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PREM 19/1217

PART 2

Confidential Filing

Royal Commission Reports
on Environmental Pollution.

ENVIRONMENTAL
AFFAIRS

Effects of Acid Rain
Agriculture & Conservation

Part 1 Sept. 1979
Part 2 June 1984

Referred to	Date	Referred to	Date	Referred to	Date	Referred to	Date
1.6.84		6.9.84					
4.6.84		7.9.84					
5.6.84		11.9.84					
8.6.84		1.10.84					
14.6.84		5.10.84					
18/6/84		9.10.84					
20.6.84		11.10.84					
22.6.84		23.10.84					
26/6/84		25.10.84					
28.6.84		26.10.84					
2.7.84		31.10.84					
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1.9.84							

PREM 19/12/17

PT 2 ENDS

PART 2 ends:-

Dr Nicholson to PM W.0786 31.10.84

PART 3 begins:-

S/SJOC to PM 2.11.84

TO BE RETAINED AS TOP ENCLOSURE

Cabinet / Cabinet Committee Documents

Reference	Date
EP(84) 9	25/10/1984
CC(84) 24 th Meeting, item 2	28/06/1984

The documents listed above, which were enclosed on this file, have been removed and destroyed. Such documents are the responsibility of the Cabinet Office. When released they are available in the appropriate CAB (CABINET OFFICE) CLASSES

Signed _____

J. Gray

Date _____

16/9/2013

PREM Records Team

Published Papers

The following published paper(s) enclosed on this file have been removed and destroyed. Copies may be found elsewhere in The National Archives.

Department of Energy - Acidity in the Environment by Deborah H Buckley-Golder: Published by HMSO June 1984.
ISBN 0 7058 0589 1

House of Commons - Fourth report from the Environment Committee, Session 1983-84. ACID RAIN volume I.
Published by HMSO July 1984. ISBN 0 10 008664 0

House of Commons HANSARD, 8 June 1984, columns 554 to 587: Air Pollution

Signed _____

J. Gray

Date _____

16/9/2013

PREM Records Team

010
W.0786

31 October 1984

PRIME MINISTER

GOVERNMENT RESPONSE TO THE TENTH REPORT OF THE ROYAL COMMISSION
ON ENVIRONMENTAL POLLUTION

The Tenth Report of the Royal Commission on Environmental Pollution contained 52 recommendations for action across the whole field of environmental pollution. The tone of the Report was generally moderate and reasoned. The Government response therefore provides a rare opportunity to present the more positive stance on environmental pollution which was agreed, for both domestic and international reasons, at the meeting you chaired on 17 May. I strongly criticised an earlier draft of the response because I believed that its style was not consistent with this policy. However, I feel that the present document admirably succeeds in presenting the Government's policy as positive and consistent. It goes a considerable way in accepting the Royal Commission's recommendations, particularly in the areas of access to information, air pollution and coastal water pollution.

2. There is one specific point to which I should draw your attention. You may wish to consider whether the response (page 34) to the Royal Commission's recommendation 7.95, on appraisal of alternative energy scenarios, makes a sufficiently robust statement on the nuclear alternatives to fossil fuels. At the meeting on acid rain which you chaired on 19 June, it was agreed that one constituent of the Government's acid rain policy was to "make it clear to the public that the development of the nuclear component is an important element in our strategy, but that we also seek gains in a variety of other ways". Also, a leader in The Times on 7 September, commenting on the Report on Acid Rain of the House of Commons Select Committee on the Environment, commented that "Curiously enough, the MPs show no eagerness to see our highly sulphurous home-mined coal replaced by imports or by more nuclear power."

3. This response provides an opportunity for a stronger statement on nuclear power and its place in reducing atmospheric pollution and I have made this point to the Department of Energy. They have, with Ministerial guidance, preferred the present rather weak remarks.

RBN

ROBIN B NICHOLSON
Chief Scientific Adviser

Cabinet Office
31 October 1984

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Prime Minister: 2

MR FLESHER

This is clearly going to be a major issue ^{next} ~~two~~ seman

ACID DEPOSITION

DF

26/10

The Prime Minister may be interested to see the attached Hansard extract of Environment Questions on Wednesday.

There was clearly much concern on all sides of the House about the apparent lack of immediate Government action to tackle the problem of acid deposition, as well as interest in the timing and nature of the response to the Select Committee's report.

Nicky Roche .

NICKY ROCHE

mr

26 October 1984

The Minister for Local Government (Mr. Kenneth Baker): No.

Mr. Pike: Does the Minister recognise that ever since his Government were elected their actions have severely restricted the freedoms of local government? Is it not time that more power was given back to local government? Would it not be appropriate in such a review to introduce organic change and allow certain services to be given back to borough councils, which are closer to the people whom they represent? I have in mind, for example, social services, which would be more appropriately tied up with the housing service.

Mr. Baker: The hon. Gentleman has made the point that my right hon. Friend made about the abolition of the metropolitan counties. The Government are very much in favour of the devolution of services to local authorities. As my hon. Friend the Member for Grantham (Mr. Hogg) indicated, that is the thrust of our policy. I appreciate that Burnley used to be a county borough and that it had a greater degree of independence in the past. But I think that the effect of the distribution of functions between the upper and lower tiers in the county councils which we are abolishing is that the senior partners will be the London boroughs and the metropolitan districts.

Acid Deposition

3. **Mr. Allan Roberts** asked the Secretary of State for the Environment what recent representations he has received on acid deposition; and if he will make a statement.

The Parliamentary Under-Secretary of State for the Environment (Mr. William Waldegrave): In the last three months, my right hon. Friend has received about 40 representations about the effects of acid deposition. We have also, of course, recently received the Environment Select Committee's report on this subject, to which the Government's response will be published shortly.

Mr. Roberts: Will the Minister undertake to publish that response as quickly as possible and ensure that there is a full debate on the report of the Select Committee in the House, as it is obvious from the evidence that the Select Committee received that the problem is extremely urgent? Damage is now occurring to the British environment as a result of sulphur and nitrogen emissions. We should be warned clearly in advance by the damage to forests and lakes in central Europe and Scandinavia.

Mr. Waldegrave: The answer to the first part of the hon. Gentleman's supplementary question is yes. The second part is not for me, but I shall report it to those who are responsible for such matters.

Mr. Forman: Although it may be necessary to press ahead with further scientific research into this serious problem, may I ask whether my hon. Friend and his Department accept that there is a strong argument for pursuing in parallel the imposition of special equipment in some power stations on a pilot basis to ascertain whether the practical effect would be to limit this harmful pollution?

Mr. Waldegrave: That was one of the recommendations of the Royal Commission to which the Government will be responding. It is worth remembering that Britain has made a major contribution already. That fact is

sometimes forgotten. From the peak of our deposition we have achieved a diminution of nearly 40 per cent., which is more than can be said for any other country.

Mr. Alton: When does the Minister expect to respond to the reports of Royal Commission and of the Select Committee? When do the Government expect to be able to comply with the EEC directive on emission control? Will grants be made available to the ecclesiastical authorities in view of the damage which is being caused to many of our churches by acid deposition?

Mr. Waldegrave: There will be no unnecessary delay in response to the reports of the Royal Commission and of the Select Committee. The negotiations on the large plant directive have only just started. The British Government, and many other countries, have serious reservations about the target figures for sulphur and nitrogen that appear in the draft proposals.

Mr. Chapman: If the Government are shortly to make a response to the Select Committee's report, will my hon. Friend confirm that the Committee's recommendation, that new motor vehicles should be designed so that there is a 40 per cent. reduction in nitrogen oxide emissions, is both a feasible and practical step to take?

Mr. Waldegrave: Without pre-empting the response to the Select Committee's report, the Government have made no secret of their view that the lean-burn engine, the route recommended by the Select Committee, is the sensible way to proceed.

Dr. David Clark: In the light of the Select Committee's report, the Royal Commission's report and growing public concern on this issue, will the Minister face his international and national responsibilities and instigate immediate action, and, in addition, set up a national inquiry into the effect of acidic emission in both urban and rural environments?

Mr. Waldegrave: With respect to the hon. Gentleman, calls for immediate action and inquiries are perhaps the easy part of the response. The British contribution to diminishing the output of acid emission into the atmosphere has been considerable. I do not agree with Labour Members that the reduction is the result of the recession. Fuel substitution and fuel economy have played a major part in the diminution. We should not rush into action without taking a careful view of the costs and benefits involved.

Wytch Farm

4. **Mr. Kirkwood** asked the Secretary of State for the Environment if he will make a statement on the environmental implications of the proposed development of the onshore oilfield at Wytch farm.

Mr. Kenneth Baker: I understand that BP's proposals at Wytch Farm are currently subject to consultation with interested parties, and a planning application is expected in due course. I am well aware of the sensitive environmental issues raised by these proposals, and would expect any application to be subject to rigorous scrutiny by Dorset county council in the first instance.

Mr. Kirkwood: I appreciate the national importance of the sensitive ecological site at Wytch Farm, but will the Minister use his good offices to require British Petroleum,

SUBJECT

cc Ops
Master.



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PRIME MINISTER'S
PERSONAL MESSAGE
SERIAL No. T182/84

10 DOWNING STREET

THE PRIME MINISTER

24 October 1984

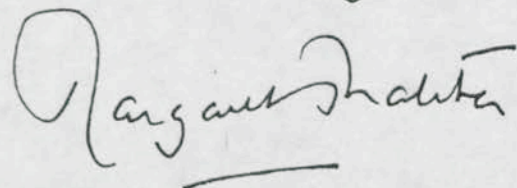
Dear Prime Minister,

Thank you for your letter of 2 October about air pollution.

I entirely agree with you that European countries need to work together to solve the long term problems of air pollution. The United Kingdom has a good record of concern about domestic air pollution and we have always acted, and acted effectively, to control problems when circumstances warranted. Our position on the long term international air pollution problems which we all now face is exactly the same; there are clearly strong grounds for concern and effective solutions have to be found. For my part, I am happy to pledge that the United Kingdom will continue to work to find those solutions both through domestic research and through work under the aegis of the United Nations Convention.

Meanwhile, I believe that current scientific evidence gives grounds for the view that reductions should be made not only in sulphur dioxide but also in nitrogen oxide emissions within a reasonable timescale. Having considered our industrial prospects and other factors, the United Kingdom therefore intends to make substantial reductions in these emissions by the turn of the century. We shall naturally stand ready to take further action in the light of changing scientific evidence.

Yours sincerely



His Excellency Mr Kare Willoch

off

PI



2 MARSHAM STREET
LONDON SW1P 3EB
01-212 3434
My ref: J/PSO/17365/84

Your ref:

23 October 1984

Dear Charles

You sent this message from the Prime Minister of Norway to the Foreign Office on 11 October and it was subsequently agreed that this Department should provide a draft reply.

- / I now attach a draft reply together with a background note.
- / I am copying this letter and enclosure to Colin Budd at the Foreign Office.

Yours

Andrew Hurren

A C ALLBERRY
Private Secretary

C D Powell Esq

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DRAFT LETTER FROM THE PRIME MINISTER TO MR KARE WILLOCH
PRIME MINISTER OF NORWAY

Thank you for your letter of 2 October about air pollution.

I ^{entirely} agree with you ~~entirely~~ that European countries need to work together to solve the long ^{term} problems of air pollution. The United Kingdom has a good record of concern about domestic air pollution and we have always acted, and acted effectively, to control problems when circumstances warranted. Our position on the long term international air pollution problems which we all now face is exactly the same; there are clearly strong grounds for concern and effective solutions have to be found. For my part, I am happy to pledge that the United Kingdom will continue to work to find those solutions both through domestic research and through work under the aegis of the United Nations Convention.

Meanwhile, I believe that current scientific evidence gives grounds for the view that reductions should be made not only in sulphur dioxide but also in nitrogen oxide emissions within a reasonable timescale. Having considered our industrial prospects and other factors, the United Kingdom therefore intends to make substantial reductions in these emissions by the turn of the century. We ^{shall} ~~will~~ naturally stand ready to take further action in the light of changing scientific evidence. ~~but I am sure that these precautionary steps are the ^{right} appropriate response to the current situation until a way can be found to achieve the effective solutions which all European Governments seek.~~

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BACKGROUND

1. More than any other country, Norway is affected by the UK's sulphur dioxide and nitrogen oxide emissions, receiving some 20% of its total deposition from us. During Mr. Waldegrave's recent visit there, he was impressed by the evidence of damage to freshwater ecosystems in the south of the country which scientists agree can be attributed to long range acid deposition. The attribution of cause and effect in the case of forest and other forms of damage is, however, less clear cut.
2. The Governments of Norway and the FRG are amongst the leaders of the (now) 20 countries which have committed themselves to reducing their total annual sulphur dioxide (SO₂) emissions or their transboundary fluxes by 30% by 1993 on the basis of annual emissions in 1980.
3. Mr. Willoch attempts in his letter to associate this commitment with the obligations laid down under the UN/ECE Convention on Long Range Transboundary Air Pollution. Although the 20 countries concerned are all parties to the Convention, the commitment does not spring from the terms of that instrument which provide for information exchange and cooperative research with a view to the development of policies to combat air pollution. Work under the Convention is only now embarking on cooperative research studies.
4. At a meeting chaired by the Prime Minister on 19 June, it was noted that the cost of reducing UK SO₂ emissions would be high for uncertain results since the connection between emissions and damage is imperfectly understood. It was also noted that evidence points to the possibility that emissions other than SO₂ may be more significant than SO₂ in the cause and effect chain. It was decided that the most appropriate response for the UK to make would be to seek to bring down total national emissions of both SO₂ and nitrogen oxide by 30% within a timescale which reflected current industrial circumstances and prospects; these considerations pointed to the end of the century as the most suitable date. It was agreed however, that circumstances do not warrant the UK binding itself to targets which would entail the retrofitting of expensive emission controls.

Env. Affairs Pt 2

Acid Rain

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10 DOWNING STREET

From the Private Secretary

11 October 1984

MESSAGE FROM THE PRIME MINISTER OF NORWAY

BF/ I enclose a copy of a letter to the Prime Minister from the Prime Minister of Norway, and would be grateful for a draft reply by 19 October.

I am copying this letter and enclosure to John Ballard in the Department of the Environment.

(C.D. POWELL)

C.R. Budd, Esq.,
Foreign and Commonwealth Office.

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~~CCNO~~

FCS/84/267

WBP

SECRETARY OF STATE FOR THE ENVIRONMENT

Acid Deposition

1. Thank you for your letter of 24 September on the large combustion plant directive. I have also seen a copy of your minute of 24 September to the Prime Minister previewing the Government's response to the Select Committee's report.

2. As the Prime Minister has commented (her Private Secretary's letter of 1 October to Ballard), we have decided on a policy which gives due weight to the need to avoid unnecessary costs to industry. In the discussions in the Community we must proceed in a manner which fully protects our position on the substance. The question of emissions from large combustion plants, however, is a matter of great political sensitivity in some other Member States, above all the FRG. Tactically, I agree that it would not be in our interests simply to declare outright opposition to a directive. Our approach should be to question the provisions in the Commission's draft, which is of course unacceptable, and to ensure that if there were any question of a directive being adopted, it is put in a form we could accept. We should aim to get others to declare themselves and to show that we are not alone in our concern at the Commission's proposals. We should stress the fact that more research is needed towards finding cost effective solutions to the problems caused by acid rain. If we can influence the debate in this way, we may succeed in pushing others towards an outcome we could accept. There is everything to be said for trying to expose the hesitations of others, given that we shall not in any event accept a directive contrary to our interests.



3. I am sending copies of this minute to the Prime Minister, the Lord President, the Secretaries of State for Energy, Employment, Scotland, Wales, Transport and Trade and Industry, the Minister of Agriculture, the Chief Secretary, Sir Robert Armstrong and Dr Nicholson.

A handwritten signature in dark ink, appearing to be 'G. Howe', written in a cursive style.

(GEOFFREY HOWE)

Foreign and Commonwealth Office
9 October 1984

Env. Affairs Pt 2
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CC 100



DEPARTMENT OF TRANSPORT
2 MARSHAM STREET LONDON SW1P 3EB

01-212 3434

The Rt Hon Patrick Jenkin MP
Secretary of State for the Environment
Department of the Environment
2 Marsham Street
LONDON SW1P 3EB

5 October 1984

Dear Patrick

NJM

ACID DEPOSITION AND CAR EMISSIONS

Thank you for your letter of 11 September.

I accept that our attitude to Stage I of the EC draft emissions directive is in effect a compromise between the advantages of energy saving and the requirement for some further reduction in vehicle emissions, and I am not seeking to reopen that. But I must say that to regard the reduction in energy saving as a "benefit foregone" is not to address the point. If the benefits of lean burn are diminished by tuning for emission reduction, the private motorist will bear the cost of that reduction in precisely the same way as the CEGB, and ultimately the electricity user, would bear the cost of flue gas desulphurisation. The fact that it may be less apparent than a rise in electricity prices does not affect the issue of principle. Given the relative emissions of power stations and vehicles I fear that this approach, when it becomes apparent, will lead to accusations of cynicism. I think colleagues should be alert to that.

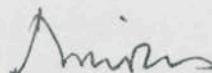
The immediate question now is how to deal with the German threat to impose domestically much tighter emission standards requiring the use of catalysts. I have no doubt

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that we should consider every means, both diplomatic and legal, to prevent this happening. The first opportunity for this since the German Cabinet's recent discussion will come at the Internal Market Council on 9 October, and I understand that officials are meeting later this week to consider what the UK's line should be then. I agree with Norman Tebbit and Peter Walker that our general tactics should include willingness to agree Stage I (amended to cope with the problems of large cars and other specialised vehicles) - but only as part of an overall compromise accepted by the Germans. We would get the worst of both worlds if we agreed Stage I - at a cost to the motorist in fuel economy - while allowing Germany to impose much tighter standards - which would create great difficulties for our manufacturers.

Copies of this letter go to the Prime Minister, Geoffrey Howe, Nigel Lawson, Norman Tebbit, Willie Whitelaw, Tom King, Michael Jopling, George Younger, Nicholas Edwards, Peter Walker, Sir Robert Armstrong and Dr Nicholson.



NICHOLAS RIDLEY

CONFIDENTIAL

Env. Affairs PT2

Acid Rain

28 OCT 1994





THE ROYAL NORWEGIAN GOVERNMENT

THE PRIME MINISTER

PRIME MINISTER'S

PERSONAL MESSAGE

Oslo, 2 October 1984

SERIAL No: T 167C/84 cc MASTER
OF

My dear Mrs. Thatcher,

In the talks between Chancellor Kohl and myself during his recent visit to Norway, considerable attention was devoted to the harmful effects of air pollution and the need for effective national measures to reduce the acidification of the environment. As a result of our deliberations we agreed on a "Joint declaration on the preservation of clean air", stressing the need for international solidarity in this field and the responsibility of all governments concerned for achieving prompt and concrete results. Enclosed please find a copy of this declaration.

I feel confident that your Government will participate in the efforts to implement the principles and obligations laid down in the United Nations Convention of 1979 on Long Range Transboundary Air Pollution, which later have been made more specific in the commitments decided upon by a majority of the contracting parties to the Convention.

I feel convinced that improved international cooperation in this field will contribute in a significant way to enhance the possibility of reversing the present dangerous development.

*Yours sincerely
Kari Willoch*

The Rt Hon Margaret Thatcher, FRS, MP
10 Downing Street
LONDON SW 1

Encl.

"Joint declaration on the preservation of clean air".

Both Heads of Government note with satisfaction that international efforts for the speedy reduction of air pollution in Europe have been given a substantial impetus through the international environment protection conference in Munich in June 1984.

They assume that the international clean air policy that was drawn up will be put into effect without delay within the framework of the UN-ECE Convention on long-range transboundary air pollution.

Both Heads of Government would draw attention to the fact that forests, watercourses, the soils, as well as irreplaceable artistic monuments are being damaged to an increasing extent. The great necessity of reducing air pollution through long-term preservation of the natural resources, calls for a determined and active effort on the part of all governments, both east and west, to give priority to this urgent task. They note that the preservation of clean air requires new technological innovations and re-adaptation, which will also provide stimuli for the national economy and the labour markets.

18 of the states parties to the Geneva Clean Air Convention have declared themselves to be committed or ready to reduce the annual emissions of sulphur dioxide and the transboundary fluxes by at least 30 percent by 1993 at the latest.

Both in Norway and in the Federal Republic of Germany as well as in other countries, action has been taken for more extensive reductions of air pollution.

International solidarity requires that, because of the transboundary fluxes of air pollution, all states

must, through effective national measures, do their share to contribute to the speediest possible reduction of the total pollution load. Not only does this apply to permanent installations, but also to other mobile sources of pollution.

Both Heads of Government expect that further international talks will be held on the subject to reach a comprehensive consensus on the present efforts to stop the dangerous development and thereby achieve lasting protection against the damaging effects of air pollution.

The Governments of Norway and the Federal Republic of Germany will, in close cooperation with each other and with other governments, adopt further measures and efforts to reach this goal.

Oslo, 6 September 1984

Kåre Willoch

Helmut Kohl

File



cc: Mr. Redwood

10 DOWNING STREET

From the Private Secretary

1 October 1984

Acid Rain

The Prime Minister has seen your Secretary of State's minute of 24 September on the Government's response to the Report of the Environment Committee, his letter of 24 September to the Foreign Secretary on the Large Combustion Plant Directive, and the Secretary of State for Energy's minute of 28 September.

She has commented that Ministers have formulated a line which balances the need to improve the environment with the need to avoid unreasonable cost burdens on industry. She believes that what is needed now is a clear and forthright statement of their intent. She is concerned, therefore, at the hesitant and defensive tone of your Secretary of State's letter to the Foreign Secretary on the line which should be taken in forthcoming discussions in Europe.

I am sending copies of this letter to Janet Lewis-Jones (Lord President's Office), Len Appleyard (Foreign and Commonwealth Office), Michael Reidy (Department of Energy), David Normington (Department of Employment), John Graham (Scottish Office), Colin Jones (Welsh Office), Dinah Nichols (Department of Transport), Callum McCarthy (Department of Trade and Industry), Ivor Llewelyn (MAFF), Richard Broadbent (Chief Secretary's Office), Richard Hatfield (Cabinet Office) and Dr. Nicholson (Cabinet Office).

Andrew Turnbull

John Ballard, Esq.,
Department of the Environment.

CC/PO



PRIME MINISTER

Patrick Jenkin's minute to you of 24 September reported that the policy line agreed at your meeting on 19 June would be announced at the current Conference in Geneva on Air Pollution. He gave his view that it was preferable to use this occasion rather than wait for publication in early November of the response to the recent report of the Select Committee on the Environment. This seems to me to be debatable, but I gather the announcement was made on 25 September.

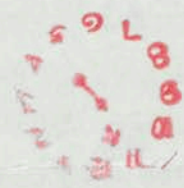
I am extremely concerned at the implication in his minute that the announcement of the June decision will lead us into difficulties in Brussels. As your Private Secretary's letter of 20 June makes clear, the proposals discussed at your meeting were presented by Patrick as a positive and coherent response to our international critics, and as a line which could be held successfully, even though it fell short of the more extreme demands being made. His latest minute refers to a lack of substance in our position. In my view, the line we have agreed goes as far as we should. It is essential that we should present it positively and with conviction, and not regard it as merely preparatory to yielding further ground.

Given the importance of the issues I hope that Patrick's draft response to the Select Committee will be circulated in good time to allow proper discussion.

I am copying this letter to the recipients of his.

Secretary of State for Energy
28 September 1984

David Lewis



128356P49841

Prime Minister^①
Agree with Peter Walker and Policy Unit
that we put our doubts aside and put out
a clear statement of the line Ministers have
agreed. 28 September 1984

AT 28/9

Yes
ms.

PRIME MINISTER

ACID RAIN

There is now an agreed policy on pollution control. It
needs sticking to and selling.

Because it represents a difficult balancing act between the
wish to clean up the environment on the one hand, and the
wish to avoid unreasonable cost burdens on industry on the
other, it requires even more skilful selling. To achieve
this, it needs to be clearly and simply stated. Robin
Nicholson is also worried that the point of your June
meeting will be lost in bureaucratic prose and half-
heartedness.

The Yes Minister script of Patrick Jenkin to Geoffrey Howe
will not do. How can anyone make it sound attractive if we
are going to say "We will find it difficult to tie ourselves
to inflexible reductions and time scales. However we should
indicate that we do not rule out ultimate consensus".

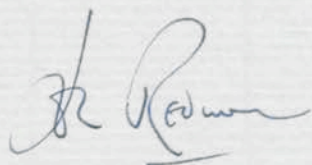
Similarly, the note on the response to the Environment
Committee's report reveals the difficulty of Patrick's task.
If we do not come out soon with a clear and forthright
statement of our intent here in the UK, we will find that

the pressures represented by the Environment Committee will build up further and may force us into a more expensive manoeuvre on Patrick's high wire.

Conclusion

In your reply to Patrick, you could stress the need to get out early and win the public debate, having agreed the policy. The Government has to be seen to care about environmental issues: otherwise we will be driven into pledges we would rather not make. Energy's warning is a fair one.

The Government has to be seen doing more than just singing in the acid rain, and if it delays any longer, it will find it too expensive to buy an umbrella.



JOHN REDWOOD



2 MARSHAM STREET
LONDON SW1P 3EB
01-212 3434

My ref:

Your ref:

24 September 1984

Dear Foreign Secretary

LARGE COMBUSTION PLANT DIRECTIVE

Community negotiations on this draft directive have moved forward desultorily since the beginning of the year but now appear to be taking a more purposeful turn. Handling of this proposal presents unusual difficulties for us and I think it is right that I should keep colleagues in touch with the line we propose to adopt. The immediate question of the line to be taken at this week's meeting of the Council Environment Working Group, and which we hope may serve for the duration of the Irish Presidency, was agreed by our officials at a recent meeting of EQO.

As you will know, a major provision of the draft directive is the setting of targets for reductions in total emissions of sulphur dioxide, nitrogen oxides and dust from large combustion plants of 60%, 40% and 40% respectively by 1995 on the basis of 1980 figures. Such a provision is incompatible with our policy on the control of SO₂ and NO_x emissions as agreed at the Prime Minister's meeting on 19 June; that meeting accepted that we should declare our aim to achieve reductions of 30% in both SO₂ and NO_x emissions by 2000 (on the 1980 base) but decided that we would not entertain any commitment to specific reductions and dates.

On the other hand, there is I think general agreement that we should not register outright opposition to the proposal. To do so would certainly damage the UK's environmental image which we are concerned to improve. Moreover, it would enable some other Member States who are far from happy with the proposal to shelter behind us and exploit our discomfort.

We are therefore faced with a difficult and uncomfortable balancing act; we need to avoid killing the negotiations while making our reservations about a commitment clear. We must maintain our study reserve on the whole directive (and since we are still gathering information about the implications of the proposal this is indeed our position). We propose to place specific reserves on the key articles (in particular article 3 which sets the targets for emission reduction) thus covering our inability to negotiate on these aspects. However, in doing so we must be prepared to give some indication of UK thinking. I propose that our delegation should make clear that while we share the general aim to reduce emissions, the numbers and dates

included in the present draft are unacceptable and that, because of the implications for the UK, we will find it difficult to tie ourselves to inflexible reductions and timescales. However we should indicate that we do not rule out ultimate consensus.

This is obviously a somewhat precarious line but it may well suffice for a time. There is a good deal of uncertainty about the position of other Member States on the proposal, and plenty of room for prolonged argument about the scope of the directive and the need for further consideration of technical aspects. We should exploit such possibilities to the full. We think it unlikely that agreement will be reached during the Irish, or subsequent Italian, Presidency.

I realise, as I am sure you do, that the position could well change and that we need to keep a close watch on developments.

/ I am copying this letter to members of OD(E) and to Sir Robert Armstrong.

Yours sincerely

A.H. Davin

for
PATRICK JENKIN

*Approved by the SAC
and signed in his absence*



PRIME MINISTER

ACID RAIN: ENVIRONMENT COMMITTEE'S REPORT

As you know, the Committee's Report was published on 6 September. We have two months in which to respond; and we have promised a Debate. The Committee have surveyed the subject comprehensively and made a wide range of recommendations. A number of these relate to increased research effort and will be broadly acceptable. On vehicle emissions they recommend reliance on the 'lean-burn' technology, in accord with our policy. On the controversial issue of abatement of SO₂ emissions, however, the Committee recommend (i) that the UK should forthwith "join the 30% Club" of countries committed to reducing total SO₂ emissions by 30% by 1993; and (ii) that we should accept the current EC proposal, in the draft Large Plants Directive, for a reduction of 60% of SO₂ emissions from these sources by 1995.

These recommendations go considerably further than our policy of "aiming for" reductions of 30% in total emissions of both SO₂ and NO_x by the year 2000, without acceptance of commitments or significant additional expenditure, which was agreed at your meeting on 19 June and on which the Government's response to the Committee must be based. After your meeting we took the view that the right occasion to announce this policy publicly would be the meeting in Geneva this week (25-28 September) of the Executive Body of the UN/ECE Long-Range Transboundary Air Pollution Convention; and in terms of our international position it will be right for us still to do this rather than wait for publication in early November of our response to the Committee. The policy is of course a significant advance on the UK's previous position, but because it falls short of the terms of the "30% Club" as such, and because it represents an aim rather than a commitment, it is unlikely to put an end to our troubles with our critics either in other countries or in Parliament. In particular, of course, we will be pressed hard on what we will do if emissions do not continue to fall, or even begin to increase.

Announcement of this policy in Geneva will necessarily affect our position on the Large Plants Directive. Negotiations on this are still at an early stage. Interdepartmental agreement has been reached

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/ on the brief for our negotiators in Brussels, and I attach for your information a copy of a separate letter to members of OD(E) about that. Our aim must be to keep these negotiations open as long as we can. But once our June decisions become public it will become increasingly difficult to explain in Brussels why we cannot make commitments based on them. If we insist that we cannot, there is a danger that the lack of substance in our new position will become all too visible. Sooner or later we are likely to face the choice of either making a formal commitment in the context of the Directive or, perhaps unilaterally, blocking the Directive altogether. Given lack of interest in the Directive by the Irish Presidency, it may be a number of months before that point is reached. But we shall need to consider this issue further when the time comes.

Work is in hand on a detailed response to the Committee's report, which I will circulate in draft to colleagues as soon as possible.

/ I am sending copies of this minute to the Lord President, the Foreign and Commonwealth Secretary, the Secretaries of State for Energy, Employment, Scotland, Wales, Transport, and Trade and Industry, the Minister of Agriculture, and the Chief Secretary, Treasury; and to Sir Robert Armstrong and Dr Nicholson.

A. H. Davis

for
PJ

26 September 1984

Approved by the SAs
and signed in his
absence



2 MARSHAM STREET
LONDON SW1P 3EB

01-212 3434

My ref:

Your ref:

11 September 1984

*nbpm
DNB
12/9*

Dear Secretary of State

ACID DEPOSITION AND CAR EMISSIONS

Thank you for your letter of 27 July. I have also seen Peter Walker's and Norman Tebbit's letters to me of 6 and 14 August. The Environment Committee's report on Acid Rain, published on 6 September, is also relevant.

The points you make in the first part of your letter were, of course, discussed at the Prime Minister's meeting on 19 June. I am sure that we all agree that the lean burn engine development is to be encouraged (and I am pleased to note the Select Committee concur); and that in principle this development can give either a maximum energy saving or a combination of energy saving and emission reduction. I have no reason to dissent from the figures you quote on this latter point. But the Prime Minister's meeting on 19 June also agreed (and the record of the meeting is clear about this) that we would be right to go for a combination of energy saving and emission reduction from lean burn engines rather than energy saving alone. This is both in the interests of air pollution control, with particular reference to the importance of ozone, and also as a counter to the EC pressures in favour of three-way converters which we are now facing. I take it that you are not now seeking to re-open this issue of principle.

As for your reference to the costs of installing FGD at two large power stations, I hardly think that you are comparing like with like. The effect of tuning lean burn engines for emission reduction is to make the energy saving rather less than it would otherwise have been - an "energy benefit foregone" - whereas the installation of FGD represents an outright addition to the costs of electricity production.

William Waldegrave's speech at Munich was firmly based on the conclusions of the Prime Minister's meeting in the previous week. The word "onslaught" reflected our vigorous EC initiative on lead in petrol in addition to our attitude to lean burn developments, and I do not think that it was inappropriate. It certainly did not, and does not, imply any concession on three-way catalysts. Nor does it imply that our approach to the relevant draft Directive should not be deliberate. As you know, Lynda Chalker and Ian Gow have agreed on an Explanatory Memorandum and briefing for Members of the European Parliament which makes these points clear. Like the No.10 conclusions, however, it does imply that we should not be unnecessarily negative.

Copies of this letter go to the Prime Minister, Geoffrey Howe, Nigel Lawson, Norman Tebbit, Willie Whitelaw, Tom King, Michael Jopling, George Younger, Nicholas Edwards, Peter Walker, Sir Robert Armstrong and Dr Nicholson.

Atkinson
for

PATRICK JENKIN

Approved by the Secretary of State
and signed in his absence

En. Affairs - En. Bluthon 172.

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20/8

W.0614

7 September 1984

PRIME MINISTER

Await minute from Dot

ACID DEPOSITION

The Report of the House of Commons Environment Committee on 'Acid Rain', which was published ^{on 6 September} yesterday, is likely to have a considerable impact, both in the House and on public opinion. A summary of its main points is attached as an Annex.

2. Several other reports have been published since the meeting you chaired on 19 June to consider the Government's policy towards acid deposition. Those by the Energy Technology Support Unit (Harwell), the Nature Conservancy Council, and the Watt Committee on Energy covered nothing either new or particularly surprising. The House of Lords Select Committee on the European Communities published a report on the acid deposition issue in the context of several European Community draft directives; it welcomed the European Community initiatives but criticised the details and felt that too stringent emission reductions were being sought.

3. The Environment Committee Report is the most important. It covers a very wide field, and is severe in its criticism of Government policy. The CEGB, CBI and the motor industry are also criticised. In contrast, the Committee appears to have been strongly influenced by the views of some independent scientists and by what they saw and heard abroad.

4. The Report adopts a very wide definition of acid rain: it includes sulphur dioxide, nitrogen oxides and hydrocarbons, and their products in atmospheric reactions. This has the advantage of comprehensiveness. However, some witnesses may have been misled about the scope of the inquiry and submitted evidence on a too narrow definition of acid rain. Another

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result is that general statements about acid rain do not clearly distinguish between different pollutants from different sources.

5. The first part of the Report is generally sound and gives an account of the known effects of the pollutants on buildings, structural materials, atmospheric visibility, forests, agriculture, natural vegetation and freshwater fisheries. An impressive amount of ground is covered but, as is characteristic of Select Committee Reports, the evidence quoted is sometimes selective and anecdotal. The Report is comprehensive in its treatment of damage to the environment in the United Kingdom itself.

6. But there is one major shortcoming in the Report: while advocating action on emission abatement now, despite scientific uncertainties, the Committee does not justify the scale of measures proposed.

7. Great stress is laid on the United Kingdom as Western Europe's "worst polluter". As you know, the emission/deposition/export/import figures can be used to support virtually any prejudice but the Report does make a telling political point that, with present policies, the United Kingdom's performance relative to other countries is going to get worse.

8. The Report argues that the burden of reduction of sulphur dioxide emissions should fall on power stations. The arguments for this are both technical and economic: the technology is available and the cost will be spread among all electricity consumers. For sulphur dioxide the Report advocates joining the "30 per cent Club" and meeting the European Community's proposed 60 per cent reduction of emissions by the end of 1995. For nitrogen oxides the Report advocated major reductions in power stations, vehicles and industrial sources. Hydrocarbon emissions are ignored.

9. There is a brief and unimpressive section on cost benefit analysis. The Committee estimates that its abatement

recommendations would add 6 per cent to electricity prices, spread over 10 years, and £50-100 to the price of a new car (with offsetting gains in fuel economy from the lean-burn technology favoured).

10. There are over 20 recommendations dealing, in addition to the points mentioned above, with research, abatement technology development, and monitoring.

11. In summary, the following new issues arise from the Report:

- a. There is a lot of data on damage to buildings presented for the first time. The interpretation of these data, however, do not clearly distinguish between recent damage and damage several decades ago, or between the effects of local pollutants and those carried long distances. But the general public may perceive damage to buildings more vividly than to the natural environment and, for the first time, see acid rain as affecting them personally.
- b. The fact that a Committee of MPs has come out so strongly for severe abatement measures will increase international pressure on the United Kingdom to take more action than is envisaged under current Government policy.
- c. The Report can be correctly criticised for accuracy and logic in a number of ways; the CEGB has already done this. However, my advice is that this alone would not be an effective basis for the Government's response.
- d. The Report can also be criticised in totally failing to give adequate consideration to the environmental benefits of an enhanced nuclear power programme.
- e. Because the Department of the Environment did not make a clear public announcement of Government policy following the meeting on 19 June, any future Government announcement

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will now be seen as defensive and in response to the Committee's pressure.

12. If the Committee's Report had been available before the Ministerial meeting of 19 June, I do not think that it would have added any scientific weight to the arguments for more action on abatement than was then agreed. More generally, the Committee's arguments for joining the 30 per cent Club or even accepting the Commission's draft directive, might have influenced Ministers to go further. Personally, I doubt it.

13. I am copying this minute to Sir Robert Armstrong.

MBN

ROBIN B NICHOLSON
Chief Scientific Adviser

Cabinet Office
7 September 1984

- 4 -

CONFIDENTIAL

HOUSE OF COMMONS ENVIRONMENT COMMITTEE
REPORT ON ACID RAIN

Summary of main points

1. Acid rain is defined widely to include sulphur dioxide, nitrogen oxides and hydrocarbons, from all man-made sources, and their products in atmospheric reactions.
2. On an international scale there is convincing evidence that acid rain is responsible for damage to buildings, structural materials, atmospheric visibility, forests, agricultural crops, natural vegetation and freshwater fisheries. There is cause for concern in the UK over likely damage to structural materials and forests. There is cause for concern in some countries, including Sweden, over possible damage to human health.
3. For total emissions of sulphur dioxide and nitrogen oxides, and their deposition in other countries, the UK can be considered to be the worst polluter in Western Europe and its relative performance is likely to get worse.
4. Reducing emissions will reverse some damage, slow down other damage, and reduce the threat of new or further damage to the UK and Scandinavia. A reduction in emissions will lead to a reduction in depositions.
5. The UK's present policy on acid rain is inadequate. Despite gaps in scientific knowledge, enough is now known to justify the application of abatement technology.
6. For the UK the quickest way to reduce sulphur dioxide emissions is by retrofitting power stations. The technology

is costly, but available. The UK should join the "30 per cent Club" immediately and attain the EC target reduction of 60 per cent by the end of 1995. This is the "best practicable means" approach, spreading the cost among electricity consumers and avoiding controls on existing other industry.

