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CIRCLE NO. 145

Real-Life Solutions

■ HOW TO BUILD A COURSE ON MINE SHAFTS

Mining for Golf

Builders faced a “hole” lot of challenges while constructing Stewart Creek, a new course located on top of old mine shafts in the Canadian Rundle Range

BY ANDREW PENNER

The beautiful mountain town of Canmore, Alberta, was originally known for coal mining. Beginning in 1886, thousands of miners kissed their loved ones goodbye and disappeared into the bowels of the earth for up to 12 torturous hours at a time. Of course, with the inherent dangers of underground coal mining, some of them would go down and never see the light of day again.

Since the mines closed in 1979, another use was found for the land. Now, on the eastern slopes of the Rundle Range near Can-

more (a 15-minute drive from Banff), a spectacular new golf course called Stewart Creek parades overtop of many of these long forgotten mine shafts. Fortunately, nobody lost his life while constructing the course. However, with numerous mine shafts still crisscrossing the terrain, construction crews were faced with difficult challenges as they built the course.

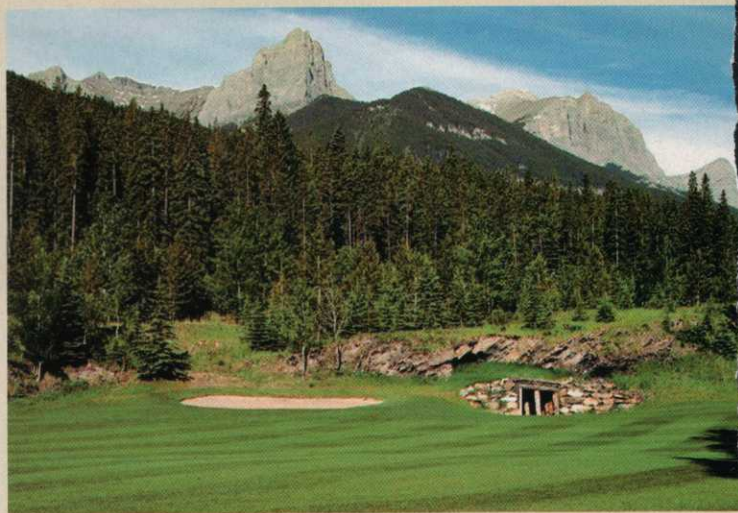
Designed by Alberta architect Gary Browning, Stewart Creek has quickly become recognized as one of Canada’s premier mountain golf destinations. A runner-up finish in *Golf Digest’s* “Best New Canadian Course” category last year hasn’t hurt either. While some of the game’s finest connoisseurs are taking notice (and players with a zest for high-altitude golf are filling the tee sheets), constructing the course didn’t come easy — or without a hefty price. According to Browning, Stewart Creek was forced to spend an estimated \$300,000 on reinforcing fairways that potentially could have collapsed or sunk due to the old mine shafts that are located under the course.

Problem

How do you build two fairways that are located on tunnels that were formerly part of a coal mine? The glib answer is “very carefully,” but there’s more to it than that.

Solution

Bring in the geo fabric, which was used as underlay to strengthen the ground on the two fairways. The geo fabric shows “amazing strength” when woven together as a textile.



Stewart Creek incorporates a number of refurbished mine entrances that add authenticity to the course’s setting. The openings make great rain shelters.

Interestingly, the final 18-hole product at Stewart Creek incorporates a number of refurbished mine entrances that add some authenticity to the course’s setting. Although golfers can enter no further than 15 feet or so into the mines (upon which the tunnels are barricaded with steel grates), the openings have been reconstructed with new timber and serve as excellent rain shelters.

However, the mine entrances were the least of the worries for construction crews. With more than 50 miles of tunnels under the course, the greatest worry, according to an Alberta provincial safety board, was centered on reinforcing fairways that, with substantial rainfall or constant pressure from golf carts, could sink and endanger the public.

