5. EVALUATION OF PROGRAM FOR INDUSTRIAL ACTIVITIES

This chapter evaluates the impacts of the industrial portion of the Phase I storm water program. As demonstrated in this chapter, the industrial program has advanced Clean Water Act (CWA) water quality protection and improvement efforts by

- Providing facilities with the necessary flexibility to implement structural and nonstructural storm water controls tailored to site-specific conditions.

- Fostering pollution prevention procedures, many of which can be implemented at a relatively low cost.

The remainder of this chapter describes the Phase I requirements for storm water discharges associated with industrial activity (Section 5.1), the analytical approach used to evaluate the program (Section 5.2), the specific methodology used for determining program impacts (Section 5.3), and the overall findings (Section 5.4).

5.1 STATEMENT OF PHASE I REQUIREMENTS

The Storm Water Phase I Rule (55 FR 47990; November 16, 1990) specifies NPDES permit requirements for eleven categories of facilities with storm water discharges associated with industrial activity that discharge to waters of the United States or to municipal separate storm sewer systems (MS4s).

5.1.1 Industrial Facilities Regulated Under the Phase I Program

The definition at 40 CFR 122.26(b)(14) specifically identifies 11 categories of facilities (identified as "I" through "xi") considered to be engaging in "industrial activity" for purposes of the Phase I storm water regulations.[1] Ten of these eleven categories are discussed in this chapter; category "x," construction activities is addressed in Chapter 4. As described in Appendix G of this Report, the Federal regulations define "industrial activities" based on either Standard Industrial Classification (SIC) codes or facility-specific activities. The industrial activity categories apply to all types of facilities, including Federal, State, and municipally owned or operated facilities, with a few exceptions (e.g., the Intermodal Surface Transportation Efficiency Act of 1991 delayed certain program requirements for municipalities with a population less than 100,000 that perform industrial activities).

For the categories of industries identified in (I) through (ix) of the definition, storm water discharges associated with industrial activity include, but are not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of

[1] Covered industrial facilities also include those facilities with storm water discharges associated with industrial activity where the permitting authority determines that the discharge contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States.

process waste waters (as defined at 40 CFR Part 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and ***significant materials*** remain and are exposed to storm water.

Significant Materials - 40 CFR 122.26(b)(12)
Include, but are not limited to, raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under section 101(14) of CERCLA; any chemical the facility is required to report pursuant to section 313 of title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag and sludge that have the potential to be released with storm water discharges.

Category (xi) of the definition addresses storm water discharges from all the areas (except access roads and rail lines) listed in the previous sentence where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery ***are exposed to storm water***. This differs from the requirement for categories (I) through (ix), to which the requirements apply ***whether or not exposure has been identified***. [2]

The term "storm water discharges associated with industrial activity" excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with storm water drained from the above described areas.

5.1.2 NPDES Storm Water Permit Requirements for Industrial Activities

Facilities that meet the definition of "storm water discharge associated with industrial activity" were required to apply for an NPDES permit by October 1992. In developing a permitting approach for industrial facilities regulated under the Phase I storm water program, EPA acknowledged the administrative burden on EPA and States authorized to provide permit coverage for a large number of sites. Consequently, EPA and authorized States have primarily relied on the use of general permits to provide permit coverage for storm water discharges from industrial facilities.

Each facility covered under EPA's general storm water permit is required to develop and implement a storm water pollution prevention plan (SWPPP). As the primary method used to control storm water discharges, the SWPPP encompasses two main objectives: (1) to identify sources of pollution potentially affecting the quality of storm water discharges associated with industrial activity from the facility and (2) to describe and ensure implementation of practices to minimize and control pollutants in storm water discharges associated with industrial activity from

[2] The Phase II storm water regulations (64 FR 68722, December 8, 1999) revise this "no exposure" provision to apply to all industrial activities identified in categories (i) through (ix) and (xi). However, although past "no exposure" determinations allowed facilities to opt out of all storm water requirements, the Phase II rule requires that these "no exposure" facilities must notify the permitting authority in writing of this determination.

the facility. Implementation of a SWPPP provides facilities with a flexible, relatively inexpensive approach for reducing pollutant loadings from storm water. An overview of the SWPPP requirements is provided in Appendix H. Examples of the types of best management practices (BMPs) in an industrial facility's SWPPP include the following:

- Good housekeeping
- Employee training
- Site inspections
- Spill prevention and response
- Preventative maintenance activities.

5.1.3 Current Status of Phase I Program for Industrial Activities

As shown in Table 5-1, more than 75,000 facilities are currently permitted nationwide for discharges of storm water associated with industrial activity. Table 5-1 lists the number of facilities by State, grouped into EPA Regions.

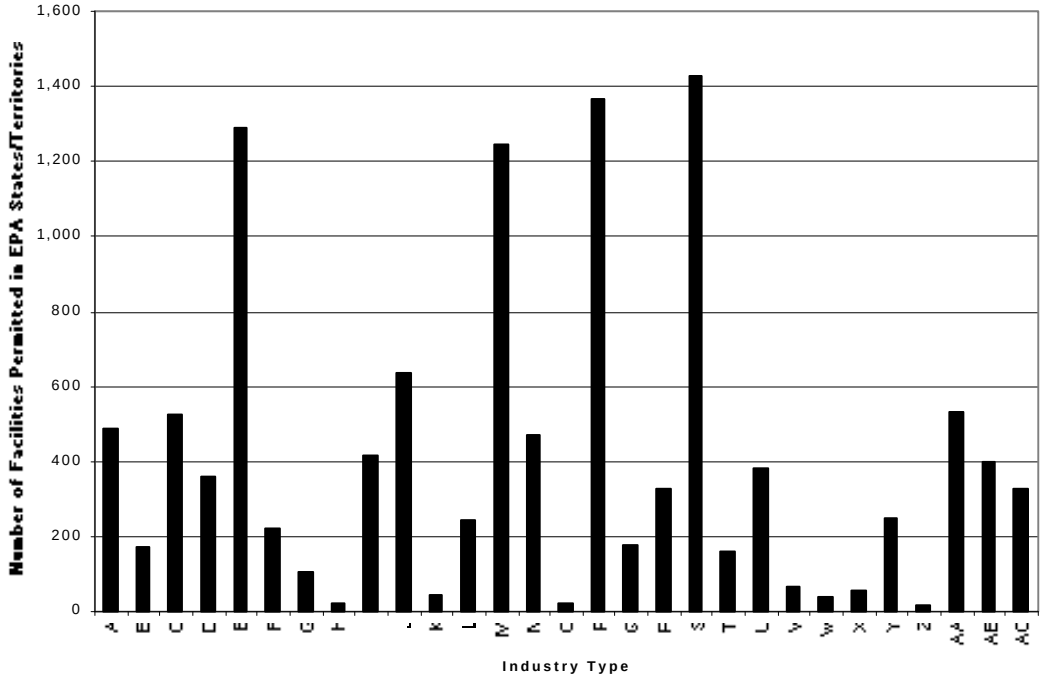
The number of facilities listed in each State varies because of several factors. The amount and type of industrial activity to be found in the State is obviously one of the factors that determines the number of facilities required to be covered under a general permit. California and Texas list 9,192 and 7,285 facilities, respectively, or 12 percent and 10 percent of the total. Other States having large numbers of industrial facilities covered by the program include Michigan with 4,900 (7 percent), Illinois with 4,172 (6 percent), and Wisconsin with 3,899 (5 percent). These five States total 29,448 facilities, or almost 40 percent of the total number of facilities covered in the country.

Information related to the number of facilities within each of the 10 industrial categories is not available for the Nation. However, EPA has information related to the number of facilities in each of the 10 categories that are covered by the Agency's multi-sector general permit (MSGP). Evaluation of this information provides an indication of the potential relative distribution of facilities across categories. Figure 5-1 details the industrial facilities covered under EPA's MSGP, organized by facility type. EPA's general permit applies to facilities in nine States, the District of Columbia, and Puerto Rico (i.e., those States and territories in which EPA is the permitting authority).

