Title V

Model General Permit Template

SERIES 14 BOILERS, STEAM GENERATORS, AND PROCESS HEATERS

Template # SJV-BSG-14-1

steam generators in the Kern County oil fields with an ATC or PTO issued prior to September 12,1979

15 MMBtu/hr < maximum design heat input rating ≤ 100 MMBtu/hr

fired on liquid fuel, gaseous fuel, and/or a combination of liquid and gaseous fuels

currently in compliance with District Rule 4351, 5.2.2 NO_x emission limits

no construction, modification, or reconstruction commenced after June 9, 1989

This template is designed to streamline the Title V permitting process for boilers, steam generators, and process heaters meeting the above qualifications. Applicants for Title V permits choosing to use this template must complete the enclosed template qualification form and submit it with their Title V application.

San Joaquin Valley Unified Air Pollution Control District

FINAL
Title V Model General Permit Template
Series 14 Boilers, Steam Generators, and Process Heaters

Template No: SJV-BSG-14-1

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FINAL DECISION DATE: _____

SAN JOAQUIN VALLEY
UNIFIED AIR POLLUTION CONTROL DISTRICT

TITLE V GENERAL PERMIT TEMPLATE SJV-BSG-14-1

ENGINEERING EVALUATION

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Template SJV-BSG-14-1

I. Purpose

The purpose of this template is to streamline the Title V permitting process by identifying the federally applicable requirements for certain boilers, steam generators and process heaters and to establish permit conditions which will ensure compliance with such requirements. These conditions will be incorporated into the Title V permit of any facility choosing to make use of the template.

II. Template Applicability

The template applies to boilers and process heaters which:

Are steam generators located in a Kern County oil field for which an ATC or PTO was issued prior to September 12, 1979, and

Were not constructed, modified, or reconstructed (see Appendix D) after June 9, 1989, and

Have a maximum design heat input rating greater than 15 MMBtu/hr, but less than or equal to 100 MMBtu/hr, and

Are currently in compliance with District Rule 4351, 5.2.2 NO_x emission requirements.

The applicability of this template is determined by completion of the Template Qualification Form (TQF) attached as Appendix G. The completed and signed TQF must be submitted with the Title V application.

III. Applicable Requirements

Units may be subject to "federally enforceable " requirements as well as requirements that are enforceable by the "District-only." Federally enforceable requirements will be enforceable by the EPA, the District, and the public through Title V permit conditions identified as federally enforceable. District-only requirements represent local or state regulations for which the EPA has no direct enforcement authority. The final Title V permits issued by the District will contain both federally enforceable and District-only requirements.

District-only requirements are not addressed in this template except for those used in streamlining of multiple requirements (see discussion in section IV). District-only requirements used in streamlining of multiple requirements will become federally enforceable. Table 1, Applicable Requirements, does not necessarily include all federally enforceable requirements that apply to boilers, steam generators, and process heaters qualifying to use this template, and it is the source's responsibility to

determine any and all applicable requirements to which the source is subject. Generally, requirements not addressed by this template are those that require a source-specific analysis, or are covered by other templates.

Table 1. Applicable Requirements

Rule Category	Rule/Regulation	Citation	Description
A	County Rule	108.1[1]	Source Sampling
A	County Rule	407[2]	Sulfur Compounds
A	County Rule	407.2[3]	Fuel Burning Equipment- Combustion Contaminants
A	County Rule	408.2[4]	Fuel Burning Equipment- Combustion Contaminants
A	County Rule	424[5]	Sulfur Compounds From Oil Field Steam Generators
A	SJVUAPCD Reg. II	2520, 9.3.2, 9.4.2, 13.2	Monitoring Requirements, Recordkeeping Requirements, and Permit Shields
A	SJVUAPCD Reg. IV	4201[6]	Particulate Matter Concentration
A	SJVUAPCD Reg. IV	4301[6]	Fuel Burning Equipment
A	SJVUAPCD Reg. IV	4305 Sec. 4.2, 5.1, 5.5.1, 5.5.2, 6.1.1, 6.2 (excepting 6.2.3[7]), 6.3.1, 6.3.2, 8.1	Boilers, Steam Generators, and Process Heaters
A	SJVUAPCD Reg. IV	4351 Sec 4.2, 5.2.2, 6.1.1, 6.2 (excepting 6.2.3[9]), 8.1	Boilers, Steam Generators, and Process Heaters - Reasonably Available Control Technology
B	SJVUAPCD Reg. II	2201	New Source Review Rule
B	SJVUAPCD Reg. II	2520[8]	Federally Mandated Operating Permits
B	SJVUAPCD Reg. IV	4101[9]	Visible Emissions
B	SJVUAPCD Reg. IV	4305 Sec. 5.4, 9.6	Monitoring and Alternate Emission Control Plan Requirements
B	FCAA Title IV	40 CFR Part 64	Compliance Assurance Monitoring (CAM)
C	New Source Performance Stds. Subpart Dc	40 CFR 60.40c	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units
C	FCAA Title IV	40 CFR 72.6 (b)	Acid Rain Provisions
D	SJVUAPCD Reg. I	1081	Source Sampling

Category “A” rules contain requirements that are directly applicable to the qualifying units; compliance with these applicable requirements will be demonstrated in this

[1] Fresno, Merced, San Joaquin, Tulare, Kern, and Stanislaus
[2] Kern, Tulare, Kings, Stanislaus, Merced, and San Joaquin
[3] Kern, Kings, San Joaquin, Stanislaus, and Tulare.
[4] Merced.
[5] Kern
[6] EPA issued a relative stringency finding, dated August 20,1996, stating District Rules 4201 and 4301 are more stringent than SIP approved County Rules 404 (Fresno, Kern, Kings, Merced, San Joaquin, Stanislaus, and Tulare), 404.1 (Kern), and 402 (Madera); and 405 (Madera) and 408 (Fresno, Kern, Kings, Merced, San Joaquin, Stanislaus, and Tulare), respectively.
[7] CO requirements not federally enforceable until the rule is approved into the SIP
[8] Other than category A requirements
[9] Portions of this rule are addressed in the facility-wide template SJV-UM-0-2

engineering evaluation and assured by the template permit conditions. In section IV, Compliance, the federally-enforceable requirements from category "A" rules are listed with a discussion of how compliance with these requirements is achieved.

Category "B" rules contain federally enforceable requirements (aside from those listed as category A) that were not addressed in this template. These may not be all of the federally enforceable requirements for this unit. Requirements from these rules must be addressed by the applicant outside of this template within the Title V application Compliance Plan form (TVFORM-004). Category "B" listing is included in this table as an informational item to assist applicants in this effort.

Category "C" rules contain requirements which have been determined not to be applicable to qualifying units. A permit shield is proposed for the category "C" rules. An explanation of the determination of non-applicability of category "C" rules is included in section V, Permit Shield.

Category "D" rules are District rules which are used to show compliance with federally enforceable requirements, and therefore some requirements from these rules will become federally enforceable through the use of this template.

There are no general conditions in this template are applicable which to all units equipped with scrubbers. Consequently , District Permit to Operate conditions ensuring scrubber control efficiency must be addressed in the Title V application outside of this template.

IV. Compliance

This section contains a discussion of how compliance is assured with each requirement addressed in this template.

District Rule 1081

District Rule 1081 has been submitted to the EPA to replace each of the county rules in the SIP: Rule 108 (Kings), 108.1 (Fresno, Merced, San Joaquin, Tulare, Kern and Stanislaus), and 110 (Madera). Appendix F lists all of the applicable requirements of District Rule 1081 and shows which are included in the rule from each county. This table shows that District Rule 1081 is more stringent than each of the county rules.

Sections 3.0, 4.0, 5.0, 6.0, and 7.0 set forth requirements for sampling facilities, collection of samples, test methods, test procedures, and administrative requirements, respectively. These requirements are covered by template permit condition #1.

District Rule 2520, 9.3.2 and 9.4.2

Section 9.3.2 requires that periodic monitoring be performed if none is associated with a given emission limit to assure compliance. Periodic monitoring consisting of

testing/sampling is supported by template permit conditions #2, #6, #8–13, #16–19, and #21.

Section 9.4.2 requires all records be maintained for at least five years. Template permit condition #3 will assure that all records be maintained for at least five years.

District Rules 4201, 3.1 and 4301, 5.1 & 5.2.3

These rules contain limits on emissions of particulate matter (PM). The following analysis shows that the proposed template PM requirements are as stringent as District Rules 4301 and 4201. Streamlining procedures, as documented in the following steps, are used to substitute the proposed set of requirements for the otherwise applicable requirements.

