

Petrol stations pollute their immediate surroundings

4 February 2011



In Spain it is relatively common to come across petrol stations surrounded by houses, particularly in urban areas. Researchers from the University of Murcia have studied the effects of contamination at petrol stations that is potentially harmful to health, which can be noted in buildings less than 100 meters from the service stations. Credit: SINC

In Spain it is relatively common to come across petrol stations surrounded by houses, particularly in urban areas. Researchers from the University of Murcia (UM) have studied the effects of contamination at petrol stations that is potentially harmful to health, which can be noted in buildings less than 100 metres from the service stations.

"Some airborne organic compounds - such as benzene, which increases the risk of cancer - have been recorded at petrol stations at levels above the average levels for urban areas where traffic is the primary source of emission", Marta Doval, co-author of the study and a researcher at the UM, tells SINC.

The study, which has been published in the *Journal of Environmental Management*, shows that the air at petrol stations and in their immediate surroundings is above all affected by emissions stemming from evaporated vehicle fuels (unburnt fuels from fuel loading and unloading operations,

refuelling and liquid spillages).

The research team measured the levels of "typical traffic" pollutants in different parts of the urban area of Murcia, and calculated the quotients for the levels of an aromatic compound (benzene) and a hydrocarbon (n-hexane) at three Murcia petrol stations (near the petrol pumps and surrounding areas) to find the distance at which the service stations stop having an impact.

"In the three cases studied we obtained maximum distances of influence of close to 100 metres, although the average distance over which this contamination has an effect is around 50 metres", Enrique González, the UM researcher who led the research team, tells SINC.

However, the distances depend on the number of petrol pumps, the amount of fuel drawn from them, traffic intensity, the structure of the surroundings, and weather conditions.

According to the researcher, "the more contaminated the zone surrounding the petrol station as a result of other causes (traffic), the lower the impact of the two pollutants at the service station". If traffic in the area surrounding the petrol station is very intense, and exceeds the emissions from the station itself, pollution at the service station is "overlapped and goes unnoticed" over short distances.

Advice for new constructions

The research study shows that a "minimum" distance of 50 metres should be maintained between petrol stations and housing, and 100 metres for "especially vulnerable" facilities such as hospitals, health centres, schools and old people's homes. "Ideally, the 100 metre distance should be respected in plans for building new houses", says Doval.

The researchers propose carrying out this study at new construction areas in which it is planned to build these kinds of facilities. However, petrol stations are not the only source of emission of these pollutants.

"There is not much use in protecting people from petrol stations if the other sources of emission (above all traffic and industries near population hubs) are not controlled or reduced", stresses González.

More information: Morales Terres, Isabel M.; Doval Minarro, Marta; González Ferradas, Enrique; Baeza Caracena, Antonia; Barbera Rico, Jonathan.

"Assessing the impact of petrol stations on their immediate surroundings" *Journal of Environmental Management* 91(12): 2754-2762, december 2010.

Provided by FECYT - Spanish Foundation for Science and Technology

APA citation: Petrol stations pollute their immediate surroundings (2011, February 4) retrieved 22 November 2017 from <https://phys.org/news/2011-02-petrol-stations-pollute.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.

Living near a petrol station is 'bad for your health' as fuel pollutants found to travel 100m

By DAILY MAIL REPORTER

UPDATED: 12:38 AEDT, 8 February 2011

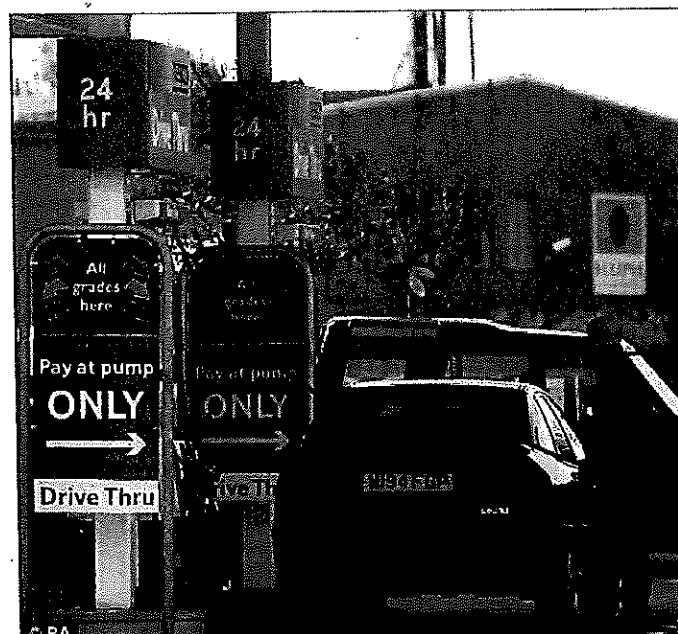
53

[View comments](#)

Living near a petrol station can be a health hazard, researchers warn.

