Reclaim, Restore, Reinvent: Creating Jobs and Cleaner Energy

THE MARTIN-MARIETTA, SODYECO, INC. SITE IN CHARLOTTE, NORTH CAROLINA

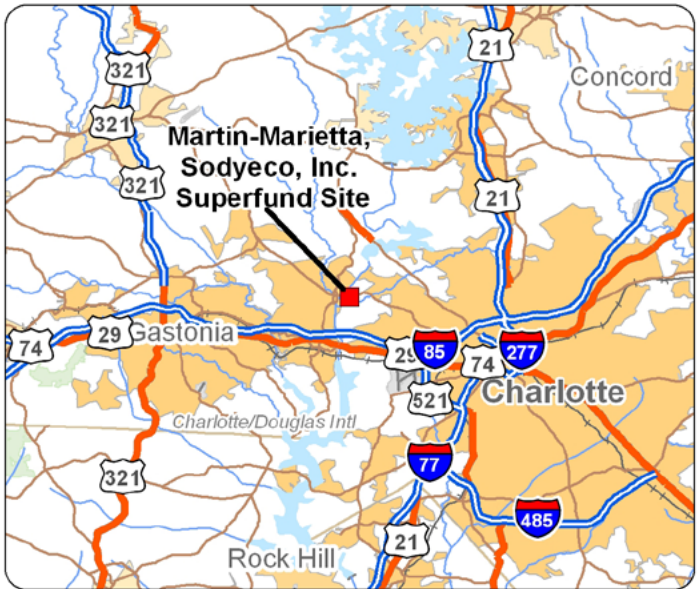
Introduction

A new day is dawning in Charlotte, North Carolina. In August 2014, over 200 people attended the Grand Unveiling of ReVenture Park. This 667-acre renewable energy industrial park is bringing together a host of innovative businesses that will create hundreds of new jobs. The redevelopment effort is reusing the property's extensive existing infrastructure – rail and interstate access, a wastewater treatment facility, existing industrial space, utility substations and transmission lines, and a 360-million-gallon containment pond – to create a platform for attracting renewable energy, alternative fuel and recycling projects.

EPA's Superfund and Resource Conservation and Recovery Act (RCRA) programs and the North Carolina Department of Environment and Natural Resources (NCDENR) have worked closely with developer Forsite Development, Clariant Corporation, the site's owner, and state and community partners to clean up the area and support its return to productive use.

Forsite Development is currently converting 300,000 square feet of industrial building space into a business park focused on energy efficiency, renewable energy and environmental technology. The project is now home to two biomass combined heat-and-power projects, an algae-to-fuel pilot plant, an all-electric truck company, an energy efficiency training firm, a plastics recycler and a 35-acre aquaculture project, among others. In total, new investments by companies on site exceed $14 million. Environmental stewardship is also an integral part of the project. The area's natural resources will be enhanced by a 185-acre conservation easement, wildlife habitat projects, stream restoration and a trail system connecting the regional Carolina Thread Trail to the nearby U.S. National Whitewater Center.

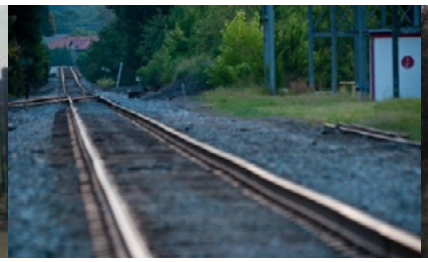
Clariant Corporation and Forsite Development focused on making sure reuse plans were compatible with the site's cleanup. The companies committed to maintaining the site's remedy and putting land use controls in place for commercial and industrial uses. EPA took the site off the Superfund program's National Priorities List (NPL) in February 2012. The property's delisting qualified it for state and federal brownfield grants and incentives, clearing the way for its transformation into ReVenture Park.



The site is located on Highway 27, about 10 miles west of Charlotte in Mecklenburg County, North Carolina.

By reclaiming, restoring and reinventing this industrial area, ReVenture Park serves as a national model for innovative redevelopment and is one of the leading renewable and clean energy projects on a Superfund site in the United States. The project illustrates how the reuse of Superfund sites can protect human health, advance environmental protection and provide valuable community assets.

This case study explores the tools and partnerships that have led to the successful cleanup and reuse of the Martin-Marietta, Sodyeco, Inc. Superfund site. The following pages trace the evolution of cleanup and reuse efforts, highlighting Forsite Development's partnership with Clariant Corporation, coordination with regulatory agencies, and ongoing cleanup planning and reuse activities through 2015. The case study provides information and lessons learned to parties interested in clean energy, adaptive use and mixed-use opportunities at Superfund sites.



Site History, Contamination and Remediation

Starting in 1936, various owners manufactured dyes and specialty chemical products on site. Disposal of wastes in landfills and pits led to soil and ground water contamination with volatile organic compounds. After initial investigations, EPA listed the site on the NPL, the Agency's list of top-priority Superfund sites, in 1983.