Step 1. Side-by-side Comparison of Applicable Requirements:

PM			
CITATION:	**District Rule 4201**	**District Rule 4301**	**Proposed Requirements**
WORK PRACTICE STANDARDS:	•None	•None	•None
EMISSION LIMIT:	•0.1 grain/cf, at dry standard conditions [4201, 3.1]	•0.1 grain/cf, calculated to 12% CO_2 at dry standard conditions [4301, 5.1] •10 lb/hr [4301, 5.2.3]	•0.1 grain/dscf [4201, 3.1] •0.1 grain/cf, calculated to 12% CO_2 at dry standard conditions [4301, 5.1] •10 lb/hr [4301, 5.2.3]
MONITORING:	•None	•None	•source testing when firing on residual oil (including crude oil) within 60 days of said firing [2520, 9.4.2]
RECORDKEEPING:	•None	•None	•record daily amount of all fuels combusted, the dates on which firing on any fuel other than certified gaseous or diesel fuel has occurred, as well as the type of non-certified fuel fired [2520, 9.4.2]
REPORTING:	•None	•None	•None
TEST METHODS:	•Particulate matter concentration - EPA Method 5 [4201, 4.1] •Stack gas velocity - EPA Method 2 [4201, 4.2] •Stack gas moisture - EPA Method 4 [4201, 4.3]	•Particulate matter concentration - EPA Method 5 [4301, 5.1] •Stack gas velocity - EPA Method 2 [4301, 5.5] •Stack gas moisture - EPA Method 4 [4301, 5.6]	•Particulate matter concentration - EPA Method 5 (note EPA Methods 2 and 4 are referenced within Method 5) [4301, 5.1 and 4201, 4.1]

Step 2. Select most stringent emission limit or performance standard:

The proposed PM emission limits of:

0.1 grain/dscf of gas calculated to 12% carbon dioxide, and

0.1 grain/dscf of gas, and

10 lb/hr

are at least as stringent as those imposed by District Rules 4201 and 4301 as demonstrated below:

Compliance with PM Limit - District Rule 4301, 5.1:

This rule requires PM emissions to be limited to the following:

0.1 grain per cubic foot of gas calculated to 12% carbon dioxide at dry standard conditions and

10 lb/hr

The proposed conditions include these requirements and are therefore at least as stringent as District Rule 4301.

Compliance with PM Limit - District Rule 4201:

This rule requires PM emissions to be limited to the following:

0.1 grain per cubic foot of gas at dry standard conditions

The excess air in the exhaust of units qualifying to use this template ranges from 0 to 4%, when calculated at 12% carbon dioxide (see Appendix B). Since maximum particulate emissions occur at 0% excess air, which may occur at operating CO_2 levels and dry standard conditions, the above limit is also included as a condition of this template. The proposed limits are at least as stringent as the requirements of this rule.

Step 3. Conditions ensuring compliance with applicable requirements

An excess air concentration of 0% in the exhaust results in the maximum particulate matter concentration for any given emission rate. Therefore, the following calculations use an uncorrected F factor to represent worst-case emissions. Calculations determining the excess air concentrations for 12% CO_2 are shown in Appendix B.

GASEOUS FUEL FIRED UNITS

The following calculations, using AP-42 emission factors for natural gas, demonstrate that the emission of PM during the firing of gaseous fuels complies with the limits of these rules.

$$\left(\frac{7.6\,lb\ \text{PM}}{10^6\,cf}\right)\left(\frac{1\,scf}{1020\,Btu}\right)\left(\frac{100\,MMBtu}{hr}\right)\left(\frac{10^6\,\text{btu}}{\text{MMbtu}}\right)=\left(\frac{0.75lb\ PM}{hr}\right)<\left(\frac{10lb\ PM}{hr}\right)$$

$$\left(\frac{7.6\,lb\ \text{PM}}{10^6\ ft^3}\right)\left(\frac{1\,scf}{1020\,Btu}\right)\left(\frac{1\,MMBtu}{8710\,dscf}\right)\left(\frac{7000\,grain}{1\,lb}\right)\left(\frac{10^6\ \text{btu}}{\text{MMbtu}}\right)=\left(\frac{0.006\,grain}{dscf}\right)<\left(\frac{0.1\,grain}{dscf}\right)$$

where:

$7.6\frac{lbPM}{10^6\,cf}$ = sum of filterable and condensable uncontrolled emission factors for natural gas-fired boilers (AP-42, Table 1.4-2)

$\frac{1020\,Btu}{1\,scf}$ = the minimum expected higher heating value of natural gas (AP-42, Table 1.4.1)

$\frac{100\ MMBtu}{hr}$ = maximum heat input this template

$\frac{8710\,dscf}{1\ MMBtu}$ = F factor, Fd, for natural gas at 0% O_2 (40CFR60, App. A, Table 19-1)

$\frac{7000\,grain}{1\,lb}$ = conversion factor (AP-42, Appendix A)

The only constituents found in non-regulated gas streams that contribute to the formation of PM are sulfur and, occasionally, trace amounts of metals. Any metals present in the gas stream are removed during the free water knock-out stage in the condenser at the compressor. The results of source tests on units operating on combined waste gas and natural gas show PM levels far below allowable levels (actual source tests are on file with the District). Based on these source test results and the preceding compliance analysis, compliance with applicable PM limits is assured without the need for PM testing.

DIESEL FUEL OIL UNITS

For diesel fired units, the 12% CO_2 correction required by District Rule 4301 in the exhaust stream occurs at 4% O_2. A more conservative analysis is obtained by calculating emissions at 0% O_2 and thus, the following compliance analysis uses F-factors uncorrected from 0% O_2.

$$\left(\frac{1.3lb\ PM}{10^3\ gal}\right)\left(\frac{1\,gal}{137{,}000\,Btu}\right)\left(\frac{100\,MMBtu}{hr}\right)\left(\frac{10^6\ \text{btu}}{\text{MMbtu}}\right)=0.9\frac{lbPM}{hr}<10\frac{lbPM}{hr}$$

$$\left(\frac{1.3lb\ \text{PM}}{10^3\ gal}\right)\left(\frac{1\,gal}{137{,}000\,Btu}\right)\left(\frac{1\,MMBtu}{9190\,dscf}\right)\left(\frac{10^6\,btu}{MMbtu}\right)\left(\frac{7000\ gr}{1\,lb}\right)=\left(\frac{0.007\ grain}{dscf}\right)<\left(\frac{0.1\,grain}{dscf}\right)$$

where:

$\frac{1.3lb\ \text{PM}}{10^3\ gal}$ = the emission factor for filterable PM, No. 2 fuel oil, (AP-42, Table 1.3-2)

$\frac{137{,}000\ Btu}{1\ gal\ diesel}$ = heating value (AP-42, Appendix A)

$\frac{9190\ dscf}{MMBtu}$ = F factor, F_d, for oil (40CFR60, App. A, Meth. 19, Table 19-1)

The preceding calculations demonstrate that the emissions of PM are expected to be well below applicable limits. Compliance with these limits is expected for even the largest units covered by this template and, therefore, no testing, recordkeeping, reporting, or monitoring will be required for these units.

RESIDUAL OIL FIRED (INCLUDING CRUDE OR TOPPED CRUDE)

Compliance with PM limits will be assured by template permit conditions that require source testing when firing on residual oil (including crude or topped-crude). The operator is required to record daily amount of all fuels combusted, the dates on which firing on any fuel other than certified gaseous or diesel fuel has occurred by permit condition #2, as well as the type of non-certified fuel fired. If a unit is fired on residual oil at any time during a calendar year, the operator is required by template permit condition #5 to show compliance with the PM emission limits by source testing the unit during such firing and within 60 days of said firing.

Step 4. Certify compliance

By using this template as part of the Title V application, the applicant is certifying compliance with all conditions required as part of the template.

Step 5. Compliance schedule for new monitoring requirements

Not applicable.

Step 6. Request for permit shield

By using this template the applicant is requesting a permit shield from the requirements of District Rules 4201 and 4301. See template permit condition #24.

District Rule 4301, 5.2.1

Rule 4301 limits emissions of sulfur compounds to 200 lb per hr, calculated as SO_2. Assuming that all sulfur compounds are converted to SO_2, this is equivalent to 100 lb of elemental sulfur per hour (see Appendix E). Operators have the option of complying with this emission limit by using certified fuels, by complying with fuel sulfur content limits, or by source testing the emission unit in combination with fuel analysis.

USING PUC OR FERC CERTIFIED NATURAL GAS

PUC regulated natural gas has a maximum sulfur content of 0.017% by weight [Public Utilities Code General Order 58-B]. FERC gas has an even lower sulfur content (~ 0.0026%, see Appendix C). The maximum sulfur concentration allowed under Rule 4301 for units subject to this template will be:

$$\frac{\left(100\frac{lb\ S}{hr}\right)\left(\frac{453.59\ g\ CH_4}{lb\ CH_4}\right)\left(\frac{23.7\ L\ CH_4}{gmol\ CH_4}\right)\left(\frac{0.00105\ MMBtu}{scf\ CH_4}\right)}{\left(\frac{16.04\ g\ CH_4}{gmol\ CH_4}\right)\left(\frac{28.317\ L\ CH_4}{scf\ CH_4}\right)\left(\frac{100\ MMBtu}{hr}\right)} = \left(\frac{0.025\ lb\ S}{lb\ CH_4}\right) \approx 2.5\%$$

where:

$100\frac{lb\ S}{hr} = 200\frac{lb\ SO_2}{hr}$ = emission limit (see Appendix D)

$\frac{453.59\ g\ CH_4}{lb\ CH_4}$ = conversion factor (AP-42, Appendix A)

$23.7\frac{L}{gmol} = \frac{(288.71K)\left(22.4\frac{L}{gmol}\right)}{273.15K}$ = molar volume of an ideal gas corrected to standard conditions (60° F, 14.7 psi) per Charles' Law

$\frac{0.00105\ MMBtu}{scf\ CH_4}$ = heating value for natural gas (AP-42, Appendix A)

$\frac{16.04\ g\ CH_4}{gmol\ CH_4}$ = molecular weight of gaseous fuel

$\frac{28.317\ L\ CH_4}{scf\ CH_4}$ = conversion factor (AP-42, Appendix A)

$100\frac{MMBtu}{hr}$ = maximum heat input allowed by this template

The preceding calculation shows that an emission rate of 200 lb SO_2/hr corresponds to 2.5% by weight sulfur content. Since the maximum sulfur content of PUC or FERC regulated natural gas is far below this limit (0.017%), units using PUC or FERC regulated natural gas will comply with this requirement.

