

Assessment Report on Tetra Tech's Support of California's Industrial Stormwater Program

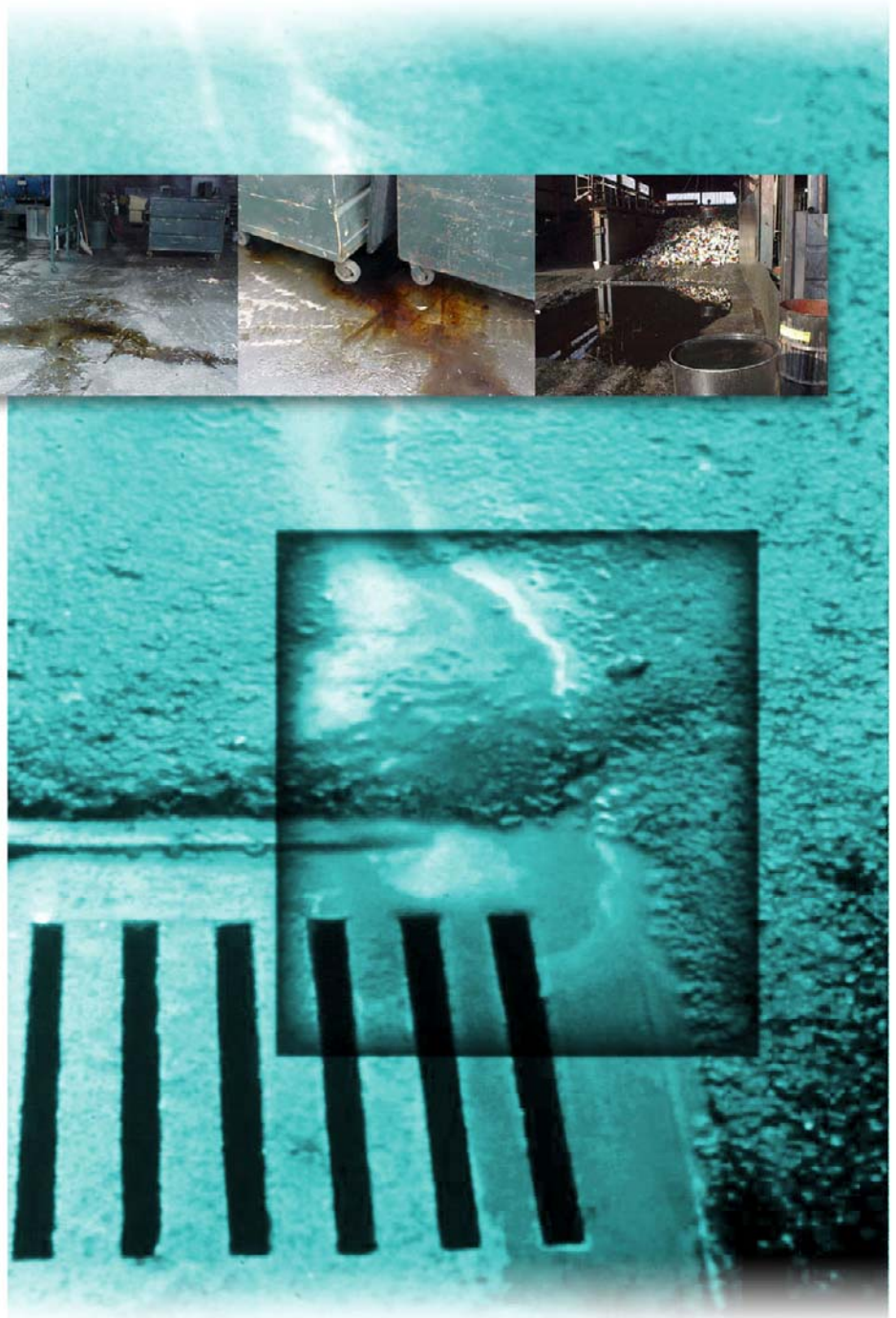


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1.0 Introduction

Tetra Tech, Inc., (Tetra Tech) has supported the California State and Regional Water Quality Control Boards with implementation of the industrial stormwater program since July 2001 under an EPA Region 9 contract. The support has consisted of industrial stormwater inspections, training, and special projects. Tetra Tech has completed more than 2,000 inspections of industrial facilities covered under the program and provided industrial inspection training to municipal employees of the Los Angeles and San Francisco Regional Water Quality Boards. Special projects in support of the industrial stormwater program have included targeted re-inspections in Los Angeles, non-filer identification in the City of Industry, and an evaluation of stormwater best management practices (BMPs) at truck transportation facilities.

Information and data collected during these activities were compiled and disseminated to EPA Region 9, the State Board, and the Regional Water Quality Control Boards through inspection and audit reports, progress reports, presentations to the California Stormwater Quality Association (CASQA) and StormCon, and telephone conversations with regulatory staff. Prior to this report, Tetra Tech had not performed a holistic analysis of information collected during industrial stormwater inspections to identify broader trends, lessons learned, and opportunities for advancing these regulatory programs. This report is intended to do the following:

- Describe training and inspection procedures
- Describe data collection and analytical tools (i.e., an industrial stormwater inspection database)
- Present discussions of the results of analyses focused on various aspects of the data collected during 4 years of inspections.

The focus of the report is on examining the information currently available from Tetra Tech's industrial stormwater inspection activities in the state of California with an eye toward opportunities to improve stormwater compliance in the state. The report also provides some brief recommendations for improvements to California's industrial stormwater program.

2.0 Tetra Tech Industrial Stormwater Inspection Approach

Tetra Tech was tasked in July 2001 to perform more than 500 industrial stormwater inspections per year for the various California Regional Water Quality Control Boards (Water Boards). The inspections, for the most part, were to occur at industrial facilities that had submitted notices of intent (NOIs) for coverage under the California General Permit for Stormwater Discharges Associated with Industrial Activity (General Permit, or CAS000001).

At the beginning of each state fiscal year (July 1–June 30), each Water Board identified a specific number of inspections to be completed by Tetra Tech. The Water Boards were

responsible for identifying the total number of inspections, as well as the specific facilities. Tetra Tech was responsible for scheduling and staffing the inspections.

To accomplish the inspections in an organized, efficient, and consistent manner, Tetra Tech established a dedicated industrial stormwater inspection team (industrial team). The industrial team consisted of 10 inspectors (employed by Tetra Tech or Tetra Tech subcontractors) willing to devote 50 percent of their time, or more, to performing industrial inspections between October 1 and April 30 (California's wet weather season) each year.

2.1 Internal Training

Each Tetra Tech inspector goes through a training process consisting of internal training followed by joint inspections with a more experienced inspector prior to conducting solo inspections. The process has been for the entire industrial team to convene in the region of one of the Water Boards for a week of training and joint inspections (kickoff week) at the beginning of each wet weather inspection period. Prior to this week the inspectors are responsible for reviewing the General Permit to re-familiarize themselves with the provisions and identify provisions that are confusing as written or difficult to evaluate in the field.

The first 2 days of the kickoff week are spent in classroom sessions, where the project manager and other experienced inspectors present the overall inspection approach, expectations, and issues specific to General Permit requirements. The classroom sessions provide an opportunity for the inspectors to discuss complicated compliance situations identified during the previous year's inspections and, through group discussions, come to a resolution as to how these items should be addressed in future inspections.

Typical discussion points include

- Establishing a link between stormwater monitoring data and BMP implementation
- Determining what constitutes appropriate BMP implementation
- Discussing stormwater sample collection with facility representatives
- Determining how to evaluate facilities for which required paperwork was prepared but is not at the site on the day of the inspection
- Working with uncooperative facility representatives.
- Reporting perceived issues of noncompliance
- Using the inspection checklist and report-writing tools

In addition to the broader discussions related to compliance determinations, the inspectors are presented with the Tetra Tech inspection approach. Delineating a very specific inspection approach was determined to be critical to ensure that each inspection is conducted in the same manner. A consistent inspection approach has ensured quality control and provided permit holders with a consistent message within and across the individual Water Boards.

The Tetra Tech inspection approach is as follows:

- Facilities are not notified of the inspection in advance, consistent with EPA and Water Board inspection protocol.
- Upon arrival at the facility, the inspector asks to see the responsible official, produces credentials (EPA Region 9-issued “Contractor” badge), and presents the responsible official with an “inspection notification letter” signed by the Water Board’s responsible official.
- The inspector then reviews paperwork required by the General Permit: stormwater pollution prevention plan (SWPPP); stormwater monitoring plan (SWMP); 5 years’ worth of annual reports; and 5 years’ worth of monitoring data.
- If a photocopier is available, the inspector makes a copy of the facility map and BMP list from the SWPPP.
- The responsible official and the Tetra Tech inspector then tour the facility yard, evaluating implemented BMPs against the SWPPP BMP list.
- The yard inspection occurs even if the responsible official is unable to produce the required paperwork.
- Photos are taken of potential yard violations, one or more general yard views, and the facility sign.
- Following the yard inspection, the inspector conducts an exit interview with the facility representative identifying areas of potential noncompliance. When a SWPPP is available, the exit interview emphasizes the link between the SWPPP BMP list and implemented BMPs,
- The inspector begins the inspection report and photo log on the day of inspection, to be completed no later than 7 days after the inspection.

2.2 Joint Inspections

Following the 2 days of classroom orientation, the inspectors are teamed up for 3 days of industrial inspections. Joint inspections are conducted: one inspector serves as the lead, while the other inspector acts as an evaluator. Over the course of one joint inspection day, each of the two inspectors will lead at least one inspection.

