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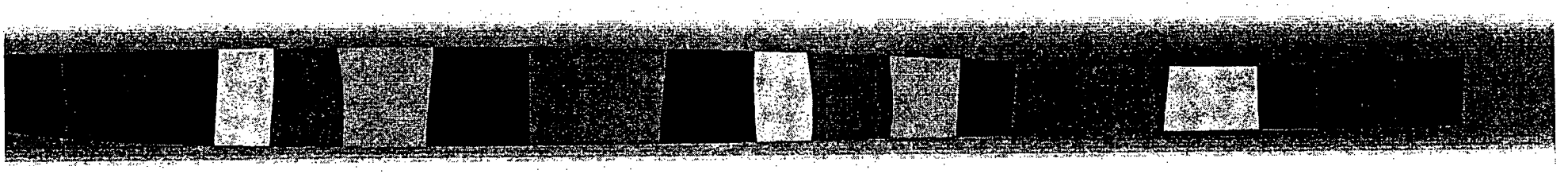
FolderID:

Folder Title:
Climate Change International Trading [2]

Stack:	Row:	Section:	Shelf:	Position:
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Baltimore - EW/2 PL

Greenhouse Gas Registry:
Accounting for Changes in Assigned Amount



Prepared by the U.S. Environmental Protection Agency

March 1999

Overview of Presentation

- Background
- Purpose
- Registry system design
- Preview of registry prototype

Background

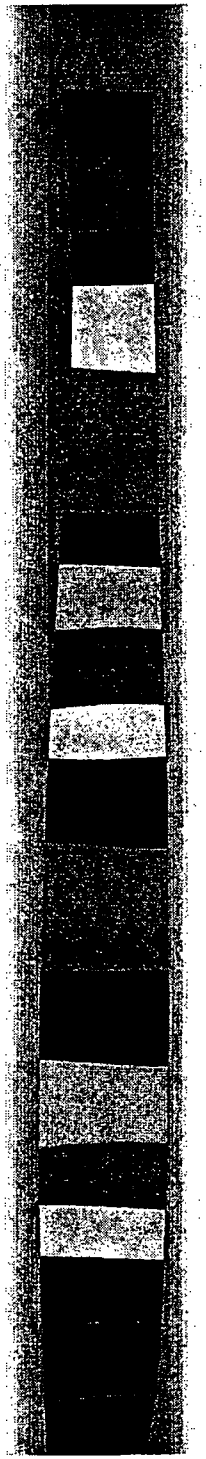
- Protocol allows use of Kyoto mechanisms to assist in compliance
- Kyoto mechanisms result in adjustments to assigned amounts
- Protocol requires Annex I countries to keep emissions during 2008-2012 below their adjusted assigned amount

What is the Registry's Purpose?

- To keep track of changes in assigned amount, in order to determine compliance at the end of the commitment period
- To provide publicly accessible information to:
  - facilitate and maintain integrity of trading
  - minimize compliance costs

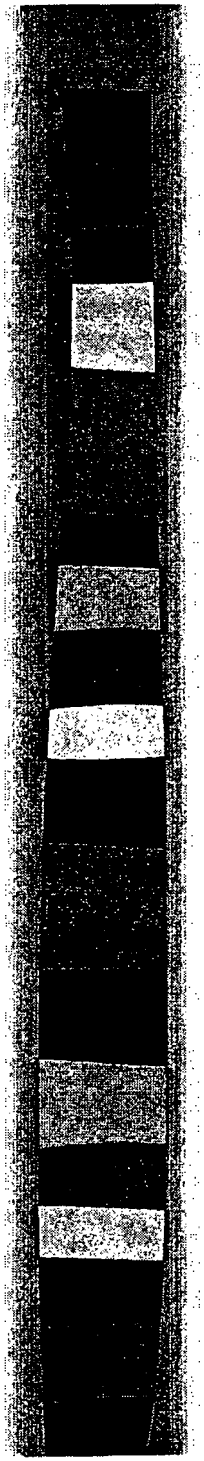
How does Assigned Amount Change?

- Annex I Parties begin with initial assigned amount (calculated from 1990 emissions & commitment in Annex B)
- Plus:
  - Certified emission reductions generated from CDM projects
  - Additions from sinks
- Plus (or minus):
  - Units of assigned amount acquired (or transferred) through emissions trading or joint implementation



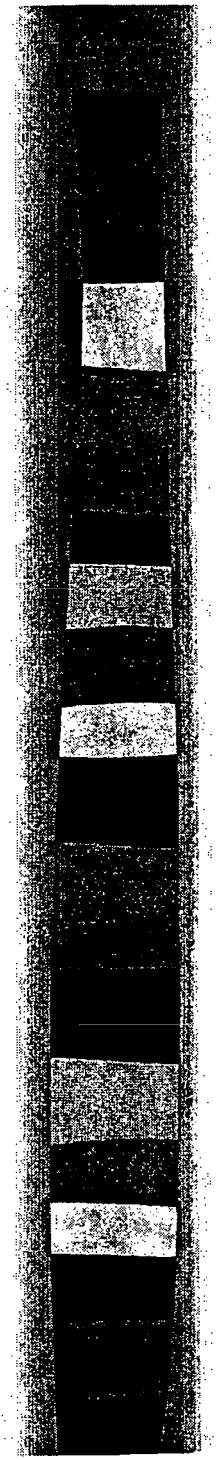
What is Transferred?

- Parts or units of assigned amount, measured in metric tonnes of carbon dioxide equivalent
- Useful to think of each such one-tonne unit of assigned amount as a "tradeable unit" allowing one tonne of emissions



What is a Tradeable Unit?

- Authorizes emission of 1 metric tonne of CO2 equivalent
- Identified by unique serial number with country of origin, relevant commitment period, & (for JI/CDM) project identifier
- Trading of units increases or decreases Party's adjusted assigned amount

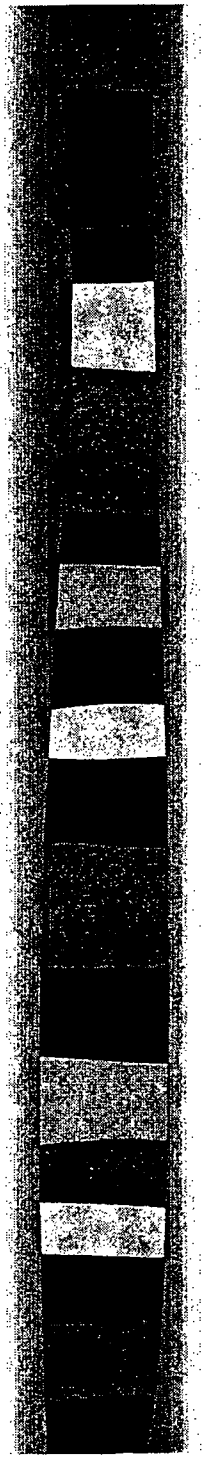


Purpose of Registry Prototype

- We're developing a prototype GHG registry system for accounting for changes to assigned amount:
  - As an educational tool to help explain Kyoto mechanisms
  - To help flesh out essential elements for international rules under the Protocol
  - To share design ideas and get feedback

Design Principles for National Registries

- Registries should be capable of accounting for changes to assigned amount as result of:
  - Art. 17 trading,
  - Art. 6 Joint Implementation,
  - Art. 12 Clean Development Mechanism,
  - Art. 3.3 & 3.4 sinks, and
  - Art. 4 bubble reallocations

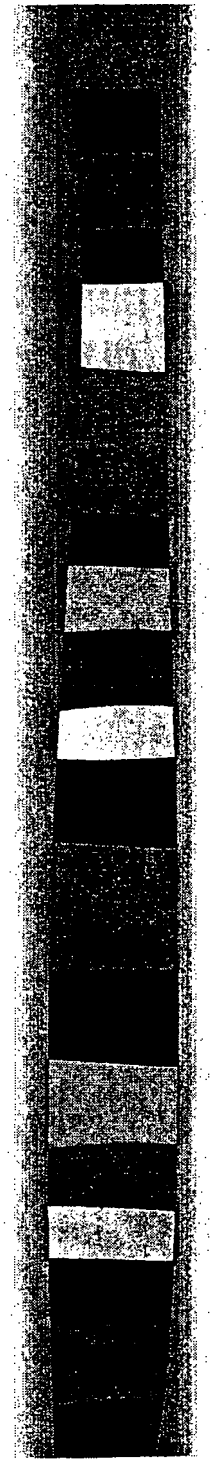


Design Principles (continued)

- Ease of operation
- Near real-time trade execution
- Publicly available account information
- Adequate capacity
- Prevention of unauthorized access to certain functions
- Provides for accounts by legal entities
- Minimized role of central administrator

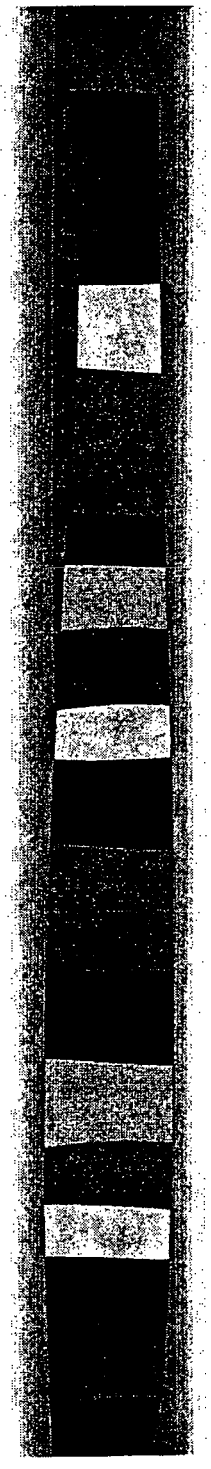
What is publicly accessible?

- Publicly accessible in registry
  - Balance of assigned amount held by Party
  - Information on entity accounts
    - representative name
    - units held in the account (by serial number)
    - account balance
- Not publicly accessible through registry
  - Contract or "street name" trades
  - Prices



Design Principles: Party's Customizable Options

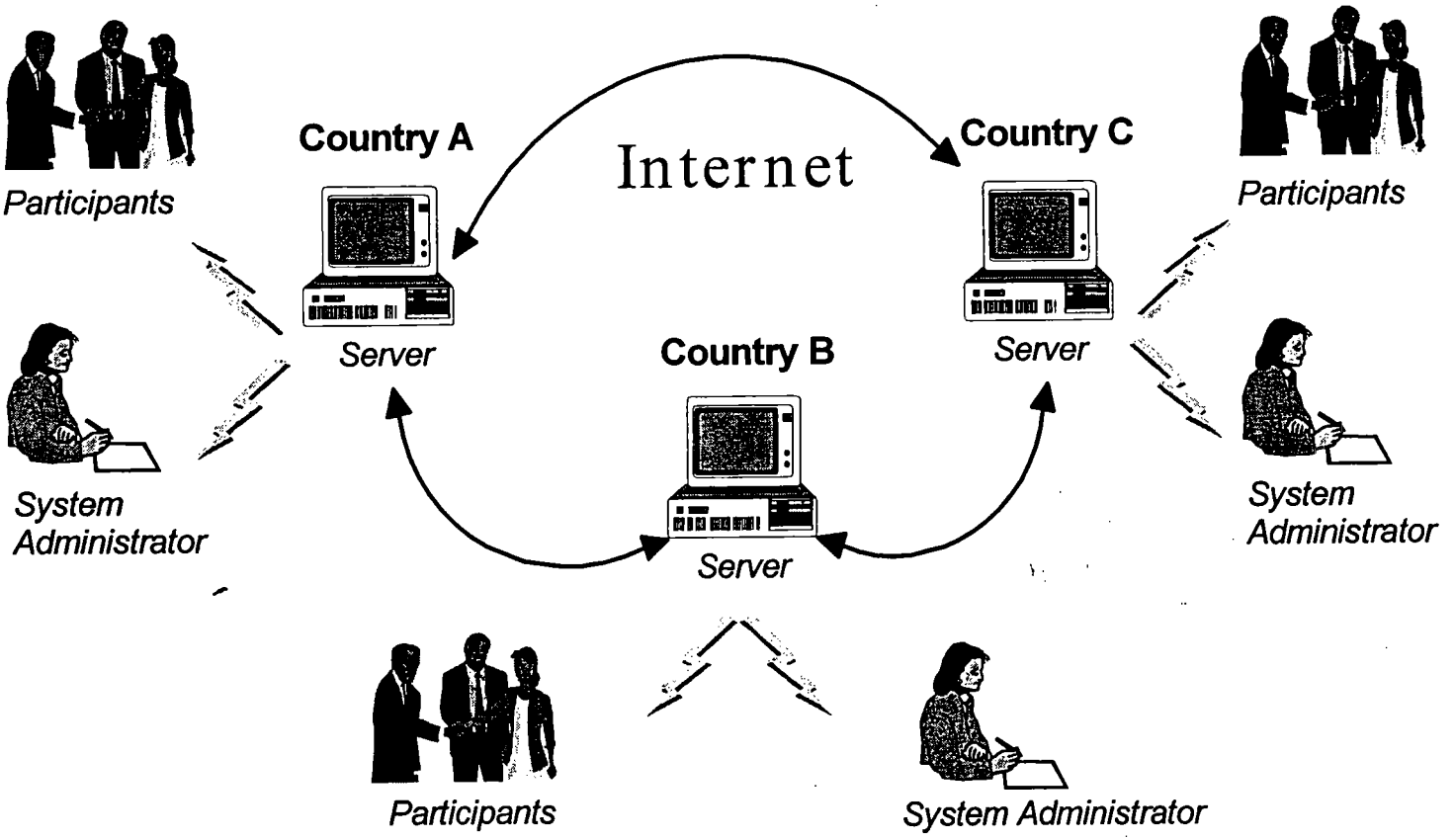
- Each Party may distribute tradable units to participants or retain at Party level
- Parties may or may not:
  - allow foreign participants to establish accounts in their Party registry
  - allow domestic participants to trade directly with foreign governments or participants
  - consolidate registries with another Party



International Link: How would it work?

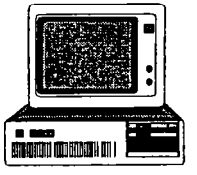
- "Distributed system"--data base and software maintained on multiple servers linked via the Internet
  - Each country has own registry database on a server containing accounts, units held, transactions pertinent to that country
  - Registry systems of countries are compatible & servers "talk" to each other

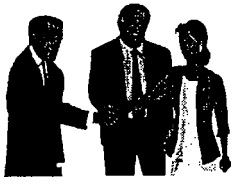
Concept of Operations



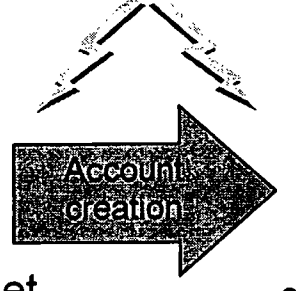
Roles of Registry Users

Country B





Participants





System Administrator

- Submit transfers via Internet
- Review public account data (holdings, transactions)

- Create, maintain accounts
- Issue tradeable units
- Record transfers
- Conduct domestic reconciliation
- Generate reports to FCCC
- Provide public access to data

Registry Alternatives

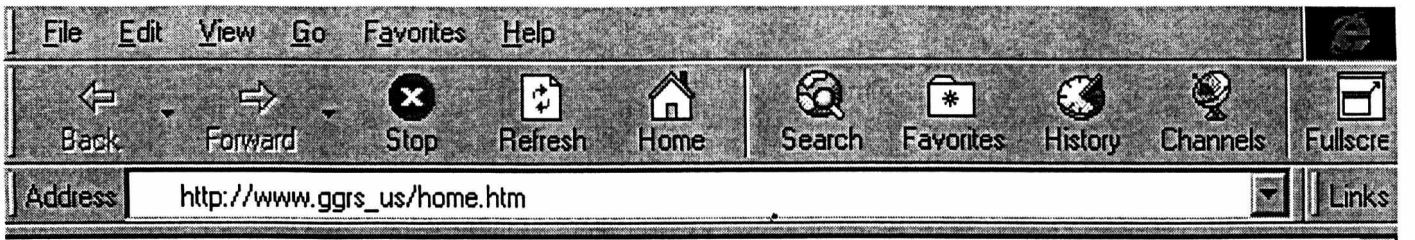
- For countries that prefer not to maintain their own registry system (e.g., because they lack technical capacity or only expect a few projects/transactions):
  - they could request the Secretariat open an account for them to register changes to their assigned amount; or
  - they could open an account in another Party's national registry

Registry Prototype: Example 1

- Government to Government transfer
  - U.S. and Japan agree to terms of transfer
  - U.S. authorized representative (transferor):
    - accesses the U.S. registry system via Internet
    - signs on as registered user
    - records and confirms the transfer of specific units to Japan's registry
  - Registry system displays a confirmation
  - U.S. registry system "talks to" Japan registry to make transfer

Registry Prototype: Example 2

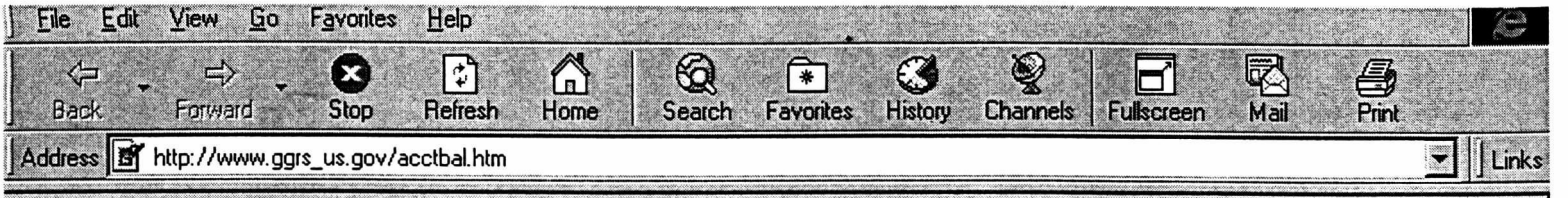
- U.S. entity to New Zealand entity transfer
  - Companies agree to terms of transfer
  - U.S. company representative (transferor):
    - accesses the U.S. registry system via Internet
    - signs on as registered user
    - records and confirms the transfer of specific units to the New Zealand company's account
  - U.S. registry "talks to" N.Z. registry to make transfer



GREENHOUSE GAS REGISTRY SYSTEM
WELCOME

Welcome to the Greenhouse Gas Registry System (GGRS). This system will enable you to obtain information about the Greenhouse Gas Program and to have transfers of "Assigned Amount Units" (AAUs) recorded:

- **Click here to find out how to open an account in the GGRS**
- **Click here to submit a transfer *(NOTE: You must be registered to use this function)***
- **Click here to link to the United Nations Framework Convention on Climate Change (UNFCCC) page**
- **Click here for background information about GGRS**
- **Click here for reports on Accounts, Transactions, and Account Balances**

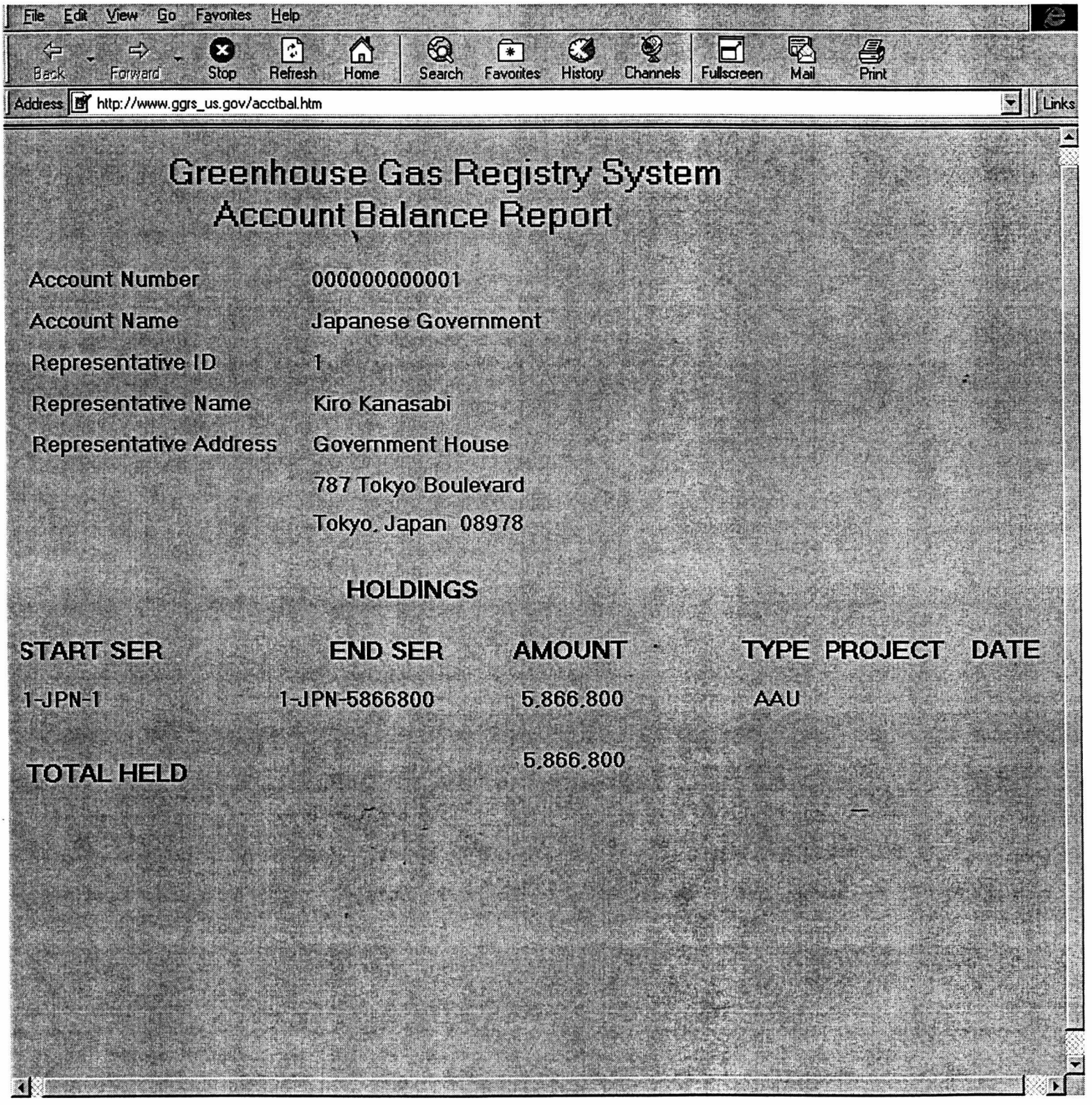


Greenhouse Gas Registry System
Account Balance Report

Account Number	000000000001
Account Name	U S Government
Representative ID	1
Representative Name	Susan Greene
Representative Address	Government Agency
	156 Pennsylvania Avenue
	Washington, DC 20003

HOLDINGS

START SER	END SER	AMOUNT	TYPE	PROJECT	DATE
1-USA-1001	1-USA-825000	824,000	AAU		
1-USA-836487	1-USA-836978	492	AAU		
1-USA-945789	1-USA-946980	1,192	AAU		
1-USA-946990	1-USA-947009	20	AAU		
1-USA-2399999001	1-USA-2400000500	1,500	AAU		
1-USA-2400000600	1-USA-2450000000	49,999,400	AAU		
TOTAL HELD		50,826,604			

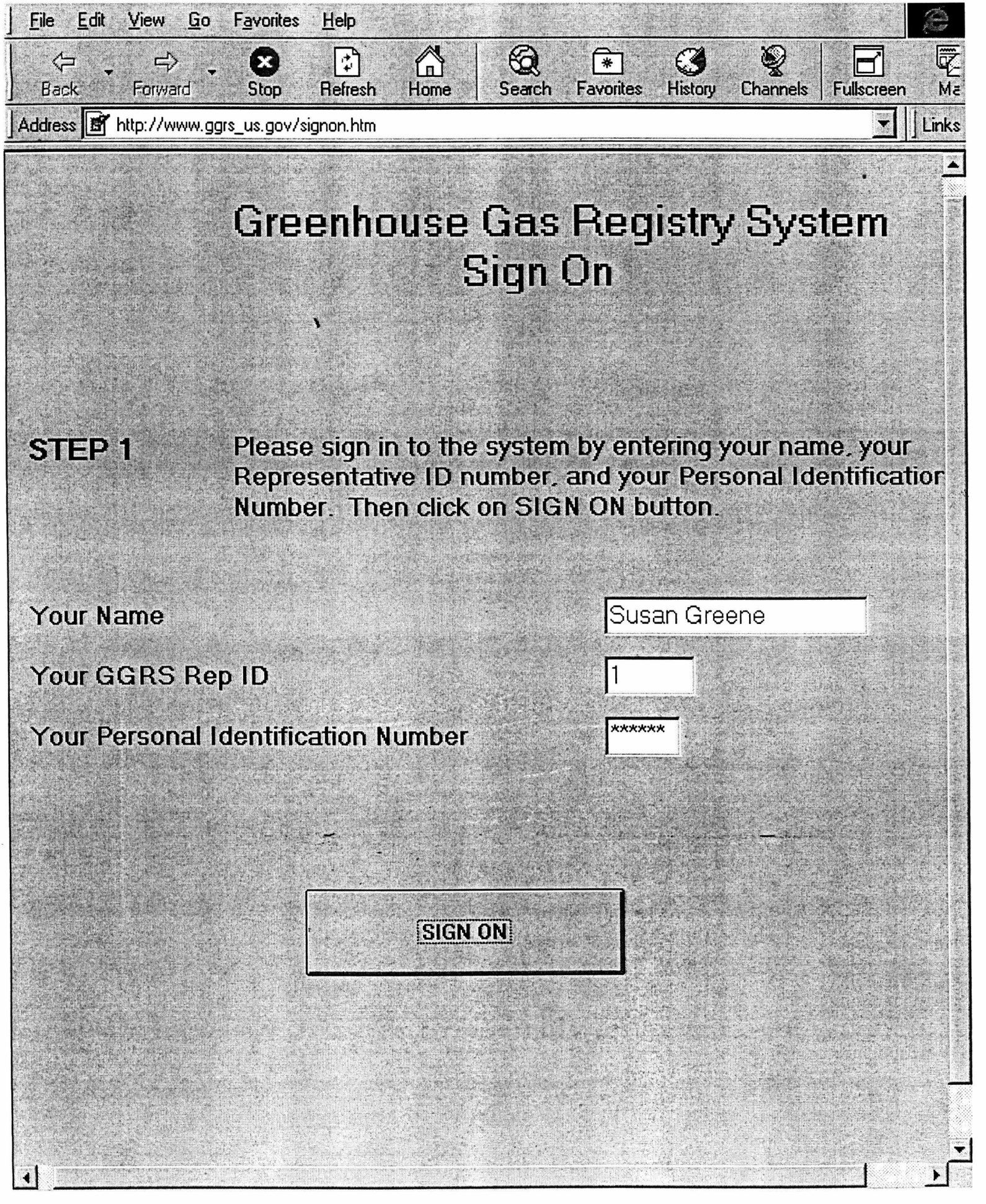


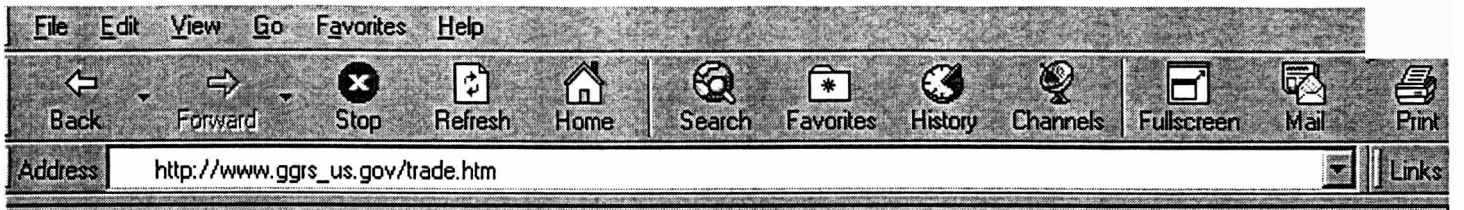
Greenhouse Gas Registry System
Account Balance Report

Account Number	000000000001
Account Name	Japanese Government
Representative ID	1
Representative Name	Kiro Kanasabi
Representative Address	Government House
	787 Tokyo Boulevard
	Tokyo, Japan 08978

HOLDINGS

START SER	END SER	AMOUNT	TYPE	PROJECT	DATE
1-JPN-1	1-JPN-5866800	5,866,800	AAU		
TOTAL HELD		5,866,800			


File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen
Address http://www.ggrs_us.gov/signon.htm
Links
Greenhouse Gas Registry System
Sign On
STEP 1
Please sign in to the system by entering your name, your Representative ID number, and your Personal Identification Number. Then click on SIGN ON button.
Your Name
Susan Greene
Your GGRS Rep ID
1
Your Personal Identification Number
******
SIGN ON



Greenhouse Gas Registry System
Transfer

STEP 2 Please select the Account you want to transfer from: the Registry and Account you want to transfer to.

