

TECHNICAL SUPPORT DOCUMENT

TECHNICAL INFORMATION PRESENTED IN REVIEW OF AN
APPLICATION FOR A
MINOR REVISION TO A PART 70 PERMIT

For

**Nellis Air Force Base (NAFB)
Clark County, Nevada**

Facility: 114

SIC Code 9711: National Security
NAICS Code 92811: National Security



Clark County
Department of Air Quality
Permitting Division

January 3, 2017

EXECUTIVE SUMMARY

Nellis Air Force Base (NAFB) is located in Clark County, Nevada, near the City of Las Vegas. The facility is a major source located in Hydrographic Area (HA) 212 (Las Vegas Valley) and HA 215 (Black Mountains Area). The Las Vegas Valley and Black Mountains Area are in attainment for all criteria pollutants.

NAFB is permitted as a Part 70 major source of NO_x, a synthetic minor source for CO, and a minor source for all other regulated pollutants. NAFB is not a major source of greenhouse gases (GHG). The potential emissions for the facility are shown in the table below:

Source PTE (tons per year)

PM ₁₀	PM _{2.5}	NO _x	CO	SO ₂	VOC	HAP	CO _{2e}
40.40	17.27	206.74	60.49	4.14	73.29	13.51	28,236

Clark County Department of Air Quality (Air Quality) has delegated authority to implement the requirement of the Part 70 operating permit program (Part 70 OP). Based on information submitted by the applicant and a technical review performed by the Air Quality staff, Air Quality issued a renewal to the Part 70 OP on September 18, 2015, and a minor revision on April 20, 2016. Since that time, NAFB applied for a minor revision of its Part 70 OP on May 18, 2016.

Based on information submitted by the applicant and a technical review performed by the Air Quality staff, Air Quality proposes the issuance of a Part 70 Operating Permit to Nellis Air Force Base.

This Technical Support Document (TSD) accompanies the proposed PART 70 OPERATING Permit for NELLIS AIR FORCE BASE.

TABLE OF CONTENTS

I. ACRONYMS	4
II. SOURCE INFORMATION.....	5
A. General.....	5
B. Description of Process.....	5
C. Permitting Action.....	6
III. EMISSIONS INFORMATION.....	6
A. Source-wide Potential to Emit	6
IV. EMISSION UNITS AND PTE	7
A. Internal Combustion.....	7
B. External Combustion.....	8
C. Storage Tanks/Fuel Dispensing/Fuel Loading.....	10
D. Degreasers.....	10
E. Paint Booths and Media Blasting	10
F. Cooling Towers	11
D. Monitoring.....	11
E. Testing.....	11
V. REGULATORY REVIEW.....	11
VI. CONTROL TECHNOLOGY.....	11
VII. INCREMENT.....	12
Table VII-1: PSD Increment Consumption	12
VIII. PUBLIC NOTICE.....	13

I. ACRONYMS

Table I-1: Acronyms and Abbreviations

Acronym	Term
Air Quality	Clark County Department of Air Quality
AFB	Air Force Base
AQR	Clark County Air Quality Regulations
AST	Aboveground Storage Tank
ATC	Authority to Construct
CFR	United States Code of Federal Regulations
CO	Carbon Monoxide
DeCA	Defense Commissary Agency
EF	Emission Factor
EPA	United States Environmental Protection Agency
EU	Emission Unit
HAP	Hazardous Air Pollutant
HP	Horse Power
IC	Internal Combustion
IFR	In-flight Refueling
kW	kiloWatt
MMBtu	Millions of British Thermal Units
NAFB	Nellis Air Force Base
NAICS	North American Industry Classification System
NO _x	Nitrogen Oxides
NSPS	New Source Performance Standards
NSR	New Source Review
PM _{2.5}	Particulate Matter less than 2.5 microns
PM ₁₀	Particulate Matter less than 10 microns
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
RACT	Reasonably Available Control Technology
SCR	Selective Catalytic Reduction
SIC	Standard Industrial Classification
SO _x	Sulfur Oxides
TSD	Technical Support Document
UST	Underground Storage Tank
VOC	Volatile Organic Compound

