D—Personnel Items

[1] D1. Supplements to Contract No. TV-71144A Between TVA and Stemar Corporation, Charlottesville, Virginia, Covering Arrangements for Management Services Related to the Nuclear Power Program.

D2. Supplement to Employee Loan Agreement with Institute of Nuclear Power Operations—Contract No. TV-69552A, Requested by Office of Nuclear Power.

D3. Supplement to Employee Loan Agreement with General Electric Company—Contract No. TV-69197A, Requested by Office of Nuclear Power.

D4. Supplement to Employee Loan Agreement with Westinghouse Electric Corporation—Contract No. TV-69499A, Requested by Office of Nuclear Power.

D5. Supplement to Contract No. TV-68702A with Stone & Webster Engineering Corporation, Requested by Office of Nuclear Power.

D6. Supplement to Contract No. TV-68879A with Stone & Webster Engineering Corporation Covering Arrangements for Services Related to TVA's Nuclear Power Program, Requested by Office of Nuclear Power.

D7. Supplement to Employee Loan Agreement with Management Analysis Company, San Diego, California—Contract No. TV-69288A, Requested by Office of Nuclear Power.

D8. Supplement to Employee Loan Agreement with G. L. Rogers Co., Inc.—Contract No. TV-72270A, Requested by Office of Nuclear Power.

D9. Supplement to Employee Loan Agreement with Bechtel North American Power Corportion—Contract No. TV-69196A, Requested by Office of Nuclear Power.

D10. Supplement to Contract No. TV-71143A Between TVA and Basic Energy Technology Associates, Inc., of Annandale, Virginia, for Services Related to the Nuclear Power Program, Requested by Office of Nuclear Power.

D11. Supplement to Personal Services Contract No. TV-71471A with H. E. Stone, Inc. of San Jose, California, for Assistance in Connection with TVA's Nuclear Power Program, Requested by Office of Nuclear Power.

D12. Supplement to Consulting Contract No. TV-71028A with Aptech Engineering Services, Palo Alto, California, to Provide Consulting Services in Connection with Issues Related to Welding Review Activity at Watts Bar Nuclear Plant, Requested by Office of Nuclear Power.

[1] D13. Supplement to Consulting Contract No. TV-71022A with WPD Associates, Inc. (William P. Derrickson), North Hampton, New Hampshire, Requested by Office of Nuclear Power.

E—Real Property Transactions

E1. Sale of Permanent Easement for Cemetery Purposes to Trustees of Dalton Cemetery, Affecting Approximately 0.14 Acre of Cherokee Reservoir Land in Grainger County, Tennessee—Tract No. XCK-571CE.

E2. Grant of Permanent Easement to the State of Tennessee Department of Transportation for a Road Right-of-Way, Affecting 0.417 Acre of Land in Morgan County, Tennessee—Tract No. XTERA-1H.

E3. Proposed Advertisement and Sale of Permanent Easement for the Construction and Operation of a Commercial Recreation Complex, Affecting 262.8 Acres of Kentucky Reservoir Land, located in Marshall County, Kentucky—Tract No. XGIR-910RE.

E4. Modification of Deed to James C. Martin and Wife, Evia M. Martin, Affecting Approximately 0.06 Acre of Guntersville Reservoir Land in Jackson County, Alabama—Tract No. XGR-37.

E5. Public Auction Sale of Phosphate Mineral Reserve Underlying 600 Acres in Polk County, Florida.

E6. Filing of Condemnation Cases.

F—Unclassified

F1. Supplement to Contract No. TV-69460A with Chattanooga State Technical Community College for Cooperation in a Project to Conduct Job-Search Workshops and Provide for Training, Job Placement, and Relocation Assistance to Dislocated Tennessee Chemical Company Workers in Copper Hill, Tennessee.

F2. Contract No. TV-72499A with United States Department of Agriculture, Soil Conservation Service in Tennessee, for Cooperation in a Project to Reclaim Certain Abandoned Coal and Noncoal Mineral Lands.

F3. Supplement to Subagreement No. 23 to Memorandum of Agreement No. TV-23928A Between TVA and the U.S. Department of the Army, Corps of Engineers, Covering Arrangements for Improvements to Navigation Facilities on the Tennessee River.

F4. Trust Agreement Between TVA Retirement System Board and Mellon Bank, N.A., and Termination of Existing Trustee Agreements.

[1] Items approved by individual Board members. This would give formal ratification to the Board's action.

CONTACT PERSON FOR MORE INFORMATION: Alan Carmichael, Director of Information, or a member of his staff can respond to requests for information about this meeting. Call (615) 632-8000, Knoxville, Tennessee. Information is also available at TVA's Washington Office (202) 245-0101.

Dated: December 9, 1987.

John G. Stewart,

Manager of Policy, Planning and Budget.

[FR Doc. 87-28720 Filed 12-10-87; 11:02 am]

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federal register

Monday
December 14, 1987

Part II

Environmental Protection Agency

40 CFR Part 82
Protection of Stratospheric Ozone; Final Rule and Proposed Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 82

[FRL-3299-9]

Protection of Stratospheric Ozone

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: EPA is requiring that individuals or legal entities involved in the production, import or export of specified ozone-depleting chemicals in 1986 provide information regarding these activities to EPA within 30 days.

To implement the Montreal Protocol, EPA must obtain data on United States 1986 production, imports and exports of the chemicals covered by this agreement. This information is critical because the Montreal Protocol uses 1986 activity as the baseline for its restrictions.

In addition to this request for data, EPA is also publishing today in the **Federal Register** its proposed detailed strategy for implementing the *Montreal Protocol on Substances that Deplete the Ozone Layer* (Montreal Protocol). While EPA is asking for public comment on that proposed strategy, this data collection rule is effective immediately.

EFFECTIVE DATE: December 14, 1987.

FOR FURTHER INFORMATION CONTACT: Stephen Seidel; Stratospheric Protection Program; Office of Program Development (ANR-445); Office of Air and Radiation; 401 M Street, SW., Washington, DC 20460. (202) 382-2878.

SUPPLEMENTARY INFORMATION:

I. Background

On September 16, 1987, the United States and 23 other nations signed the *Montreal Protocol on Substances that Deplete the Ozone Layer* (Montreal Protocol). This agreement sets forth a timetable for reducing specified ozone-depleting chemicals. It represents a significant multilateral response to addressing the health and environmental risks of stratospheric ozone depletion.

The requirements contained in the Montreal Protocol and EPA's proposed plan for implementing them within the United States are discussed in detail in a **Federal Register** notice also published today.

To implement the Montreal Protocol, EPA must obtain data on United States 1986 production, imports and exports of the chemicals covered by this agreement. This information is critical because the Montreal Protocol uses 1986 activity as the baseline for its restrictions.

Although the timing of the effective date of the Montreal Protocol is uncertain (it depends on when the conditions for entry into force are satisfied), it could occur as early as January 1, 1989. The effective date (termed entry into force) would be "January 1, 1989 provided that at least eleven instruments of ratification, acceptance, approval of the Protocol or accession thereto have been deposited by States or regional economic integration organizations representing at least two-thirds of 1986 estimated global consumption of the controlled substances * * *." In addition, *the Vienna Convention for the Protection of the Ozone Layer,* under which this Protocol was negotiated, must also have entered into force before the Protocol can take effect. If these conditions have not been satisfied by January 1, 1989, than the Protocol enters into force on the 90th day following the date on which the conditions have been fulfilled.

Recognizing the potentially short time period before entry into force, the participants at the Diplomatic Conference in Montreal passed a "Resolution on Reporting of Data." This resolution "[C]alls upon all Signatories to take, expeditiously, all steps necessary to acquire data and report on the production, import and export of controlled substances in a complete and timely manner * * *."

To implement this conference resolution, the United Nations Environment Program (UNEP) has already requested production and consumption data from signatories and has tentatively scheduled a meeting for early next year at which signatories to discuss and report on data collection efforts.

II. Statutory Authority

EPA is requiring this information under the authority granted it in Section 114 of the Clean Air Act. This section states that "the Administrator may require any person who owns or operates any emission source or who is subject to any requirement of this Act * * * provide such other information, as he may reasonably require * * *."

EPA has elected to require this information by rule to ensure that all producers, importers and exporters receive notice that this information is being collected. If the Agency instead sent letters to firms believed to be involved in these activities, it might not reach the entire universe of involved parties.

EPA intends to send follow-up requests for information under section 114 to producers of the specified ozone-depleting chemicals asking for more detailed information related to past, current, and future production activity. The information requested in those letters will supplement that required by this rule.

The rule is being published as a final action without first seeking public comment for several reasons. First, the rule is limited in scope and simply requires that information on past specified activities be reported. Second, the information requested is straightforward and clearly delineated. Third, the resources involved in reporting this information should be minimal. Only seven firms are believed to produce the specified ozone-depleting chemicals in the United States, while fewer than 20 firms or individuals are likely to have been importers or exporters in 1986. Fourth, this information is not available through existing channels. While some of the information is available through the U.S. International Trade Commission and the Chemical Manufacturers Association, this data is presented in an aggregate manner and does not cover most of the specified ozone-depleting chemicals. Fifth, as discussed EPA will need this information in a timely manner to respond to UNEP's request and to participate in the upcoming meeting on data collection. For these reasons, EPA finds that notice and public comment on this rule are impracticable, unnecessary and contrary to the public interest within the meaning of 5 U.S.C. section 553(b)(B).

III. Requirements of the Rule

A. Affected Parties

The rule applies only to those parties who produced, imported, or exported the specified bulk chemicals (See section III.B below) in 1986. Thus, firms which use chlorofluorocarbons (CFCs) and halons as part of their manufacturing process would not be affected by this rule. In fact, as stated above, EPA believes that only seven firms produced the specified ozone-depleting chemicals in the United States in 1986 and fewer than 20 firms were involved in importing or exporting these chemicals in their bulk form.

It is important to note that imports or exports of products containing or produced with the specified ozone-depleting chemicals would not be covered by this rule. Thus, it would not apply to a firm importing refrigerators containing CFC-12. It would, however, apply to the import or export of any bulk shipments of mixtures or azeotropes

containing the specified chemicals. The definition of controlled substances contained in the Montreal Protocol states that it excludes any of the specified chemicals "whether existing alone or in mixture that is in a manufactured product other than a container used for transportation or storage * * *."

B. Specified Ozone-Depleting Chemicals

The Montreal Protocol and therefore this rule applies to the following chemicals:

(1) CFC–l3—Trichlorofluoromethane (CFC–11)
(2) CCl2F2—Dichlorodifluoromethane (CFC–12)
(3) CCl2F–CClF2—Trichlorotrifluoroethane (CFC–113)
(4) CF2Cl–CClF2—Dichlorotetrafluoroethane (CFC–114)
(5) CClF2–CF3—(Mono)chloropentafluoroethane (CFC–115)
(6) CF2BrCl—Bromochlorodifluoromethane (Halon 1211)
(7) CF3Br—Bromotrifluoromethane (Halon 1301)
(8) C2F4Br2—Dibromotetrafluoroethane (Halon 2402)

C. Data Required

EPA is requiring that affected parties provide data on the quantity of each of the specified chemicals that was produced, imported or exported in 1986. The year 1986 is the baseline used in the Montreal Protocol for determining limits on production and consumption (defined as production plus imports minus exports) established by that agreement. As a result, 1986 is the year for which data is sought.

Information on the quantity and location of each of the specified chemicals produced in the United States or its territiories is required along with the amount of those chemicals which may have been used and consumed as chemical intermediaries in the production of other chemicals. The latter information is necessary to avoid double-counting CFC or halon production. Documentation supporting the submission of 1986 production levels could include production records or logs, certified production statements used for other reporting purposes or similar information. Quantities should be reported in kilograms for each of the specified CFCs and halons.

The quantity of each specified chemical imported to the United States and its territories is required to be reported to EPA along with Entry Number, Customs District and Port Code, Employer Identification Number (EIN) or importer number, commodity code, the date and port of entry and the country in which it was produced. The required information on exports includes the quantity exported, the producer of the chemical, the date and port of exit, the EIN, Customs District and Port Code, the commodity code, and the country of final destination. Documentation supporting imports and exports should include copies of official papers (e.g., shippers export declarations, Form 7525 and Entry Summaries, if available) or other evidence confirming such activity.

Affected parties should specify what of the submitted data is covered by 40 CFR, Part 2, Subpart B, which governs the treatment of business information. Congress has given EPA broad authority to secure this information through Section 114 of the Clean Air Act for the purposes of developing regulations and standards.

Under section 114, EPA is empowered to obtain information which may be considered confidential business information. Producers, importers, and exporters may request that EPA consider some or all of the information they supply as confidential at the time it is submitted. Failure to assert a claim of confidentiality at the time of submission may result in disclosure of the information by the Agency without further notice.

D. Submission of Data

The data required under this rule must be submitted to EPA within 30 days following the date of publication of this notice. It should be sent to: Stratospheric Protection Program; Office of Program Development (ANR–445); Office of Air and Radiation; 401 M Street SW., Washington, DC 20460.

E. Failure to Comply

Affected parties failing to submit the required data will be in violation of section 113 of the Clean Air Act and will be subject to fines of up to $25,000 per day. In addition, since the data collected by this rule will likely be used in determining the allocation of rights to produce and import bulk CFCs and halons, the failure to notify EPA of 1986 activities could invalidate future claims to such allocations.

F. Future Steps

EPA intends to use the information required by this rule to develop the U.S. 1986 production and consumption baseline as required under the Montreal Protocol. In addition, this data would also be used as the basis for the proposed "allocated quota" approach to implementing the Protocol (see accompanying proposed rule) which grants past producers and importers rights to produce and consume based on their 1986 activities. EPA intends to publish for comment the allocations based on this data in Spring of 1988. Final allocations providing the basis for issuing rights to import and produce the regulated CFCs and halons would be published as part of the final rule implementing the Montreal Protocol. That final rule is scheduled for promulgation by August 1, 1988.

IV. Additional Information

A. Executive Order 12291

Executive Order (E.O.) 12291 requires the preparation of a regulatory impact analysis for major rules, defined by the order as those likely to result in:

(1) An annual effect on the economy of $100 million or more;

(2) A major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic industries; or

(3) Significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

EPA has determined that this regulation does not meet the definition of a major rule under E.O. 12291, and therefore has not prepared a regulatory impact analysis (RIA).

B. Regulatory Flexibility Act

The Regulatory Flexibility Act, 5 U.S.C. sections 601–612, requires that Federal agencies examine the impacts of their regulations on small entities. Under 5 U.S.C. 604(a), whenever an agency is required to publish a general notice of proposed rulemaking, it must prepare and make available for public comment an initial regulatory flexibility analysis (RFA). Such an analysis is not required if the head of an agency certifies that a rule will not have a significant economic impact on a substantial number of small entities, pursuant to 5 U.S.C. 605(b). Because this rule will not have a significant impact on small entities, no RFA has been prepared.

C. Paperwork Reduction Act

The information collection requirements in this rule have been approved by the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.* and has been assigned OMB control number 2060–0158.

Date: December 1, 1987.

Lee M. Thomas,

Administrator.

For the reasons set out in the preamble, Part 82 of Title 40 of the Code of Federal Regulations is added as follows:

PART 82—PROTECTION OF STRATOSPHERIC OZONE

Authority: 42 U.S.C. 7457(b).

§ 82.20 Baseline data collection.

(a) This section applies to any individual or legal entity who engaged in any of the following activities in 1986 involving any of the chemicals specified in § 82.20(b) of this part:

(1) Producers who manufactured the chemicals listed in § 82.20(b) from raw materials or feedstock chemicals;

(2) Importers who transported the chemicals listed in § 82.20(b) from outside the United States or its territories to persons within the United States or its territories; and

(3) Exporters who transported the chemicals listed in § 82.20(b) from within the United States or its territories to outside the United States or its territories.

(b) The chemicals covered by this section are the following:

(1) CFC–l3—Trichlorofluoromethane (CFC–11)
(2) CCl2F2—Dichlorodifluoromethane (CFC–12)
(3) CCl2F–CClF2—Trichlorotrifluoroethane (CFC–113)
(4) CF2Cl–CClF2—Dichlorotetrafluoroethane (CFC–114)
(5) CClF2–CF3—(Mono)chloropentafluoroethane (CFC–115)
(6) CF2BrCl—Bromochlorodifluoromethane (Halon 1211)
(7) CF3Br—Bromotrifluoromethane (Halon 1301)
(8) C2F4Br2—Dibromotetrafluoroethane (Halon 2402)

(c) Individuals and legal entities meeting the conditions set forth in § 82.20 (a) and (b) must report the following information along with supporting documentation:

(1) Name, address and telephone number of contact;

(2) The amount (kilograms) of each of the substances it produced in 1986 in the United States or its territories and the location of its production;

(3) The amount (kilograms) of each of the chemicals listed in § 82.20(b) which was used and entirely consumed as a chemical intermediary in the production of other chemicals;

(4) The amount (kilograms) of each of the chemicals listed in § 82.20(b) which it imported into the United States or its territories in 1986, along with the port and date of entry and the country in which it was produced;

(5) The amount (kilograms) of each of the chemicals listed in § 82.20(b) which in 1986 it exported from the United States or its territories, the producer of the chemical, the date and port of exit, the country of final destination and the date of entry into that country.

(d) Information required by § 82.20(c) must be submitted to EPA within 30 days after the date of publication of this section. Reports should be addressed to: Stratospheric Protection Program; Office of Program Development (ANR–445); Office of Air and Radiation; U.S. Environmental Protection Agency; 401 M Street, SW., Washington DC 20460.

(e) Failure to submit required information by this date shall be a violation of section 114 of the Clean Air Act and may invalidate future claims for allocation of rights to produce or import chemicals listed in § 82.20(b).

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ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 82

[FRL-3284-9]

Protection of Stratospheric Ozone

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: EPA is proposing to limit the production and consumption of certain chlorofluorocarbons (CFCs) and brominated compounds (halons) to reduce the risks of stratospheric ozone depletion. Specifically, the proposed rule would require a freeze at 1986 consumption and production levels of CFC–11, –12, –113, –114, and –115 on the basis of their relative ozone depletion weights, followed by reductions to 80 percent and 50 percent of 1986 levels beginning in mid-1993 and mid-1998, respectively. It would also prohibit production and consumption of Halon 1211, 1301 and 2402 from exceeding 1986 levels on a weighted basis beginning in approximately 1992. Under limited circumstances, somewhat higher levels of production (but not consumption) would be permitted. Consumption is defined in the proposed rule as production plus imports minus exports of the bulk chemicals described above.

These requirements are being proposed under section 157(b) of the Clean Air Act and would constitute the United States' implementation of the "Montreal Protocol on Substances That Deplete the Ozone Layer" (Montreal Protocol) which was signed by 24 countries, including the United States, on September 16, 1987 in Montreal, Canada.

However, EPA is proposing that the control requirements described above only take effect if the United States ratifies the Protocol and following entry into force.

EPA's proposed action is in response to growing scientific evidence linking increased atmospheric levels of chlorine and bromine to anticipated depletion of the ozone layer. If ozone depletion occurs, increased levels of harmful ultraviolet radiation would penetrate to the earth's surface resulting in substantial damage to human health and the environment.

To implement the Montreal Protocol, EPA proposes to restrict production and consumption of the specified ozone-depleting chemicals. Quotas reflecting the allowable level of production and consumption will be allocated to each of the firms who engaged in these activities in 1986. Trading of allocated quotas would be permitted. Exports and imports of the restricted chemicals will also be allowed consistent with restrictions contained in the Montreal Protocol. EPA believes that this approach will provide a low-cost means of achieving its regulatory goal, spur technological innovation, minimize administrative requirements and facilitate enforcement. EPA is also considering whether to develop specific regulations limiting CFC and halon use for particular industries to supplement allocated quotas.

As an alternative to the above regulatory approach, EPA is requesting comment on the use of a regulatory fee in addition to allocated quotas. This option is being considered because it addresses concerns that an allocated quota system, by itself, is inequitable—that CFC and halon producers and importers might accrue excessive profits at the expense of CFC and halon user industries and consumers. The fee would be set to obtain for the United States Treasury price increases resulting from the scarcity created by EPA regulations. Alternatively, this same objective could be satisfied by auctioning (instead of allocating) rights to produce and consume CFCs and halons.

In a separate notice accompanying today's proposal EPA is requiring firms involved in producing, importing or exporting any of the regulated chemicals in 1986 to report these activities to EPA.

DATES: A public hearing will be held on January 7, 1988 from 9:00 a.m. to 5:00 p.m. at the location listed below, in order to provide an opportunity for oral presentations of data, views, or arguments concerning the regulations proposed in this notice. Persons who wish to testify at this hearing should notify Stephen R. Seidel at the address listed below prior to December 29, 1987.

Written comments must be submitted to the location listed below by February 8, 1988.

ADDRESSES: The public hearing will be held at the EPA Education Center; 401 M Street, SW., Washington, DC 20460.

Written comments should be sent to Docket No. A–87–20, Central Docket Section, South Conference Room 4, Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460. The docket may be inspected between 8:00 a.m. and 4:00 p.m. on weekdays. As provided in CFR Part 2, a reasonable fee may be charged for photocopying. To expedite review, it is also requested that a duplicate copy of written comments be sent to Stephen R. Seidel at the address listed below.

FOR FURTHER INFORMATION CONTACT: Stephen R. Seidel, Senior Analyst, Office of Program Development, Office of Air and Radiation (ANR–445), EPA, 401 M Street, SW., Washington, DC 20460. Telephone (202) 382–2787.

SUPPLEMENTARY INFORMATION:

I. Overview of the Problem

By preventing much of the potentially harmful ultraviolet radiation (UV–B radiation) from penetrating to the earth's surface, the stratospheric ozone layer acts as a vital shield protecting human health, welfare and the environment.

Concern about possible depletion of the ozone layer from chorofluorocarbons (CFCs) was first raised in 1974 with publication of research which theorized that chlorine released from CFCs could migrate to the stratosphere and reduce the amount of ozone (Molina and Rowland, 1974). Some of the CFCs have an atmospheric lifetime of over 120 years (i.e., they do not breakdown in the lower atmosphere). As a result, they migrate slowly to the stratosphere where higher energy radiation strikes them, releasing chlorine. Once freed, the chlorine acts as a catalyst repeatedly combining with and breaking apart ozone molecules. If ozone depletion occurs, more UV–B radiation would penetrate to the earth's surface. Moreover, because of the long atmospheric lifetimes of CFCs, it would take many decades to over a century for the ozone layer to return to past concentrations.

In the thirteen years since that theory was first proposed, substantial scientific research has supported the general concern that increased concentrations of chlorine, as well as bromine from halons, in the stratosphere pose substantial risks of depletion resulting in harm to human health and the environment.

Today's proposal is in response to increased concerns raised by the improved understanding of the risks associated with continued use of CFCs and halons. During the past two years, two extensive assessments of these risks have been completed and are relied on by EPA in evaluating the need for additional restrictions on the use of potential ozone-depleting chemicals. The first, *Atmospheric Ozone, 1985* (WMO, 1986), provides an extensive review of the current state of knowledge concerning atmospheric chemistry and modelling, past changes in trace gases that affect ozone levels, and current trends in ozone levels. A second study, *An Assessment of the Risks from Trace Gases that can Modify the Stratosphere* (EPA, 1987), was prepared by EPA and

reviewed by its Science Advisory Board. This study summarizes the state of knowledge related to both atmospheric issues (e.g., possible future changes in ozone levels), and human health and environmental effects if the ozone layer were depleted. These studies and more recent research findings are summarized below in Section IV. They also were relied on extensively in developing the regulatory impact analysis (RIA) prepared in support of this rule which is summarized below in Section VII.

Unlike most issues of concern to EPA, stratospheric ozone protection necessarily involves all nations of the world. Given their long atmospheric lifetimes, CFCs and halons become widely dispersed. As a result, the release of these chemicals in one country could adversely affect the stratosphere above, and therefore the health and welfare of, other countries. Thus, to fully protect the ozone layer from CFCs and halons, an international agreement is essential.

Recognizing the global nature of this issue, the United Nations Environment Program (UNEP) organized negotiations in 1982 aimed at developing an agreement to protect the ozone layer. Following a hiatus in 1986 to develop and assess scientific and economic information, negotiations resumed in December of that year. These negotiations were successfully concluded on September 16, 1987 in Montreal when 24 nations signed a Protocol requiring substantial reductions in the most potent ozone-depleting chemicals. This international agreement represents a concerted effort by the major CFC and halon producing and consuming nations to respond to the risks from continued reliance on ozone-depleting chemicals. It constitutes a landmark agreement among nations to take action in advance to prevent significant environmental damage from occurring. The text of the Protocol is included as an annex to this preamble and is described in greater detail below.

The regulations proposed today would permit the United States to meet the requirements established by the Montreal Protocol. They would also fulfill EPA's responsibility under section 157(b) of the Clean Air Act to protect stratospheric ozone as needed to protect public health and welfare.

Finally, this proposal also meets the requirements of an agreement settling a lawsuit brought by the Natural Resources Defense Council in the District Court of the District of Columbia (NRDC v. Thomas, No. 84–3587 (D.D.C.)) seeking to compel EPA to promulgate regulations under section 157(b). The terms of the settlement (as amended to extend the schedule) require EPA to propose regulations or state its reason for deciding not to regulate by December 1, 1987, and to take final action by August 1, 1988.

II. Background

A. Past Regulatory Actions

Following the initial concerns raised in 1974 about possible ozone depletion from CFCs, EPA and the Food and Drug Administration acted in 1978 to ban the use of CFCs as aerosol propellants in all but "essential applications" (43 FR 11301, March 17, 1978; 43 FR 11318, March 17, 1978). During the early 1970s, CFCs used as aerosol propellants constituted over 50 percent of total CFC consumption in the United States. This particular use of CFCs was reduced in this country by approximately 95 percent. Today's proposal does not affect the existing EPA and FDA regulations restricting the use of CFCs as aerosol propellants.

Since 1978, CFC use has continued to expand in other applications (e.g., as a foam-blowing agent, refrigerant and solvent). Total production now has surpassed pre-1974 levels.

Largely in response to a series of studies by the National Academy of Sciences published in the late 1970s (NAS, 1976, 1979a, and 1979b) which warned of substantial depletion and harm from continued use of CFCs, EPA issued an Advance Notice of Proposed Rulemaking (ANPR) which discussed an immediate freeze on the production of certain CFCs and the possibility of employing a system of marketable permits to allocate CFC consumption among industries which use CFCs (45 FR 66726; October 7, 1980).

Following publication of this ANPR, additional scientific evidence (see for example, *Causes and Effects of Changes in Stratospheric Ozone: Update 1983,* (NAS, 1984)) became available which suggested that the atmospheric factors affecting ozone levels were more complex than previously thought. For example, atmospheric concentrations of gases other than CFCs that also affect ozone were also increasing. Atmospheric models which are used to analyze possible future trends in ozone levels were now capable of simultaneously considering changes in multiple trace gases including CFCs. Because increases in some of these gases (e.g., carbon dioxide and methane) could potentially buffer the depleting effects of CFCs, concern about possible changes in total column ozone levels (i.e., the total amount of ozone encountered by radiation passing from the top of the atmosphere to the earth's surface at any given location) was diminished.

The apparent urgency of the ozone depletion problem was also reduced by the fact that CFC use worldwide in the early 1980s was relatively constant. While some nations did not follow the United States example by reducing their use of CFCs as aerosol propellants, others did, which further reduced global consumption of CFCs. In addition, a downturn in global economic conditions during this period had temporarily reduced the rate of growth of CFCs in nonaerosol applications.

B. EPA's Stratospheric Protection Plan

Since 1983, worldwide production of CFCs has grown at an average annual rate of 5 percent. In light of this rate of growth and further advancements in the scientific understanding of the link between CFCs and ozone depletion, EPA developed its Stratospheric Protection Plan (51 FR 1257, January 10, 1986). This plan described the analytic basis for supporting the on-going international negotiations and for reassessing the need for additional regulations of CFCs and other potential ozone-depleting chemicals.

It also set forth a schedule for both domestic and international activities related to stratospheric ozone protection. It committed EPA to sponsoring or participating in a series of workshops, both here and abroad, aimed at developing information that would be used for international negotiations and for domestic rulemaking. Workshops discussing economic issues related to ozone protection involving interested parties from within the United States were held in March and July of 1986. International workshops covering the same topics were sponsored by UNEP and took place in May and July of 1986 in Rome, Italy and Leesburg, Virginia, respectively.

The plan also committed EPA to preparing the risk assessment document mentioned above and to obtaining review of this document by the Agency's Science Advisory Board (SAB). Meetings of a subcommittee of the SAB organized specifically to review this document were held in November 1986 and January 1987. Comments from the public were also solicited (51 FR 40510, November 7, 1986). The document has been revised in response to comments from the panel and the public and is available in the docket at the address given above. The findings of the risk assessment are described in greater detail below, in Section IV.

Finally, the plan also committed EPA to conducting a rulemaking on possible further regulation of CFCs and to actively participating in the UNEP negotiations on an international agreement to limit ozone-depleting chemicals.

C. International Negotiations

The initial round of international negotiations, conducted under the auspices of UNEP, resulted in the Vienna Convention for the Protection of the Ozone Layer, which was signed in March 1985. This agreement promotes global coordination necessary for the protection of the ozone layer by providing for international cooperation in research, monitoring, and information exchange. While the initial negotiations failed to reach agreement on specific obligations limiting ozone-depleting chemicals, the Vienna Convention provides a framework for the continued negotiation and adoption of international regulatory measures necessary to protect the ozone layer.

On December 1, 1986, negotiations resumed on a possible protocol to limit CFCs and other ozone-depleting chemicals. Despite wide differences in initial positions among participating nations, these negotiations resulted ten months later in the adoption of the Montreal Protocol which was signed on September 16, 1987, by 24 nations. Specific provisions of the Protocol are discussed in detail below, and the full text is printed as an addendum to this notice.

III. Statutory Authority

Section 157(b) of the Clean Air Act (42 U.S.C. 7457(b) authorizes the Administrator to issue "regulations for the control of any substance, practice, process, or activity (or any combination thereof) which in his judgment may reasonably be anticipated to affect the stratosphere, especially ozone in the stratosphere, if such effect in the stratosphere may reasonably be anticipated to endanger public health or welfare. Such regulations shall take into account the feasibility and the costs of achieving such control."

Two aspects of this regulatory authority are notable. First, the Administrator is not required to prove that a "substance, practice, process or activity" does in fact deplete stratospheric ozone before he may regulate it. In 1977 when the ozone protection provisions were added to the Clean Air Act, Congress recognized that scientists were not certain whether stratospheric ozone was being depleted and what was causing any depletion that did occur. *See, e.g.,* H.R. Rep. No. 294, 95th Cong., 1st Sess. 98–99 (1977). However, Congress also recognized the potentially serious health and environmental consequences of ozone depletion if it were occurring, and authorized EPA to act in the face of scientific uncertainty to protect against those adverse consequences. *Id.* Thus, the Administrator may regulate on the basis of "his judgment" that the subject of regulation "may be reasonably anticipated" to affect the stratosphere and that the effect "may be reasonably anticipated to endanger public health and welfare."

Second, the Administrator is given broad latitude to choose what and how to regulate. He is not limited to controlling ozone-depleting substances themselves; he may also regulate "any practice, process, activity" that threatens the ozone layer. Nor is he limited to a particular control strategy. Besides an implicit requirement that regulations be efficacious, the statute requires only that they take into account the cost and technological feasibility of achieving the required level of control. In short, EPA has broad latitude to employ the regulatory options it finds appropriate to control threats to stratospheric ozone that in turn threaten public health and welfare.

IV. Risk Assessment

A. Changes in Atmospheric Composition

Measurements of the concentrations of specific gases over the past decade or longer have produced conclusive evidence that human activities are altering the composition of the earth's atmosphere. Table 1 summarizes the recent rate of increase for several gases, along with the period for which measurements are available. Because each of these gases affects the quantity of ozone, past and future changes in their atmospheric levels are a significant element in understanding the risks of ozone depletion.

Table 1 shows that atmospheric levels of CFC–11 and –12 have grown at the rate of 5 percent annually since 1978. CFC–11 is used primarily as a foam-blowing agent and CFC–12 is used primarily as a refrigerant. Outside the United States, in many countries both are also used extensively as aerosol propellants. Atmospheric levels of CFC–113, which is used primarily as a solvent by the electronics and metal cleaning industries, have been increasing at roughly double this rate during the same period. These growth rates reflect both continued emissions of CFCs during this period and the long atmospheric lifetimes of these chemicals.

