TECHNICAL SUPPORT DOCUMENT

for

Notice of Proposed Rulemaking

on

Arizona State Implementation Plan (SIP)

Arizona Cleaner Burning Gasoline SIP Revisions

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Technical Support Document
Phoenix Area Cleaner Burning Gasoline SIP Revisions

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SECTION 1 - INTRODUCTION AND BACKGROUND

A. Introduction

This technical support document (TSD) provides the basis for EPA action on revisions to Arizona's Cleaner Burning Gasoline (CBG) program as approved in the State implementation plan (SIP) for the Maricopa ozone, particulate matter (PM-10) and carbon monoxide (CO) nonattainment areas. The Arizona Department of Environmental Quality (ADEQ) has submitted a number of revisions to its CBG program for EPA approval into the SIP. The CBG standards help reduce emissions of volatile organic compounds (VOCs), oxides of nitrogen (NOx), carbon monoxide (CO) and particulate matter (PM-10) from motor vehicles. The area is designated as nonattainment for ozone, PM-10, and CO. This TSD reviews the State's submittals to revise the CBG program approved in the SIP, outlines the Clean Air Act (CAA or Act) requirements for EPA to approve such revisions, and provides our evaluation and recommendation for acting on the State's submittals.

B. Description of Area

The Maricopa nonattainment area is located in south central Arizona, and includes the eastern portion of Maricopa County and encompasses the cities of Phoenix, Mesa, Scottsdale, Tempe, Chandler, Glendale, and 17 other jurisdictions as well as unincorporated county lands. The area has approximately 3 million residents.

Temperatures can range from daily maximums in July of 110^{o} F to average daily minimums in January of 33^{o} F. Climatic conditions and the area's location in a broad valley result in calm wind conditions during the winter. These low winds, combined with temperature inversions and nighttime downslope drainage of air back into the valley, prevent dispersion of air pollutants.

C. History of Area Designation and Controls

The CAA Amendments of 1990 were enacted on November 15, 1990. Under section 107(d)(1)(C) of the amended Act, each area designated nonattainment for the CO, ozone, or particulate standard prior to the Amendments was to be designated nonattainment for such standard by operation of law upon enactment of the 1990 Amendments. At the time of the 1990 Amendments to the CAA, the Maricopa area was classified as moderate for CO, ozone, and particulates. These areas were thus designated nonattainment by operation of law under the 1990 Amendments. EPA codified these nonattainment designations and classifications for Arizona in 40 CFR § 81.303. The boundaries of the Maricopa nonattainment areas for CO and ozone are the same, and are slightly smaller than the boundaries of the PM-10 nonattainment area. See id.

States containing areas classified as moderate CO nonattainment by operation of law under section 107(d) were required to submit SIPs designed to attain the CO national ambient air

qualiuty standard (NAAQS) as expeditiously as practicable but no later than December 31, 1995. Since the Maricopa nonattainment area failed to attain the CO standard by the moderate area deadline, we redesignated the area as serious for CO effective August 28, 1996.

The moderate area ozone attainment deadline was November 15, 1996. On November 6, 1997, the area was reclassified to serious for ozone effective December 8, 1997, with an attainment deadline of no later than November 15, 1999.

The Maricopa nonattainment area violated both the annual and 24-hour PM-10 standards. In 1990, the area was classified a moderate nonattainment area for PM-10. In 1996, because of continuing violations of both PM-10 standards, the area was reclassified to serious and was required to submit a serious area plan by December 10, 1997 showing attainment no later than December 31, 2001.

ADEQ, the Maricopa County air pollution control agency, and the local jurisdictions in the Maricopa area have adopted and implemented a broad range of ozone, PM-10 and CO control measures including a summertime Reid vapor pressure (RVP) limit of 7.0 pounds per square inch (psi) for gasoline, an enhanced inspection and maintenance (I/M) program, Stage II vapor recovery, an employer trip reduction program, transportation control measures, and stationary and area source controls. We received a final revised PM-10 attainment demonstration in February of 2000, a final ozone attainment plan in December of 2000, and a CO attainment demonstration in April of 2001. We made a clean data finding of attainment for the Maricopa area for ozone on May 30, 2001. 66 FR 29230. The Maricopa area has more than six years of clean data for CO, indicating the NAAQS has been attained for CO as well. For PM-10, we approved the serious area nonattainment plan on July 25, 2002. 67 FR 48718. The approved PM-10 plan demonstrates that attainment will occur by the Dec. 31, 2006 deadline. Id.

D. History of Gasoline Controls in Arizona

1. Early requirements for wintertime gasoline.

Prior to the 1990 CAA Amendments, oxygenated gasoline programs were not required in CO nonattainment areas. However, as a result of EPA's 1986 disapproval of the CO attainment plans for the Maricopa CO nonattainment area, on August 10, 1987, the U.S. District Court for the District of Arizona ordered us to promulgate a Federal implementation plan (FIP) for CO in the Maricopa nonattainment area. Among the measures proposed by us in that FIP was an oxygenated fuels program.[1]

On October 5, 1987, Arizona submitted the MAG 1987 Carbon Monoxide Plan for the

[1] Oxygenated fuel blends cause motor vehicle engines to run leaner, thereby reducing emissions of carbon monoxide. Typical oxygenates used for blending include methyl tertiary butyl ether (MTBE), ethanol (gasohol), and methanol/cosolvent blends.

Maricopa nonattainment area and portions of Senate Bill (SB) 1360 as revisions to the SIP. In June 1988, the Arizona State legislature passed House Bill (HB) 2206, which contained a state-run oxygenated fuels program. On July 18 and 22, 1988, the State submitted for EPA approval portions of Arizona HB 2206 as well as a demonstration that the measures in the 1987 SIP submittal combined with the measures in the new SIP submittals provided for attainment of the CO standard in the Maricopa nonattainment area by the end of 1991. The oxygenated fuels program submitted by Arizona as part of the state's CO attainment SIP had provisions for a 2.4 to 3.7 percent by weight oxygen requirement for leaded fuels and a 1.9 to 3.7 percent by weight oxygen requirement for unleaded fuels. We approved these plan revisions on August 10, 1988 (53 FR 30224) and withdrew our proposed FIP. The Ninth Circuit Court of Appeals vacated this approval in Delaney vs. EPA, 898 F. 2d. 687 (9th Cir. 1990). Because we concluded that the court had only intended to disapprove our overall approval of the SIP and not our approval of the individual control measures, we reapproved the oxygenated fuels program and restored it to the SIP on January 29, 1991. 56 FR 3220.

