United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EPA-450-3-80-036b
August 1983

Air

EPA

# Beverage Can Surface Coating Industry — Background Information for Promulgated Standards of Performance

EIS

NSPS

EPA-450/3-80-036b

# Beverage Can Surface Coating Industry — Background Information for Promulgated Standards

Emission Standards and Engineering Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

August 1983

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PUBLICATION NO. EPA-450/3-80-036b

ENVIRONMENTAL PROTECTION AGENCY

Background Information
and
Final Environmental Impact Statement
for
Beverage Can Surface Coating Industry

Prepared by:

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(Date)

1. The promulgated standards of performance would limit emissions of volatile organic compounds from new, modified, and reconstructed two-piece beverage can surface coating lines. Section 111 of the Clean Air Act (42 USC 7411), as amended, directs the Administrator to establish standards of performance for any category of new stationary sources of air pollution which ". . . causes or contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare." All regions of the United States would be affected by these standards.

2. Copies of this document have been sent to the Department of Labor; Department of Agriculture; Department of Commerce; Office of Management and Budget; Council of Environmental Quality; members of the State and Territorial Air Pollution Program Administrators, and the Association of Local Air Pollution Control Officials; EPA Regional Administrators; and other interested parties.

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4. Copies of this document may be obtained from:

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# 1. SUMMARY

On November 26, 1980, the Environmental Protection Agency (EPA) proposed standards of performance for the beverage can surface coating industry (45 CFR 78980) under authority of Section 111 of the Clean Air Act. Public comments were requested on the proposal in the Federal Register. Eighteen comments were received, mostly from beverage can makers. Also commenting were State air pollution control agencies, coating suppliers, a trade association, and Federal agencies. Four presentations were made at the public hearing on January 6, 1981. The comments that were submitted, along with responses to those comments, are summarized in this document. The summary of comments and responses serves as the basis for the revisions made to the standards between proposal and promulgation.

## 1.1 SUMMARY OF CHANGES SINCE PROPOSAL

The significant changes to the standards involve the scope of the standards and enforcement procedures. Three-piece cans and coating of sheet stock for steel and aluminum ends have been excluded because EPA's analysis of revised industry projections indicated that no capacity would be subject to the promulgated standards through 1985. Provisions have been added requiring the use of analytical precision statements as outlined in paragraph 4.4 of Method 24 when Method 24 data are used to calculate VOC content of waterborne coatings for compliance determinations. Reporting requirements after the initial performance test, except those required under the general provisions of 40 CFR 60, have been changed to require semiannual reports of exceedances rather than immediate reporting as initially proposed.

## 1.2 SUMMARY OF IMPACTS OF PROMULGATED ACTION

### 1.2.1 Alternatives to Promulgated Action

The regulatory alternatives are discussed in Chapter 6 of the Background Information Document (BID) for the proposed standards. These regulatory alternatives reflect different levels of emission control, one of which is selected as representing the best demonstrated technology, considering costs, nonair quality health, and environmental and economic impacts for beverage can surface coating operations. These alternatives remain the same.

### 1.2.2 Environmental Impacts of Promulgated Action

Environmental impacts are discussed in Chapter 7 of the proposal BID. Because of the exclusion of three-piece can and end coating operations from the promulgated standards and revised industry projections for two-piece beverage cans, impacts on volatile organic compound (VOC) emissions are changed. No changes result in the water and solid waste environmental impacts.

Total reduction in VOC emissions resulting from the promulgated standards in the fifth year will be 2,900 Mg, as compared with a reduction of 4,800 Mg estimated under the proposed standards, a difference of 1,900 Mg. Of this difference, 1,200 Mg are the result of a downward revision of 1985 two-piece can estimated production and 700 Mg are from the exclusion of three-piece can and end sheet coating.

This represents a 32-percent reduction in baseline emissions, the same as estimated for the proposed standards.

### 1.2.3 Energy and Economic Impacts of Promulgation

Energy and economic impacts are discussed in Chapters 7 and 8 of the proposal BID as amended by Docket item IV-B-12. The economic impacts are unchanged.

Reduction in energy requirements, from the baseline, under the promulgated standards is 19,000 GJ, as compared to 36,000 GJ under the proposed standards, a difference of 17,000 GJ. Of this difference, 8,000 GJ are the result of a downward revision of 1985 two-piece can

estimated production and 9,000 GJ are from the exclusion of three-piece can and end sheet coating. In both cases this represents a 1-percent reduction from the baseline.

1.2.4 Other Considerations

1.2.4.1 Irreversible and Irretrievable Commitment of Resources. Chapter 7 of the proposal BID contains a discussion of irreversible and irretrievable commitment of resources. These impacts remain unchanged.

1.2.4.2 Environmental and Energy Impacts of Delayed Standards. Chapter 7 of the proposal BID contains a discussion of the environmental and energy impacts of delayed standards. These impacts remain unchanged.

# 2. SUMMARY OF PUBLIC COMMENTS

The list of commenters, their affiliations, and the EPA docket number assigned to each of their comments is shown in Table 2-1. Eighteen letters commenting on the proposed standards and the Background Information Document (BID) and four presentations made at the public hearing were reviewed. The significant comments have been combined into the following ten categories:

1. General
2. Emission Control Technology
3. Modification and Reconstruction
4. Economic Impact
5. Energy Impact
6. Environmental Impact
7. Legal Considerations
8. Test Methods and Monitoring
9. Reporting and Recordkeeping
10. Miscellaneous

The comments, issues, and their responses are discussed in the following sections of this chapter. A summary of the changes to the regulation is included in Section 1.1 of Chapter 1.

## 2.1 GENERAL

2.1.1 Comment: Four participants at the public hearing (IV-F-1A, IV-F-1B, IV-F-1C, IV-F-1D), two of whom subsequently submitted written comments (IV-D-3, IV-D-6), and two commenters (IV-D-4, IV-D-5) stated that in view of the projected decrease in production of three-piece beverage cans through 1985, these cans should be excluded from the standard.

Response: The growth projections appearing in the draft Environmental Impact Statement (EIS) were based on then-current industry estimates of projected market shares of two- and three-piece beverage cans. The four "model" three-piece plants projected to be subject to NSPS by 1985 were those projected to become subject to the modification or reconstruction provisions of 40 CFR 60. Three-piece can shipments were projected to stabilize at 14.5 billion units through 1985. This projection did not consider the impact of escalating energy costs and the inroads that plastic packaging would make into the metal-can share of the market. Both of these factors developed fully after the draft EIS was prepared. EPA's analysis of revised industry projections shows that three-piece can shipments in 1985 will be about 1.5 billion units. As a result, EPA has recalculated the estimated emission and energy reduction that will occur in the first 5 years after proposal. Results of these recalculations are shown in Table 2-2.

The 1980 and 1985 projections of shipments are based on data provided by the American Can Company and the Can Manufacturers Institute (CMI).[1] [2] [3]

Industry was unable to supply estimates of the fraction of existing capacity that would be subject to NSPS under the reconstruction and modification provisions of 40 CFR 60. In response to a request, the Can Manufacturers Institute reported that future expansion in existing facilities, which would be considered "reconstruction" and which would require the use of NSPS material, is not expected to exceed 1 percent. Market geography makes it impossible to estimate the fraction of capacity that would be subject to the modification provisions.[3] [4] One canmaker reported that an affected facility on all of its beverage can lines would be subject to modification by 1985.[5] An estimate that 5 percent of capacity, based on a 20-year life, would become subject to NSPS each year was made in the BID and the proposed regulation. No exception was taken to this estimate during the public hearing or the public comment period.

Consequently, 5 percent of existing 1980 capacity is assumed to come under the modification or reconstruction provisions of 40 CFR 60 annually during the 1980-1985 period.

The capacity used for coating sheets for three-piece can bodies will become available for coating steel and aluminum two-piece end stock as the three-piece can is replaced by the two-piece can during 1980-1985. A 5-percent annual obsolescence rate and a 10-percent estimated scrap rate for the production of three-piece can bodies and steel and aluminum ends is assumed, based on 1979 actual shipments as reported by CMI[6] and industry projections.[1 2 3] These data imply that there will be an excess sheet coating capacity in 1985 and, therefore, that no end sheet coating facilities would be subject to NSPS. Detailed calculations follow.

