



*Narragansett Bay Commission*

*Sustainable Energy Management  
Practices for Wastewater  
Treatment Facilities  
EPA Funded Project*

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# *Presentation Outline*

- 1. Project Problem Statement**
- 2. Project Approach**
- 3. Project Goals**
- 4. Project Partners/Stakeholders**
- 5. NBC WWTFs**
- 6. EF-EMS Project Component**
- 7. FOG ERP Project Component**
- 8. NBC Pretreatment Grease Control Program**



# *Project Problem Statement*

- **Wastewater Treatment Facility (WWTF) operations have high energy demands**
- **Energy demand increases with advanced treatment**
- **Energy costs are increasing**
- **Energy derived from fossil fuels create GHGs**
- **Waste grease impacts WWTF operations**
- **Waste grease can be a valuable source of renewable energy**



# ***Project Approach***

- **Wastewater Treatment Facility Energy Focused Management System**
  - Modeled after ISO 14001 EMS
  - Energy Measurement Component
  - Energy Efficiency Component
  - Renewable Energy Component
- **Environmental Results Program for Restaurants and Food Service Industry Sector**
  - FOG BMPs
  - Promote the use of waste grease as a source of renewable energy



# *Project Goals*

## **WWTF EF-EMS**

- **Improve Energy Efficiency of Rhode Island Wastewater Treatment Facilities, and**
- **Encourage/Increase use of Renewable Energy by Rhode Island Wastewater Treatment Facilities**

## **FOG ERP**

- **Improve Management of FOG**
- **Reduce the Discharge of Waste Oil and Grease to the Sewer System, and**
- **Promote the Use of Waste Oil and Grease as a Source of Renewable Energy**



# *Project Partners and Stakeholders*

## **Partners**

- **Rhode Island Department of Environmental Management - Office of Technical Assistance and Customer Service**
- **University of Rhode Island - Center for Pollution Prevention and Environmental Health**
- **Rhode Island Manufacturers Extension Services**
- **Narragansett Bay Commission**

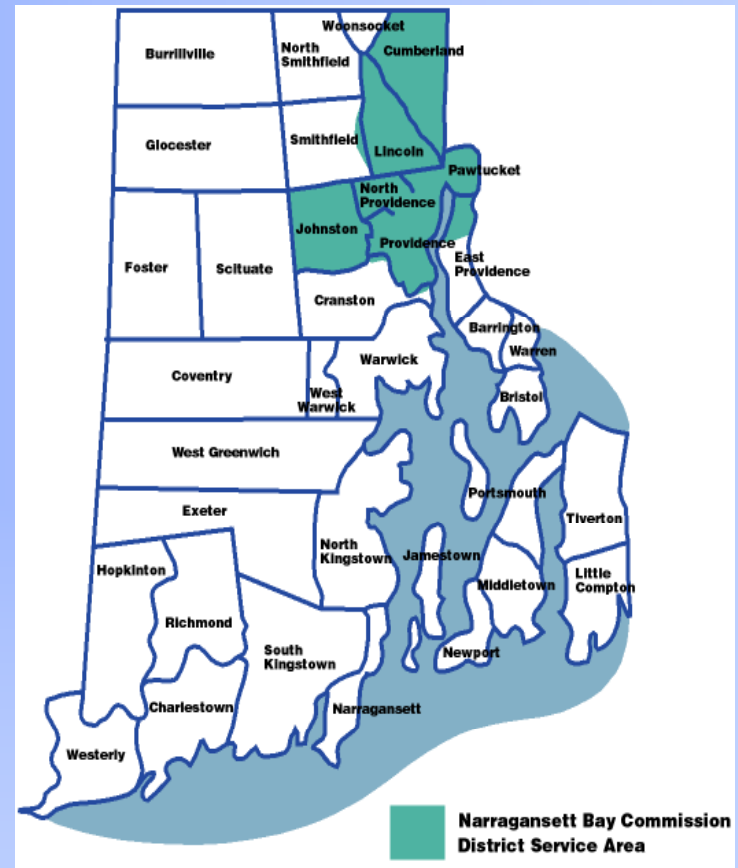
## **Stakeholders**

- **RIDEM - Office of Water Resources**
- **RI WWTFs**
- **Rhode Island Hospitality Association**
- **EPA**
- **National Grid**
- **Bio-Diesel Production Facilities**



