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Part IV

Department of Energy

Office of Conservation and Solar Energy

Industrial Energy Conservation Program; Final Rules and Change of Dates

DEPARTMENT OF ENERGY

Office of Conservation and Solar Energy

10 CFR Part 445

[Docket No. CAS-RM-79-301]

Industrial Energy Conservation Program Including Voluntary Recovered Materials Utilization Targets

AGENCY: Department of Energy.

ACTION: Final rule.

SUMMARY: The Department of Energy (DOE) is issuing this final rule to implement the Industrial Energy Conservation Program (program) required by Part E of Title III of the Energy Policy and Conservation Act (EPCA), as amended by the National Energy Conservation Policy Act (NECPA). The proposed rule was published on June 8, 1979 (44 FR 33344) and five public hearings were held in July 1979.

These regulations codify all aspects of the program, including the criteria and procedures for the identification of certain manufacturing corporations for reporting purposes, the various reporting requirements of the program, and the criteria and procedures for exemptions from reporting directly to DOE. DOE is including in the final rule the final industrial energy efficiency improvement targets which were established by the Federal Energy Administration as required by the EPCA. These regulations are intended to allow DOE to carry out more effectively its responsibilities for the program.

DOE also is establishing, as part of the comprehensive regulations, voluntary targets for the increased utilization of recovered materials (targets) for four industries, as required by the NECPA. The industries are metals and metal products, paper and allied products, textile mill products, and rubber. The statement of basis and justification for the targets is included in this notice as required by the NECPA.

Pursuant to the requirements of 10 CFR Part 445, DOE is issuing concurrently with these final regulations a **Federal Register** notice changing various deadlines for the identification and reporting aspects of the program. These changes will affect the operation of the program in 1980 only and are made to allow sufficient time to comply with these newly issued regulations.

EFFECTIVE DATE: March 17, 1980.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

I. Background

A. Introduction

On November 9, 1978, President Carter signed the National Energy Conservation Policy Act (Pub. L. 95-619) (NECPA). Section 441 of the NECPA redesignated sections 371-376 of the Energy Policy and Conservation Act (42 U.S.C. 6341-6346) (EPCA) as part E of Title III. Sections 461 and 601 of the NECPA further amended sections 371-376 of the EPCA, pursuant to which the Federal Energy Administration (FEA) and, pursuant to the Department of Energy Organization Act (Pub. L. 95-91) (DOE Act), its successor, the Department of Energy (DOE), had implemented the Industrial Energy Conservation Program (program).

This final rule sets forth the regulations for the program under the EPCA as amended by the NECPA. These regulations codify all aspects of the program by establishing Part 445 of Chapter II of Title 10 of the Code of Federal Regulations. The regulations were developed by the Office of Industrial Programs, under the Assistant Secretary for Conservation and Solar Energy, which has the responsibility for management of the program. A major purpose of this rule is to provide the necessary framework for the collection and reporting to DOE of data on industrial energy efficiency improvement and recovered materials utilization. DOE will use this data to prepare and submit reports to the President and the Congress on the progress being made by industry in improving industrial energy efficiency and increasing recovered materials utilization. DOE published the proposed program rule on June 8, 1979 (44 FR 33344). In the preamble to the proposed rule, DOE described the relevant provisions of the EPCA and the NECPA and its proposed program to implement them. Reference should be made to the Background section of the proposed rule for a description of the program under EPCA and the NECPA amendments to the program. DOE solicited comments on its proposal and held public hearings in Washington, D.C. as follows: Recovered Materials Targets for Textile Mill Products, July 23, 1979; Recovered Materials Targets for Metals and Metal Products, July 24, 1979; Recovered Materials Targets for Paper and Allied Products, July 25, 1979; Recovered Materials Targets for Rubber, July 26, 1979; All Other Aspects of the Rule, July 31, 1979.

This final rule reflects DOE's consideration of all substantive public comments received in response to its solicitation. All comments received by DOE were incorporated into the record of the administrative proceedings on this rule.

B. Proposed and Final Target Support Documents

Concurrently with the publication in the **Federal Register** of the proposed rule, DOE made available to the public copies of the detailed support documents upon which each of the proposed recovered materials utilization targets was based, and sought public comment on such documents as the proposed basis and justification for the targets. The documents set forth, in detail, the methodology, assumptions, data and analyses underlying each of the proposed targets. In addition, they included characterizations of the industries and indexes of the data sources which DOE believed to be the best available information.

Based on additional information received by DOE during the public comment period the support documents have been revised. Limited numbers of the following final target support documents are available on request from DOE: Industrial Recovered Materials Utilization Targets for the Textile Mill Products Industry; Industrial Recovered Materials Utilization Targets for the Paper and Allied Products Industry; Industrial Recovered Materials Utilization Targets for the Rubber Industry; Industrial Recovered Materials Utilization Targets for the Metals and Metal Products Industry.

These documents contain detailed material supplementary to the statement of basis and justification for the targets

which is published herein as required by law. Taken together with the statement of basis and justification in the notice, they provide the complete basis and justification for the targets. To request a copy contact: Dee Pollard, Office of Industrial Programs, U.S. Department of Energy, 1000 Independence Ave. SW., Washington, D.C. 20585 (202) 252–2384.

C. Proposed Reporting Forms

On July 17, 1979, DOE published in the Federal Register (44 FR 41652), for comment, three proposed reporting forms for use in complying with the reporting requirements of Subpart C of this rule. Public hearings on the proposed forms were held on August 27, 1979, in Washington, D.C., August 29, 1979, in Chicago, and August 31, 1979, in San Francisco. The period for written comments remained open until September 17, 1979.

The proposed forms were intended for the collection of data, at the plant, corporate, and sponsor levels, on industrial energy efficiency and utilization of energy-saving recovered materials.

Final reporting forms for use in the program will be published in the Federal Register after their review and approval by DOE's Energy Information Administration and the Office of Management and Budget.

II. Comments Received and Revisions Made (§§445.1 Through 445.43)

DOE received many written and oral comments on §§ 445.1 through 445.43 of the proposed rule. To facilitate an orderly discussion of these comments, and DOE's specific responses to them, each will be discussed in the order that the sections to which they relate appear in the rule.

Section 445.2—Definitions. DOE agreed with a number of comments suggesting that a definition of "waste" be included, since the term is used in the computation of energy consumption for identification purposes (waste is to be excluded from the the computation). DOE had defined "solid waste" for purposes of recovered materials reporting, and has now determined that the same definition applies to the computation of energy consumption for the identification purposes. DOE has therefore defined "waste" as "solid waste."

A comment was received, with which DOE agrees, that the phrase "energy source" is a better descriptive term than "energy type," since electricity and purchased steam are included in its definition.

A comment was received requesting that the definition for feedstocks be clarified. DOE has reviewed the proposed definition and believes that it is adequate for the determination of energy to be excluded from the computation of energy consumption for identification purposes.

A comment was received suggesting a different, "simpler" definition for a "plant." DOE does not agree that the change recommended would simplify the definition; it therefore remains unchanged in the final rule.

A comment was received suggesting the definition of "production" be changed to specify "net sales in constant dollars" as a measure of a corporation's activity. DOE considers the present definition sufficiently broad to cover all reasonable measures of activities, and has determined that there is no need to specify any one factor as a required determinant of production.

A definition of "plant report" has been added to clarify the methods by which plant reporting can be accomplished.

Section 445.4—Handling of Information Submitted Under the Program. A substantial number of comments expressed concern over whether the confidentiality of plant information was adequately protected under the present language of this section. Since this section adopts the language of the NECPA, which specifically states that information from plant forms made available to DOE for verification purposes shall not be released to the public, DOE sees no need for further assurances.

A comment was received recommending that at least 30 days, rather than 7 days, be allowed for an organization to respond to a determination by DOE to disclose information submitted under a confidentiality claim. Such latitude, while perhaps helpful to reporting organizations, would not be consistent with the Government's desire for expeditious responses to requests received from the public for information. Therefore, the 7 day notice, which is consistent with DOE's Freedom of Information Act regulations, is not changed in the final rule.

A comment was received recommending that guidelines be provided for sponsors to request that certain information be treated as confidential if such a claim is made by the corporation to the sponsor. Although DOE feels the proposed instructions in the section apply to this situation, it has adjusted the language of subsections (c) and (e) to clarify the relationship.

Section 445.5—Major Energy-Consuming Industries. DOE anticipated receiving comments on its designation of all twenty 2-digit SIC industries as major energy-consuming, which would thereby expand the reporting requirements to all 20 industries. Many commenters addressed themselves to this determination; all but one of these were representatives of a single industry. The commenters put forth basically three arguments against expanding the present reporting program to include the additional ten 2-digit SIC industries. First, since no targets exist, nor are any contemplated for the second ten industries, reporting energy usage would merely be recording information with no basis for making determinations regarding progress. Second, the small numbers of identified corporations in most of the second ten industries are not truly representative of their overall 2-digit industries. Third, the present reporting program has not been proven to have had a positive significant effect on industrial energy conservation efforts; thus an expansion of this effort is not justified.

DOE feels that Congress' intent is clear from the revisions made in section 375(a) of the EPCA. By removing any reference to target industries from the first sentence of section 375(a), the reporting requirement was generalized to cover corporate progress in improving its energy efficiency. Moreover, the subject matter to be reported includes progress in increasing utilization of energy saving recovered materials in four specified industries, one of which falls within the second ten industries. In vies of this specific language, DOE believes that the Congress did not intend to limit reporting under section 375 of EPCA to the ten most energy-consumptive industries.

Addressing the second argument, while DOE may agree that the identified populations in the second ten industries cannot be construed as completely representative of the respective industries, many of the initial ten industry reporting populations also are not representative of their industries. Also, Congress has never specified representation as one of its guiding principles in this reporting program.

In regard to the third argument, Congress again has not questioned the effectiveness of its legislated reporting requirements. Indeed, in passing NECPA it obviously sought to expand these requirements.

For purposes of reporting on the use of recovered materials, SIC 3079 has been excluded, as discussed under Corporate Reporting below.

Section 445.12—Requirement for Corporations To File a Report on Energy Consumption. Several commenters suggested that, since an identification

was completed during 1979 (44 FR 28750, May 16, 1979), prior to the promulgation of the rule, those corporations identified should not have to refile for identification during 1980, when the rule becomes operational, if their status remains unchanged under the parameters of subpart B of the final rule. DOE agrees with this suggestion and, in the interests of reducing paper work and administrative burden, intends to so stipulate in the formal **Federal Register** publication of its 1980 identification requirements, which should occur in early January 1980.

Section 445.13—Computation of Energy Consumption. Over 50 percent of the commenters presented recommendations on various parts of this section. Some were accepted and resulted in alterations; others were either unacceptable for various reasons or were the result of misunderstanding or misinterpretation.

Many commenters objected to the inclusion of feedstocks in the energy consumption computation. Generally it is felt by those responding that hydrocarbon feedstocks are used as building blocks rather than consumed as fuels, that improvements in the efficiency of feedstock utilization usually involve very capital-intensive changes in the basic process design of a plant, and that feedstocks were not included in the generation of the efficiency targets and have not been included in the reporting program in the past. After considering these and other factors, and the fact that feedstocks are *excluded* from the computation of energy consumption for reporting purposes, DOE has determined that feedstocks should also be excluded for identification purposes.

Another area which generated many comments concerned the standard conversion factors provided. Many commenters attributed a mandate to these factors which DOE neither stated nor intended. In the proposed rule DOE stated that, whenever possible, corporations should compute their energy consumption using the *actual* conversion factors of the fuels they consumed. In the final rule DOE is providing the list of standard or average conversion factors for use by any corporation which does not know the actual Btu content of any of its fuels consumed and cannot reliably estimate the Btu content. Units for liquid fuels have been changed from barrels to gallons as suggested by some commenters. Additionally, it is apparent from many comments that § 445.13 was erroneously connected with the reporting aspects of the program even though it appears under subpart B—Identification of Corporations. DOE feels that a careful reading of § 445.11 should preclude this misunderstanding.

A comment was received addressing the conversion factors for petroleum coke and still gas. It was pointed out that neither of these energy sources exists in barrel form except by "definition" in fuel oil equivalent terms. DOE therefore has revised the conversion factor table to reflect the actual units in which these energy sources are available—tons for petroleum coke and cubic feet for still gas.

Many comments were received objecting to the use of 3,412 Btu/Kwh rather than 10,000 Btu/Kwh as the conversion factor for purchased electricity. Again, many of these comments related to the reporting phase of the program rather than the identification process. As explained above, § 445.13 deals solely with corporate identification, while the reporting of energy consumption and efficiency was specifically addressed in the proposed reporting forms published in the July 17, 1979, **Federal Register**. Notwithstanding this misinterpretation, DOE recognizes that reasonable arguments can be advanced to support either conversion factor for electricity. However, 3,412 Btu/Kwh has been utilized for corporate identifications since the program's inception, and DOE has found no evidence to justify making such a change at this stage of the program. Eight of the ten energy efficiency improvement targets were established using 3,412 Btu/Kwh, and the reporting program for those eight industries uses 3,412. Should major program revisions be initiated in the future, the subject of the conversion factor for electricity will be again be addressed in depth.

Individual comments were received recommending that various consumption categories be reversed in determining the computation of energy consumption, i.e., exclude rather than include or vice versa. These categories included inplant transportation, office services, research services, and transport of intermediate products. Since no evidence was introduced which produced a sufficient justification for modifying its proposed position, DOE determined that these categories should remain unchanged. DOE did revise the language concerning the inclusion of energy for transportation between mining operations and manufacturing facilities to clarify that only energy for such transportation on the manufacturer's property should be included.

A comment was received suggesting that energy use due to compliance with EPA and OSHA regulations should be excluded from the consumption computation. Since allowance is made for such factors in the efficiency calculations of the reporting phase, DOE determined not to make this change.

A comment was received recommending that where the amount of energy consumed in a computation category was "insignificant" compared to overall energy consumption, DOE should recognize the collection burden involved and should specifically allow corporations to exclude mimimal consumption categories from the consumption computation. DOE believes that most corporations will use common sense in their computation process, and not spend inordinate time with computations which will have no effect on the accuracy of the reported values.

Finally, two comments were received suggesting that waste used as fuel be included in the computation of a corporation's energy consumption. Because of the difficulties inherent in determining the heating value of many types of wastes, and because greater use of wastes as fuel results in less use of scarce fossil fuels, DOE has determined that wastes used as fuel should not be included in the energy consumption reported for identification purposes.

Section 445.14—Report on Energy Consumption. Many of the commenters objected to the requirement, at various places in the proposed rule, that chief executive officer (CEO) certification authority be delegated only to another corporate "officer." Many comments pointed out that a CEO may logically delegate certification authority for energy reports to individuals other than corporate officers while maintaining a viable accountability trail. In addition, the language in both EPCA and NECPA states that the CEO or "individual" designated by such officer shall report to DOE. Therefore, DOE has revised the language in the rule to indicate that a CEO's delegation of authority to certify is not limited to officers.

Section 445.15—Identification of Corporations by DOE. A comment was received objecting to DOE's publication of a list of identified corporations in the **Federal Register**. The possible misrepresentation of this listing by the news media was presented as the primary reason for using direct mail contact as a substitute method. While DOE cannot prevent misuse of its published information, the **Federal Register** serves as a vital conduit for notification by the Federal Government to the public. DOE therefore intends to

continue to utilize the Federal Register as a useful, and cost-effective, method of communication with the industries concerned and the public.

Section 445.21—Plant Reporting Requirements. Many commenters felt that the plant reporting provisions of the proposed rule would be too burdensome for the corporations and their plants. Particular objection was made to the proposed requirements for cross-referencing identical data items between the DOE-provided form and such other plant reporting form as the corporation might elect to use in place of the DOE form.

In response to this objection, DOE has decided that, if a corporation elects to use its own plant reporting form in lieu of the DOE form, it will not be required to file a document which cross-references items on its form to identical data items on the DOE form. DOE recognizes that the information needed to comply with the corporate reporting requirements is, necessarily, obtained from the plants but may be collected by the corporations at various intervals, from various sources, and by various means. The plant reporting requirement is not intended to displace existing information systems where such systems provide adequate information. However, a plant reporting form will be expected to provide equivalent information to that provided by the DOE form, and is subject to detailed review as part of DOE's verification procedures. Hence, while cross-referencing must be provided by the corporation if requested as part of a DOE verification, it need not become a part of the general reporting burden. A definition of "plant report" has been added to § 445.2 to reflect this flexibility in plant reporting.

Further, DOE has reviewed the suggestions that certain smaller plants be exempted from the reporting requirement. DOE believes the less detailed plant reporting data requirements, the permissibility of reporting on an alternative to the DOE-provided form, and the elimination of the cross-referencing requirement for alternative forms will sufficiently ameliorate the burden of plant reporting and render such an exemption unnecessary.

Finally, the proposed DOE access to plant reports caused many commenters to conclude that DOE would collect and retain certain plant reports. It is not DOE's intention either to collect or retain plant reports, but to conduct any reviews of reports at the corporate headquarters and/or the plant sites.

Section 445.22—Corporate Reporting Requirements. Statements from several industry groups requested that the textile mill products industry be exempt from reporting on use of recovered materials because: (1) No one-trillion Btu-per-year users exist in those subdivisions having an increasing, non-zero target; (2) targets are zero for those sectors with corporations using over a trillion Btu per year; and (3) targets are currently being achieved. It was stated that reporting toward zero targets is an industry burden which serves no useful purpose. After considering such comments, DOE believes that the statutory requirement relating to reporting on the use of recovered materials does not permit such exemptions. In addition, while such industry sectors with zero targets for the use of recovered materials are not presently known to have any potential for the utilization of recovered materials, it is conceivable that currently unforeseen technology could become available between now and 1987. If this were to occur, the reporting requirements would provide information on actions which could be taken to complement the technical achievement. This is viewed as consistent with the intent of the legislation. All identified corporations in SIC 22 are therefore required to report annually on recovered materials utilization.

After reviewing the initial reports from identified corporations on their use of recovered materials, DOE has found that a significant number of identified corporations in SIC 30 do not engage in manufacturing operations involving rubber or rubber products. DOE has therefore decided to require only those corporations which are identified in SIC 30 and have manufacturing operations in one or more of the SIC codes other than SIC 3079 (Miscellaneous Plastics Products) to report on their use of recovered materials.

Similar to the determination made with respect to the plant reporting form (§ 445.21), DOE has decided to eliminate the cross-referencing requirement between a corporation's alternative form and the DOE form for those corporations reporting indirectly through a sponsor. This change is reflected in revisions to this section and to § 445.34 of the rule. However, identified corporations reporting directly to DOE must use the DOE form.

Section 445.23—Sponsor Reporting Requirements. A comment was received proposing that a corporation should have the option of reporting energy conservation/use data and recovered materials use data to different sponsors and/or directly to DOE. Not only would such flexibility require an expanded internal system within DOE to track these "partial" reports, but corporations could be forced to generate multiple reports by a sponsor's refusal to handle certain portions of the information. DOE has therefore made a determination to require reporting of recovered materials data and energy efficiency data in the same report, whether direct or through a sponsor.

Some comments were received objecting to the mandatory separate aggregation of information (in sponsor reports) submitted by non-identified corporations, i.e., separate from the aggregated information reported by identified corporations. The commenters believe that this requirement would be contrary to one of the key elements of the Industrial Energy Conservation Program, i.e., encouraging the voluntary participation of the non-identified corporations, which comprise the majority of participants in many industry reporting programs. DOE agrees that separate aggregation of energy data might result in disclosure problems, thus causing these voluntary reporters not to participate in the program. DOE has therefore determined that, since it has the capability to develop any separation through its verification procedures, all corporate data which meet reporting requirements may be aggregated in the sponsored reports. This determination should not be construed as discouraging separate aggregation which does provide additional helpful information.

Section 445.25—Reporting Date and Address; and Section 445.36—Filing Deadline and Address. A number of comments were received suggesting that misconceptions in the Congress concerning industry's progress in energy conservation have been due largely to the fact that data on industrial energy efficiency improvement is not published in a timely manner. The commenters feel that the proposed July 15 deadline for receipt of reports by DOE, more than six months after the end of the reporting period, is an unnecessary delay. They suggested that the procedures for corporate identification and requests for exemption from direct reporting be combined in the initial January 1–February 28 time period. By effecting this compression of procedures, and halving the period between final exemption and data submission, it was pointed out that the data submission deadline could be moved back to May 15. In evaluating these suggestions, DOE took into account that these annual identification and exemption procedures will impact only on those corporations initially entering the mandatory reporting universe and those

corporations in the universe with a status change, and determined that this period compression would not constitute an undue administrative burden on either the reporting corporations or DOE. However, it was also determined that the proposed 30 days, rather than the suggested 14 days, is required between the final exemptions and the data submission deadline. Therefore DOE, in the rule, has changed the reporting date for corporations and sponsors from July 15 to June 1.

A comment was received recommending that DOE report on industry's progress by March 30 rather than 1½ to 3 months following the July 15 industry report deadline. This comment ignored the basic premises of the proposed program rule and was determined to be unsupportable.

A few comments were received recommending that first-time participants in the reporting program be given until July 15 to both identify themselves and report. However, since DOE is mandated by EPCA to allow corporations identified under this program to be exempted from direct reporting, and to make exemption proposals available for public comment, DOE does not have authority to require a corporation to report at the time it identifies itself. Therefore, DOE has determined that these recommendations could not be implemented in the final rule.

Section 445.26—Data Retention. Several comments were received suggesting that the word "forms" would be more appropriately used in this section of the rule rather than "data" and "reports." Since the language of NECPA specified that plant "Forms" will be retained by the corporation, the language of this section has been changed to reflect that intent. For purposes of verification, DOE requires that all other data used by a corporation or sponsor in preparing reports under §§ 445.22 or 445.23 be retained also.

DOE has deleted the requirement that sponsors provide to DOE, copies of exempt corporation's reports upon request. The exempt corporations must provide their reports to DOE at the corporation's headquarters upon request by DOE.

Section 445.31—Scope. Some comments revealed confusion about the annual nature of the exemption process. To clarify this provision, § 445.31 was revised by adding the following sentence: These exemptions are effective for one year and renewable annually.

Section 445.34—Request To Be an Exempt Corporation. A comment was received suggesting that §§ 445.32–35 place unreasonable and unnecessary requirements upon sponsor programs and should be simplified. That comment also points out part of a statement included in the preamble of the proposed rule taken from the NECPA Conference Report which stated: "Finally, the conferees agreed not to change the language of the voluntary reporting exemption." DOE notes that the Conference Report also included the following statement: "However, it was agreed that the Secretary had not sufficiently defined 'adequate voluntary reporting program' within the guidelines provided in section 376(g), and the Secretary should set more explicit criteria for the determination of whether a voluntary program is adequate." DOE feels that its efforts in §§ 445.32–35 are important in satisfying the requirement for more explicit criteria and do not require any simplification. As indicated above, DOE has decided to eliminate the requirement for cross-referencing between a corporation's alternative form and the DOE form for exempt corporations. This change is reflected in revisions which have been made in this section, as well as in § 445.22 of the rule.

Section 445.35—Request To Be a Sponsor With an Adquate Reporting Program. A few comments were received recommending that the requirement for annual recertification by sponsors in § 445.35(c) imposes an unnecessary burden on sponsors and should be eliminated. DOE's intent behind this requirement is to establish a communication line with sponsors equivalent to that existing for identified corporations. DOE does not feel that a simple annual certification statement places any significant burden on an organization capable of sponsoring an adequate voluntary reporting program, and thus has not changed the requirement for recertification.

A comment was received suggesting that the annual certification requirement be clarified in its application to the final rule's effective date. Since the criteria and request procedures have changed extensively since their initial publication in 1976, it is DOE's intent that all corporations desiring an exemption, and all prospective sponsors of adequate reporting programs, will file initial requests under §§ 445.34 and 445.35 by February 28, 1980. Therefore, the instructions in these sections remain as proposed and shall be followed explicitly. This determination will be handled administratively in a Federal Register notice in January 1980 reminding corporations of the requirement to file information on energy consumption.

Section 445.37—Determination of Exempt Corporations and Adequate Reporting Programs. A comment was received suggesting that DOE approve sponsors and exempt corporations without the necessity for public comment, in order to expedite the program and reduce attendant expenditures. Sections 376(g) (1) of EPCA states that "The (Secretary) shall exempt a corporation from the requirements of section 375(a) if such corporation is in an industry which has an adequate voluntary reporting program, as determined by the (Secretary) annually after notice and opportunity for interested persons to comment." DOE is legally required to provide such opportunity for public comment.

Section 445.42—Energy Efficiency Improvement Targets. DOE included in this section the ten energy efficiency improvement targets in order to set forth all parts of the program in the Code of Federal Regulations; however, it did not solicit comments since they had been finalized in June 1977.

A comment was received from an industry group recommending that the published adjusted targets (i.e., adjusted to account for the effects of such factors as weather and capacity utilization rate) be included in the rule in order to provide a better indication of results projected for energy conservation initiatives. While it is true that the suggested adjusted targets more closely conform to results achieved by conservation actions, DOE has found that few industries, industry sectors, or corporations can calculate the adjustments necessary to indicate progress which is consistent with these targets. Therefore, DOE has determined that the published targets provide a more accurate basis for comparison.

