MRTF GREEN AWARDS

Midwest Regional Turf Foundation

ENVIRONMENTAL STEWARDSHIP SUSTAINS THE TURF INDUSTRY

# Victoria National Golf Club

2000 Victoria National Boulevard

Newburgh, IN. 47630

(812) 858-8230

**Nominee Name**: Phillip Fischer

**Golf Course Category**: Private Membership

**Describe any outstanding environmental issues your course has implemented?**

In order to fully understand the beauty of the game of golf, individuals must first understand the symbiotic relationship between golf courses and their surrounding environment. Victoria National's turf crew is responsible for managing the golf course and its surrounding environment in an environmentally friendly manner to provide a world class golfing experience. Several practices to counteract the environmental issues faced have been implemented. Steps include the creation of a "Conservation Area Easement" for preservation of the golf course and surrounding land in the future and the introduction of new and innovate ways of managing naturalized areas throughout the grounds. Also included is the conversion and reduction of high input grasses to less demanding, hardier, grass types and varieties.

In a partnership with the North American Land Trust (NALT), Victoria National established a "Conservation Area" easement in May 2011. This easement prohibits the further development of this land for use as anything other than for golf course use. NALT is required for approval prior to exercising any reserved right, or undertaking any project on the conservation area which may affect the conservation values or purposes. In addition to the golf course, nearly 100 acres of surrounding environmentally sensitive lowlands and woodlands has also been included. Paperwork for an additional 200 acres to be added to the conservation area is currently under review.

To be granted a NALT Conservation Area, a team of conservation biologists must complete a baseline survey of the property. Reports include plant, bird, and wildlife species observed, site description and habitats found, and recommendation for future management of the area. Our baseline survey indicated species with special status in the state of Indiana found: northern catalpa (special concern), green hawthorn (threatened), and overcup oak (watch list), and male and female bobcats (special concern). Recommendations included special care to preserve the swamp forest and hardwood bottomlands on site, and continued management of naturalized areas through trimming and prescribed burning.

Victoria National defines "naturalized" areas as areas of grassy vegetation that surround the rough, but inside and not consisting of the woodlands. Ideal naturalized areas would consist of low input native grasses growing to heights between 1-3 feet tall. Ideally grass species would consist of fescues, bromes, and other species that are still playable when grown tall yet give a soothing, pasture like appearance outlining the golf hole. Plant species found in these areas consist of perennial and annual grasses, sedges, broadleaf plants, small shrubs, and young saplings. These areas must be maintained to provide the aesthetics and playability that the golf course architects had hoped for. Without maintenance, the desired grassy vegetation would become overgrown with invasive shrubs, vines, and small trees. Due to the topography of many of the naturalized areas, innovative maintenance practices have been adapted.

Naturalized areas bordering tee surrounds, fairway landing zones, and green surrounds are maintained to be a purer stand of grassy vegetation for playability reasons. Currently, no naturalized areas are either irrigated or fertilized. Minimum pre and post emergent herbicides are used to control broadleaf weed population and noxious turf weeds (goosegrass, crabgrass, johnsongrass, etc.) in these areas.

To prevent overgrowth, each year areas are either cut or burned. Burning of native grasses has been strongly encouraged be NALT, and areas are burned once every three years rather than using traditional cutting. Burning allows many of the plant species found throughout this area to undergo its natural lifecycle, and can be used on steep hillsides inaccessible to tractors. If not burned, areas are trimmed at least once a year utilizing tractors with bush-hogs or by hand. In recent years, a strong push has been brought to bring back many "naturalized" areas that were considered out of play and not maintained. Removal of invasive trees such as cottonwoods, Japanese honeysuckle, and autumn olives, and the planting of native grasses have strongly encouraged this. NALT suggest that these "naturalized" areas and their reconstruction are the reason for an increase in ground nesting birds such as Quail and Northern Bobwhites, an increase in food sources for many songbirds, and habitats for many amphibians, and small mammals.

In addition, Victoria National has reduced its maintained turf area and converted high input turf species to lower input species where possible. To date the following reductions and conversions have taken place:

- 4 acres of Bentgrass fairways converted to Rhizomatous Tall Fescue rough
- An acre of Bentgrass converted to Zoysiagrass for testing and trials on driving range tee
- 5 acre of Bluegrass/Fescue no longer maintained as rough and allowed to grow up as "naturalized" native area.
- Average of 3 acres a year of struggling Kentucky Bluegrass converted to Rhizomatous Tall Fescue

Hardier grass species planted in these areas require fewer inputs, saving on labor, irrigation, fertilizers, and pesticides use.

**Describe your facility: acreage, topography, course design, surrounding properties?**

Victoria National Golf Club is a private, member's only club dedicated to the spirit and camaraderie of golf in its purest form. Masterfully set among 418 acres of reclaimed mining land, the Tom Fazio golf course embraces the dramatic landscape, native vegetation and deep, spring-fed lakes of this naturally restored land. Consistently ranked among the top golf courses in America, Victoria National delivers incredible golfing experiences with the character, charm, and hospitality of Southern Indiana.

