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## Stakeholder Advisory Committee Meeting Three Summary

### ***OVERVIEW***

The third meeting of the Clean Rivers Healthy Communities Stakeholder Advisory Committee (SAC) was held on Thursday, July 31, 2008. Seven committee members and seven Clean Rivers' staff and consultants attended the two-hour session. The meeting, which was dedicated to water quality, was lead by Adrienne Nemura, a professional engineer from LimnoTech, an environmental and engineering consulting firm. Ms. Nemura has over 23 years of experience evaluating the impacts of pollutant sources on watersheds and waterways.

The presentation was designed to:

- Provide an understanding of the Clean Water Act and how it regulates water quality protection.
- Explain the “designated uses” classification, which is a critical standard for the Clean Water Act.
- Describe how St. Louis’ rivers and tributaries are currently used.
- Clarify how water quality is impacted by many sources, including combined sewer overflows (CSO).
- Demonstrate, through modeling, the impact of CSO reduction on water quality.

### ***PRESENTATION***

#### ***Slide 2 – How does the Clean Water Act protect water quality?***

The Clean Water Act (CWA) creates a legal framework to protect waterways from pollution. With its water quality standards, waterway “cleanliness” is determined and that designation dictates how the waterway can be used by the public. For any discharges that effect water quality, permits are issued through the National Pollutant Discharge Elimination. Permits are issues for point sources (permanent structures transporting water to any water body). All point source discharges must have some minimum level of water treatment.

***Slide 3 – How does the Clean Water Act protect water quality?***

The CWA mandates development of water quality standards to protect designated uses, such as swimming and fishing, of water bodies. Both EPA and the states establish narrative and numeric criteria to protect those uses.

The CWA defined nine minimum controls (technology-based controls or limits) and water quality controls for point sources. These controls are used to address CSO problems without extensive engineering studies or significant costs prior to developing and implementing a long-term control plan. MSD has been implementing the technology-based controls since 1992.

If the long-term control plan cannot address water quality standards because of other non-point source pollutants, there are other options. EPA and the states must identify water bodies that are not meeting (or will not meet) water quality standards after technology-based and water quality based controls are in place. If the standards cannot be met, due to non-point pollutants, the standards are changed through a Use Attainability Analysis (UAA).

***Slide 4 – How does the Clean Water Act protect water quality?***

“Designated uses” are the crucial benchmarks that objectively define water cleanliness. From the “use definitions”, decisions about point and non point source (*unidentifiable source, usually from storm water runoff or snow melt traveling across the ground*) controls are determined objectively. The designated uses recognized by state and federal regulations are numerous, but for the purpose of combined sewer overflows, aquatic life and recreation use definitions apply.

Aquatic life implies that the stream should support a diverse population of micro invertebrates (bugs) and fish through the reproduction, survival and growth stages. Criteria used to measure aquatic life sustainability are temperature, pH, and dissolved oxygen levels, as well as ammonia, nitrogen and metal contamination.

Recreation life implies that people should be able to swim (WBC: whole body contact), wade, float or fish (SBC: secondary body contact) without getting sick. The indicator bacterium, *E. coli*, is used to determine cleanliness. While *E. coli* does not necessarily cause illness, its presence is an indicator of human or animal feces in water. The associated pathogens of *E. coli* (viruses, worms or bacteria) may cause illness.

EPA used studies from the 1960s and 70s to establish the acceptable average (or geometric mean) criteria for whole body contact at less than 126 *E. coli* per 100 milliliters. States also adopted secondary contact recreation criteria, which typically ranges between five to ten times the whole body contact criteria.

*Environmental Representative*

**Question:** *How does mercury enter our waterways?*

**Answer:** *Mercury in our waterways is an air deposition problem. It doesn't spill into the waterways through run-offs; it is emitted primarily by incinerators.*

***Slide 5 – What are the current Clean Water Act uses?***

Missouri classified streams that have permanent flow or permanent pools as being able to support either warm or cold water fisheries. In St. Louis, the green stream segments (on the map) are those that have been classified as supporting general warm-water fisheries. To protect these uses, water bodies in these segments have to meet acute and chronic numeric criteria. Acute criteria protect fisheries for survival. Chronic criteria are designed to protect fisheries for growth and reproduction. Unclassified segments (not colored green) have to meet acute criteria, just in case aquatic life is present.

Missouri has defined three recreational designated uses:

- Swimming areas – whole body contact A or B (WBC-A or WBC-B);
- Occasional swimming areas – whole body contact B; and
- Wading/Boating – secondary contact (SCR)

Currently, the only segment that is specified for WBC-A is the Mississippi River upstream of all CSOs.