Verification Issue. Several comments were received requesting clarification about DOE's procedures for verifying data submitted under the reporting program. DOE did not and does not currently feel that such operational procedures are within the scope of this rulemaking, which primarily codifies procedures with which industry must conform in meeting legislative requirements. However, when DOE decides to initiate verification of reported information, it will notify the visitees of its intentions in advance of an intended verification visit. As an integral part of this notification, DOE will inform the corporation or organization what information should be available in order for the verification to be accomplished.

III. Statement of the Basis and Justification for the Recovered Materials Utilization Targets

A. Methodology

As part of this rulemaking, DOE is establishing, in § 445.44, recovered materials utilization targets (targets) for each of the following industries—metals and metal products, paper and allied products, textile mill products and rubber. DOE is required to set such targets pursuant to section 374A of the EPCA, as established by section 461 of the NECPA.

As discussed below, DOE has developed the targets in accordance with the following statutory requirements of section 374A: 1) To use the best available information; 2) to consider the technological and economic ability of each industry to increase its use of recovered materials by the target year; 3) to consider actions taken or which could be taken before the target year by the industries and by Federal, State or local governments to increase the use of recovered materials; and 4) to consult with the Environmental Protection Agency (EPA) and representatives of each of the industries for which targets are established.

As required by section 374A, the targets are established at levels which represent the maximum feasible increase in the use of recovered materials that the appropriate industry can achieve progressively by January 1, 1987. Numerically, each proposed target represents, for an appropriate "subdivision" of an industry, a level expressed as a percentage of recovered materials from prompt industrial and obsolete scrap, which can be used per unit of production (input or output) in manufacturing operations, by the target year of 1987. The corresponding percentage of recovered materials used per unit of production in the year selected as the reference year (1976, 1977 or 1978) for each industry is also provided. The difference between the two numbers indicates the maximum feasible increase, if any, in the utilization of recovered materials between the reference year and the target year.

The targets established by this notice are based on the best information available to DOE during the target development period. Published government and industry statistics for each of the industry subdivisions were used as the data sources for the reference year levels of production and recovered materials use. Government data sources for the targets included the Department of Commerce (all industries), the Environmental Protection Agency (rubber), the Department of Agriculture (textiles), the Department of the Interior (metals and the Department of Labor (metals). In addition, data compiled and published by industry associations were useful in establishing reference levels of recovered materials use.

The associations whose published statistical reports were used included the American Textile Manufacturers Association, the American Paper Institute, the Rubber Reclaimers Association, the Rubber Manufacturers Association, the American Iron and Steel Institute, the Aluminum Association, the Copper Development Association, and the Institute of Scrap Iron and Steel.

In addition to using published data from the sources listed above, DOE consulted with numerous Federal agencies, corporations and trade associations during the development of the proposed targets. The EPA and the Department of Commerce were consulted with regard to each of the industry targets. Additionally, the Department of Agriculture was consulted in developing the textiles industry targets and the Bureau of Mines in the Department of the Interior was consulted in developing the metals targets. Each of the industries affected by the targets was consulted in the development of the targets. Major trade associations and corporations in each industry were contacted early in the program and were invited to provide consultation.

In addition to consulting the manufacturing industries for which targets were being developed, DOE consulted the industries which collect and prepare the recovered materials used by the manufacturing industries. The National Association of Recycling Industries, Inc. and the Institute of Scrap Iron and Steel were the principal contacts in this regard. Various technical research and financial institutions were also consulted in the target development, as detailed in the target support documents.

Using the information obtained from the sources identified above, DOE determined the current levels of recovered materials use for each industry and projected the maximum feasible levels of use of 1987. The methodology used in establishing the 1987 target levels of recovered materials use was developed by DOE in November and December of 1978, to respond to the reqirements of section 461 of the NECPA. The statute requires that in establishing targets DOE consider (1) the technological and economic abilities of the industries to increase their recovered materials use, and (2) all actions taken or which could be taken by the industries and by Federal, State and local governments to impact on recovered materials use by 1987.

The common methodology was applied in all four industries to ensure that all targets would be based on common definitions and be stated in consistent terms. The methodology used by DOE is described in the section below.

Step 1. Selection of Appropriate Industry Subdivisions

a. Factors which were considered in determining portions of an industry to be studied further included:

(1) Historical and current use of recovered materials in the industry.

(2) Volume of sales of industry components.

(3) Energy consumption levels.

(4) Parts of the industry which historically and currently use recovered materials.

(5) Potential for use of recovered materials between now and 1987.

b. The industry was carefully studied to determine whether an SIC, process, product type (other than SIC) or some other subdivision of the industry was most appropriate.

Step 2. Selection of Sources of Recovered Materials

a. Factors which were considered in determining sources of recovered materials included:

(1) Quality of waste.

(2) Dispersion of waste.

(3) Quantity of waste.

(4) Potential new sources, and their quality, dispersion, quantity, etc.

(5) Changes in existing sources.

b. Sources of recovered materials included were:

(1) Wastes which contain materials which are listed in the Act, e.g., mine wastes.

(2) Wastes from outside the U.S.

(3) Any waste which may provide recovered materials which can replace virgin material used by any of the industry subdivisions defined in Step 1.

c. Sources of recovered materials excluded were:

(1) Waste materials generated and introduced back into the process within the same plant.

(2) Waste materials which are not among those listed in the Act, *e.g.*, wood waste.

(3) Situations where a clear case could be made that the potential sources will never be realistically used as recovered materials.

Step 3. Technological Feasibility Analysis

a. Current and historical use of recovered materials within each industry subdivision were quantified, by source.

b. Present technical limits on industry's ability to utilize recovered materials were determined.

c. Future technical limits on the ability to use recovered materials were determined.

d. Technologies which could, if implemented, modify (either up or down) the technical limits defined in Step 3b or 3c were identified.

e. For each of the techologies defined in Step 3d, the following criteria were applied:

(1) Can it be physically in place and operational between now and 1987?

(2) Is it realistic?

(3) Will it have a significant impact on the use of recovered materials?

(4) What could be the penetration of the technology if economic considerations—or any factor other than a technical limitation—were not considered.

f. Once the technical limits were determined for each industry subdivision, the following question was posed: Is it clear that available sources of recovered materials can provide that amount for each year between now and 1987?

(1) If *yes,* then a technical feasibility analysis of recovered materials was not undertaken.

(2) If *no,* then Steps 3b through 3e were repeated with respect to supply, to determine technical limits of the identified sources to provide recovered materials. If the sources could not technically provide sufficient recovered materials for an industry subdivision, then the sources defined the technical limitation.

Step 4. Economic Feasibility Analysis

a. From Step 3, it was established whether the ability of the industry subdivision to use recovered materials was the technically limiting factor.

(1) If *yes,* appropriate economic criteria were applied to the technologies defined in Step 3d, which can be introduced into the industry.

(2) If *no,* then economic criteria were applied to the technologies which define the technical limits on the sources' ability to provide recovered materials.

b. The primary economic criterion was some concept of return on investment (ROI). Acceptable ROI's are commonly determined by considering factors such as:

(1) Capital availability.

(2) Needs of capital for other investments to increase productivity, for pollution control, etc.

(3) Risk of the technology.

The economic analyses considered, among other things:

(1) Cost of virgin materials (which embodies energy cost).

(2) Cost of recovered materials.

(3) Cost of money.

(4) Relative operating and maintenance costs associated with implementation of the technology.

c. A brief assessment was made to ensure that implementation of a technology would not have an adverse impact on employment or contribute to inflation.

d. Viable, economic alternative uses for recovered materials were identified and addressed. The price of recovered materials is determined, in part, by competing interests (demand) for the materials. The price thus presumably reflects the potential for alternative uses, e.g., use directly as a fuel or use in products not manufactured by the industries encompassed by the Act.

e. The economic analyses necessarily substituted various simplifying assumptions for the very complex real-world situation. These assumptions are shown clearly in each of the target support documents.

f. Major actions which could realistically increase the use of recovered materials by a defined industry subdivision were identified.

It was assumed that no action will affect the target unless it impacts on a decision by the management of a corporation, or a decision by the manager (or potential manager) of a recovered material source. These managerial decisions are presumably always made on the basis of economics. Therefore, the result of the economic feasibility analysis was modified by any such identified actions.

g. The sensitivity of the targets to key variables was addressed.

h. Factors which could not be quantified, but which could affect the target, were addressed.

i. Upon completion of the economic analysis, a check was run to ensure that the total industry use of recovered materials, as reflected by the "economically feasible target," did not exceed the available supply. If it did, adjustments were made, and judgments regarding potential contributions of each recovered materials source to each industry subdivision were made.

j. Upon completion of Step 4, the economically feasible level of recovered materials use by each industry subdivision was defined and stated in terms of physical quantities of recovered materials per physical quantity of the industry subdivision's product.

The methodology described above provided the framework for analyzing each industry in detail. The actual analysis of each industry was tailored to that particular industry by placing emphasis on those aspects of the methodology determined, by the nature of the industry, to be most critical. For example, if it could be readily determined that the availability of scrap was not the most severe constraint to greater use of recovered materials by an industry, then the details of scrap use technology and economics were investigated without further analysis of supply constraints.

Public Comments. There was substantial comment during the public proceedings on the targets concerning the methodology for establishing the targets.

Beginning with the most fundamental of these concerns, DOE notes that a number of commenters believe that DOE's interpretations of Section 461 of the NECPA resulted in proposed targets which are far lower than intended by the legislation. However, DOE is required by Section 461 to establish targets which represent the maximum feasible increase in utilization of recovered materials and, in so doing, to consider the following:

(1) The technological and economic ability of each industry to increase its use of recovered materials by 1987; and

(2) All actions taken or which before 1987 could be taken by each industry or by Federal, State or local governments to increase the use of recovered materials.

In developing the proposed targets, DOE considered the economic abilities of the industries to use more recovered materials by determining the current circumstances of each industry and projecting changes in circumstances between the reference year and 1987. In estimating economic variables out to 1987 DOE reviewed historical trends and considered how they might be modified. The economic systems are not assumed to remain static through 1987. Rather, DOE made and supported many assumptions about the future of the subject industries and, in most cases, evaluated the sensitivity of recovered materials utilization to these assumptions.

Of the two considerations which DOE is required to account for in setting the targets (i.e., industry ability and posssible actions to enhance recovered materials utilization) the first is the more restrictive in the case of every industry studied. If one considers all actions which "could be taken," without

any constraints, DOE would agree that the target values could be substantially greater. However, when tempered by the considerations of technological and economic feasibility, DOE believes the targets established in § 445.44 of the rule represent the " maximum feasible" levels required by Section 461.

With respect to Federal, State or local government actions which could affect recovered materials utilization, DOE has, in addition to projecting future industry actions, sought to assess the impact of existing legislation and government actions, and to take into account their probable impact on the 1987 targets. The target levels have been established with full cognizance of and accounting for the recovered materials incentives provided and potentially provided by: (1) The Resource Conservation and Recovery Act of 1976, (2) the Railroad Revitalization and Reform Act of 1976, and (3) the Energy Tax Act of 1978.

Many commenters identified actions which, in their opinions, should be taken to enhance the future use of recovered materials. Suggested actions included, but were not limited to, the following:

Revision of freight rate structures
Tax code revisions
Limitations on scrap exports
Maintenance of a scrap futures market
Legislation of mandatory deposits on beverage containers
Imposition of landfill surcharges
Relaxation of pollution standards
Restriction on mining of Federal lands

These are not, of course, actions which can be taken unilaterally by DOE. DOE fully recognizes the importance of and is actively pursuing actions which would encourage the use of recovered materials through its industrial conservation program and in other appropriate areas. However, DOE cannot, at this stage, properly take all such actions into account in establishing the targets because there is presently no way to assess their impact on the 1987 targets with any reasonable level of accuracy.

In further support of this approach to target development, DOE believes the Congress intended the targets to be reasonably attainable, based on the best currently available information, since the NECPA provides the authority for DOE to modify any target downward if it determines that the target cannot reasonably be attained. Likewise, if DOE determines, on the basis of future circumstances and expectations, such as new legislation or government actions, that the target is too low, it may increase the target.

Some proponents of higher targets proposed that DOE go much further in taking account of the impact of future possible actions, and assume that all actions, whether by industry or government, needed to achieve the higher targets will be taken by whomever has the authority to take such actions. These proponents seek by this assumption to reconcile the two considerations for target-setting, i.e., economic and technological feasibility, and future actions. Their comments suggest that the higher targets would, in turn, provide a stimulus for such actions to be taken.

After careful consideration of these comments, DOE does not believe they suggest the most realistic or effective way of implementing the voluntary targets or that it serves any real purpose to hypothesize future actions irrespective of the probabilities that such actions will be pursued. Nor does DOE believe that the setting of higher, perhaps unrealistic, voluntary targets will enhance the prospects of such actions being carried out.

DOE's consideration of these comments has confirmed its view that its approach of keeping targets within the realm of economic and technological feasibility, based on generally accepted projections with respect to the technologies and economies of the industries affected, is an effective approach to achieving Congressional objectives.

Another issue concerned with the fundamental principles of the target program, and the meaning of the targets, is whether the increased use of recovered materials saves energy, and more particularly whether such increased use saves oil and natural gas.

The issue in many cases is whether targets representing the maximum technologically and economically feasible utilization of recovered materials should be lowered for those industry subdivisions where the enhanced use of recovered materials could consume more energy, or more scarce nonrenewable energy sources like oil and gas, than similar production using virgin materials. DOE believes that the mandate of the Congress is clear: That the targets should be set at the maximum feasible level, whether or not they represent minimal energy consumption in all circumstances. Congress stated its finding in section 461(a)(2) of NECPA that "substantial additional volumes of industrial energy and other scarce natural resources will be conserved in future years * * *" if the industries concerned "* * * increase to the maximum feasible extent utilization of recovered materials in their manufacturing operations." In other words, if the goal of maximum feasible utilization of "energy-saving recovered materials," as defined in section 461, were uniformly pursued in the industries identified, the overall effect, the Congress found, would be a net saving of energy and a saving of other scarce virgin materials. The fact that a net energy saving might not be achieved in each subdivision cannot, then, detract from the clear mandate on DOE to set targets for maximum feasible utilization of recovered materials. While the targets cannot then be limited by reference to potential adverse energy impacts, DOE is obviously concerned as to such impacts and is continuing to examine the question in industries where that possibility exists.

Several commenters provided information to DOE suggesting that the increased use of recovered materials by some subdivisions of the paper industry would result in increased consumption of oil and natural gas. It was recognized by DOE, when it began the analyses to implement Section 461, that there may indeed be some subdivisions of the four industries in which conservation of nonrenewable energy resources does not necessarily follow from increased use of recovered materials. This is not inconsistent with the findings of Congress that increased use of recovered materials by the four industries as a whole will conserve substantial volumes of industrial energy. The industry sectors in which increased use of recovered materials might lead to increased use of oil and gas are subdivisions of 2-digit SIC's and the potentially negative impact on energy conservation is restricted to particular industrial products, processes or geographical regions. This important subject is discussed further in the section on paper and allied products below.

One commenter felt that DOE had not followed the requirements of Section 461 by proposing targets for some industry sectors which do not reflect an increase in recovered materials use between the reference year and 1987. The commenter argued that the requirement for DOE to "set targets for increased utilization of energy-saving recovered materials * * *" precludes the setting of targets which do not strictly portend increases. DOE stresses that the targets for increased utilization of energy-saving recovered materials are required to be established with consideration of technological and economic feasibility, and that if additional utilization is not feasible the "maximum feasible increase" may be zero or negative. To

conclude otherwise would result in the establishment of infeasible targets. DOE does not agree with one commenter's belief that the feasibility of the targets is not important because they are voluntary. It should also be pointed out with respect to this comment that every positive target established represents an increase in the absolute amount of recovered materials projected to be utilized by 1987.

One commenter felt that goals for 1987 cannot be established because of the large number of variables affecting recovered materials use and the lack of precision with which their future values can be forecast. DOE recognizes that targets for 1987 are necessarily based on projections which include numerous uncertainties. Nevertheless, DOE is required by law to establish targets based on the best available information. DOE is also given the authority to modify the original targets in the future if, for example, better information indicates that they should be higher or lower.

One commenter felt that "energy-saving recovered materials" as defined in Section 461 of the NECPA includes only obsolete scrap, not prompt industrial or self-generated scrap as these terms were defined in the proposed rule. The rationale given by the commenter is that the definition of "energy-saving recovered materials" stipulates that they are "recovered from solid waste, as defined in the Solid Waste Disposal Act." The commenter maintains that a material must have been discarded for it to be considered solid waste within the meaning of the Solid Waste Disposal Act.

DOE excluded self-generated waste from the proposed targets and still believes that action to be appropriate for this program. The issue is therefore whether "prompt industrial scrap" should be included in the targets. In proposing targets DOE found that, generally, using increased amounts of recovered materials from outside the manufacturing operation, i.e., prompt industrial and obsolete scrap, as input to the manufacturing operation saves energy in that manufacturing operation. Furthermore, DOE believes that prompt industrial waste is always discarded since it is of no further use in the manufacturing operation which generated it. Whether it is discarded to a disposal site or to a secondary user does not determine its classification as solid waste. If the materials were not utilized by a secondary processor they would likely be discarded to a landfill or other disposal facility and hence their use contributes to achieving the purposes of Section 461.

DOE believes also that to exclude prompt industrial waste from the targets would be impractical for several reasons. To exclude it solely because it has not been discarded through the same system as obsolete scrap might encourage artificial transactions involving scrap for purposes of reporting recovered materials use. DOE has also found that in certain cases, e.g., scrap which is purchased from a third party such as a broker, prompt industrial and obsolete scrap cannot always be distinguished from one another. Several commenters, including the same commenter who maintained that prompt industrial scrap is not solid waste, supported DOE's finding with regard to the frequent difficulty encountered by the user of the waste in determining whether it is prompt industrial or obsolete. That commenter stated that in many cases "such classification will be impossible; while the mill can be sure that the material purchased from the scrap dealer is *some* type of scrap, it cannot say with confidence whether the scrap should be considered 'prompt industrial' or 'obsolete.' "

For the reasons given above, DOE has decided to include prompt industrial scrap in the final targets.

One commenter believed that DOE has failed to consider the impact of recent legislation, e.g., tax credits for recycling equipment, in setting the proposed targets. DOE considered existing laws and regulations and, to the extent possible, their impact on future recovered materials use. It should be noted that some of the recently enacted legislation has not yet been fully implemented through regulations, and its impact is difficult to assess. For example, the determination of what equipment actually qualifies as recycling equipment for purposes of tax credits has yet to be made. Therefore, assumptions with respect to implementation have been necessitated. To the extent that these assumptions are not accurate, later modifications of the targets may be appropriate.

It was suggested by one commenter that the practices of countries other than the United States be analyzed in setting the targets. DOE is generally aware of the conservation technologies and practices in many other countries throughout the world and of their applicability to this country. The comments, however, related to the economically feasible levels of recovered materials use abroad, rather than to foreign technologies that this country could adopt. The targets established pursuant to Section 461 are intended to be reflective of the ability of U.S. industry to use recovered materials, irrespective of the ability of industries in other nations to do so.

Some commenters suggested that DOE use a different ratio to define the recovered materials targets. Various alternatives were proposed but none is deemed by DOE to be more applicable to all of the industries involved than the ratio used in establishing the proposed targets, i.e., prompt industrial and obsolete scrap used in a manufacturing operation divided by the production input or output of the operation.

A summary of the development of each recovered materials utilization target is included below as part of this statement of basis and justification. Interested persons are invited and encouraged to review the detailed supporting documentation for the targets in order to more completely understand the complex determinants of recovered materials use, as well as the incentives and disincentives which exist today and those which are expected to exist during the target period.

B. Textile Mill Products

Recovered materials targets were established for each major subdivision of the textile mill products industry, the subdivisions being determined by the 4-digit Standard Industrial Code (SIC) classifications. These subdivisions were chosen because manufacturing processes and products are so diverse within the industry, that targets for the industry taken as a whole would have absolutely no meaning for an individual operating plant. For example, fabrics produced by cotton weaving mills (SIC 2211) are completely different from nonwoven fabrics (SIC 2297) in required characteristics, technical processes, and raw material input; this is true throughout the industry. There are even different processes and product requirements within certain 4-digit SIC classifications. However, the detailed information on a plant-by-plant basis necessary to fully identify such differences could not be obtained. DOE believes that targets based on the major subdivisions are sufficiently meaningful.

The development of materials recovery targets for each 4-digit SIC sector was accomplished by determining from available data the amount of material currently being reused and projecting the amount that can be used in 1987. The targets established are the percentage of fiber used by each sector that is to be satisfied by recovered materials. Qualitative judgments were made about the effect of various factors, such as:

• Anticipated new technologies that could affect the use of recovered materials by 1987.

• Anticipated changes in the intermediate and final markets that could affect the use of recovered materials.

Taking into account the effects of such factors, and of activities judged likely to be undertaken by the industry and by State, Federal, and local governments to increase the use of recovered materials, the targets for 1987 were established as presented in the following Table 1. Such projections, DOE believes, represent the maximum feasible increase in recovered materials utilization by 1987.

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SIC	INDUSTRY SUBDIVISION	PROCESSED MATERIAL		1978 LEVEL OF RECOVERED MATERIALS USE	1987 RECOVERED MATERIALS TARGET
		MILLION POUNDS	PERCENT OF TOTAL	PERCENT OF TOTAL FIBER & YARN PROCESSED	PERCENT OF TOTAL FIBER & YARN PROCESSED
2211	BROAD WOVEN FABRIC MILLS, COTTON	2,587.8	16.6	0	0
2221	BROAD WOVEN FABRIC MILLS, MAN MADE FIBER & SILK	2,717.5	17.5	0	0
2231	BROAD WOVEN FABRIC MILLS, WOOL	178.9	1.1	13	13
2241	NARROW FABRICS, COTTON, WOOL, SILK & MAN-MADE	194.3	1.2	0	0
2251	WOMEN'S FULL LENGTH & KNEE LENGTH HOSIERY	89.8	0.6	0	0
2252	OTHER HOSIERY	120.4	0.8	0	0
2253	KNIT OUTERWEAR MILLS	315.7	2.0	0	0
2254	KNIT UNDERWEAR MILLS	147.5	0.9	0	0
2257	CIRCULAR KNIT FABRIC MILLS	1,094.5	7.0	0	0
2258	WARP KNIT FABRIC MILLS	496.9	3.2	0	0
2259	KNITTING MILLS, N.E.C.	7.7	0.0	0	0
2261	BROAD WOVEN FABRIC FINISHERS, COTTON	N/A	N/A	0	0
2262	BROAD WOVEN FABRIC FINISHERS, SILK & MAN-MADE	N/A	N/A	0	0
2269	TEXTILE FINISHERS, N.E.C.	N/A	N/A	0	0
2271	WOVEN CARPETS & RUGS	83.1	0.5	0	0
2272	TUFTED CARPETS & RUGS	1,306.7	8.4	0	0
2279	CARPETS & RUGS, N.E.C.	41.6	0.3	0	0
2281	YARN SPINNING MILLS, COTTON, SILK, MAN-MADE FIBERS	2,706.1	17.3	0	0
2282	YARN TEXTURIZING, COTTON, SILK, MAN-MADE FIBER	891.6	5.7	0	0
2283	YARN MILLS, WOOL	123.9	0.8	13	13
2284	THREAD MILLS	139.2	0.9	0	0
2291	FELT GOODS, EXCEPT WOVEN FELTS & HATS	58.5	0.4	59	80
2292	LACE GOODS	5.0	0.0	0	0
2293	PADDING & UPHOLSTERY FILLING	330.0	2.1	93	93
2295	COATED FABRICS, NOT RUBBERIZED	136.2	0.9	0	0
2296	TIRE CORD & FABRIC	741.4	4.8	0	0
2297	NON-WOVEN FABRICS	641.0	4.1	17	15
2298	CORDAGE & TWINE	95.2	0.6	22	22
2299	TEXTILE GOODS, N.E.C.	–	–	–	–

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The textile mill products industry is primarily a fabricated products industry. It processes natural fibers, man-made fibers, and continuous man-made filament into yarn and fabric. The Department of Commerce, in its Standard Industrial Code classification, indicates that this diverse industry (SIC 22) is made up of 30 four-digit subsectors performing the following manufacturing operations:

- Preparing fiber and subsequently manufacturing yarn, thread, braids, twine and cordage
- Manufacturing broad woven fabric, narrow woven fabric, knit fabric, and carpets and rugs from yarn
- Dyeing and finishing fiber, yarn, knit apparel, and fabric
- Coating, water proofing, or otherwise treating fabric
- Integrated manufacturing of knit apparel and other finished articles from yarn
- Manufacturing felt goods, lace goods, non-woven fabrics, and miscellaneous textiles.

Typical operations of the textiles industry include inspection and testing fibers, blending natural and man-made fibers, spinning into yarn, and weaving into fabric. This fabric is then inspected, dyed and finished to the specifications of the customer in one or more of many finishing processes.

Many of the approximately 7,000 plants in the U.S. textiles industry generate products that are used solely by other textile manufacturing operations:

- Apparel fabric is finished in the broad woven state and shipped to apparel manufacturers for cutting and sewing
- Finishing mills prepare greige goods for use in other operations
- Texturizing mills prepare continuous filament yarn for use in weaving and knitting operations.

