

# Health Consultation

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REVIEW OF ON-SITE AIR MONITORING DATA DURING THE  
REMOVAL ACTION AT LE MARS COAL GAS SITE

LE MARS COAL GAS PLANT  
LE MARS, PLYMOUTH COUNTY, IOWA

EPA FACILITY ID: IA0001032556

JULY 27, 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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Prepared by:

Iowa Department of Public Health  
Hazardous Waste Site Health Assessment Program  
Under a Cooperative Agreement with the  
Agency for Toxic Substances and Disease Registry

## Purpose

The Iowa Department of Public Health (IDPH), Hazardous Waste Site Health Assessment Program was asked by the US Environmental Protection Agency (EPA) to review a round of air sampling data. The air data was collected and analyzed during a removal action at the Le Mars Coal Gas Site in Le Mars, Iowa. EPA asked IDPH to determine from the air data if additional monitoring is necessary throughout the removal action to protect nearby residents from exposure.

## Background

The Le Mars Coal Gas site is approximately 1.6 acres in size. It is located at 331 1<sup>st</sup> Street Northeast, in the city of Le Mars, Plymouth County, Iowa. The site is a right triangle-shaped lot bordered on the north and west by the Union Pacific and Canadian National Railroads, on the east by 4<sup>th</sup> Avenue Northeast, and on the south by 1<sup>st</sup> Street Northeast. The area surrounding the site is occupied by residential and commercial properties (1).

The site was formerly the location of a manufactured gas plant, which began operation in 1884 and ceased gas production in or about 1939. In the 1950's the gas plant buildings were demolished. Later a commercial building was constructed where the old gas plant had stood. The property has had various owners through the years; the present owner is the city of Le Mars. The Le Mars city street maintenance department is the present occupant of the property (1).

Initially (in 1884), the Le Mars Coal Gas plant included a single production building housing the retort room, coal room, lime and meter room, purifying room, one gas holder, a tar well, and a main office building. Le Mars Gas Company acquired the facility in 1898 and expanded operations to include the conversion from coal gas to water and oil gas, the addition of an oil tank, and a 100,000 cubic-foot gasholder.

According to 2000 Census records, approximately 9,200 people reside within the city of Le Mars. A previous health consultation completed in 1998 reported that approximately 800 people reside within 0.25 miles of the site itself; of these, 81 were children under the age of six years (2). The nearest residence is about 50 feet south of the site (1).

## Contaminants of Concern

The contaminants of concern at this site are those associated with former manufactured gas production. Benzo(a)pyrene and other polycyclic aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs), such as benzene, are present in subsurface soils (6-17 feet deep) and in groundwater at the site. A contaminated groundwater plume in a shallow aquifer (approximately 20 feet below ground surface) extends to the west and north of the site. The area above the off-site plume consists of the railroad right-of-way and a vacant lot. The greatest concentrations of PAHs were detected in shallow groundwater directly under the site – up to 160,000 ppb (parts per billion). Benzene has been detected in on-site monitoring wells at concentrations up to 120,000 ppb.

Two municipal wells closest to the site (approximately 2000 feet down gradient and finished into the deep aquifer) have shown very low concentrations of site-related PAHs (1); Benzo(a)pyrene was detected at 0.0018 ppb. This is lower than the ATSDR comparison value (ie, Minimal Risk Level, (MRL) for Benzo(a)pyrene of 0.005 ppb.) Likewise, concentrations of VOCs in the

municipal water are all lower than MRLs. An MRL is an estimate of the daily human exposure to a chemical that is likely to be without appreciable risk for non-cancer health effects over a specified duration of exposure. MRLs serve as a starting point for further evaluation of site-related contaminants. The purpose of conservative (i.e., protective) health-based guidelines, which are used to develop comparison values, is to enable health professionals to eliminate substances from further evaluation of potential health hazards.

In order to determine what levels of contaminants in air would be cause for continued air monitoring, ATSDR has developed Environmental Media Evaluation Guides (EMEGs). EMEGs are media specific (air, water, soil) screening values that are used to select contaminants of concern at hazardous waste sites. EMEGs are based on Minimal Risk Levels (MRLs), which are an estimate of the daily human exposure to a chemical that is likely to be without appreciable risk for non-cancer health effects over a specified duration of exposure. Another important thing to note, is that MRLs are developed for continuous 24-hour a day exposures. In this instance, exposures from the site would be far less than 24-hours a day. Therefore, the use of an air EMEG provides a conservative approach for identifying contaminants of concern.

