



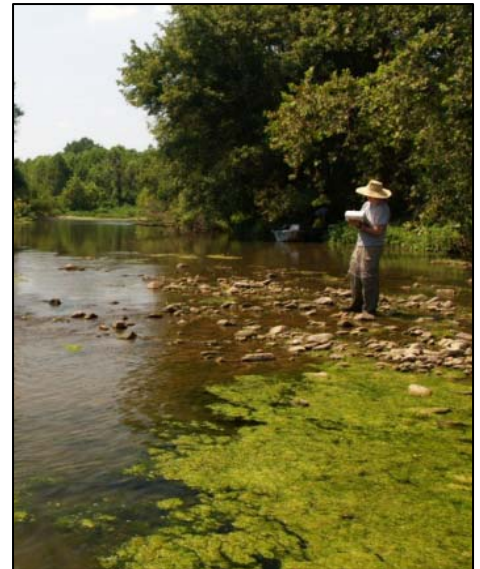
## At A Glance:

### Establishing Baselines before Undertaking Remedial Action

In Spring 2014, DuPont will begin collecting a variety of samples to establish baseline conditions in the South River and South Fork Shenandoah River. These baseline data will augment and update existing data and will allow scientists to compare conditions in the rivers before, during, and after remedial actions are implemented. Using these comparisons, scientists will evaluate if the planned riverbank stabilization is effective in reducing the amount of mercury released into the river system and, if so, whether fish and other aquatic animals show a similar reduction.

The samples that will be collected are part of a baseline monitoring plan, which was designed based on the findings of the Ecological Study and Science Team studies and with input from Science Team members. The Science Team's Monitoring Task Team will ensure that activities are coordinated with those involved in existing monitoring efforts so that data and experiences can be shared and duplication of effort can be avoided. Taken collectively, these results will provide the Science Team with data that will help them understand the effectiveness of remedial actions being undertaken

or help them assess whether new or different actions might be needed instead.



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## About this Newsletter...

In 2001, the South River Science Team was formed to serve as a focal point for technical issues concerning mercury in the South River and downstream waterways. The Science Team is a cooperative effort between the Virginia Department of Environmental Quality, Department of Health and the Department of Game and Inland Fisheries and representatives from academia, citizens groups, the Environmental Protection Agency and DuPont. The Science Team provides technical direction for the mercury monitoring program and ensures that there is effective communication provided to the users of the river. The Science Team's goal is to understand why mercury in South River fish has not decreased over time and to identify potential solutions to improve the situation.

## From the Team: Biochar Studies Provide Insight for Potential Applications

Over the last four years, the South River Science Team has performed laboratory tests and a pilot study involving biochar that have allowed them to gain insight about its behavior in aquatic environments and its effect (or lack thereof) on organisms. As discussed in previous newsletters,

conduct another laboratory study to determine if biochar helps reduce the uptake of mercury by aquatic worms. Results showed that biochar, when mixed with South River sediment, reduced mercury and methylmercury levels in the worms compared to the sediment without biochar.



About 2,000 pounds of biochar (above left photo) were applied to one half of the pond (above right photo).

biochar is an eco-friendly material that is made by heating organic carbon materials like hardwood or pine bark under oxygen-limiting conditions. Armed with the results from the tests and pilot study, the team is now exploring the possibility of applying biochar to riverbank sediment and floodplain soil to determine if it can immobilize the mercury present and thereby decrease the amount of mercury that is available to aquatic organisms and the food web.

In 2009, the Science Team worked with scientists from the University of Waterloo in Canada to understand the chemical form of mercury present in the South River sediment and floodplain soil and to determine if additives mixed with sediment and soil have the ability to immobilize mercury. A variety of additives were used; information about the laboratory study is provided in the Second Half 2010 newsletter. Study results showed that biochar successfully reduced the amount of mercury available in the sediment for uptake by organisms.

The Science Team also worked with scientists from the Smithsonian Environmental Research Center to

In 2011, the Science Team took the study from the laboratory to the field. A pilot study in a South River floodplain pond was conducted to determine whether adding biochar to the pond sediment would reduce the mercury level in organisms without harming the ecosystem. Sampling



The goal of the study was to determine if the biochar would reduce the mercury level in organisms (like those shown above) without harming the ecosystem.

results to date show that adding biochar to the pond sediment reduces mercury levels in tadpoles, snails, and aquatic insects. No adverse effects to living organisms have been observed (see First Half 2011 newsletter).

The Science Team is evaluating whether biochar could be incorporated into future remedial action efforts, such as planned riverbank stabilization. The team is also considering implementing a pilot study to incorporate biochar into floodplain soil. If these tests are successful, biochar may be a component of the remedial technologies used to reduce the impact of mercury in the South River.

