Remedial Investigation at Faribault Golf & Country Club

By DALE WYSOCKI
Golf Course Superintendent

(Ed. Note: This is Dale Wysocki's follow-up article to "Some Difficult Decisions Had to Be Made Regarding Underground Storage Tanks at Faribault Golf & Country Club" which appeared in the September, 1990 issue of Hole Notes.)

We knew that contamination existed. Now we had to find out the extent of the contamination. This called for a remedial investigation.

I had sent out bids to a couple of different environmental consultants with the soil test from the previous excavation and topographical maps pinpointing the location of the tank. Within a couple of weeks I had received the bids back with outlines of what each company would be doing.

I presented the Faribault Golf & Country Club board with the bids and left the choice up to the board. After some discussion and several questions regarding MPCA policy, they selected Barr Engineering.

Barr Engineering had proposed drilling seven wells over and around where the UST was buried *(see map)*, down to either the water table or to five feet below the base of contaminated soil. However, before this or anything else could take place, we had to give locations of rescue squads, hospital, and of course, call Gopher State for any underground wires, oil lines (we have two running under the 10th tee) and telephone wires.

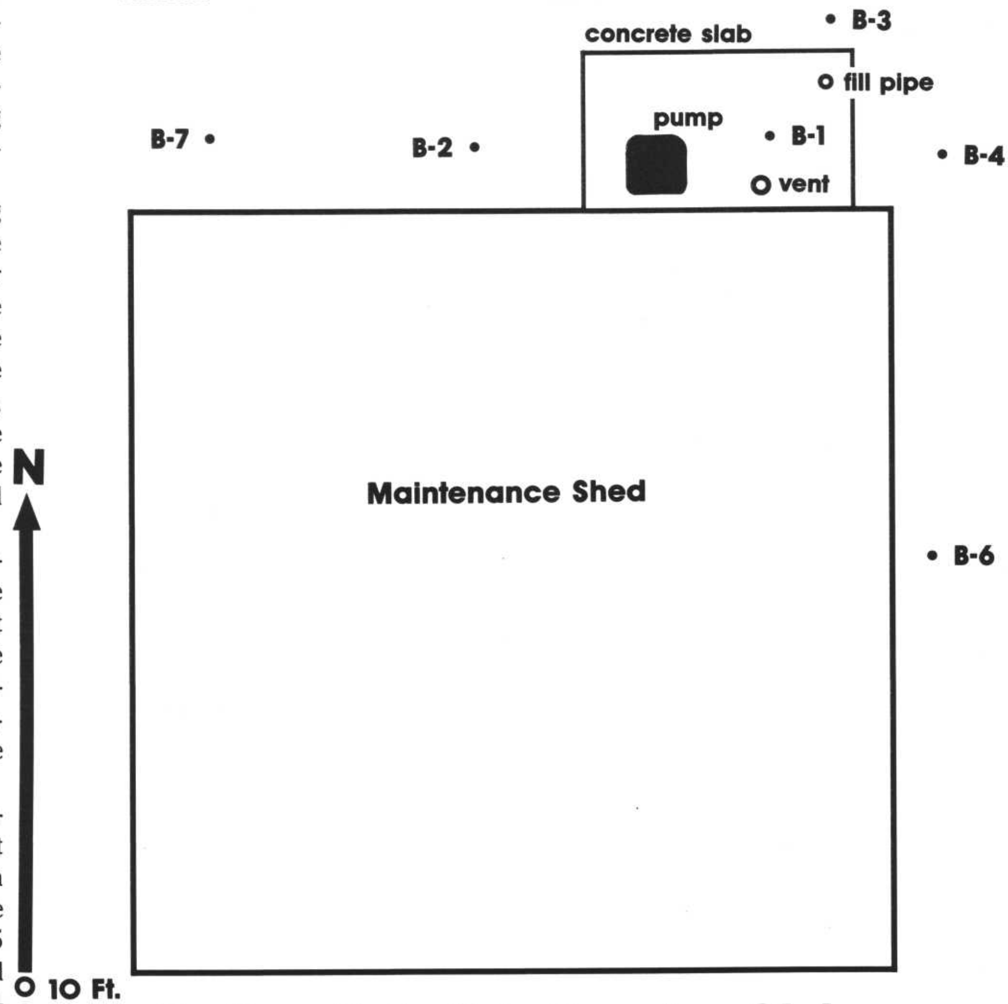
Once the "all clear" was sent and insurance requirements approved, it was time to start the remedial investigation so that a corrective action design (CAD) could be set up. On Tuesday, September 25, a CME-55 truck-mounted drill rig, operated by Exploration Technologies, would begin the test borings.

