Air Quality Permitting
Statement of Basis

May 14, 2007

Permit to Construct No. P-060048

The United States Air Force, Mountain Home Air Force Base (MHAFB)
Mountain Home, ID

Facility ID No. 039-00001

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FINAL

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Acronyms, Units, and Chemical Nomenclatures

AACC	acceptable ambient concentrations
acfm	actual cubic foot per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
EF	emissions factor
EI	emissions inventory
EPA	U.S. Environmental Protection Agency
HAP	Hazardous Air Pollutant
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
MACT	Maximum Achievable Control Technology
MHAFB	Mountain Home Air Force Base
NAAQS	national ambient air quality standard
HC	hydrocarbons
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NOx	nitrogen oxides
NSPS	New Source Performance Standards
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
Rules	Rules for the Control of Air Pollution in Idaho
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SO_2	sulfur dioxide
TAP	toxic air pollutant
$\mu g/m^3$	micrograms per cubic meter
UTM	Universal Transverse Mercator
VOC	volatile organic compound

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, Rules for the Control of Air Pollution in Idaho, for issuing permits to construct.

2. FACILITY DESCRIPTION

Mountain Home Air Force Base (MHAFB) is a military base under the command of the U.S. Air Force. The base houses the 366th Composite Wing, which is classified as an Air Force Flighter Wing. The wing consists of F-15C, F-15E, and F-16 flighters only. To support the aircraft mission, and the Air Force personnel and their dependents, the base operates a number of facilities that are air pollution sources, which include the following:

- Aircraft operation and maintenance
- Aircraft engine testing
- Ground vehicle operation and maintenance
- Hospital
- Portable sources
- Base maintenance activities
- A Hurst boiler and three CAT emergency generators
- A group of four barrier flight line generators
- The activities at the base also include a large number of air pollution sources classified as insignificant activities in accordance with IDAPA 58.01.01.317

3. FACILITY / AREA CLASSIFICATION

When all sources are aggregated, MHAFB is a major facility as defined in IDAPA 58.01.01.008.10, but it is not a PSD major facility. The facility is not a designated facility as defined in IDAPA 58.01.01.006. The AIRS facility classification is "A." The primary activity at the facility is classified as SIC 9711, national security. However, the base contains a number of different activities that are separately classified (e.g., the base hospital is classified as SIC 8062, general medical and surgical hospitals; the Army/Air Force Exchange Service gasoline service station is classified as SIC 5541, gasoline filling stations retail.)

The facility is located within AQCR 63 and UTM zone 11. The facility is located in Elmore County which is designated as unclassifiable for all regulated criteria pollutants (i.e., PM_{10}, CO, NO_X, SO_2, lead, and ozone).

The AIRS information provided in Appendix A defines the classification for each regulated air pollutant at MHAFB. This required information is entered into the EPA AIRs database.

4. APPLICATION SCOPE

The application is for a group of four barrier flight line generators discovered during the 2004 Air Emissions Inventory preparation performed in 2005. The four existing barrier flight line generators do not meet the PTC exemption criteria contained in Sections 220 through 223 of the Rules. Therefore, a Permit to Construct (PTC) is required.

4.1 Application Chronology

August 22, 2006	DEQ received the PTC application.
September 21, 2006	DEQ declared the application complete.
November 20, 2006	DEQ issued the draft permit for facility review.
March 14, 2007	DEQ issued the second draft permit requested by the applicant for facility review.

5. PERMIT ANALYSIS

This section of the Statement of Basis describes the regulatory requirements for this PTC action.

5.1 Equipment Listing

Four barrier flight line generators. Each generator has the same specifications as the following:

Barrier flight line generator

Manufacturer:	Wisconsin Motors LLC
Model:	V465D
Rated power output capacity:	65.9 horsepower

Stack Information

Stack height:	13 feet[a]
Stack diameter:	2.5 inch[a]
Stack flowrate:	483 acfm
Stack temperature:	1,300 °F

[a] Obtained from the modeling memo.

5.2 Emissions Inventory

A detailed emissions inventory (EI), including toxic air pollutants (TAPs) emissions, was provided in the PTC application. The EI has been reviewed by DEQ. It appears to be acceptable with facility's proposed operating hours. Tables 5.1 and 5.2 provide a summary of the EI for criteria pollutants and TAPs. The detailed EI can be found in Appendix B.

Table 5.1 EMISSIONS ESTIMATES[a]

Emissions Unit	PM_{10}[c]		SO_2[c]		VOC[b]		NO_x[b]		CO[b]	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Each individual barrier flight line generator	0.048	0.006	0.039	0.005	0.3	0.04	0.4	0.05	30.1	3.8
Four barrier flight line generators total	0.19	0.024	0.156	0.019	1.3	0.16	1.6	0.19	120.3	15.0

a Based on maximum annual operating hour of 250 for each individual barrier flight line generator.
b Using emission factors provided by the manufacturer (Wisconsin Motors, LLC) in June 2004 for Gasoline engine - V465D for CO, NOx, and hydrocarbons (HC). Assume HC refers to volatile organic compounds.
c Using emission factors, AP-42, Section 3.3, Table 3.3-1 (rev. 10/96).

