SD1
Managing Northern Kentucky's
Wastewater and Storm Water

January 29, 2010

Acting Director of the Division of Enforcement
Department for Environmental Protection
300 Fair Oaks Lane
Frankfort, KY 40601

Chief, Environmental Enforcement Section
Environmental and Natural Resources Division
U.S. Department of Justice
601 D street NW
Washington, DC 20005
DOJ Case No. 90-5-1-1-08591

Chief, Water Program Enforcement Branch
Water Management Division
U.S. Environmental Protection Agency, Region 4
Atlanta Federal Center
61 Forsyth Street, S.W.
Atlanta, Georgia 30303

Re: Consent Decree Case No. 2:05-cv-00199-WOB

Dear Gentlemen:

Pursuant to the above-referenced Consent Decree, Sanitation District No. 1 (SD1) is required to submit quarterly reports that demonstrate SD1's compliance with the Consent Decree:

> **42. Quarterly Reports**. The District shall submit to the Cabinet/EPA a quarterly report that describes the District's progress in complying with this Consent Decree for the previous quarter no later than thirty days after the end of each calendar quarter. The first such report shall be submitted to the Cabinet/EPA no later than thirty days after the second full quarter after entry of this Consent Decree.

Information contained within the enclosed Quarterly Report describes SD1's compliance with Consent Decree Case No. 2:05-cv-00199-WOB for the period of October 1, 2009 through December 31, 2009. This report also contains an outlook for the upcoming calendar quarter period of January 1, 2010 through March 31, 2010.

A certification as required by the Consent Decree is also enclosed (Consent Decree paragraph 38).

I am confident in the integrity of the enclosed document, and I am certain that its content not only satisfies regulatory requirements, but also helps further the mission and vision of SD1 by demonstrating aggressive, proactive, achievable measures underway in Northern Kentucky to protect water resources and enhance the quality of life.

If you have any questions or concerns, do not hesitate to contact me at 859-578-7465 or by e-mail at jeger@sd1.org.

Best regards,

Jeffery A. Eger
General Manager

JAE/jh
Enclosures

Sanitation District No. 1
January 29, 2010

Consent Decree
Quarterly Report No. 09
(October 1, 2009 through December 31, 2009)

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SD1
Managing Northern Kentucky's
Wastewater and Storm Water

CERTIFICATION

Consent Decree Quarterly Report No. 09
Consent Decree Case No. 2:05-cv-00199-WOB

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Jeffery A. Eger
General Manager

Date January 22, 2010

COMMONWEALTH OF KENTUCKY

)ss.

COUNTY OF Kenton

The foregoing instrument was acknowledged before me this 22 day of January, 2010 by Jeffery A. Eger, General Manager of Sanitation District. No. 1.

Kathleen A Jerich
NOTARY PUBLIC

Kenton County, Kentucky

My commission expires: 9-15-11

1045 Eaton Drive • Ft. Wright, KY 41017 • phone 859-578-7450 • fax 859-331-2436 • www.sd1.org

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CONSENT DECREE
QUARTERLY REPORT NO. 09

January 29, 2010

Sanitation District No. 1
1045 Eaton Drive
Ft. Wright, KY 41017

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FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

Cabinet	Kentucky Energy and Environment Cabinet
CSAP	Continuous Sewer Assessment Program
CSO	Combined Sewer Overflow
EPA	U.S. Environmental Protection Agency
gbaMS	GBA Master Series (information tracking system)
O&M	Operation and Maintenance
SD1	Sanitation District No. 1
SSO	Sanitary Sewer Overflow

SECTION 1. INTRODUCTION

1.1 Purpose

This Quarterly Report is submitted to fulfill the requirements of Sanitation District No. 1's (SD1) Consent Decree as entered on April 18, 2007. This Consent Decree is a legal agreement with the U.S. Environmental Protection Agency (EPA) and the Kentucky Energy and Environment Cabinet (Cabinet). The purpose of the Consent Decree is to address sanitary sewer overflows (SSOs) in SD1's sanitary sewer system and combined sewer overflows (CSOs) in the combined sewer system in an effort to improve water quality throughout SD1's service area. Specifically, Section V Reporting Requirements, states that:

> **42. Quarterly Reports**. The District shall submit to the Cabinet/EPA a quarterly report that describes the District's progress in complying with this Consent Decree for the previous quarter no later than thirty days after the end of each calendar quarter.

1.2 Report Period

Information contained within this report describes SD1's compliance with Consent Decree Case No. 2:05-cv-00199-WOB for the period of October 1, 2009 through December 31, 2009. This report also contains an outlook for the upcoming calendar quarter period of January 1, 2010 through March 31, 2010.

1.3 Consent Decree Compliance Schedule

A comprehensive compliance schedule for meeting the requirements of the Consent Decree can be found in Appendix A. Additionally, a more detailed listing of the projects and activities conducted to comply with the requirements of the Consent Decree, including schedules, project updates for the current reporting period, and planned activity for the subsequent quarter can be found in Appendix B.

SECTION 2. OVERFLOW DATA

This section of the Quarterly Report presents SD1's estimates of overflow activity in the collection systems. While SD1 has a long history of comprehensive data collection and inspection programs, we have been working over the last several years to realign and optimize our existing programs, originally implemented to meet pre-Consent Decree needs, to fit into the framework of the quarterly reports. This realignment continues to be improved and optimized as part of SD1's wet-weather management activities, and future reports will continue to incorporate expanded overflow metrics based on more quantitative measures as they become available.

Over the last quarter, we have made further progress with developing standardized reports in SD1's computerized maintenance management system, GBA Master Series (gbaMS), to help support the specific reporting needs for these quarterly reports and to better utilize the collected data to track system performance. We are continuing to fine-tune and optimize our tracking and reporting capabilities to increase efficiency in our work. SD1 has been using gbaMS since 1999 and has added several modules and applications in response to evolving needs over the years. As there are now new uses for this tool after entering into the Consent Decree, SD1 is undergoing adjustments to both the data input and output processes for gbaMS to generate more precise data for use in these quarterly reports. Because the refinement of gbaMS is ongoing to meet these evolving needs, several numbers generated from this software program will be reported as "approximate." SD1 continues to move forward with structuring its reporting procedures, and enhancing and improving data input and output quality assurance and quality control processes.

Overflow Categories

For reporting and system performance measurement purposes, SD1 has categorized sewer overflows throughout the service area into five distinct categories:

- *SSOs Due to Wet Weather Capacity Issues* – Recurring and inactive overflows from SD1's sanitary sewer system due to a lack of capacity during wet weather. This category includes wet-weather discharges at pump stations that may or may not have a constructed bypass. Overflows are determined to be "recurring" if they have been observed to overflow twice in a running twelve month period. Overflows are determined to be "inactive" until they occur more than once in a running twelve month period. Inactive overflows are generally under investigation as suspected or predicted hydraulic model overflow points in the collection system.

- *SSOs Due to Operational Issues* – Overflows from SD1's sanitary sewer system, including pump stations that are not a result of wet weather capacity issues. Many of these are one-time, dry-weather occurrences caused by temporary system issues that are investigated and corrected as soon as practicable.

- *Wet Weather CSOs* – Wet-weather discharges from the combined sewer system.

- *Dry Weather CSOs* – Dry-weather discharges from the combined sewer system.

- *Building Backups* – The release of raw sewage from a service lateral into a building in SD1's service area. Building backups can be caused by several factors, such as constrained capacity during wet weather or a blockage or collapse in the service lateral or main line, and can be determined to be either SD1's responsibility or the building owner's responsibility.

Quantitative Estimates

SD1 uses three general methods for developing quantitative estimates of overflow activity:

- Field inspections during, or shortly after, wet-weather events to identify activations. This inspection program has been in place since 2005 and is expanded as warranted for ongoing reporting and sewer overflow response cleanup. SD1's wet weather crew continues to perform routine inspections before, during and after rain events at prioritized recurring, inactive and suspected SSO locations to understand and verify overflow activity and the need for sewer overflow response cleanup. This is part of SD1's ongoing effort to characterize and verify overflows throughout the collection systems and ensure they are categorized accurately and cleaned up after rain events. Proper characterization of overflows ensures that the hydraulic model that SD1 utilizes maintains and improves upon its accuracy and will help identify the most appropriate and effective solutions to be included in SD1's Watershed Plans.

- Simple hydraulic estimating using Manning's Gravity Flow and Pipe Calculation to report overflows from pump stations with constructed bypasses, and industry standard volume estimations techniques and calculations are used for spills or for any witnessed overflow from a manhole. The only exception to this calculation methodology is at the Lakeview Pump Station, which has a metered bypass pipe. This method has been used historically for reporting purposes, and its results are included in this Quarterly Report.

- Estimates developed from SD1's system-wide collection system models. SD1 completed a year-long flow monitoring program in 2008, consisting of more than 245 flow meters and 45 rain gauges installed throughout the combined and separate sewer systems, that was utilized to update the calibration and validation of the system-wide hydraulic models. This calibration was undertaken to provide a model network that could confidently be used as an accurate tool in preparing the Watershed Plans for June 2009. In addition to the use of the models for planning future capital improvements, the models are also being used to provide information about the current performance of SD1's system. Based on the results of the model calibration and verification, SD1 has developed a highly calibrated hydraulic model that provides an accurate representation of the sewer system. This tool allows SD1 to have confidence in the results of the overflow volumes from the sewer system and to provide estimates of the overflow locations within the system for quarterly reporting purposes. This approach is consistent with SD1's commitment to provide the best available information on overflow activity within these reports.

For this submittal, SD1 has collected rainfall data from a series of eight rain gauges located across the system and simulated the rainfall that occurred between October 1,

2009 and December 31, 2009 within the hydraulic models. The results of the model simulations have been summarized and included as an estimate of the frequency and total volume of the overflow locations within SD1's system for this period. For the modeled locations, these results are not a summary of observed or confirmed activations but are a confident estimate of the overflow statistics based on the calibrated and verified model. As noted in earlier quarterly reports and the Sewer Overflow Response Plan, SD1 is actively realigning and optimizing their field activities to support the framework of Consent Decree requirements, and this process includes continually performing field inspections to verify the model results against actual field conditions through monitoring and observation. Over time, these field verifications will continue to improve the model as appropriate to better reflect any discrepancies found with observed conditions. It is an ongoing and continual process to refine the modeling tools in order to provide the most accurate information possible about overflow locations, including future model updates to incorporate system improvements.

Precipitation Data

Rainfall statistics are an important component of overflow reporting, as rainfall conditions represent an uncontrolled variable impacting SD1's wet weather CSO and SSO activity. Quarterly CSO and SSO activations and volumes will constantly vary over time, with or without system improvements, due to natural variations in rainfall patterns and the associated groundwater and antecedent moisture conditions. Over time, SD1 expects system improvements to show a clear trend in reduced overflow activity. However, reviewing overflow reports for any individual quarter relative to the previous quarter also requires careful review of the rainfall associated with each quarter, in order to understand the relative impact of rainfall patterns. For this reason, storm event summaries are included in all overflow reporting submittals. The data in Table 2.1 is from the Cincinnati-Northern Kentucky International Airport rain gauge maintained by the National Weather Service (CVG).

Table 2.1 Summary of Storm Events
(October 1, 2009 through December 31, 2009)

Month	Approximate # of Storm Events	Rainfall (in)
October 2009	11	5.42
November 2009	5	0.92
December 2009	12	2.93
Total	**28**	**9.27**

The remainder of this section reports overflows that occurred throughout SD1's service area during the period of October 1, 2009 through December 31, 2009. A cumulative accounting of SD1's overflow activity from January 2008 through the current reporting period can be found in Appendix C.

2.1 SSOs Due to Wet Weather Capacity Issues

As previously described, this category includes recurring and inactive overflows from SD1's sanitary sewer system due to lack of capacity during wet weather. This includes wet-weather discharges at pump stations that may or may not have a constructed bypass. Overflows are determined to be "recurring" if they have been observed to overflow twice in a running twelve month period. Overflows are determined to be "inactive" until they have been observed to overflow more than once in a running twelve month period. Inactive overflows are generally under investigation as suspected or predicted hydraulic model overflow points in the collection system.

