

## NOTICES OF PROPOSED RULEMAKING

Unless exempted by A.R.S. § 41-1005, each agency shall begin the rulemaking process by first submitting to the Secretary of State's Office a Notice of Rulemaking Docket Opening followed by a Notice of Proposed Rulemaking that contains the preamble and the full text of the rules. The Secretary of State's Office publishes each Notice in the next available issue of the *Register* according to the schedule of deadlines for *Register* publication. Under the Administrative Procedure Act (A.R.S. § 41-1001 et seq.), an agency must allow at least 30 days to elapse after the publication of the Notice of Proposed Rulemaking in the *Register* before beginning any proceedings for making, amending, or repealing any rule. (A.R.S. §§ 41-1013 and 41-1022)

### NOTICE OF PROPOSED RULEMAKING

#### TITLE 4. PROFESSIONS AND OCCUPATIONS

#### CHAPTER 16. ARIZONA MEDICAL BOARD

[R08-411]

#### PREAMBLE

- 1. Sections Affected**  
R4-16-205
- Rulemaking Action**  
Amend
- 2. The statutory authority for the rulemaking, including both the authorizing statute (general) and the statutes the rules are implementing (specific):**  
Authorizing statute: A.R.S. § 32-1403(A)(9)  
Implementing statute: A.R.S. §§ 32-1422(A)(8), 32-1425(A), 32-1426(A), 32-1429(A)(5), 32-1430(A), 32-1432(B)(2), 32-1432.01(C), 32-1432.02(A), 32-1432.03(2), 32-1436, 32-1491(A)(4)
- 3. A list of all previous notices appearing in the Register addressing the proposed rule:**  
Notice of Rulemaking Docket Opening: 14 A.A.R. 4265, November 14, 2008
- 4. The name and address of agency personnel with whom persons may communicate regarding the rulemaking:**  
Name: Lisa Wynn, Executive Director  
Address: 9545 E. Doubletree Ranch Road  
Scottsdale, AZ 85258  
Telephone: (480) 551-2791  
Fax: (480) 551-2828  
E-mail: lwynn@azmd.gov
- 5. An explanation of the rule, including the agency's reasons for initiating the rule:**  
According to A.R.S. § 32-1436, the Board is required to establish nonrefundable fees at its annual fall meeting. The Board is making rules to codify the fees that are currently on its web site at [www.azmd.gov](http://www.azmd.gov) and being charged to applicants and licensees. The Board has been charging the fees on its web site since September 2006.
- 6. A reference to any study relevant to the rule that the agency reviewed and either proposes to rely on or not to rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:**  
The Board did not review or rely on any study.
- 7. A showing of good cause why the rule is necessary to promote a statewide interest if the rule will diminish a previous grant of authority of a political subdivision of this state:**  
Not applicable
- 8. The preliminary summary of the economic, small business, and consumer impact:**  
The fee increases affected the Board, an applicant, a licensed physician, and a patient. The Board should experience moderate costs to write and implement the rules. Pursuant to A.R.S. § 32-1436, the Board is required to establish fees at its annual fall meeting. At its September 2006 meeting, the Board increased the following fees by the following amounts: issuing an initial license from \$450 to \$500; Biennial license renewal from \$450 to \$500; Reactivation of an inactive license from \$450 to \$500; locum tenens registration from \$200 to \$350; Annual teaching license at an approved school of medicine or an approved hospital internship, residency, or clinical fellowship program from \$225

Notices of Proposed Rulemaking

to \$250; annual renewal to dispense drugs and devices from \$100 to \$150; verifying a license from \$5 to \$10 per request. All other fees remain as stated in the current rules. An applicant or licensee experienced and continues to experience a minimal increase in fees for each increase listed above.

The Board currently licenses 19,400 physicians and receives approximately 1450 applications to practice medicine a year. A licensed physician may pass the costs of the fees that were increased to patients.

**9. The name and address of agency personnel with whom persons may communicate regarding the accuracy of the economic, small business, and consumer impact statement:**

Name: Lisa Wynn, Executive Director  
Address: 9545 E. Doubletree Ranch Road  
Scottsdale, AZ 85258  
Telephone: (480) 551-2791  
Fax: (480) 551-2828  
E-mail: lwynn@azmd.gov

**10. The time, place, and nature of the proceedings for the making, amendment, or repeal of the rule, or if no proceeding is scheduled, where, when, and how persons may request an oral proceeding on the proposed rule:**

Date: January 20, 2009  
Time: 1:00 p.m.  
Location: 9545 E. Doubletree Ranch Road  
Scottsdale, AZ 85258

A person may submit written comments about the proposed rules no later than 5:00 p.m. on January 20, 2009 to the individual listed in items 4 and 9.

Persons with a disability may request reasonable accommodations by contacting the individual listed in item 4 or 9. Requests should be made as early as possible to allow sufficient time to arrange for the accommodations.

**11. Any other matters prescribed by statute that are applicable to the specific agency or to any specific rule or class of rules:**

Not applicable

**12. Incorporations by reference and their location in the rules:**

None

**13. The full text of the rules follows:**

**TITLE 4. PROFESSIONS AND OCCUPATIONS**

**CHAPTER 16. ARIZONA MEDICAL BOARD**

**ARTICLE 2. LICENSURE**

Section

R4-16-205. ~~Miscellaneous Fees~~

**ARTICLE 2. LICENSURE**

**R4-16-205. ~~Miscellaneous Fees~~**

The Board charges the following fees, ~~are established~~ which are nonrefundable according to A.R.S. § 32-1436:

1. Application to practice ~~allopathic medicine~~ for a license through endorsement, USMLE Step 3, or Endorsement with SPX Examination, \$500;
2. ~~For issuing~~ Issuance of an initial license, \$450, which may be prorated from date of issuance to date of license renewal \$500;
3. ~~Two-year Biennial~~ license renewal, \$450 \$500;
4. Reactivation of an inactive license, \$450, which may be prorated from date of reactivation to date of license renewal \$500;
5. Application for a temporary license to practice medicine, \$200;
6. Locum tenens registration, ~~\$200~~ \$350;
7. Duplicate license, \$50;

8. Annual registration of an approved internship, residency, clinical fellowship program, or short-term residency, ~~\$25~~ \$50;
9. Annual teaching license at an approved school of medicine or at an approved hospital internship, residency, or clinical fellowship program, ~~\$225~~ \$250;
10. Five-day teaching permit at an approved school of medicine or at an approved hospital internship, residency, or clinical fellowship program, \$100;
11. Copy of the annual allopathic directory in either paper or CD-ROM format, \$30;
12. Initial registration to dispense drugs and devices, \$200;
13. Annual renewal to dispense drugs and devices, ~~\$100~~ \$150;
14. Penalty fee for late renewal of an active license, \$350;
15. Verifying a license, ~~\$5~~ \$10 per request;
16. ~~Copies~~ A copy of the minutes of ~~all a Board meetings during a fiscal year meeting~~, \$15 per Board meeting;
17. Copies of records, documents, letters, minutes, applications, and files, \$1 for the first three pages and 25¢ for each additional page;
18. ~~Sale of computerized tapes or diskettes not requiring programming, \$100~~ Data disk containing public information about licensed physicians, \$100; and
19. A wallet card: ~~is provided free of charge~~
  - a. at time of licensure When an initial or renewal license is issued, free of charge, and
  - b. additional wallet cards In addition to the wallet card provided in subsection (19)(a), \$10.

## NOTICE OF PROPOSED RULEMAKING

### TITLE 12. NATURAL RESOURCES

#### CHAPTER 15. DEPARTMENT OF WATER RESOURCES

[R08-412]

#### PREAMBLE

**1. Sections Affected**

R12-15-701  
R12-15-712  
R12-15-713  
R12-15-714  
R12-15-715  
R12-15-716

**Rulemaking Action**

Amend  
Amend  
Amend  
Amend  
Amend  
Amend

**2. The statutory authority for the rulemaking, including both the authorizing statute (general) and the statutes the rules are implementing (specific):**

Authorizing statutes: Laws 2007, Ch. 240, § 10(B); A.R.S. § 45-105(B)(1)

Implementing statutes: Laws 2007, Ch. 240, § 10; A.R.S. §§ 45-108, 45-108.01, 45-108.02 and 45-108.03

**3. A list of all previous notices appearing in the Register addressing the final rules:**

Notice of Rulemaking Docket Opening: 13 A.A.R. 4146, November 23, 2007

Notice of Rulemaking Docket Opening: 14 A.A.R. 4540, December 12, 2008

**4. The name and address of agency personnel with whom persons may communicate regarding the rulemaking:**

Name: Doug Dunham, Deputy Assistant Director

Address: Department of Water Resources  
3550 N. Central Ave.  
Phoenix, AZ 85012

Telephone: (602) 771-8590

Fax: (602) 771-8689

E-mail: [dwdunham@azwater.gov](mailto:dwdunham@azwater.gov)

or

Name: Nicole D. Swindle, Deputy Counsel

Notices of Proposed Rulemaking

Address: Department of Water Resources  
3550 N. Central Ave.  
Phoenix, AZ 85012

Telephone: (602) 771-8472

Fax: (602) 771-8683

E-mail: ndswindle@azwater.gov

**5. An explanation of the rules, including the agency's reasons for initiating the rules:**

**Background**

In 1973, the Arizona Legislature enacted the state's first statute addressing water availability disclosures by subdivision developers. The statute, A.R.S. § 45-108, required developers to obtain a determination of the availability of the water supply for a new subdivision from the Arizona Water Commission ("Commission") prior to recording the plat for the subdivision and marketing lots. If the Commission determined there was an adequate water supply, notice of that determination was required be included in the public report for the subdivision. If the Commission determined there was an inadequate water supply, lots could still be sold, but the developer was required to provide information regarding the determination in the public report. Because the public report is required to be given only to the initial purchasers of lots within the subdivision, any subsequent purchaser of the property would not receive the information about the inadequate water supply.

In 1980, the Arizona Legislature enacted the Arizona Groundwater Code. The Groundwater Code created the Arizona Department of Water Resources ("Department") and transferred the responsibilities of the Commission to the Department, including the requirement to administer the water adequacy statute. The Groundwater Code established active management areas ("AMA") in designated parts of the state where groundwater withdrawal and use is strictly regulated.

Among other things, the Groundwater Code changed the water adequacy requirements for new subdivisions within AMAs by requiring a developer of subdivided land in an AMA to obtain a determination of a 100-year assured water supply from the Department before the plat for the subdivision can be recorded or a public report can be issued by the Arizona Department of Real Estate ("ADRE"). A.R.S. § 45-576. In order to obtain a determination of assured water supply, the developer must demonstrate that a water supply of adequate quality is physically, continuously and legally available for 100 years, that the developer has financial capability to construct any necessary delivery and treatment facilities, and that any groundwater use is consistent with the management goal of the AMA. Areas outside AMAs are not subject to the assured water supply requirements, but remain subject to the adequacy provisions of A.R.S. § 45-108.

The minimal requirements of A.R.S. § 45-108 continued to be the sole adequacy requirement outside AMAs until 2007, when the Arizona Legislature enacted SB1575. SB1575 was enacted in response to recommendations from the Statewide Water Advisory Group ("SWAG"). SWAG is a large committee hosted by the Department to assess the growth and water supply issues facing Arizona, particularly in rural areas of the state. SWAG is made up of individuals from across the state representing diverse stakeholders, including developers, water resource planners, land use planners, state agencies, local governments, tribal communities and elected officials. SWAG began meeting in 2006 and continues to meet today.

Very early in the SWAG process, SWAG members recognized the need to give cities, towns and counties outside AMAs authority to require developers within their jurisdictions to demonstrate a 100-year adequate water supply before moving forward through the platting and lot sale process. SWAG members recognized that without such authority, communities outside AMAs have limited ability to protect their water supplies from being over-allocated. In addition to the risk of insufficient water supplies, such communities are facing increasing difficulty in obtaining funding for water augmentation projects because the source of the augmented supply could be over-allocated. SWAG recommended addressing this problem through legislation that was ultimately enacted in 2007 as SB1575.

SB1575 amended the statutes governing subdivision regulation by cities, towns and counties to give those jurisdictions authority to adopt a provision or ordinance requiring developers of new subdivisions located outside AMAs to obtain one of the following before recording their plats or obtaining a public report from ADRE: (1) a water report from the Department determining that the subdivision has a 100-year adequate water supply ("adequate water report"); or (2) a commitment of water service from a water provider that has been designated by the Department as having an adequate water supply ("designated provider"). A.R.S. §§ 9-463.01(J) and 11-806.01(F). (Such a provision or ordinance is referred to herein as a "mandatory adequacy provision," and the requirement to obtain an adequate water report or a commitment of service from a designated provider is referred to herein as a "mandatory adequacy requirement.")

A county may adopt a mandatory adequacy provision only by unanimous vote of the board of supervisors, and if a mandatory adequacy provision is adopted by a county, the county cannot later rescind the provision. A.R.S. § 11-806.01(F) and (G)(3). In addition, if a county adopts a mandatory adequacy provision, all cities and towns within that county may not approve a new subdivision located outside an AMA unless the subdivider obtains an adequate water

report from the Department or a commitment of water service from a designated provider. A.R.S. § 9-463.01(J). If a county does not adopt a mandatory adequacy provision, then a city or town in the county may adopt its own mandatory adequacy provision. A.R.S. § 9-463.01(O). (A city, town or county that adopts a mandatory adequacy provision, and a city or town located within a county that adopts a mandatory adequacy provision, is referred to herein as a “mandatory adequacy jurisdiction.”)

SB1575 contains three exemptions from the requirement that a subdivider in a mandatory adequacy jurisdiction obtain either an adequate water report from the Department or a commitment of water service from a designated provider. Two of the exemptions require approval by the Department. The first is an exemption upon a demonstration that the subdivider made substantial capital investment toward construction of the development before the mandatory adequacy provision became effective (referred to herein as the “substantial capital investment exemption”). The second is an exemption upon a demonstration that: (1) the development will be served by a water supply project that either is under construction and will be completed within 20 years or will serve Colorado river water to the development within 20 years; (2) the water supply project or Colorado river water will meet the water adequacy requirements when completed; and (3) the interim water supply meets all the criteria for an adequate water supply except that it will not be available for 100 years (referred to herein as a “20-year water supply project exemption”). A.R.S. §§ 45-108.02 and 45-108.03.

In addition to those exemptions, a mandatory adequacy jurisdiction may adopt a provision allowing a developer to obtain an exemption from a mandatory adequacy requirement if water will be hauled to the subdivision by motor vehicle or train, the city, town or county determines there is no feasible alternative water supply for the subdivision and other conditions are met (referred to herein as “water hauling exemption”). A.R.S. §§ 9-463.01(K) and 11-806.01(G)(1). The water hauling exemption described in the statutes is administered by the city, town or county, and therefore does not require a rule change. The proposed rule changes do not reference the potential water hauling exemption.

SB1575 also contains a session law (“SB1575 Session Law”) requiring the Department to make certain amendments to its Assured and Adequate Water Supply Rules, A.A.C. R12-15-701, et seq. (“AAWS Rules”). Laws 2007, Ch. 240, § 10. The amendments required by the session law relate only to the water adequacy program outside AMAs, and not to the assured water supply program within AMAs. The primary purpose of this rulemaking is to make the amendments required by the session law. In addition, the Department is proposing to make several other amendments to its AAWS rules to conform the rules to certain statutory amendments in SB1575 and to change the date when municipal providers with a designation of adequate water supply must submit their annual reports. Those rule amendments also relate only to the water adequacy program outside AMAs. The amendments proposed in this rulemaking are described in the next two sections.

#### **Amendments Required by SB1575 Session Law**

The following is a description of the amendments required by the SB1575 session law and an explanation of how the Department is proposing to amend its AAWS Rules to comply with the session law requirements.

1. **Requirement:** In determining whether an adequate water supply exists in a mandatory adequacy jurisdiction outside an AMA, the Department shall include in the calculation of the projected 100-year depth-to-static water level under A.A.C. R12-15-716(B)(3) the estimated water demand of any projected use in the same groundwater basin that is not in a mandatory adequacy jurisdiction and that is not included in a submitted application for a water report or a designation of adequate water supply. Laws 2007, Ch. 240, § 10(A).

**Proposed amendment:** The Department is proposing to amend R12-15-716(B)(3) to add language as required by the session law.

2. **Requirement:** The Director shall amend the AAWS Rules to include criteria for making determinations pursuant to A.R.S. § 45-108.03 – the statute that allows a developer of subdivided land outside an AMA to apply to the Director for a 20-year water supply project exemption. Laws 2007, Ch. 240, § 10(B)(1).

**Proposed amendment:** The Department is proposing to amend R12-15-713 by adding two new subsections, subsections (L) and (M), containing procedures for applying for a 20-year water supply project exemption pursuant to A.R.S. § 45-108.03 and the criteria under which the Director will determine whether to grant such an application.

3. **Requirement:** The Director shall amend the AAWS Rules to include criteria for demonstrating a physically available 100-year supply of groundwater or stored water recovered outside the area of impact of the stored water in specific aquifer systems and groundwater basins and sub-basins outside AMAs. The criteria may include depth-to-static water level limits or limits based on other physical aquifer characteristics that affect the physical availability of water for a proposed use and shall be appropriate for the groundwater basin or sub-basin. Laws 2007, Ch. 240, § 10(B)(2).

**Proposed amendment:** Currently, R12-15-716 provides that, except for dry lot developments, the Director shall determine that groundwater or stored water to be recovered outside the area of impact of the storage will be phys-

ically available for a proposed use outside an AMA if: (1) the groundwater or stored water will be withdrawn from wells owned by the applicant or likely to be constructed by the applicant; and (2) the groundwater or stored water will be withdrawn from depths that do not exceed a maximum depth-to-static water level of 1,200 feet below land surface (“BLS”) over a period of 100 years. To comply with the session law requirement, the Department’s Hydrology Division conducted an analysis of relevant hydrologic data to determine whether the physical availability criteria in R12-15-716 is appropriate for all areas outside AMAs, or whether different criteria should be used for specific aquifer systems or groundwater basins or sub-basins. Following that analysis, the Hydrology Division issued a report entitled: “Hydrologic Data and Recommendations Related to the Review of 100-Year Physical Availability Depth Criteria for Demonstrating Adequate Water Supplies (Study in support of requirements of SB1575)” F. Corkhill, et al., November 25, 2008 (referred to herein as the “Hydrology Report”).

The Hydrology Report reviewed the depth-to-static water levels and aquifer conditions in areas outside AMAs and found that depth-to-static water levels currently approach or exceed the maximum 100-year depth-to-static water level of 1,200 feet BLS over large portions of the C and R aquifer systems in northern Arizona and in portions of the alluvial basin-fill aquifer systems of northwestern Arizona. The Hydrology Report also found that when the existing and approved groundwater demands in the areas are taken into account, the estimated groundwater in storage in the C and R aquifer systems is significant, while the estimated groundwater in storage in the basin-fill aquifer systems of northwestern Arizona is far less. Based on that information, the Hydrology Report made the following conclusions and recommendations:

- The current physical availability criteria imposing a maximum 100-year depth-to-static water level of 1,200 feet BLS for adequacy determinations is appropriate for most areas outside AMAs, and therefore that criteria should not be changed for most areas.
- For the C and R aquifers, the rules should be changed to allow groundwater below the 1,200 feet BLS limit to be considered physically available if the applicant can demonstrate through a hydrologic study that after 100 years of withdrawals, at least 50% of the groundwater estimated to have been in storage in the area of the proposed withdrawals at the time the rule amendments became effective will remain. Because the hydrologic data needed to make such a demonstration could require an applicant for an analysis of adequate water supply to drill several exploration and production wells long before the wells are needed to produce water for the development, it may be appropriate for an applicant for an analysis of adequate water supply in the C or R aquifer to obtain an analysis by submitting a regional hydrologic study that indicates groundwater is likely to be physically available for the development. The applicant would be required to submit a site-specific hydrologic study demonstrating that the groundwater reserved in the analysis is physically available in order to obtain a water report. This would allow the applicant to obtain water reports in phases, using exploration wells to demonstrate the physical availability of groundwater for the first phase, and then, beginning with the second phase, using the hydrologic information obtained from the wells used to serve the previously approved phase to demonstrate the physical availability of groundwater for the next phase. This type of an analysis is referred to as a “phased analysis.”
- No changes should be made to the existing physical availability criteria of 1,200 feet BLS for adequacy determinations in the basin-fill aquifers of northwestern Arizona. Although depth-to-static water levels approach or exceed 1,200 feet BLS in portions of those aquifers, retaining the 1,200 feet BLS limit is appropriate for those aquifers because the estimated groundwater in storage below 1,200 feet BLS has not been demonstrated to represent a reliable, long-term water supply that would be capable of sustaining the existing and approved developments in the area after 100 years of withdrawals.

