

Health Consultation 2

MURPHY OIL SPILL
2500 EAST ST. BERNARD HIGHWAY
MERAUX, BERNARD PARISH, LOUISIANA
EPA FACILITY ID: LAD008058471

DECEMBER 9, 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

MURPHY OIL SPILL
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Prepared by:

U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Superfund and Program Assessment Branch

INTRODUCTION

The Meraux facility is owned and operated by Murphy Oil USA, Inc. The Meraux facility is located on 2500 East St. Bernard Highway in Meraux, St. Bernard Parish, Louisiana. The facility includes a dock facility for unloading and loading product, a truck terminal, and a refinery. Crude oil is offloaded at the Mississippi River dock and transported to the Meraux facility via pipeline. Additional crude oil is transported to the facility by way of auxiliary pipelines. The refinery utilizes the crude oil to produce gasoline, diesel fuel, kerosene, and No. 6 fuel oil. These products are then transported off-site via barge at the facility docks and via pipelines.

Storm surge from Hurricane Katrina placed the facility and surrounding neighborhoods under water for several days. The water lifted and dislodged a 250,000 barrel aboveground storage tank (tank # 250-2) at the Meraux Murphy Oil Refinery. At the time, the tank reportedly contained 65,000 barrels of mixed crude oil¹ and released approximately 25,110 barrels (1,050,000 gallons). The released oil has impacted approximately 1,800 homes and a yet undetermined number of other structures in adjacent neighborhoods, an area of about one square mile. Several canals have also been impacted: the 20 Arpent, the 40 Arpent, the Meraux, the Corinnes, the Delarond, and various unnamed interceptor canals.

On September 3, 2005, Murphy Oil USA, Inc. (Murphy) notified the National Response Center (report #771428) concerning an oil spill at the Murphy Oil USA Inc. Meraux facility in Meraux, St. Bernard Parish, Louisiana. FOSC Scott Harris originally investigated the release, and directed response activities until EPA and the US Coast Guard (USCG) agreed to divide responsibility for the spill. EPA is overseeing Murphy's cleanup of oil in residential properties and properties accessible to the public (parks, school yards, roads, highway median strips, sidewalks, etc.). EPA is also assisting with the treatment and remediation of oil impacted canals for cleanup levels that will be determined by key stakeholders and regulatory authorities. A significant amount of product was recovered, but residues remain on properties and in homes.

RESPONSE ACTIVITIES

EPA continues to oversee efforts to identify and characterize the extent of contamination in the area, providing written and photographic documentation of response and removal activities and analyzing split samples of 10 percent of the sediment samples for quality assurance/quality control (QA/QC). The environmental sampling is being conducted by the Center for Toxicology and Environmental Health (CTEH), a contractor to Murphy Oil. All samples are collected under EPA oversight. CTEH collects sediment samples in areas identified by the EPA as being contaminated. In addition, CTEH collected 24-hour indoor air samples from 15 to 30 properties using Summa® canisters. The indoor air results are not yet available. EPA also reviewed Murphy's plan for cleaning up oil from

¹ With a grade named, Arabian Medium APT 30.8

public areas such as roads, median strips, playgrounds and parks. Any samples not collected according to the established procedures were re-sampled.

A meeting was held on October 21, 2005 to discuss cleanup action levels, debris removal, and transfer of Federal On-Scene Coordinator (FOSC) responsibility from USCG to EPA. The EPA, USCG, Louisiana Department of Environmental Quality (LDEQ), ATSDR, Murphy Oil, and the Governor's Office attended the meeting. The meeting established procedures for soil cleanup in the public areas and set cleanup levels. Debris removal issues were listed for discussion with the JFO and a preliminary plan was presented for transferring lead responsibility to EPA.

EPA has overseen sampling of public areas (school yards, parks, etc.) and now has approval to clean public areas. EPA continues to document CTEH's sampling activities and receives splits of 10 percent of sediment samples. CTEH and EPA submitted split samples of sediment for separate analysis for various oil constituents. On November 1, the EPA gave ATSDR the results of their analyses and requested an assessment of potential health hazards posed by the contamination. ATSDR reviewed the EPA sample results and released, on November 9, 2005, an initial Health Consultation that advised the public of the nature of the hazards at the site (<http://www.bt.cdc.gov/disasters/hurricanes/katrina/murphyoil/>).