7. Nitrogen oxide emissions should be reduced by the fitting of low nitrogen oxide burners to power stations and, with Government assistance, to most categories of industrial users. There should also be controls of nitrogen oxide emissions from new motor vehicles.

8. These controls would increase electricity costs by 6 per cent, spread over 10 years, and put £50-100 on the price of a car.

9. A more fundamental energy strategy is needed, based upon conservation and more efficient transmission.

cc *press*

and
6/9

CENTRAL ELECTRICITY GENERATING BOARD

Sudbury House, 15 Newgate Street, London EC1A 7AU. Telephone 01-634 5111

From the Chairman
Sir Walter Marshall, CBE, FRS

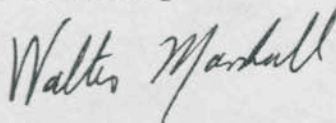
6 September 1984

The Rt Hon Peter Walker, MP
Secretary of State for Energy
Department of Energy
Thames House South
Millbank
London

Dear Secretary of State

This morning we issued the attached statement from the CEGB on the Select Committee Report on Acid Rain. In line with our telephone conversation together yesterday we shall try to avoid confrontation and discussion in the media. In the interests of speed I am copying this to the private offices of the Ministers who might be involved and also to Number 10.

Yours sincerely



W Marshall

cc PS/Secretary of State for the Environment
PS/Parliamentary Under Secretary of State, Dept of the Environment
PS/Prime Minister ✓

PR 791

6 September 1984

ENVIRONMENT COMMITTEE REPORT ON ACID RAIN

STATEMENT BY CEGB

We shall study the report carefully but our first reaction to it is disappointment that it has misunderstood or misinterpreted a great deal of the evidence given by CEGB. We believe that this has led the Committee to conclusions which are out of step both with trends in scientific views on acid rain and with the main conclusions of most other major reports published recently* ie. that more research is required into the cause and effects of acid rain.

The report contains errors of fact and misunderstandings relating to the CEGB's evidence. For example, on damage to stonework, particularly to historic buildings.

The report states that the CEGB were dismissive of the effect of acid rain on stonework, had not monitored the effects and were 'trite and evasive' in suggesting "that natural levels (of rain acidity) should be assessed before any conclusions were drawn about the effects of acid rain".

This is incorrect as the minutes of evidence show. These records that the CEGB fully acknowledged the effects of acid deposition on stonework. It is well established by international experts that the principal cause of stonework corrosion is high concentration of gaseous pollutants. These high concentrations occur only in urban areas and are the result of many small sources of pollution with power stations making only a minor contribution. Controlling the latter alone will not remove the cause of the damage or even materially lessen it.

The Committee instance several buildings in London as being a cause for their concern in this regard. However, power generation has almost ceased in the GLC area with only two small power stations remaining. Emissions of SO₂ from London power stations has thereby fallen from 55,000 tonnes per annum in 1975 to 3,000 tonnes in 1983, but this has not apparently lessened the rates of corrosion that concern the authorities. The same situation will apply in many other cities.

As stated power stations are not the major contributors to pollution in cities which mainly comes from local sources. The CEGB does not consider that it should have a responsibility for monitoring pollution from sources other than power stations.

The Committee says "Ozone has emerged as one of the primary suspects of tree damage observed in German forests. This fact has been cited by the CEEB and motor manufacturers as a reason for not controlling their NO_x emissions. We are unsure whether this was the product of ignorance or a deliberate attempt to mislead us".

This is incorrect. The CEEB pointed out that ozone arose from NO_x emissions and that was the reason why we should give attention to those emissions. Indeed we gave an educated guess that this might well turn out to be much more important than the emission of SO₂. We were therefore explicitly drawing attention to the fact that it may well turn out to be more important for the CEEB to control NO_x emissions than to control SO₂ emissions. The Committee quotes us in the exact reverse sense.

The report says that the CEEB "appears to have actually obstructed work by British companies" (on wet FGD systems).

This is incorrect. The Lodge-Cottrell Company quoted by the CEEB is a subsidiary of an American company and we would expect that any FGD systems installed in the UK would be manufactured in the UK under licence from foreign owners of the technology. The CEEB has a record of buying British second to none.

The Committee recommends "that the CEEB should install equipment to obtain the overall national reduction of 60% in accordance with the EEC Draft Directive by the end of 1995". This recommendation is more extreme than that proposed by any other body since all the costs would fall on the electricity consumer. The Committee did not ask us to cost this option nor does their Report contain any cost estimate. Our preliminary calculations suggest that to meet this proposal we would need to fit FGD to virtually every oil and coal fired power station in the country. Even if it could be done in the timescale suggested it would increase the cost of electricity by about 10 per cent.

The Committee recommends "that all power stations should have low NO_x burners installed during routine shutdowns". This statement is naive. As the Committee acknowledges we said in evidence that we did not know whether it is possible to retrofit burners which would reduce nitrogen oxide emissions to the majority of our boilers. Even if it is possible, the installation would obviously require a lengthy shutdown and rebuilding programme. The whole operation would be a significant technical challenge.

We were puzzled by the reference in Paragraph 134 that "CEGB figures for ozone levels are based on monitoring at low altitude, from which, in evidence to us, they extrapolated to high altitudes". The Board did not give this evidence.

The Report claims that the CEGB ignored the insurance element in its criteria for moving to controls. The Board has a £20 million emission technology programme which covers this aspect.

- END -

* Royal Commission
Watt Committee on Energy
House of Lords Select Committee
E.T.S.U.

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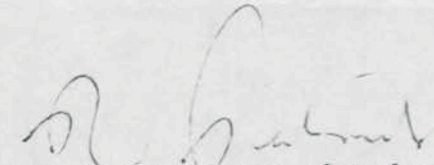
5/19

SECRETARY OF STATE
DEPARTMENT OF THE ENVIRONMENT
MILLERS LANE, LONDON, EC1A 3DB

01 211 6402

The Rt Hon Patrick Jenkin MP
Secretary of State for the
Environment
2 Marsham Street
London
SW1P 3EB

4 September 1984


I can appreciate the desire expressed by Norman Tebbit, in his letter of 14 August to you, to avoid the possible fragmentation of the internal market in motor vehicles.

Nevertheless, I can see little opportunity to concede points to the FRG. As I stated in my letter to you of 6 August, we are agreed to support the introduction of tighter vehicle emission levels, provided that they can be met by technology not involving use of catalysts. This is the key aspect of our future vehicle emission policy. I also believe that we would have the support of other vehicle manufacturing Member States (except the FRG) in this stance, although the precise position should be somewhat clearer after the meeting of officials in Brussels on 6 September.

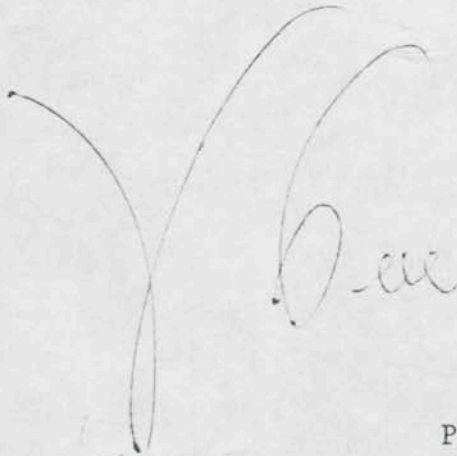
The FRG approach requires the marketing of two grades of unleaded petrol (at 97 and 92 RON), coupled with the imposition of emission control standards which can only be met by catalysts. In the German situation the impact of this on oil industry investment may not be very serious, in that nearly half the petrol sold there is regular grade. So far as motorists are concerned, this policy requires them to accept the substantial capital costs of fitting 3 way catalysts, and also to incur a major running cost penalty (of around 20 per cent) as compared with the situation which would result from the introduction of lean burn technology.

It seems to us doubtful whether these very heavy costs would yield any significant benefit in reversing damage to the German environment. If the German forests problem is eventually shown to result from ozone rather than merely summer draught conditions, No_x emissions are almost certainly better tackled by lean burn technology than 3 way catalysts, leaving those HC emissions which are not the result of evaporation to be tackled by the more robust single stage oxidation catalysts. At any rate there is surely no UK environmental case for our accepting the heavy costs of 3 way catalysts. Meanwhile the requirement for unleaded petrol at 96 RON would impose absolutely disproportionate oil industry investment costs in the UK and most other EC countries where 90 per cent of petrol sold is premium grade.

For the Community as a whole, recent studies have put this cost at more than \$2 billion, as against perhaps \$300 million the motor industry might save by not having to invest in the development of engines capable of running on petrol at 94½ - 95 RON rather than 96 RON.

For all these reasons, I think we should be very careful to avoid giving the Germans any reason to think we might move flexibly towards their position in the cause of maintaining a unified motor market in the EC.

I am sending copies of this letter to the Prime Minister, Willie Whitelaw, Geoffrey Howe, Nigel Lawson, George Younger, Nicholas Edwards, Norman Tebbit, Tom King, Michael Jopling, Nicholas Ridley, Sir Robert Armstrong and Robin Nicholson.

A handwritten signature in dark ink, appearing to read 'Peter Walker', with a large, sweeping flourish that extends upwards and to the left.

PETER WALKER

CONFIDENTIAL

Env. Affairs - Acid Rain/Pollution #2

RESTRICTED



PRIME MINISTER

Agriculture and Conservation

*no pm
but off for
meeting when
arranged.*

*sub
11/4*

I have seen the correspondence about the operations of the compensation arrangements under the Wildlife and Countryside Act.

I am sure that a review of these arrangements must be carried out. Nevertheless, I think it right to stress at this stage that any amending legislation will take up a very great deal of Parliamentary time. There can be no question of slipping in some small amendments to the Act; any changes would need to be considered carefully in the context of our legislation programme as a whole.

I am sending copies of this minute to Geoffrey Howe, Peter Walker, George Younger, Nicholas Edwards, Patrick Jenkin, John Biffen, Norman Tebbit, Tom King, Nicholas Ridley, Peter Rees and to Sir Robert Armstrong.

A handwritten signature in blue ink, appearing to be 'A' or similar.

Privy Council Office

15 August 1984

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CC NP



DEPARTMENT OF TRADE AND INDUSTRY
1-19 VICTORIA STREET
LONDON SW1H 0ET 5422
TELEPHONE DIRECT LINE 01-215
SWITCHBOARD 01-215 7877

Secretary of State for Trade and Industry

14 August 1984

The Rt Hon Patrick Jenkin MP
Secretary of State for the Environment
Department of the Environment
2 Marsham Street
London SW1P 3EB

*not open
JMB
10/8*

Dear Secretary of State,

ACID DEPOSITION AND CAR EMISSIONS

I have seen Nicholas Ridley's letter to you of 27 July.

2 It is implicit in his discussion of our attitude to non-lead vehicle emission standards that the balance of arguments may have changed since the outcome of the 28 June Environment Council. Our Departments had been working closely together, with the Department of Energy, to develop our thinking on the inter-relationship of lead in petrol and other vehicle emissions, in the expectation that the two subjects might be strongly linked in discussions in the Community. In the event, we have made very satisfactory progress on our objective of achieving Europe-wide agreement on removing lead from petrol, without yet having to take a particularly firm position on other vehicle emission standards, where the Commission's proposals were not discussed in any detail. It must therefore be right to reflect on the approach we should be taking to Community discussion of the Narjes/Davignon two-stage proposals, now that the linkage seems to have broken. Against that background, you will understand that I have much sympathy for Nicholas Ridley's reminder that even the Commission's 'first stage' proposals impose costs on consumers - even if in the form of foregone additional savings - which should not be accepted without good reason.

3 Nonetheless, the political pressure in Germany for substantially tighter standards has not eased. In particular, I am concerned about the reports that the Germans are forging ahead with instituting substantial fiscal incentives for the use of lead-free petrol and catalytic convertors, independently of any Community accord. This is a first and probably inexorable step towards a mandatory requirement for catalysts in the German market. I should be most reluctant to see this sort of fragmentation and distortion of the internal market in motor vehicles. We may

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therefore be obliged to accept rather tighter standards than we would otherwise choose, if by doing so we can keep the Germans on side. It follows that, while in general I believe strongly that we should balance the costs and environmental benefits that can be assessed on economic grounds, there may be an additional price worth paying to maintain a unified market.

4 Much will obviously depend on the attitude of other Member States as discussions on the Commission draft proceed. While we must certainly maintain our fundamental opposition to standards which virtually mandate catalyst technology, and must protect the interests of consumers and of our industry, I believe that our officials will need to avoid adopting too rigid a stance too soon on the details of Stage One of the Commission's draft.

5 I am sending copies of this letter to Nicholas Ridley and to the Prime Minister, Geoffrey Howe, Nigel Lawson, Willie Whitelaw, Tom King, Michael Jopling, George Younger, Nicholas Edwards, Peter Walker, Sir Robert Armstrong and Robin Nicholson.

Yours sincerely,

Norman Tebbit

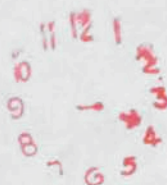
pp. NORMAN TEBBIT

(Approved by the Secretary of State and signed in his absence)

JH2AWY

And Hair
M 2

15 AUG 1984



RESTRICTED

2 MARSHAM STREET

LONDON SW1P 3EB

01-212 3434

My ref: J/PSO/15878/84

Your ref:

9 August 1984

Dear David

AGRICULTURE AND CONSERVATION

Thank you for your letter of 30 July to John Ballard in which you set out the Prime Minister's request for a review of the compensation principle, together with the need to consider back up "stop" powers.

Officials here, together with those from MAFF, Scotland, Wales and Treasury will be looking further into the detail of these matters with the intention of producing material. Thereafter, my Secretary of State will circulate a further note as requested in September.

I am copying this letter to the recipients of yours of 30 July.

Yours
AndrewA C ALLBERRY
Private SecretaryRESTRICTED

David Barclay Esq

Env Affairs : Pollution #2

THE PRESIDENT
OF THE UNITED STATES
OF AMERICA



FOOTNOTES

CONFIDENTIAL



SECRETARY OF STATE FOR ENERGY
THAMES HOUSE SOUTH
MILLBANK LONDON SW1P 4QJ
01 211 6402

The Rt Hon Patrick Jenkin MP
Secretary of State for the Environment
2 Marsham Street
LONDON SW1

7/8

August 1984

N. Edwards

I have sympathy with the points concerning the EEC proposals on car emissions made by Nicholas Ridley in his letter of 27 July to you.

At our meetings earlier this year chaired by the Prime Minister, to discuss environmental pollution, we agreed to support the introduction of tighter emission standards for vehicle emissions provided that these were achieved through lean burn technology, rather than by using three way catalysts. In the light of technical advice I find it difficult to see how our earlier decisions can be reconciled with the Commission's quite unjustifiable "second-stage" proposals. Even its milder first stage proposals could rule out lean burn technology for larger cars - as well as for all cars with automatic transmission with consequential penalties for disabled drivers - unless we were prepared to forego the energy savings promised by this new technology. When we come to decide the line HMG should take on the Commission's proposals, we shall need to pay careful attention to their implication for lean burn technology and fuel consumption.

I appreciate the delicate balancing act which William Waldegrave had to perform at Munich. It remains important to deploy in as positive a way as possible the points we agreed at the Prime Minister's meeting of 19 June. But in view of our forthcoming negotiations in the Community we should take care not to give too many hostages to fortune.

I am sending copies of this letter to the Prime Minister, Geoffrey Howe, Willie Whitelaw, Tom King, Michael Jopling, George Younger, Nicholas Edwards, Nicholas Ridley, Sir Robert Armstrong and Dr Nicholson.

Peter Walker

CONFIDENTIAL

PETER WALKER

ENV. AFFAIRS : Acid Rain

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MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
WHITEHALL PLACE, LONDON SW1A 2HH



From the Minister

Await Colleagues

PRIME MINISTER

I have seen a copy of your Private Secretary's letter of 30 July about agriculture and conservation. I have also seen Peter Rees' minute of 27 July on the same subject.

I shall of course ensure that my officials play a full part in the review of the compensation arrangements under the Wildlife and Countryside Act which you have commissioned. I hope that it will be possible to establish from the outset the basis on which the review is to take place, which I believe must be the maintenance of the voluntary principle as the general approach, with compulsion only in extreme cases. The Government defended this principle stoutly against Opposition attacks in the bitter debates during the passing of the Wildlife and Countryside Bill, and it would be a great mistake for us to re-open the issue. Departure from the general principle would cause severe problems for the operation of our countryside policies as both Patrick Jenkin and I have frequently emphasised, and as Sir Derek Barber and Mr William Wilkinson Chairman of the Countryside Commission and the NCC respectively, have endorsed.

Moreover, the introduction of compulsory arrangements which have the effect of reducing the value of a farmer's property without adequate compensation would be quite contrary to our Party's philosophy. As a Party we have been the champions of the principle of the rights of private property owners and have opposed State interference and bureaucratic controls favoured by our opponents .

To depart from this tradition would seriously weaken our credibility as upholders of freedom and enterprise. It would furthermore be bound to undermine our ability to resist attempts by the Labour Party, if ever they were in a position to do so, either to impose rigid planning controls over the countryside or to seize other private property without adequate compensation.

I hope therefore that whatever decisions are eventually taken on these important matters we shall avoid offending the voluntary principles which not only are crucial to our conservation objectives but are also rooted deeply in our Party's philosophy.

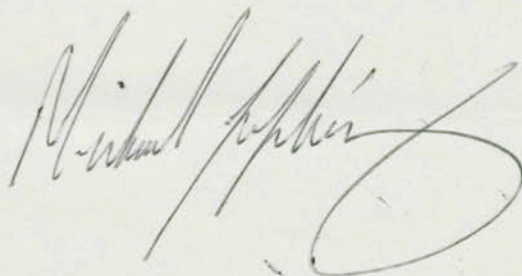
I should add that whilst we must pay due regard to the costs of our policies, I do not believe we should be unduly swayed by

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isolated examples of high compensation payments, which are not representative of the generality of agreements. The four examples given in your Private Secretary's letter are the ones that are always trotted out by our opponents to "prove" that our policy does not work. They never make the point that these examples are quite atypical, and that our policy is securing considerable environmental benefits at relatively modest cost.

I am copying this minute to Willie Whitelaw, Geoffrey Howe, Patrick Jenkin, Peter Rees, Peter Walker, George Younger, Nick Edwards, Norman Tebbit, Tom King, Nicholas Ridley and to Sir Robert Armstrong.

A handwritten signature in cursive script, appearing to read 'Michael Jopling', written in dark ink on a light-colored paper.

MICHAEL JOPLING
6 August 1984

~~Appis~~ Acid Rain: ENV. AFFAIRS Pt 2.

17 AUG 1984

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5

GOVERNMENT OF CANADA



10 DOWNING STREET

From the Private Secretary

DR. NICHOLSON
CABINET OFFICE

Acid Deposition and Car Emissions

The Prime Minister was grateful for your minute of 3 August commenting on the letter which the Secretary of State for Transport sent to the Secretary of State for the Environment on 27 July.

The Prime Minister has taken note of the distinction made in your minute between imposing costs on consumers, on the one hand, and earmarking part of the economic gain from new technology on the other. She does not, however, propose to intervene in the correspondence at this stage. No doubt the Secretary of State for the Environment will make similar points to those in your minute in his reply to Mr. Ridley.

(David Barclay)

6 August 1984



10 DOWNING STREET

ms

Prime Minister⁽²⁾

The key point is X on page 2.

There is a difference between imposing costs on consumers, and earmarking some of the economic gain from new technology in order to improve the environment.

But there is no need for you to join in this rather bad-tempered correspondence, unless you so wish.

DWB
3/8

3 August 1984

PRIME MINISTER

ACID DEPOSITION AND CAR EMISSIONS

The Secretary of State for Transport has written to the Secretary of State for the Environment expressing disquiet at the wording of the reference to reducing motor vehicle emissions in Mr Waldegrave's statement to the closing session of the Munich Air Pollution Conference at the end of June. However, the main issues which he has raised relate not directly to Mr Waldegrave's statement, but to Mr Jenkin's paper which was discussed at the meeting you chaired on 19 June to consider the Government's policy towards acid deposition.

2. Mr Ridley queries whether proposals by the European Commission, for reductions in motor vehicle emissions by 1989, should be supported by the UK as part of the Government's policy towards acid deposition. At your meeting on 19 June there was a discussion of this following Mr Jenkin's recommendation that the Commission's proposals be accepted. The meeting expressed strong support for 'lean-burn' technology as a means of reducing vehicle emissions. The consensus view was that when appropriately tuned lean-burn engines could both reduce emissions and improve fuel economy; and British motor manufacturers favoured its introduction.

3. Mr Ridley has said that, to meet the Commission's 1989 emission requirements, lean-burn engines will forgo about one third of the additional efficiency that the lean-burn technology promises. You will remember that this point was discussed at your meeting at Chequers on 27 May; attached

X | is a graph, which I showed at that meeting, illustrating the range of emissions from lean-burn and other vehicle technologies. A lean-burn engine can be tuned for minimum emissions, maximum fuel economy or a compromise between the two. It was agreed that there was justification for a modest reduction in the gain in fuel economy in the interests of reduced emissions. I believe that it is misleading to compare the cost of this to the motorist with the cost to the consumer of retrofitting flue-gas desulphurisation to power stations: the former represents a benefit partially forgone and the latter an actual expenditure. In addition the scientific evidence suggests that the benefit from the reduction of motor vehicle emissions will be felt much more widely than a reduction in power station emissions.

4. Mr Ridley has queried the magnitude of the effect on acid deposition of accepting the European Commission proposals, but has admitted that the effect on ozone production might be greater. In my view acid deposition and ozone production have to be considered together because:

i) ozone plays a role, as yet not well characterised, in the formation of 'acid precipitation' from the gases originally emitted; and

ii) there is a growing scientific consensus that much of the damage to forests, originally blamed solely on acid deposition, involves other atmospheric pollutants, in particular ozone.

Therefore when we talk about a Government policy towards acid deposition we are using this phrase as shorthand for long-range atmospheric pollution in general.

5. I do not therefore believe that Mr Ridley has produced any scientific or technical case for reopening the discussion which was concluded at your meeting of 19 June. Supporting the European Commission proposals is in line with the decisions of that meeting.

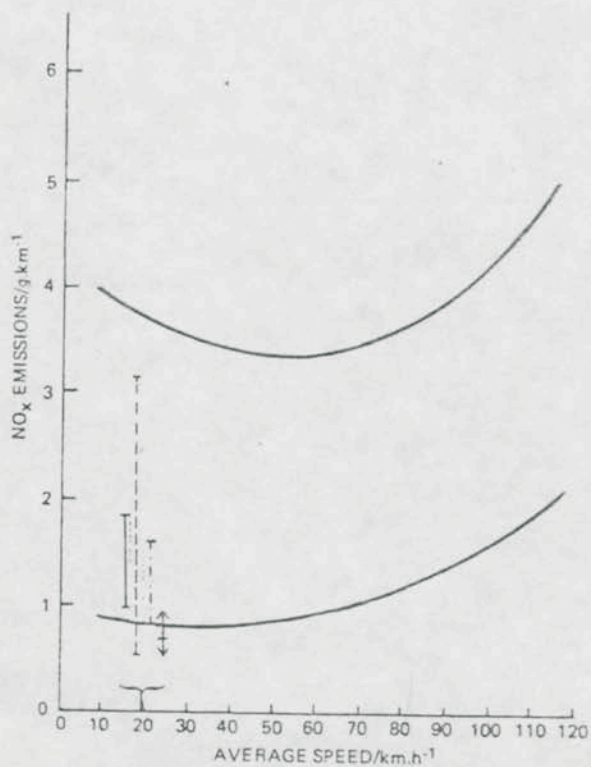
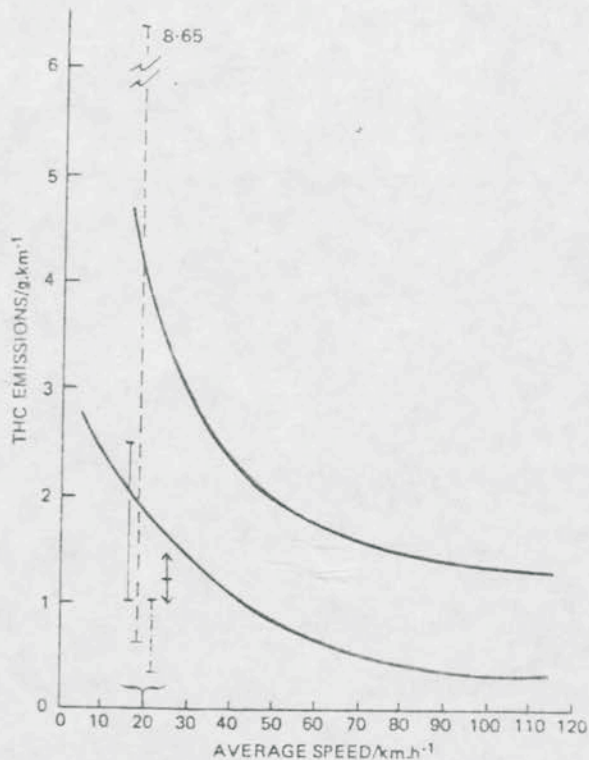
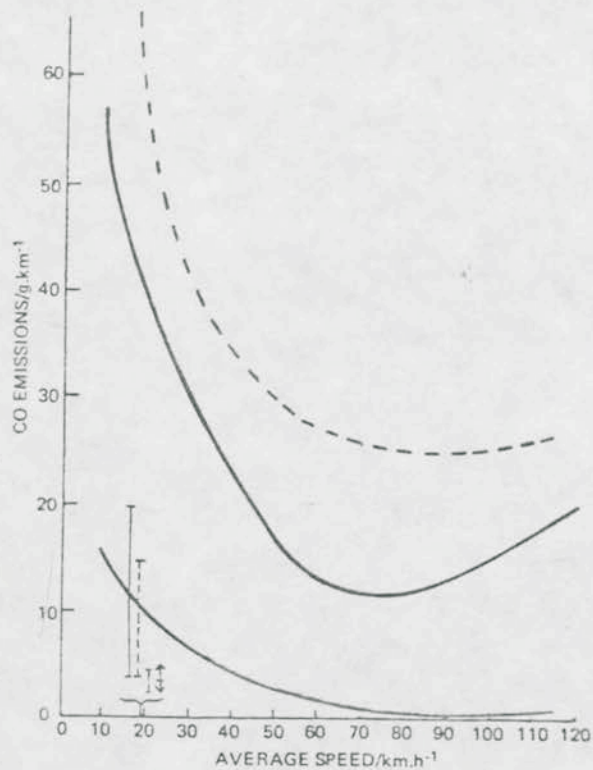


Figure 8

Emission estimates for technology systems meeting arbitrary criteria for emissions and costs, ref. (20).

	↑	system 4p	Improved Conventional
+£100	↑	system 15/16	Lean Burn
- Fuel	↓		
+£200	↑	system 23	Improved Conventional + Oxidation Catalyst
+ Fuel	↓		
+£600	↑	system 29	Improved Conventional + 3-way Catalyst
+ Fuel	↓		

Env Affairs : Aud Re: R2

W.0515

3 August 1984

MR DAVID BARCLAY, NO 10

ACID DEPOSITION AND CAR EMISSIONS

In response to your minute of 30 August, I enclose a minute to the Prime Minister in which I comment on the Secretary of State for Transport's letter to the Secretary of State for the Environment.

The background to Mr Ridley's letter is a point of view held in one part of the Department of Transport which takes the line that no concession to environmental improvement is worth the cost. They fought and lost a rearguard action on lead in petrol but now want to start one on 'lean-burn'. It is unfortunate that Mr Ridley has been persuaded to lend his name to this since I believe that a clear-cut decision was reached at the Prime Minister's meeting on 19 June that part of the economic benefit of lean-burn should be forgone in favour of reduced emissions from cars.

You are right in pointing out that forgoing part of a cost reduction to improve the environment as is proposed for 'lean-burn' is a very different matter from taking a substantial cost increase to reduce power station emissions as is proposed for fuel gas desulphurisation.

Mr Ridley is right that cars contribute very little to SO₂ emissions but as you know the NOX and hydrocarbon emissions from cars are now thought to be the major source of forest damage rather than SO₂. The statement by Mr Ridley that cars contribute 20 per cent of NOX emissions is consistent with the figure of 34 per cent for vehicles which I previously gave the Prime Minister. The difference is diesel-engined vehicles.

RBN
ROBIN B NICHOLSON
Chief Scientific Adviser

FOU
cc RP
JH



10 DOWNING STREET

From the Private Secretary

31 July, 1984

Agriculture and Conservation

The Prime Minister has now seen the Chief Secretary's minute of 27 July commenting on the minute from the Secretary of State for the Environment dated 20 July about agriculture and conservation.

The Prime Minister would be grateful if the points made by the Chief Secretary could be taken into account in the review for which she has asked of the compensation principle underlying the Wildlife and Countryside Act (my letter of 30 July to John Ballard refers).

I am sending copies of this letter to Janet Lewis-Jones (Lord President's Office), Colin Budd (Foreign and Commonwealth Office), John Ballard (Department of the Environment), Michael Reidy (Department of Energy), John Graham (Scottish Office), Colin Jones (Welsh Office), Callum McCarthy (Department of Trade and Industry), David Normington (Department of Employment), Ivor Llewelyn (Ministry of Agriculture, Fisheries and Food), Dinah Nichols (Department of Transport) and Richard Hatfield (Cabinet Office).

DAVID BARCLAY

John Gieve, Esq.,
Chief Secretary's Office



10 DOWNING STREET

From the Private Secretary

30 July 1984

AGRICULTURE AND CONSERVATION

The Prime Minister considered over the weekend your Secretary of State's minute of 20 July, to which was attached a paper by officials on agriculture and conservation. The Prime Minister has also seen the Minister of Agriculture's minute of 23 July on this subject.

The Prime Minister believes that the present operation of the Wildlife and Countryside Act 1981 is not by any means satisfactory. As a first step, she endorses the need to block the loophole in Section 28 of the Act by limiting the three months period in which the owner or occupier of a proposed SSSI can destroy important features of the site. In addition, however, the Prime Minister believes that there is a need for a fundamental review of the compensation principle on which grants are presently paid. The cost of such compensation is already far greater than originally envisaged, and several recent examples have highlighted both the size of payments to farmers and the number of years for which they continue. The Prime Minister understands that these examples include the following:

i) Probable payments of £340,000 a year for at least 20 years to a farmer at Swale in Kent for not draining 1,800 acres of wet land. Moreover, the same farmer is due to receive a back payment of £500,000.

ii) Purchase of 88 acres at Kings Sedgemoor in Somerset at a cost of £183,000, because the farmer would not agree to a Management Agreement.

iii) Payment of £20,000 a year for 65 years to Viscount Cranborne for not replacing deciduous trees with conifers.

iv) A payment to Lord Thurso of £250,000 (not made under the 1981 Act, but involving the same principle) for not disturbing 6,000 acres of peat bog in Scotland.

MR

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The Prime Minister would be grateful if your Secretary of State, in consultation with the Secretaries of State for Scotland and Wales, the Minister of Agriculture and the Chief Secretary, could now set in hand a review of the compensation principle. This should consider specifically the possibility of removal of compensation for grants foregone, and also the possibility of replacing the present periodic payments with a one-off payment related to net income foregone over, say, the following three years. In addition, the Prime Minister supports the suggestion in your Secretary of State's minute for introducing back up "stop" powers to be used where an owner or occupier either will not consider a Management Agreement, or threatens to hold the Government to ransom for an excessive cost. She would be grateful if further work could be done to define such a power, which might be coupled with a right of appeal for the farmer or land-owner.

BT / It has not, unfortunately, proved possible to arrange a discussion of these issues before the summer holidays. The Prime Minister would be grateful if your Secretary of State could circulate a further note in September reporting on the work commissioned by this letter.

I am sending copies of this letter to Janet Lewis-Jones (Lord President's Office), Colin Budd (Foreign and Commonwealth Office), Michael Reidy (Department of Energy), John Graham (Scottish Office), Colin Jones (Welsh Office), Callum McCarthy (Department of Trade and Industry), David Normington (Department of Employment), Ivor Llewelyn (Ministry of Agriculture, Fisheries and Food), John Gieve (Chief Secretary's Office), Dinah Nichols (Department of Transport) and to Richard Hatfield (Cabinet Office).

(David Barclay)

John Ballard, Esq.,
Department of the Environment

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10 DOWNING STREET

From the Private Secretary

DR. NICHOLSON
CABINET OFFICE

Acid Deposition and Car Emissions

You will have received direct a copy of the enclosed letter from the Secretary of State for Transport to the Secretary of State for the Environment about acid deposition and car emissions.

bf | I have not yet shown this letter to the Prime Minister, and before doing so I should be grateful for any comments you may care to make on the technical and financial analysis it contains. It seems to me, for example, that it is rather misleading to compare the additional cost of flue gas desulphurisation with the slightly reduced saving from lean-burn when modified to meet the Conference's "first stage" proposals. I was also surprised, given what has been said earlier, about the **assertion** that "cars at present contribute virtually no sulphur dioxide".

David Barclay

David Barclay
30 July 1984

RESTRICTED

FROM: CHIEF SECRETARY
DATE: 27 July 1984Prime Minister ⁽¹⁾

PRIME MINISTER

Agree to ask Mr Jenkin and colleagues to take these points into account in the review of compensation arrangements for which you have asked?

AGRICULTURE AND CONSERVATION

Patrick Jenkin's minute of 20 July forwarded the report by officials on the Wildlife and Countryside Act, which you asked to be prepared at the environmental pollution discussion on 17 May. I have also seen Michael Jopling's minute of 23 July. In summing up that discussion you commented that compensation was excessive, and that the case for paying it at all was questionable in some circumstances. I was, therefore, disappointed to see that Patrick's immediate recommendations would entail more expenditure not less.

When the Bill was being considered in 1981, the Explanatory and Financial Memorandum said that expenditure by the Nature Conservancy Council on management agreements might be of the order of £600,000 to £700,000 on average per year and that the provisions relating to the Countryside Commission, national parks and management agreements required no additional public expenditure. The paper by officials now concludes that expenditure will rise from a baseline of less than £1 million to between £15 million and £20 million p.a. by 1987-88. Over £12 million of this will be spent by the Nature Conservancy Council on management agreements.

On present policies the cost will escalate further beyond the PES period. The pressures on farmers and landowners to rationalise the landscape for economic reasons are bound to

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continue and the scope for destruction is vast. Pressure for conservation will, therefore, grow.

I am sure we should take steps immediately to rein back this increase in costs. First, as Patrick proposes, we should look hard at the financial regime for management agreements themselves. I am sure we should exclude compensation payments in respect of farm improvement grants foregone. More fundamentally, I think we should look carefully at the possibility of limiting the number of Sites of Special Scientific Interest. I have no objection, either, to Patrick's suggestion that the principle of compensation for profits foregone should be reexamined although I could not agree to the main alternative identified in the paper of making capital payments of £200m or more over the next 3 or 4 years.

We need also to ensure that our agricultural and environmental policies work together. It is a nonsense for the Government to provide extravagant levels of public support through the CAP and capital grants to encourage farmers to invest in their land, for example by draining grasslands for arable crops, while at the same time offering them full compensation for agreeing not to do so on environmental grounds. Reforming the CAP is bound to be a long haul but we should take what action we can on our domestic agriculture programme to stop encouraging farmers to do things which would damage the environment. For example, before introducing yet another form of public subsidy for farmers by way of grazing grants in the Norfolk Broads we should surely remove the capital grants which help and encourage farmers to plough up grazing lands.

While these measures would restrain the rate of increase in expenditure, they would leave a dangerously open-ended commitment to future public expenditure. As environmental and conservation concerns increase, there will be growing pressure for better compensation and for more categories of objects to be preserved. Before the view that owners have a right to cash compensation becomes utterly entrenched, I think we should consider most carefully the argument for moving

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from the present voluntary approach, which is quite different from that which is applied in urban planning decisions, to a regime relying less on compensation and more on compulsion.

I am copying this to Willie Whitelaw, Geoffrey Howe, Patrick Jenkin, Peter Walker, George Younger, Nick Edwards, Norman

Tebbit, Tom King, Michael Jopling, Nicholas Ridley, and to Sir Robert Armstrong.

PR

PETER REES

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DB 575



DEPARTMENT OF TRANSPORT
2 MARSHAM STREET LONDON SW1P 3EB

01-212 3434

The Rt Hon Patrick Jenkin MP
Secretary of State for the Environment
2 Marsham Street
LONDON SW1P 3EB

27 July 1984

Dear Patrick

ACID DEPOSITION AND CAR EMISSIONS

Your Private Secretary's letter of 11 July to the Prime Minister's Office enclosed William Waldegrave's report of the Munich Air Pollution Conference at the end of June. We had, of course, discussed our approach to these matters at the Prime Minister's meeting on 19 June.

As I said at the meeting, we should not overlook the fact that the lower emission standards for cars recommended in your minute will impose a cost directly on the motorist, as well as make a contribution to the lessening of air pollution.

Lean-burn engines are now being developed by European manufacturers because of their greater fuel economy, and we can expect their appearance in new models of cars progressively over the next few years. These developments could produce an improvement in fuel consumption of about 15% - an important reduction in costs of what is the major form of transport, a useful benefit to the consumer and to the balance of payments. The new cars would meet the current emission standards, agreed only last year, and their emissions would be about half those

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from cars of 10 years ago. I hope I am right in assuming that we are all agreed that this development must be encouraged.

If we intervene to demand that cars meet the Commission's "first stage" proposals for 1989, as recommended in your minute, the manufacturers will have to modify these new engines reducing their efficiency by about 5%. So about one third of the 15% improvement that we would otherwise expect, will be sacrificed. In cost terms, our intervention - assuming current petrol prices - would reduce the benefits from the new technology by some £400m per year - that is £26 per year to the average motorist. This cost will be reflected in the oil import bill.

The effect of all this on acid deposition, based on the figures in your minute, would be miniscule. Cars at present contribute virtually no sulphur dioxide and only about 20% of nitrogen oxides. The Commission's proposals require a 27% reduction in the total of nitrogen oxides and hydrocarbons, and it is probable that most of this will come through in reduced hydrocarbons rather than reduced nitrogen oxides. The effect on total acid deposition must therefore be very small. The effect on ozone production, which I accept is also a cause of concern, might be greater. But my point is that in national terms your paper asks the motorist to bear a cost greater than the consumer would if we retro-fitted flue gas desulphurisation to two large power stations - something we ruled out on economic grounds.

