

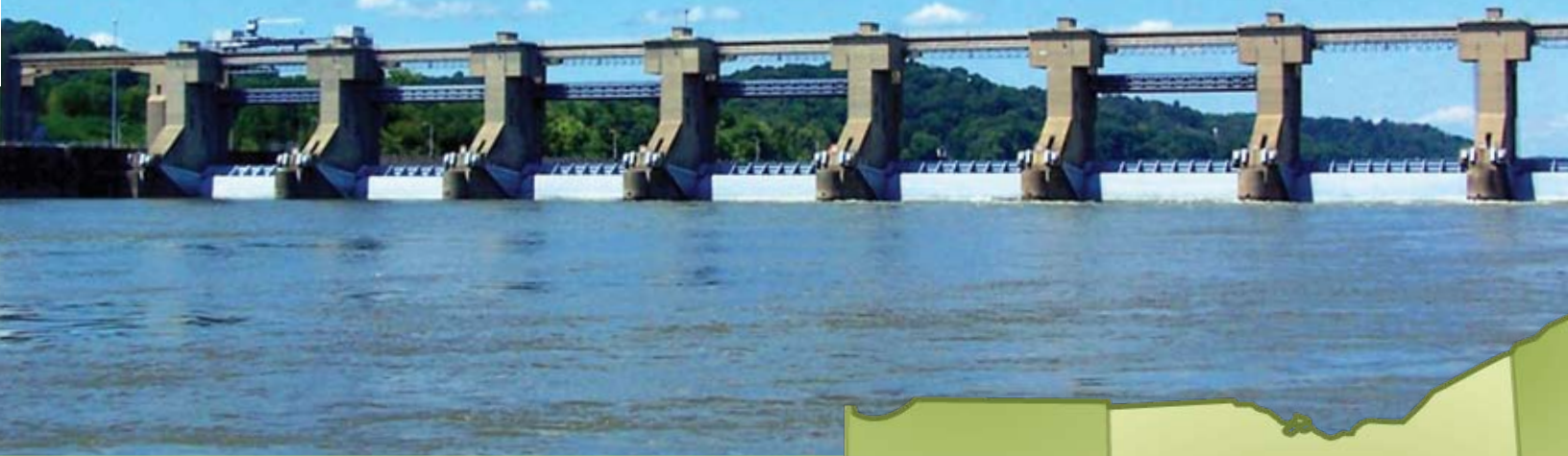
EnvironmentalMONITOR

A quarterly newsletter with emphasis on environmental products and applications.

Fall 2009

OHIO RIVER DAMS

At 981 miles long with 20 dams, the Ohio River offers an attractive alternative energy source – hydroelectric power.



What's Inside

- »Ohio River Dams
- »YSI ProODO
- »CO2 Monitoring
- »Fondriest Rental
- »In-Situ Aqua TROLL
- »YSI Tune-Up Service

The Ohio River begins at the confluence of the Allegheny and Monongahela Rivers in Pittsburgh, and flows mostly southwest for 981 miles. The Ohio River drains an area of about 204,000 square miles and empties into the Mississippi River at Cairo, Illinois.

- Continued on Page 2



OHIO RIVER DAMS

• Continued from Cover

The Ohio is second only to the Mississippi River for transported cargo. The river serves some of the nation's busiest industrial cities, richest farmlands and most productive coal fields. Coal makes up almost half the total freight shipped on the Ohio. Other major cargo includes agricultural products, chemicals, crushed rock, gravel, petroleum products, sand, and steel products.

Recognizing the importance of the Ohio River as an inland waterway, U.S. Congress authorized the Army Corps of Engineers to construct multiple wing dams or dikes along the River in 1824. In spite of these efforts, safe navigation was still sporadic and seasonal. The first complete lock and dam project built by the Corps of Engineers on the Ohio was at Davis Island, a few miles downriver of Pittsburgh. This lock and dam opened to traffic in 1885.

