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Act Now to Plug The Ozone Layer

By Michael Oppenheimer and Daniel Dudek

Strange events in Antarctica, straight out of science fiction, have grabbed the attention of scientists and world leaders. The stratosphere's ozone layer, which screens living things from damaging ultraviolet rays, has been thinning dramatically during the southern spring — the beginning of what some scientists suspect is a worldwide decay of the Earth's ozone covering.

Against the haze of scientific uncertainty that surrounds this seasonal "hole" in the atmosphere, one question stands out clearly: Can governments take coordinated action to protect the stratosphere and avert the risk to life on Earth?

Ozone, a special form of oxygen, reaches high concentrations 12 miles above the Earth, where it long had appeared immune from human intervention. But the emission of industrial chemicals, particularly so-called chlorofluorocarbons, was identified as a threat to ozone in the early 1970's. Chlorofluorocarbons stay intact until they drift into the stratosphere, where they disintegrate. Their fragments destroy ozone, and less ozone means more ultraviolet radiation reaching the Earth.

The consequences of even modest increases of ultraviolet rays are disturbing. Such radiation causes both malignant and nonmalignant skin cancer. Continuation of the existing global emission levels of chlorofluorocarbons could result in an additional 1.4 million cases of skin cancer in less than 40 years in the United States alone. By the year 2075, 40 million Americans would be affected, and fatalities could exceed 800,000, according to a study conducted by the Environmental Protection Agency.

Ocular impairment, damage to the immune system and increased air pollution are all triggered by increased ultraviolet radiation. In addition, millions of dollars of damage to

Chemical emissions are rising.

crops, forests and building materials would be inflicted yearly.

Even a partial catalogue of these horrors was sufficient to spur Congress to ban chlorofluorocarbons in aerosol spray cans in 1978. That caused a temporary decline in emissions. Most European countries, by

available within five years. Severely limiting the supply of chlorofluorocarbons would provide an incentive to develop alternatives. The E.P.A., which soon plans to issue strict guidelines for limiting the use of chlorofluorocarbons, should hold the industry to a five-year schedule for near-total elimination of emissions. The United States could set the pace for all countries to develop alternatives.

The ozone layer cannot be saved without international cooperation. Some two dozen countries have been discussing limitations of chlorofluorocarbons in a desultory fashion since 1980, but recent reports from Antarctica seem to have shaken most of them from general indifference to the problem. The European Community should now join the United States in phasing out emissions of chlorofluorocarbons over five years. Gradual ozone loss has been a sufficient reason to act. The foreboding ozone hole over Antarctica adds a note of urgency. □

ESSAY | William Safire

Better the Contras

WASHINGTON
The official McGovernite villain of 1987 has emerged at the head of the Nicaraguan resistance. He is Adolfo Calero, described by Newsweek as a "political boss" who has taken charge of the contras "only two months after he was forced out by the advocates of democracy and civilian control."

In months to come, we can expect to see him denounced in the halls of Congress as a Somoza stooge, a would-be corrupt dictator and Mr. Not-Niceguy. Whom dovish gods would destroy, they first drive batty.

The contras have been jerked around for years by Congress. First we authorized money for bandages, knowing it to be the precursor to arms; then the doves ended that humanitarian aid, forcing the contras to Ollie North's off-budget grab bag. Congress later went along with military aid to counter Communism in Central America, only to threaten to cut it off entirely now that the Reagan Administration is weakened.

Why the flip-flopping? A swing group in Congress knows why the Communists have not succeeded in subverting El Salvador: it is only because Soviet-backed Cubans and Sandinistas have their hands full with the contras in Nicaragua. If Congress collapsed the contra movement (in the same callous manner as the Shah, with our approval, sold out the rebelling Kurds in Iraq in the early 70's), Communism would surely resume its expansion on our continent.

That is why we see our policy swing-voters coming up with the cynical notion of using the contras as our bargaining chip. The Republican senatorial swingers — Cohen, Kassebaum and Rudman — have warned the President that in the coming showdown, they will vote to withdraw all aid unless a negotiated settlement is pressed.