TABLE 1.—CHANGES IN ATMOSPHERIC CONCENTRATIONS OF OZONE-MODIFYING GASES

	Measured rates of increase		
	Percent per year	Period	Reference
CFC–11 (CCl_3F)	5.0	1978–1985	WMO, 1986.
CFC–12 (CCl_2F_2)	5.0	1978–1985	WMO, 1986.
CFC–113 ($C_2Cl_3F_3$)	10.0	1975–1983	Rasmussen and Khalil, 1982.
CFC–114 ($C_2Cl_2F_4$)	[1]	[1]	[1]
CFC–115 (C_2ClF_5)	[1]	[1]	[1]
Halon-1211 ($CBrClF_2$)	23.0	1979–1984	Khalil and Rasmussen, 1985.
Halon-1301 (CF_3Br)	[1]	[1]	[1]
Halon-2402 ($C_2F_4Br_2$)	[1]	[1]	[1]
Nitrous oxide (N_2O)	0.2	1978–1985	WMO, 1986.
Methane (CH_4)	1.0	1977–1985	NASA, 1986.
Carbon Dioxide (CO_2)	0.5	1958–1985	WMO, 1986.

[1] No data available.

Much less information is available about growth in Halon 1211, 1301 and 2402. These compounds are becoming more widely used primarily in certain specialized firefighting applications. No data is yet available on atmospheric trends of Halon 1301 or 2402, while very limited measurements suggest that atmospheric levels of Halon 1211 grew at 23 percent annually in recent years. In comparison to the CFCs, total levels of these halons remain very small; because they are believed to be extremely efficient depleters of ozone (Prather et al., 1984; WMO, 1986), they are being proposed for inclusion in this regulation. (See below, Section VI.)

Carbon dioxide and methane are also increasing in the atmosphere, though at annual rates much slower than the CFCs. Unlike CFCs and halons, these have the opposite effect on

concentrations of ozone and could potentially offset depletion caused by increases in these other gases. Carbon dioxide emissions result primarily from the burning of fossil fuels. In contrast, the reason that methane levels have increased is not well understood. Moreover, this gas has a much shorter atmospheric lifetime than CFCs (approximately ten years).

Nitrous oxide levels have also been increasing at approximately 0.2 percent annually. Sources of emissions include fossil fuel combustion and fertilizers. In isolation, nitrous oxides release nitrogen in the stratosphere which would act similarly to chlorine and catalytically destroy ozone. However, depending on the relative levels of chlorine and nitrous oxide, the latter can have the net effect of slowing down the rate of depletion by binding chlorine in a relatively inactive state.

B. Changes in Ozone Levels

The extensive measurements of recent growth in atmospheric levels of ozone-modifying gases provide only indirect evidence that human activities may be altering the earth's ozone layer. To more fully analyze these risks, two approaches have been developed. First, direct measurements of the quantity of ozone have been analyzed to determine if any trends are apparent; and second, atmospheric models have been developed that attempt to project future changes in ozone levels based on assumed changes in atmospheric levels of ozone-modifying gases.

1. Direct Measurements of Ozone Levels

Monitoring of ozone levels has been conducted to various degrees using ground-based instruments for several decades. These measurements examine both total column ozone levels and changes in the quantity of ozone at specific altitudes. Since the late 1970s, satellite-based instruments have expanded the ability to measure ozone levels throughout the world.

Based on the information available at the time, the WMO assessment concluded that total column ozone levels had not substantially been altered—that no statistically significant change had occurred. For example, it cites a study by Reinsel (1985) which shows that for the period 1970 to 1983, total column ozone levels had decreased by only 0.003 ± 1.2 percent per decade which does not represent a statistically significant trend.

The WMO assessment also stated that ozone levels in the upper atmosphere (at approximately 40 kilometers) had, in fact, decreased by approximately 0.2 percent to 0.3 percent per year over the period 1970 to 1980. However, increases in ozone levels in the troposphere (i.e., the lower atmosphere) had offset the decreases above resulting in effectively no change in total column ozone.[1]

Both these findings—essentially little or no change in total column ozone and decreases at 40 km—appear consistent with current atmospheric theories and models and are contained in EPA's risk assessment which was used as the basis for this rulemaking. However, preliminary information that has only recently become available raises the question whether total column ozone levels have, in fact, declined in recent years.

2. Preliminary Evidence of Ozone Depletion

a. Seasonal Ozone Losses in Antarctica. In May 1985, an article was published in *Nature* (Farman, Gardiner and Shanklin, 1985) which provided evidence that ozone levels during the months of September to November over Antarctica had declined by approximately 40 percent from the late 1970s. This discovery of the "Antarctic ozone hole" by the British Antarctic Survey team, based on data from a ground-based instrument, was completely unexpected.

Losses of the magnitude observed in Antarctica were not predicted by current atmospheric theories or models. The Antarctic ozone hole thus raises several important questions. Are the losses in ozone caused by CFCs and halons? Are these loss mechanisms unique to the conditions found above Antarctica or do they have implications for ozone levels elsewhere? Could this seasonal ozone loss itself have implications for global ozone concentrations? How, if at all, do our current theories and models need to be altered to reflect this phenomenon? These questions have been the subject of considerable research within the scientific community since the initial article in *Nature* appeared.

In October 1986, a team of researchers traveled to Antarctica to begin the process of collecting data to aid in answering these questions. Preliminary results from the first National Antarctic Ozone Expedition strongly suggest that anomolous chlorine chemistry plays a role in the development of the ozone hole. Team members reported measurements of chlorine monoxide—a key compound in the catalytic cycle by which chlorine destroys ozone—that were 20–50 times greater than observed elsewhere in the atmosphere (Pyle and Farman, 1987). These measurements have recently been substantiated by preliminary data collected during airplane flights over Antarctica during the formation of the ozone hole in 1987 as part of experiments conducted by the NASA, the National Oceanographic and Atmospheric Administration (NOAA), and others.

Many questions must still be answered before plausible changes in theories and models can be made to account for factors responsible for the ozone hole. Researchers still must determine the exact mechanisms or reactions which produce the high levels of chlorine monoxide and they must also determine the role of dynamic (e.g., meteorological forces including temperature, pressures and winds) factors. Most importantly, they still must determine whether these loss mechanisms are unique to Antarctica or may also affect ozone levels elsewhere and whether losses in Antarctica alone could influence global concentrations of ozone. Until a clearer picture emerges, the scientific issues raised by the Antarctic ozone hole cannot yet serve as a guide for policy decisions.

Because of these remaining uncertainties, EPA believes that no adequate basis yet exists for factoring the causes and global implications of the Antarctic ozone hole into its risk assessment and regulatory scheme. The Agency has de facto assumed that the ozone hole is not related to CFCs and halons. Additional measurements from a second expedition to Antarctica, further review of data obtained from the airplane flights through the ozone hole, and related atmospheric modelling studies should become available in the coming year. The Agency intends to closely follow these scientific developments and will modify its risk assessment if new information warrants such changes. It also intends to actively participate in upcoming international scientific assessments that are required in 1989 and every four years thereafter, which are to be used as the basis for determining the need for changes to the terms of the protocol which could occur beginning in 1990. EPA is particularly interested in comments on its treatment of this issue.

[1] Over the long term, increases in ozone in the lower atmosphere cannot continue to offset decreases in the stratosphere without substantial health and environmental damage resulting. Ozone in the lower atmosphere has been linked to respiratory disease in humans and damage to crops and forests and as a result is regulated by EPA under one of its national ambient air quality standards. Moreover, the same gases producing increased ozone in the lower atmosphere are also greenhouse gases and would contribute to substantial increases in global temperatures.

b. Possible Global Losses in Ozone. Recently published data have also called into question the conclusion that *global* total column ozone levels have not decreased (Kerr, 1987). Ground-based measurements of total column ozone now suggest that a 3 percent to 5 percent decrease has occurred over the past six years. Decreases of a similar magnitude over roughly the same period have been reported based on a preliminary assessment of data from the Nimbus-7 satellite (Kerr, 1987). Because of the complexities in interpreting satellite data (e.g., calibration, instrument drift and other corrections), this data is currently undergoing further scrutiny.

As was the case with the Antarctic ozone hole, global ozone losses of this magnitude appear to fall outside the bounds of what would be expected from current theories and models. If they are confirmed by further review of the evidence, several important questions would be raised. Are these losses in excess of historic variation or are they due to natural causes (e.g. the solar cycle, volcanic activity, etc.)? Are they related to increases in atmospheric levels of CFCs and halons? What, if anything, must be changed in current models to account for such losses?

A thorough review of this data to resolve these important uncertainties has recently been initiated by scientists at NASA and NOAA. Pending the outcome of this assessment, EPA does not believe that this preliminary evidence has yet been adequately reviewed and analyzed by the scientific community to allow for it to be used in its risk assessment or regulatory decisions. Once the on-going review is completed, if new information becomes available and previously unresolved issues are successfully addressed, then EPA will modify its risk assessment to reflect this improved understanding of recent trends in ozone. This information will also be examined in the context of the upcoming international scientific and policy reviews under the terms of the Protocol. EPA specifically requests comments on the appropriate means of factoring new scientific evidence into its risk assessment and future policy decisions.

3. Role of Atmospheric Models in Predicting Future Ozone Levels

While direct measurements provide useful information concerning past changes in ozone levels, atmospheric models are the only available tool for predicting possible future trends in ozone. These models, in more or less detail, attempt to replicate the forces which determine ozone concentrations. For example, current models include approximately 50 chemical species found in the atmosphere and simulate over 140 different reactions among these chemicals which directly or indirectly affect ozone abundance.

From EPA's perspective in evaluating risks, a key question is to what degree these models can accurately predict future ozone changes. As stated above, current models do not predict the Antarctic ozone hole and suggest that global ozone levels should not have yet declined by even one percent based on the historic use of CFCs and halons, and changes in other trace gases. Furthermore, current models fail to accurately project the abundance of all chemical species at all altitudes, thereby lowering our confidence in their predictive powers.

Despite these shortcomings, both the EPA and WMO risk assessments concluded that atmospheric models represent the best available tools for evaluating future trends in ozone levels. These studies show that, when tested against the current make-up of the atmosphere, the existing atmospheric models do a reasonably good job of replicating most key atmospheric constituents. Thus, the models accurately predict many, though certainly not all, of the key chemical constituents which affect the creation and destruction of ozone. While model accuracy will inevitably improve over time, EPA has relied on current versions in assessing the risks of future ozone depletion.

4. Future Trends in Ozone Levels: Assuming No Further Regulation of CFCs or Halons

In utilizing models to predict future ozone trends, the rate of growth of ozone-modifying gases is a key variable. As part of the Regulatory Impact Analysis (RIA) prepared in support of this proposal, EPA examined the risks of ozone depletion from continued use of CFCs, halons and other relevant trace gases. The assumptions underlying this analysis are detailed in Chapter 4 of the RIA and are summarized here.

EPA conducted extensive studies analyzing possible future rates of growth for CFCs and halons in the absence of additional regulations. (See for example: Hammitt et al. (Rand), 1986; Nordhaus and Yohe, 1986; and Gibbs et al. (ICF), 1986.) This issue was also the subject of both EPA and UNEP sponsored workshops in 1986. Based on this review, EPA believes that strong market demand exists for CFC products in many sectors of the economy, both in the United States and abroad, and that in the absence of regulation, use of CFC–11, –12, and –113 would increase. In the RIA, a middle estimate of growth in trace gas emissions was developed. For CFC–11 and CFC–12, the middle estimate implies an average annual growth rate of approximately 2.7 percent, which reflects a 2.5 percent annual growth rate for the developed world, and slightly higher projected growth in the developing world and in the Soviet Union. The middle scenario includes an average annual growth rate of 2.9 percent for CFC–113, 2.6 percent for CFC–114, and 2.6 percent for CFC–115.

Recent studies by Industrial Economics, Inc. (1987), with the cooperation of an ad hoc technical committee representing halon producers and users, provided the basis for estimates of future growth in production of Halon 1211 and 1301, which are assumed to grow at average annual rates of 4.3 and 2.7 percent. Because Halon 2402 is only used in minor applications in the United States, this chemical was omitted from the analysis.

Table 2 shows the range of growth rates assumed for these chemicals. This range of estimates reflect the many factors (e.g., economic and population growth, technological innovation, etc.) which influence projections over this period of time. It also shows the growth rates assumed for carbon dioxide, methane and nitrous oxide which were based on past measurements showing increases for each of these gases. Based on a simplified one-dimensional model of the combined effects of these gases, Table 2 indicates the projected ozone depletion for each of these scenarios. Thus, in the case which represents the mid-range estimate of future trends in emissions of trace gases, projected total column ozone would decline by 3.9 percent by 2025 and by 39.9 percent by 2075. In the case where CFC use only grows by approximately 1.2 percent annually, projected ozone depletion by 2075 would reach 7.0 percent. In the case where CFC use grows at approximately 3.8 percent per year, projected ozone depletion by 2075 would exceed 50 percent.

TABLE 2

[Percent total column depletion]

Year	Low CFC growth	Medium CFC growth	High CFC growth
Projected Future Ozone Depletion in the Absence of Regulation			
1985	0.00	0.00	0.00
1990	0.27	0.27	0.28
2000	0.76	0.88	1.02
2010	1.25	1.71	2.33
2020	1.87	3.00	4.73
2030	2.55	4.86	9.13

TABLE 2—Continued

[Percent total column depletion]

Year	Low CFC growth	Medium CFC growth	High CFC growth
2040	3.33	7.66	18.86
2050	4.32	12.32	>50
2060	5.40	20.27	>50
2070	6.47	32.48	>50
2075	7.00	39.90	>50

Estimates from statistical model developed by Connell (1986) and discussed in EPA Risk Assessment (1987).

CFC and Halon Scenarios

Average implied annual rates of growth (percent)

	1985–2000	2000–2050	Post-2050
Low Scenario			
CFC–11, 12, 114, 115	2.1	1.3	Constant
CFC–113	2.1	1.3	Constant
Halon-1211	5.5	1.5	Constant
Halon-1301	−0.5	1.6	Constant
Medium Scenario			
CFC–11, 12, 114, 115	3.6	2.5	Constant
CFC–113	4.0	2.5	Constant
Halon-1211	8.8	2.9	Constant
Halon-1301	1.1	3.2	Constant
High Scenario			
CFC–11, 12, 114, 115	5.2	3.8	Constant
CFC–113	6.1	3.8	Constant
Halon-1211	12.0	4.4	Constant
Halon-1301	2.0	4.7	Constant

Other Trace Gas Scenarios

Carbon Dioxide
50th percentile scenario from the National Academy of Sciences is used (implied annual growth in atmospheric concentrations of 0.7 percent from 1985 to 2165).
Methane
Annual growth of 0.017 parts per million in atmospheric concentrations.
Nitrous Oxide
Annual growth of 0.2 percent in atmospheric concentrations.

The ozone depletion estimates in Table 2 are based on a parameterization (i.e., a statistical simplification) of a one-dimensional model developed by Lawrence Livermore National Laboratory. A recent comparison of the results of this model with one-dimensional models conducted under the auspices of UNEP showed that this parameterization produced depletion estimates that were somewhat lower than those projected by other models for the same trace gas scenarios. (UNEP, 1987).

While this parameterization provides a reasonable representation of a one-dimensional model (Connell, 1986), by design it provides only a globally averaged estimate of depletion. More sophisticated two-dimensional models have recently been developed which provide estimates of ozone depletion by latitude. Since health and environmental effects will vary by latitude, these more detailed models would be more appropriate for calculating the impacts of depletion. However, because these models are expensive and time-consuming to use, they are of limited utility for examining a wide range of scenarios as required in EPA's risk assessment. In addition, different two-dimensional models differ substantially in the degree to which depletion varies with latitude. As a result of these limitations, EPA's estimates of risks rely only on the previously mentioned one-dimensional parameterization.

A comparison of these different models was conducted by EPA as part of its risk assessment (See Chapter 5). It showed that two-dimensional models predict greater average depletion than one-dimensional models for the same trace gas scenarios. For example, one two-dimensional model (developed by Sze) projects an 18 percent depletion compared to a 15 percent depletion for exactly the same scenario for a one-dimensional model. Two-dimensional models also generally project depletion higher than global averages at latitudes greater than 40 degree North or South, especially in the spring.

5. Effects of Ozone Depletion on Human Health and the Environment

Any decrease in total column ozone would lead to increased penetration of damaging ultraviolet radiation to the earth's surface. Under current atmospheric conditions, the ozone layer blocks most of the UN–B part of the ultraviolet spectrum with the amount screened out increasing with latitude. This current gradient in exposure provides a useful natural experiment demonstrating the effects of different exposure to UN–B radiation.

The health and environmental effects of ozone depletion are briefly described below; for a fuller explanation see Chapter 7 of the RIA and Chapters 7 to 16 of the EPA's risk assessment. EPA has attempted to quantify each effect, but insufficient data has made quantifying some effects impossible. Estimates are also uncertain because of possible changes in future technologies. Additional research to better understand UV–B effects is warranted. However, EPA has taken account of all possible ozone depletion effects in assessing the need for controls.

a. *Increased Incidence of Nonmelanoma Skin Cancers.* Laboratory studies and epidemiological evidence show a strong link between exposure to UV–B radiation and increased incidence of basal and squamous nonmelanoma skin cancers. (See Chapter 7 of EPA's risk assessment.) Several lines of evidence support this relationship: (1) Nonmelanoma skin cancers tend to develop in sun-exposed sites; (2) outdoor workers have higher incidence rates; (3) incidence rates are higher closer to the equator (correcting for differences in skin pigmentation); and individuals genetically suspectible to sunburn have a higher incidence of skin cancers.

Several researchers have correlated UV–B measurements with nonmelanoma skin cancer incidence data. Results from six studies show that a 1 percent depletion of total column ozone would lead to an increase in nonmelanoma skin cancer incidence of 4.8 percent to 7.6 percent.

Based on the expected growth in trace gas emissions for the middle scenario presented in Table 2, the resulting ozone depletion would lead to an increase in incidence of approximately 153 million nonmelanoma skin cancer cases among the United States population alive today and born by the year 2075. Based on current fatality rates from basal and squamous skin cancers, this increase in incidence could be expected to lead to an increase of 3.0 million deaths of people born during this same time period. Given the uncertainties associated with the appropriate dose-response relationship, this projection could fall within the range of 1.5 million to 4.5 million deaths.

b. *Increased Incidence of Melanoma Skin Cancer.* While the current incidence of melanoma skin cancer cases is small compared to nonmelanoma cases, the fatality rate is much higher. While no animal model and in vitro experimental evidence exists explaining the exact relationship between melanoma and UV–B radiation, based on the preponderance of evidence, EPA's risk assesssment concluded that increased UV–B exposure would increase the incidence of melanoma. Evidence in support of this conclusion includes: (1) Lighter skinned individuals, whose skin has less protective melanin, have higher melonoma incidence rates than darker skinned individuals; (2) early childhood exposure to sunlight appears to be linked to higher incidence rates; and (3) individuals genetically incapable of repairing sunlight-induced damage to cells have a higher rate of incidence.

Based on a range of estimates for uncertain factors, EPA's risk assessment developed a dose-response relationship which suggests that for every 1 percent increase in ozone depletion, the incidence of melanoma would increase by slightly less than 1 percent to 2 percent and the number of fatalities from melanoma would increase by 0.8 percent to 1.5 percent.

Based on the trace gas scenario which assumed a 2.7 percent average annual

growth in CFCs, and the resulting ozone depletion shown in Table 2, the number of melanoma cases in the United States would increase by 782,100 and the number of fatalities would increase by 187,000 for the population alive today and born by the year 2075. Given the uncertainties associated with the dose-response relationship, the number of deaths could fall within a range of 93,500 to 280,000.

c. *Increased Incidence of Cataracts.* UV–B radiation has been found to play a significant role in the formation of cataracts. Supporting evidence include animal laboratory studies and epidemiological studies. Based on the available research, a dose-response relationship was developed in EPA's risk assessment (See Chapter 10). Assuming trace gas trends and the resulting ozone depletion for the middle scenario described in Table 2, the number of cases of cataracts would increase by 18.2 million for the population in the United States alive today or born through 2075.

d. *Suppression of the Immune System.* Experimental studies show a suppression of the immune response system associated with exposure to UV–B radiation. Current research does not explain the exact mechanism by which the immune system is altered or the potential implications for a wide range of diseases. Limited studies do suggest, however, that UV–B induced suppression may increase the frequency of outbreak of herpes simplex virus and leishmaniasis (i.e., a skin disorder common in the tropics). No quantitative estimates of the potential harm related to immune suppression on these or other possible diseases are at this time possible.

e. *Damages to Plants.* Limited studies have shown that plants exposed to increased levels of UV–B radiation can be harmed. Initial studies showed a substantial vulnerability to UV–B exposure across a wide range of plants. However, these studies were conducted in laboratories or greenhouses and their results have not been replicated under field conditions where photorepair mechanisms may offset damage.

The only long-term controlled field study involves soy beans. This study found that enhanced levels of UV–B radiation simulating a 16 and 25 percent ozone depletion caused reductions in crop yield of up to 25 percent in the tested cultivar. Substantially smaller changes occurred in years when drought conditions also greatly reduced crop yields of the plants grown under naturally occurring conditions (i.e., the control plants). Because a wide range of crops have tested sensitive to increased exposure to UV–B radiation, but have not yet been tested under field conditions, the dose response relationship developed from the field tests of soy beans was used as the basis for estimating impacts on major grain crops in the RIA.

f. *Damage to Aquatic Organisms.* While studies to date have been limited in scope, it appears that increased exposure to UV–B radiation could adversely affect aquatic organisms and potentially disrupt the aquatic food chain. For example, studies suggest that phytoplankton remain close to the water's surface to facilitate photosynthesis. As a result, they would be susceptible to damage from increased UV–B radiation. Similarly, the larvae stage of many fish live at or near the water's surface and would also be susceptible to damage if ozone depletion occurs. A case study showed that a 10 percent ozone depletion would lead to a 6 percent loss in the larval anchovy population. Because a wide range of aquatic organisms have shown a sensitivity to increased exposure to UV–B radiation, but insufficient data exists for developing specific dose-response relationships, the case study examining the effects on anchovy larvae was used as the basis for estimating impacts on a limited group of shellfish and fin fish in the RIA.

g. *Accelerated Weathering of Outdoor Plastics.* Plastics exposed to the outdoor environment under current ultraviolet conditions contain light stabilizers or other additives to reduce damage from chalking, yellowing or brittleness. If UV–B radiation increases, damages would increase or greater expense would be incurred in protecting against the damages from such exposure. A relationship was developed between UV–B exposure and damage to outdoor products made of polyvinyl chloride and incorporated in the analysis presented in the RIA.

h. *Increased Formation of Groundlevel Ozone.* Preliminary studies have assessed the impact of increasedUV–B penetration on the photochemical reactions responsible for the creation of groundlevel ozone. These case studies suggest that groundlevel ozone would form earlier in the day and nearer to population centers, thus exposing more people to its harmful effects. Total amounts of groundlevel ozone would also increase. While substantial harm to human health and welfare could result from increased groundlevel ozone, because of limited data, only the impacts on crop loss were included in the RIA.

i. *Climate Related Impacts Due to Increases in Ozone-Modifying Gases.* CFCs and other gases that modify stratospheric ozone are also greenhouse gases and therefore contribute to concern about future global warming. Based on the rate of growth in trace gases assumed in the middle scenario presented in Table 2, by 2075 a global equilibrium temperature (i.e., the earth's temperature at the time when incoming energy is balanced against outgoing energy) increase of 5.8 degrees centigrade (10.4 degrees Fahrenheit) could be anticipated. Based on earlier reports by the National Academy of Sciences (1983), these estimates could be 50 percent higher or lower to reflect current uncertainties in climate model predictions. This temperature increase could be expected to affect water resources, agricultural productivity, forests, and endangered species. However, because of the difficulty in quantifying these effects, the RIA does not assess the extent of potential harm related directly to climate change.

One possible indirect effect of climate change is increased sea level rise. Based on current models and the trace gas scenario described above, the projected global warming could increase global sea level by 97.8 centimeters by 2075. However, because of the difficulty in quantifying impacts related to sea level rise, the analysis in the RIA is limited to extrapolation of several case studies quantifying damage from sea level rise to major port areas in the United States.

6. Conclusion

Based on the WMO assessment and EPA's recently completed risk assessment, the Agency believes that the current rate of growth in atmospheric levels of ozone-depleting gases is likely to result in substantial depletion of ozone which would lead to significant harm to human health and the environment. While many uncertainties exist and only limited studies are available in several of the areas of potential harm, the current evidence presents a strong case for action to substantially reduce current levels of use of the most potent ozone-depleting chemicals. A comparison of the potential costs of limiting CFCs and halons to the potential health and environmental benefits is presented below in Section VII.

V. The Montreal Protocol

The Montreal Protocol is a comprehensive agreement for dealing with the threat of stratospheric ozone depletion by man-made chemicals. It has three key components. First, it requires parties to significantly reduce their production and consumption of

certain ozone-depleting substances over the next decade. Second, it provides for revision of the reduction requirements based on scheduled, periodic assessments of available scientific, environmental, technical and economic information. Third, it imposes restrictions on trade in ozone-depleting products with nonparties to minimize nonparties' potential to deplete stratospheric ozone and to encourage nations to become parties. Each of these components is described in greater detail below.

The Montreal Protocol will take effect ("enter into force") on January 1, 1989, provided that at least 11 instruments ratifying the Protocol have been deposited by States or regional economic integration organizations representing at least two-thirds of 1986 estimated global consumption of the covered substances, and that the Vienna Convention for the Protection of the Ozone Layer has entered into force. If these conditions have not been fulfilled by January 1, 1989, the Protocol will enter into force on the 90th day following the date on which the conditions have been fulfilled.

The Vienna Convention has so far been ratified by 14 nations, including the United States, as noted above. Twenty instruments of ratifications are required for its entry into force. The Department of State and the White House are currently in the process of requesting from the Senate its advice and consent to ratification of the Protocol, so that the President may ratify it on behalf of the United States.

A. Control Provisions

1. The Chemicals Covered

The Protocol identifies in Annex A two groups of ozone-depleting substances for control "controlled substances"). Group I includes CFC–11, –12, –113, –114, and –115. These chemical compounds are fully halogenated and therefore are strong potential ozone-depleters that are either widely used or potential substitutes for those chemicals which are now widely used.

Group II includes Halon 1211, 1301 and 2402. Because they contain bromine, these chemicals are even stronger potential ozone-depleters than the chemicals in Group I. However, they are currently emitted in small quantities relative to CFCs, substantial uncertainties exist as to their exact ozone depletion weights, and recent evidence suggests that their ozone-depleting potential may substantially depend on atmospheric chlorine concentrations.

The Protocol's coverage extends only to the specified chemicals in bulk form. Its definition of controlled substances excludes chemicals which are in manufactured products other than a container used for the transportation or storage of the chemicals. EPA is seeking comment on the implications of using this definition of controlled substances.

2. "Calculated Levels"

The Montreal Protocol does not place limits on each of the controlled substances. Instead, it places separate limits on the total ozone depletion potential of Group I and Group II controlled substances that a party produces and consumes. A party may consequently produce and consume any mix of the controlled substances within each of the Groups, so long as the total ozone depletion potential of the mix does not exceed the specified limits.

For purposes of calculating total ozone depletion potentials, the Protocol lists in Annex A the "ozone depleting potential" of all but one of the controlled substances. In the case of Halon 2402, it provides that the ozone depleting potential is "to be determined." More generally, it notes that the ozone depleting potentials "are estimates based on existing knowledge and will be reviewed and revised periodically," as provided under Article II, paragraph 9.

The Protocol uses the phrase "calculated levels" to refer to this weighting of controlled substances based on their relative ozone-depleting potentials. It provides under Article 3 that calculated levels be determined for each Group of controlled substances by multiplying the amount of emissions (in kilograms) of each controlled substance within that Group by the ozone depleting potential specified for it in Annex A, and adding together the resulting products.

3. Production and Consumption Limits

Just as the Protocol does not place limits on each controlled substance, it does not place limits on particular uses (e.g. aerosols, refrigeration) of the controlled substances. Instead, the Protocol limits each party's total production and consumption of Group I (CFCs) and Group II (halons) controlled substances for specified 12-month periods. It leaves up to each party how to stay within those limits.

Article 1 of the protocol defines production as "the amount of controlled substances produced minus the amount destroyed by technologies to be approved by the Parties." It defines consumption as "production plus imports minus exports of controlled substances." However, Article 3 provides that after January 1, 1993, any export of controlled substances to non-parties may not be subtracted in calculating the consumption level of the exporting party.

4. Timing and Magnitude of Limits

The limits imposed by the Protocol are generally defined in terms of 12-month periods and keyed to calculated levels of 1986 production and consumption. The year 1986 was chosen as the baseline for controls so that nations did not have an incentive to increase their production and consumption during 1987, when the protocol was being negotiated, in order to establish higher baselines.

a. *Group I controlled substances.* For Group I controlled substances, Article 2 of the Protocol requires each party to reduce in three steps the calculated level of its production and consumption of those substances.

For the first step, paragraph 1 of Article requires that if the Protocol enters into force on January 1, 1989, each party must limit its calculated levels of consumption and production to 1986 levels in the 12-month period commencing July l, 1989, and in each 12-month period thereafter. If the Protocol enters into force on a later date, each party must meet that limit in the 12 month period commencing on the first day of the seventh month following the date of entry into force of the Protocol, and in each 12-month period thereafter.

However, the Protocol permits each party to increase its production in each of the relevant control periods by up to 10 percent of its calculated level of 1986 production, provided that the increased production is used for one or both of two purposes. One purpose is to satisfy the "basic domestic needs" of developing countries operating under Article 5 of the Protocol. That Article allows developing countries who are parties to the Protocol and whose annual calculated level of consumption of both Group I and Group II controlled substances is less than 0.3 kilograms per capita on the date it becomes a party to the Protocol, to delay its compliance with the Protocol's control provisions by ten years after that specified in those provisions, so long as its per capita consumption does not exceed 0.3 kilograms.

With Article 5, the drafters of Protocol sought to fairly accommodate the "special situation" of developing countries whose 1986 consumption of the controlled substances was low relative to that of developed countries. By allowing developing countries to increase their consumption somewhat

and by allowing parties to increase their production to supply the developing countries, the drafters hoped to encourage developing countries to join the Protocol and make it unnecessary for them to build or expand any capacity for producing controlled substances in order to supply for a limited period of time their growing domestic needs.

The second justification for the parties to increase their production by up to 10 percent of 1986 levels is "for the purposes of industrial rationalization between Parties." Article 1 of the Protocol defines industrial rationalization as "the transfer of all or a portion of the calculated level of production of one Party to another, for the purpose of achieving economic efficiences or responding to anticipated shortfalls in supply as a result of plant closures."

For the second reduction step, paragraph 3 requires each party to limit the calculated level of its production and consumption in the period from July 1, 1993, to June 30, 1994, and in each 12-month period thereafter, to 80 percent of the calculated level of its 1986 production and consumption. Notably, the second reduction step takes effect beginning July 1, 1993, regardless of when the Protocol enters into force, so long as the Protocol has entered into force by that date. As in the case of the first step, each party may exceed its production limit in each control period by up to 10 percent of its 1986 production level, provided the production over the limit is used for one or both of the same two purposes described above.

Finally, for the third reduction step, paragraph 4 requires each party to limit the calculated level of its production and consumption in the period from July 1, 1998, to June 30, 1999, and in each 12-month period thereafter, to 50 percent of its calculated level of 1986 production and consumption. Each party is allowed to exceed its production limit by up to 15 percent of its calculated level of 1986 production, provided the production in excess of the limit is used for one or both of the purposes described above. The third reduction step will automatically take effect beginning July 1, 1998, so long as the Protocol enters into force anytime before July 1, 1998, and unless decided otherwise by a two-thirds majority of the parties present and voting, representing at least two-thirds of parties' total combined calculated level of consumption.

Paragraph 5 of Article 2 provides in limited circumstances for further increases in production of Group I controlled substances during any of the control periods discussed above. That paragraph permits parties to exceed the production limits set out in paragraphs 1 through 4 to the extent they receive, for the purposes of industrial rationalization, transfers of production from parties whose calculated level of 1986 production of Group I controlled substances was less than 25 kilotonnes. However, the total combined calculated levels of production of the parties involved in such a transfer of production may not exceed the production limits set out in Article 2. In addition, the secretariat of the Protocol must be notified of any such transfer.

b. *Group II controlled substances.* For Group II controlled substances, paragraph 2 of Article 2 requires that each party limit the calculated level of its production and consumption of those substances to the calculated level of its 1986 production and consumption of the same. Parties must meet that limit in the 12-month period commencing on the first day of the 37th month following the date on which the Protocol enters into force (January 1, 1992, if the Protocol enters into force on January 1, 1989), and in each 12-month period thereafter. However, each party may increase its production of Group II controlled substances in each control period by up to 10 percent of the calculated level of its 1986 production of those substances, provided that the increased production is used for the same purposes for which increased production of Group I controlled substances is allowed (i.e., supplying developing countries and for the purposes of industrial rationalization).

