TECHNICAL SUPPORT DOCUMENT

TECHNICAL INFORMATION PRESENTED IN REVIEW OF AN
APPLICATION FOR A PART 70 OPERATING PERMIT

APPLICATION SUBMITTED BY

San Diego Gas & Electric Company

For

Desert Star Energy Center

Part 70 Operating Permit Number: 652
(Revision)

SIC Code 4911: Electric Utility Services

Clark County
Department of Air Quality and Environmental Management
Permitting Section

October 2011

This Technical Support Document (TSD) accompanies the proposed Part 70 Operating Permit for Desert Star Energy Center.

TABLE OF CONTENTS

I. ACRONYMS

Table I-1: List of Acronyms

Acronym	Term
AQR	Clark County Air Quality Regulations
ATC	Authority to Construct
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emissions Monitoring System
CFR	United States Code of Federal Regulations
CO	Carbon Monoxide
CTG	Combustion Turbine-Generator
DAQEM	Clark County Department of Air Quality & Environmental Management
DLN	Dry Low-NO_x
EPA	United States Environmental Protection Agency
EU	Emission Unit
HAP	Hazardous Air Pollutant
HHV	Higher Heating Value
HP	Horse Power
kW	kilowatt
LHV	Lower Heating Value
MACT	Maximum Achievable Control Technology
MMBtu	Millions of British Thermal Units
M/N	Model Number
MW	Megawatt
NAICS	North American Industry Classification System
NO_x	Nitrogen Oxides
NRS	Nevada Revised Statutes
OP	Operating Permit
PM_{10}	Particulate Matter less than 10 microns
ppm	Parts per Million
ppmvd	Parts per Million, Volumetric Dry
PTE	Potential to Emit
QA/AC	Quality Assurance/Quality Control
RATA	Relative Accuracy Test Audits
RICE	Reciprocating Internal Combustion Engine
RMP	Risk Management Plan
SCC	Source Classification Codes
scf	Standard Cubic Feet
SIC	Standard Industrial Classification
SIP	State Implementation Plan
S/N	Serial Number
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
TCS	Toxic Chemical Substance
ULN	Ultra Low-NO_x
VOC	Volatile Organic Compound

II. EXECUTIVE SUMMARY

Desert Star Energy Center is a major source of NO_X and a minor source of PM_{10}, CO, SO_X, VOC and HAP owned by San Diego Gas & Electric Company. All processes at the site are grouped under SIC 4911: Electric Services (NAICS 221112: Fossil Fuel Electric Power Generation). The source is located at 701 El Dorado Valley Drive, Boulder City, Nevada 89005 in the El Dorado Valley airshed, hydrographic basin number 167. Hydrographic basin 167 is designated as nonattainment area for ozone and attainment area for all other regulated air pollutants.

The source is a 500 MW natural gas power generating plant with a two-on-one combined cycle configuration, consisting of two natural gas-fired stationary gas turbines, two Heat Recovery Steam Generators (HRSGs) with natural gas fired duct burners for supplemental firing and one steam turbine generator. The facility also operates one diesel-fired emergency fire pump.

The following table summarizes the source PTE for each regulated air pollutant for all emission units addressed by this Part 70 Operating Permit:

PM_{10}	$PM_{2.5}$	NO_X	CO	SO_X	VOC	HAP	H_2S	Lead (Pb)
89.62	**89.62**	**194.17**	**95.35**	**8.65**	**49.25**	**12.16**	**0.00**	**0.00**

The initial Title V operating permit (OP) was issued on October 23, 2003, and the renewal OP was issued on December 31, 2010. This Part 70 OP is issued based on the Title V revision applications submitted on July 7, 2011, and September 6, 2011, for the removal of solar fields and a change in name and ownership of the source. The removal of the solar fields (EUs: A05 and A06) results in a decrease in PM_{10} emissions for the source.