USING CERTIFIED DIESEL FUEL

Diesel-fired units qualifying to use this template are limited to the combustion of distillate fuel with a sulfur content less than 0.5%. The following demonstration illustrates, by solving for fuel sulfur content at the Rule 4301 emission limit, that the proposed limitation is more stringent than District Rule 4301, 5.2.1.

$$\frac{\left(100\frac{lb\cdot S}{hr}\right)\left(\frac{0.137\ MMBtu}{1\ gallon\ fuel\ oil}\right)}{\left(\frac{7.05\ lb\ fuel\ oil}{1\ gallon\ fuel\ oil}\right)\left(100\frac{MMBtu}{hr}\right)} = \frac{0.019\ \ lb\ S}{lb\ fuel\ oil} \cong 2\%\ weight\ sulfur\ content$$

where:

$\left(100\frac{lb\cdot S}{hr}\right) = \left(200\frac{lb\cdot SO_2}{hr}\right)$ = District Rule 4301, 5.2.1 emission limit (see Appendix F)

$\left(\frac{7.05\ lb\ fuel\ oil}{1\ gallon\ fuel\ oil}\right)$ the density of distillate oil (AP-42 Appendix A)

$\left(100\frac{MMBtu}{hr}\right)$ = maximum rated heat input for this template

$\left(\frac{0.137\ MMBtu}{1\ gallon\ fuel\ oil}\right)$ = higher heating value of distillate oil (AP-42 Appendix A)

The preceding analysis shows that the allowable fuel sulfur content at District Rule 4301 maximum emission limit and at the maximum heat input of this template, is 2% weight sulfur content. This demonstrates that the proposed fuel sulfur limit, 0.5% by weight sulfur content, is clearly more stringent.

USING NONCERTIFIED FUELS

If the operator chooses to demonstrate compliance by fuel analysis of noncertified fuels, compliance shall be determined by multiplying the sulfur content of the fuel in lb/MMBtu by the maximum hourly heat input rating of the unit in MMBtu/hr, and comparing the result to the 100 lb sulfur per hour limit. Alternatively the operator may choose to source test to determine control efficiency and perform routine fuel analysis to determine uncontrolled emissions.

Compliance with this requirement is assured by conditions #8 - #13.

<u>County Rules 404 (Madera), 406 (Fresno), and 407 (Kern, Tulare, Kings, Stanislaus, Merced, and San Joaquin)</u>

County Rules 404, 406, and 407 limit the emission of sulfur compounds to 0.2% by volume (2000 ppmv) calculated as SO_2, on a dry basis averaged over 15 minutes. Operators have the option of complying with this emission limit by using certified fuels, by complying with fuel sulfur content limits, or by source testing the emission unit.

USING PUC OR FERC CERTIFIED NATURAL GAS

PUC regulated natural gas has a maximum sulfur content of 0.017% by weight [Public Utilities Code General Order 58-B]. FERC regulated gas has a lower maximum sulfur content (~ 0.0026%, see Appendix C). Assuming that 0% excess air in the exhaust stream corresponds with maximum SO_x emissions concentration (neglecting NO_x and SO_x relative to SO_2 in the exhaust) and that CH_4 represents a typical gaseous fuel, the combustion equation is:

$$CH_4 + 2O_2 + 7.56N_2 + YS \rightarrow CO_2 + 2\ H_2O + YSO_2 + 7.56N_2$$

where:

Y = moles of sulfur in the fuel.

Solving an expression for the fraction of SO_2 in the dry exhaust by volume gives:

$$\frac{Y}{1 + 7.56} = 0.002 \Rightarrow Y = 0.01712$$

where:
Y = mole fraction of S per mole of CH_4 combusted
1 = one mole of CO_2
7.56 = number of moles of N_2
0.002 = 0.2% by volume = 2000 ppmv limit per County Rule 407

Use Y to calculate the weight fraction of S in one mole of CH_4:

$$\frac{(0.01712)(32.06)}{(16.04) + (0.01712)(32.06)} = 0.033 \Rightarrow 3.3\%\ \text{S by weight in the fuel.}$$

where:
32.06 = molecular weight of sulfur (S)
16.04 = molecular weight of methane (CH_4)
0.033 = fraction of S by weight in the fuel

The preceding calculation shows that an exhaust concentration of 0.2% by volume corresponds to a gaseous fuel sulfur content by weight of 3.3%. Therefore, the use of PUC or FERC regulated gas with a maximum sulfur content of 0.017% will assure compliance with this requirement.

USING CERTIFIED DIESEL FUEL

Diesel -fired units qualifying to use this template are limited to the combustion of distillate fuel with a sulfur content less than 0.5%. The following demonstration illustrates that the proposed limitation is more stringent than the county rules.

$$\frac{\left(\frac{142\ (0.5)\ lb\ SO_x}{10^3\ gal\ diesel}\right)\left(\frac{23.7\ L\ SO_2}{gmol\ SO_2}\right)\left(\frac{0.035315\ dscf\ SO_2}{L\ SO_2}\right)\left(\frac{453.59\ g\ SO_2}{lb\ SO_2}\right)}{\left(\frac{9190\ dscf\ exhaust}{MMBtu}\right)\left(\frac{64.14\ g\ SO_2}{gmol\ SO_2}\right)\left(\frac{137\ MMBtu}{10^3\ gal\ diesel}\right)} = \left(\frac{0.0003\ dscf\ SO_2}{dscf\ exhaust}\right) < \left(\frac{0.002\ dscf\ SO_2}{dscf\ exhaust}\right)$$

where:

$S \equiv$ weight % of sulfur in the oil = 0.5 = fuel sulfur limit this template

$\frac{142\ S\ lb\ SO_2}{10^3\ gal} =$ uncontrolled emission factor for SO_2 (AP-42, Table 1.3-2)

$23.7\frac{L}{gmol} = \frac{(288.71K)\left(22.4\frac{L}{gmol}\right)}{273.15K} =$ molar volume of an ideal gas corrected to District standard conditions (60° F, 14.7 psi) per Charles' Law

$0.035315\frac{ft^3}{L} =$ conversion factor (AP-42, Appendix A)

$453.59\frac{g}{lb} =$ conversion factor (AP-42, Appendix A)

$9190\frac{dscf}{MMBtu} =$ F-factor, F_d, for oil (40 CFR § 60, App. A, Meth. 19, Table 19-1)

$64.14\frac{g \cdot SO_2}{gmol} =$ molecular weight, SO_2

$\frac{137{,}000\ Btu}{1\ gal\ diesel} =$ higher heating value of distillate oil (AP-42, Appendix A)

$0.002\frac{parts \cdot SO_2}{parts \cdot exhaust} =$ County Rules 404, 406, and 407 emission limit

The preceding calculation shows that, for diesel fired units, an emission concentration of 0.03% by volume is expected; this concentration is 16.7% of that allowed by the rule.

USING NON-CERTIFIED GASEOUS FUELS

The limit determined above for gaseous fuels is 3.3 weight percent sulfur. This value is conservative for field gas which frequently has a lower heating value and higher exhaust volume flow rate than pure methane. Operators may choose to comply with this fuel sulfur limit by fuel testing using grab sample analysis by GC-FPD/TCD performed in the laboratory. Fuel sulfur content testing shall be performed weekly except that if compliance has been demonstrated for eight consecutive weeks, then the testing frequency shall be semi-annual. In all cases, operator shall record dates on which the unit is fired on non-certified fuel. Compliance is assured by permit conditions #3, #9, and #11.

