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**Technical Support Document
Title V Permit Renewal
APS - Saguaro Power Plant
Permit # V20627.000**

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This technical support document (TSD) summarizes some of the main items analyzed for this facility's original permit. More in-depth discussion can be found in previous TSDs from 2001.

1. APPLICANT

Arizona Public Service Company
P.O. Box 53933, Mail Sta. 4552
Phoenix, Arizona 85072-3933

2. BACKGROUND

2.1 PROJECT LOCATION

This permit renewal pertains to an existing electrical power plant owned and operated by Arizona Public Service Company, located at Mile Post Marker 2265, I-10, Red Rock, Arizona. The SIC Code is 4911. The source is situated in an area classified as "attainment" for all pollutants.

2.2 PROCESS DESCRIPTION

The source consists of 5 electrical generating units, including 4 "grandfathered" generating units: 2 steam-electric units (Unit 1 & 2) nominally rated at 115 megawatt ("mW") and 105 mW, and two 55 mW Westinghouse W-501AA simple cycle gas turbine generators (CT1 & CT2). The steam-driven generators constitute the preferred steady-state producers, while the 55 mW gas turbine generators provide quick-start capacity. Those "grandfathered" generating units were installed between 1953 and 1973. As such, while those units fall subject to "existing source" performance standards, they antedates all applicable "new source" performance standards. Each steam unit includes a boiler, steam turbine-generator, and associated equipment. Two cooling towers are used to supply cooled circulating water to the unit condensers. The fifth unit is CT3, a GE 7EA simple cycle combustion turbine rated at 80 mW.

CT1 and CT2 may combust diesel oil, which is stored on site as a secondary fuel for the combustion turbines. The steam generating units may also combust residual oil or "bunker oil" as a secondary fuel. For units allowed to burn secondary fuels, there are no limitations on the extent of use of such secondary fuels.

This source constitutes a major source of NO_x, and operates under authority of a "Title V" unitary permit. Since the steam and combustion turbines have not been modified or reconstructed, and the auxiliary generators fall subject to synthetic minor limitations, the facility does not have to go through Prevention of Significant Deterioration (PSD).

2.3 PERMITTING HISTORY

The Title V permit for this facility, V20601.000, was issued on 10/4/01. It included the requirements from previous installation permits A20501.000 and A20501.R02, and also authorized the installation and operation of the GE Frame 7EA once the 5 TM2500 units were removed.

Revision "V20601.R01", issued 1/22/2002, corrected an error in the original permit by increasing the allowable percentage of sulfur in the fuel for the steam generators from 0.8 to 0.9 percent.

Revision "V20601.R02" changed the basis for emissions averaging to assess compliance with the 7EA turbine emission caps from daily to monthly. In addition, requirements relating to photochemical reactive solvents are being removed. This requirements were deleted from SIP at 66 FR 49293 on 9/27/2001.

Renewal "V20627.000": Several changes have been made to the permit during this renewal which incorporates a modification.

- Administrative Changes: The list of Federally Enforceable Applicable Requirements has been updated to the most current one, and the requirements applying to the TM2500 turbine units have been removed from the permit, since these units were only temporarily on site and have been replaced by CT3.

- Inlet Misting Systems. This renewal authorizes the installation and operation of an inlet fogging with overspray systems on the (2) Westinghouse W-501AA simple cycle turbines (CT1 and CT2). This system will cool the compressed air that is used in the combustion process, possibly resulting in a reduction of the NOx emission concentration and an increase in power output. To avoid triggering the NSPS requirements for these 2 combustion turbines, the permit limits the use of the fogging systems to no more than 400 hours total between the two combustion turbines, and only during natural gas combustion. The permit also requires that the fogging systems automatically shut off once the load drops below 50%, since CO emissions could increase at lower loads.

2.4 COMPLIANCE/ENFORCEMENT HISTORY

The last inspection of this facility was conducted in June of 2006. The facility was in compliance. The annual RATA tests were conducted in August 2006.

This facility does not have any history of compliance problems or enforcement.

3. EMISSIONS FROM THE PROJECT

3.1 ACTUAL EMISSIONS

In 2005, the facility reported the following emissions:

CO - 11.4 tpy;
 NOx - 48.17 tpy;
 SOx - 0.20 tpy;
 PM₁₀ - 2.10 tpy;
 VOC - 4.07 tpy;
 HAP - 0.05 tpy.

