# Appendix B
# Emission Estimates

# V.1 Background

## V.1.1 General

Number of Abrasive Blasting Sources Identified: 1

Emission Source Type: Stationary

Emission Source ID: AC

There is only one abrasive cleaner or "bead blaster" at Mountain Home AFB, which contains a small opening at the point of entry from a self-contained hopper to a 55-gallon drum. The bead blaster unit is equipped with a cyclone and tube fabric filters and is only used intermittently throughout the year. However, according to Idaho air quality rules, the bead blaster located in Building 1330 is required to maintain an air quality permit., A summary of the quantity of abrasive media used is provided in Table V-1.

## V.1.2 Permit Summary –Building 1330

A revised IDEQ Permit to Construct No. 039-00001 was issued on May 30, 2002. A new emission limit for hexavalent chromium ($Cr^{+6}$) was determined not to exceed 0.137 pounds per any consecutive 12-month period.

**Permit to Construct**
Building 1330 Bead Blasting Unit
**Date Issued:** November 22, 1995
**Date Revised:** May 30, 2002
**Brief Technical Summary:**

Emission limits: Hexavalent chromium ($Cr^{+6}$) = 0.137 lb/yr
(Any consecutive 12-month period).

Operating limits: Annual = 4,500 hr/yr.

# V.2 Emission Calculation

The APIMS standard algorithm code ABCL-05 was identified to calculate $PM_{10}$ and $Cr^{+6}$ emissions. Emissions were estimated using the quantity of abrasive used multiplied by a $PM_{10}$ emission factor. For emission calculations, PM is assumed to equal $PM_{10}$.

# V.3 Sample Calculation

- Corrosion control facility abrasive cleaner (Em. Source ID AC1330).
- Quantity of abrasive used = 344 lbs/yr.
- $PM_{10}$ EF = 0.69 lb/ 1000 lb abrasive.
- $Cr^{+6}$ = 0.7% PM (filter controlled).

$$PM_{10} = \left(344\,\frac{lb}{yr}\right)\left(0.69\,\frac{lb}{1{,}000\ lb\ abrasive}\right) = 0.24\,\frac{lb}{yr}$$

$$Cr^{+6} = \left(0.24\,\frac{lb}{yr}\right)\frac{0.7}{100} = 0.002\,\frac{lb}{yr}$$

## V.4 Actual Emissions Summary

The APIMS Process ID and actual annual $PM_{10}$ emissions are presented in Table V-2. Actual annual HAP emissions are summarized in Table V-3.

## V.5 Potential Emissions Summary

Potential emissions were calculated based on potential annual hours of operations of 4,500 hrs/yr.

$$K_{p/a} = \frac{4500}{2080} = 2.16$$

Potential annual $PM_{10}$ emissions are presented in Table V-4. Potential annual HAP emissions are presented in Table V-5.

| Table V-1<br>CY 2005 ABRASIVE BLASTING OPERATIONS | | | | |
|---|---|---|---|---|
| Emission Source ID | FACILITY ID | Location | Enclosure with Cyclone and Tube Fabric Filter Y/N | Quantity of Abrasive Used (lbs/yr) |
| AC1330 | CORROSION CTRL | BLDG 1330 | Y | 344 |
| Total: | | | | 344 |

2005 Actual Emissions Table V-2

***Calculation Name:*** ABRASIVE BLASTING

| Process ID | Process Name | Unique Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|---|---|
| ICR1012934---1330 | AC1330: ABRASIVE BEAD BLAST B/1330 | 934 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0.2374 | 0.000119 |

## 2005 HAP Actual Emissions

Table V-3

***Calculation Name:*** ABRASIVE BLASTING

| Process ID | Process Name | Unique Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|---|---|
| ICR1012934---1330 | AC1330: ABRASIVE BEAD BLAST B/1330 | 934 | 18540299 | HEXAVALENT CHROMIUM ION | 0.0017 | 0.000001 |

## 2005 Potential Emissions

Table V-4

***Calculation Name:*** ABRASIVE BLASTING

| Process ID | Process Name | Unique Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|---|---|
| ICR1012934---1330 | AC1330: ABRASIVE BEAD BLAST B/1330 | 934 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0.5128 | 0.0002570 |

# 2005 HAP Potential Emissions

Table V-5

***Calculation Name:*** ABRASIVE BLASTING

| Process ID | Process Name | Unique Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|---|---|
| ICR1012934---1330 | AC1330: ABRASIVE BEAD BLAST B/1330 | 934 | 18540299 | HEXAVALENT CHROMIUM ION | 0.1370 | 0.0000685 |

# Appendix B.2
# Hospital Boilers

## Table B.4.3-1
## External Combustion Sources
## Hospital Boiler Criteria Pollutants PTE

Boiler Assumptions:

500 hours per year distillate fuel

8260 hours per year natural gas

**Hurst Boiler (1unit)**

Combustion Rate: 7.50 gallons/hr — 140,000 Btu/gal (Heat content of dist. fuel

1.05E+06 Btu/hr (Boiler rated heat input capacity) — 1,050 Btu/scf (Heat content on nat. gas)

| Pollutants | Distillate Fuel Emission rate (lb/hr) | Distillate Fuel Emissions (t/yr) | Natural Gas Emission rate (lb/hr) | Natural Gas Emissions (t/yr) | **Total Emissions (t/yr)** |
|---|---|---|---|---|---|
| SOx | 0.5325 | 0.13 | 6.00E-04 | 0.002 | **0.14** |
| NOx | 0.15 | 0.04 | 1.00E-01 | 0.41 | **0.45** |
| CO | 0.0375 | 0.01 | 8.40E-02 | 0.35 | **0.36** |
| PM10 | 0.00975 | 0.00 | 7.60E-03 | 0.03 | **0.03** |
| VOC | 0.00255 | 0.00 | 5.50E-03 | 0.02 | **0.02** |

**Kewanne Boilers (3 units)**

Combustion Rate: 37.36 gallons/hr — 140,000 Btu/gal (Heat content of dist. fuel

5.23E+06 Btu/hr (Boiler rated heat input capacity) — 1,050 Btu/scf (Heat content on nat. gas)

| Pollutants | Distillate Fuel Emission rate (lb/hr) | Distillate Fuel Emissions (t/yr) | Natural Gas Emission rate (lb/hr) | Natural Gas Emissions (t/yr) | **1 Boiler Total Emissions (t/yr)** | **3 Boilers Total Emissions (t/yr)** | **Total Combined (Hurtz and Kewanee) Emissions (t/yr)** |
|---|---|---|---|---|---|---|---|
| SOx | 2.652357143 | 0.66 | 2.99E-03 | 0.01 | **0.68** | **2.03** | **2.16** |
| NOx | 0.747142857 | 0.19 | 4.98E-01 | 2.06 | **2.24** | **6.73** | **7.18** |
| CO | 0.186785714 | 0.05 | 4.18E-01 | 1.73 | **1.77** | **5.32** | **5.68** |
| PM10 | 0.048564286 | 0.01 | 3.79E-02 | 0.16 | **0.17** | **0.51** | **0.54** |
| VOC | 0.012701429 | 0.00 | 2.74E-02 | 0.11 | **0.12** | **0.35** | **0.37** |

