Techniques for Identifying and Correcting Illicit and Inappropriate Discharges

Task #1 Technical Memorandum

Attachment A: Techniques for Identifying & Correcting Inappropriate Discharges Program Survey

Introduction

To fulfill US EPA National Pollution Discharge Elimination System (NPDES) requirements, many communities are required to implement inappropriate discharge detection and elimination (IDDE) plans. Inappropriate discharges are typically from non-stormwater connections to storm drainage systems that can cause dry-weather flow. Examples of inappropriate discharges include pipes discharging wash or process water from laundry, car wash, industrial or other facilities by inappropriate connection to storm drain systems, or infiltration of non-storm discharges into storm drain systems such as groundwater, discharges from failed septic systems, leaks from sanitary sewer systems, and other sources.

The Center for Watershed Protection (Center) in partnership with Dr. Robert Pitt from the University of Alabama is working on a grant from the US EPA to investigate how communities are pursuing inappropriate discharge detection, identification and elimination by:

- Surveying NPDES Phase I or other communities having IDDE programs,
- Researching available literature on the subject,
- Conducting special laboratory and field tests to evaluate encouraging new techniques, and
- Preparing and testing a guidance document on IDDE for use by NPDES Phase I and Phase II communities.

Existing Program Review

One aspect of this project is to perform a review of existing inappropriate discharge detection, identification and elimination programs to determine what measures have been investigated and implemented, and to what extent the measures are effective and economical. To begin the data collection on existing programs, the Center has prepared the attached survey intended for managers of inappropriate discharge detection and elimination programs, or other personnel who may have the detailed information that is required to complete the form. In general, to complete the survey the respondent needs to answer questions about: community characterization; system characterization; inappropriate discharge detection, identification and elimination program characterization; legal authority; system mapping; and education, outreach and pollution prevention programs.

Once surveys are returned, reviewed and compiled, Center staff will make arrangements to visit up to three existing programs that appear to be most successful for an in-depth interview of program managers. All programs responding to surveys and informational requests within the project time frames will be acknowledged in the final guidance document.

Survey

The Techniques for Identifying & Correcting Inappropriate Discharges Survey (attached) can be completed on paper and returned to the Center at the address shown, or if you would rather complete an electronic form, the fax-back document (next page) can be returned to the Center and an electronic, MS Word formatted document will be e-mailed for completion. Please begin the survey by finding the proper person or people to complete the attached forms and encourage them to fill in the information requested. The questions are somewhat self explanatory, however please contact Mr. Dan O'Leary or Ms. Jennifer Zielinski of the Center with any questions by e-mail at djo@cwp.org or jaz@cwp.org or by telephone at (410) 461-8323 during normal east coast business hours. Thank you in advance for your time and effort.

Techniques for Identifying & Correcting Inappropriate Discharges
Program Survey

Contact Information

Name: _____

Title: _____

Organization: _____

Address: _____

_____

_____

Telephone Number: _____

Fax Number: _____

e-mail Address: _____

Please briefly describe your overall responsibilities with respect to implementation of your stormwater NPDES program:

_____

_____

_____

_____

_____

If additional room for writing answers to any of the questions is required please use the reverse of the sheet or additional paper as required. If you have information that you feel may be helpful in compiling these surveys, please feel free to submit written information with the returned survey.

Please return all surveys to:

Center for Watershed Protection
8391 Main Street
Ellicott City, Maryland 21043
Attn: Stephanie

If you would prefer to complete an electronic version of the survey, please complete this page and fax it to (410) 461-8324 Attn.: Stephanie.

A. Community Characterization

1. What is the form of government in your jurisdiction?

☐ City ☐ County ☐ Township ☐ Other

Please describe other: _____

2. What is the approximate percentage of each of the following land uses in your jurisdiction?

☐ Ultra-Urban ☐ Urban

☐ Suburban ☐ Rural

☐ Forested/Undeveloped

3. What is the approximate population density (people/square mile) in your jurisdiction? ☐

4. What is the approximate area (square miles) in your jurisdiction? ☐

5. What is the NPDES Status of your jurisdiction?

☐ Phase I ☐ Phase II

☐ Stormwater General Permit ☐ Not applicable

B. System Characterization

1. Please estimate the total length of each of the following stormwater conveyance systems that is present in your jurisdiction with respect to overall system length:

☐ Separate Storm Sewers ☐ Combined Sewers

☐ Open Drainage (channels/ditches/swales/stream) ☐ Other

Please describe other: _____

2. How does your community manage sanitary wastes (check all that apply)?

☐ Individual Septic Systems ☐ Community Septic Systems ☐ Community Wastewater Treatment Plants (WWTP) ☐ Centralized WWTP

☐ Other

Please describe other: _____

3. Approximately how many outfalls require screening in your jurisdiction?

4. Of the outfalls in the previous question, approximately how many are:

☐ Subject to tidal action ☐ Submerged in fresh water

C. Inappropriate Discharge Detection Elimination (IDDE) Program Characterization

1. Please indicate the staff time (person-years) dedicated to your IDDE Program annually:

☐ Administrative staff	☐ Field staff
☐ Professional office staff	☐ Interns
☐ Other: _____	

2. Please estimate the annual expenditure of your IDDE Program as follows:

$☐ Administrative staff	$☐ Field staff
$☐ Professional office staff	$☐ Interns
$☐ Office equipment (e.g., mapping & tracking software)	$☐ Field equipment (annualized cost)
$☐ Laboratory Costs	$☐ Correction Costs
$☐ Monitoring Costs	$☐ Other Costs
$☐ Total Annual IDDE Program expenditure	

Please briefly describe the basis for the costs (what do they include? labor, directs, overhead, etc.).

Staff: _____

Laboratory: _____

Other: _____

3. Please rank the top five IDDE program field equipment items being used by your jurisdiction (#1 being the item that your program could not survive without):

1. _____
2. _____
3. _____
4. _____
5. _____

C. Inappropriate Discharge Detection Elimination (IDDE) Program Characterization cont.

4. What is the approximate area covered by the IDDE Program (square miles)? ☐

5. What year was the IDDE Program implemented? ☐

6. Please provide a timeline of the implementation of the full Phase I program, and indicate where your jurisdiction currently is on this timeline: (e.g., Year 1: system mapping and outfall monitoring; Year 2: mapping verification in field; Year 3: identification of priority areas and begin corrective actions; Year 4: receiving water outfall response monitoring; etc.)

   Year 1: _____

   Year 2: _____

   Year 3: _____

   Year 4: _____

   Please continue on the reverse side of this page or add additional sheets as necessary.

7. What measurable goals are used to determine the success of your IDDE Program?

   ☐ Number of outfalls screened
   ☐ Complaints received and corrected
   ☐ Documented receiving water improvement
   ☐ Number of failed septic systems corrected
   ☐ Number of discharges and quantities of flows eliminated
   ☐ Number of dye or smoke tests conducted
   ☐ Other

   Please describe other: _____

   7a. Approximately how many storm drain outfalls have been screened by your jurisdiction? _____

   7b. Approximately how many of the outfalls screened in 7a. have demonstrated that they may include inappropriate discharges? _____

   7c. Approximately how many inappropriate discharges to storm drains have been eliminated to date?

   Please include narrative on additional sheets to describe information on your IDDE program that may be helpful for us to know that we have not asked for directly in this survey.

C. Inappropriate Discharge Detection Elimination (IDDE) Program Characterization cont.

7d. Of the inappropriate discharges detected (in 8b.), how many would be classified as:

☐ Pathogenic or toxic to humans ☐ Unpolluted water

☐ Toxic or threatening to aquatic life ☐ Unknown

☐ Other

Please describe other: _____

8. Does your IDDE Program go beyond EPA minimum requirements as specified in the Federal Register?

☐ Yes ☐ No ☐ Don't know

If yes, how? _____

9. Do you consider your IDD Program successful?

☐ Yes ☐ No

Why or why not? _____

10. What references and publications did you find most useful when the IDD Program was being developed?

_____

11. Have IDD Program staff or others involved published "lessons learned" papers based on experiences, successes, and failures of the program?

☐ Yes ☐ No

If yes, please provide references or submit copies with the returned survey.

D. Legal Authority

1. Does your jurisdiction have an ordinance, bylaw, rule, or regulation that specifically prohibits inappropriate discharges from entering MS4s?

   ☐ Yes ☐ No

   If yes, please provide a copy with the returned survey.

2. Does your jurisdiction have legal authority to inspect private properties for illegal discharges?

   ☐ Yes ☐ No ☐ Yes, with Administrative Search Warrant

3. Does your jurisdiction have legal authority to inspect connections during construction?

   ☐ Yes ☐ No

4. Describe the enforcement procedures and actions used by your jurisdiction:

E. System Mapping

1. Please indicate the type of system mapping used:

   ☐ GIS ☐ CAD ☐ Paper ☐ Other

   Please describe other: _____

2. Have field surveys been conducted to verify system mapping?

   ☐ Yes ☐ No ☐ In-Progress

   If yes or in progress, describe the field verification methods used: _____

3. Please indicate which system elements below are mapped (check all that apply):

   ☐ Storm sewers ☐ Combined sewers ☐ Sanitary sewers ☐ Outfalls ☐ Land use

   ☐ Building connections to storm sewers ☐ Building connections to sanitary sewers ☐ Building connections to combined sewers ☐ Open channels (conveyance channels) ☐ Hotspot areas (gas stations, etc.)

   ☐ Waters of the US receiving discharges from outfalls ☐ Connections to adjacent systems / communities ☐ Industrial discharge permit holders ☐ Other elements pertinent to the program

   Please describe other: _____

F. Identification of Suspected Inappropriate Discharges

1. Select the investigative procedure(s) used to determine the presence of a suspected inappropriate discharge to a MS4 or receiving water:

☐ Regular inspection of outfalls by jurisdiction	☐ Regular inspection of storm sewers	☐ Regular inspection of sanitary sewers	☐ Regular Inspection of septic systems
☐ Regular outfall inspection by watershed/citizen organization	☐ Sporadic outfall inspection by watershed/citizen organization	☐ Sporadic inspection of outfalls by jurisdiction	☐ Water quality monitoring of receiving waters
☐ Dye- or smoke-testing of buildings in problem areas	☐ Dye- or smoke-testing of buildings at the time of sale	☐ Pollution reporting hotline for citizens to call	☐ Other

Please describe other: _____

2. How often are routine inappropriate discharge investigations conducted?

2a. Are they conducted on a regular basis ☐ Yes ☐ No

Please indicate the basis (annual, semiannual, etc.) _____

2b. Are they conducted after periods of dry weather? ☐ Yes ☐ No

What is the criteria for dry weather or other sporadic investigations (after X days of rainfall<X inches, etc.)?

_____

_____

3. Please describe outfall, storm sewer, sanitary sewer, or receiving water inspection and monitoring techniques used:

_____

_____

_____

_____

Please return copies of any inspection checklists for field inspection forms with this survey.

G. Confirmation of Suspected Inappropriate Discharges

1. Are tracers used to confirm suspected inappropriate discharges? ☐ Yes ☐ No

G. Confirmation of Suspected Inappropriate Discharges cont.

2. What tracer parameters are used in your program to confirm existence of inappropriate discharges (check all that apply)?

☐ Temperature	☐ Odor	☐ Color	☐ Turbidity	☐ Changes in flow
☐ Floatable matter	☐ Deposits and stains	☐ Vegetation change	☐ Structural Damage	☐ Specific conductivity
☐ Ammonia / ammonium	☐ Hardness	☐ Fluoride	☐ Potassium	☐ Surfactants
☐ Florescence	☐ pH	☐ Chlorine		

☐ Other constituent indicative of manufacturing industrial activities

☐ Other, please list: _____

3. If tracers are used, describe verification methodology and process (e.g., type and number of tests conducted, laboratory processing time, etc.):

4. If tracer procedure used is based on methodology presented in a publication, please provide reference citations for your most frequently used publications:

5. How does your jurisdiction deal with tracers and outfall submergence by fresh water

6. How does your jurisdiction deal with tracers and outfall submergence by salt / brackish water?

H. Illegal Discharge Source Identification

1. What types of inappropriate discharges have typically been found in your community?

☐ Failing septic systems ☐ Inflow / infiltration ☐ Pump station failure ☐ Cross-connections ☐ Illegal dumping practices

☐ Combined sewer overflows ☐ Sanitary sewer overflows ☐ Connection of floor drains to storm sewer ☐ Improper disposal of wastes from recreational vehicles

☐ Broken sanitary sewer line ☐ Straight pipe sewer discharge ☐ Other ☐ Other industrial / commercial sources

Please describe other: _____

Please describe other industrial/commercial sources: _____

2. Approximately what percentage of inappropriate discharges detected has been traced to the source? ☐

3. What do you regard as the top three problems in identifying inappropriate discharge sources (e.g. periodic nature of discharges, traffic, accessibility, etc.)?