The facility property covers 667 acres, with about 150 acres used for facility operations. When Clariant purchased Sodyeco, Inc. in 1985, it inherited responsibility for the plant's legacy contamination. In 1987, EPA issued the site's long-term cleanup plan, which addressed five areas (Areas A through E). It included using a pump-and-treat system for contaminated ground water; digging up soil from Area D and incinerating it off site; placing a cap over Area B; and treatability studies for Area C.

In 1994, EPA revised the cleanup plan, selecting soil flushing for Area C. The plan included flushing soil with water, capturing the water and treating it in the ground water treatment system. In 1998, EPA revised the cleanup plan again, selecting off-site treatment and disposal to address stockpiled contaminated soil in Area C. EPA issued a third revision to the cleanup plan in 1998, correcting the estimated quantity of soils addressed by cleanup activities. Clariant ceased production at the plant in 2005.

Institutional controls restricting land uses on Areas A, B and D were placed on the property. Ground water treatment is ongoing, and addressed under the Clariant facility's Resource Conservation and Recovery Act (RCRA) permit. The RCRA treatment facility uses aeration and living organisms to break down contamination in ground water.

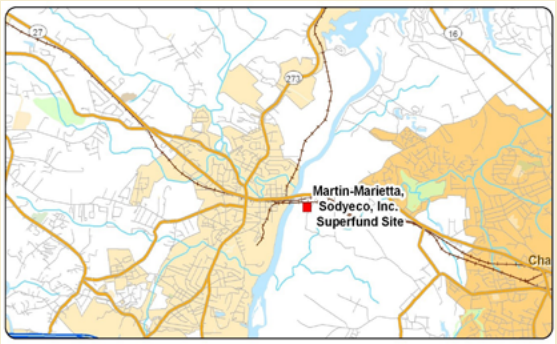
CERCLA and RCRA

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is the law passed by Congress on December 11, 1980, that is commonly known as Superfund. Congress enacted RCRA in 1976.

RCRA governs the federal management of solid waste (e.g., garbage), hazardous waste facilities and underground storage tanks holding petroleum products or certain chemicals. CERCLA governs the federal response to abandoned, uncontrolled hazardous waste sites.

EPA's Superfund and RCRA programs were both involved at the site. Today, the site continues to be managed under the RCRA program.

Aerial view of the site circa 1972. The area is located along the banks of the Catawba River.



Land uses near the site include light industrial and rural residential areas. Most of the land is undeveloped woodland.

Throughout these activities, EPA and NCDENR staff members met regularly with community stakeholders to share information and updates and to incorporate community feedback into the Superfund and RCRA processes. The selected remedy enabled the property to be reused for commercial, industrial and recreational land uses, which EPA determined to be the area's reasonably anticipated future land uses.

Construction of the final remedy finished in 1999. In 2012, EPA completed the fourth Five-Year Review for the site. The report concluded that the remedy continues to protect human health and the environment. To date, Clariant has spent over $40 million cleaning up the site and properly disposing of hazardous waste.

2009 – 2011

Building Partnerships, Laying the Groundwork

Forsite Development had an idea: to repurpose some of America's aging and outdated industrial infrastructure situated on shuttered heavy manufacturing plant sites. The goal was to create an environmentally responsible eco-industrial park that would attract clean energy technology companies. Putting this idea into practice was another matter. "We had passed over literally dozens of giant manufacturing complexes that had extensive infrastructure including; on-site power generation, central steam plants, process water and wastewater treatment," recalled Tom McKittrick, the company's founder and president. Unknown environmental conditions, poor locations and limited partnership opportunities were among the challenges.

By 2009, Clariant Corporation had spent years cleaning up the environmental mess left behind by Sodyeco Inc. "We had been looking at repurposing and reclamation types of projects for the site since we closed the plant down [in 2005]," Clariant CEO and president Ken Golder recalled. "Cleanup was important. But we knew something more could happen there."

Forsite Development took a closer look. Well located in the Charlotte metropolitan area, with good access to road, rail and other transportation infrastructure, the site was the largest underused heavy industrial property in the region. "We knew that it would take time and expertise to address contamination and potential liability issues," said McKittrick. "But the key was finding a strong partner in Clariant, they were the perfect fit to work with us on a project like this. They shared our vision that this site shouldn't be demolished, that it should be repurposed and turned into an eco-industrial park creating jobs and investment."

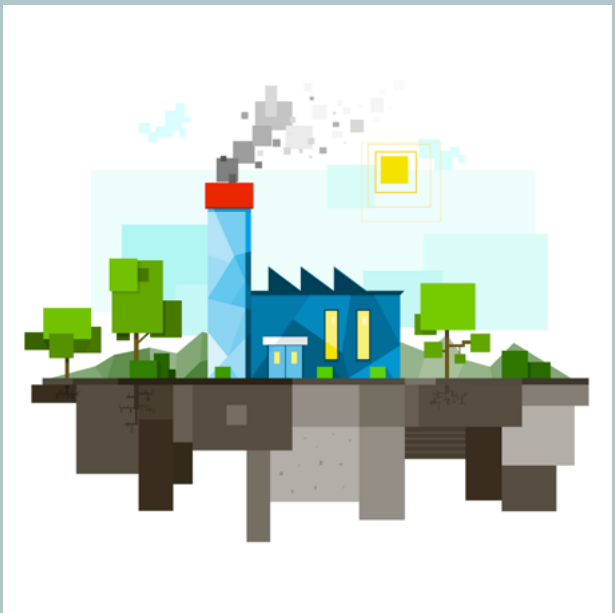
As the companies' initial discussions progressed, they reached out to EPA Region 4 and NCDENR to discuss how their plans could align with the site's cleanup and long-term stewardship as well as to address potential liability issues. Untangling the responsibilities of EPA's RCRA and Superfund programs – cleanup work had been done under both programs – was identified early as a top priority.

