Program Evaluation Report

Contra Costa Clean Water Program: Cities of Hercules, Pittsburg, Walnut Creek, and Concord; Contra Costa County; Contra Costa Clean Water Program (NPDES Permit No. CA0029912)

Executive Summary

In May 2003 Tetra Tech, Inc., with assistance from the California Regional Water Quality Control Board, San Francisco Region (Regional Board), conducted a program evaluation of 5 of the 18 permittees implementing the Contra Costa Clean Water Program (Clean Water Program). The purpose of the program evaluation was to determine the permittees' compliance with the National Pollutant Discharge Elimination System (NPDES) permit (CA0029912 and Board Order No. 99-058) and to evaluate the current implementation status of the permittees' performance standards with EPA's stormwater regulations. Because the Regional Board had already conducted some evaluation activities, the evaluation of some permittees was limited to specific topics. The program evaluation included an office and in-field verification of most aspects of program implementation for the Cities of Hercules and Pittsburg. A limited evaluation of the office activities addressing only industrial inspection activities and illicit discharges was conducted in the Cities of Walnut Creek and Concord. The evaluation reviewed office activities for most aspects of the Contra Costa County program and field activities for construction and maintenance. The evaluation also included a brief review of the oversight activities provided by the Contra Costa Clean Water Program staff.

This program evaluation report identifies potential permit violations, program deficiencies, and positive attributes and is not a formal finding of violation. Program deficiencies are areas of concern for successful program implementation. Positive attributes indicate overall progress in implementing the program.

The following potential permit violations and program deficiencies are considered the most significant:

- Each permittee should develop an individual stormwater management plan to more specifically describe how the performance standards and permit requirements will be met within their community.
- The Clean Water Program's Model Plans for Illicit Discharge Control Activities (IDCA) and Industrial and Commercial Business Inspections lack sufficient detail for effective implementation.
- The Annual Reporting format should include additional measures against which compliance with the permit and performance standards can be assessed.
- The County's Illicit Discharge Control Activities Plan is largely a plan for illegal dumping and does not address illicit discharges or illegal connections to the storm sewer.

- The County did not obtain necessary NPDES stormwater permit coverage for the construction of a County-owned animal control facility.
- The City of Hercules lacks a written industrial and commercial business inspection plan.
- The City of Hercules has not identified, verified and prioritized field screening areas for illicit discharge investigation or inspections and has not developed an IDCA plan or program.
- The City of Pittsburg lacks a compliant Inspection Activities program for industrial and commercial businesses.
- The City of Pittsburg lacks written standards, procedures, and training for industrial facility stormwater inspections.
- The City of Pittsburg lacks criteria to establish screening locations for illicit discharges investigations.
- The City of Pittsburg lacks identification of illegal dumping hot spots.
- High-priority areas were mapped in the City of Concord's IDCA Plan, but the City is not screening outfalls for dry weather discharges.

Several elements of the permittees' Clean Water Program were particularly notable:

- The Clean Water Program is funded by Stormwater Utility Assessments that have annually generated $8–12 million in revenue.
- The City of Hercules maintains new development controls as an "improvement" that is financed by the fees generated in "lighting and landscaping districts."
- The City of Hercules has a "new urbanist" regulating code for Central Hercules that outlines stormwater pollution control design standards that must be used in the Central Hercules redevelopment area.
- Walnut Creek's NPDES Program is extremely well organized. Utilization of internal work plans, a database, and formal reporting procedures for all City departments involved in the program has resulted in effective program administration.
- The Stormwater Performance Standards Implementation Status Database developed by the City of Walnut Creek is a thorough and useful tracking tool which the City also uses to more accurately report status to the Regional Board each year
- The City of Concord uses the Neighborhood Preservation Department's proactive neighborhood assessments to reduce and prevent illicit discharges.

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1.0 Introduction

1.1 Program Evaluation Purpose

The purpose of the program evaluation was to determine the permittees' compliance with the National Pollutant Discharge Elimination System (NPDES) permit (CA0029912 and Board Order No. 99-058) and to evaluate the current implementation status of the permittees' performance standards with respect to EPA's stormwater regulations. Secondary goals included the following:

- Review the overall effectiveness of the Clean Water Program.
- Identify and document positive elements of the Clean Water Program that could benefit other Phase I and Phase II municipalities.
- Acquire data to assist in reissuance of the permit.

40 CFR 122.41(i) provides the authority to conduct the program evaluation.

1.2 Permit History

The NPDES stormwater permit was issued on July 21, 1999, and is scheduled to expire on July 21, 2004. The current permit, the second issued to the permittees, requires each permittee to follow the Contra Costa Clean Water Program's Stormwater Management Plan (1999–2004) and associated performance standards. The performance standards represent the level of effort required of each permitee and are essentially best management practices (BMPs) that each permittee must implement.

1.3 Logistics and Program Evaluation Preparation

Before initiating the on-site program evaluation, Tetra Tech, Inc., reviewed the following Clean Water Program materials:

- NPDES Permit No. CA0029912
- Contra Costa Clean Water Program's Stormwater Management Plan (1999 – 2004) and associated performance standards
- 2001/2002 annual reports for each of the permittees
- Regional Board correspondence with each permittee
- Permittees' Web sites

On May 13–15, 2003, Tetra Tech, Inc., with assistance from Regional Board staff, conducted the program evaluation. The evaluation schedule is provided on page 2.

Upon completion of the evaluation, an exit interview was held with each permittee to discuss the preliminary findings. During the exit interview, the attendees were informed that the findings were to be considered preliminary pending further review by EPA and the Regional Board.

