

Regulatory Analysis Form

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INDEPENDENT REGULATORY
REVIEW COMMISSION

(1) Agency

Pennsylvania Department of Environmental Protection

(2) I.D. Number (Governor's Office Use)

7-341

IRRC Number:

1981

(3) Short Title

Gasoline Volatility Requirements - Low RVP

(4) PA Code Cite

25 Pa. Code Chapters 121, 126,
and 139

(5) Agency Contacts & Telephone Numbers

Primary Contact: Sharon Freeman, 783-1303

Secondary Contact: Barbara Sexton, 783-1303

(6) Type of Rulemaking (Check One)

- Proposed Rulemaking
 Final Order Adopting Regulation
 Final Order, Proposed Rulemaking Omitted

(7) Is a 120-Day Emergency Certification
Attached?

- No
 Yes: By the Attorney General
 Yes: By the Governor

(8) Briefly explain the regulation in clear and nontechnical language.

The proposed regulation will eliminate the use of federal reformulated gasoline (RFG) as a compliant fuel in the Pittsburgh-Beaver Valley Area during the ozone season.

The proposed regulation will also make a technical language correction relating to sampling procedures which has no impact on the regulated community.

(9) State the statutory authority for the regulation and any relevant state or federal court decisions.

This action is being taken under the authority of Section 5 of the Air Pollution Control Act (35 P.S. §4005).

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(10) Is the regulation mandated by any federal or state law or court order, or federal regulation? If yes, cite the specific law, case or regulation, and any deadlines for action.

Yes. The Commonwealth was required to implement control strategies by December 31, 1997 to demonstrate that the Pittsburgh-Beaver Valley Area will achieve the National Ambient Air Quality Standard (NAAQS) (61 FR 28061, 28064). This proposal will delete one of the strategies previously submitted.

(11) Explain the compelling public interest that justifies the regulation. What is the problem it addresses?

The Pittsburgh-Beaver Valley Area non-attainment area continues to exceed the health-based standard for ground-level ozone. This proposed regulation would replace the current provisions which allow for the sale of either RFG or low Reid vapor pressure (RVP) gasoline and help move the area toward attainment of the health-based standard for ozone, which is in the best interest of the public. This regulatory change is in response to public concern that RFG is not a suitable alternative for the Pittsburgh-Beaver Valley nonattainment area.

(12) State the public health, safety, environmental or general welfare risks associated with non-regulation.

When ground-level ozone is present in concentrations in excess of the federal health-based standard, public health is adversely affected. The federal Environmental Protection Agency has concluded that there is an association between ambient ozone concentrations and increased hospital admissions for respiratory ailments, such as asthma. Further, although children, the elderly, and those with respiratory problems are most at risk, even healthy individuals may experience increased respiratory ailments and other symptoms when they are exposed to ambient ozone while engaged in activity that involves physical exertion. Though such symptoms are often temporary, repeated exposure could result in permanent lung damage.

(13) Describe who will benefit from the regulation. (Quantify the benefits as completely as possible and approximate the number of people who will benefit.)

Approximately 2.8 to 3.0 million people in the seven counties affected by this proposed regulation will benefit from the sale of cleaner-burning fuel. Low RVP gasoline has been proven to reduce emissions of volatile organic compounds (VOC), compounds that are instrumental in the formation of ground-level ozone.

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(14) Describe who will be adversely affected by the regulation. (Quantify the adverse effect as completely as possible and approximate the number of people who will be adversely affected.)

There will be no increased cost to produce compliant gasoline because low RVP is one of the fuels already required in the area.

(15) List the persons, groups or entities that will be required to comply with the regulation. (Approximate the number of people who will be required to comply.)

All refiners, importers, distributors, resellers, carriers, wholesale purchaser-consumers, and retailers of gasoline will be required to comply with this regulation. There are approximately 1250 retail outlets in the seven-county area.

(16) Describe the communications with and inputs from the public in the development and drafting of the regulation. List the persons and/or groups who were involved, if applicable.

The Southwestern Pennsylvania Ozone Stakeholder Working Group was the primary impetus for the development of the original regulation. All of the group's meetings were open to the public. The Air Quality Technical Advisory Committee (AQTAC) has reviewed the proposed revision. In addition, the proposed revision was also discussed with the Small Business Compliance Assistance Advisory Committee.

(17) Provide a specific estimate of the cost and/or savings to the regulated community associated with compliance, including any legal, accounting or consulting procedures which may be required.

There will be no increased cost to the regulated community to produce compliant fuel. Low RVP costs more to make than conventional gasoline, but it is one of the fuels already required in the area. However, low RVP gasoline on average costs two (2) cents per gallon less than RFG gasoline which this regulation eliminates.

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(18) Provide a specific estimate of the cost and/or savings to local governments associated with compliance, including any legal, accounting or consulting procedures which may be required.

There will be no cost impact on local governments.

(19) Provide a specific estimate of the cost and/or savings to state government associated with the implementation of the regulation, including any legal, accounting or consulting procedures which may be required.

There will be no cost impact on state government.

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(20) In the table below, provide an estimate of the fiscal savings and cost associated with implementation and compliance for the regulated community, local government, and state government for the current year and five subsequent years.

	Current FY Year	FY +1 Year	FY +2 Year	FY +3 Year	FY +4 Year	FY +5 Year
SAVINGS:	\$	\$	\$	\$	\$	\$
Regulated Community	0	0	0	0	0	0
Local Government	0	0	0	0	0	0
State Governments	0	0	0	0	0	0
Total Savings	0	0	0	0	0	0
COSTS:						
Regulated Community	0	0	0	0	0	0
Local Government	0	0	0	0	0	0
State Governments	0	0	0	0	0	0
Total Cost	0	0	0	0	0	0
REVENUE LOSSES:						
Regulated Community	0	0	0	0	0	0
Local Government	0	0	0	0	0	0
State Governments	0	0	0	0	0	0
Total Revenue Losses	0	0	0	0	0	0

(20a) Explain how the cost estimates listed above were derived.

Because low RVP gasoline is one of the fuels currently required in the area, there will be no increased cost for its use.

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(20b) Provide the past three year expenditure history for programs affected by the regulation.

Program	FY-3	FY-2	FY-1	Current FY
Air Quality	21,000,000	26,000,000	29,000,000	27,000,000

(21) Using the cost-benefit information provided above, explain how the benefits of the regulation outweigh the adverse effects and cost.

The fuel regulation is a component of the Southwestern PA Ozone Stakeholder Working Group's proposed strategy to attain and maintain the health-based standard for ground-level ozone. An area that fails to attain the standard runs the risk of sanctions which could include the loss of all federal highway funds.

In addition, the health risks associated with nonregulation, described in (12), will be reduced, thereby lowering health-care and related costs in the affected area.

(22) Describe the nonregulatory alternative considered and the cost associated with those alternatives. Provide the reasons for their dismissal.

The market-based multiple compliant fuels program is being eliminated because of implementation problems with the current regulation as it relates to RFG. Refiners and marketers are supplying low RVP gasoline during the ozone season. Consequently the proposed rulemaking will not have a significant impact on the low volatility fuel program in the Pittsburgh-Beaver Valley ozone nonattainment area.

No other program alternatives were considered during the development of this proposal.

(23) Describe alternative regulatory schemes considered and the cost associated with those schemes. Provide the reasons for their dismissal.

A program requiring either RFG or low RVP is currently in place. Because of concerns related to implementation of the RFG program that option is eliminated.

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(24) Are there any provisions that are more stringent than federal standards? If yes, identify the specific provisions and the compelling Pennsylvania interest that demands stronger regulations.

Current federal limits on gasoline volatility for Northern Tier states do exist, but are less stringent than the volatility requirements of this proposal. Low RVP gasoline is necessary to meet federal health-based ozone standard requirements.

(25) How does the regulation compare with those of other states? Will the regulation put Pennsylvania at a competitive disadvantage with other states?

This regulation compares favorably to other states that have volatility requirements. The neighboring states, Ohio and West Virginia, do not have fuel control programs.

(26) Will the regulation affect existing or proposed regulations of the promulgating agency or other state agencies? If yes, explain and provide specific citations.

No.

(27) Will any public hearings or informational meetings be scheduled? Please provide the dates, times, and locations, if available.

One public hearing will be scheduled with a sixty-day public comment period. No public meetings are planned.

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(28) Will the regulation change existing reporting, record keeping, or other paperwork requirements? Describe the changes and attach copies of forms or reports which will be required as a result of implementation, if available.

There will be no increased recordkeeping or reporting.

(29) Please list any special provisions which have been developed to meet the particular needs of affected groups or persons including, but not limited to, minorities, elderly, small businesses, and farmers.

No special provisions have been developed.

(30) What is the anticipated effective date of the regulation; the date by which compliance with the regulation will be required; and the date by which any required permits, licenses or other approvals must be obtained?

The regulation will be effective upon publication in the Pennsylvania Bulletin as a final rule which is anticipated to be May 1, 1999. No licenses, permits, or other approvals are necessary.

(31) Provide the schedule for continual review of the regulation.

The regulation will be reviewed in accordance with the sunset review schedule published by the Department to determine whether the regulation effectively fulfills the goals for which it was intended.

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Copy below is hereby approved as to form and legality. Attorney General

[Signature]
DEPUTY ATTORNEY GENERAL

JUL 30 1998

DATE OF APPROVAL

Check if applicable
Copy not approved. Objections
noted.

Copy below is hereby certified to be a true and correct copy of a document issued, prescribed or promulgated by:

DEPARTMENT OF ENVIRONMENTAL PROTECTION
ENVIRONMENTAL QUALITY BOARD

(AGENCY)

DOCUMENT/FISCAL NOTE NO. #7-341

DATE OF ADOPTION: _____

BY: *[Signature]*

TITLE: JAMES M. SEIF, CHAIRMAN
(EXECUTIVE OFFICER, CHAIRMAN OR SECRETARY)

Copy below is hereby approved as to form and legality. Executive or Independent Agencies

[Signature]

7/24/98
DATE OF APPROVAL

(Deputy General Counsel)
(Chief Counsel, Independent Agency)
(Strike inapplicable title)

Check if applicable. No Attorney General approval or objection within 30 days after submission.

NOTICE OF
PROPOSED RULEMAKING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ENVIRONMENTAL QUALITY BOARD

Gasoline Volatility Requirements - Low RVP
25 Pa. Code Chapters 121, 126, and 139

**NOTICE OF PROPOSED RULEMAKING
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ENVIRONMENTAL QUALITY BOARD**

**25 Pa. Code Chapters 121, 126 and 139
Gasoline Volatility Requirements**

Preamble

The Environmental Quality Board (EQB) proposes to amend 25 Pa. Code Chapter 121 (relating to general provisions), Chapter 126 (relating to standards for motor fuels) and Chapter 139 (relating to sampling and testing) as set forth in Annex A. The proposed regulation will eliminate the use of federal reformulated gasoline (RFG) as a compliant fuel in the Pittsburgh-Beaver Valley Area during the ozone season. In addition, the proposed regulation will make a technical language correction relating to sampling procedures.

The EQB approved the proposed amendments at its July 21, 1998 meeting.

A. Effective Date

These amendments will be effective upon publication in the *Pennsylvania Bulletin* as final rulemaking.

B. Contact Persons

For further information, contact Terry Black, Chief, Regulation and Policy Development Section, Division of Compliance and Enforcement, Bureau of Air Quality, 12th Floor, Rachel Carson State Office Building, P.O. Box 8468, Harrisburg, PA 17105-8468, telephone (717) 787-1663, or R. A. Reiley, Assistant Counsel, Bureau of Regulatory Counsel, Office of Chief Counsel, 9th Floor, Rachel Carson State Office Building, P.O. Box 8464, Harrisburg, PA 17105-8464, telephone (717) 787-7060. Persons with a disability may use the AT&T Relay Service by calling 1-800-654-5984 (TDD users) or 1-800-654-5988 (voice users). This final rule is available electronically through the Department of Environmental Protection Web Site (<http://www.dep.state.pa.us>).

C. Statutory Authority

This action is being taken under the authority of Section 5 of the Air Pollution Control Act, 35 P.S. §4005, which grants to the EQB the authority to adopt regulations for the prevention, control, reduction and abatement of air pollution.

D. Background and Summary of the Amendments

This regulation proposes to eliminate the use of federal RFG as a compliant fuel in the Pittsburgh-Beaver Valley Area during the ozone season. Because of concerns with implementation of the current regulation as it relates to RFG, the Department is eliminating the RFG provisions. Since refiners and marketers have been supplying low Reid vapor pressure (RVP) gasoline during the ozone season, this proposed amendment will have minimal practical consequences. This regulation also proposes to correct technical language relating to sampling procedures.

This amendment was submitted to and approved by the Air Quality Technical Advisory Committee and the Small Business Assistance Program Compliance Advisory Committee.

E. Summary of the Regulatory Revisions

The Department is proposing to delete definitions for the term “federal reformulated gasoline or RFG” and eliminate RFG from the term “compliant fuel”. The Department also proposes to eliminate the references to RFG in Sections 126.301, 126.302 and 126.303. In addition, the Department proposes to clarify the record retention requirements in Section 126.302(c) that records shall be kept on-site. Finally, the Department proposes to correct technical language in Section 139.4(18).

F. Benefits, Costs and Compliance

Executive Order 1996-1 requires a cost/benefit analysis of the proposed regulation.

Compliance Costs

There will be no increased cost to the regulated community as a result of this proposal. Since low RVP gasoline is already required in the area, there will be no additional cost to the public or to local or state government. Low RVP gasoline on average is two (2) cents per gallon less than RFG gasoline.

Compliance Assistance Plan

The Department plans to educate and assist the public and regulated community with understanding the newly revised requirements and how to comply with them. This will be accomplished through the Department’s ongoing regional compliance assistance program.

Paperwork Requirements

There will be no additional recordkeeping and reporting costs for any entity that sells or transfers gasoline intended for use in the seven-county Pittsburgh-Beaver Valley Area during the ozone season.

G. Sunset Review

This regulation will be reviewed in accordance with the sunset review schedule published by the Department to determine whether the regulation effectively fulfills the goals for which it was intended.

H. Regulatory Review

Under Section 5(a) of the Regulatory Review Act, the act of June 30, 1989 (P.L. 73, No. 19) (71 P.S. §745.5(a)), the Department submitted a copy of the proposed rulemaking on September 8, 1998, to the Independent Regulatory Review Commission and to the Chairpersons of the Senate and House Environmental Resources and Energy Committees. Because of the legislature's adjournment sine die, the Department resubmitted the regulation to the Committees on January 25, 1999, in the 1999-2000 session of the General Assembly. In addition to submitting the proposed amendments, the Department has provided the Commission and the Committees with a copy of a detailed regulatory analysis form prepared by the Department. A copy of this material is available to the public upon request.

If the Commission has any objections to any portion of the proposed amendments, it will notify the Department within thirty (30) days of the close of the public comment period. The notification shall specify the regulatory review criteria which have not been met by that portion. The act specifies detailed procedures for the Department, the Governor and the General Assembly to review these objections before final publication of the regulation.

I. Public Comment and EQB Public Hearing

Public Hearing

The EQB will hold one public hearing for the purpose of accepting comments on the proposed amendments. The hearing will be held at 2:00 p.m. on November 2, 1998, at the Department's Southwest Regional Office, 400 Waterfront Drive, Pittsburgh, Pennsylvania.

Persons wishing to present testimony at the hearing are asked to contact Kate Coleman at the Environmental Quality Board, P.O. Box 8477, Harrisburg, PA 17105-8477, telephone 787-4526, at least one (1) week in advance of the hearing to reserve a time to present testimony. Oral testimony will be limited to ten minutes for each witness and three written copies of the oral testimony must be submitted at the hearing. Each organization is requested to designate one witness to present testimony on its behalf.

Persons with a disability who wish to attend the hearing and require an auxiliary aid, service or other accommodations in order to participate, should contact Kate Coleman at (717) 787-4526 or through the Pennsylvania AT&T relay service at 1-800-654-5984 (TDD) to discuss how the Department may accommodate their needs.

Written Comments

In lieu of or in addition to presenting oral testimony at the hearing, interested persons may submit written comments, suggestions or objections regarding the proposed amendments to the EQB, 15th Floor, Rachel Carson State Office Building, P.O. Box 8477, Harrisburg, PA 17105-8477. Comments received by facsimile will not be accepted. Comments must be received by December 2, 1998. In addition to the written comments, interested persons may also submit a summary of their comments to the EQB. This summary may not exceed one (1) page in length and must be received by December 2, 1998. The summary will be provided to each member of the EQB in the agenda packet distributed prior to the meeting at which the final regulations will be considered.

Electronic Comments

Comments may be submitted electronically to the EQB at RegComments@dep.state.pa.us. A subject heading identifying the proposal and return name and address must be included in each transmission. Comments submitted electronically must also be received by the EQB by December 2, 1998.

BY:

James M. Seif
Chairman
Environmental Quality Board

ANNEX A

TITLE 25. ENVIRONMENTAL PROTECTION
PART I. DEPARTMENT OF ENVIRONMENTAL PROTECTION
Subpart C. PROTECTION OF NATURAL RESOURCES
ARTICLE III. AIR RESOURCES

CHAPTER 121. GENERAL PROVISIONS

§ 121.1. Definitions.

The definitions in Section 3 of the act (35 P.S. §4003) apply to this article. In addition, the following words and terms, when used in this article, have the following meanings, unless the context clearly indicates otherwise:

* * * * *

Compliant fuel - Low RVP gasoline [or RFG].

* * * * *

[*RFG—Federal Reformulated Gasoline* - Gasoline that meets the requirements for RFG as specified in 40 CFR Part 80 Subpart D (relating to reformulated gasoline).]

* * * * *

CHAPTER 126. STANDARDS FOR MOTOR FUELS

SUBCHAPTER C. GASOLINE VOLATILITY REQUIREMENTS

Sec.

- 126.301. Compliant fuel requirement.
- 126.302. Recordkeeping and reporting.
- 126.303. Compliance and test methods.

§ 126.301. Compliant Fuel Requirement.

(a) This subchapter applies to gasoline which is sold or transferred into or within the Pittsburgh-Beaver Valley Area during the period May 1 through September 15, 1998, and continuing every year thereafter.

(b) A refiner, importer, distributor, reseller, terminal owner and operator or carrier, may not:

(1) Sell, exchange or supply gasoline that is not a compliant fuel during the period described in subsection (a).

(2) Blend, mix, store or transport or allow blending, mixing, storing or transporting of compliant fuel with noncompliant fuel during the period described in subsection (a).

(c) A retailer or wholesale purchaser-consumer may not sell, exchange or supply gasoline that is not a compliant fuel during the period June 1 through September 15, 1998, and continuing every year thereafter.

[(d) If RFG is required by operation of Federal law to be sold in the Pittsburgh-Beaver Valley, this subchapter no longer applies after the date that RFG is required to be sold.]

§ 126.302. Recordkeeping and reporting.

(a) Beginning with the terminal owner or operator who sells or transfers gasoline intended for use in the Pittsburgh-Beaver Valley Area during the period described in §126.301(a) (relating to compliant fuel requirements), each time the physical custody of or title to a shipment of gasoline changes hands, other than when gasoline is sold or transferred for use in motor vehicles at a retail outlet or wholesale purchaser-consumer's facility, the

transferor shall provide to the transferee a copy of the record described in this subsection. This record shall legibly and conspicuously contain, at a minimum, the following information:

- (1) The date of the sale or transfer.
- (2) The name and address of the transferor.
- (3) The name and address of the transferee.
- (4) The location of the gasoline at the time of transfer.
- (5) The volume of gasoline which is being sold or transferred.

(6) A statement or grade code certifying that the gasoline has an RVP of 7.8 pounds per square inch or less per gallon [or certified as RFG. If the gasoline is certified as RFG, each invoice, loading statement, bill of lading, delivery ticket, and other document that accompanies a shipment of RFG shall contain a statement from the refiner that certifies this fact.].

(b) A person who transports, stores or sells compliant fuel that is intended for use in the Pittsburgh-Beaver Valley Area during the period described in §126.301(a), shall segregate the compliant fuel from noncompliant fuel and the documentation described in subsection (a) shall accompany the compliant fuel at all times.

(c) Each person in the gasoline distribution network shall maintain records containing the compliance information listed in subsection (a). These records shall be retained for at least 2 years from the date of the sale or transfer of compliant fuel, **AND SHALL BE KEPT ON-SITE AT EACH POINT IN THE DISTRIBUTION NETWORK.**

§ 126.303. Compliance and test methods.

[(a)] Compliance with the 7.8 pounds per square inch RVP standard shall be determined by use of the sampling and testing methods specified in this section. Sampling or testing of gasoline required by this chapter shall be accomplished as follows:

(1) Sampling of gasoline for the purpose of determining compliance with this subchapter shall be conducted in accordance with 40 CFR Part 80, Appendix D (relating to sampling procedures for fuel volatility).

(2) Testing of gasoline for purposes of determining compliance with this rule shall be conducted in accordance with 40 CFR Part 80, Appendix E (relating to test for determining Reid Vapor Pressure (RVP) of gasoline and gasoline-oxygenate blend).

[(b) RFG shall be certified and tested in accordance with the requirements listed in 40 CFR Part 80 Subpart D (relating to reformulated gasoline).]

CHAPTER 139. SAMPLING AND TESTING

Subchapter A. SAMPLING AND TESTING METHODS AND PROCEDURES

GENERAL

§ 139.4. References.

The references referred to in this subchapter are as follows:

* * * * *

(18) "Sampling procedures for fuel volatility," 40 CFR Part 80, Appendix D (relating to [reformulated gasoline] SAMPLING PROCEDURES FOR FUEL VOLATILITY).

that the fuel met the applicable standards under paragraph (a)(1) of this section for sulfur and cetane index or aromatics content for use in motor vehicles.

[55 FR 34138, Aug. 21, 1990, as amended at 59 FR 35859, July 14, 1994]

§ 80.32 Controls applicable to liquefied petroleum gas retailers and wholesale purchaser-consumers.

After January 1, 1998 every retailer and wholesale purchaser-consumer handling over 13,660 gallons of liquefied petroleum gas per month shall equip each pump from which liquefied petroleum gas is introduced into motor vehicles with a nozzle that has no greater than 2.0 cm³ dead space from which liquefied petroleum gas will be released upon nozzle disconnect from the vehicle, as measured from the nozzle face which seals against the vehicle receptacle "O" ring, and as determined by calculation of the geometric shape of the nozzle. After January 1, 2000 this requirement applies to every liquefied petroleum gas retailer and wholesale purchaser-consumer. Any dispensing pump shown to be dedicated to heavy-duty vehicles is exempt from this requirement.

[59 FR 48490, Sept. 21, 1994]

§ 80.33 Controls applicable to natural gas retailers and wholesale purchaser-consumers.

(a) After January 1, 1998 every retailer and wholesale purchaser-consumer handling over 1,215,000 standard cubic feet of natural gas per month shall equip each pump from which natural gas is introduced into natural gas motor vehicles with a nozzle and hose configuration which vents no more than 1.2 grams of natural gas to the atmosphere per refueling of a vehicle complying with § 86.098-8(d)(1)(iv) of this chapter, as determined by calculation of the geometric shape of the nozzle and hose. After January 1, 2000 this requirement applies to every natural gas retailer and wholesale purchaser-consumer. Any dispensing pump shown to be dedicated to heavy-duty vehicles is exempt from this requirement.

(b) The provisions of paragraph (a) of this section can be waived for refueling stations which were in operation on or

before January 1, 1998 provided the station operator can demonstrate, to the satisfaction of the Administrator, that compliance with paragraph (a) of this section would require additional compression equipment or other modifications with costs similar to or greater than the cost of additional compression equipment.

[59 FR 48490, Sept. 21, 1994]

Subpart C—Oxygenated Gasoline

§ 80.35 Labeling of retail gasoline pumps; oxygenated gasoline.

(a) For oxygenated gasoline programs with a minimum oxygen content per gallon or minimum oxygen content requirement in conjunction with a credit program, the following shall apply:

(1) Each gasoline pump stand from which oxygenated gasoline is dispensed at a retail outlet in the control area shall be affixed during the control period with a legible and conspicuous label which contains the following statement:

The gasoline dispensed from this pump is oxygenated and will reduce carbon monoxide pollution from motor vehicles.

(2) The posting of the above statement shall be in block letters of no less than 20-point bold type; in a color contrasting with the intended background. The label shall be placed on the vertical surface of the pump on each side with gallonage and price meters and shall be on the upper two-thirds of the pump, clearly readable to the public.

(3) The retailer shall be responsible for compliance with the labeling requirements of this section.

(b) For oxygenated gasoline programs with a credit program and no minimum oxygen content requirement, the following shall apply:

(1) Each gasoline pump stand from which oxygenated gasoline is dispensed at a retail outlet in the control area shall be affixed during the control period with a legible and conspicuous label which contains the following statement:

The fuel dispensed from this pump meets the requirements of the Clean Air Act as part of a program to reduce carbon monoxide pollution from motor vehicles.

(2) The posting of the above statement shall be in block letters of no less than 20-point bold type; in a color contrasting with the intended background. The label shall be placed on the vertical surface of the pump on each side with gallonage and price meters and shall be on the upper two-thirds of the pump, clearly readable to the public.

(3) The retailer shall be responsible for compliance with the labeling requirements of this section.

[57 FR 47771, Oct. 20, 1992]

§ 80.36—80.39 [Reserved]

Subpart D—Reformulated Gasoline

SOURCE: 59 FR 7813, Feb. 16, 1994, unless otherwise noted.

§ 80.40 Fuel certification procedures.

(a) Gasoline that complies with one of the standards specified in § 80.41 (a) through (f) that is relevant for the gasoline, and that meets all other relevant requirements prescribed under § 80.41, shall be deemed certified.

(b) Any refiner or importer may, with regard to a specific fuel formulation, request from the Administrator a certification that the formulation meets one of the standards specified in § 80.41 (a) through (f).

§ 80.41 Standards and requirements for compliance.

(a) *Simple model per-gallon standards.* The "simple model" standards for compliance when achieved on a per-gallon basis are as follows:

Reid vapor pressure (in pounds per square inch):	
Gasoline designated for VOC-Control Region 1	≤7.2
Gasoline designated for VOC-Control Region 2	≤8.1
Oxygen content (percent, by weight)	≥2.0
Toxic air pollutants emissions reduction (percent)	≥15.0
Benzene (percent, by volume)	≤1.00

(b) *Simple model averaged standards.* The "simple model" standards when achieved on average are as follows:

Reid vapor pressure (in pounds per square inch):	
Gasoline designated for VOC-Control Region 1:	
Standard	≤7.1
Per-Gallon Maximum	≤7.4
Gasoline designated for VOC-Control Region 2:	
Standard	≤8.0
Per-Gallon Maximum	≤8.3
Oxygen content (percent, by weight):	
Standard	≥2.0
Per-Gallon Minimum	≥2.0
Toxic air pollutants emissions reduction (percent)	≥16.5
Benzene (percent, by volume):	
Standard	≤0.95
Per-Gallon Maximum	≤1.30

(c) *Phase I complex model per gallon standards.* The Phase I "complex model" standards for compliance when achieved on a per-gallon basis are as follows:

VOC emissions performance reduction (percent):	
Gasoline designated for VOC-Control Region 1	≥35.1
Gasoline designated for VOC-Control Region 2	≥15.6
Toxic air pollutants emissions performance reduction (percent)	≥17
NO _x emissions performance reduction (percent)	≥0.0
Oxygen content (percent, by weight)	≥2.0
Benzene (percent, by volume)	≤1.00

(d) *Phase I complex model averaged standards.* The Phase I "complex model" standards for compliance when achieved on average are as follows:

VOC emissions performance reduction (percent):	
Gasoline designated for VOC-Control Region 1:	
Standard	≥36.6
Per-Gallon Minimum	≥32.6
Gasoline designated for VOC-Control Region 2:	
Standard	≥17.1
Per-Gallon Minimum	≥13.1
Toxic air pollutants emissions performance reduction (percent)	≥16.5

PHASE I—COMPLEX MODEL AVERAGED STANDARDS—Continued

NO _x emissions performance reduction (percent):	
Standard	≥1.5
Per-Gallon Minimum	≤-2.5
Oxygen content (percent, by weight):	
Standard	≥2.1
Per-Gallon Minimum	≥1.5
Benzene (percent, by volume):	
Standard	≤0.95
Per-Gallon Maximum	≤1.30

(e) Phase II complex model per-gallon standards. The Phase II "complex model" standards for compliance when achieved on a per-gallon basis are as follows:

PHASE II—COMPLEX MODEL PER-GALLON STANDARDS

VOC emissions performance reduction (percent):	
Gasoline designated for VOC-Control Region 1	≥27.5
Gasoline designated for VOC-Control Region 2	≥25.9
Toxic air pollutants emissions performance reduction (percent)	≥20.0
NO _x emissions performance reduction (percent):	
Gasoline designated as VOC-controlled	≥5.5
Gasoline not designated as VOC-controlled	≥0.0
Oxygen content (percent, by weight)	≥2.0
Benzene (percent, by volume)	≤1.00

(f) Phase II complex model averaged standards. The Phase II "complex model" standards for compliance when achieved on average are as follows:

PHASE II—COMPLEX MODEL AVERAGED STANDARDS

VOC emissions performance reduction (percent):	
Gasoline designated for VOC-Control Region 1:	
Standard	≥29.0
Per-Gallon Minimum	≥25.0
Gasoline designated for VOC-Control Region 2:	
Standard	≥27.4
Per-Gallon Minimum	≥23.4
Toxic air pollutants emissions performance reduction (percent)	≥21.5
NO _x emissions performance reduction (percent):	
Gasoline designated as VOC-controlled:	
Standard	≥6.8
Per-Gallon Minimum	≥3.0

PHASE II—COMPLEX MODEL AVERAGED STANDARDS—Continued

Gasoline not designated as VOC-controlled:	
Standard	≥1.5
Per-Gallon Minimum	≥-2.5
Oxygen content (percent, by weight):	
Standard	≥2.1
Per-Gallon Minimum	≥1.5
Benzene (percent, by volume):	
Standard	≤0.95
Per-Gallon Maximum	≤1.30

(g) Oxygen maximum standard. (1) The per-gallon standard for maximum oxygen content, which applies to reformulated gasoline subject to the simple model per-gallon or average standards, is as follows:

(1) Oxygen content shall not exceed 3.2 percent by weight from ethanol within the boundaries of any state if the state notifies the Administrator that the use of an oxygenate will interfere with attainment or maintenance of an ambient air quality standard or will contribute to an air quality problem.

(ii) A state may request the standard specified in paragraph (g)(1)(i) of this section separately for reformulated gasoline designated as VOC-controlled and reformulated gasoline not designated as VOC-controlled.

(2) The standard in paragraph (g)(1)(i) of this section shall apply 60 days after the Administrator publishes a notice in the FEDERAL REGISTER announcing such a standard.

(h) Additional standard requirements. In addition to the standards specified in paragraphs (a) through (g) of this section, the following standards apply for all reformulated gasoline:

(1) The standard for heavy metals, including lead or manganese, on a per-gallon basis, is that reformulated gasoline may contain no heavy metals. The Administrator may waive this prohibition for a heavy metal (other than lead) if the Administrator determines that addition of the heavy metal to the gasoline will not increase, on an aggregate mass or cancer-risk basis, toxic air pollutant emissions from motor vehicles.

(2) In the case of any refinery or importer subject to the simple model standards:

(1) The annual average levels for sulfur, T-90, and olefins cannot exceed that refinery's or importer's 1990 baseline levels for each of these parameters; and

(ii) The 1990 baseline levels and the annual averages for these parameters shall be established using the methodology set forth in §§80.91 through 80.92; and

(iii) In the case of a refiner that operates more than one refinery, the standards specified under this paragraph (h)(2) shall be met using the refinery grouping selected by the refiner under §80.101(h).

(i) Use of simple and complex models. (1) During each calendar year 1995 through 1997, any refinery or importer shall be subject to either the simple model standards specified in paragraphs (a) and (b) of this section, or the Phase I complex model standards specified in paragraphs (c) and (d) of this section, at the option of the refiner or importer, provided that:

(1) No refinery or importer may be subject to a combination of simple and complex standards during any calendar year; and

(ii) Any refiner or importer that elects to achieve compliance with the anti-dumping requirements using the:

(A) Simple model shall meet the requirements of this Subpart D using the simple model standards; or

(B) Complex model or optional complex model shall meet the requirements of this Subpart D using the complex model standards.

(2) During the period January 1, 1998 through December 31, 1999, any refiner or importer shall be subject to the Phase I complex model standards specified in paragraphs (c) and (d) of this section.

(3) Beginning on January 1, 2000, any refiner or importer shall be subject to the Phase II complex model standards specified in paragraphs (e) and (f) of this section.

(j) Complex model early use. Before January 1, 1998, the VOC, toxics, and NO_x emissions performance standards for any refinery or importer subject to the Phase I complex model standards shall be determined by evaluating all of the following parameter levels in the

Phase I complex model (specified in §80.45) at one time:

(1) The simple model values for benzene, RVP, and oxygen specified in §80.41 (a) or (b), as applicable;

(2) The aromatics value which, together with the values for benzene, RVP, and oxygen determined under paragraph (j)(1) of this section, meets the Simple Model toxics requirement specified in paragraph (a) or (b) of this section, as applicable;

(3) The refinery's or importer's individual baseline values for sulfur, E-300, and olefins, as established under §80.91; and

(4) The appropriate seasonal value E-200 specified in §80.45(b)(2).

(k) Effect of VOC survey failure. (1) On each occasion during 1995 or 1996 that a covered area fails a simple model VOC emissions reduction survey conducted pursuant to §80.68, the RVP requirements for that covered area beginning in the year following the failure shall be adjusted to be more stringent as follows:

(1) The required average RVP level shall be decreased by an additional 0.1 psi; and

(ii) The maximum RVP level for each gallon of averaged gasoline shall be decreased by an additional 0.1 psi.

(2) On each occasion that a covered area fails a complex model VOC emissions reduction survey conducted pursuant to §80.68, or fails a simple model VOC emissions reduction survey conducted pursuant to §80.68 during 1995, the VOC emissions performance standard for that covered area beginning in the year following the failure shall be adjusted to be more stringent as follows:

(1) The required average VOC emissions reduction shall be increased by an additional 1.0%; and

(ii) The minimum VOC emissions reduction, for each gallon of averaged gasoline, shall be increased by an additional 1.0%.

(3) In the event that a covered area for which required VOC emissions reductions have been made more stringent passes all VOC emissions reduction surveys in two consecutive years, the averaging standards VOC emissions reduction for that covered area beginning in the year following the second

year of passed survey series shall be made less stringent as follows:

(1) The required average VOC emissions reduction shall be decreased by 1.0%; and

(ii) The minimum VOC emissions reduction shall be decreased by 1.0%.

(4) In the event that a covered area for which the required VOC emissions reductions have been made less stringent fails a subsequent VOC emissions reduction survey:

(i) The required average VOC emission reductions for that covered area beginning in the year following this subsequent failure shall be made more stringent by increasing the required average and the minimum VOC emissions reduction by 1.0%; and

(ii) The required VOC emission reductions for that covered area thereafter shall not be made less stringent regardless of the results of subsequent VOC emissions reduction surveys.

(1) *Effect of toxics survey failure.* (1) On each occasion during 1995 or 1996 that a covered area fails a simple model toxics emissions reduction survey series, conducted pursuant to §80.68, the simple model toxics emissions reduction requirement for that covered area beginning in the year following the year of the failure is made more stringent by increasing the average toxics emissions reduction by an additional 1.0%.

(2) On each occasion that a covered area fails a complex model toxics emissions reduction survey series, conducted pursuant to §80.68, or fails a simple model toxics emissions reduction survey series conducted pursuant to §80.68 during 1997, the complex model toxics emissions reduction requirement for that covered area beginning in the year following the year of the failure is made more stringent by increasing the average toxics emissions reduction by an additional 1.0%.

(3) In the event that a covered area for which the toxics emissions standard has been made more stringent passes all toxics emissions survey series in two consecutive years, the averaging standard for toxics emissions reductions for that covered area beginning in the year following the second year of passed survey series shall be made less

stringent by decreasing the average toxics emissions reduction by 1.0%.

(4) In the event that a covered area for which the toxics emissions reduction standard has been made less stringent fails a subsequent toxics emissions reduction survey series:

(i) The standard for toxics emissions reduction for that covered area beginning in the year following this subsequent failure shall be made more stringent by increasing the average toxics emissions reduction by 1.0%; and

(ii) The standard for toxics emissions reduction for that covered area thereafter shall not be made less stringent regardless of the results of subsequent toxics emissions reduction surveys.

(m) *Effect of NO_x survey failure.* (1) On each occasion that a covered area fails a NO_x emissions reduction survey conducted pursuant to §80.68, except in the case of Phase II complex model NO_x standards for VOC-controlled gasoline, the NO_x emissions reduction requirements for that covered area beginning in the year following the failure shall be adjusted to be more stringent as follows:

(i) The required average NO_x emissions reduction shall be increased by an additional 1.0%; and

(ii) The minimum NO_x emissions reduction, for each gallon of averaged gasoline, shall be increased by an additional 1.0%.

(2) In the event that a covered area for which required NO_x emissions reductions have been made more stringent passes all NO_x emissions reduction surveys in two consecutive years, the averaging standards for NO_x emissions reduction for that covered area beginning in the year following the second year of passed survey series shall be made less stringent as follows:

(i) The required average NO_x emissions reduction shall be decreased by 1.0%; and

(ii) The minimum NO_x emissions reduction shall be decreased by 1.0%.

(3) In the event that a covered area for which the required NO_x emissions reductions have been made less stringent fails a subsequent NO_x emissions reduction survey:

(i) The required average NO_x emission reductions for that covered area beginning in the year following this

subsequent failure shall be made more stringent by increasing the required average and the minimum NO_x emissions reduction by 1.0%; and

(ii) The required NO_x emission reductions for that covered area thereafter shall not be made less stringent regardless of the results of subsequent NO_x emissions reduction surveys.

(n) *Effect of benzene survey failure.* (1) On each occasion that a covered area fails a benzene content survey series, conducted pursuant to §80.68, the benzene content standards for that covered area beginning in the year following the year of the failure shall be made more stringent as follows:

(i) The average benzene content shall be decreased by 0.05% by volume; and

(ii) The maximum benzene content for each gallon of averaged gasoline shall be decreased by 0.10% by volume.

(2) In the event that a covered area for which the benzene standards have been made more stringent passes all benzene content survey series conducted in two consecutive years, the benzene standards for that covered area beginning in the year following the second year of passed survey series shall be made less stringent as follows:

(i) The average benzene content shall be increased by 0.05% by volume; and

(ii) The maximum benzene content for each gallon of averaged gasoline shall be increased by 0.10% by volume.

(3) In the event that a covered area for which the benzene standards have been made less stringent fails a subsequent benzene content survey series:

(i) The standards for benzene content for that covered area beginning in the year following this subsequent failure shall be the more stringent standards which were in effect prior to the operation of paragraph (n)(2) of this section; and

(ii) The standards for benzene content for that covered area thereafter shall not be made less stringent regardless of the results of subsequent benzene content surveys.

(o) *Effect of oxygen survey failure.* (1) In any year that a covered area fails an oxygen content survey series, conducted pursuant to §80.68, the minimum oxygen content requirement for that covered area beginning in the year following the year of the failure is

made more stringent by increasing the minimum oxygen content standard, for each gallon of averaged gasoline, by an additional 0.1%; however, in no case shall the minimum oxygen content standard be greater than 2.0%.

(2) In the event that a covered area for which the minimum oxygen content standard has been made more stringent passes all oxygen content survey series in two consecutive years, the minimum oxygen content standard for that covered area beginning in the year following the second year of passed survey series shall be made less stringent by increasing the minimum oxygen content standard by 0.1%.

(3) In the event that a covered area for which the minimum oxygen content standard has been made less stringent fails a subsequent oxygen content survey series:

(i) The standard for minimum oxygen content for that covered area beginning in the year following this subsequent failure shall be made more stringent by increasing the minimum oxygen content standard by 0.1%; and

(ii) The minimum oxygen content standard for that covered area thereafter shall not be made less stringent regardless of the results of subsequent oxygen content surveys.

(p) *Effective date for changed minimum or maximum standards.* In the case of any minimum or maximum standard that is changed to be more stringent operation of paragraphs (k), (l), (m), (n), or (o) of this section, the effective date for such change shall be ninety days following the date EPA announces the change.

(q) *Refineries, importers, and oxygenate blenders subject to adjusted standards.* Standards for average compliance that are adjusted to be more or less stringent by operation of paragraphs (k), (l), (m), (n), or (o) of this section apply to averaged reformulated gasoline produced at each refinery or oxygenate blending facility, or imported by each importer as follows:

(1) Adjusted standards for a covered area apply to averaged reformulated gasoline that is produced at a refinery or oxygenate blending facility if:

(i) Any averaged reformulated gasoline from that refinery or oxygenate blending facility supplied the covered

area during any year a survey was conducted which gave rise to a standards adjustment; or

(ii) Any averaged reformulated gasoline from that refinery or oxygenate blending facility supplies the covered area during any year that the standards are more stringent than the initial standards; unless

(iii) The refiner or oxygenate blender is able to show that the volume of averaged reformulated gasoline from a refinery or oxygenate blending facility that supplied the covered area during any year under paragraphs (q)(1) (i) or (ii) of this section was less than one percent of the reformulated gasoline produced at the refinery or oxygenate blending facility during that year, or 100,000 barrels, whichever is less.

(2) Adjusted standards for a covered area apply to averaged reformulated gasoline that is imported by an importer if:

(i) The covered area with the adjusted standard is located in Petroleum Administration for Defense District (PADD) I, and the gasoline is imported at a facility located in PADDs I, II or III;

(ii) The covered area with the adjusted standard is located in PADD II, and the gasoline is imported at a facility located in PADDs I, II, III, or IV;

(iii) The covered area with the adjusted standard is located in PADD III, and the gasoline is imported at a facility located in PADDs II, III, or IV;

(iv) The covered area with the adjusted standard is located in PADD IV, and the gasoline is imported at a facility located in PADDs II, or IV; or

(v) The covered area with the adjusted standard is located in PADD V, and the gasoline is imported at a facility located in PADDs III, IV, or V; unless

(vi) Any gasoline which is imported by an importer at any facility located in any PADD supplies the covered area, in which case the adjusted standard also applies to averaged gasoline imported at that facility by that importer.

(3) Any gasoline that is transported in a fungible manner by a pipeline, barge, or vessel shall be considered to have supplied each covered area that is supplied with any gasoline by that

pipeline, or barge or vessel shipment, unless the refiner or importer is able to establish that the gasoline it produced or imported was supplied only to a smaller number of covered areas.

(4) Adjusted standards apply to all averaged reformulated gasoline produced by a refinery or imported by an importer identified in this paragraph (q), except:

(i) In the case of adjusted VOC standards for a covered area located in VOC Control Region 1, the adjusted VOC standards apply only to averaged reformulated gasoline designated as VOC-controlled intended for use in VOC Control Region 1; and

(ii) In the case of adjusted VOC standards for a covered area located in VOC Control Region 2, the adjusted VOC standards apply only to averaged reformulated gasoline designated as VOC-controlled intended for use in VOC Control Region 2.

(r) *Definition of PADD.* For the purposes of this section only, the following definitions of PADDs apply:

(1) The following states are included in PADD I:

Connecticut
Delaware
District of Columbia
Florida
Georgia
Maine
Maryland
Massachusetts
New York
New Hampshire
New Jersey
North Carolina
Pennsylvania
Rhode Island
South Carolina
Vermont
Virginia
West Virginia

(2) The following states are included in PADD II:

Illinois
Indiana
Iowa
Kansas
Kentucky
Michigan
Minnesota
Missouri
Nebraska
North Dakota
Ohio
Oklahoma

South Dakota
Tennessee
Wisconsin

(3) The following states are included in PADD III:

Alabama
Arkansas
Louisiana
Mississippi
New Mexico
Texas

(4) The following states are included in PADD IV:

Colorado
Idaho
Montana
Utah
Wyoming

(5) The following states are included in PADD V:

Arizona
California
Nevada
Oregon
Washington

(59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36958, July 20, 1994; 61 FR 12041, Mar. 25, 1996)

§ 80.42 Simple emissions model.

(a) *VOC emissions.* The following equations shall comprise the simple model for VOC emissions. The simple model for VOC emissions shall be used only in determining toxics emissions:

Summer=The period of May 1 through September 15

Winter=The period of September 16 through April 30

EXHVOCS1=Exhaust nonmethane, nonethane VOC emissions from the fuel in question, in grams per mile, for VOC control region 1 during the summer period.

EXHVOCS2=Exhaust nonmethane, nonethane VOC emissions from the fuel in question, in grams per mile, for VOC control region 2 during the summer period.

EXHVOCW=Exhaust nonmethane, nonethane VOC emissions from the fuel in question, in grams per mile, during the winter period.

EVPVOCS1=Evaporative nonmethane, nonethane VOC emissions from the fuel in question, in grams per mile, for VOC control region 1 during the summer period.

RLVOC2=Running loss nonmethane, nonethane VOC emissions from the fuel in question, in grams per mile, for VOC control region 2 during the summer period.

RLVOC1=Running loss nonmethane, nonethane VOC emissions from the fuel in question, in grams per mile, for VOC control region 1 during the summer period.

RLVOC2=Running loss nonmethane, nonethane VOC emissions from the fuel in question, in grams per mile, for VOC control region 2 during the summer period.

REFVOC1=Refueling nonmethane, nonethane VOC emissions from fuel in question, in grams per mile, for VOC control region 1 during the summer period.

REFVOC2=Refueling nonmethane, nonethane VOC emissions from the fuel in question, in grams per mile, for VOC control region 2 during the summer period.

