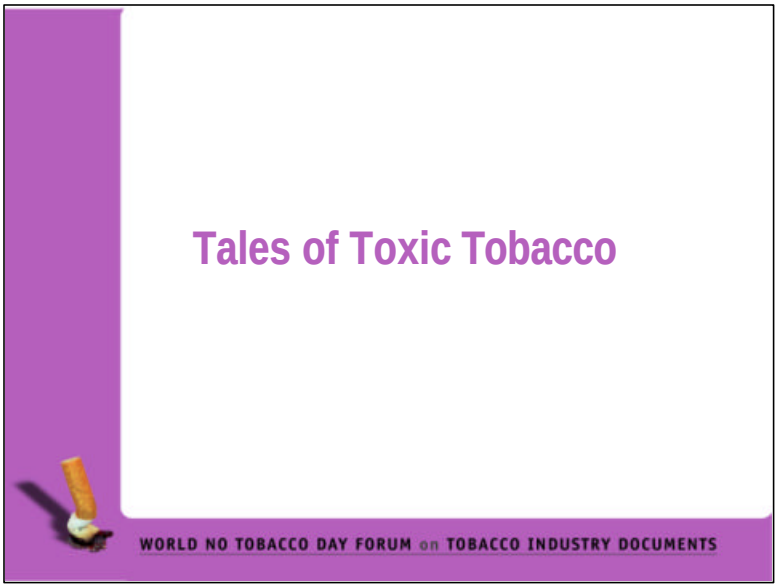
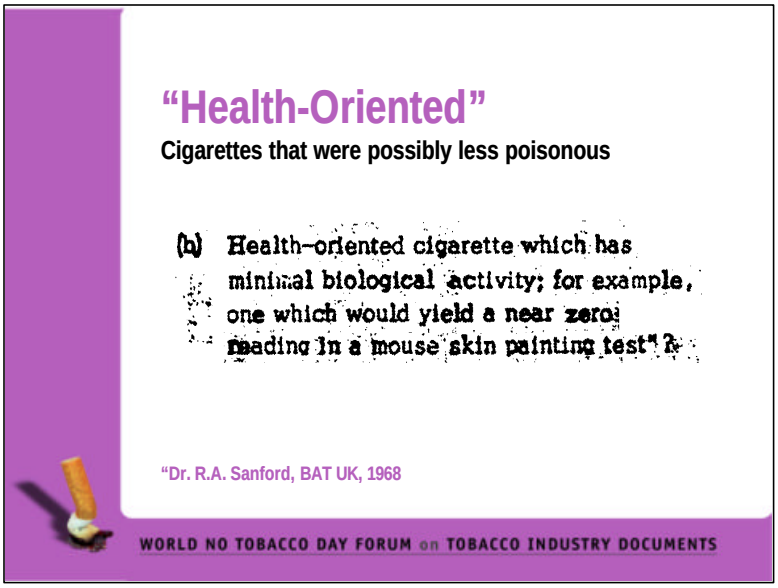


This paper was written by Neil Collishaw.

The opinions expressed are those of the author and do not necessarily reflect those of Health Canada or Physicians for a Smoke-Free Canada

For decades British-American Tobacco and its Canadian affiliate have been conducting biological tests to examine the cancer-causing potential of its products. They found that nearly all forms of their products were biologically active – they showed cancer-causing potential. Little of this research was ever shared with the public. This presentation will examine what they discovered – and didn't tell us.

