PRETREATMENT & LABORATORY ISSUES
(FOG, Nursing Homes, & Low Flow Industries)
A. Case Studies - Crystal Lake FOG Program

- Fats, Oils, & Grease (FOG)
- Regulation Update
  (Fact Sheet EPA-833-F-12-003 / September 2012)

EPA regulations prohibit “solid or viscous pollutants in amounts which will cause obstruction” in the POTW and its collection system (40 CFR 403.5(b)(3)).

- POTW’s should incorporate FOG reduction activities into their Capacity, Management, Operations, and Maintenance (CMOM) program and daily practices.
- Crystal Lake Compliance Concentration Limit (FOG – 200 mg/L) at end of pipe (manhole)
Wastewater FSE Questionnaires;
FOG Inspection Checklist &
FSE Spreadsheet
WASTEWATER DISCHARGE QUESTIONNAIRE FOR FOOD SERVICES

1. Name of property owner: .................................................................

2. Name of business owner, if different from above: .................................

3. Name and address of business establishment: ......................................

4. Phone number of business: ............................................................

5. Name, address, and phone number of business owner (if different from above): .................................................................

6. Name of responsible official for business at this address: ......................

7. Is this an existing facility or a new one? ............................................

8. Describe in detail, any source of non-sanitary wastewater discharges: (food preparation wastes, boiler blow down, etc.) ...........................

9. Do you have a grease interceptor or grease trap (describe, size)? How is it serviced (frequency), and by whom? .................................................

10. What is done with spent cooking grease and how much is generated? How is grease disposed of? Is there a grease dumpster? How often is it serviced and by whom?

11. What janitorial cleaners are there (types, usage, storage)? ....................


FOG INSPECTION WORKSHEET

Restaurant Name: _________________________________________________________

Business Address: ________________________________________________________

Date of Inspection: _______________________________________________________

Inspector (s): _____________________________________________________________

Restaurant Representative: ________________________________________________

Owner’s name if different: ________________________________________________

□ Was a questionnaire handed out to be completed?  Yes/No
   Comments: __________________________________________________________________

□ Grease Trap Manifest:  Yes/No
   Dates: _____________________________________________________________________
   Service Company: ___________________________________________________________
   Comments: __________________________________________________________________

□ Grease Trap Inspection:  Yes/No
   Comments: __________________________________________________________________
   __________________________________________________________________________

□ Pictures Taken:  Yes/No     Number of Pictures: ___
   Comments: __________________________________________________________________

□ Dishwasher:  Yes/No
   Comments: __________________________________________________________________

□ Grease Dumpster:  Yes/No
   Service Company: ___________________________________________________________
   Comments: __________________________________________________________________

