Review and Planning

Relationship of small dairy-based Food Service Establishments (FSEs) to the Fats, Oils, and Grease (FOG) Program in WSSC

WAYNE H. LUDWIG, JR.
FOG UNIT COORDINATOR

December 16, 2011

Washington Suburban Sanitary Commission

PRESENTATION OBJECTIVES

- Provide an overview of the general WSSC FOG program and the current relationship of dairy-based FSEs to it.
- Provide general University of Maryland findings and recommendations.
- Provide a summary of the new steps for the WSSC FOG program related to dairy-based FSEs.

Washington Suburban Sanitary Commission

TODAY'S PRESENTATION

- Is not necessarily the 'final procedure for compliance'.
- We want to hear from you for any glaring omissions or other opinions on the matter
- Target date for all comments and question submittals is by March 31, 2012.

Washington Suburban Sanitary Commission

General chronology of events leading to current regulatory plans

- **MAY 2007: WSSC's Modified (updated) FOG program takes effect requiring:**
  - Every 'qualifying, registered' FSE be issued a FOG Discharge Permit by December 2010 (currently there are 4900 with active permits)
  - Every 'registered' FSE be initially inspected by June 2012 (since 2007, about 8400 of the 9110 have been completed)
- **JANUARY 2010: Review of procedures on:**
  - Handling certain decisions on BMP vs. Full Permit decisions, scientifically determining 'dairy-based' wastewaters' FOG potential and how to 'tackle' the two school system's 400 potential sites became a 2010 priority

Washington Suburban Sanitary Commission

Chronology of events

- **APRIL 2010** WSSC enters into research contract* with University of Maryland to study the fate of dairy product wastewaters from specialty food service establishments (FSEs).
- **MAY 2010** WSSC issues interim FOG permits and notifies all ‘registered’ dairy-based FSEs about potential future activities.
- **APRIL 2011** University of Maryland presents their findings to WSSC.

***scope follows, next slide**

Washington Suburban Sanitary Commission

General U of M scope

- Nationwide survey
  - Literature review and national data collection
- Separation potential of dairy products
  - Typical dairy product properties in a laboratory setting
- Local field observations
  - Actual field study and analysis at working dairy-based FSEs

Washington Suburban Sanitary Commission

Chronology continued

- **MAY-JUNE 2011:** Approximately 118 FOG Discharge Permits related to Dairy FSEs are renewed prior to strategy for grease abatement being made.
- **JULY-SEPTEMBER 2011** WSSC reviews compliance strategies based on UofM study and other factors.
- **OCTOBER 2011:** WSSC notifies applicable dairy-based FSEs about plans for requiring grease abatement and opportunity to discuss the matter at an open meeting.
- **LATE NOVEMBER 2011:** With only one inquiry, WSSC sends out a second notice to the applicable FSEs about a meeting to present information.

Washington Suburban Sanitary Commission

SOME GENERAL DEFINITIONS

- **Sanitary Sewer Overflow (SSO)**

  Any unpermitted spill, release, or discharge from the WSSC Collection System (overflowing manholes, pumping stations, stream crossings, etc…)

- **Building Backup**

  The release from the Collection System through a lateral to a building or structure (basement backups)

- **Food Service Establishment (FSE)**

  The business, defined by Code, that prepares/serves food that may contain FOG.

- **Grease Abatement Device (GAD)**

  Any properly engineered and constructed mechanical device designed to remove fats, oils and/or grease

- **Best Management Practices (BMPs)**

  Kitchen / food preparation practices recognized for minimization/prevention of FOG discharged into FSE plumbing fixtures

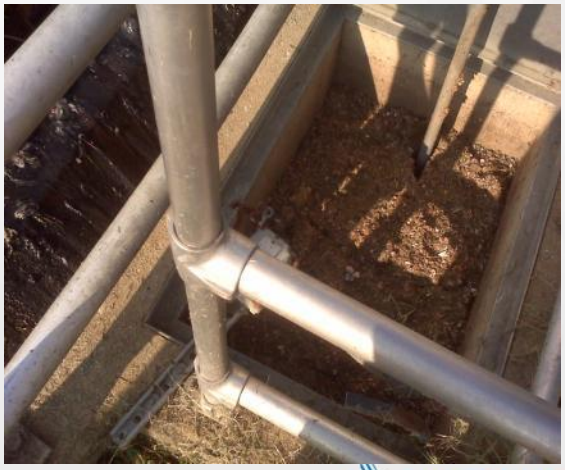
Washington Suburban Sanitary Commission

A FOG program's primary objective is SSO PREVENTION

- **SSO's in a service area have the potential to discharge thousands of gallons of raw or partially treated sewage into the storm drain system and ultimately to the local water bodies**
- **In addition, basement sewer backups can cause additional damages to property and the environment.**
- **It has been estimated that 40-60% of all SSOs and basement backups nation wide are grease related.**
  - **Pollution prevention (FOG control) is the first line of defense.**

Washington Suburban Sanitary Commission

A FOG Program's secondary function is to reduce and/or eliminate the potential for any and all *measurable FOG discharges that could effect the sewer collection and treatment processing system in various ways**



Washington Suburban Sanitary Commission

“Measurable FOG”: FOG concentration >100mg/L (0.01%)

Washington Suburban Sanitary Commission

National Pretreatment Regulations- the benchmark and starting point for utility controls

- **From the Federal Environmental Protection Agency (EPA):**
  - **The National Pretreatment Program* provides regulatory tools and authority** to state and local POTW pretreatment programs **for eliminating** pollutant discharges that cause **interference at POTWs, including interference caused by the discharge of Fats, Oils, and Grease (FOG) from food service establishments (FSE).** More specifically, the Pretreatment Program regulations at 40 CFR 403.5(b)(3) prohibit "solid or viscous pollutants in amounts which will cause obstruction" in the POTW and its collection system.
  - Consequently, **pretreatment oversight programs should include activities designed to identify and control sources of *potential* interference** and, in the event of actual interference, enforcement against the violator.

***oversight is for commercial/industrial entities only (no residential)**

Washington Suburban Sanitary Commission

WSSC Code language

- **SECTION 818 Food Service Establishments**
- **818.4** Grease Abatement System Installation and Maintenance Requirements

General. When directed by the Commission, FSEs shall install and maintain a WSSC approved grease abatement system that meets or exceeds minimum requirements cited in Section 302.10.

Washington Suburban Sanitary Commission

WSSC Code Language

SECTION 1003: GREASE ABATEMENT SYSTEMS (replaces IPC 302.10)

1003.2 Where Required.

1003.2.1 A grease abatement system shall be required to receive the drainage from fixtures and equipment with potential grease-laden waste. Fixtures and equipment shall include, but not be limited to: pot sinks; pre-rinse sinks; soup kettles or similar devices; fresh meat cutting and prepping; wok stations; floor drains; floor sinks; automatic hood wash units; and dishwashers.

1003.2.2 Flow Based Grease Interceptors shall receive waste only from fixtures and equipment that allow fats, oils or grease to be discharged.