# *Narragansett Bay Commission*

- Rhode Island's Two Largest WWTF
- Receive both Wastewater and Stormwater Flow
- Provide Wastewater Collection and Treatment Services to:
  - Ten Cities and Towns
  - 360,000 People
  - 8,000 Business
- 241 Employees
- 19 Member Board of Commissioners
- Rates set by PUC



# *NBC Wastewater Treatment Facilities*



- **Field's Point WWTF**

- 45 MGD (170.1 MLD) Average
- 65 MGD (246 MLD) Secondary
- 200 MGD (756 MLD) Primary
- Chlorination/De-chlorination
- Sludge Gravity Thickeners
- 4 Pump/Lift Stations



- **Bucklin Point WWTF**

- 24 MGD (90.8 MLD)
- 46 MGD (174 MLD) Secondary/Tertiary
- 116 MGD (438 MLD) Primary
- UV Disinfection
- Anaerobic Digestion
- 3 Pump/Lift Stations





## *EF-EMS Project Component*

- **Project Participation - 19 RI WWTFs**
- **Training on use of EPA “Energy Guidebook”**
- **Establish energy-use baselines for each participating WWTF - use Portfolio Manger**
- **Energy use assessments for participating WWTF**
- **Identify Energy Conservation and Efficiency Measures (ECEMs)**
- **Identify renewable energy resource opportunities**
- **Establish EF-EMS Roundtable**
- **Implement Plan-Do-Check-Act aspect of each EF-EMS**

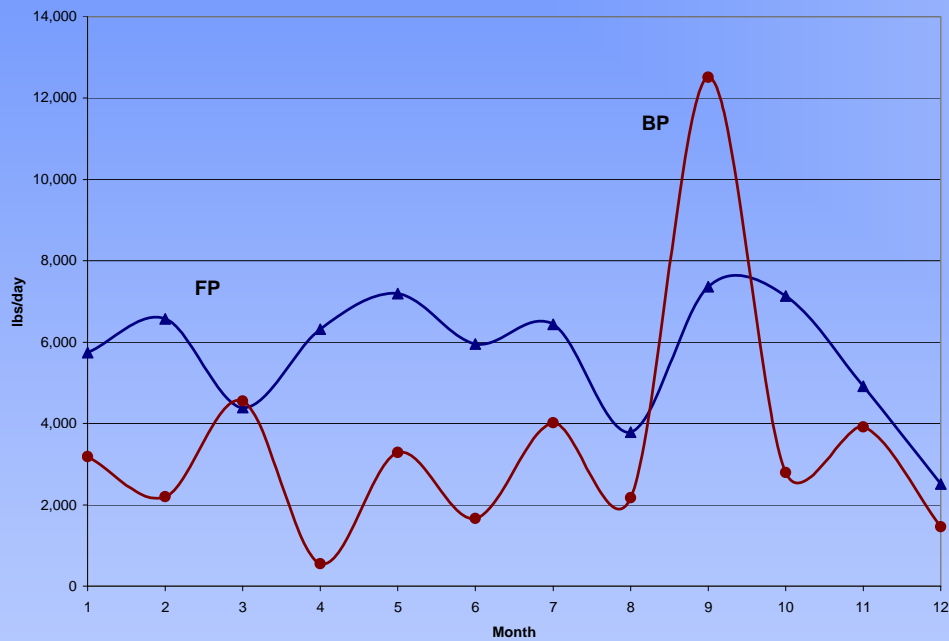


## *FOG ERP Component*

- **Project Participation - 600 plus permitted restaurants**
- **Develop FOG management checklist and set of BMPs**
- **Develop assistance tools and FOG management “self-certification” procedures**
- **Establish baseline performance through initial facility assessments and historic data analysis**
- **Conduct ERP follow-up assessments**
- **Compare performance improvements**
- **Identify opportunities and problems associated with using collected FOG as a source of renewable energy**

