

## **TECHNICAL REVIEW AND EVALUATION OF THE CONCRETE BATCH PLANT GENERAL PERMIT**

### **I. INTRODUCTION**

The Concrete Batch Plant General Permit is a permit for a facility class (Concrete Batch Plants) that contains 10 or more facilities that are similar in nature, have substantially similar emissions, and would be subject to the same or substantially similar requirements. The General Permit will last for 5 years from the date of its issuance. Equipment that is covered under the general permit will be required to have an “Authorization To Operate” (ATO). The ATO will identify the piece of equipment by having the manufacture, date of manufacture, maximum capacity, and serial number or equipment number along with the hours of operation limitation.

This General Permit allows for portable Concrete Batch Plants to move to other locations statewide, except for Maricopa County; the following townships in of Pima County: T11S-R9E, T11S-R10E, T11S-R11E, T11S-R12E, T12S-R8E, T12S-R9E, T12S-R10E, T12S-R11E and T12S-R12E (a visual representation of this area is shown in Section VIII); the following townships in portions of Santa Cruz County: T23S-R13E, T23S-R14E, T24S-R13E and T24S-R14E R12E (a visual representation of this area is shown in Section IX); the following townships in portions of Yuma County: T7S- R21W, R22W; T8S-R21W, R22W, R23W, R24W, T9S-R21W, R22W, R23W, R24W, R25W; T10S-R21W, R22W, R23W, R24W, and R25W R12E (a visual representation of this area is shown in Section X); the following townships in portions of Gila and Pinal County: T4S-R16E, T5S-R16E, T6S-R16E, T1N-R13E, T1N-R15E, T6S-R13E, and T6S-R15E (a visual representation of this area is shown in Section XI) and the following townships in portions of Cochise County: Township 23 South, Range 25 East (T23S, R25E): T23S-R26E, T23S-R27E, T23S-R28E, T24S-R25E, T24S-R26E, T24S-R27E, and T24S-R28E.

The Permittee that applies for an ATO under the general permit shall pay the Department a flat application fee of \$500 with the submittal of the permit application. The Permittee must also continue to pay, for each calendar year, the applicable administrative or inspection fees as described in the Arizona Administrative Code Title 18, Chapter 2, Article 5, section 511 (A.A.C. R18-2-511).

### **II. FACILITY DESCRIPTION**

#### **A. Process Description**

At most of these plants, sand, aggregate, cement and water are all gravity fed from the weigh hopper into the mixer trucks. The concrete is mixed on the way to the site where the concrete is to be poured. At some of these plants, the concrete may also be manufactured in a central mix drum and transferred to a transport truck. Most of the remaining concrete manufactured are products cast in a factory setting. Precast products range from concrete bricks and paving stones to bridge girders, structural components, and panels for cladding. In a few cases, concrete is dry batched or prepared at a building construction site. The raw materials can be delivered to a plant by rail, truck or barge. The cement is transferred to elevated storage silos pneumatically or by bucket elevator. The sand and coarse aggregate are transferred to elevated bins by front end loader, clam shell crane, belt conveyor, or bucket elevator. From these elevated bins, the constituents are fed by gravity or screw conveyor to weigh hoppers, which combine the proper amounts of each material.

#### **B. Air Pollution Control Equipment**

Particulate matter, consisting primarily of cement and pozzolan dust but including some aggregate and sand dust emissions, is the primary pollutant of concern. In addition, there are emissions of metals that are associated with this particulate matter. Fugitive sources include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. The amount of fugitive emissions generated during the transfer of sand and aggregate depends primarily on the surface moisture content of these materials. The extent of fugitive emission control varies widely from plant to plant.

Types of controls used may include water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, and the like. A major source of potential emissions, the movement of heavy trucks over unpaved or dusty surfaces in and around the plant, can be controlled by good maintenance and stabilization of the road surface.

### III. OPERATING LIMITS AND ASSOCIATED EMISSIONS

- A. The Permittee is allowed to operate the concrete batch plant in one of the following operating scenarios:
1. While operating under generator power, with a throughput that does not exceed 900 cubic yards per day.
  2. While operating under commercial electric power, with a throughput that does not exceed 930 cubic yards per day.

The following emissions are associated with each of the above mentioned scenarios:

*Table 1: Emissions Based on Operating Scenario*

Pollutant	Scenario #1	Scenario #2
	<i>tpy</i>	<i>tpy</i>
CO	19.51	3.61
NO <sub>x</sub>	88.82	6.26
SO <sub>2</sub>	54.33	35.54
VOCs	2.87	0.48
PM <sub>10</sub>	5.72	3.80
HAPs	2.57	0.48

- B. The Permittee is not allowed to operate the concrete batch plant in Maricopa County.
- C. The Permittee is not allowed to operate the concrete batch plant in portions of Pima, Santa Cruz, Gila, Pinal, Yuma and Cochise County.
- D. The Permittee is not allowed to collocate the concrete batch plant with a hot mix asphalt plant or a crushing and screening plant.

Hot mix asphalt or crushing and screening plant equipment is considered collocated when all of the following apply:

1. The equipment is located on property that is contiguous or adjacent to the concrete batch facility;
2. The equipment is under same or common control; and
3. Belongs to the same industrial grouping.

#### IV. APPLICABLE REGULATIONS

The Department has identified the applicable regulations that apply to each unit at a concrete batch plant facility. Tables 2, 3 and 4 summarize the findings of the Department with respect to the regulations that are applicable to each emissions unit. Previous permit conditions are discussed under Section V of this technical review document.

*Table 2: Applicable Regulations Statewide excluding Pima and Pinal County*

Unit ID	Control Equipment	Applicable Regulations	Verification
Concrete Batch Plants	Emissions from silos are controlled by baghouses. Fugitive sources controlled by water spray and other reasonable precautions.	<u>Arizona Administrative Code (A.A.C.)</u> R18-2-702.B R18-2-723	Standards of performance for concrete batch plants and fugitive dust sources.
Boilers < 10 MMBtu/hr	None	<u>A.A.C.</u> R18-2-724.C.1 R18-2-724.J R18-2-724.E	Standards of performance for fossil-fuel fired industrial and commercial equipment
Vapor Generators	None	<u>A.A.C.</u> R18-2-702.B.3 R18-2-730.A.1.a R18-2-730.A.1.b	Standards of performance for unclassified sources. This subsection is for direct-fired equipment such as vapor generators.

Unit ID	Control Equipment	Applicable Regulations	Verification
Internal Combustion Engines Subject to NSPS 40 CFR 60 Subpart IIII	None	<u><i>Code of Federal Regulations (CFR)</i></u> <u><i>40CFR</i></u> 60.4201(a),(d) 60.4202(a) 60.4202(a)(1) 60.4202(a)(2) 60.4202(c) 60.4204(a),(b) 60.4204(c)(1) 60.4204(c)(2) 60.4205(a),(b),(c) 60.4205(d)(1) 60.4205(d)(2) 60.4206 60.4207(a),(b) 60.4211(a),(b),(c),(d) 60.4212 60.4213 60.4214(a),(c)	New Source Performance Standards (NSPS) as defined in Code of Federal Regulations Subsection IIII. This subsection is for stationary compression ignition internal combustion engines that are manufactured after April 1, 2006.
Internal Combustion Engines Subject to NSPS 40 CFR 60 Subpart JJJJ	None	<u><i>Code of Federal Regulations (CFR)</i></u> <u><i>40CFR</i></u> 60.423(a) 60.4236(a)-(e) 60.4237 60.4233(a),(c)-(e) 60.4234 60.4243(a)-(g) 60.4244 60.4245	New Source Performance Standards as defined in Code of Federal Regulations Subsection JJJJ. This subsection is for stationary spark ignition internal combustion engines.
Internal Combustion Engines Subject to NSPS 40 CFR 63 Subpart <i>ZZZZ</i>	None	<u><i>Code of Federal Regulations (CFR)</i></u> <u><i>40CFR</i></u> 63.6580 63.6585(c), (d) 63.6590(a)(1)(iii) 63.6590(a)(2)(iii) 63.6590(a)(3)(iii) 63.6590(b)(3) 63.6590(c) 63.6595(a)(6),(7) 63.6605(a),(b)	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines as defined in Code of Federal Regulations Subsection ZZZZ.  All compression-ignition engines that are subject to NSPS Subpart IIII and spark-ignition engines, less than 500 hp, that are subject to NSPS Subpart JJJJ are not subject to the requirements under NESHAPS Subpart ZZZZ. Additionally, spark-ignition engines, greater than 500 hp, located at area sources, do not have any substantive obligations under NESHAP Subpart ZZZZ.

Unit ID	Control Equipment	Applicable Regulations	Verification
Internal Combustion Engines Not Subject to NSPS	None	<u>A.A.C.</u> R18-2-719.B R18-2-719.C.1 R18-2-719.E R18-2-719.F R18-2-719.H R18-2-719.I R18-2-719.J	Standards of Performance for existing stationary rotating machinery. This section is applicable to internal combustion engines that were manufactured prior to April 1, 2006.
Fugitive Dust Sources	Water and other reasonable precautions	<u>A.A.C.</u> R18-2-702 Article 6	These standards are applicable to all fugitive dust sources.
Mobile Sources	Water Sprays/Water Truck for dust control	<u>A.A.C.</u> Article 8	This Article is applicable to off-road mobile sources, which either move while emitting air pollutants or are frequently moved during the course of their utilization.
Spray Painting Operations	Not Applicable	<u>A.A.C.</u> R18-2-727	This standard is applicable to any spray-painting operation.
Demolition/ Renovation Operations	Not Applicable	<u>A.A.C.</u> R18-2-1101.A.8	This standard is applicable to any asbestos related demolition or renovation operations.
Abrasive Blasting	Not Applicable	<u>A.A.C.</u> R18-2-726 R18-2-702.B	This standard is applicable to any activity related to abrasive blasting operations.

Table 3: Regulations for Pima County

Unit ID	Control Equipment	Applicable Regulations	Verification
Concrete Batch Plants	Emissions from silos are controlled by baghouses. Fugitive sources controlled by water spray and other reasonable precautions.	<u>Pima County Code (P.C.C.)</u> P.C.C. 17.16.380	The regulations listed are applicable to Concrete Batch Plants located in Pima County.
Internal Combustion Engines	None	<u>P.C.C.</u> P.C.C. 17.16.340 P.C.C. 17.16.490	The regulation listed is applicable to all stationary gas turbines, oil-fired turbines and internal combustion engines. The regulations are identical to A.A.C. R18-2-719 so they have been streamlined into the statewide conditions.
Boilers	None	<u>P.C.C.</u> P.C.C. 17.16.165	The regulations listed are applicable to fossil-fuel fired steam generating units or general fuel burning equipment which is less than 250 MMBtu/hr (73 Megawatts) in capacity. The regulations are identical to A.A.C. R18-2-724 so they have been streamlined into the statewide conditions.
Vapor Generators	None	<u>P.C.C.</u> P.C.C. 17.16.430.A.1.a P.C.C. 17.16.430.A.1.b	The regulations listed are applicable to unclassified sources such as direct-fired vapor generators.
Fugitive Dust	Water trucks, and wet suppressants	<u>P.C.C.</u> P.C.C. 17.16.040 P.C.C. 17.16.050 P.C.C. 17.16.060 P.C.C. 17.16.080 P.C.C. 17.16.090 P.C.C. 17.16.100 P.C.C. 17.16.110  Pima County State Implementation Plan Rule 343	The regulations listed are applicable to emissions produced from fugitive dust producing activities, vacant lots, open spaces, roads, streets, particulate materials and storage piles.