Under section 211(m) added by the CAA Amendments of 1990, all CO nonattainment areas with design values of 9.5 parts per million or greater were required to adopt and implement wintertime oxygenated gasoline program by November 1, 1992 requiring 2.7 percent oxygen (by weight) for all fuel sold or dispensed in the metropolitan statistical area (MSA) in which the nonattainment area is located.

On February 11, 1991, EPA disapproved portions of the Arizona SIP in accordance with the Delaney decision and proposed a FIP for the Maricopa CO nonattainment area. 56 FR 5458. The proposed federal control measures included a wintertime fuels program that required a minimum oxygen content level of 2.7 percent by weight and RVP of no more than 10 psi during the winter CO season of October 1 through March 31, starting October 1, 1991. EPA determined at that time that these two measures were necessary to bring the area into attainment with the CO NAAQS by December 31, 1991.

On June 11, 1991, Arizona submitted a SIP revision to EPA to replace the FIP regulations with State requirements for a maximum of 10 psi RVP and 2.7 percent oxygen by weight for wintertime fuel sold in the Maricopa nonattainment area. Except for changing the beginning date of the period for the oxygenate requirement from October 1 of each year to September 30 of each year, the State regulations followed those adopted in the FIP. This SIP revision was approved by EPA in March of 1992 but applies only to the Maricopa CO nonattainment area. 57 FR 8268 (Mar. 9, 1992). Therefore, the program was approved as an equivalent substitution for the existing federal program, but not as meeting the requirements of section 211(m) since the program did not cover the entire MSA, as required by 211(m).

HB 2001 passed in special session in 1993 changed the Maricopa nonattainment area's wintertime RVP from 10 psi to 9 psi from September 30, 1994 through March 31, 1995 and from September 30 through March 31 of each year thereafter. The bill also limited the maximum summer RVP of gasoline fuel sold in the Maricopa area to 7.0 psi beginning May 31, 1995 through September 30, 1995, and applying from May 31 through September 30 of each year

thereafter. Section 13 of HB 2001, which contains the summertime and wintertime RVP limits, was submitted by the State on April 29, 1997. We approved the summertime low-RVP SIP revision on June 11, 1997. 62 FR 31734. We approved the wintertime RVP of 9 psi in our proposed and final rulemakings on Arizona's interim CBG program. 62 FR 61942 (Nov. 20, 1997) and 63 FR 6653 (Feb. 10, 1998).

2. Adoption of Federal Reformulated Gasoline and Interim CBG Requirements.

In 1996, in order to address ongoing air quality problems in the Maricopa area, Governor Symington created a Task Force charged with evaluating and recommending measures that could be implemented to reduce the formation of ozone, particulate matter, and carbon monoxide. From August through September of 1996, the Task Force considered hundreds of suggestions by the general public, private businesses, and governmental entities. Based on the evaluation of the information presented to them, on December 2, 1996, the Task Force released a report containing 35 recommended air pollution control measures. Of the 35 measures recommended by the Task Force, two measures ranked above the rest in their ability to reduce emissions of ozone-forming pollutants and their ability to be implemented in a short time period: in the short term, opting into the federal reformulated gasoline (RFG) program and, in the longer term, adopting State requirements governing the formulation of a cleaner burning gasoline. Gasoline formulations recommended by the Task Force included 1) a performance standard requiring a 10% reduction in the VOC emissions of baseline gasoline; 2) standards equivalent to the requirements of federal Phase II RFG; and 3) standards equivalent to the requirements of California Air Resources Board (CARB) Phase 2 RFG.

Governor Symington acted on the Task Force recommendation by sending a letter to EPA on January 17, 1997 requesting that the Maricopa nonattainment area be included in the federal RFG program for the 1997 and 1998 ozone seasons. The State then worked on developing its own reformulated gasoline program for the summer of 1999 and beyond.

In 1997, the State adopted HB 2307 which authorized a more comprehensive State reformulated gasoline program. HB 2307 required that gasoline sold in "Area A"[2] meet the following interim and permanent standards:

June 1, 1998 through September 30, 1998 -- CARB Phase 2 or Federal Phase I standards
From and after May 1, 1999 ---------- CARB Phase 2 or Federal Phase II standards

HB 2307 also changed the effective dates of the wintertime oxygenate requirement to November 15 through March 31 of each year. Additionally, the legislation required that gasoline sold in "Area A" meet the winter and summer RVP requirements of ARS §§ 41-2083(D) and (F). To ensure that a State-enforced gasoline program was in place for the 1998 ozone season, the

[2]At the time, "Area A", defined in Arizona Revised Statutes (ARS) § 49-541, was the Maricopa CO nonattainment area.

State legislature passed HB 2307 as an emergency measure, operative immediately. The bill required ADEQ in consultation with the Arizona Department of Weights and Measures (ADWM), to adopt interim rules reflecting the 1998 and 1999 fuel requirements by September 15, 1997.

The interim rules developed by ADEQ and ADWM established limits on gasoline properties and gasoline emissions standards to reduce emissions of VOCs, oxides of nitrogen (NOx), CO, and PM-10. Under the program, a variety of different fuels were able to meet the fuel standards during different implementation periods. Starting June of 1998 through September 30, 1998, gasoline sold in Maricopa County[3] had to meet standards similar to EPA's Phase I RFG, known as CBG Type 3, or California's Phase 2 RFG program, known as CBG Type 2. Starting May 1, 1999, gasoline had to meet standards similar to EPA's Phase II RFG program (CBG Type 1) or California's Phase 2 RFG program (CBG Type 2). CBG Type 3 (EPA's Phase I RFG) was no longer an option after the 1998 ozone season.

In a September 12, 1997 letter, ADEQ requested that EPA approve the CBG interim rule as a revision to the Arizona SIP. To allow the Arizona CBG program to substitute for the federal RFG program, on September 15, 1997, the State submitted a separate letter to EPA requesting to opt out of the federal RFG program effective June 1, 1998, contingent upon EPA's approval of the SIP revision.

EPA granted Arizona's request to opt in to the federal RFG program on June 3, 1997. On February 10, 1998, EPA issued a notice of final rulemaking approving Arizona's interim CBG program. 63 FR 6653. In approving the SIP revision, EPA found under section 211(c)(4)(C) that the State fuel requirements were necessary for the Maricopa area to achieve the ozone and PM-10 NAAQS. Based on EPA's approval of the interim CBG program, on August 11, 1998, EPA approved Arizona's request to opt out of the federal RFG program. 63 FR 43044.

