

TECHNICAL SUPPORT DOCUMENT

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

SUBMITTED BY

NEVADA POWER COMPANY

for

SUNRISE STATION

Part 70 Operating Permit Number: 8
Revision 2

SIC Code 4911: Electric Utility Services



Clark County
Department of Air Quality and Environmental Management
Permitting Section

August, 2011

EXECUTIVE SUMMARY

The Sunrise Station, owned by Nevada Power Company (NPC), dba NV Energy, is a major source for NO_x and CO; and a minor source for PM₁₀, SO_x, VOC, and HAP. The source is located at 6300 East Vegas Valley Drive, Las Vegas, Nevada 89122, in the Las Vegas Valley airshed, hydrographic basin number 212. Hydrographic basin 212 is nonattainment for CO, PM₁₀, and ozone (8-hour), and attainment for all other regulated air pollutants.

The NPC-Sunrise Station is a natural gas-fired electric generating facility consisting of two units that produce electricity. All generating and support processes at the site are grouped under the Standard Industrial Classification SIC 4911: Electric Services (NAICS 22111: Electric Power Generation). NPC-Sunrise Station includes one external combustion steam boiler (Unit Number 1) and one simple cycle natural gas turbine (Unit Number 2). The generating units are supported by a 250 kW, 390 hp emergency generator used for routine repairs and preventative maintenance, one cooling tower for the steam boiler, as well as fuel storage and transfer systems.

Clark County Department of Air Quality and Environmental Management (DAQEM) has delegated authority to implement the requirement of the Part 70 operating permit program. The external combustion steam boiler, cooling tower, and its supporting equipment are permitted through the Nevada Department of Environmental Protection (NDEP). DAQEM regulates only the simple cycle gas turbine, its associated emission units, the 390 hp portable generator, and the 5,064,081 gallon diesel storage tank. The entire Sunrise Station regulated by two jurisdictions, is a major source for NO_x, CO, SO_x, PM₁₀, and VOC, while DAQEM-regulated portion is only major for NO_x and CO. The terms facility and source, used in this TSD and Part 70 OP, signify only DAQEM-regulated units. The potential emissions for the source from DAQEM-regulated units are shown in the table below.

Table 1: Maximum Source PTE (tons per year)

Pollutant	PM ₁₀	NO _x	CO	SO ₂	VOC	HAP
Tons/Year	46.00	1,760.38	155.34	10.42	13.30	1.33
Major Source Thresholds	70	50	70	100	50	10/25¹

¹Ten tons for any individual HAP or 25 tons for combination of all HAPs.

Initial Part 70 OP was issued on January 15, 2003; Part 70 OP Revision 1 was issued on November 30, 2006. DAQEM received the Title V renewal application on June 14, 2007. Based on the information submitted by the applicant and a technical review performed by the DAQEM staff, the DAQEM proposes the renewal of a Part 70 OP to NPC-Sunrise Station.

This Technical Support Document (TSD) accompanies the proposed Part 70 Operating Permit for Nevada Power Company - Sunrise Station.

TABLE OF CONTENTS

- I. SOURCE INFORMATION 4**
 - A. General 4
 - B. Description of Process 4
 - C. Permitting Action 5
 - D. Operating Scenario 6
- II. EMISSIONS INFORMATION 6**
 - A. Total Source Potential to Emit 6
 - B. Emission Units and PTE 6
- III. REGULATORY REVIEW 8**
 - There are changes in the regulatory requirements..... 8

I. SOURCE INFORMATION

A. General

Permittee	Nevada Power Company - Sunrise Station
Mailing Address	6226 West Sahara Avenue, Las Vegas, NV 89151
Contacts	Steve Page
Phone Number	(702) 402-7706
Fax Number	(702) 402-7730
Source Location	6300 East Vegas Valley Drive, Las Vegas, NV 89122
Hydrographic Area	212
Township, Range, Section	T21S, R62E, Section 10
SIC Code	4911: Electric Services
NAICS Code	22111: Electric Power Generation

B. Description of Process

Nevada Power Company-Sunrise Station (NPC-Sunrise Station) is a natural gas fired electric utility generating facility consisting of two units which produce electricity. All generating and support processes at the site are grouped under the Standard Industrial Classification SIC 4911: Electric Services. NPC-Sunrise Station includes one external combustion steam boiler (Unit Number 1) and one simple cycle gas turbine (Unit Number 2). DAQEM regulates only the simple cycle gas turbine (Unit Number 2), its associated emission units, the 5,064,081 gallon, diesel storage tank, and the 390 hp portable emergency generator.