I am not opposed to tighter control of emission standards, provided they are based on a realistic judgment of the costs and the advantages of particular courses. We have firmly rejected catalysts on these grounds.

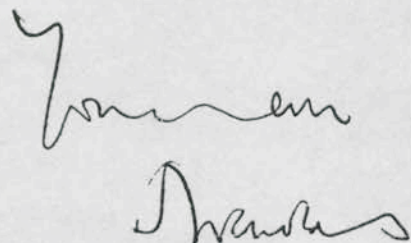
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I thought that I should set out the facts about learn-burn as I am advised of them, by our officials. It follows that we should take a cautious approach to the Commission's first stage proposals which, though far less costly than the German proposals for catalysts, are nonetheless quite expensive and would not necessarily contribute significantly to reducing acid deposition.

That, I think, is in line with the general conclusions of all our recent discussions on environmental policy. I was therefore concerned to see that in his closing statement at the Munich Conference William Waldegrave supported "a European-wide onslaught on pollutants from motor car exhausts". That seems to me quite a variance with the deliberate approach to all these problems on which I thought we had agreed. As the Minister responsible for setting pollution standards for vehicles I could not endorse an approach in those terms, which is likely to arouse expectations far beyond what it would be reasonable to fulfil. I had no opportunity to consider the line to be taken at that conference, but for the future I must ask that pronouncements on this subject should be agreed with Lynda Chalker or me, or my officials.

Copies of this letter go to the Prime Minister, Geoffrey Howe, Nigel Lawson, Norman Tebbit, Willie Whitelaw, Tom King, Michael Jopling, George Younger, Nicholas Edwards, Peter Walker, Sir Robert Armstrong and Dr Nicholson.



NICHOLAS RIDLEY

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ENV AFFAIRS: Acid Rain Pt 2

(4) mb
PRIME MINISTER

Agriculture and Conservation

Attached is the third set of papers commissioned at your meeting on environmental pollution. Earlier papers have dealt with acid rain and Sellafield. This set covers agriculture and conservation, and in particular, the workings of the Wildlife and Countryside Act.

You will wish to read the Environment Secretary's minute at Flat A, the Minister of Agriculture's minute at Flag B and the Policy Unit advice at Flag C.

Everyone agrees that the voluntary approach is best, if it can be made to work. But it is costing a good deal of money; and it is ineffective if the farmer is uncooperative.

The Policy Unit therefore suggest a review of the principles on which compensation is based and the introduction of compulsory "stop" powers coupled with a right of appeal.

A discussion of these contentious issues is unlikely to be possible before the holidays. Agree a letter, as recommended in the last paragraph of the Policy Unit note, with a view to discussion in the early autumn?

DBS
DAVID BARCLAY

26 July, 1984

MR BARCLAY

25 July 1984

AGRICULTURE AND CONSERVATION

The Department of Environment paper is long and unfocussed. It bears all the hallmarks of a muddled compromise amongst Departments and is not a basis for positive decisions.

The Problem

The Wildlife and Countryside Act is leading to huge handouts for farmers to do nothing at great cost to the taxpayer. The Act is in urgent need of revision both to close loopholes and to revise the basis of compensation.

Consider some recent examples:

- At Swale in Kent the tenant farmer is likely to be paid £340,000 pa for at least 20 years not to drain 1,800 acres of wetland. Furthermore, because negotiations have been drawn out, he will also receive a back payment of £500,000.
- At Kings Sedgemoor in Somerset, 88 acres were purchased from the farmer for £183,000 because he would not agree to a Management Agreement.
- In Dorset, Lord Cranbourne will be paid £20,000 pa for 65 years for not replacing deciduous trees with conifers in a patch of woodland.
- Lord Thurso has been paid £250,000 for not draining 6,000 acres of desolate Scottish peat bog (although not strictly under the 1981 Act, the principle is the same).

We cannot preserve the principle of full compensation and expect to achieve the amount of conservation which will satisfy the millions of people who care about the landscape at a reasonable cost. We are, in effect, fighting the CAP and its many hundreds of millions which induce the ploughing up of land which was once never considered to be suitable for arable cultivation. In other words, we are subsidising farmers under the 1981 Act for not being subsidised under the CAP.

Great stress is laid in the paper on the voluntary approach. But the point is that this approach has broken down as our recent sorry experiences with the Halvergate Marshes have shown. We should try and maintain a voluntary approach if possible but not at the high price being demanded. Our current policy would be unthinkable in any other context than farming.

DAWAAN

The paper estimates that the cost of management agreements will rise to £15-20 million pa over the next 3 years. In most cases these will be annual payments lasting for 20 years.

Furthermore, our commitments are unlikely to stop at even £20 million pa. We do not know the real potential volume of applications which could materialise once farmers find that farm incomes are being squeezed as the CAP is gradually being brought under control. Although compensation payments would also fall, the farmer would have an added incentive to opt for a quiet life and receive a steady stream of income for doing nothing.

Compensation for grants foregone is fundamentally objectionable. The fact that the savings might be modest, as is argued in the paper, is beside the point.

We are also sceptical about the value of headage payments which are proposed for the Broads. These would be paid per animal, award intensive producers most, and would be difficult to limit once they were introduced outside the less favoured areas. They would encourage farmers to acquire animals with a view to applying for compensation.

What To Do

Our first priority is to block the loophole in Section 28 of the Wildlife and Countryside Act by eliminating the 3 months' period in which farmers can destroy important features of designated sites. Patrick Jenkin has already announced his intention to close this loophole and this should be pursued as quickly as possible.

Secondly, we must introduce a back-up stop power in order that we can protect sites where the farmer will not consider a management agreement or threatens to hold us to ransom. Two further stop mechanisms could also be considered:

- disallowing drainage grants for designated areas;
- extending the Town and Country Planning General Development Order 1977 to include ploughing as "development".

The logical corollary of having a long-stop is that farmers should have some right of appeal, as do the rest of us if we object to a planning order. This would help to defuse the agricultural objections to departing from the voluntary principle enshrined in the 1981 Act.

We must also revise the basis of compensation. Why not bring our approach into line with that adopted for the conservation of buildings, ie a regulatory approach rather than a compensation principle.

If we do wish to continue with the compensation principle, this should be a one-off payment related to net income foregone over, perhaps, 3 years. There is no reason why this should undermine the voluntary approach. Many farmers have followed a voluntary approach to conservation without being paid any compensation.

Recommendations

We recommend that the Prime Minister should reply to Patrick Jenkin:

- Recognising that the Wildlife and Countryside Act is not working satisfactorily.
- Endorsing the need to block the 3 month loophole in the Act. (This is already Government policy but the Prime Minister's support would introduce a sense of urgency.)
- Noting that compensation is already costing far more than originally envisaged and supporting an urgent review of the compensation principle. This should include the removal of compensation for grants foregone and consideration of the possibilities for a one-off payment related to net income foregone over 3 years.

Most farmers are concerned about conservation and sensible revisions to the compensation arrangements need not affect the voluntary approach in the majority of cases.

- Supporting back-up stop powers to preserve threatened sites in those cases where the voluntary approach breaks down. This should be coupled with a right of appeal.

We suggest that the Prime Minister should request a revised paper along these lines for discussion in September.

DLP.

DAVID PASCALL

DAWAAN

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*Agreed - but please
amplify indent ① by including
the examples made of it on
p. 1. not*

B C.D.P

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
WHITEHALL PLACE, LONDON SW1A 2HH



From the Minister

Asst Bly Unit

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PRIME MINISTER

attached

AGRICULTURE AND CONSERVATION

Patrick Jenkin minuted you on 20th July about the Wildlife and Countryside Act and made a number of proposals for strengthening the measures for countryside conservation.

I fully endorse Patrick's affirmation of the voluntary principle as the basis of our policies for conservation. During the passage of the Wildlife and Countryside Bill and subsequently we gave many assurances to the farming community about our commitment to the voluntary approach and it would look ill to many of our supporters if we were to go back on these so soon. With agriculture representing the principal land use over nearly 80% of the area of the United Kingdom, farmers inevitably carry the primary responsibility for managing the rural environment. Their goodwill and co-operation is vital to the continuing sympathetic management of the countryside. I am in no doubt that the farming community generally has responded impressively to the challenge which the 1981 Act set them.

I welcome Patrick's support for my proposed initiative on conservation in the context of the EC Agricultural Structures legislation. Our agricultural policies should be more supportive of conservation objectives and the political benefits of this initiative will be substantial. Moreover, it would form an integral part of an updated policy for the countryside.

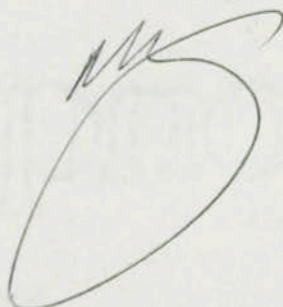
The losses of wildlife habitat since the war, to which Patrick refers, have been widely quoted, but I suspect that the rate of loss has been considerably less since 1981 and we really must give the Act a reasonable time to prove itself fully. I can,

/however, support

however, support the three proposals for immediate action which he has suggested. On the first of these it is of course not for me to comment on the level of support to the Nature Conservancy Council or the Countryside Commission; but if we are to ensure that the voluntary approach is sustained, we must not starve these bodies of the necessary resources.

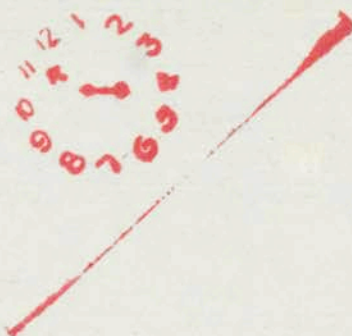
As to action in the longer term, I would be happy for officials to examine the possibility of changes in the financial arrangements for Management Agreements provided that we constrain this examination to changes which are consistent with the voluntary approach. Although I am less enthusiastic about the proposal for new "stop" powers, I can see advantage in asking officials to look carefully at the scope for extending the concept of Nature Conservation Orders to other appropriate parts of the countryside.

I am copying this minute to Willie Whitelaw, Geoffrey Howe, Peter Walker, George Younger, Nick Edwards, Patrick Jenkin, Norman Tebbit, Tom King, Peter Rees and Nicholas Ridley, and to Sir Robert Armstrong.



MICHAEL JOPLING
23 July 1984

12 1 2 3 4 5 6 7 8 9 10 11



hle ea

23 July 1984

ENVIRONMENT COUNCIL

The Prime Minister was grateful for your Secretary of State's note reporting on the Environment Council meeting on 28 June, which you sent me with your letter of 17 July. The Prime Minister has noted the position.

David Barclay

Andrew Allberry, Esq.,
Department of the Environment.

20



① About Policy Unit
② b/f for wife born

Prime Minister

ENVIRONMENTAL POLLUTION: AGRICULTURE AND CONSERVATION

The attached paper by officials follows the meeting you chaired on 17 May.

The pace of change in the countryside has quickened in recent decades. Since 1940 about 80% of the plant-rich lowland grasslands, half of the ancient lowland woods and the fens, and one third of semi-natural upland grasslands and heaths have been transformed by modern agriculture and forestry. Responsible bodies like the Nature Conservancy Council now argue that there is so little of the most vulnerable and important traditional types of countryside left that virtually all the remnants have to be safeguarded.

The 1981 Wildlife and Countryside Act was a major step forward, and has brought some real successes. But the present balance is a fragile one, and there have been mounting pressures for tighter legislative controls. If we fail to maintain the balanced principle of voluntary co-operation between farmers and conservationists the political costs could be very high.

In the past, the Common Agricultural Policy has provided substantial incentives, for example, to convert grazing land into arable and to drain wetlands to grow surplus cereals. This pressure has fuelled the changes in the countryside to which many people (there are over 3m members of voluntary conservation organisations) now object, and has led to increased costs of management agreements, which can now amount to hundreds of pounds per acre in compensation for lost profits.

I am therefore immensely encouraged by Michael Jopling's proposals for changes in the EEC Agricultural Structures Regulations which would broaden the basis for support and allow us to pay grant to encourage farming of a type which fits in with the interests of conservation, rather than the simple pursuit of increased agricultural production. As a long term shift in policy I am convinced that presentationally and politically this must be right: and would be infinitely preferable to being forced towards a general regime of detailed planning controls in the countryside which would be impossible to police and immensely unpopular with many of our supporters.



I believe that we should press strongly in Brussels for these changes. But in the short term we also need to take some actions to ensure that the implementation of the Wildlife and Countryside Act does not break down. In my view we must:

- a) ensure that the Nature Conservancy Council and the Countryside Commission have enough money and staff to press ahead with SSSI renotification and the completion of management agreements on threatened sites. Denial of these resources would undermine our present policy, and involve losing a number of major sites every year, with repeated public condemnation. We estimate that the extra costs here would rise to £20m a year over the next three years (paras 13-15 of paper);
- b) support an experimental scheme to grant-aid livestock farmers who agree to maintain traditional farming on the Broads, where there have been real problems (paras 16-17 and 34 of paper);
- c) support a Private Member's measure to block the loophole in Section 28 of the Act by eliminating the three months period in which the owner or occupier of a proposed SSSI can destroy important features of the site (para 11(i)).

In preparation for possible action on a somewhat longer timescale, I consider we should ask officials to examine the scope for:

- a) changing the financial regime for management agreements, possibly by removing compensation payments for Farm Improvement Grant and profits foregone (paras 26-7);
- b) introducing a back up "stop" power, to be used exceptionally where an owner or occupier either will not consider a management agreement, or threatens to hold us to ransom for an excessive cost (para 28(1)).



I would be grateful if we could discuss these issues at the earliest opportunity.

/ I am copying to Willie Whitelaw, Geoffrey Howe, Peter Walker, George Younger, Nick Edwards, Norman Tebbit, Tom King, Michael Jopling, Peter Rees and Nicholas Ridley, and to Sir Robert Armstrong.

Andrew Auzen

for P.J.
20 July 1984

(agreed by the Secretary of State, and signed in his absence).

CONQUEROR

ENVIRONMENTAL POLLUTION:
AGRICULTURE AND CONSERVATION:
PAPER BY DOE

INTRODUCTION

1. This paper has been prepared in consultation with other Departments following the meeting chaired by the Prime Minister on 17 May. At this meeting concern was expressed that there were deficiencies in the provisions of the Wildlife and Countryside Act for reconciling agriculture and conservation and that compensation provided under management agreements was excessive.

2. The paper describes the background to the present situation and:

(1) discusses the cost of future implementation of the Act and possible ways of reducing it;

(2) considers ways of remedying other alleged defects;

and (3) concludes by outlining the broad options for change.

3. Although the paper is addressed to "agriculture" and the environment, it is also relevant to forestry and other productive uses of open land which are affected by the provisions of the Wildlife and Countryside Act.

BACKGROUND

THE ACT AS IT STANDS

4. Part II of the 1981 Act is designed to give enhanced protection for important wildlife and countryside features whilst at the same time having regard for other interests in the countryside. It provides a framework for action to conserve areas of countryside important either for nature conservation or as landscape. The authorities primarily responsible for such action are the Nature Conservancy Council (NCC), which can "notify" Areas of Special Scientific Interest under the Act (SSSIs), and the National Park Authorities. The Act also gives local authorities new powers to further conservation and it extends the duties of the Agriculture Departments in conservation.

5. The underlying philosophy of Part II was that, in all but extreme circumstances, conservation should be pursued by agreement rather than by compulsory measures. The voluntary approach was justified on the following grounds:

(i) a major problem prior to the 1981 Act was ignorance of the existence and nature of SSSIs; if this were rectified, the farming community in general would voluntarily take a responsible attitude towards conservation;

(ii) change in the countryside was inevitable and not necessarily undesirable; what we needed was a system to facilitate its management, not its prevention;

(iii) compulsory measures would add to administrative costs and bureaucracy, and necessitate complex procedures;

(iv) most importantly effective conservation normally required some form of continuing positive management; this required the goodwill and participation of farmers and landowners.

6. To fulfil this approach the Act provides a framework within which conflicts in sensitive areas can be resolved. In general, this involves temporary restrictions to allow time for management agreements to be made whereby owners and occupiers of land forego the benefit of particular operations and improvements in return for being fully compensated. Once an SSSI has been notified under Section 28, owners and occupiers must give a three month period of notice during which operations cannot be carried out without the agreement of the NCC. This period can effectively be extended to as much as 12 months by a Nature Conservation Order (NCO) made by the Secretary of State under Section 29. No directly analogous provisions apply to landscape conservation, but Ministers have power under Section 42 to make orders relating to areas of moor or heath in National Parks. Such orders require notification of proposals to plough or otherwise convert the land to agricultural use and can have the effect of imposing a moratorium of up to 12 months on the proposed operation. Assurances were given during and after passage of the Bill that there was no intention of making any section 42 orders provided that the voluntary notification system subsisted and none has so far been necessary. In addition, in SSSIs, areas covered by NCOs, National Parks and other areas designated under the Act, farmers are obliged to give notice of applications

for farm capital grant and the Agriculture Minister must take into account any objections made by the conservation bodies before giving grant. In the event of refusal, a management agreement has to be offered. Should the offer of a management agreement be refused, the Nature Conservancy Council has powers under the legislation to compulsorily purchase the land as a nature reserve, but there are no similar powers available to local planning authorities for landscape conservation although they may seek an Article 4 Direction to withdraw permitted development rights under the Town and Country Planning General Development Order 1977 - such a Direction cannot however be used to prevent ploughing which does not constitute development ie planning permission for ploughing land is not required.

7. Analogous arrangements apply in relation to forestry grants and applications for felling permissions in SSSIs.

IMPLEMENTATION

Nature Conservation

8. The main action has been in the NCC's field. They have the task of renotifying under the Act all SSSIs, as well as notifying any new ones, in order to activate the conservation provisions applying to them. This process of notification has in turn led to the making of an increasing number of management agreements. Since the Act was passed 220 new SSSIs have been notified, and 880 renotified (some 20% of the total) and in all, about 6.3% of Great Britain is now so designated. Renotification will be substantially complete in 1986.

Landscape Conservation

9. There has been no similar need for extensive designation of landscape areas. The National Parks are well established, and limited additions only are contemplated to designated Areas of Outstanding Natural Beauty (although the Order designating the North Pennines and Clwydian AONB remain unconfirmed). There has in general been little pressure for management agreements in these areas. But a striking exception has been the Broads (neither a National Park nor an AONB) where there have been controversial proposals to drain grazing marshland and convert it to arable farming.

CRITICISMS OF THE ACT

10. Criticisms have come from two directions. Some see the approach via compensation for foregoing a damaging activity as inherently wrong, alleging that it is bound to encourage farmers to threaten to do things which they might not otherwise do. Others accept that this risk is inherent in the voluntary approach, but focus on both the collective and individual cost of management agreements; and express fears that sufficient resources will not be made available to maintain the principle of compensation so that we may fall between two stools: we may run up a considerable and recurring annual bill for compensation, then find the resources are not available and be forced, in time, to withhold the wherewithal so that authorities are obliged to refuse management agreement. Such an abandonment of the policy half way through would clearly create general acrimony.

11. Those who support the approach enshrined in the present Act make a number of further specific criticisms of its working, in particular:

(i) people can and so spoil existing and prospective SSSIs in the period of 3 months provided for discussion of a proposal to re-notify or notify them as such (11 cases have so far been identified, although only about half involved farming operations so that other land users are equally at fault - one celebrated case involved a golf club);

(ii) similar action can be taken while Ministers are considering whether to make NCO's (although no cases have so far been reported);

(iii) the procedures allow insufficient time to conclude management agreements: there is no sufficient sanction in the events of owners and occupiers being unwilling to conclude management agreements, or when unreasonably high prices are asked as eg on the Broads.

12. On the other hand, there has been criticism from farming interests that the procedure for SSSI notification affords no right of appeal and that the resulting restrictions can be onerous.

THE COSTS OF IMPLEMENTATION

13. Annex A assess the total future costs of implementing the Act assuming no constraint on financing of management agreements and no other change which would greatly alter the compensation payable under them. It is estimated that expenditure will rise from a baseline of less than £1m to between £15m and £20^m p.a. over 3 years. Over £12m of this will be spent by the NCC on management agreements following notification and renotification of SSSIs.

14. These estimates assume no substantial changes in real prices. Agreements can cost anything from less than £20 an acre per year to over £200. In one or two cases the total sums paid annually in profits foregone have been in hundreds of thousands.

15. The principal elements which give the incentive to changing farm operations (and which are reflected in compensation payments) are the patterns of relative prices and costs and developments in technology. For most major commodities there are market support guarantees under CAP, and in the absence of further changes in price relativities CAP will continue to encourage changes which are damaging to conservation. Lower prices may also induce attempts to increase output. The effect, of farm capital grant may likewise be damaging to conservation in some cases but in this respect its significance is dwarfed by CAP. The NCC calculate that exclusion of allowance for farm capital grant would reduce their compensation bill by only some 15%.

THE OPTIONS FOR REDUCING COSTS
AND/OR GETTING BETTER VALUE FOR MONEY

16. The UK has for years been in the forefront of efforts to restrain CAP price increases in products in surplus. However, it would be unrealistic to rely on future modifications of CAP for removal of price incentives to changes conflicting with conservation and attempts to increase farm output to nullify the effects of lower prices could be damaging. What does seem worthwhile is to explore the possibilities of making aid available to agriculture in ways which support conservation eg through conditional livestock headage payments. An experiment in an arrangement of this kind has been suggested for the Broads by a MAFF/DOE/Countryside Commission/Broads Authority working party. Such an approach would also develop further the conservation incentives to farmers which are currently a feature of capital grant schemes, and which were reinforced by changes to the schemes last year.

17. A rechanneling of aid on these lines would get better value for money and would help to reduce tension between conservationists and farmers. But there would be no net savings in public expenditure, and Community endorsement and involvement would be essential to any wider application. It is not therefore a short term option beyond setting up an experimental scheme.

POSSIBILITY OF RESTRAINING EXPENDITURE
INCREASES BY CASH LIMITS

18. Expenditure by the NCC and local authorities on management agreements could be contained at present baseline levels by cash limiting resources. This would represent a sharp change of policy from the embodied in the Act, which is effectively a demand - led policy: Ministers made clear during and after passage of the Act that where nature or landscape conservation considerations made it right to see a management agreement, those considerations and not a cash limit would be the deciding factor - that Parliament having willed the ends, the Government would provide the means. A price of a cash limit would be loss of good landscape particularly on the Broads. However, the more serious situation would be that the NCC would either be unable to go further with notifying or renotifying SSSIs or, if it did, to make management agreements in them. Thus of a total of 4,000 sites identified as meriting protection some 80% would be at risk, and a continuation could be expected, through loss of habitats, in the long term decline of native species of flora and fauna. While the extent of this decline in the past has been a matter of argument, there is no doubt that there has been a very marked one, especially in species dependent on lowland grasslands, heather, and wetlands.

19. A less severe cash limit, would mitigate the effect. Landscape on the Broads might be saved, but the decline in flora and fauna through loss of SSSIs would continue, though more slowly. It is unrealistic if this trend of decline is to be halted, to think in terms of half measures nor can the NCC with a current annual grant aid of the order of £15m be expected to find the cost of offsetting savings.

20. Any cash limit would signal, to farmers and to conservationists, the beginning of the end of the voluntary approach. There would be fears in the one camp of the introduction of planning controls without compensation (on the lines of listed buildings) and this could well induce farmers to destroy valuable conservation features in the meantime before such new legislation could be brought into effect. This would create a storm: the political costs in the short term would be high and pressure for a new policy very great.

POSSIBILITIES FOR REDUCING COMPENSATION PAYMENTS

21. The remaining possibilities for reducing expenditure all depend on reducing the compensation payable in individual cases. The main possibilities are as follows.

Introduction of Compulsion

22. The voluntary principle is itself liable to inflate compensation payments and the introduction of compulsory conservation measures would curb this effect. This is because some owners and occupiers may be unwilling to enter into management agreements unless paid well above the appropriate figure under the Financial Guidelines, and there is a risk of a ratchet effect in that the highest price negotiated in an area may become the going rate for later cases. (Compulsory arbitration on compensation only applies to disputed amounts where an agreement has to be offered following refusal of farm capital grant).

23. Although there is as yet no general evidence of inflated prices, and high prices per acre are inevitable in many lowland areas some form of compulsory back up powers to ensure conservation would curb excessive demands in individual cases. The reduction in liability would not be dramatic but might in the long term amount of say a 5-10% reduction in average prices and hence total public expenditure on management agreements.

Alteration of Compensation Code

24. A more dramatic alternative is to reduce compensation entitlements payable under management agreements. This can be done without new legislation by Ministers publishing fresh guidance under the terms of Section 50(2) of the Act: no Parliamentary procedure is involved. General points to be borne in mind in contemplating such changes are:

(1) they would breach undertakings given during Bill proceedings, and reflected in the present Financial Guidelines to compensate fully for any financial disadvantages arising from conservation restrictions;

(2) a reduction in compensation would necessitate backing up the voluntary approach with compulsion as few people will forego the benefit of changes without corresponding compensation;

- (3) there would be a major loss of goodwill and cooperation, and problems of evasion;
- (4) low income farmers would in some cases suffer hardship and even go out of business.

25. The individual possibilities for reducing compensation entitlements are set out in Annex B with comment and estimated savings. Dramatic savings could be achieved without legislation only by setting standard amounts per acre well below a full compensation rate. Even more drastic measures such as abolishing compensation altogether or abolishing it outside the Less Favoured Areas would need a new Bill.

26. Significant but not dramatic savings (of the order of 15%) might be achieved by excluding from compensation payments allowance for any farm capital grant which might have been payable for the improvement foregone. This would be associated with removing the statutory obligation to offer a management agreement following a refusal of grant on compensation grounds.

27. The option of annual compensation payments on the basis of profits for gone could be removed by revision of the Financial Guidelines without legislation but no significant savings would be expected. A considerable drawback would be a build up of commitments to capital payments of the order of £200m or more over the next 3 to 4 years. Such a change would, however, remove the present criticism of agreements running for 20 years with an open-ended financial commitment and would be more defensible to the public.

OPTIONS FOR AMENDING THE ACT

28. Apart from the options for reducing compensation entitlements, there are issues of legislative change which fall to be considered in their own right. There is an obvious connection in these between introduction of more compulsory powers and reductions in cost. Two principal packages as options are:

- (1) measures that (a) impose a "stop" notice on potentially damaging operations from the moment the NCC informs an owner or occupier of prospective notification or re-notification of an area of scientific interest; (b) likewise apply a "stop" notice procedure where a Nature Conservation Order is under consideration; and (c) slightly lengthen the period of application of the latter;

(2) in addition to the above a full-blooded compulsory procedure to be used as a long-stop for conserving sites by way of nature or landscape conservation orders which imposed permanent restrictions on notifiable operations (with Compensation); this could be supplemented by a power of compulsory purchase in landscape as well as nature conservation cases where such an order appeared inadequate to ensure conservation. This might enable costs to be somewhat lower than under option (1);

(3) to refine option (2) by removing the requirement for payment of Compensation so reducing costs to the minimum.

29. The first package of changes would not in itself raise the general issue of departure from the voluntary approach and could be represented as no more than tightening up the existing regime. However, farmers' objections to absence of appeal against notification of SSSIs would be reinforced, and others might seize the occasion to press for more drastic changes.

30. The second package would represent a major departure from the voluntary approach and would be controversial. There could be demands for a right to appeal against refusals of consent under conservation orders. However, if understood as a last resort procedure in important cases whether either the owner had no interest in a management agreement or where an authority were being asked an excessive price, it would be easier to justify a conservation order procedure of this kind. A power of compulsory purchase might also be justified for key sites which need to be acquired to ensure positive management to preserve their quality.

31. The controversiality of the second package would be greatly increased if associated with reduction in compensation, even more so if there were to be no Compensation as in the third package.

SUMMATION OF OPTIONS

32. It is first necessary to consider whether a future total compensation bill of £15m to £20m a year is of an order to warrant drastic action to abate it. If it is so concluded the possibilities lie in either or both of the following options:

(1) effective abandonment of present policy by way of severe cash limiting of funds for conservation and acceptance of the vociferous and sustained public opposition to loss of SSSIs and some good landscape with its implications;

and (2) substantial curtailment of compensation entitlements with a resulting need to a resort to compulsion to ensure conservation of SSSIs etc.

33. If it is concluded that the total bill is not so serious as to warrant drastic action, it is appropriate to consider whether it would be right to:

(1) provide a back up power of compulsion to discourage excessive demands for compensation (possible benefit a reduction of 5-10% in average amounts payable);

and/ or (2) eliminating farm capital grant as an element in calculating compensation (possible benefit a reduction of 15% in average amounts payable).

It must however be emphasised that these estimates of savings (some 20% plus in all) are tentative in character.

34. In addition, there is an immediate need to launch on the Broads an experimental scheme of rechanneling funds into a form of positive aid to conservation oriented farming. This will introduce headage payments which will have the effect of reducing the Compensation payable under management agreements (with some savings in total costs likely if the experiment is successful and extended to cover a 20 year period). This approach has much to commend it and will enable the effects of designation as a Less Favoured Area to be tested. This must be done urgently if the present fragile and temporary holding operation in the Halvergate area is to subsist for more than a few weeks longer.

ASSESSMENT OF POTENTIAL COST
OF IMPLEMENTING THE ACT

1. The process of notification and renotification of SSSIs is liable to trigger off negotiations for management agreements, usually in the form of agreements for annual payments for 20 years. Thus assuming availability of funds and no change in the present arrangements a continual stepping up of the total volume of annual payments can be expected over the next 3/4 years as the remaining 80% of SSSI areas are renotified (and certain new ones are notified). Already agreements made or in prospect entail commitments of the order of £2m a year, and on the basis of the NCC's Corporate Plan it is assessed that these by 1987/8 will exceed £12m given the 5 times wider coverage of SSSIs which will have been achieved by then. This contrasts with a current baseline allocation of less than £0.5m.

2. The prospects relating to National Parks and other areas of landscape value are less serious. Few management agreements have so far been made, though this may be due in part to the reluctance of authorities to incur commitments (Park authorities pay 25% of cost except in Exmoor where the authority pays only 10%; the rest is Government money). Last year the Countryside Commission were allocated some £200,000 for grant aiding the first year's cost of management agreements, but under £60,000 was spent. However, there are an increasing number of agreements in the pipeline and in the case of the Broads commitments are being made which are likely to rise in 3 years to a total of £0.5m per year. There is no financial provision for any such increase.

3. It seems reasonable to assume that by 3 years from now authorities in the National Parks and other landscape areas will have incurred annual commitments amounting to £3m at least and given the expectation that the NCC's total commitments will exceed £12m, total expenditure on agreements will be in the range of £15-20m contrasting with a current baseline of less than £1m (allowing for both the NCC and Park and other local authorities).

4. This increase is in striking contrast to the implication of the Financial Memorandum accompanying the Bill in the 1981 Act.

This took the view that its effect would be largely neutral, with an increase of only £0.6 to £0.7m a year for safeguarding expenditure by the NCC, and no increase at all in spending on landscape conservation.

5. Some further increase in costs may arise beyond the end of 5 years from now as some new agreements will be made, but with few additional SSSI notifications in prospect, and no new major additions in prospect to areas identified for landscape protection, the increase can then be expected to flatten out.

POSSIBLE ALTERATIONS TO COMPENSATION CODE

THE STATUS QUO

1. Most of the relevant provisions are set out in DOE and MAFF Circular 4/83 'Financial Guidelines'. These are issued under section 50 of the 1981 Act. They apply in particular to management agreements which are mandatory in the sense of having to be offered following a refusal of farm capital grant on conservation grounds under either section 32 or 41 of the 1971 Act. In effect however they also apply to management agreements made in other circumstances since they establish a going rate for compensation.

2. Although the compensation code is not in terms prescribed, the implication of section 50 when taken with 32 and 41 is that any compensation paid will assume that farm capital grant would have been payable for the works which are to be restrained under the agreement concerned. In addition, section 29 of the Act makes provision for compensation for diminution of land value (as well as for other loss) attributable to the restrictions imposed by a nature conservation order. There is however no compensation for the restricting effect of SSSI notifications, these under the Act as it stands being subject to not less than 3 months notice.

POSSIBLE CHANGES

3. If changes to the Act are made as proposed in Annex C so as to provide for permanent and compulsory restrictions on specified operations and works, consequential alterations would in any event be necessary to provide for compensation on the assumption of the continuance of the broad principle that no one should be out of pocket because of restrictions imposed for conservation reasons. Thus there would have to be provision for loss of land values attributable to restrictions, and abortive expenditure or other loss, with the possible alternative of annual payments representing profits foregone.

THE OPTIONS

4. If however it is proposed to abandon or modify this central principle other amendments to the Act (and Guidelines) would be needed, and the following possibilities in more or less increasing order of severity fall to be considered:

(1) In the case of owner occupiers abolish option of compensation on the basis of profits foregone, and confine to compensation for loss of capital value (and abortive expenditure etc); in the case of tenant farmers abolish after 5 years.

Comment

This would abolish a political bete noire of critics of the Act, the concept of paying people profits that they have not earned. It would not however necessarily save money as in the long run there should be on average no significant difference between the effects of the 2 compensation formulae. There would also be a short term PESC disadvantage as there would be an immediate rise in the total of payments paid; assuming capital compensation in lieu of paying profits foregone a total sum of the order of £200m would probably be payable over the next 3/4 years.

Abolition of annual payments to tenants would cause particular difficulties. The conservation authority would naturally be unwilling to pay a capital sum to a tenant for an agreement which it could not enforce should the tenancy be terminated. The management agreement would have to be made with the landlord and be enforced via a covenant to the tenancy agreement agreed between landlord and tenant. The capital sum would be paid to the landlord and the tenant reimbursed on an annual basis through a reduction in rent. There are likely to be considerable uncertainties relating to the extent to which the tenant will be compensated during the lifetime of the agreement particularly if the initial rent was low and the profit foregone high. Tenants may therefore be much less willing to participate in such agreements than they are to enter into agreements directly with the conservation authority under the present rules.

(2) Provide that no allowance shall be made for payment of farm capital grant when determining sums payable under management agreements, and as proposed in Annex C remove the obligation on the NCC and local authorities to offer management agreements when grants are refused on conservation grounds.

Comment

It is repugnant to many people that farmers should have not only to be compensated for foregoing the benefit of improvements damaging to conservation but that they should also have paid in compensation a sum equivalent to grant. The alternative assumption would be that, if it is right on conservation grounds to refuse grant for improvements, it is right that any management agreement subsequently made should assume that works objectionable on conservation grounds are not eligible for grant.

Against this it may be argued that it is wider principle of land compensation to allow for the effect of grants which would have been payable but for the compensatable event. It is important moreover not to exaggerate the financial relief which might come from such a change. While no firm calculations are possible, the NCC tentatively estimate in their case that the effect would be to reduce total amounts payable by some 15%. This would represent a public expenditure saving of the order of £2.5m - £3m a year in 5 years time (on the forecast expenditure of £15-20M).

(3) Abolish compensation altogether for certain specific items of expenditure such as land drainage works, removal of trees other than trees forming part of an area of woodland, and removal of hedgerows.

Comment

This would strike in a simple way at some of the actions most damaging to conservation, but the choice of items could look arbitrary and the financial effect on individuals would be onerous. Public expenditure

savings would depend on the items chosen but would be in the range of £3m-10m a year.

(4) Abolish compensation altogether outside areas designed as Less Favoured Areas under EC Agricultural Structures Legislation; provide for a purchase notice procedure whereby anyone with an interest in land outside such areas could serve on the NCC or local authority, as appropriate, a notice requiring the purchase of that interest on the grounds that by virtue of the restrictions imposed it was (when taken together with any other land in the same agricultural unit) incapable of beneficial use in its existing state; disputed cases could go to Ministers. Compensation would exclude allowance for the benefit of improvements or other actions prohibited.

Comment

This would obviously be highly controversial and would inflict substantial losses of capital value on owners of land as well as (in the absence of transitional provisions) on tenant farmers. However, exemption of the Less Favoured Areas would remove the main tranche of hardship cases while the financial burden of compensation in expensive lowland areas would be removed. The purchase notice procedure would provide a safety net but would be likely to result in a fairly substantial increase in holdings of publicly owned land. Public expenditure savings would be substantial, in the range of £10m-£15m a year (in 5 years time).

(5) A variant of this option would be to allow for compensation outside the Less Favoured Areas but base it on standard payments per acre for land in particular areas. These payments would be deliberately set below full compensation levels.

Comment

Such a system would cut back some of the more expensive payments in prospect but would be essentially arbitrary. Public expenditure savings would depend on the level of payments set, but it would not be feasible to look for eventual savings of more than £5m a year if glaring disparities were to be avoided between amounts paid and profits foregone.

(6) The extreme options would be to abolish compensation altogether, saving the forecast £15m-20m a year, but causing serious individual hardship in some cases, and largely destroying goodwill towards conservation in the farming community.

Comment

The policing of the countryside which would be necessary to prevent damage to nature conservation and landscape interests and to invoke compulsory powers would involve the creation of a huge new bureaucracy. Voluntary bodies could be expected to set up squads of vigilantes, a potential recipe for conflict.



CC DP
Prime Minister

12 MARSHAM STREET

LONDON SW1P 3EB

01-212 3434

My ref:

Your ref:

17 July 1984

To note.

~~18/7~~

sent
18/7

ms

Dear David,

Further to my letter of 11 July, I now enclose a note prepared for my Secretary of State which reports on the Environment Council at Luxembourg on 28 June. As you know, Mr Waldegrave attended this immediately after the Munich Air Pollution Conference.

I am again copying this letter to the Private Secretaries to the Lord President of the Council, the Secretaries of State for Foreign and Commonwealth Affairs, Energy, Scotland, Wales, Trade and Industry, Employment and Transport, the Minister of Agriculture, the Chief Secretary and the Secretary of the Cabinet.

Yours,

Andrew

A C ALLBERRY
Private Secretary

David Barclay Esq

ENVIRONMENT COUNCIL, 28 JUNE 1984

The Environment Council at Luxembourg on 28 June went well for the UK.

On unleaded petrol, our initiative a year ago bore fruit at this meeting, when the Council agreed that unleaded petrol should be introduced throughout the Community not later than 1989. This is entirely in accord with our own proposals. Urgent work will now proceed on the outstanding questions on octane ratings, together with further work on other vehicle emissions.

The draft Directive on emissions from large combustion plants was given a brief initial discussion, which showed that several of our partners share our own worries about the heavy costs of the proposals as they stand. The draft will now be remitted to a working group for detailed study.

The Council agreed to two Directives on terms satisfactory to the UK; one on a community-wide system of supervision and control of the trans-frontier shipment of hazardous waste, which will come into force in October 1985; and one on the disposal to water of the pesticide Hexachlorocyclohexane, more familiarly known as Lindane.

