

Health Consultation

COMBUSTION, INC.

ASSESSMENT OF CANCER INCIDENCE FROM THE LOUISIANA
TUMOR REGISTRY FROM 1988 - 1997

DENHAM SPRINGS, LIVINGSTON PARISH, LOUISIANA

EPA FACILITY ID: LAD072606627

MARCH 17, 2005

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

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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HEALTH CONSULTATION

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Prepared by:

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

I. EXECUTIVE SUMMARY

In 1995, the Louisiana Department of Health and Hospitals, Office of Public Health, Section of Environmental Epidemiology and Toxicology (LDHH/OPH/SEET) prepared a preliminary public health assessment for Combustion, Inc. It was determined that the Combustion, Inc. site posed a public health hazard because of past, possibly present and future exposure to soil contaminated with arsenic, lead, vanadium and polychlorinated biphenyls (PCBs). This health consultation is in response to a request by the Agency for Toxic Substances and Disease Registry (ATSDR), to conduct a health statistics review to evaluate cancer statistics. A health statistics review was conducted to evaluate whether the population residing closest to the Combustion Inc. National Priorities List (NPL) site in Livingston Parish, Louisiana, had elevated cancer incidence rates. This review evaluates cancer rates in a 1-mile proximity zone. The size of the population in the 1-mile proximity zone was approximately 4,000 persons. Cancer data (1988-1997) from the Louisiana Tumor Registry (LTR), a population based cancer incidence registry covering the entire state, was utilized for this review. The cancer cases included in the analysis are those cases that could be geocoded to latitude-longitude coordinates within 1-mile of the site. The geocoding rate for the entire data set (zip codes 70726 and 70785) was 93.0%.

Results of the cancer incidence review for the census block groups within 1-mile of the site compared with Louisiana state rates show standardized incidence ratios (SIRs) at all sites combined for males and females and for breast cancer in females were lower than expected.

The comment period for the Environmental Protection Agency's (EPA) Proposed Plan ended June 23, 2003. The EPA has begun work on responses to comments received during the comment period and on the drafting of the Record of Decision. Community health concerns were addressed in the Combustion, Inc. Health Assessment.

II. BACKGROUND AND STATEMENT OF ISSUES

The Combustion, Inc. site was an inactive, abandoned waste oil recycling facility in Livingston Parish, Louisiana. It is approximately 2 miles northwest of the town of Walker and 2.2 miles northeast of the town of Denham Springs (Figures 1 and 2). A residential community of 36 households known as the Dubose Subdivision is next to the site (1).

The health of the community living near the Combustion, Inc. NPL site in Livingston Parish, Louisiana, is of particular concern to both the LDHH/OPH/SEET, and the ATSDR. A Public Health Assessment performed by SEET in 1995 at this site resulted in a recommendation by the ATSDR for a review of cancer statistics and other available health data.

The LTR was used to ascertain cancer cases. The Tumor Registry, operated by Louisiana State University Medical Center, is a population-based cancer registry covering the entire

state of Louisiana. The registry has been in operation in the New Orleans metropolitan area since 1974, in South Louisiana since 1983 and in the rest of the state since 1988. By law, every health care provider is required to report newly diagnosed cancers.

III. METHODOLOGY

The period of time selected for evaluation of cancer incidence data was 1988-1997, which were the most recent data available for this part of the state at the time of this analysis. Cancer incidence was chosen for this review because cancer death rates are affected by multiple factors: how advanced the cancer was at the time of diagnosis, access to health care, and other factors not related to exposure. An incident cancer case was defined as an individual residing in one of the selected census block groups who was diagnosed with a new primary malignant cancer during the evaluation period. The variables analyzed included: address at time of diagnosis, parish of residence, primary cancer site, histology type, dates of diagnosis, age at diagnosis, date of birth, race, sex, census tract, census block group, and census block. Information on other risk factors such as occupational exposures or personal lifestyle habits was not available in the abstracted medical data used in this review. The potential risk factors that cannot be accounted for in this evaluation may vary within the area under evaluation or compared with the state as a whole.

Residential proximity to the Combustion, Inc. site was selected as an environmental indicator for various cancer types. This provided a clear geographically defined environmental parameter, but this approach assumes proximity equals exposure and ignores the latency period of cancer. Limited data exist to determine completed routes of exposure through air, water, or other sources at the Combustion, Inc. site. It is possible that portions of the groups were exposed while others were not. Additionally, occupational exposure information was not available. However, these are limitations that exist for all reviews and surveillance systems around NPL sites (2).