Unit ID	Control Equipment	Applicable Regulations	Verification
Spray Painting Operations	Not Applicable	<u>P.C.C.</u> P.C.C. 17.16.400	The regulation listed is applicable to any spray-painting operation. The regulation is identical to A.A.C. R18-727, so it has been streamlined into the statewide conditions.
Demolition/ Renovation Operations	Not Applicable	<u>P.C.C.</u> P.C.C. 17.16.655	The regulation listed is applicable to any asbestos related demolition or renovation operation. The regulation has been streamline with A.A.C. R18-2-1101.A.8 because the state rule is more stringent.
Abrasive Blasting	Not Applicable	<u>P.C.C.</u> P.C.C. 17.16.100.D	The regulation listed is applicable to any activity related to abrasive blasting operations. The regulation has been streamline with A.A.C. R18-2-726 and R18-2-702.B because they are more stringent.

Table 4: Regulations for Pinal County

Unit ID	Control Equipment	Applicable Regulations	Verification
Concrete Batch Plants	Emissions from silos are controlled by baghouses. Fugitive sources controlled by water spray and other reasonable precautions.	<u>Pinal County Code (Pinal Code)</u> Pinal Code 5-24-1030 Pinal Code 5-24-1032	The regulations listed are applicable to Concrete Batch Plants located in Pinal County. The regulations are identical to A.A.C. R18-2-723 so they have been streamlined into the statewide conditions.
Internal Combustion Engines	None	<u>Pinal Code</u> Pinal Code 5-23-990 Pinal Code 5-23-1010 Pinal Code 5-23-1015 Pinal Code 5-23-1020	The regulation listed is applicable to all stationary gas turbines, oil-fired turbines and internal combustion engines. The regulations are identical to A.A.C. R18-2-719 so they have been streamlined into the statewide conditions.

Unit ID	Control Equipment	Applicable Regulations	Verification
Boilers	None	<u>Pinal Code</u> Pinal Code 5-21-920 Pinal Code 5-21-930 Pinal Code 5-21-950 Pinal Code 5-21-960 Pinal Code 5-21-970	The regulations listed are applicable to fossil-fuel fired steam generating units or general fuel burning equipment in which fuel is burned for the primary purpose of producing steam, hot water, hot air or other liquids, gases or solids and in the course of doing so the products of combustion do not come into direct contact with process materials. The regulations are identical to A.A.C. R18-2-724 so they have been streamlined into the statewide conditions.
Vapor Generators	None	<u>Pinal Code</u> Pinal Code 5-24-1030.A.1.a Pinal Code 5-24-1030.A.1.b	The regulations listed are applicable to miscellaneous and unclassified sources. The regulations have been streamlined with A.A.C. R18-2-730.A.1.a, A.A.C. R18-2-730.A.1.b and R18-2-702.B.3 because they are identical.
Fugitive Dust	Water trucks, and wet suppressants	<u>Pinal Code</u> Pinal Code 3-1-102 Pinal Code 4-2-040 Pinal Code 4-2-050	The regulations listed are applicable to sources of fugitive dust emissions on the concrete batch plant while operating in Pinal County.
Spray Painting Operations	Not Applicable	<u>Pinal Code</u> Pinal Code 5-13-390	The regulation listed is applicable to any spray-painting operation. This regulation is less stringent than A.A.C. R18-727, so it has been streamlined into the statewide conditions.
Demolition/ Renovation Operations	Not Applicable	<u>Pinal Code</u> Pinal Code 7-1-060	The regulation listed is applicable to any asbestos related demolition or renovation operation. The regulation has been streamline with A.A.C. R18-2-1101.A.8 because the state rule is more stringent.
Abrasive Blasting	Not Applicable	<u>Pinal Code</u> Pinal Code 5-4-160 Pinal Code 5-4-170 Pinal Code 5-4-175	The regulation listed is applicable to any activity related to abrasive blasting operations. The regulation has been streamline with A.A.C. R18-2-726 and R18-2-702.B because they are identical.

**V. PREVIOUS PERMITS AND CONDITIONS**

**A. Previous Permits**

Table 5 below lists the previous Concrete Batch Plant General Permits

*Table 5: Previous Permits*

Date Permit Issued	Application Basis
11/10/2003	Concrete Batch Plant General Permit issued
7/17/2006	Concrete Batch Plant General Permit Reopening
5/1/2008	Concrete Batch Plant General Permit Reopening

**B. Previous Permit Conditions**

The following are discussions on the previous General Permit.

**Concrete Batch Plant General Permit**

This general permit reopening was issued on May 1, 2008.

*Table 6: Previous Permit Conditions*

Concrete Batch Plant General Permit, References	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Introduction		X			The introduction includes language describing the equipment that requires an ATO and qualifying parameters for getting a general permit for concrete batch plants.
Attachment "A"	X				General provisions – Revised to reflect contemporary analysis.
Attachment "B" I		X			This condition states that this document can be utilized as an installation permit.
Attachment "B" II.A	X				<u>Facility Wide Requirements, Operational Limitations</u> – This condition specifies the operational limitations the Permittee must meet to maintain permit compliance. – Revised to reflect contemporary analysis.
Attachment "B" II.B		X			<u>Facility Wide Requirements, Record Keeping Requirements</u> – This condition specifies the record keeping requirements the Permittee must maintain to determine compliance with the operational limitations.

Concrete Batch Plant General Permit, References	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Attachment "B" III.A	X				<u>Concrete Batch Facility Requirements, Particulate Matter &amp; Opacity Standards</u> – This condition specifies the opacity and fugitive dust emission standards. This condition was revised to differentiate between point and nonpoint sources of visible emissions.
Attachment "B" III.B		X			<u>Concrete Batch Facility Requirements, Air Pollution Controls</u> – This condition specifies the air pollution control on the cement/fly ash silos and product delivery system.
Attachment "B" III.C		X			<u>Concrete Batch Facility Requirements, Monitoring, Maintenance &amp; Recordkeeping</u> – This condition specifies the monitoring, maintenance & recordkeeping requirements for the baghouses, product delivery system and wet suppression systems.
Attachment "B" IV.A		X			<u>Wash Plant Requirements</u> , – This condition specifies the material permit conditions required to control visible emissions from airborne dust as a result of wash plant operations.
Attachment "B" V.A		X			<u>Non NSPS Boilers, Applicability</u> – This condition specifies that the boiler must have a maximum firing capacity of 10 MMBtu per hour.
Attachment "B" V.B		X			<u>Non NSPS Boilers, Fuel Limitation</u> – This condition specifies that the boiler can only burn natural gas, LPG or low sulfur diesel fuel.
Attachment "B" V.C		X			<u>Non NSPS Boilers, Particulate Matter</u> – This condition specifies that the boiler can only burn natural gas, LPG or low sulfur diesel fuel.
Attachment "B" V.D		X			<u>Non NSPS Boilers, Opacity Standards</u> – This condition specifies that the opacity of any plume or effluent from any boiler can not exceed 15 percent. It also specifies the monitoring, recordkeeping & reporting requirements to determine compliance with the opacity standard.
Attachment "B" V.E		X			<u>Non NSPS Boilers, Sulfur Dioxide</u> – This condition specifies the sulfur dioxide emission limitation and the record keeping conditions required to demonstrate compliance.

Concrete Batch Plant General Permit, References	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Attachment "B" VI.A	X				<u>Fugitive Dust Source Requirements, Applicability</u> – This condition specifies which air contaminants are applicable to this Section. – Revised to reflect contemporary analysis.
Attachment "B" VI.B	X				<u>Fugitive Dust Source Requirements, Emission Limitations &amp; Standards</u> – This condition specifies which the opacity limitation for non-point sources. – Revised to reflect contemporary analysis.
Attachment "B" VI.C	X				<u>Fugitive Dust Source Requirements, Operational Limitations</u> – This condition specifies which the operational limitations for open areas, roadways & streets, storage piles, material handling and opening burning. – Revised to reflect contemporary analysis.
Attachment "B" VI.D	X				<u>Fugitive Dust Source Requirements, Pollution Control Requirements</u> – This condition specifies the pollution control methods to be utilized to control visible emissions from haul roads and storage piles. – Revised to reflect contemporary analysis.
Attachment "B" VI.E	X				<u>Fugitive Dust Source Requirements, Pollution Control Requirements</u> – This condition specifies the pollution control methods to be utilized to control visible emissions from haul roads and storage piles. – Revised to reflect contemporary analysis.
Attachment "B" VII.A	X				<u>Conditions Specific To Mobile Sources, Applicability</u> – This condition specifies the applicability requirements for mobile sources. – Revised to reflect contemporary analysis.
Attachment "B" VII.B	X				<u>Conditions Specific To Mobile Sources, Particulate Matter &amp; Opacity</u> – This condition specifies the emission limitations and standards for the particulate matter emitted from any mobile source. – Revised to reflect contemporary analysis.
Attachment "B" VIII.A		X			<u>Conditions Specific To Portable Sources, Equipment Identification</u> – This condition specifies the manner in which all equipment is to identified and referenced in all correspondence with the Department.
Attachment "B" VIII.B		X			<u>Conditions Specific To Portable Sources, Move Notice</u> – This condition specifies the manner in which all equipment is to identified and referenced in all correspondence with the Department.