Table 5-1. Industrial Facilities Covered by Storm Water General Permits by State

State	EPA Region	Total
CT	1	1,261
MA		1,163
ME		468
NH		347
RI		142
VT		N/A
NJ	2	1,799
NY		1,821
PR		471
VI		1
DC	3	44
DE		N/A
MD		N/A
VA		N/A
WV		N/A
AL	4	2,764
FL		2,422
GA		2,508
KY		1,856
MS		2,415
NC		3,671
SC		2,235
TN		2,254
IL	5	4,172
IN		1,535
MI		4,900
MN		2,121
OH		3,282
WI		3,899
AR	6	N/A
LA		708
NM		595
OK		693
TX		7,285
IA	7	1,249
KS		13
MO		2,300
NE		402
CO	8	1,440
MT		220
ND		480
SD		550
UT		435
WY		701
AZ	9	727
CA		9,192
GU		4
HI		198
NV		534
AK	10	366
ID		228
OR		1,076
WA		1,200
Total:		75,879

N/A - not available



R -

A - Timber Products
B - Paper and Allied Products
C - Chemical and Allied Products
D - Asphalt Paving and Roofing Materials and Lubricants
E - Glass, Clay, Cement, Concrete, and Gypsum Products
F - Primary Metals
G - Metal Mining (Ore Mining and Dressing)
H - Coal Mines and Coal Mining-related Activities
I - Oil and Gas Extraction
J - Mineral Mining and Dressing
K - Hazardous Waste Treatment, Storage, or Disposal
L - Landfills, Land Application Sites, and Open Dumps
M - Automobile Salvage Yards
N - Scrap Recycling Facilities
O - Steam Electric Generating Facilities
P - Land Transportation and Warehousing
Sector Q - Water Transportation

Ship and Boat Building or Repairing Yards
S - Air Transportation
T - Treatment Works
U - Food and Kindred Products
V - Textile Mills, Apparel, and Other Fabric Product Manufacturing, Leather and Leather Products
W - Furniture and Fixtures
X - Printing and Publishing
Y - Rubber, Miscellaneous Plastic Products, and Miscellaneous Manufacturing Industries
Z - Leather Tanning and Finishing
AA - Fabricated Metal Products
AB - Transportation Equipment, Industrial or Commercial Machinery
AC - Electronic, Electrical, Photographic, and Optical Goods

Figure 5-1. Industrial Facilities Covered by the EPA Multi-Sector General Permit by Industrial Category

Although Figure 5-1 demonstrates the types of activities covered under EPA's MSGP, it does not indicate the number of facilities nationwide that actually meet the definition of the individual sectors. The number of facilities defined by each sector highlights the fact that only a percentage of any given sector will be covered by a storm water general permit. Other facilities meeting the definition might not necessarily require permit coverage. For example, any facility that discharges storm water to a publicly owned treatment works (POTW) or to a combined sewer (i.e., a single sewer conveying domestic wastewater and storm water) is not covered by the Phase I regulations.

Also, a number of heavy industrial facilities have storm water discharges covered under an existing individual NPDES permit that includes both process wastewater and storm water controls. EPA does not track these individual NPDES permits that contain storm water provisions, and therefore they are excluded from the count of covered facilities in the Notice Of Intent (NOI) database. Additionally, light industry (i.e., those facilities defined at 40 CFR 122.26(b)(14)(xi)) are required to obtain permit coverage only if the industrial activity is exposed to storm water. Therefore, a much smaller percentage of light industrial facilities are expected to be covered under the Phase I program.

5.2 ANALYTICAL APPROACH

EPA's analysis of the industrial facilities provides an understanding of improvements associated with implementing SWPPPs and activities associated with the Phase I program. The analysis characterizes key program elements used to achieve pollutant load reductions and water quality improvements. Where possible, the analysis projects national trends.

As discussed in Chapter 2, three indicators are used to identify program success:

- **Programmatic indicators** show how permitting authorities have been able to communicate program requirements to permittees since promulgation of the Phase I regulations and how permittees have been able to effectively implement these requirements, quite often using low-cost solutions.

- **Loading reductions indicators** show how reductions in pollutant concentrations are occurring in a variety of industrial sectors and how permittees are beginning to recognize the contributions of these permitting solutions to reductions in pollutant loadings to waters of the United States.

- **Water quality improvement indicators** anecdotally show how the Phase I regulations can improve water quality and how the regulated community believes that the Phase I program can have positive influences on water quality.

In responding to Congress's directive to develop this Report, EPA used in-house information, including the results of a general permit effectiveness survey performed by the Water Environment Federation (WEF) in 1996 to characterize the program and document how the Phase I program has been successful in establishing a framework for reducing pollutant loadings to receiving waters.

5.3 SPECIFIC METHODS AND RESULTS

One of the biggest challenges for EPA is to ensure that all facilities with storm water discharges associated with industrial activity are covered by an NPDES permit. Unlike the situation for municipalities, in which the regulations identify the MS4S that require permit coverage, either the facility or the permitting authority (EPA or an NPDES-delegated State) must identify the need for an NPDES permit for storm water discharges associated with an industrial activity. It is unreasonable to expect permitting authorities to make these determinations for the more than 75,000 sites nationwide. Consequently, EPA has undertaken an extensive outreach program to communicate the requirements of the Phase I storm water program. Based on findings from a recent study, this outreach effort seems to be effective.

This section describes the specific methods used to analyze the effectiveness of the Phase I program for industrial activities. It also presents the results of the analyses, focusing on the three programmatic indicators described in Chapter 2 and highlighted in Section 5.2.

5.3.1 Programmatic Indicators

This section reports on Phase I programmatic improvements based on permitting authority information, results of a storm water general permit effectiveness survey, and case studies. This section first provides an overview of the outreach efforts performed by EPA and NPDES-authorized States since promulgation of the Phase I regulations. This outreach effort promotes cost-effective and timely implementation of the regulation. This section describes how permitting authorities have used the information gained to tailor specific requirements, maximizing the benefits of efforts expended by permittees. Next, results of a 1996 storm water survey are discussed, highlighting the effectiveness and acceptance of the storm water general permitting approach based on responses from the permittees. Finally, several case studies are presented that highlight specific efforts undertaken in response to the Phase I program.

5.3.1.1 Outreach Efforts

To assist industrial facilities in meeting the intent of the Phase I regulations, EPA has developed and implemented a number of different outreach activities to promote compliance with program requirements. These activities include maintaining an Internet web site specific to the storm water program, presenting training workshops, operating an active telephone hotline, and producing guidance documents for distribution to regulated facilities.

EPA's Office of Wastewater Management (OWM) Internet web site (www.epa.gov/owm/sw/industry/index.htm) provides specific storm water information for program stakeholders. The web site guides users through the process of determining applicable requirements of the Phase I program for industrial activities. The web site's design incorporates all the programmatic resources necessary for a facility with storm water discharges associated with industrial activity to identify applicable regulations and take the steps necessary to comply with those regulations. As an example, EPA maintains a list of all threatened and endangered species, by county, that permit applicants can access to determine if discharges from the site have the potential to affect any of these species. Without this web site, each applicant would have to

perform an independent assessment to identify the threatened and endangered species present in the immediate vicinity of the storm water discharge, a task that could be quite burdensome given the number of permitted discharges.

Since 1992 EPA has conducted 28 workshops to communicate the regulatory requirements of the Phase I storm water program. Approximately 4,000 representatives from industrial facilities, the construction industry, and municipalities attended the workshops.