OXCON=Oxygen content of the fuel in question, in terms of weight percent (as measured under § 80.46)

RVP=Raid vapor pressure of the fuel in question, in pounds per square inch (psi)

(1) The following equations shall comprise the simple model for VOC emissions in VOC Control Region 1 during the summer period:

EXHVOCS1=0.444×(1-(0.127/2.7)×OXCON)

EVPVOCS1=0.7952-0.2461×RVP+0.02293×RVP×RVP

RLVOC1=-0.734+0.1096×RVP+0.002791×RVP×RVP

REFVOC1=0.04×((0.1667×RVP)-0.45)

(2) The following equations shall comprise the simple model for VOC emissions in VOC Control Region 2 during the summer period:

EXHVOCS2=0.444×(1-(0.127/2.7)×OXCON)

EVPVOCS2=0.813-0.2393×RVP+0.021239×RVP×RVP

RLVOC2=0.2963-0.1306×RVP+0.016255×RVP×RVP

REFVOC2=0.04×((0.1667×RVP)-0.45)

(3) The following equation shall comprise the simple model for VOC emissions during the winter period:

EXHVOCW=0.656×(1-(0.127/2.7)×OXCON)

(b) *Toxics emissions.* The following equations shall comprise the simple model for toxics emissions:

EXHBEN=Exhaust benzene emissions from the fuel in question, in milligrams per mile

EVPBEN=Evaporative benzene emissions from the fuel in question, in milligrams per mile

HSBEN=Hot soak benzene emissions from the fuel in question, in milligrams per mile

DIBEN=Diurnal benzene emissions from the fuel in question, in milligrams per mile

RLBEN=Running loss benzene emissions from the fuel in question, in milligrams per mile

REFBEN=Refueling benzene emissions from the fuel in question, in milligrams per mile

MTBE=Oxygen content of the fuel in question in the form of MTBE, in terms of weight percent (as measured under § 80.46)

ETOH=Oxygen content of the fuel in question in the form of ethanol, in terms of weight percent (as measured under § 80.46)

ETBE=Oxygen content of the fuel in question in the form of ETBE, in terms of weight percent (as measured under § 80.46)

FORM=Formaldehyde emissions from the fuel in question, in milligrams per mile

ACET=Acetaldehyde emissions from the fuel in question, in milligrams per mile

POM=Emissions of polycyclic organic matter from the fuel in question, in milligrams per mile

BUTA=Emissions of 1,3-Butadiene from the fuel in question, in milligrams per mile

FBEN=Fuel benzene of the fuel in question, in terms of volume percent (as measured under § 80.46)

FAROM=Fuel aromatics of the fuel in question, in terms of volume percent (as measured under § 80.46)

TOXREDS1=Total toxics reduction of the fuel in question during the summer period for VOC control region 1 in percent

TOXREDS2=Total toxics reduction of the fuel in question during the summer period for VOC control region 2 in percent

TOXREDW=Total toxics reduction of the fuel in question during the winter period in percent

(1) The following equations shall comprise the simple model for toxics emissions in VOC control region 1 during the summer period:

$$\text{TOXREDS1} = [100 \times (53.2 - \text{EXHBEN} - \text{EVPBEN} - \text{RLBEN} - \text{REFBEN} - \text{FORM} - \text{ACET} - \text{BUTA} - \text{POM})] / 53.2$$

$$\text{EXHBEN} = [1.884 + 0.949 \times \text{FBEN} + 0.113 \times (\text{FAROM} - \text{FBEN})] / 100 \times 1000 \times \text{EXHVOCS1}$$

$$\text{EVPBEN} = \text{HSBEN} + \text{DIBEN}$$

$$\text{HSBEN} = \text{FBEN} \times (\text{EVPVOCS1} \times 0.679) \times 1000 \times [(1.4448 - (0.0684 \times \text{MTBE} / 2.0) - (0.080274 \times \text{RVP})) / 100]$$

$$\text{DIBEN} = \text{FBEN} \times (\text{EVPVOCS1} \times 0.321) \times 1000 \times [(1.3758 - (0.0579 \times \text{MTBE} / 2.0) - (0.080274 \times \text{RVP})) / 100]$$

$$\text{RLBEN} = \text{FBEN} \times \text{RLVOCSS1} \times 1000 \times [(1.4448 - (0.0684 \times \text{MTBE} / 2.0) - (0.080274 \times \text{RVP})) / 100]$$

$$\text{REFBEN} = \text{FBEN} \times \text{REFVOCSS1} \times 1000 \times [(1.3972 - (0.0591 \times \text{MTBE} / 2.0) - (0.081507 \times \text{RVP})) / 100]$$

$$\text{BUTA} = 0.00556 \times \text{EXHVOCS1} \times 1000$$

$$\text{POM} = 3.15 \times \text{EXHVOCS1}$$

(i) For any oxygenate or mixtures of oxygenates, the formaldehyde and acetaldehyde shall be calculated with the following equations:

$$\text{FORM} = 0.01256 \times \text{EXHVOCS1} \times 1000 \times [1 + (0.421/2.7) \times \text{MTBE} + \text{TAME}] + (0.358/3.55) \times \text{ETOH} + (0.137/2.7) \times (\text{ETBE} + \text{ETAEE})$$

$$\text{ACET} = 0.00891 \times \text{EXHVOCS1} \times 1000 \times [1 + (0.078/2.7) \times (\text{MTBE} + \text{TAME}) + (0.865/3.55) \times \text{ETOH} + (0.867/2.7) \times (\text{ETBE} + \text{ETAEE})]$$

(ii) When calculating formaldehyde and acetaldehyde emissions using the equations in paragraph (b)(1)(i) of this section, oxygen in the form of alcohols which are more complex or have higher molecular weights than ethanol shall be evaluated as if it were in the form of ethanol. Oxygen in the form of methyl ethers other than TAME and MTBE shall be evaluated as if it were in the form of MTBE. Oxygen in the form of ethyl ethers other than ETBE shall be evaluated as if it were in the form of ETBE. Oxygen in the form of non-methyl, non-ethyl ethers shall be evaluated as if it were in the form of ETBE. Oxygen in the form of methanol or

non-alcohol, non-ether oxygenates shall not be evaluated with the Simple Model, but instead must be evaluated through vehicle testing under the Complex Model per § 80.48.

(2) The following equations shall comprise the simple model for toxics emissions in VOC control region 2 during the summer period:

$$\text{TOXREDS2} = 100 \times (52.1 - \text{EXHBEN} - \text{EVPBEN} - \text{RLBEN} - \text{REFBEN} - \text{FORM} - \text{ACET} - \text{BUTA} - \text{POM}) / 52.1$$

$$\text{EXHBEN} = [(1.884 + 0.949 \times \text{FBEN} + 0.113 \times (\text{FAROM} - \text{FBEN})) / 100] \times 1000 \times \text{EXHVOCS2}$$

$$\text{EVPBEN} = \text{HSBEN} + \text{DIBEN}$$

$$\text{HSBEN} = \text{FBEN} \times (\text{EVPVOCS2} \times 0.679) \times 1000 \times [(1.4448 - (0.0684 \times \text{MTBE} / 2.0) - (0.080274 \times \text{RVP})) / 100]$$

$$\text{DIBEN} = \text{FBEN} \times (\text{EVPVOCS2} \times 0.321) \times 1000 \times [(1.3758 - (0.0579 \times \text{MTBE} / 2.0) - (0.080274 \times \text{RVP})) / 100]$$

$$\text{RLBEN} = \text{FBEN} \times \text{RLVOCSS2} \times 1000 \times [(1.4448 - (0.0684 \times \text{MTBE} / 2.0) - (0.080274 \times \text{RVP})) / 100]$$

$$\text{REFBEN} = \text{FBEN} \times \text{REFVOCSS2} \times 1000 \times [(1.3972 - (0.0591 \times \text{MTBE} / 2.0) - (0.081507 \times \text{RVP})) / 100]$$

$$\text{BUTA} = 0.00556 \times \text{EXHVOCS2} \times 1000$$

$$\text{POM} = 3.15 \times \text{EXHVOCS2}$$

(i) For any oxygenate or mixtures of oxygenates, the formaldehyde and acetaldehyde shall be calculated with the following equations:

$$\text{FORM} = 0.01256 \times \text{EXHVOCS2} \times 1000 \times [1 + (0.421/2.7) \times (\text{MTBE} + \text{TAME}) + (0.358/3.55) \times \text{ETOH} + (0.137/2.7) \times (\text{ETBE} + \text{ETAEE})]$$

$$\text{ACET} = 0.00891 \times \text{EXHVOCS2} \times 1000 \times [1 + (0.078/2.7) \times (\text{MTBE} + \text{TAME}) + (0.865/3.55) \times \text{ETOH} + (0.867/2.7) \times (\text{ETBE} + \text{ETAEE})]$$

(ii) When calculating formaldehyde and acetaldehyde emissions using the equations in paragraph (b)(2)(i) of this section, oxygen in the form of alcohols which are more complex or have higher molecular weights than ethanol shall be evaluated as if it were in the form of ethanol. Oxygen in the form of methyl ethers other than TAME and MTBE shall be evaluated as if it were in the form of MTBE. Oxygen in the form of ethyl ethers other than ETBE shall be evaluated as if it were in the form of ETBE. Oxygen in the form of non-methyl, non-ethyl ethers shall be evaluated as if it were in the form of ETBE. Oxygen in the form of methanol or

ated as if it were in the form of ETBE. Oxygen in the form of methanol or non-alcohol, non-ether oxygenates shall not be evaluated with the Simple Model, but instead must be evaluated through vehicle testing under the Complex Model per § 80.48.

(3) The following equations shall comprise the simple model for toxics emissions during the winter period:

$$\text{TOXREDW} = 100 \times (55.5 - \text{EXHBEN} - \text{FORM} - \text{ACET} - \text{BUTA} - \text{POM}) / 55.5$$

$$\text{EXHBEN} = [(1.884 + 0.949 \times \text{FBEN} + 0.113 \times (\text{FAROM} - \text{FBEN})) / 100] \times 1000 \times \text{EXHVOCSW}$$

$$\text{BUTA} = 0.00556 \times \text{EXHVOCSW} \times 1000$$

$$\text{POM} = 2.13 \times \text{EXHVOCSW}$$

(i) For any oxygenate or mixtures of oxygenates, the formaldehyde and acetaldehyde shall be calculated with the following equations:

$$\text{FORM} = 0.01256 \times \text{EXHVOCS1} \times 1000 \times [1 + (0.421/2.7) \times (\text{MTBE} + \text{TAME}) + (0.358/3.55) \times \text{ETOH} + (0.137/2.7) \times (\text{ETBE} + \text{ETAEE})]$$

$$\text{ACET} = 0.00891 \times \text{EXHVOCS1} \times 1000 \times [1 + (0.078/2.7) \times (\text{MTBE} + \text{TAME}) + (0.865/3.55) \times \text{ETOH} + (0.867/2.7) \times (\text{ETBE} + \text{ETAEE})]$$

(ii) When calculating formaldehyde and acetaldehyde emissions using the equations in paragraph (b)(3)(i) of this section, oxygen in the form of alcohols which are more complex or have higher molecular weights than ethanol shall be evaluated as if it were in the form of ethanol. Oxygen in the form of methyl ethers other than TAME and MTBE shall be evaluated as if it were in the form of MTBE. Oxygen in the form of ethyl ethers other than ETBE shall be evaluated as if it were in the form of ETBE. Oxygen in the form of non-methyl, non-ethyl ethers shall be evaluated as if it were in the form of ETBE. Oxygen in the form of methanol or non-alcohol, non-ether oxygenates shall not be evaluated with the Simple Model, but instead must be evaluated through vehicle testing under the Complex Model per § 80.48.

(4) If the fuel aromatics content of the fuel in question is less than 10 volume percent, then an FAROM value of 10 volume percent shall be used when

evaluating the toxics emissions equations given in paragraphs (b)(1), (b)(2), and (b)(3) of this section.

(c) *Limits of the model.* (1) The model given in paragraphs (a) and (b) of this section shall be used as given to determine VOC and toxics emissions, respectively, if the properties of the fuel being evaluated fall within the ranges shown in this paragraph (c). If the properties of the fuel being evaluated fall outside the range shown in this paragraph (c), the model may not be used to determine the VOC or toxics performance of the fuel:

Fuel parameter	Range
Benzene content	0.0-4.9 vol %
RVP	5.6-9.0 psi. ¹
Oxygenate content	0-4.0 wt %
Aromatics content	0-55 vol %

¹For gasoline sold in California, the applicable RVP range shall be the 6.4-9.0 psi.

(2) The model given in paragraphs (a) and (b) of this section shall be effective from January 1, 1995 through December 31, 1997, unless extended by action of the Administrator.

(59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36958, July 20, 1994; 61 FR 20738, May 8, 1996)

§§ 80.43—80.44 (Reserved)

§ 80.45 Complex emissions model.

(a) *Definition of terms.* For the purposes of this section, the following definitions shall apply:

Target fuel=The fuel which is being evaluated for its emissions performance using the complex model
 OXY=Oxygen content of the target fuel in terms of weight percent
 SUL=Sulfur content of the target fuel in terms of parts per million by weight

RVP=Reid Vapor Pressure of the target fuel in terms of pounds per square inch

E200=200 °F distillation fraction of the target fuel in terms of volume percent

E300=300 °F distillation fraction of the target fuel in terms of volume percent

ARO=Aromatics content of the target fuel in terms of volume percent

BEN=Benzene content of the target fuel in terms of volume percent

OLE=Olefins content of the target fuel in terms of volume percent

MTB=Methyl tertiary butyl ether content of the target fuel in terms of weight percent oxygen

ETB=Ethyl tertiary butyl ether content of the target fuel in terms of weight percent oxygen

TAM=Tertiary amyl methyl ether content of the target fuel in terms of weight percent oxygen

ETH=Ethanol content of the target fuel in terms of weight percent oxygen

exp=The function that raises the number e (the base of the natural logarithm) to the power in its domain

Phase I=The years 1995-1999
 Phase II=Year 2000 and beyond

(b) *Weightings and baselines for the complex model.* (1) The weightings for normal and higher emitters (w_1 and w_2 , respectively) given in Table 1 shall be used to calculate the exhaust emission performance of any fuel for the appropriate pollutant and Phase:

TABLE 1—NORMAL AND HIGHER EMITTER WEIGHTINGS FOR EXHAUST EMISSIONS

	Phase I		Phase II	
	VOC & TOXICS	NO _x	VOC & TOXICS	NO _x
Normal Emitters (w_1)	0.52	0.82	0.444	0.738
Higher Emitters (w_2)	0.48	0.18	0.556	0.262

(2) The following properties of the baseline fuels shall be used when determining baseline mass emissions of the various pollutants:

TABLE 2—SUMMER AND WINTER BASELINE FUEL PROPERTIES

Fuel property	Summer	Winter
Oxygen (wt %)	0.0	0.0
Sulfur (ppm)	339	338
RVP (psi)	8.7	11.5
E200 (%)	41.0	50.0
E300 (%)	83.0	83.0
Aromatics (vol %)	32.0	28.4
Olefins (vol %)	9.2	11.8
Benzene (vol %)	1.53	1.64

(3) The baseline mass emissions for VOC, NO_x and toxics given in Tables 3, 4 and 5 of this paragraph (b)(3) shall be used in conjunction with the complex model during the appropriate Phase and season:

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TABLE 3—BASELINE EXHAUST EMISSIONS

Exhaust pollutant	Phase I		Phase II	
	Summer (mg/mile)	Winter (mg/mile)	Summer (mg/mile)	Winter (mg/mile)
VOC	446.0	660.0	907.0	1341.0
NO _x	660.0	750.0	1340.0	1540.0
Benzene	26.10	37.57	53.54	77.62
Acetaldehyde	2.19	3.57	4.44	7.25
Formaldehyde	4.85	7.73	9.70	15.34

TABLE 3—BASELINE EXHAUST EMISSIONS—Continued

Exhaust pollutant	Phase I		Phase II	
	Summer (mg/mile)	Winter (mg/mile)	Summer (mg/mile)	Winter (mg/mile)
1,3-Butadiene	4.31	7.27	9.38	15.84
POM	1.50	2.21	3.04	4.50

TABLE 4—BASELINE NON-EXHAUST EMISSIONS (SUMMER ONLY)

Non-exhaust pollutant	Phase I		Phase II	
	Region 1 (mg/mile)	Region 2 (mg/mile)	Region 1 (mg/mile)	Region 2 (mg/mile)
VOC	860.48	769.10	559.31	492.07
Benzene	9.66	8.63	6.24	5.50

TABLE 5—TOTAL BASELINE VOC, NO_x AND TOXICS EMISSIONS

Pollutant	Summer (mg/mile)				Winter (mg/mile)			
	Phase I		Phase II		Phase I		Phase II	
	Region 1	Region 2	Region 1	Region 2	Region 1	Region 2	Region 1	Region 2
NO _x	660.0	660.0	1340.0	1340.0	750.0	750.0	1540.0	1540.0
VOC	1306.5	1215.1	1466.3	1399.1	660.0	660.0	1341.0	1341.0
Toxics	48.61	47.58	86.34	85.61	58.36	58.36	120.55	120.55

(c) *VOC performance.* (1) The exhaust VOC emissions performance of gasolines shall be given by the following equations:

$$VOCE = VOC(b) + (VOC(b) \times Y_{voc}(t) / 100)$$

$$Y_{voc}(t) = [(w_1 \times N_v) + (w_2 \times H_v) - 1] \times 100$$

where

VOCE=Exhaust VOC emissions in milligrams/mile

$Y_{voc}(t)$ =Exhaust factor of the target fuel in terms of percentage change from baseline

VOC(b)=Baseline exhaust VOC emissions as defined in paragraph (b)(2) of this section for the appropriate Phase and season

$$N_v = [\exp v_1(t)] / [\exp v_1(b)]$$

$$H_v = [\exp v_2(t)] / [\exp v_2(b)]$$

w_1 =Weighting factor for normal emitters as defined in paragraph (b)(1) of this section for the appropriate Phase

w_2 =Weighting factor for higher emitters as defined in paragraph (b)(1) of this section for the appropriate Phase

$v_1(t)$ =Normal emitter VOC equation as defined in paragraph (c)(1)(i) of this

section, evaluated using the target fuel's properties subject to paragraphs (c)(1) (iii) and (iv) of this section

$v_2(t)$ =Higher emitter VOC equation as defined in paragraph (c)(1)(ii) of this section, evaluated using the target fuel's properties subject to paragraphs (c)(1) (iii) and (iv) of this section

$v_1(b)$ =Normal emitter VOC equation as defined in paragraph (c)(1)(i) of this section, evaluated using the base fuel's properties

$v_2(b)$ =Higher emitter VOC equation as defined in paragraph (c)(1)(ii) of this section, evaluated using the base fuel's properties

(i) *Consolidated VOC equation for normal emitters.*

$$v_1 = (-0.003641 \times OXY) + (0.0005219 \times SUL) + (0.0289749 \times RVP) + (-0.014470 \times E200) + (-0.068624 \times E300) + (0.0323712 \times ARO) + (-0.002858 \times OLE) + (0.0001072 \times E2002) + (0.0004087 \times E3002) + (-0.0003481 \times ARO \times E300)$$

(ii) *VOC equation for higher emitters.*

$$v_2 = (-0.003626 \times OXY) + (-5.40 \times 10^{-5} \times SUI) + (0.043295 \times RVP) + (-0.013504 \times E200) + (-0.062327 \times E300) + (0.0282042 \times ARO) + (-0.002858 \times OLE) + (0.000106 \times E200^2) + (0.000408 \times E300^2) + (-0.000287 \times ARO \times E300)$$

(11) *Flat line extrapolations.* (A) During Phase I, fuels with E200 values greater than 65.83 percent shall be evaluated with the E200 fuel parameter set equal to 65.83 percent when calculating $Y_{voc}(t)$ and VOCE using the equations described in paragraphs (c)(1)(i) and (ii) of this section. Fuels with E300 values greater than E300* (calculated using the equation $E300^* = 80.32 + [0.390 \times ARO]$) shall be evaluated with the E300 parameter set equal to E300* when calculating VOCE using the equations described in paragraphs (c)(1)(i) and (ii) of this section. For E300* values greater than 94, the linearly extrapolated model presented in paragraph (c)(1)(iv) of this section shall be used.

(B) During Phase II, fuels with E200 values greater than 65.52 percent shall be evaluated with the E200 fuel parameter set equal to 65.52 percent when calculating VOCE using the equations described in paragraphs (c)(1)(i) and (ii) of this section. Fuels with E300 values greater than E300* (calculated using the equation $E300^* = 79.75 + (0.385 \times ARO)$) shall be evaluated with the E300 parameter set equal to E300* when calculating VOCE using the equations described in paragraphs (c)(1)(i) and (ii) of this section. For E300* values greater than 94, the linearly extrapolated model presented in paragraph (c)(1)(iv) of this section shall be used.

(iv) *Linear extrapolations.* (A) The equations in paragraphs (c)(1)(i) and (ii) of this section shall be used within the allowable range of E300, E200, and ARO for the appropriate Phase, as defined in Table 6:

TABLE 6—ALLOWABLE RANGES OF E200, E300, AND ARO FOR THE EXHAUST VOC EQUATIONS IN PARAGRAPHS (c)(1)(i) AND (ii) OF THIS SECTION

Fuel parameter	Phase I		Phase II	
	Lower limit	Higher limit	Lower limit	Higher limit
E200	33.00	65.83	33.00	65.52
E300	72.00	Variable ²	72.00	Variable ²

TABLE 6—ALLOWABLE RANGES OF E200, E300, AND ARO FOR THE EXHAUST VOC EQUATIONS IN PARAGRAPHS (c)(1)(i) AND (ii) OF THIS SECTION—Continued

Fuel parameter	Phase I		Phase II	
	Lower limit	Higher limit	Lower limit	Higher limit
ARO	18.00	46.00	18.00	46.00

¹ Higher E300 limit—lower of 94.0 or $80.32 + [0.390 \times (ARO)]$.
² Higher E300 limit—lower of 94.0 or $79.75 + [0.385 \times (ARO)]$.

(B) For fuels with E200, E300, and/or ARO levels outside the ranges defined in Table 6, $Y_{voc}(t)$ shall be defined as: For Phase I:

$$Y_{voc}(t) = 100\% \times 0.52 \times [\exp(v_1(et)) / \exp(v_1(b))] - 1 + 100\% \times 0.48 \times [\exp(v_2(et)) / \exp(v_2(b))] - 1 + \{100\% - 0.52 \times [\exp(v_1(et)) / \exp(v_1(b))] \times [(0.000214 \times E200_{et}) - 0.014470] \times \Delta E200\} + \{[(0.0008174 \times E300_{et}) - 0.068624 - (0.000348 \times ARO_{et})] \times \Delta E300\} + \{[(-0.000348 \times E300_{et}) + 0.0323712] \times \Delta ARO\} + \{100\% \times 0.48 \times [\exp(v_2(et)) / \exp(v_2(b))] \times [(0.000212 \times E200_{et}) - 0.01350] \times \Delta E200\} + \{[(0.000816 \times E300_{et}) - 0.06233 - (0.00029 \times ARO_{et})] \times \Delta E300\} + \{[(-0.00029 \times E300_{et}) + 0.028204] \times \Delta ARO\}$$

For Phase II:

$$Y_{voc}(t) = 100\% \times 0.444 \times [\exp(v_1(et)) / \exp(v_1(b))] - 1 + 100\% \times 0.556 \times [\exp(v_2(et)) / \exp(v_2(b))] - 1 + \{100\% \times 0.444 \times [\exp(v_1(et)) / \exp(v_1(b))] \times [(0.000214 \times E200_{et}) - 0.014470] \times \Delta E200\} + \{[(0.0008174 \times E300_{et}) - 0.068624 - (0.000348 \times ARO_{et})] \times \Delta E300\} + \{[(-0.000348 \times E300_{et}) + 0.0323712] \times \Delta ARO\} + \{100\% \times 0.556 \times [\exp(v_2(et)) / \exp(v_2(b))] \times [(0.000212 \times E200_{et}) - 0.01350] \times \Delta E200\} + \{[(0.000816 \times E300_{et}) - 0.06233 - (0.00029 \times ARO_{et})] \times \Delta E300\} + \{[(-0.00029 \times E300_{et}) + 0.028204] \times \Delta ARO\}$$

where

v_1, v_2 = The equations defined in paragraphs (c)(1)(i) and (ii) of this section

et = Collection of fuel parameters for the "edge target" fuel. These parameters are defined in paragraphs (c)(1)(iv)(C) and (D) of this section

$v_1(et)$ = The function v_1 evaluated with "edge target" fuel parameters, which are defined in paragraphs (c)(1)(iv)(C) and (D) of this section

$v_2(et)$ = The function v_2 evaluated with "edge target" fuel parameters, which are defined in paragraphs (c)(1)(iv)(C) and (D) of this section

$v_1(b)$ = The function v_1 evaluated with the appropriate baseline fuel defined in paragraph (b)(2) of this section

$v_2(b)$ = The function v_2 evaluated with the appropriate baseline fuel defined in paragraph (b)(2) of this section

$E200_{et}$ = The value of E200 for the "edge target" fuel, as defined in paragraphs (c)(1)(iv)(C) and (D) of this section

$E300_{et}$ = The value of E300 for the "edge target" fuel, as defined in paragraphs (c)(1)(iv)(C) and (D) of this section

ARO_{et} = The value of ARO for the "edge target" fuel, as defined in paragraphs (c)(1)(iv)(C) and (D) of this section.

(C) During Phase I, the "edge target" fuel shall be identical to the target fuel for all fuel parameters, with the following exceptions:

(1) If the E200 level of the target fuel is less than 33 volume percent, then the E200 value for the "edge target" fuel shall be set equal to 33 volume percent.

(2) If the aromatics level of the target fuel is less than 18 volume percent, then the ARO value for the "edge target" fuel shall be set equal to 18 volume percent.

(3) If the aromatics level of the target fuel is greater than 46 volume percent, then the ARO value for the "edge target" fuel shall be set equal to 46 volume percent.

(4) If the E300 level of the target fuel is less than 72 volume percent, then the E300 value for the "edge target" fuel shall be set equal to 72 volume percent.

(5) If the E300 level of the target fuel is greater than 95 volume percent, then the E300 value of the target fuel shall be set equal to 95 volume percent for the purposes of calculating VOC emissions with the Phase I equation given in paragraph (c)(1)(iv)(B) of this section.

(6) If $[80.32 + (0.390 \times ARO)]$ exceeds 94 for the target fuel, then the E300 value for the "edge target" fuel shall be set equal to 94 volume percent.

(7) If the E200 level of the target fuel is less than 33 volume percent, then $\Delta E200$ shall be set equal to (E200 - 33 volume percent).

(8) If the E200 level of the target fuel equals or exceeds 33 volume percent, then $\Delta E200$ shall be set equal to zero.

(9) If the aromatics level of the target fuel is less than 18 volume percent, then ΔARO shall be set equal to (ARO - 18 volume percent). If the aromatics level of the target fuel is less than 10 volume percent, then ΔARO shall be set equal to -8 volume percent.

(10) If the aromatics level of the target fuel is greater than 46 volume percent, then ΔARO shall be set equal to (ARO - 46 volume percent).

(11) If neither of the conditions established in paragraphs (c)(1)(iv)(C)(9) and (10) of this section are met, then ΔARO shall be set equal to zero.

(12) If the E300 level of the target fuel is less than 72 percent, then $\Delta E300$ shall be set equal to (E300 - 72 percent).

(13) If the E300 level of the target fuel is greater than 94 volume percent and $[80.32 + (0.390 \times ARO)]$ also is greater than 94, then $\Delta E300$ shall be set equal to (E300 - 94 volume percent). If the E300 level of the target fuel is greater than 95 volume percent and $[80.32 + (0.390 \times ARO)]$ also is greater than 94, then $\Delta E300$ shall be set equal to 1 volume percent.

(14) If neither of the conditions established in paragraphs (c)(1)(iv)(C)(12) and (13) of this section are met, then $\Delta E300$ shall be set equal to zero.

(D) During Phase II, the "edge target" fuel is identical to the target fuel for all fuel parameters, with the following exceptions:

(1) If the E200 level of the target fuel is less than 33 volume percent, then the E200 value for the "edge target" fuel shall be set equal to 33 volume percent.

(2) If the aromatics level of the target fuel is less than 18 volume percent, then the ARO value for the "edge target" fuel shall be set equal to 18 volume percent.

(3) If the aromatics level of the target fuel is greater than 46 volume percent, then the ARO value for the "edge target" fuel shall be set equal to 46 volume percent.

(4) If the E300 level of the target fuel is less than 72 volume percent, then the E300 value for the "edge target" fuel shall be set equal to 72 volume percent.

(5) If the E300 level of the target fuel is greater than 95 volume percent, then the E300 value of the target fuel shall be set equal to 95 volume percent for the purposes of calculating VOC emissions with the Phase II equation given in paragraph (c)(1)(iv)(B) of this section.

(6) If $[79.75 + (0.385 \times ARO)]$ exceeds 94 for the target fuel, then the E300 value for the "edge target" fuel shall be set equal to 94 volume percent.

(7) If the E200 level of the target fuel is less than 33 volume percent, then $\Delta E200$ shall be set equal to $(E200 - 33$ volume percent).

(8) If the E200 level of the target fuel equals or exceeds 33 volume percent, then $\Delta E200$ shall be set equal to zero.

(9) If the aromatics level of the target fuel is less than 18 volume percent and greater than or equal to 10 volume percent, then ΔARO shall be set equal to $(ARO - 18$ volume percent). If the aromatics level of the target fuel is less than 10 volume percent, then ΔARO shall be set equal to -8 volume percent.

(10) If the aromatics level of the target fuel is greater than 46 volume percent, then ΔARO shall be set equal to $(ARO - 46$ volume percent).

(11) If neither of the conditions established in paragraphs (c)(1)(iv)(D)(9) and (10) of this section are met, then ΔARO shall be set equal to zero.

(12) If the E300 level of the target fuel is less than 72 percent, then $\Delta E300$ shall be set equal to $(E300) \times 72$ percent).

(13) If the E300 level of the target fuel is greater than 94 volume percent and $[80.32 + (0.390 \times ARO)]$ also is greater than 94, then $\Delta E300$ shall be set equal to $(E300 - 94$ volume percent). If the E300 level of the target fuel is greater than 95 volume percent and $[79.75 + (0.385 \times ARO)]$ also is greater than 94, then $\Delta E300$ shall be set equal to 1 volume percent.

(14) If neither of the conditions established in paragraphs (c)(1)(iv)(D)(12) and (13) of this section are met, then $\Delta E300$ shall be set equal to zero.

(2) The winter exhaust VOC emissions performance of gasolines shall be

given by the equations presented in paragraph (c)(1) of this section with the RVP value set to 8.7 psi for both the baseline and target fuels.

(3) The nonexhaust VOC emissions performance of gasolines in VOC Control Region 1 shall be given by the following equations, where:

$VOCNE1 = \text{Total nonexhaust emissions of volatile organic compounds in VOC Control Region 1 in grams per mile}$

$VOCDI1 = \text{Diurnal emissions of volatile organic compounds in VOC Control Region 1 in grams per mile}$

$VOCHS1 = \text{Hot soak emissions of volatile organic compounds in VOC Control Region 1 in grams per mile}$

$VOCRL1 = \text{Running loss emissions of volatile organic compounds in VOC Control Region 1 in grams per mile}$

$VOCRF1 = \text{Refueling emissions of volatile organic compounds in VOC Control Region 1 in grams per mile}$

(i) During Phase I:

$VOCNE1 = VOCDI1 + VOCHS1 + VOCRL1 + VOCRF1$

$VOCDI1 = [0.00736 \times (RVP^2)] - [0.0790 \times RVP] + 0.2553$

$VOCHS1 = [0.01557 \times (RVP^2)] - [0.1671 \times RVP] + 0.5399$

$VOCRL1 = [0.00279 \times (RVP^2)] + [0.1096 \times RVP] - 0.7340$

$VOCRF1 = [0.006668 \times RVP] - 0.0180$

(ii) During Phase II:

$VOCNE1 = VOCDI1 + VOCHS1 + VOCRL1 + VOCRF1$

$VOCDI1 = [0.007385 \times (RVP^2)] - [0.08981 \times RVP] + 0.3158$

$VOCHS1 = [0.006654 \times (RVP^2)] - [0.08094 \times RVP] + 0.2846$

$VOCRL1 = [0.017768 \times (RVP^2)] - [0.18746 \times RVP] + 0.6146$

$VOCRF1 = [0.004767 \times RVP] + 0.011859$

(4) The nonexhaust VOC emissions performance of gasolines in VOC Control Region 2 shall be given by the following equations, where:

$VOCNE2 = \text{Total nonexhaust emissions of volatile organic compounds in VOC Control Region 2 in grams per mile}$

$VOCDI2 = \text{Diurnal emissions of volatile organic compounds in VOC Control Region 2 in grams per mile}$

$VOCHS2 = \text{Hot soak emissions of volatile organic compounds in VOC Control Region 2 in grams per mile}$

$VOCRL2 = \text{Running loss emissions of volatile organic compounds in VOC Control Region 2 in grams per mile}$

$VOCRF2 = \text{Refueling emissions of volatile organic compounds in VOC Control Region 2 in grams per mile}$

(i) During Phase I:

$VOCNE2 = VOCDI2 + VOCHS2 + VOCRL2 + VOCRF2$

$VOCDI2 = [0.006818 \times (RVP^2)] - [0.07682 \times RVP] + 0.2610$

$VOCHS2 = [0.014421 \times (RVP^2)] - [0.16248 \times RVP] + 0.5520$

$VOCRL2 = [0.016255 \times (RVP^2)] - [0.1306 \times RVP] + 0.2963$

$VOCRF2 = [0.006668 \times RVP] - 0.0180$

(ii) During Phase II:

$VOCNE2 = VOCDI2 + VOCHS2 + VOCRL2 + VOCRF2$

$VOCDI2 = [0.004775 \times (RVP^2)] - [0.05872 \times RVP] + 0.21306$

$VOCHS2 = [0.006078 \times (RVP^2)] - [0.07474 \times RVP] + 0.27117$

$VOCRL2 = [0.016169 \times (RVP^2)] - [0.17206 \times RVP] + 0.56724$

$VOCRF2 = [0.004767 \times RVP] + 0.011859$

(5) Winter VOC emissions shall be given by VOCE, as defined in paragraph (c)(2) of this section, using the appropriate baseline emissions given in paragraph (b)(3) of this section. Total non-exhaust VOC emissions shall be set equal to zero under winter conditions.

(6) Total VOC emissions. (i) Total summer VOC emissions shall be given by the following equations:

$VOCS1 = (VOCE/1000) + VOCNE1$

$VOCS2 = (VOCE/1000) + VOCNE2$

$VOCS1 = \text{Total summer VOC emissions in VOC Control Region 1 in terms of grams per mile}$

$VOCS2 = \text{Total summer VOC emissions in VOC Control Region 2 in terms of grams per mile}$

(ii) Total winter VOC emissions shall be given by the following equations:

$VOCW = (VOCE/1000)$

$VOCW = \text{Total winter VOC emissions in terms of grams per mile}$

(7) Phase I total VOC emissions performance. (i) The total summer VOC emissions performance of the target fuel in percentage terms from baseline levels shall be given by the following equations during Phase I:

$VOCS1\% = [100\% \times (VOCS1 - 1.306 \text{ g/mi})] / (1.306 \text{ g/mi})$

$VOCS2\% = [100\% \times (VOCS2 - 1.215 \text{ g/mi})] / (1.215 \text{ g/mi})$

$VOC1\% = \text{Percentage change in VOC emissions from baseline levels in VOC Control Region 1}$

$VOC2\% = \text{Percentage change in VOC emissions from baseline levels in VOC Control Region 2}$

(ii) The total winter VOC emissions performance of the target fuel in percentage terms from baseline levels shall be given by the following equations during Phase I:

$VOCW\% = [100\% \times (VOCW - 0.660 \text{ g/mi})] / (0.660 \text{ g/mi})$

$VOCW\% = \text{Percentage change in winter VOC emissions from baseline levels}$

(8) Phase II total VOC emissions performance. (i) The total summer VOC emissions performance of the target fuel in percentage terms from baseline levels shall be given by the following equations during Phase II:

$VOCS1\% = [100\% \times (VOCS1 - 1.4663 \text{ g/mi})] / (1.4663 \text{ g/mi})$

$VOCS2\% = [100\% \times (VOCS2 - 1.3991 \text{ g/mi})] / (1.3991 \text{ g/mi})$

(ii) The total winter VOC emissions performance of the target fuel in percentage terms from baseline levels shall be given by the following equation during Phase II:

$VOCW\% = [100\% \times (VOC - 1.341 \text{ g/mi})] / (1.341 \text{ g/mi})$

(d) NO_x performance. (1) The summer NO_x emissions performance of gasolines shall be given by the following equations:

$NO_x = NO_x(b) + [NO_x(b) \times Y(t)/100]$

$Y_{NO_x}(t) = \beta(w_1 \times N_n) + (w_2 \times H_n) - 1a \times 100$

where

$NO_x = NO_x$ emissions in milligrams/mile
 $Y_{NO_x}(t) = NO_x$ performance of target fuel in terms of percentage change from baseline

$NO_x(b) = \text{Baseline } NO_x \text{ emissions as defined in paragraph (b)(2) of this section for the appropriate phase and season}$

$N_n = \exp n_1(t) / \exp n_1(b)$

$H_n = \exp n_2(t) / \exp n_2(b)$

$w_1 = \text{Weighting factor for normal emitters as defined in paragraph (b)(1) of this section for the appropriate Phase}$

$w_2 = \text{Weighting factor for higher emitters as defined in paragraph$

(b)(1) of this section for the appropriate Phase
 $n_1(t)$ =Normal emitter NO_x equation as defined in paragraph (d)(1)(i) of this section, evaluated using the target fuel's properties subject to paragraphs (d)(1)(iii) and (iv) of this section
 $n_2(t)$ =Higher emitter NO_x equation as defined in paragraph (d)(1)(ii) of this section, evaluated using the target fuel's properties subject to paragraphs (d)(1)(iii) and (iv) of this section
 $n_1(b)$ =Normal emitter NO_x equation as defined in paragraph (d)(1)(i) of this section, evaluated using the base fuel's properties
 $n_2(b)$ =Higher emitter NO_x equation as defined in paragraph (d)(1)(ii) of this section, evaluated using the base fuel's properties

(i) Consolidated equation for normal emitters.

$$n_1 = (0.0018571 \times OXY) + (0.0006921 \times SUL) + (0.0090744 \times RVP) + (0.0009310 \times E200) + (0.0008460 \times E300) + (0.0083632 \times ARO) + (-0.002774 \times OLE) + (-6.63 \times 10^{-7} \times SUL^2) + (-0.000119 \times ARO^2) + (0.0003665 \times OLE^2)$$

(ii) Equation for higher emitters.

$$n_2 = (-0.00913 \times OXY) + (0.000252 \times SUL) + (-0.01397 \times RVP) + (0.000931 \times E200) + (-0.00401 \times E300) + (0.007097 \times ARO) + (-0.00276 \times OLE) + (0.0003665 \times OLE^2) + (-7.995 \times 10^{-7} \times ARO^2)$$

(iii) Flat line extrapolations. (A) During Phase I, fuels with olefin levels less than 3.77 volume percent shall be evaluated with the OLE fuel parameter set equal to 3.77 volume percent when calculating NO_x performance using the equations described in paragraphs (d)(1)(i) and (ii) of this section. Fuels with aromatics levels greater than 36.2 volume percent shall be evaluated with the ARO fuel parameter set equal to 36.2 volume percent when calculating NO_x performance using the equations

described in paragraphs (d)(1)(i) and (ii) of this section.

(B) During Phase II, fuels with olefin levels less than 3.77 volume percent shall be evaluated with the OLE fuel parameter set equal to 3.77 volume percent when calculating NO_x performance using the equations described in paragraphs (d)(1)(i) and (ii) of this section. Fuels with aromatics levels greater than 36.8 volume percent shall be evaluated with the ARO fuel parameter set equal to 36.8 volume percent when calculating NO_x performance using the equations described in paragraphs (d)(1)(i) and (ii) of this section.

(iv) Linear extrapolations. (A) The equations in paragraphs (d)(1)(i) and (ii) of this section shall be used within the allowable range of SUL, OLE, and ARO for the appropriate Phase, as defined in the following Table 7:

TABLE 7—ALLOWABLE RANGES OF SUL, OLE, AND ARO FOR THE NO_x EQUATIONS IN PARAGRAPHS (d)(1)(i) AND (ii) OF THIS SECTION

Fuel parameter	Phase I		Phase II	
	Low end	High end	Low end	High end
SUL	10.0	450.0	10.0	450.0
OLE	3.77	19.0	3.77	19.0
ARO	18.0	36.2	18.0	36.8

(B) For fuels with SUL, OLE, and/or ARO levels outside the ranges defined in Table 7 of paragraph (d)(2)(iv)(A) of this section, $Y_{NOx}(t)$ shall be defined as:
 For Phase I:

$$Y_{NOx}(t) = 100\% \times 0.82 \times [\exp(n_1(et))/\exp(n_1(b)) - 1] + 100\% \times 0.18 \times [\exp(n_2(et))/\exp(n_2(b)) - 1] + (100\% \times 0.82 \times [\exp(n_1(et))/\exp(n_1(b))] \times [((-0.00000133 \times SUL_{et}) + 0.000692) \times \Delta SUL] + ((-0.000238 \times ARO_{et}) + 0.0083632) \times \Delta ARO] + ((0.000733 \times OLE_{et}) - 0.002774) \times \Delta OLE + (100\% \times 0.18 \times [\exp(n_2(et))/\exp(n_2(b))] \times [(0.000252 \times \Delta SUL) + ((-0.0001599 \times ARO_{et}) + 0.007097) \times \Delta ARO] + ((0.000732 \times OLE_{et}) - 0.00276) \times \Delta OLE]$$

For Phase II:

$$Y_{NOx}(t) = 100\% \times 0.738 \times [\exp(n_1(et))/\exp(n_1(b)) - 1]$$

$$+ 100\% \times 0.262 \times [\exp(n_2(et))/\exp(n_2(b)) - 1] + (100\% \times 0.738 \times [\exp(n_1(et))/\exp(n_1(b))] \times [((-0.00000133 \times SUL_{et}) + 0.000692) \times \Delta SUL] + ((-0.000238 \times ARO_{et}) + 0.0083632) \times \Delta ARO] + ((0.000733 \times OLE_{et}) - 0.002774) \times \Delta OLE + (100\% \times 0.262 \times [\exp(n_2(et))/\exp(n_2(b))] \times [(0.000252 \times \Delta SUL) + ((-0.0001599 \times ARO_{et}) + 0.007097) \times \Delta ARO] + ((0.000732 \times OLE_{et}) - 0.00276) \times \Delta OLE]$$

where

n_1, n_2 =The equations defined in paragraphs (d)(1)(i) and (ii) of this section.

et =Collection of fuel parameters for the "edge target" fuel. These parameters are defined in paragraphs (d)(1)(iv)(C) and (D) of this section.

$n_1(et)$ =The function n_1 evaluated with "edge target" fuel parameters, which are defined in paragraph (d)(1)(iv)(C) of this section.

$n_2(et)$ =The function n_2 evaluated with "edge target" fuel parameters, which are defined in paragraph (d)(1)(iv)(C) of this section.

$n_1(b)$ =The function n_1 evaluated with the appropriate baseline fuel parameters defined in paragraph (b)(2) of this section.

$n_2(b)$ =The function n_2 evaluated with the appropriate baseline fuel parameters defined in paragraph (b)(2) of this section.

SUL_{et} =The value of SUL for the "edge target" fuel, as defined in paragraph (d)(1)(iv)(C) of this section.

ARO_{et} =The value of ARO for the "edge target" fuel, as defined in paragraph (d)(1)(iv)(C) of this section.

OLE_{et} =The value of OLE for the "edge target" fuel, as defined in paragraph (d)(1)(iv)(C) of this section.

(C) For both Phase I and Phase II, the "edge target" fuel is identical to the target fuel for all fuel parameters, with the following exceptions:

(1) If the sulfur level of the target fuel is less than 10 parts per million, then the value of SUL for the "edge

target" fuel shall be set equal to 10 parts per million.

(2) If the sulfur level of the target fuel is greater than 450 parts per million, then the value of SUL for the "edge target" fuel shall be set equal to 450 parts per million.

(3) If the aromatics level of the target fuel is less than 18 volume percent, then the value of ARO for the "edge target" fuel shall be set equal to 18 volume percent.

(4) If the olefins level of the target fuel is greater than 19 volume percent, then the value of OLE for the "edge target" fuel shall be set equal to 19 volume percent.

(5) If the E300 level of the target fuel is greater than 95 volume percent, then the E300 value of the target fuel shall be set equal to 95 volume percent for the purposes of calculating NO_x emissions with the equations given in paragraph (d)(1)(iv)(B) of this section.

(6) If the sulfur level of the target fuel is less than 10 parts per million, then Δ SUL shall be set equal to (SUL - 10 parts per million).

(7) If the sulfur level of the target fuel is greater than 450 parts per million, then Δ SUL shall be set equal to (SUL - 450 parts per million).

(8) If the sulfur level of the target fuel is neither less than 10 parts per million nor greater than 450 parts per million, Δ SUL shall be set equal to zero.

(9) If the aromatics level of the target fuel is less than 18 volume percent and greater than 10 volume percent, then Δ ARO shall be set equal to (ARO - 18 volume percent). If the aromatics level of the target fuel is less than 10 volume percent, then Δ ARO shall be set equal to -8 volume percent.

(10) If the aromatics level of the target fuel is greater than or equal to 18 volume percent, then Δ ARO shall be set equal to zero.

(11) If the olefins level of the target fuel is greater than 19 volume percent, then Δ OLE shall be set equal to (OLE - 19 volume percent).

(12) If the olefins level of the target fuel is less than or equal to 19 volume percent, then Δ OLE shall be set equal to zero.

(2) The winter NO_x emissions performance of gasolines shall be given by the equations presented in paragraph (d)(1) of this section with the RVP value set to 8.7 psi.

(3) The NO_x emissions performance of the target fuel in percentage terms from baseline levels shall be given by the following equations:

For Phase I:

$$\text{Summer NO}_x\% = [100\% \times (\text{NO}_x - 0.660 \text{ g/mi}) / (0.660 \text{ g/mi})]$$

$$\text{Winter NO}_x\% = [100\% \times (\text{NO}_x - 0.750 \text{ g/mi}) / (0.750 \text{ g/mi})]$$

For Phase II:

$$\text{Summer NO}_x\% = [100\% \times (\text{NO}_x - 1.340 \text{ g/mi}) / (1.340 \text{ g/mi})]$$

$$\text{Winter NO}_x\% = [100\% \times (\text{NO}_x - 1.540 \text{ g/mi}) / (1.540 \text{ g/mi})]$$

Summer NO_x% = Percentage change in NO_x emissions from summer baseline levels

Winter NO_x% = Percentage change in NO_x emissions from winter baseline levels

(e) *Toxics performance*—(1) *Summer toxics performance*. (i) Summer toxic emissions performance of gasolines in VOC Control Regions 1 and 2 shall be given by the following equations:

$$\text{TOXICS1} = \text{EXHIBZ} + \text{FORM} + \text{ACET} + \text{BUTA} + \text{POM} + \text{NEBZ1}$$

$$\text{TOXICS2} = \text{EXHIBZ} + \text{FORM} + \text{ACET} + \text{BUTA} + \text{POM} + \text{NEBZ2}$$

where

TOXICS1=Summer toxics performance in VOC Control Region 1 in terms of milligrams per mile.