Recurring Wet Weather SSOs

Modeled activation and volume statistics for SD1's 98 recurring wet weather SSO locations for the current reporting period can be found in Appendix D. Updates to the locations of SD1's recurring SSOs will be reported on an annual basis to include any revisions based upon the field inspection and hydraulic modeling programs. Appendix E of SD1's April 2009 Quarterly Report, titled "Wet Weather SSO Revisions Transaction Database," included revisions to the recurring SSO list. Therefore, any revisions to the SSO list documented after April 2009 will be published in the April 2010 Quarterly Report.

Recurring Pump Station Overflows

In addition to the 98 recurring wet weather SSOs, there are also 14 pump stations identified in the Consent Decree that have historically documented recurring wet weather capacity issues. Table 2.2 lists each of the 14 pump stations identified in Exhibit E of the Consent Decree and demonstrates their wet weather SSO occurrences during the current reporting period.

The 14 pump stations listed in the Consent Decree discharged a total of 17 times due to lack of capacity during the current reporting period, with an estimated overflow volume of 2,333,000 gallons. As previously mentioned, SD1 uses Manning's Gravity Flow and Pipe Calculation to estimate discharge volume from pump stations. The only exception to this calculation methodology is at the Lakeview Pump Station, which has a metered bypass pipe.

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Table 2.2 Discharges from Consent Decree Pump Stations Due to Lack of Capacity during Wet Weather
(October 1, 2009 through December 31, 2009)

Name of Pump Station	Number of Discharge Occurrences	Total Estimated Volume (gallons)
Allen-Fork	0	0
Crestview	0	0
Highland Acres	1	3,000
Kentucky Aire	3	130,000
Lakeview	4	2,037,000
Riley Road	7	132,000
Ripple Creek	2	31,000
South Hampton	0	0
South Park	0	0
Sunset	0	0
Union	0	0
Alex-Licking	Overflows Eliminated	
Harrison Harbor		
Taylorsport		
TOTAL	**17**	**2,333,000**

In addition to tracking the recurring wet weather SSOs at the pump stations listed in the Consent Decree, SD1 continuously monitors all pump stations throughout the service area for recurring wet weather capacity issues. During the current reporting period, there were three pump stations with documented recurring wet weather capacity issues that discharged. Table 2.3 provides detailed information for these occurrences. As SD1 moves forward with the watershed planning efforts required under the Consent Decree, priorities will be established based on severity and known wet weather issues will be addressed.

Table 2.3 Discharges from Pump Stations Not Listed in the Consent Decree Due to Lack of Capacity during Wet Weather
(October 1, 2009 through December 31, 2009)

Name of Pump Station	Number of Wet-Weather Related Discharge Occurrences	Total Estimated Volume (gallons)
Gamon Calmet	1	5,000
Highland Heights	5	204,000
Keavy	1	4,000
TOTAL	**7**	**213,000**

Inactive Wet Weather SSOs

During the current reporting period, there were three inactive overflows observed with an estimated overflow volume of 1,855,000 gallons. Table 2.4 provides detailed information for these occurrences. These structures have been added to SD1's wet weather overflow inspection program and will be monitored to verify overflow activity and provide a sewer overflow response cleanup, if needed. These locations are also being evaluated to be added to SD1's recurring SSO list. As previously mentioned, updates to the locations of SD1's recurring SSOs will be reported on an annual basis to include any revisions based upon the field inspection and hydraulic modeling programs. Appendix E of SD1's April 2009 Quarterly Report, titled "Wet Weather SSO Revisions Transaction Database," included revisions to the recurring SSO list. Therefore, any revisions to the SSO list documented after April 2009 will be published in the April 2010 Quarterly Report.

Table 2.4 Inactive Discharges Due to Lack of Capacity during Wet Weather
(October 1, 2009 through December 31, 2009)

Structure ID#	Number of Wet-Weather Related Discharge Occurrences	Total Estimated Volume (gallons)
1990032	1	136,000
1950011	2	1,719,000
TOTAL	**3**	**1,855,000**

2.2 SSOs Due to Operational Issues

As previously mentioned, this category of overflows includes discharges from SD1's sanitary sewer system that are not a result of wet weather capacity issues. Many of these are one-time, dry-weather occurrences caused by temporary system issues that are investigated and corrected as soon as practicable.

During the current reporting period, there were a total of 25 SSOs due to operational issues throughout SD1's service area with a total estimated overflow volume of 342,000 gallons.

The 25 overflows reported in this category can be broken down by the primary causes demonstrated in Figure 2.1.

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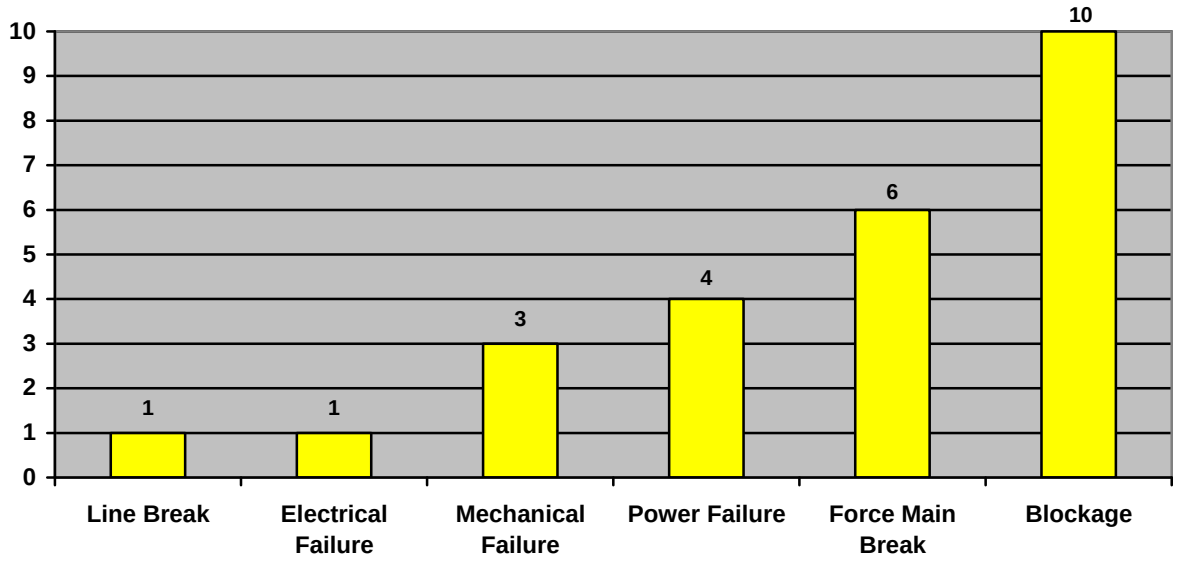
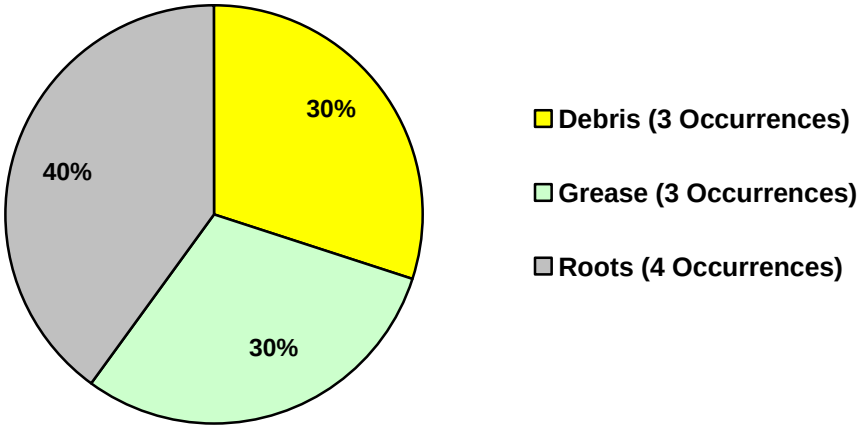
Figure 2.1 Causes of Operational Issues Resulting in SSOs
(October 1, 2009 through December 31, 2009)



The 10 SSOs caused by blockages can further be broken down into 3 secondary causes, as demonstrated in Figure 2.2.

Figure 2.2 Causes for Blockages in Pipes Resulting in SSOs
(October 1, 2009 through December 31, 2009)



All of these SSOs were immediately acted upon and the problems repaired. Where line breaks were found, the breaks were repaired and the sewers post-inspected to ensure all problems were addressed. These sewers are then put into the cleaning program to be inspected and cleaned as-needed in the next six months as part of the Continuous Sewer Assessment Program (CSAP). If the pipe continues to show a high maintenance or structural score after the initial and 6-month follow-up inspections it is put into the Permanent Solution program. The Permanent Solution program evaluates the need for a permanent repair or rehabilitation of the pipe or if the pipe should be put on a routine preventative maintenance cleaning list. All overflow events are recorded in gbaMS and are periodically reviewed to identify if any trends or localized problem areas exist that need additional attention, inspection and cleaning. Overflows due to blockages of grease are further evaluated as part of our Fat, Oil, and Grease Program.

2.3 Wet Weather CSOs

Included in Appendix E are the modeled activation and volume statistics for SD1's 92 CSOs. This data was generated from the hydraulic modeling program previously described in Section 2.1.

2.4 Dry Weather CSOs

During the current reporting period, there was one CSO during dry weather at the East 33rd Street CSO diversion (Structure ID# 0880004), with a total estimated discharge volume of 730 gallons. An inspection of the dry weather diversion pipe revealed a blockage of roots and a sag in the pipe that allowed grease to buildup. The roots and grease were removed from the line and re-inspected to ensure the blockage was completely cleared. The pipe was evaluated for repairs and was found to be in good condition other than the one sag. The pipe will be re-inspected and reassessed for repair in six months (April 2010) as part of SD1's CSAP, which will ensure that the overflow does not reoccur in accordance with the Nine Minimum Control No. 5 plan to reduce and eliminate dry weather CSOs.

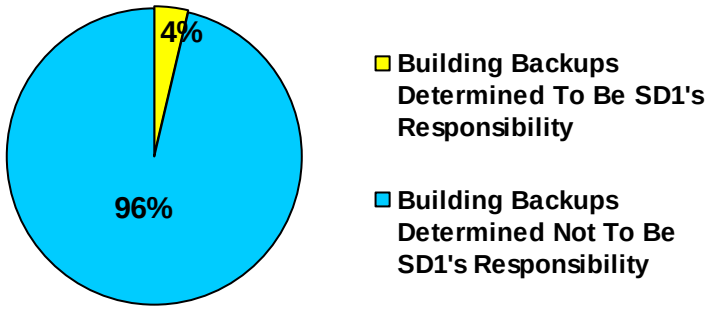
In addition, SD1 performed a closed circuit television inspection of all dry weather flow diversion pipes (approximately 140 locations) during the current reporting period. The pipes are being assessed for the appropriate next action and rehabilitation or replacement as part of SD1's CSAP. This process will ensure that any pipes with structural or maintenance deficiencies will be fixed to ensure dry weather overflows do not occur as a result of pipe defects.

2.5 Building Backups

During the current reporting period, there were approximately 111 building backups throughout SD1's service area. Of these 111**,** approximately 4 were determined to be SD1's responsibility and 107 were determined not to be the responsibility of SD1, as

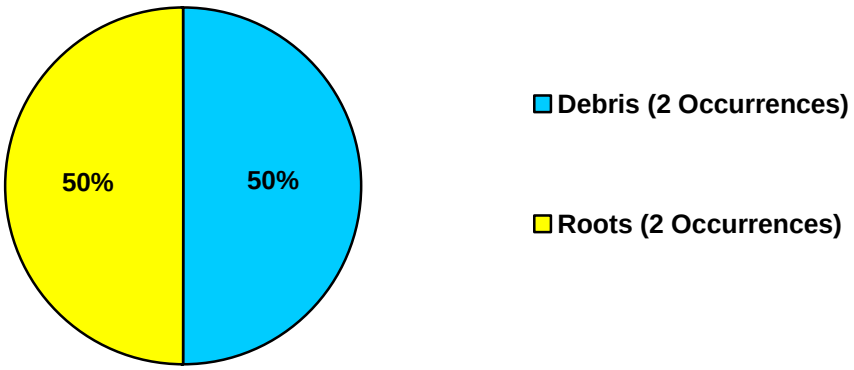
shown in Figure 2.3. The backups determined not to be the responsibility of SD1 were due to causes such as breaks and blockages in private service laterals.