In 1910, Congress passed the Rivers and Harbors Act, which authorized construction of a river-length system of locks and dams to provide a nine-foot navigation depth. When completed in 1929, the "canalization" project consisted of fifty-one movable dams with wooden wickets and a lock chamber measuring 600 feet by 110 feet.

In the 1950s, the Army Corps undertook the Ohio River Navigation Modernization Program to replace the obsolete system of wicket dams and small locks with new high-lift concrete and steel dams. These dams allow a towboat and up to fifteen barges to transit the lock in one maneuver. At many of these dams,

hydroelectric power plants have been constructed to generate electricity for nearby cities and residents.

Hydroelectricity is power generated from moving water, and it is a clean and renewable source of energy. Hydroelectric plants generate energy without emitting atmospheric pollutants or contributing to global warming. Hydropower is the primary contributor of renewable energy in the United States and can be produced as long as rain falls and rivers flow.

While the benefits of hydroelectric plants certainly outweigh the costs, the construction of these plants can be disruptive to surrounding aquatic ecosystems. The impact of the dissolved oxygen content of the water from pre-construction conditions is of particular interest.

The Federal Energy Regulatory Commission, or FERC, is an independent agency that licenses and inspects private, municipal, and state hydroelectric projects. Hydroelectric power regulation was first undertaken in 1920, and the Commission is now responsible for over 2,600 licensed and exempted dams and related water retention structures. Many FERC licenses require that the Hydroelectric Plant monitors the water quality at certain locations upstream and downstream of the plant.

Fondriest Environmental has worked with many hydroelectric plants along the Ohio River to provide real-time dissolved oxygen monitoring systems, including Willow Island, Belleville, Racine, Cannelton, and Smithland dams.

Ohio River Dams and Hydroelectric Power

Mile	Dam	1st Year	Hydro Power	Capacity
6.2	Emsworth	1921	Evaluating	18 MW
13.2	Dashields	1929	Evaluating	25 MW
31.7	Montgomery	1936	Evaluating	38 MW
54.4	New Cumberland	1959	Evaluating	TBD
84.2	Pike Island	1963	Evaluating	49 MW
126.4	Hannibal	1972	Generating	34 MW
161.7	Willow Island	1972	Pending	35 MW
203.9	Belleville	1965	Generating	42 MW
237.5	Racine	1967	Generating	48 MW
279.2	Robert C. Byrd	1937	Pending	48 MW
341.0	Greenup	1962	Generating	72 MW
436.2	Meldahl	1964	Pending	105 MW
531.5	Markland	1963	Generating	65 MW
606.8	McAlpine	1961	Generating	80 MW
720.7	Cannelton	1972	Pending	84 MW
776.1	Newburgh	1975	Evaluating	68 MW
846.0	John T Myers	1975	Evaluating	65 MW
918.5	Smithland	1980	Pending	72 MW
938.9	Lock and Dam 52	1928	—	—
962.6	Lock and Dam 53	1928	—	—
964.4	Olmsted	Constructing	—	—

YSI Optical DO Meter

The new ProODO provides traditional YSI quality in a handheld dissolved oxygen instrument with luminescent optical dissolved oxygen technology.

The ProODO utilizes smart digital sensor technology which stores calibration data within the sensor. This allows probes to be placed on any ProODO instrument without re-calibration.

YSI ODO technology reduces the time required calibrating and maintaining sensors while utilizing a user replaceable sensing element that requires approximately an annual replacement. There are no electrodes to clean or solutions to change. Based on usage, calibrations can be stable for up to one year and are stored in each sensor.

Optical technology also increases DO accuracy and eliminates probe fouling by common gases such as hydrogen sulfide.

To learn more, contact a Fondriest Applications Engineer or visit www.fondriest.com



EPA Optical DO Approval Status

In January 2006, the US EPA recommended interim approval of ASTM International Standard Test Method D 888-05, which is a method for measuring dissolved oxygen using optical sensors when reporting results under the National Pollution Discharge Elimination System (NPDES) Program. While all EPA regions (1-10) have accepted the current "Recommendation for Interim Approval", each EPA region still defines what end user documentation, and possibly test data, is required before the ATP method can be used.

