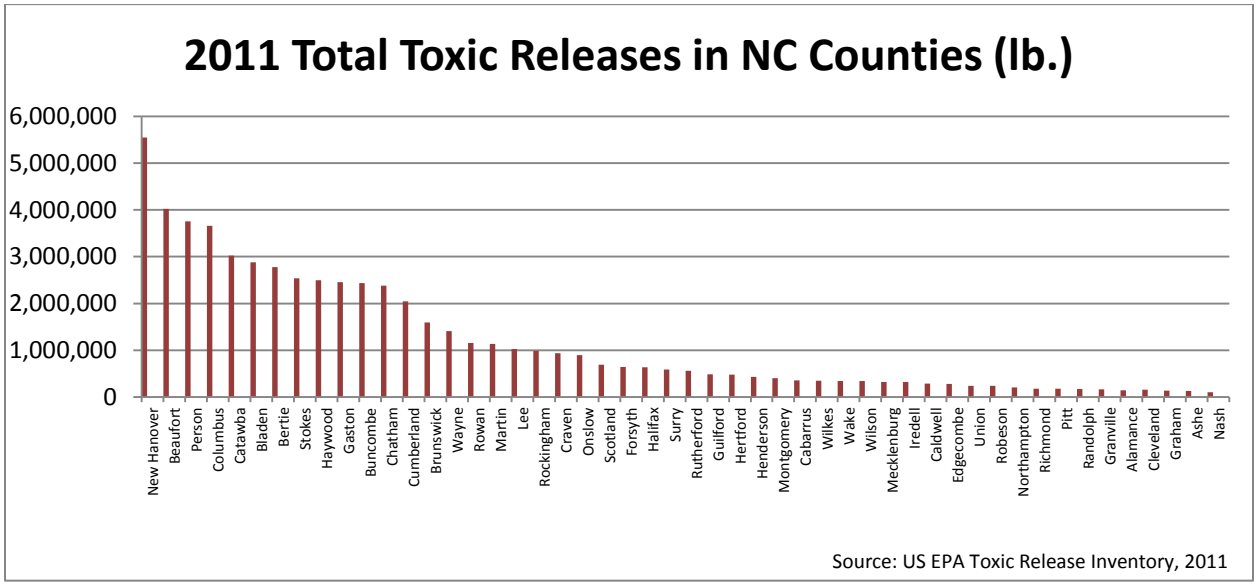
Health Effects of Toxic Emissions from Cement Plants

In addition to emitting massive amounts of "criteria pollutants," such as ozone and particulate matter which are most often associated with respiratory and cardiac illness, Titan would be a significant source of various toxic air emissions in New Hanover County. The US EPA defines toxics as "pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects."[1]

New Hanover County already tops the list in EPA's 2011 Toxic Release Inventory (TRI), which publishes total toxic releases for North Carolina's individual counties.[2] This alarming statistic is further compounded by the county having the second-smallest land mass over which to spread these toxics, as well as the second-highest population density.[3] Titan's factory would be permitted to add tens of thousands of pounds of toxic pollution to the region each year, including some of the highest mercury, acid gas, arsenic, benzene, and lead emissions in the area.

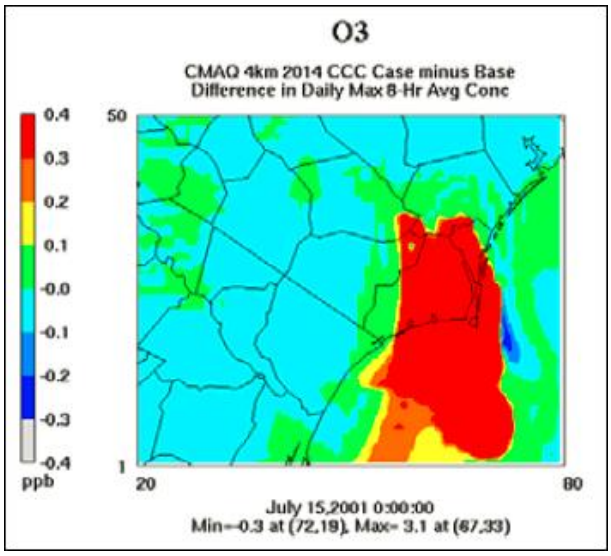


- A 2006 study published in *Environmental Health Perspectives* found a strong association between autism and heavy metal pollution, especially mercury, cadmium, and nickel.[4] Titan would emit significant amounts of all of these chemicals, and New Hanover County already has the highest levels of nickel emissions in the state.[5]

