EXHIBIT A

Initial Technical Support Document (Mar. 4, 2015)

Technical Support Document
APS Ocotillo Power Plant
Permit Number V95-007
Permit Renewal and Revision 2.0.0.0 - 1.1.0.0
Issuance Date: xxxxxxxxxx

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1. APPLICANT:

Arizona Public Service (APS)
P.O. Box 53933
Phoenix, AZ 85043

2. PROJECT LOCATION:

The Arizona Public Service Ocotillo Power Plant is located at 1500 East University Drive, Tempe, AZ 85281.

Latitude:	33°25'30"
Longitude:	111°54'31"
Average Elevation:	1,175 feet above mean sea level (AMSL).

3. PROJECT DESCRIPTION:

The Ocotillo Power Plant is located at 1500 East University Drive, Tempe Arizona, 85281, in Maricopa County. The APS Ocotillo Power Plant and the proposed Project are classified under SIC code 4911. The Plant has been in operation since 1960. The facility currently consists of two steam boiler generating units and two simple cycle gas turbine generators (GTs). The steam boiler generating units have a rated heat input capacity of 1,210 MMBtu/hr and an electric power output capacity of 110 MW each. Two cooling towers are used to supply cooled circulating water to the steam unit condensers, with rated capacities of 58,800 gallons per minute (gpm). The existing GTs are General Electric (GE) Model 501-AA units and were installed in 1972 and 1973. Each turbine has a rated heat input capacity of 915 MMBtu/hr and an electric output capacity of 55 MW. A GENRAC 125 hp propane-fired emergency generator is also installed at Ocotillo. This unit is limited to no more than 500 operating hours per year. The Ocotillo Power Plant is a major stationary air emission source as defined in County Rules 210 and 240, and operates under Title V Operating Permit V95-007.

APS is planning to install five new natural gas-fired GE Model LMS100 simple cycle GTs (GT3 through GT7) and associated equipment at the Ocotillo Power Plant. As part of the Project, APS plans to retire the existing steam electric generating units 1 and 2 and associated cooling towers before commencing commercial operation of the proposed new GTs. The existing GT1 and GT2 will no longer have dual-fuel capability and will only burn Pipeline Natural Gas. This Technical Support Document (TSD) is for a significant permit revision and permit renewal to allow for construction and operation of the proposed Project.

The Project will utilize state-of-the-art gas turbine technology to generate electricity. APS is continuing to add renewable energy, especially solar energy, to the electric power grid. However, because renewable energy is an intermittent source of electricity, a balanced resource mix is essential to maintain reliable electric service. This means that APS must have firm electric capacity which can be quickly and reliably dispatched when renewable power, or other distributed energy sources are unavailable. In addition, because customers use energy in different ways and at different times, this can create multiple times of peak demand throughout the day. The LMS100 GTs have the quick start and power escalation capability that is necessary to meet changing power demands and mitigate grid instability caused by the intermittency of renewable energy generation. The new units need the ability to start quickly, change load quickly, and idle at low load. This capability is very important for normal grid stability, but absolutely necessary to integrate with and fully realize the benefits of distributed energy such as solar power and other renewable resources. To achieve these requirements, these GTs will be designed to meet the proposed air emission limits at steady state loads as low as 25% of the maximum output capability of the turbines.

The County's assessment of the APS Ocotillo project is as follows:

- The Ocotillo plant will utilize highly efficient simple-cycle gas turbines.

- The PSD permitting requirements apply to the Project only for carbon monoxide (CO), particulate matter less than 100 microns (PM), particulate matter less than or equal to 2.5 microns ($PM_{2.5}$), and greenhouse gas (GHG) emissions. The proposed control technologies and emission limits for these pollutants represent the Best Available Control Technology (BACT) for simple-cycle gas turbines.
- After completion of the Project, the Ocotillo Plant will no longer be a major source of particulate matter less than or equal to 10 microns (PM_{10}).
- The nonattainment NSR permitting requirements do not apply to the Project.
- The air quality impacts of the Project are insignificant when compared to EPA impact thresholds. Emergency Diesel Electric Generators:

The Ocotillo Modernization Project will include the proposed installation of two 3.0 megawatt emergency generators (EG1 and EG2) (or their equivalent) powered by diesel (compression ignition) engines. These generators will have a nominal standby electric generating capacity of 3.0 MW (electric). Because these new generators will be used solely as emergency diesel generators, APS is proposing operational limits for each generator of no more than 500 hours in any 12 consecutive month period. This operational limit is explained in more detail in Chapter 7 of this TSD. Table 1 is a summary of the technical specifications for each emergency generator.

TABLE 1: Technical specifications for the proposed new emergency generators.

Generator Standby Rating, MW	3,000
Engine Power at Standby Output, brake-horsepower	4,423
Engine Displacement, L	84.67
Engine Cylinders	V-16
Engine Displacement per Cylinder, L	5.29
Maximum Diesel Fuel Consumption Rate, gal/hr	210
Exhaust Gas Flowrate, acfm	24,565
Exhaust Gas Temperature, ºF	895
NO_x Emission Controls	Selective Catalytic Reduction (SCR)
PM and VOC Emission Controls	Diesel Oxidation Catalyst
CO Emission Standard (Tier 4, post 2014), g/hp-hr	2.6
NO_x Emission Standard (Tier 4, post 2014), g/hp-hr	0.5
PM Emission Standard (Tier 4, post 2014),g/bhp-hr	0.022

Footnotes:

The maximum generator output rating, fuel consumption rating, emissions, and flowrates are based on the generator standby rating, which is the maximum short term capacity of the generator.

The CO, NO_x, and PM emission rates are the emission standards for Tier 4 engines from 40 CFR §1039.101.

4. PROJECT EMISSION UNITS:

The emission units for the Ocotillo Modernization Project are as follows:

TABLE 2: Emission Units for the Ocotillo Modernization Project

Emission Unit	Designation	Description
1	GT3	GE Model LMS100 simple cycle gas turbine Unit 3
2	GT4	GE Model LMS100 simple cycle gas turbine Unit 4
3	GT5	GE Model LMS100 simple cycle gas turbine Unit 5
4	GT6	GE Model LMS100 simple cycle gas turbine Unit 6
5	GT7	GE Model LMS100 simple cycle gas turbine Unit 7
6	GTCT	Cooling Tower
7	EG1	Emergency Diesel Generator 1
8	EG2	Emergency Diesel Generator 2

5. EMISSION CONTROLS:

For the proposed new gas turbines, the combustion gases exit the turbine at approximately 760 ºF. The exhaust gases will then pass through two post combustion air quality control systems, including oxidation catalysts for the control of CO and volatile organic compounds (VOC), and selective catalytic reduction (SCR) systems for the control of nitrogen oxides (NO_x) emissions.

For the proposed new gas turbines, CO and VOC emissions will be controlled using oxidation catalysts installed as a post combustion control system. A typical oxidation catalyst is a rhodium or platinum (noble metal) catalyst on an alumina support material. The catalyst is typically installed in a reactor with flue gas inlet and outlet distribution plates. CO and VOC react with oxygen (O_2) in the presence of the catalyst to form carbon dioxide (CO_2) and water (H_2O). Oxidation catalysts have the potential to achieve 90% reduction in uncontrolled CO emissions at steady state operation. VOC reduction capabilities are expected to be less.

Selective Catalytic Reduction (SCR) is a flue gas treatment technique for the reduction of NO_x emissions which uses an ammonia (NH_3) injection system and a catalytic reactor. An SCR system utilizes an injection grid which disperses NH_3 in the flue gas upstream of the catalyst. NH_3 reacts with NO_x in the presence of the catalyst to form nitrogen (gas) and water vapor. For this simple cycle gas turbine application, the SCR system will be a hot SCR which operates at relatively high flue gas temperatures in excess of approximately 750 ºF.

During operation, a 19% aqueous solution of ammonia will be vaporized and injected into the turbine exhaust gas stream upstream of the SCR catalyst. The ammonia will react with NO_x, with expected NO_x reduction efficiencies of approximately 90%. After passing through the SCR, the exhaust gases exit through a separate stack for each GT.

6. HYBRID COOLING TOWER:

The closed-loop cooling system provides water cooling for the High Temperature Intercooler (HTIC) at each LMS100 GT. The HTIC water flow requirements for all GTs are combined into a common system that uses a hybrid Partial Dry Cooling System (PDCS) closed cycle cooling water rated at 52,500 gallons per minute (gpm) and wet cooling of 61,500 gpm to provide the cooling necessary for maximum performance and efficiency of the GTs.

In this hybrid PDCS system, the heat is rejected using ambient air in a dry cooling system followed by a conventional wet cooling tower. This PDCS reduces water consumption in two ways. The dry-cooling section reduces the amount of heat going to the wet cooling tower which reduced water use. The dry cooling portion has no air emissions. The mechanical induced-draft cooling tower will have emissions of particulate matter (PM). The plant design specifies a Marley model F454A45E4.006A 6-cell counter flow cooling tower with the TU12 Drift Eliminator system.

7. PERMIT HISTORY:

The history of the APS Ocotillo Power Plant are as follows:

TABLE 3: Permit History

Date Received	Revision Number	Description
07/27/2000	0.0.0.0	Submitted application for new permit for power plant in Tempe.
10/31/2002	0.1.0.0	Significant revision.
12/16/2010	1.0.0.0	Permit renewal.
08/16/2002	1.0.1.0	Minor modification to add emergency generator.
04/14/2014	1.1.0.0	Significant revision to add 5 simple cycle turbines and remove 2 existing steam generating units. GT1 and GT2 will no longer have dual-fuel capability. Two 3.0 megawatt emergency generators will also be added.

8. DESCRIPTION OF REGULATED ACTIVITIES:

Tables 4 and 5 display the regulated activities before and after the modernization project.

TABLE 4: Regulated Activities before Revision

Equipment/Process	Regulated Activity	Regulated Pollutants
Steam Boiler 1 and 2	Fuel Combustion	SO_2
Combustion Turbines 1 and 2	Fuel Combustion	SO_2
Cooling Tower	Drift Loss	
Gasoline Tank	Evaporation Loss	VOC, HAPs
Abrasive Blasting Building	Abrasive Blasting	PM_{10}, $PM_{2.5}$
Asbestos Removal Activities	Asbestos Removal	Asbestos
Generac Emergency Generator	Fuel Combustion	SO_2, NO_x, VOC, CO, PM_{10}, $PM_{2.5}$, HAPs

TABLE 5: Regulated Activities after Revision

Equipment/Process	Regulated Activity	Regulated Pollutants
5 Combustion Turbines	Fuel Combustion	SO_2, NO_x, VOC, CO, PM_{10}, $PM_{2.5}$, HAPs
Combustion Turbines 1 and 2	Fuel Combustion	SO_2
Cooling Tower	Drift Loss	PM_{10}, $PM_{2.5}$
Gasoline Tank	Evaporation Loss	VOC, HAPs
Abrasive Blasting Building	Abrasive Blasting	PM_{10}, $PM_{2.5}$
Asbestos Removal Activities	Asbestos Removal	Asbestos
Generac Emergency Generator	Fuel Combustion	SO_2, NO_x, VOC, CO, PM_{10}, $PM_{2.5}$, HAPs
3.0 Megawatt Emergency Generators	Fuel Combustion	SO_2, NO_x, VOC, CO, PM_{10}, $PM_{2.5}$, HAPs

9. PROJECT NORMAL OPERATION:

The manufacturer's emission data are presented in the APS submitted revision application in Appendix B and in this TSD in Appendix A. The emission data represent a wide range of unit operating load and ambient air conditions. The potential emissions for each GT are based on the maximum rated heat input for the gas turbines of 970 MMBtu per hour (higher heating value or HHV), and the proposed BACT emission limits and manufacturer's maximum hourly emission rates. APS is not proposing limits on the hours of turbine operation nor the numbers of startup/shutdown events. Instead, to increase operational flexibility APS is proposing the following enforceable emission and operating limits which will limit the potential emissions of each regulated pollutant:

- Emission caps across the proposed new gas turbines GT3 - GT7 and the emergency generators EG1-EG2 of 125.5 tons per year (TPY) for NO_x so that the Project (in combination with the contemporaneous emission decreases from retiring of the steam units) does not result in a net emission increase of NO_x greater than 40 TPY.
- A plant-wide PM_{10} emission cap of 63.0 TPY to reclassify the Ocotillo Plant as a minor source of PM_{10} emissions under the PM_{10} Non-attainment NSR rules, so that the Project does not trigger Non-attainment NSR permitting requirements for PM_{10}.
- An annual fuel use limit of 18,800,000 MMBtu/year (HHV) combined across the new gas turbines GT3 - GT7 to limit the potential emissions of HAPs, VOC, SO_2, and Greenhouse Gases (GHG).
- An emission cap across the new gas turbines GT3 - GT7 of 239.2 TPY for CO to limit potential emissions of CO from normal operations and startup/shutdown.
- An annual fuel use limit of 2,928,000 MMBtu/year (HHV) combined across the existing gas turbines GT1 - GT2 to limit the potential emissions for HAPs and VOC.
- A 500 hr/yr limit for each emergency generator to limit criteria pollutants.