At this point, there are two ATP methods for measuring dissolved oxygen with luminescent/optical dissolved oxygen sensors that have been submitted to the EPA; ASTM D 888-05 and Hach 10360. Both methods are in the queue to be entered into the Federal Register, which will make them official methods. This is currently estimated to take place before December 2010. Upon EPA approval, optical based technology for measuring dissolved oxygen will meet all regulatory requirements and will be usable, without restriction, for NPDES compliance-related data.

Features Include:

- Expanded DO range of 0-500%
- Non-consumptive luminescent method eliminates the need for stirring
- Easy to read graphic, backlit display and keypad for use in any lighting condition
- Truly field-worthy, impact resistant, IP-67 waterproof case and connectors; rubber over molded, non-slip case, for extra durability and grip
- User-replaceable cables in lengths of 1 to 100-meters; cable management kit included with 4-meter and longer cables
- USB connection allows interaction with powerful desktop Data Manager software
- Stores 2000 data sets (sensor data, date, time, site and user defined information)
- Multiple languages include English, Spanish, French, Italian, Norwegian, Portuguese and German - Asian language support in the future
- 3-year instrument warranty; 2-year cable and probe warranty

CARBON DIOXIDE

Too much or too little?

Article written by George Fryer, Beacon Tech Net

The accepted theory at the moment is that increased levels of carbon dioxide are causing global warming. There are, however, researchers who believe that the facts point to temperature increases as the cause for increased levels of carbon dioxide .

The article CO2-Temp1 states, "In the distant past, for millions of years, CO2 levels were 12 times higher than today (4500 parts per million then, versus 380 parts per million today), and that was the time of ice age temperatures."

Regardless of belief, CO2 is a resource. It is a 'fertilizer' that causes plants to grow through the photosynthesis process. Plants take in carbon dioxide and water during sunlight hours, releasing oxygen as a waste product.

The planet was lush with plant life when CO2 levels were high. Plants are great at adapting. What would happen if we increased the level of CO2 in today's plants?

Beacon Tech Net, LLC, located in Murrels Inlet, SC, is a bold entrepreneurial company focusing on renewable energy. The Company is in its second year of a research grant received from the South Carolina Department of Agriculture through the support of the South Carolina Renewable Energy Infrastructure Fund, to determine how much increase in dry mass will occur with various levels of CO2.

In 2008, a 40% increase in dry mass of the CX-1 sweet potato occurred with 3000 parts per million verses ambient air of approximately 380 parts per million. Dr. Janice Ryan-Bohac on a farm in Smoaks, SC, is breeding the CX-1 sweet potato specifically for the production of ethanol.



Currently there are no ethanol plants in the U.S. using sweet potatoes for feedstock.

"In 2009, Vaisala GMM222 Carbon Dioxide Sensors were installed to monitor CO2 levels at the project," said George Fryer, CEO and president of Beacon Tech Net. Mr. Fryer indicated that they are able to monitor these levels from their company office in Murrells Inlet, SC even though the project is located 150 miles away in Smoaks, SC.

The project has been expanded in 2009 to include an "open field" section. The purpose of the "open field" concept in comparison with the "greenhouse" approach is to find a lower-cost alternative to simulate the conditions that would occur if CO2 were pulled from the emissions of a fossil-fuel-burning power plant and pumped into fields of sweet potatoes.

The utilization of CO2 as a 'fertilizer' to enhance the dry mass of crops would appear to make more sense than just pumping it in the ground and crossing your fingers that it will stay put.

For more information contact George Fryer, gryer@beacontech.net



Complete story: www.nexsens.com
For more information on Remote Environmental Monitoring Systems, call 888-426-2151





FONDRIEST

R · E · N · T · A · L

when your
research
demands
quality data

In response to increasing customer demand for high quality rental products with personal service, Fondriest Environmental is excited to announce the coming launch of a NEW website, Fondriest Rental.

