ISSUES RELATING TO VOC REGULATION CUTPOINTS, DEFICIENCIES, AND DEVIATIONS

Clarification to Appendix D
of November 24, 1987 FEDERAL REGISTER

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Ozone/Carbon Monoxide Program Branch
Air Quality Management Division
Office of Air Quality Planning and Standards

INTRODUCTION

On November 24, 1987, EPA proposed its post-1987 ozone and carbon monoxide policy statement. In that proposal the Agency described a process to make SIP deficiency "calls" pursuant to Section 110(a)(2)(H) of the Clean Air Act. Appendix D of the proposed policy statement contained a listing of SIP deficiencies and inconsistencies that should be addressed and corrected when States respond to such SIP calls.

The purpose of this document is to provide additional clarification of those areas described in Appendix D in which existing Reasonably Available Control Technology (RACT) regulations for volatile organic compounds (VOC) have not been adopted and/or implemented on a nationally consistent basis. This clarification does not expand or modify existing federal regulatory requirements, but merely ennances Appendix D by providing more specific information in cases where past EPA guidance or approved rulemaking was vague or ambiguous. This document does not address issues covered in Appendix D related to new source review regulations.

In the April 1987 letter from the EPA Administrator to the Governors of 42 States, EPA announced its intention to undertake a three-part process in its post-1987 SIP revisions. First, EPA was to review all federally-approved control commitments in the State implementation plan to determine whether they have been adopted. Second, EPA was to review whether these adopted measures are technically adequate and meet minimum national standards for consistency. Third, EPA was to initiate a comprehensive program to determine whether adopted measures are being effectively implemented. This document addresses many of the "Appendix D" problems uncovered during the second part of this process. Corrections of the deficiencies described herein provide for a greater degree of equity and national consistency among all States and localities that receive post-1987 ozone SIP calls.

ISSUES RELATING TO VOC REGULATION CUTPOINTS,
DEFICIENCIES AND DEVIATIONS

Executive Summary

Based on Appendix D of Federal Register of November 24, 1987

1. RACT Regulation Exemptions--
   - Where EPA has previously specified a regulation size cutoff (in CTG or other guidance documents--e.g., model regulation documents, such as EPA-450/2-79-004 and EPA-905/2-78-001), State must incorporate these cutoffs if their existing regulations are less stringent. (See Attachment 1)
   - Where EPA has previously specified 3 lb VOC/hr or 15 lb VOC/day cutoff, State may use it on actual emissions basis or use 10 tpy theoretical potential emissions (design capacity [or maximum production] and 8760 hr/yr) before add-on control. Care should be taken to make enforceable any regulations specified on an "actual" emissions basis.
   - Cutoff total determined from the sum of individual emission sources within same CTG category. (Exception: Petroleum marketing -- storage tanks, terminals, and loading racks must be combined.)
   - States may only use higher cutoffs if supported by 5% analysis on an emissions basis (showing that no significant emissions differential occurs between EPA guidance and State choice). (See Attachment 2)

2. Definition of 100 tpy non-CTG source--
   - Aggregate all unregulated sources (including sources which would have been covered by a CTG if they had been above the EPA-accepted size cutoff--e.g., <100 tpy graphic arts sources).
   - Base on theoretical potential emissions (design capacity [or maximum production] and 8760 hr/yr) before add-on control.
   - Cannot merely apply less-than-RACT controls to avoid applicability.
   - Can restrict hours of operation by legally and federally enforceable permit conditions to limit emissions below 100 tpy.
   - "Once-in-always-in" concept must apply (i.e., if emissions are found above cutoff, then State must apply RACT thereafter).

3. Form of Surface Coating Emission Limit Units--
   - Regulations should be expressed as lb VOC/gal of coating (less water and "exempt" solvents). "Exempt" solvents are those determined by EPA to have negligible photochemical reactivity. See VOC definition, page 1-2.
   - If "equivalent" add-on controls, transfer efficiency, or emission trading (cross line averaging) are contemplated, then regulation should also be expressed as lb VOC/gal of solids (or lb VOC/lb solids for graphic arts).
   - Alternatively, the regulation can contain a calculation conversion procedure to determine compliance. Procedure must be clearly defined, replicable, and consider the above factors. (See Attachment 3)
   - Daily emission caps are desirable but not mandatory unless established as part of the SIP control strategy. They cannot be used in exchange for a relaxation of RACT.

4. Exempt Solvents--
   - Treat as water in "lb VOC/gal coating less water" calculations.
   - Cannot take credit in emissions inventory and attainment demonstration or new source review for control of exempt solvents.
   - Exempt only those solvents determined to have negligible photochemical reactivity listed in the five Federal Register notices (see RECOMMENDATION FOR EXEMPT SOLVENTS, page 2-5.)

5. VOC Definition--
   - Cannot use 0.1 mm Hg vapor pressure cutoff -- inconsistent with EPA reactivity policy. Such a definition would exempt compounds of low volatility, which, under certain processes, would volatilize and, therefore, participate in photochemical reactions.
   - Model definition:
     "Volatile organic compound (VOC)--Any organic compound which participates in atmospheric photochemical reactions. This includes any organic compound other than the following compounds: methane, ethane, methyl chloroform (1,1,1-trichloroethane), CFC-113 (trichlorotrifluoroethane), methylene chloride, CFC-11 (trichlorofluoromethane), CFC-12 (dichlorodifluoromethane), CFC-22 (chlorodifluoromethane), FC-23 (trifluoromethane), CFC-114 (dichlorotetrafluoroethane), CFC-115 (chloropentafluoroethane). These compounds have been determined to have negligible photochemical reactivity. For purposes of determining compliance with emission limits, VOC will be measured by the approved test methods. Where such a method also inadvertently measures compounds with negligible photochemical reactivity, an owner or operator may exclude these negligibly reactive compounds when determining compliance with an emissions standard."

6. Corrections for Other VOC Rule Definitions--
   - List from Appendix D: (coating, coating line, refinishing, paper coating, fabric coating, vinyl coating)
   - EPA Regions to make SIP calls on State-specific definitional problems to ensure consistency with CTG's and to avoid vague and ambiguous wording.

7. Transfer Efficiency (TE)--
   - Where SIP allows credit for TE, SIP must clearly state the applicable baseline, emission limit, and test procedure. A replicable baseline should be no less stringent than standard industry practice.
   - 60% default baseline acceptable for most large appliances, metal furniture, and miscellaneous metal coating operations; however, testing for actual TE above 60% default baseline is needed to determine final compliance.
   - 30% default baseline generally acceptable for certain auto coatings: i.e., surfacer and top coat waterborne equivalence (i.e., 2.8 lb VOC/gal coating, less water at 30% TE). See page 2-22.
   - TE cannot be used as an alternative means of control unless baseline is specified and test method is approved as part of the SIP.
   - Source-specific SIP revision is required unless use of TE is approved pursuant to generic SIP provision (see discussion, page 2-14).
   - Actual TE's must be used; no NSPS TE table values allowed for final RACT compliance.

8. Cross-Line Averaging (Bubble)--
   - In cases where a State, prior to the post-1987 SIP call, has previously granted (without EPA approval) cross-line averaging to a source, the State must include the cross-line averaging scheme for approval as a source-specific SIP revision under the emissions trading (ET) policy (see 51 FR 43814, 12-4-86). Treat this as a de facto pending bubble, but only for purposes of the additional 20% control requirement.
   - Source-specific revision must meet ET policy on daily weighted average basis
   - If approved under generic bubble rule, generic rule must also meet provisions of ET policy
   - The following situations are examples of cross-line averaging:
     (1) The source averages emissions between two or more separate operations (e.g., auto prime coat and top coat) with the same or different regulatory limits; and
     (2) The source averages emissions between two or more similar processes (e.g., separate conveyor lines of similar machines) with the same or different regulatory limits.

9. Compliance Periods--
   - SIP must clearly state compliance period (e.g., hourly, daily) and averaging method (arithmetic or weighted).
   - Regulation must require compliance on no longer than daily basis (generally acceptable).
   - Longer than 24-hr averaging must meet EPA policy (O'Connor memo 1-20-84)
   - Compliance date extensions must meet EPA policy (Potter memo 8-7-86)

10. Recordkeeping Requirements--
    - Must keep records consistent with compliance time frames--daily compliance requires daily records
    - Employ most recent EPA recordkeeping guidance (guidance forthcoming).

11. Test Methods--Use most current EPA acceptable methods. All methods must be specified in the SIP. (See Attachment 4) For auto topcoating operations, see page 2-22.

12. Capture Efficiency--
    - Specify capture efficiency test method where capture efficiency is discussed or implied in limit (e.g., web-coating operations with add-on control).
    - Employ most recent guidance on capture efficiency testing (guidance forthcoming).

13. Equipment Leak Components--
    - Inaccessible valves are required to be monitored at least annually.
    - Unsafe-to-monitor valves are required to be monitored when conditions would allow these valves to be monitored safely, e.g., during shutdown.

14. Exemptions, Variances, and Alternative Means of Control--
    - Generic approval of emission trades is already covered by EPA's emission trading policy statement (51 FR 43814, December 4, 1986).

- All SIP's must specify whether approval of source-specific exemptions, variances, and/or alternative means of control shall be accomplished as a source-specific SIP revision or by a determination of approval by the State Director (a "generic" provision). All such generic determinations and supporting documentation shall be submitted to the appropriate Regional Office.
- To be approvable, a provision for generic approval of source-specific exemptions, variances, and/or alternative means of control must --
  - specify appropriate test methods and other replicable criteria in accordance with guidance issued by EPA; AND
  - require that any source seeking approval of an exemption, variance, or alternative means of control demonstrates that its control method achieves emissions reductions equal to or greater than the emission reductions required by the SIP.
- Provisions that are intended to be generic (i.e., not requiring case-by-case EPA approval for the alternative means to be federally effective) must meet the general principle of replicability described in EPA's emissions trading policy statement (51 FR 43850, December 4, 1986).
- Federal Register notices that approve SIP revisions containing general provisions that may be construed as generic procedures should include EPA's "warning" about residual authority to ensure consistent actions under generic procedures. See page 2-14.
- Seasonal controls (other than shutdown of natural gas afterburners or use of emulsified asphalt) not allowed
- State redesignation to attainment classification must not affect applicability of regulations. The EPA will approve a redesignation under 40 CFR Part 81 only if it meets EPA's redesignation policy.

WHAT DOES SIP CALL MEAN?
(Regarding VOC RACT Rules)

Response to SIP calls will be made in two phases as described below:

FIRST PHASE--LIMITED RESPONSE

(SIP revision due 1 year after work plan is submitted under SIP call)

- No additional regulatory requirements added

- Meet all previously applicable requirements for 1987 extension areas and 1982 SIP call areas ("Level Playing Field") (e.g., consistent cutoffs, test methods). All such areas must meet requirements of Groups I, II, and III CTG source categories.

- No additional RACT requirement <100 tpy for contiguous rural county

SECOND PHASE--FULL RESPONSE

(After EPA Publishes Final Ozone/CO Policy)

- New additional requirements possible for additional MSA and new contiguous (rural) SIP call areas. (May be mandatory or discretionary--depends upon final policy).

  Groups I and II

  Group III

  $\geq$ 100 tpy non CTG

- New requirements possible for new isolated rural SIP call areas. Again, depends upon final policy.

  Groups I and II: $\geq$ 100 tpy coverage only

CTG RACT REGULATION CUTOFFS/EXEMPTIONS

- Recommended cutoffs contained in CTG's, model regulations, or EPA policy memorandums (See Attachment 1)
- For additional CTG categories size cutoffs, see SELECTED COATINGS CTG CATEGORY RECOMMENDED EXEMPTION LEVEL, page 16.
- Calculating regulation size cutoffs for CTG sources
  - Base tpy cutoff on theoretical potential to emit (design capacity [or maximum production] and 8760 hr/yr) before add-on controls. Care should be taken to make enforceable any regulations specified on an "actual" emissions basis.
  - Cutoff total determined from the sum of individual emission sources within same CTG category (Exception: petroleum marketing--storage tanks, terminals and loading racks must be combined)
  - Apply RACT if plantwide emissions > cutoff limit
  - If caught with emissions > cutoff limit in the future, then State must apply RACT ("once in, always in")
  - CTG area sources have no cutoff (e.g., cold cleaner degreasers and tank trucks)
- SIP call requires States to assess their existing VOC regulations and address cutoffs in EPA guidance. Exemptions can be granted only by way of the 5% rule (see Attachment 2)
- In cases where past guidance recommends high cutoff (e.g., 100 tpy), SIP call should also recommend that State investigate small exemption levels to prepare for additional emission reductions under full response to SIP call

DEFINITION OF 100 TPY NON-CTG SOURCE

- Based on theoretical potential to emit (design capacity [or maximum production] and 8760 hr/yr) before add-on controls
- To determine if ≥ 100 tpy:
  - aggregate emissions of all nonregulated sources
    - --include sources which would have been covered by a CTG if they had been above the EPA-accepted size cutoff--e.g., <100 tpy graphic arts sources
    - --exclude regulated CTG sources
- If > 100 tpy, evaluate RACT on all unregulated source types in plant
- Even "status quo" (RACT-level) emissions must be put in regulation or federally enforceable permit form to avoid increases (e.g., emission levels without any additional controls)
- To achieve "below 100 tpy" (and avoid RACT), a State may limit production or capacity and specify this limitation in a federally enforceable permit (cannot just apply minimal controls to go below 100 tpy)
- Employ "once-in-always-in" concept for applicability

FORM OF SURFACE COATING EMISSION LIMIT UNITS

- Recommended form of emission limit--pounds VOC per gallon coating (less water and "exempt" solvents*)

- However, if rule or SIP allows:
  - determination of compliance from "equivalent" add-on controls,
  - credit for transfer efficiency, or
  - emissions trades and cross-line averaging

- Then rule must have VOC limits expressed as both:
  - pounds VOC per gallon coating (less water and exempt solvents) to aid in compliance determination

    and

  - pounds VOC per gallon solids (or pounds VOC per pound of solids for graphic arts)

    or

  - provide clearly defined, replicable conversion calculation procedure to obtain equivalent limit (See Attachment 3)

- Daily emission caps are desirable, but not mandatory unless they are established as part of the SIP control strategy. Daily emission caps cannot be used in exchange for a relaxation of RACT.

*"Exempt" solvents are those determined by EPA to have negligible photochemical reactivity. See VOC DEFINITION, page 2-6.

RECOMMENDATION FOR EXEMPT SOLVENTS

- Check all regulations
- Cannot allow circumvention of EPA reactivity policy based on other VOC definitions and exemptions
- For calculation purposes, any exempt compounds shall be treated as water
- Cannot take credit for control of exempt solvents for purposes of emissions inventory and attainment demonstrations or new source review
- Exempt solvents are only those identified in the following Federal Register notices:
  - 42 FR 35314, 7/8/77 (Table 1)
  - 42 FR 38931, 8/1/77 (corrects 7/8/77 FR)
  - 44 FR 32042, 6/4/79
  - 45 FR 32424, 5/16/80 (clarifies 6/4/79 FR)
  - 45 FR 48941, 7/22/80

FORM OF SURFACE COATING EMISSION LIMIT UNITS

- Recommended form of emission limit--pounds VOC per gallon coating (less water and "exempt" solvents*)

- However, if rule or SIP allows:

  - determination of compliance from "equivalent" add-on controls,

  - credit for transfer efficiency, or

  - emissions trades and cross-line averaging

- Then rule must have VOC limits expressed as both:

  - pounds VOC per gallon coating (less water and exempt solvents) to aid in compliance determination

  <u>and</u>

  - pounds VOC per gallon solids (or pounds VOC per pound of solids for graphic arts)

  <u>or</u>

  - provide clearly defined, replicable conversion calculation procedure to obtain equivalent limit (See Attachment 3)

- Daily emission caps are desirable, but not mandatory unless they are established as part of the SIP control strategy. Daily emission caps cannot be used in exchange for a relaxation of RACT.

*"Exempt" solvents are those determined by EPA to have negligible photochemical reactivity. See VOC DEFINITION, page 2-6.

CORRECTIONS FOR OTHER VOC RULE DEFINITIONS

- List from proposed ozone policy--

  Appendix D

  - coating
  - coating line
  - refinishing
  - paper coating
  - fabric coating
  - vinyl coating

- EPA Regions to make SIP calls on State-specific definitional problems to ensure consistency with CTG's and to avoid vague or ambiguous wording.

TRANSFER EFFICIENCY (TE)

- Where SIP allows credit for TE, SIP must clearly state the applicable baseline based on standard industry practice, emission limit, and fully replicable* test procedure for transfer efficiency.

- Current guidance: in most cases, can accept use of 60% transfer efficiency as baseline for:

  --Large appliances

  --Metal furniture

  --Miscellaneous metal parts

- Testing for actual TE above the 60% default baseline is needed to determine final compliance

- In most cases accept use of 30% TE as baseline for auto surfacer and topcoat waterborne equivalence (i.e., 2.8 lb VOC/gal coating less water at 30% TE) (see page 2-22)

- TE cannot be used as an alternative means of control unless baseline is specified and test method is approved as part of the SIP

- Source-specific SIP revision is required unless use of TE is approved pursuant to generic SIP provision (see discussion on EXEMPTIONS, VARIANCES, AND ALTERNATIVE MEANS OF CONTROL, page 2-14)

- Actual TE's must be used; TE table values (e.g., from NSPS) are unacceptable for final RACT compliance.

* For a discussion of replicability, see 51 FR 43850, 12/4/86

CROSS-LINE AVERAGING (BUBBLE)

- In cases where a State, prior to the post-1987 SIP call, has previously granted (without EPA approval) cross-line averaging to a source, the State must include the cross-line averaging scheme for approval as a source-specific SIP revision under the emissions trading (ET) policy (see 51 FR 43814, 12/4/86). Treat this as a de facto pending bubble, but only for purposes of the additional 20% control requirement.

- Based on daily weighted average

- No credit for downtime; however, credit allowed when there are enforceable production limits.

- Must be submitted as source-specific SIP revision, unless processed by the State under an EPA-approved bubble rule. Must be consistent with provisions of EPA ET policy

- If allowed under EPA-approved generic bubble rule, generic rule must meet EPA ET policy*

- Fix deficiencies in calculation procedures or compliance techniques associated with generic regulations

- The following situations are examples of cross-line averaging:

  - the source averages emissions between two or more separate operations (e.g., auto prime coat and top coat) with the same or different regulatory limits; and

  - the source averages emissions between two or more similar processes (e.g., separate conveyor lines of similar machines) with the same or different regulatory limits

*NOTE: SIP call needed for currently approved generic bubble rules that are inconsistent with EPA ET policy

COMPLIANCE PERIODS

- SIP must clearly state compliance period (e.g., hourly, daily) and averaging method (arithmetic or weighted)
- In general, regulation must require compliance on no longer than a daily basis
- Averaging times longer than 24 hours allowed ONLY in accordance with established EPA policy (O'Connor memo--1/20/84)
- Averaging periods in excess of 24 hours are not allowed generically. Must receive EPA approval as SIP revision
- Reexamine pre-O'Connor memo approvals of $\geq$ daily averaging to ensure that RACT levels of control are applied
- Compliance date extensions allowed only in accordance with Potter memo (8/7/86)

RECORDKEEPING REQUIREMENTS

- Keep records consistent with compliance time frames--daily compliance requires daily records

- Record or calculate coating solids use and VOC emitted consistent with compliance time frames

  EXAMPLES: gallons of solids per day

  pounds of VOC per day

(This allows, for instance, one to calculate compliance with a VOC limit in terms of lb VOC/gal of solids)

- List amount of diluents and (where relevant to determining compliance) wash and clean-up solvents

- Document use of EPA test methods or EPA-approved State method in calculating VOC content of coatings

- Document methods used to calculate volume percent solids content of coatings

- Separately enforceable provisions must clearly require recordkeeping

- Employ most recent EPA recordkeeping guidance

TEST METHODS AND CAPTURE EFFICIENCY

- Use most current VOC test methods (See Attachment 4). For auto topcoating operations, see page 2-22.

- All methods must be specified in the SIP.

- Procedures should allow verification of accuracy of test data.

- Prescribe capture efficiency test method where capture efficiency is discussed or implied in limit (e.g., web-coating operations with add-on control).

- Employ most recent EPA guidance on capture efficiency testing.

EQUIPMENT LEAK COMPONENTS

- Sources previously exempt from monitoring (e.g, plug and ball valves) subject to SIP requirements

- Inaccessible valves are required to be monitored at least annually.

- Unsafe-to-monitor valves are required to be monitored when conditions would allow these valves to be monitored safely, e.g., during shutdown.

EXEMPTIONS, VARIANCES, AND ALTERNATIVE MEANS OF CONTROL

- Generic approval of emission trades is already covered by EPA's emission trading policy statement (51 FR 43814, December 4, 1986). For information on emissions trading, see page 2-9.

- All SIP's must specify whether approval of source-specific exemptions, variances, and/or alternative means of control shall be accomplished as a source-specific SIP revision or by a determination of approval by the State Director (a "generic" provision). All such generic determinations and supporting documentation shall be submitted to the appropriate Regional Office.

- To be approvable, a provision for generic approval of source-specific exemptions, variances, and/or alternative means of control must --

  - specify appropriate test methods and other replicable criteria in accordance with guidance issued by EPA; AND

  - require that any source seeking approval of an exemption, variance, or alternative means of control demonstrates that its control method achieves emissions reductions equal to or greater than the emission reductions required by the SIP.

- Provisions that are intended to be generic (i.e., not requiring case-by-case EPA approval for the alternative means to be federally effective) must meet the general principle of replicability described in EPA's emissions trading policy statement (51 FR 43850, December 4, 1986).

- Federal Register notices that approve SIP revisions containing general provisions that may be construed as generic procedures should include the following statement:

> It should be noted that, similar to EPA's treatment of generic bubble rules (51 FR 43853, column 3, 12-4-86), if a State-approved action under a generic rule does not meet all the requirements for replicability, it cannot be considered part of the SIP and by definition cannot replace prior valid emission limits in the SIP. Should EPA determine, as a result of its oversight activities that a State-approved action is inconsistent with the above requirements, it will notify the State and source in writing and specify any necessary remedial measures. In such circumstances, EPA may take appropriate remedial action to assure attainment and maintenance, including direct enforcement of the original SIP limits.

- Seasonal controls (other than shutdown of natural gas afterburners or use of emulsified asphalt) are not allowed.

- State redesignation to attainment classification must not affect applicability of regulations. The EPA will approve a redesignation under 40 CFR Part 81 only if it meets EPA's redesignation policy.