Input data

| Beverage can shipments: | 1979 ($10^6$ units) | 1980 ($10^6$ units) |
|---|---|---|
| Three-piece cans | 9,748 | 1,500 |
| Two-piece cans | 44,694 | 61,900 |

| Sheet stock data: | Units/sheet | Sheet size (inches) |
|---|---|---|
| Three-piece can sheets | 35 | 35 × 42 |
| End sheets | 132 | 24 × 42 |

Coats per sheet:

- Three-piece can sheets: Three (exterior base coat, interior base coat, overvarnish)
- End sheets: Two (exterior coat, interior coat)

Calculations for 1979

Three-piece cans:

$$\frac{9{,}748 \times 10^6 \text{ cans shipped}}{\text{year}} \times \frac{\text{sheets required}}{35 \text{ cans}} \times \frac{1.10 \text{ sheets used}}{\text{sheets required}}$$

$$\times \frac{(35 \times 42) \text{ square inches}}{\text{sheet}} \times 3 \text{ coats} = 1{,}351{,}070 \times 10^6 \text{ square inches}$$

Three-piece can ends:

$$\frac{(9{,}748 \times 1.5)\ 10^6 \text{ ends shipped}}{\text{year}} \times \frac{\text{sheets required}}{132 \text{ ends}} \times \frac{1.10 \text{ sheets used}}{\text{sheets required}}$$

$$\times \frac{(24 \times 42) \text{ square inches}}{\text{sheet}} \times 2 \text{ coats} = 245{,}650 \times 10^6 \text{ square inches}$$

(assumes all steel ends and half of aluminum ends are made from sheets)

Two-piece can ends:

$$\frac{(44{,}694 \div 2) \times 10^6 \text{ ends shipped}}{\text{year}} \times \frac{\text{sheet required}}{132 \text{ ends}} \times \frac{1.10 \text{ sheets used}}{\text{sheets required}}$$

$$\times \frac{(24 \times 42) \text{ square inches}}{\text{sheet}} \times 2 \text{ coats} = 375{,}430 \times 10^6 \text{ square inches}$$

(assumes that half of the ends are made from aluminum sheets and half from precoated coil stock)

Total 1979 capacity for beverage cans: $1{,}972{,}150 \times 10^6$ square inches

Total 1979 capacity available in 1985: $1{,}449{,}710 \times 10^6$ square inches

$$1{,}972{,}150\ (1 - 0.05)^6 = 1{,}449{,}710$$

Calculations for 1985 (performed the same as calculations for 1979)

| | |
|---|---|
| Three-piece cans: | $207{,}900 \times 10^6$ square inches |
| Three-piece ends: | $37{,}800 \times 10^6$ square inches |
| Two-piece ends: | $519{,}960 \times 10^6$ square inches |

Total capacity required in 1985: $765{,}660 \times 10^6$ square inches

Excess sheet coating capacity, 1985:

$$\underset{\text{(Total capacity)}}{1{,}449{,}710} - \underset{\text{(required capacity)}}{765{,}660} = \underset{\text{(excess capacity)}}{684{,}050 \times 10^6} \text{ square inches}$$

Because the estimated demands in 1985 for three-piece cans and end stock coating capacity will be about 50 percent of estimated available capacity, EPA has determined that no plants would become subject to NSPS and that standards are not required. Consequently, three-piece can coating operations and end sheet coating operations are excluded from the promulgated standards.

These exclusions and the revised projection for two-piece cans necessitate changes in the environmental and energy impacts shown in Tables 7-12 and 7-22 of the draft EIS. Revised environmental and energy impacts are presented in Tables 2-3 and 2-4, respectively.

*2.1.2* Comment: Several comments were received stating that the proposed standards were not based on the best demonstrated system of continuous emission reduction (BDT). Three commenters (IV-F-1A, IV-D-3, IV-D-6) stated that the use of waterborne coatings has not been demonstrated as being commercially available. One commenter (IV-D-3) questioned that solvent-borne coatings and incineration could be used in the event waterborne coatings were impractical. One commenter (IV-F-1C) stated that promulgation of the proposed standards would force the industry to turn to one supplier for inside spray materials.

Response: As a result of these comments, EPA significantly expanded the data base upon which the standards are based through telephone and written communications with coaters and coating suppliers. The expanded data base, shown in Table 2-5, substantiated EPA's previous determination that the use of waterborne coatings is BDT and that coatings meeting the promulgated emission limits are available from more than one supplier. Summary of the data base is presented in the following paragraphs. While the coating of steel sheets for three-piece can bodies and steel and aluminum sheets for ends are excluded from the standards (see comment 2.1.1), coating data for these processes are included in the table. The discussion that follows is limited to two-piece beverage cans because the promulgated standards cover only this sector of the beverage can surface coating industry.

Commercially available waterborne coatings for two-piece cans are being used by a large number of canmakers representing a majority of the industry. Identity of coatings, VOC content, and reported usages are shown in Table 2-5. A summary of these data follows.

Two-piece can exterior base coat

Five canmakers, four merchant and one captive, reported using coatings with VOC contents equal to or less than that specified in the standards. Three of these canmakers identified four coatings from one supplier as being used, two reporting the use of complying coatings for all base coat requirements.[10 12] Of the remaining canmakers, one canmaker did not identify the coating being used,[13] and the other claimed confidentiality for the coating being used.[32] One additional coating from a second supplier has been qualified for use on one merchant coater's new and existing can lines. In discussions with canmakers during the collection of the data, no specific cases were identified in which waterborne coatings could not be used for the application of exterior base coat to two-piece beverage cans.

Two-piece can overvarnish/clear base coat

Four canmakers, three merchant and one captive, reported using coatings with VOC contents equal to or less than that specified in the standards. Two of these canmakers identified four coatings from two suppliers as being used, one reporting the use of complying coatings for all overvarnish requirements.[12] Of the remaining canmakers, one did not identify the coating being used,[13] and the other claimed confidentiality for five coatings being used. All of the captive canmakers' requirements are being satisfied by waterborne coatings meeting the NSPS emission limitations. Five additional coatings meeting the NSPS emission limitations are available from three suppliers. Future testing is planned for some of these coatings.

In discussions with canmakers during the collection of the data, no specific cases were identified in which waterborne coatings could not be used for the application of overvarnish or clear base coat to two-piece beverage cans.

Two-piece can inside spray

Seven canmakers, five merchant and two captive, reported using coatings with VOC contents equal to or less than that specified in the standards. Five of these canmakers identified four coatings from three suppliers as being used, two reporting the use of complying

coatings for all inside spray requirements.[12 15] Of the remaining two, one did not identify the coating being used,[13] and the other claimed confidentiality for the coating being used. During the collection of the data, two specific cases were identified in which industry maintained that satisfactory waterborne coatings were not available. One canmaker reported that for two plants making cans for export, excessive pinholing occurred because the extreme abuse the cans received in shipping and handling caused separation of the coating from the inside of the can. In subsequent discussions, the canmaker reported that the problems had been resolved and that waterborne coatings meeting the NSPS emission limitations are now being used for all inside spray operations at one plant. A program is underway at the second plant to develop a satisfactory waterborne inside spray system.[25] This plant is currently incinerating VOC emissions from inside spray operations to meet local regulations. In the second instance, a canmaker reported difficulty in applying waterborne inside spray to steel cans. In this case, solvent-borne coatings are still used and incineration is employed to satisfy the local emission limitations. The same procedures can be used to satisfy NSPS emission limitations if required. The necessary capture and destruction of VOC can be attained by enclosing the flashoff areas and incinerating the flashoff and oven exhausts.[29]

2.1.3 Comment: One public hearing participant (IV-F-1D) took exception to statements made in the beverage can factsheet that probably 4 new three-piece can plants and 10 to 20 new two-piece can plants were to be built between 1980 and 1985. This is not consistent with data that industry presented at the NAPCTAC meeting in June 1980, which indicated a dramatic reduction in three-piece can production and a leveling off of demand for two-piece cans. This comment was subsequently submitted in written form (IV-D-6).

Response: The beverage can factsheet (Docket Item 76-36 III-C-1), a summary of the proposal BID and regulation published at time of proposal, states that "EPA estimates 10 to 20 two-piece beverage can

plants and 4 three-piece beverage can plants will be affected by the proposed NSPS, the latter subject under the modification or reconstruction provisions." These plants are model plants and are the number that were considered subject to NSPS for the purposes of the economic analyses. It should be noted that the statement concerning three-piece can plants specifically excludes new facilities and indicates that facilities in place in 1979 would become subject to the modification or reconstruction provisions. The estimates of the number of model plants that could be subject to NSPS were based on industry estimates of the projected market share of two-piece and three-piece beverage cans that were later changed by data provided by the industry during the public comment period. As mentioned (comment 2.1.1), EPA analyzed the new industry data and developed revised projections that show that no three-piece can plants would be subject to the NSPS through 1985.

Insofar as two-piece can plants are concerned, based on the revised projections (see comment 2.1.1) EPA estimates that between 7 and 15 two-piece model plant equivalents would be subject to NSPS in 1985. Half of these will be subject under the reconstruction or modification provisions. These estimates assume that an average of 5 percent of existing capacity will become subject to NSPS under the modification and reconstruction provisions each year through 1985. This is consistent with industry projections that show an increase in two-piece can shipments from 49.6 billion cans in 1980 to 61.9 billion cans in 1985.

2.1.4 Comment: One respondent (IV-H-1) suggested that the BID could be improved by (1) comparing the approximately 900 counties subject to CTG limitation to the counties presently in nonattainment for ozone and (2) indicating the impact of achieving the various regulatory alternatives on the nonattainment states.

Response: Uncertainty as to the exact location of new facilities and specifics as to which existing facilities will be modified or reconstructed preclude analyses on a county-by-county basis.

2.1.5 Comment: Two public hearing participants (IV-F-1C, IV-F-1D) stated that if NSPS emission limitations were promulgated, major reformulation from coatings developed to meet RACT would be required. This redirection of coating suppliers' efforts would be at the expense of developing coatings that satisfy RACT. One of these participants subsequently submitted the comment in writing (IV-D-3). One commenter stated that the lack of continuity of units between the format of the standards and that of RACT will cause some coating suppliers to reformulate (if possible) after they have just recently reformulated (IV-D-2).