USING NON-CERTIFIED LIQUID FUELS (RESIDUAL OR CRUDE OIL)

$$\frac{\left(\frac{157\,(\mathrm{S})\ lb\ SO_x}{10^3\ gal\ oil}\right)\left(\frac{23.7\ L\ SO_2}{gmol\ SO_2}\right)\left(\frac{0.035315\ dscf\ SO_2}{L\ SO_2}\right)\left(\frac{453.59\ g\ SO_2}{lb\ SO_2}\right)}{\left(\frac{9190\ dscf\ exhaust}{MMBtu}\right)\left(\frac{64.14\ g\ SO_2}{gmol\ SO_2}\right)\left(\frac{150\ MMBtu}{10^3\ gal\ oil}\right)} = \left(\frac{0.002\ dscf\ SO_2}{dscf\ exhaust}\right)$$

where:

$S \equiv$ weight % of sulfur in the oil

$\frac{157\,(\mathrm{S})\ lb\ SO_2}{10^3\ gal} =$ uncontrolled emission factor for SO_2 (AP-42, Table 1.3-2)

$23.7\frac{L}{gmol} = \frac{(288.71K)\left(22.4\frac{L}{gmol}\right)}{273.15K} =$ molar volume of an ideal gas corrected to District standard conditions (60° F, 14.7 psi) per Charles' Law

$0.035315\frac{ft^3}{L} =$ conversion factor (AP-42, Appendix A)

$453.59\frac{g}{lb} =$ conversion factor (AP-42, Appendix A)

$9190\frac{dscf}{MMBtu} =$ F-factor, F_d, for oil (40 CFR § 60, App. A, Meth. 19, Table 19-1)

$64.14\frac{g \cdot SO_2}{gmol} =$ molecular weight, SO_2

$\frac{150{,}000\ Btu}{1\ gal\ diesel} =$ heating value of residual oil (AP-42, Appendix A)

$0.002\frac{parts \cdot SO_2}{parts \cdot exhaust} =$ County Rules 404, 406, and 407 emission limit

The preceding calculation shows that an exhaust concentration of 0.2% by volume corresponds to a fuel sulfur content by weight of 3.0%. Fuel sulfur content testing shall be performed weekly except that if compliance has been demonstrated for eight consecutive weeks, then the testing frequency shall be semi-annual. In all cases, operator shall record dates that the unit is fired on non-certified fuel.

Compliance with this requirement is assured by the conditions #3, and #10 - #12.

Kern County Rule 424

Kern County Rule 424 limits sulfur emissions to 0.11 lb sulfur per million BTUs of heat input. For PUC regulated natural gas the maximum sulfur content is 0.0068 lb sulfur per million BTU (assuming a higher heating value of 0.00105 MMBtu per standard cubic foot). For FERC regulated gas, the maximum sulfur content is even lower (0.00102 lb sulfur per million BTU). Therefore compliance is expected for these fuels.

In order to demonstrate compliance with this requirement for other fuels, the operator must determine the sulfur emissions and heat input from fuel certification, fuel testing, or source testing in combination with routine fuel analysis.

Section D of this rule allows the owner/operator of two or more boilers or steam generators at a single stationary source to show compliance by demonstrating the combined emissions from all units at a single stationary source does not exceed the total emissions from each unit that is operating in compliance with emission limits.

Compliance with these requirements shall be assured by condition #9 - #11 and #13.

District Rules 4301, 4305, and 4351

These rules contain limits on emission of oxides of nitrogen (NO_x). The following analysis shows that the proposed NO_x requirements are more stringent than District Rule 4301; as stringent as Rules 4305 and 4351 for units combusting either liquid or gaseous fuels; and more stringent than Rules 4305 and 4351 for units simultaneously combusting liquid and gaseous fuels. Streamlining procedures, as documented in the following steps, are used to substitute the proposed set of requirements for the otherwise applicable requirements.

Step 1. Side-by-side Comparison of Applicable Requirements:

NO_x				
CITATION:	**District Rule 4301**	**District Rule 4305**	**District Rule 4351**	**Proposed Requirements**
WORK PRACTICE STANDARDS:	•None	•None	•None	•None
EMISSION LIMIT:	•140 lb NO_X/hr [4301, 5.2.2]	•Gaseous fuel fired: 0.036 lb NO_X/MMBtu or 30 ppmv [4305, 5.1.1] •Liquid fuel fired: 0.052 lb NO_X/MMBtu or 40 ppmv [4305, 5.1.1] •Combination of fuels: heat input weighted average of limits [4305, 5.1.2]	<u>As of May 31, 1999</u> •Gaseous fuel fired: 0.036 lb NO_X/MMBtu or 30 ppmv [4305, 5.1.1] •Liquid fuel fired: 0.052 lb NO_X/MMBtu or 40 ppmv [4351, 5.2.2.2] <u>Until May 31, 1999</u> •Gaseous fuel fired: 0.061 lb NO_X/MMBtu or 52 ppmv [4305, 5.1.1] •Liquid fuel fired: 0.077 lb NO_X/MMBtu or 59 ppmv [4351, 5.2.4.1]Combination of fuels: liquid NO_x limit provided gaseous content < 55% [4351, 5.4]	•Gaseous fuel fired: 0.036 lb NO_X/MMBtu or 30 ppmv [4305, 5.1.1 and 4351, 5.2.2.1] •Liquid fuel fired: 0.052 lb NO_X/MMBtu or 40 ppmv [4305, 5.1.2 and 4351, 5.2.2.2] •Combination of fuels: lower NO_x limit of the 2 fuels being fired simultaneously [2520, 9.4.2]
MONITORING:	•None	•Monitor units that simultaneously fire combinations of different fuels with totalizing mass or volumetric flow rate meters. [4305, 5.4.1] •Source specific monitoring requirements [4305, 5.4.2 and 5.4.3]]	•Monitor units that simultaneously fire combinations of different fuels with totalizing mass or volumetric flow rate meters. [4351, 5.6.1]	•Monitor units that simultaneously fire combinations of different fuels with totalizing mass or volumetric flow rate meters. [4305, 5.3.1 and/or 4351, 5.6.1] •No additional proposed requirements for monitoring. These requirements will be met through the source specific Title V permits.
RECORDKEEPING:	•None	•Maintain records for two calendar years [4305, 6.1].	•Monitor and record the hhv and cumulative annual use of each fuel for each unit •Maintain records for two calendar years [4351, 6.1]	•Monitor and record the hhv and cumulative annual use of each fuel for each unit. [4351, 6.1] •Maintain records for five calendar years. [2520, 9.5.2]
REPORTING:	•None	•None	•None	•None

TEST METHODS:	•Oxides of nitrogen concentration - ARB Method 100. Stack gas velocity - EPA Method 2. [4301, 6.0]	•Fuel hhv shall be certified by third party fuel supplier or determined by: ASTM D 240-87 or D 2382-88 for liquid fuels or by ASTM D 1826-88 or D 1945-81 in conjunction with ASTM D 3588-89 for gaseous fuels. Oxides of nitrogen (ppmv) - EPA Method 7E, or ARB Method 100. Stack gas oxygen - EPA Method 3 or 3A, or ARB Method 100. NOx Emission Rate (Heat Input Basis) - EPA Method 19. [4305, 6.2] •May submit test results from individual units that represent a group of units provided conditions from 6.3.2 are met. [4305, 6.3.2]	•Fuel hhv shall be certified by third party fuel supplier or determined by: ASTM D 240-87 or D 2382-88 for liquid fuels or by ASTM D 1826-88 or D 1945-81 in conjunction with ASTM D 3588-89 for gaseous fuels. Oxides of nitrogen (ppmv) - EPA Method 7E, or ARB Method 100. Stack gas oxygen - EPA Method 3 or 3A, or ARB Method 100. NOx Emission Rate (Heat Input Basis) - EPA Method 19. [4351, 6.2] •May submit test results from individual units that are identical to a group of units, to demonstrate compliance. [6.3]	•Fuel hhv shall be certified by third party fuel supplier or determined by: ASTM D 240-87 or D 2382-88 for liquid fuels or by ASTM D 1826-88 or D 1945-81 in conjunction with ASTM D 3588-89 for gaseous fuels. Oxides of nitrogen (ppmv) - EPA Method 7E, or ARB Method 100. Stack gas oxygen - EPA Method 3 or 3A, or ARB Method 100. NOx Emission Rate (Heat Input Basis) - EPA Method 19. [4305, 6.2] •May submit test results from individual units that represent a group of units provided conditions from 6.3.2 are met. [4305, 6.3.2]

Step 2. Select most stringent emission limit or performance standard:

The proposed NO_x emission limits of:

0.036 lb NO_x/MMBtu or 30 ppmv (corrected to 3% O_2) for gaseous fuel fired boilers and steam generators, or

0.052 lb NO_x/MMBtu or 40 ppmv (corrected to 3% O_2) for liquid fuel fired boilers and steam generators, or

the lower NO_x limit of the two fuels being fired simultaneously for dual fired units

The following sections compare the proposed limitations with limitations imposed by District Rules 4301, 4305 and 4351 (all limits are converted to a common unit of measure of ppmv):

Compliance with NO_x limit-District Rule 4305:

This rule requires NO_x emissions to be limited to the following:

0.052 lb NO_x/MMBtu or 40 ppmv (corrected to 3% O_2) for liquid fuel fired boilers and steam generators, or

0.036 lb NO_x/MMBtu or 30 ppmv (corrected to 3% O_2) for gaseous fuel fired boilers and steam generators.

heat input weighted average of limits for boilers and steam generators fired on combination of fuels.

The limits for units fired on either liquid or gaseous fuels are the same as the proposed template limits. However, when a combination of these fuels is combusted simultaneously, the proposed limit is the lower NO_x limit of the 2 fuels being fired, which is more stringent than the Rule 4305 requirement of a weighted average of the 2 fuel limits.

Compliance with NO_x limit-District Rule 4351:

This rule requires NO_x emissions to be limited to the following:

0.052 lb NO_x/MMBtu or 40 ppmv (corrected to 3% O_2) for liquid fuel fired boilers and steam generators, or

0.036 lb NO_x/MMBtu or 30 ppmv (corrected to 3% O_2) for gaseous fuel fired boilers and steam generators, or

liquid NO_x limit, for boilers and steam generators fired on combination of fuels provided gaseous content less than 55%.

