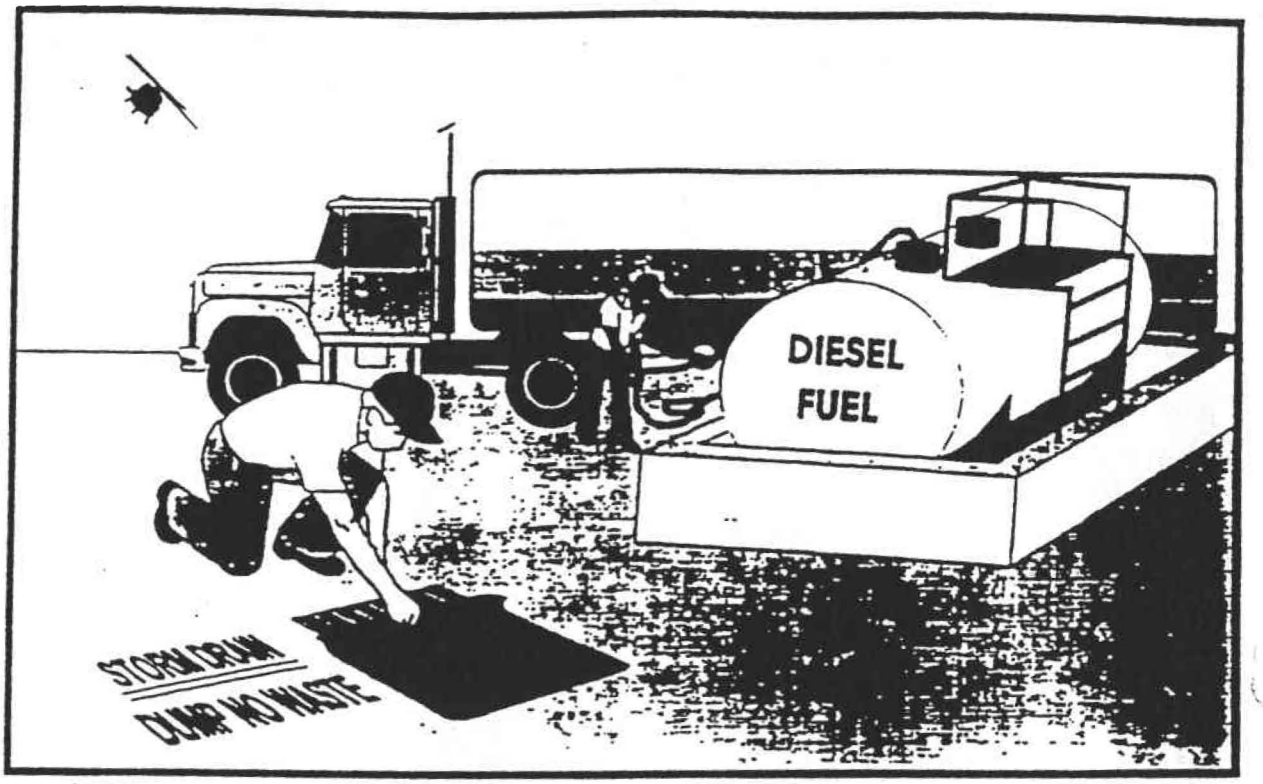
Application Guidance: Placement of trash receptacles at appropriate locations will always be practiced.

Training: Personnel will be trained as to the location of trash receptacles.

Effectiveness and Cost: Appropriately located trash receptacles are an effective, low-cost BMP.

Limitations: None

BMP 023 - Place Portable Rubber Mats over Storm Drain Inlets



Description of Potential Pollutant and Source: Spills are more likely to occur during certain operations, such as materials transfer. If these operations occur near a storm drain, the material may be discharged into the storm drain system.

Description of BMP: If operations which are likely to spill significant materials occur near a storm drain, a rubber portable mat will be placed over the storm drain during the operation. If a spill occurs during the operation, the mat will prevent the pollutant from entering the storm drain system. The spilled material can be properly cleaned up and disposed of before removal of the rubber mat.

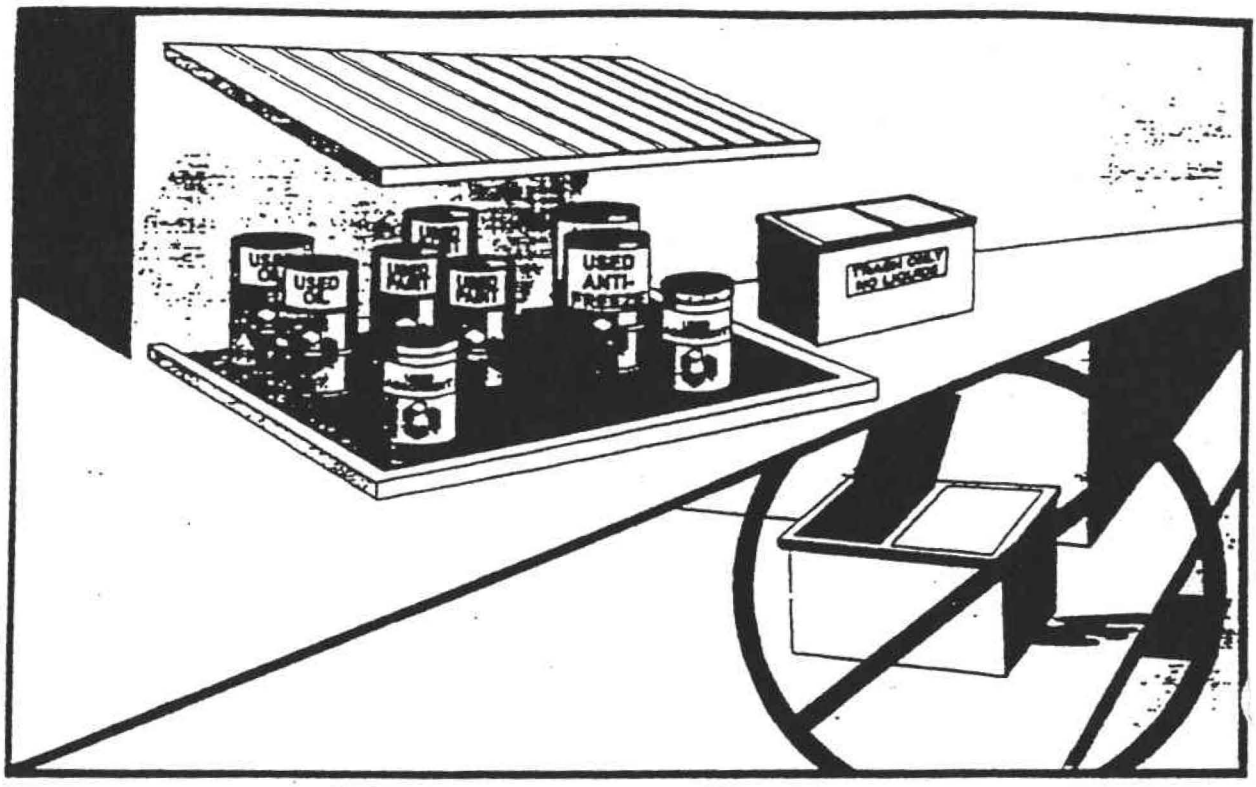
Application Guidance: Portable rubber mats will be placed over the storm drain for the duration of any operation which is likely to discharge pollutants into the storm drain.

Training: Personnel will be trained regarding the use of the portable mat. In addition, personnel will be trained in proper cleanup and disposal of any spilled material.

Effectiveness and Cost: This is a highly effective, low-cost BMP.

Limitations: This BMP works best on flat storm drain inlets.

BMP 016 - Store Waste and Recycling Materials in Proper Containers



Description of Potential Pollutant and Source: Dry waste, including items such as scrap metal, floor sweepings, metal chips, and paper goods, can be dispersed by wind or operational error if not stored properly. If a dumpster's lid is not kept closed, animals may carry garbage out of the containers. Uncovered dumpsters also expose waste to storm water, which may leak out of the dumpster and into the storm sewer system.

Description of BMP: Waste and recycling drums and containers will be located in centralized areas that provide proper labeling (both containers and location) and easy access. If possible, the area will have secondary containment (see BMPs 012, 013, and 014). Waste containers will be emptied regularly. Dumpsters will all have lids; lids should be kept closed when not in use. If the dumpster has inadequate capacity and it is not possible to keep the cover closed, the frequency of pick-up will be increased, or the dumpster will be replaced with a model of greater capacity.

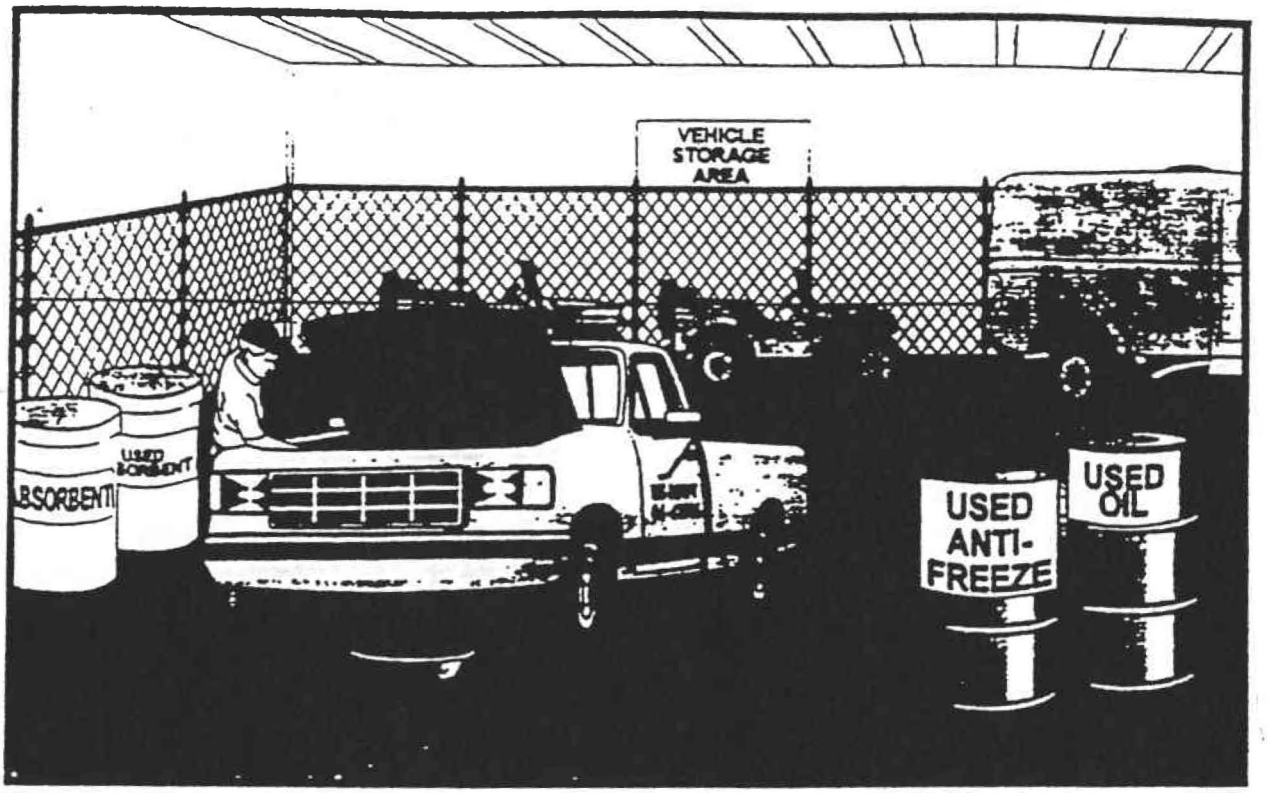
Application Guidance: This practice will be followed wherever waste material, including recycled materials, is stored.

Training: Personnel will be notified of the location of dry waste disposal areas and the proper transportation methods to the sites. Personnel will also be reminded to always keep dumpster lid closed. Signs may be posted at each area indicating type of waste to be disposed depending on need.

Effectiveness and Cost: Controlled waste areas are a moderately effective, low-cost BMP.

Limitations: None

BMP 039 - Drain All Fluids From Stored or Salvaged Vehicles and Equipment



Description of Potential Pollutant and Source: Vehicles and equipment undergoing long-term storage or salvage often contain a variety of liquids (oil, antifreeze, hydraulic fluid, etc.) that can leak or spill, thereby exposing these materials to storm water.

Description of BMP: All oil and other fluids will be drained, collected, and recycled from vehicles being stored long term or salvaged (i.e., parts vehicles).

Application Guidance: Vehicles or equipment that are to be stored without use for more than three months will be drained of all fluids. Signs will be posted on these vehicles from which fluids have been drained.

The frequency for implementing of this BMP has been provided as general guidance. However, a facility operator may wish to establish a more suitable frequency. This will require SWPPP implementers to make judgements based on facility operations and conditions. To assign frequencies other than what has been suggested (i.e., more or less frequent), the following criteria will be considered and rated either High, Medium, or Low.

If many of the criteria are assigned a High rating, the frequency may be increased. Similarly, if many criteria are assigned a Low rating, the frequency may be decreased. However, the goal of implementing this BMP will be to minimize exposure of pollutants to storm water.