Prior to becoming a nationally recognized golf course, land previously was mined by the Peabody Coal Company from 1954-1968. Mined prior to the Surface Mining Control and Reclamation Act of 1977, land was not reclaimed immediately post mining, leaving a dramatic landscape. Post mining topography left scared land with several deep cavernous lakes, meandering pits, and rolling

mounds of piled soil. Following mining operations, land was left remote and undeveloped primarily used for hunting, fishing, and other recreational outdoor activities.

Terry Friedman purchased the land in the early 1990's with the vision of bringing a world class golfing facility to Southern Indiana. It was Friedman's dream to develop a golf only club for the purest of golfers, receive rave reviews upon opening, and to host a major golf competition. To aid in Friedman's pursuit, renowned golf course architect Tom Fazio was contracted to route and design a golf course through this remote piece of property. Upon walking the land, Fazio famously remarked, "I see a hundred great golf holes here, my challenge is to pick the best 18". Fazio and Friedman's design utilized the lay of the land left from the property's mining operation, resulting in limited excavation creating a "rough around the edges" style golf course.

As Friedman had wished, the golf course opened to rave reviews. In 1999 it was voted by Golf Digest, "Best New Private Golf Course." Currently the course is rated "Best in State" and now ranks #47 in "America's 100 Greatest Golf Courses." Though the golf course is yet to host a major golf tournament, it has played host to the United Leasing Championship on the Web.com Tour and the 2006 USGA Senior Amateur. The past two years, the United Leasing's Championships has been contested in the heart of the Southern Indiana summer heat, and still the tournament has received stellar reviews by golfers and officials for the design and conditioning of the course. Planning is currently underway to attract even higher levels of competitive golf to Victoria National and the surrounding community.

Unique to Victoria National is the vast acreage the golf course resides over, 465 total acres. Friedman understood that to attract the world's best golfers you must give them the world's best conditioning. L-93 Bentgrass was chosen for its aggressive, upright growth pattern, winter hardiness, dark color, adaptability to multiple mowing heights, and disease resistance. Golf Course acreage is as follows:

- Greens- 4 acres of L-93 Bentgrass
- Tees -3.5 acres of L-93 Bentgrass
- Fairways- 32 acres of L-93 Bentgrass
- Practice facility and nursery- 6.5 acres of Bentgrass plus an acre of Zoysiagrass
- Rough- 70 acres of Kentucky Bluegrass rough
- Lakes- 70 acres of spring fed lakes
- 200 acres of naturalized grassy areas and or woodlands

Attached to the golf course is another 400 acres of undeveloped woodlands and lakes mine spoils maintained by the turf crew for hunting, fishing, and recreational activities.

Advertised as "America's Private Retreat," Victoria National offers members and guest a retreat from the hustle and bustle of daily life. The course is located 20 miles east of downtown Evansville, and 5 miles northeast of Newburgh Indiana. Opening in 1998, residential development of surrounding land was limited, but expansion of both Evansville and Newburgh has seen development to the north and west of the golf course rise. Lots have been developed on the thoroughfare entering club grounds, but minimal developments can be seen from anywhere on the golf course. The southern border consist of farmland with several small business spread throughout. The west and northwest of the golf course is

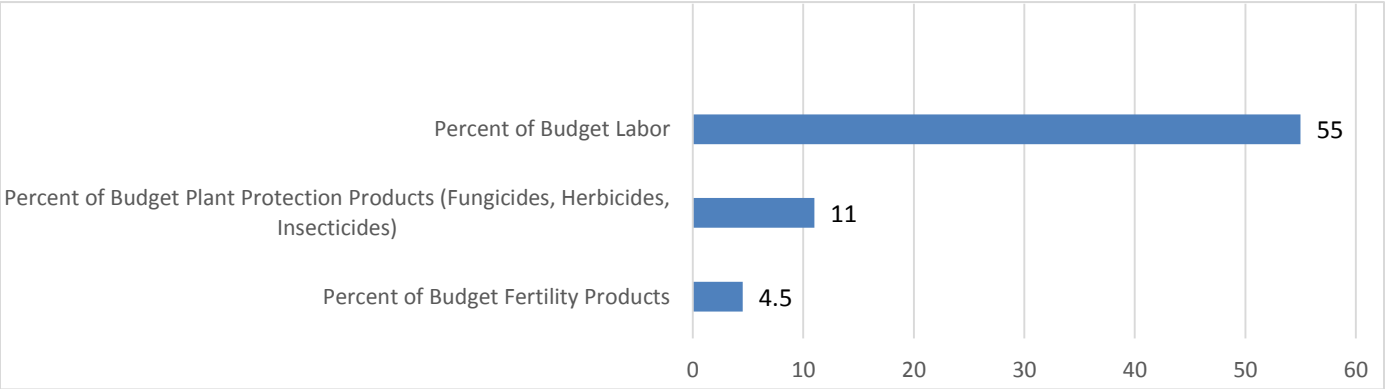
surrounded in overgrown mine lands including many lakes and dense woodlands areas with limited residential structures.

