

Arizona Air National Guard  
162<sup>nd</sup> Fighter Wing  
Air Quality Permit # 2292

Technical Support Document (TSD)

**I. GENERAL COMMENTS:**

**A. Company Information**

Source Name: Arizona Air National Guard (ANG) – 162<sup>nd</sup> Fighter Wing (162<sup>nd</sup> FW)  
Source Address: 1500 East Valencia Road, Tucson, AZ 85706

**B. Background**

The operations comprising the air pollutant emissions sources generally serve as support for the aircraft activities. These include several types of fuel-burning equipment, two “hush houses” for jet engine testing, large fuel storage and fuel dispensing systems, vehicle and aerospace ground equipment (AGE) maintenance shops and three paint booths. The source operates under a Class II air quality permit. It is considered a true minor source of conventional pollutants and an area source of HAPs.

This permit renewal is the second 5-year permit issued to ANG.

This Technical Support Document (TSD) was updated for the renewal of the permit. The renewal application was received on September 3, 2009 and was updated May 14, 2014.

The table below summarizes the permit actions taken since the last permit renewal, August 19, 2016.

**Summary of Permit Actions Within the Current Permit Term**

<b>Date Received/ Approved</b>	<b>Permit Action</b>
<b>Received 07/23/2019</b>	<b>2292-102P Facility Change Without Revision:</b>
<b>Approved 08/28/2019</b>	Addition of a 422 HP Fire Pump Engine Subject to 40 CFR Part 60 Subpart III and edits to the equipment list.

**C. Attainment Classification**

The source is located in an area that is in attainment for all pollutants.

**II. SOURCE DESCRIPTION**

**A. Process Description**

The units and activities that are considered to be significant sources of emissions at the 162nd FW include:

- Combustion sources with heat input rating above 500,000 Btu/hr:
- larger boilers and water heaters,
- skid-mounted emergency generators,
- fire suppression water pump engines;
- engine tests conducted in two jet engine test cells;

- fuel storage and transfer;
- miscellaneous chemical product usage ( degreasing, painting in booths, abrasive blasting), and,
- fuel cell maintenance.

## **B. Operating Schedule**

Standard 162nd FW facility operations occur over 2,272 hr/yr, which equates to 8 hours per day, 5 days per week, for 52 weeks per year, plus an additional 16 hours per weekend, 12 weekends per year. However, some activities associated with flight line operations may occur over an additional 8-hour shift 4 days per week.

For sources having emissions based on time in operation, the emission calculations for PTE extrapolate this actual schedule to a "maximum potential" basis of 8,760 hours per year. The operating schedule specifications for each source category are incorporated in the Appendix A calculations.

For sources not included under the voluntary operational limitations, PTE was conservatively calculated based on scaling actual emissions from the 2,272 hour/ year operating schedule up to 8,760 hours of operation. For sources subject to the limits described in the permit, the proposed annual operational limit was the basis for maximum annual emissions estimates. For emergency engines, the calculations follow U.S. EPA guidance recommending that PTE for emergency generators be based on maximum operation of 100 hr/yr or 500hr/yr (NSPS/NESHAP or PCC Standards respectively). The spreadsheets included in Appendix A provide detailed emission estimation calculations for each source.

## **C. Voluntary Operational Limitations**

The 162nd FW facility is a non-categorical source for which the potential-to-emit (PTE) will be reduced by voluntary limits on certain operations. Absent such limits, the 162nd FW facility would be categorized as a major source, and become subject to Title V permitting, if its potential emissions from stationary sources could exceed 100 tpy of any of the criteria pollutants, or 10 or 25 tpy of any single or combination of HAPs, respectively.

The current Class II permit for the 162nd FW facility is, in part, based on voluntary operational limitations that were implemented in order to avoid classification as a Title V (Class I) facility, or applicability of the Aerospace NESHAP. Recent air emission inventory reports (e.g., 2011 calendar year) show that actual emissions from stationary sources at the 162nd FW facility were well below the major source threshold for criteria pollutants (carbon monoxide [CO], nitrogen oxide [NO<sub>x</sub>], sulfur dioxide [SO<sub>x</sub>], particulate matter [PM], and volatile organic compounds [VOCs ], and for hazardous air pollutants [HAP].