II. SOURCE INFORMATION

A. General

Permittee	Nellis Air Force Base
Mailing Address	4430 Grissom Avenue, Suite 101 Nellis AFB, NV 89191-6520
Responsible Official	Paul J. Murray Commander, 99 th Air Base Wing
Contact	Paul J. Murray (702) 652-2882 Fax: (702) 652-7909 Email: Nellis.air.quality@us.af.mil
Source Location	Nellis Air Force Base Nevada 89191
Hydrographic Areas	212, 215
Township, Range, Section	T21S, R62E, Section 4
SIC Code	9711 – National Security
NAICS Code	928110 – National Security

B. Description of Process

The NAFB is divided into three geographic areas, which vary both in size and purpose. Area I (the Main Base) consists of the flight line and a wide variety of commercial and industrial use in support of the base's mission. Area II is located to the east of the Main Base. This area includes the munitions storage area and the Red Horse Squadron complex along with its mineral processing, asphalt batch plant, and concrete batch plant activities. Area III is a 1.9 square mile portion to the north of the Main Base and includes the bulk fuels storage area, Security Police Squadron facilities, open space and other support facilities.

NAFB is a federal facility and the area that NAFB covers is zoned as Public Facility (P-F). The closest residence to the boundary of NAFB is approximately 30 feet from the western fence line.

All of the activities and emission units at NAFB are classified as Standard Industrial Code (SIC) 9711 and North American Industry Classification System (NAICS) Code 928110 (National Security). The emission units and activities conducted at NAFB can be classified into the following three efforts to support the Base:

- Civil Engineering, which supports and maintains the infrastructure of the Base.
- Flight and Maintenance Squadron, which maintains and supports combat readiness of the Air Force in support of National Security.
- Training and Support Organizations, which maintains and supports combat readiness of deployable Air Force Civil Engineering Squadrons.

C. Permitting Action

An application submitted by the source on May 18, 2016, proposed to add emission units, remove emission units, and modify the capacities and throughputs of existing emission units. All proposed changes occur in the following source categories:

- Internal Combustion
- External Combustion
- Storage Tanks/Fuel Dispensing/Fuel Loading
- Degreasers
- Surface Coating
- Media Blasting
- Cooling Towers

Several emission units removed as they are under the control of the Defense Commissary Agency (DeCA) and not NAFB.

The A.O. Smith boiler at building 119 (EU: RB638) was incorrectly listed as RB368 in the previous permit. This emission unit number already is in use for a boiler at building 2955.

III. EMISSIONS INFORMATION

A. Source-wide Potential to Emit

1. NAFB is a Part 70 major source of NO_x, a synthetic minor source for CO, and a minor source for all other regulated pollutants as summarized in Table III-A-1:

Table III-A-1: Source-wide Controlled Emissions (tons per year)

Activity	PM ₁₀	PM _{2.5}	NO _x	CO	SO ₂	VOC	HAPs
Storage Tanks/Loading Racks/Fuel Dispensing	0	0	0	0	0	22.60	1.69
External Combustion ¹	0.98	0.98	9.95	9.81	0.11	1.17	0.26
Internal Combustion	4.80	4.80	137.89	26.94	1.56	8.22	0.99
Hush House	2.42	2.18	57.40	21.46	2.31	5.44	0.42
Landfill	1.64	0	0	0	0	0	0
Vacant Land	21.22	0	0	0	0	0	0
Mineral Processing	4.65	4.58	1.49	1.27	0.15	0.36	0.14
Paint Booths/Media Blasting	0.66	0.66	0	0	0	13.75	7.16
Cooling Towers	1.47	1.47	0	0	0	0	0
Incinerator	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Wood Working	2.59	2.59	0	0	0	0	0
Degreasers	0	0	0	0	0	2.24	0
Fuel Cell Maintenance	0	0	0	0	0	0.36	0.02
Miscellaneous Chemicals	0	0	0	0	0	19.14	2.82
PTE Totals	40.40	17.27	206.74	60.49	4.14	73.29	13.51
Exempt Sources	PM₁₀	PM₁₀	NO_x	CO	SO₂	VOC	HAPs
Fire Training	0.13	0.13	0.38	0.10	0.00	0.17	0.01
EOD	0.00	0.00	0.04	0.10	0.00	0.02	0.01
Exempt Storage Tanks	0.00	0.00	0.00	0.00	0.00	1.51	0.06
Subtotal	0.13	0.13	0.42	0.20	0.00	1.70	0.08
PTE Plus Exempt Sources	40.57	17.40	207.16	60.69	4.14	75.06	13.59

Activity	PM ₁₀	PM _{2.5}	NO _x	CO	SO ₂	VOC	HAPs
Major Source Thresholds	250	250	250	250	250	250	10/25²

¹ Includes exempt units, which are included in the natural gas usage cap.