Table 5.2 TAP EMISSIONS ESTIMATES[a]

TAPs[c]	Four barrier flight line generators total	Four barrier flight line generators total
	lb/hr	Ton/yr
Aldehydes[b]	0.13	0.03
Benzene[c]	0.0236	0.003
Ethylbenzene[c]	0.0184	0.002
Hexane[c]	0.0131	0.002
Cumene[c]	0.0066	0.001
Methyl tert-butyl ether[c]	0.0591	0.007
Naphthalene[c]	0.0039	0.000
Toluene[c]	0.0919	0.011
2,2,4-Trimethylpentane[c]	0.0525	0.007
Xylenes[c]	0.0919	0.011

a Based on maximum annual operating hour of 250 for each individual barrier flight line generator.
b Using emission factors, AP-42, Section 3.3, Table 3.3-1 (version 10/96).
c TAP emission factors are not available for Gasoline. Therefore liquid-phase speciation was used to estimate the TAP present in the HC. Liquid-phase speciation provided by The US Air Force Guidance for Stationary Sources, IERA, May 1999, Appendix E

5.3 Modeling

The facility has demonstrated compliance to DEQ's satisfaction that emissions from this project will not cause or significantly contribute to a violation of any ambient air quality standard. A summary of the modeling analysis is presented in Table 5.3. Detailed modeling analysis can be found in Appendix C.

Table 5.3 FULL IMPACT ANALYSIS RESULTS

Pollutant	Averaging Period	Project Ambient Impact (μg/m^3)	Background concentration (μg/m^3)	Total Ambient Concentration (μg/m^3)	NAAQS or AACC (μg/m^3)	Percent of NAAQS
NO_2	Annual	0.10	17	17.1	100	17%
SO_2	3-hr	0.01	8	8.0	80	10%
	24-hr	2.12	26	28.1	365	8%
	Annual	4.16	34	38.2	1300	3%
CO	1-hour	5508.58	3600	9,108.6	40,000	23%
	8-hour	2128.52	2300	4,428.5	10,000	44%
PM_{10}	24-hour	2.62	73	75.6	150	50%
	Annual	0.01	26	26.0	50	52%
Benzene	Annual	0.00141	NA	NA	0.12	1.2%

5.4 Regulatory Review

This section describes the regulatory analysis of the applicable air quality rules with respect to this PTC.

IDAPA 58.01.01.201.....PTC Required

The facility's existing four barrier flight line generators do not meet the PTC exemption criteria contained in Sections 220 through 223 of the Rules. Therefore, a PTC is required.

IDAPA 58.01.01.203.02.....NAAQS

"*No permit to construct shall be granted for a new or modified stationary source unless the applicant shows to the satisfaction of the Department all of the following:….02. NAAQS….*"

The facility has demonstrated compliance, to DEQ's satisfaction, that this project will not cause or significantly contribute to a violation of any ambient air quality standards.

IDAPA 58.01.01.203.03.....Toxic Air Pollutants

The Benzene emissions rate exceeded its screen emissions level. It was modeled, and the modeled ambient concentration was less than the acceptable ambient concentrations (AACC). Therefore, the facility demonstrated compliance with IDAPA 58.01.01.203.03.

IDAPA 58.01.01.625.....Visible Emissions

This regulation states that any point of emission shall not have a discharge of any air pollutant for a period aggregating more than three minutes in any 60-minute period of greater than 20% opacity. The exhaust vent/stack of each barrier flight line generator is subject to this regulation.

IDAPA 58.01.01.209.05.a.....Permit to Construct Procedures for Tier I Sources

MHAFB is a Tier I source. This PTC is issued in accordance with IDAPA 58.01.01.209.05.a. This PTC will be incorporated into the Tier I operating permit during renewal.

<u>Non-Applicable to the Four Barrier Flight Line Generators</u>

IDAPA 58.01.01 675.....Fuel Burning Equipment

This regulation establishes particulate matter emission standards (grain loading standards) for fuel burning equipment. Fuel burning equipment is defined in IDAPA 58.01.01.006 as, "*Any furnace, boiler, apparatus, stack and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer*."

The generators are internal combustion engines. The combustion of the fuel takes place in a confined space, producing expanding gases that are used directly to provide mechanical power. The engines do not produce heat or power through indirect heat transfer. Therefore, it is not fuel burning equipment as defined in IDAPA 58.01.01, and this regulation does not apply to the generators.

40 CFR 60 Subpart IIII .....Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

The applicant provided the following information through an email on May 9, 2007:

"40 CFR Subpart IIII is only applicable to compression ignition engines. The flight line arrestors at MHAFB use gasoline. If the engine is using gasoline, then it is not a compression ignition, it should be a spark ignition engine. Wisconsin motors verified that the model V456D are spark ignition. 40 CFR subpart IIII is applicable to compression ignition engines (diesel engines) so it would not be applicable to the spark ignition engines being permitted at MHAFB. 40 CFR Subpart JJJJ is the draft regulation that will cover spark ignition engines but it does not have final approval yet."