*Regional Planning Representative*

**Question:** *Did you say the tributaries that are not highlighted are protected to meet acute or chronic criteria?*

**Answer:** *Those rivers, such as Black Creek and Deer Creek that are not classified, must meet acute criteria. Those tributaries protect fisheries for survival.*

***Slide 6 – What are the proposed Clean Water Act uses?***

MSD submitted to the USEPA a Use Attainability Analysis (UAA) for the Mississippi River and the UAA is still under consideration. The UAA indicates that the segment (not shown) should remain secondary contact recreation (SCR) due to safety issues caused by barge traffic, high velocities and sporadic water depth changes. If EPA denies the UAA for secondary contact recreation, MSD may need to provide a higher level of controls for the Mississippi River. While the Mississippi is impacted by both point and non point sources, stringent controls for the Mississippi will greatly impact the controls implemented for other CSOs. The map details the designated uses for all waterways in MSD's service area.

*Environmental Representative*

**Question:** *In areas with a high concentration of golf courses, how do fertilizers impact water quality?*

**Answer:** *That depends on if the course is located in a combined sewer or separate sewer area. If it is in a separate sewer area, fertilizers can cause excessive algae growth and thus, kill wildlife.*

***Slides 7 & 8 – How are these waterways being used today?***

The Mississippi River (Port of St. Louis) is the third busiest port in the United States and it provides a waterway for barges. It is not safe for WBC-A or WBC-B (primary contact recreation).

Both the Maline Creek and the Upper River Des Peres, like many waterways, have been channelized in certain areas for flood control.

During dry weather, all of the River Des Peres flow is diverted to a culvert beneath the riverbed and the water flows to the Lemay treatment plant. In wet weather conditions, if the flow exceeds the capacity of the culvert, the flow is directed to the channelized portion of the river.

***Slide 9 – What factors influence water quality in these streams?***

Combined and separate sewer overflows (SSO) are not the only sources which affect stream water quality. Water quality is also influenced by urban storm water runoff, failing septic tanks, pet waste and wildlife. Therefore, even with the elimination of CSOs and SSOs, bacteria will still be present in the streams.

Additionally, habitat alterations, such as the loss of trees and channel improvements, can also have an adverse impact on aquatic and terrestrial life. Again, even if CSOs are eliminated, in these cases, aquatic life may not improve.

***Slides 10 to 13 – What is the water quality in these streams today?***

The table indicates the extent to which each stream meets the water quality criteria for three major pollutants – dissolved oxygen, *E. coli* bacteria and metals. Dissolved oxygen and metals affect aquatic life and *E. coli* relates to recreational use.

In general, *E. coli* is a problem for both the Mississippi and the tributaries, while dissolved oxygen impacts mostly the tributaries.

As expected, wet weather concentrations (slide 11) of *E. coli* in the Mississippi are generally higher than in dry weather conditions. This suggests that several sources are contributing to *E. coli* levels, especially when the measurements upstream are also higher.

Bacteria levels tend to be higher downstream (Oakville, MO and Kimmswick, MO) regardless of the weather conditions.

For the River Des Peres and Maline Creek at Bellefontaine, the difference between wet and dry conditions is more pronounced (slide 12).

For the River Des Peres (slide 13), while it looks like the *E coli* concentrations meet the proposed UAA standard (red line), this may not be the case because the data collected was less than that collected for the other models.

*Note: When water compliance is measured, wet and dry weather conditions are averaged together. For the tables in this presentation, the conditions are separated for additional understanding.*

*Regional Planning Representative*

**Comment:** *To me, the modeling is inadequate because it is not considering the entire watershed. If you only address the lower River Des Peres, then you are not considering the impacts upstream. Shouldn't improvements begin in the "head waters" of the watershed?*

**Response:** *You are correct; modeling is limited. Keep in mind that MSD must address water quality as dictated by the Missouri. A long-term control plan does not typically include a watershed approach. It is time consuming to complete a watershed plan and the Missouri expects a plan from MSD in August 2009.*

*Environmental Representative*

**Comment:** *As MSD looks at solutions, we must consider the greenways and trailways within the watershed as resources. The community must understand how their actions impact the watershed and how resources can be conserved for future generations.*

*Technical Team Representative*

**Question:** *You have worked with several municipalities, have any of them submitted a watershed-based LTCP (long-term control plan)?*

**Answer:** *I am only aware of one, Sanitation District 1 of Northern Kentucky. Its plan was the first Consent Decree based on a watershed management approach. Pennsylvania submitted a slightly different plan, which included more green infrastructure solutions. EPA recognizes the benefit of green solutions, however, their main concern is how quickly will the plan reduce the number of CSOs and the number of CSO events annually.*

#### ***Slide 14 – What do regulations require of MSD regarding water quality improvement?***

To comply with the Clean Water Act's CSO Policy, MSD has implemented the nine minimum controls and is completing its long-term control policy, which will be submitted to the USEPA in August 2009.

