



## **Virginia Pollution Prevention Case Study Roanoke Cement Company**

### Company Information

Roanoke Cement Company (RCC) is a limestone mining and processing facility located in Botetourt County and bordered by the Jefferson National Forest and the Appalachian Mountains. Roanoke Cement currently uses about 100 of the 2,500 acres that it owns. Roanoke Cement began production in 1951 and was acquired by Titan America LLC in 1999. It is the only active cement plant in Virginia, serving Virginia, North Carolina, West Virginia, Maryland, Tennessee, Kentucky, South Carolina, and Washington D.C.

Roanoke Cement makes sustainable development a top priority by combining business goals such as long-term economic performance with respect for people and the environment. Roanoke Cement's vision is to be recognized as a leading enterprise in its industry on sustainability and environmental stewardship. It implements this vision by monitoring its environmental performance and continually making improvements.

### Environmental Challenges and Opportunities

After evaluating the cement-making process with programs and procedures in place to mitigate potentially adverse effects on the environment, RCC pinpointed mineral extraction, energy consumption, and air quality as areas with the greatest impact. Correspondingly, plant managers and staff meet biweekly to discuss progress in these areas, as well as possible developing problems. These meetings allow RCC's team to identify areas of improvement and adjust accordingly.

Cement manufacturing has only one by-product – cement kiln dust. It was thought years ago that this product could not be used in any other application; however, recently the industry has learned that the material can be consumed in producing masonry cements. Additionally, the materials can be used as a fertilizer since it is predominately calcium oxide. RCC is now able to recycle more cement kiln dust and landfill less because of an increased demand for masonry cement. Additionally, Roanoke Cement recycles byproducts from other manufacturing sectors that would otherwise be landfilled. For example, power generation byproducts such as flyash and synthetic gypsum provide vital chemical components needed to produce clinker and cement. Sander dust from furniture manufacturers is used as a supplemental fuel for the kiln, thus reducing the dependence on fossil fuels such as coal.

Employee and community involvement is a cornerstone of RCC's environmental programs. RCC sees its relationship with local individuals and organizations as a prime opportunity to work together to accomplish environmental goals while providing meaningful resources to the community. Transparency is key to a healthy community partnership and as such, RCC maintains open communication between the plant and surrounding area. For example, in 2007, RCC created a semi-annual "Community Report" to inform over 1,000 local residents of plant activities, environmental safety, civic developments, and other events held in the community.

Most of the impetus to start the sustainability programs came from the managers within Titan America LLC, who take RCC's positive environmental impact very seriously. An example of

this was RCC's alternative fuel project at the plant. It began in 2009 as a trial, but after meeting success they now have a sustainable program which allows them to replace 10-25% of the fossil fuel with other materials. It is RCC's objective to expand this in the future to further reduce consumption of fossil fuel resources.

Sustainability programs are an integral part of Titan America's operations and sustainability initiatives originate from a variety of internal sources. Top level executives lead by example by participating in the World Business Council for Sustainable Development's Cement Sustainability Initiative, which is a CEO led organization founded to brainstorm and implement ways to reduce environmental impacts from the cement industry including CO<sub>2</sub> emissions. The idea for the apple orchard came from a plant manager and two years later a member of the Roanoke Cement management team and active participant in the Botetourt Beekeeper's Association introduced the first honey bee population to the site.

Keeping track of all the permit requirements and other short and long term tasks was challenging prior to implementation of the Environmental Management System. Knowing they had limited resources, RCC prioritized what initiatives would have the most profound impact on the real world. As mentioned earlier the sustainability program is one of their most recent focuses and has already drastically reduced the amount of coal burned to heat their cement kiln. The fuel which replaces it is taken from a landfill and is essentially transforming another's byproduct into an efficient and innovative source of energy.

### Implementation of the Sustainability Programs

#### **Environmental Management System**

Roanoke Cement implements an Environmental Management System (EMS) to track its impacts and continually improve its environmental performance. As a part of the EMS, RCC conducts environmental training in small groups throughout the plant. Smaller group training spurs questions, encourages discussions, and allows each department (electrical, mechanical, etc.) to focus on its own area of impact. Furthermore, individuals feel more comfortable volunteering their thoughts, concerns, and suggestions as to how RCC can better its environmental initiatives. After implementing its EMS, RCC solidified its efforts by striving for certification of its environmental excellence through the Virginia Environmental Excellence Program's (VEEP) rigorous application process. RCC has been an Exemplary Environmental Enterprise (E3) member of VEEP since 2013.

RCC implements many programs to reduce its environmental impacts, including recycling stormwater runoff from the plant by repurposing a tapped-out quarry. An onsite drainage system collects all industrial stormwater and leads it to the lined process pond capable of holding 15 million gallons of water. The water is then recycled in a continuous loop to cool the machinery, essentially creating a 15 million gallon rain barrel. Redirecting rainwater into the pond helps the site reduce runoff and erosion from entering nearby Catawba Creek.