ADDITIONAL CLARIFICATION BY CTG SOURCE CATEGORY

(For Selected Categories)

SELECTED COATINGS CTG CATEGORY RECOMMENDED EXEMPTION LEVEL

Applicable Source Categories:

Can
Metal Coil
Metal Furniture
Magnet Wire
Large Appliance
Miscellaneous Metal Parts
Flat Wood Paneling
Paper Coating
Fabric Coating

State may use:

- 10 tpy theoretical potential emissions (design capacity [or maximum production] and 8760 hrs/yr) before add-on control
- 3 lb VOC/hr or 15 lb/day actual emissions before add-on control
- To show that there is no significant difference between "State-derived cutoffs" and EPA guidance, States must apply "5% rule" (See Attachment 2) to allow higher cutoff. Analysis must be based on comparison of:
  - emissions after control under presumptive cutoff--with
  - emissions after control under higher cutoff
  - NOTE: 5% rule applies to entire source category, not individual sources. RACT is the test for individual sources.
- Allow coatings usage rate (gal/day) as basis for exemption if shown equivalent to emission rate exemption (see EPA guidance memo from Tom Helms, EPA/OAQPS, to Air Branch Chiefs, Regions I-X, Additional Information Concerning Emission Cut-off--3 lbs/hr, 15 lbs/day. November 4, 1987).

GASOLINE LOADING TERMINALS

- > 20,000 gal/day--considered terminal
- ≤ 20,000 gal/day = bulk plant
- Allow rolling 30-day average to determine applicability--but not for determining compliance with emission limit
- Employ "once-in-always-in" concept for applicability
- CTG limit recommendation--80 mg/l
- Ensure that trucks using terminals pass leak-tight test

GASOLINE BULK PLANTS

- Defined as $\leq$ 20,000 gal/day throughput
- Allowed exemption--< 4,000 gal/day throughput
- Recommend CTG control alternative #3 (Submerged fill + vapor balance--in and out)
- Allow rolling 30-day average for determining applicability--but not for determining compliance
- Employ "once-in-always-in" concept for applicability
- Recommend tank truck must be certified leak tight at bulk plant

LEAKS FROM PETROLEUM REFINERIES

- Define "leak" as VOC concentration > 10,000 ppm; VOC concentration ≤ 10,000 ppm is not a leak

- No CTG cutoff for petroleum refinery size

  --applies to all refineries

- Recommend consistency with SOCMI leak CTG guidance, i.e., valves located such that monitoring personnel must be elevated 2 meters above permanent support surfaces or require scaffolding might be exempt from quarterly monitoring. Annual monitoring still required.

MISCELLANEOUS REFINERY SOURCES

- Vacuum producing systems, wastewater separators, and process unit turnarounds

- No CTG cutoffs

- Recommended cutoff--only recovered petroleum products with Reid vapor pressure 0.5 pounds or greater are covered. Affected sources are not covered if throughput of these recovered petroleum products is < 200 gal/day.

- May also wish to consider NSPS where no cutoff is recommended. Segregated storm water runoff drain systems and non-contact cooling water systems are exempt.

SERVICE STATIONS--STAGE I

- Regulation can be written two ways:

  --tank size, or

  --gasoline throughput

- Tank size:

  --exempt storage tanks < 550 gal capacity for agricultural use

  --exempt < 2,000 gal capacity storage tanks in place before 1/1/79

  --exempt < 250 gal capacity storage tanks in place after 12/31/78

- Gasoline throughput:

  --exempt < 10,000 gal/mo (120,000 gal/yr) throughput for service stations

  --allow rolling 30-day average for applicability level--but <u>not</u> for compliance

- Employ "once-in-always-in" concept for applicability

- Apply 5% rule for other than 10,000 gal/mo (120,000 gal/yr) exemption (5% rule applies to the entire source category and not individual facilities).

AUTOMOBILE AND LIGHT DUTY TRUCK COATING

- EPA autocoating protocol is the preferred method for calculating daily topcoat emission rate (protocol forthcoming)

- Topcoat regulation must be amenable to use of EPA autocoating protocol:

  - Emission limit must be in units of lb VOC/gal of solids deposited (2.8 lb VOC/gal coating, less water at 30 percent TE translates to 15.1 lb VOC/gal solids deposited)

  - Compliance must be calculated on a daily weighted average basis

  - Topcoat operation must include all spray booths, flash-off areas and ovens in which topcoat is applied, dried and cured (excludes final off-line repair).

- Emission limit for surfacer (guidecoat) should be expressed in pounds of VOC per gallon of solids deposited with compliance calculated on a daily weighted average basis if transfer efficiency is to be considered in determining compliance. In these cases, the EPA protocol may be applicable for calculating daily surfacer emission rate.

- The SIP should specify whether anti-chip materials applied to main body parts (e.g., rocker panels, bottom of doors and fenders, and leading edge of roof) are treated as surfacer or miscellaneoous metal coating. These anti-chip materials should generally be treated as surfacer, especially if transfer efficiency is to be considered in compliance demonstrations. Underbody anti-chip (e.g., underbody plastisol) should be specified as a miscellaneous metal coating.

- Coatings other than primer, surfacer, topcoat and final repair should generally be considered miscellaneous metal coatings. (See memorandum from Richard Rhoads, EPA/OAQPS, to Directors, Air and Hazardous Materials Division, Regions I-X, Applicability of VOC Control Techniques Guidelines (CTG's) to the Automobile Manufacturing Industry. July 31, 1980.)

- No CTG cutoffs

- Should define exemption level on plantwide basis

- CTG applies only to manufacture of new vehicles

- New and modified sources must also meet new source review requirements, which may include BACT and LAER.

CUTBACK OR EMULSIFIED ASPHALT

- No CTG cutoffs

- Recommend seasonal exemptions (i.e., outside of ozone season) as opposed to temperature forecasting (e.g., < 50°F). (See memorandum from Richard Rhoads, EPA/OAQPS, to Air & Hazardous Materials Division Directors, Regions I-X. Cutback Asphalt-acceptable RACT Regulation. December 19, 1978).

- Specify (1) no higher than 7% oil distillate as maximum allowable solvent content in emulsified asphalt, as determined by ASTM distillation test D-244, or (2) allow use of certain grades or applications of emulsified asphalt with the following maximum solvent contents as determined by ASTM D-244: (a) 3% limit for seal coats used in early spring or late fall; (b) 3% limit when chip seals used when aggregate is dusty or dirty; (c) 8% limit when mixing with open graded aggregate that is not well washed; and (d) 12% limit when mixing with dense graded aggregate

(See memorandum from Richard Rhoads to Director, Air & Hazardous Materials Division, Regions I-X, Clarification for Final SIP Actions on Asphalt Regulations, October 4, 1979)

- Other exemptions for use solely as penetrating prime coat and when stockpiled for extended periods (longer than 1 month) (See memorandum from Richard Rhoads to Director, Air & Hazardous Materials Division, Regions I-X, Cutback Asphalt-Acceptable RACT Regulation. December 19, 1978).

SOLVENT METAL CLEANING

- Exemptions: See CTG for appropriate cutoffs

- No 3 lb/hr, 15 lb/day exemption for small cold cleaner degreasers (area source). (See memorandum from Richard Rhoads, EPA/OAQPS, to Director, Air & Hazardous Materials Division, Regions I-X, Clarification of Degreasing Regulation Requirements, September 7, 1978).

GRAPHIC ARTS

- CTG cutoff < 100 tpy potential emissions (design capacity and 8760 hr or maximum production) before control

- EPA will accept as an alternative emission limit 0.5 lb VOC/lb solids on a per line basis. (See memorandum from Darryl Tyler, EPA/OAQPS, to Director, Air Division, Regions I-X, Alternative Compliance for Graphic Arts RACT, September 9, 1987.)

- If a source wishes to average emissions across lines, it must meet the general provisions of the EPA emissions trading policy.

- Employ "once-in-always-in" concept for applicability

ATTACHMENT 1

CTG APPLICABILITY: CUTOFFS, EXEMPTIONS, AND GENERAL APPLICABILITY

CTG APPLICABILITY: CUTOFFS, EXEMPTIONS, AND GENERAL APPLICABILITY

The EPA has issued control technique guideline (CTG) documents for 30 source categories, two regulatory guideline documents covering 25 of these 30 source categories, and several policy and other miscellaneous guidance memoranda. Part of the guidance provided in the CTG's, the two regulatory documents, and the guidance memoranda concerns cutoffs, exemptions, and other similar guidance on the applicability of the recommended control techniques. This information is summarized in Tables 1, 2, and 3 for 29 of the 30 source categories. The CTG for the 30th source category, Vegetable Oil, was recommended by EPA not to be implemented by the States until test method uncertainties were resolved, and thus is not included in these tables. A complete list of references is provided at the end of these tables.

This information represents guidance issued prior to May, 1988. For categories with cutoffs listed as "None", no specific guidance on cutoffs has been issued for this particular category although a 3 lb/hr or 15 lb/day general exemption has been discussed in pre-1988 guidance. For current guidance on cutoffs for categories listed here as "None", see "Issues Relating to VOC Regulations. Cutpoints, Deficiencies, and Deviations - Clarification to Appendix D of November 24, 1987. Federal Register," May 1988.

Also, for CTG Groups I and II for nonattainment areas that neither received an attainment date extension beyond 1982 nor received a notice of SIP deficiencies ("SIP calls"), States were not required to cover sources with emissions less than 100 tons per year, even if the CTG or EPA guidance contained no applicability size cutoff.

Last Update: 5/16/88

TABLE 1. CUTOFFS FOR GROUP I CTG CATEGORIES

Source Category	Cutoffs	Comments	References
1. Gasoline Loading Terminals	•None	•Terminals are defined as >76,000 liters (20,000 gallons)/day throughput.	1
2. Gasoline Bulk Plants	(a)Storage tanks with less than 2,000 gallons storage capacity (Ref. 2, p. 5-1). (b)Exemption for bulk plants with throughputs of less than 4,000 gals per day (Ref 3, p. 1).	•Bulk plants are defined as <76,000 liters (20,000 gallons)/day throughput.	2, 3
3. Service Stations-Stage I	(a)Stationary gasoline storage containers of less than 2,085 liters (550 gallons) capacity used exclusively for the fueling of implements of husbandry, provided the containers are equipped with submerged fill pipes (Ref. 4, p. 29). (b)<7,580 liters (2,000 gallons) capacity storage tanks in place before 1/1/79 (Ref. 4, p. 29). (c)<948 liters (250 gallons) capacity storage tanks in place after 12/31/78 (Ref. 4, p.29).		4, 5

TABLE 1. CUTOFFS FOR GROUP I CTG CATEGORIES (continued)

Source Category	Cutoffs	Comments	References
	(d) Exemptions for service station tanks with throughputs of no more than 10,000 gals/month or 120,000 gals/year (Ref. 5, p. 2).		
4. Fixed Roof Petroleum Tanks	(a) <150,000 liters (40,000 gallons) storage capacity of volatile petroleum liquids (greater than 10.5kPa TVP) (Ref. 6, p. 6-1). (b) <1,600,000 liters (420,000 gallons) storage capacity of crude oil and condensate prior to lease custody transfer (Ref. 6, p. 6-2).	•Does not apply to storage vessels equipped with external floating roofs before 1/1/79 •Does not apply to horizontal, underground storage tanks storing JP-4 jet fuel (Ref. 7, p. 2).	6, 7
5. Miscellaneous Refinery Sources (Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds)	•None for vacuum producing systems and process unit turnarounds. •<200 gal/day for wastewater separators (Ref. 4, p. A-68)	•CTG recommends case-by-case addressing of instances in which control may not be justified (Ref. 8, p. 6-1).	4, 8
6. Cutback Asphalt	•None (see comment)	•If a State chooses a 100 ton per year cutoff, the State must consider all State, local, and private use in an area for which the control strategy demonstration is developed (Ref. 10, p. 6).	9, 10, 11

TABLE 1. CUTOFFS FOR GROUP I CTG CATEGORIES (continued)

Source Category	Cutoffs	Comments	References
6. Cutback Asphalt (continued)		•Use of cutback asphalt is approvable under the following circumstances: (1) where it can be demonstrated that long-life stockpiling is necessary, (2) where the asphalt is to be used solely as a penetrating prime coat, (3) months during the year where temperatures do not linger above 50°F for periods of time adequate for emulsified asphalt application and setting, and (4) where it can be demonstrated that no VOC emissions will occur from the use of the cutback (Ref. 11, pp. 2,3).	
7. Solvent Metal Cleaning	(a) In urban nonattainment areas, open top vapor degreasers with an open area of less than 1 m^2 from equipment standards (Ref. 12, p. 7-4) and conveyorized degreasers with less than 2.0 m^2 of air/vapor interface from requirement of a major control device (e.g., carbon adsorber) (Ref. 12, p. 3-34). (b) In rural nonattainment areas, all cold cleaners can be exempted and open top vapor or conveyorized degreasing operations at one plant location where emissions are 100 tons	•No size cutoffs from operational standards •Volatility of solvent is used to require greater control in cold cleaners for the same control techniques (Ref. 12, p. 3-31). •Operating and equipment requirement exemptions for cold cleaners with remote solvent reservoirs; no other exemptions for cold cleaners in urban non-attainment areas (Ref. 13, p. 1).	12, 13, 14

TABLE 1. CUTOFFS FOR GROUP I CTG CATEGORIES (concluded)

Source Category	Cutoffs	Comments	References
7. Solvent Metal Cleaning (continued)	or less on a facility-wide basis based on annual solvent purchase records can be exempted (Ref. 14, p. 1).		
8. Can Coating	•None		15
9. Metal Coils	•None		15
10. Fabrics	•None		15
11. Paper	•None		15
12. Automobile and Light-Duty Trucks	•None		15
13. Metal Furniture	•None		16
14. Magnet Wire	•None		17
15. Large Appliances	•None	•Quick drying lacquers used to repair scratches and nicks that occur during assembly are exempt from meeting any emission limits (Ref. 18, p. 1-2).	18

TABLE 2. CUTOFFS FOR GROUP II CTG CATEGORIES

Source Category	Cutoffs	Comments	References
1. Leak from Petroleum Refineries	•Leaks of concentrations less than or equal to 10,000 ppm (Ref. 19, p. 6-1).	•No cutoff for petroleum refinery size; applies to all refineries. •Not intended to affect facilities that recycle waste oil (Ref. 20, p. 13).	19, 20
2. Miscellaneous Metal Parts	•None	•This regulation is not intended to cover surface coating of the following metal parts and products: (1) automobile and light-duty trucks, (2) metal cans, (3) flat metal sheets and strips in the form of rolls or coils, (4) magnet wire for use in electrical machinery, (5) metal furniture, (6) large appliances, (7) exterior of planes, (8) automobile refinishing, (9) customized topcoating of automobiles and trucks, if production is less than 35 vehicles per day, and (10) exterior of marine vessels (Ref. 20, pp. 28 and 29).	20, 21
3. FlatWood Paneling	•None	•Does not apply to the manufacture of exterior siding, tileboard, or particleboard used as a furniture component (Ref. 20, p. 49).	20, 22
4. Synthesized Pharmaceutical Products	•<15 lbs/day; for each vent from reactors, distillation operations, crystallizers, centrifuges, and vacuum dryers (Ref. 23, p. 1-5).	•Recommends cutoffs if case-by-case approach is not practical (Ref. 23, p. 1-5). •Requirement for air dryers and production equipment exhaust systems differ at 330 lb/day (Ref. 23, p. 1-6). •Does not cover fermentation, extraction of organic chemicals from vegetable materials or animal tissues, and formulation and packaging of the products (Ref. 20, p. 61).	20, 23

TABLE 2. GROUP II CTG CATEGORIES (continued)

Source Category	Cutoffs	Comments	References
5. Rubber Tire Mfg.	•None	•Does not apply to the production of specialty tires for antique or other vehicles when produced on an irregular basis or with short production runs only if these tires are produced on equipment separate from normal production lines for passenger type tires (Ref. 20, p. 74).	20, 24
6. External Floating Roof Petroleum Tanks	(a) <150,000 liters (40,000 gallons) of storage capacity (Ref. 25, p. 5-1).	•Does not apply to fixed roof tanks with or without internal floating roofs, or to small production tanks (Ref. 25, p. 1-2).	20, 25
	(b) <1,600,000 liters (420,000 gallons) storage capacity used to store produced crude oil and condensate prior to custody transfer (Ref. 25, p. 5-3).	•Does not apply to tanks with a metallic-type shoe seal in a welded tank which has a secondary seal from the top of the shoe seal to the tank wall or external floating roof tanks storing waxy, heavy pour crudes (Ref. 25, p. 5-3). •Does not apply to petroleum liquid storage vessels: (1) that contain petroleum liquid with a true vapor pressure of less than 10.5 kPa (1.5 psia), and (2) containing petroleum liquid with a true vapor pressure less than 27.6 kPA (4.0 psia) that are of welded construction and presently possess a metallic-type shoe seal, a liquid-mounted foam seal, a liquid-mounted liquid filled type seal, or other approved closure device of demonstrated equivalence (Ref. 20, p. 105).	

TABLE 2. CUTOFFS FOR GROUP II CTG CATEGORIES (concluded)

Source Category	Cutoffs	Comments	References
6. External Floating Roof Petroleum Tanks (continued)		•Does not apply to horizontal underground storage tanks storing JP-4 jet fuel (Ref. 25, p. 2.)	
7. Graphic Arts	•<100 tons/yr (Ref. 20, p. 91).		20, 26
8. Perchloroethylene Dry Cleaning	•None	•Adsorbers are not required where there is inadequate space to accommodate them or where there is no way to desorb them. Other hardships may be found to exclude plants from using adsorbers (Ref. 27, p. 1-4). •Adsorbers are also not required at coin-operated facilities (Ref. 20, p. 118).	20, 27
9. Gasoline Tank Trucks and Vapor Collection System Leaks	•None	•The affected facilities are (1) gasoline tank trucks that are equipped for vapor collection and (2) the vapor collection systems at bulk terminals, bulk plants, and service stations that are equipped with vapor balance and/or vapor processing systems (Ref. 28, p. 2).	28

TABLE 3. CUTOFFS FOR GROUP III CTG CATEGORIES

Source Category	Cutoffs	Comments	References
1. Polymer Manufacturing	•Approximately 1,000 tons of light liquid and gaseous VOC processed (see comment).	•Provides guidelines to States to calculate uncontrolled emission rates below which RACT may be unreasonable and States could consider the exemption of plants with uncontrolled emissions at or below these emission levels (Ref. 29, p. 4-1).	29
2. SOCMI and Polymer Mfg. Equipment Leaks	•Leaks of concentrations less than 10,000 ppm (Ref. 30, p. 3-2).	•Small process units may be exempted from implementing routine leak detection and repair programs on the basis of cost effectiveness for these small units (Ref. 30, p. 4-1). •Process units processing only heavy liquid VOC or processing only non-VOC and equipment operating under vacuum may also be exempted (Ref. 30, p. 4-1).	30
3. Large Petroleum Dry Cleaners	•Does not apply to petroleum solvent dry cleaning facilities that consume less than 123,000 liters (32,500 gallons) of petroleum solvent annually (Ref. 31, p. E-2).		31
4. Air Oxidation Processes - SOCMI	•Facilities having a total resources effectiveness (TRE) index value greater than one (1) would not be required to meet RACT (Ref. 32, p. 4-2).		32
5. Equipment Leaks from Natural Gas/ Gasoline Processing Plants	(a)Leaks with VOC concentrations less than 10,000 ppm	•Does not apply to equipment operating under vacuum and to equipment in heavy liquid service (Ref. 33, p. 4-2).	33

TABLE 3. CUTOFFS FOR GROUP III CTG CATEGORIES (concluded)

Source Category	Cutoffs	Comments	References
5. Equipment Leaks from Natural Gas/ Gasoline Processing Plants (continued)	(b)States may consider exempting non-complex gas plants that have design throughputs of less than 10 million scfd (Ref. 33, p. 3-22) (c)RACT should apply only to equipment containing or contacting a process stream with a VOC concentration of 1.0 percent by weight or more (Ref. 33, p. 4-2).	•Does not apply to wet gas service reciprocating compressors that do not have a VOC control device (Ref. 33, p. 4-2).	

REFERENCES

1. Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals. EPA-450/2-77-026. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. October 1977. OAQPS No. 1.2-082.

2. Control of Volatile Organic Emissions from Bulk Gasoline Plants. EPA-450/2-77-035. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. December 1977. OAQPS No. 1.2-085.

3. Correspondence. W. C. Barber, Director, OAQPS, EPA, to Hon. L. Gudger, House of Representatives. November 13, 1978.

4. Regulatory Guidance for Control of Volatile Organic Compound Emissions from 15 Categories of Stationary Sources. EPA-905/2-78-001. U.S. Environmental Protection Agency, Region V, Air and Hazardous Materials Division. April 1978.

5. Memorandum. Richard G. Rhoads, Director, CPDD, EPA, to Director, Air and Hazardous Materials Division, Regions I-X. Evaluation of 10,000 gals/month Throughput Exemptions for Petroleum Marketing Operations. August 17, 1979.

6. Control of Volatile Organic Emissions from Storage of Petroleum Liquids in Fixed-Roof Tanks. EPA-450/2-77-036. U. S. Environmental Protection Agency. Office of Air Quality Planning and Standards. December 1977. OAQPS No. 1.2-089.

7. Memorandum. B. Polglase, Technical Guidance Section, EPA, to G. T. Helms, Chief, Control Programs Operation Branch, EPA. Applicability of Fuel Storage Regulations to JP-4 Jet Fuel. December 23, 1981.

8. Control of Refinery Vacuum Producing Systems, Wastewater Separators and Process Unit Turnarounds. EPA-450/2-77-025. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. October 1977. OAQPS No. 1.2-081.

9. Control of Volatile Organic Compounds from Use of Cutback Asphalt. EPA-450/2-77-037. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. December 1977. OAQPS No. 1.2-090.

10. Memorandum. R. G. Rhoads, Director, CPDD, EPA, to Director, Air and Hazardous Materials Division, Regions I-X. Cutback Asphalt VOC Regulations. March 6, 1979.

11. Memorandum. R. G. Rhoads, Director, CPDD, EPA, to Director, Air and Hazardous Materials Division, Regions I-X. Cutback Asphalt - Acceptable RACT Regulation. December 19, 1978.

12. Control of Volatile Organic Emissions from Solvent Metal Cleaning. EPA-450/2-77-022. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. November 1977.