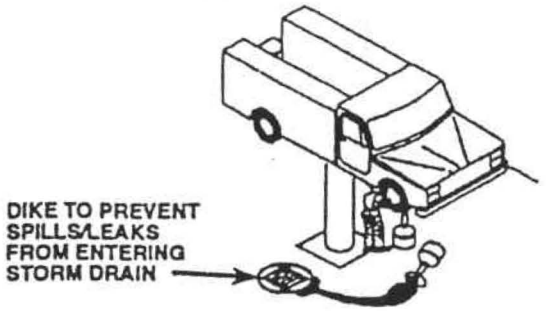
CRITERIA	RATING H=High M=Medium L=Low
Probability of exposure of significant materials to storm water	
Old age or poor condition of equipment and vehicles	
Evidence of exposure (e.g., stains on pavement)	
Proximity of source area to outfall or receiving water	
Sensitivity of receiving water to potentially exposed significant materials (e.g., waters with beneficial uses such as human contact, recreation, significant species habitat, etc.)	

Training: Signs will be posted as reminders to personnel.

Effectiveness and Cost: Draining oil and fluids is a moderately effective, low-cost BMP.

Limitations: None

ACTIVITY: VEHICLE AND EQUIPMENT MAINTENANCE AND REPAIR



Applications

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

DESCRIPTION

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

APPROACH

- Keep equipment clean, don't allow excessive build-up of oil and grease.
- Keep drip pans or containers under the areas that might drip.
- Do not change motor oil or perform equipment maintenance in non-appropriate areas. Use a vehicle maintenance area designed to prevent storm water pollution.
- Inspect equipment for leaks on a regular basis.
- Segregate wastes.
- Make sure oil filters are completely drained and crushed before recycling or disposal..
- Make sure incoming vehicles are checked for leaking oil and fluids.
- Clean yard storm drain inlets(s) regularly and especially after large storms.
- Do not pour materials down drains or hose down work areas; use dry sweeping.
- Store idle equipment under cover.
- Drain all fluids from wrecked vehicles.
- Recycle greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic, and transmission fluids.
- Switch to non-toxic chemicals for maintenance when possible.
- Clean small spills with rags, general clean-up with damp mops and larger spills with absorbent material.
- Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.
- Train employees.
- Minimize use of solvents.
- For a quick reference on disposal alternatives for specific wastes see Table 4.1, SC1.

REQUIREMENTS

- Costs (Capital, O&M) - Should be low, but will vary depending on the size of the facility.
- Maintenance - Should be low if procedures for the approach are followed.

LIMITATIONS

- Space and time limitations may preclude all work being conducted indoors.
- It may not be possible to contain and clean up spills from vehicles/equipment brought on-site after working hours.
- Drain pans (usually 1 ft. x 1 ft.) are generally too small to contain antifreeze, which may gush from some vehicles, so drip pans (3 ft. x 3 ft.) may have to be purchased or fabricated.
- Dry floor cleaning methods may not be sufficient for some spills. Use three-step method instead.
- Identification of engine leaks may require some use of solvents.

Targeted Constituents

- ○ Sediment
- ○ Nutrients
- ● Heavy Metals
- ● Toxic Materials
- ○ Floatable Materials
- ○ Oxygen Demanding Substances
- ● Oil & Grease
- ○ Bacteria & Viruses

● Likely to Have Significant Impact
○ Probable Low or Unknown Impact

Implementation Requirements

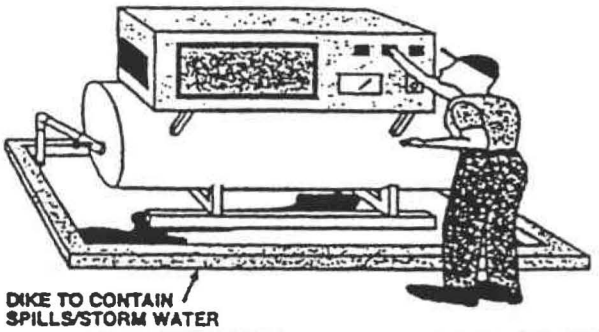
- ○ Capital Costs
- ◒ O&M Costs
- ◒ Maintenance
- ◒ Training

● High ○ Low

SC4

Best Management Practices

ACTIVITY: OUTDOOR PROCESS EQUIPMENT OPERATIONS AND MAINTENANCE



Applications

- Manufacturing
- Material Handling
- Vehicle Maintenance
- Construction
- Commercial Activities
- Roadways
- Waste Containment
- Housekeeping Practices

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from outdoor process equipment operations and maintenance by reducing the amount of waste created, enclosing or covering all or some of the equipment, installing secondary containment, and training employees.

APPROACH

- Alter the activity to prevent exposure of pollutants to storm water.
- Move activity indoors.
- Cover the area with a permanent roof.
- Minimize contact of storm water with outside manufacturing operations through berming and drainage routing (run on prevention).
- Connect process equipment area to pubic sewer or facility wastewater treatment system.
- Clean regularly the storm drainage system.
- Use catch basin filtration inserts (Chapter 5, TC6, Media Filtration) as a means to capture particulate pollutants.
- Some municipalities require that secondary containment areas (regardless of size) be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

REQUIREMENTS

- Costs (Capital, O&M)
  - Variable depending on the complexity of the operation and the amount of control necessary for storm water pollution control..
- Maintenance
  - Routine preventive maintenance, including checking process equipment for leaks.

LIMITATIONS

- Providing cover may be expensive.
- Space limitations may preclude enclosing some equipment.
- Storage sheds often must meet building and fire code requirements.

Targeted Constituents

- ● Sediment
- ○ Nutrients
- ● Heavy Metals
- ● Toxic Materials
- ○ Floatable Materials
- ○ Oxygen Demanding Substances
- ● Oil & Grease
- ○ Bacteria & Viruses

● Likely to Have Significant Impact
○ Probable Low or Unknown Impact

Implementation Requirements

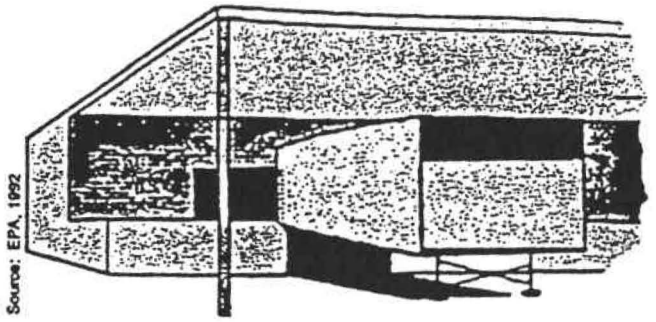
- ● Capital Costs
- ◒ O&M Costs
- ◒ Maintenance
- ◒ Training

● High ○ Low

SC7

Best Management Practices

ACTIVITY: OUTDOOR LOADING/UNLOADING OF MATERIALS



Source: EPA, 1992

Applications

- *Manufacturing*
- *Material Handling*
- *Vehicle Maintenance*
- *Construction*
- *Commercial Activities*
- *Roadways*
- *Waste Containment*
- *Housekeeping Practices*

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from outdoor loading/unloading of materials.

APPROACH

- Park tank trucks or delivery vehicles so that spills or leaks can be contained.
- Cover the loading/unloading docks to reduce exposure of materials to rain.
- Seal or door skirt between trailer and building can also prevent exposure to rain.
- Design loading/unloading area to prevent storm water runon:
  - grading or berming, and
  - position roof downspouts to direct storm water away from loading/unloading areas.
- Contain leaks during transfer.
- Use drip pans under hoses.
- Make sure fork lift operators are properly trained.
- Employee training for spill containment and cleanup.

REQUIREMENTS

- Costs (Capital, O&M) - Should be low except when covering a large loading/unloading area.
- Maintenance
  - Conduct regular inspections and make repairs as necessary. The frequency of repairs will depend on the age of the facility.
  - Check loading and unloading equipment regularly for leaks:
    - valves,
    - pumps,
    - flanges, and
    - connections.

LIMITATIONS

- Space and time limitations may preclude all transfers from being performed indoors or under cover.
- It may not be possible to conduct transfers only during dry weather.

Targeted Constituents

- ○ *Sediment*
- ● *Nutrients*
- ● *Heavy Metals*
- ● *Toxic Materials*
- ● *Floatable Materials*
- ● *Oxygen Demanding Substances*
- ● *Oil & Grease*
- ○ *Bacteria & Viruses*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

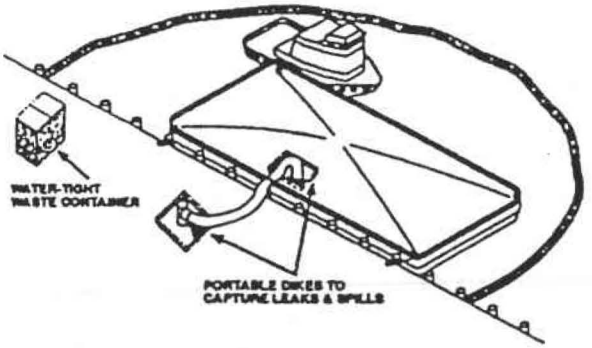
- ◒ *Capital Costs*
- ○ *O&M Costs*
- ○ *Maintenance*
- ◒ *Training*

● *High* ○ *Low*

SC5

Best Management Practices

ACTIVITY: OVER-WATER ACTIVITIES



Applications

- Manufacturing
- (Material Handling)
- Vehicle Maintenance
- Construction
- (Commercial Activities)
- Roadways
- (Waste Containment)
- (Housekeeping Practices)

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water and receiving waters from over-water activities by minimizing over-water maintenance, keeping wastes out of the water, cleaning up spills and wastes immediately, and educating tenants and employees.

APPROACH

- Properly dispose of domestic wastewater and ballast water.
- Limit over-water hull surface maintenance to sanding and minor painting.
- Use phosphate-free and biodegradable detergents for hull washing.
- Use secondary containment on paint cans.
- Have available spill containment and cleanup materials.
- Use ground cloths when painting boats on land.
- Use tarps, plastic sheeting, etc. to contain spray paint and blasting sand.
- Properly dispose of surface chips, used blasting sand, residual paints, and other materials. Use temporary storage containment that is not exposed to rain.
- Immediately clean up spills on docks or boats.
- Sweep drydocks before flooding.
- Clean catch basins and the storm drains at regular intervals.
- Post signs to indicate proper use and disposal of residual paints, rags, used oil, and other engine fluids.
- Educate tenants and employees on spill prevention and cleanup.
- Include appropriate language in tenant contracts indicating their responsibilities.
- Marinas should provide wastewater disposal facilities.

REQUIREMENTS

- Cost (Capital, O&M)
  - Most of the BMPs are of low and modest cost. Exceptions are stations for temporary storage of residual paints and engine fluids, and wastewater pumpout facilities.
- Maintenance
  - Keep ample supply of spill cleanup materials.

LIMITATIONS

Private tenants at marinas may resist restrictions on shipboard painting and maintenance. Existing contracts with tenants may not allow the owner to require that tenants abide by new rules that benefit water quality. Even biodegradable cleaning agents have been found to be toxic to fish.

Targeted Constituents

- ○ Sediment
- ○ Nutrients
- ● Heavy Metals
- ● Toxic Materials
- ● Floatable Materials
- ● Oxygen Demanding Substances
- ● Oil & Grease
- ● Bacteria & Viruses

● Likely to Have Significant Impact
○ Probable Low or Unknown Impact

Implementation Requirements

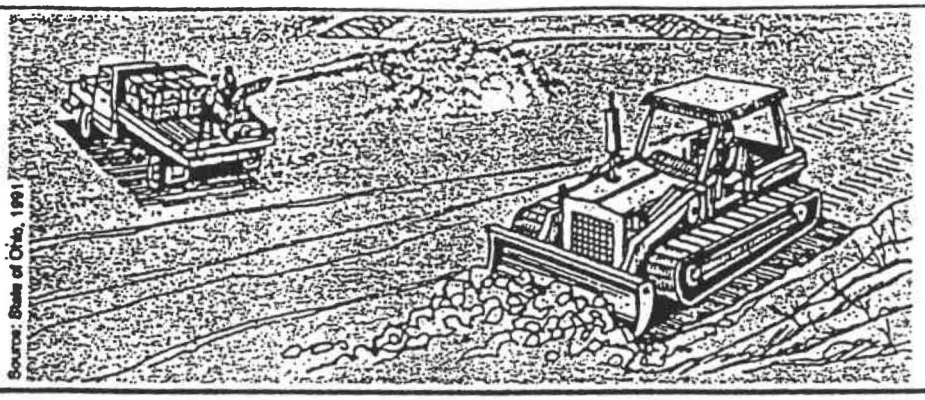
- ○ Capital Costs
- ◒ O&M Costs
- ◒ Maintenance
- ◒ Training

● High ○ Low

SC13

Best Management Practices

ACTIVITY: CONTAMINATED OR ERODIBLE SURFACE AREAS



DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from contaminated or erodible surface areas by leaving as much vegetation on-site as possible, minimizing soil exposure time, stabilizing exposed soils, and preventing storm water runon and runoff.