Article 2 of the Protocol includes several other paragraphs applicable only to particular parties other than the United States (e.g., paragraph 6 and 8). Consequently, those paragraphs will not be summarized here nor implemented by today's proposed rule.

B. Review and Revision Provisions

Built into the Protocol are mechanisms for revising its requirements in response to the latest information on stratospheric ozone depletion and its consequences. Article 6 requires the parties, beginning in 1990, and at least every four years thereafter, to assess the control measures set forth in Article 2 on the basis of available scientific, environmental, technical and economic information. It further provides for panels of experts in the relevant fields to issue reports on such information one year prior to each assessment.

Paragraph 10 of Article 2 permits the parties to change the coverage of the Protocol by revising the list of chemicals included in Group I or Group II of controlled substances, based on the periodic assessments required by Article 6. Should the parties add chemicals to either Group, paragraph 10 also permits the parties to decide on the mechanism, scope and timing of control measures that should apply to those substances. Decisions under paragraph 10 become effective when accepted by a two-thirds majority vote of the parties present and voting.

Paragraph 9 of Article 2 allows parties to adjust the ozone depleting potentials specified in Annex A and the control measures specified in Article 2, based on Article 6 assessments. Paragraph 9 provides that the parties first attempt to attempt to reach consensus on the need for any adjustment; otherwise decisions to make any adjustment must be adopted by a two-thirds majority vote of the parties present and voting representing at least fifty percent of the total consumption of the controlled substances of the parties.

C. Trade Provisions

Article 4 of the Protocol requires parties to impose specified restrictions on trade of ozone-depleting products with nonparties. The purpose of the trade restrictions is to reduce the potential of nonparties to adversely affect the ozone layer and to induce nonparties to join, or at least comply with, the Protocol.

Pursuant to paragraph 1 of Article 4, each party must ban the import of controlled substances from nonparties within one year of the Protocol's entry into force. Under paragraph 3, within three years of the Protocol's entry into force, the parties are to develop a list of products containing controlled substances (e.g., refrigerators, air conditioners); and within one year of the list having become effective, parties not objecting to the list are to ban imports of the listed products from nonparties. Under paragraph 4, within five years of the Protocol's entry into force, the parties shall determine the feasibility of banning or restricting products made with, but not containing, controlled substances (e.g., electronic equipment) and, if feasible, develop a list of such products; and within one year of the list having become effective, parties not objecting to the list are to ban imports of the listed products from nonparties.

Paragraph 5 calls on parties to "discourage" the export to nonparties of technology for producing and utilizing controlled substances. In a similar vein, paragraph 6 requires parties to "refrain" from providing new financial help for the export to nonparties of anything that would facilitate the production of controlled substances.

Article 4 also provides for several exemptions from the trade restrictions. Paragraph 7 provides that paragraphs 5 and 6 will not apply to products, equipment, plants or technology that contribute to the reduction of emission of controlled substances; and paragraph 8 exempts from the restrictions of paragraphs 1, 3 and 4 those nations that do not join, but are found to be in compliance with, the Protocol.

D. Other provisions

As for its implementation, the Protocol establishes requirements for parties to report relevant data (Article 7); an accompanying conference resolution calls for UNEP to convene a meeting of government experts to recommend to the parties measure for harmonizing and coordinating data on production, imports and exports of controlled substances. The Protocol also requires the parties at their first meeting to develop enforcement mechanisms and penalties for non-compliance (Article 8).

To ease compliance, the Protocol calls for the parties to cooperate in the research, development and exchange of information on emissions reduction technologies, substitutes for ozone-depleting products, and control strategies (Article 9). It also urges parties to lend one another, and particularly developing countries, technical assistance to facilitate participation in and implementation of the Protocol (Article 10).

VI. Proposed Action

A. Scope and Stringency

EPA proposes to implement the Montreal Protocol, provided that it enters into force and the United States ratifies it. Based on its assessment of the available evidence, EPA believes that the Protocol's requirements are an appropriate response to the potential ozone depletion problem at this time. Moreover, given that potential ozone depletion is a global problem requiring a global response, EPA believes that the Protocol is the most effective means of addressing the problem. For these reasons, EPA believes that implementation of the Protocol would best protect public health and welfare from the adverse effects of any ozone depletion.

The Protocol may be amended in ways that could significantly affect the stringency of the control regime it prescribes. For example, the Protocol provides explicitly that the fifty percent reductions in consumption and production required by Article 2, Paragraph 4, will not come into effect if the Parties by a ⁺wo-thirds majority vote otherwise. In the event that any such amendment is adopted by the parties, EPA intends to conduct rulemaking to consider the effect the changes should have on the control regime prescribed by these regulations.

1. Basis for control requirements

EPA's assessment of the risks of ozone depletion indicates that the Protocol's control requirements are an appropriate response, particularly considering that the Protocol permits revisions of the requirements as new information warrants.

The chemicals covered by the Protocol are those which currently pose the greatest threat to stratospheric ozone. Moreover, the Protocol's different treatment of CFCs and halons reasonably reflects differences in what is known about the ozone depletion potential of the two classes of chemicals and the volume of their respective emissions.

The extent to which a chemical will contribute to ozone depletion depends on its chlorine and bromine content and its atmospheric lifetime. Table 3 lists these characteristics for those compounds considered for coverage. It illustrates that the chemicals in Group II (halons) have greater ozone depletion potentials than the chemicals in Group I (CFCs), and that Group I chemicals have greater ozone depletion potentials than CFC–22 and methyl chloroform. It also shows that carbon tetrachloride (CCl4) is a stronger potential ozone-depleter than several of the chemicals included in Group I.

TABLE 3.—RELATIVE OZONE-DEPLETING POTENTIAL OF CHEMICAL COMPOUNDS

Compound	Lifetime (years)	Ozone-depleting potential [1] (mass basis)
CFC–11	75	1.0
CFC–12	111	1.0
CFC–113	90	0.8
CFC–114	185	1.0
CFC–115	380	0.6
Halon-1211	25	3.0
Halon-1301	110	10.0
Halon-2402	([2])	6.0
HCFC–22	20	0.05
Methyl Chloroform	6.5	0.1
CCl 4	50	1.06

[1] Measured relative to CFC–11 which is set to 1.0. Values reported on a mass basis (i.e. per kilogram).

[2] Not reported.

Sources: Lifetime estimates are based on WMO (1986), and are summarized in EPA Risk Assessment, 1987, and EPA Regulatory Impact Analysis, 1987. Ozone depletion potentials for CFC–11, –12, –113, –114, –115, Halon-1211 and 1301, methyl chloroform, and CCl4 approximate those estimated by the Lawrence Livermore National Laboratory one-dimensional atmospheric model (Connell, personal communication). Ozone depletion potential for Halon-2402 reported at negotiations for *Montreal Protocol on Substances that Affect the Ozone Layer* (Bakken, personal communication). Values for CFC–11, –12, –113, –114, –115, and Halon 1211 and 1301 are listed in Annex A of the Montreal Protocol. These values are preliminary estimates based on currently available research and are likely to change over time as new information becomes available.

HCFC–22 and methyl chloroform are appropriately excluded from coverage for several reasons. First, as Table 3 shows, they are substantially less harmful to the atmosphere than the other chemicals considered for coverage. Second, they have short atmospheric lifetimes, so their future atmospheric concentrations can be more quickly reduced by emission limits if such reductions are determined to be necessary in the future. Third, both chemicals are potential substitutes for some of the more potent ozone-depleting chemicals covered by the Protocol.

In contrast, carbon tetrachloride is a relatively strong potential ozone-depleter, but its small volume of emissions makes it reasonable to exclude. Most carbon tetrachloride is consumed as a feedstock to producing CFCs and relatively little is emitted into the atmosphere.

CFC–114 and CFC–115 are reasonably included despite currently minor production levels because they are fully halogenated CFCs and therefore have long atmospheric lifetimes and are relatively strong potential ozone-depleters. Furthermore, if they were not covered, they could be substituted in some uses for the covered CFCs. If such substitutions were to occur, the risk of ozone depletion would not be substantially reduced. [2]

[2] It should be noted that CFC–115 can be used in a blend with HCFC–22 in several commercial refrigeration applications. While any such use of CFC–115 would be covered by the Protocol's control requirements, shifting from CFC–12 to this blend would substantially reduce the overall ozone-depleting potential of the chemicals used. Since this reduction in ozone depletion would occur without substantially altering product prices, industry may continue this trend as one means of reducing risks from ozone depletion.

Table 3 also highlights the substantial concern with Halon 1211, 1301 and 2402 as potential ozone-depleters. Because bromine remains in a chemically reactive state in the stratosphere, it is an extremely effective catalyst contributing to ozone depletion. However, while general agreement exists that the halons are, kilogram for kilogram, more potent ozone-depleters than CFCs, substantial uncertainties exist regarding their ozone-depletion potential. As a result, the ozone depletion weights provided in Table 3 and Annex A of the Protocol, particularly in the case of the halons, should be viewed as preliminary, and are likely to change as more information becomes available.

EPA examined the effect on future ozone depletion based on projections from a simplified one-dimensional atmospheric model. For a baseline case where CFCs are reduced by 50 percent over ten years, if the halons were allowed to continue to grow at expected rates, depletion of 3.2 percent would occur by 2075. By freezing halon production at current levels, the level of predicted ozone depletion would be reduced to 1.3 percent by 2075.

EPA's risk assessment also indicates that the Protocol's reduction requirements would substantially reduce potential depletion and thus the adverse health and welfare effects of depletion. As shown earlier in Table 2, based on model projections, continued trends in worldwide use of CFCs in the absence of regulation could result in substantial ozone depletion sometime during the early part of the next century.

The extent to which limits on CFC and halon production and consumption could reduce estimated ozone depletion is dependent, in part, on future trends in other trace gases, the extent to which other nations also reduce their consumption and production of ozone-depleting chemicals, and the ability of current models to predict future changes in ozone levels. The assumptions underlying this analysis are explained in detail in the RIA accompanying this rulemaking.

Several different levels of emission reductions and their effects on ozone depletion are presented in Table 4. These estimates are compared to the base case (no regulation) shown earlier in Table 2. They indicate that international action to freeze CFCs at 1986 levels alone would substantially reduce depletion compared to the base case, but would still result in approximately 6 percent depletion by 2075. In contrast, model projections indicate that the reductions required by the Montreal Protocol and the anticipated participation by most developed and developing nations, would result in less than 2 percent depletion by 2075. If the United States were to take additional steps beyond the 50 percent reduction required by the Protocol and reduce its CFC consumption by 80 percent, depletion would only be reduced by an additional 0.1 percent.

TABLE 4.—OZONE DEPLETION LEVELS FOR ALTERNATIVE REDUCTION OPTIONS

[Percent depletion of total column ozone]

Case	2000	2025	2050	2075
1. No controls	0.9	3.9	12.4	39.9
2. CFC freeze	0.8	2.3	4.3	6.2
3. CFC 20%	0.8	1.9	3.4	5.0
4. CFC 50%	0.8	1.5	2.3	3.2
5. CFC 80%	0.8	1.2	1.6	2.2
6. CFC 50%/Halon freeze	0.8	1.3	1.6	1.3
7. CFC 50%/Halon freeze/U.S. 80%	0.8	1.2	1.4	1.2
8. U.S. only/CFC 50%	0.8	3.1	8.5	20.4

Source: Cases 1–6 assume specified reductions are taken on the timetable specified in the Montreal Protocol and that 94 percent of the non-U.S. developed world and 65 percent of the developing world participate in making these reductions. Case 7 assumes that the U.S. takes unilateral action. A more detailed discussion of assumptions is included in Chapter 5 of the RIA.

Given the many variables and uncertainties involved in predicting ozone depletion far into the future, the Protocol's control requirements achieve a reasonable degree of risk reduction. Moreover, the Protocol includes review and revision mechanisms for obtaining more or less risk reduction as advances in modelling capability, new data, or other relevant developments warrant.

The Protocol's trade provisions are also a reasonable means of reducing the risk of stratospheric ozone depletion. As model projections indicate, broad observance of the Protocol is needed to effectively protect stratospheric ozone, and nations that neither joined nor complied with the Protocol would endanger the ozone layer. Implementation of the Protocol's trade restrictions would reduce the potential for those nations to adversely affect the ozone layer and would induce them to join the Protocol.

2. International Considerations

Taken as a whole, EPA believes that the Protocol effectively addresses the global problem of potential ozone depletion. The Agency thus considers it unwise to risk undermining the agreement by deviating from its requirements.

As explained earlier, EPA believes that the available evidence fully supports the need for the Protocol's control requirements. Moreover, failure by the United States to meet all the requirements would set a damaging precedent. For the Protocol to be effective, nations cannot pick and choose which of its provisions to implement.

Requiring the United States to do more than the Protocol requires could also be counterproductive. Were EPA to implement the reductions required by the Protocol regardless of whether the Protocol enters into force, or require greater reductions than the Protocol requires, other nations might have less incentive to join the Protocol. The failure of many nations to join the United States in banning CFCs in aerosols demonstrates that unilateral United States action does not necessarily lead other nations to reduce their emissions, and raises the concern that other nations might "free-ride" on United States reductions to avoid making costly reductions themselves. In any event, as noted earlier, even if EPA were to require that the United States take an additional step beyond the Protocol and reduce its consumption by 80 percent, potential ozone depletion would only be reduced by an additional 0.1 percent.

B. Control Strategy

As noted earlier, the Montreal Protocol leaves up to each party how to achieve the required reductions in production and consumption. EPA's goal in implementing the Protocol is to provide the market place with as much flexibility as the Protocol permits to achieve the required reductions in the most economically efficient manner possible.

1. Economic Incentives Versus Engineering Controls/Bans

Two general approaches for achieving the Protocol's required reductions of controlled substances were evaluated by the Agency. One approach relies on market incentives to achieve low cost reductions in the use of CFCs and halons. Under this approach EPA could either directly restrict the supply of CFCs and halons or assess a regulatory fee on their use. Either case would increase costs of using CFCs which would give those firms with relatively low-cost reduction options an economic incentive to reduce their use of these chemicals. Those firms where no such reduction opportunities exist would continue to use CFCs, although they would have to pay a higher price.

According to economic theory, providing firms with an incentive to make cost-effective reductions should

minimize the costs to society of meeting the regulatory goal. Three alternative economic incentive approaches were evaluated: marketable rights based on auctions ("auctioned rights"), marketable rights allocated by quota to past producers and importers ("allocated quotas"), and regulatory fees.

The second general approach is the use of traditional engineering controls and product or chemicals bans ("engineering controls or bans"). It involves EPA deciding which specific industries or uses of CFCs and halons should be regulated. EPA would make this decision based on the availability of low cost reductions, the quantity of reductions achieved, the administrative burdens of monitoring compliance, the enforceability of the regulation, and the impacts on small businesses. This approach is EPA's usual method of regulating pollution. It was considered alone, and a supplement to allocated quotas based on the extent to which CFC users may be postponing the adoption of low cost reductions "hybrid option").

EPA evaluated each of these options in light of the following criteria: Certainty of achieving the desired environmental goal; economic costs and efficiency in meeting that goal; equity considerations; administrative costs and enforceability; legal certainty; and impacts on small business.

Each of the options has specific advantages, but also raises possible problems. The regulatory fees option should provide for least cost reductions, while providing clear price incentives for users to reduce their reliance on CFCs and halons and for producers to introduce chemical substitutes. However, regulatory fees alone would not ensure that the freeze or reductions of controlled substances would be achieved during the time period required by the Protocol. For example, more firms than anticipated could decide to pay the fee and continue using CFCs or halons. Engineering controls or bans would pose the same problem, since uses of CFCs or halons that were not regulated could continue to grow, possibly offsetting reductions from the regulated uses.

Engineering controls or bans would also be administratively burdensome, considering the many thousands of small firms that use CFCs or halons. In the case of regulatory fees, another concern is whether EPA has the legal authority to impose a fee which would result in revenues in excess of the costs of operating the program; regulatory fees might be invalidated as beyond the Agency's authority under the Clean Air Act. (The legal issues concerning fees are discussed in a separate analysis prepared by EPA which is contained in the docket.)

The auctioned rights option would entail auctioning rights allowing a specified amount of production or consumption of CFCs or halons. The auctions would be open to any interested party. The total amount of production and consumption rights auctioned would reflect EPA's regulatory goal. Revenues from the auction would go to the United States Treasury. Firms seeking to use CFCs or halons would have to obtain rights at auction or by purchasing them from other firms on a secondary market. Alternatively, to the extent CFC or halon producers or suppliers had not purchased rights at auction, final users of these chemicals could simply buy them directly through their existing channels of supply. EPA would monitor compliance by checking whether producers and importers held rights authorizing their production and consumption.

Like all the economic incentive approaches, auctioned rights should provide for economically efficient reductions. In addition, any revenues from the auction would go to the general treasury.[3] Concerns have been raised, however, that auctions, at least initially, would create large uncertainties for firms about price and availability, and could lead to speculation and short-term hoarding of permits (beyond a firm's actual needs) during the auction process.[4] Also, legal questions have been raised concerning EPA's authority under the Clean Air Act to implement an auction to allocate rights. (These issues are also discussed in the EPA analysis contained in the docket.)

EPA favors simply allocating rights equal to the quantity of allowable production and consumption to producers and importers of controlled substances in 1986. Since producers and importers are small in number (probably no more than 15 to 20), it would be far less burdensome to allocate rights to them instead of users. Similar to auctioned rights, firms allocated rights could buy and sell them to respond to changes in market conditions. Price increases as a result of decreased supplies should provide firms using CFCs or halons with the economic incentive to make the lowest cost reductions of controlled substances. Unlike auctioned rights or regulatory fees, this option avoids raising any legal issues concerning EPA's regulatory authority.

The major concern about the allocated quotas option is one of equity—should current CFC and halon producers and importers reap a possible windfall profit from the scarcity created by EPA's regulation? The extent to which CFC and halon prices increase over time will determine the magnitude of this potential gain.

A second concern (one that applies to all of the economic incentive approaches) is that certain industries where low-cost reductions are possible may decide not to make these reductions, at least for a time, and may elect instead to continue their use of CFCs or halons. For example, CFCs are a very small part of the costs of a computer. As a result, firms in this industry may be better able to pass on price increases to their customers. If available inexpensive reductions are not realized by these or other industry groups, then CFC and halon prices could increase more than they otherwise would, resulting in additional economic burden on all firms using these chemicals. The impact of this burden could be particularly large in the near term, before new chemical substitutes become available.

These two concerns are discussed in greater detail in a later section which describes potential remedies to these problems and presents the alternative regulatory approaches still under consideration by the Agency.

2. Design of Allocated Quota System

EPA proposes to implement the Montreal Protocol using a system of allocated, marketable "rights." [5] The Protocol's limits on production and consumption would be translated into allocated quotas of production rights and consumption rights. The Protocol's separate treatment of Group I and Group II controlled substances would be reflected in separate rights for each group of controlled substances. Similarly, the Protocol's definition of

[3] The argument advanced by economists is that equity would be served were revenues from the auction or regulatory fees to go to the Treasury because the revenues would represent payments from those who damage the environment to those who are damaged, i.e., citizens.

[4] Speculation can be an aid to market functioning. Of course, if speculators enter the market and bid up the price to levels higher than market value, they will lose money in their subsequent efforts to sell in the aftermarket. However, to the extent prices are bid up by speculators and remain higher for some time, small firms using CFCs or halons may be adversely affected.

[5] The word "rights" is used as a matter of convenience. The "rights" that would be created by the regulations are really privileges, since, if future circumstances or shifts in the regulatory approach warrant changes in allocations of controlled substances, EPA may by rulemaking modify the amount of rights allocated.

limits in terms of "calculated levels" of Group I or Group II substances would be carried over into the definition of rights. (As explained earlier, calculated level is determined by multiplying the emissions of each controlled substance by its ozone depletion weight and adding together the resulting products for all the controlled substances within each Group.) Thus, rights would be specified in terms of calculated level of Group I or Group II controlled substances, so that holders of rights could select any mix of controlled substances within each Group, provided that the total calculated level of the mix did not exceed the calculated level of the rights held.

a. *Chemical Coverage and Ozone Depletion Weights.* The regulations would include the same chemicals in Group I and Group II of controlled substances as the Protocol does. They would likewise adopt the Protocol's ozone depletion weights for each of the controlled substances. However, the regulations would also provide an ozone depletion weight for Halon 2402, whereas the Protocol leaves the weight for that halon for later determination. EPA is proposing a 6.0 weight for Halon 2402 based on its assessment of the chemical's ozone depletion potential. The Agency will also propose this weight for adoption by the Protocol parties; but should the parties establish a different weight and scientific evidence support their choice, EPA would revise its regulation to conform to the Protocol. In the meantime, EPA believes it appropriate to propose its assessment of the ozone depletion weight of Halon 2404 to give industry a basis for judging their compliance with the halon limit.

b. *Production Rights and Consumption Rights.* Production rights held by firms would authorize them to produce a calculated level of controlled substances equal to the calculated level of rights they hold.[6] Rights would be apportioned among producers of controlled substances according to the calculated level of controlled substances each produced in 1986, the baseline year established by the Protocol. The total of these "baseline production rights" would thus equal United States production in 1986.

Consumption rights would authorize holders to *produce or import* a calculated level of controlled substances equal to the calculated level of the rights held. As described earlier, the Protocol defines consumption as production plus imports minus exports, and keys its consumption limits to 1986 levels of these three components of the consumption equation. Since exports of controlled substances are subtracted from, and therefore aid compliance with the consumption limit, no rights would be required to export (although exporters would be required to report their exports to EPA). Nor would users of CFCs or halons ever become involved with either production or consumption rights—only producers, importers, and exporters would be directly involved in this proposed regulatory system.

Baseline consumption rights would be apportioned to producers and importers, but in a manner that takes account of 1986 exports. Importers would be allotted baseline consumption rights equal to the calculated level of their 1986 imports of controlled substances. Producers would be apportioned baseline consumption rights equal to the calculated level of their 1986 production, less a proportionate share of the calculated level of the United States' total 1986 exports. The apportionment formula for determining each producer's consumption rights would be the producer's 1986 production multiplied by a correction factor equivalent to:

$$\frac{[\text{(U.S. 1986 production)}-\text{(U.S. 1986 exports)}]}{\text{(U.S. 1986 production)}}$$

EPA believes producers' baseline consumption rights should be reduced to reflect exports because producers generally have been the major exporters of controlled substances.

In a separate rule also appearing in today's **Federal Register**, EPA is requiring producers, importers and exporters of controlled substances in 1986 to provide the Agency with the information needed to determine the United States' 1986 production and consumption levels, individual producer's baseline production and consumption rights, and individual importer's baseline consumption rights. Based on the information received, the Agency plans to publish proposed baseline apportionments in time for final apportionments to be included in this rule when it is promulgated on August 1, 1988.

As their definitions suggest, production and consumption rights overlap, but not entirely. To produce controlled substances, a firm must have both production and consumption rights; to import controlled substances, it need have only consumption rights. The overlap simply mirrors the overlap of the Protocol's limits on production and consumption (i.e., production plus imports minus exports). Several examples illustrate how the two limits may interact and how the proposed regulatory system would accommodate these interactions.

Assume the United States in 1986 produced 100 units, imported 10 units, and exported 5 units of Group I controlled substances. United States 1986 production would be 100 units and its 1986 consumption 105 units. After the Protocol's freeze on Group I controlled substances took effect, the United States could not produce up to 105 units of controlled substances for domestic consumption even though it would stay within its consumption limit, because it would exceed by 5 units its production limit. Unless the United States gained the right to increase its production in the manner permitted by the Protocol (described below), it could only obtain the remaining 5 units of controlled substances permitted by the consumption limit by importing them. To restate this scenario in terms of rights, United States producers would be granted production rights for 100 units of controlled substances. Producers and importers would be granted consumption rights for 105 units. Thus, producers could produce up to 100 units of controlled substances using all of their 100 production rights and 100 of the 105 available consumption rights; the remaining consumption rights could be used to import controlled substances.

c. *Allowance for Additional Consumption Rights.* A slightly different example illustrates another aspect of the proposed regulatory system. Assume the United States in 1986 produced 100 units, imported 5 units, and exported 10 units of controlled substances, for a 1986 production level of 100 and a 1986 consumption level of 95. In this case, baseline consumption rights would not be plentiful enough to permit producers to produce all 100 units for which they held baseline production rights. The Protocol would permit production of all 100 units, provided that at least 5 are

[6] Production rights would be required for virgin production, but not for recycling, of controlled substances. Production used and consumed as a chemical intermediary is also exempt. Further, the Protocol defines production of controlled substances as the amount produced minus the amount destroyed "by technologies to be approved by the parties." Because no such technologies have yet been approved, this proposal does not include any provision for credits for destruction. However, EPA intends to work with industry in the future to review existing and new destruction technologies and, if appropriate, submit these technologies to the Parties for their approval.

exported so that the consumption limit is not exceeded. The proposed regulations would permit the same by granting additional consumption rights upon proof of exports of controlled substances to any nation until January 1, 1993, and to any party of the Protocol beginning January 1, 1993.[7] If a producer held production rights for 12 units and consumption rights for 10 units, he could produce the 10 units for which he held production rights, export 2 of the units, and receive from EPA additional consumption rights for 2 units. With those additional consumption rights, he could produce all 12 units for which he held production rights.

The regulations would require controlled substances to be exported before additional consumption rights would be granted, to ensure that the United States stayed within its consumption limits. If EPA were to grant additional consumption rights based merely on a producer's plan or agreement to export controlled substances, the United States could exceed its consumption limits if the producer did not ultimately export the substances but nonetheless increased his production as allowed by the additional consumption rights he received. The regulations would moreover require that exports reach their destination—not just leave the United States—before additional consumption rights would be granted. This requirement is necessary to track controlled substances for purposes of determining parties' compliance with the consumption limits. Otherwise, on the last day of any control period, parties could export controlled substances as needed to stay within consumption limits, but since the exported controlled substances would likely not arrive at their destinations until the following control period, no party would have to include the controlled substances in the tally of its consumption.

Anyone who exports controlled substances could obtain consumption rights equal to the calculated level of controlled substances exported. If the exporter were not also a producer, he could sell the consumption rights to a producer. As further explained below, all rights created by the regulations would be transferable subject to EPA verification that the transferor in fact possesses the rights being transferred.

[7] As noted earlier, the Protocol requires that, beginning January 1, 1993, only exports to parties will be subtracted in determining consumption. EPA will in future rulemakings promulgate a list of parties based on the list kept by the Secretariat of the Protocol.

To illustrate another possible scenario, assume total United States exports increased over 1986 levels, so that the United States was below its consumption limit. While the United States could not increase its production (except under the circumstances described below), it could increase its imports up to the level permitted by the consumption cap. To restate this in terms of rights, if a producer with production rights for 10 units and consumption rights for 12 units exported 6 units, he could acquire additional consumption rights for 6 units and import a total of 8 units.

As the above examples demonstrate, the Protocol's production and consumption limits can interact in many ways. EPA has tried to create a regulatory system flexible enough to accommodate the possible interactions. Comments are requested on whether the proposed system does provide adequate flexibility and how it might be improved.

d. *Scheduled Reduction of Production and Consumption Rights.* The regulatory system must also provide for the Protocol's scheduled reductions. The proposed regulations would do so by reducing the number of rights granted over time. For Group I controlled substances, it would grant producers and importers 100 percent of their apportioned baseline production and consumption rights for the first reduction step; 80 percent of the same for the second reduction step; and 50 percent of the same for the third. For Group II controlled substances, the regulations would grant 100 percent of the apportioned 1986 baseline production and consumption rights for all the applicable control periods.

The proposed regulations do not yet specify the control periods to which the grants of rights would apply, since the Protocol makes the timing of the freezes of Group I and Group II substances dependent on when the Protocol enters into force. EPA solicits comments on the appropriate time period for which these rights would apply. EPA would promulgate the dates of the control periods in a future rulemaking after the Protocol has entered into force and before the Protocol's requirement have taken effect.

Even after the date of entry into force is known, however, a question will remain as to the proper dates for the freeze of Group I controlled substances at 1986 levels. The issue arises from the potential discontinuity in the timing of the first and second steps of the reduction schedule for Group I controlled substances. The Protocol specifies 12-month control periods for all three steps of the Group I reduction schedule. But while the Protocol provides that the second step will take effect beginning July 1, 1993, it makes the start of the first step dependent on when the Protocol enters into force. If the Protocol enters into force on January 1, 1989, the freeze will take effect beginning July 1, 1989. In that case, the end of last freeze control period will coincide with the start of the first control period for the second step. On the other hand, if the Protocol enters into force on any date other than January 1st, there would be overlapping control periods, unless EPA defined the last control period as lasting less than 12 months.

To avoid this problem, EPA intends to promulgate dates for the last control period of the freeze that do not overlap with the first control period of the 80 percent step. Unless the Protocol enters into force on January 1, the last control period of the freeze would be less than 12 months long, and the rights granted for that period would be reduced accordingly. EPA solicits comments on this approach.

e. *Allowance for Additional Production Rights.* As explained earlier, the Protocol allows parties to exceed their production limits by certain amounts under certain circumstances. For the first and second steps of the reduction schedule for Group I controlled substances and for the freeze of Group II controlled substances, the Protocol permits parties to exceed the applicable production limits by 10 percent of the calculated level of their 1986 production in order to supply the "basic domestic needs" of parties that are developing countries and "for the purposes of industrial rationalization." For the third step of the Group I reduction schedule, the Protocol allows production to exceed the 50 percent production limit by 15 percent of 1986 production levels for the same two purposes. These allowances are termed "potential production rights".

EPA believes that the driving force behind the developing countries and industrial rationalization provisions was to minimize the construction of new manufacturing capacity, particularly during the initial period when states are deciding whether to adhere to the Protocol. So viewed, the provisions for 10 and 15 percent increases in production are intended to allow nations that already have substantial installed manufacturing capacity to make available limited amounts of supplies to satisfy demand from developing nations, and to offset for losses in production that might be sustained by shutting

down inefficient or obsolete facilities. The cushion provided by the allowable "potential production rights" will provide sufficient flexibility in the market to accommodate these needs without undue price increases that might encourage construction of new manufacturing capacity.

Accordingly, EPA proposes to implement the provisions for 10 and 15 percent production increases by allocating "potential production rights" that could be converted to production rights upon proof of exports of controlled substances to parties. Every producer granted baseline production rights would also be granted potential production rights equal to 10 or 15 percent of his baseline production rights, depending on the control period and group of controlled substances involved. A producer could then obtain authorization from EPA to convert his potential production rights to production rights to the extent he exported controlled substances to parties.

Because the industrial rationalization provision refers to transfers between *parties*, and the developing country provision similarly limits production increases to those necessary to supply *parties* that are developing countries, EPA would authorize conversion of potential production rights only to the extent controlled substances have been exported to parties. In future rulemakings, EPA would promulgate, and from time to time revise, as Appendix B to these regulations, a list of nations that are parties to the Protocol. That list would be based on the list of parties kept by the Secretariat of the Protocol.

EPA would otherwise issue notices authorizing conversion of potential production rights on the same basis as the Agency would grant additional consumption rights upon proof of exports. In both cases, EPA would require that the exported controlled substances arrive in the country importing them before EPA would issue the authorizing notice or grant consumption rights. EPA would also limit the authorization or the consumption rights to the control period in which the exports arrived in the importing country.

For a producer to make use of production rights converted from potential production rights, he would also have to obtain consumption rights in the same amount. Since any controlled substances he exported to a party would provide the basis for obtaining additional consumption rights, EPA would treat requests for authorization to convert potential production rights as requests for additional consumption rights, as well. Therefore, upon proof of exports to parties, EPA would (1) issue a notice authorizing the conversion of potential production rights equal to the calculated level of the exports, for the control period in which the exports arrived in the importing nation, and (2) grant consumption rights in the same amount for the same control period.

Anyone (not just producers) exporting controlled substances to parties could obtain *authorization* to convert potential production rights, whether or not he held potential production rights. If he did not hold potential production rights, he could either purchase such rights from, or sell his authorization to, someone who does. If enough controlled substances were exported to parties, it would be possible for EPA to issue authorizations to convert more potential production rights than there were potential production rights to convert. In that case, authorizations beyond those needed to convert all available potential production rights could not be used without violating the terms of the Protocol and would therefore be useless.

f. *Transfers Involving 25 Kilotonne Parties.* The Protocol also allows a party to increase its production beyond the 10 or 15 percent allowances, if it receives a transfer, "for the purposes of industrial rationalization," of a calculated level of production from another party whose 1986 calculated level of production was less than 25 kilotonnes. However, unlike the other provisions related to industrial rationalization, this section of the Protocol provides that "the total combined calculated levels of production of the Parties concerned (may) not exceed the (Protocol's) production limits."