- Combustion of only EPA definition "Pipeline Natural Gas" in all of the existing and new gas turbines GT1 through GT7. The EPA 40 CFR 72.2 definition of "Pipeline Natural Gas" is:

  > "Pipeline Natural Gas" means a naturally occurring fluid mixture of hydrocarbons (e.g., methane, ethane, or propane) produced in geological formations beneath the Earth's surface that maintains a gaseous state at standard atmospheric temperature and pressure under ordinary conditions, and which is provided by a supplier through a pipeline. Pipeline Natural Gas contains 0.5 grains or less of total sulfur per 100 standard cubic feet. Additionally, Pipeline Natural Gas must either be composed of at least 70 percent methane by volume or have a gross calorific value between 950 and 1100 Btu per standard cubic foot.

Compliance with these limits will be demonstrated using a combination of Continuous Emission Monitoring (CEM) data, fuel use data (as measured by a certified fuel flow meter), and emission factors.

The potential emissions for normal operations for GT3 – GT7, based on the annual fuel use limit, are summarized in Table 9.

10. EMERGENCY DIESEL GENERATOR EMISSIONS:

These engines will be subject to the New Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines in 40 CFR 60, Subpart IIII. In accordance with 40 CFR §60.4201, manufacturers of new non-emergency stationary CI engines must meet the following:

> §60.4201 What emission standards must I meet for non-emergency engines if I am a stationary CI internal combustion engine manufacturer?
> (c) Stationary CI internal combustion engine manufacturers must certify their 2011 model year and later non-emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder to the certification emission standards for new nonroad CI engines in 40 CFR 1039.101, 40 CFR 1039.102, 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, and 40 CFR 1039.115, as applicable, for all pollutants, for the same maximum engine power.

The applicable standards for new non-emergency stationary CI engines under 40 CFR §1039.101 are summarized in Table 6. In accordance with 40 CFR §60.4201, manufacturers of new emergency stationary CI engines must meet the following:

> §60.4202 What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?
> (b) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power greater than 2,237 KW (3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (b)(1) through (2) of this section.
> (2) For 2011 model year and later, the certification emission standards for new nonroad CI engines for engines of the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants.

The standards under 40 CFR 89.112 are also included in Table 6. The standards for emergency stationary CI engines include only the Tier 2 standards, not the more stringent Tier 4 standards. In addition, in accordance with 40 CFR §60.4207(b), these engines must use diesel fuel that meets the requirements of 40 CFR §80.510(b) for nonroad diesel fuel. The sulfur content requirement for nonroad (NR) diesel fuel in 40 CFR §60.4207(b)(1)(i) is 15 ppm.

TABLE 6: Comparison of the diesel engine standards under 40 CFR 60, Subpart IIII.

POLLUTANT		Non-Emergency CI Engine Tier 4 Standards		Emergency CI Engine Tier 2 Standards	
		g/kWhr	g/hp-hr	g/kWhr	g/hp-hr
Carbon Monoxide	CO	3.5	2.6	3.5	2.6
Nitrogen Oxides	NO_x	0.67	0.50	6.4*	4.8*
Particulate Matter	PM	0.03	0.022	0.20	0.15
Non-Methane Hydrocarbons	NMHC	0.19	0.14	n/a	n/a

Footnote:
* The NO_x standards for Tier 2 engines are the sum of the NOx and NMHC.
The Tier 4 standards are for generator sets manufactured after the 2014 model year.
The Tier 2 standards are for engines greater than 750 horsepower (hp).

APS is proposing to install diesel generators which comply with the Tier 4 emission standards under 40 CFR §1039.101. To meet these standards, these engines will be equipped with diesel oxidation catalysts and selective catalytic reduction (SCR) systems. In addition, APS is proposing to limit the operation of each generator to no more than 500 hours per year, based on a 12-month rolling average, consistant with the County definition of "emergency engine". The potential emissions for each 3.0 MW diesel-fired emergency electric generator, based on these proposed limits, are summarized in Table 7.

TABLE 7: Potential emissions for each 3.0 MW generator and for both generators combined.

POLLUTANT		Emission Factor	Power Output	Potential to Emit, Each Generator		Potential to Emit, Both Generators
		g/hp-hr	hp	lb/hr	ton/year	ton/year
Carbon Monoxide	CO	2.61	4,423	25.43	6.36	12.71
Nitrogen Oxides	NO_x	0.50	4,423	4.87	1.22	2.43
Particulate Matter	PM	0.022	4,423	0.22	0.05	0.11
Particulate Matter	PM_{10}	0.022	4,423	0.21	0.05	0.11
Particulate Matter	$PM_{2.5}$	0.022	4,423	0.21	0.05	0.11
Sulfur Dioxide	SO_2	0.0046	4,423	0.045	0.011	0.023
Vol. Org. Cmpds	VOC	0.14	4,423	1.38	0.35	0.69
Sulfuric Acid Mist	H_2SO_4	4.6E-04	4,423	0.0045	0.0011	0.0023
Fluorides	F	3.4E-04	4,423	0.0033	0.0008	0.0016
Lead	Pb	2.8E-05	4,423	0.0003	0.0001	0.0001
Carbon Dioxide	CO_2	496.6	4,423	4,837.8	1,209.4	2,418.9
Greenhouse Gases	CO_2e	498.3	4,423	4,854.4	1,213.6	2,427.2

Footnotes:
1. Potential emissions are based on 500 hours per year of operation.
2. The CO, NO_x, PM, and VOC emission rates are based on the Tier 4 engine standards after the 2014 model year in Table 1 of 40 CFR §1039.101, and a maximum engine rating of 4,423 horsepower.
3. All PM emissions are also assumed to be PM_{10} and $PM_{2.5}$ emissions.
4. SO_2 emissions are based on a maximum fuel consumption rate of 215 gal/hr, and a sulfur content of 0.0015%.
5. Sulfuric acid mist emissions are based on 10% conversion of SO_2 to SO_3 in the flue gas.
6. Lead and fluoride emissions are based on the emission factor for oil combustion in the U.S. EPA's Compilation of Air Pollutant Emission Factors, AP-42, section 1.3, oil combustion, Tables 1.3-10 and 1.3-11., respectively, and a maximum fuel oil consumption rate of 215 gallons per hour.
7. Emission factors for GHG emissions including CO_2, N_2O and CH_4 are from 40 CFR 98, Tables C-1 and C-2. The CO_2e factors are from 40 CFR 98, Subpart A, Table A-1.

Diesel engines are also a source of hazardous air pollutants (HAPs). Potential HAP emissions are summarized in Table 8. The potential HAP emissions in Table 8 are based on emission factors from the U.S. EPA's Compilation of Air Pollutant Emission Factors, AP-42, 5th Edition, Tables 3.4-3 and 3.4-4.

TABLE 8: Potential hazardous air pollutant (HAP) emissions for the emergency generators.

AIR POLLUTANT	CAS #	Emission Factor[1]	Heat Input	Potential to Emit, Each Generator		Potential to Emit, Both Generators
		lb/mmBtu	mmBtu/hr	lb/hr	ton/year	ton/year
Benzene	71-43-2	7.76E-04	29.9	0.0232	0.00580	0.0116
Toluene	108-88-3	2.81E-04	29.9	0.0084	0.00210	0.0042
Xylene	1330-20-7	1.93E-04	29.9	0.0058	0.00144	0.0029
Formaldehyde	50-00-0	7.89E-05	29.9	0.0024	0.00059	0.0012
Acetaldehyde	75-07-0	2.52E-05	29.9	0.0008	0.00019	0.0004
Acrolein	107-02-8	7.88E-06	29.9	0.0002	0.00006	0.0001
Naphthalene	91-20-3	1.30E-04	29.9	0.0039	0.00097	0.0019
Total PAH		2.12E-04	29.9	0.0063	0.00158	0.0032
Arsenic		1.10E-05	29.9	0.0003	0.00008	0.0002
Beryllium		3.10E-07	29.9	0.0000	0.00000	0.0000
Cadmium		4.80E-06	29.9	0.0001	0.00004	0.0001
Chromium		1.10E-05	29.9	0.0003	0.00008	0.0002
Manganese		1.40E-05	29.9	0.0004	0.00010	0.0002
Mercury		1.20E-06	29.9	0.0000	0.00001	0.0000
Nickel		4.60E-06	29.9	0.0001	0.00003	0.0001
Selenium		2.50E-05	29.9	0.0007	0.00019	0.0004
TOTAL					**0.013**	**0.025**

Footnotes:

1. Emission factors are from the U.S. EPA's Compilation of Air Pollutant Emission Factors, AP-42, 5th Edition, Tables 3.4-3 and 3.4-4.
2. Potential emissions are based on limiting the total annual operation for each generator to 500 hours per year.
3. The maximum heat input rate is based on 215 gallons of fuel oil per hour, and a fuel oil heat value of 139,000 Btu per gallon.

11. DIESEL FUEL OIL STORAGE TANKS:

The Project will also include two 10,000 gallon diesel fuel oil storage tanks. Based on the operational limits for the diesel generators of 500 hours per year as proposed in this application, the maximum annual throughput for each tank would be 107,500 gallons per year. Potential VOC emissions based on the U.S. EPA's TANKS program, Version 4.0.9d (which is based on the equations from AP-42, Section 7.1, Organic Storage Tanks), is 5.10 pounds per year for each tank, or total VOC emissions of 0.0051 tons per year for both tanks combined.

12. STARTUP AND SHUTDOWN EMISSIONS:

The gas turbine air pollution control systems including selective catalytic reduction (SCR) and oxidation catalysts are not operational during the startup and shutdown of these gas turbines. Water injection is used to reduce NO_x emissions from these GTs before the SCR systems. The earlier that water injection can be initiated during the startup process, the lower NO_x emissions will be during startup. However, if injection is initiated at very low loads, it can impact flame stability and combustion dynamics, and it may increase CO emissions. These concerns must be carefully balanced when determining when to initiate water injection. Oxidation catalysts and SCR pollution control systems are not functional during periods of startup and shutdown because the exhaust gas temperatures are too low for these systems to function as designed.

For simple cycle gas turbines, the time required for startup is much shorter than gas turbines used in combined cycle applications. The expected emissions during a normal startup and shutdown are summarized in Table 10. For these LMS100 GTs, the length of time for a normal startup (the time from initial fuel firing to when the unit goes on line and water injection begins) is approximately 30 minutes. The length of time for a normal shutdown, that is, the time from the cessation of water injection to the time when the flame is out, is normally 11 minutes. Therefore, the normal duration

for a normal startup and shutdown cycle or "event" is 41 minutes. In Table 10, the startup and shutdown emissions are detailed for one event, and the maximum emissions in one hour, assuming that the remaining 19 minutes in the hour are with the GT operating at its maximum rated capacity and maximum emission rate. The startup and shutdown annual emissions have been calculated using an assumption of two startup/shutdown events per day.

13. POTENTIAL EMISSIONS FOR GTs:

The total potential emissions for the GTs are the sum of emissions during estimated normal operations and the estimated numbers of startup/shutdown, and are presented in Table 11. The total potential emissions for the Ocotillo Modernization Project are found in Table 15.

TABLE 9: Potential emissions for the Model LMS100 gas turbines GT3-GT7 during normal operation.

POLLUTANT		NORMAL OPERATION					
		Heat Input per GT	Maximum Emission Rate		Fuel Use Limit	Emissions per GT	Emissions for GT3-GT7
		MMBtu /hr	ppmdv @ 15% O_2 1 hour average	lb/hr	10^6 MMBtu/yr	ton/year	ton/year
Carbon Monoxide	CO	970	6.0	13.5	18.8	24.1	120.7
Nitrogen Oxides	NOx	970	2.5	9.3	18.8	16.5	82.6
Particulate Matter	PM	970	NA	5.4	18.8	9.6	48.2
Particulate Matter	PM_{10}	970	NA	5.4	18.8	9.6	48.2
Particulate Matter	$PM_{2.5}$	970	NA	5.4	18.8	9.6	48.2
Sulfur Dioxide	SO_2	970	NA	0.6	18.8	1.0	5.2
Volatile Organic Compounds	VOC	970	2.0	2.6	18.8	4.7	23.6
Sulfuric Acid Mist	H_2SO_4	970	NA	0.06	18.8	0.10	0.52
Fluorides (as HF)	HF	970	NA	0.00	18.8	0.0000	0.0000
Lead	Pb	970	NA	0.0005	18.8	0.0009	0.0043
Carbon Dioxide	CO_2	970	NA	113,467	18.8	202,438	1,012,190
Greenhouse Gases	CO_2e	970	NA	113,584	18.8	202,647	1,013,235

Footnotes:

1. Normal operation emissions are based on the total fuel use limit of 18.8 x 10^6 MMBtu/yr LESS fuel use during startup/shutdown of 1.49 x 106 MMBtu/yr.
2. The SO_2 emission factor of 0.0006 lb/MMBtu is based on "Pipeline Natural Gas". Sulfuric acid mist is estimated as 10% of the SO_2 emissions. The sulfuric acid mist emission rate equal to 10% of the SO_2 is a conservative (high) estimate. Most external combustion sources such as boilers with low excess oxygen levels have typical SO_2 to SO_3 (and then to sulfuric acid mist) conversion rates of about 1%.
3. The emission factors for the greenhouse gases are from 40 CFR 98, Tables C-1 and C-2 and 40 CFR 98, Subpart A, Table A-1.

