

**USGA GREEN SECTION
TURF ADVISORY SERVICE VISIT REPORT**

GOLF COURSES OF SUN CITY GRAND

Surprise, Arizona

July 8, 2010

Present:

**Mr. Jeff Hochman, Director of Golf Operations
Ms. Mitzi Mills, Executive Director
Mr. Jim Bushea, Superintendent
Mr. Dennis Krause, Superintendent
Mr. David Bergstrom, Superintendent
Mr. Brian Whitlark, USGA**



INTRODUCTION

The following report summarizes the discussions and recommendations made during the Turf Advisory Service visit on July 8, 2010.

It was a pleasure to return to the Golf Courses of Sun City Grand and discuss golf course maintenance issues on behalf of the USGA Green Section. It was great to tour the golf courses and see the continued progress and success of the plan implemented less than two years ago. The agronomic plan and resulting success on these four golf courses is the envy of many courses in the region. The entire agronomic team, club officials and the board should be commended for their willingness to accept and incorporate this aggressive strategy and for their commitment to implement a new agronomic plan. The challenge moving forward will be to continue to build on the positive momentum the club has enjoyed and make minor adjustments and modifications for further improvement.

The focus of the visit was to review the progress of the agronomic plan and evaluate overall course conditions. Specific topics covered in this report include:

1. Strategies to offer year-round quality playing conditions
2. Bunkers
3. Putting green management programs
4. Nutsedge control
5. Irrigation adjustments

Please contact our staff if you should have any questions concerning this report, or if we can contribute in other ways to your turf management operations.

1. STRATEGIES TO OFFER YEAR-ROUND QUALITY PLAYING CONDITIONS

A look back at 2008 and 2009 - Changes to the agronomic plan were implemented in the fall of 2008, less than two years ago. The progress made since that first visit is remarkable. In fall of 2008, it was reasonable to expect two to three acres of sod would be needed *per course* following chemical removal of the ryegrass in summer 2009. However, it was reported that only two acres of sod was needed for all four courses, in spite of a cool June last year.



No. 8 Cimarron (August 2008)



No. 8 Cimarron (July 2009)



No. 8 Cimarron (July 2010)

Despite poor bermudagrass growing weather, the agronomic staff continues to produce turfgrass conditions that exceed expectations through employing the agronomic plan laid out in 2008.

2010 and beyond - The agronomic staff continues to implement the agronomic plan in 2009 and 2010, with only a slight modification, in that the topdressing sand was applied in the spring only, at a rate of 35 tons per acre. The spring fairway topdressing is the most important application to expedite bermudagrass recovery, and this approach should be continued in future years. Although the weather conditions were very pleasant for golfers this spring, it was probably the worst growing weather for bermudagrass in the past 20 years in the desert southwest. In spite of the poor growing weather, it is remarkable to see that only $\frac{1}{2}$ to $\frac{3}{4}$ acres of sod for all four courses will be laid this year. Please see the discussion below, that offers guidelines related to the impact that soil temperatures and overnight low temperatures have on spring bermudagrass recovery.

Transition following a cool spring - Although the cool spring has been wonderful golf playing weather, it is not conducive for bermudagrass growth. The average temperature for May 2010 in Phoenix, Arizona was a chilly 75.1° F., compared to May 2009 at 84.6° F. At a recent seminar on transition, Dr. Leah Brilman, noted that turf managers may employ many strategies to expedite bermudagrass transition, but the number one factor influencing bermudagrass growth and recovery is the weather! Before you pull the trigger on that chemical application to remove the overseeded turf, consider the following points:

- Bermudagrass growth and recovery is more likely in the following conditions:
 - When the low air temperature is greater than 60° F. for five consecutive nights.
 - When soil temperatures, collected at the 4-inch depth at 11 a.m. exceed 65° F.
 - In the absence of a good soil thermometer, a good rule of thumb (offered by Dr. David Kopec) is to add the high and low temperature for the day and divide by two, which is often very close to the soil temperature.
 - Soil temperatures in the higher cut, roughs, will often be substantially cooler than lower cut areas, and further strengthens the argument to lower rough mowing heights in the spring.
- Consider delaying the chemical removal of your overseeded grass for several weeks. Larry Stowell, from PACE Turf recommends spraying when the average air temperature reaches 65° F. and/or soil temperatures reach 70° F. or higher at the 6-inch depth.
- In southern Arizona and Palm Springs, the optimal time to spray out this season may be mid to late June. In southern Nevada, it may be late June to early July.
- A later spray date allows for lower chemical rates while still offering complete removal of the overseed. A spray too early requires a full rate, which may delay bermudagrass recovery.

