

STATE OF CALIFORNIA
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

STAFF SUMMARY REPORT (Michael Chee)
MEETING DATE: November 12, 2008

ITEM: 8

SUBJECT: **Sanitary Sewer Overflow Reduction Program** – Status Report

CHRONOLOGY: October 2003 – Resolution in support of efforts to reduce sewer overflows
October 2005 – Resolution in support of private sewer laterals programs

DISCUSSION: This report describes the problem of sewage spills (or sanitary sewer overflows), and our strategy for reducing spills. In part, our strategy is intended to raise awareness of the significant water quality impacts associated with sewage spills from wastewater treatment plants and sewage collection systems and the need to rigorously operate, maintain, and upgrade this infrastructure. Because sewage spills occur much more frequently from sewage collection systems, the focus of this report is on spills and overflows from those systems.

Background

Raw, untreated sewage typically contains over ten times the amount of pollution (such as biochemical oxygen demand, trash, total suspended solids, oil and grease, ammonia, and metals) as treated effluent discharged from a wastewater treatment plant. In terms of bacteria and viruses, raw sewage can be thousands of times more concentrated than treated and disinfected effluent. Raw sewage also contains higher levels of pharmaceuticals and personal care products. Typical consequences when raw sewage is spilled to waters include the closure of beaches and other recreational areas, flooding of properties, and pollution of rivers and streams. Because of these adverse water quality impacts, the Clean Water Act and the Basin Plan have prohibited sewage spills since the 1970's.

From 1993 to 2003, the Board issued administrative civil liability (ACL) complaints mainly against dry weather sewage spills, averaging about one ACL complaint a year. The Board targeted large dry weather sewage spills because they posed a greater threat to water quality than storm-related sewage spills, which are diluted with stormwater. From 2004 to the present, the Board has also enforced against wet weather sewage spills, averaging about three ACL complaints a year.

In October 2003, the Board adopted a resolution supporting collaboration with the Bay Area Clean Water Agencies (BACWA) to reduce sewage spills. As part of this collaboration, the Board recognized the need for consistent and uniform sewage spill reporting to allow comprehensive assessment of the problem and to prioritize needed actions. In 2004, we completed development of a web-based system for sewage spill reporting and required its use starting in December 2004. In July 2005, we, together with BACWA experts, completed written guidance for sewer system management plans and required collection system agencies to develop their own plans by August 2008.

Prior to this effort, only collection systems owned and operated by NPDES wastewater treatment plant permittees (who operate over 10,000 miles of sewer pipes) were subject to

strict spill reporting and general operation and maintenance requirements. Collection systems tributary to the NPDES-permitted systems, known as satellite systems (who operate over 7,000 miles of sewer pipes), were subject to less strict reporting requirements in the Water Code and were not under any specific requirements to properly operate and maintain their systems.

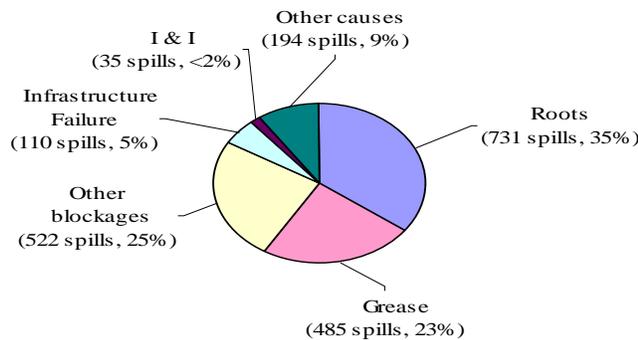
In 2006, the State Board adopted general waste discharge requirements (WDR) for all collection systems in the State. The WDR imposed a slightly different reporting requirement than ours and was launched in stages throughout the State. It was launched in this Region in May 2007. The WDR also required the development and implementation of sewer system management plans similar to our 2005 requirements but allowed for more time for plan development for some smaller agencies.

Sanitary Sewer Overflow Metrics

Based on our analysis of spill data¹ from more than 100 collection systems and discussions with some collection system agency managers, we have the following observations:

- Essentially all sewage from the over 6.5 million Bay Area residents is treated. Raw sewage spill volume is quite small compared to treated effluent discharges from wastewater treatment plants (0.0003% or 1 million gallons of the 300 billion gallons of treated effluent discharged from wastewater treatment plants in 2006).
- Overall, this Region’s sewage spill rate is much higher than the statewide average. “Spill rate” is the number of spills per 100-miles of sewer pipe per year. The statewide median is 5; this Region’s median is 11. (These are based on statewide data from the last two years.)
- Large collection systems have a lower spill rate than smaller systems (in 2006, systems with 100 miles or greater averaged 12, systems with less than 100 miles averaged 26).
- The majority of spills occur as a result of blockages (roots 35%, grease 23%, and other blockages 25%, based on chart below).

Causes of 2006 Sewage Spills
(Total number of spills 2077)



¹ For most of this analysis, Board staff chose collection system spill data from 2006 because it was the most recent complete data set at the time this project commenced.