To accommodate the removal of the solar fields from the existing operating permit, Sempra Energy created a new company, Copper Mountain Solar 1, LLC. Both solar fields, Copper Mountain Solar 1 and El Dorado Energy (EDE) Solar, were consolidated into one stationary source. Copper Mountain Solar 1 had been constructed with its own substation to allow power to be fed to the power grid. EDE Solar was constructed to use the substation that is operated by El Dorado Energy's combined cycle plant. EDE Solar was disconnected from the main substation on September 29, 2011 and connected to the Copper Mountain Solar 1 substation on September 30, 2011. Copper Mountain Solar 1, LLC submitted an application to consolidate the solar fields into one permit. The potential to emit of the new facility did not exceed the permitting threshold for PM_{10}, so the company was notified no permit was required at this time.

Based on the information submitted by the applicant and the technical review performed by the DAQEM staff, the DAQEM proposes the administrative revision of the Part 70 Operating Permit to San Diego Gas & Electric Company.

III. SOURCE INFORMATION

A. General

Permittee	San Diego Gas & Electric Company
Mailing Address	P.O. Box 62470, Boulder City, Nevada 89006
Contacts	Kevin Lampman
Phone Number	(702) 568-8203
Fax Number	(702) 568-8213
Source Location	701 El Dorado Valley Drive, Boulder City, Nevada 89005
Hydrographic Area	167
Township, Range, Section	T25S, R62E, Section 12
SIC Code	4911: Electric Services
NAICS Code	221112: Fossil Fuel Electric Power Generation

B. Description of Process

The Desert Star Energy Center has a two-on-one combined cycle configuration, consisting of two combustion turbine generators (CTGs), two heat recovery steam generators (HRSGs), one steam turbine generator and associated auxiliary systems and equipment. The plant is capable of generating a nominal 500 megawatts (MW) of gross electrical power with duct burning at a maximum ambient air temperature of 120°F and 15% humidity. The CTGs are heavy-duty, single-shaft turbines with a 165 MW (nominal) rating each.

The combustion system has dry low-NO_x combustion burner technology that accurately controls fuel flow to maintain turbine load and minimize turbine emissions. The turbines and duct burners combust only pipeline quality natural gas.

Each CTG is equipped with inlet air filtering and inlet air evaporative coolers. Combustion air for the turbine is filtered by media filters housed in an inlet filter compartment mounted adjacent to the turbine compartment. The filter housing also contains the evaporative cooling system. Air flows through the air filter, evaporative cooler and associated inlet air ductwork of each CTG and is then compressed. Natural gas is injected into the combustor section and ignited. The hot combustion gases expand through the turbine section to drive the entire CTG. The hot gases exit the turbine section and enter a HRSG dedicated to each combined turbine generator.

The Forney natural gas fired duct burners are installed immediately upstream of each HRSG. The duct burners are used for supplemental firing for additional power. The CTGs and HRSGs are in single train configuration and the exhaust gases from each HRSG passes through the ductwork to individual 100-foot exhaust stacks. The HRSGs are equipped with SCR and oxidation catalyst systems to reduce emissions.

In the HRSG, heat from the turbine exhaust gas is recovered by transferring the heat to water pumped into the HRSG, resulting in generation of steam. The steam from each HRSG is combined for use in a single steam turbine generator. The steam generator has a nominal output of 170 MW. The system is using a large air-cooled condenser.

There is also one 140 bhp emergency diesel fire pump on site. Ancillary equipment on site which does not require a permit either by AQR regulations or Part 70 includes two stationary

diesel storage tanks (250- and 500-gallons), one 100-gallon portable diesel storage tank, one 280-gallon gasoline storage tank, an aqueous ammonia storage tank and lube oil tanks for the turbines.

IV. EMISSIONS INFORMATION

A. Source-Wide Potential to Emit

The Desert Star Energy Center is a major source for NO_x and a minor source for PM_{10}, CO, SO_x, VOC, and HAP:

Table IV-A-1: Total Source PTE (tons per year)

Pollutant	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_X	VOC	HAP	H_2S	Lead (Pb)
PTE Totals	**89.62**	**89.62**	**194.17**	**95.35**	**8.65**	**49.25**	**12.16**	**0.00**	**0.00**

[1]25 tons for combination of all HAPs (no single HAP exceeds 10 tons).

B. Emission Units, Emission Limitations and PTE

The stationary source covered by this Part 70 OP is defined to consist of the emission units summarized in Table IV-B-1.