While Fondriest has offered rental instruments and equipment for many years, the new website and our unique Preferred Rental Program offers features that have been designed to simplify and speed the process of environmental monitoring equipment rental:

Schedule your rental by phone or email. We'll assign an account manager to ensure you get personalized service and your equipment needs are professionally handled in a timely manner.

Same-day shipping is available for in-stock rental equipment.

Reserve equipment up to 30 days in advance with a signed rental agreement and credit card or purchase order; we'll hold it until your project begins.

Shipping costs can be added to the quoted rental price, or we can ship using your UPS or FedEx shipping accounts.

We offer flexible time frames to meet your project requirements. If you need to extend the lease, simply call or send an email.

You won't have to tell us your rental preferences every time you reserve equipment. We keep a detailed record of your rental history.

We keep your project shipping address and contact information on file, thus simplifying your order process.

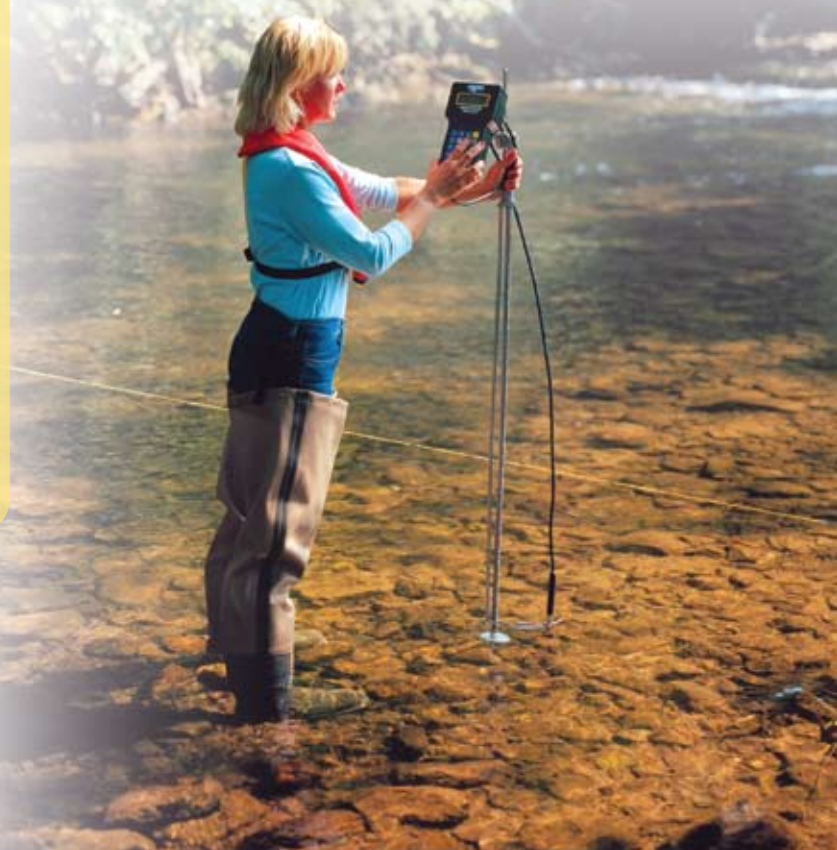
Receive quantity discounts and special pricing for repeat rentals.

This personalized approach to the rental business lets you focus on the project at hand - we take care of the rest. Contact us at 888-426-2151 to learn more about how we can assist with your next monitoring project.

Why Rent?

While it often makes sense to purchase outright, there are many short-term projects that simply make it cost-prohibitive. Here are some reasons why renting may be a better solution:

1. Renting products frees up cash flows that can be used for more vital capital expenditures, allowing customers to focus on their core functions.
2. Renting offsets the hidden costs included in purchasing and maintaining products. Storing spare parts and servicing equipment can drastically increase the total cost of ownership.
3. Owning physical assets when they are not being used greatly decreases the value. This fact can be remedied by renting equipment only when the project requires it.
4. Renting allows a company to stay contemporary with the rapidly changing technology. Fondriest's promise to always carry cutting-edge instruments allows rental customers to remain cutting-edge as well.



