

# Letter Health Consultation

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Assessment of Cancer Incidence from the Louisiana Tumor Registry  
(1988-2008) Data for the Hwy 71/72 Refinery Site

BOSSIER CITY PARISH, LOUISIANA

**Prepared by**  
**Louisiana Department of Health**

JANUARY 28, 2013

Prepared under a Cooperative Agreement with the  
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Agency for Toxic Substances and Disease Registry  
Division of Community Health Investigations  
Atlanta, Georgia 30333

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In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LETTER HEALTH CONSULTATION

Assessment of Cancer Incidence from the Louisiana Tumor Registry  
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Prepared By:

Louisiana Department of Health and Hospitals  
Office of Public Health  
Section of Environmental Epidemiology and Toxicology  
Under a cooperative agreement with the  
U.S. Department of Health and Human Services  
Agency for Toxic Substances and Disease Registry

**Bobby Jindal**  
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**Bruce D. Greenstein**  
SECRETARY

# State of Louisiana

Department of Health and Hospitals  
Center for Environmental Health Services

November 28, 2012

Ms. Laura Stankosky  
1445 Ross Ave, Suite 1200  
Dallas, Texas 75202

Dear Ms. Stankosky,

In June 2000, the Louisiana Department of Health and Hospitals/Office of Public Health/Section of Environmental Epidemiology and Toxicology's (LDHH/OPH/SEET) and the Agency for Toxic Substances and Disease Registry (ATSDR) authored the Hwy 71/72 Public Health Assessment (PHA). As part of LDHH/OPH/SEET's environmental health investigation for the Hwy 71/72 site, and as follow-up to the recommendation made in the June 2000 PHA, LDHH has evaluated cancer incidence data (1988-2008) for the zip code areas 71111 and 71112 for types of cancers related to benzene, toluene, ethylbenzene, and xylene exposures.

According to the PHA (June 2000), the Highway 71/72 site was classified as a public health hazard because the long term exposure to benzene levels in the indoor air would pose an unacceptable cancer risk for long term residents.<sup>1</sup> The following letter provides the results of SEET's cancer incidence assessment.

## **Background and Statement of Issues**

The 215-acre Highway 71/72 Refinery site is located in Bossier City, Louisiana near the intersections of Louisiana State Highways 71 and 72 in Bossier Parish. The site is approximately 2 miles east of downtown Shreveport and 1,500 feet north of the Red River. Periodic groundwater monitoring of this site is performed by the U.S. Environmental Protection Agency (EPA) to ensure that light non-aqueous phase liquid (LNAPL), a group of petroleum chemicals (mainly benzene, ethylbenzene, toluene, and xylene), is not migrating to non-contaminated areas. The PHA (June 2000) concluded that the levels of benzene reported in the indoor air, that if representative of long term exposures, would pose an unacceptable cancer risk for long term residents. The levels of toluene, xylene, and ethylbenzene reported in indoor air were below levels of health concern.

## Methodology

This report reviews cancer incidence in the zip code areas 71111, 71112, and 71111/71112 combined, and compares it with the entire State of Louisiana.<sup>2</sup> Cancer incidence is the number of new cancer cases diagnosed, often expressed as a rate over a specified period of time. In this document, the rate is the average number of new cases diagnosed in a year in a population of 100,000 people.

Because cancer is diagnosed more frequently among the elderly, and because some geographic areas have a larger proportion of elderly residents than others, age-adjusted rates are used to allow meaningful comparisons of rates from different areas by removing the effect of varying age distributions. These are weighted averages of age-specific rates, where the weights represent the distribution of a standard population, in this case the U.S. 2000 population.

Comparisons of incidence rates for individual types of cancer for zip code areas 71111, 71112, and 71111/71112 combined and Louisiana are shown in Appendix B, tables 1,2, and 3 as rate ratios along with 95% confidence intervals. If both the rate ratio and its confidence intervals are less than 1.0, then the zip code rate is considered significantly lower than the state rate; if the rate ratio and confidence interval are greater than 1.0, the zip code rate is considered significantly higher than the state rate. As seen in Appendix B, the zip code cancer rates were comparable and not significantly different from the state of Louisiana rates.

## Discussion

Benzene is known to cause cancers based on evidence from studies in both people and laboratory animals.<sup>3</sup> Long term exposure to excessive levels of benzene in air causes leukemia. Benzene exposure may also target organs such as the lung, liver, and kidneys: benzene is rapidly absorbed through the lungs and is metabolized in both the liver and kidney.<sup>4</sup>

Because the long term exposure to levels of benzene in the indoor air posed an unacceptable cancer risk for long term residents residing near the site, cancer incidence rates were calculated for the following types of cancer for zip code areas 71111, 71112, and 71111/71112 combined for the years 1988-2008 : leukemia, liver, kidney, lung and all cancers combined. All calculated rates are age-adjusted to the 2000 U.S. standard population. The population for each year was calculated by extrapolating between census year populations:

