

ATTACHMENT 1-1

**JURISDICTIONAL ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM
AND DRY WEATHER FIELD SCREENING AND ANALYTICAL MONITORING
EVALUATION**

ATTACHMENT 1-1 JURISDICTIONAL ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM AND DRY WEATHER FIELD SCREENING AND ANALYTICAL MONITORING EVALUATION

The purpose of the Jurisdictional Illicit Discharge Detection and Elimination Program is to detect and eliminate illegal connections and illicit discharges (IC/IDs) to the Municipal Separate Storm Sewer System (MS4). In support of the Illicit Discharge Detection and Elimination Program, a Dry Weather Field Screening and Analytical Monitoring Program (Dry Weather (DWM) Program) is a requirement of the San Diego Regional Water Quality Control Board Municipal Permit (Order No. R9-2007-0001).

An evaluation of the DWM Program was conducted to answer the following question:

Does the DWM Program successfully detect and eliminate illicit dry weather discharges?

Evaluation of the DWM Program found that:

- IC/ID investigations are less efficient in detecting and eliminating IC/IDs than hotline call responses (over 1,600 annually), business inspections (over 6,000 annually), and visual survey of the stormwater conveyance system during routine maintenance and/or cleaning. Based on the number of samples collected through the Dry Weather Program over the past three years, only 3.7 percent of samples collected resulted in a successful detection and elimination of an illicit discharge (87 successful IC/IDs out of 23,635 sample analyses from 2007-2009). Copermittees observed that more IC/IDs were identified through complaint referrals than through the Dry Weather program. The City of Oceanside reported in 2009-2010 that 86 out of 87 IC/IDs identified through their hotline were eliminated whereas only one IC/ID was identified and resolved through their Dry Weather Program.
- In addition to the inefficiency of the DWM Program to detect IC/IDs compared to hotline calls or inspections, the follow-up investigations which are required within two business days are rarely effective. Typically, it takes a week or more for laboratory analytical data to be reported, and if action levels are exceeded, an upstream investigation must be conducted within 2 business days of receipt of the data. With so many transient sources it is unrealistic to expect an upstream investigation conducted over a week after the IC/ID was observed to detect the source of the IC/ID. Requiring that other priorities be shifted to conduct the investigation is not an effective use of resources and does not necessarily result in the elimination of more IC/IDs.
- Identification of an action level exceedance from a storm drain outfall discharge does not necessarily indicate detection of IC/IDs. Exceedances can be caused by other sources, such as ingress of nitrate-bearing groundwater into the storm drain system, resulting in nitrate exceedances. If nitrate reduction subsequently occurs in ponded water, ammonia may also be detected. Exceedances may also be caused by saline intrusion, resulting in high conductivity, or alkalization of the runoff in a concrete channel, resulting in higher pH. Within the current permit, exceedances from these common causes currently still require a prompt upstream investigation by many jurisdictions to confirm that there is no IC/ID upstream, diverting attention away from more effective activities.