**Table II.4.3-2**
**External Combustion Sources**
**Hospital Boiler HAP PTE**

| Em. Source ID | Location | Emission Source | Power Rating | Power Rating Units | Power Rating | Power Rating Units | Fuel | Acrolein tpy | Arsenic Compounds tpy | Benzene tpy | Beryllium tpy | Cadmium tpy | Chromium Compounds tpy | Cobalt tpy | 1,4-Dichlorobenzene tpy | Ethyl Benzene tpy | Formaldehyde tpy | Hexane tpy | Hexavalent Chromium Ion tpy | Hydrogen Chloride tpy | Lead and Compounds tpy | Manganese tpy | Mercury tpy | Methyl Chloroform tpy | Naphthalene tpy | Nickel tpy | O-Xylene tpy | Selenium tpy | Toluene tpy | Xylenes tpy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EC6000.1 | BLDG 6000 | Dual Fuel Boiler | 0.105 | mmBtu/hr | 0.83 | $10^6$ scf/yr | NG | 5.41E-06 | 8.26E-08 | 0.00E+00 | 2.48E-09 | 4.54E-07 | 5.78E-07 | 3.47E-08 | 4.96E-07 | 0.00E+00 | 3.10E-05 | 7.43E-04 | 0.00E+00 | 0.00E+00 | 2.07E-07 | 1.57E-07 | 1.07E-07 | 0.00E+00 | 2.52E-07 | 8.67E-07 | 0.00E+00 | 4.96E-09 | 1.40E-06 | 9.09E-07 |
| EC6000.2 | BLDG 6000 | Dual Fuel Boiler | 5.231 | mmBtu/hr | 41.15 | $10^6$ scf/yr | NG | 2.70E-04 | 4.12E-06 | 0.00E+00 | 1.23E-07 | 2.26E-05 | 2.88E-05 | 1.73E-06 | 2.47E-05 | 0.00E+00 | 1.54E-03 | 3.70E-02 | 0.00E+00 | 0.00E+00 | 1.03E-05 | 7.82E-06 | 5.35E-06 | 0.00E+00 | 1.26E-05 | 4.32E-05 | 0.00E+00 | 2.47E-07 | 7.00E-05 | 4.53E-05 |
| EC6000.3 | BLDG 6000 | Dual Fuel Boiler | 5.231 | mmBtu/hr | 41.15 | $10^6$ scf/yr | NG | 2.70E-04 | 4.12E-06 | 0.00E+00 | 1.23E-07 | 2.26E-05 | 2.88E-05 | 1.73E-06 | 2.47E-05 | 0.00E+00 | 1.54E-03 | 3.70E-02 | 0.00E+00 | 0.00E+00 | 1.03E-05 | 7.82E-06 | 5.35E-06 | 0.00E+00 | 1.26E-05 | 4.32E-05 | 0.00E+00 | 2.47E-07 | 7.00E-05 | 4.53E-05 |
| EC6000.4 | BLDG 6000 | Dual Fuel Boiler | 5.231 | mmBtu/hr | 41.15 | $10^6$ scf/yr | NG | 2.70E-04 | 4.12E-06 | 0.00E+00 | 1.23E-07 | 2.26E-05 | 2.88E-05 | 1.73E-06 | 2.47E-05 | 0.00E+00 | 1.54E-03 | 3.70E-02 | 0.00E+00 | 0.00E+00 | 1.03E-05 | 7.82E-06 | 5.35E-06 | 0.00E+00 | 1.26E-05 | 4.32E-05 | 0.00E+00 | 2.47E-07 | 7.00E-05 | 4.53E-05 |
| EC6000.1 | BLDG 6000 | Dual Fuel Boiler | 0.105 | mmBtu/hr | 0.0008 | 1000 Gal/hr | Diesel | 0.00E+00 | 0.00E+00 | 4.01E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.19E-08 | 6.19E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.12E-07 | 0.00E+00 | 2.04E-08 | 0.00E+00 | 1.16E-06 | 0.00E+00 |
| EC6000.2 | BLDG 6000 | Dual Fuel Boiler | 5.231 | mmBtu/hr | 0.037 | 1000 Gal/hr | Diesel | 0.00E+00 | 0.00E+00 | 2.00E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.94E-07 | 3.08E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.06E-05 | 0.00E+00 | 1.02E-06 | 0.00E+00 | 5.79E-05 | 0.00E+00 |
| EC6000.3 | BLDG 6000 | Dual Fuel Boiler | 5.231 | mmBtu/hr | 0.037 | 1000 Gal/hr | Diesel | 0.00E+00 | 0.00E+00 | 2.00E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.94E-07 | 3.08E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.06E-05 | 0.00E+00 | 1.02E-06 | 0.00E+00 | 5.79E-05 | 0.00E+00 |
| EC6000.4 | BLDG 6000 | Dual Fuel Boiler | 5.231 | mmBtu/hr | 0.037 | 1000 Gal/hr | Diesel | 0.00E+00 | 0.00E+00 | 2.00E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.94E-07 | 3.08E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.06E-05 | 0.00E+00 | 1.02E-06 | 0.00E+00 | 5.79E-05 | 0.00E+00 |
| TOTAL | | | | | | | | 8.14E-04 | 1.24E-05 | 6.04E-06 | 3.73E-07 | 6.84E-05 | 8.70E-05 | 5.22E-06 | 7.46E-05 | 1.79E-06 | 5.59E-03 | 1.12E-01 | 0.00E+00 | 0.00E+00 | 3.11E-05 | 2.36E-05 | 1.62E-05 | 0.00E+00 | 6.59E-05 | 1.30E-04 | 3.07E-06 | 7.46E-07 | 3.86E-04 | 1.37E-04 |

**Conversion Factors**

| | |
|---|---|
| 1.0 scf NG equals | 1050 Btu NG |
| 1.0 Gallon propane | 91500 Btu Propane |
| 1.0 Gallon LP | 91500 Btu LP |
| 1.0 Gallon Diesel | 140000 Btu Diesel |
| 1.0 mmBtu equals | 1,000,000 Btu |

**Multipliers**

8760 hours per year
8260 Hours per year NG
500 Hours per year Diesel

# Appendix B.3.1
# Barrier Flightline Generators

**Table B.4.4.1-1**
**Internal Combustion Souces**
**Barrier Flight Line Generators PTE**

***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) | | |
|---|---|---|---|---|---|---|---|---|
| | | (lb/hp-hr) | (lb/hr) | (lb/yr) | (tons/yr) | (lb/hr) | (lb/yr) | (tons/yr) |
| Aldehydes[c] | NA | 4.85E-04 | 0.03 | 14.50 | 0.01 | 0.13 | 57.99 | 0.03 |

