



BACKGROUND

A Midwest beef packing plant experienced dangerous levels of hydrogen sulfide in their sludge dewatering facility. They asked Carus to conduct a trial using permanganate to solve the problem, enhance their operation and create a safe working environment for personnel.

PROBLEM

This beef packing facility typically dewateres about 33,000 gallons of sludge in an eight-hour period. Most of the time, the 70 gallon-per-minute (gpm) stream is split between two belt filter presses. Workers were complaining about the strong rotten egg odor in the press room. Some experienced headaches and nausea. Plant management recognized this was a serious problem which required an effective solution. Carus sent a technical service expert to the plant to do testing and evaluation of the sulfide levels.

Sulfide levels were measured directly over one of the belt filter presses and in the pressroom, using a GasTech hydrogen sulfide meter. The sulfide level directly over the belt press was beyond the range of the meter (above 120 ppm). Atmospheric sulfide levels were measured at 25 ppm in the pressroom. In addition to this, the filtrate from the belt filter press was found to have a dissolved sulfide level of approximately 80 ppm.

Low levels of hydrogen sulfide can cause headaches and dizziness, if inhaled. Importantly, exposure to hydrogen sulfide over 600 ppm can cause respiratory failure and death. Besides the extreme health risk, even low levels of hydrogen sulfide will cause severe corrosion of metal surfaces. This will shorten the useful life of expensive equipment.

SOLUTION

Numerous sludge samples were taken from the thickener and both belt filter presses for jar testing on site and at Carus' Technology Labs in LaSalle, IL. The level of dissolved and atmospheric sulfide was measured in each sample. Dissolved sulfide levels were over 100 ppm and atmospheric sulfide levels were over 120 ppm in the untreated sludge. CARUS permanganate was used to treat the sludge samples. After careful evaluation of the test results and a full scale trial, an appropriate permanganate dosage was established and fed directly to the belt press. Permanganate addition helped reduce the level of atmospheric sulfide to <5 ppm and the dissolved sulfide level down to 40 ppm.

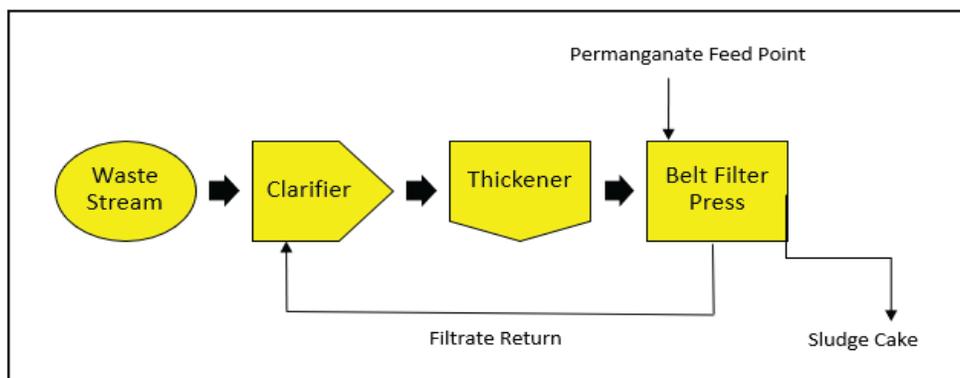


FIGURE I: Plant Overview Using CARUS Permanganate



RESULTS

The addition of permanganate to the belt presses reduced atmospheric sulfide levels directly over the presses from over 120 ppm to less than 5 ppm and in the pressroom from 25 ppm to zero. Unlike other oxidants, permanganate reacts immediately to eliminate hydrogen sulfide. This created a safer working environment for pressroom personnel. Additionally, by eliminating the highly corrosive hydrogen sulfide, the plant will experience less deterioration of metallic components and longer equipment life.

As an added benefit, by feeding permanganate to the belt filter presses, dewatering was enhanced enough to reduce the amount of polymer feed by about 50%. This resulted in substantial polymer cost savings.

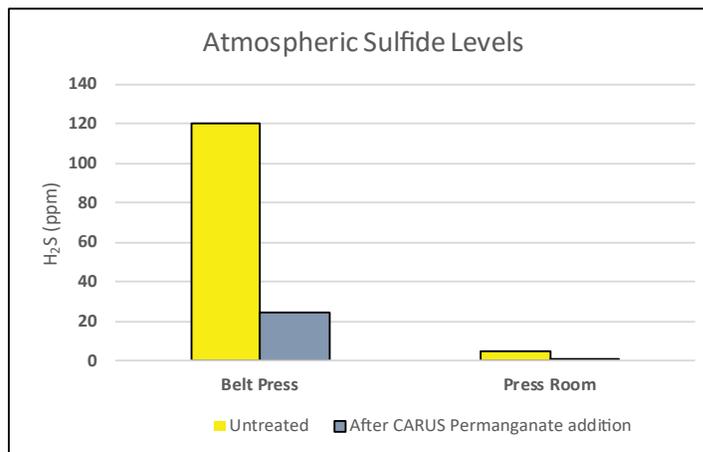


FIGURE 2: Atmospheric Sulfide Levels After Adding CARUS Permanganate

PERMANGANATE PRODUCT FROM CARUS

Permanganate is available as a high purity crystalline powder, CAIROX[®] potassium permanganate Free Flowing grade, or as a concentrated, pre-mixed liquid, CARUSOL[®] liquid permanganate, 20% active ingredient.

VALUE ADDED

LABORATORY SUPPORT

Carus has technical assistance available to answer questions, evaluate treatment alternatives, and perform laboratory testing. Our laboratory capabilities include: consulting, treatability studies, feasibility studies, and analytical services.

FIELD SERVICES

As an integral part of our technical support, Carus provides extensive on-site treatment assistance. We offer full application services, including technical expertise, supervision, testing, and feed equipment design and installation in order to accomplish a successful evaluation and/or application.

CARUS

During its 100-year history, Carus' ongoing emphasis on research and development, technical support, and customer service has enabled the company to become the world leader in permanganate, manganese, oxidation, and base-metal catalyst technologies.