² Ten tons for any one HAP or 25 tons for combination of all HAPs.

Only the new and modified emissions units mentioned in the applications are discussed in this document.

IV. EMISSION UNITS AND PTE

A. Internal Combustion

Table IV-A-1 lists the internal combustion units that are added in this permitting action.

Table IV-A-1: New Internal Combustion Emission Units

Building Number	EU	Rating	Manufacturer	Model No.	Serial No.	Manufacture Date
490	G066 ¹	755 hp	Cummins	QSX15-G9	79272601	10/2007
Inside South 1	G145	64 hp	Deutz	D2011L04I	11725906	1/2016
Inside South 2	G146	64 hp	Deutz	D2011L04I	11725905	1/2016
Outside South O/R 1	G147	64 hp	Deutz	D2011L04I		1/2016
Outside South O/R 2	G148	64 hp	Deutz	D2011L04I		1/2016

¹This unit was erroneously removed from the Operating Permit in a previous action.

One emergency IC engine (EU: G019) and four aircraft arrestor engines (EUs: G056, G057, G059, and G138) are removed in this permitting action.

Two IC engines have description updates. The building number for one engine (EU: G026) is updated from 830 to 863. The serial number for another (EU: G139) is updated to 95010600944.

Table IV-A-2: Emission Factors for New Internal Combustion Emission Units

EU	Units	PM ₁₀	PM _{2.5}	NO _x	CO	SO _x	VOC	HAP
G066	g/hp-hr	5.00E-02	5.00E-02	4.35	0.54	1.21E-05 (lb/hp-hr)	6.00E-02	3.05E-05 (lb/hp-hr)
G145	g/hp-hr	0.134	0.134	2.91	0.85	1.21E-05 (lb/hp-hr)	0.15	4.52E-05 (lb/hp-hr)
G146								
G147								
G148								

The replacement arrestor engines (EUs: G145 through G148) are each limited to 225 hours per year, which is the limit of the existing arrestor engines. The new emergency generator (EU: G066) is limited to 100 hours per year for testing and maintenance with the PTE based off of 5t00 hours per year.

Table IV-A-3: PTE for New Internal Combustion Emission Units (tons per year)

EU	PM ₁₀	PM _{2.5}	NO _x	CO	SO _x	VOC	HAP
G066	0.02	0.02	1.81	0.22	0.01	0.02	0.01
G145	0.01	0.01	0.05	0.01	0.01	0.01	0.01
G146	0.01	0.01	0.05	0.01	0.01	0.01	0.01
G147	0.01	0.01	0.05	0.01	0.01	0.01	0.01

EU	PM ₁₀	PM _{2.5}	NO _x	CO	SO _x	VOC	HAP
G148	0.01	0.01	0.05	0.01	0.01	0.01	0.01
Totals	0.06	0.06	2.01	0.26	0.05	0.06	0.05

Table IV-A-4: Emissions Increase from Internal Combustion Emission Units

	PM ₁₀	PM _{2.5}	NO _x	CO	SO _x	VOC	HAP
PTE of Removed Generators	0.14	0.14	2.27	0.41	0.05	0.54	0.05
PTE of New Generators	0.06	0.06	2.01	0.26	0.05	0.06	0.05
PTE Increase	Net Decrease	Net Decrease	Net Decrease	Net Decrease	No Change	Net Decrease	No Change

The emissions listed in Table IV-A-4 for the removed generators is based on the two-year average actual emissions as reported for 2014 and 2015.

As the new units are replacements and there is no net increase in potential emissions, a controls analysis is not required. The source has proposed a new emergency generator (EU: G066) that is equipped with a turbocharger and aftercooler. All engines will be operated and maintained in accordance with the Air Force Technical Orders and Air Force Instructions as well as manufacturer recommendations.