Figure 2.3 Building Backups: Public vs. Private
(October 1, 2009 through December 31, 2009)



The four building backups determined to be SD1's responsibility were due to blockages in the main line that can further be broken down into two secondary causes, as demonstrated in Figure 2.4.

Figure 2.4 Causes for Blockages in Main Line Resulting in a Building Backup
(October 1, 2009 through December 31, 2009)



All of these backups were immediately acted upon and the problems repaired. Where line breaks were found, the breaks were repaired and the sewers post-inspected to ensure all problems were addressed. These sewers are then put into the cleaning program to be inspected and cleaned as-needed in the next six months as part of the CSAP. If the pipe continues to show a high maintenance or structural score after the initial and 6-month follow-up inspections, it is put into the Permanent Solution program. The Permanent Solution program evaluates the need for a permanent repair or rehabilitation of the pipe or if the pipe should be put on a routine preventative

maintenance cleaning list. All backups are recorded in gbaMS and are periodically reviewed to identify if any trends or localized problem areas exist that need additional attention, inspection and cleaning. Backups due to blockages of grease are further evaluated as part of our Fat, Oil, and Grease Program.

SECTION 3. ANNUAL REVIEW OF OVERFLOW DATA

The activities, programs and projects SD1 implements as part of the Consent Decree are intended to reduce the frequency and volume of SSOs and CSOs throughout SD1's service area. These efforts include Capacity, Management, Operations, and Maintenance programs, implementation of the Nine Minimum Controls for CSOs, and various capital improvement projects. As a means to gauge the benefits of these efforts, this Section accounts for the reductions or increases in annual overflow activity from year to year and provides an analysis as to what has contributed to these changes. Rainfall and Ohio River stage level data considered in this analysis is also provided, as each represents an uncontrolled variable that significantly impacts SD1's wet weather CSO and SSO activity. A summary comparison of SD1's 2008 and 2009 overflow data can be found in Appendix F.

3.1 Summary of Precipitation Data

As previously mentioned in Section 2, CSO and SSO activations and volumes will constantly vary over time, with or without system improvements, due to natural variations in rainfall patterns and the associated groundwater and antecedent moisture conditions. Therefore, SD1 must take into consideration the influence of precipitation to determine the actual impact of system improvements.

Rainfall Conditions

The rainfall volume data in Table 3.1 is based on total rainfall data recorded at the Cincinnati Airport. The storm event data is based on an estimate of the number of events observed at the rain gauges within the SD1 system. An event is defined as a period of time where rainfall is bracketed by at least seven hours of no rainfall. Daily precipitation statistics in Figures 3.1 and 3.2 are derived from daily rainfall totals measured by the rain gauge at the Cincinnati Airport.

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Table 3.1 Rain Events and Total Rainfall by Quarter (2008 through 2009)

	2008			2009			Change from 2008-2009	
Qtr.	**# of Storm Events**	**Rainfall (in)**	**Avg. Storm**	**# of Storm Events**	**Rainfall (in)**	**Avg. Storm**	**# of Storm Events**	**Rainfall (in)**
1st	42	17.21	0.51	34	7.09	0.21	-8	-10.12
2nd	30	14.28	0.48	41	14.79	0.36	11	0.51
3rd	22	6.39	0.29	38	11.96	0.31	16	5.57
4th	24	7.78	0.32	28	9.27	0.33	4	1.49
Total	**118**	**45.66**	**0.42**	**141**	**43.11**	**0.31**	**23**	**-2.55**

Figure 3.1 Daily Precipitation (2008 through 2009)

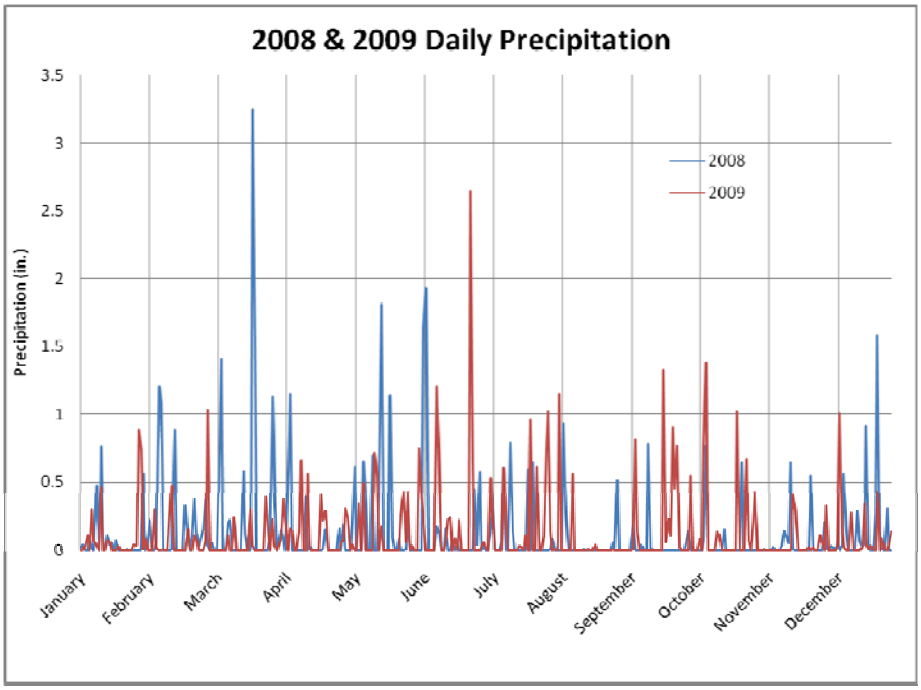

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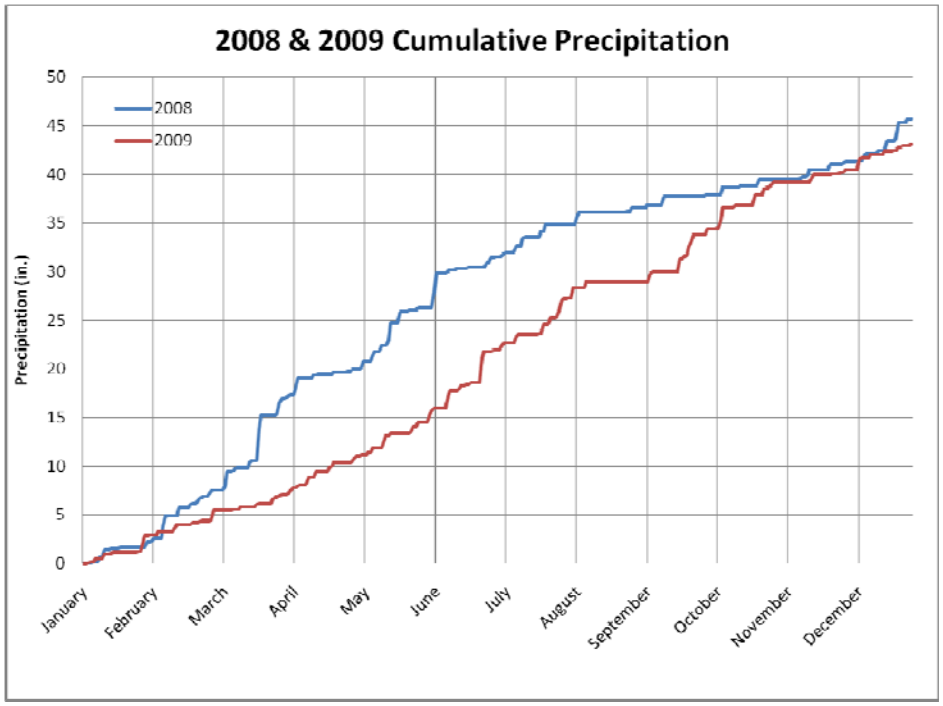
Figure 3.2 Cumulative Precipitation (2008 through 2009)



A discussion and summary of the above presented information and how it relates to changes in overflow frequency and volume is included in Section 3.2 of this report.

River Water Intrusion

SD1's system is influenced in multiple ways by the local Ohio River stage level. In addition to increasing groundwater levels that cause additional infiltration to occur, SD1's system operation is also impacted when the river stage is above 41 feet, as shown in Figure 3.3. When the Ohio River reaches the Army Corps of Engineers' specified river stages during flood conditions, CSO outfall flood gates are closed to isolate the sewer system from high river water. Other sewer system flood gates are opened or closed to isolate portions of the interceptor and combined sewers to re-route sewer flows to the flood pumping stations. The flood pump stations and gates were designed to operate by the Army Corps of Engineers to protect the cities from flooding internally due to elevated river levels or during rain events when the flows in the combined sewers could not flow out into the river due to the elevated river levels. In 2008 there were 37 days where the river stage was greater than 41 feet, and there were 10 days where the river stage was greater than 41 feet in 2009, as summarized in Table 3.2.

Figure 3.3 Daily River Stage (2008 through 2009)

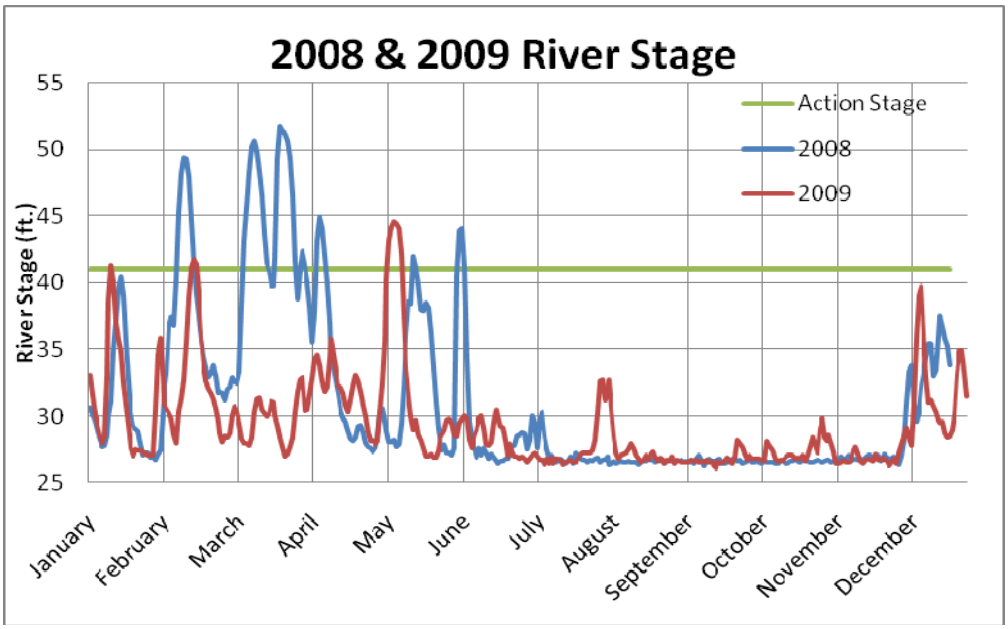


Table 3.2 Number of Days Ohio River Stage Level above 41 Feet (2008 through 2009)

Quarter	2008	2009
1	28	4
2	9	6
3	0	0
4	0	0
Total	**37**	**10**

A discussion and summary of the above presented information and how it relates to changes in CSO overflow frequency and volume is included in Section 3.4 of this report.

3.2 Review of SSOs Due to Wet Weather Capacity Issues

3.2.1 Recurring Wet Weather SSOs

Table 3.3 provides a summary of the number of activations and corresponding volume of recurring wet weather SSOs occurring in 2008 and 2009, including recurring wet weather overflows at pump stations.

Table 3.3 Recurring Wet Weather SSOs by Quarter (2008 through 2009)

	2008		2009		Change from 2008-2009	
Quarter	Activations	Volume (MG)	Activations	Volume (MG)	Activations	Volume (MG)
1st	285	103	152	26	-133	-76
2nd	211	39	175	24	-36	-15
3rd	24	2	147	20	123	18
4th	56	14	177	35	121	21
Total	**576**	**158**	**651**	**105**	**75**	**-53**

The recurring wet weather SSO volume was lower in 2009 than in 2008, although the number of activations was found to be higher in 2009. This shift in volume and total number of activations can be attributed to the following reasons, which are discussed below in further detail:

- Number of rainfall events in 2009
- Smaller average rainfall event size / Higher first quarter rainfall in 2008

Number of Rainfall Events in 2009

As shown in Table 3.1, there were 23 additional rainfall events in 2009 than in 2008. The increase in recurring wet weather SSO activations from 2008 to 2009 is related to the increased number of rainfall events that occurred during 2009.