Based on the information and recommendations contained in the Hydrology Report, the Department is proposing the following amendments to the AAWS Rules:

- (1) Amend R12-15-712 to allow developers in the C and R aquifers to obtain a phased analysis based on a regional hydrologic study, with a requirement that site-specific hydrologic information must be submitted to obtain a water report for each phase of the development.
- (2) Amend R12-15-716 to provide that in the C and R aquifers, the Director shall consider groundwater and stored water recovered outside the area of impact to be physically available if the applicant submits a hydrologic study demonstrating either that the depth-to-static water level will not exceed 1,200 feet BLS over a 100-year period or that after 100 years of withdrawals, at least 50% of the estimated groundwater in storage within the area at the time the rule amendments become effective will remain.
- (3) Amend R12-15-701 to add definitions of the following terms used in the amendments described above: “C Aquifer,” “R Aquifer,” “groundwater in storage” and “phased analysis.” The term “groundwater in storage” is defined as the volume of groundwater in a particular location within an aquifer as of the effective date of the rule amendments. The definition provides that the volume of groundwater in storage may be estimated by an evaluation “of the aquifer’s saturated thickness that accounts for potential vertical variations in aquifer storage properties for various aquifer units or sub-units.” It is important to note that groundwater in storage must be estimated as of the effective date of the rule amendments. If little or no groundwater use has occurred within the area of the proposed groundwater withdrawals between the date the rule amendments become effective and the date the

application for an adequacy determination is filed, the applicant may assume that the estimated volume of groundwater in storage as of the effective date of the rule amendments is the same as the estimated volume of groundwater in storage at the time the application is filed. Otherwise, when determining the estimated volume of groundwater in storage, the applicant must take into account the estimated groundwater withdrawals that have occurred within the area of the proposed groundwater withdrawals between the date the rule amendments become effective and the date of the application.

After reviewing the rule containing criteria for demonstrating physical availability of groundwater and stored water to be recovered outside the area of impact, the Department determined that one additional amendment to the rule is appropriate. Currently, R12-15-716(C) requires the Director to lower the maximum 100-year depth-to-static water level requirement for an applicant for an adequacy determination if the applicant demonstrates that groundwater is available at the lower depth and the applicant has the financial capability to obtain the groundwater at the lower depth. The Department believes this rule should be changed to give the Director discretion to determine whether to lower the maximum 100-year depth-to-static water level requirement if requested by an applicant. In certain situations, it may not be appropriate to lower the requirement even though there is groundwater at the lower depth and the applicant has the financial capability to obtain the groundwater. The Director should consider impacts on other uses in the area and any other site-specific hydrologic or geologic conditions that may be appropriate.

Therefore, the Department is proposing to amend R12-15-716(C) to provide that the Director *may* lower the maximum depth-to-static water level, and to list the factors the Director must consider when determining whether to do so. Additionally, the Department is clarifying the requirement that the applicant must have the financial capability to obtain the groundwater. The Department has historically required applicants to demonstrate financial capability by demonstrating that the applicant has drilled the necessary wells. Therefore, the Department is proposing to amend R12-716(C) to list as a factor for the Director's consideration whether the applicant has drilled wells to the lower depth.

#### **Other Amendments**

In addition to the amendments required by the SB1575 session law described above, the Department is proposing several other amendments to the AAWS Rules for the purpose of making conforming changes to the Rules in response to statutory amendments in SB1575 and to change the date when municipal providers with a designation of adequate water supply must submit their annual reports. Those amendments, which relate only to the water adequacy program outside AMAs, are described below.

1. **Public notice requirements.** SB1575 added § 45-108.01 to Arizona Revised Statutes Title 45, Chapter 1. This statute provides that upon receipt of an application for a water report or an application for a designation of adequate water supply for a proposed use within a mandatory adequacy jurisdiction, the Department must publish notice of the application once a week for two consecutive weeks in a newspaper of general circulation within the groundwater basin in which the proposed use is located. The statute specifies who may file an objection to the application, the deadline for filing an objection and the grounds for which an objection may be filed. The Department is proposing to amend R12-15-713 ("Water Report") and R12-15-714 ("Designation of Adequate Water Supply") to add a new subsection (D) to each rule providing that if the subdivision or water provider is located within a mandatory adequacy jurisdiction, the Director shall give public notice of the application as provided in A.R.S. § 45-108.01.
2. **Exemption based on substantial capital investment.** SB1575 added § 45-108.02 to Arizona Revised Statutes Title 45, Chapter 1. This statute allows a developer in a mandatory adequacy jurisdiction to apply to the Director for an exemption from a mandatory adequacy requirement if the developer made a substantial capital investment toward construction of the subdivision before the date the mandatory adequacy requirement became effective. The statute sets forth the criteria under which an application may be granted and the expiration date of an exemption. The Department is proposing to amend R12-15-713 to add a new subsection (N) setting forth the procedure a developer must follow to apply for an exemption under the statute and the process the Director will follow after receiving an application for an exemption. The Department is also proposing to add a new subsection (O) to the rule setting forth the procedure for applying for an extension of an exemption granted under the statute and the process the Director will follow after receiving an application for an extension.
3. **Date for filing annual reports by providers with a designation of adequate water supply.** R12-15-715(A) currently provides that a municipal provider with a designation of adequate water supply must annually submit certain information to the Department by March 31 of each year. The Department is proposing to change the date when the information must be submitted to the Department to June 1 of each year to allow a designated provider to submit the information with the community water system annual report that is required by A.R.S. § 45-343. The community water system annual report is due by June 1 of each year. A.A.C. R12-15-1017.

**Stakeholders' Process**

As part of the Department's process to explain the rulemaking process and the legislative mandate behind the Department's proposed adequacy rules, as well as to seek input from public officials, stakeholders and the public about the proposed adequacy rules, the Department held more than 20 adequacy rule workshops at various locations throughout the state, including regular meetings in Flagstaff, Parker and Tucson.

**Effective Date of Rules**

The Department proposes that the amendments to the Department's AAWS Rules contained in this Notice of Proposed Rulemaking become effective immediately upon filing with the office of the Secretary of State, after approval by the Governor's Regulatory Review Council, pursuant to A.R.S. § 41-1032(A)(1) because the amendments will preserve the public peace, health or safety. Requiring new subdivisions to have a 100-year adequate water supply before plat approval and lot sales protects new homebuyers by ensuring that they have a long-term water supply. It also protects existing homeowners by preventing an over-allocation of groundwater supplies relied on by those homeowners. To date, two counties and two municipalities have adopted mandatory adequacy ordinances pursuant to the authority granted by SB1575. In order to provide certainty to both the platting entities and the developers within these mandatory adequacy jurisdictions as to the requirement to obtain an adequate water supply determination, the Department believes an immediate effective date is warranted. Additionally, the Department believes that more counties and municipalities will adopt a mandatory adequacy ordinance after the amendments in this rulemaking become effective. For that reason, the Department believes that an immediate effective date for the amendments will preserve the public health and safety.

**Rule by Rule Summary**

**R12-15-701. Definitions – Assured and Adequate Water Supply Programs**

Five new definitions are being added. The term "mandatory adequacy jurisdiction," is used throughout the amended rules and is defined as a municipality or county that has adopted a mandatory adequacy provision or ordinance, or a municipality located within a county that has adopted such a provision or ordinance and that has received notice of the provision or ordinance from the Director. Definitions of "C Aquifer" and "R Aquifer" are added to describe those aquifer systems in northern Arizona. A definition of "groundwater in storage" is added because that term is used in the new criteria for demonstrating physical availability of groundwater in the C and R aquifers. The term is defined as the volume of groundwater in a particular location within an aquifer as of the effective date of the rule amendments. A definition of "phased analysis" is added to describe an analysis of adequate water supply issued for groundwater in the C Aquifer or R Aquifer based on a regional hydrologic study indicating that groundwater is likely to be physically available.

**R12-15-712. Analysis of Adequate Water Supply**

A new subsection (F) is being added to R12-15-712 to allow a developer of land in the C or R aquifer to obtain a new type of analysis of water supply – a phased analysis. This subsection provides that the Director shall issue a phased analysis for a development proposing to use groundwater from the C or R aquifer if the developer submits a regional hydrologic study demonstrating that groundwater is likely to be physically available to meet all or a portion of the estimated water demand of the development for 100 years according to the physical availability criteria in R12-15-716. The subsection further provides that if the Director issues a phased analysis for a development, groundwater reserved in the analysis based on the regional model may not be included in a water report unless the analysis holder submits a site-specific hydrologic study demonstrating that the groundwater is physically available. Conforming amendments are being made to other subsections in the rule.

**R12-15-713. Water Report**

Five subsections are being added. The first, subsection (D), provides that if a subdivision is located within a mandatory adequacy jurisdiction, the Director will give public notice of the application, according to the procedures for public notice described in A.R.S. § 45-108.01. New subsections (L) and (M) set forth the procedures for applying for an exemption from a mandatory adequacy requirement under A.R.S. § 45-108.03 (the 20-year water supply project exemption), and the criteria under which the Director will determine whether to grant an exemption. Subsection (N) sets forth the procedures for applying for an exemption from a mandatory adequacy requirement under A.R.S. § 45-108.02 (the substantial capital investment exemption), and the criteria under which the Director will determine whether to grant an exemption. New subsection (O) sets forth application procedures, as well as criteria, for an extension of a substantial capital investment exemption.

The procedures are similar for all four types of applications. The applicant for an exemption or an extension must submit an application on a form prescribed by the Director and demonstrate that the applicable criteria are met. The Department will review each application pursuant to the licensing time-frame rule. If the Director determines that the criteria are met, the Director will issue a letter to the applicant, as well as to the platting authority and the Arizona Department of Real Estate, stating that the owner is exempt from the requirement to obtain a water report determining that the subdivision has an adequate water supply or a commitment of water service from a designated provider.

The criteria that must be met for each type of application mirrors the criteria in the applicable statute authorizing the exemption. Subsection (L) provides that for a 20-year water supply project exemption based on the availability of a Colorado river water supply within 20 years, the applicant must demonstrate that: (1) the development will be served by a municipal provider that currently has an entitlement to Colorado river water, but the provider does not currently have the legal right to serve the water to the subdivision; (2) the provider will have the legal right to serve the Colorado river water to the development within 20 years; (3) an interim water supply meeting all the criteria for an adequate water supply under the Department's rules will be used to serve the development until the provider has the legal right to serve the Colorado river water to the development; and (4) when the provider has the legal right to serve the Colorado river water to the development, the water supply will meet all the criteria for an adequate water supply for the remainder of the 100-year period. These are the same criteria set forth in A.R.S. § 45-108.03(A).

Subsection (M) provides that for a 20-year water supply project exemption based on the completion of construction of the necessary physical works within 20 years, the applicant must demonstrate that: (1) the physical works for delivering water through the water supply project to the development are under construction and will be completed within 20 years; (2) an interim water supply meeting all the criteria for an adequate water supply under the Department's rules will be used to serve the development until the physical works are fully constructed; and (3) when the physical works are fully constructed, the water supply for the development will meet all the criteria for an adequate water supply. These are the same criteria set forth in A.R.S. § 45-108.03(A).

Subsection (N) provides that for a substantial capital investment exemption, the applicant must demonstrate the criteria for an exemption set forth in A.R.S. § 45-108.02. Those criteria are as follows: (1) the developer made substantial capital investment toward construction of the proposed development before the date the mandatory adequacy requirement first became effective (substantial capital investment does not include the original cost of acquiring the property); (2) the developer was not aware of the proposed mandatory adequacy requirement at the time the investment was made; and (3) the proposed subdivision complied in all other respects with existing state laws on the date the mandatory adequacy requirement became effective. A.R.S. § 45-108.02(A)

Subsection (O) provides that an applicant for an extension of an exemption based on substantial capital investment must demonstrate the criteria for an extension set forth in A.R.S. § 45-108.02. That statute provides that an exemption based on substantial capital investment expires five years after it is granted unless before that date at least one parcel in the development is sold to a bona fide purchaser or the Director grants an application to extend the exemption. The Director may extend the period of an exemption for no more than two successive five-year periods if the developer demonstrates that it has made material progress in developing the development, but that sales of parcels have been delayed for reasons outside the control of the developer. A.R.S. § 45-108.02(B).

**R12-15-714. Designation of Adequate Water Supply**

One new subsection, subsection (D), is being added. This subsection provides that if a designated provider's service area is located within a mandatory adequacy jurisdiction, the Director will give public notice of the application according to the procedures for public notice described in A.R.S. § 45-108.01.

**R12-15-715. Designation of Adequate Water Supply: Annual Report Requirements, Review, Modification, Revocation**

R12-15-715(A) is being amended to change the date when a municipal provider with a designation of adequate water supply must submit its annual report to the Department. The rule currently provides that the report is due on March 31 of each year. The date is being changed to June 1 of each year to allow designated providers to submit the report with their community water system annual report, which is due on June 1 of each year. A.A.C. R12-15-1017.

**R12-15-716. Physical Availability**

R12-15-716 is being amended in three respects. First, R12-15-716(B) is being amended to add new subsection R12-15-716(B)(3)(d). This subsection incorporates the requirements of the SB1575 session law that when determining whether an adequate water supply exists in a mandatory adequacy jurisdiction outside an AMA, the Director must include in the calculation of the projected 100-year depth-to-static water level under A.A.C. R12-15-716(B)(3) the estimated water demand of any projected use in the same groundwater basin to which both of the following apply: (1) the use is not in a mandatory adequacy jurisdiction; and (2) the use is not included in a submitted application for a water report or a designation of adequate water supply.

Second, R12-15-716(C) is being amended to give the Director discretion to determine whether to grant a request by an applicant for an adequate water supply to lower the depth-to-static water requirement below 1,200 feet BLS for a proposed use outside an AMA. Currently, this subsection requires the Director to lower the depth-to-static water level requirement if the applicant demonstrates that groundwater is available at the lower depth and that the applicant has the financial capability to obtain the groundwater at the lower depth. Under the amendment, the Director *may* lower the depth-to-static water level requirement after considering: (1) whether groundwater is available at the lower depth; (2) whether the applicant has drilled wells to obtain the groundwater at the lower depth; (3) whether the decline in the depth-to-static water level that will result from the applicant's use will adversely impact other uses in the area; and (4) any other site-specific hydrologic or geologic factors that may be appropriate.

Third, a new subsection (E) is being added to R12-15-716 to provide the criteria for demonstrating physical availability of groundwater or stored water to be recovered outside the area of impact of the storage in the C and R aquifer systems in Northern Arizona. This subsection requires an applicant for a water adequacy determination in the C or R aquifer to meet with the Department before filing an application to discuss the hydrologic study required by the subsection. The subsection further provides that the Director shall determine that the proposed volume of groundwater included in the application will be physically available for the proposed use if all of the following apply:

1. The groundwater will be withdrawn either from wells owned by the applicant or the proposed municipal provider that are located within the service area of the applicant or the proposed municipal provider, or from wells that are likely to be constructed for future uses of the applicant or the proposed municipal provider.
2. The applicant has submitted a site specific hydrologic study, using a method of analysis approved by the Director, that accurately takes into account the hydrology of the area and that incorporates the following demands that rely on the same water supply: (1) the demand of existing uses; (2) the estimated demand of issued certificates and water reports; (3) the estimated demand of designations; (4) the demand of developments for which the Department has issued an analysis of assured or adequate water supply; (4) if the proposed groundwater withdrawals will occur in a mandatory adequacy jurisdiction, the demand of anticipated future uses that will be located in a non-mandatory adequacy jurisdiction; and (5) the demand of the applicant's proposed use.
3. If the subdivision is a dry lot development, the applicant has demonstrated that after 100 years of withdrawing groundwater to meet all the demands listed in paragraph 2 above, the projected depth-to-static water level will not exceed 400 feet BLS.
4. If the subdivision is not a dry lot subdivision, the applicant has demonstrated either: (1) that after 100 years of withdrawing groundwater to meet all the demands listed in paragraph 2 above, the projected depth-to-static water level will not exceed 1,200 feet BLS; or (2) that after 100 years of withdrawing groundwater to meet all the demands listed in paragraph 2 above, at least 50% of the estimated groundwater in storage in the area of the proposed withdrawals will remain.

**6. A reference to any study relevant to the rule that the agency reviewed and either proposes to rely on or not to rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:**

The Department reviewed and proposes to rely on a report issued by the Department's Hydrology Division entitled, "Hydrologic Data and Recommendations Related to the Review of 100-Year Physical Availability Depth Criteria for Demonstrating Adequate Water Supplies (Study in support of the requirements of SB1575)," F. Corkhill, et al., November 25, 2008. The public may obtain a copy of the report by contacting:

Name: Frank Corkhill  
Address: Department of Water Resources  
3500 N. Central Ave.  
Phoenix, AZ 85012  
Telephone: (602) 771-8535  
Fax: (602) 771-8680  
E-mail: [efcorkhill@azwater.gov](mailto:efcorkhill@azwater.gov)

**7. A showing of good cause why the rule is necessary to promote a statewide interest if the rule will diminish a previous grant of authority of a political subdivision of this:**

Not applicable

**8. The preliminary summary of the economic, small business, and economic impact:**

**A. An Identification of the Proposed Rulemaking**

Senate Bill 1575 ("SB1575") was enacted by the Arizona State Legislature in 2007 and was codified into law the same year (Chapter 240). SB1575 amends Arizona's adequate water supply statute, A.R.S. § 45-108, and provides clear authority to counties, cities and towns located outside active management areas ("AMAs") to adopt an ordinance requiring developers of new subdivisions located within their jurisdictions to prove an adequate water supply prior to approval of the proposed subdivisions. Furthermore, if a county adopts such an ordinance, all cities and towns within the county must require developers of new subdivisions to prove an adequate water supply. Cities, towns and counties that adopt the requirement, and cities and towns within a county that adopts the requirement, are referred to herein and within the proposed rules as "mandatory adequacy jurisdictions."

SB1575 directs the Arizona Department of Water Resources (Department) to modify its rules related to the water adequacy program (A.A.C. R12-15-701 et seq.; referred to herein as "AWS rules") in three ways. First, the Department must include certain specified uses in the calculation of the projected 100-year depth-to-static water level in a mandatory adequacy jurisdiction. Second, the Department must identify the criteria for making demonstrations pursuant to

A.R.S. § 45-108.03, concerning exemptions from adequate water supply requirements for a city, town or county based on an adequate water supply within 20 years. Third, the Department must develop criteria for demonstrating a physically available 100-year supply of groundwater or stored water to be recovered outside the area of impact, as defined in A.R.S. § 45-802.01, in specific aquifer systems and groundwater basins and sub-basins outside AMAs. The criteria may include depth-to-static water level limits or limits based on other physical aquifer characteristics that affect the physical availability of water for a proposed use and shall be appropriate for the groundwater basin or sub-basin.

The Department has included other changes to the AWS rules in this rulemaking. Those changes are conforming changes that have no economic effect.

The current criteria for demonstrating a physically available 100-year supply of groundwater or stored water to be withdrawn outside the area of impact requires an applicant to demonstrate that after 100 years of pumping in the area, the depth-to-static water level will not exceed 1,200 feet below land surface. The Department proposes no changes to this requirement. However, the Department proposes to modify the physical availability criteria for the C and R aquifers of northern Arizona as a result of their unique physical characteristics by allowing a second option to demonstrate physical availability through a demonstration that 50% of estimated groundwater remains in storage after 100 years of pumping. It is this proposed rule change that has the greatest economic impact for those affected by a jurisdiction's decision to require mandatory water adequacy.

Because of the great depths to groundwater in many parts of the C and R aquifers (2,000 to 3,000 feet below land surface) and the expense involved with drilling and operating a well at these depths, the Department is also proposing to modify the rule regarding analyses of adequate water supply to allow generally for a phased approach. In this way, the developer or water provider can conduct the long-term aquifer test as part of start-up operations for an initial phase of the development, where the costs can be assumed under operational expenses and water can be beneficially used. The results of the long-term aquifer test will help determine the final volumes of water available to the development over the 100-year period.

**B. Persons Who Will Be Directly Affected By, Bear the Costs of or Directly Benefit from the Proposed Rulemaking**

Persons who will be directly affected by, bear the costs of, or directly benefit from the proposed rule modifications include investors and businesses, large and small, that develop or seek to develop subdivisions or provide municipal water services; and agencies, businesses, and private individuals (home buyers, real estate investors, land owners, well owners, and building materials suppliers).

Persons directly benefiting from the proposed rulemaking

Persons directly benefiting from the proposed rule modifications include:

- Persons who develop and build new subdivisions based on groundwater in the C or R aquifer will benefit from the option to use the new criteria (50% of groundwater in storage remaining after 100 years).

Persons directly bearing the costs of the proposed rulemaking

Persons directly bearing the costs of the proposed rule modifications include:

- Persons who develop and build new subdivisions based on groundwater in the C or R aquifer may face additional costs if they choose to use the new criteria to demonstrate physical availability. The costs will probably be passed on to lot buyers, which would result in slightly higher housing costs within those subdivisions.

**C. Cost – Benefit Analysis**

Costs associated with this rule package are for demonstrating physical availability of groundwater in the C and R aquifers of northern Arizona if the applicant chooses to use the new criteria. These costs result from the requirement to submit a hydrologic study and/or groundwater model to demonstrate that 50% of the groundwater in storage will remain after 100 years. The Department estimates that hiring a consultant to perform these studies would cost between \$20,000 and \$50,000. The Department believes this to be approximately the same as the cost for hiring a consultant to perform a hydrologic study under the existing criteria.

The Department does not include the costs to drill a well in its cost estimates, as the well would need to be drilled, regardless of the criteria in the AWS rules. However, a well driller experienced at drilling wells to the depth required in the C and R aquifers (2,000-3,000 feet below land surface) will typically include geophysical well logging and video logs of the drilled well as part of the fee for drilling the well. In some locations, geophysical well logging and video logs may be the only tools available to obtain the necessary data. Geophysical well logging costs are estimated at \$4,000 to \$6,000 and video logs of a drilled well are estimated to range from \$2,000 to \$3,000. Geophysical well logging and video logs are important for two reasons. First, the geophysical well logging helps to define the material that comprises the aquifer at the well site. By conducting the geophysical logging, the different units of the aquifer can be better described, including any low-yielding units, such as clay zones. The video logs also help to define how a well that does not have a well log is constructed. It can help locate the perforated interval in the well, the overall

condition of the well, and other well construction details. Both of these tools can help better describe the local aquifer conditions and details of the well in question.

