TECHNICAL REVIEW DOCUMENT
for
RENEWAL
of
OPERATING PERMIT 95OPAR118

to be issued to:

US Air Force
Buckley Air Base Wing
Arapahoe County
Source ID 0050028

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June 11, 2002

I. Purpose

This document will establish the basis for decisions made regarding the applicable requirements, emissions factors, monitoring plan and compliance status of emission units covered by the renewed operating permit proposed for this site. The original Operating Permit was issued August 28, 1997, and expires on August 28, 2002. This document is designed for reference during the review of the proposed permit by the EPA, the public, and other interested parties. The conclusions made in this report are based on information provided in the renewal application submitted August 31, 2001; previous inspection reports, as well as telecommunications with the applicant. Please note that copies of the Technical Review Document for the original permit and any Technical Review Documents associated with subsequent modifications of the original Operating Permit may be found in the Division files as well as on the Division website at http://www.cdphe.state.co.us/ap/Titlev.html.

II. Source Description

This facility consists of an Air Force Base on approximately 3,250 acres of land. The Base is the headquarters for the 460 Air Base Wing. The installation transitioned from a Colorado Air National Guard Base to an Air Force Base on October 1, 2000. There are approximately 150 buildings on the Base with community and housing facilities being expanded. Approximately 6,000 military and civilian employees, including contract employees, work and/or live at Buckley AFB. A number of other military organizations are tenants on the installation (Air National Guard, Army National Guard, US Army, US Navy, Department of Defense).

The source inventory reports approximately 165 stationary combustion emission units, including natural gas-fired heating units, boilers, furnaces, roof heaters, hot water heaters, diesel engine driven electricity generators and natural gas-fired electricity generators. Primary fuel storage at the Base includes two 210,000-gallon JP-8 Aboveground Storage Tanks (ASTs), sixteen diesel ASTs ranging ranging in size from 12,000 to 42,000 gallons, a 4,000-gallon capacity gasoline AST, a 6,000-gallon capacity gasoline AST and three 12,000-gallon gasoline Underground Storage Tanks (USTs). An updated listing of the stationary emission units and the primary fuel storage tanks may be found in Appendix G of the Operating Permit.

III. Applicable Requirements

The facility is located in Aurora, Arapahoe County, Colorado. The facility is approximately 12 miles east of downtown Denver. There are no affected states within 50 miles of the plant. Eagles Nest Wilderness Area and Rocky Mountain National Park are Federal Class I designated areas within 100 kilometers of the Base. Florissant Fossil Beds is a Federal Class II land area within 100 kilometers of the facility. Florissant Fossil Beds has been designated by the State to have the same sulfur dioxide increment as Federal Class I areas.

The area in which the plant operates is designated as non-attainment for particulate matter smaller than 10 microns (PM_{10}). The Base is a synthetic minor source (permit limits < 100 tons per year) for the PM_{10} emissions under the Non-attainment area New Source Review (NANSR) provisions. It is expected that the Denver metropolitan area will be designated as attainment for PM_{10} sometime during 2002. The Base will be a minor source for particulate emissions if there is no change in the potential to emit for the particulate emissions prior to the designation of attainment.

The Denver metropolitan area achieved attainment status for ozone (VOC) emissions on October 11, 2001, and for carbon monoxide (CO) on January 14, 2002. The Base is now a minor source for CO and volatile organic compounds (VOC) (potential to emit less < 250 tons per year). The Base is a synthetic minor source for nitrogen oxides (NOx) and sulfur dioxide (SO_2) emissions under the Prevention of Significant Deterioration (PSD) provisions because the Base accepted permit limits that establish the potential to emit for these emissions at less than 250 tons per year. Future addition of new sources and modifications of existing sources at this facility resulting in a significant net emissions increase (See Regulation No. 3, Part A, Section I.B.37 and 58) for any pollutant as listed in Regulation No. 3, Part A, Section I.B.58 or a modification which is major by itself will result in the application of the PSD or NANSR review requirements as appropriate.