EPA proposes to implement this provision by permitting anyone ("the recipient") to obtain production rights in excess of baseline production rights to the extent a "25-kilotonne party" agrees to transfer to him some amount of the calculated level of production that the party is permitted under the Protocol and to decrease its production by that amount. In a future rulemaking, EPA would promulgate a list of 25-kilotonne parties as Appendix D to these regulations. EPA would adopt a list of 25-kilotonne parties compiled by the Protocol parties, but absent such a list, the Agency would compile its own based on information available from the Secretariat of the Protocol and the parties themselves.

EPA believes that any transfer meeting these requirements would serve the purposes of industrial rationalization, which are to "achiev[e] economic efficiencies" or "respond[ ] to anticipated shortfalls in supply as a result of plant closures." EPA could reasonably assume that any such transfer would "achiev[e] economic efficiencies" since the United States recipient of a 25-kilotonne party's production presumably would not seek that production unless it were economically efficient for him to produce it.

The regulations would require that the recipient of a 25-kilotonne party's production obtain from the principal diplomatic representative in that party's embassy in the United States a document clearly stating that the 25-kilotonne party will decrease its production by the amount it is transferring to the recipient. The 25-kilotonne party's agreement to decrease its production by the amount being transferred would ensure that the total combined calculated levels of production of the United States and the 25-kilotonne party would not exceed the limits applicable to the two parties under the Protocol. Upon obtaining a copy of this document and other requisite information, EPA would notify the Secretariat of the Protocol of the transfer, as required by the Protocol, and issue a notice granting the recipient production rights equivalent to the calculated level of production transferred.

g. *Transfer of Rights.* As pointed out earlier, all of the rights and authorizations obtained pursuant to the regulations would be transferable. However, for a transfer to be effective, the transferor would first be required to submit a transfer request to EPA. The Agency would maintain records of who holds what rights or has been issued authorizations to convert potential production rights. If EPA's records indicated that the transferor possessed sufficient rights or authorization to cover the transfer request, EPA would issue a notice of transfer to the transferor and transferee. The transfer would take effect as of the date EPA issued the notice, and EPA would revise its records to reflect the transfer.

EPA is proposing these transfer requirements because of the need to assure compliance with the Protocol. A fraudulent transfer of rights or authorization would not only result in higher emissions of ozone-depleting substances, but risk the United States exceeding the Protocol's limits. Thus, EPA has provided for the procedural safeguards described above to minimize the possibility of fraudulent or mistaken transfers.

h. *Prohibitions on Production or Import in Excess of Rights.* The

capstone of the proposed system of production and consumption rights would be the prohibitions on production and import of controlled substances. The regulations would prohibit anyone from producing a calculated level of controlled substances in excess of the amount of "unexpended" production rights held by that person. Similarly, they would prohibit anyone from producing or importing a calculated level of controlled substances in excess of the amount of "unexpended" consumption rights held by that person. A person's "unexpended" production or consumption rights would be the total of the calculated level of production or consumption rights he holds, minus the calculated level of controlled substances the person has produced and/or imported, depending on the type of rights involved. In short, the prohibitions prevent anyone at any time from producing or importing controlled substances in amounts greater than the unused production and consumption rights that he holds at the time.

i. *Import Bans.* In addition to implementing the Protocol's production and consumption limits, the regulations would also enact the Protocol's ban on imports of controlled substances from any nonparty, except nonparties found to be in compliance with the Protocol's requirements. The Protocol requires that parties impose, and the regulations would accordingly implement, that ban beginning one year after the Protocol enters into force. In future rulemakings, EPA would promulgate, and from time to time revise, as Appendix C to these regulations, a list of nonparties found to be in compliance with the Protocol.

The Protocol also provides for parties to impose import bans on products containing and products made with, but not containing, controlled substances. However, those provisions are not self-executing, as they require further action of the parties to implement. Thus, EPA is not proposing to impose further import bans, but will promulgate such bans in future rulemakings when the parties have taken the necessary action. EPA is nonetheless seeking comments on products that should be covered by the future bans. The Agency is also seeking comment on whether any additional steps (e.g., labelling of products containing or produced with controlled substances from nonparties) might be warranted either prior to or in conjunction with the trade restrictions contained in the Protocol.

j. *Reporting and Recordkeeping.* EPA is considering a variety of alternative recordkeeping and reporting requirements. One option is to require firms involved in the production of the regulated chemicals to maintain the following information: Weekly records of the quantity of regulated chemicals produced at each facility including controlled substances produced and consumed for feedstock purposes; and weekly records of the quantity and purchaser of controlled substances produced at each plant. These records would be retained for a period of four years.

In addition, EPA would require monthly reports from producers of the controlled substances for each plant and for all plants owned by the same company within 15 days after the end of each month. The reports would include the following: summaries of monthly production of the controlled substances; monthly summaries of the quantity of sales for each of the controlled substances; the quantity and source of material containing recoverable controlled substances and the quantity of controlled substances recovered; summaries of total monthly and control-period-to-date production of the calculated levels of Group 1 and Group 2 controlled substances; and total rights the producer holds at the end of each month.

Another approach and the way EPA is presently leaning is to require the following information: daily records of the quantity of the CFCs and halons produced at each facility including controlled substances produced and consumed for feedstock purposes; daily records of the quantities of HCFC–22 and CFC–116 that may also be produced at the same facilities; continuous records of reactive temperature and pressure within the primary reactor and initial distillation column at each facility during the production operations; daily records of purchases and use of the following materials consumed in producing the regulated chemicals at each plant: carbon tetrachloride, perchloroethylene, chloroform, hydrofluoric acid, hydrochloric acid, bromine, HCFC–22 and CFC–23; and daily records of the quantity and purchaser of controlled substances produced at each plant. These records would be retained for a period of four years.

Under this approach, monthly reports required within 15 days of the end of each month would include the following: summaries of monthly production of the controlled substances, specifying the quantity used and consumed as feedstocks, and production quantities of HCFC–22 and CFC–116, if they are produced at the same facility; monthly summaries of the quantity of sales for each of the controlled substances; description of any material alterations in the annual production plan required for each facility by EPA (as described below); description of any shifts in operating characteristics; the quantity and source of material containing recoverable controlled substances and the quantity of controlled substances recovered; summaries of total monthly and control-period-to-date calculated production levels of Group I and Group II controlled substances; and the producer's total consumption rights, production rights and authorization to convert potential production rights to production rights.

EPA is leaning toward requesting daily instead of weekly records of production since daily records will provide more precise information on production. The more precise information will aid in evaluating trades (determining expended versus unexpended production rights), pinpointing violations, and will ease checks on production records when using process parameters (quantities of raw materials, temperature, pressure) to calculate production. It is not expected that daily records will impose a significant burden on the industry since information currently available to EPA indicates that manufacturers already keep production data on a once per shift basis. Records of raw materials, process parameters, and other CFC compounds (HCFC–22 and CFC–116) produced at the regulated facilities are requested to provide a check on production records. Records of sales of controlled substances would provide not only a check on production records, but would provide EPA information on whether exporters have actually purchased the reported quantity of controlled substances exported. Records of imports and exports are requested on a daily basis since EPA will need to check the date of import/export against records held by U.S. Customs and the U.S. Census to verify compliance.

This information would provide EPA with a double-check on whether producers and importers are staying within their production and consumption rights. EPA solicits comment on both of these approaches to reporting and recordkeeping requirements. EPA is specifically interested in the level of reporting necessary to ensure compliance with permit restrictions.

Whatever approach is chosen, failure to maintain the required records or file these reports in a timely manner may result in EPA assuming production for the unknown period at maximum

capacity for the purposes of evaluating compliance.

Records and reports could be required for each facility at each plant owned by a company or they could be required on an aggregate, company-wide basis. EPA is presently inclined to require that all production and sales records be maintained for individual production facilities, but that monthly reports to EPA be submitted containing information for both individual plants and aggregated for all the plants owned by a firm.

With this approach, EPA would not grant rights for each CFC or halon production facility or plant, but will instead grant rights that are company-wide. However, to facilitate enforcement with respect to these rights, EPA will require that firms inform EPA on an annual basis of their intended production plans for each facility and plant and notify the Agency of any significant shifts in the location or quantity of production described in these plans as part of their monthly reports. While compliance with these annual production plans will not be binding, they provide useful information to EPA for purposes of compliance monitoring. EPA solicits comments on the sufficiency of these requirements.

For firms engaged in the import of controlled substances, EPA is also considering a variety of alternative reporting and recordkeeping requirements. EPA is presently inclined to require the maintenance of daily records of the quantity of controlled substances, either alone or in mixtures, that are imported; the dates and ports of call of imports; the date and port of entry into the United States or its territories; the dates on which and the country in which the imported controlled substances were produced; and a name and address from which additional information can be obtained. Monthly reports by importers to EPA must include summaries of the above information along with totals for control-period-to-date and the importer's total consumption rights at the end of the month. EPA will further verify reported import activities with information obtained by U.S. Customs and with information reported through data presented by other nations to the Secretariat to the Protocol.

Exporters must report all exports not previously reported in the context of obtaining consumption or production rights. Reports would be required on a monthly basis and include: name and address of exporter and recipient of the exports; the exporter's Employer Identification Number (EIN); the type and quantity of controlled substances exported; the date and port from which the exports were shipped; the date and country in which the exports arrived; and the source from which the exported controlled substances were purchased.

To facilitate the collection of the relevant information, EPA is requesting the U.S. Department of Commerce for permission to obtain copies of Shipper's Export Declarations (Form 7525–V) filed by exporters of controlled substances. EPA is also requesting the Customs Service for permission to obtain copies of "Entry Summaries" (Form 7501) filed by importers of controlled substances. EPA solicits comments on these reporting and recordkeeping requirements.

k. *Compliance and Penalties.* Based on its review of reports and records and possible site inspections, EPA would determine whether firms are in compliance with the regulations. The regulations would define a violation as the production or import of every kilogram of controlled substances in excess of unexpended production or consumption rights, or in contravention of the ban on imports from nonparties.

Under section 113(b) of the Clean Air Act, penalties of up to $25,000 per day per violation can be assessed. Thus, a firm that produced two kilograms of controlled substances beyond its rights would be potentially subject to a maximum fine of $50,000. In addition to the various remedies under the Clean Air Act, EPA has the authority to seek injuctive relief to limit further production or sales, and to seek to have any activity in excess of unexpended rights subtracted from future year's rights. Also, the Agency may bring criminal penalties against knowing violators, as set forth under section 113(c) of the Act.

Given that compliance with the terms of the Montreal Protocol is determined on a twelve month basis, the control period would be for one block year (unless otherwise specified), and EPA would track compliance over that same period. However, tracking compliance on an annual basis presents some practical limitations—in extreme circumstances a firm could go out of compliance only at the end of the period. With a shorter averaging time or a rolling average, compliance could be judged earlier or more frequently. As an alternative to the block annual control period, EPA could specify a rolling twelve-month control period where compliance could be measured at the end of each month based on the previous twelve months of production. This alternative would provide greater assurance that the United States satisfies its obligations under the Montreal Protocol, but could somewhat limit the flexibility of firms in meeting shifting market conditions during the course of a year. EPA proposes to initially specify compliance on a block one year control period, but will consider shifting to a twelve-month rolling control period if difficulties in ensuring compliance develop. EPA may impose the twelve-month rolling quota on firms that have violated production or consumption rights or in cases where compliance monitoring is hindered.

1. *Effective Date.* The proposed regulations would not take effect until the Montreal Protocol enters into force. After the Protocol has entered into force, EPA would revise the effective date section of regulations to include the date of entry into force.

The United States is now in the process of ratifying the Protocol. That process includes completion of an environmental impact statement concerning the Protocol, and submittal of the Protocol by the President to the Senate for its advice and consent. If the Senate gives its advice and consent, the ratification document then goes to the President for his signature and, once signed, is deposited at the United Nations headquarters. Unless unanticipated delays are encountered, EPA expects this process to be completed well before the January 1, 1989 target date for entry into force.

m. *Payment of Fees.*[8] (a) *Background.* In recognition of the fact that producers and importers of controlled substances would receive production and consumption rights which would allow them to engage in their activities, EPA has examined the feasibility and desirability of making the administration of this regulatory system as self-supporting as possible by having the producers and importers bear some of its costs through payment of administrative fees. EPA is proposing to include Sec. 82.14 in the proposed rule, which would provide for EPA to collect fees in advance for granting production and consumption rights. The authority for this provision is the Independent Offices Appropriation Act ("IOAA"), 31 U.S.C. 9701 (formerly 31 U.S.C. 483(a)), which permits and encourages Federal agencies to recover, to the fullest extent possible, costs attributable to special benefits provided to identifiable recipients.

[8] Payment of *administrative fees* to cover the costs of operating the program is being proposed regardless of the regulatory approach (e.g. allocated quotas, auctions, or regulatory fees) employed. Because the fee simply covers the costs of operating the program, the legal issues concerning a fee used as a regulatory tool are not applicable.

The following describes the broad outlines of the fee program.

(b) *Activities, the Cost of Which are Proposed for Recovery.* The Supreme Court has stated that agency activities for which costs are properly chargeable to the recipient are those which "bestow[ ] a benefit on the applicant, not shared by other members of society." In *National Cable Television Ass'n* v. *U.S.*, 415 U.S. 336, 340–41 (1974). The Court of Appeals for the D.C. Circuit has further specified that the full costs of providing a service may be recovered when:

- The Agency has identified specific activities for which the fee is being assessed;
- The service produces a private benefit;
- The value of the benefit is reasonably related to the fee;
- The benefit accrues at least in part to an identifiable private beneficiary and not merely to an entire industry; and
- The service produces no independent public benefit. *Central & Southern Motor Freight Tariff Ass'n* v. *U.S.*, 777 F.2d 722, 730 (D.C. Cir. 1985).

Based on these criteria, EPA proposes to recover the full costs of the following activities, all of which relate to apportioning and administering production and consumption rights:

(1) Determining the amount of baseline production and baseline consumption rights apportioned to specific producers and importers.

(2) Processing applications, under Secs. 82.9 and 82.11 for additional production rights, and taking associated actions (e.g. notifying the Secretariat of the Protocol of 25-kilotonne party transfers).

(3) Processing applications under Sec. 82.10 for additional consumption rights.

(4) Processing applications under Sec. 82.12 for transfers of rights.

(5) Processing and maintaining the reports required to be submitted to EPA under Sec. 82.13.

EPA requests comments on whether to charge for additional activities, such as audit and enforcement activities.

(c) *Determination of Costs of Activities.* EPA proposes to recover the following costs of the activities described above:

(1) Direct labor costs, which will be based on the grade level of staff working directly on the activities;

(2) Indirect labor costs, which will include managerial and supervisory support, and secretarial/clerical support; and;

(3) Overhead costs, including office space costs, utilities, equipment, and materials.

By the first day of any control period, every person owning production or consumption rights applicable to that control period would have to pay EPA the full amount of the fee owed. Failure to pay the fee on a timely basis would result in the person being treated as owning no production or consumption rights during the control period, until payment is made. Late payment would be subject to interest computed at the Federal short-term rate.

Under EPA's proposed system, owners of production or consumption rights would make one fee payment as of the beginning of the control period. No additional fees would arise from applications to EPA under Secs. 82.9–82.12 for additional production or consumption rights or transfers of rights. EPA solicits comments on the merits of charging separately for EPA's costs in processing such applications and reducing the up-front fees accordingly. In addition, EPA solicits comments on procedures for imposing fees with respect to audit or enforcement activities, if EPA determines to impose such fees.

(d) *Fee Waivers or Adjustments.* There may be circumstances under which waivers from, or adjustments of, fees would be appropriate. While the IOAA is silent concerning such matters, it does provide that the President shall set policies concerning the implementation of the IOAA. Office of Management and Budget (OMB) Circular A–25, Sec. 9(b) contains guidelines for Federal user charge systems and provides for exceptions to a general user fee policy under several circumstances. Under these guidelines, waivers may be appropriate under the following circumstances:

(1) *Public Interest.* If the person uses the controlled substances as part of activities designed to promote the public interest, the fee may be waived. EPA solicits comments on the circumstances under which this exemption may be applicable.

(2) *Economic Hardship.* A fee may be waived or adjusted if its imposition would result in an economic hardship on the person. Considerations for an economic hardship waiver include size of the firm and amount of sales or use of controlled substances.

(3) *Small Business.* EPA solicits comment on whether waivers of adjustments would be appropriate for small businesses, based on number of employees and annual gross revenue from sale or use of the controlled substance.

EPA further solicits comments on whether a fee should be charged for processing an application for a waiver or adjustment (which would be refunded if the waiver or adjustment is granted).

3. Other Regulatory Options Considered

As a regulatory scheme, allocated quotas of production and consumption rights appear to offer the advantages of the other options while avoiding many of their potential problems. However, as discussed above, it is not free from concerns.

By restricting the supply of CFCs and halons through regulation, EPA would effectively create a scarcity that would result in higher prices for the controlled substances as demand for CFCs and halons exceeded supply over time. Under the allocated quota approach, any additional revenue that would result from the scarcity created by this regulation accrue to the firms allocated rights.

The magnitude of these transfer revenues would depend on how much the prices for the regulated chemicals increased over time. Based on the analysis presented in the RIA, Table 5 presents EPA's estimates of possible transfer revenues that would accrue primarily to the chemical manufacturers, assuming that they allowed market forces to determine what price and which firms purchase CFCs and halons. (If market forces do not operate, the producers and importers will determine allocation to users based on criteria other than prices.) Table 5 shows that, even for scenarios where price increases are small in the initial years and gradually increase to the price where expected chemical substitutes come into play, the total amount of transfers could range from $2.0 billion to $5.7 billion from 1989 through 2000. For the scenario where CFC price increases in the early years are more substantial (e.g., the "stretchout cases" where implementation of low cost reductions is delayed), the amount of the transfers increases accordingly. Overall, for the decade leading up to the turn of the century, transfer revenues were calculated to be approximately three times greater than the social costs (i.e., the real resource costs to reduce use) involved in meeting the control requirement.

TABLE 5.—PRELIMINARY ESTIMATE OF POTENTIAL SOCIAL COSTS AND TRANSFERS TO PRODUCERS

	Least cost	Stretchouts		
		Moderate	Moderate/major	Major
CFC price increases (1985 $/kg): 1989	0.0	0.0	0.0	0.0

TABLE 5.—PRELIMINARY ESTIMATE OF POTENTIAL SOCIAL COSTS AND TRANSFERS TO PRODUCERS—Continued

	Least cost	Stretchouts		
		Moderate	Moderate/major	Major
1994	2.21	3.50	3.70	5.48
1999	3.77	5.48	5.48	5.48
2005	3.77	5.48	5.48	5.48
2075	5.48	5.48	5.48	5.48
Social costs (present value in millions of 1985 dollars):				
1989–2000	689	1,146	1,628	1,850
1989–2075	27,040	29,220	37,910	38,140
Transfer revenues (present value in millions of 1985 dollars):				
1989–2000	1,975	2,516	2,757	5,703
1989–2075	6,163	7,096	6,376	9,400

Assumes CFCs regulated with an initial freeze in 1989 at 1986 levels, 20 percent reduction in 1993 and 50 percent reduction in 1998, and halons frozen at 1986 levels in 1992.

Social costs are discounted at a 2 percent rate, and transfer costs are discounted at a rate of 6 percent, reflecting the opportunity cost of funds in the private sector.

Source: Estimates taken from RIA.

An argument can be made that the above analysis overstates the quantity of transfers. According to this line of reasoning, chemical manufacturers may not behave competitively and would not allow market prices to determine who gets these chemicals, but would instead directly allocate them to their customers based on past sales. CFC and halon prices would increase only gradually reflecting the higher costs of producing less of these chemicals and the need to generate capital for research and production of chemical substitutes. The resulting lower price increases could act as a disincentive to the introduction of more expensive, substitute chemicals.

While no estimate of the price increases under this scenario has been calculated, given the slow rate of price increase in the EPA scenarios, the overall difference in the quantity of transfers is not likely to differ substantially. Thus, even in the scenario where CFC and halon producers allocate their allowable production and limit price increases, transfers on the order of a nearly a billion dollars or more are likely over the next ten years. This raises questions as to whether possible profits from continued production of the restricted chemicals might have the undesired effect of delaying the introduction of less profitable chemical substitutes.

EPA has explored a number of possible approaches to improving the equity of its proposed regulation by reducing or eliminating the potential transfers to the CFC and halon producers and importers. One approach, the use of auctions to allocate marketable rights, was mentioned in an earlier section. Under this option, EPA would auction rights to all interested parties and the resulting transfers would accrue to the U.S. Treasury.

An advantage of the auction approach is that it takes CFC allocation out of the hands of producing firms and allows the market to function. While detailed design of an auction is not presented, as an aid to commenters, the major characteristics of auction forms most likely to be applicable to the case of CFCs can be briefly presented. An advantage in the design of an auction of CFC permits is the availability of existing models provided by the auctions regularly conducted by the Federal Government in the areas of government procurement, leasing of mineral rights (including onshore and outer continental oil and gas development, coal leases, geothermal development, etc.), and Treasury bills.

The government auctions are typically structured as "first-price sealed-bid" auctions,[9] in which potential bidders submit sealed bids and the highest bidder is awarded the item for the price he bid. An alternative is the "second-price sealed-bid" auction, in which the highest bidder wins the item but pays a price equal not to his own bid but to the second-highest bid. Variations on these forms can be used: for example, the government may impose a reserve price, discarding all bids if they are too low; and bidders may be charged an entry fee for the right to participate.

When a fixed quantity of a good is put up for sale (such as with the weekly Treasury bill auction), two kinds of sealed bid auctions are used to sell multiple units, as explained below. In the discriminatory sealed bid auction, each of the bidders pays the amount he bid. In the uniform-price sealed bid auction, each successful bidder pays a price equal to the highest unsuccessful bid. Procedurally, bidders submit bids that consist of both a price and a desired number of units of the commodity. Enough units are available that a number of the highest bidders can be awarded the units for which they bid. The government then ranks all buyers' bids by price from highest to lowest, and cumulates the quantities bid.[10] The result is a market demand curve.

To aid in reducing uncertainty, the introduction of an auction as an allocation mechanism could be phased in according to a preannounced schedule (such as every three months); each auction would offer only a fraction of total rights for sale. The phase-in approach would allow time for procedural and substantive familiarity to be gained by all parties; if necessary, limitations could be placed on the amount of rights any one firm could acquire. With a very short timeframe between auctions, a firm concerned about the bidding up of prices could hold back, bid only its true value for rights in a subsequent auction, and have less concern over rights acquisition. To the extent it is desirable to protect small firms or particularly vulnerable industries, set asides could be designated for these groups.

In EPA's consideration of the use of an auction to allocate rights, several concerns have arisen. EPA is concerned about the potential large uncertainties regarding the price and availability of the controlled substances which an auction might create, particularly in its initial years. Related concerns are that big companies could easily outbid small companies, that speculators would drive up the price of rights, and that companies would hoard supplies.[11] As suggested above, a number of steps in designing an auction could be taken to address these concerns.

The final concern involves the question of EPA's legal authority under the Clean Air Act to operate an auction. Such an auction would constitute regulatory action by an administrative agency, pursuant to an asserted grant of authority from Congress, requiring the payment of money by the private sector to the U.S. Treasury. The principal legal issues EPA is considering concern (i) whether such an asserted grant of congressional authority constitutes a delegation by Congress of its constitutional power to impose taxes or, alternatively, its constitutional power to regulate commerce; and whether Congress in fact granted such authority for an auction under the statutes EPA administers.

One potential alternative—a "zero revenue auction"—might avoid some of the legal and practical problems. This alternative would not yield revenue to the government.

Under this approach, each producer (or user) would receive a provisional

[9] Sealed-bids are preferred due to risk aversion on the part of bidders.

[10] The cumulation process may require several steps (not detailed here).

[11] To some extent uncertainty stems from the shortages themselves and sufficient information regarding the auction form would alleviate concerns over the method of allocation.

allocation of rights equal to its 1986 production (or use). Each producer or user would then be required to submit a sealed bid presenting the number of rights it would purchase at a range of alternative prices (i.e. its demand schedule). These bids would be aggregated to construct the market demand for these rights. The resulting market price would then be set at the price that equates market demand with the 1986 ceiling on total production.

Each firm's final allocation will be its reported demand at the market price. Each firm would then pay an amount equal to the price of these rights times its final allocation and receive back an amount equal to the price times its provisional allocation. Net payments to the government would be zero for all firms taken together. Each firm would receive exactly the number of rights it initially stated it would be willing and able to purchase at the equilibrium price.

The zero revenue auction has several features that make it an attractive interim option. First, it virtually eliminates uncertainty by guaranteeing each firm the number of rights it initially reported in its ceiled bids at each alternative price.[12] Second, it automatically produces the first round of trades in the system of marketable permits, thus reducing any one firm's ability to hoard, speculate, or to outbid others. Third, it produces a public price signal providing information for future (non-zero revenue) auctions and other allocation systems that the government may want to implement as well as for potential entrants into the industry. Finally, if the auction is conducted for users (as opposed to producers), it would address the concerns that some users may be forced out of business. Each user could guarantee that it stays in business or be compensated for going out of business at a price to which it agreed.

If it is determined that EPA lacks the authority to conduct an auction, legislative authorization would be necessary. These legal issues are addressed in greater detail in an analysis prepared by EPA which is included in the docket.

EPA is specifically interested in receiving comments on the desirability of using auctions as the method of allocating rights, the possible steps EPA could take to minimize disruption in the early years of an auction, and the legal issues concerning the possible need for additional legislative authority.

If the legal obstacles to auctioning marketable permits cannot be resolved, a potentially attractive alternative would involve EPA allocating CFC or halon rights to firms now using (as opposed to producing, importing, or exporting) these chemicals. This option is very similar to the scenario described above whereby the chemical producers would reallocate their allowable quotas to their customers based on historic sales. The major difference is that in the option where EPA allocates rights directly to users, the possibility of transfers from users to producers is substantially reduced. However, under this option EPA would be required to allocate rights to approximately 10,000 firms who now buy directly from CFC and halon producers. EPA is interested in receiving comments on the desirability of this approach and possible ways to minimize the administrative burden of the intitial allocation.

Another attractive option which provides a strong alternative to the auction option would be to combine allocated quotas with a regulatory fee. While a fee alone would not ensure compliance with the reductions required by the Montreal Protocol, when teamed with allocated quotas, this flaw would be remedied. The quota would provide a relatively straightforward means of ensuring that the reductions required by the Montreal Protocol are achieved. A fee assessed against producers and importers would provide an economic incentive for the introduction of chemical substitutes and for firms to employ other low cost methods of reducing emissions. It would also provide clear signals about future price increases and avoid many of the potential uncertainties associated with auctions. The fee would also capture most of the transfers for the U.S. Treasury, thus serving equity.

The fee would be set to capture all or most of the CFC and halon price increases which result from the scarcity created by EPA's regulations. The marginal cost of the CFC control alternatives (including substitutes) would provide the primary basis for setting the level of such fees. As with tradable rights, fees would be scaled on the basis of ozone-depleting potential, e.g. dollars per kilogram-equivalent of ozone-depleting substance produced.

An important design consideration is the extent to which periodic fee adjustments would occur on an automatic basis or would require regulatory intervention. With the quota system in place, automatic fee changes specifically intended to bring actual CFC production into alignment with production goals would not be necessary. However, any adjustments needed as a result of significant changes in economic activity, new scientific evidence, and/or discovery that the cost of switching to certain substitutes was different than previously thought would likely be difficult to accomplish on an automatic basis. On the other hand, the more automatic the adjustment, the more certainty for investment and production decisions the system is likely to provide.

Another important design consideration is the extent to which the fee should be phased in: should it be set from the start at levels calculated to extract the full amount of transfer payments or should it be set low (merely as a price signal) and subsequently adjusted upward in (either small or large) increments?

Collection of fee payments would be directly from the firms allocated the CFC and halon quotas, on a periodic (e.g. monthly or annual) basis.

EPA seeks comments on the fees-with-quotas option, in comparison with both the auction option and the allocated quota option without fees. EPA is interested in receiving comments on the desirability and implementation issues related to this option, including the legal issues raised earlier.

Under a final approach to reducing the potential inequities of the allocated quota system, some portion of the transfers could be recaptured through voluntary donations by the producers to an industry-wide research organization. This approach would not be mandated by EPA, but would be pursued by a voluntary organization created by CFC and halon producer and user industries. Essentially, some or all of the producer firms would agree to set aside some portion of the price increase from CFCs and halons to support research activities. Funds set aside for this organization could be used to support projects to aid producers and users in their transition away from the use of these regulated chemicals. Examples of possible projects could include: joint toxicity testing for new chemicals; studies to support fire and building code changes; testing of the compatibility of new chemicals with existing equipment; education and training to encourage increased recycling by professionals involved with servicing equipment using CFCs and halons; support for tests required to obtain regulatory approvals needed for product substitutes, etc. All

[12] In fact, any firm could go so far as to guarantee its provisional allocation as its final one by reporting that it would purchase its provisional allocation regardless of the price. If all firms did this, the provisional allocation would be the final one and change hands.

proposed projects would be submitted on a voluntary basis and reviewed by a committee representing the members of the institute.

Joint research groups have been established by other industries (e.g., the Electric Power Research Institute) and are generally highly regarded by their members. Several CFC user groups have already initiated and funded joint efforts to resolve obstacles to testing and using CFC substitutes. The major halon producers and users have agreed in principal to pursue this option with the chemical producers assessing a few cent per kilogram tariff on all halon sales to fund joint projects to reduce emissions, to develop new fire protection chemicals and practices. EPA is interested in comments on the possible structure and scope of this type of organization, how it might aid in facilitating technology transfer and the extent to which it might add to research and development efforts undertaken anyway by individual firms.

The second major concern with allocated quotas relates to the possibility that some industries—particularly those where CFCs or halons are only a small fraction of total product cost—may be slow to respond to economic incentives to reduce their use of the controlled substances and may elect to simply pay higher prices for CFCs/halons instead. The rate at which firms will move to make cost effective reductions rests on a behavioral assumption about the extent to which firms will minimize production costs. To gain some insights into the effect of alternative assumptions on cost-minimizing behavior, EPA included in the RIA several scenarios where the analysis assumed that firms elected to delay or failed entirely to pursue certain cost-effective, low-cost reduction options.

Table 5 shows the differences in CFC prices for various assumptions about the rate at which firms employ low-cost use reductions. Compared to the "least cost" case where reductions are taken as they become cost competitive and technologically available, the three "stretchout" cases demonstrate that should firms not seek to minimize costs, CFC prices, social costs and transfers could all increase. Given the assumption on the availability of substitutes in the future, these increases occur primarily in the early years when the burden on user industries will be most difficult and before chemical substitutes for many applications will be commercially available.

This analysis shows the close interrelationships among CFC- and halon-using industries under the proposed regulatory approach. To the extent those industries where inexpensive reductions are available postpone making such reductions, prices of CFCs and halons would likely increase to all industries. For those user groups where CFCs are a large percentage of final product price (e.g., the foamblowing applications), such increases could be burdensome particularly in the initial years before chemical substitutes come to market and place a ceiling on such cost increases. Table 6 shows EPA estimates of the total amount of CFCs and halons consumed by the major user industries.

TABLE 6.— 1985 U.S. CONSUMPTION OF CFCs AND HALONs BY MAJOR USER INDUSTRIES

Industry	Total weighted use (mill kg)	Chemicals used
Flexible Foam	18.6	CFC–11
Rigid polyurethane foam.	61.3	CFC–11, 12
Rigid non-urethane foam.	12.8	CFC–12, 114
Refrigeration and air conditioning.	96.0	CFC.11, 12, 114, 115
Aerosol	11.6	CFC–11, 12
Solvent	54.8	CFC–113
Fire extinguisher	43.4 [1]	Halon–1211, 1301, 2402
Miscellaneous	22.0	CFC–12

[1] Estimates do not include Halon 2402.
Source: Estimates prepared for EPA Regulatory Impact Analysis.

Of course, direct limits on specific CFC or halon uses—either bans or engineering controls—also have serious drawbacks. They would reduce or effectively eliminate the markets' ability to allocate CFCs and halons to their highest valued uses and result in a waste of resources. This happens because they reduce individual's and firm's rewards from finding those uses as well as their incentives to find substitutes that do not deplete ozone.