Table IV-B-1: List of Emission Units

EU	Description	Rating	Make	Model #	Serial #	SCC
A01	Stationary Gas Turbine, natural gas fired	1,616.53 MMBtu/hr 165 MW	Westinghouse	501FC+	37A8029-1	20100201
A01A	Duct Burner for HRSG EU: A01	175 MMBtu/hr	Forney	394671-01	N/A	10100601
A02	Stationary Gas Turbine, natural gas fired	1,616.53 MMBtu/hr 165 MW	Westinghouse	501FC+	37A8030-1	20100201
A02A	Duct Burner for HRSG EU: A02	175 MMBtu/hr	Forney	394671-01	N/A	10100601
A03	Emergency Diesel Fire Pump, DOM: 1998	140 bhp	Clarke Allison	PDFP-06YT	713787F	20200102

The following units or activities are present at this source, but are insignificant. The emissions from these units or activities, when added to the PTE of the source presented in Table IV-B-2, will not make the source major for any additional pollutant not already considered major.

Table IV-B-2: Insignificant Units or Activities

Description
Gasoline Storage Tank (280 gallons)
Diesel Storage Tank (100 gallons)
Diesel Storage Tank (200 gallons)
Diesel Storage Tank (500 gallons)
0.1 MMBtu/hr Diesel Powered Space Heater
0.1 MMBtu/hr Diesel Powered Space Heater
29 hp Diesel Powered Mobile Welder, Miller Big Blue, M/N: 251D
10.5 hp Diesel Powered Light Tower
16 hp Gasoline Powered Pressure Washer
0.028 MMBtu/hr Diesel Powered Pressure Washer Heater

Table IV-B-3: Emission Unit PTE, Including Startups and Shutdowns (tons per year)

EU	PM_{10}	NO_x	CO	SO_x	VOC	HAP	NH_3
A01	39.42	96.50	45.55	4.30	22.78	---	58.00
A01+A01A	44.80	96.50	47.65	4.30	24.60	6.07	106.90
A02	39.42	96.50	45.55	4.30	22.78	---	58.00
A02+A02A	44.80	96.50	47.65	4.30	24.60	6.07	106.90
A03	0.02	1.17	0.05	0.05	0.05	0.02	0.00
Total PTE	**89.62**	**194.17**	**95.35**	**8.65**	**49.25**	**12.16**	**213.80**

Table IV-B-4: Emission Unit PTE, Excluding Startups and Shutdowns (pounds per hour)

EU	PM_{10}	NO_x	CO	SO_x	VOC	HAP	NH_3
A01	9.00	23.00	10.40	1.01	5.20	---	24.40
A01+A01A	11.60	23.00	13.10	1.01	6.60	1.36	24.40
A02	9.00	23.00	10.40	1.01	5.20	---	24.40
A02+A02A	11.60	23.00	13.10	1.01	6.60	1.36	24.40
A03	0.06	4.69	0.19	0.20	0.18	0.06	0.00
Total PTE	**23.26**	**50.69**	**26.39**	**2.22**	**13.38**	**2.78**	**48.80**

D. Testing

No additional performance testing requirements were added to the permit during this permitting action.

E. Continuous Emissions Monitoring

No additional monitoring requirements were added to the permit during this permitting action.

F. Compliance Assurance Plan

The compliance assurance plan permitted in the Title V OP issued on December 31, 2010, was not altered in this permitting action.

V. REGULATORY REVIEW

40 CFR 51, 52, 70 and 71.

On June 3, 2010, EPA published the final Prevention of Significant Deterioration (PSD) and Title V Greenhouse Gas Tailoring Rule (herein referred to as the Tailoring Rule; 75 FR 31514), setting thresholds for GHG emissions that define when permits under these programs are required for new and existing industrial facilities.

Step 2 of the Tailoring Rule implementation began on July 1, 2011. Under Step 2, ‘‘anyway’’ title V sources—that is, sources already subject to title V based on non-GHGs and that are covered under Step 1 previously—will continue to be subject to title V. In addition, GHG emission sources that equal or exceed the 100,000 tpy CO_2e threshold will be required to obtain a title V permit if they do not already have one. It is important to note that the requirement to obtain a title V permit will not, by itself, result in the triggering of additional substantive requirements or control of GHG. Rather, these new title V permits will simply incorporate whatever applicable CAA requirements, if any, apply to the source being permitted. Both of the following conditions need to be met in order for title V to apply under Step 2 to a GHG emission source: (1) An

existing or newly constructed source emits or has the potential to emit GHGs in amounts that equal or exceed 100 tpy calculated as the sum of the six well-mixed GHGs on a mass basis (no GWPs applied). (2) An existing or newly constructed source emits or has the potential to emit GHGs in amounts that equal or exceed 100,000 tpy calculated as the sum of the six well-mixed GHGs on a CO2e basis.