3.2 POTENTIAL EMISSIONS

Maximum Emission Summary (tons/year) - Potential to Emit

	SO ₂	NOx	PM ₁₀	CO	VOC	HAPs
Steam 1- Gas	3.49	987.56	44.15	139.42	31.95	0.68
Steam 1- Oil	5625.88	1274.09	323.71	199.08	30.26	21.98
Steam 2 -Gas	3.2	907.7	40.58	128.14	29.37	0.63
Steam 2 - Oil	4972.66	1126.15	286.12	175.96	26.75	19.43
CT1 - Gas	2.47	1315.45	27.13	337.08	8.63	3.84
CT1 - Oil	201.71	3514.97	47.93	13.18	1.64	15.56
CT2 - Gas	2.47	1315.45	27.13	337.08	8.63	3.84
CT2 - Oil	201.71	3514.97	47.93	13.18	1.64	15.35
CT3	0.7	39	13.5	70	2.2	3.84
TOTAL - 4 Oil Turbines	11001.96	9430.18	705.69	401.40	60.29	72.32
TOTAL - Natural Gas	12.32	4565.161	152.49	1011.73	80.79	12.83
C.Tower 1			77.11			
C.Tower 2			77.11			
Diesel Tank #2					1.8	

4. AIR QUALITY IMPACTS ANALYSIS

The following provides a summary of the facility-specific ambient impacts, as described in the technical support document for the original Title V permit issued on 10/01. **For a more in-depth explanation of the Impact Analysis, see the TSD from 2001.**

4.1 SO₂ EMISSIONS

During the initial Title V permit review for this facility, PCAQCD performed a modeling analysis to assess the SO₂ emission impact from the steam units and the combustion turbines existing at the time (not CT3) when combusting secondary fuel. From that analysis, PCAQCD concluded that the fuel-sulfur content in the permit adequately assured that the facility itself would not cause a violation of the SO₂ ambient air quality standard. In addition, the Acid Rain sulfur dioxide allowances establish a practical constraint on this facility ever emitting anywhere near its SO₂ emission potential.

4.2 NO_x EMISSIONS

PCAQCD performed a modeling analysis during the initial Title V permit review for this facility, to assess the NO_x ambient impacts from the “grandfathered” units, and concluded that this facility will not cause a violation of the NO_x ambient air quality standards. The table below shows the results.

4.3 PM₁₀ EMISSIONS

PCAQCD performed a modeling analysis during the initial Title V permit review for this facility, to assess the PM₁₀ ambient impacts from the “grandfathered” units, and concluded that this facility will not cause a violation of the ambient air quality standards. The table below shows the results.

4.4 CO EMISSIONS

PCAQCD performed a modeling analysis during the initial Title V permit review for this facility, to assess the CO ambient impacts from the “grandfathered” units, and concluded that this facility will not cause a violation of the CO ambient air quality standards. The table below shows the results.

WORST-CASE AMBIENT IMPACTS

Pollutant	Max. Concentration (µg/m ³)	NAAQS average	Allowable Concentration (µg/m ³)	Actual/Allowable (%)
SO ₂	181.5	3-hr	1,300	14
SO ₂	25.8	24-hr	365	7.1
SO ₂	3.73	annual	80	4.6
NO _x	0.26	annual	100	0.26
CO	11.5	1-hr	40,000	0.03
CO	2.3	8-hr	10,000	0.02
PM ₁₀	1.71	24-hr	150	1.1
PM ₁₀	0.17	annual	50	0.3

Note: These impacts only reflect the emissions from the steam units 1 and 2, CT1 and CT2. However, CT3 will only add limited additional emissions, having a negligible impact on the values shown in the table.

WORST-CASE AMBIENT IMPACTS + BACKGROUND EMISSIONS

Pollutant	Max. Concentration (µg/m ³)	Background Concentration ¹ (µg/m ³)	Total Allowable (µg/m ³)	NAAQS Allowable (µg/m ³)	Maximum/Total/ Allowable (%)	
SO ₂ (3-hr)	182	21.3	203.3	1,300	1.6	15.6
SO ₂ (24-hr)	25.8	8	33.8	365	2.2	9.3
SO ₂ (annual)	3.73	2.7	6.4	80	3.4	8.0
NO _x (annual)	0.26	14.2	14.5	100	14.2	14.5
CO (1-hr.)	11.5	2052	2064	40,000	5.1	5.2
CO (8-hr.)	2.3	1,368	1,370	10,000	13.7	13.7
PM ₁₀ (24-hr.)	1.71	104.5	106.2	150	69.7	70.8
PM ₁₀ (annual)	0.17	37.1	37.3	50	74.2	74.6

4.5 AIR TOXICS

During the initial Title V permit review, modeling of HAPS was conducted, and the results were compared with the Arizona Ambient Air Quality Guidelines. None of the AAAQGs were exceeded.