The facility is not subject to the requirements of Section 112(r)(7), the Accidental Release Plan Program of the Clean Air Act. There are no pollutant-specific emission units at the facility that use a control device to achieve compliance with any emission standard or limitation. Therefore, the Compliance Assurance Monitoring (CAM) rule provisions do not apply.

On June 8, 1992, the Base was issued Initial Approval for Construction Permit 90AR147. Compliance with the Title V requirements results in the Construction Permit being considered as Final Approval by the Division. The permit limits the Base emissions of criteria pollutants to levels just under the Prevention of Significant Deterioration/New Source Review (PSD/NSR) thresholds of 250 and 100 tons per year to allow the classification of the Base as a minor source for PSD/NSR considerations as previously discussed.

Construction Permit 90AR147 set emission limits for the Base, but not for individual stationary sources or groups of sources. The Construction Permit required Buckley to maintain a current inventory of all the stationary emission units, provide a procedure for the calculation of emissions from all the stationary emission units, report the annual fuel consumption, and submit APENs for new stationary sources as necessary. The reporting of the emissions from all the stationary emission units included reporting of the emissions from sources that could be exempt from reporting. As a result of difficulties in validating the

inventory, Buckley believed the various chains-of-command and personnel turnovers needed to be considered in establishing and maintaining the source inventory. A requirement for frequent reporting would establish the type of routine procedure that the military favors.

The Base has now been transferred from the Colorado Air National Guard to the US Air Force. The Air Force reviewed the inventory and the reporting process and requested the renewal of the Title V permit reduce the amount of reporting required. The Division accepts this request. The emissions from the significant sources will still be calculated on a monthly basis and records maintained, but the monthly reports no longer need to be submitted to the Division.

The Air Force requested the new Operating Permit separate the significant emissions sources and insignificant emission sources in the permit requirements. The Air Force compiled the breakout of the information in the following table. The information is typical of the emissions for the past five years.

Buckley AFB Calendar Year 2000 Estimated Actual Emissions						
	Criteria Pollutants					
Emission Source	CO, TPY	NOx, TPY	PM, TPY	PM_{10}, TPY	SO_2, TPY	VOC, TPY
NG Boilers, Furnaces, Heaters, <0.3 MMBtu/hr	0.14	0.34	0.03	0.03	0.00	0.02
NG Boilers, Furnaces, Heaters, 0.3-10 MMBtu/hr	4.93	5.87	0.45	0.45	0.04	0.32
NG Boilers, Furnaces, Heaters with diesel backup	3.16	3.77	0.29	0.29	0.02	0.21
Diesel Generators =< 600 HP	0.28	1.32	0.09	0.09	0.096	0.11
Diesel Generators > 600 HP	19.56	85.34	1.75	1.43	14.39	2.28
Arresting Barrier Gasoline Engines	0.37	0.01	0.00	0.00	0.00	0.02
Jet Engine Test Cell (Hush House)	2.45	2.14	0.05	0.05	0.07	1.36
Internal Floating Roof Fuel Storage Tanks	--	--	--	--	--	0.03
Horizontal Fuel Storage Tanks	--	--	--	--	--	2.42
Fuel Transfer Losses	--	--	--	--	--	0.20
Chemical Usage	--	--	--	--	--	0.82
Paint Usage	--	--	--	--	--	0.20
Degreasers	--	--	--	--	--	0.45
Fuel Cell Maintenance	--	--	--	--	--	0.03
Aircraft Deicing	--	--	--	--	--	0.10
Paper Shredder	--	--	0.01	0.01	--	--
Small Arms Firing	0.11	--	--	--	--	--
Welding	--	--	0	0	--	--
Woodworking	--	--	0.09	0.09	--	--
Cooling Towers	--	--	0.54	0.54	--	--
Rock Crusher	--	--	0.11	0.11	--	--

Open Flame Charbroiling (Dining facility)	--	--	0.13	0.13	--	0.02
Total Stationary Sources (TPY)	**31.00**	**98.79**	**3.54**	**3.22**	**14.61**	**8.59**
Operating Permit Limits (TPY)	**99.9**	**249.9**	**99.9**	**99.9**	**249.9**	**99.9**