Requirements of this type are also generally inflexible and unresponsive to changes in the relative values of CFCs and halons in other uses. An approach relying on bans and engineering controls places in the hands of the Federal government basic decisions on the use of these chemicals. There is no guarantee that the mandated restrictions will result in better or more valuable uses of these chemicals.

Since the initial limits are at 1986 levels, any shortfall in supply (and associated increases in prices) are not likely to be large in the early years. Further, it could take several years to promulgate regulations restricting specified uses. Thus, such regulations may not be helpful in easing the transition.

However, because of the potential concerns that some users may not minimize their costs, EPA is seeking comment on the desirability of supplementing the allocated quota system with direct limits on specific CFC or halon user industries where inexpensive reductions appear feasible. These limits could be established by EPA on a voluntary (e.g., the publication of technical guidance) or mandatory basis, or they could start as voluntary and become mandatory, through a rulemaking procedure, only if necessary. They could be developed through the traditional agency process or through a different process (e.g., a negotiated process) with greater involvement of industry and other interested groups.

In developing the RIA cost analysis, EPA obtained substantial information from a variety of sources on low-cost measures to reduce CFC and use. Based on its preliminary cost analysis, the following steps to reduce CFC and halon use appear possible during the period covered by this regulation:

a. *Commercial Air Conditioning.* Firms in this industry have taken steps in recent years to shift away from CFC–12 in air conditioning. For example, window and central units are no longer of concern from the perspective of this proposal because they now use HCFC–22. Commercial chillers have already begun to shift, but could make greater use of HCFC–22, CFC–502, CFC–500 and other chemicals and mixes with ozone depletion weights that are significantly lower than CFC–11 and CFC–12. Although CFC–502 is a blend of 48.8 percent HCFC–22 and 51.2 percent CFC–115, it has a combined ozone depletion weight of approximately 0.3, and therefore represents a potentially attractive option for many firms. By altering their market mix and shifting more toward CFC–22, CFC–502, etc., substantial reductions in CFC–11 and CFC–12 use are currently possible.

Nonetheless, there appear to be substantial emissions resulting from current practices of venting CFCs during routine maintenance. Relatively minor design changes (e.g., different valves) by equipment manufacturers could facilitate improved servicing practices and reduced emissions.

Over the longer-term, chemical substitutes may make it possible to eliminate use of CFC–11 and CFC–12 in new equipment. The most promising chemical substitute now appears to be

HFC–134a. This chemical does not contain any chlorine and therefore would not: deplete ozone. It has passed preliminary short-term toxicity tests, but has not yet undergone longer-term testing and is not yet available in commercial quantitites. Recent industry estimates suggest this chemical could be available in 5 years to 6 years if no major problems are encountered. It has many of the same chemical and physical properties of CFC–12 and initial tests suggest that it might require only minor changes to be used in new equipment. It is likely, however, to cost several times the current price of CFC–12.

b. *Automobile Air Conditioning.* Approximately 25 percent of all CFCs are used in automobile air conditioners making it by far the single largest user industry. In the near term, the auto manufacturers could improve component quality and several could redesign their air conditioning units to require a lower initial CFC charge per unit. While substantial progress has been made in reducing emissions in manufacturing over the past years, EPA's analysis suggests that a wide variance exists among automobile manufacturers and that additional steps could be taken in this area. Other CFC reductions which appear possible in the near term at the point of manufacture include completing the switchover to helium gas for testing systems and eliminating unnecessary losses during charging.

Over the longer term, automobile manufacturers appear to have several promising options for eliminating this use of CFC–12, including the use of chemical substitutes (e.g., HCFC–22, CFC–142b/22 blend, and HFC–134a). In addition, alternate air conditioning systems including a modified sterling cycle may be feasible. Because of the difficulty in knowing which of these or other options will prove to be most attractive, research into several of these options simultaneously may be desirable.

Even if automobile manufacturers are capable of shifting away from CFC–12 based air conditioners over the next seven years or longer, substantial quantitites of CFC–12 will still be required to service the existing fleet. Although a large number of facilities service car air conditioners (leaving aside for the moment the portion of the market serviced by car owners directly), several promising options deserve attention because of the large quantity of CFCs used by this market segment.

One option involves the sale of small containers used by car owners and some service centers to recharge vehicles. These containers eliminate the possibility of recovery at a service station, resulting in substantial quantitites of CFCs lost through venting, and losses due to refrigerant trapped in the container following use.

A second option involves the possibility of blending a non-CFC chemical with CFC–12 to reduce the latter's use in servicing the aftermarket. Initial research has shown promising preliminary results that such a compound could be used in existing equipment without costly modifications and would be more energy efficient and less expensive.

c. *Electronics and metal cleaning.* Perhaps the fastest growing use of CFCs is the use of CFC–113 as a solvent by the electronics industry. Because CFC–113 is nontoxic and compatible with a variety of materials, its use has increased substantially during the past several years, particularly as health concerns have been raised concerning other chlorinated solvents currently being used.

Because of the high cost of CFC–113 and the fact that it is used as a solvent and therefore is not consumed in the manufacturing process, recovery and reclamation of substantial quantities of CFC–113 already occurs. However, based on EPA's preliminary analysis, additional opportunities exist for improved recycling. For example, existing equipment frequently does not have automatic covers or hoists (in the case of open top vapor degreasors), both of which could reduce losses. In addition, operating practices could be improved to further reduce CFC losses.

Increased recovery of CFC–113 may be particularly important because of the drawbacks of switching from CFC–113 to other chlorinated solvents. EPA's Office of Toxic Substances, as part of its Chlorinated Solvents Task Force, is working along with other EPA offices and other agencies such as the Occupational Health and Safety Administration and Consumer Product Safety Commission, to review the use of methylene chloride, perchloroethylene, trichloroethylene, and methyl chloroform in solvent and other applications. Before switching to any of these alternatives, firms should consult with EPA and state agencies to determine current requirements and the potential for future regulations. In the case of metal cleaning applications, alternatives to these chlorinated solvents which might be appropriate for many current applications including aqueous cleaning as well as other non-chlorinated solvents.

The electronics industry consumes CFC–113 to remove solder flux from printed circuit boards, to degrease semiconductors, to manufacture etchant gases, to degrease printed circuit boards in storage media manufacture, and in other ways. Viable alternatives exist for each of these uses. Beginning in the short term and expanding over the longer term, the use of aqueous cleaning and flux that does not require cleaning appears most promising. EPA convened a panel of experts in this field and they reported that it is technically possible to eliminate up to 90 percent of current CFC–113 use in non-surface mount applications by substituting aqueous cleaning. The remaining 10 percent depends on non-aqueous cleaners because of design choices that can be changed over time. An important step in facilitating the use of aqueous and non-clean fluxes may involve working with the U.S. military to review its current solvent and solder specifications to facilitate the use of these alternatives where appropriate.

d. *Flexible Foam.* This industry group includes makers of polyurethane foam slabstock used primarily for bedding and mattresses. CFC–11 is used as an auxiliary blowing agent in that segment of the industry which produces less expensive, low density or supersoft foams. Many producers now use methylene chloride to make similar foam products. However, because of toxicity concerns and the possibility of more stringent regulations both inside and outside the workplace, it is unlikely that many firms will elect to switch to this alternative blowing agent.

No alternative technologies or chemical substitutes currently appear as the likely replacements for use of CFC–11 in blowing flexible foam. Instead, in the near-term it is possible that the very softest, lowest density foams will be replaced by firmer foams blown without an auxiliary agent. Over the longer-term, depending on its price, HCFC–123 may become a viable replacement for CFC–11 blown foam. This chemical appears to be a possible replacement for CFC–11 in many foam applications. It has similar industrial properties and initial tests suggest that it might be an effective substitute blowing agent. HCFC–123 has a substantially shorter lifetime than CFC–11 and therefore has not been included under the chemicals covered by this proposal. However, additional toxicity tests will be required before widespread use is possible and the costs of this substitiute are likely to be approximately 2 times to 3 times the current price of CFC–11. Like HFC–134a, this chemical should be commercially available in 5 years to 6 years assuming no major problems are encountered.

In addition to slabstock foam, flexible molded foam blown with CFC–11 is used primarily in seat and back cushions by auto manufacturers and also in some furniture uses. Several companies have stated that they currently do not use CFC–11 as an auxiliary blowing agent; they have shifted to water blown foam. Other companies have noted that within three months they will also shift out of CFC use and into water blown foams.

e. *Commercial and Residential Refrigeration.* As was the case with air conditioning, over the last few years, commercial refrigeration has moved in the direction of shifting some uses from CFC–12 to HCFC–22, CFC–502, CFC–502 and other refrigerants. This trend is likely to continue in the area of commercial refrigeration. Manufacturers can also further reduce emissions from leak testing and rework. Increased recovery at reworking, venting and disposal will also reduce the use of CFCs. Over the longer term, HFC–134a appears promising as a means of eliminating this use of CFC–12.

For home refrigerators, the same substitute may prove feasible. In addition, home appliances might be produced using a modified sterling cycle or other technology that does not use CFC as its refrigerant. CFC–500, which has as ozone-depleting potential of 0.7, can be used in some appliances such as dehumidifiers.

f. *Rigid Insulating Foam.* CFC–11 is widely used as a foam blowing agent to make various forms of insulating foam (e.g., polyurethane, isocyanurate, phenolic, etc.). Its molecular weight and low thermal conductivity make CFC–11 an excellent chemical in the manufacture of highly efficient insulating materials used for roofs, walls, and foundations.

In the near-term, this use of CFCs may not be significantly reduced because of its utility in saving energy (and meeting code requirements) and because no substitute blowing agents are available. However, some product substitutes may make inroads into its current market. Over the longer-term, HCFC–123 may become an attractive means of reducing this use of CFC–11.

g. *Rigid Packaging Foam.* CFC–12 is used as a blowing agent in the manufacture of polystyrene foam which is widely used in the food packaging industry. CFC–12 currently competes with pentane as a blowing agent for producing this foam with each capturing about 50 percent of the market.

Because of pentane's potential problems with flammability and air pollution, many firms now using CFC–12 will not want to incur the substantial costs of shifting to this chemical. Instead, recent process development efforts have demonstrated that HCFC–22 can effectively be used as an alternate blowing agent. Industry estimates suggest that only minimal costs would be incurred in converting a plant from CFC–12 to HCFC–22 (on the order of $50,000 to $100,000) and that operating costs and efficiencies will not be significantly affected. An application was recently approved by the Food and Drug Administration granting non-objection (e.g., a ruling that the proposed product for a particular use does not differ materially from an already approved product) to the use of HCFC–22 blown foam in fast food packaging.

h. *Total Flooding Fire Extinguishant Systems.* Halon 1301 is used almost exclusively as the agent in total flooding systems used to protect computer centers, document rooms, libraries, military installations, etc. Because it is nontoxic (which allows it to be discharged without evacuating the facility) and because it does not leave a residue, its provides an extremely useful function in protecting high value property.

In response to recent concerns about the role of halons as a potential ozone-depleting substance, the industry has initiated a series of steps to better understand and reduce any unnecessary emissions of this gas. For example, the industry decided not to require mandatory discharge testing of new systems as part of a review of its fire protection code. It is exploring the development of alternative test gases and ways to limit discharges from false alarms. It also conducted an industry-wide survey to determine current uses and sources of emissions and is exploring ways to track halons from the time of production to their release as basis for possibly shifting to an emissions (instead of production) based regulatory regime.

In the near term, the voluntary emission reduction steps described above might provide ample room for continued growth in the number of systems assuming substantial reductions from unncessary testing and false alarms can be realized. Over the longer term, alternate chemicals may be developed, more efficient use of these chemicals may be possible (e.g., shifting from 1301 total flooding systems to more directed, less depleting 1211 systems), or the industry may be capable of demonstrating that an emissions based regulatory system is a viable means of protecting the environment while continuing the use of these chemicals.

i. *Halon Fire Extinguishers.* Halon 1211 is used extensively in wheeled and handheld portable fire extinguishers. These extinguishers are used in situations where human exposure to the agent is possible (e.g., airplanes) or where concerns exist about harm from residues from other agents (e. g., computers). At the same time, these extinguishers have recently penetrated the broader consumer market and some percentage are now being purchased and used for applications where other agents would be adequate.

In addition, the major user of Halon 1211 is the military as part of its training exercises. The U.S. military has already initiated a review of possible steps to reduce unneccesary steps from training and is also working on developing alternative fire-fighting agents.

j. *Sterilization.* CFC–12 in combination with ethylene oxide (EO) (in a 12/88 blend) is widely used by hospitals, medical equipment manufacturers and contractors for sterilizing equipment. While 30 percent of the commercial market and majority of hospitals now use this CFC/EO blend, other options are currently feasible.

Hospitals could shift to a blend of carbon dioxide and ethylene oxide and totally eliminate their use of CFC–12. While this shift requires that a chamber be able to withstand higher pressure and may involve a longer processing time, neither of these concerns are expected to create problems for most hospitals.

Because of their higher volume use, commercial sterilizers could economically increase their recapture and recovery of CFC–12 through the addition of carbon adsorption or refrigerated condensors. In turn, hospitals could elect to increase their reliance on contract sterilizers as an alternative to shifting to carbon dioxide/ethylene oxide mix.

Sterilization using cobalt radiation has recently achieved a growing share of the market and offers another attractive alternative to current use of CFC–12 in this application. Other methods of sterilization such as electron beam and alternative chemicals are also possible over a longer time period.

Finally, EPA is also seeking comment on the desirability of requiring that products produced with the controlled substances be labelled. This requirement would provide useful information for consumers. By making it possible for consumers to distinguish between those spraycans that contained CFCs and those that did not, it was an effective part of the regulatory program limiting this use of CFCs in 1978. Labelling requirements could be used as

an adjunct to any of the other regulatory options described above.

VII. Impact of Proposed Action

A. Reductions in Ozone Depletion

The proposed regulation would substantially reduce the threat of stratospheric ozone depletion and the accompanying risks to human health and the environment. As shown earlier in Table 4, in the absence of any regulation, a continuation of current trends in the use of ozone-depleting chemicals could result in a global average of 12 percent depletion by 2050 and as much as 40 percent depletion by 2075.

By reducing consumption of the most potent ozone-depleting CFCs in approximately a decade by 50 percent from 1986 levels and by freezing consumption of halons 1211, 1301, and 2402, the projected depletion of ozone would be substantially eliminated. Based on current models, these limitations (assuming a significant portion of other nations take similar steps) would result in depletion estimates of 1.6 percent by 2050 and under 1.4 percent by 2075.

Given the large uncertainties concerning current atmospheric models, the rates of growth of other trace gases, and reduction steps by other nations, EPA's proposed action represents a reasonable near-term strategy for safeguarding the ozone layer. However, as we develop a better understanding of these factors, EPA intends to periodically reassess its actions. The Agency also intends to participate in similar reassessments conducted under the auspices of the Montreal Protocol.

B. Economic Impact

In its regulatory impact analysis, EPA has examined the potential costs (in terms of U.S. industry) and health and environmental benefits also limited to the U.S. which are likely to result from the proposed action. The analysis assumes that a large portion of other developed and developing nations join with the United States in reducing their consumption and production of the controlled substances.

Given the nature of this issue, the RIA necessarily covers a broad range of areas. On the costs side, this analysis covers eight major industrial groupings: refrigeration; air conditioning; flexible foam; rigid foam; solvent cleaning; sterilization; miscellaneous; and fire extinguishant. The RIA contains information on over 650 different control options for limiting use of CFCs and halons within these industrial groupings.

The potential benefits from limiting the amount of future depletion also cover a broad range of health and environmental concerns. An increase in the quantity of damaging ultraviolet radiation flux would represent a major change in one of the basic environmental parameters potentially affecting to varying degrees most forms of biological life. While research to date on the effects of increased exposure to UV–B radiation has been limited, the RIA explores several specific potential areas of damage, only some of which can be quantified with currently available information.

1. Economic Costs of Reductions

EPA used a bottom-up approach in analyzing the costs of meeting the proposed regulation. As described above, studies were initiated in eight major CFC and halon use categories. These groupings were then further divided into 82 specific applications. For example, refrigeration was divided into 18 categories including retail food, home refrigerators, refrigerated transport, etc. Finally costs and emission reduction estimates were developed for over 650 distinct control options covering the full range of use applications. These options included engineering controls, chemical substitutes, product substitutes, recovery and recycling, and work practices. Cost estimates included capital and operating expenses (including, where applicable, any energy penalty). Technologies were assessed in terms of the date at which they would be available (0–3 years, 4–7 years, or longer), and the rate and limits for achieving market penetration.

The cost estimates for these reductions were used as the input for the Integrated Assessment Model (IAM) which provided estimates of the total cost of meeting a regulatory goal. The model operates by prioritizing the potential reductions on the basis of least cost and the judgment of EPA's contractors based on discussion with industry representatives concerning the likely response to regulations on the part of specific industry sectors.

The output from the model provides an estimate of the total social costs for meeting a required level of reductions, the CFC or halon price increases which would likely accompany such costs, and the amount of transfers which would be involved. Table 5 contains these estimates for proposed regulation under four different assumptions concerning the rate at which firms respond to changes in market conditions resulting from restrictions on the regulated chemicals.

The "least cost" scenario assumes that all reductions are taken as soon as they are technologically available and as soon as the cost of CFCs or halons exceed the cost of making the reduction. In this scenario, CFC price increases are minimal in the early years, rise to $3.77/kg around the turn of the century and plateau around $5.48/kg well before 2075 when chemical substitutes have penetrated major markets.

The low initial cost increases reflect the large quantity of CFC and halon reductions that are available with current technologies and which either will save firms money (e.g., through additional CFC or halon recovery) or which are competitive. In the latter years of the analysis, the $5.48 price ceiling reflects the anticipated costs of alternative chemicals (e.g., primarily HFC–134a replacing CFC–12 and HCFC–123 replacing CFC–11 in foam applications) which could replace large quantites of current CFC use. In the least cost scenario, total social costs were calculated to be $689 million through 2000 and $27 billion through 2075 (all social costs assume a 2 percent discount rate).

In contrast to the "least cost" case, the other scenarios assume varying degrees of delay in implementation of steps to reduce CFC and halon use. Firms might delay their response for any of several reasons: They lack information about the availability or applicability of a technology; they are less concerned about minimizing costs in the short-run because they can pass on price increases to consumers; they may lack access to capital to make a shift to a lower cost technology; or they may assume a high "hurdle rate" (i.e., the desired return on capital for any new investments) for capital committed to pollution control.

The costs of meeting the proposed regulation under these alternative scenarios is also shown in Table 5. The social costs calculated from the IAM through 2000 ranged from $1.1 billion to $1.8 billion depending on the rate at which firms implemented low cost reductions. The CFC price increase which would accompany these costs in all scenarios reached $5.48/kg just before the turn of the century. However, the range of transfer costs during this time period (1989–2000) was much wider, reflecting different price increase in the initial years. In the "moderate stretchout" case transfers through 2075 totaled $7.15 billion, while in the "major stretchout" case transfers totaled $9.4 billion.

Thus, the rate at which firms implement low cost reductions is an

important determinant, particularly in the near-term, of the costs and transfer payments involved in meeting the proposed regulations.

As part of analyzing the economic costs of reducing CFC and halon use, the RIA also takes into consideration possible impacts of the proposed regulation on energy use. CFCs are used in a wide range of energy-related areas including insulation for buildings and appliances. Its thermal efficiency also affects energy consumption of refrigerators and other appliances.

Based on the analysis in the RIA, no significant increases in energy consumption or costs are likely to occur. In the near-term, CFCs are still likely to be used in major appliances. In the case of insulation, building and energy codes generally require a set level of energy efficiency which will either continue to be satisfied by CFC-blown foam or by other insulating materials (e.g. fiberglass). In the longer-term, substitute blowing agents are likely to be developed and formulations modified to maintain current insulating values.

2. Health and Environmental Benefits

The RIA also contains a description of the potential benefits that would result from actions to limit the risks from ozone depletion. In some of the health and environmental areas, sufficient research has been completed to provide a basis for a dose response relationship which can be used for calculating potential benefits. Examples of these areas include nonmelanoma and melanoma skin cancer, and cataracts. In other areas, research on UV–B radiation effects primarily has taken the form of case studies. For example, research on plant effects has progressed the furthest on soy beans, while research on aquatic effects has examined potential impacts on anchovies. In these and similar areas (e.g., increased groundlevel ozone formation and sea level rise impacts), the RIA quantifies benefits based on an extrapolation from existing case studies. Finally, in several areas, initial studies have clearly shown that increased UV–B radiation will cause damage, but not enough information exists to quantify those impacts. Examples include suppression of the immune system and climate related impacts on water resources, agriculture, forests, etc. A detailed decription of the derivation of the benefits estimates are included in volumes 1 and 2 of the RIA.

Table 7 summarizes estimates of the economic benefits which would result from the proposed actions to prevent future depletion of the ozone layer. These benefits reflect the difference between the base case (no regulation) described in Section IV and the "CFC 50%, Halon Freeze" case which forms the basis for this proposed regulation.

It should be stated that projecting benefits out to the year 2075 is a very speculative exercise at best (but is required because of the long atmospheric lifetime of these chemicals). The estimates are subject to substantial uncertainties both in the calculation of the dose-response effects, and in the economic values placed on such effects. Due to this enormous uncertainty, the benefits have been estimated in ranges.

TABLE 7.—SUMMARY OF BENEFITS FROM PROPOSED REGULATION*

	Reference scenario
Effects:	
Skin cancer cases	154.43 million cases.
Skin cancer deaths	3.14 million cases.
Cataract cases	17.6 million cases.
*Valuation:***	
Value of skin cancer cases	$61.3 billion.
(low and high sensitivity)	($1.1 bill.–$205 bill.).
Value of skin cancer deaths.	$6.35 trillion.
(low and high sensitivity)	($17.4 bill.–$342 tril.).
Value of cataract cases	$2.57 billion.
(low and high sensitivity)	($72 mill.–$7.8 bill.).
Damage to crops	$23.4 billion.
(low and high sensitivity)	($2.3 bill.–$46 bill.).
Damage to fish	$5.5 billion.
(low and high sensitivity)	($3 bill.–$11.4 bill.).
Damage to crops from ground level ozone.	$12.4 billion.
(low and high sensitivity)	($1.1 bill.–$24.9 bill.).
Damage to polymers	$3.12 billion.
(low and high sensitivity)	($221 mill.–$6.3 bill.).
Sea level rise damage to major ports.	$4.3 billion.
Total monetary benefits:	$6.3 trillion.
(low and high sensitivity)	($29 bill. to $340 tril.).

* Shows value of avoided damage relative to "no regulation" For populations alive today and born before 2075.

** Ranges for damage valuation reflect the following scenarios: the high scenario assumes a 1 percent discount rate and a $4 million value of life which increases by 3.4 percent per year. The low scenario assumes a 6 percent discount rate and a $2 million value of life which increases by 0.85 percent per year. The medium scenario assumes a 2 percent discount rate and a $3 million value of life which increases by 1.7 percent per year.

Health effects (skin cancer incidence and mortality, and cataract incidence modeled based on dose-response estimates presented in EPA (1987). Crop estimates presented for grain crops based only on dose response developed for soy beans. Damage to fish estimated for commercial harvest of fin and shell fish based on dose response developed for anchovies. Polymer estimates based on dose response models developed for PVC and extended to include acrylics and polyesters. Damage to crops from ground level ozone based on case studies of 3 U.S. cities and a national crop loss model. Sea level rise estimates assume anticipatory action to lessen damages, but only includes storm damage to major ports based on limited case studies.

The total benefits through 2075 were estimated to be between $29 billion and $340 trillion (benefit estimates were discounted over a range of 1 percent to 6 percent annually). The majority of these benefits resulted from decreases in the number of deaths from skin cancer which is an area where effects research has progressed the furthest. The skin cancer benefit estimates, however, assume no improvement in our ability to treat skin cancer. If a cure for cancer were discovered, these benefits would decrease enormously. Because more limited research has been undertaken in the area of potential damage to crops and aquatic organisms, the estimates of potential benefits for these areas are also uncertain. In its report to EPA, the Science Advisory Board stated that it believed that damage related to these areas could prove to be of greater global magnitude than harm from skin cancers.

3. Comparison of Costs and Benefits

Based on the analysis presented above and detailed in the RIA, the estimated benefits from the proposed regulation would far exceed the estimated costs. Table 8 summarizes these benefits and costs. It shows that for those areas where quantification was possible, benefits would total from $29 billion to $340 trillion for the period 1989–2075. In comparison, costs of reducing CFCs and halons called for by the proposed regulation for the same period would total approximately $27 billion. Table 9 illustrates the extreme sensitivity of this analysis to specific individual assumptions about discount rates and the valuation of life. Additional sensitivities are included in the RIA.

TABLE 8.—COMPARISON OF COSTS AND BENEFITS THROUGH 2075 by Scenario

[Billions of 1985 dollars]

	Health and environmental benefits	Costs	Net benefits
No Controls:			
CFC Freeze	5,995	7	5,988
(low)	16	0.7	15
(high)	324,000	12	323,988
CFC 20%	6,132	12	6,120
(low)	17	2	15
(high)	330,000	21	229,979
CFC 50%	6,299	24	6,275
(low)	18	5	13
(high)	339,000	41	338,959
CFC 80%	6,400	31	6,369
(low)	19	7	12
(high)	341,000	51	340,949
CFC 50%/ Halon freeze	6,463	27	6,436
(low)	19	5	14
(high)	345,000	46	344,954
CFC 50%/ Halon freeze/U.S. 80%	6,506	34	6,472
(low)	19	7	12
(high)	346,000	56	345,944
U.S. only CFC 50%	2,852	27	2,825
(low)	8	5	3
(high)	135,000	46	134,954

All dollar values reflect the difference between the No Controls Scenario and

the specified alternative scenario. Valuation of the health and environmental benefits applies only to people born before 2075; costs are estimated through 2075.

Ranges for damage valuation reflect the following scenarios: the high scenario assumes a 1 percent discount rate and a $4 million value of life which increases by 3.4 percent per year. The low scenario assumes a 6 percent discount rate and a $2 million value of life which increases by 0.85 percent per year. The medium scenario assumes a 2 percent discount rate and a $3 million value of life which increases by 1.7 percent per year.

Source: EPA Regulatory Impact Analysis, 1987.

TABLE 9.—SUMMARY OF RESULTS OF SENSITIVITY ANALYSES FOR COSTS AND MAJOR HEALTH BENEFITS FOR PEOPLE BORN BEFORE 2075

Sensitivity	Ozone depletion by 2075 (percent)	Value of lives lost (10^9)	Control costs (10^9)	Net present value of benefits—costs (10^9)
1. Base case (assumes a two percent discount rate)				
No controls	39.9	6,499		
Protocol	1.3	150	27	
Difference	38.6	6,349	27	6,322
2. Discount rates				
A. 1 percent				
No controls	39.9	24,650		
Protocol	1.3	388	46	
Difference	38.6	24,262	46	24,216
B. 6 percent				
No controls	39.9	71		
Protocol	1.3	9	5	
Difference	38.6	62	5	57
3. Value of life				
A. $2 million				
No controls	39.9	4,333		
Protocol	1.3	100	27	
Difference	38.6	4,233	27	4,206
B. $4 million				
No controls	39.9	8,667		
Protocol	1.3	225	27	
Difference	38.6	8,442	27	8,415

Source: EPA Regulatory Impact Analysis, 1987.

VIII. Additional Information

A. Executive Order 12291

Executive Order (E.O.) 12291 requires the preparation of a regulatory impact analysis for major rules, defined by the order as those likely to result in:

(1) An annual effect on the economy of $100 million or more;

(2) A major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic industries; or

(3) Significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

EPA has determined that this proposed regulation meets the definition of a major rule under E.O. 12291, and has prepared a regulatory impact analysis (RIA). That document, along with this notice of proposed rulemaking, has been submitted to the Office of Management and Budget (OMB) for review under Executive Order 12291. Any comments from OMB and any EPA responses to such comments are available for public inspection at the Central Docket Section, South Conference Room 4, Docket No. A–87–20, U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460. A copy of the RIA has also been placed in the rulemaking docket.

B. Regulatory Flexibility Act

The Regulatory Flexibility Act, 5 U.S.C. 601–612, requires that Federal agencies examine the impacts of their regulations on small entities. Under 5 U.S.C. 604(a), whenever an agency is required to publish a general notice of proposed rulemaking, it must prepare and make available for public comment an initial regulatory flexibility analysis (RFA). Such an analysis is not required if the head of an agency certifies that a rule will not have a significant economic impact on a substantial number of small entities, pursuant to 5 U.S.C. 605(b). EPA has prepared an initial regulatory flexibility analysis for the regulations proposed in this notice, and this initial RFA has been placed in the rulemaking docket.

The initial RFA concluded that of the many industries potentially affected by the proposed regulation, the foam blowers were the only group that could be substantially affected based on the criteria contained in EPA guidelines on preparation of an RFA. For their industries, because CFCs are such a minor portion of total product costs, price increases of the magnitude anticipated by this regulation would not result in significant economic impacts.

The preliminary RFA suggests that different segments of the foamblowing industry are likely to be affected to different extents depending on the availability of chemical substitutes versus alternative products. For example, the polystyrene foam blowers may be able to shift from CFC–12 to HCFC–22 without incurring large capital costs and therefore would remain competitive with paper and other forms of packaging. In the case of rigid foam, price increases may cause some loss of market share to non-CFC blown foam or to other materials. Due to data limitations and the inability to accurately model behavioral changes, the number of firms that might go out of business versus the number that would shift to providing other insulating material could not be determined.

In designing and evaluating its regulatory options, EPA sought to minimize the burdens placed on small firms. In addition, the proposed hybrid approach (allocated quotas plus targetted regulations) would further reduce potential increases in CFC prices and thereby reduce the impact on the foamblowing industry. Because foam blowing is one of the major uses of CFCs, providing foam blowers with set asides and outright exemptions would have substantial impacts on efforts to protect the ozone layer or substantially increase costs to other industries.

C. Paperwork Reduction Act

The information collection requirements in this proposed rule will be submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.* Comments on these requirements should be submitted to the Office of Information and Regulatory Affairs, OMB, 726 Jackson Place, Washington, DC 20530 marked "Attention: Desk Officer for EPA." The final rule will respond to any OMB or public comments on the information collection requirements.

IX. References

Connell, P.S., (1986), "A parameterized numerical fit to total column ozone changes calculated by the LLNL 1–D model of the troposphere and stratosphere", Lawrence Livermore National Laboratory, Livermore, CA.

Farman, J.C., B.G. Gardiner, and J.D. Shanklin, (1985), "Large losses of total ozone in Antarctica reveal seasonal ClOx/NOx interaction", *Nature*, 315, 207–210.

Kerr, R.A., (1987), "Has Stratospheric Ozone Started to Disappear?", *Science*, 237, 131–132.

Khalil, M.A.K., and R.A. Rasmussen, (1985), "Trichlorofluoroethane (F–113) trends at Pt. Barrow, Alaska", in *Geophysical Monitoring for Climate Change, No. 13. Summary Report 1984*, U.S. Department of Commerce, Boulder, CO.

Molina, M.J., and F.S. Rowland, (1974), "Stratospheric sink for chlorofluoromethanes: chlorine atom-catalysed destruction of ozone", *Nature*, 249, 810–812.

National Academy of Sciences, (NAS), (1976), *Halocarbons: Effects on Stratospheric Ozone*, National Academy Press, Washington, DC.

National Academy of Sciences, (NAS), (1979a), *Protection Against Depletion of Stratospheric Ozone by Chlorofluorocarbons*, National Academy Press, Washington, DC.

National Academy of Sciences, (NAS), (1979b), *Stratospheric Ozone Depletion by*

Halocarbons: Chemistry and Transport, National Academy Press, Washington, DC.

National Academy of Sciences, (NAS), (1983), *Changing Climate*, National Academy Press, Washington, DC.

National Academy of Sciences, (NAS), (1984), *Causes and Effects of Changes in Stratospheric Ozone: Update 1983*, National Academy Press, Washington, DC.

National Aeronautics and Space Administration, (NASA), (1986), *Present State of Knowledge of the Upper Atmosphere: An Assessment Report. Processes that Control Ozone and Other Climatically Important Trace Gases*, NASA Reference Publication 1162, NASA, Washington, DC.

Prather, M.J., M.B. McElroy, and S.C. Wofsy, (1984), "Reductions in ozone at high concentrations of stratospheric halogens", *Nature*, 312, 227–231.

Pyle, J.A., and J.C. Farman, (1987), "Ozone Depletion: Antarctic Chemistry to Blame", *Nature*, 329, 103–104.

Rasmussen, R.A., and M.A.K. Khalil, (1982), "Atmospheric fluorocarbons and methyl chloroform at the South Pole", *Antarctic Journal of the United States: 1982 Review*, 203–205.