Even though concentrations of PAHs and VOCs in the wells have not exceeded any health-based standards or comparison values (1), the two affected municipal wells are now on standby status due to the contamination. City water officials have indicated that the nearest private well is located approximately 3,000 feet up gradient of the site. Additionally, six residential wells are located within one mile of the site. There are no private wells in service within the city limits of Le Mars. There have been no reports of site-related contamination of private wells in the area (1).

Indoor air and soil gas samples were collected and tested for PAHs and VOCs at several homes in Le Mars adjacent to the site. The evaluation of soil gas and indoor air testing did not indicate that the current contamination is affecting the indoor air of the houses that were tested. A separate health consultation reviewing these results was published on September 19, 2003.

An Action Memorandum was signed and funding approved for a non-time critical removal action for the site on September 26, 2003. The removal activities that were planned for this site include:

- a. Air monitoring of removal action construction
- b. UST and product removal
- c. Excavation of the on-site soil source area
- d. Off –site thermal treatment of contaminated soil
- e. Backfilling with off-site soil and site restoration

### **Air Sampling**

Site work for the removal action began on April 19, 2004. Pre-excavation baseline air sampling was conducted from April 19 – 22, 2004 (72 hour sampling). Samples were collected for benzene and benzo(a)pyrene. None of the samples collected detected any benzo(a)pyrene. Results of the analysis of the benzene sampling can be found in Table 1. Reference

Concentrations (RfC) are concentrations used to determine contaminants of concern in air. If an exposure dose does not exceed an RfC, it is generally accepted that there would be little risk of adverse non-cancer health effects occurring.

**Table 1**  
**Air Sampling results for Pre-Excavation Baseline Samples**

Sample ID	Date	Location	Benzene (ppb)*	Reference Concentration (ppb)
LCG-A-1	4/19-4/22	East Site Perimeter	0.14	50.0
LCG-A-2	4/19-4/22	South Site Perimeter	2.2	50.0
LCG-A-3	4/19-4/22	West Site Perimeter	0.13	50.0
LCG-A-4	4/19-4/22	North Site, Perimeter	0.13	50.0
LCG-A-5	4/19-4/22	Inside Street Department Building, Break Room	2.5	50.0

\*ppb-parts per billion by volume

The first task that was undertaken at the site, was the removal of a tar well that was located below the concrete floor of the main city-owned building. Vapor barriers were installed to isolate the exclusion zone inside the building. An air sample was taken for a 72 hour period from 4/22-4/25 inside the building during the tar well excavation. The results of the analysis of sampling can be found in Table 2. These results represent a time weighted average concentration.

**Table 2**  
**Air Sampling results during Tar Well Excavation**

<b>Sample ID</b>	<b>Date</b>	<b>Location</b>	<b>Benzene (ppb)*</b>	<b>Reference Concentration (ppb)</b>
LCG-A-7	4/22-4/25	Inside Building, Break Room	30.0	50.0

\*ppb-parts per billion by volume

A round of air sampling was initiated on April 30, 2004 during contaminated soil excavation and soil stockpiling. The results of the analysis of this sampling can be found in Table 3.

**Table 3**  
**Air Sampling Results during Contaminated Soil Excavation**

<b>Sample ID</b>	<b>Date</b>	<b>Location</b>	<b>Benzene (ppb)*</b>	<b>Reference Concentration (ppb)</b>
LCG-A-8	4/30-5/03	South Site Perimeter	0.86	50.0
LCG-A-9	4/30-5/03	West Site Perimeter	0.37	50.0

\*ppb-parts per billion by volume

Additional air sampling was conducted during contaminated soil excavation, removal of underground storage tanks, the large geometer, stockpiled soil load out, and backfill of the excavation area. Results of the analysis of samples can be found in Table 4.

**Table 4**  
**Air Sampling Results during Contaminated Soil Excavation and  
 Tank Removal**

<b>Sample ID</b>	<b>Date</b>	<b>Location</b>	<b>Benzene (ppb)*</b>	<b>Reference Concentration (ppb)</b>
LCG-A-11	5/17-5/20	East Site Perimeter	0.17	50.0
LCG-A-13	5/17/-5/20	South Site Perimeter	11	50.0
LCG-A-12	5/17-5/20	West Site Perimeter	44	50.0
LCG-A-10	5/17-5/20	North Site Perimeter	2.0	50.0

\*ppb-parts per billion by volume

### **Site Visit**

On May 14, 2004, IDPH staff visited the Le Mars Coal Gas Plant site. They received a tour of the property at 331 1<sup>st</sup> Street, as well as the clean-fill borrow area, and a general tour of the town and surrounding area. During the site visit, it was noted that real-time air monitoring was ongoing with the use of a Photo-Ionization Detector (PID). During the tour, excavation work was underway, as well as loading and removal of stockpiled contaminated soils. Air monitoring stations were in place around the perimeter of the work site. Photo 1 depicts the air monitoring station at the West Site Perimeter.