Many times, because of the economics of scale, several greige mills will often supply greige goods to one finishing plant for final processing.

Operational economics are extremely critical for the firms in the textiles industry. The industry is mature and the largest firm commands about 7 percent of the market. There are over 5,000 firms in the United States, with only about 80 of them publicly held. In fact, the second largest firm is a privately-held company. To be able to operate in such a competitive market, continuous production at minimum cost is imperative. In 1976, the cost of materials was 61 percent of the value of textile mill products industry shipments and rising rapidly. The industry is working on new processes and equipment to utilize materials more efficiently and reduce the waste of materials. However, it is essential to maintain the quality demanded by intermediate and final consumers such as the apparel industry, retail chains, and individual customers.

The textile mill products industry is also under competitive pressure from foreign textile imports. The textiles market is growing at about 3 percent per year and imports are growing at 6 percent. Cheaper foreign imports exert a pressure on the industry to reduce its labor intensiveness and increase material utilization by installing more modern equipment. Progress has and will continue to be slow because of a lack of investment capital. The industry's current profit is about 2 percent of sales and there is little capital available from the equity or debt markets.

There is also a large demand for capital created by several government regulations, primarily the OSHA cotton dust and noise standards, and the EPA's environmental standards. The industry has little availability of nondiscretionary capital and this is not anticipated to change between now and 1987.

To facilitate an understanding of the textile mill products industry with respect to recovered materials utilization, the industry was divided into two tiers. The first tier produces high quality, fashion-oriented outerwear, while the second tier is involved primarily in the production of utility-oriented products such as upholstery filling, cordage and twine.

The first tier of the industry contains 85 percent of all materials processed. It includes SIC's 2211 through 2284 and SIC's 2292 and 2295. In this first tier, a great deal of emphasis is placed on the style and fashion of the finished consumer product (apparel, sheets, towels, etc.). Changes in the quality, appearance, and feel of the products in this tier are dictated by consumer choice, not by the textile manufacturers. For example, one apparel firm cuts all of one apparel item from lengths of fabric no greater than 10 yards to help ensure color consistency in the various parts of the item that are to be fitted together.

In the first tier, quality control of the required fiber, yarn, and fabric characteristics is strenuous. In many greige goods operations, each yard of fiber is inspected for defects and imperfections before being finished. A product that is not totally free of imperfections is downgraded to seconds or used in second-tier products. In texturizing man-made continuous filament yarn, each package (doff and bobbin) of yarn is woven into a small sample, dyed with a sensitive color, and graded relative to a master. From 20 to 30 percent of all inspected packages are downgraded as a result of this inspection. The inspection guarantees the dyeability of the texturized yarn, a guarantee required by the weaving and finishing mills.

Over 12 billion pounds of virgin fiber were purchased by the textile mill products industry in 1977. About 93.2 percent of this was consumed in producing first-tier products. The remaining virgin fibers, which constitute about 6.8 percent of the total, are those that are too short to make an acceptable product (comber and wool noils) and those that are process operating waste (card strips, sweep waste, thread waste, mill or process ends). These wastes become input material to the second-tier segments of the industry.

Limitations on the reuse of such textile fibers and yarn in first-tier products are created in part by stringent demands for product quality and by requirements that the products have certain characteristics. Satisfactory first-tier products result when the various elements of the spinning, weaving, and finishing processes are closely controlled. One of the elements that must be controlled includes the quality of short, immature, natural (cotton or wool) fibers in the basic yarn.

The picking, carding, and combing operations in the initial stages of the spinning process remove foreign matter, align fibers, and remove shorter and undesirable fibers. Natural cotton fibers are up to 1⅝ inches long. For first-tier quality yarn, fibers less than ⅞ inch in length are removed. These shorter fibers tend to lend a bulkiness and uneven surface to the resulting yarn and fabric, giving them undesirable strength, feel, appearance and dyeability characteristics. In some lower quality goods these shorter fibers are permissible, but most of these fibers are shipped to the second tier of the industry. Some very fine cotton products (combed cotton) have additional fibers combed from the yarn to give a lustre or high sheen to the final fabric. Yarn and fabric are tested extensively to control the quality, by both the textile mill and the intermediate customer (apparel, government, or chain retailers).

Currently, and in the foreseeable future, there are no technologies available to reduce yarn or fabric wastes to the fiber form without producing a predominance of very short fibers (¼ inch or less). (Yarn and fabric wastes are the major non-reworkable prompt and obsolete wastes available for reuse in the textile mill products industry.) Using fibers reclaimed from

yarn or fabric wastes, or from obsolete wastes, to produce first-tier products would result in products with inferior characteristics and would be unacceptable to intermediate and final consumers. Some yarn from these types of fibers is respun in Southern Europe and the Far East but the resulting fabrics are unacceptable for the U.S. market. Problems with short fibers severely limit the use of yarn or fabric wastes, and obsolete wastes, as recovered materials in the first tier of the textile mill products industry. Therefore, SIC 2211 through 2284 (except for SIC 2231 and 2283), SIC 2292 and SIC 2295 are assigned zero recovered materials targets.

In the manufacture of worsted wool fabric, the wool is combed to remove the shorter fibers and to give a much smoother and lightweight fabric. These shorter fibers (wool noils), which can be up to 6 inches in length, can be added into yarn to make woolen fabric for women's garments, blankets, coats, etc. The noils increase bulkiness and insulating capability while still reducing the average price of the resulting fabric.

Wool noils are currently about 13 percent of the material input for woolen products and that percentage is unlikely to change between now and 1987. Wool constitutes about 1 percent of the fiber used in the United States. With the Wool Labeling Act, and the continued growth in popularity of man-made fibers and man-made/cotton blends, it is not projected that more wool or more wool noils will be used.

The second tier of products in the textile mill products industry includes products where stress is placed on utility rather than style or fashion. Products in the second tier are covered by SIC's 2291, 2293, 2296, 2297, and 2298 and consist of cordage and rope, tire cords, furniture padding and stuffing, bandages, nonwoven products, apparel padding, felting, pocket linings, apparel linings, etc. Quality is maintained in this second tier of the industry, but emphasis is placed on strength, absorbency, and feel. Therefore, the textile manufacturers have more freedom in producing these items than they do with items in the first tier, and reduced production costs are given more consideration. This sector of the industry represents less than 15 percent of the total fiber usage in the industry.

Much of the material utilized in second-tier products is by-product waste from first-tier mills. In fact an industry subsector (SIC 2294) composed of waste processors exists to purchase, preprocess, separate and grade prompt waste for the purpose of selling to companies making second-tier products. It is estimated that between 800 million and 1 billion pounds of waste passed from the first-tier to second-tier manufacturers during 1978 (about 6.8 percent of total virgin fibers).

Basic economic forces encourage the use of waste material in the second-tier industries. This is particularly true in view of the large difference in the price obtained for virgin and recovered material. For example, 60-cents-per-pound virgin cotten sells for 5 cents per pound as a waste by-product. Therefore, textile manufacturers are concentrating on using available capital to install more material efficient equipment, to improve material utilization efficiency and reduce waste generation.

Except for the tire cord and fabric sector (SIC 2296), which has strict strength and safety regulations imposed by the Department of Transportation and is assigned a zero target, four sectors in the second tier of the industry have the following recovered materials targets:

- *Felt goods, except woven felts and hats (SIC 2291).* Currently, about 35 million pounds of recovered materials are used in felts; this is about 59 percent of the total material processed. To reduce product costs, more recovered materials can be used, although not for the very highest quality felts. Therefore, a target of 80 percent is established for this sector.
- *Padding and Upholstery Filling (SIC 2293).* This sector primarily uses chopped fibers and is limited in its use of recovered materials only by flame retardation requirements. Therefore, the 93 percent utilization level is projected to continue, and is the target for 1987.
- *Nonwoven Fabrics (SIC 2297).* The spun bonded process (which must use virgin resin) is expected to grow much faster than the nonwoven industry in general between now and 1987. Therefore, the current 17 percent use of recovered materials in nonwovens is expected to decline and a target of 15 percent is set for 1987.
- *Cordage and Twine (SIC 2298).* This sector currently uses recycled fibers as 22 percent of its material input. This is not anticipated to increase because of the strength requirements of many products; therefore, the 1987 target is established as 22 percent.

During 1979, industry reports were received by DOE documenting the projected 1987 use of recovered materials by trillion Btu users in the textile mill products industry. These data corroborated the current use figures previously developed and reinforced the proposed target levels.

The target established for the textile mill products industry have been established at the zero level for sectors utilizing over 90 percent of the total virgin materials used in the industry. The targets were set at this level for these sectors because there are no current or foreseen technologies available to provide recovered fibers in a form which can be utilized in manufacturing acceptable products.

Research and development to overcome the technological limitations will be extremely expensive and would further reduce the limited available capital funds that are more appropriately expended for modern equipment to improve materials utilization and productivity. Such equipment will probably also increase the materials-use efficiency and reduce prompt industrial waste generation (an effect that produces the same desirable result of reducing virgin materials use as does increased use of recovered materials). Development of such equipment would not provide for the use of obsolete textiles waste because of the almost infinite blends of fiber types and irreversible degradation resulting both from the initial dyeing and finishing operations and from normal consumer use.

Comments were received in support of the proposed 13 percent targets for both SIC 2231 (Broad Woven Fabric Mills, Wool), and SIC 2283 (Yarn Mills, Wool). One commenter stated that no technology exists to increase the target levels, pointing out that reworked fibers have a tendency to resist dye stuffs and thus lessen the product quality to the consumer. One comment suggested that these targets each be raised to 16 percent because increased recycling is plainly possible. However, DOE has determined that insufficient supporting data and feasibility analyses exist which support such a higher target level. After evaluation of public comments, DOE has determined that the proposed targets for SIC's 2231 and 2283 should be adopted.

With regard to the proposed 15 percent target for SIC 2297 (Non-Woven Fabrics) a commenter stated that it is unfair to assign a target for that industry segment or, indeed, on a process basis at all, but rather that targets should be set on an end-use fabric or market basis. Noting that the industry is already operating within close profit margins, it was stated that non-woven fabric manufacturers are already using the maximum tolerable amount of waste fibers that are acceptable in the end-use product application. Given these market constraints, it was nevertheless agreed by the commenter that a 15 percent target for 1987 could be met by the

industry. With regard to setting a target for an industry segment in the textiles industry, DOE believes a breakdown according to SIC Code is the most reasonable and practical method. Should targets be set on an end-use fabric basis, there could be hundreds of targets. This would add significantly to the administrative burden on both DOE and the reporting corporations. Another commenter stated that the target should be raised to 20 percent; however, insufficient supporting information was provided to DOE in support of such a target level. As a result of all comments received, the proposed target is adopted for SIC 2297, and no modifications have been made with respect to the definition of industry sectors for which targets are established.

Several comments supported the zero targets for SIC 2271 (Woven Carpets and Rugs), SIC 2272 (Tufted Carpets and Rugs) and SIC 2279 (Carpets and Rugs). One commenter stated that anything but a zero target would be infeasible for technical and economic reasons. At the present time, no known technology exists or is anticipated which would permit recovery of yarn from waste carpet scrap or from clippings sheared off the pile yarns. Another commenter suggested that all zero targets be changed to 3 percent targets. However, no analysis was provided which satisfactorily demonstrates either the technical or economic feasibility of a 3 percent target. It is concluded that the proposed target levels are appropriate and should be adopted on the basis that there exists no technological ability to utilize recovered materials in these sectors.

Comments were received in support of the proposed zero targets for SIC 2252 (Other Hosiery), SIC 2254 (Knit Underwear Mills), SIC 2257 (Circular Knit Fabric Mills), SIC 2258 (Warp Knit Fabric Mills), and SIC 2259 (Knitting Mills). One manufacturer stated that a technological breakthrough may eventually permit recycling of recovered materials but its experience indicates that this is not expected to occur within the near future. In fact, this manufacturer revealed that it had conducted tests on garnetted knit fabric and tried to run the resulting fibers through its spinning and knitting processes. With a 5 to 10 percent recycled-to-virgin fiber ratio, it was found that 50 percent of the recycled fibers fell out in the subsequent carding operation. Additional fiber fallout occurred as the fibers were further processed. After extensive investigation and experimentation, the technical problems associated with the use of recycled fibers could not be overcome and the project was terminated. In commenting on the apparel garments knitted from yarn using the recycled fibers, the same manufacturer stated that the fabric was inferior to anything that it would normally produce and it would not have made an acceptable garment, either from the standpoint of defects or fabric strength.

Another commenter recommended that the targets for these industry subsectors be raised from zero to 3 percent. However, no data or analyses were presented to support such targets. It is concluded that the proposed target levels be adopted because there are no known technical processes which can utilize recovered materials in these sectors, consistent with production of acceptable quality.

Several comments agreed with the proposed zero targets for SIC 2211 (Broad Woven Fabric Mills, Cotton), SIC 2221 (Broad Woven Fabric Mills, Manmade Fiber and Silk), and SIC 2281 (Yarn Spinning Mills, Cotton, Silk, Manmade Fibers). One manufacturer stated that fiber technology, as discussed in the DOE textiles target support document, requires virgin fibers for natural, manmade and blended products. No known technology exists to recycle fibers into filament fabric. One industry representative testified that "most textile fabrics used manmade fibers or a blend of the 1500 on-the-shelf versions of polyester fiber."

This large variety of basic fiber raw materials presents severe process problems should recycled fibers of unknown chemical history be integrated into the virgin fiber stream.

Another commenter advocated that the targets for these sectors be raised to 3 percent as an incentive to force the textile industry to develop the fiber recycling technology. Since targets must represent the maximum technically and economically feasible increase in the use of energy-saving recovered materials that the industry can achieve by 1987, DOE believes that only the adoption of zero targets seems reasonable at this time, as there is no indication that the necessary technological advances will be achieved.

General comments were received pertaining to the other proposed target levels, both zero and non-zero. In summary, the textiles industry representatives who provided comments supported all proposed levels. One commenter recommended that 11 target levels be increased by 3 to 5 percentage points. However, no data or analyses were presented to demonstrate the feasibility, either technical or economic, of such increased targets between 1979 and 1987. Therefore, all target levels proposed for the textiles industry have been adopted.

C. Paper and Allied Products

The paper and allied products industry, Standard Industrial Classification (SIC) 26, is made up of six 3-digit groups. Of these six groups, only the four involved in pulping and papermaking (SIC 261, 262, 263, and 266) can use recovered materials in manufacturing. Analysis of the potential for use of recovered materials is therefore limited to the following four groups:

- SIC 261 (pulp mills) includes establishments engaged primarily in manufacturing pulp from wood or other materials such as rags and waste paper. Pulp mills that are combined with paper or paperboard mills are not included in SIC 261, unless the pulp mill is reported separately.
- SIC 262 (paper mills except building paper mills) comprises establishments engaged primarily in manufacturing papers other than building paper, using wood pulp and other fibers. These mills may also manufacture converted paper products. SIC 262 also includes pulp mills that are combined with paper mills.
- SIC 263 (paperboard mills) includes establishments engaged primarily in manufacturing paperboard and converted paperboard products. SIC 263 also includes pulp mills that are combined with paperboard mills.
- SIC 266 (building paper and board mills) comprises establishments engaged primarily in manufacturing building paper and board from wood pulp and other fibers. SIC 266 also includes pulp mills that are combined with building paper and board mills.

Because these four groups embrace diverse products and manufacturing processes, the industry was further segmented into homogeneous components suitable for analysis. Because data for the paper industry are most often reported for the 10 major grades of paper and paperboard, DOE segmented the industry according to these 10 grades, for purposes of analysis. The 10 grades selected account for more than 99 percent of the output of the paper industry, as shown in the following table, which also shows the final recovered materials target tor each grade:

Paper or paperboard grade	U.S. production 1977 (million tons)	Percentage of total U.S. production	Target (percent)
Newsprint	3.671	6.3	18
Tissue	4.285	6.9	30
Printing and writing papers	13.848	22.4	6
Packaging and industrial converting papers	5.378	8.7	4
Unbleached kraft paperboard	13.651	22.1	10
Semichemical paperboard	4.264	6.9	26
Solid bleached paperboard	3.721	6.0	0
Recycled paperboard	7.317	11.8	108
Construction paper	1.786	2.9	55
Insulating and Hard Pressed Board	3.682	5.9	17
Total	61.803	99.9	

In determining final targets, the industry has been segmented to a greater extent than it had been in development of the proposed targets. The paperboard segment, for final target purposes, was divided into four separate segments—unbleached kraft, semichemical, solid bleached, and recycled. This was done to distinguish between those paperboard types that are manufactured primarily from virgin fibers and those manufactured primarily from secondary fibers. The construction paper and board category was segmented into (1) construction paper and (2) insulating and hard pressed board because of the lack of similarity between the two product types.

Several commenters urged DOE to set one target for the industry rather than targets for individual product groups. DOE determined that, due to the diversity of products, processes and types of recovered materials in the industry, and the varying abilities of the industry subdivisions to use recovered materials, a single industry target would not be nearly as meaningful as targets for the subdivisions. In fact, based on the recommendation of another commenter, separate targets have been established for the construction paper and the insulating and hard pressed board groups of the construction paper and paperboard subdivision.

Two types of fibrous waste products can be substituted for virgin materials in the papermaking process and could thus be included in the target for recovered materials: (1) Secondary-fiber paper, including both postconsumer waste paper (e.g., recycled newspapers) and waste paper from the paper manufacturing and converting process (e.g., paper that does not meet specifications, or clippings from envelope manufacturing); and (2) nonpaper fibrous waste (e.g., wood scrap, sawdust, bagasse and rags).

This analysis focuses on secondary fiber and does not consider nonpaper fibrous waste. Although the paper industry recovers considerable quantities of wood scrap and uses it in paper manufacturing, the National Energy Conservation Policy Act does not require DOE to set targets for use of nonpaper fibrous waste. Moreover, the definition of recovered materials as secondary fiber is consistent with the definitions applied to the other industries for which similar targets are being developed under the Act.

The following five general grades of secondary fiber were identified as sources of recovered materials.

- *Old Newsprint.* Old newspapers, including overruns.
- *Old Corrugated.* Old corrugated containers, usually obtained from retail establishments, and clippings obtained from converting plants.
- *Pulp Substitutes.* Materials that can be converted into pulp with a minimum of processing, including manufacturing wastes (e.g., residues from paper-converting operations) and consumer wastes (e.g., computer tab cards).
- *High-Grade De-inking.* Preconsumer converting and publishing scrap, and postconsumer books, magazines, ledger stock, milk cartons, and other scrap.
- *Mixed Paper.* Waste paper of various qualities, including distributors' and consumers' overstocks and obsolete inventories, and mixed paper separated from the solid-waste stream.

Use of secondary fiber in 1987 was projected for each of the 10 paper and paperboard grades, based on technical feasibility and economic practicality. However, in setting the targets for use of recovered materials in the paper and allied products industry, the adequacy of projected 1987 supplies of waste paper was also considered.

Supply projections for each waste-paper grade were developed using available data and compared with 1987 secondary-fiber demand in the 10 paper and paperboard grades. It was found that 1987 demand for secondary fiber will likely exceed supply for three paper and paperboard grades: Tissue, printing and writing papers, and unbleached kraft paperboard. For the other seven paper grades, there will likely be surpluses of secondary fiber. In theory, these surpluses could be used to balance the deficits. Consumer tissue and printing and writing papers have very stringent quality requirements, however, and can use only pulp substitutes and high-grade de-inking. Thus, supply deficits for these two paper grades cannot be eliminated by using other grades of waste paper. Moreover, it is unlikely that pulp substitutes and high-grade de-inking can be diverted from the other paper and paperboard grades for use in tissue and printing and writing papers. Hence, DOE revised the projections of secondary-fiber use in tissue and printing and writing papers, to reflect these supply constraints. For unbleached kraft paperboard, DOE projects that deficits could be eliminated by diverting surpluses of waste paper (primarily old corrugated) from recycled paperboard.

During the comment period, a number of comments focused on the effectiveness of the targets in meeting Congress' goal of reduced energy consumption. DOE notes that section 461 of NECPA does not include any requirement to consider consumption of energy or fossil fuels in establishing the targets. Section 461 does state the Congressional "finding" that the maximum feasible use of recovered materials in manufacturing will conserve substantial industrial energy and other scarce natural resources.

Conflicting testimony has been provided to DOE on whether use of secondary fiber in the manufacture of paper and paperboard saves fossil fuels. DOE cannot conclusively state that the use of recovered materials does or does not save fossil fuel in all cases. Increased use of secondary fiber by the paper industry may either increase or decrease the use of purchased energy (primarily fossil fuels), depending on the extent to which virgin or secondary fiber not used in manufacturing will be burned to produce energy.

Although some testimony insisted that increased use of recovered materials would not increase fossil-fuel consumption under any circumstances, fossil-fuel savings in many sectors of the industry appear to depend on the percentage of waste paper or pulpwood that would be burned for energy were it not used in manufacturing. The final target support document includes an analysis of the impact on energy consumption of various levels of direct energy recovery from waste paper and pulpwood. DOE has established targets that reflect the maximum technologically and economically feasible use of recovered materials, regardless of whether achieving the targets would reduce the use of fossil fuel, and will conduct additional analyses during 1980 which will be intended to better define the impact on energy associated with attainment of the targets. This approach is consistent with the Congressional mandate to establish targets based on maximum feasible recovered materials utilization.

Some other statements urged DOE, in setting targets based on the "maximum

feasible increase" in the use of recovered materials that the paper industry could attain by 1987, to disregard considerations such as consumer acceptance of paper products and the economics of their production. DOE believes, however, that consumer acceptance is an aspect of economic feasibility. The final targets are based on the criteria of technical feasibility and economic practicability including, were appropriate, considerations of consumer acceptance.

Several commenters criticized DOE for failing to consider the impact of potential Federal, State and local government incentives for the paper industry to recycle and use recovered materials. DOE believes that it is not realistic to assess the impacts of various proposed government actions that have not yet been taken; however, it has assessed the impacts of current Federal legislation, such as the Resource Conservation and Recovery Act, and actions taken by States to increase recovered materials use. This analysis is included in the final target support document.

Several commenters argued that the analysis did not take into account regional differences in the economics of production and raw-material supply, customer requirements, and manufacturing capacity. Because of such factors, the economically attractive fiber input mix will vary among regions. For example, several commenters questioned why DOE's economic analyses for many industry segments show virgin fiber to be more economically attractive than secondary fiber, when significant investments in secondary-fiber-based capacity are being announced. DOE's economic analyses are based on data for representative mills. DOE certainly agrees that production costs do vary among paper mills, particularly as a result of regional differences in cost and availability of production inputs; however, it was not reasonable for DOE to incorporate into its analyses regional variations in the economics of production and the availability of raw materials. Furthermore, DOE did not receive during the comment period any data that would enable it to perform such analyses. DOE has therefore concluded that, despite its limitations, the selection of a few cases to represent the industry provides the best analysis that can be done given the information available, within the time restrictions mandated by the legislation. Furthermore, the targets are not intended to apply to any particular regions but are industry averages. Also, the target levels deriving from the generalized analysis have been tempered by information on announced changes in plant capacity, where that information is available.

Several comments held that the analysis should have considered possible changes in waste-paper prices in response to a sharper increase in demand. DOE has performed an analysis of the sensitivity of production economics to waste-paper prices. The results of this analysis are included in the support document for those sectors in which it has a significant impact.

Several comments focused on the future availability of various grades of waste paper. Some of these comments stated that DOE's projections of waste-paper availability in 1987 were too conservative; other comments considered them overly optimistic. Consequently, as presented in the support document, DOE has developed different scenarios for the availability of secondary fiber in 1987 and considered their impact on the targets. Other comments stated that there is little potential for increasing the supply and recoverability of high grades of waste paper, and DOE has taken this into account in establishing the final targets.

A description of DOE's determination of the maximum feasible increase in the use of recovered materials, by each subdivision of the paper industry, is provided below.

Newsprint. Newsprint is an undifferentiated commodity product that can be manufactured from virgin fiber, old newsprint, or some combination of the two. The technically feasible limit of secondary-fiber substitution in newsprint manufacture is 100 percent.

Technological changes in newspaper publishing may affect the acceptability of newsprint made from secondary fiber. Most newspapers are now printed using a photoengraving process, which requires higher newsprint strength than earlier methods. Because virgin-based paper products have greater surface strength, newsprint made from secondary fiber may be at a relative disadvantage. However, the advent of twin-wire drying, which provides greater surface strength, is expected to minimize this disadvantage and might eliminate it.

To determine the maximum amount of secondary fiber that could be economically used in newsprint manufacture, the economics of using old newsprint in both existing and new capacity were considered.

In the economic analysis for new plants, the return on investment (ROI) for representative plants was calculated based on the following input mixes:

- 100 percent virgin fiber, consisting of 90 percent thermomechanical pulp (TMP) and 10 percent kraft pulp: 8.4 percent ROI
- 65 percent virgin fiber (TMP) and 35 percent secondary fiber: 9.5 percent ROI
- 100 percent secondary fiber: 12.5 percent ROI.

