

CIGARETTE MANIPULATION / SAFE CIGARETTES

1950s	
Real progress if reduce carcinogens	<p>1954:</p> <p>29 March: The Research Chief, Frederick Darkis, at Liggett remarks that “if we can eliminate or reduce the carcinogenic agent in smoke we will have made real progress”¹.</p>
Cancer-free cigarette	<p>~1955:</p> <p>A Hill and Knowlton memo quotes a tobacco company lawyer as saying “Boy! Wouldn't it be wonderful if our company was first to produce a cancer-free cigarette. What we could do to the competition”².</p>
Add nicotine	<p>1956:</p> <p>RJ Reynolds experiments by adding nicotine to tobacco stem³.</p>
Reduced tar cigarette will take the market	<p>1958:</p> <p>A scientist at Philip Morris writes to his head of Research “Evidence is building up that heavy smoking contributes to lung cancer”. He then recommends an “all-synthetic aerosol to replace tobacco smoke, if necessary ... I know this sounds like a wild programme, but I’ll bet that the first company to produce a cigarette claiming a substantial reduction (say 50 per cent less than the present Parliament or Kent) in tars and nicotine, or an ersatz cigarette whose smoke contains no tobacco tars, and with good smoking flavour, will take the market”⁴.</p>
Dilemma: to keep up or reduce nicotine	<p>1959:</p> <p>A BAT research paper comments that “On the question of nicotine and its effects on the smoker there can be two extreme forms of approach –</p> <ol style="list-style-type: none"> (1) Keep up the nicotine content of cigarettes in order to maintain the, as yet, firmly entrenched nicotine habit. (2) Reduce the nicotine per cigarette. <p>To follow No. (2) too closely might end in destroying the nicotine habit in a large number of consumers and prevent it ever being acquired by new smokers. True, deprived of an increasing amount of nicotine per cigarette, consumers may tend to smoke more cigarettes, but this can only go on up to a point.”⁵</p>
	<p>Robert DuPuis, Philip Morris’s Research Director, writes a memo regarding future desirable products asking if his department could</p>

nicotine to tar	nicotine to TPM [total particulate matter , post-combustion material known as tar] Ratio of All RJ Reynolds brands” noting that “if nicotine were added to the extracted filter, probably in the form of nicotine molate, the T. P.M level would not increase as much percentage wise as the nicotine level. Hence the ration of nicotine to TPM would be raised” ¹⁰ .
Get rid of chemical culprit	Sir Charles Ellis, from BAT R&D Department addresses the Annual BAT research conference: “ Conversely, and this is always a possibility the biological effect may increase as the condensate is used fresher and fresher. This possibility need not dismay us, indeed it would mean that there really was a chemical culprit somewhere in smoke, and one, moreover, that underwent a reaction fairly quickly to something else, I feel confident that in this case we could identify this group of substances and it would be worth almost any effort, by preliminary treatment, additives, or filtration to get rid of it”. ¹¹
Constrained by PR	One discussion at the conference shows the tension between public denial of the health risks and the potential break through of a “safer cigarette”: “ Mr. Reid suggested that no industry was going to accept that is product was toxic, or even believe it to be so, and naturally when the health question was first raised we had to start by denying it at the PR level. But by continuing that policy we had got ourselves into a corner and left no room to manoeuvre. In other words if we did get a break though and were able to improve our product we should have to about-face, and this was practically impossible at the PR level. If we could ease the approach a bit then when we did make positive contributions we could at least say so without having to crawl behind the door” ¹² .
Are we negligent?	BAT were also considering the implications of the fact that a US manufacturer, Lorillard had modified its filter to remove 90 per cent of phenols from smoke: Addison Yeoman, B&W’s lawyer asks: “In this state of knowledge [that phenols reduce cilia action and that they can be reduced] is it negligence on the part of a cigarette manufacturer either to fail to remove phenols, or to fail to warn consumers of the product of its potential danger”. ¹³
Develop a medically acceptable cigarette	1963: 21 November: Helmut Wakeham, Philip Morris, Head of Research and Development, writes a memo outlining research plans for the following year, hoping to “develop a ‘medically acceptable’ cigarette in light of the present health attitude” ¹⁴ .
Any level of nicotine ..	B&W researcher R.B. Griffith says: “It may well be to remind you, however, that we have a research program in progress to obtain, by genetic means, any level of nicotine” ¹⁵ .
But we want an	A letter from B&W to BAT discusses “optimum levels” for nicotine in cigarettes, stating: “Certainly, the nicotine level of B&W cigarettes was not obtained by accident. we can regulate fairly precisely the

<p>optimum level of nicotine</p> <p>Precision manufacture</p>	<p>nicotine and sugar levels to almost any desired level management might require ...It should be recognised that nicotine and sugar levels are not the only things important in determining smoking quality. It should be emphasised that these are but two constituents in a very complex tobacco leaf and that there are other materials in the leaf which must affect smoking quality. I am certain that when these have been identified, ways can be found to control their level just as we can control nicotine and sugar levels and we will some days achieve the goal of precision manufacture.”¹⁶</p>
<p>Doing best to supply a “safe” cigarette</p>	<p>1964:</p> <p>2 January: An internal BAT memo reads “..any work undertaken must be with a commercial or political motive as well as a scientific motive. In other word, we should like to be able to say that certain of our cigarettes provide smoke in which certain suspect ingredients have been diminished, and that the smoke from these cigarettes has been scientifically proved to produce less change than other cigarettes on animal tissues. From this would follow the conclusion that in the light of all available knowledge, the Company is doing its best to supply a ‘safer’ cigarette”¹⁷</p>
<p>Ariel – The alternative nicotine device</p>	<p>4 February: On behalf of BAT, the Battelle Institute in Geneva patents “Ariel” - an alternative nicotine delivery system - in its search for the safer cigarette. The idea was that the consumer would inhale a water-based aerosol enriched in nicotine but relatively deficient in the “tar” found in cigarette smoke. The patent stipulates that the invention intended “to provide an improved smoking device which delivers an improved smoke stream if a controlled character and which does not contain the products of combustion”¹⁸.</p>
<p>Success with Ariel</p>	<p>11 February: A BAT meeting is held to “Discuss Present Position of ARIEL and its Possible Future Continuance”. At the meeting it is discussed that ARIEL “has achieved sufficient success to render it certain that we shall wish to continue with the further development of this type of smoking device”¹⁹.</p>
<p>Health approved cigarettes</p>	<p>18 February: Helmut Wakeham, Vice President for Research and Development at Philip Morris asks for increased corporate support for “development by year end of a superior filter cigarette with acceptable taste having high gas phase absorption and very low TPM [total particulate matter or tar] ... the hoped-for results of these efforts will be cigarettes approved on all major health questions” providing “a substantive basis for vigorous health advertising by publication of articles in the technical literature ...The industry must come forward with evidence to show that its products, present and prospective are not harmful. Medical research must be done for this purpose ...The industry should abandon its past reticence with respect to medical research. Indeed, failure to do so could give rise to negligence charges”²⁰</p>

<p>Low tar/low nicotine</p> <p>Or</p> <p>Do we add nicotine</p>	<p>October: Philip Rodgers and Geoffrey Todd visit the US on behalf of the Tobacco Research Council. Their report states “Mr. Walker [American Tobacco], in Carlton, had followed Dr. Wynder's idea of a low tar, low nicotine cigarette. Dr. Seevers [Chair of the Committee for Research on Tobacco and Health] informed us that he had specifically told Dr. R-----, Director of Research of American Tobacco [AT.co], that it was important to keep up the nicotine content of the smoke, while reducing anything that ought to be reduced. Dr. Seevers' recommendation was that AT. Co. should add nicotine in cut tobacco and then reduce both nicotine and tar by filter and porous paper as in Carlton. Dr. Wakeham described Philip Morris' objective as a ‘high flavour/low delivery’ cigarette, but it was low delivery of some smoke constituent that contributed largely to a biological reaction in some short term test”²¹.</p>
<p>Minimum nicotine level</p>	<p>A Philip Morris memo states: “nicotine delivery level should be 0.7 mg minimum”. The company is also “investigat[ing] purchasing nicotine”²².</p>
<p>Maximum nicotine for minimum tar</p>	<p>1965:</p> <p>Dr. R. B. Griffith, Head of R&D at B&W tours the TRC’s research laboratories at Harrogate and Imperial’s at Bristol: “Their approach seems to be to find ways of obtaining maximum nicotine for minimum tar. Approaches being used include ..nicotine fortification of cigarette paper ...addition of nicotine containing powders to tobacco ..”²³.</p>
<p>Need at least one safe brand</p>	<p>In July, on returning from his visit to the UK, Dr. Griffith recommends: “The company should take steps to place itself in the best possible position to minimise chances of Government intervention by (a) having at least one brand on the market which is ‘safest’ possible cigarette on the basis of knowledge to date; (b) obtaining biological test data to indicate the degree to which the cigarette is ‘safer’”²⁴.</p>
<p>Ammonia is used</p>	<p>According to RJ Reynolds, Philip Morris begins using ammoniated sheet this year and “increased use of the sheet periodically from 1965 to 1974. This time period corresponds to the dramatic sales increase Philip Morris made from 1965 to 1974”²⁵.</p>
<p>Keep them hooked</p>	<p>An internal memo written by a Philip Morris researcher reads: “Determine minimum nicotine drip to keep normal smokers ‘hooked’”²⁶.</p>
	<p>BAT sets up its own toxicology programme called Project Janus, undertaken by the Batelle Institute.</p>
<p>Never be a safe cigarette</p>	<p>~1965: A “strictly confidential” report by two scientists Francis Roe, an independent tobacco consultant, and M C Pike, which is undated but uses references up to 1965, states: “We conclude that, the physical nature of tobacco smoke makes it difficult to conceive of ways of making cigarette smoking safe by means of selective filtration ...</p>