**C.1. The probable costs and benefits to agencies**

Because the Department already charges an application fee for adequate water supply determinations, there are no substantial costs to the Department from conducting this work. If more staff resources are required to process applications and make determinations of physical availability, the Department can recover much of its expenses through fees. The rulemaking will impact other agencies that own land in the C or R aquifer, including the State Land Department, and that choose to demonstrate physical availability of groundwater for a development using the new criteria. The additional costs would be the minor increase in the cost of hydrologic studies as described above. These agencies will benefit from the new optional criteria because in some cases, it will be possible to demonstrate that groundwater is physically available for 100 years under the new criteria when it would not be possible to make such a demonstration under the existing criteria.

**C.2. The probable costs and benefits to political subdivisions**

There may be additional costs to cities, towns, domestic water improvement districts and community facilities districts in the C and R aquifers that apply for a designation of adequate water supply and choose to demonstrate physical availability of groundwater using the new optional criteria. The additional costs would be the minor increase in the cost of hydrologic studies as described above. These political subdivisions will benefit from the new optional criteria because in some cases, it will be possible to demonstrate that groundwater is physically available for 100 years under the new criteria when it would not be possible to make such a demonstration under the existing criteria.

**C.3. The probable costs and benefits to businesses, including small businesses**

The businesses that will be directly affected by, bear the costs of, or directly benefit from the adequate water supply rule modifications are real estate investors, businesses (large and small) that develop subdivisions, private water companies, the construction industry, businesses that support the construction industry, and private citizens (home buyers, real estate investors, land owners, and existing well owners).

Costs may increase for developers relying on groundwater from the C and R aquifers, should those developers choose to use the new criteria to demonstrate physical availability. However, the new criteria are optional and a developer may choose to demonstrate physical availability under the existing criteria. Additionally, developers may choose to utilize the phased analysis of adequate water supply. The phased analysis approach, as discussed above, allows developers to provide additional information to the Department as that information is obtained during the typical stages of development. This allows the developer to delay the costs until such time as the costs would normally be incurred, rather than requiring the developer to drill all wells and provide data at the beginning of the process.

The new optional criteria provide a benefit to developers because a developer may be able to demonstrate that groundwater is physically available for 100 years using the new criteria when they cannot make such a demonstration under the existing criteria.

**D. The probable impact on private and public employment in business, agencies, and political subdivisions**

Because the proposed modifications impact only applicants within the C and R aquifers and the impacts are not significant (definition of the C and R aquifers, the remaining saturated thickness in the C and R aquifers, and phased analysis of adequate water supply in the C and R aquifers), the Department does not anticipate significant impacts to private and public employment. Within the C and R aquifers, the new optional criteria for demonstrating physical availability of groundwater may result in applicants hiring more consultants to conduct the necessary hydrologic studies.

**E. The probable impact on small business**

As discussed above, the proposed rulemaking will directly add costs for small businesses that are involved with land or real estate developments using the new criteria to demonstrate physical availability of groundwater in the C and R aquifers. However, such costs will likely be minimal. The phased analysis option may also reduce costs for demonstrating physical availability in the C and R aquifers and allow small businesses to defer some costs until later stages of the development process.

**Direct costs and benefits to households (private persons and consumers)**

If real estate developers pass through the costs associated with hydrologic studies demonstrating physical availability of groundwater in the C and R aquifers, homebuyers in new subdivisions may pay increased lot costs. However, since the majority of the costs associated with providing water service are associated with the infrastructure requirements and not with demonstrating an adequate water supply, the potential cost increase to consumers from water providers is negligible.

**F. The probable effect on state revenues**

The Department estimates no effect on state revenues from this proposed rulemaking.

**G. Less intrusive or less costly alternative methods of achieving the proposed rulemaking**

Notices of Proposed Rulemaking

Beginning in February 2008, the Department initiated a series of stakeholder meetings to present draft rule concepts and language as mandated by SB1575. A total of 23 informal public meetings were held presenting the draft rules and seeking public comment. Included in the stakeholder meetings were three that were technical in nature and attended primarily by hydrologic professionals representing municipal water system operators, hydrologic consultants, and representatives of the United States Geological Survey (USGS). The focus of the technical meetings was to review the current knowledge of hydrologic conditions within the state and formulate recommendations on standards for determining physical availability of groundwater. While the remainder of the public stakeholder meetings included hydrologic discussions, they focused primarily on the administrative and legal aspects of the proposed rule package. The Department received multiple comments from various parties involved in the stakeholder process.

Many of the comments focused on increased costs as part of the technical hydrologic review of the conditions of the C and R aquifers associated with the proposed rules. Based on these comments, the Department revised its previous informal rulemaking proposal to reduce the potential cost impact, while maintaining the integrity of the physical availability requirements. Additionally, the new hydrologic standard proposed for the C and R aquifers is optional and applicants may continue to use the current standard, even after the rule modification. The Department anticipates the new standard would be easier to meet, and thus less costly than the current standard in most areas of the C and R aquifers.

Also in response to informal stakeholder comments on the increased cost for developers, the Department modified its proposed rule provisions to reduce costs by increasing flexibility, such as allowing applicants in the C and R aquifers to provide site-specific data using a phased approach, resulting in the phased analysis of adequate water supply.

**9. The name and address of the agency personnel with whom persons may communicate regarding the accuracy of the economic, small business, and consumer impact statement:**

Primary:

Name: Doug Dunham, Deputy Assistant Director  
Address: Department of Water Resources  
3550 N. Central Ave.  
Phoenix, AZ 85012  
Telephone: (602) 771-8590  
Fax: (602) 771-8689  
E-mail: [dwdunham@azwater.gov](mailto:dwdunham@azwater.gov)

Secondary:

Name: Mohammed Al-Sabbry, Water Resource Specialist  
Address: Department of Water Resources  
3550 N. Central Ave.  
Phoenix, AZ 85012  
Telephone: (602) 771-8592  
Fax: (602) 771-8689  
E-mail: [mmalsabbry@azwater.gov](mailto:mmalsabbry@azwater.gov)

**10. The time, place, and nature of the proceedings for the making, amendment, or receipt of the rule, or if no proceeding is scheduled, where, when, and how persons may request a oral proceeding on the proposed rule:**

The Department will accept public comment on the proposed rules at the following date and place:

Date: January 21, 2009  
Time: 1:00 p.m.  
Place: Department of Water Resources  
3500 N. Central Ave.  
Second Floor, Verde River Conference Rooms  
Phoenix, AZ 85012

Written comments will be accepted until January 21, 2009 at 5:00 p.m. Written comments should be addressed to:

Name: Kathleen Donoghue, Docket Supervisor  
Address: Department of Water Resources  
3550 N. Central Ave.  
Phoenix, AZ 85012

Telephone: (602) 771-8472  
Fax: (602) 771-8683  
E-mail: katonoghue@azwater.gov

**11. Any other matters prescribed by statute that are applicable to the specific agency or to any specific rule or class of rules:**

None

**12. Incorporations by reference and their location in the rules:**

None

**13. The full text of the rules follows:**

**TITLE 12. NATURAL RESOURCES**

**CHAPTER 15. DEPARTMENT OF WATER RESOURCES**

**ARTICLE 7. ASSURED AND ADEQUATE WATER SUPPLY**

Section

- R12-15-701. Definitions – Assured and Adequate Water Supply Programs
- R12-15-712. Analysis of Adequate Water Supply
- R12-15-713. Water Report
- R12-15-714. Designation of Adequate Water Supply
- R12-15-715. Designation of Adequate Water Supply; Annual Report Requirements, Review, Modification, Revocation
- R12-15-716. Physical Availability

**ARTICLE 7. ASSURED AND ADEQUATE WATER SUPPLY**

**R12-15-701. Definitions – Assured and Adequate Water Supply Programs**

In addition to any other definitions in A.R.S. Title 45 and the management plans in effect at the time of application, the following words and phrases in this Article shall have the following meanings, unless the context otherwise requires:

1. “Abandoned plat” means a plat for which a certificate or water report has been issued and that will not be developed because of one of the following:
  - a. The land has been developed for another use; or
  - b. Legal restrictions will preclude approval of the plat.
2. “ADEQ” means the Arizona Department of Environmental Quality.
3. “Adequate delivery, storage, and treatment works” means:
  - a. A water delivery system with sufficient capacity to deliver enough water to meet the needs of the proposed use;
  - b. Any necessary storage facilities with sufficient capacity to store enough water to meet the needs of the proposed use; and
  - c. Any necessary treatment facilities with sufficient capacity to treat enough water to meet the needs of the proposed use.
4. “Adequate storage facilities” means facilities that can store enough water to meet the needs of the proposed use.
5. “Affiliate” means a person who, directly or indirectly through one or more intermediaries, controls, is controlled by or is under common control with the person specified.
6. “AMA” means an active management area as defined in A.R.S. § 45-402.
7. “Analysis” means an analysis of assured water supply or an analysis of adequate water supply.
8. “Analysis holder” means a person to whom an analysis of assured water supply or an analysis of adequate water supply is issued and any current owner of land included in the analysis.
9. “Analysis of adequate water supply” means a determination issued by the Director stating that one or more criteria required for a water report pursuant to R12-15-713 have been demonstrated for a development.
10. “Analysis of assured water supply” means a determination issued by the Director stating that one or more criteria required for a certificate of assured water supply pursuant to R12-15-704 have been demonstrated for a development.
11. “Annual authorized volume” means, for an approved remedial action project, the annual authorized volume specified in a consent decree or other document approved by ADEQ or the EPA, except that:
  - a. If no annual authorized amount is specified in a consent decree or other document approved by ADEQ or the EPA, the annual authorized volume is the largest volume of groundwater withdrawn pursuant to the approved remedial action project in any year prior to January 1, 1999.
  - b. If the Director increases the annual authorized volume pursuant to R12-15-729(C), the annual authorized volume

- is the amount approved by the Director.
12. "Annual estimated water demand" means the estimated water demand divided by 100.
13. "Approved remedial action project" means a remedial action project approved by ADEQ under A.R.S. Title 49, or by the EPA under CERCLA.
14. "Authorized remedial groundwater use" means, for any year, the amount of remedial groundwater withdrawn pursuant to an approved remedial action project and used by a municipal provider during the year, not to exceed the annual authorized volume of the project.
15. "Build-out" means a condition in which all water delivery mains are in place and active water service connections exist for all lots.
16. "C aquifer" means a multiple aquifer system that is a part of the regional aquifer system of Northern Arizona and that is comprised of the sequence of rock units between the Kaibab Formation and the Supai Group, inclusive.
- ~~16-17.~~ "CAP water" means:
- All water from the Colorado River or from the Central Arizona Project works authorized in P.L. 90-537, excluding enlarged Roosevelt reservoir, which is made available pursuant to a subcontract with a multi-county water conservation district.
  - Any additional water not included in subsection 16(a) of this Section that is delivered by the United States Secretary of the Interior pursuant to an Indian water rights settlement through the Central Arizona Project.
- ~~17-18.~~ "Central Arizona Groundwater Replenishment District" or "CAGR D" means a multi-county water conservation district acting in its capacity as the entity established pursuant to A.R.S. § 48-3771, et seq., and responsible for replenishing excess groundwater.
- ~~18-19.~~ "Central distribution system" means a water system that qualifies as a public water system pursuant to A.R.S. § 49-352.
- ~~19-20.~~ "CERCLA" or "Comprehensive Environmental Response, Compensation, and Liability Act of 1980" has the same meaning as prescribed in A.R.S. § 49-201.
- ~~20-21.~~ "Certificate" means a certificate of assured water supply issued by the Director for a subdivision pursuant to A.R.S. § 45-576 et seq. and this Article.
- ~~21-22.~~ "Certificate holder" means any person included on a certificate, except the following:
- Any person who no longer owns any portion of the property included in the certificate, and
  - Any potential purchaser for whom the purchase contract has been terminated or has expired.
- ~~22-23.~~ "Certificate of convenience and necessity" means a certificate required by the Arizona Corporation Commission, pursuant to A.R.S. § 40-281, which allows a private water company to serve water to customers within its certificated area.
- ~~23-24.~~ "Colorado River water" means water from the main stream of the Colorado River. For purposes of this Article, Colorado River water does not include CAP water.
- ~~24-25.~~ "Committed demand" means the 100-year water demand at build-out of all recorded lots that are not yet served water within the service area of a designation applicant or a designated provider.
- ~~25-26.~~ "County water augmentation authority" means an authority formed pursuant to A.R.S. Title 45, Chapter 11.
- ~~26-27.~~ "Current demand" means the 100-year water demand for existing uses within the service area of a designation applicant or designated provider, based on the annual report for the previous calendar year.
- ~~27-28.~~ "Depth-to-static water level" means the level at which water stands in a well when no water is withdrawn by pumping or by free flow.
- ~~28-29.~~ "Designated provider" means:
- A municipal provider that has obtained a designation of assured or adequate water supply; or
  - A city or town that has obtained a designation of adequate water supply pursuant to A.R.S. § 45-108(D).
- ~~29-30.~~ "Designation" means a decision and order issued by the director designating a municipal provider as having an assured water supply or an adequate water supply.
- ~~30-31.~~ "Determination of adequate water supply" means a water report, a designation of adequate water supply, or an analysis of adequate water supply.
- ~~31-32.~~ "Determination of assured water supply" means a certificate, a designation of assured water supply, or an analysis of assured water supply.
- ~~32-33.~~ "Development" means either a subdivision or an unplatted development plan.
- ~~33-34.~~ "Diversion works" means a structure or well that allows or enhances diversion of surface water from its natural course for other uses.
- ~~34-35.~~ "Drought response plan" means a plan describing a variety of conservation and augmentation measures, especially the use of backup water supplies, that a municipal provider will utilize in operating its water supply system in times of a water supply shortage. The plan may include the following:
- An identification of priority water uses consistent with applicable public policies.
  - A description of sources of emergency water supplies.
  - An analysis of the potential use of water pressure reduction.

- d. Plans for public education and voluntary water use reduction.
  - e. Plans for water use bans, restrictions, and rationing.
  - f. Plans for water pricing and penalties for excess water use.
  - g. Plans for coordination with other cities, towns, and private water companies.
- ~~35-36.~~ “Drought volume” means 80% of the volume of a surface water supply, determined by the director under R12-15-716 to be physically available on an annual basis to a certificate holder or a designated provider.
- ~~36-37.~~ “Dry lot development” means a development or subdivision without a central water distribution system.
- ~~37-38.~~ “EPA” means the United States Environmental Protection Agency.
- ~~38-39.~~ “Estimated water demand” means:
- a. For a certificate or water report, the Director’s determination of the 100-year water demand for all uses included in the subdivision;
  - b. For a designation, the sum of the following:
    - i. The Director’s determination of the current demand;
    - ii. The Director’s determination of the committed demand; and
    - iii. The Director’s determination of the projected demand during the term of the designation; or
  - c. For an analysis, the Director’s determination of the water demand for all uses included in the development.
- ~~39-40.~~ “Existing municipal provider” means a municipal provider that was in operation and serving water for non-irrigation use on or before January 1, 1990.
- ~~40-41.~~ “Extinguish” means to cause a grandfathered right to cease to exist through a process established by the director pursuant to R12-15-723.
- ~~41-42.~~ “Extinguishment credit” means a credit that is issued by the Director in exchange for the extinguishment of a grandfathered right and that may be used to make groundwater use consistent with the management goal of an AMA.
- ~~42-43.~~ “Firm yield” means the minimum annual diversion for the period of record which may include runoff releases from storage reservoirs, and surface water withdrawn from a well.
- ~~44.~~ “Groundwater in storage” means the volume of groundwater in a particular location within an aquifer as of the effective date of this Section. The volume of groundwater in storage may be estimated by an evaluation of the aquifer’s saturated thickness that accounts for potential vertical variations in aquifer storage properties for various aquifer units or sub-units.
- ~~43-45.~~ “Management plan” means a water management plan adopted by the director pursuant to A.R.S. § 45-561 et seq.
- ~~46.~~ “Mandatory adequacy jurisdiction” means:
- a. A municipality or county that has adopted a provision or ordinance pursuant to A.R.S. § 9-463.01 or A.R.S. § 11-806.01 providing that the final plat for a subdivision shall not be approved unless the Director has determined that the subdivision has an adequate water supply, the subdivision has obtained a commitment of water service from a designated provider, or a statutorily authorized exemption applies; or
  - b. A municipality that:
    - i. Is located within a county that has adopted a provision or ordinance described in subsection (46)(a) of this Section, and
    - ii. Has received written notice of the provision or ordinance from the Director.
- ~~44-47.~~ “Master-planned community” has the same meaning as provided in A.R.S. § 32-2101.
- ~~45-48.~~ “Median flow” means the flow which is represented by the middle value of a set of flow data that are ranked in order of magnitude.
- ~~46-49.~~ “Member land” has the same meaning as provided in A.R.S. § 48-3701.
- ~~47-50.~~ “Member service area” has the same meaning as provided in A.R.S. § 48-3701.
- ~~48-51.~~ “Multi-county water conservation district” means a district established pursuant to A.R.S. Title 48, Chapter 22.
- ~~49-52.~~ “Municipal provider” has the same meaning as provided in A.R.S. § 45-561.
- ~~50-53.~~ “New municipal provider” means a municipal provider that began serving water for non-irrigation use after January 1, 1990.
- ~~51-54.~~ “Owner” means:
- a. For an analysis, certificate, or water report applicant, a person who holds fee title to the land described in the application; or
  - b. For a designation applicant, the person who will be providing water service pursuant to the designation.
- ~~52-55.~~ “Perennial” means a stream that flows continuously.
- ~~53-56.~~ “Persons per household” means a measure obtained by dividing the number of persons residing in housing units by the number of housing units.
- ~~57.~~ “Phased analysis” means an analysis of adequate water supply for a development for which the source of supply is groundwater withdrawn from the C aquifer or the R aquifer, and for which the applicant has demonstrated, based on a regional hydrologic study, that sufficient supplies of groundwater are likely to be physically available to meet all or part of the estimated water demand of the development for 100 years.
- ~~54-58.~~ “Physical availability determination” means a letter issued by the Director stating that an applicant has demon-

strated all of the criteria in R12-15-702(C).

~~55-59.~~ "Plat" means a preliminary or final map of a subdivision in a format typically acceptable to a platting entity.

~~56-60.~~ "Potential purchaser" means a person who has entered into a purchase agreement for land that is the subject of an application for a certificate or an assignment of a certificate.

~~57-61.~~ "Projected demand" means the 100-year water demand at build-out, not including committed or current demand, of customers reasonably projected to be added and plats reasonably projected to be approved within the designated provider's service area and reasonably anticipated expansions of the designated provider's service area.

~~58-62.~~ "Proposed municipal provider" means a municipal provider that has agreed to serve a proposed subdivision.

~~59-63.~~ "Purchase agreement" means a contract to purchase or acquire an interest in real property, such as a contract for purchase and sale, an option agreement, a deed of trust, or a subdivision trust agreement.

~~64.~~ "R aquifer" means a multiple aquifer system that is a part of the regional aquifer system of Northern Arizona and that is comprised of the sequence of rock units between the Redwall Limestone and the Tapeats Sandstone, inclusive.

~~60-65.~~ "Remedial groundwater" means groundwater withdrawn pursuant to an approved remedial action project, but does not include groundwater withdrawn to provide an alternative water supply pursuant to A.R.S. § 49-282.03.

~~64-66.~~ "Service area" means:

- a. For an application for an analysis of adequate water supply, a water report, or a designation of adequate water supply, the area of land actually being served water for a non-irrigation use by the municipal provider and additions to the area that contain the municipal provider's operating distribution system for the delivery of water for a non-irrigation use;
- b. For an application for a designation of adequate water supply pursuant to A.R.S. § 45-108(D), the area of land actually being served water for a non-irrigation use by each municipal provider that serves water within the city or town, and additions to the area that contain each municipal provider's operating distribution system for the delivery of water for a non-irrigation use; or
- c. For an application for a certificate or designation of assured water supply, "service area" has the same meaning as prescribed in A.R.S. § 45-402.

~~62-67.~~ "Subdivision" has the same meaning as prescribed in A.R.S. § 32-2101.

~~63-68.~~ "Superfund site" means the site of a remedial action undertaken pursuant to CERCLA.

~~64-69.~~ "Surface water" means any surface water as defined in A.R.S. § 45-101, including CAP water and Colorado River water.

~~65-70.~~ "Water Quality Assurance Revolving Fund site" or "WQARF site" means a site of a remedial action undertaken pursuant to A.R.S. Title 49, Chapter 2, Article 5.

~~66-71.~~ "Water report" means a letter issued to the Arizona Department of Real Estate by the Director for a subdivision stating whether an adequate water supply exists pursuant to A.R.S. § 45-108 and this Article.