Enter 120,000 square feet of a geo fabric (or geo grid), which was used as

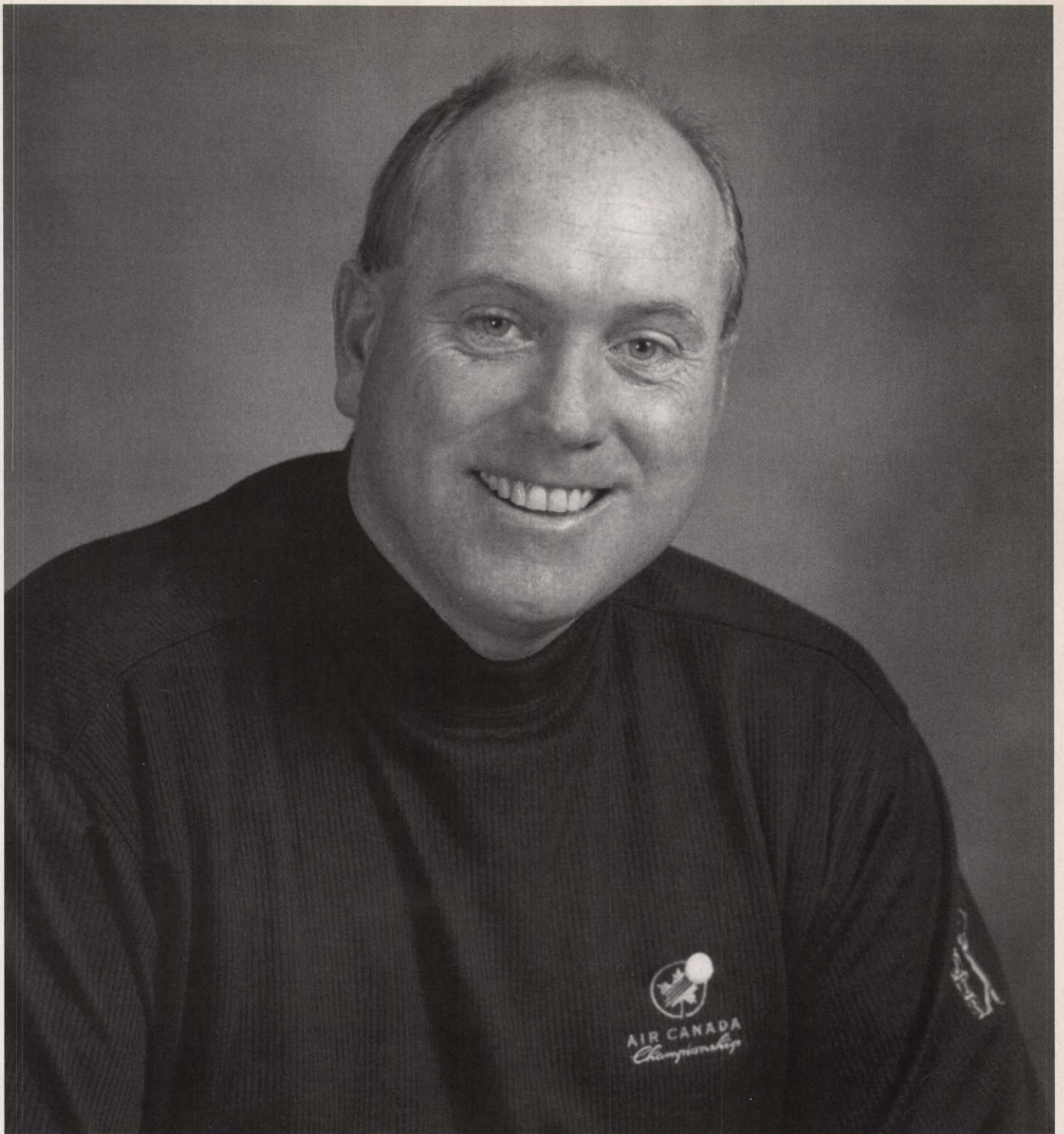
underlay to strengthen the ground on two of the fairways that posed the greatest risk. The geo fabric is extremely strong. Interestingly enough, it’s similar to what is used to keep ski racers on the course after a spill. (Yes, that would be the orange fences that line the World Cup downhill courses.)