In addition to great golf, Victoria National offers 5-star luxury accommodations in our cottages to members and their guest. 24 private suites provide the capacity to sleep 32 guests on site. The cottage program has been a huge success ushering in golfers and businesses from around the country.

**10 photos max of your facility: acreage, topography, course design, surrounding properties:**

**Operation Budget:** $

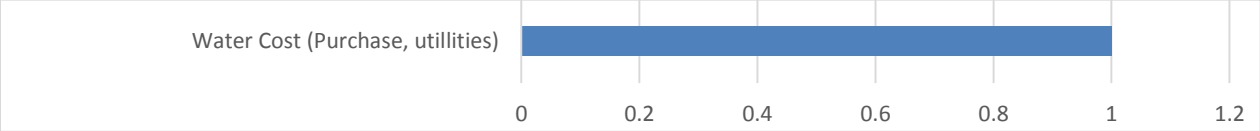
**Percent Budget:**




**Turf Type**
**Greens:** L-93 Bentgrass
**Tees:** L-93 Bentgrass
**Fairways:** L-93 Bentgrass
**Maintained Rough Areas:** Kentucky Bluegrass and Turf Type Tall Fescue
**Unmaintained Rough Areas:** Mixture of annual and perennial grass and broadleaf plants.
**Acres of Turf**

**Greens:** 4
**Tees:** 3.5
**Fairways:** 38.5
**Maintained Rough Areas:** 70
**Unmaintained Rough Areas:** 200

**Percent of Budget**




**Water used during seasons (gallons) – average over last three years: 26 million gallons**
**Water Source:** Lake
**Water Metered:** No
**Water usage reported annually to state:** No

**Describe and show protection procedures for water supplies and water sources (1000 words):**

Fresh water is a valuable natural resource abundantly available to Victoria National thanks to over 70 acres worth of spring fed lakes. Water sources not only create aesthetically pleasing views and challenging shot selections on 15 of 18 holes, they also act as a plentiful irrigation source and are used for recreational activities such as fishing. Previous efforts to protect these areas have been documented in certification as an Audubon Cooperative Sanctuary Program for Golf by Audubon International and as a Ground Water Guardian Green Site by the Groundwater Foundation. The lakes of Victoria National are an essential piece to the "Victoria National Experience" that members and guest cherish.

Since lake water leaves the property of Victoria National, protecting and preserving all of our water sources is essential. Spill ways enter into nearby Cypress Creek, which meanders 10 miles into the Ohio River. Recent actions taken to protect water supplies and sources include:

- Elimination of erosion problems
- Restoration of riparian habitats
- Limiting and properly applying plant protection products around water sources
- Water sampling and testing procedures
- Creation of spill prevention plans

These actions insure that Victoria National reduces any risk of possibly harming local water supplies and sources.

From its opening, this Tom Fazio design featured a beautiful and challenging 18th hole. The tricky par 4 featured a 432 yd. elevated tee shot into a hard dogleg right with water running along the entire right side. Erosion of the lake edge had become a growing environmental concern and aesthetically unpleasing. In 2010, the turf crew, with the guidance of a local architect and equipment operator, undertook the project of constructing a 250 yard retaining wall to hinder further erosion. Using rocks found on site, crushed stone, and erosion control fabric, a properly constructed retaining wall was finished prior to the 2011 season. A major soil erosion problem was been eliminated while creating a picturesque conclusion to an amazing round of golf.

In addition, to the 18th, several steep sloped greens banks were starting to erode inward as well. Over 100 feet of greens banks were reinforced to eliminate the possibility of a major section of green eroding into a water source. Through proper planning, Victoria National was able to eliminate an environmental concern while improving the golf course.

A major push has been made to increase riparian habitat while reducing maintained turf that borders water sources. Riparian habitat is the wildlife habitat found along the banks of rivers, streams, lakes, and other bodies of water. Riparian habitat enhances food and shelter for many species of birds, small mammals, and amphibians. Areas with maintained turf bordering water sources were examined for ways to reduce maintenance without changing course playability. Over 1,200 yards maintained turf was allowed to grow up as naturalized area and is maintained similar to naturalized area found elsewhere. These naturalized areas vary in sizes, but typically buffer water sources by 15-30 feet.

Post implementation of riparian habitat, only 200 yards of maintained turf bordering water sources existed. These areas are maintained differently from the perspective of fertilizer and chemical application. No Spray/No Spread Buffer Zones were established in these areas to protect water sources. Buffer zones of at least 15' were documented and communicated with applicators. Plant protection products requiring larger buffer zones are closely monitored for and applied accordingly to the label. The objective is to create healthy turf with strong roots for increased filtration and buffering potential prior to entering water sources.

Similar to soil tests, water analysis are performed on a yearly basis by an independent lab testing water pH, alkalinity, bicarbonates, and more. Water testing began in 2009 giving the club a baseline for any changes that may occur. No major changes in water quality have been observed yet, but we will continue to monitor. In addition to our own water sampling, a survey conducted by Indiana University Students in conjunction with the Environmental Protection Agency that monitored local water quality reassured us that the lakes of Victoria National are filled with uncontaminated high quality water.