TOXICS2=Summer toxics performance in VOC Control Region 2 in terms of milligrams per mile.

EXHIBZ=Exhaust emissions of benzene in terms of milligrams per mile, as determined in paragraph (e)(4) of this section.

FORM=Emissions of formaldehyde in terms of milligrams per mile, as determined in paragraph (e)(5) of this section.

ACET=Emissions of acetaldehyde in terms of milligrams per mile, as determined in paragraph (e)(6) of this section.

BUTA=Emissions of 1,3-butadiene in terms of milligrams per mile, as determined in paragraph (e)(7) of this section.

POM=Polycyclic organic matter emissions in terms of milligrams per mile, as determined in paragraph (e)(8) of this section.

NEBZ1=Nonexhaust emissions of benzene in VOC Control Region 1 in milligrams per mile, as determined in paragraph (e)(9) of this section.

NEBZ2=Nonexhaust emissions of benzene in VOC Control Region 2 in milligrams per mile, as determined in paragraph (e)(10) of this section.

(ii) The percentage change in summer toxics performance in VOC Control Regions 1 and 2 shall be given by the following equations:

For Phase I:

$$\text{TOXICS1}\% = [100\% \times (\text{TOXICS1} - 48.61 \text{ mg/mi}) / (48.61 \text{ mg/mi})]$$

$$\text{TOXICS2}\% = [100\% \times (\text{TOXICS2} - 47.58 \text{ mg/mi}) / (47.58 \text{ mg/mi})]$$

For Phase II:

$$\text{TOXICS1}\% = [100\% \times (\text{TOXICS1} - 86.34 \text{ mg/mi}) / (86.34 \text{ mg/mi})]$$

$$\text{TOXICS2}\% = [100\% \times (\text{TOXICS2} - 85.61 \text{ mg/mi}) / (85.61 \text{ mg/mi})]$$

where

TOXICS1%=Percentage change in summer toxics emissions in VOC Control Region 1 from baseline levels.

TOXICS2%=Percentage change in summer toxics emissions in VOC Control Region 2 from baseline levels.

(2) *Winter toxics performance*. (i) Winter toxic emissions performance of gasolines in VOC Control Regions 1 and 2 shall be given by the following equation, evaluated with the RVP set at 8.7 psi:

$$\text{TOXICW} = \{\text{EXHIBZ} + \text{FORM} + \text{ACET} + \text{BUTA} + \text{POM}\}$$

where

TOXICW=Winter toxics performance in VOC Control Regions 1 and 2 in terms of milligrams per mile.

EXHIBZ=Exhaust emissions of benzene in terms of milligrams per mile, as determined in paragraph (e)(4) of this section.

FORM=Emissions of formaldehyde in terms of milligrams per mile, as determined in paragraph (e)(5) of this section.

ACET=Emissions of acetaldehyde in terms of milligrams per mile, as determined in paragraph (e)(6) of this section.

BUTA=Emissions of 1,3-butadiene in terms of milligrams per mile, as determined in paragraph (e)(7) of this section.

POM=Polycyclic organic matter emissions in terms of milligrams per mile, as determined in paragraph (e)(8) of this section.

(ii) The percentage change in winter toxics performance in VOC Control Regions 1 and 2 shall be given by the following equation:

For Phase I:

$$\text{TOXICW}\% = [100\% \times (\text{TOXICW} - 58.36 \text{ mg/mi}) / (58.36 \text{ mg/mi})]$$

For Phase II:

$$\text{TOXICW}\% = [100\% \times (\text{TOXICW} - 120.55 \text{ mg/mi}) / (120.55 \text{ mg/mi})]$$

where

TOXICW%=Percentage change in winter toxics emissions in VOC Control Regions 1 and 2 from baseline levels.

(3) The year-round toxics performance in VOC Control Regions 1 and 2 shall be derived from volume-weighted performances of individual batches of fuel as described in § 80.67(g).

(4) Exhaust benzene emissions shall be given by the following equation, subject to paragraph (e)(4)(iii) of this section:

$$\text{EXHIBZ} = \text{BENZ}(b) + (\text{BENZ}(b) \times Y_{\text{BEN}}(t) / 100)$$

$$Y_{\text{BEN}}(t) = \beta(w_1 \times N_b) + (w_2 \times H_b) - 1\alpha \times 100$$

where

EXHIBZ=Exhaust benzene emissions in milligrams/mile

Y_{BEN}(t)=Benzene performance of target fuel in terms of percentage change from baseline.

BENZ(b)=Baseline benzene emissions as defined in paragraph (b)(2) of this section for the appropriate phase and season.

N_b=exp b₁(t)/exp b₁(b)

H_b=exp b₂(t)/exp b₂(b)

w₁=Weighting factor for normal emitters as defined in paragraph (b)(1) of this section for the appropriate Phase.

w₂=Weighting factor for higher emitters as defined in paragraph (b)(1) of this section for the appropriate Phase.

b₁(t)=Normal emitter benzene equation, as defined in paragraph (e)(4)(i) of this section, evaluated using the target fuel's properties subject to paragraph (e)(4)(iii) of this section.

b₂(t)=Higher emitter benzene equation as defined in paragraph (e)(4)(ii) of this section, evaluated using the target fuel's properties subject to paragraph (e)(4)(iii) of this section.

b₁(b)=Normal emitter benzene equation as defined in paragraph (e)(4)(i) of this section, evaluated for the base fuel's properties.

b₂(b)=Higher emitter benzene equation, as defined in paragraph (e)(4)(ii) of this section, evaluated for the base fuel's properties.

(i) *Consolidated equation for normal emitters*.

$$b_1 = (0.006197 \times \text{SUL}) + (-0.003376 \times \text{E200}) + (0.0265500 \times \text{ARO}) + (0.2223900 \times \text{BEN})$$

(ii) *Equation for higher emitters*.

$$b_2 = (-0.096047 \times \text{OXY}) + (0.0003370 \times \text{SUL}) + (0.0112510 \times \text{E300}) + (0.0118820 \times \text{ARO}) + (0.2223180 \times \text{BEN})$$

(iii) If the aromatics value of the target fuel is less than 10 volume percent, then an aromatics value of 10 volume percent shall be used when evaluating the equations given in paragraphs (e)(4)(i) and (ii) of this section. If the E300 value of the target fuel is greater than 95 volume percent, then an E300 value of 95 volume percent shall be used when evaluating the equations in paragraphs (e)(4)(i) and (ii) of this section.

(5) Formaldehyde mass emissions shall be given by the following equation, subject to paragraphs (e)(5)(iii) and (iv) of this section:

$$\text{FORM} = \text{FORM}(b) + (\text{FORM}(b) \times Y_{\text{FORM}}(t) / 100)$$

$$Y_{\text{FORM}}(t) = [(w_1 \times N_f) + (w_2 \times H_f) - 1] \times 100$$

where

FORM=Exhaust formaldehyde emissions in terms of milligrams/mile.

Y_{FORM}(t)=Formaldehyde performance of target fuel in terms of percentage change from baseline.

FORM(b)=Baseline formaldehyde emissions as defined in paragraph (b)(2)

of this section for the appropriate Phase and season.

$$N_t = \exp f_1(t) / \exp f_1(b)$$

$$H_t = \exp f_2(t) / \exp f_2(b)$$

w_1 = Weighting factor for normal emitters as defined in paragraph (b)(1) of this section for the appropriate Phase.

w_2 = Weighting factor for higher emitters as defined in paragraph (b)(1) of this section for the appropriate Phase.

$f_1(t)$ = Normal emitter formaldehyde equation as defined in paragraph (e)(5)(i) of this section, evaluated using the target fuel's properties subject to paragraphs (e)(5)(iii) and (iv) of this section.

$f_2(t)$ = Higher emitter formaldehyde equation as defined in paragraph (e)(5)(ii) of this section, evaluated using the target fuel's properties subject to paragraphs (e)(5)(iii) and (iv) of this section.

$f_1(b)$ = Normal emitter formaldehyde equation as defined in paragraph (e)(5)(i) of this section, evaluated for the base fuel's properties.

$f_2(b)$ = Higher emitter formaldehyde equation as defined in paragraph (e)(5)(ii) of this section, evaluated for the base fuel's properties.

(i) Consolidated equation for normal emitters.

$$f_1 = (-0.010226 \times E300) + (-0.007166 \times ARO) + (0.0462131 \times M7B)$$

(ii) Equation for higher emitters.

$$f_2 = (-0.010226 \times E300) + (-0.007166 \times ARO) + (-0.031352 \times OLE) + (0.0462131 \times M7B)$$

(iii) If the aromatics value of the target fuel is less than 10 volume percent, then an aromatics value of 10 volume percent shall be used when evaluating the equations given in paragraphs (e)(5)(i) and (ii) of this section. If the E300 value of the target fuel is greater than 95 volume percent, then an E300 value of 95 volume percent shall be used when evaluating the equations given in paragraphs (e)(5)(i) and (ii) of this section.

(iv) When calculating formaldehyde emissions and emissions performance, oxygen in the form of alcohols which are more complex or have higher molecular weights than ethanol shall be evaluated as if it were in the form of ethanol. Oxygen in the form of methyl ethers other than TAME and MTBE

shall be evaluated as if it were in the form of MTBE. Oxygen in the form of ethyl ethers other than ETBE shall be evaluated as if it were in the form of ETBE. Oxygen in the form of non-methyl, non-ethyl ethers shall be evaluated as if it were in the form of ETBE. Oxygen in the form of methanol or non-alcohol, non-ether oxygenates shall not be evaluated with the Complex Model, but instead must be evaluated through vehicle testing per § 80.48.

(6) Acetaldehyde mass emissions shall be given by the following equation, subject to paragraphs (e)(6)(iii) and (iv) of this section:

$$ACET = ACET(b) + (ACET(b) \times Y_{ACET}(t) / 100)$$

$$Y_{ACET}(t) = [(w_1 \times N_t) + (w_2 \times H_t) - 1] \times 100$$

where

ACET = Exhaust acetaldehyde emissions in terms of milligrams/mile

$Y_{ACET}(t)$ = Acetaldehyde performance of target fuel in terms of percentage change from baseline

ACET(b) = Baseline acetaldehyde emissions as defined in paragraph (b)(2) of this section for the appropriate phase and season

$$N_t = \exp a_1(t) / \exp a_1(b)$$

$$H_t = \exp a_2(t) / \exp a_2(b)$$

w_1 = Weighting factor for normal emitters as defined in paragraph (b)(1) of this section for the appropriate phase

w_2 = Weighting factor for higher emitters as defined in paragraph (b)(1) of this section for the appropriate phase

$a_1(t)$ = Normal emitter acetaldehyde equation as defined in paragraph (e)(6)(i) of this section, evaluated using the target fuel's properties, subject to paragraphs (e)(6)(iii) and (iv) of this section

$a_2(t)$ = Higher emitter acetaldehyde equation as defined in paragraph (e)(6)(ii) of this section, evaluated using the target fuel's properties, subject to paragraphs (e)(6)(iii) and (iv) of this section

$a_1(b)$ = Normal emitter acetaldehyde equation as defined in paragraph (e)(6)(i) of this section, evaluated for the base fuel's properties

$f_2(b)$ = Higher emitter acetaldehyde equation as defined in paragraph

(e)(6)(ii) of this section, evaluated for the base fuel's properties

(i) Consolidated equation for normal emitters.

$$a_1 = (0.0002631 \times SUL) + (0.0397860 \times RVP) + (-0.012172 \times E300) + (-0.005525 \times ARO) + (-0.009594 \times MTB) + (0.3165800 \times ETB) + (0.2492500 \times ETH)$$

(ii) Equation for higher emitters.

$$a_2 = (0.0002627 \times SUL) + (-0.012157 \times E300) + (-0.005548 \times ARO) + (-0.055980 \times M7B) + (0.3164665 \times ETB) + (0.2493259 \times ETH)$$

(iii) If the aromatics value of the target fuel is less than 10 volume percent, then an aromatics value of 10 volume percent shall be used when evaluating the equations given in paragraphs (e)(6)(i) and (ii) of this section. If the E300 value of the target fuel is greater than 95 volume percent, then an E300 value of 95 volume percent shall be used when evaluating the equations given in paragraphs (e)(6)(i) and (ii) of this section.

(iv) When calculating acetaldehyde emissions and emissions performance, oxygen in the form of alcohols which are more complex or have higher molecular weights than ethanol shall be evaluated as if it were in the form of ethanol. Oxygen in the form of methyl ethers other than TAME and MTBE shall be evaluated as if it were in the form of MTBE. Oxygen in the form of ethyl ethers other than ETBE shall be evaluated as if it were in the form of ETBE. Oxygen in the form of methanol or non-alcohol, non-ether oxygenates shall not be evaluated with the Complex Model, but instead must be evaluated through vehicle testing per § 80.48.

(7) 1,3-butadiene mass emissions shall be given by the following equations, subject to paragraph (e)(7)(iii) of this section:

$$BUTA = BUTA(b) + (BUTA(b) \times Y_{BUTA}(t) / 100)$$

$$Y_{BUTA}(t) = [(w_1 \times N_t) + (w_2 \times H_t) - 1] \times 100$$

where

BUTA = Exhaust 1,3-butadiene emissions in terms of milligrams/mile

$Y_{BUTA}(t)$ = 1,3-butadiene performance of target fuel in terms of percentage change from baseline

BUTA(b) = Baseline 1,3-butadiene emissions as defined in paragraph (b)(2) of this section for the appropriate phase and season

$$N_t = \exp d_1(t) / \exp d_1(b)$$

$$H_t = \exp d_2(t) / \exp d_2(b)$$

w_1 = Weighting factor for normal emitters as defined in paragraph (b)(1) of this section for the appropriate phase

w_2 = Weighting factor for higher emitters as defined in paragraph (b)(1) of this section for the appropriate phase.

$d_1(t)$ = Normal emitter 1,3-butadiene equation as defined in paragraph (e)(7)(i) of this section, evaluated using the target fuel's properties, subject to paragraph (e)(7)(iii) of this section.

$d_2(t)$ = Higher emitter 1,3-butadiene equation as defined in paragraph (e)(7)(ii) of this section, evaluated using the target fuel's properties, subject to paragraph (e)(7)(iii) of this section.

$d_1(b)$ = Normal emitter 1,3-butadiene equation as defined in paragraph (e)(7)(i) of this section, evaluated for the base fuel's properties.

$d_2(b)$ = Higher emitter 1,3-butadiene equation as defined in paragraph (e)(7)(ii) of this section, evaluated for the base fuel's properties.

(i) Consolidated equation for normal emitters.

$$d_1 = (0.0001552 \times SUL) + (-0.007253 \times E200) + (-0.014866 \times E300) + (-0.004005 \times ARO) + (0.0282350 \times OLE)$$

(ii) Equation for higher emitters.

$$d_2 = (-0.060771 \times OXY) + (-0.007311 \times E200) + (-0.008058 \times E300) + (-0.004005 \times ARO) + (0.0436960 \times OLE)$$

(iii) If the aromatics value of the target fuel is less than 10 volume percent, then an aromatics value of 10 volume percent shall be used when evaluating the equations given in paragraphs (e)(7)(i) and (ii) of this section. If the E300 value of the target fuel is greater than 95 volume percent, then an E300 value of 95 volume percent shall be used when evaluating the equations given in paragraphs (e)(7)(i) and (ii) of this section.

(8) Polycyclic organic matter mass emissions shall be given by the following equation:

$$POM = 0.003355 \times VOCE$$

POM=Polycyclic organic matter emissions in terms of milligrams per mile

VOCE=Non-methane, non-ethane exhaust emissions of volatile organic compounds in grams per mile.

(9) Nonexhaust benzene emissions in VOC Control Region 1 shall be given by the following equations for both Phase I and Phase II:

$$\begin{aligned} \text{NEBZ1} &= \text{DIBZ1} + \text{HSBZ1} + \text{RLBZ1} + \text{RFBZ1} \\ \text{HSBZ1} &= 10 \times \text{BEN} \times \text{VOCHS1} \times [(-0.0342 \times \text{MTB}) + (-0.080274 \times \text{RVP}) + 1.4448] \\ \text{DIBZ1} &= 10 \times \text{BEN} \times \text{VOC D11} \times [(-0.0290 \times \text{MTB}) + (-0.080274 \times \text{RVP}) + 1.3758] \\ \text{RLBZ1} &= 10 \times \text{BEN} \times \text{VOCRL1} \times [(-0.0342 \times \text{MTB}) + (-0.080274 \times \text{RVP}) + 1.4448] \\ \text{RFBZ1} &= 10 \times \text{BEN} \times \text{VOCRF1} \times [(-0.0296 \times \text{MTB}) + (-0.081507 \times \text{RVP}) + 1.3972 \end{aligned}$$

where

NEBZ1=Nonexhaust emissions of volatile organic compounds in VOC Control Region 1 in milligrams per mile.

DIBZ1=Diurnal emissions of volatile organic compounds in VOC Control Region 1 in milligrams per mile.

HSBZ1=Hot soak emissions of volatile organic compounds in VOC Control Region 1 in milligrams per mile.

RLBZ1=Running loss emissions of volatile organic compounds in VOC Control Region 1 in milligrams per mile.

RFBZ1=Refueling emissions of volatile organic compounds in VOC Control Region 1 in grams per mile.

VOC D11=Diurnal emissions of volatile organic compounds in VOC Control Region 1 in milligrams per mile, as determined in paragraph (c)(3) of this section.

VOCHS1=Hot soak emissions of volatile organic compounds in VOC Control Region 1 in milligrams per mile, as determined in paragraph (c)(3) of this section.

VOCRL1=Running loss emissions of volatile organic compounds in VOC Control Region 1 in milligrams per mile, as determined in paragraph (c)(3) of this section.

VOCRF1=Refueling emissions of volatile organic compounds in VOC Control Region 1 in milligrams per

mile, as determined in paragraph (c)(3) of this section.

(10) Nonexhaust benzene emissions in VOC Control Region 2 shall be given by the following equations for both Phase I and Phase II:

$$\begin{aligned} \text{NEBZ2} &= \text{DIBZ2} + \text{HSBZ2} + \text{RLBZ2} + \text{RFBZ2} \\ \text{HSBZ2} &= 10 \times \text{BEN} \times \text{VOCHS2} \times [(-0.0342 \times \text{MTB}) + (-0.080274 \times \text{RVP}) + 1.4448] \\ \text{DIBZ2} &= 10 \times \text{BEN} \times \text{VOC D12} \times [(-0.0290 \times \text{MTB}) + (-0.080274 \times \text{RVP}) + 1.3758] \\ \text{RLBZ2} &= 10 \times \text{BEN} \times \text{VOCRL2} \times [(-0.0342 \times \text{MTB}) + (-0.080274 \times \text{RVP}) + 1.4448] \\ \text{RFBZ2} &= 10 \times \text{BEN} \times \text{VOCRF2} \times [(-0.0296 \times \text{MTB}) + (-0.081507 \times \text{RVP}) + 1.3972 \end{aligned}$$

where

NEBZ2=Nonexhaust emissions of volatile organic compounds in VOC Control Region 2 in milligrams per mile.

DIBZ2=Diurnal emissions of volatile organic compounds in VOC Control Region 2 in milligrams per mile.

HSBZ2=Hot soak emissions of volatile organic compounds in VOC Control Region 2 in milligrams per mile.

RLBZ2=Running loss emissions of volatile organic compounds in VOC Control Region 2 in milligrams per mile.

RFBZ2=Refueling emissions of volatile organic compounds in VOC Control Region 2 in grams per mile.

VOC D12=Diurnal emissions of volatile organic compounds in VOC Control Region 2 in milligrams per mile, as determined in paragraph (c)(4) of this section.

VOCHS2=Hot soak emissions of volatile organic compounds in VOC Control Region 2 in milligrams per mile, as determined in paragraph (c)(4) of this section.

VOCRL2=Running loss emissions of volatile organic compounds in VOC Control Region 2 in milligrams per mile, as determined in paragraph (c)(4) of this section.

VOCRF2=Refueling emissions of volatile organic compounds in VOC Control Region 2 in milligrams per mile, as determined in paragraph (c)(4) of this section.

(f) Limits of the model. (1) The equations described in paragraphs (c), (d), and (e) of this section shall be valid

only for fuels with fuel properties that fall in the following ranges for reformulated gasolines and conventional gasolines:

(1) For reformulated gasolines:

Fuel property	Acceptable range
Oxygen	0.0-4.0 weight percent.
Sulfur	0.0-500.0 parts per million by weight.
RVP	6.4-10.0 pounds per square inch.
E200	30.0-70.0 percent evaporated.
E300	70.0-100.0 percent evaporated.
Aromatics	0.0-50.0 volume percent.
Olefins	0.0-25.0 volume percent.
Benzene	0.0-2.0 volume percent.

(1) For conventional gasoline:

Fuel property	Acceptable range
Oxygen	0.0-4.0 weight percent.
Sulfur	0.0-1000.0 parts per million by weight.
RVP	6.4-11.0 pounds per square inch.
E200	30.0-70.0 percent evaporated.
E300	70.0-100.0 percent evaporated.
Aromatics	0.0-55.0 volume percent.
Olefins	0.0-30.0 volume percent.
Benzene	0.0-4.9 volume percent.

(2) Fuels with one or more properties that do not fall within the ranges described in above shall not be certified or evaluated for their emissions performance using the complex emissions model described in paragraphs (c), (d), and (e) of this section.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36959, July 20, 1994]

§ 80.46 Measurement of reformulated gasoline fuel parameters.

(a) Sulfur. Sulfur content shall be determined using American Society for Testing and Materials (ASTM) standard method D-2622-92, entitled "Standard Test Method for Sulfur in Petroleum Products by X-Ray Spectrometry."

(b) Olefins. Olefin content shall be determined using ASTM standard method D-1319-93, entitled "Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption."

(c) Reid vapor pressure (RVP). Reid Vapor Pressure (RVP) shall be determined using the procedure described in 40 CFR part 80, appendix E, Method 3.

(d) Distillation. (1) Distillation parameters shall be determined using ASTM standard method D-86-90, entitled "Standard Test Method for Distillation of Petroleum Products"; except that

(2) The figures for repeatability and reproducibility given in degrees Fahrenheit in Table 9 in the ASTM method are incorrect, and shall not be used.

(e) Benzene. (1) Benzene content shall be determined using ASTM standard method D-3606-92, entitled "Standard Test Method for Determination of Benzene and Toluene in Finished Motor and Aviation Gasoline by Gas Chromatography"; except that

(2) Instrument parameters must be adjusted to ensure complete resolution of the benzene, ethanol and methanol peaks because ethanol and methanol may cause interference with ASTM standard method D-3606-92 when present.

(f) Aromatics. Aromatics content shall be determined by gas chromatography identifying and quantifying each aromatic compound as set forth in paragraph (f)(1) of this section.

(1)(i) Detector. The detector is an atomic mass spectrometer detector (MSD). The detector may be set for either selective ion or scan mode.

(ii) Method A. (A) The initial study of this method used a three component internal standard using the following calculations.

(B) The calibration points are constructed by calculating an amount ratio and response ratio for each level of a particular peak in the instrument's calibration table.

(C) The amount ratio is the amount of the compound divided by the amount of the internal standard for a given level.

(D) The response ratio is the response of the compound divided by the response of the internal standard at this level.

(E) The equation for the curve through the calibration points is calculated using the type fit and origin handling specified in the instrument's calibration table. In the initial study the fit was a second degree polynomial including a forced zero for the origin.

(F) The response of the compound in a sample is divided by the response of the internal standard to provide a response ratio for that compound in the sample.

(G) A corrected amount ratio for the unknown is calculated using the curve

fit equation determined in paragraph (C)(1)(i)(E) of this section.

(H) The amount of the aromatic compound is equal to the corrected amount ratio times the Amount of Internal Standard.

(I) The total aromatics in the sample is the sum of the amounts of the individual aromatic compounds in the sample.

(J) An internal standard solution can be made with the following compounds at the listed concentrations in volume percent. Also listed is the Chemical Abstracts Service Registry Number (CAS), atomic mass unit (amu) on which the detector must be set at the corresponding retention time if used in the selective ion mode, retention times in minutes, and boiling point in °C. (Other, similar, boiling point materials can be used which are not found in gasoline.) Retention times are approximate and apply only to a 60 meter capillary column used in the initial study. Other columns and retention times can be used.

(I) 4-methyl-2-pentanone, 50 vol% [108-10-1], 43.0 amu, 22.8 min., bp 118;

(2) benzyl alcohol, 25 vol%, [100-51-6], 108 amu, 61.7 min., bp 205;

(3) 1-octanol, [111-87-5], 25 vol%, 56.0 amu, 76.6 min., bp 196;

(K) At least two calibration mixtures which bracket the measured total aromatics concentration must be made with a representative mixture of aromatic compounds. The materials and concentrations used in the highest concentration calibration level in the initial study for this method are listed in this paragraph (f)(1)(i)(K). Also listed is the Chemical Abstracts Service Registry Number (CAS), atomic mass unit (amu) on which the detector must be set for the corresponding retention time if used in the selective ion mode, retention times in minutes, and in some cases boiling point in °C. The standards are made in 2,2,4-trimethylpentane (iso-octane), [540-84-1]. Other aromatic compounds, and retention times may be acceptable as long as the aromatic values produced meet the criteria found in the quality assurance section for the aromatic methods.

Compound	Concentration (percent)	CAS No.	AMU	Retention time	Boiling point, °C
Benzene	2.25 vol	71-43-2	78	18.9 min	80.1
Methylbenzene	10.0 vol	108-88-3	91	25.5 min	111
Ethylbenzene	5.0 vol	100-41-4	91	34.1 min	136.2
1,3-Dimethylbenzene	5 vol	108-38-3	91	35.1 min	136-138
1,4-Dimethylbenzene		106-42-3			
1,2-dimethylbenzene	10 vol	95-47-6	91	38.1 min	144
(1-methylethyl)benzene	2.25 vol	98-82-8	105	42.8 min	
Propylbenzene	2.25 vol	103-65-1	91	48.0 min	159.2
1-ethyl-2-methylbenzene	2.25 vol	611-14-3	105	49.3 min	165
1,2,4-trimethylbenzene	2.25 vol	95-63-6	105	50.9 min	169
1,2,3-trimethylbenzene	2.25 vol	526-73-8	105	53.3 min	
1,3-dimethylbenzene	2.25 vol	141-93-5	119	56.6 min	181
Butylbenzene	2.25 vol	104-51-8	91	60.7 min	183
o-Cymene	2.25 vol	527-84-4	119	63.9 min	
1-ethyl-3-methylbenzene	2.25 vol	620-14-4	105	64.2 min	
m-Cymene	2.25 vol	525-77-3	119	69.0 min	
p-Cymene	2.25 vol	99-87-6	119	73.0 min	
Isobutylbenzene	2.25 vol	538-93-2	91	75.0 min	
Indan	2.25 vol	496-11-7	117	50.0 min	
1-methyl-3-propylbenzene	2.25 vol	1074-43-7	105	78.9 min	
2-ethyl-1,4-dimethylbenzene	2.25 vol	1758-88-9	119	83.2 min	187
1,2,4,5-tetramethylbenzene	2.25 vol	95-93-2	119	83.4 min	
1-ethyl-2,4-dimethylbenzene	2.25 vol	874-41-9	119	85.7 min	
(1,1-dimethylethyl)-3-methylbenzene	2.25 vol	27138-21-2	133	87.3 min	
1-ethyl-2,3-dimethylbenzene	2.25 vol	931-98-2	119	88.7 min	
1-ethyl-1,4-dimethylbenzene	2.25 vol	874-41-9	119	94.9 min	
2-ethyl-1,3-dimethylbenzene	2.25 vol	2870-04-4	119	100.9 min	
1-ethyl-3,5-dimethylbenzene	2.25 vol	934-74-7	119	102.5 min	
1,2,3,5-tetramethylbenzene	2.25 vol	527-53-7	119	115.9 min	
Penylbenzene	2.25 vol	538-68-1	91	116 min	
Naphthalene	2.25 vol	191-20-3	128	118.4 min	198
3,5-dimethyl-1-butylbenzene	2.25 vol	98-19-1	147	118.5 min	205.3
1-methylnaphthalene	2.25 vol	90-12-0	142	129.0 min	
2-methylnaphthalene	2.25 vol	91-57-6	142	131.0 min	

(iii) Method B. (A) Use a percent normalized format to determine the concentration of the individual compounds. No internal standard is used in this method.

(B) The calculation of the aromatic compounds is done by developing calibration curves for each compound using the type fit and origin handling specified in the instrument's calibration table.

(C) The amount of compound in a sample (the corrected amount) is calculated using the equation determined in paragraph (f)(1)(i) of this section for that compound.

(D) The percent normalized amount of a compound is calculated using the following equation:

$$A_n = 100 \times \left(\frac{A_c}{A_s} \right)$$

where:

A_n = percent normalized amount of a compound

A_c = corrected amount of the compound

A_s = sum of all the corrected amounts for all identified compounds in the sample

(E) The total aromatics is the sum of all the percent normalized aromatic amounts in the sample.

(F) This method allows quantification of non-aromatic compounds in the sample. However, correct quantification can only be achieved if the instrument's calibration table can identify the compounds that are responsible for at least 95 volume percent of the sample and meets the following quality control criteria.

(2) Quality assurance. (i) The performance standards will be from repeated measurement of the calibration mixture, standard reference material, or process control gasoline. The uncertainty in the measured aromatics percentages in the standards must be less than 2.0 volume percent in the fuel at a 95% confidence level.

(ii) If the bias of the standard mean is greater than 2% of the theoretical value, then the standard measurement and measurements of all samples measured subsequent to the previous standard measurement that met the per-

formance criteria must be repeated after re-calibrating the instrument.

(iii) Replicate samples must be within 3.0 volume percent of the previous sample or within 2.0 volume percent of the mean at the 95% confidence level.

(3) Alternative test method. (i) Prior to September 1, 1998, any refiner or importer may determine aromatics content using ASTM standard method D-1319-93, entitled "Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption," for purposes of meeting any testing requirement involving aromatics content; provided that

(1) The refiner or importer test result is correlated with the method specified in paragraph (f)(1) of this section.

(g) Oxygen and oxygenate content analysis. Oxygen and oxygenate content shall be determined by the gas chromatographic procedure using an oxygenate flame ionization detector (GC-OFID) as set out in paragraphs (g) (1) through (8) of this section.

(1) Introduction; scope of application. (i) The following single-column, direct-injection gas chromatographic procedure is a technique for quantifying the oxygenate content of gasoline.

(ii) This method covers the quantitative determination of the oxygenate content of gasoline through the use of an oxygenate flame ionization detector (OFID). It is applicable to individual organic oxygenated compounds (up to 20 mass percent each) in gasoline having a final boiling point not greater than 220 °C. Samples above this level should be diluted to fall within the specified range.

(iii) The total concentration of oxygen in the gasoline, due to oxygenated components, may also be determined with this method by summation of all peak areas except for dissolved oxygen, water, and the internal standard. Sensitivities to each component oxygenate must be incorporated in the calculation.

(iv) All oxygenated gasoline components (alcohols, ethers, etc.) may be assessed by this method.

(v) The total mass percent of oxygen in the gasoline due to oxygenated components also may be determined with

this method by summing all peak areas except for dissolved oxygen, water, and the internal standard.

(vi) Where trade names or specific products are noted in the method, equivalent apparatus and chemical reagents may be used. Mention of trade names or specific products is for the assistance of the user and does not constitute endorsement by the U.S. Environmental Protection Agency.

(2) *Summary of method.* A sample of gasoline is spiked to introduce an internal standard, mixed, and injected into a gas chromatograph (GC) equipped with an OFID. After chromatographic resolution the sample components enter a cracker reactor in which they are stoichiometrically converted to carbon monoxide (in the case of oxygenates), elemental carbon, and hydrogen. The carbon monoxide then enters a methanizer reactor for conversion to water and methane. Finally, the methane generated is determined by a flame ionization detector (FID).

(3) *Sample handling and preservation.*

(i) Samples shall be collected and stored in containers which will protect them from changes in the oxygenated component contents of the gasoline, such as loss of volatile fractions of the gasoline by evaporation.

(ii) If samples have been refrigerated they shall be brought to room temperature prior to analysis.

(iii) Gasoline is extremely flammable and should be handled cautiously and with adequate ventilation. The vapors are harmful if inhaled and prolonged breathing of vapors should be avoided. Skin contact should be minimized.

(4) *Apparatus.* (i) A GC equipped with an oxygenate flame ionization detector.

(ii) An autosampler for the GC is highly recommended.

(iii) A 60-m length, 0.25-mm ID, 1.0-µm film thickness, nonpolar capillary GC column (J&W DB-1 or equivalent) is recommended.

(iv) An integrator or other acceptable system to collect and process the GC signal.

(v) A positive displacement pipet (200 µL) for adding the internal standard.

(5) *Reagents and materials.* Gasoline and many of the oxygenate additives are extremely flammable and may be

toxic over prolonged exposure. Methanol is particularly hazardous. Persons performing this procedure must be familiar with the chemicals involved and all precautions applicable to each.

(i) Reagent grade oxygenates for internal standards and for preparation of standard solutions.

(ii) Supply of oxygenate-free gasoline for blank assessments and for preparation of standard solutions.

(iii) Calibration standard solutions containing known quantities of suspected oxygenates in gasoline.

(iv) Calibration check standard solutions prepared in the same manner as the calibration standards.

(v) Reference standard solutions containing known quantities of suspected oxygenates in gasoline.

(vi) Glass standard and test sample containers (between 5 and 100 ml capacity) fitted with a self-sealing polytetrafluoroethylene (PTFE) faced rubber septum crimp-on or screw-down sealing cap for preparation of standards and samples.

(6) *Calibration.*—(i)(A) Calibration standards of reagent-grade or better oxygenates (such as methanol, absolute ethanol, methyl t-butyl ether (MTBE), di-i-propyl ether (DIPE), ethyl t-butyl ether (ETBE), and t-amyl methyl ether (TAME)) are to be prepared gravimetrically by blending with gasoline that has been previously determined by GC/OFID to be free of oxygenates. Newly acquired stocks of reagent grade oxygenates shall be analyzed for contamination by GC/FID and GC/OFID before use.

(B) Required calibration standards (percent by volume in gasoline):

Oxygenate	Range (percent)	Number of standards (minimum)
Methanol	0.25–12.00	5
Ethanol	0.25–12.00	5
t-Butanol	0.25–12.00	5
MTBE	0.25–15.00	5

(ii) Take a glass sample container and its PTFE faced rubber septum sealing cap. Transfer a quantity of an oxygenate to the sample container and record the mass of the oxygenate to the nearest 0.1 mg. Repeat this process

for any additional oxygenates of interest except the internal standard. Add oxygenate-free gasoline to dilute the oxygenates to the desired concentration. Record the mass of gasoline added to the nearest 0.1 mg, and determine and label the standard according to the mass percent quantities of each oxygenate added. These standards are not to exceed 20 mass percent for any individual pure component due to potential hydrocarbon breakthrough and/or loss of calibration linearity.

(iii) Inject a quantity of an internal standard (such as 2-butanol) and weigh the contents again. Record the difference in masses as the mass of internal standard to the nearest 0.1 mg. The mass of the internal standard shall amount to between 2 and 6 percent of the mass of the test sample (standard). The addition of an internal standard reduces errors caused by variations in injection volumes.

(iv) Ensure that the prepared standard is thoroughly mixed and transfer approximately 2 ml of the solution to a vial compatible with the autosampler if such equipment is used.

(v) At least five concentrations of each of the expected oxygenates should be prepared. The standards should be as equally spaced as possible within the range and may contain more than one oxygenate. A blank for zero concentration assessments is also to be included. Additional standards should be prepared for other oxygenates of concern.

(vi) Based on the recommended chromatographic operating conditions specified in paragraph (g)(7)(i) of this section, determine the retention time of each oxygenate component by analyzing dilute aliquots either separately or in known mixtures. Reference should be made to the Chemical Abstracts Service (CAS) registry number of each of the analytes for proper identification. Approximate retention times for selected oxygenates under these conditions are as follows:

Oxygenate	CAS	Retention time (minutes)
Dissolved oxygen	7782-44-7	5.50
Water	7732-18-5	7.20
Methanol	67-56-1	9.10
Ethanol	64-17-5	12.80

Oxygenate	CAS	Retention time (minutes)
Propanone	67-64-1	15.00
2-Propanol	67-63-0	15.70
t-Butanol	75-65-0	18.00
n-Propanol	71-23-6	21.10
MTBE	1634-04-4	23.80
2-Butanol	15892-23-6	28.30
i-Butanol	78-83-1	30.30
ETBE	637-92-3	31.10
n-Butanol	71-36-3	33.50
TAME	994-05-8	35.30
i-Pentanol	137-32-6	38.10

(vii) By GC/OFID analysis, determine the peak area of each oxygenate and of the internal standard.

(viii) Obtain a calibration curve by performing a least-squares fit of the relative area response factors of the oxygenate standards to their relative mass response factors as follows:

$$R_{i,0} = b_0 R_{m,0} + b_1 (R_{m,0})^2$$

where:

$R_{i,0}$ = relative area response factor of the oxygenate, A_i/A_1

$R_{m,0}$ = relative mass response factor of the oxygenate, M_i/M_1

A_0 = area of the oxygenate peak

A_1 = area of the internal standard peak

M_0 = mass of the oxygenate added to the calibration standard

M_1 = mass of internal standard added to the calibration standard

b_0 = linear regression coefficient

b_1 = quadratic regression coefficient

(7) *Procedure.* (i) GC operating conditions:

(A) Oxygenate-free helium carrier gas: 1.1 ml/min (2 bar), 22.7 cm/sec at 115 °C;

(B) Carrier gas split ratio: 1:100;

(C) Zero air FID fuel: 370 ml/min (2 bar);

(D) Oxygenate free hydrogen FID fuel: 15 ml/min (2 bar);

(E) Injector temperature: 250 °C;

(F) Injection volume: 0.5 µL;

(G) Cracker reactor temperature: sufficiently high enough temperature to ensure reduction of all hydrocarbons to the elemental states (i.e., $C_n H_{2n} \rightarrow C + H_2$, etc.);

(H) FID temperature: 400 °C; and

(I) Oven temperature program: 40 °C for 6 min, followed by a temperature increase of 5 °C/min to 50 °C, hold at 50 °C for 5 min, followed by a temperature

Increase of 25 °C/min to 175 °C, and hold at 175 °C for 2 min.

(ii) Prior to analysis of any samples, inject a sample of oxygenate-free gasoline into the GC to test for hydrocarbon breakthrough overloading the cracker reactor. If breakthrough occurs, the OFID is not operating effectively and must be corrected before samples can be analyzed.

(iii) Prepare gasoline test samples for analysis as follows:

(A) Tare a glass sample container and its PTFE faced rubber septum sealing cap. Transfer a quantity of the gasoline sample to the sample container and record the mass of the transferred sample to the nearest 0.1 mg.

(B) Inject a quantity of the same internal standard (such as 2-butanol) used in generating the standards and weigh the contents again. Record the difference in masses as the mass of internal standard to the nearest 0.1 mg. The mass of the internal standard shall amount to between 2 and 6 percent of the mass of the test sample (standard). The addition of an internal standard reduces errors caused by variations in injection volumes.

(C) Ensure that this test sample (gasoline plus internal standard) is thoroughly mixed and transfer approximately 2 mL of the solution to a vial

compatible with the autosampler if such equipment is used.

(iv) After GC/OFID analysis, identify the oxygenates in the sample based on retention times, determine the peak area of each oxygenate and of the internal standard, and calculate the relative area response factor for each oxygenate.

(v) Monitor the peak area of the internal standard. A larger than expected peak area for the internal standard when analyzing a test sample may indicate that this oxygenate is present in the original sample. Prepare a new aliquot of the sample without addition of the oxygenate internal standard. If the presence of the oxygenate previously used as the internal standard can be detected, then either:

(A) The concentration of this oxygenate must be assessed by the method of standard additions; or

(B) An alternative internal standard, based on an oxygenate that is not present in the original sample, must be utilized with new calibration curves.

(vi) Calculate the relative mass response factor (R_{mo}) for each oxygenate based on the relative area response factor (R_{ao}) and the calibration equation in paragraph (g)(6)(viii) of this section.

(vii) Calculate the mass percent of the oxygenate in the test sample according to the following equation:

$$M_o \% = \frac{R_{mo} M_1 (100\%)}{M_s}$$

where:

M_o % = mass percent of the oxygenate in the test sample
 M_s = mass of sample to which internal standard is added

(viii) If the mass percent exceeds the calibrated range, gravimetrically dilute a portion of the original sample to a concentration within the calibration range and analyze this sample starting with paragraph (g)(7)(iii) of this section.

(ix) Report the total weight percent oxygen as follows:

(A) Subtract the peak areas due to dissolved oxygen, water, and the inter-

nal standard from the total summed peak areas of the chromatogram.

(B) Assume the total summed peak area solely due to one of the oxygenates that the instrument is calibrated for and determine the total mass percent as that oxygenate based on paragraph (g)(7)(vii) of this section. For simplicity, chose an oxygenate having one oxygen atom per molecule.

(C) Multiply this concentration by the molar mass of oxygen and divide by the molar mass of the chosen oxygenate to determine the mass percent oxygen in the sample. For example, if the

total peak area is based on MTBE, multiply by 16.00 (the molar mass of atomic oxygen) and divide by 88.15 (the molar mass of MTBE).

(x) Sufficient sample should be retained to permit reanalysis.

(8) *Quality control procedures and accuracy.* (i) The laboratory shall routinely monitor the repeatability (precision) of its analyses. The recommendations are:

(A) The preparation and analysis of laboratory duplicates at a rate of one per analysis batch or at least one per ten samples, whichever is more frequent.

(B) Laboratory duplicates shall be carried through all sample preparation steps independently.

(C) The range (R) for duplicate samples should be less than the following limits:

Oxygenate	Concentration mass percent	Upper limit for range mass percent
Methanol	0.27-1.07	0.010-0.043C
Methanol	1.07-12.73	0.053C
Ethanol	1.01-12.70	0.053C
MTBE	0.25-15.00	0.069+0.029C
DIPE	0.98-17.70	0.048C
ETBE	1.00-18.04	0.074C
TAME	1.04-18.59	0.060C

where:

$$C = (C_o + C_d) / 2$$

C_o = concentration of the original sample

C_d = concentration of the duplicate sample

$$R = \text{Range} / (C_o - C_d)$$

(D) If the limits in paragraph (g)(8)(i)(C) of this section are exceeded, the sources of error in the analysis should be determined, corrected, and all analyses subsequent to and including the last duplicate analysis confirmed to be within the compliance specifications must be repeated. The specification limits for the range and relative range of duplicate analyses are minimum performance requirements. The performance of individual laboratories may indeed be better than these minimum requirements. For this reason it is recommended that control charts be utilized to monitor the variability of measurements in order to optimally detect abnormal situations and ensure a stable measurement process.

(E) (i) For reference purposes, a single laboratory study of repeatability was conducted on approximately 27 replicates at each of five concentrations for each oxygenate. The variation of MTBE analyses as measured by standard deviation was very linear with respect to concentration. Where concentration is expressed as mass percent, over the concentration range of 0.25 to 15.0 mass percent this relationship is described by the equation:

$$\text{standard deviation} = 0.00784 \times C + 0.0187$$

(2) The other oxygenates of interest, methanol, ethanol, DIPE, ETBE, and TAME, had consistent coefficients of variation at one mass percent and above:

Oxygenate	Concentration mass percent	Coefficient of variation percent of point
Methanol	1.07-12.73	1.43
Ethanol	1.01-12.70	1.43
DIPE	0.98-17.70	1.29
ETBE	1.00-18.04	2.00
TAME	1.04-18.59	1.52

(3) The relationship of standard deviation and concentration for methanol between 0.27 and 1.07 mass percent was very linear and is described by the equation:

$$\text{standard deviation} = 0.0118 \times C + 0.0027$$

(4) Based on these relationships, repeatability for the selected oxygenates at 2.0 and 2.7 mass percent oxygen were determined to be as follows, where repeatability is defined as the half width of the 95 percent confidence interval (i.e., 1.96 standard deviations) for a single analysis at the stated concentration:

Oxygenate	Concentration			Repeatability mass percent
	Mass percent oxygen	Mass percent oxygenate	Volume percent oxygenate	
Methanol	2.0	4.00	3.75	0.11
Ethanol	2.0	5.75	5.41	0.16
MTBE	2.00	11.00	11.00	0.21
DIPE	2.0	12.77	13.00	0.32
ETBE	2.0	12.77	12.74	0.50
TAME	2.0	12.77	12.33	0.41
Methanol	2.7	5.40	5.07	0.15
Ethanol	2.7	7.76	7.31	0.21
MTBE	2.7	14.88	14.88	0.28
DIPE	2.7	17.24	17.53	0.43
ETBE	2.7	17.24	17.20	0.67

Oxygenate	Concentration			Repeatability mass per- cent
	Mass percent oxygen	Mass percent oxy- genate	Vol- ume percent oxy- genate	
TAME	2.7	17.24	16.68	0.55

(ii) The laboratory shall routinely monitor the accuracy of its analyses. The recommendations are:

(A) Calibration check standards and calibration standards may be prepared from the same oxygenate stocks and by the same analyst. However, calibration check standards and calibration standards must be prepared from separate batches of the final diluted standards. For the specification limits listed in paragraph (g)(8)(ii)(C) of this section, the concentration of the check standards should be in the range given in paragraph (g)(8)(i)(C) of this section.

(B) Calibration check standards shall be analyzed at a rate of at least one per analysis batch and at least one per 10 samples, whichever is more frequent.

(C) If the measured concentration of a calibration check standard is outside the range of 100.0% ±6.0% of the theoretical concentration for a selected oxygenate of 1.0 mass percent or above, the sources of error in the analysis should be determined, corrected, and all analyses subsequent to and including the last standard analysis confirmed to be within the compliance specifications must be repeated. The specification limits for the accuracy of calibration check standards analyses are minimum performance requirements. The performance of individual laboratories may indeed be better than these minimum requirements. For this reason it is recommended that control charts be utilized to monitor the variability of measurements in order to optimally detect abnormal situations and ensure a stable measurement process.