Ongoing Activities

Murphy will clean up areas that are contaminated with oil within the impacted area. Cleanup of public areas will include the removal of oil stained sediment and soil. After removal, the remaining soil will be analyzed to ensure that the LDEQ soil standards have been met. If the soil fails to meet the standards, additional soil will be removed until the standards are met. The standards are the LDEQ risk evaluation/corrective action program (RECAP) residential soil standards for High Public Use Areas:

Total Petroleum Hydrocarbon - Gasoline Range Organics	650 mg/kg
Total Petroleum Hydrocarbon - Diesel Range Organics	650 mg/kg
Total Petroleum Hydrocarbon - Oil Range Organics	1800 mg/kg

SOIL AND SEDIMENT INVESTIGATIONS

Oiled-Property Visual Survey

EPA and contractor personnel have been gathering information on the oil spill, documenting response activities with photographic and written reports, and identifying and characterizing the extent of the spill in the surrounding residential area. EPA contractors and CTEH independently identified the areas that appeared to be impacted and classified the level of contamination. A house-to-house visual survey was conducted from the street to roughly characterize the levels of oiling on the properties in the impacted area. Due to legal access requirements, property areas not visible from the street or public sidewalk have not yet been surveyed.

Four levels of oiling were established for this survey: heavy, moderate, light, and oil line. Heavy was defined as a property where greater than 50 percent of the yard, sidewalks, and home were covered with product. Moderate was defined as a property where roughly 50 percent of the yard and sidewalks were covered with product. Light was defined as a property where only a small percent of the horizontal surfaces were covered with oil product. The fourth represents an oil line, or a visible band (“bathtub ring”), of oil on the residence. (See Figure 1 below)

To date, approximately 1,800 properties in the area of the Meraux facility have been visually determined to have been oiled by the spill. Of those residences, EPA classified 114 properties as heavy, 286 properties as medium, and the balance as light to oil line only.



Figure 1: Photographs showing heavy oil deposits and staining on the exterior and interior of some homes.

In the EPA map below (Figure 2), the degree of oil contamination is indicated with red, orange, green and blue contours to depict heavy, moderate, light or visible oil line. The results of this visual survey indicate that the more heavily impacted areas are immediately to the west of the Murphy Oil facility.

