Salisbury Health Survey

- In answer to requests from residents, the Blue Ridge Environmental Defense League initiated a health survey in the residential Salisbury communities of Milford Hills and Meadowbrook.
- The survey relied on a variety of methods to make its findings.
Methods

- Hundreds of citizen phone calls reporting cancers and health problems in the area, plus a systematic review of area death certificate records
  - determine primary cause of death and/or type and time of primary cancer diagnosis
- Used US Census tract block group data for area
  - calculate observed cancer rate
  - calculate expected cancer rate using direct age-adjustment with NC age-specific cancer rates
- Hydrogen sulfide modeling and monitoring maps plus over 600 formal citizen air quality odor and breathing complaints proximity serve as surrogate marker for environmental exposure
Milford Hills and Meadowbrook Census Tracts

- **Milford Hills Census Tract**
  BG 513031 (BG 1)
  687 Residents

- **Meadowbrook Census Tract**
  BG 513032 (BG 2)
  874 Residents
Identify Nearby Hazardous Chemicals/Materials

- Many Known carcinogens and neurotoxicants
- Benzene
- Polyaromatic hydrocarbons (PAHs)
- Naphtha (solvent mixed with liquid asphalt)
- Asbestos (friable chyrostile asbestos)
- Asphalt fumes
- Chlorinated solvents including trichloroethylene, 1,1-dichloroethylene, tetrachloroethylene
- Particulates of a size that are a health concern
- Hydrogen sulfide
A 2001 NC Dept of Environment and Natural Resources modeling study before carbon filters were installed and before the exhaust fan removed found that:

Average hydrogen sulfide exposure level in Milford Hills (513031): 215 parts per billion (ppb)
Nearby homes have experienced as high as: 860 ppb

Compare these hydrogen sulfided values to:
- NC 24-hour Acceptable Ambient Level: 86.2 ppb
- World Health Org. 1-hour standard: 5 ppb
Modeled Air Pollution Impacts from area plants: Toxics (ug/m\(^3\)) \(NCDENR\, 2001\)

<table>
<thead>
<tr>
<th>Toxin</th>
<th>Averaging Period</th>
<th>Maximum Impact</th>
<th>AAL</th>
<th>% of AAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>annual</td>
<td>148</td>
<td>0.12</td>
<td>123.33</td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>1 hour</td>
<td>2510</td>
<td>2100</td>
<td>120</td>
</tr>
<tr>
<td>Toluene</td>
<td>24 hour</td>
<td>10460</td>
<td>4700</td>
<td>223</td>
</tr>
<tr>
<td></td>
<td>1 hour</td>
<td>148200</td>
<td>56000</td>
<td>265</td>
</tr>
<tr>
<td>Xylene</td>
<td>24 hour</td>
<td>6380</td>
<td>2700</td>
<td>236</td>
</tr>
<tr>
<td></td>
<td>1 hour</td>
<td>90500</td>
<td>65000</td>
<td>139</td>
</tr>
</tbody>
</table>
Elevated Cancer Rates Detected

- 51303 BG1 and BG2 1571 residents represent about 1.2% Rowan County population
- But they had about 7% of pancreatic cancers in the county from 1996-2004 with 5 confirmed cases
- In 51303 BG 1 a little less than 1% (6 of 687 residents) of the block group died with lung cancer in a two year period in 2000 and 2001. Moreover, about 16 residents in the two block groups died with lung cancer from 1990-2000
Salisbury Elevated Primary Brain Cancer Rate

1995-2000: 6 residents were diagnosed with primary brain cancer cases in Census Tract 513.03 Block groups 1 and 2. These neighborhood’s brain cancer rate was 7.6 times expected NC rate for 1995-2000 (ATSDR used Rowan County rates for comparison)

1988-2000: 8 brain cancer cases were diagnosed in the same BG 1 and 2, with brain cancer incidence rate 4.7 times expected NC rate

In 1999 and 2000 over about a 12 month period, 3 children were diagnosed with a medulloblastoma out of about 1800 children residing in census tracts 513.03 and 513.04. That years the rate was about almost 300 times the expected national incidence rate of 0.59/100,000 children for medulloblastomas. In a slightly larger area several children had other brain cancers
## Salisbury Elevated Primary Brain Cancer Rate

<table>
<thead>
<tr>
<th>Observed Cases in 513031 &amp; 513032 (1988-2000)</th>
<th>Expected Cases</th>
<th>SIR-Exact Rate Ratio</th>
<th>P-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>1.69</td>
<td>4.74</td>
<td>0.00006857</td>
<td>2.044-9.327</td>
</tr>
</tbody>
</table>
Confirmation of Elevated Rates in 513031 and 513032: ATSDR/CDC 2006 Cancer Review Report

- ATSDR’s Feb. 2006 review of NC Cancer Registry data found age-adjusted elevated brain cancers, lymphomas, and cancers overall vs. county rates

<table>
<thead>
<tr>
<th>Site</th>
<th>SIR within 1 mile of asphalt plants</th>
<th>95% Confidence Interval</th>
<th>SIR Block Groups 513031(Milford Hills) &amp; 513032 (Meadowbrook in 1 mile)</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain</td>
<td>1.70</td>
<td>(0.45, 4.33)</td>
<td>6.16</td>
<td>(1.66, 15.78)*</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>1.37</td>
<td>(0.55, 2.83)</td>
<td>4.94</td>
<td>(1.80, 10.76)*</td>
</tr>
<tr>
<td>All Cancers</td>
<td>0.77</td>
<td>(0.62, 0.93)*</td>
<td>1.32</td>
<td>(1.07, 1.60)*</td>
</tr>
</tbody>
</table>

*Statistically significant results compared to Rowan County cancer rates

• ATSDR/ CDC February 2006 Final Report for Salisbury, NC Cancer Study Foster and Henderson
But ATSDR Blinked

Despite these findings, the agency’s 2006 review concluded:

“ATSDR cannot establish any causal relationship between these elevated rates and any contamination or condition in the test area.”

However, ATSDR’s analysis is based on a four-month period in 2002 that measured emissions after the asphalt facilities had installed carbon filters, removed storage tank exhaust fans, stopped chlorinated solvent contaminated water spraying, stopped uncontrolled emissions from the petroleum tank farm remediation, and halted cutback asphalt manufacturing.
How did this Happen?

- Decades of poor or absent enforcement from state environmental agencies.
- Little or no past EPA oversight of NCDENR.
- Lack of funding for EPA, NCDENR, ATSDR, and NIOSH because of industry political pressure on the Federal and State legislators.
- A total lack of the required public notification of both local residents and city officials.
Current Situation

- Sept 2009: BREDL petitioned ATSDR to reconsider their study in light of the problems regarding adequate data. In January 2010, ATSDR rejected this petition and stood by their study citing the speculative nature of modeling past exposure and the lack of resources.

- January 2010: BREDL representatives met with Rep. Brad Miller to discuss the inadequacies of ATSDR and their ability to conduct meaningful investigations into sites like Salisbury.
Remaining Tasks

- Ultimately health officials will need the help of residents past and present to do a proper health study.
- We will need to identify past residents and workers who may have been exposed.
- The NC Cancer Registry has tragically released and incorrectly analyzed inaccurate cancer data, which did not match Rowan County Health department confirmed death-certificate neighborhood cancers that we have identified. The Cancer Registry delayed cancer data release to CDC for several years.
Survey Team

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