



Simply blowing the equipment clean eliminates most of the clippings from the unit.

Environmental Common Sense — *A Sample “In-House” Audit*

Some simple steps are all you need to start.

by JAMES FRANCIS MOORE

WHENEVER superintendents gather for an educational meeting, it's a sure bet that environmental issues will be discussed. Although most superintendents are aware of the need to improve the environmental aspects of their courses, it is often an uphill battle to convince their employers that action should be taken. This hesitation on the part of the course leadership to address environmental issues is due to their failure to clearly understand the problems, the belief that their course really is not much of a threat to the environment,

and the fear that any action might invite closer scrutiny from *outsiders*.

It is the superintendent's responsibility to make his or her employers aware of environmental problems that exist on the property. Although they probably have raised the subject at meetings and indicated a need for the organization to take action, many superintendents have not taken the step of completing an in-house environmental audit for their employers. The purpose of this article is to give the superintendent a starting point for accomplishing such an audit. Follow-

ing is a sample report to the leadership of a fictitious course. This report provides a good format that can be customized to meet the needs of your course.

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To: The Green Committee

From: John Smith, Golf Course Superintendent

Date: 1/15/96

The following report has been prepared for the Committee to provide information about the environmental aspects of our golf course operations.



*It's better to replace old tanks **before** they cause problems. Fuel tank storage can be improved by the use of safer and cleaner alternative tanks that are available on the market.*

Many aspects of course management that have environmental ramifications are detailed in this report, including our current state of affairs and options for improvement. This report is an *in-house* effort for the sole use of the Committee.

There are six major areas in which our course operations have the potential to impact the environment:

- Fuel Storage
- Pesticide and Fertilizer Storage
- Equipment Washing and Pesticide Mixing Area
- Water Use
- Pesticide and Fertilizer Use
- Wildlife Habitat

Fuel Storage

Concerns

Fuel storage is a major environmental issue for most golf courses. The major problem areas are fire safety and the potential for soil and/or ground water contamination. Although safety issues are fairly straightforward, soil and water contamination is potentially a much more difficult and expensive issue. Leaking storage containers can cause tremendous environmental damage, and the cleanup of contaminated soil can be extremely costly.

Current Situation

We presently are storing two types of fuel — gasoline and diesel. Our gasoline is stored in an underground tank that is more than 20 years old. We have followed federal guidelines for leak

detection and monitoring, and so far we do not have leakage problems. Our diesel fuel is stored in a 500-gallon above-ground tank. The tank is not leaking, but it is in poor condition overall. It is mounted on a metal frame about eight feet above the ground to raise the tank high enough for fueling our equipment by gravity feed.

I am concerned about both tanks. Should a leak occur in our underground tank, the cost of repairing the environmental damage could be extremely high. Removal of the tank before problems occur is a far better option. I have checked with a local contractor on the cost of removing our existing 1,000-gallon tank. Assuming there is no leakage, removal and disposal of the tank and refilling the cavity with the same soil should cost less than \$3,000.

Our diesel tank also should be replaced. The frame supporting the tank has been damaged by equipment bumping into it, and the tank itself has been damaged by corrosion because it is fully exposed to the weather. Again, assuming no soil contamination, removal of the diesel tank should cost less than \$200.

Options

There are at least two good options for improving our fuel storage situation. Both options include removing and replacing the existing storage tanks — before they cause us problems.

Underground tanks are being replaced on many golf courses with pro-

fessionally designed and constructed underground structures that greatly reduce the possibility of leakage. These structures are extremely durable and safe. We would need to purchase either one unit that includes two internal 500-gallon storage chambers (one for gas and the other for diesel) or two 500-gallon structures. The advantage of purchasing two structures is that federal guidelines are much simpler for units smaller than 1,000 gallons. The disadvantage is that the two units will take up more space in our already limited maintenance facility area. Regardless of the exact design, the units typically are installed on a concrete slab and include collision barriers.

These units provide very good prevention against leakage, greatly simplify leakage monitoring and cleanup, if necessary, and are far less objectionable from a visual standpoint than our existing diesel tank. I have checked with the local fire marshal and have been assured the units will exceed all local environmental and safety codes. I also contacted several suppliers of these types of storage units and obtained estimates of the purchase price, including installation. Total cost for the two 500-gallon units (including pumps, monitoring devices, slab construction, etc.) would be about \$15,000.

