

Monitoring and Measuring Pollutants in a Heavily Populated Bay Area

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CAS DataLoggers recently provided the Environmental Protection Agency with the datalogging solution for an important research project. The EPA was obliged by law to monitor the condition of a bay adjacent to a major US city. To achieve this, there was a need to measure the ecological consequences of wastewater outflows from the city and the bay's capacity to cope with them. The bay covered 1,200 square miles and received the wastewater flows from the city and its suburbs, which sat directly on the river. Marine Sciences laboratories were chosen to map the discharge plumes from these outflows over a 12-month period, and the information the scientists needed to collect was on temperature, salinity (reduced salinity because of increased fresh water could lead to damage to marine life), acidity, dissolved oxygen, nitrates, phosphates and chlorophyll levels. Scientists realized that a key requirement for the project would be a long term monitoring solution with the capacity for a high number of sensors as well as expansion capabilities in case the project needed more inputs. This device would also have to be able to withstand exposure to the often inclement weather conditions that could arise with little warning out on the bay.



The EPA research team installed a **dataTaker DT85 Intelligent Universal Input Data Logger** on their small boat alongside the onboard sensor array, and then connected the logger to a **dataTaker CEM20 (Channel Expansion Module)** to extend the DT85 by 20 universal data logging channels. As part of this specially equipped launch, the datalogger was installed to record the mass of information generated by the sensors and greatly simplified data collection during the project. The bay's water was pumped continuously from about 5ft. (1.5 meters) below the surface and directed through the array of sensors measuring temperature, salinity, acidity, dissolved oxygen, nitrates, phosphates and chlorophyll. These cruises took place over a four-day period quarterly for the year.

The DT85 stand-alone, low power datalogger featured 16 to 48 universal analog sensor channels and 12 digital channels, 4 high-speed counter inputs, phase encoder inputs, and programmable serial sensor channels. These enabled connection to most sensors and data measurement sources so that almost any physical value could be scaled and logged including temperature, voltage, current, 4-20mA loops, resistance, strain gauges, frequency, and more. Additionally, the DT85 was renowned for its robust construction capable of withstanding the bay's extreme environments to keep logging through years of use. Featuring a built-in display and a design emphasizing flexibility, accuracy and durability, the DT85 was able to connect to a large number of inputs simultaneously and offered the team

advanced datalogging features and high-precision measurements. Measurements were made at an 18-bit resolution across a ± 30 V input measurement range, and in case the project grew, the datalogger was expandable up to 900 analog inputs through adding more CEM20s. The data logger could store up to 10 million data points in user-defined memory and featured independent control of schedule size and mode so that the team could log only as long as they needed. The dataTaker DT85 also archived data on alarm event, copying to USB memory and transferring via FTP if needed, providing data directly to the EPA office over the internet or a mobile phone network without the need for polling or specific host software.

The DT85's powerful communications capabilities included RS232 with modem support, USB, Ethernet and USB memory stick ports which enabled connection to the DT85 locally, remotely or over the Internet. The logger also featured support for multiple SDI-12 sensor networks, Modbus for SCADA systems, FTP and Web interface, and 12V regulated output to power sensors. The datalogger's ability to record electric current and resistance as well as voltage was also an advantage.

User-friendly dEX software was included free with the DT85, utilizing an intuitive graphical interface enabling operators to quickly configure the datalogger and view real-time sensor measurements, calculations and diagnostic information, all in a hassle-free Windows Explorer style interface. The researchers could also view their real-time data in mimics, trend charts, or tables, and retrieve historical data for analysis. Aiding in jumpstarting the project, dEX came built-in with no applications to install, ran directly from a web browser, and could be accessed either locally or remotely anywhere that a TCP/IP connection was available including worldwide over the Internet. Users could view dEX using any of the logger's built-in communications ports including Ethernet, USB and RS-232.

The EPA benefited in several major ways from installing the dataTaker DT85 and its CEM20 expansion module on the cruise ship, the most important of which was the datalogger's ability to monitor all of the pollution and chemical levels recorded by the sensor array. Not only was the datalogger able to measure all the pollution levels singlehandedly, it was also easily expandable by simple connection with a maximum of 16 CEM20s to expand the inputs whenever needed. Additionally, the logger's proven durability allowed it to operate reliably even in the unfavorable weather conditions on deck. The free dEX software included with the datalogger was easy for the researchers to use, and its ability to quickly configure the logger gave the bay project a quick start.

The EPA team's findings were substantial; interim reports revealed that there had not been serious damage to marine life although there was plenty of evidence throughout the bay of the city's outpourings. It was also found that some of the major flows into the bay occurred only intermittently,

although influences of the river were found on every sampling. The research team's findings aided in advancing future EPA efforts and safeguards to not only the public but to marine life as well.

Check out the DT85 product page at

[http://www.dataloggerinc.com/products/DT85 Intelligent Universal Input Data Logger/6/](http://www.dataloggerinc.com/products/DT85_Intelligent_Universal_Input_Data_Logger/6/).

For further information on the dataTaker DT85 Intelligent Universal Input Data Loggers, other dataTaker dataloggers, or to find the ideal solution for your application-specific needs, contact a CAS Data Logger Applications Specialist at (800) 956-4437 or visit the website at www.DataLoggerInc.com.

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