- The DWM Program characterizes discharges in the MS4s using a limited number of constituents. This overlaps with the MS4 Outfall Monitoring Program, which expands the list of constituents and tailors the list to support watershed planning. In fact, efficiencies have been gained through incorporating parts of the MS4 Outfall Monitoring Program into the DWM Program. However, the MS4 Outfall Monitoring Program has the advantage of focusing on watershed priority pollutants and not on a standard list of constituents that includes the use of field test kits that may have chemical interferences which can limit their usefulness.
- The MS4 Outfall Monitoring Program could be used to assess discharges from the storm drain system. The detection of IC/IDs could be addressed through those methods proven to be most effective to date: stormwater hotline complaints, facility inspections and public employee surveillance. Additionally, in the modified MS4 Outfall program anticipated in the next Permit, Copermittees propose that if initial field screening observations (i.e., unusual color, odor, sheen, etc.) indicate a potential illegal discharge, then it will be addressed immediately.
- Indicator bacteria are the constituent with the highest frequency above action levels from the period of 2007-2009. IC/ID investigations are typically not successful at identifying sources of bacterial indicators related to anthropogenic activities (e.g. re-growth in storm drains and wildlife scat are common sources as opposed to illicit discharges). The introduction of the Revised Total Maximum Daily Loads for Indicator Bacteria Project I – Twenty Beaches and Creeks in the San Diego Region Total Maximum Daily Load (Bacteria Project – I TMDL) for many watersheds in the region will require additional monitoring, source investigations, and treatment of bacteria. Any IC/ID component incorporating bacteria investigation should simultaneously fulfill other parallel regulatory MS4 requirements to ensure that monitoring efforts are optimized.
- Diazinon and Chlorpyrifos are no longer commercially available. These pesticides have been detected above action levels in no more than 0.3% of samples over the past three years. The analysis of organophosphate compounds is no longer a useful analysis for this program.
- The transient nature of many IC/IDs frequently causes difficulties in identifying the source of an IC/ID, even when a suspected IC/ID is detected. Often, based on exceedances of NPDES dry weather action levels, it can be concluded that an “activity” or group of “activities” have occurred in a sub-drainage area, but the source cannot be pinpointed. The nature of nonpoint source pollution may result in a timing disconnect between the “activity” producing a pollutant (e.g., over fertilizing a lawn) and the transport mechanism of the pollutant into the MS4 system (e.g., runoff from over irrigation hours after the application of the fertilizer). Unless the IC/ID activity is actually occurring and being transported into the MS4 system during the field screening and subsequent upstream investigations, the precise source and location of the IC/ID cannot be identified. In these circumstances the IC/ID is addressed through other means, such as education, and periodic reconnaissance of the area. Additionally, other program elements such as more stringent development standards and inspections of municipal, industrial and commercial facilities are preventive measures to reduce the likelihood of IC/IDs.

Conclusions:

- The conclusion of this evaluation is that the DWM Program should be discontinued in its current form. IC/ID investigations are less efficient in detecting and eliminating IC/IDs than hotline call responses (over 1,600 annually), business inspections (over 6,000 annually), and visual survey of the stormwater conveyance system during routine maintenance activities. During the permit term a comprehensive range of stormwater program elements have been implemented to decrease the likelihood of IC/IDs, and have been shown to be more efficient than the DWM Program. In addition, the MS4 Outfall Monitoring Program also samples outfall discharges. To avoid this duplication of effort, the MS4 outfall monitoring should be conducted under the MS4 Outfall Monitoring Program instead of the DWM Program. Additionally, Copermittees propose that in the MS4 outfall discharge program under the next Permit that if initial field screening observations (i.e., unusual color, odor, sheen, etc.) indicate a potential illegal discharge, then it will be addressed immediately.

Supporting Documentation

Jurisdictions conduct a separate DWM Program as described in each Jurisdictional Urban Runoff Management Program (JURMP) Annual Report. Dry weather samples are collected from the jurisdictions' MS4 to detect and eliminate IC/IDs. Samples are collected from May 1 through September 30 each Permit monitoring year. The results of the 2007, 2008, and 2009 DWM Program are included in the data assessment. The DWM Program primarily answers two core management questions, which address urban runoff discharges in the MS4: 3) What is the relative urban runoff contribution to the receiving water problem(s)? and 4) What are the sources of urban runoff that contribute to receiving water problem(s)?

During the 2007, 2008, and 2009 DWM Program monitoring years, out of 23,635 individual field and analytic samples, 1,258 samples had results measured above the dry weather action levels (Table 1) for an exceedance rate of only 5.3-percent. Table 1 also shows the exceedance rate for each analyte measured under the DWM Program. The analyte with the highest rate of results above the action level for 2007-2009 was total coliforms (25-percent), and Enterococcus was the constituent with the second highest exceedance rate (15-percent). Out of 1,091 dry weather samples collected from the region and analyzed for Diazinon, there was one dry weather action level exceedance. Of 1,089 dry weather samples collected and analyzed for Chlorpyrifos, only one sample (in Point Loma) was reported as an action level exceedance. Among the four dissolved metals for which analyses were conducted (i.e., cadmium, lead, copper, and zinc), the action level exceedance rate was less than 2-percent. Dissolved copper had the greatest number of reported exceedances (21 exceedances in 1,067 samples). Dissolved lead was found to be above the dry weather action level in five of 1,060 samples and dissolved cadmium exceeded the action level in one of 1,065 samples. Six exceedances out of 1,068 samples were reported for dissolved zinc in the region. The dissolved metals action levels are based on the CTR hardness based criteria.

