

## **What is the bucket?**

The community based "bucket" air sampling system was developed in California in 1994, when local residents living near oil refineries and chemical plants decided to do something to put an end to the pollution in their neighbourhood. These residents sought expert assistance to develop a system of independent monitoring of air pollution. Together they designed simple air monitoring device, called a "bucket" to take grab air samples. Subsequently, a US NGO, Communities for a Better Environment (CBE) organized a regional effort to provide "buckets" to five industrial communities in the San Francisco Bay area.

The CBE also convinced the U.S. EPA to verify and endorse the "bucket". The EPA provided \$90,000 to test the scientific credibility of the 'bucket', the outcome of which was approval from the EPA of the scientific reliability of the "bucket" technology and methodology of collecting air samples.

In 2000, *groundWork*, with the assistance of CBE and another US based NGO, SAEPEJ (the South African Exchange Programme for Environmental Justice) introduced the "bucket" to communities in SA. Community workshops were held in South Durban, Port Elizabeth, Cape Town and Sasolburg, and air samples were taken. In 2002 *groundWork* is seeking to develop community air monitoring systems, using the "bucket", in heavily polluted neighbourhoods in SA and Southern Africa.

### **How does the "bucket" work?**

The "bucket" is quite literally a nappy bucket which has been adapted to take air samples. Inside the sealed bucket is a Teflon sampling bag. The air is sucked out of the bucket using a handheld pump, creating a vacuum inside the bucket. Then a valve attached to the Teflon bag is opened, and air is sucked into the bag to fill the vacuum in the bucket. Once the bag is filled with air it is removed from the bucket and sent to a laboratory for testing.

### **What pollutants do the buckets test for?**

The "buckets" can be used to test for just about every gas in the air (ambient air). This includes organic and inorganic gases and sulphur compounds. The bucket cannot be used to test for particulate matter, including heavy metals, nor or toxins that normally attach themselves to particles, e.g. dioxins.

### **What are the results of "bucket" samples in SA?**

Bucket samples have been taken in South Durban (on the fence line of the Engen refinery), in Cape Town (on the fence line of the Caltex refinery) and in Sasolburg (several samples taken around Sasolburg). A variety of chemicals were found in the samples. Below are some of the most important findings.

#### **Benzene**

Levels of benzene in the Sasolburg and Durban sample were recorded at 29 parts per billion (ppb). This is the highest benzene concentration ever detected in a bucket air sample around a petroleum refinery. This was eight times higher than the USA ambient air standard according to Dr Wilma Subra, technical analyst for the samples taken in South Africa.

Benzene is a known human carcinogen. Long-term exposure to benzene in the air can cause leukaemia and anaemia. Breathing benzene can cause drowsiness, dizziness, and unconsciousness. It can also cause excessive bleeding and can affect the immune system.

### **Toluene**

High levels of toluene were found in all three samples with ranges from 24 ppb to 10 ppb. These levels were four times higher those normally found during upset conditions around petroleum refineries in the USA.

Toluene affects the brain. Repeated exposure to high levels can cause permanent brain and speech damage, vision and hearing problems, loss of muscle control, and poor balance. It can also cause memory loss, decreased mental ability and kidney failure. Chronic inhalation exposure can cause unconsciousness, and even death.

Over 30 other toxic chemicals with found in the various samples undertaken. Many of the levels of these chemicals were found at levels higher than acceptable background levels in the USA. In the Caltex sample the fuel additive MTBE was found. This chemical has come under serious scrutiny in the USA and has been the issue of various litigation battles and congress hearings to date. Caltex denied that they use MTBE.

What is most alarming is the accumulative impact these chemicals would have on people who have been constantly faced with this cocktail of pollutants for several decades.

Other information sources:

[Communities for a Better Environment](#)