Sounds high-minded; but what would such settlement entail? A New York Times editorial laid out the goals: (1) a Sandinista promise to refrain from importing Soviet and Cuban bases, advisers and missiles; (2) a promise not to launch takeovers across Nicaraguan borders; (3) a promise to behave on human rights, and maybe even allow a tame opposition party to function.

The Nicaraguan Communists have made and broken such promises before; in return for a fresh set of promises, the bargaining chippers would betray the Nicaraguan resistance. That would not only invite the subversion of El Salvador, but would send an unmistakable message of U.S. irresolution to any indigenous anti-Communist force depending on us in Angola or Afghanistan. □

The weakness in that sellout plan is laid out in the Times editorial: "[The President] could rightfully ask his critics to support the use of force should the Sandinistas betray their security promises."

Fat chance. Project ahead to a Gary Hart administration, with the Nicaraguan resistance disbanded forever and Dictator Ortega's Managua in lockstep with Havana and Moscow. In go a few medium-range missiles, capable of taking out Miami and Houston, which Managua will vehemently deny importing lately. Does anybody seriously foresee President Hart dispatching U.S. ships to blockade Nicaragua and bombers to destroy the installations and kill the Soviet advisers?

Or put yourself in a more hawkish administration. President Kemp goes on television to denounce the subversion of Honduras and El Salvador by Nicaraguan-sponsored guerrillas,

A negotiated settlement won't work.

cites the great negotiated compromise of 1987 and asks Congress for a formal declaration of war. Democrats in Congress, joined by Cohen-Kassebaum-Rudman swingers, would instantly choke up: War? Send in the Marines to an endless quagmire to protect a few corrupt dictators? What are you, some kind of jingo nut?

A small but real war is now being waged in Central America. On one side are the Communists (or Marxists, or Sandinistas, or agrarian reformers), and in the front lines on the other side are the crew of less-than-lovable contras led by Adolfo Calero. The Communist side is not in this war to settle, though it will readily sign a list of promises while the bone is in its throat; as always, Communists will carry their revolution as far as opposition weakness permits.

If our side does not win this war with the contras, we are going to have to stop Communist expansion with another force. That would mean the North Americanization of the war. Are most of the doves and swing voters really ready for that? I think not. When double-crossed, as history suggests they will be, their severity will turn out to be a chimera. The rest of the nation will be hard pressed to deliver on their threats. □

d Debt: olution

necessary to meet repayment es. Money intended for con- of ports or power plants e diverted for political pur- r to placate the military with expenditures or to replenish 's private bank account.

r than continued lending mmercial banks, these coun- ced credit and technical re- of new multinational agen- at specialize in economic ment. The World Bank and ernational Monetary Fund ot designed as development agencies, and they have not ccessful in assisting coun- ties sound development pro- New, broader agencies would ble not only of providing guid- imposing discipline but also uld monitor a government's development plan.

e such loans and technical ad- ere provided, however, devel- ountries and their creditors eed to work together to elimi- e mountains of debt that con- tie their fates together. These nents should weigh carefully ng advantages they might se- making their creditor banks partners in local public and enterprise. In return, the

Voices in the wilderness?

In recent months, three separate and authoritative reports—by the Department of Energy, the National Petroleum Council, and the American Petroleum Institute—all reached similar conclusions. And all three sounded similar warnings—warnings of the sort we have been voicing in this space and elsewhere for the past year. We've argued, as did the reports, that America may have to pay a stiff price tomorrow for the benefits of low-cost oil today. We've argued, as did the reports, that the U.S. should take whatever reasonable steps possible to encourage production of America's domestic energy resources. And we concluded that unless government acted now, the 1990s could bring a replay of the 1970s, with its "oil shocks," "energy crises," and spiraling prices.

DOE, the NPC, and the API all noted that U.S. oil demand has been rising, and production has been falling. During 1986, Americans used about 500,000 barrels of oil more each day than they did the year before. Imports climbed by about a million barrels a day. Last year, Americans imported a net 32 percent of the oil they used. For perspective, at the time of the 1973 crisis, the net import level was 35 percent, and in 1979 it was 43 percent.