	TRANSFER FROM	TRANSFER TO
Registry	United States	Japan
Account Number	000000000001	000000000001
Account Name	U S Government	Japanese Government
Representative ID	1	1
Representative Name	Susan Greene	Kiro Kanasabi

STEP 3 Please select the Allowance blocks you want to transfer by highlighting them (You can select multiple ranges)

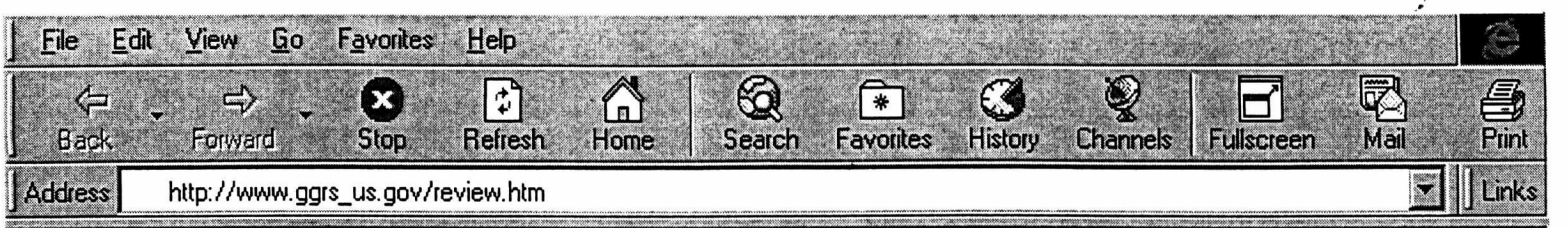
START SERIAL	END SERIAL	TYPE	AMOUNT
1-USA-836487	1-USA-836978	AAU	492
1-USA-945789	1-USA-946980	AAU	1192
1-USA-946990	1-USA-947009	AAU	20
1-USA-2399999001	1-USA-2400000500	AAU	1500

STEP 4 These are the blocks you have selected. You can now edit the blocks, by changing the Start and End Serial Numbers and Quantity.

START SERIAL	END SERIAL	TYPE	AMOUNT
1-USA-945795	1-USA-946794	AAU	1000
1-USA-2399999001	1-USA-2400000000	AAU	1000

STEP 5 You can now submit your Transfer by clicking on the SUBMIT button below.

SUBMIT



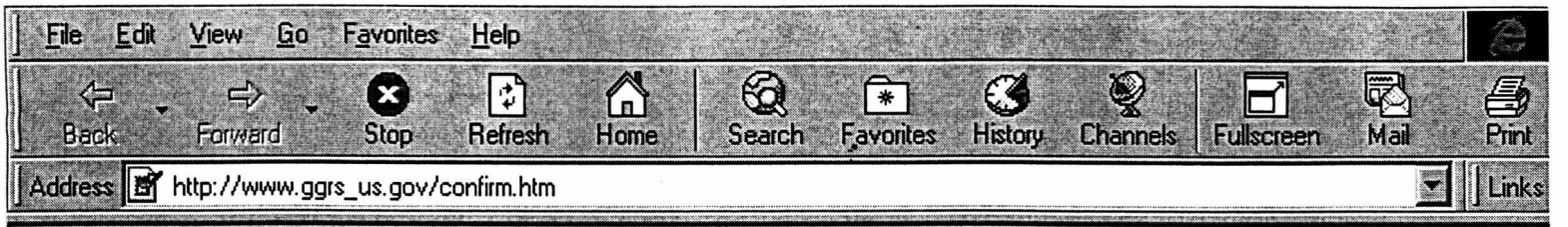
Greenhouse Gas Registry System
Transfer Information Review

STEP 6 The information you provided is listed below. If it is correct, please click on SUBMIT button. If there is any error, please click on the CANCEL button.

	TRANSFER FROM	TRANSFER TO
Registry	United States	Japan
Account Number	000000000001	000000000001
Account Name	U S Government	Japanese Government
Representative ID	1	1
Representative Name	Susan Greene	Kiro Kanasabi

START SERIAL	END SERIAL	TYPE	AMOUNT
1-USA-945795	1-USA-946794	AAU	1000
1-USA-2399999001	1-USA-2400000000	AAU	1000

SUBMIT CANCEL



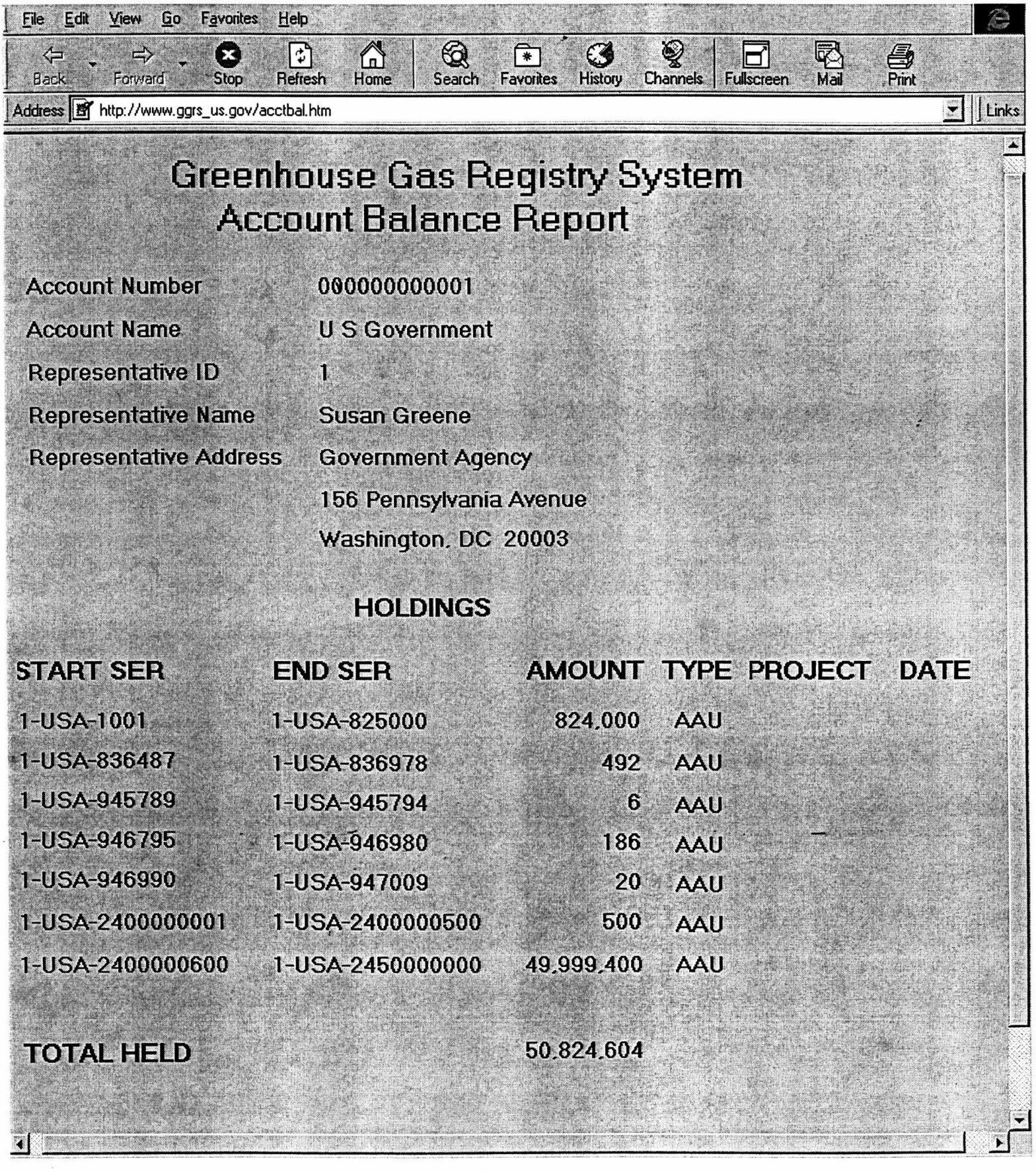
Greenhouse Gas Registry System
Transfer Confirmation

Transaction Number 179 Recorded on April 1, 2008

	TRANSFER FROM	TRANSFER TO
Registry	United States	Japan
Account Number	000000000001	000000000001
Account Name	U S Government	Japanese Government
Representative ID	1	1
Representative Name	Susan Greene	Kiro Kanasabi

START SERIAL	END SERIAL	TYPE	AMOUNT
1-USA-945795	1-USA-946794	AAU	1000
1-USA-2399999001	1-USA-2400000000	AAU	1000

This is your confirmation for this transfer. Please print this form for your records.

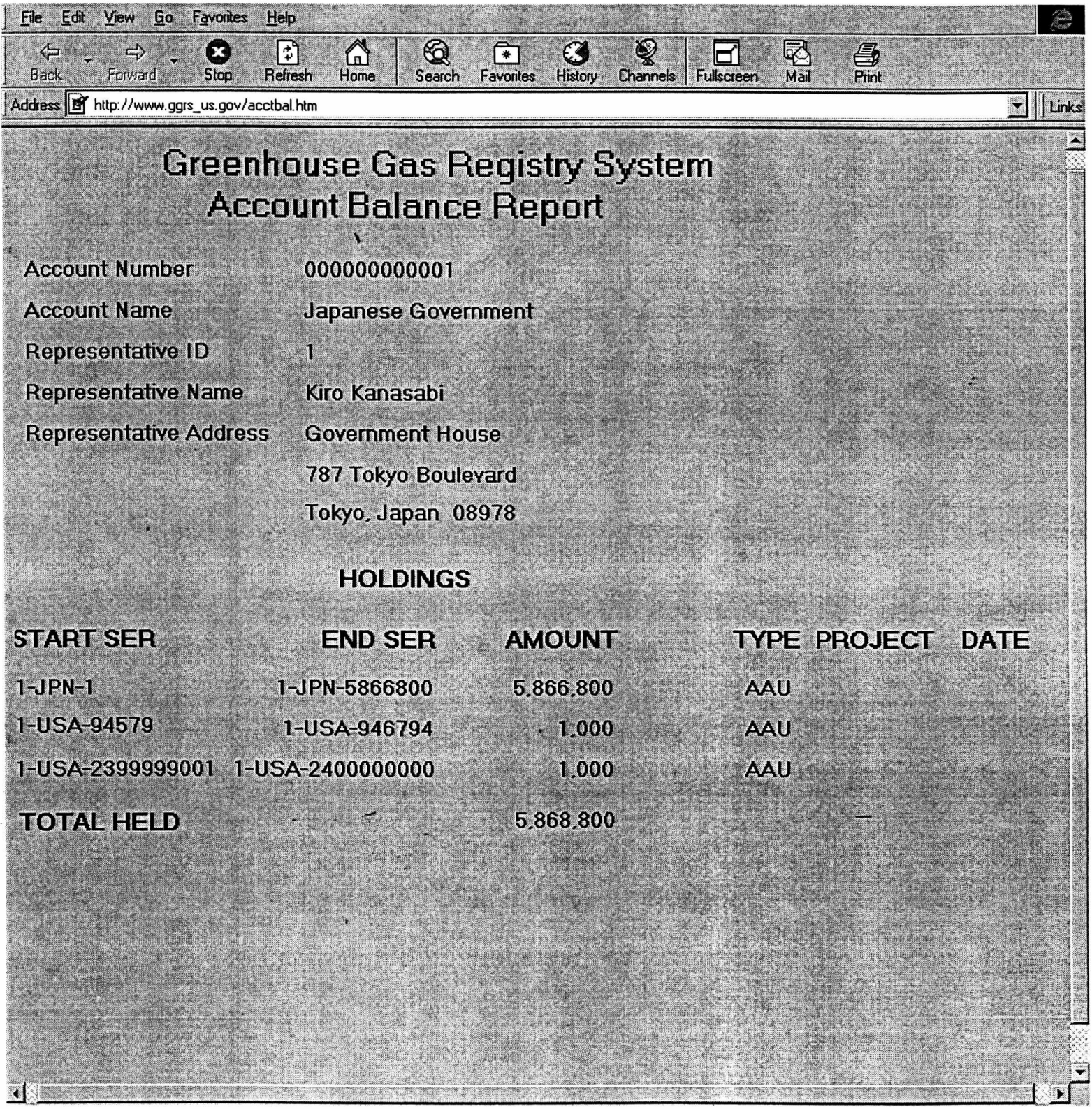


Greenhouse Gas Registry System
Account Balance Report

Account Number	000000000001
Account Name	U S Government
Representative ID	1
Representative Name	Susan Greene
Representative Address	Government Agency
	156 Pennsylvania Avenue
	Washington, DC 20003

HOLDINGS

START SER	END SER	AMOUNT	TYPE	PROJECT	DATE
1-USA-1001	1-USA-825000	824,000	AAU		
1-USA-836487	1-USA-836978	492	AAU		
1-USA-945789	1-USA-945794	6	AAU		
1-USA-946795	1-USA-946980	186	AAU		
1-USA-946990	1-USA-947009	20	AAU		
1-USA-2400000001	1-USA-2400000500	500	AAU		
1-USA-2400000600	1-USA-2450000000	49,999,400	AAU		
TOTAL HELD		50,824,604			

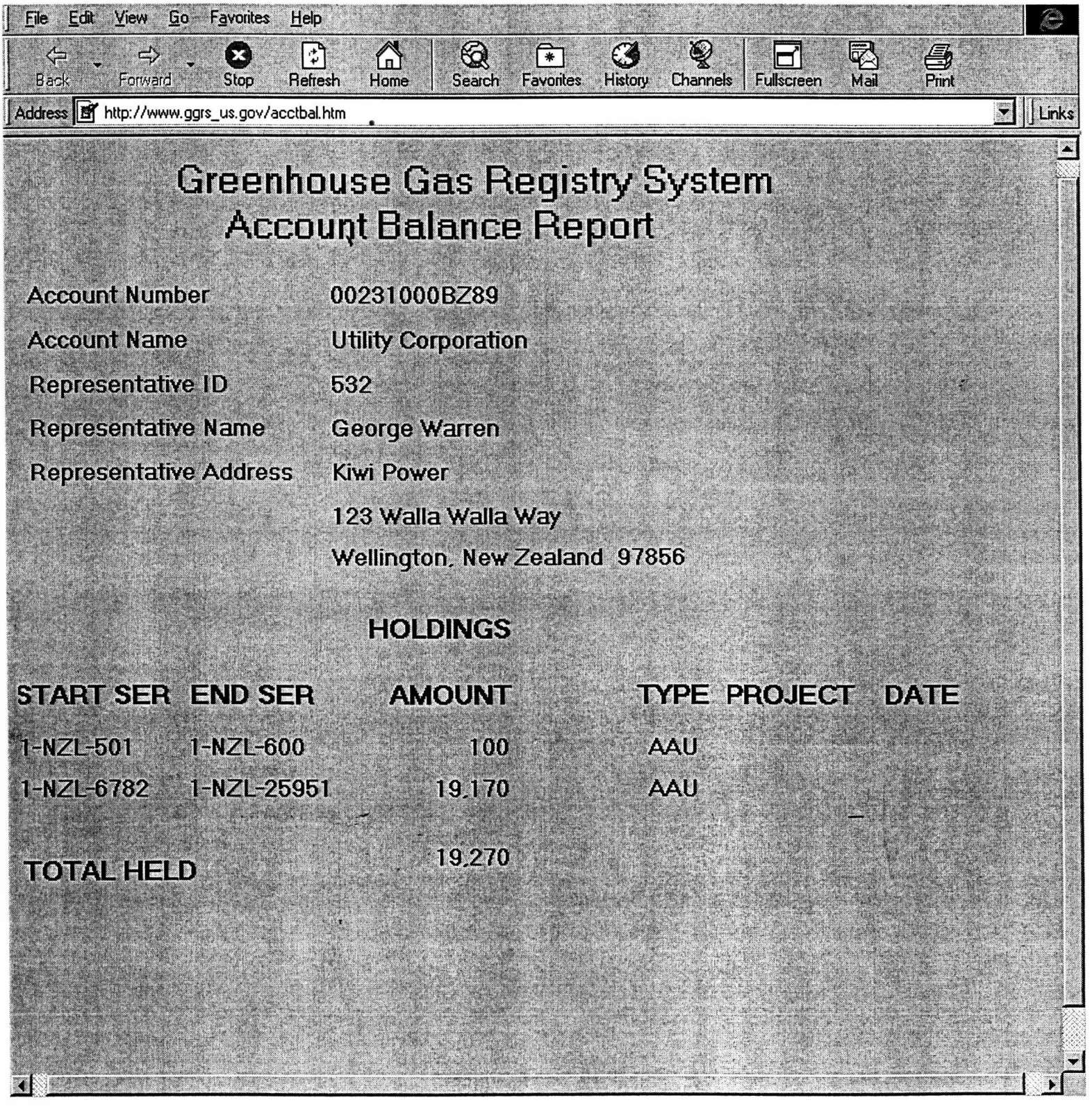


Greenhouse Gas Registry System
Account Balance Report

Account Number	000000000001
Account Name	Japanese Government
Representative ID	1
Representative Name	Kiro Kanasabi
Representative Address	Government House 787 Tokyo Boulevard Tokyo, Japan 08978

HOLDINGS

START SER	END SER	AMOUNT	TYPE	PROJECT	DATE
1-JPN-1	1-JPN-5866800	5,866,800	AAU		
1-USA-94579	1-USA-946794	1,000	AAU		
1-USA-2399999001	1-USA-2400000000	1,000	AAU		
TOTAL HELD		5,868,800			

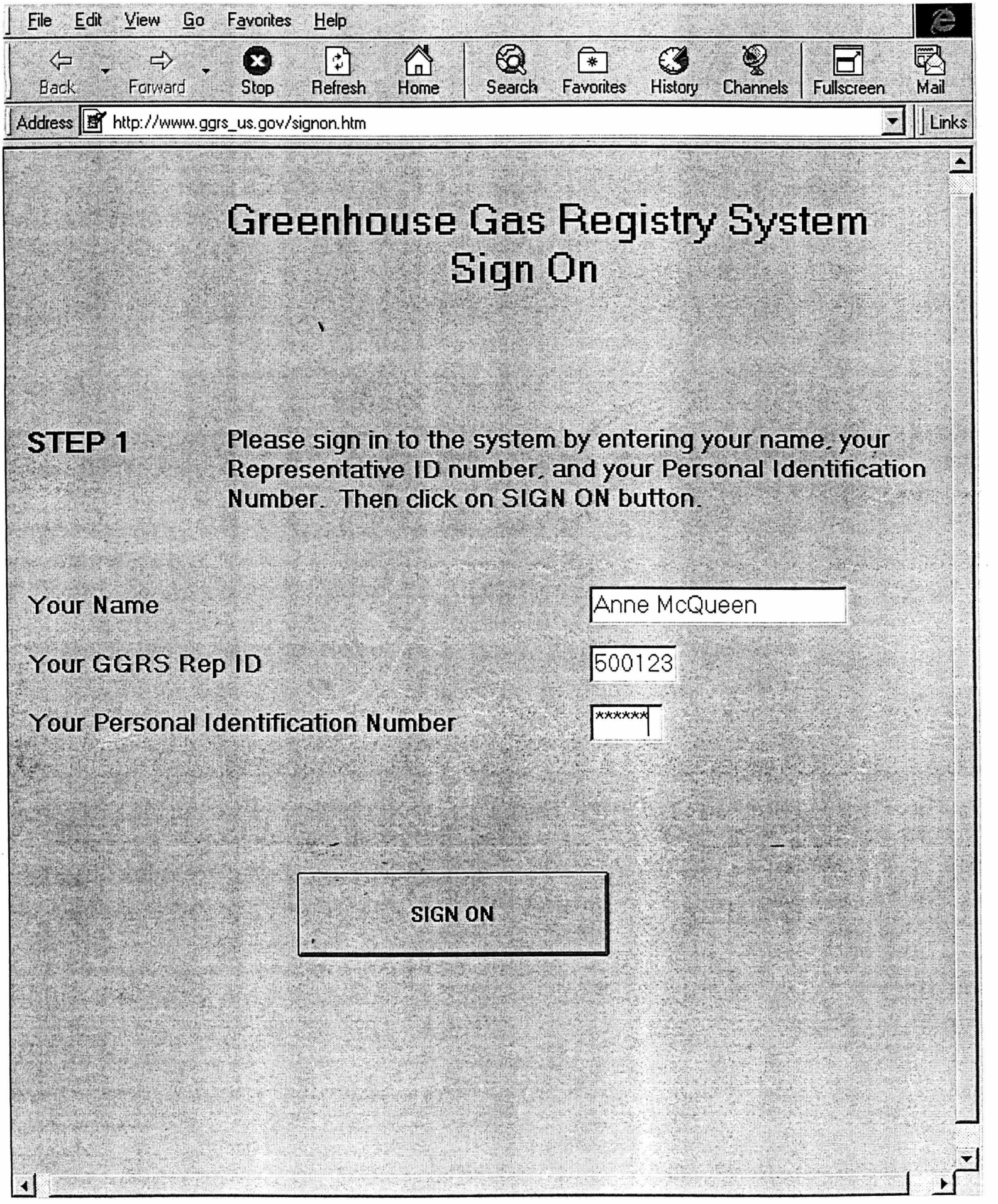


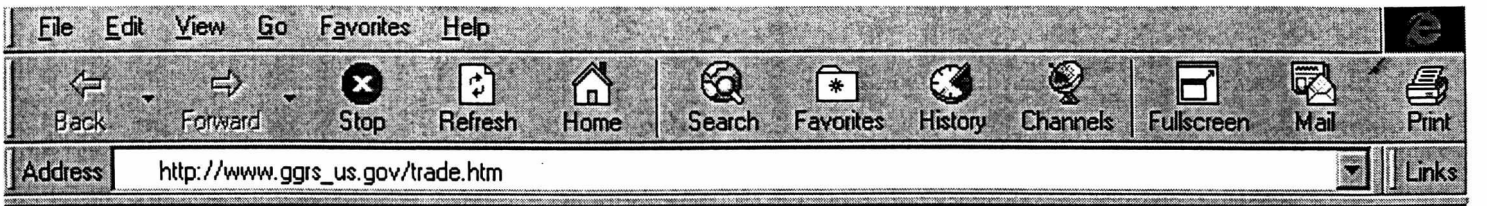
Greenhouse Gas Registry System
Account Balance Report

Account Number	00231000BZ89
Account Name	Utility Corporation
Representative ID	532
Representative Name	George Warren
Representative Address	Kiwi Power
	123 Walla Walla Way
	Wellington, New Zealand 97856

HOLDINGS

START SER	END SER	AMOUNT	TYPE	PROJECT	DATE
1-NZL-501	1-NZL-600	100	AAU		
1-NZL-6782	1-NZL-25951	19,170	AAU		
TOTAL HELD		19,270			


File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen Mail
Address http://www.ggrs_us.gov/signon.htm
Links
Greenhouse Gas Registry System
Sign On
STEP 1
Please sign in to the system by entering your name, your Representative ID number, and your Personal Identification Number. Then click on SIGN ON button.
Your Name
Anne McQueen
Your GGRS Rep ID
500123
Your Personal Identification Number
****
SIGN ON



Greenhouse Gas Registry System
Transfer

STEP 2 Please select the Account you want to transfer from, the Registry and Account you want to transfer to.

	TRANSFER FROM	TRANSFER TO
Registry	United States	New Zealand
Account Number	999900000001	00231000BZ89
Account Name	Brokers, Inc.	Utility Corp.
Representative ID	500123	532
Representative Name	Anne McQueen	George Warren

STEP 3 Please select the Allowance blocks you want to transfer by highlighting them (You can select multiple ranges)

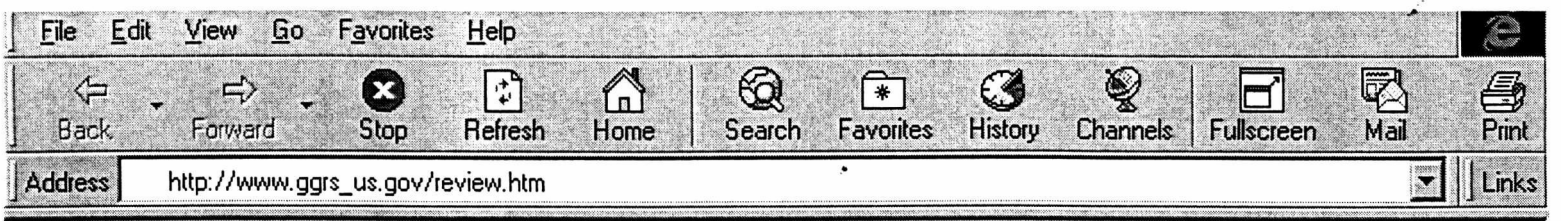
START SERIAL	END SERIAL	TYPE	AMOUNT
1-USA-2300001001	1-USA-2300002322	AAU	1322
1-USA-66538	1-USA-68987	AAU	2450
1-RUS-56578	1-RUS-57329	ERU	752
1-COS-10	1-COS-21	CER	12

STEP 4 These are the blocks you have selected. You can now edit the blocks, by changing the Start and End Serial Numbers and Quantity.

START SERIAL	END SERIAL	TYPE	AMOUNT
1-USA-2300001001	1-USA-2300002322	AAU	1322
1-RUS- 56580	1-RUS-57325	ERU	746
1-COS-12	1-COS-21	CER	10

STEP 5 You can now submit your Transfer by clicking on the SUBMIT button below.

