



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2623C
Plant ID No.: 039-00536
Applicant: NGK Spark Plugs (USA), Inc.
Facility Name: Sissonville Facility
Location: Kanawha County
NAICS Code: 336322
Application Type: Modification
Received Date: September 10, 2014
Engineer Assigned: Steven R. Pursley, PE
Fee Amount: \$2,000.00
Date Received: October 1, 2014
Complete Date: October 10, 2014
Due Date: January 8, 2014
Applicant Ad Date: September 12, 2014
Newspaper: *The Charleston Gazette*
UTM's: Easting: 445.2 km Northing: 4,263.2 km Zone: 17
Description: Installation of a natural gas generator set for power supply to the facility for R & D purposes.

DESCRIPTION OF PROCESS

The application addresses the installation of a Caterpillar model G3520C 2,082 KW generator set powered by a 2702 hp four stroke lean burn natural gas fired engine. The generator set will provide electricity to the facility for Research and Development purposes. It should be noted that this is NOT an emergency generator. It is to enable "real-world testing of spark plug design, prototypes and product development".

SITE INSPECTION

No site inspection was deemed necessary since the writer is familiar with the facility's location. The facility was last inspected on February 12, 2012, by Douglas Hammell of

DAQ's Enforcement section. He found the facility to be in compliance. To get to the facility take I 77 north to exit 114. At the end of the off ramp turn right on to County Route 21 and go approximately 0.2 miles before turning right on to River Bend Road. Go approximately 0.5 mile and turn right on to NGK Drive and the guard shack is on the right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions of NO_x and VOCs were calculated based on technical data supplied by Caterpillar. Emissions of CO and formaldehyde were based on technical data provided by the Oxidation Catalyst vendor. Use of the OC should also result in reductions in emissions of VOC's but the applicant did not apply any control efficiency to those emissions. Therefore the estimated VOC emissions should be somewhat conservative. Emissions of PM/PM₁₀/PM_{2.5} and SO₂ were based on AP-42. Total HAP emissions were based on the sum of individual HAP emissions per AP-42.

Controlled emissions from the R & D Generator Set (G3) should be as follows:

Pollutant	Pounds per Hour	Tons per Year
NO _x	5.94	26.04
CO	11.89	52.07
VOCs	2.85	12.50
PM/PM ₁₀ /PM _{2.5}	0.17	0.74
SO ₂	0.01	0.04
Formaldehyde	0.66	2.86
Total HAPs	0.98	4.31

This will bring facility wide emissions to the following:

Pollutant	Tons per Year
NO _x	30.45
CO	54.00
VOCs	12.56
PM/PM ₁₀ /PM _{2.5}	0.91

SO ₂	0.06
Formaldehyde	2.87
Total HAPs	4.39

REGULATORY APPLICABILITY

The proposed generator is subject to substantive requirements in the following state and federal air quality rules and regulations: 45CSR13, 40 CFR 60 Subpart JJJJ, and 40 CFR 63, Subpart ZZZZ. Each applicable rule, and NGK's compliance therewith, will be discussed in detail below.

45CSR13: Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation

The proposed emergency generator has an uncontrolled potential-to-emit (PTE) in excess of six (6) lbs/hour and ten (10) TPY of CO. Additionally, the generator is subject to a "substantive requirement" of an emission control rule (See 40 CFR 60, Subpart JJJJ under the Regulatory Discussion below). Therefore, under §45-13-2.24(a) and (b), the generator would be defined as a "stationary source." Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the construction . . . and operation of any stationary source to be commenced without . . . obtaining a permit to construct." As a result of this statutory language, NGK is required to obtain a permit under 45CSR13 for the construction and operation of the generator.

As required under §45-13-8.3 ("Notice Level A"), NGK placed a Class I legal advertisement in a "newspaper of general circulation in the area where the source is . . . located." The ad ran on September 12, 2014 in The Charleston Gazette and the affidavit of publication for this legal advertisement was submitted on September 30, 2014.

45CSR22 Air Quality Management Fee Program

This facility is a minor source and not subject to 45CSR30. NGK is required to keep their Certificate to Operate current.

