Oil Water Separator Field Test Method

Oil / Water Separator Field Test Method:

Testing must be completed in a way designed to simulate actual operations, so to some extent all tests must be designed individually, utilizing water flows, oil flows and a conditioning pipe that is designed to produce the appropriate turbulence at the design flow. The design of the test must be varied somewhat to match existing equipment at the site.

Equipment / utilities required:

- Sufficient clean water to operate the system at design flow
- Injection pump to insert the correct amount of oil to make the concentration required.
- Test oil (corn oil is recommended as an environmentally friendly alternative to hydrocarbon oils)
- Test sample containers.

The below information is the suggested test method. This method is similar to the method previously used for testing shipboard bilge water separators according to the International Marine Organization standard:

The test should be conducted utilizing potable water under pressure from a local fire hydrant or other large quantity source. If potable water is not available in this quantity, other water may be used, but the inlet water must then be tested for hydrocarbon content. In the event that any hydrocarbon is found in the other water inlet the quantity found must be deducted from the measured separator effluent found. The oil must be injected under controlled conditions.

For the following detailed description, refer to the project documents for flows and inlet oil concentration information.

Design flow for the system is _____. The system was designed for ____ mg/l of oil in the inlet, and that is equal to ____ l per hour of oil. The oil and water would normally be passed through a conditioning tube of known Reynolds number of at least 10,000 to thoroughly mix the two liquids before it was directed into the separator inlet pipe at a

sewer inlet grating. The system configuration as installed may have an inlet pipe that meets the Reynolds number requirements, or a special conditioning pipe as shown in Figure 1 may be required.

The current separator inlet is a _____inch pipe to the upstream sewer piping.

The test oil should be injected using a piece of metal tubing, approximately 8 mm diameter inserted down through the inlet into the inlet sewer pipe and arranged so that the end of the tubing is approximately 1 m inside the end of the existing horizontal inlet pipe. This will ensure that the oil will go down stream and not accumulate upstream.

The oil must be injected into this pipe at the required l/hr flow rate through the tubing mentioned above.

The oil should be injected into the system using a small positive displacement pump. It is not necessary to constantly meter the flow, as the flow will remain constant once it is set. Set the flow using a graduated cylinder and stopwatch method.

The simplest method of determining the water flow rate is to simply measure the crest of the water over the outlet water weir to determine the flow rate. The crest over the outlet weir for these separators should be approximately _____.

Typical method information provided below indicates use of the conditioning tube to provide at least a 10,000 Reynolds number.

The separator system must be filled with clean water prior to commencing the testing. Inlet water, if not directly from potable source must be tested for oil content.

The design of the test system must be intended to closely simulate actual operations of the system, although it is suggested that the test be conducted using corn oil instead of lubricating or transformer oil for environmental safety reasons. Corn oil is approximately the same specific gravity, (approximately 0.92) therefore making the test reasonable with corn oil. Corn oil is a somewhat higher specific gravity than the oil usually expected in the separator and is therefore a more stringent test. If corn oil is not available, soybean oil or other vegetable oil may be substituted, but if such a substitution is planned, please consult MSR before doing this. The use of oil injected at a set rate and conditioning tube of known turbulence (as evidenced by the Reynolds number in the tube) is a method paralleling that specified by the US Coast Guard and the International Marine Organization (IMO) for testing shipboard bilgewater separators. The method requires that the Reynolds number be at least 10,000. A typical test schematic is provided below as Figure 1 below. Note: The conditioning tube function may be provided by the regular inlet pipe.

Test water can usually be obtained from a convenient valve on a source with sufficient flow available. The normal valve can be utilized to regulate the water flow rate.

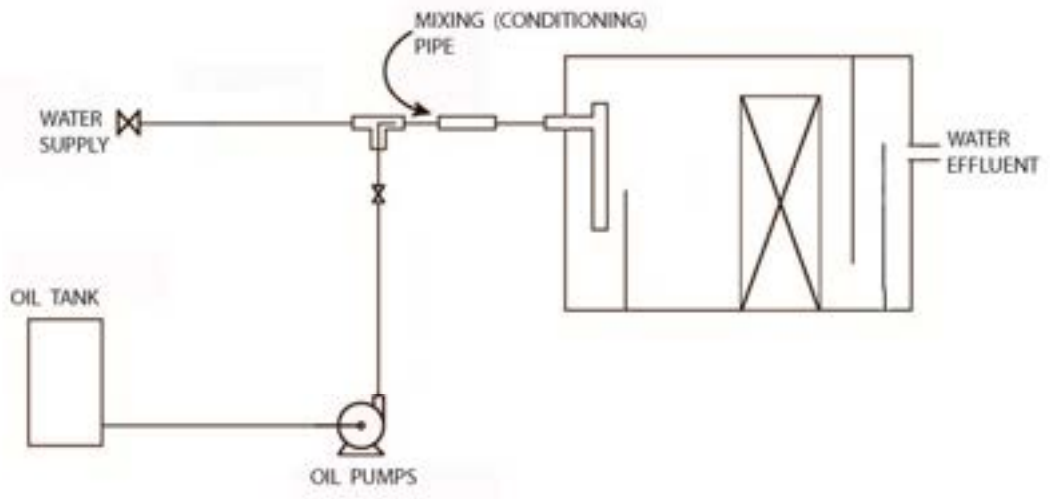

FIGURE I SCHEMATIC OF FLOWS DURING TEST

The system should be operated at the test flow rate for approximately thirty minutes (approximately 5 x the water volume of the separator) before introducing the test oil. During the testing, samples should be taken at approximately thirty-minute intervals. A redundant sample should be taken each time the main sample was taken for use in the event of inadvertent sample loss. Instantaneous flow measurements should be made at each sample time. The oil flow should be tested at both the beginning and at the end of the test. Note: samples must be taken in *clean, new* liter-size *glass* bottles and prepared / stored according to the requirements of the test lab. *Do not take samples in plastic bottles. Do not rinse bottles with sample before taking the samples. Please note it is not necessary to take inlet samples because the inlet water and oil flows are known and so the concentration can be calculated.*

Flowing water temperature and pH should be measured at the beginning and end of the test.

Samples should be taken by and analyzed by an independent third party laboratory. ***Analysis should be completed utilizing USEPA test method 1664.*** Any environmental laboratory should be able to run that test method. Results of the test may be presented as per the table below:

Separator Test Date:			
Sample Number	Time	Water Flow, gpm	Effluent Oil Content, mg/l
1			
2			
3			
4			
5			
Note: Detection limit considered to be less than 2 mg/l.			