A draft directive on air quality standards for Nitrogen Dioxide was also brought very near agreement on a basis acceptable to us.

Acid Rain Pt 2



Await further
letter from DSE.
Prime Minister (4) Dub
to note. 11/2

CCDP

2 MARSHAM STREET
LONDON SW1P 3EB

01-212 3434

My ref:

Your ref:

11 July 1984

Dear David

My Secretary of State thought that the Prime Minister might be interested to see the attached report which Mr Waldegrave made to him on the Munich Air Pollution Conference at the end of last month.

I am sending copies of this letter and of the report to the Private Secretaries to the Lord President of the Council, the Secretaries of State for Foreign and Commonwealth Affairs, Energy, Scotland, Wales, Trade and Industry, Employment and Transport, the Minister of Agriculture, the Chief Secretary and the Secretary of the Cabinet.

Yours,

Andrew

A C ALLBERRY
Private Secretary

David Barclay Esq

Secretary of State

MUNICH AIR POLLUTION CONFERENCE, 24-27 JUNE

1. You will wish to have a formal report from me as Leader of the UK delegation for this conference.

2. Thirty one member countries of the Economic Commission for Europe were represented, virtually all by Ministers. The ECE Secretariat, the EC Commission, the United Nations Environment Programme, the OECD and some non-governmental environment bodies were also represented.

3. The major document before the Conference was a draft resolution, the key feature of which was an operative paragraph on reduction of total annual national Sulphur Dioxide (SO₂) emissions. The FRG, supported by those countries which had already committed themselves to a reduction of 30% in total annual SO₂ emissions by 1993 or 1995 on the 1980 base, pressed strongly for all countries present to agree to such a commitment, and three further western countries (Belgium, Luxembourg and Liechtenstein) did so.

4. We made it clear that the UK expected to secure further substantial reductions of SO₂ emissions (beyond the 37% already achieved since 1970) and of NO_x emissions within a reasonable timescale, but that ^{we} were unable to enter into a specific commitment to reduce emissions by a precise percentage by a specified date. I attach a copy of my concluding statement. The USA, Italy, Spain and some other

.../ctd...

western countries were also unable to undertake specific commitments.

5. The USSR and some of its allies announced that, by 1993, they would seek to make 30% reductions in transboundary fluxes of SO₂ over their western borders. This is much less onerous than a commitment to reduce ^{total} emissions, but it brought the USSR some credit, not least from the Press who may not have appreciated the distinction between this formula and that of the "30% club". But, significantly, the eastern countries were not prepared to translate these statements into a specific commitment.

6. The Conference resolution, which was adopted by acclamation, reconciled these differing positions by agreeing that the Executive Body of the ECE Convention should, at its meeting in September, "adopt a proposal for a specific agreement on the reduction of annual national sulphur emissions or their transboundary fluxes by 1993 at the latest".

Agreement was also reached on paragraphs calling for a reduction in emissions or transboundary fluxes of NO_x, on the development of technically available and economically feasible strategies to reduce pollution from motor vehicles, on the need to take account of the relationship of hydrocarbons (HC) to the problem of trans-frontier pollution, and on a wide range of scientific and technical activities designed to improve monitoring, enhance understanding of the transport, deposition and effects of pollution and improve methods of abatement.

.../3...

.../ctd..

7. The atmosphere of the Conference was cordial throughout, and, contrary to the impression given by the London press, the UK was at no time isolated in its resistance to a specific commitment on reduction of SO₂ emissions. The FRG and the Scandinavians were naturally disappointed by the position we took, but they made no public reference to this and indeed the Norwegian Minister went out of her way to dissociate herself from some of the stories put about by journalists. Nor was the Press picture of embarrassment because of my absence for part of the time any closer to reality. Several other Ministers were present for only part of the time; and neither our FRG hosts nor any other delegation made any reference to this point, either to me personally or to any of my officials.

8. I have no doubt that the pressure for specific commitments will continue and indeed increase. In particular, the '30%' countries will return to the charge in the Executive Body in September. The pressure will be the greater if the eastern bloc is then prepared to enter into a formal commitment to reduce transboundary fluxes of SO₂ by specific amounts in the setting of the Convention. I am satisfied that we were tactically right to defer, for the time being, announcements of any numerical aim on the part of the UK.

H. Bondes.

WILLIAM WALDEGRAVE (approved by the Minister and signed in his absence)
6 July 1984

CC: PS/Sir Peter Harrop
Dr Holdgate
Mr Rutterford
Mr Burgess
Miss McConnell

Statement by Mr. William Waldegrave, Head of the British Delegation, to closing session of the Munich Conference, Wednesday 27 June 1984

The British delegation would like to give a warm welcome to the conclusions of this Conference. A very considerable part of the international community has shown itself capable of making steady progress on the problem of air pollution. We have not allowed the inevitable differences in the particular situations we face, and which must have some impact on national policies, particularly in the short term, to overshadow the more important fact that we are agreed that further progress must be made.

It is this more important area of agreement that I should like to emphasise, so that we do not leave behind us a misleading impression. It was never I fear going to be possible for us all to agree here and now to one single number or date for progress on each main pollutant. Perhaps that has caused a little disappointment but any disappointment should be seen against the very powerful new impetus this Conference has given to the work of the ECE Convention. And in Britain's case we have difficulty with only one thing: immediate adoption, on top of the nearly 20 % reduction made before 1980 in SO₂ emissions - of a binding commitment to a 30 % drop by 1993. But we are saying 'yes' to further substantial SO₂ reductions in a reasonable timescale; 'yes' to parallel NO_x reductions; 'yes' to a European-wide onslaught on pollutants from motor car exhausts; 'yes' to further strengthening of scientific work and monitoring within the ECE Convention and in other contexts; and above all 'yes' to an international agreement itself. The initiative and commitment of the Federal Republic, backed by the additional hospitality of the Bavarian Government, has made possible the timely affirmation of new commitments by all of us; we will look back on the Munich Conference as an important step forward, perhaps a turning point in our collective endeavours in the field of clean air.

cedp

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
WHITEHALL PLACE, LONDON SW1A 2HH



From the Minister

nbpm
DWB
3/7

The Rt Hon Patrick Jenkin MP
Secretary of State for the Environment
2 Marsham Street
London SW1P 3EB

2 July 1984

Thank you for your letter of 22 June in response to mine of 14 June, about UK Environmental Achievements. I have also seen a copy of yours of 18 June to Nicholas Ridley.

I fear I am still left with the impression that you have not fully appreciated the very real changes which we have made in the past few years in order to achieve the right balance between agriculture and conservation. I am equally concerned at the impression which your letters give that the 1981 Act will be largely ineffective in achieving its intended goals. There is very little evidence that this is the case; indeed, it would be surprising if there were, given the fact that it has been in full operation for less than two years. Perhaps more significantly, I am worried by the absence of any real recognition of the increasingly important role which farmers themselves are playing in furthering conservation, often at considerable personal cost, and the fact that effective conservation cannot be achieved other than through the full co-operation and active participation of the farming industry.

By all means let us consider ways of improving the operation of the 1981 Act. I am also, as I indicated in my earlier letter, looking at the possibility of including in the EC's agricultural structures directives a provision to safeguard areas of

/environmental

Environmental Affairs P.2 ACIDRAIN

environmental importance. I do however hope you will agree that our consideration of these issues should be based on what is currently happening, rather than on what has happened in the past, and on what is likely to represent the most effective means of encouraging farmers to pursue desirable conservation objectives.

I shall be writing round separately on Nicholas Ridley's suggestion of an initiative in Europe to take land out of farming.

I am copying this letter as before, to the Prime Minister, Cabinet colleagues, the Chief Whip and Sir Robert Armstrong.

James Ewart
Michael

MICHAEL JOPLING



nbpm. Sfs / Sottad has spoken
to Mr Walker & persuaded him
to let the announcement go ahead.

Dms
26/6

PRIME MINISTER

INCIDENCE OF LEUKAEMIA IN BONNYBRIDGE/DENNY AREA

Although the Re-Chem Factory at Bonnybridge is not directly the concern of my Department, I have serious doubts about the proposal that George Younger has put to you for a review of health statistics in the area.

The causes of leukaemia and the reasons for the variations in its local incidence are not fully understood. It seems unlikely that a medical inquiry into selective evidence about a specific local variation will be able to come to any clear conclusion about its cause.

I think it would be most unfortunate if, following the Black Inquiry which is now looking into the incidence of leukaemia around Sellafield, there was to be a proliferation of inquiries focussing on other industrial plants where allegations have been made. The setting up of such an inquiry is bound to do immense damage to the public image of the organisation concerned, which is unlikely to be counter-balanced, for the reasons above, in the final report.

I am also concerned, more specifically, that this inquiry would give rise to renewed pressure for investigation into allegations that Sellafield has given rise to excess cancer rates in the West of Scotland, or into the incidence of leukaemia around other nuclear sites.

I would much prefer to wait and see what Black concludes about the variation in leukaemia incidence that he is investigating, including recommendations that he may have for further research, before committing ourselves to this new inquiry. It may well be that what is needed is a systematic examination of the variations in local leukaemia incidence throughout the UK rather than more selective studies.

I am copying this to the recipients of George Younger's minute.

SECRETARY OF STATE FOR ENERGY

26 June 1984

Env. Affairs : Acid Rain #2.



TO: [Illegible]



cc DP

2 MARSHAM STREET
LONDON SW1P 3EB
01-212 3434

n bpm
JMB
25/6

My ref:

Your ref:

22 June 1984

Dear Michael,

Many thanks for your letter of 14 June about our booklet UK Environmental Achievements.

I note your view, shared by others, that we did not in this booklet make enough of our achievements in protecting wildlife and the countryside, and indeed I am happy to look for future opportunities, as you suggest, for getting our story across. I sympathise with your views on the unbalanced nature of some of the criticisms of our policies, and I agree entirely on the credit due for the efforts being made to reduce the excesses of CAP.

But we must also not be complacent. Of course it would be absurd for conservation reasons to try to stifle general progress and development in agriculture. As you say, the landscape which so many are keen to conserve today is itself the product of past changes in practice. But there are none the less grounds for concern. A lot of the change now taking place has a pace and scale not experienced in the past. Much of the charm of British landscape lies in its variety. This applies both to richer lowland country with hedge and copse and to wider areas of heath and moor in the uplands. It is this variety which is often at risk with current changes. Further, there can be no doubt that since the war there has been extensive destruction of wildlife habitats in this country with resulting loss of fauna and flora. We cannot afford to discover five years on that the Wildlife and Countryside Act has not curbed this destructive trend.

For all these reasons we need to take an early relook at the Act and the way it is working. Hence the importance of the discussion we are shortly to have with the Prime Minister on the basis of a paper which our officials are currently working up. Hence also the value of following up Nicholas Ridley's helpful suggestion of an initiative in Europe to take land out of intensive farming and thus serve the two objectives of reducing agricultural surplusses and conserving countryside.

I am copying this letter to the Prime Minister, Cabinet colleagues, the Chief Whip and Sir Robert Armstrong.

Your ever
Patrick

PATRICK JENKIN

Environmental Affairs Pt 2

Acid Rain

25 JUN 1984



Joe VC.
C. DIN. MAFF
WO. CO.
DOE
DHSS
DTI

10 DOWNING STREET

From the Private Secretary

22 June 1984

The Prime Minister has considered your Secretary of State's minute of 21 June, in which he proposed to set up a non-statutory independent review of the evidence of the incidence of leukaemia and related disorders in the Bonnybridge/Denny area.

Subject to the views of colleagues, the Prime Minister is content for your Secretary of State to proceed to establish such an inquiry.

I am sending copies of this letter to the Private Secretaries to recipients of your Secretary of State's minute.

(David Barclay)

John Graham, Esq.,
Scottish Office.

6



PRIME MINISTER

SCOTTISH OFFICE
WHITEHALL, LONDON SW1A 2AU

Prime Minister (1)

Agree, subject to colleagues?

2/16
21/6

Yes
mt

INCIDENCE OF LEUKAEMIA IN BONNYBRIDGE/DENNY AREA

I should be glad to have your approval to set up a non-statutory independent review of the evidence of the incidence of leukaemia and related disorders in the Bonnybridge/Denny area of Central Scotland, and of any other relevant information. You will be specially interested in this in view of the considerations which were discussed at the meeting after Cabinet on 17 May. [Environmental Pollution]

2. There has recently been considerable publicity in Scotland about the processes being undertaken at a factory in Bonnybridge owned by Re-Chem International which undertakes the processing of certain highly toxic chemicals. I understand that the company also has factories in Southampton and Pontypool each carrying out similar processes. It has been alleged, so far without any evidence to support such claims, that animal health and the environment generally have been adversely affected by the activities at the Bonnybridge factory. The latest claims have been that there are now hazards to human health and Dennis Canavan has put down five Parliamentary Questions for priority written reply seeking information about the incidence of leukaemia and related disorders in the Bonnybridge/Denny area: John MacKay has promised to write him with this information, and to publish his reply.

3. The statistics which have now been produced give cause for some concern. Although the populations in question are small, and the numbers of blood-related cancers which have been identified are consequently also very small, the registration rate for these disorders has increased in recent years. If the statistics are published in response to Parliamentary Questions, I believe that they will receive sensational publicity from some of the Scottish newspapers which have been campaigning against the Re-Chem factory. I do not think therefore that it will be possible to publish these figures without some assurance that their significance will be assessed by an independent body, and it is for this reason that I intend to announce the proposed independent review.

4. I am very conscious of the need to forestall any public pressure for action to be taken against the Re-Chem plant since the evidence so far available does not entitle us to assume that it is causing any of the troubles suspected or alleged in the Bonnybridge area. (HM Industrial Pollution Inspectorate have been pressing Re-Chem to reduce their emissions of ash and dust, but this is a separate issue.) The terms of reference which I propose for the review would not therefore include any mention of the Re-Chem factory, though it will no doubt be assumed in some quarters that the institution of the review amounts to an indictment of the factory. I would make it clear however that I regard this as the only responsible way in which to check whether there is any evidence of hazard to public health.

5. I propose that the review should be conducted under the chairmanship of Professor John Lenihan who recently retired as Professor of Clinical Physics at Glasgow University and that its terms of reference should be:

"To review any unusual features of morbidity recorded in the Bonnybridge/Denny area and in the surrounding district; to report on the significance of any abnormal findings and on any other relevant information that is available; and to advise whether further studies are required."

The membership of the review would be announced after consultation with the chairman, but I have in mind to include relevant medical, veterinary and environmental expertise so that the agricultural and environmental aspects can also be considered. I would ask for a report within 4-6 months, on the understanding that this might indicate the need for further work. I am anxious, if at all possible, to announce the setting up of the inquiry on 26 June when we shall be writing to Dennis Canavan in reply to his five Parliamentary Questions.

6. I am copying this minute to Peter Walker, Nick Edwards, Patrick Jenkin, Norman Fowler, Norman Tebbit, and Michael Jopling for their respective interests and also to Sir Robert Armstrong.

G.Y.

G.Y.

21 June 1984

CONFIDENTIAL



10 DOWNING STREET

From the Private Secretary

20 June 1984

Dear John,

Acid Deposition

The Prime Minister chaired a meeting on 19 June to consider the Government's policy towards acid deposition. In addition to your Secretary of State, those present were the Lord President, the Secretaries of State for Energy, Scotland, Wales, Transport, Mr. Gummer, Mr. Hayhoe, Mrs. Fenner, Mr. Baker, Mr. Rifkind, Mr. Waldegrave and Sir Robert Armstrong, Mr. Gregson and Dr. Nicolson and Mr. Pascall (No.10 Policy Unit). The papers before the meeting were your Secretary of State's minute to the Prime Minister of 15 June, and the Energy Secretary's minute of the same date.

Introducing his paper your Secretary of State said that at an earlier meeting Ministers had agreed on the need for a more positive approach towards acid deposition. This view had been reaffirmed at the London Summit. Following the valuable technical presentation which had taken place at Chequers, he was now putting forward a revised set of proposals which he believed constituted a positive and coherent response to our international critics. It was in his judgment a line that could be held successfully, even though it fell a long way short of the more extreme demands being made. The main features of his proposals were:

- i) A continuing commitment to research and to the development of new cost effective technology.
- ii) A statement of intent to reduce further emissions of both sulphur dioxide and nitrogen oxide, aiming at a reduction in each of 30 per cent by the year 2000 as compared with 1980 levels.
- iii) The introduction of tighter standards for vehicle emissions, provided these were achieved through lean burn technology rather than three-way catalysts.

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In discussion it was argued that considerable uncertainty attached to the forecast that 30 per cent reductions in SO2 and NOX emissions could be achieved by the year 2000 without significant additional expenditure. This forecast depended upon assumptions about the commissioning of new nuclear power stations which were, in the view of some Ministers, optimistic. Moreover, the environmental lobby regarded nuclear power with as much antipathy as they regarded acid rain. They would continue to press European Governments for flue gas desulphurisation.

The other area of uncertainty was the future level of emissions from industry other than the CEGB. Arguably the substantial reduction which had occurred in the early 1980s was a fortuitous result of the recession, which would gradually be reversed as economic growth resumed. On the other hand, the reduction also reflected structural changes in British industry which were in effect irreversible (for example, the contraction of the steel industry); and further technological developments which would benefit emissions, such as the use of fluidised bed combustion, were imminent. Concern was however expressed about the possible impact on industrial costs if target reductions did not materialise as expected but had to be achieved by other means.

In further discussion, firm support was expressed for "lean burn" technology as a means of reducing vehicle emissions. The consensus view was that when properly tuned lean burn engines could both reduce emissions and improve fuel economy; and British motor manufacturers favoured its introduction. It was widely agreed that the alternative approach using three-way catalysts on the American model was both less effective in controlling pollution, and vastly more expensive.

In discussion of the question of quantification, support was expressed for the concept of "aims" rather than commitments. Despite international criticism of the UK (much of which was ill informed), it was important not to move any faster than our industrial competitors towards implementation of improved environmental standards.

Summing up the discussion, the Prime Minister said that the meeting supported the main features of your Secretary of State's analysis and proposals. They offered the prospect of a positive and flexible response to international pressure. We should take credit for the benefits which would flow from the adoption of lean burn, and from the inclusion of NOX and hydrocarbons as well as sulphur dioxide in the package. The conclusions set out in paragraph 19 of your Secretary of State's paper were accordingly approved, subject to the following points:-

- i) The deletion of the words "at least" from the

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- i) The deletion of the words "at least" from the last line of sub-paragraph (b).
- ii) The deletion of the last three lines of sub-paragraph (d).
- iii) The insertion of a specific reference to lean burn in sub-paragraph (e).

I am sending copies of this letter to those who attended the meeting.

Yours ever,

David

John Ballard Esq
Department of the Environment



bcc: CO

10 DOWNING STREET

From the Private Secretary

20 June, 1984

Dear John,

I enclose a copy of a letter recording the Prime Minister's meeting yesterday on the subject of acid disposition.

Since the meeting record is being circulated widely, I am recording separately in this letter the following presentational point. The meeting recognised that there could, in due course, be advantage for the Government in drawing public attention to the relationship between reductions in sulphurdioxide and nitric oxide emissions on the one hand, and increased nuclear power generation on the other. But it was agreed that it would be a mistake to refer to this point at the present time, because of its sensitivity in relation to the coal dispute. The Prime Minister invited your Ministers to be guided accordingly in presenting the Government's policy both internationally and domestically.

I am sending copies of this letter to Janet Lewis-Jones (Lord President's Office) and Michael Reidy (Department of Energy).

*Yours ever,
David*DAVID BARCLAY

John Ballard, Esq.,
Department of the Environment

MR BARCLAY

18 June 1984

ACID DEPOSITION

Patrick Jenkin's proposals on acid rain and on vehicle emissions are a balanced attack on air pollution and should be supported.

Acid Rain

In view of the scientific uncertainties, it is unacceptable to spend significant sums of money on modifying existing CEGB plants. For this reason the Large Plants' Directive should be rejected.

Patrick Jenkin proposes that we announce our intention to reduce both sulphur dioxide and nitrogen oxide emissions by 30% (compared with 1980) by 2000. This is a realistic objective.

We have already achieved a 20% reduction in sulphur dioxide since 1980. This should be maintained. Increased economic activity will not significantly depend upon energy-intensive industries and Peter Walker's programme on energy conservation should reduce emissions further.

The remaining 10% reduction does not require unrealistic assumptions about nuclear power plant construction. We must aim for 4-5 GW by 2000 (Sizewell plus 3-4 others) if we are to diversify from coal and lower the costs of electricity. Reductions will also come from technological advances, particularly in feedstock preparation, and there is some scope for the CEGB to use low sulphur coal both from the NCB and in the future from imports.

These elements add up to a credible package. Nevertheless, 30% should be an aim rather than a commitment. If we are unable to meet it, there should be no question of retrofitting existing CEGB plant.

We do question however, whether our nuclear objectives should be publicised as part of this package. In view of Sellafield, the suggestion that increased nuclear power is the answer to our environmental problems is likely to be greeted with justifiable scepticism.

Vehicle Emissions

The paper underplays the opportunities for a major UK initiative on lean burn engines to follow our proposals on lead. This would have environmental benefits in its own right as well as contributing to the problem of acid rain.

DAUAAK

Conclusion

These proposals provide the basis for a positive UK initiative on air pollution without major expenditure.

DLP.

DAVID PASCALL

30% Club

Sizemitt

Nuclear calculation.



CONFIDENTIAL

P.01316

PRIME MINISTER

Acid Deposition

You had a Ministerial meeting on 17 May which discussed several policy issues relating to environmental pollution including acid deposition. You asked for several further papers to be prepared of which that on acid deposition is the most urgent since a UK line has to be settled before the Munich Conference on air pollution on 25-27 June and the EC Environment Council on 28 June, at which a draft directive on large combustion plants is to be discussed. You had a seminar on the scientific aspects of acid rain at Chequers on 27 May.

2. In his minute of 15 June Mr Waldegrave, on behalf of the Secretary of State for the Environment, discusses the policy options on acid deposition. He rejects three options: no action other than further research; joining the 30 per cent club (ie those countries who are committed to 30 per cent reduction from the 1980 level of sulphur dioxide emissions by 1995); or supporting the draft EC Large Plants Directive (which would require a 60 per cent reduction in sulphur dioxide levels and a 40 per cent reduction in nitrogen oxides levels by 1995). He puts forward instead a compromise option which is to aim at a 30 per cent reduction in 1980 levels of both sulphur dioxide and nitrogen oxides by 2000. The UK's position at the Munich Conference and at the EC Environment Council would be worked out in the light of the broad decision about policy.

MAIN ISSUES

3. The main issues are:

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- i. whether it is right to reject the three more extreme options and to go for a compromise option;
- ii. what should be the elements of the compromise option;
- iii. what are the implications for the UK's line at the Munich Conference and the EC Environment Council.

The options

4. There is likely to be little dissent from Mr Waldegrave's view that the UK should not accept the present draft of the EC Large Plants Directive. This would involve fitting flue gas de-sulphurisation to existing and new fossil fueled power stations at a cost of about £1.5 billion at a time when (paragraph 2 of Mr Waldegrave's minute) "we cannot be certain which causes determine which effects - and therefore what success might follow from the various actions we might take".
5. Joining the 30 per cent club is superficially attractive and this was a course Mr Jenkin proposed at your earlier meeting on 17 May. But this would not cover nitrogen oxides which are increasingly being seen as more relevant than sulphur dioxide to forest damage. Moreover, this option would also require a smaller but still substantial investment in flue gas de-sulphurisation, of the order of about £0.8 billion.
6. The argument is therefore likely to be merely about whether the UK should rest on its existing policy, taking credit for the substantial reduction in emissions already achieved and laying stress on our research effort; or whether we should adopt a compromise option with some additional elements. The Secretary of State for Energy and the Chief Secretary, Treasury may argue that the case has not yet been made out for going beyond our existing policy. The Foreign and Commonwealth Office is however likely to support Mr Waldegrave's suggestion that a more positive stance is



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required in international discussion.

Details of the compromise option

7. If the discussion favours a more positive compromise option, much will turn on precisely what it amounts to. Mr Waldegrave's minute suggests that there would be the following elements:

i. we should announce that it is an objective of our policy to achieve a 30 per cent reduction in emissions of both sulphur dioxide and nitrogen oxides by 2000;

ii. we would expect any new fossil fueled power station to adopt the most cost effective sulphur and nitrogen oxides abatement then available;

iii. we should propose stricter emission standards for petrol engined cars but oppose the three-way catalyst system.

8. The issue on which the meeting will need to concentrate is what we mean in practice by adopting the 30 per cent objectives and what additional expenditure is likely to be involved. It is suggested in Mr Waldegrave's minute that we may be able to achieve both these objectives without major investment above that already planned and by relying on technological developments already in progress or foreseen, together with an increase in our nuclear power station capacity. It is however accepted (paragraph 17) "that there is an element of optimism in this package". Mr Waldegrave then goes on to say: "Should it become apparent that we shall miss the 30 per cent objectives we have two options: to resile from the policy or to commit additional investment".

9. The meeting will need to consider whether it is politically feasible to accept objectives and then to resile from them later. The Secretary of State for Energy and the Chief Secretary, Treasury

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may argue that, unless the commitment to the 30 per cent objectives is very weak, and can be seen to be so, we shall in fact be obliged to make in due course whatever investment is required to ensure that the 30 per cent levels are met in the year 2000. They may argue that it would be wrong to accept objectives on this basis since, because of the uncertainties about the nuclear programme, and about the pace of technological development affecting emissions, we simply do not know what additional expenditure may be involved.

10. If there is a reluctance to accept the two 30 per cent objectives, because of the uncertainties, there would seem to be only two alternatives; to redefine the objectives in a much weaker form (eg "best endeavours" or "hope and expect"); or to return to the option of continuing with existing policy based on the need for more research.

Line in international discussions

11. It is clear that, whatever broad policy decision is taken at the meeting, much more work will need to be done to define the UK's position clearly in the discussions at the Munich Conference and on the draft EC Large Plants Directive. In the latter case some general policy statement will probably be sufficient for the Environment Council on 28 June. There will however be discussions of detail subsequently. If the preferred UK policy is to adopt objectives from which we may have to resile eventually, the task will not only be to reduce the percentages in the draft Directive but also to ensure that the obligations are expressed in a way which is not binding. The task of working out the UK's position in detail will need to be remitted to officials through the normal machinery, eg the Official Committee on European Questions (EQO).

HANDLING

12. You will wish to ask the Secretary of State for the Environment



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to introduce the minute of 15 June with support as necessary from his Parliamentary Under-Secretary of State, Mr Waldegrave. The other main contributors are likely to be the Secretaries of State for Energy, Trade and Industry and Transport, the Chief Secretary, Treasury and the Parliamentary Under-Secretary of State, Foreign and Commonwealth Office, Mr Whitney.

CONCLUSIONS

13. You will wish to reach conclusions on the following:

- i. whether we should go beyond our existing policy on acid deposition, based on the need for more research;
- ii. if so, whether we should adopt the proposals in paragraph 19 of the minute of 15 June and, in particular:
 - announce objectives of a 30 per cent reduction in emissions of sulphur dioxide and nitrogen oxides by 2000, even though we may have to resile from these if they cannot be met without additional major investment;
- iii. whether, in the light of i. and ii., officials should be asked to work out detailed positions for international discussions, and in particular those on the draft EC Large Plants Directive.

PLG

P L GREGSON

18 June 1984

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W.0417

18 June 1984

PRIME MINISTER

ACID DEPOSITION

In previous meetings Ministers have accepted the need for a positive, forward-looking UK policy on environmental matters both as a desirable measure in itself and as the best way of countering increasing pressure from other countries and environmentalist groups to take expensive, ill-conceived and ineffective 'corrective action'.

The paper from the Secretary of State for the Environment suggests a policy for the first area to be considered in detail: acid deposition.

2. UK policy on a reduction in acid deposition should be decided on the basis of three criteria:

(a) That actions are taken on the basis of the best scientific evidence available on the causes of the ecological problems, and flexibility maintained to adapt those actions to the results of fresh scientific research.

(b) That the problem is attacked as a whole and not through a series of arbitrarily separated measures designed for the convenience of the Brussels bureaucracy.

(c) That actions are cost-effective and commensurate with the UK's contribution to the problems.

3. Mr Jenkin's paper largely meets these criteria. The UK is not a significant contributor to the German forest problem and only a minor contributor to the Scandinavian lake problem. Nevertheless the scientific evidence

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indicates that a balanced attack on power stations and vehicle emissions in Europe as a whole will favourably influence the ecological factors which cause these problems.

4. Neither the present EEC proposals nor the 30% club proposal appear to have been drafted with a proper knowledge of the scientific evidence and are therefore deficient in several respects. Mr Jenkin's proposal for specific reductions of SO₂ and NO_x from combustion plants and NO_x and hydrocarbons from vehicles is, and should be seen as, an improvement on these earlier proposals. The fact that his proposed reductions in emissions can be obtained by means of the sensible engineered solutions of nuclear power generation and lean-burn vehicle engines respectively means that they are inherently cost-effective. The research element of the package will extend our knowledge of the science of the ecological problems and the range of cost-effective abatement techniques available.

5. This nuclear power generation/lean-burn engine/further research package is so powerful if confidently presented that I would advise against undermining it by referring to lesser alternatives such as flue gas desulphurisation (FGD) on a "what if" basis. I see no logic in commitment to FGD on new fossil-fuelled stations and rejection of retro-fitting old stations - the operating costs are the same and the capital costs only marginally different.

6. I am copying this minute to Sir Robert Armstrong.

RBN
ROBIN B NICHOLSON
Chief Scientific Adviser

Cabinet Office
18 June 1984

PRIME MINISTER

Acid Rain

Attached are briefs from the Cabinet Office, Dr. Nicolson and the Policy Unit.

I suggest you read Mr. Waldegrave's paper (Flag A) first. His proposals are summarised on the last page. They seem to me to amount to a good and defensible package, with two reservations:-

- i) Do we really need to risk committing ourselves to any specific figure for emission reductions - there is, after all, no scientific magic about 30 per cent?
- ii) Is it really sensible to envisage fitting FGD equipment even to new power stations?

Sellafield

This is the first of the papers you commissioned. The next will be on Sellafield, and you may like to press at the meeting for this paper to be circulated before the summer recess.

EMB

18 June 1984



2 MARSHAM STREET
LONDON SW1P 3EB
01-212 3434

My ref:

Your ref:

18 June 1984

*nbpm
DMS
19/6*

Dear Nick,

Thank you for your letter of 6 June about the booklet on Environmental Achievements. This has now been published, and so there is no possibility of adding to it. You do however raise the interesting question whether we should undertake in the EC an initiative to take large areas of farmland out of intensive agricultural use and conserve them as "natural" countryside.

The Wildlife and Countryside Act does of course provide in this country a framework for action by the Nature Conservancy Council and local authorities to conserve particular areas of countryside and in pursuance of a remit from the Prime Minister I shall be consulting colleagues shortly on possible ways of strengthening the Act and modifying the related compensation arrangements. Officials are currently engaged in preparatory work. I think however that in this exercise we shall be primarily considering measures which are within our national discretion.

As you imply, a successful initiative to reduce agricultural surpluses by taking land out of intensive agricultural use would depend upon the cooperation of other EC countries. I have no doubt that would be hard to obtain, and would in any event take a long time to negotiate, but it seems worth considering. I suggest therefore, subject to Michael Jopling's views, that officials examine this possibility and report on it as a further stage to the work currently in train on measures to strengthen the Wildlife and Countryside Act.

I am copying this letter to Michael Jopling and to the other recipients of your letter (other members of the Cabinet, the Chief Whip and Sir Robert Armstrong).

*Yours ever
Patrick*

PATRICK JENKIN

ENV AFFAIRS: Acid Rain
Pt 2

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A

CC D.P



Prime Minister

ACID DEPOSITION

P41 I was invited at our meeting on 17 May to set out the options for our policy on acid rain.

Background

2. This problem has, of course, both scientific and political components. The scientific issues are complex and long term and although there have been welcome recent developments in our understanding, it is still far from complete. We cannot be certain which causes determine which effects - and therefore what success might follow from the various actions we might take. We are giving a high priority to research designed to reduce these uncertainties. Meanwhile we have to make provisional and prudential judgements, in such a way that we can change direction without too much difficulty or expense.

3. The political problem is, however, a fairly immediate one. A number of other Governments (notably the members of the so called "30% club") have embarked upon programmes of sulphur dioxide emission abatement. A draft Directive now before the EC Environment Council calls for a 60% reduction in sulphur dioxide, 40% in nitrogen oxides and 40% in particulates from power stations and other major installations by 1995 (all percentages below a 1980 baseline). This pressure is attributable to genuine concern about transboundary pollution, especially in Scandinavia and Germany, as well as to a desire for evenness in industrial costs. And in Western Europe generally professional as well as public opinion is widely agreed upon the need for abatement of acidifying emissions. We can expect to be pressed to accept such action at the forthcoming Conference in Munich, mentioned with approval in the Summit declaration.

4. Against this background, I have considered four options:

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(a) pursue a vigorous and well published research programme and welcome technological trends which bring emissions down, but take no other special action (our policy so far);

(b) join the "30% Club";

(c) support the Commission's draft Large Plant Directive;

(d) pursue a package of policies which achieves creditable gains in abating the air pollutants involved in acid deposition, but falls into none of the above categories.

5. I advocate option (d), but before outlining it I would like to summarize my objections to the other three.

6. Before starting this analysis, it is worth reminding ourselves of what has been happening. UK total sulphur dioxide emissions rose steadily during this century to peak at 6.2 million tonnes in 1972; they then fell to 4.67 million tonnes in 1980 and, if provisional figures are confirmed to about 3.75 million tonnes in 1983 (thereby giving us a 20% reduction in the past 3 years). Sixty-five per cent of these emissions come from power stations. Nitrogen oxide emissions have remained more or less steady at 1.65-1.75 million tonnes over the past 10 years: 46% of them come from power stations and the rest from a multiplicity of sources (statistical tables are at Annex A). But I must stress that there can be no guarantee that the gain in SO₂ abatement will be held. It has come from such changes as the substitution of gas for other fuels, the reduced use of heavy fuel oils, energy conservation, and the depression of industrial activity. Some estimates imply that we could see a rebound as the economy picks up.

7. I turn now to the four options. In the first part of this analysis I concentrate on sulphur dioxide because that is the most difficult problem, but I discuss nitrogen oxides,

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hydrocarbons and ozone when I come to option (d).

The research option

8. It is common ground that we must pursue research, and we proposed a collaborative programme at the Economic Summit. We are spending over £5m a year on the themes identified at the Chequers presentation, and in addition the CEGB has a £50m R & D programme on new technology for abating SO₂ and NO_x emissions from power stations. These costs are modest compared with the potential cost of emission control. We have to present this effort positively and get more credit for it than we have been doing. But research alone will not meet our political need, which is to have a credible response to the various international demands. While the research effort must be part of our package, I therefore reject it as the sole action.

The Large Plant Directive

9. At the other end of the scale, I am sure we are all agreed in rejecting the Large Plant Directive in its present form. Although the provisional figures suggest that we may have achieved a 20% reduction in national sulphur dioxide emissions between 1980 and 1983, and 15% in those from large plants as defined in the directive, to achieve a further reduction of 45% in the latter sector by 1995 could only be achieved by fitting flue gas desulphurisation to virtually all the CEGB's large power stations. This costs about £150m per 2 Gigawatt (2000 MW) installation and even assuming that we can hold the 15% gain since 1980, would incur expenditure of the order of £1.5 billion and very likely more. It is not a practicable proposition.

The 30% Club

10. I said in my earlier paper, I am much more attracted by the proposition that we joint the "30% Club". Unlike the draft Directive, this embraces total national emissions of sulphur dioxide and if we can hold to the 1983 position we are already two-thirds of the way there. Against this, there are however substantial uncertainties. The best estimates suggest that

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even without new special measures 1995 national emissions are likely to be less than those in 1980, but we cannot be confident of holding all or most of the recent advance. While reductions in the use of heavy fuel oil, further energy conservation, and a variety of ancillary measures may help there is a real risk that we could find ourselves having to secure at least a 15% reduction in national SO₂ emissions by installing abatement equipment which in this time scale could only be FGD. Since each 2GW FGD installation reduces national emissions by 3% of the 1980 total, a 15% reduction would mean 10 GW - at a cost of £0.8bn. Although I have to stress that in my judgement nothing short of the "30% Club" will calm our international critics, the calculation leads me to look at the alternative.

The ingredients of a package

11. I start from a point evident at the Chequers presentation - that sulphur dioxide abatement deals with only one of the components of acid deposition (the generally accepted ratio is 70:30 sulphuric:nitric acids). The Large Plant Directive is in this respect more sensible than the 30% Club in dealing with nitrogen oxides as well as SO₂. I believe that there are political advantages in our emphasising our concern to tackle both - and also the hydrocarbons that, with nitrogen oxides in sunlight, generate the ozone that is increasingly emerging as a cause of forest damage.

12. I have asked how far we might get by 1995 and then by 2000 if we do not commit any investment to flue gas desulphurisation (or the equally expensive and less proven Japanese technology for removing nitrogen oxides from flue gases).

13. For the purposes of this calculation I will make the optimistic assumption that we can hold onto the 20% reduction in national SO₂ emissions between 1980 and 1983. From then

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on, analysis of future trends in emissions and of the most cost-effective options open to us depends crucially upon assumptions about changes in demand for electricity and about the growth of nuclear power. There are considerable uncertainties here. The CEGB's "medium nuclear scenario", prepared for Sizewell, envisaged a 0.75% per annum increase in electricity demand and the construction of a further 10GW (the equivalent of 9 Sizewell Bs) of nuclear capacity by 2000. If this were achieved, CEGB SO₂ emissions would fall by 20% by 2000 and 30% by 2002/3 - bringing national totals down by 14% - 20% and giving us a gain of 34% to 40% since 1980. CEGB are uncertain of achieving this and have referred to the possibility of no more than 5 or 6GW being commissioned by 2000, and in this case the improvement on 1980 falls to 27% to 30%. The gap could be narrowed by other technical advances, like the substitution of low sulphur coal - water slurries for heavy fuel oils, coal pre-treatment, the adoption of small scale atmospheric fluidised bed furnaces in industry and even the importation of some low-sulphur coal, but it is hard to estimate the gains from such a package. Taking all the data together, however, I remain optimistic that we could look for a 30% reduction in national SO₂ emissions by 2000, and possibly more, without the use of FGD and without major investment above that already planned. I suggest that we make this a stated objective of our policy. It will not get us into the "30% Club" as currently defined, but it will display a positive commitment and make our international and domestic position easier.