Pollutant		Emission Factor	Total GHG Emission Factor	
		lb/MMBtu	CO_2e Factor[3]	lb/MMBtu
Carbon Dioxide	CO_2	116.89	1	116.976
Methane	CH_4	0.0022	25	0.055
Nitrous Oxide	N_2O	0.00022	298	0.066
TOTAL GHG EMISSIONS, AS CO_2e				**117.1**

Note: There are three main categories of fluorinated greenhouse gases--hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). The major emissions source of HFCs is their use as refrigerants, in air conditioning systems in both vehicles and buildings. PFCs are compounds produced as a by-product of various industrial processes associated with aluminum production and the manufacturing of semiconductors. Sulfur hexafluoride is used in electrical transmission equipment. Fluorinated greenhouse gas emissions are not associated with natural-gas combustion activities.

In 40 CFR Part 98.42, EPA lists the GHGs that electrical generation units emit in quantities of importance, and therefore must be reported. These include CO_2, N_2O, and CH_4 gases, but do not include any fluorinated greenhouse gases. Therefore, the APS Ocotillo air permit application did not consider the insignificant emissions of fluorinated greenhouse gases.

TABLE 10: Potential emissions for the Model LMS100 gas turbines GT3-GT7 during periods of startup and shutdown.

POLLUTANT		STARTUP/SHUTDOWN EMISSIONS										
		Startup		Shutdown		Normal Operation		Total		Estimated SU/SD per GT	Emissions per GT	Emissions GT3 - GT7 Combined
		minutes	lb per event	minutes	lb per event	minutes	lb per event	lb per event	lb per hour	events per year	ton/year	ton/year
Carbon Monoxide	CO	30	17.9	11	47.0	19	4.3	64.9	69.2	730	23.7	118.4
Nitrogen Oxides	NO_x	30	22.5	11	6.0	19	2.9	28.5	31.4	730	10.4	52.0
Particulate Matter	PM	30	2.7	11	1.0	19	1.7	3.7	5.4	730	1.3	6.7
Particulate Matter	PM_{10}	30	2.7	11	1.0	19	1.7	3.7	5.4	730	1.3	6.7
Particulate Matter	$PM_{2.5}$	30	2.7	11	1.0	19	1.7	3.7	5.4	730	1.3	6.7
Sulfur Dioxide	SO_2	30	0.3	11	0.1	19	0.2	0.4	0.6	730	0.1	0.7
Volatile Organic Compounds	VOC	30	5.8	11	4.9	19	0.8	10.7	11.5	730	3.9	19.5
Sulfuric Acid Mist	H_2SO_4	30	0.0	11	0.0	19	0.0	0.0	0.1	730	0.0	0.1
Fluorides (as HF)	HF	30	0.0	11	0.0	19	0.0	0.0	0.0	730	0.0	0.0
Lead	Pb	30	0.0	11	0.0	19	0.0	0.0	0.0	730	0.0	0.0
Carbon Dioxide	CO_2	30	42,813	11	5,030	19	35,931	47,843	83,774	730	17,463	87,314
Greenhouse Gases	CO_2e	30	42,857	11	5,035	19	35,968	47,893	83,861	730	17,481	87,404

Footnote:

The fuel use during startup and shutdown is estimated based on 366 MMBtu per startup sequence and 43 MMBtu per shutdown sequence for a total of 409 MMBtu per 41 minute event. This equates to 1.49 x 106 MMBtu per year for all startup/shutdown events for all 5 turbines combined

TABLE 11. Total potential emissions for the General Electric Model LMS100 gas turbines for all periods of operation, including startup and shutdown.

POLLUTANT		TOTAL POTENTIAL TO EMIT			
		Normal Operation GT3-GT7 ton/year	Startup/Shutdown GT3-GT7 ton/year	Total Emissions ton/year	Requested Allowable Limit tons/year
Carbon Monoxide	CO	120.7	118.4	239.2	239.2
Nitrogen Oxides	NO_x	82.6	52.0	134.6	125.5
Particulate Matter	PM	48.2	6.7	54.9	54.9
Particulate Matter	PM_{10}	48.2	6.7	54.9	54.9
Particulate Matter	$PM_{2.5}$	48.2	6.7	54.9	54.9
Sulfur Dioxide	SO_2	5.2	0.7	5.9	5.9
Vol. Org. Compounds	VOC	23.6	19.5	43.1	43.1
Sulfuric Acid Mist	H_2SO_4	0.5	0.1	0.6	0.6
Fluorides (as HF)	HF	0.0	0.0	0.0	0.0
Lead	Pb	0.0	0.0	0.0	0.0
Carbon Dioxide	CO_2	1,012,190	87,314	1,099,504	1,099,504
Greenhouse Gases	CO_2e	1,013,235	87,404	1,100,640	1,100,640

14. HAZARDOUS AIR POLLUTANTS:

Gas turbines are also a source of hazardous air pollutants (HAPs). However, natural gas-fired GTs are a relatively small source of HAPs. Potential HAP emissions for the proposed new GE Model LMS100 gas turbines are detailed in Table 12. The HAP emission factors are from the U.S. EPA's WebFIRE database and *Compilation of Air Pollutant Emission Factors, AP-42,* Volume 1: Stationary Point and Area Sources, Section 3.1, Stationary Gas Turbines for Electricity Generation. Under 40 CFR Part 63, a major source of HAPs is any facility which emits, or has the potential to emit, of 10 tons per year or more of any single HAP, or 25 tons per year or more of all HAPs combined. From Table 12, the proposed new GTs will not have emissions in excess of these major source levels. The Ocotillo Power Plant is currently a minor (area) source of HAPs, and the proposed modification in this application will not change the minor HAP source status of this facility.

TABLE 12: Potential hazardous air pollutant (HAP) emission for GT3-GT7.

POLLUTANT	CAS No.	Emission Factor	Maximum Heat Input	Potential to Emit, each turbine	Potential to Emit, all 5 turbines
		lb/MMBtu	MMBtu/hr	tons/year	tons/year
Acetaldehyde	75-07-0	4.0E-05	970	0.075	0.38
Acrolein	107-02-8	6.4E-06	970	0.012	0.06
Benzene	71-43-2	1.2E-05	970	0.023	0.11
1,3-Butadiene	106-99-0	4.3E-07	970	0.001	0.00
Ethylbenzene	100-41-4	3.2E-05	970	0.060	0.30
Formaldehyde	50-00-0	7.1E-04	970	1.335	6.67
Xylene	1330-20-7	6.4E-05	970	0.120	0.60
Naphthalene	91-20-3	1.3E-06	970	0.002	0.01
PAH		2.2E-06	970	0.004	0.02
Propylene oxide	75-56-9	2.9E-05	970	0.055	0.27
Toluene	108-88-3	1.3E-04	970	0.244	1.22
TOTAL				1.93	9.66

Footnotes:

1. The emission factors are from the U.S. EPA's WebFIRE database. These factors are from the U.S. EPA's

Compilation of Air Pollutant Emission Factors, AP-42, Volume 1: Stationary Point and Area Sources, Section 3.1, Stationary Gas Turbines for Electricity Generation.

2. The emission factor for formaldehyde (CH2O) emissions are based on the uncontrolled factor, i.e., without the additional reduction from oxidation catalysts.
3. Potential emissions in tons per year are based on the following fuel use limit for all 5 turbines combined: Annual heat input limit of 18,800,000 MMBtu/year (HHV)

15. COOLING TOWER EMISSIONS:

A new mechanical draft cooling tower will be installed as part of the Ocotillo Power Plant Modernization Project. The specifications for the new cooling tower are summarized in Table 13.

TABLE 13: Specifications for the new mechanical draft cooling tower.

Total Circulating Water Flow to Cooling Tower, gpm	63,500
Number of Cells	6
Maximum Total Dissolved Solids, ppm	12,000
Design Drift Loss, %	0.0005%
Release Height, feet	42.5
Tower Enclosure Height, feet	29
Exit Diameter per cell, feet	30

In a mechanical draft cooling tower, the circulating cooling water is introduced into the top of the tower. As the water falls through the tower, an air flow is induced in a countercurrent flow using an induced draft fan. A portion of the circulating water evaporates, cooling the remaining water. A small amount of the water is entrained in the induced air flow in the form of liquid phase droplets or mist. Demisters are used at the outlet of cooling towers to reduce the amount of water droplets entrained in the air. The water droplets that pass through the demisters and are emitted to the atmosphere are called *drift loss*. When these droplets evaporate, the dissolved solids in the droplet become particulate matter. Therefore, cooling towers are sources of PM, PM_{10}, and $PM_{2.5}$ emissions.

Cooling tower PM emissions are calculated based on the circulating water flow rate, the total dissolved solids (TDS) in the circulating water, and the design drift loss according to the following AP-42 equation:

$$E = kQ(60\ \text{min/hr})(8.345\ \text{lb water/gal})\left[\frac{C_{TDS}}{10^6}\right]\left[\frac{\%DL}{100}\right] \qquad \textit{Equation 1}$$

Where,

E = Particulate matter emissions, pounds per hour

Q = Circulating water flow rate, gallons per minute = 61,500 gpm

C_{TDS} = Circulating water total dissolved solids, parts per million = 12,000 ppm

DL = Drift loss, % = 0.0005%

k = particle size multiplier, dimensionless

The particle size multiplier "k" has been added to the AP-42 equation to calculate emissions for various PM size ranges, including PM_{10} and $PM_{2.5}$.

Maricopa County uses a "k" emission factor of 31.5% to convert total cooling tower PM emissions to PM_{10} emissions consistent with the majority of power plants in Maricopa County. During the PSD permitting of the Hydrogen Energy California (HECA) project by the San Joaquin Valley Air Pollution Control District (SJVAPCD), the applicant used a ratio of 0.6 to convert cooling tower PM_{10} emissions to $PM_{2.5}$ emissions. This ratio was based on data in the California Emission Inventory Development and Reporting System (CEIDARS) data base, along with further documentation including an analysis of the emission data that formed the basis of the CEIDARS ratio, and discussions with various California Air Resources Board and EPA research staff. This

PSD permit was reviewed and commented upon by the California Energy Commission and EPA Region 9, and these agencies accepted this factor for use in cooling tower $PM_{2.5}$ emission estimates. Based on this information, Maricopa County used the same conversion factor.

Table 14 presents the calculated PM, PM_{10}, and $PM_{2.5}$ emissions for the cooling tower, using particle size multipliers of 0.315 for PM_{10} emissions and 0.189 (0.315 * 0.6) for $PM_{2.5}$ emissions, based on multipliers that have been previously approved in California PSD permitting actions.

TABLE 14: Potential emissions for the new mechanical draft cooling tower.

POLLUTANT		*Q* Flowrate	C_{TDS} Blowdown TDS Conc.	%DL Drift Loss	*k* Particle Size Multiplier	Potential to Emit	
		gallon/min	ppm	%		lb/hr	ton/yr
Particulate Matter	PM	63,500	12,000	0.0005%	1.00	1.91	8.36
Particulate Matter	PM_{10}	63,500	12,000	0.0005%	0.315	0.60	2.63
Particulate Matter	$PM_{2.5}$	63,500	12,000	0.0005%	0.189	0.36	1.58

16. TOTAL PROJECT EMISSIONS:

Table 15 summarizes the total project emissions:

TABLE 15. Summary of potential emissions for the Ocotillo Modernization Project.

POLLUTANT		Requested Allowable Emissions, tons per year				
		GT3-GT7	GTCT	Emergency Generators	Diesel Fuel Storage Tanks	TOTAL
Carbon Monoxide	CO	239.2		12.7		251.9
Nitrogen Oxides	NO_x	125.5		2.4		125.5
Particulate Matter	PM	54.9	8.1	0.1		63.1
Particulate Matter	PM_{10}	54.9	2.5	0.1		57.6
Particulate Matter	$PM_{2.5}$	54.9	1.5	0.1		56.5
Sulfur Dioxide	SO_2	5.9		0.0		5.9
Vol. Organic Cmpds	VOC	43.1		0.7	0.0051	43.8
Sulfuric Acid Mist	H_2SO_4	0.6		0.0		0.6
Fluorides (as HF)	HF	0.000		0.0		0.0
Lead	Pb	0.005		0.0		0.0
Carbon Dioxide	CO_2	1,099,504		2,418.9		1,101,923
Greenhouse Gases	CO_2e	1,100,640		2,427.2		1,103,067

Footnotes:

1. A NO_x emission cap of 125.5 tpy is proposed across both the new GT3-GT7 units in combination with the two new emergency generators.