The soil borings were placed to determine the horizontal and vertical extent of soil contamination. Samples were taken every five feet vertically from the surface to the water table or to a minimum of 5 feet below the base of the contaminated soil. The soil samples are recovered by advancing a split-spoon sampler two feet below the auger. The split spoon is then pulled out, lifted to the surface and taken apart.

The samples brought up by the split-spoon are immediately placed in airtight jars for the following analysis:

- Jar headspace analysis
- Laboratory analysis for components of the hydrocarbon stored in the tank, in this case:
  - benzene
  - ethylbenzene
  - toluene
  - xylene
  - lead
  - lead
  - total hydrocarbons

The jar headspace analysis is a field technique for determining the presence of volatile organic compounds in soil. A jar is half-filled with freshly sampled soil, sealed and shaken for 15 seconds. Then



Faribault Golf & Country Club

the sample is set aside for at least 10 minutes to allow any contaminants in the soil to volatilize.

Then the jar is shaken again for 15 seconds, and a probe connected to a photoionization detector is inserted into the jar to draw off air from the jar. The photoionization detector measures the concentration of volatile organic compounds in the air, which indicates the concentration of volatile organic compounds in the soil.

Now what did we find? Of the seven borings made, four turned up clean, but the other three—B-1, B-2, B-3—show us that there is a definite problem—a problem that extends down to 30-35 feet. The jar head space analyses indicated 48-28 ppm at 30'-32'. The maximum allowable rate set by the MPCA is 10 ppm, so now the petroleum tank release investigation suggests that the release may have impacted shallow groundwater at the site. A groundwater investigation is going to take place following this work, and a final remedial investigation report will be submitted to the MPCA for approval of recommended corrective action and site closure.

The groundwater investigation will consist of the following procedures:

1. Install three monitor wells to collect samples of groundwater for laboratory analysis;

2) Determine the rate at which groundwater flows across the site (performance of aquifer tests.;

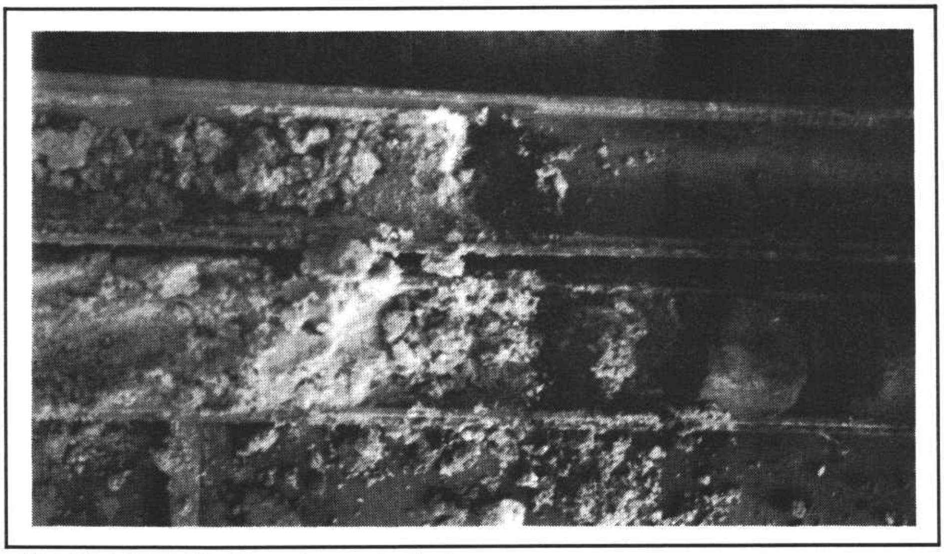
3) Identify potential receptors of contaminants derived from the site. These include water wells within one mile down gradient of the site and surface water bodies that may receive groundwater discharge from the impacted aquifer.