14. At present we do not envisage building any new coal-burning power stations until the early years of the next century. When we do, I take it for granted that they will be designed with whatever technology for sulphur and nitrogen oxide control has emerged by then as "best practicable means". We have encouraged research on more cost-effective technology in this area, and much is going on, so that I am confident we shall

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end up with something considerably cheaper than the £120m cost of FGD in a new 2GW station. All we need to say now is that we envisage such technology as part of the design of such stations - when we build them.

15. The nitrogen oxide position appears a little more tractable. Our "baseline" however has changed little between 1980 and 1983 (it is to our credit that our emissions have stayed more or less level while the Germans' have increased by some 50% over 15 years). The CEGB, in partnership with private industry, are developing low - NOX burners suited to UK conditions and if even partly successful these might allow a 10-20% reduction in these emissions from CEGB fossil-fuelled plants by 2000. Other equipment might be applicable to the 19% of national emissions from other industry: nuclear substitution at 5 and 10 GW would give the CEGB a 10% and 20% NOX reduction respectively. Given a parallel attack on the 19% of NOX from petrol engined cars (and the measures I advocate below would allow this to be halved by comparison with the current European standard), we might well achieve a 20% - 30% reduction in national emissions by 2000. I suggest we should declare 30% as our goal, and proclaim a positive initiative in that direction. We would then be mounting an attack on total acidity, which the members of the 30% Club are not.

16. Vehicle emissions should be the other component of our package. We are agreed that we must not accept the extremely expensive United States 3-way catalyst system (which could add £2.01bn to annual UK motoring costs) - but a reduction of 85% carbon monoxide, 60% hydrocarbons and 40% NOX emissions by comparison with an uncontrolled vehicle could be gained by a "lean burn" engine tuned for minimum pollution at a benefit in operating costs (from improved fuel economy) of £30 per car per year. The first stage of the Commission's current proposals for new petrol driven vehicle emissions could be met by this technology and I believe we should support them. We shall naturally go on pressing, in this context, for the

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earliest possible achievement of unleaded petrol. The Commission's second stage proposals (for 1995) are not due to be confirmed until 1988 but it is most unlikely that further "lean-burn" engine development will suffice to meet them, though some further reduction in hydrocarbon emissions (which scientific studies indicate as the key factor in ozone formation) will probably be feasible at relatively small cost. I suggest that our policy should be to accept tighter standards provided that these can be achieved by engineered solutions that do not require costly, fragile and energy-wasteful systems such as the USA 3-way catalyst.

17. I accept that there is an element of optimism in this package. We shall need to monitor our performance carefully as we go along. Technology should be working for us, especially if we set clear goals for industry (including the CEEB). Should it become apparent that we shall miss the 30% objectives we have two options: to resile from the policy or to commit additional investment - and the case for the latter will be easier to judge as our research programme clarifies the issues. I therefore have no hesitation in embarking upon this course.

Negotiations at forthcoming meetings

18. I have deliberately left until now proposals for our stance at the Munich Conference, and in the Environment Council on 28 June when the Large Plant Directive comes forward for discussion for the first time. I believe that if we can agree the broad lines of policy set out here before the Munich Conference, a credible negotiating position will follow both there and in the Environment Council. Clearly we have to reject the Directive as drafted, but I believe we shall be well placed to explore the prospects of securing changes in the percentages, dates and industrial scope so as to achieve an acceptable final text. That would allow us to be positive (whereas outright opposition to the whole concept could undermine the gains we may hope for from the package of policies I set out above), without binding an economic millstone about our necks.

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Conclusions

19. On the basis of this analysis I propose that we:

(a) continue to support and publicise a well-balanced programme of research on air pollutants, their effects and the technology for their control, participating in the international exchanges that will make the most of all our national efforts;

(b) announce our intention to achieve further reductions in national sulphur dioxide emissions, consolidating the remarkable gains of recent years and aiming at a reduction of at least 30% by 2000;

(c) announce that we shall pursue available measures to reduce nitrogen oxide emissions, aiming at a 30% abatement by 2000;

(d) make it clear to the public that the development of the nuclear component is an important element in our strategy, but that we also seek gains in a variety of other ways, and will expect any new fossil fuelled power stations to adopt the most cost-effective sulphur and nitrogen oxide abatement then available;

(e) support stricter emission standards for petrol-engined cars - but ensure that the latter do not require 3-way catalysts.

20. I am sending copies of this minute to Willie Whitelaw, Geoffrey Howe, Peter Walker, George Younger, Nick Edwards, Norman Tebbit, Tom King, Michael Jopling, Peter Rees, and Nicholas Ridley, and to Sir Robert Armstrong.

William Waldegrave

(William Waldegrave for Patrick Jenkin)

15 June 1984

2.4 Sulphur dioxide: estimated emissions from fuel combustion: by type of consumer and fuel¹

(a) By type of consumer

Million tonnes

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982 ^P	Percentage of total in 1982
Domestic	0.37	0.36	0.35	0.30	0.28	0.29	0.26	0.26	0.22	0.21	0.20	5
Commercial/ public service ²	0.31	0.29	0.26	0.24	0.24	0.24	0.23	0.24	0.20	0.18	0.17	4
Power stations	2.87	3.02	2.78	2.82	2.69	2.74	2.81	3.10	2.87	2.71	2.65	66
Refineries	0.26	0.29	0.30	0.26	0.28	0.27	0.29	0.29	0.28	0.22 ^R	0.21	5
Other industry ³	1.75 ^R	1.77 ^R	1.59	1.44 ^R	1.42 ^R	1.37 ^R	1.36 ^R	1.38 ^R	1.05 ^R	0.84 ^R	0.76	19
Rail transport	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	< 1
Road transport	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.04	0.05	0.05	1
All consumers	5.64 ^R	5.80 ^R	5.35 ^R	5.13 ^R	4.98 ^R	4.98 ^R	5.02 ^R	5.34 ^R	4.67	4.23 ^R	4.04	100

2.7 Nitrogen oxides

estimated emissions¹ by sourceNitrogen oxides²

Thousand tonnes

	1972 ^R	1973 ^R	1974 ^R	1975 ^R	1976 ^R	1977 ^R	1978 ^R	1979 ^R	1980 ^R	1981 ^R	1982	Percentage of total in 1982
Domestic	51	53	53	51	50	52	52	56	52	52	51	3
Commercial and Industrial	470	486	449	408	419	415	405	417	338	318	309	19
Power stations	731	808	722	760	770	793	806	876	851	818	769	46
Incineration and agricultural burning	8	8	8	10	12	12	12	12	12	12	12	1
Road vehicles												
petrol engine	262	279	272	266	279	286	303	308	316	309	318	19
diesel engine	158	170	166	162	168	171	176	182	176	167	172	10
Railways	48	50	47	44	41	42	42	41	40	39	35	2
All emissions	1,728	1,854	1,716	1,700	1,739	1,771	1,796	1,893	1,785	1,714	1,666	100

Env. Affairs & Ad. Rec. Pt 2

15 JUN 1984



PRIME MINISTER

ACID DEPOSITION

Patrick Jenkin is circulating a paper for our meeting on 19 June. I understand that this will discuss the costs involved in adopting particular emission control standards.

In assessing these costs it is of course necessary to form a view of the potential role of nuclear power in reducing emissions; it may be helpful if I explain some of the difficulties here. The first point I would make is that we have no means of knowing exactly how much new nuclear capacity will actually be installed by 2000. Various figures have been produced but there can be no "central case" - the uncertainties are too great. Nor are we committed to any quantified programme of nuclear installation by that date. Judgements are needed, but they must be realistic, or we may be led to suppose that there are easy options.

In their Sizewell evidence, the Central Electricity Generating Board (CEGB) set out a "medium nuclear scenario" of 10GW of new nuclear - nine Sizewells - in operation by 2000. This now seems an extremely optimistic scenario. Leaving aside questions of managerial and industrial capacity and the possibility of constructional delays, we cannot overlook the prospect of difficulty in relation to planning consents for such a number of major sites. Against this background, I very much doubt if we can realistically expect to see more than four or five new nuclear stations actually in operation by 2000. If consent is granted, the CEGB themselves do not expect Sizewell to be in operation before 1992/3 at the earliest. For another four stations to be completed by 2000 would be good going.

Best estimates suggest that, with 5GW of new nuclear, we should be well short of achieving a 30% reduction in emissions by 2000. Depending on growth assumptions and other factors, we could face the need to retrofit four or even more large plants to meet a 30% target by 2000, at a cost of upwards of £500m.

cc DP

CF: for Tuesday's meeting per

- 1) Mr Turnbull
- 2) Prime Minister (2)

Mr Walker puts down a marker for your meeting on acid rain next Tuesday.

18/6

DMS
15/6



With the current scientific uncertainty I do not believe we would be justified in incurring such costs. For the present I believe that we should continue to insist on the prior need to demonstrate that this very substantial expenditure will actually solve the problem. In Community discussion it seems feasible for us to argue for a more realistic and soundly based set of proposals without committing ourselves in advance to a particular target.

A further point: I am very concerned about the public presentational aspects of all this. We must obviously be extremely cautious at this stage in deploying figures on future nuclear construction, and their potential impact on coal use.

I am copying this minute to Willie Whitelaw, Geoffrey Howe, George Younger, Patrick Jenkin, Norman Tebbit, Tom King, Michael Jopling, Peter Rees, Nicholas Ridley and to Sir Robert Armstrong.

SECRETARY OF STATE FOR ENERGY

15 June 1984

Acid Rain Pt 2

The current scientific consensus is that acid rain is not a new phenomenon. It is a natural process that has been occurring since the beginning of time. The main cause of acid rain is the release of sulfur dioxide and nitrogen oxides into the atmosphere. These gases react with water vapor to form sulfuric acid and nitric acid, which then fall to the ground as rain or snow. The pH of acid rain is typically between 4.0 and 5.5, which is significantly lower than the pH of normal rain, which is around 5.6.

Acid rain can have a variety of effects on the environment. It can damage forests, lakes, and streams. It can also corrode buildings and other structures. In addition, acid rain can be harmful to humans and animals. For example, it can irritate the eyes, nose, and throat. It can also cause respiratory problems and other health issues.

There are several ways to reduce the amount of acid rain. One way is to reduce the amount of sulfur dioxide and nitrogen oxides that are released into the atmosphere. This can be done by using cleaner energy sources, such as wind and solar power. Another way is to use scrubbers on power plants to remove sulfur dioxide and nitrogen oxides from the exhaust gases.

BUREAU OF RESEARCH
1985

SLD
cc DP

2PPS
CF: for Tues mtg folder per D 18/6



SECRETARY OF STATE FOR ENERGY
THAMES HOUSE SOUTH
MILLBANK LONDON SW1P 4QJ

01-211-6402

Prime Minister (2)
To be aware - a good demonstration of the need for more co-ordination in this area!

David Barclay Esq
Private Secretary to the Prime Minister
10 Downing Street
LONDON SW1

15 June 1984

DWB
15/6

Dear David

In the light of the Prime Minister's meeting on 19 June to consider Government policy on acid deposition, you will wish to know that my Secretary of State will be announcing, by way of written answer on Monday 18 June, publication of a report on "Acidity in the Environment", prepared by the Department's Energy Technology Support Unit (ETSU) at Harwell.

The report was commissioned from ETSU by the Department's Chief Scientist, in the light of the growing public interest in "acid rain" and as a necessary bringing together of the wide ranging sources of information and scientific hypotheses on the subject. The report examines the origins, transport, chemical transformation and deposition of acidity and its movement through the soil into waterways. It also examines the evidence linking observed environmental damage with acid deposition primarily from the UK view point, but examining also the influence on depositions in other countries of acidity originating in the UK.

As evidence of the Government's interest in, and concern about, the problem of acid deposition, my Secretary of State feels it appropriate that this report should be given as much publicity as possible. To that end, it has accordingly been arranged that in addition to a written answer (attached) and accompanying press release, a technical briefing will be given by ETSU Scientists on 18 June to specially invited representatives on the national and technical press.

I am copying this letter to Janet Lewis-Jones (Lord President's Office), Brian Fall (FCO), John Graham (SO), John Ballard (DoE), Callum McCarthy (DTI), David Normington (DE), Ivor Llewelyn (MAFF), John Gieve (Chief Secretary's Office), Dinah Nichols (DTp) and Richard Hatfield (Cabinet Office).

Your sincerely
M F Reidy

M F REIDY
Private Secretary

* report in folder at back of file

Acid rain

R+Z

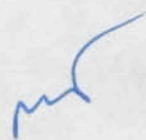


PQ AND ANSWER: ETSU REPORT ON ACIDIFICATION

Q. To ask the Secretary of State for Energy what level of research into the causes of acid rain his Department is supporting.

A. UK emissions of sulphur dioxide have already fallen by over 30% in the last decade. However the Government recognises the need to continue our efforts to obtain a better understanding of the many scientific uncertainties involved in acid deposition. To that end my Department commissioned the Energy Technology Support Unit at Harwell to study the available scientific information about the origins, transport, chemical transformation and deposition of acidity in the environment. They have considered the evidence linking observed environmental damage to vegetation, aquatic life, structural materials and human health with the deposition of acidic sulphur and nitrogen species. Their report is being published today, and I have arranged for a copy to be placed in the Library of the House.

The report will provide a very useful addition to the sources of information on this very complex subject.





From the Minister

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
WHITEHALL PLACE, LONDON SW1A 2HH

pa 2mb
18/6 a DP

Prime Minister⁽⁴⁾

To be aware. As you know, not
all colleagues share MAFF's
enthusiasm for the Wildlife and
Countryside Act June 1984

The Rt Hon Patrick Jenkin MP
Secretary of State for the Environment
2 Marsham Street
London SW1P 3EB

DWB
14/6

UK ENVIRONMENTAL ACHIEVEMENTS

See P41

I have been interested to read the booklet on environmental achievements, circulated with your Private Secretary's letter of 29 May, and the subsequent correspondence. Although now it is too late to do anything about it, I share the view that the booklet could have made more of what we have done to protect wildlife and the countryside. It is a great pity that we as Ministers give the impression that we are apologetic or defensive about the Wildlife and Countryside Act. This plays straight into the hands of our political opponents. Instead we should be much more positive about it - the Act was, after all, a considerable step forward, and we should say so.

If there are specific weaknesses in the Act that need to and can be put right, consistently with the Act's principles and in a way that is self-contained and does not reopen all the issues again, let us have a look at what can be done. This does not necessarily mean legislation - I have an idea that it might be possible to deal by administrative action with the main problems that the so-called "3 months loophole" might be causing. I note that your department is working on this. Should we not ask our respective officials to get together on it?

I see that Nicholas Ridley, in his letter to you on the subject, describes Kenneth Carlisle's CPC booklet as "excellent". I am afraid that I cannot agree with him. It strikes me that it unfortunately shows some of the same weaknesses as the attacks on our policy by our opponents. Those attacks usually consist of generalisations which are not factually based, or are based on partial or distorted "facts", or on events that occurred many years ago. They give no recognition to the changes we have made over the

last 2 or 3 years in our policies and practices relating to agriculture and conservation, the effects of which are still working through. They give no recognition to the fact that we, often in a minority of one, have been striving to reduce the excesses of the CAP - which in the public eye so often underlie the sharpest conflicts between agriculture and conservation - and that we at last are having some real success.

Nor is there any recognition that agriculture represents the principal land use over four-fifths of surface of England and Wales, and that it is the farming industry which has created the countryside as we know it today. The official conservation bodies themselves recognise that an efficient and prosperous agriculture is essential in order to achieve effective conservation. There is therefore the need to strike the right balance between the needs of agriculture and the interests of conservation, and it is important that both our agricultural and conservation policies reflect this.

I accept that we cannot stand still. As you know, in Brussels John MacGregor and I, and my officials, have been pressing that the EC's agricultural structures directives, which are now being reviewed, should pay more regard to environmental considerations. We have already made some proposals to that end. I am wondering whether we can go further. I have asked my officials to look into the possibility of including in the directives a provision for schemes to safeguard areas of environmental importance. I accept that any such initiative will have to be contained within the overall finances available for the directive, and not lead to increased expenditure. If my officials can come up with feasible proposals, I shall put them to my colleagues.

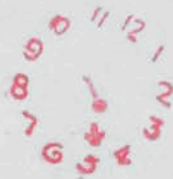
The agricultural community - and we in our policies - now recognise the importance of reconciling the needs of agriculture and of conservation. I wish I could say the same for all the conservationist lobby. Lord Melchett's recent presidential address to the Ramblers Association is a notorious example of the way some of the more extreme conservationists are not prepared to give us credit for anything we do.

All in all therefore I believe we have a reasonably good story to tell on agriculture and conservation, and that the position is steadily being improved. I do not think we need to be apologetic about it. I invite my colleagues to join Ministers in my department in stressing our positive achievements. I shall happily provide notes for those who wish to do so.

I am copying this letter to the Prime Minister, Cabinet colleagues, the Chief Whip and Sir Robert Armstrong.

James Funnell
Michael Jopling

MICHAEL JOPLING





ccdp

Treasury Chambers, Parliament Street, SW1P 3AG

A Allbery Esq
PS/Secretary of State for the Environment
Department of the Environment
2 Marsham Street
LONDON
SW1P 3EB

12 June 1984

20/6
15/6

Dear Andrew

BOOKLET ON UK ENVIRONMENTAL ACHIEVEMENTS

PT 1

Thank you for copying to me your letter of 29 May to David Barclay enclosing a copy of the booklet on environmental achievements, which was eventually published on 7 June.

The Chief Secretary is concerned that the Treasury was not, unlike other departments, consulted at official level on the drafting of the booklet. Your letter made it clear that it was too late to change the text. It was not possible, therefore, to feed in comments from the Treasury, which has a clear interest - not least from the expenditure point of view.

The Chief Secretary trusts that the Treasury will, in the future, be given the opportunity to comment on environmental matters as important as this in good time before final decisions are taken. LG2 Division (headed by Colin Allan) co-ordinates the Treasury interest in environmental matters.

I am copying this to the recipients of your letter.

Yours sincerely

John Gieve

JOHN GIEVE
Private Secretary

Environmental Affairs R2
Acid Rain

11 5 JUN 1984





PA

Dubs
11/6

10 DOWNING STREET

Prime Minister ⁽²⁾

ACID RAIN

You may like to know that
the Select Committee on the
Environment begins an
investigation of acid rain
on Monday.

We will keep you in touch.

Dubs
8/6

SOME NOTES ON THE AERIAL TRANSPORT, CHEMICAL TRANSFORMATIONS
AND DEPOSITION OF ACID POLLUTANTS.

By B.J.Mason

1. The Complexity of the Problem.

The present state of scientific knowledge does not permit us to predict, in quantitative terms, how a given reduction in the emissions of SO_2 and NO_x will affect the acidification of streams and lakes, the mortality of fresh-water fish or the die-back of trees for the following reasons:

- (i) There is no simple, linear relationship between the emission of SO_2 and NO_x and the quantity of acid deposited at distances remote from the source. This is because the deposition patterns are determined in a complex manner by the meteorological factors governing the movement and dispersion of the emitted plumes and by the complex atmospheric chemistry involved in converting the SO_2 and NO_x gases into acids. For example, rainwater tends to be most acid in summer when emissions from power stations are at a minimum.
- (ii) There is no simple relationship between the acidity and chemical composition of rain/snow reaching the ground and the acidity and chemical composition of streams and lakes because the chemistry of rainwater may be profoundly modified as it percolates through the soil and interacts with the bedrock, soil and vegetation. In particular acid water may be largely neutralized by base minerals such as Ca in the soil or may be further acidified by the indirect effects of vegetation, trees and fertilisers.

In other words, the acidification of lakes depends upon the geology and soil chemistry besides the acid deposition from the atmosphere.
- (iii) There is no simple relationship between the acidity of streams and lakes and fish mortality because this also depends on the species, size, age and genetic origin of the fish and how their food chains are affected. Moreover it appears that fish, (especially the eggs and fry), are mainly killed by Al leached out from the soil rather than by acid stress. On the other hand, Al is largely de-toxified in the presence of calcium or organic acids.
- (iv) The worst effects of acid deposition tend to be produced in short intense episodes rather than by long-term gradual increases. Thus a high proportion of the total annual acid deposition occurs on only a few days of heavy rain in both the UK and Scandinavia. Moreover high mortalities of fish eggs and fry are produced mainly by high acid surges in the rivers during the first rains following a dry spell. This has important implications for the control and alleviation of emissions.

- (v) It is also important to remember that if a 30% reduction in emissions led to a 30% reduction in the acidity of the rainfall and surface waters, this would correspond to an increase in pH of only 0.15 unit. Changes of this magnitude would hardly be detectable because the uncertainties in pH measurement are larger than this.

A 30% change in the sulphate content of rain/lake water should be detectable, but only if the measurements were averaged over a long period because of the large day to day variations.

We now describe, in a little more detail, what happens to the SO₂ and NO_x gases from the time they leave the chimney stack until they are deposited as acidic gases, particles or raindrops on the ground.

2. Emissions

Emissions of SO₂ from the UK increased from 1.5 million tonnes of S in 1900 to reach a peak of 3.2 Mt in 1965 since when they have declined by about 40% to about 2.0 Mt in 1983.

The emissions of NO_x, on the other hand, have continued to increase from 0.25 Mt in 1900 to about 0.62 Mt in 1980. However, this latter figure may be an underestimate, because measured concentrations of NO_x in city centres such as Glasgow are at least 5 times those of SO₂.

By contrast, total emissions of SO₂ in Europe (excluding the USSR) have risen continuously from 10 Mt of S in 1950 to 20 Mt in 1980.

3. Dispersion and Deposition

Once the plume emerges from the chimney it travels roughly with the wind and is spread laterally and vertically by atmospheric turbulence, whilst maintaining its identity over hundreds of miles.

Acid products falling from the plume to the ground at short distances from the source are usually in the form of gases and small particles. This so-called dry deposition accounts for about 2/3 of the total deposition in England.

As the plume travels greater distances, say over the N. Sea, it is carried to greater heights (several thousands of feet) and stands a greater chance of entering a cloud system. Here the SO₂ and NO_x are converted into H₂SO₄ and HNO₃ much more rapidly than in clear air and are rapidly brought to the ground as wet deposition in rain or snow. The heaviest deposits, therefore, tend to occur in areas of heavy rainfall i.e. in the mountainous areas of Scotland, Wales, N.W. England and in S.W. Norway.

About 80% of the total acid deposition in the UK originates from UK sources, only about 12% coming from continental Europe.

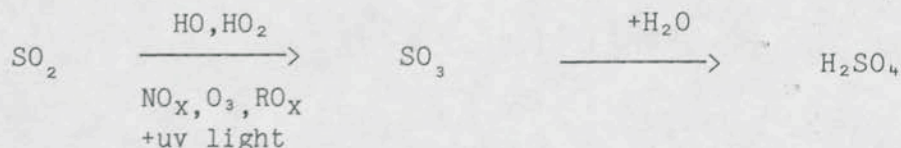
The UK contributes about 15% to the sulphate deposition of Norway and about 7% to that of Sweden. Sweden receives at least as much

from Denmark and from FRG, 3 times as much from the Eastern bloc and contributes 5 times as much herself. Norway receives about as much from Western Europe as from the UK and rather more from the Eastern bloc. It would obviously be pointless to reduce UK emission by 30% or even 60% unless the rest of Europe, including the Eastern block, did the same.

4. Chemical Conversion of SO₂ and NO_x into Acids.

SO₂ is converted to sulphuric acid and NO_x to nitric acid in the gas phase producing acidic gases and small particles which are deposited on the soil and vegetation as dry deposition and also, and more rapidly, in the liquid phase, in cloud and raindrops.

Conversion in the gaseous phase occurs in stages involving oxidizing radicals such as HO and HO₂ which are derived from NO_x, O₃ and unburnt hydrocarbons viz:

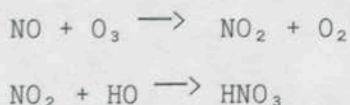


The conversion rate is about 2% per hour on a bright summer's day when about 20% of the SO₂ might be converted during the 24 hours taken for the plume to cross the N.Sea.

In the winter-time the conversion rate is probably only ~ 0.1% per hour, being limited by the lack of oxidants, which require ultra-violet light for their production.

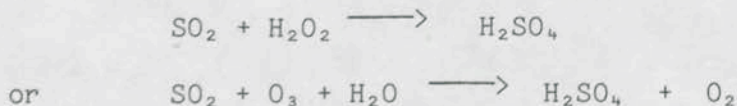
The unconverted SO₂ will gradually be dispersed through the atmosphere and contribute to the general global background.

NO is converted in the gaseous phase to nitric acid with the aid of ozone (O₃) and HO viz:



Complete conversion is likely to occur during a 24 hour crossing of the N.Sea in summer, but only about 25% might be converted on a winter's day.

If the plume enters a cloud layer, the SO₂ is rapidly adsorbed by the cloud droplets and conversion then occurs rapidly in the liquid phase by the reactions:



both involving oxidants which we derived photochemically from NO_x.

Theory indicates that these processes should lead to 100% conversion per hour in summer, and about 20% per hour in winter, unless this is limited by an unusually low concentration of oxidants.

Measurements by the Met. Office aircraft following a plume indicate conversion rates of at least 25% per hour in summer. Nitric acid is also formed in cloud and raindrops, but the rates of conversion have not been studied.

The important point to note is that the rate of formation and deposition of acid is largely determined by the availability of oxidants, which are formed by the photolysis of NO_x and unburnt hydrocarbons. Only a fraction of the SO_2 crossing the N. Sea is converted to acid and reaches the ground. In order to reduce this fraction, it may be more effective to limit the NO_x and unburnt hydrocarbons rather than concentrate solely on the reduction of SO_2 emissions. The fact that the acidity and sulphate concentrations of rainwater tend to be a maximum in summer when the emissions are a minimum may well be due to the greatly enhanced production of oxidants in strong sunlight.

5. Role of Acid Deposition and ozone on die-back of Trees.

Reduction of NO_x emissions and therefore of ozone may also be more important in connection with the die-back of trees reported to be serious in Germany. German scientists are coming round to the view that die-back results mainly from damage to leaves by atmospheric pollutants rather than damage to the roots by the direct or indirect influence of acid rain on the soil.

The greatest damage is observed to spruce and firs growing downwind of highly industrialized regions and in areas where air pollution builds up in stagnant air beneath persistent inversions in the summer time.

Ozone is thought to be the main culprit causing the leaves to fall off even in the green state. It may be that the efficient capture of highly acidic cloud and droplets by the long, thin needles is a contributory factor in that the acid may degrade the wax cuticle and thereby allow ozone easier access to the leaf tissues. The acid also probably leaches out Mg and Ca from the leaves which may die from Mg deficiency.

The damage may also have been accelerated by lack of water during the very dry summers of 1976 and 1981 causing a general deterioration in the health of the trees and making them more vulnerable to later losses of leaves and nutrients.

In any case, if high ozone concentrations are a major factor in tree damage this puts a premium on the reduction of NO_x from automobiles as well as from industrial plants.

6. The Acidity of Precipitation.

In the UK rainfall is acidic almost everywhere with annual mean values of pH ranging from 4.5 to 4.2 compared with 5.6 for uncontaminated rain. In general, rainfall in the UK is just as acidic as that in Norway and Sweden.

There is no convincing evidence that the acidity of UK rain has changed significantly in recent decades. This is probably because the greater emissions since 1950 have been largely offset by using

hot plumes from tall stacks. One of the few reliable long-term records from Cumbria shows that the mean annual value of pH remained constant at 4.4 between 1954 and 1976. A careful record for Loch Ard showed no change between 1973 and 1979. However recent sound measurements at Pitlochry are the first to indicate a drop in acidity of rainfall between 1979 and 1983 in line with reduced emissions of SO₂. Elsewhere in the UK, the measurements are not sufficiently reliable to establish a long-term trend. Scandinavian scientists have claimed that the acidity of rain over much of N.W. Europe increased (pH 4.5→4.0) from 1955 to 1970, but a CEBG analysis shows that only 29/120 stations showed a fall in pH, 5 showed an increase, and that some of the reported falls, which showed a step change, were probably due to a change in measuring technique.

Rainfall in remote parts of the world is quite acid. For example, annual average values of pH of between 4.3 and 4.9 are reported from Bermuda, Hawaii and Amsterdam Island in the Southern Indian Ocean.

7. Changes in Acidity of Lakes.

Both direct measurements and proxy measurements (e.g. fossil diatom analysis of lake sediments) give conflicting results.

In the UK

Diatom analysis of lake sediments in Galloway indicate gradual acidification since 1850 with a tendency to acceleration in recent decades. It does not appear possible to ascribe these trends to afforestation or changes in land use.

On the other hand, the FBA (Windermere) long-term, careful measurements indicate no significant change of pH in biologically stable lakes in Cumbria over the last 50 years. Biologically active lakes become very alkaline in summer (pH ~ 10) due to consumption of CO₂ by phytoplankton during photosynthesis.

In Norway.

Measurements on 87 lakes in S. Norway indicated that the median pH values fall from 6.4 to 5.7 (nine of the lakes showing a drop of 1.25 units) between 1923-49 and the 1970s.

However, the early measurements are very suspect. An independent survey of 50 lakes in S.E. Norway indicated that, in 27 of the lakes with low Ca content, the pH fell from 6.6 to 6.3 between the 1950s and 1970s. Diatom analysis for a few lakes indicated a drop of 0.5 unit during recent decades, but one lake on the W. Coast seems to have undergone no change over the last 250 years

More accurate, representative and standardized measurements of pH and chemical composition of rain and surface waters will be required to monitor changes and to establish the response to changes in emissions. This is being given high priority by the Royal Society/Swedish Academy/Norwegian Academy joint programme, but it will be difficult to follow such changes in Sweden, where a very high proportion of the lakes are now being limed and there are few control lakes to allow assessment of long-term effects.

THE EFFECT OF ACID DEPOSITION ON FORESTS

I am going to turn my title round. I am going to talk about the observed changes in certain forests first, and the possible causes, including acid deposition second. Finally I plan to say a little about the factors that are likely to be most significant if it is decided that the changes in the forests need to be stopped or reversed. I am not going to talk about crops or stonework although the Royal Commission on Environmental Pollution has commented that present concentrations of air pollutants could reduce yields of some crops in Britain, and the Select Committee on the Environment is reported to have been greatly impressed during their visit to Germany with the evidence of damage to historic monuments.

So: first, a short history of the pattern of damage.

The death of conifer forests, and the failure of plantations, close to industrial centres in Germany, the South Pennines, and around Sudbury in Ontario, have been well documented and related to acute smoke and sulphur dioxide pollution (FRG, 1984: Lines, 1984: Hutchinson,). Clean Air policies have progressively cured this problem in Europe over recent decades.

In 1972 the Swedish Government, in a report to the Stockholm Conference, alleged that acidity, deposited in their country after long range transport from elsewhere in Europe, was damaging their forests as well as their lakes and rivers. This allegation did not stand up to critical examination by specialists and was largely discounted.

The recent renewal of concern dates from the reports of a 'new kind of forest damage' in Germany, starting in the mid-1970s and getting worse during the past 4 years. This damage was first seen in silver fir, and then in spruce: some damage to pine, beech, oak, maple and ash has also been reported (FRG, 1984).

The symptoms in conifers are a loss of needles, stunted growth, thinning of the tree tops, yellowing of needles and increased infection with insect pests and fungus (FRG, 1984). The yellow

needles exhibit magnesium deficiency (Binns and Redfern, 1983). In 1982 about 8% of the total forest area in the Federal Republic was said to be more or less badly affected. In 1983 a second survey put the affected area at 34% (FRG 1984 : Bell et al, 1984). The worst effects were in Bavaria and the Black Forest. Half the silver fir forest is reported moderately or severely damaged, although this species only makes up 2% of the total German forest area. Forty per cent of the spruce (which accounts also for 40% of forest area) showed some damage in 1983 (Bell et al 1984). The Germans assess current losses as costing about 1,000 million Deutschmarks per year.

Forest damage is also reported in the DDR, Czechoslovakia, Austria, Switzerland, Sweden and France. In the first two some at least is said to be due to acute pollution like we used to experience. There is no evidence of the continental type of damage in the UK (Binns, personal communication).

It seems clear that the forest damage is a genuine phenomenon, over a considerable area of Europe.

It is less clear what the causes are. The evidence is largely circumstantial and deductive (as is normal in ecology, where field experiments are difficult).

The German damage can certainly be correlated with altitude and exposure. Most of it is above 500 metres, and the worst is above 800 metres (Krause, 1984). The taller, older trees and those exposed at the edge of the forest are most affected. But it is creeping down the hills, and also beginning to affect more young trees (FRG, 1984). Other factors that correlate with damage are drought (the situation got suddenly worse after the dry summers of 1976 and 1983), and extreme cold. On the other hand the damage occurs on many different soil types. It does not fit with changes in cultivation practice. And the correlation with fungal and insect diseases is thought by most German foresters to be secondary (FRG, 1984).

The role of air pollution is at the heart of present concern.

It has been established in the laboratory that coniferous tree species are sensitive to a range of air pollutants, including sulphur dioxide, nitrogen oxides and ozone - and that several in combination can have a larger impact than one alone (Roberts, 1984). The effects of acid mists have also been studied. The difficulty lies in extrapolating these facts to the field situation.

Some of the German damage is in areas where sulphur dioxide concentrations are very high. In the Fichtelgebirge on the Czech frontier, half hourly peaks of up to 1700 micrograms of SO₂ per cubic metre have been reported and the effects there may very well be due to the direct impact of this gas, streaming across the frontier from the east. But in Southern Bavaria and the Black Forest, some affected trees are festooned by lichens, normally a good indication of low SO₂ levels. Moreover, sulphur dioxide concentrations in the air have been falling over recent years in much of Germany, as in the UK, while damage has been increasing. The direct effects of local industrial sulphur dioxide are therefore ruled out by many as the main cause of the German problem (Krause, 1984).

Superficially, the pattern of damage does broadly coincide with the area of highest rainfall acidity (Wallen, 1980). And while SO₂ levels have fallen, sulphate concentrations and rain pH have been more constant and nitrate has risen (Krause, 1984). But laboratory experiments using fumigation of tree seedlings with acid mists have failed to re-create symptoms like those seen in the field, and damage has normally appeared only at acidities considerably greater than those seen in natural rain (Jacobson, 1984).

It is now widely believed that a combination of air pollutants is involved.

A recent official German Government paper for the forthcoming conference in Munich presents such a view, saying :

'Initially, acid precipitation (acid rain) was seen as the main cause of damage : recently, however, opinion has tended towards

the idea that photochemical oxidants developed from nitrogen oxides under the impact of sunlight, and particularly ozone, also play a significant part'.

DOE has commissioned a review of the possible impact of ozone from the team at Imperial College led by Professor Jack Rutter, who are probably our best specialists. They state that 'ozone concentrations recorded at a Black Forest site (and three other rural mountain sites in Germany) are above those which have been shown in fumigation experiments to cause visible injury and growth reductions in certain sensitive tree species.' They think it 'quite plausible' that ozone is a factor in the German forest decline.

There are some experimental as well as field observations that suggest that ozone may be a primary agent of leaf cell damage, opening the way for percolating rainwater to remove calcium, magnesium and other vital nutrients. When spruce seedlings are exposed to a combination of acid mist and ozone, leaching of magnesium may rise by 20 to 30% - enough to account for the deficiency seen in the field. Calcium and sulphate were also present at enhanced levels in the water dripping from the branches.

The best present hypothesis is therefore that ozone (and probably also sulphur dioxide, where present in high enough concentrations) damages the leaf tissues, and that this increases the rate at which percolating rainwater removes essential ions. The more acid the rain, the higher the leaching rate. In turn, the roots are stressed in attempting to make good the deficiency. Cold and drought may aggravate the situation. In soils with little neutralizing capacity there may be an accumulation of acidity, leading to toxic aluminium ion release and a vicious cycle of deterioration. The details of the model are far from firm, but the point is that the present evidence points to acid deposition and ozone acting together.

This in turn affects our judgement of how the forests might respond to curative measures.

For it implies that sulphur dioxide concentrations may not be the most sensitive variable, and that reducing SO₂ emissions alone might well have only limited effect. It implies that total deposited acidity and ozone concentration may both be key factors, and this points to

action to curb nitrogen oxides and hydrocarbons as ozone precursors as well as SO₂. Some models imply that hydrocarbon concentrations are the primary determinant of ozone levels and that reducing nitrogen oxides would not ease the situation unless they were cut to very low levels (Eggleton, 1984). Other models involve action via the soil as well as directly on the foliage, and if these apply there could well be a time lag between reducing emissions and forest recovery : Ulrich (personal communication) has said that this could be measured in decades.

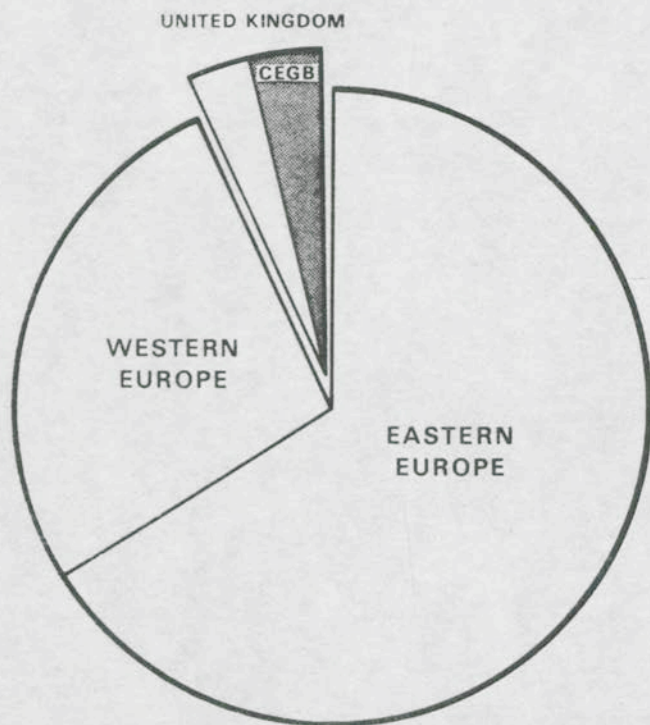
My personal view is that the recent hypotheses involving both acid deposition and ozone, with most impact where trees are stressed by climate, altitude or exposure, and with fungal pathogens and insects aggravating the situation once trees are weakened, is the most plausible. I therefore believe that remedial action may need to cover sulphur dioxide, nitrogen oxides and hydrocarbons. The German Government clearly takes this view, which is why they are seeking curbs on vehicle emissions as well as on those from power stations. And while forest damage is not now evident in the UK, it remains possible as does the confirmation of damage to sensitive crops and the evidence of acid corrosion of historic monuments. Reduction in these emissions would therefore be likely to bring some benefit to the UK environment.