1003.2.3 Volume Based Grease Interceptors shall receive the discharge of the entire kitchen and shall be sized accordingly. Exception: waste from sinks or fixtures with permitted food waste disposers shall discharge directly to the sanitary drainage system.

1003.2.4 Property owners of commercial properties, or their official designee(s), shall be responsible for the installation and maintenance of grease abatement systems serving multiple Food Service Establishments that are located on a single parcel.

Washington Suburban Sanitary Commission

Nationwide, FOG Programs vary in size and complexity

Washington Suburban Sanitary Commission

Regulated FOG discharges from FSE's range from the obvious to the obscure

Washington Suburban Sanitary Commission

“The usual suspects”

Washington Suburban Sanitary Commission

Additional factors and challenges

- Hours/days of operation
- Menu items
- Plumbing fixture types
- Potential menu changes
- Seasonal activity
- Customer frequency/quantities

Crucial information

- The potential to discharge FOG-containing wastewater of a measurable quantity is reviewed *not only* from the food production standpoint, but also the cleaning methods and wastewaters produced from the serving hardware associated with the food.
- In other words-one does not even need to cook the food at a site in order to produce FOG-containing wastewater.

Washington Suburban Sanitary Commission

Regulating Dairy-based wastewater

- Reasoning is that it contains FOG, mostly in the form of “Fats”
- Typical unique FSEs qualifying in this area would be those that serve:
  - **frozen or soft dairy desserts, dairy drinks, specialty dairy-containing drinks, ice creams, sorbets, yogurt or yogurt-based products, parfaits, frappes, lattes, smoothies and/or shakes**

Washington Suburban Sanitary Commission

Typical potential “qualifying” FSEs in WSSD

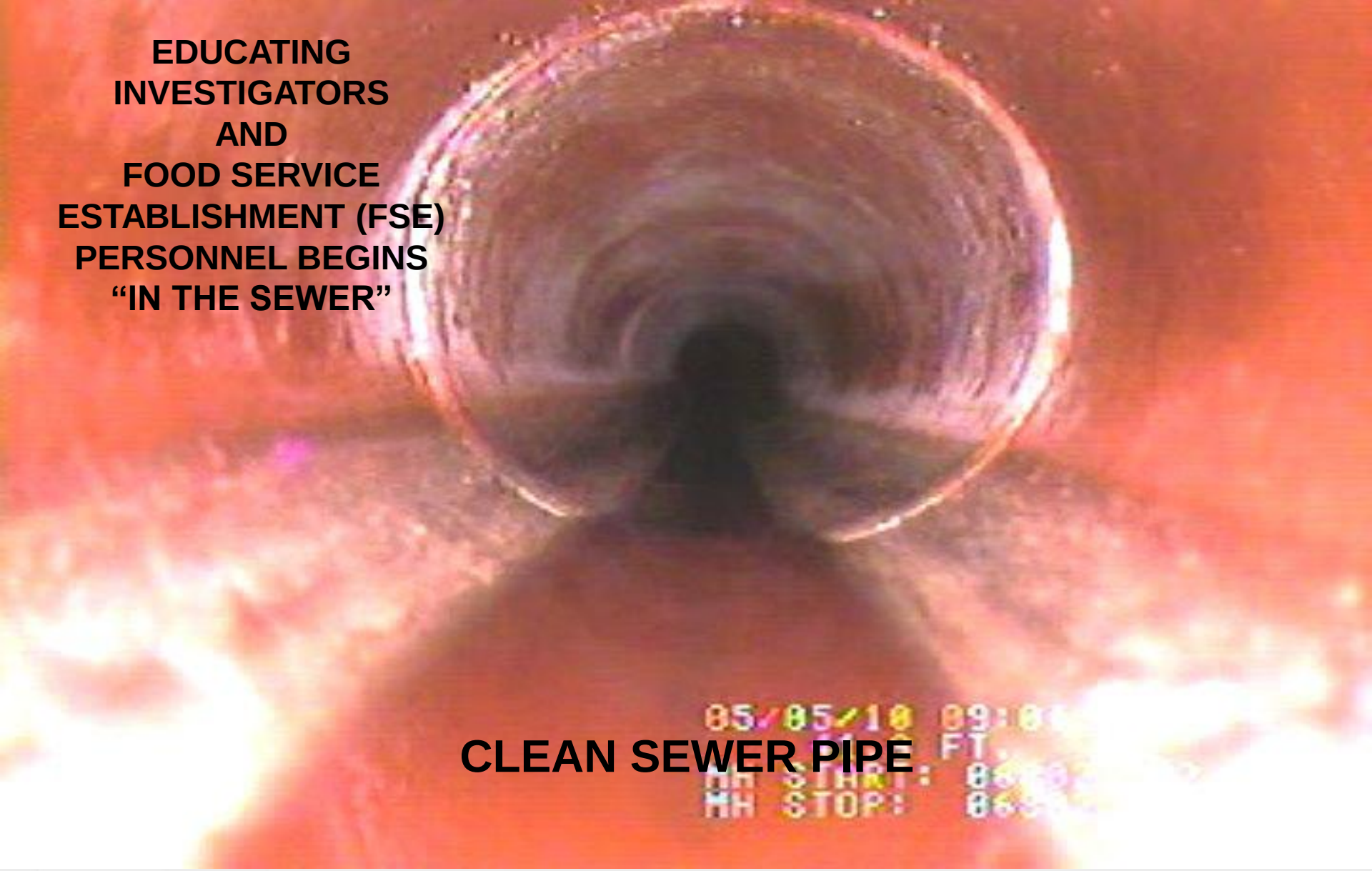
- BASKIN ROBBINS
- CARVEL
- CARIBOU COFFEE
- COLDSTONE
- MAYORGA COFFEE
- RITAS
- SEATTLES BEST
- SMOOTHIE KING
- STARBUCKS
- YOGIBERRY

Washington Suburban Sanitary Commission

Additional clarification: Coffee Shops vs. Specialty Drinks

Washington Suburban Sanitary Commission

EDUCATING INVESTIGATORS AND FOOD SERVICE ESTABLISHMENT (FSE) PERSONNEL BEGINS "IN THE SEWER"