1. _____
2. _____
3. _____

I. Inappropriate Discharge Corrections Program

1. Please describe the your program's procedure for correcting an inappropriate discharge that has been identified (use the reverse side of this page or additional sheets as necessary):

_____

_____

_____

J. Education, Outreach, and Pollution Prevention Programs

1. Does your program include education and outreach elements?

☐ Yes ☐ No

1a. What sectors of the public are targeted in the program?

☐ Industrial ☐ Commercial ☐ Residential ☐ Government

1b. Please describe what you consider to be the most effective aspects of your education and outreach program:

_____

_____

_____

J. Education, Outreach, and Pollution Prevention Programs cont.

2. Does your jurisdiction participate in a program for recycling hazardous materials?

☐ Yes ☐ No

If yes, please describe the program (e.g., curbside pickup or drop off location, types of materials recycled, frequency, etc.):

3. Does your jurisdiction have a spill response and prevention program?

☐ Yes ☐ No

If yes, please describe the program:

K. Other Pertinent Programmatic Information Or References

The Center for Watershed Protection thanks you for participating in this survey. All parties responding to this survey will be mailed a CD containing over 150 watershed protection articles entitled “The Practice of Watershed Protection” for your gracious participation.

Techniques for Identifying and Correcting Illicit and Inappropriate Discharges

Task #1 Technical Memorandum

Attachment B: SURVEY PARTICIPANTS AND SUMMARY OF INFORMATION RECEIVED

SURVEY PARTICIPANTS AND SUMMARY OF INFORMATION RECEIVED

Completed Surveys Were Received from the Following Jurisdictions:

1. Ada County Highway District, Idaho
   Contact: Erica Maguire
   Supporting Information Returned:
   a. Dry Weather Monitoring Forms

2. Albuquerque, NM
   Contact: Charles Caruso

3. Alexandria, VA
   Contact: Bill Hicks

4. Arlington County, VA
   Contact: Jason Papacosma
   Supporting Information Returned:
   a. Field Screening Analysis Program (printed database screen)
   b. 2001 Annual Report NPDES Permit

5. Austin, TX
   Contact: Roger Glick
   Supporting Information Returned:
   a. COA Dry Weather Screening Field Notes

6. Baltimore City, MD
   Contact: Bill Stack
   Supporting Information Returned:
   a. Ammonia Screening/Watershed Survey Field Sheet
   b. Ordinance- Sewer Pretreatment
   c. Certification of Adequate Authority to Control Stormwater Quality and Quantity
   d. Ordinance- Sewer Service Charges

7. Boston Water and Sewer Commission, MA
   Contact: Amy Schofield
   Supporting Information Returned:
   a. Sanitary and Combined Sewer and Storm Drains Regulations
   b. Requirements for Site Plans
   c. A Systemic Methodology for the Identification and Remediation of Illegal Connections
   d. 2000 Annual Stormwater Management Report

8. Cambridge, MA
   Contact: John Nardone
   Supporting Information Returned:
   a. Sewer Use Regulations
   b. Letters of Enforcement

c. Build Inspection, Catch Basin Inspection and Manhole Inspection Forms
d. Sample Stormwater Monitoring Plan
e. Hazardous Waste Day Flyer
f. Chain of Custody/Field Form (faxed separately from survey)

9. Clackamas County, OR
Contact: Andrew Swanson
Supporting Information Returned:
a. Illicit Discharge Elimination Program PowerPoint Presentation
b. Annual Report 1999
c. Field Reconnaissance Data Sheet
d. Standard Operating Procedure for Spills and/or release of Dangerous/Hazardous Materials

10. Dayton, OH
Contact: Michele Jones
Supporting Information Returned:
a. MS4 Dry Weather Sampling coordination sheet
b. Dry Weather Screening Data Form
c. Educational Flyers (From Site Visit)
i. General Homeowner Education
ii. Stormwater Utility Information
iii. ESC at Construction Sites
iv. Service Station Pollution Reduction
v. River Index Monitoring Information
vi. Orphan Drain Program

11. Durham, NC
Contact: John Cox

12. Falls Church, VA
Contact: Moe Wadda

13. Howard County, MD
Contact: Angeles Morales

14. Knoxville, TN
Contact: David Hagerman

15. Lakewood, CO
Contact: Alan Searcy

16. Montgomery County, MD
Contact: Meosotis Curtis
Supporting Information Returned:
a. Emergency Code Amendment to give county authority to regulate pollutants & inspection / enforcement authority
b. Dept Environmental Protection Field Inspection request form

c. Stormdrain outfall monitoring/follow-up investigation form

17. Phoenix, AZ
Contact: Michael Loffa
Supporting Information Returned:
a. Complaint Investigation Form
b. Stormwater Compliance Inspection Report

18. Portland, OR
Contact: Ali Dirks
Supporting Information Returned:
a. Outfall Inspection Form
b. Industrial Stormwater Code

19. Raleigh, NC
Contact: Mark Senior
Supporting Information Returned:
a. Illicit Discharge Complaint Form
b. Illicit Discharge Ordinance
c. Optical Brightener Monitoring of Pigeon House Branch Observations (From Site Visit)

20. Seattle, WA
Contact: Beth Schmoyer
Supporting Information Returned:
a. Business Inspection Checklist

21. Springfield, MO
Contact: Todd Wagner, P. E.
Supporting Information Returned:
a. Ordinance "dealing with discharge of pollution to city waters . . ."

22. Thousand Oaks, CA
Contact: Arne Erik Anselm
Supporting Information Returned:
a. Stormwater Management Regulations (1999)
b. Excerpt from Illicit Discharge Response Guide

23. Wayne County, MI
Contact: Dean Tuomari
Supporting Information Returned:
a. “The Do’s and Don’ts on Implementing a Successful Illicit Connection Program”
b. Summary of Impacted Uses
c. Summary of Recommended Corrective Actions
d. Prioritization Scheme for businesses
e. Type of Violations
f. Excerpt Watershed ‘96
g. Excerpt Watershed Management: Moving from Theory to Implementation

h. Types of Violations
i. Visit Procedure
j. Sample Correspondence
k. Field Inspection Result Form
l. Field Observation Worksheet
m. Tannin and Lignin Survey
n. Environmental Complaint Form
o. Enrolled Disposal Ordinance
p. Municipal Civil Infraction Ordinance
q. On-site Sewage Treatment Management Guidance Document (from site visit)
r. Chapter 2: Municipal Civil Infractions
s. Excerpt from paper submitted to Water Environment Federation 2002 Tech Conference
t. Educational material (from site visit)
    i. Homeowner CSO information Flyer
    ii. Rouge River Activity Book
    iii. Watershed Demo fact sheet
    iv. CSO Demo Fact sheet
    v. Homeowner Septic Site Record Folder
    vi. Homeowner septic reference guide
    vii. Wayne County Septic Ordinance brochure
    viii. "I think I saw a fish" door hanger

24. Worcester, MA
Contact: David Harris

The Following Jurisdictions Submitted Support Documents Only:

25. Baltimore County, MD
Contact: Stephen Adamski
Supporting Information Returned:
a. Introduction to NPDES-Municipal Stormwater Discharge Manual of Practice for Detection and Removal of Illicit Connections
b. Outfall Selection Procedure
c. Office Procedures
d. Field Procedures
    i. Field Photographic Log
    ii. Field Equipment List
e. Calibration and Maintenance
    i. Summary of Special Sampling and Handling Requirements
f. Safety
    i. Spill Response Procedure
g. Manual Contents
h. Manual Cover
i. Excerpt from 2001 Annual Report - Illicit Connection Program

26. Fort Worth, TX
Contact: Brian Camp

Supporting Information Returned:

a. TPDES MS4 Storm Water Permit Application: Storm Water Management Plan
b. Field screening protocol with printed database screen

27. Nashville, TN

Contact: Michael Hunt

Supporting Information Returned:

a. Procedures for Field Screening and Investigations

Jurisdictions that Did Not Respond to the Survey Include:

28. Colorado Springs, CO
29. Galveston County, TX
30. Washtenaw County, MI
31. Alameda County, CA
32. Brookline, MA
33. Harris County, TX
34. Honolulu, HI
35. Jefferson County, AL
36. Los Angeles County, CA
37. Milwaukee, WI
38. Montgomery, AL
39. Oakland County, MI
40. Oklahoma City, OK
41. Orange County, CA
42. Ventura County, CA
43. Gresham, OR
44. Mecklenburg, NC
45. Anchorage, AK
46. Aurora, CO
47. Boise, ID
48. Dallas, TX
49. Denver, CO
50. Fairfax County, VA
51. Frederick County, MD
52. Louisville, KY
53. Northern Virginia Regional Commission, VA
54. Sacramento, CA
55. Salt Lake County, UT
56. San Diego County, CA
57. Southfield, MI

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Task #1 Technical Memorandum

Attachment C: SUMMARY OF THE SURVEY RESULTS

A. Community Characterization

1. What is the form of government in your jurisdiction?

18 -City | 5 - County | 0 - Township | 1 – Other: Special Purpose District

2. What is the approximate percentage of each of the following land uses in your jurisdiction?

Ultra-Urban: 0% – 100%
Urban: 0% – 90%
Suburban: 10% – 60%
Rural: 0% – 30%
Forested/Undeveloped: 0.5% – 47%

3. What is the approximate population density (people/square mile) in your jurisdiction?

Range: 175 people / square mile – 15,000 people / square mile
Median = 2,537 people / square mile

4. What is the approximate area (square miles) in your jurisdiction?

Range: 2 square miles – 614 square miles
Median = 77 square miles

5. What is the NPDES Status of your jurisdiction?

20 - Phase I
3 - Phase II
2 - Stormwater General Permit
0 - Not applicable

* Ada County Highway District, ID, covers two both Phase I and Phase II jurisdictions

B. System Characterization

2. How does your community manage sanitary wastes (check all that apply)?

16 - Individual Septic Systems | 2 - Community Septic Systems | 4 - Community Wastewater Treatment Plants (WWTP) | 22 - Centralized WWTP

1 – Other: Sand filter technology

3. Approximately how many outfalls require screening in your jurisdiction?

Range: 0 outfalls – 7,165 outfalls
Median = 204 square miles

C. Inappropriate Discharge Detection Elimination (IDDE) Program Characterization

1. Please indicate the staff time (person-years) dedicated to your IDDE Program annually:

Administrative staff: 0 – 2
Field staff: 0.04 – 6
Professional office staff: 0 – 2
Interns: 0 – 1
Other: 0.75 – 1.75

2. Please estimate the annual expenditure of your IDDE Program as follows:

Administrative staff: $0 - $180,235	Field staff: $1,000 - $412,000
Professional office staff: $0 - $132,000	Interns: $0 - $24,000
Office equipment (e.g., mapping & tracking software): $0 - $5,000	Field equipment (annualized cost): $50 - $35,000
Laboratory Costs: $300 - $87,000	Correction Costs: $0 - $75,000
Monitoring Costs: $0 - $250,000	Other Costs: $1,000 - $285,000

Total Annual IDDE Program expenditure: $6,150 - $709,000

3. Please rank the top five IDDE program field equipment items being used by your jurisdiction (#1 being the item that your program could not survive without):

- Water quality test kits (Cl, Cu, detergents, phenols)
- Hach Test Kit Samplers (phosphate, Cl, pH, temperature, DO meter, SenSion electrode monitor, data logging Colorimeter)
- Hydrolab multi-meter (pH, conductivity, temperature, DO)
- Portable spectrophotometer (Hach Spectrophotometer)
- Portable field meters (conductivity, gas, DO, temperature, pH, residual chlorine)
- CHEMetrics field test (ammonia, detergents)
- YSI Water Quality Sensor Array
- Automatic sampling equipment (flowmeters & samplers)
- Sampling bottles, buckets
- Dye testing equipment
- Smoke testing equipment
- Television inspection equipment
- Sand bags
- Manhole hooks
- Maps
- Spot lights
- Mirrors
- Handheld GPS units
- Computers, database program
- Camera
- Field vehicle
- Field items: waders, machete, mask, gloves, walkie-talkies
- Confined space equipment
- Sewer cleaning vehicles

4. What is the approximate area covered by the IDDE Program (square miles)?

Range: 6.25 square miles – 498 square miles

5. What year was the IDDE Program implemented?

Range: 1987 – 2001

7. What measurable goals are used to determine the success of your IDDE Program?

16 - Number of outfalls screened	19 - Complaints received and corrected	6 - Documented receiving water improvement	4 - Number of failed septic systems corrected
11 - Number of discharges and quantities of flows eliminated	4 - Number of dye or smoke tests conducted	4 – Other (Educational programs conducted / # of people impacted; Number of warning letters sent; Completion of system mapping within permit timeframe)	

7a. Approximately how many storm drain outfalls have been screened by your jurisdiction?

Range: 1 outfall – approx. 1,000 outfalls

7b. Approximately how many of the outfalls screened in 7a. have demonstrated that they may include inappropriate discharges?