	Team 1: Clean Water Program, Contra Costa County	Team 2: Hercules, Walnut Creek and Concord	Team 3: Pittsburg
Tuesday, May 13, 2003			
Morning	CLEAN WATER PROGRAM: Monitoring, Special Studies, Public Outreach	HERCULES: Inspection Activities; Illicit Discharge Control Activities (office and field)	PITTSBURG: Inspection Activities; Industrial Outreach; Illicit Discharge Control Activities (office)
Afternoon	COUNTY: Inspection Activities; Industrial Outreach; Illicit Discharge Control Activities (office)	HERCULES: Municipal Maintenance Activities (office and field)	PITTSBURG: Inspection Activities (field)
Wednesday, May 14, 2003			
Morning	CLEAN WATER PROGRAM: Continued	HERCULES: New Development and Construction Controls (office and field)	PITTSBURG: Municipal Maintenance Activities (office and field)
Afternoon	COUNTY: Municipal Maintenance Activities (office and field); Construction (office)	WALNUT CREEK: Inspection Activities; Industrial Outreach; Illicit Discharge Control Activities (office)	PITTSBURG: New Development and Construction Controls (office and field)
Thursday, May 15, 2003			
Morning	COUNTY: Construction (field)	CONCORD: Inspection Activities; Industrial Outreach; Illicit Discharge Control Activities (office)	COUNTY: Construction (field)
Afternoon	Outbrief (all permittees together)		

1.4 Program Areas Evaluated

Because the Regional Board had already conducted evaluation activities, the evaluation of some permittees was limited to specific topics and did not always include an in-field evaluation of activities. A brief description of the program areas evaluated for each permittee is provided below.

For the Contra Costa Clean Water Program, the evaluation consisted primarily of a review of the coordination, program management, monitoring, and special studies the Clean Water Program staff had conducted. This evaluation was conducted in the office and did not include any field activities.

For Contra Costa County, office evaluations were conducted for the Industrial Activities, Industrial Outreach, Illicit Discharge Control Activities, Municipal Maintenance, and New Development and Construction Controls. Field activities included a series of construction site inspections and a visit to the main County corporation yard.

For the Cities of Walnut Creek and Concord, the evaluation team conducted a limited evaluation of the office activities addressing only Industrial Activities and Illicit Discharge Control Activities. The evaluation team did not conduct in-field evaluations in either city.

For the cities of Hercules and Pittsburg, the following program areas were evaluated:

- Program Management
- Inspection Activities
- Illicit Discharge Control Activities
- Municipal Maintenance
- New Development and Construction Controls

On February 19, 2003, the Regional Board amended the Contra Costa MS4 permit to require additional treatment controls for certain new development and significant redevelopment projects. Due to this recent permit modification, new development controls were not fully evaluated at this time for compliance with permit conditions. However, in general, it did not appear that the permittees had begun to implement a policy for establishing post-construction runoff controls for new developments.

1.5 Program Areas Not Evaluated

The following areas were not evaluated in detail as part of the program evaluation:

- Public Education and Industrial Outreach (although Industrial Outreach was addressed during the evaluation of Inspection Activities)

- Field activities associated with industrial inspections and illicit discharge control activities for Contra Costa County, Walnut Creek, and Concord.

- Activities associated with Order No. R2-2003-0022 (adopted February 19, 2003), which amended the permit to require additional treatment controls for certain new development and significant redevelopment projects.

- Wet-weather monitoring program and monitoring program details (e.g., sample location, types, frequency, parameters).

- Other NPDES permits issued to the permittees (e.g., industrial or construction NPDES stormwater permits).

- Inspection reports, plan review reports, and other relevant files. The program evaluation team did not conduct a detailed file review to verify that all elements of the Clean Water Program were being implemented as described. Instead, observations by the evaluation team and statements from the permittees' representatives were used to assess overall

compliance with permit requirements. A detailed file review of specific program areas could be included in a subsequent evaluation.

1.6 Program Areas Recommended for Further Evaluation

The evaluation team recommends the following additional assessments:

- An evaluation of the permittees that were not evaluated.
- Additional in-field evaluations of the inspection activities program and construction inspections undertaken by Contra Costa County.
- Additional in-field evaluations of inspection activities in the City of Concord.
- An evaluation of the new development and construction controls program and municipal maintenance program in the Cities of Walnut Creek and Concord.
- An evaluation of all permittees implementing programs developed in compliance with Board Order R2-2003-0022 which amended the current Contra Costs MS4 permit to require additional treatment controls for certain new development and significant redevelopment projects.

2.0 Program Evaluation Results

This program evaluation report identifies potential permit violations, program deficiencies, and positive attributes and is not a formal finding of violation. Program deficiencies are areas of concern for successful program implementation. Positive attributes indicate a permittee's overall progress in implementing the Clean Water Program. The evaluation team identified only positive attributes that were innovative (beyond minimum requirements). Some areas were found to be simply adequate; that is, not particularly deficient or innovative. The evaluation team did not evaluate all components of each permittee's Clean Water Program. Therefore, the permittees should not consider the enclosed list of violations, deficiencies, and attributes, a comprehensive evaluation of individual program elements.

The evaluation team did not evaluate all components of each permittee's Clean Water Program. Therefore, the permittees should not consider the enclosed list of program deficiencies a comprehensive evaluation of individual program elements.

The most significant potential permit violations, program deficiencies, and positive attributes identified during the evaluation are noted in the Executive Summary and are identified with *text boxes* in the following subsections.

2.1 Contra Costa Clean Water Program

NOTE: Each permittee is individually responsible for implementing the performance standards and meeting the NPDES permit requirements; however, the Clean Water Program is responsible for coordinating specific activities on behalf of all of the permittees. Findings related to all permittees (such as performance standards or the annual report) are described in this section.

2.1.1 Evaluation of Program Management

Positive Attributes:

- *The Clean Water Program is funded by Stormwater Utility Assessments that have annually generated $8–12 million in revenue.*

  Although the evaluation did not include a fiscal analysis, the Clean Water Program is commended for setting up a stormwater utility that provides a dedicated funding source, rather than funding the program out of general funds. The Stormwater Utility Assessments, which are assessed on individual properties in the County with rates set by each municipality (average charge of $35/equivalent residential unit/year), provide a stable source of funding for the program and each permittee. The stormwater utility assessments cannot pay for any debt financed capital improvements and can be used to pay for only operation and maintenance expenses.

- *A countywide management committee and administrative committee, along with several technical committees, help provide program direction, consistency, and guidance to all permittees.*

  The countywide Management Committee comprises representatives from each permittee and is the primary decision-making body for the Contra Costa Clean Water Program. An Administrative Committee provides support on administration, strategic planning, personnel, budgets, and conflict resolution. In addition, three other committees focus on specific subject areas of the permit: the New Development and Construction Control Committee, the Public Education and Industrial Outreach Committee, and the Monitoring and Inspection Committee. These committees provide the structure for permittees to share information and knowledge gained through implementing the Clean Water Program and benefit all participants.

Deficiencies Noted:

- *Each permittee should develop an individual stormwater management plan to more specifically describe how the performance standards and permit requirements will be met within their community*.