3. Current Revisions to the CBG Requirements

Since approval of the interim CBG regulations, Arizona has made a number of changes to both winter and summer gasoline requirements. In accordance with the various legislative changes to the fuel requirements in the Arizona Revised Statutes, ADEQ has made multiple revisions to its regulations and has submitted these revisions to EPA for SIP approval. EPA has not acted on these previous SIP revision requests. Therefore, with this action, EPA is proposing to approve the cumulative changes of all of these legislative and administrative revisions. This section provides a brief chronology of the State's changes to the SIP-approved CBG program.

Arizona has adopted four bills amending the State's statutory fuel requirements since

[3] The definition of "Area A" in section R20-2-701(1) was "a county with a population of one million two hundred thousand or more persons that contains a carbon monoxide vehicle emissions control area."

adoption of the original CBG program in HB2307:

- HB 2347 (signed May 27, 1998) added wintertime fuel specifications to the CBG requirements in ARS § 41-4124. The legislation specified that wintertime fuel must meet the CARB Phase 2 RFG requirements, the RVP requirements of ARS §§ 41-2083 (D) and (F), and the oxygen content requirements of ARS § 41-2183(A)(2), which required gasoline to contain at least 10 percent ethanol. The amendments also added a mechanism for gasoline suppliers to get a waiver of the 10 percent ethanol requirement from ADEQ in the event of an ethanol shortage.

- SB 1427 (signed May 29, 1998) revised the definition of Area A in ARS § 49-541 and the area subject to the wintertime oxygen content requirements of ARS § 41-2123. The changes to the definition of Area A in ARS § 49-541 expanded the area to include portions of Yavapai and Pinal Counties, as well as the Phoenix area portion of Maricopa County. The changes to ARS § 41-2123 resulted in the wintertime oxygen content requirements applying in any portion of a county in Area A and any county with a census population of 1.2 million (i.e., all of Maricopa County).

- HB 2189 (signed May 18, 1999) redefined the area subject to fuel requirements by amending ARS §§ 41-2083 (D) and (F) (RVP), 41-2122 (volatility waiver for ethanol areas) and 41-2124 (CBG). The revised applicability language in HB 2189 was added to ARS § 41-2123 after the language added by SB 1427. The effect of this change was to extend the applicability of the CBG program to include all of Maricopa County as well as portions of Yavapai and Pinal Counties. The effective date of this change for the Pinal County portion was January 1, 2001. The amendments also updated the reference to the federal RFG standards from January 1, 1997 to January 1, 1999 and authorized ADEQ and ADWM to revise the Arizona Administrative Code to incorporate the regulatory changes made by EPA on December 31, 1997 to the federal regulation (62 FR 68196).

- SB 1504 (signed April 28, 2000) amended the permanent CBG requirements in ARS § 41-2124 requiring either Federal Phase II or CARB Phase 2 RFG to specify that the minimum oxygen content standards for those fuels no longer apply. The legislation adopted a state MTBE policy that use of MTBE in fuels should be phased out as soon as possible and directed ADWM, in consultation with ADEQ, to submit a report by January 1, 2001 on expected phase out of use of MTBE. The legislation further provided that the MTBE policy provisions and requirements for reports was to be repealed after June 30, 2001. Finally, the legislation repealed the interim fuel requirements in ARS § 41-2124.01.

In accordance with these legislative amendments ADEQ, in consultation with ADWM, has made a series of revisions to the fuel regulations contained in Arizona Administrative Code

(AAC) Title 20, Chapter 2, Article 7. ADEQ has provided these revisions to EPA for approval into the SIP in four submittals dated February 24, 1999, March 29, 2001, August 15, 2001, and September 28, 2001. The key revisions to the SIP-approved interim CBG rules include the following:

• Standards for CBG Type 3, which was only available as an option in 1998, have been removed along with references to this fuel option.[4]

• Summertime minimum oxygen content standards have been removed by specifying a 0.0% minimum oxygen content for April 1 through November 1 in Table 1 of the rule, applicable to CBG Type 1, and by deleting the footnote in Table 2 specifying a per gallon minimum oxygen content of 1.8% for CBG Type 2 meeting the non-averaging option.[5]

• The option of supplying CBG Type 1 during the winter fuel season (November 2 through March 31) was removed by including wintertime fuel specifications that limit suppliers to CBG Type 2 beginning in 2000. With this change, requirements for wintertime NOx surveys were removed because CBG Type 2 (CARB Phase 2 RFG) does not include a NOx performance standard.[6]

• The option to provide non-ethanol oxygenated fuel during the winter has been removed by amending the wintertime oxygen content provisions to require fuel containing 10% ethanol, unless the use of a non-ethanol oxygenate is approved by the Director of ADEQ.[7]

• NOx performance standards for CBG Type 1 and summer survey requirements were amended to conform with changes made by EPA in December 1997 to the federal RFG regulations (62 FR 68196).[8]

• The area subject to the program was redefined to include all of Maricopa County as well as some portions of Pinal and Yavapai Counties.[9]

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[4] This change was included in ADEQ's February 1999 "CBG Permanent Rules" submittal and reflects changes to the Arizona Revised Statutes by HB 2307.

[5] For additional information, see ADEQ's March 2001 "Summertime Minimum Oxygen Content Removal" submittal. These changes reflect amendments to the Arizona Revised Statutes by SB 1504.

[6] For more information see ADEQ's August 2001 "CBG Wintertime Rules" submittal. These changes reflect amendments to the Arizona Revised Statutes by HB 2347.

[7] This change was included in ADEQ's August 2001 "CBG Wintertime Rules" submittal implementing changes to the Arizona Revised Statutes by HB 2347.

[8] See ADEQ's August 2001 "CBG Wintertime Rules" submittal.

[9] The definition of the covered area has been changed in several regulatory revisions. The final definition submitted for EPA approval is described in ADEQ's August 2001 "CBG

In support of these rule revisions, Arizona also submitted the "Technical Supplement" to the March 2001 CBG SIP revision on September 28, 2001, which contained additional technical materials regarding the State's request to remove the minimum oxygen content requirement from summertime gasoline. On January 14, 2003, ADEQ submitted additional technical materials supporting the oxygen removal.

E. Arizona's Reliance on Fuel Controls in Plans for the Maricopa Nonattainment Areas

Arizona's interim CBG program is an integral part of Maricopa's control strategies for ozone, CO and PM-10. The fuel control program is part of a larger strategy (the Maricopa ozone, CO and PM-10 attainment demonstration SIPs) to reduce ozone precursor, CO and PM-10 emissions in the Maricopa nonattainment areas.