Range: 0 outfalls – approx. 200 outfalls

7c. Approximately how many inappropriate discharges to storm drains have been eliminated to date?

Range: 0 – 1,134 inappropriate discharges

8. Does your IDDE Program go beyond EPA minimum requirements as specified in the Federal Register?

12 - Yes 5 - No 5 - Don't know 2 – N/A

If yes, how?

Albuquerque, NM	Yes	"[The program] exceeds discharge monitoring requirements."
Arlington Co., VA	Yes	"[The program] includes optical brightener monitoring as well as new follow-up procedures (see attached) "
Baltimore City, MD	Don't know	"Federal Register is somewhat ambiguous"
Boston, MA	Yes	"See 2000 Annual Stormwater Report and paper Entitled - Systematic methodology for the Identification and Remediation of Illegal Connections (enclosed)."
Clackamas Co., OR	Yes	"We monitor some minor outfalls on an annual basis. We also control illicit discharges from private storm sewers to public waters, if possible."
Dayton, OH	Yes	"Community Education Initiatives - school age children, residents, and City professional staff."
Durham, NC	Yes	"Stream monitoring"
Howard Co., MD	Yes	"Howard County tests every outfall for the parameters"
Montgomery Co., MD	Yes	"Our program approach is set up not to just screen random outfalls, but rather to aggressively target identified problem areas to reach potential polluters and prevent illegal discharges to the County system."
Phoenix, AZ	Yes	"30% outfall inspections/year."
Portland, OR	Yes	"We have documented plumbing and sewer connection records for all commercial and industrial facilities located in each outfall drainage basin. This provides us with quick and comprehensive info about all potential sources of IDDE."
Raleigh, NC	Yes	"Far more monitoring than suggested by EPA"
Springfield, MO	Yes	"Digital mapping of system"
Worcester, MA	Don't know	"We proposed a program to EPA Boston officials and they approved it."

9. Do you consider your IDD Program successful?

20 - Yes 1 - No 4 – N/A

Why or why not?

Albuquerque, NM	Yes	• Currently meeting requirements of pending EPA Discharge Permit

Arlington Co., VA	Yes	• Screen all required outfalls each year of permit • Perform follow-up investigations for suspicious outfalls • Eliminated 1 major cross connection • Support NVRC OBM monitoring
Austin, TX	Yes	• Able to verify success of other programs by this and other departments of the City of Austin
Baltimore City, MD	Yes and No	• Have been able to identify numerous sanitary leaks, etc. • Have not had sufficient resources to fully implement program, number of problems has not diminished since program began • Sanitary leaks uncovered are small part of a system-wide failure that contributes pollutants in a non-point source fashion
Boston, MA	Yes	• 863 illegal connections have been identified, 770 of which have been eliminated (as of December 1 2001) • Approximately 430,000 gallons of sewage have been removed from drainage system
Clackamas Co., OR	Yes	• We remove 10-20 illegal point sources each year
Durham, NC	Yes	• Water quality is improving in most urbanized streams for targeted parameters (fecal coliform, DO)
Knoxville, TN	Yes	• Identification and elimination of many illicit discharges
Montgomery Co., MD	Yes	• Not from outfall screening • Through the water quality outreach, complaint, and enforcement system • Discovers 8-12 illicit connections each year, about 50% traced to the source • Investigates ~ 250 complaints each year, over 75% resolved by identifying the responsible party or cause of the pollution
Phoenix, AZ	Yes	• Educate the general public to recognize storm drain pollution and to stop discharges when practical • Educate business owners/operators and government employees concerning SW • Enforcement activities related to illegal discharges increasing as City grows and public becomes aware of what to look for and who to call about the discharge • Other cities ask for our assistance in preparing Phase I and 2 storm water programs, use Phoenix storm water logo to identify catch basins and outfalls, the Phoenix SW coloring book (Storm Drain Dan) for educating school children • Talk among the local cities concerning a regional storm water program based on the Phoenix SWM program • Phoenix is 1st city in the country to be audited by the EPA for a storm water program, EPA has told other cities, counties and states to contact Phoenix concerning our SW program
Portland, OR	Yes	• Noticeable decline in discharges that are toxic to humans and aquatic life
Raleigh, NC	Yes	• Successful in identifying and eliminating numerous discharges
Thousand Oaks, CA	Yes	• Reports of potential discharges have doubled (+/-) every year, meaning people are more aware that the storm drain system is not for disposal of waste
Wayne Co., MI	Yes	• Effective at removing pollutant load to the river
Worcester, MA	Yes	• Have removed millions of gallons of sewerage from receiving waters

10. What references and publications did you find most useful when the IDD Program was being developed?

Arlington Co., VA	• Use of tracers to identify sources of contamination in dry weather flow (Pitt and Lalor, 1999)
Austin, TX	• Use of tracers to identify sources of contamination in dry weather flow (Pitt and Lalor, 1999)
Baltimore City, MD	• Investigation of Inappropriate Pollution Entries into Storm Drainage Systems: A User's Guide (Pitt et al., 1993)
Cambridge, MA	• Investigation of Inappropriate Pollution Entries into Storm Drainage Systems: A User's Guide (Pitt et al., 1993)
Clackamas Co., OR	• Federal Register • State of Oregon DEQ personnel
Durham, NC	• General Knowledge of Wastewater Characteristics (Metcalf and Eddy) • Investigation of Inappropriate Pollution Entries into Storm Drainage Systems: A User's Guide (Pitt et al., 1993) • Various publications from EPAs Rouge River National Demonstration Project • "There is a critical need for more publications on IDD. The EPA Draft Manual of Practice Identification of Illicit Connections," Sept. 1990 needs to be updated and expanded. There needs to be an evaluation of techniques like infrared aerial photography and optical brightener testing. A lot of what we use is based on knowledge of wastewater chemistry."
Howard Co., MD	• State codes and references
Lakewood, CO	• Federal Register • Stream Classifications for State Waters
Montgomery Co., MD	• Many Federal, state, other localities but do not recall any as outstanding in usefulness
Phoenix, AZ	• 40CFR122, OSHA confined space regulations
Raleigh, NC	• "Very few were useful. We had to develop our own program and are still fine tuning methods."
Springfield, MO	• Missouri DNR and EPA publications and standards
Thousand Oaks, CA	• NPDES Permit and Management Plan for Thousand Oaks, CA
Wayne Co., MI	• "There were not any in 1987, however, we did have conversation with Washtenaw County's Huron River Pollution Abatement Project."

11. Have IDD Program staff or others involved published "lessons learned" papers based on experiences, successes, and failures of the program?

3 - Yes 17 - No 4 - N/A

Boston, MA	Jewell, C. 2001."A Systematic Methodology for the Identification and Remediation of Illegal Connections." 2001 Collection Systems Odyssey: Combining Wet Weather and O&M Solutions. Water Environment Federation.
Clackamas Co., OR	presentation at statewide conference for Phase II municipalities
Wayne Co., MI	"Visit our website www.wcdoe.org/rougeriver. This division has developed an Illicit Detection Elimination Plan (IDEP) Training Program, see attachment K.1"

D. Legal Authority

1. Does your jurisdiction have an ordinance, bylaw, rule, or regulation that specifically prohibits inappropriate discharges from entering MS4s?

20 - Yes 3 - No 1 - N/A

2. Does your jurisdiction have legal authority to inspect private properties for illegal discharges?

16 - Yes	2 - No	4 - Yes, with Administrative Search Warrant	2 - N/A

3. Does your jurisdiction have legal authority to inspect connections during construction?

21 - Yes	3 - No

4. Describe the enforcement procedures and actions used by your jurisdiction:

ACHD, ID	"Enforcement protocol would be handled by amending or pulling of the Right of Way Permit. In areas where this would not apply, we work with the co-permittees via Interagency Agreement for enforcement."
Albuquerque, NM	"New stormwater ordinance being developed. Currently use control actions in existing sewer and wastewater ordinances."
Arlington Co., VA	"Have not taken any enforcement actions to date; 1 major cross connection found was corrected, but no penalties were levied. Attached excerpt from County's Utilities Ordinance, along with draft administrative regulation, outlines legal and policy framework for regulating non-stormwater discharges in accordance with MS4 permit provision allowing discharges of non-stormwater that are not significant sources of pollutants."
Austin, TX	"Verbal and written order for compliance and remediation; Class C misdemeanor; referral to state and federal agencies for investigation and enforcement actions."
Baltimore City, MD	"There is not a standard enforcement procedure we have only had to use enforcement on brick cleaning operations where we have issued stop work orders, and issued fines. We have also approached property owners and for the most part they have complied without having to do more then sending them a letter."
Boston, MA	"See the 2000 Annual Stormwater Report (sections 1.3, 2.1, 2.2, 2.3, 2.4, and 6.0), the Commission's Sewer Use Regulations and the Requirements for Site Plans."
Cambridge, MA	"See attachment"
Clackamas Co., OR	"Letters; inspections; civil penalties (rarely used for it is rarely necessary); coordination with Oregon's DEQ"
Dayton, OH	"Coordinate plans review of storm water design prior to construction, inspect site during construction to ensure proper construction, coordinate with EPA to pursue illegal dischargers, write notices of violation and warning letters, routine outfall/storm sewer observations near repeat offenders"
Durham, MA	"NOV, Administrative fines, civil actions"
Howard Co., MD	"Howard County notifies the responsible individuals of the violation, either through a phone call or a letter. The County follows up the violation with a site visit."
Knoxville, TN	"Penalty = $50 to $5,000 per day per discharge"
Lakewood, CO	"Personal Contact, Citation, District Court"
Montgomery Co., MD	"Field investigations for water quality complaints; civil fine system; State and Federal Clean Water Act for criminal investigations; cam enter suspect property with administrative order OR if immediate risk to human health and the environment, then can enter without administrative order to remove source of risk"

Phoenix, AZ	"Verbal or written cease and desist order, Advisory letter, Warning letter, Notice of Violation letter, and Compliance Status Review Meeting where monetary penalties are assessed. Businesses also receive a SW Compliance Inspection letter, Storm Water Management Plan Revision letter as well as a Closure letter. Further non-compliance with city code and the CWA is forwarded to the US EPA for enforcement action."
Portland, OR	"See support documents"
Raleigh, NC	"Usually warning letter, follow up inspection, second letter and then levy a fine if necessary"
Seattle, WA	"1) Issue Notice of Violation (per city code), can issue fine up to $500/day. Triple penalties allowed for repeat violations, deliberate violations, violations causing harm to public, private property (note: SPU has not yet exercised enforcement authority- generally have been able to achieve voluntary compliance); 2) for NPDES permitted facilities refer to State Department of Ecology"
Springfield, MO	"After detection entry onto suspect property is made and necessary inspection/tests are done. If violation is found, a Notice of Violation is made and city works with violator to correct. Legal action in accordance with city code is taken if violation is not corrected."
Thousand Oaks, CA	"See ordinance - Notice of Violation, Administrative Compliance Order, Cease and Desist"
Wayne Co., MI	"See attachment D4"
Worcester, MA	"Most of our enforcement actions take advantage of existing city and state laws including the Massachusetts Wetland Protection Act, and the Massachusetts Storm Water Policy."

E. System Mapping

1. Please indicate the type of system mapping used:

20 - GIS | 7 - CAD | 15 - Paper | 3 - Other

Describe other:

- Microfiche
- Record plans

Detailed Summary:

6 - GIS	1 - CAD	2 - Paper
4 - GIS + CAD + Paper	1 - GIS + CAD	7 - GIS + Paper
1 - GIS + CAD + Record Plans	1 - GIS + Paper + Record Plans	1 - GIS + Microfiche

2. Have field surveys been conducted to verify system mapping?

11 - Yes | 3 - No | 5 - In-Progress | 5 - Yes & In-Progress

3. Please indicate which system elements below are mapped (check all that apply):

23 - Storm sewers	7 - Combined sewers	15 - Sanitary sewers	19 - Outfalls	16 - Land use
6 - Building connections to storm sewers	5 - Building connections to sanitary sewers	2 - Building connections to combined sewers	17 - Open channels (conveyance channels)	2 - Hotspot areas (gas stations, etc.)
20 - Waters of the US receiving discharges from outfalls	6 - Connections to adjacent systems / communities	8 - Industrial discharge permit holders	9 - Other elements pertinent to the program	

Please describe other:

- Contaminated groundwater sites
- Sinkholes
- FEMA floodplains
- Stormdrain outfall drainage area
- Licensed businesses, SIC codes, industrial permittees
- Stormwater pumping plants
- Possible illicit connections
- Stormwater treatment facilities
- Producers of significant fats, oil and grease
- Streets, alleys, and drainage easements
- Sanitary Sewer treatment facilities planned for future
- Watershed boundaries

F. Identification of Suspected Inappropriate Discharges

1. Select the investigative procedure(s) used to determine the presence of a suspected inappropriate discharge to a MS4 or receiving water:

16 - Regular inspection of outfalls by jurisdiction	13 - Regular inspection of storm sewers	10 - Regular inspection of sanitary sewers	0 - Regular Inspection of septic systems
5 - Regular outfall inspection by watershed/citizen organization	8 - Sporadic outfall inspection by watershed/citizen organization	5 - Sporadic inspection of outfalls by jurisdiction	15 - Water quality monitoring of receiving waters
10 - Dye- or smoke-testing of buildings in problem areas	1 - Dye- or smoke-testing of buildings at the time of sale	19 - Pollution reporting hotline for citizens to call	4 – Other

Please describe other:

- Sporadic inspection in problem areas
- Septic systems inspected at time of sale
- Inspectors dye test/video inspect areas w/ suspected illicit connections identified during routine business inspections
- Dry weather and wet weather screening
- TV inspection of storm sewers
- Water quality monitoring of discharging waters
- Complaints from ACHD inspectors and co-permittees

2. How often are routine inappropriate discharge investigations conducted?

2a. Are they conducted on a regular basis	17 - Yes	5 - No	2 - N/A
See attached table for more information.			
2b. Are they conducted after periods of dry weather?	18 - Yes	3 - No	3 - N/A
See attached table for more information.			