B. External Combustion

In this permitting action, NAFB is removing two permitted natural gas-fired external combustion units and one insignificant natural gas-fired water heater. There is no change to the 225 MMscf per year natural gas cap.

Table IV-B-1: Removed External Combustion Emission Units

Building Number	EU	Rating (MMBtu/hr)	Manufacturer	Model No.	Serial No.
603	RB090	1.65	Seasons-4	1SSK53-1344-PN16-46HR	A 7397-0102 RTU-1
603	RB585	0.399	Raypak	WH1-0400A	1407382657
603	EB602	0.60	A.O. Smith	BTP300-600000	3G02-96193Y3

The ratings revised PTE for the external combustion units

The natural gas-fired combustion emissions are calculated using AP-42 emission factors from Chapter 1.4 Natural Gas Combustion. The NO_x and CO emission factors are from Table 1.4-1 Emission Factors for Nitrogen Oxides (NO_x) and Carbon Monoxide (CO) from Natural Gas Combustion for small boilers (<100 MMBtu/hour). The other criteria pollutant emission factors are from Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion for small boilers (<100 MMBtu/hour). The HAP emission factors are from Table 1.4-3 Emission Factors for Speciated Organic Compounds from Natural Gas Combustion.

Table IV-B-2: AP-42 Emission Factors for External Combustion

Fuel Type	Emission Control	PM	NO _x	CO	SO ₂	VOC	HAPs
Natural Gas ¹	No Control	7.6	100	84	0.6	5.5	1.89
	Low NO _x Burner	7.6	50	84	0.6	5.5	1.89
	Low NO _x /FGR	7.6	32	84	0.6	5.5	1.89
Diesel ²	No Control	2.0	20	5	0.71	0.34	0.14
Propane ³	No Control	0.7	13	7.5	0.1	1.0	0.00

¹AP-42 Section 1.4 Natural Gas Combustion Table 1.4-1 Criteria Pollutants (lb/10⁶ scf) and Table 1.4-3 HAPS (lb/10⁶ scf).

² AP-42 Section 1.3 Fuel Oil Combustion Tables 1.3-1,1.3-2,1.3-3 and 1.4-2 for Criteria Pollutants (lb/10³ gal) and Table 1.3-9 and 1.3-10 for HAPS (lb/hr).

³ AP-42 Section 1.5 Liquefied Petroleum Gas Combustion Table 1.5-1 Emission Factors for LPG Combustion (lb/10³ gal).

The source-wide emissions from the boilers are calculated as follows: the annual emissions (tons per year) from natural gas-fired combustion are calculated based on the requested source-wide cap of 225 MMscf for natural gas use. The maximum hourly emission rate is calculated by multiplying the AP-42 emission factor by the total calculated natural gas usage for all units operating at 100% capacity plus a 15% safety margin to account for fluctuations in various units.

The maximum annual fuel usage from the regulated external combustion units is shown below, using the average gross heating value of natural gas from AP-42 Chapter 1.4.1.

$$\begin{aligned}
 & \text{Max. Heat Input Rating} \left(\frac{\text{MMBtu}}{\text{hr}} \right) \times \text{conversion factor} \left(\frac{\text{hrs}}{\text{yr}} \right) \times \text{conversion factor} \left(\frac{\text{MMscf}}{\text{MMBtu}} \right) \\
 & = \text{Max Annual Fuel Usage} \left(\frac{\text{MMscf}}{\text{yr}} \right) \\
 & 243.7 \frac{\text{MMBtu}}{\text{hr}} \times 8,760 \frac{\text{hrs}}{\text{yr}} \times \frac{1 \text{ MMscf}}{1,020 \text{ MMBtu}} = 2,093.0 \frac{\text{MMscf}}{\text{yr}}
 \end{aligned}$$

This shows that without a natural gas cap, NAFB has the potential to consume 2,093.0 MMscf per year of natural gas.

The source-wide emissions are outlined in Tables IV-B-3 AND IV-B-4.

