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ENVIRONMENTAL COSTS AND NAFTA

Testimony, U.S. International Trade Commission Hearing

Potential Impact on the U.S. Economy and Selected Industries of the North American Free Trade Agreement

Washington, D.C., November 18, 1992

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I. Why Are Environmental Costs Understated?

Economists who have undertaken macro-level analysis of environmental and worker protection cost have concluded that it is not a significant factor in industrial location. One example is the World Development Report (p. 67). It argues:

"Evidence shows that developing countries do not compete for foreign investment in "dirty" industries by lowering their environmental standards. Rather . . . data . . . suggest the opposite: because it is cheaper for multinational corporations to use the same technologies as they do in industrialized countries, these firms can be potent sources of environmental improvement."

The same conclusion is reached in the extensive review of trade and environment literature by Cropper and Oates (p. 699). Altogether, the World Bank and Cropper/Oates papers reviewed at least 30 studies. Generally, these authors find that total pollution control costs are no more than 3% for the most pollution intensive industries, and therefore not significant in affecting industrial location.

In contrast, national media depict widespread environmental problems arising from Mexican industrial production for export to the U.S. (e.g. Tomsho, Langewiesche).

These Mexican problems could reflect economic incentives arising from avoided pollution control costs. In a meeting with the Director of Environmental Planning for a major Mexican industrial city, I was told that there would be no movement to control industrial pollution because industrial production for export to the U.S. was the basis for economic growth. The Director noted this comment from a Dutch industrialist: "I do everything with waste that I couldn't do in the Netherlands. Here I throw it in the sewers and you don't charge me for it."

In my judgment, the macro studies err by depending upon economic census data. All of these studies have used Federal survey data, which exclude a number of potentially significant types of environmental and worker protection costs. The analysis which follows focuses on the mining industry. Table 1A shows, for copper production, items which typically are not fully covered in economic census data on environmental protection and worker safety cost.

The comments below are based upon discussions with personnel in the Bureau of Economic Analysis, the Bureau of the Census, and management personnel at mines and smelters in the U.S., Mexico, Chile, Zaire, Zimbabwe, and South Africa, and are taken from Chapman (1991). I see six sources of error in the types of cost factors which have been excluded.

One important factor is that many labor-intensive activities that are part of a production process may not be reported. For example, the labor, fuel, and equipment costs of dust control in a pit mine by use of watering trucks may not be reported. Similarly, collateral protection devices that are a secondary part of production equipment may not be reported. Relevant examples here would be the capital and labor costs of a dust hood on an ore conveyor, or fans and hoods on a grinder.

Second, monitoring and planning activities may be excluded. Four examples of environmental protection expenses that have been excluded would be:

Table 1A:
Environmental Protection Activities and
Equipment in Copper Production

a. air and water pollution control, coal burned for power generation
b. bag house on crusher
c. berms for chemical storage
d. covered conveyor
e. primary converter hoods
f. fugitive emission hoods
g. gas collection fans, electricity
h. hazardous waste control
i. meteorological data and forecasting for possible pollution emergencies
j. monitors for air and water quality
k. PCB control
l. storm catchment reservoir for ten-year storm
m. tailing reservoir and drain
n. tall stack
o. waste oil control and monitoring
p. water discharge plans and monitoring
q. water recycle zero discharge
r. water spray for dust control
s. wet scrubbers
t. acid plant
u. professional and environmental protection personnel
v. Federal and State reports and meetings

Table 1B: Work Place Health and Safety Protection Costs

a. personal safety equipment: protective jacket, hard hat, glass, respirator, boots
b. roll cages and cabs on vehicles
c. clean workplaces
d. lights
e. minimum train crews
f. hearing testing, protection, and monitoring
g. plant air testing
h. radiation monitoring
i. respirator testing
j. training programs
k. mine and industrial safety personnel
l. mine and industrial safety reports and meetings

Sources: Personal interviews, visits to mines and smelters.

(1) professional time spent with visitors inspecting protection systems; (2) meteorological monitoring of ambient air quality; (3) environmental planning; and (4) time and expense in report preparation and meetings with State and Federal regulatory personnel.

A third omission from survey data is the cost of protecting workers from environmental hazards. All of the items in Table 1B are excluded from environmental cost reports.

A fourth excluded item is productivity loss. When production stops or is slowed because of environmental problems, this is not counted as an environmental expense.

A fifth factor in under-reporting environmental costs in surveys may be vintage: current management may not perceive practices which preceded them as protective; current management may focus on environmental practices introduced during their tenure. Examples here are respirators and tall stacks.