For expansions of existing capacity, DOE calculated ROI's for representative plants using the following mixes of additional fiber input:

- 100 percent virgin fiber (TMP): 21 percent ROI
- 100 percent secondary fiber: 23.5 percent ROI.

These returns indicate that 100 percent secondary fiber would be the preferred input to both new plants and expansions of existing plants. However, the differences between the returns are small, and the relative attractiveness of virgin- and secondary-fiber inputs may therefore be sensitive to relatively small changes in newsprint price capital costs, or operating costs. To assess this sensitivity, DOE examined the effects of a 5-percent increase or decrease in these variables on ROI for each input mix. This sensitivity analysis showed that secondary fiber would not always be a more economically attractive input than virgin fiber, expecially for expansions of existing plants.

Despite the apparently unfavorable ROI associated, on the average, with manufacturing newsprint from virgin fiber, virgin-fiber-based additions to capacity may be economic under certain circumstances. For example, if the plant is located far from the urban centers where old newsprint is plentiful, investment in virgin-fiber-based capacity might be economically attractive, particularly for the integrated manufacturers that dominate newsprint production. The economic analysis of newsprint capacity expansions did not indicate conclusively that either virgin- or secondary-fiber-based capacity is preferable.

Because the economic analysis of capacity expansions is not conclusive, and because most additions are being made by expanding existing plants, DOE projected that the trend established in announced capacity additions between 1978 and 1982 (i.e., secondary-fiber use equivalent to 21 percent of production) would continue from 1982 to 1987. Use of secondary fiber is therefore expected to increase from 825,000 tons in 1982 to 920,000 tons in 1987, or 18 percent of projected 1987 production of newsprint.

Concerning the target for newsprint, it was pointed out to DOE during the comment period that recently announced additions to capacity should be reflected in the target for use of

secondary fiber in newsprint manufacture. As indicated above, DOE has taken this additional information into account in establishing the final target for newsprint. DOE was also urged to raise the target for newsprint and to establish incentives for the industry to meet a higher target than that proposed. DOE believes, however, as mentioned previously, that the target should not be based on the effect of uncertain future government incentives. The law does, however, allow DOE to revise targets as additional information becomes available and new government programs are enacted.

Tissue. Tissue is made in a variety of grades, containing from 0 to 100 percent secondary fiber.

There are two major types of tissue: Sanitary tissue, which includes facial and toilet tissue, towels, napkins, and diapers; and nonsanitary tissue, which includes wrapping tissue, waxing tissue, and industrial cellulose wadding. In 1977, the four major sanitary tissue products (facial tissue, toilet tissue, toweling, and napkins) accounted for about 90 percent of total tissue production. The analysis of tissue focused on these four products; the secondary fiber use projected for these products was extended to the entire tissue subdivision.

Sanitary tissue products are made from 0 to 100 percent secondary fiber, containing all grades of waste paper. However, pulp substitutes and high-grade de-inking accounted for 74 percent of the secondary fiber used in 1977.

There are no technical barriers to using secondary fiber in tissue production. However, concern for product quality, as indicated by "feel," absorbency, and brightness, tends to dictate the grades and amounts of secondary fiber that may be used.

Quality requirements for tissue products vary, depending primarily on the market segment served. The market for sanitary tissue may be divided into two major segments: the consumer market and the institutional market. Consumer tissue, which is used in households, accounts for about two-thirds of sanitary tissue sales. It is distributed through supermarkets and stores. Because the buyer of consumer tissue is usually its user, this tissue must be high quality. Institutional tissue, which is used in private and public institutions, is distributed through paper merchants and industrial supply houses. Because the buyer is usually not the user, quality requirements are less stringent. Price is a very important consideration for the institutional buyer.

Because its quality requirements are very high, consumer tissue usually contains less waste paper (about 17 percent of total fiber furnish in 1977) than does institutional tissue (about 50 percent of total fiber furnish in 1977). It is, however, possible to make acceptable consumer as well as institutional tissue from 100 percent secondary fiber. Nearly all of the secondary fiber that is used in manufacturing consumer tissue comes from high-grade de-inking stocks and pulp substitutes. Lower grades of waste paper, i.e., mixed papers, old newsprint, and old corrugated, are used to a greater extent in manufacturing institutional tissue.

To determine the maximum economical use of secondary fiber, DOE examined the economics of using increased secondary fiber in existing tissue capacity and in additions to capacity.

In existing capacity, it is possible to replace virgin fiber with high-grade pulp substitutes without making substantial changes in plant and equipment. The economics of this substitution depend on the type of mill. Three major types of tissue mills use virgin fiber (for technical reasons, mills that use virgin fiber generally supplement it with some secondary fiber):

- Those that manufacture virgin pulp on-site from pulpwood
- Those that acquire dried wood pulp from pulp mills owned by the same company
- Those that purchase dried wood pulp on the open market, i.e., market pulp.

Most tissue mills are located near population centers. Because sources of pulpwood are usually distant from population centers, most tissue mills that use virgin fiber find it more economical to acquire dried wood pulp than to acquire pulpwood and convert it. The tissue mill that acquires dried wood pulp need not have any pulping equipment other than stock preparation equipment, which converts dried pulp into wet feedstock for the paper machine.

To project the use of secondary fiber in additions to tissue manufacturing capacity, DOE considered the consumer and institutional grades of tissue separately. To project the use of secondary fiber in additions to consumer-tissue capacity, the economics of producing consumer tissue from virgin fiber and from secondary fiber were compared, both in new plants and in expansions of existing plants.

For both new plants and plant expansions, the economics were too close to indicate whether virgin or secondary fiber is generally the most economically attractive input.

For institutional tissue, cost data were unavailable. DOE was therefore unable to conduct an economic analysis of using secondary fiber in the production of institutional tissue. However, 93 percent of the expansions of institutional tissue capacity announced for the period 1977–1981 are based on secondary fiber. These expansions should increase the use of secondary fiber in making institutional tissue from 708,000 tons in 1977 to 810,000 tons in 1981. DOE projects that this trend will continue through 1987, increasing the use of secondary fiber to 975,000 tons in 1987.

Total tissue production is expected to increase from 4,285,000 tons in 1977 to 4,975,000 tons in 1987. Two-thirds of total 1977 tissue production, or 2,847,000 tons, was consumer tissue; the remaining 1,438,000 tons were institutional tissue. It is projected that relative production of consumer and institutional tissue will be consistent with this ratio through 1987. Summing the estimates of secondary fiber use in consumer and institutional tissue, it is projected that the total use of secondary fiber in tissue manufacture should increase to 1,594,000 tons in 1987. Given the projected tissue production of 4,975,000 tons, this level of secondary-fiber use implies a recovered materials utilization rate of 32 percent. Due to the forecast of a deficit in the type of secondary fiber required by this sector in 1987, as discussed above, the final target was revised to 30 percent.

The proposed target for this paper grade was 38 percent. Several commenters felt that the proposed target of 38 percent for tissue products was unrealistically high. The analysis in support of the proposed target was criticized for failing to recognize important differences between consumer tissue and industrial tissue. Commenters indicated that the analysis has overstated the price differential between secondary and virgin fiber and had understated the price differential between consumer and industrial tissue products. It was also shown that the prices and manufacturing costs of consumer and industrial tissue products fluctuate considerably. Moreover, it was claimed that there is not as much flexibility in making consumer tissue from lower grades of secondary fiber as the analysis concluded. Taking all of these comments into account, DOE developed the estimate of the potential for secondary-fiber substitution in tissue manufacturing described above. The details of the analysis underlying this estimate are presented in the support document.

Other comments argued that 38 percent is too low a target for tissue products and that DOE should consider the possibility of substituting secondary fiber in existing tissue production capacity. DOE currently believes, however, that because the target for tissue is restricted by projected 1987 supplies of high-grade secondary fiber, it is unnecessary to consider substituting secondary fiber in existing capacity, even if such substitution might sometimes be economically feasible if the supply of high-grade secondary fiber were unlimited.

Printing and Writing Papers. Printing and writing papers are made in a variety of grades, containing from 0 to 100 percent secondary fiber.

There are seven major grades of printing and writing papers: uncoated groundwood, coated groundwood, uncoated free sheet, coated free sheet, cotton fiber, thin papers, and bleached bristols. Both coated and uncoated groundwood papers contain at least 25 percent groundwood fiber; the remaining fiber input is primarily chemical pulp. They are used in applications that do not require permanence, because they discolor when exposed to ultraviolet light.

Uncoated and coated free sheet papers nominally contain no more than 25 percent groundwood fiber, with the remainder of the fiber input being primarily chemical pulp. In practice, practically no groundwood is used in manufacturing free sheet papers.

Cotton fiber papers are made from a medium containing at least 25 percent cotton or similar fibers. They are used where paper of the highest quality and durability is required, *e.g.,* in currency notes. Thin papers are used in special applications, such as carbonizing and cigarette papers.

Bleached bristols are identical to solid bleached paperboard but have lower basis weights. They are used for tabulating and index cards, tags, file folders, postcards, etc.

Four of the grades (uncoated and coated groundwood; uncoated and coated free sheet) accounted for nearly 90 percent of total production in 1977. The technical and economic analyses of printing and writing papers focus on these grades; the secondary fiber use projected for these grades was extended to the entire printing and writing grade.

Both groundwood and free sheet papers are currently manufactured from 100 percent secondary fiber; there are no technical barriers to using secondary fiber in the production of these papers. However, to maintain high product quality, as indicated by brightness, opacity, printability, uniformity of thickness, and surface characteristics, only the high grades of secondary fiber (i.e., pulp substitutes and high-grade de-inking) may be used.

Both groundwood and free sheet papers made from 100 percent secondary fiber are functional and are accepted by the consumer, as long as they consistently meet standards for product quality. Consistently high and uniform product quality is very important to successful competition in this market. For coated groundwood and coated free sheet papers, which must be of very high quality, most manufacturers tend not to use secondary fiber, because it is likely to contain contaminants.

The economic analysis for this paper grade focuses on uncoated groundwood paper and uncoated free sheet. The fibrous composition of coated and uncoated groundwood papers is essentially the same; coated groundwood paper has a clay coating applied to it. Except for the coating stage, the papermaking processes for the two papers are nearly identical. Hence, the maximum economical use of secondary fiber in uncoated groundwood also applies to coated groundwood.

In most instances, the use of secondary fiber in the production of these papers may be increased only in additions to capacity. Existing capacity appears to offer little opportunity for increased use of secondary fiber.

Most printing and writing mills that are based on virgin fiber have pulping operations on-site. To replace virgin fiber with secondary fiber in such a mill, virgin pulping capacity would have to be idled or the virgin pulp used elsewhere. These alternatives are generally not economic.

To project the use of secondary fiber in this sector, DOE compared the economics of producing paper from different mixes of fiber input, both in new plants and in expansions of existing plants.

Economics will vary depending on geographical location, proximity to sources of raw material supply, specific plant design, and other factors. In some cases, virgin fiber may be more economically attractive than secondary fiber. Moreover, the ROI's calculated are quite sensitive to changes in assumptions about product price, capital cost, and operating cost.

Most additions to capacity being announced are expansions of existing plants. ROI's for plant expansions indicate that 100 percent secondary fiber is the preferred input for groundwood papers, provided an adequate supply of high-grade de-inking and pulp substitutes is available. For free sheet papers, the economic analysis does not indicate a clear preference for either virgin or secondary fiber.

To project 1987 use of secondary fiber in printing and writing papers, DOE considered secondary fiber use, through 1981, in capacity additions that have already been announced, and projected both production and secondary fiber use for the period 1982–1987. For the period 1977–1981, capacity additions already announced should increase production from the 1977 level of 13,848,000 tons to 15,561,000 tons by 1981. Correspondingly, the use of secondary fiber should increase from 190,000 tons in 1977 to 1,030,000 tons in 1981.

Production and secondary fiber use for both groundwood and free sheet papers, for the period 1982 to 1987, were then determined. For groundwood papers, it is projected that all new production capacity will be based on 100 percent secondary fiber, because it is economically attractive. About 30 percent of production capacity for printing and writing papers is dedicated to groundwood papers. Total production of printing and writing papers is projected to increase by 2,974,000 tons from 1982 to 1987; thus it is projected that 30 percent of this increased production would require about 776,000 additional tons of secondary fiber, relative to 1981 levels.

For free sheet papers, because the economic analysis was inconclusive, it is assumed that additions to production capacity will continue to use the same mix of fiber inputs as projected for the period 1977–1981, or 7 percent secondary fiber. Production of sheet is projected to increase by 2,082,000 tons between 1982 and 1987; this increase would require an additional 146,000 tons of secondary fiber.

The total increase in secondary fiber use in printing and writing papers should therefore be 922,000 tons from 1982 to 1987, for a total use of 1,952,000 tons in 1987. This level of secondary fiber use would therefore represent 11 percent of the production of printing and writing papers.

By forecasting supply, by waste paper grade, to 1987 it was determined that a supply deficit will likely exist in the target year. This will affect the printing and writing sector, which can use only pulp substitute and high grade de-inking. Hence the projection of secondary fiber use was revised to reflect the anticipated waste paper supply constraints. As a result, the final target has been set at 6 percent.

The proposed target for printing and writing papers was 6 percent. During the comment period several parties challenged the proposed target, since it

reflected a percentage reduction in secondary fiber use. It was suggested that the target for printing and writing papers should be increased to as much as 100 percent. DOE notes that, without the projected supply deficit, 11 percent recovered materials use would be feasible. However, on the basis of additional data regarding waste paper supply, DOE has revised the target for printing and writing papers to 6 percent, as detailed in the support document.

Packaging and Industrial Converting Papers. Packaging and industrial converting papers include a wide variety of products made from bleached or unbleached kraft pulp containing more that 50 percent virgin fiber, or from special pulp furnishes. Products in this grade include grocery sacks, merchandise bags, wrapping papers, shipping sacks, multiwall bags, gift wraps, packing tapes, saturating paper used in the manufacture of mica sheets and other laminates, tube paper used in the manufacture of electric fuses, and glassine, greaseproof, and vegetable parchment papers. Secondary fiber content ranges from 0 to 100 percent.

In most applications of these products, functional requirements preclude substitution of other paper products. However, the use of plastic for packaging has increased tremendously over the last 10 years. Consequently, this segment of the paper industry has recently experienced small growth (0.48 percent annually), and no significant growth is expected in the future. Capacity additions of 29,000 tons have been announced for the period 1977–1981, indicating an annual growth rate of 0.1 percent. Because of this low growth rate, this paper grade offers little opportunity for increased use of secondary fiber, despite its technical feasibility.

The use of secondary fiber in packaging and industrial converting papers is limited by the strength requirements of the products. Bag and sack paper accounts for about 65 percent of the production of this grade. Made of bleached or unbleached kraft pulp, it is used for applications such as grocery sacks and shipping sacks, which require high strength-to-weight ratios. For a given basis weight, virgin-fiber-based products are stronger than those made from secondary fiber. Using large amounts of secondary fiber would require an increase in the basis weight of the product, with a consequent increase in freight costs for the consumer. To avoid increased freight costs, consumers generally prefer bag and sack paper with a low basis weight; hence, very little secondary fiber is used in bag and sack paper.

According to one industry source, one of the products in this grade, merchandise bags, has generally lower strength requirements; use of secondary fiber in these bags could be increased. However, plastic products have been rapidly replacing paper for use in merchandise bags, and hence this product offers little opportunity for increased use of secondary fiber. Significant amounts of secondary fiber are used in some other products in this grade, but these products account for a small fraction of the total production of the grade.

Within the limits imposed by technical feasibility, the use of secondary fiber in the production of packaging and converting papers can usually be increased only by additions to capacity. Because a paper mill is designed to use a specific fiber furnish, increasing the use of secondary fiber in existing capacity would necessitate idling virgin pulping capacity or using virgin pulp elsewhere. This would generally not be economically attractive. Significant opportunities for increasing the use of secondary fiber therefore are available only with additions to capacity.

The growth of capacity and production between 1978 and 1987 is expected to be very small, however, averaging about 0.6 percent per year. As a result, use of secondary fiber as a percentage of total production is not expected to increase from the current level of 4 percent.

To estimate the 1987 use of secondary fiber in manufacturing packaging and industrial converting papers, DOE projected 1987 production as 5,780,000 tons, based on available information. This increase in production is expected to increase the use of secondary fiber from 218,000 tons in 1977 to 231,000 tons in 1987, or 4 percent of 1987 production of packaging and industrial converting papers.

Unbleached Kraft Paperboard. Unbleached kraft paperboard is defined by the American Paper Institute (API) as any paperboard made from a furnish containing at least 80 percent virgin wood pulp, using the kraft sulfate process.

In 1977, unbleached kraft linerboard accounted for 13,586,000 tons, or 92 percent, of the capacity for unbleached kraft paperboard. Analysis of this paper grade therefore focuses on unbleached kraft linerboard; secondary fiber use is projected for linerboard and extended to the entire paper grade.

Linerboard is the paperboard used for the inner and outer facings of corrugated containers; the fluted material between the two linerboard facings is called corrugating medium. Linerboard is made from unbleached kraft pulp, which may be supplemented with waste paper. (Linerboard can also be made from two other grades of paperboard. API has defined these other types of linerboard as: solid bleached linerboard, made from a furnish that contains at least 80 percent virgin bleached chemical wood pulp; and recycled linerboard, made from a furnish that contains less than 80 percent virgin kraft wood pulp. In practice, recycled linerboard is made almost entirely from secondary fiber.

Kraft linerboard competes with recycled linerboard in some, but not all, market segments; hence, in projecting production and secondary fiber use in unbleached kraft linerboard, DOE analyzed the comparative economics of producing both recycled and unbleached kraft linerboard in order to develop potential shifts in market share for each. The projection of secondary fiber use developed in this section on kraft linerboard does not, however, include the secondary fiber used in recycled linerboard. It applies only to the unbleached kraft linerboard grade.

Unbleached kraft linerboard is produced in four of the nation's eight paper-producing regions. About 82 percent of capacity is located in the three southern regions; the remainder is located in the West.

Some kraft linerboard is made from 100 percent virgin fiber. Other kraft linerboard mills use secondary fiber, e.g., clippings from container plants as a small fraction of their total fiber furnish. In 1977, about 418,000 to 578,000 tons of secondary fiber (some 3 to 4 percent of kraft linerboard production) were used in manufacturing unbleached kraft linerboard.

Since some linerboard (i.e., recycled) is currently made from 100 percent secondary fiber, it is clear that no technical barriers limit the use of secondary fiber in linerboard production. Linerboard must provide the burst, tensile, and tear strength required for a corrugated box. Rail Rule 41, an Interstate Commerce Commission regulation that applies to containers for interstate shipping, specifies the burst strength required of linerboard, and the product is consequently quite standardized.

The use of secondary fiber in unbleached kraft linerboard varies from 0 to 20 percent. Some mills use as much as 25 percent secondary fiber but, according to the industry's definition, this product is not termed unbleached kraft linerboard. According to the information obtained by DOE,

linerboard is not made from a fiber furnish consisting of between 30 and 90 percent secondary fiber. Industry experience has shown that the use of 20 percent clean secondary fiber in kraft linerboard manufacture does not significantly deteriorate the strength of the product or the performance of the board machine.

For additions to existing unbleached kraft linerboard capacity, the ROI's for 100 percent virgin fiber and for 20 percent secondary fiber are too close to justify any conclusion about the preferred fiber input. Based on announced capacity expansions, however, this segment of the paper industry will significantly increase its use of secondary fiber. To project 1987 use of secondary fiber, DOE has assumed that increases in the use of secondary fiber projected for the period 1977–1981, based on capacity additions already announced, would continue at the same rate through 1987.

Between 1977 and 1987, annual production of unbleached kraft paperboard should increase by 4,729,000 tons. API has already announced 1,687,000 tons of additional capacity which will come on stream by 1981. These additions to capacity should increase use of secondary fiber by 348,000 tons over 1977 levels. If this trend continues from 1982 to 1987, the use of secondary fiber should increase by an additional 952,000 tons; thus, the total increase in use of secondary fiber from 1977 to 1987 should be 1,300,000 tons. Adding this incremental use of secondary fiber to 1977 use (578,000 tons), the maximum economical use of secondary fiber is projected to be 1,878,000 tons in 1987. When compared to projected 1987 production of 18,380,000 tons, this secondary fiber use implies a utilization rate of 10 percent, a significant increase over the 1977 utilization rate of 4 percent for unbleached kraft paperboard.

The target initially proposed for unbleached kraft paperboard was 19 percent. The final target reflects DOE's use of more recent data on the capital costs and energy costs for this sector, which were applied in the economic analyses. Several commenters had suggested that the costs used to support the proposed target were not representative. The final target also reflects a revised projection of the 1987 supply of used corrugated containers, based on additional data provided to DOE.

Other comments stated that the use of 20 percent secondary fiber would reduce the strength of unbleached kraft paperboard and would require additional refining and use of additives in board manufacturing. However, industry experience supports DOE's conclusion that use of 20 percent secondary fiber in manufacturing unbleached kraft paperboard need not affect its strength, if appropriate actions are taken during production. The additional operating costs involved have been taken into account in the economic analysis.

In response to comments that the proposed target for unbleached kraft paperboard would put other segments of the paper industry at a disadvantage with respect to supply of secondary fiber, DOE has established the final targets such that the projected supply of secondary fiber meets or exceeds the requirements of all segments of the industry.

Semichemical Paperboard. Semichemical paperboard used as corrugating medium is made from at least 75 percent virgin wood pulp that is produced predominantly by a semichemical process.

Since recycled paperboard, which is also used as a corrugating medium, is currently made from as much as 100 percent secondary fiber, it is clear that there are no technical barriers limiting the use of secondary fiber in the production of corrugating medium. Corrugating medium must provide the rigidity for the crush resistance required for a corrugated box. Both semichemical and recycled medium provide adequate crush resistance; hence, the two grades are often used interchangeably.

The current use of secondary fiber in semichemical paperboard averages about 26 percent of production. Because of production yields, this 26 percent secondary fiber input results in a product containing about 25 percent secondary fiber. Some manufacturers occasionally report medium containing as much as 38 percent secondary fiber as semichemical medium. Despite this discrepancy in reporting, DOE's analysis has maintained the categories of semichemical and recycled paperboard as defined by the paper industry. According to these definitions, no more than 25 percent secondary fiber may be used in manufacturing semichemical paperboard.

Most capacity additions are being made by expanding existing plants. Because the economic analysis of such expansions is inconclusive, DOE's projections with respect to corrugating medium production are based on an existing study of the industry. 1987 production of semichemical paperboard is projected to be 5,580,000 tons.

DOE's analysis of the economics of semichemical paperboard production for two mixes of fiber inputs (100 percent virgin fiber and 75 percent virgin fiber) was inconclusive. Industry representatives have indicted, however, that semichemical paperboard manufacturers will continue to use 25 to 26 percent secondary fiber, the maximum proportion that can be used according to the definition of the product. Given 26 percent use of secondary fiber and projected 1987 production levels, use of secondary fiber in semichemical medium should increase to 1,457,000 tons by 1987, an increase of 344,000 tons.

The target of 26 percent for semichemical medium was questioned during the comment period, and the industry's current practice was described as producing semichemical paperboard with as much as 38 percent secondary fiber. According to industry sources, however, semichemical paperboard is defined as corrugating medium containing no more than 25 percent secondary fiber; all other corrugating medium is classified as recycled. Data on use of secondary fiber are reported according to these categories. DOE has determined, after further investigation, that the paper industry, does not produce semichemical paperboard with 38 percent secondary fiber; rather, it occasionally reports recycled paperboard containing 38 percent secondary fiber as semichemical paperboard. In establishing the targets, DOE has decided to maintain the categories of semichemical and recycled paperboard, as defined by the paper industry.

In response to comments about DOE's conclusion that production capacity for semichemical paperboard would grow four times a quickly as that for recycled paperboard (the economic analysis shows their returns on investment to be nearly equal), the final targets reflect additional economic data and shows that both types of corrugating medium will grow at nearly the same rate.

Solid Bleached Paperboard. Solid bleached paperboard is a high grade of paperboard that is used for boxes and other functional applications requiring a strong, lightweight paperboard with an aesthetically pleasing appearance.

By definition, solid bleached paperboard is manufactured from more than 80 percent virgin fiber. Almost 40 percent of solid bleached paperboard production is used in manufacturing milk cartons and food-service packaging for moist, liquid, and oily foods. The U.S. Public Health Service's fluid milk model ordinance mandates that milk cartons be made from completely virgin fiber, and buyers of packaging apply this requirement to most paperboard packaging for moist, liquid, and oily

foods. Therefore, waste paper is not used in manufacturing bleached paperboard. As a result, the recovered materials target for the manufacturer of solid bleached paperboard is 0 percent.

Regarding the target for solid bleached paperboard, several commenters questioned DOE's conclusion that no secondary fiber will be used in manufacturing solid bleached paperboard. Their comments suggested that new products could be developed which could use some amounts of secondary fiber. DOE believes, however, that the industry's practice of using very small amounts of secondary fiber in manufacturing solid bleached paperboard cannot be substantially altered by 1987, due to circumstances indicated above.

Recycled Paperboard. Recycled paperboard includes the following categories of products: Folding boxboard; medium; gypsum linerboard; tube, can, and drum stock; linerboard; set-up boxboard; chip and fillerboard; and other recycled paperboard.