"We chose to partner with Forsite because they not only shared our vision for the site, but were able to actually enhance our vision for what the site could become."

– Ken Golder,
Clariant CEO and President

What Is an Eco-industrial Park?

A place where businesses cooperate with each other and the community to reduce waste and pollution, efficiently share resources and pursue sustainable development. The twin goals are to sustain economic growth and improve environmental quality.



"They didn't come in and expect us to deal with this issue overnight. It actually turned out to be even more difficult that we thought it would be," said EPA Region 4 reuse coordinator Bill Denman. "It was a lengthy process, and we certainly appreciated their patience and willingness to stay with it." Region 4 worked closely with EPA Headquarters in Washington, D.C., to explore different administrative options that would work for both programs.

Forsite Development also identified a second priority – removing the Superfund designation. Part of the reason was perception. "If you mention Superfund, sometimes, it can make some people recoil. We thought it important to remove the label," McKittrick noted. "Superfund sites are nothing to be scared of, they can be managed." The rest was simple economics – the property's delisting would qualify it for state and federal brownfield grants and renewable energy incentives, clearing the way for its transformation into ReVenture Park.

The eventual solution addressed the needs of all parties. Groundwater cleanup and monitoring would continue under RCRA, in coordination with NCDENR. Areas cleaned up under Superfund would be taken off the NPL after land use controls and long-term monitoring plans were in place. "We understood the interest and the project's potential benefits,

and EPA is committed to supporting the beneficial reuse of sites," said EPA project manager Michael Townsend. "At the same time, we had to make sure the cleanup would continue to protect the environment and public health." Clariant put land use controls in place in August 2011. They permit only commercial and industrial land uses across cleaned-up areas of the site and restrict land uses incompatible with the remedy. EPA took the site off the NPL in January 2012.

Throughout this period, Forsite Development was also reaching out to local governments – the City of Charlotte, Mecklenburg County, the Charlotte Chamber of Commerce, the Centralina Council of Governments and other organizations – as well as the North Carolina Sustainable Energy Association, and the North Carolina General Assembly – to discuss ReVenture Park and identify areas of shared interest. These efforts soon bore fruit. Local governments proposed locating a new regional wastewater treatment facility at the site, to be operated by Charlotte Mecklenburg Utilities, the largest public water and wastewater utility in the Carolinas. And the General Assembly passed the Cleanfields Act, which provided triple credit for renewable energy credits (RECs) generated from biomass facilities at "cleanfields renewable energy demonstration parks" in North Carolina.

Finally, Forsite Development worked closely with Clariant on a lease / purchase agreement that would enable the company to eventually acquire the property, with Clariant remaining responsible for remaining cleanup. By early 2012, the pieces were coming together. However, significant challenges – project financing, liability concerns, and infrastructure renovation costs – remained.

Views of the site's Catawba River frontage (top left and right), site infrastructure and access roads, and an on-site monitoring well.

2012 – 2014

Tackling Challenges…

Clean energy was at the heart of Forsite Development's planning for ReVenture Park. Preparing the property for these operations required extensive renovation – of rail and road infrastructure, 300,000 square feet of existing industrial space, utility substations and transmission lines, and a 360-million gallon containment pond. In addition to this challenge, initial plans for a 20-megawatt waste-to-energy (WTE) power plant on site ran into community opposition. Neighbors and environmental organizations were concerned about odor and air quality impacts from the proposed facility.

Initial renovations moved along slowly. And, after several efforts to adjust power plant features, partners and financing, the WTE project did not work out. It was a tough blow for the company. "We had the package. It would have doubled recycling in Mecklenburg County," Tom McKittrick noted. Instead of giving up, however, Forsite Development retooled, focusing on two smaller power projects that would utilize biomass as a fuel source rather than incinerating waste.

Today, these projects generate four megawatts of renewable energy. They are fueled by methane from a landfill in Tennessee where the landfill gas is cleaned up and then injected into a natural gas transmission line. Waste heat from the projects warms water that is then pumped to 35-acre containment basin where a large-scale aquaculture project is underway (see image below). Duckweed is a fast-growing aquatic plant that, when harvested, doubles its weight every 48 hours. The plant has many uses, including as a biomass feedstock and a soil amendment, among others. ReVenture has teamed with Clemson University on research into the highest and best use for the material. One project under consideration is a nutrient removal cell. Nutrient-impaired water from the Catawba River would be stored in the basin, allowing the duckweed to naturally extract excess phosphorus and nitrogen. Cleaner or "polished" water would then be discharged back into the river, thereby creating state nutrient offset credits.