13. Memorandum. R. G. Rhoads, Director, CPDD, EPA, to Director, Air and Hazardous Materials Division, Regions I-X. Exemption for Cold Cleaner Degreasers. July 2, 1980.

14. Memorandum. R. G. Rhoads, Director, CPDD, EPA, to Director, Air and Hazardous Materials Division, Regions I, III-X, and Director, Environmental Programs Division, Region II. Clarification of Degreasing Regulation Requirements. September 7, 1978.

15. Control of Volatile Organic Emissions from Existing Stationary Sources - Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks. EPA-450/2-77-008. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. May 1977. OAQPS No. 1.2-073.

16. Control of Volatile Organic Emissions from Existing Stationary Sources - Volume III: Surface Coating of Metal Furniture. EPA-450/2-77-032. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. December 1977. OAQPS No. 1.2-086.

17. Control of Volatile Organic Emissions from Existing Stationary Sources - Volume IV: Surface Coating for Insulation of Magnet Wire. EPA-450/2-77-033. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. December 1977. OAQPS No. 1.2-087.

18. Control of Volatile Organic Emissions from Existing Stationary Sources - Volume V: Surface Coating of Large Appliances. EPA 450/2-77-034. U.S. Environmental Protection Agency, Office of Planning and Standards. December 1977. OAQPS No. 1.2-088.

19. Control of Volatile Organic Leaks from Petroleum Refinery Equipment. EPA 450/2-78-036. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. June 1978. OAQPS No. 1.2-111.

20. Guidance to State and Local Agencies in Preparing Regulations to Control Volatile Organic Compounds from Ten Stationary Source Categories. EPA-450/2-79-004, U. S. Environmental Protection Agency, Office of Air Quality Planning and Standards. September 1979.

21. Control of Volatile Organic Emissions from Existing Stationary Sources-Volume VI: Surface Coating of Miscellaneous Parts and Products. EPA-450/2-78-015. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. June 1978. OAQPS No. 1.2-101.

22. Control of Volatile Organic Emissions from Existing Stationary Sources-Volume VII: Factory Surface Coating of Flat Wood Paneling. EPA-450/2-78-032. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. June 1978. OAQPS No. 1.2-112.

23. Control of Volatile Organic Emissions from Manufacture of Synthesized Pharmaceutical Products. EPA-450/2-78-029. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. December 1978. OAQPS No. 1.2-105.

24. Control of Volatile Organic Emissions from Manufacture of Pneumatic Rubber Tires. EPA-450/2-78-030. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. December 1978. OAQPS No. 1.2-106.

25. Control of Volatile Organic Emissions from Petroleum Liquid Storage in External Floating Roof Tanks. EPA-450/2-78-047. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. December 1978. OAQPS No. 1.2-116.

26. Control of Volatile Organic Compounds from Existing Stationary Sources-Volume VIII: Graphic Arts - Rotogravure and Flexography. EPA-450/2-78-033. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. December 1978. OAQPS No. 1.2-109.

27. Control of Volatile Organic Emissions from Perchloroethylene Dry Cleaning Systems: EPA-450/2-78-050. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. December 1978. OAQPS No. 1.2-117.

28. Control of Volatile Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems. EPA-450/2-78-051. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. December 1978. OAQPS No. 1.2-119.

29. Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins. EPA-450/3-83-008. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. November 1983.

30. Control of Volatile Organic Compound Leaks from Synthetic Organic Chemical and Polymer Manufacturing Equipment. EPA-450/3-83-006. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. March 1984.

31. Control of Volatile Organic Compound Emissions from Large Petroleum Dry Cleaners. EPA-450/3-82-009. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. September 1982.

32. Control of Volatile Organic Compound Emissions from Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industry. EPA-450/3-84-015. U.S. Environmental Protection Agency. December 1984.

33. Control of Volatile Organic Compound Equipment Leaks from Natural Gas/Gasoline Processing Plants. EPA-450/3-83-007. U.S. Environmental Protection Agency. December 1983.

ATTACHMENT 2

EXAMPLE 5% RULE CALCULATION

EXAMPLE OF AN APPLICATION OF THE 5 PERCENT EQUIVALENCY RULE

State "X" was in the process of developing volatile organic compound (VOC) regulations for the "Metal Furniture" control technique guideline (CTG) category.

An analysis of their emission inventory for their ozone nonattainment area disclosed the following with regards to metal furniture plant potential emissions.

	Pre-control (Potential)	Post Control (CTG Allowable) (81% Overall Control Efficiency)	Post Control (St. Rec. Allowable) (81% Overall Control Efficiency)
Plant "A" -	100 t/yr	19 t/yr	19 t/yr
Plant "B" -	300 t/yr	57 t/yr	57 t/yr
Plant "C" -	18.5 t/yr	3.5 t/yr	18.5 t/yr
Plant "D" -	80 t/yr	15.2 t/yr	15.2 t/yr
Plant "E" -	90 t/yr	17.1 t/yr	17.1 t/yr
Total	588.5 t/yr	111.8 t/yr	126.8 t/yr

The cutpoint recommended by EPA for the metal furniture source category was a VOC emissions level of 10 tons per year potential. The State was considering a cutpoint of 25 tons per year potential in order to provide relief to Plant "C". It was intended to show that with a 25 ton/yr cutoff, allowable emissions would be within 5 percent of potential emissions by applying a 10 ton/yr cutoff.

An evaluation of the various plant potential emissions (assuming 90% capture efficiency and 90% control) indicated that post control (CTG) allowable VOC emissions (with a 10 ton per year cutoff) would be 111.8 tons/yr.

Post control allowable VOC emissions (with the State's recommended 25 ton per year cutoff) would be 126.8 tons/yr.

The difference in post control allowable emissions from the metal furniture source category would be 126.8 - 111.8 = 15.0 tons/yr.

$$\frac{15}{111.8} \times 100 = 13.4 \text{ percent}$$

Therefore, allowable emissions with a 25 tons per year cutoff would not be within 5 percent of allowable emissions with a 10 ton per year cutoff; thus, the 25 ton/yr cutoff would not be acceptable.

ATTACHMENT 3

VOC CONVERSION CALCULATIONS: COATINGS

VOC CONVERSION CALCULATIONS:

COATINGS

OZONE AND CO PROGRAMS BRANCH

OFFICE OF AIR QUALITY PLANNING & STANDARDS

FEBRUARY, 1988

COMPARISON OF VOC REGULATION FORMATS
#VOC/GAL COATING vs #VOC/GAL SOLIDS

EXAMPLE CONVERSION

GIVEN: [illegible] 3.0 #VOC/GAL COATING (LESS WATER)
[illegible] —7.36 #VOC/GAL

PROBLEM: [illegible] COATING TO———#VOC/GAL SOLIDS

STEP #1—— WHAT'S VOLUME OF VOC IN 1 GAL OF COATING?

$$\frac{3.0\#\text{VOC}}{\text{GAL COAT}} * \frac{1\text{GAL VOC}}{7.36\#\text{ VOC}} = \frac{0.408\text{ GAL VOC}}{\text{GAL COATING}}$$

STEP #2—— WHAT'S THE VOL OF SOLIDS IN 1 GAL COATING ?

1 GAL COATING —VOL VOC = VOL SOLIDS

1 — 0.408 = 0.592 GAL SOLIDS

STEP#3—— HOW MANY GAL OF COATING DOES IT TAKE TO GET A GAL OF SOLIDS ? (INVERSE OF STEP #2)

$$\frac{1\text{ GAL COAT}}{0.592\text{ GAL SOLIDS}} = \frac{1.689\text{ GAL COATING}}{\text{GAL SOLIDS}}$$

STEP#4—— CONVERT 3.0# VOC/GAL COATING TO #VOC/GAL SOLIDS

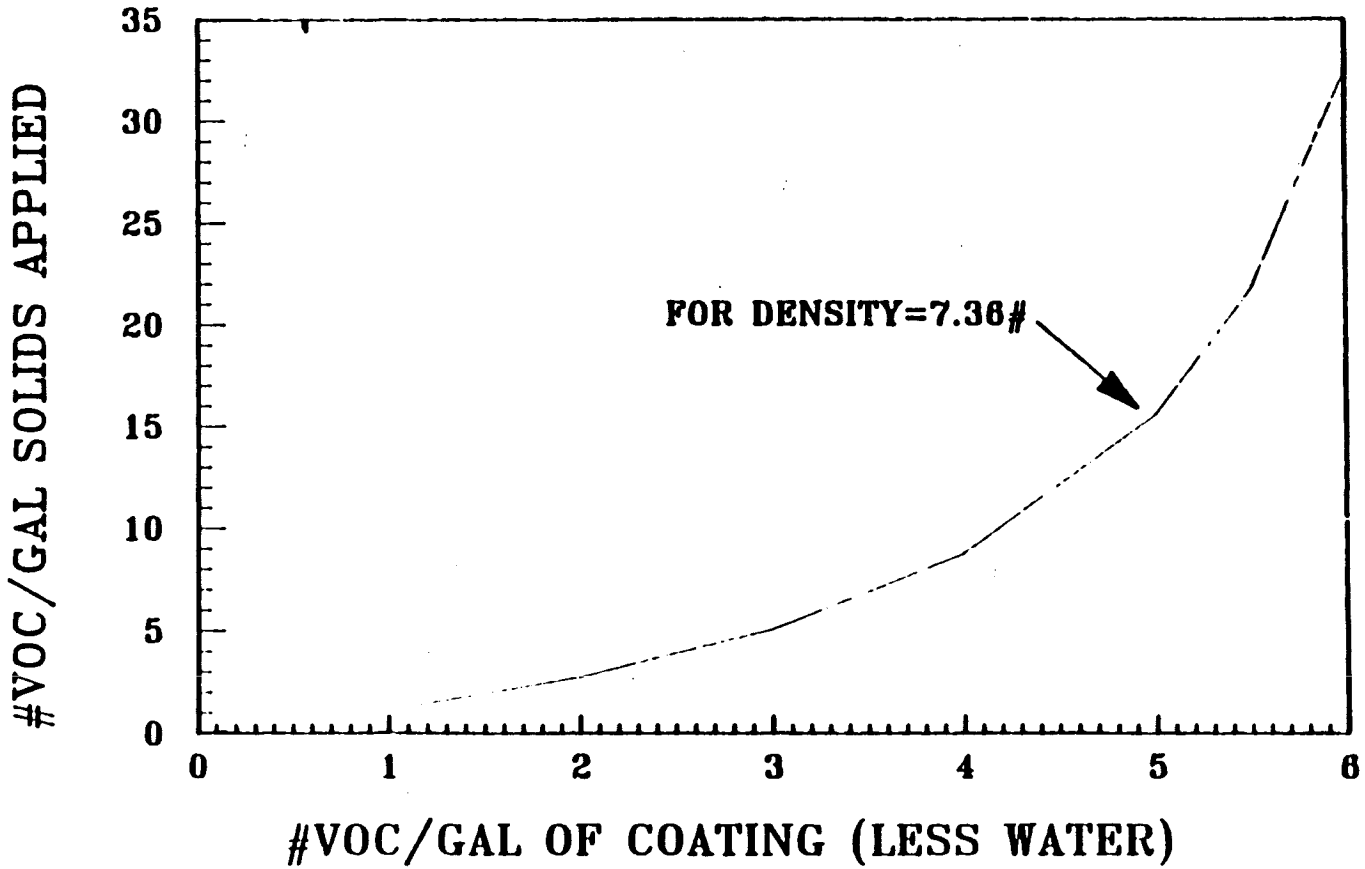
$$\frac{3.0\#\text{ VOC}}{\text{GAL COAT}} * \frac{1.689\text{ GAL COAT}}{\text{GAL SOLIDS}} = \frac{5.07\#\text{ VOC}}{\text{GAL SOLIDS}}$$

[illegible] VOC/GAL = 5.0/# VOC/GAL SOLIDS

OZONE/ CO BRANCH
C.T. HELMS
2/1/88

COMPARISON OF VOC REGULATION FORMATS

#VOC/GAL COATING vs #VOC/GAL SOLIDS



OZONE/ CO BRANCH
G.T. HELMS
12/24/87

1/28/88 GTH

PROGRAM TO COVVERT #VOC/GAL OF COATING TO
#VOC/GAL SOLIDS & #VOC/#SOLIDS

#VOC/GAL COATING	#VOC/GAL SOLIDS	#VOC/#SOLIDS
1.0	1.2	0.1
1.2	1.4	0.1
1.4	1.7	0.1
1.6	2.0	0.1
1.8	2.4	0.1
2.0	2.7	0.2
2.2	3.1	0.2
2.4	3.6	0.2
2.6	4.0	0.3
2.8	4.5	0.3
3.0	5.1	0.3
3.2	5.7	0.4
3.4	6.3	0.4
3.6	7.0	0.4
3.8	7.9	0.5
4.0	8.8	0.5
4.2	9.8	0.6
4.4	10.9	0.7
4.6	12.3	0.8
4.8	13.8	0.9
5.0	15.6	1.0
5.5	21.8	1.4
5.6	23.4	1.5
5.7	25.3	1.6
5.8	27.4	1.7
5.9	29.7	1.9
6.0	32.5	2.0
6.1	35.6	2.2
6.2	39.3	2.5
6.3	43.7	2.7
6.4	49.1	3.1
6.5	55.6	3.5
6.6	63.9	4.0
6.7	74.7	4.7
6.8	89.4	5.6
6.9	110.4	6.9
7.0	143.1	8.9
7.1	201.0	12.6
7.2	331.2	20.7
7.3	765.0	46.9

ASSUMES VOC DENSITY = 7.30 #VOC/GAL
SOLIDS DENSITY = 16.0 #/GAL

```
5 REM PROGRAM CALLED "SOLIDCALCULATE"
10 REM PROGRAM TO CALCULATE VOC & SOLIDS
15 LPRINT "                                                    1/28/88 ST-":LP
RINT
16 LPRINT"          PROGRAM TO CONVERT #VOC/GAL OF COATING TO"
17 LPRINT "              #VOC/GAL SOLIDS & #VOC/#SOLIDS":LPRINT:LPRINT
20 LPRINT "    #VOC/GAL COATING     #VOC/GAL SOLIDS     #VOC/#SOLIDS"
22 LPRINT "_____"
27 LPRINT
50 FOR X=1 TO 5 STEP .2
100 Y=X/7.36
200 Z=1-Y
300 W=1/Z
400 ANS=X*W
450 LBSOL=ANS/16'
475 REM LPRINT USING FORMAT PRINTS OUT ANSWERS WITH ONE DICIMAL PLACE
477 REM ALSO SKIPS SPACES PER ALL THE ##############'S
479 REM SEE PAGE 7-197 OF GW-BASIC MANUAL
500 LPRINT USING  "###############.#";X;ANS;LBSOL
600 NEXT X
1000 FOR X=5.5 TO 7.36 STEP .1
1005 Y=X/7.36
1200 Z=1-Y
1300 W=1/Z
1400 ANS=X*W
1425 REM DENSITY OF SOLIDS IS 16 #VOC/GAL
1450 LBSOL=ANS/16'
1500 LPRINT USING  "###############.#";X;ANS;LBSOL
1600 NEXT X
1800 LPRINT:LPRINT:LPRINT "_____
___"
1900 LPRINT:LPRINT "   ASSUMES VOC DENSITY = 7.36 #VOC/GAL"
1950 LPRINT"           SOLIDS DENSITY = 16.0 #/GAL"
```

ATTACHMENT 4

TEST METHODS OR PROCEDURES

FOR GROUP I, II, AND III CTG'S

ATTACHMENT TO MEMO FROM DARRYL TYLER, EPA/OAQPS, SEPTEMBER 14, 1984

Table 1

TEST METHODS OR PROCEDURES FOR GROUP I CTGS

Industry	CTG Document Number	Applicable Control Options	Recommended Method(s) and Document(s) Citing Test Method	Document May Be Ordered From
Cans, Coils, Paper, Fabric, and Automobiles and Light-Duty Trucks	EPA-450/2-77-008	Low solvent coatings	Method 24, 40 CFR Part 60	GPO[7]
		Add-on[1]	Method 25, 40 CFR Part 60 or methods in "Measurement of Volatile Organic Compounds," EPA 450/2-78-041	GPO[7] NTIS[2]
Metal Furniture	EPA-450/2-77-032	Low solvent coatings	(CTG pp.5-1 to 5-5) Method 24, 40 CFR Part 60	NTIS[2] GPO[7]
		Add-on[1]	Method 25, 40 CFR Part 60 or methods in "Measurement of Volatile Organic Compounds," EPA 450/2-78-041	GPO[7] NTIS[2]
Magnetic Wire Coating	EPA-450/2-77-033	Add-on[1]	Method 25, 40 CFR Part 60 or methods in "Measurement of Volatile Organic Compounds," EPA 450/2-78-041	GPO[7] NTIS[2]
Large Appliance	EPA-450/2-77-034	Low solvent coatings	(CTG pp. 5-1 to 5-4) Method 24, 40 CFR Part 60	NTIS[2] GPO[7]
		Add-on[1]	Method 25, 40 CFR Part 60 or methods in "Measurement of Volatile Organic Compounds," EPA 450/2-78-041	GPO[7] NTIS[2]

Table 1 (continued)

TEST METHODS OR PROCEDURES FOR GROUP I CTGs

Industry	CTG Document Number	Applicable Control Options	Recommended Method(s) and Document(s) Citing Test Method	Document May Be Ordered From
Bulk Terminals	EPA-450/2-77-026	Add on[1]	40 CFR 60.503 "Test Methods and Procedures", Methods 25A, 25B, 2A, 2B	GPO[7]
			Leak Tests--Monitoring During Transfer (see tank truck CTG)	
Bulk Plants	EPA-450/2-77-035	Vapor Balance System[4] Equipment Specifications and Operating Procedures	Equipment Inspection, CTG pp. 6-3 Leak Tests--Monitoring During Transfer (see tank truck CTG)	NTIS[2]
Service Stations--Stage I	Design Criteria Document (DCD)	Equipment Specifications and Operating Procedures Vapor Balance System[4]	Equipment Inspection, DCD pp. 3-6 Leak Tests--Monitoring During Transfer (see tank truck CTG)	PSLD[3]
Fixed-Roof Tanks	EPA-450/2-77-036	Equipment Specifications and Maintenance Requirements Internal Floating Roof[5]	CTG pp.6-2	NTIS[2]
		Add-on[1]	Method 25, 40 CFR Part 60	GPO[7]

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Table 1 (continued)

TEST METHODS OR PROCEDURES FOR GROUP I CTGs

Industry	CTG Document Number	Applicable Control Options	Recommended Method(s) and Document(s) Citing Test Method	Document May Be Ordered From
Petroleum Refineries				
Vacuum Producing Systems, Wastewater Separators and Process Unit Turnaround	EPA-450/2-77-025	Various Equipment Specifications and Operating Procedures	CTG pp. 6-2	NTIS[2]
*Cutback Asphalt	EPA-450/2-77-037	Water Emulsion	Direct Observation by Inspector	
		Emulsion Solvent Content	ASTM Distillation Test D-244	ASTM
*Degreasing	EPA-450/2-77-022	Equipment Specifications and Operating Procedures	CTG pp. 3-31, 3-33, 3-35, and 7-1 to 7-7	NTIS[2]
		Add-on Carbon Adsorber	Draft Test Method	OAQPS[6]

Table 2

TEST METHODS OR PROCEDURES FOR GROUP II CTGs

Industry	CTG Document Number	Applicable Control Options	Recommended Method(s) and Document(s) Citing Test Method	Document May Be Ordered From
Petroleum Refinery Fugitive Emissions (Leaks)	EPA-450/2-78-036	Inspection Monitoring Maintenance	Method 21, 40 CFR Part 60	GPO[1]
Surface Coating Miscellaneous Metal Parts and Products	EPA-450/2-78-015	Low Solvent Coatings	(CTG pp. 6-1) or Method 24, 40 CFR Part 60	NTIS[2] GPO[1]
		Add-on[3]	Method 25, 40 CFR Part 60	GPO[1]
Factory Surface Coating of Flatwood Paneling	EPA-450/2-78-032	Low Solvent Coatings	(CTG pp. 5-1) or Method 24, 40 CFR Part 60	NTIS[2] GPO[1]
		Add-on[3]	Method 25, 40 CFR Part 60	GPO[1]
Pharmaceutical Manufacture	EPA-450/2-78-029	Maintenance and Operation	(CTG pp. 7-2)	NTIS[2]
		Add-on[3]	Method 25, 40 CFR Part 60	GPO[1]
Rubber Tire Manufacture	EPA-450/2-78-030	Add-on[3]	Method 25, 40 CFR Part 60	GPO[1]
Graphic Arts Rotogravure and Flexography	EPA-450/2-78-033	Low Solvent Inks, High Solids Inks	Method 24 , 40 CFR Part 60	GPO[1]
		Add-on[3]	Method 25, 40 CFR Part 60	GPO[1]
External Floating Roof Tanks	EPA-450/2-78-047	Inspection Maintenance Monitoring	CTG pp. 5-1 to 5-4	NTIS[2]
*Dry Cleaning Perchloroethylene	EPA-450/2-78 050	Operation and Maintenance	CTG pp. 6-1 to 6-4	NTIS[2]
		Add-on Carbon Adsorption	Draft Test Method 23	OAQPS[6]

Table 2 (continued)

TEST METHODS OR PROCEDURES FOR GROUP II CTGs

Industry	CTG Document Number	Applicable Control Options	Recommended Method(s) and Document(s) Citing Test Method	Document May Be Ordered Fr
Gasoline Tank Trucks	EPA-450/2-78-051	Pressure-Vacuum Test	Method 27, 40 CFR 60, or CTG, Appendix B	GPO[1]
		Inspection, Monitoring, Maintenance	CTG-Appendix B-Leak Tests for Monitoring During Loading	NTIS[2]

Table 3. Test Methods or Procedures for Group III CTG's

Industry	CTG Document Number	Applicable Control Options	Recommended Method(s) and Document(s) Citing Test Method	Document May Be Ordered From
Large Petroleum - Dry Cleaners	EPA-450/3-82-009	Operation and Maintenance	CTG, Appendix E	NTIS[2]
		Add-on	40 CFR Part 60, Method 25	GPO[1]
Natural Gas/Gasoline Processing Plants	EPA-450/3-83-007	Inspection Monitoring Maintenance	40 CFR Part 60, Method 21	GPO[1]
SOCMI-Fugitive	EPA-450/3-83-006	Inspection Monitoring Maintenance	40 CFR Part 60, Method 21	GPO[1]
Manufacture of High Density Polyethylene Polypropylene and Polystyrene	EPA-450/3-83-008	Add-on	40 CFR Part 60 Method 18, 25, or 25A As appropriate	GPO[1]
VOL Storage	CTG not issued as of 9/1/84			
SOCMI Air Oxidation	CTG not issued as of 9/1/84			

Footnotes

1. Add-on: Incineration, carbon adsorbers, refrigeration, refrigeration/compression/absorption, etc.

2. Order by document number from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (nominal fee required).

3. Order from U.S. EPA, Office of Air Quality Planning and Standards, Emission Standards and Engineering Division, Chemical and Petroleum Branch, Mail Drop 13, Research Triangle Park, N. C. 27711. Document title: "Design Criteria to Stage I Vapor Control Systems Gasoline Service Stations", November 1975.