“You could cut the fabric with a knife, but it holds amazing strength when woven together as a textile,” Browning says. “Its tensile strength is unbelievable.”

The theory behind it, of course, is that if ground underneath the fabric settles, the people on top will be protected by the grid and the ground should remain solid. “Hypothetically, you could have portions of a golf hole that are actually suspended by the fabric, with nothing but hollow ground underneath,” says Al Draper of Evans Golf

Continued on page 94

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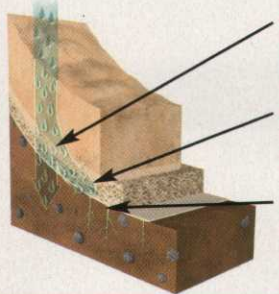
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GOL0303

CIRCLE NO. 139

Real-Life Solutions

Continued from page 92
Course Construction and the project manager for the work done at Stewart Creek.

“The areas of most concern were on fairways No. 2 and No. 4,” cites Draper. “Consequently, those were the two fairways where we needed to install the geo fabric.”

The second hole (a par 5 nearing 600 yards) and the fourth hole (a par 4 nearly 480 yards) were completely lined with the tensor-like fabric. In fact, the second hole features four layers of the fabric, while the fourth hole has two separate layers.

Understandably, what made the process difficult for the workers was not the installation, but the excavation which was the first step. In order for crews to have enough room for the soil to house irrigation heads, pipes and cable, the ground had to be excavated a meter in depth.

“Being in the Canadian Rockies, we hit plenty of rock,” Draper recalls. “In some areas, it simply wasn't possible to get down a meter so we built areas up instead, adding enough soil on top of the fabric to have sufficient room for the irrigation and to ensure the fabric went taut.”

As ironic as it seems, heavy equipment was needed for the excavation to occur.

“At times, it didn't seem logical,” Browning says. “Here we were going through this major process for public safety, in lieu of possible settlement, and

tons of heavy equipment was constantly at work above these sensitive areas.”

Naturally, the process was a measure required by the government of Alberta through a specially assembled board of safety officials that no longer exists.

Bringing their own first-hand expertise to the site was a number of mine engineers who assisted Draper at Stewart Creek. “The engi-

If ground underneath the fabric settles, the people on top will be protected by the grid and the ground should remain solid.

neers were helpful in determining the configurations of the tunnels, providing old mining maps, gauging the strength of the various shafts and entranceways, outlining steps necessary for the restorative work and for overall safety,” Draper says.

Understandably, no current maps existed on “the underworld,” so “first-hand knowledge from engineers who were familiar with the mine workings was crucial,” Draper adds.

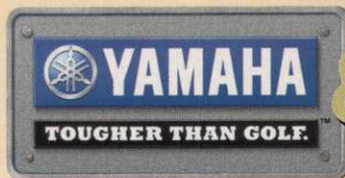
After excavation, the fab-

Continued on page 100

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Mark Esoda, CGCS

Atlanta CC, Marietta, Ga.

Leader in Georgia GCSA and Georgia Turfgrass Foundation

"Mark Esoda? He's the bomb, the best," says Georgia GCSA President Wade Thomas. "Through his leadership and foresight, he has been able to achieve more singly than anyone I can think of to advance golf in Georgia."



From his work with the Georgia GCSA, Georgia Turfgrass Association, Georgia Turfgrass Foundation Trust and now the Water Task Force, Esoda has clearly had an impact. Touring the country speaking on behalf of the GCSAA's Professional Development Initiative, he has helped permanently affect the national association. This is not to mention his professionalism in preparing Atlanta CC for seven BellSouth Classics and his enthusiastic "fatherism" in being a troop leader and patrol coach for the Flaming Dragons (Georgia's Boy Scout Troop 431).

"There is gratification in volunteering," Esoda says. "As corny as it sounds, the more you put into an organization, the more you get out of it."

Jim Nicol, CGCS

Hazeltine National GC, Chaska, Minn.