Concrete Batch Plant General Permit, References	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Attachment "B" VIII.C		X			<u>Conditions Specific To Portable Sources, Dust Control Plan Submission</u> – This condition specifies that a dust control plan must be submitted when operating within Maricopa County.
Attachment "B" VIII.D		X			<u>Conditions Specific To Portable Sources, Renting or Leasing Permitted Equipment</u> – This condition specifies that a copy of the General Permit and ATOs must accompany all equipment whether it is owned, rented or leased.
Attachment "B" VIII.E		X			<u>Conditions Specific To Portable Sources, Portable Source Operating Solely in One County</u> – This condition defines when a Permittee must obtain a permit from county agency.
Attachment "C" I.A		X			<u>Internal Combustion Engines, Applicability</u> – This condition states that this section applies to all internal combustion engines that are not defined as non-road engines.
Attachment "C" I.B		X			<u>Internal Combustion Engines, Applicability</u> – This condition states that until the Department confirms the non-road engine determination that the engines will have to comply with the conditions in this section.
Attachment "C" II.A		X			<u>Internal Combustion Engines, Operational Limitations</u> – Maximum Capacity Requirements – This specifies the maximum combined capacity of all the generators & internal combustion engines that are allowed on the plant and the record keeping requirements.
Attachment "C" II.B		X			<u>Internal Combustion Engines, Operational Limitations</u> – Fuel Limitations – This specifies the type of fuel allowed to be burned in the generator and the record keeping requirements to certify that the sulfur content of the fuel is less than the limit specified in Condition III.B.1.e.
Attachment "C" III.A		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – Applicability – This specifies that this Section applies to compression ignition engines subject to NSPS.

Concrete Batch Plant General Permit, References	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Attachment "C" III.B.1		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – General Requirements – This condition specifies the operating requirements for the generators subject to NSPS, including the maximum sulfur content of the diesel fuel used.
Attachment "C" III.B.2		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – Emission Limitations & Standards – This condition specifies the appropriate emission limitation for each type of internal combustion engine.
Attachment "C" III.B.3		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – Notification & Reporting Requirement – This condition specifies the reporting requirements for non-emergency engines.
Attachment "C" III.B.4		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – Monitoring & Record Keeping Requirements – This condition specifies the appropriate monitoring & record keeping requirements for each type of internal combustion engine.
Attachment "C" III.B.5		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – Testing Requirements – This condition specifies which performance test is applicable depending whether the engine has a displacement less than or greater than 30 liters per cylinder.
Attachment "C" III.C.1		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – Particulate Matter – This condition specifies the emission limitation and standards of particulate matter that an internal combustion engine may emit based on maximum engine power and engine displacement in liters per cylinder.
Attachment "C" III.C.2		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – Particulate Matter – This condition states that a diesel particulate filter must be installed, maintain & operated in accordance with good air pollution control practices.

Concrete Batch Plant General Permit, References	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Attachment "C" III.C.3		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – Particulate Matter – This condition specifies the monitoring & record keeping requirements required to ensure compliance with the particulate matter emission limitations & standards.
Attachment "C" III.D		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – Nitrogen Oxides – This condition specifies the emission limitation and standards of nitrogen oxide that an internal combustion engine may emit based on maximum engine power and engine displacement in liters per cylinder.
Attachment "C" III.E		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – Carbon Monoxide – This condition specifies the emission limitation and standards of carbon monoxide that an internal combustion engine may emit based on maximum engine power and engine displacement in liters per cylinder.
Attachment "C" III.F		X			<u>Internal Combustion Engines, Compression Ignition Engines Subject To NSPS</u> – Hydrocarbon – This condition specifies the emission limitation and standards of hydrocarbon that an internal combustion engine may emit based on the year of manufacture, engine displacement and maximum engine power of the generator.
Attachment "C" IV.A		X			<u>Internal Combustion Engines, Generators Not Subject To NSPS</u> – Applicability – This specifies that this Section applies to internal combustion engines not subject to NSPS.
Attachment "C" IV.B.1		X			<u>Internal Combustion Engines, Generators Not Subject To NSPS</u> – Particulate Matter & Opacity – Emission Limitations and Standards – This condition requires the Permittee to not emit particulate matter into the atmosphere in excess of the amount calculated by the equation stated in this condition. The equation is based on the heat input of the internal combustion engine, in MMBtu/hr. This specifies that this Section applies to internal combustion engines not subject to NSPS. This condition also requires the Permittee not to emit smoke with opacity greater than 40 percent.

Concrete Batch Plant General Permit, References	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Attachment "C" IV.B.2		X			<u>Internal Combustion Engines, Generators Not Subject To NSPS</u> – Particulate Matter & Opacity – Monitoring & Recordkeeping – This condition specifies that a certified EPA Reference Method 9 observer conduct a monthly survey of the visible emissions coming from the stack of the generators and also maintain onsite records of the fuel supplier certification that verifies the sulfur content of the fuel oil.
Attachment "C" IV.B.3		X			<u>Internal Combustion Engines, Generators Not Subject To NSPS</u> – Particulate Matter & Opacity – This condition specifies that performance tests be conducted as required by the Director.
Attachment "C" IV.C		X			<u>Internal Combustion Engines, Generators Not Subject To NSPS</u> – Sulfur Dioxide – This condition specifies the sulfur dioxide limits and record keeping requirements required to verify compliance.
Attachment "D" I			X		<u>Maricopa County Requirements, Applicability of Multiple Permit Conditions</u> – This condition specifies that when there are multiple permit conditions regulating the same emission unit, the condition or combination of conditions with the lowest emissions rate or concentration of regulated air pollutants released will apply. Deleted because operation in Maricopa County is prohibited.
Attachment "D" II.A			X		<u>Maricopa County Requirements, Facility Wide Limitations</u> – Hourly Limitation – This condition specifies the number of hours the facility may operate in Maricopa county. Deleted because operation in Maricopa County is prohibited.
Attachment "D" II.B			X		<u>Maricopa County Requirements, Facility Wide Limitations</u> – Opacity Limitations – This condition specifies that the opacity limit from any air contaminant, except uncombined water is 20 percent. Deleted because operation in Maricopa County is prohibited.

Concrete Batch Plant General Permit, References	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Attachment "D" II.C.1			X		<u>Maricopa County Requirements, Facility Wide Limitations</u> – Operating Limitations – <i>Gaseous &amp; Odorous Emissions</i> – This condition specifies that the facility is not to emit gaseous or odorous air contaminants from the equipment, operations or plant which cause air pollution. Deleted because operation in Maricopa County is prohibited.
Attachment "D" II.C.2			X		<u>Maricopa County Requirements, Facility Wide Limitations</u> – Operating Limitations – <i>Material Containment Required</i> – This condition specifies material containment requires for solvents, VOCs, paints, acids, alkalies, pesticides, fertilizer and manure. The contents of this condition have been moved to the Air Pollution Control Requirements Section. Deleted because operation in Maricopa County is prohibited.
Attachment "D" II.C.3			X		<u>Maricopa County Requirements, Facility Wide Limitations</u> – Operating Limitations – <i>Stack Requirements</i> – This condition specifies that the Director may require the installation of abatement equipment or modification where a stack, vent or other outlet is at such a level that air contaminants are discharging to adjoining property. The contents of this condition have been moved to the Air Pollution Control Requirements Section. Deleted because operation in Maricopa County is prohibited.
Attachment "D" II.D			X		<u>Maricopa County Requirements, Facility Wide Limitations</u> – Air Pollution Control Requirements – This condition specifies the requirements for the operations & maintenance plan. Deleted because operation in Maricopa County is prohibited.
Attachment "D" II.E			X		<u>Maricopa County Requirements, Facility Wide Limitations</u> – Monitoring / Recordkeeping / Reporting Requirements – This condition specifies the opacity monitoring requirements; the record keeping requirements for odor complaints, operations & maintenance plans and production records; and testing requirements for opacity determinations and particulate matter when grain loading. Deleted because operation in Maricopa County is prohibited.

Concrete Batch Plant General Permit, References	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Attachment "D" III.A			X		<u>Maricopa County Requirements, Concrete Batch Plant Requirements</u> – Emission Limitations/Standards – This condition specifies the fugitive dust and the stack emission opacity limitation for the concrete batch plant. Deleted because operation in Maricopa County is prohibited.
Attachment "D" III.B			X		<u>Maricopa County Requirements, Concrete Batch Plant Requirements</u> – Record Keeping Requirement – This condition specifies the records to be maintained for the dry mix concrete plant. Deleted because operation in Maricopa County is prohibited.
Attachment "D" IV.A			X		<u>Maricopa County Requirements, Fugitive Emission Requirements</u> – Particulate Matter & Opacity – This condition specifies the particulate matter & opacity emission limitations/standards, monitoring requirements and testing requirements for fugitive sources of dust. Deleted because operation in Maricopa County is prohibited.
Attachment "D" IV.B			X		<u>Maricopa County Requirements, Fugitive Emission Requirements</u> – Dust Control Plan Required – This condition specifies the requirements for dust control plans. Deleted because operation in Maricopa County is prohibited.
Attachment "D" V.			X		<u>Maricopa County Requirements, Conditions Specific To Portable Sources</u> – Dust Control Plan Required – This condition specifies the move notice requirements. Deleted because operation in Maricopa County is prohibited.
Attachment "E" I.		X			<u>Pima County Requirements, Applicability of Multiple Permit Conditions</u> – This condition specifies that when there are multiple permit conditions regulating the same emission unit, the condition or combination of conditions with the lowest emissions rate or concentration of regulated air pollutants released will apply.

Concrete Batch Plant General Permit, References	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Attachment "E" II.			X		<u>Pima County Requirements, Crushing &amp; Screening Plant Requirements</u> – This condition specifies the particulate matter emission limitations and standards for a crushing and screening plant. These conditions have been removed from the permit because collocation of a crushing & screening plant with the concrete batch plant is prohibited. The concrete batch plant emission limit requirements have been added.
Attachment "E" III	X				<u>Pima County Requirements, Fugitive Emissions Requirements</u> – This condition specifies the requirements for visibility limiting standards, the fugitive dust producing activities, vacant lots & open spaces, roads & streets, particulate materials, storage piles and mineral tailings. The language of this section has been revised to represent the most current version of the Pima County Regulations.
Attachment "F" I.		X			<u>Pinal County Requirements, Applicability of Multiple Permit Conditions</u> – This condition specifies that when there are multiple permit conditions regulating the same emission unit, the condition or combination of conditions with the lowest emissions rate or concentration of regulated air pollutants released will apply.
Attachment "F" II.		X			<u>Pinal County Requirements, Fugitive Emissions Requirements</u> – This condition specifies the particulate matter emissions requirements.

## VI. PERIODIC MONITORING, RECORDKEEPING AND REPORTING (STATEWIDE)

### A. Concrete Batch Plant

#### 1. Facility Wide

- a. The Permittee must maintain daily records of the operating hours of the equipment and the total daily production of material processed by the equipment covered under this General Permit.

- b. The Permittee must keep on-site records of maintenance performed on all emission related equipment.
- c. The Permittee must maintain on-site, records of the manufacturer's data for all concrete batch plant equipment utilized at the facility.
- d. At the time the compliance certifications are submitted, the Permittee must submit reports of all monitoring, recordkeeping, and testing activities required by the permit.