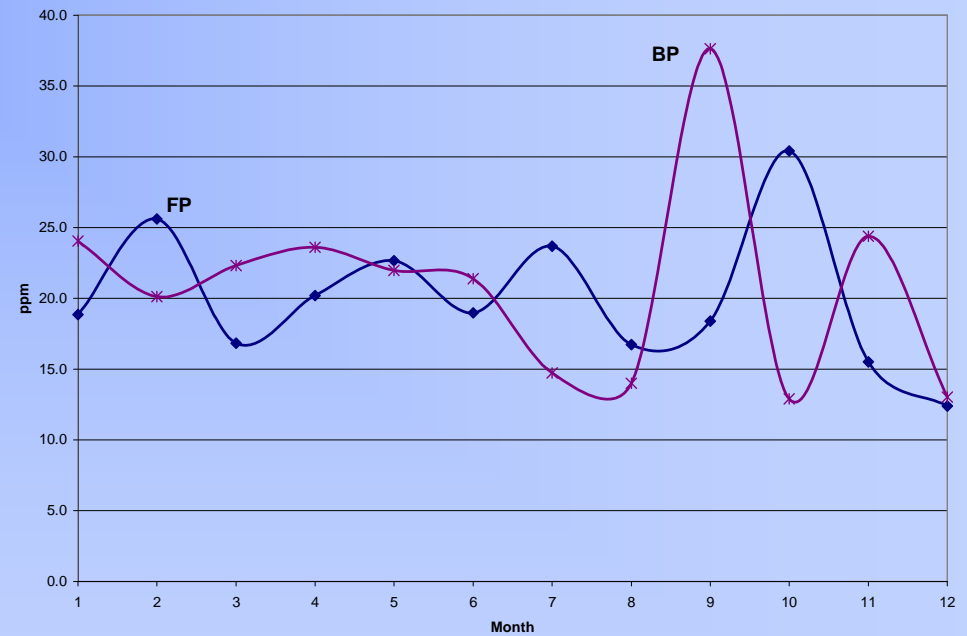


# NBC WWTF Oil and Grease Loadings

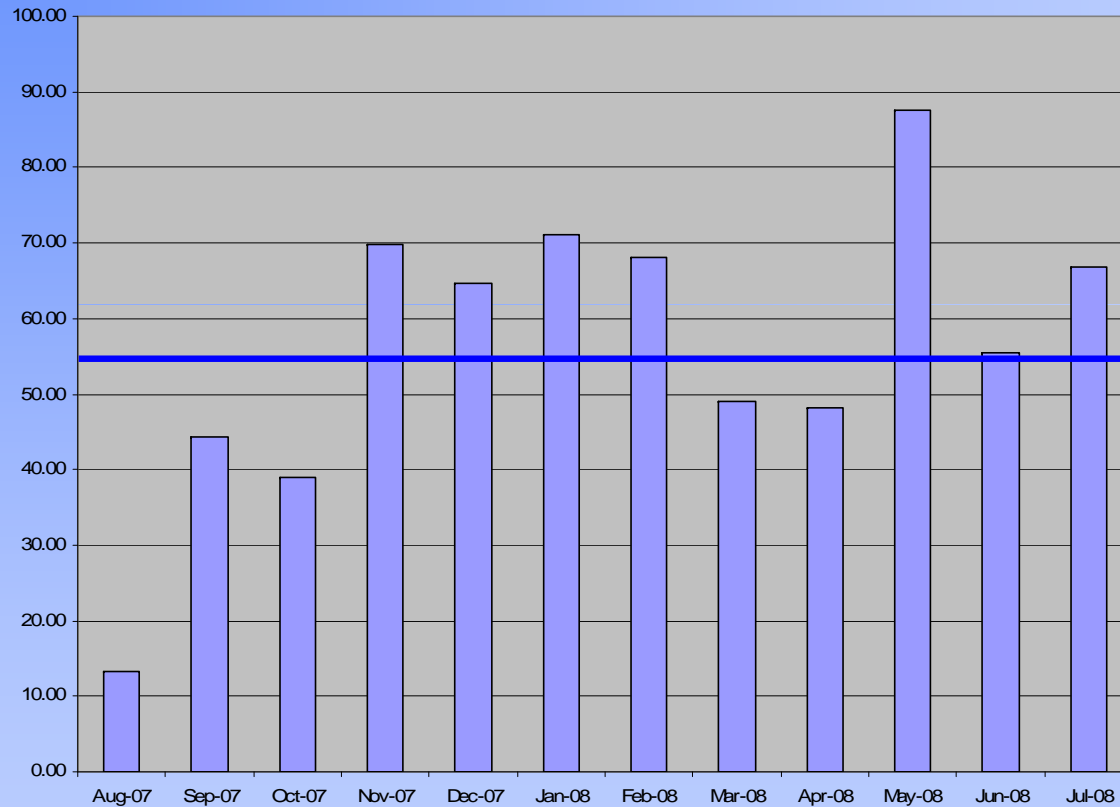


Lbs/Day

mg/l



# Grease Waste from FP WWTF



Tons of Dry Scum



## *Anticipated Project Outcomes*

- **Improve Energy Efficiency of participating WWTFs by 5 to 10 % over base year performance (2007)**
- **Decrease WWTF energy demand on local grid by 10 - 20% using renewable energy resources**
- **Decrease quantity of grease received at WWTFs**
- **Increase use of waste grease as a source of renewable energy by 25%**





# *NBC Grease Control Program*



# ***NBC Pretreatment Program***

- **1,507 discharge permits in effect**
- **On average conduct 2,000 inspections/year**
- **Conduct approximately 50 investigations/year**
  - **10% - 20% regarding grease issues**



