

EXTRACTIONS



a newsletter from O'CONNOR ASSOCIATES

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GAS FLARING CHANGES

When waste natural gas is flared (burned) it is ideally converted to carbon dioxide and water. If the combustion process is incomplete, unburned reactants and other combustion products are released into the atmosphere. Recent wind tunnel studies at the University of Alberta's Department of Mechanical Engineering have shown that 5% to 10% of natural gas remains unburned in moderate winds of 20 to 40 km/hr. In Alberta, 70% of the flared gas comes from solution gas in oil wells, with the remaining 30% coming from releases during flow-rate testing of gas wells and releases of pressure spikes at gas processing plants.

Gas flaring practice in Alberta is undergoing change for three reasons:

- growing public awareness of the health risks of gas flaring, particularly of sour gas
- new government regulations to reduce total gas flared
- new technologies for improving flare combustion efficiency

Health risks to people, livestock, and crops from sulphur emissions are increasingly the target of public concern, so much so that residents near sour gas plants or planned sour gas wells vigorously oppose the current flaring practices.

In May, Energy Minister Steve West announced a review of 34 older gas plants with a view to bring them up to current emission standards, a potentially costly upgrade. The Alberta Energy Utilities Board (EUB) has released a draft of the *Upstream Petroleum Industry Flaring Guide* which aims to reduce the total volume of flared gas by 25% by the end of 2001. The EUB has not yet imposed flare combustion efficiency regulations since practical measurement techniques are unavailable, but it expects new technologies to produce better than 98% efficiency.

Several companies are already changing their practices. Stampede Oil and Startech Energy have both agreed to try a new enclosed incineration technique on their proposed sour gas wells southwest of Calgary to satisfy demands from nearby residents.

The EUB *Guide* also says, "If flaring cannot be eliminated, the operator would then consider alternatives for minimizing the volumes of gas that are flared, for example the generation of electricity." Proponents of new micro-turbine electric generators, which run on flows as small as 300 m³/day, claim 99% combustion efficiency and suggest that if 60% of flared gas in Alberta were converted to electricity, it would provide 3250 GW/year, roughly 40% of Calgary's daily electrical requirements.

[from <<http://www.mece.ualberta.ca/groups/combustion/flare/page6.html>>, *Calgary Herald*, April 14, p. B7 and May 6, p. A12, <<http://www.eub.gov.ab.ca>>]

BENZENE EMISSIONS TO DROP

In an attempt to reduce benzene emissions, Alberta Energy Company is testing a new dehydration device at a well site near Grande Prairie in northern Alberta.

Benzene, a toxic pollutant linked to leukemia, is emitted from glycol dehydrators, which are used to dry natural gas as a corrosion prevention measure before the gas is put into a pipeline. Alberta has about 80% of the glycol dehydrators in Canada, and 9 000 tonnes of benzene went into the atmosphere in 1995. In 1997, the Canadian Association of Petroleum Producers agreed to a voluntary plan which would cut benzene emissions by 40-45% by 2001 and by 90% by 2005.

Hydro Pacific Technologies of Vancouver developed the dehydration device which recovers the water but keeps the benzene with the gas. However, to those already concerned about existing pollutants in natural gas, this may be unwelcome news. According to the British medical journal, *The Lancet*, exposure to natural gas from cooking ranges increases the risks of asthma attacks, reduced lung function, increased airway obstruction, and shortness of breath in women.

[from *Calgary Herald*, April 5 & 19, 1999, *The Lancet*, Vol. 347, Feb. 17, 1999, p. 427]

MERCURIAL SHOWERS

Mercury is continuing to build up in the Arctic from mercurial 'showers' that occur each spring. Environment Canada researchers began measuring gaseous mercury at Alert on the northern tip of Ellesmere Island in 1995. When the readings began to fluctuate wildly in late March, the researchers first thought their equipment was malfunctioning. However, the phenomenon has returned each spring since. The researchers are still unravelling the complex chemical chain of events which begins with sunlight on sea salt liberating bromine which combines with ozone forming bromine oxide. Bromine oxide oxidizes the mercury vapours, and the cold temperatures turn the gas into a solid which then falls to the ground. This discovery disproves the widely-held belief that mercury vapour in the atmosphere is inert, and it may lead to better understanding of ozone depletion in the north.

[from *Science and the Environment*, March/April 1999,
<http://www.ec.gc.ca/science/sandemar99/article3_e.html>]

INTERESTING

- Indoor air quality problems including lead, formaldehyde, volatile organic compounds, pesticides, CO₂, and CO were found in 20% of American schools.
[from <<http://ens.lycos.com/ens/mar99/1999L-03-29-09.html>>]
- School-age girls may be more likely to suffer ill effects from air pollution than boys.
[from <<http://ens.lycos.com/ens/mar99/1999L-03-29-09.html>>]
- Ohio scientists have found a way to use genetically-altered, single-celled algae to remove heavy metals from lakes.
[from <<http://ens.lycos.com/ens/apr99/1999L-04-09-09.html>>]
- A new recycling plant will make Edmonton the first major city in Canada to exceed the national waste reduction target of 50% diversion from landfill by 2000.
[from *Environmental Science & Engineering*, May 1999]
- A recent Health Canada report indicates that ground-level ozone is a health hazard at concentrations less than one-fifth of the current federal guideline.
[from *EnCompass Magazine*, April/May 1999, p. 33]
- All the US Army's bullets will be lead-free by 2003.
[from *Enviroline*, Vol. 10, No. 6, p. 10]
- Los Angeles residents have a 426 times higher risk of cancer due to air pollution than the target risk under the US Clean Air Act.
[from *Enviroline*, Vol. 10, No. 6, p. 6]
- Seven percent of Inuit newborns in northern Quebec have lead concentrations in their blood that exceed the Canadian guidelines.
[from *Calgary Herald*, March 22, 1999]

FROG PARASITES

Estrogens, pesticides, or ozone loss are often thought responsible for deformities found in wild frogs. The deformities are viewed as a signal of a potentially broader environmental problem. However, developmental biologist Dr. Stanley Sissons and his colleagues at Hartwick College in Oneonta, New York, have demonstrated that one kind of deformity — 2 to 3 limbs sprouting from one limb bud, each a mirror image of the one next to it — is caused by trematode parasites. These creatures burrow into the hindquarters of tadpoles where they physically rearrange the limb bud cells. Chemically-caused deformities are different and so far have not been found in wild frogs. There are still many other kinds of deformities to study, but Dr. Sissons says he has yet to see deformities linked to UV or chemical pollutants.

[from <<http://ens.lycos.com/ens/apr99/1999L-04-30-01.html>>]

TBT AND CANCER

Organic tin compounds, used most often in anti-fouling marine paints and wood preservatives, disrupt the function of human killer cells that normally destroy tumour and virus-infected cells. Researchers Dr. Bommanna Loganathan and Dr. Margaret Whalen of Murray State University, Kentucky, have shown that the tumour-killing ability of natural killer cells was inhibited when exposed to 'environmentally relevant' concentrations of tri-butyltin (TBT) for as little as an hour. Mono- and di-butyltin were only slightly less harmful.

Activities are already under way to reduce the amount of organic tin compounds released into the environment. The International Marine Organization, a UN agency, is planning a global ban on the use of anti-fouling marine paints containing TBT by 2003. A Pennsylvania firm, Rhom and Haas Company, has developed an alternative to TBT in marine paints using isothiazolone. An Alberta company, Treeline Wood Products Ltd., has developed an alternative wood preservative using a non-toxic, borate-based process.

[from <<http://ens.lycos.com/ens/mar99/199L03-25-02.html>>]

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