A "Spill Prevention Plan" was written based off EPA guidelines to protect against possible spills and protect employees and the environment if a spill were to occur. The plan was written and orally communicated to all employees responsible for the handling of potential hazardous materials. The plan includes evaluation of potential hazardous sites such as mix areas, chemical storage units, fuel filling stations, details to prevent spills, and protocol if a spill occurred. If a hazardous spill were to occur, agencies contact info is included with maps showing flow of surface water and drainage to prevent contamination.

It is not difficult to realize the importance water plays in making Victoria National both aesthetically beautiful and physically challenging. The lakes, and the water in them, are the lifeblood of the golf course. Preservation and protection are paramount not only to the health of the golf course, but also for the use of other recreational activities. Without the lakes, the grander of the "Victoria National Experience" would not be possible.

**10 photos max of your water supplies and water sources:**


2006 USGA Senior Amateur Championship
Victoria National Golf Club, Newburgh, Indiana · September 16-21, 2006
Conducted by the United States Golf Association.
COURSE EVACUATION MAP
Hole 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Tee CH CH B D D D E E CH CH CH F G H I I J CH
Fairway CH A C D B E CH CH G G H I CH CH
Green CH B C D D B E A CH CH F G H H I I CH CH
CONCESSIONS
SHORT GAME AREA
CART STAGING TENT
PRACTICE RANGE
SHUTTLE BUS PICK-UP/DROP-OFF
HOSPITALITY TENT
CLUBHOUSE
COTTAGES
Cart Path

**Describe and show your plant protection application equipment, mix and fill facilities, wash and clean procedures, and rinsate disposal (1000 words):**

At Victoria National great attention is paid to application equipment and proper application technique to ensure that all pesticides, fertilizers, and other plant protection products are applied uniformly and safely. All applications are overseen by one of three commercially licensed applicators by the Indiana State Chemist Office. A written "Spill Prevention Plan" based on EPA guidelines has been posted and communicated with all technicians in areas housing potentially hazardous materials.

Application sheets are developed by the Superintendent based off a written integrated pest management plan and local conditions. Application sheets inform application technicians of area to be treated, products to be used and rates, equipment, nozzle selection, carrier amount, and total tank amount.

Application equipment is chosen based on efficiency and accuracy. Application equipment includes:

- Two 300 gallon riding 21' boom sprayers featuring a centrifugal pump
- A 160 gallon 18' boom sprayer featuring a diaphragm pump.
- A 300 and 350 gallon pull behind tank featuring a diaphragm pump with hose and 6' spray hawk boom
- A 25 gallon electric sprayer with wand
- Five 4 gallon backpack sprayers and assortment of hand pumped sprayers
- 80 gallon riding pendulum action broadcast spreader
- Four push broadcast spreaders

All tanks over 300 gallons are equipped with a 200+ foot hose with either a sprayhawk or handgun attachment option.

To maximize products target effectiveness and reduce drift potential, a wide selection of nozzles is available. Nozzles are selected on the basis of droplet size, pressure, wind condition, plant protection products being applied, carrier needs, and equipment. To ensure proper functioning of equipment and nozzles, equipment is calibrated and examined for proper output and nozzle patterns prior to each application.

All mixing and filling procedures take place inside the Chemical Room. Housed in this facility is a custom mix unit, plant protection products other than granular fertilizer, equipment and nozzle storage, personal protection equipment (PPE), and other accessories. The Chemical Room is a secured room featuring impermeable concrete surface floor with three self contained drainage basins. Unique to Victoria National is the use of their custom mix unit. This unit was developed for Victoria National and allows for safe mix-up and transfer of products to application equipment. Using a computer generated program, technicians inform the unit of the given application. It is connected to a water line, and fitted with a 70 gallon mix tank with low pressure high volume agitation for the mixing of products and water into slurry. The tank is fitted with a scale which is used to measure amounts of water and product added. In addition, a rinsate spigot allows for rinsing of containers during the mixing procedure. The

computer screen displays how much of a product to add and even informs the technician when a given amount of product has been added by utilizing the scale. Pumps are available as well to pump products directly from hold containers into the mix unit. The preciseness of the scale eliminates measuring out products in containers, eliminating another step of exposure to technicians and possible spills.

The concentrated mix slurry is pumped into the designated application equipment inside the Chemical Room. Rinse water is run through the unit until it is thoroughly cleaned and emptied into equipment. The computer is able to tell technicians precisely amount of water used to make the slurry, water used for rinsate, and fill application equipment precisely to the necessary gallon.

All applications are made under the guidance of the Indiana State Chemist Office protocols. Proper PPE is worn in accordance with the label during all calibrations, mix procedures, applications, and clean up. Jugs used for chemical storage are triple rinsed utilizing the mix units jug rinsate system and properly disposed of by recycling or trash following mixing. Product packages and jugs are properly disposed of rendering materials nonfunctional for alternate uses and recycled if possible. Rinsate from cleaning of jugs is simply emptied into the tank and applied during applications. Rinsate from the catch basin found within the Chemical-Room is diluted with 300 gallons of water and applied across a spray out field.