	because known carcinogens are produced from such a wide variety of organic materials during the process of pyrolysis, it is most unlikely that a completely safe form of tobacco smoking can be evolved” ²⁷ .
Ariel is our insurance	1966: 28 July: A BAT report outlines the reason for “Project Ariel”. “Project ARIEL was a research topic aimed at the development of a smoking device from which a smoker can receive, in a suitable form, sufficient nicotine to give satisfactory physiological and psychological responses, unaccompanied by the products of combustion and pyrolysis associated with normal cigarette smoking ... it would seem sensible to anticipate a worsening situation and ARIEL could be an insurance which the Company cannot afford to neglect” ²⁸ .
Extractable nicotine	30 September: A BAT survey finds that “the reaction of a smoker to the strength of the smoke from a cigarette could be correlated to the amount of ‘extractable’ nicotine in the smoke, rather than to the total nicotine content ... “a smoke with a higher ‘extractable’ nicotine, and hence higher concentration of nicotine base, will have an appreciable amount of the nicotine in the vapour phase. Rapid absorption of vapour phase nicotine could explain a rapid transfer of nicotine to the brain” ²⁹ .
Ariel manufacture feasible	1967: 2 March: Dr. Green from BAT research, summarises recent findings: “Methods have been worked out by which the ratio of nicotine to tar can be increased and it has been shown for at least one brand that this ration can be increased by lowering the tar without adversely affecting consumer preference ... The ARIEL smoking device is smokeable, would probably be safer to smoke than an ordinary cigarette and manufacture now appears feasible” ³⁰ .
“Safe” designs	July: Dr. Robert Johnson from R&D at B&W returns from two weeks at BAT’s Southampton’s laboratories: “Current studies on the design of ‘safe’ cigarettes fall into several main approaches. These are: (1) synthetic tobacco substitutes, (2) cigarettes incorporating a large percentage of air-cured tobacco (3) smoking products delivering smoke with a high nicotine/tar ration, and (4) selective filtration” ³¹ .
Health orientated cigarette	24 –27 October: BAT’s Annual Research Conference is held in Montreal. Minutes of the meeting comment that “ It might be possible to market a health-orientated cigarette without prior biological testing” ³² .
Increase nicotine	A study by BAT finds that “treatment of a filter with polyethyleneimine (PEI) increases the delivery of ‘extractable nicotine” ³³ .

Double nicotine	American Tobacco begin investigating the production of nicotine from “n rustica”, a plant with almost double the concentration of nicotine ³⁴ .
Two types of cigarette: “Health image” to reassure the customer and “health orientated”, with lowered biological activity	1968: September: DR Green from BAT addresses the Annual BAT research conference: “Research staff should lay down guidelines against which alternative products can be chosen in everyday operations. Although there may, on occasions, be conflict between saleability and minimal biological [carcinogenic] activity, two types of product should clearly be distinguished, viz: a) A health-image (health reassurance) cigarette b) A Health-orientated (minimal biological activity) cigarette, to be kept on the market for those customers choosing it ³⁵ .”
Health reassurance	17 November: Dr Green from BAT writes a paper on “Cigarettes with Health Reassurance” stating: “We should attempt to make continued improvement in our current brands, removing anything from smoke which may be harmful or alleged to be harmful ..a second approach which could be made both with existing brands and with new brands is to aim at a lower smoke production per cigarette (i.e. lower tar) while maintaining ‘normal’ nicotine ...the third phase in our approach might be to produce cigarettes low both in smoke yield and in nicotine. This would, if course, be aimed to meet the expected criticisms of nicotine ... The next phase in our approach on this might be to design cigarettes predominately orientated towards health considerations ³⁶ ”.
pH and nicotine	A report by BAT’s research Department found that “nicotine retention appears to be dependent principally on smoke pH and nicotine content” ³⁷ .
“Safe” prototype	1969: June: At the Annual BAT Research Conference the “conference considered what the characteristics of the ‘safest’ cigarette might be ...it was decided to accept as a research objective that such a prototype cigarette be developed” ³⁸ .
Humans don’t smoke like machines	June: The Canadian Tobacco Industry tells an all-Party Health Committee, called the Isabelle Committee that “human smokers differ greatly in the frequency and intensity of their puffing and the amount of each cigarette they smoke. Thus there may be little relation between the figures reported from the machine and the actual exposure of any given smoker with any given cigarette” ³⁹ .
Must have	September: DJ Wood from R&D at BAT gives a presentation to company executives: “It is our belief that the cigarette of the future must have reduced biological activity, and when I speak of biological activity I mean the adverse effects such as tumour production on mice which I have just mentioned ...The cigarette must also have acceptable smoke quality. The assumption is that a cigarette which shows

“safer” cigarettes	reduced biological activity by any or all of these tests is likely to be ‘safer’ to humans ...The intention at R&DE is to use whatever biological tests are available in the development of a ‘safer’ cigarette... Ways of reducing biological activity: 1) Filtration, 2) Choice of Tobacco. 3) Treatment of tobacco; 4) Cigarette design; 5) Synthetic materials” ⁴⁰ .
Alter tobacco advantageously	Late 60’s/ early 70s: An undated report about Project Janus indicates that: “additive-treated tobacco and sheet materials show considerable merit biologically, indicating that tobacco can be altered advantageously” ⁴¹ .

1970s	
Never imply its safe	1970: June: A BAT document on “Smoking and Health”, says that “the industry should however never put itself in the position that by offering to publish tar/nicotine figures it is implying that some cigarettes are ‘safer’. If there is to be any suggestion of this, it must come from the government” ⁴² .
There is only a partial solution	October: The Annual BAT Research conference concludes that “the smoking and health problem <i>is at least partially</i> amenable to a research solution”. Three years previously, in 1967, the scientists had concluded that “the smoking and health problem <i>is</i> amenable to a research solution” [emphasis added] ⁴³ .
Got to reduce carbon monoxide	October: The BAT Biological Tasting Committee considers: “that it is still very important to reduce the level of carbon monoxide in cigarette smoke. It is a known poison present in relatively large amounts and, despite the lack of success in developing a suitable filter, efforts should be continued” ⁴⁴ .
Vary nicotine/tar	31 December: An internal Philip Morris memo about “nicotine/tar ratio study” shows that the company “are initiating a study of the effect of systematic variation of the nicotine/ tar ratio upon smoking rate and acceptability measures. Using the Marlboro as a base cigarette, we will reduce the tar delivery incrementally by filtration and increase the nicotine delivery incrementally by adding a nicotine salt. All cigarettes will be smoked for several days by each of a panel of 150 selected volunteers” ⁴⁵ .
Exploit “safer for health”	~ 1970: A 1971 Confidential Matinée Marketing Plan for Imperial Tobacco states under “Opportunities” that: “Due to continuing anti-smoking publicity, the public continues to be aware of and concerned with the suggested hazards of cigarette smoking. Matinée is then in an ideal position to take advantage of this situation with its low T&N and ‘safer for health’ propositions” ⁴⁶ .
	1971: May: BAT internal documents show that “The ‘safer’ cigarette

<p>“Safe” cigarettes are key to industry’s future</p>	<p>is in my view the key to the industry’s future ... push on as fast as possible with the search for the safer cigarette - in this connection there are signs that Governments and medical authorities are more prepared than they used to be to say that low tar/nicotine brands are ‘safer’. Hence all associated brand companies should have their brand programmes adjusted to meet this trend ... Industry must avoid any ‘safer’ implication on itself⁴⁷”</p>
<p>Increase nicotine</p>	<p>30 June: An internal BAT document shows that “Mr. H. G. Horsewell continues to work with alkaline filter additives which selectively increase nicotine delivery”⁴⁸.</p>
<p>Reassure with “healthy” brands</p>	<p>21 October: P Short from BAT writes a report on “A New Product”: “Manufacturers are concentrating on the low TPM [total particulate matter, tar] and Nicotine segment in order to create brands ...which aim, in one way or another, to reassure the consumer that these brands are relatively more “healthy” than orthodox blended cigarettes”⁴⁹</p>
<p>Increasing pH to increase nicotine</p>	<p>16 December: A Liggett document articulates that: “Increasing the pH of a medium in which nicotine is delivered increases the physiological effect of the nicotine by increasing the ratio of free base to acid salt form, the free base from being more readily transported across physiological membranes. We are pursuing this project with the eventual goal of lowering the total nicotine present in smoke while increasing the physiological effect of the nicotine which is present, so that no physiological effect is lost on nicotine reduction.”⁵⁰”</p>
<p>Manipulate nicotine</p>	<p>An internal Philip Morris memo outlines that “our plans are to concentrate upon that nicotine delivery range between 0.3 and 1.2 mg with a systematic manipulation of the nicotine/tar ratio”⁵¹.</p>
<p>Marlboro Lights launched</p>	<p>Philip Morris launches Marlboro Lights in the US, with a tar yield of 13 compared to 17 for normal Marlboro with the slogan “For smokers who prefer the lighter taste of a low-tar cigarette”⁵².</p>
<p>Opportunity to market unique cigarette</p> <p>Smokers compensate</p>	<p>1972: March: An RJR internal document states: “There is a gap in present cigarette product lines, hence an opportunity to market a unique type of cigarette ...[which]should deliver about 1.3 mg of nicotine and 13 mg of ‘tar’, hence would have a uniquely low ‘tar’-to-nicotine ...I believe that for the typical smoker nicotine satisfaction is the dominant desire, as opposed to flavour and other satisfactions ... In theory, and probably in fact, a given smoker in a given day has a rather fixed per hour and per day requirement for nicotine. Given a cigarette that delivers less nicotine than he desires, the smoker will subconsciously adjust his puff volume and frequency and smoking frequency, so as to obtain and maintain his per hour and per day requirement for nicotine”⁵³.</p>
<p>Adjust pH to manipulate nicotine</p>	<p>An internal Liggett Group document indicates they were researching the effects of adjusting pH levels with the “eventual goal of lowering the total amount of nicotine while increasing the effect of the nicotine”⁵⁴.</p>

