

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 24 1981

OFFICE OF ENFORCEMENT

Mr. Amasjit S. Gill
General Electric - Gas Turbine Division
One River Road
Schenectady, New York 12345

Dear Mr. Gill:

This is to respond to your letter of May 19, 1981, requesting a determination of the applicability of NSPS and PSD to stationary gas turbines converting from middle distillates to natural gas.

The information presented in your letter indicated that NO_x and SO₂ emissions will decrease after the conversion to natural gas and hydrocarbons, CO and particulate emissions will either remain the same or decrease. As you correctly pointed out in your letter, the NSPS would only apply if there is an increase in emissions of a pollutant to which the standard applies. The NSPS for gas turbines applies only to NO_x and SO₂ emissions. Since the conversion from middle distillate fuel to natural gas for the turbines in question will cause a decrease in NO_x and SO₂ emissions, it is not considered a modification as defined in 40 CFR 60.14(a). The turbines however, could be subject to the NSPS if the conversion falls under the definition of reconstruction (See 40 CFR 60.15).

PSD review would apply to a proposed modification at an existing major stationary source if it would cause a significant net increase in actual emissions of any regulated pollutant. In the case of the gas turbine conversions outlined in your letter, PSD applicability is determined by evaluating any change in emissions rates caused by the conversions. The data contained in your letter indicate that the emission rates after the conversion will either remain constant or decrease. Actual emissions could increase only if there is an increase in the production rate or hours of operation, both of which are specifically exempt from PSD review. (See 40 CFR 52.21(b) (2) (iii) (f)). Therefore, since there will not be any increase in emission rates or any creditable increases in actual emissions, the conversion of the gas turbines will not be subject to PSD review.

If you have any questions concerning this determination please contact Janet Farella of my staff at 202-755-2564.

Sincerely yours,

Edward E. Reich, Director
Division of Stationary
Source Enforcement

cc: Peter Wyckoff
Mike Trutna

GENERAL ELECTRIC

GAS TURBINE DIVISION

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Copy: Don R. Goodwin, EPA
Research Triangle Park,
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May 19, 1981

Mr. Edward Reich, Director
Division of Stationary Source Enforcement
Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Dear Mr. Reich:

Stationary Gas Turbines Converting from Distillate to Natural Gas

The Economic Regulatory Administration of the Department of Energy grants temporary public interest exemptions, from the prohibitions of the Fuel Use Act of 1978, to burn natural gas where such use displaces the use of middle distillates, thereby decreasing our reliance on imported oil.

Existing gas turbines, which do not have built-in dual fuel capability, install new combustion hardware so that they can burn natural gas instead of middle distillates. The concern arises whether such a conversion would be classified a "modification" or "major modification" and, therefore, subject the gas turbine to the New Source Performance Standards (NSPS) or a Prevention of Significant Deterioration (PSD) review.

MODIFIED

The definition of modification is provided in 40 CFR 60 as:

- | | |
|-----------|--|
| 60.14 (a) | "Except as provided under paragraphs (e) and (f) of this section, any physical or operational change to any existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of Section III of the Act |
| 60.2 | " 'Standard' means a standard of performance proposed or promulgated under this part." |

NEW SOURCE PERFORMANCE STANDARDS (NSPS)

Hydrocarbons, carbon monoxide and particulates are specifically excluded from the NSPS promulgated on Sept. 10, 1979. Justification for the exclusion was provided in the Oct 3, 1977 Federal Register on page 53783.

"HC and CO emissions from stationary gas turbines operating at peak load are relatively low because the higher the percentage of peak load at which a turbine operates, the more efficient the combustion of the fuel. Gas turbines normally operate at 80 to 100 percent of peak load with HC emissions averaging less than 50 ppm and CO emissions averaging less than 500 ppm at 15 percent oxygen. HC and CO emissions from stationary gas turbines, therefore, were not selected for control by standards of performance."

"Particulate emissions from stationary gas turbines depend on the ash content of the fuel and are minimal. Consequently, particulate emissions from stationary gas turbines were not selected for control by standards of performance."

Since there is no standard for CO, unburned hydrocarbons and particulates under NSPS for stationary gas turbines, NSPS would not apply even if there was an increase in the emission rate of these three pollutants. As shown in the attached four tables, NO_x and SO₂ decrease, and CO, unburned hydrocarbons and particulates remain unchanged or decrease.

PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

PSD review would apply if the emissions increase by amounts greater than de minimis levels. De minimis levels, shown on page 52709 in the August 7, 1980 Federal Register, are:

Tons/Year Equivalent lbs/hour (8760 hours/year)		
Carbon Monoxide	100	22.83
Nitrogen Oxides	40	9.13
Sulfur Dioxide	40	9.13
Particulates	25	5.70
Volatile Organic Compounds	40	9.13

For those machines which are not restricted to a specific number of hours of operation per year by an enforceable permit condition, allowable emissions would be the hourly emission rate multiplied by 8760 hours per year. Then, for PSD review purposes, net emissions increases should be evaluated against these allowable emissions to see if de minimis levels are exceeded.

