AMEREN CIPS – GRAND TOWER POWER STATION
GRAND TOWER, ILLINOIS
PROJECT SUMMARY

I. INTRODUCTION

Ameren CIPS (Ameren) has proposed to install combined cycle combustion turbines to replace the existing coal-fired boilers at their Grand Tower Power Station in Grand Tower. The project will include two natural gas fired turbines/heat recovery steam generators with duct burners (CT/HRSG) to generate up to 600 MW of electricity. The proposed project requires permit because of its associated air emissions.

II. PROJECT DESCRIPTION

The proposed facility will include two natural gas fired combustion turbines (CT) and associated supplementary-fired heat recovery steam generators (HRSG). Each new CT will exhaust to a single supplementary-fired HRSG. A generator located on the shaft of each CT will provide a portion of the facility's electric output. The steam produced from each of the associated HRSG will be routed to the existing steam turbine generating units to provide additional electrical output. The HRSG can produce steam using the hot turbine exhaust and firing supplementary burners in the HRSG to increase the amount of steam output to allow maximum utilization of the steam turbine generator capacity.

The proposed project includes replacement of the existing coal fired boilers, allowing the emissions to be used in the netting demonstration. The net change in emissions of Sulfur Dioxide (SO_2), Nitrogen Oxide (NO_X) and Particulate Matter (PM) are not significant and therefore are not subject to New Source Review (NSR)/Prevention of Significant Deterioration (PSD) regulations for the pollutant. Because of significant increase in the emissions of Carbon Monoxide (CO) and Volatile Organic Material (VOM), the project is subject to PSD review for CO and VOM pollutants.

The NO_X emissions from each CT/HRSG unit will be controlled through low NO_X combustors and, in the future, use of add-on Selective Catalytic Reduction (SCR) in the HRSG as needed. Low NO_X combustors lower NO_X formation by controlling flame turbulence and staging the mixing of fuel and combustion air. SCR uses a catalyst operated in an appropriate temperature range that normally is present in one section of the HRSG to control NOx, by reaction with ammonia, urea, or other similar chemicals. The NOx is converted back into nitrogen and oxygen, as originally present in the atmosphere, and water is formed as a byproduct.

The CO and VOM emissions from each CT/HRSG will be controlled through good combustion practices. Combustion control practices include operational and incinerator design elements to control the amount and distribution of excess air in the flue gas to ensure that there is enough oxygen present for complete combustion.

III. PROJECT EMISSIONS

Emissions of combustion products (carbon monoxide (CO), nitrogen oxide (NO_X), particulate matter/particulate matter <10 microns (PM/PM_{10}), sulfur dioxide (SO_2) and volatile organic material (VOM)) result from the combustion of fuel in the CTs and the HRSGs.

The potential emissions from the proposed project are provided below. The potential emissions include emissions from the CT/HRSGs and an indirect heater, based on full operation of 8,760 hours per year. Duct burners in HRSGs are also estimated to operate 8760 hours per year. The table also shows the net emissions increase/decrease from the project because of shut down of the coal-fired boilers.

Potential Project Emissions (ton/yr)					
Unit	NO_X (ton/yr)	CO (ton/yr)	PM (ton/yr)	VOM (ton/yr)	SO_2 (ton/yr)
Estimated Project emissions	1,913	1,256	106	127	18
Historical plant emissions (two year average)	3,841	89	271	12	20,041
Net Change in emissions	-1,928	1,167	-165	115	-20,023

IV. APPLICABLE REGULATIONS

A. GENERAL

The proposed project will readily comply with applicable state and federal emission standards, including the Illinois Air Pollution Control Board emission standards and regulations (35 Ill. Adm. Code: Subtitle B) and applicable federal emission standards (40 CFR Part 60).

B. ADDITIONAL REQUIREMENTS FOR MAJOR STATIONARY SOURCE CONSTRUCTION AND MODIFICATION

The project is in an area classified as attainment for all criteria pollutants. The facility is considered a major source subject to PSD regulations, 40 CFR 52.21. Net emission increase of Carbon Monoxide (CO) and Volatile Organic Material (VOM) are greater than the PSD significant emission increase threshold of 100 tons/year and 40 tons/year respectively. The project is therefore subject to the additional requirements imposed by the federal rules for PSD for the pollutants.