Arizona has taken a multi-pollutant approach to reduce background concentrations of ozone and its precursors and CO, and consequently, to lower the design values of ozone and CO in the Maricopa nonattainment area. The measure of success of this strategy is that the area has had clean data since the summer of 1997 for ozone and the winter season of 1996 for CO. The "Final Serious Area Ozone State Implementation Plan for Maricopa County," submitted to EPA in December, 2000, includes the interim CBG program as one of the control measures relied upon to reduce VOC emissions. The maintenance plan for ozone, which we expect to be submitted in December 2003, will likely include the revised permanent CBG requirements. The CBG program, as revised, is also included among the control strategies relied upon in the CO redesignation request and maintenance plan ADEQ submitted to EPA on June 16, 2003.

The area's PM-10 plan includes CBG as an on-road mobile source control measure to meet Best Available Control Measure (BACM) and Most Stringent Measure (MSM) requirements. The plan reflects the statutory revisions to the interim CBG program being proposed in today's action. See, e.g., EPA, Technical Support Document for Approval of the Serious Area PM-10 State Implementation Plan, at 122-23 (Jan. 14, 2002). EPA approved the Maricopa County PM-10 Serious Area Plan on July 25, 2002. 67 FR 48718. The plan demonstrates that the area will achieve the annual and 24-hour PM-10 standards by December 31, 2006. Id.

Wintertime Rules" submittal and reflects statutory changes made by HB 2189.

SECTION 2- ANALYSIS OF ARIZONA CBG SIP REVISIONS

A. Overview of Requirements

In determining the approvability of any SIP revision, we must evaluate the proposed revision for consistency with the requirements of the CAA and EPA regulations, as found in CAA section 110 and Title I, Part D and 40 CFR Part 51 (Requirements for Preparation, Adoption, and Submittal of Implementation Plans). Section 110(a)(2) contains the general requirements for SIPs (e.g., enforceable emissions limits,[10] ambient monitoring, permitting of new sources, adequate funding).

Of particular relevance for revisions to measures currently approved into the SIP, is the requirement of section 110(l). Section 110(l) allows revisions to a SIP as long as the revisions do not interfere with any applicable requirement of the Act including requirements concerning attainment and reasonable further progress. Thus, revisions to SIPs must meet the general requirements applicable to all SIPs including: reasonable notice and public hearing; necessary assurances that the implementing agencies have adequate personnel, funding, and authority under section 110(a)(2)(E)(i) and 40 CFR § 51.280; and a description of enforcement methods as required by 40 CFR § 51.111. In addition, EPA will consider the effect of these proposed SIP revisions on the ability of the State to attain the NAAQS and demonstrate reasonable further progress.

For SIP revisions addressing certain fuel measures, an additional statutory requirement may apply. CAA section 211(c)(4)(A) generally prohibits state regulation of a motor vehicle fuel characteristic or component for which EPA has adopted a control or prohibition under section 211(c)(1), unless the state control is identical to the federal control. Section 211(c)(4)(C), however, provides an exception to this preemption if EPA approves the state requirements in a SIP.

B. Compliance with General SIP Requirements

Reasonable Notice and Public Hearing. The revisions to the CBG rule contained in the various State SIP submittals all were adopted following reasonable notice and a public hearing. A public hearing for the "CBG Permanent Rules" was held on December 11, 1997. A public hearing for the "CBG Wintertime Rules" was held on June 8, 1999. A public hearing for the "Summertime Minimum Oxygen Content Removal" submittal was held on November 20, 2000.

Enforceable Emissions Limits and Program for Enforcement. For the most part, the enforcement

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[10] Approvable regulations must include clear indications of what constitutes a violation, who is liable, and what defenses are available. In addition, penalties must be large enough to both ensure that any economic benefit due to noncompliance would be limited and include an additional penalty for deterrence.

provisions of the revised CBG rule are the same as the interim rule. The CBG rules, as revised, contain an extensive description of the standards and what would constitute a violation, recordkeeping and reporting requirements, the enforcement methods to be used, and the fines to be imposed for noncompliance. The most notable change is the deletion of the requirement for wintertime NOx surveys and the increase of summertime NOx and VOC surveys. The State deleted the wintertime NOx survey requirement because, after November 15, 2000, only CBG Type 2 (similar to CARB Phase 2 RFG) could be sold in the Maricopa nonattainment area in the wintertime, and there are no NOx performance standards for this gasoline. Consistent with EPA's December 31, 1997 final revisions to the federal RFG program (62 FR 68196), however, the revised rules increase the number of gasoline quality surveys during the summer wherever CBG is sold. We conclude that the CBG program continues to be enforceable with these revisions.

The February 1999 "CBG Permanent Rules" submittal contains assurances that ADEQ and ADWM have adequate personnel, funding, and authority to implement the rules. These assurances have not changed with the subsequent submittals. We have concluded that the provisions contained in the revised CBG rules confer on the State the requisite authority to enforce compliance.

C. Compliance with Section 110(l)

Section 110(l) prohibits EPA from approving a SIP revision if the revision would interfere with any applicable requirement of the Act including requirements concerning attainment and reasonable further progress (RFP). In applying section 110(l) to a particular SIP revision, we need not focus solely on the SIP revision's impact on emissions; rather we may look at whether the entire SIP still provides for expeditious attainment of the NAAQS. We believe Arizona's CBG program, as modified, will continue to reduce ozone, PM-10 and wintertime CO concentrations, and, along with the other SIP measures, will be consistent with the Maricopa area's continued or planned attainment of the ozone, PM-10 and CO NAAQS.

Ozone. In April 2001, EPA determined that the Phoenix area had attained the 1-hour ozone standard by its statutory deadline of November 15, 1999. See 66 FR 29230 (May 30, 2001). The area has continued in attainment since 1999 with no recorded exceedances of the 1-hour ozone standard and an overall downward trend in ozone levels. See Letter from Nancy Wrona, ADEQ to Colleen McKaughan, EPA, June 12, 2002.