Immediately following product application, application equipment is carefully cleaned and inspected. Proper calibrations and precise knowledge of square footage, yields little excess products following applications. On the rare instances excess products occurs, products are evaluated for similar areas of applications that may be safely and beneficially applied. Tanks are immediately cleaned using a full tank of rinse water applied in similar fashion that day's application in a spray out field. The spray out fields are two, two acre fields planted in a blend of fescues, bluegrasses, and native grasses growing on soils similar to the golf course. The first rinse tank is followed up with two more rinses of 50 gallons. Following the second rinsate, all filters are cleaned, lines and valves are checked, and the equipment is checked over.

Once tanks are rinsed, the exterior of equipment is then cleaned. Equipment is cleaned on the wash pad using a pressure washer to remove all particles. Cleaning of exterior ensures that all equipment remains safe for following users and keeps equipment looking new. Clean equipment allows for quicker detection of possible leaking or nonfunctioning parts. Upon final cleaning, equipment is once again checked for any problems.

**10 photos max of your plant protection application equipment, mix and fill facilities, wash and clean procedures, and rinsate disposal:**


PRO GATOR


Kimberly-Clark
KleenGuard
5850401
Kimberly-Clark
KleenGuard
CRAFTSMAN


Fore GOMP
Fore GOMP


689 lb
COMMAND
BREAKERS
MAIN POWER
DISPATCHER


NO SMOKING
EXIT
DANGER
HAZARDOUS MATERIALS
AUTHORIZED PERSONNEL ONLY
PLEASE KEEP DOOR CLOSED


3.0 GAL SS 11010
DUAL NOZZLES
2.5 GAL 11008 VS
SCREENS
AGROTOP TC 11016 1.2
1.2 GAL 11004 VS
GASKETS

Describe your plant protection program, timing, and sample of products used within the guidelines of your program:

Providing members and guests of Victoria National pristine cool-season grass course conditions in Southern Indiana, much attention must be paid to its plant protection program. The foundation for applications of a plant protection product is based on the complex and ever evolving written integrated pest management (IPM) plan. Considering the four steps of IPM, acceptable pest levels are evaluated, preventative cultural practices are incorporated, disease is closely monitored for, and control options are applied if necessary.

Victoria National's IPM plan will differ depending on associated pests and areas affected. However, the same planning, observation, understanding of the pest, evaluation of treatment options, and modifications occur for any pest. We will examine the fungal pathogen *Sclerotinia homeocarpa* (Dollar Spot) for the purpose describing plant protection program, timing, and sample products.

To determine acceptable pest levels, evaluation of the pest, symptoms, and its adverse effect to maintaining playable and healthy stands of turf must be considered. Due to the importance of smooth, aesthetically pleasing, playable putting surfaces, and their importance to club operations, any dollar spot outbreak on greens is unacceptable. Minimal dollar spot may be tolerated in fairways and tees, as long as a massive outbreak is not imminent. Due to the likelihood of bluegrass being capable to withstand and outgrow any outbreak, the rough is never treated for dollar spot.

A thorough understanding of turf and pest life cycles, and optimum growing environments can aid in combating the onset of pest utilizing cultural practices. Victoria National has implemented several cultural practices to ensure dollar spot outbreaks are limited. L-93 bentgrass was selected for its disease tolerance, especially to dollar spot. Maintaining proper nitrogen fertility decreases likelihood of fungal outbreak while insuring plants are equipped to fight infection. Limiting excess leaf wetness is accomplished by removing dew during morning hours to prevent prolonged dew periods and proper irrigation practices. Routine topdressing and aerification are practiced to remove thatch buildup and promote plant health. Relief from excessive morning shade, and stagnate air movement on greens, has been sought by removing many large trees and shrubs surrounding greens. Air circulation has also been increased by the addition of fans to every putting green.

Though cultural practices and preventative plant protection applications are applied for most pests, technician must still be able to identify all pest and related problems. To aid in monitoring for pest activity, Victoria National employees eight full time employees with university degrees in the field of Turf-Science Management, plus five interns working towards turf degrees, and several seasoned veterans capable of identifying many turf related pest issues. Every off season, an ideal pest management plan and calendar for pest is compiled. The plan includes dates to monitor for pests, previous outbreak locations, ideal temperatures for outbreaks, and planned plant protection applications. Monitoring for dollar spot begins when daytime highs approach anywhere between 55-88$^{o}$F from mid-March through mid-November. These dates are only ideal dates, depending on average highs, local weather patterns and growing conditions, monitoring may begin or end before or after given

dates. Historically outbreak prone areas are documented and closely monitored during times of high susceptibility.

In an ideal situation, plant protection products would only be applied as a last resort when a pest or pests has been accurately identified, broken through the allowable threshold, and all preventative cultural practices taken. However, due to enormous pest pressures and player expectations, particular known pest problems must be treated on a preventative basis with plant protection products approach. Ideal plant protection schedules are made out for all applications during winter months to allow for purchasing of products. Scheduling applications allows for with consideration for rotating chemical classes to prevent resistance issues, and prevents over applying chemical against label restrictions. Schedules are made for worst case scenarios. An example would be for greens, beginning in mid-March, applications begin on two week intervals. As the growing season progress, application frequencies are cut from biweekly, to ten day interval, eventually to weekly intervals. However, applications frequencies are based on current growing conditions and can be prolonged as needed.