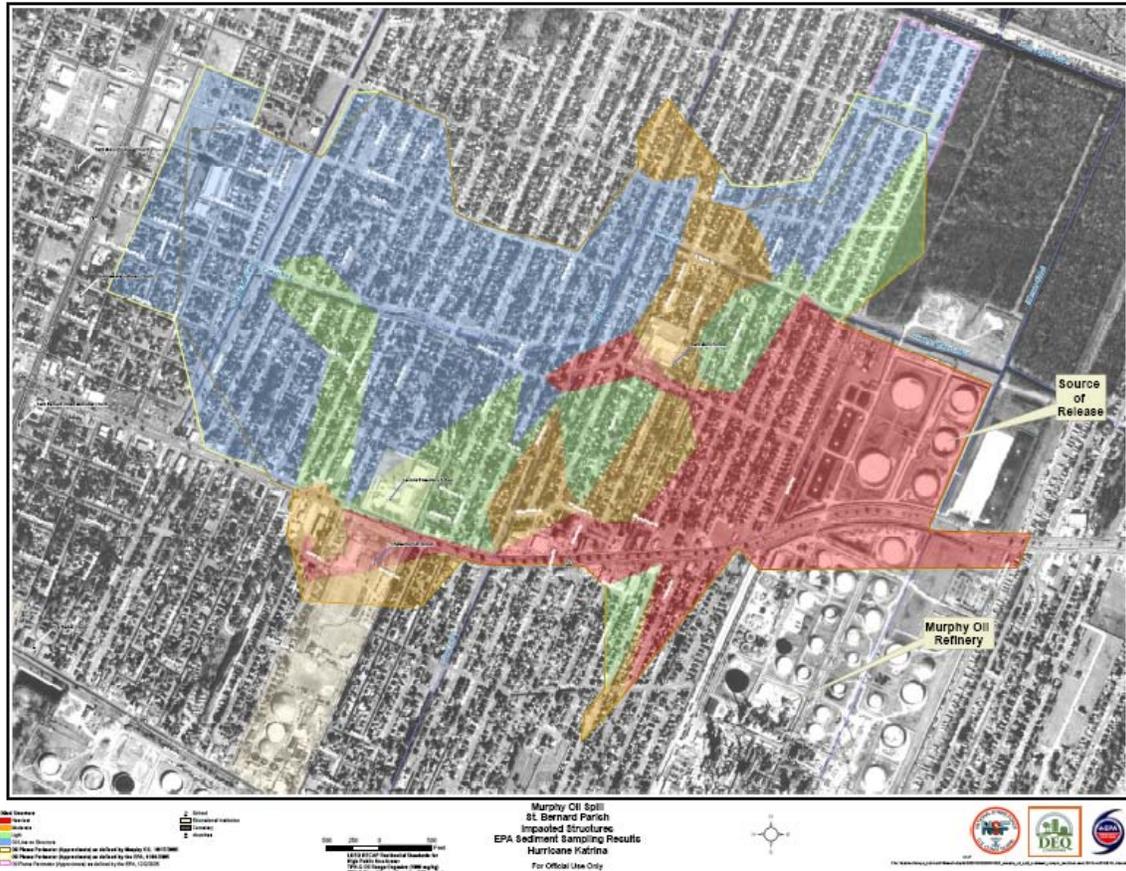


Figure 2: Current EPA classification of oil contamination in properties near the Murphy Oil facility.

Soil and Sediment Sampling Procedures

CTEH, the contractor to Murphy Oil is collecting sediment samples from the properties and is splitting 10% of the soil/sediment samples with EPA. Sediment samples are a composite of sediment collected from no less than three visibly contaminated areas on the property. Whenever possible, sediment deposits (0-6 inches) were collected. If no sediment was visible, surface soil (0-2 inches) was collected instead.

RESULTS (Soil and Sediment Collected Prior to November 8, 2005)

For this Health Consultation, ATSDR reviewed the results of sediment/soil sampling that was conducted between September 19 and November 8, 2005, at more than 800 properties. The data indicated that there was a wide range of contaminant concentrations in sediment deposits throughout the community. A small percentage of the properties had clear signs of heavy contamination, with additional properties showing significant contamination. There were elevated contaminant levels indoors as well at outdoors, and

elevated concentrations of contaminants often occurred indoors and outdoors at the same properties. The majority of the properties showed no signs of significant oil-related contamination. Indoor surface wipe samples also documented the presence of oil contamination. Although wipe samples provide a qualitative indicator of contamination, they cannot be used for a quantitative evaluation of risk.

The sampling data indicated that the most highly contaminated areas were directly west of the Murphy Oil facility. In Figures 3 and 4 below, the properties with sediment contaminant concentrations in excess of LDEQ Risk Evaluation and Corrective Action Plan (RECAP) standards for petroleum products are indicated. The RECAP standards for petroleum fractions were derived using methodology of the TPH Criteria Working Group². In this approach, the petroleum product is divided into petroleum fractions, and indicator compounds are used to assess the toxicity of each fraction.

The sediment samples were collected 1-2 months after the oil spill occurred. It is expected that the concentrations of some oil contaminants in sediment and soil would decrease over time as the result of volatilization of low molecular weight chemicals, off-site transport by surface water runoff, and biodegradation. However, for this health consultation, ATSDR assumed that the concentrations of the chemicals in sediment are the same as those detected at the time of the sampling.

The elevated concentrations of diesel range organics and oil range organics at some of these properties indicate significant contamination by petroleum products. Properties exceeding LDEQ standards will be remediated by Murphy Oil. ATSDR concurs that remediating these properties to contaminant concentrations below the RECAP standards would be protective of public health.

At a few locations, sediment contaminant concentrations exceeded ATSDR comparison values. ATSDR uses comparison values to select contaminants that need further evaluation. A comparison value is an estimated amount of a contaminant in the environment that is not expected to harm anyone. However, even if a contaminant is present in the environment at a level greater than the comparison value, contact with it does not necessarily mean that adverse health effects will occur. ATSDR comparison values are contaminant concentrations many times lower than levels at which no effects were observed in studies on experimental animals or human epidemiological studies. If contaminant concentrations are exceeded, ATSDR conducts further evaluations to determine if adverse health effects are possible under site specific conditions.

