

Briefing Outline for Siting Committee Presentation

MIDWAY SUNSET COGENERATION COMPANY **(85-AFC-3C)**

Contact: Christina Snow 651-3770

Time Needed: 10 minutes

Action Requested of Siting Committee: This is an informational item for review

Business Meeting Date: April 6, 2011

Background:

The Midway Sunset Cogeneration Project is a 225 MW cogeneration power plant located near the community of Fellows in Kern County. The project uses cogeneration steam to aid in enhanced oil recovery process. The project was certified by the Energy Commission in May 1987, has been in operation since 1989, and is owned by the Midway Sunset Cogeneration Company (MSCC).

Over the years since operation, the project owner has submitted several amendments to ensure project reliability and maintain compliance with San Joaquin Valley Air Pollution Control District (SJVAPCD) rules and regulations.

SUMMARY OF PETITION

- On October 25, 2010, the MSCC filed a petition with the California Energy Commission requesting to modify the Midway Sunset Cogeneration Project.
- Staff performed an initial review and requested a modified petition to address the most recent amendment to AQ-18. A modification to the October 25, 2010 petition was submitted and posted on November 19, 2010.
- The modifications proposed in the petition would:
 - Replace Unit B DLN9 combustion chambers, liners and burner heads with DLN1 + combustion chambers, liners and burner heads.
 - Revise the equipment description for each combustion turbine generators.
 - Revise the compliance test submittal time frame from 30 days to 60 days consistent with the Authority to Construct (ATC) permit from the San Joaquin Valley Air Pollution Control District.
 - Modification of applicable air quality Conditions of Certification.

STAFF ANALYSIS

- Staff analyzed the petition and determined that there will be no significant impacts as a result of the proposed amendment.
- Staff had to review several amendments to determine the history of revisions to the emission limit standards.
- Condition of Certification AQ-18 has emission limits for all three units of the facility, Units A, B and C.
- The last approved amendment relating to emission limits was in 2006 and was not in response to a District requirement. The project owner requested a decrease in emissions for Unit A based upon

the belief that a new GE Evolution Rotor would allow an increase of output by nine percent, lower the heat rate and reduce emission limits for Oxides of Nitrogen (NOx) from 5 to 2 ppm, and Carbon Monoxide (CO) from 25 to 6 ppm. Due to technical problems with the Evolution Rotor, GE did not offer it commercially and the portion specifically related to Unit A and the Evolution Rotor in AQ-18 Condition of Certification was never deleted.

- The 2006 approved language still allowed Unit A to operate with the emission limits associated with either the Evolution Rotor or the pre-existing emission limits applicable to Units B and C and the applicant remained in compliance with the Condition of Certification.
- This current Petition to Amend updates AQ-18 Condition of Certification to reflect the allowed emission limits for all three units, deleting reference to the GE Evolution Rotor on Unit A. The revision is consistent with the SJVAPCD Authority to Construct (ATC) permit which was issued on October 26, 2010.
- No additional changes are recommended for the Conditions of Certification.

PUBLIC PROCESS

- The Original Petition to modify project filed/docketed on October 25, 2010 and posted on the Energy Commission's website on October 26, 2010.
- A revised Petition to Amend was filed, docketed and posted on the website on November 19, 2010.
- Notice of Receipt mailed to the post-certification mailing list and affected public agencies and docketed on December 1, 2010 and was posted on the website on December 7, 2010.
- Staff analysis was mailed to interested parties and docketed on January 20, 2011. The staff analysis was then posted on the Energy Commission Website on January 25, 2011.

FINDINGS

- The petition meets all the filing criteria of Section 1769(a) concerning post-certification project modifications;
- The modification will not change the findings in the Energy Commission's Final Decision pursuant to Section 1755;
- The project will remain in compliance with all applicable laws, ordinances, regulations, and standards, subject to the provisions of Public Resources Code section 25525;
- The proposed modifications to the Air Quality Conditions of Certification will result in a beneficial change by ensuring that the license reflects the correct equipment and required emission limits set in the previous Energy Commission Decision and required by the SJVAPCD; and,
- There has been a substantial change in circumstances since the Energy Commission certification justifying the change and that the change is based on information that was not available to the parties prior to Energy Commission certification in that the proposed modifications relate to the most recent air quality emission limit requirements as determined by the SJVAPCD.