On September 21, 2011, the Permittee provided the CO_2 emission information for the source. The Permittee estimated actual emissions for 2010 was 1,195,845.4 metric tons of CO_2 emission. The source is a major source for CO_2 and therefore, the source is subject to all applicable requirements under the Tailoring Rule.

AQR SECTION 11 - AMBIENT AIR QUALITY STANDARDS *(in part)*

Desert Star Energy Center is a major source in Hydrographic Area (HA) 167 (Eldorado Valley). Permitted emission units include two turbines and one fire pump. Minor source baseline dates for PM10 (July 9, 1997), NO2 (July 9, 1997) and SO2 (January 19, 2004) have been triggered for HA 167. Since minor source baseline dates have been triggered, Prevention of Significant Deterioration (PSD) increment analysis is required.

DAQEM modeled the source using AERMOD to track the increment consumption. Stack data submitted by the applicant were supplemented with information available for similar emission units. Five years (1999 to 2003) of meteorological data from the McCarran Station and Desert Rock Station were used in the model. United States Geological Survey (USGS) National Elevation Dataset (NED) terrain data was used to calculate elevations. Table V-1 presents the results of the modeling.

Table V-1: PSD Increment Consumption for HA 167

Pollutant	Averaging Period	PSD Increment Consumption by the Source ($\mu g/m^3$)	Location of Maximum Impact	
			UTM X (m)	UTM Y (m)
SO_2	3-hour	12.72[1]	681700	3962100
SO_2	24-hour	2.74[1]	681675	3962365
SO_2	Annual	0.33	681675	3962365
PM_{10}	24-hour	5.13[1]	681497	3961980
PM_{10}	Annual	0.38	681497	3962840
NO_X	Annual	1.18	681140	3962163

[1]Modeled 2nd High Concentration

Table V-1 shows the location of the maximum impact and the potential PSD increment consumed by the source at that location. The impacts are below the PSD increment limits.

VI. COMPLIANCE

The compliance requirements in the Title V OP issued on December 31, 2010, were not altered in this permitting action.

C. Permit Shield

A permit shield was not requested by the source.

D. Streamlining Demonstration

The streamlining demonstration in the Title V OP issued on December 31, 2010, was not altered in this permitting action.

E. Summary of Monitoring for Compliance

The monitoring section in the Title V OP was revised to remove all requirements related to the disturbed surfaces of the solar fields.

VII. EMISSION REDUCTION CREDITS (OFFSETS)

The source is subject to offset requirements in accordance with AQR Section 12.7. Offset requirements and associated mitigation are pollutant-specific.

VIII. ADMINISTRATIVE REQUIREMENTS

AQR Section 12.5.2.3 require that DAQEM identify the original authority for each term or condition in the Part 70 Operating Permit. Such reference of origin or citation is denoted by [italic text in brackets] after each Part 70 Permit condition.

DAQEM proposes to issue the Part 70 Operating Permit conditions on the following basis:

Legal:
On December 5, 2001 in Federal Register Volume 66, Number 234 FR30097 the EPA fully approved the Title V Operating Permit Program submitted for the purpose of complying with the Title V requirements of the 1990 CAAA and implementing 40 CFR 70.

Factual:
San Diego Gas & Electric Company has supplied all the necessary information for DAQEM to draft Part 70 Operating Permit conditions encompassing all applicable requirements and corresponding compliance.

Conclusion:
DAQEM has determined that San Diego Gas & Electric Company will continue to determine compliance through the use of CEMS, performance testing, semi-annual reporting, daily recordkeeping, coupled with annual certifications of compliance. DAQEM proceeds with the preliminary decision that a Part 70 Operating Permit should be issued as drafted to San Diego Gas & Electric Company for a period not to exceed five years