Finally, interest expense or opportunity cost for investment in protection equipment is not included in the survey data. This could be significant.

As part of my work in industry analysis, I met with production engineers and accountants to estimate the cost differentials in two industries, copper production and silverware manufacture. In addition, published research on U.S.-Japanese productivity in automobile manufacturing was the basis for estimating cost differences in pollution control.

Summarizing this work, it appears that these costs add 14% to U.S. auto manufacturing, 20% to copper production, and 25% to silverware manufacture. This latter activity has since disappeared from the U.S. Copper and automobiles continue to be produced here at stable or declining levels, and world growth in production, including production for U.S. markets, continues to take place elsewhere.

In conclusion, the finding that pollution control costs are no more than 3% is a significant underestimate. Based on the values of 14-25% for the sample industries above, the previous conclusion needs revision. Environmental and worker protection cost may indeed be significant factors in industrial location.

2. NAFTA's Impact on North American Pollution

Where data are available, they show that U.S. pollution emissions from manufacturing are stable or declining, while the increases in the rest of the world are accelerating. Sulfur emissions are one such case as shown in Figure 1. This is likely to be a typical case: reduced U.S. emissions, rising emissions elsewhere. If data existed on global pollution emissions, I think this would also be the case for acid rain emissions, carbon monoxide, unburned hydrocarbons, and toxic wastes.

In economic theory, it is possible for a net increase in pollution to arise from the interaction of strict pollution control in one region, negligible control in another region, and trade (Chapman, 1992). Whether or not this theoretical possibility becomes an actual event depends upon the specific cost and emission factors in each region's industry.

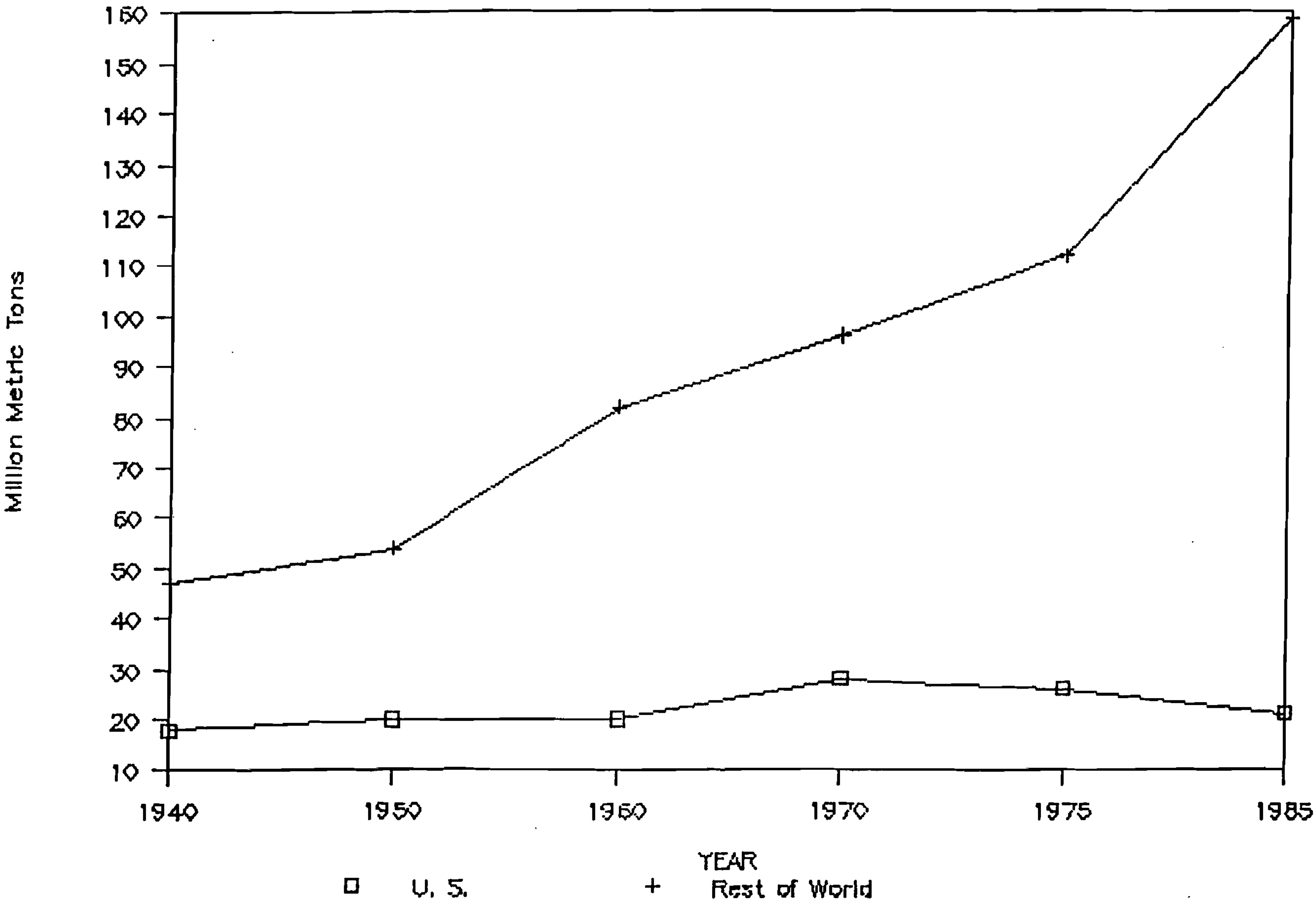
On a simpler plane, this process is evident in the technologies by which copper is produced and traded. Environmental sulfuric acid may be produced in the ratio of 3 to 1 in copper production in Arizona, New Mexico, and Sonora, Mexico. Therefore, each ton of copper produced, in the absence of control, releases 3 tons of acid rain emissions. In Northern Sonora, the smelters at Cananea and Nacozari have little or no effective sulfur control. Mexican copper smelters are now a significant source of this pollution in the Southwestern U.S. and the Grand Canyon. In the U.S., however, extracting the same ore types but with pollution controls, results in 90-95% of the sulfur being prevented from entering the atmosphere.