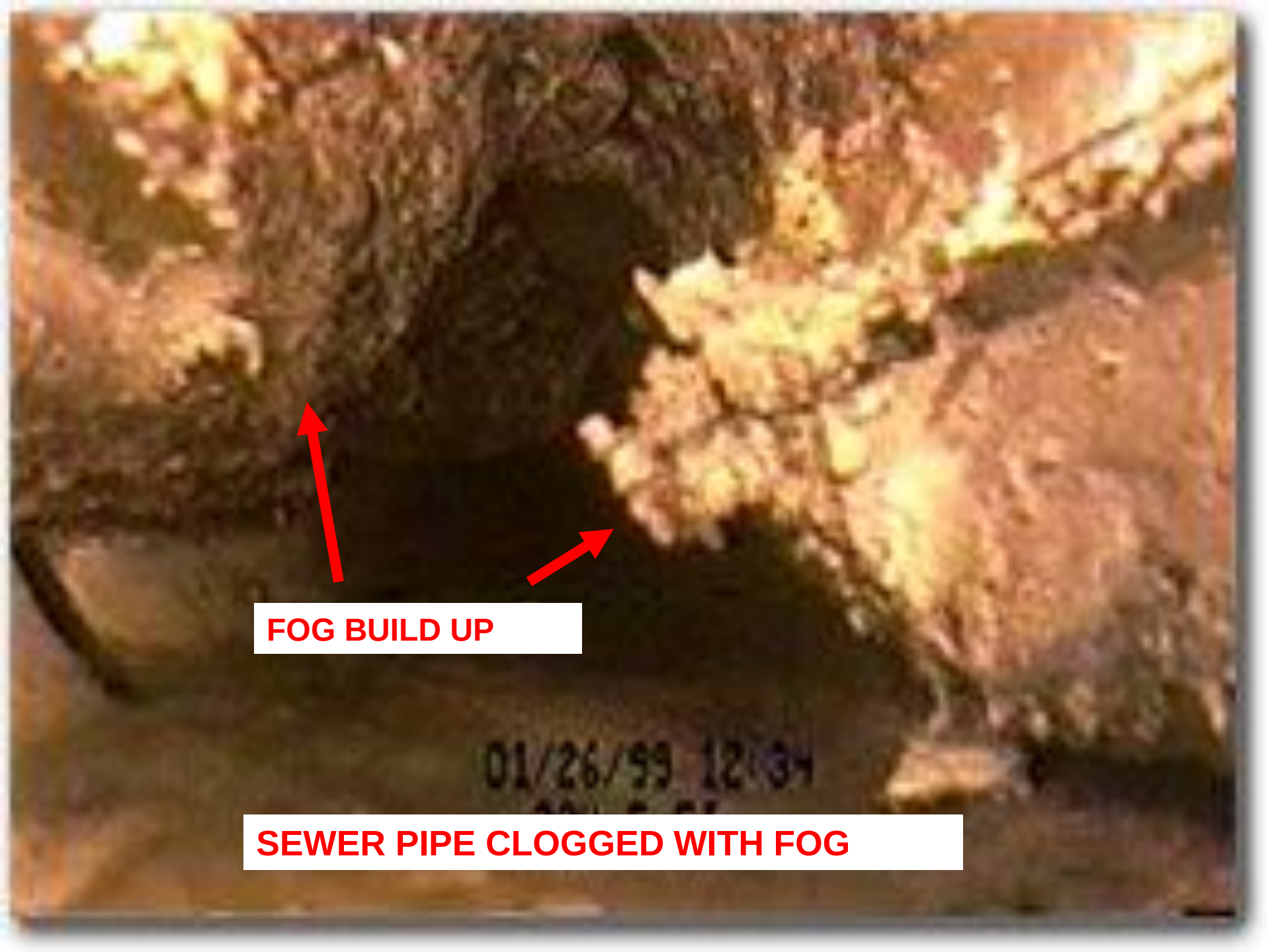
CLEAN SEWER PIPE

Washington Suburban Sanitary Commission


FOG BUILD-UP FORMING IN SEWER PIPE
13 1:38PM

That “greasy” build-up

Washington Suburban Sanitary Commission


FOG BUILD UP
SEWER PIPE CLOGGED WITH FOG

SEWAGE OVERFLOW IN PARKING LOT

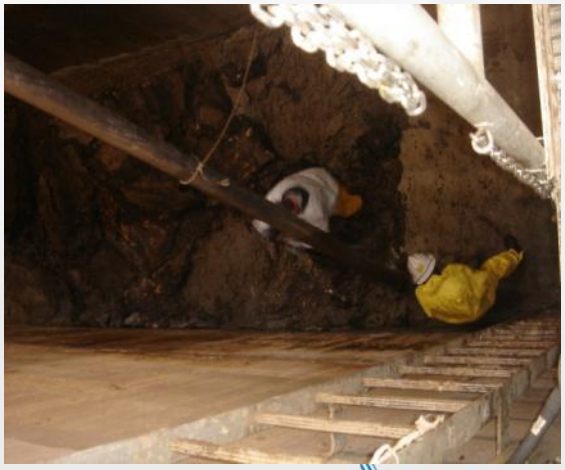
Other FOG issues: sewage pumping station “build-up”

Washington Suburban Sanitary Commission

SEWAGE PUMP STATION WETWELL CLEANING JANUARY 2010 ($10,000)

Washington Suburban Sanitary Commission

TWO MEN “IN THE HOLE”



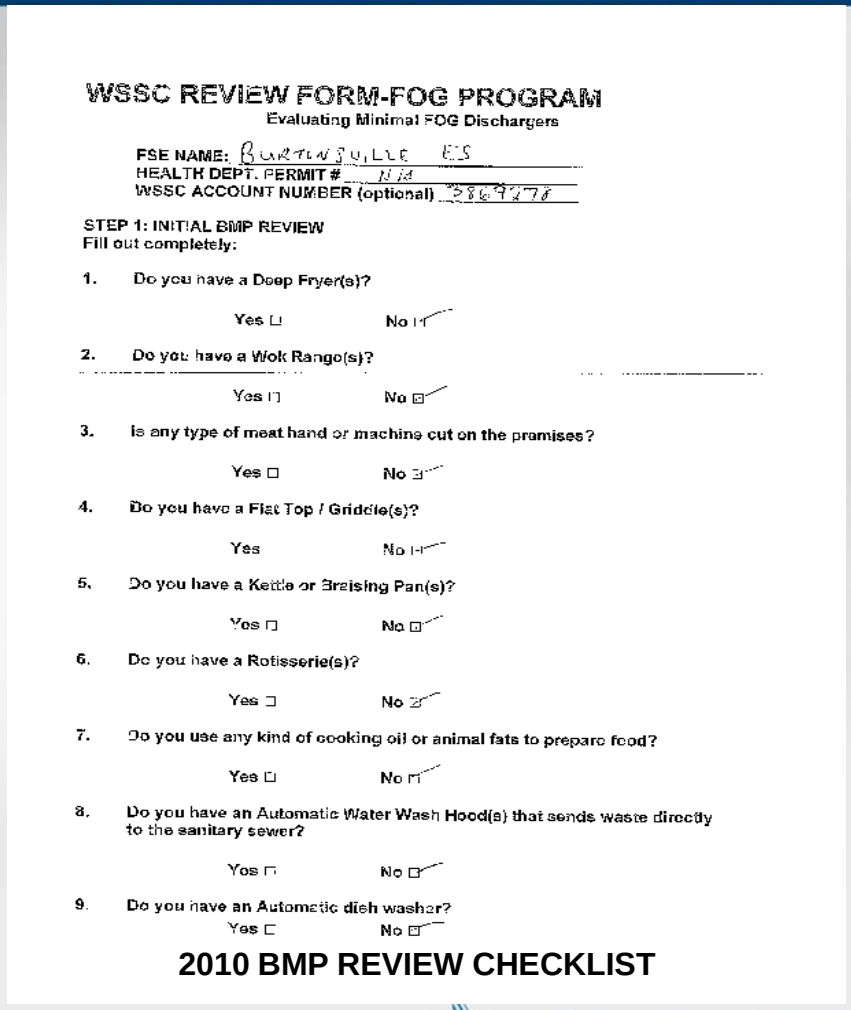
Washington Suburban Sanitary Commission

GETTING IT CLEAN

Washington Suburban Sanitary Commission

Current WSSC FOG Permit classifications

- **Full Permit**
  - GAD required to be present and maintained
  - BMP Practices
- **BMP Permit**
  - Regulatory recognized BMP practices required
    - “BMP checklist”
- **No Permit**
  - FSE is exempt due to one or more factors (usually no food preparation performed)