40 CFR 60, Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

Subpart JJJJ of 40 CFR 60 is the NSPS for stationary spark ignition internal combustion engines. Section §60.4230 states that "provisions of [Subpart JJJJ] are applicable to manufacturers, owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE)." Specifically, §60.4230(a)(4) states that Subpart JJJJ applies to "[o]wners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:

- (i) On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP (except lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP);

NGK has proposed the construction of one (1) new SI ICE generator (manufactured in 2014) that is subject to Subpart JJJJ. Based on the standards for owner/operators of a generator SI ICE under §60.4233(e), the following table details the emission standards for the engine:

Duty	Size (hp)	Displacement (L/cyl)	Source	Emission Standards (g/hp-hr)		
				NO _x	CO	VOC ¹
Non Emergency	2,702	<10	Subpart JJJJ Table 1	2.0	4.0	1.0

¹Excluding Formaldehyde (see footnote d of Table 1 of Subpart JJJJ)

The proposed engine's PTE will meet the above emission standards: NO_x - 1.0 g/hp-hr, CO - 2.0 g/hp-hr, VOC - 0.48 g/hp-hr. Since the purchased engine is not a "certified engine" under Subpart JJJJ, compliance with these standards shall be demonstrated primarily by keeping a maintenance plan and performing testing in accordance with §60.4243(b)(2)(ii) and §60.4244. Additionally, NGK will be required to perform an initial notification per §60.4245(c) and perform monitoring, recordkeeping and reporting per §60.4245(a) and §60.4245(d).

40 CFR 63, Subpart ZZZZ: National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

According to NGKs application, the facility is a minor source of HAPs and, therefore, the generator is subject to the area source provisions of the MACT. In order to comply with the area source provisions of Subpart ZZZZ NGK has to comply with 40 CFR 60 Subpart JJJJ.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides general toxicity information for those pollutants not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NOx), Ozone, Particulate Matter (PM), and Sulfur Dioxide (SO2). These pollutants have National Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal and state programs designed to limit their emissions and public exposure. These programs include federal source-specific HAP limits promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Potential applicability to these programs were discussed above under REGULATORY APPLICABILITY.

HAPs

Section 112(b) of the Clean Air Act (CAA) identifies 188 compounds as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The combustion of both natural gas and fuel oil has the potential to produce HAPs. However, the potential HAP emissions from the facility are below the levels that define a major HAP source. Therefore, the facility is considered a minor (or area) HAP source, and no source-specific major source NESHAP or MACT standards apply. The following table lists each HAP potentially emitted by the R & D generator in excess of 20 pounds/year (0.01 tons/year) and the carcinogenic risk associated thereto (as based on analysis provided in the Integrated Risk Information System (IRIS)):

HAPs	Type	Known/Suspected Carcinogen
Acetaldehyde	VOC	Yes
Acrolein	VOC	No
Benzene	VOC	Yes
1,3 Butadiene	VOC	Yes
Formaldehyde	VOC	Yes
Hexane	VOC	No
2,2,4 Trimethylpentane	VOC	No
Biphenyl	VOC	Yes
Methanol	VOC	No
Toluene	VOC	No
Xylene	VOC	No

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health effects may be associated with a wide range of ambient concentrations and

Fact Sheet R13-2623C
NGK Spark Plugs (USA), Inc.
Sissonville Facility

exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals*. For a complete discussion of the known health effects refer to the IRIS database located at www.epa.gov/iris.

AIR QUALITY IMPACT ANALYSIS

Since this is a minor modification to an existing minor source.

MONITORING OF OPERATIONS

No monitoring or testing beyond that already required by permit R13-2623B and by 40 CFR 60 Subpart JJJJ (discussed above), is deemed necessary.

CHANGES TO PERMIT R13-2623B

The following changes were made to permit R13-2623B:

- * The new Generator was added to Table 1.0
- * The new Generator and associated emissions were added to condition 4.1.5.
- * New conditions 4.1.15 4.1.16 and 4.1.17 were added.
- * Old condition 4.1.15 was renumbered to 4.1.18.
- * Old condition 4.2.1 was changed to correct typos.
- * New condition 4.3.2 was added.
- * New condition 4.4.7 was added.
- * New section 4.5 was added.

RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that permit R13-2623C for the modification of a spark plug and oxygen sensor manufacturing plant near Sissonville, Kanawha County, be granted to NGK Spark Plugs (USA), Inc.

Steven R. Pursley, PE
Engineer

January 12, 2015

Fact Sheet R13-2623C
NGK Spark Plugs (USA), Inc.
Sissonville Facility