The contaminants that most frequently exceeded the ATSDR comparison values were the polyaromatic hydrocarbons (PAHs) (Figure 5). PAH concentrations in sediment samples from 16 properties exceed the comparison value. PAHs are present at low concentrations in crude oil, and some are classified by the National Toxicology Program as reasonably anticipated to be a human carcinogen. However, even if it is conservatively assumed that

² Total Petroleum Hydrocarbon Criteria Working Group Series (Donna Vorhees and Wade Weisman) 1997. Volume 5, Human Health Risk-Based Evaluation of Petroleum Contaminated Sites: Implementation of the Working Group Approach (<http://www.aehs.com/>)

a resident ingested 100 milligrams of sediment every day with the maximum PAH concentration (4.4 ppm benzo(a)pyrene) for a lifetime (70 years), the theoretical increased cancer risk would be less than 5 in 100,000 (5×10^{-5}). Actual exposure to PAHs and the resulting risk would likely be even lower. Such exposures do not pose a significant health hazard.

A few sediment samples contained elevated concentrations of pesticides (e.g., dieldrin), plasticizers (e.g., di(2-ethylhexyl)phthalate), and other chemicals. These chemicals are not related to oil contamination and are often found in urban soils. These infrequently detected chemicals were not further evaluated.

Health Effects of Exposure to Oil and Oil Constituents

Crude oil is a complex mixture containing thousands of different chemicals. Depending on the source, crude oil contains various portions of straight and branched chain paraffins, cycloparaffins, and naphthenic, aromatic, and polyaromatic hydrocarbons. In addition, crude oil contains trace amounts of sulfur containing chemicals such as sulfides, mercaptans, thiophenes, and other more complex sulfur compounds. Although the chemical composition of crude oil varies by source, crude oils and petroleum products share certain toxic characteristics.

The most likely pathway for people to be exposed to petroleum contaminated sediments is by direct contact with bare skin. Children may be at increased risk of exposure to contaminated sediments during play activities. In addition, oil contaminants can adhere to the fur of pets, and the contamination can be transferred to people who pet or groom their pets.

Prolonged dermal contact with crude oil and petroleum products can cause skin erythema (reddening), edema, and burning. The skin effects can be exacerbated by subsequent exposure to ultraviolet light from sunlight. This enhanced toxicity is due to the phototoxicity of trace contaminants in the oil, such as the PAHs.

Human epidemiological studies have shown that high-dose, chronic, occupational exposure to mineral oils can cause skin cancer. An increased risk of skin cancer, sinonasal cancer, gastrointestinal cancer, and bladder cancer have been reported in metal workers and other occupations with prolonged contact with mineral oils. These carcinogenic effects may be related to the PAHs in the mineral oils. As discussed above, short-term or long-term exposures to the reported concentrations of PAHs in sediment samples are unlikely to cause a significant carcinogenic risk.

ATSDR did not receive any data on indoor air concentrations of volatile organic chemicals (VOCs). If doors and windows of buildings are closed, VOCs that evaporate from residual oil can remain trapped indoors. In the absence of indoor air VOC data, ATSDR is not able to assess whether indoor air concentrations of volatile petroleum constituents, such as benzene, are at levels of health concern.

Conclusions

- (1) Concentrations of oil-related chemicals in sediment and soil samples from most properties are below ATSDR comparison values and LDEQ RECAP standards for petroleum products. Short-term or long-term exposures to such sediments do not pose a public health hazard. However, other potential health hazards, such as indoor mold and structural damage, should be evaluated prior to re-occupying these properties.
- (2) Concentrations of petroleum products in sediment and soil samples from some properties exceed LDEQ RECAP standards. Remediating such properties to the RECAP standards would be protective of public health for re-occupancy.