- Spills caused by inflow and infiltration into collections systems (or “I&I”) and insufficient system capacity in wet weather, though smaller in terms of total number of spills (less than 2% in 2006), result in larger spill volumes (36% of the total volume spilled in 2006). (The percentage of the total volume spilled will fluctuate from year to year due to rainfall. In 2007, 76% of the total volume spilled was due to wet weather events.)
- I&I in collection systems, when not causing local spills, greatly increases flows to wastewater treatment plants. These increased flows result in a practice called “blending,” where the treatment plant discharges a mix of fully-treated wastewater and partially-treated wastewater that was routed around biological treatment. Blending has been common practice for the past three decades and is currently permitted at over a third of the Region’s treatment plants (17 of 48, see attached) provided the discharge meets all effluent limits. This practice is also preferable to restricting inflows to a treatment plant, which can back up peak flows in collection systems, potentially leading to raw sewage spills from manholes onto streets and into storm drains.
- Other metrics can be used to rate the wet weather performance of collection systems. These include spill volume per 100-miles of pipe, and “peaking factors”, which are the ratios of flow during a rain event to that during dry weather.

Basic Collection System Needs

Based on the above observations, there are two inter-related primary means to reduce sewage spills: strategic operation and maintenance by collection system agencies and infrastructure rehabilitation to reduce I&I. The required sewer system management plans provide the structure for meeting both of these means. Plan implementation by collection system agencies should lead to reductions in both the number and volume of spills over time. However, the success of these plans will depend on each collection system agency’s level of commitment and the hurdles each will face.

One such hurdle is the expertise needed for strategic operation and maintenance “asset management” programs. At the heart of an asset management approach is the execution of a disciplined and efficient preventative maintenance program. Most, although not all, sewage spills are not the result of random factors. Rather they are the result of chronic repetitive conditions that can be identified and managed in order to extend the life of the collection system and prevent spills. For instance, geographically based tracking systems to proactively identify and track the history of problem areas for preventative maintenance and spot repairs have proven useful. In the case of large-scale problems, these tracking systems also provide the basis for the development of capital improvement solutions. However, only agencies with an adequate fee base can support the staff, equipment, and investments needed to implement these strategies successfully. Therefore, there may be situations in which centralization or consolidation of collection systems will result in more efficient and effective management.

Another hurdle is the lack of incentive for infrastructure rehabilitation by interconnected collection systems. Rehabilitation of public infrastructure to reduce wet weather I&I can cost in the millions of dollars. Decades old legal agreements between collection systems that are interconnected, or that share a common wastewater treatment plant, often do not have caps on peak flows from any one system. Instead, sewer fees and treatment plant capacities are allocated based on dry weather sewage flows rather than peak wet weather sewage flows. This does not provide any incentive for an individual system to reduce its wet weather I&I. Therefore, a regulatory structure is needed to require interconnected

systems to coordinate on the development of flow allocations that places the proper level of responsibility and accountability on each system.

A final hurdle is the need for rehabilitation of the private sewer pipe infrastructure in many communities. While public agencies own over 17,000 miles of sewer pipes in the Region, nearly the same amount of sewer pipe infrastructure is privately owned. These private sewer pipes, referred to as “private laterals,” connect homes to larger publically owned sewer pipes. Most private laterals are as old as the homes they serve and the cost of each replacement can be in the thousands of dollars. Ordinances requiring inspection and repair of leaky laterals are rare in the State; in this Region, less than 10 out of over 100 collection systems have ordinances in place. Such requirements, together with incentive programs, are sorely needed to address this problem. The Board recognized this in 2005 when it adopted a resolution in support of sewer lateral management programs. Since then, the Board has approved four supplemental environmental projects totaling nearly \$800,000 that supplement the cost to homeowners for their replacement of leaky laterals. This directs some of our ACL complaint fines back towards solving part of the sewage spill problem, and we plan to continue encouraging this approach.

Future Strategy to Reduce Sanitary Sewer Overflows

The spill rate statistics provided above are based on regional data from just one year, 2006. By just looking at one year’s data, because of annual variability in rainfall, operating budgets, and capital improvements by the collection systems, we are not able to draw strong conclusions about where sewage spill problems may be worse within our Region, or which agencies have adequate funding. As such, we plan to compile several years of data for a more reliable comparative performance rating system.

As mentioned above, capacity-related sewage spills tend to be large in volume. While we collect additional years of data to fine tune our comparative performance rating structure, we will continue to pursue enforcement against collection system agencies and their satellite collection agencies to reduce these types of large sewage spills. This strategy is demonstrated by the recent enforcement actions against agencies in Marin County and San Mateo County. We will also continue to coordinate with U.S. EPA and non-government organizations in our future enforcement efforts.

We also plan to re-invigorate our strategy of enforcing dry weather sewage spills because, gallon for gallon, dry weather spills have much more water quality impact than wet weather spills. In addition, we will investigate under-reporting of the number and volume of sewage spills to not reward such behavior. This effort will include conducting field response to more complaints and possibly auditing the records of agencies selected at random. To address operation and maintenance of systems, we will seek opportunities to establish a third party certification program of sewer system management plans, and pursue enforcement on those agencies with the highest spill rates once we have fine tuned the comparative performance ratings.

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MENDATION: This item is a status report; no action is necessary.