40 CFR 60 Subpart GG.....Standards of Performance for Stationary Gas Turbines

The four barrier flight line generators are not subject to this regulation because they are not gas turbines.

40 CFR 63 Subpart ZZZZ.....National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

The four barrier flight line generators are not subject to this regulation because MHAFB is not a major source to emit hazardous air pollutants (HAPs).

5.5 Permit Conditions Review

PTC Scope

5.1 Permit Condition 1.1 states the purpose of this permit action.

5.2 Table 1.1 lists all the regulated sources in this permit.

Four barrier flight line generators

5.3 Permit Conditions 2.1 and 2.2 describe the four barrier flight line generators and their emissions control.

5.4 Permit Conditions 2.3 establishes the annual PM_{10} emissions limit to ensure the compliance with annual PM_{10} NAAQS. The averaging time for this limit is a calendar year because the PM_{10} NAAQS is based on a calendar year average and the PM_{10} annual impact was modeled based on a calendar year average.

Emissions for CO, NO_X, and SO_2 were are not included in the permit as permit limits because they are inherently limited by the annual PM_{10} emissions limits for the long-term emissions and by the design capacity of the engines for the short-term emissions.

Benzene emissions limit is not needed because the modeled impact of uncontrolled benzene emissions increment was less than AACC.

To ensure compliance with the PM_{10} emissions limits, 1) Permit Condition 2.5 requires the permittee to operate and maintain the four barrier flight line generators in accordance with the manufacturer's recommendations and specifications; 2) Permit Condition 2.6 establishes the annual operating hour limit for each barrier flight line generator; and 3) Permit Condition 2.7 requires the permittee to keep records on site for the most recent five-year period.

Per the applicant's request, the annual operating hours for each engine will be recorded based on 12-month rolling average that is more stringent than calendar year average.

5.5 Permit Condition 2.4 limits the opacity of all visible emissions from any stack, vent, or other functionally equivalent opening to no more that 20% for a period or periods exceeding three minutes in any 60 minutes period.

To ensure compliance with this limit, Permit Conditions 2.5 requires the permittee to operate and maintain the four barrier flight line generators in accordance with the manufacturer's recommendations and specifications; and Permit Condition 2.8 requires the permittee to comply with facility-wide visible emissions monitoring in the Tier I operating permit.

PTC General Provisions

5.6 Section 3 of the permit contains PTC General Provisions.

6. PERMIT FEES

MHAFB submitted a $1,000 PTC application fee on August 22, 2006, in accordance with IDAPA 58.01.01.224. MHAFB's emissions increase is between 10 to 100 tons range. In accordance with IDAPA 58.01.01.225, the PTC processing fee is $5,000. DEQ received the processing fee on February 20, 2007. MHAFB is a major source and is subject to Tier I fees. MHAFB is current on the Tier I fees.

Table 6.1 PTC PROCESSING FEE TABLE

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
NO_X	0.19	0	0.19
SO_2	0.019	0	0.019
CO	15.0	0	15.0
PM_{10}	0.024	0	0.024
VOC	0.16	0	0.16
TAPS/HAPS	0.074	0	0.074
Total:	15.5	0	15.5
Fee Due	**$ 5,000.00**		

7. PERMIT REVIEW

7.1 Regional Review of Draft Permit

The draft permit was made available for Boise Regional Office review on November 10, 2006. There were no comments received on the draft permit.

7.2 Facility Review of Draft Permit

The draft permit was provided for facility review on November 20, 2006. The second draft permit requested by the applicant was provided for facility review on March 14, 2007. Comments on the second draft permit were received through an email on May 9, 2007. The comments are addressed in the final permit.

7.3 Public Comment

An opportunity for public comment period on the PTC application was provided in accordance with IDAPA 58.01.01.209.01.c. During this time, there were not comments on the application and no requests for a public comment period on DEQ's proposed action.

8. RECOMMENDATION

Based on review of application materials, and all applicable state and federal rules and regulations, staff recommend that MHAFB be issued the final PTC No. P-060048 for the four barrier flight line generators. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD requirements.

SYC Permit No. P-060048

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Appendix A

AIRS Information

P-060048

AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

Facility Name: **The United States Air Force, Mountain Home Air Force Base (MHAFB)**
Facility Location: **Mountain Home, Idaho**
AIRS Number: **039-00001**

AIR PROGRAM POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	SM80	TITLE V	AREA CLASSIFICATION A-Attainment U-Unclassified N- Nonattainment
SO_2	B						B	U
NO_x	A						A	U
CO	A						A	U
PM_{10}	B						B	U
PT (Particulate)	B						B	
VOC	B						B	U
THAP (Total HAPs)	B							
			APPLICABLE SUBPART					

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAPs only, class "A" is applied to each pollutant which is at or above the 10 T/yr threshold, **or** each pollutant that is below the 10 T/yr threshold, but contributes to a plant total in excess of 25 T/yr of all HAPs.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