Because the area attained the ozone NAAQS, Arizona was not required to submit a serious area attainment demonstration;[11] therefore, there is no plan against which to judge

[11] See Memorandum, John S. Seitz, Director, OAQPS, EPA, to Regional Air Directors, "Reasonable Further Progress, Attainment Demonstrations, and Related Requirements for Ozone Nonattainment Areas Meeting the Ozone National Ambient Air Quality Standard," May 10, 1995.

whether the proposed revisions are consistent with the area's formal plan to attain the standard by its applicable statutory deadline. However, because the area attained the ozone standard in 1999 – and has continued to attain the standards – under the interim CBG program, we can compare the revised CBG program to the interim CBG program for purposes of our analysis under section 110(l).[12]

For purposes of ozone attainment, the most substantial change to the CBG program in these proposed revisions is the removal of the two percent minimum oxygen requirement for summertime CBG. This change, however, is not a relaxation in the SIP because the SIP-approved regulations already allowed the use of non-oxygenated CBG (i.e., CBG Type 2 produced to comply with the averaging option or Predictive Model alternative formulations) during the summer control period. In fact, all of the proposed SIP revisions governing fuel formulation requirements involve limiting the formulation options available to gasoline suppliers but do not require entirely new fuels that were not otherwise allowed under the current SIP-approved rules. Thus, the fuel options allowed under the revised State rules will be no less stringent than those already allowed under the current SIP.

While we find on the face of the regulations that section 110(l) is satisfied and there will be no relaxation in the SIP, we have worked with ADEQ to assess the changes in emissions and ozone concentrations likely to occur as a result of these changes to the CBG program. Arizona's technical analysis supporting the March 2001 "Summertime Minimum Oxygen Content Removal" submittal indicated that the removal of the minimum oxygen content requirement for CBG Type1 could result in increases in VOC and CO emissions and a decrease in NOx emissions, as compared to the emissions from gasoline provided to the area during the period of 1997 to 1999 (the period in which the area first attained the ozone NAAQS). This reference gasoline is predominantly ether-oxygenated CBG Type 1, with some non-oxygenated CBG Type 2.[13] These changes in emissions are not likely to interfere with requirements for attainment because the projected emissions changes are relatively small, and Phoenix has had a general downward trend in ambient ozone concentrations from 1996 to 2002, allowing a buffer for these changes in emissions without necessarily jeopardizing attainment.

As described in more detail in the following section, we confirmed this conclusion by reevaluating ADEQ's emissions modeling and using these results to assess the impact these emission changes may have on ambient ozone concentrations. Our modeling generated speciated emissions estimates likely to result from the changes to the CBG requirements. We provided these speciated emissions estimates to the State and the State performed modeling

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[12] See Hall v. EPA, 273 F.3d 1146, 1160 n.11 (9th Cir. 2001) (noting "no relaxation" test would "clearly be appropriate in areas that achieved attainment under preexisting rules").

[13] Arizona's analysis also assumed that the federal 30 ppm Tier 2 sulfur requirement (40 CFR Part 80, Subpart H) applied to both the reference gasoline and the non-oxygenated CBG Type 1. Section 3 of this TSD provides further details on the assessment of emissions changes from the proposed revisions.

using the Urban Airshed Model (UAM). The modeling predicted a four percent reduction in peak ozone for the types of non-oxygenated gasoline likely to be supplied to the area under the revised rules. The modification to Arizona's summertime gasoline program, therefore, will not interfere with requirements related to attainment and maintenance of the ozone NAAQS in the Maricopa nonattainment area.[14]

In 2001, we determined the area had attained the 1-hour ozone standard and therefore the RFP requirements of 182(c)(2)(B) for serious ozone nonattainment areas no longer applied to Maricopa. 66 FR 29230 (May 30, 2001). As a result, there is no continuing obligation for the State to show further VOC reductions. The revisions therefore do not need to be evaluated against these RFP requirements to satisfy section 110(l).

We need not resolve whether 110(l) requires EPA to evaluate the consistency of SIP revisions with past RFP demonstrations once EPA finds the area has attained the ozone NAAQS because the Maricopa area has more than adequate VOC reductions to continue to demonstrate RFP. The only existing RFP demonstration for the area is the 15 percent rate-of-progress (ROP) demonstration required by CAA section 182(b)(1) promulgated by EPA as part of a FIP. See 63 FR 28898 (May 27, 1998). This plan demonstrated that by April 1, 1999, the State would have sufficient control measures in place to achieve a 15 percent reduction of VOC emissions, net of growth, from the 1990 baseline inventory of VOC emissions. Id. This original ROP demonstration assumed the benefits of the first phase of the CBG program by estimating the VOC reductions from use of Phase I RFG (i.e., CBG Type 3). See 64 FR 36243 (July 6, 1999). In 1999, it became clear that some of the national rulemakings relied upon in the ROP demonstration (i.e., regulations governing architectural coatings and certain consumer products) would not be effective by April 1, 1999 and 1.0 tons per day (tpd) of replacement VOC reductions needed to be identified. See 64 FR 14649 (Mar. 26, 1999). We determined that these VOC reductions would be more than made up for by the additional reductions provided by the second phase of the CBG program (i.e., Phase II RFG or CBG Type 1), which would provide an additional 2 tpd of VOC reductions. Id.

Since approval of the ROP, the national architectural coatings rulemakings originally credited in the 1998 ROP have become effective, providing an estimated additional 4.3 tpd of VOC reductions and obviating the need to rely on the additional reductions of the second phase of the CBG program. See 64 FR 14649, 14660. Because the proposed revisions to the CBG program will continue to provide VOC emission reductions in excess of those provided by the first phase of the CBG program, the proposed revisions will not interfere with the 15 percent ROP demonstration made in 1999.[15]

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[14] These reductions in peak 1-hour ozone concentrations should also ensure the fuel changes will not interfere with achievement of the 8-hour ozone NAAQS.

[15] ADEQ estimates the proposed revisions removing the summertime oxygen requirement may increase VOC emissions by 0.6 tpd. See "Wintertime CBG" Submittal, Enclosure 3.

Carbon monoxide. For CO attainment, we propose to conclude that the revisions to the CBG program are consistent with the area's plan for attainment. In March, 2001, Arizona submitted a revised serious nonattainment area CO plan for the Phoenix area. This plan relied in part on the CBG program being proposed for approval today to demonstrate both progress toward and attainment of the CO standard in the area. See Revised MAG 1999 Serious Area Carbon Monoxide Plan for the Maricopa County Nonattainment Area, Maricopa Association of Governments, March 2001, Chapter 9.[16] Therefore, these revisions to the CBG program are consistent with and support the development of the Phoenix area's plan for meeting the Act's attainment and RFP requirements.