They say the air in the immediate vicinity of garages is often polluted with airborne particles from evaporated fuel and therefore harmful to local residents.

Scientists from the University of Murcia in Spain studied the effects of contamination at petrol stations.



Dangerous airborne organic compounds can travel as far as 100m from petrol stations

They found dangerous airborne pollutants from garages could contaminate buildings as far as 100m away.

The scientists said a 'minimum' distance of 50 metres should therefore be maintained between petrol stations and housing, and 100 metres for 'especially vulnerable' facilities such as hospitals, health centres, schools and old people's homes.

Study co author Marta Doval, said: 'Some airborne organic compounds - such as benzene, which increases the risk of cancer - have been recorded at petrol stations at levels above the average levels for urban areas where traffic is the primary source of emission.'

The study, published in the Journal of Environmental Management, shows the air at petrol stations and in their immediate surroundings is especially affected by emissions stemming from evaporated vehicle fuels. This includes unburnt fuel from fuel loading and unloading operations, refuelling and liquid spillages.

The research team measured the levels of 'typical traffic' pollutants in different parts of the urban area of Murcia. They then calculated the quotients for the levels of an aromatic compound (benzene) and a hydrocarbon (n-hexane) at three Murcia petrol stations - near the petrol pumps and surrounding areas - to find the distance at which the service stations stop having an impact.

In the three cases studied a maximum distances of influence of close to 100 metres was found although the average distance of contamination was around 50 metres.

But the distances depend on the number of petrol pumps, the amount of fuel drawn from them, traffic intensity, the structure of the surroundings, and weather conditions.

Share or comment on this article



Learn more about oil sands.

Click to Watch Video

Taking on the world's toughest energy challenges.

[Login or Register](#)

[Follow SA](#)

SCIENTIFIC AMERICAN™

Winner of the 2011
National Magazine Award
for General Excellence



THE PRINT EDITION

[View Latest Issue »](#)
[Subscribe to Print »](#)
[Give a Gift Subscription »](#)
[Buy This Issue »](#)

[Magazines](#)

[News & Features](#) [Blogs](#) [Multimedia](#) [Education](#) [Citizen Science](#) [Topics](#)

[Home » EarthTalk »](#)

EarthTalk | Health

0 Like Be

Is It Safe to Live Near a Gas Station?

The health concerns for you or your family with living by the pump

| April 14, 2009 | 8

[Share](#) [Email](#) [Print](#)

Dear EarthTalk: I am looking at possibly buying a house that is very close to a gasoline station. Is it safe to live so close to a gas station? What concerns should I have? I have toddler and infant babies.

-- Ranjeeta, Houston, TX

Despite all the modern health and safety guidelines they must follow, gas stations can still pose significant hazards to neighbors, especially children. Some of the perils include ground-level ozone caused in part by gasoline fumes, groundwater hazards from petroleum products leaking into the ground, and exposure hazards from other chemicals that might be used at the station if it's also a repair shop.



Gas stations can pose significant hazards to nearby residents. Some of the perils include ground-level ozone caused in part by gasoline fumes, carbon monoxide from car exhaust, groundwater pollution from oil and gas leaking into the ground or from leaking underground storage tanks, and exposure hazards from other chemicals that might be used if the station is also a repair shop.

Image: Getty Images

Ozone pollution is caused by a mixture of volatile organic compounds, some of which are found in gasoline vapors, and others, like carbon monoxide, that come from car exhaust. Most gas pumps today must have government-regulated vapor-recovery boots on their nozzles, which limit the release of gas vapors while you're refueling your car. A similar system is used by the station when a tanker arrives to refill the underground tanks. But if those boots aren't working properly, the nearly odorless hydrocarbon fumes, which contain harmful chemicals like benzene, can be released into the air.

Higher ozone levels can lead to respiratory problems and asthma, while benzene is a known cancer-causing chemical, according to the National Institutes of Health (NIH). The quest to reduce ozone levels has led the state of California to implement a more stringent vapor-recovery law, effective April 1, 2009, which requires that all gasoline pumps have a new, more effective vapor-recovery nozzle.

ADVERTISEMENT



Learn more about oil sands.