To minimize resistance risk, chemical classes are rotated throughout the growing season. For example, dollar spot may be treated with up to nine different fungicides from five different classes. Fungicides may be used come from the chemical classes; benzimidazole, carboxamide, dicarboxamide, DMI, and nitrile. Fungicides are selected based on previous effectiveness and current conditions. For example, boscalid, a fungicide belonging to the carboxamide class, may be used in early spring because of its long term effectivenss. However, many DMI class fungicides such as propiconazole are limitedly used during summer heat due towards tendency of leaf tip burn. By rotating chemical classes throughout the growing season, our risk for resistance issues is greatly reduced.

Describe your over-all facility, equipment maintenance area, equipment storage, equipment cleaning, and fuel storage and fill area (1000 words):

Victoria National believes in order for employees to perform at the highest levels, employees must be well equipped. It requires experienced operators and a vast fleet of equipment to ensure Victoria National remains regarded as “Best in State”. If operation, maintenance, cleaning, and storage of equipment are not done in a responsible fashion, an environmental hazard may quickly arise. To ensure Victoria National remains environmentally responsible, standards and guidelines for equipment storage, cleaning, and service have been set.

The maintenance compound consists of a spacious 3.5 acres plot directly southeast of the Golf Course. At the heart of the compound is the maintenance shop. The compound also features a one acre turf nursery, a horticultural nursery, isolated bins for mulch, topdressing sands, bunker sands, pea-gravel, and divot mix, a dry sand silo, and hose racks. The equipment wash station is located directly north of the shop. Equipment is cleaned after every use utilizing heated pressure washer or irrigation spigots. Solid particles are separated from rinse water and allowed to drain into a nearby field. Paved parking for 50 plus employees and nearby fields serves as home for the armada of trucks brought by Golf Channel and Web.com Tour during the United Leasing Championship.

The maintenance shop, a former equipment service building used during the properties coal mining days, has been retrofitted for the Turf Crew. The 15,000 square foot facility includes space for equipment storage and service, offices, dormitories, break and locker rooms, a chemical room, a course accessory room, and a parts room. A majority of the shop is encompassed in three 3500 square foot bays. Two bays are utilized for the storage of equipment and tools, while mechanics use the third bay as a work space. Equipment technicians perform nearly all maintenance and service to equipment in this bay. A parts room is attached to the mechanics bay, housing additional storage of commonly used parts and accessories during equipment maintenance. The offices and meeting area for the Superintendent and his management team were constructed to greet all guests upon arrival. Three dormitories, housing up to eight turf interns, have been installed to attract the best turf interns with free housing. The course accessory room houses all tools and accessories used in daily setup of the golf course. Attached to the back of the shop is the chemical room, housing plant protection products and fertilizers in a secure facility. In 2010, a heated and cooled break room was constructed to provide meeting space for fifty plus employees and a relaxing lunch room facility. Attached to the break room is a locker room and men's and women's restrooms.

The rear of the facility features a secure fenced in .6 acre gravel lot housing the fueling station, a 2,500 square foot lean to pole barn, and a 45 foot enclosed trailer. The lean to pole barn provides covered storage for larger and or rarely used pieces of maintenance equipment such as tractors, mini excavators, skid steers, topdressers, and more. Bulk storage of granular fertilizers and other dry kept goods such as concrete are stored here as well. Seed, Tarps, and liners are stored inside the 45 foot trailer. The fueling station consists of two one thousand gallon above ground lightweight double walled steel tanks, designated separately for diesel and gasoline. Double walled steel tanks provide secondary containment for petroleum products and are clearly visible in the unlikelihood of leakage occurring. Two and a half and five gallon fuel containers are stored next to the tanks in an inflammable storage safety cabinet.

Due to nature of products stored in the parts room, chemical room, and course accessory room, special precautions are taken to ensure environmental hazards due not arise. Spill prevention planning has been established and documented. The parts room stores vehicular products such as new and used motor oil, hydraulic fluids, antifreeze, batteries, and cleaning agents. Utilizing a company specialized in the disposal of these and other products once used, we are able to properly dispose of over 300 gallons of harmful materials. Products awaiting disposal are stored in a secured area in the parts room, in a self-contained plastic catch basin sitting atop and impermeable concrete floor. Through agreements with our local tire dealers, used tires are recycled upon purchase of new tires. A battery leasing company bi weekly restocks new batteries and properly removes and recycles any old batteries. Batteries are also stored in the parts room. The chemical room stores plant protection products along with liquid fertilizers in a secured section of the shop. All products are stored atop impermeable concrete floor with self-containing catch basins. The course accessory room houses cleaning and painting products which are stored atop plastic catch basins to prevent major spill from occurring.