***Speciated Organic Compound Emissions in HC[d]***

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

**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 B.3.2
Hospital Generators

**Table B.4.4.2-1**
**Internal Combustion Sources**
**Hospital Generators Criteria Pollutants PTE**

| Em. Source ID | Location | Facility ID | Power Rating | Power Rating Units | Fuel | NOx tpy | CO tpy | SOx tpy | PM10 tpy | VOC tpy |
|---|---|---|---|---|---|---|---|---|---|---|
| IC6000.1 | BLDG 6000 | HOSPITAL #1 | 750 | kW | Diesel | 4.47 | 1.02 | 0.08 | 0.13 | 1.31 |
| IC6000.2 | BLDG 6000 | HOSPITAL #2 | 750 | kW | Diesel | 4.47 | 1.02 | 0.08 | 0.13 | 1.31 |
| IC6000.3 | BLDG 6000 | HOSPITAL #3 | 750 | kW | Diesel | 4.47 | 1.02 | 0.08 | 0.13 | 1.31 |
| **Total** | | | | | | **13.4** | **3.1** | **0.2** | **0.4** | **3.9** |

**Notes:**
Diesel Fire Pumps rated in horsepower (hp)
**Assumptions:**
Annual Hours of Operation per unit: 500
Average Percent Load: 0.74

Table B.4.4.2-2
Internal Combustion Sources
Hospital Generators HAP PTE

| Em. Source ID | Location | Facility ID | Power Rating | Power Rating Units | Fuel | Acetaldehyde tpy | Acrolein tpy | Benzene tpy | 1,3-Butadiene tpy | Formaldehyde tpy | Naphthalene tpy | Toluene tpy | Xylenes tpy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IC6000.1 | BLDG 6000 | HOSPITAL #1 | 750 | kW | Diesel | 3.29E-05 | 1.03E-05 | 1.01E-03 | 0.00E+00 | 1.03E-04 | 0.00E+00 | 3.66E-04 | 2.51E-04 |
| IC6000.2 | BLDG 6000 | HOSPITAL #2 | 750 | kW | Diesel | 3.29E-05 | 1.03E-05 | 1.01E-03 | 0.00E+00 | 1.03E-04 | 0.00E+00 | 3.66E-04 | 2.51E-04 |
| IC6000.3 | BLDG 6000 | HOSPITAL #3 | 750 | kW | Diesel | 3.29E-05 | 1.03E-05 | 1.01E-03 | 0.00E+00 | 1.03E-04 | 0.00E+00 | 3.66E-04 | 2.51E-04 |
| **Total** | | | | | | **0.000** | **0.000** | **0.003** | **0.0000** | **0.000** | **0.000** | **0.001** | **0.001** |

**Notes:**
Diesel Fire Pumps rated in horsepower (hp)
**Assumptions:**
Annual Hours of Operation per unit: 500
Average Percent Load: 0.74

# Appendix B.4
# Jet Engine Testing

# H.1 Background

## H.1.1 General

Number of Engine Types: 2

Emission Source Type: Stationary

Emission Source ID: JET

Jet engine testing is performed at two facilities, Hush House No. 1 and Hush House No. 2. Two engine types, the F-100-PW-220 and the F-100-PW-229, were tested at Mountain Home AFB during CY 2005. Hush House No. 2 usually tests the engines while they are mounted in the aircraft (mobile source). If significant problems are encountered, the engines are removed from the aircraft to facilitate further testing, which is performed at Hush House No. 1 (stationary source).

When Hush House No. 1 is shut down for any reason, any stationary jet-engine testing performed in Hush House No. 2 is logged by testing personnel as Hush House No. 1. There is currently only one engine stand on base used for engine testing; this stand is transported to Hush House No. 2 for stationary testing. Emissions are estimated from stationary jet engine testing. Mobile source emissions are not estimated as part of this inventory.

## H.1.2 Permit Summary

- **Permit to Construct:** Hush House No. 1, Facility 1344; and Hush House No. 2, Facility 270.

- **Date Issued:** May 30, 2002

- **Brief Technical Summary:**
  - Annual hours of operation not to exceed 690 hr/yr.
  - Annual emission limits: $NO_x$ = 85 tpy; VOC = 13 tpy; CO = 63 tpy; $SO_2$ = 1.5 tpy; PM/PM10 = 4.0 tpy.

# H.2 Emission Calculation Method

Emission factors vary for each power setting: idle, intermediate, military, and afterburner. Emission factors were obtained from IERA, 2001. Criteria air pollutant, HAP emission factors, and fuel flow rates are presented in Table H-1.

The method used for estimating emissions from jet engine testing include the following data:

- Criteria emission factors in lb/engine-hr;
- HAP emission factors in lb/ 1,000 lb fuel;
- Fuel flows for each HAP power setting; and
- Time duration for each power setting.

The total duration, in minutes, at each power setting for monthly jet engine testing in CY 2005 are presented in Table H-2. These data are based on detailed test logs shown in Appendix AAA-3.

## H.3 Sample Calculations

Sample calculations are presented below for criteria and HAP emissions. Criteria emissions are calculated based on emission factors in units of lb/engine-hr. HAP emissions are calculated based on emission factors in units of lb/1,000 lb fuel.

- Engine type: F-100-PW-229.
- Idle Mode (Idle Mode EF)
- Time = 7,400 min/yr (123 hr/yr); $NO_x$ $EF_I$ = 4.13 lb/eng-hr.
- Partial Power Mode (Intermediate Mode EF)

  Time = 1,920 min/yr (32 hr/yr); $NO_x$ $EF_I$ = 102.34 lb/eng-hr.
- Military Mode (Military Mode EF)

  Time = 2,099 min/yr (35 hr/yr); $NO_x$ $EF_I$ = 662.4 lb/eng-hr.
- Maximum Power Mode (Afterburner Mode EF)

  Time = 740 min/yr (12 hr/yr); $NO_x$ $EF_I$ = 1,058.78 lb/eng-hr.