WSSC REVIEW FORM-FOG PROGRAM

Evaluating Minimal FOG Dischargers

FSE NAME: BURTONSVILLE ES
HEALTH DEPT. PERMIT #: N/A
WSSC ACCOUNT NUMBER (optional): 2867278

STEP 1: INITIAL BMP REVIEW
Fill out completely:

1. Do you have a Deep Fryer(s)?
   Yes ☐ No ☑
2. Do you have a Wok Range(s)?
   Yes ☐ No ☑
3. Is any type of meat hand or machine cut on the premises?
   Yes ☐ No ☑
4. Do you have a Flat Top / Griddle(s)?
   Yes ☐ No ☑
5. Do you have a Kettle or Braising Pan(s)?
   Yes ☐ No ☑
6. Do you have a Rotisserie(s)?
   Yes ☐ No ☑
7. Do you use any kind of cooking oil or animal fats to prepare food?
   Yes ☐ No ☑
8. Do you have an Automatic Water Wash Hood(s) that sends waste directly to the sanitary sewer?
   Yes ☐ No ☑
9. Do you have an Automatic dish washer?
   Yes ☐ No ☑

2010 BMP REVIEW CHECKLIST

Washington Suburban Sanitary Commission

UM Study completed
April 2011

Washington Suburban
Sanitary Commission

ALLEN P. DAVIS
Department of Civil and Environmental Engineering
University of Maryland

Education:

Ph.D. University of Delaware. Civil (Environmental) Engineering, 1989
M.C.E. University of Delaware. Civil (Environmental) Engineering, 1986
B.S. University of Delaware. Agricultural Engineering; Minor: Civil Engineering, 1984

Experience:

2001-present Director, Maryland Water Resources Research Center
2000-present Professor, University of Maryland
1989-2000 Assistant and Associate Professor, University of Maryland

Registration & Professional Affiliation:

Professional Engineer, (Environmental Engineering), State of Maryland, No. 21143.
Fellow, American Society of Civil Engineers

Awards & Honors:

Association of Environmental Engineering and Science Professors (AEESP) 2004 Distinguished Service Award for Outstanding Service as Chair of the Government Affairs Committee.
University of Maryland Engineering Research Center, Technology Extension Service Award for Environmental Achievement (April 1996)
National Science Foundation 1993 Young Investigator Award (June 1993)

Washington Suburban Sanitary Commission

JOEL J. DUCOSTE
jducoste@ncsu.edu

Undergraduate Institution	Degree	Major	Year
Rensselaer polytechnic Institute	B.S.	Mechanical Engineering	1988
Graduate Institution	**Degree**	**Major**	**Year**
Rensselaer Polytechnic Institute	M.Eng.	Mechanical Engineering	1989
University of Illinois	Ph.D.	Environmental Engineering	1996

Professional Engineer Registration: EIT: Ohio, 1991

Employment Appointments

Associate Professor of Civil, Construction, and Environmental Engineering, North Carolina State University, 2004 – Present
FWO Visiting Professor, University of Ghent, 2006
Assistant Professor of Civil Engineering, North Carolina State University, 1998 - 2004
Senior Water Treatment Process Engineer, CH2M HILL, 1996-1998

Professional Activities and Awards

NSF Advance Scholar 2009
National Academy of Engineering Frontier of Engineering Japan Symposium Participant 2008
Fulbright Research Fellow 2006-2007
National Science Foundation Career Award 2001-2006
Ralph Metcalfe Chair at Marquette University (Visiting lecturer award) 2000
Board Member, EPA Science Advisory Board Drinking Water Committee (2009-Present)
Board Member, North Carolina Fulbright Association (2008-Present)
Editorial Board Member, Journal of Environment Engineering ASCE (2008-Present)
North Carolina House of Representative Offshore Energy
Exploration Study Committee (2009-Present)

Washington Suburban Sanitary Commission

NC State research recently published (EPA grant funding)

Environmental Science & Technology

ARTICLE

pubs.acs.org/est

Evidence for Fat, Oil, and Grease (FOG) Deposit Formation Mechanisms in Sewer Lines

Xia He,[†] Mahbuba Iasmin,[†] Lisa O. Dean,[†] Simon E. Lappi,[§] Joel J. Ducoste,[†] and Francis L. de los Reyes, III[*,†]

[†]Department of Civil, Construction, and Environmental Engineering, North Carolina State University, Raleigh, North Carolina 27695, United States

[†]Department of Food, Bioprocessing, and Nutrition Sciences, North Carolina State University, Raleigh, North Carolina 27695, United States

[§]Department of Chemistry, North Carolina State University, Raleigh, North Carolina 27695, United States

Supporting Information

ABSTRACT: The presence of hardened and insoluble fats, oil, and grease (FOG) deposits in sewer lines is a major cause of line blockages leading to sanitary sewer overflows (SSOs). Despite the central role that FOG deposits play in SSOs, little is known about the mechanisms of FOG deposit formation in sanitary sewers. In this study, FOG deposits were formed under laboratory conditions from the reaction between free fatty acids and calcium chloride. The calcium and fatty acid profile analysis showed that the laboratory-produced FOG deposit displayed similar characteristics to FOG deposits collected from sanitary sewer lines. Results of FTIR analysis showed that the FOG deposits are metallic salts of fatty acid as revealed by comparisons with FOG deposits collected from sewer lines and pure calcium soaps. Based on the data, we propose that the formation of FOG deposits occurs from the aggregation of excess calcium compressing the double layer of free fatty acid micelles and a saponification reaction between aggregated calcium and free fatty acids.