The 162nd FW facility is continuing voluntary and federally enforceable permit conditions to limit potential emissions. Specifically, the restrictions apply to the level of activity of two jet engine test cells, and annual limits on routine operation of Jet-A and diesel fired equipment. These provisions allow the facility to retain its permitting status as a synthetic minor (Class II) source. These proposed limitations have been developed to maximize operational flexibility, which is critical considering the national security-related mission of the 162nd FW facility.

### **Jet engine test cells**

Aircraft engine tests, which are conducted in two jet engine test cells, will be restricted to a total of 800 engine tests during any consecutive 12-month period. This restriction applies to the total for both jet engine test cells combined. For a typical engine test cycle, this corresponds to uninstalled engine tests each approximately 1.3 hours in duration. For purposes of estimating emissions, each test will be presumed to have typical duration in three jet engine modes:

- Idle            1.0 hours/test
- Military       0.2 hours/test
- Afterburn     0.1 hours/test

The proposed operational limit was derived from the maximum potential number of engines than can be practically tested in one year with the test patterns currently in use. However, it should be recognized that emissions for given test will likely vary depending on the engine in test, the test cycle modes of operation, e.g., idle, military, or afterburn, and ambient conditions. Due to changes in operations, the potential exists for test patterns to change, thereby affecting potential emissions. To ensure that unexpected changes in testing patterns do not cause excess emissions, the 162nd FW facility is proposing the stated limits on number of tests based on conservative emissions estimates for aircraft engines at each mode.

#### **Internal combustion engines using Diesel and Jet-A**

The emergency generator and fire water pump engines will be restricted to 500 hours per engine per 12-month rolling period. These engines are not used for routine operations, other than periodic testing and maintenance; therefore the facility can comply with this limit without loss of operational flexibility.

#### **Aircraft arresting-barrier rewind engines**

The aircraft arresting-barrier rewind engines were restricted to 1,200 cumulative run hours per year for all engines combined. At a total horsepower of 520 hp (8 x 65 hp units) this equates to 78,000 horsepower-hours per year for purposes of emission estimation for all engines combined. The arresting-barrier engines are not used for routine landings, and therefore the facility will demonstrate compliance with this limit without loss of operational flexibility. The Control Officer has determined the operation of the barrier engines as an 'insignificant activity'; as result the operational restriction has been removed from the permit.

### **III. REGULATORY HISTORY**

The most recent inspection was completed on March 8, 2012. The source was found to be in non-compliance with the permit. The following summary is taken from the inspection report.

#### **Deficiency #1:**

In accordance with Part A, Section XVI. and Section XVI.C of the permit and P.C.C. 17.12.235 and 240, ANG failed to provide a written notice of facility changes or submit a permit revision prior to the installation and operation of new emergency generators and natural gas fired equipment.

#### **Deficiency #2:**

In accordance with NSPS, Subpart IIII, 40 CFR 60.4208, ANG installed a new emergency generator at building 39 POL after December 31, 2008 and did not demonstrate that the NSPS generator is compliant with the emission standards for 2007 model emergency generators or that it is excluded from the requirement to meet this standard.

These deficiencies were adequately resolved and closed on April 17, 2012.

The source is currently in compliance with all Pima County Code requirements.

### **IV. EMISSIONS ESTIMATES**

Emissions of regulated pollutants from the equipment and activities at the ANG facility have been quantified conservatively based on procedures and assumptions described in this section.

Emission estimates for the facility were derived using emission factors from AP-42 tables. AP-42 tables 3.3-1 thru 3 and 3.4-1 thru 4 (Diesel Industrial Engines and Large Stationary Diesel Engines) were used for emergency generator emission factors. For the boilers the highest emission factors for diesel or natural gas were used from AP-42 tables 1.3-1 and 2, the SO<sub>x</sub> emission factor was adjusted per AP-42 Table 1.3-1 to

burning distillate fuel oils containing no greater than 0.5% by weight Sulfur.

The emergency generators are fired exclusively with diesel fuel. The emergency generator’s PTE is assumed to be inherently controlled, per EPA guidelines, to operation for no more than 500 hours. The source is a synthetic minor source of criteria pollutants. The emergency generators are restricted by the permit to operate no more than 100 hours of operation to avoid triggering other federally applicable requirements. True emergency operation is not limited. Restricting the allowable fuels fired in the boilers and the maintenance and readiness testing run hours of the emergency generators, results in the boilers having no limitations when firing fuel oil.

The following tables outline the sources uncontrolled and controlled potential to emit.

The PTE has been calculated for the boilers using the highest emission factors for diesel or natural gas and the limited operation of the emergency generators. There is no hour limit on the emergency generators during true emergencies.