The second option is less expensive and, for the most part, could be accomplished in-house. We would build a containment structure consisting of concrete flooring and walls large enough to completely surround two tanks (similar in appearance to our existing diesel tank). The structure would prevent leakage from contaminating the underlying soil, and would serve as a barrier between the tanks and our equipment. A roof would be constructed to help prevent corrosion of the tanks. The tanks themselves are built with interior and exterior walls to provide additional protection against leaks.

The two skid-mounted tanks and electric transfer pumps would cost approximately \$4,000. I estimate we can build the containment structure and roof for about \$1,500, bringing the total to approximately \$5,500 for the entire project. Again, I have checked with our local fire marshal and found this option will meet local code requirements.

Recommendation

Although we can build our own storage structure for less money, I

suggest we purchase the prefabricated units listed on the attached literature. These units will meet all of our storage needs and will ensure that we have addressed the environmental concerns in the best manner possible. Also, since they are completely self-contained, they can be moved if necessary.

Pesticide Storage

Concerns

The storage of pesticides also has become a prominent issue in golf course management. Improper storage increases the possibility of soil and water contamination, theft and/or vandalism, or injury to maintenance workers.

Current Situation

We currently store pesticides in our maintenance building. This building also houses equipment, the mechanic's work area, crew facilities, and my office. Although the building is locked at night, it is unsecured during the day for reasons of practicality. Products are stored in a locked closet labeled *pesticides*, located adjacent to my office. The closet is neither vented nor does it provide containment should a pesticide container leak or be knocked over. Although we do have an eye and face washing station near our restroom, the station is not near the pesticide storage area. Finally, since the products are stored within the confines of our maintenance building, the fire department may be hesitant to tackle a fire should one occur in the building. In addition to the extra risk of injury to fire fighting personnel, the water used to extinguish a fire in a building that contains pesticides can itself become a hazardous waste product. For these reasons I feel it is important to take immediate steps to improve our pesticide storage facilities.

Options

As is the case with fuel storage, there now are prefabricated pesticide storage structures available that address each of the concerns expressed above. These units are fire rated, secured, ventilated, and lighted, and protected against contamination of soil or water should leakage of a container occur. They are stand-alone units that can be placed easily in our existing maintenance area.

The better units have a wide variety of options, including heating and air conditioning, fire suppression systems, and eye/face washing stations. I con-

tacted a number of suppliers and found that prices range from about \$9,000 to \$12,000 for top-quality structures. The smaller figure represents a basic 8' x 8' unit. The larger figure will purchase a unit that is 8' x 12' and fully equipped with ventilation, lighting, shelving, insulation, and an eye/face washing station.

The second option is to construct our own storage unit. We can purchase a 10' x 12' metal storage building complete with locking door and lighting for about \$1,500. We would finish the interior and install ventilation for another \$500. A stainless steel floor (to provide containment in case of spills) would cost about \$800. Containment shelves are another \$500. Eye and face washing equipment and an emergency spill containment kit would add another \$500 and bring the total cost for our homemade structure to approximately \$4,000. I have checked with the fire marshal, who has agreed to review the plans for this structure should we choose this option.

Until we are able to significantly improve the way in which we store chemicals, we plan on keeping the amount of pesticides (and fertilizers) on hand to an absolute minimum. This should not be viewed as a long-term solution since we would not be able to count on the availability of the required product when problems arose on the course. We also would be unable to take advantage of discounts that are offered for seasonal and quantity purchases.

Recommendation

Without question, the ideal option is to purchase a prefabricated unit. They are much better constructed than the home-built structure and are more likely to meet future code requirements should they be made more stringent. However, if this option proves too expensive, I am confident we can construct our own building in good manner.

Equipment Washing Area

Concerns

Mowing is one of the primary tasks accomplished on any course. During the washing of equipment, grass clippings and other residues are discharged into the drainage area. The clippings contain nutrients and may contain some pesticide residue as well. Fertilizer and pesticide equipment also is washed following use. For these rea-

sons, equipment washing areas are being closely scrutinized for their possible environmental impact.