17. 40 CFR PART 60 SUBPART KKKK REQUIREMENTS:

On July 6, 2006, the U.S. EPA published final rules revising the standards of performance for stationary combustion turbines under 40 CFR Part 60, Subpart KKKK. These standards are incorporated by reference in County Rule 360 §301.84. In accordance with 40 CFR §60.4315, the pollutants regulated by this subpart are nitrogen oxides (NO_x) and sulfur dioxide (SO_2).

Sulfur Dioxide (SO_2) Emission Limits:

For SO_2 emissions under 40 CFR §60.4330, if your turbine is located in a continental area, you must either:

a. Limit SO_2 emissions to 0.90 pounds per megawatt-hour gross output, or

b. Not burn any fuel which contains emissions in excess of 0.060 lb SO_2/MMBtu heat input.

Nitrogen Oxides (NO_x) Emission Limits:
For NO_x emissions under 40 CFR §60.4325, you must meet the emission limits specified in Table 1 in 40 CFR 60 Subpart KKKK. Each of the proposed new natural gas-fired GE Model LMS100 simple cycle Gas turbines has a maximum design heat input capacity of 970 MMBtu per hour. The applicable standards in Table 1 are summarized below.

Excerpts from Table 1 to 40 CFR Part 60, Subpart KKKK: NO_x emission limits for new stationary combustion turbines.

Combustion turbine type	Combustion turbine heat input at peak load (HHV)	NO_x emission standard
New, modified, or reconstructed turbine firing natural gas.	Greater than 850 MMBtu/hr	15 ppm at 15 percent O_2 or 0.43 lb/MWh

General Compliance Requirement (40 CFR §60.4333):
The simple cycle gas turbines, the SCR and oxidation catalysts air pollution control equipment, and monitoring equipment must be operated and maintained in a manner consistent with good air pollution control practices for minimizing emissions at all times including during startup, shutdown, and malfunction.

NO_x Monitoring Requirements (40 CFR §60.4335):
Subpart KKKK allows for a variety of acceptable monitoring methods to demonstrate compliance with the NO_x emission limits. APS has elected to install, certify, maintain, and operate a continuous emission monitoring system (CEMS) consisting of a NO_x monitor and a diluent gas (either oxygen (O_2) or carbon dioxide (CO_2)) monitor to determine the hourly NO_x emission rate in parts per million (ppm) corrected to 15% O_2. The CEMS will be installed and certified according to Appendix A of 40 CFR Part 75, and the relative accuracy test audit (RATA) of the CEMS will be performed on a lb/MMBtu basis. APS requested Maricopa County Air Quality Department approval to satisfy the 40 CFR 60 Subpart KKKK quality assurance (QA) plan requirements by implementing the QA program and plan described in Section 1 of Appendix B to Part 75. Subpart KKKK excess emissions will be identified according to 40 CFR §60.4350 procedures.

SO_2 Monitoring Requirements (40 CFR §§60.4360 and 60.4365):
Subpart KKKK allows for a variety of acceptable monitoring methods to demonstrate compliance with the SO_2 emission limits. To be exempted from fuel sulfur monitoring requirements, APS must demonstrate that the potential sulfur emissions expressed as SO_2 are less than 0.060 lb/MMBtu for continental US areas. The demonstration can be made by providing information from a current, valid purchase contract, tariff sheet or transportation contract for the fuel, specifying that the total sulfur content for natural gas use in continental areas is 20 grains of sulfur or less per 100 standard cubic feet. Because the new GTs will combust only "Pipeline Natural Gas" with a typical SO_2 emission rate of 0.0006 lb/MMBtu, this is the method that APS proposes to meet the Subpart KKKK SO_2 monitoring requirements. "Pipeline Natural Gas" has a maximum of 0.5 grains of sulfur per 100 standard cubic feet. APS is only allowed to combust "Pipeline Natural Gas", so they will be well below the limit.

Performance Tests (40 CFR §60.4400):
Initial performance testing is required in accordance with 40 CFR §60.8. Subsequent performance tests must be conducted on an annual basis. As described in §60.4405, the NO_x CEMS RATA tests may be used as the initial NO_x performance test. The SO_2 performance test may be a fuel analysis of the natural gas, performed by the operator, fuel vendor, or other qualified agency (§60.4415 provides the required ASTM test methods).

Reporting Requirements (40 CFR §60.4375):

For each affected unit required to continuously monitor parameters or emissions, or to periodically determine the fuel sulfur content under this subpart, reports of excess emissions and monitor downtime must be submitted in accordance with 40 CFR §60.7(c). Excess emissions must be reported for all periods of unit operation, including start-up, shutdown, and malfunction. Paragraphs §60.4380 and §60.4385 describe how excess emissions are defined for Subpart KKKK.

For each affected unit that performs annual performance tests in accordance with §60.4340(a), a written report of the results of each performance test must be submitted before the close of business on the 60th day following the completion of the performance test.

18. GREENHOUSE GAS EMISSIONS:

The U.S. EPA published proposed Standards of Performance for Greenhouse Gas Emissions from New Electric Utility Generating Units in the Federal Register, Vol. 79, No.5, on Jan. 8, 2014. These proposed rules include performance standards for new combustion turbines under 40 CFR 60, Subpart KKKK.

If this rule is finalized and promulgated, APS will address the applicability requirements in a permit application revision for the Project.

19. FEDERAL ACID RAIN PROGRAM 40 CFR §72.6:

The federal Acid Rain Program regulations in 40 CFR §72.6(a)(3)(i) state that a utility unit that is a new unit shall be an affected unit, and any source that includes such a unit shall be an affected source, subject to the requirements of the Acid Rain Program. A "utility unit" means a unit owned or operated by a utility that serves a generator in any State that produces electricity for sale. Finally, "Unit" means a fossil fuel-fired combustion device. Because the new gas turbine generators fire natural gas and produce electricity for sale, these new GTs are affected units under the federal Acid Rain Program. A copy of the Acid Rain Permit application has been submitted to EPA by APS, and is included with their revision application as Appendix D.

20. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS:

Hazardous air pollutant (HAP) emissions are regulated under section 112 of the Clean Air Act. The U.S. EPA's National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines (NESHAP), 40 CFR Part 63, Subpart YYYY, were published on March 5, 2004. Under 40 CFR §63.6085, "you are subject to this subpart if you own or operate a stationary combustion turbine located at a major source of HAP emissions. Under 40 CFR §63.2, Major source means:

> ***Major source*** means any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants, unless the Administrator establishes a lesser quantity, or in the case of radionuclides, different criteria from those specified in this sentence.

Potential HAP emissions for the proposed new GE Model LMS100 gas turbines are detailed in Table 12. The HAP emission factors are from the U.S. EPA's WebFIRE database. These factors are from the U.S. EPA's *Compilation of Air Pollutant Emission Factors, AP-42*, Volume 1: Stationary Point and Area Sources, Section 3.1, Stationary Gas Turbines for Electricity Generation. Based on the emissions in Table 12, these gas turbines will be a minor source of HAP emissions under 40 CFR §63.2. Please note that the potential emissions for formaldehyde (CH_2O) emissions in Table 12 are based on the *uncontrolled* emission factor from the U.S. EPA's WebFIRE database.

Table 16 is a summary of potential HAP emissions for the existing General Electric Model 501 gas turbines. The potential emissions for these existing gas turbines are based on the operational limits for natural gas as proposed in this application. Table 17 is a summary of the total potential HAP

emissions for the Ocotillo Power Plant after the Modernization Project, based on the operational limits for the new and existing gas turbines as proposed in this application. From Table 17, total potential emissions of each individual HAP are less than 10 tons per year, and total potential emissions of all HAPs combined are also less than 25 tons per year. Therefore, the Ocotillo Power Plant will remain a minor source of HAP emissions after the Modernization Project and these new gas turbines will not be subject to the NESHAP requirements of 40 CFR Part 63, Subpart YYYY.

TABLE 16: Hazardous air pollutant (HAP) emissions for GT1-GT2 based on the operational limits in this TSD.

POLLUTANT	CAS No.	Emission Factor	Maximum Heat Input	Potential to Emit, each turbine	Potential to Emit, both turbines combined
		lb/MMBtu	MMBtu/hr	tons/year	tons/year
Acetaldehyde	75-07-0	4.0E-05	915	0.029	0.06
Acrolein	107-02-8	6.4E-06	915	0.005	0.01
Benzene	71-43-2	1.2E-05	915	0.009	0.02
1,3-Butadiene	106-99-0	4.3E-07	915	0.000	0.00
Ethylbenzene	100-41-4	3.2E-05	915	0.023	0.05
Formaldehyde	50-00-0	7.1E-04	915	0.520	1.04
Xylene	1330-20-7	6.4E-05	915	0.047	0.09
Naphthalene	91-20-3	1.3E-06	915	0.001	0.00
PAH		2.2E-06	915	0.002	0.00
Propylene oxide	75-56-9	2.9E-05	915	0.021	0.04
Toluene	108-88-3	1.3E-04	915	0.095	0.19
Acetaldehyde	75-07-0	4.0E-05	915	0.029	0.06
TOTAL				**0.75**	**1.51**

Footnotes:

1. The emission factors are from the U.S. EPA's Compilation of Air Pollutant Emission Factors, AP-42, Volume 1: Stationary Point and Area Sources, Section 3.1, Stationary Gas Turbines for Electricity Generation.
2. The emission factor for formaldehyde (CH_2O) emissions are based on the uncontrolled factor, i.e., without the additional reduction from oxidation catalysts.
3. Potential emissions in tons per year are based on the following fuel use limit for both turbines combined of 2,928,000 MMBtu (HHV) per year

TABLE 17: Total hazardous air pollutant (HAP) emissions for the Ocotillo Power Plant after the Modernization Project.

POLLUTANT	CAS No.	Potential to Emit, tons per year			
		GT1-GT2	GT3-GT7	Diesel Generators	TOTAL
Acetaldehyde	75-07-0	0.059	0.376	0.0004	0.435
Acrolein	107-02-8	0.009	0.060	0.0001	0.070
Benzene	71-43-2	0.018	0.113	0.0116	0.142
1,3-Butadiene	106-99-0	0.001	0.004		0.005
Ethylbenzene	100-41-4	0.047	0.301		0.348
Formaldehyde	50-00-0	1.039	6.674	0.0012	7.715
Xylene	1330-20-7	0.094	0.602	0.0029	0.698
Naphthalene	91-20-3	0.002	0.012	0.0019	0.016
PAH		0.003	0.021	0.0032	0.027
Propylene oxide	75-56-9	0.042	0.273		0.315
Toluene	108-88-3	0.190	1.222	0.0042	1.417
Arsenic				0.0002	0.000
Beryllium				0.0000	0.000
Cadmium				0.0001	0.000
Chromium				0.0002	0.000
Manganese				0.0002	0.000
Mercury				0.0000	0.000
Nickel				0.0001	0.000
Selenium				0.0004	0.000
TOTAL		**1.50**	**9.66**	**0.03**	**11.19**

21. NEW SOURCE REVIEW (NSR):

In the Clean Air Act Amendments of 1977, Congress established two preconstruction permitting programs which are commonly referred to as New Source Review. Title I, Part C of the Act includes the PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY (PSD) program. Title I, Part D of the Clean Air Act includes the PLAN REQUIREMENTS FOR NONATTAINMENT AREAS. This program is often called the Non-attainment Area New Source Review (NANSR) program.

In accordance with the delegation agreement with US EPA dated Nov 22, 1993, MCAQD administers the PSD program pursuant to requirements under 40 CFR §52.21. Therefore, the requirements of both 40 CFR §52.21 and County Rule 240 §308 are applicable to new major stationary sources and major modifications for attainment pollutants. This application is intended to meet both the requirements of 40 CFR §52.21 and County Rule 240 as applicable. The provisions of County Rule 240 §305 – 308 are applicable to new major stationary sources and major modifications at existing sources for pollutants for which the area is designated as nonattainment.

The Ocotillo Power Plant is located in the City of Tempe, Maricopa County, Arizona. The location of the power plant is currently designated nonattainment for particulate matter less than 10 microns (PM_{10}) (classification of serious) and the 2008 8-hour ozone standards (classification of marginal). The area is designated as a maintenance area for CO. The area is designated attainment/unclassifiable for all other criteria pollutants.

Prevention of Significant Deterioration of Air Quality (PSD):

The PSD program applies to new major sources or major modifications to existing sources for pollutants where the area is designated attainment/unclassifiable with National Ambient Air Quality Standards (NAAQS). The PSD program requires:

- Installation of the Best Available Control Technology (BACT) for each regulated pollutant which exceeds the significant levels.

- An air quality analysis to demonstrate that new emissions will not cause or contribute to a violation of any applicable NAAQS or PSD increment.
- Class I area impacts analysis.
- An additional impacts analysis.
- Public involvement and participation.

Nonattainment Area New Source Review (NANSR):
NANSR applies to new major sources or major modifications at existing sources for criteria pollutants for which the area is designated nonattainment. NANSR requirements are customized for the nonattainment area. However, all NANSR programs require:

- Installation of the Lowest Achievable Emission Rate (LAER) for each pollutant which exceeds the significant levels in the nonattainment area.
- Emission offsets.
- Alternatives Analysis
- Public involvement and participation.