### H.3.1 $NO_x$ Calculation (Idle Mode)

$$NO_x = (\text{Idle mode time})(NO_x\ EF_I)$$

$$NO_x = \left(7{,}400\,\frac{\text{min}}{\text{yr}}\right)\left(\frac{hr}{60\text{ min}}\right)\left(\frac{4.13\text{ lb}}{\text{engine - hr}}\right) = 509.4\,\frac{\text{lbs}}{\text{yr}}$$

### H.3.2 $NO_x$ Calculation (Intermediate Mode)

$$NO_x = (\text{Int. mode time})(NO_x\ EF_I)$$

$$NO_x = \left(1{,}920\,\frac{\text{min}}{\text{yr}}\right)\left(\frac{hr}{60\text{ min}}\right)\left(\frac{102.34\text{ lb}}{\text{engine - hr}}\right) = 3{,}274.9\,\frac{\text{lbs}}{\text{yr}}$$

### H.3.3 $NO_x$ Calculation (Military Mode)

$$NO_x = (\text{Military mode time})(NO_x\ EF_1)$$

$$NO_x = \left(2{,}099\ \frac{\text{min}}{\text{yr}}\right)\left(\frac{hr}{60\ \text{min}}\right)\left(\frac{662.4\ \text{lb}}{\text{engine - hr}}\right) = 23{,}173.0\ \frac{\text{lbs}}{\text{yr}}$$

### H.3.4 $NO_x$ Calculation (Afterburner Mode)

$$NO_x = (\text{Afterburn er mode time})(NO_x\ EF_1)$$

$$NO_x = \left(740\ \frac{\text{min}}{\text{yr}}\right)\left(\frac{hr}{60\ \text{min}}\right)\left(\frac{1{,}058.78\ \text{lb}}{\text{engine - hr}}\right) = 13{,}058.3\ \frac{\text{lbs}}{\text{yr}}$$

Total annual $NO_x$ emissions $= 509.4 + 3{,}274.9 + 23{,}173.0 + 13{,}058.3 = 40{,}015.6$ lb/yr

### H.3.5 Benzene Calculation (Idle Mode)

$$Benzene = (\text{Idle mode time})\ (\text{Benzene}\ EF_1)(\text{Fuel Flow Rate})$$

$$Benzene = \left(7{,}400\ \frac{\text{min}}{\text{yr}}\right)\left(\frac{hr}{60\ \text{min}}\right)\left(\frac{0.098\ \text{lb}}{1{,}000\ \text{lb}}\right)\left(1{,}097\ \frac{\text{lb}}{\text{hr}}\right) = 13.26\ \frac{\text{lbs}}{\text{yr}}$$

### H.3.2 Benzene Calculation (Intermediate Mode)

$$Benzene = (\text{Int. mode time})\ (\text{Benzene}\ EF_1)(\text{Fuel Flow Rate})$$

$$Benzene = \left(1{,}920\ \frac{\text{min}}{\text{yr}}\right)\left(\frac{hr}{60\ \text{min}}\right)\left(\frac{0.002\ \text{lb}}{1{,}000\ \text{lb}}\right)\left(7{,}617\ \frac{\text{lb}}{\text{hr}}\right) = 0.49\ \frac{\text{lbs}}{\text{yr}}$$

### H.3.3 Benzene Calculation (Military Mode)

$$Benzene = (\text{Military mode time})\ (\text{Benzene}\ EF_1)(\text{Fuel Flow Rate})$$

$$Benzene = \left(2{,}099\ \frac{\text{min}}{\text{yr}}\right)\left(\frac{hr}{60\ \text{min}}\right)\left(\frac{0.003\ \text{lb}}{1{,}000\ \text{lb}}\right)\left(10{,}104\ \frac{\text{lb}}{\text{hr}}\right) = 1.06\ \frac{\text{lbs}}{\text{yr}}$$

### H.3.4 Benzene Calculation (Afterburner Mode)

$$Benzene = \text{(Afterburner mode time) (Benzene } EF_1\text{)(Fuel Flow Rate)}$$

$$Benzene = \left(740\,\frac{\text{min}}{\text{yr}}\right)\left(\frac{hr}{60\text{ min}}\right)\left(\frac{0.0077\text{ lb}}{1{,}000\text{ lb}}\right)\left(54{,}074\,\frac{\text{lb}}{\text{hr}}\right) = 5.13\,\frac{\text{lbs}}{\text{yr}}$$

Total annual Benzene emissions = 13.26 + 0.49 + 1.06 + 5.13 = 19.9 lb/yr

## H.4 Actual Emissions Summary

The APIMS Process ID and actual criteria and HAP pollutant emissions for Jet Engine Testing are presented in Tables H-3 and H-4 for the F100-PW-220 and F100-PW-229 engines, respectively.

## H.5 Potential Emissions Summary

Emission factors established in the May 30, 2002, permit were used to calculate emissions. Potential annual criteria and HAP pollutant emissions for Jet Engine Testing are presented in Tables H-5 and H-6, respectively.

Table H-1
EMISSION FACTORS FOR AIRCRAFT ENGINE TESTING
Engine Type: F100-PW-220 / F100-PW-229

| Pollutant[1] | EF @ Idle (lb/engine-hr) | EF @ Part. Power (lb/engine-hr) | EF @ Military (lb/engine-hr) | EF @ Max Power (lb/engine-hr) |
|---|---|---|---|---|
| CO | 11.04 | 0.88 | 7.58 | 1593.16 |
| VOC | 0.41 | 1.75 | 6.26 | 338.09 |
| $NO_x$ | 4.13 | 102.34 | 662.4 | 1058.78 |
| $SO_2$ | 0.56 | 3.00 | 5.03 | 21.67 |
| $PM_{10}$ | 2.23 | 11.89 | 12.87 | 47.93 |

| HAPs | EF @ Idle (lb/1,000 lb) | EF @ Part. Power (lb/1,000 lb) | EF @ Military (lb/1,000 lb) | EF @ Max Power (lb/1,000 lb) |
|---|---|---|---|---|
| *Fuel Flow Rates* | *1,097* | *7,617* | *10,104* | *54,074* |
| Benzene | 0.098 | 0.002 | 0.003 | 0.0077 |
| Toluene | 0.020 | 0.0035 | 0.005 | 0.012 |
| Ethylbenzene | 0.00480 | 0.00027 | 0.0024 | 0.0022 |
| Xylenes | 0.0360 | 0.008 | 0.026 | 0.025 |
| Styrene | 0.00480 | 0.00028 | | |
| Naphthalene | 0.0640 | 0.004400 | 0.000370 | 0.00048 |
| Formaldehyde | 0.8200 | 0.02 | 0.006 | 0.015 |
| Acetaldeyde | 0.2000 | 0.008 | 0.011 | 0.013 |
| Acrolein | 0.0970 | | | |

[1]Sources at Air Force Installations USAF Volatile Speciation for JP-8 based on Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations (USAF Institute for Environment, Safety, and Occupational Risk Analysis, 2001).

