KING COUNTY

INDUSTRIAL WASTE PROGRAM

Sampling Procedure for Customers:

Free-Floating Polar Fats, Oils, and Grease (FF-FOG)

Version: **001**

Implemented: **February1, 2016**

Author: _____ **Date:** 2/3/16

Lead: _____ **Date:** 2.3.16

Supervisor: _____ **Date:** 2.3.16

1. Scope and Application

This Standard Operating Procedure (SOP) applies to the field measurement of free-floating polar fats, oils, and grease (FF-FOG) by industrial dischargers.

2. Method Summary

A 1-liter volumetric flask is used to provide a quantitative measurement of the volumetric concentration of FF-FOG in the wastewater discharge.

3. Definitions

3.1 FF -FOG: Organic polar compounds derived from vegetable/plant or animal sources that are composed of long chain triglycerides.

4. Sample Collection, Preservation, Apparatus, Equipment, and Consumables

The sample is collected and analyzed in the field within 15 minutes of collection without any preservation required using the following apparatus and equipment:

- 6-inch or 12-inch ruler or measuring tape; must be able to read to $1/8^{th}$ of an inch markings
- 1-liter Nalgene polymethylpentene (PMP) volumetric flask (Nalgene No. 4001-1000). The flask may be purchased directly. KCIW could also provide a flask at the request of the customer
- Stainless steel cup or another clean sample collection device
- Digital camera
- Thermometer only if discharge >75 degrees F
- Nitrile gloves
- Detergent 8 or other detergent to sufficiently clean flask

5. Procedure

5.1 Calibration

Only a 1-liter Nalgene PMP flask may be used for this method. The Industrial Waste Program has calibrated this type of flask and has determined that it is the only one acceptable for use for the determination of FF-FOG.

5.2 Sample Collection and Analysis

5.2.1 Temperature

Measure the temperature of the discharge prior to taking a sample. Follow step 5.2.2 if the temperature is below 75^{o} F and step 5.2.3 if the temperature is above 75^{o} F.

5.2.2 Measurements for Routine Temperature Discharges

If a sample tap is available at the locator, collect the sample directly into the flask. If a sample tap is not available, collect the wastewater in another container such as stainless steel cup, swirl the contents, and immediately transfer to the flask. Record information about the container used to collect the sample (if any other method or container was used).

Bring the fluid volume as close to the 1000 mL line of the flask as possible. It is important to be able to read the lines of the FF-FOG surface and the FF-FOG/fluid interface.

After transfer of sample to the flask, place the cap on the flask and invert it three (3) times to mix the contents. Place the flask on a flat surface, remove the cap, and allow the flask contents to settle.

When the settling time has reached 20 minutes, check the flask to see if any FF-FOG is adhering to the flask sidewalls. If so, tap the sides of the flask to dislodge any adhering FF-FOG. Allow the contents of the flask to settle for an additional 10 minutes (**30 minutes total**).

At the conclusion of the 30 minute settling period, record the volume of FF-FOG. From the neck of the flask, record the difference in height from the FF-FOG/fluid interface to the surface of the FF-FOG. Record the height of the FF-FOG to the nearest one-eighth ($1/8^{th}$) inch. If the height of FF-FOG is between two measurements (e.g., between $1/8^{th}$ and $1/4^{th}$ inch), use the lower of the two measurements.

For FF-FOG height values that are less than 0.125 inches report the data as "<0.125 in.". For FF-FOG height values greater than 3.125 inches report the data as ">3.125 in.".

When the FF_FOG is > than 0.25 inches, take photograph(s) of the sample and record observations.

5.2.3 Measurements for Moderate to High Temperature Discharges

This procedure is required to collect FF-FOG samples under temperatures that are representative of sanitary sewer conditions. If the temperature of the wastewater discharge is greater than 75°F, then conduct the following steps:

- Place the volumetric flask into a large container (5 gallon bucket, etc.) filled with tap water. A tap water depth of four (4) inches is normally sufficient to cool the flask to below 75^{o}F.

- Follow the procedure under Section 5.2.2. Make sure the body of the 1-liter volumetric flask is submerged in the water bath throughout the duration of the 30-minute settling period. It is okay for the neck of the flask to extend above the water level.

- At the conclusion of testing under Section 5.2.2, measure the temperature of the water bath. If the water bath temperature is less than 75°F, then report the results. If the water bath temperature is greater than 75°F, then conduct an additional 30-minute settling period with a new water bath. Repeat, if necessary.

- Document in detail all actions taken.

6. Maintenance

6.1 Flask Cleaning

Clean the volumetric flask after each use. The flask can be cleaned with soap and water to remove residues including FF-FOG. Rinse the flask in warm water and clean the inside walls with a soft brush. Soaking the flask overnight with soap and water should be sufficient. After soaking , use a soft brush to clean the inside walls, and rinse the flask at least three-times with tap water to remove any residual detergent.

7. Quality Assurance and Quality Control

7.1 Samples should be collected and be analyzed using good field practices (mixing; splitting; use of pen, clear and complete writing, correction of errors).

7.2 All equipment used should be clean.

7.3 The SOP should be available to all personnel performing this procedure and all personnel must be fully trained prior to performing the procedure.

7.4 All personnel must follow the procedure and must not change the procedure without prior approval from KCIW.

8. Data Reduction, Reporting and Documentation

8.1 The data must be recorded in a log book. At a minimum, record the name of the person performing the procedure, the date and time of measurement, and the actual observation.

8.2 Report the data onto the KCIW self-monitoring form provided by the program and follow internal procedures for review, approval and reporting to KCIW.

9. References

G. Tchobanoglous and F. Burton; *Wastewater Engineering – Treatment, Disposal, and Reuse* (p. 1028); 3rd Edition 1991; Metcalf and Eddy, Inc.