If you increase pH then you increase nicotine	1973: 22 January: A Liggett report summarises that “The purpose of the research under this project was to develop a method for increasing the smoke pH of a cigarette. A low smoke solids, low nicotine cigarette with an increased smoke pH would then have relatively more free nicotine in its smoke. Consequently, a higher nicotine impact would result producing a more satisfying smoke” ⁵⁵ .
“Safe” Cigarette	8 February. In the US the federally supported Tobacco Working Group (TWG), chaired by Dr. Gori, is initiated and starts working on the idea of a safe cigarette ⁵⁶ .
Doesn’t matter is “safe” actually means “safe”	13 February: An internal BAT memo written to Dr. Green about Safer Cigarettes outlines “Product Development” (to cope with current governmental S&H [smoking and health] pressures). This is what our management really expects R&D to do. Things like marketable low tar and nicotine cigarettes ..The question as to whether such cigarettes are really safer does not matter, although privately even our Health people wonder whether low tar and nicotine cigarettes are a good idea. I think the researches going on into the smoker’s response to such modified cigarettes comprise genuine inquiry in the smoking and health field, examining what I call the ‘involuntary moderation’ concept of a safer cigarette” ⁵⁷ .
Got to free nicotine	12 July: An RJ Reynolds scientist writes that “Our analysis suggests that pH does not correlate as closely with share performance as does free nicotine. Our emphasis should be directed toward free nicotine while pH would provide us with a measure of or tool to effect free nicotine” ⁵⁸ .
Deliberate control of pH	Claude Teague, a scientist at RJ Reynolds, writes that “All evidence indicates that the relatively high smoke pH (high alkalinity) shown by Marlboro (and other Philip Morris brands) and Kool is deliberate and controlled ...These differences in nicotine impact and other smoke qualities arising from smoke pH increases would be expected to give rise to differences in consumer response, hence market performance” ⁵⁹
Give youth a nicotine kick through pH regulation	An internal RJ Reynolds Memo, entitled “Cigarette concept to assure RJR a larger segment of the youth market”, says that “Any desired additional nicotine ‘kick’ could be easily obtained through pH regulation ⁶⁰ .”
Smokers adjust smoking pattern	1974: 12 January: Notes from the Annual BAT Research Conference show that a BAT German study has shown that “whatever the characteristics of cigarettes as determined by smoking machines, the smoker adjusts his pattern to deliver his own nicotine requirements” ⁶¹ .
Reconstituted tobacco	5 June: R.M. Irby, Chief of Research for the New Products Division at American Tobacco, responds to a query from American’ Vice President, who had requested to know “our knowledge regarding increasing the nicotine content of reconstituted tobacco” ⁶² .
Nicotine	26 November: An internal RJ Reynolds document outlines how “we are working on a cigarette in which 95% to 98% of the nicotine has

removal	been removed from the tobacco and smoke” ⁶³ .
People smoke more than machines – so lets keep the machines	An internal Philip Morris document details : “Some unexpected observations on tar and Nicotine and Smoker Behaviour ... Generally, people smoke in such a way that they get more than predicted by machines. This is especially true for dilution (i.e. low tar, low nicotine) cigarettes ..The FTC’s [Federal trade Commission] standardised test should be retained: It gives low ratings” ⁶⁴ .
Winston Lights launched	RJ Reynolds launches Winston Lights in the US, with the slogan “A new cigarette that’s lighter in taste, low in tar” ⁶⁵ .
Liggett “eliminate” cancer from cigarettes	Scientists at Liggett pioneer a cigarette using a palladium treated cigarette with a charcoal filter that in tests on mice achieved up to a 100 per cent drop in tumorigenicity and a 50 per cent drop in cocarcinogenic promoters ⁶⁶ . James Mold, one of the key scientists involved recalls : “This was a very exciting period for our research because we had been able to get rid of the material which was causing the cancers, which had now consumed something like 20 years ... and we were prepared to go ahead and develop a cigarette that incorporated this finding ... I think that we were very ecstatic over the fact that we had been able to do something that no one else was able to do and that was to eliminated their cancer causing materials from cigarette smoke.” ⁶⁷
More ammonia	RJ Reynolds introduces “ammoniated sheet filler in the Camel filter cigarette”. According to the company, because of this, “better market performance was indicated in the subsequent years” ⁶⁸ .
Need normal nicotine but low tar	1975: 16 April : At the Annual BAT Research conference “the need for normal nicotine low tar cigarettes which appeal to the consumer was identified” ⁶⁹ .
Low delivery = Healthy	October: An internal Philip Morris research paper states: “Our goal is to come up with a low delivery cigarette that will appeal to current low delivery cigarette smokers ..some proportion of current low delivery smokers may desire to switch to a more flavourful cigarette and others may follow as consumer experience results in changing the image of low delivery cigarettes so that smokers believe a flavourful cigarette can really be ‘healthy’” ⁷⁰ .
Normal nicotine / low tar	October: An internal RJ Reynolds memo states: “There may be an opportunity for a new cigarette with no/very low ‘tar’ but a ‘normal’ amount of nicotine” ⁷¹ .
Smokers adjust habit	A Chronology of B&W’s Smoking and Health Research stipulates that a “compensation study conducted by Imperial Tobacco, a BATco affiliate, [shows that a smoker] adjusts his smoking habits when smoking cigarettes with low nicotine and TPM [total particulate matter] to duplicate his normal cigarette intake” ⁷² .
Tobacco substitutes	In the UK, the Hunter Committee gives tobacco substitutes a lukewarm endorsement: “The product may be no more dangerous to health than a similar product containing tobacco only and could be less injurious” ⁷³ .

Light doesn't mean light	L. Meyer, from Philip Morris writes an internal memo, outlining that "The smoker profile data reported earlier indicated that Marlboro Lights cigarettes were not smoked like regular Marlboros. In effect, the Marlboro 85 smokers in this study did not achieve any reduction in smoke intake by smoking a cigarette (Marlboro Lights)." ⁷⁴
Compensation	1976: 30 January: A BAT Research document entitled "Compensation for Changed Delivery" concludes that "many established smokers do compensate for changed delivery in an attempt to equalise nicotine delivery, when this is possible" ⁷⁵
Give up tar not smoking	2 February: A B&W advert for Vantage in <i>Newsweek</i> claims that: "How many times have you decided to give up smoking? Nobody these days is telling you not to give up smoking. But if you've given it up more times than you'd like to remember, the chances are you enjoy it too much to want to give it up at all. If you're like a lot of smokers these days, it probably isn't smoking that you want to give up. It's some of that 'tar' and nicotine you've been hearing about." ⁷⁶
Tar / nicotine reduction	March: Imperial: "There has been a steady reduction in the tar and nicotine content of cigarettes on sale in this country in recent years, and both here and abroad we notice a growing preference for lower tar and nicotine levels" ⁷⁷ .
Maintain nicotine	9 March: An internal Lorillard memo states that "It is recognised in the tobacco industry that it is desirable to maintain the nicotine content of tobacco at a constant level in order to provide a satisfactory smoking product. This is difficult to accomplish since the nicotine content depends upon the type of tobacco, where it is grown, uniformity of various blends, type and efficiency of filter used and the processing" ⁷⁸ .
Need PR initiative	15 March: An RJR Document outlining "Planning Assumptions and Forecast for the Period 1976-1986" outlines that: "The third effort of the anti-tobacco lobby could be labelled indirect prohibition. This refers to the efforts of the anti-tobacco lobby to enforce over a period of time a steady lowering of tar and nicotine, especially the latter, will eventually lead current smokers to stop altogether and the 'new smoker' not to start. Very little is being done on an Industry-wide basis to counteract this, and an RJR initiative seems warranted. It is important that efforts on this point be made, not only in the United States, but also overseas ...
"Safer" cigarette	"Current simplistic emphasis of direct reduction of smoke 'tar' and nicotine will remain high but may be replaced gradually by emphasis on selected reduction of specific smoke components alleged to be harmful, with shift from 'prohibition-total cessation' to development of an allegedly 'safer' cigarette ...Substantial progress will result toward what is alleged to be a 'safer' cigarette from use of a combination of many techniques ...There may be a limited market for a quality cigarette delivering essentially no nicotine ...A cigarette with 'normal' smoke nicotine and significantly lowered 'tar', e.g. with unique tar/nicotine ratio of 10 or less, may achieve a significant place in the

	market” ⁷⁹ .
Danger nicotine will be reduced below threshold Need health re-assurance	25 March: A BAT document on “The Product in the Early 1980s” argues that “There is a danger in the current trend of lower and lower cigarette deliveries - i.e. the smoker will be weaned away from the habit. If the nicotine delivery is reduced below a threshold ‘satisfactory’ level, then surely smokers will question more readily why they are indulging in an expensive habit ... Looking further down the road.....filters might offer a selective means of controlling smoke toxicity ... Well before that date, however, opportunities exist for filter and cigarette designs which offer the image of “health re-assurance” ⁸⁰ .
Got to keep nicotine high	4 May: An internal Lorillard memo, regarding the “Nicotine Augmentation Project”, outlines that: “Recommendations from health oriented agencies and pressure from competitive companies make it imperative that Lorillard develop a flavourful cigarette delivering lower tar while at the same time delivering a level of nicotine higher than could be obtained normally by conventional cigarette construction. This goal is almost an absolute necessity for brands delivering less than 8 mg of tar. If achieved, the technology may be applied to all classes of cigarette to achieve lower tar delivery while maintaining or enhancing current nicotine levels” ⁸¹ .
Increase nicotine	8 June: A Lorillard Research report shows how “nicotine was applied as free nicotine and nicotine tartrate to different tobaccos for the purpose of increasing the nicotine to tar ration in the cigarette smoke .. Random taste panelling implied that only a small addition of free nicotine was needed to provide the impact of a higher nicotine cigarette.” ⁸²
Dozen solutions to adding nicotine	16 June: A further Lorillard “Nicotine Augmentation Project” memo states: “About a dozen approaches have been recognised as a possible solution to the problem of delivering more nicotine in the smoke of low tar cigarettes” ⁸³ .
To increase nicotine, increase the pH	12 July: A Lorillard Research Centre report into “pH of Smoke, A Review” “The question that must be addressed ...is whether a smoker smokes for nicotine or for flavour ...if nicotine satisfaction were the only criteria, increasing the pH would be the obvious step ...It is probably no coincidence that these same full flavour cigarettes have the higher pH’s ... The market leaders appear to have the higher pH’s, and hence the higher concentration of free base nicotine. If the desired goal is defined to be increased nicotine yield in the delivered smoke ... increase the pH, which increases the ‘apparent’ nicotine content without changing the absolute amount” ⁸⁴ .
Increase pH = Increased nicotine kick	21 September: A RJ Reynolds report states that “as the pH increases, the nicotine changes its chemical form so that it is more rapidly absorbed by the body and more quickly gives a ‘kick’ to the smoker” ⁸⁵ .
Two schools of	9 November: An internal RJ Reynolds memo into nicotine research outlines that under “Smoking and Health”, “Two basic schools of