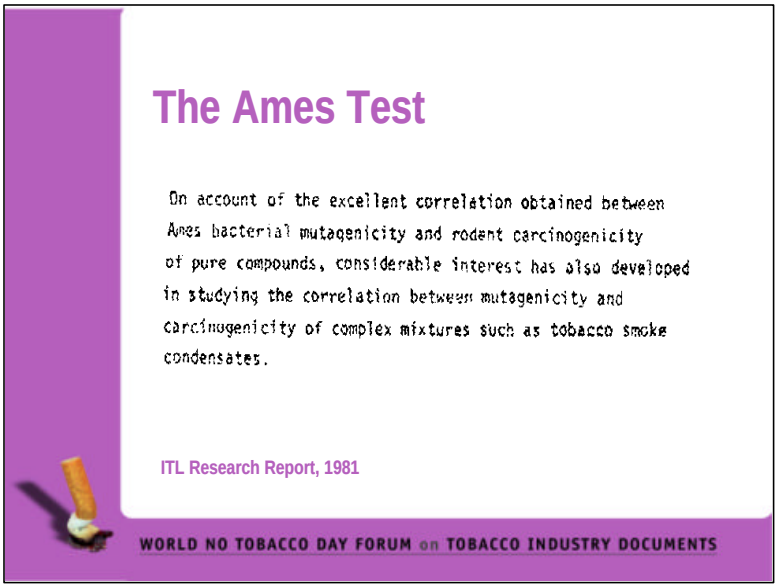


By the late 1960s, the tobacco industry knew they had to do something more to respond to the health issue. There were stark choices. They could fool smokers or they could make cigarettes that were truly safe, or at least, a little less hazardous. Both paths were explored. Over the next thirty years they were to implement more changes aimed at fooling smokers than at protecting their health.

In 1968, Dr Sanford of BAT clearly described the two kinds of cigarettes that could be made, health image and health-oriented cigarettes.

This presentation will focus on the health-oriented cigarettes.

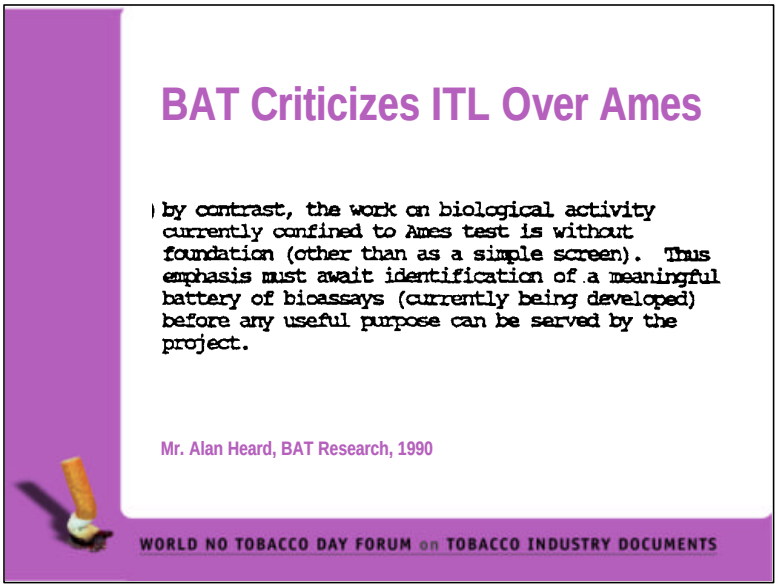
BAT and ITL were to record thousands of readings in mouse skin painting and other biological tests of tobacco and tobacco smoke. Few of them were ever zero. But they did not share their results with the outside world and they kept on selling cigarettes.



Mouse-skin painting was undertaken in earnest in the 1950s and 1960s within the tobacco industry. By the 1980s Imperial Tobacco was using other kinds of tests for cancer-causing potential. Chief among these was the Ames test. There was also limited use of another kind of test, the nitromethane fraction index (NMFI) that had been developed in Imperial Tobacco's own laboratories.

In the early 1980s, ITL reported using the Ames test to see if tobacco causes genetic mutation (mutagenicity), known to be strongly related to cancer-causing potential (carcinogenicity).

The Ames test examines genetic mutations of bacteria in Petri dishes. It became the test of choice for cancer-causing potential of tobacco and tobacco smoke in ITL.