22. MAJOR NSR APPLICABILITY:

The New Source Review (NSR) programs are applicable to new major stationary sources and major modifications at existing sources. Because the existing Ocotillo Power Plant is a fossil fuel-fired steam electric plant with a heat input of more than 250 million Btu per hour, the major source thresholds under the PSD program are 100 tons per year of any pollutant and 100,000 tons per year of GHG emissions. Note that after the Ocotillo Modernization Project, the electrical generating units will consist of only simple-cycle gas turbines, and Ocotillo therefore will no longer be classified as a steam electric plant. Therefore, after the Project is completed, the major source thresholds under the PSD program will be 250 tons per year of any pollutant and 100,000 tons per year of GHG emissions. However, the Ocotillo Power Plant NO_x and GHG emissions, both before and after the Project, will be greater than the major source threshold, and therefore the facility will continue to be classified as a major source with respect to the PSD rules.

The location of the Ocotillo Power Plant is currently classified as a serious nonattainment area for particulate matter equal to or less than 10 microns (PM_{10}), and is also classified as a marginal nonattainment area for ozone. The regulated pollutant for PM_{10} non-attainment areas is PM_{10}; the regulated pollutants for ozone nonattainment areas include NO_x and VOC emissions. The major source threshold levels under Maricopa County Rule 240, section 210.1 for stationary sources located in a nonattainment area are:

210.1 Any stationary source located in a nonattainment area that emits, or has the potential to emit, 100 tons per year or more of any conventional air pollutant, except as follows:

Pollutant Emitted	Nonattainment Pollutant And Classification	Quantity Threshold Tons/Year Or More
Carbon Monoxide (CO)	CO, Serious, with stationary sources as more than 25% of source inventory	50
Volatile Organic Compounds (VOC)	Ozone, Serious	50
VOC	Ozone, Severe	25
PM_{10}	PM_{10}, Serious	70
NO_x	Ozone, Serious	50
NO_x	Ozone, Severe	25

210.8 A major source that is major for oxides of nitrogen shall be considered major for ozone in nonattainment areas classified as marginal, moderate, serious or severe.

From the above, the major source threshold in serious nonattainment areas for PM_{10} is 70 tons per year, and the major source threshold for the ozone nonattainment area pollutants (NO_x and VOC emissions) is 100 tons per year.

Because the current potential PM_{10} and NO_x emissions from the Ocotillo Power Plant are greater than the nonattainment major stationary source thresholds, the Ocotillo Power Plant is an existing major stationary source for PM_{10} and ozone under the NANSR program. ***However, with this application, APS is proposing a plant-wide emission cap of 63 tpy in accordance with County Rule 201, (EMISSION CAPS) which limits the total potential emissions for the entire Ocotillo Power Plant below the major source threshold level of 70 tons per year for PM_{10} emissions.*** Therefore, the Project will not be subject to the NANSR or PSD programs for PM_{10} emissions. In addition, the Ocotillo Power Plant potential VOC emissions both before and after the Project are less than 100 tpy, therefore the Project will not be subject to the NANSR or PSD programs for VOC emissions.

a. Two-steps for Determining NANSR and PSD Applicability for Modifications:
Determining the applicability of NANSR and PSD for modifications at an existing stationary major source is a two-step process in accordance with the provisions in 40 CFR §52.21(a)(2)(iv)(a):

Except as otherwise provided in paragraphs (a)(2)(v) and (vi) of this section, and consistent with the definition of major modification contained in paragraph (b)(2) of this section, a project is a major modification for a regulated NSR pollutant if it causes two types of emissions increases - a significant emissions increase (as defined in paragraph (b)(40) of this section), and a significant net emissions increase (as defined in paragraphs (b)(3) and (b)(23) of this section). The project is not a major modification if it does not cause a significant emissions increase. If the project causes a significant emissions increase, then the project is a major modification only if it also results in a significant net emissions increase.

i. Step 1: Project Emission Increases:
The first step is the calculation of the project emission increases in accordance with the methods specified in 40 CFR §52.21(a)(2)(iv)(b) – (d). If the project emissions increase is less than the regulated NSR pollutant significant emission rate in 40 CFR §52.21(b)(23)(i) and County Rule 100 §200.99, then the project is not a major modification and is not subject to review for that pollutant. The significant emission rates are summarized below. If the project causes a significant emissions increase, then the project is a major modification only if it also results in a significant net emissions increase.

TABLE 18: NANSR and PSD significant emission rates for the Ocotillo Power Plant, tons per year.

Pollutant	PSD Significant Threshold
Carbon Monoxide	100
Nitrogen Oxides	40
Particulate Matter	25
PM_{10}	15
$PM_{2.5}$	10
Sulfur Dioxide	40
VOC	40
Lead	0.6
Fluorides (as HF)	3
Sulfuric Acid Mist	7
Greenhouse Gases	75,000*

*The threshold for determining whether GHGs are "subject to regulation" is pursuant to 40 CFR 52.21(b)(49).

ii. Step 2: Net Emission Increase:
In accordance with 40 CFR §52.21(a)(2)(iv)(a), if the project causes a significant emissions increase, then the project is a major modification only if it also results in a significant net emissions increase. This second step in determining PSD applicability is commonly called netting. Netting involves accounting for source-wide contemporaneous and creditable emissions increases and decreases to demonstrate that the total changes to emissions at the source will not result in a significant net emission increase for that pollutant. Net emissions increase in 40 CFR §52.21(b)(3)(i) and County Rule 100 §200.66 means the amount by which the sum of the following exceeds zero:

1) Any increase in actual emissions from a particular physical change or change in the method of operation at a stationary source; and

2) Any other increases and decreases in actual emissions at the source that are contemporaneous with the particular change and are otherwise creditable.

An increase or decrease in actual emissions is contemporaneous with the increase from the particular change only if it occurs between: 1) the date five years before construction on the particular change commences, and 2) The date that the increase from the particular change occurs.

With this application, APS is proposing to permanently retire the existing Ocotillo Steam Turbine electric generating units 1 and 2 before commencing commercial operation of the proposed new gas turbines. The PSD and NANSR applicability determinations in this permit application are therefore based on the net emissions increases for this Project, considering the contemporaneous decreases in emissions from the permanent shutdown of the Ocotillo Steam Turbines Units 1 and 2 which have been netted against the increase in emissions from the proposed new emissions units.

b. Step 1: Project Emission Increases:
The Ocotillo Power Plant Modernization Project will involve the construction of five new gas turbines, a cooling tower, two emergency generators, and other associated equipment. The first step in determining NANSR and PSD applicability for this Project is the calculation of the project emissions increases in accordance with the applicability procedures specified in 40 CFR §52.21(a)(2)(iv)(d):

i. Actual-to-potential test for projects that only involve construction of a new emissions unit(s). A significant emissions increase of a regulated NSR pollutant is projected to occur

if the sum of the difference between the potential to emit (as defined in paragraph (b)(4) of this section) from each new emissions unit following completion of the project and the baseline actual emissions (as defined in paragraph (b)(48)(iii) of this section) of these units before the project equals or exceeds the significant amount for that pollutant (as defined in paragraph (b)(23) of this section).

The total potential emissions for the Ocotillo Power Plant Modernization Project are compared to the NANSR and PSD significant emission rates in Table 19. If the project emission increase is less than the PSD pollutant significant emission rates in 40 CFR §52.21(b)(23)(i), then the project is not a major modification and is not subject to PSD review for that pollutant. From Table 19, the Project will not result in a significant emissions increase for sulfur dioxide (SO_2), sulfuric acid mist (H_2SO_4), and fluorides. Therefore, the Project is not a major modification for these pollutants.

TABLE 19: Project emissions compared to the significant levels for the Ocotillo Modernization Project. All emissions are in tons per year.

POLLUTANT		New Project Emissions	PSD/NANSR Significant Level	Over?
Carbon Monoxide	CO	251.9	100	YES
Nitrogen Oxides	NO_x	125.4	40	YES
Particulate Matter	PM	63.4	25	YES
Particulate Matter	$PM_{2.5}$	56.6	10	YES
Sulfur Dioxide	SO_2	5.9	40	NO
Sulfuric Acid Mist	H_2SO_4	0.6	7	NO
Fluorides (as HF)	HF	0.0	3	NO
Lead	Pb	0.0	0.6	NO
Carbon Dioxide	CO_2	1,101,923	75,000	YES
Greenhouse Gases	CO_2e	1,103,067	75,000	YES

c. Step 2: Contemporaneous Decreases in Emissions from the Permanent Shutdown of the Ocotillo Steam Turbines Units 1 and 2.
In accordance with 40 CFR §52.21(a)(2)(iv)(a), if the project causes a significant emissions increase, then the project is a major modification only if it also results in a significant net emissions increase. This second step results in the calculation of a net emissions increase.

ii. Baseline Actual Emissions.

Under the definition of net emissions increase in 40 CFR §52.21(b)(3)(i)(b), baseline actual emissions for calculating increases and decreases shall be determined as provided in 40 CFR §52.21(b)(48), except that paragraphs (b)(48)(i)(c) and (b)(48)(ii)(d) of this section shall not apply. Under 40 CFR §52.21(b)(48), for any existing electric utility steam generating unit baseline actual emissions means the average rate, in tons per year, at which the unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 5-year period immediately preceding when the owner or operator begins actual construction of the project.

Note that County Rule 240 §305.7 states that "A decrease in actual emissions shall be considered in determining the potential of a new source or modification to emit only to the extent that the Control Officer has not relied on it in issuing any permit or permit revision under these rules, or the State has not relied on it in demonstrating attainment or reasonable further progress." Under County Rule 100 §200.3, actual emissions means "the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during a 2-year period that precedes the particular date and that is representative of normal source operation. The Control Officer may allow the use of a different time period upon a

demonstration that it is more representative of normal source operation." In this NANSR/PSD applicability analysis, the baseline period for all pollutants is the 24-month period from March 2012 to February 2014, which meets the definition of both baseline actual emissions and actual emissions.

The baseline actual emissions for the Units 1 and 2 Steam Turbines and associated cooling towers are presented in Appendix E of the APS application, and summarized in Tables 20, 21, 22, and 23. The NO_x and CO_2 baseline actual emissions and the unit heat input expressed in MMBtu are based on the data from the Acid Rain Program CEMS. PM, PM_{10}, and $PM_{2.5}$ emissions are based on the heat input from the CEMS, and measured emission rates from stack tests. All PM emissions are also assumed to be PM_{10} and $PM_{2.5}$ emissions. All other baseline actual emissions are based on the heat input from the CEMS, and AP-42 emission factors.

d. Calculation of the Net Emissions Increase for the Project.
For the Ocotillo Power Plant Modernization Project, the calculation of a net emission increase as defined in 40 CFR §52.21(b)(3)(i) means the amount by which the sum of the following exceeds zero:

i. The increase in Project emissions; and

ii. Decreases in actual emissions from the Units 1 and 2 Steam Turbines.
These are the only contemporaneous and creditable changes at the Ocotillo Power Plant. Because APS is proposing to permanently shut down the existing Unit 1 and 2 Steam Turbines and associated cooling towers prior to the initial operation of the new Project emissions units, the creditable decrease in actual emissions is equal to the baseline actual emissions for these emission units.

Table 24 is a calculation of the net emissions increase for the Ocotillo Power Plant Modernization Project. From Table 24, the Project will result in a significant emissions increase and a significant net emissions increase in carbon monoxide (CO), PM, PM_{10}, $PM_{2.5}$, and greenhouse gas (GHG) emissions.

TABLE 20: Baseline actual emissions for the Ocotillo Power Plant Steam Turbine Unit 1.

POLLUTANT		Baseline Heat Input	Baseline Emission Rate	Baseline Actual Emissions
		MMBtu	lb/MMBtu	ton/year
Carbon Monoxide	CO	609,861	0.0235	7.2
Nitrogen Oxides	NO_x	609,861	0.133	40.7
Particulate Matter	PM	609,861	0.0075	2.3
Particulate Matter	PM_{10}	609,861	0.0075	2.3
Particulate Matter	$PM_{2.5}$	609,861	0.0075	2.3
Sulfur Dioxide	SO_2	609,861	0.0006	0.2
Sulfuric Acid Mist	H_2SO_4	609,861	0.0000006	0.0002
Fluorides (as HF)	HF	609,861	0.0	0.0
Lead	Pb	609,861	0.0000005	0.0002
Carbon Dioxide	CO_2	609,861	118.9	36,243
Greenhouse Gases	CO_2e	609,861	119.0	36,279

TABLE 21: Baseline actual emissions for the Ocotillo Power Plant Steam Turbine Unit 2.