#### **R12-15-712. Analysis of Adequate Water Supply**

- A.** A person proposing to develop land outside an AMA that will not be served by a designated provider may apply for an analysis of adequate water supply before applying for a water report. An applicant for an analysis must be the owner of the land that is the subject of the application or have the written consent of the owner. The commissioner of the Arizona State Land Department may apply for an analysis for land owned by the state of Arizona outside an AMA or may consent to the inclusion of such land in an application.
- B.** An applicant for an analysis shall submit an application on a form prescribed by the Director with the fee required by R12-15-730, and attach the following:
  1. A title report, condition of title report, limited search title report, or recorded deed, dated within 90 days of the date the application is submitted to the Director, demonstrating the ownership of the land that is the subject of the application;
  2. A description of the development, including:
    - a. A map of the land uses included in the development,
    - b. A list of water supplies proposed to be used by the development,
    - c. A summary of land use types included in the development, and
    - d. An estimate of the water demand for the land uses included in the development; and
  3. Evidence that the applicant has complied with subsection (E) or subsection (F) of this Section.
- C.** An applicant shall sign the application for an analysis. If an applicant is not a natural person, the applicant's authorized officer, managing member, partner, trust officer, trustee, or other person who performs similar decision-making functions for the applicant shall sign the application. If the applicant submits a letter, signed by the applicant and dated within 90 days of the date the application is submitted, authorizing a representative to submit applications for permits regarding the land that is the subject of the water report, the authorized representative may sign the application on the applicant's behalf.
- D.** After a complete application is submitted, the Director shall determine the estimated water demand of the development.
- E.** The Director shall issue an analysis if an applicant demonstrates one or more of the following:
  1. Sufficient supplies of water are physically available to meet all or part of the estimated water demand of the develop-

- ment for 100 years, according to the criteria in R12-15-716;
  2. Sufficient supplies of water are continuously available to meet the estimated water demand of the development for 100 years, according to the criteria in R12-15-717;
  3. Sufficient supplies of water are legally available to meet the estimated water demand of the development for 100 years, according to the criteria in R12-15-718;
  4. The proposed sources of water are of adequate quality, according to the criteria in R12-15-719.
- F.** The Director shall issue a phased analysis for a development for which the proposed source is groundwater to be withdrawn from the C aquifer or the R aquifer outside an AMA if the applicant submits with the application a regional hydrologic study that demonstrates that sufficient supplies of groundwater are likely to be physically available to meet all or part of the estimated water demand of the development for 100 years, according to the criteria in R12-15-716. The applicant also may submit with the application a site-specific hydrologic study that demonstrates that groundwater is physically available to meet part of the estimated water demand of the development for 100 years, according to the criteria in R12-15-716. If the Director issues a phased analysis for a development:
1. The Director shall specify the volume of groundwater that the applicant has demonstrated is likely to be physically available based on the regional hydrologic study and any volume of groundwater that the applicant has demonstrated is physically available based on a site-specific hydrologic study.
  2. The Director shall not include in a water report the volume of groundwater included in the phased analysis that the Director has determined, based on a regional hydrologic study, is likely to be physically available unless the analysis holder submits additional information, including a site-specific hydrologic study, to demonstrate that the groundwater is physically available.
  3. The phased analysis shall be subject to all of the provisions in this Section and in R12-15-716.
- ~~F.G.~~** For 10 years after the Director issues an analysis, or a longer period allowed under subsections ~~(H)~~ or (I) or (J) of this Section:
1. If groundwater is a source of supply in the analysis and the applicant demonstrates that groundwater is physically available under subsection (E)(1) or is likely to be physically available under subsection (F), the Director shall consider that supply of groundwater reserved for the use of the proposed development in subsequent determinations of physical availability pursuant to R12-15-716(B) and R12-15-716(E).
  2. Except as provided in subsection (G)(4) of this Section, if an analysis holder applies for a water report for a subdivision located on land included in the analysis, the Director shall presume that a criterion demonstrated in the analysis remains satisfied with respect to the subdivision, unless the Director has received new evidence demonstrating that the criterion is not satisfied.
  3. If the Director issues the water report, the Director shall reduce the volume of groundwater reserved pursuant to subsection ~~(F)(1)~~ (G)(1) of this Section by the amount of the estimated water demand for the water report that will be met with groundwater.
  4. Subsection (G)(2) of this Section shall not apply to the volume of groundwater included in a phased analysis that the Director has determined, based on a regional hydrologic study, is likely to be physically available unless the analysis holder submits additional information, including a site-specific hydrologic study, to demonstrate that the groundwater is physically available.
- ~~G.H.~~** The Director shall reduce the amount of water considered reserved for use of the development upon request by the analysis holder. If the analysis holder requesting a reduction is not the person to whom the analysis was issued, the Director shall reduce the amount of reserved groundwater only if the person to whom the analysis was issued or that person's designee consents to the request for reduction. The person to whom the analysis was issued shall notify the Director in writing of the person's designee for purposes of this subsection.
- ~~H.I.~~** The analysis holder may apply to the Director for a five-year extension of the time period in subsection ~~(F)~~ (G) of this Section by submitting an application on a form prescribed by the Director no earlier than 36 months before the end of the time period and no later than 30 days before the end of the time period. If an extension is granted, the analysis holder may apply to the Director for an additional five-year extension by submitting an application on a form prescribed by the Director no earlier than 36 months before the end of the extended time period and no later than 30 days before the end of the extended time period. The Director shall extend the time period for no more than two successive five-year periods under this subsection if the analysis holder demonstrates one of the following:
1. The analysis holder has made a substantial capital investment in developing the land included in the analysis.
  2. The analysis holder has made material progress in developing the land included in the analysis.
  3. Progress in developing the land included in the analysis has been delayed for reasons outside the control of the analysis holder.
- ~~I.J.~~** After the Director grants two five-year extensions pursuant to subsection ~~(H)~~ (I) of this Section, the Director may extend the time period for additional five-year periods if the analysis holder files a timely application pursuant to subsection ~~(H)~~ (I) of this Section and demonstrates one of the criteria in subsections ~~(H)(1), (H)(2), or (H)(3)~~ (I)(1), (I)(2), or (I)(3) of this Section.
- ~~J.K.~~** The Director shall review an application for an analysis or an application for an extension pursuant to subsections ~~(H)~~ or

(I) or (J) of this Section pursuant to the licensing time-frame provisions in R12-15-401.

**R12-15-713. Water Report**

- A.** An application for a water report shall be filed by the current owner of the land that is the subject of the application.
- B.** An applicant for a water report shall submit an application on a form prescribed by the Director with the fee required by R12-15-730 and provide the following:
1. A title report, condition of title report, limited search title report, or recorded deed, dated within 90 days of the date the application is filed and demonstrating that the applicant is the owner of the land that is the subject of the application;
  2. A plat of the subdivision;
  3. An estimate of the 100-year water demand for the subdivision;
  4. A list of all proposed sources of water that will be used by the subdivision;
  5. If the applicant is seeking a finding that the subdivision has an adequate water supply, evidence that the criteria in subsection ~~(E)~~ (F) of this Section are met; and
  6. Any other information that the Director reasonably determines is necessary to decide whether an adequate water supply exists for the subdivision.
- C.** Each applicant shall sign the application for a water report. If an applicant is not a natural person, the applicant's authorized officer, managing member, partner, trust officer, trustee, or other person who performs similar decision-making functions for the applicant shall sign the application. If an applicant submits a letter, signed by the applicant and dated within 90 days of the date the application is submitted, authorizing a representative to submit applications for permits regarding the land to be included in the water report, the authorized representative may sign the application on the applicant's behalf.
- D.** If the subdivision is located within a mandatory adequacy jurisdiction, the Director shall give public notice of the application as provided in A.R.S. § 45-108.01.
- ~~**D-E.**~~ After a complete application is submitted, the Director shall review the application and associated evidence to determine:
1. The estimated water demand of the subdivision;
  2. Whether the applicant has demonstrated all of the requirements in subsection (E) of this Section.
- ~~**E-F.**~~ The Director shall determine that the subdivision has an adequate water supply if the applicant demonstrates all of the following:
1. Sufficient supplies of water are physically available to meet the estimated water demand of the subdivision, according to the criteria in R12-15-716;
  2. Sufficient supplies of water are continuously available to meet the estimated water demand of the subdivision, according to the criteria in R12-15-717;
  3. Sufficient supplies of water are legally available to meet the estimated water demand of the subdivision, according to the criteria in R12-15-718;
  4. The proposed sources of water will be of adequate quality, according to the criteria in R12-15-719;
  5. The applicant has the financial capability to construct adequate delivery, storage, and treatment works for the subdivision according to the criteria in R12-15-720.
- ~~**F-G.**~~ The Director shall issue a water report to the applicant that states whether the applicant has complied with the requirements in subsection ~~(E)~~ (F) of this Section.
- ~~**G-H.**~~ The Director shall review an application for a water report pursuant to the licensing time-frame provisions in R12-15-401.
- ~~**H-I.**~~ The Director may review or modify a water report if the Director receives new evidence regarding the criteria in subsection ~~(E)~~ (F) of this Section. The Director shall not modify a water report pursuant to this subsection if any of the residential lots included in the plat have been sold. To determine whether a water report should be modified pursuant to this subsection, the Director shall use the standards in place at the time the original application was submitted for the water report. If the Director modifies a water report, the Director shall:
1. Provide for an administrative hearing pursuant to A.R.S. Title 41, Chapter 6, Article 10; and
  2. Notify the Arizona Department of Real Estate.
- ~~**I-J.**~~ An owner of land that is the subject of a water report may request a modification of the water report at any time by submitting an application in accordance with subsection (B) of this Section. To determine whether a water report should be modified pursuant to this Section, the Director shall use the standards in place at the time of review.
- ~~**J-K.**~~ A water report is subject to the provisions of R12-15-708.
- L.** An owner of a subdivision that will be served Colorado River water by a municipal provider and that is located within a mandatory adequacy jurisdiction may apply for an exemption from the requirement to obtain a water report finding that the subdivision has an adequate water supply or a commitment of water service from a designated provider by submitting an application on a form prescribed by the director and demonstrating that the criteria in subsection (L)(2) of this Section are met. Upon receiving an application pursuant to this subsection, the Director shall:
1. Review the application pursuant to the licensing time-frame provisions in R12-15-401.

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2. Determine whether the applicant has demonstrated that all of the following apply:
    - a. Sufficient supplies of water will not be legally available to meet the estimated water demand of the subdivision in a timely manner because the municipal provider does not currently have the legal right to serve Colorado River water to the subdivision;
    - b. The municipal provider currently has an entitlement to Colorado River water, according to the criteria in R12-15-718(G);
    - c. The municipal provider will have the legal right to serve Colorado River water to the subdivision within 20 years;
    - d. An interim water supply will be used to serve the subdivision until the municipal provider has the legal right to serve Colorado River water to the subdivision and the interim water supply meets all of the criteria in subsection (F) of this Section, except that the supply will be available for the interim period and not for 100 years; and
    - e. When the municipal provider has the legal right to serve Colorado River water to the subdivision, the Colorado River water supply will meet all of the criteria in subsection (F) of this Section for the remainder of the 100-year period.
  3. If the Director determines that the criteria of subsection (L)(2) are met, issue a letter to the applicant, the platting authority, and the Arizona Department of Real Estate stating that the owner is exempt from the requirement to obtain a water report finding that the subdivision has an adequate water supply or a commitment of water service from a designated provider.
- M.** An owner of a subdivision that will be served by a water supply project under construction and that is located within a mandatory adequacy jurisdiction may apply for an exemption from the requirement to obtain a water report finding that the subdivision has an adequate water supply or a commitment of water service from a designated provider by submitting an application on a form prescribed by the director and demonstrating that the criteria in subsection (M)(2) of this Section are met. Upon receiving an application pursuant to this subsection, the Director shall:
1. Review the application pursuant to the licensing time-frame provisions in R12-15-401.
  2. Determine whether the applicant has demonstrated that all of the following apply:
    - a. Sufficient supplies of water will not be available to meet the estimated water demand of the subdivision in a timely manner because the physical works for delivering water to the subdivision are not complete;
    - b. The physical works for delivering water to the subdivision are under construction and will be completed within 20 years;
    - c. An interim water supply will be used to serve the subdivision until the physical works for delivering water to the subdivision are fully constructed and the interim water supply meets all of the criteria in subsection (F) of this Section, except that supply will be available for the interim period and not for 100 years; and
    - d. When the physical works for delivering water to the subdivision are fully constructed, the water supply will meet all of the criteria in subsection (F) of this Section for the remainder of the 100-year period.
  3. If the Director determines that the criteria of subsection (M)(2) of this Section are met, issue a letter to the applicant, the platting authority, and the Arizona Department of Real Estate stating that the owner is exempt from the requirement to obtain a water report finding that the subdivision has an adequate water supply or a commitment of water service from a designated provider.
- N.** An owner of a subdivision located within a mandatory adequacy jurisdiction may request an exemption from the requirement to obtain a water report finding that the subdivision has an adequate water supply or a commitment of water service from a designated provider based on substantial capital investment pursuant to A.R.S. § 45-108.02 by submitting an application on a form prescribed by the Director and demonstrating that the criteria of A.R.S. § 45-108.02 are met. Upon receiving an application pursuant to this subsection, the Director shall:
1. Review the application pursuant to the licensing time-frame provisions in R12-15-401.
  2. Determine whether the criteria for an exemption in A.R.S. § 45-108.02 are met.
  3. If the Director determines that the criteria of A.R.S. § 45-108.02 are met, issue a letter to the applicant, the platting authority, and the Arizona Department of Real Estate stating that the owner is exempt from the requirement to obtain a water report finding that the subdivision has an adequate water supply or a commitment of water service from a designated provider, and that the exemption expires five years after the date of the letter, unless prior to that date at least one lot in the subdivision is sold to a bona fide purchaser or the Director extends the time period.
- O.** If the Director grants an exemption from the requirement to obtain a water report finding that the subdivision has an adequate water supply or a commitment of water service from a designated provider pursuant to A.R.S. § 45-108.02, the owner of the subdivision may apply to the director for an extension of the exemption before the exemption expires by submitting an application on a form prescribed by the Director demonstrating that the criteria in A.R.S. § 45-108.02 for an extension of the exemption are met. The Director shall not grant more than two successive five-year extensions. Upon receiving an application pursuant to this subsection, the Director shall:
1. Review the application pursuant to the licensing time-frame provisions in R12-15-401.
  2. Determine whether the criteria in § 45-108.02 for an extension of the exemption are met.
  3. If the Director determines that the criteria for an extension pursuant to A.R.S. § 45-108.02 are met, the Director shall

issue a letter to the applicant, the platting authority, and the Arizona Department of Real Estate, stating that the exemption is extended for an additional five years from the previous expiration.

**R12-15-714. Designation of Adequate Water Supply**

- A.** A municipal provider applying for a designation of adequate water supply shall submit an application on a form prescribed by the Director with the fee required by R12-15-730 and the following:
1. The applicant's current demand;
  2. The applicant's committed demand;
  3. The applicant's projected demand for the proposed term of the designation;
  4. The proposed term of the designation, which shall not be less than two years;
  5. Evidence that the criteria in subsection ~~(E)~~ (F) of this Section are met; and
  6. Any other information that the Director determines is necessary to decide whether an adequate water supply exists for the municipal provider.
- B.** A city or town, other than a municipal provider, that is applying for a designation shall submit an application on a form prescribed by the Director with the fee required in R12-15-730, and provide the following:
1. The current demand of the applicant's service area;
  2. The committed demand of the applicant's service area;
  3. The projected demand of the applicant's service area for the proposed term of the designation;
  4. The proposed term of the designation, which shall not be less than two years; and
  5. Evidence that the requirements in A.R.S. § 45-108(D) are met.
- C.** An application for a designation shall be signed by:
1. If the applicant is a city or town, the city or town manager or a person employed in an equivalent position. The application shall also include a resolution of the governing body of the city or town, authorizing that person to sign the application; or
  2. If the applicant is a private water company, the applicant's authorized officer, managing member, partner, trust officer, trustee, or other person who performs similar decision-making functions for the applicant.
- D.** If the municipal provider is located within a mandatory adequacy jurisdiction, the Director shall give public notice of the application as provided in A.R.S. § 45-108.01.
- ~~D-E.~~** After a complete application is submitted, the Director shall review the application and associated evidence to determine:
1. The annual volume of water that is physically, continuously, and legally available for at least 100 years;
  2. The term of the designation, which shall not be less than two years;
  3. The estimated water demand for the applicant's service area for 100 years; and
  4. Whether the applicant has demonstrated compliance with all requirements in subsection ~~(E)~~ (F) or ~~(F)~~ (G) of this Section.
- ~~E-F.~~** The Director shall designate the applicant has having an adequate water supply pursuant to subsection (A) of this Section if the applicant demonstrates all of the following:
1. Sufficient supplies of water are physically available to meet the applicant's estimated water demand, according to the criteria in R12-15-716;
  2. Sufficient supplies of water are continuously available to meet the applicant's estimated water demand, according to the criteria in R12-15-717;
  3. Sufficient supplies of water are legally available to meet the applicant's estimated water demand, according to the criteria in R12-15-718;
  4. The proposed sources of water are of adequate quality, according to the criteria in R12-15-719; and
  5. The applicant has the financial capability to construct adequate delivery, storage, and treatment works in a timely manner according to the criteria in R12-15-720.
- ~~F-G.~~** The Director shall issue a designation pursuant to subsection (B) of this Section if the applicant demonstrates that the requirements of A.R.S. § 45-108(D) are met.
- ~~G-H.~~** The Director shall review an application for a designation of adequate water supply pursuant to the licensing time-frame provisions in R12-15-401.

**R12-15-715. Designation of Adequate Water Supply; Annual Report Requirements, Review, Modification, Revocation**

- A.** By ~~March 31~~ June 1 of each calendar year, a designated provider shall submit the following information for the preceding calendar year on a form provided by the Director:
1. The designated provider's committed demand;
  2. The demand at build-out for customers with which the designated provider has entered into an agreement to serve water, other than committed demand;
  3. A report regarding the designated provider's compliance with water quality requirements;
  4. The depth-to static water level of all wells from which the designated provider withdrew water;

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5. A report regarding volume of water withdrawn, diverted, or received from each source for delivery to customers;
  6. Any other information the Director may reasonably require to determine whether the designated provider continues to meet the criteria for a designation of adequate water supply.
- B.** If there is a change of ownership, the subsequent owner of a designated provider shall notify the Director in writing of the change in ownership within 90 days.
  - C.** The Director shall review a designation at least every 15 years following issuance of the designation to determine whether the designation should be modified or revoked.
  - D.** The Director may modify a designation for good cause, including a merger, division of the designated provider, or a change in ownership of the designated provider. A designated provider may request a modification of the designation at any time pursuant to R12-15-714. To determine whether the designation should be modified, the Director shall use the standards in place at the time of review.
  - E.** The Director may revoke a designation if:
    1. After notifying the designated provider and initiating a review of the designated provider's status, the Director ~~deter~~  
~~mines~~ determines that the designated provider has less water, according to the criteria in ~~R12-15-714(E)~~ R12-15-714(F), than the amount required for a 100-year supply for the provider's:
      - a. Current demand,
      - b. Committed demand, and
      - c. Projected demand for the next two calendar years;
    2. The designated provider fails to construct adequate delivery, storage, and treatment works in a timely manner; or
    3. ADEQ or another governmental entity with equivalent jurisdiction has determined, after notice and an opportunity for a hearing, that the designated provider is in significant noncompliance with 18 A.A.C. Title 18, Chapter 4 and is not taking action to resolve the noncompliance.
  - F.** To determine whether the designation should be revoked, the Director shall use the standards in place at the time of review. If the Director determines that a designation of adequate water supply should be revoked, the Director shall provide for an administrative hearing, in accordance with A.R.S. Title 41, Chapter 6, Article 10.
  - G.** If a designated provider's designated status terminates, the provider may apply for re-designation at anytime after termination.
  - H.** Notwithstanding any other provision in this Article, a decision and order of the Director designating a city, town, or private water company as having an assured water supply is not affected by this Article solely because the rule numbers cited in the decision and order may have changed after the effective date of the decision and order.