Unit Number 2 is a Westinghouse 501-B6 single shaft, nominal 76 MW simple cycle combustion gas turbine using natural gas as its primary fuel (EU: 801). The unit can also use diesel fuel, but the source requested removal of the diesel fuel firing option from the permit. This request has been addressed in this revision. As originally permitted in 1975, Unit Number 2 has no restrictions on hours of operation, no restrictions concerning fuel type, no controls, and no required record keeping, reporting, or performance testing. In 2002, DAQEM issued an amended permit requiring water injection, emissions tracking, annual emission limitations, record keeping, reporting, and performance testing.

The Onan 250 kW, 390 hp emergency diesel generator (EU: A02) may be tested no more than 26 hours per year and, beyond that, may be operated for repairs and maintenance only during the interruption of the normal power supply. The facility also has a 5,064,081 gallon diesel fuel storage tank.

The NPC-Sunrise Station gas turbine (EU: 801) is continuously monitored for the natural gas flow, turbine load, and water injection rate as indicators of NO_x emissions in the flue gas. The monitoring system generates a log of data and provides alarm signals to the control room when

the 3-hour average water injection rate is less than the optimum water injection rate. The system complies with 40 CFR 64 Compliance Assurance Monitoring (CAM) Rule.

C. Permitting Action

On May 13, 2010, Nevada Power Company, dba NV Energy (NVE), submitted request for administrative revision of Part 70 OP. The administrative change addresses comments submitted by NVE by DAQEM following on-site inspection of the Sunrise Station.

During the inspection, DAQEM discovered that the Onan emergency generator (EU: A02) had an incorrect power output rating listed in the Part 70 OP. The capacity of the generator was listed as 250 kW (380 hp). However, the source identified that Onan generator is coupled with Cummins diesel engine, which is actually rated at 390 hp. The permit currently lists only the generator, not the engine as the emission unit. The source asked for addition of diesel engine information, since the engine is the emission unit. The updating of engine capacity from 380 hp to 390 hp, did not change the PTE of the unit.

Table I-C-2: BACT Determinations for Sunrise Station

EU	Description	BACT Technology	BACT Limit
801	76 MW natural gas-fired electric turbine generator	Water injection for NO _x control. Natural gas burning for SO _x control.	0.34 lbs/MMBtu NO _x on a 3-hour average at 15% O ₂ .
A02	380 hp Onan diesel emergency generator	Turbocharged, Aftercooled, Low sulfur diesel fuel (< 0.05%)	No limits.

Permitting of Portable Emergency Generator

The emergency generator was installed on September 30, 1993. On February 29, 1996, the CCHD submitted a letter to NVE which required NVE to submit a compliance plan that addressed the non-compliance issue (no ATC) for the diesel emergency generator. On March 25, 1996, NVE replied with a letter containing permit terms to be incorporated into the Title V application. NPC proposed an annual 150 hour cap for the emergency generator. On April 25, 1996, the CCHD responded to NPC in a letter, stating NVE was to “submit an application for ATC for the diesel generator by May 25, 1996”. Following the CCHD determination that the ATC is complete and approvable, the information was to be submitted as the compliance schedule for the emission unit. Additionally, the CCHD explained to NVE that the Part 70 permit application could not be used as a vehicle to by-pass pre-construction review requirements for the portable generator. An application was submitted and deemed complete (11/02/99) for an ATC/OP for the Onan 250 kW emergency generator (EU: A02). An ATC/OP was issued on November 5, 1999. The unit was given a 26 hours per year cap for testing and maintenance.

Table I-C-5: PTE of Cummins Emergency Generator 390 hp

Pollutant	EF g/hp-hr	lbs/hour	Hours/year	Tons/year
PM ₁₀	0.50	0.57	26	0.01
NO _x	9.30	8.02	26	0.10
CO	1.00	1.74	26	0.02
SO ₂	0.56	0.53	26	0.01
VOCs	0.48	0.64	26	0.01

The PTE emissions were below offset de minimus threshold for all pollutants and no offset obligation was placed on NVE for this unit. Neither modeling nor performance testing was required for a unit of this size, operation, and PTE.