RCC is also constantly searching for opportunities to reduce energy and fuel consumption, including substituting the use of fossil fuels with sustainable materials. An alternative fuel system that fires biomass was commissioned by RCC to reduce the plant's coal consumption. The plant is a member of the U.S. Environmental Protection Agency's Energy Star Partnership, and has been an Energy Star Award recipient for seven consecutive years.

Beyond greening their practices within plant perimeters, RCC's commitment to minimize its impact extends into the surrounding area. As a member of the Wildlife Habitat Council, RCC continually explores opportunities to increase biodiversity and restore wildlife habitat throughout the facility. In 2007, RCC staff established a pollinator habitat to improve ecosystem health by increasing pollinator diversity. Two acres of land previously used as a scrap metal "dumping ground" was converted into a beautiful, thriving apple orchard. An apple tree was planted for each employee and flowerbeds containing native flowers, such as black-eyed susans and purple coneflowers, were planted around the facility to aid with pollination. Company employees and their families contribute to the habitat by participating in site upkeep. Many employees even have integrated their enthusiasm for beekeeping into RCC's pollinator habitat by attending meetings with the Botetourt Beekeepers Association and then applying their knowledge at RCC.

The plant's close proximity to the Appalachian Trail attracts many hikers and nature enthusiasts alike. RCC maintains the Andy Layne Memorial Trail, which allows hikers to access the three-fourths of the trail that crosses their property and connects to the Appalachian Trail. The trail that passes through RCC property ranks as one of the top day hikes in the area.

RCC was awarded the Wildlife Habitat Council's "Wildlife at Work" certification in 2012 for their commitment to long-term wildlife habitat enhancement efforts. The installation of a pollinator habitat, quarry restoration project, and employee volunteer efforts to improve the water quality of Catawba Creek are all incorporated into the company's Wildlife Management Plan. While anyone can contribute ideas, the Wildlife Team is comprised of five dedicated employees who continually monitor and implement new land management practices to benefit native flora and fauna. RCC was also awarded the Corporate Lands for Learning certification in 2014 for using the three habitats for educational opportunities in the community. These corporate lands have been able to benefit the local community through no cost educational outreach opportunities.

### **Trout Pond Restoration Project**

RCC initiated the Trout Pond Restoration Project to restore wildlife to an expired quarry mine by creating wetlands. This site provides a stopover location for migratory birds and allows RCC employees and their families to benefit from recreational and educational uses. RCC began restoration of the old quarry site in 2008 and by 2010 RCC released 350 trout into the quarry pond as part of their commitment to raise awareness and preserve valuable watershed resources. To the left of the pond, a shallow area was created to grow wetland vegetation. Plantings included eight Tuscarora Crape Myrtles, two Weeping Willows, four Spiraling Willows, and Cattails. Plant species found in the region or native to Virginia were favored as sustainable choices. The trout pond is not only beneficial to Roanoke Cement employees and their families, but also for many guests visiting the site.

The local Boy Scout troops benefit from visiting the trout pond by learning about different types of trout, their diet and habitat, and why trout are good indicators of environmental quality. Troops are able to earn their Fish and Wildlife Management and Environmental Science merit badges through these visits. In addition to the Boy Scouts, local elementary schools participating in Trout Unlimited's "Trout in the Classroom" program take fieldtrips to the site to release the trout that they have raised from eggs in their classroom during the academic year. In 2013, Trout Unlimited donated three aquariums to participating schools, along with chillers and trout eggs – everything that a class needs to "babysit" the trout from eggs to fingerlings before releasing them into the RCC pond. Employees and visitors alike can learn about the pond through the habitat information signs that are posted in the area.

### **Working with Local Schools**

RCC pursues many initiatives to provide opportunities to local schools. The plant helped launch a school-wide program titled "Sustainability Saves" at Fishburn Park Elementary School. Through this program, RCC sponsored a competition among 300 students to develop and document the greatest home energy savings. RCC has also participated in the Green Schools Challenge, a friendly competition to encourage students, teachers, and administrators to implement a variety of no or low-cost environmental initiatives at their schools. This program aims to reduce carbon emissions, save money, provide healthier learning and teaching environments, conserve natural resources, and increase environmental awareness.

RCC has a longstanding relationship with Greenfield Elementary school as well. School administrators asked RCC to participate in a "meet and greet" at the school's Earth Day event, at which each class would visit for 10-minute intervals. At the event, RCC set up a display board to illustrate the importance of pollinators and preserving pollinator habitat. For example, the students learned about how many of our favorite foods require pollinators, why some pollinators are threatened, and what we can do to reduce our impact, such as planting gardens and reducing fertilizer use.

During the summer of 2013, RCC hosted students from Roanoke City Public Schools "5-5-5 Camp" which used an observational hive to introduce students to the inner workings of a honey bee hive and led to discussions on the importance of pollinators. Students were also introduced to water quality improvement topics such as reducing pollutants such as sediment and nutrient loads from degrading stream health. The crowd pleasing trout were shown to aid the discussion on criteria a habitat must meet in order to sustain the life cycle of these environmentally sensitive fish species.

