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**Technical Support Document
Title V Permit Renewal
Salt River Project - Desert Generating Station
Permit # V20636.000**

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Technical Support Document
SRP - Desert Generating Station
Permit # V20636.000

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.

1. APPLICANT

Salt River Project Agricultural Improvement and Power District
P.O. Box 52025, PAB 352
Phoenix, Arizona 85072-2025

2. BACKGROUND

2.1 PROJECT LOCATION

This permit renewal pertains to an existing electricity generating station owned and operated by Salt River Project (SRP) on the outskirts of Casa Grande, Arizona. The facility location lies in the central desert basin of Arizona, about 39 miles from Superstition Wilderness, and 61 miles from Saguaro National Monument. These areas are designated as Federal PSD Class I areas which are afforded special protection from environmental impacts under the CAA. Although it does not qualify for the Class I area protections under the CAA, the BLM's Table Top Wilderness lies about 17 miles from the facility. The Gila Indian Reservation lies about 7 miles north of the facility, and the Ak Chin Indian Reservation lies about 10 miles to the northwest.

The area is designated as attainment for all criteria pollutants. The underlying attainment criteria are defined by the National Ambient Air Quality Standards (NAAQS), as required under CAA §109 and promulgated at 40 CFR Part 50. The attainment designation includes carbon monoxide (CO), oxides of nitrogen (NO_x), particulate matter (PM₁₀), oxides of sulfur (SO_x), and ozone (O₃). However, ozone, CO and particulate nonattainment areas all commence at the Pinal County/Maricopa County line, lying about 21 miles due north of the project.

2.2 PROCESS DESCRIPTION

The facility's SIC Code is 4911.

The existing facility consists of a natural-gas-fired, two-on-one combined cycle electrical generating plant. The primary power generating equipment would consist of two combined cycle combustion turbine (CCCT) generating sets¹ (Siemens Westinghouse Model 501F) and two heat recovery steam generators (HRSG). Each HRSG unit is equipped with an auxiliary duct burner. The respective CCCT/HRSG units each have a separate exhaust stack. The HRSG units both feed a single steam turbine generator. The CCCT and HRSG units fire natural gas exclusively.

Each CTG has a heat input capacity² of 1932 mmBtu/hr. The duct burners in each HRSG have a heat input capacity of 456 mmBtu/hr. Each CTG has a nominal base-load generating capacity of 160 MW. The steam turbine generator has a nominal base-load generating capacity of 260 MW.

The facility also includes a 263 horsepower diesel-driven emergency water pump; and a mechanical draft cooling tower to reject waste heat from the steam cycle to the atmosphere.

This facility constitutes a "major emitting source" for Prevention of Significant Deterioration (PSD) since the permit-allowable emissions for at least one criteria pollutant exceeds 250 tpy, and allowable emissions for at least one criteria pollutant also exceeds 100 tpy, and the facility constitutes one of the 28 specifically listed "categorical" sources. Specifically, the facility is a fossil fuel-fired steam electric generating station with a heat input capacity exceeding 250 million British thermal units per hour.

When originally permitted, this project went through "PSD review" for NO_x, PM/PM₁₀, CO, and VOC. The BACT Top Down analysis can be found in the TSD for V20610.000.

¹ These units are also referred to as "combustion turbine generators," or "CTG" units."

² Based on the higher heating value of the fuel.

See the technical support prepared for the original permit V20610.000 (“`.000”) and permit revisions/renewals V20610.R01, V20610.R02, V20610.R03 and V20620.000 for more detailed information.

2.3 PERMITTING HISTORY

The following is a list of permits issued to this facility since the original Title V:

Permit/Revision	Type	Issuance	Reason for Revision
V20610.000	Title V permit	9/10/1999	New Title V permit
V20610.R01	Minor Modification	8/23/2000	Discrepancies on initial design.
V20610.R02	Significant Revision		Revise PTE for CO
V20620.000	Title V Renewal		Renewal and Admin. Changes

2.4 COMPLIANCE/ENFORCEMENT HISTORY

The last inspection of this facility was conducted in June of 2009. The facility was in compliance. The annual RATA tests were conducted in August 2008.