The limits for units fired on either liquid or gaseous fuels are the same as the proposed template limits. However, when a combination of these fuels is combusted simultaneously, the proposed requirement always sets the limit for NO_x to the lower limit of the two fuels being fired simultaneously, as opposed to the Rule 4351 requirement allowing the limit to be the liquid NO_x limit, provided gaseous content is less than 55%, which is higher than the gaseous limit. The proposed requirements are more stringent than District Rule 4351, 5.2.2 for dual fired units.

Compliance with NO_x limit-District Rule 4301:

This rule requires NO_x emissions be limited to 140 lb/hr (calculated as NO_2). Converting to common units of measure:

NATURAL GAS FIRED:

$$\frac{\left(140\frac{lb\cdot NO_X}{hr}\right)\left(237\frac{L}{gmol}\right)\left(0.035315\frac{ft^3}{L}\right)\left(453.59\frac{g}{lb}\right)}{\left(8710\frac{dscf}{MMBtu}\right)\left(100\frac{MMBtu}{hr}\right)\left(46.01\frac{g\cdot NO_2}{gmol}\right)} = 0.00133 = 1330\ ppmv$$

FUEL OIL FIRED

$$\frac{\left(140\frac{lb\cdot NO_X}{hr}\right)\left(23.7\frac{L}{gmol}\right)\left(0.035315\frac{ft^3}{L}\right)\left(453.59\frac{g}{lb}\right)}{\left(9190\frac{dscf}{MMBtu}\right)\left(100\frac{MMBtu}{hr}\right)\left(46.01\frac{g\cdot NO_2}{gmol}\right)} = 0.00126 = 1260\ ppmv$$

where:

$140\frac{lb\cdot NO_X}{hr}$ = NO_X emission rate limit per District Rule 4301, 5.2.2

$23.7\frac{L}{gmol} = \frac{(288.71K)\left(22.4\frac{L}{gmol}\right)}{273.15K}$ = molar volume of an ideal gas corrected to District standard conditions (60° F, 14.7 psi) per Charles' Law

$0.035315\frac{ft^3}{L}$ = conversion factor (AP-42, Appendix A)

$453.59\frac{g}{lb}$ = conversion factor (AP-42, Appendix A)

$8710\frac{dscf}{MMBtu}$ = F-factor, F_d, for natural gas (40CFR§60, App. A, Meth. 19, Table 19-1)

$9190\frac{dscf}{MMBtu}$ = F-factor, F_d, for oil (40 CFR§60, App. A, Meth. 19, Table 19-1)

$100\frac{MMBtu}{hr}$ = maximum heat input this template

$46.01 \frac{g \cdot NO_2}{gmol}$ = molecular weight, NO_2

The following table is a summary of emission limitations in common units of measure as suggested by White Paper #2:

Proposed Limitation (ppmv)		Rule 4301 (ppmv)	
GAS FIRED	OIL FIRED	GAS FIRED	OIL FIRED
30	40	1330	1260

The proposed limits are more stringent than the otherwise applicable limits of District Rule 4301.

Step 3. Conditions ensuring compliance with applicable requirements

The units qualifying to use the template shall be required by permit condition to comply with the streamlined nitrogen oxides emission limits and associated monitoring, recordkeeping, and testing. See template permit conditions #14 - #21.

There are no general conditions in this template for NO_x control technology monitoring. This is due to permit conditions being source specific. Consequently, District Permit to Operate conditions reflecting NO_x control technology monitoring must be addressed in the Title V application outside of this template.

Proposed emission limits will not apply during periods of natural gas curtailment to units burning liquid fuel that are normally fired with gaseous fuel. This exemption is limited to 336 cumulative hours of operation per calendar year, excluding equipment testing not to exceed 48 hours per calendar year. See template permit condition #22.

Step 4. Certify compliance

By using this template as part of the Title V application, the applicant is certifying compliance with all conditions required as part of the template.

Step 5. Compliance schedule for new monitoring requirements

Not applicable.

Step 6. Request for permit shield

By using this template the applicant is requesting a permit shield from District Rule 4301, 4305 and 4351. See template permit condition #24.

V. Permit Shield

A permit shield legally protects a facility from enforcement of the shielded regulations when a source is in compliance with the terms and conditions of the Title V permit. Compliance with the terms and conditions of the Title V permit is considered compliance with all applicable requirements upon which those conditions are based, including those that have been subsumed.

By using this template the applicant is requesting a permit shield from County Rules 108 (Kings), 108.1 (Fresno, Merced, San Joaquin, Tulare, Kern and Stanislaus), and 110 (Madera). See template permit condition #23.

A permit shield will be granted for 40 CFR 60 Subpart Dc because units qualified to use this template are limited to those which were not modified[10] or reconstructed[11] after June 9, 1989. A permit shield is granted from this requirement in template permit condition #25.

A permit shield will also be granted for 40 CFR 72.6 because facilities qualifying to use this template are not acid rain sources. Boilers and steam generators that have produced electricity for sale in 1985 or on or after November 15, 1990 are disqualified from this template in the attached Template Qualification Form. Therefore, there are no boilers or steam generators that are part of a Title IV source that will use this template as part of a Title V permit application. A permit shield is granted from this requirement in template permit condition #25.

VI. Permit Conditions

The following conditions will be incorporated into the Title V permit of any facility choosing to make use of template SJV-BSG-14-1:

1. All required source testing shall conform to the compliance testing procedures described in District Rule 1081(Last Amended December 16, 1993). [District Rule 1081, and County Rules 108 (Kings), 108.1 (Fresno, Merced, San Joaquin, Tulare, Kern, and Stanislaus), and 110 (Madera)]

2. Copies of all fuel invoices, gas purchase contracts, supplier certifications, and test results to determine compliance with the conditions of this permit shall be maintained. The operator shall record daily amount and type(s) of fuel(s) combusted and all dates on which unit is fired on any noncertified fuel and record specific type of noncertified fuel used. [District Rule 2520, 9.3.2]

[10] as defined in 40CFR§60.2
[11] as defined in 40CFR§60.15

3. The operator shall maintain all records of required monitoring data and support information for inspection at any time for a period of five years. [District Rule 2520, 9.4.2]

4. Particulate matter emissions shall not exceed 0.1 grain/dscf, 0.1 grain/dscf calculated to 12% CO_2, nor 10 lb/hr. [District Rules 4201, 3.1 and 4301, 5.1 and 5.2.3].

5. Source testing shall be performed using EPA Method 5 while firing on residual oil (including crude or topped crude) to demonstrate compliance with PM emission limits. During each year which the facility fires oil, source testing shall be performed within 60 days of firing on residual oil unless such testing has been performed within the 12 month period prior to firing on said oil and the test results showed compliance with PM emission limits of this permit. For units firing on residual oil for more than 720 hours per year, source testing shall be performed within 60 days of firing on oil, unless such testing has been performed within the 12 month period prior and test results showed compliance with these requirements. [District Rule 2520, 9.3.2]

6. Emissions of sulfur compounds from this unit shall not exceed 200 lb per hour, calculated as SO_2. Compliance with this requirement may be demonstrated by firing the unit only on PUC or FERC regulated natural gas or on diesel fuel not exceeding 0.5% sulfur by weight; or by testing the sulfur content of each fuel and determining the maximum hourly emissions of sulfur compounds by multiplying the sulfur content of each fuel in lb/MMBtu by the maximum heat input rating of the unit; or by source testing in combination with fuel analysis. [District Rule 2520, 9.3.2 and District Rule 4301, 5.2.1]

7. When complying with sulfur emission limits by fuel analysis or by a combination of source testing and fuel analysis, each fuel source shall be tested weekly for sulfur content and higher heating value. If compliance with the fuel sulfur content limit and sulfur emission limits has been demonstrated for 8 consecutive weeks for a fuel source, then the fuel testing frequency shall be semi-annually. If a semi-annual fuel content source test fails to show compliance, weekly testing shall resume. If the source of fuel is changed, weekly testing shall again be required as outlined in this permit condition. When source or type of fuel gas changes, sampling for sulfur content shall be conducted within one week. A change in fuel type is defined as changing between any of the following: crude oil, refined petroleum product, PUC-quality gas, unprocessed field gas or any field gas with any specific level of pretreatment. [District Rule 2520, 9.3.2]

8. When complying with SO_x emission limits by testing of stack emissions, testing shall be performed not less than once every 12 months using EPA Method 6B; or Method 8; or, for units using gaseous fuel scrubbed for sulfur pre-combustion, a grab sample analysis by GC-FPD/TCD performed in the laboratory and EPA Method 19 to calculated emissions. Gaseous fuel fired units demonstrating compliance on two consecutive annual source tests shall be tested not less than once every thirty-six months, however annual source testing shall resume if any test fails to show compliance. [District Rule 2520, 9.3.2]

9. If the unit is fired on noncertified gaseous fuel and compliance with SO_x emission limits is achieved through fuel sulfur content limitations, then the sulfur content of the gaseous fuel being fired in the unit shall be determined using ASTM D 1072, D 3031, D 4084, D 3246 or grab sample analysis by GC-FPD/TCD performed in the laboratory. [District Rule 2520, 9.3.2]