thought	thought exist currently: A. Reduce both ‘tar’ and nicotine to achieve safety, B. Reduce ‘tar’ and increase (or hold level) nicotine. ⁸⁶ ”
There is a way round increasing nicotine	December: A BAT Board Plan on Smoking and Health stipulates: “Where imposition of maximum tar and nicotine yields is likely , as for league tables, this should be resisted, but if resistance is not successful attempts should be made to get levels fixed sufficiently high to cover the majority of brands ...Because of the legal and public relations problems ...nicotine, as an isolated identifiable chemical material, should not be added in our products. However, these objections do not refer to ... tobacco extracts which contain nicotine” ⁸⁷ .
Smokers control nicotine intake need low tar / high nicotine cigarette	10 December: A Lorillard research report outlines how: “A review has been made of the literature of smoke-dose nicotine with the goal of discovering some indications of threshold dose and optimum doses of nicotine in the average cigarette smokers ... it seems that, within limits, smokers can and do control their nicotine intake from smoke by varying their smoking techniques ... It would seem desirable to have a low tar cigarette with a nicotine content between the threshold and optimum doses level. Such a product would optimise the nicotine and minimise the carbon monoxide and tar effects, respectively” ⁸⁸ .
Filters make no difference to health	Ernest Pepples, B&W’s Vice President and General Counsel “The industry has moved strongly toward filter cigarettes, which have increased from 0.6 per cent in 1950 to 87 per cent in 1975 ...The new filter brands vying for a pierce of the growing filter market made extraordinary claims ... In most cases, however, the smoker of a filter cigarette was getting as much or more nicotine and tar as he would have gotten from a regular cigarette. He had abandoned the regular cigarette, however, on the grounds of reduced risk to health” ⁸⁹ .
Can’t imply tobacco isn’t safe	A BAT lawyer writes of the dangers of product liability using Non-Tobacco Material (NTM) in cigarettes to make them “safer”: “All assertions that NTM is ‘safe’ (or even ‘safer’) should be avoided. Not least because of the subsidiary implications that tobacco is not ‘safe’ (or less ‘safe’). ⁹⁰ ”
Researchers TAMED by the lawyers	Liggett and Myers set a task-force to develop “TAME,” the palladium “safe cigarette”. James Mold recalls what happened next: “We were approached by the Legal Department, and told that everything that we were doing, any memorandum we wrote and reports that were written and conferences that were held, that they would be attended by a legal representative. Correspondence and reports would be written from and to someone in the Legal Department and all would be stamped with Confidential and Lawyer - Client Privilege. It became apparent that the lawyer wanted the project to fail. Mold believes that Liggett was being pressurised not only by their own lawyers, but also those from other companies. “If they [other tobacco companies] were going to compete with the product, all their products were going to become obsolete, if one considers the market in terms of

	<p>each of the company's own interests - one can easily conclude that there had been an attempt to discourage this product to go out"⁹¹. The product was never marketed.</p>
<p>Need health-orientated cigarette</p>	<p>A B&W marketing report outlines how "consumers' growing interest and concern about the smoking and health issue justifies new product development in this area ... it is recommended, therefore, that new product work be focused on the development of a health-orientated brand which offers the consumer selective gas filtration, lowered tar/nicotine and good taste ... effectively convey the concept that certain gases in cigarette smoke may be undesirable and the proposed brand's unique ability to selectively filter these gases while remaining low in tar and tasting good".</p> <p><u>"Strategies:</u> Decrease the delivery of the noxious gases in cigarette smoke by 25 per cent ... All communications will focus on the familiarising consumers with the effect of cigarette smoke gases on 'health' and tobacco taste. These communications will simultaneously establish the proposed brand as the only cigarette on the market that decreases the harmful components in smoke, including tar/nicotine, while maintaining good tobacco taste".</p>
<p>Capitalise on health concerns</p>	<p><u>"Objectives:</u> In logical sequence, explain to consumers the implications of certain gases in cigarette smoke as they effect taste and smoker 'safety'. Capitalise on consumers' already existing attitude about the 'hazards' or tar and nicotine. Make known that the product selectively reduces those same gases and has low tar and nicotine thus is a 'safer' and better tasting cigarette"⁹².</p>
<p>Smokers smoking more = compensation</p>	<p>1977: March: William Dunn, a research scientist at Philip Morris co-authors a report: "We find that our smokers [were] smoking cigarettes in 1972 that delivered significantly less tar and nicotine than in 1968. At the same time they were smoking more cigarettes as well as more of the rod [farther down the tobacco portion] from each cigarette. These findings suggest ...that a tar and nicotine quota mechanism may be operative. That is they may be smoking more ...to compensate for the decreases in the tar and nicotine delivery of their cigarettes"⁹³.</p>
<p>Increase nicotine</p>	<p>12 April: A Lorillard Research report shows how "an investigation into increasing the nicotine content of our present type of reconstituted leaf has been made"⁹⁴."</p>
<p>Nicotine enrichment</p>	<p>13 April: A further Lorillard Memo outlines how "for a little less than the past year the Research Department has been working on a succession of projects which collectively may be called the nicotine enrichment project ...Tobacco scientists know that physiological satisfaction is almost totally related to nicotine addiction. The objective of the Research Department in this project has been to find how the nicotine delivery of the new product could be maximised"</p>
	<p>"The most direct solution to the problem of increasing nicotine</p>

Add nicotine	delivery in the new product would be to add nicotine alkaloid directly to the tobaccos used in the new blend. The direct approach involved determining at which point in the manufacturing process the nicotine could be added, and secondly, determining where the necessary quantity of nicotine to support a major brand could be obtained. The direct approach involves some serious problems, mainly centring around the intensely poisonous nature of nicotine alkaloid, and economic problems in obtaining a source of nicotine ⁹⁵ .”
Provide consumer reassurance by claiming low delivery and perception of mildness	14 April: P. L Short, from BAT writes a paper on “ Smoking and Health: the Effect on Marketing”, commenting that “All work in this area should be directed towards providing consumer reassurance about cigarettes and the smoking habit. This can be provided in different ways, e.g. by claiming low deliveries, by the perception of low deliveries and by the perception of ‘mildness’. Furthermore, advertising for low delivery or traditional brands should be constructed in ways so as not to provoke anxiety about health, but to alleviate it, and enable the smoker to feel assured about the habit and confident in maintaining it over time ”. ⁹⁶
Free nicotine	August: An advertising conference undertaken for B&W examines the goals of how to “Develop a Low Tar High Nicotine Cigarette and “have FREE NICOTINE as opposed to BOUND” ⁹⁷ .
	12 August: The TWG was officially terminated ⁹⁸
Should we cheat smokers?	26 August: Dr Green from BAT outlines suggested questions for the Chairman’s Advisory Conference including: -“How far should BAT go in attempting to decrease the risk of smoking, both generally and specifically by product modifications? - Should we market cigarettes intended to re-assure the smoker that they are safer without assuring ourselves that indeed they are so or are not less safe? For example, should we ‘cheat’ smokers by ‘cheating’ League Tables? ⁹⁹ ”
Design to compensate	21 September: A BAT memo outlines how “it should now be possible to design a number of cigarettes which would have the same smoking machine delivery but different deliveries to the compensating smoker. Broadly speaking, this could be achieved by developing cigarettes with a knowledge of the smoker’s response to such factors as pressure drop, ventilation, irritation, impact, nicotine delivery, etc ¹⁰⁰ .”
Less harmful	25 November: In a BAT Board paper on Strategies on Smoking and Health it states: “we have progressively modified our products to reduce those smoking constituents which are alleged to be ‘harmful’” ¹⁰¹ .
Maintain satisfaction	An internal Lorillard memo outlines that: "The trend toward low-tar cigarettes necessitates that ways be found to maintain nicotine satisfaction” ¹⁰²
	~1977: Arthur D. Little, a consulting organisation write a paper on “The Development of a Flavour System for Acceptability to Smokers of Candidate Less Hazardous Cigarettes” noting that: “The less

Less hazardous cigarette	hazardous cigarette may be defined as one which does not result in a risk to tobacco-related diseases which is significantly different from that of the non-smoking population, and epidemiological evidence indicates that such cigarettes are feasible. As this report indicates, the Smoking and Health Programme has been successful in testing and developing methods that can be utilised in the manufacture of the less hazardous cigarette” ¹⁰³
Determine minimum tar / nicotine for smoker satisfaction	1978: An RJR memo outlines “Specific undertakings for 1978 include “Determine minimum ‘tar’/ nicotine levels for smoker satisfaction through panel and consumer testing and study effect of varying nicotine levels and smoke pH on low ‘tar’ blends ...determine means to control ‘tar’/nicotine ratio and to increase nicotine impact” ¹⁰⁴ .
Switching smokers smoke more	1 March: A B&W document identifies that “Those familiar with the physiological aspects of smoking have suggested that low ‘tar’ consumers are not satisfying their nicotine need. In addition, focus group work has shown that when smokers switch from a high ‘tar’ to a low ‘tar’ brand they claim to smoke more. This may be empirical evidence of a need to satisfy some physiological urge, perhaps nicotine.” ¹⁰⁵
Develop alternative products	March: The Annual BAT research conference concludes: “it may be worth studying epidemiologically the current smokers of low tar products over the next decade. But until this evidence is available alternative products should be developed” ¹⁰⁶ .
We find compensation and smokers don’t smoke like machines	14 April: A BAT report states that “we have found a trend within the department for smokers to increase the volume of smoke drawn from cigarettes as the standard deliveries have been reduced by manufacturers ... we also observed ... a degree of compensation for reduced delivery when a ventilated cigarette was smoked ... We have not yet observed a smoker who smokes to the same patterns as a standard smoking machine” ¹⁰⁷ .
Is a “safe” cigarette ethical	15 May: Dr. Conning from Liggett writes a paper on “The Concept of Less Hazardous Cigarettes”. “There are broadly two sets of problems which attend the concept of a safer cigarette. The first is concerned with the ethical question: ‘ Is it morally permissible to develop a safe method for administering a habit-forming drug when, in so doing, the number of addicts will increase?’. The second relates to the technical feasibility of achieving greater safety ... But, where the end product cannot be free of hazard, there could be a case for prohibition ...The question , therefore becomes: ‘How feasible would it be to banish smoking from among human activities?’ The crusaders would have us believe that it is merely a question of prohibitive expense and a change of image - away from the virile masculine stereotype, or liberated woman, towards weak, degenerate, dependent characteristics. If we can implant this concept in the minds of adolescents, smoking will be banished for ever”...