Response: EPA agrees that major reformulation may be required for some low-solvent coatings. However, based on the data presented in Table 2-5, this does not appear to be a problem. Coatings listed in this table were developed to satisfy RACT requirements. A majority of these coatings also will satisfy NSPS requirements.

2.1.6 Comment: One public hearing participant (IV-F-1D) and one commenter (IV-D-2) questioned the format of the proposed standards. The NSPS for the beverage can industry are based on kilograms of VOC per litre of coating solids. This differs from the format, kilograms of VOC per litre of coating minus water, currently being used by the States. While the new method may be more useful, it does not directly compare with the old method. Therefore, a coating may comply with the old method but not the new or vice versa.

Response: Compliance with the standards is determined by comparing the volume-weighted average VOC content of all coatings and diluent solvents used at each affected facility for each calendar month with the appropriate emission limitation. This calculation requires determination of the VOC content of each coating used as mass per volume of coating solids.

The RACT format can be converted to the NSPS format using the following equation:

kilogram of VOC per litre of solids =

$$\frac{\text{kilogram of VOC per litre of coating less water}}{1\ \text{(litre of coating)} - \frac{\text{kilogram of VOC per litre of coating less water}}{\text{density of VOC}}}$$

It is recognized that the conversion is sensitive to the VOC density; the lower the VOC density, the higher the calculated VOC content. In the conversion of VOC content expressed in the RACT format for selection of the numerical emission limitations of the promulgated standards, a density of 0.85 was used. This is lower than that normally used in waterborne coatings, and resulted in a higher numerical emission limitation than would have been determined had the density of the VOC used in the coating been available. This action favors the coater. Coatings formulated under the existing standards may still to be used in existing facilities; however, any new, modified, or reconstructed facility will be required to use coatings meeting the promulgated emission limitations.

2.1.7 Comment: One commenter (IV-D-4) questioned the need for an NSPS that requires industry to do what is already being done. New installations in nonattainment areas would be required to use lowest allowable emission rate (LAER) which in this case would be "achieved in practice," that would be the same as the proposed NSPS. Installations in attainment areas, if any, would of course be required to apply best available control technology (BACT), which would be the coatings now in use and the same as the proposed NSPS.

Response: In enacting Section 111, Congress intended to insure that every new, modified, or reconstructed facility, wherever located, control emissions to at least a nationally uniform emission ceiling. Congress recognized that in individual cases greater emissions reduction could be achieved than that achievable through application of BDT. For these individual cases, the Act may require application of more stringent requirements. Even though, as the commenter suggests, BACT or LAER requirements applicable in such individual cases may eventually spur development of broadly demonstrated coatings

similar to or better than NSPS-level coatings, Section 111 still requires the Agency to set minimum nationally applicable standards that will insure control of emissions at new sources to at least the level achievable through use of BDT.

2.1.8 Comment: One respondent (IV-D-5) stated that the proposed standards do not require the "best demonstrated system of continuous emission reduction . . ." By regulating the VOC content of coatings for new sources without regard to the quantity of coating supplied, the Agency is encouraging the construction of new facilities with greater emissions than identical existing CTG facilities. The quantity of coating needed by the various canmakers to produce an acceptable can is a much more significant factor in emission reduction technology than is the VOC content of the waterborne coatings which might be used. Manufacturing materials that inherently require less applied coating than other materials represent a better system of emission reduction. This is an obvious conclusion drawn from the draft EIS and from information contained in Docket A-80-4. As a result of ignoring this fact, the Agency has prepared a standard that cannot possibly be construed as meeting the intent of Section 111 of the Clean Air Act.

Response: In EPA's judgment the promulgated standards are based on BDT (see comment 2.1.2). Formatting the standards in terms of mass of VOC per unit of production, e.g., 1,000 cans, was considered in the development of the standards. This approach was discarded because of inflexibility in accommodating the range of coating thicknesses used by the industry to meet the requirements of the many types of beverage cans produced by the industry, especially at merchant can plants. Such an approach also raises problems in setting numerical limits for the standards. If an industry-average coating thickness is used as the basis, coaters using an above-average coating thickness would be penalized. Specifying maximum thickness for each coating use is an unreasonable approach and could only effectively be accomplished at an exorbitant cost. Consequently, this format was rejected in favor of the mass of VOC per volume of coating solids format.

## 2.2 EMISSION CONTROL TECHNOLOGY

2.2.1 Comment: A comment was made at the public hearing (IV-F-1B) that the proposed emission limitations were so stringent that coating suppliers would not have any latitude to vary formulations as required to meet the wide range of equipment used and the environmental conditions encountered in beverage can surface coating operations.

Response: The coating data presented in Table 2-5 indicate that coating suppliers are providing coatings meeting the promulgated emissions limitations for a wide range of equipment and environmental conditions. Only two specific cases were identified, involving two-piece can inside spray operations, in which waterborne coatings could not be used. In these cases operational and environmental requirements were being satisfied through the use of solvent-borne coatings and incineration (see comment 2.1.2). Furthermore, the monthly averaging provisions of the standards for each affected facility would permit the use of some coatings not meeting the standards, provided other coatings with lower VOC were used to bring the monthly average to the promulgated emission limitations. As indicated in Table 2-5, a range of waterborne coatings is available.

2.2.2 Comment: At the public hearing one participant (IV-F-1B) stated that under NSPS, existing coating systems that have not yet been able to meet RACT values must meet even more stringent emission standards. Essentially only incineration, a counterproductive energy-consuming system, can be used.

Response: Existing equipment is not required to meet the promulgated standards unless the facility undergoes modification or reconstruction as defined in 40 CFR 60. Under such circumstances, EPA considers that there are sufficient coatings commercially available to meet the standards. (See comment 2.1.2 above.) Incineration is considered to be a reasonable and affordable option (Chapter 8, proposal BID as amended by docket item IV-B-12).

2.2.3 Comment: One participant at the public hearing (IV-F-1C) and two commenters (IV-D-3, IV-D-5) expressed concern that if NSPS materials for two-piece can inside spray are not available,

afterburners will have to be used. This could very well call for an overall control efficiency of 80 percent, requiring approximately 90 percent capture efficiency, which is not attainable.

Response: Coating data presented in Table 2-3 (comment 2.1.2) indicate the availability of a variety of waterborne coatings for inside spray. The VOC content of waterborne coatings reported as being used by both merchant and captive canmakers ranges from 0.46 to 0.90 kg VOC/litre of solids compared with the promulgated emission limitation of 0.89 kg VOC/ litre of solids. The promulgated regulations permit monthly averaging, which should facilitate satisfying the requirements. (See comment 2.2.1.)

During the collection of data, only two cases were identified in which satisfactory waterborne coatings were not available. In these cases, solvent-borne coatings and incineration provided the requisite emission reduction.

A typical higher solids, solvent-borne inside spray coating in general use contains 3.01 kg VOC/litre of coating solids (Table 4-2, proposal BID). An overall control efficiency of 70 percent is required to reduce the VOC emissions from the use of this typical inside spray coating to the emission level prescribed in the promulgated standards. A test at a two-piece can plant, using Method 25 procedures, showed a 78-percent capture efficiency of VOC emissions from coater, flashoff area, and cure oven on an inside spray line. This capture efficiency is thought to be conservative because the cure oven quench exhaust was not quantified in the test.[29 30] Combining this capture efficiency with a nominal 90-percent incinerator destruction efficiency results in an overall control system efficiency of 70 percent. It is the Agency's engineering judgment that, in instances in which the use of waterborne coatings may not be applicable, the necessary capture and control (destruction or recovery) are attainable at a reasonable and affordable cost (Chapter 8, proposal BID and docket item IV-B-12).

2.2.4 Comment: Three participants at the public hearing (IV-F-1B, IV-F-1C, IV-F-1D), two of which provided additional information in

subsequent correspondence (IV-D-3, IV-D-4), stated that because of (1) difficulties being experienced in implementing the RACT program, (2) the limited capabilities of users to qualify new coatings, (3) the problems involved in qualifying NSPS materials on existing lines prior to the construction of new facilities, and (4) small incremental emission reduction from NSPS compared to that resulting from the trend away from three-piece cans to two-piece cans, RACT values should form the basis for NSPS.

Response: The problems of implementing RACT and the problem generated by the limited capabilities of users to qualify new coatings appear to be overstated in light of the data shown in Table 2-5. Numerous coatings with VOC content equal to or less than RACT are being used on existing two-piece can lines. In addition to meeting RACT, many of these coatings also satisfy the NSPS requirements. (See comment 2.1.2.)

The problems of qualifying NSPS materials on existing lines prior to the construction of new facilities would not be resolved by using RACT as the basis of the NSPS. One practice prevalent throughout the industry is that coatings must be qualified on each line regardless of the use in other plants operated by the same canmaker.

EPA agrees that there has been a significant reduction in VOC emissions as a result of RACT and the trend away from three-piece cans to two-piece cans. However, EPA is mandated under Section 111 of the Clean Air Act to base NSPS on the BDT, which for this industry is the use of coatings with lower organic solvent content than RACT coatings.

In view of this and in the light of data presented in Table 2-5 (comment 2.1.2), EPA has determined that the promulgated emission limitations for two-piece cans represent BDT.