Long Creek Conservation Area

The project's conservation easement covers 185 acres, about 30 percent of ReVenture Park's land area. The easement protects a wide swath of natural area on both sides of Long Creek and nearly 1.4 miles of Catawba River frontage. The easement will also connect the Carolina Thread Trail, a regional network of greenways, trails and blueways, to the nearby U.S. National Whitewater Center.

Forsite Development and Clariant worked with the Catawba Lands Conservancy (CLC) to develop the easement. ReVenture Park also secured a Wildlife and Industry Together Certification (W.A.I.T) with the North Carolina Wildlife Federation. This collaboration includes wildlife habitat enhancement projects throughout ReVenture Park.

Refining Plans…

The company also expanded the project's sustainability focus in other ways, bringing together a wide range of environmentally friendly uses as part of the project. "Doing right by the environment was an absolute cornerstone of our development plans," McKittrick said. "There is over 667 acres of land here. Only about 300 acres of that is the plant site; the rest of it is pristine untouched wilderness, wild lands. It was vital to ensure that we were protecting and enhancing that natural resource." The company reached out to area organizations and local land conservancies, the North Carolina Forestry Service, and state universities for ideas. All of their feedback came together in the plans for ReVenture Park (see text box).

Lining up Resources…

Finally, in March 2013, the project reached a key milestone. ReVenture Park was accepted into the North Carolina Brownfields

Signing of the site's brownfields agreement in March 2013.

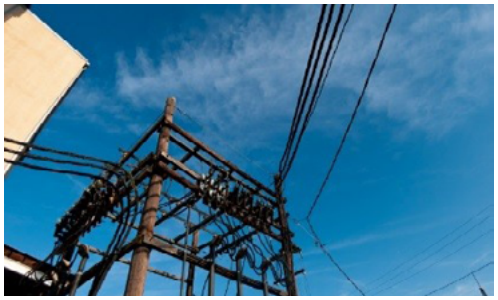
program, qualifying it for state and federal brownfield grants and renewable energy incentives. Under the terms of the agreement, Forsite Development agreed to post financial assurance guaranteeing that funds for remaining cleanup. In return, businesses and tenants would be able to locate on site with comprehensive liability protection.

NCDENR also required that Forsite Development develop a Living Environmental Management Plan outlining the projects and practices planned for the site, with particular attention paid to areas with known contamination. "We also have quarterly calls with NCDENR to provide project updates," noted Tom McKittrick. "The interaction has been great for the project and NCDENR has been fantastic to work with."

North Carolina Governor Pat McCrory and NCDENR Secretary John Skvarla announced the signing of the brownfields agreement at a press conference in Raleigh. "Our mission is to protect our state's environment and natural resources while enhancing the quality of life for North Carolina's citizens," said Skvarla at the signing ceremony. "Thanks to the vision of the developers of ReVenture Park and the structure of our Brownfields Program, this project will allow us to reuse this land, protect the environment and create jobs." Governor McCrory concurred. "This project is an extraordinary example of how public and private sectors can partner to benefit the economy and the environment," he said.

In late 2013, following the completion of facility renovations, Forsite Development began recruiting new and emerging recycling projects, as well as alternative fuel and renewable energy technology businesses to the site. "The signing of the brownfields agreement was a watershed moment," McKittrick noted. "It enabled us to expand the ways in which we could create and drive value." Revenue streams include:

- Power generation and thermal energy sales
- Monetizing site's existing wastewater permit's nutrient allocation
- Selective demolition and metals recycling
- Sale of excess equipment and tanks
- Conservation easement tax credits
- 185-acre land sale to City of Charlotte for new wastewater treatment facility
- Building leases
- Equity in startup companies



Existing infrastructure at the Martin-Marietta, Sodyeco, Inc. Superfund site.

Facility renovations included building demolition. Concrete from this building was reused as road aggregate.

Final plans for ReVenture Park brought together a remarkable variety of clean energy, high-tech, educational and environmental projects and initiatives. Forsite Development plans to build out the park in phases. The ReVenture West phase is first; it is expected to bring in $73.5 million investment and produce about 245 jobs. Next will be ReVenture East, which is expected to bring in 485 jobs and $235 million in investment.

ReVenture Park: A Closer Look

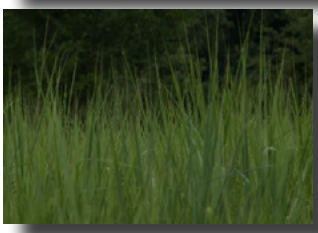
ReVenture Park includes a host of ongoing and proposed projects.

ReVenture Park™

CHARLOTTE'S FIRST ECO-INDUSTRIAL PARK

Mulberry bushes grown at ReVenture Park by Enthogenetics feed silkworms that have some spider DNA. Known as "spider silkworms," they produce a tough silk to make fabric used by the military.