Particulate Matter. As with CO, the proposed revisions are consistent with the area's plan for attaining the NAAQS and satisfying RFP. EPA approved the Maricopa County PM-10 Serious Area Plan on July 25, 2002. 67 FR 48718. The area's PM-10 plan includes CBG as an on-road mobile source control measure to meet Best Available Control Measure (BACM) and Most Stringent Measure (MSM) requirements. The plan reflects the statutory revisions to the interim CBG program being proposed in today's action. See, e.g., EPA, Technical Support Document for Approval of the Serious Area PM-10 State Implementation Plan, at 122-23 (Jan. 14, 2002).[17] Because the revisions to the interim CBG program are assumed in the demonstration of attainment and RFP for PM-10, we conclude the proposed revisions satisfy the requirements of 110(l).[18]

D. Findings Under Section 211(c)(4)

In our approval of the CBG interim rule and Arizona's 211(c)(4)(C) waiver request (63 FR 6653 (Feb. 10, 1998)), we approved CBG Types 2 and 3 for 1998 and CBG Types 1 and 2 for 1999 and beyond, finding these fuel requirements necessary to achieve the NAAQS in the Maricopa nonattainment area.

The proposed revisions to the CBG rule would not add new fuel requirements to the SIP. The revisions remove currently SIP-approved requirements and compliance options and are therefore within the scope of the previous finding. The Act therefore does not require a new

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[16] ADEQ estimates that the revisions to the wintertime program will provide a further reduction in total CO emissions of around 33 metric tons per day over those achieved by the program as implemented prior to 1999. See "Wintertime CBG" Submittal, Enclosure 3.

[17] We note that the 1998 approval of the interim Arizona CBG program claimed PM-10 reductions from the program's NOx performance standard (63 FR 6653) and the proposed revisions do not change these NOx performance standards. ADEQ claims additional PM-10 emission reductions will be achieved by the proposed revisions to the wintertime oxygen content requirement. In the Background Information Document supporting ADEQ's August 2001 "CBG Wintertime Rule" submittal, ADEQ claims the change to a 3.5 percent oxygen content requirement will reduce PM-10 emissions by 2.1 metric tons per day.

[18] With respect to PM2.5, EPA AIRS data indicate that the Phoenix area has not violated the 24-hour or annual PM2.5 NAAQS through 2002, and is not expected to be nonattainment for PM2.5

finding under 211(c)(4)(C).

SECTION 3 - TECHNICAL ANALYSIS AND ADDITIONAL MATERIALS

A. Introduction

While we have concluded for purposes of section 110(l) that the rule changes do not relax the State CBG requirements because the rules already allow for the fuel formulations required by the proposed SIP revisions, we have nonetheless attempted to evaluate the changes to fuels and emissions, and the impact on ozone concentrations, likely to result from the proposed SIP revisions. The goal of this analysis was to evaluate whether removing the summertime minimum oxygen content requirement for CBG1 and CBG2 meeting the non-averaging standard would interfere with ozone NAAQS attainment or RFP in the Maricopa nonattainment area. As discussed in detail below, we have concluded the proposed SIP revisions will actually result in ambient ozone concentrations decreasing slightly, so removal of the minimum oxygen content requirement will not interfere with NAAQS attainment.

B. Assessing the Impact of Fuel Changes on Attainment

For purposes of analyzing how fuel changes will affect ozone levels, we used the formulation of gasoline provided to the area in 1999 as the baseline fuel. We used 1999 as the baseline fuel because EPA made a finding that the area was in attainment by the 1999 ozone season. 66 FR 29230 (May 30, 2001). The 1999 design value was 11.3 pphm ozone (this is roughly five percent below the ozone NAAQS of 12 pphm). Thus it is reasonable to conclude that since the area was in attainment in 1999, the actual fuel in place in 1999 was sufficient for attainment.

Going into this analysis, we assumed that removing oxygen from fuel will tend to increase CO and VOC emissions, and decrease NOx emissions.[19] Since previous modeling results for Maricopa have sometimes shown that a decrease in NOx will increase ambient concentrations of ozone (i.e., there is a "NOx disbenefit"), all of these emissions changes could be expected to increase ozone. At the same time, the effect of these fuel changes was uncertain because we anticipated the impact on VOC and NOx emissions would be small, and the larger CO emissions change was not anticipated to have much effect on ozone concentrations.

The approach used to quantify the effect of removing the minimum oxygen content requirements included five steps: 1) choosing a fuel to model; 2) estimating evaporative and exhaust emissions changes with various models including models developed for EPA's California waiver analysis, EPA's MOBILE6 and draft NONROAD models; 3) speciating changes in VOC emissions using EPA's SPECIATE database; 4) using photochemical modeling with the EPA-recommended UAM to estimate the ozone effect of the changes for the modeled

[19] We made this assumption based on information provided to us in ADEQ's September 29, 2001 Technical Supplement, "Impacts of Potential MTBE Phaseout in Arizona," by Energy and Environmental Analysis, Inc., and MathPro Inc. (Dec. 19, 2000) ("MathPro Report").

episode; and 5) scaling the monitored design value based on modeling results to estimate the ozone impact of the changes.

1. Choice of fuel to model

Our selection of non-oxygenated CBG Type 1 and non-oxygenated predictive model CBG Type 2 as the alternatives to model is based on several considerations. While the SIP revision would remove the oxygen requirement from "non-averaging option" CBG Type 2, as well as CBG Type 1, allowing CBG Type 1 without oxygen is clearly the more significant change. The MathPro Report concluded, "Non-oxygenated CBG Type 1 likely would constitute most of the gasoline pool supplied to the CBG area in the Summer season. (Temporary conditions in West or East refineries or in the distribution system, or business considerations, might induce supply of some volumes of other CBG variants from time to time)." MathPro Report at iii. This conclusion was based on cost estimates relative to their reference case. Since the reference case (i.e., baseline fuel) is predominantly MTBE-oxygenated CBG (with some non-oxygenated CBG Type 2 and no ethanol-oxygenated CBG), and since costs of producing non-oxygenated CBG Type 1 were estimated to be greater than the reference case costs, this conclusion applies if MTBE is banned or voluntarily phased out of Arizona CBG.[20]

If MTBE is not phased out of Arizona CBG, MathPro cost estimates suggest that the reference case would remain the most favorable choice for refiners if the SIP revision were not approved. The costs of producing CBG Type 1 without oxygen are estimated to be less than or equal to the costs of producing CBG Type 2 without oxygen and less than the costs of producing any of the ethanol-oxygenated alternatives. Thus, approval of the SIP revision may result in a mix of MTBE-oxygenated CBG, and these two non-oxygenated alternatives.[21] If there is an

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[20] This analysis makes several references to the possibility of an MTBE ban or phase-out. Arizona's SB 1504 adopted a policy encouraging the phase-out of MTBE in fuels. This policy and associated reporting requirements were repealed in accordance with the provisions of the bill on June 30, 2001. The State has not promulgated rulemaking to effect the phase-out of the use of MTBE, but the analysis in this section notes how the conclusions would or would not change should the State decide to move forward with such a phase-out.