The copper produced at the Mexican sites is usually sold to Japan, even-

FIGURE 1

GLOBAL SULFUR DIOXIDE EMISSIONS

(million metric tons)



tually entering the U.S. in automobiles and electronics. Consequently, although the U.S. buys the product and bears the pollution impact, there is no formalized effective way by which environmental and economic policy are integrated.

3. The Need for Pollution Monitoring

The U.S. EPA and State agencies, in cooperation with U.S. manufacturers, monitor and report extensive data on emissions. The Appendix reproduces 2 Tables from the November 1991 publication. One table shows national totals, and another shows an industry breakdown. In addition, this type of data is frequently available for individual counties. This is the kind of information that is essential for informed policy. It is not available in Mexico.

On both a professional and personal basis, I strongly advocate the establishment of a mechanism to collect and report quantitative data on pollution, and I believe this should be part of the NAFTA process. It might proceed in two steps: a careful review of existing pollution emissions in a one-time study, followed by a mechanism to implement regular data collection and publication.

4. The Clinton Proposal

The current version of the Treaty available to me has no substantive sections addressing environmental protection (September 6 text). I think this is a serious problem requiring a major effort to remedy it.

Personally, I think the commercial dimensions of NAFTA can have a positive economic impact in all 3 countries, if full employment is achieved as the Agreement is implemented. However, the environmental defect is of such serious magnitude that some additional work is necessary.

President-Elect Clinton advocated amending the Agreement to include an environmental commission (Ifill, New York Times). (This would also include worker safety as an environmental consideration.) If pursued aggressively and competently, an environmental commission would establish the needed framework for data collection and analysis, and policy implementation.

We have seen that Mexican, Canadian, and U.S. business can already operate effectively in all three countries. They can integrate production and marketing effectively. The result is lower product prices. However, in the absence of an integrated and effective approach to environmental pollution, NAFTA will probably lead to overall increases in North American pollution. The Clinton approach or something similar to it is desirable.

5. Appendix. Sample US-EPA Pollution Data: Two Illustrations

Table 1. Summary of Estimates of
Nationwide Emissions.

Table B-13. Emissions of Total
Particulate Matter from Industrial Processes.

Source: US-EPA, National Air Pollution Estimates, 1991.

TABLE 1. SUMMARY OF ESTIMATES OF NATIONWIDE EMISSIONS

Pollutant (Teragrams/Year)	1940	1950	1960	1970	1975	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Total Particulate Matter	23.1	24.9	21.6	18.5	10.6	8.5	8.0	7.1	7.1	7.4	7.2	6.7	6.9	7.5	7.2	7.5
PM-10 (Point and Fugitive Process Sources)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.0	5.6	5.8	6.3	6.1	6.4
PM-10 (Fugitive Dust Sources)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	40.5	45.3	38.1	54.3	48.5	40.8
Sulfur Oxides	17.6	19.8	19.7	28.3	25.8	23.4	22.5	21.2	20.6	21.5	21.1	20.9	20.5	20.6	20.8	21.2
Nitrogen Oxides	6.9	9.4	13.0	18.5	19.6	20.9	20.9	20.0	19.4	19.8	19.9	19.1	19.4	20.0	19.8	19.6
Non-Methane Volatile Organic Compounds	15.2	18.1	21.0	25.0	21.1	22.6	21.3	19.6	20.4	21.2	20.1	19.0	19.3	19.4	18.5	18.7
Carbon Monoxide	82.6	87.6	89.7	101.4	84.1	79.6	77.5	72.5	74.5	71.9	68.7	63.2	63.4	64.7	60.4	60.1
Lead (Gigagrams/Year)	NA	NA	NA	203.8	147.0	70.6	56.0	54.5	46.6	40.2	20.1	8.4	8.0	7.6	7.2	7.1