The purpose of joint inspections is site-specific training and quality control. The two inspectors are able to share approaches and provide direct input as to aspects that went well and aspects that could be improved. Participating in inspections with a different set of eyes looking at the same yard also provides an opportunity for inspectors with expertise in different technical areas to share their perspectives and broaden their experience.

The inspectors also prepare inspection reports together, again so that each can benefit from the approaches and expertise of the other. Inspection teams are rotated daily to provide the broadest possible exposure to other team members.

2.3 Solo Inspections

For the remainder of the wet weather season, inspections are conducted solo, with each inspector responsible for organizing his or her inspection week, communicating with the

Water Boards, and preparing reports. Tetra Tech schedules inspections in weeklong bundles. Each inspection week consists of two or more inspectors working in one Water Board's region. The inspectors perform two to three inspections per day with a minimum obligation of eight inspections per week. The weeklong approach was established because the inspectors are often required to travel to the inspection area and periods of less than 1 week were generally not cost-effective. Periodically the project manager spends a day with each inspector evaluating and refining his or her inspection approach and ensuring consistency among the members of the industrial team.

2.4 Inspectors Training Inspectors

As the inspectors gain experience, they are asked to train other industrial stormwater inspectors. These other inspectors might be Tetra Tech employees, Water Board staff, or municipal inspectors associated with a municipal separate storm sewer system (MS4) permit. To date, Tetra Tech industrial inspectors have provided training to Water Board staff (through informal ride-along inspections) and municipal inspectors from MS4 co-permittees in Los Angeles County, Orange County, and Contra Costa County.

2.5 Calibration with the Water Boards

Each inspection week starts with a kickoff meeting at the Water Board. The purposes of the meeting are to receive feedback from Water Board staff regarding previous inspection reports, to identify particular areas of focus important to the Water Board, and to have Water Board staff provide additional information pertaining to the upcoming inspections. Water Board staff are welcome to participate in any of the scheduled inspections, although the Tetra Tech inspector always leads the inspection.

3.0 Tetra Tech Compliance Reporting Tools

3.1 Inspection Checklist

Tetra Tech developed an industrial inspection checklist in fall 2001. It was compiled from checklists provided by the Santa Ana Regional Water Quality Control Board, the San Diego Regional Water Quality Control Board, and the Los Angeles Regional Water Quality Control Board. The checklist includes questions related to all General Permit provisions (paperwork and BMP implementation), a table for recording stormwater monitoring data (including EPA and Water Board benchmark values), a photo reference sheet, and several pages for notes.

The checklist provides the first-order record of the inspection. The inspectors are required to keep their checklists and all paperwork collected during the inspection should EPA, the Water Boards, or other interested parties request copies in addition to the inspection report.

The checklist also provides a useful summary of the General Permit provisions and can be provided to a facility representative as a summary of what needs to be included in a SWPPP, for example, or what the stormwater monitoring benchmark values are.

3.2 Electronic Tools

Tetra Tech developed an electronic industrial stormwater inspection-reporting tool in 2001. The tool is based in Microsoft Access and allows inspectors to enter inspection data through a series of check boxes and memo fields; each permit requirement is reflected in the database. The database also contains additional information such as physical location of the facility, receiving water, regional board, pertinent stormwater monitoring data, facility Standard Industrial Classification (SIC) codes, and overall facility ranking as determined during the inspection.

Tetra Tech inspectors have been using this database for all industrial stormwater inspections conducted in California between August 2001 and May 2005 (the most recent month when inspections were conducted). To date, the database contains information on permit compliance from 1,848 General Permit inspections. The only inspections not reflected in the database are the non-filer audits performed in the City of Industry during the winter of 2005 (see Section 5.1).

The Water Boards were provided with a copy of the database, and data, following each round of inspections. EPA Region 9 was provided with a database of all Water Board stormwater inspections at the end of each contract year.

4.0 Quantitative Analysis of Data

The following data analysis and summary statistics are based on information collected during 1,848 California industrial stormwater inspections conducted between August 2001 and May 2005. Tetra Tech was not tasked with conducting industrial stormwater inspections in fiscal year 2005/2006.

Data from each inspection were entered into Tetra Tech's industrial stormwater inspection database. In the database, compliance is denoted by a check mark. The absence of a check mark indicates potential noncompliance¹ and is usually accompanied by a memo discussing the potential noncompliance issue. The database retained the same basic structure across all inspection years; as the process matured, additional fields were added but none were deleted. The data reported below are from fields that were carried forward from the original database constructed in August 2001.

Appendix A presents the same information for each of the five most frequently inspected SIC codes. The following sections refer to the Appendix A data, where appropriate, to highlight different compliance issues in these specific SIC codes.

¹ Tetra Tech inspectors were tasked with identifying all areas of potential General Permit noncompliance. The Water Boards were responsible for determining whether these areas of "potential noncompliance" required follow-up.

The State Board's industrial stormwater NOI database contains 9,543 active participants. Based on this number, Tetra Tech inspected approximately 19 percent of the regulated community and 45 percent of the 947 auto dismantlers in the State Board's current NOI database.²

4.1 SIC Codes Inspected and Number of Facilities Inspected in Each SIC Code

The General Permit requires coverage based on the SIC codes listed in the General Permit, Attachment 1. Tetra Tech inspected industrial facilities representing more than 124 different SIC codes. Table 1 presents the 10 SIC codes inspected most frequently by Tetra Tech inspectors. These 10 codes represent 67 percent of the total number of facilities inspected.



Table 1. Ten SIC Codes Most Frequently Inspected

SIC code	No. of inspected facilities	Percentage of total (1,848 facilities)
5015 - Auto Salvage/Dismantling	433	24%
5093 - Scrap Recycling Facilities	168	9%
42XX - Motor Freight Transportation and Warehousing	163	9%
327X - Concrete, Gypsum, and Plaster Products (Except 3274 Lime)	158	8%
347X - Coating, Engraving, and Allied Services	86	5%
41XX - Local and Highway Passenger Transportation	58	3%
344X - Fabricated Structural Metal Products	46	2%
349X - Miscellaneous Fabricated Metal Products	42	2%
4953 - Hazardous Waste Treatment Storage or Disposal	40	2%
36XX - Electronic and Other Electrical Equipment and Components, Except Computer Equipment	36	2%

Auto dismantlers were the most frequently inspected industry. This stems in part from the fact that auto dismantler stormwater compliance was a high priority for the Los Angeles and Santa Ana Water Boards and in part from the fact that the Los Angeles metropolitan area has the greatest concentration of auto dismantlers in the United States (estimated to be 25 percent of all U.S. auto dismantlers).

Although not specifically reflected in the compliance data, auto dismantlers' stormwater compliance is positively related to the market price of scrap metal, as identified by the presence (or absence) of scrap material stored within these yards. The amount of scrap

² California State Water Resources Control Board, [Download Statewide Industrial Stormwater Database Active Notice of Intent \(NOIs\)](#) (July 10, 2006).

material stored can directly affect the quality of stormwater runoff from the facilities. Tetra Tech started visiting auto dismantlers in 2001 when the price of scrap metal was at a recent low (\$77 per ton³). Because of the low prices, auto dismantlers were stockpiling scrap metal until the price increased. The price began to climb after 2003 with the growth of the Chinese economy (\$318 per ton in 2004⁴), and the stockpiles dwindled as auto dismantlers sold their scrap metal to capitalize on these higher prices.

4.2 Number of Facilities Inspected in Each Water Board by Year

Table 2 presents the number of industrial stormwater inspections performed for each Water Board, by fiscal year (July 1–June 30). The Los Angeles, Central Valley, Santa Ana, and San Francisco Bay Water Boards were Tetra Tech’s largest clients. Conversely, Tetra Tech performed only one industrial stormwater inspection for the Central Coast Water Board and none for the Lahontan Water Board’s Victorville office. However, Tetra Tech inspected all the regulated facilities for the Lahontan Water Board’s South Lake Tahoe office, twice.

Table 2. Number of Industrial Facilities Inspected by Water Board and California Fiscal Year

Water Board	California fiscal year			
	2001–2002	2002–2003	2003–2004	2004–2005
North Coast (1)	1	0	33	32
San Francisco Bay (2)	66	43	83	98
Central Coast (3)	1	0	0	0
Los Angeles (4)	336	20	89	57
Central Valley, Sacramento (5s)	0	84	86	50
Central Valley, Redding (5r)	0	53	0	15
Central Valley, Fresno (5f)	0	0	13	20
Lahontan, Victorville (6)	0	0	0	0
Lahontan, South Lake Tahoe (6)	0	25	26	0
Colorado River Basin (7)	0	8	24	16
Santa Ana (8)	222	59	33	58
San Diego (9)	137	0	4	56
Fiscal year total	763	292	391	402

Tetra Tech’s first year of industrial stormwater inspections, 2001/2002, was also the largest. Tetra Tech inspectors visited 763 facilities that year. The number dropped to 292 in 2002/2003, in part because it was determined that the Water Boards did not have enough staff to efficiently process the Tetra Tech inspection reports.

4.3 Summary Statistics for All Inspections

Summary statistics follow for General Permit paperwork requirements (SWPPP, SWMP, and annual report), field implementation of stormwater BMPs, and stormwater

³ China's need for metal keeps U.S. scrap dealers scrounging, <http://www.nytimes.com/2004/03/13/business/worldbusiness/13SCRA.html?ex=1394514000&en=b6e48c65fecf26b0&ei=5007> (March 13, 2004).

⁴ Soaring steel prices keep scrap yards busy, <http://www.bizjournals.com/triad/stories/2004/03/29/story4.html?page=2>, (March 26, 2004).

monitoring data. The section concludes with overall rankings for the 1,848 inspected facilities reported in the database.