Duckweed growing in a former containment point at ReVenture Park. Duckweed clarifies water by removing excess nutrients, nitrogen and phosphates. When dried, duckweed can be used as a biofuel.



Switch grass also makes a good biofuel. A field of it has been planted at ReVenture Park.

Wildlife on site includes osprey, white egrets, bald eagles, kestrels and wild turkeys.

Electric-powered light delivery truck assembly by EV-Fleet at ReVenture Park.

Natural areas and recreation resources include a 185-acre conservation easement, trails and connecting access to the U.S. National Whitewater Center, and several wildlife habitat enhancement projects in conjunction with the North Carolina Wildlife Federation.

These piles of bio char are a byproduct of wood gasification. Bio char can be used as a soil amendment. The Renewable Gas Co. is working on how to do so efficiently.

"Old, unused manufacturing facilities shouldn't be liabilities. Developing an eco-industrial park on a dormant industrial complex is an opportunity where the private sector, public policy and environmental stewardship align to promote the clean energy economy. We are transforming liabilities into assets – the essence of recycling."

– Tom McKittrick, Forsite Development President and Founder

EPA and Site Reuse: Renewable Energy

With its mix of biomass power generation, biofuels production and energy crop research, ReVenture Park is one of the leading clean and renewable energy projects on a Superfund site in the United States.

Since the inception of the Superfund program, EPA has been building on its expertise in conducting site characterization and remediation to ensure that contamination is not a barrier to the reuse of property. Today, consideration of future use is an integral part of EPA's cleanup programs, from initial site investigations and remedy selection through to the design, implementation, and operation and maintenance of a site's remedy. For example, EPA is working nationwide with public and private partners to encourage renewable energy development opportunities on current and formerly contaminated lands.

EPA's Green Power Partnership is a voluntary program that supports the organizational procurement of green power – electricity produced from renewable resources – by offering expert advice, technical support, tools and resources. Partnering with EPA helps organizations lower the transaction costs of buying green power, reduce their carbon footprints and communicate their environmental leadership to stakeholders. To date, more than 1,300 organizations have joined the partnership, using more than 28 billion kilowatt-hours of green power annually. Leading municipalities are also partnering with EPA to become Green Power Communities.

EPA's RE-Powering America's Land Initiative identifies the renewable energy potential of contaminated lands and serves as a resource for parties interested in reusing these lands for renewable energy development. Through coordination and partnerships among federal, state, tribal and other government agencies, utilities, communities and the private sector, EPA and its partners are exploring how new renewable energy facilities can be developed on these properties.

EPA's Green Remediation Strategy fosters the use of best management practices for green remediation at contaminated sites. "Green remediation" is the practice of considering all environmental effects of remedy implementation and incorporating options to maximize the environmental benefits of cleanups. By incorporating the use of renewable energy sources, EPA and its partners are maintaining the effectiveness of remediation methods while reducing greenhouse gas emissions from conventional power sources.

"What's happening here is land recycling. The brownfields agreement is facilitating the reuse, and that reuse will be conducted safely. There is no reason why this site cannot be put back into productive reuse."

– NCDENR Brownfields Manager Bruce Nicholson

The Grand Unveiling of ReVenture Park

By August 2014, with projects underway and tenants on site, it was time to formally unveil ReVenture Park. More than 200 people attended the celebration.

Clariant's CEO and president Ken Golder opened proceedings, highlighting the plant's history of providing jobs in the region dating back to the 1930s. "This well-deserved new lease on life provides tremendous opportunities, for economic development and for substantial job creation," he noted. "Equally important, it embraces the promise of expanded conservation areas and the creation of a sustainable network of parks and trails connecting some of the most pristine land in Mecklenburg County."

"This is a historic day for Charlotte and North Carolina and this entire region. We're coming together to make something happen, to revitalize what was once a brownfield and make it a greenfield again. This is a win for jobs, it's a win for the environment, it's a win for future economic development, it's a win for our quality of life, it's a win for the Catawba River…This is a win for North Carolina."

– North Carolina Governor Pat McCrory

"This was once an eyesore, but now it's a sight for sore eyes. It's a thing of beauty."

– N.C. Speaker of the House Thom Tillis

"The successful reuse of the Martin-Marietta/Sodyeco site is an example of EPA's commitment to support beneficial reuse of sites, using cleanup programs to ensure protection of future users. The partnership between government and the private sector, and a vision to bring about positive change for the community has resulted in the accomplishment of a great milestone for the site. The path to redevelopment has been established and it will lead to a productive community asset. EPA will continue to work with enterprising individuals and organizations to bring new opportunities to communities impacted by contaminated sites."

– Franklin E. Hill, Superfund Division Director, EPA Region 4

"This is a crescendo moment. I feel like we have crested the hill and momentum is on our side. My greatest hope for what we're doing here is that this project serves as a catalyst for others like it to happen."

– Tom McKittrick, President and Founder, Forsite Development

Current Tenants at ReVenture Park

Businesses and projects on site currently employ about 50 people:

Entogentics: Making ballistic vests woven from spider silk.