The group of significant emission sources in the list have been shaded. Because the actual emissions are much lower than the permit limits, it is unlikely that emissions from the insignificant sources could result in the Base exceeding the permit limits. The Division accepts the information prepared by Buckley supports the request to modify the permit to separate the insignificant sources from the significant sources. While some of the groups of sources have insignificant levels of emissions they are subject to applicable requirements, other than emissions reporting or emission limits, that must be identified in the Operating Permit. The Division believes the previous difficulty in maintaining a current inventory of the sources warrants more than a casual tracking of the sources. Updating the complete stationary source inventory on an annual basis would serve the purpose. Any new significant sources or group of sources identified or insignificant sources or group of sources that are found to be subject to applicable requirements, will require the submittal of an APEN and a construction permit or combination construction permit/operating permit application. The air pollutant emissions contribution from the new source(s) will be included within the permitted emission limit of the existing Construction Permit (90AR147) until the existing permit limits may be exceeded. The construction permit or the combination construction permit/operating permit for the new source(s) may establish specific annual emission limits for the source and will set forth any specific regulatory requirements for the source such as MACT, NSPS, etc., and possible short term emission limits that may be required by regulation.

The modification of the conditions of Construction Permit 90AR147 necessary to separate the significant and insignificant sources is being done directly in this Operating Permit. The normal procedure is to note the Construction Permit condition being modified at an appropriate location in the Operating Permit. In this case, an attempt to include notations of modifications, deletions or reorganization of Construction Permit 90AR147 in the Operating Permit had the potential to create major confusion. The modification of the Construction Permit is identified as a general note under Section I, Condition 1.3 that cites the authority to make a direct modification of a construction permit, as opposed to attempting a condition by notation in the body of the Operating Permit.

The fuel burning equipment is categorically exempt from the Colorado regulations when operating with natural gas. However, some of the equipment is equipped to combust diesel fuel in the event of a curtailment of the natural gas supply. The combustion of the diesel fuel is subject to the particulate standard in Colorado Regulation No. 1, Section III.A.1.a and Section III.A.1.b. The regulation requires compliance with a particulate matter emission limit of 0.5 pounds per million Btu for equipment rated at less than 1 million Btu per hour of heat input. For the Base fuel burning equipment with heat inputs greater than 1 million Btu per hour, the limit is based on the following equation:

$PE = 0.5(FI)^{-0.26}$ where FI = Fuel Input in Million Btu per Hour, and
PE = Particulate Emission limit in pounds per million Btu of heat input.

For 1 MMBtu/hr equipment: $0.5\ (1)^{-0.26} = 0.50$ lb/MMBtu

For 10 MMBtu/hr equipment: $0.5\ (10)^{-0.26} = 0.28$ lb/MMBtu

Applicable requirements for operating on diesel fuel must be included in the Operating Permit because the emissions are subject to the following two provisions:

> Regulation No. 1, §VI.A.3.b sets a standard of 1.5 pounds of sulfur dioxide per million Btu of heating input for fuel burning equipment with a heat input of less than 300 million Btu/hr constructed or modified prior to October 27, 1977.
>
> Regulation No. 6, §B.II.D.2.a sets a standard of 0.8 pounds of sulfur dioxide per million Btu of oil heat input for fuel burning equipment with a oil heat input of less than 250 million Btu/hr constructed, reconstructed, or modified after January 30, 1979.

The manufacturers of the equipment recommend the fuel switching and the diesel fuel burning components be routinely exercised to ensure they are in working order when needed. The exercise results in routine short intervals, generally less than ten (10) minutes, of operation with diesel fuel. These routine exercises have been exempted from the permit requirements unless there is credible evidence to indicate non-compliance.