Recommendations

- (1) Avoid bare skin contact with sediment, soil, and indoor surfaces with visible oil contamination.
- (2) Properties with sediment/soil contamination that exceeds LDEQ RECAP standards for petroleum products should be remediated prior to re-occupancy.
- (3) Homes with visible indoor oil contamination or noticeable petroleum odors should be tested to determine if indoor air VOCs are at concentrations of health concern prior to re-occupancy.
- (4) Homes should not be re-occupied until potential health hazards, such as indoor mold and structural damage, have been assessed and remediated, where necessary.

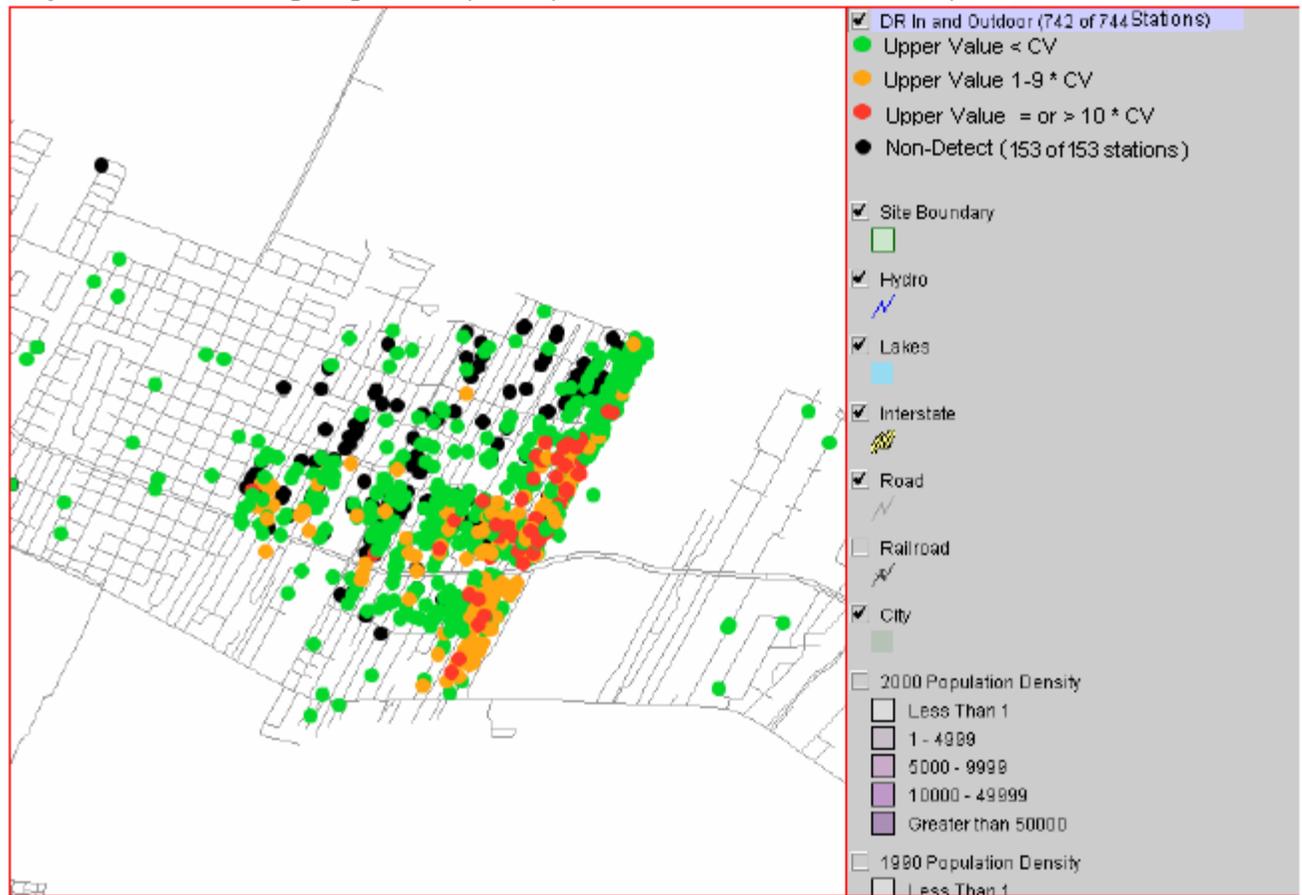
Public Health Action Plan

Upon request, ATSDR will evaluate additional environmental sampling data and will provide our assessment to the public.