SUBMIT



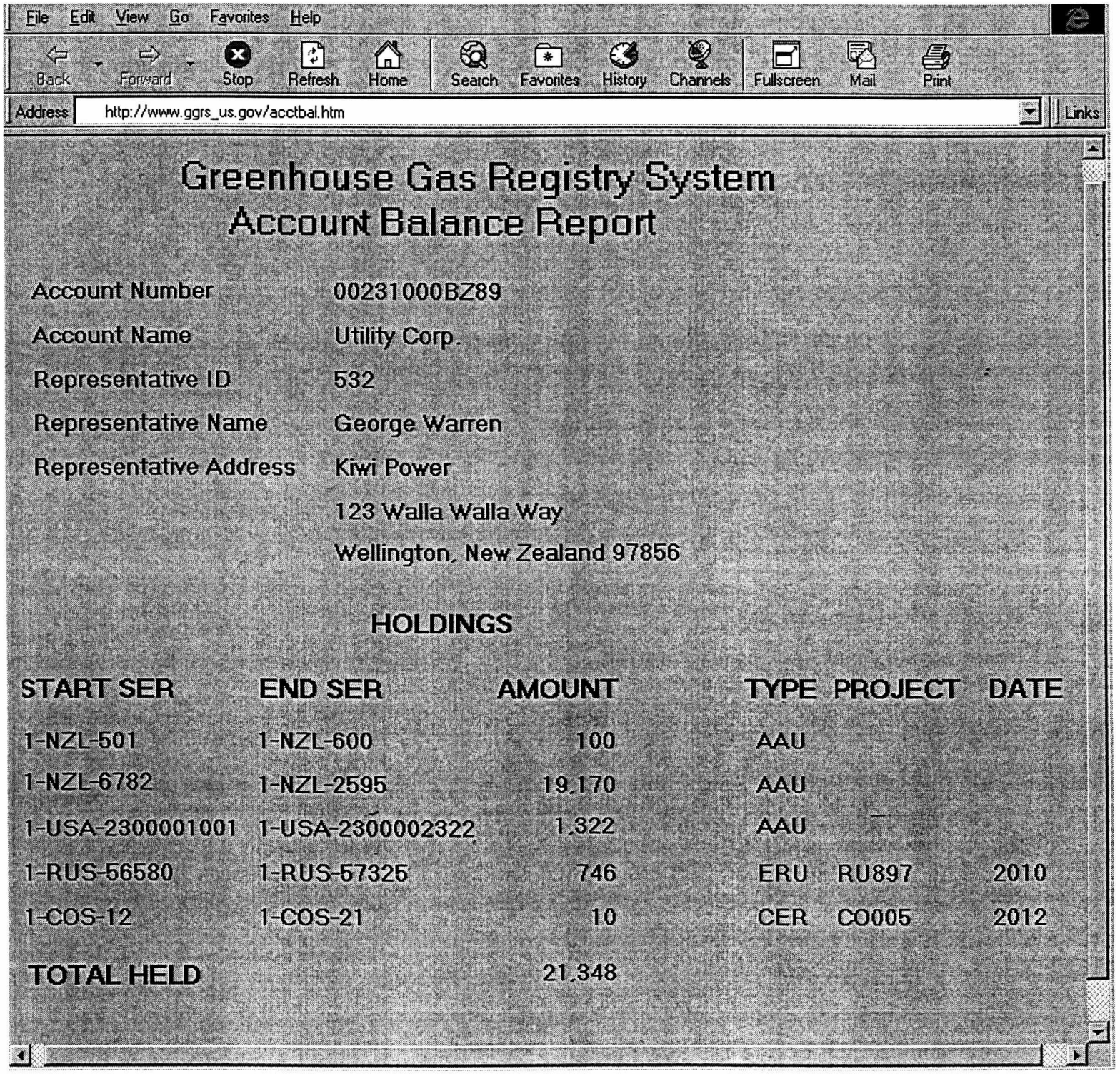
Greenhouse Gas Registry System
Transfer Information Review

STEP 6 The information you provided is listed below. If it is correct, please click on SUBMIT button. If there is any error, please click on the CANCEL button.

	TRANSFER FROM	TRANSFER TO
Registry	United States	New Zealand
Account Number	999900000001	00231000BZ89
Account Name	Brokers, Inc.	Utility Corp.
Representative ID	500123	532
Representative Name	Anne McQueen	George Warren

START SERIAL	END SERIAL	TYPE	AMOUNT
1-USA-2300001001	1-USA-2300002322	AAU	1322
1-RUS-56580	1-RUS-57325	ERU	746
1-COS-12	1-COS-21	CER	10

SUBMIT CANCEL



Greenhouse Gas Registry System
Account Balance Report

Account Number	00231000BZ89
Account Name	Utility Corp.
Representative ID	532
Representative Name	George Warren
Representative Address	Kiwi Power
	123 Walla Walla Way
	Wellington, New Zealand 97856

HOLDINGS

START SER	END SER	AMOUNT	TYPE	PROJECT	DATE
1-NZL-501	1-NZL-600	100	AAU		
1-NZL-6782	1-NZL-2595	19,170	AAU		
1-USA-2300001001	1-USA-2300002322	1,322	AAU		
1-RUS-56580	1-RUS-57325	746	ERU	RU897	2010
1-COS-12	1-COS-21	10	CER	CO005	2012
TOTAL HELD		21,348			

Hot Air from the European Union

As the international community gathers in Bonn, Germany this week to make progress on the international agreement to combat climate change, the European Union has taken a most unhelpful step - one that could make long-term efforts to solve this problem much more difficult.

On May 17, the EU proposed to restrict drastically the use of market-based mechanisms under the 1997 Kyoto Protocol. The EU proposal would: (1) raise costs unnecessarily, (2) introduce economic game playing under the guise of environmentalism, and (3) renege on the deal made at Kyoto. Consider each point in turn.

First, the EU's May 17 proposal would increase dramatically the cost of fighting global warming, thus wasting scarce capital that could be used to protect the environment. The Kyoto market-based mechanisms were designed to harness market forces to determine how and where to reduce greenhouse gas emissions most cost effectively. The mechanisms, if allowed to work fully, would promote significant environmental gains at the lowest possible cost. The EU proposal, in contrast, would gut these market forces of their power and effectiveness.

[While the risk of climate change is real and the consequences potentially catastrophic, our societies also face many other important challenges such as unemployment, health care and crime. To many, these challenges appear to be more immediate. Resources available to avert climate change, therefore, are limited. The EU proposal would allocate them unwisely.] *[cut if necessary]*

Second, the EU proposal, in addition, is an attempt to secure economic and competitive advantage wrapped in green rhetoric. The EU has proposed a double standard. The EU asserts an unlimited right to transfer emissions from one member of the Union

OPTIONAL FORM 99 (7-90) Final Version

FAX TRANSMITTAL # of pages ▶

To Roger Ballentine | From Nigel Purvis

Dept./Agency | Phone #

to another within the so-called "EU bubble," yet it wishes to deny similar flexibility to other countries. In effect, the EU seeks to restrict every flexibility mechanism agreed to at Kyoto except its own.

The EU estimates that under its proposal the United States could use the Kyoto mechanisms to achieve only about 40% of its total emissions reduction obligation. In contrast, by the EU's own figures, its proposal would allow the Union acting as a whole to purchase about 80% of needed reductions.

The EU proposes, furthermore, that it should receive full credit for the significant decline in greenhouse gas emissions brought on by East Germany's economic collapse. The EU seeks to apply this expected emissions surplus toward its overall reduction target. In contrast, the EU proposes to limit other countries that have experienced economic woes, such as Russia, to transferring only a fraction of their expected emissions surpluses. If the EU had set out to create a more self-serving, one-sided and disingenuous proposal, one might wonder what it would be.

Third, the EU seeks to renege on the Kyoto deal. At Kyoto, the United States, EU member states and other developed countries accepted ambitious, legally binding, greenhouse gas reduction targets *in exchange for* the flexibility to achieve them via the Kyoto mechanisms. The issue of whether market mechanisms, especially emissions trading, should be capped was explicitly debated and rejected at Kyoto. The EU is seeking in effect to pocket the aspects of the Kyoto agreement it likes and renegotiate the rest.

The EU argues that capping the Kyoto mechanisms is necessary to stimulate more "domestic action" on climate change, particularly in the United States. The United States pursues strong domestic actions to reduce greenhouse gas emissions, and does not

consider the Kyoto mechanisms a substitute for such actions. Since 1993, President Clinton has started dozens of programs designed both to save energy and to reduce emissions. In this year's budget alone, the President is proposing a 34% increase for R&D in energy efficient technology and renewable energy; a five year package of tax incentives for consumers who purchase energy efficient products and for producers of renewable energy; and $1.8 billion for global change research. The package totals over $4 billion for the fiscal year. The President's initiatives protect the environment while allowing for continued economic growth and competitiveness. American firms also are taking important steps at home to reduce emissions, and more is needed.

The EU errs, however, when it fixates on "domestic action." When a U.S. firm pays to install energy efficient technology in another country (through the purchase of emission credits under one of the Kyoto mechanisms the EU seeks to restrict) that action reduces emissions just as much as more expensive investments made at home.

It is naïve, furthermore, to believe that raising the cost of implementing the Kyoto Protocol would lead the United States to act more swiftly to limit its emissions. President Clinton, the U.S. Congress and the American people are united in wanting to mitigate climate change at the lowest practical cost. An unnecessarily costly treaty stands little chance of U.S. ratification.

While we, in the United States, know from experience that market-based approaches to environmental protection work, we understand that some fear that emission reductions achieved in this manner will be difficult to monitor and measure. The United States is working with the international community to address these concerns by ensuring, for example, that the Kyoto regime has strong reporting and compliance provisions.

Make no mistake about it. The EU's proposal to limit the world's flexibility in fighting climate change is both unwise and self-serving. The United States will oppose it.

Word Count: 895



White House Climate Change Task Force

May 18, 1998

Roger & Julie –

This is an item from last year – but it could still be valuable for follow on work –

Saxton's staff economist came down for a visit in prep for this hearing. He seemed solid. I'll dig up his name & pass along.

– DIRK

Press copy only

JOINT ECONOMIC COMMITTEE HEARING

"TRADABLE EMISSIONS"

Wednesday, July 9, at 10 a.m.

2325 Rayburn House Office Building

1. **Statement of Chairman Jim Saxton (R-NJ)**

2. **Statement of Mr. Peter Guerrero,** Dir. of Environmental Protection Issues, GAO. 1) - Phil Mogee - (2 men at him from GAO) 2) = author of report (name?) Charles Barn—?

3. **Statement of Ms. Mary Nichols,** Assist. Admin. for Air and Radiation, U.S. Environmental Protection Agency.

4. **Statement of Ms. Mary Gade,** Dir. of the Illinois Environmental Protection Agency.

5. **Statement of Dr. Daniel Dudek,** Sr. Economist with the Environmental Defense Fund.

6. **Statement of Mr. Carlton Bartels,** Managing Dir. of Cantor Fitzgerald Environmental Brokerage Services.

7. **Statement of Mr. Daniel Chartier,** Manager, Emissions Trading, Fossil Operations Business Unit, Wisconsin Electric Power Company.

Joint Economic Committee Hearing
"Tradable Emissions"
Wednesday, July 9, 10 a.m.
2325 Rayburn House Office Building
(written by Elizabeth Lowenhaupt)

Hearing Summary

In general, everyone seemed to be in agreement that emissions trading programs have proven both economically and environmentally successful as tools for reducing emissions. Most of the questions asked seemed designed to obtain clarification on various explanations made during the testimonies. Discussion of open market trading and the EPA auctions were both somewhat controversial.

Speaker: Chairman Jim Saxton (R-NJ)
Summary of Opening Statement: Mr. Saxton spoke in favor of tradable emissions as a tool for reducing pollution with economic efficiency. He explained emissions trading systems, gave as a successful example the sulfur dioxide allowances trading which followed the Clean Air Act Amendments of 1990 to control acid rain, and suggested that emissions trading systems, now used in some regions for controlling nitrogen oxide, sulfur dioxide, and volatile organic compound emissions, be considered as approaches to such issues as ozone and particulate matter as well as global warming on an international level. He called tradable emissions "a smart alternative to the traditional command-and-control approach to environmental regulation."

Other members of the Committee present for at least part of hearing:
Senator Bingaman
Mr. Ewing
Mr. McCrery

Speaker: Mr. Peter Guerrero (Dir. Of Environmental Protection Issues, GAO)
Summary of Statement: The GAO testimony discussed the economic and environmental successes of EPA's sulfur dioxide allowance trading program, the (limited) experiences of trading programs for other air pollutants, and further issues to consider in expanding trading programs (including "the need for reliable emissions data, penalties to discourage noncompliance, the allocation of emissions allowances, and the development of trading boundaries"). In addition, Mr. Guerrero discussed in detail the RECLAIM program in southern California, which is an example of a cap and trade program based on NO_x and SO_x emissions.
Questions and Answers: Saxton asked several questions clarifying the measures of success, both environmental and economic, for the RECLAIM program. He also asked whether or not other examples existed which were as dramatic, and what controversial issues had been identified. Finally, he asked about the problem of "hot spots". Guerrero, with the help of two other men from the GAO, answered his questions in a straightforward manner. Only about 6 other states were mentioned as having identified similar issues, but others were said to be addressing ozone and smog issues with the possibility of using tradable emissions as a tool. The only controversial point mentioned was whether or not tradable emissions programs are good for the environment, but it was claimed that since Title IV of the Clean Air Act, which provides flexibility, has led to

both environmental and economic success. The question of "hot spots" was answered with the reminder that this is a problem regardless of reduction method, as well as with the explanation of how a system can be analyzed before it is actually implemented to minimize the problem. In later questions, Mr. Saxton asked several questions further exploring the Cap and Trade system and comparing it to the Open Market Trade (which was declared less environmentally effective than the Cap and Trade, since at a minimum the Cap and Trade ensures environmental improvement), as well as clarifying the fact that under command-control systems, regulators determined the methods of emissions reduction whereas under an emissions trade system, competition is generated in pollution control methods since participants have the freedom to choose.

Mr. Bingaman asked about the setting of limits for SO_2, the ability to determine how much of the SO_2 decrease was actually due to emissions trade, and the problem of sanction enforcement if the system is applied on a worldwide basis to CO_2. The response to the first question warned of strategic behavior as a problem with setting the cap as close to the starting point of the program as would be necessary in order to set it as accurately as possible; participants, knowing that their limits would be set based on percentages of output at a given time, would simply increase emissions during that time. The second question was addressed with a slide of "Options Selected for Phase 1 Compliance" and the comment that while most of the decrease was due to the switch to low-energy coal, the two next highest causes were the installation of scrubbers and the emissions trading. Finally, the representatives from the GAO listed the requirements of any program, regardless of what method of emissions reduction, including the presence of sufficient penalties and enforcement, so that the cost of non-compliance is higher than the cost of compliance. He later outlined three distinct models: 1) command-and-control where the regulator says you have to do this to meet the requirements, 2) command-and-control where the regulators says you have to meet the requirements but it doesn't matter how, and 3) emissions trade (where you can not only choose the technology, but can also trade emissions). When he asked whether model two was the most typical method by the government, the response was that there was not much flexibility before Title IV.

Mr. Ewing asked about the role of state governments in emissions trading programs and was answered with a description of such organizations as OTAG (Ozone Transport Assessment Group) but also the comment that it is the U.S. EPA which facilitates with its annual auction, tracks trades, and enforces compliance. It was established that emissions trading is popular with the regulated industries in that it gives them an economically feasible way to meet the requirements. The economic incentives for trading were reiterated when Mr. Ewing asked "Wouldn't some companies rather pay than make changes for reductions?"

Speaker: Ms. Mary Nichols (Assist. Admin. For Air and Radiation, U.S. EPA)
Summary of Statement: Ms. Nichols described the EPA's experience with air pollution reduction since 1970, claiming that "our air is generally cleaner and healthier today than at any time since EPA began measuring air quality", as well as a brief history of emissions trading programs. She listed the following as factors to consider when working with emissions trading: the nature of the problem, the number of sources with differing control costs, the ability to quantify emissions, the institutional capabilities, and the challenges of developing or implementing interstate trading programs. She mentioned the RECLAIM program, and then described EPA's involvement in other emissions trading efforts relating to sulfur dioxide, nitrogen oxides, and greenhouse gas emissions, concluding with the fact that EPA has found emissions trading to be a

useful tool.

Questions and Answers: Mr. Saxton asked why the EPA open market trading regulations have not yet been issued, and Ms. Nichols responded that the EPA originally thought it would be useful to give the states a model rule, but that it turned out the differences between the situations in different states rendered this impractical. She stressed the achievement on the issue of agreement between the business and the environmental communities when asked about that in that the environmental groups no longer consider trade programs "evil". She expressed the EPA's official support of the RECLAIM program (when asked why, if the RECLAIM program is working so well, the EPA one won't be issued until 1997). Finally, Mr. Saxton asked what Congress can do to help, to which Ms. Saxton replied that the EPA has minimum authority to require trade under the Clean Air Act and that maybe later legislation will be needed to eliminate such problems as patchwork.

Mr. Bingaman asked why reductions happen more quickly because of trading, and Ms. Nichols responded that the ability to trade within a business (e.g. between factories) gives flexibility and an incentive to move quickly in order to have a future cushion and that requests from the economic planning arm of a company appears much more urgent to the company than those from its environmental arm (including such specialists as engineers and lawyers). He raised the point of dropping allowance prices and finally the hurdle involved in implementing CO_2 programs, the latter of which was fielded with a statement of the need for education to the rest of the world (much of which is skeptical) on the benefits of emissions trade systems.

Mr. McCrery asked about the auction procedure. Brian McLean, the head of the EPA's acid rain program, explained its structure.

PANEL (4 speakers)

Speaker: Ms. Mary Gade (Dir. of the Illinois Environmental Protection Agency)
Summary of Statement: Ms. Gade discussed the program currently being developed (with expected implementation in 1999) for the state of Illinois which involves an emissions trading system for volatile organic compounds in the Chicago metropolitan area. She described the development, features, and expected benefits of the system. The features she listed which are critical to the success of the program include a cap on emissions, inclusion of all significant sources, flexibility, confidence in the market mechanism, reduction target enforcement measures, and cost savings potential.

Speaker: Dr. Daniel Dudek (Sr. Economist with the Environmental Defense Fund)
Summary of Statement: Dr. Dudek expressed the EDF's approval of market-based environmental policies, claiming that they "increase environmental effectiveness, reduce compliance costs, create financial rewards for environmental performance, tap existing on-site expertise in the search for new solutions, create incentives for new technologies, processes, and environmental management". He first discussed the environmental benefits of emissions trading, then mentioned its economic success, listing the requirements for any successful pollution program, and finally addressed present policy needs and priorities, including increased public education on the significance of these environmental reforms, a way of dispelling the "remaining artifacts of the old command-and-control system", and the extension of emissions trading to additional emissions and sources.

Speaker: Mr. Carlton Bartels (Managing Dir. Of Cantor Fitzgerald Environmental Brokerage Services)

Summary of Statement: Mr. Bartels began by listing three different types of environmental programs: command and control, emissions taxes, and tradable emission rights. He discussed the successes of existing tradable emission programs, advised that the market be kept simple and not overdeveloped, described an appropriate role for regulators, and stressed the need for both adequate funding and strong enforcement. Finally, he claimed that future tradable emissions programs would need a decreased cost of participation and therefore possibly looser monitoring standards if they are to be expanded. He said that while an international greenhouse gas trading program might be possible in the long-term, the U.S. should first manage the issue domestically.

Speaker: Mr. Daniel Chartier (Manager, Emissions Trading, Fossil Operations Business Unit, Wisconsin Electric Power Company)

Summary of Statement: Mr. Chartier discussed the issue of emissions trading from the perspective of a utility. He described the positive experience which Wisconsin Electric has had with the trading aspect of the Acid Rain Program, mentioned its application to other markets, advised simplicity, flexibility, certifiable reductions, and recognition of early reductions in the development of programs for other markets, and encouraged increased education and outreach as well as a trust in the science for current programs.

Questions and Answers: Mr. Saxton asked each member of the panel for the greatest success and the greatest failure of an emissions trade program.

Chartier: positive=save money for customers, environmental progress
negative=nothing he would change, except maybe the debate over the auction system

Gade: positive=the certainty for regulators that goals will be achieved, improved cooperation between businesses and regulators due to flexibility, improved air quality, economic benefits (for Illinois, saved 40-50% in job losses from the traditional method, $3000/ton reductions)
negative=emissions trading has taken so long and has so far to go, especially in other states (EPA can help by guiding, helping design, and facilitating inter-state trade)

Dudek: positive=ability to learn by doing, substantial base of public understanding (also evolving internationally)
negative=threat that we'll lose the momentum and public trust or support because of poorly designed programs (esp. concerned about OMRT)

Bartels: important to maintain momentum
threat: must make it clear where the program is going so as not to penalize companies for doing things in advance

Mr. Ewing asked whether or not there is trading of emissions credits on any "formal markets", which raised the question of formal vs. informal markets. Job losses (Gade: know that since at lower costs, jobs preserved--Chicago) What can Congress do? (EPA could do lots such as comparability between states, states with programs for meeting certain criteria can get fast track approval authority to go out and trade).

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Congress of the United States
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Washington, DC 20510–6602

STATEMENT OF CHAIRMAN JIM SAXTON
JOINT ECONOMIC COMMITTEE

HEARING ON "EMISSIONS TRADABLE"

July 9, 1997

Good morning. I am pleased to welcome our witnesses who are here to discuss the concept of tradable emissions. Tradable emissions—also known as tradable credits or allowances—provide policy makers an opportunity to employ the power of markets to ease the burden of environmental regulation. As such, they offer a major opportunity for regulatory reform.

Emissions trading systems are currently in use in several pollution abatement programs throughout the United States. An emissions trading system is based on the principle that the cost of emissions reductions varies from facility to facility. When each facility is given a limit on its emissions by the regulators, some facilities may be able to reduce emissions more than required at a fairly low cost. Those which can do so may choose to reduce emissions levels below those required and sell this difference to another source facing a higher cost of reducing its emissions. If the market price of these extra emissions entitlements is higher than the cost of reducing emissions at a given facility, then there is an incentive to make further reductions and sell these entitlements.

One current trading program is the sulfur dioxide allowances trading created by the Clean Air Act Amendments of 1990 to control acid rain. We will hear more about this program from our witnesses, but I want to note that the sulfur dioxide trading program appears to be an excellent example of how a market for emissions can reduce the cost of achieving our environmental protection goals at least cost. Its use in the acid rain program has reduced job loss, promoted economic growth, and lowered producer and consumer costs.

Tradable emissions are also being employed on a regional level to control nitrogen oxide, sulfur dioxide, and volatile organic compound (VOC) emissions on a regional basis. We will hear testimony on at least one such program today.

I believe that there is great potential for the further use of emissions trading systems in pollution abatement programs. As the Nation debates such issues as more stringent standards for ozone and particulate matter—and on an international scale, global warming—tradable emissions will provide a smart alternative to the traditional command-and-control approach to environmental regulation.

United States General Accounting Office

GAO

Testimony

Before the Joint Economic Committee
Congress of the United States

For Release
on Delivery
Expected at
10 a.m. EDT
Wednesday
July 9, 1997

AIR POLLUTION

Overview and Issues on Emissions Allowance Trading Programs

Statement of Peter F. Guerrero, Director,
Environmental Protection Issues,
Resources, Community, and Economic
Development Division

GAO/T-RCED-97-183

Mr. Chairman and Members of the Committee:

We are pleased to be here today to testify on the work we have done on the allowance trading program to control acid rain, which was set forth under the Clean Air Act, and to provide some observations on the feasibility of applying a similar trading approach to control other types of air pollution. Under emissions trading programs, pollution sources that reduce their emissions below the required levels can sell their extra allowances to other sources of pollution to help them meet their requirements. Trading of emissions allowances can be a less costly means to achieve pollution reductions than traditional regulatory approaches.

Our testimony today specifically focuses on (1) cost savings and pollution reductions from EPA's acid rain—or sulfur dioxide (SO_2)—allowance trading program, which are based largely on our December 1994 report[1] as updated to reflect current program data, (2) experiences with trading programs designed to control other air pollutants, and (3) issues that need to be considered in expanding trading programs. In summary, we found the following:

- In 1994, we reported that trading and increased flexibility provided under the act could reduce compliance costs by $3.1 billion per year as compared to conventional regulatory approaches.[2] We also estimated that SO_2 emissions could be reduced by approximately 2 million tons below the level specified in the act. Currently, there is more trading of allowances between utilities than we reported in 1994 and prices being paid for allowances have fallen through 1996, suggesting large cost savings. In addition, EPA's 1996 compliance report indicates that emissions of SO_2 were 2.9 million tons, or 35 percent, below the emissions cap.
- To date, there has been limited experience in applying trading programs to other types of air pollutants. In one example of a trading program, the South Coast Air Quality Management District has implemented a trading program in the Los Angeles area to reduce air pollutants that contribute to the area not meeting national air quality standards. District officials believe the program will be more cost-effective than traditional regulatory approaches. EPA plans to issue additional guidance for states to follow in establishing various types of trading programs that the agency believes

[1]Air Pollution: Allowance Trading Offers an Opportunity to Reduce Emissions at Less Cost (GAO/RCED-95-30, Dec. 16, 1994).

[2]This estimate is for the year 2002 and assumes that utilities trade with one another until all cost savings opportunities are realized.

will provide states with more flexibility to decide the most cost-effective way to reduce emissions.

- Several key issues need to be considered in expanding emissions trading programs to other pollutants. These issues include the need for reliable emissions data, penalties to discourage noncompliance, the allocation of emissions allowances, and the development of trading boundaries, to ensure that actual emissions reductions are achieved.

Background

Emissions allowance trading differs from the traditional approach to environmental protection, commonly referred to as "command-and-control." Under a command-and-control approach, sources of pollution are required to install control technologies or meet plant-specific reductions of emissions for all sources. According to critics of this regulatory approach, command and control is needlessly costly because it imposes similar reduction requirements on sources that sometimes incur very different control costs, rather than concentrating reductions at those sources with the lowest control costs.

Recognizing the economic and environmental benefits of emissions trading, the Congress adopted a new regulatory approach to deal with the issue of acid rain by reducing SO_2 emissions, a major cause of the problem. Specifically, title IV of the Clean Air Act allows electric utilities, the major source of SO_2 emissions, to trade allowances to emit SO_2 with other utilities. After setting the overall reductions in SO_2 emissions to be achieved, the Congress defined each source's specific emissions limits and directed the administration to allocate allowances to sources in amounts equal to the emissions limits. These emissions limits for all sources combined to meet a total emissions cap. Sources that emit SO_2 must install continuous emissions monitors and regularly report their actual emissions to EPA. Utilities that reduce their emissions below the required levels can sell their extra allowances to other utilities to help them meet their requirements. Utilities that exceed their emissions allowances forfeit allowances to cover the excess emissions and must pay fines that are set at several times the estimated average cost of complying with SO_2 emissions limits.

The use of market approaches to address environmental problems is not new. EPA introduced limited forms of trading emissions into its regulations in the late 1970s.[3] More recently, the Clean Air Act Amendments of 1990

[3]For more details on these earlier approaches to trading, see A Market Approach to Air Pollution Control Could Reduce Compliance Costs Without Jeopardizing Clean Air Goals (GAO/PAD-82-15, Mar. 23, 1982).

also addressed the use of market-based approaches to attain and maintain the National Ambient Air Quality Standards (NAAQS) for other air pollutants, particularly ozone. Section 110(a)(2)(A) of title I of the act describes general requirements for state implementation plans to meet the NAAQS and clarifies that states can use "economic incentives such as fees, marketable permits, and auctions of emission rights" to meet the act's requirements.

The 1990 amendments to the act also recognize that the long-range transport of ground-level ozone is a regional problem that states and localities cannot be expected to fully address by themselves. Therefore, the amendments provided for the creation of interstate transport regions to deal with the ozone problem on a regional basis. The trading of emissions allowances can be a particularly useful approach to address regional problems with ozone in a cost-effective manner.