POLLUTANT		Baseline Heat Input	Baseline Emission Rate	Baseline Actual Emissions
		MMBtu	lb/MMBtu	ton/year
Carbon Monoxide	CO	634,840	0.0235	7.5
Nitrogen Oxides	NO_x	634,840	0.142	45.2
Particulate Matter	PM	634,840	0.0075	2.4
Particulate Matter	PM_{10}	634,840	0.0075	2.4
Particulate Matter	$PM_{2.5}$	634,840	0.0075	2.4
Sulfur Dioxide	SO_2	634,840	0.0006	0.2
Sulfuric Acid Mist	H_2SO_4	634,840	0.0000006	0.0002
Fluorides (as HF)	HF	634,840	0.0	0.0
Lead	Pb	634,840	0.0000005	0.0002
Carbon Dioxide	CO_2	634,840	118.9	37,728
Greenhouse Gases	CO_2e	634,840	119.0	37,766

Footnotes for Tables 12 and 13

1. The baseline period for all pollutants is the 24-month period from March 2012 to February 2014.

TABLE 22: Total baseline actual emissions for the Ocotillo Power Plant Steam Turbines Units 1 and 2.

POLLUTANT		Baseline Heat Input	Baseline Emission Rate	Baseline Actual Emissions
		MMBtu	lb/MMBtu	ton/year
Carbon Monoxide	CO	1,244,701	0.0235	14.6
Nitrogen Oxides	NO_x	1,244,701	0.138	85.9
Particulate Matter	PM	1,244,701	0.0075	4.6
Particulate Matter	PM_{10}	1,244,701	0.0075	4.6
Particulate Matter	$PM_{2.5}$	1,244,701	0.0075	4.6
Sulfur Dioxide	SO_2	1,244,701	0.0006	0.4
Sulfuric Acid Mist	H_2SO_4	1,244,701	0.0000006	0.0004
Fluorides (as HF)	HF	1,244,701	0.000000	0.0000
Lead	Pb	1,244,701	0.0000005	0.0003
Carbon Dioxide	CO_2	1,244,701	118.9	73,972
Greenhouse Gases	CO_2e	1,244,701	119.0	74,045

TABLE 23: Total baseline actual emissions for the Ocotillo Power Plant Steam Turbines Units 1 and 2 and the associated cooling towers.

POLLUTANT		Unit 1	Unit 2	Cooling Towers	Baseline Actual Emissions
		ton/year	ton/year	ton/year	ton/year
Carbon Monoxide	CO	7.2	7.5		14.6
Nitrogen Oxides	NO_x	40.7	45.2		85.9
Particulate Matter	PM	2.3	2.4	6.7	11.4
Particulate Matter	PM_{10}	2.3	2.4	2.1	6.8
Particulate Matter	$PM_{2.5}$	2.3	2.4	1.3	5.9
Sulfur Dioxide	SO_2	0.2	0.2		0.4
Sulfuric Acid Mist	H_2SO_4	0.00018	0.00019		0.0004
Fluorides (as HF)	HF	0.00000	0.00000		0.0000
Lead	Pb	0.00015	0.00016		0.0003
Carbon Dioxide	CO_2	36,243.5	37,728		73,972
Greenhouse Gases	CO_2e	36,279.0	37,766		74,045

TABLE 24: Net emissions increase and PSD applicability. All emissions are tons per year.

POLLUTANT		New Project Emissions	Creditable Emission Decreases	Net Emission Increase	Significance Level	Over?
Carbon Monoxide	CO	251.9	14.6	237.3	100	YES
Nitrogen Oxides	NO_x	125.4	85.9	39.5	40	NO
Particulate Matter	PM	63.4	8.0	55.4	25	YES
Particulate Matter	$PM_{2.5}$	56.6	5.3	51.3	10	YES
Sulfur Dioxide	SO_2	5.9	0.4	5.5	40	NO
Sulfuric Acid Mist	H_2SO_4	0.6	0.0	0.6	7	NO
Fluorides (as HF)	HF	0.002	0.0	0.0	3	NO
Lead	Pb	0.005	0.000	0.005	0.6	NO
Carbon Dioxide	CO_2	1,101,923	73,972	1,027,951	75,000	YES
Greenhouse Gases	CO_2e	1,103,067	74,045	1,029,022	75,000	YES

Footnotes:

1. In accordance with 40 CFR §52.21(i)(2), since the area is nonattainment for PM_{10}, PSD does not apply to PM_{10} emissions.

e. Conclusions Regarding PSD Applicability.

Based on the total potential emissions for the Ocotillo Power Plant Modernization Project as proposed, the Project will not result in a significant emissions increase for sulfur dioxide (SO_2), sulfuric acid mist (H_2SO_4), and fluorides. Based on the proposed permanent shutdown and retirement of the Ocotillo Steam Turbine Units 1 and 2, the net emission increase for NO_x is below the significant emission rate and PSD review is not triggered for that pollutant. The net emission increases for CO, PM, $PM_{2.5}$, and GHG are above the significant emission rates and PSD review is triggered for only these pollutants. Finally, because the Ocotillo Power Plant is located in an area designated as nonattainment for PM_{10} and VOC, the Project is not subject to PSD review for those pollutants.

f. Conclusions Regarding Nonattainment Area New Source Review Applicability.

APS is proposing plant-wide fuel use limits and emission caps in accordance with County Rule 201 which limit the total potential emissions for the entire Ocotillo Power Plant below the nonattainment major source thresholds for PM_{10} and VOC emissions (see Table 37). Therefore, after the Project the Ocotillo plant will be considered a nonattainment major source for NO_x and a minor source for PM_{10} and VOC, and will not be subject to NANSR for PM_{10} and VOC.

As shown in Table 23, the net emissions increase for NO_x is less than the significant emission rate. Therefore, based on the proposed emission limits in this permit application, this Project is not a major modification for NO_x and is not subject to review for any nonattainment area pollutants.

g. Minor NSR BACT Requirements.

MCAQD Rule 241, §301.2, requires the application of BACT to any modified stationary source if the modification causes an increase in emissions on any single day of more than 150 lbs/day or 25 tons/year of VOC, NO_x, or PM; more than 85 lbs/day or 15 tons/year of PM_{10}; or more than 550 lbs/day or 100 tons/year of CO. BACT is only required for the sources or group of sources being modified. The Provisions of Rule 241 do not apply to new major sources and major modifications to existing major sources subject to the requirements of the PSD program at MCAQD Rule 240.

As described in Section 4.45 of this application, PSD BACT requirements already apply to CO, PM, $PM_{2.5}$, and GHG pollutants. Therefore, Rule 241 BACT does not apply to these pollutants. The only regulated pollutants that Rule 241 BACT could potentially apply to are PM_{10}, NO_x, and VOC. Based on the hourly mass emission rates listed in Table 9, and assuming that all five new GTs could operate at full load for 24 hours in a day, the GTs alone exceed the Rule 241

daily thresholds and trigger the Rule 241 BACT requirement for these three pollutants. Therefore, this air pollution control construction permit application includes Rule 241 BACT analyses for all new emission units for NO_x and VOC (presented in Appendix B of this application), and the PSD PM and $PM_{2.5}$ BACT analyses will meet the requirement for a Rule 241 PM_{10} BACT analysis.

h. Title V Revision.
The proposed Ocotillo Modernization Project meets the criteria for requiring a Significant Permit Revision as described in Rule 210 §406. Therefore, the permit application includes all information required by Rule 210 §406, Rule 240 and other applicable Maricopa County Rules.

23. APPLICABLE SIP REQUIREMENTS FOR NONATTAINMENT AREA NEW SOURCE REVIEW:

The Maricopa County applicable state implementation plan (SIP) contains administrative permit processing rules. EPA approved these rules for the issuance of permits for minor source new source review and major source nonattainment area new source review (NANSR) but not for prevention of significant deterioration permits (PSD) in attainment areas. Under a delegation agreement with US EPA, Maricopa County administers the PSD program pursuant to the requirements under 40 CFR §52.21. The department also follows the requirements of current Maricopa County Air Pollution Control Rule 240 when conducting preconstruction review for major sources for both NANSR/PSD.

The applicable SIP requirements for nonattainment area new source review are found in SIP Rule 21.0—Procedures for Obtaining an Installation Permit. SIP Rule 21 also includes the incorporation by reference of Arizona Administrative Code (ACC) Articles R9-3-301, R9-3-302, R9-3-303, R9-3-304, R9-3-305, R9-3-307, including definitions used and articles referenced in those administrative rules except for four definitions specifically modified in SIP Rule 21(D)(1). AAC Article R9-3-302 specifically addresses NANSR and the terms referenced in the article are defined in AAC Article R9-3-101.

Several provisions contained in the applicable SIP apply to the applicability determination for the APS Ocotillo major modification and differ from 40 CFR 52.21 and Rule 240. These provisions include:

- A "dual source" definition of stationary source found in SIP Rule 21.0(D)(1)(b) and (c) that only applies for sources located in nonattainment areas.
- Definitions of "major source" and "major modifications" that only list volatile organic compounds as a precursor to ozone.
- Definition of "major source" that specifies a nonattainment area major source threshold of 100 tons per year of any pollutant.

Considering the provisions contained in the applicable SIP, the department has determined that the APS Ocotillo project would not be classified as a major source of nonattainment pollutants. The basis for this determination is described below.

Under a dual source definition, a source is defined in two ways. A source may be either the entire plant (See SIP Rule 21(D)(1)(b)) or an individual emission unit (See SIP Rule 21(D)(1)(c)). Therefore, NANSR only applies to major sources of VOCs and PM_{10}, the nonattainment pollutants per the definitions major source and major modification. As a major source may be either a major individual emission unit and/or a major plant, the potential emissions from the entire plant and separately from each individual emission unit were compared to the 100 TPY threshold.

The APS Ocotillo project will add five additional simple cycle turbines and de-commission two existing steam generating units. Two existing simple cycle turbines will remain on site. The potential emissions from the entire plant and for each individual emission unit were calculated as follows:

- Based on commitments reflected in permit conditions of a proposed combined fuel use limitation the new GT3-GT7 turbines and the proposed combined fuel use limits on the existing GT1-GT2 turbines, the plantwide potential emissions of VOC and PM_{10} are 42.5 TPY and 63 TPY, respectively.
- Because the proposed fuel use limits are over groups of turbines, the potential emissions for each individual emission were calculated using the maximum allowable operating levels that could occur for each individual emission unit under either normal operations or under startup/shutdown operations.
  - For each new GT3-GT7 turbine individually, the potential VOC and PM_{10} emissions are calculated as 50.4 TPY and 23.7 TPY.
  - For each of the existing GT1-GT2 turbines, the potential VOC and PM_{10} emissions are 3.1 TPY and 12.4 TPY calculated by allocating the entire GT1-GT2 fuel use limit to a single turbine.
- For the new emergency generator, the potential VOC and PM_{10} emissions are 0.35 TPY and 0.05 TPY calculated assuming 500 hours of operation per year.
- For the new cooling tower, the potential PM_{10} emissions are 2.6 TPY calculated based on 8,760 hours per year.

Therefore, under either a plantwide or individual emission unit basis in the applicable SIP definition of source, the Ocotillo plant would not be classified as a major source of nonattainment pollutants.

24. PROPOSED CONTROL TECHNOLOGIES AND EMISSION LIMITS:

Appendix A of this TSD presents the APS control technology analysis for the proposed simple-cycle GTs and the hybrid cooling tower. The analyses address both the BACT requirements under the PSD rules, as well as the "County BACT" analysis required under Maricopa County Air Pollution Control Regulations, Rule 241, §301.1.

For the PSD BACT analysis for the pollutants CO, PM, $PM_{2.5}$, and GHG, the "top-down" approach was used as recommended by EPA. This method evaluates progressively less stringent control technologies until a level of control considered BACT is reached, based on the environmental, energy, and economic impacts. The five steps of a top-down BACT analysis are:

1. Identify all available control technologies with practical potential for application to the emission unit and regulated pollutant under evaluation;
2. Eliminate all technically infeasible control technologies;
3. Rank remaining control technologies by effectiveness and tabulate a control hierarchy;
4. Evaluate most effective controls and document results; and
5. Select BACT, which will be the most effective practical option not rejected, based on economic, environmental, and/or energy impacts.

The Maricopa County BACT analysis for the pollutants NO_x and VOC was performed in accordance with the Air Quality Department's memorandum "REQUIREMENTS, PROCEDURES AND GUIDANCE IN SELECTING BACT and RACT", revised July, 2010. In Section 8 of that memorandum, the guidance states: "To streamline the BACT selection process, the Department will accept a BACT control technology for the same category of industry as listed by the South Coast Air Quality Management District (SCAQMD), SJVACD, or the BAAQMD, or other regulatory agencies accepted by the Department as a viable alternative. Sources who opt to select control technology for the same or similar source category accepted by the air quality management districts in California may forgo the top-down

analysis described above." Based on this guidance, the Ocotillo control technology analysis considered recent NO_x and VOC BACT determinations in California for similar simple-cycle gas turbines.