4. Visual inspection except for leaks.

5. Visual inspection only.

6. Order from: U.S. EPA, Office of Air Quality Planning and Standards, Emission Measurement Branch, Mail Drop 19, Research Triangle Park, N. C. 27711. Method Title: "Method 23--Determination of Halogenated Organics from Stationary Sources," proposed 45 FR 39766, June 11, 1980.

7. Order from: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Document title "Code of Federal Regulations, 40 CFR Protection of Environment, Parts 60 to 80."

* Test method currently not included in 40 CFR Part 60.

Table 4: NSPS Reference Test Methods for Volatile Organic Compounds

Method 1	Sample and Velocity Traverses for Stationary Sources, 40 CFR 60, Appendix A.
Method 1A	Sample and Velocity Traverses for Stationary Sources with Small Stacks or Ducts, (proposed 48 FR 48965, October 21, 1983)
Method 2	Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube) 40 CFR 60, Appendix A.
Method 2A	Direct Measurement of Gas Volume Through Pipes and Small Ducts, 48 FR 37592, August 18, 1983.
Method 2B	Determination of Exhaust Gas Volume Flow Rate from Gasoline Vapor Incinerators, 48 FR 37594, August 18, 1983.
Method 2C	Determination of Stack Gas Velocity and Volumetric Flow Rate from Small Stacks or Ducts (Standard Pitot Tube), (proposed 48 FR 48965, October 21, 1983).
Method 2D	Measurement of Gas Volume Flow Rates in Small Pipes and Ducts, (proposed 48 FR 48957, October 21, 1983).
Method 3	Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight, 40 CFR 60, Appendix A.
Method 4	Determination of Moisture Content in Stack Gases, 40 CFR 60, Appendix A.
Method 18	Determination of Gaseous Organic Compounds by Gas Chromatography, 48 FR 48344, October 18, 1983.
Method 21	Determination of Volatile Organic Compound Leaks, 48 FR 37609, August 18, 1983.
Method 23	Determination of Halogenated Organics from Stationary Sources, (proposed 45 FR 39756, June 11, 1980).
Method 24	Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings, 40 CFR 60, Appendix A.
Method 24A	Determination of Volatile Matter Content and Density of Printing Inks and Related Coatings, 40 CFR 60, Appendix A.
Method 25	Determination of Total Gaseous Nonmethane Organic Emissions as Carbon, 40 CFR 60, Appendix A.
Method 25A	Determination of Total Gaseous Organic Concentrations Using a Flame Ionization Analyzer, 48 FR 37595, August 18, 1983.
Method 25B	Determination of Total Gaseous Organic Concentration Using a Nondispersive Infrared Analyzer, 48 FR 37597, August 18, 1983.
Method 27	Determination of Vapor Tightness of Gasoline Delivery Tank Using Pressure-Vacuum Test, 48 FR 37597, August 18, 1983.

ATTACHMENT 5

INDEX TO EPA GUIDANCE MEMORANDUMS AND POLICIES

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22.	9/29/78	Vapor Recovery Meeting Questions	
23.	10/06/78	Comments on Auto Industry Proposals	Rhoads
24.	10/12/78	Unclassified Counties with Significant VOC Point Source Emissions	Hawkins
25.	10/26/78	Ozone Transport Values for SIP Revisions	Barber
26.	10/26/78	Definition of Volatile Organic Compounds	Helms
27.	10/27/78	Oxidant Standard Work Group Meeting on 10/19/78	Heim
28.	11/03/78	Volatile Organic Compounds Emissions Inventory	Barber
29.	11/03/78	Categorical Compliance Schedule for VOC Sources	Barber
30.	11/09/78	Clarification of Paper Coating Definition for VOC Sources	Rhoads
31.	11/13/78	Waste Disposal Regulations for VOC	Calcagni
32.	11/13/78	Clarification of RFP for Oxidant Control Strategies	Barber
33.	11/16/78	Volatile Organic Compound Emissions Reductions at GM	Barber
34.	11/21/78	RACT Options for Can Coating Operations	Rhoads
35.	12/07/78	Selection of O_x Design Value	Rhoads
36.	12/19/78	Cutback Asphalt - Acceptable RACT Regulation	Rhoads
37.	12/20/78	Availability of End Seal Compounds for Can Manufacturing Operations	Helms
38.	12/21/78	Reasonable Further Progress Requirements for Areas with Difficult Oxidant Problems	James
39.	12/22/78	Request for Response to Proposed Compliance Schedules by the New England States for Coordinated Air Use Management (NESCAUM)	Hohman
40.	12/29/78	PSD and NSR SIP Revision Submittals	Hohman
41.	1/16/79	Continuity of SIP Regulations - Revised Enclosure	Hawkins
42.	1/16/79	New England States for Coordinated Air Use Management (NESCAUM) Compliance Program for VOC Sources	Rhoads
43.	1/25/79	Consistency in VOC Regulations	Helms

44.	2/21/79	Determination of Reductions Necessary to Attain the Ozone Standard	Rhoads
45.	3/06/79	Regulation of Methyl Chloroform (1, 1, 1, Tricholoroethane) and Methyl Chloride.	Barber
46.	3/06/79	Cutback Asphalt VOC Regulations	Rhoads
47.	3/15/79	Questions and Answers on VOC Regulations	Polglase
48.	4/04/79	State Implementation Plans; General Preamble for Proposed Rulemaking on Approval of Plan Revisions for Nonattainment Areas	44 FR 20372
49.	4/13/79	Fabric Coating Emission Limits	Helms
50.	5/01/79	Letter to 3M on Bubbling	Rhoads
51.	5/03/79	Paper Coating Emission Limits	Helms
52.	5/04/79	Need for Emission Offsets in Rural O_3 Non-attainment Areas	Rhoads
53.	5/16/79	Need for Rural Emission Offset in Approved State Plans	Rhoads
54.	5/18/79	Implementation of RFP Requirements	Barber
55.	5/21/79	Draft Language - Preambles for SIP Proposals and Approvals	Rhoads
56.	5/24/79	Evaluation of RACT for an Automobile Assembly Prime Coating Operation	Rhoads
57.	5/25/79	Submission of State Air Permits as SIP Revisions	Rhoads
58.	6/04/79	Air Quality; Clarification of Agency Policy Concerning Ozone SIP Revisions and Solvent Reactivities	44 FR 32042
59.	6/15/79	Baseline Transfer Efficiency for Spray Application of Water-borne Automotive Coatings	Walsh
60.	6/20/79	Modifications to Recommendations for Solvent Metal Cleaning	Rhoads
61.	7/03/79	Appropriate Transfer Efficiency for "Waterborne Equivalence"	Rhoads
62.	8/17/79	Evaluation of 10,000 gals/month throughout Exemptions for Petroleum Marketing Operations	Rhoads
63.	8/17/79	5% Demonstration	Rhoads

64.	8/22/79	State Implementation Plans/Revised Schedules for Submitting Reasonably Available Control Technology Regulation for Stationary Sources of VOC	Hawkins
65.	8/28/79	SIP; General Preamble for Proposed Rulemaking on Approval of Plan Revisions for Nonattainment Areas-Supplement	44 FR 50371
66.	9/19/79	Summary of State Implementation Plan VOC Regulations	Polglase/ Calcagni
67.	10/04/79	Clarification for Final SIP Actions on Asphalt Regulations	Rhoads
68.	11/15/79	VOC Test Methods of Procedures	Rhoads
69.	12/12/79	Exemptions for Degreasers	Rhoads
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71.	1/03/80	VOC Regulations Issues	Helms
72.	1/28/80	State and Regional Agencies Continue to Make Serious Errors in Calculating Equivalence with the RACT Recommendations for Surface Coating	Salman
73.	3/20/80	New Fugitive Hydrocarbons Emissions Factors for Petroleum Refineries and Petrochemical Plants	Rhoads
74.	4/18/80	Applicability of VOC Emissions Guidelines: General Motors Corporation, North Tarrytown Assembly Plant	Giaccone
75.	4/25/80	Compliance Schedules for Low Solvent Technology Programs of the Graphic Arts CTG Category	Rhoads
76.	4/30/80	Letter to N.Y. DEC, Pharmaceutical CTG	Williams
77.	5/05/80	Procedure to Calculate Equivalency with the CTG Recommendations for Surface Coating	Rhoads
78.	5/16/80	Solvent Reactivities	45 FR 32424
79.	6/16/80	Gasoline Tank Truck Regulations	Rhoads
80.	7/02/80	Exemption for Cold Cleaner Degreasers	Rhoads
81.	7/07/80	Determination of Capture Efficiency	Berry
82.	7/18/80	Letter to Texas Oil Marketers Association	Rhoads
83.	7/21/80	Calculation of Evaporation Loss from External Floating Roof Tanks	Williams
84.	7/22/80	Solvent Reactivities List Additions	45 FR 48941

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86.	7/30/80	Leaks from Gasoline Tank Trucks	Helms
87.	7/31/80	Applicability of VOC Control Technique Guidelines (CTGs) to the Automobile Manufacturing Industry	Rhoads
88.	8/04/80	Applicability of Paper Coating, Fabric Coating, and Graphic Arts CTG	Helms
89.	8/08/80	Request for Confirmation of the Definition of a 100 Ton Source as Applied to Controls in the Gasoline Storage and Marketing Chain	Helms
90.	8/22/80	The Use of Permit Conditions to Define Potential to Emit	Rhoads
91.	8/25/80	Fabric Printing Definition	Berry
92.	8/28/80	Issues Concerning VOC RACT II Regulations Development	Helms
93.	9/03/80	Miscellaneous Metal Parts and Products CTG Emission Limits for Coating of Shipping Pails and Drums	Helms
94.	10/17/80	Equivalency Calculations with the CTG Recommendations for Surface Coating	Rhoads
95.	10/24/80	Set II VOC Regulation Approval	Hawkins
96.	10/28/80	Standards of Performance for New Stationary Sources: Graphic Arts Industry; Publication Rotogravure Printing; Proposed Rule and Notice of Public Hearing	45 FR 71537
97.	11/20/80	Role of Improved Transfer Efficiency in Demonstrating Compliance with the CTG Recommendations for Surface Coating	Rhoads
98.	11/20/80	Appropriate Transfer Efficiencies for Metal Furniture and Large Appliance Coating	Rhoads
99.	11/20/80	Compliance with VOC Emission Limitations for Can Coating Operations	Hawkins
100.	11/25/80	Approval and Promulgation of Implementation Plans; Revised Deadline for Submission of VOC RACT Regulations for Set II CTG	45 FR 78121
101.	11/28/80	Appropriate Transfer Efficiencies for Metal Furniture and Large Appliance coating	Helms
102.	12/01/80	Revised Seasonal Afterburner Policy	Barber

103.	12/02/80	Role of Improved Transfer Efficiency in Demonstrating Compliance with the CTG Recommendations for Surface Coating	Helms
104.	12/02/80	Cost Effectiveness for RACT - Application to Leaks from Petroleum Refinery Equipment	Helms
105.	12/02/80	RACT for Specialty Printing Operations	Rhoads
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107.	12/03/80	Compliance with VOC Emission Limitations for Can Coating Operations	Hawkins
108.	12/24/80	RACT/LAER Determinations for Casket Coaters	Helms
109.	12/30/80	New Nonattainment Designations	Rhoads
110.	1/16/81	Model Index for Ozone SIPs	Calcagni
111.	1/22/81	SIPs, Approval of 82 Ozone Plan for Extension Areas Final Policy	46 FR 7182
112.	1/28/81	Letter to Demmkoehler Concerning Coating Specifications	Barber
113.	1/28/81	Federal Paint Specifications Vis-A-Vis CTG	Barber
114.	2/03/81	Part D Conditional Approvals - Prioritizing Conditions	Helms
115.	2/06/81	Storage Tank Vapor Balance Requirements at Synthesized Pharmaceutical Products Manufacture Facilities	Tyler
116.	3/13/81	Applicability of Fuel Storage Regulations to JP-4 Jet Fuel	Tuerk
117.	3/24/81	Test Methods for the Set I and Set II CTG Source Categories	Tuerk
118.	4/03/81	Clarification of VOC "Test Method" Requirements	Tuerk
119.	4/06/81	VOC Test Methods or Procedures for Group I and Group II CTGs	Tuerk
120.	4/17/81	Internal Surface Coating Bubble for Rhode Island	Williams
121.	4/23/81	Criteria for Reviewing State VOC Bubble Regulations	Tuerk
122.	4/24/81	Letter to Massport on Jet Fuel	Burr
123.	4/29/81	NSPS, Petroleum Liquid Storage Vessels - Equivalency Determination	46 FR 23984

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124.	4/30/81	Status of 1982 Ozone SIP Data Base	Rhoads
125.	5/06/81	Cost Effectiveness of Gasoline Tank Truck Certification Program	Tyler
126.	7/21/81	State of Michigan Stage I Service Station 5% Determination	Helms
127.	7/24/81	Tank Truck Certification Workshop Follow-up	Nicholson
128.	7/24/81	Results of the Regional Survey of Studies Related to RACT Beyond the VOC CTGs	Helms
129.	8/07/81	Working Group Meeting - Review of 111(d) Guidelines to Control Trichloroethylene, Perchloroethylene, 111 Trichloroethane Methyl Chloride and Trichlorotri-flouroethane from Existing Organic Solvent Cleaners	Goodwin
130.	8/11/81	Aerosol Can Mounting Cup Sealant Compounds	Helms
131.	8/14/81	Applicability of the Miscellaneous Metal Parts CTG to the Coating of Electromotive Parts	Helms
132.	9/11/81	Review of PA Group II VOC Regulations	Polglase/Williams
133.	9/22/81	Summary of Group I and II VOC RACT Regulations	Nicholson
134.	9/22/81	Review of Final Group II VOC Regulations for Massachusetts	Polglase/Williams
135.	9/24/81	Summary of Group I VOC Regulations	Williams
136.	10/20/81	Compliance Schedules for Auto Assembly Paint Shops	46 FR 51366
137.	10/26/81	VOC Regulations for the 1982 SIP	Helms
138.	11/04/81	Status of State Action on Group III and Beyond Source Categories	Polglase
139.	11/06/81	Policy on the Use of Conditional Approvals (Draft)	Bennett
140.	11/09/81	New Procedures for Review of State Implementation Plans	Bennett
141.	11/30/81	Review of Plan Revisions by the Office of Management and Budget	Bennett
142.	12/11/81	Policy on the Use of Conditional Approvals	Bennett
143.	12/14/81	Summary of Tank Truck Certification Tests	Polglase
144.	12/14/81	Letter to George Payne on Can Manufacturing	Barber

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145.	2/09/82	Acceptability of Oklahoma's Demonstration Concerning the Surface Coating of Miscellaneous Metal Parts and Products	Helms
146.	2/12/82	Acceptability of Oklahoma's Demonstration Concerning the Surface Coating of Miscellaneous Metal Parts and Products	Helms
147.	3/19/82	Approval and Promulgation of Implementation Plans; San Francisco Bay Area Air Basin Nonattainment Area Plan (Boiler-Plate for "good cause")	47 FR 11866
148.	3/19/82	San Francisco Nonattainment Plan	47 FR 11866
149.	3/25/82	Clean Air Act Restriction Applying to SIP Revisions Due 7/1/82	Perry-OGC
150.	4/08/82	EPA Emissions Trading Policy	Spink
151.	4/19/82	VOCs from Bakeries	Carb
152.	6/18/82	Prime Coating at Chrysler Assembly Plant	Tyler
153.	8/27/82	Equivalency with the Perchloroethylene Dry Cleaning CTG RACT Recommendations	Helms
154.	9/07/82	Clarification of Memo Dated May 6, 1981 Truck Certification Program	Helms
155.	9/28/82	Policy on Excess Emissions During Start-up, Shutdown, Maintenance, and Malfunctions	Bennett
156.	11/01/82	Errata Sheet for Petroleum Dry Cleaners	Farmer
157.	1/17/83	Allowable Tank Truck terminal Emission Limits	Polglase
158.	3/04/83	Review of Illinois Group II VOC Rules	Williams/Polglase
159.	4/04/83	Draft RACT Determinations	Williams
160.	4/15/83	Reynolds Metals - VOC Bubble with Long-Term Emissions Averaging	Helms
161.	4/21/83	Averaging Time - VOC Equivalence Compliance Calculations	Polglase
162.	5/10/83	Graphic Arts - 100 TPY Potential Exemption	Polglase
163.	5/17/83	Guidance for Non-CTG RACT Determinations	Helms
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165.	6/06/83	Tank Truck Hatch Covers	Calcagni
166	6/28/83	Letter to Dow Chemical on Exempt Solvents	Helms

167.	6/29/83	Exclusion of Exempt Solvents From VOC Calculations	Helms
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172.	10/20/83	Addition of Dilution Solvents to Printing Inks	Polglase
173.	10/24/83	Solvent Reactivities	Federal Register
174.	10/31/83	Averaging Times for Compliance with VOC emission Limits	Tyler
175.	12/05/83	Meeting Report on Long-Term Averaing for VOC Sources	Polglase
176.	1/20/84	Averaging Times for Compliance with VOC Emission Limits--SIP Revision Policy	O'Connor
177.	1/27/84	Violations of Record Keeping Provisions in Approved SIPs	SSCD
178.	2/29/84	Draft PEDCo Report for Surface Coating Calculations	Polglase
179.	3/06/84	VOC Equivalency Calculations - Clarification of Requirements	Tyler
180.	3/08/84	Letter to Lillquist on Flexible Packaging	Cannon
181.	3/15/84	Reynolds and Westvaco Plant Proposed Ozone SIP Revisions	Helms
182.	4/16/84	Letter on VOC extend compliance dates	Rothblatt
183.	5/7/84	Topcoating and Printy of Urethane Fabric and Sheets	Helms
184.	5/7/84	Exclusion of Vinyl Plastisol from VOC Compliance Calculations	Helms
185.	5/21/84	Confirmation that VOC Regulations are required for CTG III	Tyler
186.	6/19/84	Regional survey - VOC Equivalency Calculations	Polglase
187.	6/25/84	Confirmation of Definition of 100 TPY Source	Helms

188.	6/25/84	Applicability of CTG III	Tyler
189.	7/30/84	Federally Enforceable Permits for 100 TPY non CTG sources	Helms
190.	8/28/84	VOC data sheet for suppliers of paints and coatings	Emison
191.	8/29/84	VOC Policy (From 19 VOC Issue Resolution Process)	Rasnic
192.	9/11/84	Methods to establish daily violations from annual VOC use data	Berry
193.	9/14/84	VOC test methods or procedures for Group I, II, and III CTGs	Tyler
194.	11/07/84	Connecticut VOC issues	Murphy
195.	12/06/84	Comments on VOC clarification memo	Hagg
196.	12/21/84	Connecticut VOC issues	Helms
197.	1/09/85	Clarification of CTG RACT Recommendation for High-Density Polyethylene, polypropylene, and polystyrene	Tyler
198.	2/04/85	Stack height in facilities using air stripping for groundwater cleaning	Cannon
199.	2/11/85	Response concerning VOC clarification memo	Tyler
200.	4/02/85	Emission limits for coating of shipping pails and drums	Helms
201.	4/23/85	Consideration of Organisols in VOC Compliance Calculations	Emison
202.	4/23/85	Printing on Unsupported Vinyl Film Covered by CTG	Crumpler
203.	5/20/85	Results of May 3 VOC Meeting (From 19 VOC Issue Resolution Process)	SSCD
204.	7/22/85	Graphic Arts - Add-On Control Systems	Dalton
205.	8/15/85	Fabric Coating - Dip and Impregnator Coating	Crumpler
206.	8/27/85	Classification of Benzene as a VOC	Tyler
207.	8/29/85	Paper Coating RACT Determination	Johnson
208.	12/16/85	Baseline Time Period for VOC Transfer Efficiency Credits	Helms

209.	1/17/86	Issues #3(e) and #5 of the VOC Issue Resolution Process: Establishing Proof of VOC Emissions Violations, and Bubbles in Consent Decrees Resolving Civil Actions Under Section 113(b) of the Clean Air Act (From 19 VOC Issue Resolution Process)	Price
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213.	5/01/86	Exemption of Negligibly Photochemically Reactive Compounds by the State of South Carolina	Tyler
214.	5/16/86	Compliance With VOC Emission Limitations for Can Coating Operations (From 19 VOC Issue Resolution Process)	Emison
215.	5/22/86	Exemption of Negligibly Photochemically Reactive Compounds by the State of South Carolina	Tyler
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217.	8/07/86	Policy on the Availability of Low-Solvent Technology Schedules in Clean Air Act Enforcement Actions	Potter
218.	8/07/86	Policy on SIP Revisions Requesting Compliance Date Extensions for VOC Sources	Potter
219.	9/22/86	Reactivity of Acetylene	Hathaway
220.	10/07/86	DOD Directive on VOC Compliance	Hitte
221.	10/30/86	Inclusion of Cleanup Solvents in Determining Applicability to the 100-Ton Per Year Non-CTG Requirements	Helms

222.	11/21/86	Early Compliance and Stipulated Penalties in VOC Enforcement Cases	Pasnic/Alushin
223.	1/20/87	Determination of Economic Feasibility	Helms
224.	3/16/87	November 21, 1986 Memorandum Titled "Early Compliance and Stipulated Penalties in VOC Enforcement Cases"	Hitte
225.	4/17/87	Definition of VOC	Helms
226.	6/25/87	Emission Cut-Off for Control Techniques Guidelines - Volatile Organic Compound Sources	Helms
227.	7/21/87	Definition of Volatile Organic Compounds (VOC's)	Helms
228.	9/09/87	Alternative Compliance for Graphic Arts RACT	Tyler
229.	11/04/87	Additional Information Concerning Emission Cut-Off — 3 lbs/hr, 15 lbs/day	Helms