United Nations Environment Programme, (1987), "*Ad Hoc* Scientific Meeting to Compare Model Generated Assessments of Ozone Layer Change for Various Strategies for CFC Control", Wurzburg, Federal Republic of Germany, 9–10 April 1987, UNEP/WG.167/INF.1

United States Environmental Protection Agency (EPA), (1987), *An Analysis of the Risks from Trace Gases That Can Modify the Stratosphere*, U.S. EPA, Washington, DC.

World Meteorological Organization (WMO), (1986), *Atmospheric Ozone 1985. Assessment of Our Understanding of the Processes Controlling its Present Distribution and Change*. WMO Global Ozone Research and Monitoring Project—Report No. 16, WMO, Geneva, Switzerland.

Date: December 1, 1987.

Lee M. Thomas,

Administrator.

United Nations Environment Programme

MONTREAL PROTOCOL ON SUBSTANCES THAT DEPLETE THE OZONE LAYER

Final Act, 1987

Montreal Protocol on Substances That Deplete the Ozone Layer

The Parties to this Protocol,

Being Parties to the Vienna Convention for the Protection of the Ozone Layer,

Mindful of their obligation under that Convention to take appropriate measures to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone 1 year,

Recognizing that world-wide emissions of certain substances can significantly deplete and otherwise modify the ozone layer in a manner that is likely to result in adverse effects on human health and the environment,

Conscious of the potential climatic effects of emissions of these substances,

Aware that measures taken to protect the ozone layer from depletion should be based on relevant scientific knowledge, taking into account technical and economic considerations,

Determined to protect the ozone layer by taking precautionary measures to control equitably total global emissions of substances that deplete it, with the ultimate objective of their elimination on the basis of developments in scientific knowledge, taking into account technical and economic considerations,

Acknowledging that special provision is required to meet the needs of developing countries for these substances,

Noting the precautionary measures for controlling emissions of certain chlorofluorocarbons that have already been taken at national and regional levels,

Considering the importance of promoting international co-operation in the research and development of science and technology relating to the control and reduction of emissions of substances that deplete the ozone layer, bearing in mind in particular the needs of developing countries,

Have agreed as follows:

Artcle I: Definitions

For the purposes of this Protocol:

1. "Convention means the Vienna Convention for the Protection of the Ozone Layer, adopted on 22 March 1985.

2. "Parties" means, unless the text otherwise indicates, Parties to this Protocol.

3. "Secretariat" means the secretariat of the Convention.

4. "Controlled substance" means a substance listed in Annex A to this Protocol, whether existing alone or in a mixture. It excludes, however, any such substance or mixture which is in a manufactured product other than a container used for the transportation or storage of the substance listed.

5. "Production" means tbe amount of controlled substances produced minus the amount destroyed by technologies to be approved by the Parties.

6. "Consumption" means production plus imports minus exports of controlled substances.

7. "Calculated levels" of production, imports, exports and consumption means levels determined in accordance with Article 3.

8. "Industrial rationalization" means the transfer of all or a portion of the calculated level of production of one Party to another, for the purpose of achieving economic efficiencies or responding to anticipated shortfalls in supply as a result of plant closures.

Article 2: Control Measures

1. Each Party shall ensure that for the twelve-month period commencing on the first day of the seventh month following the date of the entry into force of this Protocol, and in each twelve-month period thereafter, its calculated level of consumption of the controlled substances in Group I of Annex A does not exceed its calculated level of consumption in 1986. By the end of the same period, each Party producing one or more of these substances shall ensure that its calculated level of production of the substances does not exceed its calculated level of production in 1986, except that such level may have increased by no more than ten per cent based on the 1986 level. Such increase shall be permitted only so as to satisfy the basic domestic needs of the Parties operating under Article 5 and for the purposes of industrial rationalization between Parties.

2. Each Party shall ensure that for the twelve-month period commencing on the first day of the thirty-seventh month following the date of the entry into force of this Protocol, and in each twelve-month period thereafter, its calculated level of consumption of the controlled substances listed in Group II of Annex A does not exceed its calculated level of consumption in 1986. Each Party producing one or more of these substances shall ensure that its calculated level of production of the substances does not exceed its calculated level of production in 1986, except that such level may have increased by no more than ten per cent based on the 1986 level. Such increase shall be permitted only so as to satisfy the basic domestic needs of the Parties operating under Article 5 and for the purposes of industrial rationalization between Parties. The mechanisms for implementing these measures shall be decided by the Parties at their first meeting following the first scientific review.

3. Each Party shall ensure that for the period 1 July 1993 to 30 June 1994 and in each twelve-month period thereafter, its calculated level of consumption of the controlled substances in Group I of Annex A does not exceed, annually, eighty per cent of its calculated level of consumption in 1986. Each Party producing one or more of these substances shall, for the same periods, ensure that its calculated level of production of the substances does not

exceed, annually, eighty per cent of its calculated level of production in 1986. However, in order to satisfy the basic domestic needs of the Parties operating under Article 5 and for the purposes of industrial rationalization between Parties, its calculated level of production may exceed that limit by up to ten per cent of its calculated level of production in 1986.

4. Each Party shall ensure that for the period 1 July 1998 to 30 June 1999, and in each twelve-month period thereafter, its calculated level of consumption of the controlled substances in Group I of Annex A does not exceed, annually, fifty per cent of its calculated level of consumption in 1986. Each Party producing one or more of these substances shall, for the same periods, ensure that its calculated level of production of the substances does not exceed, annually, fifty per cent of its calculated level of production in 1986. However, in order to satisfy the basic domestic needs of the Parties operating under Article 5 and for the purposes of industrial rationalization between Parties, its calculated level of production may exceed that limit by up to fifteen per cent of its calculated level of production in 1986. This paragraph will apply unless the Parties decide otherwise at a meeting by a two-thirds majority of Parties present and voting, representing at least two-thirds of the total calculated level of consumption of these substances of the Parties. This decision shall be considered and made in the light of the assessments referred to in Article 6.

5. Any Party whose calculated level of production in 1986 of the controlled substances in Group I of Annex A was less than twenty-five kilotonnes may, for the purposes of industrial rationalization, transfer to or receive from any other Party, production in excess of the limits set out in paragraphs 1, 3 and 4 provided that the total combined calculated levels of production of the Parties concerned does not exceed the production limits set out in this Article. Any transfer of such production shall be notified to the secretariat, no later than the time of the transfer.

6. Any Party not operating under Article 5, that has facilities for the production of controlled substances under construction, or contracted for, prior to 16 September 1987, and provided for in national legislation prior to 1 January 1987, may add the production from such facilities to its 1986 production of such substances for the purposes of determining its calculated level of production for 1986, provided that such facilities are completed by 31 December 1990 and that such production does not raise that Party's annual calculated level of consumption of the controlled substances above 0.5 kilograms per capita.

7. Any transfer of production pursuant to paragraph 5 or any addition of production pursuant to paragraph 6 shall be notified to the secretariat, no later than the time of the transfer or addition.

8. (a) Any Parties which are Member States of a regional economic integration organization as defined in Article 1(6) of the Convention may agree that they shall jointly fulfill their obligations respecting consumption under this Article provided that their total combined calculated level of consumption does not exceed the levels required by this Article.

(b) The Parties to any such agreement shall inform the secretariat of the terms of the agreement before the date of the reduction in consumption with which the agreement is concerned.

(c) Such agreement will become operative only if all Member States of the regional economic integration organization and the organization concerned are Parties to the Protocol and have notified the secretariat of their manner of implementation.

9. (a) Based on the assessments made pursuant to Article 6, the Parties may decide whether:

(i) adjustments to the ozone depleting potentials specified in Annex A should be made and, if so, what the adjustments should be; and

(ii) further adjustments and reductions of production or consumption of the controlled substances from 1986 levels should be undertaken and, if so, what the scope, amount and timing of any such adjustments and reductions should be.

(b) Proposals for such adjustments shall be communicated to the Parties by the secretariat at least six months before the meeting of the Parties at which they are proposed for adoption.

(c) In taking such decisions, the Parties shall make every effort to reach agreement by consensus. If all efforts at consensus have been exhausted, and no agreement reached, such decisions shall, as a last resort, be adopted by a two-thirds majority vote of the Parties present and voting representing at least fifty per cent of the total consumption of the controlled substances of the Parties.

(d) The decisions, which shall be binding on all Parties, shall forthwith be communicated to the Parties by the Depositary. Unless otherwise provided in the decisions, they shall enter into force on the expiry of six months from the date of the circulation of the communication by the Depositary.

10. (a) Based on the assessments made pursuant to Article 6 of this Protocol and in accordance with the procedure set out in Article 9 of the Convention, the Parties may decide:

(i) Whether any substances, and if so which, should be added to or removed from any annex to this Protocol; and

(ii) The mechanism, scope and timing of the control measures that should apply to those substances;

(b) Any such decision shall become effective, provided that it has been accepted by a two-thirds majority vote of the Parties present and voting.

11. Notwithstanding the provisions contained in this Article, Parties may take more stringent measures than those required by this Article.

Article 3: Calculation of Control Levels

For the purposes of Articles 2 and 5, each Party shall, for each Group of substances in Annex A, determine its calculated levels of:

(a) Production by:

(i) Multiplying its annual production of each controlled substance by the ozone depleting potential specified in respect of it in Annex A; and

(ii) Adding together, for each such Group, the resulting figures;

(b) Imports and exports, respectively, by following, *mutatis mutandis*, the procedure set out in subparagraph (a); and

(c) Consumption by adding together its calculated levels of production and imports and subtracting its calculated level of exports as determined in accordance with subparagraphs (a) and (b). However, beginning on 1 January 1993, any export of controlled substances to non-Parties shall not be subtracted in calculating the consumption level of the exporting Party.

Article 4: Control of Trade With Non-Parties

1. Within one year of the entry into force of this Protocol, each Party shall ban the import of controlled substances from any State not party to this Protocol.

2. Beginning on 1 January 1993, no Party operating under paragraph 1 of Article 5 may export any controlled substance to any State not party to this Protocol.

3. Within three years of the date of the entry into force of this Protocol, the Parties shall, following the procedures in Article 10 of the Convention, elaborate in an annex a list of products containing controlled substances. Parties that have

not objected to the annex in accordance with those procedures shall ban, within one year of the annex having become effective, the import of those products from any State not party to this Protocol.

4. Within five years of the entry into force of this Protocol, the Parties shall determine the feasibility of banning or restricting, from States not party to this Protocol, the import of products produced with, but not containing, controlled substances. If determined feasible, the Parties shall, following the procedures in Article 10 of the Convention, elaborate in an annex a list of such products. Parties that have not objected to it in accordance with those procedures shall ban or restrict, within one year of the annex having become effective, the import of those products from any State not party to this Protocol.

5. Each Party shall discourage the export, to any State not party to this Protocol, of technology for producing and for utilizing controlled substances.

6. Each Party shall refrain from providing new subsidies, aid, credits, guarantees or insurance programmes for the export to States not party to this Protocol of products, equipment, plants or technology that would facilitate the production of controlled substances.

7. Paragraphs 5 and 6 shall not apply to products, equipment, plants or technology that improve the containment, recovery, recycling or destruction of controlled substances, promote the development of alternative substances, or otherwise contribute to the reduction of emissions of controlled substances.

8. Notwithstanding the provisions of this Article, imports referred to in paragraphs 1, 3 and 4 may be permitted from any State not party to this Protocol if that State is determined, by a meeting of the Parties, to be in full compliance with Article 2 and this Article, and has submitted data to that effect as specified in Article 7.

Article 5: Special Situation of Developing Countries

1. Any Party that is a developing country and whose annual calculated level of consumption of the controlled substances is less than 0.3 kilograms per capita on the date of the entry into force of the Protocol for it, or any time thereafter within ten years of the date of entry into force of the Protocol shall, in order to meet its basic domestic needs, be entitled to delay its compliance with the control measures set out in paragraphs 1 to 4 of Article 2 by ten years after that specified in those paragraphs. However, such Party shall not exceed an annual calculated level of consumption of 0.3 kilograms per capita. Any such Party shall be entitled to use either the average of its annual calculated level of consumption for the period 1995 to 1997 inclusive or a calculated level of consumption of 0.3 kilograms per capita, whichever is the lower, as the basis for its compliance with the control measures.

2. The Parties undertake to facilitate access to environmentally safe alternative substances and technology for Parties that are developing countries and assist them to make expeditious use of such alternatives.

3. The Parties undertake to facilitate bilaterally or multilaterally the provision of subsidies, aid, credits, guarantees or insurance programmes to Parties that are developing countries for the use of alternative technology and for substitute products.

Article 6: Assessment and Review of Control Measures

Beginning in 1990, and at least every four years thereafter, the Parties shall assess the control measures provided for in Article 2 on the basis of available scientific, environmental, technical and economic information. At least one year before each assessment, the Parties shall convene appropriate panels of experts qualified in the fields mentioned and determine the composition and terms of reference of any such panels. Within one year of being convened, the panels will report their conclusions, through the secretariat, to the Parties.

Article 7: Reporting of Data

1. Each Party shall provide to the secretariat, within three months of becoming a Party, statistical data on its production, imports and exports of each of the controlled substances for the year 1986, or the best possible estimates of such data where actual data are not available.

2. Each Party shall provide statistical data to the secretariat on its annual production (with separate data on amounts destroyed by technologies to be approved by the Parties), imports, and exports to Parties and non-Parties, respectively, of such substances for the year during which it becomes a Party and for each year thereafter. It shall forward the data no later than nine months after the end of the year to which the data relate.

Article 8: Non-Compliance

The Parties, at their first meeting, shall consider and approve procedures and institutional mechanisms for determining non-compliance with the provisions of this Protocol and for treatment of Parties found to be in non-compliance.

Article 9: Research, Development, Public Awareness and Exchange of Information

1. The Parties shall co-operate, consistent with their national laws, regulations and practices and taking into account in particular the needs of developing countries, in promoting, directly or through competent international bodies, research, development and exchange of information on:

(a) Best technologies for improving the containment, recovery, recycling or destruction of controlled substances or otherwise reducing their emissions;

(b) Possible alternatives to controlled substances, to products containing such substances, and to products manufactured with them; and

(c) Costs and benefits of relevant control strategies.

2. The Parties, individually, jointly or through competent international bodies, shall co-operate in promoting public awareness of the environmental effects of the emissions of controlled substances and other substances that deplete the ozone layer.

3. Within two years of the entry into force of this Protocol and every two years thereafter, each Party shall submit to the secretariat a summary of the activities it has conducted pursuant to this Article.

Article 10: Technical Assistance

1. The Parties shall, in the context of the provisions of Article 4 of the Convention, and taking into account in particular the needs of developing countries, co-operate in promoting technical assistance to facilitate participation in and implementation of this Protocol.

2. Any Party or Signatory to this Protocol may submit a request to the secretariat for technical assistance for the purposes of implementing or participating in the Protocol.

3. The Parties, at their first meeting, shall begin deliberations on the means of fulfilling the obligations set out in Article 9, and paragraphs 1 and 2 of this Article, including the preparation of workplans. Such workplans shall pay special attention to the needs and circumstances of the developing countries. States and regional economic integration organizations not party to the Protocol should be encouraged to participate in activities specified in such workplans.

Article 11: Meetings of the Parties

1. The Parties shall hold meetings at regular intervals. The secretariat shall convene the first meeting of the Parties

not later than one year after the date of the entry into force of this Protocol and in conjunction with a meeting of the Conference of the Parties to the Convention, if a meeting of the latter is scheduled within that period.

2. Subsequent ordinary meetings of the Parties shall be held, unless the Parties otherwise decide, in conjunction with meetings of the Conference of the Parties to the Convention. Extraordinary meetings of the Parties shall be held at such other times as may be deemed necessary by a meeting of the Parties, or at the written request of any Party, provided that, within six months of such a request being communicated to them by the secretariat, it is supported by at least one third of the Parties.

3. The Parties, at their first meeting, shall:

(a) Adopt by consensus rules of procedure for their meetings;

(b) Adopt by consensus the financial rules referred to in paragraph 2 of Article 13;

(c) Establish the panels and determine the terms of reference referred to in Article 6;

(d) Consider and approve the procedures and institutional mechanisms specified in Article 8; and

(e) Begin preparation of workplans pursuant to paragraph 3 of Article 10.

4. The functions of the meetings of the Parties shall be to:

(a) Review the implementation of this Protocol;

(b) Decide on any adjustments or reductions referred to in paragraph 9 of Article 2;

(c) Decide on any addition to, insertion in or removal from any annex of substances and on related control measures in accordance with paragraph 10 of Article 2;

(d) Establish, where necessary, guidelines or procedures for reporting of information as provided for in Article 7 and paragraph 3 of Article 9;

(e) Review requests for technical assistance submitted pursuant to paragraph 2 of Article 10;

(f) Review reports prepared by the secretariat pursuant to subparagraph (c) of Article 12;

(g) Assess, in accordance with Article 6, the control measures provided for in Article 2;

(h) Consider and adopt, as required, proposals for amendment of this Protocol or any annex and for any new annex;

(i) Consider and adopt the budget for implementing this Protocol; and

(j) Consider and undertake any additional action that may be required for the achievement of the purposes of this Protocol.

5. The United Nations, its specialized agencies and the International Atomic Energy Agency, as well as any State not party to this Protocol, may be represented at meetings of the Parties as observers. Any body or agency, whether national or international, governmental or non-governmental, qualified in fields relating to the protection of the ozone layer which has informed the secretariat of its wish to be represented at a meeting of the Parties as an observer may be admitted unless at least one third of the Parties present object. The admission and participation of observers shall be subject to the rules of procedure adopted by the Parties.

Article 12: Secretariat

For the purposes of this Protocol, the secretariat shall:

(a) Arrange for and service meetings of the Parties as provided for in Article 11;

(b) Receive and make available, upon request by a Party, data provided pursuant to Article 7;

(c) Prepare and distribute regularly to the Parties reports based on information received pursuant to Articles 7 and 9;

(d) Notify the Parties of any request for technical assistance received pursuant to Article 10 so as to facilitate the provision of such assistance;

(e) Encourage non-Parties to attend the meetings of the Parties as observers and to act in accordance with the provisions of this Protocol;

(f) Provide, as appropriate, the information and requests referred to in subparagraphs (c) and (d) to such non-party observers; and

(g) Perform such other functions for the achievement of the purposes of this Protocol as may be assigned to it by the Parties.

Article 13: Financial Provisions

1. The funds required for the operation of this Protocol, including those for the functioning of the secretariat related to this Protocol, shall be charged exclusively against contributions from the Parties.

2. The Parties, at their first meeting, shall adopt by consensus financial rules for the operation of this Protocol.

Article 14: Relationship of This Protocol to the Convention

Except as otherwise provided in this Protocol, the provisions of the Convention relating to its protocols shall apply to this Protocol.

Article 15: Signature

This Protocol shall be open for signature by States and by regional economic integration organizations in Montreal on 16 September 1987, in Ottawa from 17 September 1987 to 16 January 1988, and at United Nations Headquarters in New York from 17 January 1988 to 15 September 1988.

Article 16: Entry Into Force

1. This Protocol shall enter into force on 1 January 1989, provided that at least eleven instruments of ratification, acceptance, approval of the Protocol or accession thereto have been deposited by States or regional economic integration organizations representing at least two-thirds of 1986 estimated global consumption of the controlled substances, and the provisions of paragraph 1 of Article 17 of the Convention have been fulfilled. In the event that these conditions have not been fulfilled by that date, the Protocol shall enter into force on the ninetieth day following the date on which the conditions have been fulfilled.

2. For the purposes of paragraph 1, any such instrument deposited by a regional economic integration organization shall not be counted as additional to those deposited by member States of such organization.

3. After the entry into force of this Protocol, any State or regional economic integration organization shall become a Party to it on the ninetieth day following the date of deposit of its instrument of ratification, acceptance, approval or accession.

Article 17: Parties Joining After Entry Into Force

Subject to Article 5, any State or regional economic integration organization which becomes a Party to this Protocol after the date of its entry into force, shall fulfil forthwith the sum of the obligations under Article 2, as well as under Article 4, that apply at that date to the States and regional economic integration organizations that became Parties on the date the Protocol entered into force.

Article 18: Reservations

No reservations may be made to this Protocol.

Article 19: Withdrawal

For the purposes of this Protocol, the provisions of Article 19 of the Convention relating to withdrawal shall apply, except with respect to Parties referred to in paragraph 1 of Article 5. Any such Party may withdraw from this Protocol by giving written notification to the Depositary at any time after four years of assuming the obligations specified in paragraphs 1 to 4 of Article 2. Any such withdrawal shall take effect

upon expiry of one year after the date of its receipt by the Depositary, or on such later date as may be specified in the notification of the withdrawal.

Article 20: Authentic Texts

The original of this Protocol, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations.

In witness whereof the undersigned, being duly authorized to that effect, have signed this protocol.

Done at Montreal this sixteenth day of September, One Thousand Nine Hundred and Eighty Seven.

ANNEX A.—CONTROLLED SUBSTANCES

Group	Substance	Ozone depleting potential [1]
Group I:	$CFCl_3$ (CFC-11)	1.0
	CF_2Cl_2 (CFC-12)	1.0
	$C_2F_3Cl_3$ (CFC-113)	0.8
	$C_2F_4Cl_2$ (CFC-114)	1.0
	C_2F_5Cl (CFC-115)	0.6
Group II:	CF_2BrCl (halon-1211)	3.0
	CF_3Br (halon-1301)	10.0
	$C_2F_4Br_2$ (halon-2402)	([2])

[1] These ozone depleting potentials are estimates based on existing knowledge and will be reviewed and revised periodically.
[2] To be determined.

For the reasons set out in the preamble, Part 82 of Title 40 of the Code of Federal Regulations is proposed as follows:

1. The authority citation for Part 82 continues to read as follows:

Authority: 42 U.S.C. 7457(b).

2. Part 82 is amended by adding the following §§ 82.1 through 82.14 and appendices A through D to read as follows:

PART 82—PROTECTION OF STRATOSPHERIC OZONE

Sec.

Authority: 42 U.S.C. 7457(b).

§ 82.1 Purpose and scope.

(a) The purpose of these regulations is to implement the *Montreal Protocol on Substances that Deplete the Ozone Layer* under authority provided by section 157 of the Clean Air Act. The Montreal Protocol requires each nation that becomes a Party to the Protocol to limit its total production and its consumption (defined as production plus imports minus exports) of certain ozone-depleting substances according to a specified schedule. The Protocol also requires Parties to impose certain restrictions on trade in ozone-depleting substances with nonparties.

(b) This rule applies to any individual, corporate, or governmental entity that produces, imports, or exports controlled substances.

§ 82.2 Effective date.

The regulations under this Part will take effect when the Montreal Protocol enters into force. The Montreal Protocol will enter into force on January 1, 1989, provided that at least 11 instruments of ratification, acceptance, approval of the Protocol or accession thereto have been deposited by States or regional economic integration organizations representing at least two-thirds of 1986 estimated global consumption of the controlled substances, and provided that the Vienna Convention for the Protection of the Ozone Layer has entered into force. If these conditions have not been fulfilled by January 1, 1989, the Protocol will enter into force on the ninetieth day following the date on which the conditions have been fulfilled.

§ 82.3 Definitions.

As used in this Part, the term:

(a) "Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

(b) "Baseline consumption rights" means the consumption rights apportioned under Sec. 82.6.

(c) "Baseline production rights" means the production rights apportioned under Sec. 82.5.

(d) "Calculated level" means the level of production, exports or imports of controlled substances determined for each Group of controlled substances by:

(1) Multiplying the amount (in kilograms) of production, exports or imports of each controlled substance by that substance's ozone depletion weight listed in Appendix A to this Part; and

(2) Adding together the resulting products for the controlled substances within each Group.

(e) "Consumption rights" means the privileges granted by this Part to produce and import calculated levels of controlled substances; however, consumption rights may be used to produce controlled substances only in conjunction with production rights. A person's consumption rights are the total of the rights he obtains under Secs. 82.7 (baseline rights for Group I controlled substances), 82.8 (baseline rights for Group II controlled substances), and 82.10 (additional consumption rights upon proof of exports of controlled substances), as may be modified under Sec. 82.12 (transfer of rights).

(f) "Control periods" means those periods during which the prohibitions under Sec. 82.4 apply. Those periods are:

(1) For Group I controlled substances: [reserved]

(2) For Group II controlled substances: [reserved]

(g) "Controlled substance" means any substance listed in Appendix A to this Part, whether existing alone or in a mixture, but excluding any such substance or mixture that is in a manufactured product other than a container used for the transportation or storage of the substance listed.

(h) "Export" means the transport of controlled substances from within the United States or its territories to persons or countries outside the United States or its territories.

(i) "Facility" means any process equipment (e.g., reactor, distillation column) to convert raw materials or feedstock chemicals into controlled substances.

(j) "Import" means the transport of controlled substances from outside the United States or its territories to persons within the United States or its territories.

(k) "Montreal Protocol" means the *Montreal Protocol on Substances that*

Deplete the Ozone Layer which was adopted on September 16, 1987, in Montreal, Canada.

(l) "Nations complying with, but not joining, the Protocol" means any nation listed in Appendix C to this Part.

(m) "Party" means any nation that is a party to the Montreal Protocol and listed in Appendix B to this Part.

(n) "Person" means any individual or legal entity, including an individual, corporation, partnership, association, state, municipality, political subdivision of a state, Indian tribe, and any agency, department, or instrumentality of the United States and any officer, agent, or employee thereof.

(o) "Plant" means one or more facilities at the same location owned by or under common control of the same person.

(p) "Potential production rights" means the production rights obtained under Sec. 82.9 (a) and (b).

(q) "Production" means the manufacture of a controlled substance from any raw material or feedstock chemical; however, production does not include the manufacture of controlled substances that are used and entirely consumed in the production of other chemicals.

(r) "Production rights" means the privileges granted by this Part to produce calculated levels of controlled substances; however, production rights may be used to produce controlled substances only in conjunction with consumption rights. A person's production rights are the total of the rights he obtains under Secs. 82.7 (baseline rights for Group I controlled substances), 82.8 (baseline rights for Group II controlled substances), and 82.9 (c) and (d) (additional production rights), as may be modified under Sec. 82.12 (transfer of rights).

(s) "Twenty-five-kilotonne Party" means any nation listed in Appendix D to this Part.

(t) "Unexpended consumption rights" means consumption rights that have not been used. At any time in any control period, a person's unexpended consumption rights are the total of the calculated level of consumption rights he holds at that time for that control period, minus the calculated level of controlled substances that the person has produced and imported in that control period until that time.

(u) "Unexpended production rights" means production rights that have not been used. At any time in any control period, a person's unexpended production rights are the total of the calculated level of production rights he holds at that time for that control period, minus the calculated level of controlled substances that the person has produced in that control period until that time.

§ 82.4 Prohibitions.

(a) No person may produce at any time in any control period, a calculated level of controlled substances in excess of the amount of unexpended production rights held by that person at that time for that control period. Every kilogram of such excess constitutes a separate violation of this regulation.

(b) No person may produce or import at any time in any control period, a calculated level of controlled substances in excess of the amount of unexpended consumption rights held by that person at that time for that control period. Every kilogram of such excess constitutes a separate violation of this regulation.

(c) A person may not use his production rights to produce a quantity of controlled substances unless he owns at the same time consumption rights sufficient to cover that quantity of controlled substances, nor may he use his consumption rights to produce a quantity of controlled substances unless he owns at the same time production rights sufficient to cover that quantity of controlled substances. However, consumption rights alone are required to import controlled substances.

(d) Beginning one year after the effective date of this Part, no person may import any quantity of controlled substances from any nation not listed in Appendix B to this Part (Parties to the Montreal Protocol), unless that nation is listed in Appendix C to this Part (Nations Complying with, But Not Party to, the Protocol). Every kilogram of controlled substances imported in contravention of this regulation constitutes a separate violation of this regulation.

§ 82.5 Apportionment of baseline production rights.

Persons who produced one or more controlled substances in 1986 are apportioned calculated levels of baseline production rights as set forth in paragraphs (a) and (b) of this section. Each person's apportionment is equivalent to the calculated levels of that person's production of Group I and Group II controlled substances in 1986.

(a) For Group I controlled substances:

Person	Calculated level
[Reserved]	[Reserved].

(b) For Group II controlled substances:

Person	Calculated level
[Reserved]	[Reserved].

§ 82.6 Apportionment of baseline consumption rights.

Persons who produced, imported, or produced and imported one or more controlled substances in 1986 are apportioned calculated levels of baseline consumption rights as set forth in paragraphs (a) and (b) of this section. The apportionment for each person who imported controlled substances is equivalent to the calculated levels of Group I and Group II controlled substances that the person imported in 1986. The apportionment for each person who produced controlled substances is equivalent to the calculated levels of Group I and Group II controlled substances that the person produced in 1986, multiplied by a correction factor. The general equation for the correction factor is (the calculated level of 1986 United States production minus the calculated level of 1986 United States exports) divided by (the calculated level of 1986 United States production); correction factors are separately calculated for Group I and Group II controlled substances.

(a) For Group I controlled substances:

Person	Calculated level
[Reserved]	[Reserved].

(b) For Group II controlled substances:

Person	Calculated level
[Reserved]	[Reserved].

§ 82.7 Grant and phased of baseline production and consumption rights for group I controlled substances.

(a) For each of the control periods that ends before July 1, 1993, every person is granted 100 percent of the baseline production and consumption rights apportioned to him under Secs. 82.5(a) and 82.6(a).

(b) For each of the control periods that occurs between July 1, 1993, and June 30, 1998, inclusive, every person is granted 80 percent of the baseline production and consumption rights apportioned to him under §§ 82.5(a) and 82.6(a).

(c) For each of the control periods that begins after June 30, 1998, every person is granted 50 percent of the base-line production and consumption rights apportioned to him under §§ 82.5(a) and 82.6(a).

§ 82.8 Grant and freeze of baseline production and consumption rights for group II controlled substances.

For each of the control periods specified in § 82.3(f)(2), every person is granted 100 percent of the baseline production and consumption rights apportioned to him under § 82.5(b) and 82.6(b).

§ 82.9 Allowance for production rights in addition to baseline production rights.

(a) Every person apportioned baseline production rights for Group I controlled substances under § 82.5(a) is also granted a calculated level of potential production rights equivalent to:

(1) 10 percent of his apportionment under § 82.5(a), for each control period ending before July 1, 1998; and

(2) 15 percent of his apportionment under § 82.5(a), for each control period beginning after June 30, 1998.

(b) Every person apportioned baseline production rights for Group II controlled substances under § 82.5(b) is also granted a calculated level of potential production rights equivalent to 10 percent of his apportionment under § 82.5(b), for each control year specified in § 82.3(f)(2).

(c) A person may convert potential production rights, either granted to him under paragraphs (a) and (b) of this section or obtained by him under § 82.12 (transfer of rights), to production rights only to the extent authorized by the Administrator under § 82.11 (Exports to Parties). A person may obtainauthorization to convert potential production rights to production rights either by requesting issuance of a notice under § 82.1lor by completing a transfer of authorization under § 82.12.

(d) Any person ("the recipient") may obtain productionrights in accordance with the provisions of this paragraph.

(1) A nation listed in Appendix D to this Part (Twenty-five-kilotonne Parties) must agree to transfer to the recipient at a specified time some amount of the calculated level of production that the nation is permitted under the Montreal Protocol. The recipient must obtain from the principal diplomatic representative in that nation's embassy in the United States a document clearly stating that that nation agrees to reduce its allowable calculated level of production by the amount being transferred to the recipient and for the control period(s) to which the transfer applies.

(2) The recipient must submit to the Administrator a transfer request that includes a true copy of the document required by paragraph (d)(1) of this section and that sets forth the following:

(i) The identity and address of the recipient;

(ii) The identity of the Twenty-five-kilotonne Party;

(iii) The names and telephone numbers of contact persons for the recipient and for the Twenty-five-kilotonne Party;

(iv) The amount of allowable calculated level of production being transferred; and

(v) The control period(s) to which the transfer applies.

(3) After receiving a transfer request that meets the requirements of paragraph (d)(2) of this section, the Administrator will:

(i) Notify the Secretariat of the Montreal Protocol of the transfer; and

(ii) Issue the recipient a notice granting the recipient production rights equivalent to the calculated level of production transferred, and specifying the control periods to which the grant of production rights applies. The grant of production rights will be effective on the date that the notice is issued.

§ 82.10 Allowance for consumption rights in addition to baseline consumption rights.

(a) Except as limited by paragraph (b) of this section, any person may obtain, in accordance with the provisions of this paragraph, consumption rights equivalent to the calculated level of controlled substances that the person has exported from the United States or its territories. The consumption rights granted under this section will be valid only during the control period in which the exports arrived in the country to which they were transported.