INTRODUCTION

As the numbers and density of commercial food preparation and serving facilities increase, so do the amounts of fats, oils, and grease (FOG) that are routinely discharged into sewer collection systems. Of the estimated tens of thousands of sanitary sewer overflows (SSOs) that occur each year in the United States, approximately 48% are due to line blockages, of which 47% are related to FOG deposits that constrict the cross-sectional access of pipes.[1] Despite the central role that FOG deposits play in SSOs, very little is known about the mechanisms of FOG deposit formation in sanitary sewers. Examination of the physical properties and chemistry of FOG deposit samples from 23 cities around the United States[2] showed that FOG deposits display an adhesive character, have a grainy, sandstone-like texture and high yield strength. In addition, 16 of 19 FOG deposit samples (84%) contained greater than 50% lipid content, with the primary lipid being palmitic, a saturated fat and 85% of FOG deposit samples contained calcium as the primary metal, with average concentrations of 4255 mg/L.[2] The preferential accumulation of fats and calcium further suggests that FOG deposits may be metallic salts of fatty acids, and chemical saponification may be responsible for their formation.[2] Calcium ions are naturally present in domestic and industrial wastewater, and high levels of free fatty acids have been found in wastewater due to processes such as food frying.[3] Additionally, calcium may be released from biologically induced concrete corrosion.[4−6] While the saponification process may be a plausible explanation for the formation of these deposits due to their chemical constituents and physical structure, proof for this mechanism requires additional data, including the actual formation of FOG deposits under saponification conditions. The objective of this study is to verify the hypothesis that FOG deposit formation is the result of a saponification reaction between free fatty acids and metal ions such as calcium.

MATERIALS AND METHODS

Formation of FOG Deposits under Laboratory Conditions. Grease interceptor (GI) effluent from a steakhouse in Cary, NC was collected and used as the source of free fatty acids. The GI effluent characteristics were as follows: COD of 1136 ± 368 mg/L, alkalinity of 237 ± 17 mg $CaCO_3$/L, pH of 6.9 ± 0.25, and average Ca, Mg, Fe, and K concentrations of 9.1, 3.1, 0.4, and 7.2 mg/L, respectively. The reaction was performed using a jar-test apparatus (Phipps & Bird Jar Tester). In each beaker, 1 L of GI effluent was added and mixed with calcium chloride salt ($CaCl_2.2H_2O$) at varying concentrations. The mixing speed was set at 20 rpm and operated continuously at 20 °C for 10 days. On day 10 of the reaction process, the solution in each beaker was filtered through a wet-strengthened qualitative filter

Received: January 18, 2011
Accepted: April 8, 2011
Revised: April 5, 2011

samples taken from sewer lines (apartment, shopping center 1, and shopping center 2). Saturated fat was the major component, and palmitic was the primary saturated fatty acid in all FOG deposit samples, consistent with the results of Keener et al.[2] Monounsaturated fat was the second major component in all FOG deposit samples. Although the percentages of monounsaturated fat in FOG deposit samples from sewer lines were higher than those of the deposits formed in the lab, low percentages (around 10%) of monounsaturated fat in FOG deposits were observed in 12 FOG deposits from sewer lines.[2] Oleic was the primary monounsaturated fat in the FOG deposits formed in the lab and in those collected in the apartment area and shopping center 1. In addition, linoleic was the primary polyunsaturated fat in all FOG deposit samples, similar to the results of Keener et al.[2]

Three reactions (R1, R2, and R3) of GI effluent and calcium chloride were assessed at calcium concentrations of 50, 400, and 750 mg/L, respectively. Increasing concentrations of calcium were explored to determine any impact on the amount of FOG deposit formed. As mentioned earlier, biological reactions that induce corrosion of concrete pipes[4−6] may release excess calcium beyond that found in typical wastewaters. As the calcium concentration was increased from 50 mg/L to 750 mg/L, the resulting FOG deposit weight also increased (Table 2). From R1 to R3, increasing levels of calcium led to higher calcium levels measured in the FOG deposits.

Total fat in the FOG deposit increased from R1 to R2, indicating that additional calcium reacted with surplus free fatty acids in R2. Total fat, however, remained constant at 23 mg from R2 to R3, suggesting that although more calcium was added, no more free fatty acids were available to react with calcium.

The total fat to calcium ratios are higher in FOG deposit samples collected from shopping centers than in those formed under laboratory conditions, which may have been caused by different reaction conditions such as the finite amount of available free fatty acids to react with excess calcium under lab batch conditions. The FOG deposits from the shopping centers were likely the result of long-term reactions with higher concentrations of available free fatty acids that were continuously discharged from food service establishments. However, with the same fatty acid substrate (GI effluent), in R2 and R3, the total fat concentration remained at 23 mg, but the total fat to calcium ratio decreased from 5.16 in R2 to 3.67 in R3. The decreased ratio suggests that there may be other processes aside from saponification that led to accumulation of calcium within these deposits.

The results in Table 2 suggest that there may be two processes involved in FOG deposit formation. In the first process, calcium tends to accumulate around fatty acid micelles due to a DLVO type process[11] (i.e., compression of charged double layer) due to the slightly negative carboxylic end of the free fatty acids. In the second process, free fatty acids react with calcium to form calcium based fatty acid salts through a saponification reaction. The slightly negative carboxylic ends of unreacted free fatty acids continue to attract positive calcium ions, since the saponification reaction may be slow compared to the transport of calcium ions toward the solid deposit (i.e., a reaction limited process).[9] Due to the slower saponification reaction, it is hypothesized that more calcium than the stoichiometric amount needed for saponification would accumulate in the deposit. Research is needed, however, to confirm the involvement of a double layer compression process along with a saponification reaction to create solid FOG deposits in sewer lines.

FTIR Analysis. FTIR is a simple and powerful technique that is widely applied to determine oil and grease in water,[12−15] oily materials in different chemical processes,[16−19] trans fat in food,[20,21] and fatty acids and fatty acid salts.[9,22−24] If the saponification hypothesis is correct, then the calcium soap should be detected in the FOG deposit. In the infrared spectra, when free fatty acids react with calcium salt and the "hard" metallic salts of fatty acids (soaps) is formed, the carbonyl group stretching vibration at 1745 cm^{-1} of triacylglycerols (TAG) disappears, and three characteristic calcium soap bands appear: (i) the carboxylate ion symmetric stretching vibration, ν_1 at 1422 cm^{-1}; (ii) the carboxylate ion asymmetric stretching vibration, ν_2 at 1577 cm^{-1}; and (iii) the metal−oxygen bond vibration at 665 cm^{-1}.[9,25] Poulenat et al.[9] identified four regions that can be attributed to

(a) (b)

Figure 1. FOG deposits formed under laboratory conditions. (a) Photo was taken at day 10 when free fatty acids reacted with calcium salt in 1 L beaker; (b) Close-up of FOG deposit particles.

Table 1. Fatty Acid Composition of FOG Deposits

sample	total fat[a] (g/g)	saturated fat[b] (%)	primary saturated fat	mono unsaturated fat[c] (%)	primary mono unsaturated fat	poly unsaturated fat[d] (%)	primary poly unsaturated fat
R1	0.344	78.8	palmitic	9.8	oleic	0.8	linoleic
R2	0.255	57.5	palmitic	9.0	oleic	0.6	linoleic
R3	0.18	70.6	palmitic	14.0	oleic	0.7	linoleic
apartment	0.261	56.5	palmitic	38.3	oleic and palmitoleic	1.0	linoleic
shopping center 1	0.393	38.7	palmitic	37.2	oleic	15.3	linoleic
shopping center 2	0.489	64.7	palmitic	31.7	palmitoleic	0.6	linoleic

[a] Total fat content was calculated from a 1 g FOG deposit sample. [b] Saturated fat is shown as a percentage of the total fat. [c] Monounsaturated fat is shown as a percentage of total fat. [d] Polyunsaturated fat is shown as a percentage of total fat.