EPA's Storm Water Hotline (800-245-6510) has also played a vital role in making information readily available to the regulated community. Since promulgation of the Phase I rule in 1990, EPA has received and responded to well over 150,000 calls on the hotline. In the 2 years after promulgation of the Phase I rule, EPA distributed more than **2,500 documents a month** based solely on hotline requests. To this day, the hotline continues to average more than 500 calls a month.

5.3.1.2 Water Environment Federation General Permit Effectiveness Survey

Arguably, one of the best ways to assess the effectiveness of an environmental program is to seek feedback directly from the regulated community regarding the value of the requirements in protecting the environment. Where compliance costs are high with little noticeable environmental improvement, it is reasonable to assume that many, if not most, companies will argue that the regulations are unnecessary, burdensome, inefficient, and so forth. Conversely, low-cost alternatives that provide noticeable improvements to the environment are likely to be more readily accepted by the regulated community.

Consistent with the approach described above, WEF[3] published a report in October 1996 entitled *Effectiveness of Industrial Storm Water General Permitting Program* (WEF, 1996). This report, funded through an EPA cooperative agreement, provides a summary of industrial storm water permittee's responses to a variety of questions related to the Phase I storm water program. The following discussion draws from information contained in that report and demonstrates that

- SWPPPs have been developed by industry.
- SWPPPs are not redundant requirements.
- EPA outreach materials have assisted affected facilities.
- BMPs have resulted in water quality improvements.

It was EPA's objective to increase stakeholder involvement in setting priorities for the Phase I program by working with WEF and industry to obtain input on the effectiveness of the industrial portion of the program. The report built on an initial project performed under the WEF/EPA cooperative agreement. The project was an avenue for Phase I industrial facilities (in States where EPA was the permitting authority) to report to EPA on the effectiveness of SWPPPs and

[3] WEF is an international not-for-profit educational and technical organization of more than 40,000 water quality experts. Members include environmental, civil, and chemical engineers, biologists, chemists, government officials, students, treatment plant managers and operators, laboratory analysts, and equipment manufacturers and distributors.

to provide feedback to EPA on the program's success. The objective was expanded in 1995 to address all States, evaluate the Phase I program beyond the SWPPP requirements, and provide an evaluation for the need for a "no exposure" exemption.

Data were collected through a survey instrument designed to elicit industrial permittee's perceptions of the storm water program. The survey was prepared by a diverse work group consisting of industrial representatives as well as State and EPA staff. Using EPA and State databases of facilities, WEF identified a total of 76,286 facilities covered by storm water general permits.[4] WEF determined that mailing the questionnaire to 10 percent of these facilities would provide statistically useful results even if only 5 percent of the surveys were returned. With that in mind, WEF distributed 7,500 questionnaires to a stratified random sample of facilities.

The questionnaires were mailed in January 1996 with responses due back to WEF in February 1996. WEF received 584 completed responses (an 8.2 percent response rate with a confidence level of ±4.04 percent). Responses were from industries representing 237 different four-digit SIC

Table 5-2. Makeup of WEF Survey Respondents

Types of Industries
- 44.4% heavy industry (categories (i) through (ix) in 40 CFR 122.26(b)(14))
- 31.5% light industry (category (xi) facilities)
- 10.1% miscellaneous (SIC codes that are not in any of the categories identified in 40 CFR 122.26(b)(14))
- 14.0% that WEF could not differentiate (no SIC code specified in the response)

Facility Size Designation
- 36.3% small business
- 51.8% not a small business
- 11.9% uncertain

Range of the Number of Employees at Facilities
- 0 employees (1.7%)
- 1–25 employees (36.6%)
- 26–100 employees (27.8%)
- >100 employees (33.9%)

Size of Facilities
- <1 acre (3.8%)
- 1–5 acres (32.2%)
- 5–25 acres (34.4%)
- >26 acres (29.6 %)

Annual Average Rainfall
- 0–10 inches (14.4%)
- 11–20 inches (26.8%)
- 21–20 inches (21.4%)
- 31–40 inches(19.1%)
- >40 inches (16.9%)

Source: WEF, 1996.

[4] No data were available for Vermont and West Virginia; two other States, Minnesota and Kansas, chose not to participate.

codes. A breakdown of the respondents is provided in Table 5-2.[5] One of the key indicators of facility makeup was to differentiate between small and large businesses as a way to evaluate the differential burden of program compliance. The discussion that follows highlights any meaningful differences (or similarities) for small and large facilities.

Implementation Status

WEF assessed the degrees of program implementation based on a number of survey questions. One of the most important questions asked whether the facility had developed a SWPPP. Presumably, facilities that had developed a SWPPP would be better able to assess the effectiveness of the program as well as the costs associated with implementation of program requirements. Of the total respondents, 17.4 percent stated that a SWPPP had not been developed, with another 3.9 percent uncertain if the facility had a SWPPP. Small business respondents were less likely to have prepared a SWPPP (23 percent) or to know if they had a plan (7.2 percent).[6] The WEF report surmises that small businesses tend not to understand the regulatory requirements as well as larger businesses.

WEF found that most firms that failed to prepare SWPPPs, irrespective of size, were confused by the program requirements.

The remainder of the analysis focused on facilities that had prepared a SWPPP. Of these industrial respondents, the vast majority (67 percent) indicated that the Phase I rule was the first regulation that affected storm water discharge from their facility.

To reduce program development costs, EPA has made significant efforts to provide permittees with as much guidance as possible. Therefore, one issue of concern was whether these outreach efforts had proven successful. The analysis found that approximately 70 percent of the facilities were able to prepare the SWPPP using internal resources; that is, only 30 percent used an external consultant to prepare the plan. For facilities that prepared their own SWPPP, 71.3 percent used government guidance only (EPA and/or State). Costs for plan preparation varied, with an overall average cost of $7,606 and a small business average cost of $4,341.

SWPPP Components Found to Be Effective in Controlling Storm Water

[5]WEF did not attempt to identify why certain facilities had submitted NOIs for coverage (and had returned the WEF questionnaire) even though the facility's SIC code was not in one of the covered sectors. Rather, the assumption was made that for one reason or another, since these facilities had submitted an NOI, they were covered under the Phase I program and would have valuable information to contribute. Therefore, all responses were retained and evaluated.

[6]The Phase I storm water regulations require all facilities submitting an NOI to have a SWPPP in place prior to submission of the NOI. Under the Phase I rule, certain classes of industrial activities can eliminate coverage under the storm water program by eliminating storm water discharges associated with industrial activities (i.e., eliminating exposure).