Helpless in face of hazards	<p>... we may conclude that there is nothing unethical in the concept of a safer cigarette; that the use of artificial means to control mood is a very human characteristic; that we should not seek to expand but cannot dispel the habit; and , that our real duty lies in diminishing the adverse consequences. The technical problem of achieving this is truly formidable, mainly because of the complex nature of tobacco smoke, and our lack of knowledge of basic human toxicology. Smoking is associated, classically, with three sets of diseases –pulmonary cancer, chronic bronchitis and emphysema (chronic obstructive airway disease) and cardiovascular disease – and despite the expenditure of enormous resources in terms of money, manpower and thought, we have little understanding of the proximate constituents of tobacco smoke which result in these disease processes, or of the mechanism involved. That they are multifactorial is certain, but this only adds to our helplessness in the face of immediate hazards”¹⁰⁸.</p>
Cut out safe	<p>In Mid-1978, a marketing management constancy, submits a draft proposal to B&W regarding a “low delivery project”, exploring the marketing opportunities for “low tar” cigarettes, stating “The parameters of a ‘safe’ cigarette have been defined by Dr. Gori of the Federal Government, although his definition of ‘safe’ is believed to be as yet largely unrecognised by the medical community at large”. The word ‘safe’ was systematically excised from the final draft¹⁰⁹.</p>
Smokers are Pavlov’s dogs	<p>June: David Creighton from BAT writes a paper on “Compensation for Changed Delivery”: "It is generally accepted that a large number of habitual smokers are influenced in their smoking habit by the amount of nicotine that they draw from a cigarette. Over a period of time, during which they are learning to smoke effectively - that is so they do not make themselves feel ill, but do derive pleasure and satisfaction from smoking - they probably build up an association in their minds between the mouth sensations such as flavour, irritation and "impact" and the amount of smoke that gives them the satisfaction of smoking. This is a similar mechanism to Pavlov's dogs”.</p>
Smokers compensate	<p>“A smoker is likely to compensate for changed delivery if given a cigarette brand with different standard machine smoked deliveries to his usual brand so that as far as possible he maintains a constant blood level of nicotine ... Compensation may be defined as:- ‘Subconscious changes made to the smoking pattern by a smoker in an attempt, which may or may not be successful, to equalise the deliveries of products which have different deliveries when smoked by machine under standard conditions...’</p>
	<p>“Numerous experiments have been carried out in Hamburg, Montreal and Southampton within the company, as well as many other experiments by research workers in independent organisations, that</p>

<p>Its difficult to ignore health advice</p>	<p>show that generally smokers do change their smoking patterns in response to changes in the machine smoked deliveries of cigarettes ... It is difficult to ignore the advice of Health Authorities who advise smokers to give up smoking or change to a lower delivery brand but there is now sufficient evidence to challenge the advice to change to a lower delivery brand, at least in the short term. In general a majority of habitual smokers compensate for changed delivery, if they change to a lower delivery brand.”¹¹⁰</p>
<p>Low tar cigarettes retain quitters</p>	<p>A report for Imperial Tobacco (Canada) says that : “We have evidence of virtually no quitting among smokers of those brands [of under 6 mg of tar], and there are indications that the advent of ultra low tar cigarettes has actually retained some potential quitters in the cigarette market by offering them a viable alternative”¹¹¹.</p>
<p>Will doctors back “safer” cigarettes?</p>	<p>1979: March: A marketing report prepared for B&W states that “The concept of a cigarette that is low in tar and nicotine with a filter that greatly reduces known deleterious gasses was exposed to them [a survey of doctors]. It was generally well received ...at this early stage in our research there seems to be hope for an educational programme that would lead to acceptance by the medical profession of a ‘safer’ cigarette.”¹¹²</p>
<p>Tar reduction led to cancer reduction</p>	<p>18 July: The Research Co-ordinator for the Tobacco Advisory Council, P. Lee, writes a paper on “Reduction in Tar Yields and Trends in Male Lung Cancer Rates”: It seems not unreasonable to conclude that switching to lower tar cigarettes is genuinely associated with a reduction of lung cancer ... it could well be correct that the reduction in ‘tar’ delivery of cigarettes has indeed been a major factor in the decrease of risk among younger men.¹¹³”</p>
<p>Low tar cigarettes may increase risk of smoking</p>	<p>19 July: P. Lee writes another paper on tar reduction and nicotine compensation: “It has been suggested by a number of workers that nicotine may be addicting and therefore the smoker may adjust his smoking pattern to keep his nicotine at some optimal level. As nicotine and tar yields are closely correlated it follows that, if the smoker equalises the amount of nicotine he gets from a cigarette, he is likely to approximately equalise his tar intake also ... the effect of switching to low tar cigarette may be to increase, not decrease, the risks of smoking”.</p> <p>...”the evidence seems to indicate that a smoker, when switching to a brand with a lower nicotine yield, will tend to ‘compensate’ mainly by altering inhalation patterns but partly perhaps by a small increase in consumption”¹¹⁴.</p>
<p></p>	<p>9 August: The TAC write a memo to the Independent Scientific Committee on Smoking and Health: “There are circumstances in which smokers when switching to a brand with reduced tar yield. will tend to</p>

Partial compensation	‘compensate’ whether consciously or sub-consciously, if they find some aspect of a new cigarette less acceptable than that of a normal brand ...taken together, the evidence- much of which is conflicting - suggests that although ‘compensation’ can and does occur under these circumstances it will, more often than not, be only partial so that reduced tar yield will in fact mean reduced tar intake to the smoker, although the reduction in tar intake will be relatively smaller than the reduction in notional tar yield ¹¹⁵ .”
De-nicotined	Philip Morris designs a “de-nicotined” cigarette called “Next” ¹¹⁶ .
Achieve the acceptable cigarette	The Annual BAT research conference concludes: “There has been no change in the scientific basis for the case against smoking. Additional evidence if smoke-dose incidence of some diseases associated with smoking has been published. But generally this has long ceased to an area for scientific controversy ... The meeting affirmed that cigarettes acceptable on all counts can probably be achieved by research and, indeed, may in fact be available” ¹¹⁷ .

1980s	
Goal to determine minimum level of nicotine	1980: 13 February: An internal Lorillard memo about a meeting declares that the “Goal” is to “Determine the minimum level of nicotine that will allow continued smoking. We hypothesise that below some very low nicotine level, diminished physiological satisfaction cannot be compensated for by psychological satisfaction” ¹¹⁸ .
Nicotine preponderance	24 March: William Dunn, a research scientist at Philip Morris writes that “If only some smokers smoke for the nicotine effect (I personally believe most regular smokers do) then in today’s climate we would do well to have a low TPN [total particulate matter – tar] and CO [carbon monoxide] delivering cigarette that can supply adequate nicotine ... I think of a 5 mg cigarette delivering .75 mg to 1 mg of nicotine, the task being to overcome the taste problem typically reported with such a preponderance of nicotine” ¹¹⁹ .
Chemically engineered cigarette	11 April: A Brainstorming session a BAT considers the “Chemically Engineered cigarette” “The product would be low tar, normal nicotine and high flavour and would imply the growth of tobacco not for leaf but as a source of nicotine and flavour” ¹²⁰ .
Hole-blocking of low-tar increases smoke by up to 300%	A study published by Lynn Kozlowski in the <i>American Journal of Public Health</i> finds that if smokers block the holes of low-tar cigarettes, this could increase toxic by-products of smoke by up to 300 per cent. ¹²¹
Can’t make a “safe” cigarette as that implies others are	Victor DeNoble, a research scientists is employed by Philip Morris from 1980-1994, to work on nicotine and a manmade substitute. “The company was convinced in the 1970’s that nicotine was causing cardiovascular hear t disease. My job was to find a man-made substitute, a drug that would substitute nicotine in cigarettes.” DeNoble was to find a nicotine substitute, which could have been used

dangerous	to make a “safer cigarette”, but he recalls that: “They lawyers said we couldn’t say it- we couldn’t make a ‘safe cigarette’ because that implies that the cigarettes the manufacturers make aren’t safe, and that would make the company liable so the programme was shelved. ¹²²
Surgeon-General: There isn’t a “safe” cigarette	1981: January: The Surgeon General concludes that there is “no such thing as a safe cigarette ... An additional concern is that the production of cigarettes with lower “tar” and nicotine yields may involve the increasingly use of additives for tobacco processing or flavouring. Some additives available for use are either known or suspect carcinogens or give rise to carcinogenic substances when burned. The use of these additives may negate beneficial effects of the reduction of ‘tar’ yield, or might pose increased or new and different disease risks” ¹²³ .
Nicotine manipulation	28 January: A Lorillard research scientist writes a proposal to “Continue Project B412- Nicotine Manipulation” .. Recent findings have indicated that certain additives, when added to the tobacco, can accelerate the rate of migration of nicotine. ¹²⁴ ”
Minimum /optimum nicotine delivery by nicotine and sugar manipulation	June: The Objective of a RJ Reynolds “Nicotine-Satisfaction Study” is “To develop an understanding of minimum/optimum nicotine delivery and optimum ‘tar’/nicotine (T/N) limits which maximise consumer acceptance utilising fuller flavour low-‘tar’ (FFLT) prototypes in a consumer study”. In the study “nicotine and sugar were manipulated by substitution of speciality tobaccos while maintaining overall CAMEL LIGHTS blend proportions ... The major conclusions that were obtained from this study are Optimum T/N is 10.5 to 11.5 for FFLT cigarettes ... reduced casing and /or lowered sugar levels may increase satisfaction ¹²⁵ ”.
Need to pay attention to compensation	August: The Annual BAT research conference concludes strategic objectives for filters: “To develop novel filters and novel filter technology aimed at the development of marketable low-tar products, paying particular regard to human smoking patterns”. The conference also “felt that the time is close when Government agencies world-wide will take more notice of compensation - and of the scale of the differences, for a given commercial product, between smoking machine numbers and the dose of smoke actually obtained by smokers ... If no other reason than defence, we must pay increasing attention as to how our products -especially new products - are smoked by different categories of smokers ¹²⁶ .”
Humans don’t smoke like machines – they compensate Difficult to ignore advice to	1982: 7 April: A BAT study into Human Smoking Behaviour states: “What the standard machine data does not tell you is what a human smoker will give himself when he smokes a particular brand”. The company results showed that “compensatory changes are made to the way in which individual cigarettes are smoked, rather than smoking all cigarettes in the same way and altering the number of cigarettes smoked per day... It is difficult to ignore the advice of the Health Authorities who advice smokers to give up smoking or change to a lower delivery brand but there is now sufficient evidence to challenge the advice to