Current Situation

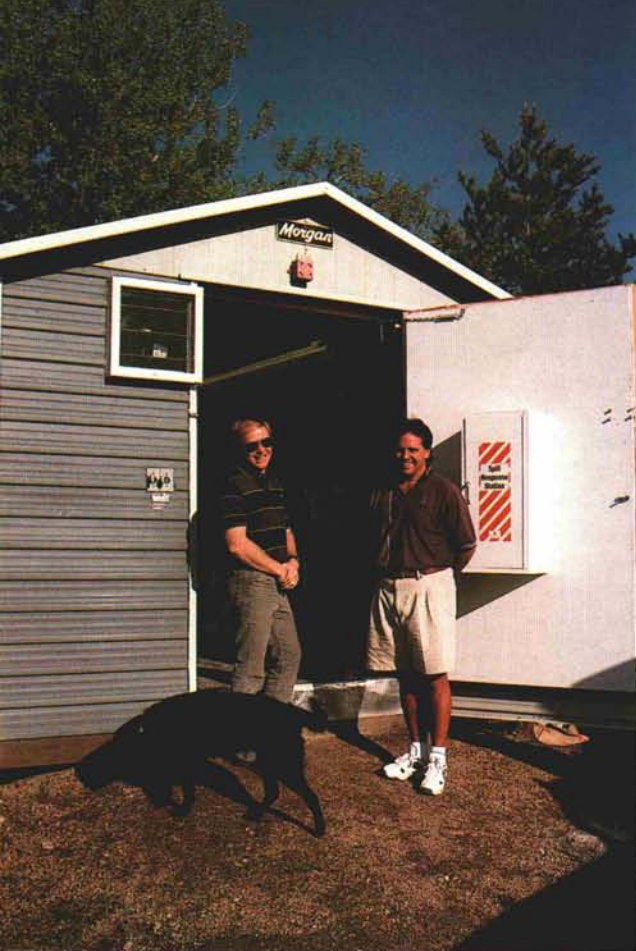
We currently wash our mowing equipment on a concrete pad behind the shop. There is a drain inlet in the center of the pad that collects rinsate water, as well as clippings and other debris. The drain pipe extends from the pad and surfaces in a small drainage swale that then drains into the lake on the eighth hole. Prior to the construction of the wash pad, we discharged all rinsate into the local city sewer. Although I feel retaining our rinsate on the property by virtue of discharging it into the lake on the eighth hole is a better option than the previous practice, the nutrients in the rinsate have increased the severity of algae blooms, which affect the ecology of the pond and make it extremely unattractive. Also, since the lake overflows into a neighborhood creek, I am concerned about the possibility of contaminating that creek.

Options

This issue has become such a concern throughout the country that rinsate recycling equipment is now available for golf courses. This equipment is similar in design and function to the filters used for swimming pools, although special modifications are in-

Where do your clippings end up when equipment is washed?





Good pesticide and fertilizer storage structures can be built or purchased. These structures should be secure, ventilated, lighted, fire rated, and provide protection in case of spills.

cluded for neutralizing chemical residues and removing solid debris such as clippings. Since contamination of the soil and/or water with chemicals occurs most often during mixing (spills, overflows, etc.), the unit also includes a mixing area. Predictably, this equipment is very expensive (as high as \$40,000).

The next option is to reconstruct our existing washing area. One design includes a concrete washing area that slopes to a collection pit. The pit itself includes a trap area and screen at the deepest end that collects as much of the clippings as possible. This pit is built to include a layer of gravel overlaid with sand to provide additional filtering. Finally, the collection area itself is constructed to allow our front-end loader to scoop out the majority of the debris, which then is added to our compost pile. I have obtained an estimate to build this type of wash pad. The total cost will be approximately \$7,000.

I have also instituted a number of steps to make an immediate reduction in the amount of material we wash into the lake. First, we have installed five

quick-coupler valves in rough areas throughout the course. These areas serve as "pre-wash" sites for our mowers that accumulate the most clippings. A different site is used each day to avoid creating an overly wet area and to keep odors to a minimum. The vast majority of clippings are removed in the pre-wash area. The equipment then is steam-cleaned on our existing wash pad. We also are considering using hand-held blowing equipment to remove excess clippings from our mowers prior to the final steam cleaning.