The reports mentioned several options for America, without making firm recommendations. We'd like to go further, and reiterate policies we've urged before. And would like to

the natural gas being sold today is still under price controls. Decontrol would give the petroleum industry a lift. The current natural gas surplus will disappear well before the oil glut, but many easy-to-produce gas resources are being neglected. Given the proper incentive, they would be produced—without triggering major price hikes.

● Repeal the "windfall profits" tax. It isn't producing any revenue now anyhow, since oil is selling below its trigger prices. Repeal would signal the domestic industry that if it invests in exploration and production, it will get to keep a fairer share of any future rewards. Similarly, Congress should realize that the oil industry simply can't afford to be singled out for any more special taxes like the Superfund levy, which calls for a handful of industries to shoulder a society-wide problem.

● Continue filling the Strategic Petroleum Reserve. It's an excellent insurance policy—and like most insurance, we hope we'll never need it, but it's nice to know it's there. Besides, America bought a lot of oil for the SPR at \$30 a barrel, and at today's prices the government can take advantage of a relative bargain.

● Open up federal lands for petroleum exploration. We've been saying for well over 10 years now that oil and gas production and a clean environment are not mutually exclusive. The wa-

Doniger & Dubek 9/8

- Seeing prob in mkt-terms ^{incentives} is good rather than command & control terms, -- all agree.
- Why took SFA on exten of time for domestic rulemaking sched.
- Also all see trade implic's.
- Wld differ on how much time for long term reduc's, tho enviro's know it has to be in yrs.
- Mkt based issues = flexibility is adv to implementation, & opens opp for future changes.
- Movement toward negotiated regulation
 - ↳ wood stove
 - ↳ truck & car compliance

→ Alliance & Enviro's are meeting.
↳ yet what to do in the face of uncertainty -- each have come out diff, indus saying lin produc capac & eng's saying need lots immed reduc's.

Enviro's
★ Environ Gps ⊗ Focus on the 85%
reduc. nec. to stabilize
↓
∴ Shoot for this reduc in 5 yrs.

neck out
2) DuPont's -- public that substit's availab
for 5 yrs.

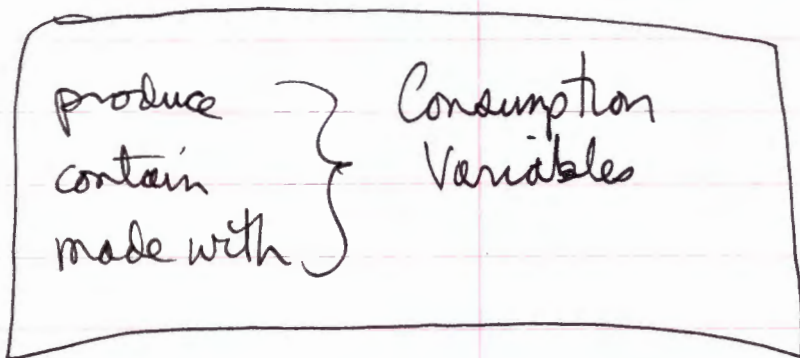
Enviro's -- Need strong signal to adapt
strong incentives.

★ Prepared to see CFC-22 as part
of the solution.

"Multi-party - multi-variable Problem"

→ Mention that CFCs are very small element of the products containing CFCs

U.S. Fluorocarbons producers = $\frac{2}{3}$ world's producers.



View of Int'l Negot's

* The Europeans have begun to take the U.S. seriously which they didn't b-4. -- it's b/c we're sticking to position that has brought them around.

-4-

RCB = Jan's thinking about going to Vienna.

Trade Provision

↳ must be strengthened bc in current form wld exert little leverage over the most likely cheaters & wld cover few products.

(113) -- Can be Closed & Recycled as a matter of process.
↳ argues for inclusion.

Why They are Willing to Delay

- ① Int'l Process
 - ② EPA is doing all they can
-

What are SIC codes?

Benedick

- Wirth,
- Tripp &
- EPA rep.