Appendix B

Emissions Inventory

P-060048

Appendix C of Mountain Home AFB Synthetic Minor Permit Application June 2006

Barrier Flight Line Generator Units - Potential to Emit

Assumptions

No. of engines	4	
Fuel type:	Gasoline	
Power (hp)	65.9	
Maximum Usage (hr/yr)[a]	250	
1 lb =	453.6	grams

Criteria Pollutants

Pollutant	EF	Individual Emissions			Total Emissions (4 Generators)		
	(g/hp-hr)	(lb/hr)	(lb/yr)	(tons/yr)	(lb/hr)	(lb/yr)	(tons/yr)
CO[b]	207	30.1	7,518	3.8	120.3	30,073	15.0
NOx[b]	2.67	0.4	97	0.05	1.6	388	0.19
HC[b]	2.26	0.3	82	0.04	1.3	328	0.16
	(lb/hp-hr)	(lb/hr)	(lb/yr)	(tons/yr)	(lb/hr)	(lb/yr)	(tons/yr)
SOx[c]	5.91E-04	0.039	9.7	0.005	0.156	38.9	0.019
PM_{10}[c]	7.21E-04	0.048	11.9	0.006	0.190	47.5	0.024

Hazardous Air Pollutants

Pollutant	Cas No	EF	Individual Emissions			Total Emissions (4 Generators)			IDAPA 58.01.01.585/586	Comparison
		(lb/hp-hr)	(lb/hr)	(lb/yr)	(tons/yr)	(lb/hr)	(lb/yr)	(tons/yr)	EL (lb/hr)	
Aldehydes[c]	NA	4.85E-04	0.03	14.50	0.01	0.13	57.99	0.03	NA	

Speciated Organic Compound Emissions in HC[d]

Pollutant	Cas No	wt% in liquid-phase	Individual Emissions			Total Emissions (4 Generators)			IDAPA 58.01.01.585/586	Comparison
			(lb/hr)	(lb/yr)	(tons/yr)	(lb/hr)	(lb/yr)	(tons/yr)	EL (lb/hr)	
Benzene	71-43-2	1.8	0.006	1.478	0.0007	0.0236	5.91	0.003	8.00E-04	**Exceeds**
Ethylbenzene	100-41-4	1.4	0.005	1.149	0.0006	0.0184	4.60	0.002	29	Below
Hexane	110-54-3	1	0.003	0.821	0.0004	0.0131	3.28	0.002	12	Below
Cumene	98-82-8	0.5	0.002	0.410	0.0002	0.0066	1.64	0.001	16.3	Below
Methyl tert-butyl ether	1634-04-4	4.5	0.015	3.694	0.0018	0.0591	14.78	0.007	NA	
Naphthalene	91-20-3	0.3	0.001	0.246	0.0001	0.0039	0.99	0.000	3.33	Below
Toluene	108-88-3	7	0.023	5.746	0.0029	0.0919	22.98	0.011	25	Below
2,2,4-Trimethylpentane	540-84-1	4	0.013	3.283	0.0016	0.0525	13.13	0.007	23.3	Below
Xylenes	1330-20-7	7	0.023	5.746	0.0029	0.0919	22.98	0.011	29	Below

Notes:

[a] Self imposted limit

[b] Emission factors provided by manufacturer (Wisconsin Motors, LLC), Gasoline engine - V465D, June 2004, for CO, NOx, and HC.
Assume hydrocarbons (HC) refers to volatile organic compounds.
[c] Emission factors, AP-42, Section 3.3, Table 3.3-1, Web site August
2005.

[d] HAP emission factors are not available for Gasoline. Therefore liquid-phase speciation was used to estimate the HAP present in the HC.
Liquid-phase speciation provided by The US Air Force Guidance for Stationary Sources, IERA, May 1999, Appendix E.

Appendix C

Modeling Review

P-060048

MEMORANDUM

DATE: November 15, 2006

TO: Shawnee Chen, P.E., Senior Air Quality Engineer, Air Program

FROM: Darrin Mehr, Air Quality Analyst, Air Program

PROJECT NUMBER: P-060048

SUBJECT: Modeling Review for Mountain Home Air Force Base Permit to Construct Application for Four Flightline Barrier Generator Engines for their facility near Mountain Home, Idaho.

1.0 Summary

The Mountain Home Air Force Base (MHAFB) submitted a Permit to Construct (PTC) application for the installation of four flightline barrier generators (FBGs). The FBGs are already in place and were discovered by MHAFB during the preparation of an emission inventory in April 2005. Each generator engine is rated at 65.9 horsepower (hp) and operates on gasoline. Air quality analyses involving atmospheric dispersion modeling of emissions associated with the facility were submitted in support of a permit application to demonstrate that the facility would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02).

An ambient impact modeling demonstration was submitted by MHAFB for criteria air pollutants for compliance with National Ambient Air Quality Standards (NAAQS) and benzene for compliance with the IDAPA 58.01.01.586 toxic air pollutant (TAP) increment.