‹cid Rain Program Has Reduced Compliance Costs and Emissions

In December 1994, we reported that the acid rain program would result in significant cost savings as compared to a traditional command-and-control regulatory approach. Thus far, reports of SO_2 emissions have indicated that the acid rain program has also been successful in achieving greater than planned reductions in emissions.

ost Savings

As we reported previously, utilities have taken advantage of the regulatory flexibility under title IV to choose less costly ways to reduce emissions. As vendors have competed to fulfill utilities' compliance needs, utilities' ability to choose among various compliance measures has lowered prices for low-sulfur coal, scrubbers, and allowances. For individual utilities, we reported that the cost savings were large. For example, the Central Illinois Public Service expected to save $225 million as a result of allowance trading and the act's flexibility to choose among control options. Illinois Power reported saving $91 million by purchasing allowances instead of installing scrubbers. Similarly, Duke Power projected savings of $300 million, and Wisconsin Electric Power Company estimated saving almost $90 million by avoiding the installation of scrubbers. Carolina Power and Light expected to reduce its future compliance costs by two-thirds as a result of purchasing allowances.

IL, NC, WI

Projected cost savings through the acid rain program are substantial and depend on the level of trading. In 1992, EPA estimated that the costs of achieving compliance could be up to 50 percent lower than the costs

under a traditional command-and-control approach, depending on how much trading occurred between utilities. We also estimated large potential savings. According to our 1994 estimates, emission reductions would cost as much as $4.5 billion per year by 2002 if utilities were forced to use the types of controls typically prescribed under more traditional regulations. Under the act's more flexible approach, we estimated that utilities would spend about $2.6 billion per year if they restricted themselves to internal trading, resulting in annual savings of $1.9 billion.[4] Finally, we estimated that costs could be reduced an additional $1.2 billion per year by 2002 if utilities traded with one another until all cost-savings opportunities were realized, resulting in annual cost savings of $3.1 billion. However, at the time we made these estimates, there was very little trading of allowances occurring between different utility companies and, thus, little evidence that this additional $1.2 billion per year in cost savings would be realized.

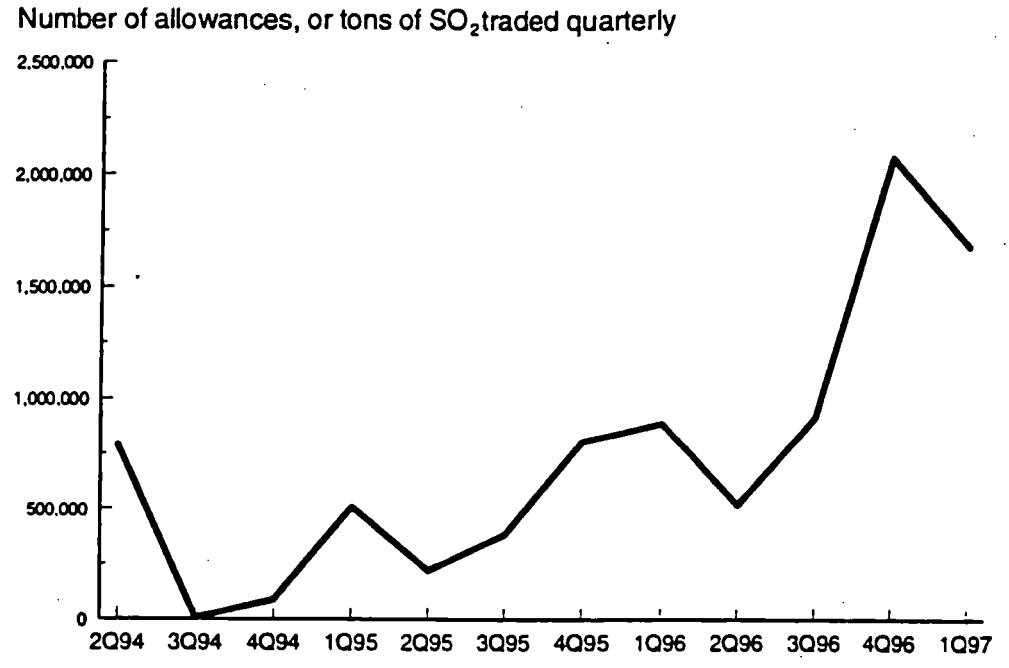
In 1994, we reported that various factors were causing the low level of allowance trading at that time. Among them, phasing in emissions reductions over several years had reduced the urgency to buy and sell allowances. We also reported a major barrier to trading was that state utility commissions and the Federal Energy Regulatory Commission had provided limited guidance on whether utilities could recover allowance trading costs. Without this guidance, many utilities may have avoided trading and instead installed scrubbers or fuel-switching equipment.

Recent data from EPA indicate that the amount of actual trading between utilities has been increasing since the time of our report. The number of allowances traded between utilities, or between utilities and other entities (e.g., brokers), has increased about 400 percent, from 881,852 in 1994 to 4,407,302 in 1996 (see fig. 1 for quarterly trading data).[5] EPA's data suggest that utilities are making substantial efforts to achieve potential cost savings.

[4]Internal trading means that a utility can lower costs by cutting back emissions in one of its power plants and using the resulting allowances to cover emissions in another of its plants.

[5]Allowances equal one ton of SO_2. 1994 allowances are for three quarters of the year.

Figure 1: Trends in Acid Rain Allowance Trading, 1994-97



Source: EPA Data

EPA holds an annual auction to ensure the availability of allowances for utilities needing them. EPA designed the auction as a "price discriminating" auction in which bidders pay what they bid, thereby resulting in a range of winning prices. Allowances can also be traded by utilities outside of EPA's auction. We reported in 1994 that, since the auction did not produce a single winning price, utilities found the range of winning prices confusing as an indicator of the actual market price for allowances. According to several utilities, market analysts, and some economic research, an auction resulting in a single, market-clearing price, would provide more accurate price data.

The prices paid for allowances have generally fallen since our 1994 report. Specifically, prices for allowances at EPA's auction have fallen from an average winning bid of $159 in 1994 to $68.14 in 1996. In the most recent 1997 auction, the average winning bid was $110.36. EPA also auctions allowances for use 6 and 7 years after the auction, and prices for these

allowances have also fallen from highs of $148 and $149 respectively in 1994 to lows of $65.36 and $64.21 in 1996. The average winning bid for 6-year advances in the most recent 1997 auction was $105.51 and for 7-year advances it was $104.16. Prices of allowances sold outside EPA's auction in the private market indicate the same generally decreasing trends, which taken together with increased trading between utilities and other entities, indicate that the costs of complying with the Act may be even lower than we suggested in 1994. We previously reported that the costs of reducing pollution were falling as a result of competition between compliance options spurred by title IV's flexible regulatory approach. An official at the Chicago Board of Trade, which is responsible for holding the annual auction, concurred in this assessment and attributed the declining prices to (1) the act's inherent flexibility in allowing utilities to pick less expensive ways to comply with the law, in particular by using low sulfur western coal, and (2) the impact this has had on dramatically lowering the price of scrubbers.

Emissions Reductions

Title IV of the act is designed to achieve a nationwide 10-million-ton reduction in SO_2 emissions from 1980 levels by the year 2010. Of this reduction, 8.5 million tons is expected to come from electric utilities, the nation's major source of SO_2 emissions. The reduction is being implemented in two phases. In Phase 1, beginning January 1, 1995, the utilities with the highest levels of emissions—primarily large midwestern coal-fired plants—had to reduce their annual emissions by a total of 3.5 million tons. In Phase 2, beginning January 1, 2000, utilities must reduce their annual total emissions by another 5 million tons.

The acid rain program, including the use of emissions trading, has been successful in reducing emissions of SO_2 from utilities. To achieve the program's overall goals to reduce emissions, the program imposes an annual nationwide emissions cap on SO_2. EPA reports that actual emissions from Phase 1 utilities were 5.4 million tons in 1996 or about 35 percent below the emissions cap of 8.3 million tons for that year. EPA's data also indicate that since 1980, the program's baseline year for emissions reductions, emissions reductions have occurred in every one of the 21 states containing utilities affected by Phase 1.

Trading for Other Air Pollutants

As noted previously, title I of the act allowed states to use economic incentives, including the auctioning of emissions allowances, to meet national ambient air quality standards for air pollutants and ozone

precursors, such as nitrogen oxides (NO_x) and volatile organic compounds (VOCs). Despite this legislation and attempts by EPA to implement new guidance on trading emissions allowances, there has been little trading for these other air pollutants.

ap and Trade Programs

Emissions cap and trade programs under title I are designed in a similar fashion to the title IV acid rain program. States or localities set total caps on emissions and identify those sources that are responsible for meeting the overall emissions cap. Emissions allowances are then allocated to each individual source.

One prominent example of a title I program has been ongoing in southern California since October 1993. Los Angeles is the only area of the country under the act's classification that is considered in the extreme class of ozone nonattainment. As part of its efforts to comply with the act, the South Coast Air Quality Management District developed a trading program to reduce emissions of NO_x and sulfur oxides (SO_x) from stationary sources. This program, called the Regional Clean Air Incentives Market (RECLAIM), was approved by the California Air Resources Board in October 1993. Nearly 400 stationary sources, which accounted for about 70 percent of NO_x and SO_x stationary-source emissions in the district, were initially included in this program.[6] Sources were included if they held permits for equipment or processes that emit generally greater than four tons of NO_x or SO_x per year.

RECLAIM requires that overall emissions of NO_x and SO_x be reduced gradually every year and replaces many existing command and control rules for NO_x and SO_x. As with the acid rain program, those sources in RECLAIM can choose the most cost-effective means to reduce emissions. Sources that reduce emissions below their allocation can sell their excess allowances to other sources for whom the cost of those allowances is less expensive than installing emissions controls. Sources not participating in RECLAIM are still subject to existing command and control rules for NO_x and SO_x.

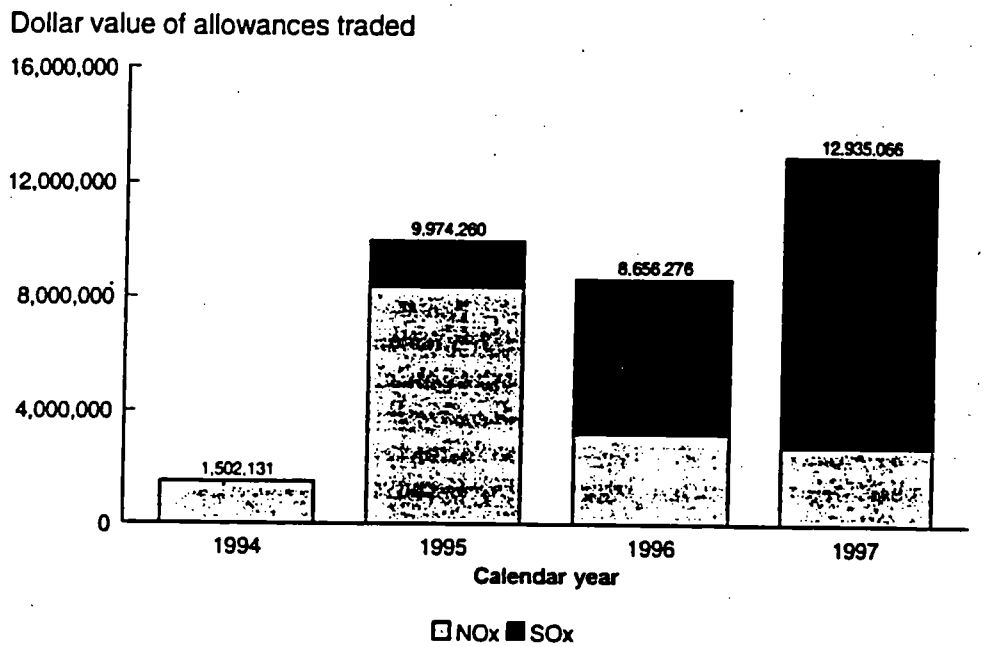
District officials believe that RECLAIM is affording stationary sources significant cost savings over complying with a conventional command-and-control approach. The district originally estimated that the cost of this trading program would be $80.8 million annually as compared

[6]As of the end of 1995, sources in RECLAIM had declined to 330. According to district officials, the decrease is primarily because district staff found that some sources had less than four tons of emissions per year or belong to an exempt category.

to $138.7 million with a conventional command-and-control compliance system. Although they have not yet fully analyzed these costs, they believe that the program has been cost-effective. District officials told us that cost comparisons will be included in the initial RECLAIM 3-year audit to be completed next year.

Trading in RECLAIM indicates that there is an active market in emissions allowances. According to the district, $33 million in allowances has been traded as of April 1997. As shown in figure 2, the dollar value of allowances traded in the first quarter of 1997 already exceeds the annual amounts for the first 3 years of the RECLAIM program. Sources included in this program were initially allocated emissions allowances based on historical emissions data reported in a selected year that those sources believed was representative of normal economic conditions. As a result, the total program allowances exceeded actual emissions at the program's start. District officials believe that the increased trading in the first quarter of 1997 indicates that surplus allowances built into annual targets during the program's early years are starting to disappear.

Figure 2: Trends in RECLAIM Allowances Traded, 1994-97



Note: 1997 data is for the first quarter only.

Southern California only

Source: South Coast Air Quality Management District data

At the start of the RECLAIM program, environmental groups were concerned that, because of the initially generous allocation of allowances, actual emissions would initially increase. Another issue raised was that RECLAIM could adversely affect air quality in certain areas of the South Coast District because the program established a total cap rather than specific controls for each source. As a result of these concerns, the California Air Resources Board requires the district to audit the program each year and submit a report that assesses emission reductions and analyzes air quality in specific areas within the district. The district's most recent audit found that actual NO_x and SO_x emissions for 1995 were both somewhat higher than in 1993 (the program's baseline year). However, the increase was partially attributed to procedures for dealing with missing data which tend to overstate actual emissions. The audit report noted that emissions in the third program year (1996) should be lower due to the expected installation and certification of continuous emissions monitors for most major

sources. The audit also reported that emissions do not appear to have geographically shifted because of the program.

District officials attempted to extend RECLAIM to emissions of VOCs but were unsuccessful. One reason was that the reliability of emissions data for VOCs is less certain than for NO_x and SO_x due to their chemical makeup and because they are difficult to monitor. Additionally, there was a lack of agreement among the district and its stakeholders on the baseline level of emissions for VOCs.

In addition to the RECLAIM program, a concept for another cap and trade program has been developed for 12 northeastern and mid-atlantic states and the District of Columbia. This program, known as the Ozone Transport Commission's (OTC) NO_x Budget Program, caps the summertime NO_x emissions for participating areas at 219,000 tons in 1999 as compared to the 1990 baseline of 490,000 tons. In 2003, the emissions cap will decrease to 143,000 tons. NO_x emissions allowances will be allocated to emissions sources in each of the states and the District of Columbia. The program plans to use an allowance trading system to help achieve the goals to reduce emissions in a cost-effective way. Each participating state may develop its own regulations to implement the NO_x Budget Program including the allocation of its share of the NO_x budget and the use of allowance trading. The OTC NO_x Budget Program is scheduled to go into effect in 1999.

An interstate allowance trading program is also being considered by the 37 easternmost states (OTC and 24 additional states). This group, known as the Ozone Transport Assessment Group, is currently studying possible strategies to reduce NO_x emissions, including an emissions cap and adopting emissions trading.

›en Market Trading

To facilitate the development and implementation of additional emissions trading programs, EPA proposed an "open market trading" rulemaking in August 1995. This proposal was intended to provide states and industry with another option to comply with the requirements of title I in the most cost-effective manner possible. Open markets were proposed to create incentives for sources to achieve more emissions reductions than required by permit and thereby create surplus emissions' credits. These credits are similar to allowances under cap and trade programs except that they are based on the rate of emissions from a source instead of total emissions. Rather than installing control equipment, other sources could find it more

cost-effective to purchase these credits on the open market, thereby meeting their compliance obligations at a lower cost.

EPA's proposed rulemaking on open market trading was the number one priority out of 25 regulatory initiatives for EPA announced by President Clinton and Vice President Gore in March 1995. However, despite its priority, EPA has not issued the rule because several concerns were raised about it. For example, states were moving forward with their own trading plans and believed that EPA's proposal was too prescriptive and would not allow them the needed flexibility to design their own trading programs. The Environmental Defense Fund also expressed concerns that this type of trading rule would not ensure environmental benefits because it did not include any cap on emissions.

EPA officials told us that they now plan to issue guidance on open market trading rather than a new rule to provide states with more flexibility to decide the most cost-effective ways to reduce emissions. EPA officials told us they expect to finalize this guidance by December 1997. Although EPA has not issued formal guidance, some states appear to be moving forward with their own open market trading programs. However, other states are waiting for EPA to provide additional clarification on trading issues. For example, New Jersey wants to see some level of standardization across the country in calculating emissions credits so that interstate trades can be made.

Issues to Consider for Expanding Emissions Trading

Although trading under title I has been limited thus far, the experiences under the acid rain and RECLAIM programs point to five key issues that EPA, states, and other stakeholders will need to consider when adopting additional trading programs.

Reliable Monitoring and Reporting of Emissions

Reliable emissions monitoring and reporting systems are important to help ensure environmental benefits. As noted in our 1994 report, each utility must install EPA-certified continuous emissions monitors and regularly report those emissions to EPA to help ensure that actual emissions are accurately tracked. At the end of each year, EPA grants utilities 30 days to obtain the allowances necessary to cover their actual emissions during the previous year. After this grace period, EPA deducts allowances from a utility's allowance holdings in an amount equal to its recorded emissions. The deduction of allowances, as well as the issuance, transfer, and tracking of allowances, is conducted through an automated system. Operating like a bank, this system tracks the allowances held by utilities

and any other companies, organizations, or individuals possessing allowances. The tracking system provides EPA with a way to determine compliance by ensuring that a source's actual emissions do not exceed its available allowances. Similarly, the RECLAIM program requires major sources to install continuous emissions monitors to track NO_x and SO_x emissions. The reliability of emissions data from other pollutants, such as VOCs, is less certain. Thus, determining ways to obtain reliable data for these other pollutants will be a key issue in developing additional trading programs.

Adequate Financial Penalties

Financial penalties in emissions trading programs must be large enough to discourage noncompliance. For example, if a utility does not have enough allowances to cover its SO_2 emissions, the acid rain program imposes an automatic penalty of $2,000 per ton, indexed yearly to inflation.[7] The penalty is currently about twenty-five times higher than today's allowance prices. In addition, a utility that does not comply also has its allowance holdings reduced in the next year by one allowance for each excess ton of SO_2 emitted. EPA reported that all units were in full compliance for 1995. Under RECLAIM, facilities that fail to achieve their annual emissions allowance may also be subject to monetary penalties. The South Coast Air Quality Management District reports that 92 percent of RECLAIM facilities complied with their allocations during the 1995/1996 compliance year and attributed most instances of noncompliance to misunderstandings of proper procedures.

ıissions Baselines and ɔcations

Although determining emissions' baselines and allocations can be difficult, stipulating a fixed amount of emissions to be reduced helps ensure environmental benefits. The acid rain program has built-in safeguards to ensure that environmental protection is achieved regardless of how much or how little allowance trading occurs. These same protections could serve as environmental safeguards in applying this approach to controlling other air pollutants. As described previously, the RECLAIM program has similar emissions caps.

Despite the environmental benefits of an emissions cap, it can be difficult and resource intensive to agree on the baseline and how to allocate it to emissions sources. This can also be an issue under a command-and-control approach. In the acid rain program, average 1985-87

[7]According to EPA, the actual penalty in 1996 was $2,454 per ton.

emissions[8] were chosen as the baseline against which to measure the required reductions to reduce utilities' incentives to maintain higher emissions for the express purpose of receiving larger initial allowances. Additionally, choosing an average of emissions over several years, rather than singling out 1 year, increases the chance that the emissions baseline represents normal economic activity. In the RECLAIM program, it was only after extensive debate that a baseline level was set for NO_x and SO_x emissions. Much of the debate centered on whether to choose as a baseline year one in which the region was suffering from a recession, thereby establishing an emissions baseline that would have been lower than normal.

Determining Trading Areas

Determining the area boundaries for any trading prior to implementing a program is important because, to the extent area boundaries can be enlarged without jeopardizing air quality, trading is made easier. For instance, an SO_2 allowance in one state can be traded for an allowance in another state, thereby expanding the number of potential trades. Similarly, scientists know that ground-level ozone is a regional phenomenon because pollutants that cause it can be transported long distances by meteorological conditions. Thus, trading allowances for air pollutants that cause ozone can sometimes be done among sources in several states.

Auction Design

The design of any auction associated with a trading program is also an important feature in encouraging trading. As noted previously, EPA's annual SO_2 auction has resulted in allowances being sold at multiple prices, causing uncertainty about what constitutes a fair market price. In adopting emissions trading programs that include an auction, a single price design would be preferable as we noted in our 1994 report.

Conclusion

The acid rain program, including the trading of emissions allowances, has been successful thus far in reducing SO_2 emissions at reduced compliance costs. However, there has been limited success in expanding emissions trading to other pollutants covered under the act. Several important issues, such as developing and implementing reliable emissions monitoring and reporting systems, determining penalties for noncompliance, and allocating emissions reductions among participants, must be addressed in adopting any emissions trading program. As a

[8]The calculation was based on energy input data for utilities multiplied by standard emissions factors.

consequence, it will take time for EPA and the states to resolve these issues.

In judging the feasibility and success of these trading programs to improve environmental quality at less cost, it is important to note that traditional command and control regulatory approaches have shared many of the same problems and challenges, such as establishing agreed upon emissions baselines. In summary, Mr. Chairman, whether regulatory or market-based programs are implemented, mechanisms must be incorporated into such programs to provide for periodic monitoring and evaluation which will help ensure that environmental goals are achieved.

This completes my prepared statement. I will be happy to respond to any questions you or Members of the Committee may have.

TESTIMONY OF MARY D. NICHOLS
ASSISTANT ADMINISTRATOR FOR AIR AND RADIATION
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
JOINT ECONOMIC COMMITTEE
July 9, 1997

INTRODUCTION

Thank you for inviting me to testify today on emissions trading. Before I discuss EPA's experience with emissions trading, let me first point out that this country has made substantial progress toward clean air since passage of the Clean Air Act.

Since 1970, the underlying drivers of air quality problems in the U.S. have gone up -- U. S. population has grown by 28%, real Gross Domestic Product has grown by 99%, and the number of miles traveled by on-road vehicles (VMT) has increased by 116%. Behind these statistics are more factories, more production, more commerce, more power generation, and more cars. However, as a result of efforts marshaled under the Clean Air Act, during this same time period we have achieved a 29% reduction in air pollution -- that's not emissions -- but actual, monitored air pollution.[1]

In other words, as a Nation we have not just held our own, we have been able to substantially improve air quality across the country, even as the sources of air pollution have increased and the economy has grown. As a result, our air is generally cleaner and healthier today than at any time since EPA began measuring air quality. These pollution reductions are preventing tens of thousands of respiratory illnesses and deaths every year.

But the job is not done. We must continue to make progress in cleaning up our Nation's air. And we must be open to new tools, such as emissions trading, to progress faster, less expensively and more effectively toward that goal. We have experience in using market incentives, including emissions trading -- we know that it works, and we plan to expand its use.

The air pollution reduction programs in the U.S. have historically been based on traditional forms of environmental regulation: source-specific emissions standards (e.g., Reasonably Available Control Technology) set on a uniform basis for categories of

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[1] U.S. EPA, National Air Quality and Emissions Trends Report, 1995, EPA 454-96-008, Washington, D.C., December 1996.

similar sources. Even though set as performance standards, these regulations have a tendency to treat all sources within a category the same and to be oriented either toward the average or typical source at an average cost of control, or toward the more difficult sources to control. Such standards simultaneously miss substantial opportunities for inexpensive reductions by sources with lower than average control costs, and impose a disproportionately high cost (per ton of pollutant reduced) on other sources. State and federal governments frequently lack information on undemonstrated but cost-effective control options, and sources have no incentive to be forthcoming. Governments also tend to overlook smaller or unconventional sources.

Recognizing some of these shortcomings with traditional regulation, EPA has developed policies since the late 1970's permitting trading approaches for an increasing variety of emissions. Emissions trading is based on the simple concept of allowing sources, through market-based mechanisms, to seek the least costly solution to meeting pollution control requirements. Sources with relatively low costs of control are able to create extra reductions that are used by sources with relatively high costs of control. When these sources trade emission control obligations, the area experiences the same level of emissions reductions, but at a lower overall cost.

Over the last twenty years, EPA has learned that market-based programs and other uses of economic incentives can dramatically cut costs compared to other approaches. The lead and chloroflorocarbon (CFC) phase-out plans and the Acid Rain program are all examples of the ability of market-based programs to provide environmental protection at lower cost. EPA analyses have suggested that for the gasoline lead phaseout program, the trading and banking provisions resulted in 20 percent lower costs. The cost of reduction in the CFC phaseout program, which used an emissions allowance trading system, was at least 30 percent less than it would have been without trading. According to GAO's analysis of the sulfur dioxide (SO_2) allowance program published in December 1994, the projected compliance costs for full implementation with trading should be less than half the costs without trading, i.e., $2.0 billion per year versus $4.9 billion per year.

In this era of heightened competitive pressures, EPA recognizes that it is essential to ensure that industry is getting the greatest pollution reduction for its money. Emissions trading is one way to do this.

Emissions trading is beneficial because:

- it lowers the cost of pollution control which lowers the cost of goods and services for consumers;

- it rewards technological innovation, creating a market for better pollution control technology and creating an incentive to exceed regulatory targets;

- it can provide cleaner air, sooner, with incentives for early reductions; and

- it obviates the need for compliance delays and variances by providing sources with the flexibility of complying by purchasing credits.

EPA would like to see all of the above benefits realized wherever possible. It must be remembered, however, that trading is only a tool and does not replace the need for setting and achieving an environmental objective, which can be implemented through a cap on total emissions, or the setting of emissions rates on all relevant facilities sufficient to achieve the specified air quality goal. The degree of flexibility afforded by trading must be matched with the appropriate accountability, i.e., the more accountable individual sources are with respect to their emissions, and the more accountable the overall program is to the environmental objective, the more flexible the program can be with regard to how, where, and when emissions are reduced.

FACTORS TO CONSIDER FOR TRADING

From our experience, we have found several factors important to consider before choosing to employ emissions trading.

Nature of the Problem

First, the decision to utilize trading depends on the nature of the problem to be solved. If the pollutant of concern is transported far from its source and dispersed broadly, such as SO_2 and to a lesser degree oxides of nitrogen (NO_x), then where it is reduced may be less important than reducing total loadings in general. Also, if the primary concern is total annual loadings, such as SO_2, then when during the year emissions are reduced is less important. If the concern is ambient ozone concentrations, NO_x and volatile organic compounds (VOC), reductions need to be made in the summer months and a trading system would have to be based on this. Human induced atmospheric carbon loading, which takes place over decades and is caused by emissions of greenhouse gases from multiple sources in many countries around the world, is especially well suited for trading.

On the other hand, pollutants that need to be reduced in a specific location for health or environmental reasons might not be appropriate for trading over a broad region – for example, acutely toxic pollutants. Also, sources emitting pollutants whose impacts are localized would not be good candidates for purchasing emission allowances in lieu of controlling on site. However, such sources could still benefit from

being part of a trading regime by selling their reductions to others and recovering some of their compliance costs.