All recycled paperboard products can be manufactured from 100 percent secondary fiber. There are no technical barriers to the use of secondary fiber in this paper grade. In practice, all recycled products except corrugating medium are manufactured from 100 percent secondary fiber. Recycled medium can also be manufactured from 100 percent secondary fiber. The average use of secondary fiber in recycled medium, however, is 75 percent of production. (The paper industry classifies corrugating medium with less than 25 percent secondary fiber as semichemical.)

According to linerboard manufacturers, consumers generally prefer kraft linerboard to recycled linerboard because it is stronger than recycled linerboard and has superior printability. Consequently, the share of the linerboard market held by recycled linerboard has decreased over the last 10 years. When the total supply of linerboard exceeds demand, recycled linerboard tends to sell at a slight discount ($5 to $7 per ton), because of the consumer's preference for kraft linerboard.

Economic analyses indicate that, for new plants, 100 percent secondary fiber is the economically preferable input, provided there is an adequate supply of old corrugated containers available within an economic distance of the plant. Hence, the most economically attractive additions to linerboard capacity would be recycled linerboard plants. However, recycled linerboard does not compete with unbleached kraft linerboard in all segments of the market, because recycled linerboard has less strength and printability than unbleached kraft linerboard. For this reason, recycled linerboard production is expected to grow at a lower rate, from 1977 to 1987, than unbleached kraft linerboard.

To calculate the absolute aggregated use of secondary fiber in manufacturing recycled paperboard, projected 1987 production and secondary fiber use for all of the recycled paperboard products have been summed. Projected 1987 production of 8,205,000 tons of recycled paperboard will consume 8,854,000 tons of secondary fiber. These figures imply an aggregate secondary fiber utilization rate of 108 percent for recycled paperboard, which is about the same as the 1977 utilization rate. Even though use of secondary fiber per ton of output will not change, the absolute amount of secondary fiber used will increase, from 7,930,000 tons in 1977 to 8,854,000 tons in 1987, because of the increased production of recycled paperboard. The target is greater than 100 percent because most recycled paperboard products are manufactured from input which is totally comprised of recovered materials, and there are materials losses during the production process.

In the comments on recycled paperboard, DOE was urged to state targets in terms of absolute tonnage of secondary fiber used rather than in terms of secondary fiber as a percentage of production. However, the actual tonnage of secondary fiber that the industry will use for any grade of paper depends on product output, which in turn depends on a range of economic variables. DOE therefore feels that it is generally more appropriate to set targets as a percentage of production rather than as absolute tonnage, and desires that all targets be stated in similar terms. The final target for use of secondary fiber in recycled paperboard manufacture has therefore been established as 108 percent of the production of recycled paperboard.

Combined Paperboard Target. As noted above, in determining final targets, the paperboard segment of the industry was divided into its four components. Such treatment addresses separately the types of paperboard which are manufatured primarily from virgin materials (i.e., unbleached kraft, semichemical, and solid bleached paperboard) and that manufactured primarily from recovered materials (i.e., recycled paperboard). Such treatment also identifies the amounts of recovered materials used in 1977, and the amounts which can be used in 1987, for each type of paperboard, relative to the maximum or minimum amounts embodied in the definition of each type.

Although this type of analysis may be more meaningful in terms of a particular paperboard type, it does not address directly the aggregate use of recovered materials by the paperboard industry. Accordingly, DOE has developed, for information purposes, such an aggregated recovered materials utilization target for paperboard. While additions to capacity for solid bleached paperboard offer no opportunities for increased use of recovered materials, additions for other types of paperboard do present such opportunities. The aggregate target for paperboard thus depends on the relative share of the paperboard market accounted for by each type.

Considering, among other things, the supply of old corrugated containers and the limited competition among the types of paperboard, DOE has projected production of each type through 1987 and determined for information purposes, a combined 1987 recovered materials utilization target for the entire paperboard industry. The combined paperboard target is 34 percent.

Construction Paper. Construction paper products, which are used primarily by the building industry, include sheathing paper; felts used for roofing, floor coverings, automobiles, sound deadening, industrial applications, pipe coverings, refrigerators, etc.; asbestos and asbestos-filled paper; and flexible wood-fiber insulation.

With the exception of asbestos and asbestos-filled papers, construction paper products are currently made with secondary fiber, primarily mixed waste papers, old corrugated, and old newsprint. According to industry sources, 1977 use of secondary fiber in manufacturing construction paper was about 55 percent, or 982,000 tons. Because roofing felts account for 86 percent of construction paper production, the analysis focused on roofing felts; the secondary fiber use for roofing felts has then been extended to the entire paper grade.

Because of product requirements, manufacturers of roofing felts use a maximum of approximately 55 percent secondary fiber. Tensile strength and absorbency are key requirements in roofing felts, which are treated with asphalt. Using a medium containing more than 55 percent secondary fiber would reduce both tensile strength and absorbency to unacceptable levels. Fifty-five percent was therefore established as the 1987 secondary fiber utilization rate for construction paper. Because increased use of secondary

fiber, as a percentage of production, in this grade is unlikely due to technical considerations, an analysis of the economic practicality of using secondary fiber is unnecessary.

To project 1987 use of secondary fiber in construction-paper manufacturing, 1987 production of construction paper was projected. The result was 2,156,000 tons. Given 55 percent secondary fiber use in relation to production, the use of secondary fiber in this grade is projected to be 1,186,000 tons in 1987.

DOE's conclusion, that using more than 55 percent secondary fiber in manufacturing roofing felts would reduce strength and absorption to unacceptable levels, was questioned during the comment period. DOE notes that this conclusion is based on information obtained during consultation on the targets and no information has been provided to DOE which would justify any modification.

Insulating and Hard Pressed Board. Insulating and hard pressed board are used primarily by the building industry. Insulating board is a homogeneous wood-fiber panel. Low density, semi-rigid insulating board is used as ceiling tile and acoustical tile. High density, rigid insulating board is used for applications such as exterior sheathing and interior paneling, and as a base for plaster or siding. Hard pressed board, or hardboard, is made from long fiber mechanical pulp, obtained primarily from wood residues. Hardboard is dense (40–90 lb/cu ft) and is used for such applications as cabinet backing and wall paneling.

Insulating and hard pressed board products are not produced on a conventional cylinder board machine and do not in any way resemble paper products. They are generally not made by the manufacturers of paper and paperboard. Waste paper is not used in manufacturing hard pressed board, which is usually made from wood residues or waste wood.

To use waste paper in manufacturing hard pressed board, it would be necessary to develop production technology that could provide the density and strong bonding required for hardboard. Such development is unlikely in the near future, because waste wood is a less expensive raw material than secondary fiber.

Some waste paper is used in manufacturing insulating board; its use is not expected to increase, however, since production of insulating board is not projected to increase. In 1977, about 815,000 tons of secondary fiber were used in the manufacture of insulating board. Because production of insulating board is not expected to increase, the amount of secondary fiber used in manufacturing insulating and hard pressed board is expected to remain constant at 815,000 tons through 1987.

The total production of insulating and hard pressed board is expected to increase from 3,682,000 tons in 1977 to 4,670,000 tons in 1987. Since the use of secondary fiber is expected to remain at 815,000 tons, all devoted to insulating board, the secondary fiber utilization rate for insulating and hard pressed board combined is projected to be 17 percent in 1987.

Some comments questioned DOE's assumption that secondary fiber cannot be used in manufacturing hard pressed board. Hard pressed board must be dense and highly bonded. To DOE's knowledge, no current technology can produce board with these qualities from a secondary fiber. Moreover, hard pressed board is made from waste wood, which is less expensive than secondary fiber.

D. Rubber

Numerous documents on recovered rubber were acquired and studied in the process of establishing recovered materials targets for the rubber industry. A bibliography of these documents is presented in the target support document. Analysis of the available data resulted in selection of Standard Industrial Classification (SIC) codes as the most appropriate industry descriptors for target-setting purposes. On the basis of product characteristics, data availability, recognized industry subsectors and other factors, the industry subdivisions indicated below were selected. The 1987 recovered materials target is shown for each subdivision.

		Target (percent)
SIC 3011—Tires and Inner Tubes		5
SIC 3041—Rubber Hoses and Belting.	Industrial Products	5
SIC 3069—Fabricated Rubber Products.		
SIC 3293—Gaskets, Packing and Sealing Devices.		
SIC 3357—Rubber Wire Insulating.		
SIC 3021—Rubber Footwear		15
SIC 7534—Tire Retreading and Repair shops.		[1] 12

[1] Recovered rubber used in retreads as a percentage of total virgin and recovered rubber used in all tire production.

Because adequate data were not available to generate discrete targets for SIC 3041, SIC 3069, SIC 3293, and SIC 3357, those subsectors were evaluated together under the heading "Industrial Products." Recovered rubber targets are therefore developed for the following four industry subdivisions:

- Tires and Inner Tubes
- Industrial Products
- Rubber Footwear
- Tire Retreading and Repair Shops.

These four subdivisions encompass all portions of the rubber industry which manufacture rubber products. Two other SIC subdivisions, which manufacture rubber as distinct from rubber products, were also considered—SIC 3031, Reclaimed Rubber, and SIC 2822, Synthetic Rubber Production. A target is not established for reclaimed rubber production because that industry uses all scrap in producing raw materials (recovered rubber) for use by industries for which targets have been established. To set a target for SIC 3031 would therefore result in double-counting. In the case of SIC 2822, there is no opportunity to use recovered rubber as a raw material and the product is, for all intents and purposes, a virgin material which could potentially be displaced by the increased use of recovered rubber in the manufacturing of products.

Analysis of the various sources of recovered rubber, and development of rubber material balances (i.e., a disaggregated quantification of the flow of rubber polymer into and out of the industry) for the overall industry and the various subdivisions, were critical to determining the potential for recovered rubber utilization. These analyses are contained in the target support document.

The types of rubber scrap from which rubber polymer may be recovered include "obsolete scrap" (recoverable materials discarded after end use); "prompt industrial scrap" (recoverable materials generated by an industrial process and used as input to a manufacturing operation other than the process that generated it); and "self-generated scrap" (recoverable materials generated by a manufacturing operation and used as input to the same manufacturing operation). Analysis of the literature indicated that there were no available data which indicate that prompt industrial scrap or self-generated scrap is utilized by rubber products manufacturers. However, the initial reports on recovered materials (DOE Form CS–153), submitted by rubber products manufacturers to the Department of Energy, indicate that there is some self-generated and prompt industrial scrap being used at present by the rubber industry. From the information provided on the CS–153's, tire manufacturing is the only industry subdivision which used prompt industrial scrap in 1978. The amount used, however, was only 0.5 percent of the amount of obsolete scrap used.

This level of prompt industrial scrap utilization is too low to have any measurable effect on the targets. Since DOE's methodology utilized in target

generation specifically excludes self-generated scrap from inclusion in the targets, the fact that such scrap is actually used has no impact on the target. Thus, the final recovered rubber utilization targets are based on rubber polymer recovered only from obsolete scrap, as were the proposed targets.

Evaluation of recovered rubber sources indicated that unless a rapid, extensive, and unanticipated growth is exhibited by competing uses for recovered rubber, scrap tires (obsolete scrap) could provide rubber polymer in amounts more than ample to support the recovered rubber targets for 1987. The amount of obsolete scrap in existence, by itself, is therefore not a factor which constrains recovered rubber use to the target levels.

Since the latest available data for most of the industry subdivisions were for 1977, that year is used as the reference case. Analysis of the trends in recovered rubber utilization indicates that reclaimed rubber use has declined significantly in the first half of the 1970's; however, it remained almost constant in 1976 and 1977. Production of retreaded tires, as a percent of new tires, has fluctuated over the last ten years. The utilization of ground crumb rubber (waste rubber ground to small particle size) has increased over the last two years. Tire slitting, an industry which cuts and stamps out new products from the sidewalls and treads of waste tire carcasses, has also grown in recent years.

In assessing technical feasiblity for using recovered rubber, it is clear that the technology exists to process and utilize recovered rubber to replace virgin materials. However, the quality of many products containing recovered rubber often declines as the percentage of recovered rubber utilized increases. This reduction in quality is evident in shorter product life and diminished levels of product performance, reliability, and safety. It is therefore critical to a comprehensive evaluation of realistic technical feasibility that product quality be taken into account. The term technical feasibility is thus defined as that maximum level of recovered rubber which could potentially be included in a given product or mix of products without degrading product quality to unacceptable levels.

Using this definition, the analysis for each industry subdivision resulted in the determination that there are technical limits, determined by product quality and performance requirements, to the levels of recovered rubber which can be used within the rubber products industry. These limits, nevertheless, indicate that more recovered rubber can be used by the industry than was employed during the reference year, 1977. Consequently, increased use of recovered rubber by 1987 is deemed technically feasible for each subdivision for which targets have been established.

In the 1977 Reference Year, the following percentages of natural, synthetic and recovered rubber were utilized by the following three segments of the rubber products industry (tire retreading is addressed separately below):

Industry segment	Natural rubber	Synthetic rubber	Recovered rubber	Total
SIC 3011 Tires etc	29	69	2	100
SIC 3041, SIC 3069, SIC 3292, SIC 3357 Industrial products	14	83	3	100
SIC 3021 Footwear	20	80	0	100
Industry Total*	24	74	2	100

*Does not include tire retreading and repair shops, SIC 7534.

Analysis of available data resulted in the determination that the level of recovered rubber used in *tire and inner tube manufacture* could be increased from 2 percent to approximately 5 percent by 1987. Significantly, the tire manufacturing sector uses nearly two-thirds of the total rubber used. This figure reflects projections of the 1987 tire population in terms of the percentages of each tire category (passenger, truck, etc.) and tire type (radial, bias) in that population, average 1987 tire weights for each category, average 1987 tire rubber polymer content, and the maximum amount of recovered rubber which is technically feasible for incorporation into each tire type and category.

The technically feasible upper limit to recovered rubber use in tire and inner tube manufacture equates with that amount, as defined after discussions with a number of technical experts from the industry, which could be incorporated into a given type/category while assuring that product quality, in terms of safety, durability and performance, would be maintained within the range exhibited by corresponding products in 1977. It should be noted that tire manufacturing industry representatives have stated in their initial report to DOE on 1978 recovered rubber use that projected industry trends indicate a decline in reclaimed rubber use through 1983. However, no quantitative data have been provided which would support revising the technically feasible target levels which were proposed.

For the *industrial products* segment of the rubber industry, it was determined that recovered rubber utilization could be increased from the 1977 level of 3 percent to a technically feasible maximum of 5 percent by 1987. Evaluation of the potential for increasing the level of recovered rubber use within these classifications was complicated by the fact that the potential for such use is closely tied to the type of product being made. This industry segment produces a broad spectrum of products, with each factory producing a different product mix. Many of these products must conform to stringent performance specifications and thus can use little or no recovered rubber. On the other hand, products such as car mats and noncritical hoses can use significant amounts of recovered rubber. The technically feasible target for this industry segment is based on plant-specific as well as industry-wide data, and reflects the determination by industry representatives of the increase in recovered rubber utilization which could be accomplished without compromising the quality of any product class.

The technically feasible *footwear* target for 1987 reflects a recovered rubber utilization level of 15 percent of the total rubber polymer used in that industry segment. As less than 0.1 percent of the rubber polymer used in footwear manufacture in 1977 was recovered rubber polymer, nearly all of this target represents an increase over present utilization levels. Again, the target is based primarily on the statements of some industry representatives about the maximum amount of recovered rubber which could be used without reducing product quality below present levels.

The technically feasible recovered materials utilization targets for 1987 are presented in the following table:

	Industry segment	Natural rubber	Synthetic rubber	Recovered rubber	Total
SIC 3011	Tires, etc	37	58	5	100
SIC 3041, SIC 3069, SIC 3293, SIC 3357	Industrial Products	13	82	5	100
SIC 3021	Footwear	20	65	15	100
	Industry Total*	27	68	5	100

*Does not include tire retreading and repair shops, SIC 7534.

The 1987 projections of the tonnages of natural, synthetic and recovered rubber which reflect these target levels are presented in the target support document, along with detailed descriptions of the assumptions underlying all targets and the methodology used in their generation.

For the tire retreading segment of the rubber industry, the major potential for increase in retreaded tire use exists in the passenger tire category. Currently, nearly all worn truck and bus tires are examined, and about 80 percent are retreaded. It is generally agreed that not much can be done to improve the retreadability rate for these tires. However, passenger retread production is presently operating well below maximum capacity. The 1977 production level of passenger retreads was 33 million. By increasing the current production rate to 90 percent of retread plant capacity, and concomitantly increasing the retreadability rate to its potential maximum level, the technically feasible limit for passenger retread production could be increased to 105 million in 1987. When added to the projected 1987 levels of truck and bus retread production, the maximum feasible retread limit for 1987 becomes 132.2 million.

After determination of technical limits, analyses were conducted to determine whether the technically feasible levels of recovered rubber use would be affected by economic constraints. The conclusion is that for the manufacture of tires, industrial products and footwear, the technical limits defined above are economically feasible. It should be noted that two rubber products manufacturing companies, in reporting to the Department of Energy on their use of recovered rubber in 1978, have stated that economic considerations would prevent the use of reclaimed rubber in their products even if such use were technically feasible. Capital and operating costs are qualitatively indicated as the primary underlying rationale for this statement. However, no quantitative data supporting this contention has been provided. In the absence of such quantitative data, no firm basis exists for revising the technically achievable industry-wide targets presented above.

In conducting the economic analyses, factors such as the costs of collecting, transporting and processing recovered rubber were considered. Various assumptions were made with respect to each industry analyzed. These assumptions are detailed in the target support document. It is noted in that document that rubber product manufacturers apparently often prefer higher cost synthetic rubber polymer to recovered rubber, even within the technically feasible limits defined by the analysis. Possible explanations have been explored. For example, regardless of the cost advantage to using larger amounts of recovered rubber, an individual tire manufacturer is unlikely to risk making any changes in the product that might conceivably lower its performance qualities, due to the highly competitive nature of the national and international market. While such considerations fall within the realm of economic feasibility determination, data are not available which can document in a quantitative manner the market impacts of decisions to use more recovered rubber. Therefore, the technically feasible targets for these industries were deemed to be economically feasible as well. Institutional considerations, such as the Uniform Tire Grading Program, were also explored. Such factors could affect the proclivity of tire manufacturers to use recovered materials; however, there is again no concrete data to support a lower target value.

Unlike the three industry segments discussed above, in the case of *tire retreading*, information analyzed results in the conclusion that economic and institutional factors are the primary constraints to the increased use of retreaded passenger tires. Specifically, the major economic factors include the excessively high transportation costs associated with the collection of discarded tire carcasses, and the disposal costs of the unretreadable casings. Generally, small retailers and those in more remote areas are necessarily bypassed by the retread industry, even though their inventories of scrap tires are expected to contain about 35 percent retreadable casings. In order to recoup costs involved in the collection of these tires, the price that could be demanded for the finished product would have to be raised above its competitive level. The incentives for more thorough scrap tire collection and inspection are therefore negated by the relationship of transportation costs to finished product value.

Based on current information, it has been estimated that about 60 percent of the scrap passenger tires potentially retreadable can be economically inspected for retreading. If a policy promoting tire retreading were adopted, then it could become economically feasible to both inspect and retread a higher percentage of scrap tires.

The primary institutional factors constraining increased use of retreads are the negative consumer opinions regarding retreaded tires. Misconceptions which many consumers have regarding the desirability of retreads have led, to some extent, to consumer preference for low priced new tires over retreads.

Based on the above, as well as other considerations detailed in the support document, the retreading target for 1987 is projected to be 12.1 percent, which is an increase from the 1977 level of 8.6 percent. This retreading target is defined differently than the other recovered materials targets. While other targets are stated in terms of recovered material use as a percentage of total material input or total production within an industry subdivision, the retreading target is stated in terms of retreads as a percentage of total annual tire production. It is felt by DOE that this definition more accurately reflects recovered rubber utilization projections in overall tire production. Details and specific terminology are provided in the support document.

Finally, an evaluation of alternative uses for recovered rubber (other than recovery and use within the rubber products industry) was undertaken. It indicated that many uses do exist. Examples of such uses include road

paving and repairing, direct combustion, pyrolysis, artificial fishing reef construction, and athletic field surfacing. However, projections of the expected growth in such uses indicate that, unless an unexpected boom occurs in one or more of these applications, ample scrap rubber will continue to be available to support the 1987 recovered rubber targets.

There are several key areas relative to this evaluation where data are scarce, nonexistent, or contradictory. Unlike some other industries that have been involved in recovered materials utilization research for a number of years, the rubber industry is just beginning to evaluate the ultimate potential for increased recovered rubber utilization. A large portion of the technical data necessary to make such an evaluation has not been developed. Most rubber recovery efforts are still in the experimental stages and little information is available concerning the capabilities for recovery and use of waste rubber; however, new developments could change rubber recovery utilization prospects for the future. For example, a critical uncertainty relates to the performance characteristics of products manufactured with varying amounts of recovered rubber. Quantitative test results which address the relationship between product quality and recovered materials content are not available. This lack of quantitative information on rubber product degradation, as a function of the amount of recovered rubber included, represents a critical information gap which must be filled. Further efforts by industry, government, and trade organizations seem appropriate to perform the research necessary to establish soundly-based recovered rubber performance standards and to increase data bases. The results of programs to identify quality, performance, appearance, and safety factors could significantly influence the target levels for the recovery and reuse of waste rubber.

With respect to recovered materials targets proposed for the rubber industry, comments were provided by two respondents. One respondent is a major manufacturer of tires, as well as an operator of tire recapping facilities. This manufacturer stated a belief that the program of reporting and setting targets for recovered materials is counterproductive, and that meeting the targets proposed for the industry would have negative societal impacts. Its basic argument is that any increase in the amount of reclaimed rubber used in producing tires will result in unacceptable decreases in tire performance, safety characteristics and other standards. It was stated, for example, that use of 5 percent reclaim in premium passenger and truck tires will result in excessive reduction in tread wear, thus reducing service life and defeating the purposes of recycling. Similar arguments were advanced with respect to a number of tire types. It was also stated that a quality reduction due to use of reclaim would make domestic tire manufacturers less competitive with foreign manufacturers, jeopardize compliance with Department of Transportation requirements and increase fuel consumption. It was suggested by this respondent that DOE should concentrate on improving the retreadability of original tire carcasses. DOE believes this commenter may express the concerns of many producers and consumers about the quality of products using recovered rubber.

The second commenter on the proposed rubber industry targets expressed agreement with DOE's conclusions, stating its belief that the levels proposed are technologically feasible.

In establishing the proposed targets for the rubber industry, DOE pointed out that excessively increasing the use of recovered rubber generally has an adverse impact on product quality. In a product such as tires, the extent of this impact is critical, particularly when safety considerations are involved. Nevertheless, as pointed out by DOE in its supporting documentation of June 8, 1979, the relationships among recovered rubber use and important product characteristics have not been sufficiently quantified. DOE feels, however, that taking steps to delineate such relationships should precede other actions to increase use of recovered rubber as a replacement for virgin materials in rubber products. DOE also believes that the energy ramifications of using waste rubber for various purposes should be investigated. Those actions which would increase uses which are energy-conservative and do not adversely affect product quality should be pursued.

While one of the comments received expressed serious concern about product quality, no specific information was provided which would enable DOE to better quantify the impact of recovered rubber use on product performance. Since there seems to be general agreement that this is the constraining influence on recovered materials use, DOE has no basis at this time for concluding that rubber industry target levels other than those proposed are more appropriate. Therefore, the proposed targets are adopted.

E. Metals and Metal Products

Materials recovery targets are established for five major subdivisions of the metals and metal products industry. These subdivisions were selected based on their ability to utilize the metallic recovered materials included in NECPA Section 461. The subdivisions, together with their respective targets and reference year (1976) recovered materials utilization levels, are:

[In percent]

	1987 target	1976 levels
● Ferrous metals	41	38
● Aluminum	35	30
● Copper	50	47
● Zinc	36	33
● Lead	60	51

The targets were developed by determining, from the best available information, the amount of recovererd materials used in the reference year and the maximum feasible increase in the use of such materials by the year 1987. The analysis included technical and economic factors which affect recycling in each subdivision, as well as other special considerations related to recycling but not strictly technological or economic.

Because of the voluntary nature of these targets, the level of utilization of recovered materials will primarily be determined by economics. Thus, a key feature of the approach is the use of econometric modeling techniques to estimate the targets for recovered materials for 1987. The modeling used 1976 as base year. The technical/economic analysis considered such factors as capacity growth, impurity specifications, and other factors that would affect the demand for recoverable materials. On the supply side, the price responsiveness of the supply was evaluated in order to arrive at draft targets for these recoverable materials. The sensitivity of the targets to variations in key variables was also evaluated.

Consideration of technical factors included the identification of technical constraints to recovered materials use. These constraints were dealt with as either process constraints (i.e. process factors that limit recycling), product quality constraints (i.e. industry specifications for materials), or recovered material quality constraints (i.e. chemical and physical properties required of recovered material as input to a process).