- A 2012 study published in *The Archives of General Psychiatry* found significantly increased rates of autism for children exposed to criteria pollutants during gestation, as well as during their first year of life. For high levels of both coarse and fine particulate pollution, the researchers found that the rate of autism more than doubled for children exposed during prenatal and first-year development.[6] Titan's cement plant would be the 2nd-largest source of both of these pollutants in New Hanover County.[7]

- Titan would more than double the total emissions of benzene for New Hanover County, moving its statewide ranking from 10th to 2nd.[8] Lupo, et al.'s 2010 study found that pregnant women living in areas with high levels of benzene in the air were more likely to have babies with neural defects.[9] Other studies have linked benzene with increased rates of cancer, as well as other developmental problems in newborns.[10]

- A 2012 study published in *Science of the Total Environment* found that homes within 3 to 5 km of a cement kiln had 2 to 9 times the level of dioxins than those further away.[11] Dioxins are considered an acutely toxic class of chemicals by the EPA, which lists cement kilns as one of the "major contributors" of these chemicals to the environment.[12]



This figure, from a 2011 health report conducted by ICF International, provides an example of an emission "plume" from Titan Cement, in this case ozone. However, the same prevailing atmospheric conditions can be expected to drive much of Titan's toxic emissions in the same path as the pollutants modeled in this study.

- A public health assessment conducted by Michigan's Department of Community Health found that out of eight surface water samples taken near a massive cement plant in Alpena, MI, all eight had pH levels greater than the US EPA Drinking Water Action Level. Additionally, six of those had lead concentrations greater than the US EPA Drinking Water Action Level. They also found that the groundwater under the cement kiln dust pile east of the plant was contaminated with metals at concentrations exceeding US EPA Maximum Contaminant Levels, as well as other health-based criteria.[13]

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[1] US Environmental Protection Agency. Toxic Air Pollution – About Air Toxics. http://www.epa.gov/oar/toxicair/newtoxics.html
[2] US EPA, 2011. TRI On-site and Off-site Reported Disposed of or Otherwise Released (in pounds), for facilities in All Industries, for All chemicals, By County, North Carolina. http://iaspub.epa.gov/triexplorer/tri_release.geography
[3] US Census Bureau, 2011. American Factfinder: New Hanover County, North Carolina. http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml
[4] NCDENR Division of Air Quality, 2012. North Carolina Point Source Emissions Report. http://xapps.ncdenr.org/aq/ToxicsReport/toxrpt.jsp?ibeam=true
[5] Windham, et al., 2006. Autism spectrum disorders in relation to distribution of hazardous air pollutants in the San Francisco bay area. *Environmental Health Perspectives*, Vol. 114(9).
[6] Volk, et al., 2012. Traffic-Related Air Pollution, Particulate Matter, and Autism. Archives of General Psychiatry.
[7] NCDENR Division of Air Quality, 2012. North Carolina Point Source Emissions Report. http://xapps.ncdenr.org/aq/ToxicsReport/toxrpt.jsp?ibeam=true
[8] NCDENR Division of Air Quality, 2012. North Carolina Point Source Emissions Report. http://xapps.ncdenr.org/aq/ToxicsReport/toxrpt.jsp?ibeam=true
[9] Lupo, et al., 2010. Maternal Exposure to Ambient Levels of Benzene and Neural Tube Defects among Offspring: Texas, 1999–2004. *Environmental Health Perspectives*, Vol. 119(3).
[10] Xing, et al., 2010. Benzene exposure near the U.S. permissible limit is associated with sperm aneuploidy. *Environmental Health Perspectives*, Vol. 118(6).
[11] Deziel et al., 2012. Determinants of polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans in house dust samples from four areas of the United States. *Science of The Total Environment*.
[12] US Environmental Protection Agency, 2007. TRI Dioxin and Dioxin-like Compounds Toxic Equivalency (TEQ) Information Rule- Final rule. http://www.epa.gov/tri/lawsandregs/teq/teqpfinalrule.html
[13] Michigan Department of Community Health. "Petitioned Public Health Assessment: Lafarge Corporation – Alpena Plant." March 15, 2000.