EV Fleet: Developing the first highway-ready, electric light pickup truck.

FC Organics: Taking charcoal from an on-site energy unit and mixes it with food waste from the NASCAR Hall of Fame to create a beneficial soil amendment.

Graceful Roots: Working with FC Organics to test the charcoal soil amendments for use in their landscape design business.

Sustainable Ethanol Technologies: UNC Charlotte scientists working on technology that allows low-cost production of ethanol from wood waste.

TerraMarCo: Company with rights to distribute technology in Africa; offices on site at ReVenture Park and in Washington, D.C.

Bio-Energy Farms: Transforming 320 acres on site into fields of energy crops for renewable energy and fuel projects.

Duckweed Ponds: Using a 35-acre containment basin in a new system creating biomass for energy production.

Waste Knot Wood: Turns non-recyclable pallets and wood-crating materials into wood fuel for biomass power units at ReVenture Park.

The Renewable Gas Co.: Partnered with Forsite Development on two biomass projects that will generate enough renewable energy to power more than 3,000 homes.

Recognizing Community Leadership and Excellence in Superfund Redevelopment

Every year, EPA Region 4 seeks opportunities to recognize the remarkable community-wide efforts that return Superfund sites to use. Through its Excellence in Site Reuse Award, the Region honor the hard work and partnerships that lead to a site's reuse. Forsite Development was one of the 2014 recipients of EPA Region 4's Excellence in Site Reuse Award.

In February 2015, Tom McKittrick was also recognized by CLT Joules, an initiative to promote energy innovation in Charlotte, with its first-ever Energy Entrepreneur of the Year Award.

Timeline of Events

1930s to 1983	Dye and chemical manufacturing by site owners Dyestuff Company, Martin-Marietta and Sodyeco Inc. contaminates soil and ground water
1981-1983	Initial cleanup actions
Sept. 1983	EPA lists area on NPL
1985	Clariant becomes owner of site property after acquisition of Sodyeco Inc.
Sept. 1987	EPA issues site's Record of Decision (ROD)
1989	Capping of Area B complete
1990	Start of groundwater treatment, removal of Area C contamination
1994	EPA updates remedy to include soil flushing for Area C
1998	EPA updates remedy to include off-site treatment and disposal for contaminated Area C soils and to correct estimated quantity of soils addressed by cleanup
1999	Contaminated soil removed and treated off site
Sept. 1999	All parts of site remedy are in place
2005	Clariant closes down manufacturing facility
Early 2009	Forsite Development and Clariant begin working together on plans for ReVenture Park
Aug. 2010	S.B. 886 legislation provides triple credit for RECs generated by biomass facilities at "cleanfields renewable energy demonstration parks" in North Carolina
2011	EPA updates cleanup plan; groundwater cleanup under site's RCRA permit and land use controls required
Aug. 2011	Clariant puts land use controls in place
Late 2011	Long Creek Conservation Area easement finalized; W.A.I.T. habitat collaboration partnership in place
Jan. 2012	EPA takes site off NPL
Sept. 2012	Site's fourth Five-Year Review finds remedy remains protective of human health and environment
Mar. 2013	Site property accepted into North Carolina Brownfields program; brownfields agreement signed
Late 2013	Building and infrastructure renovations completed
Aug. 2014	Grand unveiling of ReVenture Park; more than 200 people in attendance
2015	ReVenture Park has 10 tenants; investments by companies on site exceed $14 million

2015+

Looking Forward

At full buildout, ReVenture Park will generate an estimated $900 million in new investment and more than 1,000 "green collar" jobs. The project also substantially advances Charlotte's stated vision of becoming a "New Energy Capital," while its conservation easement, habitat projects, stream restoration and trails enhance the area's natural resources and recreation opportunities. Forsite Development ultimately plans to surround ReVenture Park with an "eco-district" of almost 600 acres of new neighborhoods, shopping areas and office space.

Forsite Development has partnered with UNC-Charlotte's urban design program on initial plans for the project. Key planning principles will include renewable energy, energy efficiency, sustainable infrastructure, natural area protection, community gardens, extensive trail connections, water conservation and recycling.

Forsite Development Project Criteria

- 500,000+ square-foot-facility on at least 500 acres
- Existing power and/or steam infrastructure
- Active air permits
- Wastewater treatment with active permits
- Heavy electrical infrastructure
- Rail with dedicated spur rail car storage
- Deep water ports
- Water rights (intake, withdrawal, discharge)
- States with a renewable portfolio standard (RPS) are a plus
- A community that wants to see a site repurposed

"There will be a focus on open space and protected natural areas," Tom McKittrick said. "We will be expanding the conservation easement and greenway areas and many of the homes will back up to natural space connected with trails. The area's proximity to the U.S. National Whitewater Center will hopefully appeal to outdoor-minded homebuyers."

ReVenture Park: An Industrial Ecosystem in Action*

Today, ReVenture Park is well on its way to becoming one of the cornerstones of Charlotte's clean-energy economy. It is also showing how a healthy industrial ecosystem can eliminate waste and allow symbiotic relationships to form. The 10 companies currently on site are mostly in the startup and research and development phase, and already are figuring out how to work together.