  Although each permittee is required to follow the performance standards, most permittees have not developed individual plans describing exactly how they will implement the performance standards and who within their organization is responsible for each performance standard. Also, the performance standards developed for all permittees do not provide the detailed direction and guidance that each permittee needs to implement these cross-departmental programs. Examples of this identified during the evaluation included: lack of definable standards for the inspection activities and industrial outreach and the illicit discharge control activities.

  The permittees should develop individual stormwater management plans that describe how the program and performance standards will be implemented in each municipality. As examples, the permittees could review the Jurisdictional Urban Runoff Management Programs (JURMPs) developed by each municipality in San

Diego County or the stormwater plan developed by the City of Sacramento. Both programs have developed regional management objectives and local implementation plans.

- *The Clean Water Program's Model Plans for Illicit Discharge Control Activities and Industrial and Commercial Business Inspections lack sufficient detail for effective implementation*.

The Model Illicit Discharge Control Activities Plan (April 2000) and the Model Industrial and Commercial Business Inspection Plan (August 1999) lack the detail and guidance necessary to effectively implement these programs and determine compliance. Most of the permittees evaluated simply copied these model plans for their own use.

For example, the illicit discharge control activities plan should:

- Define which activities or areas within a community are considered high-priority or provide guidance to permittees on what they should consider when identifying high-priority areas.
- Set a minimum schedule for screening high-, medium- and low-priority areas.
- Describe criteria for identifying whether a discharge is "illicit."
- Include detailed procedures to follow when an illicit discharge has been identified.
- Describe the enforcement procedures to be used.

The industrial and commercial business inspection plan should:

- Identify the universe of businesses in the community that are potentially subject to inspection.
- Describe procedures for how the business list will be updated.
- Clearly define the types of "priority businesses" or high-priority businesses to be inspected.
- Set a minimum schedule for inspecting these high-priority businesses.
- Describe minimum inspection procedures, including the use of inspection checklists or forms.
- Describe outreach procedures with targeted business categories for more specific outreach.
- Describe enforcement procedures to be used.

The Clean Water Program model plans could be rewritten to include such detail or alternatively, each permittee could develop community specific plans based on their local characteristics and objectives. Each permittee will develop and implement these plans differently.

- *The Clean Water Program and permittees lack formal measures to document the effectiveness of individual program elements.*

The current method of evaluating the Clean Water Program accounts for activities such as the number of public education events, number of catch basins cleaned, number of outfalls inspected, and other basic performance measures. These activities are tracked, but performance standards or goals against which the activities'

performance can be measured have not been established. To provide a means to measure program effectiveness, the City should establish indirect and direct measures to assess the effectiveness of each performance standard. Indirect measures are based on the assumption that the use of specific program activities is effective in decreasing storm water pollution and ultimately protecting water quality. Direct measures focus on characterizing the quality of water bodies receiving discharges from permittee municipal separate storm sewer systems (MS4s).

The measures should be linked to programmatic, social, or environmental indicators like those listed in the 1996 Center for Watershed Protection report *Environmental Indicators to Assess Stormwater Control Programs and Practices*. For example, the City of Phoenix monitors social indicators like the public's knowledge of stormwater issues as a measure of success. As another example, Sacramento County tracks the number of warnings, corrective actions, penalties, and stop work orders issued as a performance measure and uses the number of illegal non-stormwater discharges reported as an effectiveness measure. The City of Sacramento has set minimum performance standards for each BMP, such as a standard to visit 20 classrooms each year to conduct stormwater presentations.

- *The Clean Water Program should more specifically define "priority businesses" and increase the frequency of inspections*.
  The Model Industrial and Commercial Business Inspection Plan allows each permittee to define "priority businesses" without requiring certain categories of businesses to be included. Priority businesses are described in the plan as those businesses that "show evidence of active non-stormwater pollutant discharges during a routine inspection." Although this wording provides flexibility to each permittee, it also potentially misses some high-priority facilities that should be routinely inspected. For example, other stormwater programs in California often cite facilities subject to the statewide Industrial General Permit, auto repair and body shops, retail gasoline outlets, and restaurants as having the highest potential to contaminate stormwater, and the municipalities inspect such facilities at defined frequencies. The Clean Water Program should designate a minimum set of facilities that are to be considered high priorities for all permittees.

  In addition, the Model Plan requires that a "priority business" be inspected once the following year after being identified as a priority, but allows that business to fall back to inspections once every 5 years if it is no longer considered a "priority business." Because of the difficulty in detecting non-stormwater discharges during inspections, the potential pollutant sources typically found at these facilities, and the frequent turnover in staff, all permittees should routinely inspect the set of minimum facilities discussed above more often than once every 5 years. A facility should not be subject to less frequent inspections unless the facility qualifies for the no exposure exemption from the State.

  For example, the Sacramento MS4 permit issued in 2002 requires certain commercial and industrial facilities to be inspected once every 3 years. At a minimum, the inspected facilities must include auto body shops, auto dealers, auto repair shops,

equipment rentals, nurseries, kennels, restaurants, and retail gasoline outlets. In the San Diego MS4 permit, issued in 2001, high-priority industrial sites, including those subject to the statewide Industrial General Permit and industrial facilities tributary to a 303(d) impaired waterbody, are required to be inspected annually.

2.1.2 Evaluation of Monitoring and Special Studies Programs

Positive Attribute:

- *The Clean Water Program has completed a number of special studies to collect additional information on the development and implementation of BMPs.*
  Although the evaluation team did not focus on the specifics of individual studies, the Clean Water Program is commended for the variety of special studies and monitoring programs completed. From FY 1993/1994 to FY 2001/2002, the Clean Water Program has completed 15 special studies. These include, for example, the in-process Contra Costa Golf Course Study to evaluate the nutrient and pesticide runoff from golf courses in the County and the study of urban sources of mercury, PCBs, and chlorinated pesticides. The permittees are strongly encouraged to incorporate the findings from these studies into implementation of the Clean Water Program activities.

2.1.3 Evaluation of Reporting Requirements

Deficiency Noted:

- *The Annual Reporting format should include additional measures against which compliance with the permit and performance standards can be assessed*.