To reduce the possibility of chemical contamination during the washing of pesticide application equipment, we no longer discharge any rinsate from this washing operation into a drain system of any kind. All spray solutions are applied to the course. We calibrate the equipment closely to keep left-over solution to a minimum. Any excess material is applied to the course. The equipment is then repeatedly rinsed, and

the rinsate is applied to the course as well. We also keep *spill kits* on hand to immediately clean up any contamination that may occur during mixing.

Recommendation

Although there is no question that the unit that combines storage, rinsate filtration, and a contained mixing area is the most complete solution to our equipment washing and chemical mixing needs, this may not be economically feasible for our club at this time. Therefore, unless the club can find money for the more expensive option now, my suggestion is to proceed with the modification of our wash pad area as described in the second option.

Water Use, Pesticide and Fertilizer Use, and Wildlife Habitat

Concerns

I have combined the last three areas of concern into one category since they are closely related. Golf courses can be heavy users of water. In many parts of the country, water use by golf courses is being closely regulated. Fertilizer

and pesticide use on golf courses continues to be one of the most volatile issues in golf course management today. Although university research indicates there is little to fear as long as these products are selected and applied properly, many people are concerned about their use. Finally, properly managed golf courses are starting to be recognized as excellent sites for a variety of wildlife. There are many courses in the country that have made concerted efforts to further improve this environmentally positive aspect of golf course management.

There is a trend in golf maintenance to increase wildlife habitat by allowing areas of the course that seldom come into play to return to a more natural state. This is accomplished by reducing or eliminating irrigation, fertilizer and pesticide applications, and mowing. In addition to creating nesting habitat and sanctuary for wildlife, courses are finding it possible to save money and labor that can better be used elsewhere on the property.