In order to characterize the population living within 1-mile of the site, 1990 census data were evaluated as shown in Table 1. The racial composition of residents living within 1-mile of the site differs from the state in that 96.5 % of the residents were white compared to 67.3% in the state, and 2.7% of the residents were black compared with 30.8% in the entire state. The proportion of persons living below poverty was lower within the census block groups within 1-mile of the site (18.6%) compared with state statistics (23.6%), and the proportion of families living below the poverty level was lower within 1-mile of the site (16.2%) compared with state population (19.4%). Median family annual income and median household annual income for the population within 1-mile of the site were higher than for the state population. Per capita annual income is lower for residents within 1-mile of the site than the state.

Table 1: Estimated Demographic Characteristics for Louisiana and for the Combustion Inc. site within a 1-Mile Radius, 1990.

Demographic Characteristic	Louisiana (%)	Combustion Inc. (%)*
Total Population	4,219,973 (100)	4,020 (100)
White	2,839,138 (67.3)	3,878 (96.5)
Black	1,299,281 (30.8)	110 (2.7)
Other	81,554 (1.9)	32 (0.8)
Gender		
Female	2,188,587 (51.9)	2,018 (50.2)
Male	2,031,386 (48.1)	2,002 (49.8)
No. of Families	1,098,374	1,146
No. of Households	1,498,371	1,343
Median Age (years)	31.0	29.4
Annual Income (dollars)		
Family (median)	\$26,313.00	\$28,593.00
Household (median)	\$21,949.00	\$25,279.00
Per capita	\$10,635.00	\$10,238.00
Poverty Level		
Persons below	23.6%	18.6%
Families below	19.4%	16.2%

* The census block groups within 1-mile of the site (0404-2 and 0405-2).

A geographical information system (GIS) was utilized to define and estimate populations living near the Combustion, Inc. site and to assist in the identification of cancer cases that occurred in residents near the site during the years 1988 to 1997. The use of GIS allowed the SEET to analyze cancer in geographic areas not defined by town boundaries and to look at smaller geographic areas. Specifically for this review, the SEET focused on 1-mile proximity (approximately 1000 to 4000 persons) as the geographic areas of interest. Street Atlas software was used to obtain latitude and longitude coordinates for the cancer cases with valid street address information. These cases were plotted using MapInfo software on a base map of Livingston Parish census block groups to determine which geocoded cases occur within 1-mile of the Combustion, Inc. site. Property maps of the Combustion, Inc. site in Livingston Parish were obtained from the Louisiana Department of Environmental Quality (LDEQ). The perimeter of the site was digitized in the Universal Transverse Mercator (UTM) coordinate system using Intergraph/MGE GIS software system.

Livingston Parish is a semi-rural area with many residents listing address information as Post Office Boxes or Rural Routes. LDHH/OPH/SEET does not currently have a means of obtaining accurate latitude-longitude coordinates for such addresses. The data set

used for the analyses includes only those cancer cases that could be geocoded to latitude-longitude coordinates of the 1-mile proximity zone to the site. Georeferenced coordinates were obtained for 1464 of the 1574 cancer cases in the zip codes (70726 & 70785) encompassing the 1-mile boundary of the site, a geocoding rate of 93% (Table 2).

Table 2: Numbers of Cancer Cases Geocoded for the Combustion, Inc. Site, 1988-1997	
	Zip codes 70726 & 70785
Number of cancer cases total	1,574
Total cases geocoded	1,464
In 1-mile radius	109
Not in 1-mile radius	1,355
Non-geocodeable cases	110

Analysis of the cancer incidence was conducted using SIRs. The SIR is the ratio of observed cases in a particular area to the cases that would be expected to occur in that area. Using a comparison population’s age-race-sex-specific incidence rates and the study area’s age-race-sex-specific population data mathematically derives the expected number of cases. The study area’s age-race-sex-specific population data are multiplied by the rates from the comparison population, in this case the state of Louisiana, to determine the number of cases which would be expected in the study population. The SIR is then calculated by dividing the observed number of cases by the expected number of cases. If the observed number of cases equals the expected number of cases, the SIR will equal one (1.0). If the observed number of cases is less than the expected number of cases, the SIR will be less than one (<1.0). If the observed number of cases is greater than the expected number of cases, the SIR will be greater than one (>1.0).

Statistical significance in this investigation was evaluated using a 95 percent confidence interval (95% CI) of the SIRs; no formal statistical testing was performed (1). The 95% CI is used to evaluate the probability that the SIR may be less than or greater than 1.0 due to chance alone. If the confidence interval includes 1.0, then the SIR is not considered significantly different than 1.0.