4.3.1 Compliance with Paperwork Requirements

The General Permit requires facilities to have, and maintain on-site, a SWPPP, a SWMP, historical annual reports, and monitoring data. Annual reports and monitoring data must be retained for a period of 5 years, or from when the NOI was submitted, if less than 5 years. Reviewed SWPPPs and SWMPs ranged from professional documents prepared by consultants to handwritten outlines. The professionally prepared documents were not necessarily better than the handwritten or operator-produced versions.

4.3.1.1 SWPPP Compliance

Seventy-four percent of inspected facilities produced a document identified as a SWPPP (Table 3). The other 26 percent had not produced a SWPPP or claimed that it was located at an off-site location or was at the consultant's office being updated. Percentages reported in Table 3 are based on the number of facilities that produced a SWPPP (1,360 facilities). Less than half of the SWPPPs produced for Tetra Tech inspectors met all General Permit requirements.

Table 3. Compliance with General Permit SWPPP Requirements		
Overall General Permit requirement	Facilities in compliance	Percentage of inspected facilities (n=1,848)
<i>A SWPPP was developed and implemented (A.1)*</i>	1,360	74%
General Permit required SWPPP contents	Facilities in compliance	Percentage of facilities with SWPPP (n=1,360)
The SWPPP identified a specific person or persons and their positions within the facility organization as members of a stormwater pollution prevention team (A.3)	1,106	81%
The SWPPP included a site map (A.4)	1,089	80%
The SWPPP included a list of significant materials handled and stored at the site (A.5)	1,223	90%
The SWPPP included a narrative description of the facility's industrial activities, associated potential pollutant sources, and potential pollutants that could be discharged in stormwater discharges or authorized non-stormwater discharges (A.6)	1,255	92%
The SWPPP included a narrative assessment of all industrial activities and potential pollutant sources (A.7)	1,256	92%
The SWPPP included a narrative description of stormwater BMPs to be implemented at the facility for each potential pollutant (A.8)	1,280	94%
The SWPPP was signed and certified by the appropriate facility personnel (A.9)	911	67%
<i>Facility SWPPP met all General Permit requirements</i>	648	48%

* Facility representative produced a document titled "Stormwater Pollution Prevention Plan."

SWPPP compliance rates for the top five SIC codes (Appendix A) are not significantly different, with the exception of 42XX – Motor Freight Transportation and Warehousing Facilities. For SIC code 42XX, 65 percent of the SWPPPs reviewed met all General Permit requirements (Appendix A, Table A.9).

The SWPPP stormwater BMP list is the area where consultants seem to do their clients the greatest disservice. Frequently, the professionally prepared documents provide a general list of BMPs for a specific industry, regardless of whether the individual BMPs are appropriate to or implemented at a specific facility. A popular example is “Yard will be swept on a daily basis” when the yard surface is, in fact, dirt. Technically, an overzealous inspector could consider a facility out of compliance for each BMP listed in the SWPPP, whether appropriate or not, that was not implemented in the yard. Certainly it is up to the facility representative to evaluate the SWPPP BMP list before signing and certifying the SWPPP (only 67 percent of the SWPPPs were signed and certified), but consultants should emphasize that the BMP list should be evaluated for those measures that are actually being carried out.

4.3.1.2 SWMP Compliance

Sixty-seven percent of inspected facilities produced a SWMP (Table 4); however, 87 percent of the SWMPs met all General Permit requirements. The differing levels of completeness between SWPPPs and SWMPs were surprising. Data suggest that if a facility has a SWMP, it is likely to be complete; not so for a SWPPP.

A possible reason for this is that SWMPs are largely boilerplate and the information, with the exception of sampling locations, can be copied from the Internet or from another facility in the same SIC code.

SWMP compliance rates for the top five SIC codes (Appendix A) are not significantly different from the percentages in Table 4.

Table 4. Compliance with General Permit Stormwater Monitoring Plan (SWMP) Requirements		
Overall General Permit requirement	Facilities in compliance	Percentage of facilities with SWMP on-site (n=1,848)
<i>Facility developed a written SWMP (B.1)</i>	<i>1,246</i>	<i>67%</i>
General Permit required SWMP contents	Facilities in compliance	Percentage of facilities with SWMP (n=1,246)
SWMP describes procedures for quarterly non-stormwater visual monitoring (B.3)	1,202	96%
SWMP describes stormwater discharge visual observations (B.4)	1,220	98%
SWMP describes stormwater sample collection procedures and protocols (B.5)	1,180	95%
SWMP describes locations and outfalls for visual observation and sample collection (B.7)	1,156	93%
SWMP explains how the facility's monitoring program will satisfy the monitoring program objectives (B.10)	1,174	94%
<i>Facility SWMP met all General Permit requirements</i>	<i>1,090</i>	<i>87%</i>

4.3.1.3 General Permit Sampling and Monitoring Requirements

Visual and analytical stormwater monitoring is required by the General Permit unless the facility does not discharge during any of the storm events or the storm occurs outside normal business hours. Data must be maintained and submitted with each year's annual report, due in July. The Water Boards closely track annual report submittals and follow up with facilities that do not submit on time. As a result, 89 percent of the facilities had the most recent annual report available for review (Table 5).

Table 5. Compliance with General Permit Sampling and Monitoring Requirements		
Overall General Permit requirement	Facilities In compliance	Percentage of total (n=1,848)
<i>Previous year's submitted annual report available for review</i>	1,647	89%
General Permit required annual report contents	Facilities In compliance	Percentage of facilities with annual report (n=1,647)
Quarterly non-stormwater discharge visual observations (B.3.c)	1,541	93%
Stormwater discharge visual observations (B.4)	1,578	96%
Facility operators collected stormwater samples during the first hour of discharge from (1) the first storm event of the wet season and (2) at least one other storm event in the wet season (B.5)	1,424	86%
Stormwater samples were analyzed for the appropriate parameters (B.5.c); includes facilities that collected fewer than the required number of samples	1,521	92%
Facility operators visually observed and collected samples of stormwater discharges from all drainage areas that represent the quality and quantity of the facility's stormwater discharges from the storm event (B.7)	1,430	87%
Facility operators conducted one comprehensive site compliance evaluation in each reporting period (July 1– June 30) (A.9)	1,560	95%
All analytical stormwater results were within EPA/Water Board benchmark values	949	58%
<i>Annual Report met all General Permit requirements (B.14)</i>	1,055	64%

Initially (through 2002/2003), Tetra Tech inspectors reviewed the annual reports at the Water Board. This proved to be a significant burden on Water Board staff because they had to pull the appropriate files prior to each week and re-file them at the end of each week, as well as provide photocopiers and workspace for the Tetra Tech inspectors. This process was eliminated in favor of reviewing all documents at the facility. Because the General Permit requires that all documents be maintained on-site,⁵ facilities that could not provide an annual report were considered noncompliant.

⁵ CAS000001, Description of General Permit Conditions, Retention of Records.

These three notes clarify the information presented in Table 5:

1. A little less than half (42 percent) of the facilities that submitted analytical stormwater monitoring data had one or more parameters outside the EPA/Water Board benchmark values.
2. The number of samples outside EPA/Water Board benchmark values might be skewed by incorrect sample collection practices. Frequently, facilities reported collecting samples from stormwater pooling on the property rather than from stormwater discharging from the property.
3. The reported number of 86 percent of the annual reports having collected the correct number of samples includes facilities that claimed “no discharge” or “no qualifying storm event.”

The third point is worth considering during future General Permit revisions. The General Permit defines *qualifying storm event* as follows:

[s]ample collection is only required of stormwater discharges that occur during scheduled facility operating hours and that are preceded by at least (3) three working days without stormwater discharge.⁶

Determining whether a qualifying storm event occurred during the previous reporting period is challenging for inspectors. One can get a general estimate by reviewing annual reports for facilities in the same geographic area to see if others sampled from “qualifying storm events,” but without visiting a facility during a rain event, one cannot be sure what amount of rain generates a discharge at a particular facility. A number of Tetra Tech’s inspectors are of the opinion that facilities use “no qualifying storm event” to avoid paying for laboratory analysis and having to submit data.

An amusing illustration of poor understanding of stormwater sampling requirements was provided during a facility inspection. The Tetra Tech inspector asked to see the facility’s stormwater monitoring results. Instead of returning with a spreadsheet or laboratory analysis sheets, the facility representative brought back a tray with six Mason jars filled with stormwater. The water had been collected during the previous reporting period but never submitted to a laboratory for analysis.

The most unusual excuse for not submitting analytical monitoring data was provided by a southern California auto dismantler. The facility representative stated, “Yes, a stormwater sample was collected for analysis.” However, the sample had been placed in the facility refrigerator prior to delivery to the lab. A facility employee, thinking the sample was chilled water, started to drink the sample, determined that it did not taste good, and dumped it down the drain.

⁶ CAS000001 Section B.5.b.

4.3.2 Stormwater Best Management Practice Implementation

Implementation of stormwater BMPs is critical to maintaining the quality of stormwater at the facility boundary or discharge point. BMPs are either structural or nonstructural; Tetra Tech did not collect quantitative data regarding implementation of structural versus nonstructural BMPs.



Anecdotal information suggests that facilities rely on nonstructural BMPs

(e.g., good housekeeping, spill cleanup) until it becomes clear (through an inspection, for example) that benchmark values cannot be attained without the implementing structural BMPs. In addition, structural BMP implementation appears to be positively correlated with facility size and market capitalization.