Buckley requested to use biodiesel in addition to No. 2 distillate. Biodiesel is available as an alternative fuel. Biodiesel may be used neat or in a mixture with petroleum diesel. Biodiesel is reported to reduce emissions of hydrocarbons, carbon monoxide and some hazardous air pollutants but have a slight increase in nitrogen oxides when compared to petroleum diesel. No published emission factors were provided for biodiesel. The Division accepts the use of biodiesel but the emission factors for petroleum diesel are to used unless Buckley elects to conduct the performance tests necessary to establish the emission factors for the internal combustion engines and the fuel burning equipment.

A number of the fuel storage tanks are subject to the provisions of the New Source Performance Standards (NSPS) Subpart Kb titled "Standards of Performance for Volatile Organic Liquid Storage Vessels (including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984". The Kb provisions require Buckley to maintain a record of the dimensions and an analysis of the capacity of the tanks for the life of the tanks. The dimensions and the capacity of the subject tanks are listed in Appendix G of the Operating Permit.

IV. Emission Factors

From time to time published emission factors are changed based on new or improved data. A logical concern is what happens if the use of the new emission factor in a calculation results in a source being out of compliance with a permit limit. For this Operating Permit, the emission factors or emission factor equations included in the permit are considered to be fixed until changed by a modification of the permit. Obviously, factors dependent on the fuel sulfur content or heat content cannot be fixed and will vary with the test results. The formula for determining the emission factors is, however, fixed. It is Buckley's responsibility to be aware of changes in the factors, and to notify the Division in writing of impacts on the permit requirements when there is a change in factors. Upon notification, the Division will work with Buckley to

address the situation.

Regulation No. 3, Part A, Section II.B.1. establishes a ranking for methods for estimating emissions. The use of emission factors from actual test data is required where the information is available. Emission factors published in the EPA Document AP-42, Compilation of Air Pollutant Emission Factors is the next choice, followed by emission factors published in other sources acceptable to the Division, mass balance calculations and other engineering calculations. Buckley may elect to use emission factors greater than AP-42 in order to provide a conservative emissions estimate or in the belief that a higher factor is more representative of the performance of the source. The Division generally accepts the request to use emission factors greater than AP-42 without the need for validation. The use of emission factors lower than AP-42 must be validated by a source performance test.

For reference the following emission factors are to be used for estimating the emissions for the sources listed. Fuel storage tank emissions are to be estimated from the most current version of the EPA TANKS computer program or by the use of AP-42 emission factors.

APEN GROUP	EMISSION FACTORS					
	PM	PM_{10}	SO_2	NOx	VOC	CO
Boilers 0.3 to 10MMBtu/Hr Diesel Fuel	1.7 lb/10^3gal	1.7 lb/10^3gal	7.10 lb/10^3gal	18.0 lb/10^3gal	0.3 lb/10^3gal	5.0 lb/10^3gal
Diesel Engine Powered Generators > 600 HP	0.30 gm/kw-hr	0.24 gm/kw-hr	0.246 gm/kw-hr	14.59 gm/kw-hr	0.39 gm/kw-hr	3.34 gm/kw-hr
Jet Engine Test Cell (Hush House)	lb/hour	lb/hour	lb/hour	lb/hour	lb/hour	lb/hour
Power Settings: Idle	1.62	1.62	0.56	5.62	1.1	26.1
Power Settings: Intermed	1.1	1.1	3.4	120.0	1.25	14.5
Power Settings: Afterburner	6.1	6.1	8.5	255.0	1135.0	1597.0

V. Monitoring

The Operating Permit requires the source inventory be validated at least once per year, but it may be updated as often as desired. The current inventory is to be maintained on file and made available to the Division for review. The emissions from the insignificant sources are to estimated once per calendar year but do not have to be reported to the Division. The estimation will provide information to indicate if an insignificant source may be exceeding the APEN reporting threshold and allow tracking of the total emission contribution from the insignificant sources.

Low sulfur No. 2 distillate meeting the requirements of ASTM D396 has a maximum sulfur content of 0.05%. The following calculations demonstrate that the fuel limitations preclude the diesel fuel burning equipment from exceeding the particulate limits of 0.28 and 0.5 pounds per million Btu of heat input set by Regulation No. 1, the sulfur dioxide standard of 1.5 pounds per million Btu set by Regulation No. 1 and the 0.8 pounds per million Btu set by Regulation No. 6.

