

SEMI-ANNUAL REPORT ON

PROJECT XL

JEFFERSONTOWN SEWERSHED/CHENOWETH RUN WATERSHED
PRETREATMENT REINVENTION PROJECT

(Reporting Period: January 1 – June 30, 2003)



**Louisville and Jefferson County
Metropolitan Sewer District**
700 W. Liberty Street
Louisville, KY 40203

with assistance from Strand Associates, Inc.



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1.0 INTRODUCTION

MSD completed an EPA Grant project for the Development of Pretreatment Performance Measures. The objective of this project was to develop, implement, and assess specific Performance Measures designed to measure the environmental impact of the Pretreatment Program in the Jeffersontown Sewershed/Chenoweth Run Watershed area. MSD was also selected to participate in the Project XL (eXcellence in Leadership) program.

With information gained from the Performance Measures, and with the regulatory flexibility provided by the XL Pilot Project, resources can ultimately be shifted to address the greatest environmental concerns in the watershed. MSD's strategy is to take better information and reallocate resources with this XL program to create environmental benefits according to a stakeholder-endorsed prioritization strategy.

The Final Project Agreement (FPA) for MSD's XL project was signed by MSD, USEPA, and Kentucky Department of Environmental Protection (KYDEP) on September 28, 2000. The FPA documents the enforceable commitments, voluntary commitments, and aspirations for the project. The FPA calls for a five year effort and requires annual and semi-annual reporting.

MSD received a reissued KPDES permit for the Jeffersontown treatment plant with an effective date of June 1, 2002. In the reissued permit, MSD was given part of the regulatory authority to begin implementing the XL study from the KYDEP. KYDEP is also pursuing the implementation of code changes to further allow the pilot study. These code changes were adopted in December 2002.

As part of Project XL, MSD has committed to produce a semi-annual Report for EPA, KYDEP and project stakeholders. The semi-annual report is due each October 1. This semi-annual report is in addition to annual reports MSD must furnish on April 1 of each year.

The report is comprised of the following sections:

Section 1 – Introduction

Section 2 – Activities and Accomplishments

Section 3 – Data Collection and Trend Charts

2.0 ACTIVITIES AND ACCOMPLISHMENTS

MSD has been very active in implementing the XL Pilot program in 2003. In this semi-annual report, MSD will present an update on many of the project activities.

2.1 Stakeholder Involvement

MSD held a general stakeholder meeting on April 21, 2003. Topics discussed included a Project XL update, MSD's Annual XL report, Industrial agreements in lieu of permits, supplemental environmental projects, Pollutant of Concern (POC) reduction strategies, and open discussion. A summary of the meeting is included in the Appendix. Minutes of other stakeholder and work group meetings are also included on MSD's webpage at http://www.msdlouky.org/insidemsd/pretreat_projectxl.htm.

MSD assembled a Stakeholder Work Group to assist in making decisions on this project. The Stakeholder Work Group included MSD staff, a consultant, two representatives from Kentucky Pollution Prevention Center, a state regulator, an environmentalist, and two industrial representatives. The Work Group has not met in 2003 since most project elements requiring stakeholder involvement were concluded in 2002. MSD may convene a meeting with a Stakeholder Work Group in early 2004 to obtain insight on the direction of this project.

2.2 Pollutants of Concern

"Pollutants of concern" (POC) is a phrase coined for this project for parameters in the wastewater for which the utility should exercise heightened concern due to the data evaluation from the performance measures review. The following criteria for the determination of POCs were established with stakeholder involvement.

A parameter would be considered a POC:

- * If there have been multiple exceedances of any of the Performance Measures.
- * If the data shows an increasing trend for that parameter toward any of the Performance Measures.
- * If concentrations of that parameter in the receiving stream are near water quality criteria (even though the pollutant source may not be pretreatment related).
- * If that parameter is listed as a reason for the stream to be on the State's 303d list.
- * If the parameter has a numeric limit on the Wastewater Treatment Plant's NPDES permit.

Table 2.2-1 identifies the current J-Town Pollutants of Concern as determined by the work group based on these criteria and the data collected over the past two years.