Through the inspection process, Tetra Tech inspectors evaluated the implementation of stormwater BMPs at each facility inspected. The simplest evaluation resulted from comparing the list of BMPs from the SWPPP with BMPs implemented in facility outdoor areas. Of the 1,280 facilities with SWPPP BMP lists (Table 3), 928 were found to have adequately implemented the BMPs in outdoor areas (72 percent). That number might be misleading because it identifies facilities that had implemented SWPPP BMPs in outdoor areas; it does not capture facilities where the SWPPP BMP list was incomplete and additional BMPs should be added to the SWPPP and implemented in outdoor areas. These data are available in narrative form, but their storage in the database does not lend itself to quantitative analysis.

4.3.3 Unauthorized Non-Stormwater Discharges

Detailed data analysis is not presented for observed unauthorized non-stormwater discharges. The inspectors observed 158 facilities with unauthorized non-stormwater discharges, fewer than 10 percent of the facilities inspected. In these cases, the facilities were directed to “cease and desist” and the Water Board was immediately notified.

Of these 158 facilities, 1 facility in the Los Angeles Water Board was assessed the largest financial penalty associated with a Tetra Tech industrial stormwater inspection. Cemex Construction Materials, L.P., was assessed a penalty of \$86,500 for unauthorized non-stormwater discharge (Complaint No. R4-2004-0068); however, the calculated potential maximum penalty was \$4,360,000 based on the number of days between the NOI

submittal and the date the illicit drain was sealed (436 days x \$10,000 per day).⁷ Tetra Tech employee Steve Hruby conducted the initial inspection on December 18, 2003, and Jonathon Bishop (Interim Executive Director) signed the complaint on July 2, 2004.

4.4 EPA/Water Board Benchmark Value Exceedances



Stormwater samples from individual facilities and group monitoring plan (GMP) members must be analyzed for four standard parameters: total suspended solids (TSS), pH, specific conductance (SC), and total organic carbon (TOC). Oil and grease (O&G) may be substituted for TOC. Specific SIC codes are required to perform analytical tests for additional pollutants, as discussed in CAS000001 Section B, Table D. Analytical results are submitted with each year's annual report for comparison against benchmark values.

Sample results above benchmark values, or outside benchmark values in the case of pH, are not considered violations of the permit because the benchmark values are guidelines, not effluent limitations. Rather, they are considered indicators of poor housekeeping or incomplete stormwater BMP implementation.

4.4.1 Analytical Stormwater Data Collection

With respect to sampling data, the inspectors reviewed previous years' stormwater analytical data. Information recorded during the inspection included the number of sampling events; stated reasons why fewer than two stormwater events were sampled (e.g., no qualifying storm event); analytical data outside the benchmark values; and required parameters for which samples were not tested. Data regarding the number of outfalls sampled at each facility or concentrations for those parameters within benchmark values were not collected.

4.4.2 Summary of Analytical Stormwater Data

Tetra Tech performed 1,848 inspections between August 2001 and May 2005 for the Regional Boards. Stormwater analytical data collected from these 1,848 facilities breaks down as follows:

- 1,424 (77 percent) collected the required number of samples (2 per year or were GMP members).

⁷ <http://www.swrcb.ca.gov/enforcement/docs/r04/2004/R4-2004-0068-ORDER-4412.pdf>.

- 873 facilities (47 percent) reported exceedances of 1 or more benchmark values in 1 or more sample events, including those that collected 1 sample instead of the 2 required samples (for non-GMP members).
- 1,615 individual sample results from these 873 facilities reported analytical results outside benchmark values for one or more of the following parameters: pH, TSS, SC, O&G, and TOC. Additional sample results showed exceedances of other Table D parameters, but they were not tabulated.

Monitoring data analysis was performed using two different approaches. The first method was the “facility-level” approach, and the second method was the “individual sample” approach. The primary difference between the two is that the first approach looks at facilities that reported exceedances of benchmark values for only TSS (at the request of EPA Headquarters), without regard to the number of individual sample events with reported values outside the benchmark values. The second approach uses data from the individual sample events to characterize the frequency and nature of stormwater parameters outside benchmark values.

4.4.3 Facility-level Analysis of Analytical Stormwater Data

Facility-level data were compiled for all industrial facilities inspected by Tetra Tech staff between August 2001 and May 2005. The database Tetra Tech used for entering and summarizing inspection data includes the following fields useful for this analysis:

- Did the facility collect one or more stormwater samples during the previous reporting year (as required by the General Permit)?
- If samples were collected, were any of the reported analytical data outside benchmark values? If so, then:
 - The inspectors entered data for specific sample events and outfalls for which facilities reported analytical results outside benchmark values.
 - Was TSS one of the parameters for which analytical monitoring data was outside benchmark values?⁸

Data available for the facility-level analysis were fairly robust and should provide representative statistics regarding the expected percentage of facilities that report TSS values outside benchmark values when complete samples are collected.

Of the 1,848 industrial facilities inspected between August 2001 and May 2005, 1,563 facilities (85 percent) collected one or more stormwater samples during the reporting year prior to the date of inspection or reported no qualifying storm event.

- 1,424 of the inspected facilities (77 percent) reported complete sample results (including those that identified “no qualifying storm event”)—samples from two wet weather events. The remaining 139 collected samples from only one of the two required wet weather events.

⁸ The analysis focused on TSS because the stormwater monitoring data analysis was initially performed for EPA Headquarters, which was interested in TSS compliance.

- 881 facilities reported analytical results outside benchmark values for one or more parameters (56 percent of those with data from one or more sample events [n = 1,563]).
- 470 facilities reported TSS concentrations above the benchmark value (30 percent of those with data from one or more sample events [n = 1,563]).

The estimate of 30 percent for those who sampled and reported TSS exceedances is consistent with other studies reviewed during the course of this analysis—26 percent in a San Francisco RWQCB study⁹ and 31.5 percent in a *Water Environment Research* article.¹⁰

4.4.4 Individual Sample Analysis of Analytical Stormwater Data

The individual sample analysis is based on tabulation of stormwater monitoring events with one or more parameters outside benchmark values, as identified during industrial stormwater inspections conducted by Tetra Tech staff. Unfortunately, the database structure does not allow the number of samples with one or more benchmark value exceedances to be compared with the total number of samples collected at the inspected facilities. Tetra Tech inspectors did not collect, nor were they asked to collect, information on the number of outfalls sampled at a facility during the previous reporting year. For example, a facility might have sampled three outfalls during two storms (six samples); but if exceedances were reported for only one sample, the data set only shows this one sample.

Table 6 summarizes sample results for stormwater analytical data reported to be outside benchmark values. EPA or Regional Board benchmark values are provided for reference. Table 6 is based on only data recorded for analytical results outside benchmark values. Tetra Tech inspectors did not record concentrations or values for analytical data within benchmark values.

⁹ LaPlante, Alexa, and Rico Duazo to Loretta K. Barsamian, Status Report on the General NPDES Permit for Discharges of Stormwater Associated with Industrial Activities for Region 2 and Review of the 2001/2002 Annual Monitoring Reports. . . . <http://www.waterboards.ca.gov/rwqcb2/Agenda/03-19-03/03-19-03-11staffreport.doc> (March 13, 2003).

¹⁰ Lee, Haejin, and Michael K. Stenstrom, Utility of stormwater monitoring, *Water Environment Research* 77(1), 2005.

Table 6. Summary of Stormwater Analytical Data for Individual Sample Results Outside of Benchmark Values

	pH (su)	TSS (mg/L)	SC (µmhos/cm)	O&G (mg/L)	TOC (mg/L)
Total number of samples with one or more values outside benchmark	n = 1,615				
Benchmark value	6.0–9.0	< 100	< 200	< 15	< 110
No. of samples outside benchmark limits	317 (19%)	904 (56%)	1023 (63%)	188 (12%)	101 (6%)
Min	1.64	*	*	*	*
Max	12.3	35,000	18,000	1,490	2,700
Average**	*	724	1,472	65	350
Median**	*	280	460	28	190

* Not applicable.

** Only data above the benchmark values were available for this analysis.

The data presented in Table 6 are useful for answering the following question: “If analytical stormwater sample results are outside benchmark values for one or more parameters, which parameters are these likely to be?” The answer to this question, in order of decreasing likelihood, is SC, TSS, pH, O&G, then TOC. The broader applicability of the individual sample analysis is limited by the limited total number of samples of which the 1,615 with benchmark value exceedances are a subset.

4.5 Distribution of Facility Stormwater Ratings

Tetra Tech assigned an overall rating to each facility inspected based on the types of potential violations observed. The rating system is as follows:

1 – Poor stormwater BMP implementation and management practices present a threat to the quality of stormwater discharged from the facility. It is recommended that the Water Board perform a follow-up inspection.

2 – Compliance issues with required General Permit paperwork requirements and minor yard issues. Facility is not deemed a threat to stormwater quality at the point(s) of discharge. Compliance can be effectively handled with a letter from the Water Board requesting updated documentation and, if appropriate, pictures of improved stormwater BMPs.

3 – Facility determined to be in compliance; no follow-up needed at this time.

* – Facility was visited but not inspected. Reasons include the following: the facility was not open for business on the day of inspection or the facility was no longer operating at the NOI address.

Table 7 presents the overall distribution of rankings. Surprisingly, the distribution approximates a normal bell curve with around 20 percent rated “1” or “3,” 52 percent rated “2,” and the remainder visited but not inspected.