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Updated - 1/13/88

Cross Reference Index by Source Category

Category	Date of Memo	Originator
1) Surface Coating of Cans	11/21/78	Rhoads
	12/20/78	Helms
	11/20/80	Hawkins
	12/03/80	Hawkins
	8/11/81	Helms
	12/14/81	Barber
	5/16/86	Emison (19 VOC Issue)
2) Surface Coating of Metal Coils		
3) Surface Coating of Fabrics	4/13/79	Helms
	8/04/80	Helms
	8/25/80	Berry
	12/02/80	Rhoads
	8/05/85	Crumpler
4) Surface Coating of Paper Products	11/09/78	Rhoads
	5/13/79	Helms
	8/04/80	Helms
	8/29/85	Johnson
5) Surface Coating of Automobiles	10/06/78	Rhoads
	11/16/78	Barber
	5/24/79	Rhoads
	4/18/80	Giaccone
	7/18/80	Giaccone
	7/31/80	Rhoads
	10/20/81	46 FR 51386
	6/18/82	Tyler
6) Surface Coating of Metal Furniture	11/20/80	Rhoads
	11/28/80	Helms
7) Surface Coating of Magnet Wire		
8) Surface Coating of Large Appliances	11/20/80	Rhoads
	11/28/80	Helms
9) Gasoline Terminals	8/08/80	Helms
	8/22/80	Rhoads
	9/14/83	Polglase
10) Gasoline Bulk Plants	9/14/83	Polglase
11) Stage I Vapor Recovery Roof Tanks	7/21/81	Helms

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Cross Reference Index by Source Category (pg. 2)

Category	Date of Memo	Originator
12) Gasoline Storage in Fixed Roof Tanks	8/08/80	Helms
13) Petroleum Refinery Process	3/20/80	Rhoads
14) Cutback Asphalt	12/19/78	Rhoads
	3/06/79	Rhoads
	10/04/79	Rhoads
15) Solvent Metal Degreasing	9/07/78	Rhoads
	12/12/79	Rhoads
	7/02/80	Rhoads
16) Surface Coating of Miscellaneous Metal Parts and Products	8/04/80	Helms
	9/03/80	Helms
	1/28/81	Barber
	8/14/81	Helms
	2/09/82	Helms
	2/12/82	Helms
	4/02/85	Helms
17) Flatwood Paneling		
18) Pharmaceutical	4/30/80	Giaccone
	8/04/80	Helms
	2/06/81	Tyler
	3/13/81	Tuerk
19) Pneumatic Rubber Tire		
20) Vegetable Oil		
21) Graphic Arts	4/25/80	Rhoads
	8/04/80	Helms
	10/28/80	Federal Register
	5/10/83	Polglase
	7/22/85	Dalton
	9/09/87	Tyler
22) Dry Cleaning	8/04/80	Helms
	8/07/81	Helms
	8/27/82	Helms
	11/01/82	Farmer
	10/24/83	Federal Register
23) Leaks at Petroleum Refineries	12/02/80	Helms

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Cross Reference Index by Source Category (pg. 3)

Category	Date of Memo	Originator
24) External Floating Roof Tanks	8/08/80	Helms
	3/13/81	Tuerk
	4/29/81	Federal Register
25) Gasoline Tank Trucks	6/16/80	Rhoads
	7/18/80	Rhoads
	7/21/80	Williams
	7/30/80	Helms
	5/06/81	Tyler
	7/24/81	Nicholson
	12/14/81	Polglase
	9/07/82	Helms
	6/06/83	Calcagni
	9/19/83	McLaughlin
26) Bubbling	5/01/79	Rhoads
	7/15/79	Walsh
	4/17/81	Williams
	4/29/81	Tuerk
	4/08/82	Spink
	4/15/83	Helms
	7/05/83	Helms
	10/12/83	Tyler
	10/31/83	Tyler
	12/05/83	Polglase
	1/20/84	O'Connor
	3/09/84	Tyler
	1/22/86	Price (19 VOC Issues)
	2/28/86	Emison (19 VOC Issues
27) Solids Applied/Transfer Efficiency	6/15/79	Walsh
	7/03/79	Rhoads
	1/28/80	Salman
	5/05/80	Rhoads
	8/04/80	Helms
	10/17/80	Rhoads
	11/20/80	Rhoads
	12/02/80	Helms
	2/26/81	Salman
	3/04/83	Williams/Polglase
	6/29/83	Helms
	2/29/84	Polglase
	3/06/84	Tyler
	12/16/85	Helms
	4/11/86	Emison (19 VOC Issues

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Cross Reference Index by Source Category (pg. 4)

Category	Date of Memo	Originator
28) Exempt Solvents	7/08/77	Federal Register
	8/24/78	Barber
	3/06/79	Barber
	6/04/79	Federal Register
	7/22/80	Federal Register
	2/26/81	Salman
	6/28/83	Helms
	6/29/83	Helms
	10/24/83	Federal Register
	5/01/86	Tyler
	5/22/86	Tyler
	9/22/86	Hathaway
29) Capture Efficiency	7/07/83	Berry
30) Test Methods	11/15/79	Rhoads
	3/24/81	Tuerk
	4/03/81	Tuerk
	4/06/81	Tuerk
	4/11/86	Emison (19 VOC Issues
	9/18/84	Tyler
31) Beyond Set I and II CTG	7/24/81	Helms
	11/04/81	Polglase
	12/30/81	Helms
	8/29/84	Rasnic (19 VOC Issues
	1/31/86	SSCD (19 VOC Issues)
	6/25/87	Helms
	11/4/87	Helms
32) 111(d)	8/07/81	Goodwin
33) Definition of VOC	10/26/78	Helms
	8/27/85	Tyler
	4/17/87	Helms
	7/21/87	Helms
34) RFP	12/21/78	James
35) 5% Rule	8/17/79	Rhoads
36) Long Term Averaging	10/31/83	Tyler
	12/05/83	Polglase
	1/20/84	O'Connor
	3/06/84	Tyler
37) Jet Fuel	3/13/81	Tuerk
	4/21/81	Polglase
	4/24/81	Burr
38) Dilution Solvents	10/20/83	Berry
	10/30/86	Helms

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Cross Reference Index by Source Category (pg. 5)

Category	Date of Memo	Originator
39) Definition of 100 Ton-Per-Year	9/07/79	Rhoads
	8/08/80	Helms
	8/22/80	Rhoads
	5/10/83	Polglase
	6/25/84	Helms
	2/28/86	Emison (19 VOC Issues)
	4/11/86	Emison (19 VOC Issues)
40) CTG III	5/21/84	Tyler
41) Afterburners	12/01/80	Barber
	2/28/86	Emison (19 VOC Issues)
42) Non-CTG Bakeries	4/19/82	Carb
43) High Density Polyethylene, Polypropylene, and Polystyrene	1/09/86	Tyler
44) Surface Coating of Vinyl-coated Fabric or Vinyl Sheets	4/23/86	Crumpler
45) Criteria for Plan Revisions for Nonattainment Areas	5/19/78	43 FR 21673
46) Low Solvent Technology	8/07/86	Potter
	11/21/86	Rasnic/Alushin
	3/16/87	Hitte
47) Compliance Date Extension	8/07/86	Potter
48) General VOC Issues	5/20/85	SSCD (19 VOC Issues)
49) Recordkeeping/ Reporting	1/17/86	Price (19 VOC Issues)
	4/11/86	Emison (19 VOC Issues)
50) Class A1, A2, and B VOC sources	1/31/86	SSCD (19 VOC Issues)
51) Baseline Year for VOC Percent Emission Reductions as per State SIP Regulations	2/28/86	Emison (19 VOC Issues)

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Cross Reference Index by Source Catecory (pg. 6)

52) Type of Compliance Monitoring When Incineration Is Used Sporadically	4/11/86	Emison (19 VOC issues)
53) Cost Effectiveness of controlling VOC's	8/04/86	Berry
54) Clean up Solvents	10/30/86	Helms

ATTACHMENT 6

SUMMARIES OF CONTROL TECHNIQUES GUIDELINES (CTG'S)

SUMMARY OF CTG DOCUMENT FOR TANK TRUCK GASOLINE LOADING TERMINALS

AFFECTED FACILITIES	Any tank truck loading operations at the primary wholesale outlet for gasoline which delivers at least 76,000 liter/day (20,000 gal/day). A facility which delivers under 20,000 gal/day is covered by the CTG for bulk plants.
NUMBER OF AFFECTED FACILITIES	According to the Bureau of Census, there were 1,925 terminals in 1972. Current estimates are about 1,600 terminals nationwide.
VOC EMISSIONS NATIONWIDE	Estimated annual emissions are 250,000 Mg/yr (275,000 ton/yr), which represent about 0.9 percent of estimated VOC emissions nationwide.
VOC EMISSION RANGE PER FACILITY	Without vapor recovery systems, VOC emissions can range from 0.6 to 1.4 g/1,000 liters of throughput (5 to 12 lb/1,000 gal). For a typical size facility having a throughput of 950,000 liter/day (250,000 gal/day VOC emissions are estimated to be 200 Mg/yr (220 ton/yr).
100 TON/YR SOURCE SIZE	For an uncontrolled facility with fixed roof tanks, a 133,000 liter /day (35,000 gal/day) plant would result in VOC emission of 100 ton/yr. For an uncontrolled facility with floating roof tanks, a 454,000 liter/ day (120,000 gal/day) facility would result in VOC emissions of 100 ton/yr.
EMISSION LIMIT	The recommended emission limit is 80 mg/liter (0.67 lb/1,000 gal) of gasoline loaded. This limit is based on submerged fill and vapor recovery/control systems. No leaks in the vapor collection system during operation is a requirement.
VOC REDUCTION PER FACILITY	A minimum control of 87 percent is expected for the loading facility.
COSTS	BASIS: 250,000 gal/day facility with active vapor control systems. Capital cost: $140,000 - $195,000 Annualized cost: $ 20,000 - $ 30,000 Cost effectiveness: $120 - $180 per ton VOC

SUMMARY OF CTG DOCUMENT FOR BULK GASOLINE PLANTS

AFFECTED FACILITIES	A wholesale gasoline distribution facility which has a maximum daily throughput of 76,000 liters (20,000 gal) of gasoline. Facilities which deliver over 20,000 gal/day are covered under the CTG for terminals. Potentially severe economic hardship may be encountered by bulk plants which deliver less than 4,000 gal/day.
NUMBER OF AFFECTED FACILITIES	There were 23,367 bulk plants in 1972 according to the Bureau of Census. Current estimates are about 18,000 bulk gasoline plants nationwide.
VOC EMISSIONS NATIONWIDE	Estimated annual emissions are 150,000 Mg/yr (165,000 ton/yr) [14,15] which represent about 0.6 percent of estimated VOC emissions nationwide.
VOC EMISSION RANGE PER FACILITY	A facility with three storage tanks would have VOC emissions approximating 4.4 kg/day (20 lb/day) plus a range of 0.2 to 3.0 g/1,000 liters throughput (2.0 to 25.0 lb/1,000 gal). For a typical size facility having a throughput of 18,900 liter/day (5,000 gal/day) average VOC emissions are estimated to be 15 Mg/yr (17 ton/yr).
100 TON/YR SOURCE SIZE	None.
CTG EMISSION LIMIT	Emission limits recommended in terms of equipment specification alternatives: 1. Submerged fill of outgoing tank trucks. 2. Alternative 1 + vapor balance for incoming transfer. 3. Alternative 2 + vapor balance for outgoing transfer.
VOC REDUCTION PER FACILITY	Emission Reductions / Total Plant / All Transfers Alternative 1: 22 percent / 27 percent Alternative 2: 54 percent / 64 percent Alternative 3: 77 percent / 92 percent
COSTS	BASIS: 4,000 gal/day throughput using submerged fill and vapor balance for both incoming and outgoing transfers:. Capital cost: $4,000 - $10,000 Annualized cost: $ 100 - $ 1,200 Cost effectiveness: $9 - $90 per ton VOC

SUMMARY OF DOCUMENT FOR GASOLINE SERVICE STATIONS - STAGE I

AFFECTED FACILITIES	Transfer of gasoline from delivery trucks to service station storage tanks. No exemptions were noted in the "Design Criteria for Stage I Vapor Control Systems."
NUMBER OF AFFECTED FACILITIES	Estimated to be 180,000 retail gasoline service stations nationwide. There are 240,000 other gasoline dispensing outlets.
VOC EMISSIONS NATIONWIDE	For transfer of gasoline to service station storage tanks, VOC emissions estimated to be 400,000 Mg/yr (440,000 ton/yr)[14,15] which represents about 1.5 percent of estimated VOC emissions nationwide.
VOC EMISSION RANGE PER FACILITY	Without vapor controls, VOC emissions are estimated to be 1.4 kg/1,000 liters (11.5 lb/1,000 gal) of throughput. For a typical facility having a throughput of 151,000 liter/mo (40,000 gal/mo), VOC emissions would be 2.5 Mg/yr (2.8 ton/yr) for Stage I.
100 TON/YR SOURCE SIZE	For an uncontrolled facility, a 2,800,000 liter/mo (750,000 gal/mo) throughput results in VOC emissions of 100 ton/yr. Very few service stations will have this size throughput. The emissions include both Stage I and Stage II losses.
CTG EMISSION LIMIT	Emission limits recommended in terms of equipment specifications. Recommended controls are submerged fill of storage tanks, vapor balance between truck and tank, and a leak free truck and vapor transfer system.
VOC REDUCTION PER FACILITY	Stage I control can reduce transfer losses by 95+ percent and total facility losses by 50 percent.
COSTS*	BASIS: Application of submerged fill and vapor balance to a service station with three tanks. Capital cost: $600 Annualized cost: ($200) Cost effectiveness: ($110) per ton VOC[13]

* ($---) indicates savings

SUMMARY OF CTG DOCUMENT FOR PETROLEUM LIQUID STORAGE IN FIXED-ROOF TANKS

AFFECTED FACILITIES	Fixed-roof storage tanks having a capacity greater than 150,000 liters (40,000 gal or 950 bbl) and storing petroleum liquids which have a true vapor pressure greater than 10.5 kPa (1.5 psia). Fixed-roof tanks which have capacities less than 1,600,000 liters (420,000 gal or 10,000 bbl) used to store produced crude oil and condensate prior to lease custody transfer are exempt.
NUMBER OF AFFECTED FACILITIES	Estimated for the year 1976 to be 7,300 tanks nationwide.
VOC EMISSIONS NATIONWIDE	Estimated annual emissions are 560,000 Mg/yr (616,000 ton/yr) which represent about 2.1 percent of the estimated VOC emissions nationwide. Emissions of VOC from fixed-roof tanks are 4.7 times that from existing floating roof tanks, although the total capacity of fixed-roof tank storage is less. [14]

VOC EMISSION RANGE PER FACILITY

VOC emission ranges for gasoline or crude oil storage assuming 5 to 20 turnovers per year and a true vapor pressure of 13.8 to 69 kPa (2.0 to 10 psia).

Size →	Small	Medium	Large
Capacity (gal)	420×10^3	2.3×10^6	6.3×10^6
Dimensions diam. x ht. (ft)	50 x 30	100 x 40	150 x 48
VOC Emissions			
Gasoline (Mg/yr)	12 - 113	52 - 535	123 - 1,353
(ton/yr)	13 - 125	57 - 590	135 - 1,490
Crude Oil (Mg/yr)	7 - 65	28 - 311	68 - 796
(ton/yr)	8 - 72	30 - 340	75 - 875

100 TON/YR SOURCE SIZE	Variable depending on many parameters including the type and vapor pressure of the petroleum liquid stored, schedule of tank filling and emptying, and the geographic location of tank. As shown above a medium size tank can easily exceed 100 ton/yr emissions of VOC.
CTG EMISSION LIMIT	Emission limits recommended in terms of equipment specifications: Installation of internal floating roofs or alternative equivalent control. Types of alternative controls are not specified in the CTG document.
VOC REDUCTION PER FACILITY	VOC emission reduction of 90+ percent can be achieved by installation of internal floating roofs.
COSTS*	BASIS: 55,000 bbl (2,310,000 gal) medium size tank with gasoline or crude oil, with true vapor pressure range of 14 to 69 kPa (2 to 10 psia) and 5 to 20 turnovers per year. Capital cost: $31,000 Annualized cost: $(70,000) to 2,100 Cost effectiveness: ($123) - $73 per ton VOC

* ($-) indicates savings

SUMMARY OF CTG DOCUMENT FOR PROCESSES AT PETROLEUM REFINERIES

AFFECTED FACILITIES	The affected facilities and operations are: a. Vacuum producing systems (VPS). b. Wastewater separators (WS). c. Process unit turnarounds (PUT) - (i.e., shutdown, repair or inspection, and start up of a process unit). The CTG provides no exemptions.
NUMBER OF AFFECTED FACILITIES	No estimates of the number of individual facilities are available. There are approximately 285 refineries nationwide.
VOC EMISSIONS NATIONWIDE	Estimated annual nationwide emissions from vacuum producing systems (VPS), wastewater separators (WS), and process unit turnarounds (PUT) are 730,000 Mg/yr (800,000 ton/yr) which represent about 2.7 percent of estimated VOC emissions nationwide. [14]
VOC EMISSION RANGE PER FACILITY	The estimated average annual VOC emissions from affected facilities at a petroleum refinery are 2,560 Mg (2,820 ton). Emission factors used for estimating uncontrolled, reactive VOC emissions are: a. VPS - 145 kg/$10^3 m^3$ (50 lb/10^3 bbl) refinery throughput. b. WS - 570 kg/$10^3 m^3$ (200 lb/10^3 bbl) refinery throughput. c. PUT - 860 kg/$10^3 m^3$ (301 lb/10^3 bbl) refinery throughput.
100 TON/YR SOURCE SIZE	The following annual refinery throughputs will result in 100 ton/yr uncontrolled VOC emissions from each affected facility type: a. VPS - 24.6 x $10^6 m^3$ (3.9 x 10^6 bbl). b. WS - 6.3 x $10^6 m^3$ (1.0 x 10^6 bbl). c. PUT - 4.2 x $10^6 m^3$ (0.67x 10^6 bbl).
CTG EMISSION LIMIT	Emission limits recommended in terms of equipment specifications: a. VPS - incineration of VOC emissions from condensers. b. WS - covering separator forebays. c. PUT - combustion of vapor vented from vessels.
VOC REDUCTION PER FACILITY	Implementing the recommended controls can reduce VOC emissions by: a. VPS - 100 percent. b. WS - 95 percent. c. PUT - 98 percent.
COSTS*	BASIS: A 15,900 m^3/day (2,500 bbl/day) refinery using the recommended control equipment.

		VPS	WS	PUT - 10 units
Capital cost	$1,000 :	24 - 52	63	98
Annualized cost	$1,000 :	(95) - (89)	(310)	26
Cost effectiveness	$/ton :	(104) - (96)	(90)	5

* ($-) indicates savings

SUMMARY OF CTG DOCUMENT FOR CUTBACK ASPHALT

AFFECTED FACILITIES	Roadway construction and maintenance operations using asphalt liquefied with petroleum distillates.
NUMBER OF AFFECTED FACILITIES	No estimates were obtained.
VOC EMISSIONS NATIONWIDE	Estimated annual emissions are 655,000 Mg/yr (720,000 ton/yr). This represents about 2.4 percent of estimated VOC emissions nationwide. [14]
VOC EMISSION RANGE PER FACILITY	Estimated VOC emissions from cutback asphalt production are: a. 0.078 kg/kg (ton/ton) of slow cure asphalt. b. 0.209 kg/kg (ton/ton) of medium cure asphalt. c. 0.204 kg/kg (ton/ton) of rapid cure asphalt.
100 TON/YR SOURCE SIZE	Not generally applicable to this source category since the main sources of emissions are the road surfaces where the asphalt is applied.
CTG EMISSION LIMIT	Substitute water and nonvolatile emulsifier for petroleum distillate blending stock.
VOC REDUCTION PER FACILITY	VOC emission reductions are approximately 100 percent.
COSTS*	BASIS: The major cost associated with control of VOC is the price difference between cutback and emulsified asphalt. A price differential of 5 cent/gallon savings to 1 cent/gallon penalty results in a cost effectiveness range of ($73) - $15 per ton VOC.

* ($---) indicates savings

SUMMARY OF CTG DOCUMENT FOR SOLVENT METAL CLEANING

AFFECTED FACILITIES

Three types of solvent degreasers are affected:
a. Cold cleaner: batch loaded, nonboiling solvent degreaser.
b. Open top vapor degreaser: batch load, boiling solvent degreaser.
c. Conveyorized degreaser: continuously loaded, conveyorized solvent degreaser, either boiling or nonboiling.

Open top vapor degreasers smaller than 1 m^2 of open area are exempt from the application of refrigerated chillers or carbon adsorbers.

Conveyorized degreasers smaller than 2.0 m^2 of air/vapor interface are exempt from a requirement for a major control device.

NUMBER OF AFFECTED FACILITIES

Estimates of the number of solvent degreasers nationwide for the year 1974 are:
a. Cold cleaners (CC) - 1,220,000.
b. Open top vapor degreasers (OT) - 21,000.
c. Conveyorized degreasers (CD) - 3,700.

VOC EMISSIONS NATIONWIDE

Estimates of annual nationwide emissions are:
a. CC - 380,000 Mg/yr (419,000 ton/yr).
b. OT - 200,000 Mg/yr (221,000 ton/yr)
c. CD - 100,000 Mg/yr (110,000 ton/yr) [14]

which represent about 2.5 percent of estimated VOC emissions nationwide.

VOC EMISSION RANGE PER FACILITY

Averaged emission rates per degreaser:
a. CC - 0.3 Mg/yr (0.3 ton/yr).
b. OT - 10 Mg/yr (11 ton/yr).
c. CD - 27 Mg/yr (30 ton/yr).

100 TON/YR SOURCE SIZE

Data indicate that on an average 10 open top degreasers or 4 conveyorized degreasers may emit 100 ton/yr.

CTG EMISSION LIMIT

The VOC emission limit is recommended in terms of equipment specifications and operation procedures. Required control equipment can be as simple as a manually operated tank cover or as complex as a carbon adsorption system depending on the type, size, and design of the degreaser.

VOC REDUCTION PER FACILITY

The actual percent VOC reduction will vary depending on the control equipment installed and the operational procedures followed. Recommended control methods can reduce VOC emissions by:
a. CC - 50 to 53 percent (± 20 percent).
b. OT - 45 to 60 percent (± 15 percent).
c. CD - 25 to 60 percent (± 10 percent).