Table 3: Cancer Incidence (CI) Among White Residents Living Within 1-Mile of the Combustion Inc. Site Compared with Louisiana Rates, 1988-1997

Cancer Type	Gender	No. of Cases		SIR	CI	
		Observed	Expected		upper	lower
All cancers	Male	55	92.68	0.593	0.76	0.45
	Female	54	79.74	0.677	0.87	0.51
Breast	Female	11	23.71	0.464	0.78	0.23
Colorectal	Female	5	10.18	0.491	1.02	0.15
Lung/bronchus	Male	12	19.8	0.606	1.00	0.31
	Female	13	11.42	1.138	1.84	0.60
Prostate	Male	15	24.18	0.62	0.97	0.35

IV. RESULTS

In reviewing the cancer statistics, there is no clear association between residences within 1-mile of the site and cancer incidence. The investigators encountered difficulties in geocoding seven percent of the cancer cases occurring within Livingston Parish, 1988-1997, due to addresses listed as Post Office Boxes and Rural Routes. At the present LDHH/OPH/SEET does not possess technology that would enable a more accurate geocoding system for non-street number addresses.

Advantages of conducting this type of review are that it examines cancer rates in a community and provides a response to community concerns about potential excess of cancer in their community. It also provides specific information about the health status of this particular community and can be used to identify areas where further public health investigations or actions may be warranted. Reviewing cancer incidence data lets us examine the number of individuals in a community who have been diagnosed with cancer thus representing a more accurate picture of cancer in a community than examining only deaths due to cancer.

Limitations in the available data make it impossible to determine the cause of disease in a population or to determine other factors that may influence the rate of disease. Also, some of the reported numbers of specific types of cancer are very small and make the rates unstable. Unstable rates make it difficult to prove statistical significance.

This review may not accurately depict cancer incidence within 1-mile of the site because of the challenges of identifying disease rates (such as incident cancers) in small

populations and because of the challenges with geocoding. Since cancer may take many years to develop, various genetic, lifestyle, and environmental factors may interact before the cancer becomes apparent (3).

Due to the very small black population in the 1-mile proximity zone (N=110), cancer analysis was performed for whites only. Of the total 109 cancer cases in the 1-mile proximity zone examined over the ten-year review period, 50.5% [55 cases] were among males and 49.5% [54 cases] were among females (Table 3). Among males, frequently occurring cancers were lung and bronchus [12 cases] and prostate [15 cases]. Among females, frequently occurring cancers were breast [11 cases], colorectal [5 cases] and lung and bronchus [13 cases]. The SIRs for cancer at all sites combined for males and for females and breast cancer for females were lower than expected.

One of the primary concerns expressed by communities is the effect on their health associated with living in proximity to a hazardous waste site. With the help of GIS software, we were able to utilize existing data and present health outcome data in a clear manner. Latitude and longitude coordinates were found for 1464 (93.0%) of the 1574 cancer cases in zip codes 70726 and 70785. While no cause and effect conclusions can be drawn, public health data relevant to a specific community can provide a first step toward addressing general health concern.

V. CONCLUSIONS

The objective of this investigation was to determine whether elevated cancer rates exist in the community living around Combustion, Inc., an abandoned creosote wood treating facility, as compared with cancer incidence in Livingston Parish and the state of Louisiana. The main findings from this investigation are as follows:

- Cancer incidence ratios for all sites combined for white females and white males were significantly lower than expected, and breast cancer incidence for white females was significantly lower than expected.
- 93% of all of the cancer cases in the 1-mile proximity zone were geocoded. As a result, this review may not accurately depict cancer incidence within 1-mile of the site.

REFERENCES

1. Ries LAG, Kosary CL, Hankey BF, HARRAS A, Miller BA, Edwards BK (eds). SEER Cancer Statistics Review, 1973-1993: Tables and Graphs, National Cancer Institute. Bethesda, MD, 1996.
2. Louisiana Office of Public Health (OPH), Public Health Assessment for Combustion, Inc. June 5, 1995.
3. Agency for Toxic Substances and Disease Registry. Polychlorinated Biphenyls. Atlanta: US Department of Health and Human Services: November 2000.

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CERTIFICATION

This Combustion, Inc., Assessment of Cancer Incidence, public health consultation was prepared by the Louisiana Department of Health and Hospitals under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodology and procedures existing at the time the health consultation was initiated. Editorial review was completed by the Cooperative Agreement partner.

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The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this public health consultation and concurs with the findings.

Roberta Erlwein
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Figure 1

Livingston Parish 1990 Census Tracts and Combustion Inc. Boundary
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Figure 2

Livingston Parish 1990 Census Block Groups Within One Mile of Combustion Inc.
Printed August 16, 2001