Victoria National is currently in the process of upgrading the equipment washing and fueling area to further promote its environmental stewardship. Plans have been drawn and approved for mthe

use of both city and irrigation water, greatly improved filtration of rinsate, and recycling of water to be used for irrigation and or plant protection applications. Plans for a new fueling station include a self-contained concrete pad for both the tanks to sit on and a place for fueling. The pad would not drain into any nearby areas, but be capable of containing any spills, similarly to the design of gas station fueling areas.

**10 photos max of your facility, equipment maintenance area, equipment storage, equipment cleaning, fuel storage and fill areas:**


DUPONT
BASF
Harrell's
TENBARGE
THANK YOU TO OUR TOURNAMENT SPONSORS
Grassroots
RedoxTURF
ADVANCED
TURF SOLUTIONS


NO
SMOKING


FOR USED
CAUTION
DROP FORKS
BEFORE LIFTING
Precaución
Baje la uñas
para meterlas


Golf Lift
Golf Lift
JACOBSEN


AR 3
JACOBSEN

**Do you have a safety plan:** Yes

**Do you perform routine building and site safety inspections:** Yes

**Do you conduct safety training classes with your staff:** Yes

**How often do you conduct safety training classes with your staff:** Monthly

Describe your efforts to reduce inputs to your facility and things to help with environmental impact of your facility (1000) words:

Through innovations and research, Victoria National has been able to reduce inputs and improve its environmental impact. Throughout this application, we have addressed numerous initiatives and projects that have already reduced our environmental impact or look to do so in the future. Further examples include a major reduction in irrigation usage and the upstart of a recycling program.

Due to cool season grass and demand for pristine playing conditions, average irrigation use at Victoria National is greater than most neighboring courses. Though irrigation use is higher, great lengths are taken to ensure irrigation water is used in the wisest manner with no waste. Utilization of irrigation software and monitoring evapotranspiration rates aid in creating a base irrigation schedule. Daily check of irrigation heads coverage, pattern, and pressure by two dedicated irrigation technicians maximizes irrigation efficiency. During periods of prolonged heat and humidity, precautions are taken to irrigate precisely for optimum plant health. Overhead irrigation is restricted from April through August, except

for flushing and deep watering. Soil moisture is monitored daily throughout the golf course using hand held moisture meters, soil probes, and in ground moisture sensors. Over 100 moisture meter readings are taken from greens each day, and 200 soil probes from tees, fairways, and rough. Moisture readings are recorded, mapped, and communicated to a team of 25 hand waters who irrigate areas only in need of water. Irrigating utilizing only hand waters prevents from over watering while giving sought after playing conditions.

Major improvements in turf quality and reduction of water were noted in 2011, following the installation of an Acid Injections System (AIS). Installation of the AIS has lowered the natural pH of irrigation water from 8.1 to 6.5. Lowering pH prevents the buildup of the invasive Zebra Mussel, which has wreaked havoc on the club's irrigation system. Stuck heads, a result of Zebra Mussel's shell buildup, could waste up to 21,000 gallons a night, or equivalent to 1.5 million gallons per year.

Research from Purdue University and others indicates the optimum plant uptake of nutrients occurs at a soil pH of 7.0. Soil testing and water analysis indicated soils and irrigation with a high pH, while plant tissue analysis indicated limited nutrients. The installation of the AIS has aided in lowering soil pH and making more nutrients available for plant uptake. Considerably denser, stronger rooted turf has been noticed requiring less irrigation water. Longer protection windows for most fungicides, more effective herbicide and insecticide applications, and greater response from fertilizer applications have also been noticed since the installation of the AIS.

As a result of the AIS and better moisture management practices, water usage is down. Water usage has been slashed from 450,000 gallons per night prior to 2011 to approximately 315,000 gallons per night. Savings of 135,000 gallons per night translate to approximately 10 million gallons a year.

Another major input Victoria National is reducing is its use and reliance on electricity. Known energy saving steps has been taken. Steps taken within the maintenance facility include; only air conditioning essential rooms, signage on doors reminding employees to keep doors shut while air condition or heat is on, and the use of energy efficient shop lighting. Overhead doors in the maintenance facility remain closed during winter months when heaters are functioning, except once at the beginning and end of workdays to allow equipment in and out.

In other club buildings, the use of programmable thermostats has reduced energy use. Thermostats are programmed for optimum temperatures when the building is in use, if not in use such as during the night, nighttime setbacks are programmed to conserve energy. Incandescent lighting fixtures throughout the club are being replaced using energy conserving LED fixtures. Light switches in staff rooms such as closets and bathrooms are being fitted with motion sensor light switches to utilize lights only when needed by staffers. Outdoor landscape lighting has been converted from timers to photocells to reduce wasted lighting during both day and nighttime hours. New weather stripping is being applied to club windows and doors to further insulate structures and prevent energy losses. Future planning includes purchasing charging units for golf course vehicles that charge during non peak hours. Charging units would reduce our energy demand during peak hours reducing energy costs.