(D) Independent reference standards should be purchased or prepared from materials that are independent of the calibration standards and calibration

check standards, and must not be prepared by the same analyst. For the specification limits listed in paragraph (g)(8)(ii)(F) of this section, the concentration of the reference standards should be in the range given in paragraph (g)(8)(i)(C) of this section.

(E) Independent reference standards shall be analyzed at a rate of at least one per analysis batch and at least one per 100 samples, whichever is more frequent.

(F) If the measured concentration of an independent reference standard is outside the range of 100.0% ±10.0% of the theoretical concentration for a selected oxygenate of 1.0 mass percent or above, the sources of error in the analysis should be determined, corrected, and all analyses subsequent to and including the last independent reference standard analysis confirmed to be within the compliance specifications in that batch must be repeated. The specification limits for the accuracy of independent reference standards analyses are minimum performance requirements. The performance of individual laboratories may be better than these minimum requirements. For this reason it is recommended that control charts be utilized to monitor the variability of measurements in order to optimally detect abnormal situations and ensure a stable measurement process.

(G) The preparation and analysis of spiked samples at a rate of one per analysis batch and at least one per ten samples.

(H) Spiked samples shall be prepared by adding a volume of a standard to a known volume of sample. To ensure adequate method detection limits, the volume of the standard added to the sample shall be limited to 5% or less than the volume of the sample. The spiked sample shall be carried through the same sample preparation steps as the background sample.

(I) The percent recovery of the spiked sample shall be calculated as follows:

$$\% \text{ Recovery} = \frac{100\% (C_m (V_o + V_i) - C_o V_o)}{C_s V_i}$$

where:

V_o = Volume of sample (Ml)

V_i = Volume of spiking standard added (Ml)

C_m = Measured concentration of spiked sample

C_o = Measured background concentration of sample

C_s = Known concentration of spiking standard

(J) If the percent recovery of any individual spiked sample is outside the range 100% ±10% from the theoretical concentration, then the sources of error in the analysis must be determined and corrected, and all analyses subsequent to and including the last analysis confirmed to be within the compliance specifications must be repeated. The maintenance of control charts is one acceptable method or ensuring compliance with this specification.

(K) (1) Either the range (absolute difference) or relative range (but not necessarily both) for duplicate samples shall be less than the following limits:

Oxygenate	Concentration (volume percent)	Range	Rel- ative range (vol- ume per- cent)
Methanol	1.0-12.0	7.2
Ethanol	3.0-12.0	7.1
t-Butanol	3.0-12.0	9.4
MTBE	3.0-15.0	0.55	9.2

(2) Relative range is calculated as follows:

$$R_r = \frac{200(R)}{C_o + C_d}$$

where:

R_r = relative range

R = range

C_o = concentration of the original sample

C_d = concentration of the duplicate sample

(3) If the limits in paragraph (g)(8)(ii)(K)(1) of this section are exceeded, the sources of error in the analysis should be determined, corrected, and all analyses subsequent to and including the last duplicate analysis confirmed to be within the compliance

specifications must be repeated. The specification limits for the range and relative range of duplicate analyses are minimum performance requirements. The performance of individual laboratories may indeed be better than these minimum requirements. For this reason it is recommended that control charts be utilized to monitor the variability of measurements in order to optimally detect abnormal situations and ensure a stable measurement process. For reference purposes, a single laboratory study of precision (approximately 35 replicates) yielded the following estimates of method precision:

Oxygenate	Con- centration (weight percent)	Repeatability (volume per- cent)	(Percent)
Methanol	2.0	3.7	0.11
Ethanol	2.0	5.4	0.24
t-Butanol	2.0	8.8	0.39
MTBE	2.0	11.0	0.37

(4) Repeatability is defined as the half width of the 95 percent confidence interval for a single analysis at the stated concentration.

(iii) The laboratory shall routinely monitor the accuracy of its analyses. At a minimum this shall include:

(A) Calibration check standards and calibration standards may be prepared from the same oxygenate stocks and by the same analyst. However, calibration check standards and calibration standards must be prepared from separate batches of the final diluted standards. For the specification limits listed in paragraph (g)(8)(iii)(C) of this section, the concentration of the check standards should be in the range given in paragraph (g)(8)(iii)(C) of this section.

(B) Calibration check standards shall be analyzed at a rate of one per analysis batch or at least one per ten samples, whichever is more frequent.

(C) If the measured concentration of a calibration check standard is outside the range of 100% ±10% percent of the theoretical concentration for methanol and ethanol, or 100% ±13% for t-butanol and MTBE, the sources of error in the analysis should be determined, corrected, and all analyses subsequent to and including the last standard analysis confirmed to be within the compliance specifications must be repeated.

The specification limits for the accuracy of calibration check standards analyses are minimum performance requirements. The performance of individual laboratories may indeed be better than these minimum requirements. For this reason it is recommended that control charts be utilized to monitor the variability of measurements in order to optimally detect abnormal situations and ensure a stable measurement process.

(D) Independent reference standards shall be purchased or prepared from materials that are independent of the calibration standards and calibration check standards, and must not be prepared by the same analyst. For the specification limits listed in paragraph (g)(8)(iii)(F) of this section, the concentration of the reference standards should be in the range given in paragraph (g)(8)(iii)(C) of this section.

(E) Independent reference standards shall be analyzed at a rate of one per analysis batch or at least one per 100 samples, whichever is more frequent.

(F) If the measured concentration of an independent reference standard is outside the range of 100%±10% of the theoretical concentration for methanol and ethanol, or 100%±13% for t-butanol and MTBE, the sources of error in the

analysis should be determined, corrected, and all analyses subsequent to and including the last independent reference standard analysis confirmed to be within the compliance specifications in that batch must be repeated. The specification limits for the accuracy of independent reference standards analyses are minimum performance requirements. The performance of individual laboratories may indeed be better than these minimum requirements. For this reason it is recommended that control charts be utilized to monitor the variability of measurements in order to optimally detect abnormal situations and ensure a stable measurement process.

(G) If matrix effects are suspected, then spiked samples shall be prepared and analyzed as follows:

(1) Spiked samples shall be prepared by adding a volume of a standard to a known volume of sample. To ensure adequate method detection limits, the volume of the standard added to the sample should be minimized to 5% or less of the volume of the sample. The spiked sample should be carried through the same sample preparation steps as the background sample.

(2) The percent recovery of spiked samples should be calculated as follows:

$$\% \text{Recovery} = \frac{100 (C_s (V_o + V_s) - C_o V_o)}{C_s V_s}$$

where:

- C_s=concentration of spiked sample
- C_o=concentration of sample without spiking
- C_s=known concentration of spiking standard
- V_o=volume of sample
- V_s=volume of spiking standard added to the sample

(3) If the percent recovery of a spiked sample is outside the range of 100% ±13% of the theoretical concentration for methanol and ethanol, or 100% ±16% for t-butanol and MTBE, the sources of error in the analysis should be determined, corrected, and all analyses subsequent to and including the last analysis confirmed to be within the compli-

ance specifications must be repeated. The specification limits for the accuracy of the percent recovery of spiked sample analyses are minimum performance requirements. The performance of individual laboratories may indeed be better than these minimum requirements. For this reason it is recommended that control charts be utilized to monitor the variability of measurements in order to optimally detect abnormal situations and ensure a stable measurement process.

(9)(i) Prior to September 1, 1998, and when the oxygenates present are limited to MTBE, ETBE, TAME, DIPE,

tertiary-amyl alcohol, and C₁ to C₄ alcohols, any refiner, importer, or oxygenate blender may determine oxygen and oxygenate content using ASTM standard method D-4815-93, entitled "Standard Test Method for Determination of MTBE, ETBE, TAME, DIPE, tertiary-Amyl Alcohol and C₁ to C₄ Alcohols in Gasoline by Gas Chromatography," for purposes of meeting any testing requirement; provided that

(i) The refiner or importer test result is correlated with the method set forth in paragraphs (g)(1) through (g)(8) of this section.

(h) *Incorporations by reference.* ASTM standard methods D-3606-92, D-1319-93, D-4815-93, D-2622-92, and D-86-90 with the exception of the degrees Fahrenheit figures in Table 9 of D-86-90, are incorporated by reference. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(A) and 1 CFR part 51. Copies may be obtained from the American Society of Testing Materials, 1916 Race Street, Philadelphia, PA 19103. Copies may be inspected at the Air Docket Section (LE-131), room M-1500, U.S. Environmental Protection Agency, Docket No. A-92-12, 401 M Street SW., Washington, DC 20460 or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36961, July 20, 1994; 61 FR 58306, Nov. 13, 1996]

§ 80.47 [Reserved]

§ 80.48 Augmentation of the complex emission model by vehicle testing.

(a) The provisions of this section apply only if a fuel claims emission reduction benefits from fuel parameters that are not included in the complex emission model or complex emission model database, or if the values of fuel parameters included in the complex emission model set forth in § 80.45 fall outside the range of values for which the complex emission model is deemed valid.

(b) To augment the complex emission model described at § 80.45, the following requirements apply:

(1) The petitioner must obtain prior approval from the Administrator for

the design of the test program before beginning the vehicle testing process. To obtain approval, the petitioner must at minimum provide the following information: the fuel parameter to be evaluated for emission effects; the number and description of vehicles to be used in the test fleet, including model year, model name, vehicle identification number (VIN), mileage, emission performance (exhaust THC emission level), technology type, and manufacturer; a description of the methods used to procure and prepare the vehicles; the properties of the fuels to be used in the testing program (as specified at § 80.49); the pollutants and emission categories intended to be evaluated; the precautions used to ensure that the effects of the parameter in question are independent of the effects of other parameters already included in the model; a description of the quality assurance procedures to be used during the test program; the statistical analysis techniques to be used in analyzing the test data, and the identity and location of the organization performing the testing.

(2) Exhaust emissions shall be measured per the requirements of this section and § 80.49 through § 80.62.

(3) The nonexhaust emission model (including evaporative, running loss, and refueling VOC and toxics emissions) shall not be augmented by vehicle testing.

(4) The Agency reserves the right to observe and monitor any testing that is performed pursuant to the requirements of this section.

(5) The Agency reserves the right to evaluate the quality and suitability of data submitted pursuant to the requirements of this section and to reject, re-analyze, or otherwise evaluate such data as is technically warranted.

(6) Upon a showing satisfactory to the Administrator, the Administrator may approve a petition to waive the requirements of this section and § 80.49, § 80.50(a), § 80.60(d)(3), and § 80.60(d)(4) in order to better optimize the test program to the needs of the particular fuel parameter. Any such waiver petition should provide information justifying the requested waiver, including an acceptable rationale and supporting data. Petitioners must obtain approval from

the Administrator prior to conducting testing for which the requirements in question are waived. The Administrator may waive the noted requirements in whole or in part, and may impose appropriate conditions on any such waiver.

(c) In the case of petitions to augment the complex model defined at § 80.45 with a new parameter, the effect of the parameter being tested shall be determined separately, for each pollutant and for each emitter class category. If the parameter is not included in the complex model but is represented in whole or in part by one or more parameters included in the model, the petitioner shall be required to demonstrate the emission effects of the parameter in question independent of the effects of the already-included parameters. The petitioner shall also have to demonstrate the effects of the already-included parameters independent of the effects of the parameter in question. The emission performance of each vehicle on the fuels specified at § 80.49, as measured through vehicle testing in accordance with § 80.50 through § 80.62, shall be analyzed to determine the effects of the fuel parameter being tested on emissions according to the following procedure:

(1) The analysis shall fit a regression model to the natural logarithm of emissions measured from addition fuels 1, 2, and 3 only (as specified at § 80.49(a) and adjusted as per paragraph (c)(1)(iv) of this section and § 80.49(d)) that includes the following terms:

(i) A term for each vehicle that shall reflect the effect of the vehicle on emissions independent of fuel compositions. These terms shall be of the form $D_i \times V_i$, where D_i is the coefficient for the term and V_i is a dummy variable which shall have the value 1.0 for the i th vehicle and the value 0 for all other vehicles.

(ii) A linear term in the parameter being tested for each emitter class, of the form $A_i \times (P_i - P_i(\text{avg})) \times E_i$, where A_i is the coefficient for the term, P_i is the level of the parameter in question, $P_i(\text{avg})$ is the average level of the parameter in question for all seven test fuels specified at § 80.49(a)(1), and E_i is a dummy variable representing emitter class, as defined at § 80.62. For normal

emitters, $E_1=1$ and $E_2=0$. For higher emitters, $E_1=0$ and $E_2=1$.

(iii) For the VOC and NO_x models, a squared term in the parameter being tested for each emitter class, of the form $B_i \times (P_i - P_i(\text{avg}))^2 \times E_i$, where B_i is the coefficient for the term and where P_i , $P_i(\text{avg})$, and E_i are as defined in paragraph (c)(1)(ii) of this section.

(iv) To the extent that the properties of fuels 1, 2, and 3 which are incorporated in the complex model differ in value among the three fuels, the complex model shall be used to adjust the observed emissions from test vehicles on those fuels to compensate for those differences prior to fitting the regression model.

(v) The A_i and B_i terms and coefficients developed by the regression described in this paragraph (c) shall be evaluated against the statistical criteria defined in paragraph (e) of this section. If both terms satisfy these criteria, then both terms shall be retained. If the B_i term satisfies these criteria and the A_i term does not, then both terms shall be retained. If the B_i term does not satisfy these criteria, then the B_i term shall be dropped from the regression model and the model shall be re-estimated. If, after dropping the B_i term and re-estimating the model, the A_i term does not satisfy these criteria, then both terms shall be dropped, all test data shall be reported to EPA, and the augmentation request shall be denied.

(2) After completing the steps outlined in paragraph (c)(1) of this section, the analysis shall fit a regression model to a combined data set that includes vehicle testing results from all seven addition fuels specified at § 80.49(a), the vehicle testing results used to develop the model specified at § 80.45, and vehicle testing results used to support any prior augmentation requests which the Administrator deems necessary.

(i) The analysis shall fit the regression models described in paragraphs (c)(2)(ii) through (v) of this section to the natural logarithm of measured emissions.

(ii) All regressions shall include a term for each vehicle that shall reflect the effect of the vehicle on emissions independent of fuel compositions.

These terms shall be of the form $D_i \times V_i$, where D_i is the coefficient for the term and V_i is a dummy variable which shall have the value 1.0 for the i th vehicle and the value 0 for all other vehicles. Vehicles shall be represented by separate terms for each test program in which they were tested. The vehicle terms for the vehicles included in the test program undertaken by the petitioner shall be calculated based on the results from all seven fuels specified at § 80.49(a). Note that the D_i estimates for the petitioner's test vehicles in this regression are likely to differ from the D_i estimates discussed in paragraph (c)(1)(i) of this section since they will be based on a different set of fuels.

(iii) All regressions shall include existing complex model terms and their coefficients, including those augmentations that the Administrator deems necessary. All terms and coefficients shall be expressed in centered form. The Administrator shall make available upon request existing complex model terms and coefficients in centered form.

(iv) All regressions shall include the linear and squared terms, and their coefficients, estimated in the final regression model described in paragraph (c)(1) of this section.

(v) The VOC and NO_x regressions shall include those interactive terms with other fuel parameters, of the form $C_{(i,j)} \times (P_i - P_i(\text{avg})) \times (P_j - P_j(\text{avg})) \times E_i$, where $C_{(i,j)}$ is the coefficient for the term, P_i is the level of the parameter being added to the model, $P_i(\text{avg})$ is the average level of the parameter being added for all seven addition fuels specified at § 80.49(a), P_j is the level of the other fuel parameter, $P_j(\text{avg})$ is the centering value for the other fuel parameter used to develop the complex model or used in the other parameter's augmentation study, and E_i is as defined in paragraph (c)(1) of this section, which are found to satisfy the statistical criteria defined in paragraph (e) of this section. Such terms shall be added to the regression model in a stepwise manner.

(3) The model described in paragraphs (c)(1) and (2) of this section shall be developed separately for normal-emitting and higher-emitting vehicles. Each emitter class shall be treated as a dis-

tinct population for the purposes of determining regression coefficients.

(4) Once the augmented models described in paragraphs (c)(1) through (3) of this section have been developed, they shall be converted to an uncentered form through appropriate algebraic manipulation.

(5) The augmented model described in paragraph (c)(4) of this section shall be used to determine the effects of the parameter in question at levels between the levels in Fuels 1 and 3, as defined at § 80.49(a)(1), for all fuels which claim emission benefits from the parameter in question.

(d)(1) In the case of petitions to augment the complex model defined at § 80.45 by extending the range of an existing complex model parameter, the effect of the parameter being tested shall be determined separately, for each pollutant and for each technology group and emitter class category, at levels between the extension level and the nearest limit of the core of the data used to develop the unaugmented complex model as follows:

Fuel parameter	Data core limits	
	Lower	Upper
Sulfur, ppm	10	450
RVP, psi	7	10
E200, vol %	33	68
E300, vol %	72	94
Aromatics, vol %	18	46
Benzene, vol %	0.4	1.8
Olefins, vol %	1	19
Oxygen, wt %		
As ethanol	0	3.4
All others:	0	2.7

(2) The emission performance of each vehicle on the fuels specified at § 80.49(b)(2), as measured through vehicle testing in accordance with §§ 80.50 through 80.62, shall be analyzed to determine the effects of the fuel parameter being tested on emissions according to the following procedure:

(i) The analysis shall incorporate the vehicle testing data from the extension fuels specified at § 80.49(b), the vehicle testing results used to develop the model specified at § 80.45, and vehicle testing results used to support any prior augmentation requests which the Administrator deems necessary. A regression incorporating the following terms shall be fitted to the natural

logarithm of emissions contained in this combined data set:

(A) A term for each vehicle that shall reflect the effect of the vehicle on emissions independent of fuel compositions. These terms shall be of the form $D_i \times V_i$, where D_i is the coefficient for the term and V_i is a dummy variable which shall have the value 1.0 for the i th vehicle and the value 0 for all other vehicles. Vehicles shall be represented by separate terms for each test program in which they were tested. The vehicle terms for the vehicles included in the test program undertaken by the petitioner shall be calculated based on the results from all three fuels specified at § 80.49(b)(2).

(B) Existing complex model terms that do not include the parameter being extended and their coefficients, including those augmentations that the Administrator deems necessary. The centering values for these terms shall be identical to the centering values used to develop the complex model described at § 80.45.

(C) Existing complex model terms that include the parameter being extended. The coefficients for these terms shall be estimated by the regression. The centering values for these terms shall be identical to the centering values used to develop the complex model described at § 80.45.

(D) If the unaugmented VOC or NO_x complex models do not contain a squared term for the parameter being extended, such a term should be added in a stepwise fashion after completing the model described in paragraphs (d)(2)(1)(A) through (C) of this section. The coefficient for this term shall be estimated by the regression. The centering value for this term shall be identical to the centering value used to develop the complex model described at § 80.45.

(E) The terms defined in paragraphs (d)(2)(1)(C) and (D) of this section shall be evaluated against the statistical criteria defined in paragraph (e) of this section.

(i) The model described in paragraph (d)(2)(1) of this section shall be developed separately for normal-emitting and higher-emitting vehicles, as defined at § 80.62. Each emitter class shall be treated as a distinct population for

the purposes of determining regression coefficients.

(e) *Statistical criteria.* (1) The petitioner shall be required to submit evidence with the petition which demonstrates the statistical validity of the regression described in paragraph (c) or (d) of this section, including at minimum:

(i) Evidence demonstrating that collinearity problems are not severe, including but not limited to variance inflation statistics of less than 10 for the second-order and interactive terms included in the regression model.

(ii) Evidence demonstrating that the regression residuals are normally distributed, including but not limited to the skewness and Kurtosis statistics for the residuals.

(iii) Evidence demonstrating that overfitting and underfitting risks have been balanced, including but not limited to the use of Mallows' C_p criterion.

(2) The petitioner shall be required to submit evidence with the petition which demonstrates that the appropriate terms have been included in the regression, including at minimum:

(i) Descriptions of the analysis methods used to develop the regressions, including any computer code used to analyze emissions data and the results of regression runs used to develop the proposed augmentation, including intermediate regressions produced during the stepwise regression process.

(ii) Evidence demonstrating that the significance level used to include terms in the model was equal to 0.90.

(f) The complex emission model shall be augmented with the results of vehicle testing as follows:

(1) The terms and coefficients determined in paragraph (c) or (d) of this section shall be used to supplement the complex emission model equation for the corresponding pollutant and emitter category. These terms and coefficients shall be weighted to reflect the contribution of the emitter category to in-use emissions as shown at § 80.45.

(2) If the candidate parameter is not included in the unaugmented complex model and is not represented in whole or in part by one or more parameters included in the model, the modification shall be accomplished by adding the terms and coefficients to the complex

model equation for that pollutant, technology group, and emitter category.

(3) If the parameter is included in the complex model but is being tested at levels beyond the current range of the model, the terms and coefficients determined in paragraph (d) of this section shall be used to supplement the complex emission model equation for the corresponding pollutant.

(i) The terms and coefficients of the complex model described at § 80.45 shall be used to evaluate the emissions performance of fuels with levels of the parameter being tested that are within the valid range of the model, as defined at § 80.45.

(ii) The emissions performance of fuels with levels of the parameter that are beyond the valid range of the unaugmented model shall be given in percentage change terms by $100 \cdot [(100+A) \times (100+C) / (100+B)]$, where:

(A) "A" shall be set equal to the percentage change in emissions for a fuel with identical fuel property values to the fuel being evaluated except for the parameter being extended, which shall be set equal to the nearest limit of the data core, using the unaugmented complex model.

(B) "B" shall be set equal to the percentage change in emissions for the fuel described in paragraph (f)(3)(i) of this section according to the augmented complex model.

(C) "C" shall be set equal to the percentage change in emissions of the actual fuel being evaluated using the augmented complex model.

(g) EPA reserves the right to analyze the data generated during vehicle testing, to use such analyses to determine the validity of other augmentation petitions, and to use such data to update the complex model for use in certifying all reformulated gasolines.

(h) Duration of acceptance of emission effects determined through vehicle testing:

(1) If the Agency does not accept, modify, or reject a particular augmentation for inclusion in an updated complex model (performed through rulemaking), then the augmentation shall remain in effect until the next update to the complex model takes effect.

(2) If the Agency does reject or modify a particular augmentation for inclusion in an updated complex model, then the augmentation shall no longer be able to be used as of the date the updated complex model is deemed to take effect, unless the following conditions and limitations apply:

(i) The augmentation in question may continue to be used by those fuel suppliers which can prove, to the Administrator's satisfaction, that the fuel supplier had already begun producing a fuel utilizing the augmentation at the time the revised model is promulgated.

(ii) The augmentation in question may only be used to evaluate the emissions performance of fuels in conjunction with the complex emission model in effect as of the date of production of the fuels.

(iii) The augmentation may only be used for three years of fuel production, or a total of five years from the date the augmentation first took effect, whichever is shorter.

(3) The Administrator shall determine when sufficient new information on the effects of fuel properties on vehicle emissions has been obtained to warrant development of an updated complex model.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36962, July 20, 1994]

§ 80.49 Fuels to be used in augmenting the complex emission model through vehicle testing.

(a) Seven fuels (hereinafter called the "addition fuels") shall be tested for the purpose of augmenting the complex emission model with a parameter not currently included in the complex emission model. The properties of the addition fuels are specified in paragraphs (a) (1) and (2) of this section. The addition fuels shall be specified with at least the same level of detail and precision as in § 80.43(c), and this information must be included in the petition submitted to the Administrator requesting augmentation of the complex emission model.

(1) The seven addition fuels to be tested when augmenting the complex model specified at § 80.45 with a new fuel parameter shall have the properties specified as follows:

PROPERTIES OF FUELS TO BE TESTED WHEN AUGMENTING THE MODEL WITH A NEW FUEL PARAMETER

Fuel property	Fuels						
	1	2	3	4	5	6	7
Sulfur, ppm	150	150	150	35	35	500	500
Benzene, vol %	1.0	1.0	1.0	0.5	0.5	1.3	1.3
RVP, psi	7.5	7.5	7.5	6.5	6.5	8.1	8.1
E200, %	50	50	50	62	62	37	37
E300, %	85	85	85	92	92	79	79
Aromatics, vol %	27	27	27	20	20	45	45
Olefins, vol %	9.0	9.0	9.0	2.0	2.0	18	18
Oxygen, wt %	2.1	2.1	2.1	2.7	2.7	1.5	1.5
Octane, (R+M)/2	87	87	87	87	87	87	87
New Parameter ¹	C	C-B/2	B	C	B	C	B

¹ C=Candidate level, B=Baseline level.

(i) For the purposes of vehicle testing, the "baseline" level of the parameter shall refer to the level of the parameter in Clean Air Act baseline gasoline. The "candidate" level of the parameter shall refer to the most extreme value of the parameter, relative to baseline levels, for which the augmentation shall be valid.

(ii) If the fuel parameter for which the fuel supplier is petitioning EPA to augment the complex emission model (hereinafter defined as the "candidate parameter") is not specified for Clean Air Act summer baseline fuel, then the baseline level for the candidate parameter shall be set at the levels found in typical gasoline. This level and the justification for this level shall be included in the petitioner's submittal to EPA prior to initiating the test program, and EPA must approve this level prior to the start of the program.

(iii) If the candidate parameter is not specified for Clean Air Act summer baseline fuel, and is not present in typical gasoline, its baseline level shall be zero.

(2) The addition fuels shall contain detergent control additives in accordance with section 211(l) of the Clean Air Act Amendments of 1990 and the associated EPA requirements for such additives.

(3) The addition fuels shall be specified with at least the same level of detail and precision as in § 80.43(c), and this information shall be included in the petition submitted to the Administrator requesting augmentation of the complex emission model.

(i) Paraffin levels in Fuels 1 and 2 shall be altered from the paraffin level in Fuel 3 to compensate for the addition or removal of the candidate parameter, if necessary. Paraffin levels in Fuel 4 shall be altered from the paraffin level in Fuel 5 to compensate for the addition or removal of the candidate parameter, if necessary. Paraffin levels in Fuel 6 shall be altered from the paraffin level in Fuel 7 to compensate for the addition or removal of the candidate parameter, if necessary.

(ii) Other properties of Fuels 4 and 6 shall not vary from the levels for Fuels 5 and 7, respectively, unless such variations are the naturally-occurring result of the changes described in paragraphs (a)(1) and (2) of this section. Other properties of Fuels 1 and 2 shall not vary from the levels for Fuel 3, unless such variations are the naturally-occurring result of the changes described in paragraphs (a)(1) and (2) of this section.

(iii) The addition fuels shall be specified with at least the same level of detail and precision as defined in paragraph (a)(5)(i) of this section, and this information must be included in the petition submitted to the Administrator requesting augmentation of the complex emission model.

(4) The properties of the addition fuels shall be within the blending tolerances defined in this paragraph (a)(4) relative to the values specified in paragraphs (a)(1) and (2) of this section. Fuels that do not meet these tolerances shall require the approval of the Administrator to be used in vehicle

testing to augment the complex emission model:

Fuel parameter	Blending tolerance
Sulfur content	±25 ppm.
Benzene content	±0.2 vol %.
RVP	±0.2 psi.
E200 level	±2 %.
E300 level	±4 %.
Oxygenate content	±1.0 vol %.
Aromatics content	±2.7 vol %.
Olefins content	±2.5 vol %.
Saturates content	±2.0 vol %.
Octane	±0.5.
Detergent control additives	±10% of the level required by EPA's detergents rule.
Candidate parameter	To be determined as part of the augmentation process.

(5) The composition and properties of the addition fuels shall be determined by averaging a series of independent tests of the properties and compositional factors defined in paragraph (a)(5)(i) of this section as well as any additional properties or compositional factors for which emission benefits are claimed.

(i) The number of independent tests to be conducted shall be sufficiently large to reduce the measurement uncertainty for each parameter to a sufficiently small value. At a minimum the 95% confidence limits (as calculated using a standard t-test) for each parameter must be within the following range of the mean measured value of each parameter:

Fuel parameter	Measurement uncertainty
API gravity	±0.2°API
Sulfur content	±10 ppm
Benzene content	±0.02 vol %
RVP	±0.05 psi
Octane	±0.2(R+M)/2
E200 level	±2%
E300 level	±2%
Oxygenate content	±0.2 vol %
Aromatics content	±0.5 vol %
Olefins content	±0.3 vol %
Saturates content	±1.0 vol %
Detergent control Additives.	±2% of the level required by EPA's detergents rule.

LEVEL OF EXISTING COMPLEX MODEL PARAMETERS BEING EXTENDED

Fuel property being extended	Extension fuel No. 1	Extension fuel No. 2	Extension fuel No. 3
Sulfur, ppm	Extension level	60	450
Benzene, vol %	Extension level	0.5	1.5
RVP, psi	Extension level	6.7	8.0
E200, %	Extension level	38	61
E300, %	Extension level	78	92
Aromatics, vol %	Extension level	20	45
Olefins, vol %	Extension level	3.0	18
Oxygen, wt %	Extension level	1.7	2.7

(ii) The 95% confidence limits for measurements of fuel parameters for which emission reduction benefits are claimed and for which tolerances are not defined in paragraph (a)(5)(i) of this section must be within ±5% of the mean measured value.

(iii) Each test must be conducted in the same laboratory in accordance with the procedures outlined at § 80.46.

(b) Three fuels (hereinafter called the "extension fuels") shall be tested for the purpose of extending the valid range of the complex emission model for a parameter currently included in the complex emission model. The properties of the extension fuels are specified in paragraphs (b)(2) through (4) of this section. The extension fuels shall be specified with at least the same level of detail and precision as in § 80.43(c), and this information must be included in the petition submitted to the Administrator requesting augmentation of the complex emission model. Each set of three extension fuels shall be used only to extend the range of a single complex model parameter.

(1) The "extension level" shall refer to the level to which the parameter being tested is to be extended. The three fuels to be tested when extending the range of fuel parameters already included in the complex model or a prior augmentation to the complex model shall be referred to as "extension fuels."

(2) The composition and properties of the extension fuels shall be as described in paragraphs (b)(2) (i) and (ii) of this section.

(i) The extension fuels shall have the following levels of the parameter being extended:

LEVEL OF EXISTING COMPLEX MODEL PARAMETERS BEING EXTENDED—Continued

Fuel property being extended	Extension fuel No. 1	Extension fuel No. 2	Extension fuel No. 3
Octane, R+M/2	87	87	87

(ii) The levels of parameters other than the one being extended shall be given by the following table for all three extension fuels:

LEVELS FOR FUEL PARAMETERS OTHER THAN THOSE BEING EXTENDED

Fuel property	Extension fuel No. 1	Extension fuel No. 2	Extension fuel No. 3
Sulfur, ppm	150	150	150
Benzene, vol %	1.0	1.0	1.0
RVP, psi	7.5	7.5	7.5
E200, %	50	50	50
E300, %	85	85	85
Aromatics, vol %	25	25	25
Olefins, vol %	9.0	9.0	9.0
Oxygen, wt %	2.0	2.0	2.0
Octane, R+M/2	87	87	87

(3) If the Complex Model for any pollutant includes one or more interactive terms involving the parameter being extended, then two additional extension fuels shall be required to be tested for each such interactive term. These additional extension fuels shall have the following properties:

(i) The parameter being tested shall be present at its extension level.

(ii) The interacting parameter shall be present at the levels specified in paragraph (b)(2)(i) of this section for extension Fuels 2 and 3.

(iii) All other parameters shall be present at the levels specified in paragraph (b)(2)(ii) of this section.

(4) All extension fuels shall contain detergent control additives in accordance with Section 211(l) of the Clean Air Act Amendments of 1990 and the associated EPA requirements for such additives.

(c) The addition fuels defined in paragraph (a) of this section and the extension fuels defined in paragraph (b) of this section shall meet the following requirements for blending and measurement precision:

(1) The properties of the test and extension fuels shall be within the blending tolerances defined in this paragraph (c) relative to the values specified in paragraphs (a) and (b) of this

section. Fuels that do not meet the following tolerances shall require the approval of the Administrator to be used in vehicle testing to augment the complex emission model:

Fuel parameter	Blending tolerance
Sulfur content	±25 ppm.
Benzene content	±0.2 vol %.
RVP	±0.2 psi.
E200 level	±2 %.
E300 level	±4 %.
Oxygenate content	±1.5 vol %.
Aromatics content	±2.7 vol %.
Olefins content	±2.5 vol %.
Saturates content	±2.0 vol %.
Octane	±0.5.
Candidate parameter	To be determined as part of the augmentation process.

(2) The extension and addition fuels shall be specified with at least the same level of detail and precision as defined in paragraph (c)(2)(i) of this section, and this information must be included in the petition submitted to the Administrator requesting augmentation of the complex emission model.

(i) The composition and properties of the addition and extension fuels shall be determined by averaging a series of independent tests of the properties and compositional factors defined in paragraph (c)(2)(ii) of this section as well as any additional properties or compositional factors for which emission benefits are claimed.

(ii) The number of independent tests to be conducted shall be sufficiently large to reduce the measurement uncertainty for each parameter to a sufficiently small value. At a minimum the 95% confidence limits (as calculated using a standard t-test) for each parameter must be within the following range of the mean measured value of each parameter:

Fuel parameter	Measurement uncertainty
API gravity	±0.2 °API.
Sulfur content	±5 ppm.
Benzene content	±0.05 vol %.
RVP	±0.08 psi.
Octane	±0.1 (R+M/2).
E200 level	±2 %.

Fuel parameter	Measurement uncertainty
E300 level	±2 %.
Oxygenate content	±0.2 vol %.
Aromatics content	±0.5 vol %.
Olefins content	±0.3 vol %.
Saturates content	±1.0 vol %.
Octane	±0.2.
Candidate parameter	To be determined as part of the augmentation process.

(iii) Petitioners shall obtain approval from EPA for the 95% confidence limits for measurements of fuel parameters for which emission reduction benefits are claimed and for which tolerances are not defined in paragraph (c)(2)(i) of this section.

(iv) Each test must be conducted in the same laboratory in accordance with the procedures outlined at § 80.46.

(v) The complex emission model described at § 80.45 shall be used to adjust the emission performance of the addition and extension fuels to compensate for differences in fuel compositions that are incorporated in the complex model, as described at § 80.48. Compensating adjustments for naturally-occurring variations in fuel parameters shall also be made using the complex model. The adjustment process is described in paragraph (d) of this section.

(d) The complex emission model described at § 80.45 shall be used to adjust

the emission performance of addition and extension fuels to compensate for differences in fuel parameters other than the parameter being tested. Compensating adjustments for naturally-occurring variations in fuel parameters shall also be made using the complex model. These adjustments shall be calculated as follows:

(1) Determine the exhaust emissions performance of the actual addition or extension fuels relative to the exhaust emissions performance of Clean Air Act baseline fuel using the complex model. For addition fuels, set the level of the parameter being tested at baseline levels for purposes of emissions performance evaluation using the complex model. For extension fuel #1, set the level of the parameter being extended at the level specified in extension fuel #2. Also determine the exhaust emissions performance of the addition fuels specified in paragraph (a)(1) of this section with the level of the parameter being tested set at baseline levels.

(2) Calculate adjustment factors for each addition fuel as follows:

(i) Adjustment factors shall be calculated using the formula:

$$A = \frac{[1 + (P(\text{actual}) 100)]}{[1 + (P(\text{nominal}) 100)]}$$

where

A=the adjustment factor

P(actual)=the performance of the actual fuel used in testing according to the complex model

P(nominal)=the performance that would have been achieved by the test fuel defined in paragraph (a)(1) of this section according to the complex model (as described in paragraph (d)(1) of this section).

(ii) Adjustment factors shall be calculated for each pollutant and for each emitter class.

(3) Multiply the measured emissions from each vehicle by the corresponding adjustment factor for the appropriate addition or extension fuel, pollutant,

and emitter class. Use the resulting adjusted emissions to conduct all modeling and emission effect estimation activities described in § 80.48.

(e) All fuels included in vehicle testing programs shall have an octane number of 87.5, as measured by the (R+M)/2 method following the ASTM D4814 procedures, to within the measurement and blending tolerances specified in paragraph (c) of this section.

(f) A single batch of each addition or extension fuel shall be used throughout the duration of the testing program.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36962, July 20, 1994]

§ 80.50 General test procedure requirements for augmentation of the emission models.

(a) The following test procedure must be followed when testing to augment the complex emission model described at § 80.45.

(1) VOC, NO_x, CO, and CO₂ emissions must be measured for all fuel-vehicle combinations tested.

(2) Toxics emissions must be measured when testing the extension fuels per the requirements of § 80.49(a) or when testing addition fuels 1, 2, and 3 per the requirements of § 80.49(a).

(3) When testing addition fuels 4, 5, 6, and 7 per the requirements of § 80.49(a), toxics emissions need not be measured. However, EPA reserves the right to require the inclusion of such measurements in the test program prior to approval of the test program if evidence exists which suggests that adverse interactive effects of the parameter in question may exist for toxics emissions.

(b) The general requirements per 40 CFR 86.130-96 shall be met.

(c) The engine starting and restarting procedures per 40 CFR 86.136-90 shall be followed.

(d) Except as provided for at § 80.59, general preparation of vehicles being tested shall follow procedures detailed in 40 CFR 86.130-96 and 86.131-96.

§ 80.51 Vehicle test procedures.

The test sequence applicable when augmenting the emission models through vehicle testing is as follows:

(a) Prepare vehicles per § 80.50.

(b) Initial preconditioning per § 80.52(a)(1). Vehicles shall be refueled randomly with the fuels required in § 80.49 when testing to augment the complex emission model.

(c) Exhaust emissions tests, dynamometer procedure per 40 CFR 86.137-90 with:

(1) Exhaust Benzene and 1,3-Butadiene emissions measured per § 80.55; and

(2) Formaldehyde and Acetaldehyde emissions measured per § 80.56.

§ 80.52 Vehicle preconditioning.

(a) Initial vehicle preconditioning and preconditioning between tests with different fuels shall be performed in ac-

cordance with the "General vehicle handling requirements" per 40 CFR 86.132-96, up to and including the completion of the hot start exhaust test.

(b) The preconditioning procedure prescribed at 40 CFR 86.132-96 shall be observed for preconditioning vehicles between tests using the same fuel.

§§ 80.53-80.54 [Reserved]

§ 80.55 Measurement methods for benzene and 1,3-butadiene.

(a) Sampling for benzene and 1,3-butadiene must be accomplished by bag sampling as used for total hydrocarbons determination. This procedure is detailed in 40 CFR 86.109.

(b) Benzene and 1,3-butadiene must be analyzed by gas chromatography. Expected values for benzene and 1,3-butadiene in bag samples for the baseline fuel are 4.0 ppm and 0.30 ppm respectively. At least three standards ranging from at minimum 50% to 150% of these expected values must be used to calibrate the detector. An additional standard of at most 0.01 ppm must also be measured to determine the required limit of quantification as described in paragraph (d) of this section.

(c) The sample injection size used in the chromatograph must be sufficient to be above the laboratory determined limit of quantification (LOQ) as defined in paragraph (d) of this section for at least one of the bag samples. A control chart of the measurements of the standards used to determine the response, repeatability, and limit of quantification of the instrumental method for 1,3-butadiene and benzene must be reported.

(d) As in all types of sampling and analysis procedures, good laboratory practices must be used. See, Lawrence, *Principals of Environmental Analysis*, 55 *Analytical Chemistry* 14, at 2210-2218 (1983) (copies may be obtained from the publisher, American Chemical Society, 1155 16th Street NW., Washington, DC 20036). Reporting reproducibility control charts and limits of detection measurements are integral procedures to assess the validity of the chosen analytical method. The repeatability of the test method must be determined by measuring a standard periodically during testing and recording the measured

values on a control chart. The control chart shows the error between the measured standard and the prepared standard concentration for the periodic testing. The error between the measured standard and the actual standard indicates the uncertainty in the analysis. The limit of detection (LOD) is determined by repeatedly measuring a blank and a standard prepared at a concentration near an assumed value of the limit of detection. If the average concentration minus the average of the blanks is greater than three standard deviations of these measurements, then the limit of detection is at least as low as the prepared standard. The limit of quantitation (LOQ) is defined as ten times the standard deviation of these measurements. This quantity defines the amount of sample required to be measured for a valid analysis.

(e) Other sampling and analytical techniques will be allowed if they can be proven to have equal specificity and equal or better limits of quantitation. Data from alternative methods that can be demonstrated to have equivalent or superior limits of detection, precision, and accuracy may be accepted by the Administrator with individual prior approval.

§ 80.56 Measurement methods for formaldehyde and acetaldehyde.

(a) Formaldehyde and acetaldehyde will be measured by drawing exhaust samples from heated lines through either 2,4-Dinitrophenylhydrazine (DNPH) impregnated cartridges or impingers filled with solutions of DNPH in acetonitrile (ACN) as described in §§ 86.109 and 86.140 of this chapter for formaldehyde analysis. Diluted exhaust sample volumes must be at least 15 L for impingers containing 20 ml of absorbing solution (using more absorbing solution in the impinger requires proportionally more gas sample to be taken) and at least 4 L for cartridges. As required in § 86.109 of this chapter, two impingers or cartridges must be connected in series to detect breakthrough of the first impinger or cartridge.

(b) In addition, sufficient sample must be drawn through the collecting cartridges or impingers so that the measured quantity of aldehyde is suffi-

ciently greater than the minimum limit of quantitation of the test method for at least a portion of the exhaust test procedure. The limit of quantitation is determined using the technique defined in § 80.55(d).

(c) Each of the impinger samples are quantitatively transferred to a 25 mL volumetric flask (5 mL more than the sample impinger volume) and brought to volume with ACN. The cartridge samples are eluted in reversed direction by gravity feed with 6 mL of ACN. The eluate is collected in a graduated test tube and made up to the 5 mL mark with ACN. Both the impinger and cartridge samples must be analyzed by HPLC without additional sample preparation.

(d) The analysis of the aldehyde derivatives collected is accomplished with a high performance liquid chromatograph (HPLC). Standards consisting of the hydrazone derivative of formaldehyde and acetaldehyde are used to determine the response, repeatability, and limit of quantitation of the HPLC method chosen for acetaldehyde and formaldehyde.

(e) Other sampling and analytical techniques will be allowed if they can be proven to have equal specificity and equal or better limits of quantitation. Data from alternative methods that can be demonstrated to have equivalent or superior limits of detection, precision, and accuracy may be accepted by the Administrator with individual prior approval.

§§ 80.57-80.58 [Reserved]

§ 80.59 General test fleet requirements for vehicle testing.

(a) The test fleet must consist of only 1989-91 MY vehicles which are technologically equivalent to 1990 MY vehicles, or of 1986-88 MY vehicles for which no changes to the engine or exhaust system that would significantly affect emissions have been made through the 1990 model year. To be technologically equivalent vehicles at minimum must have closed-loop systems and possess adaptive learning.

(b) No maintenance or replacement of any vehicle component is permitted except when necessary to ensure operator safety or as specifically permitted

in § 80.60 and § 80.61. All vehicle maintenance procedures must be reported to the Administrator.

(c) Each vehicle in the test fleet shall have no fewer than 4,000 miles of accumulated mileage prior to being included in the test program.

(59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36962, July 20, 1994)

§ 80.60 Test fleet requirements for exhaust emission testing.

(a) Candidate vehicles which conform to the emission performance requirements defined in paragraphs (b) through (d) of this section shall be obtained directly from the in-use fleet and tested in their as-received condition.

(b) Candidate vehicles for the test fleet must be screened for their exhaust VOC emissions in accordance with the provisions in § 80.62.

(c) On the basis of pretesting pursuant to paragraph (b) of this section, the test fleet shall be subdivided into two emitter group sub-fleets: the normal emitter group and the higher emitter group.

(1) Each vehicle with an exhaust total hydrocarbon (THC) emissions rate which is less than or equal to twice the applicable emissions standard shall be placed in the normal emitter group.

(2) Each vehicle with an exhaust THC emissions rate which is greater than

two times the applicable emissions standard shall be placed in the higher emitter group.

(d) The test vehicles in each emitter group must conform to the requirements of paragraphs (d)(1) through (4) of this section.

(1) Test vehicles for the normal emitter sub-fleet must be selected from the list shown in this paragraph (d)(1). This list is arranged in order of descending vehicle priority, such that the order in which vehicles are added to the normal emitter sub-fleet must conform to the order shown (e.g., a ten-vehicle normal emitter group sub-fleet must consist of the first ten vehicles listed in this paragraph (d)(1)). If more vehicles are tested than the minimum number of vehicles required for the normal emitter sub-fleet, additional vehicles are to be added to the fleet in the order specified in this paragraph (d)(1), beginning with the next vehicle not already included in the group. The vehicles in the normal emitter sub-fleet must possess the characteristics indicated in the list. If the end of the list is reached in adding vehicles to the normal emitter sub-fleet and additional vehicles are desired then they shall be added beginning with vehicle number one, and must be added to the normal emitter sub-fleet in accordance with the order in Table A:

TABLE A—TEST FLEET DEFINITIONS

Veh No	Fuel system	Catalyst	Air injection	EGR	Tech. group	Manufacturer
1	Multi	3W	No Air	EGR	1	GM
2	Multi	3W	No Air	No EGR	2	Ford
3	TBI	3W	No Air	EGR	3	GM
4	Multi	3W+OX	Air	EGR	4	Ford
5	Multi	3W	No Air	EGR	1	Honda
6	Multi	3W	No Air	No EGR	2	GM
7	TBI	3W	No Air	EGR	3	Chrysler
8	Multi	3W+OX	Air	EGR	4	GM
9	TBI	3W+OX	Air	EGR	7	Chrysler
10	Multi	3W	Air	EGR	5	Toyota
11	Multi	3W	No Air	EGR	1	Ford
12	Multi	3W	No Air	No EGR	2	Chrysler
13	Carb	3W+OX	Air	EGR	9	Toyota
14	TBI	3W	No Air	EGR	3	Ford
15	Multi	3W+OX	Air	EGR	4	GM
16	Multi	3W	No Air	EGR	1	Toyota
17	Multi	3W	No Air	No EGR	2	Mazda
18	TBI	3W	No Air	EGR	3	GM
19	Multi	3W+OX	Air	EGR	4	Ford
20	Multi	3W	No Air	EGR	1	Nissan

TABLE B—TECH GROUP DEFINITIONS IN TABLE A

Tech group	Fuel system	Catalyst	Air injection	EGR
1	Multi	3W	No Air	EGR
2	Multi	3W	No Air	No EGR
3	TBI	3W	No Air	EGR
4	Multi	3W+OX	Air	EGR
5	Multi	3W	Air	EGR
6	TBI	3W	Air	EGR
7	TBI	3W+OX	Air	EGR
8	TBI	3W	No Air	No EGR
9	Carb	3W+OX	Air	EGR

Legend:

Fuel system:

- Multi=Multi-point fuel injection
- TBI=Throttle body fuel injection
- Carb=Carburetted

Catalyst:

- 3W=3-Way catalyst
- 3W+OX=3-Way catalyst plus an oxidation catalyst

Air Injection:

- Air=Air injection
- EGR=Exhaust gas recirculation

(2) Test vehicles for the higher emitter sub-fleet shall be selected from the in-use fleet in accordance with paragraphs (a) and (b) of this section and with § 80.59. Test vehicles for the higher emitter sub-fleet are not required to follow the pattern established in paragraph (d)(1) of this section.