(1) The person who exported (the "exporter") the controlled substances must submit to the Administrator a request for consumption rights setting forth, with supporting documentation, the following:

(i) The identities and addresses of the exporter and the recipient of the exports (the "importer");

(ii) The exporter's EIN (Employer Identification Number);

(iii) The names and telephone number of contact persons for the exporter and for the importer;

(iv) The quantity and type of controlled substances exported;

(v) The date on which and the port from which the controlled substances were exported from the United States or its territories;

(vi) The country to which the controlled substances were exported and the date on which they arrived in that country;

(vii) The source from which and the date on which the exporter purchased the controlled substances.

(2) The Administrator will review the information and documentation submitted under paragraph (a)(1) of this section, and issue the exporter a notice granting the exporter consumption rights equivalent to the calculated level of controlled substances that the documentation verifies were exported. The grant of the consumption rights will be effective on the date the notice is issued.

(b) No consumption rights will be granted after January 1, 1993, for exports of controlled substances to any nation not listed in Appendix B to this Part (Parties to the Montreal Protocol).

§ 82.11 Exports to parties.

In accordance with the provisions of this section, any person may obtain authorization to convert potential production rights to production rights by exporting controlled substances to nations listed in Appendix B to this Part (Parties to the Protocol). Authorization obtained under this section will be valid only during the control period in which the controlled substances arrived in the party to which they were exported. A request for authorization under this section will be considered a request for consumption rights under § 82.10, as well.

(a) The exporter must submit to the Administrator a request for authority to convert potential production rights to production rights. That request must set forth, with supporting documentation, the following:

(1) The identities and addresses of the exporter and the importer;

(2) The exporter's EIN number;

(3) The names and telephone numbers of contact persons for the exporter and for the importer;

(4) The quantity and type of controlled substances exported;

(5) The date on which and the port from which the controlled substances were exported from the United States or its territories;

(6) The country to which the controlled substances were exported and the date on which they arrived in that country; and

(7) The source from which and the date on which the exporter purchased the controlled substances exported.

(b) The Administrator will review the information and documentation submitted under paragraph (a) of this section, and assess the quantity of controlled substances that the documentation verifies were exported to a party. Based on that assessment, the Administrator will issue the exporter a notice authorizing the conversion of a specified quantity of potential production rights to production rights in a specified control year, and granting

consumption rights in the same amount for the same control year. The authorization may be used to convert potential production rights to production rights as soon as the date on which the notice is issued.

§ 82.12 Transfers of Production and Consumption Rights.

Any person ("transferor") may transfer to any other person ("transferee") any amount of the transferor's consumption rights, production rights, potential production rights, or authorization to convert potential production rights to production rights, as follows:

(a) The transferor must submit to the Administrator a transfer request setting forth the following:

(1) The identities and addresses of the transferor and the transferee;

(2) The names and telephone numbers of contact persons for the transferor and for the transferee;

(3) The type of rights (i.e., consumption rights, production rights, or potential production rights) or authorization being transfered;

(4) The Group of controlled substances to which the rights or authorization being transferred pertains;

(5) The amount of rights or authorization being transferred;

(6) The control period(s) for which the rights or authorization are being transferred; and

(7) The amount of unexpended rights of the type and for the control period being transferred that the transferor holds as of the date of the request.

(b) If the records maintained by the Administrator, taking into account any previous trades and any production or imports reported by the transferor, indicate that the transferor possessed, as of the date the transfer request was processed, unexpended rights or authorization sufficient to cover the transfer request, the Administrator will issue a notice of transfer to the transferee and the transferor. The notice will specify the transferor and transferee, and the amount, type and control year of the rights or authorization transferred. The transfer will be effective on the date the notice of transfer is issued.

§ 82.13 Recordkeeping and reporting requirements.

(a) Unless otherwise specified, the recordkeeping and reporting requirements set forth in this section take effect as follows:

(1) For Group I controlled substances, beginning with the first day of the first control period specified in § 82.3(f)(1).

(2) For Group II controlled substances, beginning with the first day of the first control period specified in § 82.3(f)(2).

(b) Unless otherwise specified, reports required by this section must be mailed within 15 days of the end of the applicable reporting period to the Administrator.

(c) Records and copies of reports required by this section must be retained for four years.

(d) In reports required by this section, quantities of controlled substances must be stated in terms of kilograms.

(e) Every person ("producer") who will produce controlled substances during a control period must comply with the following recordkeeping and reporting requirements:

(1) By the first day of each control period, every producer must submit to the Administrator a plan estimating for each of his facilities the type and amount of controlled substances he will produce and the time periods during which the controlled substances will be produced. The plan must also include estimates of the quantities of chlorodifluoromethane (HCFC–22) and hexafluoroethane (CFC–116) each of these facilities will produce in that control period. Any change in the plan during the control period must be communicated to the Administrator no later than the month following the change, as part of the monthly report required under paragraph (e)(3) of this section.

(2) Every producer must maintain the following:

(i) Daily records of the quantity of each of the controlled substances produced at each facility, including controlled substances produced for feedstock purposes;

(ii) Daily records of the quantity of HCFC–22 and CFC–116 produced at each facility also producing controlled substances;

(iii) Continuous records of the reactive temperature and operating pressures within the primary reactor and initial distillation column during the production operations at each facility; and

(iv) Daily records of the quantity of the following raw materials and feedstock chemicals purchased for and used at each plant: carbon tetrachloride, perchloroethylene, chloroform, hydrofluoric acid, hydrochloric acid, bromine, CFC–113, HCFC–22, and CFC–23.

(v) Daily records of the quantity and purchaser of controlled substances produced at each plant.

(3) For each month, every producer must provide the Administrator with a report containing the following information:

(i) The production and sales in that month of each controlled substance, specifying the quantity of any controlled substance used for feedstock purposes for each plant and totaled for all plants owned by the same person;

(ii) The quantities of HCFC–22 and CFC–116 produced that month at the same facilities producing any of the controlled substances for each plant;

(iii) A description of any shifts that have occurred that month in the planned utilization of facilities as described in the plan provided to the Administrator under paragraph (e)(1) of this section;

(iv) The total for that month and for the control-period-to-date of calculated levels of production for Group I and Group II controlled substances for each plant;

(v) The producer's total consumption rights, potential production rights, production rights and authorization to convert potential production rights to production rights, as of the end of that month; and

(vi) The quantity and names and addresses of the source of recyclable or recoverable materials containing the controlled substance which is recovered at each plant. For any person who fails to maintain the records and reports required by this paragraph, the Administrator may assume that the person has produced at full capacity during the period for which records or reports were not kept, for purposes of determining whether the person has violated the prohibitions at Sec. 82.4.

(f) For Group I controlled substances, beginning with the first control period specified under Sec. 82.3(f)(1), and for Group II controlled substances, beginning one year after the Montreal Protocol enters into force, any person ("importer") who imports controlled substances during a control period must comply with the following recordkeeping and reporting requirements:

(1) Any importer must maintain the following daily records:

(i) The quantity of each controlled substance imported, either alone or in mixtures;

(ii) The date on which the controlled substances were imported;

(iii) The port of exit and port of entry through which the controlled substances passed; and

(iv) The dates on which and the country in which the imported controlled substances were produced.

(2) For each month, every importer must submit to the Administrator a

report containing the following information:

(i) The daily records required in paragraph (g)(1) of this section for the previous month;

(ii) The total for that month and for the control-period-to-date of calculated levels of imports for Group I and Group II controlled substances; and

(iii) The importer's total consumption rights at the end of that month.

(g) For any exports of controlled substances not reported under Secs. 82.10 (additional consumption rights) or 82.11 (Exports to Parties), the person ("exporter") who exported the controlled substances must submit to the Administrator the following information within one month of the otherwise unreported exports leaving the United States:

(1) The names and addresses of the exporter and the recipient of the exports;

(2) The exporter's EIN number;

(3) The type and quantity of controlled substances exported;

(4) The date on which and the port from which the controlled substances were exported from the United States or its territories;

(5) The country to which the controlled substances were exported and the date on which they arrived in that country; and

(6) The source from which and that date on which the exporter purchased the controlled substances exported.

§ 82.14 Payment of fees.

[Reserved]

Appendix A to Part 82—Controlled Substances and Ozone Depletion Weights

Controlled substances	Ozone depletion weights
A. Group I:	
CFCl3—Trichlorofluormethane (CFC–11)	1.0
CCl2F2—Dichlorodifluoromethane (CFC–12)	1.0
CCl2F–CClF2—Trichlorotrifluorethane (CFC–113)	0.8
CF2Cl–CClF2—Dichlorotetrafluoroethane (CFC–114)	1.0
CClF2–CF3—(Mono)chloropentafluoroethane (CFC–115)	0.6
B. Group II:	
CF2BrCl—Bromochlorodifluoromethane (Halon 1211)	3.0
CF3Br—Bromotrifluoromethane (Halon 1301)	10.0
C2F4Br2—Dibromotetrafluoroethane (Halon 2402)	6.0

Appendix B to Part 82—Parties to the Montreal Protocol

[Reserved]

Appendix C to Part 82—Nations Complying With, But Not Parties to, the Protocol

[Reserved]

Appendix D to Part 82—Twenty-Five-Kilotonne Parties

[Reserved]

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Part III

Department of Transportation

Coast Guard

33 CFR Parts 95, 146, 150, 173 and 177
46 CFR Parts 4, 5, 26, 35, 78, 97, 109, 167, 185, 196 and 197
Operating a Vessel While Intoxicated; Final Rule

DEPARTMENT OF TRANSPORTATION

Coast Guard

33 CFR Parts 95, 146, 150, 173, and 177

46 CFR Parts 4, 5, 26, 35, 78, 97, 109, 167, 185, 196, and 197

[CGD 84-099]

Operating a Vessel While Intoxicated

AGENCY: Coast Guard, DOT.

ACTION: Final rule.

SUMMARY: The Coast Guard is setting standards and establishing rules designed to monitor, control, and reduce alcohol and drug use in both recreational vessel operation and commercial marine operations including operations on the Outer Continental Shelf and at deepwater ports. This final rule sets forth those standards for both recreational and commercial vessels, as well as delineating who is considered to be operating a vessel. In addition, the rule: (1) Prescribes several operating requirements for vessels subject to inspection under Chapter 33 of Title 46, United States Code; (2) provides for personnel licensed, registered, or documented by the Coast Guard to seek rehabilitation prior to being subject to a proceeding to suspend or revoke their license, certificate of registry, or merchant mariners' document for alcohol or drug related incompetence; (3) allows Coast Guard personnel to terminate use of certain vessels when the operator appears to be under the influence of an intoxicant to the extent that further operation of the vessel creates an unsafe condition; and (4) amends the regulations requiring reports of all marine casualties to include specific information on the role of alcohol or drug use in the casualty. The rule also makes miscellaneous amendments to several subparts.

EFFECTIVE DATE: January 13, 1988.

FOR FURTHER INFORMATION CONTACT: Mr. Sean T. Connaughton, Office of Marine Safety, Security and Environmental Protection (G-MVP), Phone (202) 267-0214, for information on commercial vessel operating requirements.

Mr. Carlton Perry, Office of Boating, Public, and Consumer Affairs (G-BBS), Phone (202) 267-0979, for information on recreational boating intoxication standards, casualty reporting and the terminations for unsafe use.

LCDR David Wallace, Office of Marine Safety, Security and Environmental Protection (G-MMI), Phone (202) 267-1420, for information on commercial vessel casualty reporting and the rehabilitation program.

The above persons can be contacted at U.S. Coast Guard Headquarters 2100 Second Street SW., Washington, DC 20593, between 9 a.m. and 4 p.m. Monday through Friday, except holidays.

SUPPLEMENTARY INFORMATION: The Coast Guard is required by provisions of the Coast Guard Authorization Act of 1984 (Pub. L. 98-557) to establish appropriate standards for determining whether an individual is intoxicated while operating a vessel. This Act amended Title 46 United States Code (U.S.C.) 2302(c) to provide that "An individual who is intoxicated when operating a vessel, as determined under standards prescribed by the Secretary by regulation, shall be—(1) liable to the United States Government for a civil penalty of not more than $1,000; or (2) fined not more than $5,000, imprisoned for not more than one year, or both." The Act also amended 46 U.S.C. 6101 and 6102 to require that marine casualty reports include information as to whether the use of alcohol or drugs contributed to the casualty.

On May 23, 1986, the Coast Guard published concurrently an Advance Notice of Proposed Rulemaking (CGD 84-099A; 51 FR 18900) and a Notice of Proposed Rulemaking (CGD 84-099; 51 FR 18902) on Operating a Vessel While Intoxicated. The Advance Notice posed several questions and issues relating to the operation of recreational vessels while intoxicated, while the Notice proposed rules and standards for individuals operating a commercial vessel while intoxicated, most of which would be incorporated into a new Part 95 of Title 33, Code of Federal Regulations. The comment period for both Notices ended on August 21, 1986.

Based on comments received on both projects, a combination Notice and Supplemental Notice of Proposed Rulemaking was published on February 9, 1987 (52 FR 4116). While intended primarily to address issues relating to recreational boating, this notice proposed several revisions to the commercial marine rulemaking. The Notice/Supplemental Notice comment period ended on May 11, 1987.

Now, based on all comments received, the Coast Guard is issuing this final rule containing the standards and rules designed to monitor, control, and reduce alcohol and drug use in both recreational vessel operations and commercial marine operations. This rule also makes miscellaneous amendments correcting statutory references, eliminating duplicate provisions, and conforming casualty reporting requirements to the codification of Title 46 U.S.C., as proposed in the May 23, 1986 NPRM. This final rule combines the two separate dockets, 84-099 and 84-099A, into one.

Discussion of Comments

33 CFR Part 95—Recreational Vessel Operator Standards

The Notice of Proposed Rulemaking (NPRM) solicited public comment on establishing Federal standards for intoxication which would provide for a behavioral standard and an alcohol concentration standard conforming to an enacted State standard for blood alcohol concentration (BAC). A total of 32 comments were received. Recreational and commercial organizations and national boating interests, with memberships totaling over a million boaters, submitted six of the total comments received. The National Transportation Safety Board also commented on the NPRM, based on their research into accidents and accident prevention.

The comments came from the following groups in the numbers noted:

4 recreational boaters.
9 commercial or licensed operators.
1 recreational boating association.
7 commercial boating interests.
1 national boating interest.
6 State Boating Law Administrators.
3 individual boating interests.
1 Federal agency.

Most of the comments did not address all of the proposed rule. A number of comments reiterated earlier suggestions made on the May 23, 1986, ANPRM, or commented anew on commercial aspects of the proposed rule. Although the comments on recreational issues did not clearly favor any specific approach, they overwhelmingly supported the need to take action against intoxicated operators. The following is a section by section summary of the comments received in response to the NPRM.

1. General Comments

All six State Boating Law Administrators and the American Institute of Marine Underwriters supported the proposed regulations and urged rapid issuance of the final rule. Several of the comments commended the Coast Guard for its efforts on this important issue. Conversely, several comments questioned the significance of the number of alcohol or drug related accidents and deaths compared to the number of boats in use and urged the Coast Guard to be a "service" agency instead of a "police" agency.

One comment suggested licensing the operator, since operating a vessel is a privilege, not a civil liberty, and preferred the breath test to blood test due to danger from AIDS, but objected to other aspects of the proposed rulemaking, including: lack of public hearings, danger from enforcement procedures offshore or due to inexperience, criminal penalties too vague, too much police power and potential for abuse, and local enforcement agencies driving expensive high powered "toys" at taxpayers' expense.

Saving lives is a primary Coast Guard mission. The Coast Guard believes that boating accidents and fatalities involving alcohol or drugs will be reduced by publicity and enforcement of these rules. The regulations respond to Congress' direction to set standards by regulation for determining whether an individual is intoxicated. The Coast Guard agrees that the States have the primary responsibility for law enforcement regarding recreational boats. However, the Coast Guard is a law enforcement agency and must be capable of enforcing the regulations required by Congress. Although accidents involving recreational boats are normally investigated by State or local agencies, the Coast Guard will continue to investigate accidents. These standards will be used in enforcement actions arising from those investigations and when intoxicated operators are encountered during a boarding or for other reasons. The Coast Guard plans to develop appropriate training for its boarding officers and directives to implement this rule. The rulemaking does not require any increased enforcement activity by State or local authorities.

The Coast Guard has not received any other request to hold public hearings and there is no indication that the rulemaking would be improved by holding hearings.

2. Purpose

One comment supported implementing the prohibition in 46 U.S.C. 2302 of operating a vessel while *in fact* intoxicated, but cautioned that the implementation methods and intoxication standards must be developed with an understanding of the situations and conditions to which they apply, and with respect to constitutional and other rights of boatmen.

The Coast Guard agrees and has proposed differing standards for recreational and commercial vessels. Our enforcement policies and guidance will be sensitive to the circumstances and rights of boatmen.

3. Applicability

Two comments concurred that the proposed rule should apply to the operation of *all* vessels. One comment suggested this section not use the phrase "and vessels owned in the United States on the high seas" because of problems interpreting "on the high seas" and legality of such enforcement. The comment also suggested deleting the sentence clarifying applicability to foreign vessels as unnecessary information in the section.

The Coast Guard does not foresee problems with interpreting "on the high seas" or enforcing laws with regard to applicable vessels, and has retained the phrase. The phrase is used in 46 U.S.C. 2301, which establishes the applicability of these rules. "High seas" is defined in 33 CFR 2.05. The Coast Guard has also retained the clarification of applicability to foreign vessels for the benefit of mariners on those vessels who may be unsure of their need for compliance or who may follow another country's customs.

4. Definition of Terms Used in This Part

Several comments addressed the definition of "vessel owned in the United States", suggesting clarifying an apparent omission of boats numbered under laws of a State, and adding a definition of "vessel."

No change has been made to the definition of "vessel owned in the United States" as used in § 95.005, since State numbering systems are approved under the provisions of Chapter 123 of Title 46, United States Code. A definition of "vessel" has been added in § 95.010.

5. Operating a Vessel

Two comments suggested that the regulations should clarify that "operating" a recreational vessel means the vessel is "underway", to stay within the authorization of the law.

The statute does not define the term "operate." For many purposes, a commercial vessel is considered to be "operating" while moored to a dock or at anchor. The Coast Guard recognizes that recreational vessels may be used as vacation homes, or even primary residences, and that the activities of persons on board while the vessel is at anchor or moored differ from the activities taking place on commercial vessels. Therefore, the Coast Guard has limited the applicability of the rules to recreational vessels that are underway and included a definition of "underway" in § 95.010.

6. Standard of Intoxication

A number of comments addressed use of behavioral and BAC standards. Two comments opposed each other, suggesting that one standard only be used in support of the other. Two others supported the BAC level (.10%) proposed, but objected to the behavioral standard due to a lack of boarding officer qualifications and training, the possibility that fatigue and exposure to sun and heat can produce symptoms similar to intoxication, and that behavioral standards are easily subverted for harassment purposes. One comment suggested use of portable breath testing equipment as a final determinant or preliminary to requiring the operator to travel to an appropriate place for a BAC test, and urged making some real attempt to find a method, consistent with individual rights, to test for drugs other than alcohol. The NTSB lauded the use of both the subjective behavioral standard and the objective BAC standard, suggesting using an evolving standard of .08 percent offered in the Uniform Vehicle Code (UVC) and Model Traffic Ordinance. The NTSB also suggested defining alcohol concentration in terms of both blood and breath, such as defined in the UVC.

The Coast Guard has retained both BAC and behavioral standards, including their independent usage. Although BAC testing and behavioral observation can be used in combination to support the overall determination of intoxication, it must be stressed that the BAC and behavioral standards are independent of each other. A person may be tested and may not reach the threshold level of BAC, yet be intoxicated under the behavioral standard. Either standard determines intoxication and constitutes a violation of 46 U.S.C. 2302(c). Thus, the standards take into account a person's ability to "mask" intoxication or a person's susceptibility to intoxication.

The behavioral standard is based upon the definition in Section 4–2(14), Code of Virginia. This particular definition has been upheld by both the Virginia courts and Federal courts. A behavioral standard is essential for several reasons: First, in many instances, testing for blood alcohol concentration level may not be available within an acceptable time frame or the person may refuse to consent to a chemical test. Second, intoxication may be caused by drugs, or a combination of drugs and alcohol where the BAC level is not exceeded. In addition, while the blood alcohol levels are statistically sound, there may be

individuals with a susceptibility to alcohol or drug/alcohol combinations such that they are seriously impaired at levels lower than the BAC standard. The behavioral standard may also be used as a measure of what constitutes reasonable cause to test a person for drugs or alcohol.

The Coast Guard agrees with the NTSB on defining alcohol concentration and has adopted the definition used in the UVC. The Coast Guard has retained the .10% BAC level as the common BAC level in State boating laws and has not adopted the .08% BAC level, although this is becoming more common in State highway traffic laws. Should a similar trend develop in State boating laws, the Coast Guard will consider adopting the lower standard.

The Coast Guard plans to develop appropriate training for Coast Guard boarding officers in calibrating and using breath testing equipment. The Coast Guard currently conducts training in this area at the Boating Safety Course for State law enforcement officers. Also, the Coast Guard has awarded a grant to develop a training course in behavioral observation methods. Methods of testing for drugs other than alcohol will be included in the training course, and publicized as they are developed and become available.

7. Adoption of State Standards

Two comments supported the proposed adoption of State standards, one emphasizing applying the standards to all vessels. Another comment was concerned that adopting State BAC level standards meant exclusion of the use of State breath tests and State tests for drugs other than alcohol. The NTSB urged setting a Federal BAC standard at .08 percent and adopting only those State standards which were stricter than the Federal standard.

The Coast Guard has retained these provisions as proposed. This section does not exclude or include State *test* methods. It adopts State BAC level *standards*, where enacted, as Federal BAC level *standards*. The Coast Guard will describe appropriate methods for determining intoxication, including breath tests and tests for drugs other than alcohol, as they are developed and become available. The most common standard of those States setting a BAC standard is .10 percent. The existence of a Federal .10 percent BAC standard, even while adopting State standards that may be less strict, will still encourage States to strengthen their laws.

8. Determination of Intoxication

The NTSB commended the Coast Guard for proposing that refusal to submit to a test is admissible and presumptive of intoxication and urged that the provision be retained. One comment suggested refusal be a rebuttable presumption of intoxication. Another comment suggested refusal be used as evidence in court, but not as a presumption of intoxication.

One comment suggested a two step process for this section: First, using behavioral observation as a reasonable basis to direct a person to submit to toxicological testing; second, using the test results to determine intoxication.

One comment objected to this section for a number of reasons including: problems with using behavioral standards, provisions for anyone making the determination, opportunity for harassment of boaters, and presumption of intoxication for refusal to submit to a test when directed.

One comment suggested defining methods of toxicological testing which will be used, the provisions for training officers to administer tests, and what qualifications they must meet. One comment suggested that the term "in a timely manner" should be defined so as not to place too much discretion in the hands of the boarding officer.

One comment suggested clarifying that this section is applicable to *any* vessel, including recreational vessels.

The Coast Guard has retained the presumption of intoxication for refusal to take a test when directed to do so by a law enforcement officer. The Coast Guard intends to develop proper training of, and procure proper equipment for, its boarding officers to avoid the potential for misuse of authority and improper determinations. The Coast Guard already conducts training in this area at the Boating Safety Course for State law enforcement officers. Also the Coast Guard has awarded a grant to develop a training course in behavioral observation methods. Training in the calibration and use of breath testing equipment will also be conducted. Methods of testing for drugs other than alcohol will be included, and publicized, as they are developed and become available. The rule simply establishes the standards for determining intoxication. It does not attempt to establish training standards or methods of conducting tests. To do so would impose requirements on State and local law enforcement officers. These factors are properly considered during the hearing process in evaluating the weight to be given to the testimony or evidence presented.

While the behavioral standard may be used as a reasonable basis to test a person for drugs or alcohol, the behavioral standard is also intended to be an independent basis for determining intoxication. The Coast Guard has determined that a behavioral standard independent of a BAC standard is essential. There may be individuals with a susceptibility to alcohol or drug/alcohol combinations such that they are seriously impaired at levels lower than the BAC standards. Whatever the cause, the objective is to remove dangerously impaired operators from vessels to which 46 U.S.C. 2302 applies.

The term "timely manner" is not defined to allow for distance and transportation time considerations. While seven States require chemical testing within 2 to 4 hours of an arrest, the proximity of the test to the observed operation of the vessel is a factor that the hearing officer can consider in evaluating the weight to be given to the results.

Section 95.005 clearly states the applicability of Part 95, including § 95.017 (now issued as §§ 95.030 through 95.040).

33 CFR Part 95—Commercial Vessels

There were 106 comments received on the proposed rules applicable to commercial vessels in response to the May 23, 1986, Notice of Proposed Rulemaking and the February 9, 1987, Supplemental Notice of Proposed Rulemaking. The following categories of comments were received:

23 May 1986 NPRM

Mariners	37
Operating Companies	14
Marine Industry Associations	14
Pilot Association	1
Maritime Unions	3
NTSB	1
States and municipalities	6
Law Firm	1
Laboratory	1
Marine Related Firms	4
Training Institutions	3
Government Agencies	3
Total	88

9 February 1987 SNPRM

Mariners	9
Operating Companies	2
Marine Industry Associations	4
Pilot Association	1
Maritime Union	1
NTSB	1
Total	18

Several revisions were made in developing the final rule due to the comments received, all of which are discussed below.

9. Purpose

There was some concern over the possible interference of this rule with more stringent existing employer sponsored programs. While several comments were submitted on this subject, the fundamental issue involved is discussed in Recommendation #59 of the Towing Safety Advisory Committee (TSAC). The recommendation says, in part, "Many barge operators have longstanding corporate policies which prohibit the possession or consumption of alcohol aboard vessels. While TSAC recognizes that the pending Coast Guard rule on commercial vessel intoxication only seeks to establish intoxication standards as required by 46 U.S.C. 2302(c), and does not purport to govern questions of possession or consumption, it is of overriding importance that the regulatory text of this rule clarify that the establishment of an intoxication standard does not implicitly encourage alcohol consumption aboard commercial vessels, rather the opposite."

In response to this concern, the Coast Guard included the following statement in a new paragraph 95.001(b); "Nothing in this part shall be construed as limiting the authority of a vessel's marine employer to limit or prohibit the use or possession of alcohol on board a vessel." "Marine employer" is defined as the owner, managing operator, charterer, agent, master, or person in charge of a commercial vessel. The Coast Guard encourages employers to implement comprehensive programs to prevent the misuse of alcohol on their vessels and it is believed that the final rule will not negate company programs.

10. Applicability

Several comments raised the issue of the applicability and enforcement of these rules to foreign vessels within U.S. waters. One commenter believes this rule to be an "unwarranted interference with the routine commercial operation of merchant vessels." While the Coast Guard understands the concern over the application of these rules to foreign vessels, 46 U.S.C. 2302 clearly applies to the operation of foreign vessels while they are in U.S. waters. Intoxicated foreign seamen are as much a hazard to themselves, their shipmates, their vessel, the environment, and other vessels operating on the navigable waters of the United States, as intoxicated American seamen. Therefore, the application of this rule remains the same.

One commenter specifically requested to know when the rules will apply, particularly whether the rules govern the conduct of crewmembers ashore. The rules do not apply to a crewmember ashore, even on ships business, however, the operating rules contained in § 95.045 must be complied with. The rules will apply to a crewmember whenever that individual is operating a vessel, which, in most cases, will be whenever the individual is on board the vessel. It is the duty of all crewmembers to respond to emergencies or "call out" while on board. This is expressly recognized by 46 U.S.C. 8104.

11. Definition of Terms

There are several definitions added in the final rule; "alcohol concentration," "chemical test," "law enforcement officer," "marine employer," "recreational vessel," "underway," and "vessel." All these definitions were added to make the final rule easier to understand and to address comments questioning the meaning and application of terms used in the rule.

12. Operating a Vessel

There has been a major revision to this part due to comments received on the perceived inequality of the rule's application. In the SNPRM of February 9, 1987, it was proposed that all members of the crew of a vessel subject to any manning requirement under Part F of Subtitle II of Title 46, United States Code, would be considered to be "operating a vessel" while, for other commercial and recreational vessels, only those persons who have "an essential role" in the operation of the vessel would be subject to the rules. The final rules apply to all members of the crew of any commercial vessel, not only those vessels subject to any manning requirement under Part F. This will guarantee uniformity and simplify compliance with, and enforcement of, the rule. The final rule has been altered throughout to reflect this philosophy. It should be noted that all members of the crew of a fishing vessel will be subject to the rules.

Several comments expressed particular concerns as to whether individuals who do not appear to be directly operating or navigating a vessel, such as stewards, should be considered to be "operating a vessel." It is the position of the Coast Guard that all crewmembers on board a vessel contribute to the function of the vessel or the accomplishment of its mission. In addition to their regularly assigned duties, each crewmember has additional safety related responsibilities, including emergency duties. All of these duties are inherently associated with the vessel's operation and the effects of intoxicants upon an individual's performance of these duties could pose a threat to the safety of the individual as well as to the vessel, its equipment, passengers, or crew. For these reasons, all crewmembers of a commercial vessel are considered to be "operating a vessel" and, as such, will be limited in their use of intoxicants.

13. Standard of Intoxication

There was overwhelming opposition to having two alcohol concentration levels for commercial vessels, depending on the category of vessel. Several comments questioned the reasoning behind the proposal, especially since commercial vessels of similar size and route would have different standards apply, and more importantly, that different standards may apply to the same vessel during different periods of operation. The final rule has a uniform alcohol concentration standard for all commercial vessels.

The issue of which alcohol concentration standard to use for the commercial marine industry was addressed by almost every comment. Several comments wanted anything over .00 alcohol concentration to be the standard of intoxication, others wanted a universal .10 alcohol concentration, still others wanted .05 or .08. The Coast Guard has decided to make the .04 standard applicable to all commercial vessels. As noted in the NPRM, there are several studies which indicate that impairment due to intoxicants begins around .04, and the Federal Aviation Administration and the Federal Railroad Administration have adopted similar standards. The Coast Guard realizes that this standard may appear low and that the commercial vessel standard will be a more stringent standard than the recreational vessel standard. However, commercial operators normally operate more frequently, and transport passengers or cargo or conduct other operations where the effect of errors can result in significant harm extending beyond the vessel and its personnel. The lower alcohol concentration level is intended to ensure that persons who receive compensation for operating commercial vessels are held to a high standard of conduct.

14. Determination of Intoxication

Comments submitted on both the NPRM and the SNPRM indicate confusion concerning the "determination of intoxication" and the role that non-law enforcement personnel have in making that "determination."

The proposed rule appeared to permit a determination of intoxication to be made, with its accompanying penalties, by a marine employer or law

enforcement officer without giving the individual suspected of intoxication the opportunity to rebut such charges. This was never intended by the Coast Guard. This section would only be utilized in administrative or judicial hearings with full opportunity to contest the charge. The comments criticized using non-law enforcement personnel in making determinations, the legality of such determinations, liability for wrongful determinations of intoxication, and the mechanics involved in actually making a determination. The number and volume of comments indicate general misunderstanding of this section.

In an effort to remove this misunderstanding, the entire section has been rewritten and restructured. None of the concepts of the original section are changed, rather they have been placed in a more understandable form. Section 95.030 now simply states that personal observation of apparent intoxicated behavior or a chemical test are acceptable as evidence of intoxication. This evidence may then be submitted at an administrative or judicial proceeding where the actual determination of intoxication would be made. The rule does not preclude the use of other evidence at a hearing, nor does it mandate the use of the specified evidence.

Section 94.035 outlines who may direct a chemical test, when reasonable cause exists to direct the taking of a chemical test, and some general testing requirements. Since marine employers are most likely to be in a position to recognize the need for testing an employee, the Coast Guard continues to permit those employers to require chemical testing for reasonable cause. The acceptability of a particular test required by a marine employer will be established during an administrative or judicial proceeding.

Section 94.050, states the effect of refusing chemical testing.

It is believed that this revised structure clearly states the process leading to a determination of whether an individual operating a vessel is intoxicated.

Several comments requested that the Coast Guard publish guidelines for making personal observations of intoxication. As stated previously, the Coast Guard is developing training materials on the subject and will distribute them to law enforcement personnel and marine employers.

15. General Operating Rules for Vessels Inspected Under Chapter 33 of Title 46 United States Code

The prohibition against assuming duties within four hours of consuming alcohol has been retained. Several comments suggested that this paragraph be deleted entirely, while others supported its retention or suggested increasing the hours of abstinence. Although the imposed period of abstinence cannot guarantee the sobriety of an individual, it will limit the ability to assume a watch or duties after drinking, while not entirely prohibiting moderate consumption of alcohol, such as with meals. Violation of this section will not be a violation of 46 U.S.C. 2302(c), but could subject an individual to other administrative actions such as suspension or revocation proceedings against a Coast Guard issued license, certificate, or document.