Click to Watch Video »

Taking on the world's toughest energy challenges.

Follow Scientific American

Scientific American Newsletter

Get weekly coverage delivered to your inbox.

[Sign Up Now](#)

Latest Headlines

Obama, Campaigning on Clean Energy, Champions LED Bulbs

ClimateWire | 2 hours ago | 3

Mississippi Floods Could Mean Huge Gulf "Dead Zone"

Reuters | 6 hours ago | 2

Energy Firms Fear "Tremendous Decline" in CO₂ Price

Reuters | 8 hours ago | 2

[Show Most Read](#)

[Show Most Commented](#)

TRY A RISK-FREE ISSUE

YES! Send me a free issue of Scientific American with no obligation to continue the subscription. If I like it, I will be billed for the one-year subscription.



Underground gasoline storage tanks can also be a problem. The U.S. Environmental Protection Agency (EPA) estimates that there are some 660,000 of them from coast-to-coast. Many a lawsuit has been filed against oil firms in communities across the country by people whose soil and groundwater were fouled by a gas station's leaking underground storage tank. In the past, most tanks were made of uncoated steel, which will rust over time. Also, pipes leading to the tanks can be accidentally ruptured.

When thousands of gallons of gasoline enter the soil, chemicals travel to groundwater, which the EPA says is the source of drinking water for nearly half the U.S. If buying a home, consider its potential loss in value if a nearby underground storage tank were to leak. Gasoline additives such as methyl tertiary-butyl ether (MTBE), which has been outlawed in some states, make the water undrinkable—and that is only one of 150 chemicals in gasoline. Repeated high exposure to gasoline, whether in liquid or vapor form, can cause lung, brain and kidney damage, according to the NIH's National Library of Medicine.

Spilled or vaporized gasoline is not the only chemical hazard if the station is also a repair shop. Mechanics use solvents, antifreeze and lead products, and may work on vehicles that have asbestos in brakes or clutches. Auto refinishers and paint shops use even more potentially harmful chemicals.

In today's car-centric world, we can't escape exposure completely, because these chemicals are in our air just about everywhere. But by choosing where we live, keeping an eye out for spills, and pressuring the oil companies to do the right thing for the communities they occupy, we can minimize our exposures.

CONTACTS: U.S. EPA, www.epa.gov; National Institutes of Health, www.nih.gov.

EarthTalk is produced by E/The Environmental Magazine. SEND YOUR ENVIRONMENTAL QUESTIONS TO: EarthTalk, P.O. Box 5098, Westport, CT 06881; earthtalk@emagazine.com. Read past columns at: www.emagazine.com/earthtalk/archives.php. **EarthTalk is now a book!** Details and order information at: www.emagazine.com/earthtalkbook.

[Post a Comment](#) | [Read Comments \(8\)](#)

[Reprints and Permissions »](#)

0 Like Be first submit Share 0

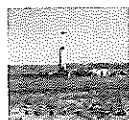
Articles You Might Also Like



Idle Moments
Turn into Tons of
Air Pollutants at
Schools



Are Everyday
Consumer
Products Making
People Sick? A
Q&A with Paul D.
Blanc



Drill for Natural
Gas, Pollute
Water



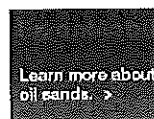
Some airborne
particles pose
more dangers
than others



Are Pesticides
from Plants
Dangerous to
Humans?

The Ski
Environ

SCIENTIFIC AMERICAN MAGAZINE ON FACEBOOK



8 Comments

[Add Comment](#)

1. JamesDavis
02:23 PM 4/14/09

The town I live in is very small and there was an abandoned gas station sitting on an acre of land in the center of town that needed torn down. After they tore the station down, the EPA did their chemical check and they found so much chemical pollution in the ground that they will not allow any one to build

City
State
Zip
[Continue](#)

Science Jobs of the Week

Bioinformatics Expert Next Generation Sequencing
Functional Genomics Center Zurich (FGCZ)
Zurich

Vienna International Post-Doctoral Training in
Molecular Life Sciences
Max F. Perutz Laboratories
Wien, Austria

Postdoctoral Associate
University of Minnesota
Minneapolis, MN, USA

Postdoctoral Research Fellow
Sloan Kettering Institute
New York, USA

Postdoctoral research fellow
University of North Carolina at Chapel Hill, School of
Medicine
105 Mason Farm Rd, Chapel Hill, NC 27599, USA

[More jobs from Naturejobs.com »](#)

ADVERTISEMENT

Plugin cannot be rendered with the specified parameters.