CASE STUDY

Camp Creek Golf Club Pesticide Storage and Mix/Load Center

By Larry Livingston, CGCS

PROJECT DESCRIPTION

The project is a Pesticide Rinse Water Reuse System at the Camp Creek Golf Club in Panama City. The pesticide mix/load area is adjacent to a wetland. We wanted to eliminate the possibility of pesticide rinse water contaminating the wetland or the groundwater associated with it. We wanted a mix/load facility that was functional yet easy to maintain and use.

Before this system was constructed, the golf course did not exist. This system was built during construction of the course. After implementing the project, we had a mix/load area that was simple and easy to use, manage and maintain. Best of all, it prevented potential pesticide mix/load rinse water from contaminating the groundwater or adjacent wetland.

Goals

- Create a pesticide mix/load area that would accommodate two sprayers.
- Create safety factors that rinse water contamination would not occur if a part of the system was compromised.
- Be able to dispense an exact amount of make-up and/or rinse water.
- Position spray tank fill hoses so that they were convenient to use but out of the way when not used.
- Prevent sand, dirt, etc., from getting into the rinse water holding tank.
- Be able to easily monitor the sumps so that leakage could be observed.
- Prevent pesticide residual from absorbing into the concrete floor.
- Have safety equipment readily available and accessible.
- Be able to completely contain any pesticide spill that might occur in this system.
- Monitor for fire and theft.

This is the main mix/load area. The concrete floor has a 36-mil chemical-resistant liner underneath and is sealed on top with chemical-resistant epoxy paint. The red grate covers the primary sump. A stainless steel mixing table, sink, eye wash and shower are some of the safety features. The recycled rinsate water is stored in a 500 gallon tank to the left. Photo by Larry Livingston, CGCS.
Inset: Timer and controls on the totalizer unit allows for adding recycled rinsate water and fresh water when mixing chemicals. Photo by Larry Livingston, CGCS.

Implementation & Maintenance

The pesticide rinse water reuse system is designed to contain all the rinse water that is generated during a pesticide mix/load operation so that environmental contamination does not occur. It is designed to be efficient to operate, easy to maintain, and simple to monitor for leakage. I designed a similar system at another golf club a few years ago. I took the best from that design and incorporated improvements into the new design. Quality control during construction is essential to make sure the system is installed exactly as planned. The narrative below, along with the attached pictures, gives a complete description of the system operation.

The Pesticide Rinse Water Reuse Area is in a 30- by 30-foot roofed area consisting of an 8-foot-8-inch by 30-foot pesticide storage room and a 21- by 30-foot mix/load area. Two double chain-link lockable gates are used to secure the area. The floor is made of concrete with a 36-mil chemical-resistant liner underneath. The walls are concrete-filled concrete block. The floors in the mix/load area and the pesticide storage room are coated with a chemical-resistant and waterproof paint. The floor in the mix/load area is sloped so that water drains to a sump located in the middle of the area. The floor in the pesticide storage room is level with an 8-inch solid concrete lip around the floor that is sealed as well. This area will contain 1,158 gallons of liquid. There is no drain in the floor of the pesticide storage room. Safety signs are posted in a number of places in the area.

At the wall opposite the gates in the mix/load area are the controls for adding potable or reuse water to the spray tank, a hook for an apron, a sink, a stainless steel table, a stainless steel shelf above the table, a safety equipment storage cabinet, an emergency shower/eye wash station, and the door to the

pesticide storage room. Between the table and the shelf is a clipboard for the Pesticide Application Sheet. At the wall to the right of the gates are two stainless steel shelves that are used for storage of smaller sprayers. The wall to the left of the gates consists of concrete block and chain-link fence.