COSTS *

BASIS: CC of 0.5 m^2 work area using high volatility solvent (a) and low volatility solvent (b); OT of 1.67 m^2 work area; and CD of 3.9 m^2 work area.

	Capital Cost $1,000	Annualized Cost $1,000	Cost Effectiveness $/ton VOC
CC-a	0.025	0.001	20
CC-b	0.065	(0.026)	(240)
OT	0.3 - 10.3	(0.8) - 0.8	(360) - 220
CD	7.5 - 18	(3.7) - 1.5	(260) - 260

* (S---) indicates savings

SUMMARY OF CTG DOCUMENT FOR COATING OF CANS

AFFECTED FACILITIES	Two- and three-piece can surface coating lines including the application areas and the drying ovens.
NUMBER OF AFFECTED FACILITIES	Estimated to be 460 affected facilities nationwide.
VOC EMISSIONS NATIONWIDE	Estimated annual emissions from can coating facilities are [illegible] Mg/yr (150,000 ton/yr) which represent about 0.5 percent of the estimated nationwide VOC emissions. [14,15]
VOC EMISSION RANGE PER FACILITY	Typical annual emissions from can coating lines can vary from [illegible] Mg (14 tons) for end sealing to 240 Mg (260 ton) for two-piece can coating for a plant average of 310 Mg (340 ton).
100 TON/YR SOURCE SIZE	Typical can coating facilities as represented in the CTG would all approach or exceed 100 TPY VOC emissions if uncontrolled.
CTG EMISSION LIMIT	The recommended VOC emission limits are: a. Sheet coating, two-piece exterior 0.34 kg/l (2.8 lb/gal)* b. Two- and three-piece interior 0.51 kg/l (4.2 lb/gal)* c. Two-piece end exterior 0.51 kg/l (4.2 lb/gal)* d. Three-piece side seam 0.66 kg/l (5.5 lb/gal)* e. End seal compound 0.44 kg/l (3.7 lb/gal)*
VOC REDUCTION PER FACILITY	The actual percent reduction will vary depending on the solvent content of the existing coatings and the control method selected. Implementation of the recommended control methods can reduce VOC emissions by 60 to 100 percent.
COSTS	BASIS: 5,000 scfm facility using thermal or catalytic incineration with primary heat recovery, or adsorption with recovered solvent credited at fuel value. CAPITAL COST: $125,000 - $162,000 ANNUALIZED COST: $42,000 - $71,000 COST EFFECTIVENESS: $135 - $706 per ton VOC

* Coating minus water

SUMMARY OF CTG DOCUMENT FOR COATING OF METAL COILS

AFFECTED FACILITIES	Coil surface coating lines including the application areas, the drying ovens, and the quench areas.
NUMBER OF AFFECTED FACILITIES	Estimated to be 180 facilities nationwide.
VOC EMISSIONS NATIONWIDE	Estimated annual emissions from coil coating facilities are 30,000 Mg/yr (33,000 ton/yr), which represent about 0.1 percent of the estimated nationwide VOC emissions. [14,15]
VOC EMISSION RANGE PER FACILITY	Average annual VOC emission for a typical facility is estimated to be 180 Mg (200 ton).
100 TON/YR SOURCE SIZE	It is estimated that 2 x 10^6 m^2 (2 x 10^9 ft^2) of coil coated could result in a potential emission of 100 tons of VOC.
CTG EMISSION LIMIT	The recommended VOC emission limit is 0.31 kg per liter of coating minus water (2.6 lb/gal).
VOC REDUCTION PER FACILITY	The actual percent reduction will vary depending on the solvent content of the existing coatings and the control method selected. Implementation of the recommended control methods can reduce VOC emissions by 70 to 98 percent.
COSTS	BASIS: 15,000 scfm facility using incineration with primary heat recovery. Capital cost: ≈ $170,000 Annualized cost: ≈ $ 70,000 Cost effectiveness: $51 - $94 per ton VOC

SUMMARY OF CTG DOCUMENT FOR COATING OF FABRIC AND VINYL

AFFECTED FACILITIES	Fabric and vinyl surface coating lines including the application areas and the drying ovens. Fabric coating includes all types of coatings applied to fabric. Vinyl coating refers to any printing, decorative, or protective topcoat applied over vinyl coated fabric or vinyl sheets.
NUMBER OF AFFECTED FACILITIES	Estimated to be 130 facilities nationwide.
VOC EMISSIONS NATIONWIDE	Estimated annual emission from fabric coating operations are [illegible] Mg/yr (110,000 ton/yr). [15] The vinyl segment of the fabric industry emits about 36,000 Mg/yr (40,000 ton/yr). VOC from fabric coating represents about 0.4 percent of the estimated VOC emissions nationwide.
VOC EMISSION RANGE PER FACILITY	Average annual VOC emissions are estimated to be 850 Mg (940 ton).
100 TON/YR SOURCE SIZE	Any but the smallest fabric coating facilities should exceed emissions of 100 ton/yr of VOC.
CTG EMISSION LIMIT	The recommended VOC emission limits are: a. Fabric coating 0.35 kg per liter of coating minus water (2.9 lb/gal). b. Vinyl coating 0.45 kg per liter of coating minus water (3.8 lb/gal).
VOC REDUCTION PER FACILITY	The actual percent reduction will vary depending on the solvent content of the existing coatings and the control method selected. Implementation of the recommended control methods can reduce VOC emissions by 80 to 100 percent.
COSTS	BASIS. 15,000 scfm facility using incineration with primary heat recovery or adsorption with recovered solvent credited at fuel value. Capital cost: $150,000 - $320,000 Annualized cost: $ 60,000 - $ 75,000 Cost effectiveness: $34 - $39 per ton VOC

SUMMARY OF CTG DOCUMENT FOR SURFACE COATING OF PAPER PRODUCTS

AFFECTED FACILITIES	Paper surface coating lines including the application areas and the drying ovens. The CTG document applies to manufacturing of adhesive tapes, adhesive labels, decorated paper, book covers, office copier paper, carbon paper, typewriter ribbons, and photographic films.
NUMBER OF AFFECTED FACILITIES	SIC 2641, Paper Coating and Glazing, had 397 plants in 1967. Current estimates for this category are 290 plants nationwide.
VOC EMISSIONS NATIONWIDE	Estimated annual emissions are 320,000 Mg/yr (350,000 ton/yr). Of this amount, the manufacture of pressure sensitive tapes and labels is estimated to emit 263,000 Mg/yr (290,000 ton/yr). Emissions from the coating of paper products represent about 1.2 percent of nationwide VOC emissions.[14]
VOC EMISSION RANGE PER FACILITY	Emissions from typical paper coating lines can vary from 23 to 450 kg/hr (50 to 1,000 lb/hr). A plant may have 1 to 20 coating lines. It is estimated that the annual average VOC emission from paper coating plants is 1,480 Mg (1,630 ton).
100 TON/YR SOURCE SIZE	Based on the data given, a plant with one large line or two small lines can exceed 100 ton/yr of VOC emissions.
CTG EMISSION LIMIT	The recommended VOC emission limit is 0.35 kg per liter of coating minus water (2.9 lb/gal).
VOC REDUCTION PER FACILITY	The actual percent reduction will vary depending on the solvent content of the existing coatings and the control method selected. Implementation of the recommended control methods can reduce VOC emissions by 80 to 99 percent.
COSTS	BASIS: 15,000 scfm facility using incineration with primary heat recovery or adsorption with recovered solvent credited at fuel value. Capital cost: $150,000 - $320,000 Annualized cost: $ 60,000 - $ 75,000 Cost effectiveness: $34 - $40 per ton VOC

SUMMARY OF CTG DOCUMENT FOR COATING IN AUTOMOBILE AND LIGHT-DUTY TRUCK ASSEMBLY PLANTS

AFFECTED FACILITIES	Automobile and light-duty truck surface coating lines including the application areas, the flashoff areas, and the drying ovens. The CTG provides no exemptions but notes that it may not be reasonable to convert an existing water-borne dip prime coating syster
NUMBER OF AFFECTED FACILITIES	Identified for the year 1977 to be 47 plants nationwide.
VOC EMISSIONS NATIONWIDE	Estimated annual emissions from auto and light duty truck plants are 90,000 Mg/yr (100,000 ton/yr). This is about 0.3 percent of estimated VOC emissions nationwide. [14,15]
VOC EMISSION RANGE PER FACILITY	Emissions from typical coating lines can vary from 270 to 1,800 kg/hr (600 to 4,000 lb/hr). Average annual emissions are estimated to be 2,380 Mg (2,620 ton) per subject plant.
100 TON/YR SOURCE SIZE	All uncontrolled coating lines at the assembly plants are expected to emit in excess of 100 tons of VOC per year.
CTG EMISSION LIMIT	The recommended VOC emission limits are: a. Prime coating 0.23 kg/l (1.9 lb/gal) minus water b. Top coating 0.34 kg/l (2.8 lb/gal) minus water c. Final repair coating 0.58 kg/l (4.8 lb/gal) minus water
VOC REDUCTION PER FACILITY	The actual percent reduction will vary depending on the solvent content of the existing coatings and the control method selected. Implementation of the recommended methods can reduce VOC emissions for: a. Prime coating - 80 to 93 percent. b. Top coating - 75 to 92 percent. c. Final repair coating - not available
COSTS	BASIS: 30 - 65 units per hour facility with substantial variability in both existing operations and potentially applicable control systems. Capital cost: $6,500,000 - $50,000,000 Annualized cost: $2,000,000 - $25,000,000 Cost effectiveness: $1,000 - $4,000 per ton VOC

SUMMARY OF CTG DOCUMENT FOR COATING OF METAL FURNITURE

AFFECTED FACILITIES	Metal furniture surface coating lines including the application and flashoff areas, and the drying ovens.
NUMBER OF AFFECTED FACILITIES	Approximately 1,400 facilities would be affected nationally.
VOC EMISSIONS NATIONWIDE	Estimated annual emissions are 90,000 Mg/yr (100,000 ton/yr).[15] This represents about 0.3 percent of estimated VOC emissions nationwide.[14]
VOC EMISSION RANGE PER FACILITY	Estimated average annual VOC emissions are 70 Mg (80 ton) per facility.
100 TON/YR SOURCE SIZE	For a model dip coating line, a plant coating (with no primer), 1,500,000 m^2 (16,200,000 ft^2) of shelving per year would emit about 100 ton/yr.
CTG EMISSION LIMIT	The recommended VOC emission limit is 0.36 kg per liter of coating minus water (3.0 lb/gal).
VOC REDUCTION PER FACILITY	The actual percent reduction will vary depending on the solvent content of the existing coatings and the control method selected. Implementation of the recommended control methods can reduce VOC emissions by 50 to 99 percent.
COSTS	BASIS: A dip coating facility coating 7,000,000 ft^2 of shelving per year converting to water-borne or electrodeposition: Capital cost: $3,000 - $124,000 Annualized cost: $11,000 - $ 25,000 Cost effectiveness: $440 - $657 per ton VOC

SUMMARY OF CTG DOCUMENT FOR COATING OF MAGNET WIRE

AFFECTED FACILITIES	Wire coating oven.
NUMBER OF AFFECTED FACILITIES	Estimated to be 30 plants nationwide. It is not unusual for a wire coating plant to have 50 coating ovens.
VOC EMISSIONS NATIONWIDE	CTG states that there is no way to know how much solvent is actually emitted. About 29,500 metric tons (32,500 ton) of solvent are used each year but much of this is controlled.
VOC EMISSION RANGE PER FACILITY	Emissions from a typical uncontrolled oven will be approximately 12 kg/hr (26 lb/hr). The average annual emissions of VOC per plant are estimated to be 314 Mg (340 ton).[15]
100 TON/YR SOURCE SIZE	CTG indicates that each of the facilities, if uncontrolled, could easily exceed 100
CTG EMISSION LIMIT	The recommended VOC emission limit is 0.20 kg per liter of coating minus water (1.7 lb/gal).
VOC REDUCTION PER FACILITY	The actual percent reduction will vary depending on the solvent content of the existing coatings and the control method selected. Implementation of the recommended control methods can reduce VOC emissions by 90 percent.
COSTS	BASIS: 10,000 scfm facility controlling VOC by use of incineration with primary heat recovery. Capital cost: Approximately $220,000 Annualized cost: $85,000 - $115,000 Cost effectiveness: $105 - $140 per ton VOC

SUMMARY OF CTG DOCUMENT FOR COATING OF LARGE APPLIANCES

AFFECTED FACILITIES	Large appliance surface coating including the prime, single, or topcoat application areas, the flashoff areas, and the oven.
NUMBER OF AFFECTED FACILITIES	Estimated to be about 270 plants nationwide.
VOC EMISSIONS NATIONWIDE	Estimated annual emissions are 42,000 Mg/yr (46,000 ton/yr), which represent about 0.2 percent of estimated nationwide VOC emissions.
VOC EMISSION RANGE PER FACILITY	The average annual VOC emissions are estimated to be 170 Mg (185 ton).
100 TON/YR SOURCE SIZE	Extrapolating the model facility data, a plant coating 221,000 clothes washer cabinets per year would exceed 100 ton/yr emissions of uncontrolled VOC.
CTG EMISSION LIMIT	The recommended VOC emission limit is 0.34 kg per liter of coating minus water (2.8 lb/gal).
VOC REDUCTION PER FACILITY	The actual percent reduction will vary depending on the solvent content of the existing coatings and the control method selected. Implementation of the recommended control methods can reduce VOC emissions by 79 to 95 percent.
COSTS*	BASIS: 768,000 clothes washer cabinets coated per year using various combinations of control techniques. Capital cost: $70,000 - $1,250,000 Annualized cost: ($300,000) - $350,000 Cost effectiveness: ($1,050) - $1,180 per ton VOC

* ($---) indicates savings

SUMMARY OF CTG DOCUMENT FOR LEAKS FROM PETROLEUM REFINERY EQUIPMENT

Affected facilities (p. 6-1)*	Petroleum refinery equipment including pump seals, compressor seals, seal oil degassing vents, pipeline valves, flanges and other connections, pressure relief devices, process drains, and open ended pipes.
Number of affected facilities	There were 311 petroleum refineries in the nation as of January 1, 1979.[12]
VOC emissions nationwide (p. 5-1)*	The estimated VOC emissions nationwide are 170,000 Mg/year, or about 1 percent of the total VOC emissions from stationary sources.
VOC emissions range per facility (p. 3-2)*	The potential VOC emissions per leaking source range from 1.0 to 10 kg/day.
100 ton/year source size (p. 1-3, 2-3)*	A single leaking source has the potential to emit 0.4 to 3.7 Mg VOC/year (0.5 to 4.1 ton/yr). A refinery with between 25 and 227 leaking components would emit 100 tons/year of VOC. A model medium size refinery may have 90,000 leaking components.
CTG emission limits (p. 1-3)*	If a leaking component has a VOC concentration of over 10,000 ppm at the potential leak source, it should be scheduled for maintenance and repaired within 15 days.
VOC reduction per facility (calculated)	Estimated to prevent the release of 1821.1 Mg/year (2007.4 ton/year) of VOC at a model medium size refinery (15,900 m^3/day) by reducing emissions from 2933.6 Mg (3233.5 ton) to 1112.5 Mg (1226.1 ton) per year.[13]
Costs (p. 4-8)*	Basis: A monitoring and maintenance program for a 15,900 m^3/day (100,000 bbl/day) refinery (Fourth quarter 1977 dollars). Instrumentation Capital Cost 8,800 Total Annualized Costs 115,000 Cost Effectiveness $/Mg (86.85)†[13] $/ton (78.81)†[13]

*The source of the summary information is the indicated page number(s) in "Control of Volatile Organic Compound Leaks from Petroleum Refinery Equipment," EPA-450/2-78-036.

†Numbers in parentheses are savings.

SUMMARY OF CTG DOCUMENT FOR SURFACE COATING OF MISCELLANEOUS METAL PARTS AND PRODUCTS

Affected facilities (p. 1-2)*	Coating application areas, flashoff areas, dryers, and ovens for manufacturers of: a. Large farm machinery b. Small farm machinery c. Small appliances d. Commercial machinery e. Industrial machinery f. Fabricated metal products g. Any other industrial category, which coats metals, under SIC major groups 33-39, inclusive. Except those facilities which are covered by previous CTGs.
Number of affected facilities	96,000[1,a]
VOC emissions nationwide	9.0×10^7 Mg/yr (1×10^8 tons/yr) estimated for 1977, which represents about 5.0 percent of stationary source estimated emissions.[1,b]
VOC emission range per facility (pp. 1-10, 2-3)*	a. An emission factor of 0.66 kg VOC/l coating less water (5.5 lb VOC/gal coating less water) can be expected from a facility utilizing a coating composed of 75 percent organic solvent, 25 percent solids by volume. b. For facilities utilizing an electrodeposition process the VOC emission factor is 0.36 kg VOC/l coating less water (3.0 lb/gal).
100 tons/yr source size (calculated)	An emission factor of 3.5 lb VOC/gal implies that a minimum process rate of 3.64×10^7 gal coating material/yr would be required for a facility to be a potential 100 tons/yr source.
CTG emission limit (p. v)*	Coating method — Recommended limitation (wt. VOC / vol. coating) a. Air or forced air dried items — 0.42 kg/l (3.5 lb/gal) b. Clear coat — 0.52 kg/l (4.3 lb/gal) c. No or infrequent color change or small number of colors applied 1. Powder coatings — 0.05 kg/l (0.4 lb/gal) 2. Other — 0.36 kg/l (3.0 lb/gal) d. Outdoor, harsh exposure or extreme performance characteristics — 0.42 kg/l (3.5 lb/gal) e. Frequent color change, large number of colors applied, or first coat on untreated ferrous substrate — 0.36 kg/l (3.0 lb/gal)
VOC reduction per facility (p. 2-1)*	Process modification — Percent reduction in VOC emissions (coating/equipment change) 50-90 Exhaust gas treatment 90+
Costs (pp. 3-8 to 3-14)*	Basis: A medium size coating line (~ 743,000 m^2/yr, ~ 8×10^6 ft^2/yr) with single or two coat operation using flow-coat, dip-coat, or spray-coat applications. The ranges cover the costs of several different VOC control options. Capital cost ($1000): 20-1,817 Annualized cost ($1000): (27)*-402 Cost effectiveness ($/Mg): (290)*-6,841 ($/ton): (261)*-6,206

[1] The source of the summary information is the indicated page number in "Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VI: Surface Coating of Miscellaneous Metal Parts and Products," EPA-450/2-78-015.

* Numbers in parentheses are savings.

SUMMARY OF CTG DOCUMENT FOR FACTORY SURFACE COATING OF FLAT WOOD PANELING

Affected facilities (p. 1-2)*

The affected facilities are factories that surface coat the following types of flat wood panels:

a. Hardwood plywood
b. Particleboard
c. Hardboard

Number of affected facilities (p. 1-2)*

Affected Facilities	Nationwide Total
a. Hardwood plywood	247
b. Particleboard	80
c. Hardboard	67

VOC emissions nationwide

8.4×10^4 Mg/yr (9.3×10^4 tons/yr) estimated for 1977 which represents about 0.5 percent of stationary source estimated emissions.[1]

VOC emission range per facility (Table 2-2 p. 2-5)*

Potential VOC emissions per coated surface area are:

0.4 to 8.0 kg/100 m^2 (0.8 to 16.5 lb/1000 ft^2)

depending on the coating/curing process as well as the coating materials used.

100 tons/yr source size (calculated)

Based on the VOC emission range above, a 100 tpy source would coat a minimum annual throughput of:

1.8×10^4 to 7.7×10^6 standard panels/yr

Where a standard panel is 2.97 m^2 (32 ft^2).

CTG emission limit (p. v)*

	Recommended limitation
Printed hardwood plywood and particleboard	2.9 kg VOC/100 m^2 (6.0 lb VOC/1000 ft^2)
Natural finish hardwood plywood	5.8 kg VOC/100 m^2) (12.0 lb VOC/1000 ft^2)
Class II† finishes for hardboard paneling	4.8 kg VOC/100 m^2) (10.0 lb VOC/1000 ft^2)

VOC reduction per facility (Table 2-1 p. 2-4)*

70 to 90 percent VOC emission reduction, depending on coating material and coverage, through use of water-borne coatings, incineration, adsorption, ultraviolet curing or electron beam curing.

Costs (Table 3-2 p. 3-9)*

Basis:

	Shifts: 1		Shifts: 2	
	Panels/yr: 2,000,000		Panels/yr: 4,000,000	
	Waterborne	UV/Waterborne	Waterborne	UV/Waterborne
Capital cost ($1000)	52	155	52	155
Annualized cost ($1000)	101	124.6	200.8	234.4
Cost effectiveness ($/Mg)	269	292	256	264
($/ton)	244	264	232	240

*The source of the summary information is the indicated page number in "Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VII: Factory Surface Coating of Flat Wood Paneling," EPA-450/2-78-032.

†Definition on p. vii of EPA-450/2-78-032.

SUMMARY OF CTG DOCUMENT FOR MANUFACTURE OF SYNTHESIZED PHARMACEUTICAL PRODUCTS

Affected facilities (p. 1-4)*	Synthesized pharmaceutical manufacturing facilities. Specific sources include: 1. Dryers 2. Reactors 3. Distillation Units 4. Storage and transfer of VOC 5. Filters 6. Extraction equipment 7. Centrifuges 8. Crystallizers.
Number of affected facilities (p. 1-2)*	Estimated 800 plants nationwide
VOC emissions nationwide	30,000 Mg/yr (55,000 tons/yr) estimated for 1977 which represents about 0.3 percent of stationary source estimated VOC emissions.[1]
VOC emission range per facility	Not available
100 ton/yr source size	Not available
CTG emission limit (p. 1-5)*	1. a. Surface condensers or equivalent control on vents from reactors, distillation operations, crystallizers, centrifuges, and vacuum dryers that emit 6.8 kg/day (15 lb/day) or more VOC. b. Surface condensers must meet certain temperature versus VOC vapor pressure criteria. 2. Additional specific emission reductions are required for air dryers, production equipment exhaust systems, and storage and transfer of VOC. 3. Enclosures or covers are recommended for rotary vacuum filters, processing liquid containing VOC and in-process tanks. 4. Repair of components leaking liquids containing VOC.
VOC reduction per facility	Not available
Costs (pp. 5-14 to 5-42)*	Capital and Annualized Cost graphs are provided for the following types of control equipment: conservation vents, floating roofs, pressure vessels, carbon adsorption systems, thermal and catalytic incineration systems, water cooled condensers, chilled water and brine cooled condensers, freon cooled condensers, packed bed scrubbers and venturi scrubbers. Cost effectiveness data is not calculated for typical plants.