10. If the unit is fired on liquid fuel that is not supplier-certified 0.05% sulfur content or less and compliance with SO_x emission limits is achieved through fuel sulfur content limitations, then the sulfur content of the liquid fuel being fired in the unit shall be determined using ASTM D 2880. [District Rule 2520, 9.3.2]

11. If fuel analysis is used to demonstrate compliance with conditions of this permit, the fuel higher heating value for each fuel shall be certified by a third party fuel supplier or determined by: ASTM D 240 or D 2382 for liquid hydrocarbon fuels; ASTM D 1826 or D 1945 in conjunction with ASTM D 3588 for gaseous fuels. [District Rule 2520, 9.3.2; 4305, 6.2.1; and 4351, 6.2.1]

12. The concentration of sulfur compounds in the exhaust from this unit shall not exceed 0.2% by volume as measured on a dry basis over a 15 minute period [County Rules 404 (Madera), 406 (Fresno), and 407 (Kern, Kings, Merced, San Joaquin, Stanislaus, and Tulare)]. To demonstrate compliance with this requirement the operator shall do one of the following: fire the unit only on PUC or FERC regulated natural gas or diesel fuel not exceeding 0.5% sulfur by weight; or test the sulfur content of each fuel source and demonstrate the sulfur content does not exceed 3.3% by weight for gaseous fuels or 3.0% by weight for residual oil (including crude or topped crude); or determine that the concentration of sulfur compounds in the exhaust does not exceed the concentration limit by a combination of source testing and fuel analysis. [District Rule 2520, 9.3.2]

13. Sulfur emissions shall not exceed 0.11 lb of sulfur per million BTU of heat input, averaged over 3 - one hour periods. Compliance with this requirement may be demonstrated by firing the unit only on PUC or FERC regulated natural gas; multiplying the reported sulfur content of each fuel in lb/MMBtu by the maximum heat input rating of the unit; or by a combination of source testing for sulfur compounds and fuel analysis. If averaging two or more units is used to satisfy this requirement, the permittee must demonstrate that the total emissions of sulfur emissions from all of its permitted steam generators prior to September 12, 1979 which are located at the same stationary source do not exceed the total emissions that would result if each of its existing steam generators that are subject to this rule were operating in compliance with Kern County Rule 424. A compliance plan shall identify each steam generator subject to Rule 424 and shall indicate the specific control technique and resulting emission rate for each steam generator. Should any of the representative units exceed the required SO_x emission limits of this permit, each of the units in the group shall demonstrate compliance by emissions testing within 90 days of the failed test. (This requirement shall not supersede a more stringent NSR or PSD permit testing requirement.) [Kern County Rule 424 and District Rule 2520, 9.3.2]

14. Annual source testing shall be performed for NO_x (ppmv) according to EPA Method 7E (or ARB Method 100), stack gas oxygen by EPA Method 3 or 3A (or ARB Method 100), and NO_x emission rate (heat input basis) by EPA Method 19. Gaseous fired units demonstrating compliance on 2 consecutive annual tests shall be tested not less than once every 36 months. Annual testing shall resume if any such test fails to show compliance. [District Rule 4305, 6.2.2, 6.2.4-7, & 6.3.1 and 4351, 6.2.2 & 6.2.4-7, & 6.3]

15. Annual test results submitted to the District from unit(s) representing a group of units may be used to demonstrate compliance with NO_x limits of this permit for that group, provided the selection of the representative unit(s) is approved by the APCO prior to testing. Should any of the representative units exceed the required NO_x emission limits of this permit, each of the units in the group shall demonstrate compliance by emissions testing within 90 days of the failed test. (This requirement shall not supersede a more stringent NSR or PSD permit testing requirement.) [District Rules 4305, 6.3.2 and 4351, 6.3]

16. The following conditions must be met for representative unit(s) to be used to demonstrate compliance for NO_x limits for a group of units: 1) all units are initially source tested and emissions from each unit in group are less than 90% of the permitted value and vary 25% or less from the average of all runs, 2) all units in group are similar in terms of rated heat input (rating not to exceed 100 MMBtu/hr), make and series, operation conditions, and control method, and 3) the group is owned by a single owner and located at a single stationary source. [District Rules 2520, 9.3.2 and 4305, 6.3.2]

17. All units in a group for which representative units are source tested to demonstrate compliance for NO_x limits of this permit shall have received the same maintenance and tune-up procedures as the representative unit(s). These tune-up procedures shall be completed according to District Rule 4304 (Adopted October 19, 1995) and tune-up test results shall show comparable results for each unit in the group. Records shall be maintained for the each unit of the group including all preventative and corrective maintenance work done. [District Rules 2520, 9.3.2 and 4305, 6.3.2]

18. All units in a group for which representative units are source tested to demonstrate compliance for NO_x limits of this permit shall be fired on the same fuel type during the entire compliance period. If a unit switches for any time to an alternate fuel type (e.g. from natural gas to oil) then that unit shall not be considered part of the group and shall be required to undergo a source test for all fuel types used, within one year of the switch. [District Rules 2520, 9.3.2 and 4305, 6.3.2]

19. The number of representative units source tested to demonstrate compliance for NO_x limits shall be at least 30% of the total number of units in the group. The units included in the 30% shall be rotated, so that in 3 years, all units in the entire group will have been tested at least once. [District Rule 2520, 9.3.2]

20. Nitrogen oxide (NO_x) emission concentrations in ppmv shall be referenced at dry stack gas conditions, and shall be calculated to 3.00 percent by volume stack gas oxygen and averaged over 60 minutes, and lb/MMBtu rates shall be calculated as lb NO_2/MMBtu of heat input (hhv). [District Rule 4305, 5.0, 8.2 and/or 4351, 8.1].

21. Nitrogen oxide (NO_x) emissions shall not exceed:

A) 0.036 lb NO_x/MMBtu or 30 ppmv when unit is gaseous fuel fired,

B) 0.052 lb NO_x/MMBtu or 40 ppmv when unit is liquid fuel fired, nor

C) lower NO_x limit of the two fuels being fired simultaneously for dual fired units.

These NO_x limits shall not apply during natural gas curtailments to units burning liquid fuel that are normally fired with gaseous fuel. This exemption is limited to 336 cumulative hours of operation per calendar year excluding equipment testing not to exceed 48 hours per calendar year. For any unit so exempted, cumulative annual hours of operation on each liquid during curtailment and during testing shall be monitored and recorded. [District Rule 4351, 4.2, 5.2.2, 5.4 & 6.1.2 and/or District Rule 4305, 4.2, 5.1 & 6.1.1 and the subsumed District Rule 4301, County Rule 405 (Madera) and County Rule 408 (Fresno, Kern, Tulare, Kings, Stanislaus, Merced, and San Joaquin)].

22. Compliance with permit conditions in the Title V permit shall be deemed compliance with the requirements of County Rules 108 (Kings), 108.1 (Fresno, Merced, San Joaquin, Tulare, Kern, and Stanislaus), and 110 (Madera), 402 (Madera), 404 (Fresno, Kern, Tulare, Kings, Stanislaus, Merced, and San Joaquin), 405 (Madera), 408 (Fresno, Kern, Tulare, Kings, Stanislaus, Merced, and San Joaquin), 407.2 (Kern, Tulare, Kings, Stanislaus, and San Joaquin), and 408.2 (Merced). A permit shield is granted from these requirements. [District Rule 2520, 13.2]

23. Compliance with permit conditions in the Title V permit shall be deemed compliance with the following requirements: SJVUAPCD Rules 4201 (Last Amended December 17, 1992), 4301 (Last Amended December 17, 1992), 4305 sections 4.2, 5.1, 5.5.1, 5.5.2, 6.1.1, 6.2 (except 6.2.3), 6.3.1, 6.3.2, and 8.1 (Last Amended December 17, 1992), and 4351, sections 4.2, 5.2.2, 6.1.1, 6.2, and 8.1(Last Amended October 19, 1995). A permit shield is granted from these requirements. [District Rule 2520, 13.2]

24. The requirements of 40 CFR 72.6(b) and 40 CFR 60.40c do not apply to this source because units have no construction, modification or reconstruction since June 9, 1989. A permit shield is granted from this requirement. [District Rule 2520, 13.2]

APPENDIX A

EPA COMMENTS / DISTRICT RESPONSE FOR TEMPLATE # SJV-BSG-14-1

EPA COMMENTS / DISTRICT RESPONSE

The US EPA's comments regarding boiler, steam generator and process heater templates are reprinted below followed by the District's response. A copy of the US EPA's 2/18/03 letter is available at the District's Central Region Office. SJVAPCD commitment letters dated 2/3/03 and 2/12/03 are also available. Please note that only those comments which apply to template BSG-14-1 are addressed. This template is designed for boilers, steam generators and process heaters that qualify for this template using the template qualification form in Appendix G.

1. Comment:

Fuel gas monitoring for all sources that may burn field gas:
We appreciate the District's commitment to require fuel content sampling within one week of any change to the source or type of fuel gas. The monitoring that was originally proposed does not assure compliance because a source could test low sulfur gas, and then burn high-sulfur gas from units that can have sulfur levels much higher than the limits that apply to the source. The District has committed to require additional sampling any time that the source switches between a different source or type of fuel. We recommend, if a source switches to a fuel with a higher sulfur content, that the source initially monitor for eight weeks and then at the same frequency specified in the proposed permit. We also would like to note that changing the sources of gas would include (but not be limited to) the proposed permit revisions that we have seen recently to modify and/or interconnect well vent gas collection systems that are then directed to BSGs. We also recommend specifying in the templates SOx sampling methods that are both EPA and District approved.