APPROACH

This BMP addresses soils which are not so contaminated as to exceed criteria (see Title 22 California Code of Regulations for Hazardous Waste Criteria), but the soil is eroding and carrying pollutants off in the storm water.

Contaminated or erodible surface areas can be controlled by:

- Preservation of natural vegetation,
- Re-vegetation,
- Chemical stabilization,
- Removal of contaminated soils, or
- Geosynthetics.
- For a quick reference on disposal alternatives for specific wastes see Table 4.1, SC1.

REQUIREMENTS

- Cost (Capital, O&M)
  - Except for preservation of natural vegetation, each of the above solutions can be quite expensive depending upon the size of the area.
- Maintenance
  - Maintenance should be minimal, except possibly if irrigation of vegetation is necessary.

LIMITATIONS

Disadvantages of preserving natural vegetation or re-vegetating include:

- Requires substantial planning to preserve and maintain the existing vegetation.
- May not be cost-effective with high land costs.
- Lack of rainfall and/or poor soils may limit the success of re-vegetated areas.

Disadvantages of chemical stabilization include:

- Creation of impervious surfaces.
- May cause harmful effects on water quality.
- Is usually more expensive than vegetative cover.

Applications

- Manufacturing
- Material Handling
- Vehicle Maintenance
- (Construction)
- Commercial Activities
- (Roadways)
- Waste Containment
- Housekeeping Practices

Targeted Constituents

- ● Sediment
- ● Nutrients
- ● Heavy Metals
- ● Toxic Materials
- ● Floatable Materials
- ● Oxygen Demanding Substances
- ● Oil & Grease
- ○ Bacteria & Viruses

● Likely to Have Significant Impact
○ Probable Low or Unknown Impact

Implementation Requirements

- ◒ Capital Costs
- ◒ O&M Costs
- ○ Maintenance
- ○ Training

● High ○ Low

SC10

Best Management Practices

3. Spill Prevention, Control, and Cleanup

Small spills can have cumulative effects that add up to a significant source of potential pollutants in your storm water discharge. The best approach by far is to prevent spills and leaks: maintain a regular inspection and repair schedule, and correct potential spill situations before a spill can occur. Some prevention techniques are described in Sections 4, 5, and 6.

When a spill does occur, quick and effective response is the best way to prevent pollutants from reaching storm water. Prepare a set of well-defined procedures for responding to a spill of any liquids in an area that might be exposed to storm water. The procedures can be specific for your facility, and should consider all circumstances from small, minor releases that can be easily handled to a large emergency spill — including who to call to respond to the situation before it gets out of hand. Train employees in the procedures (Section 1).

The basic procedures should emphasize that spills be cleaned up promptly, not allowed to evaporate. Otherwise, pollutants remain on the pavement and may be washed to the storm drains with the next rain, or will remain in the soil to become a possible groundwater pollutant. If the spill is on an unpaved surface, determine whether you need to remove the contaminated soil to prevent it from being a source of future storm water pollutants.

Also, the standard procedures should specify cleaning up leaks, drips, and other spills without water whenever possible. Do not use a hose or wet mop to clean up a spill area. Hosing may remove the spill from the immediate area, but does not keep the pollutant out of the environment. On the contrary, it adds to the volume of the spill and spreads the spilled material around a larger area.

If you handle hazardous materials, spill prevention and response procedures are described in your hazardous materials management plan, filed with your fire department or other hazardous materials ("HazMat") authority (see Section 6). If a spill occurs, notify the authorities as required in your emergency response plan. Contain and collect the spilled substance, then dispose of the substances and any contaminated soil in compliance with hazardous materials regulations.

Small spills are those which can be wiped up with a shop rag. Don't put wet rags in the dumpster with the shop trash: store them in a covered rag bin, of the kind used at auto service stations. Avoid paper towels. You can avoid making this a waste stream by sending used rags to a professional cleaning service. (You need to inform your cleaning service of what the shop rags have been used for.) Do not saturate rags with gasoline, solvents, or other volatile liquids.

Medium-sized spills are too large to wipe up with a rag and require more attention. Contain and soak up the liquid using dry absorbent material such as vermiculite, specially-prepared sawdust, or "cat litter." Absorbent "snakes" may be used as temporary booms to contain and soak up the liquid. Sweep up the used absorbent and snakes and dispose of them appropriately: with the shop trash if non-hazardous, with the hazardous wastes if necessary. Another convenient option is to use a wet/dry shop vacuum cleaner to collect spills, and dispose of the liquid with your liquid or hazardous wastes. *Do not* use vacuums for gasoline, solvents or other volatile fluids, because the enclosed vacuum may become an explosion hazard.

Larger spills must be contained, then cleaned up. For spills of food waste or other non-hazardous liquid, take steps to contain and clean up the liquid, and minimize the wash water used in cleanup. Shut off or plug storm drain inlets or sewer inlets where the spill may enter. If necessary, keep temporary plugs on hand to fit your inlets and train employees in when and how to use them. For hazardous materials spills, implement your emergency procedures and alert your HazMat authority.

Wipe up small spills immediately with shop rags.

5. Outdoor Materials Storage and Handling

If you handle **bulk solid materials** outdoors, keep them covered, in appropriate containments, and protected from storm water. Apply this policy for raw materials, products, by-products, and construction materials or supplies. Materials of concern include gravel, sand, lumber, topsoil, compost, concrete, packing materials, metal products, and others.

Store the material in one of these ways:

- The preferred method is storage on a paved surface with a roof or covering so that no direct rainfall contacts them, and with appropriate berms or mounding to prevent run-on of storm water. Roofs are required by most municipalities for new facilities.
- Where a roof is not feasible, store on a specially constructed paved area with a drainage system. Pave the area with a slope of about 1.5% to minimize water pooling. Prevent runoff and run-on with berms or curbing along the perimeter. For many materials, the preferred alternative will be the installation of *no drain* and the testing and pumping of ponded water to the sanitary sewer, a treatment sytem, or offsite disposal as appropriate. Discharge to the storm drain is not allowed for many materials.
- Where a drain is allowed, install longitudinal drains that lead to treatment facilities or water quality catch basins along the lower edge of the pad. You may need a permit from your wastewater authority to discharge to the sanitary sewer, or may need the Regional Board to allow special provisions in your storm water NPDES permit (the General Permit).
- As a temporary arrangement, place the material on a paved surface and cover it with plastic sheeting, secured with weighted tires or sand bags. If possible, choose a mounded or bermed area that will prevent run-on of storm water through the material. Move the materials to a permanent storage place as soon as possible.

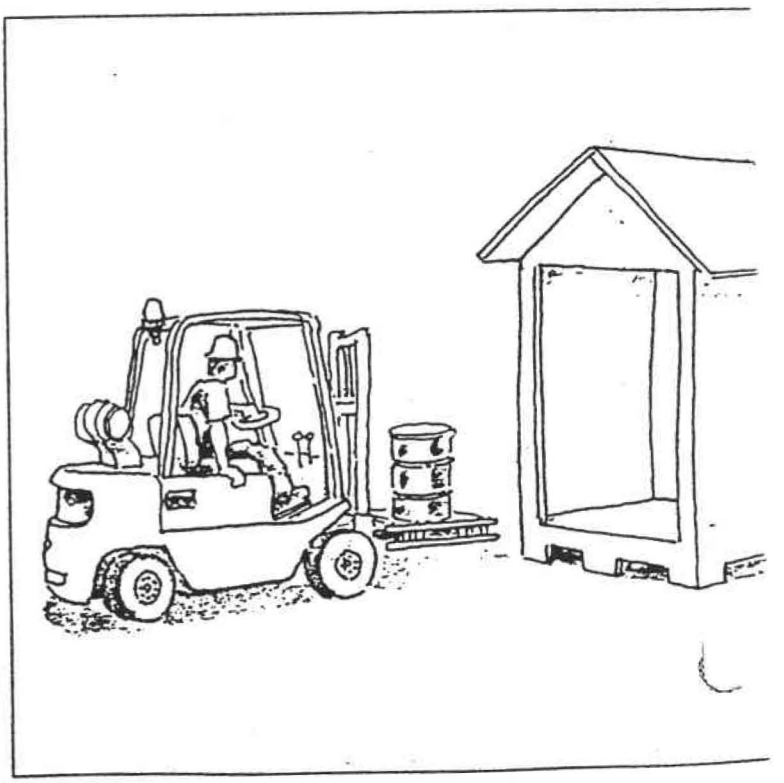
Parking lots or other surfaces near bulk materials storage facilities should be swept periodically to remove fines that may wash out of the materials, which will otherwise wash away with storm water. Larger bulk material storage facilities will need more extensive structural controls designed for the specific facility and material.

Hazardous materials need to be stored in accordance with federal, state, and local HazMat requirements. The requirements are generally more than adequate to prevent storm water pollution — for instance, HazMat secondary containment may have *no drain*.

If you store **liquid containers**, implement a plan and a design to control unexpected leaks and spills so the liquid does not reach storm drains or surfaces that will be exposed to storm water. If you store hazardous materials, the spill prevention plans required by your HazMat authority are adequate to ensure storm water protection. Non-hazardous materials storage should also incorporate spill control designs and procedures.

Select a storage method appropriate for the type of material. Keep liquid tanks in a designated area on a paved impermeable surface and within a berm or other secondary containment. Keep outdoor storage containers especially in good condition. Inspect containers regularly for damage or leaks, as described

"Doghouse" sheds are one way to keep storm water away from barrels and materials kept outdoors, and provide spill control at the same time.

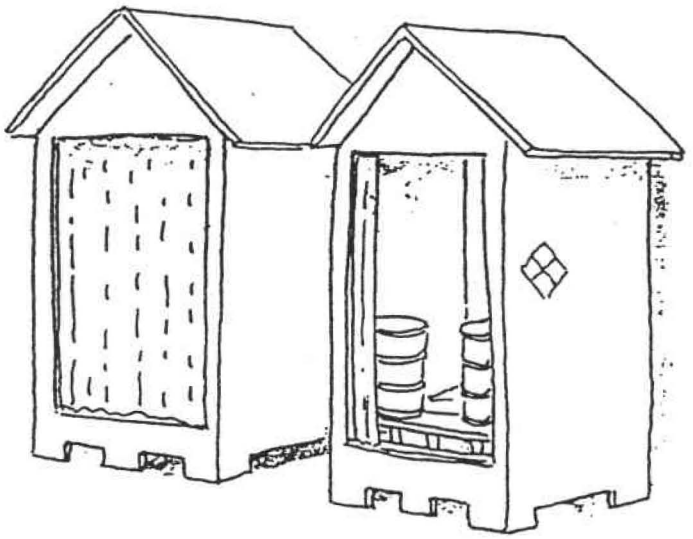


in Section 4. Clean up any leaks or spills immediately (using dry methods, described in Section 3), and repair the leaks promptly.

If the materials frequently leak during transfer, or the materials generally cause a wet environment when using or storing them, the area may need to be connected to the sanitary sewer (permitted by your wastewater authority), and should be covered and bermed to minimize contact with storm water.

Some localities *require* that secondary containments be connected to sanitary sewers, and prohibit any hard-plumbed storm drain connections within the secondary containment. On the other hand, large storage facilities and tank farms that have high-capacity bermed areas may receive rainfall over a wide area, and much of it may not contact the tanks or equipment; these might be better-served by a storm drain. As a rule, large facilities like this need site-specific storm water pollution prevention designs.

For smaller storage tanks, storage in roofed areas can prevent all contact with storm water (in combination with well-designed spill control procedures). Store liquids in a shed where one is available. New sheds, even if temporary, can be costly because of building permits and fire-code requirements. A possible option is the "doghouse" design used by some firms (illustrated). The roof and flooring prevent contact with direct rain or run-on storm water. Since it has only two walls, most fire departments do not require sprinklers. The flooring is wire mesh above secondary containment, so most HazMat authorities accept the structure for storing hazardous materials. (A permit may be required by local building or planning departments.)



Storm water in secondary containments often accumulates from direct rainfall into open containments. Water that has contacted storage vessels, or the pumping and transfer equipment associated with storage and handling, is considered to have contacted industrial activities and may not be discharged to the storm drains.

You may wish to roof the containment to avoid this problem. If that is not possible, or you wish to avoid the cost, you need to identify an acceptable disposal for water from the containment. One common solution is a portable pumping system that can be moved to accommodate separate containment structures on your site. The equipment can pump water into a truck or portable temporary holding tank. The water then can be tested and disposed according to whether any pollutants are present. Some disposal options are:

- If it meets criteria to be defined as hazardous waste, employ a certified hazardous waste hauler for disposal at a permitted hazardous waste facility.
- If it contains constituents similar to process wastewater for which your onsite wastewater pretreatment facilities are designed, pretreat the water and discharge to the sanitary sewer.
- If it meets standards for your industrial discharge permit, discharge it to the sanitary sewer without pretreatment (if your wastewater authority permits).
- Reuse it on your site in an appropriate manner: industrial process water, equipment wash water, steam cleaning makeup, or another use where the water will eventually be discharged as industrial or sanitary wastewater. You may need to invest in a truck or plumbing to convey the water to its reuse location.
- If it is free of hazardous constituents, use it on your facility grounds for landscape watering. Don't apply the water to landscaping if hazardous pollutants are present — even if not concentrated enough to be hazardous waste — because the pollutants may accumulate in the soil or vegetation, and create a health hazard over the long term.