# *NBC Grease Control Program*

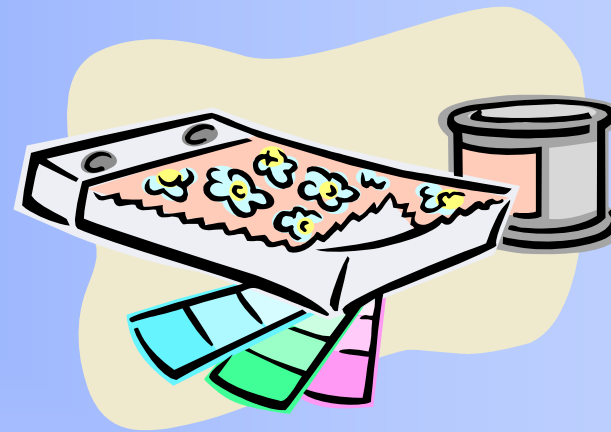
- Been in place since the late 1980s
- 818 Permitted companies with the potential to discharge grease laden wastewater
  - Restaurants
  - Schools
  - Nursing Homes
  - Hospitals
  - Supermarkets
  - Food Processors





# *Permit Requirements*

- **Discharge Limits**
- **Grease Removal Equipment**
- **Record Keeping**
- **Monitoring**
- **Notification of Changes**



# *Grease Removal Requirements*

- ④ **Meet NBC discharge limitation of 125.0 ppm**
- ④ **Submit plans detailing kitchen layout, plumbing and grease removal equipment**
- ④ **Install grease removal equipment with sample port**
  - ④ **Automatic Electro/Mechanical**
  - ④ **Outdoor In-ground Passive**
- ④ **Maintain all pretreatment equipment to ensure continuous operation**