□ Location and description of sampling manholes: ___________________________
   __________________________________________________________________________
<table>
<thead>
<tr>
<th>Restaurant</th>
<th>Address</th>
<th>Phone Number</th>
<th>Yearly Inspection Date</th>
<th>Questionnaire On File</th>
<th>Dishwasher Connected</th>
<th>Grease Trap Frequency</th>
<th>Grease Trap/Interceptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1776 Restaurant</td>
<td>997 W. Virginia Street</td>
<td>815-356-1776</td>
<td>1/29/2015</td>
<td>Yes</td>
<td>Monthly</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Ana’s Cakes &amp; Bakery</td>
<td>35 Berkshire Drive</td>
<td>847-428-9000</td>
<td>1/22/2015</td>
<td>Unknown</td>
<td>Yes</td>
<td>1x Quarterly</td>
<td>Yes</td>
</tr>
<tr>
<td>Andy’s</td>
<td>468 W. Virginia Rd</td>
<td>815-459-1661</td>
<td>1/22/2015</td>
<td>Unknown</td>
<td>No</td>
<td>Monthly</td>
<td>Yes</td>
</tr>
<tr>
<td>Arby’s</td>
<td>6000 Northwest Hwy</td>
<td>815-455-2346</td>
<td>1/27/2015</td>
<td>1/13/2009</td>
<td>No</td>
<td>Every 2 months</td>
<td>Yes</td>
</tr>
<tr>
<td>Around the Clock</td>
<td>5011 Northwest Hwy</td>
<td>815-459-2100</td>
<td>1/29/2015</td>
<td>1/29/2015</td>
<td>Yes</td>
<td>Monthly</td>
<td>Yes</td>
</tr>
<tr>
<td>Barnells</td>
<td>855 Cog Circle</td>
<td>12/1/2008</td>
<td>1000 GA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benedict’s LaStrada</td>
<td>40 N. Williams St.</td>
<td>815-459-6600</td>
<td>1/22/2015</td>
<td>11/11/2009</td>
<td>50 GA</td>
<td>1x month</td>
<td>Yes</td>
</tr>
<tr>
<td>Boston Market</td>
<td>6000 Northwest Hwy</td>
<td>815-356-6700</td>
<td>1/22/2015</td>
<td>4/5/2009</td>
<td>No</td>
<td>1x month</td>
<td>Yes</td>
</tr>
<tr>
<td>Brink St.</td>
<td>85 Brink St.</td>
<td>815-788-8585</td>
<td>1/22/2015</td>
<td>2/3/2015</td>
<td>Unknown</td>
<td>No</td>
<td>1x month</td>
</tr>
<tr>
<td>Buena Vista</td>
<td>406 Virginia Street</td>
<td>815-477-7205</td>
<td>10/16/2009</td>
<td>75 GA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buffalo Wild Wings</td>
<td>5755 Northwest Hwy</td>
<td>815-356-0333</td>
<td>1/22/2015</td>
<td>4/7/2009</td>
<td>Yes</td>
<td>2x month</td>
<td>Yes</td>
</tr>
<tr>
<td>Buffalo Rings &amp; Wings</td>
<td>1520 Carlmont</td>
<td>815-788-9464</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burger King</td>
<td>855 E Terra Cotta Ave</td>
<td>815-356-5201</td>
<td>1/27/2015</td>
<td>1/29/2015</td>
<td>1000 GA</td>
<td>1000 GA</td>
<td>Every 3 mo.</td>
</tr>
<tr>
<td>Café Olympic</td>
<td>90 N. Williams St.</td>
<td>815-459-4100</td>
<td>1/29/2015</td>
<td>2/3/2015</td>
<td>15 GA</td>
<td>Yes</td>
<td>Once per Month</td>
</tr>
<tr>
<td>Chen’s King Wok</td>
<td>6100 Northwest Highway</td>
<td>815-356-8899</td>
<td>4/27/2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chex Pierre</td>
<td>246 Pomeroy Ave.</td>
<td>815-444-6180</td>
<td>11/20/2008</td>
<td>7 GA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chili’s</td>
<td>5620 Northwest Hwy</td>
<td></td>
<td>1000 GA</td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lin’s Kitchen</td>
<td>1024 McHenry Ave</td>
<td></td>
<td>100 GA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China Palace</td>
<td>6146 Northwest Hwy</td>
<td></td>
<td>11/30/2008</td>
<td>75 GA</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chipotle</td>
<td>5006 Northwest Hwy</td>
<td></td>
<td>4/2/2008</td>
<td>1000 GA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chuck E Cheese</td>
<td>4725 Northwest Hwy</td>
<td>815-455-7463</td>
<td>4/3/2009</td>
<td>1000 GA</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colonial Café</td>
<td>5689 Northwest Hwy</td>
<td>815-444-8223</td>
<td>5/1/2009</td>
<td>2 Traps 36x30x18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Cottage</td>
<td>6 E. Crystal Lake Ave</td>
<td>815-459-7520</td>
<td>4/16/2008</td>
<td>30 GA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country Donuts</td>
<td>1815 S. Virginia</td>
<td>815-455-2028</td>
<td>2/5/2015</td>
<td>12/3/2008</td>
<td>40 GA</td>
<td>Yes but only wash cups</td>
<td>every 2-3 months</td>
</tr>
<tr>
<td>Culvers</td>
<td>501 Pingree Rd</td>
<td>815-356-9090</td>
<td>4/29/2009</td>
<td>1500 GA</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dunkin Donuts</td>
<td>4817 Northwest Hwy</td>
<td>815-477-4817</td>
<td></td>
<td>4/7/2009</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>El Burrito</td>
<td>6236 Northwest Hwy</td>
<td>815-477-0715</td>
<td>12/4/2008</td>
<td>5 x 3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FOG Case Studies
Case 1 – Surcharge Backup from Grease
Check Grease Interceptors