3. Please describe outfall, storm sewer, sanitary sewer, or receiving water inspection and monitoring techniques used:

ACHD, ID	The outfalls are visually inspected for physical hydraulic data such as flow and structural condition, as well as estimation of flow, if present. If flow is present then a qualitative assessment is done to determine if it is an illicit discharge. This assessment includes looking at water color, odor, turbidity, floatables, sedimentation. If the flow is suspected to be illicit, a follow-up grab sample is taken. This sample is taken to a lab for analysis to better pinpoint the illicit discharge source.
Albuquerque, NM	Automatic water quality samplers at each outfall sample each discharge event.

Arlington Co., VA	Visual inspection (see attached inspection checklist) + colorimeter tests at 20% of required outfalls each year; beginning in FY02, new follow-up procedures based on Lalor and Pitt (1999) will be used (see attached excerpt from FY01 MS4 annual report); will conduct TV inspections and smoke tests of suspicious storm sewer lines if strong evidence (visual, odor, or through sampling) of contamination
Austin, TX	See inspection form
Baltimore City, MD	Weekly screening of receiving waters using hydrolab or equivalent and field test kit for ammonia. When a threshold value is exceeded, sampling continues upstream until the source is located. To address chronic problems, a monthly sampling program is conducted using an extensive variety of laboratory-analyzed chemical parameters at approximately 40 receiving water stations. When long-term medians exceed a certain percentile based on the entire database, investigations are conducted by sampling further upstream in the storm drain network.
Boston, MA	See Annual Report (Sections 2.1 and 3.0)
Cambridge, MA	Visual, Dye Testing, Television and Water Quality Testing. See attachment #3
Clackamas Co., OR	use WQ monitoring equipment; use eyes and nose (at safe distance)
Dayton, OH	Visual observations for discoloration and odor by sewer maintenance crews, call to environmental staff if anything is out of ordinary, environmental field crews screen water sample and track to origin, collect sample for lab analysis when appropriate.
Durham, NC	Outfalls and suspected discharges are screened for ammonia, phosphate, chloride detergents, copper, phenols. Streams monitored for fecal coliform with some stations monitored for Cu & Zn and nutrients.
Howard Co., MD	Chemical testing
Knoxville, TN	Approximately 150 outfalls/ year are selected and inspected for dry weather flow. If the outfall is flowing, the discharge is sampled and traced to the source if contaminated.
Lakewood, CO	Visual, T.V. Sampling as required
Montgomery Co., MD	Storm drains were identified using the County's GIS storm drain inventory. A Hydrolab meter was used to measure pH, temperature, conductivity, and dissolved oxygen. The meter was calibrated prior to each use. The measurements for pH were made in Standard Units and units for temperature are in degrees centigrade. The dry weather flow screenings were made using Chemetrics VVR colorimetric test kits for phenol, copper, detergent and chlorine. All units are reported in parts per million and levels below the lowest detectable limits of the kit were not recorded or noted as BDL.
Phoenix, AZ	Outfalls are inspected/monitored for all NPDES parameters once every 5 years as required by the SW permit. Field screening is conducted on dry-weather flows that are observed during the outfall inspection as required. Video inspections are conducted on high priority outfalls in an attempt to trace illicit dry-weather flows. There are NO receiving waters in the City, only dry washes or riverbed called Waters of the US, therefore no inspection is possible on receiving waters. The sanitary sewer is a separate system and is part of the Water Services Dept.
Portland, OR	See support document
Raleigh, NC	Visual for flow, odor, color. If suspicious flow then we take sample and analyze
Seattle, WA	See attached Business Inspection Form
Springfield, MO	Visual inspection for discharge, if discharge exists test with field kit and check DO, pH, conductivity, temperature to determine if illicit discharge exists, further lab analysis if necessary.
Thousand Oaks, CA	Visual, T.V. Sampling as required
Wayne Co., MI	Visual observations, odors, grab sample, dye aesthetics

Worcester, MA	For outfall inspection we first generate a list and map of all outfalls in area to be screened. Then we locate the outfalls during dry weather and screen them. We test for Conductivity, Turbidity, DO, Chlorine, Temp., and pH. We also measure flow and do a visual inspection for oil sheen, sewage, soapsuds, odors, and condition of outfall. We then return to the outfall within 4 - 24 hours to re-screen. In the past we used to test for surfactants but as of 2001 we no longer use this test. We found that doing this test that uses Chloroform did not significantly increase any indications of an illicit discharge that a good visual inspection would locate.

G. Confirmation of Suspected Inappropriate Discharges

1. Are tracers used to confirm suspected inappropriate discharges? 17 - Yes 5 - No 2 - N/A

2. What tracer parameters are used in your program to confirm existence of inappropriate discharges (check all that apply)?

18 - Temperature	20 - Odor	20 - Color	16 - Turbidity	13 - Changes in flow
18 - Floatable matter	19 - Deposits and stains	13 - Vegetation change	11 - Structural Damage	13 - Specific conductivity
11 - Ammonia / ammonium	2 - Hardness	7 - Fluoride	3 - Potassium	10 - Surfactants
5 - Florescence	18 - pH	16 - Chlorine		
12 - Other				

4 - Other constituent indicative of manufacturing industrial activities

Other:

- BOD
- Iron
- Phosphorus
- Copper
- Lead
- Scum
- Detergents
- Manganese
- Silver
- Dissolved oxygen
- Metals
- Sodium
- Dissolved solids
- Nickel
- Suds
- E. coli
- Nitrate, nitrite
- Sulfate
- Fecal coliform
- Nutrients
- Sulfide
- Flow rates
- ORP
- Volatile organics
- Grease, oil, oil sheen
- Phenol
- Zinc
- Hexavalent chromium
- Phosphates

3. If tracers are used, describe verification methodology and process (e.g., type and number of tests conducted, laboratory processing time, etc.):

ACHD, ID	Grab samples are taken at the outfall. The type of method is site specific, depending on land uses of that drainage basin and the suspected tracers found on visual inspection. Lab tests are typically a 2-week turn around time.
Arlington Co., VA	Cl, Cu, phenols, and surfactants: colorimeter tests in lab using Hach Storm Water Test Kit (#); 2 tests conducted if contamination found; approximately 5 minutes/test. NH3, Fl: Hach DR850 colorimeter; 2 tests conducted if contamination found; approximately 5-20 minutes/test. K: still determining best analytical method
Austin, TX	See reference in C. 10

Baltimore City, MD	Tracers from laboratory tests can only identify chronic problems. While we have not spent too much time addressing these dischargers, our approach is to take additional samples further upstream at strategic points indicated by land use or industry types. For field tracers, the tracer is continually sampled at strategic points upstream until the source is identified. Lab time is usually 2-3 weeks. We have had success with field tracers especially ammonia in detecting sewage leaks.
Boston, MA	A field test is used to test flow for surfactants and ammonia
Cambridge, MA	See attachment # 4 Stormwater Monitoring Work Plan
Clackamas Co., OR	Most data is collected in the field with portable meters. Lab tests are slow. Illicit discharges usually last for minutes so time to find the source is very limited.
Dayton, OH	Field screen w/ pH paper and Hach test Kits >2X, Attempt to trace to source to identify constituents/hazards, Collect a laboratory sample and analyze for VOC's, TPH, etc, Dye test suspected discharge source
Durham, NC	Selection of appropriate tracer is at the discretion of experienced field technicians, who consult with professional office staff on difficult situations.
Knoxville, TN	A flow sample is obtained and tested with a CHEMetrics field test kit for the parameters listed above
Lakewood, CO	Application of dye to suspected illicit connection locations and monitoring for color at outfall
Montgomery Co., MD	Property owner permission is obtained for testing. Dye tablets are flushed or washed down suspicious drains. Staff begin to check problem outfalls after 1 hour and continue periodic checking up to 48 hours.
Phoenix, AZ	Field screening of a dry-weather flow takes about 2 hours to conduct. The field screening is completed two times in 24 hours. The same tests are run each time. See the tests listed above in G2.
Portland, OR	All basic tracers are done in field (pH, temp, conductivity, iron, copper, residual chlorine) for real time results; Fecal coliform samples are taken back to laboratory for processing. It takes 24 hours to get results back.
Raleigh, NC	Samples are processed at our own wastewater lab for up to 20 parameters. Results usually take one to two weeks
Seattle, WA	Field test kits yield immediate results, follow up lab work ASAP dependent on test procedure
Wayne CO., MI	Ammonia surfactants, pH, conductivity done with field kits or meters in the field. E. Coli delivered to EPA approved lab within 4 hours
Worcester, MA	Visual inspection is first performed to determine what type of test would be best suited for the area. In areas with large flows coliform testing is performed. Samples are taken to a city lab and results are available in 24 hours. In storm sewers with smaller flows coliform testing and or sandbagging is used to narrow down the area to search. When an suspect area is found a TV" inspection is performed by sewer department employees. Suspicious connections are dye tested to verify if they are connected to the storm or sanitary sewer. "

4. If tracer procedure used is based on methodology presented in a publication, please provide reference citations for your most frequently used publications:

ACHD, ID	Draft Manual of Practice Identification of Illicit Connections, EPA Permits Division (EN-336) Sept. 1990. Methods need to comply to 40 CFR 136.
Arlington Co., VA	Pitt, R. and M. Lalor. 1999. Use of tracers to identify sources of contamination in dry weather flow. Watershed Protection Techniques. Vol. 3, No. 1, page 585-592.
Austin, TX	Pitt, R. and M. Lalor. 1999. Use of tracers to identify sources of contamination in dry weather flow. Watershed Protection Techniques. Vol. 3, No. 1, page 585-592.

Wayne Co., MI	E. *coli* - Standard Methods for the Examination of Water And Wastewater; meter and field kits follow manufacturers' instructions

5. How does your jurisdiction deal with tracers and outfall submergence by fresh water

Four methods identified in survey responses:

- Sample taken at an upstream point via a manhole or another access point.
- Test at low tide only.
- Chemical tracers not used, qualitative tracers used if submerged.
- For those outfalls that are submerged, no sampling can be completed until the irrigation canal is dried about once every year or two, the schedule is not under the City's control.

6. How does your jurisdiction deal with tracers and outfall submergence by salt / brackish water?

Two methods identified in survey responses:

- Stations are typically compared to each other for outliers. Investigations occur when a certain tracer exceeds a threshold value, which is based on the data distribution of all sampling stations.
- If the outfall is submerged the inspection/sampling is performed at the next upstream manhole that is accessible and dry.

H. Illegal Discharge Source Identification

1. What types of inappropriate discharges have typically been found in your community?

7 - Failing septic systems	11 - Inflow / infiltration	3 - Pump station failure	16 - Cross-connections	20 - Illegal dumping practices
5 - Combined sewer overflows	11 - Sanitary sewer overflows	14 - Connection of floor drains to storm sewer	7 - Improper disposal of wastes from recreational vehicles	
17 - Broken sanitary sewer line	8 - Straight pipe sewer discharge	5 - Other	13 - Other industrial / commercial sources	

Other:

- Acid from brick cleaning
- Commercial vehicle washing, including concrete / stucco machine washouts
- Construction sediment
- Contaminated groundwater infiltration
- Fruit juice
- Illicit connections without a NPDES permit
- Malfunctioning air pollution equipment
- Meat processing by-products (bloodwaste)
- Missing or broken separation plates in common manholes
- Potable water leaks
- Process water discharge
- Residential irrigation overflow
- Residential pool water
- Restaurant grease
- Wash down from industrial activities
- Waste motor oil, antifreeze from residential sources

2. Approximately what percentage of inappropriate discharges detected has been traced to the source?

Range: 50% - 100%, with 1 respondent reporting "unknown" and 4 reporting N/A

3. What do you regard as the top three problems in identifying inappropriate discharge sources (e.g. periodic nature of discharges, traffic, accessibility, etc.)?