Atmospherics Good

- no confrontation, except for NGOs
- Chairman's mtg w/
- smaller -- gp developed this (w/ 1/2 rep from many countries)

① Chem's 11, 12, 113 [114 & 115]

Halons not in now & not in the mandat
& Soviets insisted

② Timing Entry into force (1988)

auto-freeze 2 yrs aft entry (1990)

auto-20% ↓ 2 yrs aft. (1992)

[A] 6 yrs ~~later~~ ^{off entry}, add'l 30% if simple
majority confirm (1994)

- or -

[B] Add'l 30% 8 yrs aft entry force
unless 2/3 (1996)]

Beyond this, mtgs to decide
further reduce [up to virtual
elim --- not substitu
availab]

NGO's

- on warpath, gave away everything
- Spradley & Smith sabotaged
- gave away 95%
- took away automatic

NOAA

- unhappy b/c too strong

Int - understood,

EPA

- best that could be done

- ① Will there be an options paper?
↳ Lee = no
↳ advise & not bring to DPC for decia.

Process

→ OSTP on the planning gp.

Richard

~~Reduce~~

8- Coverage
Je 19- UNEP mtg — Will prob'ly result in P's
Gov'g Conf. mandate to incl halons.

June 29-30 — The next major mtg.

June 19-- due response on Chairman's text.

U.S. assoc w/ chem coverage -- full chemical coverage.

→ EOP briefing from repr on deleg
as to what US is assoc'd w/.

→ Hqs shld not push the DPC to come up w/ a position

→ What say?

① Come up w/ position

② Say 175 & "it's under consid"

③ Explain

→ Tolba = going to testify

→ trade elements still under discussion
It can't be done by Wednes

① St. Dept. -- going to chairman to ask if this part of hqs can be delayed or conducted diff b/c in middle negot's

② Int'l Treaty only = no domestic

③ Midway thru, been good process.

④ lots left to be done -- issues

⑤ reviewing results

⑥ all the progress

⑦ offensive ~~defensive~~ & not defensive

⑧ DPC will decide b-4 protocol is signed

⑨ some diff pts of view

pot together
small
looking at
⑩ →

Dave's Gp =

Benedick
Lee Thomas
Colio
Marty

Having DPC develop position wld be:

→ Impractical

→ Negatively affects negotiating process b/c

① have not received cable ② must in next 2 weeks define remaining

issues & the subpts rec'd for the final rd.

③ DPC will have a b-y + aft consid
"try to get it" -- "do we like what you got?"

② How much shld Cabinet Council process be highlighted in the testimony?

⇒ hurt int'l negot's if we project disarray

~~In Legal Affs~~

Tomorrow

State Dept.

-- Will go to the Cong & ask for delay

or
as fallback, private briefing.

-- elements of uncertainty

Testimony mtg 10103

4:00 -

5:00 - debriefing

The Issue

~~① Done work~~

Done -- facil' r. // getting issues & options

- ① formula
- ② trade
- ③ LDC's

Aerosols

Use of
11 & 12 from 1958-85

8.8 Kg / capita

EC

11.6 Kg / capita

US..

- 85 population
- cumulative use total
divided by pop.

All CFC use
Cumulative

13.7 / kg / ^{cap.} EC

26 / kg / cap. US

EC current use.

.71

.82

alliance

4/15

CFC Substitutes

Impacts of Freeze

[Putnam Hayes & Bartlett Rpt on econ impacts of freeze.
(will be done in ≈ 1 wk)]

Putnam, Hayes, w/o Restrict's U.S. CFC use wld increase
298000 met tons \rightarrow 473,000 met tons

Prelim
Concl =
I. wld freeze (by ozone depletion pot'l of
CFC 11, 12 & 113)

Signif. p \uparrow 's of CFCs in ST (0-3 yrs)
 \hookrightarrow 2-3 x's \uparrow of p's
LT (7 yrs +) \hookrightarrow p \uparrow 's 4 x's.

[Freeze of adjusted production at 86 levels.
starting in 1988.
(Analysis out to yr 2000)]

\downarrow

* Reason p is \uparrow 'g is that substit's are
not going to be available to meet the demand.
(If substit's were availab at \downarrow 'd p, then
p wld go down.