Pollutant	Controlled Potential To Emit (Tons per Year)						
	Boilers & Heaters	Generators & Fire Water Pumps	Aircraft Arresting Barrier Engines	Engine Test Cells	Fuel Storage /Transfer	Operational Sources	Total
CO	10.97	2.07	0.3	39.5	-	-	52.8
NO <sub>x</sub>	17.38	9.75	0.43	33.9	-	-	61.5
PM <sub>10</sub>	1.36	0.68	0.028	3.79	-	1.35	7.2
PM <sub>2.5</sub>	1.36	0.68	0.028	3.79	-	1.35	7.2
SO <sub>2</sub>	0.108	0.64	0.023	2.61	-	-	3.4
VOC	0.99	0.78	0.84	8.17	6.18	10.30	27.3
HAPs	0.28	0.017	0.077	0.98	0.95	1.34	3.6

## V. APPLICABLE REQUIREMENTS

### Federal Air Pollution Control Regulations

#### 40 CFR, Part 60 Standards of Performance for New Stationary Sources

##### Subpart A: General Provisions

Appendix A The test methods in this appendix are referred to in § 60.8 (Performance Tests) and § 60.11 (Compliance with Standards and Maintenance Requirements) of 40 CFR part 60, subpart A (General Provisions).

Subpart III - New Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines – applicable to stationary compression ignition internal combustion engines (CIICE) that are not certified National Fire Protection Association (NFPA) fire pump engines and are both pre and post model year 2007.

#### 40 CFR Part 63 National Emission Standards for Hazardous Air Pollutants for Source Categories

Subpart A: General Provisions. This subpart contains national emissions standards for HAPs that regulate specific categories of sources that emit one or more HAP regulated pollutants under the CAA. The general provisions under subpart A apply to sources that are subject to the specific Subparts of Part 63

Subpart ZZZZ: National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. - This rule establishes national emission limitations and operating

limitations for HAPs emitted from stationary reciprocating internal combustion engines (RICE). The rule applies to owners or operators of new and reconstructed stationary RICE of any horsepower rating which are located at a major **or area source** of HAP. While all stationary RICE located at major **or area sources** are subject to the final rule (promulgated January 18, 2008, amending the final rule promulgated June 15, 2004), there are distinct requirements for regulated stationary RICE depending on their design, use, horsepower rating, fuel, and major or area HAP emission status.

Pima County Code Title 17, Chapter 17.12 – Permits and Permit Revisions

Article I	General Provisions
Article II	Individual Source Permits
Article VI	Fees

Pima County Code Title 17, Chapter 17.16 – Emission Limiting Standards

Article I	General Provisions
Article II	Visible Emission Standards
Article III	Emissions from Existing and New Nonpoint Sources
Article IV	New and Existing Stationary Source Performance Standards

Pima County Code Title 17, Chapter 17.20 – Emissions Source Testing and Monitoring

Pima County Code Title 17, Chapter 17.24 – Emissions Source Recordkeeping and Reporting

Pima County Code Title 17, Chapter 17.28 – Violations and Conditional Orders

Pima County Code Title 17: New and Existing Stationary Source Performance Standards for the Surface Coating and Solvent Handling Activities

**VI. REQUIERMENTS SPECIFICALLY IDENTIFIED AS NON-APPLICABLE**

Fuel storage tanks predate the applicability date of federal NSPS for petroleum product storage tanks (e.g., 40 CFR Part 60, Subpart Kb)

The federal New Source Performance Standards (NSPS) for reciprocating, spark-ignition stationary engines (40 CFR Part 60, Subpart JJJJ) was reviewed to assess applicability to the gasoline-fired aircraft arresting engines. These engines are individually rated at 65 hp, and operate on an infrequent, as-needed basis to assist in landings. The engines present at the facility pre-date the applicability date for the rule, and are not subject to Subpart JJJJ.

A number of skid mounted emergency generator engines are located at the ANG facility. These units operate with diesel (distillate no. 2 oil) as a primary fuel, but are capable of using Jet-A as a back-up fuel. The units have construction dates that predate the emergency generator engine applicability dates in NSPS, Subpart IIII for compression-ignition, internal combustion engines.