Population for zip code area 71111 for years 1988-2008 = 30, 639

Population for zip code area 71112 for years 1988-2008 = 27, 150

The equation to calculate incidence of cancer cases per 100,000 for 21 years (1988-2008) is the following:

$$\text{Incidence of Cancer Cases/ 100,000} = \frac{(\# \text{ of new cancer cases} * 100, 000)}{(21 \text{ years} * \text{ population number})}$$

Table 1: Cancer Incidence in Zip Code Area 71111 and Louisiana, 1988-2008 (average annual per 100,000\*, rate ratios, and 95% Confidence Intervals)

<b>Cancersite</b>	<b>Zip Code 71111 Incidence Rates</b>	<b>Louisiana Incidence Rates</b>	<b>Rate Ratio</b>	<b>95% Confidence Intervals</b>
<b>All Cancers Combined</b>	472.0	484.3	0.97	0.89,1.07
<b>Kidney</b>	12.1	15.0	0.81	0.46,1.40
<b>Lung</b>	75.2	82.2	0.91	0.73,1.14
<b>Liver</b>	3.7	4.9	0.76	0.22,1.79
<b>Leukemia</b>	12.1	12.1	1.00	0.57,1.73

\*Age adjusted to the 2000 U.S. standard population

The rates for all cancers are lower for the zip code area 71111 than the state of Louisiana rates. The rate ratios are less than 1.0 with the exception of the cancer incidence rate for leukemia which is 1.0. Since both confidence intervals include 1.0, the calculated cancer incidence rates are not significantly different than the state rates.

Table 2: Cancer Incidence in Zip Code Area 71112 and Louisiana, 1988-2008 (average annual per 100,000\*, rate ratios, and 95% Confidence Intervals)

<b>SITES</b>	<b>Zip Code 71112 Incidence Rates</b>	<b>Louisiana Incidence Rates</b>	<b>Rate Ratio</b>	<b>95% Confidence Intervals</b>
<b>All Cancers Combined</b>	493.3	484.3	1.00	0.93,1.11
<b>Kidney</b>	15.3	15.0	1.02	0.61,1.65
<b>Lung</b>	77.7	82.2	0.95	0.75,1.17
<b>Liver</b>	3.9	4.9	0.80	0.22,1.79
<b>Leukemia</b>	11.8	12.1	0.98	0.51,1.63

\*Age adjusted to the 2000 U.S. standard population

The rates for the following cancers are lower for the zip code area 71112 than the state of Louisiana rates: lung, liver, and leukemia; however, they are not significantly different from the state rates since both confidence intervals include 1.0. The cancer incidence rates for the kidney and all cancers combined are very slightly higher than the state of Louisiana rates, however, they are not significantly different from the state rates since both confidence intervals include than 1.0.

Table 3: Cancer Incidence in Zip Code Areas 71111 and 71112 Combined and Louisiana, 1988-2008 (average annual 100,000\*, rate ratios, and 95% Confidence Intervals)

<b>SITES</b>	<b>Zip Codes 71111 &amp; 71112 Combined Incidence Rates</b>	<b>Louisiana Incidence Rates</b>	<b>Rate Ratio</b>	<b>95% Confidence Intervals</b>
<b>All Cancers Combined</b>	482.0	484.3	1.00	0.91,1.09
<b>Kidney</b>	13.6	15.0	0.91	0.51,1.48
<b>Lung</b>	76.4	82.2	0.93	0.74,1.16
<b>Liver</b>	3.8	4.9	0.78	0.22,1.79
<b>Leukemia</b>	11.9	12.1	0.98	0.51,1.63

\*Age adjusted to the 2000 U.S. standard population

The calculated incidence rates for all cancers for the combined zip code areas 71111 and 71112 are lower than the state of Louisiana rates. The rate ratios are less than 1.0 for all cancers with the exception of the cancer incidence rate for all cancers combined which is 1.0. However, since both confidence intervals include 1.0 for all cancer sites above, the calculated cancer incidence rates are not significantly different than the state rates.

#### **Conclusion**

Overall, cancer incidence rates of the lung, liver, leukemia, kidney, and combined cancers in the zip code areas 71111 and 71112 from 1988-2008 did not differ significantly from those in the state of Louisiana.

#### **Recommendations**

There are no recommendations to be made at this time. LDHH/OPH/SEET will examine future data as needed.

Sincerely,

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## References

1. Blanker, Ellen; Cooper, Barbara; Gallo, Kimberly; and Metcalf, M. Public Health Assessment: Highway 71/72 Refinery, Bossier City, Bossier Parish, Louisiana. Atlanta: US Department of Health and Human Services: 2000 June 16.
2. The Louisiana Tumor Registry (LTR) updates the statewide database as new case reports arrive. There is a tendency for the number of cases reported for a given time period to increase slightly, the more time passes after that period. Data used in this review were provided by LTR in 2008.
3. American Cancer Society. Accessed 12 December 2012 at: <http://www.cancer.org/cancer/cancercauses/othercarcinogens/intheworkplace/benzene>.
4. ToxGuide for Benzene. Atlanta: US Department of Health and Human Services. Accessed at: <http://www.atsdr.cdc.gov/ToxProfiles/tp.asp?id=40&tid=14>.
5. Cotran R, Kumar V & Robbins S. Robbins Pathologic Basis of Disease (4th edition). W.B. Saunders, Philadelphia, 1989, p. 268.



