**Operation Overview Model 5000 Series pH Control Systems**

The Model 5000 series pH Control systems use a patented Dif-Jet™ non-fouling carbon dioxide gas diffusion and injection process to lower the pH of process water and or storm water at ready mix concrete plants, and precast concrete manufacturing operations. These systems also lower Total and Suspended Solids to low levels.

The programmable logic controller in the system can be set to lower the pH to almost any end point. The controller is pre-set to maintain a pH of 7.5 in the detention basin.

The system is installed on a 10'x 10' concrete pad adjacent to the pit, basin or tank with the cleanest, most settled water. The system circulates the water in the containment basin with a submersible pump in a closed loop piping system and continually monitors the pH level. When the pH rises to 8.25, the controller will actuate a solenoid valve and begin to diffuse and inject carbon gas. Once the water is at a pH of 7.5, the valve shuts off and the water circulates until the pH rises to 8.25 again. The range may be adjusted to the owner's preference. For example, the "on" set point can be set to 7.5 and the "off" set point can be 7.0 for a lower tighter range.

High pH process water contains a high levels of suspended and dissolved solids, primarily calcium hydroxide. The carbon dioxide forms carbonic acid when it is dissolved in water, the reaction between the carbonic acid and calcium hydroxide forms calcium carbonate which is insoluble in water and precipitates out of the water. Typically, the "Total Suspended Solids" reading will be from 14 to 17 after pH adjustment. The EPA permits discharge of treated process water when the pH is 9.00 or lower and the TSS (Total Suspended Solids) is under 30.

As part of a water recycling program, the treated water may be used to batch concrete, for dust control, truck washing and irrigation of lightweight aggregate or release from the property according to the storm water permit for the plant. The treated water may also be returned to the municipal waste water system.

pH adjusted water does not scale up windshields or paint. It will not scale up pumps, valves or fittings so maintenance costs are lower compared to using high pH process water to batch concrete.

Also, having a basin or pit of pH adjusted water will generally help in managing stormwater as the "buffered water" will neutralize most of the stormwater that enters the basin. These systems are useful for treating and maintaining stormwater containment to avoid discharging high pH water.
Carbon Dioxide costs about .29 lb delivered. Typical C02 cost will be around $6.00 per day per 10,000 gallons of high pH water. This figure may vary depending on the actual pH and total alkalinity of the process water.

The systems include everything needed to operate except the C02 supply and tank. Fortrans supplies a Victor SR-31-320 high flow C02 regulator and nylon supply hose. The final 115V- 20 A electrical connection is by others.

A small amount of schedule 80 PVC piping and fittings to construct the return outlet per our supplied drawing will also be required.

Fortrans does not recommend "batch treating" of process water. Once the system is installed; run continually during plant operating hours. The system will not use more C02 than if batch treating and scaling in piping and lines will be greatly reduced.

The Model 5000S, 50008 and 5000SK all have the capacity to treat up to 75,000 GPD. The systems are supplied with operation manuals that contain detailed operating and maintenance instructions, installation instructions and drawings that show how to set up the pump and pump boom and how to install the discharge piping.

**Competitive Information**

The Model 5000S pH Control Systems cost approximately 60 to 70% less to purchase and operate than acid based neutralization systems. The cost savings is based on using less pounds of C02 than sulfuric acid or hydrochloric acid.

Sulfuric Acid based systems or sodium bisulfate systems will increase Total Suspended Solids. A separate filter will be required to meet EPA standards for discharge.

Fortrans' systems do not use corrosives, all of the components last longer. No hazardous chemical permits are required.

All systems are guaranteed to perform to our customer's satisfaction.