

# DQM Annual Pipeline QA Checks

The following document is intended to be a guide for conducting annual Dredge Quality Management quality assurance checks on pipeline dredges. The procedures should provide general guidance for the process to be followed however as in all marine operations it is important that personnel be aware of the vessel's specifics and use critical thinking to ensure that the process applied is the best way to safely and reliably collect the needed data.

It is our goal to provide safe expeditious service in performing the QA check and as such there is no set order for the check. It is the job of the QA check team to work with the dredger and system provider to make sure that all required checks are performed and data collected while attempting to minimize interruptions to normal operations.

For pipeline dredges all components – Position, Head Depth, and Velocity - are required

## **Position Check**

The annual QA check process will include checking the position of the suction mouth as reported on the DQM onboard screen against readings from a handheld GPS receiver. The two readings should differ by no more than 3 meters (or 10 ft), depending on the number of satellites available.

### **Purpose:**

The purpose of the position check is to verify the accuracy of the dredge positioning system.

### **Material required:**

- 1) Dredge Position check form
- 2) Handheld GPS

### **Procedure:**

Turn on the handheld GPS and allow sufficient time to acquire the maximum number of satellites at a static location. The GPS location should be taken as close to the suction mouth location as possible; the position reading indicated on the DQM onboard display should also be noted at the same time (this may require a second person or a camera/screenshot). The two readings will then be entered into the spreadsheet for and the difference in location calculated. Number of satellites received should be noted in remarks. Difference in position should be less than 10 feet.

## **Suction Mouth Depth Check**

The annual QA check for pipeline dredges will require calibration checks of the reported suction mouth depth using manual means such as tape measures or sounding lines to directly measure depth. The Contractor shall have on the dredge a tape, chain, or wire with clearly visible flags/tags placed at 1-foot increments within the operational range of the ladder. This tape or chain shall be capable of measuring the depth below the water with sufficient length to measure 5 feet over the maximum project depth. Where pressure sensors are used to calibrate the depth sensors there is little ability to prove the calibration of either sensor and this method is only acceptable in areas where current flow past the vessel cannot be minimized enough to safely handle a measuring chain/tape. If this type instrument is used for calibration, it must be a vented pressure gage and shall be required that it be sent out for yearly manufacturer's calibration and then checked at a known depth during inspection. Extra care shall be taken not kink the cable or restrict the vent during deployment. The QA check team will review the depth data to ensure that the system is operating within acceptable accuracy, directing the contractor to re-calibrate or repair system components as necessary. Weekly calibration of the depth sensor is recommended as these sensors are sensitive to environmental conditions.

### **Purpose:**

To verify accuracy of ladder depth sensors.

### **Material Required:**

- 1) Suction Mouth Depth Check form / Notebook
- 2) Chain or tape, marked at foot intervals, or known distances within the operational range of the ladder
- 3) Handheld radio to communicate

### **Procedure:**

The steel tape or chain shall be attached to the cutter head or ladder and any offset to the suction mouth shall be noted. The ladder shall be lowered so that one of the flags is even with the water surface. Note the depth indicated by the chain or tape. Call up to the lever room and record the value they are reading on the DQM screen. Repeat the procedure for a minimum of three depths within the operating range of the ladder.

Difference between manually measured and system-measured averages should be equal to or less than 0.5 ft.

This test is highly dependent on wave heights and should be conducted in very low wave situations due to error caused by reading the measuring tape correctly.

## **Velocity Check**

The annual QA check for pipeline dredges will require calibration checks of the reported velocity using a dye test or calibrated external meter. The Contractor shall have on the dredge a supply of dye and an procedure for safely injecting the dye into the pipeline. Additionally, the accurate pipeline length from the point of dye injection to the outfall will be required. If an external meter is used for calibration checks the meter must be calibrated within the past year and its installation must meet the manufacturer's instructions.

The QA check team will review the velocity data to ensure that the system is operating within acceptable accuracy, directing the contractor to re-calibrate or repair system components as necessary.

**Purpose:**

To verify accuracy of velocity instrumentation.

**Material Required:**

- 1) Velocity Check form / Notebook
- 2) Environmentally appropriate testing dye and injection point/procedure  
(Bright Dyes by Kingscote Chemical available at McMaster-Carr is EPA approved)
- 3) Handheld radio to communicate
- 4) Stopwatch

**Procedure:**

The dredge pump should be run in such a way to provide a steady flow of water with no material. Verify that the velocity and rpm are staying constant. Dye is injected and the stop watch is started. The velocity reading is monitored to verify that it remains constant. The stop watch is stopped at the first sighting of dye from the outfall. Using the pipe length and time a velocity is determined and compared to the onboard reading. It is recommended that this test be run more than once and at more than one velocity to verify instrument accuracy.