(3) The minimum test fleet size is 20 vehicles. Half of the vehicles tested must be included in the normal emitter sub-fleet and half of the vehicles tested must be in the higher emitter sub-fleet. If additional vehicles are tested beyond the minimum of twenty vehicles, the additional vehicles shall be distributed equally between the normal and higher emitter sub-fleets.

(4) For each emitter group sub-fleet, 70 ± 9.5% of the sub-fleet must be LDVs, & 30 ± 9.5% must be LDTs. LDTs include light-duty trucks class 1 (LDT1), and light-duty trucks class 2 (LDT2) up to 8500 lbs GVWR.

§ 80.61 [Reserved]

§ 80.62 Vehicle test procedures to place vehicles in emitter group sub-fleets.

One of the two following test procedures must be used to screen candidate vehicles for their exhaust THC emissions to place them within the emitter group sub-fleets in accordance with the requirements of § 80.60.

(a) Candidate vehicles may be tested for their exhaust THC emissions using the federal test procedure as detailed in 40 CFR part 86, with gasoline conforming to requirements detailed in 40 CFR 86.113-90. The results shall be used in accordance with the requirements in § 80.60 to place the vehicles within their respective emitter groups.

(b) Alternatively, candidate vehicles may be screened for their exhaust THC emissions with the IM240 short test procedure.¹ The results from the IM240 shall be converted into results comparable with the standard exhaust FTP as detailed in this paragraph (b) to place the vehicles within their respective emitter groups in accordance with the requirements of § 80.60.

(1) A candidate vehicle with IM240 test results <0.367 grams THC per vehicle mile shall be classified as a normal emitter.

(2) A candidate vehicle with IM240 test results ≥0.367 grams THC per vehicle mile shall be classified as a higher emitter.

§§ 80.63-80.64 [Reserved]

§ 80.65 General requirements for refiners, importers, and oxygenate blenders.

(a) *Date requirements begin.* The requirements of this subpart D apply to all gasoline produced, imported, transported, stored, sold, or dispensed:

(1) At any location other than retail outlets and wholesale purchaser-consumer facilities on or after December 1, 1994; and

¹ EPA Technical Report EPA-AA-TSS-91-1. Copies may be obtained by ordering publication number PB92104405 from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

(2) At any location on or after January 1, 1995.

(b) *Certification of gasoline and RBOB.* Gasoline or RBOB sold or dispensed in a covered area must be certified under § 80.40.

(c) *Standards must be met on either a per-gallon or on an average basis.* (1) Any refiner or importer, for each batch of reformulated gasoline or RBOB it produces or imports, shall meet:

(i) Those standards and requirements it designated under paragraph (d) of this section for per-gallon compliance on a per-gallon basis; and

(ii) Those standards and requirements it designated under paragraph (d) of this section for average compliance on an average basis over the applicable averaging period; except that

(iii) Refiners and importers are not required to meet the oxygen standard for RBOB.

(2) Any oxygenate blender, for each batch of reformulated gasoline it produces by blending oxygenate with RBOB shall, subsequent to the addition of oxygenate, meet the oxygen standard either per-gallon or average over the applicable averaging period.

(3)(i) For each averaging period, and separately for each parameter that may be met either per-gallon or on average, any refiner shall designate for each refinery, and any importer or oxygenate blender shall designate, its gasoline or RBOB as being subject to the standard applicable to that parameter on either a per-gallon or average basis. For any specific averaging period and parameter all batches of gasoline or RBOB shall be designated as being subject to the per-gallon standard, or all batches of gasoline and RBOB shall be designated as being subject to the average standard. For any specific averaging period and parameter a refiner for a refinery, or any importer or oxygenate blender, may not designate certain batches as being subject to the per-gallon standard and others as being subject to the average standard.

(ii) In the event any refiner for a refinery, or any importer or oxygenate blender, fails to meet the requirements of paragraph (c)(3)(i) of this section and for a specific averaging period and parameter designates certain batches as being subject to the per-gallon stand-

ard and others as being subject to the average standard, all batches produced or imported during the averaging period that were designated as being subject to the average standard shall, *ab initio*, be redesignated as being subject to the per-gallon standard. This redesignation shall apply regardless of whether the batches in question met or failed to meet the per-gallon standard for the parameter in question.

(d) *Designation of gasoline.* Any refiner or importer of gasoline shall designate the gasoline it produces or imports as follows:

(1) All gasoline produced or imported shall be properly designated as either reformulated or conventional gasoline, or as RBOB.

(2) All gasoline designated as reformulated or as RBOB shall be further properly designated as:

(i) Either VOC-controlled or not VOC-controlled;

(ii) In the case of gasoline or RBOB designated as VOC-controlled, either intended for use in VOC-Control Region 1 or VOC-Control Region 2 (as defined in § 80.71);

(iii) Reformulated gasoline (but not RBOB) must be designated either as oxygenated fuels program reformulated gasoline, or not oxygenated fuels program reformulated gasoline.

(A) Gasoline must be designated as oxygenated fuels program reformulated gasoline if such gasoline:

(1) Has an oxygen content that is greater than or equal to 2.0 weight percent; and

(2) Arrives at a terminal from which gasoline is dispensed into trucks used to deliver gasoline to an oxygenated fuels control area within five days prior to the beginning of the oxygenated fuels control period for that control area.

(B) Gasoline may be designated as oxygenated fuels program reformulated gasoline if such gasoline has an oxygen content that is greater than or equal to 2.0 weight percent, regardless of whether the gasoline is intended for use in any oxygenated fuels program control area during an oxygenated fuels program control period.

(iv) For gasoline or RBOB produced, imported, sold, dispensed or used during the period January 1, 1995 through

December 31, 1997, either as being subject to the simple model standards, or to the complex model standards;

(v) For each of the following parameters, either gasoline or RBOB which meets the standard applicable to that parameter on a per-gallon basis or on average:

(A) Toxics emissions performance;

(B) NO_x emissions performance in the case of gasoline certified using the complex model.

(C) Benzene content;

(D) With the exception of RBOB, oxygen content;

(E) In the case of VOC-controlled gasoline or RBOB certified using the simple model, RVP; and

(F) In the case of VOC-controlled gasoline or RBOB certified using the complex model, VOC emissions performance; and

(vi) In the case of RBOB, as RBOB that may be blended with:

(A) Any oxygenate;

(B) Ether only;

(C) Any renewable ox. renate;

(D) Renewable ether only;

(E) Non-VOC controlled renewable ether only.

(3) Every batch of reformulated or conventional gasoline or RBOB produced or imported at each refinery or import facility, or each batch of blendstock produced and sold or transferred if blendstock accounting is required under § 80.102(e), shall be assigned a number (the "batch number"), consisting of the EPA-assigned refiner, importer or oxygenate blender registration number, the EPA-assigned facility registration number, the last two digits of the year in which the batch was produced, and a unique number for the batch, beginning with the number one for the first batch produced or imported each calendar year and each subsequent batch during the calendar year being assigned the next sequential number (e.g., 4321-54321-95-000001, 4321-54321-95-000002, etc.).

(e) *Determination of properties.* (1) Each refiner or importer shall determine the value of each of the properties specified in paragraph (e)(2)(i) of this section for each batch of reformulated gasoline it produces or imports prior to the gasoline leaving the refinery or import facility, by collecting

and analyzing a representative sample of gasoline taken from the batch, using the methodologies specified in § 80.46. This collection and analysis shall be carried out either by the refiner or importer, or by an independent laboratory. A batch of simple model reformulated gasoline may be released by the refiner or importer prior to the receipt of the refiner's or importer's test results except for test results for oxygen and benzene, and RVP in the case of VOC-controlled gasoline.

(2) In the event that the values of any of these properties is determined by the refiner or importer and by an independent laboratory in conformance with the requirements of paragraph (f) of this section:

(i) The results of the analyses conducted by the refiner or importer for such properties shall be used as the basis for compliance determinations unless the absolute value of the differences of the test results from the two laboratories is larger than the following values:

Fuel property	Range
Sulfur content	25 ppm
Aromatics content	2.7 vol %
Olefins content	2.5 vol %
Benzene content	0.21 vol %
Ethanol content	0.4 vol %
Methanol content	0.2 vol %
MTBE (and other methyl ethers) content	0.6 vol %
ETBE (and other ethyl ethers) content	0.6 vol %
TAME	0.6 vol %
t-Butanol content	0.6 vol %
RVP	0.3 psi
50% distillation (T50)	5 °F
90% distillation (T90)	5 °F
E200	2.5 vol %
E300	3.5 vol %
API Gravity	0.3 °API

(ii) In the event the values from the two laboratories for any property fall outside these ranges, the refiner or importer shall use as the basis for compliance determinations:

(A) The larger of the two values for the property, except the smaller of the two results shall be used for oxygenates; or

(B) The refiner shall have the gasoline analyzed for the property at one additional independent laboratory. If this second independent laboratory obtains a result for the property that is within the range, as listed in paragraph (e)(2)(i) of this section, of the refiner's or importer's result for this property,

then the refiner's or importer's result shall be used as the basis for compliance determinations.

(f) *Independent analysis requirement.*
(1) Any refiner or importer of reformulated gasoline or RBOB shall carry out a program of independent sample collection and analyses for the reformulated gasoline it produces or imports, which meets the requirements of one of the following two options:

(i) *Option 1.* The refiner or importer shall, for each batch of reformulated gasoline or RBOB that is produced or imported, have the value for each property specified in paragraph (e)(2)(i) of this section determined by an independent laboratory that collects and analyzes a representative sample from the batch using the methodologies specified in § 80.46.

(ii) *Option 2.* The refiner or importer shall have a periodic independent testing program carried out for all reformulated gasoline produced or imported, which shall consist of the following:

(A) An independent laboratory shall collect a representative sample from each batch of reformulated gasoline that the refiner or importer produces or imports;

(B) EPA will identify up to ten percent of the total number of samples collected under paragraph (f)(1)(ii)(A) of this section; and

(C) The designated independent laboratory shall, for each sample identified by EPA under paragraph (f)(1)(ii)(B) of this section, determine the value for each property using the methodologies specified in § 80.46.

(2)(i) Any refiner or importer shall designate one independent laboratory for each refinery or import facility at which reformulated gasoline or RBOB is produced or imported. This independent laboratory will collect samples and perform analyses in compliance with the requirements of this paragraph (f) of this section.

(ii) Any refiner or importer shall identify this designated independent laboratory to EPA under the registration requirements of § 80.76.

(iii) In order to be considered independent:

(A) The laboratory shall not be operated by any refiner or importer, and

shall not be operated by any subsidiary or employee of any refiner or importer;

(B) The laboratory shall be free from any interest in any refiner or importer; and

(C) The refiner or importer shall be free from any interest in the laboratory; however

(D) Notwithstanding the restrictions in paragraphs (f)(2)(iii) (A) through (C) of this section, a laboratory shall be considered independent if it is owned or operated by a gasoline pipeline company, regardless of ownership or operation of the gasoline pipeline company by refiners or importers, provided that such pipeline company is owned and operated by four or more refiners or importers.

(iv) Use of a laboratory that is debarred, suspended, or proposed for debarment pursuant to the Governmentwide Debarment and Suspension regulations, 40 CFR part 32, or the Debarment, Suspension and Ineligibility provisions of the Federal Acquisition Regulations, 48 CFR part 9, subpart 9.4, shall be deemed noncompliance with the requirements of this paragraph (f).

(v) Any laboratory that fails to comply with the requirements of this paragraph (f) shall be subject to debarment or suspension under Governmentwide Debarment and Suspension regulations, 40 CFR part 32, or the Debarment, Suspension and Ineligibility regulations, Federal Acquisition Regulations, 48 CFR part 9, subpart 9.4.

(3) Any refiner or importer shall, for all samples collected or analyzed pursuant to the requirements of this paragraph (f), cause its designated independent laboratory:

(i) At the time the designated independent laboratory collects a representative sample from a batch of reformulated gasoline, to:

(A) Obtain the refiner's or importer's assigned batch number for the batch being sampled;

(B) Determine the volume of the batch;

(C) Determine the identification number of the gasoline storage tank or tanks in which the batch was stored at the time the sample was collected;

(D) Determine the date and time the batch became finished reformulated

gasoline, and the date and time the sample was collected;

(E) Determine the grade of the batch (e.g., premium, mid-grade, or regular); and

(F) In the case of reformulated gasoline produced through computer-controlled in-line blending, determine the date and time the blending process began and the date and time the blending process ended, unless exempt under paragraph (f)(4) of this section;

(i) To retain each sample collected pursuant to the requirements of this paragraph (f) for a period of 30 days, except that this period shall be extended to a period of up to 180 days upon request by EPA;

(iii) To submit to EPA periodic reports, as follows:

(A) A report for the period January through March shall be submitted by May 31; a report for the period April through June shall be submitted by August 31; a report for the period July through September shall be submitted by November 30; and a report for the period October through December shall be submitted by February 28;

(B) Each report shall include, for each sample of reformulated gasoline that was analyzed pursuant to the requirements of this paragraph (f):

(1) The results of the independent laboratory's analyses for each property; and

(2) The information specified in paragraph (f)(3)(1) of this section for such sample; and

(iv) To supply to EPA, upon EPA's request, any sample collected or a portion of any such sample.

(4) Any refiner that produces reformulated gasoline using computer-controlled in-line blending equipment is exempt from the independent sampling and testing requirements specified in paragraphs (f)(1) through (3) of this section and from the requirement of paragraph (e)(1) of this section to obtain test results for each batch prior to the gasoline leaving the refinery, provided that such refiner:

(i) Obtains from EPA an exemption from these requirements. In order to seek such an exemption, the refiner shall submit a petition to EPA, such petition to include:

(A) A description of the refiner's computer-controlled in-line blending operation, including a description of:

(1) The location of the operation;

(2) The length of time the refiner has used the operation;

(3) The volumes of gasoline produced using the operation since the refiner began the operation or during the previous three years, whichever is shorter, by grade;

(4) The movement of the gasoline produced using the operation to the point of fungible mixing, including any points where all or portions of the gasoline produced is accumulated in gasoline storage tanks;

(5) The physical lay-out of the operation;

(6) The automated control system, including the method of monitoring and controlling blend properties and proportions;

(7) Any sampling and analysis of gasoline that is conducted as a part of the operation, including on-line, off-line, and composite, and a description of the methods of sampling, the methods of analysis, the parameters analyzed and the frequency of such analyses, and any written, printed, or computer-stored results of such analyses, including information on the retention of such results;

(8) Any sampling and analysis of gasoline produced by the operation that occurs downstream from the blending operation prior to fungible mixing of the gasoline, including any such sampling and analysis by the refiner and by any purchaser, pipeline or other carrier, or by independent laboratories;

(9) Any quality assurance procedures that are carried out over the operation; and

(10) Any occasion(s) during the previous three years when the refiner adjusted any physical or chemical property of any gasoline produced using the operation downstream from the operation, including the nature of the adjustment and the reason the gasoline had properties that required adjustment; and

(B) A description of the independent audit program of the refiner's computer-controlled in-line blending operation that the refiner proposes will satisfy the requirements of this paragraph (f)(4); and

(ii) Carries out an independent audit program of the refiner's computer-controlled in-line blending operation, such program to include:

(A) For each batch of reformulated gasoline produced using the operation, a review of the documents generated that is sufficient to determine the properties and volume of the gasoline produced;

(B) Audits that occur no less frequently than annually;

(C) Reports of the results of such audits submitted to the refiner, and to EPA by the auditor no later than February 28 of each year;

(D) Audits that are conducted by an auditor that meets the non-debarred criteria specified in § 80.125 (a) and/or (d); and

(iii) Complies with any other requirements that EPA includes as part of the exemption.

(g) *Marking of conventional gasoline.* [Reserved]

(h) *Compliance audits.* Any refiner and importer of any reformulated gasoline or RBOB, and any oxygenate blender of any RBOB who meets the oxygen standard on average, shall have the reformulated gasoline and RBOB it produced, imported, or blended during each calendar year audited for compliance with the requirements of this subpart D, in accordance with the requirements of subpart F, at the conclusion of each calendar year.

(i) *Exclusion from compliance calculations of gasoline received from others.* Any refiner for each refinery, any oxygenate blender for each oxygenate blending facility, and any importer shall exclude from all compliance calculations the volume and properties of any reformulated gasoline that is produced at another refinery or oxygenate blending facility or imported by another importer.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36952, July 20, 1994; 59 FR 39289, Aug. 2, 1994; 59 FR 60715, Nov. 28, 1994]

EFFECTIVE DATE NOTE: At 59 FR 39289, Aug. 2, 1994, § 80.65 was amended by revising para-

graph (d)(2)(vi) effective September 1, 1994. At 59 FR 60715, Nov. 28, 1994, the amendment was stayed effective September 13, 1994.

§ 80.66 Calculation of reformulated gasoline properties.

(a) All volume measurements required by these regulations shall be temperature adjusted to 60 degrees Fahrenheit.

(b) The percentage of oxygen by weight contained in a gasoline blend, based upon its percentage oxygenate by volume and density, shall exclude denaturants and water.

(c) The properties of reformulated gasoline consist of per-gallon values separately and individually determined on a batch-by-batch basis using the methodologies specified in § 80.46 for each of those physical and chemical parameters necessary to determine compliance with the standards to which the gasoline is subject, and per-gallon values for the VOC, NO_x, and toxics emissions performance standards to which the gasoline is subject.

(d) Per-gallon oxygen content shall be determined based upon the weight percent oxygen of a representative sample of gasoline, using the method set forth in § 80.46(g). The total oxygen content associated with a batch of gasoline (in percent-gallons) is calculated by multiplying the weight percent oxygen content times the volume.

(e) Per-gallon benzene content shall be determined based upon the volume percent benzene of a representative sample of a batch of gasoline by the method set forth in § 80.46(e). The total benzene content associated with a batch of gasoline (in percent-gallons) is calculated by multiplying the volume percent benzene content times the volume.

(f) Per-gallon RVP shall be determined based upon the measurement of RVP of a representative sample of a batch of gasoline by the sampling methodologies specified in Appendix D of this part and the testing methodology specified in Appendix E of this part. The total RVP value associated with a batch of gasoline (in RVP-gallons) is calculated by multiplying the RVP times the volume.

(g)(1) Per gallon values for VOC and NO_x emissions reduction shall be calculated using the methodology specified in § 80.45 that is appropriate for the gasoline.

(2) Per-gallon values for toxic emissions performance reduction shall be established using:

(1) For gasoline subject to the simple model, the methodology under § 80.42 that is appropriate for the gasoline; and

(1) For gasoline subject to the complex model, the methodology specified in § 80.45 that is appropriate for the gasoline.

(3) The total VOC, NO_x, and toxic emissions performance reduction values associated with a batch of gasoline (in percent reduction-gallons) is calculated by multiplying the per-gallon percent emissions performance reduction times the volume of the batch.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36963, July 20, 1994]

§ 80.67 Compliance on average.

The requirements of this section apply to all reformulated gasoline and RBOB produced or imported for which compliance with one or more of the requirements of § 80.41 is determined on average ("averaged gasoline").

(a) *Compliance survey required in order to meet standards on average.* (1) Any refiner, importer, or oxygenate blender that complies with the compliance survey requirements of § 80.68 has the option of meeting the standards specified in § 80.41 for average compliance in addition to the option of meeting the standards specified in § 80.41 for per-gallon compliance; any refiner, importer, or oxygenate blender that does not comply with the survey requirements must meet the standards specified in § 80.41 for per-gallon compliance, and does not have the option of meeting standards on average.

(2)(i)(A) A refiner or importer that produces or imports reformulated gasoline that exceeds the average standards for oxygen or benzene (but not for other parameters that have average standards) may use such gasoline to offset reformulated gasoline which does not achieve such average standards, but only if the reformulated gasoline that does not achieve such average

standards is sold to ultimate consumers in the same covered area as was the reformulated gasoline which exceeds average standards; provided that

(B) Prior to the beginning of the averaging period when the averaging approach described in paragraph (a)(2)(i)(A) of this section is used, the refiner or importer obtains approval from EPA. In order to seek such approval, the refiner or importer shall submit a petition to EPA, such petition to include:

(1) The identification of the refiner and refinery, or importer, the covered area, and the averaging period; and

(2) A detailed description of the procedures the refiner or importer will use to ensure the gasoline is produced by the refiner or is imported by the importer and is used only in the covered area in question and is not used in any other covered area, and the record keeping, reporting, auditing, and other quality assurance measures that will be followed to establish the gasoline is used as intended; and

(C) The refiner or importer properly completes any requirements that are specified by EPA as conditions for approval of the petition.

(ii) Any refiner or importer that meets the requirements of paragraph (a)(2)(i) of this section will be deemed to have satisfied the compliance survey requirements of § 80.68 for the covered area in question.

(b) *Scope of averaging.* (1) Any refiner shall meet all applicable averaged standards separately for each of the refiner's refineries;

(2)(i) Any importer shall meet all applicable averaged standards on the basis of all averaged reformulated gasoline and RBOB imported by the importer; except that

(ii) Any importer to whom different standards apply for gasoline imported at different facilities by operation of § 80.41(i), shall meet the averaged standards separately for the averaged reformulated gasoline and RBOB imported into each group of facilities that is subject to the same standards; and

(3) Any oxygenate blender shall meet the averaged standard for oxygen separately for each of the oxygenate blender's oxygenate blending facilities, except that any oxygenate blender may

group the averaged reformulated gasoline produced at facilities at which gasoline is produced for use in a single covered area.

(c) *RVP and VOC emissions performance reduction compliance on average.* (1) The VOC-controlled reformulated gasoline and RBOB produced at any refinery or imported by any importer during the period January 1 through September 15 of each calendar year which is designated for average compliance for RVP or VOC emissions performance on average must meet the standards for RVP (in the case of a refinery or importer subject to the simple model standards) or the standards for VOC emissions performance reduction (in the case of a refinery or importer subject to the complex model standards) which are applicable to that refinery or importer as follows:

(i) Gasoline and RBOB designated for VOC Control Region 1 must meet the standards for that Region which are applicable to that refinery or importer; and

(ii) Gasoline and RBOB designated for VOC Control Region 2 must meet the standards for that Region which are applicable to that refinery or importer.

(2) In the case of a refinery or importer subject to the simple model standards, each gallon of reformulated gasoline and RBOB designated as being VOC-controlled may not exceed the maximum standards for RVP specified in § 80.41(b) which are applicable to that refiner or importer.

(3) In the case of a refinery or importer subject to the complex model standards, each gallon of reformulated gasoline designated as being VOC-controlled must equal or exceed the minimum standards for VOC emissions performance specified in § 80.41 which are applicable to that refinery or importer.

(d) *Toxics emissions reduction and benzene compliance on average.* (1) The averaging period for the requirements for benzene content and toxics emission performance is January 1 through December 31 of each year.

(2) The reformulated gasoline and RBOB produced at any refinery or imported by any importer during the toxics emissions performance and benzene averaging periods that is des-

ignated for average compliance for these parameters shall on average meet the standards specified for toxics emissions performance and benzene in § 80.41 which are applicable to that refinery or importer.

(3) Each gallon of reformulated gasoline may not exceed the maximum standard for benzene content specified in § 80.41 which is applicable to that refinery or importer.

(e) *NO_x compliance on average.* (1) The averaging period for NO_x emissions performance is January 1 through December 31 of each year.

(2) The requirements of this paragraph (e) apply separately to reformulated gasoline and RBOB in the following categories:

(i) All reformulated gasoline and RBOB that is designated as VOC-controlled; and

(ii) All reformulated gasoline and RBOB that is not designated as VOC-controlled.

(3) The reformulated gasoline and RBOB produced at any refinery or imported by any importer during the NO_x averaging period that is designated for average compliance for NO_x shall on average meet the standards for NO_x specified in § 80.41 that are applicable to that refinery or importer.

(4) Each gallon of reformulated gasoline must equal or exceed the minimum standards for NO_x emissions performance specified in § 80.41 which are applicable to that refinery or importer.

(f) *Oxygen compliance on average.* (1) The averaging period for the oxygen content requirements is January 1 through December 31 of each year.

(2) The requirements of this paragraph (f) apply separately to reformulated gasoline in the following categories:

(i) All reformulated gasoline;

(ii) All reformulated gasoline that is not designated as being OPRG; and

(iii) In the case of reformulated gasoline certified under the simple model, that which is designated as VOC-controlled.

(3) The reformulated gasoline produced at any refinery or imported by any importer during the oxygen averaging period that is designated for average compliance for oxygen shall on average meet the standards for oxygen

specified in § 80.41 that is applicable to that refinery or importer.

(4) The reformulated gasoline that is produced at any oxygenate blending facility by blending RBOB with oxygenate that is designated for average compliance for oxygen shall on average meet the standards for oxygen specified in § 80.41 that is applicable to that oxygenate blending facility.

(5) Each gallon of reformulated gasoline must meet the applicable minimum requirements, and in the case of simple model reformulated gasoline the minimum and maximum requirements, for oxygen content specified in § 80.41.

(g) *Compliance calculation.* To determine compliance with the averaged standards in § 80.41, any refiner for each of its refineries at which averaged reformulated gasoline or RBOB is produced, any oxygenate blender for each of its oxygenate blending facilities at which oxygen averaged reformulated gasoline is produced, and any importer that imports averaged reformulated gasoline or RBOB shall, for each averaging period and for each portion of gasoline for which standards must be separately achieved, and for each relevant standard, calculate:

(1)(i) The compliance total using the following formula:

$$\text{COMPLIANCE TOTAL} = \left(\sum_{i=1}^n V_i \right) \times \text{std}$$

where

V_i=the volume of gasoline batch i
std=the standard for the parameter being evaluated

n=the number of batches of gasoline produced or imported during the averaging period

and

(ii) The actual total using the following formula:

$$\text{ACTUAL TOTAL} = \sum_{i=1}^n (V_i \times \text{parm}_i)$$

where

V_i=the volume of gasoline batch i
parm_i=the parameter value of gasoline batch i

n=the number of batches of gasoline produced or imported during the averaging period

(2) For each standard, compare the actual total with the compliance total.

(3) For the VOC, NO_x, and toxics emissions performance and oxygen standards, the actual totals must be equal to or greater than the compliance totals to achieve compliance.

(4) For RVP and benzene standards, the actual total must be equal to or less than the compliance totals to achieve compliance.

(5) If the actual total for the oxygen standard is less than the compliance total, or if the actual total for the benzene standard is greater than the compliance total, credits for these parameters must be obtained from another refiner, importer or (in the case of oxygen) oxygenate blender in order to achieve compliance:

(i) The total number of oxygen credits required to achieve compliance is calculated by subtracting the actual total from the compliance total oxygen; and

(ii) The total number of benzene credits required to achieve compliance is calculated by subtracting the compliance total from the actual total benzene.

(6) If the actual total for the oxygen standard is greater than the compliance total, or if the actual total for the benzene standard is less than the compliance totals, credits for these parameters are generated:

(i) The total number of oxygen credits which may be traded to another refinery, importer, or oxygenate blender is calculated by subtracting the compliance total from the actual total for oxygen; and

(ii) The total number of benzene credits which may be traded to another refinery or importer is calculated by subtracting the actual total from the compliance total for benzene.

(h) *Credit transfers.* (1) Compliance with the averaged standards specified in § 80.41 for oxygen and benzene (but for no other standards or requirements) may be achieved through the transfer of oxygen and benzene credits provided that:

- (1) The credits were generated in the same averaging period as they are used;
- (ii) The credit transfer takes place no later than fifteen working days following the end of the averaging period in which the reformulated gasoline credits were generated;
- (iii) The credits are properly created;
- (iv) The credits are transferred directly from the refiner, importer, or oxygenate blender that creates the credits to the refiner, importer, or oxygenate blender that uses the credits to achieve compliance;
- (v) Oxygen credits are generated, transferred, and used:
 - (A) In the case of gasoline subject to the simple model standards, only in the following categories:
 - (1) VOC-controlled, non-OPRG;
 - (2) Non-VOC-controlled, non-OPRG;
 - (3) Non-VOC-controlled, OPRG; and
 - (4) VOC-controlled, OPRG; and
 - (B) In the case of gasoline subject to the complex model standards, only in the following categories:
 - (1) OPRG; and
 - (2) Non-OPRG;
- (vi) Oxygen credits generated from gasoline subject to the complex model standards are not used to achieve compliance for gasoline subject to the simple model standards;
- (vii) Oxygen credits are not used to achieve compliance with the minimum oxygen content standards in §80.41; and
- (viii) Benzene credits are not used to achieve compliance with the maximum benzene content standards in §80.41.
- (2) No party may transfer any credits to the extent such a transfer would result in the transferor having a negative credit balance at the conclusion of the averaging period for which the credits were transferred. Any credits transferred in violation of this paragraph are improperly created credits.
- (3) In the case of credits that were improperly created, the following provisions apply:
 - (i) Improperly created credits may not be used to achieve compliance, regardless of a credit transferee's good faith belief that it was receiving valid credits;
 - (ii) No refiner, importer, or oxygenate blender may create, report, or

- transfer improperly created credits; and
 - (iii) Where any credit transferor has in its balance at the conclusion of any averaging period both credits which were properly created and credits which were improperly created, the properly created credits will be applied first to any credit transfers before the transferor may apply any credits to achieve its own compliance.
 - (i) *Average compliance for reformulated gasoline produced or imported before January 1, 1995.* In the case of any reformulated gasoline that is intended to be used beginning January 1, 1995, but that is produced or imported prior to that date:
 - (1) Any refiner or importer may meet standards specified in §80.41 for average compliance for such gasoline, provided the refiner or importer has the option of meeting standards on average for 1995 under paragraph (a) of this section, and provided the refiner or importer elects to be subject to average standards under §80.65(c)(3); and
 - (2) Any average compliance gasoline under paragraph (i)(1) of this section shall be combined with average compliance gasoline produced during 1995 for purposes of compliance calculations under paragraph (g) of this section.
- § 80.68 Compliance surveys.**
- (a) *Compliance survey option 1.* In order to satisfy the compliance survey requirements, any refiner, importer, or oxygenate blender shall properly conduct a program of compliance surveys in accordance with a survey program plan which has been approved by the Administrator of EPA in each covered area which is supplied with any gasoline for which compliance is achieved on average that is produced by that refiner or oxygenate blender or imported by that importer. Such approval shall be based upon the survey program plan meeting the following criteria:
 - (1) The survey program shall consist of at least four surveys which shall occur during the following time periods: one survey during the period January 1 through May 31; two surveys during the period June 1 through September 15; and one survey during the period September 16 through December 31.

- (2) The survey program shall meet the criteria stated in paragraph (c) of this section.
- (3) In the event that any refiner, importer, or oxygenate blender fails to properly carry out an approved survey program, the refiner, importer, or oxygenate blender shall achieve compliance with all applicable standards on a per-gallon basis for the calendar year in which the failure occurs, and may not achieve compliance with any standard on an average basis during this calendar year. This requirement to achieve compliance per-gallon shall apply *ab initio* to the beginning of any calendar year in which the failure occurs, regardless of when during the year the failure occurs.
- (b) *Compliance survey option 2.* A refiner, importer, or oxygenate blender shall be deemed to have satisfied the compliance survey requirements described in paragraph (a) of this section if a comprehensive program of surveys is properly conducted in accordance with a survey program plan which has been approved by the Administrator of EPA. Such approval shall be based upon the survey program plan meeting the following criteria:
 - (1) The initial schedule for the conduct of surveys shall be as follows:
 - (i) 120 surveys shall be conducted in 1995;
 - (ii) 80 surveys shall be conducted in 1996;
 - (iii) 60 surveys shall be conducted in 1997;
 - (iv) 50 surveys shall be conducted in 1998 and thereafter.
 - (2) This initial survey schedule shall be adjusted as follows:
 - (i) In the event one or more ozone nonattainment areas in addition to the nine specified in §80.70, opt into the reformulated gasoline program, the number of surveys to be conducted in the year the area or areas opt into the program and in each subsequent year shall be increased according to the following formula:

$$ANS_i = \left(\frac{V_{opt-in}}{V_{orig}} \times NS_i \right) + NS_i$$

where:

- ANS_i = the adjusted number of surveys for year i; i = the opt-in year and each subsequent year
- NS_i = the number of surveys according to the schedule in paragraph (b)(1) of this section in year i; i = the opt-in year and each subsequent year
- V_{opt-in} = the total volume of gasoline supplied to the opt-in covered areas in the year preceding the year of the opt-in
- V_{orig} = the total volume of gasoline supplied to the original nine covered areas in the year preceding the year of the opt-in

- (ii) In the event that any covered area fails a survey or survey series according to the criteria set forth in paragraph (c) of this section, the annual decreases in the numbers of surveys prescribed by paragraph (b)(1) of this section, as adjusted by paragraph (b)(2)(i) of this section, shall be adjusted as follows in the year following the year of the failure. Any such adjustment to the number of surveys shall remain in effect so long as any standard for the affected covered area has been adjusted to be more stringent as a result of a failed survey or survey series. The adjustments shall be calculated according to the following formula:

$$ANS_i = \left(\frac{V_{\text{failed}}}{V_{\text{total}}} \times (NS_{i-1} - NS_i) \right) + NS_i$$

where:

ANS_i = the adjusted number of surveys in year i; i = the year after the failure and each subsequent year

V_{failed} = the total volume of gasoline supplied to the covered area which failed the survey or survey series in the year of the failure

V_{total} = the total volume of gasoline supplied to all covered areas in the year of the failure

NS_i = the number of surveys in year i according to the schedule in paragraph (b)(1) of this section and as adjusted by paragraph (b)(2)(i) of this section; i = the year after the failure and each subsequent year

(3) The survey program shall meet the criteria stated in paragraph (c) of this section.

(4) On each occasion the comprehensive survey program does not occur as specified in the approved plan with regard to any covered area:

(i) Each refiner, importer, and oxygenate blender who supplied any reformulated gasoline or RBOB to the covered area and who has not satisfied the survey requirements described in paragraph (a) of this section shall be deemed to have failed to carry out an approved survey program; and

(ii) The covered area will be deemed to have failed surveys for VOC and NO_x emissions performance, and survey series for benzene and oxygen, and toxic and NO_x emissions performance.

(c) *General survey requirements.* (1) During the period January 1, 1995 through December 31, 1997:

(i) Any sample taken from a retail gasoline storage tank for which the three most recent deliveries were of gasoline designated as meeting:

(A) Simple model standards shall be considered a "simple model sample"; or

(B) Complex model standards shall be considered a "complex model sample."

(ii) A survey shall consist of the combination of a simple model portion and a complex model portion, as follows:

(A) The simple model portion of a survey shall consist of all simple model samples that are collected pursuant to the applicable survey design in a single covered area during any consecutive seven-day period and that are not excluded under paragraph (c)(6) of this section.

(B) The complex model portion of a survey shall consist of all complex model samples that are collected pursuant to the applicable survey design in a single covered area during any consecutive seven-day period and that are not excluded under paragraph (c)(6) of this section.

(iii)(A) The simple model portion of each survey shall be representative of all gasoline certified using the simple model which is being dispensed in the covered area.

(B) The complex model portion of each survey shall be representative of all gasoline certified using the complex model which is being dispensed in the covered area.

(2) Beginning on January 1, 1998:

(i) A survey shall consist of all samples that are collected pursuant to the applicable survey design in a single covered area during any consecutive seven-day period and that are not excluded under paragraph (c)(6) of this section.

(ii) A survey shall be representative of all gasoline which is being dispensed in the covered area.

(3) A VOC survey, and prior to January 1, 2000, a NO_x survey, shall consist of any survey conducted during the period June 1 through September 15.

(4)(i) A toxics, oxygen, and benzene survey series shall consist of all surveys conducted in a single covered area during a single calendar year.

(ii) A NO_x survey series shall consist of all surveys conducted in a single covered area during the periods January 1 through May 31, and September 16 through December 31 during a single calendar year.

(5)(i) Each simple model sample included in a survey shall be analyzed for

oxygenate type and content, benzene content, aromatic hydrocarbon content, and RVP in accordance with the methodologies specified in § 80.46; and

(ii) Each complex model sample included in a survey shall be analyzed for oxygenate type and content, olefins, benzene, sulfur, and aromatic hydrocarbons, E-200, E-300, and RVP in accordance with the methodologies specified in § 80.46.

(6)(i) The results of each survey shall be based upon the results of the analysis of each sample collected during the course of the survey, unless the sample violates the applicable per-gallon maximum or minimum standards for the parameter being evaluated plus any enforcement tolerance that applies to the parameter (e.g., a sample that violates the benzene per-gallon maximum plus any benzene enforcement tolerance but meets other per-gallon maximum and minimum standards would be excluded from the benzene survey, but would be included in the surveys for parameters other than benzene).

(ii) Any sample from a survey that violates any standard under § 80.41, or that constitutes evidence of the violation of any prohibition or requirement under this subpart D, may be used by the Administrator in an enforcement action for such violation.

(7) Each laboratory at which samples in a survey are analyzed shall participate in a correlation program with EPA to ensure the validity of analysis results.

(8)(i) The results of each simple model VOC survey shall be determined as follows:

(A) For each simple model sample from the survey, the VOC emissions reduction percentage shall be determined based upon the tested values for RVP and oxygen for that sample as applied to the VOC emissions reduction equation at § 80.42(a)(1) for VOC-Control Region 1 and § 80.42(a)(2) for VOC-Control Region 2;

(B) The VOC emissions reduction survey standard applicable to each covered area shall be calculated by using the VOC emissions equation at § 80.42(a)(1) with RVP=7.2 and OXCON=2.0 for covered areas located in VOC-Control Region 1 and using the VOC emissions equation at § 80.42(a)(2) with RVP=8.1 and OXCON=2.0 for covered areas located in VOC-Control Region 2; and

(C) The covered area shall have failed the simple model VOC survey if the VOC emissions reduction average of all survey samples is less than VOC emissions reduction survey standard calculated under paragraph (c)(8)(i)(B) of this section.

(ii) The results of each complex model VOC emissions reduction survey shall be determined as follows:

(A) For each complex model sample from the survey series, the VOC emissions reduction percentage shall be determined based upon the tested parameter values for that sample and the appropriate methodology for calculating VOC emissions reduction at § 80.45;

(B) The covered area shall have failed the complex model VOC survey if the VOC emissions reduction percentage average of all survey samples is less than the applicable per-gallon standard for VOC emissions reduction.

(9)(i) The results of each simple model toxics emissions reduction survey series conducted in any covered area shall be determined as follows:

(A) For each simple model sample from the survey series, the toxics emissions reduction percentage shall be determined based upon the tested parameter values for that sample and the appropriate methodology for calculating toxics emissions performance reduction at § 80.42.

(B) The annual average of the toxics emissions reduction percentages for all samples from a survey series shall be calculated according to the following formula:

$$AATER = \left(\left(\frac{\sum_{i=1}^{n_1} TER_{1,i}}{n_1} \right) \times 0.468 \right) + \left(\left(\frac{\sum_{i=1}^{n_2} TER_{2,i}}{n_2} \right) \times 0.532 \right)$$

where

AATER = the annual average toxics emissions reduction

TER_{1,i} = the toxics emissions reduction for sample i of gasoline collected during the high ozone season

TER_{2,i} = the toxics emissions reduction for sample i of gasoline collected outside the high ozone season

n₁ = the number of samples collected during the high ozone season

n₂ = the number of samples collected outside the high ozone season⁰

(C) The covered area shall have failed the simple model toxics survey series if the annual average toxics emissions reduction is less than the simple model per-gallon standard for toxics emissions reduction.

(ii) The results of each complex model toxics emissions reduction survey series conducted in any covered area shall be determined as follows:

(A) For each complex model sample from the survey series, the toxics emissions reduction percentage shall be determined based upon the tested parameter values for that sample and the appropriate methodology for calculating toxics emissions reduction at § 80.45;

(B) The annual average of the toxics emissions reduction percentages for all samples from a survey series shall be calculated according to the formula specified in paragraph (c)(9)(i)(B) of this section; and

(C) The covered area shall have failed the complex model toxics survey series if the annual average toxics emissions reduction is less than the applicable per-gallon complex model standard for toxics emissions reduction.

(10) The results of each NO_x emissions reduction survey and survey series shall be determined as follows:

(i) For each sample from the survey and survey series, the NO_x emissions reduction percentage shall be determined based upon the tested parameter

values for that sample and the appropriate methodology for calculating NO_x emissions reduction at § 80.45; and

(ii) The covered area shall have failed the NO_x survey or survey series if the NO_x emissions reduction percentage average for all survey samples is less than the applicable Phase I or Phase II complex model per-gallon standard for NO_x emissions reduction.

(11) For any benzene content survey series conducted in any covered area the average benzene content for all samples from the survey series shall be calculated. If this annual average is greater than 1.000 percent by volume, the covered area shall have failed a benzene survey series.

(12) For any oxygen content survey series conducted in any covered area the average oxygen content for all samples from the survey series shall be calculated. If this annual average is less than 2.00 percent by weight, the covered area shall have failed an oxygen survey series.

(13) Each survey program shall:

(i) Be planned and conducted by a person who is independent of the refiner or importer (the surveyor). In order to be considered independent:

(A) The surveyor shall not be an employee of any refiner or importer;

(B) The surveyor shall be free from any obligation to or interest in any refiner or importer; and

(C) The refiner or importer shall be free from any obligation to or interest in the surveyor; and

(ii) Include procedures for selecting sample collection locations, numbers of samples, and gasoline compositions which will result in:

(A) Simple model surveys representing all gasoline certified using the simple model being dispensed at retail outlets within the covered area during the period of the survey; and

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(B) Complex model surveys representing all gasoline certified using the complex model being dispensed at retail outlets within the covered area during the period of the survey; and

(iii) Include procedures such that the number of samples included in each survey assures that:

(A) In the case of simple model surveys, the average levels of oxygen, benzene, RVP, and aromatic hydrocarbons are determined with a 95% confidence level, with error of less than 0.1 psi for RVP, 0.05% for benzene (by volume), and 0.1% for oxygen (by weight); and

(B) In the case of complex model surveys, the average levels of oxygen, benzene, RVP, aromatic hydrocarbons, olefins, T-50, T-90 and sulfur are determined with a 95% confidence level, with error of less than 0.1 psi for RVP, 0.05% for benzene (by volume), 0.1% for oxygen (by weight), 0.5% for olefins (by volume), 5° F. for T-50 and T-90, and 10 ppm for sulfur; or an equivalent level of precision for the complex model-determined emissions parameters; and

(iv) Require that the surveyor shall:

(A) Not inform anyone, in advance, of the date or location for the conduct of any survey;

(B) Upon request by EPA made within thirty days following the submission of the report of a survey, provide a duplicate of any gasoline sample taken during that survey to EPA at a location to be specified by EPA each sample to be identified by the name and address of the facility where collected, the date of collection, and the classification of the sample as simple model or complex model; and

(C) At any time permit any representative of EPA to monitor the conduct of the survey, including sample collection, transportation, storage, and analysis; and

(v) Require the surveyor to submit to EPA a report of each survey, within thirty days following completion of the survey, such report to include the following information:

(A) The identification of the person who conducted the survey;

(B) An attestation by an officer of the surveyor company that the survey was conducted in accordance with the survey plan and that the survey results are accurate;

(C) If the survey was conducted for one refiner or importer, the identification of that party;

(D) The identification of the covered area surveyed;

(E) The dates on which the survey was conducted;

(F) The address of each facility at which a gasoline sample was collected, the date of collection, and the classification of the sample as simple model or complex model;

(G) The results of the analyses of simple model samples for oxygenate type and oxygen weight percent, benzene content, aromatic hydrocarbon content, and RVP, the calculated toxics emission reduction percentage, and for each survey conducted during the period June 1 through September 15 the VOC emissions reduction percentage calculated using the methodology specified in paragraph (c)(8)(i) of this section;

(H) The results of the analyses of complex model samples for oxygenate type and oxygen weight percent, benzene, aromatic hydrocarbon, and olefin content, E-200, E-300, and RVP, the calculated NO_x and toxics emissions reduction percentage, and for each survey conducted during the period June 1 through September 15 the calculated VOC emissions reduction percentage, except that beginning on January 1, 2000 NO_x emissions reduction percentages must be reported only for surveys conducted outside the period June 1 through September 15;

(I) The name and address of each laboratory where gasoline samples were analyzed;

(J) A description of the methodology utilized to select the locations for sample collection and the numbers of samples collected;

(K) For any samples which were excluded from the survey, a justification for such exclusion; and

(L) The average toxics emissions reduction percentage for simple model samples and the percentage for complex model samples, the average benzene and oxygen percentages, and for each survey conducted during the period June 1 through September 15, the average VOC emissions reduction percentage for simple model samples and

the percentage for complex model samples, the average NO_x emissions reduction percentage for all complex model samples collected prior to January 1, 2000, and the average NO_x emissions reduction percentage for samples collected outside the period June 1 through September 15 beginning on January 1, 2000;

(14) Each survey shall be conducted at a time and in a covered area selected by EPA no earlier than two weeks before the date of the survey.

(15) The procedure for seeking EPA approval for a survey program plan shall be as follows:

(i) The survey program plan shall be submitted to the Administrator of EPA for EPA's approval no later than September 1 of the year preceding the year in which the surveys will be conducted; and

(ii) Such submittal shall be signed by a responsible corporate officer of the refiner, importer, or oxygenate blender, or in the case of a comprehensive survey program plan, by an officer of the organization coordinating the survey program.

(16)(i) No later than December 1 of the year preceding the year in which the surveys will be conducted, the contract with the surveyor to carry out the entire survey plan shall be in effect, and an amount of money necessary to carry out the entire survey plan shall be paid to the surveyor or placed into an escrow account with instructions to the escrow agent to pay the money over to the surveyor during the course of the conduct of the survey plan.

(ii) No later than December 15 of the year preceding the year in which the surveys will be conducted, the Administrator of EPA shall be given a copy of the contract with the surveyor, proof that the money necessary to carry out the plan has either been paid to the surveyor or placed into an escrow account, and if placed into an escrow account, a copy of the escrow agreement.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36963, July 20, 1994; 62 FR 12576, Mar. 17, 1997]

§ 80.69 Requirements for downstream oxygenate blending.