6. Waste Handling and Disposal

Table 2 summarizes the preferred storage and disposal practices for some common industrial facility wastes. For many wastes, reusing or recycling is the most cost-effective means to prevent potential pollution. Fluids that you hold for recycling are special categories of hazardous waste. You may store them on your site only for short periods, in accordance with hazardous waste requirements, but they can be transported under somewhat less stringent requirements than other hazardous wastes. Many recycling services have special variances or permits that reduce your paperwork requirements and allow shipping at reduced cost.

Keep general shop trash in a dumpster with the lid closed. Put the dumpster in a paved area, not on unpaved soil or your lawn. Keep the area clean by picking up dropped trash and sweeping the area regularly (perhaps once a week), but don't use a hose to clean up — keep water off the area. Nearly all dumpsters and trash compactors leak; keep liquid wastes out of them, and keep them closed to keep storm water out.

If you can't prevent leakage from trash containers, install a roof or lean-to that keeps direct rainfall off, and place asphalt curbing or berms around the dumpster to contain the leaks. (Check with your local agencies and comply with fire codes and building permits.)

If you store scrap metal or other materials outdoors, keep them under a roof, cover, or tarpaulin. Keep scr parts or other used metals indoors. Oils and other potential pollutants can wash off long after you think the parts have been washed clean. Collect waste metal, such as used parts and metal lathe filings, for delivery to a scrap metal dealer.

If you store empty drums outdoors, do not hold them longer than necessary. Ship them to a drum reconditioner or another facility.

- Drain them completely to avoid spills.
- Seal them properly watertight, to keep storm water from entering; otherwise, the water would become a process wastewater, and can't be dumped to the storm drain.

Store and handle hazardous wastes properly. Hazardous materials or wastes are not a storm water problem if they are handled in accord with state and federal regulations, and the requirements of your local HazMat control authority.

Keep hazardous waste and materials indoors or under cover in a locked area, to keep nighttime trespassers away. Store them before disposal in special hazardous waste containers, or closed drums within a secondary containment that is approved by your HazMat authority.

Table 2. Preferred waste handling & disposal methods

		Recommended storage	Preferred disposal	Hazardous waste?
General plant wastes	Used parts: clean metal scrap	Bin (covered or indoors)	Scrap collector	No
	Used oily parts, contaminated	Drum	Hazardous waste hauler	Yes
	Metal shavings	Bin (covered or indoors)	Scrap collector	No
	Used rags	Rag bin with lid	Rag laundry	Possibly
	Soiled cleanup absorbent	Drum	Hazardous waste hauler	Yes
	Coolant from air conditioner or refrigeration equipment	Recycling machine	Reuse in-house (HVAC service company)	No
Liquid wastes	Paints*	Original container, with lid	Hazardous waste hauler	Yes
	Waste lubricating oil	Drum (segregate)	Oil recycler	Special**
	Solvents, thinners, and miscellaneous fluids*	Tank ("hot" waste) (Segregate different fluids to make recycling possible)	Solvent recycler (where possible) or waste hauler	Possibly
Liquid containers	Empty drums	Indoors or under cover	Drum reconditioner	
	Empty cans, bottles, aerosol cans, etc.	Drum	Municipal trash or hazardous waste hauler	Possibly
Vehicle wastes	Waste motor oil	Drum (segregate)	Oil recycler	Special**
	Brake fluid, gear oil, hydraulic fluids, etc.*	Bottle or tank ("hot" waste)	Hazardous waste hauler	Yes
	Antifreeze	Tank (segregate)	Recycler	Special**
	Batteries	Open rack	Battery supplier	Special**
	Tires	Covered or indoors	Tire hauler	No
	Oil filters	Drum (drain first)	Oil recycler	Special*

** Unused pure product may sometimes be returned to the vendor rather than disposed as waste.* *** Recyclable under special hazardous materials restrictions.*

12. Building Repair, Remodeling, and Construction

This section describes some relatively simple BMPs that apply to minor building repairs, remodelling, and minor construction projects at an industrial facility that involve "industrial activity exposed to storm water."

Larger-scale projects, such as construction of new facilities, are covered under a separate General Permit for construction. These require more extensive storm water pollution prevention measures than described here. A separate BMP manual for construction activities is available from the Santa Clara Valley NPS Program. (See rear cover.)

The same practices are *recommended* for construction activities on industrial sites. Before you begin a construction or repair project, review the Construction BMP Manual to identify and implement the appropriate practices. If those BMPs do not apply, or are unduly elaborate for a simple construction activity that will be completed in a short time, consider the BMPs described in this section.

Store building materials under cover or in contained areas, using BMPs discussed above, in Section 5. For outdoor storage at a construction site, select a pollution prevention method such as:

- Put an impermeable tarp over piles of wood, gravel, or other materials. Don't wait for forecasts of rain — do this every day, to avoid being caught unaware. Also, it will keep materials from blowing off the pile and contributing pollutants to runoff later.
- Keep the working area clean every day for the same reason. Sweep up wood splinters, paint chips, and other residues every day, as well as a thorough cleanup at the end of the project.

Painting requires some basic procedures.

- Before painting, while you scrape to remove old paint, spread a ground cloth or tarpaulin to collect dust and paint chips. If the paint contains lead or tributyl tin, dispose of the paint chips as hazardous waste.
- Mix paints indoors before starting work.
- Use impermeable ground cloths, such as plastic sheeting, while you paint. Place in-use paint buckets in a pan or on plastic sheeting.
- At the end of the work day, store paint buckets and barrels of materials away from contact with storm water.
- Use a tarp or portable, inflatable berm to prevent spills.
- Treat a paint spill as a chemical spill: capture it before it flows to the storm drain, and clean it up promptly using dry methods.

During **painting cleanup,** proper procedures are:

- If you use water-based paint, clean brushes and equipment in a sink connected to the sanitary sewer.
- Clean up oil-based paint where you can collect the waste paint and solvents to be handled as small quantity hazardous waste — do not pour it to the sink or to a storm drain.
- Keep leftover paint, solvents, and other supplies for a later use, or deliver them to a solvent recycler with other plant wastes when you ship a batch.
- Handle empty paint cans and other containers as described in Section 6. Containers may be small-quantity hazardous waste. Latex paint cans are not hazardous waste if the paint is dry.

Do not fall back on old cleanup practices from days when storm water pollution was not known as a problem. Do not pour leftover paint down the storm drain or onto the ground. Do not clean brushes into the storm drain or pour buckets of cleanup water to the drain, or wash spilled paint down the storm drain with a hose. These practices are now categorized as "illegal dumping." Do not wipe brushes onto old newspapers, or pour leftover paint supplies into newspapers and discard the paper in the trash.

Spray painting requires a few extra precautions.

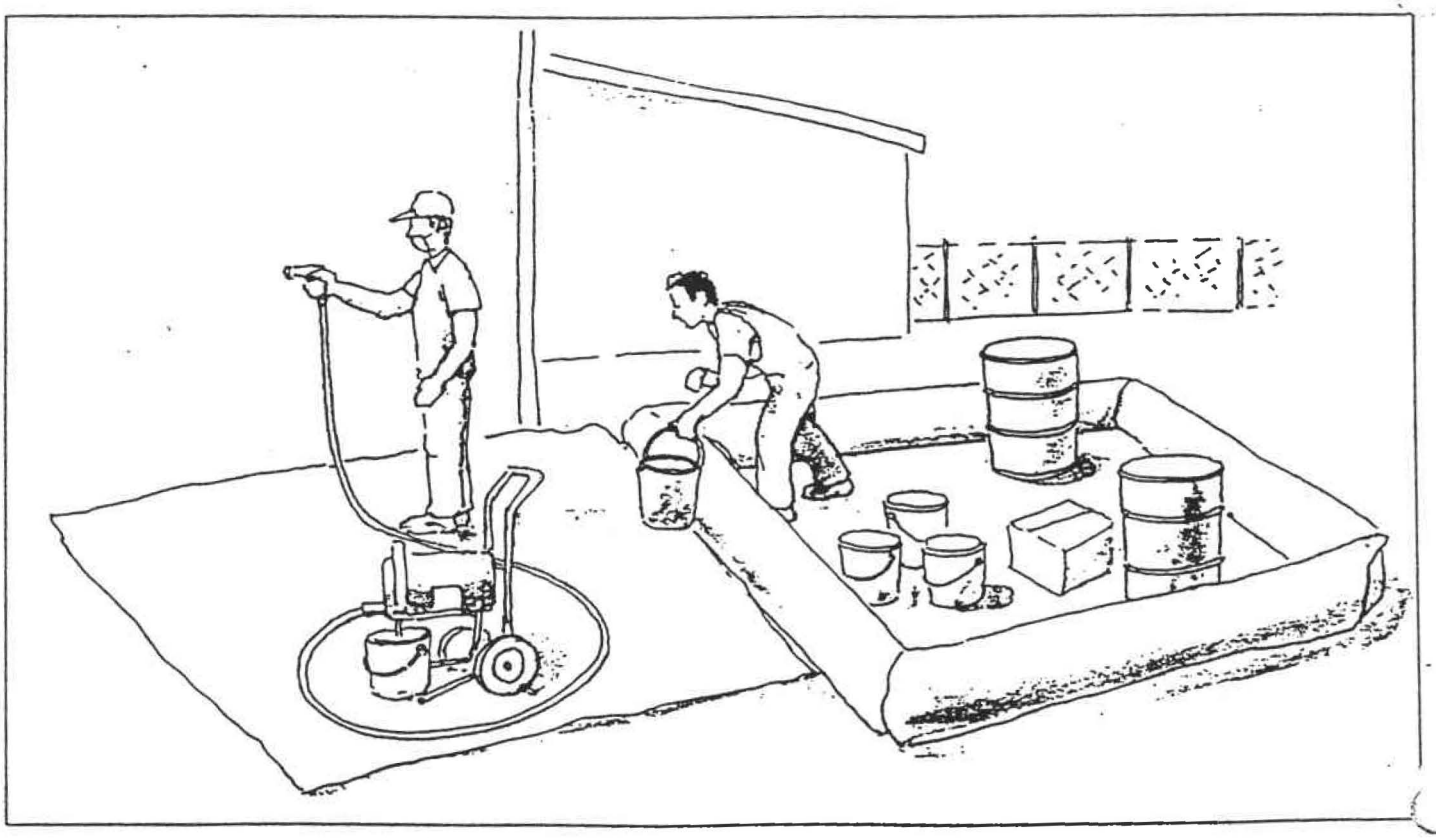
- Use temporary scaffolding to hang drop cloths or draperies to shield you from the wind and to collect overspray.
- Arrange the draperies to minimize the spreading of windblown materials.
- Be aware of air quality restrictions on spray paints that use volatile chemicals. Consider a water-based spray paint for better air quality compliance.

Sand blasting can be controlled to keep particles off of paved surfaces and out of storm drains. Ask your municipality whether building and construction codes place requirements on the size and type of blasting medium that is allowed. More complete instructions are available in the Construction BMP manual for full-sized jobs, but some basics should be applied for smaller projects, as well:

- Place a tarpaulin or ground cloth beneath your work to capture the blasting medium and particles from the surface being cleaned.
- Hang tarps or drop cloths to enclose the area, using temporary scaffolding if necessary. Arrange the drop cloths to protect the work area from wind, and to capture airborne particles.
- Curtail operations on a windy day.
- Clean up frequently: collect dust and particles from the drop cloths before you produce too large a pile to handle easily.

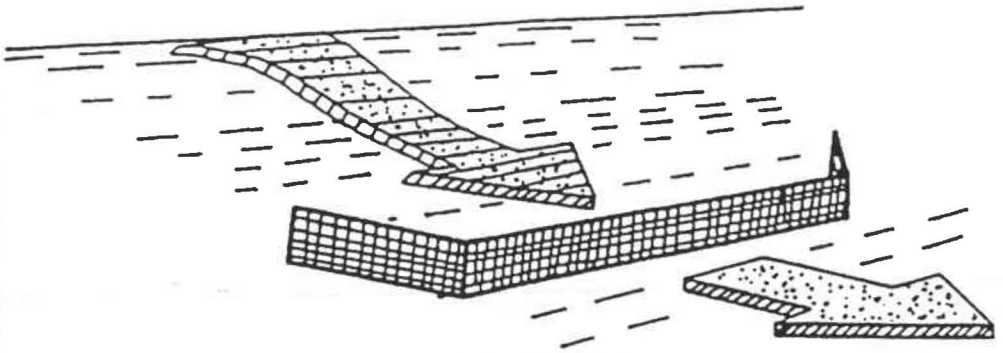
Wood preservatives, pavement seal coating, and other outdoor surface treatments commonly contain metals, pesticides, solvents, or polymers that are hazardous materials. Handle and dispose of them properly, as follows:

- Apply only as much of the chemical as the wood can absorb or as needed to cover the paved area.
- Soak up excess chemicals with absorbent mater. or rags rather than allowing them to flow to the storm drains or soak into the soil.
- If the chemicals spill, clean up promptly using dry techniques; see Section 3.
- When sealing a sidewalk, prevent the sealant from reaching the gutters or drains. Use absorbent booms, or stuff rags into storm drain openings.
- When treating a roof with wood preservative or sealant, line the gutters with rags. Dispose of the rags properly: with your hazardous waste if the substances you are using are hazardous.
- If you clean a roof or sidewalk before applying preservative, sweep thoroughly to remove loose particles first, then wash with water if necessary.
- Collect wash water from downspouts or drains where possible and remove particles.
- Avoid applying surface treatment chemicals during the wet weather season.



