

# Millsboro Inhalation and Biomonitoring Report finds air pollution coming into Delaware problematic; “Personal air,” indoor sources contributed most to toxic exposure

NEWS FROM THE DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL, THE DELAWARE DEPARTMENT OF HEALTH AND SOCIAL SERVICES AND THE OFFICE OF US REPRESENTATIVE JOHN CARNEY

DOVER (May 28, 2013) – US Representative John Carney, the Delaware Department of Health and Social Services (DHSS) and the Delaware Department of Natural Resources and Environmental Control (DNREC) announced the release today of [\*The Millsboro Inhalation Exposure and Biomonitoring Study, Final Report\*](#). The report, sponsored by the Delaware Cancer Consortium and DNREC, and prepared by RTI International (RTI), was undertaken in response to residents’ concerns about cancer rates in the Millsboro area.

## **Air and Biological Sampling**

During the fall of 2011 and 2012, 35 Millsboro area residents participated in an inhalation exposure and biomonitoring study of PM<sub>2.5</sub> (fine particulate matter that poses a health concern when levels in the air are high). Over a timeframe of three consecutive days in both 2011 and 2012, indoor, outdoor and personal air samples (the air breathed in a personal space) were analyzed for fine particulate matter both upwind and downwind of the power plant. Air samples were assessed for PM<sub>2.5</sub>

mass, and screened for environmental tobacco smoke and black carbon. Investigators also identified metals in the PM<sub>2.5</sub>, such as selenium, arsenic, mercury, nickel, lead, chromium and uranium. Environmental samples were supplemented by biological sampling of the participants for volatile organic compounds (VOCs) and metals.

### **Key Findings of Air Sampling**

Monitoring found that the largest impact on ambient air may be pollution carried by air currents from large urban areas outside the state. According to RTI, exposure levels did not increase with the operation of the nearby NRG Indian River power plant.

Personal air and indoor sources were cited as contributing most to study participants' exposure to PM<sub>2.5</sub>. – in fact, personal air concentrations of PM<sub>2.5</sub> were statistically higher than outdoor concentrations. RTI found that personal air samples were influenced by the frequency in participation and intensity of common indoor activities, such as smoking, cooking, cleaning, and using personal care products.

“Delawareans have a right to know if they are being exposed to environmental toxins that could increase their risk of cancer and other health issues,” said Congressman Carney, a member of the Delaware Cancer Consortium. “The results of this study show the importance of monitoring potential sources of toxins both in Delaware and in states that are upwind of us. It also reinforces that prevention and making healthy lifestyle choices, such as not smoking, are critical to avoiding these health issues before they start. I’m very pleased to have played a role in completing this study – it will be a useful tool in planning the next steps in the fight against cancer.”

Bromine was the only metal with personal air levels significantly higher than outdoor samples. Bromine likely comes from sources that are unique to indoor settings, such as

flame retardants and environmental tobacco smoke (ETS). Several potential indoor sources screened during the study, including tobacco smoke, require further sampling and data analysis to identify.

PM<sub>2.5</sub> exposure levels for indoor and personal air monitoring were not altered by the Indian River power plant emissions, the study found.

“The results of this study clearly illustrate that we need to continue our focus on the key factors that contribute to serious health challenges in the state,” said DNREC Secretary Collin O’Mara. “We have made considerable progress in reducing toxic emissions by reducing pollution from power plants and large industrial facilities, but this study shows that this is not the whole solution and that we must further expand our efforts to reduce pollution coming in from upwind states as well as support efforts to help residents reduce personal and indoor sources of toxins.”

DHSS Secretary Rita Landgraf said: “The role that the environment plays in people’s health will always be a complex puzzle filled with many variables. Thanks to funding from DNREC and the Delaware Cancer Consortium, and especially to the involvement of volunteers from the Millsboro area who participated in the study, we now have a baseline for that puzzle. Over time, we hope to expand our use of biomonitoring, both in terms of science and geography, to gain an even better understanding of how people’s indoor and outdoor environments are affecting their health.”

### **Key findings of Biological Sampling**

As with found with RTI’s air monitoring, blood and urine results from the study showed that PM<sub>2.5</sub> exposure was not consistently altered by Indian River power plant operation. Blood samples were analyzed for volatile organic compounds and metals (cadmium, mercury, and lead). Volatile organic compounds and metals in blood samples were consistent across

both sample years, 2011 and 2012. There were significant associations between blood mercury, blood lead, and urinary uranium and PM<sub>2.5</sub>, but all of the associations appeared to be driven by a single measurement from a single individual.

Urine samples were analyzed for 14 metals. Data found that participants who consumed seafood within 48 hours of providing a urinary sample had increased urinary arsenic levels. Arsenic in fish is primarily an organic form of arsenic and it is nontoxic; this study measured total (inorganic and organic) arsenic in urine. While inorganic arsenic is considered toxic, organic arsenic is less toxic and is quickly excreted from the body. Arsenic concentrations in fish and shellfish from the nearby Inland Bays are not greater than concentrations in fish and shellfish from the entire East and Gulf Coasts of the U.S. Data from the biomonitoring study also suggests that the regular consumption of grains significantly decreases exposure to arsenic, reflecting possible dietary factors or food interactions.

The study, the first of its kind in Delaware and the first funded by a state, was managed by the Delaware Cancer Consortium Environment Committee. The study was undertaken to establish a baseline for assessing human exposures to natural and synthetic compounds in the environment along the Indian River in the area of NRG's power plant there.

While information is expanding every day about the causes of cancer, research studies show mixed results in finding a direct link between cancer and the environment. Cancer incidence appears to be considerably impacted by lifestyle and genetics. To learn more about healthy lifestyle choices that may reduce risks for cancer, visit [www.delawarecancerconsortium.org](http://www.delawarecancerconsortium.org). To learn more about reducing potential toxins in your home, please visit <http://www.dhss.delaware.gov/dhss/dph/hsp/hhdelres.html>. The Millsboro Inhalation Exposure and Biomonitoring Study also can

be found [on the DNREC website](#).

“Research shows that lifestyle improvements matter in reducing cancer risk,” said Dr. Karyl Rattay, Division of Public Health director. “An easy to remember healthy lifestyle slogan is ‘5-2-1 Almost None’: five or more fruits or vegetables daily, no more than two hours of recreational screen time, one hour of total physical activity a day and almost no sugary beverages. In addition to quitting smoking and limiting common toxins in the home, a healthier lifestyle can make a healthier you.”

The multimedia exposure study was underwritten by DNREC and the Delaware Cancer Consortium, in collaboration with the Delaware Health Fund. Jonathan Thornburg, PhD, and James Raymer, PhD, of RTI International were co-principal investigators. A registered Delaware Division of Public Health nurse collected the biological specimens, which were analyzed by the Delaware Public Health Laboratory while DNREC’s Division of Air Quality performed air dispersion modeling.

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