* } \rightarrow

* and, since there is a fixed amt of 11, 12 & 113
& no substit's = p will go up.

Pt = No way to have substit's in these timeframes.

These p \uparrow 's will provide incen's to develop substit's.

→ Cost to society \equiv [aggregate of $p \uparrow$'s \times qty produced by mechanism]
1 billion dollars

→ Wealth Transfer = 3-4 billion dollars.
↳ ($p \uparrow \times$ remaining qty)

[Thru yr. 2000 cumulative.]

CHEMICAL SUBSTIT'S

Wk's on:

CFC 123 (for 11) (123 looks best for 11)

CFC 134a (for 12) (134a looks best for 12)

No process doesn't work on these.
Not currently consid'd substit's.

assuming
it
works

b-4 com'l availab, long process (7-10 yrs)
↳ pilot plant
↳ tox studies
↳ start new com'l facil's

Toxicity studies are the factors that can't be compressed; these have not started.

↳ amt mat. to test is not available

↳ tests are very expensive & need certainty it will be reliable.

Halocarbons - not producing, want commitment of 20,000 lb (20/lb)(??)

↓
Envir ap's
said these
guys are
produc'g

Need ~~redu~~^{reduce} to force devmt of tech? - No.

↓
Alliance = freeze is the way to go. ↓

Indus
position } →

↳ [Not going to oppose the freeze
on adjusted production.]

↳ This wld provide suffic incen's
to dev substit's as quick as
any add'l reduc's wld
encourage.

Why haven't tox tests started?

↳ initial scoping is inexpensive, then very expensive

↳ the discussions until Dec '86 had not
solidified to suggest a freeze was
definite enuff. to commit the
millions of \$ nec.

↳ pot'l for low yield & very large waste
stream.

↳ part will be hazardous
b/c will get other
fluorocarbons.

↳ ^{must} spend lots \$ on bldg a plant & it's always
a gamble. b/c devmts in pol or in
tech. cd make it uneconomical.

[?] Further Reductions req'd aft 10 yrs } moving from
↳ what pot'l negative effects? } their 7-10
yr. submt devmt.
↳ It is chilling effect on industry.

Automobile industries \rightarrow if everyone shifts to 22,
in 10 yrs, will be shifting again
& will have to go thru the expenditure
and shift again. \therefore 22 is not a
viable substitute.

- ① not suffic incen now to invest the large sums
to dev alts. which have most pot'l. for success
 - ② not clr whether these alts will pass
muster & won't know until X \$ & X yrs.
 - ③ if they are OK, then \rightarrow reduce is not too
painful.
 - ④ if they do not wk, then a reduce wld
have to come from other means
besides substit's.
 - we need to know this info, the sooner
the better
 - this discovery wld redirect the reg. decis
- \therefore if the reg'd reduce is far enuff away in
time it is not incrementally costly.

Refrig's & room a/c's : 12 ^{refrigerant hermetically sealed.} (10-20 yr life)
- life time of product affected
by various factors.
- costly & long process to eval alt.
re reliability.
11 (in foam for insulation

complex experiments & lots tests to see
if new product will work.

Ex: New compressor — re-design & testing
cost \$100 million.

[?] Is it possible technologically to reclaim
refrigerant?

- not sure.
- auto indus -- may have to redesign
> of the same car.

Room A/C's 22 -- sealed system

The Time

10 yr LT Planning

Don't Want a Number on the Horizon B/c --

- it wld have an impact on planning
of all levels & direct many
corp. decisions — and --
- a lot can happen in 10 yrs -- and
- they did prove not the best decisions
econ'ly, — and --
- govt may chg its mind anyway.

A/C -- larger sizes.... Use 22 -- no Substit
availab.
+ 11 & 12

\$43 million to do compressor in
recent re-design of product.