Table H-2

SUMMARY OF ACTUAL JET ENGINE TESTING OPERATIONS FOR CY 2005

| Month | JP-8 Use | TESTS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Idle | | Part. Power | | Military | | Max. Power | |
| | (gal) | Duration (min/month) | Duration (hr/month) | Duration (min/month) | Duration (hr/month) | Duration (min/month) | Duration (hr/month) | Duration (min/month) | Duration (hr/month) |
| Engine: F100-220 / F100-229 | | | | | | | | | |
| 1 | 0 | 554 | 9.2 | 68 | 1.1 | 87 | 1.5 | 29 | 0.5 |
| 2 | 0 | 759 | 12.7 | 56 | 0.9 | 110 | 1.8 | 38 | 0.6 |
| 3 | 0 | 732 | 12.2 | 29 | 0.5 | 111 | 1.9 | 25 | 0.4 |
| 4 | 0 | 629 | 10.5 | 58 | 1.0 | 125 | 2.1 | 43 | 0.7 |
| 5 | 0 | 475 | 7.9 | 46 | 0.8 | 99 | 1.7 | 49 | 0.8 |
| 6 | 0 | 411 | 6.9 | 40 | 0.7 | 99 | 1.7 | 35 | 0.6 |
| 7 | 0 | 271 | 4.5 | 27 | 0.5 | 52 | 0.9 | 36 | 0.6 |
| 8 | 0 | 1007 | 16.8 | 103 | 1.7 | 188 | 3.1 | 79 | 1.3 |
| 9 | 0 | 662 | 11.0 | 53 | 0.9 | 162 | 2.7 | 36 | 0.6 |
| 10 | 0 | 913 | 15.2 | 82 | 1.4 | 100 | 1.7 | 31 | 0.5 |
| 11 | 0 | 695 | 11.6 | 167 | 2.8 | 225 | 3.8 | 46 | 0.8 |
| 12 | 0 | 474 | 7.9 | 74 | 1.2 | 65 | 1.1 | 30 | 0.5 |
| Total, min | 0 | 7,582 | 126 | 803 | 13 | 1,423 | 24 | 477 | 8 |
| Unit Rate,min | | 60.0 | | 60.0 | | 60.0 | | 60.0 | |

# 2005 Actual Emissions

Table H-3

***Calculation Name:*** JET ENGINE TESTING

| Process ID | Process Name | Unique Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|---|---|
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 630080 | CARBON MONOXIDE | 19600 | 9.8 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 630080 | CARBON MONOXIDE | 1360 | 0.68 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 630080 | CARBON MONOXIDE | 20 | 0.01 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 630080 | CARBON MONOXIDE | 260 | 0.13 |
| | | | | **Sum CAS: CO** | **21240** | **10.62** |
| | | | | | | |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | NOX | OXIDES OF NITROGEN | 13020 | 6.51 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | NOX | OXIDES OF NITROGEN | 500 | 0.25 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | NOX | OXIDES OF NITROGEN | 3280 | 1.64 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | NOX | OXIDES OF NITROGEN | 23180 | 11.59 |
| | | | | **Sum CAS: NOx** | **39980** | **19.99** |
| | | | | | | |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | PM10 | PARTICULATE MATTER <10UM (PM10) | 580 | 0.29 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | PM10 | PARTICULATE MATTER <10UM (PM10) | 280 | 0.14 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | PM10 | PARTICULATE MATTER <10UM (PM10) | 380 | 0.19 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | PM10 | PARTICULATE MATTER <10UM (PM10) | 460 | 0.23 |
| | | | | **Sum CAS: PM10** | **1700** | **0.85** |
| | | | | | | |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | SOX | OXIDES OF SULFUR | 260 | 0.13 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | SOX | OXIDES OF SULFUR | 60 | 0.03 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | SOX | OXIDES OF SULFUR | 100 | 0.05 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | SOX | OXIDES OF SULFUR | 180 | 0.09 |
| | | | | **Sum CAS: SOx** | **600** | **0.3** |
| | | | | | | |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 4160 | 2.08 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 60 | 0.03 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 60 | 0.03 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 220 | 0.11 |
| | | | | **Sum CAS: VOC** | **4500** | **2.25** |

# 2005 HAP Actual Emissions

Table H-4

***Calculation Name:*** JET ENGINE TESTING

| Process ID | Process Name | Unique Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|---|---|
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 100414 | ETHYLBENZENE | 1.46 | 0.00073 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 100414 | ETHYLBENZENE | 0.65 | 0.000325 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 100414 | ETHYLBENZENE | 0.07 | 0.000035 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 100414 | ETHYLBENZENE | 0.85 | 0.000425 |
| | | | | **Sum CAS: 100414** | **3.03** | **0.001515** |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 100425 | STYRENE | 0 | 0 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 100425 | STYRENE | 0.65 | 0.000325 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 100425 | STYRENE | 0.07 | 0.000035 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 100425 | STYRENE | 0 | 0 |
| | | | | **Sum CAS: 100425** | **0.72** | **0.00036** |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 107028 | ACROLEIN | 0 | 0 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 107028 | ACROLEIN | 13.12 | 0.00656 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 107028 | ACROLEIN | 0 | 0 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 107028 | ACROLEIN | 0 | 0 |
| | | | | **Sum CAS: 107028** | **13.12** | **0.00656** |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 108883 | TOLUENE | 7.98 | 0.00399 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 108883 | TOLUENE | 2.71 | 0.001355 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 108883 | TOLUENE | 0.85 | 0.000425 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 108883 | TOLUENE | 1.77 | 0.000885 |
| | | | | **Sum CAS: 108883** | **13.31** | **0.006655** |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 1330207 | XYLENE (MIXED) | 16.63 | 0.008315 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 1330207 | XYLENE (MIXED) | 4.87 | 0.002435 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 1330207 | XYLENE (MIXED) | 1.95 | 0.000975 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 1330207 | XYLENE (MIXED) | 9.19 | 0.004595 |
| | | | | **Sum CAS: 1330207** | **32.64** | **0.01632** |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 50000 | FORMALDEHYDE | 9.9767 | 0.00498835 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 50000 | FORMALDEHYDE | 110.91 | 0.055455 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 50000 | FORMALDEHYDE | 4.875 | 0.0024375 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 50000 | FORMALDEHYDE | 2.1218 | 0.0010609 |
| | | | | **Sum CAS: 50000** | **127.8835** | **0.06394175** |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 71432 | BENZENE | 5.12 | 0.00256 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 71432 | BENZENE | 13.26 | 0.00663 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 71432 | BENZENE | 0.49 | 0.000245 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 71432 | BENZENE | 1.06 | 0.00053 |
| | | | | **Sum CAS: 71432** | **19.93** | **0.009965** |