Economic considerations were addressed in different levels of detail among the five industry subsectors. Relatively more sophisticated analyses were conducted on the more energy-consumptive sectors. Most of the effort in econometric modeling was focused on the ferrous industry which, as defined in this study, accounts for approximately 83 percent of the energy consumed in SIC 33. Econometric techniques were also used to estimate the supply of recoverable materials in 1987 for aluminum (11 percent of SIC 33 energy) and for copper (3 percent of SIC 33 energy). For the lead and zinc sectors, each of which uses less than 1 percent of the SIC 33 energy, targets were developed using historical data and published forecasts of the future of the industries.

Since the amount of prompt industrial scrap generated is a function of technological factors in the metal-producing and metal-fabricating industries and is totally price inelastic in both the short and long run, the problem of recycling can best be addressed by considering the market for obsolete scrap, which is the output of past production. During any given period, the market clears at some level of scrap delivery and price. This price-quantity combination will be determined primarily by the steepness of the supply and demand curves (i.e., their degree of price responsiveness or elasticity), by the length of the market period being considered, ("short-run" curves may well be different from "long-run" curves), and by exogenous factors such as levels of economic activity that move the two curves around.

Subject areas included under special considerations were the impact of such things as EPA and OSHA regulations on the industry's ability to increase its use of recovered materials.

The primary metals industries (i.e., those that supply metals mainly by extracting them from virgin raw materials or ores) and the secondary metals industries (i.e., those that mainly supply scrap and/or refined metals from scrap) differ from each other in many important respects, although their products are usually perfect substitutes for each other.

The primary industry relies on the exploitation of mineral deposits where a given metal is concentrated as a result of various types of geological activity. A mineral deposit is called an "ore" only if it can be exploited economically. That is, the difference between an ore deposit and a resource is that an ore deposit can be exploited economically under a given set of market conditions, whereas a resource has to wait for different market conditions before it can be exploited. Ore grade (the concentration of metal in the ore) and ore tonnage generally follow a log-normal distribution. Thus, the quality of ore available for exploitation (ore reserves) will increase with rising prices. In the past, the richest deposits have been exploited first and, as the cost of extraction and processing decreased because of advances in technology, lower and lower grade deposits have been exploited. In this century, the reduction in the costs of extraction and processing through technological change has usually kept pace with ore grade degradation, so the real price of many metals has either remained constant or has declined somewhat. Many metallic ore deposits contain valuable by-products such as gold, silver or molybdenum, which increase the economic value of the ore. Alternately, some ore deposits contain associated impurities, which require more complicated processing and decrease the value of the ore. Transportation costs are important in the primary metals industry; plants are usually located near the ore deposits in order to minimize transportation costs for raw materials, or in areas which are nodes in existing transportation networks, or in areas that offer other benefits, such as low-cost energy.

The secondary metal industry is scrap-based and tends to locate near the source of its raw materials, which is typically near large urban centers. On an aggregate level, the raw materials used by the secondary industries can be classified into three groups: home scrap, prompt industrial scrap, and obsolete scrap. Home scrap, also referred to as runaround, is generated internally within a plant, usually because of downstream fabricating operations within the same plant or corporation. Home scrap, obviously compatible in composition, is used within the corporation. Prompt industrial scrap, also referred to as new scrap, generated as a result of manufacturing operations, is sold by the generator to a scrap dealer such as a scrap broker, a scrap collector, or a scrap reprocessor (which could include segments of the primary industry). Thus, home scrap and prompt industrial scrap are generated and used in identical fashion and are differentiated only by the absence or presence of a transaction. The quantity of home scrap generated in a particular industry reflects the technology of the industry, the presence or absence of vertical integration in the industry, and the geographical distribution of the plants belonging to a single corporation. Statistical data on home scrap generation and consumption are available for only a few industries; data on prompt industrial scrap are generally better. The two categories are not clear and distinct, however. Essentially all the home and prompt industrial scrap is utilized directly. The supply of this scrap depends on the overall level of industrial activity in the manufacturing sector that generates the scrap, and it is quite price inelastic. Improvements in manufacturing technology have generally tended to reduce the availability of such scrap. Also, it is important to note that even more energy is saved when less home and prompt industrial scrap is generated than when this scrap is recycled.

The third category of scrap, recovered from materials that have reached the end of their useful life and/or have been discarded, is obsolete scrap. This category of scrap is distinct from the other two categories in many ways. Because home and prompt industrial scrap are generated in specific locations and in predictable quantities, they have been reliable sources of scrap to the scrap dealers/collectors, in the same fashion that ore deposits are a reliable source of raw materials to the primary industry. This is not the case with obsolete scrap, which is also referred to as old scrap.

The generation of obsolete scrap is usually very diffuse. It is often collected as a part of industrial or municipal waste collection operations. Whether this obsolete scrap is recycled or is lost to a landfill/waste dump depends a great deal on the mode of collection (e.g., source segregation vs. a single collection of mixed wastes), the prevailing economic conditions in the scrap market, and the existing infrastructure for handling scrap. This infrastructure is composed of scrap preprocessors, and upgraders, who can be distinct and separate from those who melt the scrap. Because obsolete scrap is traded, it is often mixed with prompt industrial scrap at the preprocessing stage, and available statistics do not always distinguish between the two categories. The supply of obsolete scrap is somewhat more price elastic than for the other two categories. Besides source segregation, the technology for waste processing, transportation costs, and alternative disposal costs (e.g., landfill costs) are all important factors in obsolete scrap supply.

Because of the diversity of the industry sectors, the differences in the quality of data available among the industries, and other factors, the target development procedure for each sector is unique and will be discussed

separately as part of this statement of basis and justification.

Ferrous. In developing a single target for the ferrous sector, the sector was further subdivided into the following:

- Iron and Steel
- Ferrous Foundries
- Ferroalloys

The sources of ferrous scrap which can be utilized by each of the three ferrous groups were identified. Ferrous scrap, mill scale, dust and sludge, and slag were considered recoverable in the manufacture of iron and steel. Scrap steel in the form of carbon steel, stainless steel, other alloys, and cast iron (including that from the ferrous fraction of municipal solid waste) was determined to be the only potential source for ferrous foundry recovery. Dusts and sludges are not expected to be recyclable by foundries for their ferrous content by 1987, due primarily to their low iron content and the presence of impurities. Neither cupola slag nor electric furnace slag was determined to be a potential source of iron units for foundries by 1987 because of technical and economic factors. (It should be noted, however, that part of this slag is recovered as ballast for road construction.) Only purchased ferrous scrap and electric arc furnace slag produced in ferromanganese production were determined to be sources of recovered materials for ferroalloys production through 1987.

Each of the three industry subgroups was analyzed by process, to simplify the analysis since relatively few of the industry unit operations are capable of processing recovered materials. In the case of steel making, recovered materials can enter the production sequence at three points:

- Sinter strand.
- Blast furnace.
- Steelmaking furnace.

The ferrous foundry sector was segregated into two well-defined segments:

- Iron Foundries.
- Steel foundries.

This breakdown was chosen because the steel foundries are virtually 100 percent scrap based, whereas the iron foundries consume moderate amounts of pig iron as well as scrap. Further, the Bureau of Mines publishes scrap data separately for these two sectors.

The ferroalloy sector was divided according to the type of ferroalloy produced—ferrochromium, ferromanganese, silicomanganese, and ferrosilicon.

Next, technical factors related to the ability to use recovered materials were considered. By far, the most significant technical factor in the context of increasing the use of recovered materials is the capability of the Basic Oxygen Furnace (BOF) to utilize scrap. Because the BOF does not rely on external sources of energy, the quantity of scrap it can process is limited by the amount of energy available for melting. In current practice, BOF's are operated with 20–30 percent scrap in the charge. Unlike the open hearth and electric arc furnaces, the BOF uses scrap not only as a source of iron but also as a coolant for controlling process temperatures. Consequently, the proportion of scrap used cannot be arbitrarily changed without adjusting other variables to maintain the thermal balance. Alternate means of increasing scrap use include:

- Reducing heat losses of the process.
- Adding external fuel to the process.
- Raising the temperature of the process reactants.

Of these alternatives, retrofitting for scrap preheating is considered the most practical. However, this slows down production, and its economics depend on the prices of scrap and energy as well as on other, site specific, factors. The extent to which scrap preheating is adopted in the future is thus dependent on the future availability and prices of ferrous scrap and of energy.

Economic factors were then considered in developing the target. Whether the utilization of recovered materials by the ferrous industry can be increased by 1987 depends on the demand and supply dynamics of the ferrous scrap market.

On the demand side, the amount of scrap that can be utilized is largely constrained by the proportion of steelmaking furnace types in the industry. In 1976, the electric furnace accounted for 19 percent of raw steel production, using almost entirely scrap. The BOF accounted for 62 percent of 1976 raw steel output. The normal scrap charge mix in the BOF is 28 percent, with economic penalties usually associated with deviations from this ratio, dependent on plant-specific factors. The open hearth furnace, which accounts for the remaining steel production, is more flexible with regard to the charge mix. The scrap ratio in the charge can be easily changed in response to, for example, scrap price. The open hearth furnaces are rapidly being phased out, however, and being replaced in some cases by BOF's, which have a smaller scrap use potential, and in some cases by electric furnaces which are capable of using 100 percent scrap. So on the demand side the mix of furnace types in existence in the industry in 1987 is a major determinant of the ability of the industry to use recovered materials at that time.

The recovered materials supply consists of prompt industrial scrap generated by current industrial activity and reused almost immediately, and obsolete scrap extracted from discarded ferrous products. The amount of prompt industrial scrap generated is a function of technological factors in the steelmaking and steel consuming industries and is totally price-inelastic in both the short and long run. In principle, scrap price change will have both short-run and long-run effects on obsolete scrap supply. The amount of obsolete scrap used is a function of price. The short-run effect is that higher scrap prices will result in attention to previously uneconomic scrap sources. The long-run effect is, in practice, not significant.

DOE used a model of the ferrous scrap market that incorporates both engineering and economic parameters, in an effort to depict realistically the technological and economic factors that characterize the demand and supply dynamics. The model organizes extensive technical information concerning the market into a flexible framework that can be used to test the economic viability of increased use of recovered materials. A complete description of the model is contained in the target support document.

The information incorporated into the model includes details on the process characteristics of scrap-using and scrap-generating activities, the inventory of obsolete scrap and the price elasticity of obsolete scrap supply.

Several additional factors which are not strictly technical or economic, but which play a part in recovered materials use in the ferrous industry, were considered. These special considerations included:

- Variable use of scrap in BOF's.
- The trend toward continuous casting.
- Scrap substitutes.

With regard to the use of scrap in BOF's the approach taken in this investigation was that, although it is possible to change the BOF scrap demand coefficient, it is not likely that the ratio will change significantly by 1987. Thus, the BOF scrap coefficient has been estimated for 1987 to be identical to the current value.

Continuous casting (i.e., the converting of molten steel directly into billets, blooms, or slabs without the intermediate step of ingot casting) has been projected for target-setting purposes at 25 percent of industry capacity in 1987, approximately double the 1976 level.

Iron oxides (ore, mill scale, etc.) and directly reduced iron (iron coverted from

iron ore without the need for a blast furnace) can be partially substituted for ferrous scrap in steelmaking furnaces. The potential exists for substantial quantitites of ferrous scrap to be displaced by these substitutes, particularly directly reduced iron. Total production of directly reduced iron in the U.S. is not expected to exceed a few million tons by 1987, however. Accordingly, the target analysis includes the consumption of 2 million short tons of directly reduced iron in 1987.

Other key assumptions believed by DOE to be the most likely developments and used in the establishment of the ferrous target include the following:

- Raw steel production and finished steel consumption were projected to grow at a 2 percent annual rate.
- Only five percent of raw steel was assumed to be produced in open hearth furnaces in 1987.
- The decrease in open hearth production after 1976 was apportioned between BOF's and electric furnaces on the basis of hot metal displaced.
- The growth in raw steel production was split equally between BOF's and electric furnaces.
- Scrap exports in 1987 will be 10 million tons.

Based on the assumptions discussed above, the bases of which are outlined in the target support document, and the econometric analysis of the ferrous scrap market, the maximum feasible level of recovered materials use in the ferrous metals industry was determined to be 41 percent in 1987.

Two comments received on the ferrous metals target questioned the assumption that all new steelmaking capacity through 1987 will be divided equally between BOF's and electric arc (EA) furnaces. DOE stated in the target support document for the proposed target that the mix of steelmaking furnaces is a very important variable in determining the 1987 level of iron and steel recycling and that any projection of the mix out to 1987 would be uncertain. Thus, in the target support document the sensitivity of the target to the steelmaking furnace mix is considered. Only two ratios were considered, however, in the proposed support document: 1:1 and 2:1 BOF to EA. The 1:1 ratio was selected for the base case as proposed. DOE still recognizes the uncertainty associated with estimating such a ratio. However, no information was provided DOE during the comment period which would support any alternative to the 1:1 ratio, and that ratio is used for the final targets.

One commenter expressed doubt that the additional electricity needed for electric melting to achieve the proposed target would be available by 1987. Cutbacks in construction of new generation facilities was given as the basis for the doubt. DOE has no reason to believe, at this time, that sufficient generating capacity will not exist in 1987. If for any reason it does not, then the industry mix of new BOF to new EA capacity may not be 1:1 as projected.

Two commenters questioned the validity of the assumption that the steel industry growth rate between 1976 and 1987 will be two percent per year and stated that to the extent that the growth rate is less than two percent there will be much less opportunity to increase the use of scrap. DOE recognizes the importance of the industry growth rate on the target value. The proposed support document included an analysis of a scenario in which the growth rate for finished steel production was 1.6 percent per year. The result of that analysis indicated that the maximum feasible target in that lower growth scenario would be 40.9 percent as compared to 41.3 percent at the two percent growth rate. Both figures round off to 41 percent. Since DOE is aware of no information which would better support a growth rate projection of other than 2 percent, and since the most recent forecast of the Department of Commerce is 2 percent, that growth rate is used in the final target.

Two commenters suggested that DOE study further the energy implications of using increased amounts of scrap in the manufacture of iron and steel. The commenters were particularly concerned with the possibility that the increased use of scrap could result in increased consumption of oil and natural gas while reducing the consumption of coal. DOE believes that the type of fuel saved is a vitally important consideration, along with the quantities saved. DOE has considered the information provided during the comment period, as well as additional information. While the energy impact of the targets is of great concern, it is not felt that the information provided to date warrants modification of the ferrous target. DOE intends to thoroughly investigate the energy relationships associated with increased recovered materials use. The targets established by this rule, however, are believed by DOE to be the maximum feasible based on the best available information, as required by the NECPA.

One commenter stated a belief that the ferrous target as proposed promotes steel production in a manner which results in higher costs than would otherwise be the case, and thus contributes to inflation. DOE reviewed the material provided and found it to be based on certain assumptions which are not well supported. As indicated above, a consideration of the potential inflationary impact was included in the methodology for setting the targets. Underlying the inflationary impact argument is the implication that decisions would be made which are contrary to economic feasibility because of the targets. The targets are considered by DOE to be economically feasible based on current information.

Several commenters believed that sufficient scrap will not be available to meet the proposed target in the ferrous sector without export controls on ferrous scrap. One commenter stated a belief that any program designed to stimulate increased use of scrap will be self-defeating if the U.S. does not limit exports of ferrous scrap. DOE recognizes that exports of scrap impact the price and availability of scrap for domestic markets. The proposed target reflects the assumption that ferrous scrap exports between 1976 and 1987 will not be controlled. Scrap exports were considered as a major factor in the proposed ferrous target. The econometric model supporting the target included scrap exports in determining obsolete scrap supply quantities through 1987. The value used for scrap exports in the target year was ten million tons. This projection is still considered by DOE to represent the best information on the scrap export levels for the target year, and was supported by testimony at the public hearing. The final support document shows the effects of alternative levels of scrap exports on the target. In the long run, scrap exports can alter the process mix in the iron and steel industry as well as the scrap demand coefficients for the steelmaking process and ferrous foundries. These indirect impacts of scrap exports on the long rang structure of the industry were not considered in setting the target; to the extent that they become significant in the future DOE will consider modifying the target.

Three commenters questioned the value used by DOE for the price-elasticity of supply of scrap. One merely stressed the uncertainty of any estimate. Two disagreed with the value used by DOE and cited studies by others which used a value of elasticity different from that used by DOE. The various studies cited in testimony were reviewed by DOE during development of the proposed target and the reasons for rejecting them are clearly stated in the proposed and final target support documents. One study did not

incorporate the price elasticity of supply into the model. Another included no values for scrap inventory. DOE believes that the value used in this target setting effort is the best estimate, for the reasons stated in the target support document. One of the commenters believed the price-elasticity to be incorrect because it failed to consider the impact of foreign demand on the availability of scrap for domestic use. The commenter provided, in support of the position, a recent analysis which claimed to support a finding that the foreign component of demand for U.S. ferrous scrap is a far more powerful determinant of U.S. price levels than domestic demand. The model used by DOE to support the proposed targets considered the total demand for scrap as a single endogenous variable. One component of that demand was based on scrap exports. It is not felt to be necessary to disaggregate the demand variable into the two components of domestic and foreign demand if both are contained in the demand model. The analysis provided by the commenter showed that the relative weight of foreign demand to domestic demand remains virtually unchanged over time, which further supports combined treatment. The same commenter suggested also that, since prompt industrial scrap tends to be priced with obsolete scrap in the market, the impact of exports will be even broader than a change in the price-elasticity of supply of obsolete scrap might indicate.

One commenter criticized the methadology used by DOE to develop the ferrous target because it did not consider future changes in the manner in which steel will be made. In particular, it was recommended that DOE evaluate more closely the potential of scrap preheating and the Q–BOP process to increase the ratio of scrap to the total charge of raw materials in steelmaking.

DOE has conducted further analysis with regard to the potential of scrap preheating and determined that it will not increase the 1987 target. The final support document includes an economic analysis of scrap preheating. DOE has also looked more closely at the Q–BOP process, as suggested and determined that actual operating experience has not confirmed the expectations of the process developers for increased scrap ratios. In fact, the scrap consumption in the Q–BOP has been reported to be one to two percent less than the BOF.

The same commenter suggests that the maximum feasible target for ferrous scrap use must be based on values for recycling ratios of each steelmaking furnace type which are at least as high as any achieved in the past. The use of a 28 percent scrap-to-total-charge ratio in the BOF was specifically questioned. DOE believes the assumption that a certain scrap ratio will be feasible in the future, based solely on the fact that it was feasible at some time in the past, is not consistent with the requirement in Section 374A of the EPCA that DOE consider, in the target setting effort, the economic ability of the industry to increase its use of recovered materials. With regard to use of the 28 percent ratio, DOE recognizes that it is possible to operate BOF's with more than 28 percent scrap and that some BOF's, are, in fact using more than 28 percent scrap. The ability to use more scrap in the BOF is dependent on many variables, including the type of operations which the BOF supports (e.g., ingot or continuous casting). DOE is not convinced that the scrap charge to BOF's can increase significantly by 1987 as the industry moves more toward continuous casting, which requires hotter steel and therefore can tolerate less scrap unless the scrap is preheated (see discussion of scrap preheating above). With respect to energy consumption, continuous casting requires significantly less energy than ingot casting with subsequent billet and slab production.

One commenter criticized DOE for not attempting to reconcile the differences between the two major sources of information on obsolete ferrous scrap supply, one of which was a study commissioned by the commenter. After examining all available information on obsolete scrap supply prior to proposing targets, DOE determined that neither study cited by this commenter was appropriate to this task. The basis for this determination is set forth in both the proposed and final target support documents.

The use of 1976 data was questioned by one commenter who suggested that more recent data was ignored by DOE. In proposing targets, DOE endeavored to use the most recent available information which was complete. If information for a year was not complete with respect to the industry or an industry sector, DOE selected a previous year. Since the comment period, DOE has reviewed the most recent data and found no additional information on which to base a change in the ferrous target.

One commenter believed that the base case ratio of electric arc to BOF's was too high and thus the target based on the increase in electric furnace share of production by 1987 is understated. DOE has reviewed the information on this subject provided by various commenters, and concludes that the base case ratio used by DOE is correct. It should be noted that the reference year used by DOE for this target is 1976, and the ratio has changed since that time. The target, however, relates to the reference year rather than the current year.

Two commenters suggested that the ferrous target be increased to at least 50 percent but provided no information on which to base such an increase. It is clear that such an increase could be forecast only by hypothesizing modifications to conditions which affect industry decisions—modifications which DOE believes are not likely to occur. Such recycling ratios as recommended by the commenters may indeed be technologically feasible. DOE is, however, required to consider the economic ability of the industry to increase its recovered materials use. This issue is addressed in detail under Public Comments, above.

After consideration of all public comment on the target, DOE determined that no additional information had been provided which could justify a modification to the proposed target.

Aluminum. The sources of recovered material identified for the aluminum sector were purchased new scrap and old scrap (i.e., prompt industrial and obsolete). The principal marginal source of recoverable material is old scrap, availability of which could increase between now and 1987. The three major categories of old scrap where an increase is possible are: aluminum recovered via source segregation of beverage cans and other aluminum items; aluminum recovered from municipal solid wastes in resource recovery systems; and mixed scrap recovered from automobile shredding. Aluminum from non-bauxite sources of recovered materials was considered but rejected because the technology for recovering aluminum from these sources is not likely to be commercial by 1987.

The following process subdivisions were considered in deriving the target for aluminum:

- Primary producers.
- Secondary smelters.
- Independent fabricators.
- Aluminum foundries.
- Chemical producers.

Aluminum-based scrap is usually recycled by melting in gas or oil-fired reverberatory furnaces, crucible furnaces, and induction furnaces. There are no process technology constraints concerning the amount of scrap (percentage scrap in charge) that can be melted in each of these furnaces,

although the different types of furnaces do provide different melting capacities.

The recycling furnaces are best suited for melting (as distinct from refining) and adequate scrap preparation is required to minimize contamination of the melt with impurities from the scrap.

Suitable technology is needed to separate aluminum from the non-magnetic fraction of shredded automobiles and from the non-ferrous fraction obtained in the treatment of municipal refuse. Techniques in various stages of development include water elutriation, heavy media separation, eddy current, etc.

The principal refining step in the recycling of aluminum-based scrap is the removal of magnesium by treating the molten metal with chlorine or aluminum. The metal produced from the scrap has to meet a product specification. With the exception of magnesium removal, impurity levels are reduced by dilution with primary aluminum, and other alloying elements are added to attain the desired composition. Even well-segregated aluminum scrap is often contaminated with other metals, many of which can be considered impurities. Stainless steel is particularly troublesome because, unlike common steel, it cannot be separated from scrap magnetically, it is difficult to detect visually and it dissolves in aluminum more readily than common steel. Free zinc is present in some borings, in jar covers, and as die castings. Magnesium, whether free or alloyed, is usually disadvantageous, since the principal alloys produced from scrap are permanent mold and die casting alloys which contain little magnesium (usually less than 0.1 percent). Since about 85 percent of the recoverable material available to a smelter consists of mill products (high in magnesium content) the molten metal contains 0.5–0.8 percent magnesium, and has to be brought back into specification by demagging. Demagging is not required, however, for deoxidizer material (used in the steel industry) since magnesium is not critical.

Non-metallic contaminants in aluminum scrap, such as paint, oil, plastic, insulation, and rubber, are a major source of air pollution. In developing the target the analysis considered supply and demand in both physical and economic terms.

The physical aspect of scrap demand concerns the process limitations on the amount of scrap that can be utilized. In the aluminum industry, unlike steel, there are no relevant physical demand constraints imposed by technology. The economic aspects of scrap demand relate to the price of scrap. The price of scrap is driven to a large extent by demand rather than by supply.

DOE used an aluminum scrap economic model to calculate the aluminum target. The equations and details of the model are provided in the target support document. The model predicts the volume of scrap that will be available for recycling from different sources, based on forecasts for exogenous variables used in the model. The assumptions which DOE feels best project the industry parameters to 1987, and on which the aluminum target is therefore based, include the following:

- 5 percent annual industry growth rate.
- Price of scrap remains constant in real terms (1967 $).
- Can reclamation rate increased to 40 percent.
- Aluminum reclaimed per can decreases 27 percent.
- Aluminum can production increased from 20.1 billion in 1976 to 38.5 billion in 1987.
- In 1987 the U.S. will produce about 85 percent of its primary aluminum demand.
- Aluminum recovery from municipal solid waste in 1987 will be 100 million pounds.
- The aluminum scrap inventory in 1987 will be 43.1 billion pounds.
- Eleven million cans will be scrapped in 1987; 80 percent of these, or 8.8 million vehicles, will be processed adding 334 million pounds of aluminum to scrap supply.
- Scrap exports in 1987 will be 200 million pounds.

Based on the above assumptions, the bases for which are outlined in the target support document, and its use of the model, DOE calculated the maximum feasible level of recovered materials utilization to be 35 percent in 1987 for aluminum.

One commenter on the aluminum target referenced statistics which predict that by 1987 (1) the aluminum industry will double its total production; and (2) secondary aluminum producers will at least double their production. It was charged that DOE failed to consider the estimates and that the resulting target is, therefore, too low. All targets, however, are stated in terms of ratios of recovered materials used to total production. Hence, if both recovered materials use *and* total production double during any interval, the ratio remains unchanged. The target established by DOE for aluminum reflects a substantial increase in recovered materials use relative to total production.