Smaller Average Rainfall Event Size / Higher First Quarter Rainfall in 2008

The reduction in the recurring wet weather SSO volume is also related to the impact of rainfall on SD1's system. As shown in Table 3.1 and Figure 3.1, although the overall total number of rainfall events during 2009 is greater than 2008, the average sizes of the rainfall events were smaller and the collection system was able to convey more of the wet weather flow to the treatment facilities which resulted in less overall volume. SD1's hydraulic models are calibrated to incorporate seasonal changes in groundwater level, which includes the winter conditions that are observed every year from January-March. Rainfall that occurs at this time of year has a greater impact on overflow volumes than rainfall that occurs during the summer and fall months due to the influence of seasonal groundwater levels and its heightened effects in concert with back-to-back storm events. A total of 17.21 inches of rain fell during the first quarter of 2008 as compared to 7.09 inches during the first quarter of 2009. This significantly higher rainfall volume directly correlates to more CSO and SSO activity due to the high groundwater levels. The increased rainfall in other parts of 2009 does not make up for the disparity in overflow volume in the first quarter of 2008.

3.2.1 Inactive Wet Weather SSOs

SD1 has performed wet weather SSO investigations since 2005 but has only tracked inactive wet weather overflow occurrences for inclusion in the Quarterly Reports since the beginning of 2009. During this time, SD1 has reported a total of 13 inactive overflows with an estimated overflow volume of 3,340,000 gallons. These structures will continue to be monitored to verify overflow activity and provide a sewer overflow response cleanup, if needed. These locations are also being evaluated to be added to SD1's recurring SSO list.

3.3 Review of SSOs Due to Operational Issues

Table 3.4 provides a summary of the number of activations and corresponding volume of SSOs due to operational issues in 2008 and 2009.

Table 3.4 SSOs Due to Operational Issues (2008 through 2009)

Year	Total Number of Occurrences	Total Volume (Million Gallons)
2008	143	5
2009	108	31
Change from 2008-2009	**-35**	**26**

There were 35 less discharges from SD1's sanitary sewer system due to operational issues during 2009 compared to 2008. This reduction can be attributed to regularly scheduled operation and maintenance (O&M) activities as implemented through SD1's formal CSAP that has been in place since January 2008. Implementation of the CSAP has enabled SD1 to more effectively and proactively prioritize and implement system inspection, cleaning, and rehabilitation/replacement needs in order to reduce overflows due to operational issues. Table 3.5 summarizes the work completed by both internal and external crews during 2008 and 2009 that has helped to maintain proper operation of the collection system.

Table 3.5 O&M Activities (2008 through 2009)

O&M Activity	2008	2009
Manhole Repairs	483	330
Manhole Replacements	55	59
New Manhole Installations	26	53
Sewer Line Replacements	113	127
Sewer Line Repairs	193	240
Sewer Line Rehabilitated (CIPP)	6	15
Sewer Lines Televised	1,486,608	1,410,598
Sewers Cleaned	706,441	530,303

The increase in the volume of overflow from 2008 to 2009 can be attributed to the two following issues that account for approximately 93% (29 million gallons) of the total 2009 overflow volume:

- Failures at the Lakeview Pump Station and Force Main
- Winter Ice Storm

Failures at the Lakeview Pump Station and Force Main

As described in Quarterly Report No. 6 and 7, three operational failures that occurred during the first and second quarter of 2009 related to the Lakeview Pump Station and force main account for approximately 83% (26 million gallons) of the total overflow volume related to operational issues. A project was underway during these releases in order to control surge pressures and to prevent the very type of failures that occurred. This project, which included the installation of two 7,500 gallon surge tanks, an underground tank vault and installation of four pump discharge check valves, was complete as of August 2009. The installation of the surge tanks will ensure that future failures of this type do not reoccur at the Lakeview Pump Station. SD1 will also implement an approximate $5 million project as part of its Watershed Plans to replace the pumps at the Lakeview Pump Station to ensure reliability and maximize capacity. In addition, SD1 is evaluating the targeted replacement/rehabilitation of the Lakeview force main to prevent future leaks as part of its Force Main and Air Release Valve Preventative Maintenance Program.

Winter Ice Storm

The Greater Cincinnati Tri-State area experienced a winter ice storm during the first quarter of 2009 with sleet and freezing rain that caused widespread power outages across the area for multiple days. During this time, seven pump stations lost power, with an estimated overflow volume of 3.2 million gallons, of which 94% can be attributed to the Lakeview Pump Station. Lakeview Pump Station has two independent power supplies and the storm caused both power supplies to be out of service for a prolonged period of time. Duke Energy worked around the clock to restore power to the Lakeview Pump Station as well as the surrounding area. This severe weather event accounts for 10% of the total overflow volume related to operational issues.

3.4 Review of Wet Weather CSOs

Table 3.6 provides a summary of the number of activations and corresponding volume of CSOs occurring in 2008 and 2009.

Table 3.6 Recurring Wet Weather CSOs by Quarter (2008 through 2009)

	2008		2009		Change	
Quarter	Activations	Volume (MG)	Activations	Volume (MG)	Activations	Volume (MG)
1st	943	1,798	607	266	-336	-1,532
2nd	899	685	1,244	436	345	-249
3rd	542	119	828	397	286	278
4th	504	267	610	403	106	135
Total	**2,888**	**2,869**	**3,289**	**1,502**	**401**	**-1,367**

The CSO volume was significantly lower in 2009 than in 2008, although the number of activations was found to be higher in 2009. This shift in volume and total number of activations can be attributed to the following reasons, which are discussed below in further detail:

- High first quarter rainfall in 2008
- River Water Intrusion in 2008
- Increase number of rainfall events in 2009
- Combined sewer system improvements

Higher First Quarter Rainfall in 2008

As previously described in section 3.2, the reduction in CSO volume from 2008 to 2009 is related to the rainfall observed during the first quarter. This significantly higher rainfall volume directly correlates to more CSO and SSO activity due to the high groundwater levels. The increased rainfall in other parts of 2009 does not make up for the disparity in overflow volume in the first quarter of 2008.

River Water Intrusion in 2008

As shown in Figure 3.3 and Table 3.2, the Ohio River stage level was significantly higher in 2008 for the first half of the year, with approximately 27 more days above 41 feet (the flood control action level for SD1's system). These additional days at high river stage have a direct correlation to additional overflow volume in 2008 due to the operation of SD1's system. In addition, the majority of these days occurred in the first quarter, magnifying the impact of large rain events that occurred during the high river periods.

Increased Number of Rainfall Events in 2009

The number of rainfall events in 2009 was higher than in 2008, which increased the number of activations. However, because the average event size was smaller in 2009 the collection system was able to convey more of the wet weather flow to the treatment facilities which resulted in less overall volume.

SD1 Combined System Improvements

SD1 incorporated many significant capacity increase improvements in the combined sewer system, including several nine minimum control improvements. The details of these improvements are explained in SD1's Watershed Plans and are estimated to reduce annual overflow volume by approximately 149 million gallons:

- Bromley wet well settings optimization (estimated to reduce typical year overflow volume by 80 million gallons)
- Inline storage implementation (estimated to reduce typical year overflow volume by 49 million gallons)
- Targeted interceptor cleaning (estimated to reduce typical year overflow volume by 20 million gallons)

3.5 Review of Dry Weather CSOs

Table 3.7 provides a summary of the number of activations and corresponding volume of dry weather CSOs occurring in 2008 and 2009.

Table 3.7 Dry Weather CSOs (2008 through 2009)

Year	Total Number of Occurrences	Total Volume (Million Gallons)
2008	15	9
2009	8	.104
Change from 2008-2009	**-7**	**-8.9**

The reduction in the number of activations and the amount of overflow volume can be attributed to two primary reasons:

- Routine CSO investigations
- Routine O&M Activities

Routine CSO Investigations

SD1's CSO investigation crew inspects each CSO outfall and its associated diversions once per week as well as after every rainfall event. During the weekly routine inspections, the CSO investigation crew visually looks for debris and blockages that may trigger a dry weather overflow or would affect the ability of the diversion to maximize the flow entering the interceptor during rainfall.

Routine O&M Activities

SD1's CSAP prioritizes which sewers in the combined sewer system need inspection, cleaning and repair or rehabilitation. Regularly scheduled O&M activities for key assets in the combined sewer system ensure that sewers are kept clean and unobstructed to reduce overflows or downstream blockages at the diversion locations.

As part of SD1's Nine Minimum Control programs for solids & floatable control and the reduction of dry weather CSOs, SD1 has implemented an ongoing catch basin retrofit program to trap debris and an associated inspection and cleaning program. In addition, SD1 has constructed four grit pits along the Ohio River and Licking River interceptors to remove grit and other solids from the sewers. The details of these programs and projects are explained in SD1's Watershed Plans and the summary statistics for 2008 and 2009 are presented in Table 3.8. These activities ensure that the combined sewer system will perform as effectively as possible to maximize treatment of combined sewage and reduce the magnitude, frequency, and duration of CSOs.

Table 3.8 Combined Sewer System O&M Activities (2008 through 2009)

O&M Activity	2008	2009
Catch Basins Cleaned	1,210	887
Catch Basin Inspections[1]	2057	3327
Catch Basins Repaired, Replaced, and/or Retrofitted	286	244
Grit Pit Cleaning (Yards of Debris Removed)	358	439

[1] *This includes inspections of private and Kentucky Transportation Cabinet owned catch basins located in SD1's service area.*

3.6 Review of Building Backups

Table 3.9 provides a summary of the building backups reported during 2008 and 2009.

Table 3.9 Building Backups: Public vs. Private (2008 through 2009)

Responsible Party	2008	2009	Change
Private Owner	402	482	80
SD1	39	36	-3
Total	**441**	**518**	**77**

There were 77 more building backups reported during 2009; however, the number of building backups determined to be SD1's responsibility slightly decreased from 39 to 36. This result is within SD1's performance target of less than 0.1% of customer accounts experiencing a building backup caused by a problem with the public sewer system. SD1 expects this number to continue to decline through further implementation of the CSAP.

APPENDIX A:

Consent Decree Schedule

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Consent Decree Compliance Schedule

	CONSENT DECREE ACTIVITY	PERCENT COMPLETE	DUE DATE	DATE OF COMPLETION
	CIVIL PENALTY			
✓	Pay Civil Penalties to EPPC and US EPA	100%	06/18/07	06/18/07
	CMOM PROGRAM REQUIREMENTS – 2007 through 2014			
✓	Submit CMOM Program Self-Assessment	100%	10/18/07	10/17/07
✓	Submit Grease Control Program	100%	10/18/07	09/18/07
✓	Submit Pump Station Backup Power Plan	100%	04/18/08	12/14/07
✓	Submit Sewer Overflow Response Plan (SORP)	100%	10/18/07	10/09/07
Submit CMOM Annual Report				
✓	CMOM Annual Report 1	100%	12/31/07	12/28/07
✓	CMOM Annual Report 2	100%	12/31/08	12/19/08
✓	CMOM Annual Report 3	100%	12/31/09	12/18/09
	CMOM Annual Report 4	0%	12/31/10	
	CMOM Annual Report 5	0%	12/31/11	
	CMOM Annual Report 6	0%	12/31/12	
	CMOM Annual Report 7	0%	12/31/13	
	CMOM Annual Report 8	0%	12/31/14	
Complete SORP Annual Review				
✓	SORP Annual Review 1	100%	05/14/09	01/30/09
✓	SORP Annual Review 2	100%	12/31/10	09/30/09
	SORP Annual Review 3	0%	12/31/11	
	SORP Annual Review 4	0%	12/31/12	
	SORP Annual Review 5	0%	12/31/13	
	SORP Annual Review 6	0%	12/31/14	
	INITIAL WATERSHED PROJECTS			
	Complete Initial Watershed Projects (51 Total)	78%	12/31/14	
Submit Initial Watershed Projects Annual Report				
✓	Initial Watershed Projects Annual Report 1	100%	04/18/08	04/08/08
✓	Initial Watershed Projects Annual Report 2	100%	06/07/09	06/05/09
	Initial Watershed Projects Annual Report 3	0%	06/07/10	
	Initial Watershed Projects Annual Report 4	0%	06/07/11	
	Initial Watershed Projects Annual Report 5	0%	06/07/12	
	Initial Watershed Projects Annual Report 6	0%	06/07/13	
	Initial Watershed Projects Annual Report 7	0%	06/07/14	
	NMC PROGRAM REQUIREMENTS – 2007 through 2014			
✓	Submit NMC Documentation of Compliance	100%	04/18/08	03/12/08
✓	Complete Additional NMC Compliance Activities (51 Total)	100%	04/18/09	04/18/09
Submit NMC Annual Report				
✓	NMC Annual Compliance Report 1	100%	09/04/09	05/11/09
	NMC Annual Compliance Report 2	0%	09/04/10	
	NMC Annual Compliance Report 3	0%	09/04/11	
	NMC Annual Compliance Report 4	0%	09/04/12	
	NMC Annual Compliance Report 5	0%	09/04/13	
	NMC Annual Compliance Report 6	0%	09/04/14	
	PUBLIC PARTICIPATION			
✓	Watershed Summit	100%	N/A	08/30/07
✓	Watershed Community Council Meeting 1	100%	N/A	11/27/07
✓	Watershed Community Council Meeting 2	100%	N/A	02/26/08
✓	Watershed Community Council Meeting 3	100%	N/A	05/20/08
✓	Watershed Community Council Meeting 4	100%	N/A	08/19/08
✓	Watershed Community Council Meeting 5	100%	N/A	11/18/08
✓	Watershed Community Council Meeting 6	100%	N/A	02/17/09