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

3. EMISSIONS FROM THE PROJECT

3.1 ACTUAL EMISSIONS

In 2008, the facility reported the following emissions:

CO - 15.1 tpy;
 NO_x - 79.13 tpy;
 SO_x - 3.5 tpy;
 PM₁₀ - 30.8 tpy;
 VOC - 13.8 tpy;
 HAP - 5.9 tpy.

3.2 POTENTIAL EMISSIONS

Table 1. Maximum Emission Summary (tons/year) - Potential to Emit with Controls

Pollutant	Per Turbine (TPY)	Total (TPY)
Nitrogen Oxides (NO_x)	107.0	214.0
Carbon Monoxide (CO)	n.a.	2208.5
Particulate Matter (PM₁₀)	81.3	162.6
Sulfur Oxides (SO₂)	18.75	37.5
Volatile Organic Compounds (VOC)	51.9	103.8

The ancillary equipment for the project - the diesel fired pump - adds marginal amounts (less than one ton per year for each criteria pollutant, and less than one hundredth of a ton in the case of SO₂) to these totals. However, the cooling tower adds 13.6 tons per year of particulate matter. Table 2

shows the overall project's maximum emissions and compares them with the PSD "significance levels" which trigger formal PSD review for the specific pollutant.

Table 2 - Total Project Potential to Emit ("PTE") and PSD Significance Level

Pollutant	Project PTE (TPY)	PSD "Significant" Level
NO_x	214.0	40
CO	2208.5	100
SO₂	37.5	40
VOC	103.8	40
PM/PM₁₀	176.2	25/15
Beryllium	0.00027	0.0004
Mercury	0.0058	0.1

Note: PTEs estimated at 4000 hours/year for duct burner operations, and continuous operation for other emission unit elements.

3.3 AMMONIA EMISSIONS

The permit includes a limit of ammonia emissions of 10 ppmv. An annual performance test is required to demonstrate compliance. This limit is below the odor threshold for detection. The Arizona Air Quality Guideline sets the 24 hour limit for ammonia at 140 µg/m³. The maximum ambient concentration of ammonia will be less than 8.0 µg/m³ at 10 ppmv. Hourly emissions of ammonia will be about 36 pounds. No health risks are anticipated from these levels of emissions.

4. AIR QUALITY IMPACTS ANALYSIS

Since the applicant is not proposing any changes to the facility or permit, a new air quality impact analysis is not required. This is a summary of the ambient air quality impact analyses conducted for this facility during the original permit application, to determine the impacts of the project on ambient air quality.

4.1 PREDICTED AIR QUALITY IMPACTS VS "SIGNIFICANT" AND "DE MINIMIS" LEVELS

The following table shows that the air modeling results for the project indicated that neither the significance levels nor the de minimis levels of air quality impact were reached. As a result, the project did not trigger pre-construction monitoring requirements, a requirement to analyze increment consumption, or a requirement to perform NAAQS analyses under the PSD program regulations. Table 5 represents the CO analysis conducted during revision .R02 of the original permit, where CO levels were adjusted to reflect actual data.

Pollutant	Averaging Time	Maximum Predicted Impact	PSD Class II Significant Impact Level	PSD De Minimis Monitoring Level
NO_x	Annual	0.37	1	14
PM-10	24-hour	3.53	5	10
	Annual	0.32	1	Exempt

4.2 PREDICTED CO ANALYSIS VS NAAQS

Pollutant	Averaging Period (hr)	Facility Impact (ug/m ³)	Allowable Concentration (ug/m ³)	Impact/Allowable %	Background Concentration (ug/m ³)	Cumulative Concentration (ug/m ³)	Aggregate/Allowable %
CO	1	3682	40,000	9.2	2805	6487.0	16.2
CO	8	400.7	10,000	4.0	1088	1205.0	14.9

4.3 ADDITIONAL IMPACT ANALYSIS

This permit's renewal does not propose any physical changes or construction activity, and new Impact Analyses are not necessary.