2. *Opacity*

The Permittee is required to conduct a monthly visual survey on all process equipment. The Permittee must keep records of all surveys and EPA Reference Method 9 observations performed. These records will include the emission point observed, location of observer, name of observer, date and time of observation, and the results of the observation. If the observation shows a Method 9 opacity reading in excess of the opacity limit of 20 percent, the Permittee will be required to initiate appropriate corrective action to reduce the opacity below the standard. The Permittee will keep a record of the corrective action performed. These logs must be maintained on-site and be available to ADEQ representative upon request.

3. *Baghouses*

The Permittee is required to maintain logs of all maintenance activities performed on any baghouses. Included in these logs are the types of maintenance activity being performed, the duration of each maintenance activity, the date, start time and the end time of the activity. If the baghouse is equipped with a pressure drop measuring device than the Permittee must monitor and record twice per shift the pressure drop across the baghouse.

**B. Boilers**

1. *Particulate Matter*

- a. The Permittee is to keep records of fuel supplier certifications. The certification should contain the name of the fuel supplier and the lower heating value of the fuel. These records need to be available to ADEQ upon request.
- b. The Permittee is required to maintain on-site copies of the fuel analysis supplied by the marketer for each batch of "on specification" used oil fuel.

2. *Opacity*

The Permittee is to conduct a monthly survey of visible emissions coming from the stack of the boiler by a certified EPA Reference Method 9 observer. If the emissions appear to exceed the standard of 15 percent, the observer must conduct a certified EPA Reference Method 9 observation. The Permittee must keep records of the survey and any EPA Reference Method 9 observations performed. If the observation shows an excess reading the Permittee must report this to ADEQ as an excess emission and take the appropriate corrective action to reduce the opacity below 15 percent. The Permittee must keep a record of the corrective action performed.

3. *Sulfur Dioxide*

If the boiler fires low sulfur diesel fuel the Permittee must keep records of fuel supplier certifications to demonstrate that the diesel fuel is low sulfur (<0.9% by weight). The certification must have information about the sulfur content and the method used to determine the sulfur content of fuel. These records must be available to the ADEQ inspector upon request.

**C. Internal Combustion Engines**

1. *Facility Wide*

- a. The Permittee must maintain daily records of the total hours of operation of each internal combustion engine.
- b. If the generator burns low sulfur diesel fuel, the Permittee must maintain copies of fuel supplier certifications to verify that the sulfur content of the fuel is less than the limit specified in the permit.

2. *Engines Subject to NSPS*

a. General Requirements

- i. If the engine is an emergency engine, the Permittee must install a non-resettable hour meter prior to startup of the engine.
- ii. If the engine is an emergency engine, the Permittee must maintain monthly records of engine operation. The records are to include the purpose of operation, the duration of time the engine was operated and identify whenever the operation of the engine was for emergency purposes.
- iii. The Permittee must maintain copies of engine certifications, maintenance performed on engine and other documentation demonstrating that each engine complies with the applicable standards in this Permit, and must make the documentation available to ADEQ upon request.
- iv. The Permittee must maintain documentation from the manufacturer certifying that all stationary spark ignition internal combustion engines are certified to meet the emission standards specified in the permit.
- v. If a stationary spark ignition internal combustion engine is not certified, documentation that the engine meets the emission standards in the permit is required. If the uncertified engine has a capacity greater than or equal to 500 horsepower the Permittee is required to submit an initial notification containing the name and address of the Permittee, the facility address, engine information, emission control equipment and fuel used.

b. Particulate Matter

If a non-emergency engine is equipped with a diesel particulate filter, the Permittee must install a backpressure monitor on the filter that notifies the Permittee when the high backpressure limit of the engine is approached. Records of any corrective action taken after the backpressure monitor has notified the Permittee that the high backpressure limit of the engine has been approached must be kept.

3. *Engines Not Subject to NSPS*

a. Particulate Matter

The Permittee must have a certified EPA Reference Method 9 observer conduct a monthly survey of visible emissions coming from the stack of the generators. If the emissions appear to exceed the standard, the observer must do a certified Method 9

observation. Records of the initial survey and any Method 9 observations performed must be kept. If the opacity reading is in excess of 40 percent, the Permittee must report it to ADEQ as an excess emission and initiate appropriate corrective action to reduce the opacity below 40 percent. All records of corrective action performed must be retained.

b. Sulfur Dioxide

The Permittee is required to maintain records of daily sulfur content and lower heating value of the fuel fired in the internal combustion engines, along with a copy of the fuel supplier certification specifying the sulfur content and lower heating value. These records must be made available to the ADEQ inspector upon request.

**D. Fugitive Dust Sources**

1. A certified Method 9 observer is required to conduct a monthly survey of visible emissions coming from the fugitive dust sources. If the opacity of the emissions observed appears to exceed the opacity limit, the observer must conduct a certified six-minute EPA Reference Method 9 observation. The Permittee must keep records of the location, date, time and result of the Method 9 observation, of the initial survey and any EPA Reference Method 9 observations performed. If the observation result is above the opacity limit, the Permittee is required to take corrective action and log all their actions. Any exceedance must be reported to ADEQ as an “excess emission”.
2. The Permittee must keep records of the precautions used to prevent excessive amounts of particulate matter from becoming airborne and the date they were implemented.

**VI. MODELING ANALYSIS**

**Introduction**

This discussion provides a comprehensive air quality impact modeling analysis in support of the development of the General Permit for Concrete Batch Plants. Two levels of modeling sophistication are used, including screening modeling analysis with SCREEN3 and refined modeling analysis with AERMOD. The modeling analysis presented here was conducted to determine throughput limits for concrete batch plants under which the compliance with National Ambient Air Quality Standards (NAAQS) can be demonstrated with regulatory air quality models.

**Background Concentrations**

State-level background concentrations were determined according to the AQD’s annual air quality reports for the most recent three years (2005, 2006 and 2007). Note that the determination for PM<sub>10</sub> background concentration excluded portions of Maricopa, Yuma, Pima, Pinal, Gila, Cochise, and Santa Cruz County. Therefore, the General Permit for Concrete Batch Plants will not be authorized in these areas. Table 7 presents the values that were used to represent background concentrations for criteria pollutants.

*Table 7: Background Concentrations used in Modeling Analysis*

Pollutant	Averaging Period	Background Concentration ( $\mu\text{g}/\text{m}^3$ )
PM <sub>10</sub>	24-hour	65
SO <sub>2</sub>	Annual	5
	24-hour	50
	3-hour	250
NO <sub>2</sub>	Annual	30
CO	8-hour	2,800
	1-hour	4,500

Table 8 provides an itemized emissions inventory for all PM<sub>10</sub> sources considered in the modeling analysis. The emissions were estimated according to the daily throughput limits of 1060 yd<sup>3</sup> of concrete with generator and 1175 yd<sup>3</sup> of concrete without generator and latest AP-42 emission factors for concrete batching, wind erosion and unpaved roads.

The emissions for CO, NO<sub>x</sub> and SO<sub>2</sub> were estimated using the worst-case scenario (allowing gasoline as fuel for the generator) and the results are shown in Table 9.

#### Emissions

Table 8: PM<sub>10</sub> Emissions Inventory

Source ID	Source Descriptions	Emission Rate with Generator Power		Emissions Rate without Generator Power	
		(LB/HR)	(G/S)	(LB/HR)	(G/S)
ADGS	Aggregate delivery to ground storage	0.137	0.0172	0.152	0.0191
ATC	Aggregate transfer to conveyor	0.137	0.0172	0.152	0.0191
ATEB	Aggregate transfer to elevation bins	0.137	0.0172	0.152	0.0191
SDGS	Sand delivery to ground storage	0.031	0.0039	0.034	0.0043
STC	Sand transfer to conveyor	0.031	0.0039	0.034	0.0043
STEB	Sand transfer to elevated bins	0.031	0.0039	0.034	0.0043
WHL	Weigh hopper loading	0.168	0.0212	0.186	0.0234
TML	Truck mix loading (controlled)	0.199	0.0251	0.221	0.0278

Source ID	Source Descriptions	Emission Rate with Generator Power		Emissions Rate without Generator Power	
		(LB/HR)	(G/S)	(LB/HR)	(G/S)
GEN	Generator	0.295	0.0371		
CTCS	Cement transfer to cement silo (controlled)	0.0044	0.00055	0.0049	0.00062
CSTS	Cement supplement transfer to cement silo (controlled)	0.0088	0.0011	0.0098	0.0012
WEAS	Wind erosion from aggregate storage piles	0.050	0.0063	0.050	0.0063
WESS	Wind erosion from sand storage piles	0.016	0.0021	0.016	0.0021
UR	Unpaved Road	0.5	0.063	0.509	0.064

Table 9: Emissions Inventory for CO, NO<sub>x</sub> and SO<sub>2</sub>

Pollutants	Emissions from Generator		Emissions from Boiler	
	(lb/hr)	(g/s)	(lb/hr)	(g/s)
*CO	322.67	40.66	0.82	0.10
NO <sub>x</sub>	20.99	2.64	1.43	0.18
SO <sub>2</sub>	4.78	0.60	8.11	1.02

\*This is the worst case scenario where CO emissions are based on gasoline as fuel for the generator. The permit will not exceed major source thresholds of any pollutants by prohibiting the use of gasoline in the generators.

### Screening Modeling

Screening modeling analysis with SCREEN3 was performed for PM<sub>10</sub>, CO, NO<sub>x</sub> and SO<sub>2</sub> using the source release parameters as indicated in Table 10 and Table 11. The following modeling options were also used:

- Full meteorology with all stabilities and wind speeds;
- An automated distance array with a minimum distance of 0 meters and a maximum distance of 500 meters;
- Zero for receptor height;
- No complex terrain above stack height;

- No simple terrain above stack base;
- No building downwash;
- Rural area.

Since SCREEN3 only generates 1-hour maximum impacts, the EPA recommended conversion factors (persistence factors) were used to determine the concentrations for other averaging periods of concern. The modeled results as compared with NAAQS are shown in Table 12 and Table 13.

As presented in Table 12 and Table 13, the maximum modeled concentrations of CO, NO<sub>x</sub> and SO<sub>2</sub> with the addition of the corresponding background concentrations did not exceed the NAAQS. Therefore, the proposed emissions of CO, NO<sub>x</sub> and SO<sub>2</sub> from Concrete batch plants will not cause or contribute to a violation of the NAAQS. However, the screening analysis indicated the maximum 24-hour PM<sub>10</sub> concentration in excess of NAAQS. The maximum 24-hour PM<sub>10</sub> predicted concentrations plus background concentration were 191.8 µg/m<sup>3</sup> (with generator) and 196.7 µg/m<sup>3</sup> (without generator) respectively as compared with the NAAQS of 150 µg/m<sup>3</sup>.