Centrifugals use thousands of tons of ~~22~~ 11/12
(these units are condition large bldgs) (1000 lbs
per 400-500 sq ft)

- 22 not adaptable to lrg chillers
∴ looking at substs
 - lrg centrifugal chillers lifetime = 50 yrs.
↓
 - they are containable (for lrg systems, the containmt is economical).
 - Home A/C = 70% = ~~22~~ CFC 22
 - Car A/C & refreg's = 12 use
 - ^{there is} no 22 in large bldgs (centrig chillers) - 12 + 11 (11 is containable for lrg units economically & is the most dgrs to ozone)
- 12 is what escapes
- * → Not much pot'l to move to 22 in A/C busin.
(yet options ex

- * 134a has the ultimate pot'l to substat for 12 = 62% (that in a/c)
- * 123 has pot'l to substat for 77% of 11 uses. (that in foam)

Rigid Foam (CFCs provide insulating value)

- reduced CFCs emitted in mfr to < 5%
- final product cost wld be greatly affected by ↑ CFC costs.
- use of 123 wld ↓ insulation value by 30%
- if alt becomes availab, 2-5 yrs to see if it will wk.

- the rigid foams are conven & inexpen for concrete.
- pot'l ↑ in housing costs b/c the same insul pot'l will be larger physically req'g re-design of door-jams, etc. /or/ less insulating pot'l is the ENERGY costs

com'l uses

- 33% new resid'l use CFC foams
- 56% use CFC foams in com'l flat roofs
- 42% CFC foams in farm bldg
- 80% side wall
- 30% resid'l reinsul.

CMA & Rasmussen studies for emissions.

★ Prob = ^{Foam Folks} **Not** agree that emissions = Use
B/c only lose 50% in mfg.

★ Follow this up on how we measure emissions & validate reduc's

→ rigid blowing foam = almost all 11

1416 & 123 = Pot'l Alt's.

- ↳ vapor pressure
- ↳ conductivity
- ↳ many other factors affecting the foaming
- ↳ flammab
- ↳ tox
- ↳ reactiv w/ other chem's.
- ↳ soluble (they are)
- ↳ strength (foams will collapse)

[2-5 yrs from time alt is dev'd req'd for applications testing.

Flexible Foams -- (methyl chloide = substit)
-- prob'ly won't be a big
prob (123 & 141b shld
wk too.)

Polystyrene Foam -- uses 12; lifetime = 20 yrs
22 as alt
yet it comes out in 6
mo's vs. 12 stays in for
the lifetime of the product.
- 142b may be an alt.
but lim'd availab. now.
- 124 & 133a unknown.

[25 plants
in world
7 plants in U.S.]

Polyethylene Foam -- uses 114; no substit.

Expandable Polystyrene -- uses 11 b/c low
Granules flammab; no suitable
(packing agents) replacements.

Electronics

113 -- degreasing semi-conductors
& removing solder chips.

[recapture & recycle of CFC by
the refrigeration coils]

113 is the solvent of choice, other solvents are bad
actors; 113 = nontoxic, nonabrasive &
nonreactive.

* wld need these qualities in any substit

→ Other solvents have left (i.e. TCE) b/c of other probs.
& have poorer quality in semi-conductors.

→ 113 is responsib for ↑'d speed in semi-conductor
that are miniaturized.



No near-term ~~15-18 yrs~~ Alternative
(10-13 yrs) for 113 users.

→ 132b is the closest alt, yet it wld not
be suitable b/c it's too vigorous & strong.

→ Currently surveying for substitu's.

→ 113 is expensive — it is selected anyways;
∴ price ↑'s wld not affect the demand

[Remember Japan!]
Recapture & Recycle
↓ degreasers
Today
The maximum now = 85%; yet now
the recapture is prob'ly > like
50%. & wld not be able to
get the add'l 50% economically
today.

the catallac
of the line

Auto Indus

— use 113 in degreasing computer parts
same status as indus.

— 11 in foam blowing; looking at water
blown foam (2-5 yrs away)

— use 12 —
mobile A/C's — 22 will ~ wld b/c wld
redesign in future.
↳ recharge

OZONE
SUBGP

4/13

Craig P. // Tom Plare // JR Spodley
Benedick // Jan // Becky

8:00am

→ Wednesday

Fitzhugh's office

Benedick: Wants to back-off 95%, yet stick to coverage
re: agents.