A technical review of the submitted air quality analyses was conducted by DEQ. The submitted modeling analyses in combination with DEQ's staff analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed that predicted pollutant concentrations from emissions associated with the facility, when appropriately combined with background concentrations, were below applicable air quality standards at all receptor locations. Table 1 presents key assumptions and results that should be considered in the development of the permit.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
Flightline barrier generator engines were assumed to be operated 24 hours per day for each generator. All four generators were assumed to operate concurrently during the same day. Annual emission rates of each existing FLB generator engine were scaled to account for 250 hours per year.	Daily operation of each generator is not limited. Annual testing operating hours for each existing flightline barrier generator engine should be limited to 250 hours per year.
Emissions of all criteria air pollutants, except carbon monoxide, were below modeling thresholds.	DEQ only reviewed carbon monoxide ambient impacts for compliance with NAAQS.
The anemometer height was corrected to a user input value of 6.1 meters.	The 6.1 meter height is accurate for the time period of the 1987-1991 meteorological data sets at the Boise airport met site.

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2.0 Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 Area Classification

The MHAFB facility is located in Elmore County, designated as an attainment or unclassifiable area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}).

2.1.2 Significant and Full Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources at the facility exceed the significant contribution levels (SCLs) of IDAPA 58.01.01.006.90, then a full impact analysis is necessary to demonstrate compliance with IDAPA 58.01.01.203.02. A full impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the National Ambient Air Quality Standards (NAAQS) listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS.

Table 2. CRITERIA AIR POLLUTANTS APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Contribution Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual	1.0	50[f]	Maximum 1st highest[g]
	24-hour	5.0	150[h]	Maximum 6th highest[i]
Carbon monoxide (CO)	8-hour	500	10,000[j]	Maximum 2nd highest[g]
	1-hour	2,000	40,000[j]	Maximum 2nd highest[g]
Sulfur Dioxide (SO_2)	Annual	1.0	80[f]	Maximum 1st highest[g]
	24-hour	5	365[j]	Maximum 2nd highest[g]
	3-hour	25	1,300[j]	Maximum 2nd highest[g]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[f]	Maximum 1st highest[g]
Lead (Pb)	Quarterly	NA	1.5[h]	Maximum 1st highest[g]

[a]IDAPA 58.01.01.006.90
[b]Micrograms per cubic meter
[c]IDAPA 58.01.01.577 for criteria pollutants
[d]The maximum 1st highest modeled value is always used for significant impact analysis
[e]Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[f]Never expected to be exceeded in any calendar year
[g]Concentration at any modeled receptor
[h]Never expected to be exceeded more than once in any calendar year
[i]Concentration at any modeled receptor when using five years of meteorological data
[j]Not to be exceeded more than once per year

The increase in emissions from the modification to the MHAFB facility are required to demonstrate compliance with the toxic air pollutant (TAP) increments with an ambient impact dispersion analysis for any TAP with a requested potential emission rate that exceeds the screening emission rate limit specified by IDAPA 58.01.01.585 or 58.01.01.586. Table 3 lists the applicable screening emission rates and regulatory limits (allowable increments) for the TAPs of concern for this project.

Table 3. TOXIC AIR POLLUTANTS APPLICABLE REGULATORY LIMITS				
Pollutant	**Averaging Period**	**Screening Emission Rate Limit[a] (lb/hr)[b]**	**Regulatory Limit (AACC)[c] (μg/m³)[d]**	**Modeled Value Used[e]**
Benzene (CAS[f]# 71-43-2)	Annual	8.0E-04	0.12	Maximum 1st highest[g]

[a]IDAPA 58.01.01.585 and 58.01.01.586
[b]Pounds per hour
[c]Increment for acceptable ambient concentration for carcinogens
[d]Micrograms per cubic meter
[e]The maximum 1st highest modeled value is always used to establish TAPs compliance
[f]Chemical abstract service
[g]Concentration at any modeled receptor, never expected to be exceeded in any calendar year

2.2 Background Concentrations

Ambient background concentrations were revised for all areas of Idaho by DEQ in March 2003[1]. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. Background concentrations used in these analyses are listed in Table 4, and were based on generic concentrations for rural/agricultural locations.

Table 4. BACKGROUND CONCENTRATIONS		
Pollutant	**Averaging Period**	**Background Concentration (μg/m³)[a]**
PM_{10}[b]	24-hour	73
	Annual	26
NO_2[c]	Annual	17
CO[d]	1-hour	3,600
	8-hour	2,200
SO_2[e]	3-hour	34
	24-hour	26
	Annual	8

[a]Micrograms per cubic meter
[b]Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[c]Nitrogen dioxide

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

Table 5 provides a summary of the modeling parameters used in the DEQ verification analyses.

The application's modeling demonstration only addressed the installation four flightline barrier generators instead of the facility-wide demonstration for the original Tier II permitting project that the modeling protocol was intended to address.