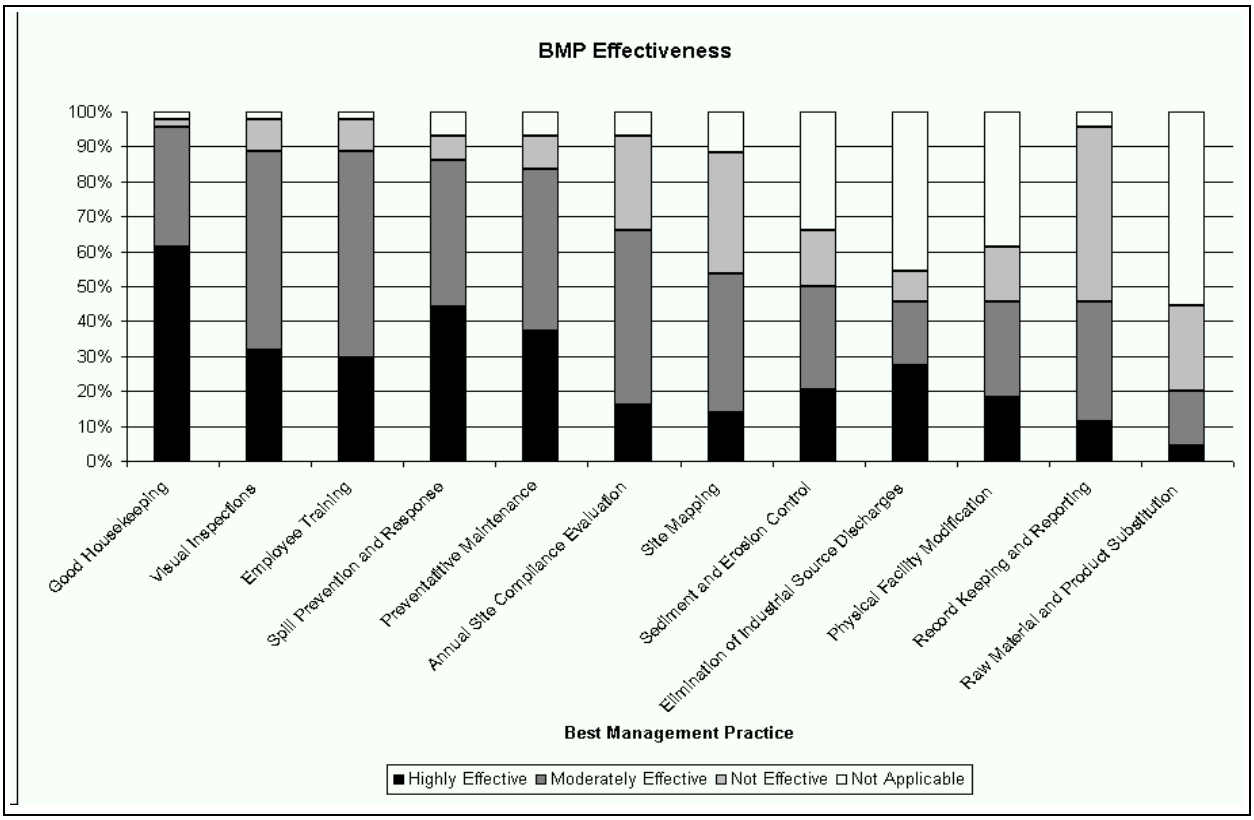


Figure 5-2. Rating of BMP Effectiveness as Reported in the WEF Survey

As discussed in Section 5.1.2, one of the key components of facility SWPPPs is BMPs. The WEF survey sought to assess the level of effectiveness of different combinations of BMPs. Permittees were asked to label each BMP as highly effective, moderately effective, not effective, or not applicable. The list of BMPs provided in the survey questionnaire matched the SWPPP requirements identified in the Phase I rule. A histogram showing how permittees evaluated each BMP is provided in Figure 5-2.

As shown in Figure 5-2, the BMPs considered by at least 75 percent of the respondents to be applicable and highly or moderately effective are

- Good housekeeping
- Visual inspections
- Employee training
- Spill prevention and response
- Preventative maintenance.

Other BMPs considered to be highly or moderately effective by at least 50 percent of the respondents included the annual site compliance evaluation, site mapping, and sediment and erosion control.

Not all BMPs were found to be applicable to any given site. For example, elimination of industrial source discharges was found to be highly or moderately effective by fewer than 50 percent of the respondents, but of the respondents that found the technique to be applicable to their site, more than 85 percent found it to be a highly or moderately effective technique. Similarly, sediment and erosion control and physical facility modifications were found to be highly or moderately effective for a majority of facilities for which these BMPs were applicable.

BMPs found not to be effective included raw material and product substitution and record keeping and reporting. As indicated in the WEF report, "clearly the one perceived to be the least effective was record keeping and reporting." In fact, more than 53 percent of the respondents who identified this as an applicable BMP found it not to be effective.

Cost of Complying with the Regulations

The WEF survey sought to establish costs for complying with the provisions of the storm water program. The survey identified three major cost components: SWPPP development, capital improvements, and annual operation. WEF designed its survey to collect costs in stated ranges.

SWPPP costs ranged from less than $1,000 to more than $100,000, with the average cost being about $7,500. More than 67 percent of the facilities spent less than $5,000 on plan development; 81 percent spent less than $10,000 developing the plan.

WEF found that approximately 39 percent of facilities had to expend resources for capital improvements to meet the regulatory requirements. The primary capital improvements identified were covered structures/improved storage (23.1 percent); ponds and other containment structures (19.3 percent); improved drainage, grading, and erosion control (18.5 percent); and berms, dikes, and diversion runoff (14.7 percent). WEF reported a trimodal distribution of costs with 33.7 percent of the facilities spending less than $5,000, 45.4 percent spending between $5,000 and $50,000, and 20.7 percent spending more than $50,000. Even though 80 percent of the facilities spent less than $50,000, the average cost was $89,030, which was heavily influenced by a number of facilities that had spent more than $100,000 on capital improvements (with an average cost of that group of more than $600,000 per facility). The median cost of capital improvements was just over $10,000 per facility.

For annual operating expenses, the average cost is $4,105, although the majority (69.5 percent) incurred annual costs of less than $2,500. The median annual cost was slightly more than $1,000.

To more fully understand the cost-effectiveness, WEF requested respondents to identify the three most cost-effective activities the facility had implemented and the three least cost effective measures. The two most common responses for most effective were good housekeeping and employee training, which were selected over 50 percent more frequently than the next two responses. The next two responses were structural controls, consisting of ponds and other containment structures, and improvement of storage, including installation of covered storage facilities.

By far, the least cost-effective measure reported was monitoring or sampling and analysis. Based on responses, WEF surmised that the costs associated with monitoring might be considered too high or the data generated from monitoring are considered of little value in effectively reducing storm water pollution. Not one respondent identified monitoring or sampling and analysis as one of the top three most effective measures. The next two most common least cost-effective measures, record keeping and reporting and plans/mapping, also were not identified as one of the three most effective measures by any respondent.

WEF asked respondents to identify those aspects of the SWPPP the facility would continue to implement even if the storm water regulations no longer existed. Almost 43 percent of the respondents indicated that they would retain the plan in it entirety, with 52.3 percent saying that they would retain some of it. Less than 5 percent indicated that they would not retain any aspect of the SWPPP in the absence of regulatory requirements. Similar to the question on effectiveness of specific BMPs, when asked which components of the SWPPP would be retained, the three overwhelmingly most common answers were good housekeeping, training, and inspections. Spill prevention and response, and preventative maintenance were the next two most common responses. Again, not one facility identified monitoring, or sampling and analysis as one of the measures that would be continued.

Finally, WEF asked respondents to identify the reasons that the facility would continue to implement the SWPPP even if the regulations did not exist. Approximately 80 percent of the respondents indicated that they would retain the plan requirements because of the environmental benefit, 59 percent because it was a corporate policy, 46 percent because it was required by other regulations, 24 percent because of the economic benefits, and 2.2. percent because of the public relations benefit.

The WEF study indicates that industrial facilities generally acknowledge the benefits associated with SWPPPs and BMPs. Indeed, as noted above, almost 43 percent of respondents reported they would retain the SWPPP in its entirety in the absence of regulatory requirements. Certain actions, particularly low-cost actions that could be characterized as good business practices, were well received. Other requirements, particularly monitoring and record keeping/reporting, were not highly valued by the respondents.

WEF Study Conclusions

- **#** Most respondents believe that BMP implementation has led to water quality improvement.
- **#** More than 95 percent of the respondents determined that good housekeeping was effective.
- **#** Preventative maintenance, elimination of sources, visual inspections, sediment and erosion control, spill prevention and response, and employee training were also rated as successful.
- **#** More than 60 percent of the respondents felt that the potential improvements in water quality might be worth the corresponding expenditures.
- **#** More than 90 percent of the respondents indicated that they would continue to implement at least some parts of their SWPPP even if the Phase I requirements were removed.

5.3.1.3 Case Studies

A number of case studies are presented here that describe the types of programmatic activities one State and several industrial facilities have undertaken to comply with the

Phase I program. The case studies illustrate how some facilities in different industrial sectors have taken advantage of the flexibility of the program by using a variety of approaches to comply. Complete case studies are provided in Appendix D.