RECOMMENDATION

- Staff recommends that the Energy Commission approve the project modification(s) and associated revisions to the air quality conditions of certification based upon staff's findings and subject to the revised Condition of Certification.

MIDWAY SUNSET COGENERATION COMPANY (85-AFC-3C)

Petition to Amend to Upgrade Unit B Combustion System

Joseph Hughes

January 6, 2011

INTRODUCTION

Midway Sunset Cogeneration Company (MSCC) was licensed May 14th, 1987 and came online May 1st, 1989. Since this time MSCC has undergone several amendments to ensure project reliability and maintain compliance with San Joaquin Valley Air Pollution Control District (SJVAPCD) rules and regulations.

MSCC's most recent requested amendment, dated November 8, 2010, requests modifications to Units A, B and C. The petition proposes minor administrative changes to Unit A, B and C, plus revising unit B's dry low NOx (DLN) technology from a DLN9 Combustion System to a DLN1+ Combustion System.

LAWS, ORDINANCES, REGULATION, AND STANDARDS (LORS) - COMPLIANCE

The SJVAPCD released an Authority to Construct (ATC) on October 26, 2010, to allow administrative changes to Unit A, B and C, plus revising unit B's DLN9 Combustion System to a DLN1+ Combustion System. The ATC ensures compliance with applicable federal, state, and local air quality requirements.

Air Quality Table 1 summarizes the applicable LORS for the facility.

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
42 U.S.C. §7401 et eq.	Federal Clean Air Act: New Source Review
State	
Health and Safety Code §41700	"... no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property."
Local	
Rule 2201	New and Modified Stationary Source Review
Rule 2520	Federally Mandated Operating Permits

Rule 4001	New Source Performance Standards Subparts GG & KKKK
Rule 4002	National Emissions Standards For Hazardous Air Pollutants
Rule 4101	Visible Emissions
Rule 4102	Nuisance
Rule 4201	Particulate Matter Concentration
Rule 4301	Fuel Burning Equipment
Rule 4703	Stationary Gas Turbines
Rule 4801	Sulfur Compounds

SETTING

The setting and surrounding environment will not be affected by the project change as there will be no change to project permitted emissions and the MSCC will continue to operate in compliance with the Energy Commission Decision.

ANALYSIS

Revising Unit B's Dry Low NOx Technology

MSCC is licensed by the California Energy Commission as a cogeneration facility comprised of three GE Frame 7E combustion turbine Generators (CTGs). Waste heat from each CTG is routed through its heat recovery steam generator (HRSG) to produce steam used in the adjoining oil field for thermally enhanced oil recovery. In order to accommodate the declining steam demands of the steam host, MSCC is proposing to operate Unit B as a peaking unit when the steam demand is low and as a cogeneration unit when the steam demand requires it.

MSCC's initial District emission limit for NOx was 25 ppm and was achieved by injecting water into the combustion system of the units to cool the flame. In 1999 the Energy Commission approved an order allowing MSCC to delete the water injection and install the DLN15 combustion system to meet the new District imposed emission limit of 22 ppm NOx. In 2000 the Energy Commission approved an order to allow MSCC to replace the DLN15 combustion system with the DLN9 to meet a further reduction to 10 ppm NOx. The latest NOx emission reduction for MSCC was to 5 ppm. At that time, GE had no commercially available technology better than the DLN9 so in 2003 the Energy Commission approved MSCC's request to install an SCR grid in the HRSG of each unit to control the NOx emissions to 5 ppm. CEC lbs/hr and EPA lbs/MMBtu NOx emission limits were adjusted each time the District limit was lowered.