PERCENT CHANGE

Pollutant	1940-1990	1970-1990	1980-1990	1989-1990
Total Particulate Matter	-68	-59	-12	4
PM-10 (Point and Fugitive Process Sources)	NA	NA	NA	5
PM-10 (Fugitive Dust Sources)	NA	NA	NA	-16
Sulfur Oxides	21	-25	-9	2
Nitrogen Oxides	184	6	-6	-1
Non-Methane Volatile Organic Compounds	23	-31*	-17	1
Carbon Monoxide	-27	-41	-25	-1
Lead	NA	-97	-90	-1

Notes: NA means not available.
1990 estimates are preliminary.
Negative percent change indicates a decrease.
*Percent change is based on an adjusted estimate for highway vehicles in 1970 to reflect recent changes in estimation method.
Refer to Section 4.1.1 for details.

TABLE B-13. EMISSIONS OF TOTAL PARTICULATE MATTER FROM INDUSTRIAL PROCESSES
(Gigagrams/Year)

Source Category	1970	1975	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Cattle Feed Lots (0211)	20	20	20	20	20	20	20	20	21	22	21	20	19	19
Cotton Ginning (0724)	20	20	20	20	30	20	10	20	24	17	26	27	21	25
Metallic Ore Mining (10)	530	320	210	180	200	110	110	130	129	114	130	128	153	149
Coal Mining (1211)	350	250	290	310	310	320	300	350	314	313	312	321	336	332
Crushed Stone (142)	1,350	760	570	450	380	340	370	400	421	482	477	578	574	603
Sand and Gravel(144)	50	40	50	40	40	30	30	40	41	46	46	45	46	49
Clays (145)	1,610	290	150	130	70	60	70	80	79	64	56	55	46	46
Potash/Phosphate Rock (1474,1475)	40	30	30	30	10	10	10	10	12	6	5	7	9	9
Feed and Grain Milling (204)	70	60	50	40	50	50	30	50	49	58	45	44	46	80
Lumber and Plywood (24)	80	70	80	70	70	60	70	80	82	92	98	98	96	104
Pulp Mills (261,262)	620	220	120	140	90	100	100	120	117	96	98	109	86	88
Chemicals (28)	220	120	140	140	120	100	110	130	118	90	95	97	101	103
Petroleum Refining (2911)	60	70	50	50	40	40	30	30	20	19	17	17	17	18
Asphalt Paving and Roofing (295)	560	320	130	110	90	90	110	140	118	124	133	127	125	133
Glass (321,322)	40	40	30	30	30	30	30	30	28	24	23	25	25	25
Cement (3241)	1,580	640	520	380	290	220	240	270	266	213	196	213	215	216
Brick and Tile (3251)	40	30	20	10	10	7	10	10	14	12	12	11	10	11
Concrete, Lime, Gypsum (327)	580	290	140	130	100	80	80	90	90	89	90	93	92	100
Clay Sintering (3295)	100	40	10	10	10	10	10	10	10	6	7	6	5	6
Iron and Steel (3312)	1,190	570	400	310	300	200	180	180	161	136	140	159	155	154
Ferroalloys (3313)	160	90	40	30	30	20	20	20	21	17	16	16	22	20
Iron and Steel Foundries (332)	150	70	60	50	40	40	30	30	37	35	38	40	46	47
Primary Nonferrous Smelters (333)	390	200	100	90	90	60	70	70	66	51	55	55	55	54
Secondary Nonferrous Smelters (334,336)	60	50	50	40	40	30	30	40	35	34	33	34	38	40
Grain Elevators (4421,5153)	670	590	550	490	550	510	280	430	489	390	346	353	353	364
Total	10,540	5,200	3,830	3,300	3,010	2,557	2,350	2,780	2,762	2,550	2,515	2,676	2,692	2,796

Note: 1990 emission estimates are preliminary. The sums of subcategories may not equal total due to rounding.
Numbers in brackets are Standard Industrial Codes.

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