Consent Decree Compliance Schedule

	CONSENT DECREE ACTIVITY	PERCENT COMPLETE	DUE DATE	DATE OF COMPLETION
	PUMP STATION OVERFLOW ELIMINATION PLAN (PSOEP) – 2007 through 2014			
✓	Submit PSOEP	100%	10/18/07	09/18/07
Submit PSOEP Annual Report				
✓	PSOEP Annual Report 1	100%	05/14/09	05/11/09
	PSOEP Annual Report 2	0%	05/14/10	
	PSOEP Annual Report 3	0%	05/14/11	
	PSOEP Annual Report 4	0%	05/14/12	
	PSOEP Annual Report 5	0%	05/14/13	
	PSOEP Annual Report 6	0%	05/14/14	
	REPORTING – 2007 through 2014			
Submit Quarterly Report				
✓	Submit Quarterly Report 1	100%	01/30/08	01/30/08
✓	Submit Quarterly Report 2	100%	04/30/08	04/30/08
✓	Submit Quarterly Report 3	100%	07/30/08	07/30/08
✓	Submit Quarterly Report 4	100%	10/30/08	10/30/08
✓	Submit Quarterly Report 5	100%	01/30/09	01/30/09
✓	Submit Quarterly Report 6	100%	04/30/09	04/30/09
✓	Submit Quarterly Report 7	100%	07/30/09	07/30/09
✓	Submit Quarterly Report 8	100%	10/30/09	10/30/09
✓	Submit Quarterly Report 9	100%	01/30/10	01/29/10
	Submit Quarterly Report 10	0%	04/30/10	
	Submit Quarterly Report 11	0%	07/30/10	
	Submit Quarterly Report 12	0%	10/30/10	
	Submit Quarterly Report 13	0%	01/30/11	
	Submit Quarterly Report 14	0%	04/30/11	
	Submit Quarterly Report 15	0%	07/30/11	
	Submit Quarterly Report 16	0%	10/30/11	
	Submit Quarterly Report 17	0%	01/30/12	
	Submit Quarterly Report 18	0%	04/30/12	
	Submit Quarterly Report 19	0%	07/30/12	
	Submit Quarterly Report 20	0%	10/30/12	
	Submit Quarterly Report 21	0%	01/30/13	
	Submit Quarterly Report 22	0%	04/30/13	
	Submit Quarterly Report 23	0%	07/30/13	
	Submit Quarterly Report 24	0%	10/30/13	
	Submit Quarterly Report 25	0%	01/30/14	
	Submit Quarterly Report 26	0%	04/30/14	
	Submit Quarterly Report 27	0%	07/30/14	
	Submit Quarterly Report 28	0%	10/30/14	
	STATE ENVIRONMENTAL PROJECTS			
✓	Setup 6 Separate Escrow Accounts	100%	10/18/07	10/18/07
	Conservancies	33%	04/18/12	
	Boone County	*10%*	04/18/12	
	Campbell County	*70%*	04/18/12	
	Kenton County	*20%*	04/18/12	
	Licking River Watershed Watch	25%	04/18/12	
	Split Rock	100%	04/18/12	12/18/08
	Education Programs	25%	04/18/12	
	State Environmental Project Completion Report	0%	06/17/12	
	SUPPLEMENTAL PROJECTS			
	Supplemental Environmental Projects	55%	04/18/12	
	SEP Completion Reports	0%	06/17/12	

Consent Decree Compliance Schedule

	CONSENT DECREE ACTIVITY	PERCENT COMPLETE	DUE DATE	DATE OF COMPLETION
	WATERSHED PLANS			
Framework for Developing Watershed Plans				
✓	Obtain Public Input on Framework for Watershed Plans	100%	04/09/08	04/09/09
✓	Submit Framework for Watershed Plans	100%	04/18/08	04/17/08
First Round Watershed Plans				
✓	Obtain Public Input on First Round of Watershed Plans	100%	06/27/09	06/08/09
✓	*Public Comment Period (5/7/09-6/8/09)*	100%	06/08/09	06/08/09
✓	*Boone County Public Meeting*	100%	N/A	05/14/09
✓	*Campbell County Public Meeting*	100%	N/A	05/19/09
✓	*Kenton County Public Meeting*	100%	N/A	05/21/09
✓	Submit First Round of Watershed Plans	100%	06/30/09	06/30/09
Second Round Watershed Plans				
	Obtain Public Input on Second Round of Watershed Plans	0%	Summer 2014[1]	
	Submit Second Round of Watershed Plans	0%	Summer 2014[1]	
Third Round Watershed Plans				
	Obtain Public Input on Third Round of Watershed Plans	0%	Summer 2019[1]	
	Submit Third Round of Watershed Plans	0%	Summer 2019[1]	
	[1] *Deadline is dependent on the approval date of each Watershed Plan.*			
	Consent Decree Compliance			
	Complete all Consent Decree Compliance Measures	15%	12/31/25	

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APPENDIX B:

Watershed Improvement Program

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Watershed Improvement Program (2007 through 2014)

CIP Title	Basin	Scheduled Completion Date	Actual Completion Date	Past Activity for 10/1/2009 to 12/31/2009	Planned Activity for 01/1/2010 to 03/31/2010
Initial Watershed Projects					
Strawberry PS Elimination	North	2006	2005	Complete	
Beechwood Outfall Sewer Replacement	North	2007	2007	Complete	
Eastern Regional - Contract 1--Pond Creek Force Main and Gravity Sewer to Eastern Regional WRF	East	2008	2007	Complete	
Eastern Regional - Contract 2--Kahn's Gravity Sewer and Gravity Sewer to the Pond Creek PS	East	2008	2007	Complete	
US 27 at Summit Assessment	East	2008	2006	Complete	
Eastern Regional - Contract 4--Alex-Licking Gravity Sewer & Force Main to Contract 1	East	2009	2008	Complete	
Eastern Regional - Contract 6--Pond Creek PS	East	2008	2007	Complete	
Eastern Regional - Contract 8A--Alex-Licking PS	East	2009	2009	Complete	
Parkside PS Relocation	East	2008	2007	Complete	
Eastern Regional Water Reclamation Facility	East	2008	2008	Complete	
Highland Heights PS Study	East	2006	2006	Complete	
Wilson/Waterworks Road Relief Sewer Study	East	2008	2007	Complete	
Pinehill/Skyview Terrace Sewer	East	2006	2005	Complete	
Western Regional - KDOT - Turkeyfoot Road Force Main	West	2006	2005	Complete	
Western Regional - Union Sewer (North and South)	West	2013	2008	Complete	
American Sign PS Rehabilitation	West	2008	2008	Complete	
Allen Fork Collection System - Phase I Improvements	West	2009	2007	Complete	
Duncan Drive Assessment Project	West	2007	2006	Complete	

Updated: January 29, 2010

Watershed Improvement Program (2007 through 2014)

CIP Title	Basin	Scheduled Completion Date	Actual Completion Date	Past Activity for 10/1/2009 to 12/31/2009	Planned Activity for 01/1/2010 to 03/31/2010
Initial Watershed Projects					
Banklick PS Screening Facility	Central	2006	2005	Complete	
Stevenson Road Relief Sewer Project Phase II	Central	2006	2006	Complete	
Latonia Combined Sewer Separation	Central	2009	2007	Complete	
Licking River Sewer Crossing Study	Central	2007	2007	Complete	
McMillan PS Removal	Central	2006	2005	Complete	
Meyer Road PS Rehabilitation	Central	2008	2008	Complete	
Macke PS Rehabilitation	Central	2008	2008	Complete	
Richwood PS Improvements	Central	2006	2005	Complete	
Patton Street Sewer Study	Central	2006	2006	Complete	
South Hills Outfall	Central	2008	2007	Complete	
Grit Chamber Projects	Multiple	2010	2008	Complete	
Fort Wright Illicit Discharge Removal	Multiple	2007	2006	Complete	
Fort Wright Sanitary Sewer Rehabilitation Phase 1	Multiple	2007	2006	Complete	
Fort Wright Outfall Sewer - Phase II	Multiple	2006	2006	Complete	
Dry Creek Treatment Plant - Grit Removal Modifications	Multiple	2006	2005	Complete	
Large Diameter Sewer Assessment Program - Phase III	Multiple	2007	2006	Complete	
Brookwood Subdivision SSES Study	Multiple	2006	2006	Complete	
Southern Kenton Drainage Study	Multiple	2007	2006	Complete	
Wilson Road Sewer Assessment Project	Multiple	2006	2005	Complete	
Apple Drive Sewer Outfall	Multiple	2006	2006	Complete	
Bluegrass Swim Club Sewer Separation	Multiple	2008	2007	Complete	

Watershed Improvement Program (2007 through 2014)

CIP Title	Basin	Scheduled Completion Date	Actual Completion Date	Past Activity for 10/1/2009 to 12/31/2009	Planned Activity for 01/1/2010 to 03/31/2010
Initial Watershed Projects					
Eastern Regional - Contract 3--Riley Force Main and Gravity Sewer to the ERWRF	East	2009	n/a	Finish Construction	Finish Construction
Eastern Regional - Contract 7--Riley Road #2 PS	East	2009	2009	Finish Construction	Complete
Western Regional - Turkeyfoot Industrial Road Force Main	West	2013	n/a	Force main Construction was split into 4 phases. Phases 1 & 2 are complete. Phase 3 is under construction. Phase 4 is under design.	
Western Regional Conveyance System to Western Regional WRF	West	2013	n/a	Construction	Construction
Western Regional - Sunnybrook Sewer	West	2013	n/a	Construction	Finish Construction
Western Regional - Gunpowder Interceptor Sewer	West	2013	n/a	Construction	Finish Construction
Western Regional Water Reclamation Facility	West	2013	n/a	Construction	Construction
Eastern Regional - Contract 5--Sunset Force Main and Gravity Sewer	East	2010	n/a	Final Design	Final Design
Eastern Regional - Contract 8B - Sunset PS Relocation	East	2010	n/a	Final Design	Final Design
Western Regional - Frogtown Interceptor Sewer (from Sunnybrook Dr. to Frogtown Rd.)	West	2014	n/a	Final Design	Final Design
Western Regional - South Fork Gunpowder Interceptor Sewer and Rosetta Sewer	West	2013	n/a	Final Design	Final Design
Western Regional - Narrows Road Diversion PS	West	2013	n/a	Final Design	Final Design
Initial Watershed Projects Total Costs (future and spent dollars)					**$415.4 Million**

Watershed Improvement Program (2007 through 2014)