- Periodic nature
- Accessibility (building, stream, outfall)
- Accuracy of mapping
- Complexity of network
- Insufficient staffing
- Insufficient expertise
- Traffic
- Multiple sources w/in system
- Illegal dumping / one-time dischargers / mobile sources (cars, contractors)
- Natural influences (tidal, stream)
- Unreliable methods
- Unreliable equipment
- Lack of public knowledge regarding dangers of discharging certain wastewaters (i.e. washwater)

I. Inappropriate Discharge Corrections Program

1. Please describe the your program's procedure for correcting an inappropriate discharge that has been identified (use the reverse side of this page or additional sheets as necessary):

ACHD, ID	We contact, educate, and require cleaning by responsible parties. In some cases, we have our forces do the cleanup and bill the responsible party.
Albuquerque, NM	On site discussions of various solutions with discharger
Arlington Co., VA	1 discharge identified was corrected by TV inspecting line and determining source (apartment building); plumbing cross connection corrected by building owner
Austin, TX	Once the probable sources has been identified, it is reported to the City's Spills and Complaints hotline for further investigation
Baltimore City, MD	Most of our dischargers are related to the sanitary system. These are referred to our Utility Maintenance Section for correction.
Boston, MA	The Commission's annual Capital Improvement Program includes funding for the elimination of illegal connections by a private contractor. Once an illegal connection is confirmed, the location is forwarded to the Commission's Construction Division and the correction is added the Commission's illegal connection repair contract. If the illegal connection requires a special design to correct, Engineering Design Division Staff review available record plans and relevant maps and prepare the necessary design plans before forwarding the information to the Construction Division.
Cambridge, MA	If corrections can be made in the city right of way a City contractor is called out to make appropriate changes at no cost to the property owner. If corrections need to be made either internally or on private property a letter and timeline are sent to the property owner stating that the problem is theirs to correct. See attachment #2
Clackamas Co., OR	Work with property and/or business owner to promptly rectify the matter
Dayton, OH	Screen at outfall, photograph river, trace to source, speak to manager, show photographs, present warning letter and follow-up on clean up activities
Durham, MA	Issue Notice of Violation with specified time to achieve correction. Conduct follow up visit.
Howard County, MD	Notification of violation through a phone call or latter or site visit and then a site visit to assure compliance.
Knoxville, TN	Notify discharger to stop immediately. Request written plans from the discharger on the manner of preventing future discharges. Levy penalties if necessary.
Lakewood, CO	Personal Contact, Citation, District Court
Montgomery Co., MD	Notify property owner in writing with number of days to correction. If not corrected, then issue civil citation and court order for hearing. Court hearing for fine and order for abatement. If abatement order not followed, then this becomes a criminal case. Most cases are civil cases with very few criminal citations and process through court system.

Phoenix, AZ	The illicit discharge is typically followed to the source using the video system or by opening manholes. The facility is then inspected and connections are tested if needed. The facility is required to remove the illicit connection and plumb it to the sanitary sewer. If cooperation is not found, the facility may be issued a Compliance Status Review Meeting and penalties are assessed and a compliance deadline is issued for the removal of the illegal connection. If the facility is still non-compliant then their name and address is sent to US EPA Region9 for further enforcement action.
Portland, OR	1) Once identified- an illicit discharge is forwarded to our Industrial Stormwater Compliance Section; 2) Once identified- an illicit connection is forwarded to the City's Plumbing Department
Raleigh, NC	By ordinance it is the responsibility of the owner or operator to resolve. If not, we handle and fine or put lien on property for cost of remediation
Springfield, MO	Require private party to discontinue activity leading to discharge until permanent corrective improvements are constructed
Thousand Oaks, CA	Verbal warning, require clean up if possible
Wayne Co., MI	See attachment D.4
Worcester, MA	if it is an illicit connection from a private sewer connection the DPW generates a contract for the homeowner to sign. This contract specifies that the city will have the connection repaired and will pay for 50% of the cost.

J. Education, Outreach, and Pollution Prevention Programs

1. Does your program include education and outreach elements?

19 - Yes 3 - No 2 – N/A

1a. What sectors of the public are targeted in the program?

15 - Industrial 18 - Commercial 19 - Residential 12 - Government

2. Does your jurisdiction participate in a program for recycling hazardous materials?

22 - Yes 1 - No 1 – N/A

3. Does your jurisdiction have a spill response and prevention program?

21 - Yes 2 - No 1 – N/A

Survey Question F-2: Frequency of Routine Discharge Investigations

	Regular Basis	Investigation Frequency	Criteria For Dry Weather or Other Sporadic Investigations
ACHD, ID	No	• As needed	• 72 hours with < 0.10 inches of rain
Albuquerque, NM	Yes	• Twice a year	• Months other than June, July and August
Arlington Co., VA	Yes	• Annually + follow-up if needed	• 72 hours with < 0.10" of rain
Austin, TX	No		• 72 hours with < 0.10" of rain
Baltimore City, MD	Yes	• Weekly	• Generally: flow in gutters have stopped, stream turbidity not a problem
Boston, MA	Yes	• Ongoing (~ 20 major outfalls inspected annually) • Stormdrains inspected in response to reports from state and local agencies, watershed organizations and concerned citizens	• 48 hours with < 0.10" of rain
Cambridge, MA	Yes	• Daily	• 72 hours with < 0.10" of rain
Clackamas Co., OR	Yes	• No less than annually for major outfalls	
Dayton, OH	Yes	• Weekly	• 48 - 72 hours < than 0.10" of rain • Everyday visual observation for trouble outfalls • Laboratory analysis in storm and at outfall for repeat offenders
Durham, NC	No	• As indicated by stream monitoring	• 72 hours with < 0.10" of rain
Howard Co., MD	Yes	• Annually	• 72 hours with < 0.10" of rain
Knoxville, TN	Yes	• 4 times per year	• 24 hours with < 0.10" of rain
Lakewood, CO	Yes	• In response to complaints, television inspection	• 24 hours with no rain or snow
Montgomery Co., MD	Yes	• Annual random 100 outfalls in targeted areas	• 48 hours with < 0.10" of rain
Phoenix, AZ	Yes	• ~ 100 illicit discharge complaints inspected annually • 56 major outfalls (20%) are inspected each year	• Dry weather flow from outfalls: 24 hours with less than 0.10 inches of rain • Complaints: investigated as they arrive
Portland, OR	Yes	• Annually	• 24 hours with < 0.10" of rain
Raleigh, NC	Yes	• Annually of problem areas	• 72 hours with < 0.10" of rain
Seattle, WA	No	• In response to complaint or routine business inspections	

Survey Question F-2: Frequency of Routine Discharge Investigations

	Regular Basis	Investigation Frequency	Criteria For Dry Weather or Other Sporadic Investigations
Springfield, MO	Yes	• 250 locations through city over 5 year permit	• 72 hours with < 0.10" of rain • Additional 25 random wet weather points done annually, no later than 48 hours after > 0.2" and < 3" in 24 hours, preceded by 72 hours with < 0.1"
Thousand Oaks, CA	No	• As needed (in response to complaints)	
Wayne Co., MI	Yes	• Daily	• 72 hours with < 0.10" of rain, and real time review of flow data
Worcester, MA	Yes	• Larger outfalls inspected in conjunction with City's Health Dept. on weekly basis • Other problem, critical areas checked frequently	• July: 96 hours with < 0.10" of rain • August: 72 hours with < 0.10" of rain • September: 48 hours with < 0.10" of rain

Techniques for Identifying and Correcting Illicit and Inappropriate Discharges

Task #1 Technical Memorandum

Attachment D: IDDE Program On-Site Interview Notes

Notes from IDDE Interview with
Hector Manzano and Umoja Muleyyar of the
Baltimore City Department of Public Works
April 3, 2002

Interview conducted by Daniel O'Leary and Jennifer Zielinski

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These notes provide an overview of the day spent in the field with the Baltimore City IDDE field crew.

Introduction

- We met the Water Quality Management (WQM) Division field crew at the Ashburton Treatment Plant. At the plant they have a "field office" where they store waders, safety vests, chemicals, vent hoods, batteries and other equipment.
- Day Planning: We discussed making 3 stops with Hector and Umoja: Boston Street at Lakewood Drain and Moores Run at Arizona Avenue.
- Equipment: Because these drains had been surveyed previously, Hector and Umoja knew what field equipment was necessary: Hach 2010 Spectrophotometer (kit with: vials, sterile eye droppers, "pillars" or reagents, battery) bucket on a rope, rubber gloves, eye protection, van.
- Baltimore City deals primarily with sewage leaks in residential watersheds like the ones on the agenda for review, and therefore their field procedure for residential areas is generally as follows:
  - The outfall is located on a map and in the field.
  - Visual inspection is performed, and a decision about chemical testing for ammonia is made. The general test for ammonia (N) is performed in the field using the Hach 2010 to detect presence or absence.
  - Once presence of ammonia is determined at the outfall by visual screening or water test, they move upstream to a predetermined junction to rescreen for the purpose of isolating the inappropriate discharge location.
  - Once they isolate the inappropriate discharge location, they call in the utility maintenance division. Utility maintenance compares complaints received with the location specified by WQM Division, and makes the decision to investigate using closed circuit TV camera or perform other investigations (dye, smoke or physical search).
  - Utility Maintenance then makes repairs.
- WQM Division then performs a follow-up investigation using the same field techniques as before to ensure that repairs have been made and that no other problems exist.

Lakewood Drain

- Lakewood Drain outfall is a large diameter arch bridge that is tidally influenced and partially submerged. WQM showed us the storm drain system map for this drain and it is extensive, including redundant loops and connections to adjacent systems to complicate the process. Notes from the first stop are as follows:
  - The bucket was tossed in the receiving water from atop the bridge, hoisted and dumped, and re-tossed in for a sample. Operator wore rubber gloves and eye protection. The sample was returned to the crew van.

Wearing latex gloves, crew member carefully extracted 2 ml of sample using sterile eye dropper and added it to buffer chemical in test vile. Two reagents or "pillars", one of which was Ammonia Cyanurate, were added to the sample vile and the vile was shaken vigorously to mix, then allowed to sit for at least 20 minutes. It started to turn light green almost immediately, indicating presence of ammonia.

WQM crew brought a controlled sample of 0.3 mg/l concentration ammonia for background comparison, and should have deionized water to (0) zero the spectrophotometer. Unfortunately the deionized water container assumed to be full was nearly empty, so field tests for ammonia could not be run. The crew would run the tests later after return to the field office. Ideally the spectrophotometer would display that the field sample ammonia concentration either was less than or exceeded the background sample concentration, indicating presence or absence. If present (as expected) the crew would go up into the watershed to another preplanned location and repeat procedures to isolate the inappropriate discharge source.

Moores Run at Arizona Avenue (NW Baltimore, ADC Map 36, C, 5)

- Moores Run has an automated sampler installed at the Radecke Avenue crossing. The automated sampler results showed a spike in ammonia concentration during routine screening. WQM field crew walked upstream from the sampler location and found gray water entering the stream as well as strong odor from an existing storm drain outfall.
- WQM sampling crew called in to investigate and isolate the problem, CWP staff accompanied.
- First, upon parking vehicles near the outfall location a strong sewage odor was apparent. Then, the problem outfall was located by brief walk through the woods (and a homeless camp). The outfall was still contributing gray water to the stream and the presence of algae indicated high nutrient concentrations.
- We went upstream from the outfall to the first manhole and opened the lid (traffic cones in place). Gray water was running (dry weather flow) through the manhole and algal growth present.
- We located an adjacent sanitary manhole ($\pm$ 20 feet away) and pulled the cover to take a look. Apparently the sanitary line was clogged and the sanitary manhole was full of gray water (to the top).
- The full sanitary manhole was enough evidence of a problem for WQM crew. Crew marked the sanitary manhole cover with spray paint and called Utility Maintenance Division. The remaining course of action included Utility Maintenance cleaning the sewage clog (by way of a vacuum truck) and visually inspecting to see if dry weather flow stops. If the dry-weather flow stops, then no follow-up was anticipated, even when asked about making repairs to fix the apparent connection. WQM crew said that there are too many minor problems in the City to find/fix them all. "The whole city needs sewer pipes lined".
- Automated sampling at Radecke Avenue bridge over Moore's Run will alert the WQM crew of any future problems.

CWP Observations

- The City has a program that may be adequate to locate and correct large scale problems or episodes, but the majority of inappropriate discharges will not be found nor corrected without a miracle in funding.
- The field work gave an indication that the City's problems appear to be more infrastructure related than intentional, although intentional connections and episodes exist.