2.2.5 Comment: One participant at the public hearing (IV-F-1D) commented that EPA, in proposing NSPS, has tried to design can lines and specific materials.

Response: To perform the environmental and economic analyses required in NSPS development, model plants were formulated. These are not intended to represent what an actual plant should look like, but

rather to present a range of capacities as the basis of subsequent analyses. The model plants are based on coatings currently in use on sufficient lines to warrant the determination of the availability of NSPS-compliance coatings. EPA's specification of BDT is not in any way a requirement that facilities use a specific technology.

2.2.6 Comment: One commenter (IV-D-4) challenged the implied assumption in the BID that the industry is using coatings which are RACT as defined in CTG-II. The projected emissions of VOC assume that all the coatings being applied today in two-piece beverage cans are RACT. This is not the case, as shown in Tables C-1, C-2, and C-3 on pages C-4 to C-6 of Appendix C in the BID. These tables list the VOC content of coatings that are in general use today for two-piece beverage cans and that are the proposed standards for the two-piece can.

Response: The assumption that industry is currently using RACT coatings was not made in the development of the NSPS. Rather, the assumption was made that SIP emission limitations would be based on RACT and that RACT should form the baseline case against which the environmental and energy analyses could be made.

EPA recognizes that on some can lines, coatings with VOC content lower than RACT are being used. These coatings serve as the bases for the promulgated emission limitations. On other lines RACT coatings are being used, and on the remaining lines coatings with VOC content higher than RACT are in use. In the development of a baseline for use in the environmental and energy analyses, EPA made the assumption that in the absence of NSPS, the industrywide average VOC content would be equal to RACT.

2.2.7 Comment: One commenter (IV-D-5) requested that ink/lithography emissions should be explicitly excluded in the preamble to avoid future confusion, particularly at the State and local agency level.

Response: The promulgation preamble contains such a statement.

2.2.8 Comment: One commenter (IV-D-5) stated that the last line of paragraph 6, page 3-4, draft EIS, should read ". . . two-piece can end line."

Response: Paragraph C, page 3-4, draft EIS should read as shown in the comment.

2.2.9 Comment: One respondent (IV-D-5) stated that the seventh line of paragraph 4, page 3-17, draft EIS should read ". . . when coil stock is."

Response: Seventh line of paragraph 4, page 3-17, draft EIS should read as shown in the comment.

2.2.10 Comment: One commenter (IV-D-5) stated that the distinction should be made in the draft EIS (p. 3-10) between steel and aluminum with regard to exterior base coat for two-piece cans.

Response: No distinction is made between steel and aluminum two-piece cans in the development of model plants. While it is recognized that different coatings thicknesses are required, the additional effort is not justified by the marginal improvement in accuracy that would result in estimating emissions and energy requirements in the subsequent analyses.

2.2.11 Comment: One commenter (IV-D-5) stated that a BID reference (4-57) covering the use of no-varnish inks was outdated.

Response: Reference 57, Chapter 4, draft EIS, was included to indicate the trend away from no-varnish inks. The citation from this reference must be taken in the context of the entire section in which it appears, the last paragraph of which states, "During 1979 there was a trend away from no-var inks. . ."

2.2.12 Comment: One commenter (IV-D-5) indicated that Reference 46, Chapter 4, draft EIS, is superseded by Reference 65. There is no indication that any new or modified facility would use solvent-borne coatings with incineration, even if it were a feasible means of achieving NSPS.

Response: Use of solvent-borne coatings and incineration must be considered as a viable alternative to satisfying NSPS requirements. One captive canmaker recently built a new plant using incineration and is currently operating this facility using solvent-borne coatings.

2.2.13 Comment: Recommendation is made that the end-sealing application should be deleted from Tables 4-1 and 4-2, draft EIS.

Several years elapse between "qualification tests" and "general use." Waterborne end-sealing compound is not a realistic option at this time. (IV-D-5).

Response: Tables 4-1 and 4-2 of the draft EIS are intended to present state-of-the-art. The use of waterborne end-sealing materials is footnoted to indicate that the material is undergoing qualification tests. As such, its inclusion in Table 4-1 is considered appropriate. The same is true with the use of solvent-borne end-sealing materials listed in Table 4-2. The preamble to the proposed regulation excludes end-sealing compound emissions because the technology was not considered as having been demonstrated.

2.2.14 Comment: Exception was taken (IV-D-7) to EPA's statement in 45 FR 78982 that "transfer efficiencies of 90 percent with inside spray operations are consistently achieved." Exactly what EPA's use of 10-percent VOC assessment in this instance means was unclear. It was requested that EPA consider allowing a facility that demonstrates a consistent transfer efficiency (for inside coating operations) of greater than 90 percent to credit that percentage above 90 percent against other coating operations that may exceed the compliance limits.

Response: Because of the absence of standardized procedures for determining transfer efficiencies, the complicated calculations for estimating transfer efficiencies, and the high transfer efficiencies consistently achieved for inside spray operations (over 90 percent), EPA determined that introducing a transfer efficiency into the equations prescribed for determining compliance would unnecessarily complicate the compliance procedures. Because of the high transfer efficiencies (90 percent or higher) that are consistently achieved, inclusion of such a term in the compliance equation would be equivalent to introducing essentially the same term on both sides of the equation. Consequently, the promulgated standards are based on an assumed 100-percent transfer efficiency. It should be noted that a 90-percent transfer efficiency was used in the environmental and energy analyses for inside spray operations.

2.2.15 Comment: One participant at the public hearing (IV-F-1D) questioned the feasibility of specifying NSPS emission limitations for steel and aluminum end sheet coating so close to the RACT number--0.50 kg VOC/litre of solids versus 0.54 kg VOC/litre of solids.

Response: The comment is no longer applicable. Coating of aluminum and steel sheets for ends has been eliminated from the promulgated standards. (See comment 2.1.1.)

2.2.16 Comment: One commenter (IV-D-2) questioned the use of an assumed VOC density of 0.85 kg/litre of solids in converting RACT numbers to kilograms of VOC per litre of solids. It is dangerous to propose new standards on assumptions rather than hard data. For example, an error of 5 percent in VOC density would result in a change of 37 percent in the calculated kilograms of VOC per litre of solids. Furthermore, no can manufacturer or coating supplier has been able to duplicate the data in the BID. One commenter questioned using VOC content based on other than Reference Method 24 data (IV-D-5).

Response: EPA recognizes that the conversion of VOC content from RACT terms is sensitive to the density of the VOC solvent. The selected density of 0.85 kg/litre is below that of the VOC normally used in waterborne coatings. Use of this density results in a higher VOC content per volume of solids than if actual VOC density of the coating upon which the promulgated emission limitations are based were used. Inasmuch as this favors the coater, EPA considers this approach appropriate. The 37-percent error in calculated kilogram of VOC per litre of solids from a 5-percent error in density appears to be overstated. EPA calculations on the impact of a 5-percent error in density indicate, as shown below, that even if the assumed density of 0.85 kg/litre were inaccurate by 5 percent, the resulting effect on conversion from RACT to NSPS terms would not be significant.

| Density | Calculated VOC content (kg/litre solids) | Percent change |
|---|---|---|
| VOC content kg/litre of coating less water = 0.50. | | |
| 0.85 × 0.95 | 1.313 | 8.2 |
| 0.85 | 1.214 | 0 |
| 0.85 × 1.05 | 1.137 | 6.3 |
| VOC content kg/litre of coating less water = 0.15 | | |
| 0.85 × 0.95 | 0.184 | 1.1 |
| 0.85 | 0.182 | 0 |
| 0.85 × 1.05 | 0.180 | 1.1 |

The following equation was used in converting the RACT format to NSPS.

$$\text{kilogram of VOC per litre of solids} = \frac{\text{kilogram of VOC per litre of coating less water}}{1 \text{ (litre of coating)} - \frac{\text{kilogram of VOC per litre of coating less water}}{\text{density of VOC}}}$$

In using this equation to develop the basis for the promulgated emission limitations, an organic solvent density of 0.85 kg/litre was assumed. As mentioned above and in the response to Comment 2.1.6, this is below the density of the VOC normally used in waterborne coatings. Use of this density results in a higher VOC numerical limitation than would have been determined if the actual VOC density were used. This action favors the coater.

2.3 MODIFICATION AND RECONSTRUCTION

2.3.1 Comment: One commenter (IV-D-3) felt that the replacement of a coater or oven should not be classified as reconstruction because it is replacement in kind due to wear, not to increased material usage, and that replacement should not be subject to NSPS.

Response: In promulgating 40 CFR 60.15, EPA intended to subject to NSPS existing sources that have undergone such extensive component replacement that they have become essentially new sources. Application of BDT to facilities with largely new components furthers the intent of Congress that emissions be minimized through application

of BDT with the turnover in the nation's industrial component base. This purpose is advanced through coverage of facilities that undergo substantial component replacement, whether the replacement is due to wear or increased material usage, and whether or not an emissions increase results from the replacement.

Under Section 60.15, the replacement of a piece of equipment does not in itself subject an existing facility to NSPS. However, once the cost of components over time exceeds 50 percent of the cost of a comparable new facility and it is technologically and economically feasible for the facility comply, NSPS would apply. In making decisions that involve the expenditure of funds that would trigger the reconstruction provisions, industry also would consider the cost of any control system that may be necessary to meet the NSPS requirements.

