A Safe Bet **in Reno**

Optimizing wastewater handling and saving money

By Mike Stangel

PPG Industries constantly seeks to improve pollution and waste prevention programs throughout its global manufacturing facilities. Nevada is no exception: In 2009, PPG's Reno Plant took steps to enhance its existing wash water and wastewater management program by implementing an in-house chemical treatment and dewatering system. The Reno Plant produces latex paint under the familiar brand names of Olympic and Pittsburgh paints.

The Tahoe Reno Industrial Park in McCarran, Nev., has a wastewater treatment plant on site for its industrial customers. PPG-Reno wanted to work with the treatment plant to optimize its wash water and wastewater disposal methods. The current process consisted of decanting, pumping and hauling the wastewater across the state twice a week for thousands of dollars per truckload. Feeding to the industrial wastewater treatment center via sewer disposal made more environmental and economic sense.

PPG-Reno Plant Engineer Robert Mansfield and Environmental Engineer Barbara Coruna understood that direct drain discharge of raw latex wash water or wastewater sludge would not be feasible. Coruna tried treatment and decanting methods with no success, so Mansfield began researching compliant wastewater treatment equipment.

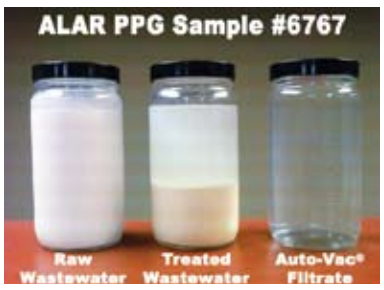
Mansfield contacted ALAR Eng. Corp., which designed and manufactured a complete chemical batch and filter system for the PPG Louisville Coatings Plant. Mansfield understood that wastewater is a moving target and that no two process waters are alike, so he carried out several performance tests to make sure the equipment met Reno's criteria.

PPG first shipped a 5-gal representative sample to ALAR for a simulated bench test of the Auto-Vac, a rotary vacuum drum precoat filter.

Separation Stages

Removal of latex and metals from water involves a two-step separation process: chemical separation and mechanical separation. The first step, chemical separation, breaks the solids and liquids apart by adding chemical pretreatments such as pH adjusters, polymers or clays. The second step, mechanical separation, physically removes the precipitated solid particles from the sludge through filtration.

PPG's raw wastewater sample measured a thick 6% raw solid content by weight, which required large amounts of chemicals to break the emulsion. Therefore ALAR diluted the sample 1 to 1 (water to waste), with the goal of recycling the filtered water



Chemical separation is necessary to break emulsion and precipitate metals.

ARTICLE SUMMARY

Challenge: PPG Industries in Reno, Nev., sought a more efficient way to deal with its wash water and wastewater and wanted to work with the Tahoe Reno Industrial Park's wastewater treatment plant.

Solution: PPG-Reno did its due diligence in conducting several performance tests on a complete chemical batch and filter system from ALAR Eng. Corp.

Conclusion: PPG ultimately purchased an ALAR Auto-Vac Model AV660 to filter 12,000 gal of wastewater per day. They were able to reduce cross-state sludge handling and disposal costs.

Acid is automatically pumped into the batch tank to shock the pH and separate the solids. Lime is used to precipitate the metals and neutralize the water.

PPG uses a series of three tanks: equalization/holding, chemical batch treatment and clean water filtrate (dilution) tanks. The Auto-Vac is capable of filtering 12,000 gal per day of PPG's latex wash water and wastewater (after dilution).

The Auto-Vac is prepiped, prewired and skid mounted for easy installation.

The Auto-Vac separates the solids from the liquids, producing a dry cake that has the consistency of damp sand. Dry solids typically measure greater than 45% raw solid content by weight.

for future dilution. In many cases, customers are concerned with diluting wastewater and cite, "dilution is not the solution to pollution." Using water as a pretreatment chemical is an economical alternative to commercial products. Water thins out heavy solids and creates space so that molecular binding chemicals can react effectively in smaller doses.

The diluted sample reacted well to chemical batch treatment. The lab added ferric sulfate (acid) to shock the pH and separate the solids from the water. A polymer-based bentonite clay was added to disintegrate the tacky adhesive latex content and grab solids. The last step involved raising the pH with lime to precipitate metals and neutralize the water. The sludge remained agitated during the entire procedure to maintain an equalized liquid for a homogeneous filtration.