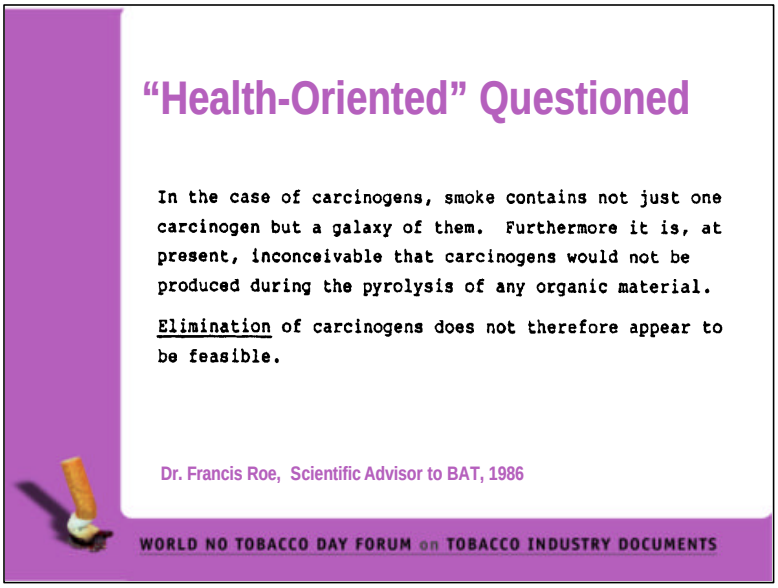


Scientific flaws with the Ames test were signalled.

Mainstream scientific opinion is in accord with Alan Heard. The accepted and appropriate use of the Ames test is as an initial screen to determine whether or not the substance in question could possibly cause cancer. A positive result on the Ames test would be followed by more tests to determine more definitively if a substance caused cancer. Of course, definitive knowledge in house that tobacco smoked caused cancer would be inconvenient knowledge to have. ITL never sought to acquire it. They just kept doing Ames tests.

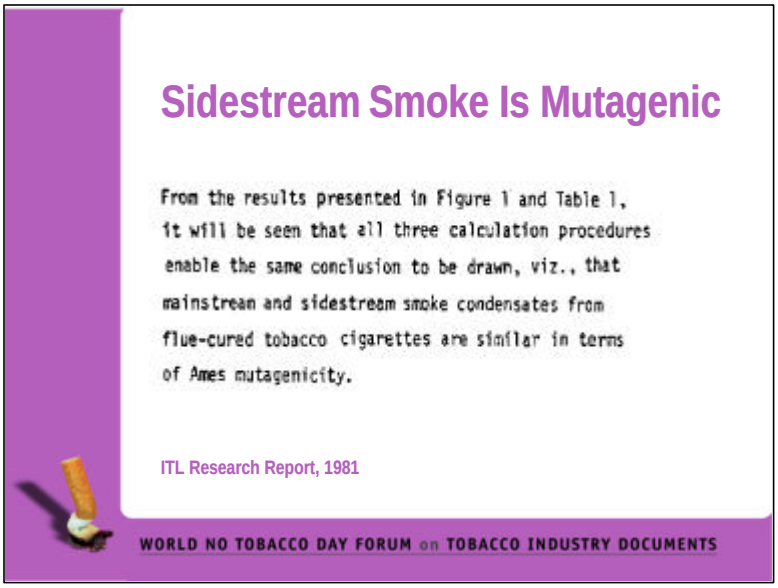
They accumulated masses of data indicating that various kinds of tobacco had higher or lower scores on the Ames test. They gave meaning (of doubtful scientific validity) to these tests ranking their brands as scoring higher or lower on Ames tests. They thought that lower scores on the Ames test might convey some safety or marketing advantage some time in the future.

But they never shared this scientific work, or the meaning they attached to it, with the public.



Strategic flaws with research into 'health-oriented' cigarettes were also identified. If you found out cigarettes caused mutations, people would want to know if they caused cancer. If you found out they caused cancer, people would want you to remove the cancer-causing agents.

In a project entitled "Eliminate, Modify, Neutralize" (EMN), Imperial Tobacco proposed to eliminate some toxins from tobacco. BAT scientist, Dr F.J.C. Roe criticized it, correctly pointing out that you could never eliminate all of the cancer causing agents in tobacco smoke. There were just too many – "a galaxy of them". Project EMN was killed.



Despite these problems, ITL continued to do Ames tests, using it not as intended as a screening test for cancer-causing potential, but as a way of ranking cigarettes as to whether they caused more or fewer genetic mutations according to the Ames test.

BAT may have expressed concerns -- but they continued to rely on ITL's Montreal labs as a centre of excellence for their biological testing.