| | | | | | | |
|---|---|---|---|---|---|---|
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 7439921 | LEAD | 0.5264 | 0.000263 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 7439921 | LEAD | 0.0847 | 0.000042 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 7439921 | LEAD | 0.6336 | 0.000317 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 7439921 | LEAD | 0.6927 | 0.000346 |
| | | | | **Sum CAS: 7439921** | **1.9374** | **0.000968** |
| | | | | | | |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 7440020 | NICKEL | 0.0479 | 0.000024 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 7440020 | NICKEL | 0.0077 | 0.000004 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 7440020 | NICKEL | 0.0576 | 0.000029 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 7440020 | NICKEL | 0.063 | 0.000031 |
| | | | | **Sum CAS: 7440020** | **0.1762** | **0.000088** |
| | | | | | | |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 7440382 | ARSENIC | 0.5072 | 0.000254 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 7440382 | ARSENIC | 0.0816 | 0.000041 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 7440382 | ARSENIC | 0.6675 | 0.000334 |
| | | | | **Sum CAS: 7440382** | **1.2563** | **0.000629** |
| | | | | | | |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 7440439 | CADMIUM | 0.0479 | 0.000024 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 7440439 | CADMIUM | 0.0077 | 0.000004 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 7440439 | CADMIUM | 0.063 | 0.000031 |
| | | | | **Sum CAS: 7440439** | **0.1186** | **0.000059** |
| | | | | | | |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 7440473 | CHROMIUM | 0.5072 | 0.000254 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 7440473 | CHROMIUM | 0.0816 | 0.000041 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 7440473 | CHROMIUM | 0.6675 | 0.000334 |
| | | | | **Sum CAS: 7440473** | **1.2563** | **0.000629** |
| | | | | | | |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 75070 | ACETALDEHYDE | 8.65 | 0.004325 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 75070 | ACETALDEHYDE | 27.05 | 0.013525 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 75070 | ACETALDEHYDE | 1.95 | 0.000975 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 75070 | ACETALDEHYDE | 3.89 | 0.001945 |
| | | | | **Sum CAS: 75070** | **41.54** | **0.02077** |
| | | | | | | |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 7782492 | SELENIUM | 0.0148 | 0.000007 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 7782492 | SELENIUM | 0.0077 | 0.000004 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 7782492 | SELENIUM | 0.0576 | 0.000029 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 7782492 | SELENIUM | 0.063 | 0.000031 |
| | | | | **Sum CAS: 7782492** | **0.1431** | **0.000071** |
| | | | | | | |
| IET15831338--AFT | AET - JET ENGINE TESTING - F100-220 & 229 - AFT | 1338 | 91203 | NAPHTHALENE | 0.319 | 0.0001595 |
| IET15861181--IDLE | AET - JET ENGINE TESTING F100-220 & 229 - IDLE | 1181 | 91203 | NAPHTHALENE | 8.66 | 0.00433 |
| IET15871336--INT | AET - JET ENGINE TESTING -F100-220 & 229 -INT | 1336 | 91203 | NAPHTHALENE | 1.07 | 0.000535 |
| IET15881337--MILT | AET - JET ENGINE TESTING - F100-220 &229 - MILT | 1337 | 91203 | NAPHTHALENE | 0.13 | 0.000065 |
| | | | | **Sum CAS: 91203** | **10.179** | **0.0050895** |

## 2005 Potential Emissions

Table H-5

***Calculation Name:*** JET ENGINE TESTING

| Process Name | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|
| JET ENGINE TESTING BY PERMIT | 630080 | CARBON MONOXIDE | 126000 | 63 |
| JET ENGINE TESTING BY PERMIT | NOX | OXIDES OF NITROGEN | 170000 | 85 |
| JET ENGINE TESTING BY PERMIT | PM10 | PARTICULATE MATTER <10UM (PM10) | 8000 | 4 |
| JET ENGINE TESTING BY PERMIT | SOX | OXIDES OF SULFUR | 3000 | 1.5 |
| JET ENGINE TESTING BY PERMIT | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 26000 | 13 |

# 2005 HAP Potential Emissions

Table H-6

***Calculation Name:*** JET ENGINE TESTING

| Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|
| JET ENGINE TESTING BY PERMIT | 100414 | ETHYLBENZENE | 35 | 0.0175 |
| JET ENGINE TESTING BY PERMIT | 100425 | STYRENE | 2.1 | 0.00105 |
| JET ENGINE TESTING BY PERMIT | 107028 | ACROLEIN | 35 | 0.0175 |
| JET ENGINE TESTING BY PERMIT | 108883 | TOLUENE | 69 | 0.0345 |
| JET ENGINE TESTING BY PERMIT | 1330207 | XYLENE (MIXED) | 138 | 0.069 |
| JET ENGINE TESTING BY PERMIT | 50000 | FORMALDEHYDE | 69 | 0.0345 |
| JET ENGINE TESTING BY PERMIT | 71432 | BENZENE | 414 | 0.207 |
| JET ENGINE TESTING BY PERMIT | 7439921 | LEAD | 0 | 0 |
| JET ENGINE TESTING BY PERMIT | 7440020 | NICKEL | 0 | 0 |
| JET ENGINE TESTING BY PERMIT | 7440382 | ARSENIC | 0 | 0 |
| JET ENGINE TESTING BY PERMIT | 7440439 | CADMIUM | 0 | 0 |
| JET ENGINE TESTING BY PERMIT | 7440473 | CHROMIUM | 0 | 0 |
| JET ENGINE TESTING BY PERMIT | 75070 | ACETALDEHYDE | 138 | 0.069 |
| JET ENGINE TESTING BY PERMIT | 7782492 | SELENIUM | 0 | 0 |
| JET ENGINE TESTING BY PERMIT | 91203 | NAPHTHALENE | 14 | 0.007 |

Appendix B.5.1
Surface Coating Operations
Transportation Paint Booth

# K.1 Background

## K.1.1 General

Number of Surface Coating Source Groups Identified: 10

Emission Source Type: Stationary

Emission Source ID: SC

This category includes painting operations conducted in spray booths, within the open-air environment in buildings, and outdoors. Base personnel provided the type and amounts of surface coatings for the permitted paint booths. Spray coating usage was also derived from the EMIS database for the following buildings: 3016, 3018, 3023, 1359, and basewide architectural/structural operations.

Surface coating usage are summarized in Appendices AAA-6.1 through AAA-6.7. Surface coating was classified according to the following categories:

- Primers: coatings that are designed for application to a surface to provide a firm bond between the substrate and subsequent coatings;
- Polyurethane coatings: topcoats that are commonly used due to their high resistance to corrosion. Polyurethane coatings contain a resin (base) component and a catalyst (hardener) component that are mixed together – normally 3 parts of resin to 1 part of catalyst;
- Enamels: topcoats that are characterized by their ability to form a smooth surface;
- Lacquers: coating with composition based on synthetic thermoplastic film-forming materials dissolved in organic solvent;
- Thinners: volatile liquids added to a coating to reduce its viscosity.

Below are brief descriptions of major MHAFB painting shops and operations. The summary of surface coating amounts used by facility, pollution control equipment efficiency, and painting transfer efficiency is presented in Table K-1.

## K.1.2 Permit Summary – Building 1330 (Aircraft and Air craft Parts Paint Booth)

Two spray paint booths are permitted for fighter aircraft and aircraft parts to control particulate matter and VOCs. A revised IDEQ Permit to Construct (PTC) No. 039-00001 was issued on May 30, 2002. Air pollution control equipment is summarized for

the aircraft and aircraft parts paint booth in Sections K.1.2.1 and K.1.2.2, respectively.

**Permit to Construct**
Aircraft and Aircraft Parts Surface-coating Spray Booths – Hangar 1330
**Date Issued:** January 17, 2001
**Date Revised:** May 30, 2002.
**Brief Technical Summary:**

Aircraft Paint Booth
Throughput Limits: Daily usage = 684 gal/day; annual usage = 1,250 gal/yr

Parts Paint Booth
Throughput Limits: Daily usage = 140 gal/day; annual usage = 350 gal/yr

### K.1.2.1 Aircraft Paint Booth (Building 1330)

The aircraft paint booth contains fiber filters for controlling particulates (97 percent efficiency) and activated carbon filters for controlling VOCs (90 percent efficiency). Specifications for all coatings applied in this facility in CY 2005 are presented in Table K-2. CY 2005 coating usage was derived from the database containing daily coating usage (Appendix AAA-6.1).