The Clean Water Program has developed instructions for how permittees are to complete the 2002/2003 Annual Report Forms. Although this guidance is detailed, it is still difficult to determine compliance with each of the performance standard categories because the annual report typically reports on activities accomplished and not the total universe of activities that could have been accomplished. For example, under inspection activities, each permittee is to report on the total number of priority/nonpriority inspections conducted. However, the instructions do not require the permittee to state how many industrial/commercial facilities are located within the municipality for comparison purposes. To be more useful, the report should identify these inspections by major category (e.g., category name, total number in category in the municipality, total number in category inspected). The list could be further defined by, for example, facilities subject to the statewide Industrial General Permit, automotive repair and body shops, retail gasoline outlets, restaurants, and other categories of facilities of major concern.

Similarly, when reporting the number of curb miles swept or catch basins cleaned, the total number of curb miles in the municipality and the total number of catch basins in the municipality should also be reported so the Regional Board can determine whether the program is meeting the performance standard.

2.2 Contra Costa County

2.2.1 Evaluation of Inspection Activities and Industrial Outreach

Positive Attribute:

- *Contra Costa County is a sponsor in the Bay Area Green Business Program, which includes specific pollution prevention standards that address stormwater contamination.*
  The Green Business Program requires businesses to meet minimum standards in four different categories—solid waste reduction and recycling, energy conservation, water conservation, and pollution prevention—to qualify. Businesses may meet the stormwater standard by implementing different measures to prevent contamination of stormwater runoff. For example, restaurants may choose different BMPs, including using proper cleaning practices for sidewalks and parking lots, cleaning private catch basins annually, labeling storm drains, and using landscaping to prevent erosion. Additional information on the Bay Area Green Business Program is provided on the Web at *http://www.greenbiz.abag.ca.gov/*.

Deficiency Noted:

- *The County's Industrial and Commercial Business Inspection Plan does not describe how high-priority businesses are defined and does not describe how the business database is updated.*
  The inspection plan describes priority businesses, which must be inspected at least once the following year after being identified as a priority, as those with a "high potential for non-stormwater pollutant discharges due to unusually poor housekeeping" in several specified outdoor areas. The plan does not describe how the County will identify these businesses with "unusually poor housekeeping" or what constitutes such housekeeping. Nor does the plan describe the process for annually updating the businesses in the database or their individual classification. It was unclear how the County plans to keep the database or priority businesses updated. The County should revise the inspection plan to provide more details on how high-priority businesses are identified and how the database is updated.

2.2.2 Evaluation of Illicit Discharge Control Activities

Potential Permit Violation:

- *The County's Illicit Discharge Control Activities Plan is largely a plan for illegal dumping and does not address illicit discharges or illegal connections to the storm sewer.*

  Performance standard IDCA-1 requires the County to "prepare a written Illicit Discharge Control Plan (Plan) that demonstrates the agency's commitment to conducting effective investigation, tracking, and elimination of illicit discharges, and describes the level of effort for conducting these activities in the following fiscal year. The plan will demonstrate that the agency has:

A. Identified, verified, and prioritized field screening areas for investigation and/or repeat inspections;
B. Developed a schedule for conducting investigations of the high priority areas during the coming year;
C. Selected which agency or group will conduct the field activities and estimated the number of labor hours required to implement the program;
D. Determined how the illicit discharge investigations will be implemented;
E. Established how activities will be documented (e.g., by including sample inspection forms);
F. Adopted minimum enforcement procedures;
G. Developed procedures for follow-up enforcement or referral to another agency, including appropriate time periods for action; and
H. Demonstrate proper legal authority."

The County's staff described the Illicit Discharge Control Activities Plan as essentially an "illegal dumping plan" that identifies several areas of the County as high priorities for illegal dumping. The plan does not describe activities to address illicit discharges into the storm drain system and does not address the identification or elimination of illegal connections to the MS4. The plan also does not address the level of effort required to conduct the activities described in the plan. Additionally, the County did not perform scheduled screenings of the identified illegal dumping areas as required by performance standard IDCA-4.

2.2.3 Evaluation of Municipal Maintenance Activities

Positive Attribute:

- *The County has developed detailed and comprehensive stormwater pollution prevention plans for all three corporation yards.*
  The County has prepared stormwater pollution prevention plans (SWPPPs) for the main Public Works corporation yard at Waterbird Way in Martinez and the two satellite corporation yards in Richmond and Brentwood. Each SWPPP was recently revised (May 2003) and includes a detailed site plan, site description and facility layout, description of potential pollutant sources, BMPs, and spill cleanup procedures. A brief site visit to the main corporation yard demonstrated that the BMPs identified in the plan were being implemented.

2.2.4 Evaluation of New Development and Construction Controls

Potential Permit Violation:

- *The County did not obtain necessary NPDES stormwater permit coverage for the construction of a County-owned animal control facility.*

Performance standard NDCC-13 requires the County to:

> "prior to construction of any project needing permits, proof of coverage (i.e., under the General Construction Activity Storm Water Permit promulgated by the SWRCB, Army Corps 404 Permit, RWQCB's 401 Water Quality Certification, etc.) will be required. Require developers to prepare, submit to the agency for

> review and approval, and implement an effective erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions during the construction period."

The evaluation team visited a County-owned construction project building—an animal control facility on Imhoff Road at Waterbird Way next to the County corporation yard. The County broke ground for the 3-acre construction site in August 2002 but did not submit a Notice of Intent (NOI) to be covered under the State's Construction Activities Stormwater General Permit as required after March 10, 2003 for all active projects disturbing more than one acre. The project also included construction of a culvert for a stream, but the County did not appear to have the proper permits for this activity.

Failure to obtain the required permits is a potential violation of both the MS4 permit performance standards and the State Construction General Permit.

Positive Attribute:

- *The County has recently developed an inspection manual for construction site field inspectors.*
  The *Construction-Site Stormwater Quality Inspection Manual* (dated March 25, 2003) has been developed to assist field staff in implementing the construction site field inspection performance standards (NDCC-14 through NDCC-19). This manual includes copies of the relevant performance standards, permits, and forms, along with guidance on what inspectors should look for at construction sites. The manual is clearly indexed, and it is an excellent reference and resource for construction site field inspectors.

Deficiencies Noted:

- *The County's construction site inspectors did not appear to adequately ensure compliance with erosion and sediment controls.*
  The evaluation team visited two large subdevelopment construction projects in the southern portion of unincorporated Contra Costa County. Although some sites had erosion and sediment controls, many controls required maintenance and some controls were missing. For example, a large concrete pour with inadequate stabilization at the entrance to the multiple concrete truck washouts had resulted in sediment discharges to the street and storm drains. The absence of BMP for this site was not immediately addressed by the on-site inspectors.