**R12-15-716. Physical Availability**

- A.** The volume of a proposed source of water that is physically available to an applicant for a determination of assured water supply or a determination of adequate water supply is the amount determined by the Director to be physically available pursuant to subsections (B) through ~~(L)~~ (M) of this Section.
- B.** If the proposed source is groundwater that will not be withdrawn from the C aquifer or the R aquifer outside an AMA, the applicant shall submit a hydrologic study, using a method of analysis approved by the Director, that accurately describes the hydrology of the affected area. Except as provided in subsection (D) of this Section, the Director shall determine that the proposed volume of groundwater will be physically available for the proposed use if both of the following apply:
  1. The groundwater will be withdrawn as follows:
    - a. Except as provided in subsection (B)(1)(b) of this Section, from wells owned by the applicant or the proposed municipal provider that are located within the service area of the applicant or the proposed municipal provider or from proposed wells that the Director determines are likely to be constructed for future uses of the applicant or the proposed municipal provider.
    - b. If the application is for a dry lot development, from wells that the Director determines are likely to be constructed on individual lots.
  2. Except as provided in subsection (C) of this Section, the groundwater will be withdrawn from depths that do not exceed the applicable maximum 100-year depth-to-static water level according to the following:

Type and location of development	Maximum 100-year depth-to-static water level
a. Developments in Phoenix, Tucson, or Prescott AMAs, except dry lot developments	1000 feet below land surface
b. Developments in Pinal AMA, except dry lot developments	1100 feet below land surface
c. Developments outside AMAs, except dry lot developments	1200 feet below land surface

d. Dry lot developments	400 feet below land surface
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3. The Director shall calculate the projected 100-year depth-to-static water level by adding the following for the area where groundwater withdrawals are proposed to occur:
  - a. The depth-to-static water level on the date of application.
  - b. The projected declines caused by existing uses, using the projected decline in the 100-year depth-to-static water level during the 100-year period after the date of application, calculated using records of declines for the maximum period of time for which records are available up to 25 calendar years before the date of application. If evidence is provided to the Director of likely changes in pumpage patterns and aquifer conditions, as opposed to those patterns and conditions occurring historically, the Director may determine projected declines using a model rather than evidence of past declines.
  - c. The projected decline in the depth-to-static water level during the 100-year period after the date of application, calculated by adding the projected decline from each of the following that are not accounted for in subsection (B)(3)(b) of this Section:
    - i. The estimated water demand of issued certificates and water reports that will be met with groundwater or stored water recovered outside the area of impact of the stored water, not including the demand of subdivided lots included in abandoned plats;
    - ii. The estimated water demand of designations that will be met with groundwater or stored water recovered outside the area of impact of the stored water; and
    - iii. The groundwater reserved for developments for which the Director has issued an analysis pursuant to R12-15-703 or R12-15-712.
  - d. If the groundwater withdrawals will occur within a mandatory adequacy jurisdiction, the projected decline in the depth-to-static water level caused by anticipated future uses, if both of the following apply:
    - i. The anticipated future use will not be located within a mandatory adequacy jurisdiction; and
    - ii. The anticipated future use is not accounted for in subsections (B)(3)(b) or (B)(3)(c) of this Section.
  - ~~d-e.~~ The projected decline in depth-to-static water level that the Director projects will result from the applicant's proposed use over a 100-year period.
- C. The Director ~~shall~~ may lower the maximum 100-year depth-to-static water level requirement specified in subsection ~~(B)(2) (B)(2)(c)~~ of this Section for an applicant seeking a determination of adequate water supply ~~if the applicant demonstrates both of the following:~~. When determining whether to lower the maximum 100-year depth-to-static water level requirement, the Director shall consider the following factors:
  1. ~~Groundwater~~ Whether groundwater is available at the lower depth; and
  2. ~~The~~ Whether the applicant has the financial capability to obtain the groundwater at drilled wells to the lower depth, according to the criteria in R12-15-720;
  3. Whether the decline in depth-to-static water level that the Director projects will result from the applicant's proposed groundwater use over a 100-year period will adversely impact other uses in the area; and
  4. Any other site-specific hydrologic or geologic factors that may be appropriate.
- D. If the proposed source is groundwater that will be withdrawn from a groundwater basin outside an AMA and transported into an AMA, the Director shall determine that the proposed volume of groundwater will be physically available if both of the following apply:
  1. The groundwater will be withdrawn from wells owned by the applicant or the proposed municipal provider or from proposed wells that the Director determines are likely to be constructed for the future uses of the applicant or the proposed municipal provider.
  2. Withdrawal of the groundwater will comply with any depth-to-static water level criteria, decline rate criteria, and volume limitation criteria prescribed by statute. If there are no applicable depth-to-static water level criteria prescribed by statute, withdrawal of the groundwater shall comply with the depth-to-static water level criteria in subsection (B)(2) of this Section.
- E. If the proposed source is groundwater that will be withdrawn from the C aquifer or the R aquifer outside an AMA, the applicant shall meet with the Department before filing the application to discuss the hydrologic study required by this subsection. The Director shall determine that the proposed volume of groundwater will be physically available for the proposed use if all of the following apply:
  1. The groundwater will be withdrawn from wells owned by the applicant or the proposed municipal provider that are located within the service area of the applicant or the proposed municipal provider or from proposed wells that the Director determines are likely to be constructed for future uses of the applicant or the proposed municipal provider.
  2. The applicant has submitted a site-specific hydrologic study, using a method of analysis approved by the Director, that accurately describes the hydrology of the affected area. The hydrologic study shall incorporate all of the following demands that rely on the same water supply:
    - a. The demand of existing uses;

- b. The estimated water demand of issued certificates and water reports, not including the demand of subdivided lots included in abandoned plats;
- c. The estimated water demand of designations;
- d. The demand of developments for which the Director has issued an analysis pursuant to R12-15-703 or R12-15-712;
- e. If the groundwater withdrawals will occur within a mandatory adequacy jurisdiction, the demand of anticipated future uses that will not be located within a mandatory adequacy jurisdiction and that are not accounted for in subsection (E)(2)(a) through (E)(2)(d) of this Section; and
- f. The demand of the applicant's proposed use.

3. One of the following applies:

- a. The subdivision will be a dry lot development and the applicant demonstrates that after 100 years of withdrawing groundwater to meet all of the demands described in subsection (E)(2) of this Section, the projected depth-to-static water level will not exceed 400 feet below land surface.
- b. The subdivision will not be a dry lot development and the applicant demonstrates that after 100 years of withdrawing groundwater to meet all of the demands described in subsection (E)(2) of this Section, the projected depth-to-static water level will not exceed 1200 feet below land surface.
- c. The subdivision will not be a dry lot development and the applicant demonstrates that after 100 years of withdrawing groundwater to meet all of the demands described in subsection (E)(2) of this Section, at least 50% of the estimated groundwater in storage in the area of proposed withdrawals will remain.

**F.F.** Subject to subsection ~~(L)~~ (M) of this Section, if the proposed source of water is surface water, other than CAP water, or Colorado River water, the Director shall determine the annual volume of water that is physically available for the proposed use, taking into consideration the priority date of the right or claim, by calculating 120% of the firm yield of the proposed source at the point of diversion as limited by the capacity of the diversion works; except that if the applicant demonstrates that an alternative source of water will be physically available during times of shortage in the proposed surface water supply, the Director shall determine the annual volume of water available by calculating 100% of the median flow of the proposed source at the point of diversion as limited by the capacity of the diversion works. The Director shall determine the firm yield or median flow as follows:

- 1. By calculating the firm yield or median flow at the point of diversion based on at least 20 calendar years of flow records from the point of diversion, unless 20 calendar years of records are unavailable and the Director determines that a shorter period of record provides information necessary to determine the firm yield or median flow; or
- 2. By calculating the firm yield or median flow at the point of diversion using a hydrologic model that projects the firm yield or median flow, taking into account at least 20 calendar years of historic river flows, changes in reservoir storage facilities, and projected changes in water demand. The yield available to any applicant may be composed of rights to stored water, direct diversion, or normal flow rights. If the permit for the water right was issued less than five years before the date of application, the Director shall require the applicant to submit evidence, as applicable, in accordance with this subsection.

**F.G.** Subject to subsection ~~(L)~~ (M) of this Section, if the proposed source of water is CAP water, the Director shall determine the annual volume of water that is physically available for the proposed use as follows:

- 1. If the applicant or the proposed municipal provider has a non-declining, long-term municipal and industrial subcontract for CAP water, calculate 100% of the annual amount of water established in the subcontract.
- 2. If the applicant has a lease for Indian priority CAP water, calculate 100% of the annual amount of water established in the lease.
- 3. If the applicant has a subcontract for CAP water other than a non-declining, long-term municipal and industrial subcontract or a lease for Indian priority CAP water:
  - a. If the applicant submits evidence of sufficient backup water supplies, calculate 100% of the annual amount of water established in the subcontract. The applicant may establish backup water supplies by one or more of the following:
    - i. A drought response plan;
    - ii. Long-term storage credits;
    - iii. A contract for water with a multi-county water conservation district; or
    - iv. Evidence of other backup supplies that are physically, continuously, and legally available.
  - b. If the applicant does not submit evidence of sufficient backup water supplies pursuant to subsection ~~(F)(3)(a)~~ (G)(3)(a) of this Section, calculate the percentage of the annual amount of water established in the subcontract that reasonably reflects the reliability of the applicant's CAP water supply.

**G.H.** Subject to subsection ~~(L)~~ (M) of this Section, if the proposed source of water is Colorado River water, the Director shall determine the annual volume of water that is physically available for the proposed use as follows:

- 1. If the priority of the contract for Colorado River water provides reliability equal to or better than CAP municipal and industrial water, calculate 100% of the annual amount of water established in the contract.
- 2. If the contract for Colorado River water provides reliability that is less than CAP municipal and industrial water:

- a. If the applicant submits evidence of sufficient backup water supplies, calculate 100% of the annual amount of water in the contract. The applicant may establish backup water supplies by one or more of the following:
  - i. A drought response plan;
  - ii. Long-term storage credits;
  - iii. A contract for water with a multi-county water conservation district; or
  - iv. Evidence of other backup supplies that are physically, continuously, and legally available.
- b. If the applicant does not submit evidence of sufficient backup water supplies pursuant to subsection ~~(G)(2)(a)~~ (H)(2)(a) of this Section, calculate the percentage of the annual amount of water established in the contract that reasonably reflects the reliability of the applicant's Colorado River water supply.

~~H.I.~~ H.I. Subject to subsection ~~(H)~~ (J) of this Section, if the proposed source of water is effluent, the Director shall determine the annual volume of water that will be physically available by evaluating the current, metered production or the projected production of effluent. The volume of effluent that is physically available shall not include the following:

1. If the effluent will be delivered directly from a wastewater treatment plant, the volume of effluent that exceeds the applicant's estimated water demand that will be met with effluent; and
2. The volume of effluent that does not comply with any applicable water quality requirements for the proposed use of the effluent.

~~H.J.~~ H.J. If the proposed source of water is stored water to be recovered from recovery wells, the Director shall determine the volume of water that is physically available for the proposed use as follows:

1. If the stored water is represented by long-term storage credits in existence on the date of application, the amount that is physically available is the amount that may be recovered pursuant to the credits in a manner consistent with A.R.S. Title 45, Chapter 3.1, subject to subsection ~~(H)(3)~~ (J)(3) of this Section.
2. If the applicant proposes to use long-term storage credits that do not exist on the date of application or recover stored water on an annual basis pursuant to A.R.S. § 45-851.01, the Director shall evaluate the following in determining whether to include the proposed credits or the water proposed to be stored and recovered annually in the amount of water that is physically available for the applicant's proposed use:
  - a. The terms of a contract to obtain water to store in a storage facility;
  - b. The physical, continuous, and legal availability of the water proposed to be stored;
  - c. The presence of an existing storage facility that will be available for use for the proposed storage;
  - d. The existence of all required permits of an adequate duration; and
  - e. Whether recovery of the stored water will comply with subsection ~~(H)(3)~~ (J)(3) of this Section.
3. If the applicant proposes to recover the stored water from recovery wells located outside the area of impact of storage, the stored water will be considered physically available only if sufficient water exists for the withdrawals consistent with both of the following:
  - a. The maximum 100-year depth-to-static water level requirements established in subsection (B)(2) of this Section; and
  - b. Any criteria for the withdrawals prescribed in the management plan in effect at the time of the application.

~~J.K.~~ J.K. If the applicant will obtain the source of water through a water exchange agreement, the Director shall determine that the water is physically available for the proposed use if the applicant submits evidence that the source of water the applicant or the applicant's customers will use will be physically available in accordance with the terms of this Section.

~~K.L.~~ K.L. In the case of two or more pending, conflicting, complete and correct applications for determinations of assured water supply or determinations of adequate water supply, the Director shall give priority to the application with the earliest priority date. The priority date of an application for a determination of assured water supply or determination of adequate water supply shall be the date that a complete and correct application is filed with the Director. The Director shall consider an application complete and correct if it contains all the information required and the Director verifies that the information is accurate.

~~L.M.~~ L.M. For a certificate applicant that proposes to use surface water, the Director shall determine that the proposed source is physically available only if the applicant demonstrates one of the following:

1. The land that is the subject of the application is a member land of the CAGR.
2. The applicant has independently obtained the surface water supply.
3. The proposed municipal provider would satisfy the criteria in R12-15-722 if the municipal provider were subject to those requirements.

NOTICE OF PROPOSED RULEMAKING

TITLE 18. ENVIRONMENTAL QUALITY

CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR POLLUTION CONTROL

[R08-413]

PREAMBLE

- 1. Sections Affected**

R18-2-101	Amend
R18-2-201	Amend
R18-2-203	Amend
R18-2-216	Amend
Appendix 4	New Section
  
- 2. The statutory authority for the rulemaking, including both the authorizing statute (general) and the statutes the rules are implementing (specific):**

Authorizing Statutes: A.R.S. §§ 49-104(A)(1), (11), and 49-425  
Implementing Statutes: A.R.S. §§ 49-404 and 49-405
  
- 3. A list of all previous notices appearing in the Register addressing the final rules:**

Notice of Rulemaking Docket Opening: 14 A.A.R. 2245, June 6, 2008
  
- 4. The name and address of agency personnel with whom persons may communicate regarding the rulemaking:**

Name: Thomas C. Luch  
Address: Department of Environmental Quality  
1110 W. Washington St.  
Phoenix, AZ 85007  
Telephone: (602) 771-4480 (This number may be reached in-state by dialing 1-800-234-5677 and requesting the seven digit number.)  
Fax: (602) 771-2366  
E-mail: tcl@azdeq.gov
  
- 5. An explanation of the rules, including the agency's reasons for initiating the rules:**

Summary. The Arizona Department of Environmental Quality is proposing rules to update its ambient air quality standards for particulate matter (PM) with an aerodynamic diameter of less than or equal to 2.5 microns (PM<sub>2.5</sub>), and eight-hour averaged ozone (O<sub>3</sub>) to conform to the most recent federal National Ambient Air Quality Standards (NAAQS).

Background. In 2006, EPA promulgated final rules implementing new NAAQS for PM<sub>2.5</sub>, (71 FR 61144, October 17, 2006) and again in 2008 for ozone (73 FR 16436, March 27, 2008). ADEQ is proposing to amend R18-2-201 and R18-2-203 to include these NAAQS.

The new primary and secondary ambient air quality standards were established for PM<sub>2.5</sub>. The federal primary standard for PM<sub>2.5</sub> 24-hour average concentration has been lowered from 65 to 35 µg per cubic meter, while the annual arithmetic mean standard remains unchanged at 15 µg per cubic meter. The new primary standard is expected to provide increased protection against a wide range of PM-related health effects, including: premature mortality; increased hospital and emergency room visits; increased respiratory symptoms and disease; and decreased lung function, especially in the at-risk populations such as the elderly, individuals with cardiopulmonary disease, children and persons with asthma. The new secondary standard for PM<sub>2.5</sub> is identical to the primary standard and is expected to provide protection against PM-related public welfare effects including soiling, material damage, and visibility impairment.

The new primary ozone standard sets forth an eight-hour averaged standard at a level of 0.075 ppm. This new primary standard is expected to provide increased protection to the public, particularly at-risk populations such as children, against a wide range of ozone-induced health effects, such as decreased lung function, increased respiratory symptoms, and hospital and emergency room admissions. The secondary eight-hour averaged ozone standard is identical to the primary standard and is expected to provide increased protection to the public welfare against ozone-induced effects on the environment, such as damage to agricultural crops, forests and other ecosystems.

The National Ambient Air Quality Standards contained in Article 2 are cited extensively in Chapter 18 of the *Arizona Administrative Code*, particularly in: Article 3, Permits and Permit Revisions; Article 4, Permit Modifications for New Major Sources and Major Modifications To Existing Sources; and Article 7, Existing Stationary Source Performance Standards. This rulemaking will reduce confusion and ensure that the correct EPA NAAQS standards are applied throughout Arizona.

Section by Section Explanation of the Proposed Rules:

**R18-2-101. Definitions**

The proposed rule will amend definition 85 to display the specific particulate matter measurements in subscript designation for particulate matter less than or equal to 2.5 and 10 microns in diameter, (PM<sub>2.5</sub>) and (PM<sub>10</sub>) respectively.

**R18-2-201. Particulate Matter; PM<sub>10</sub> and PM<sub>2.5</sub>**

The proposed rule will amend subsection (B), to comply with the current EPA standard of 35 micrograms per cubic meter for both the primary and secondary ambient air quality standards for PM<sub>2.5</sub>. The annual PM<sub>10</sub> standard is maintained in subsection (A) because of Arizona's acute problems with PM<sub>10</sub> non-attainment, including Arizona's pending "Five-Percent Plan" for PM<sub>10</sub> compliance.

**R18-2-203. Ozone; One-hour Standard and Eight-hour Averaged Standard**

The proposed rule will amend subsection (B), adding the expiration date of May 27, 2008, for the eight-hour averaged standard of 0.08 ppm. Additionally, a new subsection (C) will provide the revised federal standard for eight-hour ozone as effective May 27, 2008, updating the averaged primary, secondary and annual fourth-highest daily maximum standards to 0.075 ppm. Subsection (C) will also provide notice of the incorporation by reference of 40 CFR 50, Appendix P.

**R18-2-216. Interpretation of Ambient Air Quality Standards and Evaluation of Air Quality Data**

The proposed rule will amend the Section to include an additional subsection (B), which will provide a cross-reference to NAAQS data in Appendix 4. Appendix 4 will contain a reference chart providing the historical national ambient air quality standards as promulgated by EPA.

**Appendix 4. Historical National Ambient Air Quality Standards Chart**

The proposed rule will include the addition of a new appendix, Appendix 4, which will contain a historical list of the national ambient air quality standards as promulgated by EPA in an easy-to-read chart format.

**6. A reference to any study relevant to the rule that the agency reviewed and either proposes to rely on or not to rely on in its evaluation of or justification for the rule, where the public may obtain or review each study, all data underlying each study, and any analysis of each study and other supporting material:**

See: Criteria documents for Final Rule at 71 FR 61144, Air Quality Criteria for Particulate Matter ("Criteria Document") (three volumes, EPA/600/P-99/002aF-bF, 2004), and Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical information ("Staff Paper") (EPA-452/R-05-005, December 2005).

See: Criteria documents for Final Rule at 71 FR 10030, Air Quality Criteria for Ozone and Related Photochemical Oxidants ("Criteria Document") (three volumes, EPA/600/R-05/004aF-cF, March 2006), and Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical Information ("Staff Paper") (EPA-452/R-07-007, July 2007).

**7. A showing of good cause why the rules are necessary to promote a statewide interest if the rules will diminish a previous grant of authority of a political subdivision of this state:**

Not applicable

**8. The preliminary summary of the economic, small business, and consumer impact:**

**Rule Identification.**

This rulemaking includes amended Sections R18-2-201, "Particulate matter: PM<sub>10</sub> and PM<sub>2.5</sub>," and R18-2-203, "Ozone: 1-hour standard and 8-hour averaged standard." These changes are being proposed to conform to the most recent federal National Ambient Air Quality Standards (NAAQS).

The 24-hour average concentration for the primary ambient air quality standard for PM<sub>2.5</sub> in subsection R18-2-201(B)(1)(b) is being changed from 65 micrograms (µg) to 35 µg per cubic meter (m<sup>3</sup>) of PM<sub>2.5</sub>. Likewise, the 24-hour average concentration for the secondary ambient air quality standard for PM<sub>2.5</sub> in R18-2-201(B)(2)(b) is being changed from 65 µg/m<sup>3</sup> to 35 µg/m<sup>3</sup> of PM<sub>2.5</sub>. This also requires a change to 35 µg/m<sup>3</sup> in subsection R18-2-201(B)(5).

The eight-hour averaged primary ambient air quality standard for ozone in subsection R18-2-203(B)(1) is being changed from 0.08 to 0.075 parts per million (ppm). Likewise, the eight-hour averaged secondary ambient air quality standard for ozone in subsection R18-2-203(B)(1) is being changed from 0.08 to 0.075 ppm with no rounding. Due to rounding, the previous standard effectively was 0.084 ppm. This proposed rule also requires a change to 0.075 ppm in subsection 2R18-2-03(B)(3).

#### **Introduction and Summary.**

There are no additional costs to the regulated community when a state agency incorporates an already effective federal standard. Thus, this proposed rulemaking will not impose additional costs on the regulated community, small business, political subdivisions of the state, or members of the general public. Costs to ADEQ will be minimal, based on reducing confusion and assuring that correct standards are applied. ADEQ does not anticipate needing additional employees to implement and enforce these rules.

In 2008, EPA promulgated final rules implementing new NAAQS for ozone. The new primary ozone NAAQS established an eight-hour averaged standard at 0.075 ppm. This primary standard is expected to provide greater protection to the general public, especially subpopulations that would experience increased risk (e.g., school-age children, outdoor workers, persons with asthma and other respiratory diseases, and elderly), against a wide range of adverse health effects. Ozone-induced health effects can include the following: decreased lung function, increased respiratory symptoms, emergency room visits, hospital admissions, and premature mortality. The secondary ozone standard is identical to the primary standard. It is expected to provide increased welfare protection against ozone-induced effects on vegetation, agricultural crops, forests, and ecosystems (73 FR 16435, March 27, 2008). Current ambient concentrations of O<sub>3</sub> are sufficient to impair growth of common and economically valuable plants and tree species (EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Volume I, EPA 600/R-05/004aF, Chapter 9, "Environmental Effects: Ozone Effects on Vegetation and Ecosystems," pp. 9-1; 9-2; and 9-6).

In 2006, EPA promulgated final rules implementing new NAAQS for particulate matter, lowering the 24-hour average concentration from 65 µg/m<sup>3</sup> to 35 µg/m<sup>3</sup> of PM<sub>2.5</sub>. The annual arithmetic mean concentrations remain unchanged. The new primary standard is expected to provide increased protection against a wide range of adverse health effects. PM-related health effects include: decreased lung function, especially at risk persons (e.g., persons with cardiopulmonary disease, children with asthma, and elderly), chronic bronchitis, premature mortality, increased emergency room visits, and hospital admissions. The new secondary standard for PM<sub>2.5</sub> is identical to the primary standard, which is expected to provide increased protection against PM-related welfare effects, such as visibility, soiling, and material damage (71 FR 61144, October 17, 2006).

ADEQ expects human health benefits to accrue to the general public and welfare benefits to accrue to the environment as a result of the implementation of more protective standards for ozone and particulates. Benefits are expected to accrue to the regulated community as the primary implementer of these rules.

Health benefits potentially accrue to the general public whenever enforcement of environmental law takes place. The PM<sub>2.5</sub> standards, for example, are expected to provide increased protection against short-term exposure, including premature mortality and hospital admissions and emergency room visits. Adverse health effects from air pollution result in a number of economic and social consequences. These could include reduced number of incidents of adverse health endpoints (see Table 1), reduced medical costs, and reduced school and work loss days (71 FR 61144, October 17, 2006, p. 61155).