### K.1.2.2 Parts Paint Booth (Building 1330)

The aircraft parts paint booth contains fiber filters for controlling particulates (97 percent efficiency). Specifications for all coatings applied in this facility in CY 2005 are presented in Table K-3. CY 2005 coating usage was derived from the database containing daily coating usage (Appendix AAA-6.2).

### K.1.3 Munitions Area (Buildings 3016 and 3018)

Specifications for all coatings applied in this area in CY 2005 are presented in Table K-4. Coating usage was derived from the EMIS database (Appendix AAA-6.3).

### K.1.4 Buildings 3023 and 1359

Specifications for all touch-up coatings applied in these buildings in CY 2005 are presented in Table K-5. CY 2005 coating usage was derived from the EMIS database (Appendix AAA-6.3).

### K.1.5 Flightline Area Spray Painting

These operations include small repair jobs on the flightline, in hangers 1329 and 1335, outside the paint booths in Hangars 1330 and 198, and on aircraft on static display. A revised IDEQ PTC No. 039-00001 was issued on May 30, 2002. Throughput limits were not changed from the March 30, 2000, PTC to the May 30, 2002, PTC. PM and PM-10 permit limits were removed.

**Permit to Construct**
Flightline Area Spray Painting
**Date Issued:** March 30, 2000
**Date Revised:** May 30, 2002
**Brief Technical Summary:**

| | |
|---|---|
| Emission limits: | Annual VOC = 1.5 tpy |
| Usage limit: | Hourly usage = 16.1 gal/day; annual usage = 300 gal/yr |

Specifications for all coatings applied in these facilities in CY 2005 are presented in Table K-6. CY 2005 coating usage was derived from the database containing daily coating usage (Appendix AAA-6.4).

### K.1.6 Vehicle Maintenance Paint Booth (Building 1100)

A revised IDEQ PTC No. 039-00001 was issued on May 30, 2002. PM and PM-10 permit limits were removed and replaced by Process Weight Rule.

**Permit to Construct**
Vehicle Spray Paint Booth – Building 1100
**Date Issued:** September 15, 1999
**Date Revised:** May 30, 2002
**Brief Technical Summary:**

| | |
|---|---|
| Emission limits: | Annual VOC = 4 tpy |
| Usage limit: | Annual usage = 300 gal/yr |

Specifications for representative coatings applied in this facility are presented in Table K-7. CY 2005 coating usage was derived from the database containing daily coating usage (Appendix AAA-6.5).

### K.1.7 Arts and Crafts Center (Building 2806)

Specifications for representative coatings applied to the Arts and Crafts Center are presented in Table K-8. CY 2005 coating usage was derived from facility logs containing daily coating usage (Appendix AAA-6.6).

### K.1.8 Hand-wipe Cleaning Operations

These operations include the removal of contaminants such as dirt, grease, oil, and coatings from aircraft by physically rubbing with a material such as a rag, tack rag, or rag moistened with a cleaning solvent. Emissions from these operations are accounted for in the category "Miscellaneous Chemical Usage."

## K.2 Emission Calculation Method

The APIMS standard algorithm codes SURF-02, SURF-04, and SURF-05 were identified to calculate $PM_{10}$, VOC, and HAP emissions. Three assumptions were also made to calculate emissions: (1) Actual air emissions were calculated based on MSDS information. (2) A material balance approach (quantity of paint issued is equal to quantity applied with no waste assumed). (3) All VOCs evaporate and are emitted to the atmosphere, unless a control device reduces the emission concentration.

## K.3 Sample Calculations

### K.3.1 Aircraft Paint Booth (Em. Source ID SC1330.1)

The following data are used in the calculations:

- SCC: 4-02-999-95 (Surface Coating Operations/Surface Coating - Miscellaneous).
- Paint type = Green Polyurethane Coating (NSN 8010-01-305-5555).
- CY 2005 usage = 1.8 gal/yr.
- Fiber filter control efficiency (particulates) = 97%.
- Activated carbon filters control efficiency (VOCs) = 90%.
- High volume/low pressure (HVLP) spray gun transfer efficiency = 45% (manufacturer's information).
- Density = 9.04 lb/gal.
- VOC content = 36% by weight of total product.

- Solids content = 64% by weight of total product.
- Xylene content = 1% by weight of total VOC.

### K.3.1.1 VOC Calculation

VOC (uncontrolled) = (Volume Used) * (Density) * (VOC wt%)

VOC (controlled) = VOC (uncontrolled) * (1- VOC control efficiency)

$$\text{VOC (controlled)} = \left(1.80\frac{\text{gal}}{\text{yr}}\right)\left(9.04\frac{\text{lb}}{\text{gal}}\right)(0.36)\left(1-\frac{90}{100}\right) = 0.59\frac{\text{lbs}}{\text{yr}}$$

### K.3.1.2 Particulates ($PM_{10}$) Calculation

$PM_{10}$ (uncontrolled) = (Volume Used) (Density) (Solid wt %) (1 - Transfer Efficiency)

$PM_{10}$ (controlled) = $PM_{10}$(uncontrolled) (1 – $PM_{10}$ Control Efficiency)

$$PM_{10}\text{ (controlled)} = \left(1.80\frac{\text{gal}}{\text{yr}}\right)\left(9.04\frac{\text{lb}}{\text{gal}}\right)(0.64)(1-0.45)\left(1-\frac{97}{100}\right) = 0.17\frac{\text{lbs}}{\text{yr}}$$

### K.3.1.3 HAP Calculation

Xylene (uncontrolled) = (Volume Used) (Density) (HAP wt%)

Xylene (controlled) = Xylene (uncontrolled) (1 – VOC control efficiency)

$$\text{Xylene (controlled)} = \left(1.80\frac{\text{gal}}{\text{yr}}\right)\left(9.04\frac{\text{lb}}{\text{gal}}\right)(0.01)\left(1-\frac{90}{100}\right) = 0.016\frac{\text{lb}}{\text{yr}}$$

## K.4 Actual Emissions Summary

The APIMS Process ID and actual annual Criteria pollutants for surface coating sources are presented in Table K-9. The actual annual HAPS for surface coating sources are presented in Table K-10.

## K.5 Potential Emissions Summary

Potential usages of surface coatings were based on permit information and Kp/a values (Table K-11).

The APIMS Process ID and potential annual Criteria pollutants for surface coating sources are presented in Table K-12. The potential annual HAPS for surface coating sources are presented in Table K-13.