- Don't be shy with nitrogen. Soluble nitrogen this time of year stresses the overseeded grass and will expedite bermudagrass recovery.

This year, more than any other, will NOT likely offer a seamless transition. You must nurture the relationships you have with the pro shop staff, general manager, board members, and golfers and educate them on why this transition may be poor, even though you employed all the right management strategies.

Mowing height affects transition – The higher height of cut in the rough areas on the golf course shade the bermudagrass and effectively cool soil temperatures. As such, if overseeding is continued in the roughs, club officials and residents should always expect to see some bare areas and poor turf following removal of the overseeded ryegrass.



Although bermudagrass density has improved in the overseeded rough areas, the higher height of cut results in cooler soil temperatures and shaded bermudagrass. As such, club officials and residents should always expect to see some bare areas and poor bermudagrass density during transition time as long as the roughs are overseeded.

2. BUNKERS

The sand in the bunkers on all four courses has been contaminated over time with organic matter, silt and clay, and rocks. The useful life expectancy of sand in bunkers built with liners and drainage typically ranges between seven to ten years. Sand in the bunkers such as these at Sun City Grand, lacking liners and drainage, should be

expected to last three to eight years. Clearly, the bunker sand is well past its useful life and needs to be replaced. The agronomic staff reported drainage in the bunkers is good and as such, it may not be necessary to install internal drainage. It is thought that much of the contamination comes from the steep slopes on the bunker faces. In order to address this issue, you may consider conducting a trial bunker, or even several bunkers, in the following fashion:

- Remove all existing sand to the subgrade.
- The existing sand can be sieved to remove pebbles and rocks, and used for topdressing strategic areas on the golf course.
- The subgrade should be inspected to ensure the slope will accommodate 2 to 3 inches of sand on the steep faces and 4 to 6 inches of sand on the bottom of the bunkers (slopes that are too steep or inconsistent slope on the subgrade should be remedied at this time).
- In some cases, the lip of greenside bunkers may need to be lowered to reconstruct the bunker to its original design.
- To address the contamination issue on the steep faces, you may consider one of the following solutions to line these areas of the bunker:

Klingstone® Bunker Liners
Klingstone Golf
Bob McCormick, General Manager
(704) 575-1920
bobm@klingstone.com
<http://klingstone.com>

StaLok® Bunker Liners
Stabilizer Solutions
Jim Hubbs, Vice President
(602)225-5900
www.stabilizersolutions.com

Soiltac® Bunker Stabilizers
Soilworks, LLC
(800) 545-5420
(480) 545-5454
<http://www.soiltac.com>

Bunker sand selection and testing - While playing quality of sand is a subjective matter for golfers, the following criteria should be used to evaluate the long-term performance and playing quality of the potential bunker sands:

- ✓ Sand particle size and physical characteristics
- ✓ Availability from local or regional suppliers
- ✓ Price
- ✓ Color

You may choose to incorporate three or four bunker sands that for evaluation. Give the golfers the opportunity to choose whichever sand they prefer once the agronomic staff is comfortable with all of the potential choices. For your reference, several articles on choosing bunker sand have been included with this report.



Over time, the bunker sand on all four courses has become contaminated with organic matter, silt and clay, and rocks from the steep slopes on bunker faces. The sand is well past its useful life and should be replaced with quality bunker sand.

