SSO Reduction Program Review and Update
Written Comments

Submitted by:

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Background

We approach our comments on the SSO Reduction Program with two basic themes: Theme 1 - technology since the implementation of Order 2006-0003-DWQ (May 2006) has sufficiently advanced to provide for cost-effective wide-spread **Automated Monitoring** (AM) in collection systems, and Theme 2 – the continued drought in California, and the likelihood for long term water shortages in the state point to wastewater as a new and more pervasive source of potable water statewide. Both of these themes lead to some shared and basic truths about wastewater:

- Wastewater should be kept where it belongs – out of the environment and in a wastewater system until it can be treated for use; and
- Wastewater should be protected from uncontrolled dumping, like other forms of source water are protected today.

Low cost, widely deployable AM deals with both of these issues.

Since 2006, AM technology has developed to a maturity and robustness that allows it to be deployed widely and cost effectively in a collections system. A notable example of widespread deployment is the City of Hawthorne. Starting in November 2006, Hawthorne has deployed 50 SmartCover® AM units in their system of approximately 2,000 manholes, or about 2.5% of the total. Since the time of deployment, Hawthorne has gone from 10 – 12 SSOs per year to zero in nearly 36 months. Hawthorne was spending about $400,000 per year on fines and mitigation of spills, and the cost of the AM system is a small fraction of these fines.

Overall, the SmartCover® monitoring system has helped sanitation agencies identify and prevent more than 813 potential SSOs – mostly in California - by early warning of unusual or high water levels indicating constrictions or blockages downstream. We have noted that at "high risk" sites, AM systems prevent – on average - about one SSO every two years.

In general, two methods of deployment of AM systems have occurred: (a) Small numbers of units at known trouble spots in a collection system; and (b) large number of units widely dispersed in the collection system. Deployments of the (a) type have resulted in

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decreases in SSOs, but deployments of (b) type have resulted in dramatic reduction if not outright elimination of SSOs – for example, Hawthorne, Culver City, and Cupertino. The fraction of sites that need to be instrumented is not yet quantified, but all lift stations should have battery-backup AM and somewhere between 2% and 10% of manholes in collections system appear to give complete protection, depending upon geography, age and complexity of the system.

Most lift stations in California are currently instrumented with AM systems. However, the standard SCADA commonly used often uses line power and land-based communications or point-to-point radio, and has reliabilities that often leave these important assets without communications. Back-up battery powered AM systems that operate on a different communication network add valuable redundancy for these critical assets which are often the cause of major SSOs.

It should be noted that this new generation of AM systems depends directly upon level measurement, not flow, and one major consequence of this difference is the very low false alarm rate of level systems.

Specific Comments:

We offer the following comments based on SWRCB Order # 2006-0003-DWQ:

1. Initial Findings should include a clear statement that the goal of all sanitary system operators is to eliminate SSOs completely. In order to achieve this goal, all feasible steps based on a Wastewater Best Management Practices (WBMP) should be implemented. Technology and methods now exist to enable the complete elimination of SSOs at a reasonable cost and all feasible steps should be taken towards this goal.

2. A WBMP would include the following elements regarding SSO elimination as it relates to AM systems:

    2.1. FROG (fats, roots, oil and grease) control and programs

    2.2. Cleaning and validation of cleaning

        2.2.1. COMMENT: Widely dispersed AM systems can provide continuous data monitoring to allow operators to tune and optimize maintenance cycles, decreasing costs, risk and carbon footprint.

    2.3. Methods to remotely and automatically monitor the collection system

        2.3.1. Closed loop management control around alarms and staff response to alarms

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2.3.2. Record keeping regarding exceptional events and responses to these events

3. SSMP's should be modified to address the WBMP and include the following:

3.1. Vulnerability analysis for sanitary system operations, including the following factors:

3.1.1. History of previous spills over the previous X years
3.1.1.1. Cost and mitigation of these spills

3.1.2. Sensitive environmental areas

3.1.3. Sensitive commercial and industrial areas

3.1.4. Areas with difficulty of access

3.1.5. Areas with susceptibility to I&I

3.1.6. Lift station locations

3.1.7. Facilities at the interface between two agencies

3.1.8. Costs and risks of spills at all locations

3.1.9. A sample VA sheet that might be used, for example, is attached in Appendix A.

3.2. An Automated Monitoring (AM) Section that includes:

3.2.1. List of locations that are under AM

3.2.1.1. Site profile sheet that includes: location, GPS, altitude, age, manhole depth, line diameter, unique manhole code designation, unusual circumstances, manhole vs. lift station vs. siphon, drop hole or multiple line junction, reason for this site chosen for AM, frequency of manual inspection, etc.