Washington Suburban Sanitary Commission

Conclusion

- Separation in GADs/ Lab (acidic conditions)

1. Accumulation of separated material
2. Floating (fat) / settling
3. ↑in fat content of floating/settling layers each week (coffee shop)

- Slower pace of separation for ice cream (stabilizers)
- Faster pace for specialty coffee shop
- Detergents seemed to slightly enhance separation in lab, did not prevent partitioning

Washington Suburban Sanitary Commission

Excerpt from UofM presentation April 2011

Regulating Dairy-based wastewater

Why it may be ignored in FOG Programs-and answers

- Adds to theoretical overall workload of a FOG Control program **(WSSC can handle)**
- "Intuitive" sense of minimal harm. **(Proven precursor)**
- The bigger, more obvious sources deserve the attention ("we have bigger fish to fry"). **(they will, but remainder cannot be ignored)**
- Sense that this particular source is everywhere, anyway ("everybody loves ice cream") **(regulatory authority and public education)**
- What's coffee without cream and how can it possibly clog a drain? **(summarized in this report)**
- "Economic burden of an environmental mandate" (requiring a GAD) **(a 'little' $ could go a long way overall; new construction already mandates it)**

Washington Suburban Sanitary Commission

Arguments against GAD treatment

- The majority of the dairy-based wastewater produced will remain in suspension throughout the collection system from source to WWTP. **(theory vs observation)**
- No known dairy-based FSE has ever caused a *grease* blockage. **(many other FSEs are also in "this boat"—this is not the entire point)**
- In the grand scheme of things, dairy-based wastewater is a minimal contributor to the overall sewer system *grease* loading. **(many 'minimums' can add up to a 'maximum')**

Washington Suburban Sanitary Commission

Arguments against GAD treatment (continued)

- Due to the nature of dairy matter, any flow-based and all volume-based GADs will promote acidic conditions and hydrogen sulfide production. **(True of *any* organic [food] matter)**
- Due to the nature of dairy matter, any flow-based and all volume-based GADs will produce a rapidly decomposing, odorous material that will be 'exposed' upon maintenance. **(True of many types of food wastewater, field experience will minimize impacts)**

Washington Suburban Sanitary Commission

RECALL: Dairy-based FOG Permit conditions May/June 2010 (BMP-R)

- “Dairy-based” FSE’s received a Full Permit with a cover letter of explanation.
- If they already had grease abatement, maintain it and follow BMPs
- If don’t have grease abatement, don’t install one now, follow BMPs
- U of M consultant study may determine next cycle- either BMP or Full Permit

Washington Suburban Sanitary Commission

REVIEW

- **WSSC is currently operating under a Consent Decree to control Sanitary Sewer Overflows (SSOs). Approximately 60% of WSSC's SSOs were related to fats, oils, and grease (FOG) blockages.**
- **WSSC was directed to submit a plan for approval to the Environmental Protection Agency (EPA) and the Maryland Department of the Environment (MDE) to reduce FOG-related SSOs and basement backups.**
- **Increased inspections, permitting, and update of the FOG Regulations (Code) is required by the plan.**
- **Inspections and permitting began in May 2007**

Washington Suburban Sanitary Commission

Regulated FOG discharges from FSE's range from the obvious to the obscure

FOG production varies

Washington Suburban Sanitary Commission

pre·cur·sor

- **Definition of ---**

  1 **: one that** precedes **and indicates the approach of another.**

  2**: a substance, cell, or cellular component from which another substance, cell, or cellular component is formed**

Washington Suburban Sanitary Commission

Reasoning idea

- Dairy FOG is a precursor to (potential and/or actual) FOG build-up in a sewer system, therefore removal of dairy FOG, to the extent of best available technology (a GAD) should be pursued.

Washington Suburban Sanitary Commission

WSSC REVIEW FORM-FOG PROGRAM
Evaluating Dairy-based Minimal FOG Dischargers

FSE NAME/PERMIT/ETC.:_____

PART A

Are ice cream products manufactured at this facility?
Yes □ No □

PART B

1. **Do you serve frozen or soft dairy desserts, dairy drinks, specialty dairy-containing drinks, ice creams, sorbets, parfaits, frappes, lattes, yogurts, smoothies and/or shakes?**
Yes □ No □ N/A □

PART C ("Applicable items" are listed in question B1. above)

1. **Do you only directly* serve the applicable item(s) that has been pre-packaged/prepared elsewhere?**
Yes □ No □ N/A □

2. **Are the applicable items consumed on a disposable plate, cup or container (or napkin) and/or taken to go and are the potential utensils issued to the consumer disposable?**
Yes □ No □ N/A □

3. **Do you prepare any of the applicable items above using mechanical or mixing devices (such as blenders, soft ice cream makers, milk shake makers, cappuccino machines, etc.) that require cleaning and sanitizing?**
Yes □ No □ N/A □

4. **Do you hand wash any pans, dishes containers and/or utensils from the applicable items on a daily basis?**
Yes □ No □ N/A □
If yes- please describe: Include the number of dishes/utensils/containers hand washed per day and what they contain:

5. **Where are leftover, expired, defective, mistakenly-made or otherwise extra unsaleable applicable items disposed of, specifically (list all methods) and describe frequency and quantity of disposal:**

***"directly" means the applicable item is completely pre-packaged for direct sale (no handling) OR applicable product is physically scooped from a pre-packaged container to the cone or container.**