Number of Sources with Differing Control Costs

Second, for trading to be utilized and cost savings realized, an adequate number of sources with differing levels of control costs is necessary. Also necessary is a balance between enough sources to make trading viable, but not too many that the program becomes unworkable. For instance, it may not be practical if every car owner were a participant in a mobile source trading program.

Ability to Quantify Emissions

Third, EPA believes that accurate quantification of emissions ensures that the environmental objective is being achieved, and that it gives participants in the market necessary information about the commodity they are trading. Quantification also allows the more effective establishment and enforcement of emissions, budgets or caps.

Institutional Capabilities

Fourth, though trading programs can give sources increased flexibility to choose from multiple compliance options, as with any market, they require appropriate ground rules and proper management. Essential safeguards such as accurate measuring and reporting of emissions, effective and automatic enforcement tools, and certified trading commodities insure the integrity of the trading program and achievement of the environmental objective.

Finally, it should be pointed out that air pollution control programs implemented through State Implementation Plans (SIPs) have unique challenges when developing or implementing interstate trading programs to address multi-state nonattainment situations.

EXAMPLES OF TRADING PROGRAMS

Throughout the country there are many efforts under way to use emissions trading. The RECLAIM program in the Los Angeles area, for example, has been used by the South Coast Air Quality Management District since 1993 to assist the area in coming into attainment with the ozone and SO_2 standards. It is a cap and trade program applied to stationary sources of NO_x and SO_2 and is credited with reducing emissions at substantial cost savings. Today, however, I would like to focus on those emissions trading efforts with which EPA is directly involved.

Sulfur Dioxide (SO_2) Emissions

The leading cause of acidification of our lakes and streams is long-term total loadings of sulfur compounds, and the primary source of these compounds is emissions of SO_2 from hundreds of coal-burning power plants. The Acid Rain Program sets a cap on the total amount of SO_2 emissions from power plants, allocates those emissions in the form of tradeable allowances, and lets the plants trade allowances freely on a national basis. Confidence that allowances accurately represent emissions is assured by state of the art emissions monitoring equipment required on most emission stacks and by automatic penalties for exceedances. The Acid Rain Program has proven to be highly successful in reducing both SO_2 emissions and compliance costs.

In 1995, the first year of the program, we saw the largest one-year drop in SO_2 emissions since 1970. The 110 power plants required to be in this first phase of the program reduced emissions by more than 50% below their levels in 1980 and 40% below the levels required by law. In 1996, these impressive results were nearly repeated with emissions 35% below required levels [see Figure 1]. These emissions reductions resulted in a decrease of 10 to 25% in wet sulfur deposition (acid rain) over large areas of the eastern U.S. in 1995 [see Figure 2]. Ambient concentrations of sulfur dioxide also declined by 17% between 1994 and 1995.[2] By the year 2010, the reduction in fine sulfate particulate matter is expected to provide health benefits of $12 to 40 billion per year[3] and visibility benefits of $3.5 billion per year.[4]

Data from the SO_2 Allowance Tracking System (ATS) is showing that utilities are taking advantage of the market flexibilities and cost saving opportunities afforded by the program. More than 2,400 allowance transfers moving approximately 38 million allowances (where one allowance is an authorization to emit one ton of SO_2) were recorded by EPA between early 1994 and the end of the first quarter of 1997 [see Figure 3]. More than 50% of Phase I affected utilities have engaged in trades with others outside of their company such as other utilities and brokers. Though the number of brokers and traders involved in the market has remained relatively stable since 1995 (there are seven companies that identify themselves as brokers or traders in the ATS), their level of involvement has increased significantly. From 1995 to 1996, the flow of

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[2] U.S. EPA, National Air Quality and Emissions Trends Report, 1995, EPA 454-96-008, Washington, D.C., December 1996.

[3] Lauraine G. Chestnut: "Human Health Benefits from Sulfate Reductions under Title IV of the 1990 Clean Air Act Amendments," November 10, 1995 (unpublished contractor report to EPA).

[4] Lauraine G. Chestnut and Robin L. Dennis: "Economic Benefits of Improvements in Visibility: Acid Rain Provisions of the 1990 Clean Air Act Amendments," Journal of the Air and Waste Management Association, vol. 47, March 1997.

allowances from brokers/traders to utilities increased six-fold and the stream from utilities to brokers increased three-fold. The price of allowances has fallen from early estimates of $400 - $1000 to less than $100 for an allowance [see Figure 4]. These results prove that a legitimate trading market in SO_2 emission allowances exists and is thriving.

Nitrogen Oxides (NOx) Emissions

Using a cap and trade approach to limit NO_x emissions and reduce transported levels of NO_x and ozone which in turn can assist states in attaining and maintaining the ozone standard and mitigate acidification and eutrophication is also appropriate. As the Ozone Transport Assessment Group (OTAG)[5] modeling has shown, NO_x is emitted by multiple sources and transported across state boundaries. EPA is in fact preparing to manage a regional NOx trading program for 12 Northeastern states represented by the Ozone Transport Commission (OTC) , which will begin in 1999. The OTC program will include electric power generators and industrial boilers, and will allow emissions trading throughout the 12-state region. Before embarking on the trading program, the OTC reviewed analyses indicating that multi-state trading would not be harmful to ozone attainment and would reduce compliance costs by 30% compared to the same scenario without trading. Since electric utilities contribute about 30% of total NO_x emissions and are already monitoring and reporting NO_x emissions under the Acid Rain Program and participating in the SO_2 allowance trading program, the administrative framework associated with their participation in a regional NO_x trading program is relatively straightforward.

Greenhouse Gas Emissions

Scientists agree that the balance of evidence supports the view that there is a discernible human influence on global climate due to the significant increase in greenhouse gas emissions (principally carbon dioxide, methane, nitrous oxides, chloroflourocarbons). This global environmental problem is especially well suited to be addressed through emissions trading because the problem is caused by cumulative emissions well mixed in the atmosphere, residing for long periods of time, and originating from multiple sources all over the world. The international community is interested in finding cost-effective policies for slowing and eventually halting global climate change as evidenced by the adoption of the UN Framework Convention on Climate Change. Recently, there has been a growing interest in applying an emissions trading paradigm to the climate problem as indicated by the recent report prepared by the Organization for Economic Cooperation and Development, Working Paper 9, titled

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[5] OTAG consists of 37 states convened to study the extent of ozone transport and develop recommendations on cost-effective reduction strategies.

"Policies and Measures for Common Action" on the subject of International Greenhouse Gas Emission Trading. That paper concludes – and we strongly agree – that an international emissions trading system founded upon accurate, verifiable emissions measurement and reporting can send the right market signals to create investment in cost-effective technologies to reduce greenhouse gas emissions.

In January, the U.S. put forth a climate protocol proposal based on legally binding greenhouse gas emissions budgets that offered Parties the option of using emissions trading to achieve needed reductions in greenhouse gas emissions in the most cost-effective manner possible.

The key to lowering costs is to allow maximum flexibility in reducing emissions, while ensuring the strict accountability of all Parties involved. Allowing trading between nations with low and high marginal costs of abatement could reduce the costs of achieving emission reductions significantly. The ultimate effectiveness of a trading system in lowering the costs of reducing emissions will depend on its ability to keep transaction costs low, and its success in creating and maintaining the credibility of the commodity being traded.

Creating an international emissions trading system requires three initial conditions: a legally binding allocation of emissions authorizations (or starting emissions budgets); a standardized and verifiable system of measurement and reporting that enables actual emissions to be matched to authorized amounts; and an effective legal mechanism to ensure that all Parties are complying with their obligations.

CONCLUSION

To sum up, EPA has now had 20 years of experience with emissions trading programs. Where appropriate to the problem and when properly designed and implemented, we have found emissions trading to be an extremely helpful tool in lowering compliances costs, promoting innovation, and achieving environmental goals.

Figure 1

SO2 Trading Program: Initial Results

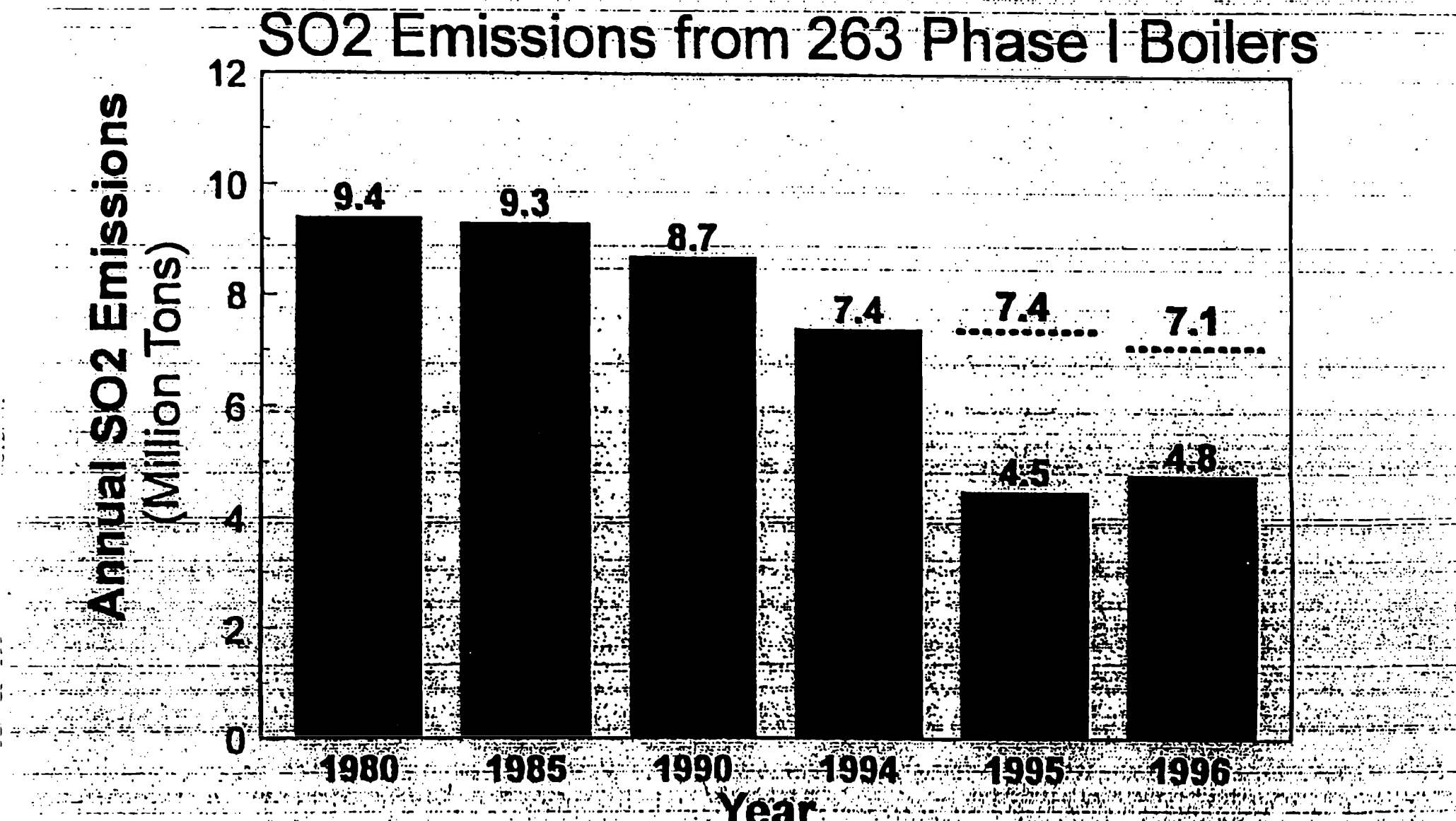


Figure 2

SO2 Trading Program: Reductions in Wet Sulfate Deposition

Percent Departures of 1995 Annual Sulfate Ion Concentrations from Predictions of the 1983-94 Seasonalized Trend Model



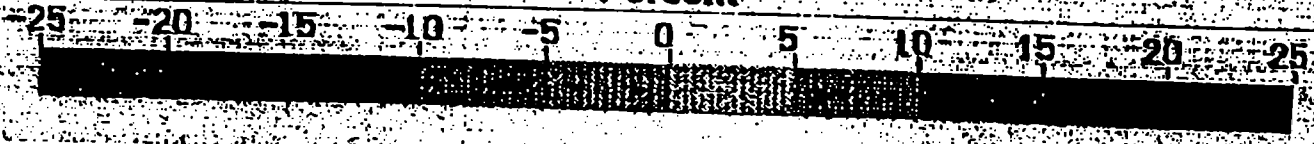


Figure 3

SO2 Trading Program: 38 Million Allowances Transferred

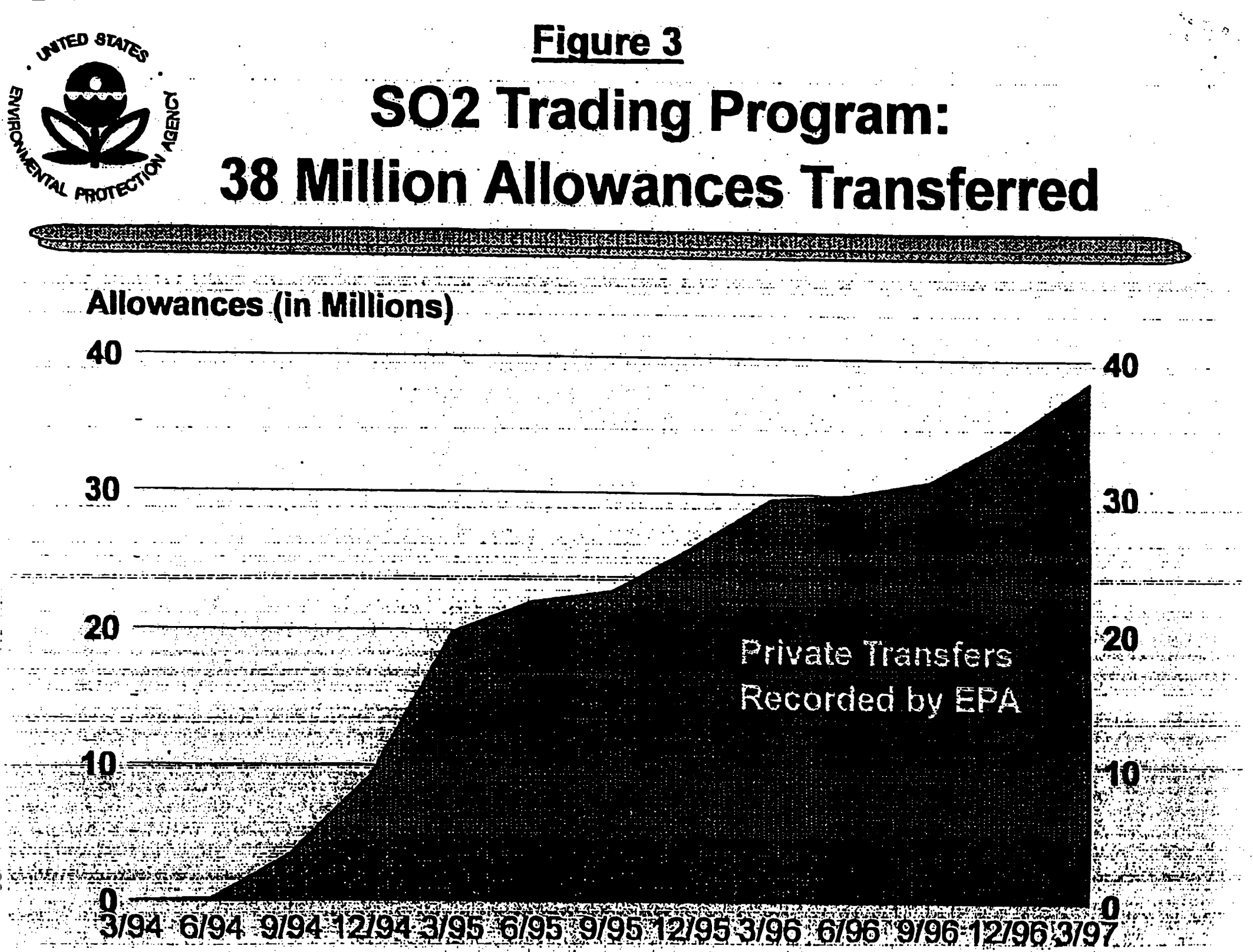
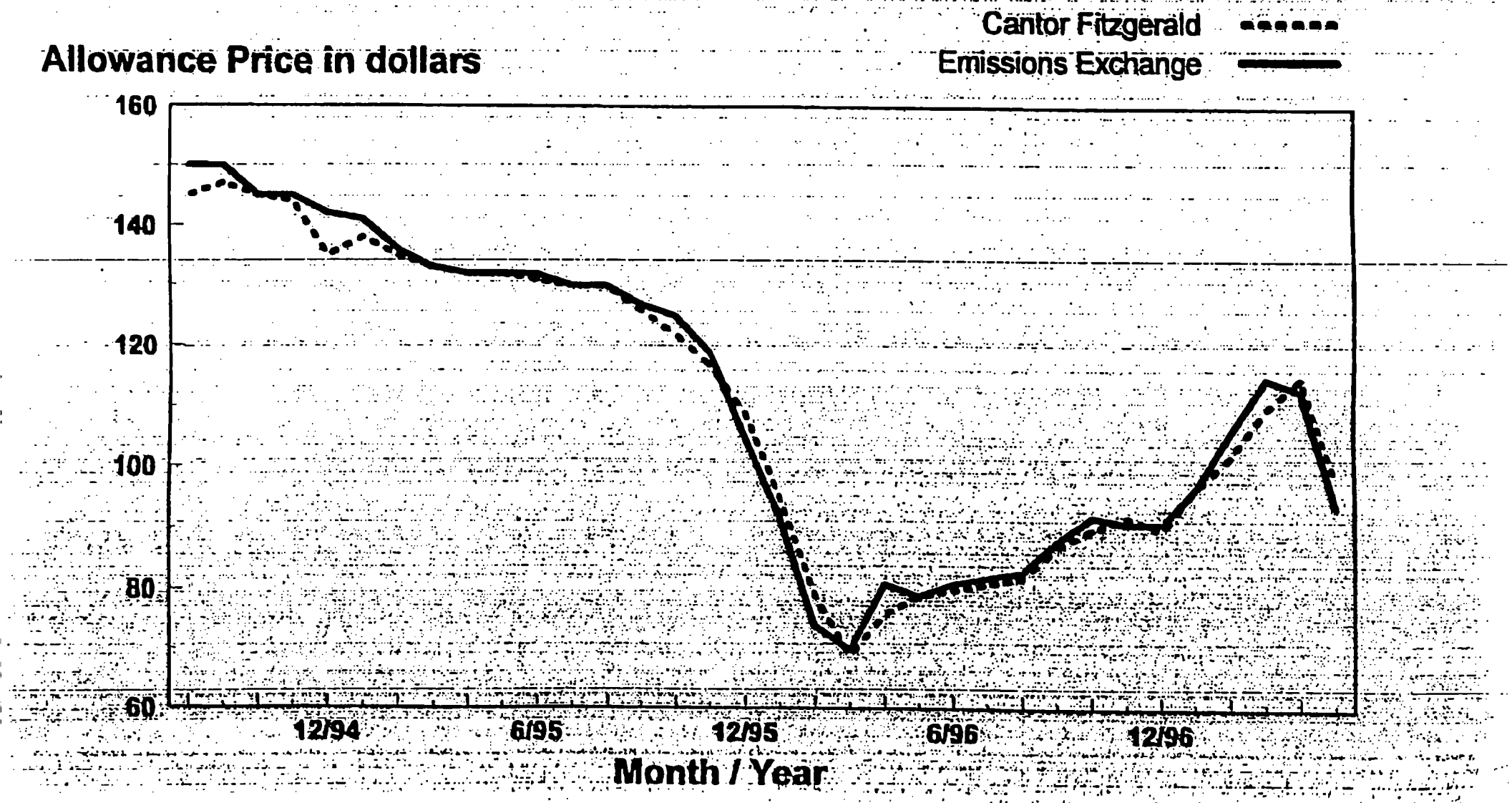


Figure 4

SO2 Trading Program: Allowance Prices



TESTIMONY OF

MARY A. GADE, DIRECTOR

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA)

FOR THE HEARING OF

THE JOINT ECONOMIC COMMITTEE

CONGRESS OF THE UNITED STATES

ON THE ISSUE OF

TRADEABLE EMISSIONS

AS A METHOD OF

REDUCING THE COST

OF POLLUTION CONTROL

JULY 9, 1997

Good morning. My name is Mary Gade. I am the director of the Illinois Environmental Protection Agency. Thank you for inviting me to testify before the Joint Economic Committee today on the issue of emissions trading, a keystone in Illinois' efforts to use market forces to achieve enhanced environmental benefits by the most cost-effective methods.

While some of my colleagues on the panel will discuss the advantages of trading systems, I will focus today on a unique program we expect to launch in 1999 in Illinois. Now in the final stage of rulemaking, the Illinois volatile organic compounds (VOC) trading system for the Chicago metropolitan area will be the first of its kind in the nation. We were pleased when President Clinton chose to honor our efforts in designing this program as an outstanding example of government re-invention in March 1995.

We believe this program will give Illinois businesses the tool they need to meet targeted reductions required by the Clean Air Act. Make no mistake, this is no small obligation. Chicago was classified in 1990 as one of the nine worst ozone non-attainment areas in the country under the 120 parts per billion standard. Ground-level ozone or smog significantly impacts the health and well-being of 7 million Illinoisans each year. Despite increasingly stringent and costly controls on most of our industries, the Chicago metro area continues to have ozone exceedences. In fact, just last week we had our first exceedence of the year, at 128 parts per billion. Confronted with this difficult environmental challenge and concerned about negative impacts on Illinois' economy, Illinois EPA weighed our options.

We recognized that relying solely on the traditional "command and control" regulatory approach would impose tremendous costs on our industry and could be a deterrent to innovation. Consequently we turned to market-based approaches.

The Emissions Reduction Market System (ERMS) in Illinois is the result of four years of review and study that has drawn in top experts from the public and private sectors. The Illinois EPA held workshops, hearings and assembled a multi-faceted design team that did thorough research and investigation of market-based approaches before proceeding with our program.

The system that resulted from this collaboration is built upon three fundamental policy considerations. The first, and most critical, is to assure that air quality goals are met. We did this by establishing an explicit cap on total VOC emissions implemented through a fixed number of VOC emission allotments -- that is authorizations to emit 200 pounds of VOCs -- which are tradeable, and to a limited extent, bankable. This approach is modeled in part after the Title IV Acid Rain Program. The cap on mass emissions distinguishes this program from traditional command and control requirements as well as some other emissions trading frameworks. Second, Illinois EPA recognized a minimum amount of governmental interference was desirable in a free market system, so we worked hard to limit the regulatory involvement that would be necessary once the program was up and running. As a result, transaction costs will be reduced, creating an incentive for increased participation by sources and maximizing the cost savings that are realized. Finally, to safeguard environmental progress, we incorporated sound performance accountability standards.

We believe Illinois' market-based strategy will result in significant reductions in one of the two major pollutants contributing to unhealthy levels of ozone while providing increased flexibility and significant cost-savings for business and industry.

Illinois' program has several novel features but is not a pioneer. Without the foresight of the Congress in laying the foundation for market mechanisms to reduce pollution as part of the 1990 amendments to the Clean Air Act, Illinois' program might still be in the starting blocks. The success of sulfur dioxide trading under the Acid Rain program is an important forerunner of our efforts. We carefully reviewed the structure and the data generated by the Acid Rain program in crafting Illinois' system.

DEVELOPMENT EFFORTS

Illinois EPA did not set out to create the country's first VOC trading program. In fact, after the Clean Air Act Amendments of 1990, the Agency initially targeted NOx emissions for reduction. We were convinced they were the key to reducing unhealthy ozone levels. We turned to the approach we knew best and started to develop Reasonably Available Control Technology (RACT) regulations for NOx. Because of the legitimate fears over cost by the business community, we simultaneously began working on something new -- a NOx trading system.

In June 1993, I was joined by Sam Skinner, president of Commonwealth Edison, our state's largest electric utility, in jointly announcing the development of a NOx trading program. A design team was formed with staff from Illinois EPA, Commonwealth Edison, and the Environmental Defense Fund, and developed a draft proposal distributed in September 1993.

However, the plot took a major twist in December 1993. Results from the Lake Michigan Air Directors' Consortium regional air quality modeling project showed for the first time that NOx reductions in the Chicago nonattainment area would not improve and might even exacerbate ozone conditions in the Lake Michigan airshed. In reaction to these findings, and without much humor, we joked about graduating from the School of Hard NOx. This unexpected finding shifted the onus for controls in the Chicago metropolitan area on VOC emission reductions.

The findings were subsequently reaffirmed by the extensive modeling and research done by the Ozone Transport Assessment Group, which I was privileged to chair. OTAG was a unique two-year collaboration between the states, U.S. EPA and hundreds of private stakeholders. OTAG confirmed the importance of localized VOC reductions in addressing urban ozone attainment and the existence of substantial NOx reduction disbenefits on high ozone days in Chicago and New York City and to a lesser extent in other major northern cities.

Unfortunately, when Illinois EPA began to review options for obtaining increased VOC reductions, we were stymied.

A thorough review of the potential for using additonal RACT for reducing VOC emissions could identify only one, cold cleaning degreasing, that was a viable option. That left only the option of ratcheting down further and requiring even more dramatic VOC emissions cuts from industries that were already heavily regulated.

The inevitable conclusion was that VOC trading should be pursued. Our work with the NOx proposal had strengthened our conviction that real benefits would result from an emissions trading program. We asked four of the largest VOC emitters in the Chicago area -- Caterpillar, Abbott Labs, Corn Products and Amoco -- to join our design team. The team also met with other interested parties and encouraged submission of written comments. Finally, the new proposal was submitted to the scrutiny of a formal peer review process by three experts before the final report was issued in March 1995. Incidentally, one of the team members is my fellow panelist today, Dan Dudek of the Environmental Defense Fund. We are grateful for EDF's significant contribution to this project.

Our design was formally endorsed by Governor Jim Edgar and the Illinois General Assembly in legislation approved in the summer of 1995. Senate Bill 460 expressed support for using market-based approaches and authorized Illinois EPA to propose rules for an emissions reduction market system. Illinois EPA submitted proposed regulations to the Illinois Pollution Control Board in hearings that were recently concluded. The Board heard enthusiastic testimony in support of the program from the Chemical Industry Council of Illinois, on behalf of about 80 manufacturers statewide.

The plan was also endorsed by the Illinois Environmental Regulatory Group, which represents 45 firms in the Chicago area that are major sources of VOCs. We anticipate final rulemaking by early fall.

PROGRAM FEATURES

The Illinois EPA design team concluded our program must have six key elements to be successful and incorporated them in our proposal. They are a cap on emissions, including all significant sources, providing flexibility, confidence in the market mechanism, enforcement for meeting reduction targets, and the potential for cost savings.

First and foremost is establishing a cap on emissions. A carefully-crafted cap ensures both the environmental performance of the system and drives the cost-savings. The team also determined it was environmentally appropriate and would provide additional flexibility to the trading participants if the cap was based on reductions in VOCs during the five-month "ozone season" from May through September. A review of the monitoring data indicated that no hourly concentrations of ozone have been measured above 100 parts per billion outside of those months.

The Illinois program sets a cap requiring a 12 percent reduction of VOCs from a baseline level of VOC emissions for each source. The baseline is determined by using an average of the seasonal emissions from prior representative years.