Table 10: Source Release Parameters Utilized in PM<sub>10</sub> Screening Modeling Analysis

Point Sources							
Emission Source	Source ID in Table 2	Emission Rate (g/s)		Stack Diameter (m)	Stack Height (m)	Stack Exit Velocity (m/s)	Stack Exit Temperature (K)
		With Generator	Without Generator				
Generator	GEN	0.0371	-	0.2	6.71	30.5	783
Cement Silo	CTCS, CSTS	0.0017	0.0019	0.32	12.2	4	408
AREA SOURCES							
Emission Source	Source ID in Table 2	Emission Rate (g/s)		Length of X Side of Area (m)	Length of Y Side of Area (m)	Release Height (m)	
		With Generator	Without Generator				
Process Area	ADGS, ATC, ATEB, ADGS, STC, STEB, WHL, TML	0.110	0.122	160	160	3	
Wind Erosion	WEAS, WESS	0.0084	0.0084	13.5	13.5	3.8	
Unpaved Road	UR	0.121	0.127	160	160	3	

Table 11: Source Release Parameters Utilized in CO/NO<sub>x</sub>/SO<sub>2</sub> Screening Modeling Analysis

Emission Source	Emission Rate (g/s)			Stack Diameter (m)	Stack Height (m)	Stack Exit Velocity (m/s)	Stack Exit Temperature (K)
	CO	NO <sub>x</sub>	SO <sub>2</sub>				
Generator	40.66	2.64	0.60	0.2	6.71	30.5	783
Boiler	0.10	0.18	1.02	1.52	12.19	7.62	533

Table 12: Results of SCREEN3 Modeling Analysis (with Generator)

Pollutant	Averaging Time	Modeled Maximum Concentration (µg/m <sup>3</sup> )	Background Concentration (µg/m <sup>3</sup> )	Total Concentration (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )	%NAAQS
PM <sub>10</sub>	1-hour	279.9				
	24-hour	112.0	65	177.0	150	118
CO	1-hour	6,202	4,500	10,702	40,000	26.8
	8-hour	4,342	2,800	6,842	10,000	68.4
SO <sub>2</sub>	1-hour	110				
	3-hour	99	250	349	1,300	26.9
	24-hour	44	50	94	365	25.8
	Annual	9	5	14	80	17.5
NO <sub>2</sub>	1-hour	406				
	Annual	32	30	62	100	62.0

Table 13: Results of SCREEN3 Modeling Analysis (without Generator)

Pollutant	Averaging Time	Modeled Maximum Concentration (µg/m <sup>3</sup> )	Background Concentration (µg/m <sup>3</sup> )	Total Concentration (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )	%NAAQS
PM <sub>10</sub>	1-hour	290.0				
	24-hour	116.0	65	181.0	150	120.7
CO	1-hour	1.8	4,500	4,502	40,000	11.3
	8-hour	1.3	2,800	2,801	10,000	28.0
SO <sub>2</sub>	1-hour	18.6				
	3-hour	17	250	267	1,300	20.5
	24-hour	7	50	57	365	15.6
	Annual	2	5	7	80	8.8
NO <sub>2</sub>	1-hour	3.3				
	Annual	0.3	30	30.3	100	30.3

### Refined Modeling

As the results of the screening analysis indicated that the predicted concentrations of 24-hour PM<sub>10</sub> exceeded the NAAQS, it is necessary to perform a refined modeling analysis to determine whether a refined analysis can demonstrate the compliance with the NAAQS without reducing the throughput limits. The most recent version of EPA's AERMOD model was used for the refined analysis.

#### Layout of Concrete Batch Plants

The layout of concrete batch plants generally differs from one site to another. To simplify the modeling analysis, a site plan was developed as shown in Figure 1. The process area was set at 160 meters by 160 meters as used in the previous modeling analysis ADEQ performed in 1996. The layout of sources was determined according to the site plans of several existing concrete batch plants. Two assumptions were made to provide conservative predictions of PM<sub>10</sub> concentrations:

- To model the fugitive emissions generated from ready-mix trucks traveling on unpaved haul road (one of the biggest PM<sub>10</sub> source for concrete batch plants), the travel route for ready-mix trucks was placed along the process area boundary
- The other two major PM<sub>10</sub> sources (WHL and TML) were placed close to the northern boundary of the process area, since the prevailing wind directions in the meteorological data sets used for modeling are typically from southeast or southwest (the meteorological data sets used for modeling will be discussed later).

#### Source Release Parameters

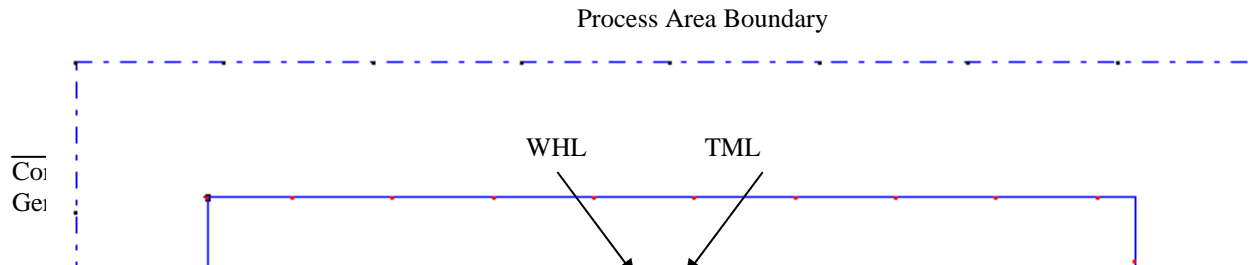
Table 14 summarizes the source release parameters used in the 24-hour PM<sub>10</sub> modeling analysis. These parameters were determined according to the values used in previous modeling analysis ADEQ performed in 1996 as well as the recommended values in *Concrete Batch Plant Modeling Guide* developed by Iowa Department of Natural Resources. The unpaved road emissions were modeled as 38 adjacent volume sources and the number of volume sources and the corresponding release parameters were determined following the ADEQ air modeling guidelines.

#### Operating Scenarios

Two operating scenarios for concrete batch plants were tested:

- Scenario #1: 88 tph concrete with generator and 98 tph concrete without generator; operating 24 hours per day; the daily throughputs are 1060 yd<sup>3</sup> of concrete (with generator) and 1175 yd<sup>3</sup> of concrete (without generator), respectively;
- Scenario #2: 75 tph concrete with generator and 78 tph concrete without generator; operating 24 hours per day; the daily throughputs are 900 yd<sup>3</sup> of concrete (with generator) and 930 yd<sup>3</sup> of concrete (without generator), respectively.

Note that Scenario #1 represents the throughput limits used in the current CBP general permit. In comparison to Scenario #1, Scenario #2 cuts around 15% of the throughput for operating under generator power and around 20% of the throughput for operating under commercial electric power, respectively.



**Figure 1 Layout of Concrete Batch Plant for AERMOD Modeling Analysis**  
 (Refer to Table 2 for detailed source descriptions)

ADGS .....	Aggregate Delivery to Ground Storage
ATC .....	Aggregate Transfer to Conveyor
ATEB .....	Aggregate Transfer to Elevation Bins
CSTS .....	Cement Supplement Transfer to Cement Silo
CTCS .....	Cement Transfer to Cement Silo
SDGS .....	Sand Delivery to Ground Storage
STC .....	Sand Transfer to Conveyor
STEB .....	Sand Transfer to Elevated Bins
TML .....	Truck Mix Loading
WEAS .....	Wind Erosion from Aggregate Storage Piles
WESS .....	Wind Erosion from Sand Storage Piles
WHL .....	Weigh Hopper Loading

*Table 14: Source Release Parameters Utilized in PM<sub>10</sub> AERMOD Modeling Analysis*

Point Sources						
Source ID	Emission Rate (g/s)		Stack Diameter (m)	Stack Height (m)	Stack Exit Velocity (m/s)	Stack Exit Temperature (K)
	With Generator	Without Generator				
GEN	0.0371	-	0.2	3.66	50	775
CTCS, CSTS	0.0017	0.0019	0.32	12.2	4	408
Volume Sources						
Source ID	Emission Rate (g/s)		Sigma Y (m)	Sigma Z (m)	Release Height (m)	
	With Generator	Without Generator				
ADGS	0.0172	0.0191	1.60	2.20	6.17	
ATC	0.0172	0.0191	0.85	0.43	3.51	
ATEB	0.0172	0.0191	0.71	0.43	8.08	
SDGS	0.0039	0.0043	1.60	2.20	6.17	
STC	0.0039	0.0043	0.85	0.43	3.51	
STEB	0.0039	0.0043	0.71	0.43	8.08	
WHL	0.0212	0.0234	0.85	0.14	4.72	
TML	0.0251	0.0278	0.25	0.5	3.00	
UR TRUCK <sup>a</sup>	0.0016	0.0016	7.00	2.80	3.00	
UR LOADER <sup>b</sup>	0.0034	0.0037	7.00	2.80	3.00	
Area Sources						
Source ID	Emission rate (g/s)		Radius of Circle (m)	Release Height (m)		
	With Generator	Without Generator				
WEAS	0.0063	0.0063	7.6	3.8		
WESS	0.0021	0.0021	7.6	3.8		

<sup>a</sup>Unpaved haul road emissions from ready-mix truck are modeled as 33 adjacent volume sources; the emission rate shown in Table 8 is for a single volume source only;

<sup>b</sup>Unpaved haul road emissions from front-end loader are modeled as 3 adjacent volume sources; the emission rate shown in Table 8 is for a single volume source only.

#### Meteorological Data

The following meteorological data sets were used to represent state-wide meteorological conditions:

- Met #1: Joseph surface data 2005, Flagstaff upper air data 2005;
- Met #2: Flagstaff surface data 1997-2001, Flagstaff upper air data 1997-2001;
- Met #3: Tucson surface data 2001-2005, Tucson upper air data 2001-2005;
- Met #4: Kingman surface data 2001-2005, Desert Rock upper air data 2001-2005;
- Met #5: Wintersburg surface data 1994-1996, Tucson upper air data 1994-1996;
- Met #6: Gila Bend surface data 1994-1995, Tucson upper air data 1994-1995.

The locations of meteorological data sets are shown in Figure 2. The surface data for Joseph, Wintersburg and Gila Bend was obtained from on-site meteorological measurements while the surface data for Flagstaff, Tucson and Kingman were obtained from National Weather Service. The meteorological data sets for Phoenix and Yuma were not used because the General Permit for Concrete Batch Plants will not be applied to the two areas.

#### Other Modeling Parameters

Receptor network: Receptors were spaced 25 meters along process area boundary (PAB) and 50 meters from PAB to 500 meters;  
 Base elevation: Zero;  
 Building downwash: No building downwash;  
 Urban/Rural classification: Rural area.