Outdoor painting requires practices to prevent paint and dust from becoming storm water pollutants.

BMP: SILT FENCE



Objectives

- *Housekeeping Practices*
- *Contain Waste*
- *Minimize Disturbed Areas*
- *Stabilize Disturbed Areas*
- *Protect Slopes/Channels*
- *Control Site Perimeter* (●)
- *Control Internal Erosion* (●)

GENERAL DESCRIPTION

A silt fence is made of a filter fabric which has been entrenched, attached to supporting poles, and sometimes backed by a wire fence for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

SUITABLE APPLICATIONS

- Along the perimeter of the site.
- Below the toe of a cleared slope.
- Along streams and channels.
- Around temporary spoil areas.
- Across swales with catchments less than 1 acre.
- Below other small cleared areas.

INSTALLATION/APPLICATION

- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 feet at any point.
- No more than 1 acre, 100 ft., or 0.5 cfs of concentrated flow should drain to any point along the silt fence.
- Turn ends of fence uphill.
- Provide area behind the fence for runoff to pond and sediment to settle (approx. 1200 sq. ft. per acre draining to the silt fence).
- Select filter fabric which retains 85% of the soil, by weight, based on sieve analysis, but is not finer than an equivalent opening size of 70.

REQUIREMENTS

- Maintenance
  - Inspect weekly and after each rainfall.
  - Repair wherever fence is damaged.
  - Remove sediment when it reaches 1/3 the height of the fence.
- Cost (source: EPA, 1992)
  - Average annual cost for installation and maintenance (assumes 6 month useful life): $7 per lineal foot ($850 per drainage acre)

LIMITATIONS

- Do not use where 85% of the soil, by weight, passes through a No. 200 sieve because the filter fabric will clog.
- Do not place fence on a slope, or across any contour line.
- Do not use in streams, channels, or anywhere flow has concentrated.
- Do not use in locations where ponded water may cause flooding.

Targeted Pollutants

- ● *Sediment*
- ○ *Nutrients*
- ○ *Toxic Materials*
- ○ *Oil & Grease*
- ○ *Floatable Materials*
- ○ *Other Construction Waste*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ◒ *O&M Costs*
- ◒ *Maintenance*
- ○ *Training*
- ○ *Suitability for Slopes >5%*

● *High* ○ *Low*

ESC50

Best Management Practices

Additional Information — Silt Fence

A silt fence is a temporary sediment barrier consisting of filter fabric stretched across and attached to supporting posts, entrenched, and, depending upon the strength of the fabric used, supported with wire fence. Silt fences trap sediment in two ways: (1) by intercepting and detaining small amounts of sediment from disturbed areas during construction operations in order to promote sedimentation behind the fence; and (2) by decreasing the velocity of low flows (up to 0.5 cfs) in swales.

Silt fences may be used for perimeter control, placed upstream of the point(s) of discharge of sheet flow from a site. They may also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion, and perpendicular to minor swales or ditch lines for up to one acre contributing drainage areas. Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows.

Installation/Application

Planning:

Silt fences are generally most effective when the following placement criteria are followed:

- Limit the upstream drainage area to 1 acre or less when used alone or in combination with sediment basin in a larger site.
- The maximum slope perpendicular to the fence line should be 1:1.
- Limit the maximum sheet or overland flow path length to any point along the fence to 100 feet.
- Limit the concentrated flows reaching the fence to 0.5 cfs.

Silt fences are preferable to straw barriers in many cases. Laboratory work at the Virginia Highway and Transportation Research Council has shown that silt fences can trap a much higher percentage of suspended sediments than can straw bales. While the failure rate of silt fences is lower than that of straw barriers, there are many instances where silt fences have been improperly installed. The following installation methods can improve performance and should be followed:

- Construct the silt fence along a level contour.
- Silt fences should remain in place until the disturbed area is permanently stabilized.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 sq. ft. of ponding area should be provided for every acre draining to the fence.
- Turn the ends of the filter fence uphill to prevent storm water from flowing around the fence.
- Leave an undisturbed or stabilized area immediately downslope from the fence.
- Do not place in live streams or intermittently flowing channels.

Design:

Selection of a filter fabric is based on soil conditions at the construction site (which affect the equivalent opening size (EOS) fabric specification) and characteristics of the support fence (which affect the choice of tensile strength). The designer should specify a filter fabric that retains the soil found on the construction site yet will have openings large enough to permit drainage and prevent clogging. The following criteria is recommended for selection of the equivalent opening size:

1. If 50 percent or less of the soil, by weight, will pass the U.S. standard sieve No. 200, select the EOS to retain 85 percent of the soil. The EOS should not be finer than EOS 70.
2. For all other soil types, the EOS should be no larger than the openings in the U.S. Standard Sieve No. 70 [0.0083 in. (0.21 mm.)] except where direct discharge to a stream, lake, or wetland will occur, then the EOS should be no larger than Standard Sieve No. 100.

ESC50

Additional Information — Silt Fence

To reduce the chance of clogging, it is preferable to specify a fabric with openings as large as allowed by the criteria. No fabric should be specified with an EOS smaller than U.S. Standard Sieve No. 100 [0.0059 in. (0.15 mm.)]. If 85 percent or more of a soil, by weight, passes through the openings in a No. 200 sieve [0.0029 in. (0.074 mm.)], filter fabric should not be used. Most of the particles in such a soil would not be retained if the EOS was too large, and they would clog the fabric quickly if the EOS was small enough to capture the soil.

The fence should be supported by a wire mesh if the fabric selected does not have sufficient strength and bursting strength characteristics for the planned application (as recommended by the fabric manufacturer). Filter fabric material should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0° F. to 120° F.

Installation Guidelines:
Filter fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- Posts should be spaced a maximum of 6 feet apart and driven securely into the ground a minimum of 30 inches.
- A trench should be excavated approximately 8 inches wide and 12 inches deep along the line of posts and upslope from the barrier.
- When standard strength filter fabric is used, a wire mesh support fence should be fastened securely to the upslope side of the posts using heavy-duty wire staples at least 1 inch long, tie wires or hog rings. The wire should extend into the trench a minimum of 4 inches.
- The standard strength filter fabric should be stapled or wired to the fence, and 40 inches of the fabric should extend into the trench. When extra-strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated and the filter fabric stapled or wired directly to the posts.
- Avoid the use of joints. The filter fabric should be purchased in a continuous roll, then cut to the length of the barrier. When joints are necessary, filter cloth should be spliced together only at a support post, with a minimum 6 inch overlap, and both ends securely fastened to the post.
- The trench should be backfilled with compacted native material.

Requirements
Maintenance:

Inspect monthly during dry periods and immediately after each rainfall. Repair as necessary. Sediment must be removed when it reaches approximately one third the height of the fence, especially if heavy rains are expected.

Filter fences should not be removed until the upslope area has been permanently stabilized.

Limitations
- Filter fences will create a temporary sedimentation pond on the upstream side of the fence and may cause temporary flooding. Fences not constructed on a level contour will be overtopped by concentrated flow resulting in failure of the filter fence.
- Filter fences are not practical where large flows of water are involved, hence the need to restrict their use to drainage areas of one acre or less, and flow rates of less than 0.5 cfs.
- Problems may arise from incorrect selection of pore size and/or improper installation.
- Do not allow water depth to exceed 1.5 ft. at any point.
- Improperly installed fences are subject to failure from undercutting, overlapping, or collapsing.

ESC50

Additional Information — Silt Fence

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September1992.

Environmental Action Manual, City of Austin, Texas, 1989.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, Jun 1981.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April, 1992.

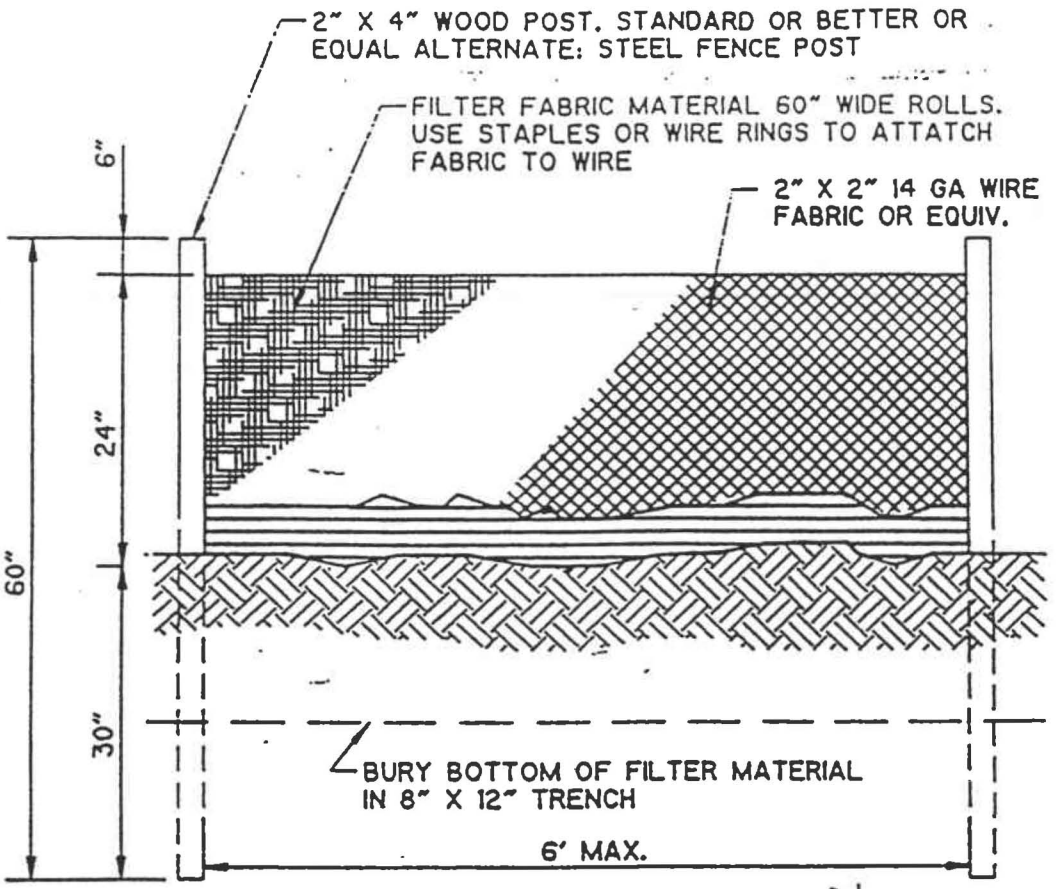
Sedimentation and Erosion Control Practices, An Introductory of Current Practices (Draft), USEPA, 1990.

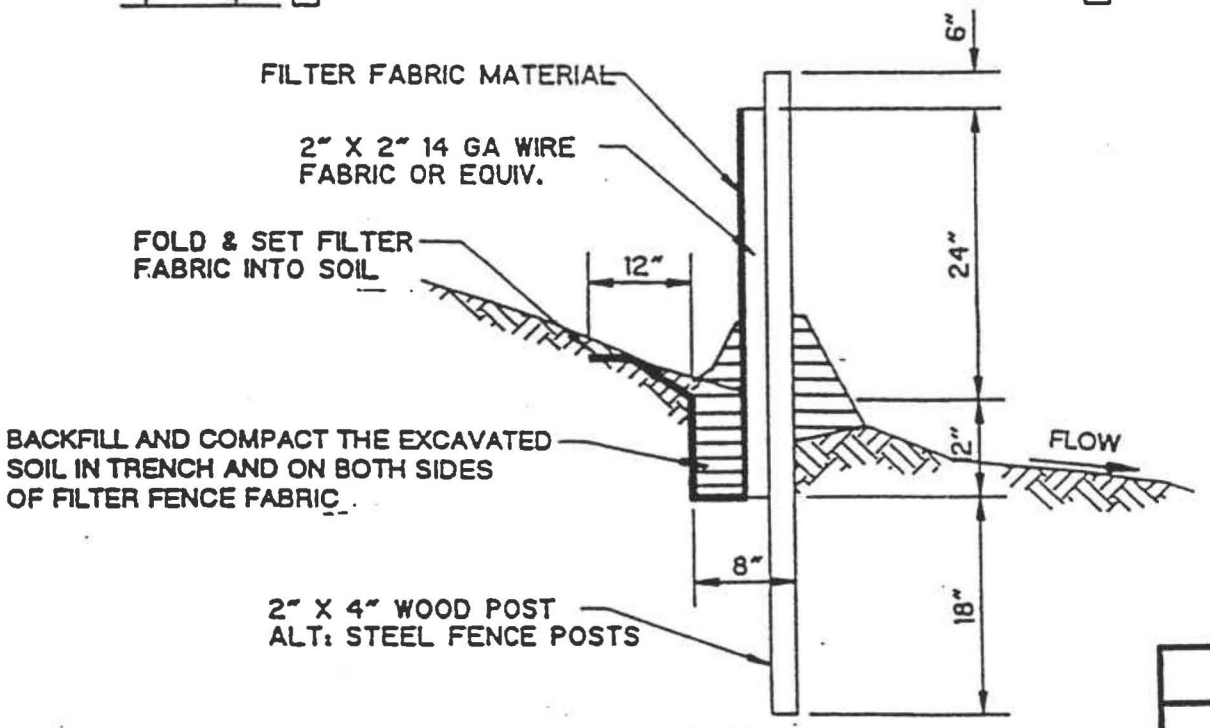
Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

