Panther Technologies, Inc.

FMC

BIOREMEDIATION BULLETIN 1.3

PermeOx® Plus in Wastewater Applications

In addition to bioremediation, **PermeOx® Plus** has been used to enhance the performance of activated sludge process in typical wastewater treatment applications. The following example illustrates the benefit of calcium peroxide in industrial wastewater treatment.

Odor Abatement with PermeOx® Plus in Municipal Collection System

Offensive hydrogen sulfide odors from the collection system of a Southeastern Pennsylvania municipality were being experienced. Field tests successfully demonstrated the effectiveness of **PermeOx® Plus** for controlling hydrogen sulfide in the collection system of the subject municipality. Addition of **PermeOx® Plus** to the collection system reduced the H_2S level at three downstream locations by an average of 82% in the water and 98% in the air. Additionally, the treatment with **PermeOx® Plus** increased the dissolved oxygen content of the wastewater further suppressing H_2S generation. The formation of sulfides (H_2S, HS^-, S^{-2}) in municipal collection and treatment systems is caused by biochemical conversion of sulfates (SO_4^{-2}) by bacterial under oxygen deficient conditions.

$$SO_4^{-2} + \text{organic matter} \rightarrow S^{-2} + H_2O + CO_2$$
$$S^{-2} + 2H^+ \rightarrow H_2S$$

Baseline data collected at three downstream sampling points indicated the following:

Location	Residence Time	Aqueous Sulfide Conc.	Air Sulfide Conc.
Pump Station #6	2.5 – 3 hrs	2.8 ppm	38 ppm
Sugan Road	3.0 – 3.2 hrs	1.0 ppm	14 ppm
Bridge St.	0.5-5 hrs	1.1 ppm	12 ppm

Initially the collection system was treated with high levels **PermeOx® Plus** and then the treatment level was reduced to a maintenance dose. Samples for hydrogen sulfide in the water and air were measured. The successful results of these tests appear below.

Location	**PermeOx®** Dose	Aqueous Sulfide Conc.	Air Sulfide Conc.
Pump Station #6	5 lb/hr	0.5 ppm	0.0 ppm
Sugan Road	5 lb/hr	0.1 ppm	0.0 ppm
Bridge St.	5 lb/hr	0.2 ppm	1.0 ppm
Pump Station #6	1 lb/hr	0.6 ppm	0.1 ppm
Sugan Road	1 lb/hr	0.1 ppm	0.0 ppm
Bridge St.	1 lb/hr	0.7 ppm	0.0 ppm

The test results show that the addition of **PermeOx® Plus** effectively controlled H_2S in the collection system for up to 5 hours down stream. Based on these data, feed rates in the range of 1 to 5 lb/hr was found to provide corrosion and odor control in the collection system.