Modeled Results

The maximum modeled 24-hour PM<sub>10</sub> concentrations for two operating scenarios under varied meteorological conditions are summarized in Table 15 and Table 16. Scenario #1 with generator led to the exceedance of the NAAQS for the meteorological data sets of Met #5 and Met #6. Scenario #1 without generator also failed to demonstrate the compliance with the NAAQS for the meteorological data sets of Met #1, Met #5, and Met #6. The NAAQS was met for Scenario #2 under all meteorological conditions tested.

The AERMOD modeling analysis also revealed that the PM<sub>10</sub> impacts from concrete batch plants were limited to near-field areas. All modeled maximum 24-hour PM<sub>10</sub> concentrations under varied meteorological conditions occurred in or near the process area boundary.

Table 15: Results of AERMOD Modeling Analysis for PM<sub>10</sub>-24hrs (with Generator)

		Modeled Concentration (µg/m <sup>3</sup> ) <sup>a</sup>		Total Concentration (µg/m <sup>3</sup> ) <sup>b</sup>	
		Scenario #1	Scenario #2	Scenario #1	Scenario #2
Met #1	2005	91.9	72.8	156.9	137.8
Met #2	1997	65.0	51.5	130.0	116.5
	1998	50.7	40.2	115.7	105.2
	1999	53.7	42.5	118.7	107.5
	2000	60.2	47.7	125.2	112.7
	2001	72.5	57.4	137.5	122.4
Met #3	2001	82.9	65.7	147.9	130.7
	2002	72.6	57.5	137.6	122.5
	2003	79.5	63.0	144.5	128.0
	2004	76.4	60.5	141.4	125.5
	2005	71.4	56.6	136.4	121.6
Met #4	2001	64.7	51.2	129.7	116.2
	2002	66.5	52.7	131.5	117.7
	2003	58.8	46.6	123.8	111.6
	2004	54.6	43.2	119.6	108.2
	2005	60.7	48.1	125.7	113.1
Met #5	1994	81.6	64.6	146.6	129.6
	1995	92.9	73.6	157.9	138.6
	1996	106.6	84.4	171.6	149.4
	1997	106.2	84.1	171.2	149.1
	1998	92.0	72.9	157.0	137.9
Met #6	1994	103.1	81.6	168.1	146.6
	1995	95.2	75.4	160.2	140.4

<sup>a</sup> High 2<sup>nd</sup> high concentration;

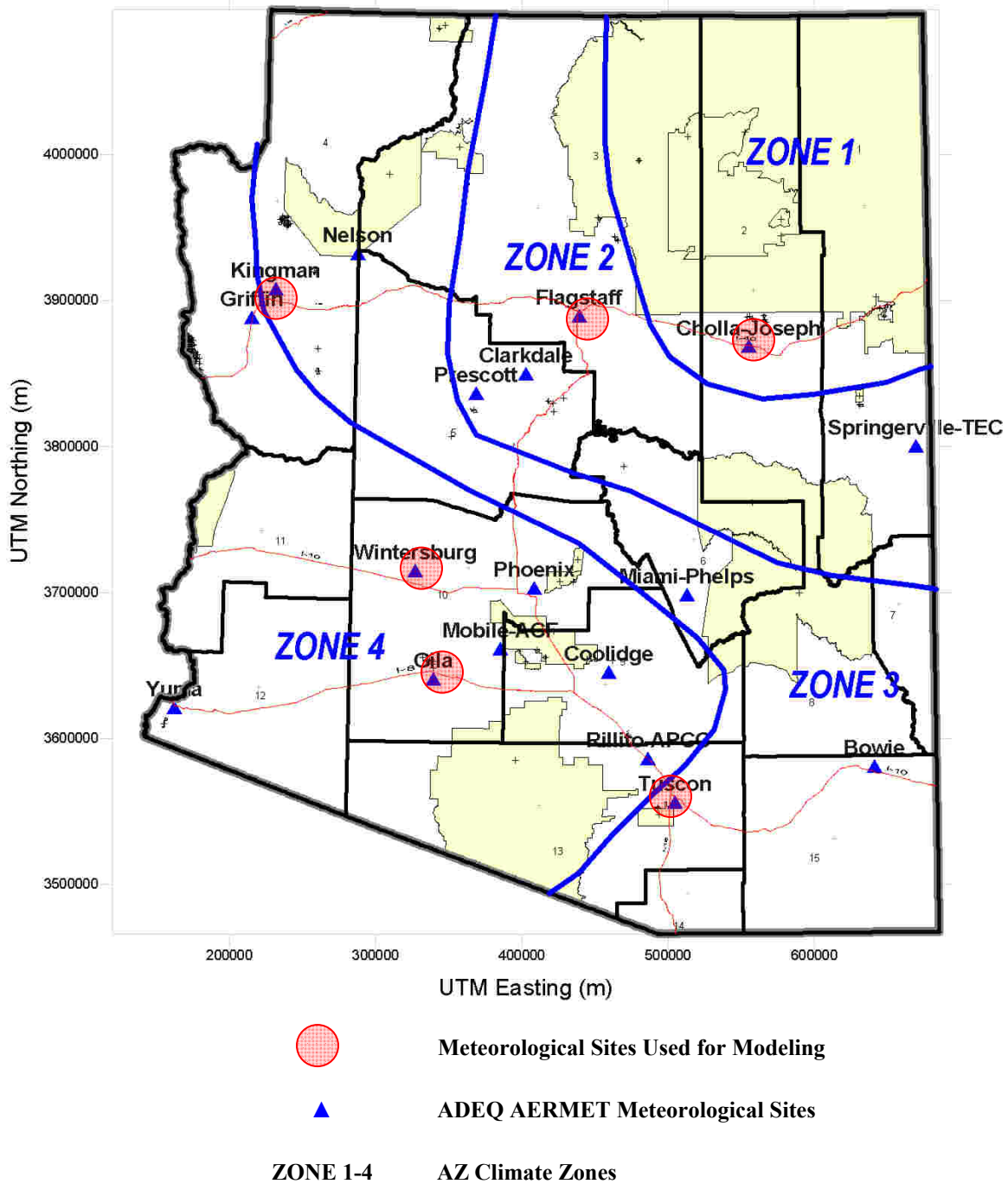
<sup>b</sup> Total Concentration = Modeled Concentration + Background Concentration (65 µg/m<sup>3</sup>).

Table 16: Results of AERMOD Modeling Analysis for PM<sub>10</sub>-24hrs (with Generator)

		Modeled Concentration ( $\mu\text{g}/\text{m}^3$ ) <sup>a</sup>		Total Concentration ( $\mu\text{g}/\text{m}^3$ ) <sup>b</sup>	
		Scenario #1	Scenario #2	Scenario #1	Scenario #2
Met #1	2005	84.7	71.9	149.7	136.9
Met #2	1997	60.6	51.4	125.6	116.4
	1998	49.6	42.1	114.6	107.1
	1999	51.7	43.9	116.7	108.9
	2000	57.4	48.7	122.4	113.7
	2001	68.0	57.7	133.0	122.7
Met #3	2001	75.7	64.3	140.7	129.3
	2002	67.7	57.5	132.7	122.5
	2003	69.5	59.0	134.5	124.0
	2004	75.3	63.9	140.3	128.9
	2005	67.9	57.6	132.9	122.6
Met #4	2001	59.4	50.4	124.4	115.4
	2002	61.9	52.6	126.9	117.6
	2003	57.2	48.6	122.2	113.6
	2004	51.3	43.6	116.3	108.6
	2005	54.1	45.9	119.1	110.9
Met #5	1994	77.3	65.6	142.3	130.6
	1995	87.2	74.0	152.2	139.0
	1996	98.1	83.3	163.1	148.3
	1997	97.8	83.1	163.8	148.1
	1998	85.1	72.2	150.1	137.2
Met #6	1994	95.1	80.8	160.1	145.8
	1995	83.1	70.6	148.1	135.6

<sup>a</sup> High 2<sup>nd</sup> high concentration;

<sup>b</sup> Total Concentration = Modeled Concentration + Background Concentration ( $65 \mu\text{g}/\text{m}^3$ ).



**Figure 2: Locations of Surface Meteorological Data Sets Used in AERMOD Modeling Analysis**

## Permit Changes Resulting from Dispersion Modeling Analysis

1. The General Permit for Concrete Batch Plants will not be applied to PM<sub>10</sub> nonattainment areas because of high PM<sub>10</sub> background concentrations within the areas.
2. The cumulative horsepower ratings of all the generators in the facility shall not exceed 660 hp.
3. To assure compliance with the 24-HOUR PM<sub>10</sub> NAAQS, the following throughput restrictions are being established in the general permit:

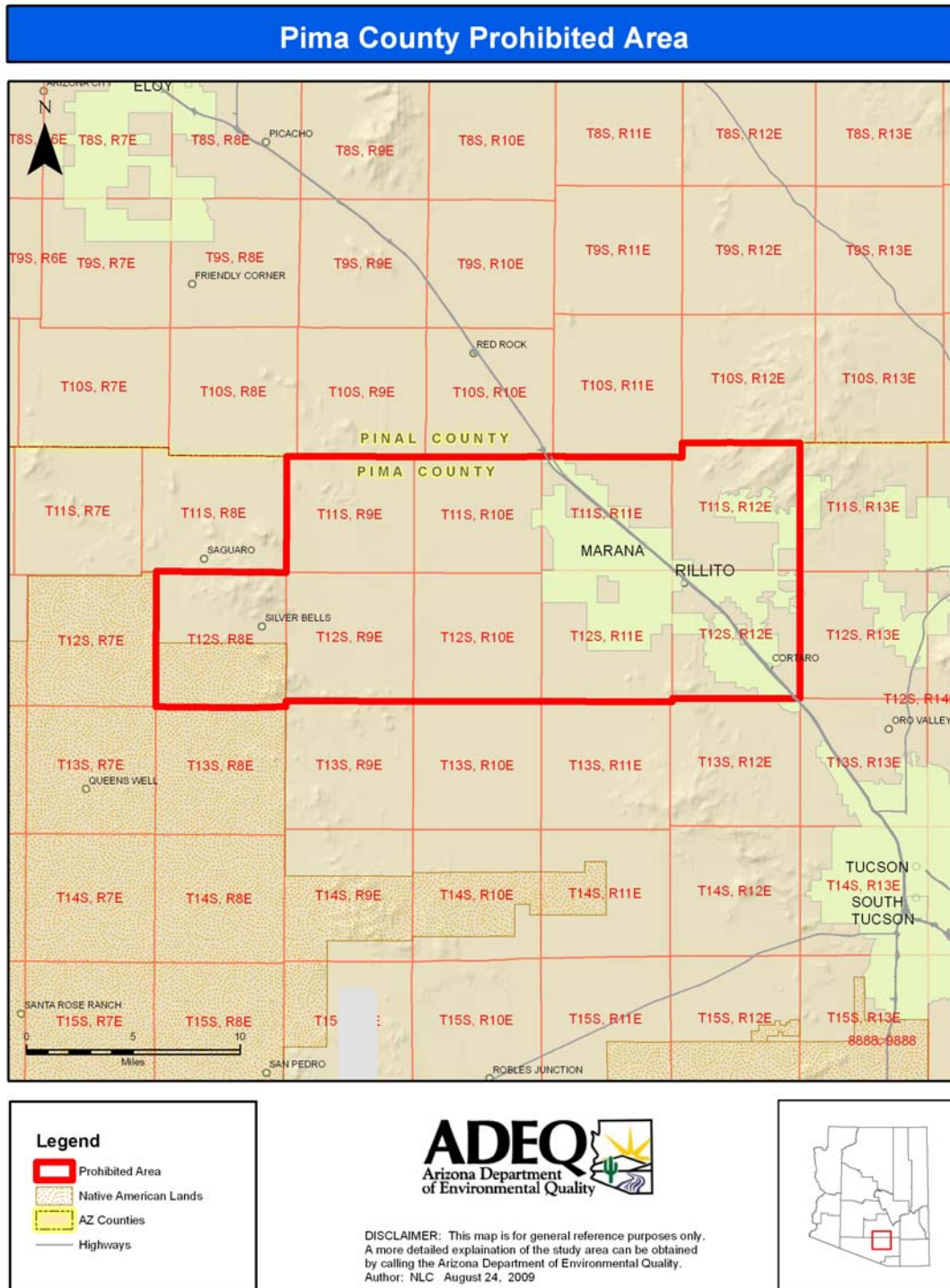
The throughput should be limited to 900 yd<sup>3</sup> per day of concrete for operating under generator power and 930 yd<sup>3</sup> per day for operating under commercial electric power, respectively.