Since 2003 the units have been unable to bypass the HRSG (and SCR) and operate in simple cycle mode and still maintain the 5 ppm NOx emission limits. However, GE has recently developed a DLN1+ combustion system that can meet MSCC's permitted 5 ppm NOx emission limit without the use of the SCR. MSCC is proposing an amendment to upgrade Unit B's existing DLN9 combustion system with the recently developed DLN1+ combustion system, thereby continuing to meet the permitted NOx emission of 5 ppm and all other emission limits, including the carbon monoxide (CO) emission limits of 25 ppm, and reduce ammonia slip emissions when Unit B is operated in bypass as a peaking unit. The proposed amendment includes leaving the SCR grid and ammonia injection system intact for use when Unit B is required as a cogeneration unit. If or when the SCR system is used, MSCC will meet all the SCR conditions, including the calculation and recording of ammonia slip. MSCC will require the

installation of two new ports, one sampling port and one test port, in the bypass stack to remain in compliance with all applicable LORS. The proper placement of the ports will be coordinated with MSCC's testing consultants and approved by the District as required by verification in condition of certification (CoC) **AQ-18**.

The installation of the DNL1+ in Unit B would be executed during annual routine maintenance and would not result in any additional impacts.

Administrative Changes

The first administrative change requested by MSCC is to revise the equipment description for each CTG from 75 MW to 78.2 MW in the SJVAPCD Permit to Operate (PTO). This is not a physical increase in the units' ratings but reflects a revision from the nominal rating used during the permitting process compared to the actual nominal rating of the final purchased equipment. This revision would help avoid future confusion and regulatory scrutiny. This change does not affect any CoCs.

The second administrative change requested by MSCC would extend the submittal period for source test results for emission limits in **AQ-18** from 30 days to 60 days. Testing for VOCs and ammonia slip require samples to be sent offsite for lab tests. It has proven difficult for the testing service to be submitted in 30 days. The District has recognized the difficulty and revised Rule 1081, Section 7.3 to allow 60 days. The District has agreed to revise their condition on MSCC's PTO to agree with District Rule 1081.

MSCC's last application for an amendment to AQ-18 was not in response to a District requirement and was never implemented. The application was for the installation of an Evolution Rotor being developed by GE. The Evolution Rotor, as envisioned by GE, would reduce emission limits for NOx and CO. GE ran into technical difficulties during factory tests of the Evolution Rotor and elected not to offer it commercially. Since this is the most recent amendment to MSCC's AQ-18, the proposed changes are provided in Energy Commission order number 06-1030-3 as shown below. The new proposed emission limits shown below are the same limits approved in Energy Commission order 03-0909-02 "Petition to Add Selective Catalytic Reduction System" which have been the ongoing current permitted emission limits regulated by the District since the Evolution Rotor was never installed.

CONCLUSIONS AND RECOMMENDATIONS

Staff recommends approval of the requested administrative changes and installation of the DLN1+ to allow MSCC's unit B to operate as either a peaker or cogeneration unit. There will be no change in permitted emissions at the MSCC. With the minor modifications to the Conditions of Certification, the project would continue to comply with all applicable LORS.

PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

The following conditions of certification would be amended in the Final Commission Decision for the Midway Sunset Cogeneration Company to ensure compliance with all applicable LORS. ~~Strikethrough~~ is used to indicate deleted language and underline for new language.

Pollutant emissions from ~~each SCR-controlled~~ **the Stack of each** combustion turbine shall not exceed the following limits (in pounds mass per hour, lbm/hr) except during times of start-up or shutdown (as described in Condition of Certification AQ-44):

Particulate	9.98	lbm/hr
Sulfur Compounds	0.92	lbm/hr as SO ₂
Oxides of Nitrogen	17.66	lbm/hr as NO ₂
Hydrocarbons (nonmethane)	9.00	lbm/hr
Carbon Monoxide	54.91	lbm/hr

~~Pollutant emissions from each combustion turbine with the Evolution Rotor installed, shall not exceed the following limits (in pounds mass per hour) with the exceptions given below.~~

~~Gas-Fired Case:~~

Particulate	9.98	lbm/hr
Sulfur Compounds	0.92	lbm/hr as SO₂
Oxides of Nitrogen	7.06	lbm/hr as NO₂
Hydrocarbons (nonmethane)	9.00	lbm/hr
Carbon Monoxide	13.18	lbm/hr