One commenter emphasized the sensitivity of the aluminum target to the amount of aluminum in automobiles, stating that even with large increases in the amount of aluminum in automobiles (as anticipated) substantial increases in recycled aluminum from this source will not take place until some time after 1987. The aluminum target reflects the finding that the use of aluminum in automobiles has been increasing for some time, from about 50 pounds per automobile in 1978. It is projected that 8.8 million vehicles will be scrapped and processed in 1987. The trend will likely continue beyond the target period, but the 1987 target reflects the increases in aluminum use which have already been realized, and does not depend entirely on recovery of aluminum from automobiles yet to be produced.

An error in the recovered materials use figures for aluminum in the reference year was noted by one commenter. DOE has rectified the error.

Copper. Recoverable materials in the copper industry may come from a variety of solid waste, including the following categories of scrap:

- Number 1 wire and heavy copper (99% copper).
- Number 2 wire, mixed light and heavy scrap (92–96 percent copper).
- Brass and bronze scrap (from red brass containing 82.5 percent copper to bronze with 57.5 percent copper).
- Other alloyed copper scrap (e.g., cartridge cases, auto radiators, railroad car boxes).
- Low grade scrap (e.g., armatures from electric motors).

The industry consists of the following four groupings:

- Primary producers (smelters).
- Secondary smelters.
- Brass mills.
- Foundries.

Brass mills are the largest consumers of purchased copper scrap.

With regard to technical constraints to recovered materials use, secondary smelters can be further divided into two categories—those which can smelt and refine and those which are essentially remelters and refiners and have no smelting capability. Those that can smelt and refine are 100 percent scrap based and have practically no process constraints in processing copper scrap. Those without the smelting capability can process only high grade scrap.

Primary smelters can, in principle, melt any grade of scrap. The smelting furnaces are designed, however, for handling finely-powdered concentrates and not heavy, bulky scrap. It is not likely that the furnaces will be altered for the feeding of substantial quantities of heavy scrap in the near term.

Brass mills, because they usually have only melting facilities, purchase clean

and well-sorted scrap and do not recover and low-grade scrap or residues. This is true also for foundries, except that some lower grade scrap with well-known composition may be used.

Using existing econometric models of the copper industry and projected primary refined copper production as detailed in the target support document, DOE developed a target for the copper industry. The increase in the recoverable copper reservoir was calculated using an observable average lag of approximately 20 years between the use of copper in capital equipment and its release through scrapping.

Using the price, production output and recoverable copper reservoir growth projections through 1987, shown in Table 2 below, the maximum feasible copper recovery level was projected to be 50 percent in 1987.

Table 2

Primary Refined Output	21.5%
Scrap Price	17.0%
Recoverable Reservoir	34.0%

With regard to the target for the copper sector, one commenter believes there is a paradox in that the sensitivity analysis of the target shows that, given certain circumstances, there may be no increase in recovery of obsolete copper scrap by 1987. DOE notes that the estimated potential for copper recovery in 1987 is subject to a number of uncertainties. The support document shows that the target is sensitive also to factors which could result in greater use of recovered materials by 1987 than that proposed.

Two commenters questioned the inclusion of mine wastes recovery in the copper target, since mining is not part of the "metals and metal products industry" referred to in the NECPA. DOE believes that, since the targets address the use of recovered materials, it is appropriate to consider recovered materials *used* by the "metals and metal products" industry regardless of whether they were generated by the industry. Substantial amounts of metals are recovered from manufacturing industries other than SIC 33, as well as from sectors of the economy other than the manufacturing sector (e.g., mining, construction). To ignore these sources of recovered materials would, DOE believes, be contrary to the NECPA.

One commenter stated his belief that the recycling ratio given for copper in the reference year was inflated due to the inclusion of self-generated scrap. DOE did not include self-generated scrap in the reference year for any industry.

Zinc. The zinc industry recovers zinc (and zinc oxide) from a broad spectrum of home, prompt industrial, and obsolete scrap. Zinc can also be recovered from steelmaking dusts, although this process is not practiced on any significant scale in this county. As with other metals, obsolete scrap represents a principal marginal source of recoverable material.

The new zinc scraps are almost always recycled at present. For example, the zinc supplier to a galvanizer generally contracts to buy back all zinc-containing residues. The galvanizer residues repurchased under these agreements includes drosses, skimming, ashes, and sal skimmings. Zinc die casters generally do not enter into such contracts, but their scrap is generally recycled as home scrap or sold to dealers for recycle. Some chemical residues and flue dusts are also recycled as sources of recoverable materials. The main new source is electroplating liquors, which will not be reprocessed for their zinc content by any zinc industry subsector before 1987. However, other industry sectors might reprocess these electoplating solutions for their more valuable metal content.

The zinc-containing fractions from municipal incinerators are a category which might make a small contribution before 1987. The other miscellaneous wastes that contain zinc are not included in the target because they are either dissipative uses of zinc or they are not expected to be recovered before 1987. For example, the zinc oxide will not be recovered from rubber products until a process is developed to recover the energy or chemicals from the rubber. Paint pigments are a dissipative use of zinc, and building demolition wastes will not be sorted for metals because of labor costs. The zinc content of old municipal landfills or old mine wastes is not high enough to warrant its processing before 1987.

Looking at the process constraints by class of recoverable material, the following statements can be made:

- The only processes that generally recover zinc products from oxidized zinc materials are the vertical distillation retorts and the chemical and pigment plants. The types of scrap that are generally highly oxidized include the galvanizer's scrap, the chemical residues, and the flue dusts.
- The foundries recover zinc from scrap that has a high metallic zinc content and controlled metallic impurities. They usually process their own home scrap and other new zinc die-cast scrap.
- The secondary distillers process all zinc scrap, but can recover only the metallic zinc content of the scrap. They must sell the residues to other plants for recovery of the zinc values from the oxidized zinc content.

If all smelter capacity capable of processing scrap processed scrap rather than virgin ore, an additional 350,000 short tons of zinc scrap could be processed per year. Most of this additional capacity is in the primary vertical retorts, which could accept more scrap in their charge. The large excess smelting capacity indicates that processing ability, however, is not a major restriction to increased zinc recycling.

Very little recycled zinc is used by the die-cast industry, except for home scrap, because of the tight standards required for the main raw material, a grade of zinc called "specification 49 zinc." This zinc can contain less than 0.001 percent of lead, tin, or cadmium, a degree of purity that is difficult to obtain from recycled zinc. The other applications, such as galvanizing and zinc oxide products, do not have the same stringent requirements. For example, "prime western grade" zinc, with 98.5 percent zinc, the standard grade of zinc needed for galvanizing, can be produced from recovered materials. The presence of zinc oxides in the recoverable materials is also not a major problem, since the vertical distillation retorts can reduce the oxides to metallic zinc.

Econometrics modeling was not used to explicitly evaluate the economics of using recovered zinc. However, economic considerations are implicit in the analysis.

The majority of old zinc scrap comes from the shredding of old automobiles and appliances. The resulting shredded materials are sorted, into a ferrous fraction, a nonferrous fraction, and fluff, by magnetic and air classifiers. The copper and brass are hand picked from the nonferrous fraction, leaving a mixture of aluminum, zinc, and solder. The zinc that is sweated from the remaining mixture and sold as ingot makes up the bulk of the old general zinc scrap. If the aluminum is separated from the zinc and solder by heavy media separation, the zinc and solder go into the old die-cast scrap category.

Automobiles scrapped in 1978 contained about 250,000 short tons of zinc die castings. Because new cars contain less zinc, those scrapped in 1987 will have only 125,000 short tons of zinc. More efficient recovery, however, could still enable meeting a 1987 target of 70,000 short tons per year.

The output of zinc products should not change dramatically from present levels before 1987. By 1976 all of the older, marginal, and more polluting horizontal retort plants had been shut down. Some form of both electrolytic and

pyrometallurgical reduction should survive to 1987.

Increased recovery of zinc will center on old die castings. The recovery rate for old die castings should increase from a 1973–1976 average of 49,600 short tons per year to 70,000 short tons per year by 1987. This increase in recovery, coupled with a decrease in zinc content of automobiles, would raise the proportion of old automobile die castings recovered from 20 percent in 1976 to 64 percent in 1987. The other categories of recoverable materials should remain fairly constant if zinc consumption remains level until 1987. The recovery level for all zinc manufacturing is thus projected to increase from 33 percent of production in 1976 to a maximum feasible level of 36 percent of production in 1987.

Regarding the zinc target, one commenter suggested that the proposed target is too high in view of the drastic reduction in use of zinc die castings by the automobile industry, since die casting is the easiest process in which to use recovered zinc. The proposed target for zinc, however, considered the decreasing quantities of zinc use in automobiles. Automobiles scrapped in 1978 contained 250,000 short tons of zinc die castings. Those scrapped in 1987 will have only 125,000 short tons of zinc. This decrease, however, is expected to be mitigated by more efficient zinc recovery technology, so that the 1987 target of 70,000 short tons can be attained.

Lead. The scrap materials considered for inclusion in target selection are broadly grouped as new scrap, old scrap, slags, and dusts.

The different recoverable materials have historically gone to different types of processing, depending upon the process and constraints. Primary blast furnaces use very little, if any, recoverable materials other than the small quantities of dusts, drosses, and skimmings generated in the plant. Secondary blast furnaces or reverberatory/blast furnace combinations can treat most wastes, including oxides. Kettles can treat a variety of metallic lead materials but cannot handle wastes which require refining.

The blast furnace is the principal process in the primary lead industry that can handle recoverable materials. The blast furnace is an efficient reducer (metallic oxides to metal) and could, therefore, process a wide range of recoverable materials including oxidized materials, dust, drosses, skimmings, etc. It could also be used to melt metallic scrap, although it is not designed for this use. The blast furnace reduces to metal most of the impurities found in the recoverable materials charge. Since the primary industry, for the most part, produces pure lead, these impurities have to be removed from the lead by refining before use.

The blast furnace used by the secondary lead industry has process characteristics similar to those of the blast furnaces used in the primary industry. Reduction of impurities to metal is an advantage in this case, though, because of the difference in product specifications, i.e., alloys rather than pure lead. Unlike the primary blast furnace, the secondary blast furnace is used almost entirely to process recoverable materials. Its ability to reduce to metal other elements in the recoverable materials (notably antimony), along with the lead, is a desirable feature for the secondary industry which produces, for example, antimonial lead from high-antimony recoverable materials. A possible constraint on blast furnaces (both primary and secondary) is that very fine recoverable materials (e.g., dusts) must be agglomerated before use to avoid being blown out of the furnace.

The reverberatory furnace is employed only in the secondary lead industry. This furnace, even with furnace atmosphere control, is essentially a non-reducing process. In the secondary lead industry, reverbs are often used in conjunction with a blast furnace to process recoverable materials that contain both metallic lead and oxides. The recoverable material charge is melted in the reverberatory furnace, producing metallic lead and a slag layer containing any oxidized material (e.g., lead, antimony). The slag layer is reduced in the blast furnace, producing metallic lead (or alloy). Without the blast furnace, the reverb is extremely limited and can only process recoverable materials that contain metallic lead.

The kettle is essentially a melter, and can handle only scrap materials requiring melting only. The kettle is also used for refining operations. Because of heat transfer considerations and because kettle melting/refining is a batch operation, kettle melting is used only on small batches of scrap.

Constraints on the recoverable material are set by the product specifications, the technical limitations of the available equipment, and the chemistry of the process. Normally, it is advantageous to match the feed material as closly as possible to the final product specifications. Thus, battery plates are normally recycled as antimonial lead, type metal is recycled to type, cable to soft lead, etc.

Theoretically, there is no technical limit to the amount of recoverable material a secondary plant can recycle, provided the product specification constraints are overcome.

However, on an industry level, the amount of recoverable material that can be recycled is limited by the availability of scrap materials. Based on historical recovery rates and the types of material under consideration, it is possible to estimate the maximum amount of material that can be recycled under foreseeable economic conditions. This information, along with projected growth rates for the various end uses, and knowledge of the lifetime (i.e., years from production to availability for recycle) allows the calculation of a theoretical maximum of production which is sustainable in the long run by the secondary producers, based on scrap availability.

Econometric modeling was not used to explicitly evaluate the economics of using recovered metals in this industry analysis. However, economic considerations are incorporated in assumptions used in the analysis and in the projection of historic trends.

The target for the lead industry has been estimated based upon the following information and assumptions, the bases for which are outlined in the target support document:

- There will be no significant use of recoverable material in the primary industry by 1987.
- The secondary industry uses recoverable material as 100 percent of its raw material.
- The capacity of the primary industry will remain at its 1976 level. Because of the lead-time requirements for mine/mill/smelter/refinery, no new capacity will come onstream by 1987. The net effect of any additions to capacity at existing smelters will be offset by capacity decreases.
- In the long term, maximum capacity utilization by the primary industry is about 86 percent, or 700,000 short tons of lead annually.
- Secondary capacity can be increased in a relatively short (several years) period of time.
- The changeover to maintenance-free batteries will not adversely affect the secondary industry.
- The demand reduction in chemicals and pigments will not adversely affect the primary industry.
- Total demand for lead will increase by 1987; demand in batteries will increase at 4 percent annually, and in metal products at 1 percent annually.
- Net scrap exports in 1987 will be zero.

Based on this information, the target for the maximum feasible level of recovered material utilization is set at 60 percent for lead.

With regard to the target for the lead sector, one commenter suggested that the target setting task has been reduced to an academic exercise, because proposed environmental regulations for the industry make even the continued existence of the industry uncertain. Obviously, DOE has premised the target for use of recovered lead on the continued existence of both the primary and secondary sectors of the lead industry. As with any assumption on which a target is based, the target may have to be modified if the assumption proves to be inaccurate.

Significant baseline structural changes in the U.S. lead industry may result from decreased demand for lead because of EPA regulations, the changeover from antimonial-lead to calcium-lead maintenance-free batteries, and the economic impact of proposed EPA and OSHA regulations. These could potentially result in many plant closings and a lower rate of utilization of recoverable materials.

Two end-use markets, pigments and chemicals, will probably experience significant demand reductions over the next 5 to 10 years. Chemicals demand will decrease as a result of EPA regulations limiting the amount of TEL (about 99 percent of chemicals) in gasoline. Similarly, the demand for lead oxides in pigments will decrease as a result of various regulations concerning the lead content of paint. Demand reduction in these two end-use sectors will decrease lead demand proportionately. Most of the lead consumed in pigments and chemicals is refined soft lead and has historically come mostly from the primary industry (about two-thirds). Since primary and secondary lead are technical substitutes in most cases, this decrease in demand for soft lead may cause some market reorganization.

Finally, the outcome of proposed EPA air and OSHA air regulations may affect recovered materials utilization in the lead industry. The final economic outcome of these regulations is unknown at this time.

One commenter argued that prompt industrial scrap should not be included in the targets for copper, zinc, and lead since the objective of the industries which produce such scrap is to reduce the generation of this category of scrap.

The same commenter stated that most copper, lead, and zinc companies cannot "in general distinguish between prompt industrial and obsolete scrap." One reason cited by DOE for including prompt industrial scrap in the targets (even though its current use is high and desirable manufacturing efficiency improvements will reduce the amount of prompt industrial scrap available) was the inter-relationships among the various categories of scrap. If, as the commenter stated, one cannot always distinguish prompt industrial from obsolete scrap, then one type cannot, as a practical matter, be neglected in setting targets or reporting progress in recovered materials use.

The same commenter asserted that no significant quantity of these materials that can be economically recovered is not actually being recovered. With regard to copper this same comment was made by two others. The commenters maintain that such scrap is never irrevocably discarded. DOE agrees that such metals always exist for recovery but stresses the dependence of the recovery ratio on the economic situation at the time. The copper target is supported by a projection of the economics through 1987 and is not limited to the current characteristics of the economy. The increase in the recoverable copper reservoir has been projected, as have scrap prices and primary refined copper production, to derive the target. DOE believes the target to reflect the most likely future conditions in the industry.

IV. Procedural Matters

A. Regulatory Review

DOE has determined that this rulemaking is significant, as that is used in Executive Order 12044 "Improving Government Regulations" and amplified in DOE Order 2030 "Procedures for the Development and Analysis of Regulations, Standards, and Guidelines." It is considered significant because it establishes the recovered materials targets, and the criteria and procedures for mandatory reporting on industrial energy efficiency and utilization of recovered materials.

DOE has further determined that the rulemaking is not likely to have a major impact, as defined by Executive Order 12044 and amplified in DOE Order 2030, because it is not likely to impose a gross economic annual cost of $100 million or more and is not likely to have any of the other impacts which are defined as major in DOE Order 2030. Accordingly no regulatory analysis was performed.

As further required by DOE Order 2030, a draft regulatory evaluation plan was prepared for the proposed rulemaking.

B. Consultation With Other Federal Agencies and Major Industries

Pursuant to section 372 of the EPCA(c), in developing the targets for the increased utilization of recovered matrials DOE has consulted with the Administrator of the Environmental Protection Agency and each of the major industries subject to the provisions of section 374A.

In accordance with section 404 of the DOE Act, the Federal Energy Regulatory Commission received a copy of the proposed rules. The Commission has not exercised its discretion to determine that the rule significantly affects any function within its jurisdiction under section 402 (a)(1), (b) and (c) of the DOE Act.

(Energy Policy and Conservation Act (Pub. L. 94–163) as amended by the National Energy Conservation Policy Act (Pub. L. 95–619); Federal Energy Administration Act of 1974 (Pub. L. 93–275), as amended; E.O. 11790 (39 FR 238185); The Department of Energy Organization Act (Pub. L. 95–91); E.O. 12009 (42 FR 46267))

In consideration of the foregoing, the Department of Energy establishes Part 445 of Chapter II of Title 10 of the Code of Federal Regulations, as set forth below.

Issued in Washington, D.C., February 6, 1980.

T. E. Stelson,

Assistant Secretary, Conservation and Solar Energy.

Chapter II of Title 10, Code of Federal Regulations, is amended by adding Part 445 as follows:

PART 445—INDUSTRIAL ENERGY CONSERVATION PROGRAM

Subpart A—General Provisions

Sec.

Subpart B—Identification of Corporations

Subpart C—Reporting Requirements

Authority: Secs. 5, 7, 13, Pub. L. 93–275, 88 Stat. 97 (15 U.S.C. 764, 766, 772); secs. 371–376, Pub. L. 94–163, 89 Stat. 871 (42 U.S.C. 6341–6346), as amended by Pub. L. 95–619, 92 Stat. 3207; secs. 301, 308; Pub. L. 95–91, 91 Stat. 565 (42 U.S.C. 7151, 7158); E.O. 11790 (39 FR 23185); E.O. 12009 (42 FR 46267).

Subpart A—General Provisions

§ 445.1 Purpose and scope.

This part sets forth the regulations for the Industrial Energy Conservation Program established under Part E of Title III of the Act. It includes criteria and procedures for the identification of reporting corporations, reporting requirements, criteria and procedures for exemption from filing reports directly with DOE, voluntary industrial energy efficiency improvement targets and voluntary recovered materials utilization targets. The purpose of the program is to promote increased energy conservation by American industry and, as it relates to the use of recovered materials, to conserve valuable energy and scarce natural resources.

§ 445.2 Definitions.

For the purpose of this part—

"Act" means the Energy Policy and Conservation Act (Pub. L. 94–163, 80 Stat. 971), as amended by the National Energy Conservation Policy Act (Pub. L. 95–619, 92 Stat. 3207).

"Btu" means British thermal unit.

"Chief executive officer" means, within a corporation or a sponsor, the chief executive officer or other individual who is in charge of the corporation or sponsor.

"Commercial quality production" means the manufacture of products suitable for shipment and/or sale.

"Control" means the ability to direct or cause the direction of the management and policies of a corporation. Whether control is present involves a question of fact to be determined from such criteria as a degree of ownership (especially of voting shares), contractual arrangements and other means of influence, such as ability to appoint a majority of a corporation's board of directors, whether by sufficient stock ownership or other means.

"Corporation" means a person as defined in Section 3(2)(b) of the Act (any corporation, company, association, firm, partnership, society, trust, joint venture or joint stock company) and includes any person which controls, is controlled by, or is under common control with such person.

"DOE" means the Department of Energy.

"Energy efficiency" means the amount of energy in Btu's consumed per unit of production.

"Energy source" means electricity, purchased steam, natural gas, bituminous coal, anthracite, coke, ethane, propane, LPG, natural gasoline, gasoline (including aviation), special naphtha, kerosene, distillate fuel oil (including diesel), still gas, petroleum coke, residual fuel oil, crude oil, and any other material consumed as a fuel in manufacturing.

"Exempt corporation" means an identified corporation which DOE determines, pursuant to § 445.37, is not required to report directly to DOE.

"Feedstock" means petroleum products, natural gas or coal used as a raw material which is processed to become a part of the chemical composition of a manufactured product other than an energy source.

"Identified corporation" means a corporation identified by DOE in accordance with § 445.15. A corporation is an identified corporation for a year in which it consumed, in accordance with § 445.13, at least one trillion Btu's.

"Major energy-consuming industry" is an industry listed in § 445.5(a).

"Manufacturing" means the mechanical or chemical transformation of materials or substances into new products, as described on page 57 of the Office of Management and Budget Standard Industrial Classification Manual (1972).

"Manufacturing operation" means the mechanical or chemical transformation of materials or substances into a product classified with SIC codes 22, 26, 30, or 33; which is measured in a single unit of production. Manufacturing operations include, but are not limited to, the production of iron, steel, aluminum, copper, lead, zinc, wood pulp, paper, spun textile goods, woven textile goods, felt textile goods, non-woven textile goods, tires and tire products, rubber footwear, and industrial rubber products.

"Obsolete scrap" means recovered materials created by the use and subsequent discard of a product. Examples are discarded tires, automobiles, and newspapers. This includes recovered materials from outside the United States which are used in manufacturing operations in the United States.

"Plant" means an economic unit of a corporation at a single physical location where manufacturing is performed.

"Plant report" means a duly completed report on the form provided by DOE for plant reporting in accordance with section 375(c) of the Act, or on such other form as provides information equivalent to that required to be reported on the form provided by DOE.

"Product" means an item or grouping of items (separate parts of, or all of a product line) that is the production of a manufacturing corporation that is classified within a major energy-consuming industry.

"Production" means the quantity of a corporation's product output, throughput, or activity.

"Program" means the Industrial Energy Conservation Program.

"Prompt industrial scrap" means recovered materials generated by an industrial process and used as input to a manufacturing operation other than the industrial process which generated it. An example is metal fabrication stamping waste which is used in manufacturing steel. This includes recovered materials from outside the United States which are used in manufacturing operations in the United States.

"Recovered materials" means any of the following energy-saving recovered materials: aluminum, copper, lead, zinc, iron, steel, paper and allied paper products, textiles, and rubber, recovered from solid waste.

"SIC" means the Standard Industrial Classification system described in the Office of Management and Budget Standard Industrial Classification Manual (1972).

"Solid waste" means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other

discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities; but does not include solid or dissolved materials in domestic sewage, or solid or dissolved materials in irrigation flows, or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923).

"Sponsor" means a trade association or other person who operates or intends to operate a reporting program which collects data from one or more corporations.

"United States" means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, and any territory or possession of the United States.

"Waste" means "solid waste".

§ 445.3 Management of the program.

The Office of Industrial Programs, Office of the Assistant Secretary for Conservation and Solar Energy, Department of Energy, will implement and manage the program.

§ 445.4 Handling of information submitted under the program.

(a) Except as otherwise provided in this section, the handling of information submitted to DOE under this part shall be governed by DOE's Freedom of Information regulations, 10 CFR Part 1004.

(b) DOE will not disclose any information obtained under this part which is a trade secret or other matter described in 5 U.S.C 552(b) (4), disclosure of which may cause significant competitive harm, except to committees of Congress upon request of such committees; and information from plant reporting forms made available to DOE for verification purposes under § 445.26(a) shall not be released to the public.

(c) A corporation or sponsor which claims that information provided to DOE under this part is a trade secret or commercial or financial information that is privileged or confidential within the meaning of the Freedom of Information Act (FOIA) exemption in 5 U.S.C. 552(b) (4), and that disclosure of this information would cause significant corporate competitive damage, must so inform DOE by providing at the time of the submission of the information a detailed item-by-item explanation of whether the information is customarily treated as confidential by the corporation and the industry, and a detailed explanation of the anticipated competitive damage which would result from public disclosure.

(d) Prior to disclosing any information other than in response to a request made under 10 CFR Part 1004, DOE will grant any person who submitted information in accordance with paragraph (c) of this section an opportunity to comment on the proposed disclosure by providing at least seven days notice of DOE's determination to disclose such information. For purposes of this paragraph, notice is deemed to be given when mailed to the person who provided the information.

(e) Any information submitted to DOE by a corporation or sponsor under this part shall not be considered energy information, as defined by section 11(e) (1) of the Energy Supply and Environmental Coordination Act of 1974 (15 U.S.C. 796), for purposes of any verification examination authorized to be conducted by the Comptroller General under section 501 of the Act.

§ 445.5 Major energy-consuming industries.