- Lessons learned in Lakewood Drain and other watersheds as discussed by WQM crew:
- Lakewood Drain used to discharge noticeably gray colored water on a regular basis. WQM found a massive sewer leak in the watershed (Patterson Park Avenue at Eager Street) using the above techniques and through City procedures the massive leak was fixed. Noticeably gray water stopped running, and the WQM crew sees this as a great success, but acknowledges that their work is not finished in the watershed.
- Isolated problem areas are being monitored using ISCO 3700 automated samplers at 2 locations, one north and one south of Patterson Park. Auto samplers take 1 sample per hour and results of ammonia tests are compared to isolate problem locations.
- Samplers are visited by field crews in anticipation of rain and can be reset to change sampling time intervals. Samples require ice to keep them fresh, so a crew must visit each sampler in anticipation of rain to stock with ice, and collect samples prior to ice melting.
- City only uses smoke or dye testing in isolated locations. E.g., if the TV survey shows that one business appears responsible for an inappropriate connection then they ask/get permission to flush dye tablets down sewers. If dye testing is unsuccessful or more than one business or building may be connected, the City notifies owners and tenants that smoke testing will be performed and requests that if anyone sees smoke in their building they should call a certain telephone number. Smoke testing has a higher success rate than dye testing in the crew's opinion because people get a bit scared when they see smoke and call immediately. Additionally, dye testing of known toilets and sinks may not reveal connections of unknown floor, laundry sink or other drains to storm drain system.
- Problems encountered include:
- Spills in open water: Sometimes boats spill various pollutants near storm drain outfalls and WQM crew gets the call. After investigation of the storm drain they do not detect any pollutants. Sometimes preliminary fact finding points the crew in a different direction than the storm drain. Fact finding expertise comes with experience.
- WQM uses newly prepared GIS maps as a guide to storm drains, but also relies on historical maps. They said that most of the problems they have discovered have been in older residential and industrial areas, and the historical maps are sometimes better than the new ones.
- Salinity of the water in the harbor affects the test results. WQM crew mentioned the importance of salinity and being familiar with background conditions.

Notes from IDDE Interview with
Steve Adamski of the
Baltimore County Department of Environmental Protection and Resource Management
May 15, 2002

Interview conducted by Daniel O'Leary

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I visited 3 outfalls in Baltimore County with Mr. Adamski on May 15, 2002. First was a box culvert under Philadelphia Road at Rosewick Avenue in Rosedale, second we looked for an outfall in the Rosedale Terrace neighborhood but could not find it, third was a 36" pipe under MD 702 near Mansfield Avenue in Essex, last we went to a 24" pipe discharging from an apartment complex from E. Collingham Drive toward Charlesmont Road in Dundalk. Outfalls were selected by Mr. Adamski based on previous screening that revealed potential problems.

Authority
- Mandated by NPDES Phase I as a program element.
- Baltimore Co performed a legal review of ordinances existing at the time of the NPDES Phase I permit and decided they had adequate legal authority to start an effective program, but would bolster the program if shortfalls were encountered.

Program Structure
- City responsible for public water supply system, sometimes the County helps make repairs.
- DPW – Utilities responsible for underground san and storm sewers, pretreatment program and sanitation / dumping.
- DPW – Highways resp. for surface drainage
- DEPRM resp. for septics and IDDE program, groundwater management program, and has a regional health management division.
- MDE permits industrial dischargers

Program Funding / Costs
- Baltimore County DEPRM operating budget.

Mapping
- Fair to poor quality mapping, rely on investigator description, street map, system maps and luck to find identified outfall. (one outfall of four intended during field trip not found).

Training
- Mr. Adamski is a biologist that has a number of years of experience (25 +/-) in water and wastewater testing, and that is how he wound up doing illicits.

Testing
- Ran colormetric tests for various parameters: chlorine, copper, phenol (to detect industrial discharges) and pH, and took a temperature reading. Phenols rarely score a hit but the test is inexpensive to run.
- Used to use LaMotte to test for detergents but stopped because hits occurred everywhere

(false positives).
- Laboratory used for bio parameters (N, P, BOD, etc.) and metals to confirm presence or absence if screener requests. Typically lab work is only requested if screener suspects sewage or industrial waste based on initial screening and colormetric test results. Lab work takes about 30 days
- Occasionally the County does TV or dye testing, but currently does not keep track of buildings being tested. Two County agencies, Regional Divisions and DEPM main office, do dye testing but do little to coordinate.

Equipment
- LaMotte test kit (with Octet Comparator)
- Thermometer
- Beaker
- Sample jars

Enforcement
- County writes letters (and citations) to dischargers outlining what has to be done and by when.
- Has never had a serious problem trying to get compliance
- Often the problem is the County's – sewage leak, water leak, etc. Any problems within Co. R/W has to be fixed by County.

Public Education
- S separate section of the department does public education, works with watershed groups, attends fairs, etc.

Follow-up
- Screener sets priority for return to outfall. Priority 1 means needs immediate attention, 2 means rescreen in one year and 3 means no need to rescreen for 10 years.
- NPDES Permit requires 200 screenings per year, Baltimore County usually makes about 130/yr with one full time staff.

Correction / Costs
- No data. Often the County fixes the problems using general funds.

Database
- Entered in general county database to help prioritize rescreenings. Ideally the data is entered annually but usually lags behind (they are doing 2001 data entry now, in Aug 2002).

Lessons Learned
- Low (land) areas with septics are rescreened each year regardless of "clean" readings.

Notes from IDDE Interview with
Amy Schofield of the
Boston Water and Sewer Commission
July 15, 2002

Interview conducted by Daniel O'Leary

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BWSC generally pursues illegal connection detection by visually screening manholes in a storm drain system. The protocol is typically from upstream – down, to isolate inappropriate discharges that can then be corrected before moving further downstream in the system. Some of their experiences are as follows:

Authority

- BSWC has legal authority to pursue illicit connections but has never used it. Generally, citizen involvement and convincing owners that it is the right thing to do has been successful.
- Strong "Sewer Use Regulations" are program backbone (Copy in IDDE File). It helps to have something written to point to when someone challenges authority.

Program Structure

- Boston worked directly with US EPA Region I on Phase I. No "permit authority" in MA at the time. DEQ is assumed to be taking on role in Ph II.
- IDDE program started in 1986 (predating NPDES) in response to public health issues.
- Interdepartmental Duties: BSWC is different than Boston Public Works. BSWC has storm drains and san to connection with MWRA system (Deer Island).
  City does haz waste and other things.
  City still doesn't have a permit from EPA.
- Specific industrial activities are not presently a program focus, work on a case by case basis.
- No priority areas are established. BSWC has a systematic approach that eventually will net all storm drains. Do respond, however, to complaints. Otherwise, all 'sheds are created equal.

Program Funding / Costs

- Program is funded by fees on BSWC system users.
- Average cost to find illicit connection is $3k. Average cost to fix is $3k also.
- Program in Stony Brook projected to cost $1.3m for detection only (including consultant costs), excluding CSO portion of system.

Mapping

- BSWC has a GIS that illustrates CSOs and separate systems on maps. They use the maps to identify areas where investigations have taken place and where they are needed

Training

- Seems like a handful of folks in the office know about IDDE, but not a lot of cross training takes place. I only met with Amy in her office. Charlie Jewell really runs the IDDE program but he was out on paternity leave.

Testing

- BSWC automatically tests using colormetric methods to confirm pollution if dry weather flow is present.
- If no dry weather flow, sand bags lowered on ropes into manholes, help to find intermittent flows or flows from businesses having late night hours. Sand bagging checked after 48 hours. If discharge present, test using colormetric tests.
- Dye testing is primary means for finding connections.
  - Water and sewer billing used to ID building owners.
  - Letters seeking permission for tests are mailed to owners.
  - Crews go knocking on doors.
  - If no answer, door hangers used to notify residents.
  - Do not leave notices in mailboxes.
  - Place dye in lowest sanitary connection in building.
  - Pull manhole covers on storm and sanitary lines and post observers at each.
  - Use different dye colors
  - Notify police and fire about testing to head off inquiries.
  - Fire Dept must respond to smoke testing calls, even if they are aware. Maybe have FD representatives accompany during smoke testing.
  - Maybe just run washer or place dye in laundry sink / outlet then run washer.
- BSWC performed a study showing that if they had to wait 72 hours following a rainfall event before they could sample, they would miss a large number of sampling opportunities annually, so they changed to 48 hours from 72.
- Colormetric tests used to confirm pollution once dry weather or intermittent flow observed.
- Infrequently BSWC sends samples to labs for better information but have had problems with methods for detection of fecal coliform.
- No standard method for detection of fecal coliform. Have run into problems with lab interpretations of samples (outliers discarded, etc.).
- Road salt and sediments interfere with detection of surfactants using tracers.
- Presence of surfactants + ammonia = illegal connection
- Surfactants alone = illegal washing machine connection >> minor problem by comparison.
- Ammonia alone typically means sewage is present

Equipment

- Manhole puller
- Mirror/light source
- Dye

Enforcement

- BSWC not presently monitoring receiving waters.
  - Mad Kayaker (Roger Fragmeyer ?) keeps BSWC and dischargers on toes.

Public Education

- Public Outreach: BSWC uses door hangers to encourage neighbors to act responsibly.
- Within region, BSWC is only one owner of outfalls. They have started erecting signs on outfalls to ID them from the water.

Follow-up

- BSWC has a catch basin initiative to locate and perform condition assessment of all catch basins. Goals are to:
  - Review quarterly to assess maintenance needs and practices.
  - Driven by public health needs.
- BWSC has construction inspectors who watch new construction projects.
- BWSC has no retesting program in place. Current goal is to get all systems reviewed for the first time, and only respond to complaints in systems already screened.

Correction / Costs

- BWSC has a contract set up for fixing problems ID'd. Recommend having the fix it contract in place before beginning detection work.
- Average cost to fix is $3k.

Database

- BSWC has a database that is tied into GIS.

Lessons Learned

- Initial screening of flows in one system indicated no illicit connections, then once a vacant building in the watershed was occupied, illegal flows started.
- "Gray" water issue: Sump pump discharge from institutions not allowed in san or storm. EPA allows "clean" discharge through "exclusions" in permits. Burden to prove "clean" is on discharger.
- Does one land use contribute more illicit connections than others? No, age is the primary factor. BSWC has had regulations since 1977. Prior to that little emphasis was placed on IDDE.
- Hyde Park study
  - No illicit connections detected.
  - F. Coliform samples collected.
  - Surveyed pet waste – residents and users of park.
  - Prepared a flyer for educating the public (Scoop the Poop – multilingual)
- Streets and parking are next frontier.
  - Commercial stormwater project completed
    - Low, med and high density studied
    - Pet waste studied
    - Mixed use forthcoming

Notes from IDDE Interview with
Jim Wilcox and Wendy Robinson of the
Cambridge Department of Public Works
July 17, 2002

Interview conducted by Daniel O'Leary

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City of Cambridge has been under consent order from the US EPA Region 1 since 19XX to eliminate illicit connections to storm drains. Recent efforts have been focused on Ailwife Creek, a tributary to Mystic River.

Authority

- Cambridge uses their "Sewer Use Regulations" and pressure "to do the right thing" to get illicits corrected, and have been very successful. Sewer use regulations outline what can lawfully be discharged into sanitary sewers and storm or combined sewers.
- Cambridge is not a Phase I city, but will be a Phase II. The start of the Illicit Discharge Detection and Elimination (IDDE) program in Cambridge is a result of a consent order from US EPA Region 1 under the goal of making the Charles River swimmable by 2005. Gains in the Charles have helped focus attention on Mystic and other rivers in the region.

Program Structure

- Sewer Maintenance and Engineering is under the Cambridge DPW (CDPW). IDDE is under this program as is capital improvements, and maintenance for sanitary and storm sewers. Cambridge sanitary sewers connect to MWRA systems carrying regional sewage to treatment plants.
- No priority areas are established by testing outfalls. CDPW is approaching IDDE one watershed at a time, that eventually will net all storm drains. CDPW does respond, however, to complaints.

Program Funding / Costs

- Program is funded from the city's general operating budget. The entire sewer maintenance and engineering budget is approximately $15m annually.
- Capital projects are typically funded through State Revolving Fund loans.
- Some field investigation techniques are funded through MWRA I and I grant, e.g. TV work and contractor cleaning services.

Mapping

- CDPW is "lucky" that all their maps are in pretty good shape. Maps are color coded to highlight sanitary, storm, CSO and "common manholes". Maps are useful to show where cross connections may occur as well as voids in storm or sanitary service.
- Map updates are on-going with field work. As buildings are tested they get color coded on the maps, with the colors representing clean or suspected or confirmed illicit connections.

Training

- Seems like a handful of folks in the office know about IDDE, but not a lot of formal cross training takes place. CDPW operation is relatively small, so general awareness of things to

watch out for is present.

Testing

- Originally, CDPW identified and screened outfalls having dry weather flow for fecal coliform (and other constituents) as part of initial investigations. Samples were collected and sent to labs for analysis based on protocols in *Standard Methods for Examination of Water and Wastewater*.
- Labs give approximate fecal counts generally within 2 days and final counts within 5 days
- CDPW primarily does physical screening by searching for dry weather only, then dye testing buildings within areas of suspected or confirmed illicit connections. They do not have a formal program for pursuing intermittent flows, but have employed sandbags at problem locations.
- Once an illicit discharge is detected and the possible entry location in the pipe network is narrowed down, dye testing and possibly use of closed circuit TV are employed to find the problem.