Connecticut's Use of Phase I Monitoring Data Assists in Program Implementation

The Connecticut Department of Environmental Protection (DEP) currently regulates approximately 1,200 facilities under its General Permit for the Discharge of Stormwater from Industrial Facilities. Part of the general permit requirements include annual monitoring for 11 water quality parameters, including whole effluent toxicity. As described below, the State has found the Phase I storm water monitoring data to be essential to the efficient operation of the State's program.

The State general permit establishes performance criteria that represents the 80th percentile of statewide storm water quality from industrial facilities for each monitored parameter (derived from storm water discharge data collected from the first general permit issued by the State). These criteria are not enforceable limitations, but are used as a means of identifying storm water discharges that are significantly more contaminated than that discharged by most facilities regulated under the general permit. The performance criteria are specifically used by the State to provide flexibility for regulated facilities. Facilities that meet the criteria for all monitoring parameters for two consecutive years are exempt from monitoring for the remainder of the permit term.

The State has been collecting and analyzing storm water data for the past four years (1996-99). DEP prepares and distributes annual reports for the regulated facilities that summarizes all the monitoring data submitted to the State. According to DEP, the annual summary allows each facility to see where they stand in comparison to others, and many facilities have been found to improve storm water quality without prodding from DEP. DEP also uses the collected storm water data to more focus compliance activities. In particular, DEP lists those facilities that report highly contaminated storm water. By focusing on those with the greatest potential to impact water quality, DEP feels that the return on its limited resources is maximized and a higher rate of overall compliance is ultimately achieved.

DEP has also used the storm water monitoring data to assess technical assistance and research needs related to storm water controls. For example, the State discovered that marinas are much more likely to discharge storm water that is toxic to aquatic life than other types of facilities in the transportation category. As a result, DEP designated marinas as a priority problem, which is being addressed through a cooperative agreement with the Connecticut Marine Trades Association to perform research to identify the cause of the degraded storm water quality.

Ciba Specialty Chemicals, Newport, Delaware, Saves Money by Capturing and Reusing Storm Water

This case study shows how one industrial facility used the program's flexibility to arrive at an innovative solution to control its contaminated storm water discharge. Ciba Specialty Chemicals is a specialty chemical manufacturer that was identified as having a zinc-laden toxic dry weather

discharge to the receiving water as the result of infiltration at the site. Also, high levels of suspended solids were found to run off the site during storm events. Before the Phase I regulations, the facility collected contaminated ground water and pumped the water to the municipality for treatment. Storm water ran off the site directly to the river. Through installation of an on-site storm water collection network, Ciba Specialty Chemicals has been able to meet the SWPPP requirements of the Phase I program while at the same time eliminating the toxicity and reducing levels of suspended solids in the discharge. The facility's solution was to collect the first flush of storm water from the site and use the water for on-site cooling. In addition to the control of storm water discharges, Ciba's storm water collection system also captures spills, preventing discharge to the river. As a result, analytical testing of storm water discharges now shows zero percent mortality of aquatic species. In addition, the facility has saved money both from the reduction in the purchase of cooling water and from reduction in annual maintenance costs associated with the previously contaminated ground water.

Doggett Auto Parts, Bryan, Texas, Receives National Recognition for Aggressively Implementing Its Best Management Practices

This case study is an example of the positive effect that compliance with the Phase I program can have on a business. Doggett Auto Parts is a full-service auto recycling facility that stores 1,000 cars on-site and dismantles about 20 vehicles a month. In response to the Phase I regulations, the facility developed a SWPPP in 1994 and, through aggressive implementation, was approved as a Certified Automotive Recycler by the Automotive Recyclers Associations, becoming one of the first facilities in the Nation to achieve this status. (Doggett was also one of the first facilities in the country to achieve Gold Seal Quality Program status, a distinguished recognition for facilities with honest, reputable, quality business practices throughout the automotive recycling industry for the direct benefit of customers.) Employing fewer than 10 employees, Doggett trained its entire staff on the requirements of the Phase I program and then worked to identify solutions to eliminate storm water contamination from its facility. Some of the simple solutions incorporated into the facility's SWPPP included draining of all fluids from vehicles and reusing the fluids where possible, providing secondary containment around storage tanks, storing parts that had previously contained any automotive fluids indoors to prevent contact with storm water, and storing vehicles off the ground on wheel stands to allow for easy inspection of possible leaks under the cars. As a result of Doggett's aggressive plan for complying with the Phase I program, each of its employees is now aware of the environmental benefit of the program.

5.3.2 Loading Reductions

As noted previously, one of the key indicators of water quality benefits attributable to the Phase I program is preventing pollutants from being released to the environment. Water quality improvement occurs when industrial facilities employ practices that prevent or minimize contact of storm water with industrial activities and hence minimize the amount of pollutants carried off the site with the runoff and into receiving waters. This section describes how the Phase I program has reduced loadings of pollutants, highlighting this accomplishment through the use of storm water monitoring data, BMP effectiveness summaries, and case studies.

5.3.2.1 Storm Water Monitoring Data

The analysis of monitoring data from industrial sources presented below does not attempt to quantify nationwide estimates of loading reductions. Data on quantities of industrial pollutant discharges are insufficient to perform that type of analysis. Most notably, few data exist on the volume of storm water runoff from the diverse universe of industrial sources. Rather, the focus of this analysis will be on the reductions in concentrations (i.e., removal efficiency) that can be achieved at individual facilities, comparing storm water monitoring data submitted prior to Phase I permit requirements (i.e., group application monitoring data from 1991–92) with data submitted subsequent to Phase I permit requirements (i.e., discharge monitoring report data from 1994–present). The analysis suggests that, by and large, industry sectors experienced significant reductions in pollutant mean concentrations.

Use of Group Applications to Derive Pre-Phase I Program Pollutant Concentrations

The Phase I regulations originally established a two-part group application procedure to obtain coverage under the Phase I program. More than 1,200 groups and 60,000 member facilities (from all 50 States, Washington, DC, and many of the U.S. Territories) submitted part 1 applications. Of these applicants, EPA approved 700 groups and 44,000 members.[7]

The Phase I regulations required a set percentage of the group members to submit monitoring data in the part 2 applications (see Table 5-3). In addition to certain site-specific pollutants, all facilities submitting data were required to monitor for eight conventional pollutants: pH, 5-day biochemical oxygen demand, chemical oxygen demand, total suspended solids, oil and grease, total phosphorus, total Kjeldahl nitrogen, and nitrate plus nitrite nitrogen. Part 2 applications were a one-time option available for storm water discharges associated with industrial activity and were due to EPA by October 1, 1992. These data therefore represent the nature of storm water discharges before regulatory permit controls. EPA has compiled summaries of these part 2 group application monitoring data in several documents, most notably in the 1995 MSGP (60 FR 50804,

[7] EPA also issued a Baseline Industrial General Permit that provided another permitting option, although since that time EPA has merged the group and General Permit applications into a single permitting option, the Multi-Sector General Permit.

September 29, 1995) and in the March 1995 *Storm Water Discharges Potentially Addressed by Phase II of the National Pollutant Discharge Elimination System Storm Water Program* (USEPA, 1995). In both of those documents, EPA presented the data on a sector-specific basis. The sector approach has been used because, as has been discussed, the framework of EPA's current Phase I program is that the regulations are uniformly applied on a sector-specific basis (i.e., the MSGP).