Table 2.2-1 J-Town 2003 POC Selection as made by the Stakeholder Work Group

Parameter	Frequent Exceedances of the PM	Increasing Trend toward PM	Approaching Stream WQ	Parameter noted on 303d list	NPDES Permit limit
Arsenic	No	No	No	No	No
Cadmium	No	No	No	No	No
Chromium	No	No	No	No	No
Copper	Yes	No	No	No	No
Cyanide (Amenable)	Yes	No	No	No	No
Iron	NA	NA	No	No	No
Lead	Yes	No	Yes	No	No
Mercury	Yes	No	Yes	No	No
Nickel	No	No	No	No	No
Selenium	No, watch	No	No	No	No
Silver	No, watch	No	No	No	No
Zinc	No	No	No	No	No
BOD	No	No	NA	No	Yes
TSS	No	No	NA	No	Yes
Ammonia	No	No	NA	No	Yes
Phosphorus	No	No	NA	Yes	Yes

2.3 “Clean Sampling and Clean Analytical”

MSD undertook an experiment to compare the effect of using “clean” sampling techniques as compared to MSD’s “conventional” sampling technique. This study was conducted in June 2001. The study generally showed MSD’s “conventional” sampling technique was not introducing contamination into the collected samples.

Also in June 2001, MSD compared the two sets of samples collected by using MSD’s “conventional” analytical techniques against more rigorous “clean” analytical techniques performed by an outside laboratory. The “clean” analytical techniques were able to achieve substantially lower detection limits. The data collected in June 2001 generally showed “conventional” analytical techniques were not able to demonstrate the absence of a pollutant while “clean” techniques were.

A follow-up study was performed in June 2002 where seven consecutive days of samples were split between the “clean” and “conventional” analytical techniques. The results obtained were consistent with the earlier study. The “clean” techniques were better able to demonstrate the absence or presence at a very low level for several pollutants.

MSD conducted another round of clean analytical work in May 2003. In this study, pre-cleaned sample bottles were used to collect samples of J-Town WTP effluent. The study included analyses for mercury, copper and lead.

- The daily mercury samples were analyzed by three labs (two using standard analytical techniques and the third using 'clean' analytical techniques). The labs employing standard techniques routinely quantified mercury in the effluent while the split sample analyzed by clean techniques quantified mercury at one-tenth to one-hundredth the levels quantified by conventional techniques.
- The daily copper samples were analyzed by three labs (all using standard analytical techniques, but one lab offered a significantly lower detection limit). Two of the three labs reported similar results for copper, while the third lab's results were inconsistent. More credence is placed in the results that were consistent between two labs.
- The daily lead samples were analyzed by three labs (all using standard analytical techniques, but one lab offered a significantly lower detection limit). The lead results using the more sensitive technique were quantified at a lower value than by the conventional techniques.

MSD will prepare a summary report that documents the three clean sampling/clean analytical efforts. A copy of this report will be included in our next Annual Report.

2.4 Pollution Prevention

MSD began working closely with Kentucky Pollution Prevention Center (KPPC) to plan watershed-based and industry-specific pollution prevention efforts. The efforts underway in 2003 include:

- MSD required all Industrial Users (IUs) within the J-Town system perform a Pollution Prevention (P2) audit. The requirement was included in the IU agreements and Significant Industrial User (SIU) permits. The results will be documented in the next Annual Report.
- MSD is working on preparing Best Management Practices (BMPs) for dentists in the county. This effort is targeting silver and mercury waste reductions. MSD is collaborating with KPPC and the Kentucky Dental Association to prepare the BMPs.
- MSD presented a paper titled "Environmental Performance Measures for a Pretreatment Program to Identify the Need for Watershed-Based Pollution Prevention Efforts" to the National Pollution Prevention Roundtable held in Louisville in April 2003. An excellent dialogue followed the presentation where pollution prevention examples were shared from other areas of the country.
- KPPC offered a mercury thermometer exchange for the entire watershed. The exchange took place at the Jeffersontown Gaslight Festival in September 2003. KPPC received a

grant from the USEPA Region 4-Pollution Prevention Grants program to help fund this initiative. This project was also partially funded by contributions from industries with Industrial User Agreements.