3.2.2. Fraction of locations that are AM

3.2.3. Effectiveness of AM
3.2.3.1. False alarm rate
3.2.3.2. False negative rate
3.2.3.3. Spills prevented

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4. Monitoring of private laterals shall be required if there is a spill on these laterals. Cost of monitoring shall be borne by property owner.

5. Enforcement actions should include whether operator uses AM or not, and whether these systems are maintained properly.

6. AM should be required for Operators that:

   6.1. Have repeated violations at the same locations

   6.2. Have persistent system-wide violations

   6.3. Have an unusually high frequency of violations

7. AM should be encouraged through supplemental environmental projects (SEPs) as a response to SSOs.

Comments on Wastewater as Source Water

1. Reclaiming wastewater to a maximum extent should be encouraged by the revised regulations. Therefore, wastewater needs to be protected beyond the current practices.

2. Two modes of protection include: prevention of loss of wastewater as a spill (covered in the SSO reduction discussed above); and protection of wastewater as "source water" by preventing illegal dumping or introduction of contaminants into waste water in the collection system.

3. AM offers a cost-effective means to both monitor the system for prevention of overflows as well as monitor for illegal entries. (In the four years of operation, SmartCover® AM systems have detected 23 illegal dumping or intrusion incidents into the collection system.)

4. AM is often placed at location with suspected dumping – for example remote easements or industrial parks.

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APPENDIX A
EXAMPLE OF VULNERABILITY ASSESSMENT FOR MANHOLES

Manhole Vulnerability Assessment Example

The following spreadsheet is an example of a manhole vulnerability assessment tool that can be used to prioritize risk and mitigation efforts at a given manhole location. By entering selected parameters a risk score can be generated for comparison between sites. In general not all manholes in a collection system can be instrumented, therefore priorities can be set to determine the optimal deployment of a AM system.

In this case the site numbers identify the following types of sites:

1. A mixed use suburban area with single and multiple family homes and some commercial occupancy.
2. A remote, low density area.
3. A highly urbanized area on the boundary between two agencies.
4. An urbanized area with mixed use and moderate commercial activity.

In each case a risk score (from 0.8 to 9.7) is calculated to provide management guidance on mitigation at each site.

The weighting functions for these calculations can be varied for a given agency to reflect priorities from the SSMP.

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Manhole Risk Assessment (MRA)
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CASE	1		2		3		4	
	Input	Magic	Input	Magic	Input	Magic	Input	Magic
depth of manhole - feet	10	1.176091	20	0.69897	5	1.30103	10	1.176091
diameter of line - inches	8	0.90309	8	0.90309	16	1.20412	8	0.90309
assessed valuation within 300 feet '000s	4000	3.60206	200	2.30103	20000	4.30103	6000	3.778151
propeties served	100	2	1	0	10000	4	200	2.30103
serves a high population site - population count	500	2.699838	0	0	5000	3.699057	500	2.699838
days between inspections - currently	30	1.851258	360	0.30103	5	1.982271	30	1.851258
spills in five years	2	3	0	1	10	11	3	4
restaurant count	3	1.491362	0	0	40	2.603144	10	2.004321
mutli family - apartment unit count	120	2.082785	0	0	120	2.082785	400	2.603144
agency boundary distance	1000	0.30103	1000	0.30103	0	3.000434	500	2.699838
		19.10751		5.50515		35.17387		24.01676
Offset	3							
gain	0.3							
RISK (think Richter Level)		**4.8**		**0.8**		**9.7**		**6.3**
Risk Assessment		**Moderate**		**Low**		**Very High**		**High**

This model is not suitable for remote manholes that could spill for an extended period of time and not be detected. A different model is being considered for such locations.

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