Several subparts of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) at 40 CFR Part 63, were reviewed to assess applicability to the operations at the ANG facility. Operations that are covered by NESHAP regulations, such as grinding/ polishing, metal plating, part coating, paint stripping as part of aircraft and vehicle maintenance will not occur at the ANG facility. Consequently, several potentially-applicable NESHAP subparts that relate to such operations (e.g., Subparts EEEE, HHHH, WWWWWW, and XXXXXX) are not applicable to this facility. Subpart PPPPP of 40 CFR Part 63 provides NESHAP standards for engine test cells/ stands (40 CFR 63.9280 through 63.9375 and Tables 1 -7). However, this subpart is also not applicable to the 162nd FW test cells. As described in §63.9290 (a);" An affected source is the collection of all equipment and activities associated with engine test cells/stands used for testing uninstalled stationary or uninstalled mobile (motive) engines located at a major source of HAP emissions. " Since the 162nd FW facility is not a major HAP source, this description of an affected source excludes the facility test cells.

The facility is not be a Major Source of criteria pollutants, as all of the potential emissions (as calculated in Appendix A) are to be maintained below 100 tons per year by adoption of operational limits. Consequently,

the federal Title V permit program does not apply. Based on these emission rates, the facility will also not be subject to Compliance Assurance Monitoring (CAM) rules. Similarly, the 162nd FW facility will not be a Major Source of HAPS, as no individual pollutant will be emitted at 10 tons/year or more, and collectively the total HAP emissions, on a potential to emit basis, are far below 25 tons per year.

The 2011 emission inventory for the 162nd FW facility shows no Class I ozone depleting substances (ODSs) and over 200 pounds of Class II ODSs were used. The requirements for federal ODS regulations fall primarily on manufacturers and importers of ODSs, and on trained individuals who maintain systems that contain ODSs. However, per federal regulations (40 CFR Part 82), owners or operators of equipment which contain 50 pounds or greater of ozone depleting substances are required to repair leaks such that the leak rate is below 15% per year. Documentation of equipment repairs and ODS replacement records are required to be maintained for two years for equipment containing greater than 50 pounds of ODSs. In compliance with these requirements, records are maintained at the 162nd FW facility to estimate the overall usage of ODS due to equipment repair.

40 CFR Part 63 NESHAP Subpart JJJJJJ has been identified as non-applicable since the boilers will be operated as gas-fired boilers. Should the boilers switch to fuel oil use and become subject to Subpart JJJJJJ in the oil firing subcategory as defined in 40 CFR 63.11237, a significant permit revision will be required and compliance with Subpart JJJJJJ will be required within 180 days of the effective date of the fuel switch.

#### NESHAP Part 63 Subpart ZZZZ Vacatur

On May 1, 2015, the U.S. Court of Appeals for the District of Columbia Circuit issued a decision vacating paragraphs 40 CFR 63.6640(f)(2)(ii)-(iii) below. Guidance regarding the impact of the vacatur is available here: <https://www3.epa.gov/ttn/atw/icengines/docs/RICEVacaturGuidance041516.pdf>.

(ii) Emergency stationary RICE may be operated for emergency demand response for periods in which the Reliability Coordinator under the North American Electric Reliability Corporation (NERC) Reliability Standard EOP-002-3, Capacity and Energy Emergencies (incorporated by reference, see § 63.14), or other authorized entity as determined by the Reliability Coordinator, has declared an Energy Emergency Alert Level 2 as defined in the NERC Reliability Standard EOP-002-3.

(iii) Emergency stationary RICE may be operated for periods where there is a deviation of voltage or frequency of 5 percent or greater below standard voltage or frequency.

## **VII INSIGNIFICANT AND EXEMPT ACTIVITIES**

Numerous insignificant sources and trivial activities are associated with operation of ANG facility. PDEQ has promulgated a standardized list of certain acknowledged "Insignificant" sources and activities that are not otherwise subject to any applicable requirement (17.04.340 (114)). From that definition, the following activities or sources are or would likely be present at the 162nd FW Tucson facility:

- Aircraft arresting-barrier rewind engines
- Landscaping, building maintenance, or janitorial activities.
- Gasoline storage tanks with capacity of ten thousand gallons or less.
- Diesel and fuel oil storage tanks with capacity of forty thousand gallons or less.
- Batch mixers with rated capacity of five cubic feet or less.
- Hand-held or manually operated equipment used for buffing, polishing, carving, cutting, drilling, machining, routing, sanding, sawing, surface grinding, or turning of ceramic art work, precision parts, leather, metals,
- plastics, fiberboard, masonry, carbon, glass or wood.
- Internal combustion (IC) engine-driven compressors, IC engine-driven electrical generator sets, and IC engine-driven water pumps used only for emergency replacement or standby service.
- Lab equipment used exclusively for chemical and physical analyses.