- MSD developed a tri-fold color brochure which was handed out to the public at the Jeffersontown Gaslight Festival and will be distributed further (via local schools, library, etc.). The brochure is targeted to the general public and offers suggestions on opportunities for them to improve the health of Chenoweth Run. (Copy attached)
- KPPC is also assisting MSD with researching additional Pollution Prevention efforts aimed at reducing Pollutants of Concern.

2.5 Reevaluation of SIUs

The criteria MSD has selected to determine if an industrial user is a SIU includes any of the following:

- * If the user discharges greater than 5% of flow or loading of a pollutant of concern to the WTP.
- * If the user has been in significant noncompliance (SNC) at any time during the preceding two years.
- * If the user has a reasonable potential to adversely impact the WTP.
- * If the user has the potential to discharge uncontrolled slug loads.

MSD, with the assistance of the Stakeholder Work Group, categorized industrial users into the following:

Significant Industrial Users (SIU):	White Castle Foods, Lantech, Russtech, Jones Plastic
Non-Significant Categorical Industrial Users (NCIU):	Winston Products, HL Lyons
Industrial Users (IU):	Papa Johns Foods, Beechmont Press, Bramco Brandeis, Cummins Cumberland, Dispensers Optical, Southern Standard Carton, Clark Detroit Diesel, Ryder Truck, Innovative Electric Design, and Print-Tex.

MSD has issued signed Industrial User agreements for IUs and NCIUs. MSD has also issued revised SIU permits. The effective date for these permits and agreements was January 1, 2003.

A new industry has entered the JTown sewershed, JCK Enterprises. They occupy the former DCE facility. JCK Enterprises is a metal finishing industry. They will be issued a SIU permit. This new industry will discharge into the Manhole 4 basin.

2.6 Industrial User (IU) Agreements

MSD worked with the Stakeholder Workgroup in the development of agreements for Industrial users and agreements for Non-Significant Categorical Industrial Users. These IU agreements have been prepared and executed. The effective date of the agreements was January 1, 2003. The IU and NCIU agreements require Industries to complete a pollution prevention audit and submit a summary of the findings to MSD (within 6 months), contribute half of their annual savings toward a supplemental environmental project (by end of each calendar year), and submit an annual certification to MSD (by end of each calendar year). The IU and NCIU agreements also contain other general requirements. Copies of these agreements were included in our 2002 Annual Report.

MSD will report on the results of the pollution prevention audits, the contributions to supplemental environmental projects and annual certifications in our next Annual Report. Failure to adhere to the terms of the agreement will be grounds for MSD to reissue an SIU permit to these industries.

2.7 Reallocation of Resources

MSD has developed a plan for reallocation of freed industrial resources with the involvement of stakeholders. Industries with less annual costs resulting from a change in their regulatory arrangement are required to contribute at least half of their annual savings to stakeholder-approved supplemental environmental projects. Table 2.7-1 lists the contributions made toward these projects. In 2003 the reallocation of resources will total \$6,854.

MSD has revised the sampling plan for the treatment plant, collection system and industries for 2003. The plan includes more emphasis on the SIUs and no sampling from the industries with Industrial Agreements. There are no projected savings for MSD as a result of this revised sampling approach. However, MSD believes the revised sampling plan is more specifically targeting the pollutants of concern.

2.8 Pollutant of Concern Initiatives

MSD continues to investigate initiatives to reduce pollutants of concern. The following table identifies the current thinking on potential initiatives to develop during this project:

Pollutant of Concern	Potential Initiatives
Copper	KPPC Industrial Audits, Additional “clean” analytical work, Watershed-based pollution prevention, Monitor trunk sewer and WTP influent loadings, Collaborate with Louisville Water Company to reduce corrosion, Reduce use of root control chemicals (copper sulfate), Establish BMPs for closed loop cooling & refrigeration systems.
Lead	KPPC Industrial Audits, Additional “clean” analytical work, Monitor trunk sewer and WTP influent loadings, Collaborate with Louisville Water Company to reduce corrosion, Review radiator shops in the area, work to establish BMPs.
Mercury	KPPC Industrial Audits, Additional “clean” analytical work, Watershed-based pollution prevention, Monitor trunk sewer and WTP influent loadings, Thermometer exchange sponsored by KPPC (via a grant), Meet with analytical laboratories in the area to establish BMPs.
Cyanide – Amenable	KPPC Industrial Audits, Additional “clean” analytical work, Consider using the most sensitive analytical technique available, Monitor trunk sewer and WTP influent loadings.
BOD	Monitor trunk sewer and WTP influent loadings.
TSS	Monitor trunk sewer and WTP influent loadings.
NH3-N	Monitor trunk sewer and WTP influent loadings.
Phosphorus	Monitor trunk sewer and WTP influent loadings, Restore tree canopy along Chenoweth Run

3.0 DATA COLLECTION AND TREND CHARTS

3.1 Monitoring

Data has been collected during the first half of 2003 as identified in the Appendix.

Stream monitoring is being conducted routinely by MSD staff for other purposes. Currently samples are collected twice a month and analyzed for TSS, metals and nutrients. Data collected from this effort will be summarized in our next Annual Report.

3.2 Trend Charts

The following trend charts have been developed for this report:

- 3.2-1 BOD for J-Town WTP Effluent (Monthly Average vs. Permit)
- 3.2-2 TSS for J-Town WTP Effluent (Monthly Average vs. Permit)
- 3.2-3 Ammonia-Nitrogen for J-Town WTP Effluent (Monthly Average vs. Permit)
- 3.2-4 Total Phosphorus for J-Town WTP Effluent (Monthly Average vs. Permit)
- 3.2-5 BOD for J-Town WTP Effluent (Weekly Average vs. Permit)
- 3.2-6 TSS for J-Town WTP Effluent (Weekly Average vs. Permit)
- 3.2-7 Ammonia-Nitrogen for J-Town WTP Effluent (Weekly Average vs. Permit)
- 3.2-8 Total Phosphorus for J-Town WTP Effluent (Weekly Average vs. Permit)
- 3.2-9 J-Town WTP Effluent non-Pollutants of Concern
- 3.2-10 J-Town WTP Effluent Copper
- 3.2-11 J-Town WTP Effluent Lead
- 3.2-12 J-Town WTP Effluent Mercury
- 3.2-13 J-Town WTP Effluent Amenable Cyanide
- 3.2-14 J-Town WTP Biosolids (all metals)
- 3.2-15 J-Town WTP Influent BOD
- 3.2-16 J-Town WTP Influent TSS
- 3.2-17 J-Town WTP Influent Ammonia-Nitrogen
- 3.2-18 J-Town WTP Influent Total Phosphorus
- 3.2-19 J-Town WTP Influent Copper
- 3.2-20 J-Town WTP Influent Lead

- 3.2-21 J-Town WTP Influent Mercury
- 3.2-22 J-Town WTP Influent Amenable Cyanide

All data presented in the trend charts was analyzed using MSD's "conventional" analytical techniques.

3.3 Narrative on Trends

A. Effluent Measures- Conventional Pollutants vs. NPDES Limits

The performance of the J-Town WTP with respect to conventional permit limits is shown on Figures 3.2-1 through 3.2-8. The figures depict the plant performance against the monthly average limits and against weekly average limits. The monthly average limits are compared to a 30-day moving average and the weekly average limits are compared to the seven-day moving average. BOD, TSS, and NH₃-N limits have been in effect for the entire period. The effluent limit for total phosphorus has only been in effect since November 2000.

From January 1, 2003 through June 30, 2003, the facility was in compliance with all limits for BOD, TSS, NH₃-N, and Phosphorus.

B. Biomonitoring vs. NPDES limit

MSD conducts quarterly biomonitoring for the J-Town WTP. Quarterly testing was completed in March and April 2003. The biomonitoring results from the first two quarters of 2003 did not show any effluent toxicity.