After completing the chemical separation stage, the treated sample was ready for mechanical separation. The ALAR filter was pre-coated with a 3-in. layer of filter media called diatomaceous earth (DE). The filter was submerged in the sludge, and the vacuum sucked the separated water through the filter while the DE captured the suspended solids. Before the filter media blinded, a lathe-like knife removed the solids from the surface, leaving a clean layer of DE to pull more solids. The vacuum drew air in through the filter, extracting moisture from the solids and producing a dry cake with the consistency of damp sand. The DE filtered out 1-micron or larger particles from the water, producing a clear, colorless filtrate. The physical results were shipped back to PPG-Reno along with a filtration test report for review.

The next performance test took place in Kentucky. Coruna coordinated a two-day trial in which they treated, filtered and analyzed 1,000 gal of PPG-Reno wash water using Louisville's existing ALAR Flex-O-Star system. "[ALAR's] attention to detail and willingness to help really made this trial an easy one to complete," Coruna said.

Impressed with the performance, Coruna conducted analyticals on the effluent, ran toxicity characteristic leaching procedure tests on the cake solids, performed cost justification studies and researched environmental, health and safety compliance data.

More Testing

With the reports submitted, Mansfield wanted to pilot test an Auto-Vac in a controlled plant environment. He felt PPG-Reno's daily wastewater variances dictated a need to field test a filter over several weeks.

ALAR rents Auto-Vac units so companies can customize treatment and filtration equipment. ALAR's pilot units process approximately 500 gal per shift. They are not built to handle full-scale production nor intended as short-term commercial equipment rentals.

PPG rented a stock Auto-Vac Model AV220, already having treatment tanks, chemical addition systems and pH monitors on site. Given the dynamic of the side-stream pilot setup, the chemicals were added manually and pH monitoring was done by hand; a comprehensive automatic treatment system was discussed and designed for future full-scale equipment.

The pilot test was successful. It routinely generated 48% dry solids (by weight) and produced quality effluent with total suspended solids levels at 15 ppm (mg/L).

Mansfield continued his due diligence by beta testing a plate-and-frame filter press. ALAR builds this technology but did not recommend it. Latex paint, even with treatment, will blind a plate system. The dilution ratio would need to increase, as a press operates best with a low percentage of solids.

PPG's city sewer discharge goal was another concern. An Auto-Vac filters 1-micron-sized particles and a filter press 25-micron-sized particles, meaning the difference between compliance and noncompliance. A press requires large doses of coagulant and flocculant to increase particle sizes.

Plate-and-frame filtration rates surge then trickle as solids build in the plate chambers and block the flow of water. The large volume of latex rinse water at PPG-Reno would require an enormous press. A set of replacement plates are necessary to avoid production bottlenecks while another operator removes, scrapes and pressure washes the dirty plates. In paint applications, filter press cake solids come off wet, possibly requiring a sludge dryer or drying bed. Higher solid moisture content equals more tonnage to haul and increased energy and maintenance for drying.

Problem Solved

The Auto-Vac filter did not blind or cause bottlenecks, and its self-cleaning feature was forgiving of solid and chemical treatment variances. It offered absolute microfiltration with a consistent flow of quality water and landfill-ready solids.

PPG purchased an ALAR Auto-Vac Model AV660 to filter 12,000 gal of wastewater per day. Only the filter was purchased because the Reno facility had a state-of-the-art equalization tank and feed system already in place. ALAR's CAD layout and mechanical engineers worked with Mansfield in retrofitting the Auto-Vac to PPG's equipment.

ALAR's chemical department provided Coruna with cost analysis and material safety data sheet reports so she could ensure PPG used the most economical and eco-friendly treatment methods.

The machine arrived pre-piped, pre-wired and skid mounted. After installation, a certified ALAR engineer traveled to PPG-Reno to provide onsite safety and machine startup instruction. PPG continues to have engineering phone support and sample testing available for any new PPG water-based products.

Aside from being environmentally proactive, PPG demonstrated astute business and innovation skills. The Reno facility eliminated cross-state sludge hauling and significantly reduced disposal costs. WWD

Mike Stangel is west regional manager for ALAR Eng. Corp. Stangel can be reached at mikes@alarcorp.com or 708.479.6100.

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