Table IV-B-3: Source-wide Emissions from External Combustion Units^{1,2} (tons/year)

Description	Fuel Usage Limits	PM ₁₀	PM _{2.5}	NO _x	CO	SO _x	VOC	HAP
Natural Gas-fired Boilers with no controls	123.6MMscf/yr (134.7 MMBtu/hr ¹)	0.47	0.47	6.18	5.19	0.04	0.34	0.12
Natural Gas-fired Boilers with Low NO _x controls	101.4 MMscf/yr (111.7 MMBtu/hr ¹)	0.39	0.39	2.54	4.26	0.03	0.28	0.10
Diesel-fired Boilers	1,020 hrs diesel each Unlimited natural gas	0.12	0.12	1.08	0.27	0.03	0.54	0.03
RB630	Unlimited Propane	0.01	0.01	0.16	0.09	0.01	0.01	0.01
Total	225 MMscf/yr² (246.4 MMBtu/hr)	0.98	0.98	9.95	9.81	0.11	1.17	0.26

¹Conversion Factor – 1,020 Btu/scf (AP-42 Chapter 1.4).

² Voluntary cap proposed by source. Annual limits are based on a consecutive twelve-month total. There is no change to diesel boiler emissions in this permitting action.

Table IV-B-4: Emissions Increase from External Combustion Emission Units

	PM ₁₀	PM _{2.5}	NO _x	CO	SO _x	VOC	HAP
Previous PTE	0.99	0.99	9.94	9.81	0.11	1.17	0.26
Revised PTE	0.98	0.98	9.95	9.81	0.11	1.17	0.26
PTE Increase	Net Decrease	Net Decrease	0.01	No Change	No Change	No Change	No Change

C. Storage Tanks/Fuel Dispensing/Fuel Loading

The source is removing an insignificant 1,000 gallon diesel storage tank located at building 603. As this was an insignificant emission unit, there is no change in PTE with this.

D. Degreasers

In this permitting action, the source is requesting to add the degreasers listed in Table IV-D-1. The new units will be limited to 208 hours each per year, which is consistent with existing degreasers.

Table IV-D-1: New Degreasers

EU	Bldg	Make	Model	Serial Number	Capacity (gal)
M060	10304	Chemfree Corporation/ Smartwasher	SW328		25
M061	10304	Chemfree Corporation/ Smartwasher	SW328		25

Table IV-D-2: New Degreasers PTE

EU	Hours/Year	Area (ft ²)	EF (lb/hour/ft ²)	VOC (lb/hour)	HAP (lb/hour)	VOC (tons/year)	HAP (tons/year)
M060	208	8.1	0.08	0.65	0	0.07	0
M061	208	8.1	0.08	0.65	0	0.07	0
Totals						0.14	0

The increase in PTE is below the significance threshold and therefore a RACT analysis is not required. The existing control, monitoring, and recordkeeping requirements in the Operating Permit will apply to the new units.

E. Paint Booths and Media Blasting

The Permittee is requesting to add the unit listed in Table IV-E-1 with a production limit of 10,000 lbs/yr.

Table IV-E-1: New Media Blasting Emission Unit

EU	Building	Description	Make	Model No.	Serial No.
D031	807	Media Blaster	ALC Abrasive Blasting	40400	

Table IV-E-2: New Media Blasting Emission Unit PTE

EU	Production Limit (lb/yr)	PM ₁₀ / PM _{2.5} EF (lb/1,000 lb)	PM ₁₀ / PM _{2.5} (lb/month)	PM ₁₀ / PM _{2.5} (ton/yr)
D031	10,000	0.03	0.03	0.01

The source repeated a request that one unit (EU: D016) be removed. This unit was removed in the Operating Permit issued on April 20, 2016.

The source also requested to increase the allowable VOC content of the topcoats used for the Building 807 surface coating operations (EUs: D005) from 1.6 lb/gal to 4.1 lb/gal. This increases the VOC PTE of this unit from 0.42 tons per year to 0.86 tons per year. The past average actual emissions for this emission unit is 0.05 tons per year, resulting in an emission increase of 0.81 tons per year.

The increase in PTE is below the significance threshold and therefore a RACT analysis is not required. The existing control, monitoring, and recordkeeping requirements in the Operating Permit will apply to the new units.

F. Cooling Towers

The Permittee requested to remove two cooling towers (EUs: C025 and C026) that are under control of DeCA and not NAFB.