Equipment

- Traffic cone
- Safety vests
- Letters from government describing the program.
- Manhole cover puller (screwdriver to clean cracks)
- Metal detector to find buried manholes
- Shovel
- Field forms / clipboard
- Mirror/light source
- Dye
- On-call: Vacuum truck to remove blockages.

Enforcement

- CDPW not presently monitoring receiving waters.
  Mad Kayaker (Roger Fragmeyer ?) keeps CDPW and dischargers on toes.

Public Education

- CDPW does not have a formal public outreach program about illicit connections.

Follow-up

- CDPW is pursuing elimination of “common manholes” through systematic and funding based approaches. They have an on-call contractor that is contracted to do a certain number of projects annually, and CDPW prioritizes projects for them .

Correction / Costs

- CDPW fixes problems in the city right of way, requires homeowners to fix problems on private property or in the house.
- Average cost to fix is $5k including design.

Database

- CDPW has a database or “dye test log” that is organized by catchment area. The inspector has found it more useful to organize the database by address to determine which properties

have been dye tested on a given street or block.

Lessons Learned

- Try to avoid revisiting the same property more than once. Get all potential information the first time to save credibility. CDPW originally checked only in storm drains for dye, and if none came through assumed everything was OK. Then after some problems persisted, they returned to the same properties to retest and found that the dye was not entering the sanitary either, indicating a blockage in the pipe that can lead to I/I problems.

  Lesson – Check sanitary and storm at the same time to confirm dye test.
- Data quality relates somewhat to personnel…Originally CDPW used interns to collect data and found a lot of the data collected to be unusable.
- Make sure dye testing is witnessed by the inspector. Simply giving the dye tablet to a homeowner and asking them to put it in the drain is not acceptable because they may not put it where you want them to or they may throw it in the trash, leaving you scratching your head about the results.
- Provide as much advance notice to homeowners as possible about dye testing through flyers and door hangers. Do not place flyers in mailboxes.
- Consider ultimate use of a database before agreeing on software and hardware. Make sure sufficient flexibility is in system to search properly and meet your needs.
- Track the locations of lateral sewers, not just mains. CDPW spent a lot of time and money on testpitting for sewers in the early days of making corrections. Now they require the contractor to verify sewer locations through TV or other means prior to digging.
- Cambridge is having a political problem with Belmont, an adjacent community, that discharges storm water through a CDPW system and claims that the water is clean. CDPW has evidence that the water is polluted with fecal coli. Because Belmont says their discharge is clean, Cambridge must decide on how to get the problem corrected.

Notes from IDDE Interview with
Donna Winchester, Michele Jones, and Felicia Graham
City of Dayton
May 13, 2002

Interview conducted by Jennifer Zielinski

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Program Background

- When Dayton's program started there was very limited information on IDDE available.
- Communities should be made aware of many of the common problems that exist and how to address them. (e.g., appropriate size of oil boom; trace parameters (hach); lab parameters - what is most useful; industrial processes - how do you narrow down what you are looking for; color, odor tells nothing)
- Advice for Phase II communities - First, communities should know their system and staff should spend time in the field. Mapping is valuable, but event GIS mapping is only accurate to a point - an experienced field crew is much more valuable.
- Ask for plenty of money. A lesson learned - they would have asked for more money when they started the stormwater utility. It's more difficult to change the rate in place then it is to set a higher rate initially.
- Unit costs are not used for budgeting.
- Measurable goal of the program is the number of discharges and quantities of flows eliminated. A log of discharges is kept on a shared computer drive that all staff have access to.

Prioritization of Discharge Investigation

- Historic, chronic problems have all been corrected. Prioritization is usually based on visibility or on what may cause the biggest problem (e.g., river outfall screening prior to a river event).
- All complaints received are considered high priority. The response actions taken will depend on the type of spill.

Field Screening

- The field techniques guidance was developed over time as new environmental staff and interns needed training.
- All outfalls in the City (of all sizes) are inspected at least once a year, and screening is conducted in a variety of weather conditions, not just during dry weather. Often, substances will pool in low spots within the storm drains, and will be washed out with the first flush.
- In addition, City staff have noted variations in discharges depending on the time of year. For instance, leaf and branch litter in the autumn can accumulate in storm drains and act as a dam for substances that will then be washed out when it rains.
- In-stream monitoring is used to determine the long-term effects of various environmental programs, it is not used for IDDE purposes. Outfall screening is heavily relied upon, along with complaints received.
- If a flow or problem is found at an outfall, staff goes immediately up the trunk. A sample is taken.

- Compared to lab testing and field test kits, visual observations are the most useful.
- Field kits are rarely useful - it is difficult to determine which tests should be run in the field to determine a pollutant.
- Parameters no longer screened for include phenols, detergents, and copper
- In general, more guidance is needed on limits for different parameters that would indicate that the discharge includes an illegal discharge. Also, more guidance is needed on background levels (levels typically found in urban runoff).
- All outfalls in the City are screened.
- Time spent at each outfall is highly variable since each outfall may be a unique situation.

Tracing an Inappropriate Discharge to the Source

- Standard procedure used for tracing an inappropriate discharge to its source - starting at the outfall, use the City's drainage maps to identify the major trunk lines draining to it. Go upstream, testing at each outfall using a jar or plastic bag tied to a string.
- TV has its place, it is usually used for I/I or other outside influences.
- They brought out one of their outfall drainage maps. They have mapped all outfalls, and for problem outfalls have identified strategic upstream sampling point in the system.
- Smoke and dye testing are both used. Smoke is not used that often.
- Recommendations for dye testing - use plenty of dye; used different colored dye for different potential sources; use lots of flush water; allow plenty of time; grab the sample, since you may not be able to detect dye by looking down the manhole. Also, notify the local DEP or EPA prior to dye testing.

Correcting Inappropriate Discharges

- Have not had historic problems with having the appropriate authority needed to require individuals to correct problems - have typically had almost immediate compliance. Owners, industry, are usually very cooperative - they don't want the reputation of polluting the river.
- Course of action - require that they cease discharge first, then correct plumbing in coordination with the appropriate City departments.
- The responsible party typically pays for correction of inappropriate discharges

Legal Questions

- They've rarely had to invoke their legal authority.
- Proof of a possible illegal connection is required to access private property to conduct further testing - they have never been challenged. It has been sufficient to demonstrate that the discharge exists (pop manhole, show discharge, sample, etc.).
- Violators typically fix the problem. The City does follow through to verify that it has been corrected. The City's role is to watchdog the process and the system.

Education

- Dayton has education programs geared towards school-age children, residents, municipal employees, and the commercial and industrial sectors.
- City staff regularly visit local schools to educate students on litter, rivers, etc.
- The City is required by permit to provide annual training for staff. Both professional and field staff receive training. Training of field staff has been beneficial, often discharges are reported by field staff. Cross-training of professional office staff is also important to ensure that reported problems are not "lost" as they move up the chain of command.
- The City provides education for the commercial and industrial sectors through direct

communication. For instance, at problem outfalls, the DEM will send letters to businesses within the drainage area with pertinent information, such as who to contact with questions.

Questions raised by Dayton:

- What is the best way to test for pesticides and herbicides?
- What levels of TSS should be tested for to determine if there is a problem (e.g., construction site runoff)?

Things that should be included in a manual:

- Safety
  - at sampling points
  - street safety - barricades
  - poison ivy, ticks, etc.
  - terrain (ankle support)
  - getting sample without falling in
  - don't send anyone into storm sewer if you don't know what's down there
  - use remote jar technique
  - always travel / work in pairs
- Use a digital camera.
- Use sample bags, they can slip between grates.
- Use a bladder pump with motor - attach tubing - pulls sample up to surface.
- Put pictures on letters sent to dischargers. E.g., the City does pursue individual residential dischargers, mainly on a complaint-received basis. If someone calls to complain that their neighbor's car is parked in the street and leaking oil, the City sends a letter w/picture of car to the assumed owner. They don't always get sent to the actual owner.
- Outfalls should be labeled so people can ID specific problem outfall when calling in a complaint.
- Stencil catch basins - identify receiving water in stencil, or provide some other identifying mark, so that people can ID specific problem catch basin when calling in a complaint.
- Another common discharge they have encountered - vents on commercial buildings spewing onto roofs, when it rains this becomes a discharge, but not something detected during dry weather!

Notes from IDDE Interview with
Mark Senior, Stormwater Services Engineer, of the Central Engineering Department, Stormwater Management
City of Raleigh
May 23, 2002

Interview conducted by Jennifer Zielinski

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This hour-long interview did not cover all topics discussed with other jurisdiction. The primary focus of the interview was to cover lessons learned by Raleigh. The sewer system in Raleigh is completely separate.

Program Structure

- The Stormwater Management Division within the Central Engineering Department runs the program. However, some functions are the responsibility of the Public Utilities Department (fixing problems in sanitary line, conducting dye and smoke testing, television inspection of the lines)

Program Funding / Costs

- Stormwater Management has a flat annual budget based on their own experience of what the program costs to run. They allocate a certain amount for testing and a certain amount for cleaning. The Department also budgets for 2 specialists, one is responsible for enforcement and dealing with citizen complaints; the other is responsible for monitoring and tracing the source of problems.
- The cost of television inspection and smoke testing is included in Public Utilities budget.

Training

- All city inspectors receive cross-training.

Testing

- Raleigh conducts in-stream monitoring. They have conducted baseline monitoring on 8 or 9 streams for basic parameters. Some parameters are used to detect sewer leaks (fluoride, fecal, ammonia, sodium, and conductivity). All testing is done in a lab. The program shares a lab with public utilities.
- During their initial outfall field screening they used field kits, but they didn't pick up much and they often got weird readings. Copper, chlorine, and surfactants worked well.
- Pigeon House Branch study

  They used optical brighteners over a summer – didn't pick up indicators of connection, probably too much dilution in the 24" pipes tested

  Fecal and total coliform

  - Determine where high counts occur based on spikes observed in testing data – narrow down during testing
  - Review maps for crossings of systems

    See paper "Optical Brightener Monitoring of Pigeon House Branch Observations"

Public Education

- The intermittency of discharges makes detection very difficult, Raleigh has come to rely on citizen complaints / reports of problems. As such, public education is considered to be the best tool they have. The City has a hotline for citizens to call, uses educational flyers, and have adopt-a-stream programs. They also conduct internal education of all inspectors. They have also had some education exposure on the local news and television programs.

Correction / Costs

- When a leak is found, the utilities department use smoke testing, TV inspection, and / or dye testing to find the source.
- If the problem is in the sanitary line, the Utilities Department pays for the correction.
- If the problem is in the service line (business to sanitary) the owner pays.
- If a spill occurs, the responsible party is responsible for clean-up costs. If it is on private property, insurance will usually cover it.
- Up until now, they have not needed proof of a possible illegal discharge to investigate further, property owners have usually been very cooperative. The Jiffy Lube issue (described below) is probably the worst encounter they have had (it was chronic).

Lessons Learned

- The majority of illicit connections found by Raleigh's program:
  Not a lot of commercial connections
  More - floor drains; basement washing machines; occasionally cross-connections; leaks from sanitary sewers (overflows, infiltration, etc.)
  Some dumping, not a lot. Predominantly a result of people washing fleet vehicles (police and fire); car washing (at car dealerships) and Jiffy Lube. Raleigh teamed up with other nearby jurisdictions to deal with problem of Jiffy Lube dumping illegally. Problem arose because the corporation provided incentives to the Jiffy Lubes that serviced the most cars the quickest. Employees ended up draining fluids in the parking areas.
  Problems with blow offs – from heating and cooling system (state government building).
  Cleaning of air conditioners on top of buildings
  The usual problems, such as oil dumping, which is hard to catch
  Car wrecks – ruptured tanks. In these cases, both the fire department and haz mat team respond.
- Minimal problems have been found during routine outfall screening. Mark recommends the following process for jurisdictions starting up a program:
  Conduct an initial screening of all outfalls. Look for visual evidence (damage at outfall, etc.) as well as flows during dry weather. This will allow the community to catch the worst, and most likely chronic problems, immediately.
  Conduct in-stream sampling as a following. Establish baselines for the receiving waters, and look for deviations from this.
  Conduct a public education campaign.
- Dry weather screening should be conducted. Alternatively, no flow from an outfall during dry weather warrants further investigation.