5. TITLE V PERMIT ANALYSIS

5.1 APPLICABLE REQUIREMENTS -GENERAL

The Saguaro Power Plant commenced operation in 1954. The plant, with the exception of CT3, antedates any installation permit, PSD or NSPS requirements. Permittee has accepted federally enforceable limits on emissions from CT3 in order to avoid PSD review.

The 2001 TSD includes an explanation of general facility-wide applicable requirements.

5.2. NEW APPLICABLE REQUIREMENTS

5.2.1 FOGGING SYSTEMS OPERATIONAL LIMITATIONS

As part of this renewal, Permittee will be installing fogging systems in units CT1 and CT2. These systems will allow an increase in power output. In order to avoid triggering NSPS requirements for CT1 and CT2, and possible PSD review, the Permittee has accepted federally enforceable limitations on the use of these fogging systems. Such systems will be only used for a total of 400 hours per year, and only during natural gas combustion.

APS provided calculations with the renewal application showing that by taking limitations, NSPS and PSD would not be triggered. The emissions from CT1 and CT2 were estimated using AP-42 factors, since they are not equipped with CEMs, and source testing has not been conducted yet for these units. The difference in heat input (MMBtu/hr) and output (MW) from the “no fogging” to “with fogging” conditions were estimated using performance curves from Westinghouse. While a reduction in NO_x is expected, APS conservatively did not use a reduced NO_x rate in determining future potential emissions. To avoid an unnecessary increase in CO emissions, the permit restricts the use of the inlet foggers at loads below 50%.

The annual increase in emissions was calculated using AP-42 factors and the estimated heat input increase. APS estimates that the heat input of each CT will increase from 809 to 883 MMBtu/hr during the months of May through September.

¹ SO₂ background from www.epa.gov/air/data/monvals.html, based on lowest annual mean, lowest 2nd max. for 3-hr and 24-hr averages; there are no SO₂ monitors within about 40 miles of this facility. NO_x data taken at Saguaro National Monument for years 1995 and 1996. PM₁₀ data taken at Coolidge for years 1995 through 1999. CO data taken at Casa Grande for years 1995 through 1997.

Emissions Summary for CT1/CT2 (400 hours total)			
	CT1/CT2 Potential Emissions (tpy)	Significance Levels	Exceeds SL
NOx	4.74	40	No
CO	1.21	100	No
SO2	0.01	40	No
PM10	0.1	15	No
VOC	0.03	40	No

- PSD Applicability

According to the calculations, the 400 hour limitation will maintain the net emissions increase below the PSD significance threshold.

- NSPS Applicability

The heat input of each CT during the winter (based on 20°F, 70.5 MW) is 967 MMBtu/hr. In the summer, the use of inlet foggers will result in an output of 64 MW with heat input of 883 MMBtu/hr. AP-42 factors have been used for calculating emissions due to the lack of site-specific factor, is, and these factors do not change with the rating or heat input. Therefore, the only change due to the foggers is the heat input, which is actually lower in the summer than in the winter. Therefore, the applicant posits that there is no increase in the hourly emission rate, and therefore the NSPS is not triggered..

- Compliance Demonstration: Modeling

As part of the initial Title V permit application, this facility underwent a PSD review including an ambient air quality modeling analysis. This modeling analysis was conducted using worst-case scenario emissions, which for most pollutants is during the burning of oil. While the use of the foggers indicates a potential increase in emissions during natural gas combustion, this increase would represent a negligible impact on the previously modeled emissions. No additional modeling has been conducted.

- Compliance Demonstration: Operations and Recordkeeping

Permittee is now required to keep records of the amount of hours the fogging systems are used, and to demonstrate that only natural gas was being combusted during those hours of operation. The permit requires that CT1 and CT2 are equipped with systems to record the amount of hours the fogging systems are used, and also to prevent their operations when oil is being combusted.