Table IV-G-1: Removed Cooling Towers

EU	Building	Make	Model No.	Serial No.	Capacity (gpm)	TDS (ppm)	% Drift	PM _{2.5/10} PTE (tons/yr)
C025	603	Recold	JT-40160	02703	350	3,200	0.001	0.01
C026	603	Recold	JT-40160	02702	350	3,200	0.001	0.01

D. Monitoring

The new equipment added in this revision did not trigger new monitoring requirements, as similar units are present in the permit with sufficient monitoring requirements. The new units were added to the existing language.

E. Testing

No new performance testing requirements are added in this permitting action. New emission units did not trigger addition performance testing.

V. REGULATORY REVIEW

The new diesel engines are subject to 40 CFR 60, Subpart IIII. These units have been added to the appropriate existing conditions found in the current Title V Operating Permit to which they apply.

No new regulatory requirements are applicable to the source.

VI. CONTROL TECHNOLOGY

Since the PTE for the new emissions units does not exceed the minor NSR significant level of AQR 12.4.2.1, the source is not subject to RACT.

A summary of the PTE changes is listed below in Table VI-1.

Table VI-1: Change in PTE per Emission Unit Type (tons per year)

	PM ₁₀	PM _{2.5}	NO _x	CO	SO _x	VOC	HAP
Internal Combustion	-0.08	-0.08	-0.26	-0.15	0.00	-0.48	0.00
External Combustion	-0.01	-0.01	0.01	0.00	0.00	0.00	0.00
Degreasers	0.00	0.00	0.00	0.00	0.00	0.14	0.00
Surface Coating/Media Blasting	0.01	0.01	0.00	0.00	0.00	-0.44	-0.01
Cooling Towers	-0.14	-0.14	0.00	0.00	0.00	-0.02	0.00
Net Increase	Net Decrease						

The increase in PTE from only the new and revised emission units is shown in Table VI-2.

Table VI-2: PTE Increases of New and Revised Units (tons per year)

	PM ₁₀	PM _{2.5}	NO _x	CO	SO _x	VOC	HAP
Internal Combustion	0.06	0.06	2.01	0.26	0.05	0.06	0.05
External Combustion	Net Decrease	Net Decrease	0.01	0.00	0.00	0.00	0.00
Degreasers	0.00	0.00	0.00	0.00	0.00	0.14	0.00
Surface Coating/Media Blasting	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Cooling Towers	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Increases	0.07	0.07	2.02	0.26	0.05	0.20	0.05
Minor NSR Significant Levels	7.50	5.00	20	50	20	20	N/A

VII. INCREMENT

Nellis Air Force Base is a major source located in Hydrographic Area (HA) 212 (Las Vegas Valley) and HA 215 (Black Mountains Area). Minor source baseline dates for NO_x (October 21, 1988) and SO₂ (June 29, 1979) have been triggered in HA 212. Minor source baseline dates for NO_x (July 19, 1989) and PM₁₀ (June 18, 1983) have been triggered in HA 215.

Air Quality modeled the source using AERMOD to track the Prevention of Significant Deterioration (PSD) increment consumption. Stack data submitted by the applicant was supplemented with information available for similar emission units. Five years (1999 to 2003) of meteorological data from the McCarran Station and Desert Rock Station were used in the model. United States Geological Survey (USGS) National Elevation Dataset (NED) terrain data was used to calculate elevations. Table VII-1 presents the results of the modeling.

Table VII-1: PSD Increment Consumption

Pollutant	Averaging Period	PSD Increment Consumption by the Source (µg/m ³)	Location of Maximum Impact	
			UTM X (m)	UTM Y (m)
SO ₂	3-hour	3.99 ¹	677478	4014023
SO ₂	24-hour	0.65 ¹	677478	4014023
SO ₂	Annual	0.22	676985	4013916
NO _x	Annual	4.62	676840	4013810
PM ₁₀	24-hour	9.31 ¹	677131	4014023
PM ₁₀	Annual	3.15	676840	4013810

¹ Second High Concentration

Table VII-1 shows the location of the maximum impact and the potential PSD increment consumed by the source at that location. The impacts are below the PSD increment limits.

VIII. PUBLIC NOTICE

This permitting action is a minor revision and therefore is not subject to public notice per AQR 12.5.2.10(a)(2).