Martin Holdgate
25 May 1984

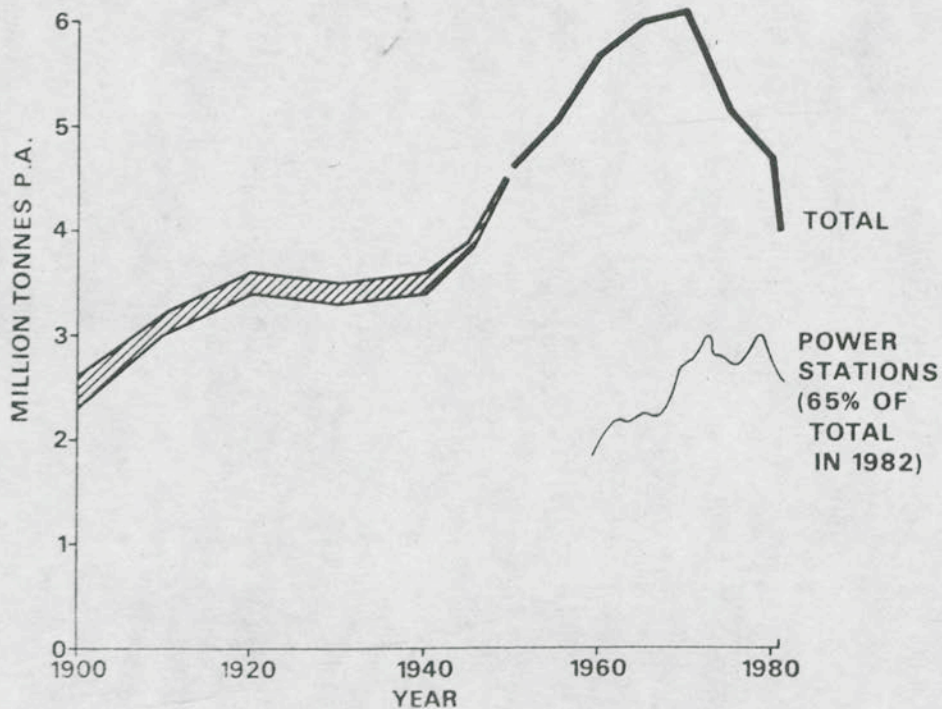
ABATEMENT

1. European SO₂ Emissions
2. Trends in SO₂ Emissions, UK
3. Trends in NO_x Emissions, UK
4. SO₂ Emissions and Sulphate Deposition
5. Precursors of Acid Rain
6. Hydrocarbons are Important
7. Points of Attack
8. SO₂: Coal Preparation
9. SO₂: Limestone Injection
10. SO₂: Flue Gas Desulphurisation
- 11 a/b FGD -- Size and Costs
12. SO₂: Fuel Switching
13. SO₂: Fluidised Bed Combustion
- 14 a/b NO_x: Combustion Control
15. NO_x: Flue Gas Treatment
16. CEEB Action Programme
17. SO₂: Contributions to Abatement

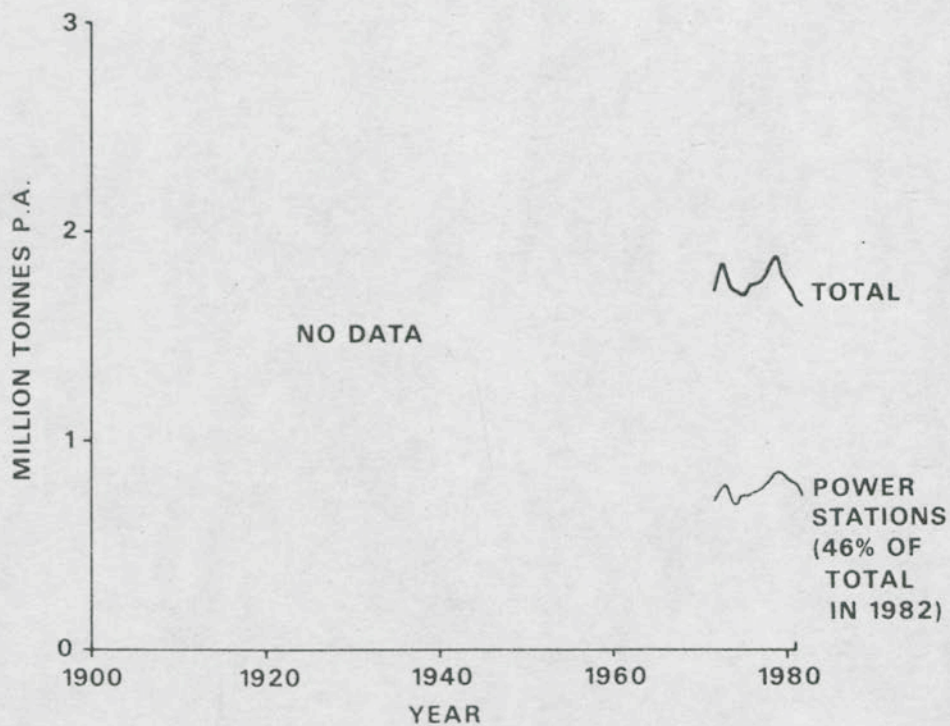
SULPHUR DIOXIDE EMISSIONS 1982



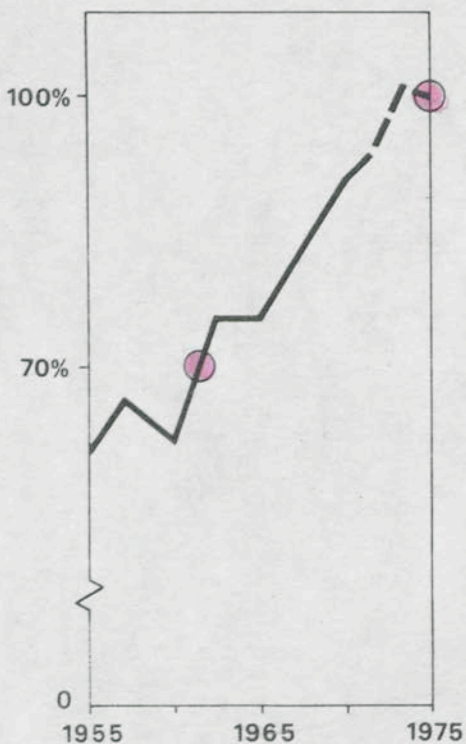
UK SULPHUR DIOXIDE EMISSIONS



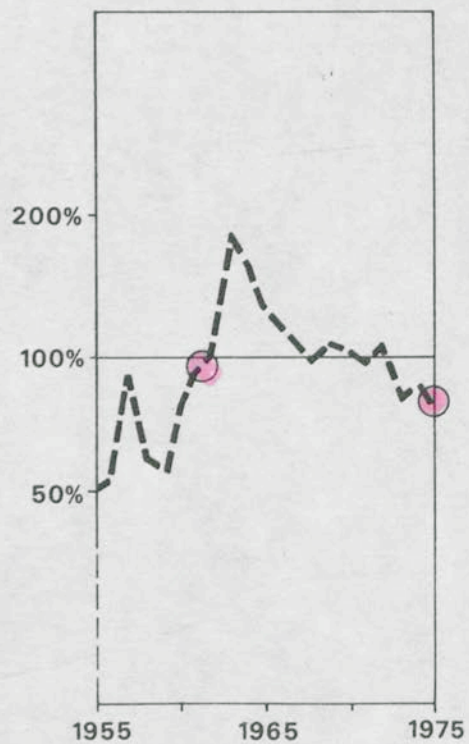
UK NO_x EMISSIONS

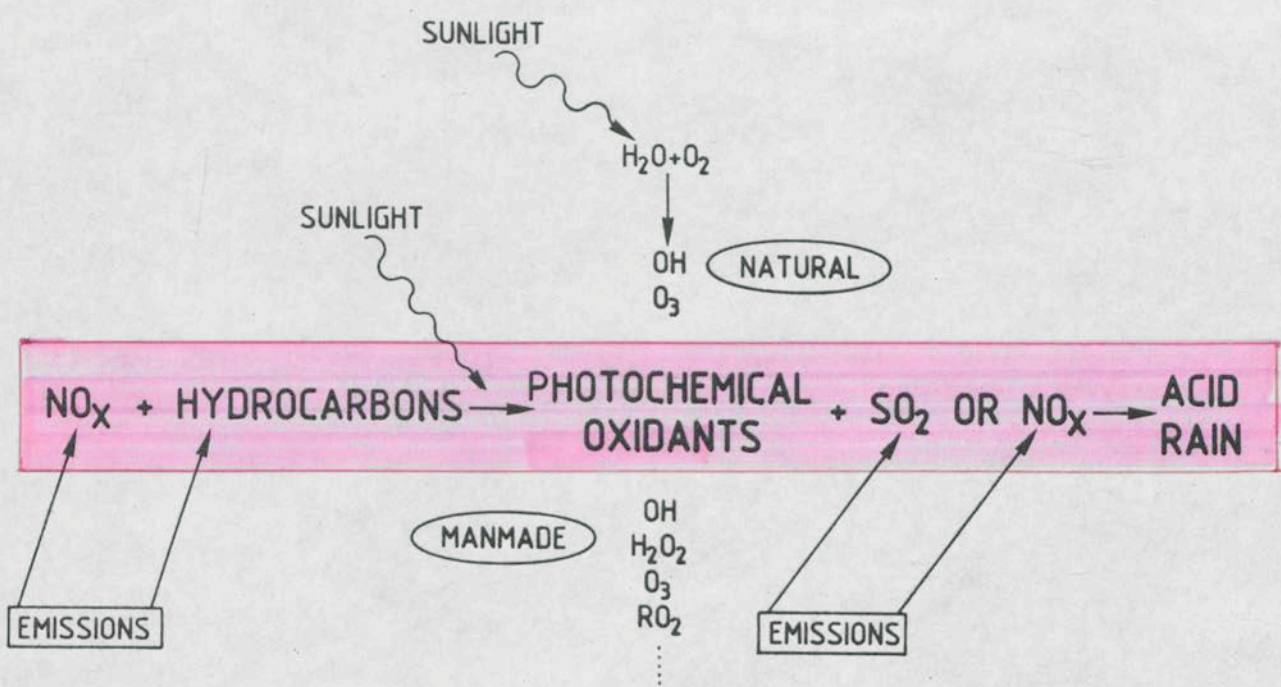


EUROPEAN SO₂ EMISSIONS

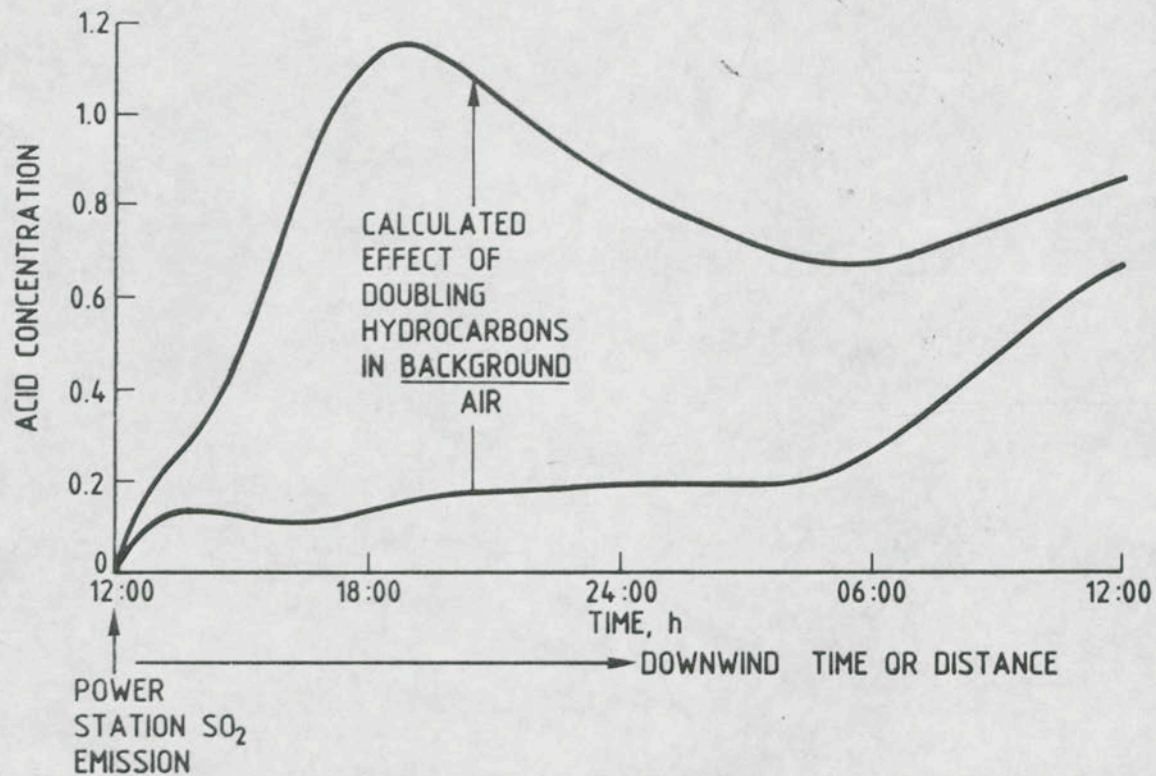


SCANDINAVIAN SULPHATE DEPOSITION



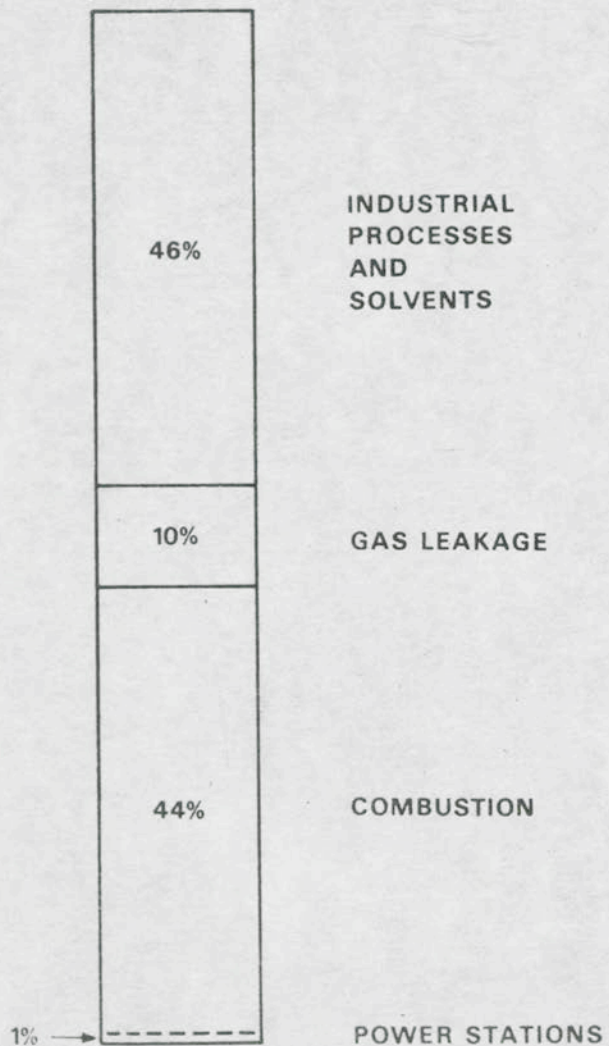


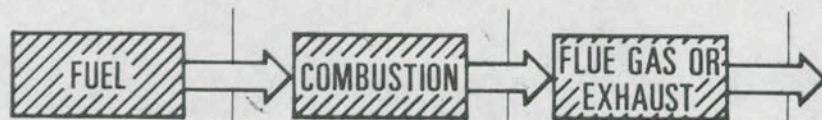
PRECURSORS OF ACID RAIN.



HYDROCARBONS ARE IMPORTANT

NON-METHANE HYDRO CARBONS 1982

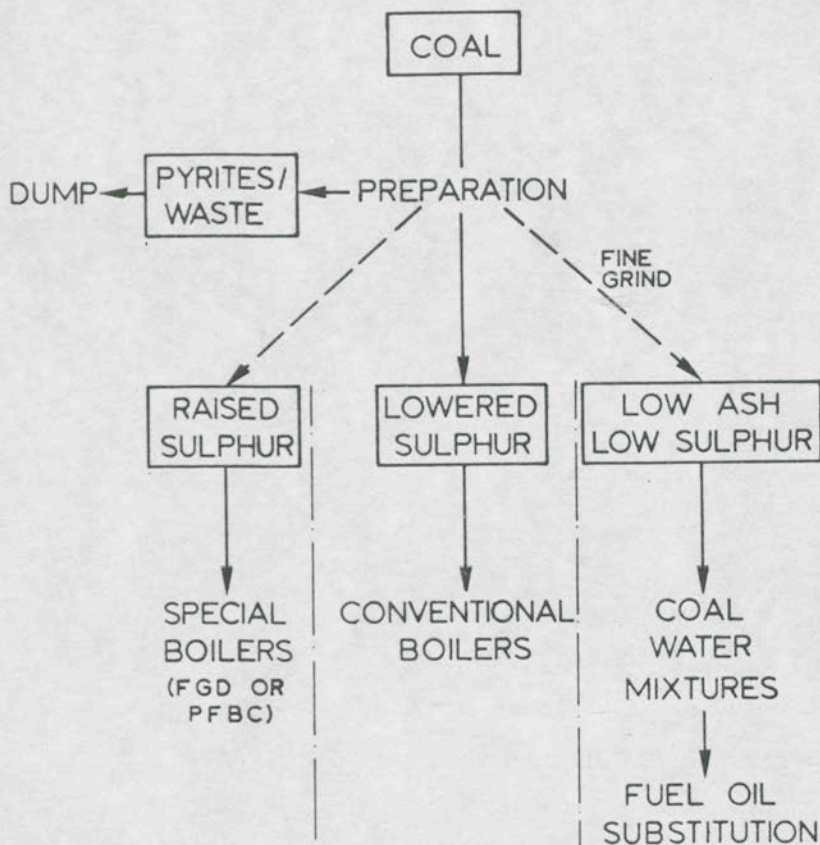




		FUEL	COMBUSTION	FLUE GAS OR EXHAUST	
INDUSTRY & HEATING	POWER STATIONS	SULPHUR (DIOXIDE)	SELECTION OR PROCESSING	ABSORB	WASH OUT
		NITROGEN OXIDES		REDUCE FORMATION	CONVERT
	TRANSPORT	HYDRO-CARBONS	PREVENT LEAKAGE. ETC	EFFICIENT COMBUSTION	CONVERT

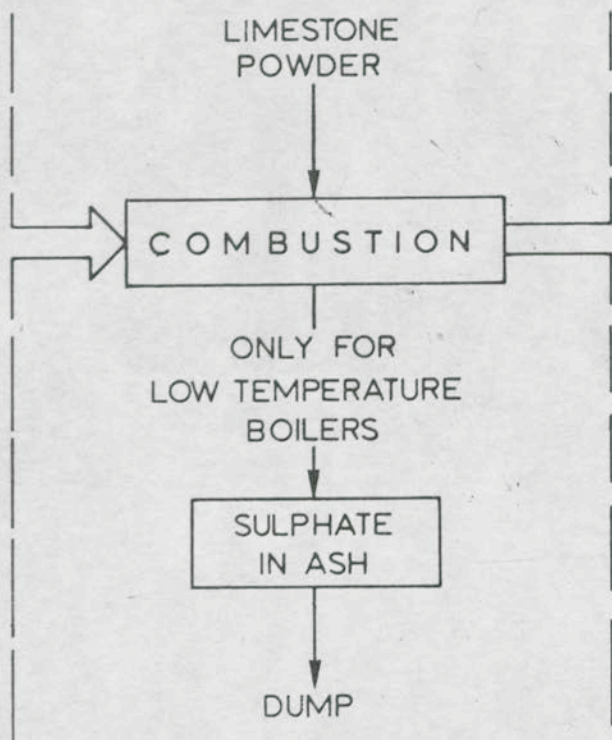
POINTS OF ATTACK

SO₂: COAL PREPARATION



SULPHUR EXTRACTED	—	~ 8%	UP TO 30%
COST/tonne SO ₂	?	£150 - £800	£1500 - £2500 (COAL) NO NET COST? (OIL)
STATUS	PAPER STUDIES	COMMERCIAL	DEVELOPMENT

SO₂ : LIMESTONE INJECTION



SULPHUR
EXTRACTED

UP TO 35%

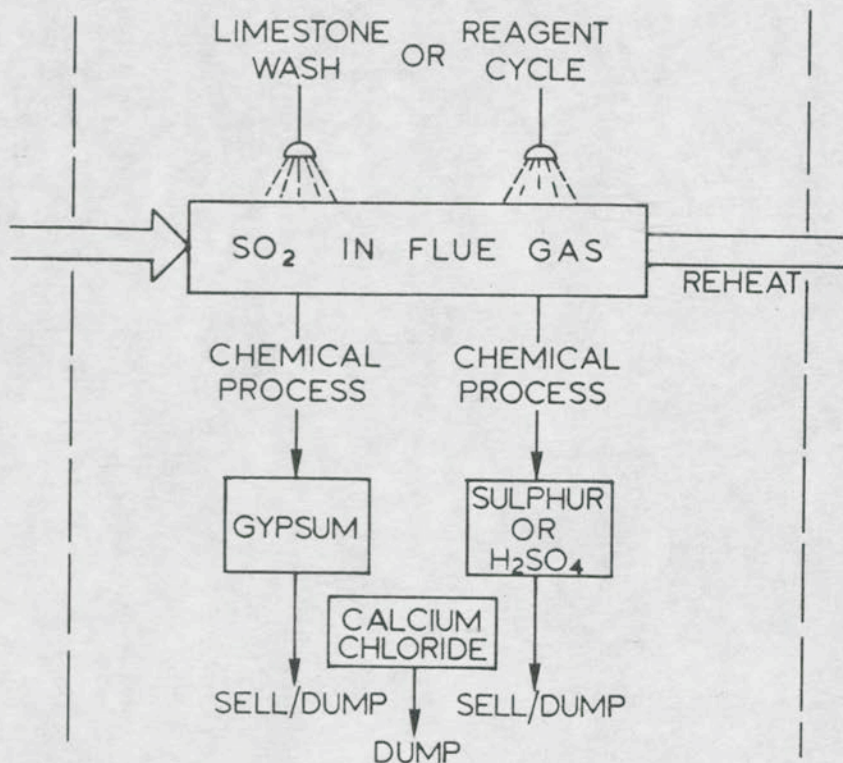
COST/tonne
SO₂

£400 PLUS

STATUS

UNPROVEN

SO₂ : FLUE GAS DESULPHURISATION



SULPHUR
EXTRACTED

90%

COST/tonne
SO₂

£200 - £400 (2000 MW(e))
£900 - £1600 (50 MW(t))

STATUS

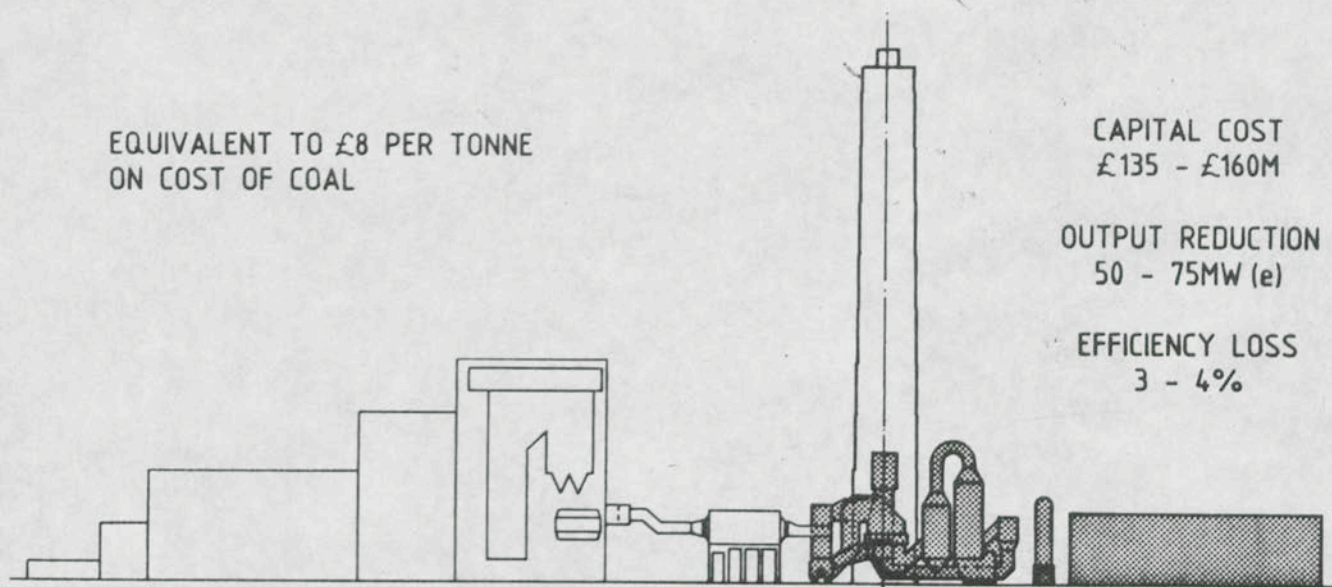
COMMERCIAL

EQUIVALENT TO £8 PER TONNE
ON COST OF COAL

CAPITAL COST
£135 - £160M

OUTPUT REDUCTION
50 - 75MW (e)

EFFICIENCY LOSS
3 - 4%



POWER STATION 2000 MW (e)

F.G.D. PLANT

COM(83)704

SO ₂ RETROFIT INVESTMENT		
REDUCTION ON 1980 %	TARGET DATE	
	1995	2000
60	£ 1400M	£ 1200M
30	£ 600M	£ 300M

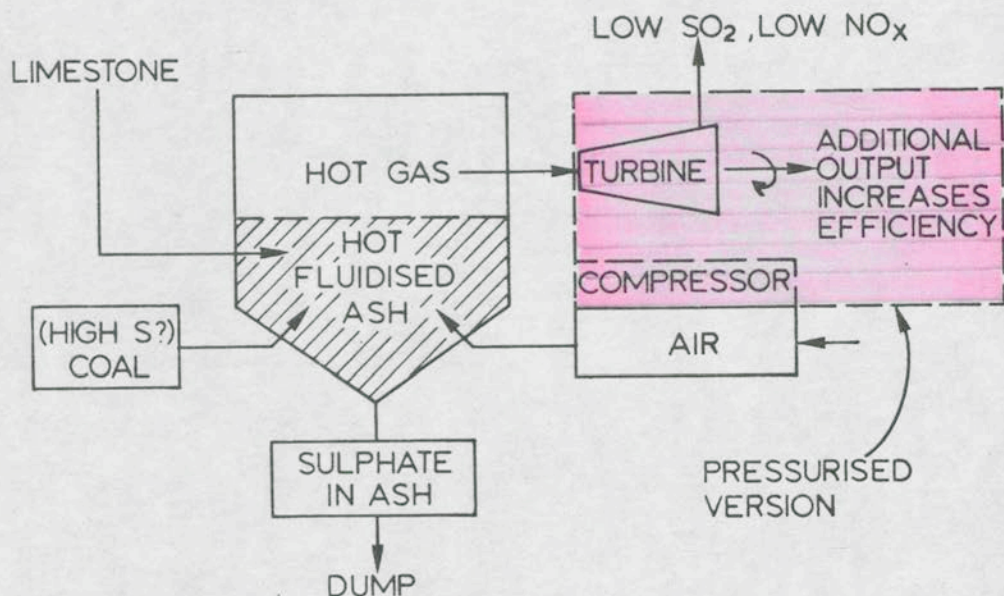
SO ₂ RETROFIT ANNUAL COST AT TARGET DATE		
REDUCTION ON 1980 %	TARGET DATE	
	1995	2000
60	£ 350M	£ 280M
30	£ 140M	£ 60M

(SCENARIO C, MEDIUM NUCLEAR)

SO₂ : FUEL SWITCHING

	LOW SULPHUR COAL IMPORTS	LOW SULPHUR OIL IMPORTS	"DESULPHURISED" OIL	NUCLEAR SUBSTITUTION
SULPHUR ABATED	UP TO 50%	UP TO 65%	UP TO 65%	98%
COST/tonne SO ₂	(SAVING £200?)	£200 - £300	£600 - £1300	(SAVING ~ £800)
STATUS	COMMERCIAL	COMMERCIAL	COMMERCIAL	COMMERCIAL

FLUID BED COMBUSTION



SULPHUR
EXTRACTED

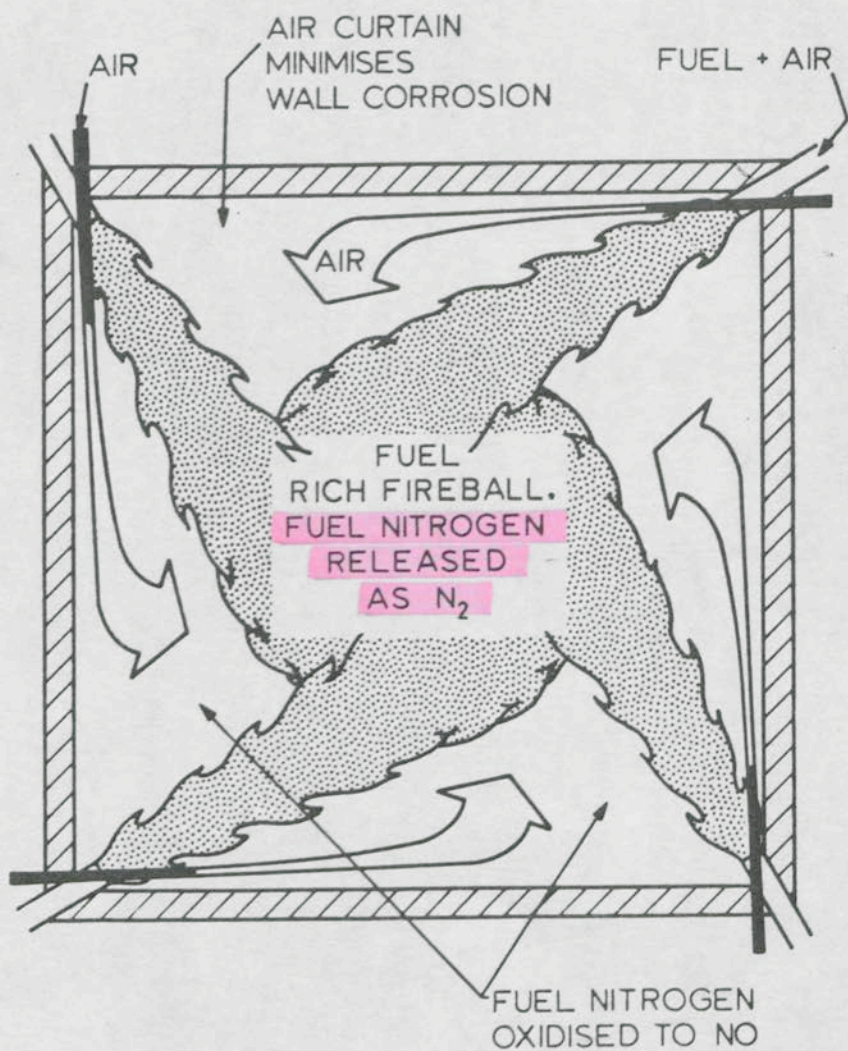
~60% ATMOSPHERIC
~80% PRESSURISED

COST/tonne
SO₂

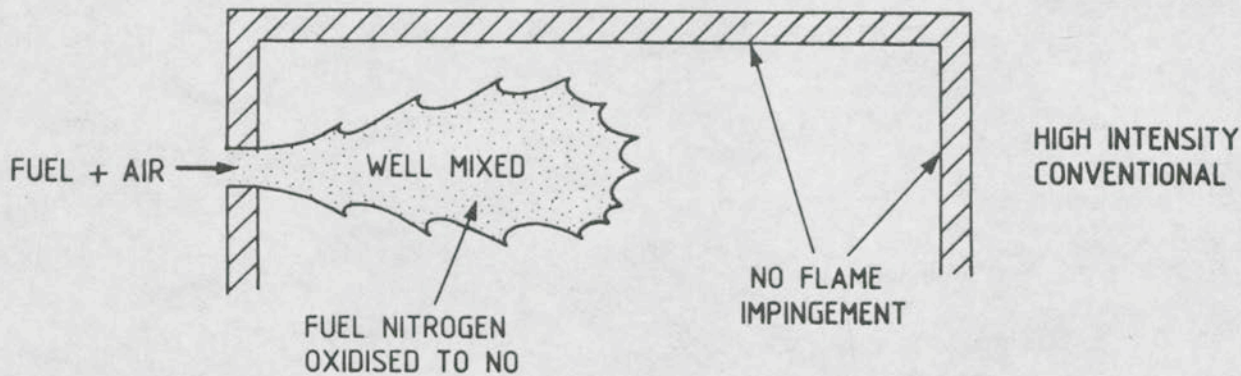
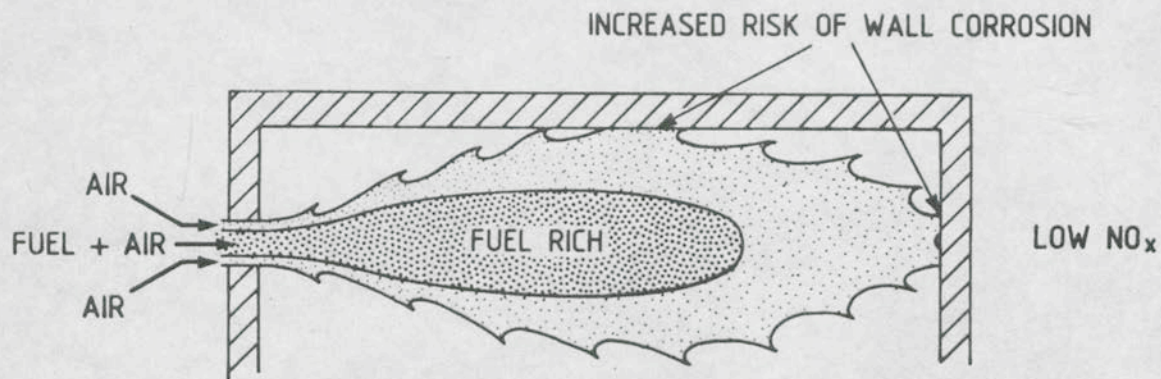
LESS THAN F.G.D.