ITL's Ames tests results were consistent. All forms of tobacco and tobacco smoke caused genetic mutation.

ITL persevered with Ames tests. They found that all forms of tobacco and tobacco smoke cause genetic mutations to a greater or lesser degree. They found that:

•mainstream smoke is mutagenic

•sidestream smoke is mutagenic

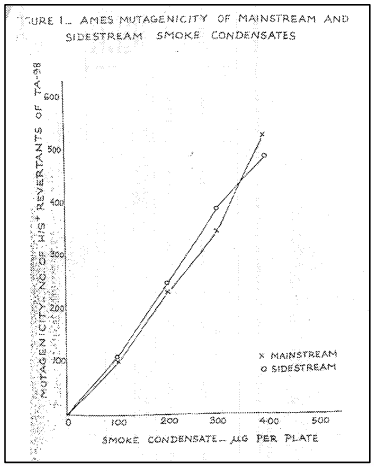
•cigarettes with more nicotine are more mutagenic

•ventilated cigarettes are more mutagenic

Non-smokers should be concerned that ITL research demonstrated that sidestream smoke was just as mutagenic as mainstream smoke.

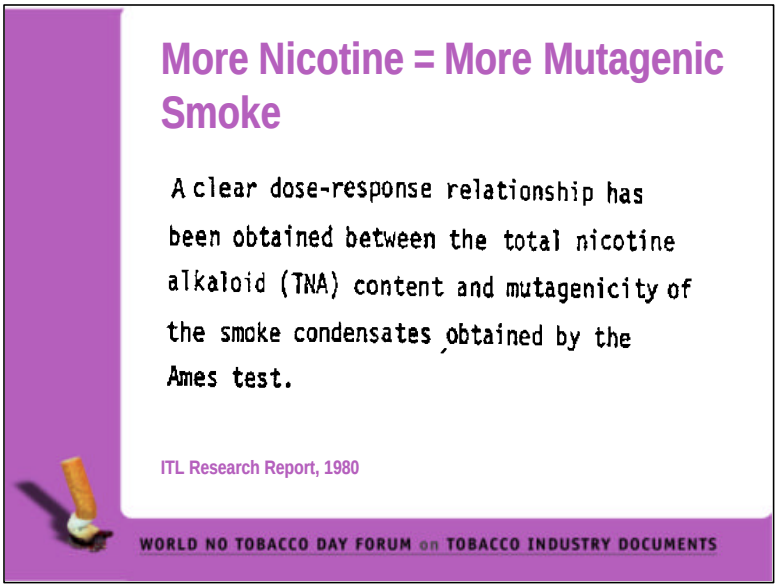
Mutagenicity of sidestream and mainstream smoke

ITL Research Report, 1981



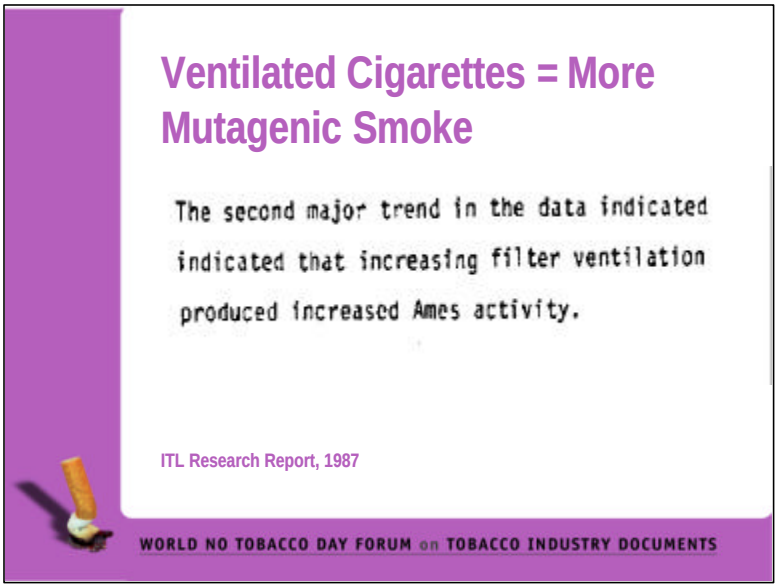
WORLD NO TOBACCO DAY FORUM on TOBACCO INDUSTRY DOCUMENTS

ITL's own research revealed clear, consistent and surprising similar dose-response relationships for the mautagenicity response of the Ames test to higher and higher doses of mainstream and sidestream tobacco smoke. Rarely are such clear and straightforward dose-response relationships observed in nature. ITL never volunteered this information to smokers or non-smokers. ITL continues to deny the link between second hand smoke and lung cancer.