*The source of the summary information is the indicated page(s) in "Control of Volatile Organic Emissions from Manufacture of Synthesized Pharmaceutical Products," EPA-450/2-78-029.

SUMMARY OF CTG DOCUMENT FOR MANUFACTURE OF PNEUMATIC RUBBER TIRES

Affected facilities (pp. 1-1, 1-3)*	Rubber tire manufacturing plants, producing passenger car, and light and medium duty truck tires. Operations affected are: undertread cementing, bead dipping, tread end cementing, and green tire spraying.
Number of affected facilities (p. 2-2)*	Maximum of 62 rubber tire plants nationwide
VOC emissions nationwide (p. 1-2)*	1976 VOC emissions estimate from rubber tire manufacturing totalled 88,200 Mg/yr (97,200 tons/yr). This quantity represents 0.6 percent of total national VOC emissions from stationary sources.
VOC emission range per facility (p. 1-2)*	The average tire plant is estimated to release 4,000 kg per day (8,820 lb/day) of emissions or 1,000 Mg VOC per year (1,100 tons/yr).
100 tons/yr source size (p. 2-8)*	The model plant, producing 16,000 tires/day, has potential to emit 1,460 Mg/yr (1,600 tons VOC/yr). Therefore a plant producing approximately 1,000 tires/day would be a potential 100 tons/yr source.
CTG emission limit (p. 4-2)*	VOC emissions reduction from the affected operations is recommended through use of carbon adsorption or incineration. Water-based coatings may be used for green tire spraying.
VOC reduction per facility (p. 1-4)*	a. Carbon adsorption gives an overall efficiency of 62-86 percent in reducing VOC emissions, when applied to the affected operations. b. Incineration gives an overall efficiency of 59-81 percent when applied to the affected operations. c. Water-based coatings, applied to green tire spraying, provide an overall emission reduction efficiency of 97 percent.
Costs (pp. 4-11, 4-15)*	Basis: A model 16,000 tires/day plant using the various control technologies recommended on the following affected operations. All costs are based on January 1978 dollars.

	Undertread cementing	Bead dipping	Tread end cementing	Green tire spraying
Capital cost ($1000)	130-340	115-250	135-375	15-450
Annualized cost ($1000)	92-280	70-985	100-340	118-490
Cost effectiveness ($/Mg)	166-505	1,480-20,800	1,140-3,880	202-839
($/ton)	150-458	1,340-18,800	1,000-3,500	184-763

*The source of the summary information is the indicated page(s) in "Control of Volatile Organic Emissions from Manufacture of Pneumatic Rubber Tires," EPA-450/2-78-030.

SUMMARY OF CTG DOCUMENT FOR EXTERNAL FLOATING ROOF TANKS

Affected facilities (p. 1-2)*	External floating roof tanks larger than 150,000 liters (40,000 gal) storing petroleum liquids. See exceptions noted in text.
Number of affected facilities (p. 2-1)*	There is an estimated 13,800 internal and external floating roof tanks that are larger than 150,000 liters (40,000 gal). The number of external floating roof tanks is not available.
VOC emissions nationwide (p. 1-2)*	An estimated 65,000 Mg (71,630 tons) of VOC was emitted in 1978 which represents about 4.0 percent of stationary source estimated emissions.
VOC emission range per facility (pp. 3-3, 3-9)*	The emission range for a 30.5 m (100 ft) diameter tank storing 41.4 kPa (6 psi) vapor pressure gasoline is 212 Mg/yr (233 tons/yr) for a slightly gapped primary seal to 2.2 Mg/yr (2.4 tons/yr) for a tight rim-mounted secondary seal over a tight primary seal.
100 tons/yr source size	No single floating roof tank is expected to emit more than 100 tons/yr.[1]
CTG emission limit (pp. 5-1, 5-4)*	A continuous secondary seal or equivalent closure on all affected storage tanks, plus certain inspection and recordkeeping requirements.
VOC reduction per facility (pp. 3-3, 3-9)*	Ranges from about 200 to 2 Mg/yr (220 to 2.2 tons/yr).
Costs (pp. 4-9, 4-12)*	Basis: External floating roof tank 30.5 m (100 ft) in diameter with a capacity of 8.91×10^6 liters (55,000 bbl) controlled by a rim mounted secondary seal. Capital cost ($1000): 16.9 Annualized cost ($1000): 3.3 Cost effectiveness ($/Mg): (66)†-3,655 ($/ton): (59)†-3,316

*The source of the summary information is the indicated page(s) in "Control of Volatile Organic Emissions from Petroleum Liquid Storage in External Floating Roof Tanks," EPA-450/2-78-047.

†Numbers in parenthesis indicate credits.

SUMMARY OF CTG DOCUMENT FOR GRAPHIC ARTS — ROTOGRAVURE AND FLEXOGRAPHY

Affected facilities (p. 1-1)*	Flexographic and rotogravure processes applied to publication and packaging printing.
Number of affected facilities (p. 2-5)*	a. Publication printing is done in large printing plants, number less than 50 in total. b. There are approximately 13 to 14 thousand gravure printing units and 30 thousand flexographic printing units.
VOC emissions nationwide (p. 2-8)*	a. Gravure 100,000 Mg/yr 1976 (110,000 tons/yr) b. Flexography 30,000 Mg/yr 1976 (33,000 tons/yr) This represents about 0.8 percent of stationary source estimated emissions.[1]
VOC emission range per facility (calculated)	a. Gravure 7.4 Mg/printing unit per year (8.2 tons/unit) b. Flexography 1 Mg/printing unit per year (1.1 tons/printing unit per year)
100 tons/yr source size	A plant will be a potential 100 tons/yr VOC source if it uses 110-180 Mg (120-200 tons) of ink per year, where the solvent concentration is 50-85 percent.
CTG emission limit (pp. 1-2, 1-3)*	Use of water-borne or high solids inks meeting certain composition criteria or the use of capture and control equipment which provides: a. 75 percent overall VOC reduction where a publication rotogravure process is employed; b. 65 percent overall VOC reduction where a packaging roto-rotogravure process is employed; or, c. 60 percent overall VOC reduction where a flexographic printing process is employed.
VOC reduction per facility	Same as CTG limit above.

Costs (pp. 4-8 4-13)*

VOC control option	Incinerator	Incinerator	Carbon adsorption	Carbon adsorption
Ink usage, Mg/yr (tons/yr)	7 (7.7)	2,500 (2,750)	3,500 (3,860)	7,000 (7,720)
VOC concentration ppm	500	500	1,200	2,400
Capital cost	94,000	1,110,000	701,000	701,000
Annualized cost	24,900	1,665,500	72,800	(41,700)†
Cost effectiveness $/Mg	8,360	1,650	51	(15)
$/ton	7,570	1,480	46	(14)

*The source of the summary information is the indicated page number in "Control of Volatile Organic Emissions from Existing Stationary Sources, Volume VIII: Graphic Arts — Rotogravure and Flexography," EPA-450/2-78-033.

†Numbers in parentheses are savings.

SUMMARY OF CTG DOCUMENT FOR PERCHLOROETHYLENE DRY CLEANING SYSTEMS

Affected facilities (p. 2-1)*	Affected facilities are coin-operated, commercial, and industrial dry cleaning systems which utilize perchloroethylene as solvent.
Number of affected facilities (calculated)	a. Coin-op 14,900 b. Commercial 44,600 c. Industrial 230
VOC emissions nationwide (pp. 1-2, 2-1)*	a. Coin-op 21,400 Mg/yr (23,500 tons/yr) b. Commercial 123,000 Mg/yr (135,000 tons/yr) c. Industrial 13,600 Mg/yr (15,000 tons/yr) The estimated 158,000 Mg VOC/yr is 0.9 percent of total stationary source estimated emissions.
VOC emission range per facility (p. 5-2)*	Uncontrolled VOC emissions Type of plant — kg/yr — (lb/yr) a. Coin-op 1,460 (3,200) b. Commercial 3,240 (7,200) c. Industrial 32,400 (72,000)
100 tons/yr source size (extrapolated)	A large industrial dry cleaning plant, processing 750 Mg (825 tons) of clothes per year, would be a potential 100 tons VOC per year source.
CTG emission limit (pp. 6-1 - 6-4)*	a. Reduction of dryer outlet concentration to less than 100 ppm VOC, by means of carbon adsorption. (Facilities with inadequate space or steam capacity for adsorbers are excluded.) b. Reduction of VOC emissions from filter and distillation wastes. c. Eliminate liquid and vapor leaks.
VOC reduction per facility (pp. 2-5, 2-7)*	Carbon adsorption applied to commercial and industrial plants will reduce overall VOC emissions by 40-75 percent.
Costs (p. 4-5)*	Basis: Carbon adsorbers for a commercial plant cleaning 46,000 kg (100,000 lb) of clothes per year. Capital cost $4,500 Annualized cost $300 Cost effectiveness $90 credit/Mg $80 credit/ton

*The source of the summary information is the indicated page number in "Control of Volatile Organic Emissions from Perchloroethylene Dry Cleaning Systems," EPA-450/2-78-050.

SUMMARY OF CTG DOCUMENT FOR LEAKS FROM GASOLINE TANK TRUCKS AND VAPOR COLLECTION SYSTEM

Affected facilities (p. 2)*	a. Gasoline tank trucks that are equipped for vapor collection. b. Vapor collection systems at bulk terminals, bulk plants, and service stations that are equipped with vapor balance and/or vapor processing systems.
Number of affected facilities	Not available
VOC emissions nationwide	Not available
VOC emission range per facility	Not available
CTG emission limit (pp. 1 and 2)	The control approach is a combination of testing, monitoring, and equipment design to ensure that good maintenance practices are employed to prevent leaks from truck tanks or tank compartments and vapor collection systems during gasoline transfer at bulk plants, bulk terminals, and service stations. A leak is a reading greater than or equal to 100 percent of the LEL at 2.5 cm from a potential leak source as detected by a combustible gas detector.
VOC reduction per facility	Not available
Costs	Not available

*The source of the summary information is the indicated page number in "Control of Volatile Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems," EPA-450/2-78-051.

Summary of CTG Document for Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins

AFFECTED FACILITIES: This CTG applies to emissions from certain processes in the manufacture of high-density polyethylene, polypropylene, and polystyrene.

The manufacture of these three polymers are estimated to account for 53,000 ton/yr of VOC emissions or 56% of emissions from all types of polymer manufacturing.

Typical size uncontrolled plants could emit:

high density polyethylene	3,100 tons/yr
polypropylene	5,700 tons/yr
polystyrene	260 tons/yr

CTG EMISSION LIMIT: The following emission reductions or limitations are considered representative of RACT:

(1) For polypropylene plants using liquid phase processes: a 98 weight percent reduction or reduction to 20 ppm of continuous VOC emissions from the polymerization reaction section (i.e., reactor vents), the material recovery section (i.e., decanter vents, neutralizer vents, by-product and diluent recovery operations vents), and the product finishing section (i.e., dryer vents and extrusion and pelletizing vents).

(2) For high-density polyethylene plants using liquid phase slurry processes: a 98 weight percent reduction or reduction to 20 ppm of continuous VOC emissions from the material recovery section (i.e., ethylene recycle treater vents) and the product finishing section (i.e., dryer vents and continuous mixer vents).

(3) For polystyrene plants using continuous processes: an emission limit of 0.12 kg VOC/1,000 kg product from the material recovery section (i.e., product devolatilizer system).

CONTROL TECHNIQUES: Flares or thermal incinerators are the most commonly used control devices. They can destroy 98% of the streams ducted to them.

Condensers are often used on polystyrene vents. These can control 95% of the VOC emissions passing through them.

CONTROL COSTS: Cost per ton of VOC controlled is a function of the uncontrolled emission rates. The CTG gives emission rates (in Kg VOC/Mg product and Mg/yr) above which the control cost is $1000/Mg or less. Similar cutoffs are given for $2000/Mg and $3000/Mg. A State may choose to use any cutoff which gives an appropriate level of stringency.

Summary of CTG Document for VOC Leaks
from SOCMI/Polymer Manufacturing

AFFECTED FACILITIES/
APPLICABILITY:

Equipment in VOC service in process units producing synthetic organic chemicals listed in SOCMI NSPS and manufacturing polymers and resins;

Applies to VOC leaks from process equipment: pumps, compressors, valves, open-ended lines, sampling connections, safety relief devices.

CTG EMISSION LIMIT:

Equipment specifications and inspections/maintenance requirements:

1. Capping of open-ended lines (except when in use)

2. Quarterly leak detection and repair of pumps, valves, compressors, safety relief devices

3. Repair components appearing to leak on basis of sight, smell, sound

4. Less frequent monitoring than quarterly for valves in gas or light liquid service

5. Weekly visual inspections for indications of leaks from pumps in light liquid service

6. Monitor safety relief devices after each overpressure relief for proper reseating

Summary of CTG Document for VOC Emissions
From Large Petroleum Dry Cleaners

AFFECTED FACILITIES/
APPLICABILITY: Petroleum solvent washers, dryers, solvent filters, settling tanks, vacuum stills, and other containers and conveyors of petroleum solvent used in petroleum solvent dry cleaning facilities.

Applies to all petroleum solvent dry cleaning facilities consuming 123,000 liters (32,500 gallons) or more of petroleum solvent annually.

CTG EMISSION LIMIT:

1. Petroleum solvent dry cleaning dryer:

   Either

   ° VOC limit of 3.5 lb of VOC per 100 lb dry weight of articles dry cleaned

   Or

   ° Install solvent recovery dryer

2. Petroleum solvent filtration system:

   Either

   ° Limit VOC content in filtration wastes to 1 lb per 100 lb dry weight of articles dry cleaned

   Or

   ° Install cartridge filtration system; drain filter cartridges in their sealed housings for 8 hours or more before their removal

3. Repair petroleum solvent vapor and liquid leaks within 3 working days after identifying the leaks

Summary of CTG Document for VOC Emissions from Air Oxidation Processes In Synthetic Organic Chemical Manufacturing Industry

AFFECTED FACILITIES/ APPLICABILITY:

Air oxidation facilities within SOCMI, including all reactors using air as oxidizing agent to produce an organic chemical.

Includes any equipment (absorbers, adsorbers, condensers, ammonia/HCl recovery units) used to collect VOC for beneficial use or reuse (for sale or recycling)

CTG EMISSION LIMIT:

For each air oxidation process vent stream, <u>either</u>:

1. Use combustion device (e.g., thermal oxidation, flares, boilers) to reduce VOC emissions by 98 weight percent or to 20 ppmv, whichever is less stringent;

<u>OR</u>:

2. Maintenance of total resource effectiveness (TRE) index value greater than 1.0 (TRE is a measure of cost effectiveness of controlling air oxidation streams with a 98% combustion device (thermal oxidation). A TRE index of 1.0 is equivalent to a cost effectiveness of $1600/Mg (1980 dollars) of VOC emission reduction)

Summary of CTG Document for VOC Equipment Leaks
From Natural Gas/Gasoline Processing Plants

AFFECTED FACILITIES/
APPLICABILITY:

Equipment in VOC service within a process unit in onshore natural gas processing plants.

Equipment leaks from gas plants are VOC emissions that result when process fluid (either gas or liquid) leaks from plant equipment: pumps, compressors, valves, pressure relief devices, open-ended valves or lines, flanges and connections, gas-operated control valves.

RACT applies only to equipment containing or contacting a process stream with VOC concentration of 1.0 percent by weight or more

CTG EMISSION LIMIT:

Equipment specifications and inspections/maintenance requirements:

1. Quarterly monitoring of pumps, valves, compressors, and relief valves

2. Weekly visual inspection of pumps

3. Repair any component that appears to be leaking on the basis of sight, smell, or sound

4. Less frequent monitoring than quarterly for difficult-to-monitor valves

5. Capping of open-ended lines (except when open end is in use)

6. Leaking components should be tagged and repaired within 15 days or at next shutdown.

Summary of CTG Document for VOC Equipment Leaks
From Natural Gas/Gasoline Processing Plants

AFFECTED FACILITIES/
APPLICABILITY:

Equipment in VOC service within a process unit in onshore natural gas processing plants.

Equipment leaks from gas plants are VOC emissions that result when process fluid (either gas or liquid) leaks from plant equipment: pumps, compressors, valves, pressure relief devices, open-ended valves or lines, flanges and connections, gas-operated control valves.

RACT applies only to equipment containing or contacting a process stream with VOC concentration of 1.0 percent by weight or more

CTG EMISSION LIMIT:

Equipment specifications and inspections/maintenance requirements:

1. Quarterly monitoring of pumps, valves, compressors, and relief valves

2. Weekly visual inspection of pumps

3. Repair any component that appears to be leaking on the basis of sight, smell, or sound

4. Less frequent monitoring than quarterly for difficult-to-monitor valves

5. Capping of open-ended lines (except when open end is in use)

6. Leaking components should be tagged and repaired within 15 days or at next shutdown.

ATTACHMENT 7

EPA PROTOCOL FOR CALCULATING DAILY EMISSION RATE

FOR AUTOMOBILE AND LIGHT-DUTY TRUCK TOPCOAT OPERATIONS

(TO BE PROVIDED)

ATTACHMENT 8

APPENDIX D, NOVEMBER 24, 1987, FEDERAL REGISTER

Information for Proposed Standards. EPA–450/3–83–016a. May 1984.

7. Surface Coating of Plastic Parts for Business Machines—Background Information for Proposed Standards. EPA–450/3–83–019a. December 1985.

8. Photochemically Reactive Organic Compound Emissions From Consumer and Commercial Products. EPA 902/4–86–007. prepared by EPA Region II. November 1986.

9. Evaluation of a Paint Spray Booth Utilizing Air Recirculation. EPA–600/2–84–143.

10. Benefits of Microprocessor Control of Curing Ovens for Solvent Based Coatings. EPA–625/2–84–031. September 1984.

The EPA Region IV has prepared. with contractor assistance. a number of reports on specific non-CTG sources in specific cities. These reports describe control technology which is available. The reports listed below were prepared by EPA Region IV.

11. Volatile Organic Compound Control at Specific Sources in Louisville. Kentucky and Nashville. Tennessee. EPA–904/9–81–087. December 1981.

This report discusses control technology for these industries:

Wood Furniture
Aluminum Rolling Mill Lubricant Control
Fiberglass Reinforced Polyester Boat Building (Styrene Emissions)

12. Technical Support in the Development of a Revised Ozone State Implementation Plan for Atlanta. Georgia. prepared for EPA Region IV by Pacific Environmental Services. EPA Contract No. 68–02–3887. August 1985.

This report includes:

Architectural Surface Coating
Automobile Refinishing
Commercial/Consumer Solvent Use
Fuel Combustion
Gasoline Volatility
Aircraft Emissions
Degreasing
Lawn and Garden Equipment

13. Summary Report for Technical Support in Development of a Revised Ozone State Implementation Plan for Memphis. Tennessee. prepared for EPA Region IV by Pacific Environmental Services. EPA Contract No. 68–02–3887. June 1985.

This multi-volume report includes:

Wood Furniture Coating
Barge Loading Facilities
Sheet Fed Paperboard Coating
Chemical Processing Plants
Solvent Extraction
Offset Lithography
Bulk Plants

14. Technical Information Document for Technical Support in Development of a Revised Ozone State Implementation Plan for Birmingham. Alabama. prepared for EPA Region IV by Pacific Environmental Services. EPA Contract No. 68–02–3887. This consists of a series of reports published in October and November 1984 and February 1985. Industries covered include:

Surface Coating of Large Aircraft
Paint Manufacturing
Coke Processes
Lamination of Vinyl Countertops
Mineral Wood Production Industry
Brick Manufacturing Industry
Explosives Manufacturing Industry

A number of control technology documents have been widely circulated as draft documents for review. Some of these documents have never been issued as final documents such as CTG's for various reasons. but they still contain much helpful technical information. Copies of some of these may be still available from EPA. especially from the Emissions Standards and Engineering Division of the Office of Air Quality Planning and Standards. Among these are:

15. Draft. "Control of Volatile Organic Compound Emissions From Full-Web Process-Color Heatset Web Offset Lithographic Printing." August 1981.

16. Draft. "Control Technique Guidelines for the Control of Volatile Organic Emissions From Wood Furniture Coating." April 1979.

17. Draft. "Fabric Printing Industry—Background Information for Proposed Standards". April 21. 1981.

18. Draft. "Economic Impact Analysis of Catalytic Incineration and Carbon Adsorption on the Fabric Printing Industry." November 1981.

19. Draft. "Control of Volatile Organic Emissions From Existing Stationary Sources: Paint Manufacturing Industry." U.S. EPA. OAQPS. In addition. EPA's Air Toxics Control Technology Center has issued the following report:

20. Air Stripping of Contaminated Water Sources. Air Emissions and Control. July 20. 1987. Prepared for Air Toxics Control Technology Center. U.S. Environmental Protection Agency. Research Triangle Park. North Carolina 27711.

Potential New Source Review (NSR) Measures

The primary approach a State could follow to mitigate the effects of growth by reductions through its NSR program would be to subject more sources to new source review.

The following measures are being suggested for States to consider in their control strategies as appropriate techniques to deal with growth. Under current rules. new sources and modifications may be exempted from the Part D major NSR requirements by: (1) Having a potential to emit below certain thresholds (100 tons per year (tpy) for new sources and 40 tpy of VOC for modifications to existing major sources); (2) not being located in an area designated as nonattainment under section 107 of the Clean Air Act (Act); and (3) qualifying for one of the specific exemptions contained in the NSR regulations (e.g., conversion to municipal wastes for power generation. production increases not limited by a permit. increased operating hours).

Each of these situations has a separate set of possible solutions or revisions.

(1) *Thresholds*—The thresholds contained in the NSR program could be lowered to. say. 25 tpy for major sources and major modifications. A significant portion of the total VOC emissions generally come from small sources. so lowering cutoffs would bring significantly more of the VOC emissions into the major NSR program. Even 25 tpy threshold may not cover a majority of the emissions resulting from new sources. One study has shown that for VOC's. modifications and new sources emitting less than 5 tpy compose 55 percent of total new VOC emissions.

(2) *Location Outside Nonattainment Area*—States may wish to apply the nonattainment area NSR requirements of section 173 of the Clean Air Act (and State programs under that section) to sources located outside but near designated nonattainment areas.