MURPHY OIL SPILL

St. Bernard Parish

Map Name: Diesel Range Organics Only - Comparison with LA DEQ RECAP Values, Indoor and Outdoor



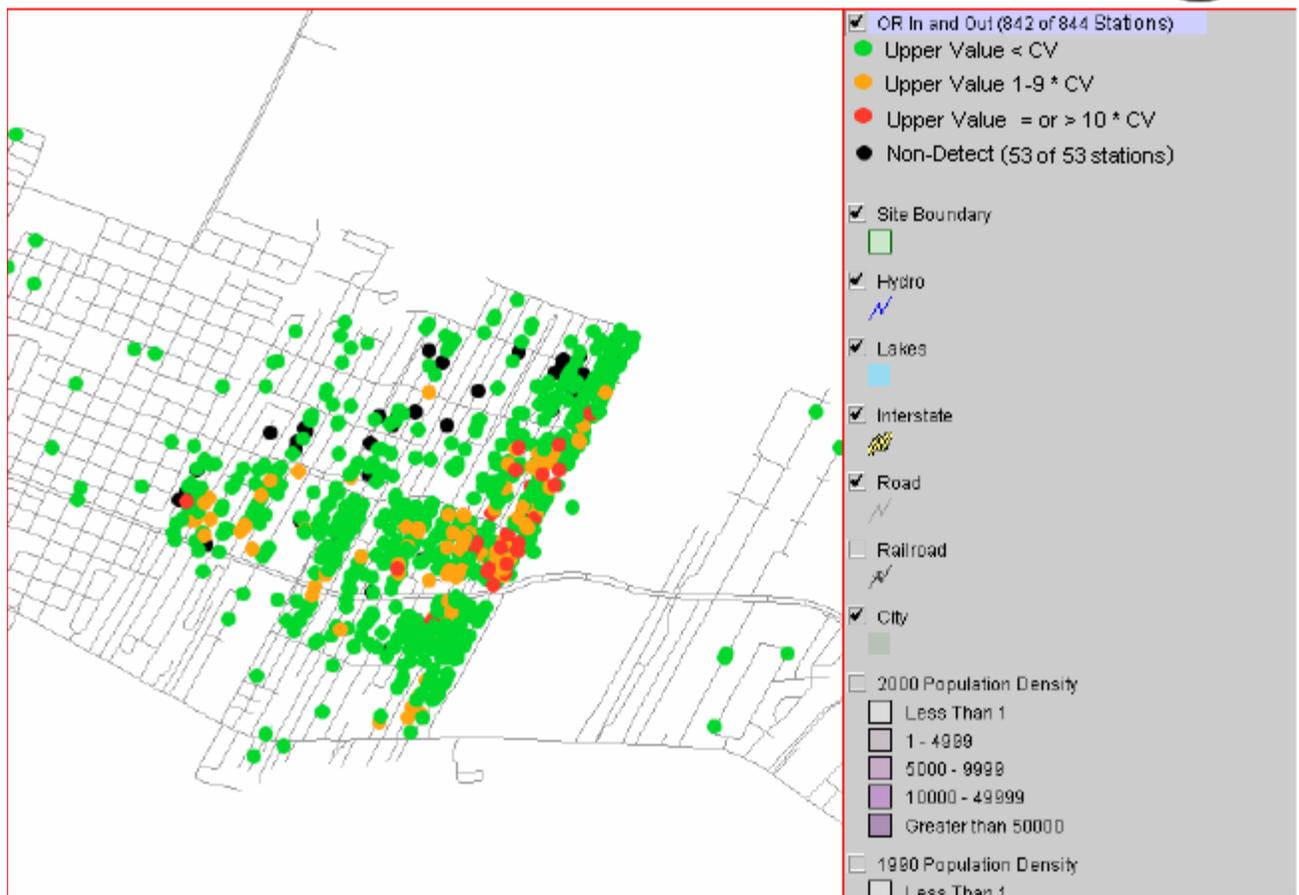
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Figure 3: Sediment/Soil Concentrations of Total Petroleum Hydrocarbons - Diesel Range Organics

MURPHY OIL SPILL

St. Bernard Parish

Map Name: Oil Range Organics Only - Comparison with LA DEQ RECAP Values, Indoor and Outdoor