The allotments will be written into the Title V permits of each source and will be valid for the season in which it has been issued and the next season. The total number of allotments for the entire metro area will be limited to achieve the overall 12 percent reduction in VOC emissions -- about 1500 tons per season. In addition, it is important to emphasize that the reductions go beyond those already achieved under RACT requirements. To further ensure the market will not create any toxic "hot spots," sources will also still be subject to federal Maximum Available Control Technology (MACT) standards that apply to toxic VOC emissions. This will prevent increases in toxic VOCs being offset by decreases in non-toxic VOC emissions in the Chicago metro area under the trading system.

The second key element of the program is including all sources whose emissions significantly impact the target reductions. The system will capture about 90 percent of the total point source emissions of VOCs in the Chicago metro area by requiring any business with a Title V permit to participate if their emissions exceed 10 tons per season. An estimated 244 individual sources emitting 12,500 tons of VOC emissions per season and representing 28 different industrial categories, including printers, food processors, can coaters, oil refineries and chemical companies will be required to participate.

Third, the system must have as much flexibility as possible.

Stakeholders told us repeatedly that governmental review and/or approval of specific trading transactions would severely hamper performance of the system.

Consequently, this "cap and trade" program does not require regulatory review or approval of specific transactions because of the nature of the trading units in the market. All have been created upfront and do not require validation during the transaction process.

The system also includes a secondary source of allotments called the Alternative Compliance Market Account in response to industry concerns that adequate allotments would be available for purchase. This account in effect provides a "safety net." One percent of each source's baseline will go into this account and would come out of the 12 percent reduction. In addition, 20 percent of allotments held by sources that have shut down will go into the account, as well as any voluntary contributions. Anyone may purchase the allotments from this account at a price of $10,000 per ton or a level tied to a multiple of the average market price.

We also allow for banking of unused emission trading units as an incentive for sources to make early reductions. This approach also enables sources to plan ahead and cope with year to year fluctuations in operations. However, unlike in the Acid Rain program where allowances have an unlimited lifetime, in the Illinois VOC program, the lifetime of the trading units is limited to two years. We have done this to reduce the potential for "emission spikes" or exceedences of the total budget.

We have also built in exemptions for sources who wish to make deeper reductions without participating in the trading program or for sources who have already installed the maximum level of feasible controls.

In another unique measure of flexibility, the Emissions Reduction Market System also includes the potential for inter-sector trading. Companies could reduce their costs of meeting VOC reduction targets by purchasing and scrapping vehicles resulting in an equivalent tonnage reduction. Based on Illinois EPA's experience from a prototype "Cash for Clunkers" program in partnership with General Motors and the Environmental Defense Fund, a full-scale program that scraps approximately 5,000 vehicles would cost less than $2,500 per ton for VOC reductions.

Fourth, the Illinois EPA design team wanted to make sure our VOC trading system had the confidence of investors and participants. Many sources subject to the VOC Emission Reduction Market System were concerned about the availability of trading units and relevant price information. The Acid Rain program uses an annual auction as one mechanism to ensure a supply of allowances on the market and as an indicator of the market price for allowances. The VOC sources in the Chicago area felt that our Alternative Market Compliance Account could serve as sufficient insurance that there will be trading units available for purchase. Therefore, an official auction was unnecessary. To provide additional information on the price of trading units, the Illinois EPA agreed to post and update average price information on our trading system electronic bulletin board.

Fifth, in order for the system to ensure the underlying goal of reducing pollutants, there must be consequences for not complying or delaying implementation of the VOC reduction targets. Therefore, we have included a series of checks and balances to make sure the fundamental interests of all stakeholders, including the public welfare, are protected.

Participating sources will be required to provide actual VOC emissions data for the allotment period as well as data on its emissions transactions. If it is determined a source does not have sufficient allotments to cover its emissions, they must be made up from the set-aside account or from the following year's allotment. Sources that exceed their allotments will have to pay a penalty through purchasing an additional 20 to 50 percent more trading units or making the equivalent emission reductions.. This feature provides both an economic disincentive for noncompliance and maintains the integrity of the environmental goal. Finally, the Agency will conduct an Annual Performance Review of all aspects of the market system to evaluate its impact in producing emission reduction benefits.

Last, but certainly not least, the program must have the potential for significant savings. Using accepted U.S. EPA methodology for estimated control costs by industrial category, Illinois EPA projected industries in the Chicago faced additional costs of $700 per ton to more than $18,000 per ton to further reduce VOC emissions. Although we will not know the price of the allotments until the market actually starts operating, an educated guess based on accepted forecasting methods is they will sell for less than $3,000 per ton.

Our analysis also indicated that imposing California-level strict controls on the Chicago metro area would require industries to spend up to $20.9 million to get only about 50 percent of the reductions we will achieve under our system at a projected cost of only $3.2 million. The analysis also estimated the trading program will result in an areawide gross regional product savings of $34 million and personal income savings of $22 million over an eight year period.

The savings or benefit to individual sources, will of course, vary significantly. We looked at the potential for trading among several specific VOC sources in the Chicago metro area. The trading program will provide an economic benefit to both industries with relatively high costs for increased VOC reductions and those that can meet the target at relatively low cost but can then generate excess credits to sell. For example, a rubber and plastic facility has ozone season emissions of 30.2 tons of VOCs. To meet the 12 percent reduction requirement on its own, the facility determined it would need to install a thermal oxidizer at an annual cost of $279,300. But with the new trading system, it can instead purchase 3.6 tons (the 12 percent reduction) of allotments at a price ranging up to $10,000 per ton. That would result in at least $243,300 in potential cost savings

Among witnesses appearing before the Illinois Pollution Control Board in support of the VOC trading program was Steve Ziesmann of Abbott Laboratories, who also served on our design team. Mr. Ziesmann noted that because Abbott has multiple VOC discharge sources in the Chicago metro area, having to reduce emissions at each site by 12 percent would cost between $15 and $20 million. Using the market-based trading system, Abbott will be able to achieve the overall 12 percent target by higher reductions at some of the sites, with a total cost of between $2 and $4 million.

"The cost to Abbott, and to society, of achieving the same level of emission reductions under ERMS will be much less than what it may have been under a traditional 'command and control' regime," Mr. Ziesmann testified.

LESSONS AND CONCLUSION

It is our expectation that a VOC trading program in Illinois will work dramatically better than if we continued to rely only on a traditional command and control approach. While do not yet have the system in place, from the lessons from other market systems and from our partnership with business and the environmental community over the past four years, we are confident this is the right direction.

Our past efforts at command and control regulation led to years of litigation, mistrust between the business community and our Agency and the imposition by court order of a federal implementation plan, but not attainment of the federal ozone standard. Continuing down that road would only severely hamper the Illinois economy and not necessarily obtain cleaner air.

The Illinois Emissions Reduction Market System does not pit jobs against clean air but instead gives companies a powerful market incentive for innovation. By opening up a range of cost-effective choices, it is our hope industry will be spurred to go beyond complying with regulations geared to the "least common denominator." Free from one-size-fits-all bureaucratically prescribed technologies and control strategies, business will be able to make business decisions that are also good for the environment and the public health. Illinois is bullish about market-based solutions to achieving pollution reductions. We have high hopes for this system. It can not afford to fail and it will not fail. #



EMISSIONS TRADING: PRACTICAL LESSONS FROM EXPERIENCE*

Testimony of

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Before the

Joint Economic Committee

U.S. House of Representatives
U.S. Senate

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INTRODUCTION

My name is Daniel J. Dudek and I am a senior economist with the Environmental Defense Fund, a national not-for-profit environmental organization with over 300,000 members. EDF's mission is to solve environmental problems by combining science, law, and economics. EDF, among all environmental organizations, has particularly focused on the development of market-based policies. I am here today to testify as an unabashed advocate of market-based environmental policies. EDF believes such policy tools:

- increase environmental effectiveness
- reduce compliance costs
- create financial rewards for environmental performance
- tap existing on-site expertise in the search for new solutions
- create incentives for new technologies, processes, and environmental management.

We believe that the nation has accumulated significant experience with several forms of market-based environmental policies, particularly that class of market tools known as emissions trading. Emissions trading was initially implemented in the late 70's to address concerns about rigid Clean Air Act compliance deadlines and the need to encourage local economic growth for employment. Since that time, emissions trading and banking has been applied to heavy duty engine nitrogen oxide and particulate emissions, the lead phase down in gasoline by refiners, the reduction of production of stratospheric ozone destroying chlorofluorocarbons, cutting acid rain, retiring high emitting vehicles, creating incentives for alternative vehicle fuels, and for the reduction of pollution discharges to rivers and lakes.

Conceptually, emissions trading is quite simple, no more complex than addition and subtraction. In fact, EDF has frequently analogized the acid rain program to the opening and management of a checkbook. Within a category of sources each of which has an emissions limitation requirement, any one source may reduce its emissions more than required and find its emissions below its emissions limitation. That source in effect can transfer or assign the extra increment of emissions reduction to a second source; the second source can emit above its required limitation up to the amount of the first source's extra reductions and both sources' combined emissions still equal the same quantity that would have been emitted had both been emitting at their initial required levels. The key is defining what constitutes an extra reduction and quantifying it. The key to the success of these programs has been empowering business to determine the most effective strategy to produce pollution reductions.

During the '80's emissions trading initiatives created a mixed record, at best. Since emissions trading was grafted onto existing command-and-control programs which suffered basic flaws, it often had the effect of amplifying those flaws. As a result, many

environmentalists worried that including emissions trading in programs that did not control total pollution well in the first place would only aggravate existing command-and-control programs' considerable barriers to achieving the intended levels of emissions reductions (Hinds, 1996). At the same time, the inherent difficulty of converting command-and-control requirements into tradable emissions reductions made transactions cumbersome and costly. However mixed, these experiences provided invaluable learning for the development of more market-oriented emissions trading programs.

With the enactment of the acid rain emissions trading program in the Clean Air Act Amendments of 1990, this decade has seen a steady expansion of emissions trading programs that have brought, or are poised to bring, exactly the benefits the original proponents of emissions trading promised. For the most part, these programs have succeeded by integrating the design of businesses' compliance requirements with the design of the emissions trading tool. In many cases, this design integration has forged a new paradigm for pollution control that offers superior environmental performance, lower cost and a ramping back of otherwise intrusive relationships between regulators and business.

If one of the often debilitating flaws of command-and-control programs was their failure to make any party accountable for achieving specific levels of reductions in actual emissions, and if, for this reason, such programs made emissions trading environmentally risky and economically cumbersome, then the distinctive genius of the acid rain program's design -- which has been instrumental in encouraging the widened use of emissions trading in the past several years -- was in taking these problems on directly.

In so doing, the acid rain program introduced the paradigm-shifting notion of making sources explicitly obligated for meeting a limitation on their actual emissions. This has the effect of guaranteeing that the intended emissions reductions in fact will be achieved and of capping total emissions at the aggregate reduction level. To the great benefit of emissions trading, this approach also means that any emissions reductions below a source's required emissions limitation level are, by definition, surplus and therefore tradable. As a result, sources can create, bank, sell and/or buy, the tradable emissions reduction currency without the need of regulatory intervention with respect to any transaction. Uncertainty and overall transactions costs which dominated emissions trading in the 1980's are radically reduced, if not eliminated.

All of this is made especially easy and understandable by the mechanics of the acid rain program. Every year, the EPA allocates a fixed total of marketable permits, called emissions allowances, to the group of sources with emissions limitations. These allocations were explicitly established by Congress as an integral part of the Clean Air Act Amendments of 1990. In fact, the distribution of these allowances to affected sources was key to reducing industry's opposition to the program and ameliorating impacts among states. Sources can buy, sell or bank these allowances however they wish provided that at the end of each year each source holds allowances equal in number to its actual emissions. As a result, even the regulator's role is fundamentally streamlined.

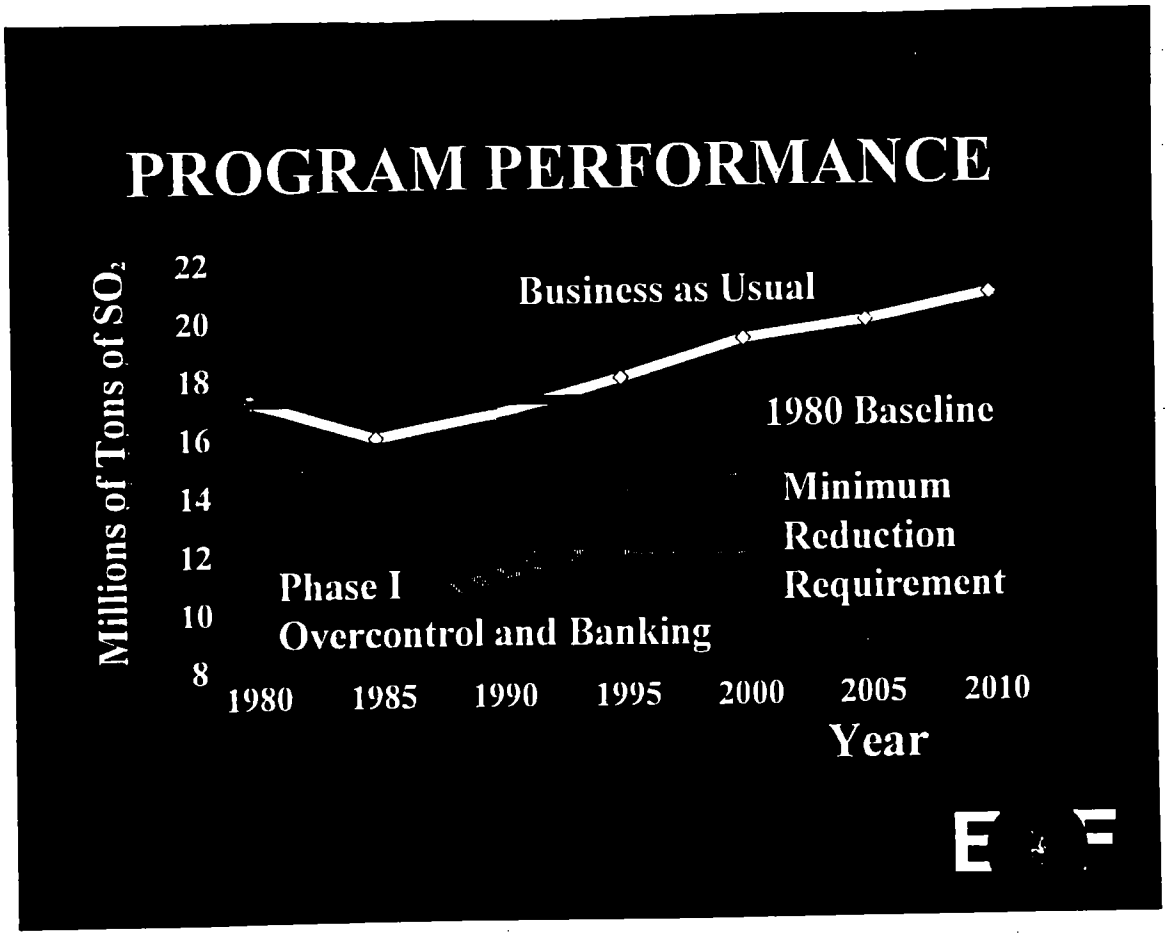
Aside from its many inherent virtues, the acid rain program has provided an instant textbook example of how emissions trading can work and how the problems associated with emissions trading in the past can be escaped or solved. Congress' work in designing the program restored both environmental and economic credibility to the concept of emissions trading and offered a variety of environmental policy-makers and interested parties teaching-by-example. It is in response to this teaching, that environmental regulators from Southern California to the Northeast have developed and deployed emissions trading to combat air pollution throughout this decade.

ENVIRONMENTAL BENEFITS OF EMISSIONS TRADING

EDF had long been convinced of the importance of integrating environmental programs into economic decision-making. Put simply, the vast bulk of the money spent on environmental problems comes from the private sector. Given our market economy's ability to grind down costs through competition and innovation, why shouldn't we harness entrepreneurial energy in solving pollution problems? If we did, we would have more investment choices, new products and markets, fewer resources spent, and, perhaps most important for the environment, more progress faster. However, for many years, EDF was largely alone in this belief. Emissions trading was and is controversial even in the Environmental Protection Agency. It took the spectacular results of the acid rain allowance trading program to demonstrate the power of market forces to produce environmental benefits.

Enhanced Environmental Performance from Early Reductions and Banking

As the figure below indicates, one of the most dramatic results from the Clean Air Act acid rain program has been the degree of overcontrol, i.e. the number of extra reductions that utility sources have made in response to the opportunity to produce and "bank" extra reductions for future use. In 1995, the first year of the program, utility emissions were 39% below allowable levels and in 1996, the program's second year, they were 35% below allowable emission levels (EPA, 1997). This is 3.44 and 2.86 million tons respectively. What other environmental program can show such dramatic performance in so short a time? This performance is especially salient when viewed from the perspective of the environmental problem we are attempting to solve.



In part, acid rain as it affects ecosystems is a cumulative emissions problem which acts over time to leach the buffering capacities from the soils sustaining forests and surrounding lakes. As this buffering capacity is depleted, the process of lake acidification and forest decline are accelerated. By reducing emissions sooner rather than later, the program provides relief to these acid-stressed ecosystems exactly when they need it most. In economist's terms, the marginal benefits, i.e. avoided damages, associated with these extra reductions are highest when we first begin to reduce emission levels. The typical command-and-control regulatory program, on the other hand, phases reductions in slowly and provides no motivation for companies to reduce any more than they are required by the regulation.

In effect, emissions trading turns traditional environmental incentives on their head. Companies are challenged and rewarded by a flexible compliance program and market opportunities to go beyond government minimums. Environmental management becomes part of the strategic business plan.

Recently, EDF was able to participate directly with a company in which this very dynamic was unfolding. On May 14, EDF and British Petroleum struck an agreement to design a greenhouse gas emissions trading program and to test design options with demonstration transactions (Los Angeles Times, 1997). BP's action reflects exactly this strategic understanding, an understanding engendered whenever markets for emissions

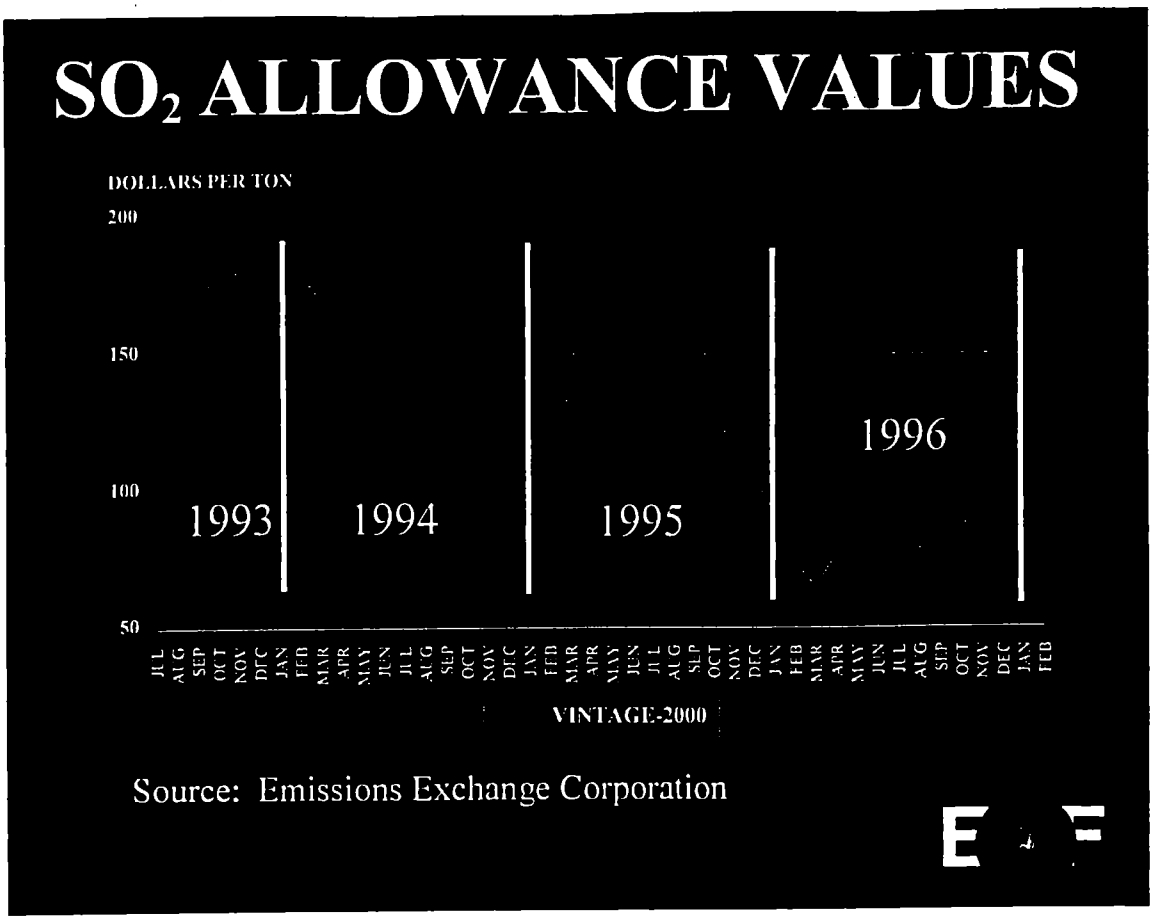
reductions are created. Furthermore, it reflects another critical change induced by the spread of the emissions trading paradigm – the switch from reactive to proactive policy involvement by business.

Reduced Program Costs and Higher levels of Environmental Protection

In addition to accelerating emissions reductions and realigning the incentives of private firms, emissions trading programs, especially those exemplified by the acid rain program, bring other environmental benefits. The simple notion that making sources explicitly accountable for their actual emissions can simultaneously serve as the cornerstone for an emissions trading system has helped air regulators confronting a variety of pollutants and environmental problems see that they can design programs that impose explicit caps on total emissions and thus ensure achievement of intended emissions reductions. This insight has helped win over many previously skeptical environmentalists and regulators.

However, the ability of well designed cap and trade programs to guarantee emissions reductions and the lowest achievable costs led to another more critical insight – that we could afford more environmental protection if policy makers could be guaranteed that costs would be as low as possible. It was this insight that led President Bush to adopt a 10 million ton reduction in sulfur dioxide emissions for the Administration's acid rain program proposal to Congress, a goal long advocated by environmentalists. Assured of the lowest costs to the economy by the flexible market orientation of the program's design, President Bush was able to eliminate the usual tension between environmental and economic performance.

How has the program performed in economic terms? The chart below shows the unexpected history of allowance prices. The economic models employed to assess the potential costs of compliance with the acid rain program predicted substantially higher costs and allowance values (Ellerman, et al., 1997). This performance is especially dramatic when considered in the context of the Direct Sale Subaccount established under Sec. 416 which sets aside 50,000 tons per year for direct sale at $1500 per ton adjusted by the Consumer Price Index.



Focuses Environmental Resources Efficiently and Stimulates Innovation

Some critics have argued that there is "not enough" trading in the acid rain program. They miss two points. First, the purpose of the acid rain program is not to promote trading.[1] Rather, it is to reduce acid deposition at the lowest cost. All evidence points to the fact that the program is succeeding triumphantly. The allowance values reflected in the figure above are far below the marginal cost of compliance projected for the program when it was enacted.

Second, the allowance-trading market may be effective in reducing costs because it fosters implicit or "latent" emissions trading as well as active trading. Put another way, emissions trading places all compliance options in direct competition with each other. Of course, any program that permits flexibility in compliance choices does this. Because of emissions trading, however, that competition is geometrically expanded in the acid rain program. Different compliance options do not compete with each other only at any one facility. Because emissions trading allows a facility operator to choose to apply a

[1] Nonetheless, trading activity increased in 1994 and has continued in 1996. Trading between distinct entities doubled between 1995 and 1996 from 1.9 million tons in 1995 to 4.4 million tons in 1996 (EPA, 1997). At the same time, it is important to recognize that transfers even between units with the same owner can produced very substantial cost savings when compared with more inflexible regulatory programs. These internal transfer economies are a critical consideration for transboundary pollution problems such as acid rain, ozone, and greenhouse gases.

compliance option at its own site or, in effect, at any other affected facility that can make surplus allowances available, the facility operator's range of choices are much broader, the competition among them much more intense, and the capacity of that competition to lower costs much, much greater.

BASIC MARKET REQUIREMENTS

To date, the dramatic spread of emissions trading in the 1990's has been carried by three programs that were more or less patterned on the acid rain "cap and allowance" or "cap and trade" model. The Northeast states' Ozone Transport Commission (OTC) adopted a nearly identical system for controlling oxides of nitrogen (NOx) in the 12-state region as an important measure for reaching the groundlevel ozone standard in cities throughout the region. In Los Angeles, the South Coast Air Quality Management District adopted a similar cap and trade program to reduce NOx and sulfur dioxide emissions in the L.A. basin. Finally, the Illinois Environmental Protection Agency (IEPA) developed a cap and trade program for reducing volatile organic compounds in Chicago.[2]

EDF participated in the "design team" effort convened by the IEPA. Initially, the design team assumed that the characteristics of VOC emissions, their atmospheric behavior in ozone formation and difficulties quantifying them militated against the use of a cap and trade approach. In trying to develop an emissions trading design that ensured environmental integrity and economic viability, however, the design team discovered the superior features of a cap and trade program actually made it easier to address these issues. In contrast, it was alternative designs that did not include caps or that did not proceed from the cornerstone of defining compliance in terms of actual emissions that proved to be the least likely to achieve success.

On the basis of this experience, as well as on its participation in the OTC's design efforts for its NOx program, EDF has concluded that cap and trade programs should be the template of first resort that policy-makers use when designing air pollution programs. To be sure, there are a variety of models and approaches to emissions trading that policy-makers can use in designing specific programs. None has the inherent environmental and economic advantages of the cap and trade model. As a result, in EDF's view, the variety of emissions trading models should be understood to occupy a hierarchy at whose top is the cap and trade approach. For this reason, in assessing alternatives, program designers should begin by determining whether the cap and trade model can be applied to managing the pollutant(s) for which they may be creating a program. Only if they conclude that such an approach is impracticable, should they examine alternative tools.

In fact, notwithstanding its strong preference for cap-based programs, EDF itself has advocated for the use of emissions trading approaches that do not follow the cap and trade template in a number or circumstances, particularly in its work on emissions and emissions trading in the mobile source sector (EDF and GM, 1992). Such approaches are

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[2] Illinois uses the term "volatile organic materials" or VOM to describe its program.

demanded for sources that cannot be subject to a total emissions cap or are not being subject to mandatory regulation. Even sources with these characteristics, however, can play a beneficial role in an emissions trading program, just as emissions trading can dramatically improve the performance of programs for controlling emissions from these sources. In fact, the market forces unleashed by cap and trade programs can be focused on the search for untraditional, but cost-effective emissions reductions such as accelerated vehicle retirement.

In working with such programs, EDF has concluded that a second maxim, of equal importance to the ultimate preference for cap and trade models, should guide the work of policy designers: in fashioning emissions trading programs, regulators must develop program features that are highly specific to the pollutants being managed and the environmental problem being addressed. Attempts to promulgate generic emissions trading rules that purport to be applicable to a variety of sources or a range of programs almost inevitably will result in failure. One need only look at the U.S. EPA's ill-fated proposal in 1995 of an Open Market Trading Rule (OMTR) for a demonstration of the importance of this maxim.