# *Automatic Electro/Mechanical GRU*

- **Sized properly**
- **Sample port**
- **Solids Retention**
- **Accessible**
- **Fixtures required to be connected**
  - **Pre-Rinse Sinks**
  - **Pot Wash Sinks**
  - **Three-Bay Sinks**
  - **Soup Kettles**
  - **Wok Stations**
  - **Floor Drains**



## *Automatic Electro/Mechanical GRU (cont'd)*

- **Prohibited Discharges to GRU**
  - **Dish Washer**
  - **Garbage Grinders/Disposals**
  - **Vegetable Prep Sinks**
  - **Steam Tables**
  - **Sanitary Sinks**
  - **Ice Machines**
  - **Freezer Condensate**



## *Automatic Electro/Mechanical GRU (cont'd)*

### Ⓢ **Log Books**

#### Ⓢ **Maintenance**

- Ⓢ **Emptying Strainer Basket**
- Ⓢ **Cleaning Wiper Blades**
- Ⓢ **Cleaning Trough**
- Ⓢ **Wet Vacuuming of GRU**

#### Ⓢ **Amount of Grease Removed from unit**

#### Ⓢ **Date and time of inspection**

#### Ⓢ **Person conducting inspection**



## *Outdoor Inground Passive Grease Interceptor*

- **Sizing: 15 gal/seat but no smaller than 500 gal**
- **Accessible sampling tee w/ 8” diameter**
- **GI must be accessible**
- **Fixtures required to be connected:**
  - Pre-Rinse Sinks    Soup Kettles**
  - Pot Wash Sinks    Wok Stations**
  - Three-Bay Sinks    Dish Washers**
  - Vegetable Prep Sinks                  Garbage Grinders/Disposals**
  - Floor Drains**



## *Outdoor Inground Passive Grease Interceptor (cont'd)*

- ④ **Prohibited Discharges to GI**
  - ④ **Sanitary**
  - ④ **Ice Machines**
  - ④ **Freezer Condensate**
- ④ **Record Keeping**
  - ④ **Thickness of Grease Layer**
  - ④ **Pump-Outs including volume**
  - ④ **Receipts from pump-outs**
  - ④ **Date and time of inspection**
  - ④ **Person conducting inspection**



# *Inspection Program*

- **Conduct inspections of 75% of restaurants annually**
- **Inspect all other companies with the potential to discharge grease laden wastewater bi-annually**





# *Inspection Program (cont'd)*

## **Prior to inspection**

- **Review company information**
- ✓ **Permit**
- ✓ **Correspondence**
- ✓ **Plans**
- **Gather Equipment for inspection of GRU/GI**
- ✓ **Hand Tools**
- ✓ **Cover Hook**
- ✓ **Bottle Brush**
- ✓ **Camera**
- ✓ **PPE**



