

COMMUNITY'S FREQUENTLY ASKED QUESTIONS A BRIEF OVERVIEW

1. What is flaring?

The word flaring is used to describe a naked (open) flame that is burning off excess gas. This usually occurs at oil refineries, as well as at certain chemical plants. Gases are generated when the process is not operating properly, when there is loss of power or when gases are vented during maintenance. Far more flaring takes place at gas and oil production facilities than at refineries. It also occurs at some mines and many land fill sites.

2. What are the main problems with flaring?

Flares release very large volumes of gas into the atmosphere in a brief period of time.

They are prone to problems of wind turbulence and lack of time to burn the gases and variable temperature, which contribute to an "unclean" burn.

One of the main problems with flaring is that flaring efficiencies are essentially unknown. Often, refineries quote manufacturers' specifications, as they don't know their actual efficiency. Research from the Alberta Research Council (Canada) also suggests that the number and volume of potentially toxic compounds released due to incomplete combustion was much higher than expected.¹

Flaring also contributes to a number of environmental problems such as eco inefficiency, resource depletion, global warming and acid deposition.

3. Why do refineries flare?

Flares are designed to protect the refinery equipment, and blow gases beyond the immediate workplace area – they are not designed to protect the offsite public.

Refineries regard flaring as a necessary safety device, for getting rid of excess gas. This is a safety mechanism for the refinery. If too much gas builds up, parts of the refineries could overpressure and explode.

Some refineries flare more than they should, as this is an easy way to get rid of a refinery's waste.² In south Durban, refineries flare due to operational upsets and maintenance as well as emergencies. It is interesting to note that in terms of Engen's new permit, issued on 31st December 2004, they are prohibited from flaring for economic reasons.

4. Why are some flares smoky?

If a flare is smoky, then it is not a good flare, because what is being released is not being burnt completely i.e. incomplete combustion. Both Engen and SAPREF in south Durban add steam to their flares, and this helps the flare burn properly. If a flare is smoky or the flame is remarkably high, it should be reported. Flares also smoke because the volume of gas overwhelms the capacity of the flare to burn efficiently.

5. Why is there such a strong smell when flaring occurs?

Many gases are released during flaring. If the flare is "good" flare, only carbon dioxide (CO₂) and water are released. Since monitoring of gases does not occur at the flare tip, it could be argued that this only happens in a laboratory! There are two gases that could cause a flare to smell – sulphur dioxide and hydrogen sulphide.

Sulphur dioxide (SO₂) is a colourless gas and has a strong smell. It irritates the respiratory system, and can cause and aggravate asthma and bronchitis. Continued exposure in pregnant women can result in babies being born with a pre-condition to asthma.³

Hydrogen sulphide (H₂S) is an extremely dangerous chemical. It has a rotten egg smell. According to a Handbook Hydrogen Sulphide issued by Shell Safety Committee December 1986, "The major hazard of hydrogen sulphide is its ability to cause sudden death due to accidental exposure" in high concentrations.

The concentrations during flaring are normally far below the accidental level but high enough to be recognised by the smell and health symptoms such as nausea and vomiting.

Another point to note regarding hydrogen sulphide is that the continued exposure to this chemical leads to a reduced olfactory response which means that the more one is exposed to this, the less one can smell it. It could be present in a dangerous concentration, and one would not be able to smell it.

6. What is put into the air when refineries flare?

According to the Canadian Public Health Association 2000 Position Paper, 250 different toxins have been identified during flaring, that have been released into the air. These include:

- Particulate matter (soot)
- Benzene
- Benzopyrene
- Carbon di-sulphide (CS₂)
- Carbonyl sulphide (COS)
- Toluene
- Mercury

¹ http://www.ec.gc.ca/energ/oilgas/flaring/flaring_general2_e.htm

² <http://www.groundwork.org.za/Pamphlets/flaring.htm> and *Enforcement Alert* Volume 3 Number 9 (Put out by the Environmental Protection Agency (EPA)

³ Settlers Primary School Health Study, November 2002

- Arsenic
- Chromium
- Sour gas with hydrogen sulphide and sulphur dioxide
- Nitride oxides (NO_x)
- Carbon dioxide (CO₂)
- Methane (CH₄)
- Polycyclic aromatic hydrocarbons (PAH)

Other useful numbers to report flaring from petro-chemical industries in South Africa are:

Sasolburg: 016 9603439
 Sasol Secunda: Pierre de Jager 082 414 5196
 Caltex Cape Town: Steve Woodruff MD of refinery 021 508 3200
 SAPREF: 0800 3300 90
 Engen: 0800 3300 99
 SCDEA: 031 461 1991
 eThekweni Health Department: 031 3003136

7. Does flaring affect my health?

Certain compounds that may be released will aggravate respiratory diseases such as asthma. The US EPA Enforcement Alert October 2000 states: "hydrogen sulphide is regarded as a toxin similar to cyanide in toxicity. Flaring can produce high ambient concentrations of sulphur dioxide. Short-term exposures to elevated sulphur dioxide levels while at moderate exertion may result in reduced lung function accompanied by such symptoms as wheezing, chest tightness, or shortness of breath..."

8. Does flaring affect air quality?

Flaring can affect air quality, especially if the flares are not burning efficiently. The air monitoring stations have detected increased levels of particulate matter during flaring episodes. Ground level hydrogen sulphide concentrations are also known to increase. Flaring also increases carbon dioxide levels. Incomplete combustion results in harmful hydrocarbons and particulate matter (soot) being released into the atmosphere. Studies in Houston, Texas indicate that smog levels can rise as the result of excess flaring because of excess flaring because of VOCs and sulphur dioxide releases.

9. How is air quality monitored?

In Durban, air quality is being measured by the eThekweni Air Quality Monitoring Network.

At present we can log onto a website www2.nilu.no/airquality/ to check on a daily basis. From time to time, SDCEA will be offering workshops on how to understand this information. Contact the SDCEA offices on 031 461 1991 for more details.

10. What can I do when I see a flare?

In south Durban, when the flares are smoky or large, members of the public can report it to the eThekweni Health Department 031 – 3003136 or the 24 hour pollution complaint centre on 031 361 0000. Ask for a log number. Then you can report it to SDCEA 031-4611991 who will then log it on the Geographic Information System (GIS). It is useful to know which refinery has the flare, what time the flaring started and when it finished, so that we can relate this information to the air quality data that we have.

Flaring at oil refineries in south Durban and Denmark