Table 5-3. Part 2 Group Application Requirements (40 CFR 122.26(c)(2)(I)(D))

Size of Group	No. Required to Monitor
≥1,000 members	≥100 members
100–999 members	≥10% of members
21–99 members	≥10 members
4–20 members	≥50% of members

For groups with >10 members: at least two dischargers must monitor from each of the nine precipitation zones nationwide for any zone with at least 10 members or one discharger from each zone with fewer than 10 members.*
For groups with ≤10 members: at least one discharger must monitor from each of the nine precipitation zones nationwide.*

**Applies to each precipitation zone represented by the group.*

A brief summary of the group applications and the intent of the data collection effort highlights the significance of the group application monitoring data. The Phase I group application option enabled EPA to gather the information necessary for issuing permits for certain classes of storm water discharges associated with industrial activities. At the same time, this approach reduced the costs and administrative burdens associated with preparing permit applications and developing permits.[8]

The group application regulations required that monitoring data must be (1) representative of the members' discharges, (2) from a storm event greater than 0.1 inch, and (3) taken from a storm event that occurred at least 72 hours after a previously measurable storm event. Also, grab samples were to be collected during the first 30 minutes of the discharge. The regulations provided that when a facility had two or more substantially identical effluents,[9] the permittee had to sample only one of these outfalls and report that the data apply to the other outfalls.

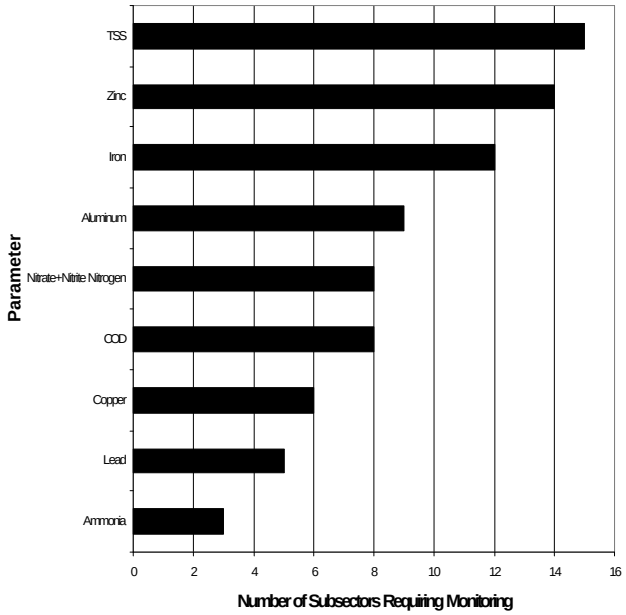
Use of Discharge Monitoring Reports to Derive Post-Phase I Pollutant Concentrations

The NPDES regulations, at 40 CFR 122.41(l)(4), specify monitoring report requirements that must be included in all NPDES permits. This section specifies that monitoring results are to be reported on a Discharge Monitoring Report (DMR). EPA and many NPDES-authorized States have developed and implemented DMR forms to be used by permittees for reporting analytical

[8] EPA recommended that NPDES-authorized States adopt the permits prepared by the Agency. Many States have, in fact, adopted EPA's MSGP or a permit similar in intent, form, and content, with specific State concerns added as appropriate.

[9] EPA defined the term "substantially identical effluents" in *NPDES Storm Water Sampling Guidance Document* (EPA 800/B-92-001).

monitoring results. The storm water MSGP does not require all covered facilities to submit DMRs. Appendix I contains a list of the 19 industrial sectors (and appropriate subsectors) with analytical monitoring requirements under the MSGP. EPA set monitoring requirements for these sectors based on an analysis of group application data and the identification of sectors and subsectors that were shown to have the potential to discharge pollutants above EPA-established benchmark concentrations.[10] Sectors and subsectors required to monitor must submit DMRs to the permitting authority. As indicated in Appendix I, the parameters to be monitored vary for each sector and subsector but are limited to the nine pollutants referenced in Figure 5-3. As in the group application process, grab samples are to be collected during the first 30 minutes of discharge.



* BOD and phosphorus monitoring is required of two subsectors each and magnesium, cadmium, cyanide, mercury, selenium, silver, manganese and pH monitoring is required of one subsector each.

Figure 5-3. Parameters Required to Be Monitored in the MSGP and the Number of Subsectors Required to Monitor for Each Parameter*

As noted previously, EPA is the permitting authority for seven States and all territories (except the Virgin Islands). In developing the MSGP, EPA recommended that NPDES-authorized States adopt a permit similar to EPA's. To date, all of the authorized States have adopted some type of general permit program for storm water discharges associated with industrial activity, with a significant number of the States having implemented a Multi-Sector permit similar or identical to that issued by EPA. As a result, the monitoring requirements highlighted above are similar across the country. With that in mind, and given the short time frame for preparing this Report, EPA opted to use DMR data from States for which EPA is the permitting authority and not attempt to collect data from other States.

For this Report, EPA compiled DMRs for 399 facilities from eight States and two territories, representing 24 of the 30 industrial sectors and five of the nine precipitation zones nationwide.[11]

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[10] EPA established benchmark concentrations that represent levels at which storm water discharge could potentially impair or could contribute to impairing water quality, or could affect human health from ingestion of water or fish. Facilities with less than benchmark concentrations are considered to have little potential for water quality impacts. Benchmark concentrations are not effluent limits, and EPA has instructed NPDES-authorized States that the benchmarks should not be interpreted or adopted as such.

[11] DMRs collected for Arizona, Florida, Johnston Atoll (Federal facilities only), Hawaii (Federal facilities only), Maine, Massachusetts, New Hampshire, New Mexico, Puerto Rico, and Texas. Florida and Texas have since received NPDES program authorization.

These data represent monitoring performed from 1993 to 1999, with 90 percent of the monitoring performed between 1996 and 1998. Of the six sectors not represented, five do not have analytical monitoring requirements in the MSGP and the sixth, sector K, Hazardous Waste Treatment and Disposal, is the one category with monitoring requirements for which EPA did not have DMR data available for this Report.

Group Application/DMR Comparative Analysis

As described above, EPA has collected a significant amount of effluent quality data for facilities with storm water discharges associated with industrial activity. For both the group application process and DMR requirements, similar sampling criteria and analytical monitoring techniques were used, making data from these two sources comparable. Although the best-case scenario would involve comparing data for identical facilities before Phase I regulation (i.e., group applications) and after Phase I implementation (i.e., DMRs), the short time frame allotted for preparation of this Report prevented the more detailed data collection effort needed for such an analysis. Rather, as had been done for the group applications, DMR data were grouped by parameter and subsector for comparison. Also, the analysis that follows is not intended to provide a definitive statistical analysis of data, but rather to provide indications of the trends of program implementation. As shown below, trends emerge.

As presented in the fact sheet of the MSGP, group application data were compiled and simple statistics performed on the data. Specifically, for each subsector, statistics included means, medians, maximums, minimums, and 95th and 99th percentiles. For this Report, EPA focused on the two most common approaches for evaluating environmental data—means and medians. EPA used mean and median concentrations of data submitted in group applications and compared those to mean and median concentrations of data submitted in DMRs. The analysis was performed on a subsector basis for each of the 33 sector/subsector combinations (see Appendix I) that are required to perform analytical monitoring as a condition of the MSGP. Of these 33 combinations, EPA analyzed data for 16 of the subsectors, those being the subsectors for which EPA had ample DMR data to compare. The criteria used to designate "ample data" were (1) any subsectors for which EPA had at least three facilities with DMR and three facilities with group application data for at least one pollutant, and (2) those subsectors with DMRs for two facilities where the MSGP had data for five or fewer facilities. A compilation of all the subsector/pollutant combinations with ample data is provided in Appendix J. For each of these combinations (a total of 35 combinations), Appendix J identifies the pollutant, the number of facilities with group application and with DMR monitoring data, the number of grab samples collected for both group application and DMR monitoring data, the mean and median concentrations, and the percent change in mean and median concentrations from the group application data to the DMR data.