There will be net decrease in the emissions of Sulfur Dioxide (SO_2), Nitrogen Oxide (NO_X) and Particulate Matter (PM) and therefore are not subject to NSR/PSD review requirements for the pollutant.

C. REGIONAL EMISSION CONTROL PROGRAMS

The Grand Tower station is subject to USEPA's Acid Rain Program pursuant to Title IV of the Clean Air Act. These new turbines will be affected units under the Acid Rain Program and must be covered by an Acid Rain Permit before they begin operation. Under the Acid Rain Program, one question is whether the turbines are considered to repower the existing coal fired units or whether they are simply considered new units.

The new turbines will also be subject to programs now being developed to control regional emissions of NO_X as related to ozone. Since these programs are still being developed, the treatment of the turbines as repowered unit, new units, or a combination thereof, has not yet been determined.

V. PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

A major project in an attainment area is subject to the federal PSD rules. The PSD rules were established to ensure that new and modified sources will not adversely impact "clean air" areas and will comply with applicable standards.

A PSD review requires: 1) a case-by-case Best Available Control Technology (BACT) determination, taking into account energy, environmental and economic impacts, as well as technical feasibility; 2) an ambient air quality impact analysis, including a baseline determination and dispersion modeling, to determine whether the allowable emissions from the source, in conjunction with the proposed net emissions increase, would cause or contribute to a violation of the applicable PSD increment or National Ambient Air Quality Standard (NAAQS); 3) an assessment of the impact on soils, vegetation and visibility; and, 4) public notice and comment, including an opportunity for public hearing. The Illinois EPA has been delegated authority by the USEPA to administer the federal PSD program.

A. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

BACT is defined as an emission limitation based on the maximum degree of pollution reduction determined on a case-by-case basis considering technical, economic, energy and environmental considerations.

Ameren conducted a BACT analysis for CO and VOM in order to determine the most appropriate level of control required at the facility for these pollutants.

Ameren has proposed good combustion practices including use of natural gas fuel only in the CTs and duct burners of HRSGs to minimize emissions of CO and VOM. With good combustion practices CO and VOM emissions will be reduced to a level of 25 ppm and 3 ppm respectively, at 15 percent O_2 on an hourly average during normal operation of CT/HRSGs.

The Illinois EPA concurred that the project will utilize BACT for CO and VOM.

B. AIR QUALITY ANALYSIS

An ambient air quality analysis was conducted by the consulting firm, Burns & McDonnell, on behalf of Ameren to assess the impacts of the emissions due to the proposed project. Under the PSD rules, this analysis must determine whether the proposed project will cause or contribute to a violation of any applicable air quality standard.

Air quality analysis was performed using the conservative SCREEN3 dispersion modeling for CO and Ozone Screening method for VOM for the project. The analysis performed conforms to the guidance and requirements of the USEPA and the Illinois EPA.

Ameren has provided adequate information to determine that proposed emission increases will not cause a violation of the NAAQS for VOM, and NAAQS or the significant impact levels for CO established under the PSD regulations.

Pollutant	Averaging Period	Maximum Predicted Impact (ug/m^3) or ppm*	Significant Impact Level (SIL) (ug/m^3)	NAAQS (ug/m^3) or ppm*
CO	1-Hour	562.6	2,000	40,000
CO	8-Hour	393.8	500	10,000
VOM*	1-Hour	0.120	--	0.125

* Represented in ppm concentration for VOM emissions. Maximum Predicted Impact includes background ozone concentrations of 0.106 ppm reported at monitor located in St. Genevieve County to the west of Grand Tower station, operated by Missouri Department of Natural Resources.

D. ASSESSMENT OF ENVIRONMENTAL IMPACTS

The ambient air quality assessment performed also assessed the potential impact of the proposed facility on soils, vegetation, and visibility. The Illinois EPA concluded that the project would not cause any adverse effect to these environmental media.

VI. PROPOSED PERMIT

The conditions of the proposed permit of the turbine project contain limitations and requirements for the CT/HRSG including the measures that must be used to control CO and VOM emissions from the CT/HRSG system. The permit also establishes appropriate compliance procedures, including inspection practices, recordkeeping requirements and reporting requirements.

VII. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that the proposed permit meets all applicable state and federal air pollution control requirements. The Illinois EPA is therefore proposing to issue a permit for construction of the proposed project.

Comments are requested on this proposed action by the Illinois EPA and the proposed conditions on the draft permit.