Unbeknownst to smokers, ITL had demonstrated that higher nicotine level in cigarettes was associated with greater mutagenicity.

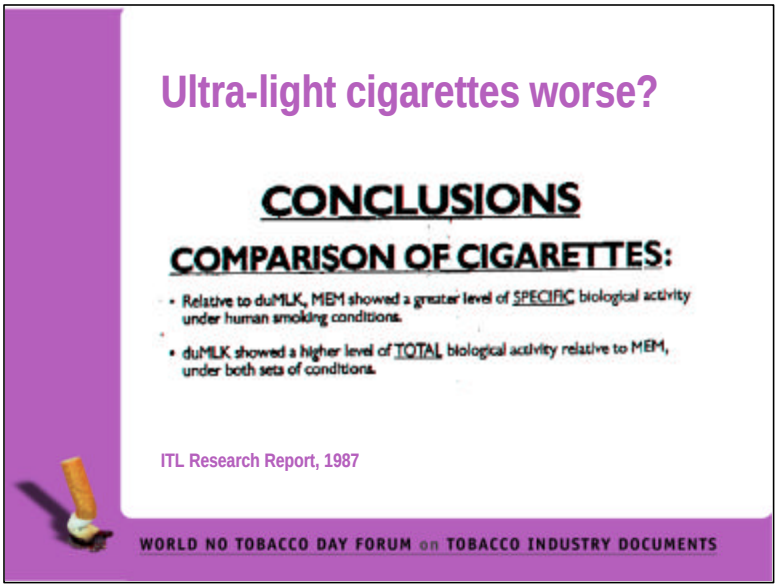
Nonetheless, they continued to work to increase the amount of nicotine in relation to tar.



More ventilation, used in lower yield cigarettes that many people believed to be less hazardous, produced higher levels of mutagenicity. And ITL didn't tell consumers that either.

Nor did ITL reduce ventilation in cigarettes.

In fact, ventilation grew considerably in the 1980s. ITL reported in 1981 that all major brands would be ventilated by 1983. (hyperlink)

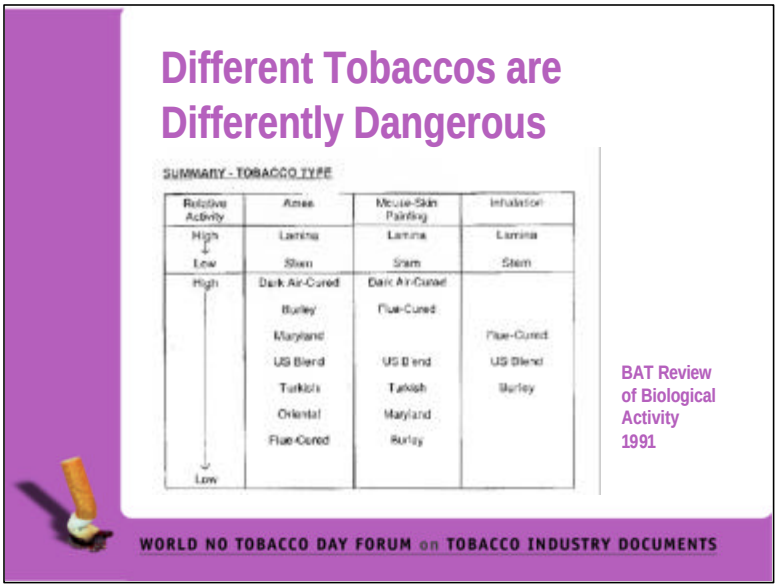


In 1984 Imperial Tobacco discovered that the very low-tar Matinee Extra Mild was potentially more dangerous than the higher-tar du Maurier light, when tested under conditions designed to mimic human smoking behaviour..