give up	change to a lower delivery brand, at least in the short-term. In general a majority of habitual smokers compensate for changed delivery, if they choose a lower delivery brand than their usual.” REF
Don't quit – smoke Lights	7 May: A Marketing report, entitled Project Plus/ Minus, prepared for Imperial Tobacco (Canada), states: “The third objective [of Project Plus/ Minus] was to explore brand selection patterns and the perceptions of light brands. The latter was approached in particular as regard the view of light brands as potential substitutes for quitting” ¹²⁷ .
Low tar allays guilt fears	July: Another marketing report for Imperial Tobacco (Canada) says “LTNs [low tar and nicotine] allow consumers to smoke under social duress. As a category, the low-tar brands are seen as a means to yield to health considerations, social pressures and personal guilt feelings .. The desire to quit smoking altogether and the rationalisation offered by many consumers that their going down in tar and nicotine brings them closer to the inevitable step of giving up smoking may actually increase the market considerably” [emphasis in original] ¹²⁸ .
Identify friendly scientists to say low delivery - low risk	2 July: A B&W report in to the “Obstacles / Enemies of a Swing to a Low ‘Tar’ and What Action Should we Take” states: “B&W will undertake activities designed to generate statements by public health opinion leaders which will indicate tolerance for smoking and improve the consumer’s perception of ultra low ‘tar’ cigarettes (5 mg or less). The first step will be the identification of attractive scientists not previously involved in the low delivery controversy who would produce studies re-emphasizing the lower delivery, less risk concept. Through political and scientific friends, B&W will attempt to elicit from the administrative and legislative branches of the federal government, and perhaps voluntary health groups, statements sympathetic to the concept that generally less health risk is associated with ultra low delivery cigarette consumption” ¹²⁹ .
Ammonia influences pH of smoke	9 August: A draft RJ Reynolds position paper on “Ammonia” states: “Ammonia is used by RJRT in the following tobacco processing operations. 1. Denicotinisation of burley tobacco 2. Ammonisation of reconstituted tobacco ...During the 1950’s Dr C.E. Teague Jr. investigated the ammoniation of tobacco and tobacco stems and reported dramatic improvements in the smoking qualities of ammoniated tobacco stems. ... These studies [further studies in the 70s] led to the following observations and conclusions. The pH of cigarette smoke is important to smoke quality and can be used as a measure of the physiological strength of smoke. Ammonia in smoke is one the major pH controlling components ... Philip Morris introduced the use of added ammonia in their cigarettes products in 1965 ...Philip Morris brands, especially Marlboro, began growing in sales very rapidly after the introduction of added ammonia” ¹³⁰ .
Health risk of	September: BAT’s annual research conference concludes that “despite intensive research over the past 25 years, the biological activity

low products unknown	not known in quantitative terms whether the smoke from modern low and ultra-low delivery products [cigarettes] has a lower specific biological activity than that from previous high delivery products”. ¹³¹
Need to counter compensation	1983: 16 February: L. Blackman from BAT writes a report of a meeting of Tobacco company directors: “Compensatory smoking - This is also a particularly tricky subject. On the one hand it is commercially sensitive. On the other, it must be in the interest of the industry to get data and speak out against those who claim that the low delivery programme is misleading in that smokers compensate for the low deliveries.” ¹³²
Smokers smoke differently from machines and smoke for nicotine Interested in compensation	25 July: An internal RJ Reynolds memo outlines how “smokers smoke differently than the FTC machine and may well smoke to obtain a certain level of nicotine in the their bloodstream. If a given level of nicotine in the blood is the final goal of the smoker, one would predict that he would smoke an FFT [full-flavour tar] and ULT [ultra-low tar] cigarette differently. If the smoker could obtain the same nicotine in his bloodstream from an FFT and ULT cigarette by modifying his puffing/inhaling pattern, it would be expected that he blood cotinine level would be the same after smoking either cigarette on a regular basis. This all falls under the area of smoker compensation which we have been interested in for some time now” ¹³³ .
Add vitamin A	27 July: An internal BAT research document argues that: “The current status of Vitamin A as an anti-cancer agent should be reviewed in the context of the possible addition of Vitamin A (or some derivative) to tobacco” ¹³⁴ .
Need to counter compensation or turn it to a competitive advantage	August: The Annual BAT research conference, this year held in Rio de Janeiro shows that the company was concerned that: “Compensation is now attracting the interest of Government and medical authorities in many parts of the world ... There is now an urgent need to assess whether there are ways in which the industry can either counter the situation or alternatively turn it to a competitive advantage.” ¹³⁵
Filters	6 December: A Lorillard Research report finds that charcoal-filtered cigarettes containing 20% w/w phenethylamine absorbed onto the charcoal showed increased smoke pH and a six-fold increase in free nicotine while mainstream nicotine and CPM levels remained almost unchanged ¹³⁶
Optimum re-enforcing effects	Philip Morris determines that acetaldehyde can enhance the positive reinforcing effect of nicotine. The company sets out to find the ratio of acetaldehyde to nicotine which will have “optimal reinforcing effects”. The company monitors the effect of the presence of acetaldehyde on sales ¹³⁷ .
Tar is down but	1984: 6-8 June: At a BAT “Nicotine Conference”, it is revealed that the “trend in product deliveries over time of both tar and nicotine for the leading brands within the UK market have been examined in an attempt to relate possible changes in delivery with sales. In general,

nicotine is up	over the 10 year period examined only a slight decrease in the delivery of tar was observed in middle tar products and no substantial change in low delivery products. The nicotine delivery of middle and low tar products has increased slightly over this time period”.
Need maximum impact from minimum nicotine	It is also discussed why BAT are interested in nicotine to “identify minimum dose of body nicotine ..maximum impact from a minimum of nicotine ...modification of smoke by pH manipulation ..enhancement of tobacco character from low tar products ...can such products be balanced through product design.”
We can disturb the status quo	The conference heard how “we can disturb the <i>status quo</i> either directly or indirectly ... addition of nicotine/salts/derivatives to the blend, increase/decrease nicotine availability through pH manipulation ... There is evidence that the level of free (unprotonated) to bound (protonated) nicotine has an effect on the assessment of impact and product strength ... the ratio of free to bound nicotine is pH dependent with relatively small changes in smoke pH having potentially substantial changes in free nicotine levels ..Smoke pH and hence free to bound nicotine can be affected by many factors including tobacco type, blend consumption, tobacco processing and cigarette design parameters. Air cured tobaccos have higher free: bound nicotine ratios compared to flue and sun cured tobaccos. Expanded tobacco has a lower ratio generally ... These studies indicate how the level of free: bound nicotine levels can be used to modify product strength perception” ¹³⁸ .
Product modification for maximum effects	Session VI of the conference is called “Product modification for maximal nicotine effects” in which it is discussed that “In general terms the cigarette can be considered as a nicotine aerosol delivery device which is controlled by the mouth as a mechanism for determining the maximum per puff delivery; the frequency of puffing determining the overall product delivery ... The balance between inhalation assessment/product acceptability and the possible need to satisfy a whole body pharmacological requirement is crucial to understanding the controlling and motivating factors for the smoking process ... [which] can be considered as a means of nicotine dosing” ¹³⁹ .
Nicotine dosing	
Compensation and free nicotine	25-28 June: A BAT “Structured Creativity Conference” held at Southampton discusses “ <u>Compensatable filters</u> : to make it easier for smokers to take what they require from a cigarette. This means in effect that the filter will be compensatable and implies a high taste to tar ratio. <u>Free Base nicotine</u> : More efficient utilisation of in situ nicotine in cigarette smoke ¹⁴⁰ ”
Nicotine is the driving force behind compensation	July: At a Smoking Behaviour -Marketing Conference, BAT scientists decide that “It is accepted that nicotine is both the driving force and the signal (as impact) for compensation in human smoking behaviour”. One session at the conference is entitled “Product Modification for Maximal Nicotine Effects”: “Sufficient is known to begin to improve the quality and characteristics of current products in terms of sensory

	and whole body effects based on nicotine modification”.
Aiding compensation	T.Riehl, Vice-President for R&D at B&W, gives a presentation on Project Aries. According to Riehl “Aries’ smoke chemistry differs” because it provides “nicotine enrichment in latter puffs”. Ian Ayres, group research manager, explains that the company is exploring ways of “designing products which aid smoker compensation”. ¹⁴¹
Develop acceptable cigarettes	September: At a BAT research conference it is stated that “The basic objectives of the Biological Programme are unchanged., i.e. to develop acceptable cigarettes with minimum biological activity” ¹⁴² .
Unethical alternative designs?	12 September: A BAT research document explores the ideas of “Elastic/ Compensatable Products”: “Irrespective of the ethics involved, we should develop alternative designs (that do not invite obvious criticism) which will allow the smoker to obtain significant enhanced deliveries should he so wish”. ¹⁴³
Active nicotine	12 November: An internal BAT document discusses Project SHIP. Discussed in the document is how “Nicotine may be presented to the smoker in at least three forms: (1) Salt form in the particulate phase, (2) Free base form in the particulate phase (3) Free base form in the vapour phase. It has long been believed that nicotine presented as in (2) /(3) is considerably more ‘active’” ¹⁴⁴ .
Reduce tar but increase nicotine	Victor DeNoble, the research scientist at Philip Morris, says that one of the most important research findings into nicotine was that “the company began to realise that they could reduce the tar, but increase the nicotine, and still have the cigarette be acceptable to the smoker” ¹⁴⁵ .
Take advantage of subconscious	1985: June: R. Sandford from B&W writes an internal memo on “ <u>Compensation</u> - It exists; most smokers practice it, but we need to understand it better before advantage can be taken in the marketplace. Here, I believe designing to the subconscious is preferred to requiring the smoker to commit a conscious act [emphasis added].” ¹⁴⁶
Stop quitters quitting	1986: February - March: Extracts from Imperial Tobacco’s (Canada) “Project Viking” include the assumption that “Quitters may be discouraged from quitting, or at least kept in the market longer, by either of two product opportunities noted before. A less irritating cigarette is one route (Indeed, the practice of switching to lower tar cigarettes and sometimes menthol in the quitting process tacitly recognises this). The safe cigarette would have wide appeal, limited mainly by the social pressures to quit” ¹⁴⁷ .”
Critical pH	August: A BAT research document notes that “the pH of the smoke is critical in determining the amount of nicotine absorbed” ¹⁴⁸ .
You can’t	18 December: A Confidential memo written by Patrick Sheehy, the head of BAT, objects to a proposal for a “safe cigarette” because “In