**Photo 1 – West Site Perimeter Air Monitoring Station**

### **Community Health Concerns**

To date, EPA or IDPH has received no community health concerns. There is a potential, however, for fugitive air emissions to escape from the site during excavation activities and adversely affect the air quality near the surrounding residential homes. Odors that occur during excavation could also prompt community health concerns.

### **Discussion**

On June 2, 2004, the On-Scene Coordinator (OSC) for EPA at the Le Mars site forwarded the results of the analysis of air sampling (shown in Tables 1-4 in this document) to IDPH. IDPH was asked to review the air sampling data, and then determine if additional air monitoring is

necessary during the remainder of the excavation activities. IDPH verbally gave recommendations to the OSC the next day, regarding future air monitoring activities.

The levels of benzene measured at the various air monitoring stations was compared to the Acute EMEG of benzene for air, of 50 parts per billion (ppb). In this case, the Acute EMEG is equal to the EPA's Reference concentration. This is not true for all chemicals. Acute exposures are defined as being those of 14 days or less. Because work was not continuous at the site, and excavation of contaminated soils was intermittent, it is highly unlikely that nearby residents were ever exposed to more than 14 days of fugitive air emissions in a row from the site. Benzene levels were found to be close to the Acute EMEG during excavation activities on 4/22-4/25 (tar well excavation) and 5/17-5/20 (contaminated soil excavation and tank removal). Although levels of benzene measured in air at the various monitoring stations approached the Acute EMEG it does not necessarily mean that any adverse health effects would be expected for nearby residents, including sensitive populations. Because benzene is a very volatile substance that dissipates in air rapidly, it is difficult to determine what the exposures would be, if any, for nearby residents. The levels *do* indicate that further monitoring would be prudent as excavation and truck loading continues at the site. Air monitoring should continue as outlined in the Record of Decision

## Children's Health Concerns

Based on information reviewed for this health consultation, and the depth of the contaminants underground, it is unlikely that children were exposed to unacceptable concentrations of site constituents from the Le Mars Coal Gas site in the past.

IDPH has identified potential current and future exposure scenarios for children at the Le Mars Coal Gas site. The greatest potential for current and future exposures would be to fugitive emissions from the site during excavation. Because air monitoring has shown that the concentrations in air are below health-based comparison values on-site, it is unlikely that exposures to off-site fugitive emissions would be harmful to children.

## Conclusions

- The Le Mars Coal Gas Site currently poses **No Apparent Public Health Hazard**. This designation means that contamination is present, but not in amounts likely, to cause any long-term adverse health effects.
- Air monitoring events have shown that benzene levels in air approaching the Acute EMEG have occurred in the past.
- Future excavation and loading of contaminated soils are expected to cause similar fugitive emissions to those in the past.
- It would be prudent to continue air monitoring until all soil intensive activities are completed on site.

## **Recommendations**

- Continue air monitoring until all soil remediation activities are completed on site.

## **Public Health Action Plan**

- IDPH will continue to review air-monitoring data provided by EPA and update health recommendations as necessary.
- IDPH will work with the EPA to follow up with LeMars residents to address any health concerns that they may have.

## **Preparers of the Report**

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## References

1. Garvey, Daniel, J . Le Mars Coal Gas Plant Site, Site Profile Report. From Internet website: [http://www.epaosc.net/site\\_profile.asp?site\\_id=O7YH](http://www.epaosc.net/site_profile.asp?site_id=O7YH).
2. Johnson, John. Health Consultation, Le Mars Coal Gas Site, Le Mars, Plymouth County, Iowa. June 26, 1998.

## **CERTIFICATION**

The Iowa Department of Public Health, Hazardous Waste Site Health Assessment Program, has prepared this health consultation evaluating site information and air sampling data at the LeMars Coal Gas Plant site in LeMars, Iowa under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). The document is in accordance with approved methodology and procedures existing when the health consultation was being prepared. Editorial review was completed by the Cooperative Agreement partner.

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Technical Project Officer, CAT, SPAB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.

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Team Leader, CAT, SPAB, DHAC, ATSDR