> "Relative to du Maurier Light Kingsize, Matinee Extra Mild showed a greater level of SPECIFIC biological activity under human smoking conditions."

In 1990, BAT prepared "A review of the biological activity of smoke", a treatise of more than 200 pages that reviewed and summarized biological research carried out by the tobacco industry (especially BAT companies) over three decades.

The report focuses exclusively on whether various forms of cigarettes showed more or less biological activity. The slide shown here summarizes the relative level of cancer-causing potential for different kinds of tobacco on different kinds of tests.

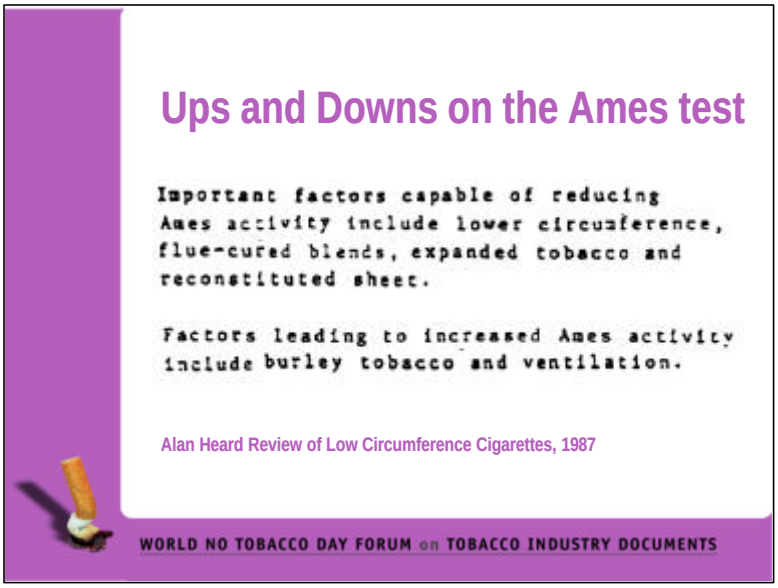


In one sense, the results are ambiguous. The chart shows that flue-cured tobacco, the kind used in Canadian cigarettes scored low on the Ames test but high on the mouse-skin painting test and inhalation tests.

In another sense, the results are unambiguous. The chart only shows relative cancer-causing potential – from more to less. But the results were never zero. All forms of cigarettes and tobacco tested by whatever means showed some cancer-causing potential.

The report suggests that mouse-skin painting was more likely to detect the cancer-causing potential of polycyclic aromatic hydrocarbons (PAHs) while the Ames test was more sensitive to the cancer-causing potential of nitrosamines and other nitrogen-bearing compounds. Relative to American blend cigarettes, Canadian cigarettes are higher in PAHs and lower in nitrosamines. But both classes of compounds cause cancer. And there is no public health benefit to getting cancer caused by PAHs over cancer caused by nitrosamines.

Imperial Tobacco continued doing Ames tests throughout the 1980s and early 1990s; the Ames test was the one that put their cigarettes in a relatively favourable light. Mouse skin painting and inhalation tests, ones that might have produced quite different results, were conveniently ignored.



Meanwhile, large numbers of Canadians continued to be killed by cancer caused by smoking. They would never benefit from knowledge of Imperial Tobacco's research on mutagenesis and carcinogenesis.

With "health-oriented" research, ITL fails to:

•conduct recommended follow-up tests to determine carcinogenesis

•remove mutagens and carcinogens from cigarettes

•make cigarettes that were really safer

•tell Canadians that, according to ITL research, that nearly all their products caused genetic mutation and possibly cancer

All in all, ITL failed to live up to its responsibilities to properly test the health effects of its products.

Once they decided to use the Ames test in a way other than intended, and found that tobacco and tobacco smoke in all its forms caused mutations, they once again failed to tell the public their findings or what they meant.

They failed to warn consumers of the potential hazards of these products, and they failed to make products that really would be safer.

There were and continue to be attempts to develop ways to make products that score lower on the Ames test. But it is far from clear what the health benefit, if any, that such products would have.

We have uncovered no evidence that these products were introduced to market.