THE 'CHECKLIST' 2011

Washington Suburban Sanitary Commission

Investigator overview: surveying the site

Washington Suburban Sanitary Commission

Menu items

Washington Suburban Sanitary Commission

Utensil and other “dairy ware” requiring clean-up

Washington Suburban Sanitary Commission

Dairy-related waste production

Washington Suburban Sanitary Commission

Mixers and blenders

Washington Suburban Sanitary Commission

Mechanical ice cream dispensers

Spill clean-up procedures

MOP SINK

Washington Suburban Sanitary Commission

Final disposal alternatives

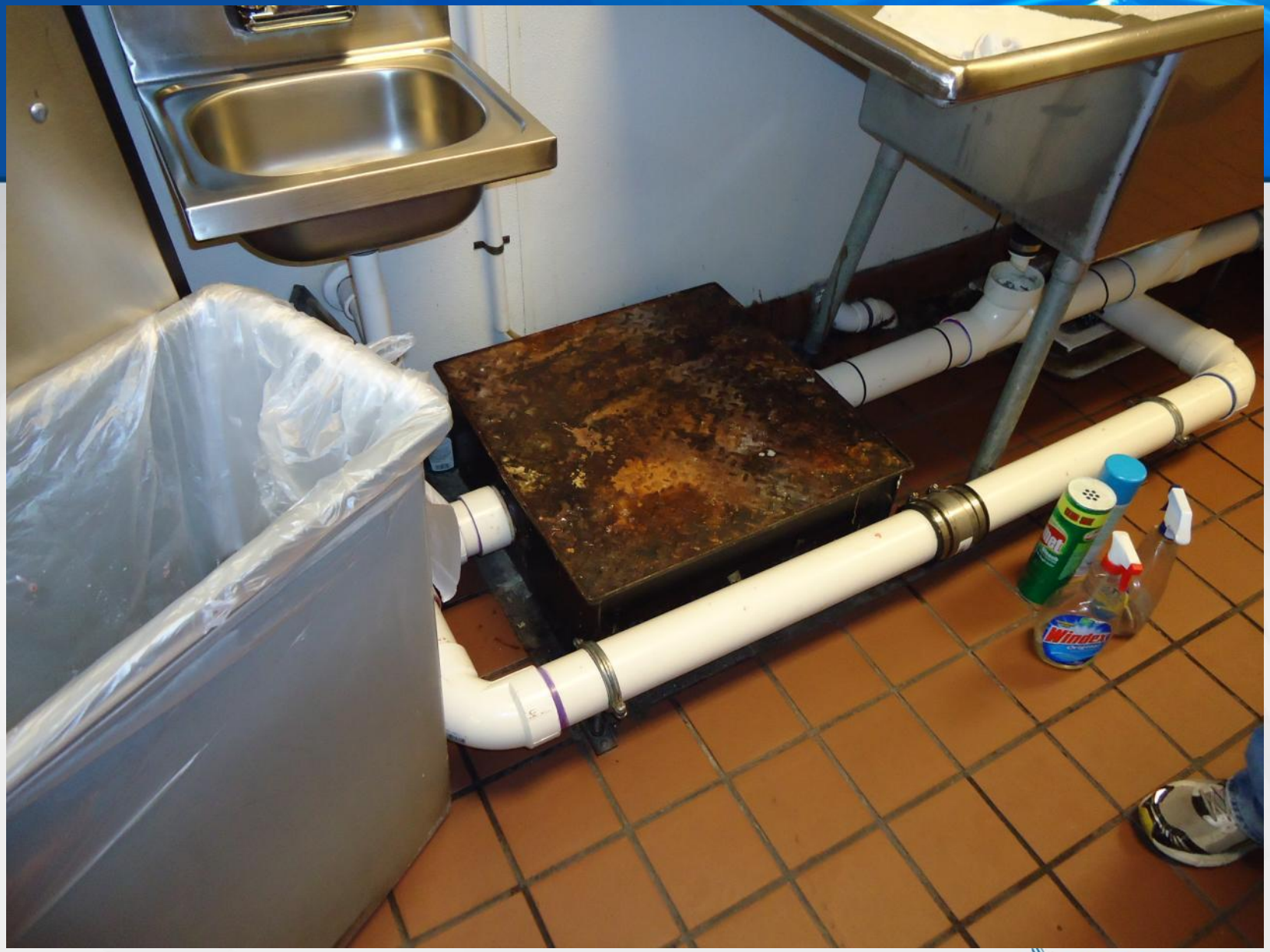
SPOILED OR OUTDATED

Washington Suburban Sanitary Commission

What we're seeing (existing)