## VII. LIST OF ABBREVIATIONS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ADGS	Aggregate Delivery to Ground Storage
AQD	Air Quality Division
ATC	Aggregate Transfer to Conveyor
ATEB	Aggregate Transfer to Elevation Bins
ATO	Authorization to Operate
AZ	Arizona
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CSTS	Cement Supplement Transfer to Cement Silo
CTCS	Cement Transfer to Cement Silo
EPA	Environmental Protection Agency
g	Gram
GEN	Generator
HAP	Hazardous Air Pollutant
ID	Identification
K	Kelvin
lb/hr	Pound per Hour
LPG	Liquefied Petroleum Gas
m	Meter
Met	Meteorological Data
MMBtu/hr	Million British Thermal Units per Cubic Foot
NAAQS	National Ambient Air Quality Standards
NOV	Notice of Violation
NO <sub>x</sub>	Nitrogen Oxides
NSPS	New Source Performance Standards
PAB	Process Area Boundary
P.C.C.	Pima County Code
PM	Particulate Matter
PM <sub>10</sub>	Particulate Matter Nominally less than 10 Micrometers
PTE	Permanent Total Enclosure
s	Second
SDGS	Sand Delivery to Ground Storage
SIP	State Implantation Plan
SO <sub>2</sub>	Sulfur Dioxide
STC	Sand Transfer to Conveyor
STEB	Sand Transfer to Elevated Bins
TML	Truck Mix Loading

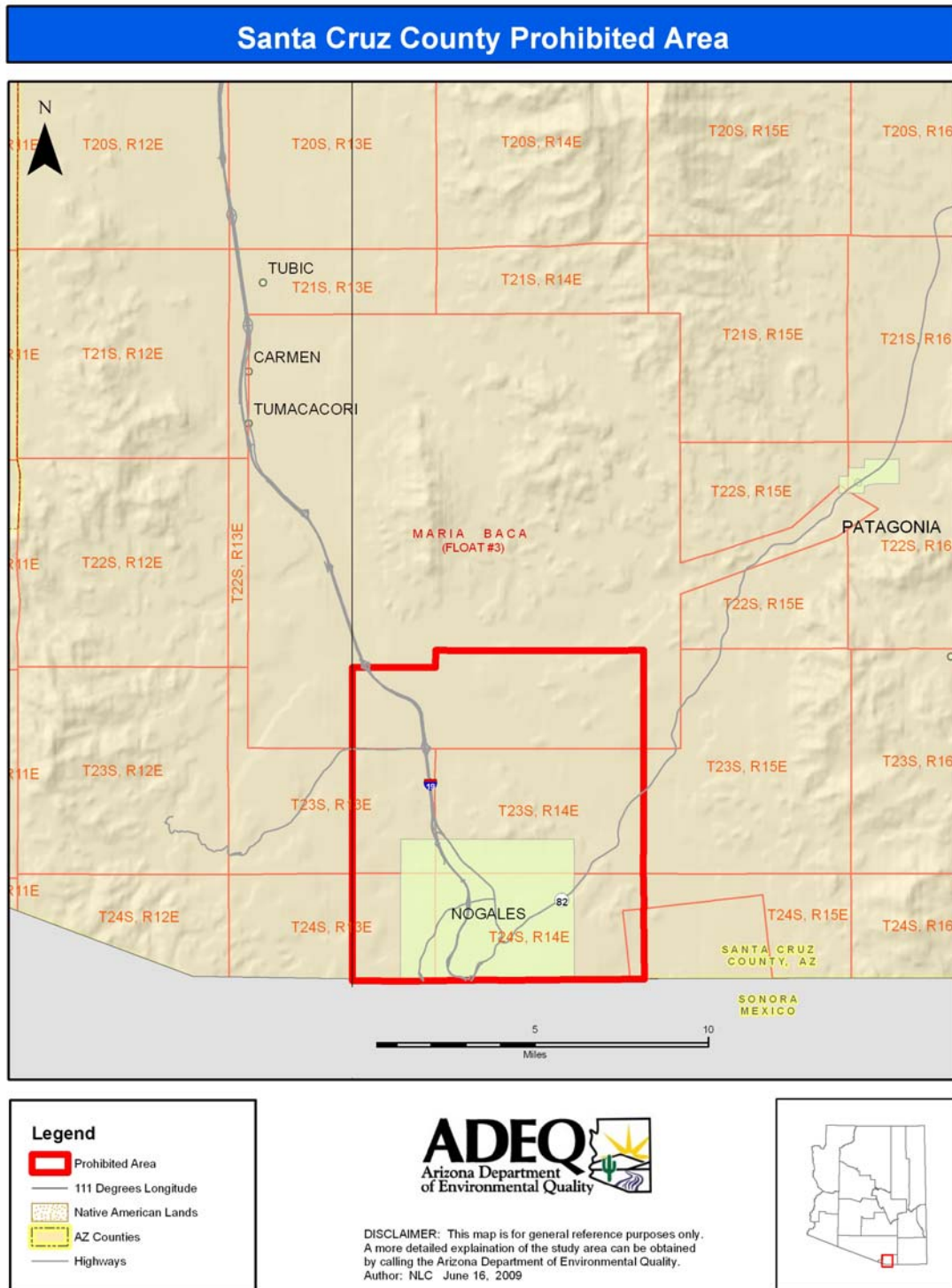
tph ..... Ton per Hour  
UR ..... Unpaved Road  
UTM ..... Universal Transverse Mercator  
VOC ..... Volatile Organic Compound  
WEAS ..... Wind Erosion from Aggregate Storage Piles  
WESS ..... Wind Erosion from Sand Storage Piles  
WHL ..... Weigh Hopper Loading  
yd<sup>3</sup> ..... Cubic Yards  
μ ..... Micro  
# ..... Number  
% ..... Percentage

**VIII. GENERAL AIR QUALITY CONTROL PERMIT FOR CONCRETE BATCH PLANTS  
MAP OF THE PROHIBITED PORTIONS OF PIMA COUNTY**



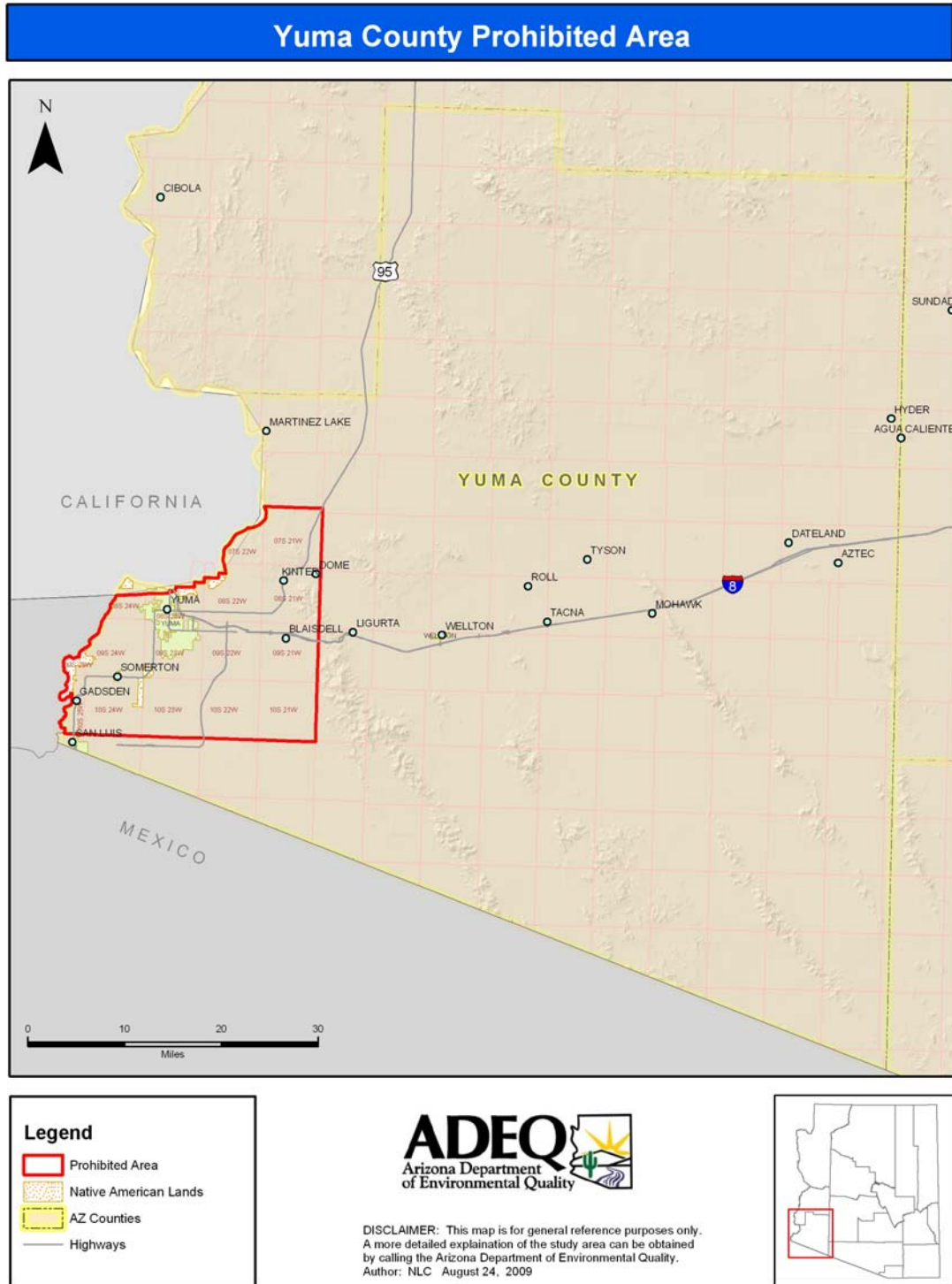
The red boxed area represents the portion of Pima County where concrete batch plant operations are prohibited. Operations in the following townships are prohibited: T11S-R9E, T11S-R10E, T11S-R11E, T11S-R12E, T12S-R8E, T12S-R9E, T12S-R10E, T12S-R11E and T12S-R12E.