The requirements of this section apply to all reformulated gasoline blendstock for oxygenate blending, or RBOB, to which oxygenate is added at any oxygenate blending facility.

(a) *Requirements for refiners and importers.* For any RBOB produced or imported, the refiner or importer of the RBOB shall:

(1) Produce or import the RBOB such that, when blended with a specified type and percentage of oxygenate, it meets the applicable standards for reformulated gasoline;

(2) In order to determine the properties of RBOB for purposes of calculating compliance with per-gallon or averaged standards, conduct tests on each batch of the RBOB by:

(i) Adding the specified type and amount of oxygenate to a representative sample of the RBOB; and

(ii) Determining the properties and characteristics of the resulting gasoline using the methodology specified in § 80.65(e);

(3) Carry out the independent analysis requirements specified in § 80.65(f);

(4) Determine properties of the RBOB which are sufficient to allow parties downstream from the refinery or import facility to establish, through sampling and testing, if the RBOB has been altered or contaminated such that it will not meet the applicable reformulated gasoline standards subsequent to the addition of the specified type and amount of oxygenate;

(5) Transfer ownership of the RBOB only to an oxygenate blender who is registered with EPA as such, or to an intermediate owner with the restriction that it only be transferred to a registered oxygenate blender;

(6) Have a contract with each oxygenate blender who receives any RBOB produced or imported by the refiner or importer that requires the oxygenate blender, or, in the case of a contract with an intermediate owner, that requires the intermediate owner to require the oxygenate blender to:

(i) Comply with blender procedures that are specified by the contract and are calculated to assure blending with the proper type and amount of oxygenate;

(ii) Allow the refiner or importer to conduct quality assurance sampling and testing of the reformulated gasoline produced by the oxygenate blender;

(iii) Stop selling any gasoline found to not comply with the standards under which the RBOB was produced or imported; and

(iv) Carry out the quality assurance sampling and testing that this section requires the oxygenate blender to conduct;

(7) Conduct a quality assurance sampling and testing program to be carried out at the facilities of each oxygenate blender who blends any RBOB produced or imported by the refiner or importer with any oxygenate, to determine whether the reformulated gasoline which has been produced through blending complies with the applicable standards, using the methodology specified in § 80.46 for this determination.

(i) The sampling and testing program shall be conducted as follows:

(A) All samples shall be collected subsequent to the addition of oxygenate, and either:

(1) Prior combining the resulting gasoline with any other gasoline; or

(2) In the case of truck splash blending, subsequent to the delivery of the gasoline to a retail outlet or wholesale purchaser-consumer facility provided that the three most recent deliveries to the retail outlet or wholesale purchaser facility were of gasoline produced using that refiner's or importer's RBOB, and provided that any discrepancy found through the retail outlet or wholesale purchaser facility sampling is followed-up with measures reasonably designed to discover the cause of the discrepancy; and

(B) Sampling and testing shall be at one of the following rates:

(1) In the case of RBOB which is blended with oxygenate in a gasoline storage tank, a rate of not less than one sample for every 400,000 barrels of RBOB produced or imported by that refiner or importer that is blended by that blender, or one sample every month, whichever is more frequent; or

(2) In the case of RBOB which is blended with oxygenate in gasoline delivery trucks through the use of computer-controlled in-line blending equip-

ment, a rate of not less than one sample for every 200,000 barrels of RBOB produced or imported by that refiner or importer that is blended by that blender, or one sample every three months, whichever is more frequent; or

(3) In the case of RBOB which is blended with oxygenate in gasoline delivery trucks without the use of computer-controlled in-line blending equipment, a rate of not less than one sample for each 50,000 barrels of RBOB produced or imported by that refiner or importer which is blended, or one sample per month, whichever is more frequent;

(ii) In the event the test results for any sample indicate the gasoline does not comply with applicable standards (within the correlation ranges specified in § 80.65(e)(2)(i)), the refiner or importer shall:

(A) Immediately take steps to stop the sale of the gasoline that was sampled;

(B) Take steps which are reasonably calculated to determine the cause of the noncompliance and to prevent future instances of noncompliance;

(C) Increase the rate of sampling and testing to one of the following rates:

(1) In the case of RBOB which is blended with oxygenate in a gasoline storage tank, a rate of not less than one sample for every 200,000 barrels of RBOB produced or imported by that refiner or importer that is blended by that blender, or one sample every two weeks, whichever is more frequent; or

(2) In the case of RBOB which is blended with oxygenate in gasoline delivery trucks through the use of computer-controlled in-line blending equipment, a rate of not less than one sample for every 100,000 barrels of RBOB produced or imported by that refiner or importer that is blended by that blender, or one sample every two months, whichever is more frequent; or

(3) In the case of RBOB which is blended with oxygenate in gasoline delivery trucks without the use of computer-controlled in-line blending equipment, a rate of not less than one sample for each 25,000 barrels of RBOB produced or imported by that refiner or importer which is blended, or one sample every two weeks, whichever is more frequent;

(D) Continue the increased frequency of sampling and testing until the results of ten consecutive samples and tests indicate the gasoline complies with applicable standards, at which time the sampling and testing may be conducted at the original frequency;

(iii) This quality assurance program is in addition to any quality assurance requirements carried out by other parties;

(8) A refiner or importer of RBOB may, in lieu of the contractual and quality assurance requirements specified in paragraphs (a) (6) and (7) of this section, base its compliance calculations on the following assumptions:

(i) In the case of RBOB designated for any-oxygenate, assume that ethanol will be added;

(ii) In the case of RBOB designated for ether-only, assume that MTBE will be added; and

(iii) In the case of any-oxygenate and ether-only designated RBOB, assume that the volume of oxygenate added will be such that the resulting reformulated gasoline will have an oxygen content of 2.0 weight percent;

(9) Any refiner or importer who does not meet the contractual and quality assurance requirements specified in paragraphs (a) (6) and (7) of this section, and who does not designate its RBOB as ether-only or any-oxygenate, shall base its compliance calculations on the assumption that 4.0 volume percent ethanol is added to the RBOB; and

(10) Specify in the product transfer documentation for the RBOB each oxygenate type or types and amount or range of amounts which is consistent with the designation of the RBOB as any-oxygenate, or ether-only, and which, if blended with the RBOB will result in reformulated gasoline which:

(i) Has VOC, toxics, or NO_x emissions reduction percentages which are no lower than the percentages that formed the basis for the refiner's or importer's compliance determination for these parameters;

(ii) Has a benzene content and RVP level which are no higher than the values for these characteristics that formed the basis for the refiner's or importer's compliance determinations for these parameters; and

(iii) Will not cause the reformulated gasoline to violate any standard specified in § 80.41.

(b) *Requirements for oxygenate blenders.* For all RBOB received by any oxygenate blender, the oxygenate blender shall:

(1) Add oxygenate of the type(s) and amount (or within the range of amounts) specified in the product transfer documents for the RBOB;

(2) Designate each batch of the resulting reformulated gasoline as meeting the oxygen standard per-gallon or on average;

(3) Meet the standard requirements specified in § 80.65(c) and § 80.67(f), the record keeping requirements specified in § 80.74, and the reporting requirements specified in § 80.75; and

(4) In the case of each batch of reformulated gasoline which is designated for compliance with the oxygen standard on average:

(i) Determine the volume and the weight percent oxygen of the batch using the testing methodology specified in § 80.46;

(ii) Assign a number to the batch (the "batch number"), beginning with the number one for the first batch produced each calendar year and each subsequent batch during the calendar year being assigned the next sequential number, and such numbers to be preceded by the oxygenate blender's registration number, the facility number, and the second two digits of the year in which the batch was produced (e.g., 4321-4321-95-001, 4321-4321-95-002, etc.); and

(iii) Meet the compliance audit requirements specified in § 80.65(h).

(c) *Additional requirements for terminal storage tank blending.* Any oxygenate blender who produces reformulated gasoline by blending any oxygenate with any RBOB in any gasoline storage tank, other than a truck used for delivering gasoline to retail outlets or wholesale purchaser-consumer facilities, shall, for each batch of reformulated gasoline so produced determine the oxygen content and volume of this gasoline prior to the gasoline leaving the oxygenate blending facility, using the methodology specified in § 80.46.

(d) *Additional requirements for distributors dispensing RBOB into trucks for*

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blending. Any distributor who dispenses any RBOB into any truck which delivers gasoline to retail outlets or wholesale purchaser-consumer facilities, shall for such RBOB so dispensed:

(1) Transfer the RBOB only to an oxygenate blender who has registered with the Administrator of EPA as such;

(2) Transfer any RBOB designated as ether-only RBOB only if the distributor has a reasonable basis for knowing the oxygenate blender will blend an oxygenate other than ethanol with the RBOB; and

(3) Obtain from the oxygenate blender the oxygenate blender's EPA registration number.

(e) *Additional requirements for oxygenate blenders who blend oxygenate in trucks.* Any oxygenate blender who obtains any RBOB in any gasoline delivery truck shall:

(1) On each occasion it obtains RBOB from a distributor, supply the distributor with the oxygenate blender's EPA registration number;

(2) Conduct a quality assurance sampling and testing program to determine whether the proper type and amount of oxygenate is added to RBOB. The program shall be conducted as follows:

(i) All samples shall be collected subsequent to the addition of oxygenate, and either:

(A) Prior combining the resulting gasoline with any other gasoline; or

(B) Subsequent to the delivery of the gasoline to a retail outlet or wholesale purchaser-consumer facility provided that the three most recent deliveries to the retail outlet or wholesale purchaser facility were of gasoline that was produced by that oxygenate blender and that had the same oxygenate requirements, and provided that any discrepancy in oxygenate type or amount found through the retail outlet or wholesale purchaser facility sampling is followed-up with measures reasonably designed to discover the cause of the discrepancy;

(ii) Sampling and testing shall be at one of the following rates:

(A) In the case computer-controlled in-line blending is used, a rate of not less than one sample per each five hundred occasions RBOB and oxygenate are loaded into a truck by that oxygen-

ate blender, or one sample every three months, whichever is more frequent; or

(B) In the case computer-controlled in-line blending is not used, a rate of not less than one sample per each one hundred occasions RBOB and oxygenate are blended in a truck by that oxygenate blender, or one sample per month, whichever is more frequent;

(iii) Sampling and testing shall be of the gasoline produced through one of the RBOB-oxygenate blends produced by that oxygenate blender;

(iv) Samples shall be analyzed for oxygenate type and oxygen content using the testing methodology specified at § 80.46; and

(v) In the event the testing results for any sample indicate the gasoline does not contain the specified type and amount of oxygenate (within the ranges specified in § 80.70(b)(2)(i)):

(A) Immediately stop selling (or where possible, to stop any transferee of the gasoline from selling) the gasoline which was sampled;

(B) Take steps to determine the cause of the noncompliance;

(C) Increase the rate of sampling and testing to one of the following rates:

(1) In the case computer-controlled in-line blending is used, a rate of not less than one sample per each two hundred and fifty occasions RBOB and oxygenate are loaded into a truck by that oxygenate blender, or one sample every six weeks, whichever is more frequent; or

(2) In the case computer-controlled in-line blending is not used, a rate of not less than one sample per each fifty occasions RBOB and oxygenate are blended in a truck by that oxygenate blender, or one sample every two weeks, whichever is more frequent; and

(D) This increased frequency shall continue until the results of ten consecutive samples and tests indicate the gasoline complies with applicable standards, at which time the frequency may revert to the original frequency.

(f) *Oxygenate blending with OPRG.* Notwithstanding the requirements for and restrictions on oxygenate blending provided in this section, any oxygenate blender may blend oxygenate with reformulated gasoline that is designated as OPRG, without meeting the record keeping and reporting requirements

that otherwise apply to oxygenate blenders, provided that the reformulated gasoline so produced is:

(1) Used in an oxygenated fuels program control area during an oxygenated fuels program control period; and

(2) "Substantially similar" under section 211(f)(1) of the Clean Air Act, or is permitted under a waiver granted by the Administrator under the authority of section 211(f)(4) of the Clean Air Act.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36964, July 20, 1994]

§ 80.70 Covered areas.

For purposes of subparts D, E, and F of this part, the covered areas are as follows:

(a) The Los Angeles-Anaheim-Riverside, California, area, comprised of:

- (1) Los Angeles County;
- (2) Orange County;
- (3) Ventura County;
- (4) That portion of San Bernardino County that lies south of latitude 35 degrees, 10 minutes north and west of longitude 115 degrees, 45 minutes west; and

(5) That portion of Riverside County, which lies to the west of a line described as follows:

(i) Beginning at the northeast corner of Section 4, Township 2 South, Range 5 East, a point on the boundary line common to Riverside and San Bernardino Counties;

(ii) Then southerly along section lines to the centerline of the Colorado River Aqueduct;

(iii) Then southeasterly along the centerline of said Colorado River Aqueduct to the southerly line of Section 36, Township 3 South, Range 7 East;

(iv) Then easterly along the township line to the northeast corner of Section 6, Township 4 South, Range 9 East;

(v) Then southerly along the easterly line of Section 6 to the southeast corner thereof;

(vi) Then easterly along section lines to the northeast corner of Section 10, Township 4 South, Range 9 East;

(vii) Then southerly along section lines to the southeast corner of Section 15, Township 4 South, Range 9 East;

(viii) Then easterly along the section lines to the northeast corner of Section 21, Township 4 South, Range 10 East;

(ix) Then southerly along the easterly line of Section 21 to the southeast corner thereof;

(x) Then easterly along the northerly line of Section 27 to the northeast corner thereof;

(xi) Then southerly along section lines to the southeast corner of Section 34, Township 4 South, Range 10 East;

(xii) Then easterly along the township line to the northeast corner of Section 2, Township 5 South, Range 10 East;

(xiii) Then southerly along the easterly line of Section 2, to the southeast corner thereof;

(xiv) Then easterly along the northerly line of Section 12 to the northeast corner thereof;

(xv) Then southerly along the range line to the southwest corner of Section 18, Township 5 South, Range 11 East;

(xvi) Then easterly along section lines to the northeast corner of Section 24, Township 5 South, Range 11 East; and

(xvii) Then southerly along the range line to the southeast corner of Section 36, Township 8 South, Range 11 East, a point on the boundary line common to Riverside and San Diego Counties.

(b) San Diego County, California.

(c) The Greater Connecticut area, comprised of:

(1) The following Connecticut counties:

- (i) Hartford;
- (ii) Middlesex;
- (iii) New Haven;
- (iv) New London;
- (v) Tolland;
- (vi) Windham; and

(2) Portions of certain Connecticut counties, described as follows:

(i) In Fairfield County, the City of Shelton; and

(ii) In Litchfield County, all cities and townships except the towns of Bridgewater and New Milford.

(d) The New York-Northern New Jersey-Long Island-Connecticut area, comprised of:

(1) Portions of certain Connecticut counties, described as follows:

(i) In Fairfield County, all cities and townships except Shelton City;

(ii) In Litchfield County, the towns of Bridgewater and New Milford;

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(2) The following New Jersey counties:

- (i) Bergen;
- (ii) Essex;
- (iii) Hudson;
- (iv) Hunterdon;
- (v) Middlesex;
- (vi) Monmouth;
- (vii) Morris;
- (viii) Ocean;
- (ix) Passaic;
- (x) Somerset;
- (xi) Sussex;
- (xii) Union; and

(3) The following New York counties:

- (i) Bronx;
- (ii) Kings;
- (iii) Nassau;
- (iv) New York (Manhattan);
- (v) Queens;
- (vi) Richmond;
- (vii) Rockland;
- (viii) Suffolk;
- (ix) Westchester;
- (x) Orange; and
- (xi) Putnam.

(e) The Philadelphia-Wilmington-Trenton area, comprised of:

- (1) The following Delaware counties:
 - (i) New Castle; and
 - (ii) Kent;
- (2) Cecil County, Maryland;
- (3) The following New Jersey counties:

- (i) Burlington;
- (ii) Camden;
- (iii) Cumberland;
- (iv) Gloucester;
- (v) Mercer;
- (vi) Salem; and
- (4) The following Pennsylvania counties:

- (i) Bucks;
- (ii) Chester;
- (iii) Delaware;
- (iv) Montgomery; and
- (v) Philadelphia.

(f) The Chicago-Gary-Lake County, Illinois-Indiana-Wisconsin area, comprised of:

- (1) The following Illinois counties:
 - (i) Cook;
 - (ii) Du Page;
 - (iii) Kane;
 - (iv) Lake;
 - (v) McHenry;
 - (vi) Will;
- (2) Portions of certain Illinois counties, described as follows:

(i) In Grundy County, the townships of Aux Sable and Goose Lake; and
(ii) In Kendall County, Oswego township; and

(3) The following Indiana counties:

- (i) Lake; and
- (ii) Porter.

(g) The Baltimore, Maryland area, comprised of:

- (1) The following Maryland counties:
 - (i) Anne Arundel;
 - (ii) Baltimore;
 - (iii) Carroll;
 - (iv) Harford;
 - (v) Howard; and
- (2) The City of Baltimore.

(h) The Houston-Galveston-Brazoria, Texas area, comprised of the following Texas counties:

- (1) Brazoria;
- (2) Fort Bend;
- (3) Galveston;
- (4) Harris;
- (5) Liberty;
- (6) Montgomery;
- (7) Waller; and
- (8) Chambers.

(i) The Milwaukee-Racine, Wisconsin area, comprised of the following Wisconsin counties:

- (1) Kenosha;
- (2) Milwaukee;
- (3) Ozaukee;
- (4) Racine;
- (5) Washington; and
- (6) Waukesha.

(j) The ozone nonattainment areas listed in this paragraph (j) are covered areas for purposes of subparts D, E, and F of this part. The geographic extent of each covered area listed in this paragraph (j) shall be the nonattainment area boundaries as specified in 40 CFR part 81, subpart C:

(1) Sussex County, Delaware;

(2) District of Columbia portion of the Washington ozone nonattainment area;

(3) The following Kentucky counties:

- (i) Boone;
- (ii) Campbell;
- (iii) Jefferson; and
- (iv) Kenton;
- (4) Portions of the following Kentucky counties:

(i) Portion of Bullitt County described as follows:

(A) Beginning at the intersection of Ky 1020 and the Jefferson-Bullitt County Line proceeding to the east along

the county line to the intersection of county road 567 and the Jefferson-Bullitt County Line;

(B) Proceeding south on county road 567 to the junction with Ky 1116 (also known as Zoneton Road);

(C) Proceeding to the south on KY 1116 to the junction with Hebron Lane;

(D) Proceeding to the south on Hebron Lane to Cedar Creek;

(E) Proceeding south on Cedar Creek to the confluence of Floyds Fork turning southeast along a creek that meets Ky 44 at Stallings Cemetery;

(F) Proceeding west along Ky 44 to the eastern most point in the Shepherdsville city limits;

(G) Proceeding south along the Shepherdsville city limits to the Salt River and west to a point across the river from Mooney Lane;

(H) Proceeding south along Mooney Lane to the junction of Ky 480;

(I) Proceeding west on Ky 480 to the junction with Ky 2237;

(J) Proceeding south on Ky 2237 to the junction with Ky 61 and proceeding north on Ky 61 to the junction with Ky 1494;

(K) Proceeding south on Ky 1494 to the junction with the perimeter of the Fort Knox Military Reservation;

(L) Proceeding north along the military reservation perimeter to Castleman Branch Road;

(M) Proceeding north on Castleman Branch Road to Ky 44;

(N) Proceeding a very short distance west on Ky 44 to a junction with Ky 1020; and

(O) Proceeding north on Ky 1020 to the beginning.

(ii) Portion of Oldham County described as follows:

(A) Beginning at the intersection of the Oldham-Jefferson County Line with the southbound lane of Interstate 71;

(B) Proceeding to the northeast along the southbound lane of Interstate 71 to the intersection of Ky 329 and the southbound lane of Interstate 71;

(C) Proceeding to the northwest on Ky 329 to the intersection of Zaring Road on Ky 329;

(D) Proceeding to the east-northeast on Zaring Road to the junction of Cedar Point Road and Zaring Road;

(E) Proceeding to the north-northeast on Cedar Point Road to the junction of Ky 393 and Cedar Point Road;

(F) Proceeding to the south-southeast on Ky 393 to the junction of county road 746 (the road on the north side of Reformatory Lake and the Reformatory);

(G) Proceeding to the east-northeast on county road 746 to the junction with Dawkins Lane (also known as Saddlers Mill Road) and county road 746;

(H) Proceeding to follow an electric power line east-northeast across from the junction of county road 746 and Dawkins Lane to the east-northeast across Ky 53 on to the La Grange Water Filtration Plant;

(I) Proceeding on to the east-southeast along the power line then south across Fort Pickens Road to a power substation on Ky 146;

(J) Proceeding along the power line south across Ky 146 and the Seaboard System Railroad track to adjoin the incorporated city limits of La Grange;

(K) Then proceeding east then south along the La Grange city limits to a point abutting the north side of Ky 712;

(L) Proceeding east-southeast on Ky 712 to the junction of Massie School Road and Ky 712;

(M) Proceeding to the south-southwest and then north-northwest on Massie School Road to the junction of Ky 53 and Massie School Road;

(N) Proceeding on Ky 53 to the north-northwest to the junction of Moody Lane and Ky 53;

(O) Proceeding on Moody Lane to the south-southwest until meeting the city limits of La Grange;

(P) Then briefly proceeding north following the La Grange city limits to the intersection of the northbound lane of Interstate 71 and the La Grange city limits;

(Q) Proceeding southwest on the northbound lane of Interstate 71 until intersecting with the North Fork of Currys Fork;

(R) Proceeding south-southwest beyond the confluence of Currys Fork to the south-southwest beyond the confluence of Floyds Fork continuing on to the Oldham-Jefferson County Line; and

(S) Proceeding northwest along the Oldham-Jefferson County Line to the beginning.

(5) The following Maine counties:

(i) Androscoggin;

(ii) Cumberland;

(iii) Kennebec;

(iv) Knox;

(v) Lincoln;

(vi) Sagadahoc;

(vii) York;

(6) The following Maryland counties:

(i) Calvert;

(ii) Charles;

(iii) Frederick;

(iv) Montgomery;

(v) Prince Georges;

(vi) Queen Anne's; and

(vii) Kent;

(7) The entire State of Massachusetts;

(8) The following New Hampshire counties:

(i) Strafford;

(ii) Merrimack;

(iii) Hillsborough; and

(iv) Rockingham;

(9) The following New Jersey counties:

(i) Atlantic;

(ii) Cape May; and

(iii) Warren;

(10) The following New York counties:

(i) Dutchess;

(11) The portion of Essex County that consists of the portion of Whiteface Mountain above 4,500 feet in elevation.

(12) The following Texas counties:

and

(i) Collin;

(ii) Dallas;

(iii) Denton; and

(iv) Tarrant;

(13) The following Virginia areas:

(i) Alexandria;

(ii) Arlington County;

(iii) Fairfax;

(iv) Fairfax County;

(v) Falls Church;

(vi) Loudoun County;

(vii) Manassas;

(viii) Manassas Park;

(ix) Prince William County;

(x) Stafford County;

(xi) Charles City County;

(xii) Chesterfield County;

(xiii) Colonial Heights;

(xiv) Hanover County;

(xv) Henrico County;

(xvi) Hopewell;

(xvii) Richmond;

(xviii) Chesapeake;

(xix) Hampton;

(xx) James City County;

(xxi) Newport News;

(xxii) Norfolk;

(xxiii) Poquoson;

(xxiv) Portsmouth;

(xxv) Suffolk;

(xxvi) Virginia Beach;

(xxvii) Williamsburg; and

(xxviii) York County.

(k) Any other area classified under 40 CFR part 81, subpart C as a marginal, moderate, serious, or severe ozone non-attainment area may be included on petition of the governor of the state in which the area is located. Effective one year after an area has been reclassified as a severe ozone nonattainment area, such severe area shall also be a covered area for purposes of this subpart D.

(l) Upon the effective date for removal under §80.72(a), the geographic area covered by such approval shall no longer be considered a covered area for purposes of subparts D, E and F of this part.

(m) The prohibitions of section 211(k)(5) will apply to all persons other than retailers and wholesale purchaser-consumers July 3, 1997. The prohibitions of section 211(k)(5) will apply to retailers and wholesale purchaser-consumers August 4, 1997. As of the effective date for retailers and wholesale purchaser-consumers, the Phoenix, Arizona ozone nonattainment area is a covered area. The geographical extent of the covered area listed in this paragraph shall be the nonattainment boundaries for the Phoenix ozone non-attainment area as specified in 40 CFR 81.303.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36964, July 20, 1994; 60 FR 2699, Jan 11, 1995; 60 FR 35491, July 10, 1995; 61 FR 35680, July 8, 1996; 62 FR 30270, June 3, 1997]

EFFECTIVE DATE NOTE: At 62 FR 30270, June 3, 1997, §80.70 was amended by adding paragraph (m), effective July 3, 1997.

§ 80.71 Descriptions of VOC-control regions.

(a) Reformulated gasoline covered areas which are located in the following states are included in VOC-Control Region 1:

Alabama
Arizona
Arkansas
California
Colorado
District of Columbia
Florida
Georgia
Kansas
Louisiana
Maryland
Mississippi
Missouri
Nevada
New Mexico
North Carolina
Oklahoma
Oregon
South Carolina
Tennessee
Texas
Utah
Virginia

(b) Reformulated gasoline covered areas which are located in the following states are included in VOC-Control Region 2:

Connecticut
Delaware
Idaho
Illinois
Indiana
Iowa
Kentucky
Maine
Massachusetts
Michigan
Minnesota
Montana
Nebraska
New Hampshire
New Jersey
New York
North Dakota
Ohio
Pennsylvania
Rhode Island
South Dakota
Vermont
Washington
West Virginia
Wisconsin

Wyoming

(c) Reformulated gasoline covered areas which are partially in VOC Control Region 1 and partially in VOC Control Region 2 shall be included in VOC Control Region 1, except in the case of the Philadelphia-Wilmington-Trenton CMSA which shall be included in VOC Control Region 2.

§ 80.72 Procedures for opting out of the covered areas.

(a) For petitions received prior to and including December 31, 1997 and in accordance with paragraph (b) of this section, the Administrator may approve a petition from a state asking for removal of any opt-in area, or portion of an opt-in area, from inclusion as a covered area under § 80.70. If the Administrator approves a petition, he or she shall set an effective date as provided in paragraph (c) of this section. The Administrator shall notify the state in writing of the Agency's action on the petition and the effective date of the removal when the petition is approved.

(b) To be approved under paragraph (a) of this section, a petition must be signed by the governor of a state, or his or her authorized representative, and must include the following:

(1) A geographic description of each opt-in area, or portion of each opt-in area, which is covered by the petition;

(2) A description of all ways in which reformulated gasoline is relied upon as a control measure in any approved state or local implementation plan or plan revision, or in any submission to the Agency containing any proposed plan or plan revision (and any associated request for redesignation) that is pending before the Agency when the petition is submitted; and

(3) For any opt-in areas covered by the petition for which reformulated gasoline is relied upon as a control measure as described under paragraph (b)(2) of this section, the petition shall include the following information:

(i) Identify whether the state is withdrawing any such pending plan submission;

(ii)(A) Identify whether the state intends to submit a revision to any such approved plan provision or pending plan submission that does not rely on

reformulated gasoline as a control measure, and describe the alternative air quality measures, if any, that the state plans to use to replace reformulated gasoline as a control measure;

(B) A description of the current status of any proposed revision to any such approved plan provision or pending plan submission, as well as a projected schedule for submission of such proposed revision;

(iii) If the state is not withdrawing any such pending plan submission and does not intend to submit a revision to any such approved plan provision or pending plan submission, describe why no revision is necessary;

(iv) If reformulated gasoline is relied upon in any pending plan submission, other than as a contingency measure consisting of a future opt-in, and the Agency has found such pending plan submission complete or made a protectiveness finding under 40 CFR 51.448 and 93.128, demonstrate whether the removal of the reformulated gasoline program will affect the completeness and/or protectiveness determinations;

(4) The Governor of a State, or his or her authorized representative, shall submit additional information upon request of the Administrator,

(c) (1) Except as provided in paragraph (c)(2) of this section, the Administrator shall set an effective date for removal of an area under paragraph (a) of this section of 90 days from the Agency's written notification to the state approving the opt-out petition.

(2) If reformulated gasoline is contained as an element of any plan or plan revision that has been approved by the Agency, other than as a contingency measure consisting of a future opt-in, then the effective date under paragraph (a) of this section shall be 90 days from the effective date for Agency approval of a revision to the plan that removes reformulated gasoline as a control measure.

(d) The Administrator shall publish a notice in the FEDERAL REGISTER announcing the approval of any petition under paragraph (a) of this section, and the effective date for removal.

[61 FR 35680, July 8, 1996]

§ 80.73 Inability to produce conforming gasoline in extraordinary circumstances.

In appropriate extreme and unusual circumstances (e.g., natural disaster or Act of God) which are clearly outside the control of the refiner, importer, or oxygenate blender and which could not have been avoided by the exercise of prudence, diligence, and due care, EPA may permit a refiner, importer, or oxygenate blender, for a brief period, to distribute gasoline which does not meet the requirements for reformulated gasoline, if:

(a) It is in the public interest to do so (e.g., distribution of the nonconforming gasoline is necessary to meet projected shortfalls which cannot otherwise be compensated for);

(b) The refiner, importer, or oxygenate blender exercised prudent planning and was not able to avoid the violation and has taken all reasonable steps to minimize the extent of the nonconformity;

(c) The refiner, importer, or oxygenate blender can show how the requirements for reformulated gasoline will be expeditiously achieved;

(d) The refiner, importer, or oxygenate blender agrees to make up air quality detriment associated with the nonconforming gasoline, where practicable; and

(e) The refiner, importer, or oxygenate blender pays to the U.S. Treasury an amount equal to the economic benefit of the nonconformity minus the amount expended, pursuant to paragraph (d) of this section, in making up the air quality detriment.

§ 80.74 Recordkeeping requirements.

All parties in the gasoline distribution network, as described in this section, shall maintain records containing the information as required in this section. These records shall be retained for a period of five years from the date of creation, and shall be delivered to the Administrator of EPA or to the Administrator's authorized representative upon request.

(a) *All regulated parties.* Any refiner, importer, oxygenate blender, carrier, distributor, reseller, retailer, or wholesale-purchaser who sells, offers for sale, dispenses, supplies, offers for supply,

stores, transports, or causes the transportation of any reformulated gasoline or RBOB, shall maintain records containing the following information:

(1) The product transfer documentation for all reformulated gasoline or RBOB for which the party is the transferor or transferee; and

(2) For any sampling and testing on RBOB or reformulated gasoline:

(i) The location, date, time, and storage tank or truck identification for each sample collected;

(ii) The identification of the person who collected the sample and the person who performed the testing;

(iii) The results of the tests; and

(iv) The actions taken to stop the sale of any gasoline found not to be in compliance, and the actions taken to identify the cause of any noncompliance and prevent future instances of noncompliance.

(b) *Refiners and importers.* In addition to other requirements of this section, any refiner and importer shall, for all reformulated gasoline and RBOB produced or imported, maintain records containing the following information:

(1) Results of the tests to determine reformulated gasoline properties and characteristics specified in § 80.65;

(2) Results of the tests for the presence of the marker specified in § 80.82;

(3) The volume of gasoline associated with each of the above test results using the method normally employed at the refinery or import facility for this purpose;

(4) In the case of RBOB:

(i) The results of tests to ensure that, following blending, RBOB meets applicable standards; and

(ii) Each contract with each oxygenate blender to whom the refiner or importer transfers RBOB; or

(iii) Compliance calculations described in § 80.69(a)(8) based on an assumed addition of oxygenate;

(5) In the case of any refinery or importer subject to the simple model standards, the calculations used to determine the 1990 baseline levels of sulfur, T-90, and olefins, and the calculations used to determine compliance with the standards for these parameters; and

(6) In the case of any refinery or importer subject to the complex model

standards before January 1, 1998, the calculations used to determine the baseline levels of VOC, toxics, and NO_x emissions performance.

(c) *Refiners, importers and oxygenate blenders of averaged gasoline.* In addition to other requirements of this section, any refiner, importer, and oxygenate blender who produces or imports any reformulated gasoline for which compliance with one or more applicable standard is determined on average shall maintain records containing the following information:

(1) The calculations used to determine compliance with the relevant standards on average, for each averaging period and for each quantity of gasoline for which standards must be separately achieved; and

(2) For any credits bought, sold, traded or transferred pursuant to § 80.67(h), the dates of the transactions, the names and EPA registration numbers of the parties involved, and the number(s) and type(s) of credits transferred.

(d) *Oxygenate blenders.* In addition to other requirements of this section, any oxygenate blender who blends any oxygenate with any RBOB shall, for each occasion such terminal storage tank blending occurs, maintain records containing the following information:

(i) The date, time, location, and identification of the blending tank or truck in which the blending occurred;

(ii) The volume and oxygenate requirements of the RBOB to which oxygenate was added; and

(iii) The volume, type, and purity of the oxygenate which was added, and documents which show the source(s) of the oxygenate used.

(e) *Distributors who dispense RBOB into trucks.* In addition to other requirements of this section, any distributor who dispenses any RBOB into a truck used for delivering gasoline to retail outlets shall, for each occasion RBOB is dispensed into such a truck, obtain records identifying:

(1) The name and EPA registration number of the oxygenate blender that received the RBOB; and

(2) The volume and oxygenate requirements of the RBOB dispensed.

(f) *Conventional gasoline requirement.* In addition to other requirements of

this section, any refiner and importer shall, for all conventional gasoline produced or imported, maintain records showing the blending of the marker required under § 80.82 into conventional gasoline, and the results of the tests showing the concentration of this marker subsequent to its addition.

(g) *Retailers before January 1, 1998.* Prior to January 1, 1998 any retailer that sells or offers for sale any reformulated gasoline shall maintain at each retail outlet the product transfer documentation for the most recent three deliveries to the retail outlet of each grade of reformulated gasoline sold or offered for sale at the retail outlet, and shall make such documentation available to any person conducting any gasoline compliance survey pursuant to § 80.68.

§ 80.75 Reporting requirements.

Any refiner, importer, and oxygenate blender shall report as specified in this section, and shall report such other information as the Administrator may require.

(a) *Quarterly reports for reformulated gasoline.* Any refiner or importer that produces or imports any reformulated gasoline or RBOB, and any oxygenate blender that produces reformulated gasoline meeting the oxygen standard on average, shall submit quarterly reports to the Administrator for each refinery or oxygenate blending facility at which such reformulated gasoline or RBOB was produced and for all such reformulated gasoline or RBOB imported by each importer.

(1) The quarterly reports shall be for all such reformulated gasoline or RBOB produced or imported during the following time periods:

(i) The first quarterly report shall include information for reformulated gasoline or RBOB produced or imported from January 1 through March 31, and shall be submitted by May 31 of each year beginning in 1995;

(ii) The second quarterly report shall include information for reformulated gasoline or RBOB produced or imported from April 1 through June 30, and shall be submitted by August 31 of each year beginning in 1995;

(iii) The third quarterly report shall include information for reformulated

gasoline or RBOB produced or imported from July 1 through September 30, and shall be submitted by November 30 of each year beginning in 1995; and

(iv) The fourth quarterly report shall include information for reformulated gasoline or RBOB produced or imported from October 1 through December 31, and shall be submitted by the last day of February of each year beginning in 1996.

(2) The following information shall be included in each quarterly report for each batch of reformulated gasoline or RBOB which is included under paragraph (a)(1) of this section:

(i) The batch number;

(ii) The volume of the batch;

(iii) The grade of gasoline produced (i.e., premium, mid-grade, or regular);

(iv) For any refiner or importer:

(A) Each designation of the gasoline, pursuant to § 80.65; and

(B) The properties, pursuant to §§ 80.65 and 80.66;

(v) For any importer, the PADD in which the import facility is located; and

(vi) For any oxygenate blender, the oxygen content.

(3) Information pertaining to gasoline produced or imported during 1994 shall be included in the first quarterly report in 1995.

(b) *Reports for gasoline or RBOB produced or imported under the simple model—(1) RVP averaging reports.* (i) Any refiner or importer that produced or imported any reformulated gasoline or RBOB under the simple model that was to meet RVP standards on average ("averaged reformulated gasoline") shall submit to the Administrator, with the third quarterly report, a report for each refinery or importer for such averaged reformulated gasoline or RBOB produced or imported during the previous RVP averaging period. This information shall be reported separately for the following categories:

(A) Gasoline or RBOB which is designated as VOC-controlled intended for areas in VOC-Control Region 1; and

(B) Gasoline or RBOB which is designated as VOC-controlled intended for VOC-Control Region 2.

(ii) The following information shall be reported:

(A) The total volume of averaged reformulated gasoline or RBOB in gallons;

(B) The compliance total value for RVP; and

(C) The actual total value for RVP.

(2) *Sulfur, olefins and T90 averaging reports.* (i) Any refiner or importer that produced or imported any reformulated gasoline or RBOB under the simple model shall submit to the Administrator, with the fourth quarterly report, a report for such reformulated gasoline or RBOB produced or imported during the previous year:

(A) For each refinery or importer; or

(B) In the case of refiners who operate more than one refinery, for each grouping of refineries as designated by the refiner pursuant to § 80.41(h)(2)(iii).

(ii) The following information shall be reported:

(A) The total volume of reformulated gasoline or RBOB in gallons;

(B) The applicable sulfur content standard under § 80.41(h)(2)(i) in parts per million;

(C) The average sulfur content in parts per million;

(D) The difference between the applicable sulfur content standard under § 80.41(h)(2)(i) in parts per million and the average sulfur content under paragraph (b)(2)(ii)(C) of this section in parts per million, indicating whether the average is greater or lesser than the applicable standard;

(E) The applicable olefin content standard under § 80.41(h)(2)(i) in volume percent;

(F) The average olefin content in volume percent;

(G) The difference between the applicable olefin content standard under § 80.41(h)(2)(i) in volume percent and the average olefin content under paragraph (b)(2)(ii)(F) of this section in volume percent, indicating whether the average is greater or lesser than the applicable standard;

(H) The applicable T90 distillation point standard under § 80.41(h)(2)(i) in degrees Fahrenheit;

(I) The average T90 distillation point in degrees Fahrenheit; and

(J) The difference between the applicable T90 distillation point standard under § 80.41(h)(2)(i) in degrees Fahrenheit and the average T90 distillation

point under paragraph (b)(2)(ii)(I) of this section in degrees Fahrenheit, indicating whether the average is greater or lesser than the applicable standard.

(c) *VOC emissions performance averaging reports.* (1) Any refiner or importer that produced or imported any reformulated gasoline or RBOB under the complex model that was to meet the VOC emissions performance standards on average ("averaged reformulated gasoline") shall submit to the Administrator, with the third quarterly report, a report for each refinery or importer for such averaged reformulated gasoline produced or imported during the previous VOC averaging period. This information shall be reported separately for the following categories:

(i) Gasoline or RBOB which is designated as VOC-controlled intended for areas in VOC-Control Region 1; and

(ii) Gasoline or RBOB which is designated as VOC-controlled intended for VOC-Control Region 2.

(2) The following information shall be reported:

(i) The total volume of averaged reformulated gasoline or RBOB in gallons;

(ii) The compliance total value for VOC emissions performance; and

(iii) The actual total value for VOC emissions performance.

(d) *Benzene content averaging reports.*

(1) Any refiner or importer that produced or imported any reformulated gasoline or RBOB that was to meet the benzene content standards on average ("averaged reformulated gasoline") shall submit to the Administrator, with the fourth quarterly report, a report for each refinery or importer for such averaged reformulated gasoline that was produced or imported during the previous toxics averaging period.

(2) The following information shall be reported:

(i) The volume of averaged reformulated gasoline or RBOB in gallons;

(ii) The compliance total content of benzene;

(iii) The actual total content of benzene;

(iv) The number of benzene credits generated as a result of actual total benzene being less than compliance total benzene;

(v) The number of benzene credits required as a result of actual total benzene being greater than compliance total benzene;

(vi) The number of benzene credits transferred to another refinery or importer; and

(vii) The number of benzene credits obtained from another refinery or importer.

(e) *Toxics emissions performance averaging reports.* (1) Any refiner or importer that produced or imported any reformulated gasoline or RBOB that was to meet the toxics emissions performance standards on average ("averaged reformulated gasoline") shall submit to the Administrator, with the fourth quarterly report, a report for each refinery or importer for such averaged reformulated gasoline that was produced or imported during the previous toxics averaging period.

(2) The following information shall be reported:

(i) The volume of averaged reformulated gasoline or RBOB in gallons;

(ii) The compliance value for toxics emissions performance; and

(iii) The actual value for toxics emissions performance.

(f) *Oxygen averaging reports.* (1) Any refiner, importer, or oxygenate blender that produced or imported any reformulated gasoline that was to meet the oxygen standards on average ("averaged reformulated gasoline") shall submit to the Administrator, with the fourth quarterly report, a report for each refinery and oxygenate blending facility at which such averaged reformulated gasoline was produced and for all such averaged reformulated gasoline imported by each importer during the previous oxygen averaging period.

(2)(i) The following information shall be included in each report required by paragraph (f)(1) of this section:

(A) The total volume of averaged RBOB in gallons;

(B) The total volume of averaged reformulated gasoline in gallons;

(C) The compliance total content for oxygen;

(D) The actual total content for oxygen;

(E) The number of oxygen credits generated as a result of actual total ox-

ygen being greater than compliance total oxygen;

(F) The number of oxygen credits required as a result of actual total oxygen being less than compliance total oxygen;

(G) The number of oxygen credits transferred to another refinery, importer, or oxygenate blending facility; and

(H) The number of oxygen credits obtained from another refinery, importer, or oxygenate blending facility.

(ii) The information required by paragraph (f)(2)(i) of this section shall be reported separately for the following categories:

(A) For gasoline subject to the simple model standards:

(1) Gasoline which is designated as VOC-controlled and oxygenated fuels program reformulated gasoline (OPRG);

(2) Gasoline which is designated as VOC-controlled and non-OPRG;

(3) Gasoline which is designated as non-VOC-controlled and OPRG; and

(4) Gasoline which is designated as non-VOC-controlled and non-OPRG; and

(B) For gasoline subject to the Phase I or Phase II complex model standards:

(1) Gasoline which is designated as OPRG; and

(2) Gasoline which is designated as non-OPRG.

(iii) The results of the compliance calculations required in § 80.67(f) shall also be included in each report required by paragraph (f)(1) of this section, for each of the following categories:

(A) All reformulated gasoline;

(B) Gasoline which is designated as non-OPRG; and

(C) For gasoline subject to the simple model standards, gasoline which is designated as VOC-controlled.

(g) *NO_x emissions performance averaging reports.* (1) Any refiner or importer that produced or imported any reformulated gasoline or RBOB that was to meet the NO_x emissions performance standard on average ("averaged reformulated gasoline") shall submit to the Administrator, with the fourth quarterly report, a report for each refinery

or importer for such averaged reformulated gasoline that was produced or imported during the previous NO_x averaging period.

(2) The following information shall be reported:

(i) The volume of averaged reformulated gasoline or RBOB in gallons;

(ii) The compliance value for NO_x emissions performance; and

(iii) The actual value for NO_x emissions performance.

(3) The information required by paragraph (g)(2) of this section shall be reported separately for the following categories:

(i) Gasoline and RBOB which is designated as VOC-controlled; and

(ii) Gasoline and RBOB which is not designated as VOC-controlled.

(h) *Credit transfer reports.* (1) As an additional part of the fourth quarterly report required by this section, any refiner, importer, and oxygenate blender shall, for each refinery, importer, or oxygenate blending facility, supply the following information for any oxygen or benzene credits that are transferred from or to another refinery, importer, or oxygenate blending facility:

(i) The names, EPA-assigned registration numbers and facility identification numbers of the transferor and transferee of the credits;

(ii) The number(s) and type(s) of credits that were transferred; and

(iii) The date(s) of transaction(s).

(2) For purposes of this paragraph (h), oxygen credit transfers shall be reported separately for each of the following oxygen credit types:

(i) For gasoline subject to the simple model standards:

(A) VOC controlled, oxygenated fuels program reformulated gasoline (OPRG) oxygen credits;

(B) VOC controlled, non-OPRG oxygen credits;

(C) Non-VOC controlled, OPRG oxygen credits; and

(D) Non-VOC controlled, non-OPRG oxygen credits; and

(ii) For gasoline subject to the Phase I or Phase II complex model standards:

(A) OPRG oxygen credits; and

(B) Non-OPRG oxygen credits.

(i) *Covered areas of gasoline use report.* Any refiner or oxygenate blender that produced or imported any reformulated

gasoline that was to meet any reformulated gasoline standard on average ("averaged reformulated gasoline") shall, for each refinery and oxygenate blending facility at which such averaged reformulated gasoline was produced submit to the Administrator, with the fourth quarterly report, a report that contains the identity of each covered area that was supplied with any averaged reformulated gasoline produced at each refinery or blended by each oxygenate blender during the previous year.

(j) *Additional reporting requirements for certain importers.* In the case of any importer to whom different standards apply for gasoline imported at different facilities by operation of § 80.41(q)(2), such importer shall submit separate reports for gasoline imported into facilities subject to different standards.

(k) *Reporting requirements for early use of the complex model.* Any refiner for any refinery, or any importer, that elects to be subject to complex model standards under § 80.41(i)(1) shall report such election in writing to the Administrator no later than sixty days prior to the beginning of the calendar year during which such standards would apply. This report shall include the refinery's or importer's baseline values for VOC, NO_x, and toxics emissions performance, in milligrams per mile.

(l) *Reports for per-gallon compliance gasoline.* In the case of reformulated gasoline or RBOB for which compliance with each of the standards set forth in § 80.41 is achieved on a per-gallon basis, the refiner, importer, or oxygenate blender shall submit to the Administrator, by the last day of February of each year beginning in 1996, a report of the volume of each designated reformulated gasoline or RBOB produced or imported during the previous calendar year for which compliance is achieved on a per-gallon basis, and a statement that each gallon of this reformulated gasoline or RBOB met the applicable standards.

(m) *Reports of compliance audits.* Any refiner, importer, and oxygenate blender shall cause to be submitted to the Administrator, by May 31 of each year, the report of the compliance audit required by § 80.65(h).

(n) *Report submission.* The reports required by this section shall be:

(1) Submitted on forms and following procedures specified by the Administrator; and

(2) Signed and certified as correct by the owner or a responsible corporate officer of the refiner, importer, or oxygenate blender.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36964, July 20, 1994; 60 FR 65574, Dec. 20, 1995]

§ 80.76 Registration of refiners, importers or oxygenate blenders.