ESC50

Additional Information — Silt Fence

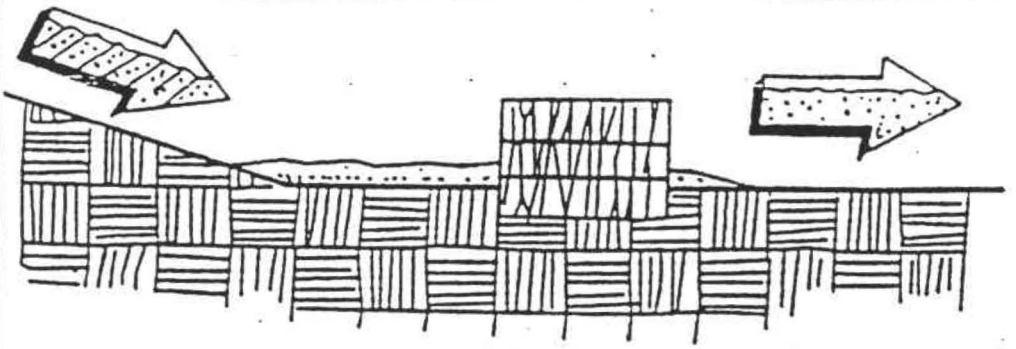




SILT FENCE

ESC50

BMP: STRAW BALE BARRIERS



Objectives

- Housekeeping Practi
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

GENERAL DEFINITION

A straw bale barrier consists of straw bales placed end to end along a level contour in a shallow trench and staked to hold them in place. The barrier detains runoff, creating a pond behind the barrier where sedimentation occurs.

SUITABLE APPLICATIONS

- Along the perimeter of the site.
- Along streams and channels.
- Across swales with small catchments.
- Around temporary spoil areas.
- Below other small, cleared areas.

INSTALLATION/APPLICATION CRITERIA

- Use primarily in areas where sheet or rill flow occurs.
- No more than 1/4 acre per 100 feet of barrier should drain to the barrier.
- Install along a level contour.
- Place in a 4-inch deep trench.
- Backfill and compact the excavated soil on the upstream face of the barrier.
- Secure each bale with two stakes.
- Leave enough area (about 1200 sq. ft. per acre) behind the barrier for runoff to pond (no more than 1.5 ft. depth) and sediment to settle.

REQUIREMENTS

- Maintenance
  - Inspect weekly and after each rain.
  - Replace bales which have decomposed or whose bindings have broken.
  - Remove sediment behind the barrier when it reaches a depth of 6 inches.
- Costs (source: EPA, 1992)
  - Average annual cost for installation and maintenance (assumes 3 month useful life): $17 per lineal foot ($6,800 per drainage acre).

LIMITATIONS

- Straw bale barriers are not to be used for extended periods of time because they tend to rot and fall apart.
- Suitable only for sheet flow on slopes of 2% or flatter.
- Not appropriate for large drainage areas, limit to one acre or less.
- Straw bales lose their effectiveness rapidly due to rotting, thus constant maintenance is required.
- Not recommended for concentrated flow, inlet protection, channel flow, and live streams.
- Bale bindings of jute or cotton not recommended.

Targeted Pollutants

- ● Sediment
- ○ Nutrients
- ○ Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

- ● Likely to Have Significant Impact
- ○ Probable Low or Unknown Impact

Implementation Requirements

- ● Capital Costs
- ● O&M Costs
- ● Maintenance
- ○ Training
- ○ Suitability for Slopes >5%

● High ○ Low

ESC51

Best Management Practices

- Straw bale barriers have not been as effective as expected due to improper use. These barriers have been placed in streams and drainageways where runoff volumes and velocities have caused the barriers to wash out. In addition, failure to stake and entrench the straw bale has allowed undercutting and end flow.

ESC51

Additional Information — Straw Bale Barrier

A straw bale barrier consists of a series of secured anchored bales placed to intercept sediment-laden runoff from small drainage areas of disturbed soil. The barrier ponds runoff and allow sediment to settle. Straw bale dikes should not be used for extended periods of time because they tend to rot and fall apart.

The straw bale barrier is used where there are no concentrations of water in a channel or drainageway, and where erosion would occur from sheet flow. These barriers are typically constructed below disturbed areas subject to sheet flow of runoff.

Installation/Application

Straw bale barriers should be used for drainage areas no more than 1/4 acre per 100 feet of barrier length, with no more than 100 ft upstream of any point along the barrier. The barrier should be placed along a level contour no greater than 2:1. When installed and maintained according to the guidelines on this fact sheet, straw bale dikes remove approximately 67% of the sediment transported in construction site runoff. This optimum efficiency can only be achieved through careful maintenance, with special attention to replacing rotted or broken bales. The barrier should be constructed on a level contour to prevent concentration of flow against a small portion of the barrier.

An effective straw bale barrier should be installed in the following manner:

1. Bales should be placed on the contour and in a row with ends tightly abutting the adjacent bales.
2. Leave area for runoff to pond upstream of the barrier by locating barrier away from the toe of slopes. This also provides access for maintenance.
3. Each bale should be embedded in the soil a minimum of (4) inches and placed so the bindings are horizontal. Bindings placed on soil will soon disintegrate and cause the barrier to fail.
4. Bales should be securely anchored in place by either two stakes or re-bars driven through the bale. The first stake in each bale should be driven toward the previously laid bale at an angle to force the bales together. Stakes should be driven flush with the bale.
5. Backfill and compact the excavated soil along the upstream face of the barrier.
6. Remove the barrier when it has served its usefulness so as not to block or impede storm flow or drainage.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

"Draft - Sedimentation and Erosion Control, An Inventory of Current Practices", U.S.E.P.A., April, 1990.

"Environmental Criteria Manual", City of Austin, Texas.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, Jun 1981.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April, 1992.

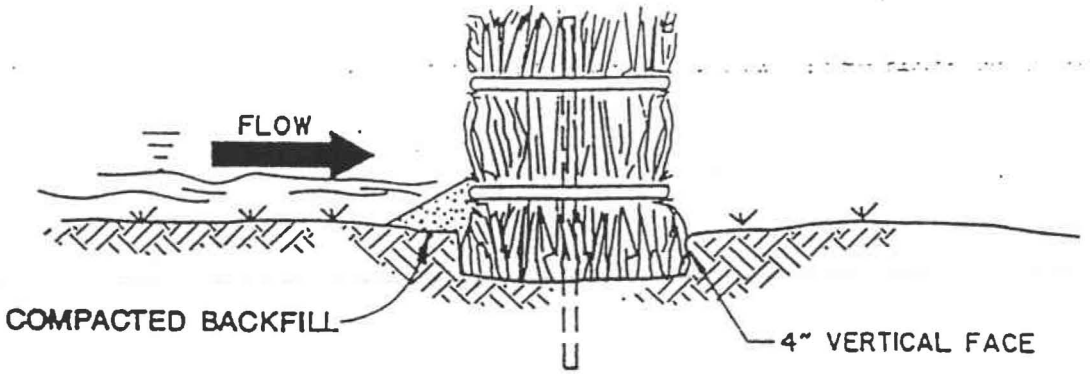
Stormwater Management Water for the Puget Sound Basin, Washington State Department of Ecology, The Technical Manual - February 1992, Publication # 91-75.

Water Quality for Construction Businesses, City of Bellevue, Washington.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

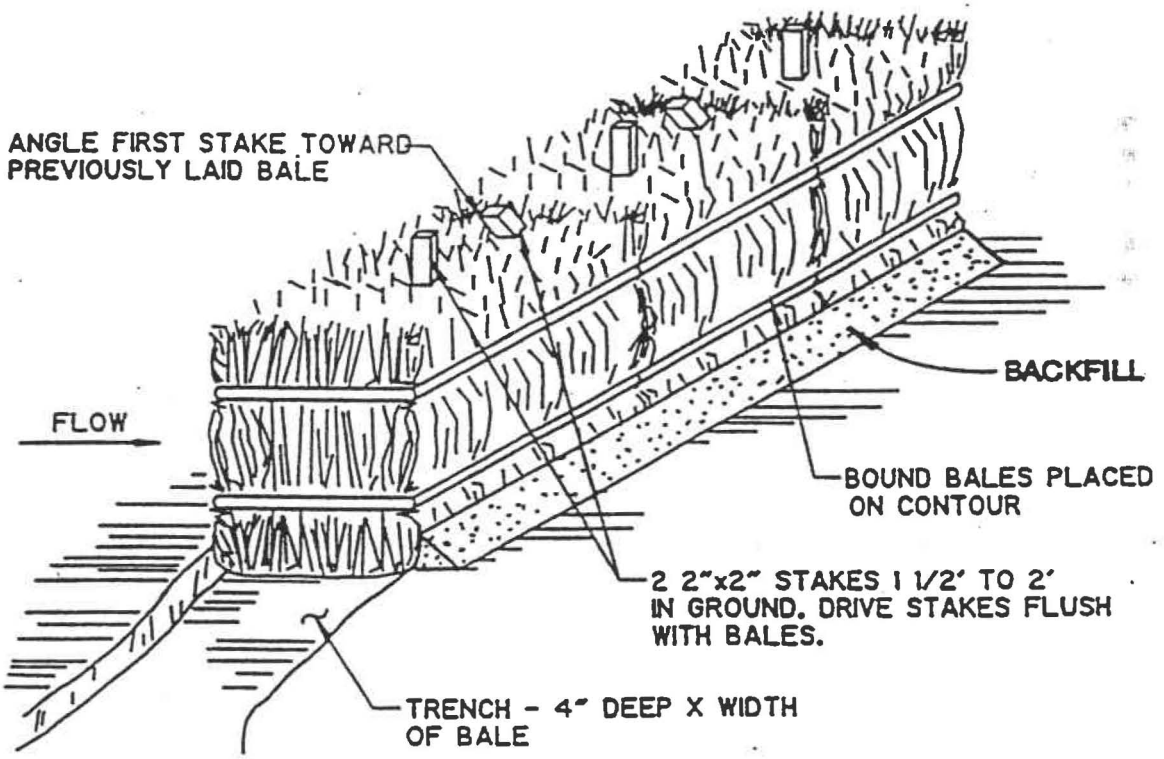
ESC51

Additional Information — Straw Bale Barrier



• PROMOTES ON SITE SEDIMENTATION BY CREATING A TEMPORARY POND.

BEDDING DETAIL



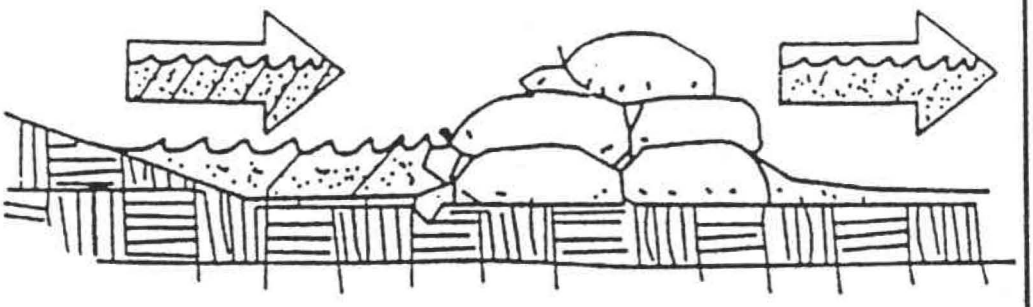
SUBSTITUTION OF STEEL BARS FOR WOODEN STAKES IS NOT RECOMMENDED DUE TO POTENTIAL FOR DAMAGING CONSTRUCTION EQUIPMENT

ANCHORING DETAIL

STRAW BALE BARRIERS

ESC51

BMP: SAND BAG BARRIER



Objectives

- Housekeeping Practic
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- (Protect Slopes/Channels)
- (Control Site Perimeter)
- (Control Internal Erosion)

GENERAL DEFINITION

Stacking sand bags along a level contour creates a barrier which detains sediment-laden water, ponding water upstream of the barrier and promoting sedimentation.

SUITABLE APPLICATIONS

- Along the perimeter of the site.
- Check dams across streams and channels.
- Along streams and channels.
- Barrier for utility trenches in a channel.
- Across swales with small catchments.
- Division dike or berm.
- Below the toe of a cleared slope.
- Create a temporary sediment trap.
- Around temporary spoil areas.
- Below other small cleared areas.