Appendix K provides a ranking of the mean differences in pollutant concentrations for each of the subsector/pollutant combinations. As presented, 24 of the 35 combinations had at least 50 percent lower mean concentrations in the DMR data than in the group application data. Similarly, as noted in Appendix K, 24 of the 35 combinations had at least 50 percent lower median concentrations, with 18 of the combinations over 75 percent lower. For analyses such as this, median concentrations are better indicators since they are less vulnerable to the impact of outliers or extraneous data points. With the evaluation focusing on comparing data for industry

subsectors rather than comparing data for the same facility, median concentrations also minimize the influence that extremely high or low concentrations may have on the analytical results.

In addition to the analysis of each subsector/pollutant combination, EPA analyzed the differences in concentrations of each pollutant (see Appendix J). A summary of that analysis is presented in Figure 5-4. As can be seen, differences in pollutant concentrations ranged from 13 to 95 percent, with five of seven pollutants showing a DMR concentration greater than 50 percent lower than the pre-program group application data. Again, even though this analysis represents sector-based comparisons and is not comparing pre- and post-regulation data for the same facilities, the difference in concentrations suggests that loading reductions are occurring. Although influences other than the Phase I regulation may be partly responsible for these reductions, no other environmental legislation or regulation enacted or promulgated since 1992 at the Federal level has established such direct requirements for storm water associated with industrial activities.

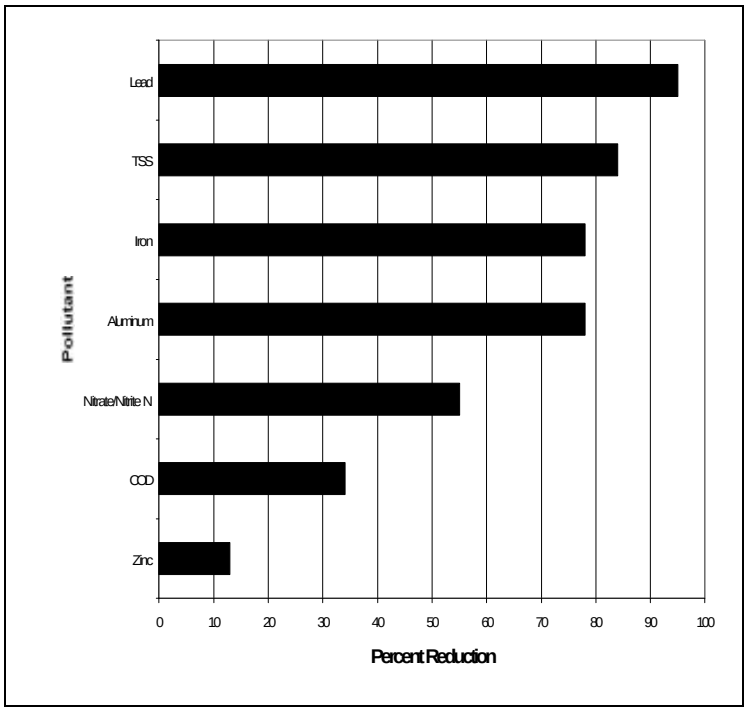


Figure 5-4. Median Reductions in Pollutant Concentrations by Pollutant

5.3.2.2 Case Studies on BMP Effectiveness

This section provides several examples of facilities that have demonstrated the reduction of pollutant loadings to receiving water through implementation of storm water controls in response to the Phase I regulations. As noted throughout this Report, EPA has minimal data that demonstrate clear improvements in water quality as a result of the Phase I program. However, EPA does have examples illustrating where the Phase I program is reducing the contribution of pollutants to waters of the United States. The following case studies demonstrate a few of these instances. Complete case studies are provided in Appendix D.

Empire Castings, Tulsa, Oklahoma, Reduces Solids Loadings by 90 Percent

This case study illustrates the pollutant reductions that can be obtained from compliance with the Phase I regulation. Empire Castings is an iron foundry that uses sand molds for its castings. Empire Castings worked with EPA Region 6 and the Oklahoma Department of Environmental Quality (DEQ) to participate in an innovative and voluntary program designed to help foundries comply with State and Federal regulations. Although the effort focused on all environmental

regulations, storm water discharges was one of the areas evaluated. Effluent sampling data, collected in October 1992 as a requirement of the Phase I regulation, identified elevated levels (i.e., 1,800 mg/L) of total suspended solids (TSS) in Empire Castings' storm water discharge. In consultation with local foundries, EPA, and DEQ, the facility identified and implemented several BMPs to minimize the discharge of pollutants. Some of the simple measures identified included improved housekeeping such as vacuuming up residual sand more frequently, addition of a filtering system (mesh-covered hay bales), and addition of a storm water retention basin to allow solids to settle from the storm water prior to discharge. These and other similar measures have reduced concentrations of TSS in the storm water discharge by 90 percent.

When asked about the cost-effectiveness of these measures, facility management indicated that it is difficult to put a price on environmental benefits, but they believe the program has been cost-effective in terms of direct benefits (reduced pollutants in storm water discharges) and indirect benefits (increased production rates due to housekeeping changes) achieved.

Pratt Auto Salvage and Sales, Hoxie, Arkansas, Implements Measures to Eliminate All Pollutants in Storm Water Discharges

This case study demonstrates the ability of a facility to totally eliminate storm water contaminants without a negative impact on business operations. Although one of the goals of the CWA is "zero discharge of pollutants," the efforts of facilities to completely eliminate process wastewater discharges can require expensive control technologies and process modifications. Storm water discharges, however, are not a necessary element of process operations, and in many instances they can be totally eliminated. Pratt Auto Salvage and Sales of Hoxie, Arkansas, has shown that industries can implement measures under the Phase I program to achieve the goals of the CWA. The facility engages in the wholesale distribution of motor vehicle supplies in addition to processing 100 used or damaged vehicles each month. It is located on a 20-acre site adjacent to an elementary school and an apartment complex.

To comply with its storm water discharge permit, issued pursuant to the Phase I regulations, Pratt Auto Salvage implemented a number of management practices to eliminate any contact of storm water with contaminated automotive fluids. One of the significant steps taken was to drain all fluids from vehicles in a covered building with a cement floor and recover the fluids for off-site recycling or disposal. Vehicles are then dismantled, with saleable parts removed and the rest of the vehicles placed outside in the yard for crushing. The 15-acre yard is covered with rocks and gravel and shows no signs of the oil or rust stains typically expected from salvage yards.

Hoechst Celanese, Coventry, Rhode Island, Addresses Significant Storm Water Issues as a Result of the Phase I Program

A January, 1995 inspection by the Rhode Island Department of Environmental Management (DEM) of Hoechst Celanese (HC) located in Coventry, Rhode Island found that the facility had numerous unsecured barrels located adjacent to the river, barrels actually floating in the river, and visual evidence of spills around the barrels and elsewhere on the facility property. Additionally, the inspector noted broken sandbags along the riverbank, litter in the channelized brook on the site, and eroded point source discharge points. At the time of the inspection, HC was operating

under an administratively extended permit that did not include any of the Phase I requirements. In response to this inspection, DEM compiled a list of activities for HC to undertake as part of the facility's application for permit reissuance. As a result of a letter from DEM to the facility in April 1995, HC developed and submitted a SWPPP to DEM in July 1995 to address the State's concerns. Although HC is not required by law to implement its SWPPP until it has been incorporated into the NPDES permit, the facility realized the importance of minimizing pollutant contamination of storm water discharges and began to implement the plan before the permit was reissued. In fact, the majority of the facility has since been sold to a new manufacturer and indications from current facility management are that the SWPPP is being implemented.

Measures undertaken by HC to address DEM's concerns included a number of good housekeeping practices such as improved pallet management techniques and loading/unloading techniques to prevent future spills/staining and to prevent any barrels from reaching the river. Also, HC developed an employee training program that, consistent with the Phase I requirements, addressed housekeeping, material handling, spill prevention and response, and routine inspections.