3. PUTTING GREEN MANAGEMENT PROGRAMS

In general, the putting greens were in good shape on the day of the visit. However, a closer inspection of the subsurface conditions reveals organic matter in the top 2 to 3 inches on all four courses, is pushing the upper limits of the high range. In addition, the soil characteristics of the Granite Falls North and South greens are less than ideal and will require special attention to improve conditions.

Organic matter reduction – The current core removal program for the four courses at Sun City Grand employs two cultivation events with ½-inch diameter tines and two events with ⅜-inch diameter tines, with various spacing. Although the number of core cultivation events is more aggressive than most, the amount of surface area affected may only be 8% to 12% on an annual basis. In other words, about 90% of the greens surface remains unaffected by core aeration each year.

Given the increasing organic matter levels in the top 4 inches, it is suggested to modify the current core cultivation program to reach a goal of 25% surface area removal. There are a variety of ways to achieve the 25% goal, but in general, it is suggested to use ½-inch or ⅝-inch diameter tines to accommodate a greater quantity of sand in the voids, and to use a tighter spacing (1½-inch x 2-inch) for each aeration event. It is also important to consider the depth of penetration of the aeration tines. It appears that the majority of organic matter and accumulation of fine material occurs in the top 4 inches of soil. As such, you may consider utilizing 5-inch aeration tines to completely impact the first 4 inches beneath the surface.

Granite Falls North/South greens – Following a close review of the physical soil tests, it is clear the Granite Falls North and South greens contain more fine material, including silt, clay, and fine and very fine sand, when compared to the Cimarron and Desert Springs greens. It appears that the topdressing sand used on the Granite Falls courses contained fine material at some point in time. As a result, the percentage of pore space that drains freely after soil drying (non-capillary porosity) is low at only 13% in green No. 1, and only 11% in green No. 10 on the Granite Falls North course. The non-capillary porosity on the Granite Falls South course is low, as well, at only 12%. Furthermore, the percentage of pores that do not drain freely with gravity, also known as capillary porosity, or water-filled pores is high in the Granite Falls North and South greens, with values at 30% or greater. As a guideline, the non-capillary pore space should range between 15% to 30%, and the capillary pore space should range between 15% and 25%. Given this information, the following strategies are offered to improve water movement through the Granite Falls North and South greens:

- In addition to the core aeration process already described, it is suggested to incorporate solid, deep tine aeration in conjunction with the core aeration events. Following a recent discussion with Mr. Bergstrom, it was good to hear he has already incorporated this process with a Soil Reliever[®] two to three times per season. Although the amount of area affected with this strategy is minimal, the deep channels will substantially improve water infiltration over time.

- Mr. Bergstrom noted that upon removing cores from the greens, they were discarded rather than simply dragged into the greens. Considering the high percentage of fine material in the top four inches, I fully support this operation.
- In addition to the more aggressive practices already outlined, you may consider venting the greens on a weekly to biweekly basis. A mechanical sand rake equipped with a spiking device or a greens roller equipped with spikes can be effective in venting greens. A more effective tool is to use the walk-behind greens aerifiers equipped with solid bayonet tines. Another alternative that is gaining momentum is the PlanetAir[®] machine that easily penetrates 3 to 4 inches into the soil, is minimally disruptive, and is fast enough to work ahead of the greens mowers in the morning routine.



Organic matter in all four golf courses has increased to levels beyond what would be considered ideal for putting greens. Slight modifications to the current core aeration program to decrease organic matter and maintain acceptable putting surfaces are outlined in this report.

4. NUTSEDGE CONTROL

Step One: Weed Hoe[®]

- Rate is 2 ozs/1000 sq. ft.
- 87 oz/acre
- 0.68 gal/acre
- May through June Applications (safe on rye)
(Note: SedgeHammer[®] is also safe on rye)
- Apply minimum 2 times at 4 week intervals (maximum of 4 times)
- If weed control is unsatisfactory, you may need to apply at shorter intervals (2 to 3 weeks)
- About \$18/acre