## **Report Preparation**

This letter health consultation for the Assessment of Cancer Incidence from the Louisiana Tumor Registry (1988- 2008) Data for the Highway 71/72 Refinery site was prepared by the Louisiana Department of Health and Hospitals/Office of Public Health/Section of Environmental Epidemiology and Toxicology under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved agency methods, policies, procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented.

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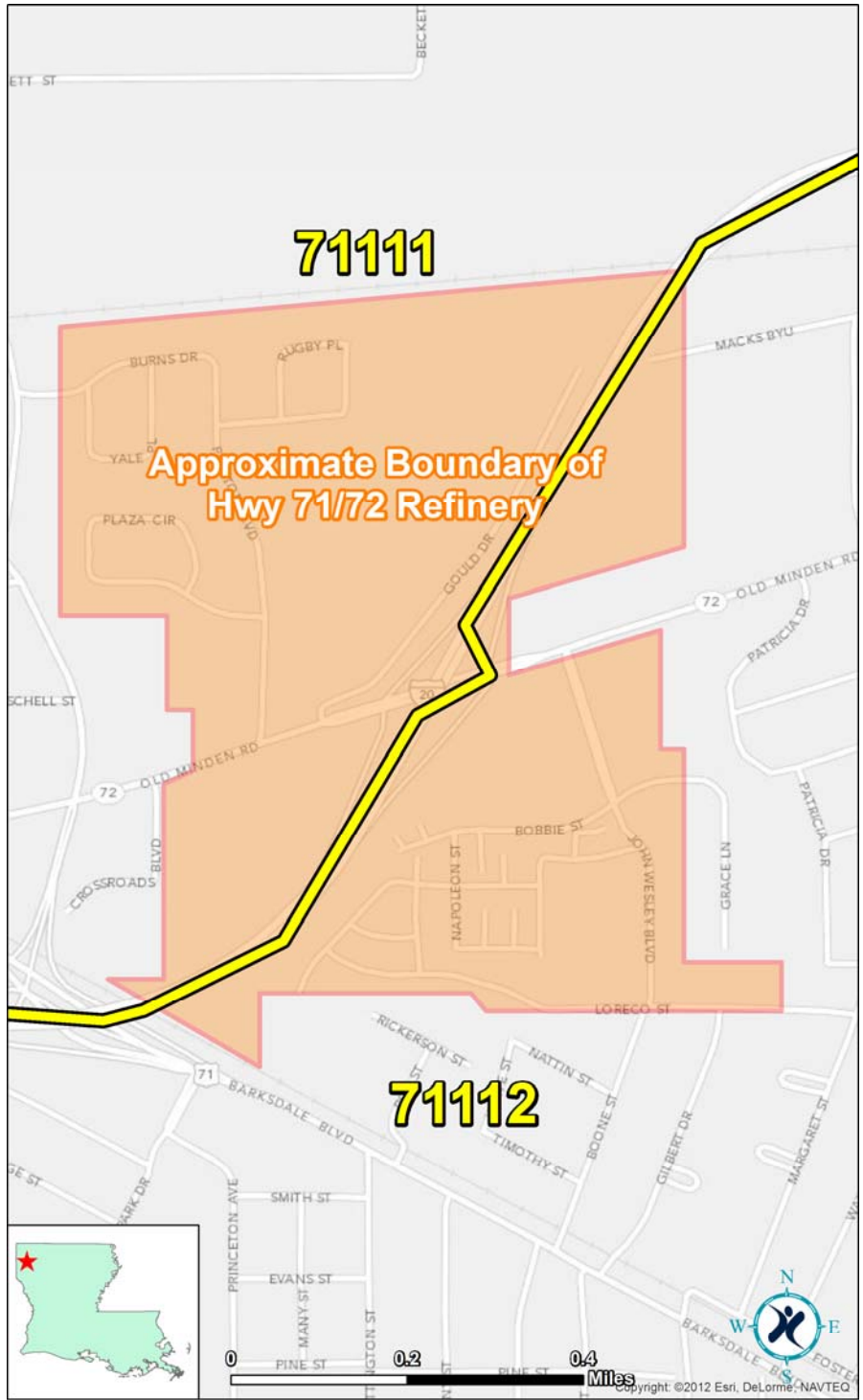
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## **APPENDIX A: Map**

### **Figure A-1: Location of the Hwy 71/72 site**



Map produced December 12, 2012 by the Louisiana Department of Health and Hospitals / Office of Public Health / Section of Environmental Epidemiology and Toxicology (SEET) using data provided by Agency for Toxic Substances and Disease Registry.  
 Disclaimer: SEET cannot guarantee the accuracy of the information contained on these maps and expressly disclaims liability for errors and omissions in their contents.