4.3.1 Toxics Impact Analysis - Arizona Ambient Air Quality Guidelines

Applicant's analysis showed that none of the approach the screening thresholds defined by the Arizona Ambient Air Quality Guidelines. Therefore, PCAQCD concludes that potential toxic emissions from this facility do not present a risk to public health.

5. TITLE V PERMIT ANALYSIS

5.1 APPLICABLE REQUIREMENTS -GENERAL

Within the meaning of 40 CFR Part 70, this constitutes a "major source" that requires an operating permit, as contemplated by Part 5 of the CAA. Such permits are commonly known as "Title V" permits.

5.1.1 PCAQCD Reg. 7-3-1.7 (3/31/75) SIP APPROVED

This rule limits particulate emissions the fuel burning equipment.

Based on a heat input capacity of 1932 mmBtu/hr. for an individual turbine, total turbine PM emissions cannot exceed 686#/hr. Based on a heat input capacity of 916 mmBtu/hr. for an individual duct burner, PM emissions cannot exceed 387 #/hr. Combined, total PM emissions cannot exceed 1073 #/hr.

The application posits maximum particulate emission rates of 42.2 #/hr.³, or roughly 4% of the limit. Based on the rather comfortable "margin of safety," PCAQCD finds that periodic visibility monitoring constitutes "periodic monitoring" that will adequately assure compliance.

Similarly, PCAQCD §§5-21-930 and 5-23-1010 also imposes the same heat capacity equation with regard to the affected emissions units, and PCAQCD reaches the same compliance-related conclusion outlined above.

5.1.2 NEW SOURCE PERFORMANCE STANDARDS (NSPS)

- a. Subpart GG. The combustion turbines fall subject to 40 CFR Part 60, Subpart GG, which imposes limitations on NO_x and SO₂ emissions.

The permit limits the facility to burning only pipeline-quality natural gas, as defined by the Acid Rain regulations. ~~Accordingly, supplier certifications allow verification that fuel-sulfur meets the Subpart GG limitations, and allows a mass-balance analysis to demonstrate that worst-case SO₂ emissions stay within Subpart GG concentration limitation. Daily sampling or an alternate monitoring scheme (as defined by EPA) for fuel sulfur is required.~~ **Since the previous renewal, Subpart GG has been updated to allow for the use of a tariff or contractual agreement to demonstrate compliance with the sulfur limitations in the natural gas combusted. Accordingly, the permit has been revised to incorporate language consistent with the NSPS.**

³ Based on a total heat input capacity of 2848 mmBtu/hr., and a "good combustion practice" emission rate of 0.0128 #/mmBtu, hourly emissions equal 42.15 #/hr.

The BACT requirements defined above are far more stringent than the NO_x emission limitations imposed by the NSPS. That is, the 3.0 ppmv NO_x emission rate allowed under the BACT determination is far more stringent than the NSPS limitation. Subpart GG allows a combustion-rate dependent NO_x emission rate, which, based on the 1932 mmBtu/hr. heat input capacity of the turbines, allows NO_x emissions at a rate of 75 ppmv @ 15% oxygen. The 3.0 ppmv NO_x emission limit imposed under the BACT determination represents a more than a 90% reduction below the emission rate allowed by the NSPS. Compliance with the BACT requirements will assure compliance with the NSPS NO_x limitations.

Nonetheless, performance testing will be required, pursuant to 40 CFR Part 60, Subpart A.

On an ongoing basis, compliance will be assured by the CEMs, as required under Subpart Da below.

- b. Subpart Da. The 456 MMBtu/hr duct burners fall subject to 40 CFR Part 60, Subpart Da, which imposes limitations on opacity, PM emissions and NO_x emissions.