Table 7. Tabulation of Stormwater Ratings		
Rating	No. of facilities	Percentage of total facilities (n=1,848)
1 – Potential threat to stormwater quality	329	18%
2 – Paperwork and minor yard violations	980	53%
3 – In compliance	415	22%
* - Visited but not inspected	89	5%

Overall facility ratings for the five SIC codes evaluated in Appendix A have a distribution similar to that in Table 7. Generalizing the percentages from Table 7 to the current number of facilities in the NOI database, statewide General Permit compliance is estimated as follows:

- 1,718 facilities present a potential threat to stormwater quality.
- 5,058 facilities are not in compliance with General Permit paperwork requirements.
- 2,099 facilities are in compliance with the General Permit.

For comparison, Table 8 presents the overall facility ratings for the 541 GMP participants inspected by Tetra Tech. These facilities are included in the tables above, so a direct comparison of overall ratings between GMP members and non-GMP members is not possible. Regardless, the data presented are useful for estimating the overall General Permit compliance of GMP members.

Table 8. Tabulation of Stormwater Ratings for GMP Members		
Rating	No. of facilities	Percentage of total facilities (n=541)
1 – Potential threat to stormwater quality	83	15%
2 – Paperwork and minor yard violations	269	49%
3 – In compliance	161	30%
* - Visited but not inspected	21	4%

Overall facility ratings for Tetra Tech inspections of GMP members are skewed slightly more toward compliance than the totals presented in Table 7. Thirty percent of GMP members were in compliance with General Permit requirements, compared with 22 percent of the total inspected population. However, one would expect the number of “1” and “2” rated facilities to be lower for GMP members. The General Permit requires GMP members to

... develop and implement a written site specific SWPPP and monitoring program in accordance with the General Permit and must satisfy any group monitoring requirements.” (CAS000001 Section B.15)

The GMP leader is responsible for

[c]onducting a minimum of two on-site inspections of each participant's facility (it is recommended that these inspections be scheduled during the Annual Comprehensive Site Compliance Evaluation) during the term of

this General Permit to evaluate the participant's compliance with this General Permit and the GMP, and to recommend any additional BMPs necessary to achieve compliance with this General Permit. Participants that join in Years 4 and 5 shall be scheduled for one evaluation. A copy of the evaluation and recommended BMPs shall be provided to the participants. (CAS000001 Section B.15.d.v)

The overall ratings presented in Table 8 suggest that either GMP members are not implementing the stormwater program as recommended by the GMP leader or (a) the GMP site inspections are not as rigorous as EPA/Water Board inspections, (b) the GMP site inspections focus on specific aspects of the General Permit and not the entire General Permit, or (c) the GMP leader is not removing noncompliant members from the GMP.

4.6 Follow-up Inspections

Tetra Tech and the Los Angeles Water Board performed 101 stormwater follow-up inspections beginning in January 2002. Facilities targeted for follow-up inspections were initially inspected in fall 2001 and rated “1” or “2.” Upon receipt of the Tetra Tech inspection reports, the Water Board issued a notice to comply (NTC, for “2” facilities) or a notice of violation (NOV, for “1” facilities) directing them to come into compliance within 45 days. The re-inspections occurred at least 45 days after the Water Board delivered the compliance notice.

Table 9 presents the results of the two sets of inspections, the initial inspection and then the follow-up inspection after the facility received a compliance notice from the Water Board. The same facilities are represented in the first and second inspections.

Table 9. Compliance Data from the Same Facilities Inspected Twice

No. of facilities inspected	SWPPP available	SWPPP complete*	SWMP available	No UNSWDs**	SWPPP BMPs implemented*
First inspection (fall 2001)					
101	56 (55%)	19 (34%)	52 (51%)	90 (89%)	19 (34%)
Second inspection (winter 2002)					
101	96 (95%)	68 (71%)	93 (92%)	100 (99%)	76 (79%)

* Percentage based on the number of facilities with a SWPPP available.

**Unauthorized non-stormwater discharge.

General Permit compliance rates increased significantly by the second inspection: the number of SWPPPs and SWMPs available for review almost doubled. Moreover, the number of facilities that were adequately implementing SWPPP BMPs more than tripled. The success of the follow-up inspections suggests several important points regarding compliance by the regulated community:

- Frequent inspections provide positive results.
- Compliance inspections coupled with compliance assistance, at least during a facility's first industrial stormwater inspection, provide the strongest outcome.

- Facility representatives begrudgingly acknowledged that the compliance inspection and follow-up provided them with information they needed to bring the facility into compliance.
- Many facility representatives, particularly those associated with larger corporations, use compliance notices as leverage to obtain additional funding from the corporate office for the stormwater program.

Overall facility ratings also improved by the second inspection. Sixty-six facilities improved by at least one rating (“1” to “2,” “2” to “3,” or “1” to “3”), while only four facilities dropped a rating point by the second inspection. Twenty-seven facility ratings were unchanged from the first inspection, and four facilities had gone out of business.



The ideal frequency for industrial stormwater inspections is estimated to be once every 2 or 3 years and more frequently for problem facilities. Frequent inspections enable permittees to calibrate their programs to meet General Permit requirements and Water Board expectations. Extending the inspection frequency beyond 3 years runs the risk of having the stormwater program fall below the facility’s day-to-day “radar” and might affect institutional memory, particularly at facilities with regular staff turnover.

4.7 Secondary Benefits from Field Inspector Presence

The benefits of industrial stormwater inspections and a regular field presence go beyond the direct impact of General Permit compliance at inspected facilities. Secondary benefits include encouraging General Permit compliance at facilities that are not inspected, improving communication between permit holders and the Water Board or the permit holder and the consultant or GMP leader, and maintaining an ongoing awareness of the stormwater program within the regulated community. Secondary benefits are not easily quantified, but anecdotal information collected during stormwater inspections suggests that these benefits are present and potentially significant.

The regulated community tends to be in regular contact with industry peers and neighbors. For example, the auto dismantlers maintain two-way radios that are mainly used to locate parts for customers. However, during industrial stormwater inspections, the radios are used to announce that the Water Board is performing industrial stormwater inspections and the specific focus of the inspections (i.e., paperwork, BMP

implementation, or everything). As a result, other members of the radio network might pull their paperwork together and set their staff to cleaning up the yard and repairing BMPs in anticipation of an inspection that might or might not occur.

Similarly, GMP leaders track General Permit compliance inspections and the different aspects focused on by each Water Board. Facility GMP files contain many examples of correspondence from GMP leaders to GMP members indicating that the Water Board and EPA Region 9 are performing in-depth General Permit inspections and noncompliance is being taken seriously. The GMP leader recommends that facilities have their paperwork organized and located on-site, and that stormwater BMPs be evaluated and replaced as necessary.

5.0 Special Projects

Between 2001 and 2005, Tetra Tech inspectors had the opportunity to participate in several special projects for the Water Boards. They are considered special projects because the scope of the work was more focused than simply inspecting all the facilities on a list generated by the Water Board. Special projects included non-filer audits in the City of Industry (Los Angeles), transportation sector BMP implementation (Los Angeles), and industrial stormwater compliance inspector training for several municipalities.

5.1 Non-Filer Audits

During winter of 2005, the Los Angeles Water Board, City of Industry, and Tetra Tech worked together to identify and quantify non-filers (facilities that should have applied for General Permit coverage because of their SIC codes but had not) in the City of Industry, California. The City of Industry was selected because of its large concentration of manufacturing and retail companies; 92 percent of land use in the City of Industry is delegated to industry.

Municipal representatives of the City of Industry provided a list of business names and addresses to the project manager. The list did not include facility SIC codes. The list was then crosschecked against a list of General Permit holders. Those facilities not appearing on the General Permit holder list were targeted for field evaluation to determine whether they should have submitted an NOI for coverage under the General Permit. Tetra Tech and the Water Board staff performed the targeted inspections.

Individual inspectors were assigned streets within the City of Industry. Inspectors visited all targeted facilities, as well as other facilities with potential stormwater exposure identified while traveling along assigned streets. Field visits began by meeting with business representatives to identify the types of activities conducted at the address and the business's SIC code. When a business appeared to meet the criteria for coverage under the General Permit (either operating under a regulated SIC or with outdoor industrial activities), the inspector walked the site with business representatives to collect supplemental information to determine whether the facility should be covered under the General Permit.

Challenges persisted throughout the inspection week. Inspectors were overwhelmed with the task of acquiring SIC codes from business representatives. Business representatives not accustomed to regulators at their doorstep were reluctant to reveal information, let alone allow inspectors on the business property. Moreover, few facility representatives were aware, or claimed to be aware, of their SIC code.

Inspectors concluded that 28 percent of the facilities evaluated were non-filers. It was estimated that more than 100,000 businesses in the state operate under an applicable General Permit SIC code. From this sample set, bringing in 28 percent of this population (28,000 industrial facilities) could generate significant revenue for the state and the stormwater program.

5.2 Survey of Transportation Sector Stormwater BMP Implementation

At the request of the Los Angeles Water Board, Tetra Tech and Water Board inspectors evaluated BMPs frequently implemented for stormwater control at motor freight transportation facilities (SIC code 42XX – Motor Freight Transportation and Warehousing). The inspections occurred during the week of February 21, 2005, immediately following a heavy storm cycle that raised the rainfall total for the season in downtown Los Angeles to 33.9 inches. Inspections were done in accordance with standard industrial inspections, with the exception of having a focus on the effectiveness of



particular BMPs common to the trucking industry. BMP analysis was based on visual inspection; historical stormwater sampling data were not evaluated.

Structural and nonstructural BMP evaluations were conducted at 38 freight transportation facilities selected by the Water Board. Common industrial activities included waste disposal, maintenance, fueling, and truck washing. BMPs were visually evaluated to judge their effectiveness in mitigating pollutant runoff from these activities. Structural BMPs included overhead cover, secondary containment, spill kit presence, berms, slot drains (to convey wash water) and clarifiers (used to reduce suspended material and hydrocarbons in discharges to surface waters). Nonstructural BMPs included maintenance schedules of structural BMPs and general housekeeping practices. A

qualitative scale was used to rate the effectiveness of the BMPs applied to these industrial activities.