EDF was deeply critical of the OMTR and vigorously opposed its final promulgation. To be sure, we offered the agency detailed criticism of a number of its features. In our view, however, its flaws stemmed from the fact that EPA had set itself an impossible task in attempting to propound a rule with generic application. For example, in its attempt to craft the OMTR for use across the full range of existing command-and-control programs, the EPA was unable to fashion a method for establishing that emissions reductions were surplus and tradable in a way that both guaranteed the environmental integrity of the underlying emissions control program while ensuring that open market trading was economically practical. More critically, the EPA failed to provide guidance for the integration of this proposed program with existing emission reduction credit trading programs or with emerging state-based cap and trade programs.

From EDF's perspective, there is no reason to reject open market trading out of hand. Instead, open market trading must be understood to sit far below cap and trade approaches on the emissions trading hierarchy and the application of open market trading should be attempted, as is the case of all trading approaches, only when it can be carefully integrated into the overall design of a specific emissions control program.

However great the superiority of cap and trade programs relative to other trading approaches, even cap and trade is not a magic bullet. The importance of fashioning emissions trading programs by integrating them into overall pollution management programs cannot be overstated.

In crafting pollution control programs, policy designers must pay attention to several fundamentals, however, if their efforts are to succeed:

1. Environmental integrity is paramount. A pollution control program is virtually certain to fail if sources are permitted to trade emissions reductions that are not truly surplus relative to the emissions limitation target of the overall program or, at least, of the category of sources being regulated. The cap and trade approach succeeds because it makes traded reductions surplus virtually by definition. The open market approach, in contrast, must struggle to assure that traded reductions are surplus.

It is imperative for the success of emissions trading programs that the clear and unequivocal message be sent that emissions trades are fully equivalent as compliance options to on-site controls.[3] The performance of most emissions trading markets has been characterized by significant sources of supply, but effective demand has been much slower to develop. Frequently, this pattern has been due to regulatory uncertainty introduced by either environmental or economic regulators. In this regard, public education is a key component to success. Critics can easily misrepresent emissions trading as "selling licenses to pollute". Demonstration transactions, preferably with environmental partners, are an important tool in allaying suspicion about the environmental effectiveness of such programs.[4]

2. Market fundamentals apply to emissions trading markets. An insufficient number of participants will doom an emissions trading market. For example, the U.S. established an production quota trading system to implement the Montreal Protocol and eliminate chloroflourocarbons, which deplete stratospheric ozone. Because there were so few producers, the quota-trading market saw little, if any, activity. Similarly, an early water effluent trading program was established by the state of Wisconsin to reduce pollution in the Fox river. The program was designed, however, in a way that featured extensive regulatory oversight of transactions. As a result, anticipated uncertainty and high transactions costs inhibited participation.

3. High transactions costs may be good for brokers and other intermediaries, but not for buyers and sellers. The design of the acid rain program was highly conducive to minimizing transactions costs: regulatory approval was eliminated and transparency was maximized. Critics have repeated the mantra that there is "not enough trading".[5] These have tended to be market intermediaries, who have missed the point – the program's

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[3] Of course, the pollution controlled whether through on-site controls or emissions trades must meet all applicable health-based limitations such as the National Ambient Air Quality Standards.

[4] For example, in 1992, the Illinois Environmental Protection Agency sponsored a 200 vehicle test of the EDF-GM design for retiring high emitting vehicles. The rigorous nature of this demonstration helped to convince the US EPA that this program design was sound. Ultimately, the design has been incorporated into the set of Economic Incentive Programs offered to states for use in meeting the ambient air quality standards established under Title I. California has recently developed a 70,000 car per year program.

[5] Transactions costs include the costs for search, negotiation, approval, monitoring, enforcement, and insurance. To the extent that the legal regime prevents these costs from being reduced, their existence will reduce the number of transactions and increase overall program costs. For a more complete discussion see Stavins (1993). Dudek and Wiener warn that "regulators wishing to reduce compliance costs using these tools need to design them (and their supporting institutional infrastructure) with a view to managing transaction costs or risk not achieving the primary benefits that they offer in the first place" (1996, p. 6).

purpose is to achieve the required reductions at the lowest cost, regardless of how much or little work or profit there is for brokers. Indeed, those firms, like Cantor Fitzgerald, whose low-cost intermediary services have been specifically designed to streamline transactions costs have done the best at surviving, while those that sought to emphasize their own role have left the market. A key institutional innovation was establishing the legal ability for any person to own or hold such allowances. This has allowed options, swaps, forward and futures contracts to be developed.[6]

In contrast, the OMTR seemed to be designed to maximize uncertainty and related transactions costs. While the proposed rule suggested that emissions trading brokers could provide the tools for hedging or absorbing those costs for buyers and sellers, it would appear that brokers would have to play a featured role – and charge the market accordingly.

4. Banking has important environmental and economic benefits, but must be carefully designed. If sources can keep excess emissions reductions in one year and use them in future years, then an emissions trading system gives them an incentive to make additional surplus reductions early. In virtually every case, early reductions yield additional environmental benefits, as exemplified by acid rain. At the same time, banking can be critical to market formation. In the early years of many markets, potential supply-side investors may have reason to doubt whether demand exists for extra emissions reductions they may create. If they know, however, that reductions made even in the early years of a program can be used in later years, when the market can be expected to mature, the value of that expectation will justify making early reductions. In many cases, investments in early reductions involve investments in aggressive and innovative control technologies, thus helping to stimulate the deployment of environmental innovation.

Of course, for many environmental problems, acute exposure to pollutants is more serious than cumulative exposure. In these cases, later emissions increases are not *environmentally* offset by earlier excess reductions. It falls to program designers then to find approaches to balance the benefits of banking with its potential problems. For example, the designers of the OTC's NOx cap and trade program permitted unlimited banking but included a "flow control" requirement limiting the use of banked emissions reductions in certain circumstances.[7] The designers of the IEPA VOC program, in

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[6] EDF participated in the development of an interpollutant emissions swap. In this case, 25,000 tons of SO_2 allowances from Arizona Public Service were exchanged for 1.75 million tons of CO_2 reductions from Niagara Mohawk Power Corporation.

[7] This provision illustrates the importance of designing the emissions trading market in conformity with the underlying environmental problem. In particular, NOx trading programs are intended to control ozone precursors which tend to have greater environmental impact during hot weather. These same weather patterns induce increased demand for electricity which results in increased NOx emissions from the increased combustion. In the absence of some feedback on NOx emission reductions bank withdrawals, the potential would exist for trading to exacerbate the environmental problem.

contrast, included a device to limit, ultimately, the number of emissions reductions that could be banked.

5. Regulators cannot be market-makers, but they can give markets the tools to build the institutions to facilitate market activity. A key to markets, of course, is information. Program designers can ensure this by maintaining a transparent system for accounting for sources' emissions and tracking trades. In addition, auctioning a small portion of emissions credits or allowances can jump-start price discovery.[8] Of course, private intermediaries are instrumental to facilitating market activity. For this reason, emissions trading markets should be designed to let any person, not just sources, hold and transact allowances or credits.

PRESENT POLICY NEEDS AND PRIORITIES

The practical experience with emissions trading is significant and growing. However, some real barriers to the realization of its full potential remain. First, not enough has been to educate the public about the importance of these environmental reforms. They have reduced costs and provided more environmental protection sooner. This is the kind of good news that is all too rare in environmental policy making. This good news needs to be shared with our colleagues and trading partners throughout the world as well. As we review our experience with the Commission on Environmental Cooperation established under the North American free Trade Agreement, we should extend NAFTA's mandate to free trade in environmental commodities.[9] NAFTA is an excellent laboratory for the extension of emissions trading outside the U.S. Our trading partners among the OECD nations need to understand more of the positive experience with emissions trading in the U.S. At the present time, negotiations aimed at the development of a market-based international protocol for the control of greenhouse gas emissions is threatened by misunderstanding of emissions trading (Dudek and Goffman, 1997).

Secondly, the remaining artifacts of the old command-and-control system continue to inhibit effective application of emissions trading. Nowhere is this more evident than in the difficulties of cooperatively managing interstate flows of ozone and its precursors. Last year, EDF was involved in the first interstate emissions trade of NOx emissions reduction credits. The trade was between facilities of two companies straddling the borders of New Jersey and Pennsylvania. Most aspects of the negotiations between the two companies involved were a relatively straightforward business transaction. However, the negotiations between the two states and the two regional EPA

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[8] Ellerman, et al (1997) note the importance of the SO2 allowance auction in price discovery and in the ultimate emergence of a smoothly functioning market. The auction provisions in the legislation could have been strengthened through provision of a sunset mechanism geared to the emergence of private alternatives for example. This approach was followed in the design of the Illinois VOM trading program.

[9] EDF has established a program in the El Paso-Juarez region to build an institutional capacity and experience with cross-border emissions trading. Closer cooperation with Canada in the control of SO2 emissions as well as ozone precursors offers positive economic opportunities.

offices were protracted. Since such a transaction had never before been consummated, each state had to under the other's program in order to adjust for the transfer. In the end, the resolution of critical details concerning emissions inventories had to be punted to the US EPA since the strategies each state was pursuing differed so radically. These differences existed and persisted despite the fact that each state program was developed under the US EPA's Final Emissions Trading Guidance of 1986. We will continue to have high compliance costs and poor environmental protection if we don't address these key interstate comparability issues.

Lastly, we need to extend the development of emissions trading both in the emissions and sources covered. EDF's strategic vision is of a complete set of environmental commodity markets as companions to the normal markets for goods and services. This comprehensive approach would extend the environmental and economic effectiveness of these programs more widely throughout the economy. Emissions trading programs have been very effective in controlling costs for producers. They have also acted to reveal and identify and bring to market emissions reductions options not previously contemplated by regulators. The remaining challenge is how to tap consumer energy to amplify the economic rewards to producers' environmental decision making. Creating market incentives for companies to reveal the emissions consequences of their products in competition for consumer purchases, for example in the case of energy or vehicles, would be a significant step to creating markets for environmental commodities that engaged all Americans.

REFERENCES

Dudek, Daniel J., Joseph Goffman, Dean Drake, and Tom Walton, "Mobile Emission Reduction Crediting: A Clean Air Act Economic Incentive Policy Proposal for Retiring High-Emitting Vehicles", Environmental Defense Fund and General Motors Corporation, October 1992, 18 pp.

Dudek, Daniel J. and Jonathan Baert Wiener, "Joint Implementation, Transaction Costs, and Climate Change", Organization for Economic Cooperation and Development, OCDE/GD(96)173, Paris, 1996, 69 pp.

Dudek, Daniel J. and Joseph Goffman, "Emissions Budgets: Building an Effective International Greenhouse Gas Control System", Environmental Defense Fund, February 1997, 32 pp.

Ellerman, A. Denny, Richard Schmalensee, Paul L. Joskow, Juan Pablo Montero, and Elizabeth Bailey, "Sulphur Dioxide Emissions Trading Under Title IV of the 1990 Clean Air Act Amendments: Evaluation of Compliance Costs and Allowance Market Performance", Center for Energy and Environmental Policy Research, Massachusetts Institute of Technology, Cambridge, MA, Draft May 1997.

Emissions Exchange Corporation, "SO_2 Allowance Values", 8101 W. Flamingo Road, Las Vegas, Nevada, 1997.

Hinds, Michael deCourcy, "Environmental Protection: A Challenge Bigger than All Outdoors", National Issues Forum Institute and Public Agenda, New York, New York, 1996, 29 pp.

Los Angeles Times, "British Petroleum CEO John Browne Delivers Speech on Global Climate Change at Stanford University", Business and Technology Section, Monday, May 19, 1997.

Stavins, Robert N., "Transaction Costs and the Performance of Markets for Pollution Control", Environment and Natural Resources Discussion Paper G-93-02, John F. Kennedy School of Government, Harvard University, Cambridge, MA, May 1993.

U.S. Environmental Protection Agency, 1996 Compliance Report: Acid Rain Program, Office of Air and Radiation, EPA 430-R-97-025, June 1997, 19 pp.

Testimony of
Carlton W. Bartels
Managing Director
Cantor Fitzgerald Environmental Brokerage Services

before

Congress of the United States
The Joint Economic Committee

July 9, 1997

Overview

Q. Do you have any opening comments?

A. Yes, first I would like to thank the Committee for inviting me to come and share my comments and insights regarding the usefulness of market based environmental trading systems. Over the course of my career I have been involved in environmental regulation of utilities from several different perspectives--as a utility planning engineer, as the Director of Regulated Utility Planning for the State of Vermont, as a senior scientist at the Tellus Institute for Resource and Environmental Strategies and, currently, as the Managing Director of Cantor Fitzgerald Environmental Brokerage Services.

Q. What is your direct experience with market based emission programs?

A. My first exposure to market based programs was during my tenure as Senior Scientist at the Tellus Institute. A significant part of my work focused on how best to incorporate environmental impacts into utility resource planning. In that capacity I provided expert testimony on this issue in a variety of jurisdictions.

My analysis of Title IV of the Clean Air Act Amendments of 1990 (the Acid Rain Program) led me to conclude that the tradable emissions system are a highly efficient and effective approach to this contentious problem. Economically, tradable emission rights[1] can readily be incorporated into resource planning and operations promoting economic efficiency. Environmentally, the fixed quantity of emission rights guarantees permanent reductions in the emission of the pollutant from the regulated sources. I would like to emphasis guarantee and permanence compared to other types of environmental regulation.

My enthusiasm for these programs led to my present position at Cantor Fitzgerald. I joined Cantor Fitzgerald in 1992 and created Environmental Brokerage Services (CF-EBS) to service the secondary market for Emission Allowances used in Title IV of the Clean Air Act Amendments of 1990. CF-EBS subsequently has expanded to serve the secondary market for RECLAIM Trading Credits, and the various state programs for Emission reduction Credits. CF-EBS currently has a staff of eight broking all active environmental trading programs in the United States, and the fledgling market for Greenhouse Gas Offsets.

Since establishing CF-EBS, I have been immersed in developing services and programs to extract value from these markets for my clients.

Q. Given your experience, do you believe that market based tradable emission programs are a successful method of implementing environmental policy?

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[1] Tradable emissions rights are used in a variety of existing, and proposed programs. The rights themselves are called various names in the different programs, including: Emissions Allowances, Emission Reduction Credits, Discrete Emission Reductions, etc. Unless specified in my comments, I am referring to tradable emissions rights , in general, and will refer to them in this generic fashion.

A. Absolutely. The interface between economics and environmental responsibility has always been one of the most problematic issues faced in resource planning for electric utilities and other businesses that create significant environmental impacts. Tradable emissions programs address the pertinent public policy issue, i.e., containment of environmental insults, head on, while leaving the marketplace to reveal the path to obtaining that goal.

Different Types of Environmental Programs

Q. Please elaborate on your last point by contrasting tradable emissions programs to other modes of implementing environmental policy.

A. There are three basic types of environmental regulation: Command and Control; Tradable Emission Rights; and Emission Taxes. Each types balances environmental and economic impacts of environmental restrictions using a different economic paradigm.

Command and Control

Command and Control, the traditional approach to environmental regulation n the US, uses a central planning perspective. Command and Control focuses on technology prescribing specifically the environmental control technological approach a business must use comply with the regulation.

The economic penalties of this system are severe. Command and Control is rigid, does not readily adapt to changing economic conditions, and therefor, does not embrace new technological solutions.

In the short-term on an operational level, industry has an extremely limited ability to adjust its compliance strategies to changing business conditions. This can result in both economic and environmental sacrifice.

In the long term on a strategic level, the cast in concrete nature of Command and Control regulations stifles innovation. Entrepreneurs are discouraged from exploring better ways to meet environmental constraints knowing they must not only build a better mouse trap, but before they can sell it, they must also get regulatory approval. The process of getting such approvals is unwieldy, bureaucratic, and fraught with vested interests for maintaining the status quo.

Emissions Taxes

Emission taxes, by contrast, focus on environmental objectives indirectly. Emission taxes offer no direct connection to the level of true emissions. They attempt to control pollution through economic surrogates.

Controlling emissions through taxation can result in an endless game of chasing one's tail. Such taxes are in turn either environmentally ineffective or economically punitive depending on the state of the economy. During strong economic periods, emission taxes are likely to be sufficiently high to constrain excess emissions resulting from increased industrial activity. During weak economic periods, taxes are an unnecessary burden on businesses operating within acceptable emission limits.

Finally, and perhaps most significantly, emission taxes place environmental and economic objectives in diametric opposition. Emission taxes pose the perpetual threat that environmental policy will become hostage to fiscal policy.

Tradable Emission Rights

Tradable emissions programs correctly and directly recognize that the key public policy issue is the containment of a particular environmental insult. Pollution is a reality of today's society. Environmental policy must balance the negative impacts of pollution against the benefits of industrialization. The creation of a limited quantity of tradable emission rights transforms the right to pollute into a scarce resource.[2] This is exactly the way it should be viewed.

[2] Tradable emissions rights generally apply to a particular segment of regulated businesses, and not all of the potential emitters. However, for narrative simplicity I will omit restating this modifier.

By limiting the amount of emissions available to a particular category of regulated businesses, the environmental goals are guaranteed. And most importantly, they are guaranteed through time. Emissions are constrained through the short-term rise and fall of the business cycle and in the long-term as industry reinvents itself.

Economically, today's market economy is well positioned to continually reallocate this scarce resource to the highest valued users ensuring the efficient allocation of this new commodity. In addition, the economic burden on industry is self-regulating. An emissions trading system adjusts the economic burdens in correlation with the economic cycle. During periods of economic slow down the demand for emission rights decreases resulting in a lower prices and costs to industry. During economic expansion, demand increases driving prices up, promoting rational investment strategies in alternative processes that reduce emissions at a time when industry can best afford it.

Successes of Existing Market Based Programs

Q. From a practical view point, what is your overall impression with the actual experience with the implementation of tradable emission programs?

A. Existing programs have been very successful, which is very impressive given the novelty of these early programs. In particular, the success of the Acid Rain Program[3] is widely held. The GAO[4] conservatively estimated that the utility industry will save at minimum of $1.4 billion per year compared to traditional Command and Control regulation.

While I agree that the Acid Rain Program has been highly successful, I have a somewhat different view on the revealed successes and weaknesses of the program than the mainstream interpretations. Some of the criticisms leveled at the program, are really success stories. Conversely, some of the attributed successes I believe reveal modest failures in the programs design.

Q. Please elaborate.

A. The Acid Rain program came under criticism after the program revealed the true cost of emissions reductions to be well below the estimates prevailing at the time the program was being developed. It was argued that the low costs demonstrated that the environmental community had failed to capture sufficient reductions. Others argue the low prices did not result from the use of tradable rights, but rather from the unforeseen impact of railroad regulation.

Both of these interpretations are in error. First, the primary environmental benefit of tradable permit programs is achieved when the cap is established The cost savings resulting from the use of emission allowances (EAs) versus traditional command and control regulation is a very important secondary benefit, as well as the major economic benefit. The operative question from the environmental perspective is whether or not the agreed upon emissions cap is sufficient, not whether it could have been lower simply because the goal was less expensive to achieve than anticipated. The environmental goal was to achieve a specific quantity of emission reductions, not to spend a specific sum of money.

Second, it is interesting that some parties denigrate the value of the tradable rights programs by teasing out the technological basis of the savings. Tradable rights programs in and of themselves do not reduce emissions. Instead, they provide the vehicle that permits the affected parties to seek out and exploit such opportunities.

Q. Isn't the point of that criticism that the saving would have been obtainable through traditional methods without the use of a tradable rights program?

A. Theoretically, the saving would be obtainable under Command and Control; however, we can never know whether or not the saving would have been captured without a tradable program. My guess is that they probable would not have been.

There are several factors underlying this opinion. One is the reluctance by a regulated entity to modify an approved environmental compliance strategy. This is particularly true, if such a modification requires regulatory, or

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[3] Title IV of the Clean Air Act Amendments of 1990.

[4] Air Pollution Allowance Trading Offers an Opportunity to Reduce Emissions at Less Cost; (GAO/RCED-95-30, December 1994).

public, review. The Acid Rain Program grants utilities the right to take advantage of temporary reduction opportunities without lengthy review, and, of equal importance, to revert to their original strategy if conditions change back.

I have an antidote, which illustrates this point. Before the market price of EAs was well established, it was routine to explore a client's cost of emission reductions to determine if they should be buying or selling EAs. One utility fuel trader was reluctant to reveal the cost of emission reductions on his system. Eventually, he revealed that the company was actually saving money buying lower sulfur fuel. This opportunity had been available for some time, so prior to fuel switching the company had been polluting at a loss.

This seemingly illogical behavior was actually quite rational. Under the pre-EA system, if the utility had started to buy lower sulfur fuel, they would have been subject to a de facto downward ratcheting of their allowed emissions. This company was afraid that should the price of low versus higher sulfur fuel should later reverse itself, it would not be politically feasible to increase emissions back to earlier levels. Economically, the added cost of the higher sulfur fuel was the cost to maintain the option to continue emitting at previously allowed levels.

Q. You mentioned earlier that some claims of success for this program you viewed as partial failures. What did you mean?

A The EA program has resulted it a vast over compliance by the affected utilities in the early years of the program. The EPA reports that Phase I affect units over controlled emissions by 6.3 million tons, or 38% below allowable levels.[5] While this is unarguably good for the environment from a Acid Rain abatement standpoint, it reveals one of the weakness of the specific implementation of the Acid Rain Program.

While some early excess reduction was expected, the actual excess reductions were two or three times that anticipated level. For the most part this resulted from investments by utilities in emission reductions, which in retrospect, were not economic efficient.

Part of the blame is attributable to unavoidable vagaries of planning for the future. With regard to the Acid Rain Program, rail deregulation had the unanticipated impact of expanding the economic penetration of low sulfur coal from the Powder River Basin into new markets.

A second factor was the failure of both utilities and their regulators to embrace the freedom offered by the new system. In too many cases, the immediate reaction was to reduce system emissions before without consideration of trading opportunities.

Third, the last minute bifurcation of the program into Phase I and Phase II. This compounded both of the aforementioned faults and contributed an additional dimension. Phase I embraced the 110 'big dirty' utility stations requiring them to enter the tradable EA program in 1995. Phase II embraces all plants beginning in the year 2000. Economies of scale indicate that the biggest emitters are likely to have the lowest average cost of emission reductions. Consequently, they are among the natural sellers. Conversely, the natural EA buyers would be found among the Phase 2 units. The bifurcation of the program inserted a five year separation between the decision making points between the natural buyers and sellers.

Efficient markets rely upon the constant give and take between buyers and sellers. A five year gulf breaks the communication between these groups depriving the potential Phase I sellers of important feedback regarding the value of their reductions; i.e., what the market would pay for those reductions. As a result, the Phase I utilities made large investment decisions based upon early, untested estimates of the value of emission reductions.

Q. Were any of these factors unavoidable?

A. All three of these factors contributed largely to the over investment in reductions. Of them the first case was largely unavoidable. Plans will always be revealed to be better or worse than anticipated in the cold light of the future revealed. If we had perfect foresight we wouldn't need markets, we would have a perfectly efficient centrally planned economy. With markets and planning comes mistakes, and conversely, the occasional windfall.

Corporate cultures will always take time to embrace radically new tools, the adaptation period growing geometrically with the level of regulation. To embrace these new tools utilities had to build consensus both within their company and with their regulators that trading was an appropriate course of action. Often secondary factors weighed into the debate, such as effects on local employment. In addition, both utilities and regulators lack many of the required skill sets to fully recognize and exploit the new opportunities available to them. In the future, this

[5] 1996 Compliance Report Acid Rain Program, (EPA 430-R-97-025, June 1997).

problem will be lessened as new programs embrace players already operating under existing programs due to program overlap; and as new players review the errors of earlier program hopefully avoiding those mistakes. Additionally, new programs will benefit greatly from the existing framework of brokers, traders, and trade organizations developed to service the EA market.

The bifurcation of the program was the only issue which was unavoidable. Future program design should refrain from inserting unavoidable complications into the system. Markets work best; i.e., when they are simplest and unencumbered.

Keep It Simple

Q. Is there a greater lesson to be derived from your last point?

A. Market forces are excellent at anticipating and correcting for uncertainty. However, dealing with this uncertainty inflicts a price on the overall efficiency of the system. Consequently, in the promotion of efficiency, it is best to keep the programs as simple as possible. One important aspect of simplicity is to apply the program uniformly to all participants. Any subdivision of program participants into sub-groups creates different economic impacts among the groups resulting in a different equilibrium price for each group. While markets thrive on exploiting the differences among participants the creation of artificial differentials should be avoided.

The apparently simple act of the Phase I and II bifurcation greatly complicated the implementing regulations, reporting and monitoring. A very large portion of the implementing regulations addressed issues related to the bifurcation, and a large part of the implementation and monitoring ensures that participants do not unduly shift emissions from Phase I to Phase II units.

The resulting complexity of the regulations eventually led to legal challenges of the regulations.

Q. Isn't it important to build in regulations to protect against environmental 'hot spots'?

A. Yes it is, but fortunately most of the protections are already available through existing laws. Each facility is still governed by an individual air emissions permit. If there is a specific need to further control a particular source, it can be done on a case by case basis. This was done at the Navaho coal-fired power station, which was required to reduce its sulfur dioxide emissions below that allowed under the Acid Rain Program to address haze problems at the Grand Canyon.

I would caution that any such adjustments must be made selectively and only after the program has had an opportunity to work. New programs already contain a reassessment period providing a safety net against programmatic failure. If the program is not on track to accomplishing its emission goals, the emissions cap can adjusted downward. Because the reassessment process and time frame is known, and the assessment will be public, the market for those particular emission rights should have an amble opportunity to assimilate the potential for changes to the cap and make adjustments to the price for those rights accordingly.

Q. Isn't it important to build in regulations protect against a party cornering the market?

A. Hypothetically, it might be possible for a party to corner the market. However, in practice it would be very difficult and unlikely to be an attractive investment. First, no party can corner the market without first purchasing the credits in the open market. This would require out bidding the other potential purchasers. Second, as the prices rise due to the speculators activities, it would become attractive for parties not to utilize any credits they already held and to execute emission control strategies instead with the intention of selling their now unneeded credits. The combined effect of these two factors makes it unlikely that a speculator would find the risk reward relationship attractive.

Avoid the Urge to Develop the Market

Q. Does this concept of program simplicity extends to other aspects of the implementation of tradable right programs?

A. Yes it does. In general, the simpler the program the more efficient the market for the commodity can become in its continual reallocation of emissions to the highest value uses. Ironically, one complicating factor can be the attempt of a regulating body to facilitate market development.

When a marketable product is created a support services (e.g., brokers, trade organizations, information providers, etc.) develop in proportion to the economic value of the portion of the product expected to trade. I am directly involved developing these services for tradable emissions rights.

New markets create a tremendous level of anxiety among the market's participants. The level of anxiety is inversely proportionate to the level of their experience with markets. As a result, arguments undoubtedly arise for regulators to create programs or institutions to "encourage" market development. In many cases, such programs create an unanticipated obstacle to the development of an efficient market.

Q. Please explain how a program designed to enhance market development can create such an obstacle.

A. We turn to markets in the belief that overall efficiency is achieved through the constant give and take of parties with different knowledge, ideas and objectives. This applies the sector servicing the market, as well as, the flow of the market good itself. If the government dictates a program or market activity, it is de facto preventing the give and take used by the market to find the best solution. This creates at least two problems.

First, it virtually eliminates the competition among ideas. Potential service providers will not spend the resources to offer alternative solutions. Second, if the injected solution proves to be ill designed, or even slightly off target, corrections are hard to make. Where competitive pressures constantly cause the market service industry to refine its products to better serve market participants, legislated or regulatory programs must be corrected through political, not economic feedback.