## 2.4 ECONOMIC IMPACT

2.4.1 Comment: Two respondents (IV-D-6, IV-D-7) and one public hearing participant (IV-F-10) questioned EPA's conclusion that the proposed standards would have little economic impact on the beverage can industry. Recommendations that the adoption of emission limits lower than RACT would essentially shut off expansion in the beverage can industry were ignored. EPA would be imposing VOC emission limits below the (current) lowest achievable levels of several can coating manufacturers. If those manufacturers could not achieve the new levels, the November 26 proposals would be regulating them out of business at the outset. This in turn would reduce or restrict competition within the coating supply industry, which would cause substantial economic hardship to can manufacturers. One public hearing participant (IV-F-1A) stated that EPA ignored industry's comments that adopting emission limitations lower than RACT would essentially shut off expansion in the beverage can industry.

Response: Because EPA's analyses of industry projections showed that no end or three-piece capacity would be subject to the standards in 1985, only two-piece cans are covered by the promulgated standards (comment 2.1.1). Therefore, response will be limited to

two-piece beverage cans. The promulgated standards will not apply to existing facilities except when they become subject to the modification or reconstruction provisions of 40 CFR 60. Industry's recommendations concerning the adoption of emission limits lower than RACT were not ignored. For example, as a result of industry comments at the NAPCTAC meeting, application of end-sealing compound was excluded from the proposed standards. Industry's recommendations were considered in the development of the promulgated standards, but in the light of other economic and coating availability data, a determination was made that the promulgation of NSPS for the beverage can surface coating industry would not result in exorbitant or unreasonable economic impacts. As a result of this and other comments, EPA reviewed the economic analyses and the cost data upon which they were based. It was found that the cost data used for the economic analyses reported in Chapter 8, Volume I BID, included only the capital costs involved in the construction of the coating portion of a two-piece can line and did not include the cost of the front- and back-end equipment. Costs were revised and the economic analysis redone. Revised costs and analyses are included in Docket Item IV-B-12. The revised economic analyses show significantly smaller economic impacts than those reported in Volume I of the BID. Therefore EPA's conclusions that no adverse economic impacts are expected to occur are still valid. Coatings meeting the promulgated standards are available and in use in a sufficient number of cases to warrant the determination that the technology is available (see comment 2.1.2). EPA projects a net savings to result from the use of waterborne coatings. The use of solvent-borne coatings and incineration as an alternative means of compliance is estimated to reduce the return on investment by about 2 percent, depending on plant size. From 2 to 5 percent additional capital outlay would be required over that required to achieve RACT. While these are negative economic impacts, they are considered reasonable and affordable.

2.5 ENERGY IMPACT

2.5.1 Comment: One comment was made that the energy requirements in Tables 6-6, 7-18, and 7-22, draft EIS, do not take into account that ventilating air must be heated in winter (IV-D-5).

Response: Ventilating air must be heated in the winter whether or not NSPS are promulgated. The energy analysis is based on the incremental energy requirements between the base case and the emission control option under consideration. In all cases except one, the ventilating air requirements are significantly less than for the base case. End forming, the exception, has been excluded from the standards. Thus, any error introduced by not including the heating of ventilating air results in a lower energy savings than would actually be realized over the base case.

2.5.2 Comment: One commenter (IV-D-7) took exception to the statement in the preamble that the proposed standards would result in a net energy reduction because less coating per can would be used (based upon higher solids contents of waterborne coatings). Experience indicates that waterborne coatings require as much or more energy expenditure as solvent-borne coatings. Further review or data collection concerning this issue was recommended. The commenter offered to submit data for both waterborne and solvent-based can coatings, upon EPA's request.

Response: This comment was subsequently withdrawn (IV-D-19) because appropriate inquiries by the commenter to other canmakers led to the conclusion that the comment was not applicable to the industry as a whole. However, because the issue was raised, EPA considers that a general discussion of energy requirements is appropriate.

It is assumed that the comment applies only to two-piece cans because the commenter's company makes only that type of can. Under some conditions, cure oven energy requirements for waterborne-coated two-piece cans may be higher than for solvent-borne coatings. As discussed in Chapter 3 of the proposal BID, when waterborne coatings are used, exhaust air flow through the cure oven is based on considerations other than the lower explosive limit. Sufficient air

must pass through the oven to clear the VOC and compounds that may be formed during the curing process. In general, air flows are about the same as when solvent-borne coatings are used.

In such a case, the energy to heat and vaporize the water content of the coating would be greater than that required for an equivalent volume of VOC. However, energy required to heat and vaporize water or VOC is less than 10 percent of the total energy requirements when pin ovens are used. The greater portion of the energy requirements is for heating the air, heating the cans, and heating the pins. Similar consideration would apply to other than pin-type ovens.

In determining incremental energy impacts, both the base case and regulatory alternative energy requirements were based on the use of waterborne coatings. Because the energy impact is based on the difference between the base case and the alternative under analyses and for the reasons cited above, the energy analyses are considered to be sufficiently accurate for standards development purposes.

## 2.6 ENVIRONMENTAL IMPACT

2.6.1 Comments: Two participants at the public hearing (IV-F-1C, IV-F-1D) stated that emission reductions will occur naturally as a result of conversion from three-piece to two-piece can production. Coating material used for the manufacture of two-piece cans is approximately 28 percent less than the coating material used for the manufacture of three-piece cans, regardless of whether the material used is conventional high solvent or RACT. Therefore, a net emission reduction results with the shift from three-piece cans to two-piece cans. This reduction far outweighs any reduction that will occur as a result of implementation of NSPS. These comments were subsequently submitted in writing (IV-D-3, IV-D-6).

Response: EPA agrees that there has been a significant reduction in VOC emissions as a result of the trend away from three-piece cans to two-piece cans. Emission data to date substantiate this. It is also true that reduction attainable through the promulgation of the beverage can surface coating NSPS will be much less than that achievable upon complete implementation of the RACT

program. However, EPA is required under Section 111 of the Clean Air Act to promulgate NSPS for industries within source categories on the Priority List where, as in the case of this industry, application of control technology will achieve significant reduction beyond that achieved without NSPS. Application of BDT, which for this industry is the use of coatings with lower organic solvent content than RACT coatings, would achieve such a reduction. As a result, Section 111 requires EPA to promulgate standards reflecting such application.

## 2.7 LEGAL CONSIDERATIONS

2.7.1 Comment: Three canmakers (IV-F-1B, IV-F-1D, IV-D-2) were concerned that moving an existing plant to another site would subject the plant to NSPS or State new source emission limitations. One canmaker (IV-D-15) subsequently submitted hypothetical situations to support his contention that problems would be encountered by State interpretation, which would consider the facility as a new source even if NSPS did not apply.

Response: Movement of an affected facility to another site, in itself, is exempted from NSPS under §60.14(e)(6). This exemption applies to 40 CFR 60 only. State or local regulations and other Federal regulations covering prevention of significant deterioration or new source review could apply to the move.

2.7.2 Comment: One respondent (IV-D-2) stated that the Agency's definition of an affected facility as each coating operation, as opposed to an entire line or an entire manufacturing plant, may not provide the same degree of latitude as the existing "bubble concept" and may limit methods of compliance. One commenter (IV-D-3) recommended that an alternate compliance plan be incorporated in the NSPS. If the total facility emissions are equivalent to NSPS limitations using an alternate compliance plan, there is no detriment to the environment; therefore, an alternate compliance plan should be permissible. Particularly in a facility that would have a combination of NSPS and RACT limitations, an alternate compliance plan should be allowed. This would permit the facility to use the same materials for all lines, NSPS and RACT in combination. This plan would improve implementation of an air pollution control program.

Response: The "bubble concept" refers to application of a standard to an entire plant rather than to individual emission points, although emission ceilings may concurrently be assigned to individual emission points. The term "affected facility" refers to the particular portion of a plant to which a standard applies. In this case the affected facility has been defined as a surface coating operation, which consists of a coating application station(s), flashoff area(s), and cure oven. The choice of the affected facility for any standard is based on the Agency's interpretation of the Clean Air Act, as amended, and judicial construction of its meaning. Under Section 111, the NSPS must apply to "new sources"; a "source" is defined as "any building, structure, facility, or installation which emits or may emit any air pollutant" [Section 111(a)(3)]. Most industrial plants, however, consist of numerous pieces or groups of equipment that emit air pollutants and that might be viewed as "sources." EPA uses the term "affected facility" to designate the equipment, within a particular kind of plant, that is chosen as the "source" covered by a given standard.

In choosing the affected facility, EPA must decide which pieces or groups of equipment are the appropriate units for separate emission standards in the particular industrial context involved. The Agency does this by examining the situation in light of the terms and purpose of Section 111. One major consideration in this examination is that the use of a narrower definition results in bringing replacement equipment under the NSPS sooner; if, for example, an entire plant were designated the affected facility, no part of the plant would be covered by the standard unless the plant as a whole were "modified." If, on the other hand, each piece of equipment were designated the affected facility, as each piece were replaced, the replacement piece would be a new source subject to the standard. Because the purpose of Section 111 is to minimize emissions by application of the best demonstrated control technology (considering cost, other health and environmental effects, and energy requirements) at all new and modified sources, the presumption is that a narrower designation of

the affected facility is proper. This designation insures that new emission sources within plants will be brought under coverage of the standards as they are installed. This presumption can be overcome where the impacts attributable to the narrower designation are unreasonable in the light of emissions reduction resulting from the selection of that definition.