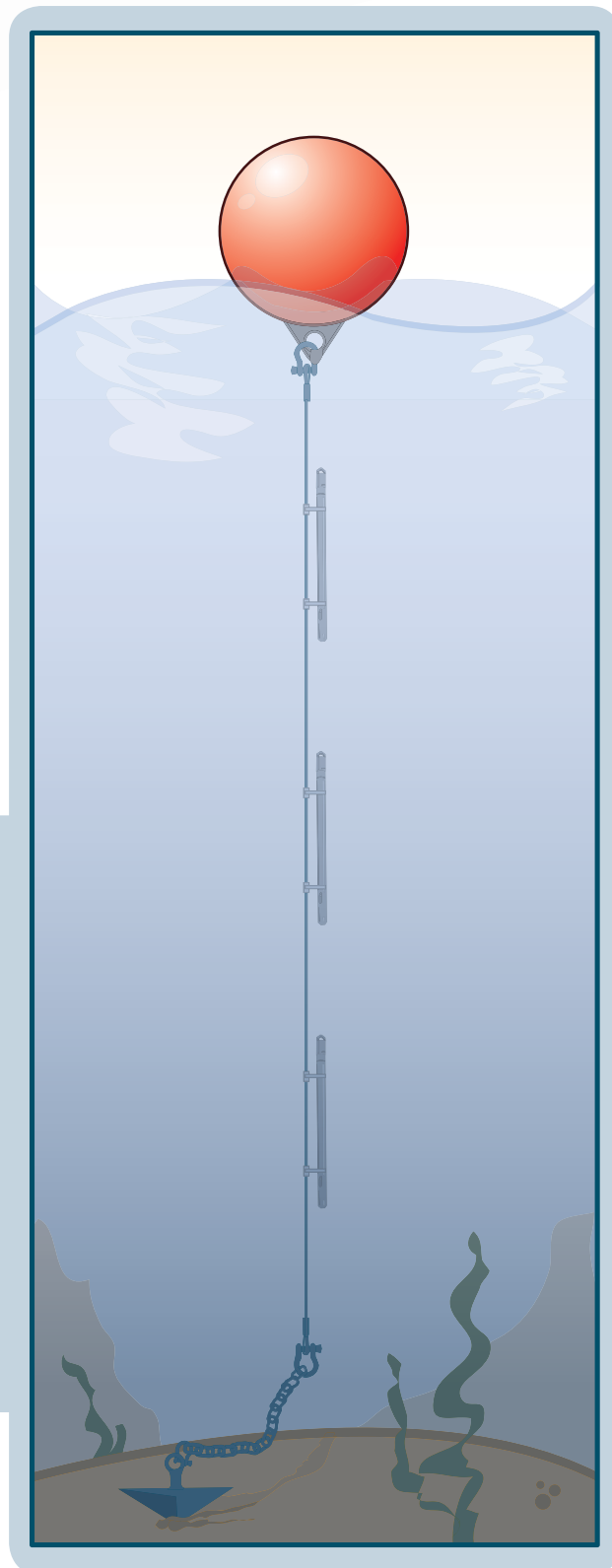
Aqua TROLL 100 Conductivity Logger



The In-Situ Aqua TROLL 100 instrument simultaneously measures and logs conductivity and temperature. The instrument offers internal batteries that are guaranteed to last up to five years when reading every 15 minutes. External batteries, solar power, or external 8-36 VDC options are also available. When used as an autonomous logger, standard logging modes include linear, linear average, and event testing with logging rates as fast as 1 second. For remote data telemetry applications, the Aqua TROLL 100 also has built-in Modbus RS485, SDI-12, and 4-20mA output communications.