Entogenetics received a grant from the U.S. military to create a ballistic vest using spider silk from genetically modified silkworm. These worms will eat leaves from mulberry trees grown on-site. The leftover brush can be handed over to Waste Knot Wood, a company that turns scrap wood, like non-recyclable pallets, into a fuel source for the biomass power unit.

The pyrolysis process will generate excess heat, which Duckweed Ponds plans to use to heat the lake where it will try and grow duckweed as an energy source. The pyrolysis process turns sawdust into bio char, a stable form of carbon that research suggests could be an important tool in rebuilding healthy soils and sequestering carbon. FC Organics has plans to take the bio char that the plant creates and combine it with bokashi compost from the NASCAR Hall of Fame to create a high-quality soil amendment.

ReVenture's industrial ecology mimics the way that nature produces no such thing as "waste." Unused byproducts are quickly brought into other companies' production processes, preventing the buildup of hazardous materials that turned the dye-manufacturing area into a Superfund site.

** from the North Carolina Sustainability Connection*

The company has also begun to look beyond ReVenture Park, to other underused manufacturing sites. "We're very excited about the opportunity to duplicate this," Tom McKittrick said. "We've proven it can be done, we've learned all of the pitfalls, some of which have been quite painful. But the view appears to be worth the climb. We are very excited about where we are. There's so much opportunity to repurpose these sites. It's economically viable and it's the right thing to do. Opportunity for people. That's what I see."

Lessons Learned

A combination of significant factors has contributed to the site's cleanup and successful redevelopment.

- The property's size, contiguous acreage, existing infrastructure, and proximity to the metropolitan Charlotte area meant it was an attractive site for redevelopment.
- Forsite Development energetically pursued the property's redevelopment over the long term, putting in place the requisite resources, partnerships and expertise.
- Responsible party Clariant Corporation remains an engaged partner, working with Forsite Development, site agencies and community partners to ensure that cleanup protects human health and the environment while also supporting safe and appropriate reuse.
- EPA and NCDENR are active partners who understand the project's redevelopment priorities in the context of the site's ongoing cleanup.
- All parties involved continue to be patient and flexible, recognizing that cleanup and redevelopment are complex processes reliant on available resources, multiple partners, cleanup requirements, market conditions and other factors.

The Bigger Picture

While these conditions created an ideal climate for the successful reuse of the Martin-Marietta, Sodyeco, Inc. site, there also a range of broader lessons learned that can help guide similar projects at contaminated lands across the country.

EPA and state agencies work closely with communities, site owners and other stakeholders to support reuse outcomes that are compatible with site cleanups.

The Agency places a high priority on supporting the return of contaminated sites to productive and beneficial uses. At ReVenture Park, EPA and NCDENR were able to clarify cleanup requirements and responsibilities under the RCRA and Superfund programs, enabling the site's removal from the NPL and its brownfields certification by NCDENR.

"It took patience and a willingness to take on a difficult and complex situation," recalled EPA Region 4's Bill Denman. "Region 4 staff asked how we could find a way to make things work, ensuring protectiveness without unnecessarily limiting future use."

While EPA provides tools and resources to support Superfund reuse, communities and public- and private-sector organizations make it happen.

Project Stakeholders and Partners

- Area communities
- Charlotte-Mecklenburg Utilities
- Duke Energy
- Clariant Corporation
- Crosland
- Catawba River District
- Coalogix/Acorn Energy
- UNC-Charlotte programs
- Carolina Solar Energy
- U.S. National Whitewater Center
- Catawba Lands Conservancy
- Carolina Thread Trails
- EPA Region NCDENR
- North Carolina State Energy Office
- Mecklenburg and Gaston Counties
- Cities of Charlotte, Mt. Holly and Belmont
- North Carolina legislators
- Office of the Governor
- Charlotte Regional Partnership
- Charlotte Chamber of Commerce
- Centralina Council of Governments

EPA's mission is to protect human health and the environment. EPA relies on engaged community stakeholders to bring their future land use goals and priorities to the table so that this information can be incorporated into the remedial process, linking cleanup and redevelopment. At ReVenture Park, Forsite Development and Clariant came to EPA and NCDENR to make sure park plans would be compatible with the site's cleanup. They also asked the agencies to clarify Superfund and RCRA program responsibilities and what would need to happen to enable delisting the site from the NPL.

Federal agencies and states provide many tools and incentives that strengthen the feasibility of renewable energy projects.

NCDENR's brownfields certification meant that ReVenture Park qualified for state and federal grants, loans and other resources. The triple-credit renewable energy provisions of the state's Cleanfields Act also remained in place, attracting companies interested in biomass energy production opportunities.

EPA and Reuse: Lessons Learned

Since the inception of the Superfund program, the EPA has been building on its expertise in conducting site characterization and remediation to ensure that contamination is not a barrier to the reuse of property. Today, consideration of future use is an integral part of the EPA's cleanup programs from initial site investigations and remedy selection through to the design, implementation, and operation and maintenance of a site's remedy.