The issue of whether those crewmembers not actually "operating" a commercial vessel in the traditional sense of the word should be allowed to be intoxicated has been previously discussed. For those reasons, § 95.045 remains unchanged.

The issue of prescription drug use was raised by several comments. After careful consideration, § 95.045 has been revised to read, "A crewmember (including a licensed individual), pilot, or watchstander not a regular member of the crew: * * * (d) May consume a legal non-prescription or prescription drug provided the drug does not cause the individual to be intoxicated." It is realized that any drug may have side effects possibly resulting in intoxication and that a physician may not know how a certain drug will affect a particular individual. The individual taking a drug has the knowledge of its effects, and a supervisor or others can witness the effects. Therefore, the regulation has been revised to put the responsibility for compliance primarily on the individual. While this section specifically applies to inspected vessels, persons operating uninspected vessels must ensure they are not intoxicated due to the use of legal drugs.

The paragraph dealing with crew shortages and reporting requirements has been deleted. Since only an administrative or judicial proceeding can determine if an individual is intoxicated, a marine employer would not have timely knowledge whether or not they had complied with this section. The removal of this section, however, does not diminish the responsibility of the vessel's crew or marine employer to observe crewmembers actions and take appropriate action to prevent intoxicated personnel from operating a vessel.

16. Prohibitions for vessels subject to any manning requirement under Part F of Title 46, United States Code

This section has been entirely deleted since it is redundant.

17. Penalties

The paragraph dealing with penalties for marine employers who permit intoxicated individuals to remain in their employ has been deleted. Since only an administrative or judicial hearing can determine if an individual is intoxicated, a marine employer would be subject to penalty "after the fact" if they unwittingly continued to use personnel that are later proven to have been intoxicated. Instead, § 95.050 has been revised to include a duty to prohibit an intoxicated individual from standing a watch or performing duties, but only when the marine employer has reason to believe the individual is intoxicated.

46 CFR Part 4—Marine Casualties and Investigations

18. Alcohol or Drug Use by Individuals Directly Involved in Marine Casualties

A number of commenters objected to the proposed requirement for the owner, managing operator, charterer, master, or person in charge of a vessel to "determine" when there is any alcohol or drug involvement by persons directly involved in reportable marine casualties. The commenters feel that the determination of alcohol or drug use, or of intoxication, is a function which should be conducted by qualified law enforcement personnel, not by the marine employer. The Coast Guard agrees, and further recognizes that the ultimate responsibility to determine whether an individual used alcohol or drugs, or was intoxicated, most appropriately rests with the person who is authorized to impose sanctions or penalties for such conduct (i.e., a Coast Guard administrative law judge, Coast Guard civil penalty hearing officer, or judge of a Federal District Court). For this reason, this section has been reworded to require the marine employer to determine when there is "evidence" of drug or alcohol use by individuals involved in marine casualties. The proposed requirements concerning documentation of such "evidence", through the submission of Form CG–2692 or through entries in an official log book, have also been reworded accordingly.

Another commenter noted that not all commercial vessels are legally required to carry official log books, and recommended the insertion of the words

"if carried" following the words "official log book" to highlight this distinction. The Coast Guard agrees and the recommended words have been added where appropriate.

46 CFR Part 5—Marine Investigation Regulations—Personnel Action

19. Voluntary Deposits of Licenses, Certificates, or Documents in the Event of Mental or Physical Incompetence

The several comments on this subject were equally split on whether it is or is not appropriate to withhold or reduce remedial action based on an individual's rehabilitation from substance abuse. As indicated in the NPRM of May 23, 1986, the Coast Guard firmly believes that encouraging voluntary rehabilitation efforts of seamen who abuse drugs or alcohol will result in a safer marine industry. At the same time, the Coast Guard continues to take seriously its responsibility under 46 U.S.C. 7704 to revoke a seaman's license, certificate, or document if it is shown at a hearing that the seaman has been convicted of violation of a dangerous drug law, or has been a user of, or addicted to, dangerous drugs. The Coast Guard feels that the provision to allow a seaman to voluntarily deposit his or her license, certificate, or document in lieu of a hearing, and to not return those papers except under specific circumstances, is an appropriate effort to merge these disparate purposes. Accordingly, the provisions will be retained as proposed.

A number of commenters also addressed the different time periods following rehabilitation after which a license or document may be returned to a seaman (i.e., no time limit following alcohol rehabilitation, a minimum of 6 months following drug rehabilitation). Because drug-related activity is illegal, and because of the provisions of 46 U.S.C. 7704, the Coast Guard feels that a more stringent standard must be applied to the drug abuser to demonstrate that he or she is "cured." Accordingly, this provision will be retained as proposed.

Regulatory Evaluation

The Coast Guard has reviewed this final rule under Executive Order 12291 and has determined that it is not a major regulation.

The original proposal was considered a significant regulation under the Department of Transportation guidelines because it was likely to be controversial. The comments received have supported that conclusion. Although the proposal was modified in response to the comments received, some controversy may remain. Accordingly, the final rule remains classified as a significant regulation. As modified, it is not expected to have a significant economic impact. A regulatory impact analysis is not required; however, a final evaluation has been prepared and has been included in the public docket. A copy of the final evaluation may be obtained from: Commandant (G–CMC/21), (CGD 84–099), U.S. Coast Guard, Washington, DC 20593–0001.

It is expected that this rule will reduce the risk to the lives and safety of the boating public and commercial operators that is caused by intoxicated operation of vessels. The existence of the rule should deter a person from operating a recreational vessel while intoxicated due to publicity that the law is now enforceable. Experience with seat belt laws and usage is a corollary. In 1982, only 11 percent of drivers nationwide used seat belts while 89 percent went unprotected. In 1987, after a publicity campaign directed at motorists and enactment of seatbelt laws in 29 states and the District of Columbia, the use of seat belts had risen to 42 percent nationwide (58 percent unprotected). In other words, the number of people who had previously elected to engage in unsafe behavior decreased 35 percent as a result of Federal and State action. If the Coast Guard regulations and publicity campaign achieved similar results, recreational boating accidents and commercial marine casualties involving alcohol or drugs could be reduced by 35 percent. The benefits to society of such a reduction could be $46.1 million to $209.9 million. Experience with educational campaigns addressing intoxicated operation of motor vehicles has also shown reductions in accidents. An extensive education campaign and State BAC laws have reduced the number of intoxicated drivers involved in fatal accidents from 30 percent to 25 percent, a 16.7 percent reduction. A comparable reduction in recreational boating accidents and commercial marine casualties involving alcohol or drugs could yield benefits to society of $21.9 million to $100.2 million. Although the exact number of accidents involving alcohol or drugs prevented cannot be accurately predicted, it is expected this rulemaking will reduce the number of casualties and cost to society. By either of the above cost reduction estimates, the benefit/cost ratio is very favorable. Moreover, if this regulation, as an opening wedge, can reduce alcohol related recreational boating accident and commercial marine casualty costs by just 1 percent, its benefits will have exceeded its modest costs. Compliance with these rules will not impose any cost or burden on persons operating a recreational vessel or commercial vessel except for those operators who regard becoming intoxicated as a privilege. The Coast Guard believes the probable benefits of reasonable limits on drinking far outweigh the burden imposed. It is also hoped that the rule will encourage State legislatures to strengthen their present laws in this area.

Paperwork Reduction Act

The rules in this document revise information collection requirements in 46 CFR Part 4 and 33 CFR Part 173. The Office of Management and Budget (OMB) has approved the information collection currently required. Control number OMB–2115–0003 has been assigned for casualty reports and control number OMB–2115–0010 has been assigned for boating accident reports. Although the report forms are being changed to reflect specific alcohol or drug involvement in casualties, this is considered merely a clarification of existing reporting requirements and a minor change to the reporting burden.

This rule will not require any major expenditures by the maritime industry, consumers, Federal, State, or local governments. Additionally, the Coast Guard has reviewed this rule under the Regulatory Flexibility Act (Pub. L. 98–354) and certifies that this rule will not have a significant impact on a substantial number of small entities.

List of Subjects

33 CFR Part 95

Marine safety, Vessels, Alcohol and alcoholic beverages, Drugs.

33 CFR Part 146

Continental Shelf, Marine safety, Occupational safety and health, Reporting and recordkeeping, Alcohol and alcoholic beverages, Drugs.

33 CFR Part 150

Deepwater ports, Marine safety, Reporting and recordkeeping, Alcohol and alcoholic beverages, Drugs.

33 CFR Part 173

Marine safety, Reporting and recordkeeping, Alcohol and alcoholic beverages, Drugs.

33 CFR Part 177

Marine safety, Recreational vessels, Unsafe conditions, Alcohol and alcoholic beverages, Drugs.

46 CFR Part 4

Administrative practice and procedures, Investigations, Accidents, Marine safety, National Transportation

Safety Board, Reporting requirements, Alcohol and alcoholic beverages, Drugs.

46 CFR Part 5

Administrative practice and procedures, Investigations, Administrative law judge, Investigating officer, Seaman, License, Certificate, Document, Rehabilitation, Administrative hearings, Suspension and revocation, Alcohol and alcoholic beverages, Drugs.

46 CFR Part 26

Marine safety, Penalties, Reporting requirements, Vessels, Navigation (water), Passenger vessels, Fishing vessels, Alcohol and alcoholic beverages, Drugs.

46 CFR Part 35

Cargo vessels, Marine safety, Seaman, Occupational safety and health, Reporting and recordkeeping requirements.

46 CFR Part 78

Marine safety, Passenger vessels, Penalties, Reporting requirements, Navigation (water), Alcohol and alcoholic beverages, Drugs.

46 CFR Part 97

Cargo vessels, Marine safety, Reporting requirements, Navigation (water), Penalties, Alcohol and alcoholic beverages, Drugs.

46 CFR Part 109

Continental Shelf, Oil and gas exploration, Marine safety, Marine resources, Reporting requirements, Vessels, Alcohol and alcoholic beverages, Drugs.

46 CFR Part 167

Fire prevention, Reporting requirements, Marine safety, Alcohol and alcoholic beverages, Drugs.

46 CFR Part 185

Marine safety, Passenger vessel, Reporting requirements, Navigation (water), Alcohol and alcoholic beverages, Drugs.

46 CFR Part 196

Marine safety, Oceanographic vessel, Reporting requirements, Navigation (water), Penalties, Alcohol and alcoholic beverages, Drugs.

46 CFR Part 197

Diving, Marine safety, Occupational safety and health, Vessels, Alcohol and alcoholic beverages, Drugs.

Final Rule

In consideration of the foregoing, the Coast Guard amends Chapter 1 of Title 33, Code of Federal Regulations and Chapter 1 of Title 46, Code of Federal Regulations as set forth below:

TITLE 33—[AMENDED]

1. A new Subchapter F—Vessel Operating Regulations is added to read as follows:

SUBCHAPTER F—VESSEL OPERATING REGULATIONS

PART 95—OPERATING A VESSEL WHILE INTOXICATED

Sec.

Authority: 46 U.S.C. 2302, 3306, and 7701; 49 CFR 1.46.

§ 95.001 Purpose.

(a) The purpose of this part is to establish intoxication standards under 46 U.S.C. 2302 and to prescribe restrictions and responsibilities for personnel on vessels inspected, or subject to inspection, under Chapter 33 of Title 46 United States Code. This part does not pre-empt enforcement by a State of its applicable laws and regulations concerning operating a recreational vessel while intoxicated.

(b) Nothing in this part shall be construed as limiting the authority of a vessel's marine employer to limit or prohibit the use or possession of alcohol on board a vessel.

§ 95.005 Applicability.

(a) This part is applicable to a vessel (except those excluded by 46 U.S.C. 2109) operated on waters subject to the jurisdiction of the United States, and to a vessel owned in the United States on the high seas. This includes a foreign vessel operated on waters subject to jurisdiction of the United States.

(b) This part is also applicable at all times to vessels inspected, or subject to inspection, under Chapter 33 of Title 46 United States Code.

§ 95.010 Definition of terms as used in this part.

"Alcohol" means any form or derivative of ethyl alcohol (ethanol).

"Alcohol concentration" means either grams of alcohol per 100 milliliters of blood, or grams of alcohol per 210 liters of breath.

"Chemical test" means a test which analyzes an individual's breath, blood, urine, saliva and/or other bodily fluids or tissues for evidence of drug or alcohol use.

"Controlled substance" has the same meaning assigned by 21 U.S.C. 802 and includes all substances listed on Schedules I throught V as they may be revised from time to time (21 CFR 1308).

"Drug" means any substance (other tha alcohol) that has known mind or function-altering effects on a person, specifically including any psychoactive substance, and including, but not limited to, controlled substances.

"Intoxicant" means any form of alcohol, drug or combination thereof.

"Law enforcement officer" means a Coast Guard commissioned, warrant, or petty officer; or any other law enforcement officer authorized to obtain a chemical test under Federal, State, or local law.

"Marine employer" means the owner, managing operator, charterer, agent, master, or person in charge of a vessel other than a recreational vessel.

"Recreational vessel" means a vessel meeting the definition in 46 U.S.C. 2101(25) that is then being used only for pleasure.

"Underway" means that a vessel is not at anchor, or made fast to the shore, or aground.

"Vessel" includes every description of watercraft of other artificial contrivance used, or capable of being used, as a means of transportation on water.

"Vessel owned in the United States" means any vessel documented or numbered under the laws of the United States; and, any vessel owned by a citizen of the United States that is not documented or numbered by any nation.

§ 95.015 Operating a vessel.

For purposes of this part, an individual is considered to be operating a vessel when:

(a) The individual has an essential role in the operation of a recreational vessel underway, including but not limited to navigation of the vessel or control of the vessel's propulsion system.

(b) The individual is a crewmember (including a licensed individual), pilot, or watchstander not a regular member of the crew, of a vessel other than a recreational vessel.

§ 95.020 Standard of intoxication.

An individual is intoxicated when:

(a) The individual is operating a recreational vessel and has an alcohol concentration of .10 percent by weight or more in their blood;

(b) The individual is operating a vessel other than a recreational vessel and has an alcohol concentrarion of .04 percent by weight or more in their blood; or,

(c) The individual is operating any vessel and the effect of the intoxicant(s) consumed by the individual on the person's manner, disposition, speech, muscular movement, general appearance or behavior is apparent by observation.

§ 95.025 Adoption of State standards.

(a) This section applies to recreational vessels on waters within the geographical boundaries of a State having a statute defining a percentage of alcohol in the blood for the purposes of establishing that a person operating a vessel is intoxicated or impaired due to alcohol.

(b) If the applicable State statute establishing a standard for determining impairment due to alcohol uses the terms "under the influence," "operating while impaired," or equivalent terminology and does not separately define a percentage of alcohol in the blood for the purpose of establishing "intoxication," the standard containing the highest defined percentage of alcohol in the blood applies in lieu of the standard in § 95.020(a). If the applicable State statute contains a standard specifically applicable to establishing intoxication, in addition to standards applicable to other degrees of impairment, the standard specifically applicable to establishing intoxication applies in lieu of the standard in § 95.020(a).

(c) For the purposes of this part, a standard established by State statute and adopted under this section is applicable to the operation of any recreational vessel on waters within the geographical boundaries of the State.

§ 95.030 Evidence of intoxication.

Acceptable evidence of intoxication includes, but is not limited to:

(a) Personal observation of an individual's manner, disposition, speech, muscular movement, general appearance, or behavior; and,

(b) A chemical test.

§ 95.035 Reasonable cause for directing a chemical test.

(a) Only a law enforcement officer or a marine employer may direct an individual operating a vessel to undergo a chemical test when reasonable cause exists. Reasonable cause exists when:

(1) The individual was directly involved in the occurrence of a marine casualty as defined in Chapter 61 of Title 46, United States Code, or

(2) The Individual is suspected of being in violation of the standards in §§ 95.020 or 95.025.

(b) When an individual is directed to undergo a chemical test, the individual to be tested must be informed of that fact and directed to undergo a test as soon as is practicable.

(c) When practicable, a marine employer should base a determination of the existence of reasonable cause, under paragraph (a)(2) of this section, on observation by two persons.

§ 95.040 Refusal to submit to testing.

(a) If an individual refuses to submit to or cooperate in the administration of a timely chemical test when directed by a law enforcement officer based on reasonable cause, evidence of the refusal is admissible in evidence in any administrative proceeding and the individual will be presumed to be intoxicated.

(b) If an individual refuses to submit to or cooperate in the administration of a timely chemical test when directed by the marine employer based on reasonable cause, evidence of the refusal is admissible in evidence in any administrative proceeding.

§ 95.045 General operating rules for vessels inspected, or subject to inspection, under Chapter 33 of Title 46 United States Code.

While on board a vessel inspected, or subject to inspection, under Chapter 33 of Title 46 United States Code, a crewmember (including a licensed individual), pilot, or watchstander not a regular member of the crew:

(a) Shall not perform or attempt to perform any scheduled duties within four hours of consuming any alcohol;

(b) Shall not be intoxicated at any time;

(c) Shall not consume any intoxicant while on watch or duty; and

(d) May consume a legal non-prescription or prescription drug provided the drug does not cause the individual to be intoxicated.

§ 95.050 Responsibility for compliance.

(a) The marine employer shall exercise due diligence to assure compliance with the applicable provisions of this part.

(b) If the marine employer has reason to believe that an individual is intoxicated, the marine employer shall not allow that individual to stand watch or perform other duties.

§ 95.055 Penalties.

An individual who is intoxicated when operating a vessel in violation of 46 U.S.C. 2302(c), shall be:

(a) Liable to the United States Government for a civil penalty of not more than $1,000; or,

(b) Fined not more than $5,000, imprisoned for not more than one year, or both.

PART 146—[AMENDED]

2. The authority citation for Part 146 continues to read as follows:

Authority: 43 U.S.C 1333(d)(1), 1347, 1348; 49 CFR 1.46(z).

3. Section 146.35 is amended by adding a new paragraph (a)(7) to read as follows:

§ 146.35 Written report of casualty.

(a) * * *

(7) Includes information relating to alcohol or drug involvement as specified in the vessel casualty reporting requirements of 46 CFR 4.05–12.

* * * * *

PART 150—[AMENDED]

4. The authority citation for Part 150 continues to read as follows:

Authority: 33 U.S.C. 1231, 1509(a)(b); 49 CFR 1.46.

5. Section 150.711 is amended by adding a new paragraph (b)(9) to read as follows:

§ 150.711 Casualty or accident.

* * * * *

(b) * * *

(9) The vessel casualty reporting requirements relating to alcohol or drug involvement as specified in the vessel casualty reporting requirements of 46 CFR 4.05–12.

* * * * *

PART 173—[AMENDED]

6. The authority citation for Part 173 is revised to read as follows and all other authority citations within this part are removed:

Authority: 46 U.S.C. 6101 and 12121; 49 CFR 1.46(n)(1).

§ 173.51 Applicability.

7. In § 173.51 paragraph (b) is revised to read as follows:

* * * * *

(b) This subpart does not apply to a vessel subject to inspection under Title 46 U.S.C. Chapter 33.

8. In § 173.57 paragraph (v) is revised to read as follows:

§ 173.57 Casualty or accident report.

* * * * *

(v) The opinion of the person making the report as to the cause of the casualty, including whether or not alcohol or drugs, or both, was a cause or contributed to causing the casualty.

* * * * *

PART 177—[AMENDED]

9. The authority citation for Part 177 is revised to read as follows:

Authority: 46 U.S.C. 4302; 49 CFR 1.46(n)(1).

10. Section 177.01 is amended by revising the introductory text to read as follows:

§ 177.01 Purpose and applicability.

This part prescribes rules to implement section 4308 of Title 46 United States Code which governs the corrections of especially hazardous conditions on recreational vessels and uninspected passenger vessels on waters subject to the jurisdiction of the United States and, for a vessel owned in the United States, on the high seas, except operators of:

* * * * *

§ 177.03 [AMENDED]

11. Section 177.03 is amended by removing and reserving paragraph (a).

12. Section 177.05 is amended by revising the introductory text to read as follows:

§ 177.05 Action to correct an especially hazardous condition.

An operator of a boat who is directed by a Coast Guard Boarding Officer to take immediate and reasonable steps necessary for the safety of those aboard the vessel, under section 4308 of Title 46, United States Code, shall follow the direction of the Coast Guard Boarding Officer, which may include direction to:

* * * * *

13. Section 177.07 is amended by revising the introductory text and paragraphs (b) and (c) to read as follows:

§ 177.07 Other unsafe conditions.

For the purpose of section 4308 of Title 46, United States Code, "other unsafe condition" means a boat:

* * * * *

(b) That is operated by an individual who is apparently intoxicated, as defined in § 95.020 of this chapter, to the extent that, in the boarding officer's discretion, the continued operation of the vessel would create an unsafe condition.

(c) Has a fuel leakage from either the fuel system or engine, or has an accumulation of fuel in the bilges.

* * * * *

TITLE 46 [AMENDED]

PART 4—[AMENDED]

14. The authority citation for Part 4 continues to read as follows:

Authority: 43 U.S.C. 1333; 46 U.S.C. 2306, 6101, 6301, 6305; 50 U.S.C. 198; 49 CFR 1.46(b) and (z), except subpart 4.40 for which the authority is 49 U.S.C. 1903(a)(1)(E); 49 CFR 1.46(n)(10)(i).

15. Subpart 4.03 is amended by adding §§ 4.03–35, 4.03–45, 4.03–50, and 4.03–55 to read as follows:

§ 4.03–35 Nuclear vessel.

The term "nuclear vessel" means any vessel in which power for propulsion, or for any other purpose, is derived from nuclear energy; or any vessel handling or processing substantial amounts of radioactive material other than as cargo.

§ 4.03–45 Marine employer.

"Marine employer" means the owner, managing operator, charterer, agent, master, or person in charge of a vessel other than a recreational vessel.

§ 4.03–50 Recreational vessel.

"Recreational vessel" means a vessel meeting the definition in 46 U.S.C. 2101(25) that is then being used only for pleasure.

§ 4.03–55 Law enforcement officer.

"Law enforcement officer" means a Coast Guard commissioned, warrant or petty officer; or any other law enforcement officer authorized to obtain a chemical test under Federal, State, or local law.

16. Subpart 4.05 is amended by revising § 4.05–10 and adding §§ 4.05–12 and 4.05–35 and to read as follows:

Subpart 4.05—Notice of Marine Casualty and Voyage Records

* * * * *

§ 4.05–10 Written report of marine casualty.

(a) In addition to the notice required by § 4.05–1, the marine employer shall, within five days, report in writing to the Officer in Charge, Marine Inspection, at the port in which the casualty occurred or the nearest port of first arrival. The written report required for vessel or personnel accidents shall be made on Form CG–2692. The Form CG–2692A (Barge Addendum) may be used as needed and appended to Form CG–2692.

(b) If filed without delay, the Form CG–2692 may also provide the notice required by § 4.05–1.

§ 4.05–12 Alcohol or drug use by individuals directly involved in casualties.

(a) For each marine casualty required to be reported by § 4.05–10, the marine employer shall determine whether there is any evidence of alcohol or drug use by individuals directly involved in the casualty.

(b) The marine employer shall include in the written report, Form CG–2692, submitted for the casualty information which:

(1) Identifies those individuals for whom evidence of drug or alcohol use, or evidence of intoxication, has been obtained; and,

(2) Specifies the method used to obtain such evidence, such as personal observation of the individual, or by chemical testing of the individual.

(c) An entry shall be made in the official log book, if carried, pertaining to those individuals for whom evidence of intoxication is obtained. The individual must be informed of this entry and the entry must be witnessed by a second person.

(d) If an individual directly involved in a casualty refuses to submit to, or cooperate in, the administration of a timely chemical test, when directed by a law enforcement officer or by the marine employer, this fact shall be noted in the official log book, if carried, and in the written report (Form CG–2692), and shall be admissible as evidence in any administrative proceeding.

§ 4.05–35 Incidents involving nuclear vessels.

The master of any nuclear vessel shall immediately inform the Commandant in the event of any accident or casualty to the nuclear vessel which may lead to an environmental hazard. The master shall also immediately inform the competent governmental authority of the country in whose waters the vessel may be or whose waters the vessel approaches in a damaged condition.

PART 5—[AMENDED]

17. The authority citation for Part 5 continues to read as follows:

Authority: 46 U.S.C. 7101, 7310, 7701; 50 U.S.C. 198; 49 CFR 1.46(b).

18. Subpart E is amended by revising § 5.201 and adding § 5.205 to read as follows:

Subpart E—Deposit or Surrender of License, Certificate, or Document

§ 5.201 Voluntary deposits in event of mental or physical incompetence.

(a) A holder may deposit a license, certificate, or document with the Coast Guard in any case where there is evidence of mental or physical incompetence. A voluntary deposit is accepted on the basis of a written agreement, the original of which will be given to the holder, which specifies the conditions upon which the Coast Guard will return the license, certificate, or document to the holder.

(b) Where the mental or physical incompetence of a holder of a license, certificate, or document is caused by use of or addiction to dangerous drugs, a voluntary deposit will only be accepted contingent on the following circumstances:

(1) The holder is enrolled in a bona fide drug abuse rehabilitation program;

(2) The holder's incompetence did not cause or contribute to a marine casualty,

(3) The incompetence was reported to the Coast Guard by the individual or any other person and was not discovered as a result of a Federal, State or local government investigation; and

(4) The holder has not voluntarily deposited or surrendered a license, certificate, or document, or had a license, certificate, or document revoked for a drug related offense on a prior occasion.

(c) Where the mental or physical incompetence of a holder of a license, certificate, or document is caused by use or addiction to alcohol, a voluntary deposit will only be accepted contingent on the following circumstances:

(1) The holder is enrolled in a bona fide alcohol abuse rehabilitation program;

(2) The holder's incompetence did not cause or contribute to a marine casualty; and

(3) The incompetence was reported to the Coast Guard by the individual or any other person and was not discovered as a result of a Federal, State, or local government investigation.

(d) Where the conditions of paragraphs (b) and (c) of this section are not met, the holder may only surrender such license, certificate, or document in accordance with § 5.203.

§ 5.205 Return or issuance of a license, certificate of registry, or merchant mariners document.

(a) A person may request the return of a voluntarily deposited license, certificate, or document at any time, provided he or she can demonstrate a satisfactory rehabilitation or cure of the condition which caused the incompetence; has complied with any other conditions of the written agreement executed at the time of deposit; and complies with the physical and professional requirements for issuance of a license, certificate, or document.

(b) Where the voluntary deposit is based on incompetence due to drug abuse, the deposit agreement shall provide that the license, certificate, or document will not be returned until the person:

(1) Successfully completes a bona fide drug abuse rehabilitation program;

(2) Demonstrates complete non-association with dangerous drugs for a minimum of six months after completion of the rehabilitation program; and

(3) Is actively participating in a bona fide drug abuse monitoring program.

(c) Where the voluntary deposit is based on incompetence due to alcohol abuse, the deposit agreement shall provide that the license, certificate, or document will not be returned until the person:

(1) Successfully completes a bona fide alcohol abuse rehabilitation program; and

(2) Is actively participating in a bona fide alcohol abuse monitoring program.

(d) The voluntary surrender of a license, certificate, or document is the equivalent of revocation of such papers. A holder who voluntarily surrenders a license, certificate, or document must comply with provisions of §§ 5.901 and 5.903 when applying for the issuance of a new license, certificate, or document.

19. Subpart L is amended by adding paragraphs (d), (e) and (f) to § 5.901 to read as follows:

Subpart L—Issuance of New Licenses, Certificates, or Documents After Revocation or Surrender

§ 5.901 Time limitations.

* * * * *

(d) For a person whose license, certificate, or document has been revoked or surrendered for the wrongful simple possession or use of dangerous drugs, the three year time period may be waived by the Commandant upon a showing that the individual:

(1) Has successfully completed a bona fide drug abuse rehabilitation program;

(2) Has demonstrated complete non-association with dangerous drugs for a minimum of one year following completion of the rehabilitation program and;

(3) Is actively participating in a bona fide drug abuse monitoring program.

(e) For a person whose license, certificate or document has been revoked or surrendered for offenses related to alcohol abuse, the waiting period may be waived by the Commandant upon a showing that the individual has successfully completed a bona fide alcohol abuse rehabilitation program and is actively participating in a bona fide alcohol abuse monitoring program.

(f) The waivers specified under subparagraphs (d) or (e) of this section may only be granted once to each person.

PART 26—[AMENDED]

20. The authority citation for Subpart 26.08 is revised to read as follows:

Authority: 46 U.S.C. 6101; 46 CFR 1.46(b)

21. Subpart 26.08 is revised to read as follows:

Subpart 26.08—Notice and Reporting of Casualty and Voyage Records

§ 26.08-1 Notice and reporting of casualty and voyage records.

The requirements for providing notice and reporting of marine casualties and for retaining voyage records are contained in Part 4 of this Chapter.

PART 35—[AMENDED]

22. The authority citation for Part 35 continues to read as follows:

Authority: 46 U.S.C. 3306 and 3703; 49 CFR 1.46.

23. Subpart 35.15 is revised to read as follows:

Subpart 35.15—Notice and Reporting of Casualty and Voyage Records

§ 35.15-1 Notice and reporting of casualty and voyage records.

The requirements for providing notice and reporting of marine casualties and for retaining voyage records are contained in Part 4 of this Chapter.

PART 78—[AMENDED]

24. The authority citation for Subpart 78.07 is revised to read as follows:

Authority: 46 U.S.C. 3306; 49 CFR 1.48(b).

25. Subpart 78.07 is revised to read as follows:

Subpart 78.07—Notice and Reporting of Casualty and Voyage Records

§ 78.07-1 Notice and reporting of casualty and voyage records.

The requirements for providing notice and reporting of marine casualties and for retaining voyage records are contained in Part 4 of this chapter.

PART 97—[AMENDED]

26. The authority citation for Part 97 continues to read as follows:

Authority: 46 U.S.C. 3306; 49 CFR 1.46.

27. Subpart 97.07 is revised to read as follows:

Subpart 97.07—Notice and Reporting of Casualty and Voyage Records

§ 97.07-1 Notice and reporting of casualty and voyage records.

The requirements for providing notice and reporting of marine casualties and for retaining voyage records are contained in Part 4 of this chapter.

PART 109—[AMENDED]

28. The authority citation for Part 109 is revised to read as follows:

Authority: 43 U.S.C. 1333; 46 U.S.C. 3306. 46 App. U.S.C. 86; 49 CFR 1.46 and (n)(6).

29. Subpart D of Part 109 is amended by removing §§ 109.413 and 109.417 and revising § 109.411 to read as follows:

§ 109.411 Notice and reporting of casualty

The requirements for providing notice and reporting of marine casualties are contained in Part 4 of this chapter.

PART 167—[AMENDED]

30. The authority citation for Part 167 continues to read as follows:

Authority: 46 U.S.C. 3306; 49 CFR 1.46.

31. Section 167.65–65 is revised to read as follows:

§ 107.65–65 Notice and reporting of casualty and voyage records.

The requirements for providing notice and reporting of marine casualties and for retaining voyage records are contained in Part 4 of this chapter.

PART 185—[AMENDED]

32. The authority citation for Part 185 is revised to read as follows and all other authority citations in the Part are removed:

Authority: 46 U.S.C. 3306; 49 CFR 1.46(b).

33. Subpart 185.15 is revised to read as follows:

Subpart 185.15—Notice and Reporting of Casualty and Voyage Records

§ 185.15-1 Notice and reporting of casualty and voyage records.

The requirements for providing notice and reporting of marine casualties and for retaining voyage records are contained in Part 4 of this chapter.

PART 196—[AMENDED]

34. The authority citation for Part 196 continues to read as follows:

Authority: 46 U.S.C. 3306; 49 CFR 1.46.

35. Subpart 196.07 is revised to read as follows:

Subpart 196.07—Notice and Reporting of Casualty and Voyage Records

§ 196.07-1 Notice and reporting of casualty and voyage records.

The requirements for providing notice and reporting of marine casualties and for retaining voyage records are contained in Part 4 of this chapter.

PART 197—[AMENDED]

36. The authority citation for Part 197 is revised to read as follows:

Authority: 33 U.S.C. 1509(b); 43 U.S.C. 1333; 46 U.S.C. 3306, 6101; 49 CFR 1.46(b) and (s).

37. Section 197.386 is amended by adding paragraph (d) to read as follows:

§ 197.486 Written report of casualty.

* * * * *

(d) The report required by this section must include information relating to alcohol or drug involvement as required by § 4.05–12 of this chapter.

December 9, 1987.

P.A. Yost,

Admiral, U.S. Coast Guard Commandant.

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