The Agency has determined that the selection of each coating operation as the affected facility would not result in unreasonable impacts. It is technologically and economically feasible to control each surface coating operation. Choosing a combination of surface coating operations or the whole plant as the affected facility would be inconsistent with the language and intent underlying Section 111 because this broader definition would delay NSPS coverage of new facilities within the plant. Bubbling emissions at NSPS-regulated facilities with emissions at RACT facilities could permit all NSPS-regulated facilities in a plant to achieve less than BDT-level control. This would be inconsistent with Section 111's requirement that emissions at NSPS-regulated facilities be controlled to the level reflecting application of BDT. Therefore, the Agency has selected each surface coating operation as the affected facility for these standards.

2.7.3 Comment: One commenter (IV-D-3) stated that EPA's banking policy provides a built-in incentive for industry to develop materials superior to RACT. Resulting reduction in emissions from existing plants will far outweigh any benefits that might result from the implementation of NSPS.

Response: The NSPS program does not prevent existing plants from banking emissions. NSPS are emission limits for new, modified, and reconstructed affected facilities based on BDT. In accordance with Section 111, these standards insure at least a specified minimum level of control at new, modified, and reconstructed facilities, wherever located--including those for which banking and other economic incentives may not be sufficient to induce good control of VOC emissions in the absence of NSPS.

2.7.4 Comment: One commenter (IV-D-3) was concerned that the promulgation of NSPS would jeopardize the ongoing RACT program if a new line were added to an existing plant, which is very common in the can business. The new line would be governed by NSPS limitations. Different coatings would be required for use on the new line than on the old line. Maintaining inventory and regulating the use of the two different sets of coatings for the production of the same can would be unmanageable. If the plant used alternate compliance, a complicated calculation scheme would be needed to demonstrate compliance with both NSPS and RACT. The dual system of RACT and NSPS in a plant will not work and will lead to demise of one or another in terms of practicality. Either the entire facility will be switched to NSPS, or RACT materials will be incinerated on NSPS lines. This concept is contrary to the recent U.S. EPA policy of discouraging the use of afterburners.

Response: The situation that would result from the addition of a new line subject to NSPS to an existing plant appears to be no different from the situation in existing plants that make more than one type of beverage can, each of which may require different types of coating. The same procedures used to maintain inventories and regulate the use of different coatings in the latter plant are considered to be applicable to the situation described in the comment.

The procedures outlined for determining compliance for plants using RACT coatings[31] and in the draft regulation for plants using NSPS coatings are not incompatible and permit the use of RACT coatings on one line and NSPS coatings on another. Furthermore, in enacting Section 111, Congress recognized that to enhance air quality over the long run it is important that new sources within a plant achieve limits based on the best demonstrated technology, irrespective of the level of control at existing sources within the plant.

Compliance of the NSPS affected facilities in a can plant would be determined using volume of coatings, VOC content thereof, and diluent solvent used in the affected facility by the procedures presented in the proposed regulations. Compliance of that portion of

the plant subject to RACT would be in accord with provisions of the applicable State and local regulations. The data required for these calculations are considered to be those that any prudent manufacturer would maintain even if the NSPS were not promulgated.

2.7.5 Comment: One commenter (IV-D-2) felt that the information needed by EPA to determine compliance and to calculate emission inventories could be done with annual reports as opposed to monthly compliance determinations. These reports would only need to list each coating used by the plant along with kilograms of VOC per litre of solids and actual usage amounts. Those plants required to run control equipment would also have to report the average percentage of VOC reduction by the equipment and the number of production hours that the control equipment was not running, which could be backed up by a simple chart record.

Response: Annual reports are not considered an acceptable basis for determining compliance. Such an approach would permit a wide fluctuation in the mass of VOC emitted to the atmosphere at any one time. All of the canmakers contacted during the development of the standards reported maintaining coating-usage data on at least a monthly basis. As stated in paragraph 2.9.1, EPA has investigated alternatives for reducing recordkeeping and reporting burdens and has changed the requirement for immediate reporting of noncompliance to semiannual reporting.

The promulgated regulations do not require reporting the average percentage of VOC reduction if an incinerator was used, or the number of hours the control system was not operating. Where compliance is achieved through the use of incineration, the owner or operator is required to identify and report, semiannually, all 3-hour periods during which the operating temperature, when cans are being processed, was more than 28° C below the average temperatures of the device during the most recent performance test. The destruction efficiency of the control device determined during the most recent performance test is used in determining compliance during any calendar month.

2.8 TEST METHODS AND METHODOLOGY

2.8.1 Comment: Two commenters (IV-D-2, IV-D-6) questioned the relationship of the proposed standards and the use of Reference Method 24 for determining compliance. Recommendations were made that the proposed standards should include a "cushion" that would allow for differences in test findings resulting from variation of the three experimentally determined physical constants used to calculate VOC content of coatings. Upward readjustment of the proposed standards to at least RACT level is required to avoid capricious erroneous noncompliance findings.

Response: EPA recognizes the potential variability in the results when Method 24 is used to analyze water-based coatings. EPA intends for enforcement agencies to consider this variability when using Method 24 results to determine compliance with the standard. The promulgated regulation requires that when Method 24 data are used to determine VOC content of waterborne coatings for compliance determinations, they be adjusted as described in Section 4.4 of Method 24.

If the VOC level of a waterborne coating, based on formulation, is at or below the standard, there is less than one chance in 10,000 that the Method 24 adjusted results would show the VOC level to be above the standard. The Agency considers this risk insignificant compared to the usefulness of Method 24 in determining compliance.

2.9 REPORTING AND RECORDKEEPING

2.9.1 Comment: One commenter (IV-D-2) stated that the recordkeeping requirements are unnecessarily tedious and time consuming, ask for much nonessential information, and necessitate intimidating and complex calculations. Production people would be required to do day-to-day and even hour-to-hour monitoring. The recordkeeping requirements penalize manufacturers that must meet the standards using control equipment instead of compliance coatings. The Agency's estimate that the proposed requirements would cost the industry 12 person-years over the first 5 years of the standards is unrealistically low. The commenter added that his company has less

than 10 percent of the nation's two-piece can business, and conservatively estimates a cost of 2.3 person-years over the first 5 years of the standards. Even if the Agency's estimate is correct, the requirements are unnecessarily involved and are another example of an inflationary, nonproductive expense imposed upon industry by a governmental agency.

Response: The reporting and recordkeeping requirements were selected as being the minimum required to insure continuous compliance with the standards. EPA disagrees that day-to-day or hour-to-hour monitoring will be required. Compliance is determined on a monthly basis and requires data that any prudent manufacturer would normally maintain. For facilities using waterborne coatings, required data consist of the volume and VOC content of each coating and the volume and density of each diluent VOC solvent used during each calendar month. When an emission control system is used, the most recently determined overall reduction efficiency of the system also is required.

EPA has been investigating alternative ways of reducing monitoring, recordkeeping and reporting burdens on owners and operators. The goal is to reduce all recordkeeping and reporting that is not essential to insuring proper operation and maintenance. After reviewing the requirements in the proposal, EPA determined that monitoring and compiling data are essential for both the owner or operator and EPA to insure proper operation and maintenance. A responsible owner or operator would need monitoring information compiled in a usable form to determine when adjustments in the control system are needed to insure that it is performing at its intended effectiveness level. It was judged, however, that immediate reporting of noncompliance with the standards is not essential to EPA. Semiannual reporting is considered sufficient to enable EPA to efficiently discharge its enforcement responsibility. Therefore, after initial performance testing, the requirement to immediately report all instances of noncompliance, as required in the proposal package, has been changed to require only semiannual reports. Reports

required under the general provisions of 40 CFR 60 remain unchanged. States delegated the authority to enforce these standards remain free to impose their own reporting requirements in conjunction with this regulation.

Recordkeeping provisions of the proposed standards require maintaining records of all data and calculation for at least 2 years. In addition, records of incinerator operating temperatures are required if incineration is used, as are data on daily solvent recovery if a solvent-recovery system is used. Incinerator temperatures and daily solvent-recovery data are considered essential to the operation of these devices and would be generated, maintained, and examined whether or not required by the standards.

Details of the estimate that 12 person-years would be required by industry during the first 5 years of the standard are contained in the Reports Impact Analysis (Docket Item II-1-53). The estimates of industry requirements during the first 5 years have been revised downward to 11 person years as a result of the change between proposal and promulgation (Docket Item IV-J-2). In a subsequent discussion the commenter stated that the 2.3 person-years was a worst case estimate based on all existing facilities being modified or reconstructed during 1980-1985.[5]

Annual recordkeeping and reporting requirements for each affected facility used in the Reports Impact Analysis are as follows:

| Report | Estimated person-hours |
|---|---|
| One-time reports required by the General Provision of 40 CFR 60 | 98 |
| Recurring reports | |
| Monthly compliance determination | 24 |
| Report noncompliance | 1 |
| Report quarterly incineration operating parameter | 8 |
| Maintain daily record of solvent recovery | 60 |

It is EPA's judgment that the estimates are based on best available data, that the estimates are realistic, and that the requirements are not inflationary.