(a) For purposes of this part, the following 2-digit SIC code manufacturing industries are the major energy-consuming industries:

(1) SIC 20—Food and kindred products;
(2) SIC 21—Tobacco products;
(3) SIC 22—Textile mill products;
(4) SIC 23—Apparel and other textile products;
(5) SIC 24—Lumber and wood products;
(6) SIC 25—Furniture and fixtures;
(7) SIC 26—Paper and allied products;
(8) SIC 27—Printing and publishing;
(9) SIC 28—Chemicals and allied products;
(10) SIC 29—Petroleum and coal products;
(11) SIC 30—Rubber and miscellaneous plastic products;
(12) SIC 31—Leather and leather products;
(13) SIC 32—Stone, clay and glass products;
(14) SIC 33—Primary metal industries;
(15) SIC 34—Fabricated metal products;
(16) SIC 35—Machinery, except electrical;
(17) SIC 36—Electric, electronic equipment;
(18) SIC 37—Transportation equipment;
(19) SIC 38—Instruments and related products; and
(20) SIC 39—Miscellaneous manufacturing industries.

(b) The following major energy-consuming industries are the industries for which reporting on the use of recovered materials is required under § 445.22(b):

(1) SIC 22—Textile mill products;
(2) SIC 26—Paper and allied products;
(3) SIC 30—(excluding Rubber products SIC 3079, as provided in § 445.22(d));
(4) SIC 33—Primary metal industries.

§ 445.6 Procedures for appeals.

Any appeal of a determination by DOE pursuant to any provision of this part shall be filed with the Office of Hearings and Appeals, U.S. Department of Energy, Washington, D.C. 20585, within 30 days of the date of that determination, pursuant to the procedures for such an appeal stated in 10 CFR 205, Subpart H. A person has not exhausted its administrative remedies until an appeal has been filed under that subpart, and an order granting or denying the appeal has been issued.

§ 445.7 General information-gathering authority.

In addition to the exercise of authority under Part E of Title III of the Act, DOE may exercise any authority available under any other provision of law to obtain such information with respect to industrial energy efficiency and industrial recovered materials use which it determines is necessary or appropriate to the attainment of the objectives of the program. Nothing in this part shall limit the authority of DOE to require reports of energy information under any other law.

Subpart B—Identification of Corporations

§ 445.11 Scope.

This subpart contains the criteria and procedures for the annual identification of corporations.

§ 445.12 Requirement for corporations to file a report on energy consumption.

(a) Except as provided by paragraph (b) of this section, a corporation which consumed, as determined according to § 445.13, at least one trillion Btu's of energy in a calendar year within a major energy-consuming industry shall file a report on that energy consumption with DOE as provided in § 445.14.

(b) Any corporation which was identified by DOE under § 445.15 within a major energy-consuming industry for a calendar year and which consumed, as determined according to § 445.13, at least one trillion Btu's of energy within the same major energy-consuming industry in the next calendar year, need

not file a new report of its energy consumption in that industry.

(c) Any corporation which was identified by DOE under § 445.15 within a major energy-consuming industry for a calendar year and which consumed, as determined according to § 445.13, less than one trillion Btu's of energy within the same major energy-consuming industry in the next calendar year shall file a report on its energy consumption in that industry as provided by § 445.14. The failure of a corporation described in this paragraph to file a report may result in the continued identification of the corporation by DOE under § 445.15.

§ 445.13 Computation of energy consumption.

(a) For purposes of this subpart, energy consumed is the sum of the Btu contents of all energy sources consumed by a corporation in a manufacturing industry within the United States and includes energy used for—

(1) Direct manufacturing activities;

(2) Thermal self-generation of electricity;

(3) Heating, ventilating and air conditioning of manufacturing buildings and plant offices, as well as manufacturing services such as shops, cafeteria, other plant personnel services, and plant chemical and analytical laboratories;

(4) In-plant transportation, such as lift trucks, conveyors, cranes, and railroads;

(5) Transportation on a manufacturer's property between mining operations and manufacturing facilities;

(6) Raw material storage; and

(7) Services for finished product warehouses within a plant fence if directly related to manufacturing activities.

(b) For purposes of this subpart, energy consumed does not include (where such use is metered separately or can otherwise be identified)—

(1) All uses of electricity self-generated by thermal means;

(2) Services for corporate and divisional offices not contiguous to a plant;

(3) Services for basic research not contiguous to a plant;

(4) Services for regional distribution centers;

(5) Fuel for corporate aircraft, salesmen's cars and over-the-highway trucks;

(6) By-product fuels sold and shipped, or stored for sale;

(7) Facility start-up energy (to point of commerical quality production);

(8) Waste used as fuel;

(9) Transport of intermediate product to another producer for finishing within the same two-digit industry;

(10) Fuels received for storage for later disposition; and

(11) Feedstocks.

(c) For purposes of this section, where energy is consumed in manufacturing in one major energy-consuming industry for purposes of manufacturing an end product in another major energy-consuming industry, and such energy is not separately metered or cannot otherwise be identified, the energy is consumed in the major energy-consuming industry of the end product.

(d) To avoid double-counting in the case of thermally self-generated electricity, a corporation's electricity consumption shall be comprised only of purchased electricity and self-generated hydropower. For example, where a corporation consumes coal in the thermal generation of electricity for its own use, the Btu's of the coal, but not the Btu's of the electricity, shall be included.

(e) Where a corporation can measure or reliably estimate the Btu content of its energy sources (except electricity), energy consumed must be determined by reference to those actual or estimated Btu contents. Where a corporation cannot measure or reliably estimate the Btu contents of its energy sources, and in the case of electricity, the following conversion factors (Btu's/energy unit) must be used:

(1) Electricity, 3,412/kwh;
(2) Natural gas, 1,020/cu. ft;
(3) Bituminous coal, 22,565,000/short ton;
(4) Anthracite, 25,400,000/short ton;
(5) Coke, 26,000,000/short ton;
(6) Petroleum coke, 30,120,000/short ton;
(7) Ethane, 73,380/gal;
(8) Propane, 91,620/gal;
(9) LPG, 95,500/gal;
(10) Natural gasoline, 110,000/gal;
(11) Gasoline (including aviation), 124,950/gal;
(12) Special Naphtha, 124,950/gal.
(13) Kerosene, 135,000/gal;
(14) Distillate fuel oil (including diesel), 138,690/gal;
(15) Still gas, 400/cu. ft;
(16) Residual fuel oil, 149,690/gal;
(17) Crude Oil, 138,100/gal; and
(18) Other energy sources (including purchased steam), (to be determined by calorimetric measurement or engineering standard as appropriate for consuming corporation).

§ 445.14 Report on energy consumption.

(a) The reports required by § 445.12 (a) and (c) must include the following information:

(1) The name, title, address and phone number of the individual responsible for reporting energy data for the corporation;

(2) The Internal Revenue Service "Employer Identification Number" (EIN) for the corporation; and

(3) The following statement, completed as appropriate:

———— consumed at least (name of corporation) one trillion Btu's of energy in calendar year ——in SIC(s) ——— (For only those corporations filing pursuant to § 445.12(c) substitute or add the completed phrase: (and) consumed less than one trillion Btu's of energy in calendar year —— in SIC(s) ———), as determined according to 10 CFR 445.13. I certify that all the information in this report is true and accurate to the best of my knowledge.

———— (Signature of Chief Executive Officer or individual designated by such officer)

———— Date of Submission

(b) Reports required by § 445.12 must be received by DOE by February 28 following the close of the calendar year for which the corporation is required to report and must be sent to the following address: Office of Industrial Programs, U.S. Department of Energy, Room 2H-085, 1000 Independence Avenue, SW., Washington, D.C. 20585. The deadline and address for submission of the report may be changed by DOE by the publication of a notice of the change in the **Federal Register**.

(c) Where a corporation controls, is controlled by or is under common control with another corporation, the corporation required to file the report is the corporation which controls.

(1) Where a corporation controls a joint venture, that corporation shall include the energy consumed by the joint venture in its energy consumption. Where more than one corporation controls a joint venture, each controlling corporation shall include in its energy consumption an equal percentage of the energy consumed by the joint venture during the calendar year for which the report is filed.

(2) Where a corporation is under common control, each controlling corporation shall include in its energy consumption an equal percentage of the energy consumer by the corporation under common control.

(3) A corporation shall supply to DOE, upon request, any material which DOE may require to verify control.

(d) All data used by a corporation in determining its energy consumption must be retained by the corporation for at least five years.

§ 445.15 Identification of corporations by DOE.

(a) Annually, after reviewing the information filed pursuant to § 445.12, and any other information on corporate energy consumption available to it, DOE

will identify each corporation which consumed at least one trillion Btu's of energy within a major energy-consuming industry in the previous year, pursuant to the procedures set forth in paragraph (b) of this section.

(b) DOE will publish in the Federal Register a list identifying corporations. If this list must be supplemented, DOE may publish an updated list or may notify a corporation of its identification by certified mail.

§ 445.16 Request for modification.

(a) A corporation may file a request with DOE to modify its identification pursuant to § 445.15, on the grounds of clerical or technical error.

(b) Notwithstanding the provisions of § 445.6, the request must be filed with DOE within 30 days of the identification of the corporation, at the Office of Industrial Programs, U.S Department of Energy, Room 2H–085, 1000 Independence Avenue, SW., Washington, D.C. 20585, and marked "Industrial Energy Conservation Program: Request for Modification." DOE may change the address for the submission of such requests by the publication of a notice of such change in the Federal Register.

(c) 10 CFR 205.131 and 205.134 provide the format for such a request.

(d) The request must adequately explain how the corporation erred in its report of energy consumption or how DOE erred in identifying the corporation.

(e) DOE shall respond to the request by granting or denying it within 20 days of the receipt of the request by the Office of Industrial Programs.

Subpart C—Reporting Requirements

§ 445.21 Plant reporting requirements.

(a) An identified corporation shall have at its headquarters in the United States a separate report on the progress each plant of the identified coporation has made during the reporting period in improving its energy efficiency in each major energy-consuming industry within which the corporation is identified.

(b) The reports required under paragraph (a) of this section must be prepared on a plant reporting form which has been—

(1) Published and made available for this purpose by DOE, or

(2) Developed and used by the identified corporation.

(c) The reports required under paragraph (a) of this section must be completed in a manner sufficiently timely to permit the data from such reports to be aggregated in the corporation's report required by § 445.22

§ 445.22 Corporate reporting requirements.

(a) The chief executive officer (or individual designated by such officer) of each identified corporation shall report by the date specified in § 445.25 on the progress the corporation has made in improving its energy efficiency in each major energy-consuming industry within which the corporation is identified, including data aggregated from plant reports required under § 445.21.

(b) The chief executive officer (or individual designated by such officer) of each corporation identified within any of SIC(s) 22, 26, 30 or 33 also shall report by the date specified in § 445.25 on the progress the corporation has made to increase its utilization of recovered materials in each of these four industries within which the corporation is identified.

(c) The information required under paragraphs (a) and (b) of this section must be submitted by SIC code—

(1) To DOE on a corporate reporting form which has been published and made available for this purpose by DOE, or

(2) For an exempt corporation, to a sponsor of an adequate reporting program on a corporate reporting form—

(i) Described in paragraph (c)(1) of this section, or

(ii) Which provides information equivalent to that required to be reported on the form described in paragraph (c)(1) of this section, accompanied by the certification required by the DOE form.

(d) Notwithstanding the requirements of paragraph (b) of this section, the chief executive officer of a corporation identified within SIC 30, all of whose manufacturing operations are within SIC 3079, (miscellaneous plastics products), shall not be required to report on the progress the corporation has made to increase its utilization of recovered materials in SIC 30.

§ 445.23 Sponsor reporting requirements.

(a) The chief executive officer (or individual designated by such officer) of each sponsor of an adequate reporting program, as determined pursuant to § 445.37, shall report by the date specified in § 445.25 to DOE, as follows:

(1) For each major energy-consuming industry for which the sponsor has an adequate reporting program, on the progress the exempt corporations which participate in the adequate reporting program have made in improving their energy efficiency in that major energy-consuming industry, and

(2) For each of SIC(s) 22, 26, 30 and 33 for which the sponsor has an adequate reporting program, on the progress the exempt corporations which are required to report under § 445.22(b), and which participate in the adequate reporting program, have made to increase their utilization of recovered materials.

(b) The information required under paragraph (a) of this section must be submitted to DOE on a sponsor reporting form which has been—

(1) Published and made available for this purpose by DOE, or

(2) Previously supplied by the sponsor to DOE in its submission under § 445.35, accompanied by the certification required by the DOE form.

(c) Notwithstanding paragraph (a) of this section, a sponsor, in preparing its report, may aggregate data from reports filed with it by exempt corporations under § 445.22(c)(2) with data from reports by nonidentified corporations, only to the extent that the reports from the nonidentified corporations meet the requirements of § 445.22.

§ 445.24 Reporting period.

The reporting period for each report required by this subpart is the calendar year for which each corporation covered by the report is an identified corporation.

§ 445.25 Reporting date and address.

All reports submitted to DOE under this subpart must be received by DOE by the June 1 following the end of the reporting period and must be sent to the address provided in the instructions to the appropriate DOE form. This deadline and address may be changed by DOE by timely notification of such change to identified corporations and sponsors of adequate reporting programs.

§ 445.26 Data retention.

(a) All forms submitted to an identifed corporation under § 445.21 and all other data used by that corporation in preparing reports under § 445.22, must be retained by the corporation for at least five years from the filing date and must be made available to DOE promptly upon request for verification.

(b) All reports submitted by an exempt corporation to a sponsor under § 445.22(c)(2) must be retained by the exempt corporations for at least five years from the filing date. Upon request for verification the reports must be made promptly available to DOE by the corporation at its headquarters.

(c) All data, other than reports described in paragraph (b) of this section, used by a sponsor in preparing reports submitted to DOE under § 445.23 must be retained by the sponsor for at least five years from the filing date and must be made available to DOE promptly upon request for verification.

Subpart D—Exemption Criteria and Procedures

§ 445.31 Scope.

This subpart contains the criteria and procedures for the exemption of identified corporations from the requirement of filing corporate reporting forms directly with DOE. These exemptions are effective for one year and renewable annually.

§ 445.32 Criteria for the exemption of corporations.

In order for an identified corporation to be exempt from filing the corporate report required by § 445.22 directly with DOE, pursuant to § 445.37, the corporation must—

(a) File a timely and complete request to be an exempt corporation pursuant to § 445.34;

(b) Participate in an adequate reporting program; and

(c) If it was previously determined to be an exempt corporation, have met the requirements of § 445.22(a), (b) and (c)(2) for the period it has been exempt.

§ 445.33 Criteria for adequate reporting programs.

In order for a reporting program of a sponsor to be determined an adequate reporting program for a major energy-consuming industry, pursuant to § 445.37, the sponsor must—

(a) File a timely and complete request to be a sponsor with an adequate reporting program, pursuant to § 445.35;

(b) If its program previously was determined to be adequate, have met the requirements of § 445.23 and have provided each identified corporation which participated in the reporting program with (1) specific written guidance for preparing and submitting the corporate report under § 445.22(c)(2) to the sponsor, and (2) a copy of the report which the sponsor filed with DOE under § 445.23.

§ 445.34 Request to be an exempt corporation.

(a) An identified corporation may seek an exemption by submitting a request to DOE describing its participation in an adequate reporting program.

(b) This request must include the following information:.

(1) The name and address of the identified corporation,

(2) The name and telephone number of the person responsible for preparing the report required by § 445.22 on behalf of the corporation,

(3) The name, address, and telephone number of the sponsor in whose reporting program the corporation has arranged to participate, together with the enumeration of all major energy-consuming industries for which the corporation will submit reports to the sponsor;

(4) A statement that it will meet the requirements of § 445.22(a), (b) and (c)(2) and § 445.26 (a) and (b);

(5) A statement of how the corporation will report to the sponsor, either—

(i) On the DOE corporate reporting form, or

(ii) On some other reporting form, designated by the corporation; and

(6) A certification by the chief executive officer (or other individual designated by such officer) of the corporation as follows:

"I certify that all information provided in this request is true and accurate to the best of my knowledge."

(c) Notwithstanding the requirements of paragraph (a) of this section, any corporation which was exempt under § 445.37 for a calendar year and for which all information required by paragraph (b) of this section is unchanged, need not refile a request for the next year.

§ 445.35 Request to be a sponsor with adequate reporting programs.

(a) A sponsor may seek to have its reporting program determined to be adequate by submitting a request to DOE describing its reporting program.

(b) This request must include the following information:

(1) The name and address of the sponsor;

(2) The name and telephone number of the person responsible for preparing the report required by § 445.23 on behalf of the sponsor;

(3) A listing of each major energy-consuming industry covered by its reporting programs;

(4) A statement that the sponsor will meet the requirements of §§ 445.23 and 445.26(c);

(5) A statement of how the sponsor will submit the reports required by § 445.23 to DOE; either—

(i) On the DOE sponsor reporting form; or

(ii) On some other reporting form, designated by the sponsor;

(6) If the sponsor designates some other form, a copy of the form, together with an index referencing each and every item on the DOE form to the corresponding identical item on the form submitted;

(7) A statement that the sponsor will provide each identified corporation which participates in the reporting program with—

(i) Specific written guidance for preparing and submitting the corporate report under § 445.22(c)(2) to the sponsor; and

(ii) A copy of the report which the sponsor files with DOE under § 445.23; and

(8) A certification signed by the chief executive officer (or other individual designated by such officer) as follows:

I certify that all information provided in this request is true and accurate to the best of my knowledge.

(c) Notwithstanding the requirements of paragraph (a) of this section, a sponsor which was determined to have an adequate reporting program for a calendar year and for which all information required by paragraph (b) of this section are unchanged, need not refile a request for the next year, if its chief executive officer (or other individual designated by such officer) submits a certification that all items in the request filed the previous year are still true and accurate to the best of his knowledge.

§ 445.36 Filing deadline and address.

The requests made pursuant to § 445.34 and § 445.35 must be received by DOE by February 28 of each year and must be sent to the following address: Office of Industrial Programs, U.S. Department of Energy, Room 2H–085, 1000 Independence Avenue, S.W., Washington, D.C. 10585. DOE may change the deadline and address for submission of such requests by publishing a notice of such change in the **Federal Register.**

§ 445.37 Determination of exempt corporations and adequate reporting programs.

(a) Annually, in accordance with the criteria set forth in § 445.32 and § 445.33, DOE will exempt corporations and determine the adequacy of the reporting programs in which they participate, pursuant to the procedures set forth in paragraph (b) of this section.

(b) DOE will publish in the **Federal Register** for public comment its proposal to exempt corporations and to determine as adequate the reporting programs in which they participate. After considering comments from interested persons, DOE will exempt corporations and determine the adequacy of the reporting programs in which they

participate by publishing a list of corporations and sponsors of programs in the Federal Register.

§ 445.38 Failure to report.

(a) If a sponsor of an adequate reporting program fails to submit the report required by § 445.23 by the deadline established in § 445.25, DOE may, by notice to the sponsor and to the identified corporations which participate in its program, revoke its determination that the sponsor has an adequate reporting program. Within 30 days after the notice is mailed, each such corporation must submit a corporate report directly to DOE as provided in § 445.22(c)(1).

(b) If a sponsor determines that an exempt corporation has failed to file a timely corporate report as required by § 445.22(c)(2), it should submit a report as required by § 445.23 only on those corporations which filed the corporate report with the sponsor. If an exempt corporation does not file the report required by § 445.22 with a sponsor, it must file the report required by § 445.22 directly with DOE.

Subpart E—Voluntary Energy Efficiency Improvement Targets and Voluntary Recovered Materials Utilization Targets

§ 445.41 Purpose and scope.

(a) This subpart contains the energy efficiency improvement targets and the recovered materials utilization targets established by DOE pursuant to section 374 and 374A of the Act.

(b) No liability shall attach to, and no civil or criminal penalties shall be imposed on, any corporation for any failure to meet any energy efficiency improvement target or any recovered materials utilization target contained in this subpart.

§ 445.42 Energy efficiency improvement targets.

(a) Each energy efficiency improvement target is a percentage figure which represents, for a major energy-consuming industry, the percentage reduction in energy consumption per unit of production which DOE has determined that such industry can achieve between calendar year 1972 and January 1, 1980, as established in 42 FR 29642, June 9, 1977, "Final Industrial Energy Efficiency Improvement Targets." Each target is set at a level which represents the maximum feasible improvement in energy efficiency that each industry can achieve.

(b) The energy efficiency improvement targets are set forth in Table I.

Table I

SIC Code	Major energy-consuming industry	Target
20	Food and kindred products	12
22	Textile mill products	22
26	Paper and allied products	20
28	Chemicals and allied products	14
29	Petroleum and coal products	12
32	Stone, clay, and glass products	16
33	Primary metal industries	9
34	Fabricated metal products	24
35	Machinery except electrical	15
37	Transportation equipment	15

§ 445.43 Modification of energy efficiency improvement targets.

An energy efficiency improvement target in § 445.42 may be modified at any time if DOE—

(a) Determines that such target cannot reasonably be attained or could reasonably be made more stringent, and

(b) Publishes such determination in the Federal Register together with a statement of the basis and justification for the modification after providing an opportunity for public comment on any proposed modification.

§ 445.44 Recovered materials utilization targets.

(a) Recovered materials utilization targets are established for each of the following industries—textile mill products, paper and allied products, metals and metal products, and rubber.

(b) Each recovered materials utilization target is a percentage figure which represents, for each industry subdivision listed in paragraph (c) of this section, the amount of recovered materials from prompt industrial and obsolete scrap which DOE has determined can be used per unit of production by calendar year 1987. Each target is set at a level which represents the maximum feasible increase in the utilization of recovered materials which the industry can achieve progressively by January 1, 1987.

(c) The recovered materials utilization targets are set forth in Tables II, III, IV, and V.

Table II.—*Textile Mill Products*

Industry subdivision	Recovered materials utilization target	Recovered materials utilization in reference year 1978
Broad woven fabric mills, wool	13	13
Yarn mills, wool	13	13
Felt goods, except woven felt hats	80	59
Padding and upholstery filling	93	93
Nonwoven fabrics	15	17
Cordage and twine	22	22
All other textile mill products	0	0

Table III.—*Paper and Allied Products*

Industry subdivision	Recovered materials utilization target	Recovered materials utilization in reference year 1977
Newsprint	18	14
Tissue	30	28
Printing and writing paper	6	7
Packaging and industrial converting papers	4	4
Unbleached kraft paperboard	10	4
Semichemical paperboard	26	26
Solid bleached paperboard	0	0
Recycled paperboard	108	108
Construction paper	55	55
Insulating and hard pressed board	17	22

Table IV.—*Rubber*

Industry subdivision	Recovered materials utilization target	Recovered materials utilization in reference year 1977
Tires and tire repair materials	5	2
Rubber industrial products	5	3
Rubber footwear	15	0
Tire retreading and repair	12	9

Table V.—*Metals and Metal Products*

Industry subdivision	Recovered materials utilization target	Recovered materials utilization in reference year 1976
Ferrous	41	38
Aluminum	35	30
Copper	50	47
Lead	60	51
Zinc	36	33

§ 445.45 Modification of recovered materials utilization targets.

Any recovered materials utilization target in § 445.44 may be modified if DOE—

(a) Determines that such target cannot reasonably be attained, or that the target should require greater use of recovered materials, and

(b) Publishes such determination in the Federal Register together with a basis and justification for the modification, after providing an opportunity for public comment on the proposed modification.

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10 CFR Part 445

Industrial Energy Conservation Program

AGENCY: Department of Energy.

ACTION: Notice of change of dates.

SUMMARY: The Department of Energy (DOE) is hereby announcing changes to various deadlines for the identification

and reporting aspects of its Industrial Energy Conservation Program (program), as required by the program regulations contained in 10 CFR Part 445, issued today by DOE. These changes will affect the operation of the program in 1980 only and are made to allow sufficient time to comply with the newly issued regulations.

EFFECTIVE DATE: February 14, 1980.

FOR FURTHER INFORMATION CONTACT:

Lewis S. Newman, Office of Industrial Programs, U.S. Department of Energy, 1000 Independence Avenue SW., Washington, D.C. 20585 (202) 252–2384.

Pamela M. Pelcovits, Office of General Counsel, U.S. Department of Energy, 20 Massachusetts Avenue NW., Washington, D.C. 20585 (202) 376–4616.

SUPPLEMENTARY INFORMATION: The Department of Energy (DOE) has today issued 10 CFR Part 445 which contains regulations for the Industrial Energy Conservation Program (program). These regulations, in part, establish deadlines for the filing of certain information and requests by manufacturing corporations and others with DOE. As required by 10 CFR § 445.14(b), § 445.25 and § 445.36, DOE is hereby providing public notice of the following date changes:

1. Statements on 1979 energy consumption, as required by § 445.12, must be received by DOE by March 31, 1980;

2. The reports required by § 445.22 and § 445.23 must be received by DOE by July 1, 1980; and

3. Requests made pursuant to § 445.34 and § 445.35 for the 1979 reporting period must be received by DOE by March 31, 1980.

These changes affect the operation of the program in 1980 only and are made to allow sufficient time for complying with the newly issued regulations. All other provisions and requirements of 10 CFR Part 445 are unchanged.

Issued in Washington, D.C. February 6, 1980.

Thomas E. Stelson,

Assistant Secretary, Conservation and Solar Energy.

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