In addition, the PDEQ defines as Insignificant "any other activity which the control officer determines is not necessary, because of its emissions due to size or production rate, to be included in an application in order to determine all applicable requirements and to calculate any fee under this title." Based on this definition, the

following extended list of insignificant activities applies to the 162<sup>nd</sup> FW Tucson facility:

- Pressurized storage and piping for compressed gases; e.g., air, propane, or liquefied petroleum gas (LPG)
- Individual, gas-fired comfort heaters and other gas-fired equipment with heat input less than 500,000 Btu/hr. (Although the estimated aggregate of such heaters is included in the overall air emission estimate for the AZANG Tucson facility).
- Petroleum product storage tanks and associated piping and loading operations for lubricating oil and used oil
- Storage and handling of drums or other transportable containers where the containers are sealed during storage, and covered during loading and unloading.
- Vehicle exhaust venting systems at maintenance shops that remove exhaust emissions from stationary vehicles being operated in servicing bays.
- Water treatment or storage systems for facility service and potable water.
- Chemical storage associated with water and wastewater treatment where the water is treated for consumption and/ or used within the permitted facility.
- Particulate emissions from the air conditioning cooling towers.
- Flanges, valves, pump seals, pressure relief valves, and other individual components not in VOC service that have the potential for leaks.
- Cafeterias, kitchens, and other facilities used for food or beverage preparation.
- Equipment using water, water and soap or detergent, or a suspension of abrasives in water for purposes of cleaning or finishing.
- Battery recharging areas.
- Aerosol can usage.
- Acetylene, butane, and propane torches.
- Blast-cleaning equipment (e.g., planes and servicing vehicles) using a suspension of abrasive in water and any exhaust system or collector serving them exclusively.
- Lubricating system reservoirs.
- Hydraulic system reservoirs.
- Adhesive use.
- Production of hot/ chilled water for onsite use.
- Safety devices such as fire extinguishers.
- General vehicle maintenance and servicing activities.
- Storage cabinets for flammable products.
- Office/ Administration:
- Housekeeping activities and associated products for cleaning purposes and operation of vacuum cleaning systems.
- Air conditioning, cooling, heating or ventilation equipment
- General office activities such as paper shredding, copying, photographic activities, and blueprinting.
- Restroom facilities and associated cleanup operations, stacks, and vents.
- Smoking rooms and areas.
- Normal consumer use of consumer products, including hazardous substances as defined in the Federal Hazardous Substances Act (15 U.S.C. 1261 et. seq.).
- Employee car and AZ ANG facility light truck traffic on paved and unpaved private roadways within the facility.
- Firefighting activities and training conducted at the facility 28

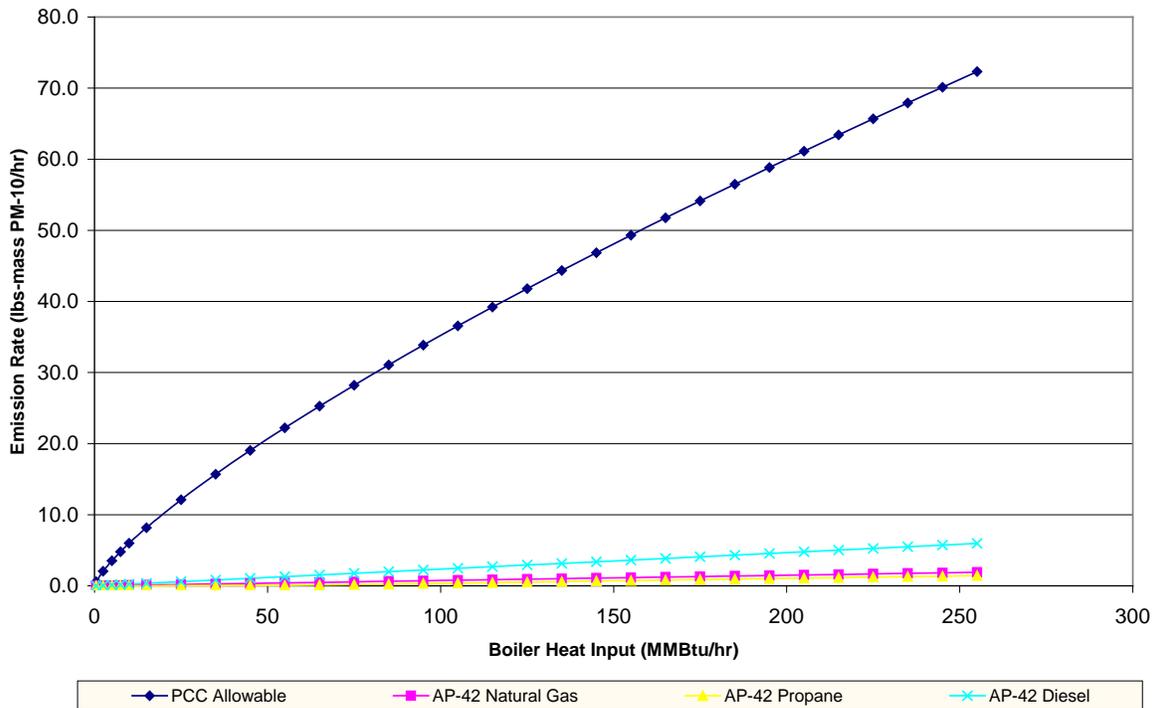
## **VII. PERMIT CHANGES and APPLICABILITY DETERMINATIONS**