  The County uses three different inspectors to ensure compliance of erosion and sediment controls at construction sites: a grading inspector, a construction (Public Works) inspector, and a building inspector. Although the evaluation team did not meet with a County building inspector, most of the violations appeared to occur during the building inspection phase. The County should ensure that all inspectors are adequately trained and are ensuring compliance with its erosion and sediment control

requirements. Procedures should be put in place to ensure appropriate BMPs are deployed and maintained through all phases of construction. Additionally, the newly produced construction inspection manual should be distributed to all construction inspectors and should be supplemented with classroom, tailgate, or on-site training.

- *The County's plan review process could be improved by the development and use of local erosion and sediment control criteria and requirements*.
  The County does not use a specific checklist or criteria to review submitted plans against erosion and sediment control requirements. Although the County applies standard conditions addressing erosion and sediment control to plans, these conditions are largely based on regional or statewide guidance. A plan review checklist for stormwater specifically developed in the County is not used. A detailed and specific checklist would identify the key issues, appropriateness of BMPs, and ensure permit coverage is obtained. The checklist and criteria could be used for both public and private projects and would help to prevent situations where projects are missing required permits (e.g., the animal control facility) or plans lack adequate BMPs.

2.3 City of Hercules

2.3.1 Evaluation of Program Management

Adequate

2.3.2 Evaluation of Inspection Activities and Industrial Outreach

Note: Hercules performs their own inspections and does not contract out the inspections with the local Sanitary District.

Potential Permit Violation:

- *The City of Hercules lacks a written industrial and commercial business inspection plan.*

  Performance standard INSP-1 requires each agency to "utilize a written inspection plan that outlines specific steps each agency will take to conduct effective facility inspections." The standard also requires the development of a priority facilities list. The list should include the number of facilities that will be inspected during the coming fiscal year, names of priority facilities, and a description of the associated performance standards. While this plan may be fairly simple due to the small number of facilities, it is still important to develop this plan for program planning and documentation. It would ensure that more than just the NPDES Coordinator/inspector is aware of program requirements in the City.

Positive Attribute:

- *There are two biotechnology business parks in Hercules where all non-retail business is located in the City. These business parks are required to house all dumpsters in covered buildings according to City Code.*
  The businesses located in these parks do not store any materials outside, therefore, the only possible source of stormwater pollutants would be from the dumpster and trash

area. The City requires these dumpsters to be housed in a secure, covered building preventing contamination of stormwater runoff.

Deficiency Noted:

- *Hercules does not have a coordinated system or database to track inspections, complaints, or corrective actions*.
  Information regarding complaints, investigations, and corrective actions is not documented or tracked in a formal way. Without a formal documentation and tracking system, it is difficult to confirm that the City is inspecting facilities at least once per year as required (performance standard INSP-4) and is properly evaluating potential new facilities, documenting inspection results for use in compliance activities (INSP- 19, INSP-20, INSP-21) and conducting program assessments every year (INSP-22) as required by the performance standards in the NPDES permit. The inspector does not use an inspection form but instead relies on individual contact with each business. However, it is recommended that the City develop a better system of documenting inspections and compliance activities so as not to rely on the memory, abilities and individual contacts established by a single inspector.

2.3.3 Evaluation of Illicit Discharge Control Activities

Potential Permit Violations:

- *The City of Hercules has not identified, verified and prioritized field screening areas for investigation or inspections and has not developed an IDCA plan or program.*

According to performance standard IDCA-1, the City is required to develop a plan to prioritize areas determined to be at varying degrees of risk for illicit discharges and connections. The areas determined to be "high" priority are to be inspected at least once per year (IDCA-4). Medium and low priority areas are also to be inspected regularly (IDCA-6). The City contracts with a private company to inspect the storm sewer system once per year which could include outfalls, however, no prioritized and coordinated inspection of outfalls is conducted, during dry weather months or otherwise. The City has not developed a plan or identified prioritized areas as required by the performance standards. It is recommended that the City prioritize areas or outfalls in the City and require the contractor to inspect those areas for illicit discharges and connections. Clean Water Program inspection forms and the model Illicit Discharge Control Activities Plan could be used as examples.

An example of an effective dry weather analytical and field screening program can be found in San Diego's *Model Program Guidance for an Illicit Connection/Illicit Discharge Detection and Elimination Program* (available at *http://www.projectcleanwater.org*). Appendix D of this model program includes Dry *Weather Analytical and Field Screening Monitoring Guidance*. This guidance describes the specific activities the permittees will take to evaluate dry weather flows, includes a dry weather storm drain monitoring data and observation sheet, and lists action levels for when exceedances of field screening and laboratory parameters will trigger follow-up activities.

- *The City has not trained staff with which the City contracts to perform maintenance on the City's outfalls and does not require these staff to report illicit discharges in any formalized way.*
  According to IDCA-2, staff performing inspections of outfalls should be properly trained. The City has not trained the contractors which perform maintenance on their system. In addition, the City does not have an official checklist or inspection form in order to obtain consistent illicit discharge information from contract maintenance staff. To date, no information regarding illicit discharges has been obtained from the contractors; however, they are not provided any guidance or forms to use to recognize and report illicit connections or discharges. Without consistent and formalized feedback, the usefulness of the inspection activities appears questionable.

2.3.4 Evaluation of Municipal Maintenance Activities

Adequate.

2.3.5 Evaluation of New Development and Construction Controls

Positive Attributes:

- *The City maintains new development controls as an "improvement" that is financed by the fees generated in "lighting and landscaping districts."*

The City has required a number of new development treatment controls in recent redevelopment projects. Each new development control is underground, and at the conclusion of the project it will be taken over by the City to be maintained by contracted staff. The fees generated by the lighting and landscaping districts pay for the long-term maintenance of stormwater facilities, lighting, and median landscaping. This approach will ensure that these new development controls continue to operate as designed.

- *Hercules has a "new urbanist" regulating code for Central Hercules that outlines design standards that must be used in the Central Hercules redevelopment area.*

The new code requires such things as narrower streets, less impervious area (e.g., fewer parking spaces), and increased landscaping. For example, in Central Hercules landscape strips of at least 6 feet are required between all parking aisles to create a continuous shade canopy. The City encourages low-water vegetation other than turf as well. These "new urbanist" requirements improve stormwater quality, reduce the temperature of stormwater runoff, and reduce the amount of runoff after construction.