C. Metals and Organics vs. Water Quality Criteria

Quarterly monitoring of the effluent has been conducted twice between January and June 2003 for all metals and cyanide. The results have been compiled into a database and several trend charts. The effluent has not been sampled yet for priority pollutant organics (VOCs, semi-volatiles, pesticides, and base neutral compounds) in 2003. Sampling will be conducted in the next period.

The facility effluent was sampled for seven consecutive days each quarter. Composite samples were collected and analyzed for metals and Cyanide (amenable to chlorination). The data has been assembled into a database and trend charts have been created to display the concentration of specific metals against the lowest water quality criteria. The facility discharges into Chenoweth Run, a zero flow stream during dry weather. The consequence of this is no allowable dilution of the effluent can be included when computing typical water quality thresholds for toxic compounds. The lowest water quality criteria were presented in the J-Town Background Report and were based on an average WTP effluent hardness of 211 mg/L.

Figures 3.2-9 through 3.2-13 display the updated metals and cyanide data collected since 1999. The data has been normalized by dividing the concentration in the effluent by the lowest water quality criteria. The figures demonstrate Arsenic, Cadmium, Chromium, Nickel, Selenium, Silver, and Zinc were not present in the effluent above water quality criteria. The following parameters had multiple exceedances above the threshold set in this project for concern (which is 70% of the water quality criteria):

- * Copper was regularly above the threshold and occasionally above the water quality criteria.
- * Lead was above the water quality criteria and threshold on several occasions.
- * Mercury was occasionally above the water quality criteria and very often not detected in the effluent (Note: the lowest limit of detection for mercury is above the water quality criteria and the data point represented on the graph is half the level of detection).
- * Cyanide (Amenable) has not been detected in the effluent recently, however, the analytical detection limit is above the water quality criteria. (Note: the limit of detection for cyanide is above the water quality criteria and the data point represented on the graph is half the level of detection).

D. Aesthetic Quality

The operators of the J-Town WTP note any aesthetic concerns over the effluent quality in their daily log book. MSD has not encountered significant problems with the effluent aesthetic quality (as evidenced by solids, floatables, foam, or color) during the period from January 1, 2003 through June 30, 2003.

3.5.1 Biosolids Measures

A. Metals vs. 503 Regulations

Samples of the biosolids generated at the J-Town facility were taken (from the new plant biosolids storage tank) daily for four days during each quarterly sampling event. The samples were analyzed for metals and total solids. The results were converted into mg/KG concentrations for direct comparison to exceptional quality criteria in the EPA 503 regulations. MSD selected the 503 regulation concentrations in lieu of the state regulations since they offer a more national perspective in this study and MSD is currently not required to meet any standards. The data collected since 1999 have been entered into a database and trend charts were prepared.

Figure 3.2-14 displays the normalized concentration of all metals in the J-Town biosolids. The threshold selected for biosolids was 90% of the exceptional quality sludge criteria from the 40 CFR 503 regulations. With the exception of four data points for copper, all concentrations were below the 90% threshold criteria. This data indicates there are no metals of concern in the J-

Town biosolids. In reviewing the biosolids data, there are no increasing trends in metals concentrations that cause concern.

3.5.2 Other Measures

A. Chronic Maintenance Concerns in Collection System

MSD utilizes Hansen, a specialized computer program, to track maintenance problems in the collection system. Data are recorded in Hansen for any complaints or maintenance concerns for the collection system. MSD has not recorded any chronic maintenance problems in the collection system that were attributed to suspected industrial discharges from January 1, 2003 to June 30, 2003.

B. Chronic Maintenance Concerns at WTP

MSD utilizes System Accounting Process (S.A.P.), a computer program to track maintenance problems at their treatment facilities. Data are recorded in S.A.P. for any non-routine maintenance performed at the J-Town WTP. MSD has not recorded any chronic maintenance problems at the WWTP that were attributed to suspected industrial discharges from January 1, 2003 to June 30, 2003.