Inspectors used their best professional judgment to rate the effectiveness of BMPs. Ratings were tabulated and summarized per industrial activity. The inspectors concluded that BMP maintenance schedules and design/installation practices generally depict the effectiveness of BMPs.

5.3 Industrial Stormwater Inspector Training for MS4 Co-permittees

Tetra Tech stormwater inspectors conducted training for MS4 co-permittee inspectors in Los Angeles, Orange, and Contra Costa counties. As part of the training, Tetra Tech inspectors hosted classroom sessions in the mornings and then led mock stormwater inspections at industrial facilities within the applicable county. Representatives from various municipalities covered under county MS4 permits attended the training sessions.

The training inspections were designed to introduce municipal stormwater inspectors to the stormwater inspection process, with emphasis on SWPPP review and identifying inadequate or ineffective BMP implementation. The training inspections were conducted according to Tetra Tech's industrial stormwater inspection checklist.

Each training inspection concluded with a question-and-answer session between the Tetra Tech lead inspector and the municipal participants. The Tetra Tech inspector would explain in detail why particular issues were a stormwater concern and what to expect from similar facilities. Overall, the training process appeared beneficial to all parties, and future sessions would continue to build expertise among the municipal inspection staff.

6.0 Lessons Learned

Leading General Permit compliance inspections at 1,848 industrial facilities provided a unique laboratory for evaluating the implementation of the stormwater program. Some of the lessons learned will be obvious to the reader, while others might be more obtuse.

6.1 Compliance Improves with Field Inspector Presence

As previously discussed in the "Follow-up inspections" section, facility compliance improves with awareness of the program and a regular presence of compliance inspectors at the facility or at other facilities in the same industry group or neighborhood. Regulatory presence (1) shows the facility representatives that the Water Board takes the program seriously and (2) keeps stormwater compliance in the minds of facility representatives.

6.2 Paperwork Compliance, or Lack Thereof, Does Not Always Relate to Stormwater Quality

This is a rather mundane lesson until viewed from the framework of the General Permit itself. Obviously, the goal of the General Permit is to improve or maintain the quality of stormwater discharges from regulated facilities and, as a result, minimizes degradation of

surface waters by polluted stormwater. Evaluation of General Permit compliance begins with the required paperwork. For example, the General Permit requires that a SWPPP be maintained on-site and the SWPPP contain a list of stormwater BMPs that are implemented in the yard.

What happens if the facility does not have a SWPPP or the SWPPP does not contain a list of stormwater BMPs? The first-order violation is the lack of a SWPPP or a complete SWPPP. Without a SWPPP BMP list to compare against implemented stormwater BMPs, it is difficult for an inspector to say whether the facility is or is not in compliance. Restated, the inspector can make a visual estimation of whether the facility is operating within the spirit of the General Permit; but if it is not, and no SWPPP is available, the permit does not appear to contain provisions that address poor BMP implementation absent a SWPPP BMP list.

6.3 MS4 Stormwater Audits Focus on Different Issues than State Board or EPA Stormwater Audits

The regulated community is frequently confused by the different stormwater inspector affiliations—local, state, federal, and contractor. Often, when arriving at a facility, the facility representative says something like “I just had a stormwater inspection a couple of weeks ago.” Upon retrieving the inspection report from this previous inspection, it turns out to be an MS4 industrial stormwater inspection. Following on the initial confusion, it is possible for a facility to get a good report from the municipal inspection and a bad report from the Water Board/EPA inspection.

The discrepancies result from the different level of detail employed by the two types of inspectors. The MS4 inspector asks if the facility has a SWPPP but is not required to review it in detail. Nor is the MS4 inspector expected to review monitoring data or BMP implementation beyond the four or five general classes of BMPs identified on the MS4 checklist. In comparison, the Water Board/EPA inspector reviews the SWPPP in detail, reviews the monitoring data in detail, and specifically evaluates the implementation of BMPs identified in the SWPPP, which might or might not match the general BMP categories from the municipal inspector’s list.

Each type of inspection has its place, but the differing focus of the two inspectors causes confusion for the regulated community. Ultimately, the best solution is more information sharing between the MS4s and the Water Boards to ensure that minimal inspection overlaps occur, unless requested.

7.0 Future Data Collection

The data collected to date are useful in characterizing the performance of the General Permit. However, the ultimate goal of tying stormwater discharge data into broader watershed management projects (e.g., total maximum daily load [TMDL] studies) will require the collection of additional pieces of information from each facility inspected. For example,

- Global positioning system (GPS) data for inspected facilities will allow mapping of stormwater dischargers within watersheds and other geographic areas.
- Number of stormwater outfalls, in addition to number of samples and benchmark exceedances, will allow the Water Boards and EPA to continue to refine their understanding of benchmark value exceedances and sources.
- Emphasizing facility size and impervious area will help to get a better handle on potential pollutant loading from facility stormwater discharges. Without information on loading, a ¼-acre facility with pervious surface that discharges a couple of gallons of stormwater outside benchmark values looks worse on paper than a 100-acre paved facility that has all analytical results within benchmark values. The reality is that the larger facility has a greater impact on the receiving water, but the smaller facility might receive more regulatory attention.

The addition of these sets of data will broaden the applicability of data collected during stormwater inspections. The most immediate use is assigning pollutant loadings to nonpoint sources in TMDL analyses.

8.0 Opportunities to Improve Compliance through Future Inspections and Projects

Awareness of General Permit requirements continues to increase as the Water Boards and EPA (both EPA staff and EPA contractors) continue to spend time on field inspections. The information presented in this report shows that the General Permit is reasonably successful and that with the upcoming re-issuance of the General Permit, several opportunities exist for continuing to improve compliance.

8.1 Compliance Tool Development for Regulators or Dischargers

The State Board should develop an on-line SWPPP development tool. The tool could contain pages for each of the General Permit SWPPP requirements, tailored to specific industrial practices. Permit holders would then select the industrial activities, pollutant sources, and BMPs applicable to their facilities, or type in additional ones; print out the SWPPP; add a site map; and certify. The SWPPPs could be stored in State Board computers and accessible to the permit holder for revisions and regulators for review prior to site inspections or when reviewing the annual report.

The California Integrated Water Quality System (CIWQS) should include an industrial stormwater inspection-tracking tool. The tracking tool should be available to federal, state, and local regulators. Following each inspection, the inspector could log into the

system and identify the facility inspected, date of inspection, and major findings. Such a tool could minimize overlap and duplication of efforts by the various regulatory agencies. Moreover, Tetra Tech's industrial stormwater reporting tool could be modified from a Microsoft Access-based system to a CIWQS-based system.

8.2 Other Targeting Approaches

Targeting inspections with an eye toward a specific water quality goal or characterizing an entire industry offers opportunities to maximize benefit from limited inspection resources. Tetra Tech developed the following list of potential targeting strategies:

- Inspect all stormwater permit holders within the watershed boundaries of section 303(d)-listed waters with the goal of focusing on BMPs associated with the pollutants contributing to impairment.
- Identify local areas that have a significant industrial presence and are adjacent to a surface water. Inspect all industrial facilities within that geographic area—NOI filers and non-filers.
- Evaluate the annual reports, and inspect those that submitted analytical results outside benchmark values. The San Diego Water Board used this approach in 2004/2005 to develop Tetra Tech's inspection list.
- Emphasize facilities that did not collect the appropriate number of samples to encourage facility representatives not to game the system by reporting "no qualifying storm event." Cross reference these inspections with other facilities in the same geographic area that were able to collect samples.
- Identify particular industries, and identify and inspect all permit holders from those industries during one wet weather season.
- Develop a list of all facilities in a specific SIC code using a business-listing database such as Dunn & Bradstreet. Inspect all facilities on the list—NOI filers and non-filers—statewide

9.0 Recommendation for Improvements to California's Industrial Stormwater Program

The following brief recommendations, based on Tetra Tech's past experience in the state, are made to help improve the effectiveness of California's industrial stormwater program:

- Perform follow-up inspections at all facilities previously rated as "1" or "2" that have not yet been re-inspected.
- Focus new industrial stormwater inspections on heavy industry other than 5015 – auto dismantlers, 5093 – scrap recycling facilities, and 42XX - motor freight transportation and warehousing.
- Identify a smaller 303(d)-listed watershed segment of a larger 303(d)-listed water with a significant industrial presence within the watershed boundaries. Inspect all stormwater permit holders within the watershed boundaries with the goal of

focusing on BMPs associated with the pollutants that are contributing to impairment.