Table 25 summarizes the proposed BACT emission limits that are described in Appendix B of the APS permit application for the proposed new LMS100 gas turbines. These BACT emissions will be achieved through the use of high efficiency simple-cycle gas turbines, good combustion practices, water injection in combination with selective catalytic reduction (SCR), oxidation catalysts, and combustion of pipeline quality natural gas. Table 26 summarizes the proposed BACT emission limits for the proposed new emergency diesel generators. These BACT emissions will be achieved through the use of high efficiency diesel engines, good combustion practices, selective catalytic reduction (SCR), diesel oxidation catalysts, and combustion of ultra-low sulfur diesel fuel.

As part of the GHG BACT analysis process, EPA Region 9 has provided a framework for establishing the GHG BACT limit for gas turbines when considering the variation of turbine efficiency and emissions as a function of operating load in their "Responses to Public Comments on the Proposed Prevention of Significant Deterioration Permit for the Pio Pico Energy Center", November 2012, Comment 13. The simple-cycle GTs proposed for the Pio Pico Energy Center are the same units being proposed by APS for this Project. EPA stated that it is not possible to predict the extent of part load operation for the life of the generating facility, and therefore it is inappropriate to establish a GHG permit limit that prevents the facility from generating electricity as intended. For the Pio Pico PSD permit, EPA established the GHG BACT emission limit at a level achievable during the lowest normal operating load, which was 50% load with a resulting GHG BACT limit of 1,328 lb CO2/MWh of gross electric output. This same methodology was used by APS to develop their proposed Ocotillo GHG BACT limit. Because the Ocotillo CTs must have the capability to operate continuously at loads as low as 25% of the maximum load, the BACT emission limit for these GTs has been set to the 25% load value of 1,690 lb CO2/MWh of gross electric output. It should be noted that while it is possible that this facility may be subject to GHG emission standards in the final version of the NSPS at 40 CFR 60 Subpart KKKK, the proposed NSPS emission limits are not applicable at this time, and therefore are not a controlling floor for BACT purposes since the proposed NSPS is not a final action and the proposed standard may change.

TABLE 25: BACT Emission Limits for the Ocotillo Modernization Project gas turbines.

Pollutant	PSD or County BACT Requirement	Proposed BACT Emission Limit
Carbon Monoxide (CO)	PSD BACT	6.0 ppmdv at 15% O_2, based on a 1-hour average.
Nitrogen Oxides (NO_x)	County BACT	2.5 ppmdv at 15% O_2, based on a 1-hour average.
Particulate Matter PM and $PM_{2.5}$	PSD BACT	5.4 pounds per hour, combined filterable and condensable.
Particulate Matter PM_{10}	County BACT	5.4 pounds per hour, combined filterable and condensable.
Volatile Organic Compounds (VOC)	County BACT	2 ppmdv at 15% O_2, based on a 1-hour average.
Greenhouse Gases (CO_2e)	PSD BACT	Achieve an initial heat rate of no more than 8,742 Btu/kWhr of gross electric output at 100% load. 1,690 lb CO_2/MWh of gross electric output, based on a 12-month. Prepare and follow a Maintenance Plan.

TABLE 26: BACT Emission Limits for the Ocotillo Modernization Project emergency generators.

Pollutant	PSD or County BACT Requirement	Proposed BACT Emission Limit
Carbon Monoxide (CO)	PSD BACT	Tier 4 Emission Standard of 2.61 g CO/hp-hr. The operation of each generator may not exceed 500 hours per year.
Nitrogen Oxides (NO_x)	County BACT	Tier 4 Emission Standard of 0.50 g NO_x/hp-hr. The operation of each generator may not exceed 500 hours per year.
Particulate Matter PM and $PM_{2.5}$	PSD BACT	Tier 4 Emission Standard of 0.022 g PM/hp-hr. The operation of each generator may not exceed 500 hours per year.
Particulate Matter PM_{10}	County BACT	Tier 4 Emission Standard of 0.022 g PM/hp-hr. The operation of each generator may not exceed 500 hours per year.
Volatile Organic Compounds (VOC)	County BACT	Tier 4 Emission Standard of 0.14 g NMHC/hp-hr. The operation of each generator may not exceed 500 hours per year.
Greenhouse Gases (CO_2e)	PSD BACT	Carbon dioxide (CO_2) emissions may not exceed 1,209 tons per year. The operation of each generator may not exceed 500 hours per year.

25. EMISSIONS FOR EXISTING GENERATOR AND GASOLINE STORAGE TANK:

Table 27 summarizes the total potential emissions for the existing propane-fired Generac 125 hp emergency engine at the Ocotillo Power Plant.

The Ocotillo plant also contains a 2,000 gallon gasoline storage tank, with an allowable permitted throughput limitation of 120,000 gallons per year. Potential VOC emissions based on the U.S. EPA's TANKS program, Version 4.0.9d (which is based on the equations from AP-42, Section 7.1, Organic Storage Tanks), is 1,664 pounds per year, equal to 0.83 tons per year.

The emissions from these units are added to the emissions from the new Project emission units and summarized in Table 15 to determine the major source status of the facility.

TABLE 27: Summary of potential emissions for existing emergency engines.

Pollutant		Emission Factor lb/MMBtu	Heat Input MMBtu/hr	Emission Factor g/hp-hr	Power Output hp	Potential Emissions Each Generator	
						lb/hr	ton/yr
Carbon Monoxide	CO	NA	NA	129.1	125	35.55	8.89
Nitrogen Oxides	NO_x	NA	NA	4.32	125	1.19	0.30
Particulate Matter	PM	0.01941	1.49	NA	NA	0.03	0.01
Particulate Matter	PM_{10}	0.01941	1.49	NA	NA	0.03	0.01
Particulate Matter	$PM_{2.5}$	0.01941	1.49	NA	NA	0.03	0.01
Sulfur Dioxide	SO_2	0.000588	1.49	NA	NA	0.0009	0.0002
Vol Org Cmpds	VOC	NA	NA	0.20	125	0.06	0.01
Sulfuric Acid Mist	H_2SO_4	NA	NA	3.2E-04	125	0.0001	0.0000
Fluorides	F	NA	NA	NA	NA	0	0
Lead	Pb	NA	NA	NA	NA	0	0
Carbon Dioxide	CO_2	NA	NA	750.9	125	206.7	51.7
Greenhouse Gases	CO_2e	NA	NA	753.6	125	207.5	51.9

Footnotes:

1. Potential emissions are based on 500 hours per year of operation.

2. The CO, NO_x, and VOC (THC) emission rates are based on manufacturer's data.

3. PM and SO_2 emissions are based on LPG fuel flow rate of 69.18 lb/hr, a heat content of 21,561 Btu/lb HHV, and AP-42 gas fired 4-stroke rich burn engine emission factors.

4. Sulfuric acid mist emissions are based on 10% conversion of SO_2 to SO_3 in the flue gas.

5. Emission factors for GHG emissions including CO_2, N_2O and CH_4 are from 40 CFR 98, Tables C-1 and C-2.

   The CO_2e factors are from 40 CFR 98, Subpart A, Table A-1.

26. MODELING:

APS has provided detailed modeling results with its application.

a. Modeling Basis:

As part of this Title V and PSD construction permit application, a PSD air quality dispersion modeling analysis has been prepared for the two pollutants that trigger PSD review modeling requirements, carbon monoxide (CO) and particulate matter less than or equal to 2.5 microns ($PM_{2.5}$). This analysis demonstrates that the Project does not result in an air quality impact above the Significant Impact Levels (SILs), and therefore does not cause or contribute to an exceedance of any National Ambient Air Quality Standards (NAAQS) or PSD increment. The National Air Quality Standards (NAAQS), Class II PSD increments, and Class II Significant Impact Levels ("SILs") are summarized in Table 28.

The procedures used for all air quality impact analyses were consistent with relevant EPA and Maricopa County guidance. EPA guidance for performing air quality analyses is described in Chapter C of EPA's "New Source Review Workshop Manual", Draft - October 1990, in EPA's "Guideline on Air Quality Models", 40 C.F.R. Part 51, Appendix W in EPA's "AERMOD Users Guide" and related addendums, and in EPA's "AERMOD Implementation Guide", updated March 19, 2009. In addition, EPA has developed updated $PM_{2.5}$ analysis guidance and specific 1-hr NO_2 and SO_2 NAAQS modeling analysis guidance.

The air quality analysis supplied by the applicant presents an overview of the modeling procedures used, discusses the EPA approved near-field dispersion model, the meteorological data processing procedures, the development of the receptor network, the Good Engineering Practice (GEP) stack height analysis and generation of building downwash parameters for the facility, and the emissions and stack parameter data that were modeled. It also presents the dispersion modeling results, and compares them to the SILs, and if necessary, the NAAQS and PSD increments.

TABLE 28: Significant Impact Levels, NAAQS, and PSD Class II Increments. (µg/m3)

Pollutant	Averaging Period	Class II SIL	NAAQS	PSD Class II Increment
Carbon Monoxide (CO)	8-hour	500	10,000	n/a
	1-hour	2000	40,000	n/a
Particulate Matter ($PM_{2.5}$)	Annual	0.3	15	4
	24-hour	1.2	35	9

b. Dispersion modeling:

There are two levels of sophistication of atmospheric dispersion computer models that can be used for the air quality analysis within 50 km of a facility (i.e., a "near-field" modeling analysis). The first level consists of "screening" models, such as EPA's SCREEN3 model, that conservatively estimate ambient impacts from the modeled source. The second level is referred to as "refined" models. These models, such as EPA's AERMOD model, require more detailed and precise input data, including representative hourly meteorological data, and result in more accurate estimates of the source ambient air impacts.

The AERMOD model (version 14134) was used for the air quality analyses, with the regulatory default option set. AERMOD is a steady-state plume dispersion model that simulates transport and dispersion from multiple point, area, or volume sources based on an up-to-date characterization of the atmospheric boundary layer. AERMOD uses Gaussian distributions in the vertical and horizontal for stable conditions, and in the horizontal for convective conditions; the vertical distribution for convective conditions is based on a bi-Gaussian probability density function of the vertical velocity. For elevated terrain AERMOD incorporates the concept of the critical dividing streamline height, in which flow below this height remains horizontal, and flow above this height rises up and over terrain. AERMOD also uses the advanced PRIME algorithm to account for building wake effects.

The regulatory DEFAULT option requires the use of terrain elevation data, stack-tip downwash, sequential date checking, and does not permit the use of the model in the SCREEN mode. In the regulatory default mode, pollutant half-life or decay options will not be employed. These regulatory default options will be employed for this AERMOD analysis.

AERMOD incorporates both rural and urban processing options, which affect the dispersion rates used in calculating ground-level pollutant concentrations. Based on a land use analysis, the majority of land use within 1 km of the site is rural while within 3 km of the site it is urban. To conservatively estimate the maximum ambient impacts, the AERMOD modeling was performed using both urban and rural dispersion options and the highest modeled impact was selected. The urban option population value used for the Phoenix Metropolitan Statistical Area (MSA) was 4,400,000.Air Quality Analysis Results:

Because the new GTs may begin operation before the existing steam boiler structures are completely dismantled, two sets of BPIP-PRIME analyses were performed, both with and without the existing steam boiler structures. The calculated building downwash parameters are the same for these two BPIP-PRIME analyses, indicating that the steam boiler existing

structures are not the controlling structures for the new emission units and the AERMOD predicted impacts for the new emission units are not affected by these existing structures.

The Project-only impacts (i.e., the impacts from the proposed GTs, emergency generators, and cooling tower) are summarized in Table 29. All Project impacts are below the Significant Impact Levels, therefore the Project impacts are not significant and a cumulative NAAQS and PSD increment analysis is not required.

c. Emission and Stack Data.

Tables 9 and 10 present emissions for the proposed GTs. Because the emission rates vary with load, a modeling analysis of various operating loads and ambient temperatures (a load screening analysis) was performed. The stack temperatures and flow rates used for the 100%, 75%, 50%, and 25% loads were the minimum values at each load across the range of ambient temperatures. Because emissions are directly related to heat input rates, normalized emissions of 1.0, 0.78, 0.59, and 0.38 were used for the four load scenarios, based on the relative heat input at these four loads. Table 30 summarizes the results of this load screening analysis using the model predicted "highest first high" concentrations across the complete 5 year meteorological data set. Table 30 demonstrates that the 100% load condition results in the maximum impacts for all averaging intervals, therefore it was used for the subsequent $PM_{2.5}$ modeling analysis. For the CO analyses, because the maximum short-term emission rates occur during startup /shutdown operation, the 25% load stack parameters were used to best simulate startup/shutdown turbine conditions and conservatively determine the CO ambient impacts. Table 31 presents a summary of the 100% load stack parameters and the emission rates that were modeled for the new GTs and cooling tower.

TABLE 29: Significant impact modeling results for the new emissions units. (µg/m3)

Pollutant	Averaging Interval	Highest Modeled Conc.	SILs	Impacts Above SIL?
CO	8-hour	314	500	No
	1-hour	821	2,000	No
$PM_{2.5}$	Annual	0.10	0.3	No
	24-hour	1.1	1.2	No

TABLE 30: Load screening modeling results.