INSTALLATION/APPLICATION CRITERIA

- May be used in drainage areas up to 5 acres.
- Install along a level contour.
- Base of sand bag barrier should be at least 48 inches wide.
- Height of sand bag barrier should be at least 18 inches high.
- 4 inch PVC pipe may be installed between the top layer of sand bags to drain large flood flows.
- Provide area behind barrier for runoff to pond and sediment to settle, size according to sediment trap BMP criteria (ESC55).
- Place below the toe of a slope.
- Use sand bags large enough and sturdy enough to withstand major flooding.

REQUIREMENTS

- Maintenance
  - Inspect after each rain.
  - Reshape or replace damaged sand bags immediately.
  - Remove sediment when it reaches six inches in depth.
- Cost
  - Sand bag barriers are more costly, but typically have a longer useful life than other barriers.

LIMITATIONS

- Sand bags are more expensive than other barriers, but also more durable.
- Burlap should not be used for sand bags.

Targeted Pollutants

- ● Sediment
- ○ Nutrients
- ○ Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

- ● Likely to Have Significant Impact
- ○ Probable Low or Unknown Impact

Implementation Requirements

- ● Capital Costs
- ○ O&M Costs
- ○ Maintenance
- ○ Training
- ◒ Suitability for Slopes >5%

● High ○ Low

ESC52

Best Management Practices

Additional Information — Sand Bag Barrier

Suitable Applications

Sand bag berms may be used during construction activities in stream beds and utility construction in channels, temporary channel crossing for construction equipment, etc. Sand bag berms may also be installed parallel to roadway construction. Sand bag berms may also be used to create temporary sediment traps, retention basins and in place of straw bales or silt fences. Examples of applications include:

- Check dams across stream channels.
- Barriers for utility trenches or other construction in a stream channel.
- At temporary channel crossings.
- May be used on a slope where straw bales and silt fences are not appropriate.
- As a diversion dike.
- Embankment for a temporary sediment basin or retention basin.
- Sediment barriers near the toe of slopes.
- At construction perimeter.

Advantages

- Provides a semi-permeable barrier in potentially wet areas.
- More permanent than silt fences or straw bales.
- Allows for easy relocation on site to meet changing needs during construction.

Installation/Application

Sand bag barriers may be used for sediment trapping in locations where silt fences and straw bale barriers are not strong enough. In addition, sand bag barriers are appropriate to use when construction of check dams or sumps in a stream is undesirable. The sand bag berms can provide the same function as a check dam without disturbing the stream or vegetation. The sand bag berm will also allow a small sediment retention area to be created prior to construction of final detention basins. For installation of a sand bag berm, the following criteria should be observed:

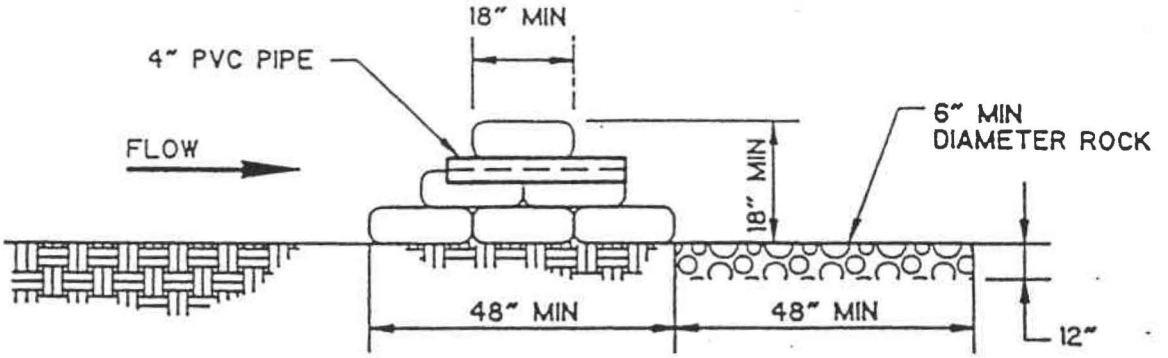
- Drainage Area - Up to five (5) acres.
- Height of Berm - 18 inches minimum height, measured from the top of the existing ground at the upslope toe to the top of the barrier.
- Width of Berm - 48 inches minimum width measured at the bottom of the barrier; 18 inches at the top.
- Sand bag Size - Length 24 to 30 inches, width 16 to 18 inches and thickness six (6) to eight (8) inches. Weight 90 to 125 pounds.
- Sand bag Material - Polypropylene, polyethylene or polyamide woven fabric, minimum unit weight four (4) ounces per square yard, mullen burst strength exceeding 300 psi and ultraviolet stability exceeding 70 percent. Use of burlap is discouraged since it rots and deteriorates easily.
- Grade of Sand - Coarse sand, gravel.
- Runoff water should be allowed to flow over the tops of the sand bags or through four (4) inch polyvinyl chloride pipes embedded below the top layer of bags.
- Area behind the sand bag barrier should be established according to sizing criteria for sediment trap BMP (ESC55).

REFERENCES

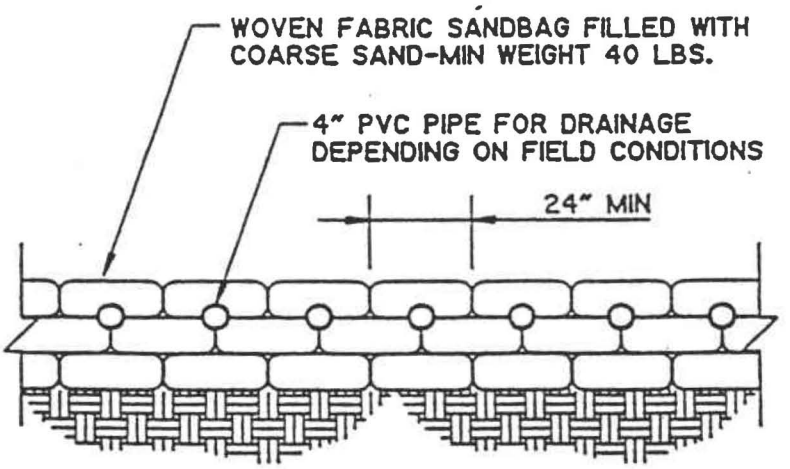
Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency - November 1988.

ESC52



CROSS-SECTION

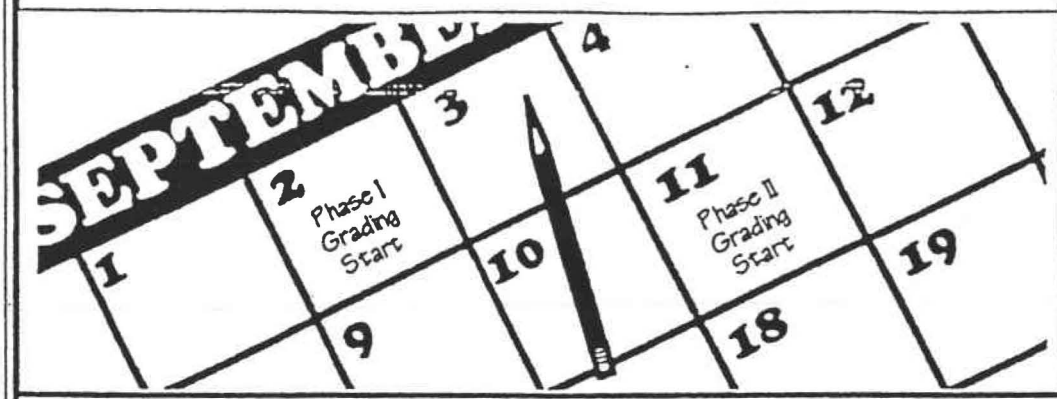


FRONT VIEW

SAND BAG BERM

ESC52

BMP: SCHEDULING



Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

DESCRIPTION

Sequencing the construction project to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.

SUITABLE APPLICATIONS

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project. Use of other, more costly yet less effective, erosion and sedimentation controls, may often be reduced through proper construction sequencing.

APPROACH

- Project design considerations: Design project to integrate into existing land contours. Significant regrading of a site will require more costly erosion and sedimentation control measures and may require that on-site drainage facilities be installed.
- Incorporate existing, natural areas: Inventory and evaluate the existing site terrain and vegetation. Disturbance of highly erosive natural areas (e.g., steep, unstable slope areas, watercourses) should be minimized, while protecting other areas may enhance site aesthetics. Construction should not disturb these areas (see ESC2).
- Avoid rainy periods: Schedule major grading operations during dry months. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means (see ESC 10 to 24) or to install temporary sediment trapping devices (see ESC 50 to 56).
- Practice erosion and sediment control year round: Erosion may be caused during dry seasons by "freak" rainfall, wind and vehicle tracking. Therefore, keep the site stabilized year-round, and retain wet season sediment trapping devices.
- Minimize soil exposed at one time: Schedule projects to disturb only small portions of the site at any one time. Complete grading as soon as possible. Immediately stabilize the disturbed portion before grading the next portion. Practice staged seeding—revegetate cut and fill slopes as the work progresses.
- Trenching: Close and stabilize open trenches as soon as possible. Sequence trenching projects so that most open portions of the trench are closed before new trenching is begun.

REQUIREMENTS

- Cost
  - Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost-effectiveness of scheduling techniques should be compared with the other, less effective erosion and sedimentation controls to achieve a cost-effective balance.

Targeted Pollutants

- ○ Sediment
- ○ Nutrients
- ○ Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

- ● Likely to Have Significant Impact
- ○ Probable Low or Unknown Impact

Implementation Requirements

- ○ Capital Costs
- ○ O&M Costs
- ○ Maintenance
- ○ Training
- ○ Suitibility for Slopes >5%

● High ○ Low

ESC1

Best Management Practices

LIMITATIONS

There are no significant limitations to the use of this BMP.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona - 1992.

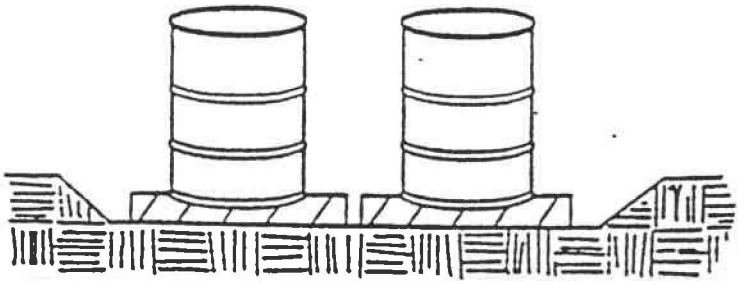
Erosion and Sediment Control Guidelines for Developing Areas in Texas, U.S. Department of Agriculture, Soil Conservation Service, Fort Worth, Texas - 1976.

Storm Water Management for Construction Activites. Developing Pollution Prevention Plans and Best Management Practices, U.S. Environmental Protection Agency, Office of Water (EPA 832-R-92-005) - September, 1992.

Virginia Erosion and Sediment Control Handbook, Third Edition, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation - 1992.

ESC1

ACTIVITY: MATERIAL DELIVERY AND STORAGE



Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from material delivery and storage by minimizing the storage of hazardous materials on-site, storing materials in a designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see CA11 (Material Use), or CA12 (Spill Prevention and Control). For information on wastes, see the waste management BMPs in this chapter.

APPROACH

The following materials are commonly stored on construction sites:

- Soil,
- Pesticides and herbicides,
- Fertilizers,
- Detergents,
- Plaster or other products,
- Petroleum products such as fuel, oil, and grease, and
- Other hazardous chemicals such as acids, lime, glues, paints, solvents, and curing compounds.

Storage of these materials on-site can pose the following risks:

- Storm water pollution,
- Injury to workers or visitors,
- Groundwater pollution, and
- Soil contamination.

Therefore, the following steps should be taken to minimize your risk:

- Designate areas of the construction site for material delivery and storage.
  - Place near the construction entrances, away from waterways
  - Avoid transport near drainage paths or waterways
  - Surround with earth berms (see ESC30, Earth Dike.)
  - Place in an area which will be paved
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.
- Keep an accurate, up-to-date inventory of materials delivered and stored on-site.
- Keep your inventory down.

Targeted Pollutants

- ◒ Sediment
- ◒ Nutrients
- ◒ Toxic Materials
- ◒ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Waste

- ● Likely to Have Significant Impact
- ○ Probable Low or Unknown Impact

Implementation Requirements

- ○ Capital Costs
- ○ O&M Costs
- ○ Maintenance
- ◒ Training
- ○ Suitability for Slopes >5%

● High ○ Low

CA10

Best Management Practices

- Minimize hazardous materials on-site storage.
- Handle hazardous materials as infrequently as possible.
- During the rainy season, consider storing materials in a covered area. Store materials in secondary containments such as an earthen dike, horse trough; or even a children's wading pool for non-reactive materials such as detergents, oil, grease, and paints. Small amounts of material may be secondarily contained in "bus boy" trays or concrete mixing trays.
- Do not store chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and, when possible, in secondary containment.
- If drums must be kept uncovered, store them at a slight angle to reduce ponding of rainwater on the lids and to reduce corrosion.
- Try to keep chemicals in their original containers, and keep them well labeled.
- Train employees and subcontractors.
- Employees trained in emergency spill cleanup procedures should be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove materials and any contaminated soil (See CA22). If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

REQUIREMENTS

- Cost (Capital, O&M)
  - All of the above are low cost measures.
- Maintenance
  - Keep the designated storage area clean and well organized.
  - Conduct routine weekly inspections and check for external corrosion of material containers.
  - Keep an ample supply of spill cleanup materials near the storage area.