D. Operating Scenario

The emergency generator (EU: A02) may operate up to 26 hours per year for testing and maintenance purposes only. The generator uses turbocharging and aftercooling, and combust only low sulfur (less than 0.05 percent) diesel fuel. The generator shall not be used for dispatchable peak shaving.

II. EMISSIONS INFORMATION

A. Total Source Potential to Emit

The source potential to emit (PTE) for pollutants (Table II-A-1), as presented in the Part 70 OP, reflects the permitted emission limits established in the January 15, 2003 (Permit 8, Modification 1), June 30, 2006 (ATC/OP 8, Modification 1, Amendment 2) for natural gas burning option, and October 7, 2008 (ATC 8, Modification 1, Revision 4).

Table II-A-1: Maximum Source PTE (tons per year)

Pollutant	PM ₁₀	NO _x	CO	SO _x	VOC	HAPs
lbs/hour ¹	11.34	413.66	38.00	3.16	3.99	0.32
tons/year ²	46.00	1,760.38	155.34	10.42	13.30	1.33

¹ lbs/hour PTE for the turbine are based on natural gas usage; lbs/hour includes portable generator and, for VOCs and HAPs, diesel storage tank hourly emission rates. Start-up/shut-down PTE listed in Table II-B-3.

² tons/year assumes 8,760 hours per year turbine operation on natural gas, 26 hrs/year emergency generator operation and continuous VOC and HAP emissions from the diesel tank.

B. Emission Units and PTE

The following tables summarize the allowable limits for each emission unit.

Table II-B-1: List of Emission Units

EU	Description	Rating	Make	Model #	Serial #	SCC
801	Single Shaft, Simple Cycle Turbine	76 MW	Westinghouse	501-B5	27A1111-1	20100201
A02	Emergency Generator	250 kW	Onan	250 ODFM-17R50331N	ES7089916 4	20200102
	Diesel Engine	390 hp	Cummins	NT855-G3	11403347	
A09	Diesel Number 2 Fuel Storage Tank	5,064,081 Gallon	Chicago Bridge and Iron Co.	N/A	N/A	40301019

Emission limitations in this document refer to pounds per MMBtu, pounds per hour, and tons per year. The terms “year” and “annual” in this permit refer to any consecutive 12-month period. Actual and allowable annual emissions, including startup and shutdown, from EU: 801 and actual and allowable short-term and annual emissions from EU: A02 and A03 shall not exceed the applicable PTE listed in Table II-B-2. NO_x emission factor (0.34 lbs/MMBtu) is a short term enforceable emission limitation for EU: 801.

Table II-B-2: Emission Units PTE¹

EU	PM ₁₀ ²			NO _x ³			CO ⁴			SO _x ⁵			VOC ⁶		
	EF	lbs/hr	tons/year	EF	lbs/hr	tons/year	EF	lbs/hr	tons/year	EF	lbs/hr	tons/year	EF	lbs/hr	tons/year
801	0.0089	10.50	45.99	0.34	401.88	1,760.23	0.03	35.46	155.3 1	0.0020	2.38	10.41	0.0021	2.48	10.87
A02 ⁷	2.20E-03	0.84	0.01	3.10E-02	11.78	0.15	6.68E-03	2.54	0.03	2.05E-03	0.78	0.01	2.51E-03	0.96	0.01
A03 ⁸	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	2.42

¹ Start-up/shut-down emissions are included in the annual limits of Table II-C-3 for EU 801. See Table II-B-4 for HAP emissions.

² EU: 801 PM₁₀ emissions based on maximum heat input rating of 1,182 MMBtu/hr (based on HHV); 2003 performance testing; and 8,760 hours of operation per year. EF is in lbs/MMBtu. EU: A02 based on AP-42 emission factor in lbs/hp-hr.