Performance tests will be required, pursuant to 40 CFR Part 60, Subpart A.

However, the BACT requirements defined above are far more stringent than the NO_x emission limitations imposed by Subpart Da. The NSPS limits NO_x emissions to 86 ng/J (0.20#/MMBtu), or about 57 ppmv at 15% oxygen, and also requires a 25% reduction in NO_x, relative to uncontrolled emission levels. The 3.0 ppmv NO_x emission limit imposed under the BACT determination represents a more than a 90% reduction below the emission rate allowed by the NSPS. Compliance with the BACT requirements will assure compliance with the NSPS NO_x limitations.

Subpart Da requires CEMs for NO_x (40 CFR §60.47a.c.) and CO or oxygen (40 CFR §60.47a.d.) Those systems must operate during startup and shutdown. 40 CFR §60.47a.f defines minimum operating cycle for the CEMs.

Subpart Da limits the allowable rate of particulate matter emissions, with the limit defined in terms of # of emissions per mmBtu heat input. Given the total 2301 mmBtu/hr. heat input capacity of the turbine/duct burner units, Subpart Da limits particulate emissions to 0.03 #/mmBtu, or 69 #/hr.

The applicant's BACT analysis invoked "good combustion practice". The revised application indicated that aggregate particulate emissions from the turbine/duct burner units will not exceed 42.2 #/hr.⁴ of PM₁₀ emissions, or 61.1% of the rate allowed under Subpart Da. Provided the NSPS performance test shows actual emission rates that do not substantially exceed (*i.e.* exceed by more than a nominal 25%) the application-certified rates, then based on those performance test results and in view of the apparent roughly 40% margin of safety, PCAQCD finds that a performance test, coupled with periodic opacity observations, will provide periodic monitoring adequate to assure continuous compliance.

- c. NSPS Fuel sulfur monitoring - [40 CFR §60.334; Code §6-1-030]

The permit includes a fuel-sulfur monitoring requirement, as well as a proposed alternative monitoring schedule that reconciles with prior EPA guidance.

5.2 COMPLIANCE ASSURANCE MONITORING (CAM) - 40 CFR 64

The CAM requirement pertains to emission units that have "tailpipe" controls. Given that NO_x

⁴ Based on a total heat input capacity of 2848 mmBtu/hr., and a "good combustion practice" emission rate of 0.0128 #/mmBtu, hourly emissions equal 42.15 #/hr.

emissions from each turbine/burner unit will be separately controlled by a down-stream ammonia injection and a catalyst bank, each must comply with the CAM requirements. However, since NSPS Subpart Da already requires NO_x CEMs for each CCCT/HRSG, those CEMs inherently satisfy CAM requirements.

5.3 ADMINISTRATIVE PERMIT CHANGES

5.3.1 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. The only emissions units subject to this standard are the cooling towers and ancillary activities.

5.3.2 ANCILLARY ACTIVITIES

To mirror other generating stations' permits, PCAQCD has added as section for requirements of facility-wide ancillary activities such as Abrasive Blasting, Architectural Coatings and Cutback and Emulsified Asphalt. These activities are conducted at this facility on a periodic basis.

5.3.3 PERMIT RENEWAL

The requirements for renewal of permits have been corrected. They incorrectly stated that all sources have to apply for a renewal 3 months in advance of expiration. This is incorrect, as the rule requires that Class I (Title V) sources apply for a renewal at least 6 months in advance.

5.3.4 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.

5.3.5 RISK MANAGEMENT PLAN (40 CFR PART 68)

This Part has been removed from the list of applicable requirements in Section 2 of the permit since the concentration of the aqueous ammonia stored at this facility is less than 20%, and therefore not a regulated substance under the RMP program.

6. CONCLUSION

Based on the information supplied by Applicant and analyses conducted by PCAQCD, PCAQCD concludes that the renewing this permit 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.