The more stringent federal NAAQS may result in additional compliance costs due to the potential expansion of existing nonattainment boundaries and new nonattainment areas. This could include planning areas in the state that never have been planning areas for a criteria pollutant. Thus, with the expansion of planning areas, both costs and benefits could be experienced by counties, Councils of Government, and other entities involved in creating or expanding nonattainment areas in the state.

ADEQ expects probable benefits to outweigh probable costs.

#### **Entities Impacted.**

The potential classes of persons directly impacted include: general public, environment, counties, Councils of Government, and other entities involved in creating or expanding nonattainment areas in the state, and ADEQ as the implementing agency.

#### **Background.**

The first part of this Section contains the following information: ozone (O<sub>3</sub>) formation and exposure, and the history of ozone standards. The second part of this Section contains information regarding fine particulate matter (PM<sub>2.5</sub>).

**OZONE**

Ozone Formation and Exposure

O<sub>3</sub> is classified as either “good” or “bad,” depending on its location in the atmosphere. It is considered good in the stratosphere (ranging six to 30 miles) where it occurs naturally and forms a layer that protects life on earth from the sun’s rays, and bad when present at ground-level in the troposphere, the layer closest to earth’s surface. O<sub>3</sub> primarily becomes a problem during the summer months because of strong sunlight and hot weather (EPA 2008, Ozone, GoodUp High, Bad Nearby <http://www.epa.gov/groundlevelozone/pdfs/ozonegb.pdf>).

Ground-level ozone is not emitted directly into the atmosphere, but it is created by chemical reactions between oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOCs) in the presence of sunlight. O<sub>3</sub> forms from biogenic and anthropogenic precursor emissions (specifically NO<sub>x</sub> and VOCs).<sup>1</sup> Ambient O<sub>3</sub> concentrations are directly affected by temperature, solar radiation, and wind speed (73 FR 16435, March 27, 2008; EPA 2008, Ozone, GoodUp High, Bad Nearby <http://www.epa.gov/groundlevelozone/pdfs/ozonegb.pdf>).

The formation of O<sub>3</sub> results from the oxidation of nitric oxide (NO) to nitrogen dioxide (NO<sub>2</sub>) by organic (RO<sub>2</sub>) or hydro-peroxy (HO<sub>2</sub>) radicals. Photolysis of NO<sub>2</sub> yields NO and ground-state oxygen atoms that reacts with molecular oxygen to form O<sub>3</sub>. Photolysis is a chemical process that breaks down molecules into smaller units through the absorption of light (EPA July 2007, Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper, EPA-452/R-07-007).

Oxidized nitrogen compounds are emitted mainly as NO, which is subsequently oxidized to NO<sub>2</sub> that can be reduced back to NO. NO and NO<sub>2</sub> are grouped together as NO<sub>x</sub>. A large number of oxidized, nitrogen-containing compounds exist in the atmosphere such as: NO; NO<sub>2</sub>; nitrate (NO<sub>3</sub>); nitrous acid (HNO<sub>2</sub>); nitric acid (HNO<sub>3</sub>); nitrogen pentoxide (N<sub>2</sub>O<sub>5</sub>); pernitric acid (HNO<sub>4</sub>); peroxy acetyl nitrate (PAN) and its homologues; other organic nitrates; and particulate nitrate. These species are collectively designated as NO<sub>y</sub>, but because NO<sub>x</sub> is a surrogate for NO<sub>y</sub>, NO<sub>x</sub> is monitored and reported (EPA July 2007, Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper, EPA-452/R-07-007).

Naturally occurring O<sub>3</sub> in the troposphere can result from biogenic organic precursors that react with naturally occurring nitrogen oxides and, on rare occasions, “intrusion” by stratospheric O<sub>3</sub> into the troposphere (EPA July 2007, Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper, EPA-452/R-07-007, p. 1-3). Naturally occurring ozone concentrations occur at background levels considerably below the NAAQS. Unhealthy O<sub>3</sub> levels are the result of anthropogenic emissions of O<sub>3</sub> precursors, mainly NO<sub>x</sub> and VOC.

Common source categories of anthropogenic VOC emissions include: products of incomplete fuel combustion (mostly from mobile sources), chemical and allied products manufacturing, metals processing, other industrial processing, solvent utilization, storage and transport, waste disposal and recycling, highway vehicles, off-highway vehicles, and miscellaneous (EPA July 2007, “Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical Information,” OAQPS Staff Paper, EPA-452/R-07-007, Table 2-1. “NO<sub>x</sub> Emission Sources, 1970-2004”).

Episodes of high O<sub>3</sub> concentrations are associated with slow moving, high pressure systems of sinking air masses during warm seasons. This pattern results in cloudless skies with light winds. This condition results in the development of stable air masses near the surface that inhibit the vertical mixing of O<sub>3</sub> precursors, minimizing the dispersal of pollutants, and thus increasing pollution concentrations. In addition, photochemical activity is enhanced due to higher temperatures and availability of sunlight. The downward entrainment of overnight transported O<sub>3</sub> and precursors trapped aloft starts on the following day as the boundary layer starts to grow (EPA July 2007, “Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical Information,” OAQPS Staff Paper, EPA-452/R-07-007, p. 2-39). For detailed information about physics and chemistry of ozone, see EPA February 2006, “Air Quality Criteria for Ozone and Related Photochemical Oxidants,” Vol. I, EPA 600/R-05/004aF, Chapter 2, pp. 2-1 through 2-29; and EPA February 2006, “Air Quality Criteria for Ozone and Related Photochemical Oxidants,” Vol. II, Annex (AX2), EPA 600/R-05/004bF, pp. AX2-1 through AX2-189). The vast majority of NO<sub>x</sub> that contributes to ozone formation comes from fuel combustion.

Exposure to O<sub>3</sub> is driven by ambient outdoor concentrations that vary by time of day, location, and activities of persons exposed. The dose received by individuals also is a function of the volume of O<sub>3</sub> delivered to the lungs, the breathing route, and the rate of respiration. Additionally, individual response, which can vary, is related to individual susceptibility to O<sub>3</sub>. More susceptible individuals will experience larger responses than those whom are less susceptible.<sup>2</sup>

Outdoor workers, joggers, school-age children, adults engaging in moderate or greater exertion for prolonged durations, and persons with asthma and other respiratory diseases are considered “exposure of concern.” Evidence from epidemiology studies show associations with serious respiratory morbidity and cardiopulmonary mortality effects at exposure levels extending below 0.080 ppm. New evidence shows lung function decrements and respiratory symptoms in healthy persons subject to an O<sub>3</sub> exposure level of 0.060 ppm (72 FR 37818, July 11, 2007, p. 37854; also p. 37828).

#### History of Ozone Standards

On April 30, 1971, the U.S. EPA established primary and secondary National Ambient Air Quality Standards (NAAQS) for photochemical oxidants at an hourly average of 0.08 parts per million (ppm), not to be exceeded more than one hour per year (36 FR 8186).

EPA revised the primary and secondary standards on February 8, 1979, to 0.12 ppm, and changed the indicator to ozone (O<sub>3</sub>). The form of the O<sub>3</sub> standard was changed to the expected number of days per calendar year with a maximum hourly average concentration above 0.12 ppm (44 FR 8202).

#### 1997 NAAQS Revisions

On July 18, 1997, EPA revised the primary and secondary O<sub>3</sub> standards under a court-ordered schedule and accelerated review process (62 FR 38856). This represented the third review of O<sub>3</sub> standards; the second periodic review of criteria and standards resulted in no change (58 FR 13008). Scientific evidence linked exposure to ambient O<sub>3</sub> to adverse health and welfare effects at levels allowed by the one-hour average standard. The existing primary one-hour average standard was replaced with an eight-hour averaged standard set at 0.08 ppm (effectively 0.084 ppm due to EPA’s rounding convention) and the form of this standard was changed to the annual fourth-highest daily maximum eight-hour averaged concentration, averaged over three years. The secondary O<sub>3</sub> standard also was revised to be identical to the revised primary standard (62 FR 38856).

On May 14, 1999, in response to petitions filed regarding a broad range of issues, the U.S. Court of Appeals for the District of Columbia Circuit remanded the O<sub>3</sub> NAAQS to EPA. The court directed EPA to consider potential beneficial health effects of pollution in shielding the general public from effects of solar ultraviolet radiation and its adverse health effects (*American Trucking Associations v. EPA*, 175 F.3d 1027, D.C. Cir., 1999).

EPA petitioned the U.S. Supreme Court for certiorari on the judgment. On February 27, 2001, the U.S. Supreme Court reversed the judgment of the D.C. Circuit Court on the constitutional issue, holding that § 109 of the Clean Air Act does not delegate legislative power to EPA in contravention of the Constitution, remanding the case to the D.C. Circuit Court to consider challenges not addressed by the court’s earlier decisions (*Whitman v. American Trucking Associations*, 531 U.S. 457, 2001). On March 26, 2002, the D.C. Circuit Court issued its final decision, stating the 1997 O<sub>3</sub> NAAQS is “neither arbitrary nor capricious” and denied the remaining petitions for review (*Whitman v. American Trucking Associations*, 283 F.3d 355, D.C. Cir., 2002).

On November 14, 2001, EPA proposed to leave the 1997 eight-hour NAAQS unchanged in response to the D.C. Circuit Court’s remand. Subsequently, EPA reaffirmed the eight-hour O<sub>3</sub> NAAQS set in 1997 (68 FR 614).

EPA announced on April 30, 2004, that the one-hour O<sub>3</sub> NAAQS would no longer be applicable to areas one year after the effective date of the designation of those areas for the eight-hour NAAQS (69 FR 23966). As of June 15, 2005, the one-hour NAAQS expired and no longer apply to most areas (*See* 40 CFR 50.9).

#### 2008 NAAQS Revisions

A NAAQS review was initiated by EPA in September 2000, requesting additional information (65 FR 57810). A work plan was released in November 2002 for the Clean Air Scientific Advisory Committee (CASAC) and the general public (EPA 2002, Project Work Plan for Revised Air Quality Criteria for Ozone and Related Photochemical Oxidants, Research Triangle Park, NC: National Center for Environmental Assessment-RTP Report # NCEA-R-1068). Following a series of workshops in 2003, the first draft Criteria Document was released for CASAC and public review on January 31, 2005 (EPA, 2005, Air Quality Criteria for Ozone and Related Photochemical Oxidants, Washington, D.C. EPA/600/R-05/004aA-cA). The second draft Staff Paper was released on July 17, 2006.

The schedule for the review was governed by a consent decree resolving a lawsuit filed in March 2003 by plaintiffs representing national environmental organizations because EPA failed to complete the current review within the period provided by statute (*American Lung Association v. Whitman*, No. 1:03CV00778, D.D.C., 2003). The modified consent decree was entered by the court on December 16, 2004.<sup>3</sup>

On August 2, 2007, EPA issued a Regulatory Impact Analysis (RIA) for revisions to the O<sub>3</sub> NAAQS proposed June 20, 2007. It estimated potential costs and benefits for reaching the standard by 2020, based on a standard ranging from 0.070 to 0.075 ppm, as well as two other levels (0.065 ppm and 0.079 ppm), (EPA, 2007, “Fact Sheet-Regula-

tory Impact Analysis of EPA's Proposed Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone," available from: [http://www.epa.gov/ground\\_level\\_ozone/fs20070802.html](http://www.epa.gov/ground_level_ozone/fs20070802.html), August 8, 2007).

On March 27, 2008, EPA lowered the eight-hour primary standard from 0.08 ppm to 0.075 ppm (to three decimal places) and made the secondary standard identical to the revised primary standard. Its rationale for developing the primary and secondary standards for O<sub>3</sub> was based on an "integrative synthesis" of hundreds of studies conducted in many countries that examined associations between exposure to ambient O<sub>3</sub> and the associated range of adverse health effects. An emphasis was placed on U.S. and Canadian studies. The O<sub>3</sub> standards became effective on May 27, 2008 (73 FR 16435, March 27, 2008).

#### PM<sub>2.5</sub> Standard

In July 1997, EPA added standards for fine particulates, referring to particles with an aerodynamic diameter less than or equal to 2.5 microns in diameter, noting that fine and coarse fractions of PM<sub>10</sub> should be considered separately (62 FR 38652, July 18, 1997). EPA established two new PM<sub>2.5</sub> primary standards: annual standard of 15 µg/m<sup>3</sup>, based on the three-year average of annual arithmetic mean PM<sub>2.5</sub> concentrations from single or multiple community-oriented monitors; and a 24-hour standard of 65 µg/m<sup>3</sup>, based on the three-year average of the 98th percentile of 24-hour PM<sub>2.5</sub> concentrations at each population-oriented monitor within an area. EPA also revised the secondary standards by making them identical to the primary standards. The secondary standard, which addresses welfare effects, includes: visibility impairment; effects on vegetation and ecosystems; materials damage and soiling; and effects on climate change.

In 2006, EPA promulgated final rules implementing revised NAAQS for PM<sub>2.5</sub>, lowering the 24-hour average concentration from 65 µg/m<sup>3</sup> to 35 µg/m<sup>3</sup> of PM<sub>2.5</sub>. The annual arithmetic mean concentrations remain unchanged. The new primary standard is expected to provide increased protection against a wide range of adverse health effects. PM-related health effects include: decreased lung function, especially for at risk persons (e.g., persons with cardiopulmonary disease, children with asthma, and elderly), chronic bronchitis, premature mortality, increased emergency room visits, and hospital admissions. The new secondary standard for PM<sub>2.5</sub> is identical to the primary standard, which is expected to provide increased protection against PM-related welfare effects, such as visibility, soiling, and material damage (71 FR 61144, October 17, 2006).

Although the incremental costs associated with this rule are relatively low, air quality benefits are high. No adverse economic impacts on private or small businesses are anticipated.

#### **Cost Benefit Analysis.**

This Section is divided into potential impacts of ozone and PM<sub>2.5</sub>. The first part covers ozone; the second part covers PM<sub>2.5</sub>.<sup>4</sup>

#### General Health Effects of Ozone (O<sub>3</sub>)

Ozone (O<sub>3</sub>) exposure can reduce lung function and aggravate symptoms of asthma and other respiratory diseases. Persons at risk include healthy children and adults whom are active outdoors. Typical symptoms include: chest tightness, shortness of breath, and wheezing (72 FR 37818, July 11, 2007, pp. 37826 and 37861). Symptoms can lead to a variety of health endpoints, such as hospital admissions, school absences, increased medication usage, and premature mortality.<sup>5</sup>

Health benefits resulting from reduced air pollution can be expressed as avoided cases of O<sub>3</sub> and PM<sub>2.5</sub> related health effects and assigned dollar values. Table 1 shows monetized values of specific adverse health effects. If these health endpoints were avoided, cost-benefit savings could accrue to individuals. It is included in this EIS to provide a basis for potential human health benefits from reducing ambient ozone and particulate levels. ADEQ cannot provide an estimate of how many individuals will experience fewer of the health endpoints contained in Table 1.

In general, O<sub>3</sub> exposure is associated with the following: lung function decrements, respiratory symptoms, respiratory infection susceptibility, increased medication usage, aggravation of asthma, inflammation of the lungs, restricted activity days, school absences, work loss days, increased hospital and emergency room visits, hospital admissions, impairment of lung defense mechanisms, irreversible changes in lung structure, and premature mortality (73 FR 16435, March 27, 2008; EPA April 2003, "Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines," EPQ420-R-03-008, p. 2-89; EPA February 2006, "Draft Regulatory Impact Analysis: Control of Hazardous Air Pollutants from Mobile Sources," EPA 420-D-06-004, p. 3-77).

People exposed to O<sub>3</sub> levels found today in many areas of the U.S. are at risk, based on numerous scientific studies. Either short-term (one to three hours) or prolonged exposure (six to eight hours) to higher ambient O<sub>3</sub> concentrations may result in adverse health effects. Precursors to lung injury can become apparent within three hours after exposure in humans (72 FR 37818, July 11, 2007, p. 37825). Repeated exposure to O<sub>3</sub> can cause people to be more susceptible

to respiratory infection and lung inflammation, or aggravate preexisting respiratory disease, such as asthma, or lead to premature aging of the lungs and/or chronic respiratory illnesses, e.g., emphysema and chronic bronchitis (see 73 FR 16435, March 27, 2008, pp. 16440; EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Vol. I, EPA 600/R-05/004aB-cB, section 8.6.2, as cited in 72 FR 37818, July 11, 2007, p. 37825).<sup>6</sup> The elderly population, in general, is more susceptible to O<sub>3</sub> mortality effects (EPA April 2003, "Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines," EPA 420-R-03-008, p. 2-89; 72 FR 37818, July 11, 2007).

Reaction of O<sub>3</sub> with lipids and antioxidants in the epithelial lining fluid and the epithelial cell membranes of the lung can be the initial step in mediating adverse health effects of O<sub>3</sub>. However, the initial step activates a cascade of events that lead to oxidative stress, injury, inflammation, airway epithelial damage, and increased alveolar permeability to vascular fluids. This could lead to increased airway responsiveness, i.e., airway bronchoconstrictive response to airway irritants and allergens. Continued respiratory inflammation can alter the ability to respond to infectious agents, allergens, and toxins.

Detailed data about short-term, prolonged, and long-term exposures of O<sub>3</sub> on respiratory, morbidity, and cardiovascular system effects are available in Chapters 6, 7, and 8 of the Criteria Document (EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Volume I, EPA 600/R-05/004aF) and the OAQPS Staff Paper (EPA July 2007, "Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical Information," EPA-452/R-07-007, Chapter 3, "Policy-Relevant Assessment of Health Effects Evidence," pp. 3-1 through 3-107).

#### Persons With Elevated Exposure

Children and outdoor workers could be among those whom are most at risk for elevated O<sub>3</sub> exposure. Children are more at risk of experiencing adverse health effects because they spend more time outdoors, while their respiratory systems are developing. Eighty percent of their alveoli are formed after birth. There may be no threshold for an O<sub>3</sub>-induced impact on human health (72 FR 37818, July 11, 2007, pp. 37826 and 37869). Outdoor workers spend much more time outdoors than the average adult.

#### Asthma and Ozone Exposure for Sensitive Subpopulations

Persons with altered states (physiological, morphological, and biochemical), typical of persons with respiratory diseases like asthma, chronic obstructive pulmonary disease (COPD), and chronic bronchitis, are more sensitive to additional oxidative stress induced by O<sub>3</sub> exposure (EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Vol. I, EPA 600/R-05/004aB-cB, section 8.7, as cited in 72 FR 37818, July 11, 2007, p. 37826).

Persons with respiratory illnesses are at a greater risk because this group can experience reduced lung function and increased respiratory symptoms, such as chest pain and cough. Symptoms result from exposure to relatively low O<sub>3</sub> levels during prolonged periods of moderate exertion. For more details, see EPA April 2003, "Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines," EPA 420-R-03-008, p. 2-89; 72 FR 37818, July 11, 2007; 72 FR 37818, July 11, 2007, p. 37827; Adams, W.C. 2002, Comparison of Chamber and Face-mask 6.6-Hour Exposures to Ozone on Pulmonary Functions and Symptoms Responses," *Inhal. Toxicol.*, 14:745-764; Adams, W.C. 2006, Comparison of Chamber 6.6-Hour Exposures to 0.04-0.08 ppm Ozone via Square-wave and Triangular Profiles on Pulmonary Responses," *Inhal. Toxicol.*, 18:127-136, as cited in 73 FR 16435, March 27, 2008, p. 16454).

Persons with asthma have larger and more serious effects from O<sub>3</sub> exposure than healthy persons, according to controlled human exposure and epidemiology studies (73 FR 16435, March 27, 2008, pp. 16440 and 16441). Although asthmatic individuals could experience adverse symptoms soon after O<sub>3</sub> exposure, it may take one to three days after exposure before these persons seek medical attention due to increased airway responsiveness or inflammation. Lung function decrements could be detected epidemiologically within lags of one to two days following O<sub>3</sub> exposure, due to the rapid onset of lung function changes and their persistence for 24-48 hours. Other responses may take longer and persist for longer periods of time. The lag is confirmed by asthma-related emergency department visits or hospital admissions with one to three day lags. Although the time response is highly variable, increased mortality within zero to three day lags may be predicted due to O<sub>3</sub>-induced increases in clotting agents arising from the cascading events, beginning with cell injury that occurs within 12-24 hours of O<sub>3</sub> exposure (72 FR 37818, July 11, 2007, p. 37826).

Numerous studies substantiate the fact that short-term ambient O<sub>3</sub> exposure aggravates persons with existing asthma (Thurston, et al. 1997, Ostro et al., 2001, Jalaludin et al., 2000, Desqueyroux et al., 2002, Just et al., 2002). In a widely cited study, Whittemore and Korn (1980) examined daily asthma attack diaries from 16 panels of asthmatics

living in six communities in southern California during mid-1970s. They used multiple logistic regression analysis to test for relationships between daily attacks and daily levels of two types of pollutants (photochemical oxidants and total suspended particulates), and a variety of weather variables. Results for the two pollutant models showed significant relationships between daily levels of both pollutants and reported asthma attacks.

Recent studies suggest the potential for a relationship between long-term ambient O<sub>3</sub> concentrations and the new onset of asthma (McDonnell et al. 1999; McDonnell et al. 2002). New diagnoses of asthma in children were associated with heavy exercise in communities with mean eight-hour concentration of 0.0596 ppm or greater of O<sub>3</sub> (McDonnell et al. 2002).