1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

Table 5. MODELING PARAMETERS		
Parameter	**Description/Values**	**Documentation/Additional Description**
Model	ISCST3/BEE-LINE BEEST GUI[a]	ISCST3, Version 020305/BEE-LINE BEEST Version 9.50
Meteorological data	1987-1991	Boise surface and upper air data
Land Use (urban or rural)	Rural	Rural dispersion coefficients were used by MHAFB based on the land use for the 3 kilometer (km) area surrounding the MHAFB.
Terrain	Not considered	Actual elevations for receptors, buildings, and emission sources were not used. All elevations were assumed to be zero to represent flat terrain.
Building downwash	Downwash algorithm	Building dimensions obtained from modeling files submitted, and BPIP, Version 95086, and ISCST3 were used to evaluate downwash effects.
Receptor grid	Grid 1	50 meter spacing for the facility's property boundary and within the property boundary of areas that are not fenced and are accessible to civilians. The runway is not fenced but is not accessible to civilians. Receptors were not located within the runway.
	Grid 2	100 meter spacing for 1,000 meters outward from the perimeter of the property boundary
	Grid 3	500 meter spacing extending 4,400 meters from the property boundary

[a]Graphic user interface

3.1.1 Modeling protocol

A protocol was submitted by CH2M HILL, on behalf of the MHAFB, to DEQ prior to submission of the application. A DEQ approval notice was not included in the PTC application materials.

Modeling was conducted using methods and data presented in the modeling protocol and the *State of Idaho Air Quality Modeling Guideline* with the following exceptions:

- Complex and intermediate terrain algorithms were not employed because all receptors, buildings, and emissions sources were assumed to have the same elevation.
- Ambient background concentrations used to establish PM_{10} NAAQS compliance were obtained after the modeling protocol was submitted. The values used in the analysis are appropriate.

3.1.2 Model Selection

ISCST3 was used by MHAFB to conduct the ambient air analyses. BPIP was used to calculate the wind-induced downwash effects due to structures at the site.

3.1.3 Meteorological Data

Boise surface and upper air meteorological data were used for the MHAFB site near Mountain Home. The anemometer height was incorrectly set at 10 meters in the application's modeling demonstration. DEQ used an anemometer height of 6.1 meters in the verification analyses.

3.1.4 Terrain Effects

The modeling analyses submitted by MHAFB did not consider elevated terrain. The actual elevation of each receptor was not used. Therefore, the application assumed flat terrain with no intermediate or complex terrain that needed to be included in the analysis. Ambient impacts used for the design

concentrations were fairly close to the facility boundary and occurred in relatively flat terrain.

3.1.5 Facility Layout

DEQ did not verify the proper identification of the facility boundary and buildings on the site by comparing the modeling input to a scaled facility plot plan or satellite photos. The plot plan submitted with the application did not provide any scale or building height data.

3.1.6 Building Downwash

Plume downwash effects caused by structures present at the facility were accounted for in the modeling analyses. The Building Profile Input Program (BPIP) was used by the applicant to calculate direction-specific building dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and emissions release parameters for ISCST3.

The applicant did not anticipate ambient impacts for the four flightline barrier generators to occur at receptors located within the wakes of building cavities, which would have required the use of ISC-PRIME for the modeling demonstration. This is a reasonable approach considering the location of the emissions sources in relation to the structures at this facility.

The plot plan submitted with the application was not scaled and did not contain any building height information to compare building dimensions used as inputs to BPIP to listed building information.

DEQ's verification modeling used BPIP and ISCST3.

3.1.7 Ambient Air Boundary

Ambient air was determined to exist around the facility boundary. MHAFB has treated areas that are within the property boundary and are not fenced and are accessible to civilians as ambient air. The runway is not fenced but the area is restricted to unauthorized personnel, and it can be expected that military personnel will dissuade anyone attempting to access any unfenced restricted area.

3.1.8 Receptor Network

The receptor grids used by MHAFB met the minimum recommendations specified in the *State of Idaho Air Quality Modeling Guideline*. DEQ verification analyses were conducted using the same receptor grid.

3.2 Emission Rates

Emissions rates used in the dispersion modeling analyses submitted by the applicant were reviewed against those in the permit application. The following approach was used for DEQ verification modeling:

- All modeled criteria and toxic air pollutant (TAP) emissions rates were equal to or greater than the MHAFB facility's emissions calculated in the PTC application or the permitted allowable rate.

Table 6 lists the criteria air pollutant emissions rates for sources included in the dispersion modeling analyses for short term averaging periods for carbon monoxide. The sources listed in Table 6 all emit carbon monoxide and were modeled in the facility-wide full impact analysis.