The wells will be located in a manner which will result in one well in the upgradient direction of groundwater flow through the site, and two wells located in the down gradient direction from the site.

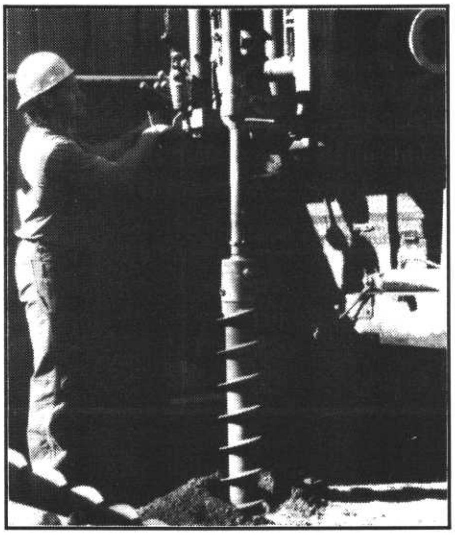
Finally, after all the data is collected and all the results are in from laboratory analyses, recommendations will be presented for corrective action for site closure. Based on the recent soil boring program, it appears that soil excavation may not be the most efficient means of preventing further migration of contaminants to the shallow aquifer.

Possible alternatives are surface capping of the site, in-site soil venting or bioremediation. I would like to thank Denny Palmer, Dan Witala and Dave Dahlstrom for their technical advice in this article.

—Dale Wysocki

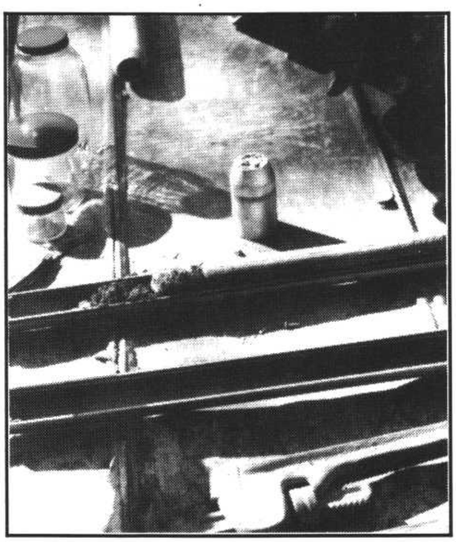


***THE BLACK LAYER** on the top half of the split spoon was extremely high in soil contaminants, located right above groundwater.*

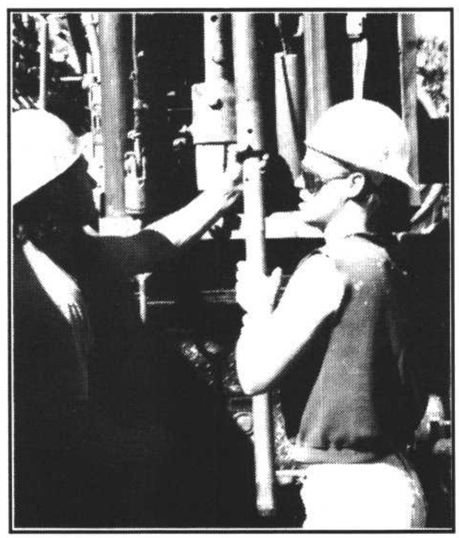


***OPERATING** a CME-55 is Jerry Scallin of Exploration Technologies.*

***PERFORMING** jar headspace test is Dave Dahlstrom of Barr Engineering Co.*



***A SPLIT-SPOON SAMPLER** with a sample of soil that later would be checked for contaminants.*



***TECHNICIANS** from Exploratory Technologies attach a "split-spoon" sampler.*