(a) Registration with the Administrator of EPA is required for any refiner and importer, and any oxygenate blender that produces any reformulated gasoline.

(b) Any person required to register shall do so by November 1, 1994, or not later than three months in advance of the first date that such person will produce or import reformulated gasoline or applicable blendstocks, whichever is later.

(c) Registration shall be on forms prescribed by the Administrator, and shall include the following information:

(1) The name, business address, contact name, and telephone number of the refiner, importer, or oxygenate blender;

(2) For each separate refinery and oxygenate blending facility, the facility name, physical location, contact name, telephone number, and type of facility; and

(3) For each separate refinery and oxygenate blending facility, and for each importer's operations in a single PADD:

(i) Whether records are kept on-site or off-site of the refinery or oxygenate blending facility, or in the case of importers, the registered address;

(ii) If records are kept off-site, the primary off-site storage facility name, physical location, contact name, and telephone number; and

(iii) The name, address, contact name and telephone number of the independent laboratory used to meet the independent analysis requirements of § 80.65(f).

(d) EPA will supply a registration number to each refiner, importer, and oxygenate blender, and a facility registration number for each refinery and oxygenate blending facility that is identified, which shall be used in all reports to the Administrator.

(e)(1) Any refiner, importer, or oxygenate blender shall submit updated registration information to the Administrator within thirty days of any occasion when the registration information previously supplied becomes incomplete or inaccurate; except that

(2) EPA must be notified in writing of any change in designated independent laboratory at least thirty days in advance of such change.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36965, July 20, 1994]

§ 80.77 Product transfer documentation.

On each occasion when any person transfers custody or title to any reformulated gasoline or RBOB, other than when gasoline is sold or dispensed for use in motor vehicles at a retail outlet or wholesale purchaser-consumer facility, the transferor shall provide to the transferee documents which include the following information:

(a) The name and address of the transferor;

(b) The name and address of the transferee;

(c) The volume of gasoline which is being transferred;

(d) The location of the gasoline at the time of the transfer;

(e) The date of the transfer;

(f) The proper identification of the gasoline as conventional or reformulated;

(g) In the case of reformulated gasoline or RBOB:

(1) The proper identification as:

(i)(A) VOC-controlled for VOC-Control Region 1; or VOC-controlled for VOC-Control Region 2; or Not VOC-controlled; or

(B) In the case of gasoline or RBOB that is VOC-controlled for VOC-Control Region 1, the gasoline may be identified as suitable for use either in VOC-Control Region 1 or VOC-Control Region 2;

(ii) Oxygenated fuels program reformulated gasoline; or Not oxygenated

fuels program reformulated gasoline; and

(iii) Prior to January 1, 1998, certified under the simple model standards or certified under the complex model standards; and

(2) The minimum and/or maximum standards with which the gasoline or RBOB conforms for:

(i) Benzene content;

(ii) Except for RBOB, oxygen content;

(iii) In the case of VOC-controlled gasoline subject to the simple model standards, RVP;

(iv) In the case of gasoline subject to the complex model standards:

(A) Prior to January 1, 1998, the NOx emissions performance minimum, and for VOC-controlled gasoline the VOC emissions performance minimum, in milligrams per mile; and

(B) Beginning on January 1, 1998, the NOx emissions performance minimum, and for VOC-controlled gasoline the VOC emissions performance minimum; and

(3) Identification of VOC-controlled reformulated gasoline or RBOB as gasoline or RBOB which contains ethanol, or which does not contain any ethanol.

(h) Prior to January 1, 1998, in the case of reformulated gasoline or RBOB subject to the complex model standards:

(1) The name and EPA registration number of the refinery at which the gasoline was produced, or importer that imported the gasoline; and

(2) Instructions that the gasoline or RBOB may not be combined with any other gasoline or RBOB that was produced at any other refinery or was imported by any other importer;

(i) In the case of reformulated gasoline blendstock for which oxygenate blending is intended:

(1) Identification of the product as RBOB and not reformulated gasoline;

(2) The designation of the RBOB as suitable for blending with:

(A) Any oxygenate;

(B) Ether only; or

(C) Other specified oxygenate type(s) and amount(s); and

(3) The oxygenate type(s) and amount(s) which the RBOB requires in order to meet the properties claimed by the refiner or importer of the RBOB;

(4) Instructions that the RBOB may not be combined with any other RBOB except other RBOB having the same requirements for oxygenate type(s) and amount(s), or, prior to blending, with reformulated gasoline; and

(j) In the case of transferrers or transferees who are refiners, importers or oxygenate blenders, the EPA-assigned registration number of those persons.

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36965, July 20, 1994]

§ 80.78 Controls and prohibitions on reformulated gasoline.

(a) *Prohibited activities.* (1) No person may manufacture and sell or distribute, offer for sale or distribution, dispense, supply, offer for supply, store, transport, or cause the transportation of any gasoline represented as reformulated and intended for sale or use in any covered area:

(i) Unless each gallon of such gasoline meets the applicable benzene maximum standard specified in § 80.41;

(ii) Unless each gallon of such gasoline meets the applicable oxygen content:

(A) Minimum standard specified in § 80.41; and

(B) In the case of gasoline subject to simple model standards, maximum standard specified in § 80.41;

(iii) Unless each gallon is properly designated as oxygenated fuels program reformulated gasoline, within any oxygenated gasoline program control areas during the oxygenated gasoline control period;

(iv) Unless the product transfer documentation for such gasoline complies with the requirements in § 80.77; and

(v) During the period May 1 through September 15 for all persons except retailers and wholesale purchaser-consumers, and during the period June 1 through September 15 for all persons including retailers and wholesale purchaser-consumers:

(A) Unless each gallon of such gasoline is VOC-controlled for the proper VOC Control Region, except that gasoline designated for VOC-Control Region 1 may be used in VOC-Control Region 2;

(B) Unless each gallon of such gasoline that is subject to simple model standards has an RVP which is less

than or equal to the applicable RVP maximum specified in § 80.41;

(C) Unless each gallon of such gasoline that is subject to complex model standards has a VOC and NOx emissions reduction percentage which is greater than or equal to the applicable minimum specified in § 80.41.

(2) No refiner or importer may produce or import any gasoline represented as reformulated or RBOB, and intended for sale or use in any covered area:

(i) Unless such gasoline meets the definition of reformulated gasoline or RBOB; and

(ii) Unless the properties of such gasoline or RBOB correspond to the product transfer documents.

(3) No person may manufacture and sell or distribute, or offer for sale or distribution, dispense, supply, or offer for supply, store, transport or cause the transportation of gasoline represented as conventional which does not contain at least the minimum concentration of the conventional gasoline marker specified in § 80.82.

(4) Gasoline shall be presumed to be intended for sale or use in a covered area unless:

(i) Product transfer documentation as described in § 80.77 accompanying such gasoline clearly indicates the gasoline is intended for sale and use only outside any covered area; or

(ii) The gasoline is contained in the storage tank of a retailer or wholesale purchaser-consumer outside any covered area.

(5) No person may combine any reformulated gasoline with any non-oxygenate blendstock except:

(i) A person that meets each requirement specified for a refiner under this subpart; and

(ii) The blendstock that is added to reformulated gasoline meets all reformulated gasoline standards without regard to the properties of the reformulated gasoline to which the blendstock is added.

(6) No person may add any oxygenate to reformulated gasoline, except that oxygenate may be added to reformulated gasoline that is designated as OPRG provided that such gasoline is used in an oxygenated fuels program

control area during an oxygenated fuels control period.

(7) No person may combine any reformulated gasoline blendstock for oxygenate blending with any other gasoline, blendstock, or oxygenate except:

(i) Oxygenate of the type and amount (or within the range of amounts) specified by the refiner or importer at the time the RBOB was produced or imported; or

(ii) Other RBOB for which the same oxygenate type and amount (or range of amounts) was specified by the refiner or importer.

(8) No person may combine any VOC-controlled reformulated gasoline that is produced using ethanol with any VOC-controlled reformulated gasoline that is produced using any other oxygenate during the period January 1 through September 15.

(9) Prior to January 1, 1998:

(i) No person may combine any reformulated gasoline or RBOB that is subject to the simple model standards with any reformulated gasoline or RBOB that is subject to the complex model standards, except that such gasolines may be combined at a retail outlet or wholesale purchaser-consumer facility;

(ii) No person may combine any reformulated gasoline subject to the complex model standards that is produced at any refinery or is imported by any importer with any other reformulated gasoline that is produced at a different refinery or is imported by a different importer, unless the other refinery or importer has an identical baseline for meeting complex model standards during this period; and

(iii) No person may combine any RBOB subject to the complex model standards that is produced at any refinery or is imported by any importer with any RBOB that is produced at a different refinery or is imported by a different importer, unless the other refinery or importer has an identical baseline for meeting complex model standards during this period.

(10) No person may combine any reformulated gasoline with any conventional gasoline and sell the resulting mixture as reformulated gasoline.

(b) *Liability.* Liability for violations of paragraph (a) of this section shall be

determined according to the provisions of § 80.79.

(c) *Determination of compliance.* Compliance with the standards listed in paragraph (a) of this section shall be determined by use of one of the testing methodologies specified in § 80.46, except that where test results using the testing methodologies specified in § 80.46 are not available or where such test results are available but are in question, EPA may establish non-compliance with standards using any information, including the results of testing using methods that are not included in § 80.46.

(d) *Dates controls and prohibitions begin.* The controls and prohibitions specified in paragraph (a) of this section apply at any location other than retail outlets and wholesale purchaser-consumer facilities on or after December 1, 1994, at any location on or after January 1, 1995.

(59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36965, July 20, 1994)

§ 80.79 Liability for violations of the prohibited activities.

(a) *Persons liable.* Where the gasoline contained in any storage tank at any facility owned, leased, operated, controlled or supervised by any refiner, importer, oxygenate blender, carrier, distributor, reseller, retailer, or wholesale purchaser-consumer is found in violation of the prohibitions described in § 80.78(a), the following persons shall be deemed in violation:

(1) Each refiner, importer, oxygenate blender, carrier, distributor, reseller, retailer, or wholesale purchaser-consumer who owns, leases, operates, controls or supervises the facility where the violation is found;

(2) Each refiner or importer whose corporate, trade, or brand name, or whose marketing subsidiary's corporate, trade, or brand name, appears at the facility where the violation is found;

(3) Each refiner, importer, oxygenate blender, distributor, and reseller who manufactured, imported, sold, offered for sale, dispensed, supplied, offered for supply, stored, transported, or caused the transportation of any gasoline which is in the storage tank containing gasoline found to be in violation; and

(4) Each carrier who dispensed, supplied, stored, or transported any gasoline which is in the storage tank containing gasoline found to be in violation, provided that EPA demonstrates, by reasonably specific showings by direct or circumstantial evidence, that the carrier caused the violation.

(b) *Defenses for prohibited activities.* (1) In any case in which a refiner, importer, oxygenate blender, carrier, distributor, reseller, retailer, or wholesale purchaser-consumer would be in violation under paragraph (a) of this section, it shall be deemed not in violation if it can demonstrate:

(i) That the violation was not caused by the regulated party or its employee or agent;

(ii) That product transfer documents account for all of the gasoline in the storage tank found in violation and indicate that the gasoline met relevant requirements; and

(iii)(A) That it has conducted a quality assurance sampling and testing program, as described in paragraph (c) of this section; except that

(B) A carrier may rely on the quality assurance program carried out by another party, including the party that owns the gasoline in question, provided that the quality assurance program is carried out properly.

(2)(i) Where a violation is found at a facility which is operating under the corporate, trade or brand name of a refiner, that refiner must show, in addition to the defense elements required by paragraph (b)(1) of this section, that the violation was caused by:

(A) An act in violation of law (other than the Act or this part), or an act of sabotage or vandalism;

(B) The action of any reseller, distributor, oxygenate blender, carrier, or a retailer or wholesale purchaser-consumer supplied by any of these persons, in violation of a contractual undertaking imposed by the refiner designed to prevent such action, and despite periodic sampling and testing by the refiner to ensure compliance with such contractual obligation; or

(C) The action of any carrier or other distributor not subject to a contract

with the refiner but engaged by the refiner for transportation of gasoline, despite specification or inspection of procedures and equipment by the refiner which are reasonably calculated to prevent such action.

(ii) In this paragraph (b), to show that the violation "was caused" by any of the specified actions the party must demonstrate by reasonably specific showings, by direct or circumstantial evidence, that the violation was caused or must have been caused by another.

(c) *Quality assurance program.* In order to demonstrate an acceptable quality assurance program for reformulated gasoline at all points in the gasoline distribution network, other than at retail outlets and wholesale purchaser-consumer facilities, a party must present evidence:

(1) Of a periodic sampling and testing program to determine if the applicable maximum and/or minimum standards for oxygen, benzene, RVP, or VOC or NO_x emission performance are met; and

(2) That on each occasion when gasoline is found in noncompliance with one of the requirements referred to in paragraph (c)(1) of this section:

(i) The party immediately ceases selling, offering for sale, dispensing, supplying, offering for supply, storing, transporting, or causing the transportation of the violating product; and

(ii) The party promptly remedies the violation (such as by removing the violating product or adding more complying product until the applicable standards are achieved).

§ 80.80 Penalties.

(a) Any person that violates any requirement or prohibition of subpart D, E, or F of this part shall be liable to the United States for a civil penalty of not more than the sum of \$25,000 for every day of each such violation and the amount of economic benefit or savings resulting from each such violation.

(b) Any violation of a standard for average compliance during any averaging period, or for per-gallon compliance for any batch of gasoline, shall constitute a separate violation for each and every standard that is violated.

(c) Any violation of any standard based upon a multi-day averaging period shall constitute a separate day of violation for each and every day in the averaging period. Any violation of any credit creation or credit transfer requirement shall constitute a separate day of violation for each and every day in the averaging period.

(d)(1)(i) Any violation of any per-gallon standard or of any per-gallon minimum or per-gallon maximum, other than the standards specified in paragraph (e) of this section, shall constitute a separate day of violation for each and every day such gasoline giving rise to such violations remains any place in the gasoline distribution system, beginning on the day that the gasoline that violates such per-gallon standard is produced or imported and distributed and/or offered for sale, and ending on the last day that any such gasoline is offered for sale or is dispensed to any ultimate consumer for use in any motor vehicle; unless

(ii) The violation is corrected by altering the properties and characteristics of the gasoline giving rise to the violations and any mixture of gasolines that contains any of the gasoline giving rise to the violations such that the said gasoline or mixture of gasolines has the properties and characteristics that would have existed if the gasoline giving rise to the violations had been produced or imported in compliance with all per-gallon standards.

(2) For the purposes of this paragraph (d), the length of time the gasoline in question remained in the gasoline distribution system shall be deemed to be twenty-five days; unless the respective party or EPA demonstrates by reasonably specific showings, by direct or circumstantial evidence, that the gasoline giving rise to the violations remained any place in the gasoline distribution system for fewer than or more than twenty-five days.

(e)(1) Any reformulated gasoline that is produced or imported and offered for sale and for which the requirements to determine the properties and characteristics under § 80.65(f) is not met, or any conventional gasoline for which the refiner or importer does not sample and test to determine the relevant properties, shall be deemed:

(i)(A) Except as provided in paragraph (e)(1)(i)(B) of this section to have the following properties:

Sulfur content—970 ppm
Benzene content—5 vol %
RVP (summer)—11 psi
50% distillation—250 °F
90% distillation—375 °F
Oxygen content—0 wt %
Aromatics content—50 vol %
Olefins content—26 vol %

(B) To have the following properties in paragraph (e)(1)(i)(A) of this section unless the respective party or EPA demonstrates by reasonably specific showings, by direct or circumstantial evidence, different properties for the gasoline giving rise to the violations; and

(i) In the case of reformulated gasoline, to have been designated as meeting all applicable standards on a per-gallon basis.

(2) For the purposes of paragraph (e)(1) of this section, any refiner or importer that fails to meet the independent analysis requirements of § 80.65(f) may not use the results of sampling and testing that is carried out by that refiner or importer as direct or circumstantial evidence of the properties of the gasoline giving rise to the violations, unless this failure was not caused by the refiner or importer.

(f) Any violation of any affirmative requirement or prohibition not included in paragraph (c) or (d) of this section shall constitute a separate day of violation for each and every day such affirmative requirement is not properly accomplished, and/or for each and every day the prohibited activity continues. For those violations that may be ongoing under subparts D, E, and F of this part, each and every day the prohibited activity continues shall constitute a separate day of violation.

§ 80.81 Enforcement exemptions for California gasoline.

(a)(1) The requirements of subparts D, E, and F of this part are modified in accordance with the provisions contained in this section in the case of California gasoline.

(2) For the purposes of this section, "California gasoline" means any gasoline that is sold, intended for sale, or made available for sale as a motor ve-

hicle fuel in the State of California and that:

(i) Is manufactured within the State of California;

(ii) Is imported into the State of California from outside the United States; or

(iii) Is imported into the State of California from inside the United States and that is manufactured at a refinery that does not produce reformulated gasoline for sale in any covered area outside the State of California.

(b)(1) Any refiner, importer, or oxygenate blender of gasoline that is sold, intended for sale, or made available for sale as a motor fuel in the State of California is, with regard to such gasoline, exempt from the compliance survey provisions contained in § 80.68.

(2) Any refiner, importer, or oxygenate blender of California gasoline is, with regard to such gasoline, exempt from the independent analysis requirements contained in § 80.65(f).

(3) Any refiner, importer, or oxygenate blender of California gasoline that elects to meet any benzene content, oxygen content, or toxics emission reduction standard specified in § 80.41 on average for any averaging period specified in § 80.67 that is in part before March 1, 1996, and in part subsequent to such date, shall, with regard to such gasoline that is produced or imported prior to such date, demonstrate compliance with each of the standards specified in § 80.41 for each of the following averaging periods in lieu of those specified in § 80.67:

(i) January 1 through December 31, 1995; and

(ii) March 1, 1995, through February 29, 1996.

(4) The compliance demonstration required by paragraph (b)(3)(ii) of this section shall be submitted no later than May 31, 1996, along with the report for the first quarter of 1996 required to be submitted under § 80.75(a)(1)(i).

(c) Any refiner, importer, or oxygenate blender of California gasoline that is manufactured or imported subsequent to March 1, 1996, and that meets the requirements of the California

Phase 2 reformulated gasoline regulations, as set forth in Title 13, California Code of Regulations, sections 2260 et seq., is, with regard to such gasoline, exempt from the following requirements (in addition to the requirements specified in paragraph (b) of this section):

(1) The parameter value reconciliation requirements contained in § 80.65(e)(2);

(2) The designation of gasoline requirements contained in § 80.65(d), except in the case of RBOB that is designated as "any renewable oxygenate," "non-VOC controlled renewable ether only", or "renewable ether only";

(3) The reformulated gasoline and RBOB compliance requirements contained in § 80.65(c);

(4) The marking of conventional gasoline requirements contained in § 80.65(g) and 80.82;

(5) The annual compliance audit requirements contained in § 80.65(h), except where such audits are required with regard to the renewable oxygenate requirements contained in § 80.83;

(6) The downstream oxygenate blending requirements contained in § 80.69, except where such requirements apply to the renewable oxygenate requirements contained in § 80.83;

(7) The record keeping requirements contained in §§ 80.74 and 80.104, except that records required to be maintained under Title 13, California Code of Regulations, section 2270, shall be maintained for a period of five years from the date of creation and shall be delivered to the Administrator or to the Administrator's authorized representative upon request;

(8) The reporting requirements contained in §§ 80.75 and 80.105;

(9) The product transfer documentation requirements contained in § 80.77; and

(10) The compliance attest engagement requirements contained in subpart F of this part, except where such requirements apply to the renewable oxygenate requirements contained in § 80.83.

(d) Any refiner, importer, or oxygenate blender that produces or imports gasoline that is sold, intended for sale, or made available for sale as a motor vehicle fuel in the State of California

subsequent to March 1, 1996, shall demonstrate compliance with the standards specified in §§ 80.41 and 80.90 by excluding the volume and properties of such gasoline from all conventional gasoline and reformulated gasoline that it produces or imports that is not sold, intended for sale, or made available for sale as a motor vehicle fuel in the State of California subsequent to such date. The exemption provided in this section does not exempt any refiner or importer from demonstrating compliance with such standards for all gasoline that it produces or imports.

(e)(1) The exemption provisions contained in paragraphs (b)(2), (b)(3), and (c) of this section shall not apply under the circumstances set forth in paragraphs (e)(2) and (e)(3) of this section.

(2)(i) Such exemption provisions shall not apply to any refiner, importer, or oxygenate blender of California gasoline if any gasoline formulation that it produces or imports is certified under Title 13, California Code of Regulations, section 2265 or section 2266, unless such refiner, importer, or oxygenate blender within 30 days of the issuance of such certification:

(A) Notifies the Administrator of such certification;

(B) Submits to the Administrator copies of the applicable certification order issued by the State of California and of the application for certification submitted by the regulated party to the State of California; and

(C) Submits to the Administrator a written demonstration that the certified gasoline formulation meets each of the complex model per-gallon standards specified in § 80.41(c).

(ii) If the Administrator determines that the written demonstration submitted under paragraph (e)(2)(i)(C) of this section does not demonstrate that the certified gasoline formulation meets each of the complex model per-gallon standards specified in § 80.41(c), the Administrator shall provide notice to the party (by first class mail) of such determination and of the date on which the exemption provisions specified in paragraph (e)(1) of this section shall no longer be applicable, which date shall be no earlier than 90 days after the date of the Administrator's notification.

(3)(i) Such exemption provisions shall not apply to any refiner, importer, or oxygenate blender of California gasoline who has been assessed a civil, criminal or administrative penalty for a violation of subpart D, E or F of this part or for a violation of the California Phase 2 reformulated gasoline regulations set forth in Title 13, California Code of Regulations, sections 2260 et seq., effective 90 days after the date of final agency or district court adjudication of such penalty assessment.

(ii) Any refiner, importer, or oxygenate blender subject to the provisions of paragraph (c)(3)(i) of this section may submit a petition to the Administrator for relief, in whole or in part, from the applicability of such provisions, for good cause. Good cause may include a showing that the violation for which a penalty was assessed was not a substantial violation of the federal or California reformulated gasoline regulations.

(f) In the case of any gasoline that is sold, intended for sale, or made available for sale as a motor vehicle fuel in the State of California subsequent to March 1, 1996, any person that manufactures, sells, offers for sale, dispenses, supplies, offers for supply, stores, transports, or causes the transportation of such gasoline is, with regard to such gasoline, exempt from the following prohibited activities provisions:

- (1) The oxygenated fuels provisions contained in § 80.78(a)(1)(iii);
- (2) The product transfer provisions contained in § 80.78(a)(1)(iv);
- (3) The oxygenate blending provisions contained in § 80.78(a)(7); and
- (4) The segregation of simple and complex model certified gasoline provision contained in § 80.78(a)(9).

(g)(1) Any refiner that operates a refinery located outside the State of California at which California gasoline (as defined in paragraph (a)(2)(iii) of this section) is produced shall, with regard to such gasoline, provide to any person to whom custody or title of such gasoline is transferred, and each transferee shall provide to any subsequent transferee, documents which include the following information:

(i) The name and address of the transferor;

(ii) The name and address of the transferee;

(iii) The volume of gasoline which is being transferred;

(iv) The location of the gasoline at the time of the transfer;

(v) The date and time of the transfer;

(vi) The identification of the gasoline as California gasoline; and

(vii) In the case of transferors and transferees who are refiners, importers or oxygenate blenders, the EPA-assigned registration number of such persons.

(2) Each refiner and transferee of such gasoline shall maintain copies of the product transfer documents required to be provided by paragraph (g)(1) of this section for a period of five years from the date of creation and shall deliver such documents to the Administrator or to the Administrator's authorized representative upon request.

(h) For purposes of the batch sampling and analysis requirements contained in § 80.65(e)(1), any refiner, importer or oxygenate blender of California gasoline may, with regard to such gasoline, use a sampling and/or analysis methodology prescribed in Title 13, California Code of Regulations, sections 2260 et seq., in lieu of any applicable methodology specified in § 80.46.

(i) The exemption provisions contained in this section shall not be applicable after December 31, 1999:

[59 FR 7813, Feb. 16, 1994, as amended at 59 FR 36965, July 20, 1994; 59 FR 39289, Aug. 2, 1994; 59 FR 60715, Nov. 28, 1994]

EFFECTIVE DATE NOTE: At 59 FR 39289, Aug. 2, 1994, § 80.81 was amended by revising paragraphs (c)(2), (c)(5), (c)(6), and (c)(10) effective September 1, 1994. At 59 FR 60715, Nov. 28, 1994, the amendment was stayed effective September 13, 1994.

§ 80.82 Conventional gasoline marker. [Reserved]

§ 80.83 Renewable oxygenate requirements.

(a) *Definition of renewable oxygenate.* For purposes of subparts D and F of this part, renewable oxygenate is defined as provided in this paragraph (a).

(1) In the case of oxygenate added to reformulated gasoline or RBOB that is not designated as VOC-controlled or

that is not subject to the additional requirements associated with an extended non-commingling season pursuant to § 80.83(i), renewable oxygenate shall be:

(i) An oxygenate that is derived from non-fossil fuel feedstocks; or

(ii) An ether that is produced using an oxygenate that is derived from non-fossil fuel feedstocks.

(2) In the case of oxygenate added to reformulated gasoline or RBOB that is designated as VOC-controlled or that is subject to the additional requirements associated with an extended non-commingling season pursuant to § 80.83(i), renewable oxygenate shall be an ether that meets the requirements of paragraph (a)(1)(ii) or (a)(3) of this section.

(3) An oxygenate other than those ethers specified in paragraphs (a)(1) or (a)(2) of this section may be considered a renewable oxygenate if the Administrator approves a petition to that effect. The Administrator may approve such a petition if it is demonstrated to the satisfaction of the Administrator that the oxygenate does not cause volatility increases in gasoline that are non-linear in nature (i.e., a non-linear vapor pressure blending curve). The Administrator may approve a petition subject to any appropriate conditions or limitations.

(4)(i) Oxygenate shall be renewable only if the refiner, importer, or oxygenate blender who uses the oxygenate is able to establish in the form of documentation that the oxygenate was produced from a non-fossil fuel feedstock.

(ii)(A) Any person who produces renewable oxygenate, as defined in paragraph (a)(1) of this section, or who stores, transports, transfers, or sells such renewable oxygenate, and where such renewable oxygenate is intended to be used in the production of gasoline, shall maintain documents that state the renewable source of the oxygenate, and shall supply to any transferee of the oxygenate documents which state the oxygenate is from a renewable source.

(B) Any person who imports oxygenate that is represented by the importer to be renewable oxygenate, as defined in paragraph (a) of this section, shall maintain documents, obtained from the person who produced the oxygenate,

that include a certification signed by the owner or chief executive officer of the company that produced the oxygenate that states:

(7) The nature of the feedstock for the oxygenate; and

(2) A description of the manner in which the oxygenate meets the renewable definition under paragraph (a) of this section.

(iii) No person may represent any oxygenate as renewable unless the oxygenate meets the renewable definition under paragraph (a) of this section.

(5) For purposes of this section, an oxygenate shall be considered to be derived from non-fossil fuel feedstocks only if the oxygenate is:

(i) Derived from a source other than petroleum, coal, natural gas, or peat; or

(ii) Derived from a product:
(A) That was produced using petroleum, coal, natural gas, or peat through a substantial transformation of the fossil fuel;

(B) When the product was initially produced, it was not commonly used to generate energy (e.g. automobile tires); and

(C) The product was sold or transferred for a use other than energy generation, and was later treated as a waste product.

(b) *Renewable oxygenate standard.* (1) The reformulated gasoline and reformulated gasoline produced using RBOB that is produced by any refiner at each refinery, or is imported by any importer, shall contain a volume of renewable oxygenate such that the reformulated gasoline and reformulated gasoline produced using RBOB, on average, has an oxygen content from such renewable oxygenate that is equal to or greater than 0.30 wt% for the period of December 1, 1994 through December 31, 1995, and 0.60 wt% beginning on January 1, 1996.

(2) The averaging period for the renewable oxygenate standard specified in paragraph (b)(1) of this section shall be:

(i) Each calendar year; except that
(ii) Any reformulated gasoline and RBOB that is produced or imported prior to January 1, 1995 shall be averaged with reformulated gasoline and

angstroms by the following ratio obtained on an isoctane blank:

Background at 1.175 angstroms

Background at 1.211 angstroms

6.3 Determine the corrected lead intensity ratio, which is the net lead intensity cor-

$$R = \frac{\text{Lead L alpha-background}}{\text{Incoherent tungsten L alpha-corrected background}}$$

6.4 Obtain a linear calibration curve by performing a least squares fit of the corrected lead intensity ratios to the standard concentrations.

7. Procedure.

7.1 Prepare a calibration curve as described in 6. Since the scattered tungsten radiation serves as an internal standard, the calibration curve should serve for at least several days. Each day the suitability of the calibration curve should be checked by analyzing several National Bureau of Standards (NBS) lead-in-reference-fuel standards or other suitable standards.

7.2 Determine the corrected lead intensity ratio for a sample in the same manner as was done for the standards. The samples should be brought to room temperature before analysis.

7.3 Determine the lead concentration of the sample from the calibration curve. If the sample concentration is greater than 5.0 g Pb/U.S. gallon or the range calibrated for in 6.1, the sample should be diluted so that the result is within the calibration span of the instrument.

7.4 Quality control standards, such as NBS standard reference materials, should be analyzed at least once every testing session.

7.5 For each group of ten samples, a spiked sample should be prepared by adding a known amount of lead to a sample. This known addition should be at least 0.05 g Pb/U.S. gallon, at least 50% of the measured lead content of the unspiked sample, and not more than 200% of the measured lead content of the unspiked sample (unless the minimum addition of 0.05 g Pb/U.S. gallon exceeds 200%). Both the spiked and unspiked samples should be analyzed.

8. Quality control.

8.1 The difference between duplicates should not exceed 0.005 g Pb/U.S. gallon or a relative difference of 6%.

8.2 All quality control standard check samples should agree within 10% of the nominal value of the standard.

rected for matrix effects by division by the net incoherently scattered tungsten radiation. The net scattered intensity is calculated by subtracting the background intensity at 1.211 angstroms from the gross intensity of the incoherently scattered tungsten L alpha peak. The equation for the corrected lead intensity ratio follows:

8.3 All spiked samples should have a percent recovery of 100% ±10%. The percent recovery, P, is calculated as follows:

$$P = 100 \times (A - B) / K$$

where

A = the analytical result from the spiked sample, B = the analytical result from the unspiked sample, and K = the known addition.

8.4 The difference between independent analyses of the same sample in different laboratories should not exceed 0.01 g Pb/U.S. gallon or a relative difference of 12%.

9. Past quality control data.

9.1 Duplicate analysis for 26 samples in the range of 0.01 to 0.10 g Pb/U.S. gallon resulted in an average relative difference of 5.2% with a standard deviation of 5.4%. Duplicate analysis of 14 samples in the range 0.1 to 0.5 g Pb/U.S. gallon resulted in an average relative difference of 2.3% with a standard deviation of 2.0. Duplicate analysis of 47 samples in the range of 0.5 to 5 g Pb/U.S. gallon resulted in an average relative difference of 2.1% with a standard deviation of 1.8%.

9.2 The average percent recovery for 23 spikes made to samples in the 0.0 to 0.1 g Pb/U.S. gallon range was 103% with a standard deviation of 3.2%. For 42 spikes made to samples in the 0.1 to 5.0 g Pb/U.S. gallon range, the average percent recovery was 102% with a standard deviation of 4.2%.

9.3 The analysis of National Bureau of Standards lead-in-reference-fuel standards of known concentrations in a single laboratory has resulted in found values deviating from the true value for 14 determinations of 0.0490 g Pb/U.S. gallon by an average of 2.8% with a standard deviation of 6.4%, for 11 determinations of 0.065 g Pb/U.S. gallon by an average of 4.4% with a standard deviation of 2.9%, and for 15 determinations of 1.991 g Pb/U.S. gallon by an average of 0.3% with a standard deviation of 1.3%.

9.4 Eighteen analyses of reference samples (U.S. EPA, Research Triangle Park, NC) have resulted in found values differing from the true value by an average of 0.0004 g Pb

U.S. gallon with a standard deviation of 0.004 g Pb/U.S. gallon.

ANNEX

A1. Precautionary Statements

A1.1 ISOCTANE

Danger—Extremely flammable. Vapors harmful if inhaled.

Vapor may cause flash fire.

Keep away from heat, sparks, and open flame.

Vapors are heavier than air and may gather in low places, resulting in explosion hazard.

Keep container closed.

Use adequate ventilation.

Avoid buildup of vapors.

Avoid prolonged breathing of vapor or spray mist.

Avoid prolonged or repeated skin contact.

A1.2 TOLUENE

Warning—Flammable. Vapor harmful.

Keep away from heat, sparks, and open flame.

Keep container closed.

Use with adequate ventilation.

Avoid breathing of vapor or spray mist.

Avoid prolonged or repeated contact with skin.

A1.3 GASOLINE

Danger—Extremely flammable. Vapors harmful if inhaled.

Vapor may cause flash fire.

Keep away from heat, sparks, and open flame.

Vapors are heavier than air and may gather in low places, resulting in explosion hazard.

Keep container closed.

Use adequate ventilation.

Avoid buildup of vapors.

Avoid prolonged breathing of vapor or spray mist.

Avoid prolonged or repeated skin contact.

[39 FR 24891, July 8, 1974; 39 FR 25653, July 12, 1974; 39 FR 26287, July 18, 1974, as amended at 47 FR 765, Jan. 7, 1982; 52 FR 259, Jan. 5, 1987; 56 FR 13768, Apr. 4, 1991]

APPENDIX C TO PART 80—[RESERVED]

APPENDIX D TO PART 80—SAMPLING PROCEDURES FOR FUEL VOLATILITY

1. Scope.

1.1 This method covers procedures for obtaining representative samples of gasoline for the purpose of testing for compliance with the Reid vapor pressure (RVP) standards set forth in §80.27.

2. Summary of method.

2.1 It is necessary that the samples be truly representative of the gasoline in question. The precautions required to ensure the representative character of the samples are numerous and depend upon the tank, carrier, container or line from which the sample is being obtained, the type and cleanliness of the sample container, and the sampling procedure that is to be used. A summary of the sampling procedures and their application is presented in Table 1. Each procedure is suitable for sampling a material under definite storage, transportation, or container conditions. The basic principle of each procedure is to obtain a sample in such manner and from such locations in the tank or other container that the sample will be truly representative of the gasoline.

3. Description of terms.

3.1 *Average sample* is one that consists of proportionate parts from all sections of the container.

3.2 *All-levels sample* is one obtained by submerging a stoppered beaker or bottle to a point as near as possible to the draw-off level, then opening the sampler and raising it at a rate such that it is 70-85% full as it emerges from the liquid. An all-levels sample is not necessarily an average sample because the tank volume may not be proportional to the depth and because the operator may not be able to raise the sampler at the variable rate required for proportionate filling. The rate of filling is proportional to the square root of the depth of immersion.

3.3 *Running sample* is one obtained by lowering an unstoppered beaker or bottle from the top of the gasoline to the level of the bottom of the outlet connection or swing line, and returning it to the top of the gasoline at a uniform rate of speed such that the beaker or bottle is 70-85% full when withdrawn from the gasoline.

3.4 *Spot sample* is one obtained at some specific location in the tank by means of a thief bottle, or beaker.

3.5 *Top sample* is a spot sample obtained 6 inches (150 mm) below the top surface of the liquid (Figure 1).

3.6 *Upper sample* is a spot sample taken at the mid-point of the upper third of the tank contents (Figure 1).

3.7 *Middle sample* is a spot sample obtained from the middle of the tank contents (Figure 1).

3.8 *Lower sample* is a spot sample obtained at the level of the fixed tank outlet or the swing line outlet (Figure 1).

3.9 *Clearance sample* is a spot sample taken 4 inches (100 mm) below the level of the tank outlet (Figure 1).

3.10 *Bottom sample* is one obtained from the material on the bottom surface of the tank, container, or line at its lowest point.

3.11 *Drain sample* is one obtained from the draw-off or discharge valve. Occasionally, a drain sample may be the same as a bottom sample, as in the case of a tank car.

3.12 *Continuous sample* is one obtained from a pipeline in such manner as to give a representative average of a moving stream.

3.13 *Mixed sample* is one obtained after mixing or vigorously stirring the contents of the original container, and then pouring out or drawing off the quantity desired.

3.14 *Nozzle sample* is one obtained from a gasoline pump nozzle which dispenses gasoline from a storage tank at a retail outlet or a wholesale purchaser-consumer facility.

4. Sample containers.

4.1 Sample containers may be clear or brown glass bottles, or cans. The clear glass bottle is advantageous because it may be examined visually for cleanliness, and also allows visual inspection of the sample for free water or solid impurities. The brown glass bottle affords some protection from light. Cans with the seams soldered on the exterior surface with a flux of rosin in a suitable solvent are preferred because such a flux is easily removed with gasoline, whereas many others are very difficult to remove. If such cans are not available, other cans made with a welded construction that are not affected by, and that do not affect, the gasoline being sampled are acceptable.

4.2 *Container closure.* Closure devices may be used as long as they meet the following test: The quality of closures and containers must be determined by the particular laboratory or company doing the testing through the analysis of at least six sample pairs of gasoline and gasoline-oxygenate blends. The six sample pairs must include at least one pair of ethanol at 10 percent and one pair of MTBE at 15 percent. The second half of the pair must be analyzed in a period of no less than 90 days after the first. The data obtained must meet the following criteria and should be made available to the EPA upon request;

n =number of pairs
 d =duplicate bottle's-initial bottle's vapor pressure
 t =student t statistic; the double sided 95% confidence interval for $n-1$ degrees of freedom

$$\sum d/n(2)^{-1} \cdot t \cdot ((\sum d^2 - (\sum d)^2/n)/(n-1))^{1/2} \leq 0.38$$
 psi

4.2.1 Screw caps must be protected by material that will not affect petroleum or petroleum products. A phenolic screw cap with a teflon coated liner may be used, since it has met the requirements of the above performance test upon EPA analysis.

4.3 *Cleaning procedure.* The method of cleaning all sample containers must be consistent with the residual materials in the container and must produce sample contain-

ers that are clean and free of water, dirt, lint, washing compounds, naphtha or other solvents, soldering fluxes, and acids, corrosion, rust, and oil. New sample containers should be inspected and cleaned if necessary. Dry either the container by passing a current of clean, warm air through the container or by allowing it to air dry in a clean area at room temperature. When dry, stopper or cap the container immediately.

5. Sampling apparatus.

5.1 Sampling apparatus is described in detail under each of the specific sampling procedures. Clean, dry, and free all sampling apparatus from any substance that might contaminate the material, using the procedure described in 4.3.

6. Time and place of sampling.

6.1 When loading or discharging gasoline, take samples from both shipping and receiving tanks, and from the pipeline if required.

6.2 *Ship or barge tanks.* Sample each product after the vessel is loaded or just before unloading.

6.3 *Tank cars.* Sample the product after the car is loaded or just before unloading.

NOTE: When taking samples from tanks suspected of containing flammable atmospheres, precautions should be taken to guard against ignitions due to static electricity. No object or material should be lowered into or suspended in a compartment of a tank which is being filled. A recommended waiting period of no less than five minutes after cessation of pumping will generally permit a substantial relaxation of the electrostatic charge for small volume vessels such as tank cars and tank trucks; under certain conditions a longer period may be deemed advisable. A recommended waiting period of no less than 30 minutes will generally permit a substantial relaxation of the electrostatic charge for large volume vessels such as storage tanks or ship tanks; under certain conditions a longer period may be deemed advisable.

7. Obtaining samples.

7.1 Directions for sampling cannot be made explicit enough to cover all cases. Extreme care and good judgment are necessary to ensure samples that represent the general character and average condition of the material. Clean hands are important. Clean gloves may be worn but only when absolutely necessary, such as in cold weather, or when handling materials at high temperature, or for reasons of safety. Select wiping cloths so that lint is not introduced, contaminating samples.

7.2 As many petroleum vapors are toxic and flammable, avoid breathing them or igniting them from an open flame or a spark

produced by static. Follow all safety precautions specific to the material being sampled.

7.3 When sampling relatively volatile products (more than 2 pounds (0.14 kg/cm²) RVP), the sampling apparatus shall be filled and allowed to drain before drawing the sample. If the sample is to be transferred to another container, this container shall also be rinsed with some of the volatile product and then drained. When the actual sample is emptied into this container, the sampling apparatus should be upended into the opening of the sample container and remain in this position until the contents have been transferred so that no unsaturated air will be entrained in the transfer of the sample.

8. Handling samples.

8.1 *Volatile samples.* It is necessary to protect all volatile samples of gasoline from evaporation. Transfer the product from the sampling apparatus to the sample container immediately. Keep the container closed except when the material is being transferred. After delivery to the laboratory, volatile samples should be cooled before the container is opened.

8.2 *Container outage.* Never completely fill a sample container, but allow adequate room for expansion, taking into consideration the temperature of the liquid at the time of filling and the probable maximum temperature to which the filled container may be subjected.

9. Shipping samples.

9.1 To prevent loss of liquid and vapors during shipment, and to protect against moisture and dust, cover the stoppers of glass bottles with plastic caps that have been swelled in water, wiped dry, placed over the tops of the stoppered bottles, and allowed to shrink tightly in place. The caps of metal containers must be screwed down tightly and checked for leakage. Postal and express office regulations applying to the shipment of flammable liquids must be observed.

10. Labeling sample containers.

10.1 Label the container immediately after a sample is obtained. Use waterproof and oilproof ink, or a pencil hard enough to dent the tag, since soft pencil and ordinary ink markings are subject to obliteration from moisture, oil smearing and handling. An indelible identification symbol, such as a bar code, may be used in lieu of a manually addressed label. The label shall reference the following information:

10.1.1 Date and time (the period elapsed during continuous sampling);

10.1.2 Name of the sample;

10.1.3 Name or number and owner of the vessel, car, or container;

10.1.4—Brand and grade of material; and
 10.1.5—Reference symbol or identification number.

11. Sampling procedures.

11.1 The standard sampling procedures described in this method are summarized in Table 1. Alternative sampling procedures may be used if a mutually satisfactory agreement has been reached by the party(ies) involved and EPA and such agreement has been put in writing and signed by authorized officials.

11.2 *Bottle or beaker sampling.* The bottle or beaker sampling procedure is applicable for sampling liquids of 16 pounds (1.12 kg/cm²) RVP or less in tank cars, tank trucks, shore tanks, ship tanks, and barge tanks.

11.2.1 *Apparatus.* A suitable sampling bottle or beaker as shown in Figure 2 is required. Recommended diameter of opening in the bottle or beaker is 3/4 inch (19 mm).

11.2.2 Procedure.

11.2.2.1 *All-levels sample.* Lower the weighted, stoppered bottle or beaker as near as possible to the draw-off level, pull out the stopper with a sharp jerk of the cord or chain and raise the bottle at a uniform rate so that it is 70-85% full as it emerges from the liquid.

11.2.2.2 *Running sample.* Lower the unstoppered bottle or beaker as near as possible to the level of the bottom of the outlet connection or swing line and then raise the bottle or beaker to the top of the gasoline at a uniform rate of speed such that it is 70-85% full when withdrawn from the gasoline.

11.2.2.3 *Upper, middle, and lower samples.* Lower the weighted, stoppered bottle to the proper depths (Figure 1) as follows:

Upper sample	middle of upper third of the tank contents
Middle sample	middle of the tank contents
Lower sample	level of the fixed tank outlet or the swing-line outlet

At the selected level pull out the stopper with a sharp jerk of the cord or chain and allow the bottle or beaker to fill completely, as evidenced by the cessation of air bubbles. When full, raise the bottle or beaker, pour off a small amount, and stopper immediately.

11.2.2.4 *Top sample.* Obtain this sample (Figure 1) in the same manner as specified in 11.2.2.3 but at six inches (150 mm) below the top surface of the tank contents.

11.2.2.5 *Handling.* Stopper and label bottle samples immediately after taking them, and deliver to the laboratory in the original sampling bottles.

11.3 *Tap sampling.* The tap sampling procedure is applicable for sampling liquids of twenty-six pounds (1.83 kg/cm²) RVP or less in tanks which are equipped with suitable

sampling taps or lines. This procedure is recommended for volatile stocks in tanks of the breather and balloon roof type, spheroids, etc. (Samples may be taken from the drain cocks of gage glasses. If the tank is not equipped with sampling taps.) The assembly for tap sampling is shown in Figure 3.

11.3.1 Apparatus.

11.3.1.1 *Tank taps.* The tank should be equipped with at least three sampling taps placed equidistant throughout the tank height and extending at least three feet (0.9 meter) inside the tank shell. A standard 1/4 inch pipe with suitable valve is satisfactory.

11.3.1.2 *Tube.* A delivery tube that will not contaminate the product being sampled and long enough to reach to the bottom of the sample container is required to allow submerged filling.

11.3.1.3 *Sample containers.* Use clean, dry glass bottles of convenient size and strength or metal containers to receive the samples.

11.3.2 *Procedure.* Before a sample is drawn, flush the tap (or gage glass drain cock) and line until they are purged completely. Connect the clean delivery tube to the tap. Draw upper, middle, or lower samples directly from the respective taps after the flushing operation. Stopper and label the sample container immediately after filling, and deliver it to the laboratory.

11.4 *Continuous sampling.* The continuous sampling procedure is applicable for sampling liquids of 16 pounds (1.12 kg/cm²) RVP or less and semiliquids in pipelines, filling lines, and transfer lines. The continuous sampling may be done manually or by using automatic devices.

11.4.1 Apparatus.

11.4.1.1 *Sampling probe.* The function of the sampling probe is to withdraw from the flow stream a portion that will be representative of the entire stream. The apparatus assembly for continuous sampling is shown in Figure 4. Probe designs that are commonly used are as follows:

11.4.1.1.1 A tube extending to the center of the line and beveled at a 45 degree angle facing upstream (Figure 4(a)).

11.4.1.1.2 A long-radius forged elbow or pipe bend extending to the center line of the pipe and facing upstream. The end of the probe should be reamed to give a sharp entrance edge (Figure 4(b)).

11.4.1.1.3 A closed-end tube with a round orifice spaced near the closed end which should be positioned in such a way that the orifice is in the center of the pipeline and is facing the stream as shown in Figure 4(c)).