LIMITATIONS

- Storage sheds often must meet building and fire code requirements.

REFERENCES

Best Management Practices and Erosion Control Manual for Construction Sites; Flood Control District of Maricopa County, AZ, September 1992.

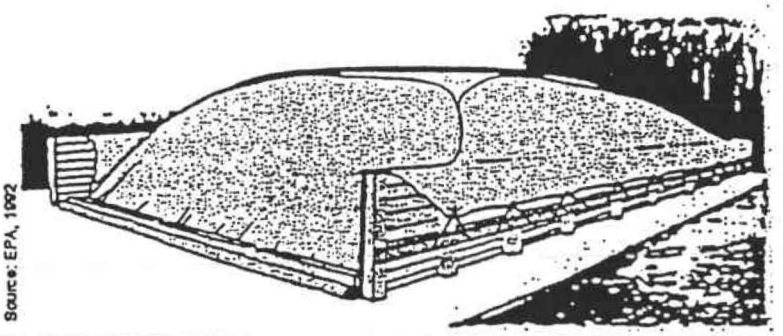
Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Storm Water Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

CA10

ACTIVITY: OUTDOOR STORAGE OF RAW MATERIALS, PRODUCTS, AND BY- PRODUCTS



Applications

- *Manufacturing*
- *Material Handling*
- *Vehicle Maintenance*
- *Construction*
- *Commercial Activities*
- *Roadways*
- *Waste Containment*
- *Housekeeping Practices*

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from outdoor material and product storage areas by enclosing or covering materials, installing secondary containment, and preventing storm water runon.

APPROACH

- Protect materials from rainfall, runon, runoff and wind dispersal:
  - Store material indoors.
  - Cover the storage area with a roof.
  - Cover the material with a temporary covering made of polyethylene, polypropylene, or hypalon.
  - Minimize storm water runon by enclosing the area or building a berm around the area.
  - Use "doghouse" for storage of liquid containers.
- Parking lots or other surfaces near bulk materials storage areas should be swept periodically to remove debris blown or washed from storage area.
- Install pellet traps at storm water discharge points where plastic pellets are loaded and unloaded.
- Keep liquids in a designated area on a paved impervious surface within a secondary containment.
- Keep outdoor storage containers in good condition.
- Use berms and curbing.
- Use catch basin filtration inserts (Chapter 5, TC6, Media Filtration)

REQUIREMENTS

- Costs (Capital, O&M)
  - Costs should be low except where large areas may have to be covered.
- Maintenance
  - Berm and curbing repair and patching.

LIMITATIONS

- Space limitations may preclude storing some materials indoors.
- Some municipalities require that secondary containment areas (regardless of size) be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.
- Storage sheds often must meet building and fire code requirements.

Targeted Constituents

- ● *Sediment*
- ○ *Nutrients*
- ● *Heavy Metals*
- ● *Toxic Materials*
- ● *Floatable Materials*
- ○ *Oxygen Demanding Substances*
- ● *Oil & Grease*
- ○ *Bacteria & Viruses*

● *Likely to Have Significant Impact*
○ *Probable Low or Unknown Impact*

Implementation Requirements

- ◒ *Capital Costs*
- ○ *O&M Costs*
- ○ *Maintenance*
- ◒ *Training*

● *High* ○ *Low*

SC8

Best Management Practices

Additional Information — Outdoor Storage of Raw Materials, Products, and By-Products

Raw materials, by-products, finished products, containers, and material storage areas exposed to rain and/or runoff can pollute storm water. Storm water can become contaminated by a wide range of contaminants when materials wash off or dissolve into water or are added to runoff by spills and leaks.

Paved areas should be sloped in a manner that minimize the pooling of water on the site, particularly with materials that may leach pollutants into storm water and/or groundwater, such as compost, logs, and wood chips. A minimum slope of 1.5 percent is recommended.

Curbing should be placed along the perimeter of the area to prevent the runon of uncontaminated storm water from adjacent areas as well as runoff of storm water from the stockpile areas. The storm drainage system should be designed to minimize the use of catch basins in the interior of the area as they tend to rapidly fill with manufacturing material. In these cases, consider the use of the catch basin insert filter described in Chapter 5, TC6 (Media Filtration). The area should be sloped to drain storm water to the perimeter where it can be collected or to internal drainage alleyways where material is not stockpiled. If the raw material, by-product, or product is a liquid, more information for outside storage of liquids can be found under SC6, Outdoor Container Storage of Liquids.

Examples

The "doghouse" design has been used to store small liquid containers. The roof and flooring design prevent contact with direct rain or runoff. The doghouse has two solid structural walls and two canvas covered walls. The flooring is wire mesh about secondary containment. The unit has been used successively at Lockheed Missile and Space Company in Sunnyvale.

REFERENCES

Best Management Practices for Industrial Storm Water Pollution Control, Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

Storm Water Management for Industrial Activities: Developing Pollution Prevention Plans, and Best Management Practices, EPA 832-R-92-006, EPA, 1992.

Water Quality Best Management Practices Manual, City of Seattle, 1989.

SC8

ACTIVITY: VEHICLE AND EQUIPMENT CLEANING

Graphic: North Central Texas COG, 1993

Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from vehicle and equipment cleaning by using off-site facilities, washing in designated, contained areas only, eliminating discharges to the storm drain by infiltrating or recycling the wash water, and/or training employees and subcontractors.

APPROACH

- Use off-site commercial washing businesses as much as possible. Washing vehicles and equipment outdoors or in areas where wash water flows onto paved surfaces or into drainage pathways can pollute storm water. If you wash a large number of vehicles or pieces of equipment, consider conducting this work at an off-site commercial business. These businesses are better equipped to handle and dispose of the wash waters properly. Performing this work off-site can also be economical by eliminating the need for a separate washing operation at your site.
- If washing must occur on-site, use designated, bermed wash areas to prevent wash water contact with storm water, creeks, rivers, and other water bodies. The wash area can be sloped for wash water collection and subsequent infiltration into the ground.
- Use as little water as possible to avoid having to install erosion and sediment controls for the wash area.
- Use phosphate-free, biodegradable soaps.
- Educate employees and subcontractors on pollution prevention measures.
- Do not permit steam cleaning on-site. Steam cleaning can generate significant pollutant concentrations.
- For a quick reference on disposal alternatives for specific wastes, see Table 4.2, CA40, Employee/Subcontractor Training.

REQUIREMENTS

- Costs (Capital, O&M)
  - All of the above are low cost measures.
- Maintenance
  - Minimal, some berm repair may be necessary.

LIMITATIONS

- Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades.
- Sending vehicles/equipment off-site should be done in conjunction with ESC24 (Stabilized Construction Entrance).

REFERENCE

Swisher, R.D., 1987. Surfactant Biodegradation, Marcel Decker Corporation

Targeted Pollutants

- ○ Sediment
- ○ Nutrients
- ◒ Toxic Materials
- ◒ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

● Likely to Have Significant Impact
○ Probable Low or Unknown Impact

Implementation Requirements

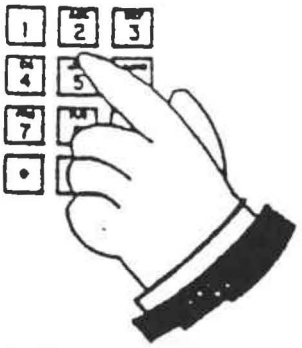
- ◒ Capital Costs
- ○ O&M Costs
- ◒ Maintenance
- ○ Training
- ○ Suitability for Slopes >5%

● High ○ Low

CA30

Best Management Practices

ACTIVITY: SPILL PREVENTION AND CONTROL



Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

DESCRIPTION

Prevent or reduce the discharge of pollutants to storm water from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, CA10 (Material Delivery and Storage) and CA11 (Material Use), also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this chapter.

APPROACH

The following steps will help reduce the storm water impacts of leaks and spills:

Define "Significant Spill"

- Different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.

General Measures

- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals.

Cleanup

- Clean up leaks and spills immediately.
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this chapter for specific information.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).

Targeted Pollutants

- ○ Sediment
- ○ Nutrients
- ◒ Toxic Materials
- ◒ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

- ● Likely to Have Significant Impact
- ○ Probable Low or Unknown Impact

Implementation Requirements

- ○ Capital Costs
- ◒ O&M Costs
- ○ Maintenance
- ◒ Training
- ○ Suitability for Slopes >5%

● High ○ Low

CA12

Best Management Practices

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur on-site, use a designated area and/or a secondary containment, located away from drainage courses, to prevent the runon of storm water and the runoff of spills.
- Regularly inspect on-site vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use adsorbent materials on small spills rather than hosing down or burying the spill. Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trash cans or dumpsters can leak oil and pollute storm water. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur on-site, use designated areas, located away from drainage courses, to prevent the runon of storm water and the runoff of spills.
- Discourage "topping-off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/leaks.

REQUIREMENTS

- Costs (Capital, O&M)
  - Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.
- Maintenance
  - Keep ample supplies of spill control and cleanup materials on-site, near storage, unloading, and maintenance areas.
  - Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals on-site.

LIMITATIONS

- If necessary, use a private spill cleanup company.

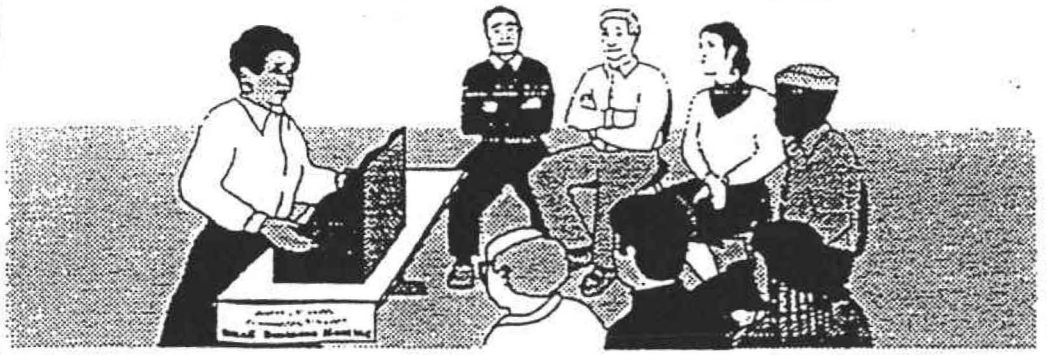
REFERENCES

Blueprint for a Clean Bay-Construction-Related Industries: Best Management Practices for Storm Water Pollution Prevention; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992; Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

CA12

ACTIVITY: EMPLOYEE/SUBCONTRACTOR TRAINING



Objectives

- Housekeeping Practices
- Contain Waste
- Minimize Disturbed Areas
- Stabilize Disturbed Areas
- Protect Slopes/Channels
- Control Site Perimeter
- Control Internal Erosion

DESCRIPTION

Employee/subcontractor training, like maintenance or a piece of equipment, is not so much a best management practice as it is a method by which to implement BMPs. This fact sheet highlights the importance of training and of integrating the elements of employee/subcontractor training from the individual source controls into a comprehensive training program as part of a company's Storm Water Pollution Prevention Plan (SWPPP).

The specific employee/subcontractor training aspects of each of the source controls are highlighted in the individual fact sheets. The focus of this fact sheet is more general, and includes the overall objectives and approach for assuring employee/subcontractor training in storm water pollution prevention. Accordingly, the organization of this fact sheet differs somewhat from the other fact sheets in this chapter.

OBJECTIVES

Employee/subcontractor training should be based on four objectives:

- Promote a clear identification and understanding of the problem, including activities with the potential to pollute storm water;
- Identify solutions (BMPs);
- Promote employee/subcontractor ownership of the problems and the solutions; and
- Integrate employee/subcontractor feedback into training and BMP implementation.

APPROACH

- Integrate training regarding storm water quality management with existing training programs that may be required for your business by other regulations such as: the Illness and Injury Prevention Program (IIPP) (SB 198) (California Code of Regulations Title 8, Section 3203), the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard (29 CFR 1910.120), the Spill Prevention Control and Countermeasure (SPCC) Plan (40 CFR 112), and the Hazardous Materials Management Plan (Business Plan) (California Health and Safety Code, Section 6.95).
- Businesses, particularly smaller ones that may not be regulated by Federal, State, or local regulations, may use the information in this Handbook to develop a training program to reduce their potential to pollute storm water.
- Use the quick reference on disposal alternatives (Table 4.2) to train employee/subcontractors in proper and consistent methods for disposal.

CA40

Best Management Practices

ACTIVITY: EMPLOYEE/SUBCONTRACTOR TRAINING (Continue)

- Consider posting the quick reference table around the job site or in the on-site office trailer to reinforce training.
- Train employee/subcontractors in standard operating procedures and spill cleanup techniques described in the fact sheets. Employee/subcontractors trained in spill containment and cleanup should be present during the loading/unloading and handling of materials.
- Personnel who use pesticides should be trained in their use. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct on-site inspections.
- Proper education of off-site contractors is often overlooked. The conscientious efforts of well trained employee/subcontractors can be lost by unknowing off-site contractors, so make sure they are well informed about what they are expected to do on-site.

CA40

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