HYDROGEN SULFIDE MONITORING QA/QC PLAN

GEORGIA-PACIFIC TOLEDO

SECTION 1: INTRODUCTION

Masen Environmental and Operations Solutions was contracted by Georgia-Pacific, LLC to develop and manage a quality assurance/quality control program for nine hydrogen sulfide (H2S) monitoring devices at the Georgia-Pacific Toledo Containerboard facility in Toledo, Oregon. These H2S monitors are Acrulog Parts Per Billion (PPB) devices with external power and RS-485 (Modbus) output that have a range of 0-2,000 parts per billion (PPB) and a sampling interval of 10 minutes. These units are equipped with a Robustel gateway with GPS tracking capability and are powered by a battery/solar panel combination. The current monitoring locations are shown on figure 1 below.

FIGURE 1: SENSOR LOCATIONS

The quality assurance/quality control program for these units includes the following activities:

- Standard sensor maintenance practices done in accordance with the sensor manufacturer's recommendations. These are detailed in Section 2.
- Multi-point response test at 0 ppb, 50 ppb and either 100, 250 or 500 ppb once per quarter.

The device is considered to be operating within an acceptable level of precision if the difference between the multi-point response test readings and the known response test gas concentration is less than or equal to 20%.

Corrective action is triggered if the acceptance criteria is not met which will include another response test and a device calibration if the second response test results are outside of the acceptance criteria.

SECTION 2: MAINTENANCE, TESTING & CALIBRATION

As described in Section 1, preventative maintenance on the sensors is done in accordance with the manufacturer's recommendations. The following preventative maintenance schedule is being implemented for these devices. The schedule described below is followed unless device performance or device health parameter readings indicate device maintenance is needed sooner.

Maintenance Task	Maintenance Frequency
Replace humidity control pack in Acrulog sensor	Every 6 months
Calibrate the device in accordance with cailbration procedures	Every 6 months
Replace external filter	Annually
Replace Acrulog batteries	Annually
Clean solar panel (If needed)	Annually
Inspect the device, enclosure and solar/battery system for damage, corrosion or other potential problems.	Annually

TABLE 1: PREVENTATIVE MAINTENANCE SCHEDULE

In addition to the standard maintenance practices, a multi-point response test is done quarterly. The procedures for the multi-point response test are shown in Table 2 below.

Tasks No.	Description
1	The devices (Acrulog, gateway, solar panel, etc.) are inspected
2	The Acrulog external filter is removed and inspected
3	The gas dilution system charcoal filter is inspected and tested
4	The Acrulog is placed into “log stop” mode
5	The flow regulator is connected to the gas cylinder
6	The Acrulog gas dilution system is utilized and is set to achieve the desired concentration
7	A calibration T-piece fitting is connected to the Acrulog “IN” external filter
8	The tubing from the gas cylinder is connected to one side of the T-piece. The other side of the tubing is vented to the air
9	The Acrulog is placed into sampling mode
10	The flow rate for response testing is set
11	The sampling occurs and the reading from the response test is recorded
12	The results are compared to the acceptance criteria. Adjustments are made as needed.
13	The unit is placed back in service

TABLE 2: MULT-POINT RESPONSE TEST PROCEDURES

The following procedures are followed for sensor calibrations.

Tasks No.	Description
1	The devices (Acrulog, gateway, solar panel, etc.) are inspected
2	The Acrulog external filter is removed and inspected
3	The gas dilution system charcoal filter is inspected and tested (If applicable)
4	The Acrulog is placed into “log stop” mode
5	The flow regulator is connected to the calibration gas cylinder
6	The Acrulog gas dilution system is utilized and is set to achieve the desired concentration (If applicable)
7	A calibration T-piece fitting is connected to the Acrulog “IN” external filter
8	The tubing from the gas cylinder is connected to one side of the T-piece. The other side of the tubing is vented to the air
9	The flow rate for calibration is set
10	The Acrulog is set to “Calibration” and the “Y” on the display screen is swiped with a magnetic tool
11	The Acrulog then completes the calibration cycle.
12	The unit is placed back into service

TABLE 3: SENSOR CALIBRATION PROCEEDURES

Ambient temperature and relative humidity readings are taken at the beginning of each response test or calibration. These parameters are controlled to the maximum extent possible as the ideal environmental conditions for performing response tests and calibrations on the Acrulog devices is 68°to 86° at a relative humidity range of 40% to 60%.