



FOR IMMEDIATE RELEASE:

## **FRP TROUGHS KEY TO PASSIVE WT-SYSTEM'S AGGRESSIVE IRON OXIDE ECO-SOLUTION.**

FIRST-OF-ITS-KIND PASSIVE MINE DRAINAGE SYSTEM TREATS 600K LBS OF FE PER YEAR FROM FORMER MARCHAND MINE.

Union City, PA—For over 60 years, iron oxide and ensuing orange sludge deposits had polluted the water discharging from the abandoned Marchand Mine near Lowber, PA into Sewickley Creek and the Youghiogheny River. The recently constructed Marchand Mine Treatment System is a patented six-pond/large wetland passive mine drainage system that incorporates specially designed FRP (fiberglass reinforced plastic) troughs that manage the hydrology in treating a 1,200-2,250 gmp discharge containing 65-90 mg/L Fe. In addition to providing vital ecological cleaning of the stream/watershed—the first-of-its-kind system has pioneered the recovery of iron oxides/sludge into a marketable pigment product.

### **POLLUTED HISTORY/INNOVATIVE WT SYSTEM:**

Early coal mining production from the Marchland Mine produced the unavoidable bi-product of discharge of polluted mine drainage which began flowing from the mine's portal shortly after its shut-down in the early 1940s—resulting in almost a million pounds of iron oxide discharge contamination every year since.

Environmental laws of the 1970's made water pollution an unacceptable consequence of coal mining and led to the development of chemical and mechanical treatment technologies. While these technologies have been effective in eliminating new sources of pollution—they are expensive and often created solid waste problems which didn't serve the long-term needs of solving the Marchland Mine problem.

In 2002, \$1.3 million in Growing Greener grant funding was awarded from the Pennsylvania Department of Environmental Protection to Sewickley Creek Watershed Association (SCWA) to design and construct an effective passive mine water system. The SCWA enlisted Hedin Environmental/Iron Oxide Recovery (IOR: Pittsburgh, PA) to design the system and assist in the project's permitting, monitoring, management and construction by DeBaldo Brothers, Inc (Glenshaw, PA) —beginning in October 2005.

Because the project would involve significantly high flow rates, IOR contracted MFG Water Treatment Products Company (MFG-WTP: Union City, PA) to specially design and manufacture an inlet/outlet FRP trough system that could optimize the hydrology distribution and passive precipitation of Fe throughout the projects six ponds—all while avoiding short circuiting due to high flow rates.



### **TROUGH CHALLENGE:**

Since the IOR systems' design process incorporates passive technologies; which take advantage of naturally occurring chemical and biological processes to cleanse the contaminated mine waters—the MFG-WTP trough system was designed to set in earth embankments while aerating and breaking up the water of the large flow system. Additionally, the discharge from the production ponds had to be directed into the constructed wetlands where residual iron would be removed and a final discharge produced that does not pollute the receiving stream.

### **TROUGH SOLUTION:**

A total of twelve (12) fifty foot (50') troughs were built using open-mold production at the MFG Union City manufacturing facility. The custom design configured the troughs to be embedded in the earth with the optimal FRP strength to handle the corrosive elements and high flow rates associated with the project. The FRP materials included corrosion resistant resins and glass configured in directional and random chopped glass to maximize performance and strength including:

#### **FRP Material Specifications:**

- Nominal Thickness: 1/4 inch.
- Gel-Coat Finish: On all surfaces, contain ultraviolet inhibitor.
- Glass: Type E, random chopped with chrome or silane finish.
- Color: Aqua. Color molded-in with ultraviolet inhibitor.

#### **Minimum FRP Laminate Physical Properties:**

- Tensile Strength, ASTM D 638: 12,000 psi.
- Flexural Strength, ASTM D 790: 19,000 psi.
- Flexural Modulus, ASTM D 790: 900,000 psi.
- Barcol Hardness, ASTM D 2583: 35.
- Notch Izod Impact, ASTM D 256: 13 ft-lbs/inch.
- Water Absorption, ASTM D 570: 0.2 percent. (maximum)



Due to the high volume of water coming out of the mine and to maximize its potential; the design also had to incorporate a segregated gate so it wouldn't allow any water to pass by and could be cleaned out periodically. Additionally, a notched weir was incorporated to control the volume of fluid which passed through with a weir flow rate @ full 2" head pressure @ 48.6 cubic feet per second.

Once delivered on-site, the trough system assembly was smooth according to DeBaldo Brothers' President Pete DeBaldo, "It was a simple process of bolting the troughs together and drilling them into anchor points—4 people to set the trough and a 2 to assemble—essentially six man-hours per unit."



## RESULTS / CONCLUSION:

With construction completed in November 2006, the passive mine water system at Marchand Mine cleaned the stream and helped in the recovery of iron oxides and optimized the production of recoverable, saleable iron oxide. The waters' excessive iron-turned-to-sludge was made into pigment branded by IOR as EnvironOxide™ for Hoover Color Corporation (Hiwassee, VA).



Since its first year of operation, testing shows the system has decreased Fe concentrations, on average, from 74 mg/L to less than 1 mg/L Fe. The ponds remove 85% of the Fe and are 25-50% more efficient than other passive systems treating similar water. The system has also successfully treated flows as high as 2,250 gpm and functioned well in February 2007 when much of the wetland was frozen. Over the next 25 years, the Marchand System will treat 21 billion gallons of water at a cost of ~7 cents per 1,000 gallons.

According to Bob Hedin, IOR/Hedin President, "The system represents the next wave of technical innovation for mine water treatment. The FRP troughs were instrumental in providing superior strength and handling large flow rates which can be incorporated into larger flow systems on future projects."

## CORPORATE PROFILE:

For over 30 years MFG Water Treatment Products Company has played a significant role in supplying the industrial, water and wastewater treatment industry with advanced fiber reinforced polymer (FRP) products. MFG-WTP offers a broad line of FRP products in standard shapes and sizes; with all parts and assemblies designed to customer specifications by qualified engineers and produced under rigid engineering and quality control standards.

Depending on the specific product, it achieves the ANSI\*/NSF\*\*61 certification for potable water as well as ANSI/AWWA+ F101 contact molded or F102 matched-metal-die-molded components.

\* American National Standards Institute \*\* NSF International + American Water Works Association

MFG-WTP is part of twelve key Molded Fiber Glass Companies (MFG: Est. 1948/Ashtabula, OH) entities specializing in optimizing resins and FRP products for myriad of commercial/industrial market applications including: custom-molded composite components for heavy truck, automotive, wind energy, agriculture and rail transport, and propriety products for material handling, construction, telecommunications, water treatment and other commercial industries worldwide.

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