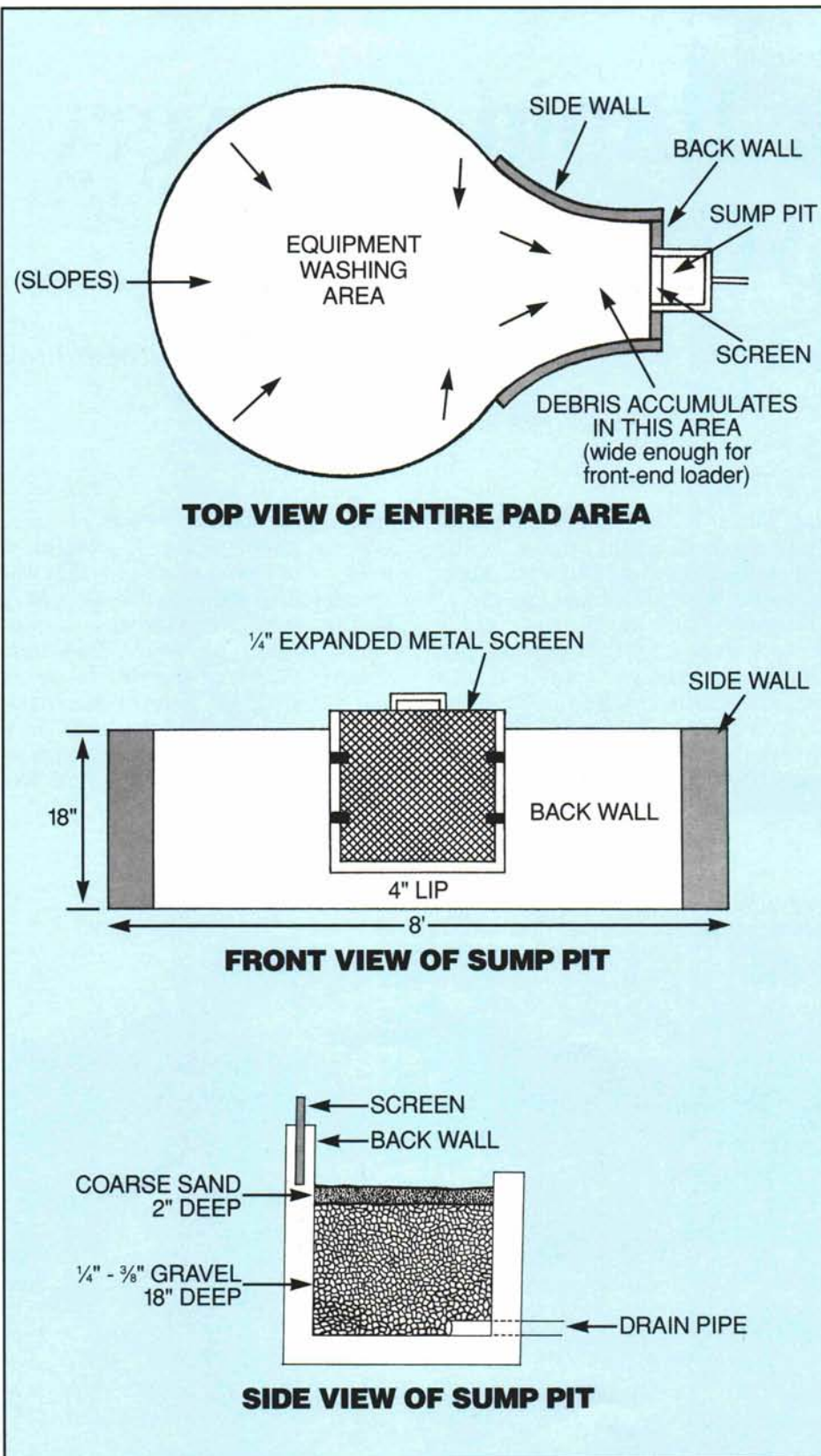
Current Situation

In my estimation, there are eight to ten acres on our course that seldom come into play. At least six of these acres are irrigated once or twice per week. We fertilize these areas twice per season. A pre-emergence herbicide is applied to the entire acreage each fall (for winter weeds), and two post-emergence applications are made during the spring and summer. We presently are mowing the irrigated acreage twice per week and the non-irrigated area once per week. Also, the turf areas surrounding all of our lakes are being mowed at fairway height.

Options

Common sense dictates that any reduction in input (in terms of water and chemical usage) will prove a positive step from an environmental standpoint.

Since we apply about 12 inches of water per year to this acreage, eliminating irrigation over eight acres would result in a savings of two to three million gallons of water per year. Eliminating the pesticide and fertilizer applications would save approximately \$4,000. By reducing the mowing of the roughs around the lakes, we could channel 800 to 1,000 labor hours per year into other course maintenance activities. Allowing the turf around the lakes to grow to a height of four inches or more would provide a buffer strip



An illustration of a simplified wash rack.

of higher cut turf to further reduce the possibility of fertilizer or chemical runoff into the lakes.

Perhaps the most important gain would be the encouragement of wildlife on our course. I'm sure many of our

players have already noticed the bluebirds in the boxes we mounted on number 14 and purple martins that constantly patrol our lakes for mosquitoes and other insects. By promoting another eight to 10 acres of nesting habi-

tat, we can expect to enhance both the variety and numbers of birds and other wildlife on our course.

Recommendation

My recommendation is to begin establishing our naturalized areas as soon as possible. We can allow these areas to return to a native or natural state by essentially reducing all maintenance. Since we have promoted turf-grass in these areas for years, it will take a season or two for native grasses to once again flourish. We can speed this process up by sowing native grasses, wildflower seeds, and other native plants. However, it should be pointed out that the areas definitely will look unkempt for a while. There are likely to be some players who will feel the appearance of the course has suffered by reducing the maintenance of these areas. A good educational effort will be required to illustrate the advantages of this and other changes in our maintenance programs. Our first step should be to enroll in the Cooperative Sanctuary Program developed through a joint effort of the USGA and the Audubon Society of New York State. I contacted the USGA and received information about this program, which I have attached to the end of this report.

Summary

We should consider hiring a professional environmental consultant to perform a more thorough review of our maintenance facility. The company would provide us with a comprehensive report, including suggestions for improvement and options to obtain detailed drawings for the construction of storage facilities, wash pads, etc. We can obtain such a review for approximately \$1,500.

There are many other environmental aspects of the care of our course that have not been covered in this brief report. Please review the information I have included with this report, summarizing recent research sponsored by the USGA and conducted at major universities across the country. Although I have made every effort to ensure our course is professionally managed, we do have opportunities to improve our maintenance operations for the benefit of the environment and the game of golf.

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