First Business On Line

Third Business On Line
Manholes on Street Showing Blockage
Conclusion

- Letter Correspondence
- Updated Wastewater Discharge Questionnaire
- Annual FOG Site Inspection
- Scheduled Operational Maintenance & Observations of the City Sanitary Line
- Finish Using Inventory of Grease Blocks & Make Decision on Future Use
- Compliance Monitoring
- NOV / Possible Fines
Case 2 – Business Strip Malls
West Manhole – City Sanitary Line
Center Manhole – South Towards Back of Asian Restaurant
East Manhole – City Sanitary Line
Surface View of East Manhole
East Manhole – Private Sanitary Line
Discharge Manhole from Bakery & Pizza
## CRYSTAL LAKE MONITORING SUMMARY FOR CRYSTAL LAKE PLAZA

**Fats, Oils, & Grease (FOG)**  
(Sewer Use Compliance Limit - 200 mg/L)

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Sample Dates</th>
<th>Sample Results (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Manhole (CITY)</td>
<td>5/23/2014</td>
<td>71</td>
</tr>
<tr>
<td>East Manhole (CITY)</td>
<td>1/14/2015</td>
<td>148</td>
</tr>
<tr>
<td>East Manhole (CITY)</td>
<td>1/23/2015</td>
<td>123</td>
</tr>
<tr>
<td>East Manhole (CITY)</td>
<td>3/25/2015</td>
<td>108</td>
</tr>
<tr>
<td>Next Manhole West of East Manhole (CITY)</td>
<td>1/14/2015</td>
<td>170</td>
</tr>
<tr>
<td>Center Manhole (CITY)</td>
<td>5/23/2014</td>
<td>462</td>
</tr>
<tr>
<td>Center Manhole (CITY)</td>
<td>1/14/2015</td>
<td>187</td>
</tr>
<tr>
<td>Center Manhole (CITY)</td>
<td>1/23/2015</td>
<td>511</td>
</tr>
<tr>
<td>Center Manhole (CITY)</td>
<td>3/25/2015</td>
<td>79</td>
</tr>
</tbody>
</table>

**Note:** the sample on 1-23-15 was collected from the lateral trench discharging from CL Plaza.

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Sample Dates</th>
<th>Sample Results (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Manhole (CITY)</td>
<td>5/23/2014</td>
<td>342,000</td>
</tr>
<tr>
<td>West Manhole (CITY)</td>
<td>1/14/2015</td>
<td>283</td>
</tr>
<tr>
<td>West Manhole (CITY)</td>
<td>1/23/2015</td>
<td>365</td>
</tr>
<tr>
<td>West Manhole (CITY)</td>
<td>3/25/2015</td>
<td>70,400</td>
</tr>
</tbody>
</table>

**Note:** this sample was collected from the south side of the manhole.  
The discharge trench from the Plaza was under grease and water and could not be seen.

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Sample Dates</th>
<th>Sample Results (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MH CLP 6W</td>
<td>1/23/2015</td>
<td>3.1</td>
</tr>
</tbody>
</table>

**Note:** this is the discharge manhole from west end of the Plaza.  
The manhole labeled MH CLP 5W is only a clean-out.

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Sample Dates</th>
<th>Sample Results (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MH CLP 2E</td>
<td>1/23/2015</td>
<td>26</td>
</tr>
<tr>
<td>MH CLP 2C</td>
<td>3/25/2015</td>
<td>228</td>
</tr>
</tbody>
</table>

**Conclusion:**  
There is a definite change in the results in the center and west manholes on Jackman Drive.  The lateral trench that discharges the Plaza in the center manhole on Jackman has the highest concentration of FOG. This manhole appears to be directly downs from the Asian Restaurant.