Long-time servant with Minnesota GCSA and GCSAA

It is easier to list the offices Jim Nicol has not held, and the committees on which he has not served, than to name those he has. His only regret is that he could not have done more, having run unsuccessfully for GCSAA's board of directors.

"I wanted to help shape things," he said simply about his years of work at the national and state levels.



While working 18 years at Bunker Hills GC in Coon Rapids, Minn., and six at Hazeltine National GC in Chaska, Minn., Nicol has served on the Minnesota GCSA board of directors and was elected vice president and then president in 1997 and 1998, respectively.

His work with the GCSAA has included serving on several committees and serving as chapter delegate for several years.

"Jim is a highly respected member of the Minnesota GCSA and his opinions on association affairs are taken very seriously," said association President Rick Fredericksen of Woodhill CC in Wayzata, Minn. "Jim hosted last year's PGA Championship at Hazeltine National GC and his experience with other professional golf tournaments is an asset valued by his peers."

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Real-Life Solutions

Continued from page 94
ric, which came in rolls 15 feet wide, was simply laid overtop the exposed rock and soil. From there, the irrigation was placed on top of the fabric and covered with the removed soil and a mixture that was prepared nearby. As an added challenge, there was no soil readily available.

Fortunately, a layer of peat was discovered on one of the natural plateaus on the course. Also, silt deposited close to Stewart Creek was available for use. Draper combined both entities to form an appropriate growing medium.

Because the region had been so heavily used in coal



PHOTO COURTESY OF STEWART CREEK

Stewart Creek has quickly become recognized as one of Canada's premier mountain golf destinations.

mining, there were additional concerns regarding past mining activity. "There were areas that we simply had to stay away from when routing the course," Browning says.

A constant reminder, and an area that is strictly out of bounds for the maintenance team and the golfers alike, is readily seen beside the 10th fairway. A gaping open pit mine is

just yards off the fairway and signs warn anyone who ventures too close.

"The area is environmentally sensitive as the elk and sheep are drawn to the naturally forming salt and mineral deposits in the mine," says superintendent Sean Kjemhus. "The area is simply off limits."

With coal a relatively low-in-demand resource, it's

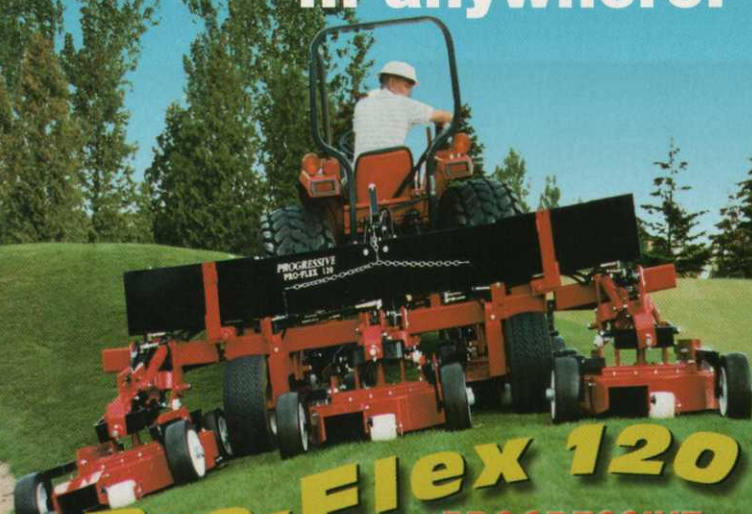
not likely the tunnels under the course will ever be illuminated by a miner's headlamp again. Today, the black coal-lined tunnels have been replaced with lush green networks of Kentucky bluegrass — a sign of the times. In addition, the local miners have exchanged their pick axes for golf clubs.

As for Sean Kjemhus and his maintenance team, they get up early in the morning and kiss their loved ones goodbye. And with the smell of coal still in the air, they put on their hard hats and venture into dangerous terrain. ■

Penner is a free-lance writer from Calgary, Alberta.