**IX. GENERAL AIR QUALITY CONTROL PERMIT FOR CONCRETE BATCH PLANTS  
MAP OF THE PROHIBITED PORTIONS OF SANTA CRUZ COUNTY**



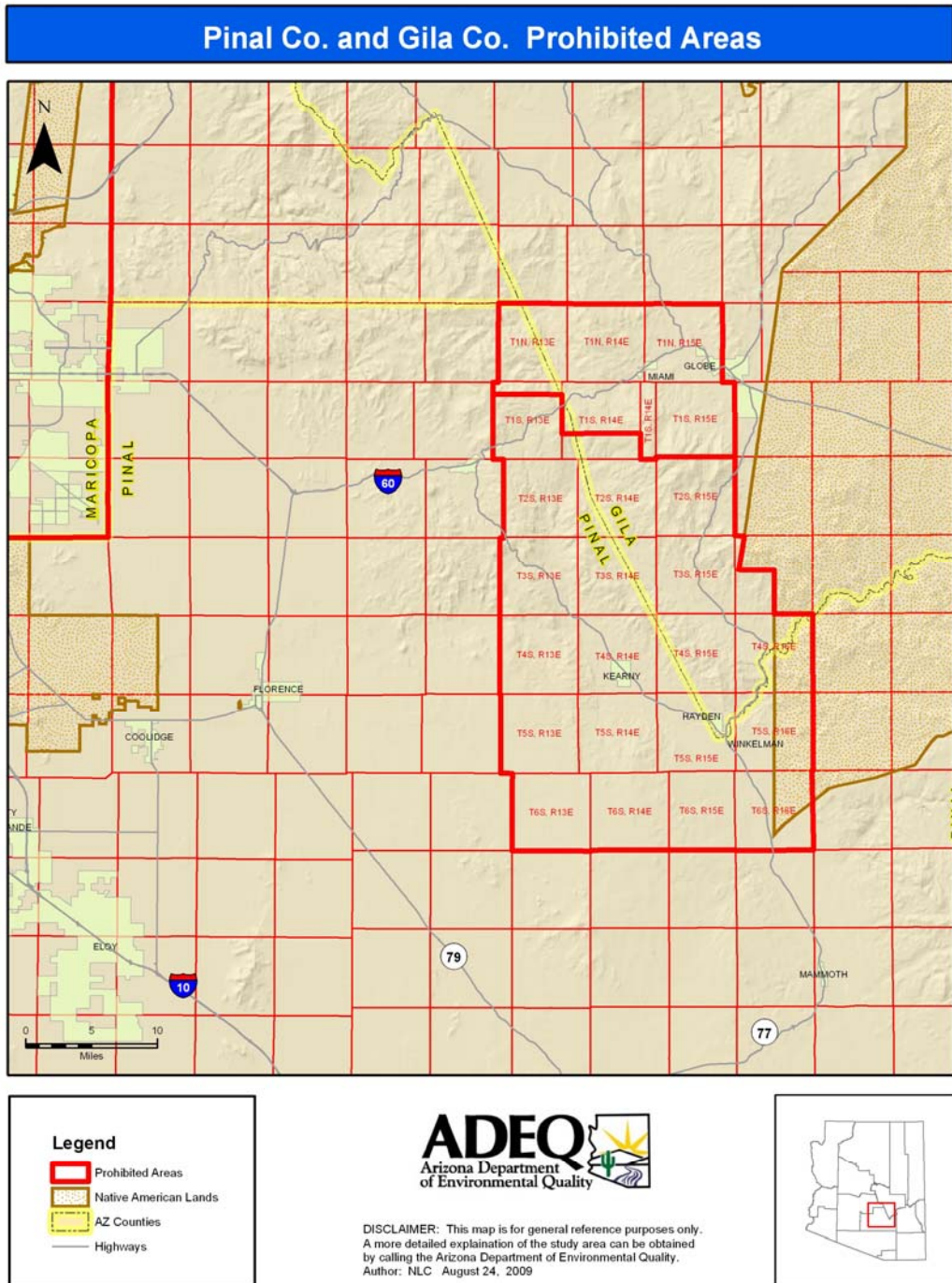
The red boxed area represents the portion of Santa Cruz County where concrete batch plant operations are prohibited. Operations in the following townships are prohibited: T23S-R13E, T23S-R14E, T24S-R13E and T24S-R14E.

**X. GENERAL AIR QUALITY CONTROL PERMIT FOR CONCRETE BATCH PLANTS  
MAP OF THE PROHIBITED PORTIONS OF YUMA COUNTY**



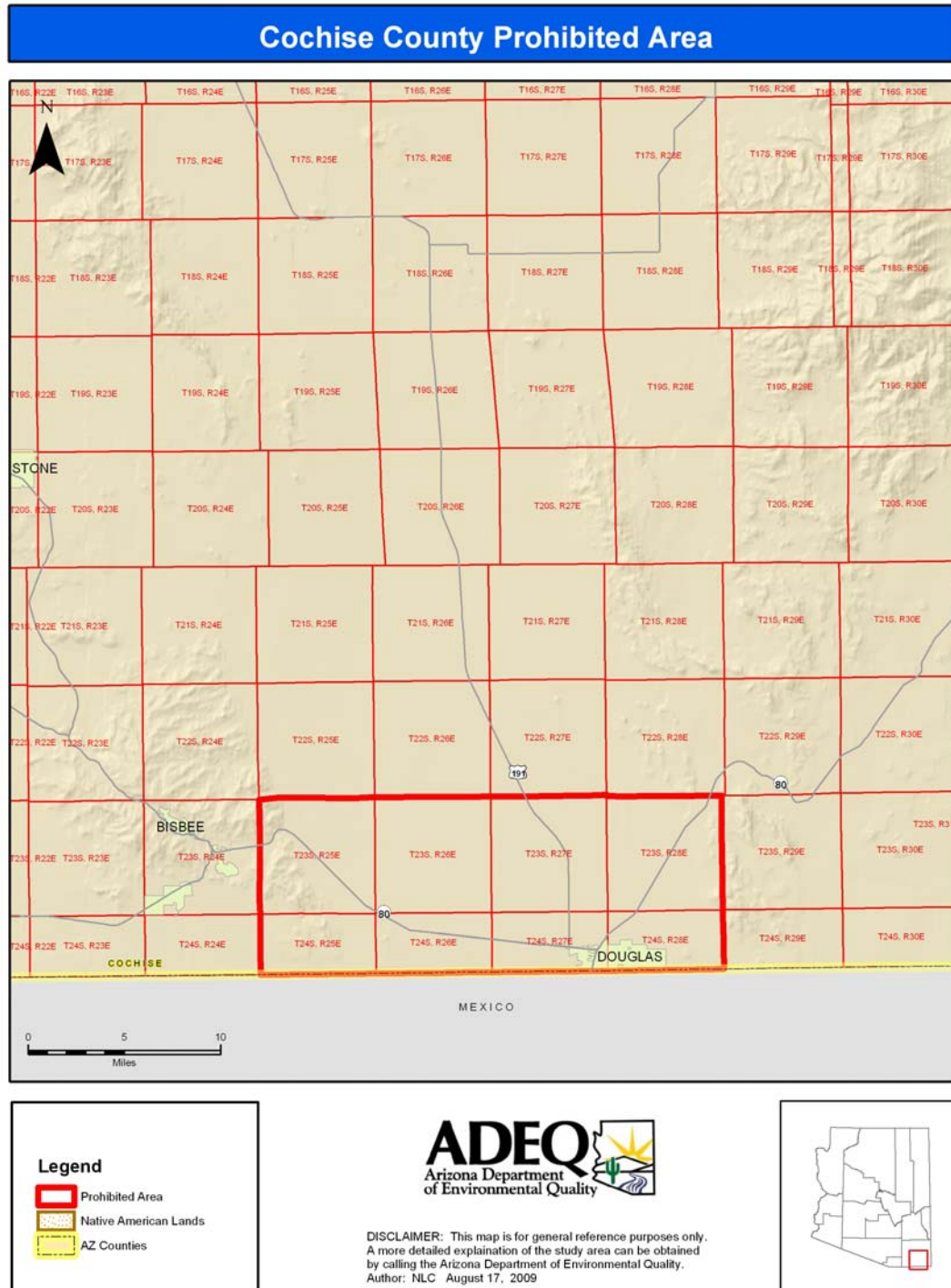
The red boxed area represents the portion of Yuma County where concrete batch plant operations are prohibited. Operations in the following townships are prohibited: T7S- R21W, R22W; T8S-R21W, R22W, R23W, R24W, T9S-R21W, R22W, R23W, R24W, R25W; T10S-R21W, R22W, R23W, R24W, and R25W.

**XI. GENERAL AIR QUALITY CONTROL PERMIT FOR CONCRETE BATCH PLANTS  
MAP OF THE PROHIBITED PORTIONS OF GILA COUNTY AND PINAL COUNTY**



The red boxed area represents the portion of Gila County and Pinal County where concrete batch plant operations are prohibited. Operations in the following townships are prohibited: T4S-R16E, T5S-R16E, T6S-R16E, T1N-R13E, T1N-R15E, T6S-R13E, and T6S-R15E.

**XII. GENERAL AIR QUALITY CONTROL PERMIT FOR CONCRETE BATCH PLANTS  
MAP OF THE PROHIBITED PORTIONS OF COCHISE COUNTY**



The red boxed area represents the portion of Cochise County where concrete batch plant operations are prohibited. Operations in the following townships are prohibited: Township 23 South, Range 25 East (T23S, R25E): T23S-R26E, T23S-R27E, T23S-R28E, T24S-R25E, T24S-R26E, T24S-R27E, and T24S-R28E.