CIP Title	Basin	Scheduled Completion Date	Actual Completion Date	Past Activity for 10/1/2009 to 12/31/2009	Planned Activity for 01/1/2010 to 03/31/2010
System-wide and Basin Projects (Schedules listed in this section are subject to change based on the approval of SD1's Watershed Plans.)					
Alex-Licking PS Overflow Elimination	Central	2010	2009	Complete	
Harrison Harbor PS Overflow Elimination	East	2010	2009	Complete	
Donnemeyer Improvements, Newport Pavilion Improvemetns, Bellevue Relief Sewer, Wilson/Waterworks Road	North	2010	2009	Complete	
Taylorsport PS Overflow Elimination	North	2010	2004	Complete	
Riley Road PS Overflow Elimination	East	2010	2009	The pump station was put into service 12/21/09.	
River Water Intrusion Mitigation	System-wide	Beyond 2014	n/a	Initial Design	Initial Design
Priority Inflow and Infiltration Source Identification & Removal Program	System-wide	Beyond 2014	n/a	Initial Design	Initial Design
Green Programs					
– Downspout Disconnection	System-wide	Beyond 2014	n/a	Initial Design	Initial Design
– Rain Barrels	System-wide	Beyond 2014	n/a	Initial Design	Initial Design
– Rain Gardens	System-wide	Beyond 2014	n/a	Initial Design	Initial Design
– Green Roof	System-wide	Beyond 2014	n/a	Initial Design	Initial Design
– Urban Reforestation	System-wide	Beyond 2014	n/a	Initial Design	Initial Design
Green Demonstration Projects					
– I-71/75 Reforestation	System-wide	Beyond 2014	n/a	Final Design	Construction
– Prisoner's Lake Water Harvest Project	System-wide	Beyond 2014	n/a	Construction	Construction
– Green Street	System-wide	Beyond 2014	n/a	Initial Design	Initial Design
– Green School	System-wide	Beyond 2014	n/a	Initial Design	Initial Design
– Partnering on Developing	System-wide	Beyond 2014	n/a	Initial Design	Initial Design
– Innovative Technology Testing	System-wide	Beyond 2014	n/a	Initial Design	Initial Design
Lakeview PS Pump Replacement	Central	2014	n/a	Initial Design	Initial Design
Church Street (gray, green, & watershed controls)	Central	2013	n/a	Initial Design	Initial Design

Watershed Improvement Program (2007 through 2014)

CIP Title	Basin	Scheduled Completion Date	Actual Completion Date	Past Activity for 10/1/2009 to 12/31/2009	Planned Activity for 01/1/2010 to 03/31/2010
System-wide and Basin Projects (Schedules listed in this section are subject to change based on the approval of SD1's Watershed Plans.)					
Vernon Lane (Public & Private Source I/I Removal)	Central	Beyond 2014	n/a	Initial Design	Initial Design
Watershed Controls Pilot Projects					
– Taylor Wetland	Central	Beyond 2014	n/a	Final Design	Construction
– Retention Basin #1	Central	Beyond 2014	n/a	Initial Design	Initial Design
– Retention Basin #2	Central	Beyond 2014	n/a	Initial Design	Initial Design
Sunset PS Overflow Elimination	Central	2010	n/a	Status reported under initial watershed project above.	
Ripple Creek PS Removal	Central	2010	n/a	Initial Design	Final Design
Ash Street PS and Forcemain	East	2014	n/a	Initial Design	Initial Design
Crestview PS Overflow Elimination	East	2014	n/a	Initial Design	Initial Design
Demonstration of Green Technologies – Taylor Creek Retention	East	2011	n/a	Final Design	Final Design
Bellevue Trunk Sewer Replacement (Riviera Drive)	East	2012	n/a	Initial Design	Initial Design
Allen Fork PS Overflow Elimination	North	2014	n/a	Initial Design	Initial Design
Lakeside Park – Public Sewer Rehab and Private Source Removal	North	Beyond 2014	n/a	Initial Design	Initial Design
Van Deren Sanitary Sewer Improvements	North	2011	n/a	Construction	Finish Construction
Avon Drive Sanitary Sewer Improvements	North	2010	n/a	Construction	Finish Construction
Willow Run Dynamic Control Facility	North	2014	n/a	Initial Design	Initial Design
Willow Run Direct Entry Point Bar Racks	North	2009	n/a	Final Design	Construction
KYTC Basin - Green Infrastructure Retrofit	North	2012	n/a	Final Design	Construction
South Park PS Overflow Elimination	North	2010	n/a	Final Design	Final Design
Highland Acres PS Removal	West	2010	n/a	Initial Design	Initial Design
Kentucky Aire PS Removal	West	2013	n/a	Initial Design	Initial Design
South Hampton PS Removal	West	2013	n/a	Initial Design	Initial Design
Union PS Removal	West	2013	n/a	Initial Design	Initial Design
System-wide and Basin Projects Total Costs (future and spent dollars)					**$78 Million**

Watershed Improvement Program (2007 through 2014)

CIP Title	Basin	Scheduled Completion Date	Actual Completion Date	Past Activity for 10/1/2009 to 12/31/2009	Planned Activity for 01/1/2010 to 03/31/2010
Committed Projects					
SD1 has budgeted $123.8 million over the next five years to rehabilitate and properly maintain its infrastructure in order to avoid failures that are costly to fix and pose a threat to public health and the environment. By nature, the work in this category is reflective of common daily operations, including activities such as: fixing failing pipes, maximizing existing dry and wet weather capacity, addressing loss of service and basement backups, reducing inflow and infiltration, and minimizing wet weather overflows. As typical and frequent tasks, a summary of SD1's progress will be provided in the next set of Watershed Plans and through updates provided in the annual CMOM and NMC reports.					
Committed Projects Total Costs (future and spent dollars)					**$123.8 Million**

2007 through 2014 Watershed Improvement Plan Total Costs (future and spent dollars)	**$617.2 Million**

APPENDIX C:

Cumulative Overflow Data

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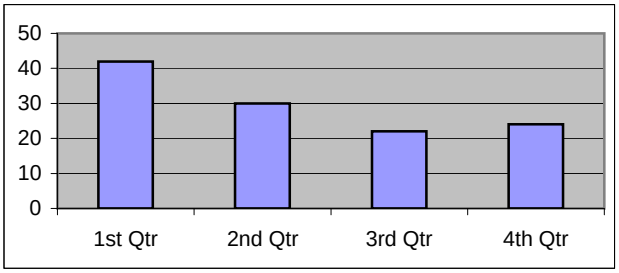
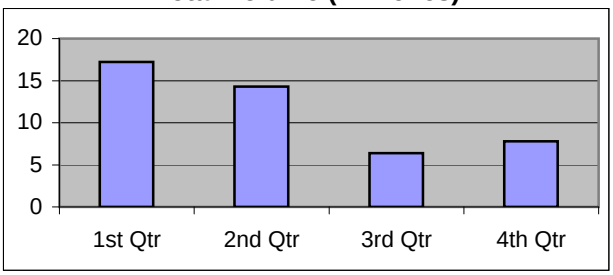
Cumulative Overflow Data
January 1, 2008 through December 31, 2008

Rainfall

Total Occurrences

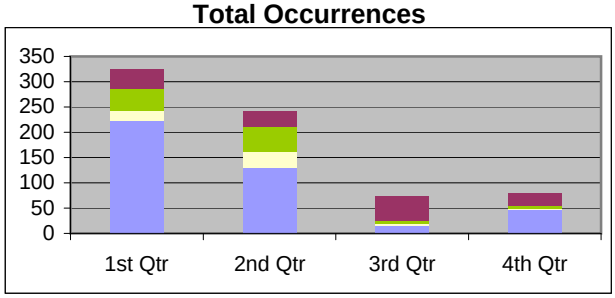


Total Volume (In Inches)

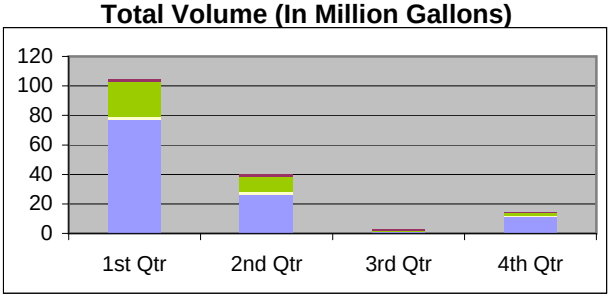


SSOs - Due to Wet Weather (WW) and Operational Issues

Total Occurrences



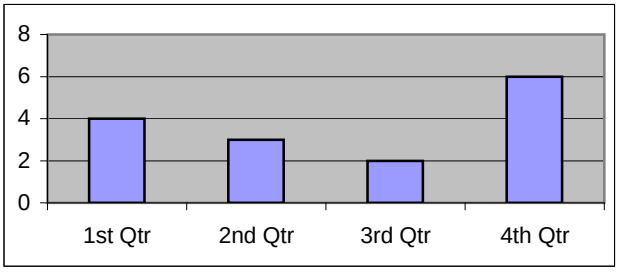
Total Volume (In Million Gallons)



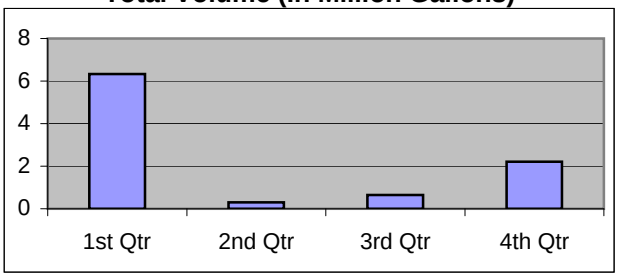
Recurring WW CD Pump Station Overflows
Recurring WW Other Pump Station Overflows
SSOs Due to Operational Issues
Recurring WW SSOs

Dry Weather CSOs

Total Occurrences

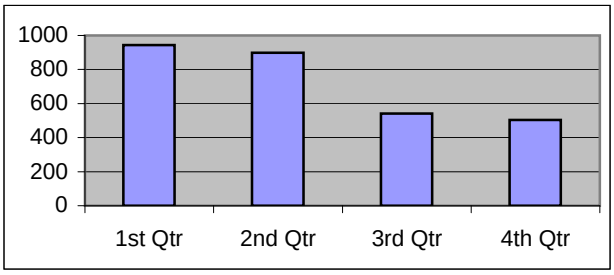


Total Volume (In Million Gallons)

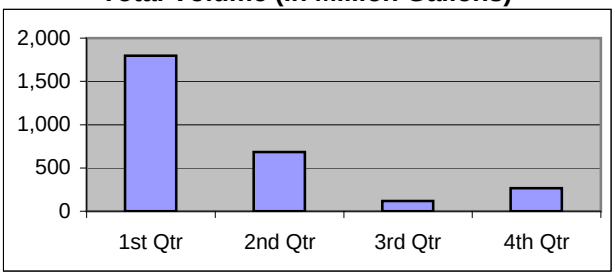


Wet Weather CSOs

Total Occurrences

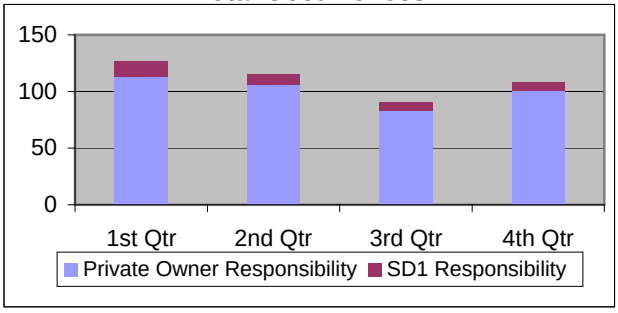


Total Volume (In Million Gallons)



Building Backups

Total Occurrences



2008 Overflow Summary

	Occurrences	Volume	
Rainfall	118	45.66	inches
Recurring WW SSOs	576	158	MG
Inactive WW SSOs	N/A	N/A	
Operational SSOs	143	5	MG
Dry Weather CSOs	15	9	MG
Wet Weather CSOs	2888	2,869	MG
Building Backups (Private)		402	
Building Backups (SD1)		39	