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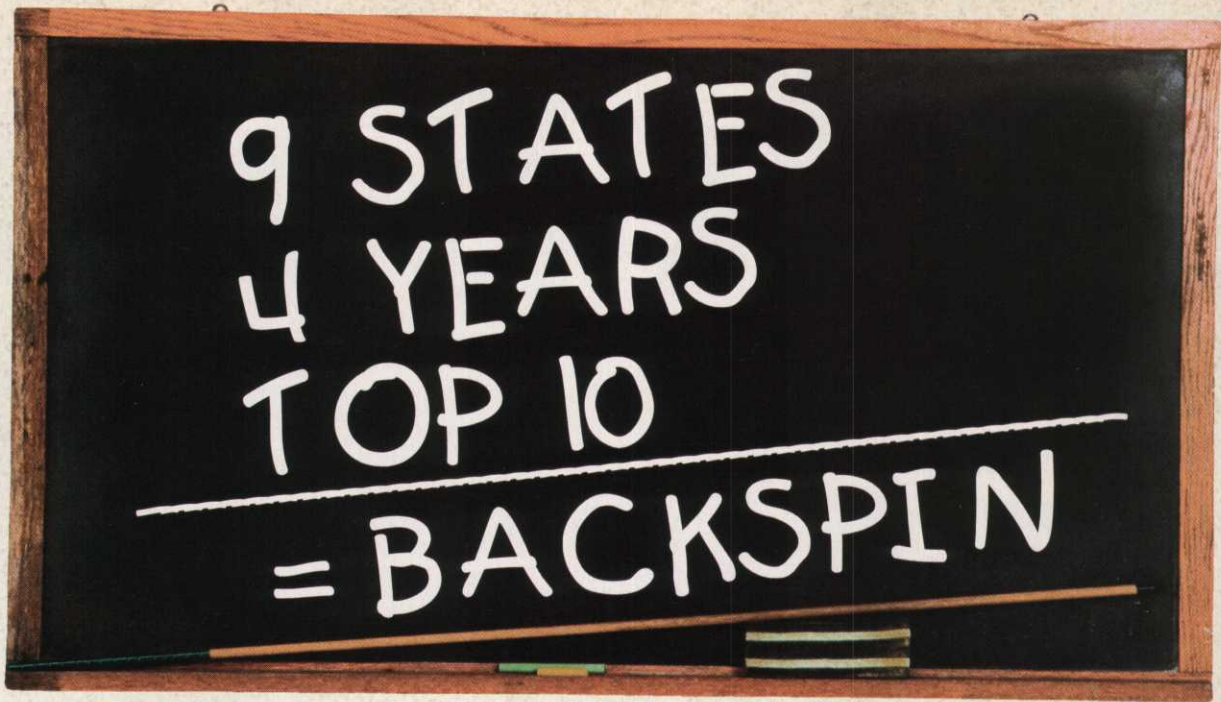
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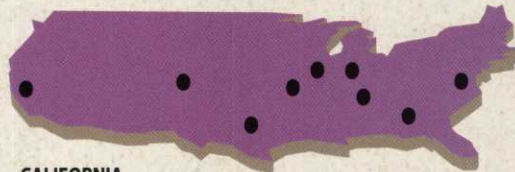
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LSD	0.4	LSD	0.3	LSD	0.3	LSD	0.2



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A-4	6.8
BACKSPIN	6.1
CATO	5.1
LSD	0.4