- ~~1. NO_x emission concentrations during steady state operation shall not exceed 7.06 lbs/hr over a one-hour average (clock-hour basis). Steady state operation refers to any period that is not a startup or shutdown (as described in Condition of Certification AQ-44). A clock hour in a one-hour average will commence at the top of the hour.~~
- ~~2. Compliance with the NO_x emission limitations during steady-state operation shall not be required during short-term excursions limited to a cumulative total of 10 hours per rolling 12-month period.~~
- ~~3. Short term excursions are defined as 15-minute periods designated by the owner/operator (and approved by the CPM) that are the direct result of transient load conditions, not to exceed four consecutive 15-minute periods when the 15-minute average NO_x concentration exceeds 2.0 ppmvd @ 15 percent O₂. The maximum three-hour average NO_x concentration for periods that include short-term excursions shall not exceed 5 ppmvd @ 15 percent O₂. The maximum three-hour CO concentration for periods that include short-term excursions shall not exceed 25 ppmvd @ 15 percent O₂.~~
- ~~4. Examples of transient load conditions include, but are not limited to the following: initiation or shutdown of combustion turbine inlet air cooling, or rapid combustion turbine load changes. All emissions during short-term~~

~~excursions shall accrue towards the daily and annual emissions limitations of this permit and shall be included in all calculations of daily and annual mass emission rates as required by this permit.~~

~~5. All emissions during short-term excursions shall accrue towards the hourly, daily and annual emissions limitations of these conditions and shall be included in all calculations of hourly, daily, and annual mass emission rates as required herein.~~

Verification: To demonstrate compliance with the emission limits provided, the owner/operator shall provide initial and on-going performance tests as follows:

- a. At least 60 days before commercial operation date of the power cogeneration facility, or 60 days before the permit to operate anniversary date, the owners shall submit to the SJVUAPCD, CARB and the CEC a detailed performance test plan for the power plant's AECS. The performance test will be funded by the owners and conducted by a third party approved by the SJVUAPCD and CARB. The SJVUAPCD will notify the owners and the CEC of its approval, disapproval, or proposed modifications to the plan within 30 days of receipt of the plan. The owners shall incorporate the SJVUAPCD and the Commission's comments or modifications to the plan.
- b. The owners shall notify the SJVUAPCD and the CEC, within five days, before the facility begins commercial operation. The owners shall also notify the SJVUAPCD one week prior to the beginning of testing to allow the SJVUAPCD to observe and/or conduct concurrent sampling.
- c. Compliance with emission limits shall be demonstrated by a SJVUAPCD witnessed sample collection performed by an independent testing laboratory within 60 days after startup of this equipment and annually within 60 days prior to permit anniversary date.
- d. The owners shall submit the results of the compliance test within ~~30~~**60** days of completion of the tests. The owners shall submit to the SJVUAPCD, its application for a Permit to Operate via registered mail. The owners shall submit a copy of the application to the CEC within 10 days of its submittal to the SJVUAPCD. The SJVUAPCD shall approve or disapprove the application as prescribed in the SJVUAPCD rules.
- e. The owners shall include all Excursions in the Quarterly Emissions Report as a separate section (such as "breakdowns" or "excess emissions") as well as including them in all daily and annual emission calculations.

REFERENCES

CEC(a) – California Energy Commission, Order Approving a Petition to Amend Air Quality Conditions of Certification, Order No. 99-1117-03.

CEC(b) – California Energy Commission, Order Approving a Petition to Amend Air Quality Conditions of Certification, Order No. 00-1011-10.

CEC(c) – California Energy Commission, Order Approving a Petition to Add Selective Catalytic Reduction System, Order No. 03-0909-02.

CEC(d) – California Energy Commission, Order Approving a Petition to Install Evolution Rotor, Order No. 06-1030-3.

MSCC(a) – Midway Sunset Cogeneration Company, Petition to Amend to Upgrade Unit B Combustion System and Modify AQ Condition of Certification, October 2010.

MSCC(b) – Midway Sunset Cogeneration Company, Modification of Petition to Amend Units A, B and C, November 2010.

SJVAPCD – San Joaquin Valley Air Pollution Control District, Proposed Authority to Construct, August 2010.