Table 6. MODELED CRITERIA POLLUTANT SHORT-TERM EMISSIONS RATES		
Source ID	**Description**	**CO[c] Emission Rates (lb/hr[d])**
Point Sources		
DORMBOIL		0.0003
GBFNWN	Flightline Barrier Generator – Unit A	30.07
GBFNWS	Flightline Barrier Generator – Unit B	30.07
GBFSWS	Flightline Barrier Generator – Unit C	30.07
GBSWS	Flightline Barrier Generator – Unit D	30.07
BLDG1403		1.16
BLDG2192		2.73
BLDG3504		0.17
BLDG3510		0.27
BLDG4827		2.73
COMGEN1		1.16
COMGEN2		0.33
COMGEN3		0.66
COMGEN4		0.20
COMISGEN		0.33
DORMGEN		0.99
FIRE47G		0.17
FIRE47P		6.03
FIRE97G		0.17
FIRE97P		6.03
FIRENG		0.10
FIRESG		0.99
FLGGEN1		0.50
FLGGEN3		0.17
FLGGEN5		1.52
FLGGEN6		0.17
FLGGEN7		0.17
FLGGEN8		0.20
FLGGEN9		0.30
FLGGEN10		1.52
FLGGEN11		0.04
FLGGEN12		0.10
HOUSEG3		0.66
LIFT1		0.17
LIFT2		0.17
LIFT3		0.17
LIFT4		0.17
LIFT6		0.17
MELLON		0.66
PITS		1.16
WATERTR		0.23
WELL2		0.99
WELL6		0.99
HUSH1		34.23
HUSH2		34.23
Area Sources		
FLTGEN		0.0016

[a]Carbon monoxide
[b]Pounds per hour
[c]The carbon monoxide NAAQS have a 1-hour (hr) averaging (avg) period and an 8-hr avg period.

Table 7 lists the modeled TAP emissions rates for the project. The project, as defined in the PTC application, is subject to compliance with the benzene TAP increment. Daily emissions were modeled by MHAFB for 24 hours. Annual emissions were modeled over 8,760 hours per year. The modeled hourly

rates reflect a 250 hour per year limit of operation on each generator that is operating at rated capacity.

Table 7. MODELED TOXIC AIR POLLUTANT EMISSIONS RATES		
Source	Benzene Emission Rates	
	(lb/hr)[a]	(T/yr)[b]
GBFNWS	1.60E-04	0.0007
GBFNWN	1.60E-04	0.0007
GBFSWS	1.60E-04	0.0007
GBSWN	1.60E-04	0.0007

[a]Pounds per hour
[b]Tons per year

3. 3 Emission Release Parameters

Table 8 provides emissions release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity for point sources. Table 9 provides the emission release parameters for the area source associated with the carbon monoxide modeling demonstration for this project. Values used in the analyses appeared reasonable and within expected ranges. Additional documentation /verification of these parameters was not required.

Table 8. POINT SOURCE STACK PARAMETERS						
Release Point	Description	Source Type	Stack Height (m)[a]	Modeled Stack Diameter (m)	Stack Gas Flow Temperature (K)[b]	Stack Gas Flow Velocity (m/sec)[c]
DORMBOIL		Point	7.31	0.1	828.7	0.001[d]
GBFNWS	Flightline Barrier Generator -Unit A	Point	3.96	0.0635	977.6	55.1
GBFNWN	Flightline Barrier Generator -Unit B	Point	3.96	0.0635	977.6	55.1
GBFSWS	Flightline Barrier Generator -Unit C	Point	3.96	0.0635	977.6	55.1
GBSWN	Flightline Barrier Generator -Unit D	Point	3.96	0.0635	977.6	55.1
BLDG1403		Point	2.44	0.08	828.7	70
BLDG2192		Point	3.96	0.13	684.3	70
BLDG3504		Point	1.52	0.06	833.2	26.8
BLDG3510		Point	1.52	0.06	833.2	26.8
BLDG4827		Point	3.96	0.13	684.3	70
COMGEN1		Point	6.70	0.08	813.2	0.001[d]
COMGEN2		Point	3.05	0.06	833.2	26.8
COMGEN3		Point	6.09	0.06	813.2	0.001[d]
COMGEN4		Point	6.09	0.06	833.2	0.001[d]
COMISGEN		Point	11.58	0.06	420.8	0.001[d]
DORMGEN		Point	7.31	0.08	828.7	0.001[d]
FIRE47G		Point	5.49	0.06	833.2	26.8
FIRE47P		Point	4.27	0.15	833.2	70
FIRE97G		Point	5.49	0.06	833.2	26.8
FIRE97P		Point	4.27	0.15	833.2	70
FIRENG		Point	7.62	0.06	833.2	26.8
FIRESG		Point	1.52	0.08	813.2	70
FLGGEN1		Point	3.96	0.08	828.7	0.001[d]
FLGGEN3		Point	4.27	0.06	833.2	0.001[d]