We believe that the monitoring for units burning field gas with either upstream fuel gas treatment or post-combustion scrubbing must be subject to case-by-case review. We appreciate the District's agreement (via your February 13, 2003 letter and a follow-up phone call) to clarify in the template that these units are subject to case-by-case review for CAM and periodic monitoring, since these units may need to be monitored closely to determine the effectiveness of sulfur removal. We would also like to note that the sampling included in this template does not replace the need for case-by-case review of monitoring for other emission limits, such as NSR limits.

Response:

The District has incorporated the suggested changes. See condition 7 for changes to gas monitoring. Table 1 has been revised to show that CAM and other periodic monitoring will be addressed outside of the template.

2. Comment:

Kern County Rule 424 limit
The template contains Kern County Rule 424, but the limit is not enforceable as originally proposed. The source can show that they meet the limit on a unit-specific basis, but may also average emissions between all units permitted prior to September 12, 1979. We recommend requiring that any source wishing to average emissions between different units apply for a sources-specific alternate operating scenario allowing source averaging.

We understand that the District intends to require source-specific averaging plans for all sources that wish to use this option, and we have several recommendations for such plans. First, the source-specific permits must clearly identify which units will be averaged, and verify the eligibility of each unit for the averaging plan. Second, the permit must contain a compliance program for determining whether the facility is meeting the limit. Third, the source should be required to give notice of any changes between alternative operating scenarios.

Response:

Condition 13 of this template has been revised to address these concerns.

3. Comment:

Particulate testing for BSGs firing liquid fuels
The template BSG #14 and #16 requires PM testing if the source burns crude oil. We agree that PM testing should be required when burning crude oil due to the higher potential PM emissions. The template is not clear how often testing would be required if the source continuously burns crude oil. We believe that in the unusual case where a facility burns crude oil, testing will be necessary each year. We appreciate the District's suggested language to clarify this issue, and recommend using the following language:

A...during each year which the facility fires oil, source testing shall be performed within 60 days of firing oil, ...

Response:

Condition 5 of this template has been revised to address these concerns.

4. Comment:

NOx exemptions during natural gas curtailments
For each unit, these exemptions must be explicitly limited to the underlying rule limit that allow for them. We have found that otherwise, the permit creates the impression that the exemption for the template conditions also applies to other applicable requirements that do not allow the exemption. We appreciate the District's commitment to make the necessary corrections for each of the permit templates.

Response:

The District has incorporated the suggested changes. See condition 21.

5. Comment:

Permit Shield
We appreciate the District's commitment to add a basis for the acid rain permit shield for templates #4, 8, and 12 and recommend also adding the basis for unit#14.

Response:

The District has added this basis to the acid rain permit shield. See condition 24.

APPENDIX B

O_2/CO_2 EXHAUST CONCENTRATIONS FOR TEMPLATE # SJV-BSG-14-1

NATURAL GAS

Maximum PM emissions will occur at 0% O_2 in the exhaust stream and District Rule 4301 requires a 12% CO2 correction. For natural gas firing units, 0% O_2 occurs at 12% CO_2. This is demonstrated by the following combustion equation for natural gas (wherein X denotes moles of excess air and (neglecting sulfur).

$$CH_4 + (2+X)O_2 + (2+X)(3.78)N_2 \rightarrow CO_2 + 2\,H_2O + XO_2 + (2+X)(3.78)N_2$$

Solving an expression for the fraction of O_2 in the exhaust by volume, wherein the numerator represents the number of moles of CO_2 and the denominator represents the total number of moles of dry exhaust, set equal to 12% CO_2 yields the number of moles of excess air (X).

$$\frac{1}{1 + X + (2+X)3.78} = 0.12 \Rightarrow X = 0.05$$

Substituting the coefficients and solving the resultant equation for the fraction of O_2 verifies that 12% CO_2 is equivalent 0% O_2:

$$CH_4 + 2.05O_2 + 7.75N_2 \rightarrow CO_2 + 2\,H_2O + 0.05O_2 + 7.75N_2$$

$$\frac{0.05}{1 + 0.05 + 7.75} = 0.0057 \approx 0\%$$

FUEL OIL

For units burning fuel oil the following combustion equation, wherein X denotes moles of excess air, reveals that 12% CO_2 in the exhaust stream occurs at 4% O_2. Consequently, the compliance of units firing on fuel oil is shown using AP-42 F factors uncorrected from 0% O_2 to illustrate the worst case scenario.

$$C_{14}H_{30} + (21.5+X)O_2 + (21.5+X)(3.78)N_2 \rightarrow 14CO_2 + 15\,H_2O + XO_2 + (21.5+X)(3.78)N_2$$

Solving an expression for the fraction of O_2 in the exhaust by volume, wherein the numerator represents the number of moles of CO_2 and the denominator represents the total number of moles of dry exhaust, set equal to 12% CO_2 yields the number of moles of excess air (X).

$$\frac{14}{14 + X + (21.5+X)3.78} = 0.12 \Rightarrow X = 4.5$$

Substituting the coefficients and solving the resultant equation for the fraction of O_2 in the exhaust verifies that 12% CO_2 is equivalent 4% O_2:

$$C_{14}H_{30} + 25O_2 + 94.5N_2 \rightarrow 14CO_2 + 15H_2O + 4.5O_2 + 94.5N_2$$

$$\frac{4.5}{14 + 4.5 + 94.5} = 0.039 \approx 4\%$$

APPENDIX C

GAS SULFUR CONTENT STANDARDS
FOR
TEMPLATE # SJV-BSG-14-1

Template SJV-BSG-14-1

GENERAL ORDER 58-B
(Supplemental to General Order 58-A)

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

HEATING VALUE MEASUREMENT STANDARD FOR GASEOUS FUELS

Approved October 17, 1984. Effective November 16, 1984.
(Decision 84-10-052, CII 83-11-01)

Original Order Approved December 28, 1955--Effective January 17, 1956

It is ORDERED that the following rules be adopted effective November 16, 1984 to govern all gas corporations as defined in the Public Utilities Code,* in the determination of heating values of fuel gases. The order also is supplemental to General Order 58-A, which requires utilities to provide and maintain heating value measurement stations and shall not relieve any gas corporation from complying with the provisions of general Order 58-A.

7. Purity of Gas

A. **Hydrogen Sulfide**

No gas supplied by any gas utility for domestic, commercial or industrial purposes in this state shall contain more than one-fourth (0.25) grain of hydrogen sulfide per one hundred (100) standard cubic feet.

B. **Total Sulfur**

No gas supplied by any gas utility for domestic, commercial or industrial purposes shall contain more that five (5) grains of total sulfur per one hundred (100) standard cubic feet.

C. Test procedures used to determine the amounts of hydrogen sulfide and total sulfur shall be in accordance with accepted gas industry standards and practices.

D. When hydrogen sulfide, or total sulfur, exceeds the limits set forth in Section 7.a. and Section 7.b., the gas utility shall notify the Commission and commence remedial action immediately. The Commission shall be notified when the level of hydrogen sulfide, or total sulfur, has been reduced to allowable limits.

$$\%S\left(lb\ S \big/ lb\ CH_4\right) = \left(\frac{5\,gr}{100\,scf}\right)\left(\frac{1\,lb}{7000\,gr}\right)\left(\frac{24.45\,L}{mol\,CH_4}\right)\left(\frac{mol\,CH_4}{16\,g}\right)\left(\frac{454\,g}{1\,lb}\right)\left(\frac{0.035\,scf}{L}\right)(100) = 0.017\%\ sulfur$$

FERC Gas Contract

ARTICLE 14 - QUALITY OF GAS

14. QUALITY

14.1 Gas Quality at Delivery Point(s): The Gas delivered by Transporter for Shipper at the Delivery Point(s):

(a) shall be merchantable Natural Gas commercially free from objectionable odors, solid matter, dust, gums, and gum forming constituents, or any other substance which interferes with its intended purpose, or causes interference with the proper and safe operation of the lines, meters, regulators, or other appliances through which it may flow;

(b) shall contain not more than seven (7) pounds/MMcf of water;

(c) shall contain no hydrocarbons in liquid form at the temperature and pressure at which the Gas is delivered at the Delivery Point;

(d) shall not exceed a hydrocarbon dew point of fifteen degrees (15°) Fahrenheit at pressures up to 800 psig;

(e) shall contain not more that 0.2% by volume of oxygen;

(f) shall contain not more than 3.0% by volume of carbon dioxide or nitrogen;

(g) shall contain not more than a combined total of 4.0% by volume of inerts, including carbon dioxide, nitrogen, oxygen and any other inert compound;

(h) shall contain not more that 0.25 grain of hydrogen sulfide per 100 Cubic Feet of Gas (the gas shall not contain any entrained hydrogen sulfide treatment chemical (solvent) or its by-products);

(i) shall contain not more that 0.3 grains of mercaptan sulfur per 100 Cubic Feet of Gas;

(j) shall contain not more that 0.75 grains of total sulfur per 100 Cubic Feet of Gas;

