



Dairy Manure Residual Dewatering

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Location: Oregon

Products: TenCate™ Geotube® Containers
Solve 9244- Emulsion Polymer
Solve 10 –Inorganic Coagulant

Equipment: Polymer Make-down Unit

Background and Objectives

A large organic dairy facility in northern Oregon wanted to dewater residuals from their operation to allow them to compost, reuse, and/or market the dewatered solids and effectively irrigate the liquid filtrate. The manure from several hundred dairy cows and the wash-water from the milking operation merge in a reception pit and are pumped to a manure separator to remove the larger particles which are periodically reused. The liquid residual from the separator is stored in a structure under the separator and was previously irrigated onto an adjacent field. The remaining solids and nutrients in the residual were accumulating in the field and facility managers searched for options to separate the solids and harvest the nutrients. The objectives were to process the liquid residual, capture the solids and nutrients, and irrigate the remaining water onto the adjacent field without accumulating additional nutrients. The solids

collected in the Geotube® container could then be composted and sold. The facility managers wanted the large processing and storage characteristics, as well as the low cost of operation offered in a Geotube®. A full scale pilot study commenced in January, 2009.

Geotube® Container Sizing

Geotube® containers are manufactured from high strength polypropylene fabric and are designed to allow effluent water to escape through the pores of the fabric while retaining the chemically conditioned solids. The lay-down area at the site could accommodate a large container. A 200-ft. long by 80-ft circumference GT500 Geotube® container was selected to contain and dewater the manure residual for this application.

WaterSolve's Chemical Conditioning

A representative sample of the separator filtrate was collected and sent to the WaterSolve's laborato-

ry for testing. Dewatering coagulant and polymers were evaluated based on water release rate, water clarity, and flocculent appearance. In addition, dosing rate(s) were determined during bench-top dewatering experiments and recommendations provided to the facility during this phase of the program. Coagulants and polymer(s) that flocculated and dewatered these residuals most effectively were re-evaluated with lower doses in order to isolate the most efficient dewatering and flocculating program. The coagulant Solve 10 followed by the polymer Solve 9244 was the recommended chemical conditioning program for dewatering this dairy manure. We recommended using Solve 10 at 3,333-ppm followed by Solve 9244 at 166-ppm in order to achieve adequate solids concentrations in the Geotube® container for subsequent passing of a Paint Filter Test and excavation to the compost site.

The Result

WaterSolve was contracted to start up the Geotube® dewatering project and train the employees at the dairy facility to operate the equipment. A 50-ft by 220-ft. containment pad was constructed with straw waddles as the border and a plastic underlayment to contain the filtrate. Filtration fabric strips were laid perpendicular to the Geotube® container on top of the underlayment prior to unrolling the 200 ft. by 80 ft. circumference Geotube®. Two 10-gph LMI chemical feed pumps and a polymer make-down unit were plumbed into a mixing manifold to deliver the proper dose of coagulant and polymer. A 5/8 inch hose supplied water from a hydrant to the polymer make-down unit at approximately 10-gpm. The coagulant Solve 10 was fed neat and injected into the 4 inch mixing manifold followed by the made-down polymer. A pump on the storage container transferred the manure through the mixing chamber and through existing underground pipeline to the Geotube® container. Adjustments to the coagulant and polymer dose were made in response to visible observations of the inline floc from samples taken from a sample port at the end of the mixing chamber. The facility continues to dewater the dairy manure residual on a daily basis with excellent results and has added another similar arrangement utilizing WaterSolve chemistry and Geotube® containers to serve another dairy facility.



Photo shows raw sample on the left, chemically treated sample in the center, and filtrate on the right .



A chemically treated sample indicates good release, clarity, and flocculation of the dairy manure residual.



Geotube® container begins to fill.



The layout from atop the storage tank.