STATUS

ATMOSPHERIC - COMMERCIAL DEMONSTRATION
PRESSURISED - FURTHER DEVELOPMENT AT
GRIMETHORPE (£25M+)



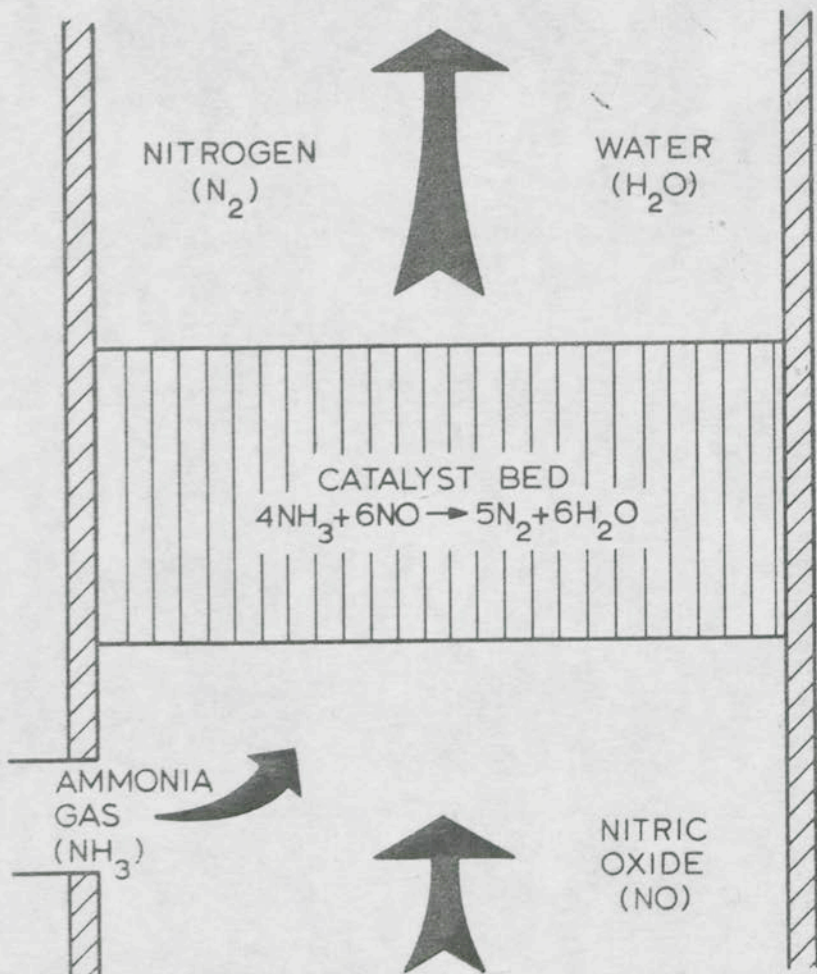
FUEL-RICH FIREBALL
PLAN VIEW



LOW NO_x BURNER (PLAN VIEW)

Cost approximately
equal to FGD
for NEW plant

~80% reduction



DRY FLUE GAS DE- NO_x

CONTROL TECHNOLOGY

CEGB ACTION PROGRAMME

SULPHUR DIOXIDE

POSSIBLE IMPACT

- | | |
|---|-----------|
| 1. Prepare for FGD if Necessary | Late 80's |
| 2. Explore Coal Preparation
- with NCB | Late 80's |
| 3. Develop Coal Water Mixtures | 1990 |

NITROGEN OXIDES

- | | |
|---------------------------------------|-----------|
| 4. Develop Low-NO _x Burner | Late 80's |
| 5. Pilot Rich-Fireball Trial | Late 80's |

SO₂ + NO_x

- | | |
|---|-------|
| 6. Develop Pressurised Fluid Bed
- with NCB (DEn) at Grimethorpe | 2000 |
| 7. Assess Gasification of Coal
- with BGC, NCB, DEn | 2000+ |

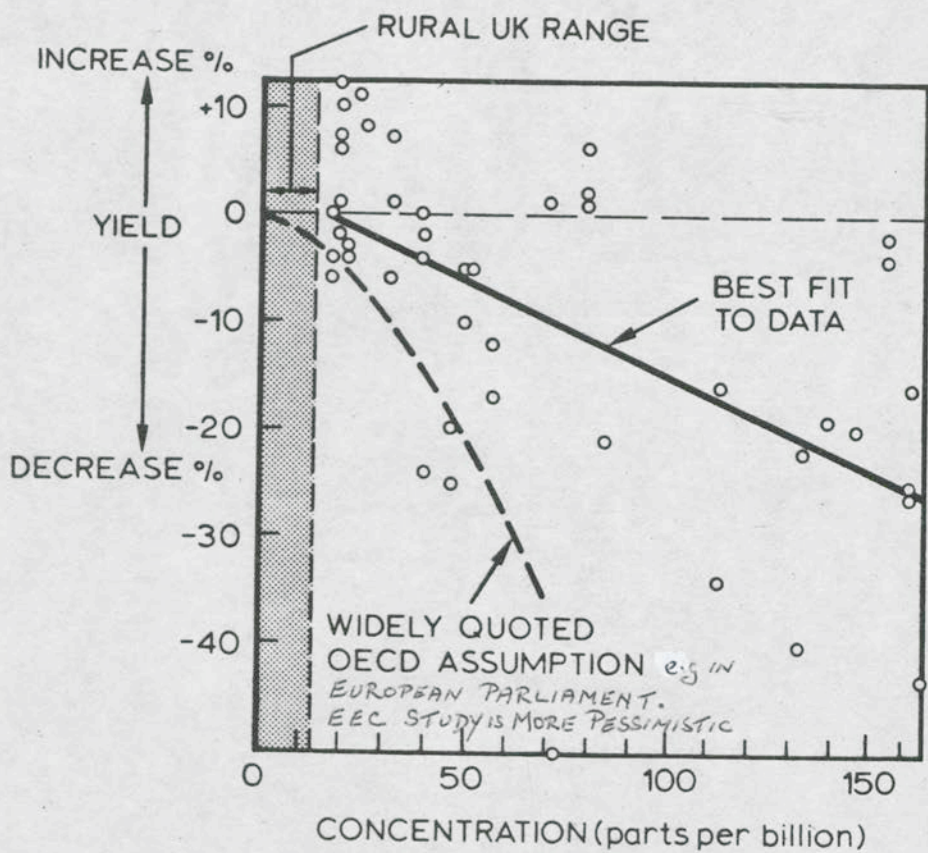
Cost ~ £ 50M Over 3 yrs

POSSIBLE CONTRIBUTIONS TO UK SO₂ ABATEMENT

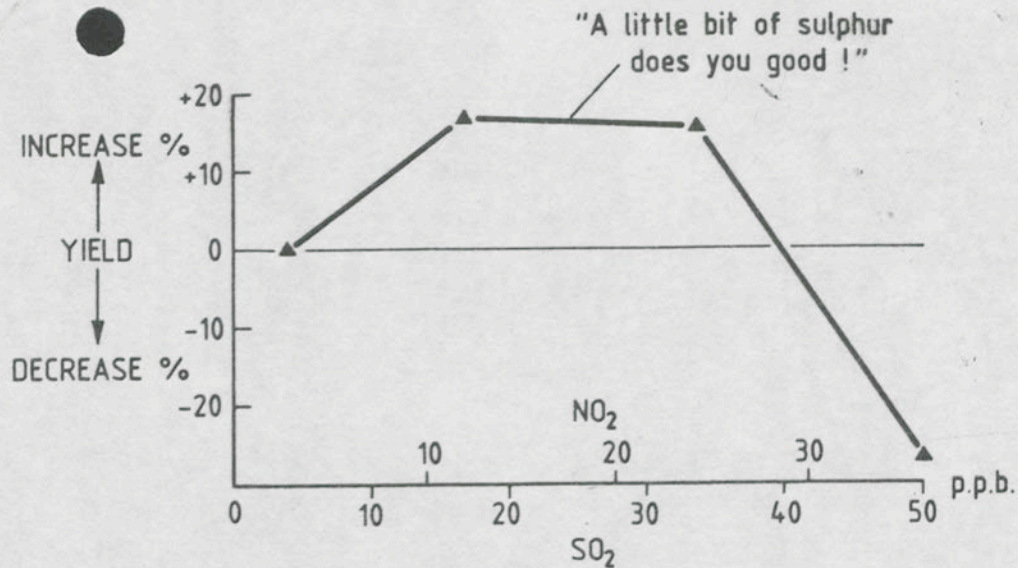
(UK 1980 ~ 4700 k tonnes SO₂, CEGB 55%)

	1995		2000	
	k tonnes	% of 1980	k tonnes	% of 1980
1. UK Reduction to 1982	(630)	(13)	?	
2. Two New 1100 MW Nuclear Stns.	160	3½		
3. Six New 1100 MW Nuclear Stns.	-	-	450	10
4. FGD, Retrofit to Power Stations	1500	32	1800?	38?
5. Controls, Other Industry	400?	9?	500?	11?
6. Coal Preparation	100	2	?	
7. 5 Mt Low S. Coal Import	100	2		
8. Refineries	?		?	
9. 10 Mt Low S. Fuel Oil	150	3		
10. 10 Mt Oil Substitution by Coal Water Mixture	70	1½	?	

NOT ALL ADDITIVE

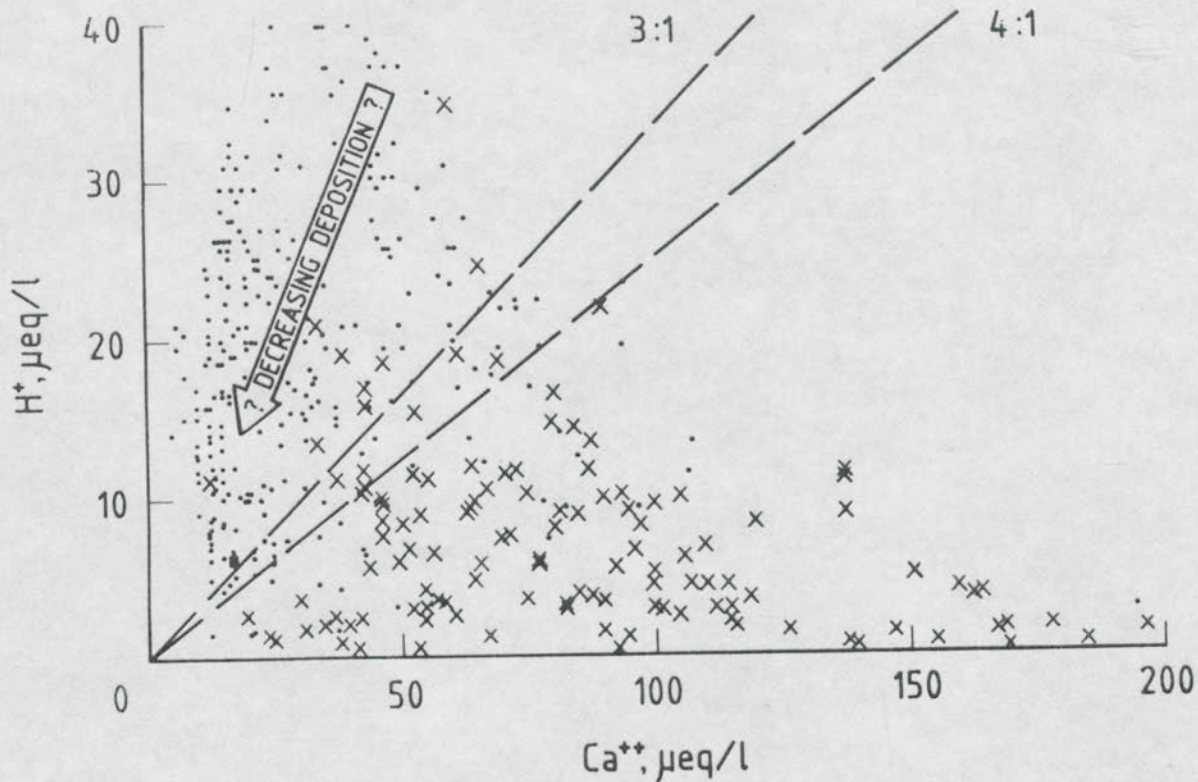


EFFECT OF SO₂ ON RYEGRASS
(1981)



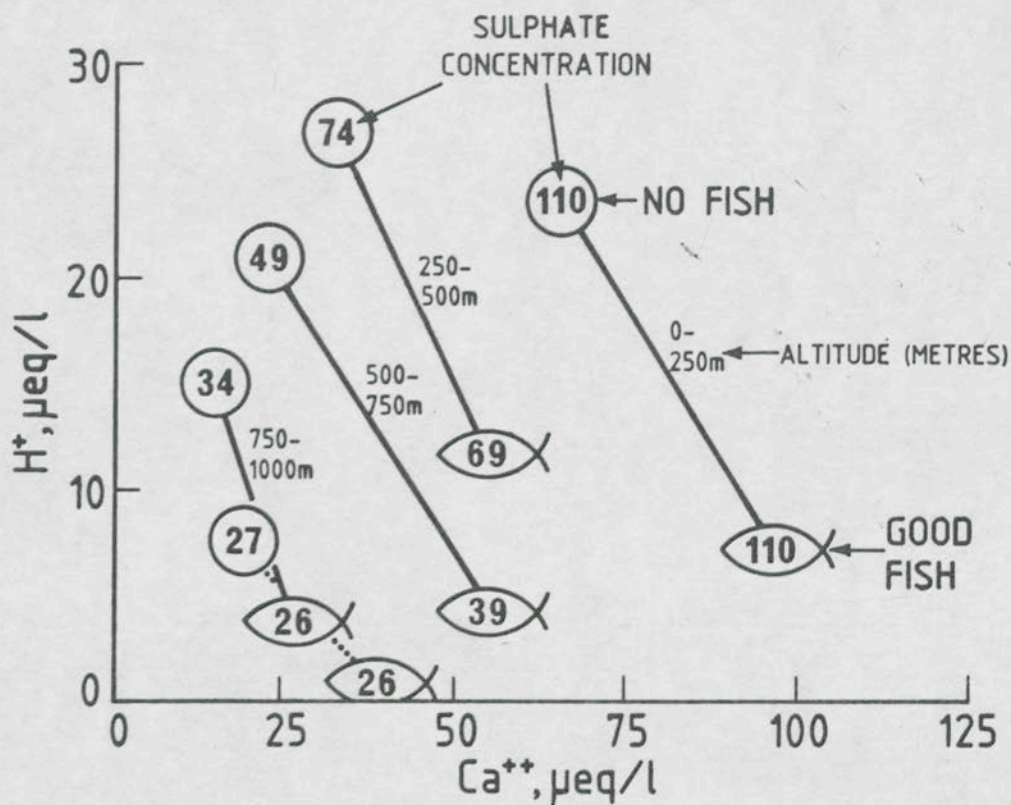
← RURAL → | ← URBAN →

EFFECT OF SO₂ & NO₂ ON WINTER BARLEY (1984)



• NO FISH x GOOD FISH

NORWEGIAN LAKES



NORWEGIAN LAKES - FISH STATUS
AND SULPHATE LEVELS

OBJECTIVES ACCEPTED BY THE ROYAL SOCIETY
AND THE SCANDINAVIAN ACADEMIES

1. In the affected areas of Southern Scandinavia, what are the factors, in addition to pH, that in practice determine the fishery status of lakes?
2. What are the biological, chemical and hydrogeological characteristics of catchments which determine whether the composition of surface waters falls within a range acceptable to fish?
3. In Southern Scandinavia, to what extent are these characteristics being adversely affected by the acid deposition itself?
4. What changes would be brought about in water chemistry and fishery status in Southern Scandinavia by given levels of reduction of man-made sulphur deposition?

These are ALL concerned with soil, water and fish.
NOT with forest damage.

IF the Academies believe there is good scientific reason to extend their work to forests, the CEGB has agreed to fund the extension.

SWEDISH CONCERN ON FORESTS

1972, Stockholm Conference

"We have found no good reason for attributing the reduction in growth to any cause other than acidification"

1982, Stockholm Conference

"The analysis . . . has not confirmed the declining growth that had earlier been implied. Norwegian investigations . . . have likewise been unable to establish any diminution of growth in the areas considered sensitive to acid precipitation"

1983, South Sweden

"Dieback" observed after one of the driest, sunniest summers on record for a century.



cc WO
Dr. Nicholson
FCO
DTRANS
CS, HMT
Kenneth Baker's Office, DTI
CO
MAFF
SO
8 June 1984

ce MATTER . 10 DOWNING STREET

From the Private Secretary

Dear John,

Acid Rain

Further to my letter of 30 May, I now enclose a record of the presentation on the subject of acid deposition which was held at Chequers on 27 May.

Also enclosed are papers tabled at the presentation by Sir John Mason, Dr. Martin Holdgate, and the CEGB.

I am sending copies of this letter and the enclosures to the recipients of my letter of 30 May.

*Yours ever,
David*

David Barclay

John Ballard Esq
Department of the Environment.

RECORD OF A PRESENTATION ON ACID DEPOSITION GIVEN AT
CHEQUERS ON SUNDAY 27 MAY 1984

Present:

The Prime Minister
The Secretary of State for the Environment
The Rt. Hon. Kenneth Baker, MP, Minister of State, DTI,
The Hon. William Waldegrave, MP, PUSS, HM Treasury
The Earl of Avon, PUSS, Department of Energy
Mr. David Pascall, No. 10 Policy Unit
Sir Walter Marshall, Chairman, CEGB
Dr. Peter Chester, Central Electricity Research Laboratory
Sir John Mason, Royal Society
Sir Hermann Bondi, NERC
Dr. Martin Holdgate, Department of the Environment
Dr. Robin Nicholson, Cabinet Office

The presentation had been arranged to give Ministers a fuller appreciation of the scientific background to forthcoming policy decisions on acid rain.

Introducing the presentation, Dr. Nicholson said that it had two objectives: first to present the scientific evidence; and secondly to describe the state of the art and possible developments in abatement technology.

Sources of Emissions

Dr. Nicholson then described the principal sources of emissions associated with acid deposition. In the Northern Hemisphere, 90% of the sulphur dioxide in the atmosphere was man-made. The proportion was much less in the Southern Hemisphere. In the United Kingdom, 65% of sulphur dioxide emissions came from power stations. Around 50% of atmospheric NOx was man-made, and of this amount nearly half

came from power stations, and another 34% from motor vehicles. Both sulphur dioxide and NOx could oxidise to give acid deposition. The other important ingredient was hydrocarbon, from unburnt motor fuels, spillages, leaks etc. The hydrocarbons were not a serious pollutant in themselves, but they played an important secondary role eg in production of ozone which could damage leaves.

Sulphur dioxide emissions in the UK had peaked in 1970, but declined substantially since then. Total European emissions had however increased dramatically over the same period, primarily because of developments in Eastern Europe. As a result of these two trends, the United Kingdom now accounted for 11% of European sulphur dioxide emissions, as opposed to 25% in 1950. There had been a steady rise in NOx emissions from motor vehicles, as the number on the roads had increased.

There were three basic approaches to abatement. First there was prevention of pollution at source - for example, the use of smokeless fuels, and lead-free petrol. Secondly, pollutants could be removed at or near the source - for example dust removers in industrial processes. Thirdly, it was sometimes possible to counter the ecological effects of particular pollutants - for example by liming acid lakes.

Chemical Changes in the Atmosphere

Sir John Mason described the complicated sequence of events which lay between emission of a pollutant and acid deposition. Gaseous sulphur dioxide and NOx from United Kingdom power stations could undergo a journey covering many miles and lasting many hours. Prediction of the consequences in terms of acid deposition was complex. It depended both on physical factors such as wind speed and direction, the stability of the atmosphere, and the presence of clouds or sunshine; and also on a complex chain of

chemical reactions, which themselves required atmospheric oxidising agents generated by ultra-violet light. There was thus no direct connection between emissions and deposition, as was illustrated by the fact that depositions were at a maximum in summer when emissions were at a minimum.

Moreover, there was no direct connection between acid deposition and damage to forests or lakes. Other speakers would explore this area in more detail. But it was important to note that external influences (eg the presence or absence of fertilisers) could be just as important as acid deposition.

Turning to the distribution of sulphurous depositions in Europe, Sir John Mason said that 80% of sulphur falling in the UK was home-made. But UK emissions played a relatively small role in the problems of Scandinavia - for example 6% of sulphur falling in Sweden came from UK sources. In the United Kingdom rain was acid everywhere, with an average pH of between 4.2 and 4.5 compared with 5.6 for uncontaminated rain. Such evidence as there was suggested that the degree of acidity had been roughly constant between 1954 and 1976, although it might now be increasing slightly. The Norwegians claimed that the average pH value of rain had moved from 4.5 to 4 between 1955 and 1970, but the evidence for this was questionable.

Summing up, Sir John Mason said that long term changes in acidity seemed less important than short term episodes. Heavy acid deposition occurred on perhaps 10 days each year. There was good evidence that the mortality of fish in Scandinavian lakes was related to heavy rain after a long dry spell, or to snow melt, since both these circumstances produced a surge of acid. This suggested that strategies could be developed to prevent the worst effects of acid deposition if periods of heavy rainfall or sudden temperature rise could be predicted. For example, power

stations might change over to low sulphur fuels at a week's notice.

Lakes and Streams

Sir Hermann Bondi described the effects of acid depositions on lakes and streams. The process started on land, and in some circumstances the acidity of rain could increase markedly between the time it fell and the time it reached a stream or lake. For example, water running down the trunk of a conifer leached out acidic substances from the tree itself and became more acidic. The phenomenon was less apparent with deciduous trees. Forest management thus assumed critical importance. If trees were felled selectively, rather than in large areas, less acid was released. A still more effective technique was whole tree removal, which avoided the acidic decomposition of brushwood. There was evidence also that the disturbance of moorland could produce a pulse of acidity in streams. In Great Britain, there was evidence of significant damage to fresh water mainly in the North East and in certain parts of Scotland. These changes seemed to be associated with large scale changes in land use.

Forest Damage

Dr. Holdgate spoke first about the history of sulphur dioxide pollution. Originally, the problem had been associated with acute damage near industrial sites, but these had become less significant since the clean air policy had taken effect. Concern revived in 1972, when the Swedes reported forest damage associated with acid rain. However, their simplistic analysis had not stood up to technical criticism. Very recently, however, there were reports from Germany of a new kind of forest damage, and these lay behind the present international concern.

Damage had been observed first in silver fir trees, and later in other types. Conifers exhibited loss of needles, stunted growth, the thinning of tree tops, and increased infection by pests and funguses. In 1982, the German Government had estimated that 8% of their forests were badly affected. In 1983 after an exceptionally dry summer, the estimate was 34%, although 25% within this represented only slight damage. The effects were worst in Bavaria and the Black Forest. Fifty per cent of the silver fir population showed signs of damage, although this type of tree represented only 2% of German forests. However, 40% of spruce trees were also said to be damaged, and spruce represented 40% of the forest total. Whilst there was room for argument over the figures, it seemed clear that forest damage was a genuine phenomenon which affected large areas of Central Europe.

Dr. Holdgate then summarised current understanding of the causes of forest damage. The effect was correlated with altitude, drought and cold, and it particularly affected tall trees at the edge of forests. It seemed that factors such as soil type, cultivation techniques, and the presence of insects and funguses were significant. Pollution by gaseous sulphur dioxide was probably significant only in the remaining "hot spots" near industrial plants. There was a superficial correlation between wet acid deposition and forest damage, but the effect could not be reproduced in the laboratory. The favoured hypothesis was that both wet acid deposition and the presence of other "poisons" were necessary. Thus it appeared that high levels of ozone were a major factor in the German forest decline.

It seemed possible that ozone, and perhaps also sulphur dioxide itself, damaged the leaf cells, leaving them vulnerable through rainwater removing essential magnesium and calcium. The removal was aided if the rain itself was

acidic. As a result of the mineral loss, the roots of the tree were stressed by trying to make up the loss, and this weakening could be aggravated by cold and drought. It was argued by some authorities that very high levels of acidity could lead to the release of aluminium in the soil, which poisoned the root.

Summing up his contribution, Dr. Holdgate said that sulphur dioxide alone was probably not the most sensitive variable in the process of forest damage. It was at least as important to control emissions of NOx and hydrocarbons, which led to the production of ozone.

Abatement Technologies for Power Stations

Dr. Peter Chester discussed the application of abatement technology at UK power stations. He emphasised that the effect of any particular reduction in emissions was impossible to predict. One reason for this was that the supply of photo-chemical oxidants from hydrocarbons might well be the limiting factor.

Possible techniques for abating sulphur dioxide emissions included the removal of sulphur from coal; the injection of limestone (although this would be difficult to apply in the UK, because of the high flame temperature employed); and flue gas desulphurisation. The latter technique could remove about 90% of the sulphur dioxide in flue gas, and had been operated successfully elsewhere in the world. However, it produced calcium chloride, which was difficult to dispose of, and it was extremely costly to retro-fit and only slightly less costly if incorporated in a newly built power station. The capital cost would be in the region of £135-£160 million per 2000 MW power station. In addition each such station would suffer a reduction in output of between 50 and 75 MW, and there would be an efficiency loss of 3-4%. These costs were equivalent to an

/ Dr. Chester

increase of £8 per tonne in the price of coal. The Prime Minister commented that costs of this order were quite prohibitive.

Dr. Chester continued that, because of the high cost of flue gas desulphurisation, the CEGB was exploring alternative technologies. The most promising was fluidised bed combustion - this would be cheaper than FGD, and involve a smaller loss of energy, but it would not be available until about the year 2000. As for emissions of NO_x, the preferred route would be to keep air away from the fuel for as long as possible by altering the dimensions of the flame in burners. But there was a risk of greater corrosion, which meant that the cost of the 40% reduction by 1995 which the EEC was seeking could be substantial. The Japanese had adopted a different approach which involved removing NO_x from flue gas. But equipment of this sort was much more expensive and was difficult to fit in addition to flue gas desulphurisation.

In conclusion, Dr. Chester emphasised the high costs involved in rapid reductions of SO₂ and NO_x emissions, and the uncertain result in terms of reduced damage to forests and to fresh water. The figures he had quoted were for the CEGB only. It was important to remember that the rest of industry would also face additional burdens.

Abatement Technologies for Vehicles

Dr. Nicholson said that vehicles were as important a source of NO_x and hydrocarbon pollution as power stations and one of the main sources of hydrocarbons. The Americans had tackled the problem by requiring the fitting of three-way catalyts. These were effective when new, but tended to deteriorate rapidly in use. Indeed, some drivers simply removed them. They were expensive to instal (£600

per car) and maintain, and carried a significant penalty in terms of reduced fuel economy (a loss of 10%). Overall, the technology of the three-way catalyst was not highly regarded, although it was fashionable in some quarters.

The preferred solution to vehicle emission control from the UK's point of view was undoubtedly the lean-burn engine. This involved increasing the proportion of air to fuel in the cylinder. Lean-burn technology was favoured by BL and by Ford of Europe, by the French motor manufacturers and by the smaller German manufacturers. It cost very much less per vehicle than the fitting of catalysts (about £100), involved no maintenance costs, and was more resilient. Lean-burn engines could be adjusted either to minimise emissions, or to maximise fuel economy but even with the former, overall fuel economy was not adversely affected.

Concluding, Dr. Nicholson said that improvements in emissions from vehicles were only part of the story for hydrocarbons. Pollution from spillage and leakage of fuel should not be overlooked.

8 June 1984



DEPARTMENT OF TRANSPORT
2 MARSHAM STREET LONDON SW1P 3EB

01-212 3434

pa
Dus
7/6

CE/D
Prime Minister²

Mr Ridley suggests an initiative in the Community to take land out of agriculture. Await colleagues?
6 June 1984

Dus
6/6

ms

The Rt Hon Patrick Jenkin MP
Secretary of State for the Environment
Department of the Environment
Room N16/05
2 Marsham Street
LONDON SW1P 3EB

Dear Patrick

UK ENVIRONMENTAL ACHIEVEMENTS

PA 315.84

I agree with Arthur Cockfield's comments on the booklet on Environmental achievements, and share his concern about the public perception of our farming policy. The protection of the countryside and of wildlife is rightly of great and growing public concern, and we ought to have a better tale to tell.

I have just read Kenneth Carlisle's excellent CPC booklet "Conserving the Countryside", which makes alarming reading. It confirms, to my mind, the need for us to give a stronger lead.

My view is that the issue of protecting the natural countryside and wildlife habitats is inextricably bound up with farming policy, and that is bound up with the Common Agricultural Policy. To make progress I believe we ought to plan an initiative within Europe, expressed in terms of a deliberate policy of taking land out of intensive agricultural production across the Community in order to preserve and extend natural countryside areas. The Americans have succeeded in setting aside something like 50 million acres. I see no reason why the EEC Member States cannot agree to a set aside policy too. This would make a sizeable contribution to reducing surpluses.

I think this issue is of great political importance and I therefore suggest it would be a good idea to establish a working party to formulate a policy designed to reverse the process of despoilation of the countryside. If we can persuade Europe to adopt such a policy we would achieve two of our objectives - ~~protecting~~ important sites and reducing European farm production.

I am copying this letter to recipients of your Private Secretary's letter.

Nicholas Ridley

NICHOLAS RIDLEY

Env Affairs. Acid Rain Pt 2

JN 1984

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The Prime Minister
10 Downing Street
Whitehall,
London, SW1

Our ref RL/PFC/DSL
06/05/01.3

Your ref

Date 5 June 1984

Dear Prime Minister,

Chemical Reactions Producing Acid Rain

At the meeting at Chequers on 27 May you said you would like to see a list of the chemical reactions involved in the formation of acid rain. Diagram 6 of my Presentation involved the 93 reactions listed in the attachment. Of these the fifteen marked "***" are the vital steps in the formation of photochemical oxidants.

A glance at the list will give you some idea of the complexity of the processes involved and the role played by hydrocarbons.

Yours sincerely,

P.F. Chester
Research Director

cc: Sir Walter Marshall
Dr. Robin Nicholson, Cabinet Office

REACTIONS USED IN CERL ATMOSPHERIC ACIDITY MODEL

(Diagram 6 presented on 27.5.84)

Those marked ** are important for the formation of photochemical oxidants.

Those marked N make a negligible contribution to overall result.

Table 6

	<u>Reaction</u>	<u>Rate Constant^a</u>
	1. $\text{NO} + \text{O}_3 \rightarrow \text{NO}_2 + \text{O}_2$	$51.7 \exp(-1450/T)$
N.	2. $2\text{NO} + \text{O}_2 \rightarrow 2\text{NO}_2$	$2.0 \times 10^{-12} \exp(530/T)$
**	3. $\text{NO}_2 + h\nu \rightarrow \text{NO} + \text{O}$	$7.8 \times 10^{-3} \text{ s}^{-1}{}^b$
**	4. $\text{O} + \text{O}_2 + \text{M} \rightarrow \text{O}_3 + \text{M}$	$6.47 \times 10^{-2} \exp(510/T)$
N.	5. $\text{O} + \text{NO}_2 \rightarrow \text{NO} + \text{O}_2$	2.2×10^2
N.	6. $\text{O} + \text{NO} + \text{M} \rightarrow \text{NO}_2 + \text{M}$	$9.38 \exp(584/T)$
N.	7. $\text{O} + \text{NO}_2 + \text{M} \rightarrow \text{NO}_3 + \text{M}$	61
	8. $\text{NO}_3 + h\nu \rightarrow \text{NO}_2 + \text{O}$	$9.9 \times 10^{-2} \text{ s}^{-1}{}^b$
	9. $\text{NO}_3 + h\nu \rightarrow \text{NO} + \text{O}_2$	$4.0 \times 10^{-2} \text{ s}^{-1}{}^b$
	10. $\text{NO}_3 + \text{NO} \rightarrow 2\text{NO}_2$	4.6×10^2
	11. $\text{NO}_2 + \text{O}_3 \rightarrow \text{NO}_3 + \text{O}_2$	$2.95 \exp(-2450/T)$
N.	12. $\text{O}_3 + h\nu \rightarrow \text{O}_2 + \text{O}$	$5.1 \times 10^{-4} \text{ s}^{-1}{}^b$
**	13. $\text{O}_3 + h\nu \rightarrow \text{O}_2 + \text{O}(^1\text{D}_2)$	$3.2 \times 10^{-5} \text{ s}^{-1}{}^b$
	14. $\text{O}(^1\text{D}_2) + \text{M} \rightarrow \text{O} + \text{M}$	$4.92 \times 10^8 \exp(107/T) \text{ s}^{-1}$
**	15. $\text{O}(^1\text{D}_2) + \text{H}_2\text{O} \rightarrow 2\text{OH}$	3.0×10^3
	16. $\text{OH} + \text{OH} \rightarrow \text{H}_2\text{O} + \text{O}$	$2.46 \times 10^2 \exp(-550/T)$
	17. $\text{OH} + \text{OH} + \text{M} \rightarrow \text{H}_2\text{O}_2 + \text{M}$	$7.56 \exp(900/T)$
	18. $\text{H}_2\text{O}_2 + h\nu \rightarrow 2\text{OH}$	$3.6 \times 10^{-6} \text{ s}^{-1}{}^b$
	19. $\text{OH} + \text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{O} + \text{HO}_2$	$72.8 \exp(-164/T)$
	20. $\text{OH} + \text{O}_3 \rightarrow \text{O}_2 + \text{HO}_2$	$44.8 \exp(-930/T)$
**	21. $\text{HO}_2 + \text{HO}_2 \rightarrow \text{H}_2\text{O}_2 + \text{O}_2$	62
	22. $\text{HO}_2 + \text{O}_3 \rightarrow 2\text{O}_2 + \text{OH}$	$0.344 \exp(-580/T)$
	23. $\text{HO}_2 + \text{OH} \rightarrow \text{H}_2\text{O} + \text{O}_2$	7.4×10^2
	24. $\text{NO} + \text{OH} + \text{M} \rightarrow \text{HNO}_2 + \text{M}$	3.0×10^2
	25. $\text{NO} + \text{HO}_2 \rightarrow \text{NO}_2 + \text{OH}$	$81.2 \exp(254/T)$
	26. $\text{NO}_2 + \text{OH} + \text{M} \rightarrow \text{HNO}_3 + \text{M}$	$2.31 \times 10^{13} \exp((-26.6 T/(17.4 + T)) - 0.5 \ln(T/280))$

Table 6 (Cont.)

	<u>Reaction</u>	<u>Rate Constant^a</u>
	27. $\text{NO}_2 + \text{HO}_2 + \text{M} \rightarrow \text{HO}_2\text{NO}_2 + \text{M}$	25
	28. $\text{HO}_2\text{NO}_2 + \text{M} \rightarrow \text{NO}_2 + \text{HO}_2 + \text{M}$	$1.4 \times 10^{14} \exp(-10420/T) \text{ s}^{-1}$
	29. $\text{HNO}_2 + h\nu \rightarrow \text{NO} + \text{OH}$	$2.8 \times 10^{-3} \text{ s}^{-1}{}^b$
	30. $\text{HNO}_3 + h\nu \rightarrow \text{NO}_2 + \text{OH}$	$5.6 \times 10^{-7} \text{ s}^{-1}{}^b$
	31. $\text{HNO}_2 + \text{OH} \rightarrow \text{H}_2\text{O} + \text{NO}_2$	1.4×10^2
	32. $\text{HNO}_3 + \text{OH} \rightarrow \text{H}_2\text{O} + \text{NO}_3$	2.0
	33. $\text{NO}_3 + \text{NO}_2 \rightarrow \text{NO} + \text{O}_2 + \text{NO}_2$	$5.59 \exp(-1000/T)$
	34. $\text{NO}_3 + \text{NO}_2 + \text{M} \rightarrow \text{N}_2\text{O}_5 + \text{M}$	$3.64 \exp(861/T)$
	35. $\text{N}_2\text{O}_5 + \text{M} \rightarrow \text{NO}_2 + \text{NO}_3 + \text{M}$	$1.24 \times 10^{14} \exp(-10317/T) \text{ s}^{-1}$
	36. $\text{N}_2\text{O}_5 + \text{H}_2\text{O} \rightarrow 2\text{HNO}_3$	3.2×10^{-7}
	37. $\text{SO}_2 + h\nu \rightarrow \text{SO}_2(^3\text{B}_1)$	$1.7 \times 10^{-5} \text{ s}^{-1}{}^b$
	38. $\text{SO}_2(^3\text{B}_1) + \text{M} \rightarrow \text{SO}_2 + \text{M}$	$2.0 \times 10^6 \text{ s}^{-1}$
	39. $\text{SO}_2(^3\text{B}_1) + \text{O}_2 \rightarrow \text{SO}_3 + \text{O}$	0.07
N.	40. $\text{O} + \text{SO}_2 + \text{M} \rightarrow \text{SO}_3 + \text{M}$	$20.6 \exp(-1120/T)$
	41. $\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$	22
	42. $\text{SO}_2 + \text{OH} + \text{M} \rightarrow \text{HSO}_3 + \text{M}$	30
	43. $\text{SO}_2 + \text{HO}_2 \rightarrow \text{SO}_3 + \text{OH}$	2.2×10^{-2}
	44. $\text{SO}_2 + \text{NO}_3 \rightarrow \text{SO}_3 + \text{NO}_2$	0.25
N.	45 ^c . $\text{RCH}=\text{CH}_2 + \text{O} + x\text{NO} \xrightarrow{\text{O}_2} \text{RCHO} + \text{HCHO} + x\text{NO}_2 + y\text{O}_3$	$1.01 \times 10^2 \exp(-38/T) \text{ s}^{-1}{}^d$
	46 ^c . $\text{RCH}=\text{CH}_2 + \text{O}_3 + x\text{NO} \xrightarrow{\text{O}_2} \text{RCHO} + \text{HCHO} + x\text{NO}_2 + y\text{O}_3$	$0.15 \exp(-1900/T) \text{ s}^{-1}{}^d$
**	47. $\text{RCH}=\text{CH}_2 + \text{OH} \xrightarrow{\text{O}_2} \text{R}'\text{O}_2 + \text{H}_2\text{O}$	$1.9 \times 10^2 \text{ s}^{-1}{}^d$
**	48. $\text{RCH}=\text{CH}_2 + \text{OH} \xrightarrow{\text{O}_2} \text{R}'\text{CHO} + \text{HO}_2$	$1.2 \times 10^2 \text{ s}^{-1}{}^d$

Table 6 (Cont.)

	Reaction	Rate Constant ^a
**	49. $\text{RCHO} + \text{h}\nu \xrightarrow{2\text{O}_2} \text{RO}_2 + \text{CO} + \text{HO}_2$	$8.6 \times 10^{-5} \text{ s}^{-1 \text{ b, d}}$
**	50. $\text{OH} + \text{CO} \xrightarrow{\text{O}_2} \text{CO}_2 + \text{HO}_2$	7.4
N.	51. $\text{RCHO} + \text{O} \xrightarrow{\text{O}_2} \text{RCO}_3 + \text{OH}$	13^{d}
**	52. $\text{RCHO} + \text{OH} \xrightarrow{\text{O}_2} \text{RCO}_3 + \text{H}_2\text{O}$	$3.9 \times 10^2^{\text{d}}$
**	53. $\text{RCO}_3 + \text{NO}_2 + \text{M} \rightarrow \text{PAN} + \text{M}$	$1.2 \times 10^2^{\text{d}}$
**	54. $\text{RCO}_3 + \text{NO} \xrightarrow{\text{O}_2} \text{RO}_2 + \text{CO}_2 + \text{NO}_2$	$2.1 \times 10^2^{\text{d}}$
	55. $\text{RCO}_3 + \text{SO}_2 \xrightarrow{\text{O}_2} \text{RO}_2 + \text{CO}_2 + \text{SO}_3$	$7.0 \times 10^{-3}^{\text{d}}$
	56. $\text{HCHO} + \text{h}\nu \rightarrow \text{CO} + \text{H}_2$	$9.9 \times 10^{-5} \text{ s}^{-1 \text{ b}}$
**	57. $\text{HCHO} + \text{h}\nu \xrightarrow{2\text{O}_2} 2\text{HO}_2 + \text{CO}$	$2.7 \times 10^{-5} \text{ s}^{-1 \text{ b}}$
	58. $\text{H}_2 + \text{OH} \xrightarrow{\text{O}_2} \text{HO}_2 + \text{H}_2\text{O}$	$8.86 \times 10^2 \exp(-2590/T)$
N.	59. $\text{HCHO} + \text{O} \xrightarrow{\text{O}_2} \text{HO}_2 + \text{CO} + \text{OH}$	$4.92 \times 10^2 \exp(-1450/T)$
**	60. $\text{HCHO} + \text{OH} \xrightarrow{\text{O}_2} \text{H}_2\text{O} + \text{HO}_2 + \text{CO}$	2.6×10^2
	61. $\text{RO}_2 + \text{NO} \xrightarrow{\text{O}_2} \text{R}'\text{CHO} + \text{HO}_2 + \text{NO}_2$	88^{e}
	62. $\text{RO}_2 + \text{HO}_2 \rightarrow \text{ROOH} + \text{O}_2$	$1.89 \exp(1296/T)^{\text{e}}$
	63. $2\text{RO}_2 \xrightarrow{\text{O}_2} 2\text{R}'\text{CHO} + 2\text{HO}_2$	3.9^{e}
	64. $\text{RO}_2 + \text{SO}_2 \xrightarrow{\text{O}_2} \text{SO}_3 + \text{RCHO} + \text{HO}_2$	$6.0 \times 10^{-2}^{\text{e}}$
	65. $\text{RH} + \text{OH} \xrightarrow{\text{O}_2} \text{RO}_2 + \text{H}_2\text{O}$	50^{f}
	66. $\text{HCl} + \text{OH} \rightarrow \text{H}_2\text{O} + \text{Cl}$	$73.8 \exp(-425/T)$
	67. $\text{Cl} + \text{RH} \xrightarrow{\text{O}_2} \text{HCl} + \text{RO}_2$	$1.79 \times 10^3 \exp(-61/T)^{\text{e}}$

Table 6 (Cont.)