TABLE 2-1. LIST OF COMMENTERS ON THE PROPOSED STANDARDS OF PERFORMANCE FOR THE BEVERAGE CAN SURFACE COATING INDUSTRY

| Dockent number | Commenter and affiliation |
|---|---|
| IV-D-1 | Jack M. Heinemann<br>Advisor on Environmental Quality<br>Federal Energy Regulatory Commission<br>Washington, D.C. 20426 |
| IV-D-2 | Kelly Murphy, P.E.<br>Environmental Engineer<br>Ball Metal Container Group<br>Westminister, Colorado 80020 |
| IV-D-3<br>IV-F-1C[a] | R. M. Rivetna<br>Manager, Environmental Engineering<br>National Can Corporation<br>Chicago, Illinois 60631 |
| IV-D-4 | Richard D. McKirahan<br>American Can Company<br>Greenwich, Connecticut 06830 |
| IV-D-5 | R. H. Donaldson, P.E.<br>Manager, Environmental & Energy Compliance<br>Reynolds Aluminum<br>Can Division Headquarters<br>Richmond, Virginia 23234 |
| IV-D-6<br>IV-F-1D[a] | George O. Payne, Jr.<br>Chairman, Hydrocarbons Task Force<br>Can Manufacturers Institute<br>Washington, D.C. 20036 |
| IV-D-7<br>IV-D-19 | Cecelia J. Pollara<br>Regulatory Affairs Analyst<br>Adolph Coors Company<br>Golden, Colorado 80410 |
| IV-D-8 | Harry H. Hovey, Jr., P.E.<br>Director, Division of Air<br>New York State Department of Environmental Conservation<br>Albany, New York 12233 |
| IV-D-9<br>IV-D-14 | George O. Payne<br>Continental Can Company<br>Chicago, Illinois |
| IV-D-10[b] | Harvey M. Sheldon<br>Nisen, Elliott & Meier<br>Chicago, Illinois 60602 |

See footnote at end of table. (continued)

TABLE 2-1. (continued)

| Docket number | Commenter and affiliation |
|---|---|
| IV-D-11 | Harvey M. Sheldon<br>Nisen, Elliott & Meier<br>Chicago, Illinois 60602 |
| IV-D-12 | R. Turner<br>Manager, Environmental and Energy<br>Miller Brewing Company<br>Milwaukee, Wisconsin 53201 |
| IV-D-13 | R. H. Shinn<br>Director of Research<br>Crown Cork and Seal Company, Inc.<br>Philadelphia, Pennsylvania 19138 |
| IV-D-15<br>IV-F-1B[a] | Robert A. Gere<br>Manager, Air Compliance<br>Corporate Public Affairs<br>American Can Company<br>Greenwich, Connecticut 06830 |
| IV-D-16 | Paul W. Hallman<br>General Counsel<br>Can Manufacturers Institute<br>Washington, D.C. 20036 |
| IV-D-17[c] | R. M. Rivetna<br>Manager, Environmental Engineering<br>National Can Corporation<br>Chicago, Illinois 60631 |
| IV-H-1 | Robert T. Miki<br>Deputy Assistant Secretary for<br>Regulatory Policy (Acting)<br>U.S. Department of Commerce<br>Washington, D.C. 20230 |
| IV-F-1A[a] | George Gerhardt<br>Mobil Chemical Company |

[a]Public hearing comment.

[b]Identical to IV-D-6, submitted by a law firm representing the Can Manufacturers Institute.

[c]Provided additional data in support of IV-D-3.

TABLE 2-2. COMPARISON OF BID ENVIRONMENTAL AND ENERGY ANALYSES WITH ANALYSES BASED ON CMI/AMERICAN CAN PROJECTIONS OF BEVERAGE CAN SURFACE COATING ACTIVITIES

| | Shipments ($10^9$ units) | | | | Capacity subject to NSPS ($10^9$ units) | | Emissions reduced by NSPS (Mg) | | Energy reduction (GJ) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | | 1985 | | | | | | | |
| | BID | CMI | BID | CMI | BID | CMI | BID | CMI | BID | CMI |
| Two-piece steel and aluminum cans | 46.0 | 49.6 | 65.9 | 61.9 | 31.4 | 22.3 | 4,113 | 2,924 | 26,847 | 19,066 |
| Three-piece sheet coating | 14.5 | 5.6 | 14.5 | 1.5 | 3.5 | 0 | 54 | 0 | 4,499 | 0 |
| Three-piece can forming | 14.5 | 5.6 | 14.5 | 1.5 | 3.5 | 0 | 311 | 0 | 39 | 0 |
| Steel and aluminum end coating | 75.0 | 60.8 | 94.9 | 63.4 | 20.9 | 0 | 333 | 0 | 4,243 | 0 |
| Total | | | | | | | 4,811 | 2,924 | 35,658 | 19,066 |

TABLE 2-3. EMISSION REDUCTIONS FROM EMISSION CONTROL OPTIONS, TWO-PIECE STEEL OR ALUMINUM INTEGRATED FACILITY, 1985[a]

| Coating operation | Base case | | Option IA | | Option IB | | Option IC | | Option ID | |
|---|---|---|---|---|---|---|---|---|---|---|
| | kg/$10^3$ units | Mg | kg/$10^3$ units | Mg | kg/$10^3$ units | Mg | kg/$10^3$ units | Mg | kg/$10^3$ units | Mg |
| Exterior base-coat operation | 0.137 | 3,055 | 0.076 | 1,695 | 0.076 | 1,695 | 0.073 | 1,628 | 0.073 | 1,628 |
| Lithography/overvarnish | 0.054 | 1,204 | 0.073 | 1,628 | 0.005 | 112 | 0.046 | 1,023 | 0.005 | 112 |
| Inside spray[b] | 0.223 | 4,973 | 0.097 | 2,163 | 0.097 | 2,163 | 0.164 | 3,657 | 0.164 | 3,657 |
| Total | 0.414 | 9,232 | 0.246 | 5,486 | 0.178 | 3,970 | 0.283 | 6,308 | 0.242 | 5,397 |
| Reduction from NSPS | | -- | | 3,746 | | 5,262 | | 2,924 | | 3,835 |

NOTE: Revised; originally Table 7-12, proposal BID.

[a]Affected capacity is based on 22.3 billion can equivalents subject to NSPS in 1985.

[b]Based on a 90-percent transfer efficiency.

## TABLE 2-4. ENERGY REQUIREMENTS FOR EMISSION CONTROL OPTIONS, TWO-PIECE CANS SUBJECT TO NSPS IN 1985[a,b,c] (gigajoules)

| | Small scale | | | | | Large scale | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Base case | Emission control option | | | | Base case | Emission control option | | | |
| | | IA | IB | IC | ID | | IA | IB | IC | ID |
| Electricity | 52,048 | 54,412 | 37,821 | 48,012 | 31,153 | 47,142 | 49,505 | 34,587 | 43,128 | 27,897 |
| Natural gas | 1,894,563 | 5,041,428 | 3,415,334 | 1,879,043 | 1,232,320 | 1,735,408 | 4,632,379 | 3,058,936 | 1,720,356 | 1,126,529 |
| Total | 1,946,611 | 5,095,840 | 3,453,155 | 1,927,055 | 1,263,473 | 1,782,550 | 4,681,884 | 3,093,523 | 1,763,484 | 1,154,426 |
| Reduction due to NSPS | | (3,149,229) | (1,506,544) | 19,556 | 683,138 | | (2,899,334) | (1,310,973) | 19,066 | 628,124 |

NOTE: Revised, originally Table 7-22, proposal BID.

[a]VOC concentration in ventilating air is ppmV 100 as xylene. Affected capacity is based on 22.3 billion cans subject to NSPS in 1985.

[b]Figures in parentheses indicate an increase in energy requirements over the base case.

[c]Assumes 25 percent of two-piece cans are steel, the same ratio as in 1978.