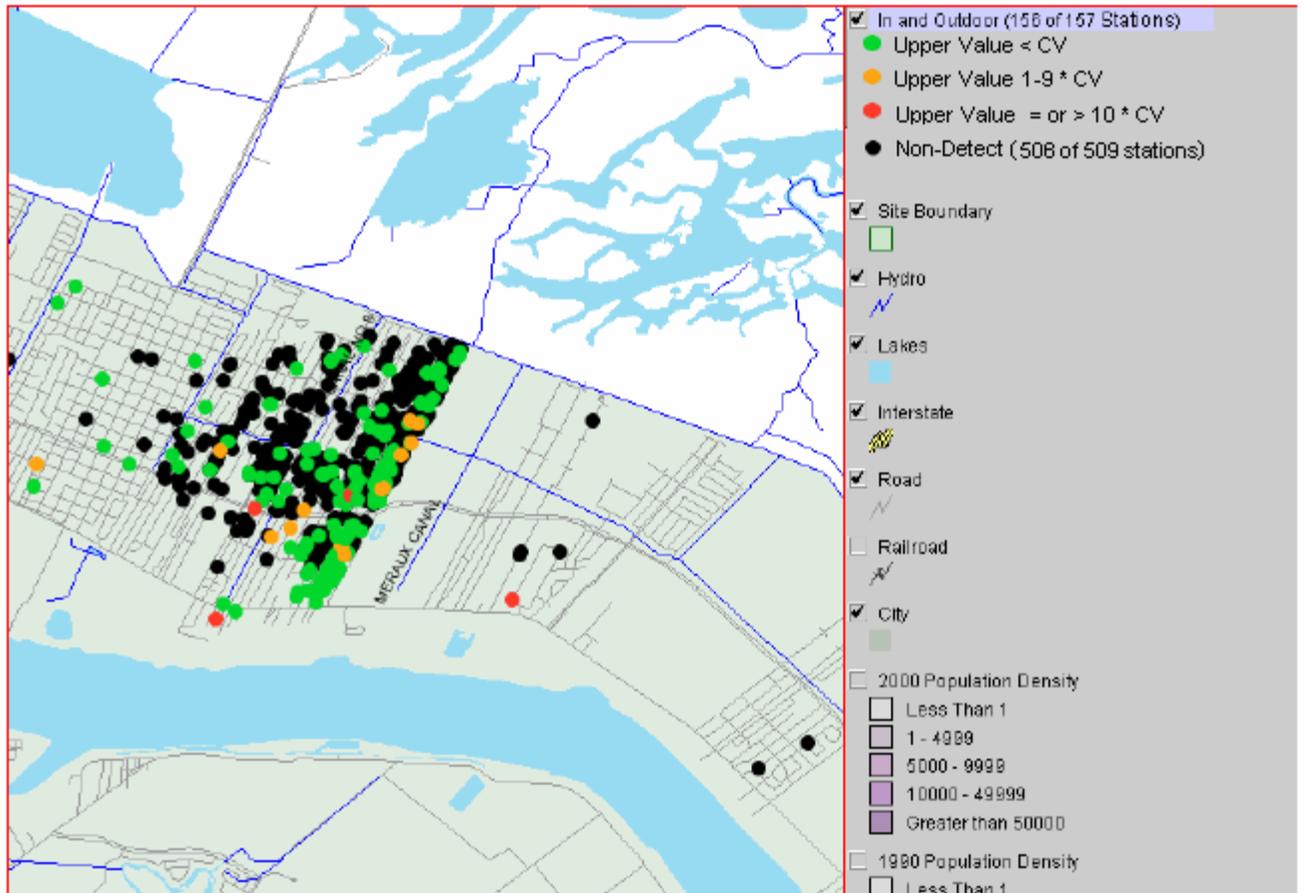
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Figure 4: Sediment/Soil Concentrations of Total Petroleum Hydrocarbons - Oil Range Organics

MURPHY OIL SPILL

St. Bernard Parish

Map Name: PAHs Only - Comparison with ATSDR values, Indoor and Outdoor



12/05/2005

Figure 5: Sediment/Soil Concentrations of Polyaromatic Hydrocarbons (PAHs)

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