Notes from IDDE Interview with
Wayne County Department of Environment
May 16 - 17, 2002

Interview conducted by Deb Caraco and Stephanie Linebaugh

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Primary WC DOE Contacts:
- Dean Tuomari- Director of Illicit Discharge Program
- Sue Thompson- Environmental Specialist (Education, WQ Sampling, Complaint Investigation)
- Patrick Cullen - Field Staff

Additional WC Staff:
- Kelly Cave- Watershed Dept. Division Director
- Noel Mullett- Education Specialist
- Matthew Kobylarz - Department Manager Environmental Health Division (Septics)
- Matthew Best - Environmental Specialist (Johnson Creek Project)
- Crystal -Field Crew
- Nancy -Specialist
- Kisha Rizato - Field Staff (also displays, enviroscape)
- Peter - Field Staff
- Mike- Field Staff
- Anne (GIS)
- Judy (Clerical support)

Program Overview

Industrial/Commercial
- 1985 State Mandated Water Resources Protection
- 1987 Wayne County Began Program through Charter (?)
- 1989 Remedial Action Plan (RAP) incorporated through subcommittees all levels of govt. and stakeholders input which resulted in a plan emphasizing CSO's and stormwater permitting.
- 1992 (?) Rouge River Project funded by EPA
- Eventually there was a shift to addressing and lowering bacteria levels to meet MI recreational use standards so that canoeing can occur on the river.
- SSOs initially not considered a problem but are now working on addressing in long-term plans.
- The interaction between levels has become more formalized throughout the years but there is still difficulty in communication between all the layers of governance: Municipal, State, County, Drain Commissioner, Community Associations, and Roads
- Currently working on watershed wide authority "alliance" between groups to enhance watershed protection.
- There are independent community associations in each Subwatershed that consists of one paid staff and community volunteers. These groups provide a platform for homeowner and commercial education. In addition, if the association is active, greater community

accountability is reached through peer pressure. For example, if high bacteria counts are found at a particular site, the community members can target that area for education as well as bring the problem to the attention the greater community in order to apply pressure to correct the problem. There are approximately 48 community groups.

- WC DOE regulates industrial and commercial areas but does not regulate septic systems. Septic systems are regulated by the Department of Health.

Residential Septic

- 1 manager + three crew provide inspector training and inspections if contracted by homeowner
- *Follow up*
- Courtesy copy sent to other departments and agencies
- Feedback to initial citizen complaint must be provided
- The county is ultimately responsible for illicit program even if turned over to local jurisdiction to enforce. WC will retest to verify correction was made.

Commercial/Industrial

- Very time consuming. Must work with local agencies and have good relationships with local officials.
- Must ask many questions when tracking down information because all parties may not know what is important to share
- The county relies on "good-cop/ bad-cop" methodology to convince voluntary compliance. County = good, State = bad
- Department has corporate lawyers that have been used in two occasions to get compliance form large corporations. Initially, department had own lawyer but since most are voluntarily corrected a separate lawyer was not necessary.

Residential Septic

- Typically more required than for commercial areas because residents are slower to respond to illicit connections than commercial/ industrial areas because they are not used to be so closely regulated and money is always an issue

Lessons Learned

- Tangible parameters and goals important in soliciting community support (i.e.: water health, canoeing, etc.)
- Adaptability/ flexibility/ problem solving skills essential
- Important to target goal so can set parameters, field tests etc
- Continuous Technical development essential (database)
- Knowing and having good working relationship with inspector key to getting problems fixed correctly and quickly. (Relationships/ Trust)
- Have a head of each department
- Lots of ground truthing required
- Need to give community feedback- if violation reported need to let community know what steps are being taken to work on situation since it is not always obvious that steps are being taken.
- Know past regulations too b/c may provide insight into older developments

- Don't make any assumptions- (Example, just because new development doesn't mean followed current codes, just because lid say stormdrain doesn't mean it is, pipes may actually cross boundaries)
- Persistent complaints probably mean something- so even if initial investigation turns up negative additional investigation needed (ex. bar late night discharges- testing done in day)
- Keep the big picture, surrounding area in mind.

Authority

Industrial and Commercial Areas

- Backbone: Codes and Ordinances
- Plumbing Codes
- Building Codes
- Dumping Codes
- County's Health Code, which is based on the Clean Water Act
- IDEP program does not have authority over Septic systems.
- According to WC code need permission from tenant only to enter a building
- It at a site to check on area for I/C, check the rest of facility as well. Most facilities have more than one ID/C

Residential (Septic Systems**)**

- Health Code Act 361. Plumbing must be connected to approved sanitary system. Ordinance supporting must be unquestionably clear to prevent loop holes.
- Jurisdiction over Septic systems under IDDE would be good
- Be aware that codes may have changed over time. For example, floor drains were allowed to be connected to the storm drain system prior to 1960 in Wayne County. In addition, one community still interpreted the new code to mean the same thing.

Program Funding/Costs

Industrial/Commercial

- The county programs are grant dependent. WC received large grant for program planning and implementation. As a result, the IDDE program, particularly the education elements, appear to be high quality and comprehensive.
- They also gave us a table with some unit costs:
- Data Review and Record Search: $575/day (Includes search of community complaints, water quality data to find "hotspots"
- Outfall Identification and Investigation $2,750/stream mile
- Outfall sampling $50/sample (ammonia, surfactants with chemetrics, conductivity, pH, T)
- Dye Testing: $900/facility
- "Advanced Investigations": (Moving up the pipe: $3,700/storm drain pipe mile.
- They estimated that TV testing costs about $1,500 to $1,700/day.

Residential Septic

- Budget for Manager and 3 environmental field crew = $4-500,000
- This summer receiving a $25K grant to identify failing septic systems. Will include survey of areas previously not targeted. College students will walk around conducting survey.
- Ordinance needs to be clearly defined failure

Industrial/Commercial
- Cost of correction is paid for by owner

Residential Septic
- Average $10-12,000 but can vary greatly with size, soil type, pump system, geology, grade (one recent correction cost $42,000)
- Seller cost of inspection can be done by county or private trained contractor. County charges $250 no pumping + $150 pumping and confirmation of flow to system.
- Often if septic system has failed will connect to sewer line if available because it is cheaper that fixing septic system

Mapping/Data Management

- Maps important but accuracy nearly impossible to achieve
- As-built hard to work with and are often not completed
- Beware of false assumptions based on mapping. Showing map of areas where ID/C found may be skewed because of targeted areas and response to complaints.
- Mostly reactive reporting, some investigative use
- Half staff received some training on GIS
- continue to try to improve resolution (currently 1:24,000 reach file soon changing to NHD.
- Presentations available
- Ortho imagery used, earlier integration would have improved program
- Should gather as much info as possible since will never know what future reporting will be required: Community, hydraulic area, type of violations, Number of visits, team,
- Hydraulic area difficult to follow in field street/ address preferred
- If you're working in an
- Old maps should never be thrown out. Often will lead to true set up
- Early integration of Ortho images useful
- Red flags to prioritize field visits
- Separated CSO system - potential that not disconnected properly
- Age of development - outdated regulations guided construction (ex. develop prior to 1960 did not regulation floor drain connection.)
- Area with business with varying hours.
- You have to be really flexible with data gathering and recording because technology and data needs can change over time.

Outfall Screening

- Outfalls are not best indicator of illicit connection due to dilution, period nature, and time difference in discharge into system and discharge from outfall. "Slugs" can amplify periodic problems.
- 1 sample means nothing due to periodic nature.

In-Pipe Testing

Commercial/Industrial
- Typical procedure: 1)Hotspot identified through land use/ complaints, 2) conduct E. coli

tests at outfalls/ non-intersections, 3) test several upstream locations, 4)check with maps to continue investigation, 4a) once narrowed done- dye test building to verify IC. 4b) if discharge is suspected to originate from septic system, the case is passed to Dept. of Health

- DPW is really valuable for locating sewer/storm drain lines. Inspectors are looking at plans, and they can be wrong. Often, DPW staff remember where they were actually located.
- TV testing can be used (not so much in Wayne County) to locate a source. One thing to watch out for with this is that the inflow may be submerged (this happened in one case). Another tip on TV testing is that you might as well TV the whole pipe even if you think you're located in a relatively narrow area. Filming is cheap, and a lot of the cost is just setup, etc.
- *E.coli test* used as primary test since canoeing(MI standards for recreational contact) is watershed goal.

  It is not a real time test. Require overnight lab work with good relationship with lab.

  1 sample means nothing. Could be one time event and not traceable. Or just because low levels found doesn't mean there is not a problem. Could be a slug, leak, misconnection in system.

  Keep sample results in context of surrounding area- results will vary with land use so need to know what is local baseline/ what is accepted

On-Site

- *Dye test* most cost effective method to detect IC.

  Prior to dye testing go to local township for maps of manhole accessibility.

  Must check baseline color prior to choosing dye. some background colors will mask the dye. Blues and purples can be lost in oils. Green, then Red dye, most effective colors.

  Important to know area, types of businesses that have permitted colored discharges (ex. print shop)

  Things that stop dye from appearing where it should: actually attached to septic system, plugged, broken pipe (leaks), connected to stormdrain system.

  Best dye brands 'liquid dye"- don't need to mix, not as messy

  Dye strips are ok. Useful in areas where can't mess up

  Alternate colors to speed up test.

  Time between dye test can vary with system but typically time for dye passage is10-30 minutes. If not seen in roughly 1 hour will check stormdrain system.

  If not found in sewer system, should contact authorities to expect dye in river so as to not cause alarm in community

  Quick fax list to alert appropriate authorities of dye release, work in area

  Green, then red, dye easiest color to see

  - Equipment for dye testing (Important but not listed in survey)

    Steel toed boots (Redwings preferred)

    Probe to detect cover

    Metal detector

    Meter walker to measure dist from known manhole to next

    Sanitizers

    Rain/winter gear

    reflective gear

    tire iron to open some man hole lids

Residential Septic

- Current Rouge River system tests septic systems at time of sale only. Having regularly scheduled inspections (ex. every 5 years) was not supported.
- The average rate of sale is every 6.9 years. In the first 2 years of inspections 208 conducted. Had a 26% failure rate. 90% of those corrected w/in 66 days (of which 20% were corrected by connecting to sewer line.)
- Also complaint driven inspections
- Dye tests used
- Important that issue familiar to homeowners.
- Staff should have several forms of ID and carry any previous correspondence with homeowner.
- At tests, can conduct dye test, but also look for backflow. Depending on the tank design, this can be accomplished either by listening for backflow, or by looking through the manhole.

Education/Pollution Prevention

- While conduct dye testing also look for good housekeeping behavior
- Education made part of every persons job, especially field staff
- Training of non-IDDE staff important to give more eyes in the field looking for IC/D

Industrial & Commercial

- WC currently trains field crew of DPW, Rec Dept. and Drain staff on ID/C to increase awareness of ID/C and increase number of “eyes” looking for the problem.
- Currently use power point presentations but working on short video as well.
- Problem solving activity that includes finding ID/C source by finding facts, buying information and tests other real life scenarios. The activities have been very well received.
- Have begun selling training services to local communities to assist them with developing their program.

Residential

- Contractor training requires existing core knowledge, and includes seminar, exams and annual registration fee $60.
- Technique: Repeated Multimedia w/ heavy focus on children.(displays, brochures, discussion, presentations, power point)
- Tracking is difficult. Currently it includes: # brochures put out, 2 participant surveys, (94 baseline, 95 follow up, 200? 2nd follow-up TBD)
- Lots of education material available
- Recognition program for businesses in compliance. Recognized in local papers, etc. Currently only in 26 basin so not fully effective yet.

Residential Septic

- In Wayne county 1990 survey showed 12,000 septic system
- Educational material provided upon inspection
- Surveys show not all homeowners know where or even what type of system they have.

New Research

- Isotopes not fully refined yet but potentially can isolate sources
- Fecal coliform high potential for false positives so not used.
- Deniger: Bioluminescence (Possible for E. coli)
- Oil Absorbent Pillows

Additional Issues

- Kelly Cave was concerned with authorship of material since much of our final document outline overlaps with their existing training program. Inquired if use of their material indicated co-authorship or if Wayne Co. was just a case study. Deb clarified that Wayne County would be a case study and that we would make sure proper citation was agreed upon prior to document completion. WC requested copy of final document.
- The count program is grant driven and will be coming to end of grant money in next year or so. WC is interested in selling services to local communities to maintain program. Also interested in providing workshops outside of local areas, for instance at the Institute?

Materials provided for WC staff

- Project Scope
- Document Outline
- Questions
- Practice CD (5)

Materials provided to CWP Staff

- Rouge River Project Staff Brochure
- Wayne County On-Site Sewage Disposal Fact Sheet
- On-Site Sewage Treatment Management Manual
- Homeowner Onsite System Record Keeping Folder
- Homeowners brochure on Septic Systems
- Wayne Co. On-Site Sewage Disposal System Evaluation and Maintenance Ordinance
- On-Site Sewage Treatment Management Guidance Document
- Johnson Creek Project Folder
- “I think I saw a fish . . .” door hanger info sheet
- “Stormdrains aren’t garbage cans” Homeowner handout
- CSO educational flyer
- Rouge River Activity Book
- Watershed Fact Sheet
- Unit Cost of investigation