5.3.3 Water Quality Indicators

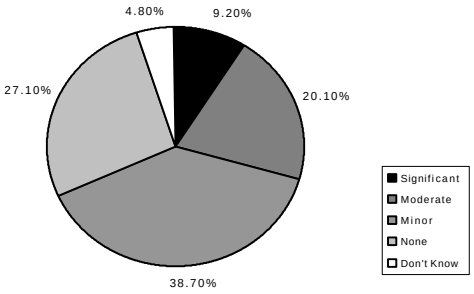
Only 6.3 percent of WEF survey respondents with SWPPPs who performed water quality monitoring did not think that the SWPPP implementation had improved water quality.

Although the Phase I program has resulted in loading reductions on a facility-specific basis, as demonstrated above, the Agency does not possess firm quantitative data indicating how such reductions have resulted in water quality improvements. The WEF survey, however, provides evidence that implementation of the Phase I program has benefitted water quality — at least in the opinion of survey respondents.

The survey asked respondents whether water quality monitoring and analysis had been performed on the storm water runoff from the facility and, if so, in the opinion of the survey respondent, were the BMPs incorporated into the SWPPP successful? More than half of the respondents (56.7 percent) indicated that water quality monitoring had been performed, with 56.9 percent of those respondents believing that BMPs were successful in improving water quality. Only 6.3 percent stated that BMPs were not successful (36.9 percent stated that data were inconclusive or not enough data had been collected to make the determination).

WEF also tried to assess just how much survey respondents felt that SWPPPs and improved water quality or reduced storm water contaminants. Figure 5-5 provides a summary of those responses. The responses to this question can be interpreted in two different ways: 68 percent believe that there is at least some improvement in water quality or 65.8 percent believe that there is little or no improvement.

The WEF report refined this analysis by assessing the opinions of those facilities that had collected the data to reinforce their impressions of water quality improvements. In this instance, 74.4 percent of the facilities responded that there had been at least some improvement in water quality or reduction in pollutant loadings.



Source: WEF, 1996.

Figure 5-5. Impact of SWPPPs on Water Quality

When asked whether the improvement or potential improvements in water quality were worth the corresponding expenditures, the amount of money expended on the program had little impact on the respondents' answers. The number of respondents that reported that water quality improvements were worth the costs was almost identical to the number of respondents reporting that water quality improvements were not worth the cost.

5.4 FINDINGS OF THE REVIEW OF THE PHASE I PROGRAM FOR STORM WATER ASSOCIATED WITH INDUSTRIAL ACTIVITIES

This section summarizes findings from EPA's review and analysis of the Phase I program for discharges of storm water associated with industrial activities. First, successful components of the Phase I program are identified, particularly as they relate to the protection of water quality. Second, the components of the Phase I program that may need to be addressed by EPA are discussed to ensure they are an effective part of future storm water management programs.

> The three WEF survey respondents with the highest expenditures on the program (each in excess of $1 million) all felt that the improvement in water quality was worth the expenditure.

5.4.1 Successful Attributes of the Phase I Program for Industrial Activities

This section describes the specific storm water management components that have been effective in controlling storm water discharges and protecting water quality.

The Phase I Program Provides a Sensible, Flexible, Low-Cost Approach to Storm Water Control

As documented in the WEF report, more than 95 percent of permittees said they would retain at least some of the required SWPPP even if the storm water regulations did not exist, with almost 43 percent saying that they would retain the plan in its entirety. Seventy-five percent of the WEF survey respondents indicated the following BMPs as being either highly or moderately effective:

- Good housekeeping
- Visual inspections
- Employee training
- Spill prevention and response
- Preventative maintenance.

Consistent with this finding, the general permitting option provides flexibility to the permittees on how to comply with the regulations, with the focus on low-cost pollution prevention techniques rather than more costly treatment alternatives. Similarly, EPA provides permittees with the option of using existing management plans developed for other environmental programs to supplement its storm water management plan or in lieu of developing a redundant plan for storm water control.

Loading Reductions Result From Phase I Permitting of Industrial Storm Water Discharges

In 1992 analytical data collected from Empire Castings, an iron foundry in Tulsa, Oklahoma, identified elevated levels of total suspended solids (TSS) in storm water discharges from the facility. In response, Empire Castings implemented several BMPs to minimize the discharge of pollutants, such as improved housekeeping, addition of a filtering system, and construction of a storm water retention basin to promote settling. As a result, the facility has reduced concentrations of total suspended solids in storm water discharges by 90 percent.

Water Quality Improvements Have Been Realized as a Result of Phase I Implementation

Based on findings from WEF survey respondents, 74 percent of industrial operators who had collected data as part of their SWPPP implementation indicated that there has been at least some improvement in water quality. Approximately half of the respondents to the WEF survey believe that the water quality improvements were worth the cost of the program. In fact, the three survey respondents with the highest expenditures on the program (each in excess of $1 million) all felt that the improvements to water quality were worth the expenditures.

EPA Outreach Has Facilitated Compliance

As indicated by the WEF survey respondents, more than 71 percent of the permittees prepared storm water pollution prevention plans using government-developed guidance materials. EPA has distributed guidance through an active outreach program incorporating a storm water hotline, training courses, guidance manuals, and the Internet. As noted in the WEF report, "it appears that both EPA and the States have done an excellent job in providing the necessary assistance to prepare a storm water management plan." As shown in the report, permittees using government-developed guidance were able to prepare these management plans at a lower cost than facilities that used other guidance materials.

"No-Exposure" Opt-Out Has Provided Flexibility

Additionally, as originally promulgated, the Phase I program provides light industry with an opportunity to opt out of program requirements altogether by eliminating exposure of industrial activity to storm water, thereby attaining the ultimate goal of the CWA of "zero discharge of pollutants" for those facilities selecting that option. The Phase II program expands upon this successful measure by providing heavy industry with a similar opportunity to opt out of the program by successfully eliminating exposure of industrial activity to storm water.

5.4.2 Components of the Phase I Program That May Need to Be Addressed

While collecting and analyzing information related to the effects of the Phase I program, EPA identified several components that might not be effective as currently established and implemented. Key aspects of the industrial storm water program that may need additional refinement include the following:

- The requirements of EPA's general permit for industrial facilities specify analytical monitoring for certain industrial sectors. The purpose of the monitoring is to provide facility operators with the necessary information to determine the effectiveness of their SWPPPs in controlling the discharge of pollutants in storm water. EPA has received feedback from industry representatives that the costs associated with analytical monitoring are too high, and that the data generated are not useful in determining the effectiveness of their SWPPPs.

  Agency Response: EPA is considering alternatives to the analytical monitoring requirements in EPA's general permit for storm water discharges associated with industrial activity, and will request public comment on alternatives to analytical monitoring requirements during proposal. The Federal Register notice for the proposed MSGP is expected in February 2000.

- Respondents to the WEF survey identified the following BMP measures as ineffective in controlling the discharge of pollutants in storm water:

  - Record keeping and reporting
  - Raw material and product substitution
  - Site mapping.

Agency Response: While some respondents to the WEF survey did not feel the above measures are effective in controlling the discharge of pollutants in storm water, EPA feels they are important components of a comprehensive and effective SWPPP. Developing a facility site map, for instance, although not directly effective in controlling the discharge of pollutants, can be a very simple and effective exercise that provides an operator with a better understanding of the potential sources of pollutants exposed to storm water. The site map also provides the operator with a better understanding of the drainage areas from their facility, which should facilitate assessment of necessary controls. Accurate record keeping and reporting is essential to track compliance with SWPPP implementation requirements, as well as assist in anticipating areas of concern for storm water contamination (e.g., tracking the types and amounts of materials stored at the facility). However, EPA will explore ways to streamline record keeping and reporting regulations to the extent practicable. With regard to measures that address "raw material and product substitution," these are BMPs that facilities are to consider, and implement as appropriate and necessary.