Load Level	Annual Impact	1-Hr Impact	8-Hr Impact	24-Hr Impact
100%	0.034	3.86	0.96	0.43
75%	0.032	3.32	0.85	0.38
50%	0.029	2.73	0.70	0.31
25%	0.026	1.96	0.53	0.24

TABLE 31: Gas Turbine, Emergency Generator, and Cooling Tower Emissions and Stack Parameters.

Source ID	Source Description	Easting (X)	Northing (Y)	Base Elevation	Stack Height	Temp.	Exit Velocity	Stack Diameter	CO	$PM_{2.5}$
		(m)	(m)	(ft)	(ft)	(°F)	(fps)	(ft)	(lb/hr)	(lb/hr)
GT3	CT3-LMS100	414839.88	3698721.2	1169	85	771	115.0	13.5	69.2	5.4
GT4	CT4-LMS101	414839.88	3698774.2	1170	85	771	115.0	13.5	69.2	5.4
GT5	CT5-LMS102	414840.18	3698826.8	1170	85	771	115.0	13.5	69.2	5.4
GT6	CT6-LMS103	414840.47	3698879.6	1170	85	771	115.0	13.5	69.2	5.4
GT7	CT7-LMS104	414841.07	3698932.5	1171	85	771	115.0	13.5	69.2	5.4
GTCT C1	CoolTwr Fan 1	414898.25	3698921.5	1170	42.5	87	33	30.0		5.82E-02
GTCT C2	CoolTwr Fan 2	414911.68	3698921.5	1171	42.5	87	33	30.0		5.82E-02
GTCT C3	CoolTwr Fan 3	414925.03	3698921.2	1171	42.5	87	33	30.0		5.82E-02
GTCT C4	CoolTwr Fan 4	414938.46	3698921.1	1171	42.5	87	33	30.0		5.82E-02
GTCT C5	CoolTwr Fan 5	414951.96	3698920.9	1171	42.5	87	33	30.0		5.82E-02
GTCT C6	CoolTwr Fan 6	414965.39	3698920.9	1171	42.5	87	33	30.0		5.82E-02
EMERG1	Emergency Generator 1	414911.5	3698797	1170	15	900	231	1.5	25.4	2.2E-01
EMERG2	Emergency Generator 2	414913.5	3698775	1170	15	900	231	1.5	25.4	2.2E-01

27. ADDITIONAL IMPACT ANALYSIS:

The Prevention of Significant Deterioration (PSD) program requires an additional impact analysis for pollutants that trigger PSD review (for this Project, those pollutants are CO and $PM_{2.5}$). The purpose of this analysis is to assess the potential impact the proposed project will have on visibility, soils, and vegetation, as well as the impact of general commercial, residential, and industrial growth associated with the proposed project.

a. Analysis on Soils, Vegetation, and Visibility:
The analysis of impacts on vegetation and soils is based on EPA guidance. The National Ambient Air Quality Standards (NAAQS) are designed to protect "health and welfare", including "welfare" effects on water, vegetation, and soils, and are a useful benchmark for evaluating soil and vegetation impacts. In addition, model predicted concentrations were compared to other available effects screening levels for sensitive species presented in EPA's "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals," December 12, 1980, EPA 450/2-81-078. Since the ambient impacts from the Project for CO and $PM_{2.5}$ do not exceed the significant impact levels (SILs), are far below the screening levels for sensitive species for CO, and because the Project will combust only natural gas, it can be concluded that the Project will not result in harmful effects to vegetation and soils.

b. Associated Growth and Secondary Emissions:
The emissions resulting from residential, commercial, and industrial growth associated with, but not directly a part of the project, must also be considered when conducting the air quality analysis. Given the large local population and the limited construction related activities associated with this Project, the construction associated with the Project will not have a significant impact to the local population. Further, since the Ocotillo Power Plant is an existing operation, the employees required to operate the facility are already largely hired and available, so that further impacts to the local area will be small. In addition, local municipal services will not be adversely impacted by this Project. Therefore, the Project is not expected to have a measurable effect on the residential, commercial, or industrial growth of the area.

28. NEW PERMIT CONDITIONS:

Tables 32 through 35 summarize the enforceable emission limits for the Ocotillo Modernization Project gas turbines (GTs) and cooling tower. The proposed permit compliance requirements are described below, and consist of: Continuous Emission Monitoring (CEM) data for NO_x, CO, and carbon dioxide (CO_2) emissions; fuel use data; PM_{10}, $PM_{2.5}$, and VOC emission factors derived from the most recent stack test data; fuel specification data from the natural gas pipeline supplier; and data on the number of startup/shutdown events.

TABLE 32: Rolling 12-month Average Limits (tons per year)

Emissions Unit(s)	SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$	VOC	CO_2e
GT3 - GT7	5.9	125.5	239.2	63	54.9	43.1	1,100,640
EG1 – EG2 Emergency Generators	0.02		12.7		0.1	0.7	2,427
GTCT	NA	NA	NA		1.6	NA	NA
GT1-GT2	NA	NA	NA		NA	NA	NA

TABLE 33: Hourly Emission Limits for the new gas turbines GT3 - GT7 when turbines operate during periods other than startup/shutdown and tuning/testing mode, lb/hour).

Emissions Unit(s)	SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$	VOC	CO_2e
GT3-GT7 individually	0.6	9.3	13.5	5.4	5.4	2.6	NA
GTCT	NA	NA	NA	0.6	0.36	NA	NA

TABLE 34: Hourly emission limits for Units GT3 - GT7 during periods when gas turbines operate in startup/shutdown (lb/hour, 1-hour average).

	NO_x	CO
GT3-GT7	31.4	69.2

TABLE 35: Additional concentration or rate emission limits.

Emission Unit or Device	NO_x	CO	PM_{10} Total	$PM_{2.5}$ Total	VOC	CO_2e	Other
GT3 - GT7 during Normal Operation Other than Startup/Shutdown or Tuning/Testing Mode	2.5 ppmdv at 15% O_2, 1 hour average	6.0 ppmdv at 15% O_2, 1 hour average	5.4 lbs/hr	5.4 lbs/hr	2 ppmdv at 15% O_2, 1 hour average	1,690 lbs CO_2/MWh gross output, based on a rolling 8,760-operating hour average.	Ammonia 10 ppmdv, Based on a 24-hour rolling average
Cooling Tower	NA	NA	Drift eliminators limiting drift to 0.0005% and Total Dissolved Solids (TDS) content of circulating cooling water less than 12,000 ppm	Drift eliminators limiting drift to 0.0005% and Total Dissolved Solids (TDS) content of circulating cooling water less than 12,000 ppm	NA	NA	NA
Pipeline Natural Gas Fuel Sulfur Content	NA	NA	NA	NA	NA	NA	NA

The following notes and compliance methods apply to Tables 32 through 35:

a. NA (Not Applicable) means that the device does not emit the indicated pollutant.

b. Startup is defined as the period between when a unit is initially started and fuel flow is indicated and ending 30 minutes later.

c. "Shutdown" is defined as the period beginning with the initiation of gas turbine shutdown sequence and lasting until fuel combustion has ceased.

d. The rolling 12- month limits shall be calculated monthly using the data from the most recent 12 calendar months, with a new 12-month period beginning on the first day of each calendar month.

f. NO_x emissions during normal operations, startup/shutdown periods, and tuning/testing periods from GT3 through GT7 shall be calculated using CEMS data in accordance with 40 CFR Part 75, Appendix F.

g. CO emissions from Units GT1 through GT7 shall be calculated from CEMS data.

h. PM_{10} and VOC emissions during normal operations, startup/shutdown periods, and tuning/testing periods from Units GT3 through GT7 shall be calculated using monitored fuel flow and emission factors from the most recent performance test for each unit, unless an alternative emission factor can be demonstrated to the satisfaction of the Control Officer and the Administrator to be more representative of emissions.

i. PM_{10} and VOC emissions during normal operations, startup/shutdown periods,and tuning/testing periods from GT1 and GT2 shall be calculated using monitored fuel flow and emission factors from the U.S. EPA document AP-42, unless an alternative emission factor can be demonstrated to the satisfaction of the Control Officer and the Administrator to be more representative of emissions.

j. PM_{10} emissions from the Cooling Towers (GTCT) shall be calculated from the following equation: PM_{10} Emissions (tons/yr) = Total Recirculation Rate (gallons/minute) * TDS Concentration (milligrams/liter) * Operating Hours * 3.94E-13;

k. SO_2 emissions from all units shall be calculated from fuel usage during normal operations, startup/shutdown, and the sulfur content of the fuel as determined as specified in this permit.

l. Unless otherwise stated, the PM_{10} emission limits include both solid (filterable) and condensable particulate matter. Filterable PM_{10} is measured with 40 CFR Part 60 Appendix A Method 5. Condensable particulate matter is measured with 40 CFR 60 Appendix A Method 202.

29. OPERATIONAL REQUIREMENTS FOR UNITS GT3 THROUGH GT7:
The following operational and monitoring and recordkeeping requirements are also proposed:

a. The Permittee shall operate and maintain Selective Catalytic Reduction (SRC) catalysts on Units GT3 through GT7. The Permittee shall maintain an Operations and Maintenance (O&M) Plan for the SCRs required by these Permit Conditions. The Plan shall be in a format acceptable to the Department and shall specify the procedures used to maintain the SCRs. The Permittee shall at all times during normal operation comply with the latest version of the O&M Plan approved in writing by the Control Officer. [County Rules 210 §302.1.b and 322 §306.2 and §306.3]

b. The Permittee shall operate and maintain CO Oxidation Emission Control Systems (OX-ECS) on GT3 through GT7. The Permittee shall maintain an O&M Plan for the OX-ECS required by these Permit Conditions. The Plan shall be in a format acceptable to the Department and shall specify the procedures used to maintain the OX-ECS. The Permittee shall comply at all times with the most recent version of the O&M Plan that has been approved in writing by the Control Officer. [County Rules 210 §302.1.b and 322 §306.2 and §306.3]

c. The Permittee shall use operational practices recommended by the manufacturer and parametric monitoring to ensure good combustion control. [County Rule 322 §301.3]

d. The Permittee shall not combust any fuel other than natural gas in units GT3 through GT7.

30. MONITORING AND RECORDKEEPING FACILITY-WIDE:
The Permittee shall hourly monitor and record the hours of operation and operating mode (startup, shutdown, or normal) of Units GT3 through GT7; exhaust temperature prior to entering the SCR systems and the OX-ECS; the amount of natural gas combusted in individual Units GT3 through GT7; and the actual heat input of Units GT3 through GT7. The Permittee may monitor the combined fuel usage in Units GT3 through GT7 instead of individually. The Permittee shall monitor and record the hours of operation of the emergency generators EG1 and EG2. The Permittee shall monthly calculate and record the emissions from Units GT1 and GT2, GT3 through GT7, EG1 and EG2, and the Cooling Tower and shall monthly compare the calculated emissions to the limits contained in the permit.

31. TOTAL FACILITY EMISSIONS AFTER REVISION:

TABLE 36: Total allowable emissions for the Ocotillo Power Plant after the Project.

POLLUTANT		Allowable Emission, tons per year						
		GT1-2	GT3-GT7	EG1 EG2	Existing Emergency Generator	New Diesel and Existing Gasoline Tanks	New Cooling Tower	TOTAL
Carbon Monoxide	CO	122.9	239.2	12.7	8.9			374.8
Nitrogen Oxides	NO_x	479.7	125.5	2.4	0.3			605.2
Particulate Matter	PM	12.4	54.9	0.1	0.0		8.4	75.7
Particulate Matter	PM_{10}	12.4	54.9	0.1	0.0		2.6	63
Particulate Matter	$PM_{2.5}$	12.4	54.9	0.1	0.0		1.6	63
Sulfur Dioxide	SO_2	0.9	5.9	0.0	0.00			6.8
Vol. Organic Cmpds	VOC	3.1	43.1	0.69	0.01	0.84		47.8
Sulfuric Acid Mist	H_2SO_4	0.1	0.59	0.0	0.0			0.68
Fluorides (as HF)	HF	0.0	0.0	0.0	0.0			0.0
Lead	Pb	0.0007	0.0049	0.0	0.0			0.006
Carbon Dioxide	CO_2	175,371	1,099,504	2,418.9	51.7			1,277,293
Greenhouse Gases	CO_2e	175,552	1,100,640	2,427.2	51.9			1,278,618

Footnote:
The requested plant-wide total allowable PM_{10} emissions are 63.0 tpy.

32. CONCLUSION AND PROPOSED ACTION:

Based on the information supplied by APS, and on the analyses conducted by the MCAQD, the MCAQD has concluded that the requested permit revision is consistent with Federal, State, and County regulations and rules and will not cause or contribute to a violation of any federal ambient air quality standard, will not cause any Arizona Ambient Air Quality Guidelines to be exceeded, and will not cause additional adverse air quality impacts.

The, MCAQD proposes to issue the Permit Revision, V95007 – 2.0.0.0 - 1.0.1.0, subject to the proposed permit conditions.

Appendix A: Control Technology Review

APS Ocotillo
Modernization Project