"For more than two decades, EPA has worked with diverse stakeholders to make sure reuse considerations are taken into account during the cleanup process," reflected Melissa Friedland, EPA's Superfund Program Manager for Redevelopment. "Superfund cleanups can be creative and flexible in allowing for future site uses, but that information needs to be plugged in early to be as effective as possible."

EPA also works with site stakeholders to consider how future land use considerations can inform the implementation and long-term stewardship of site remedies as well as cleanup planning. At some sites, for example, reuse considerations can inform the future location of ground water monitoring wells and other operation and maintenance equipment that might inadvertently hinder redevelopment efforts. At other sites, detailed site reuse plans have provided additional benefits that save time and reduce redevelopment costs. For example, future infrastructure corridors or building footers can be installed in coordination with site cleanup activities.

Identify partnership roles and responsibilities, engage diverse expertise and establish reasonable redevelopment expectations for the process.

Projects at contaminated lands are often complex undertakings that require diverse expertise. Forsite Development recognized its strengths, such as reuse planning and resource leveraging, and relied on a diverse project team for legal, technical, legislative and engineering expertise to make ReVenture Park happen. The resulting redevelopment plans were grounded in cleanup and market considerations, reasonably anticipating the land uses that would be located at the property in the future.

Outreach and engagement with local and state governments and communities is important.

Forsite Development's extensive outreach efforts meant that even after original power plant plans did not work out, the company was able to work with localities, regional partnerships and state agencies to identify other energy providers and prospective tenants.

Responsible parties and site owners are important stakeholders who can contribute to restoration and reuse planning activities as well as cleanup discussions.

Clariant's long-term interest in the area's economic sustainability and addressing its long-term obligations at the site meant that the company was willing to support the site's reuse, putting needed land use controls in place to ensure the long-term protection of public health and the environment and signing a lease-sale agreement with Forsite Development. For its part, Forsite Development agreed to guarantee an estimated $12.5 million for remaining cleanup activities.

"Clariant's commitment to the environment necessitated a remediation effort costing in excess of $40 million to address, control and improve environmental conditions and protect the Catawba River," CEO and president Ken Golder noted. "Clariant is committed to leaving behind a legacy of responsible corporate stewardship and has helped shape the vision for ReVenture Park."

Think long term.

It can take many years to remediate contamination that has accumulated over decades. At the Martin-Marietta, Sodyeco, Inc. site, clarifying the responsibilities of EPA's Superfund and RCRA programs also took time. These activities provide a time window for stakeholders to build partnerships and identify resources, coordinate with EPA and state agencies, and develop a strategy for returning a site to use while protecting future users. Forsite Development worked for five years to put in place the pieces needed to develop ReVenture Park.

Build on past experience.

Today, thanks to the BFPP provisions of the 2002 Brownfields Revitalization Act, environmental insurance and EPA tools such as Ready for Reuse Determinations, well-established resources are available to address stigma, liability and other site issues. Prospective purchasers can contact EPA site teams to learn more, or see the Sources and Resources section for additional information.

Conclusions

The redevelopment of the Martin-Marietta, Sodyeco, Inc. Superfund site illustrates how private sector leadership, collaborative partnerships with regulatory agencies, and detailed, flexible long-term planning can result in two major outcomes: the protection of human health and the environment and successful redevelopment.

At ReVenture Park, Forsite Development worked closely with Clariant, the site's owner, EPA and NCDENR, and local and regional organizations, leading a complex redevelopment project that has brought together diverse partners. In turn, the initiative has led to new economic opportunities and community benefits, providing one of the leading examples of clean energy, adaptive use and mixed-use Superfund redevelopment in the nation.

Reclaim, Restore, Reinvent: Creating Jobs and Cleaner Energy

MARTIN-MARIETTA SYDECO, INC. REDEVELOPMENT CASE STUDY

Sources and Resources

Sources

Images and maps for this case study are from EPA Region 4, NCDENR, Forsite Development, Clariant Corporation and site visits.

Resources

ReVenture Park website:
www.reventurepark.com

EPA site profile, including site decision documents:
www.epa.gov/region4/superfund/sites/npl/northcarolina/marmarsdnc.html

EPA Superfund Redevelopment Initiative:
www2.epa.gov/superfund-redevelopment-initiative

EPA Green Power Partnership:
www.epa.gov/greenpower

EPA's RE-Powering America's Land Initiative:
www.epa.gov/renewableenergyland

Renewable energy policy and incentive database:
www.dsireusa.org

NCDENR Division of Waste Management:
portal.ncdenr.org/web/wm

CERCLA liability and local government aquisitions:
www2.epa.gov/enforcement/state-and-local-government-activities-and-liability-protections

2002 Brownfields Revitalization Act and BFPP information:
www2.epa.gov/enforcement/brownfields-and-land-revitalization-cleanup-enforcement

Environmental insurance information:
www2.epa.gov/brownfields/brownfields-environmental-insurance-helps-ensure-redevelopment

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November 2015