Step Two: Certainty[®] Turf Herbicide

- 1.25 ozs/A
- July and August applications
- Go at high rate to help avoid resistance.
- Two (2) applications
(Note: Total amount of Certainty[®] limited to 2.65 lbs product/acre/year)
- About \$87/A
- Apply one month after last WeedHoe[®] application
- Should apply last application in August or September

5. IRRIGATION ADJUSTMENTS

The irrigation system is the lifeblood of a golf course. Although it is a costly component, it is one of the most important for maintaining good, consistent playing conditions throughout the year. This is true for most golf courses in the United States but is particularly important for golf courses in the southwest region. Included with this report are several reprints on how to evaluate golf course irrigation systems, but several important factors to keep in mind include uniformity, efficiency, reliability, and control.

Reliability - Normal wear-and-tear takes its toll on irrigation pipes and joints. The typical life expectancy of a golf course irrigation system is twenty years. The system becomes weaker each year and blowouts occur more frequently. Irrigation breaks are troublesome in that golf course maintenance falls behind as staff members are required to repair the damage. Routine irrigation repair requires an increase in labor so that golf course maintenance does not diminish. Irrigation breaks can also be agronomically costly, depending on the severity of the blowout. Some irrigation breaks occur as small leaks that create soggy conditions for long periods, until the break is located. Large breaks, however, can cause extensive damage to the surrounding area.

Efficiency/uniformity - Irrigation uniformity is one of the most important factors for evaluating an irrigation system. Excessively wet or dry areas can occur throughout the golf course due to improper head spacing, pipe sizes, and pressure. This is particularly evident on the Cimarron golf course. Improved irrigation systems utilize proper pumps, larger pipes and an increased number of heads to optimize irrigation control. Irrigation designs are also improved with newer systems. For example, new designs and construction methods optimize sprinkler spacing and often result in irrigation uniformity values in excess of 80%.

Irrigation consultant - It is recommended to have the irrigation system evaluated by a qualified irrigation consultant. These individuals specialize in irrigation technology and provide efficient systems based upon the needs of the club. Because they are independent of any certain manufacturer, irrigation consultants provide clubs with *needed* upgrades. Irrigation consultants are generally involved with every aspect of a renovation project from initial site analysis, to bidding and final construction. This ensures that highest quality is given to such an important project. It was mentioned that Harvey Mills Design has been contacted to evaluate the irrigation system and I feel this should provide the club with an excellent resource.

Trial hole on Cimarron - One idea discussed was to closely evaluate the irrigation performance on the No. 8 hole on the Cimarron golf course. We discussed using a Dickson Meter™ to evaluate and record pressure during evening irrigation, and installing Full Coverage Irrigation™ (FCI) upgraded nozzles in all full-circle irrigation heads. Another change will involve earmarking each sprinkler with individual satellite control, rather than dual heads per station, which will offer improved water management flexibility. Furthermore, Mr. Krause noted an irrigation audit was completed on this hole and he is waiting on the results. You may wish to complete a second irrigation audit, or preferably, multiple audits, once the changes have been made. Working with area superintendents who have completed similar analyses and made the appropriate changes, they have noted improvements within as little as several weeks but will more likely take several months.

CONCLUSION

Thank you for a most enjoyable visit and the opportunity to discuss golf course maintenance issues. I continue to be impressed with the remarkable recovery these golf courses have seen in the past two years. The agronomic plan that the staff at the Sun City Grand Golf courses has employed serves as a fine example for others to follow. Moving forward, the key issues that need to be addressed are sand replacement in the bunkers and a slightly modified core aeration program for putting greens. I trust the suggestions and recommendations contained in this report will assist your efforts to fine-tune programs and steadily improve overall course conditions. Best wishes for continued progress over the remaining summer months, and I look forward to being of further assistance on behalf of the USGA Green Section.

Respectfully submitted,



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USGA Green Section

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Distribution:

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Reprints:

- Calculating Bunker Volume
- How to Select the Best Sand for Your Bunkers
- Physical Analysis of Sands for Golf Course Bunker Use
- If it were only as simple as a walk on the beach
- Does Your Irrigation System Make the Grade?
- Having Your Morning Coffee Without Donuts