#### Asthma Emergency Room (ER) Visits

Several studies have established a relationship between increases of ozone and a variety of asthmatic symptoms. Weisel et al. (1995) conducted a five-year retrospective study of the relationship between summer ozone concentrations and asthma-induced ER visits in central and northern New Jersey (1986-1990). Cody et al. (1992) did a similar study for the same geographical area during the summer months of 1988 and 1989. Although Weisel et al.'s (1995) results were derived from a single-pollutant equation, the Cody et al. (1992) study includes SO<sub>2</sub> as a co-pollutant. Multiple linear regression analyses were conducted for each year, generating positive and significant coefficients of daily ER visits with ozone concentrations.

#### Respiratory Hospital Admissions

For the non-elderly ages (0-64) ozone-related respiratory hospital admissions, Hall et al. (2006) used a report by Thurston and Ito (1999), which summarized an extensive literature on hospital admissions that included ozone as one of the explanatory variables. This was the same approach adopted by CARB (2005). In the Thurston and Ito (1999) report, a statistical synthesis of three Canadian studies (Burnett et al. 1994, Thurston et al. 1994, and Burnett et al. 1997) yielded a quantitative estimate of the respiratory hospital admission effect associated with ozone exposures for the non-elderly general population. They calculated a relative risk factor of 1.18 per 100 ppb increase in daily one-hour maximum ozone levels.

To estimate ozone-related avoided incidences of respiratory hospital admissions for patients 65 and older, Hall et al. generated a pooled  $\beta$  value (0.004536) using several health studies referenced by EPA. All of these studies found significant associations between ozone and various categories of respiratory hospital admissions (Schwartz, 1995), who analyzed the relationship between ozone and all respiratory admissions for the cities of New Haven, Connecticut and Tacoma, Washington, and Moolgavkar et al. (1997), Schwartz (1994a), and Schwartz (1994b), who considered pneumonia and chronic obstructive pulmonary disease admissions in Minneapolis and Detroit.

Studies have reported the effects of O<sub>3</sub> on unscheduled respiratory hospital admissions of children (Burnett et al. 2001, Gouveia and Fletcher 2000, Petroseshevsky et al., 2001, Wong et al. 1999). A study in Toronto, Canada (Burnett et al. 2001) discovered a significant relationship between one-hour maximum O<sub>3</sub> concentrations and respiratory hospital admissions in children under two years of age.

#### Premature Mortality

Recent studies reported statistically significant associations between O<sub>3</sub> exposure and premature mortality (Touloumi et al. 1997, Samet et al. 2000, Dominici et al. 2003, Bell et al. 2004, Huang et al. 2005, Schwartz 2005, Gryparis et al. 2004).

Several meta-analyses reported fairly consistent and positive combined effect estimates for an increase in mortality for a standardized change in O<sub>3</sub> (Bell et al. 2005, Ito et al. 2005, Levy et al. 2005). Although Bell et al. (2005) and Ito et al. (2005) suggested evidence of publication bias, the association between mortality and O<sub>3</sub> concentrations remained after accounting for potential bias.

#### School Absences and Restricted Activity Days

Ozone-related school absence is a health outcome that has been examined in two published health studies. The first, by Chen et al. (2000), considered the association between air pollution and daily elementary school absenteeism in Washoe County, Nevada (1996-1998). Hall et al. (2006) regressed student absenteeism on three air pollutants (ozone, PM<sub>10</sub>, and CO), weather variables, and other confounding factors, using autoregression analysis. The second study (Gilliland et al. 2001) examined 1,933 fourth grade students for O<sub>3</sub>-related school absences in 12 southern California communities with differing concentrations of multiple pollutants (O<sub>3</sub>, NO<sub>2</sub>, and CO). Park (2002) also found increased rates of illness-related school absenteeism associated with eight-hour averaged O<sub>3</sub> concentration.

These researchers used a two-stage time series regression model that controlled for day of the week and temperature to assess whether there were any associations between pollution levels and absences. The studies found ozone to be statistically associated with daily absenteeism. Chen et al. (2000) predicted that for every 50 ppb increase in ozone

the overall absence rate increased by 13.01%. In contrast, Gilliland et al. (2001) found that a 20 ppb increase in eight-hour averaged ozone concentrations was associated with a 16.3% increase in the all-absence rate.

Minor restricted activity days (MRADs) represent days when various symptoms (respiratory) reduce normal activities, but not enough to prevent going to work or attending school. The combination of symptoms inducing an MRAD is more restrictive than any individual symptom.

The Ostro and Rothschild study (1989) used a national sample of the adult (18-65) working population (18-65) over a six-year time period (1976-1981) to determine some of the health consequences of ozone and fine particles. The authors found an association between ozone and minor restrictions in activity, after controlling for fine particles which could be used to derive an exponential ozone concentration response function.

#### Welfare Effects of Ozone (O<sub>3</sub>)

The secondary O<sub>3</sub> standard is designed to directly protect public welfare from known or anticipated adverse effects. Indirectly, the standard is expected to provide increased protection to the services and functions of ecosystems. The ecosystem components include soils, water, and wildlife, as well as associated ecosystems goods and services. Additionally, O<sub>3</sub> negatively impacts materials and property.

Major concerns relate to vegetation, including agricultural crops, forests, and herbaceous and woody species. O<sub>3</sub> impairs crops, vegetation and ecosystems more than any other air pollutant. It enters plants through stomata (apertures) in leaves in a process called uptake.<sup>7</sup> Once O<sub>3</sub> reaches the interior of plant cells, it inhibits/damages cellular components and functions (e.g., enzyme activities, lipids, and cellular membranes). The process disrupts the plant's osmotic balance and energy utilization patterns. The damage can be assessed by visible foliar injury (chlorotic and necrotic spotting), increased leaf senescence (leaf aging), and/or reduced photosynthesis (EPA July 2007, Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper, EPA-452/R-07-007, p. 7-1; EPA April 2003, "Draft Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines," EPA 420-R-03-008, pp. 9-18, 9-19, 9-20, 9-161; EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Volume I, Chapter 11, EPA 600/R-05/004aF, p. 11-1; EPA February 2006, "Draft Regulatory Impact Analysis: Control of Hazardous Air Pollutants from Mobile Sources," EPA 420-D-06-004, p. 3-91).<sup>8</sup>

Even without visible evidence of foliar injury, O<sub>3</sub> can interfere with photosynthesis and allocation of carbon. Decreased carbohydrate availability means fewer carbohydrates will be available for plant growth, reproduction, and crop yields. Growth impairment can occur during seedlings, saplings, or mature growth stages, resulting in premature senescence and reduced plant vigor (72 FR 37818, July 11, 2007, pp. 37884 and 37885).

O<sub>3</sub> damage reduces plants' capacity to form carbohydrates. As a result, plants reallocate existing resources away from root growth and storage, above ground growth or yield, and reproductive processes, toward leaf repair and maintenance. The loss of plant vigor can lead to secondary impacts that modify their responses to other environmental factors (EPA February 2006, "Draft Regulatory Impact Analysis: Control of Hazardous Air Pollutants from Mobile Sources," EPA 420-D-06-004, p. 3-91).<sup>9</sup>

Species and varieties of plants differ widely in their susceptibility to O<sub>3</sub>, and other photochemical oxidants. Vegetation includes numerous species of crop plants, forest trees, shade trees, ornamental plants, and thousands of other plants. Vegetation plays an important role in defining the structure and function of an ecosystem. If a sufficient number of plants within a community is negatively impacted, O<sub>3</sub>-related effects can adversely effect ecosystems, although not all organisms would be equally affected by O<sub>3</sub> exposure (72 FR 37818, July 11, 2007, pp. 37887 and 37888).

O<sub>3</sub> exposure in forests and ecosystems leads to shifts in species composition and associated ecosystem services (nutrient cycling, or hydrologic cycles). In addition to economic costs from adverse impacts to single plants, agricultural crops, and managed forests, costs are generated from adverse impacts to economic production, ecological structure, genetic resources, and cultural values. O<sub>3</sub> exposure has an adverse effect on saplings and mature forest trees, and natural vegetation. Impacts are cumulative, i.e., they carry over from one year to the next year (Hogsett et al. 1997 as cited in 72 FR 37890, July 11, 2007; EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Volume I, Chapter 9, EPA 600/R-05/004aF, p. 9-10).

O<sub>3</sub> can cause a variety of adverse vegetation effects, starting from individual cells through the hierarchy: whole leaves, plants, plant populations, communities, and entire ecosystems. Hence, adverse effects are more than just whether or not vegetation has experienced injury or damage (Guderian 1977, as cited in 72 FR 3789, July 11, 2007). Evidence suggests that O<sub>3</sub> exposure can predispose plants to drought stress, although the response is generally species specific (EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Volume I, Chapter 9, EPA 600/R-05/004aF, p. 9-10).<sup>10</sup> Therefore, adverse vegetation effects on a larger scale can be categorized

into four major responses: carbohydrate production and allocation, reduced growth and reproduction, foliar injury, and premature senescence.

### Crops

Current ambient concentrations are sufficient to impair growth of common and economically valuable plants and tree species. O<sub>3</sub> exposure over the growing season causes detrimental plant effects, such as biomass loss and reductions in yield, but the higher the O<sub>3</sub> concentration and exposure time, the greater the impact on vegetation (73 FR 16435, March 27, 2008; EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Volume I, EPA 600/R-05/004aF, Chapter 9, "Environmental Effects: Ozone Effects on Vegetation and Ecosystems," pp. 9-1; 9-2; and 9-6).

Recent scientific literature supports the conclusion that ambient O<sub>3</sub> concentrations are reducing the yield of major crops in the U.S., as well as reducing the quality or nutritive value of annual species (EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Volume I, Chapter 9, EPA 600/R-05/004aF, p. 9-16).

### Materials

O<sub>3</sub> and other photochemical oxidants react with materials causing their useful life to decrease and to reduce their aesthetic appearances. Materials known to be targets for damage are: elastomers, textiles and fabrics (fibers), dyes, and paints.

Elastomeric compounds that are susceptible to low levels of O<sub>3</sub> include natural rubber and synthetic polymers and copolymers of butadiene, isoprene, and styrene.<sup>11</sup> Textiles and fabrics are damaged by O<sub>3</sub> in a similar fashion as elastomers. One study showed a 20 percent loss in breaking strength.<sup>12</sup> Dyes, pigments, and inks also are subject to fading by O<sub>3</sub> exposures. The rate of fading is governed by the diffusion of the dye to the fiber surface. O<sub>3</sub> molecules break the aromatic ring portion of the dye molecule, oxidizing the dye. Some artists' pigments also are sensitive to fading and oxidation by O<sub>3</sub> when exposed to concentrations found in urban areas. O<sub>3</sub> fugitive organic pigments include alizarin red, blue-violet pigments, and yellow coloring agents. O<sub>3</sub> reacts to erode some surface coatings, i.e., paints, varnishes, and lacquers (EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Volume I, EPA 600/R-05/004aF, Chapter 11, "Ozone Effects on Man-Made Materials," p. 11-1 through 11-14).

### Endnotes for Ozone

<sup>1</sup> Sources of NO<sub>x</sub> include: motor vehicles (56%); utilities (22%); industrial, commercial, residential, and fuel combustion (17%), and all other sources (5%). VOC sources include: industrial, commercial processes (50%), motor vehicles (45%), and consumer solvents (5%) [EPA 2008, Ozone, GoodUp High, Bad Nearby <http://www.epa.gov/groundlevel ozone/pdfs/ozonegb.pdf>].

<sup>2</sup> Susceptibility includes genetic, developmental, or acquired risk factors.

<sup>3</sup> See EPA July 2007, Review of the National Ambient Air Quality Standards for Ozone: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper, EPA-452/R-07-007, pp. 1-3 to 1-10.

<sup>4</sup> Much of the information about ozone and particulates is from Hall et al., 2006, "The Health and Related Economic Benefits of Attaining Healthful Air in the San Joaquin Valley" and EPA February 2006, "Draft Regulatory Impact Analysis: Control of Hazardous Air Pollutants from Mobile Sources," EPA 420-D-06-004, section 3.3.2, "Health Effects of Ozone."

<sup>5</sup> The nature of the effects are due to the following: increased airway responsiveness (bronchial hyperactivity) measured by the decrement in pulmonary function after inhalation exposure to specific or nonspecific bronchoconstrictor stimuli, respiratory inflammation and increased permeability, increased susceptibility to respiratory infection, alterations in lung morphology, and cardiovascular effects, such as changes in heart rate variability and cardiac arrhythmia (72 FR 37818, July 11, 2007, pp. 37827-37835; 37849). For details see EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Volume I, Chapter 8, "Integrative Synthesis: Ozone Exposure and Health Effects," EPA 600/R-05/004aF, pp. 8-73 through 8-81.

<sup>6</sup> O<sub>3</sub>-induced inflammatory response in both upper respiratory track and lower respiratory track changes in host defense capability increasing airway responsiveness to allergens in persons with allergic asthma and allergic rhinitis. Thus, asthmatics have a greater respiratory related physiological response than healthy persons (also see 72 FR 37818, July 11, 2007, pp. 37824-37851).

<sup>7</sup> The process, described as O<sub>3</sub> uptake and toxicity. Changes can occur within hours or days following O<sub>3</sub> exposure, but other effects may take longer to occur, being most obvious under exposure to low O<sub>3</sub> concentrations for long periods. Low-exposure chronic effects are linked to the senescence process or to some physiological response closely linked to senescence, such as translocation, reabsorption, storage, and allocation of nutrients and carbon (EPA February 2006, "Air Quality Criteria for Ozone and Related Photochemical Oxidants," Volume I, EPA 600/R-05/004aF, Chapter 9, "Environmental Effects: Ozone Effects on Vegetation and Ecosystems," pp. 9-1; 9-2; and 9-6).

<sup>8</sup> For many, the obvious effect of O<sub>3</sub> in ambient air is visible foliar injury (e.g., necrosis and chlorosis). Visible foliar injury can occur within a growing season at very low levels of O<sub>3</sub> exposure. Another adverse effect that one may not realize that the cause was due to O<sub>3</sub> exposure is plant stress which predisposes plants and ecosystems to attack by natural enemies. Natural enemies include: disease- and injury-inducing bacteria, fungi,

nematodes, viruses, and insects (see Gaudy, Anthony F. and Elizabeth T. Gaudy, 1988, *Elements of Bioenvironmental Engineering*, Chapter 4, for a description of microorganisms). O<sub>3</sub> exposure can decrease resistance of plants to injury and damage by abiotic stress factors such as drought and frost.

<sup>9</sup> Plants may become more sensitive to other air pollutants, more susceptible to disease, insect attack, harsh weather, and other environmental stresses. Evidence also suggests that O<sub>3</sub> exposures can interfere with the formation of mycorrhiza, essential symbiotic fungi associated with the roots of most terrestrial plants, by reducing the amount of carbon available for transfer from the host to the symbiont.

<sup>10</sup> Mechanisms of response to ambient levels of O<sub>3</sub> are similar in most cases, regardless of the sensitivity of the species. Once extensive cellular injury has occurred through propagation (at the subcellular, cellular, and whole system levels), larger-scale effects include: reduced carbohydrate production and reallocation, reduced growth and reproduction, visible foliar injury and premature senescence, and reduced plant vigor.

<sup>11</sup> These compounds are long chain unsaturated organic molecules that O<sub>3</sub> damages by breaking the molecular chain at the carbon-carbon double bond. Elastomers, antiozonants, and wax are added to elastomeric formulations during the manufacturing process.

<sup>12</sup> Synthetic fibers are less affected by O<sub>3</sub> than natural fibers. In this study, scoured cotton duck cloth and bleached cotton print cloth were exposed to 0.020 to 0.060 ppm O<sub>3</sub> for 1,200 hours.

### **FINE PARTICULATE MATTER**

#### **Particulate Matter Formation and Exposure**

Particulate air pollution is a suspended mixture of solid particles and liquid droplets that vary in size and chemical composition. Particulates comprise a broad class of chemically and physically diverse substances with varying concentrations across space and time due to the class of the source and the transformation that occurs in the atmosphere. Particulate concentrations can be used as a surrogate for visibility impairment (71 FR 61144, October 17, 2006, p. 61146).

Particulates can be emitted directly or formed in the atmosphere when gaseous pollutants react to form fine particles. The latter are referred to as “secondary” particles because they are created by physicochemical transformation of gases (e.g., nitrates and sulfates). Particulates are produced as a by-product of combustion in vehicles, power plants, and industrial facilities.

Fine particulate matter (PM<sub>2.5</sub>) is defined as particles with an aerodynamic diameter equal to or less than 2.5 microns in diameter (< one-thirtieth the diameter of a human hair). Fine particulates pose a greater risk because particulates are respirable and can penetrate the respiratory system more efficiently than larger particles. New studies have confirmed and strengthened prior studies about the association between fine particles and mortality and respiratory morbidity (71 FR 61144, October 17, 2006, p. 61221). Short- and long-term exposures to PM<sub>2.5</sub>, acting alone and/or in combination with gaseous co-pollutants, are now more certain than was understood in EPA’s last review of particulates (71 FR 61144, October 17, 2006, pp. 61157-61158).

Fine particulates can result in the following adverse health effects: aggravation of asthma symptoms, chronic and acute bronchitis, bronchitis in children, respiratory symptoms, acute respiratory symptoms, restricted activity days, work loss days, and mortality.

#### **Asthma and PM Exposure for Sensitive Subpopulations**

According to the American Lung Association (1995), time-series studies with diagnosed asthmatics who record their symptoms and medication usage daily show an association between the aggravation of asthma symptoms and daily concentrations of PM (Whittemore and Korn 1980). This is a widely cited study that examined diaries from 16 panels of asthmatics living in six communities in southern California during mid-1970s. This study examined the impact of photochemical oxidants and total suspended particulates.

Dockery et al. (1996) examined the respiratory health effects of exposure to a number of pollutants, including PM, on a sample of over 13,000 children (aged 8-12 years) from 24 communities in the U.S. and Canada. Using a two-stage logistic regression model, and adjusting for the potential confounding effects of sex, parental asthma and education, history of allergies, and current smoking in the home, they found PM<sub>2.1</sub> to be significantly related to cases of acute bronchitis.

Schwartz et al. (1994) used logistic regression and found a statistical association between lower respiratory symptoms (LRS) in children and a number of pollutants, including PM<sub>10</sub>, acid aerosols, gaseous pollutants, and fine particles. LRS included cough, chest pain, phlegm, and wheeze. The study was conducted in six cities over a five-year period (1984-1988) and considered a sample of over 1,800 students enrolled in grades 2-5. More recently, Schwartz and Neas (2000) replicated the earlier analysis, focusing their efforts on PM<sub>2.5</sub> with a model that included coarser particulates (PM<sub>10-2.5</sub>) and an odds ratio of 1.29, associated with a 15 µg/m<sup>3</sup> change in PM<sub>2.5</sub>.

Pope et al. (1991) studied Utah school children (aged 9-11), and examined the association between daily occurrences of upper respiratory symptoms (URS) and daily PM<sub>10</sub> concentrations. A day of upper respiratory symptoms was defined as consisting of one or more of the following symptoms: runny or stuffy nose, wet cough, and burning eyes (also aching or red eyes). Using logistic regression, the study found that PM<sub>10</sub> was significantly associated with upper respiratory symptoms. EPA (2003b) used this work to develop a concentration response function with a  $\beta$  estimate of 0.0036. Hall et al. (2006) converted this PM<sub>10</sub>-derived value to its PM<sub>2.5</sub> counterpart (0.0072), and also relied on Pope et al.'s (1991) daily upper respiratory symptom incidence rate per child of 0.3419.

According to the American Lung Association (1995), cross-sectional analyses found that the probability that a child has had a diagnosis of bronchitis during a given time period is correlated with average PM concentrations in the city of residence during the same time period (Dockery et al. 1989).

#### Respiratory and Cardiovascular Hospital Admissions

A conclusion of the Dominici et al. (2006) study was that short-term exposure to PM<sub>2.5</sub> increased the risk of hospital admissions for respiratory and cardiovascular diseases. The study used 11.5 million Medicare enrollees (aged > 65 years) living in 204 U.S. urban counties with populations over 200,000. This study used daily counts of county hospital admissions for primary diagnosis of cerebrovascular, peripheral and ischemic heart diseases, heart rhythm, heart failure, COPD, and respiratory infection and injuries as a control outcome. The conclusion was that for each 10  $\mu\text{g}/\text{m}^3$  incremental increase in the air pollution level, about 11,000 extra hospitalizations for cardiovascular and respiratory disease occurred.

#### Chronic Bronchitis

A case of chronic bronchitis is considered to be a recurring condition of mucus in the lungs and wet cough during a minimum of three months per year for several years in a row. Abbey et al. (1995) studied the association between fine particles (including PM<sub>2.5</sub>) and new occurrences of these chronic respiratory symptoms in a survey group of nearly 1,900 Californian Seventh Day Adventists. The study found a statistically significant relationship between PM<sub>2.5</sub> and the development of chronic bronchitis in adults aged 27 and over (1977-1987). According to the American Lung Association (1995), prospective and cross-sectional studies indicate higher rates of chronic respiratory disease in locations with higher PM concentrations (also see Abbey et al. 1993).

#### Acute Respiratory Symptoms

According to the American Lung Association (1995) studies where panels of healthy subjects recorded daily respiratory symptoms, the frequency of such symptoms were positively correlated with daily PM concentrations in the study locations (Krupnick et al. 1990).

#### Mortality

Time-series studies have found evidence of an association between daily mortality rates and daily PM concentrations in urban areas of the U.S. and elsewhere (Dockery et al. 1992). Likewise, evidence has been found in prospective and cross-sectional studies of an association between mortality rates in different locations and average PM concentrations in those locations (Pope et al. 1995). Further, various types of cardiopulmonary illness are the causes of death most often correlated with PM concentrations according to the American Lung Association (1995).