[21] This conclusion is further supported by the limitations of the current infrastructure for delivering CBG. The MathPro Report explains, " [T]he pipeline system can accommodate only two fungible grades of gasoline. One of these would continue to be conventional gasoline, for areas of Arizona other than Maricopa County; the other would be one class of CBG gasoline-either ethanol blended (to a uniform oxygen content) or non-oxygenated, but not both." MathPro Report at 7. The March 2001 SIP submittal from ADEQ concludes: "KinderMorgan can only manage four grades of gasoline[:] premium and regular conventional gasoline, and premium and regular CBG or AZRBOB. As a result, only AZRBOB or finished non-oxygenated CBG can be delivered to the Phoenix gasoline bulk storage terminal. While KinderMorgan would be able to handle two more grades of gasoline if more breakout tankage was built, no such plans exist." See March 2001 SIP submittal, Enclosure 3, Exhibit 1 - Final Background Information.

MTBE ban in Arizona, in the absence of an oxygenate requirement, we would expect either non-oxygenated CBG Type 1, or some mix of non-oxygenated CBG Type 1 and non-oxygenated CBG Type 2.

Although we believe that the above discussion justifies our decision to model only these non-oxygenated alternatives and to conclude that ethanol use is unlikely, particularly if the State continues to allow the use of MTBE allowed, we have given additional consideration to this issue. It is important to remember that the current regulations do not prohibit ethanol-oxygenated CBG and already allow non-oxygenated CBG. Furthermore, the non-oxygenated CBG Type 2 option currently available is sometimes used, even though MTBE can be used in Arizona CBG. If MTBE is phased out of Arizona CBG and ethanol-oxygenated CBG is introduced, we would expect the non-oxygenated CBG Type 2 market share to increase if the SIP revision were not approved. Thus, an unfavorable commingling situation could occur if we do not approve the SIP revision. Hypothetically, while approving the SIP revision could further increase commingling emissions, it could also decrease commingling emissions, depending largely on the ethanol market share with and without non-oxygenated CBG Type 1. Approving the SIP revision would possibly reduce the ethanol market share in a mixed ethanol/non-oxygenated market, but is unlikely to increase it. Thus, the proposed SIP revision is likely to reduce potential permeation VOC emissions.

In summary, CBG Type 1 and CBG Type 2 (using the predictive model option) without oxygen were the only alternatives selected for our modeling evaluation because they, along with MTBE-oxygenated CBG, appear to be the likely types of CBG that will be produced under current or future conditions, particularly if the SIP revision is approved. Additionally, modeling both CBG Type 1 and CBG Type 2 without oxygen allows direct comparison of a non-oxygenated option created by the SIP revision with a currently-allowed non-oxygenated option. Our decision not to model ethanol-oxygenated options also simplifies our analysis because we do not need to estimate certain VOC increases that may occur with the introduction of ethanol-oxygenated CBG into the Arizona summer CBG pool.[22]

2. Estimating emissions changes

Our approach for estimating changes in emissions is described in the memorandum, "Calculation of Emission Changes for Evaluation of Arizona CBG Oxygenate Requirement SIP Revision," Stuart Romanow, EPA OTAQ (Jan. 17, 2003). In that analysis we compared the

[22] These emissions increases are due to commingling of ethanol-oxygenated gasoline and other gasoline, which can occur during vehicle refueling, and through permeation emission, which can increase when ethanol is used in gasoline. While we would expect permeation emissions to increase directly with ethanol market share, we would expect commingling emissions to be highest when the ethanol market share in the affected area is near fifty percent, with little commingling effect when the ethanol market share is either zero or one hundred percent.

baseline gasoline (i.e., 1999 summer CBG Type 1 with 2.1 percent oxygen), to two other non-oxygenated gasolines -- CBG Type 1 without oxygen and predictive model CBG Type 2 without oxygen. The properties of these future fuels were predicted in the MathPro Report. In predicting the future formulation of these non-oxygenated fuels, it was assumed both of these gasolines would meet the federal "Tier 2" sulfur standards in 40 CFR part 80, subpart H. The two gasoline formulations used for the comparison were chosen to reflect non-oxygenated CBG that could be in place in 2005.

Based on the predicted changes in various fuel components, we calculated the likely changes in vehicle emissions components (e.g., running losses, refueling, and exhaust) for both of the predicted fuel formulations. We assumed that estimates of the maximum emissions impact of the CBG oxygenate requirements would be given by the emissions changes between the baseline gasoline and these non-oxygenated CBG alternatives; i.e., we assumed, in effect, the ether-oxygenated baseline gasoline constituted the entire Arizona CBG pool, and was entirely displaced by each of these non-oxygenated CBG alternatives.[23] Since the baseline gasoline was not subject to the federal Tier 2 sulfur requirement, the emissions impacts we estimated included not only those due to the removal of oxygen, but also those due to the reduction of sulfur. Directionally, the emissions changes associated with changing from the baseline gasoline to the non-oxygenated CBG formulations were reductions in NOx, and increases in VOC and CO emissions. The memorandum previously cited provides the percent changes for the various categories of emissions. Further analysis, described below, was necessary to evaluate the impact of these changes on ambient ozone concentrations.

3. VOC emissions speciation

Our approach for speciating VOC emissions is described in the memorandum, "Speciation of oxygenate removal to determine UAM emission adjustment factors," Scott Bohning, EPA Region 9 (Feb. 11, 2003). Speciation profiles of vehicle emissions for oxygenated and non-oxygenated gasolines were chosen for each vehicle emissions component. (The profiles are measured percentages for some 50 VOCs.) The original profiles were transformed into profiles for the nine "lumped" VOCs used by the Carbon Bond 4 chemical mechanism used in UAM. These lumped profiles were then applied to the emission changes from Step 2, and the components added in proportion, arriving at speciated vehicle emissions. Ratios of these gave a set of adjustment factors to apply to UAM on-road and off-road emissions inputs, to reflect changes to non-oxygenated CBG Type 1 and CBG Type 2.