RCC also has spearheaded electronic waste initiatives that benefit schools by participating in programs like Funding Factory, which raises money for local schools by encouraging responsible electronic recycling. Since first participating in this initiative in 2013, Roanoke Cement has recycled 40 pounds of cell phones and printer cartridges, raising \$100 for Troutville Elementary.

## **Catawba Creek Aquatic Habitat**

A five-mile stretch of Catawba Creek runs through the north and west ends of the RCC property. As a tributary to the James River, Catawba Creek is a part of the Chesapeake Bay watershed. To secure the reserves necessary to continue operation of the plant RCC must expand its quarry, which will affect about an acre of wetlands and 4,195 feet of intermittent streams. In accordance with its “local impact, local mitigation” policy, RCC has chosen to preserve and enhance a two-mile segment of Catawba Creek. This yearlong project began in 2013 and involved fencing cattle off the creek, grading the stream bank along heavily eroded areas, and planting more than 16,000 trees. The goal was to create a 200-foot riparian buffer on each side of the two-mile stretch of creek. By creating a riparian buffer, RCC hopes to eliminate direct and indirect pollution entering the stream, improve velocity attenuation, reduce runoff and erosion, and support wildlife habitat and aquatic life. RCC’s philosophy that when there is a local impact, there should be local mitigation is why they underwent a large, time-consuming water quality improvement project instead of simply purchasing stream credits. And not only does RCC want to maintain long-term environmental stewardship for the site, but they also want the project to serve as an example of the most beneficial ecosystem compensation plan for impact to streams.

RCC and the Boy Scouts are continuing their partnership by installing and monitoring wood duck nesting boxes along the creek. This site will be used for school-age children to visit and learn about the characteristics of a healthy aquatic system. RCC has also recruited volunteers for stream monitoring and upkeep. RCC holds the Catawba Creek Cleanup one Saturday every spring, allowing its employees and their families to join with local residents to pick up trash along nearby roadsides and streams. Participants put on boots and are ready to get dirty with hands-on learning about sources of trash, the affect of trash on water quality, and the importance of corporate environmental responsibility. This effort has been increasingly successful, resulting in more than 2,500 pounds of trash in a single cleanup. After seven years of coordinating these annual cleanups RCC officially adopted Catawba Creek in 2013.

RCC employees also participate in the Virginia Save Our Streams program by hosting a volunteer monitoring event every year for Catawba Creek. The monitoring workshop evaluates water quality by quantifying the number of organisms in the stream. Employees collect macro invertebrate specimens, tallying the number of each species, and calculating the ecological condition of the stream based on the Virginia Save Our Streams Multi-metric Index Score.

### Results and Evaluation of the Process

In March 2014, RCC was recognized by the Cement Industry Energy and Environmental Awards for Overall Environmental Excellence. The awards honor individual cement facilities that exemplify the spirit of continuous environmental improvement and support their resolve with action. In addition to awards in their industry, RCC has been recognized by other local, state, and federal organizations as well. RCC has received the Roanoke Valley Cool Cities Coalition’s “Cool Citizen Award” in May 2009 for financial contributions that allowed the coalition to purchase over 2,600 compact fluorescent bulbs, fund educational programs that reach 3,000 local residents, and provide technical assistance to the local government measures to reduce greenhouse gases.

RCC has learned that the key to implementing sustainability programs is to use the value of continuous improvement to keep the ball rolling. RCC has a list of initiatives that they continue to update regularly. It's vital to have a program in place that allows people to see measurable results. RCC's program not only allows people to see these results it involves them in the process, which keeps the team motivated to continuously improve. Industry can be a significant asset to a small community. Big companies are made up of individual people, each with their own passions and causes. A company that cares about social and environmental responsibility can be used as a means of carrying out these causes and affecting big changes in the lives of their employees and the community. Companies should consider instituting a "do something!" policy, which commits the company to doing something to improve their local environment each year. Even small actions can add up to big results.

Through RCC's sustainable materials program they are substituting 10% of fossil fuels and look forward to seeing their substitution rates continue to rise.

#### Continual Improvement of the Program

RCC looks forward to using their mitigation project as an outdoor classroom in 2015. RCC has had several events on this site which have been well attended, and in 2015 they look forward to adding more events to the calendar to continue to educate the community on environmental issues.

RCC is also planning on addressing light pollution by inventorying sources of light and integrating LED lighting, which over the long term can save thousands in electric bills and significantly reduce energy consumption. This project has a proven return on investment and does not require a lot of additional effort since RCC routinely replaces lights, this time they are just replacing them with energy efficient lights.

RCC is also in the planning stages of creating a habitat for bats. Since bats are important to the environment as pollinators and for pest control RCC believes that this effort would be in line with the other wildlife habitats on the property.

Continuing to train and educate employees, particularly with regard to environmental monitoring. It is important that all employees serve as the eyes and ears of the environmental team. Employees must recognize and report potential issues before they become a problem, but it is also important that they feel comfortable bringing ideas to the team on potential areas of improvement.