PSD (cont'd)

As can be seen from the attached four tables which provide uncontrolled emission rates for four GE gas turbines, the hourly emissions rates decrease for NO_x and SO₂ and remain unchanged or decrease for CO, unburned hydrocarbons and particulates when the fuel is switched from distillate to natural gas.

Therefore, these four gas turbine models would not require a PSD review when the capability to burn natural gas is added and the fuel is switched from distillate to natural gas, and "allowable" emissions, as opposed actual emissions, are not exceeded on an annual basis.

Your official concurrence with our interpretation is requested at your earliest convenience.

Sincerely,

A.S Gill, Environmental/Regulatory Planner

/eb Attach.

GENERAL ELECTRIC

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FUEL -----> LOAD ----->		<u>Natural Gas</u>		<u>Distillate</u>	
		<u>Base</u>	<u>Peak</u>	<u>Base</u>	<u>Peak</u>
Output,	kw	74,400	80,500	72,900	78,800
Heat Rate (LHV),	Btu/kwh	10,690	10,640	10,790	10,750
Fuel Consump. (LHV) 10,000,000 Btu/hr		795.30	856.50	786.60	847.10
NOx as NO2	lbs/hr	450	535	790	970
*SOx as SO2	lbs/hr	0	0	254	275
Particulates	lbs/hr	<28	<30	28	30
Hydrocarbons, (as CH4),	lbs/hr	<12	<12	12	12
C0,	lbs/hr	<21	<21	21	21

*Distillate Fuel with 0.3% Sulfur by Weight, Natural Gas Fuel Containing no Sulfur.

The results are based on field and combustion laboratory test data from the same or similar machines and combustion systems, correlated to provide a coherent body of emissions data. The data presented are for operation at ISO conditions.

GENERAL ELECTRIC

FUEL -----> LOAD ----->	<u>NATURAL GAS</u>		<u>DISTILLATE</u>	
	<u>BASE</u>	<u>PEAK</u>	<u>BASE</u>	<u>PEAK</u>
Output, kW	61,300	67,700	60,000	66,300
Heat Rate (LHV), Btu/kWh	11,000	10,920	11,130	11,030
Fuel Consump.(LHV) 1,000,000 Btu/hr	674.3	739.3	667.8	731.3
NOx as NO2, lbs/hr	325	405	510	640
*Sox as SO2, lbs/hr	0	0	216	237
Particulates, lbs/hr	< 24	< 26	24	26
Hydrocarbons, (as CH4), lbs/hr	< 11	< 11	11	11
CO, lbs/hr	< 19	< 19	19	19

*Distillate Fuel with 0.3% Sulfur by Weight, Natural Gas Fuel Containing no Sulfur.

The results are based on field and combustion laboratory test data from the same or similar machines and combustion systems, correlated to provide a coherent body of emissions data. The data presented are for operation at ISO conditions.

FUEL -----> LOAD ----->		<u>NATURAL GAS</u>		<u>DISTILLATE</u>	
		<u>BASE</u>	<u>PEAK</u>	<u>BASE</u>	<u>PEAK</u>
Output,	kW	31,750	34,750	31,100	34,000
Heat Rate (LHV),	Btu/kWh	11,280	11,210	11,380	11,310
Fuel Consump.(LHV) 1,000,000 Btu/hr		358.1	389.5	353.9	384.5
Nox as NO2,	lbs/hr	185	220	325	385
Sox as SO2,	lbs/hr	0	0	115	125
Particulates,	lbs/hr	< 13	< 14	13	14
Hydrocarbons, (as CH4),	lbs/hr	< 6	< 6	6	6
CO,	lbs/hr	<11	< 11	11	11

*Distillate Fuel with 0.3% Sulfur by Weight, Natural Gas Fuel Containing no Sulfur.

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GENERAL ELECTRIC

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FUEL -----> LOAD ----->		<u>NATURAL GAS</u>		<u>DISTILLATE</u>	
		<u>BASE</u>	<u>PEAK</u>	<u>BASE</u>	<u>PEAK</u>
Output,	kW	24,620	26,600	24,110	26,050
Heat Rate (LHV),	Btu/kWh	12,300	12,200	12,450	12,340
Fuel Consump.(LHV) 1,000,000 Btu/hr		302.8	324.5	300.2	321.5
Nox as NO ₂ ,	lbs/hr	140	155	200	225
Sox as SO ₂ ,	lbs/hr	0	0	97	104
Particulates,	lbs/hr	< 11	< 11	11	11
Hydrocarbons, (as CH ₄),	lbs/hr	< 5	< 5	5	5
CO,	lbs/hr	< 10	< 10	10	10

* Distillate Fuel with 0.3% Sulfur by Weight, Natural Gas Fuel Containing no Sulfur.

The results are based on field and combustion laboratory test data from the same or similar machines and combustion systems, correlated to provide a coherent body of emissions data. The data presented are for operation at ISO conditions.