FLGGEN5		Point	2.74	0.08	833.2	70
FLGGEN6		Point	2.44	0.06	833.2	0.001[d]
FLGGEN7		Point	2.44	0.06	833.2	26.8
FLGGEN8		Point	2.44	0.08	833.2	26.8
FLGGEN9		Point	2.44	0.08	833.2	26.8
FLGGEN10		Point	2.44	0.08	833.2	70
FLGGEN11		Point	2.44	0.08	833.2	26.8
FLGGEN12		Point	2.44	0.08	833.2	26.8
HOUSEG3		Point	9.14	0.06	813.2	0.001[d]
LIFT1		Point	1.52	0.06	833.2	26.8
LIFT2		Point	1.52	0.06	833.2	26.8
LIFT3		Point	1.52	0.06	833.2	26.8
LIFT4		Point	1.52	0.06	833.2	26.8
LIFT6		Point	1.52	0.06	833.2	26.8
MELLON		Point	1.52	0.06	813.2	70
PITS		Point	2.44	0.08	828.7	70
WATERTR		Point	1.52	0.06	833.2	26.8
WELL2		Point	3.96	0.08	828.7	70
WELL6		Point	3.96	0.08	828.7	70
HUSH1		Point	4.57	6.71	310.8	30.5
HUSH2		Point	4.57	6.71	310.8	30.5

[a]Meters
[b]Kelvin
[c]Meters per second.
[d]Velocity set to 0.001 m/s to reflect either a raincap-equipped stack or a horizontal release point

Table 9. AREA SOURCE STACK PARAMETERS

Release Point	Release Height (m)[a]	Easterly Length (m)	Northerly Length (m)	Angle from North (degrees)
FLTGEN	0.0	549	2,438.4	135

[a]Meters

3.4 Results for Full Impact Analyses

3.4.1 Significant Contribution Analysis

A significant contribution analysis was submitted for this application for all criteria air pollutants. DEQ reviewed the requirements for the modeling demonstration for this PTC project. A comparison of the project's criteria air pollutant emission rates are compared to the modeling thresholds in Table 10. DEQ determined that only a significant contribution analysis for carbon monoxide emissions was required for the flightline barrier generator PTC project.

Table 10. MODELING DEMONSTRATION REQUIREMENTS FOR FOUR GENERATORS				
Pollutant	**Averaging Period**	**Potential Emissions for Project[a] (lb/hr)[b] or (T/yr)[c]**	**Modeling Threshold[d]**	**Significant Contribution Modeling Demonstration Required?**
PM_{10}[e]	24-hour	0.190 lb/hr	0.2 lb/hr	No
	Annual	0.024 T/yr	1 T/yr	No
SO_2[f]	3-hour	0.156 lb/hr		No
	24-hour	0.156 lb/hr	0.2 lb/hr	No
	Annual	0.019 T/yr	1 T/yr	No
CO[g]	1-hour	120.3 lb/hr		Yes
	8-hour	120.3 lb/hr	14 lb/hr	Yes
NO_2[h]	Annual	0.19 T/yr	1 T/yr	No

[a]Emissions from four generator engines are aggregated. Requested operating limits are accounted for in emissions estimates.
[b]Thresholds are from Table 1 of the State of Idaho Air Quality Modeling Guideline, Document ID AQ-011 (rev. 1, 12/31/02)
[c]Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[d]Sulfur dioxide
[e]Carbon monoxide
[f]Nitrogen dioxide

3.4.2 Full Impact Analysis

The results of the full impact analyses were obtained from the output files submitted in MHAFB's application, and are listed in Table 11. The flightline barrier generators were assumed to operate continuously at rated capacity for the 1-hour and 8-hour averaging periods.

Table 11. RESULTS OF FULL IMPACT ANALYSES						
Pollutant	**Averaging Period**	**Modeled Design Concentration ($\mu g/m^3$)[a]**	**Background Concentration ($\mu g/m^3$)**	**Total Ambient Impact ($\mu g/m^3$)**	**NAAQS[b] ($\mu g/m^3$)**	**Percent of NAAQS**
CO[c]	1-hour	5,508.6	3,600	9,108.6	40,000	23%
	8-hour	2,141.9	2,300	4,441.9	10,000	44%

[a]Micrograms per cubic meter
[b]National ambient air quality standards
[c]Carbon monoxide

Table 12 lists the maximum predicted TAP ambient impacts presented by MHAFB, and the results of DEQ's verification analyses for the project. TAPs compliance was evaluated for the increase in emissions that would be caused by operating each of the four flightline barrier generators for 250 hours.

DEQ re-ran the TAPs modeling demonstration with a revised anemometer height of 6.1 meters and the ISC3-Prime model. MHAFB used an anemometer height of 10 meters with the ISCST3 model. Predicted ambient impacts of the project's TAPs emissions did not exceed allowable increments.

Table 12. TOXIC AIR POLLUTANT ANALYSIS RESULTS				
Pollutant	**Averaging Period**	**Maximum Concentration ($\mu g/m^3$)[a]**	**AACC[b] ($\mu g/m^3$)**	**Percent of Limit**
Carcinogenic TAPs				
Benzene	Annual	0.00141 (0.00149)[c]	0.12	1.2%

[a]Micrograms per cubic meter
[b]Acceptable ambient concentration for carcinogens
[c]Values in parentheses are DEQ verification analysis results, highest 1st high for design concentrations and percentages for the percent of limit values

4.0 Conclusions

The ambient air impact analysis submitted, in combination with DEQ's verification analyses, demonstrated to DEQ's satisfaction that emissions from the facility, as represented by the applicant in the permit application, will not cause or significantly contribute to a violation of any air quality standard.