³ EU: 801 NO_x emissions based on maximum heat input rating of 1,182 MMBtu/hr; 8,760 hours of operation per year; and the May 24, 1990 NO_x Reduction Plan agreement with the Clark County Health District. EF is 0.34 lbs/MMBtu. EU A02 EF is based on AP-42 emission factor in lbs/hp-hr

⁴ EU: 801 CO emissions based on maximum heat input rating of 1,182 MMBtu/hr; AP-42 Table 3.1-1; and 8,760 hours of operation per year. EF is in lbs/MMBtu. EU A02 based on AP-42 emission factor in lbs/hp-hr

⁵ EU 801 SO_x emissions based on maximum heat input rating of 1,182 MMBtu/hr; AP-42 Table 3.1-2a; Federal Energy Regulatory Commission pipeline quality standard of 0.75 grains/100 dscf total sulfur in natural gas; and 8,760 hours of operation per year. EF is in lbs/MMBtu. EU A02 based on AP-42 emission factor in lbs/hp-hr

⁶ EU: 801 VOC emissions based on maximum heat input rating of 1,182 MMBtu/hr; AP-42 Table 3.1-2a; and 8,760 hours of operation per year. EF is in lbs/MMBtu. EU A02 based on AP-42 emission factor in lbs/hp-hr

⁷ EU: A02 emissions based on 380 hp; 26 hours per year testing and maintenance.

⁸ EU: A03 VOC emissions from American Petroleum Institute Tanks Program.

Table II-B-3: Turbine Start-up and Shut-down PTE^{1,2,3,4,5}

EU	PM ₁₀ ⁶		NO _x		CO		SO _x ⁶		VOC ⁶	
	lbs/MMBtu	lbs/hr	lbs/MMBtu	lbs/hr	lbs/MMBtu	lbs/hr	lbs/MMBtu	lbs/hr	lbs/MMBtu	lbs/hr
801	0.0089	3.77	0.38	174.9	0.37	107.7	0.002	0.85	0.0021	0.89

¹ Annual limits for EU: 801 in Table III-B-2 include start-up and shut-down emissions shown in Table III-B-3. The EF listed in Table III-C-2 will be used unless the source will develop more representative EF.

² PTE represents emissions for one (1) hour of startup/shutdown.

³ Emission factors taken from Clark Unit 7 CEMS data during periods of startup and shutdown (natural gas) with low load (15 MW or less) and no load, and are the average for the “hourly” time frame. “Hourly” time frame varied from 10 to 60 minutes. Emission factors chosen were the highest recorded during the start-up/shut-down time frames.

⁴ Raw CEMS data from Clark Station Unit 7 (2/10/02): PM₁₀, SO_x and VOCs - heat input 423.8 MMBtu/hr, average load 15.6 MW, gas GCV 1,060 HHV; NO_x - heat input 423.3 MMBtu/hr, average load 15.6 MW, gas GCV 1,060 HHV; CO lbs/MMBtu - heat input 213.5 MMBtu/hr, average load 0.0 MW, gas GCV 1,060 HHV; CO lb/hr - heat input 284.8 MMBtu/hr, average load 2.8 MW, gas GCV 1,060 HHV.

⁵ Actuals ± 10%.

⁶ PM₁₀, VOC and SO_x emission factors were taken from Table III-B-2 and multiplied by the corresponding heat input for the start-up/shut-down period. Highest heat input was 423.8 MMBtu/hr (based on gas gross caloric value of 1,060 HHV).

Table II-B-4: HAP Emissions

	Turbine (EU: 801) Gas-fired at 8,760 Hours per Year ^{1,2}	Diesel Generator (EU: A02) at 26 Hours per Year ³	Diesel Tank (EU: A03) at 8,760 Hours per Year ⁴	All Emission Units
lbs/hour	0.25	0.017	0.053	0.32
ton/year	1.10	0.0002	0.23	1.33

¹ Formaldehyde, benzene, and toluene emission factors from Gas-fired Boiler and Turbine Air Toxics Summary Report, prepared by Carnot Technical Services, Tustin, CA, for the Gas Research Institute and The Electric Power Research Institute, August 1996; remaining emission factors from AP-42 Section 3.1, Stationary Gas Turbines, Table 3.1-3.

² Based on heat inputs of 899 MMBtu/hr (LHV) for natural gas,

³ Emission factors from AP-42, Volume 1, Chapter 3, Table 3.3-2.

⁴ HAPs at concentrations found in #2 diesel fuel oil (per MSDS) applied to VOC emission limit.

III. REGULATORY REVIEW

There are changes in the regulatory requirements.