(3) *Specific Exemptions*—The definitions currently contained in the NSR program exempt certain increases in emissions from being considered as a modification. These exemptions allow sources capable of accommodating alternative fuels or raw materials to switch fuels or raw materials (e.g., from oil to coal) without being subject to major NSR requirements. Also. sources may increase their operating hours (e.g., from 8 hours per day to 24 hours per day) and throughput (e.g., from 60 percent of capacity) to the maximum possible while meeting Federal NSR requirements (unless the changes are specifically limited by Federal enforceable conditions). States could remove these exemptions from the NSR regulations.

Appendix D—Discrepancies and Inconsistencies Found in Current SIP's

The EPA has reviewed a number of SIP's and found inconsistencies and discrepancies from established EPA policy and guidance. The following

discussion lists the most prominent problems and suggests corrections to these problems. While no State or local agencies are specifically identified, EPA intends to discuss individual State and local deficiencies with the appropriate agencies at the time the SIP call is made.

a. Achieve Consistent Implementation of New Source Review Programs

During its audits of State and local NSR programs, EPA has found considerable differences in how agencies implement their NSR regulations. EPA has found, for example, that many major modifications of sources escape preconstruction review and that lowest achievable emission reduction (LAER) determinations for sources subject to NSR are often inconsistent and insufficiently stringent. In many cases, these problems may result from improper interpretation of the applicable rules. To minimize the likelihood that this will occur in the future, EPA intends to develop guidance on such issues as how emissions increases and decreases should be calculated for netting purposes, when and how implementing agencies may use growth allowances as a substitute for offsets, and how to ensure that best available control technology and LAER determinations reflect the best technology for the source in question rather than simply the new source performance standards control level. The EPA also intends to increase its auditing and enforcement of State programs.

New Source Review Regulations

The primary focus of the new source review regulations is to evaluate the emissions impact of new or modified source projects before construction commences on the projects. The basic requirement for a new source of air pollution is to ensure that its emissions do not cause any new nonattainment situations or exacerbate any existing nonattainment problems. All sources must "prove," generally by modeling air quality impacts before and after the proposed change, that they do not cause or contribute to any nonattainment problem. For major new sources and major modifications wishing to locate in designated nonattainment areas, the applicant must also show that the most stringent pollution control equipment (LAER) is being installed, that all other sources owned by the applicant within the State are in compliance (Statewide compliance), and that the emission increases are either offset or taken into account with an approved growth allowance (emission offsets). These requirements are listed in the Clean Air Act in sections 172 and 173.

The wording in some State NSR regulations allows or has the potential to allow certain sources to avoid some or all of the intended requirements of new source review. This is in conflict with the Federal provisions, since State rules can be more stringent than the Federal provisions, but in no case can they be less stringent. The EPA believes that appropriate guidance and technical support can help ensure that States implement the new source review regulations in conformance with EPA policy; however, States may need to correct or clarify some of their regulations to avoid possible applicability or enforcement problems that may arise under new source review due to less stringent provisions. The following areas are the focus of efforts to achieve conformity with EPA policy.

Exemptions

Permit Conditions: Federal requirements state that only federally enforceable permit conditions may be used to exempt a source from the requirements for major sources. State operating permits and State consent decrees are not federally enforceable unless incorporated into the SIP either through EPA approved case-by-case rulemaking or through a generic mechanism. State preconstruction permits issued by States under EPA-approved SIP regulations pursuant to 40 CFR 51.18, 51.24, or 51.30, as well as construction permits issued by EPA or by delegated States under 52.21 are federally enforceable.

State Nonattainment Designations: The EPA will not permit a State to exempt sources located in nonattainment areas that the State has designated "attainment" without EPA approval. Similarly, States will not be permitted to use attainment demonstrations that have not received EPA approval to determine whether an offset or netting transaction is consistent with RFP.

General: States should revise their regulations to remove any regulatory provisions that could be used to exempt any source from any major NSR requirements. The only exclusions are those contained in the Federal definitions of major stationary sources [40 CFR 51.165(a)(1)(iv)] or major modifications [40 CFR 51.165(a)(1)(v)]. No source type (e.g., cotton gins, resource recovery facility) or source class (e.g. reactivated sources) may have a blanket exemption from any new source review requirement. This is a problem under the major source and major modification thresholds, since the NSR provisions require that all emission increases be accumulated for applicability purposes. For example, a single cotton gin may be a minor source, while four cotton gins (under common ownership) locating on one piece of land would constitute a major source or major modification. States may retain exemptions from *minor* source permitting requirements if (1) there exists a federally approved growth allowance to mitigate resulting increases in emissions and (2) State regulations expressly prohibit the use of the exemptions to exempt any major source or major modification from major NSR requirements.

Clean Spot Exemption: As a result of the August 1980 rulemaking which was conducted as part of the *Alabama Power* decision, State regulations cannot contain provisions that exempt a source from major new source review requirements where the source does not "significantly cause or contribute to a violation of a National Ambient Air Quality Standard." The August 1980 requirements subject any major source or major modification located in an EPA designated nonattainment area to the major NSR requirements regardless of the ambient impact of the source. Some SIP's, however, still retain this exemption and should be revised.

Offset/Netting Requirements [112]

Offsets: The EPA requires State regulations to contain enforceable and specific criteria on the credibility of emission reductions as offsets. These provisions must include a specific, well-defined baseline for emission increases and decreases, a requirement that all emission reductions used for offsets be federally enforceable (see section on permit conditions above), certain restrictions on the use of emission reductions caused by prior shutdowns and curtailments as offsets, and the prohibition of the use of any emission reductions already included in a State attainment demonstration. The last requirement listed is to ensure that a State does not use a reduction twice, i.e.,

[illegible] final resolution of the settlement agreement arising from the industry challenge to EPA's final promulgation of revised NSR rules [illegible] EPA, No. 79-1112 (D.C. Cir. February [illegible]) may alter these requirements. See 48 FR [illegible] 25, 1983) (proposed revisions). However, unless and until EPA finally revises the relevant regulations the current requirements remain in effect. If a State changes its regulations to meet these requirements and EPA then relaxes these requirements pursuant to this CMA settlement agreement, EPA will allow the States to change their applicable regulations as appropriate

once for attainment purposes and once for mitigation of new source growth.

Netting: The EPA requires State regulations to contain specific and enforceable criteria if a State wishes to allow a source to "net out" of major NSR review. A source "nets out" of major new source review by securing emission decreases within the source to mitigate increases from the same source, resulting in an "insignificant" emissions increase on a sourcewide basis. The Federal regulations require the following criteria for netting: (1) An "actual" baseline: (2) health and welfare equivalence between the emission increases and decreases: (3) Federal enforceability of emissions decreases (see section on permit conditions above); (4) a specific contemporaneous time frame (up to 10 years); and (5) the prohibition on the use of any reductions already incorporated in a State's attainment demonstration (see discussion on offsetting above). The health and welfare equivalence generally focuses on the concept of air quality: the air quality effects of the proposed netting action must result in equivalent or improved air quality. For "stable" pollutants, this places an emphasis on dispersion. For an ozone nonattainment area, the relative reactivities of the VOC species also plays an important role in air quality determinations. The State should not allow a netting transaction that causes an increase in a reactive VOC and a decrease in a negligibly reactive VOC even if the absolute amount of VOC emitted does not increase significantly. The contemporaneous timeframe is needed to ensure that increases are accumulated over a reasonable period of time, to discourage construction projects exempting themselves from NSR, and ensure that decreases are not so old as to already be taken into account in attainment demonstrations. Also, if a reduction occurred a very long time ago, that reduction should go towards assisting an area to show attainment rather than assisting a source to avoid major NSR requirements.

Definitions

VOC: NSR regulations should use a VOC definition that defines VOC as all organic compounds except those that EPA has listed in its Federal Register notices as nonphotochemically reactive. (See VOC definition in RACT regulations discussion.)

Other: NSR regulations should contain clear definitions, consistent with Federal requirements, for the following terms: Stationary source: actual emissions: allowable emissions: fugitive emissions: commence or begin construction: building, structure, or facility: and major stationary source. State regulations that do not contain good, concise definitions that meet the Federal requirements risk treating sources inequitably because of varying interpretations of the definitions. For example, minor variations in a State rule regarding the LAER definition which appear unimportant could allow a source to avoid installing proven technology by arguing that it costs too much, a result that is unacceptable using the EPA definition. The definitions must provide a framework to make decisions replicable among sources.

Small Sources

Lack of Minor Source and Minor Modification Review: As required by the Federal rules, SIP's should require a review program of all sources of air pollution regardless of size. This review must include an assurance that no new source or modification will interfere with attainment and maintenance of the standard as well as a requirement that all construction projects be subject to public comment procedure. Many States only have requirements for major sources and major modifications. States may only exempt minor sources from these requirements if (1) there exists a federally approved growth allowance to mitigate resulting increases in emissions and (2) State regulations expressly prohibit the use of exemptions to exempt any major source or major modifications from NSR requirements.

b. Ensure Conformity of SIP's With Existing EPA Policy

Although most SIP regulations have met the terms of EPA's requirements for Part D plans, EPA may have approved some SIP's containing rules that do not meet those requirements.

Some State regulations controlling VOC emissions are being implemented in a manner that is not consistent with EPA requirements and policies and can, in certain cases, significantly interfere with the effectiveness of those regulations. These implementation problems appear to be caused by incorrect or ambiguous definitions, variable interpretation, the lack of key provisions (e.g., compliance times, test methods, etc.), or specific provisions in State regulations that are inconsistent with current EPA policies. In some cases, these problems can interfere with the States' ability to (1) secure their expected emissions reductions from stationary source RACT regulations or (2) control emission growth through their NSR regulations. EPA plans to work with States to identify these problem areas and provide training, guidance, and other technical support to ensure that RACT and NSR regulations are effectively implemented.

Stationary Source RACT Regulations

The existing RACT regulations were developed as a major component of the SIP strategies to achieve VOC emission reductions. The following describes the areas where RACT regulations have been adopted and/or implemented on an inconsistent basis.

RACT Regulation Exemptions

Many of the CTG's that EPA issued in the late 1970's recommended that States exempt from their RACT rules only those sources falling below certain size or throughput cutoffs. Other CTG's recommended no such cutoffs. Some of the RACT regulations now in the SIP's, however, establish exemptions wider than those recommended in the CTG's or provide exemptions so ambiguous as to be susceptible to abuse. The EPA will require the States to amend such rules to ensure that these exemptions conform to the CTG recommendations in all cases except those for which the State provides adequate justification that the CTG level would impose unreasonable requirements in that State.

Definition of 100 Tons Per Year Source

The EPA guidance has called on SIP's for extension areas to require RACT for sources with the potential to emit more than 100 tons per year (tpy), but that do not fall into a CTG category. Although EPA intended the definition of source for this purpose to be the entire plant, some SIP's are susceptible to an interpretation requiring RACT only for individual emissions units emitting more than 100 tpy. Also, some SIP's are susceptible to a reading under which the source must apply RACT only if it has a potential to emit more than 100 tpy with controls. EPA intended, however, to have States apply RACT to non-CTG sources emitting more than that amount without controls. Therefore, EPA intends to require the relevant States to amend VOC rules that do not clearly reflect EPA's intent.

Other Issues

Existing VOC rules contain a variety of other ambiguities and exemptions that may impede efforts to achieve full RACT-level reductions. Although some of the affected State or local agencies currently interpret these rules consistently with EPA policy, courts will frequently turn to the actual words of the rules to decide the legal obligations of the affected sources. For that reason, EPA believes it is essential for States to

amend these rules to state clearly what is required. Until the States change these rules. the Agency will continue to interpret them consistent with EPA's intent when it approved them and will encourage the relevant State or local agencies to do the same. Examples of these deficiencies are described generally below.

Emission Limit Units: VOC rules incorporating limits expressed as pounds of VOC per gallon (lb VOC/gal) of coating should also list the equivalent lb VOC/gal of solids emission limit. It will be acceptable but not mandatory to totally replace pounds of VOC per gallon of coating units with units of lbs VOC per gallon of solids. VOC rules should state that units of lbs VOC/gal of solids be used for all calculations involving emission trades. cross-line averaging. and determining compliance by add-on control equipment such as incinerators and carbon adsorbers.

Exempt Solvents: Compliance calculations for coatings expressed as lb VOC/gallon coating (less water) should treat exempt solvents such as 1.1.1-trichloroethane and methylene chloride as water for purposes of calculating the "less water" part of the coating composition.

VOC Definitions: These rules should define VOC as all organic compounds except those that EPA has listed as photochemically nonreactive in its Federal Register notices. Many rules incorrectly contain a vapor pressure cutoff (e.g., 0.1 mmHg) that effectively exempts some photochemically reactive compounds (such as butyl dioxitol. a paint solvent. and certain mineral oils) from control. The following definition is a model for use:

Volatile Organic Compound (VOC)—Any organic compound which participates in atmospheric photochemical reactions: that is. any organic compound other than those which the Administrator designates as having negligible photochemical reactivity. VOC may be measured by a reference method. an equivalent method. an alternative method or by procedures specified under 40 CFR Part 60. A reference method. an equivalent method. or an alternative method. however. may also measure nonreactive organic compounds. In such cases. an owner or operator may exclude the nonreactive organic compounds when determining compliance with a standard.

Other Definitions: A variety of other definitions in VOC rules are inconsistent with EPA's CTG's. EPA proposes to identify these deficiencies and require the States to remedy them.[11]

Transfer Efficiency: Transfer efficiency is a measure of how efficiently coating solids are applied to the objects being coated in spray coating operations. Increasing transfer efficiency reduces the amount of coating used for a particular job and may thereby reduce VOC emissions. Some States have attempted to provide sources with credit for transfer efficiency improvements.

The EPA proposes to require that sources be allowed to seek credit for transfer efficiency improvements only if the SIP specifies a baseline transfer efficiency and a test method acceptable to EPA for determining actual transfer efficiency. (The use of default. assumed or table transfer efficiency values would be unacceptable.) This could be done either with general or source-specific SIP revisions.

Cross Line Averaging: A source may use crossline averaging only upon (1) EPA approval as a source-specific SIP revision or (2) State adoption under a cross-line averaging or equivalency rule that EPA has approved generically.

Compliance Periods: VOC rules should describe explictly the compliance timeframe associated with each emission limit (e.g.. instantaneous or daily). However. where the rules are silent on compliance time. EPA will interpret it as instantaneous. The rules could include periods longer than 24 hours only in accordance with the memorandum from John O'Connor. Acting Director of the Office of Air Quality Planning and Standards. dated January 20. 1984. entitled "Averaging Times for Compliance With VOC Emission Limits-SIP Revision Policy." and only as source-specific SIP revisions.

Recordkeeping: The EPA would require States to amend their VOC rules to require explicitly that sources keep records needed to assess compliance for the timeframe specified in the rule. Records must be commensurate with regulatory requirements and must be available for examination on request. The SIP must give reporting schedules and reporting formats. For example. these rules must require daily records if the SIP requires daily compliance. If a company is bubbling its emissions on a daily basis. the rules must require daily records to determine compliance. If units of lb VOC/gallon solids is used in calculations for daily compliance. the source must record gallons of solids used per day and pounds of VOC emitted per day. The rules should also require sources to list separately the amount of diluents and. where relevant to determining compliance. wash and clean-up VOC. Beyond that. they should require sources to document (1) that the coatings manufacturer used either EPA Method 24 or an EPA-approved State method to calculate the amount of VOC per gallon of coating (less water and exempt solvents) and (2) what method the manufacturer used to calculate the volume percent solids content of the coatings.

Test Methods: EPA will require States to amend their VOC rules to require the use of the most current test methods to determine the VOC content of coatings (e.g.. EPA Reference Method 24 (1-hour bake) or equivalent ASTM Methods). The method used to determine volume percent solids should be specific and should be an EPA-approved method (see "Procedures for Certifying Quantity of Volatile Organic Compounds Emitted by Paint. Ink. and Other Coatings." EPA-450/3-84-019. December 1984). The procedures in outdated ASTM methods and the Volume II CTG are generally no longer acceptable. Procedures should specify that EPA or States may verify test data submitted by companies with independent tests and that EPA or State conducted tests will take precedence.

The EPA will also require States to amend their VOC rules to state the procedures to be used to measure capture and control device efficiencies. For example. the rules for some types of sources or control systems should require the use of temporary enclosures. rather than material balances. in capture efficiency tests. Provisions that require "well engineered capture systems" or "maximum reasonable capture" should be replaced with specific control requirements.

Equipment Leak Components. The EPA shall require equipment leak SIP regulations to be strengthened according to the intent of the CTG's. For example. sources that have previously been exempt from monitoring requirements due to line size or the use of plug and ball valves should become subject to the SIP requirements. In addition. SIP's should not exempt unsafe and inaccessible valves from all periodic

[11] For example. definitions of "coating line" should not exempt from control coating lines that do not have bake ovens. Also. definitions of "refinishing" in miscellaneous metal coating rules should make clear that "in-line" or "final out" repair by original equipment manufacturers is not refinishing. Refinishing should be limited to the repainting of used equipment. The definition of paper coating should be revised to make clear that the paper coating regulations cover coating on plastic film and metallic foil as well as paper. Paper and fabric coating should cover saturation operations as well as strictly coating operations. Vinyl coating definitions should make clear that organisol and plastisol coatings (which traditionally have contained little or no solvent) cannot be used to bubble emissions from vinyl printing and topcoating. Coating should be defined to include "functional" as well as protective or decorative films.

monitoring requirements. The EPA believes that inaccessible and unsafe-to-monitor valves should be monitored as often as practicable because of the potential for finding leaks and reducing emissions. The EPA does not consider annual monitoring or monitoring at shutdown to be an unreasonable burden for inaccessible and unsafe-to-monitor valves.

For natural gas plants, RACT should apply to equipment that contains or contacts a process stream with a VOC concentration of 1.0 percent by weight or more. Equipment with process streams containing relatively low percentages of VOC (i.e., between 1.0 and 10.0 percent) contributes a significant portion of total emissions from natural gas plants and, therefore, is subject to RACT requirements.

Exemptions and Variances: Many SIP's contain provisions giving the State authority to grant variances, exemptions, and alternative means of control strategies. SIP's must clearly state whether EPA approval of such variances is required on a case-by-case basis before such a variance, exemption, or alternative means becomes federally-effective. Provisions that are intended to be generic (i.e., not requiring case-by-case EPA approval for the alternative means to be federally-effective) must meet the general principle of replicability described in EPA's Emissions Trading Policy Statement (51 FR 43814, December 4, 1986).

Appendix E—Guidance Document on Enhanced I/M

I. Introduction

The EPA has considered the potential for greater VOC and CO reductions from vehicle inspection and maintenance programs, and believes that substantial enhancement is available.

The EPA is considering a variety of options relative to enhanced I/M, including establishing a specific enhanced I/M performance level for some nonattainment areas as well as relying on the 3 percent reduction requirement to force consideration of enhanced I/M in lieu of a mandated performance requirement. The latter option would allow States to consider the benefits of enhanced I/M, along with those of other control measures, in deciding how to meet the 3 percent average annual reduction requirement.

The other option toward which EPA is presently leaning would be to establish a specific enhanced I/M requirement for areas with relatively serious ozone or CO nonattainment problems. The remainder of this appendix describes aspects of and issues related to a separate enhanced I/M requirement, if adopted.

Possible enhancements fall into four categories. First, operating losses due to improper inspections, incomplete enforcement, or lenient repair waiver systems can be reduced. Second, additional vehicles which are exempt based on age, or vehicle type can be made subject to the inspection requirement. Third, the emission test portion of the periodic inspection can be made more sophisticated or the pass/fail limits or cutpoints more stringent. Fourth, important emission control components can be checked visually, or by other means that do not involve emissions measurement, for evidence of tampering or misfueling.

The concept of "enhanced I/M," therefore, covers both increases to the coverage and stringency of inspection, and improved management practices to assure full effectiveness. The requirements being considered for areas adopting enhanced I/M are explained in detail below.

II. Background

In 1978, EPA first established policy for the implementation of the I/M programs required under the Clean Air Act Amendments of 1977. This policy addressed the elements to be included in SIP revisions, minimum emission reduction requirements, administrative requirements, and schedules for implementation. Approvable I/M programs were to be in place in all ozone and CO extension areas by the end of 1982, and were to produce at least a 25 percent reduction in light-duty vehicle hydrocarbon exhaust emissions and at least 3 percent reduction in CO exhaust emissions as of the end of 1987.

At this time, there are I/M programs operating in 60 urban areas in 32 States. There are a variety of program designs in place, some which just exceed minimum levels, and some which contain additional measures to achieve greater emission reductions. The EPA audits of I/M programs over the last 3 years have identified both considerable accomplishments by State and local agencies in implementing programs successfully, and a number of operating problems. These audit findings serve as the basis for the increased stringency and the additional administrative requirements associated with enhanced I/M.

III. New Performance Standard for VOC and CO Reductions

The EPA has developed a computer model which it proposes to use to assess the benefits of various I/M program designs, expressed as annual tons of reduction from a typical urban fleet of one million vehicles. The model is based on MOBILE3, but performs additional manipulations of the emission estimates. The assumptions employed in this computer model are explained in detail in the technical report, entitled "Method for Estimating the Cost-Effectiveness of Inspection/Maintenance Program Designs."

The EPA is leaning toward a nominal performance standard to be achieved by enhanced I/M of 5700 tons of HC and 69,000 tons of CO per year per million light-duty vehicles over the first 5 years of operation of the enhanced program. This level represents the design level of the third most stringent of the 27 or so distinct I/M programs currently in operation. As discussed in the preamble of this policy, EPA is also considering other performance levels which could be established, if a separate enhanced I/M requirement is adopted. The level of performance described above would be equivalent to the following design:

—Centralized biennial inspections
—20 model years of passenger cars and light trucks
—20 percent stringency for pre-1981 vehicles
—Idle test
—207(b) cutpoints for 1981+ vehicles (1.2 percent CO/220 ppm HC)
—Catalyst, inlet, and lead deposit inspections on 1981+ vehicles
—5 percent waiver on the emission short test

Programs which vary from this design yet have equivalent emission reductions would be acceptable. For example, decentralized biennial inspections and/or fewer model years of coverage are also allowed, provided other features of the program design are strengthened such that the estimated benefit meets the new performance standard.

Programs may show equivalency to this design using either national or local conditions of tampering/misfueling rates, vehicle type mix, average speed, etc. Use of local conditions may result in a performance standard different than 5700/69,000; in all cases, equivalency to the above design would be the controlling criterion for approval.

The new computer model has two features which were not included in MOBILE3 but which grew out of the past 3 years of evaluating operating programs. First, for purposes of SIP approval, decentralized programs will be credited with identifying and repairing existing tampering at a rate which is less than that modeled for centralized programs. The initial analysis suggests a reduced