**Comment from Monitoring on (3/25/15)**  
Manhole MH CLP 2C is directly connected to the Asian restaurant. Concentration is over the limit but visually not too bad.  
Next MH downstream is within compliance limits, but the west manhole on Jackman continues to have high FOG.
Conclusion

- The City center & west manholes exceed FOG limits.
- Private manhole from Asian restaurant over the FOG compliance limit.
- Collect one more set of samples from all locations.
- Continue to communicate with management company.
- Implement some of the recommendations that were presented to the management company in late 2014.
- Possible NOV and follow ERP.
CASE 3 – CONFLICTS WITH NEIGHBORS
Both Discharge Pipes in Manhole
Drain Backup in Basement
Tree Roots & Unclogging the Sanitary Line
Water & Bad Visibility
Other Issues With The Business
Conclusion

- Regular grease trap service every two months
- Inspections & checking service manifests
- Private Connection from MH to middle of Route 14 should be blockage free
- Follow similar policies from other FOG locations
The Fabric / Rag Issue – Rehabilitation Center or Retirement Residence; Who is the Culprit?
Fabric / Rags at Lift Station Pumps (2014)
Maintenance Costs – last 7 years ($47,000)
Clumping of Fabric / Rags - 2014
Nursing Home – Discharge from Washers
The Retirement Residence – Fabric on Sump
Retirement Residence – Discharge Filter from Washers (2010 & 2014)
Rehabilitation Center – Metal Drain Screen (2014)
Rehabilitation Center – Fabricated Trench Screen (2014)
Continuing Issues – Rags (wipes, paper towels, & latex gloves)
Discharge at Rehabilitation Residence
Current Status

**Retirement Residence**
- PVC filter at washer discharge drain / cleaned daily
- Two large sump pump wells cleaned to monitor effectiveness of PVC filter
- Septic Shield installed on washers in resident laundry rooms
- NOV – follow ERP

**Rehabilitation Center**
- Filters now include a lint trap over the discharge drain
- A small metal drain screen
- A newly fabricated trench screen
- All cleaned daily
- NOV – follow ERP
Possible Solutions / Options

• Issue NOV’s to both facilities and follow ERP
• Require both facilities to construct their own pretreatment (grinders) on influent to sanitary

• Install high efficiency pumps at lift station better designed for rags & debris
• Require responsible parties to split costs for new pumps
• Pass costs for bi-monthly maintenance to responsible parties ($4,050 per year)
Low Flow Industries - < 100 GA Process Flow
Flow, Blockage, TSS, BOD, FOG, and Others
Case Scenario (1) – Zero Discharger
Metal Molding & Casting

Historical Issues
1) Zinc
2) BOD
3) TSS
4) Ammonia
No Process Discharge

- Sealed or no shop floor drains
- Cooling tower water (re-circulate)
- Machines are re-circulated petroleum based units
- Shop floors are dry swept
- Office and lunch room cleanup – wet mop with discharge to sink or bathroom drains
Collecting Samples – Issues
Paper and low volume of flow
Ammonia – Source?

- Sewer use limit (26 mg/L)
- 12 composite & grab samples (first three (41 to 74 mg/L))
- Last nine within the compliance limits
- Hydro-jet sewer

CONCLUSION
1) Household plumbing & cleaning items
2) Drano used in bathroom backup (contains ammonia)
3) Residue affect – low flows
4) NOV was not issued
Case Scenario (2) Induction Hardening of Steel Parts (job shop – no machining)

**Discharges Sources**

- Process - parts washing & quenching (approx. 6000 GA/day)
- Two cooling towers approx. 200 GA / week batched discharged
- Two air compressors blown off daily (5 GA)
- General sanitary > 1140 GA/day
Issues (2012 – 2013)

- Notice of Violation for
  1) Cu (0.60 & 0.62 mg/L)
  2) Fe (41.0 & 86 mg/L)
  3) P (19.7 mg/L)
  4) Ammonia (29 mg/L)
  5) TSS (high)
  6) BOD (high)

- Monitoring the manhole
Manhole – Little Flow
Response & Corrective Actions

- Capture process wastewater in tote bins allowing metals to settle prior to filtering
- Change to low phosphate detergent in parts washing
- Manhole pipe in MH at higher elevation than incoming sewer pipe
Conclusion

- Reconstruct MH at costs over $10,000.
- End of process sampling site at the floor drain
- The City will continue to sample the MH & end of process site
- Updated monitoring & site inspection
Ultimate Goal – Protect the Watersheds
Questions or Comments