↓
U.S. position paper - inter-ag concurrence
+ then use it.

Europe 20% reduce GWP from entry-into-force
(US + can do as this w/ little diffie)

Tom: Credit to US to ban aerosols

JR: begin roll-back after others ban
aerosols. (yet this has not been
whable to others b/c --

- ① Japan conserving lots CFC 113 +
- ② Europe use CFCs for Big Mac's
etc. + rely on them for major
industry's (i.e. French perfume)

RCB: Not "back-off" but "focus"

Becky: Aerosols,

Benedick: It won't wk.

+ Europe has moved from positions

Dave: Wait for science

Jan: of the 4-5 variables involved - should prioritize:

- ① agents covered
- ② countries covered
- ③ trade
- ④ then, the amt reduce

Wallace → St. Dept remarks
NSC / re orgn.

Tues 2:00 pm Alliance
 5:00 pm Donagan

wed ?

Indus	Gvt	Drain	Indus	
Indus	Gvt	Gvt	Indus	<u>etc.</u>
Indus	Gvt	Drain	Gvt	

Planning
 Eval
 action.

- ① Small Gp. — Mon afternoon
- Dave Gibbons
 - Jan Mares
 - Potter
 - Becky Dunlop
 - Benedick
- ② Change ^{nature of} the issue } more -'s than +'s to do anything
b-y
- [?] = How to bring it to the DPC process?

↳ think thru the process.

③ → Thomas briefing to Council in May

↳ EPA -- how they see DPC getting involved

he'll ask what should the Admin posit be?

For April

- ① stick to prior
- ② pleased to see other countries moving.
- ③ Pres. will be rev'g results of Apr. negot's.

③ ENKE Why go mtg end next wk.

2/6/85

EPA, ICF (WRI attended)

Models

[?] Pop projections -- how accurate? -- how inpt to models accuracy?

ICF = GNP + pop both inpt., w/ GNP more inpt.

↳ These projections are not nec'lly accurate in the ST.

↓
Ex: Census -- Intel -- 1st 5 counts were not acc + ~get it until 6th.

Steve ★ Nobody believes we can predict pop + GNP in LT
* yet this will not improve in the near-mid term nec for decisionmakers.

[?] What is the degree of confidence -- how much uncertainty shld we inform our principals of?

[* Assump's = absence growth limitations / emissions limitations + it
Assump's that new products will require as much CFCs as previous,
↓

There is a hand-out ⇒'g that fit. tech chg's will limit growth

Irving * - Yet EPA's "what if" scenarios incorp this factor.

Get bank table of emissions for 12 + 113

↳ * equivalent of 6 yrs of emissions in the "bank"

[?] = formula using to negot. an int'l agreement?
≡ (adjusted production) (also, - recycling / destroy)

BASIS FOR US POSITION

SAB used the 2 charts of CFC 12 saying
need ↓ 85% to stabilize concn's.

→ Chg N_2O descrip. to say it interacts w/ CFCs
in troposphere to ↑ ozone.

→ 2D models better.

★ Supports polluter Pays Theory in Policy.
★ latitudinal variables. { ① not only is where
most of pollution is,
② but also where
pollution is occurring

⊗ Effects vary with latitudes.

↳ both ways:

- ① > depletion north yet
- ② depletion in lower latitudes
brings in > UVB.

DeConio -

→ [How can DPC process
↳ formulate negotiating options.

- crude estimates

- benefit estimates much > than cost estimates

↳ crop yield (spec)

↳ global warming (spec)

↳ cancers (can assign deaths #'s to)

↳ #'s in hundreds of billions

↳ no control 1 mill deaths / 88 yrs.

↓
annual rate $\frac{10-20 \text{ bill}}{\text{yr.}}$

↳ produce

↳ investmt

↳ not clear how doing it
alliance \$1 billion
now to 2000
for freeze.

- active agent is ultraviolet flux.

- Shld we use the DPC or the Circ 175 process?

→ Need policy allowing for ^{Sci} assessmt.

Dr. Johnson -- Think it shld go to DPC.