## *Inspection Program (cont'd)*

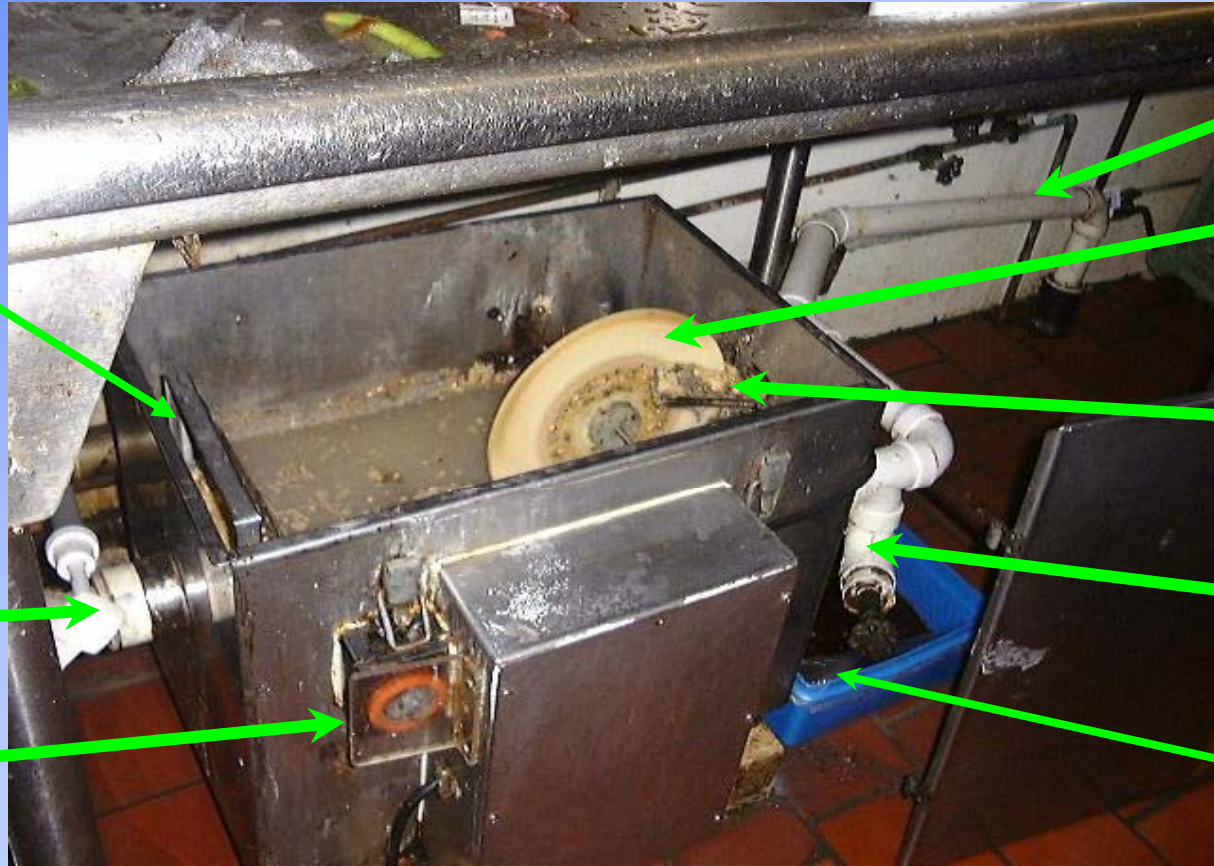
### **At location**

- ✓ **Verify owner and contact information**
- ✓ **Verify plans for accuracy**
- ✓ **Review maintenance records**



# Inspection Program (cont'd)

## Automatic Electro/Mechanical GRU



**Strainer Basket**

**Inlet**

**Timer Unit**

**Outlet**

**Skimmer Wheel**

**Wiper Blades**

**Sample Port**

**Grease Container**



## *Inspection Program (cont'd)*

### **GRU Inspection**

- ✓ **Open unit**
- ✓ **Inspect grease layer**
- ✓ **Remove strainer basket**
- ✓ **Inspect wiper blades, trough, skimmer wheel for integrity**
- ✓ **Ensure drainage hose is connected to waste grease reservoir**



## *Inspection Program (cont'd)*

- ✓ **Check Timer Operation**
  - ✓ **Proper time**
  - ✓ **Proper cleaning cycle settings**
- ✓ **Manually override timer to start the unit ensuring the unit operates properly**
- ✓ **If not operating check to see if power is supplied**
- ✓ **Inspect sample port**
  - ✓ **Open Valve**
  - ✓ **Clean if necessary**
- ✓ **Return to initial condition and close unit**