### **A. Exclusion of PCC Particulate Matter Discharge Rate Standards**

The applicable PCC rules for the maximum particulate discharge rates are not normally included for Class II and III area source permits as explained below.

- For particulate matter sources, the calculated maximum particulate matter discharge rate, as provided in Title 17, yields maximum rates that far exceed the emissions expected from most typical area sources.
- With regard to fuel burning equipment, PCC 17.16.165.C limits the emissions of particulate matter from commercial and industrial fossil-fuel fired equipment (including but not limited to boilers). This limit is not normally included in permits because allowable emissions are consistently over an entire order of magnitude higher than EPA AP-42 estimated potential emissions. The chart below, illustrates the point.

**Comparison of Emissions of PM-10 for Boilers: PCC Allowable vs AP-42 Estimated**



Comparative Chart of Allowable Particulate Emissions Under Pima County Code, Title 17, and Estimated Potential Emissions based on EPA AP-42 Estimates for External Combustion Sources. Allowable emissions are consistently over ten times estimated potential emissions. Therefore, it is not necessary to include the standard in the permit explicitly, but by reference in Attachment 1 of the permit.

## XI. Exclusion of PCC Sulfur Dioxide Emission Standards

Compliance with the fuel sulfur limitation requirements in the permit shall ensure compliance with the Sulfur Dioxide Standards of PCC 17.16.165.E and 17.16.340.F; which limit the emission of SO<sub>2</sub> to 1.0 pound per million BTU of heat input when burning low sulfur fuel. The definition of low sulfur fuel (PCC 17.04.340.A. “Low Sulfur Fuel”) is fuel oil containing less than 0.9 percent sulfur by weight. “High Sulfur Fuel” is defined as fuel oil containing 0.9% wt. or more Sulfur. In accordance with EPA AP-42 Appendix A, page A-5, the heating value of diesel fuel is estimated at 137,000 BTU per gallon. Thus, 1 million BTU of heat input is equivalent to 7.3 gallons of diesel. At 7.05 lbs per gallon, 51.47 lbs of diesel will produce 1 million BTU. At 0.9% 51.47 lbs of diesel contains 0.46 lbs of sulfur. Combined with Oxygen to form SO<sub>2</sub>, and assuming 100% of the sulfur in the fuel forms SO<sub>2</sub>, this would yield 0.92 lb SO<sub>2</sub> per 1MMBtu. Thus, low sulfur fuel oil will produce 0.92 lbs of SO<sub>2</sub> per million BTU of heat input. This is roughly 8% less than the prescribed 1.0 pound SO<sub>2</sub> per million BTU limit.

Natural gas, gasoline, and No. 1 and 2 distillate fuel oils 1-D and 2-D Diesel, and jet fuels delivered to Pima County consistently show sulfur levels below the 0.5% wt. sulfur level as shown in fuel supplier certifications which verify the sulfur content of the fuel fired. The equipment specific fuel sulfur restrictions in the permit and the prohibition to use high sulfur oil in other fuel fired equipment at the facility allow for the omission of PCC 17.16.165.E and PCC 17.16.340.F. These rules are incorporated by reference in Attachment 1 of the permit.