*Previous newsletters are available online. For more information about this topic, contact Nancy Grosso at (302) 999-3114 or [nancy.r.grosso@dupont.com](mailto:nancy.r.grosso@dupont.com).*



# TechCorner: DuPont Modifying Permit to Include Rivers

DuPont has applied for a Resource Conservation and Recovery Act (RCRA) permit modification for the former DuPont Waynesboro site. The existing

modified to address historic mercury releases to the aquatic and terrestrial floodplain systems of the South River and South Fork Shenandoah River.

Protect human health and the environment from the potential hazards of waste disposal	Conserve energy and natural resources
Reduce the amount of waste generated	Ensure that wastes are managed in an environmentally sound manner

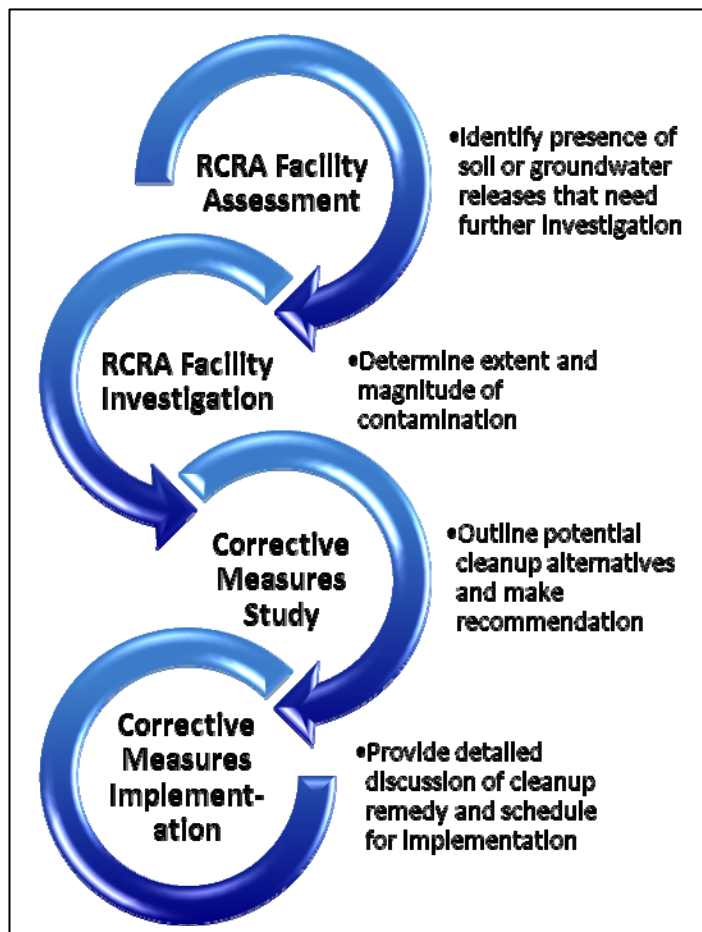
RCRA was passed as a law in 1976 and has the four goals shown above.

RCRA permit for the site describes the plant's history and the actions required to identify and clean up historical contamination. The permit is being

DuPont has been investigating and cleaning up its former plant site under the RCRA Corrective Action program, which consists of four phases. Although DuPont has conducted investigations and pilot



Once modified, work performed on the South River and South Fork Shenandoah River will be part of the permit for the former DuPont Waynesboro plant.



The primary four steps of the RCRA Corrective Action process are shown above, along with the activities associated with each step.

studies on the South River and South Fork Shenandoah River with agency involvement, these efforts were not completed under a formal administrative process. Once the existing RCRA permit for the former DuPont plant is modified to include the rivers, work will be able to proceed under the RCRA Corrective Action program.

*For more information about the permit modification, contact Vince Maiden (DEQ Project Manager) at (276) 676-4867 or [vincent.maiden@deq.virginia.gov](mailto:vincent.maiden@deq.virginia.gov) or Angela Alonso (DEQ Permit Writer) at (804) 698-4328 or [angela.alonso@deq.virginia.gov](mailto:angela.alonso@deq.virginia.gov).*

## Did You Know? City Completes Riverbank Improvement Projects

In Fall 2013, the City of Waynesboro completed its riverbank work at Ridgeview Park and Wayne Avenue Pocket Park to improve South River water quality in these areas. The City graded over 1,000 feet of riverbank between Wayne Avenue and the INVISTA plant in Waynesboro to reduce its

steepness and then planted native vegetation to stabilize it. At Ridgeview Park, a channel and three habitat structures were created in the river. The City completed the work with the help of staff from Parks and Recreation and the Department of Game and Inland Fisheries.



These photos show Ridgeview Park before (left) and after (right) riverbank improvements.

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