Deficiency Noted:

- *The City of Hercules does not use a checklist or guidance to assist engineers in sizing and selecting post-construction controls.*
  According to NCDD-10 and NCDD-11, the City is required to "develop and implement appropriate design guidelines and practices which incorporate water quality protection measures." Although the City requires post-construction controls, it has not established design guidelines and acceptance criteria for these BMPs regarding appropriateness of use, minimum pollutant removal, detention time, or

storm size requirements for quality or quantity control for developers and/or City employees. The City appeared mainly concerned about sediment and floatables, yet it does not provide guidance to City engineers to ensure that the BMPs to be installed are adequate. It is recommended that the City work with the Clean Water Program to establish design standards and criteria for post-construction controls in order to best attain water quality protection or improvement goals. The standards must meet the requirements of the amended permit, Order No. R2-2003-0022 (http://www.swrcb.ca.gov/rwqcb2/Agenda/02-19-03/02-19-03-13finalorder.doc) and should be distributed to developers and engineers for application.

Examples of design standards and methodologies for post-construction controls can be found at www.stormwatercenter.net.

2.4 City of Pittsburg

2.4.1 Evaluation of Program Management

Deficiency Noted:

- *The City lacks intra-departmental coordination on stormwater activities.*
  There are no institutional agreements between City departments to ensure coordination and collaboration on stormwater management activities. The Storm Water Management Plan (SWMP) does not contain specific language that explicitly addresses the roles and responsibilities of the departments involved in the implementation of the stormwater program. In addition, the City does not conduct regular stormwater meetings to ensure program effectiveness and coordination among City departments. During the course of the evaluation, some City staff responsible for BMP implementation had little knowledge of their role in the overall storm water program. Roles and responsibilities for proper program implementation heavily rely on the communication and coordination between City departments.

  Program coordination is essential to the effective implementation of the stormwater program. For example, the City of Escondido conducts monthly stormwater meetings that involve each responsible department and division head. The meetings include an update from each responsible department, hot issues for each program component, overall program status, and any additional issues.

2.4.2 Evaluation of Inspection Activities and Industrial Outreach

Potential Permit Violations:

- *The City lacks a compliant Inspection Activities program for industrial and commercial businesses.*

  Three areas of non-compliance were identified.

  Performance standard INSP-1 requires each agency to "utilize a written inspection plan that outlines specific steps each agency will take to conduct effective facility inspections." The standard also requires the development of a priority facilities list. The list should include the number of facilities that will be inspected during the

coming fiscal year, names of priority facilities, and a description of the associated performance standards. The in-office evaluation revealed that the City had not developed the inspection plan required by the permit.

Performance standard INSP-3 refers to outreach to businesses during inspections, as well as working with trade associations, business groups, and other associations. Because of the lack of inspections, outreach to businesses during inspections had not occurred. Other outreach efforts were not identified.

INSP-4 requires each agency to "inspect priority facilities as defined in the inspection plan at least once per year." Industrial inspections had not occurred in approximately a year reportably because of a lack of staff. The City is contracting with thein negotiations with the Delta-Diablo Sanitary District to have the District start conducting inspections as early as July 2003.

Although the City did demonstrate an adequate industrial inspection during the on-site mock inspection, there was no schedule for future industrial inspections.

- *The City lacks written standards, procedures, and training for industrial facility stormwater inspections.*

Performance standard INSP-2 requires the City to "adequately train facility inspectors. This may include stormwater regulations and requirements (local City ordinances, municipal stormwater permits, and the industrial stormwater General permit), impacts of non-stormwater discharges to the storm drains, inspection techniques and procedures, follow-up and enforcement procedures, and storm water BMPs." The City does not have a formal stormwater inspector training program for industrial and commercial facilities. The City needs to develop procedures for conducting industrial stormwater inspections, provide stormwater training to inspectors, and provide stormwater outreach information (such as appropriate stormwater BMPs) to the regulated industries.

For examples of stormwater outreach brochures targeting specific industries, refer to the list of resources for businesses compiled by Alameda's Countywide Clean Water Program at *http://www.cleanwaterprogram.com/publications_libraryResources.htm*.

Deficiencies Noted:

- *The City does not identify industrial facilities regulated by the statewide General Permit for Industrial Activities and has no procedures to address non-filer facilities.* The City has not identified regulated facilities covered under the statewide General Permit for Industrial Activities and therefore has neither included them in a priority list nor inspected them. The City also lacks procedures to address known or suspected non-filers. Procedures should be established to catalog facilities that have not filed an NOI under the statewide General Permit for Industrial Activities for future identification to the Regional Board.

- *The City lacks a public Stormwater Hotline.*
  The City does not have a public stormwater hotline. Staff explained that the County has a hotline, but the hotline is not specific to stormwater. Additionally, staff believed that while those answering hotline calls are accountable for contacting the responsible municipalities, this did not occur in all cases.

2.4.3 Evaluation of Illicit Discharge Control Activities

Potential Permit Violation:

- *The City lacks criteria to establish screening locations for illicit discharge investigations.*

  Performance standard IDCA-1 discusses the preparation of a written Illicit Discharge Control Plan that addresses eight topics, one of which is the identification of verified and prioritized field screening areas for investigation and repeat inspection. The City is currently using the Clean Water Program Illicit Discharge Control Activities (IDCA) model and although the model plan is being updated, the plan is not specific to the City's unique characteristics. Formalized criteria to establish screening locations for investigations of illicit discharges or hot spot areas that have a higher potential for stormwater pollution have not been established. Subsequently, the physical locations have not been identified or mapped.

  For an example of an effective dry weather analytical and field screening program, the City should review San Diego's municipal stormwater program and the *Model Program Guidance for an Illicit Connection/Illicit Discharge Detection and Elimination Program* (available at http://www.projectcleanwater.org). Appendix D of this model program includes a *Dry Weather Analytical and Field Screening Monitoring Guidance*. This guidance describes the specific activities the permittees will take to evaluate dry weather flows, includes a dry weather storm drain monitoring data and observation sheet, and lists action levels for when exceedances of field screening and laboratory parameters will trigger follow-up activities.

