Summary of USGS Reports

The following are brief summaries of two (2) extensive reports issued by the U.S. Geological Survey which included assessments of Eureka Water Probes multiprobes. The full reports are found in the Tech Notes section on the Eureka website, also available on the USGS website.

I. Summary of Evaluation of the Manta2 Water-Quality Multiprobe Sonde

This evaluation was conducted by the U.S. Geological Survey (USGS) Hydrologic Instrumentation Facility (HIF) in 2017. The HIF evaluates the performance of instruments and equipment that are used to measure hydrologic data. Evaluation reports document the results at the time of testing, and may or may not represent future instrument performance resulting from updates and improvements to the device. These reports are not an endorsement by the USGS, but rather a tool for use by USGS personnel to facilitate the decision-making process when selecting instruments and equipment for use in the field. This report documents the laboratory and field evaluation of the Manta2 3.5 water-quality multiprobe sonde.

The Manta2 3.5 water-quality multiprobe sonde was tested against known standards over the sonde's operating temperature to verify the manufacturer's stated accuracy specifications for pH, specific conductance (SC), dissolved oxygen (DO), and turbidity. The Manta2 was compliant with Serial Digital Interface at 1200 baud (SDI-12) version 1.3. During laboratory testing, the Manta2 met all USGS "National Field Manual for the Collection of Water-Quality Data" (NFM) recommendations and manufacturer's accuracy specification at all pH values tested, with the exception of 2 data points (pH 11.16 at 15 °C and pH 10.78 at 40 °C.) The Manta2 SC sensors were within the manufacturer's accuracy specifications, except at 100 microsiemens per centimeter (μ S/cm) at 15°C, 25 °C, and 40 °C; at 1,000 μ S/cm at 40 °C; and at 10,000 μ S/cm at 15 °C and 40 °C. The SC sensors were within the NFM recommendations, except at 100 μ S/cm at 40 °C, exceeding the 37 test standard value by as much as 25 percent. The Manta2 water-guality multiprobe met the NFM recommendations and manufacturer's accuracy specifications for DO and turbidity. A Manta2 sonde was field tested on the Pearl River at USGS station 02492620. During the 6week field test, the Manta2 showed overall good agreement with the site sonde for temperature, pH, and DO. Differences were observed in SC data, but were most likely due to stratification of the water column and the difference in the deployment depth of the sondes.

II. Guidelines and Standard Procedures for High-Frequency Groundwater-Quality Monitoring Stations—Design, Operation, and Record Computation

The goal of this USGS report – conducted in 2019 - was to provide specific guidelines for the monitoring station set-up for various well types, the use of water-quality sensors for high-frequency groundwater-quality monitoring, to refine guidance for data corrections, and make appropriate updates to the records computation procedures. This involved testing with a Manta multiprobe, and sondes from 2 other manufacturers.

A Eureka Water Probes[®] Manta 2, a YSI/Xylem EXO1, and an RBR Maestro Multi-Channel Logger were evaluated in side-by-side experiments using manufacturer supplied flow cells. The results of the short-term laboratory precision experiments of the three water-quality sondes for both SC and pH are presented in table 1–2 in the full report. Among the results the pH precision experiment (n = 12 or 13) showed low 3-sigma SDs for each of the water-quality sondes (table 1–2). The Manta 2 had the smallest 3-sigma SD at 0 pH units, followed by the EXO1 at 0.02 pH units, and the RBRmaestro at 0.06 pH units.

Complete reports also found in **Tech Notes,** or on USGS website.