First and foremost, the long-term control plan must reduce the number and frequency of combined sewer overflows to **meet water quality standards**. However, the controls must be **cost-effective** and **consider the community's financial capability**, in light of competing infrastructure projects (both internal and external to MSD).

***Slide 15 – How do CSOs affect water quality in streams?***

CSOs do impact stream water quality during wet weather periods. However, combined sewer overflows are not the only contributing bacteria sources that impact the waterway's designated use.

***Slides 16 to 22 – What will be the likely impact of CSO reduction on water quality?***

For the Lower River Des Peres (slide 17), the green line indicates the dry weather concentrations of *E. coli* and the red line indicates the increased *E. coli* levels during a wet weather occurrence. The black dashed line indicates the proposed criterion.

If CSOs were eliminated (slide 18), concentrations of *E. coli* would still be higher than the average criterion at any point. This is relative to weather conditions.

However, for compliance purposes wet and dry weather concentrations are averaged. In that case (slide 19), the model predicts a slight reduction in *E. coli* concentrations (solid red line vs. thin red line).

Regarding *E. coli* in the Maline Creek (slide 20), during wet weather conditions the concentrations are slightly less than along the Lower River Des Peres, but they are not in compliance. In this case, upstream conditions impact the concentration levels.

Again, by eliminating CSOs along the Maline Creek (slide 21), peak bacteria sources are not greatly reduced. For compliance purposes (slide 22), complete removal of combined sewer overflows doesn't have a significant effect on the levels of *E. coli*.

***Slides 23 – What are the best options for reducing CSOs on the affected waterways?***

The optimal remedies include a variety of approaches because of the tradeoffs between keeping the storm water out of the system versus increasing the capacity of the system to collect, store and treat water.

Therefore, the two major options are collection of water and storage of water. Collection strategies can include separating sewers, rehabilitating leaky systems, storing water through inflatable dams or increasing pump station capacity. Of the options, separating sewers in densely populated residential areas is the most expensive and disruptive alternative.

Water storage includes constructing deep covered tunnels (either underground or surface). With storage, the water is held until the peak flows subside. Then, the excess water flows to the treatment plant for processing. This approach reduces the overall pollutant load to the watershed instead of transferring part of to storm water runoff. Compared to sewer separation, water storage tends to concentrate construction to smaller areas, which means less expense and disruption.

*Environmental Representative*

**Question:** *Why aren't we considering state parks in this discussion? There is no one here representing state parks. I was recently at one, and I didn't even see recycling bins.*

**Answer (from a fellow SAC member):** *I don't know about state parks, but for the St. Louis County parks we are implementing green strategies.*

***Slide 24 – Most Common Technologies Survey of 275 CSO Plans for Small and Large Communities***

As noted from the table, most plans relied on a combination of technologies. Although sewer separation is the most used control for CSOs, this is more common in small areas or communities.

While not listed as a control strategy, green infrastructure is being employed by many municipalities to address combined sewer overflows. Portland, OR; Philadelphia, PA; Milwaukee, WI; and Cincinnati, OH are a few of the cities using green strategies. In most cases, green technologies are used to reduce runoff. As innovative and site-specific strategies, the effectiveness of green strategies has not been fully documented.

***Slide 25 – How would you like to use these waterways in the future?***

Although we want to initially think about how our waterways should be used, as you have learned today, water quality is just one of the considerations to think about. We must also think about implementation feasibility, cost effectiveness and community burden, i.e. public cost.

***NEXT STEPS***

The next SAC meeting will be held in early October. At this meeting, members will learn about the factors to consider when evaluating control strategies and assist the CSO team in determining the control levels (number of CSOs allowed annually) to pursue for each receiving stream.

## **Appendix – SAC Meeting Three Attendees**

### ***SAC Members***

- Michael Bardot, P.E.
- Cyndi Harrison, Ph.D.
- Donald Jeffries
- Christopher King
- Michael Nelson
- Kathleen Strout
- David Wilson

### ***Clean Rivers Project Team Members***

- Jon Bergenthal
- Neil Frankenberg
- Gary Moore
- Susan Myers
- Jessica Perkins
- Kristol Whatley