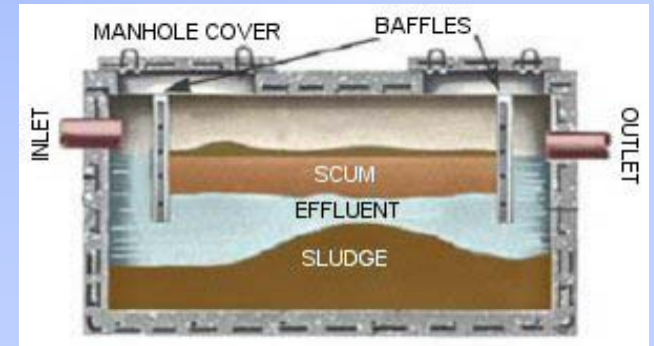
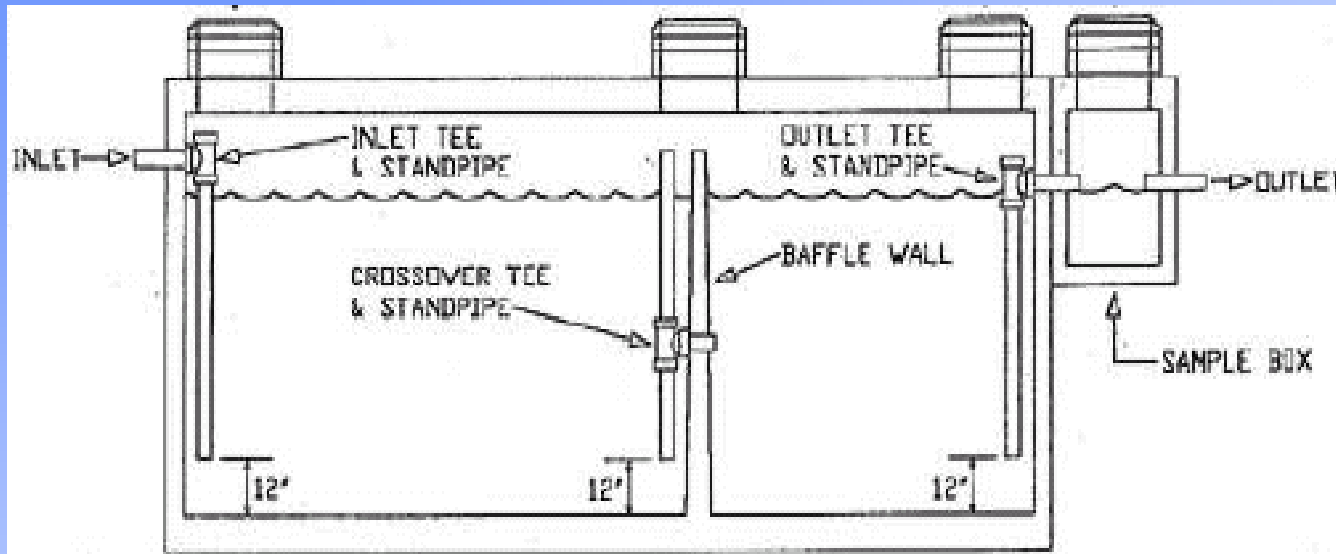


## *Inspection Program (cont'd)*



# *Inspection Program (cont'd)*

## *Outdoor Inground Passive Interceptor*



## *Inspection Program (cont'd)*

### **GI Inspection**

- ✓ **Open manhole covers**
- ✓ **Inspect sample tee for signs of grease**
- ✓ **Try to determine the thickness of grease and solids layers**
- ✓ **Close interceptor**





# *Inspection Program (cont'd)*

## **Post Inspection**

- **At location**
  - ✓ **Review findings with contact person**
  - ✓ **Respond to questions**
- **At office**
  - ✓ **Enter inspection in the PT computer system**
  - ✓ **Write detailed memo to the company file**
  - ✓ **Write detailed letter to the company**
- **Conduct future follow up inspections in accordance with SOPs and as necessary**





**Poorly Operating Automatic GRU**





**Blockage due to poor maintenance on  
Passive In-Ground Grease Traps**





**Grease from food preparation facilities  
caused blockages in a sewer line**





**No Power to Automatic GRU**