Particulate Matter:

Diesel Fuel: $\frac{1.7\ \text{lb}}{1000\ \text{gal}} \text{ X } \frac{\text{gal}}{139{,}000\ \text{Btu}} \text{ X } \frac{1{,}000{,}000}{\text{MM}} = 0.0122\ \frac{\text{lb}}{\text{MMBtu}} < 0.28 \text{ or } 0.50\ \frac{\text{lb}}{\text{MMBtu}}$

Sulfur Dioxide:

Diesel Fuel: $\frac{142\ \text{X}\ 0.05\ \text{lb}}{1000\ \text{gal}} \text{ X } \frac{\text{gal}}{139{,}000\ \text{Btu}} \text{ X } \frac{1{,}000{,}000}{\text{MM}} = 0.051\ \frac{\text{lb}}{\text{MMBtu}} < 0.8 \text{ or } 1.5\ \frac{\text{lb}}{\text{MMBtu}}$

Buckley only needs to retain a file copy of the above calculations for demonstrating this compliance in the absence of any other credible evidence.

The Division has determined, based on AP-42 emission factors and engineering judgment, that particulate emissions from the fuel burning equipment will be insignificant when pipeline quality natural gas is used as fuel. A restriction to using only pipeline quality natural gas for the insignificant sources of fuel burning equipment will be adequate for demonstrating compliance with the opacity standard if there is no credible evidence to the contrary.

The permit limits are established as 12 month rolling totals. This requires the emissions from the significant sources to be calculated each month. Buckley will need to be mindful that a significant increase in the operating time for the large diesel engine driven generators has the potential to challenge the permit limits.

The Air Force requires the large diesel engine driven generators to be operating in the standby mode for specifically defined conditions. These conditions relate to the potential for the loss of electricity supplied by commercial sources. A typical situation is the requirement for standby operation during late afternoon and early evening summer thunderstorms, winter snow storms or similar types of weather. Shutdown from the standby operation may occur after darkness, or the entire standby operation may occur during the night. The severe weather conditions and darkness may preclude the performance of a Method 9 opacity observation during the operation of the engines. The Air Force requested not to have to continue to operate the engine(s), or to have to re-start the engines, just to comply with the requirement to perform an opacity observation. The opacity monitoring requirements have been modified to reflect this request.

VI. Compliance

The renewal application and a recent inspection report identified non-compliance issues. The non-compliance identified in the application was a result of a delay in implementing a computerized system for tracking the hazardous air pollutant emissions. Buckley has committed to the schedule below to correct the non-compliance. The installation and operation of the Environmental Management Information System (EMIS) is to include training base personnel for proper chemical purchasing and approval procedures, hazardous materials and Material Safety Data Sheets (MSDS) training, computer training including EMIS software and data base training. The EMIS software is to be installed throughout the Base with accessibility through a common computer host server.

a. By March 16, 2002

Provide user access to EMIS database for all of Buckley's tenants

b. By April 16, 2002

Provide EMIS and product ordering procedures training for all tenant POCs.

c. After April 16, 2002

Regularly inspect tenants for approved chemical products and storage inventory volumes upon completion of tenant training.

The compliance schedule listed above will be completed prior to the issuance of the renewal of the Operating Permit. The schedule is not included in the Operating Permit because it would not be applicable at the time this renewed Operating Permit will be issued.

An inspection identified the installation of three (3) gasoline storage tanks for the AAFES Exchange that did not have a proper construction permit. An application for the construction permit was submitted, Construction Permit 01AR0868S was issued with Initial Approval and the applicable requirements incorporated into this Operating Permit. Since the gasoline storage tanks covered by th Initial Approval will have been operating for more than 180 days by the due date of the first semi-annual monitoring report required by this Operating Permit, the Division considers that the Responsible Official certification submitted with that report will serve as the self-certification of compliance for Construction Permit 01AR0868S.

The Division accepts that the actions taken by the Base has resulted in the Base being in compliance with all the applicable requirements at the time this permit is issued.