develop a “safe” cigarette	attempting to develop a ‘safe’ cigarette you are, by implication in danger of being interpreted as accepting that the current product is ‘unsafe’ and this is not a position that I think we should take” ¹⁴⁹ .
’59 cigarettes lower than ‘86	1987: A BAT document “covering the period October 1986 to February 1987” states that “The specific activity of condensate of a plain Virginia cigarette made in 1959 has been found to be lower than that of a sample manufactured in 1986 to the same design and composition, as far as that is possible. It was also compared with condensates from the top five brands from the UK market and found to be lower than them” ¹⁵⁰ .
Compensation	13 January: A BAT document states that “The ‘compensation’ theory of smoking suggests that smokers increase the ‘vigour’ of smoking low-tar cigarettes because they are attempting to obtain their habitual dose of nicotine” ¹⁵¹ .
Premier launched - tobacco heated not burnt	September: RJ Reynolds launch “Premier”, which is heated rather than burnt, producing no ash, and little side-stream smoke. Edward Horrigan from Reynolds remarks that since the products normally associated with cigarettes “are eliminated or greatly reduced, including most compounds that are often associated with the smoking and health controversy. Simply put we think this is the world’s cleanest cigarette ...we are not saying its a safe or safer cigarette. We’re saying many allegations about the burning of tobacco and elimination of those compounds should be greatly reduced with this product” ¹⁵² .
New product – less risk – Oops misquote	At a private meeting with top health officials, Peter Hutt from law firm Covington and Burling, an attorney to Reynolds admits that the new product would provide “important health benefits by reducing the risk of cancer in smokers” and RJR’s researchers would work to “find ways to reduce the nicotine and carbon monoxide levels so as to reduce the risk of heart disease”. The company later said Hutt was misquoted ¹⁵³ .
A TAME testify Lawyers take over	1988: 17 June: James Mold, the former employee of Liggett, testifies before Congress that “During 1976 a Project task Force was established to expedite the product development of the Safer Cigarette (also known as Tame, or XA). The Legal Department established procedures by which a representative of the Legal Department must be present at all subsequent meetings Re: Project Tame. All notes taken were to be collected by the lawyer. Any memos, reports or correspondence, were to be written as originating from the Legal Department or addressed to the Legal Department and all written materials were to be stamped as Confidential with Lawyer-Client Privilege. The procedures were adhered to from that point (28 June 1976)”
No intent, no capability	“ ... In early 1984 I was advised ..that it was now proposed to produce the ‘safer cigarette’ in Durham, NC for sale in the US and I would consent to staying on for this purpose. Again I said yes ...At this time it became apparent that there was no serious intent to market the product and furthermore, there was not the capability within the

	company to provide the technical support nor the marketing expertise to accomplish this. ¹⁵⁴ ”
Confirm humans aren't machines	20 August: BAT undertakes “Project Verso” which concludes that “this experiment has once again confirmed the observation that conventional standard machine smoking is not representative of typical human smoking behaviour. Subjects adjust smoking behaviour depending on the product presented to them” ¹⁵⁵ .
Optimum nicotine	1989: A RJR memo reveals that the company had a “nicotine optimisation” programme from 1978 to 1984 ¹⁵⁶ .
Most manufacturers use ammonia Secret of Marlboro is ammonia	June: Notes of a B&W “Ammonia Technology Conference” held the previous month show how “all US manufacturers except Liggett use some form of AT [ammonia technology] in some cigarettes products. Its widespread use by PM [Philip Morris] has led the consumer to associate AT with good tobacco taste ... The US cigarette industry uses about ten million pounds of ammonia compounds a year .. the secret of Marlboro is Ammonia ... While B&W can now mimic Marlboro's taste properties, we have not yet matched Marlboro's impact” ¹⁵⁷ .
Introduce Ammonia	10 November: Minutes from a meeting of BAT's Tobacco Strategy Review Team show that “the chairman stressed the importance of introducing ammonia treatment as the means for producing an authentic US taste ... Work on the pick-up of nicotine and flavours by various aerosols streams in continuing ... It was noted that experience had shown that there was little demand for a cigarette with a very low nicotine content ... The alternative approach of trying for a low-tar cigarette (i.e. an increased nicotine to tar ration- was thought to be more promising. There were two approaches to this; through leaf developments and through cigarette design including the use of increased concentrations of humectants (e.g. glycerol) ... it was noted that y-1 tobacco, yielding high nicotine and low tar had been developed exclusively by B&W by DNA-P and was now being grown in Brazil ... it was noted that B&W hoped to launch a brand based in Y-1 tobacco in 1990” ¹⁵⁸ .

1990s	
Legal scope?	1990: 26 November: An RJ Reynolds report into “Project XB” asks “How good do we feel that legal group will allow us to sell product we visualise – i.e. take out tar vs. add nicotine?” ¹⁵⁹ .
Low tar / enhanced nicotine	An undated RJ Reynolds report shows how in 1990 “Project GTX Studies” finds that “ULT [ultra low tar] cigarettes with enhanced nicotine yields and good smoking characteristics can be produced ¹⁶⁰ .”
	Another undated RJR report “The Over-Smoking Issue”, using data

<p>Each smoker has a nicotine requirement</p> <p>Low tar advertising is misleading</p>	<p>from 12 November 1990, states: “It has been argued for several years that low tar and ultra-low tar cigarettes are not really what they are claimed to be ...Each individual smoker has his or his own nicotine requirement from each cigarette. Virtually all cigarettes can be made to yield the desired amounts of nicotine depending on the size of the puff taken and the extent to which the puff is inhaled”.</p> <p>The document claims that “the argument can be constructed that ULT advertising is misleading to the smoker ..Smokers of low yield cigarette adjust their smoking manoeuvre to obtain some desired level of nicotine and therefore concomitantly increase their tar intake.¹⁶¹”</p>
<p>Ammonia liberates nicotine</p>	<p>1991: February: A B&W leaf blenders handbook states: “Ammonia, when added to a tobacco blend, reacts with the indigenous nicotine salts and liberates free nicotine. As a result of such change, the ratio of extractable nicotine to bound nicotine in the smoke may be altered in favour of extractable nicotine. As we know, extractable nicotine contributes to impact in cigarette smoke and this is how ammonia can act as an impact booster ... Ammonia liberates additional flavour compounds, including free nicotine, from the blend. because of this phenomenon, such compounds can transfer more efficiently into the smoke. this means that, at the same blend alkaloid content, a cigarette incorporating RT [reconstituted tobacco] will deliver more flavour compounds, including nicotine, into smoke than one without it”¹⁶²</p>
<p>Ammonia code-word</p>	<p>1 March: A BAT internal memo states: “The Tobacco Strategy Review Team has identified a need to add greater confidentiality to our use of ammonia technology throughout the BAT Group. They have asked that for commercial confidentiality, we substitute a code word in place of the expression ‘ammonia technology’”¹⁶³.</p>
<p>Need to control nicotine</p>	<p>3 May: A RJ Reynolds report, with a subheading “Controlled Nicotine Process” outlines a “Goal” to “develop a viable process for the total control of nicotine in product.” The “Basis” behind this is “It is in the best long term interest for RJR to be able to control and effectively utilise every pound of nicotine we purchase. Effective control of nicotine in our products should equate to a significant product performance and cost advantage¹⁶⁴.”</p>
<p>Ammonia technology</p>	<p>1992: 26 October: An internal B&W document reveals that the company analysed “Philip Morris’ Global Strategy” and “Marlboro Product Technology”: the Marlboro brand and what made it so successful. The report concludes that: “What product technology, then, makes Marlboro a Marlboro? Looking at all of the technology employed in Marlboro on a world-wide basis, ammonia technology remains the key factor ...Ammonia technology is critical to the Marlboro character, taste and delivery Key desirables are: Ammonia in smoke, smoke pH increase, free nicotine/nicotine transfer¹⁶⁵”</p>

Table – a new nicotine delivery system	<p>An undated Philip Morris report, with data as late as 1992 outlines a proposal for a “safer” cigarette code named Table. “Philip Morris has chosen to pursue a nicotine delivery device that, like RJR’s Premier, continues the cigarette tradition of sucking on a cylindrical mouthpiece to inhale flavourings and nicotine from a tobacco based product. The approach of heating rather than burning the tobacco produces a cleaner, safer smoking experience. Known by the code name of Table, the product has the potential to replace the conventional cigarette -- in much the same way that cigarettes replaced chewing tobacco over a hundred years ago -- as a more socially acceptable form of tobacco use. As preparations are made to consider launching Table, two key challenges face Philip Morris:</p> <ul style="list-style-type: none"> • Can Philip Morris build a world-class nicotine delivery device that can compete successfully with conventional cigarettes as well as pharmaceutical company cessation products? • Will the consumer find this revolutionary nicotine delivery device uniquely appealing?”¹⁶⁶.
FDA – Evidence companies control nicotine	1994: 25 February: US FDA Commissioner, David Kessler says that there is “mounting evidence” that tobacco companies control levels of nicotine ¹⁶⁷ .
No we don’t	Donald Johnston, Chief Executive of the American Tobacco Company, tells Henry Waxman, the Congressional Committee Chairman: “At no point in the manufacturing process is nicotine content controlled, adjusted, or restored to compensate for nicotine lost during the manufacturing process” ¹⁶⁸ .
Dispel the myth	25 March: FDA Commissioner, David Kessler, testifies before the Congressional Health and Environment Subcommittee, that: “It is a myth that people who smoke low nicotine cigarettes are necessarily going to get less nicotine than people who smoke high nicotine cigarettes” because smokers compensate “by altering puff volume, puff duration, inhalation frequency, depth of inhalation, and number of cigarettes smoked.” ¹⁶⁹
We don’t control nicotine	25 March: Charles Whitley, a senior consultant at the US Tobacco Institute testifies before the Congressional Health and Environment Subcommittee, “Commissioner Kessler suggested that the cigarette manufacturers ... deliberately manipulate the amount of nicotine in cigarettes in order to ‘produce and sustain addiction’ ... I am here today to tell you - unequivocally - that these suggestions are false - Nicotine levels are a function of ‘tar’ levels. When ‘tar’ levels are set, nicotine levels follow ” [emphasis added] ¹⁷⁰ .
We don’t manipulate	27 March: Brennan Dawson, Vice President, Tobacco Institute, “The industry does take the position that ...not only do they not add nicotine, but they don’t manipulate nicotine. So Congress has