Updated January 29, 2010

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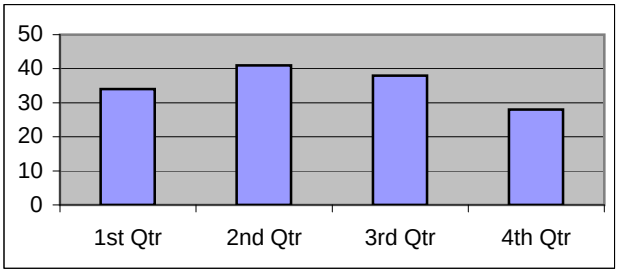
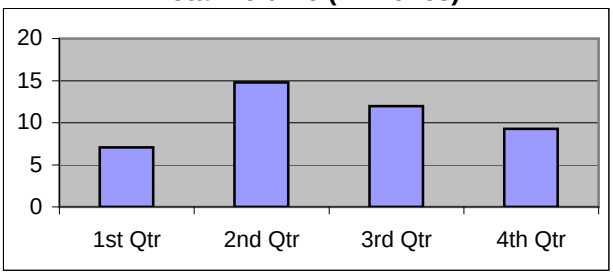
Cumulative Overflow Data
January 1, 2009 through December 31, 2009

Rainfall

Total Occurrences

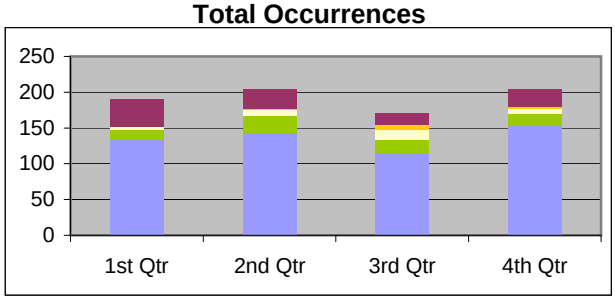


Total Volume (In Inches)

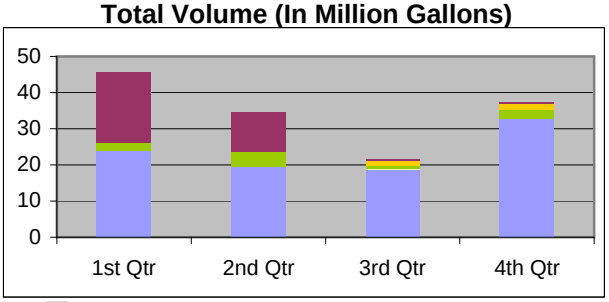


SSOs - Due to Wet Weather (WW) and Operational Issues

Total Occurrences



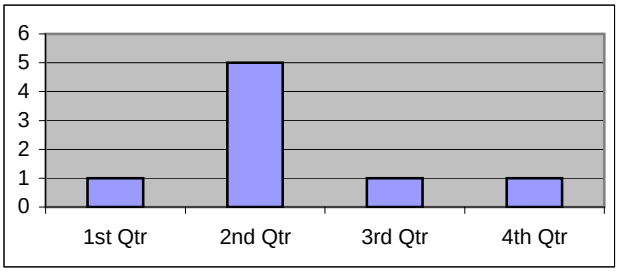
Total Volume (In Million Gallons)



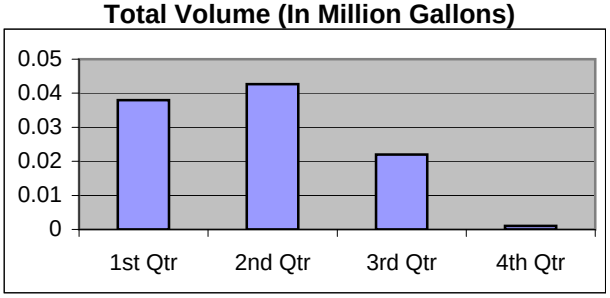
Recurring WW SSOs
Recurring WW CD Pump Station Overflows
Recurring WW Other Pump Station Overflows
Inactive WW Overflows
SSOs Due to Operational Issues

Dry Weather CSOs

Total Occurrences

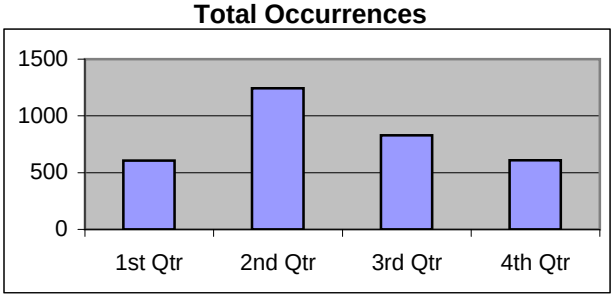


Total Volume (In Million Gallons)

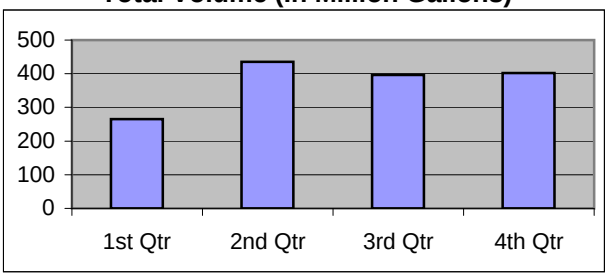


Wet Weather CSOs

Total Occurrences

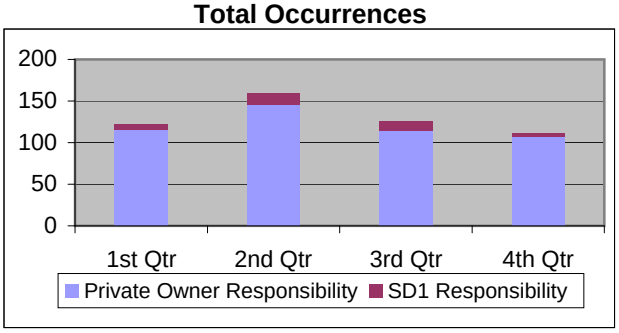


Total Volume (In Million Gallons)



Building Backups

Total Occurrences



2009 Overflow Summary			
	Occurrences	**Volume**	
Rainfall	141	43.11	inches
Recurring WW SSOs	651	105	MG
Inactive WW SSOs	13	3	MG
Operational SSOs	108	31	MG
Dry Weather CSOs	8	0.104	MG
Wet Weather CSOs	3289	1,502	MG
Building Backups (Private)		482	
Building Backups (SD1)		36	

Updated January 29, 2010

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APPENDIX D:

Recurring Wet Weather SSOs

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Recurring Wet Weather SSOs					
No.	MHID	City	County	Predicted Overflow Activations	Model Predicted Overflow Volume (MG)
1	0020005	Silver Grove	Campbell	8	1.524
2	0020014	Silver Grove	Campbell	0	0.000
3	0050022	Fort Thomas	Campbell	3	0.194
4	0060001	Unincorp Campbell County	Campbell	2	0.165
5	0060002	Unincorp Campbell County	Campbell	1	0.017
6	0100001	Highland Heights	Campbell	0	0.000
7	0100002	Highland Heights	Campbell	2	0.285
8	0110010	Highland Heights	Campbell	5	0.284
9	0150058	Wilder	Campbell	5	0.870
10	0150063	Wilder	Campbell	0	0.000
11	0150064	Wilder	Campbell	0	0.000
12	0150065	Wilder	Campbell	2	0.090
13	0150085	Unincorp Campbell County	Campbell	0	0.000
14	0150086	Southgate	Campbell	3	0.367
15	0150356	Southgate	Campbell	0	0.000
16	0220044	Fort Thomas	Campbell	2	0.062
17	0220058	Fort Thomas	Campbell	1	0.001
18	0270062	Fort Thomas	Campbell	0	0.000
19	0300008	Fort Thomas	Campbell	NA	NA
20	0410010	Fort Thomas	Campbell	6	0.103
21	0410019	Fort Thomas	Campbell	4	0.118
22	0410036	Fort Thomas	Campbell	0	0.000
23	0440074	Fort Thomas	Campbell	1	0.004
24	0530083	Newport	Campbell	6	0.546
25	0860001	Wilder	Campbell	19	17.684
26	0860003	Wilder	Campbell	0	0.000
27	0860016	Wilder	Campbell	0	0.000
28	1040060	Independence	Kenton	1	0.051
29	1090069	Edgewood	Kenton	0	0.000
30	1110025	Erlanger	Kenton	2	0.058
31	1110051	Erlanger	Kenton	2	0.079
32	1110067	Erlanger	Kenton	2	0.411
33	1110161	Erlanger	Kenton	2	0.023
34	1110164	Erlanger	Kenton	2	0.042
35	1110174	Elsmere	Kenton	2	0.015
36	1110275	Elsmere	Kenton	0	0.000
37	1110294	Erlanger	Kenton	2	0.042
38	1220029	Erlanger	Kenton	0	0.000
39	1240008	Erlanger	Kenton	7	0.356
40	1240012	Erlanger	Kenton	1	0.011
41	1560016	Fort Mitchell	Kenton	0	0.000
42	1560019	Fort Mitchell	Kenton	0	0.000
43	1560074	Fort Mitchell	Kenton	0	0.000
44	1560092	Fort Mitchell	Kenton	0	0.000
45	1590006	Lakeside Park	Kenton	0	0.000
46	1600029	Lakeside Park	Kenton	2	0.044
47	1600050	Lakeside Park	Kenton	2	0.117
48	1610102	Fort Mitchell	Kenton	1	0.003
49	1610114	Fort Mitchell	Kenton	1	0.005
50	1610115	Fort Mitchell	Kenton	0	0.000
51	1690043	Fort Wright	Kenton	0	0.000
52	1690072	Fort Wright	Kenton	NA	NA
53	1700025	Park Hills	Kenton	0	0.000
54	1730104	Fort Mitchell	Kenton	1	0.005

Updated 7/30/2009

Recurring Wet Weather SSOs					
No.	MHID	City	County	Predicted Overflow Activations	Model Predicted Overflow Volume (MG)
55	1760047	Edgewood	Kenton	0	0.000
56	1760048	Edgewood	Kenton	0	0.000
57	1830020	Unincorp Boone County	Boone	0	0.000
58	1830067	Unincorp Boone County	Boone	0	0.000
59	1850140	Covington	Kenton	1	0.003
60	1850141	Covington	Kenton	1	0.035
61	1860108	Taylor Mill	Kenton	0	0.000
62	1870013	Covington	Kenton	0	0.000
63	1890011	Lakeside Park	Kenton	0	0.000
64	1920163	Cold Spring	Campbell	NA	NA
65	1930007	Southgate	Campbell	0	0.000
66	1940006	Fort Wright	Kenton	2	0.401
67	1960002	Fort Wright	Kenton	2	0.267
68	1990018	Covington	Kenton	0	0.000
69	1990028	Covington	Kenton	1	1.266
70	2030097	Edgewood	Kenton	0	0.000
71	2070019	Elsmere	Kenton	2	0.361
72	2070020	Elsmere	Kenton	1	0.018
73	2090008	Elsmere	Kenton	3	0.212
74	2100007	Elsmere	Kenton	0	0.000
75	2100036	Elsmere	Kenton	1	0.040
76	2100037	Elsmere	Kenton	1	0.035
77	2100106	Elsmere	Kenton	2	0.095
78	2100128	Elsmere	Kenton	0	0.000
79	2100129	Elsmere	Kenton	5	1.371
80	2110002	Elsmere	Kenton	2	0.168
81	2120001	Elsmere	Kenton	1	0.022
82	2120041	Elsmere	Kenton	1	0.007
83	2130022	Villa Hills	Kenton	2	0.046
84	2150050	Crestview	Kenton	1	0.004
85	2160004	Fort Mitchell	Kenton	1	0.004
86	2160036	Fort Mitchell	Kenton	NA	NA
87	2280010	Unicorp Kenton County	Kenton	0	0.000
88	2280011	Unicorp Kenton County	Kenton	3	0.204
89	2280016	Unicorp Kenton County	Kenton	2	0.235
90	2290001	Crescent Springs	Kenton	0	0.000
91	2300019	Erlanger	Kenton	2	0.158
92	2300123	Unicorp Kenton County	Kenton	8	1.928
93	2300523	Erlanger	Kenton	8	2.190
94	2380001	Unincorp Boone County	Boone	0	0.000
95	2390002	Unincorp Boone County	Boone	0	0.000
96	2390006	Unincorp Boone County	Boone	0	0.000
97	2390008	Unincorp Boone County	Boone	0	0.000
98	2390762	Unincorp Boone County	Boone	0	0.000
			TOTAL	**153**	**32.65**

Threshold for model activation is 0.01 MGD and 0.001 MG

Updated 7/30/2009

APPENDIX E:

Wet Weather CSOs

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Wet Weather CSOs				
No.	CSO ID	KPDES Permit #	Model Predicted Activations	Model Predicted Overflow Volume (MG)
1	0010220	To Be Permitted	5	0.66
2	0010228	To Be Permitted	NA	NA
3	0030031	KY0021466 - Outfall 10	0	0.00
4	0200069	KY0021466 - Outfall 11	6	0.24
5	0330100	KY0021466 - Outfall 12	1	0.00
6	0340050	KY0021466 - Outfall 14	6	0.13
7	0340051	KY0021466 - Outfall 13	6	0.08
8	0360079	To Be Permitted	12	2.67
9	0540009	To Be Permitted	10	0.18
10	0540044	To Be Permitted	5	0.07
11	0550134	To Be Permitted	1	0.01
12	0570089	KY0021466 - Outfall 16	13	12.40
13	0570090	KY0021466 - Outfall 17	12	8.45
14	0600094	KY0021466 - Outfall 18	8	0.26
15	0600096	To Be Permitted	1	0.03
16	0600097	KY0021466 - Outfall 19	9	0.85
17	0600104	To Be Permitted	1	0.00
18	0610071	KY0021466 - Outfall 21	23	3.22
19	0610072	KY0021466 - Outfall 20	6	0.11
20	0620075	KY0021466 - Outfall 23	14	2.20
21	0620077	KY0021466 - Outfall 22	4	0.06
22	0630061	KY0021466 - Outfall 83	5	0.31
23	0640090	KY0021466 - Outfall 24	17	26.61
24	0650054	To Be Permitted	0	0.00
25	0650090	KY0021466 - Outfall 26	6	1.38
26	0650098	To Be Permitted	6	4.53
27	0650100	KY0021466 - Outfall 25	1	0.03
28	0690059	To Be Permitted	1	0.01
29	0730129	To Be Permitted	18	0.38
30	0770096	KY0021466 - Outfall 28	6	0.34
31	0790084	KY0021466 - Outfall 31	23	3.17
32	0790086	KY0021466 - Outfall 29	14	15.78
33	0840111	To Be Permitted	1	0.02
34	0840112	To Be Permitted	15	1.00
35	0840116	KY0021466 - Outfall 27	18	1.35
36	0870078	KY0021466 - Outfall 33	1	0.06
37	0870079	KY0021466 - Outfall 34	18	7.96
38	0880081	KY0021466 - Outfall 36	18	6.49
39	0880082	KY0021466 - Outfall 35	1	0.11
40	0910065	KY0021466 - Outfall 38	16	39.64
41	0910066	To Be Permitted	0	0.00
42	0910068	KY0021466 - Outfall 37	14	14.84
43	0930102	KY0021466 - Outfall 43	0	0.00
44	0930103	KY0021466 - Outfall 42	1	0.02
45	0930104	KY0021466 - Outfall 40	1	0.03
46	0930105	KY0021466 - Outfall 41	18	5.49
47	0930106	KY0021466 - Outfall 39	1	0.00
48	0960063	KY0021466 - Outfall 45	2	0.20
49	0960064	KY0021466 - Outfall 44	1	0.00
50	0980073	KY0021466 - Outfall 46	1	0.02

Updated 01/29/2010

Wet Weather CSOs				
No.	CSO ID	KPDES Permit #	Model Predicted Activations	Model Predicted Overflow Volume (MG)
51	0980080	KY0021466 - Outfall 47	0	0.00
52	0980081	KY0021466 - Outfall 48	20	13.74
53	1310100	To Be Permitted	NA	NA
54	1320112	To Be Permitted	0	0.00
55	1350155	KY0021466 - Outfall 49	1	0.03
56	1380132	To Be Permitted	1	0.06
57	1380146	To Be Permitted	1	0.00
58	1420141	KY0021466 - Outfall 50	8	0.13
59	1420142	KY0021466 - Outfall 51	20	11.26
60	1420144	KY0021466 - Outfall 52	0	0.00
61	1420145	KY0021466 - Outfall 53	0	0.00
62	1420146	KY0021466 - Outfall 54	0	0.00
63	1420147	KY0021466 - Outfall 55	1	0.00
64	1440204	KY0021466 - Outfall 59	0	0.00
65	1440205	KY0021466 - Outfall 60	4	0.09
66	1440206	KY0021466 - Outfall 61	7	0.42
67	1440207	To Be Permitted	0	0.00
68	1440209	KY0021466 - Outfall 56	25	22.22
69	1470089	KY0021466 - Outfall 62	2	0.12
70	1470093	KY0021466 - Outfall 63	14	16.74
71	1480185	To Be Permitted	6	0.56
72	1480187	KY0021466 - Outfall 30	18	149.54
73	1490132	KY0021466 - Outfall 65	2	0.24
74	1490172	KY0021466 - Outfall 64	0	0.00
75	1500131	KY0021466 - Outfall 66	16	1.96
76	1510133	To Be Permitted	0	0.00
77	1510245	To Be Permitted	1	0.02
78	1710114	KY0021466 - Outfall 69	1	0.07
79	1710116	KY0021466 - Outfall 68	10	2.64
80	1710119	KY0021466 - Outfall 70	6	1.18
81	1710121	KY0021466 - Outfall 71	5	0.56
82	1710124	KY0021466 - Outfall 72	5	0.85
83	1720109	KY0021466 - Outfall 73	15	3.66
84	1730259	KY0021466 - Outfall 75	5	0.50
85	1730262	To Be Permitted	0	0.00
86	1730263	KY0021466 - Outfall 74	9	0.50
87	1840130	To Be Permitted	5	0.17
88	1850158	KY0021466 - Outfall 76	20	12.34
89	1870193	KY0021466 - Outfall 78	8	0.25
90	1870194	KY0021466 - Outfall 79	1	0.02
91	1880090	KY0021466 - Outfall 81	5	0.98
92	1880091	KY0021466 - Outfall 80	1	0.36
		TOTAL	**610**	**402.55**

Threshold for model activation is 0.01 MGD and 0.001 MG

APPENDIX F:

Annual Comparison of Overflow Data

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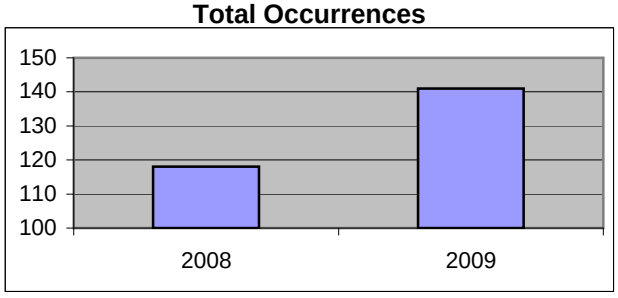
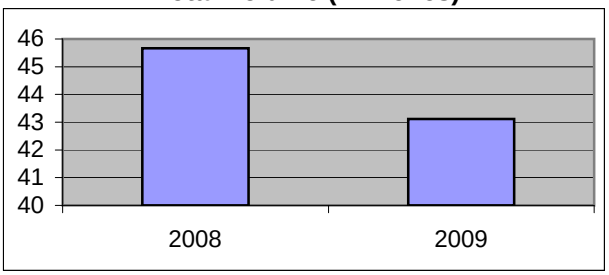
Annual Cumulative Overflow Data
2008 through 2009

Rainfall

Total Occurrences

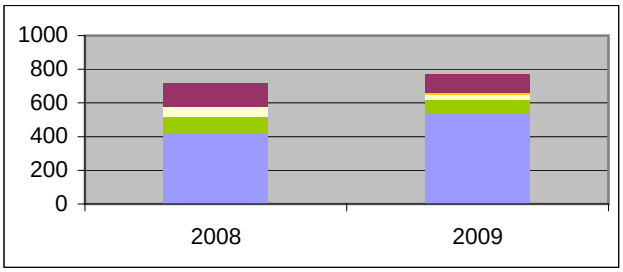


Total Volume (In Inches)

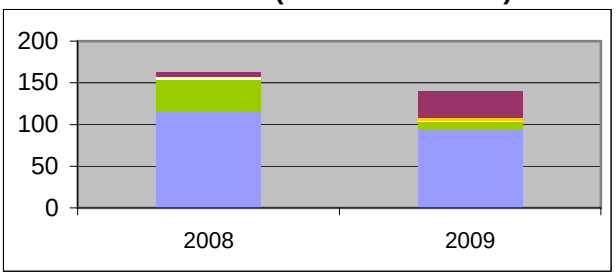


SSOs - Due to Wet Weather (WW) and Operational Issues

Total Occurrences



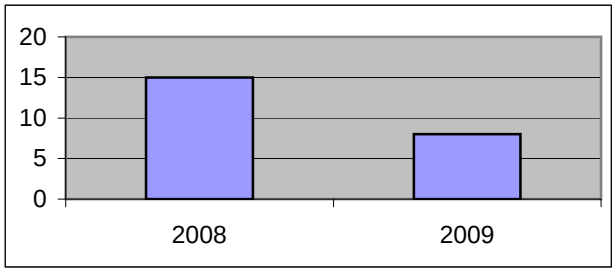
Total Volume (In Million Gallons)



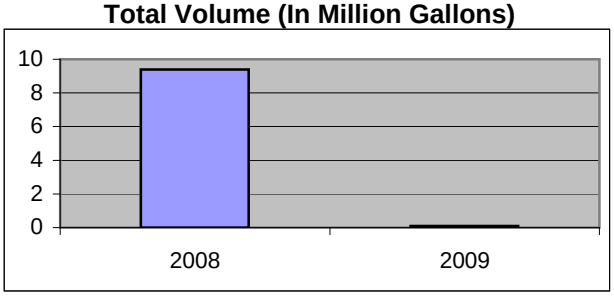
Recurring WW SSOs
Recurring WW CD Pump Station Overflows
Recurring WW Other Pump Station Overflows
Inactive WW Overflows
SSOs Due to Operational Issues

Dry Weather CSOs

Total Occurrences

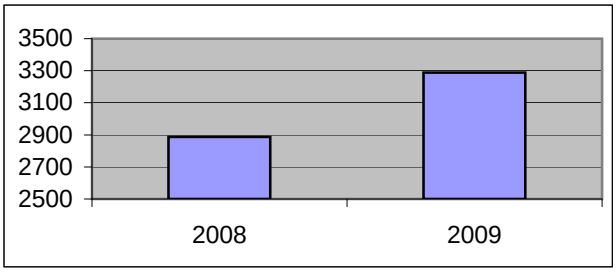


Total Volume (In Million Gallons)

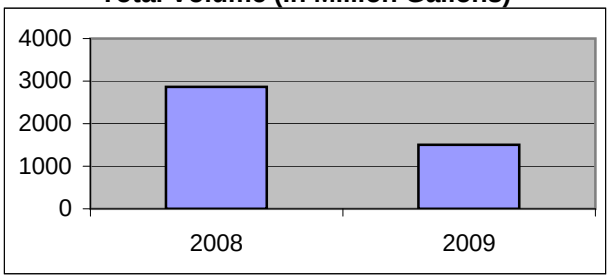


Wet Weather CSOs

Total Occurrences

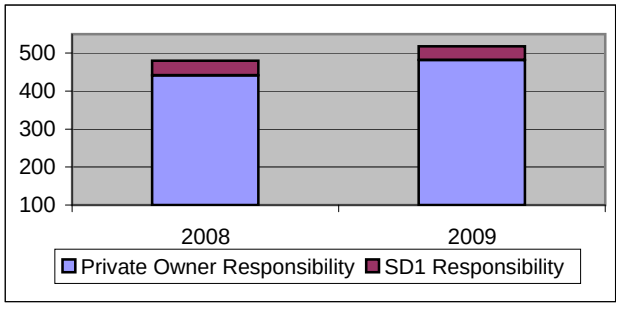


Total Volume (In Million Gallons)



Building Backups

Total Occurrences



Change from 2008 to 2009			
	Occurrences	Volume	
Rainfall	23	-2.55	inches
Recurring WW SSOs	75	-53	MG
Inactive WW SSOs	13	3	MG
Operational SSOs	-35	26	MG
Dry Weather CSOs	-7	-8.90	MG
Wet Weather CSOs	401	-1,367	MG
Building Backups (Private)		80	
Building Backups (SD1)		-3	

Updated January 29, 2010