Epidemiologic literature has found an association of increased fine particulate air pollution with acute and chronic mortality. In an earlier study, data from the Harvard Six Cities adult cohort study showed that long-term exposure to ambient PM<sub>2.5</sub> was associated with increased mortality.

Eight additional years of data were analyzed during a time when air pollution was declining in many of the cities studied (Watertown, MA; Kingston and Harriman, TN; St. Louis, MO; Steubenville, OH; Portage, Wyocena, and Par-deeville, WI; and Topeka, KA). The researchers concluded that total cardiovascular and lung cancer mortality were positively associated with ambient PM<sub>2.5</sub> concentrations and reduced PM<sub>2.5</sub> concentrations were associated with reduced mortality risk. They found an increase in overall mortality associated with each 10  $\mu\text{g}/\text{m}^3$  increase in PM<sub>2.5</sub> modeled either as the overall mean (rate ratio 1.16, 95% confidence interval 1.07-1.26) or as exposure in the year of death (rate ratio 1.14, 95% confidence interval 1.06-1.220). PM<sub>2.5</sub> exposure was associated with lung cancer (rate ratio 1.27, 95% confidence interval 0.96-1.69) and cardiovascular deaths (rate ratio 1.28, 95% confidence interval 1.13-1.44). Improved mortality was associated with decreased mean PM<sub>2.5</sub> (10  $\mu\text{g}/\text{m}^3$ ) between periods at the rate ratio 0.73 and 95% confidence interval, 0.57-0.95 (Laden, F., J. Schwartz, F.E. Speizer, D.W. Dockery, Reduction in Fine Particulate Air Pollution and Mortality," extended follow up of the Harvard Six Cities Study, *Am. J. Respir. Crit. Care Med.*, 173: 667-672, March 2006).

Studies of daily variation of mortality show that PM concentrations and daily mortality counts are positively correlated in some regions of the U.S. The statistical evidence shows that air pollution causes excess mortality in the U.S.

as well as in other countries (Dockery, D.W. and C. A. Pope III, 1994, Acute Respiratory Effects of Particulate Air Pollution, *Annu. Rev. Public Health* 1994, 15: 107-132).

The Health Effects Institute started the Particle Epidemiology Evaluation Project in 1994 to address the concern that the association of PM with mortality could be a result of uncontrolled effects of weather or other pollutants. The paper by Kelsall et al. (1997), which added to a previously published study of Philadelphia data, 1973-1980 (Samet, J.M., S. L. Zeger, K. Berhane, 1995, "The Association of Mortality and Particulate Air Pollution," Health Effects Institute, Cambridge: MA), used Poisson regression models to estimate the increased risk of daily mortality associated with air pollution while controlling for longer-term time trends, season, and weather (1974-1988). The research was conducted under contract with the Health Effects Institute.

Results of the Kelsall et al. (1997) research showed moderate correlations of daily concentrations of total suspended particles (TSP), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), and carbon monoxide (CO), and slight correlation of ozone (O<sub>3</sub>) with other pollutants. When included individually in the model, the means of current and previous days' levels of TSP, SO<sub>2</sub>, and O<sub>3</sub> had statistically significant effects on total mortality; pollutant increases of an interquartile range (34.5 µg/m<sup>3</sup>, 12.9 ppb, and 20.2 ppb, respectively) were associated with increases in mortality of around 1% for TSP and SO<sub>2</sub>, and of around 2% for O<sub>3</sub>. The effects of TSP and SO<sub>2</sub> were diminished when both pollutants were simultaneously included in the model, whether pairwise or in the full multi-pollutant model. This study confirms the association between TSP and mortality found in previous studies in Philadelphia (Kelsall, J.E., J.M. Samet, S.L. Zeger, J. Xu, 1997, "Air Pollution and Mortality in Philadelphia, 1974-1988." *Am. J. Epidemiol.*, 146: 750-762).

Philadelphia was chosen because of available TSP data over time and previous reports on mortality in Philadelphia. The initial report was by Schwartz and Dockery ("Increased Mortality in Philadelphia Associated With Daily Air Pollution Concentrations." *Am. Rev. Respir. Dis.* 1992, 145:600-604). Studies that followed all reported positive associations of air pollutants with mortality.

The scientific literature that assesses associations between PM<sub>2.5</sub> and premature mortality in adults has expanded rapidly over the past decade, with several large scale multi-city studies that either extend or reanalyze earlier studies (Pope et al. 1995; Krewski et al. 2000; Pope et al. 2002; and Jerrett et al. 2005). The estimate for PM<sub>2.5</sub> related mortality for the San Joaquin Valley required determining which of these studies is most appropriate for conditions in this region.

In general, studies are preferred if they are peer reviewed, cover longer periods of time, are more recent to better reflect current demographics and lifestyles, use larger samples, account for confounding factors, and were conducted in locations that have the greatest similarity to the study population. There also is an increase in literature that measures or indicates the probability of an association between PM<sub>2.5</sub> and mortality in children less than 1 year of age (Woodruff et al. 1997; Loomis et al. 1999; Pereira et al. 1998; Wang et al. 1997; and Chay and Greenstone 2003).

Both EPA and CARB have conducted recent benefit assessments for PM<sub>2.5</sub> reduction (EPA 2003b; EPA 2004; EPA 2005a; and CARB 2005), and these assessments have undergone peer review of the analytical approaches used. The consensus determined that national studies, the Pope et al. study (2002) would be the preferred basis to estimate adult mortality from particulate emissions.

The Pope et al. (2002) study was a large-scale, longitudinal cohort study that followed a large nationally representative population (ages 30 and older) across 61 cities over a 16-year follow-up period from a base of 1979-1983. Extending the follow-up period to 16 years increased the mortality data set by a factor of three compared to earlier studies. This study included PM<sub>2.5</sub> data from 1999 and the first three quarters of 2000, and controlled more precisely for a series of personal risk factors that included lifestyle and occupation. The increase for the all-cause mortality associated with annual average PM<sub>2.5</sub> was 6% per 10 µg/m<sup>3</sup>.

The Woodruff et al. (1997) study was the first comprehensive national study to assess the impact of fine PM on infant mortality in the U.S. It included a sample size of 4,000,000 infants less than 1 year of age across 86 metropolitan areas (1989-1991). Overall, the study estimated an increase of 4% for all-cause infant mortality for every 10 µg/m<sup>3</sup> increase in PM<sub>10</sub>.

The Jerrett et al. (2005) study was based on the Los Angeles area population subset from the national cohort included in Pope et al. (2002), accounted for the same confounders, and also assessed the association between average annual PM<sub>2.5</sub> and differences in mortality in the age 30 and older population. The authors found a substantially higher association between PM<sub>2.5</sub> and mortality, with a 17% increase in all-cause mortality for every 10 µg/m<sup>3</sup> increase in PM<sub>2.5</sub>.

#### Restricted Activity and Work Loss Days

Minor restricted activity days (MRADs) is a term that represents days when various symptoms (often respiratory) reduce normal activities, but do not prevent going to work or attending school. Ostro and Rothschild (1989) used six years of Health Interview Survey data (1976-1981), a large cross-sectional database collected by the National Center for Health Statistics, to determine health consequences of PM and ozone. They also found a statistical association between fine particles and minor restrictions in activity, after controlling for ozone.

Ostro (1987) examined the effect of fine particulates on work loss days (WLDs) using a national survey of working adults, aged 18-64, in 49 different metropolitan areas in the U.S. The author found a significant link between PM<sub>2.5</sub> and missed days of work for each of the six years of the study (1976-1981), estimating separate coefficients for each year of the analysis.

ADEQ and other Entities

The more stringent federal NAAQS that are proposed to be implemented by this rulemaking may impose additional compliance costs due to the potential expansion of existing nonattainment boundaries and identification of new non-attainment areas. This could include areas in the state that never have been planning areas for criteria pollutants.

With the expansion of planning areas, both costs and benefits could be experienced by counties, Councils of Government, subcounty places and other entities involved in creating or expanding nonattainment areas in the state.

Small Business Impacts

Statutes require agencies to reduce the impact of a rule on small businesses by using certain methods, when they are legal and feasible, in meeting the statutory objectives of the rulemaking. The following examples show methods that are available to reduce the impacts on small businesses. Under § 41-1055(B)(5)(c)(i) through (iii), agencies may employ methods to reduce the impact on small businesses including: (1) establishing less costly compliance requirements; (2) establishing less costly schedules or less stringent deadlines for compliance; and (3) exempting small businesses from any or all requirements.

Under § 41-1035; however, agencies must consider each of the methods set forth in this Section and reduce the impact, by using one or more, if the agency finds that the methods are legal and feasible in meeting the statutory objectives of the rulemaking. These methods include: (1) establishing less stringent compliance or reporting requirements; (2) establishing less stringent schedules or deadlines in the rule for compliance or reporting requirements; (3) consolidating or simplify compliance or reporting requirements; (4) establishing performance standards to replace design or operational standards; and (5) exempting small businesses from any or all rule requirements.

ADEQ cannot exempt small business owners from complying with the rule provisions to mitigate potential impacts, because the adopted rules are federal standards and the rules implementing the standards cannot be less stringent.

Table 1 Monetized Values of Health Endpoints

Health Endpoint (avoided health effect)	Value per Incidence (2005\$ unless noted)	Notations
Premature Mortality (VSL)	6,500,000	EPA's value of \$5.5 million converted to 2005 dollars
Chronic Bronchitis (onset)	374,000	Estimated in two CV studies (Krupnick and Cooper 1989; Viscusi et al. 1991) updated from the value used by EPA (2003b, 2004, 2005)
Respiratory Hospitalizations (applies to adults and children)	32,000	CA-based value (Chestnut et al. 2006)
Emergency Room Visit	335	Based on two combined COI studies (EPA 2005); excludes time lost at work or school and value of pain avoidance
Work Loss Day (WLD)	141	Daily wage rates in Kern and San Joaquin counties
Work Loss Day (WLD)	123	Daily wage rate in Merced County
Acute Bronchitis (six-day period)	110	Computed from Loehman et al. (1979) values for chest discomfort and cough, and adjusted to 2005 dollars
School Absent Day (SAD)	79	San Joaquin County

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School Absent Day (SAD)	65	Tulare County
Minor Restricted Activity Day (MRAD)	61	Based on WTP (Tolley et al. 1986) and reported by EPA 2005 (\$51 in 1999), and converted to current dollars and adjusted for income (CARB 2005)
School Absence Day (SAD)	54	Computed from an indirect cost of 3.6 million school loss days to be \$194.5 million in 1994 dollars (Smith et al. 1997)
Asthma Attack (per event)	50	Adjusted from EPA's peer-reviewed value and updated to current dollars and income; value is based on a 1986 CV study conducted in Los Angeles that estimated WTP to avoid a "bad asthma day" (Rowe and Chestnut)
Upper Respiratory Symptom Day (URS)	32	Adjusted from the value EPA adopted (2005) to account for inflation and income
Lower Respiratory Symptom Day (LRS)	20	Adjusted from the value EPA adopted (2005) to account for inflation and income
Acute Bronchitis (single day)	18	Computed from Loehman et al. (1979) values for chest discomfort and cough, and adjusted to 2005 dollars

Source: Hall, JV, V Brajer, and FW Lurmann, 2006, "The Health and Related Economic Benefits of Attaining Healthful Air in the San Joaquin Valley," CA State University, Fullerton, CA (March), pp. 69-71.

VSL=value of a statistical life; CV=contingent valuation; WTP= willingness-to-pay; MRAD= minor restricted activity day; COI=cost of illness

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72 FR 37818, July 11, 2007

71 FR 61144, October 17, 2006

69 FR 23966, April 30, 2004

68 FR 614, January 6, 2003

65 FR 57810, September 26, 2000

62 FR 38856, July 18, 1997

62 FR38652, July 18, 1997

58 FR 13008, March 9, 1993

44 FR 8202, February 8, 1979

36 FR 8186, April 30, 1971

**9. The name and address of agency personnel with whom persons may communicate regarding the accuracy of the economic, small business, and consumer impact statement:**

Name: David Lillie

Address: Department of Environmental Quality  
1110 W. Washington St.  
Phoenix, AZ 85007

Telephone: (602) 771-4461 (Any extension may be reached in-state by dialing 1-800-234-5677, and asking for a specific number.)

Fax: (602) 771-2366

E-mail: Lillie.David@ev.state.az.us

**10. The time, place, and nature of the proceedings for the making, amendment, or repeal of the rule or, if no proceeding is scheduled, where, when and how persons may request an oral proceeding on the proposed rule:**

Date: January 20, 2009

Time: 2:00 p.m.

Location: Department of Environmental Quality  
1110 W. Washington St.  
Phoenix, AZ 85007  
Conference Room 145

Nature: Oral Proceedings with opportunity for formal comments.

Close of Comment: 5:00 p.m., January 20, 2009

**11. Any other matter prescribed by statute that is applicable to the specific agency or to any other specific rule or class of rules:**

Not applicable

**12. Incorporations by reference and their location in the rules:**

40 CFR 50; Appendix 2

40 CFR 50, Appendices A through N; Appendix 2

40 CFR 53; Appendix 2

40 CFR 58; Appendix 2

40 CFR 58, all appendices; Appendix 2

- |                                 |            |
|---------------------------------|------------|
| 40 CFR Part 60, all appendices; | Appendix 2 |
| 40 CFR Part 61, all appendices; | Appendix 2 |
| 40 CFR Part 63, all appendices; | Appendix 2 |

**13. The full text of the rules follows:**

**TITLE 18. ENVIRONMENTAL QUALITY**

**CHAPTER 2. DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR POLLUTION CONTROL**

**ARTICLE 1. GENERAL**

Section

R18-2-101. Definitions

**ARTICLE 2. AMBIENT AIR QUALITY STANDARDS; AREA DESIGNATIONS; CLASIFICATIONS**

Section

R18-2-201. Particulate ~~matter~~ Matter: PM<sub>10</sub> and PM<sub>2.5</sub>

R18-2-203. Ozone: ~~1-hour standard and 8-hour averaged standard~~ One-hour Standard and Eight-hour Averaged Standard

R18-2-216. Interpretation of ~~ambient air quality standards and evaluation of air quality data~~ Ambient Air Quality Standards and Evaluation of Air Quality Data

Appendix 4. ~~Reserved~~ Historical National Ambient Air Quality Standards Chart

**ARTICLE 1. GENERAL**

**R18-2-101. Definitions**

In addition to the definitions prescribed in A.R.S. §§ 49-101, 49-401.01, 49-421, 49-471, and 49-541, in this Chapter, unless otherwise specified:

1. No change
2. No change
  - a. No change
  - b. No change
  - c. No change
  - d. No change
  - e. No change
3. No change
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5. No change
6. No change
7. No change
8. No change
9. No change
10. No change
  - a. No change
  - b. No change
  - c. No change
  - d. No change
  - e. No change
  - f. No change
11. No change
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  - b. No change
  - c. No change
12. No change
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- 41. No change
- 42. No change
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  - f. No change
  - g. No change
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  - l. No change
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- 44. No change
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- 63. No change
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    - viii. No change:
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    - xi. No change
- 64. No change
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    - ii. No change
  - c. No change
    - i. No change
    - ii. No change
    - iii. No change
    - iv. No change
    - v. No change
    - vi. No change
    - vii. No change
    - viii. No change
    - ix. No change
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- xxvii. No change
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- 73. No change
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- 80. No change
- 81. No change
- 82. No change
- 83. No change
- 84. No change
  - a. No change
  - b. No change
  - c. No change
  - d. No change
- 85. "PM<sub>2.5</sub>" means particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers as measured by a reference method based on 40 CFR 50 Appendix L, or by an equivalent method designated according to 40 CFR 53.
- 86. No change
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    - iii. No change
    - iv. No change
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- z. No change
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- ss. No change
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- uu. No change
- vv. No change
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  - iv. No change
- xx. No change
- 128. No change

**ARTICLE 2. AMBIENT AIR QUALITY STANDARDS; AREA DESIGNATIONS; CLASSIFICATIONS**

**R18-2-201. Particulate ~~matter~~ Matter: PM<sub>10</sub> and PM<sub>2.5</sub>**

- A. No change
  - 1. No change
    - a. No change
    - b. No change
  - 2. No change
    - a. No change

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- b. No change
- 3. No change
  - a. No change
  - b. No change
- 4. No change
- 5. No change
- B. PM<sub>2.5</sub> Standards**
  - 1. No change
    - a. No change
    - b. No change
  - 2. No change
    - a. No change
    - b. No change
  - 3. No change
    - a. No change
    - b. No change
  - 4. No change
  - 5. The primary and secondary 24-hour ambient air quality standards for PM<sub>2.5</sub> are met when the 98th percentile 24-hour concentration, determined according to 40 CFR 50, Appendix N, is less than or equal to ~~65~~ 35 micrograms per cubic meter.

**R18-2-203. ~~Ozone: 1-hour standard and 8-hour averaged standard~~ One-hour Standard and Eight-hour Averaged Standard**

- A. No change**
  - 1. No change
  - 2. No change
  - 3. No change
- B. ~~8-hour~~ Eight-hour averaged standard. Until May 27, 2008:**
  - 1. No change
  - 2. No change
  - 3. No change
- C. Revised eight-hour averaged standard. Effective May 27, 2008:**
  - 1. The eight-hour averaged primary ambient air quality standard for ozone is 0.075 ppm.
  - 2. The eight-hour averaged secondary ambient air quality standard for ozone is 0.075 ppm.
  - 3. Eight-hour averaged primary and secondary ambient air quality standards for ozone are met at an ambient air quality monitoring site when the average of the annual fourth-highest daily maximum eight-hour ozone concentration is less than or equal to 0.075 ppm, determined according to 40 CFR 50, Appendix P. Appendix P as adopted by 73 FR 16511 March 27, 2008, is incorporated by reference and on file with the Department. This incorporation by reference contains no future editions or amendments.

**R18-2-216. ~~Interpretation of ambient air quality standards and evaluation of air quality data~~ Ambient Air Quality Standards and Evaluation of Air Quality Data**

- A. No change**
- B. Appendix 4 to this Chapter contains a Historical National Ambient Air Quality Standards Chart.**

**Appendix 4. ~~Reserved~~ Historical National Ambient Air Quality Standards Chart**

<b><u>National Ambient Air Quality Standards</u></b>				
<b><u>Pollutant</u></b>	<b><u>Primary Standards</u></b>		<b><u>Secondary Standards</u></b>	
	<b><u>Level</u></b>	<b><u>Averaging Time</u></b>	<b><u>Level</u></b>	<b><u>Averaging Time</u></b>
<u>Carbon Monoxide</u>	<u>9 ppm</u> <u>(10 mg/m<sup>3</sup>)</u>	<u>8-hour<sup>(1)</sup></u>	<u>None</u>	
	<u>35 ppm</u> <u>(40 mg/m<sup>3</sup>)</u>	<u>1-hour<sup>(1)</sup></u>		
<u>Lead</u>	<u>1.5 µg/m<sup>3</sup></u>	<u>Quarterly Average</u>	<u>Same as Primary</u>	
<u>Nitrogen Dioxide</u>	<u>0.053 ppm</u> <u>(100 µg/m<sup>3</sup>)</u>	<u>Annual</u> <u>(Arithmetic Mean)</u>	<u>Same as Primary</u>	

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<u>Particulate Matter (PM<sub>10</sub>)</u>	<u>150 µg/m<sup>3</sup></u>	<u>24-hour<sup>(2)</sup></u>	<u>Same as Primary</u>	
<u>Particulate Matter (PM<sub>2.5</sub>)</u>	<u>15.0 µg/m<sup>3</sup></u>	<u>Annual<sup>(3)</sup></u> <u>(Arithmetic Mean)</u>	<u>Same as Primary</u>	
	<u>35 µg/m<sup>3</sup> (2006 std)</u>	<u>24-hour<sup>(4)</sup></u>	<u>Same as Primary</u>	
	<u>65 µg/m<sup>3</sup> (1997 std)</u>	<u>24-hour</u>	<u>Same as Primary</u>	
<u>Ozone</u>	<u>0.075 ppm (2008 std)</u>	<u>8-hour<sup>(5)</sup></u>	<u>Same as Primary</u>	
	<u>0.08 ppm (1997 std)</u>	<u>8-hour<sup>(6)</sup></u>	<u>Same as Primary</u>	
	<u>0.12 ppm</u>	<u>1-hour<sup>(7)</sup></u> <u>(Applies only in limited areas)</u>	<u>Same as Primary</u>	
<u>Sulfur Dioxide</u>	<u>0.03 ppm</u>	<u>Annual</u> <u>(Arithmetic Mean)</u>	<u>0.5 ppm</u> <u>(1300 µg/m<sup>3</sup>)</u>	<u>3-hour<sup>(1)</sup></u>
	<u>0.14 ppm</u>	<u>24-hour<sup>(1)</sup></u>		

<sup>(1)</sup> Not to be exceeded more than once per year.

<sup>(2)</sup> Not to be exceeded more than once per year on average over three years.

<sup>(3)</sup> To attain this standard, the three-year average of the weighted annual mean PM<sub>2.5</sub> concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m<sup>3</sup>.

<sup>(4)</sup> To attain this standard, the three-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m<sup>3</sup> (effective December 17, 2006).

<sup>(5)</sup> To attain this standard, the three-year average of the fourth-highest daily maximum eight-hour averaged ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).

<sup>(6)</sup> (a) To attain this standard, the three-year average of the fourth-highest daily maximum eight-hour averaged ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(b) The 1997 standard – and the implementation rules for that standard – will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

<sup>(7)</sup> (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1.

(b) As of June 15, 2005, EPA revoked the one-hour ozone standard in all areas except the eight-hour ozone nonattainment Early Action Compact (EAC) Areas.