(k) shall not contain any toxic or hazardous substance, in concentrations which, in the normal use of the Gas, results in an unacceptable risk to health, is injurious to pipeline facilities, is a limit to merchantability or contrary to applicable governmental standards;

(l) shall have a minimum total heating value of not less than nine hundred seventy (970) Btu's per Cubic Foot of Gas on a dry basis;

(m) shall have a temperature of not less than forty degrees (40°) Fahrenheit, and not more than one hundred twenty degrees (120°) Fahrenheit.

$$\%S\left(lb\ S \Big/ lb\ CH_4\right) = \left(\frac{0.75\,gr}{100\,scf}\right)\left(\frac{1\,lb}{7000\,gr}\right)\left(\frac{24.45\,L}{mol\,CH_4}\right)\left(\frac{mol\,CH_4}{16\,g}\right)\left(\frac{454\,g}{1\,lb}\right)\left(\frac{0.035\,scf}{L}\right)(100) = 0.0026\%\ sulfur$$

APPENDIX D

DEFINITIONS
FOR
TEMPLATE # SJV-BSG-14-1

NSPS Definitions

§ 60.15 Reconstruction.

a) An existing facility, upon reconstruction, becomes an affected facility, irrespective of any change in emission rate.
b) "Reconstruction" means the replacement of components of an existing facility to such an extent that:
   1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, and
   2) It is technologically and economically feasible to meet the applicable standards set forth in this part.
c) "Fixed capital cost" means the capital needed to provide all the depreciable components.
d) If an owner or operator of an existing facility proposes to replace components, and the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, he shall notify the Administrator of the proposed replacements. The notice must be postmarked 60 days (or as soon as practicable) before construction of the replacements is commenced and must include the following information:
   1) Name and address of the owner or operator.
   2) The location of the existing facility.
   3) A brief description of the existing facility and the components which are to be replaced.
   4) A description of the existing air pollution control equipment and the proposed air pollution control equipment.
   5) An estimate of the fixed capital cost of the replacements and of constructing a comparable entirely new facility.
   6) The estimated life of the existing facility after the replacements.
   7) A discussion of any economic or technical limitations the facility may have in complying with the applicable standards of performance after the proposed replacements.
e) The Administrator will determine, within 30 days of the receipt of the notice required by paragraph (d) of this section and any additional information he may reasonably require, whether the proposed replacement constitutes reconstruction.
f) The Administrator's determination under paragraph (e) shall be based on:
   1) The fixed capital cost of the replacements in comparison to the fixed capital cost that would be required to construct a comparable entirely new facility;
   2) The estimated life of the facility after the replacements compared to the life of a comparable entirely new facility;
   3) The extent to which the components being replaced cause or contribute to the emissions from the facility; and
   4) Any economic or technical limitations on compliance with applicable standards of performance which are inherent in the proposed replacements.
g) Individual subparts of this part may include specific provisions which refine and delimit the concept of reconstruction set forth in this section.

[40 FR 58420, Dec. 16, 1975]

§ 60.2 Definitions.

Modification means any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted.

[44 FR 55173, Sept. 25, 1979, as amended at 45 FR 5617, Jan. 23, 1980; 45 FR 85415, Dec., 24, 1980; 54 FR 6662, Feb. 14, 1989; 55 FR 51382, Dec. 13, 1990; 57 FR 32338, July 21, 1992; 59 FR 12427, Mar. 16, 1994]

§ 60.41c Definitions

Residual oil means crude oil, fuel oil that does not comply with the specifications under the definition of distillate oil, and all fuel oil numbers 4, 5, and 6, as defined by the ASTM in D396-78.

SJVUAPCD Definitions

Kern County Rule 424

Small Producer: a person, including any business entity, which, on March 6, 1980 had petroleum business interests solely in drilling and producing crude oil and gas.

APPENDIX E

SULFUR/SULFUR DIOXIDE CONVERSION FOR TEMPLATE # SJV-BSG-14-1

The following analysis shows the reasoning behind the mass increase in converting sulfur to sulfur dioxide (SO_2). The chemical equation for converting sulfur into sulfur dioxide is:

$$S + O_2 \rightarrow SO_2$$

The preceding equation shows that 1 mole of sulfur combined with 1 mole of oxygen will create 1 mole of sulfur dioxide. The molecular weight of sulfur (S) is 32.06 grams/mole. The molecular weight of oxygen (O_2) is 32.0 grams/mole. Thus, when the mole of sulfur is combined with the mole of oxygen, the resulting mole of sulfur dioxide has a mass of 64.06 grams/mole.

The preceding analysis shows that when sulfur is calculated as sulfur dioxide, the resulting mass of sulfur dioxide is twice the mass of initial sulfur converted.

APPENDIX F

COUNTY RULE / DISTRICT RULE 1081 COMPARISON FOR TEMPLATE # SJV-BSG-14-1

Template SJV-BSG-14-1

Rule 1081 (Source Sampling)

REQUIREMENTS	1081 SJVUAPCD	108 KINGS	110 MADERA	108.1 FRESNO	108.1 MERCED	108.1 S.J.	108.1 TULARE	108.1 KERN	108.1 STANI SLAUS
Upon request of the APCO, the source shall provide info. and records to enable the APCO to determine when a representative sample can be taken.	X		X	X	X	X	X	X	X
The facility shall collect, have collected or allow the APCO to collect, a source sample	X	X	X	X	X	X	X	X	X
The source shall have District personnel present at a source test	X								
The applicable test method, if not specified in the rule, shall be conducted in accordance with 40 CFR § 60, Appendix A	X								
Test procedures: 1) arithmetic mean of three runs 2) a scheduled source test may not be discontinued solely due to the failure to meet the applicable standard(s), and 3) arithmetic mean of two runs is acceptable if circumstances beyond owner or operator control occurs.	X								

APPENDIX G

TEMPLATE QUALIFICATION FORM
FOR
TEMPLATE # SJV-BSG-14-1

Template SJV-BSG-14-1

Title V General Permit Template Qualification Form

District permit #_____

Please answer the questions in the table below. A boiler or steam generator (unit) which meets the criteria of this table is qualified to use this template as part of a Title V application. To use this template, remove this sheet and attach to application.

Yes	No	Description of Qualifying Units
		Is this unit a steam generator used in oil field operations in Kern County for which an authority to construct or permit to operate was issued prior to September 12, 1979? [Kern County Rule 424] If "yes", continue to next question; otherwise STOP - you cannot use this template.
		Does this unit have a maximum design heat input rating greater than 15 MMBtu/hr [Kern County Rule 424] and less than or equal to 100 MMBtu/hr? If "yes", continue to next question; otherwise STOP - you cannot use this template.
		Is this unit fired on diesel with a sulfur content < 0.5% by weight, residual oil (including crude or topped-crude, as defined in Appendix C, Definitions), gaseous fuel, and/or a combination of liquid and gaseous fuels? If "yes", then continue to next question; otherwise STOP- you cannot use this template.
		Is this unit currently in compliance with District Rule 4351, 5.2.4.1 emission limits? If "yes", then continue to next question; otherwise STOP - you cannot use this template.
		Has construction, modification, or reconstruction commenced after June 9, 1989? [NSPS 40 CFR 60.40c(a)] If "no", continue to next question; otherwise STOP - you cannot use this template.
		Is the unit equipped with selective catalytic reduction? If "no" continue to the next question; otherwise STOP - you cannot use this template.
		Is the unit a combustion device which converts water to dry steam or to a mixture of water vapor and steam, with a pressure of more than 30 psia? [Kern County Rule 424] If "yes," continue to the next question, otherwise STOP - you cannot use this template.
		Is the unit operated by a small producer (see Appendix C), having a rated heat input capacity of less than 35 MMBtu/hr or part of a facility with a total heat input less than 165 MMBtu/hr? [Kern County Rule 424] If "no," continue to the next question, otherwise STOP - you cannot use this template.
		Are your district permits limited to 9 billion Btu per year of heat input? {District Rule 4305] If "no", continue to next question; otherwise STOP - you cannot use this template
		Is this unit a solid fuel fired unit? [District Rule 4351] If "no", continue to next question; otherwise STOP - you cannot use this template.
		Is this unit a dryer or a glass melting furnace? [District Rule 4305] If "no", continue to next question; otherwise STOP - you cannot use this template.
		Is this unit a smelter or kiln where the products of combustion come into direct contact with the material to be heated? [District Rule 4305] If "no", continue to next question; otherwise STOP - you cannot use this template.
		Is this unit an unfired or fired waste heat recovery boiler that is used to recover or augment heat from the exhaust of combustion turbines or internal combustion engines? [District Rules 4305 and 4351] If "no", continue to next question; otherwise STOP - you cannot use this template.
		Is this a resource recovery unit? [District Rule 4305] If "no", continue to next question; otherwise STOP - you cannot use this template.
		Was this unit used to produce electricity for sale in 1985 or on or after November 15, 1990? [40 CFR 72.6(b)] If "no" you qualify to use this template; otherwise STOP - you cannot use this template.

Based on information and belief formed after reasonable inquiry: 1) the information on this form is true, accurate, and complete, and 2) the facility is in compliance with this template's permit conditions:

_____ _____

Signature of Responsible Official Date

_____

Name of Responsible Official (Please print)