Remodeling and construction of three cottage buildings at Victoria National the past two years, allow for up to 24 guests to stay onsite. The turf crew designed and installed low maintenance landscaping that would fit the surrounding property. Only maintained turf areas surrounding the cottages were fitted with irrigation. Landscape beds and 3 acres of naturalized areas were installed without irrigation reducing water usage. River gravel was selected as landscape cover material rather than wood mulch to reduce yearly mulching. Native grasses, laurels, laryapy, hollies, weeping cherry, lavenders, daisies, and black eye Susan's were chosen based on USDA Plant Hardiness Maps and past successes throughout the golf course.

In February 2013, the clubhouse launched a recycling program for all cardboard, glass, plastic, aluminum and steel cans used in day to day operations. This initiative was not mandated by any governing bodies or regulations. Our recycling program went even farther during the United Leasing Championships, a Web.com tour event. During the event, efforts put forth by Victoria National, tournament organizer, Allied Waste, and local Boy Scout Troops, we were able to recycle 25,000 pounds of material. Boy Scout earned service hours by collecting and recycling materials and aided us in keeping the golf course and the environment clean.

**10 photos max of your efforts to reduce inputs to your facility and things to help with the environmental impact of your facility.**


Kenneth May Photography


CASE


**Describe the benefits of new technology and research in relationship to your programs and your facility (1000 words):**

Golf courses cannot escape the onslaught of new technology and research designed to make them better. Victoria National has been implementing new technology and research for the past 15 years, and will continue to do so in the future. Simply implementing new technology and research will not bring better results, it is how these ideas are incorporated to update existing maintenance practices, from implementation through follow up. Victoria National has introduced several new technologies and utilize research to improve the course conditions, some have worked better than others.

From its opening, Victoria National has been on the forefront of many new turf technologies. It was constructed as the first golf course in the country to feature SubAir aeration and moisture removal system on all twenty putting green complexes. The goal of the SubAir unit is to aid playing surfaces through moisture content management, subsurface aeration, and root zone temperature control. However, lack of knowledge and poor design led to the failure of nearly all of these units. In recent years, most units have been retrofitted and upgraded to once again enhance the greens. Introducing new technologies may not work out as originally designed. By following up on past failures with the SubAir units, Victoria National was able to retrofit new technology and allow them to benefit the golf course.

Correct moisture management may be a superintendent's most difficult responsibility. Finding the fine line for optimum plant health can be very difficult. Both excess and insufficient soil moisture can

be devastating to plant life. To aid in finding the perfect balance of moisture in soils, Victoria National adopted using moisture sensors in 2009. Using moisture sensors has become an integral part of maintenance practices at Victoria National. Utilizing portable moisture sensors, up to 8 technicians are capable of taking over 100 exact readings of volumetric water content. Meters are capable at reading at depths between 1-10 inches. Readings for greens are recorded and monitored daily throughout the growing season. Precise applications of irrigation can then be applied to greens based off moisture reading and upcoming weather. Through trial and error, we have been able to find the volumetric water content that is best for optimum plant health and playability. This new technology has cut back on overwater and allowed for stronger turf health.

New fertilizers options and beneficial research has changed the way Victoria National fertilizes turf. Besides a natural organic fertilizer applied to greens and tees post aerification, granular and slow release fertilizers are no longer applied on bentgrass greens, tees, and fairways. Bentgrass is fertilized throughout the season by spoon-feeding liquid fertilizers. Newer liquid fertilizers options that use high efficiency fertilizers in lower quantities allow for improved environmental responsibility. Utilizing these liquid fertilizers allows us to apply fertilizers only when needed. Fertility rates are based off current growing conditions, turfgrass aesthetics, and soil analysis. Switching to liquid fertilizers has reduced the amount of fertilizer leaching entering waterways as well. A reduction of the severity of algae blooms in lakes throughout the golf course has been documented since the switching to liquid fertilizers.

The installation of an acid injection system has greatly improved irrigation water, plant protection products effectiveness and nutrient uptake. Lowering the pH of water has reduced the amount of wasted water due to stuck irrigation heads. Indicated in research from Purdue University, pesticides and fertilizer are found to be less effective when applied using alkaline water. Utilizing the acid injection system, more neutral water is now used for pesticide and fertilizer applications. An increase is pesticide longevity and fertilizer effectiveness has been seen since the installation of the acid injection system. It has also aided in freeing up nutrients available for plant uptake that were unavailable in alkaline soils such as phosphorus, iron, boron, copper and zinc.

Evaluation of university research and the National Turfgrass Evaluation Program, Victoria National has been able to plant well performing turf species. L-93 Bentgrass was selected because of its performance in NTEP studies for heat tolerance and dollar spot resistance. An acre of Meyer Zoysiagrass has been installed on the driving range for trial purposes. The trial is to evaluate the playing conditions of warm-season grass for possibilities of switching fairways grasses and tees to a warm-season grass. To date, Meyer Zoysiagrass has not been capable of outperforming L-93 Bentgrass in playability standards sought by members. In addition, NTEP studies have also aided in the switch from Kentucky Bluegrass to Rhizomatous Tall Fescue. NTEP studies indicated for this area, disease and drought tolerance for fescue is much greater than bluegrass.

**10 photos max of new technologies and research:**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