TABLE 2-5. DATA BASE, BEVERAGE CAN SURFACE COATING

| Coating | VOC | Status |
|---|---|---|
| **Two-piece can exterior base coat** | | |
| Standard: 0.29 kg/litre of solids | | |
| Inmont S21-143XL | 0.26[7] | Used on four lines, Metal Container Corporation, Jacksonville, FL[8] |
| Inmont S21-121A | 0.29<br>0.25[10] | Available commercially from Inmont;[9] in use by Crown Cork[10] |
| Inmont S21-53B (S21-140) | 0.28[11] | In use by Reynolds[12] |
| Inmont S-21-54 | 0.29 | In use by Crown Cork[10] |
| Midland Dexter 1401W111 | 0.23 | Qualified for use on Reynolds new and existing lines[12] |
| Not specified | 0.24 | In use by American Can for beer and soft drink cans[13] |
| Claimed confidential | 0.24 | In use by Continental Can Company, U.S.A.[32] |
| **Overvarnish and clear base coat two-piece cans and three-piece sheets** | | |
| Standard: 0.46 kg VOC/litre of solids | | |
| Inmont S12-121 | 0.46[14] | Commercially available from Inmont[14]; qualified alternative for Miller's Fulton plant; in use at Miller's Fort Worth plant[15] |
| PPG-CE 3180D | 0.36[16] | In use by Reynolds at multiple lines and locations[12]<br>In use at Miller's Fulton and Reidsville plants; proposed but not yet tested for the Milwaukee plant[15] |
| Inmont S-145-124 | 0.37 | Planned for new lines by Reynolds[17] |
| Not specified | 0.34 | Typical of coatings used by Reynolds in new and existing plants[18] |
| Whittaker 62C10A | 0.38 | Commercially available from Whittaker for two-piece steel and aluminum cans[19] |
| Whittaker 62C10-3 | 0.26 | Commercially available from Whittaker for two-piece aluminum cans[19] |
| Inmont 145-144 | 0.38[11] | In use by Reynolds at multiple lines and locations[12] |

(continued)

TABLE 2-5. (continued)

| Coating | VOC | Status |
|---|---|---|
| Inmont 145-144A | 0.28[11] | In use by Reynolds at multiple lines and locations[12] |
| Not specified | 0.43 | In use by American Can[13] |
| Inmont 145-145 | 0.45[11] | Proposed for startup of Miller's Moultrie plant[15] |
| Claimed confidential | 0.41 | In use by Continental Can Company, U.S.A.[32] |
| Claimed confidential | 0.35 | Not specified[32] |
| Claimed confidential | 0.34 | In use by Continental Can Company, U.S.A.[32] |
| Claimed confidential | 0.35 | In use by Continental Can Company, U.S.A.[32] |
| Claimed confidential | 0.33 | In use by Continental Can Company, U.S.A.[32] |
| | Two-piece can inside spray | |
| | Standard: 0.89 kg VOC/litre of solids | |
| Du Pont RK-Y-6077 | 0.89 | Commercially available from Du Pont[20]<br>In use by Reynolds at multiple lines and locations[12]<br>In use at Miller's Reidsville plant[15] |
| Glidden 62-640C-549A | 0.89 | Commercially available from Glidden for 75 percent of waterborne users[21]<br>In use by Reynolds at multiple lines and locations[12]<br>In use by Crown Cork and Seal[10]<br>Qualified alternative for Miller's Reidsville plant[15] |
| Glidden 640C-560A | 0.46 | In use on four lines, Metal Container Columbus plant. Intended as replacement for 62-640C-549A; has been qualified for some soft drinks; one soft drink bottler plans commercialization[22]<br>Being considered by Reynolds for qualification[12]<br>In use on all one lines at Metal Container Jacksonville plant[8] |

(continued)

TABLE 2-5. (continued)

| Coating | VOC | Status |
|---|---|---|
| Dexter-Midland 4000W13M | 0.85 | Commercially available from Dexter-Midland[23]<br>In use at one National Can plant for soft drink cans[24]<br>Qualified for use by National Can for all beer customers except Olympia and for full range of soft drink uses[24] |
| Not specified | 0.89 | Typical of coatings used by Reynolds on new and existing lines[18] |
| Not specified | 0.61 | In use at one plant by American Can[13] |
| Not specified | 0.84-0.89 | In use by Crown Cork[25] |
| Claimed confidential | 0.86 | In use by Continental Can Company, U.S.A.[32] |
| **Three-piece can inside spray** | | |
| Proposed standard: 0.64 kg VOC/litre of solids | | |
| PPG CS625-1 | 0.69 | Available from PPG[26] |
| PPG CS625-2 | 0.69[26] | In fourth month of qualification testing at National Can; results are promising;[24] this is a higher viscosity version of PPG CS625-1 |
| PPG 3020 | 0.66 | In use by Crown Cork and Seal[10] |
| Mobil 78W263 | 0.61 | In fourth month of qualification testing at National Can; results are promising[24] |
| Not specified | 0.58 | In use by American Can for soft drinks. American Can currently is not making three-piece beer cans[13] |
| **Three-piece sheet interior base coat[a]** | | |
| Proposed standard: 0.50 kg VOC/litre of solids | | |
| Mobil S-9536-004 | 0.50 | In fourth month of qualification test at National Can; results are promising[27] |
| Mobil 79W195A | 0.53 | In fourth month of qualification test at National Can; results are promising[24] |

See footnotes at end of table.



(continued)

TABLE 2-5. (continued)

| Coating | VOC | Status |
|---|---|---|
| PPG CS3038-1 | 0.57[26] | Currently in use at National Can[24] |
| **Three-piece sheet exterior base coat** | | |
| Proposed standard: | 0.50 kg/litre solids | |
| Mobil S-9536-004 | 0.50 | Commercially available from Mobil[28] |
| Mobil S-9536-006 | 0.50 | Commercially available from Mobil[28] |
| American Can | - | Currently has no commonly used waterborne coatings for three-piece base coats[13] |
| **End stock exterior coat[b]** | | |
| Proposed standard: | 0.50 kg VOC/litre of solids | |
| Mobil S-9536-005 | 0.50 | Commercially available from Mobil;[28] in use at National Can[27] |
| Celanese X1755 | 0.49 | Under qualification at National Can[24] |
| Inmont Y112-11 | 0.43 | Under qualification at National Can[24] |
| Inmont W131-13 | 0.48 | Under qualification at National Can[27] |
| PPG CC3409 | 0.52 | Under qualification at National Can[24] |
| O'Brien 854-C-1009 | 0.50 | Under qualification at National Can[24] |
| Midland VW1501F | 0.42 | Under qualification at National Can[24] |
| **End stock interior coat[c]** | | |
| Proposed standard: | 0.50 kg VOC/litre of solids | |
| Celanese X1751 | 0.52 | Under qualification at National Can[27] |
| Inmont W131-13 | 0.46 | Under qualification at National Can[27] |

[a]American Can currently has no commonly used waterborne coatings for three-piece can base coats.[13]

[b]American Can has tested an end coating material with 2.37 lb VOC/gal of solids (0.28 kg/litre) and found it unsatisfactory.[13]

[c]National Can feels that exterior end stock coats can be used for interior coat with only minor reformulation that does not affect coating characteristics or VOC content.[24]

## 2.10 MISCELLANEOUS

2.10.1 Comment: One commenter (IV-D-5) felt that the draft EIS and the proposed preamble and regulation are much more complex and lengthy than necessary. Discussion of incineration and the three-piece can should be eliminated.

Response: The material in the draft EIS and in the proposal preamble and regulation was considered necessary to present the technical basis and the rationale for the development of the proposed standards. The beverage can surface coating industry is complex, involving as many as eleven coating operations on five separate items. Discussion of each of these was considered necessary to determine the scope and level of the proposed standards. A discussion of incineration was considered essential because one canmaker had recently constructed two plants using solvent-borne coatings. Also incineration is considered to be an affordable alternative to the use of waterborne coatings. Other than the rationale for excluding three-piece cans from the standards, no mention is made of this item in the promulgation preamble and regulation.

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| TECHNICAL REPORT DATA<br>*(Please read Instructions on the reverse before completing)* | | |
|---|---|---|
| 1. REPORT NO.<br>EPA-450/3-80-036b | 2. | 3. RECIPIENT'S ACCESSION NO. |
| 4. TITLE AND SUBTITLE<br>Beverage Can Surface Coating Industry--Background Information for Promulgated Standards of Performance | | 5. REPORT DATE<br>August 1983<br>6. PERFORMING ORGANIZATION CODE |
| 7. AUTHOR(S) | | 8. PERFORMING ORGANIZATION REPORT NO. |
| 9. PERFORMING ORGANIZATION NAME AND ADDRESS<br>Office of Air Quality Planning and Standards<br>U.S. Environmental Protection Agency<br>Research Triangle Park, North Carolina 27711 | | 10. PROGRAM ELEMENT NO.<br>11. CONTRACT/GRANT NO.<br>68-02-3056 |
| 12. SPONSORING AGENCY NAME AND ADDRESS<br>Office of Air Quality Planning and Standards<br>Office of Air, Noise, and Radiation<br>U.S. Environmental Protection Agency<br>Research Triangle Park, North Carolina 27711 | | 13. TYPE OF REPORT AND PERIOD COVERED<br>Final<br>14. SPONSORING AGENCY CODE<br>EPA/200/04 |
| 15. SUPPLEMENTARY NOTES | | |

16. ABSTRACT

Standards of Performance for the control of emissions from the beverage can surface coating industry are being promulgated under the authority of section 111 of the Clean Air Act. These standards would apply to all beverage can surface coating lines for which construction or modification began on or after the date of proposal of the regulations. This document contains a summary of public comments and responses that serves as the basis for the revisions made to the standards between proposal and promulgation.

| 17. KEY WORDS AND DOCUMENT ANALYSIS | | |
|---|---|---|
| a. DESCRIPTORS | b. IDENTIFIERS/OPEN ENDED TERMS | c. COSATI Field/Group |
| Air pollution<br>Pollution control<br>Standards of performance<br>Beverage cans<br>Volatile organic compound<br>Surface coating | Air Pollution Control | 13B |
| 18. DISTRIBUTION STATEMENT<br>Unlimited | 19. SECURITY CLASS *(This Report)*<br>Unclassified<br>20. SECURITY CLASS *(This page)*<br>Unclassified | 21. NO. OF PAGES<br>53<br>22. PRICE |