Appendix A

Compliance statistics for five largest SIC codes inspected

SIC 5015 - Auto Salvage/Dismantling

Compliance with paperwork requirements

Total number of SIC 5015 facilities inspected – 433

Table A.1 Compliance with General Permit SWPPP Requirements (5015)		
General Permit Requirement	Facilities in Compliance	Percentage of 5015 Facilities with a SWPPP (n=433)
<i>A SWPPP was developed and implemented (A.1)*</i>	317	73%
General Permit Required SWPPP Contents	Facilities in Compliance	Percentage of 5015 facilities with SWPPP (n=317)
The SWPPP identified a specific individual or individuals and their positions within the facility organization as members of a stormwater pollution prevention team (A.3)	272	86%
The SWPPP included a site map (A.4)	254	80%
The SWPPP included a list of significant materials handled and stored at the site (A.5)	296	93%
The SWPPP included a narrative description of the facility's industrial activities, associated potential pollutant sources, and potential pollutants that could be discharged in stormwater discharges or authorized non-stormwater discharges (A.6)	301	95%
The SWPPP included a narrative assessment of all industrial activities and potential pollutant sources (A.7)	295	93%
The SWPPP included a narrative description of stormwater BMPs to be implemented at the facility for each potential pollutant (A.8)	302	95%
The SWPPP was signed and certified by the appropriate facility personnel	210	66%
<i>Facility SWPPP met all General Permit requirements</i>	148	47%

* Facility representative produced a document titled "Stormwater Pollution Prevention Plan"

Table A.2 Compliance with General Permit SWMP Requirements (5015)		
General Permit Requirement	Facilities in Compliance	Percentage of 5015 Facilities with SWMP on-site (n=433)
<i>Facility developed a written stormwater monitoring program (B.1)</i>	308	71%
General Permit Required SWMP Contents	Facilities in Compliance	Percentage of 5015 facilities with SWMP (n=308)
SWMP describes procedures for quarterly non-stormwater visual monitoring (B.3)	297	96%
SWMP describes stormwater discharge visual observations (B.4)	302	98%
SWMP describes stormwater sample collection procedures and protocols (B.5)	300	97%
SWMP describes locations and outfalls for visual observation and sample collection (B.7)	291	94%
SWMP explains how the facility's monitoring program will satisfy the monitoring program objectives (B.10)	302	98%
<i>Facility SWMP met all General Permit Requirements</i>	279	90%

Table A.3 Compliance with General Permit Sampling and Monitoring Requirements (5015)		
General Permit Requirement	Facilities In Compliance	Percentage of 5015 Total (n=433)
Previous year's annual report available for review	376	87%
General Permit Required Annual Report Contents	Facilities In Compliance	Percentage of 5015 facilities with Annual Report (n=376)
Quarterly non-stormwater discharge visual observations (B.3.c)	358	95%
Stormwater discharge visual observations (B.4)	373	99%
Facility operators collected stormwater samples during the first hour of discharge from (1) the first storm event of the wet season, and (2) at least one other storm event in the wet season (B.5)	355	94%
Stormwater samples were analyzed for the appropriate parameters (B.5.c), includes facilities that collected fewer than the required number of samples	354	94%
Facility operators visually observed and collected samples of stormwater discharges from all drainage areas that represent the quality and quantity of the facility's stormwater discharges from the storm event (B.7)	336	89%
The facility operator conducted one comprehensive site compliance evaluation in each reporting period (July 1- June 30) (A.9)	348	92%
All analytical stormwater results were within EPA/Water Board benchmark values	280	74%
Annual Report was complete	258	69%

BMP implementation

SWPPP BMP implementation for the 5015-sample group was determined to be 57 percent; 302 SWPPPs identified BMPs but only 175 facilities fully implemented the BMPs identified in the SWPPP.

Distribution of Facility Stormwater Ratings

Table A.4 Tabulation of Stormwater Ratings (5015)		
Rating	No. of Facilities	Percentage of 5015 facilities (n=433)
1 – Potential Threat to Stormwater Quality	92	21%
2 – Paperwork and minor yard violations	212	49%
3 – In Compliance	91	21%
* - Visited But Not Inspected	20	5%

SIC 5093 - Scrap Recycling Facilities

Total number of SIC 5093 facilities inspected - 168

Compliance with paperwork requirements

Table A.5 Compliance with General Permit SWPPP Requirements (5093)		
General Permit Requirement	Facilities in Compliance	Percentage of 5093 Facilities with a SWPPP (n=168)
<i>A SWPPP was developed and implemented (A.1)*</i>	116	69%
General Permit Required SWPPP Contents	Facilities in Compliance	Percentage of 5093 facilities with SWPPP (n=116)
The SWPPP identified a specific individual or individuals and their positions within the facility organization as members of a stormwater pollution prevention team (A.3)	93	80%
The SWPPP included a site map (A.4)	97	84%
The SWPPP included a list of significant materials handled and stored at the site (A.5)	108	93%
The SWPPP included a narrative description of the facility's industrial activities, associated potential pollutant sources, and potential pollutants that could be discharged in stormwater discharges or authorized non-stormwater discharges (A.6)	108	93%
The SWPPP included a narrative assessment of all industrial activities and potential pollutant sources (A.7)	107	93%
The SWPPP included a narrative description of stormwater BMPs to be implemented at the facility for each potential pollutant (A.8)	109	93%
The SWPPP was signed and certified by the appropriate facility personnel	63	54%
<i>Facility SWPPP met all General Permit requirements</i>	48	41%

* Facility representative produced a document titled "Stormwater Pollution Prevention Plan"

Table A.6 Compliance with General Permit SWMP Requirements (5093)		
General Permit Requirement	Facilities in Compliance	Percentage of 5093 Facilities with SWMP on-site (n=168)
<i>Facility developed a written stormwater monitoring program (B.1)</i>	108	64%
General Permit Required SWMP Contents	Facilities in Compliance	Percentage of 5093 facilities with SWMP (n=108)
SWMP describes procedures for quarterly non-stormwater visual monitoring (B.3)	105	97%
SWMP describes stormwater discharge visual observations (B.4)	106	97%
SWMP describes stormwater sample collection procedures and protocols (B.5)	100	92%
SWMP describes locations and outfalls for visual observation and sample collection (B.7)	99	92%
SWMP explains how the facility's monitoring program will satisfy the monitoring program objectives (B.10)	101	93%
<i>Facility SWMP met all General Permit Requirements</i>	90	86%

Table A.7 Compliance with General Permit Sampling and Monitoring Requirements (5093)		
General Permit Requirement	Facilities In Compliance	Percentage of 5093 Total (168)
<i>Previous year's annual report available for review</i>	150	89%
General Permit Required Annual Report Contents	Facilities In Compliance	Percentage of 5093 facilities with Annual Report (n=150)
Quarterly non-stormwater discharge visual observations (B.3.c)	143	95%
Stormwater discharge visual observations (B.4)	144	96%
Facility operators collected stormwater samples during the first hour of discharge from (1) the first storm event of the wet season, and (2) at least one other storm event in the wet season (B.5)	132	88%
Stormwater samples were analyzed for the appropriate parameters (B.5.c), includes facilities that collected fewer than the required number of samples	123	82%
Facility operators visually observed and collected samples of stormwater discharges from all drainage areas that represent the quality and quantity of the facility's stormwater discharges from the storm event (B.7)	129	86%
The facility operator conducted one comprehensive site compliance evaluation in each reporting period (July 1- June 30) (A.9)	132	88%
All analytical stormwater results were within EPA/Water Board benchmark values	85	57%
Annual Report was complete	92	61%

Benchmark value exceedances

SWPPP BMP implementation for the 5093-sample group was determined to be 79 percent, 109 SWPPPs identified BMPs but only 86 facilities fully implemented the BMPs identified in the SWPPP.

Distribution of rankings

Table A.8 Tabulation of Stormwater Ratings (5093)		
Rating	No. of Facilities	Percentage of 5093 Total facilities (n=168)
1 – Potential Threat to Stormwater Quality	34	20%
2 – Paperwork and minor yard violations	96	57%
3 – In Compliance	28	16%
* - Visited But Not Inspected	7	4%

SIC 42XX - Motor Freight Transportation and Warehousing

Total number of SIC 42XX facilities inspected - 163 facilities

Compliance with paperwork requirements

Table A.9 Compliance with General Permit SWPPP Requirements (42XX)		
General Permit Requirement	Facilities in Compliance	Percentage of 42XX Facilities with a SWPPP (n=163)
<i>A SWPPP was developed and implemented (A.1)*</i>	113	69%
General Permit Required SWPPP Contents	Facilities in Compliance	Percentage of 42XX facilities with SWPPP (n=113)
The SWPPP identified a specific individual or individuals and their positions within the facility organization as members of a stormwater pollution prevention team (A.3)	89	79%
The SWPPP included a site map (A.4)	101	89%
The SWPPP included a list of significant materials handled and stored at the site (A.5)	103	91%
The SWPPP included a narrative description of the facility's industrial activities, associated potential pollutant sources, and potential pollutants that could be discharged in stormwater discharges or authorized non-stormwater discharges (A.6)	105	93%
The SWPPP included a narrative assessment of all industrial activities and potential pollutant sources (A.7)	106	94%
The SWPPP included a narrative description of stormwater BMPs to be implemented at the facility for each potential pollutant (A.8)	110	97%
The SWPPP was signed and certified by the appropriate facility personnel	96	85%
<i>Facility SWPPP met all General Permit requirements</i>	74	65%

* Facility representative produced a document titled "Stormwater Pollution Prevention Plan"

Table A.10 Compliance with General Permit SWMP Requirements (42XX)		
General Permit Requirement	Facilities in Compliance	Percentage of 42XX Facilities with SWMP on-site (n=163)
<i>Facility developed a written stormwater monitoring program (B.1)</i>	106	65%
General Permit Required SWMP Contents	Facilities in Compliance	Percentage of 42XX facilities with SWMP (n=106)
SWMP describes procedures for quarterly non-stormwater visual monitoring (B.3)	100	94%
SWMP describes stormwater discharge visual observations (B.4)	104	98%
SWMP describes stormwater sample collection procedures and protocols (B.5)	100	94%
SWMP describes locations and outfalls for visual observation and sample collection (B.7)	95	90%
SWMP explains how the facility's monitoring program will satisfy the monitoring program objectives (B.10)	101	95%
<i>Facility SWMP met all General Permit Requirements</i>	90	85%

Table A.11 Compliance with General Permit Sampling and Monitoring Requirements (42XX)		
General Permit Requirement	Facilities In Compliance	Percentage of 42XX Total (n=163)
Previous year's annual report available for review	150	92%
General Permit Required Annual Report Contents	Facilities In Compliance	Percentage of 42XX facilities with Annual Report (n=150)
Quarterly non-stormwater discharge visual observations (B.3.c)	140	93%
Stormwater discharge visual observations (B.4)	140	93%
Facility operators collected stormwater samples during the first hour of discharge from (1) the first storm event of the wet season, and (2) at least one other storm event in the wet season (B.5)	130	87%
Stormwater samples were analyzed for the appropriate parameters (B.5.c), includes facilities that collected fewer than the required number of samples	159	
Facility operators visually observed and collected samples of stormwater discharges from all drainage areas that represent the quality and quantity of the facility's stormwater discharges from the storm event (B.7)	131	87%
The facility operator conducted one comprehensive site compliance evaluation in each reporting period (July 1- June 30) (A.9)	141	94%
All analytical stormwater results were within EPA/Water Board benchmark values	106	71%
Annual Report was complete	117	78%

BMP implementation

SWPPP BMP implementation for the 42XX-sample group was determined to be 71 percent, 110 SWPPPs identified BMPs but only 78 facilities fully implemented the BMPs identified in the SWPPP.