**Table 1. 2007, 2008, and 2009 Jurisdictional Dry Weather Program Monitoring Data
Summary of Action Level Exceedances**

Constituent Group	Constituent	Number of Dry Weather Samples Collected Regionally	Number of Dry Weather Action Level Exceedances	Percentage of Action Level Exceedances (%)
General chemistry	pH	2868	80	3%
	Oil & grease	976	8	1%
	Ammonia (NH ₃ -N)	2821	164	6%
	Methylene blue active substance (MBAS)	1515	119	8%
Nutrients	Orthophosphate (PO ₄ -P)	2844	117	4%
	Nitrate (NO ₃ -N)	2837	156	5%
Metals	Cadmium (dissolved)	1065	1	0%
	Copper (dissolved)	1067	21	2%
	Lead (dissolved)	1060	5	0%
	Zinc (dissolved)	1068	6	1%
Pesticides	Chlorpyrifos	1089	1	0.09%
	Diazinon	1091	1	0.09%
Bacteria	Total coliforms	1111	283	25%
	Fecal coliforms	1112	127	11%
	Enterococci	1111	169	15%
Grand Total		23,635	1,258	5.3%

* For conductivity and turbidity the action levels adopted by the Dry Weather Workgroup are based on best professional judgment and are excluded from this table.

When the Regional Monitoring Program implemented the analysis of organophosphate pesticides in 2001, it was based on the threat of these pesticides entering the region's receiving waters, evidence of persistent exceedances of Diazinon and Chlorpyrifos, and evidence of pesticide-induced acute and chronic toxicity to *Ceriodaphnia dubia*. DWM Program results for Chlorpyrifos and Diazinon over the past seven years are shown in Table 2. The dry weather exceedance rates for Diazinon and Chlorpyrifos have steadily declined over the past six years of monitoring and have been less than 1% in each year over the past five years. With respect to the USEPA ban on the pesticides Diazinon and Chlorpyrifos and the infrequent (or lack of) detections for these analytes in the DWM Program, this analysis could be justifiably removed from the next Permit constituent list..

Table 2. Jurisdictional Dry Weather Monitoring Program Results for Chlorpyrifos and Diazinon for the Period 2003–2009

Monitoring Year	Analyte	Number of Dry Weather Samples Collected Regionally	Number of Dry Weather Action Level Exceedances	Percentage of Action Level Exceedances
2003	Chlorpyrifos	373	117	31.4%
2004	Chlorpyrifos	241	1	0.4%
2005	Chlorpyrifos	285	0	0%
2006	Chlorpyrifos	382	1	0.3%
2007	Chlorpyrifos	333	0	0%
2008	Chlorpyrifos	387	1	0.3%
2009	Chlorpyrifos	369	0	0%
2003	Diazinon	373	129	34.6%
2004	Diazinon	240	6	2.5%
2005	Diazinon	286	2	0.7%
2006	Diazinon	377	2	0.5%
2007	Diazinon	333	0	0%
2008	Diazinon	389	0	0%
2009	Diazinon	369	1	0.3%

During the past three years (2007-2009) an IC/ID was detected for 118 (5-percent) of the action level exceedances. Of the 118 IC/IDs, 87 were resolved (i.e., source was identified and eliminated). Compared to the stormwater hotline and inspection programs, the proportion of IC/IDs that are resolved in the DWM Program is much lower. Methods such as hotline call in programs and inspection programs meet the requirements of non-stormwater discharge elimination to the storm sewers, and Copermittees report the number of IC/IDs eliminated as a result of their hotline call-in program or inspection program in their Annual Jurisdictional Urban Runoff Management Plan Reports.