	<u>Reaction</u>	<u>Rate Constant^a</u>
68.	$\text{Cl} + \text{RCH}=\text{CH}_2 \xrightarrow{\text{O}_2} \text{HCl} + \text{RO}_2$	$7.3 \times 10^2{}^d$
69.	$\text{Cl} + \text{HCHO} \xrightarrow{\text{O}_2} \text{HCl} + \text{CO} + \text{HO}_2$	1.9×10^3
70.	$\text{Cl} + \text{RCHO} \xrightarrow{\text{O}_2} \text{HCl} + \text{RCO}_3$	$1.9 \times 10^3{}^d$
71.	$\text{Cl} + \text{H}_2 \xrightarrow{\text{O}_2} \text{HCl} + \text{HO}_2$	$8.61 \times 10^2 \exp(-2290/T)$
72.	$\text{OH} + \text{H}_2\text{S} \xrightarrow{2\text{O}_2} \text{H}_2\text{O} + \text{SO}_2 + \text{O} + \text{OH}$	1.3×10^2
73.	$\text{Cl} + \text{H}_2\text{S} \xrightarrow{2\text{O}_2} \text{HCl} + \text{SO}_2 + \text{O} + \text{OH}$	1.5×10^3
N. 74.	$\text{OH} + \text{OCS} \xrightarrow{2\text{O}_2} \text{SO}_2 + \text{CO}_2 + \text{O} + \text{OH}$	1.4
N. 75.	$\text{OH} + \text{CS}_2 \xrightarrow{2\text{O}_2} \text{SO}_2 + \text{OCS} + \text{O} + \text{OH}$	4.6
N. 76.	$\text{O} + \text{CS}_2 \xrightarrow{3\text{O}_2} 2\text{SO}_2 + 2\text{O} + \text{CO}$	$1.48 \times 10^3 \exp(-845/T)$
77.	$\text{OH} + \text{CH}_4 \xrightarrow{\text{O}_2} \text{CH}_3\text{O}_2 + \text{H}_2\text{O}$	0.16
78.	$\text{Cl} + \text{CH}_4 \xrightarrow{\text{O}_2} \text{CH}_3\text{O}_2 + \text{HCl}$	$2.45 \times 10^2 \exp(-1370/T)$
79.	$\text{CH}_3\text{O}_2 + \text{RO}_2 \rightarrow \text{R}'\text{OH} + \text{HCHO}$ $+ \text{CH}_3\text{OH} + \text{RCHO} + \text{O}_2$	7.5^e
N. 80.	$\text{ROH} + \text{OH} \xrightarrow{\text{O}_2} \text{H}_2\text{O} + \text{R}'\text{CHO} + \text{HO}_2$	64^e
81.	$\text{ROOH} + h\nu \xrightarrow{\text{O}_2} \text{R}'\text{CHO} + \text{HO}_2 + \text{OH}$	$1.2 \times 10^{-5} \text{ s}^{-1}{}^{b,e}$
82.	$\text{ROOH} + \text{OH} \rightarrow \text{H}_2 + \text{RO}_2$	21^e
83.	$\text{CH}_3\text{O}_2 + \text{SO}_2 \xrightarrow{\text{O}_2} \text{SO}_3 + \text{HCHO} + \text{HO}_2$	0.12
** 84.	$\text{CH}_3\text{O}_2 + \text{NO} \xrightarrow{\text{O}_2} \text{NO}_2 + \text{HCHO} + \text{HO}_2$	1.7×10^2
85.	$\text{CH}_3\text{O}_2 + \text{HO}_2 \rightarrow \text{CH}_3\text{OOH} + \text{O}_2$	$1.89 \exp(1296/T)$

Table 6 (Cont.)

	<u>Reaction</u>	<u>Rate Constant</u> ^a
86.	$2\text{CH}_3\text{O}_2 \xrightarrow{\text{O}_2} 2\text{HCHO} + 2\text{HO}_2$	3.9
87.	$2\text{CH}_3\text{O}_2 \rightarrow \text{CH}_3\text{OH} + \text{HCHO} + \text{O}_2$	7.5
88.	$\text{CH}_3\text{O}_2 + \text{RO}_2 \xrightarrow{\text{O}_2} \text{R}'\text{CHO} + \text{HCHO} + 2\text{HO}_2$	3.9 ^e
N. 89.	$\text{CH}_3\text{OH} + \text{OH} \xrightarrow{\text{O}_2} \text{HCHO} + \text{H}_2\text{O} + \text{HO}_2$	25
90.	$\text{CH}_3\text{OOH} + h\nu \xrightarrow{\text{O}_2} \text{HCHO} + \text{HO}_2 + \text{OH}$	$1.2 \times 10^{-5} \text{ s}^{-1}$ ^b
91.	$\text{PAN} + \text{M} \xrightarrow{\text{O}_2} \text{RO}_2 + \text{CO}_2 + \text{NO}_3 + \text{M}$	$3.0 \times 10^{-3} \text{ s}^{-1}$ ^d
92.	$\text{CH}_3\text{OOH} + \text{OH} \rightarrow \text{CH}_3\text{O}_2 + \text{H}_2\text{O}$	21
93.	$2\text{RO}_2 \rightarrow \text{ROH} + \text{R}'\text{CHO} + \text{O}_2$	7.5 ^e

a All rate constants are quoted in units of $\text{ppm}^{-1} \text{ s}^{-1}$ unless otherwise stated and are applicable over the temperature range, $T = 278\text{--}298 \text{ K}$. For reactions involving a third body the value quoted is for the product $k[\text{M}]$ where $[\text{M}]$ is 1 atmosphere of air.

b Rate constant is dependent on solar photon flux. The value listed is a maximum and is modified in the model to take account of latitude, time of day and day in the year.

c $x = 0.953$ and $y = 0.047$

d Value quoted is for $\text{R} = \text{CH}_3$

e Value quoted is for $\text{R} = \text{CH}_3\text{CH}_2$

f Value quoted is for $\text{R} = \text{CH}_3\text{CH}_2\text{CH}_2$



PWS *SH*

10 DOWNING STREET

From the Private Secretary

6 June, 1984

Acid Rain

I am writing on behalf of the Prime Minister to thank you for your letter of 5 June, and the formidable list of chemical reactions which you enclosed. I will show this to the Prime Minister over the weekend, and I know she will be interested (as well as impressed) by it.

DAVID BARCLAY

Dr. P. F. Chester

(T.)

CENTRAL ELECTRICITY GENERATING BOARD

Technology Planning
and Research Division

**Central Electricity
Research Laboratories**

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The Prime Minister
10 Downing Street
Whitehall,
London, SW1

Our ref RL/PFC/DSL
06/05/01.3

Your ref

Date 5 June 1984

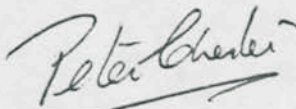
Dear Prime Minister,

Chemical Reactions Producing Acid Rain

At the meeting at Chequers on 27 May you said you would like to see a list of the chemical reactions involved in the formation of acid rain. Diagram 6 of my Presentation involved the 93 reactions listed in the attachment. Of these the fifteen marked "***" are the vital steps in the formation of photochemical oxidants.

A glance at the list will give you some idea of the complexity of the processes involved and the role played by hydrocarbons.

Yours sincerely,



P.F. Chester
Research Director

cc: Sir Walter Marshall
Dr. Robin Nicholson, Cabinet Office

REACTIONS USED IN CERL ATMOSPHERIC ACIDITY MODEL

(Diagram 6 presented on 27.5.84)

Those marked ** are important for the formation of photochemical oxidants.

Those marked N make a negligible contribution to overall result.

Table 6

	<u>Reaction</u>	<u>Rate Constant^a</u>
	1. $\text{NO} + \text{O}_3 \rightarrow \text{NO}_2 + \text{O}_2$	$51.7 \exp(-1450/T)$
N.	2. $2\text{NO} + \text{O}_2 \rightarrow 2\text{NO}_2$	$2.0 \times 10^{-12} \exp(530/T)$
**	3. $\text{NO}_2 + h\nu \rightarrow \text{NO} + \text{O}$	$7.8 \times 10^{-3} \text{ s}^{-1}{}^b$
**	4. $\text{O} + \text{O}_2 + \text{M} \rightarrow \text{O}_3 + \text{M}$	$6.47 \times 10^{-2} \exp(510/T)$
N.	5. $\text{O} + \text{NO}_2 \rightarrow \text{NO} + \text{O}_2$	2.2×10^2
N.	6. $\text{O} + \text{NO} + \text{M} \rightarrow \text{NO}_2 + \text{M}$	$9.38 \exp(584/T)$
N.	7. $\text{O} + \text{NO}_2 + \text{M} \rightarrow \text{NO}_3 + \text{M}$	61
	8. $\text{NO}_3 + h\nu \rightarrow \text{NO}_2 + \text{O}$	$9.9 \times 10^{-2} \text{ s}^{-1}{}^b$
	9. $\text{NO}_3 + h\nu \rightarrow \text{NO} + \text{O}_2$	$4.0 \times 10^{-2} \text{ s}^{-1}{}^b$
	10. $\text{NO}_3 + \text{NO} \rightarrow 2\text{NO}_2$	4.6×10^2
	11. $\text{NO}_2 + \text{O}_3 \rightarrow \text{NO}_3 + \text{O}_2$	$2.95 \exp(-2450/T)$
N.	12. $\text{O}_3 + h\nu \rightarrow \text{O}_2 + \text{O}$	$5.1 \times 10^{-4} \text{ s}^{-1}{}^b$
*	13. $\text{O}_3 + h\nu \rightarrow \text{O}_2 + \text{O}(^1\text{D}_2)$	$3.2 \times 10^{-5} \text{ s}^{-1}{}^b$
	14. $\text{O}(^1\text{D}_2) + \text{M} \rightarrow \text{O} + \text{M}$	$4.92 \times 10^8 \exp(107/T) \text{ s}^{-1}$
*	15. $\text{O}(^1\text{D}_2) + \text{H}_2\text{O} \rightarrow 2\text{OH}$	3.0×10^3
	16. $\text{OH} + \text{OH} \rightarrow \text{H}_2\text{O} + \text{O}$	$2.46 \times 10^2 \exp(-550/T)$
	17. $\text{OH} + \text{OH} + \text{M} \rightarrow \text{H}_2\text{O}_2 + \text{M}$	$7.56 \exp(900/T)$
	18. $\text{H}_2\text{O}_2 + h\nu \rightarrow 2\text{OH}$	$3.6 \times 10^{-6} \text{ s}^{-1}{}^b$
	19. $\text{OH} + \text{H}_2\text{O}_2 \rightarrow \text{H}_2\text{O} + \text{HO}_2$	$72.8 \exp(-164/T)$
	20. $\text{OH} + \text{O}_3 \rightarrow \text{O}_2 + \text{HO}_2$	$44.8 \exp(-930/T)$
*	21. $\text{HO}_2 + \text{HO}_2 \rightarrow \text{H}_2\text{O}_2 + \text{O}_2$	62
	22. $\text{HO}_2 + \text{O}_3 \rightarrow 2\text{O}_2 + \text{OH}$	$0.344 \exp(-580/T)$
	23. $\text{HO}_2 + \text{OH} \rightarrow \text{H}_2\text{O} + \text{O}_2$	7.4×10^2
	24. $\text{NO} + \text{OH} + \text{M} \rightarrow \text{HNO}_2 + \text{M}$	3.0×10^2
	25. $\text{NO} + \text{HO}_2 \rightarrow \text{NO}_2 + \text{OH}$	$81.2 \exp(254/T)$
	26. $\text{NO}_2 + \text{OH} + \text{M} \rightarrow \text{HNO}_3 + \text{M}$	$2.31 \times 10^{13} \exp((-26.6 T/(17.4 + T)) - 0.5 \ln(T/280))$

Table 6 (Cont.)

	<u>Reaction</u>	<u>Rate Constant^a</u>
	27. $\text{NO}_2 + \text{HO}_2 + \text{M} \rightarrow \text{HO}_2\text{NO}_2 + \text{M}$	25
	28. $\text{HO}_2\text{NO}_2 + \text{M} \rightarrow \text{NO}_2 + \text{HO}_2 + \text{M}$	$1.4 \times 10^{14} \exp(-10420/T) \text{ s}^{-1}$
	29. $\text{HNO}_2 + h\nu \rightarrow \text{NO} + \text{OH}$	$2.8 \times 10^{-3} \text{ s}^{-1}{}^b$
	30. $\text{HNO}_3 + h\nu \rightarrow \text{NO}_2 + \text{OH}$	$5.6 \times 10^{-7} \text{ s}^{-1}{}^b$
	31. $\text{HNO}_2 + \text{OH} \rightarrow \text{H}_2\text{O} + \text{NO}_2$	1.4×10^2
	32. $\text{HNO}_3 + \text{OH} \rightarrow \text{H}_2\text{O} + \text{NO}_3$	2.0
	33. $\text{NO}_3 + \text{NO}_2 \rightarrow \text{NO} + \text{O}_2 + \text{NO}_2$	$5.59 \exp(-1000/T)$
	34. $\text{NO}_3 + \text{NO}_2 + \text{M} \rightarrow \text{N}_2\text{O}_5 + \text{M}$	$3.64 \exp(861/T)$
	35. $\text{N}_2\text{O}_5 + \text{M} \rightarrow \text{NO}_2 + \text{NO}_3 + \text{M}$	$1.24 \times 10^{14} \exp(-10317/T) \text{ s}^{-1}$
	36. $\text{N}_2\text{O}_5 + \text{H}_2\text{O} \rightarrow 2\text{HNO}_3$	3.2×10^{-7}
	37. $\text{SO}_2 + h\nu \rightarrow \text{SO}_2(^3\text{B}_1)$	$1.7 \times 10^{-5} \text{ s}^{-1}{}^b$
	38. $\text{SO}_2(^3\text{B}_1) + \text{M} \rightarrow \text{SO}_2 + \text{M}$	$2.0 \times 10^6 \text{ s}^{-1}$
	39. $\text{SO}_2(^3\text{B}_1) + \text{O}_2 \rightarrow \text{SO}_3 + \text{O}$	0.07
N.	40. $\text{O} + \text{SO}_2 + \text{M} \rightarrow \text{SO}_3 + \text{M}$	$20.6 \exp(-1120/T)$
	41. $\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$	22
	42. $\text{SO}_2 + \text{OH} + \text{M} \rightarrow \text{HSO}_3 + \text{M}$	30
	43. $\text{SO}_2 + \text{HO}_2 \rightarrow \text{SO}_3 + \text{OH}$	2.2×10^{-2}
	44. $\text{SO}_2 + \text{NO}_3 \rightarrow \text{SO}_3 + \text{NO}_2$	0.25
N.	45 ^c . $\text{RCH}=\text{CH}_2 + \text{O} + x\text{NO} \xrightarrow{\text{O}_2} \text{RCHO}$ $+ \text{HCHO} + x\text{NO}_2 + y\text{O}_3$	$1.01 \times 10^2 \exp(-38/T) {}^d$
	46 ^c . $\text{RCH}=\text{CH}_2 + \text{O}_3 + x\text{NO} \xrightarrow{\text{O}_2} \text{RCHO}$ $+ \text{HCHO} + x\text{NO}_2 + y\text{O}_3$	$0.15 \exp(-1900/T) {}^d$
**	47. $\text{RCH}=\text{CH}_2 + \text{OH} \xrightarrow{\text{O}_2} \text{R}'\text{O}_2 + \text{H}_2\text{O}$	1.9×10^{2d}
**	48. $\text{RCH}=\text{CH}_2 + \text{OH} \xrightarrow{\text{O}_2} \text{R}'\text{CHO} + \text{HO}_2$	1.2×10^{2d}

Table 6 (Cont.)

	<u>Reaction</u>	<u>Rate Constant^a</u>
**	49. $\text{RCHO} + \text{h}\nu \xrightarrow{2\text{O}_2} \text{RO}_2 + \text{CO} + \text{HO}_2$	$8.6 \times 10^{-5} \text{ s}^{-1 \text{ b,d}}$
**	50. $\text{OH} + \text{CO} \xrightarrow{\text{O}_2} \text{CO}_2 + \text{HO}_2$	7.4
N.	51. $\text{RCHO} + \text{O} \xrightarrow{\text{O}_2} \text{RCO}_3 + \text{OH}$	13^{d}
**	52. $\text{RCHO} + \text{OH} \xrightarrow{\text{O}_2} \text{RCO}_3 + \text{H}_2\text{O}$	$3.9 \times 10^2^{\text{d}}$
**	53. $\text{RCO}_3 + \text{NO}_2 + \text{M} \rightarrow \text{PAN} + \text{M}$	$1.2 \times 10^2^{\text{d}}$
**	54. $\text{RCO}_3 + \text{NO} \xrightarrow{\text{O}_2} \text{RO}_2 + \text{CO}_2 + \text{NO}_2$	$2.1 \times 10^2^{\text{d}}$
	55. $\text{RCO}_3 + \text{SO}_2 \xrightarrow{\text{O}_2} \text{RO}_2 + \text{CO}_2 + \text{SO}_3$	$7.0 \times 10^{-3}^{\text{d}}$
	56. $\text{HCHO} + \text{h}\nu \rightarrow \text{CO} + \text{H}_2$	$9.9 \times 10^{-5} \text{ s}^{-1 \text{ b}}$
**	57. $\text{HCHO} + \text{h}\nu \xrightarrow{2\text{O}_2} 2\text{HO}_2 + \text{CO}$	$2.7 \times 10^{-5} \text{ s}^{-1 \text{ b}}$
	58. $\text{H}_2 + \text{OH} \xrightarrow{\text{O}_2} \text{HO}_2 + \text{H}_2\text{O}$	$8.86 \times 10^2 \exp(-2590/T)$
N.	59. $\text{HCHO} + \text{O} \xrightarrow{\text{O}_2} \text{HO}_2 + \text{CO} + \text{OH}$	$4.92 \times 10^2 \exp(-1450/T)$
**	60. $\text{HCHO} + \text{OH} \xrightarrow{\text{O}_2} \text{H}_2\text{O} + \text{HO}_2 + \text{CO}$	2.6×10^2
	61. $\text{RO}_2 + \text{NO} \xrightarrow{\text{O}_2} \text{R}'\text{CHO} + \text{HO}_2 + \text{NO}_2$	88^{e}
	62. $\text{RO}_2 + \text{HO}_2 \rightarrow \text{ROOH} + \text{O}_2$	$1.89 \exp(1296/T)^{\text{e}}$
	63. $2\text{RO}_2 \xrightarrow{\text{O}_2} 2\text{R}'\text{CHO} + 2\text{HO}_2$	3.9^{e}
	64. $\text{RO}_2 + \text{SO}_2 \xrightarrow{\text{O}_2} \text{SO}_3 + \text{RCHO} + \text{HO}_2$	$6.0 \times 10^{-2}^{\text{e}}$
	65. $\text{RH} + \text{OH} \xrightarrow{\text{O}_2} \text{RO}_2 + \text{H}_2\text{O}$	50^{f}
	66. $\text{HCl} + \text{OH} \rightarrow \text{H}_2\text{O} + \text{Cl}$	$73.8 \exp(-425/T)$
	67. $\text{Cl} + \text{RH} \xrightarrow{\text{O}_2} \text{HCl} + \text{RO}_2$	$1.79 \times 10^3 \exp(-61/T)^{\text{e}}$

Table 6 (Cont.)

	<u>Reaction</u>	<u>Rate Constant^a</u>
68.	$\text{Cl} + \text{RCH}=\text{CH}_2 \xrightarrow{\text{O}_2} \text{HCl} + \text{RO}_2$	$7.3 \times 10^2{}^d$
69.	$\text{Cl} + \text{HCHO} \xrightarrow{\text{O}_2} \text{HCl} + \text{CO} + \text{HO}_2$	1.9×10^3
70.	$\text{Cl} + \text{RCHO} \xrightarrow{\text{O}_2} \text{HCl} + \text{RCO}_3$	$1.9 \times 10^3{}^d$
71.	$\text{Cl} + \text{H}_2 \xrightarrow{\text{O}_2} \text{HCl} + \text{HO}_2$	$8.61 \times 10^2 \exp(-2290/T)$
72.	$\text{OH} + \text{H}_2\text{S} \xrightarrow{2\text{O}_2} \text{H}_2\text{O} + \text{SO}_2 + \text{O} + \text{OH}$	1.3×10^2
73.	$\text{Cl} + \text{H}_2\text{S} \xrightarrow{2\text{O}_2} \text{HCl} + \text{SO}_2 + \text{O} + \text{OH}$	1.5×10^3
N. 74.	$\text{OH} + \text{OCS} \xrightarrow{2\text{O}_2} \text{SO}_2 + \text{CO}_2 + \text{O} + \text{OH}$	1.4
N. 75.	$\text{OH} + \text{CS}_2 \xrightarrow{2\text{O}_2} \text{SO}_2 + \text{OCS} + \text{O} + \text{OH}$	4.6
N. 76.	$\text{O} + \text{CS}_2 \xrightarrow{3\text{O}_2} 2\text{SO}_2 + 2\text{O} + \text{CO}$	$1.48 \times 10^3 \exp(-845/T)$
77.	$\text{OH} + \text{CH}_4 \xrightarrow{\text{O}_2} \text{CH}_3\text{O}_2 + \text{H}_2\text{O}$	0.16
78.	$\text{Cl} + \text{CH}_4 \xrightarrow{\text{O}_2} \text{CH}_3\text{O}_2 + \text{HCl}$	$2.45 \times 10^2 \exp(-1370/T)$
79.	$\text{CH}_3\text{O}_2 + \text{RO}_2 \rightarrow \text{R}'\text{OH} + \text{HCHO}$ $+ \text{CH}_3\text{OH} + \text{RCHO} + \text{O}_2$	7.5^e
N. 80.	$\text{ROH} + \text{OH} \xrightarrow{\text{O}_2} \text{H}_2\text{O} + \text{R}'\text{CHO} + \text{HO}_2$	64^e
81.	$\text{ROOH} + h\nu \xrightarrow{\text{O}_2} \text{R}'\text{CHO} + \text{HO}_2 + \text{OH}$	$1.2 \times 10^{-5} \text{ s}^{-1}{}^{b,e}$
82.	$\text{ROOH} + \text{OH} \rightarrow \text{H}_2 + \text{RO}_2$	21^e
83.	$\text{CH}_3\text{O}_2 + \text{SO}_2 \xrightarrow{\text{O}_2} \text{SO}_3 + \text{HCHO} + \text{HO}_2$	0.12
** 84.	$\text{CH}_3\text{O}_2 + \text{NO} \xrightarrow{\text{O}_2} \text{NO}_2 + \text{HCHO} + \text{HO}_2$	1.7×10^2
85.	$\text{CH}_3\text{O}_2 + \text{HO}_2 \rightarrow \text{CH}_3\text{OOH} + \text{O}_2$	$1.89 \exp(1296/T)$

Table 6 (Cont.)

	<u>Reaction</u>	<u>Rate Constant^a</u>
86.	$2\text{CH}_3\text{O}_2 \xrightarrow{\text{O}_2} 2\text{HCHO} + 2\text{HO}_2$	3.9
87.	$2\text{CH}_3\text{O}_2 \rightarrow \text{CH}_3\text{OH} + \text{HCHO} + \text{O}_2$	7.5
88.	$\text{CH}_3\text{O}_2 + \text{RO}_2 \xrightarrow{\text{O}_2} \text{R}'\text{CHO} + \text{HCHO} + 2\text{HO}_2$	3.9 ^e
N. 89.	$\text{CH}_3\text{OH} + \text{OH} \xrightarrow{\text{O}_2} \text{HCHO} + \text{H}_2\text{O} + \text{HO}_2$	25
90.	$\text{CH}_3\text{OOH} + h\nu \xrightarrow{\text{O}_2} \text{HCHO} + \text{HO}_2 + \text{OH}$	$1.2 \times 10^{-5} \text{ s}^{-1 \text{ b}}$
91.	$\text{PAN} + \text{M} \xrightarrow{\text{O}_2} \text{RO}_2 + \text{CO}_2 + \text{NO}_3 + \text{M}$	$3.0 \times 10^{-3} \text{ s}^{-1 \text{ d}}$
92.	$\text{CH}_3\text{OOH} + \text{OH} \rightarrow \text{CH}_3\text{O}_2 + \text{H}_2\text{O}$	21
93.	$2\text{RO}_2 \rightarrow \text{ROH} + \text{R}'\text{CHO} + \text{O}_2$	7.5 ^e

a All rate constants are quoted in units of $\text{ppm}^{-1} \text{ s}^{-1}$ unless otherwise stated and are applicable over the temperature range, $T = 278\text{--}298 \text{ K}$. For reactions involving a third body the value quoted is for the product $k[\text{M}]$ where $[\text{M}]$ is 1 atmosphere of air.

b Rate constant is dependent on solar photon flux. The value listed is a maximum and is modified in the model to take account of latitude, time of day and day in the year.

c $x = 0.953$ and $y = 0.047$

d Value quoted is for $\text{R} = \text{CH}_3$

e Value quoted is for $\text{R} = \text{CH}_3\text{CH}_2$

f Value quoted is for $\text{R} = \text{CH}_3\text{CH}_2\text{CH}_2$



2 MARSHAM STREET
LONDON SW1P 3EB
01-212 3434

My ref:

Your ref:

5 June 1984

Dear Lord Cockfield

mbpm
amb
9/6

BOOKLET ON UK ENVIRONMENTAL ACHIEVEMENTS

Thank you for your letter of 31 May. - See Pt 1

I take your point. But there are in fact references to the countryside and wildlife scattered throughout the booklet; the final version will contain quite a few illustrations of the countryside and wildlife; and I suspect that had we tried to make more of our record in this area, we would have been more likely to provoke controversy than put it to rest.

As you know, we are currently reviewing certain aspects of the Wildlife and Countryside Act and the related financial arrangements and I shall shortly be in touch with colleagues about this. In the meantime I would prefer that we did not highlight the subject in the booklet.

It is now in any case too late to change the booklet if we are to have copies ready by the London Economic Summit. I hope that your evident fears about the reception which the booklet will receive will prove unfounded.

I am copying as before.

Yours sincerely,

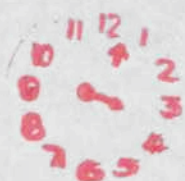
Andrew Murray (Private Secretary)

fw PATRICK JENKIN - agreed by the Secretary of State, and signed in his absence.

The Rt Hon the Lord Cockfield

ENV^U ARRIVAL: Bird Rain
PK2

05 JUN 1984





J. Coles, Esq.,
10 Downing Street.

With the compliments of

W. J. ADAMS

FOREIGN AND COMMONWEALTH OFFICE
LONDON, SW1A 2AH

CONFIDENTIAL

uk



Foreign and Commonwealth Office

London SW1A 2AH

4 June 1984

P.J. Smith, Esq.,
Private Secretary to
Sir Brian Hayes, KCB,
Department of Trade and Industry,
1-19 Victoria Street,
London, S.W.1.

*m 3/6
h.a.*

Dear Smith,

LONDON ECONOMIC SUMMIT INITIATIVE ON THE ENVIRONMENT

See Pt 1

1. Thank you for your letter of 29 May about our draft Speaking Note. As you will have noted, it followed closely my Secretary of State's minute of 8 May to the Prime Minister which had been accepted as the basis for our initiative at the Summit. But I entirely take your point about the need to clear briefs on environmental issues with the DTI. I have brought this point to the attention of officials here and have asked them to note Dr. Howe's name as the appropriate contact within the DTI.

will request if required

2. I am copying this letter to those who received copies of your letter.

Yours ever,
W.J. Adams
W.J. Adams

- c.c. PS/Sir G. Moseley, KCB, DOE
- PS/Sir K. Couzens, KCB, Dept. of Energy
- PS/Sir P. Middleton, KCB, H.M. Treasury
- PS/Sir W. Fraser, KCB, Scottish Office
- PS/M.E. Quinlan, Esq., CB, Department of Employment
- PS/P. Lazarus, Esq., CB, Department of Transport
- J. Coles, Esq., 10 Downing Street ✓
- R. Hatfield, Esq., Cabinet Office.

CONFIDENTIAL

OS JUNE 1950



2 MARSHAM STREET
LONDON SW1P 3EB

01-212 3434

My ref:

Your ref:

JMS
4/6

4th June 1984

Dear David

We have just received the attached copy of our booklet on environmental protection, which you may want to show to the Prime Minister.

I should stress that it is a "paste-up" rather than the final production; the end copies which are being produced during the week will be on more normal paper!

Yours ever,

Andrew

A C ALLBERRY
Private Secretary

David Barclay Esq



filed ck

10 DOWNING STREET

From the Private Secretary

DR. NICHOLSON
CABINET OFFICE

Acid Rain Presentation

BF7
I enclose a draft record of the scientific presentation on acid deposition which was given at Chequers on Sunday 27 May. I should welcome comments and any necessary amendments.

We discussed the possibility that the record should be combined with other material to form a more comprehensive document. Perhaps, when you have had a chance to consider the draft, we could have a further word about this.

DB

1 June 1984

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DRAFT

RECORD OF A PRESENTATION ON ACID DEPOSITION GIVEN AT
CHEQUERS ON SUNDAY 27 MAY 1984

Present:

The Prime Minister
The Secretary of State for the Environment
The Rt. Hon. Kenneth Baker, MP, Minister of State, DTI,
The Hon. William Waldegrave, MP, PUSS, HM Treasury
The Earl of Avon, PUSS, Department of Energy
Mr. David Pascall, No. 10 Policy Unit
Sir Walter Marshall, Chairman, CEGB
Dr. Peter Chester, Central Electricity Research Laboratory
Sir John Mason, Royal Society
Sir Hermann Bondi, NERC
Dr. Martin Holdgate, Department of the Environment
Dr. Robin Nicholson, Cabinet Office

The presentation had been arranged to give Ministers a fuller appreciation of the scientific background to forthcoming policy decisions on acid rain.

Introducing the presentation, Dr. Nicholson said that it had two objectives: first to present the scientific evidence; and secondly to describe the state of the art and possible developments in abatement technology.

Sources of Emissions

Dr. Nicholson then described the principal sources of emissions associated with acid deposition. In the Northern Hemisphere, 90% of the sulphur dioxide in the atmosphere was man-made. The proportion was much less in the Southern Hemisphere. In the United Kingdom, 65% of sulphur dioxide emissions came from power stations. Around 50% of atmospheric NOx was man-made, and of this amount nearly half

came from power stations, and another 34% from motor vehicles. Both sulphur dioxide and NOx could oxidise to give acid deposition. The other important ingredient was hydrocarbon, from unburnt motor fuels, spillages, leaks etc. The hydrocarbons were not a serious pollutant in themselves, but they played an important secondary role eg in production of ozone which could damage leaves.

Sulphur dioxide emissions in the UK had peaked in 1970, but declined somewhat since then. Total European emissions had however increased dramatically over the same period, primarily because of developments in Eastern Europe. As a result of these two trends, the United Kingdom now accounted for 11% of European sulphur dioxide emissions, as opposed to 25% 10 years ago. There had been a steady rise in sulphur dioxide and NOx emissions from motor vehicles, as the number on the roads had increased.

There were three basic approaches to abatement. First there was prevention at source - for example, the use of smokeless fuels, and lead-free petrol. Secondly, pollutants could be removed at or near the source - for example dust removers in industrial processes. Thirdly, it was sometimes possible to counter the ecological effects of particular pollutants - for example by liming acid lakes.

Chemical Changes in the Atmosphere

Sir John Mason described the complicated sequence of events which lay between emission of a pollutant and acid deposition. Gaseous sulphur dioxide and NOx from United Kingdom power stations could undergo a journey covering many miles and lasting many hours. Prediction of the consequences in terms of acid deposition was complex. It depended both on physical factors such as wind speed and direction, the stability of the atmosphere, and the presence of clouds or sunshine; and also on a complex chain of

/ chemical

chemical reactions, which themselves required atmospheric oxidising agents generated by ultra-violet light. There was thus no direct connection between emissions and deposition, as was illustrated by the fact that depositions were at a maximum in summer when emissions were at a minimum.

Moreover, there was no direct connection between acid deposition and damage to forests or lakes. Other speakers would explore this area in more detail. But it was important to note that external influences (eg the presence or absence of fertilisers) could be just as important as acid deposition.

Turning to the distribution of sulphurous depositions in Europe, Sir John Mason said that 80% of sulphur falling in the UK was home-made. But UK emissions played a relatively small role in the problems of Scandinavia - for example 6% of sulphur falling in Sweden came from UK sources. In the United Kingdom rain was acid everywhere, with an average pH of between 4.2 and 4.5. Such evidence as there was suggested that the degree of acidity had been roughly constant between 1954 and 1976, although it might now be increasing slightly. The Norwegians claimed that the average pH value of rain had moved from 4.5 to 4 between 1955 and 1970, but the evidence for this was questionable.

Summing up, Sir John Mason said that long term changes in acidity seemed less important than short term episodes. Heavy acid deposition occurred on perhaps 10 days each year. There was good evidence that the mortality of fish in Scandinavian lakes was related to heavy rain after a long dry spell, or to snow melt, since both these circumstances produced a surge of acid. This suggested that strategies could be developed to prevent the worst effects of acid deposition if periods of heavy rainfall or sudden temperature rise could be predicted. For example, power

stations might change over to low sulphur fuels at a week's notice.

Lakes and Streams

Sir Hermann Bondi described the effects of acid depositions on lakes and streams. The process started on land, and in some circumstances the acidity of rain could increase markedly between the time it fell and the time it reached a stream or lake. For example, water running down the trunk of a conifer leached out acidic substances from the tree itself and became more acidic. The phenomenon was less apparent with deciduous trees. Forest management thus assumed critical importance. If trees were felled selectively, rather than in large areas, less acid was released. A still more effective technique was whole tree removal, which avoided the acidic decomposition of brushwood. There was evidence also that the disturbance of moorland could produce a pulse of acidity in streams. In Great Britain, there was evidence of significant damage to fresh water only in the North East and in certain parts of Scotland. These changes seemed to be associated with large scale changes in land use.

Forest Damage

Dr. Holdgate spoke first about the history of sulphur dioxide pollution. Originally, the problem had been associated with acute damage near industrial sites, but these had become less significant since the clean air policy had taken effect. Concern revived in 1972, when the Swedes reported forest damage associated with acid rain. However, their simplistic analysis had not stood up to technical criticism. Very recently, however, there were reports from Germany of a new kind of forest damage, and these lay behind the present international concern.

Damage had been observed first in silver fir trees, and later in other types. Conifers exhibited loss of needles, stunted growth, the thinning of tree tops, and increased infection by pests and funguses. In 1982, the German Government had estimated that 8% of their forests were badly affected. In 1983, the estimate was 34%, although 25% within this represented only slight damage. The effects were worst in Bavaria and the Black Forest. Fifty per cent of the silver fir population showed signs of damage, although this type of tree represented only 2% of German forests. However, 40% of spruce trees were also said to be damaged, and spruce represented 40% of the forest total. Whilst there was room for argument over the figures, it seemed clear that forest damage was a genuine phenomenon which affected large areas of Central Europe.

Dr. Holdgate then summarised current understanding of the causes of forest damage. The effect was correlated with altitude, drought and cold, and it particularly affected tall trees at the edge of forests. It seemed that factors such as soil type, cultivation techniques, and the presence of insects and funguses were secondary. Pollution by gaseous sulphur dioxide was probably significant only in the remaining "hot spots" near industrial plants. There was a superficial correlation between wet acid deposition and forest damage, but the effect could not be reproduced in the laboratory. The favoured hypothesis was that both wet acid deposition and the presence of oxidants were necessary. Thus it appeared that high levels of ozone were a factor in the German forest decline.

It seemed possible that ozone, and perhaps also sulphur dioxide itself, damaged the leaf cells, leaving them vulnerable to rainwater removing essential magnesium and calcium. The process was aided if the rain itself was acidic. As a result of the mineral loss, the roots of the tree were stressed, and this weakening could be aggravated by

cold and drought. It was argued by some authorities that very high levels of acidity could lead to the release of aluminium in the soil, which poisoned the root.

Summing up his contribution, Dr. Holdgate said that sulphur dioxide alone was probably not the most sensitive variable in the process of forest damage. It was at least as important to control emissions of NOx and hydrocarbons, which led to the production of ozone.

Abatement Technologies for Power Stations

Dr. Peter Chester discussed the application of abatement technology at UK power stations. He emphasised that the effect of any particular reduction in emissions was impossible to predict. One reason for this was that the supply of photo-chemical oxidants from hydrocarbons might well be the limiting factor.

Possible techniques for abating sulphur dioxide emissions included the removal of sulphur from coal; the injection of limestone (although this would be difficult to apply in the UK, because of the high flame temperature employed); and flue gas desulphurisation. The latter technique could remove about 90% of the sulphur dioxide in flue gas, and had been operated successfully elsewhere in the world. However, it produced calcium chloride, which was difficult to dispose of, and it was extremely costly if retro-fitted. The capital cost would be in the region of £135-£160 million per 2000 MW power station. Each such station would suffer a reduction in output of between 50 and 75 MW, and there would be an efficiency loss of 3-4%. These costs were equivalent to an increase of £8 per tonne in the price of coal. The Prime Minister commented that costs of this order were quite prohibitive.

/ Dr. Chester

Dr. Chester continued that, because of the high cost of flue gas desulphurisation, the CEEB was exploring alternative technologies. The most promising was fluidised bed combustion - this would be cheaper than FGD, and involve a smaller loss of energy, but it would not be available until about the year 2000. As for emissions of NO_x, the preferred route would be to keep air away from the fuel for as long as possible by altering the dimensions of the flame in burners. But there was a risk of greater corrosion, which meant that the cost of the 40% reduction by 1995 which the EEC was seeking could be substantial. The Japanese had adopted a different approach which involved removing NO_x from flue gas. But equipment of this sort could not be retro-fitted in addition to flue gas desulphurisation.

In conclusion, Dr. Chester emphasised the high costs involved in rapid reductions of SO₂ and NO_x emissions, and the uncertain result in terms of reduced damage to forests and to fresh water. The figures he had quoted were for the CEEB only. It was important to remember that the rest of industry would also face additional burdens.

Abatement Technologies for Vehicles

Dr. Nicholson said that vehicles were as important a source of NO_x and hydrocarbon pollution as power stations. The Americans had tackled the problem by requiring the fitting of three-way catalyts. These were effective when new, but tended to deteriorate rapidly in use. Indeed, some drivers simply removed them. They were expensive to instal and maintain, and carried a significant penalty in terms of reduced fuel economy. Overall, the technology of the three-way catalyst was not highly regarded, although it was fashionable in some quarters.

The preferred solution to vehicle emission control from the UK's point of view was undoubtedly the lean-burn engine.

This involved increasing the proportion of air to fuel in the cylinder. Lean-burn technology was favoured by BL and by Ford of Europe, by the French motor manufacturers and by the smaller German manufacturers. It cost very much less per vehicle than the fitting of catalysts, involved no maintenance costs, and was more resilient. Lean-burn engines could be adjusted either to minimise emissions, or to maximise fuel economy.

Concluding, Dr. Nicholson said that improvements in emissions from vehicles were only part of the story. Pollution from spillage and leakage of fuel should not be overlooked.

1 June 1984

VSCABW

PART 1 ends:-

CDL to S/S Ew 31. 5 - 84

PART 2 begins:-

DB to Dr. Nicholson + att.
1. 6. 84.