CALIFORNIA		COLORADO		TEXAS		KENTUCKY	
L93	7.6	A-1	7.9	A-1	7.2	A-4	7.4
BACKSPIN	7.1	BACKSPIN	7.1	BACKSPIN	6.7	BACKSPIN	6.9
PENNCROSS	6.0	PENNCROSS	4.7	PENNCROSS	5.0	PENNCROSS	5.7
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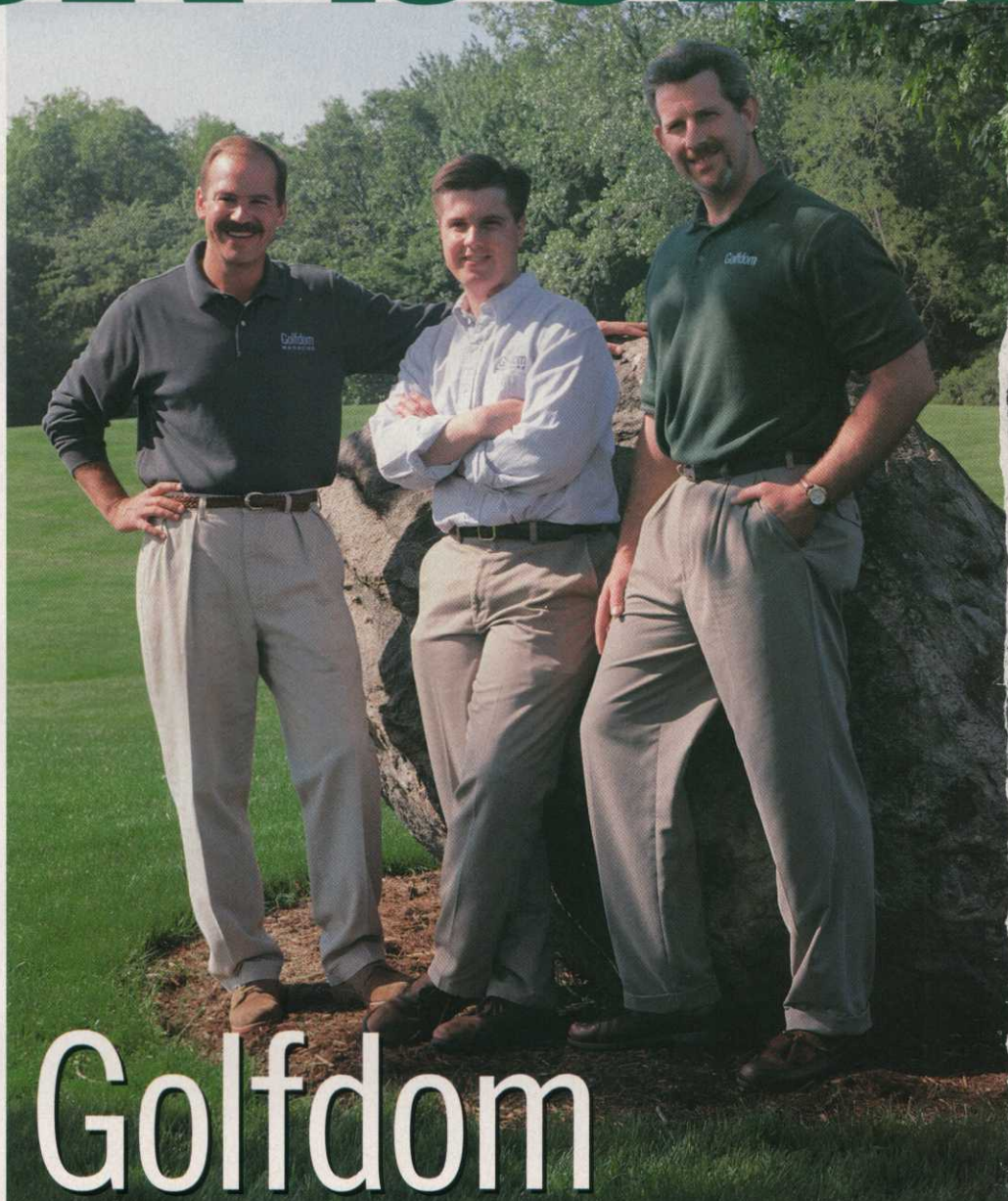
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- 17 35 Director of Golf
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3. What is your facility's annual maintenance budget?

- 24 A More than \$2 Million
- 25 B \$1,000,001-\$2 Million
- 26 C \$750,001-\$1 Million
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- 28 E \$300,001-\$500,000
- 29 F \$150,001-\$300,000
- 30 G Less than \$150,000

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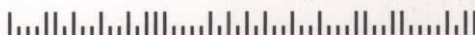
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