- Compliance Demonstration: Testing

Due to the grandfathered status of CT1 and CT2, no performance test has ever been conducted on these units, and they are not equipped with CEMS. Therefore, to ensure that emissions from these units are in line with the estimates used to demonstrate whether the addition of the foggers would trigger PSD or NSPS, the permit requires that one of the units be tested with and without the foggers. Only NOx and CO emission rates will be determined, since potential emissions of PM10, VOC and SOx are negligible, and due to the high temperatures of these simple cycle units, PM10 testing would be difficult.

The “without” test will ensure that for future calculations or modifications at the facility, there is a site-specific emission rate during CT operations without the foggers. Also, if the results show higher rates than those previously calculated using AP-42 factors, the PSD and NSPS trigger calculations conducted for this

will need to be revisited to ensure that neither PSD or NSPS are triggered.

The “with” test will be conducted with the same conditions as the “without” but during operation of the foggers.

The results of these tests will be representative of both CTs.

5.2.2 LOCALLY ENFORCEABLE OPACITY LIMITATIONS

As of April 23, 2006, point sources not subject to an NSPS or an opacity standard from another existing rule in the Pinal County Code, are subject to a 20% opacity limitation. This limitation is locally enforceable only.

5.2.3 COMPLIANCE ASSURANCE MONITORING (CAM) - 40 CFR 64

The CAM rule is applicable to pollutant-specific emissions units at major sources when the emission unit is subject to an emission limit or standard, the emission unit uses a control device to achieve compliance with such emission limit or standard, and the emission unit has potential pre-control device emissions equal or above major source thresholds.

As indicated in the renewal permit application (1/04/06), page 8-20, the potential pre-control device emissions for the steam units, CT1 and CT2 could potentially be subject to the CAM rule for one or more of the criteria pollutants and HAPs. However, since none of these units are equipped with control devices, CAM is not applicable. CT-3's pre-control device emissions are below the major source threshold, and therefore CAM is not applicable to this unit either.

5.2.4 MACT FOR TURBINES - 40 CFR 63 SUBPART YYYY

Subpart YYYY of 40 CFR 63 was promulgated on 3/5/04. It establishes national emission limitations and operational limitations for HAP emissions from stationary combustion turbines located at major sources of HAP emissions. The Saguaro facility has the potential to emit above major source threshold of HAPs.

Per 40§63.6090(a)(1), the turbines at this facility are existing, and in accordance with 63.6090(b)(4), these turbines do not have to meet the requirements of the subpart and of subpart A. No initial notification is necessary either.

5.3 OTHER PERMIT CHANGES

5.3.1 The following changes have been made to the permit through this renewal/revision:

- Administrative Changes: The requirements applying to the TM2500 turbine units have been removed from the permit, since these units were only temporarily on site and have been replaced by CT3.
- 20% opacity: Section 5 of the permit now includes the locally enforceable 20% opacity limitation.
- Addition of Architectural Coatings and Cutback and Emulsified Asphalt requirements from §5-12-370 and §5-16-670. These activities are conducted at this facility on a periodic basis.

5.3.2 Compliance Verification

The only new compliance verification requirements that have been added to the permit are in relation to the fogging system, and already discussed elsewhere in this TSD. The same compliance regime that the original Title V permit required, is still required by this renewal.

5.3.3 State Implementation Plan (SIP) Requirements

Several requirements have been deleted from Section 2 of the permit since they have been deleted from the applicable SIP.

5.4 REGULAR COMPLIANCE REPORTING/PERFORMANCE TEST REPORTING

The steamer units and CT3 fall subject to the SO₂ and NO_x emission limitations of the Acid Rain Program, and must comply with the monitoring requirements fo 40 CFR Part 75 for SO₂, NO_x and CO₂. CT1 and CT2 are grandfathered, and one of these units will be tested for CO and NO_x to verify emission rates.

The permit includes a testing regime for CO and NO_x which is only triggered when emissions show that the facility is being utilized, or that secondary fuel is being used, above a 10% capacity factor. Otherwise, while the facility is not being utilized on a frequent basis, emission factors and parametric monitoring are used for compliance demonstrations.

Semi-annual reports required by the permit require sufficient information to adequately show compliance.

6. CONCLUSION

Based on the information supplied by Applicant and analyses conducted by the PCAQCD, PCAQCD concludes that the proposed project will not cause or contribute to a violation of any federal ambient air quality standard or cause any applicable PSD increment to be exceeded. Therefore, PCAQCD intends to issue to Applicant the renewal permit.