Washington Suburban Sanitary Commission

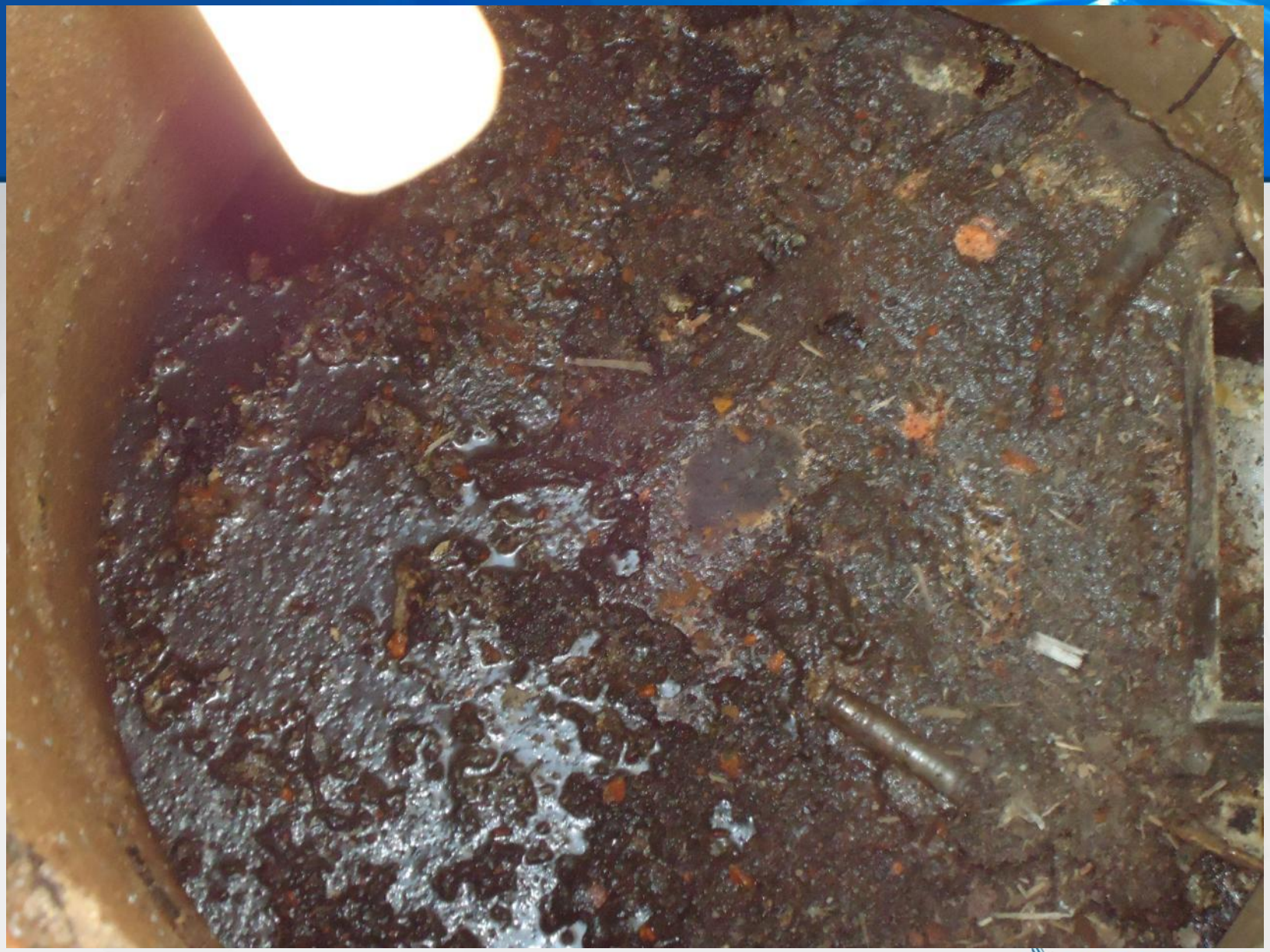
Washington Suburban Sanitary Commission



Washington Suburban Sanitary Commission

Washington Suburban Sanitary Commission

Washington Suburban Sanitary Commission



Washington Suburban Sanitary Commission

Washington Suburban Sanitary Commission

Washington Suburban Sanitary Commission

WRAP-UP:
Reducing/eliminating FOG from FSE's

- BEST MANAGEMENT PRACTICES
- RECYCLING
- TREATMENT/DISCHARGE PREVENTION via GADs
- EDUCATION/TRAINING

Washington Suburban Sanitary Commission

Logical steps towards a resolution

- Detailed review of the UM “Final Report”
- Prepare an internal (RSG) strategy for any and all changes, modifications, reviews, suggestions and comments.
- Assure the process is Consent Decree ‘audit proof’.
- Meet and review with WSSC General Counsel
- Decide on implementation schedule that includes education, training and anticipated applicable FSE installation timetables.
- Work with affected FSEs (approx. 118 or 2% of Permit inventory) to the extent possible and consistent with the Code

Washington Suburban Sanitary Commission

Excerpt slides from presentation to national conference of the NACWA, May 2011

Investing in FOG Futures: *Trends in Regulation and Treatment*

WAYNE H. LUDWIG, JR.
FOG UNIT COORDINATOR
WSSC
wludwig@wsscwater.com

NACWA
A Clear Commitment to America's Waters

Washington Suburban Sanitary Commission

Trends in Regulation and Treatment

- **Provide an overview of a general FOG program.**
- **Provide a summary of the most common challenges for regulators and businesses subject to FOG program requirements.**
- **Summarize latest initiatives:**
  - GAD performance assessments
  - Grease Abatement Device (GAD) nomenclature
  - ***Specialty dairy-based Food Service Establishment (FSE) findings***
  - School partnerships for education about FOG
  - “Regionalizing” FOG Management Programs

Washington Suburban Sanitary Commission

Specialty coffee shop "captured" material

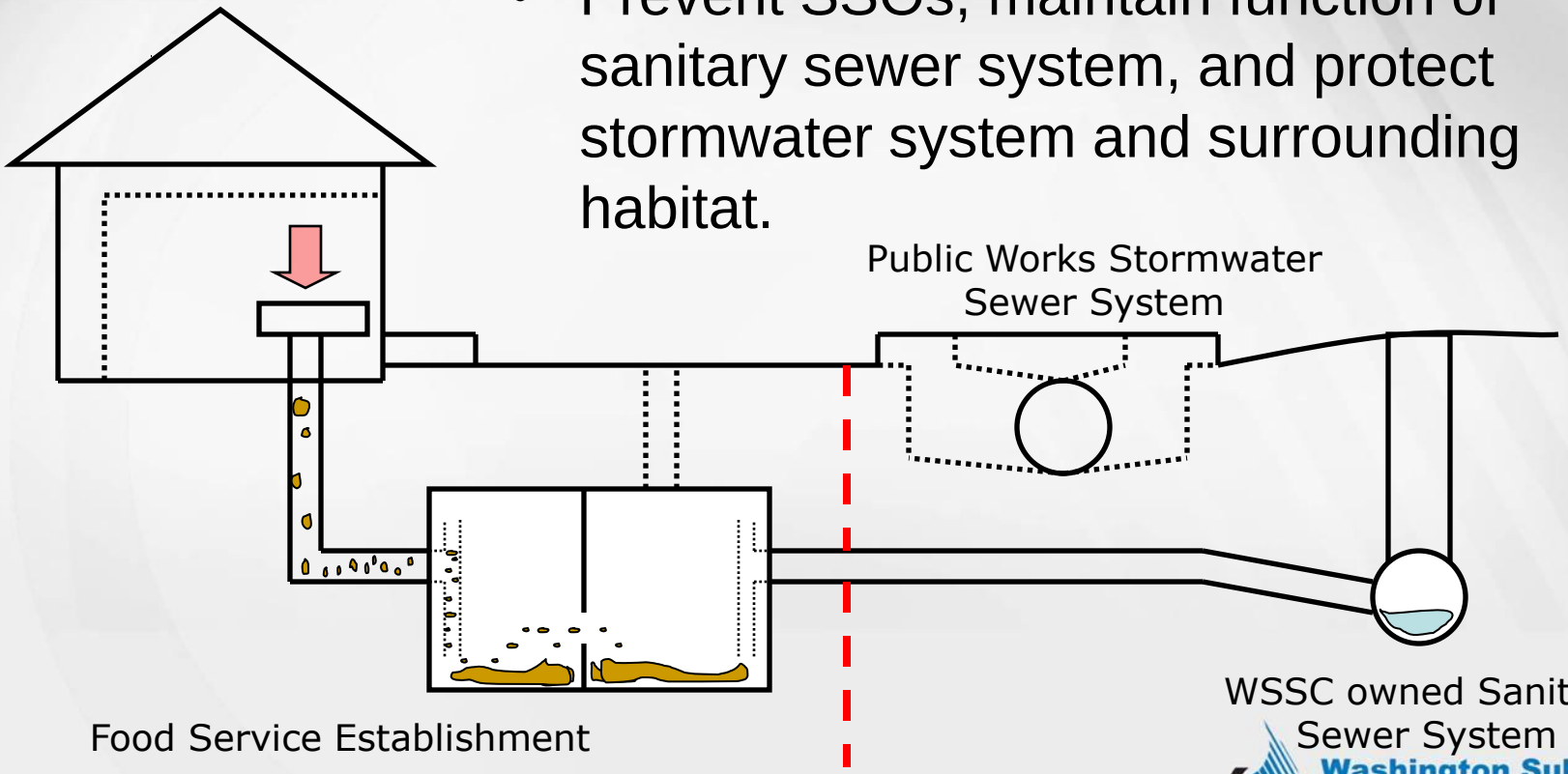
FLOW BASED UNIT

VOLUME BASED UNIT

Washington Suburban Sanitary Commission

Reducing FOG from FSEs

- Kitchen BMPs
- Installed and properly maintained GRDs
- Prevent SSOs, maintain function of sanitary sewer system, and protect stormwater system and surrounding habitat.



Washington Suburban Sanitary Commission

QUESTIONS / COMMENTS?

We would like you to take the time to review today's presentation and the
U of M research report and get back to us about it
CONTACT INFORMATION ON THE NEXT SLIDE

Washington Suburban Sanitary Commission

Any and all inquiries in writing please:

WAYNE H. LUDWIG, JR.
FOG UNIT COORDINATOR
WSSC
14501 SWEITZER LANE
LAUREL, MD 20707
wludwig@wsscwater.com

Washington Suburban Sanitary Commission