11.4.1.2 *Probe location.* Since the fluid to be sampled may not in all cases be homogeneous, the location, the position and the size of the sampling probe should be such as to minimize stratification or dropping out of heavier particles within the tube or the displacement of the product within the tube as a result of variation in gravity of the flowing

stream. The sampling probe should be located preferably in a vertical run of pipe and as near as practicable to the point where the product passes to the receiver. The probe should always be in a horizontal position.

11.4.1.2.1 The sampling lines should be as short as practicable and should be cleared before any samples are taken.

11.4.1.2.2 Where adequate flowing velocity is not available, a suitable device for mixing the fluid flow to ensure a homogeneous mixture at all rates of flow and to eliminate stratification should be installed upstream of the sampling tap. Some effective devices for obtaining a homogeneous mixture are as follows: Reduction in pipe size; a series of baffles; orifice or perforated plate; and a combination of any of these methods.

11.4.1.2.3 The design or sizing of these devices is optional with the user, as long as the flow past the sampling point is homogeneous and stratification is eliminated.

11.4.1.3 To control the rate at which the sample is withdrawn, the probe or probes should be fitted with valves or plug cocks.

11.4.1.4 Automatic sampling devices that meet the standards set out in 11.4.1.5 may be used in obtaining samples of gasoline. The quality of sample collected must be of sufficient size for analysis, and its composition should be identical with the composition of the batch flowing in the line while the sample is being taken. An automatic sampler installation necessarily includes not only the automatic sampling device that extracts the samples from the line, but also a suitable probe, connecting lines, auxiliary equipment, and a container in which the sample is collected. Automatic samplers may be classified as follows:

11.4.1.4.1 *Continuous sampler, time cycle (nonproportional) type.* A sampler designed and operated in such a manner that it transfers equal increments of liquid from the pipeline to the sample container at a uniform rate of one or more increments per minute is a continuous sampler.

11.4.1.4.2 *Continuous sampler, flow-responsive (proportional) type.* A sampler that is designed and operated in such a manner that it will automatically adjust the quantity of sample in proportion to the rate of flow is a flow-responsive (proportional) sampler. Adjustment of the quantity of sample may be made either by varying the frequency of transferring equal increments of sample to the sample container, or by varying the volume of the increments while maintaining a constant frequency of transferring the increments to the sample container. The apparatus assembly for continuous sampling is shown in Figure 4.

11.4.1.4.3 *Intermittent sampler.* A sampler that is designed and operated in such a manner that it transfers equal increments of liquid from a pipeline to the sample container

at a uniform rate of less than one increment per minute is an intermittent sampler.

11.4.1.5 *Standards of installation.* Automatic sampler installations should meet all safety requirements in the plant or area where used, and should comply with American National Standard Code for Pressure Piping, and other applicable codes (ANSI B31.1). The sampler should be so installed as to provide ample access space for inspection and maintenance.

11.4.1.5.1 Small lines connecting various elements of the installation should be so arranged that complete purging of the automatic sampler and of all lines can be accomplished effectively. All fluid remaining in the sampler and the lines from the preceding sampling cycle should be purged immediately before the start of any given sampling operation.

11.4.1.5.2 In those cases where the sampler design is such that complete purging of the sampling lines and the sampler is not possible, a small pump should be installed in order to circulate a continuous stream from the sampling tube past or through the sampler and back into the line. The automatic sampler should then withdraw the sample from the sidestream through the shortest possible connection.

11.4.1.5.3 Under certain conditions, there may be a tendency for water and heavy particles to drop out in the discharge line from the sampling device and appear in the sample container during some subsequent sampling period. To circumvent this possibility, the discharge pipe from the sampling device should be free of pockets or enlarged pipe areas, and preferably should be pitched downward to the sample container.

11.4.1.5.4 To ensure clean, free-flowing lines, piping should be designed for periodic cleaning.

11.4.1.6 *Field calibration.* Composite samples obtained from the automatic sampler installation should be verified for quantity performance in a manner that meets with the approval of all parties concerned (including EPA), at least once a month and more often if conditions warrant. In the case of time-cycle samplers, deviations in quantity of the sample taken should not exceed \pm five percent for any given setting. In the case of flow-responsive samplers, the deviation in quantity of sample taken per 1,000 barrels of flowing stream should not exceed \pm five percent. For the purpose of field-calibrating an installation, the composite sample obtained from the automatic sampler under test should be verified for quality by comparing on the basis of physical and chemical properties, with either a properly secured continuous nonautomatic sample or tank sample. The tank sample should be taken under the following conditions:

11.4.1.6.1 The batch pumped during the test interval should be diverted into a clean

tank and a sample taken within one hour after cessation of pumping.

11.4.1.6.2 If the sampling of the delivery tank is to be delayed beyond one hour, then the tank selected must be equipped with an adequate mixing means. For valid comparison, the sampling of the delivery tank must be completed within eight hours after cessation of pumping, even though the tank is equipped with a motor-driven mixer.

11.4.1.6.3 When making a normal full-tank delivery from a tank, a properly secured sample may be used to check the results of the sampler if the parties (including EPA) mutually agree to this procedure.

11.4.1.7 *Receiver.* The receiver must be a clean, dry container of convenient size to receive the sample. All connections from the sample probe to the sample container must be free of leaks. Two types of containers may be used, depending upon service requirements.

11.4.1.7.1 *Atmospheric container.* The atmospheric container shall be constructed in such a way that it retards evaporation loss and protects the sample from extraneous material such as rain, snow, dust, and trash. The construction should allow cleaning, interior inspection, and complete mixing of the sample prior to removal. The container should be provided with a suitable vent.

11.4.1.7.2 *Closed container.* The closed container shall be constructed in such a manner that it prevents evaporation loss. The construction must allow cleaning, interior inspection and complete mixing of the sample prior to removal. The container should be equipped with a pressure-relief valve.

11.4.2 Procedure.

11.4.2.1 *Nonautomatic sample.* Adjust the valve or plug cock from the sampling probe so that a steady stream is drawn from the probe. Whenever possible, the rate of sample withdrawal should be such that the velocity of liquid flowing through the probe is approximately equal to the average linear velocity of the stream flowing through the pipeline. Measure and record the rate of sample withdrawal as gallons per hour. Divert the sample stream to the sampling container continuously or intermittently to provide a quantity of sample that will be of sufficient size for analysis.

11.4.2.2 *Automatic sampling.* Purge the sampler and the sampling lines immediately before the start of a sampling operation. If the sample design is such that complete purging is not possible, circulate a continuous stream from the probe past or through the sampler and back into the line. Withdraw the sample from the side stream through the automatic sampler using the shortest possible connections. Adjust the sampler to deliver not less than one and not more than 40 gallons (151 liters) of sample during the desired sampling period. For time-cycle samplers, record the rate at

which sample increments were taken per minute. For flow-responsive samplers, record the proportion of sample to total stream. Label the samples and deliver them to the laboratory in the containers in which they were collected.

11.5 *Nozzle sampling.* The nozzle sampling procedure is applicable for sampling gasoline from a retail outlet or wholesale purchaser-consumer facility storage tank.

11.5.1 *Apparatus.* Sample containers conforming with section 4.1 should be used. A spacer, if appropriate (figure 6), and a nozzle extension device similar to that shown in figures 7, 7a, or 7b shall be used when nozzle sampling. The nozzle extension device does not need to be identical to that shown in figures 7, 7a, or 7b but it should be a device that will bottom fill the container with a minimum amount of vapor loss.

11.5.2 *Retail sampling procedure*

11.5.2.1 If a nozzle extension as found in figure 7 or 7a is used, 3 gallons of gasoline should first be dispensed from the pump nozzle to purge the pump hose and nozzle. Then a small amount of product should be dispensed through the nozzle extension into the sample container to rinse the sample container. A pump nozzle spacer (figure 6) may be used if the pump is a vapor recovery type. Rinse the sample container and discard the waste product into an appropriate container. Insert the nozzle extension (figure 7 or 7a) into the sample container and insert the pump nozzle into the extension with slot over the air bleed hole (when using figure 7). Fill the sample container slowly through the nozzle extension to 70-85 percent full (figure 8). Remove the nozzle extension. Cap the sample container at once. Check for leaks. Discard the sample container and re-sample if leak occurs. If the sample container is leak tight, label the container and deliver it to the laboratory.

11.5.2.2 If a nozzle extension as found in figure 7b is used, 3 gallons of gasoline should first be dispensed from the pump nozzle to purge the pump hose and nozzle. Then screw a dry and dirt free 4 oz sample bottle container onto the bottle filling fixture. Insert the nozzle into the nozzle extension. Insert the discharge end of the modified nozzle extension into a gasoline safety can or into the filler neck of a vehicle. Obtain the sample by pumping at least 0.2 gallon through the sampler. Remove the sample bottle from the fixture. The sample must be 70-85 percent full. Cap the sample container at once. Check for leaks. Discard the sample container and re-sample if a leak occurs. If the sample container is leak tight, label the container and deliver it to the laboratory.

12. *Special Precautions and Instructions.*

12.1 *Precautions.* Vapor pressures are extremely sensitive to evaporation losses and to slight changes in composition. When ob-

serving, storing, or handling samples, observe the necessary precautions to ensure samples representative of the product and satisfactory for RVP tests. Official samples should be taken by, or under the immediate supervision of, a person of judgment, skill, and sampling experience. Never prepare composite samples for this test. Make certain that containers which are to be shipped by common carrier conform to applicable Interstate Commerce Commission, state, and local regulations. When flushing or purging lines or containers, observe the pertinent regulations and precautions against fire, explosion, and other hazards.

12.2 *Sample containers.* For nozzle sampling, use containers of not less than 4 ounces (118 ml) nor more than two gallons (7.6 liters) capacity, of sufficient strength to withstand the pressure to which they may be subjected, and of a type that will permit replacement of the cap or stopper with suitable connections for the transfer of the sample to the gasoline chamber of the vapor pressure testing apparatus. For running or all-level sampling procedures, use containers of not less than one quart (0.9 liter) nor more than two gallons (7.6 liters) capacity. Open-type containers have a single opening which permits sampling by immersion. Closed-type containers have two openings, one in each end (or the equivalent thereof), fitted with valves suitable for sampling by purging.

12.3 *Transfer connections.* The transfer connection for the open-type container consists of an air tube and a liquid delivery tube assembled in a cap or stopper. The air tube extends to the bottom of the container. One end of the liquid delivery tube is flush with the inside face of the cap or stopper and the tube is long enough to reach the bottom of the gasoline chamber while the sample is being transferred to the chamber. The transfer connection for the closed-type container consists of a single tube with a connection suitable for attaching it to one of the openings of the sample container. The tube is long enough to reach the bottom of the gasoline chamber while the sample is being transferred.

12.4 *Sampling open tanks.* Use clean containers of the open type when sampling open tanks and tank cars. An all-levels or a running sample obtained by the bottle procedure described in 11.2 is recommended. When the question exists of stratification of the contents of the tank, it is recommended that either a running or all-levels sample be taken along with upper, middle, and lower spot sampling. Before taking the sample, flush the container by immersing it in the product to be sampled. Then obtain the sample immediately. The sample must be 70-85 percent full. Close the container promptly and confirm it is not leaking. Label the container and deliver it to the laboratory.

12.5 *Sampling closed tanks.* Containers of the closed type may be used to obtain samples from closed or pressure tanks. Obtain the sample using the purging procedure described in 12.6.

12.6 *Purging procedure.* Connect the inlet valve of the closed-type container to the tank sampling tap or valve. Throttle the outlet valve of the container so that the pressure in it will be approximately equal to that in the container being sampled. Allow a volume of product equal to at least twice that of the container to flow through the sampling system. Then close all valves, the outlet valve first, the inlet valve of the container second, and the tank sampling valve last, and disconnect the container immediately. Withdraw enough of the contents so that the sample container will be 70-80 percent full. If the vapor pressure of the product is not high enough to force liquid from the

container, open both the upper and lower valves slightly to remove the excess. Promptly seal and label the container, and deliver it to the laboratory.

TABLE 1—SUMMARY OF GASOLINE SAMPLING PROCEDURES AND APPLICABILITY

Type of container	Procedure	Paragraph
Storage tanks, ship and barge tanks, tank cars, tank trucks.	Bottle sampling.	11.2
Storage tanks with taps	Tap sampling.	11.3
Pipes and lines	Continuous line sampling.	11.4
Retail outlet and wholesale purchaser-consumer facility storage tanks.	Nozzle sampling.	11.5

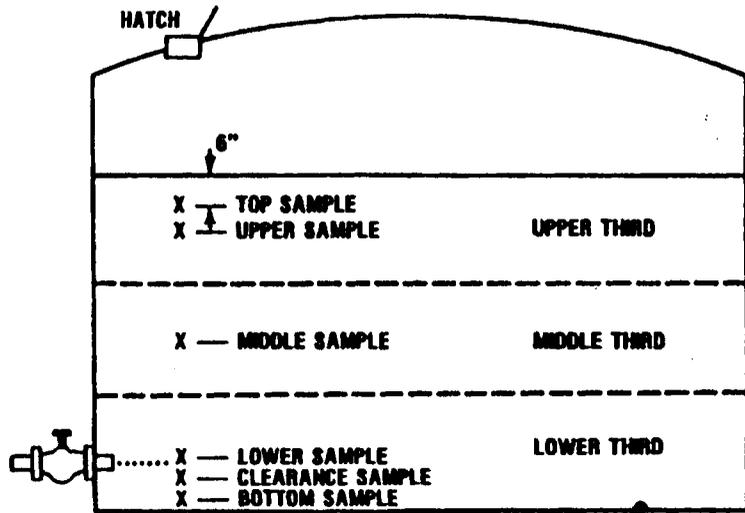
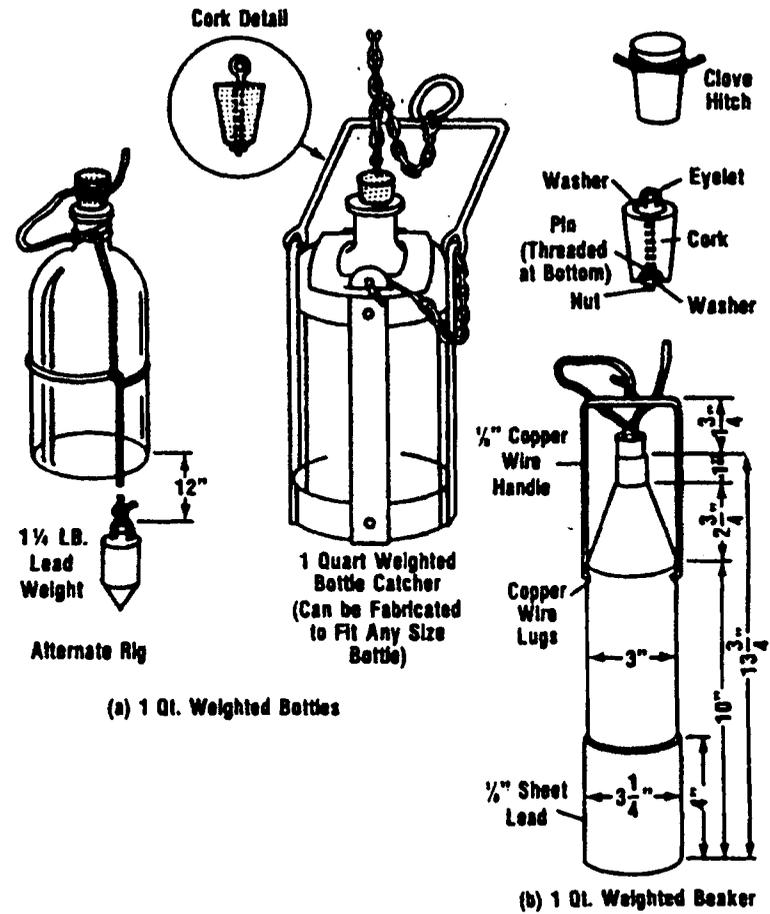


Figure 1. Sampling Depths



(a) 1 Qt. Weighted Bottles

(b) 1 Qt. Weighted Beaker

METRIC EQUIVALENTS

in.	1/4	1	1 1/2	2	3	4	10	12	13 1/4
mm	3	25	45	70	83	102	250	300	350

Figure 2. Assembly for Bottle Sampling

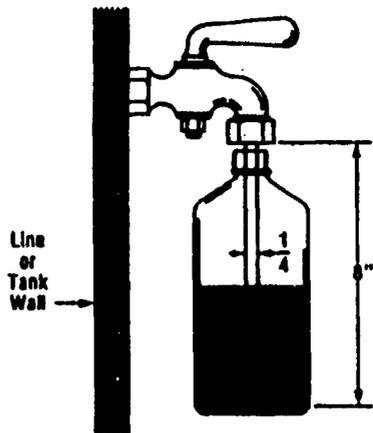


Figure 3. Assembly for Tap Sampling

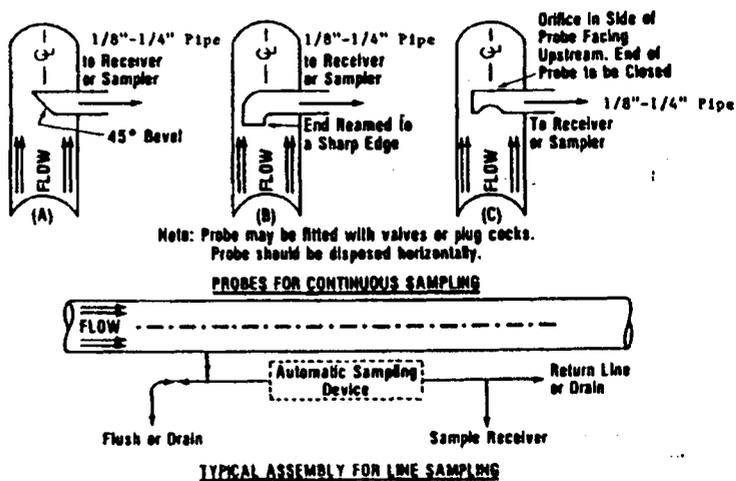


Figure 4. Probes for Continuous Sampling

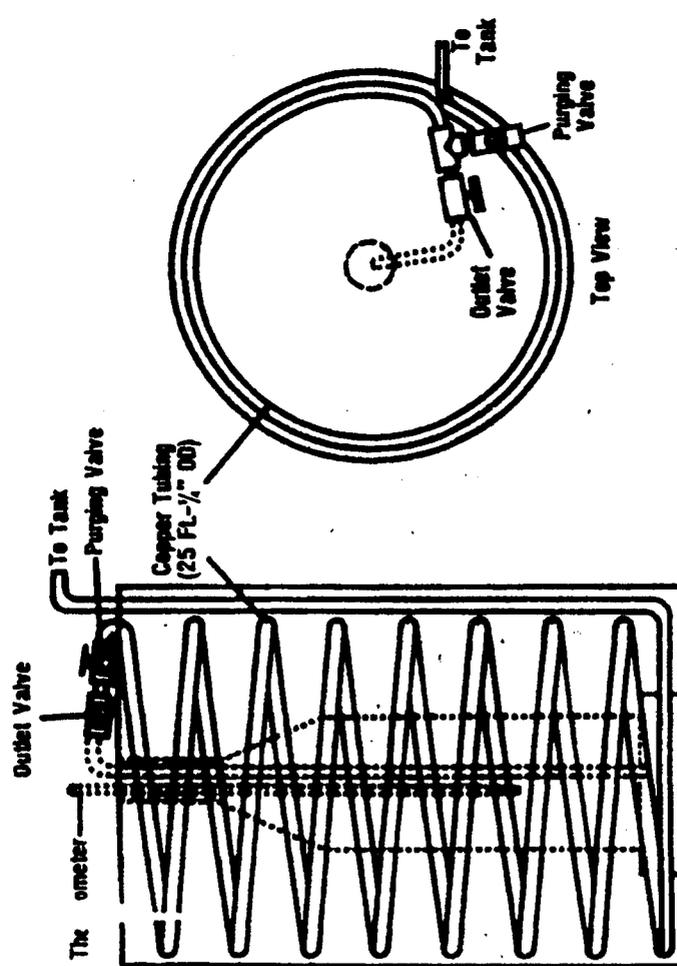
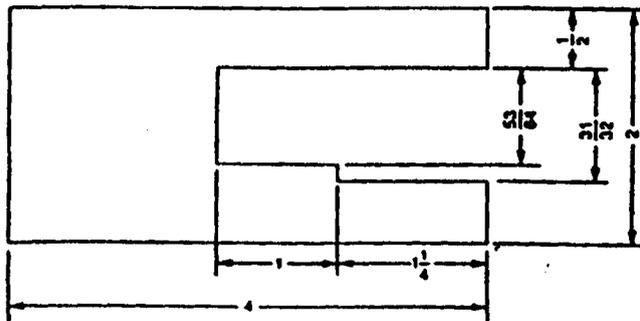
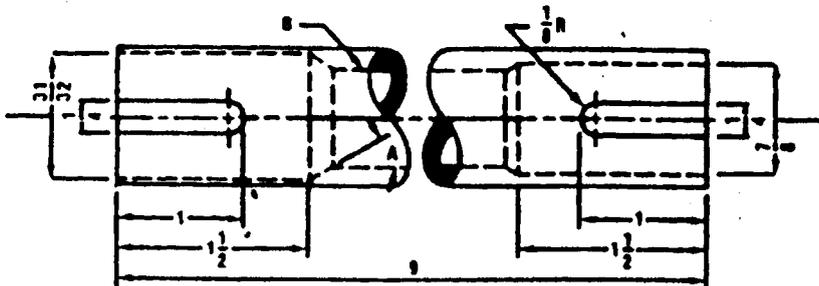


Figure 5. Cooling Bath for Reid Vapor Pressure Sampling



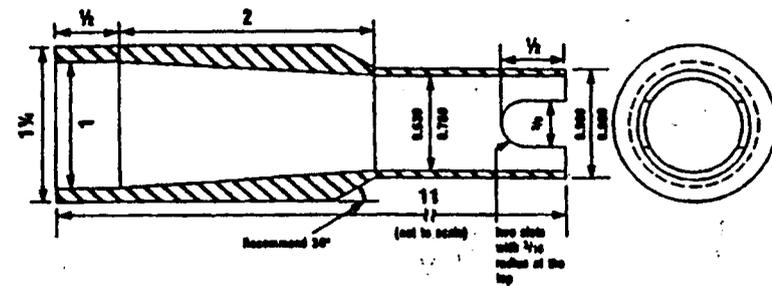
Make from 1/4 Inch flat stock (recommend non-ferrous material)
 All dimensions in inches
 Scale: 1 inch = 1 inch
 Break all edges and corners

Figure 6. Spacer for Nozzle Sampling



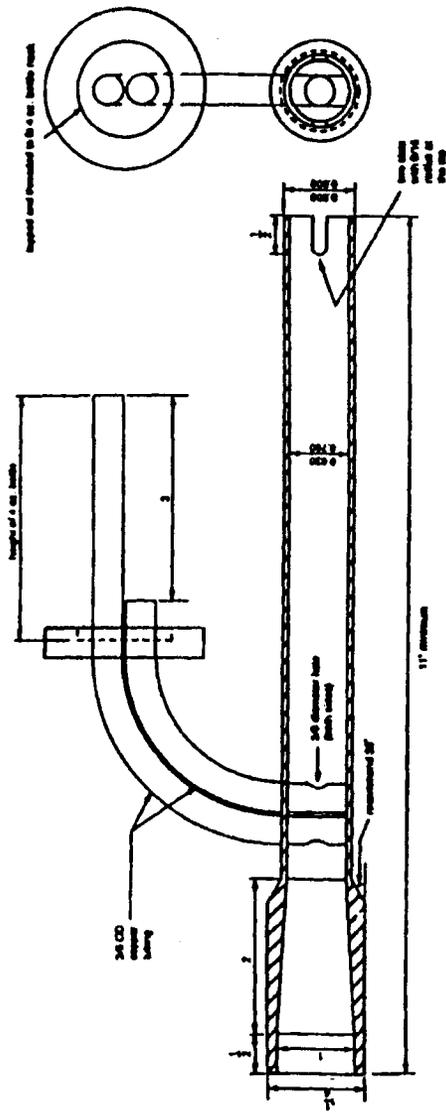
Use 1/2 in. Schedule 80 Black Iron Pipe
 All dimensions in inches
 All tolerances \pm 0.005
 A - Recommend 30°
 B - Inside Diameter Schedule 80 Black Iron Pipe

Figure 7. Nozzle Extension for Nozzle Sampling



All Dimensions in inches (full scale except as noted)
 All decimal dimensions represent minimum and maximum
 Tolerance for all other dimensions to \pm 0.005
 Made of non-ferrous material, unaffected by gasoline

Figure 7a. Nozzle Extension for Nozzle Sampling
 (Compatible with narrow neck sample containers)



All dimensions in inches
 All decimal dimensions represent minimum and maximum
 Tolerance for all other dimensions is $\pm 1/32$
 Made of non-ferrous material, unaffected by gasoline
 Scale: 0.700 inch = 1 inch

Figure 7b. Nozzle Extension for Nozzle Sampling with 4 ounce bottle

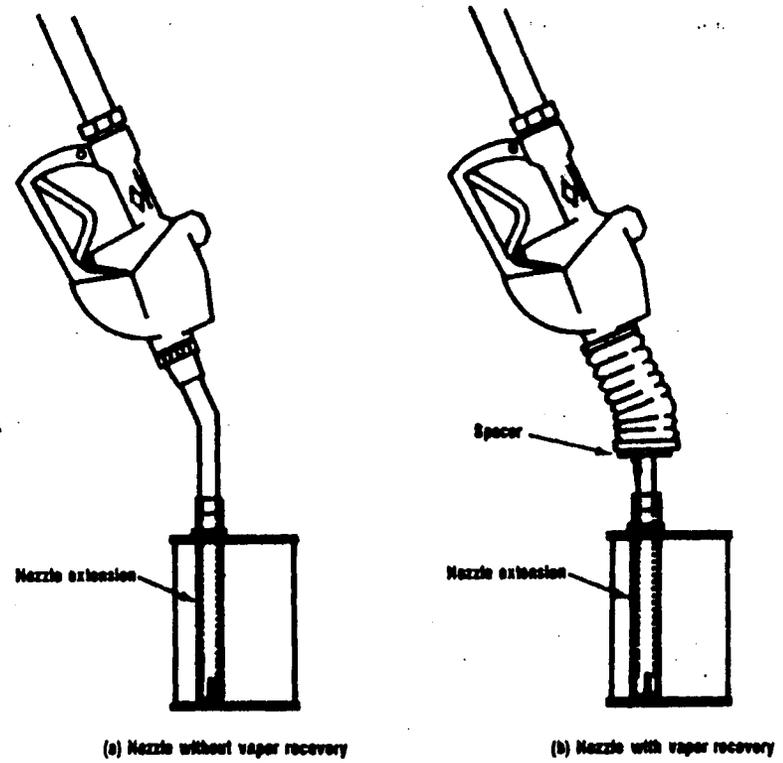


Figure 8. Assembly for Nozzle Sampling

[54 FR 11886, Mar. 22, 1989; 54 FR 27017, June 27, 1989, as amended at 55 FR 25835, June 25, 1990; 58 FR 14485, Mar. 17, 1993; 58 FR 19152, Apr. 12, 1993]

APPENDIX E TO PART 80—TEST FOR DETERMINING REID VAPOR PRESSURE (RVP) OF GASOLINE AND GASOLINE-OXYGENATE BLENDS

METHOD 3—EVACUATED CHAMBER METHOD

1. Scope.

1.1 This method covers the determination of the absolute pressure, measured against a vacuum of a gasoline or gasoline-oxygenate blend sample saturated with air at 32-40 °F (0-4.5 °C). The absolute (measured) pressure is observed with a system volume ratio of 1 part sample and 4 parts evacuated space at 100 °F (37.8 °C).

1.2 The values stated in pounds per square inch absolute are standard.

2. Summary of method.

2.1 A known volume of air-saturated fuel at 32-40 °F is introduced into an evacuated, thermostatically controlled test chamber, the internal volume of which is or becomes five times that of the total test specimen introduced into the test chamber. After the injection the test specimen is allowed to reach thermal equilibrium at the test temperature, 100 °F (37.8 °C). The resulting pressure increase is measured with an absolute pressure measuring device whose volume is included in the total of the test chamber volume. The measured pressure is the sum of the partial pressures of the sample and the dissolved air.

2.2 The total measured pressure is converted to Reid vapor pressure by use of a correlation equation (see Section 9).

3. Apparatus.

3.1 The apparatus shall employ a thermostatically controlled test chamber which is capable of maintaining a vapor-to-liquid ratio between 3.95 and 4.05 to 1.00.

3.2 The pressure measurement device shall have a minimum operation range from 0 to 15 psia (0 to 103 kPa) with a minimum resolution of 0.05 psia (0.34 kPa). The pressure measurement device shall include any necessary electronic and readout devices to display the resulting reading.

3.3 The test chamber shall be maintained at 100±0.2 °F (37.8±0.1 °C) for the duration of the test except for the time period after sample injection when the sample is coming to equilibrium with test temperature of 100±0.2 °F (37.8±0.1 °C).

3.4 A thermometer that meets the specification ASTM 18 F (18 C) or a platinum resistance thermometer shall be used for measuring the temperature of the test chamber. The minimum resolution for the temperature measurement device is 0.2 °F (0.1 °C) and an accuracy of ±0.2 °F (±0.1 °C).

3.5 The vapor pressure apparatus shall have a provision for the introduction of the test specimen into the evacuated or to be

evacuated test chamber and for the cleaning or purging of the chamber following the test.

3.6 If a vacuum pump is used, it must be capable of reducing the pressure in the test chamber to less than 0.01 psia (0.07 kPa). If the apparatus uses a piston to induce a vacuum in the sample chamber the residual pressure shall be no greater than 0.01 psia (0.07 kPa) upon full expansion of the test chamber devoid of any material at 100±0.2 °F (37.8±0.1 °C).

3.7 Ice water or air bath for chilling the sample to a temperature between 32-40 °F (0-4.5 °C).

3.8 Mercury barometer, 0 to 17.4 psia (0 to 120 kPa) range.

3.9 McLeod vacuum gauge, to cover at least the range of 0 to 5 mm Hg (0 to 0.67 kPa). Calibration of the McLeod gauge is checked as in accordance with Annex A6 of ASTM test Method D 2892-84, (Standard test method for distillation of Crude Petroleum (15-Theoretical Plate Column)). ASTM D-2892-84 is incorporated by reference. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C 552(a) and 1 CFR part 51. Copies may be obtained from the American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103. Copies may be inspected at the U.S. Environmental Protection Agency, Air Docket Section, room M-1500, 401 M Street, SW., Washington, DC 20460 or at the Office of the Federal Register, 800 North Capitol Street, NW., Washington, DC.

4. Reagents and materials.

4.1 *Quality control standards.* Use chemicals of at least 99% purity for quality control standards. Unless otherwise indicated, it is intended that all reagents conform to the specifications of the committee on Analytical Reagents of the American Chemical Society where such specifications are available (see section 7.3). Specifications for analytical reagents may be obtained from the American Chemical Society, 1155 16th Street, NW., Washington, DC 20036.

- 4.1.1 2,2,4-trimethylpentane
- 4.1.2 2,2-dimethylbutane
- 4.1.3 3-methylpentane
- 4.1.4 n-pentane
- 4.1.5 acetone
- 4.2 n-pentane (commercial grade-95% pure)

5. Handling of samples.

5.1 The sensitivity of vapor pressure measurements to losses through evaporation and the resulting change in composition is such as to require the utmost precaution in the handling of samples. The provisions of this section apply to all samples for vapor pressure determinations.

5.2 Sample in accordance with 40 CFR part 80, appendix D.

5.3 Sample container size. The minimum size of the sample container from which the vapor pressure sample is taken is 4 ounces (118 ml). It will be 70 to 85% filled with sample.

5.4 Precautions.

5.4.1 Determine vapor pressure as the first test on a sample. Multiple analyses may be performed, but must be evaluated given the stated precision for the size of the sample container, and the order in which they were run in relation to the initial analysis.

5.4.2 Protect samples from excessive heat prior to testing.

5.4.3 Leaking samples should be replaced if possible. Analysis results from leaking sample containers must be marked as such.

5.4.4 Samples that have separated into two phases should be replaced if possible. Analysis results from samples that have phase separated must be marked as such.

5.4.5 Sample handling temperature. In all cases, cool the sample to a temperature of 32-40 °F (0-4.5 °C) before the container is opened. To ensure sufficient time to reach this temperature, directly measure the temperature of a similar liquid at a similar initial temperature in a like container placed in the cooling bath at the same time as the sample.

6. Preparation for test.

6.1 *Verification of sample container filling.* With the sample at a temperature of 32-40 °F (0-4.5 °C), take the container from the cooling bath, wipe dry with an absorbent material, unseal it, and examine its ullage. The sample content, as determined by use of a suitable gauge, should be equal to 70 to 85 volume % of the container capacity.

6.1.1 Analysis results from samples that contain less than 70 volume % of the container capacity must be marked as such.

6.1.2 If the container is more than 85 volume % full, pour out enough sample to bring the container contents within the 70 to 85 volume % range. Under no circumstance may any sample poured out be returned to the container.

6.2 Air saturation of the sample in the sample container. With the sample at a temperature of 32-40 °F (0-4.5 °C), take the container from the cooling bath, wipe dry with an absorbent material, unseal it momentarily, taking care to prevent water entry, reseal it, and shake it vigorously. Return it to the bath for a minimum of 2 minutes. Repeat the air introduction procedure twice, for a total of three air introductions to completely saturate the sample.

6.3 Prepare the instrument for operation in accordance with the manufacturer's instructions.

6.3.1 *Instruments with vacuum pumps.* Clean and dry the test chamber as required to ob-

tain a sealed test chamber pressure of less than 0.01 psi (0.07 kPa) for 1 minute. If the pressure exceeds this value check for and resolve in the following order; residual sample or cleaning solvent, sample chamber leaks, and transducer calibration.

6.3.2 *Instruments without vacuum pumps.* The sample purges the sample chamber through a series of rinses before the analysis occurs. Errors due to leaks in the plunger, piston seals, or carryover from previous samples or standards may give erratic results (see Note of section 6.3.2). The operator must run a quality control standard for at least one in twenty analyses or once a day to determine if there is carryover from previous analyses or if leaks are occurring.

NOTE: When using a self cleaning apparatus some residual product may be carried over into subsequent analyses. Carryover effect should be investigated when conducting sequential analyses of dissimilar materials, especially calibration standards. Inaccuracies caused by carryover effect should be resolved using testing procedures designed to minimize such interferences.

6.4 If a syringe is used for the physical introduction of the sample specimen, it must be either clean and dry before it is used or it may be rinsed out at least three times with the sample. When cleaning the syringe, the rinse may not be returned to the sample container. The syringe must be capable of obtaining, upon filling with the sample charge, a quantity of sample that has an entrained gas volume of less than 3% of the necessary sample volume.

7. Calibration.

7.1 *Pressure measurement device.*

7.1.1 Check the calibration of the pressure measurement device daily or until the stability of the device is documented as having less than or equal to 0.03 psi (0.2 kPa) drift per unit of the appropriate calibration period. When calibration is necessary, follow the procedures in sections 7.1.2 through 7.1.4.

7.1.2 Connect a properly calibrated McLeod gauge to the vacuum source line to the test chamber. Apply vacuum to the test chamber. When the McLeod gauge registers a pressure less than 0.8 mm Hg (0.1 kPa) adjust the pressure measurement device's zero control to match to within ±0.01 psi (0.07 kPa) of the McLeod Gauge.

7.1.3 Open the test chamber to the atmosphere and observe the pressure measurement device's reading. Adjust the pressure measurement device's span control to within ±0.01 psi (0.07 kPa) of a temperature and latitude adjusted mercury barometer.

7.1.4 Repeat steps 7.1.2 and 7.1.3 until the instrument zero and barometer readings read correctly without further adjustments.

7.2 *Thermometer.* Check the calibration of the ASTM 18 F (18 C) thermometer or the

platinum resistance thermometer used to monitor the test chamber at least every six months in accordance ASTM E1-86, (Standard Specification for ASTM Thermometers). ASTM E1-86 is incorporated by reference. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from the American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103. Copies may be inspected at the U.S. Environmental Protection Agency, Air Docket Section, room M-1500, 401 M Street, SW., Washington, DC 20460 or at the Office of the Federal Register, 800 North Capitol Street, NW.,

Washington, DC. Check the reading of the thermometer against a National Institute of Standards and Technology traceable thermometer.

7.3 *Quality assurance.* The instrument's performance must be checked at least once per day using a quality control standard listed in section 4.1. In the case of the non-vacuum pump instruments the frequency is stated in section 6.3.2. The standards must be chilled to the same temperature, have the same ullage, and saturated with air in the same manner as the samples. Record total measured pressure and compare against the following reference values:

Compound	Lower control limit	Upper control limit
2,2,4-trimethylpentane	2.39 psia (16.5 kpa)	3.03 psi (20.9 kpa)
3-methylpentane	6.86 psia (47.3 kpa)	7.26 psi (50.1 kpa)
acetone	7.97 psia (55.0 kpa)	8.12 psi (56.0 kpa)
2,2-dimethylbutane	10.64 psia (73.4 kpa)	10.93 psi (75.4 kpa)
n-pentane	16.20 psia (111.7 kpa)	16.40 psi (113.1 kpa)

If the observed pressure does not fall between the reference values, check the instrument for leaks and its calibration (Section 7).

7.3.1 Other compounds, gasolines, and gasoline blends may be used as control standards as long as these materials have been statistically evaluated for their mean total measured pressure using an instrument that conforms to this procedure.

7.3.2 The control limits can be calculated with the following formula:

MEAN MEASURED PRESSURE

$$\bar{X} = \frac{\sum x_i}{n}$$

Standard Deviation

$$S_{x_i} = \frac{\sum x_i^2 - (\sum x_i)^2 / n}{(n-1)}^{0.5}$$

Upper Control Limit (UCL)

$$UCL = \bar{X} + (t_{n-1,0.975}) * (S_x)$$

Lower Control Limit (LCL)

$$LCL = \bar{X} - (t_{n-1,0.975}) * (S_x)$$

where: x_i is the individual analyses of the control standard, n is the number of analyses (for a new instrument or a new control standard this should be at least ten analyses); $(t_{n-1,0.975})$ is the two-tailed student t statistic for $n-1$ degrees of freedom for 95% of the expected data from the analysis of the standard.

6. Procedure.

8.1 Remove the sample from the cooling bath or refrigerator, dry the exterior of the container with absorbent material, unseal, and insert the transfer tube, syringe, or transfer connection (see section 6). Draw an aliquot (minimize gas bubbles) of sample into a gas tight syringe or transfer the sample using tubing or transfer connection and deliver this test specimen to the test chamber as rapidly as possible. The total time between opening the chilled sample container and inserting/securing the syringe or transfer connection into the sealed test chamber shall not exceed one minute.

8.2 Follow the manufacturer's instructions for injection of the test specimen into the test chamber, and for the operation of the instrument to obtain a total measured vapor pressure result for the test specimen.

8.3 Set the instrument to read the test results in terms of total measured pressure. If the instrument is capable of calculating a Reid Vapor Pressure equivalent value ensure that only the parameters in section 9.2 are used.

9. Calculation and record of result.

9.1 Note the total measured vapor pressure reading for the instrument to the nearest 0.01 psi (0.07 kPa). For instruments which do not automatically display a stable pressure value, manually note the pressure indicator reading every minute to the nearest 0.01 psi (0.07 kPa). When three successive readings agree to within 0.01 psia (0.07 kPa) note the final result to the nearest 0.01 psia (0.07 kPa).

9.2 Using the following correlation equation, calculate the Reid Vapor Pressure (RVP) that is equivalent to the total measured vapor pressure obtained from the instrument. In order to compare the vapor pressure standards set out in 40 CFR 80.27. Ensure that the instrument reading in this equation corresponds to the total measured pressure and has not been corrected by an automatically programmed correction factor.

$$RVP \text{ psi} = (0.956 * X) - 0.347$$

$$RVP \text{ kPa} = (0.956 * X) - 2.39$$

where: X = total measured vapor pressure in psi or kPa

9.3 Record the RVP to the nearest 0.01 psi (0.07 kPa) as the official test result.

9.4 EPA will use the above method as the official vapor pressure test method. EPA will recognize correlations from regulated parties if the correlations are established directly with EPA's test laboratory. Any test method may be used for defense as long as adequate correlation is demonstrated to this method (i.e., any vapor pressure defense test method could be used if adequate correlation exists directly to this method, which can then be converted to Reid Vapor Pressure by use of the EPA Grabner correlation equation in section 9.2 of this method).

[58 FR 14488, Mar. 17, 1993]

APPENDIX F TO PART 80—TEST FOR DETERMINING THE QUANTITY OF ALCOHOL IN GASOLINE

METHOD 1—WATER EXTRACTION METHOD

1. Scope.

This test method covers the determination of the type and amount of alcohols in gasoline.

2. Summary of method.

Gasoline samples are extracted with water prior to analysis on a gas chromatograph (GC). The extraction eliminates hydrocarbon interference during chromatography. A known quantity of isopropanol is added to the fuel prior to extraction to act as an internal standard.

3. Sample description.

3.1 Sample in accordance with 40 CFR part 80, appendix D.

At least 100 ml. of gasoline suspected of containing ethanol and/or methanol are required.

4. Apparatus.

4.1 Gas chromatograph—A gas chromatograph equipped with a flame ionization detector.

4.2 Column—A gas chromatograph column, glass, 1800 by 6.35 cm. outside diameter, packed with chromosorb 102.

4.3 Recorder—A 1-mv recorder with a 1 second full scale response and a chart speed of 10 mm. per minute (0.4 inches per minute).

4.4 Syringe (100 ul.) for adding the internal standard.

4.5 Pipet.

4.6 Injection syringe (10 ul.).

4.7 Extraction syringe (1-5 ml.) with 3-inch needle.

4.8 250 ml. (½ pint) glass sample bottles with screw caps or equivalent.

4.9 Calibration standard solutions extracted from gasoline containing known quantities of alcohols.

4.10 Reference standard solutions extracted from gasoline containing known quantities of alcohols.

4.11 Distilled water.

4.12 Reagent grade isopropanol.

4.13 Rubber gloves.

4.14 I.D. tags.

5. Precautions.

NOTE 1: Gasoline and alcohols are extremely flammable and may be toxic over prolonged exposure. Methanol is particularly hazardous. Persons performing this procedure must be familiar with the chemicals involved and all precautions applicable to each.

5.1 Extractions and dilutions must be performed in well-ventilated areas, preferably under a fume hood, away from open flames and sparks.

5.2 Rubber gloves must be worn during the handling of gasoline and alcohols.

5.3 Avoid breathing fumes from gasoline and alcohols, particularly methanol.

5.4 Gas cylinders must be properly secured and the hydrogen FID fuel must be segregated from the compressed air (oxidizer) tank.

6. Visual inspection.

6.1 Ensure that the samples do not contain sediment or separated phases prior to extraction.

6.2 Ensure adequate quantities of GC supply gases to maintain a run.

7. Test article preparation.

7.1 Gas chromatography—Use carrier gas, flow rates, detector and injection temperatures and column as specified in the GC manufacturer's specifications.

7.2 Sample extraction, preparation and analysis.

7.2.1 Label two 6 ml. vials with the sample identification number supplied with the



Pennsylvania Department of Environmental Protection

Rachel Carson State Office Building
P.O. Box 2063
Harrisburg, PA 17105-2063
January 25, 1999

The Secretary

717-787-2814

Mr. Robert E. Nyce
Executive Director
Independent Regulatory Review Commission
14th Floor, Harristown II
Harrisburg, PA 17101

RE: Proposed Rulemaking: Gasoline Volatility Requirements (Low RVP) (#7-341)

Dear Bob:

Enclosed is a copy of a proposed regulation for review and comment by your Committee pursuant to Section 5(e) of the Regulatory Review Act. This proposal was published in the *Pennsylvania Bulletin* on September 26, 1998, with a 67-day public comment period that closed December 2. One public hearing was held during that time. This proposal was approved by the Environmental Quality Board (EQB) on July 21, 1998.

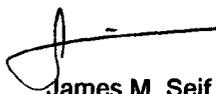
The Commonwealth is required to implement control strategies to demonstrate that the Pittsburgh-Beaver Valley Nonattainment Area will achieve the national ambient air quality standards (NAAQS) for ozone. This proposal would change the current provisions, published November 1, 1997, that allow for the sale of either federal reformulated gasoline (RFG) or Reid vapor pressure (RVP) gasoline by eliminating the use of RFG as a compliant fuel for this Area during the ozone season of May 1 through September 15 of each year. Refiners and marketers have been supplying low RVP gasoline during the ozone season.

DEP discussed this proposal with the Small Business Assistance Program Compliance Advisory Committee and the Air Quality Technical Advisory Committee (AQTAC). Both Committees supported the proposal.

The Department will provide the Commission with any assistance required to facilitate a thorough review of this proposal. Section 5(g) of the Act provides that the Commission may, within ten days after the expiration of the Committee review period, notify the agency of any objections to the proposed regulation. The Department will consider any comments or suggestions received by the Commission, together with Committee and other public comments prior to final adoption.

For additional information, please contact Sharon Freeman, Regulatory Coordinator, at 783-1303.

Sincerely,



James M. Seif
Secretary

Enclosure

TRANSMITTAL SHEET FOR REGULATIONS SUBJECT TO THE
REGULATORY REVIEW ACT

RECEIVED

I.D. NUMBER: 7-341
SUBJECT: Gasoline Volatility Requirements - Low RVP
AGENCY: DEPARTMENT OF ENVIRONMENTAL PROTECTION
99 JAN 25 PM 3:38
INDEPENDENT REGULATORY REVIEW COMMISSION

TYPE OF REGULATION

- X Proposed Regulation
- Final Regulation
- Final Regulation with Notice of Proposed Rulemaking Omitted
- 120-day Emergency Certification of the Attorney General
- 120-day Emergency Certification of the Governor
- Delivery of Tolled Regulation
 - a. With Revisions
 - b. Without Revisions

FILING OF REGULATION

DATE	SIGNATURE	DESIGNATION
1/25/99	[Signature] <i>usky</i>	HOUSE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY
1/25/99	[Signature]	
	<i>Bonnie Aske</i> <i>white</i>	SENATE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY
1/25/99	<i>Kim C. Garner</i>	INDEPENDENT REGULATORY REVIEW COMMISSION
		ATTORNEY GENERAL
		LEGISLATIVE REFERENCE BUREAU

January 12, 1999