The durable titanium housing resists fouling and safeguards against corrosion, even in the harshest of conditions. The instrument is completely sealed to withstand pressures up to 500 PSI. When used in coastal environments and high-fouling sites, the optional TROLL Shield antifouling system combats biofouling of the Aqua TROLL instrument and its conductivity cell. Reduced sensor fouling extends instrument deployment by up to 6 weeks and improves instrument accuracy and performance. The TROLL Shield antifouling system includes a coiled copper guard over the sensor.

Aqua TROLL 100 conductivity loggers are the perfect solution for cost-effective conductivity & temperature profiling studies. A typical application includes attaching multiple instruments to a stainless steel mooring line. A topside mooring & marker buoy keeps the line suspended vertically, while a pyramid anchor moors the line to the lake bottom. A 1/2" galvanized steel bottom chain allows the system to rise and lower during changing water levels without compromising the holding properties of the bottom anchor. Contact the Fondriest Application Engineering Team to configure a profiling system for your next project.



Fondriest Service and Repair Center

Quality data can be directly correlated to the condition of your monitoring equipment. Instrument check-up, characterization, and certification by a factory-authorized service center are recommended on a semi-annual basis. In addition to improved data quality, the useful life of the monitoring instrument is extended with regular service.

Fondriest's factory-authorized service & repair center offers excellent turn-around times and low service costs on your YSI instrument repair and annual maintenance services, ensuring the continuity of your sampling program and accuracy of your data.

As the peak sampling season winds down, it is a good idea to ensure that your water quality instruments are factory inspected, reconditioned, calibrated, and ready for another season of accurate water quality data collection.

By sending your YSI instruments to the Fondriest Service & Repair Center, you can be assured it will be returned to you meeting factory specifications in a timely and cost-effective manner. What's more, Fondriest technicians will perform a free evaluation on your instruments and send you a formal price quote before making any repairs.

Call our Service & Repair Department at **(888) 426-2151** for more information.



Authorized
Repair Center



NATIONWIDE EVENTS

October 27-31

North American Lake Management Society (NALMS): Connecticut Convention Center in Hartford, CT

November 4-5

Water Management Association of Ohio (WMAO): Ramada Plaza Hotel in Columbus, OH

November 16-17

Northeast Private Well Water Symposium: Holiday Inn By The Bay in Portland, ME

November 15-19

Water Quality Technology Conference: Sheraton at Washington State Convention Center in Seattle, WA

December 8-9

OTCO 39th Annual Water Distribution Workshop: Ramada Plaza Hotel in Columbus, OH

STAFF

Editor

Tiffany Dykstra
tiffany@fondriest.com

Designer

Patrick Beatty
pat@fondriest.com

Contributing Writers

Steve Fondriest
steve@fondriest.com

Paul Nieberding
paul@fondriest.com

Zack Henderson
zack@fondriest.com

YSI Multi-Parameter Sonde Tune-Up Service

★★★★★ *Bring your YSI sonde back to factory specs!*

YSI 6-Series sonde tune-up service includes:

- Upgrade instrument software
 - Recondition, test, and calibrate sensors
 - Inspect and test all cables and connectors
 - Confirm circuit board performance
 - Inspect and clean seal areas
 - Replace damaged o-rings
 - Return with a certificate of performance
- Replacement sensors and parts sold separately.

only
\$129

FONDRIEST
ENVIRONMENTAL

FONDRIEST ENVIRONMENTAL

when your **research** demands **quality data**

Fondriest Environmental, Inc.
1328 Parkway Court
Beavercreek, OH 45432

PRSR STD
US POSTAGE
PAID
DAYTON, OH
PERMIT# 860

- P** 888.426.2151
- F** 937.426.1125
- E** info@fondriest.com
- ➔** fondriest.com



\$50 Off Next Purchase

With the launch of the new website, we are offering a special discount to our valued customers. Mention this ad, and receive \$50 off your next purchase of \$500 or more.

➔ fondriest.com

Redeemable at time of purchase. Offer valid for website or phone orders of \$500 or greater. Not valid with any other discounts or promotions. Offer expires 12/31/2010.