4. Photochemical modeling

Our use of photochemical modeling is briefly described in the memorandum, "The effect

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[23] The actual non-oxygenated CBG share of the future Arizona CBG pool will be dependent on a number of factors, including whether MTBE continues to be used in Arizona CBG.

of the removal of MTBE from gasoline on Phoenix ozone," Peter Hyde, ADEQ (Jan. 14, 2003). UAM modeling of 1996 ozone design values developed by ADEQ was used for this analysis.[24] Using a UAM utility program, the adjustment factors from Step 3 were applied to available binary files containing 1999 on-road mobile source emissions, resulting in "across-the-board" emissions changes. UAM was then run for the oxygenated 1999 base case, and for the adjusted, non-oxygenated CBG Type 1 and CBG Type 2 cases. Respectively, the 1-hour ozone maxima were 162 ppb, 156 ppb, and 156 ppb. Thus, the modeling predicts about a four percent decrease in ozone design value from the 1999 baseline year.

5. Scaling design values to predict impact on ozone concentrations

The 1999 design value developed in Step 4 was scaled using the relative change as predicted by the model. This was done principally to use the 1999 year as a baseline, since the area was monitored to be in attainment that year. This scaling approach is consistent with recent draft changes in ozone attainment demonstration guidance (*Draft Guidance on the Use of Models and Other Analyses in Attainment Demonstrations For The 8-Hour Ozone NAAQS*, EPA, May 1999, EPA-454/R-99-004; available at http://www.epa.gov/ttn/scram/). The new guidance supports the use of modeling to develop "Relative Reduction Factors" (RRFs) which can then be applied to monitored concentrations to predict changes from actual monitored conditions. This scaling procedure provides a mechanism for using modeled results even where there is apparent "bias" in the modeled results (i.e., situations in which the model prediction does not match the observed design value). While developed for the 8-hour ozone standard, it represents new thinking on the use of modeling results that is also applicable to particulate matter and the 1-hour ozone standard.

The effect on 1999 ozone concentrations that would result from changing to non-oxygenated fuels can be estimated as:

$$\textit{new}\ 1999\ \textit{design value} = \textit{old}\ 1999\ \textit{design value} \times \frac{UAM(1999,\ \textit{new fuel})}{UAM(1999,\ \textit{base fuel})}$$

where UAM(*x*,*y*) = ozone value predicted by UAM for given year *x* and fuel *y*
"base fuel" = the 1999 fuel with oxygenate, CBG Type 1
"new fuel" = the Tier 2 fuel without oxygenate, CBG Type 1 or CBG Type 2

Using the formula above, the resulting design value assuming the use of non-oxygenated CBG Type 1 is:

ozone design value without oxygenate = (11.3 pphm) * (156 ppb CBG Type 1) / (162 ppb base)

[24] New modeling is under development by the Maricopa Association of Governments for the ozone maintenance plan, but was still in its early stages at the time of this analysis.

= 11.3 * 0.963
= 10.9 pphm

Since the UAM predicted the same maximum ozone design value with the use of non-oxygenated CBG Type 2, the new "scaled" estimate of the 1999 design value will also be the same. Since the estimates are both below the ozone NAAQS of 12 pphm, our modeling shows that removing minimum oxygen content requirements is not likely to interfere with the area's ability to attain the 1-hour ozone standard.

C. Predicting Future Ozone Impacts

The preceding discussion indicates what 1999 ozone concentrations would have been if the predicted non-oxygenated gasolines were sold in the area in place of the 1999 baseline gasoline. To address the anticipated impact on ozone concentrations in future years we cannot use the same modeling approach.[25] We therefore have taken a more qualitative approach to assess likely impacts.

We considered how emissions from vehicles using the baseline gasoline compare over time to the emissions from vehicles using the predicted non-oxygenated fuels. As a general matter, the emissions effect of oxygenate in gasoline declines with time. As in EPA's analysis of the California waiver, we can assume that for the newest vehicles ("Tech 5"), the oxygen change has no effect (there is not enough data available to assume anything else). Since new vehicles are an increasing percentage of the fleet as time goes by, the effect of the oxygen removal will also diminish with time. Second, because of the various new controls that are in effect, overall area emissions will be going down. This change will eventually overwhelm any effect on vehicle emissions resulting from oxygen removal.

[25] We do not believe it is reasonable to use an approach similar to the steps described above to directly model ozone concentrations in the year 2005 with non-oxygenated Tier 2 fuel. First, the various changes that will occur between 1999 and 2005 obscure the change due to oxygen removal. Second, a modeling inventory for 2005 is not available from ADEQ and it is not reasonable to interpolate from the available 2010 inventory, since it does not include various control measures that have come into effect since it was developed in 1997. Even if the 2010 inventory did include those changes, because of their differential effect on VOC and NOx, the VOC/NOx ratio in 2010 would be substantially different than the ratio in 1999. It would thus be harder to justify using a 2010 projection with the available modeling, which is based on a 1996 episode. Overall, these complications and uncertainties point toward redoing the inventory and modeling from scratch. This would require far more time and resources than the approach followed, and would have its own uncertainties.

APPENDIX A - List of Technical Memoranda Used in Section 110(l) Analysis

Technical memoranda

analysis_memo.wpd
"Calculation of Emission Changes for Evaluation of Arizona CBG Oxygenate Requirement SIP Revision", Memorandum from Stuart Romanow, EPA OTAQ, January 17, 2003

speceqns.wpd
"Speciation of oxygenate removal to determine UAM emission adjustment factors", Memorandum from Scott Bohning to Wienke Tax, EPA Region 9, 2/11/03

rfl_eqns.wpd
"An attempt at "refueling-only" UAM adjustment factors for stationary emissions", notes from Scott Bohning, EPA Region 9, 2/10/03

pgh_sum_memo.wpd
"The effect of the removal of MTBE from gasoline on Phoenix ozone", Memorandum from Peter Hyde to Theresa Pella, ADEQ, 1/14/03

Spreadsheets

spec_spreadsheets.txt
"Arizona oxygenate removal - overview of spreadsheets", Scott Bohning, EPA Region 9

AZ99_pctchange.xls and AZ99_pctchange.123
Emission percent changes in removing oxygenated, Stuart Romanow, EPA OTAQ

ph_initial_cb4_species.xls
Draft speciation methodology, non-road gas/diesel split, Peter Hyde, ADEQ

voc-togconversions_mar_4_2002.xls
Ratios of TOG to VOC for various source categories, EPA speciation web site

cbiv-profiles_mar_4_2002.xls
CB4 speciation profiles, EPA speciation web site

lumping.123
CB4 speciation profile for diesel, Scott Bohning, EPA Region 9

cbg_spec.123
UAM adjustment factors, Scott Bohning, EPA Region 9