nicotine	been told formally by every cigarette manufacturer in the US that this claim is without foundation” ¹⁷¹ .
We reduce nicotine	13 April: Brennan Dawson, Tobacco Institute: “The Manufacturing process that takes the blended tobacco and makes it into cigarettes results in a reduction in the levels of nicotine” ¹⁷² .
Nicotine is for taste	14 April: Thomas Sandefur, the head of B&W, testifying before the Congressional Health and Environment Subcommittee, admits that the companies blend different types of tobacco to “reduce the tar and maintain the nicotine”. Sandefur is also asked whether: “nicotine delivery is an important product feature for consumers”, to which he replies “nicotine in terms of taste, as a constituent of taste, is important, yes, sir ... Without nicotine, cigarettes simply would not taste like cigarettes” ¹⁷³ .
We blend for taste	The Vice President of B&W, T.F. Riehl, also testifies before the Subcommittee. Q: “My question is do you deliberately mix the tobacco of the Barclay cigarette so that it will have a much higher concentration of nicotine?” Riehl: “No sir. We blend for taste, not nicotine” ¹⁷⁴ .
Do not manipulate nicotine	Also testifying before Congressional Subcommittee, the head of Philip Morris, says that “Philip Morris does not ‘manipulate’ nor independently ‘control’ the level of nicotine in our products ..nicotine levels are measured at only two points in our manufacturing process, prior to the tobaccos being blended and then 18 months later, when those leaves have been manufactured into finished cigarettes” ¹⁷⁵ .
Y-1- the high nicotine plant	17 June: FDA Officials meet with representatives of B&W, who admit growing a high nicotine yielding tobacco plant Y-1. The company’s chief product developer admits “It was going to be a blending tool, so that when we lowered the tar we could maintain the nicotine level”. FDA officials respond that “this was a fantastic admission, because it flies in the face of everything they have said. They have said over and over that nicotine is not set, but it follows tar levels. Now we had a top product developer for the world’s third largest company telling us what they said in public was not true” ¹⁷⁶ .
Don’t increase nicotine	The CEO of RJ Reynolds states: “We do not increase the level of nicotine in any of our products to ‘addict’ smokers.” ¹⁷⁷
Don’t increase nicotine	B&W state in a press release: “B&W does nothing in the manufacture of its tobacco products that increases the level of nicotine above which is naturally found in the tobacco plant, nor does it artificially increase nicotine.” ¹⁷⁸
Don’t manipulate cigarettes	The Tobacco Institute issues a Press Release, stating: “Cigarette manufacturers do not ‘manipulate’ the level of nicotine in various brands, Nicotine levels follow ‘tar’ levels – as manufacturers have reduced ‘tar’ levels and yields over the years to satisfy changing

	consumer tastes, nicotine levels and yields have fallen correspondingly” . ¹⁷⁹
We can reduce risk	1995: March: Dr. Hinrich Elmenhorst, head of Science, Smoking and Health at Rothmans Cigaretten (Germany); “What we can do is adjust the properties of our products in such a way as to reduce the elements linked to alleged risk” ¹⁸⁰ .
We don't raise nicotine	30 May -1 June: An internal Training Manual for Philip Morris responds to the accusations of “spiking” of cigarettes and “compensation”: “Philip Morris does no such thing. There is less nicotine in a finished cigarette than in the natural tobacco materials from which it is made. None of the processes in the manufacture of cigarettes raises the naturally occurring nicotine levels in tobacco In fact most of the processes reduce the yields of all smoke components, including 'tar' and nicotine”...
Compensation	“Smokers could, theoretically, compensate for the 'lower yields' by smoking more frequently or intensively, but most don't. The 'compensation' that does take place tends to be slight, temporary and insufficient to make up for the decrease in product yields” ¹⁸¹ .
Eliminate safe cigarettes	November: Dr Wigand, ex-Chief of Research at B& W, from January 1989 to March 1993, testifies in a legal case in New Orleans: Question: “And what did they [senior B&W personnel and lawyers] eliminate, the stuff that said cigarettes were harmful”? Wigand: “They eliminated all reference to anything that could be discovered during any kind of liability action in reference to a safer cigarette. Statements were made that anything that eludes [alludes] to a safer cigarette clearly indicates that other cigarettes are unsafe, and it, furthermore, would acknowledge that nicotine is addictive” .. Question: “Would you say generally, Mr. Sandefur was receptive to your ideas to find a safe cigarette? ... Was he receptive to your advice and counsel about trying to find a safe cigarette?” Wigand: “No” Question: “What did he say to you in general in the various times you recommended a search for a safe cigarette?” Wigand: “That there can be no research for a safer cigarette. Any research on a safer cigarette would clearly expose every other product as being unsafe, and therefore, present a liability issue in terms of any type of litigation”.
No research into safe cigarette	Wigand is also asked why Brown and Williamson manipulated nicotine levels, to which he replies “yes” Question: “How did B&W manipulate levels of nicotine in cigarettes?” Wigand: “There are a number of ways you manipulate nicotine levels. One way is to use additives. These additives are usually in the form of nitrogenous bases”.
Did manipulate nicotine	Question: “What does nitrogenous bases mean?” Wigand: “Nicotine as it exists in a plant of tobacco is locked up in

<p>And other compounds</p>	<p>an inactive form as a salt. In order to free that salt to be pharmacologically active, you need to change the pH. You need to change the pH of the tobacco. You also need to change the pH of the smoke, such that you convert total nicotine to free nicotine. Free nicotine is pharmacologically active. Nicotine as a salt, as in tobacco itself, is not pharmacologically active ...”</p> <p>...Y-1 was a project dedicated towards increasing the tar-to-nicotine ratios. If you can have less mass of tobacco at higher nicotine, you’d essentially be reducing the negative character of smoking, as you’d be reducing tar or maintaining the nicotine delivery at a constant level” ...</p> <p>Question: Are the other ways that B&W manipulated nicotine, to your knowledge?</p> <p>Wigand: “You can do it through cigarette design, through filtration, through paper design, through blend. The primary form of managing or manipulating nicotine delivery .. is by use of ammonia compounds ... Any compound that can change pH creates an equilibrium in the rod that frees up nicotine ...”</p> <p>Question: “Did B&W, to your knowledge, use acetaldehyde knowingly in cigarettes to enhance the effects of nicotine on the smoker?”</p> <p>Wigand: “Yes ...acetaldehyde was an additive that was used”.¹⁸²</p>
<p>Ammonia doesn’t alter nicotine</p>	<p>June: Philip Morris: “There is no indication that ammonia compounds in our cigarettes alter the amount of nicotine the smoker inhales”¹⁸³.</p>
<p>More bang</p>	<p>18 October: A former Associate Director of the Council for Tobacco Research, John Kreisher, remarks, “Ammonia helped the industry lower the tar and allowed smokers to get more bang with less nicotine. It solved a couple of problems at the same time”¹⁸⁴.</p>
<p>Ammonia not to increase nicotine</p>	<p>19 October: Philip Morris says it “does not use ammonia in the cigarette manufacturing process to increase the amount of nicotine inhaled by the smoker or to ‘affect the absorption of nicotine inhaled by the smoker’ or to ‘affect the rate of absorption of nicotine on the bloodstream if the smoker’”¹⁸⁵.</p>
<p>We wouldn’t enhance nicotine</p>	<p>19 October: BAT denies doctoring cigarettes, stating that “There is no way we add anything to enhance the nicotine”¹⁸⁶.</p>
<p>Key objective of 20-30 years was to reduce tar and increase nicotine</p>	<p>1996: March: William Farrone, who worked for Philip Morris for seven years from 1976 as the Director of Applied Research, signs an affidavit for the US FDA: “It is well recognised within the cigarette industry that there is one principle reason why people smoke - to experience the effects of nicotine ...clearly by the 1970s and early 1980s the tobacco industry had established that smokers required a minimal level of nicotine within a cigarette ... It was common knowledge within the industry that cigarettes without nicotine would not sell. Nicotine free cigarettes in the 1959s and 1980s were failures. If we accept the premise, as the cigarette</p>

	<p>industry surely does - that cigarettes are a nicotine delivery system ... then it becomes a desirable technical challenge to decrease the 'tar' in a cigarette while maintaining the delivery of nicotine. This has been a key objective of the cigarette industry over the last 20-30 years, some industry documents now reveal ... product developers and blend and leaf specialists were responsible for manipulating and controlling the design and production of cigarettes in order to satisfy the consumer's need for nicotine".¹⁸⁷</p>
They monitor nicotine	<p>March: Jerome Rivers, who worked for Philip Morris for 23 years, also signs an affidavit for the FDA: "During the manufacture of reconstituted tobacco, we frequently monitored the alkaloid [nicotine] content of the by-products, the slurry, and the final reconstituted tobacco sheet .. we would measure the alkaloid [nicotine] content of the final product approximately once per hour"¹⁸⁸.</p>
Do not manipulate nicotine	<p>April: Philip Morris responds to the whistle-blower accusations by stating that: "The simple fact is that Philip Morris does not manipulate or independently control for nicotine, and the assertions that nicotine is monitored are just plain wrong"¹⁸⁹.</p>
No bull	<p>October: RJ Reynolds re-launches its Winston brand without any additives, "All taste. No additives. No bull"¹⁹⁰.</p>
The future is lower	<p>October: Allen Kassam, Vice President of R&D, Philip Morris Europe: "The future is clearly going to be a rapid drive to lower and lower tar"¹⁹¹.</p>
Greeks launch Biofilter	<p>1997: The Greek cigarette firm launches BF "biofilter" cigarettes, which claim that "Biofilter has the unique ability to neutralise various harmful compounds in cigarette smoke ... [BF] is the first world-wide cigarette equipped with the Biofilter, giving higher protection to the filter". Golden Filter which developed the filter says that the Biofilter "can be considered as an artificial lung, which enables all harmful reactions to be carried out within the filter and not within the body".¹⁹²</p>
Nicotine free	<p>August: Alternative Cigarettes of New York announces that it has obtained the exclusive rights from the North Carolina State University for an invention to eliminate nicotine in tobacco. Alternative Cigarettes announces that it will market nicotine-free cigarettes in 1998¹⁹³.</p>
We can't promote safe because we don't know	<p>December: Paul Adams, the Director of Consumer Affairs and Chris Proctor, head of BAT's science and regulation give a speech at the Annual Trade Fair on "Standing up for Tobacco". They say that the industry has been taking note of public health concerns by developing "lighter" products, but "we cannot promote these products as 'safer' cigarettes because we simply don't have sufficient understanding of all the chemical processes to do so".¹⁹⁴</p>

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