Deficiency Noted:

- *The City's illicit discharge inspectors lack adequate training on formalized procedures for inspections and enforcement.*
  Performance standards IDCA-12 and 13 discuss developing criteria for initiating enforcement actions. The illicit discharge inspectors lacked formalized procedures for inspections and specific knowledge regarding local enforcement procedures. Providing illicit discharge inspectors with formalized procedures for enforcement will increase consistency among inspectors and illicit discharge locations. The City should also provide annual training on illicit discharges that is targeted to various city staff. For example, first responders and field staff would receive more intensive training than office staff receiving calls. The City held a 90-minute training on the Illicit Discharge Program on May 30, 2002, but is encouraged to expand this training to also include field activities (spill response procedures and proper illicit discharge investigation techniques) and enforcement/follow-up procedures.

2.4.4 Evaluation of Municipal Maintenance Activities

Potential Permit Violation:

- *The City lacks identification of illegal dumping hot spots.*
  Performance standard MUNI-42 requires each agency to identify illegal dumping hot spots, conduct regular inspections to discourage additional dumping incidents, and consider appropriate actions to prevent illegal dumping. Evaluations with the municipal maintenance department revealed that the City has not established a priority list of illegal dumping areas. The City must develop a priority list to facilitate the maintenance scheduled for the City and its jurisdictional areas. The prioritized list would simplify the identification of targeted areas for public outreach.

Positive Attribute:

- *The City's corporation yard is a Green Business certified facility and has maintained excellent stormwater practices to control potential pollutants.*
  An evaluation of the facility revealed good housekeeping practices, such as running the street sweeper once a week, conducting maintenance activities indoors, disposing of waste materials weekly, and using a vacuum truck to maintain the drains leading from the facility to the sanitary sewer. The facility undergoes a daily inspection of the yard to ensure all BMPs are effective and properly installed. A recertification inspection is performed every 3 years. Recertification requires the facility to conform to all the elements necessary to obtain Green Business certification. Those elements are storm water BMP installation, recycling, landscaping, automotive maintenance, vehicle washing, and other elements on the Green Business certification checklist.

Deficiencies Noted:

- *The City's field crews lack formalized guidance and training on proper maintenance of structural stormwater controls.*
  Performance standard MUNI-23 requires the City to develop a stormwater facility inspection and maintenance plan that specifically includes an inspection schedule, criteria for determining when to clean inlets, identification of target areas, and an inventory of major storm drains systems. The City did not appear to have written guidance for proper cleaning of stormwater facilities such as storm drain inlets and detention basins. The City also did not appear to conduct adequate training for field staff regarding stormwater maintenance. New staff are typically placed with senior field staff and trained on the job. Although on-the-job training is valuable, more formal guidance and training techniques should also be developed. For an example, refer to the City of Stockton's *Maintenance Staff Guide,* as well as the City of Oceanside's *Municipal Maintenance Guidance Book*.

- *The City lacks an application and storage plan for pesticide, herbicide, and fertilizer.*
  Discussion with the Environmental Services Center Division of the Public Works Department revealed that the City does not have a pesticide/herbicide/fertilizer application plan. The City should develop an application plan so that registered City applicators are aware of the appropriate BMPs and restrictions when they apply

pesticides. The plan should include performance standards MUNI-123 through MUNI-165, which specifically discuss pesticide use and storage, fertilizer use and storage, and use of Diazinon and copper-based pesticides. Furthermore, integrated pest management (IPM) practices should be incorporated into the plan.

Performance standard MUNI-110 requires that necessary safety equipment and spill containment kits be readily accessible in areas where chemicals are used. Spill kits should be placed on spray trucks as well as other trucks that have a high potential for spills.

2.4.5 Evaluation of Public Education

Positive Attribute:

- *The City uses and actively promotes the regional Green Business Certification Program.*
  The City has been heavily involved in the San Francisco Area Green Business Certification Program. The City has been encouraging new businesses, as well as older businesses, to become certified. The Green Business Certification Program targets restaurants, automotive facilities, landscapers, retail gas outlets, municipal maintenance, publication outfits, and other businesses. The certification program is conducted by ensuring that a business conforms to the Green Business checklist, which covers recycling activities, stormwater activities, landscape activities, and other categories. The City has been successful in working with the Southeast Asian business community and had seven certified Green Businesses.

Deficiency Noted:

- *The City relies almost exclusively on Contra Costa Clean Water Program publications to educate the public; it does not use other publications or forms of media to reach target communities.*
  City staff stated that publications developed by the Contra Costa Clean Water Program are the main source of materials used to educate the public. The City should consider developing additional educational material that specifically target stormwater practices for, at a minimum, households, automotive facilities, restaurants, and industrial facilities. In addition, the City should consider using information gained from site inspections and municipal complaints to more specifically target public outreach to specific areas and pollutants.

2.4.6 Evaluation of New Development and Construction Controls

Deficiencies Noted:

- *The construction inspectors lack adequate inspection procedures and knowledge of the City's enforcement procedures.*
  Inspectors lack written procedures to conduct adequate inspections. According to field staff, inspections are conducted based on individual experience and relevant training. Inspectors lack written procedures for the evaluation of on-site erosion and sediment controls, non-stormwater issues, construction waste and disposal and do not use a construction checklist during routine inspections. The development of

formalized inspection procedures and checklists would help the inspectors to evaluate the maintenance of erosion and sediment control BMPs.

Additionally, construction inspectors appeared to lack specific knowledge regarding the enforcement procedures, the potential penalties, and their specific enforcement authorities. Interviews with field staff indicated that inspectors have the authority to issue stop work orders and correction notices, but enforcement among construction sites appeared inconsistent.

- *The City does not adequately verify NPDES permit coverage for construction sites disturbing more than 1 acre.*
  The City does not verify that all construction sites disturbing more than 1 acre have submitted NOIs to the State Water Resources Control Board during their plan review process.

- *The training program for building inspectors could be improved.*
  Although City building inspectors are not specifically tasked to inspect for active construction sites for erosion and sediment controls, they are a component of the City's overall inspection process and should be able to identify deficiencies and, at a minimum, contact responsible city staff. Currently, building inspectors do not receive training on general stormwater awareness or erosion and sediment control issues. The purpose behind training building inspectors is to maintain a level of consistency among City construction and building inspectors.

2.5 City of Walnut Creek

2.5.1 Evaluation of Program Management

Positive Attributes:

- *Walnut Creek's NPDES Program is extremely well organized. Utilization of internal work plans, a database, and formal reporting procedures for all City departments involved in the program has resulted in effective program administration.*

The Coordinator tracks the performance of all BMPs and related City programs through meetings with staff, reporting forms, and a Stormwater Performance Standards Implementation Status Database.