Distribution of rankings

Table A.12 Tabulation of Stormwater Ratings (42XX)		
Rating	No. of Facilities	Percentage of 42XX Total facilities (163)
1 – Potential Threat to Stormwater Quality	25	15%
2 – Paperwork and minor yard violations	86	53%
3 – In Compliance	42	26%
* - Visited But Not Inspected	8	5%

327X - Concrete, Gypsum, and Plaster Products (Except 3274 Lime)

Total number of SIC 3274 facilities inspected - 158 facilities

Compliance with paperwork requirements

Table A.13 Compliance with General Permit SWPPP Requirements (327X)		
General Permit Requirement	Facilities in Compliance	Percentage of 327X Facilities with a SWPPP (n=158)
<i>A SWPPP was developed and implemented (A.1)*</i>	110	70%
General Permit Required SWPPP Contents	Facilities in Compliance	Percentage of 327X facilities with SWPPP (n=110)
The SWPPP identified a specific individual or individuals and their positions within the facility organization as members of a stormwater pollution prevention team (A.3)	84	76%
The SWPPP included a site map (A.4)	86	78%
The SWPPP included a list of significant materials handled and stored at the site (A.5)	101	92%
The SWPPP included a narrative description of the facility's industrial activities, associated potential pollutant sources, and potential pollutants that could be discharged in stormwater discharges or authorized non-stormwater discharges (A.6)	103	94%
The SWPPP included a narrative assessment of all industrial activities and potential pollutant sources (A.7)	102	93%
The SWPPP included a narrative description of stormwater BMPs to be implemented at the facility for each potential pollutant (A.8)	98	89%
The SWPPP was signed and certified by the appropriate facility personnel	85	77%
<i>Facility SWPPP met all General Permit requirements</i>	59	54%

* Facility representative produced a document titled "Stormwater Pollution Prevention Plan"

Table A.14 Compliance with General Permit SWMP Requirements (327X)		
General Permit Requirement	Facilities in Compliance	Percentage of 327X Facilities with SWMP on-site (n=158)
<i>Facility developed a written stormwater monitoring program (B.1)</i>	97	61%
General Permit Required SWMP Contents	Facilities in Compliance	Percentage of 327X facilities with SWMP (n=97)
SWMP describes procedures for quarterly non-stormwater visual monitoring (B.3)	95	98%
SWMP describes stormwater discharge visual observations (B.4)	97	99%
SWMP describes stormwater sample collection procedures and protocols (B.5)	92	95%
SWMP describes locations and outfalls for visual observation and sample collection (B.7)	82	84%
SWMP explains how the facility's monitoring program will satisfy the monitoring program objectives (B.10)	89	92%
<i>Facility SWMP met all General Permit Requirements</i>	77	79%

Table A.15 Compliance with General Permit Sampling and Monitoring Requirements (327X)		
General Permit Requirement	Facilities In Compliance	Percentage of 327X Total (n=158)
<i>Previous year's annual report available for review</i>	134	85%
General Permit Required Annual Report Contents	Facilities In Compliance	Percentage of 327X facilities with Annual Report (n=134)
Quarterly non-stormwater discharge visual observations (B.3.c)	126	94%
Stormwater discharge visual observations (B.4)	133	99%
Facility operators collected stormwater samples during the first hour of discharge from (1) the first storm event of the wet season, and (2) at least one other storm event in the wet season (B.5)	107	80%
Stormwater samples were analyzed for the appropriate parameters (B.5.c), includes facilities that collected fewer than the required number of samples	130	97%
Facility operators visually observed and collected samples of stormwater discharges from all drainage areas that represent the quality and quantity of the facility's stormwater discharges from the storm event (B.7)	119	89%
The facility operator conducted one comprehensive site compliance evaluation in each reporting period (July 1- June 30) (A.9)	132	98%
All analytical stormwater results were within EPA/Water Board benchmark values	88	66%
Annual Report was complete	78	58%

BMP implementation

SWPPP BMP implementation for the 327X-sample group was determined to be 79 percent; 98 SWPPPs identified BMPs but only 78 facilities fully implemented the BMPs identified in the SWPPP.

Distribution of rankings

Table A.16 Tabulation of Stormwater Ratings (327X)		
Rating	No. of Facilities	Percentage of 327X Total facilities (n=158)
1 – Potential Threat to Stormwater Quality	37	23%
2 – Paperwork and minor yard violations	71	45%
3 – In Compliance	32	20%
* - Visited But Not Inspected	17	11%

347X - Coating, Engraving, and Allied Services

Total number of SIC 347X facilities inspected - 86 facilities

Compliance with paperwork requirements

Table A.17 Compliance with General Permit SWPPP Requirements (347X)		
General Permit Requirement	Facilities in Compliance	Percentage of 347X facilities inspected (n=86)
<i>A SWPPP was developed and implemented (A.1)*</i>	68	79%
General Permit Required SWPPP Contents	Facilities in Compliance	Percentage of 347X facilities with SWPPP (n=68)
The SWPPP identified a specific individual or individuals and their positions within the facility organization as members of a stormwater pollution prevention team (A.3)	54	79%
The SWPPP included a site map (A.4)	48	70%
The SWPPP included a list of significant materials handled and stored at the site (A.5)	52	76%
The SWPPP included a narrative description of the facility's industrial activities, associated potential pollutant sources, and potential pollutants that could be discharged in stormwater discharges or authorized non-stormwater discharges (A.6)	59	87%
The SWPPP included a narrative assessment of all industrial activities and potential pollutant sources (A.7)	60	88%
The SWPPP included a narrative description of stormwater BMPs to be implemented at the facility for each potential pollutant (A.8)	59	86%
<i>The SWPPP was signed and certified by the appropriate facility personnel</i>	15	22%
<i>Facility SWPPP met all General Permit requirements</i>	10	15%

* Facility representative produced a document titled "Stormwater Pollution Prevention Plan"

Table A.18 Compliance with General Permit SWMP Requirements (347X)		
General Permit Requirement	Facilities in Compliance	Percentage of 347X facilities inspected (n=86)
<i>Facility developed a written stormwater monitoring program (B.1)</i>	63	73%
Required SWMP Contents	Facilities in Compliance	Percentage of 347X facilities with SWMP (n=63)
SWMP describes procedures for quarterly non-stormwater visual monitoring (B.3)	60	95%
SWMP describes stormwater discharge visual observations (B.4)	60	95%
SWMP describes stormwater sample collection procedures and protocols (B.5)	58	92%
SWMP describes locations and outfalls for visual observation and sample collection (B.7)	60	95%
SWMP explains how the facility's monitoring program will satisfy the monitoring program objectives (B.10)	57	90%
<i>Facility SWMP met all General Permit Requirements</i>	56	89%

Table A.19 Compliance with General Permit Sampling and Monitoring Requirements (347X)		
General Permit Requirement	Facilities In Compliance	Percentage of 347X facilities inspected (n=86)
<i>Previous year's annual report available for review</i>	84	98%
Required Annual Report Contents	Facilities In Compliance	Percentage of 347X facilities with Annual Report (n=84)
Quarterly non-stormwater discharge visual observations (B.3.c)	72	86%
Stormwater discharge visual observations (B.4)	81	96%
Facility operators collected stormwater samples during the first hour of discharge from (1) the first storm event of the wet season, and (2) at least one other storm event in the wet season (B.5)	73	87%
Stormwater samples were analyzed for the appropriate parameters (B.5.c), includes facilities that collected fewer than the required number of samples	54	64%
Facility operators visually observed and collected samples of stormwater discharges from all drainage areas that represent the quality and quantity of the facility's stormwater discharges from the storm event (B.7)	63	75%
The facility operator conducted one comprehensive site compliance evaluation in each reporting period (July 1- June 30) (A.9)	77	92%
All analytical stormwater results were within EPA/Water Board benchmark values	25	30%
<i>Annual Report was complete</i>	36	43%

BMP implementation

SWPPP BMP implementation for the 347X-sample group was determined to be 98 percent; 59 SWPPPs identified BMPs and 58 facilities fully implemented the BMPs identified in the SWPPP.

Distribution of rankings

Table A.20 Tabulation of Stormwater Ratings (347X)		
Rating	No. of Facilities	Percentage of Total facilities (n=86)
1 – Potential Threat to Stormwater Quality	14	16%
2 – Paperwork and minor yard violations	51	59%
3 – In Compliance	21	24%
* - Visited But Not Inspected	0	0%