The mix/load area can accommodate two sprayers. The sprayers are filled by connecting either a green hose (potable water) or a red hose (recycled rinse water) to the sprayer. An anti-siphon connector valve is mounted to the spray tank to prevent pesticide contamination of the potable water. On the ends of both the green and red hoses is a valve, which is in the off position when the hose is connected to the tank. The valve below the anti-siphon connector is opened. The appropriate totalizer located on the wall is set at zero. The water is turned on (a timer is used for the rinse water) and the valve at the end of the hose where it is connected to the sprayer tank is turned on. The totalizer is monitored as water is dispensed into the spray tank. Once the desired amount of water is dispensed, the valve at the end of the hose connected to the spray tank is turned off, the water is turned off, the valve below the anti-siphon connector is turned off and the hose is removed from the connector and hung up.

Rinse water that falls to the floor during the mix/load operation flows to a plastic grate located in the center of the floor. This is the primary sump. The function of this sump is to allow the heavy contaminates (soil, sand, etc.) to fall out of suspension. Rinse water moves from this sump to the secondary sump that is under an aluminum cover located next to the red grate.

The primary sump consists of a stainless steel liner that has been constructed and installed so that there is an air space between the bottom of the sump and the concrete floor of the sump. This air gap is monitored to check for water leaking past the stainless steel containment. The concrete portion of the sump has been sealed with a chemical-resistant material. Rinse water moves from the primary sump to the secondary sump via gravity through a pipe connecting the two. The fitting at the primary sump has a 90-degree elbow oriented downward so that sand, dirt, etc., will not be able to get into the secondary sump.

Once the rinse water reaches the secondary sump it is stored in a plastic drum. An automatic submersible pump is used to pump the rinse water from the plastic drum to a 500-gallon holding tank. The concrete portion of the sump has been sealed with a chemical-resistant material. A leak from the plastic container can easily be seen by looking at the sealed concrete floor in the secondary sump.

Rinse water from the secondary sump is pumped through a filter and into a 500-gallon holding tank. The holding tank is located in a sealed containment area. The rinse water is held here until needed for future spray operations. When needed, the rinse water is pumped from the holding tank by a centrifugal pump. It is controlled by a timer located on the wall. A totalizer is used to meter the amount of rinse water dispensed. A water hose with potable water is used for washing down the floor, etc.

Pesticides are stored in the pesticide storage room. This room is adjacent to the mix/load area and has a metal door that locks automatically when closed. Inside the room are metal shelves used for pesticide storage. An exhaust fan and explosion-proof lights are located in this room. The pesticide storage room is monitored for fire and theft via a 24-hour security system.

The maintenance for this area consists of routine cleaning, inspecting the sumps for leakage, cleaning the filter at the 500-gallon storage tank, monitoring the level of rinse water in the storage tank, checking the operation of the emergency shower/eye wash, monitoring pesticide inventory.

Results

We are very pleased with the results of this mix/load area. It has allowed us to easily and safely mix and apply the pesticides needed for the maintenance of the course. We know that this systems allows us to protect the groundwater and nearby wetland from pesticide contamination.

Golfer/Employee Response

The golfers and visitors that have toured the facility have been very impressed with the assertive efforts we have taken to protect our environment. We communicate through a display in the golf shop, through one-on-one discussions with members and golfers, tours of the facility, etc. We are also working on a link to our web site that will contain information on this.

Perspective and Recommendations

What, if anything, would you do differently if you were to do the project again? What would you recommend to others implementing this project?

The rinse water hose is on the same side as the spray-rig exhaust pipe. It would be nice to have it on the other side. I would recommend to others to use quality products. Don't try to save money with cheap equipment, pumps, etc. Also, make sure the contractor installs everything the proper way.

Economic Costs & Benefits

How much did it cost to implement this project?

$10,700 for the supplies does not include construction labor and material costs.

What are your anticipated or actual financial savings?

This is hard to measure except to say that without having this facility our chances of having a potential soil, groundwater and wetland contamination problem are very likely and would be costly to correct. Besides being an insurance factor against pollution and contamination, it is just the right thing to do when handling pesticides responsibly.

For more information about this project contact Larry Livingston CGCS, 850-231-7610 or larry_Livingston@arvida.com