- *The Stormwater Performance Standards Implementation Status Database is a thorough and useful tracking tool which the City also uses to more accurately report status to the Regional Board each year.*

The database tracks each BMP and provides information regarding responsible staff, dates of completion and describes the action for each year of the permit term to date.

- *The City of Walnut Creek has a stormwater management ordinance that allows up to a $5,000 fine per violation per day for illicit discharges or industrial noncompliance.*
  The City has used this penalty to stop illicit discharges from industrial/commercial sites and uses the money received to further fund its educational program with the

Lindsay Wildlife Museum. To date, nearly $20,000 in fines has been collected. The City may also bill the discharger for any remediation the City performs as a result of the discharge.

2.5.2 Evaluation of Inspection Activities and Industrial Outreach

Positive Attributes:

- *The City's stormwater ordinance gives the City the authority to require a non-NPDES permit holder to develop a SWPPP if the City deems the facility a water quality threat.*
  The City has used this authority to require a SWPPP for facilities that are not required to obtain an NPDES permit. The City then inspects the facility for compliance with the SWPPP during regular inspections.

- *The City is now targeting an additional group of potential dischargers—commercial service cleaners*.
  The City is working with the Police Department to perform a series of nighttime inspections to determine whether commercial service cleaning staff are illegally discharging wash water into downtown storm drains.

- *All stormwater inspection and compliance information is entered into the citywide code enforcement database.*
  The information is maintained by address and can be accessed along with any other code-related history on the property.

2.5.3 Evaluation of Illicit Discharge Control Activities

Positive Attributes:

- *City field staff have a quick reference sheet that lists the phone numbers necessary for environmental response, and they call the NPDES Coordinator with possible stormwater issues.*
  This reference sheet ensures that field staff are able to quickly contact the appropriate person when they find an illicit discharge or spill.

- *Investigative reporting forms are used when City staff finds evidence of an illicit discharge in the field during regular maintenance or planned outfall inspections.*
  This form is a carbon copy door hanger. The original checklist and information about what was found in the neighborhood stays with the resident, and the copy is returned to the NPDES Coordinator. Each incident is given a case number and the information and address are entered into the GIS database and tracked. This information is then used to alter the high-priority inspection areas as necessary.

- *The City analyzed the results of the Clean Water Program's resident survey and determined that pesticide application was the stormwater topic on which residents needed the most education.*
  The City then contracted with the Lindsay Wildlife Museum to create an IPM garden and educational program for City residents.

2.6 City of Concord

2.6.1 Evaluation of Inspection Activities and Industrial Outreach

Positive Attribute:

- *The City has a stormwater ordinance in place and has successfully levied the penalty associated with it (up to$1,000) to stop discharges*.
  In addition to levying these fines, the City has also successfully cleaned up sites and then charged the discharger (or put a lien on the property) for the City's time and resources.

Deficiency Noted:

- *The City should consider expanding the types of facilities addressed by the Inspection Activities program element.*
  The City contracts with the Central Contra Costa Sanitation District to conduct inspections of automotive repair facilities and restaurants once every 5 years. Regardless of location or compliance history, the City does not perform any additional industrial or commercial inspections, beyond the Sanitation District's inspections, that are not in response to a complaint. The City should consider conducting additional inspections in priority areas or targeting priority businesses with a potential to impact storm water quality.

2.6.2 Evaluation of Illicit Discharge Control Activities

Potential Permit Violation:

- *High-priority areas were mapped in the City's IDCA Plan, but the City is not screening outfalls for dry weather discharges.*

According to the permit and Concord's Illicit Discharge Control Activities Plan (April 2000), the City should be surveying high-priority areas at least once per year and medium- and low-priority areas at least once during the 5-year period. Although the City inspects outfalls once per year during regular maintenance (regardless of area), these inspections are not targeted to the priority areas and are not specifically conducted during dry weather to identify dry weather discharges. The City of Carlsbad, for example, has a regularly scheduled program to screen dry weather flows from outfalls for illegal discharges. Results of dry weather screening are then used to identify illicit discharges and prioritize areas for further investigation. Carlsbad's illicit discharge detection program also includes regular field screening observations, field testing focused on eight constituents, and laboratory analytical monitoring of at least 25 percent of the sites with flowing or ponded water, focusing on a wide variety of constituents.

Positive Attributes:

- *The City uses the Neighborhood Preservation Department's proactive neighborhood assessments to reduce and prevent illicit discharges*.
  The inspectors regularly inspect neighborhoods to try to prevent blight and improve health and safety. The City Code is used to clean up leaking automobiles, cover dumpsters, clean up trash, and otherwise eliminate many residential or commercial sources of illicit discharges.

- *The City distributes door hangers to inform residents that someone has discharged a pollutant into the storm drain.*
  The door hangers, designed by the Clean Water Program, are used to target residents in a specific problem area. This practice demonstrates an effort to stop illicit discharges at the source, as opposed to just detecting them and eliminating isolated occurrences.

- *The City of Concord has implemented guidelines for charity car washing to control potential pollutants in the wash water*.
  Each car wash group is sent a letter outlining various BMPs including discharging into a sanitary system where available, disposing of wash water into grassy areas, staying 100 feet from any wellheads, minimizing soap used, and not discharging into any storm sewers or surface water. The letter acts an educational tool as well as a proactive illicit discharge preventive measure.

Deficiencies Noted:

- *Field maintenance staff are not formally trained regarding illicit discharges or other nonpoint source issues*.
  Tailgate meetings are used, but stormwater discharges and dumping are not official topics of discussion. For example, in the City of San Diego, All City employees receive stormwater pollution prevention general training. Approximately 90 percent of employees have received the training, which covers the stormwater ordinance, the permit, general information, and some selected IDCA guidance. Each participant is given a Stormwater Pollution Report Pad to use to report observed illegal discharges to the Stormwater Program. An educator provides the training, and a video is used as well. Participants in the workshop are given a pretest and posttest to measure the training's effectiveness. The results are tracked and are being used to determine the focus and information to be disseminated each year.

- *City maintenance staff do not use a form or checklist to identify and describe illicit discharges in the field.*
  The City relies on phone calls and e-mails to relay information to the NPDES Coordinator, and there is no database tracking of illicit discharges or spills found in the field.