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ANSWERS FOR EFFLUENT WATER CHALLENGES

There's no question that high-quality water is becoming limited and turf professionals throughout the country are seeking alternative sources.

Experts say sewage effluent – the wastewater from sewage treatment facilities – is probably the most available alternate source of irrigation water for turf. This trend began more than 30 years ago in the arid regions of the Southwest. In recent years it's become increasingly popular in humid regions as well, as older treatment facilities have been upgraded and now produce a very high-quality effluent.

When looking for alternative water sources, our main challenges are water-quality problems caused by soluble salts, which – by the way – can occur in nearly any region of the world. Increasing numbers of golf courses and commercial sites are being encouraged to use alternate water sources potentially high in saline, like recycled municipal water, for irrigation. Through this span of use, we're seeing the effects of excess soluble salts on turfgrass plantings in a wide range of climates.

Water analysis and periodic monitoring have become necessary parameters for sound irrigation management. *Before a superintendent commits to using any alternative water source for irrigating turf, he should conduct a sodium adsorption ratio (SAR) test to estimate the source's sodium hazard.*

Researchers believe a standard water report for commercial applications provides numerous data, some of which has little bearing for turfgrass irrigation. Therefore, any test should be performed by a qualified laboratory that understands turf applications. Most experts agree the most important parameters for turfgrass management are:

- Total concentration of soluble salts (salinity);
- Sodium (Na) content;
- Relative proportion of sodium to calcium (Ca) and magnesium (Mg) (Sodium Adsorption Ratio or SAR);
- Chloride (Cl), boron (B), bicarbonate (HCO3), and carbonate (CO3) content;
- And pH.

Other parameters you're likely to find and should review in a water test report are nutrient content – nitrogen (N), phosphorus (P) and potassium (K) – chlorine content and suspended solids.

Once you know the results, you can develop a plan of action. I highly recommend every golf facility use the talents of a professional agronomist to interpret the alternative water source's effects on soils. A proper agronomic program renders most water sources adaptable for turfgrass irrigation.

After a comprehensive plan is in place with your agronomist, potential remedies for poor irrigation water quality are many and may include any of the following:

- **Sulfuric acid** is commonly used to reduce carbonates and bicarbonates by converting them to a gas and literally "fizzing" them away. The remaining sulfur then converts the sodium to sodium sulfate, similar to gypsum. Sulfuric acid, however, is expensive and can be dangerous to handle. It also may deteriorate any metal or cement that it contacts within the irrigation distribution system. There is a risk of property damage and personal injury.
- **Sulfur burners** are an alternative to sulfuric acid. Sulfur burners heat soil sulfur to create sulfurous acid, which "fizzes off" bicarbonates, similar to what sulfuric acid does. Sulfur burners are safer to operate, but still can harm metal and cement piping. The crudeness of the equipment can lead to over acidification of the irrigation source. They also can be unsightly out on the golf course, require manual storage and reloading of bagged sulfur and may emit a burnt sulfur smell when operating.
- **Urea-sulfuric acid** is an alternative to sulfuric acid that uses urea as a buffer, making it easier to handle. Urea-sulfuric acid will contain high amounts of nitrogen in addition to sulfuric acid. This ratio can result in the over application of nitrogen while trying to supply the needed acidity.
- **Liquid calcium** is another option. The two most common forms are calcium polysulfide and calcium chloride. Liquid calcium is very expensive when comparing the cost-per-unit of calcium to solution-grade gypsum. With "liquid calcium," you must pay for a prepared liquid solution comprised mostly of water. Calcium polysulfide also emits a strong sulfur odor and can add a yellow tint to the irrigation water. Calcium chloride adds additional chloride to the effluent water, which is typically already high in chloride and does not create all the benefits that calcium sulfate does.
- **Nutrient injectors** can be used to add solution-grade gypsum, as well as other water management tools, such as wetting agents and micro and macro nutrients.
- **Non-corrosive sprayable acids** have been developed to allow targeted applications of acidity. This technology enables the user to treat potential trouble areas, such as greens, individually without any concern for nitrogen or sulfur excesses. One company has developed the technology even further by incorporating the safe acid onto a dry particle.

With such a wide variety of tools available, it's crucial that the turfgrass manager learn and understand the pros and cons of each. In addition, the superintendent may need to review all cultural practices to ensure a cohesive soil/water management plan is in place. Water reports are the equivalent of getting blood work from your physician; it's an important component to the overall health of your site. Remember, however, that water treatment is only a part of a solid, comprehensive water management plan. **GCI**