3.6 Future Efforts

MSD will continue implementing this project during the next six-month period. Substantial efforts over the next six months include:

- Review, summarize and follow-up with industrial users on their recently completed P2 Audits.
- Participate in the Chenoweth Run Clean-up, a supplemental environmental project sponsored through Project XL.
- Meet with the Louisville Water Company to continue discussion regarding the concentration of lead and copper in the drinking water. Propose a tap water sampling effort to obtain representative local data.
- Work with KPPC to summarize the results from the Mercury reduction grant including the mercury thermometer exchange and public informational booth at the Jeffersontown Gaslight Festival (Supplemental Environmental Project).
- Hold a Stakeholder Work Group meeting in early 2004 to review 2003 data, confirm SIUs and POCs. Work with the project stakeholders to identify and plan future supplemental projects.
- Consider a direct mailing of resources (including cost sharing information) for stream bank restoration to all property owners along Chenoweth Run to encourage tree planting and restoration of riparian zones.

- Continue project XL sampling at SIUs, collection system manholes, treatment plant influent/effluent/biosolids and Chenoweth Run.
- Summarize the results from the 'clean sampling/clean analytical' efforts conducted in 2003. Future 'clean sampling/clean analytical' efforts will be recommended.
- Begin preparation of the next Annual Report.
- Continue looking for avenues to publicize this project and commend the industrial users who are project partners.
- Make additional progress on POC strategies including BMP development.

Appendix - Summary of Data Collection Efforts for January 1 through June 30, 2003

Location	Parameter	Data Collection Efforts
J-Town WTP Effluent	Flow Conventionals Nutrients Metals & CN Organics Others (O&G) Biomonitoring	Daily and continuously Three days per week per KPDES Permit plus daily samples during weekly events below Three days per week per KPDES Permit plus daily samples during weekly events below Daily during weeks of February 11-17, May 13-19 None None Tests during months of each quarter
J-Town WTP Biosolids	Flow Nutrients Metals & CN	Daily volumes Four daily during weeks of February 17-23, May 13-19 Four daily during weeks of February 17-23, May 13-19
J-Town WTP Influent	Flow Conventionals Nutrients Metals & CN Organics Others (O&G)	Daily and continuously Three days per week per KPDES Permit plus daily samples during weekly events below Three days per week per KPDES Permit plus daily samples during weekly events below Daily during weeks of February 17-23, May 13-19 None None
Collection System MH1, MH2, MH3, MH4, MH5	Flow Conventionals Nutrients Metals & CN Organics Others (O&G)	Daily and continuously since approximately July 2000 for MH 1-4, weekly during sampling events for MH5. Daily during weeks of February 17-23, May 13-19 Daily during weeks of February 17-23, May 13-19 Daily during weeks of February 17-23, May 13-19 None None
Collection System MH6	Flow Conventionals Nutrients Metals & CN Organics Others (O&G)	Daily during sampling events for MH6. One sample during weeks of February 17-23, May 13-19 One sample during weeks of February 17-23, May 13-19 One sample during weeks of February 17-23, May 13-19 None None
Significant Industries tributary to MH1 (Russtech, Jones Plastic, Lantech)	Flow Conventionals Nutrients Metals & CN Organics Others (O&G)	Daily during period of February 17-23, May 13-19 Daily during period of February 17-23, May 13-19 Daily during period of February 17-23, May 13-19 None None

Appendix - Summary of Data Collection Efforts for January 1 through June 30, 2003
(Continued)

Location	Parameter	Data Collection Efforts
Significant Industries tributary to MH2 (White Castle)	Flow Conventionals Nutrients Metals & CN Organics Others (O&G)	Daily during period of February 17-23, May 13-19 Daily during period of February 17-23, May 13-19 Daily during period of February 17-23, May 13-19 Daily during period of February 17-23, May 13-19 None None
Significant Industries tributary to MH3 (None)	N/A	N/A
Significant Industries tributary to MH4 (None)	N/A	N/A
Industries tributary to MH5 (NONE)	N/A	N/A
Industries tributary to MH6 (NONE)	N/A	N/A
Chenoweth Run upstream and downstream	Conventionals Nutrients Metals & CN Organics Others (O&G)	One during weeks of February 17-23, May 13-19 One during weeks of February 17-23, May 13-19 One during weeks of February 17-23, May 13-19 None None