Q. Can you offer any examples of how programs were designed to encourage market development proved to be hindrances?

A. Yes. In particular, I point to the annual auction held by the EPA each year as mandated by the Clean Air Act Amendments. Each year the EPA withholds and auctions 2.8% of the allocated emission allowances. The original premise was to ensure that non-utility generators, which did not receive an original allocation, had access to emission allowances at a 'market price'.

The results have proven to be quite different than original expected. Almost none of the auctioned emission allowances have been purchased by the groups that sought these protection. The structure of the auction (i.e., once a year for two vintages only) was not useful service this sector. Instead these parties found they were much better serviced by through unregulated over the counter markets in which they could tailor deals to their specific requirements.

Unfortunately, the auction has proven to be worse than simply superfluous. Because the allowances are auction with no minimum price, bidding naturally starts below the prevailing market price. This depresses prices, and penalizes sellers.

Appropriate Role for Regulators

Q. Does this mean there is no role for government in enhancing market development?

A. Not at all. Government has a vital role in the development of all emission trading market. Without regulation there simply is no market. However, that role should be sharply focused enforcement of the underlying environmental objectives, not on developing the market itself.

Nonetheless, I am certain that political pressures will result in future interventions. In these cases, I would strongly advocate that any such intervention have a short and well defined time limit. Any market "enhancement" programs, e.g., auctions, direct sales, etc., should have a fixed expiration date. Extension of a program after that date should require affirmative action, i.e., a demonstration that the effort is having a positive affect and is worth extending. Such a blue sky provision will help ensure that only worthwhile programs get extended.

Q. What factors should the government effort be focused?

A. It is the government's twin duties to write the rules and enforce them.

Need for Adequate Funding

Q. Are there other important factors in establishing a viable trading program?.

A. As I discussed earlier, the simpler the program the more readily it will be embraced by it participants, and the less opportunity for game playing will exist. An often overlooked aspect of establishing the program is funding. Emission trading programs are heavily loaded with front end costs. Establishing the rules, setting up the reporting and recordation systems, and making initial allocations is time consuming and expensive. These up-front cost will be well repaid by a well functioning program. The EPA estimates that the EA program is responsible for 40% of the reduction resulting from the Clean Air Act Amendments of 1990 while utilizing approximately 2% of the staff and other resources.[6]

Early on, the Acid Rain program suffered from the slow establishment of the Allowance Tracking System. The ATS is the computer database in which all Allowances exist. It is essentially the title system for EAs. The creation of the database was delayed for a year in part due to lack of funding. With millions of dollars involved in a medium size transaction, it is easy to understand why the ability to transfer title of the purchased allowances is important. While the lack of transfer capability did not prevent trading in its entirety, it greatly hampers the development of the most efficient market forms

Need for Strong Enforcement

Q. Please elaborate on you thoughts regarding enforcement.

A. There is no 'natural benefit' for owning a tradable emissions right. Their only value is compliance with the law. Consequently, there must be a fate worse than trading if trading is to succeed. Accordingly, penalties for non-compliance must severe when compared to the costs of trading (including the time and effort to execute the trades). And, just as importantly, penalties must be enforced.

Future Programs

Q: Do you have any observations you would like to make regarding the future of tradable emission programs?

A: Yes. Tradable programs are expanding to embrace more and more types of environmental commodities. In addition to expanding to include new pollutants, I expect the programs will also expand to embrace an ever growing number of emitters in each program. Tradable programs initially encompass the largest emitters, consequently an expansion of the program will absorb lower level emitters. Nonetheless, the total quantity of emissions controlled by the program would grow. For such an expansion to occur the cost of participating in the programs must decrease. This may require a loosening of monitoring standards.

For example, the Acid Rain program has a provision to allow industrial sources to opt-in and join the program. Unfortunately, the cost of the required monitoring equipment is so great as to prohibit all but the largest emitting facilitates from joining the program. As a result, facilities that might otherwise join and clean-up are excluded. This is unfortunate.

To facilitate the next generation of programs, we should loosen monitoring standards, but not enforcement standards This is a natural progression in the development of the emissions trading paradigm. Trading programs already exchanged the certainty that each and every trade is in the public good for the knowledge that the aggregate trading program is in the public good.

I believe the level of monitoring and enforcement can be similarly loosened on the individual entity so that we can embrace an ever greater portion of active polluters. Loosening monitoring may result in the occasional cheat or accidental emitter escaping detection; but the gains from embracing larger population of polluters and getting them to reduce emissions at a lower cost should more than off-set such leakage.

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[6] Looking Back on SO2: What's Good for the Environment is Good for the Market; Melanie Dean and Joe Kruger; to be published in Public Utilities Journal, August 1997.

Trading Greenhouse Gas Emissions and Offsets

Q. What is your opinion of a greenhouse gas trading program?

A. I believe that if the US is going to contain it emissions of greenhouse gases (by reduction and offset), a trading program is by far the best means available. I believe the free market will quickly demonstrate that the is a large quantity of relatively inexpensive greenhouse gas reductions and offsets available domestically, as well as internationally. In fact, I am already marketing a large portfolio of high quality projects at a fraction of the cost below those commonly used when discussing the issue.

Q. Do you believe that an international greenhouse gas trading program is possible?

A. In the long-term yes, but I do not believe it the best way to inaugurate trading. I believe the US could establish a domestic trading program to fulfill any commitment to contain domestic emissions of greenhouse gases. A domestic program could incorporate a cap and trade system, similar to the Acid Rain Program, for the allowable level of emissions, and could also permit the creation of greenhouse gas credits through offsets (e.g., methane abatement, carbon sinks, etc.). Offset credits would be approved by a certifying entity, perhaps similar to that establish for Joint Implementation Projects.

A domestic trading program would result in the establishment of a hard price for greenhouse gas offsets. It is my believe that if hard currency were available for parties selling credits to the US market, an international market would quickly develop. This would likely lead to other countries willing to live by the same rules desiring to join the program . Eventually the for the importation of credits from other countries could be allowed provided they meet a criteria at least as strict that used to certify US offsets as credits.

As with other emission programs, we would soon discover that the cost of the solution was well below our expectations.

Q. Does this conclude you testimony?

A Yes, it does.

Attachment to the
Testimony of Carlton W. Bartels

Carlton W. Bartels, Managing Director
Cantor Fitzgerald Environmental Brokerage Services
Cantor Fitzgerald Power Brokerage Service

Carlton W. Bartels joined Cantor Fitzgerald in 1992 to develop the Environmental Brokerage Services division. Environmental Brokerage Services brings Cantor Fitzgerald's prowess as the world's foremost auctioneer of securities and financial assets to the SO2 emissions allowance market created under the Clean Air Act Amendments of 1992, and the Regional Clean Air Incentives Market (RECLAIM) of the South Coast Air Quality Management District (California). In 1995, Environmental Brokerage Services opened a west coast office becoming the only firm that provides brokerage and consulting services involving all national emissions trading programs and global greenhouse gas offsets trading. Mr. Bartels articles and talks on emission trading have appeared in numerous trade journals and dozens of conference proceedings. He has provided testimony to the U.S. Senate on the implementation of Title IV of the Clean Air Act Amendments of 1990, and was a panelist on the White House Conference on Global Climate Change, Joint Implementation Workshop.

In June 1997, Mr. Bartels opened Power Brokerage Services at Cantor Fitzgerald to service the recently deregulated market for wholesale electricity.

Mr. Bartels came to Cantor Fitzgerald from the Tellus Institute for Resource and Environmental Strategies in Boston where he held the position of Senior Scientist. At Tellus, Mr. Bartels consulted domestically and internationally on energy policy focusing on economic and environmental implications of the electric utility industry. Mr. Bartels' has provided expert testimony and consultation on a wide variety of utility issues including: resource procurement and development; environmental externalizes; tariff policy and design; non-utility generation; utility mergers; and resource valuation.

From 1981 to 1986, Mr. Bartels worked for the Vermont Department of Public Service. In his position as the Director of Regulated Utility Planning, he was responsible for strategic planning of the electric utility industry statewide, including the development of Vermont's Twenty Year Electric Plan, and the negotiation of power supply contracts. From 1979 to 1981, Mr. Bartels worked for Green Mountain Power Corporation as an Energy Planning Engineer.

Mr. Bartels earned a Masters of Business Administration from the University of Vermont in 1985, and a Bachelor of Engineering from the State University of New York at Stony Brook in 1979.

WISCONSIN ELECTRIC SUPPORTS EMISSIONS TRADING

Wisconsin Electric[1] strongly supports market-based emissions reduction strategies. Market-based systems which include the opportunity to trade emissions provide the flexibility for affected parties to utilize technology and innovation to manage the costs of reducing emissions -- benefiting consumers, shareholders and the environment. Only by incorporating good business practice and sound scientific analysis into environmental control can we continue to improve the environment while maintaining a sound, healthy economy.

THE TRADING PROVISIONS OF THE ACID RAIN PROGRAM

Title IV of the Clean Air Act Amendments of 1990 (CAAA) calls for a 10-million-ton reduction in utility sulfur dioxide (SO2) emissions when fully implemented. Under old regulatory schemes, this reduction would have been achieved through command-and-control regulation. In other words, regulators would have determined a specific, inflexible emission limit for a plant or unit, or specified what technology to install to reduce emissions. Then, regardless of cost, the emission limit would have to be met or the technology installed.

The trading provisions of Title IV of the CAAA introduced the concept and use of a market-based system. Utilities are allocated SO2 emissions "allowances." One emission allowance is equal to one ton of SO2. For each ton of SO2 emitted by a utility, the utility must surrender one allowance. Under the market-based approach, utilities with allocations above its projected emissions could trade, sell or bank the excess allowances. A utility with emissions above its annual allocation of allowances has several choices available. It can install emission reduction technologies, switch to a lower sulfur fuel to meet the allocation target, improve efficiency, employ conservation or purchase allowances in the market to cover its needs.

If a utility chooses to buy allowances for compliance, two factors ensure that the environmental goals are being achieved. First, excess allowances available on the market means that another party has already made the needed emissions reduction, otherwise the

[1] A subsidiary of Wisconsin Energy Corp., Wisconsin Electric provides electricity, natural gas and/or steam service to about 2.3 million people in southeastern Wisconsin (including the Milwaukee area), the Appleton area, the Prairie du Chien area, and in northeastern Wisconsin and Michigan's Upper Peninsula.

allowances would not be available. Therefore, the benefit to the environment has already been achieved. Secondly, all other local, state and federal regulations, such as the National Ambient Air Quality Standards (NAAQS), still apply. No utility or plant can buy so many SO2 allowances as to endanger the local air quality by violating any other applicable standard.

MEASURING THE ACID RAIN PROGRAM'S SUCCESS

The success of the Acid Rain Program is easy to quantify. SO2 emissions in 1995 were 39 percent below allowable emission levels; this was a total of 3.4 million tons of additional reduction.[2] In 1996, SO2 emissions were 35 percent, or 2.89 million tons, below 1996 allocation levels.[3] Utilities achieved excellent results in complying with the continuous emission monitoring requirements, with both exceptional accuracy results and high monitor availability.[4]

Trading activity continued to grow in 1996. A total of 4.4. million allowances changed hands in 1996 in what the EPA defines as economically significant transfers (transfers between economically distinct utility, broker or fuel company.)[5]

Many more trades occurred intra-utility as allowances were traded between unit accounts for compliance. It should be noted that allowances are allocated by EPA to a specific unit. For many owners of multiple units, the most common type of trade is the simple transfer (trade) of allowances between commonly owned units for compliance. Many statistics overlook the quantity of these intra-company trades. Intra-company trading may be the highest volume compliance activity undertaken by a company, and its significance cannot be ignored.

[2] U.S. Environmental Protection Agency, *Acid Rain Program 1995 Compliance Results*, , EPA/430-R-96-012, July 1996.
[3] U.S. Environmental Protection Agency, *Acid Rain Program 1996 Compliance Report*, , EPA/430-R-97-025, June 1997.
[4] Ibid.
[5] Ibid.

WISCONSIN ELECTRIC'S EXPERIENCE

Wisconsin Electric's own experience with the trading provisions of the Acid Rain Program has been very positive. Compliance planning done immediately following passage of the CAAA showed that Wisconsin Electric expected to have a Phase I allocation that exceeded expected emissions by 200,000 to 250,000 allowances over the five years of Phase I (from 1995 through 1999). During Phase II (year 2000 and beyond), the company expects a shortage of approximately 30,000 allowances per year if no action is taken to reduce emissions.

After careful study of emission reduction strategies it was determined that the least-cost compliance methodology for Phase II would be to switch to lower sulfur fuels at several facilities, achieving 10,000- 20,000 tons of total reductions. The balance of the required reduction would be purchased from the market

In order to achieve the total 30,000 ton SO2 reduction on the Wisconsin Electric system alone, absent the market, would have meant the installation of scrubbers on at least two units. Comparing the capital and O&M cost to scrub the two units, to the cost of purchasing the same emissions reduction on the market, there was over a $100 million (in 1995 $'s) savings by pursuing the purchase allowances option.

With such dramatic cost savings available through the market, Wisconsin Electric gradually entered the market as early as 1992 to begin contracting for the sale of the excess Phase I allowances and the purchase of the needed Phase II allowances. Analysis of the market based on projected future allowance costs and internal economic factors (such as the cost of capital and inflation factors), showed that the simultaneous sale and purchase of allowances was the most beneficial to Wisconsin Electric. Other companies with excess Phase I allowances have concluded, using different economic data, that simply banking Phase I allowances for use in later years was the most economically advantageous route to follow. If Wisconsin Electric had chosen to only bank allowances, and not make any other changes, scrubbers would have been required within 5-7 years of the start of Phase I. This made fuel switching and allowance purchase the most viable option when compared to simply banking allowances.

In summary, by choosing the compliance path of fuel switching and allowance purchases for Phase II, Wisconsin Electric has saved its customers over $100 million and deferred the installation of scrubbers for the foreseeable future.

REGULATORY CERTAINTY

For traders in the emissions market to be able to transact business, they need to know that the commodity that they are trading will be here not only today, but tomorrow as well. For example, one concern that has risen is that the highly controversial proposed standard for PM 2.5 could effectively kill the SO2 trading program. The stringency of the proposed PM 2.5 standard could require that all fossil fuel fired utility boilers would need to be scrubbed. If this were to happen, nearly every utility in the US would have an extensive oversupply of SO2 emission allowances. This huge over supply would drive prices to zero, making the SO2 market and the Title IV trading program meaningless. Care must be taken as programs are added to the regulatory scheme to be certain that negative impacts are minimized, especially on programs as successful as Title IV's trading provisions.

APPLICATION TO OTHER MARKETS

The idea of emissions trading as a means of achieving environmental goals at the lowest possible cost is taking hold in markets other than SO2. Title I of the CAAA encourages trading of nitrogen oxides (NOx) and volatile organic compounds (VOCs) as a means of achieving compliance with ambient air quality standards, while Title III opens the door to trading to meet pending requirements for toxic substances.

The Ozone Transport Assessment Group (OTAG) included the use of market-based systems as a means of compliance in the final recommendations from this group to EPA. World leaders are evaluating and negotiating a world-wide market for CO2 emission stabilization/reduction under the Framework Convention for Climate Change. Other smaller regional and state level markets are being developed for other pollutants.

PRACTICAL ADVICE FOR DESIGNING OTHER MARKETS

Simplicity. The Title IV SO2 market is an example in market simplicity. EPA regulations are clear and simple when it comes to recording and processing trades. EPA does not interfere with the market by "approving" trades, they simply record the trade. As long as the party has the allowances on account that they desire to trade, the EPA processes the transaction. This simplicity has kept transaction costs low and helped to create efficiencies that might otherwise not exist. The simplicity of the market has also attracted third parties, such as brokers and independent trading firms. These parties have helped to increase market liquidity. Burdensome regulation that would discourage their participation in new markets and drive costs higher have not been a barrier to entry.

Flexibility. The Acid Rain program allows sources the needed flexibility to choose the desired compliance methodology. Sources can install equipment, reduce usage, or buy allowances, for example, in any combination. The same flexibility should be built into any trading programs for NOx or greenhouse gas emissions. For greenhouse gas emissions this would include the recognition of Joint Implementation projects entered into with non-Annex I nations. Developing nations are the source of some of the most cost-effective greenhouse gas reduction and sequestration projects worldwide. To leave these potential projects out of the picture would be detrimental to the process of achieving greenhouse gas emission reductions at the lowest cost.

For NOx, this may mean allowing inter-sector trading. One example of this would be the ability to scrap older, less-efficient automobiles to achieve the same NOx reduction as otherwise would have had to have been achieved by a utility or industrial boiler on its own.

Certifiable Reductions. The SO2 reductions under the Acid Rain Program are being accomplished with no dispute. Utility emissions are being accurately monitored under the Acid Rain Program through the use of certified continuous emission monitors.

As the debate on greenhouse gas reductions continues at the global level, care must be exercised to ensure that all parties play by a common set of rules. Emission reductions claimed by a party must be real, measurable and certifiable. It would be extremely unfair to the U.S. if we were to closely control and monitor, at great expense, our greenhouse gas

reductions under any potential treaty, only to have another country apply a less stringent standard of measurement or conduct. In a global economy, the playing field must be level to minimize any impacts to the U.S.

Recognition of Early Reductions. Parties that commit to making early, voluntary reductions should not be penalized and should be given full recognition for their efforts. What often occurs is that companies that are ahead of the curve and employ environmental foresight by making voluntary reductions prior to the enactment of regulations, are often penalized by having their early reductions ignored or discounted.

The rationale expressed by some to justify this discounting is that the reductions, should have or would have occurred even without the regulation. Admittedly, some parties only make reductions when faced with pending regulations. However, this ignores that many companies do, in fact, make voluntary reductions to better the environment, and further ignores the issue of capital stock turnover. For example, a company may choose to install a technology at a site early if it thought that pending regulations were likely to require a reduction at a later date. Such a choice would be driven by the fact that most pollution control equipment has a 20-30 year life expectancy. No company wants to install equipment one day, just to replace it a few years later with a new piece of equipment. With rules seemingly always in a state of flux, and new proposals surfacing weekly, this is a real concern to utilities.

Regulation should encourage and recognize emission reductions that are voluntary. After all, the sooner a reduction is made, the sooner we will see the benefit to the environment.

WHAT STEPS CAN HELP THE EXISTING MARKET

Education and Outreach. Public understanding of emissions trading is increasing, but it is still widely misunderstood. Emissions trading is easily sensationalized by the press through the use of provocative headlines over "trading the right to pollute," or claiming that sources that buy emissions have found a "loophole" in the regulations. While these claims help to sell news papers, they do little to build the trust that is needed to expand emissions trading into other sectors. Popular media nearly always overlook the simple fact that SO2

emissions are down dramatically in the first two years of the Acid Rain Program, and costs are far lower through the use of trading than anyone ever predicted they would be. More public outreach is needed as new emission reduction programs, such as the NOx reductions under OTAG, move forward if these programs are to include trading provisions that the public will accept.

To help in this effort, a new industry group, the Emissions Marketing Association (EMA), was formed to promote market-based trading solutions to environmental problems. This group, started by Wisconsin Electric and other key market players, is chartered as an independent, non-profit trade association. EMA currently represents over 60 companies, including several international firms. EMA's mission is to promote the advancement and application of policy and regulation relevant to market-based emissions trading systems; encourage and facilitate information exchange; and provide programs in education and training. Information on the EMA is attached to this testimony.

Trust the Science. The science behind the need for emissions reduction is complex and is evolving as tools are perfected and applied. The OTAG process is a stellar example of this. Never before have the states come together, as they did in the OTAG process, to study the ozone transport phenomenon in such depth. The body of knowledge on ozone transport has been greatly increased, and through rigorous review, there is relative agreement on the inputs and outputs of the process. This sound science provides for the next phase of work in which EPA now must recommend the reductions needed to solve the problem. Subregional efforts are now under way to further refine the science and identify the emission reduction strategies that will result in an improved environment.

CONCLUSIONS

Market-based emissions reduction systems that include emissions trading are an effective tool in our national environmental strategy. While environmental protection is, and should continue to be, a top priority on our national agenda, care must be exercised to ensure that required emission reductions are allowed to take place in the most efficient and economical manner possible.

Emissions trading has already proven its success as a tool for reducing the cost of meeting the strict SO2 emission reduction targets of the CAAA, proving that economic and environmental goals can be achieved efficiently and successfully. Market-based approaches to emission reductions will ensure that, as we proceed into the future, Americans will enjoy both the benefits of lower cost power and a cleaner, healthier environment.

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THE EMISSIONS MARKETING ASSOCIATION

Your complete resource for emissions trading information, education and access

EMA Mission Statement

The mission of the Emissions Marketing Association is to promote market based trading solutions for environmental control and to serve its membership and the public. The Emissions Marketing Association will pursue this mission through the following objectives:

(a) Promote the advancement and application of policy and regulation relevant to market based emission trading systems.

(b) Encourage and facilitate information exchange among members and other professional and technical groups, and the public.

(c) Provide programs in education and training to improve knowledge and skill of members and of the public.

Member Companies

(As of June 1, 1997)

AIG Trading Corp.
Alabama Power Co.
Alcoa
Allegheny Power
Aquila Energy
Arizona Public Service Co.
Associated Electric Cooperative
Atlantic Electric
Automated Credit Exchange
AYP Energy, Inc.
Cantor Fitzgerald - EBS
Cargill
Center for Energy & Environmental Policy Research-MIT
Centerior Energy
Chicago Board of Trade
Cinergy Corp.
Commonwealth Edison
Detroit Edison
Dickstein, Shapiro, Morin & Oshinsky
Duke Power Co.
Edison Electric Institute
Electric Software Products
Emissions Exchange Corp.
Emissions Trading, LLC
Enron Capital & Trade Resources
EPA Acid Rain Division
Euro Brokers
Green Power Corporation (Asia)
Greenhouse Emissions Mgmt Consortium (Canada)
Hoosier Energy REC, Inc.
Koch Industries
LG&E Power Marketing, Inc.
Long Island Lighting Co.
Natural Resources Group
NIPSCO Energy Services, Inc.
Oglethorpe Power Corp.
Ohio Edison Co.
Ontario Hydro
Pacific Gas & Electric
PacifiCorp
PECO Energy Company
Pennsylvania Power & Light Co.
Potomac Electric Power Co.
Power Navigator
Public Service Electric & Gas
Radian International LLC
Rochester Gas & Electric Corp.
Sonnenschein Nath & Rosenthal
Southern Company Services
Springfield City Water, Light & Power
Tennessee Valley Authority
The Pittsburgh & Midway Coal Mining Co.
Trees for the Future
TU Electric
U. S. Generating Co.
Utilicorp Energy Group
Virginia Power
Wisconsin Electric
Wisconsin Power & Light

ema

Frequently Asked Questions...

WHY JOIN THE EMA?

Networking

- Gain better access to traders, brokers and utilities all seeking to buy, sell and trade their emissions
- EMA members trade SO2, CO2 and NOx in the form of allowances, credits, offsets, DER's and ERC's.

Education

- The EMA is committed to bringing you the latest speakers and topics on emissions marketing through frequent conferences.
- The second EMA emissions trading conference will be held October 27-29, 1997, in Phoenix, Arizona. The US Environmental Protection Agency is co-sponsoring this conference.

Information Exchange

- Learn about the Acid Rain program, OTAG, OTC, RECLAIM, green house gas emissions trading and other trading venues.
- Keep up-to-date on developing regional, national and international markets.
- New market opportunities are developing on a regular basis. *Don't be left out!*

Risk Reduction

- Learn how to reduce your risk by integrating market tools such as options, swaps and forwards into your portfolio.

WHAT DOES IT COST?

Individual Membership

- $500.00 annual membership fee.
- Designed for individuals not affiliated with a company or small businesses that have only one representative in the Association.

Corporate Membership:

- $500.00 annual membership fee for the first individual, and $200.00 annual membership fee for the second or subsequent individual (Associate Member) from the same company.
- Designed for holding companies or larger corporations desiring to have more than one individual enjoy the advantages of membership in the EMA.
- Corporate memberships are limited to one voting individual regardless of the number of associate members.

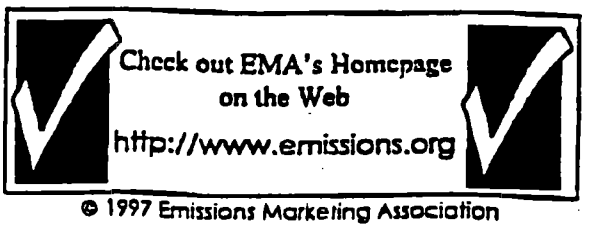
Affiliate Membership

- $125.00 annual membership fee.
- Designed for individuals from qualified nonprofit, governmental and academic institutions only.
- Affiliate members enjoy all Association benefits but do not have voting rights.

NEED MORE INFORMATION?

☎ Call (414) 221-3600 ℻ Fax (414) 221-3899

✉ Write to the EMA at P.O. Box 740, Milwaukee, WI 53201-0740



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INTERNATIONAL EMISSIONS TRADING

The Kyoto Protocol combines ambitious environmental targets with innovative market-based mechanisms to help Parties achieve those targets at the lowest possible cost. Recognizing that the cost of reducing greenhouse gas emissions is many times greater in some countries than in others, the Protocol allows each country with a binding target (an Annex B country) to use "emissions trading" and other flexibility mechanisms to meet their commitments.

How Emissions Trading Would Work

In an emissions trading system, Annex B countries and their authorized private entities will be able to purchase emissions allowances from each other. Each Annex B country's binding target determines how many allowances it has. Countries may buy or sell these emissions allowances at the government-to-government level. Countries may also authorize their legal entities (companies, individuals, NGOs, etc.) to buy and sell emissions allowances. If the cost of controlling emissions is different in two countries, both will benefit if the one facing lower costs sells some of its emissions allowances to the other. The environmental impact of reducing greenhouse gases will be the same no matter where the reductions take place. Thus, emissions trading will allow the overall reduction required by the Kyoto targets to be achieved at a lower total cost, with both buyers and sellers gaining from the savings allowed by trading.

U.S. Experience with Emissions Trading

U.S. experience with domestic emissions trading has been highly successful. The acid rain provisions of the federal Clean Air Act allow electric power plants to trade sulfur dioxide allowances, resulting in an active private market. Emissions are being cut significantly ahead of schedule--over the last three years, emissions have been reduced over 30% more than required--and the cost of emissions reductions has been less than 50% of what was expected.

Benefits of Trading

In order to provide real environmental benefits, a trading system must have mechanisms for verification, reporting and accountability that meet high standards. At the same, the system must be designed to be as efficient as possible to result in cost-effective reductions. Greenhouse gas emissions trading will bring many benefits. It would:

- ***Promote ratification of and global compliance with the Protocol*** by making reductions less costly. Trading will also provide incentives to reduce emissions below target levels;
- ***Cut the cost of reducing greenhouse gases*** by allowing the marketplace to identify the most cost-effective reductions, thereby making efficient use of scarce global resources; and
- ***Quicken the pace at which countries address climate change*** by creating a market for innovative ways to reduce emissions cost-effectively and fostering the rapid development and diffusion of new technologies that reduce emissions.

Next Steps

The rules of an emissions trading system need to be clear and predictable--ensuring the integrity of the process while avoiding restrictions that would burden the market or reduce cost savings. To participate in trading, a country must take on a binding target under the Protocol and meet the high standards of the emissions trading system. The U.S. is working with a number of countries to help establish the necessary measurement and reporting capacity.