Table K-1
SUMMARY OF ACTUAL SURFACE COATING OPERATIONS FOR CY 2005

| Facility ID | Location | Source ID | Quantity Used, gal | Pollution Control | Controlled Pollutant | Control Efficiency % | Transfer Efficiency % | Reference Tables |
|---|---|---|---|---|---|---|---|---|
| CORRCONTRL | BLDG 1330 | SC1330.1 | 87.0 | HEPA Filters | Particulate | 97% | 45% | K2 |
| Aircraft Paintbooth | | | | Carbon Filters | VOC | 90% | | |
| CORRCONTRL | BLDG 1330 | SC1330.2 | 26.6 | HEPA Filters | Particulate | 97% | 45% | K3 |
| Parts Paintbooth | | | | | VOC | 90% | | |
| Flightline Area Spray Painting | Flightline Area | SCFLIGHT | 30.0 | - | - | 0% | 45% | K6 |
| Vehicle Maintenance Paintbooth | BLDG 1100 | SC1100 | 21.8 | Fiber Filters | Particulate | 95% | 45% | K7 |

Appendix B.5.2
Surface Coating Operations
Aircraft Paint Booth

Table K-2
CY 2005 AIRCRAFT PAINTBOOTH COATING SPECIFICATIONS AND USAGE (CORROSION CONTROL, BUILDING 1330)

| Paint Description | Product Number | Manufacturer | Usage (gal/yr) | Specific Gravity | Density (lb/gal) |
|---|---|---|---|---|---|
| | PRIMERS | | | | |
| Epoxy Primer Coating | 8010-01-416-6557 | Deft Inc. | 10.23 | 1.24 | 10.35 |
| Coating Kit, Rain Erosion | 8010-01-423-0392 | Freecom Inc. | 0.63 | 1.78 | 14.85 |
| Clearcoat | 8010P6010/9810 | Western Automotive | 0.38 | 0.94 | 7.88 |
| Lord Aeroglaze Epoxy Primer | 8010P-9741 | Lord Corporation | 24.30 | 1.34 | 11.18 |
| Overall Clearcoat / Overall Hardener | 8010P 6020/9820 | Western Automotive | 3.53 | 0.944 | 7.88 |
| DEFT Epoxy Primer | 8010-01-218-7354 | Deft Inc. | 0.06 | 1.428 | 11.91 |
| Rain Erosion Coating | 8010-01-235-0828 | | 0.5 | 0.994 | 8.29 |
| Poly Thinner | 8010-01-181-8079 | Deft Inc. | 0.50 | 0.850 | 7.09 |
| **Subtotal** | | | **40.1** | | |
| | ENAMEL TOPCOATS | | | | |
| Polyurethane Coating, White | 8010-01-265-9143 | Deft Inc. | 4.56 | 1.25 | 10.46 |
| Polyurethane Coating, Black 37038 | 8010-01-285-3554 | Deft Inc. | 0.44 | 1.13 | 9.42 |
| Polyurethane Coating, Green 24052 | 8010-01-305-5555 | Deft Inc. | 1.80 | 1.08 | 9.04 |
| Sempin Green 24052 | 8010-01-441-6006 | Deft Inc. | 0.13 | 1.16 | 9.64 |
| Enamel, White Gloss | 8010-01-331-6114 | LHB Industries | 0.03 | 0.80 | 6.67 |
| Enamel, Orange | 8010-01-336-5058 | LHB Industries | 0.03 | 1.05 | 8.74 |
| Red Poly | 8010-01-265-9154 | Deft Inc. | 0.41 | 1.14 | 9.47 |
| Polyurethane, Part A | 8010-01-353-6551 | Deft Inc. | 0.06 | 1.19 | 9.94 |
| Ceram-Kote 54 | 8010-01-423-0402 | Deft Inc. | 0.25 | 1.780 | 14.85 |
| DEFT Extended Life Poly | 8010-01-492-4699 | Deft Inc. | 12.54 | 1.106 | 9.23 |
| DEFT Extended Life Poly | 8010-01-492-4700 | Deft Inc. | 2.64 | 1.108 | 9.24 |
| DEFT Extended Life Poly | 8010-01-492-4701 | Deft Inc. | 19.68 | 1.104 | 9.21 |
| DEFT Extended Life Poly | 99GY012 | Deft Inc. | 3.54 | 1.110 | 9.26 |
| Blue Poly | 8010-01-285-3043 | Deft Inc. | 0.31 | 1.084 | 9.04 |
| Black Poly | 8010-01-285-3048 | Deft Inc. | 0.41 | 1.016 | 8.48 |
| **Subtotal** | | | **46.8** | | |
| **Total** | | | **87.0** | | |

Appendix B.5.3
Surface Coating Operations
Aircraft Parts Paint Booth

Table K-3
CY 2005 PARTS PAINTBOOTH COATING SPECIFICATIONS AND USAGE (CORROSION CONTROL, BUILDING 1330)

| Paint Description | Product Number | Manufacturer | Usage (gal/yr) | Specific Gravity | Density (lb/gal) |
|---|---|---|---|---|---|
| | PRIMERS | | | | |
| Epoxy Primer Coating | 8010-01-416-6557 | Deft Inc. | 1.38 | 1.24 | 10.35 |
| Overall Clearcoat | 8010P6020 | Western Automotive | 0.41 | 0.94 | 7.88 |
| Lord Aeroglaze Epoxy Primer | 8010P-9741 | Lord Corporation | 3.29 | 1.34 | 11.16 |
| DEFT Epoxy Primer | 8010-01-218-7354 | Deft Inc. | 2.41 | 1.428 | 11.91 |
| **Subtotal** | | | **7.48** | | |
| | ENAMEL TOPCOATS | | | | |
| 36251 Deft Extended Life Poly | 8010-01-492-4699 | Deft Inc. | 3.37 | 1.106 | 9.23 |
| 36176 Deft Extended Life Poly | 8010-01-492-4700 | Deft Inc. | 1.3 | 1.108 | 9.24 |
| 36118 Deft Extended Life Poly | 8010-01-492-4701 | Deft Inc. | 4.1 | 1.104 | 9.21 |
| 36270 Deft Extended Life Poly | 99GY012 | Deft Inc. | 0.19 | 1.11 | 9.26 |
| 11136 Red Poly | 8010-01-265-9154 | Deft Inc. | 0.25 | 1.14 | 9.47 |
| Rain Erosion Black | 8010-00-459-1754 | | 0.13 | | |
| 36270 Poly Paint | 8010P8211F36270 | Deft Inc. | 0.06 | 1.193 | 9.95 |
| Polyurethane Coating, Black 37038 | 8010-01-285-3554 | Deft Inc. | 1.22 | 1.13 | 9.42 |
| High Solids Gray, Part A | 8010-01-305-5551 | Deft Inc. | 0.63 | 1.18 | 9.86 |
| Polyurethane Coating, Green 24052 | 8010-01-305-5555 | Deft Inc. | 3.55 | 1.08 | 9.04 |
| Enamel, Yellow | 8010-01-331-6114 | LHB Industries | 0.08 | 0.80 | 6.67 |
| Polyurethane, Part A | 8010-01-353-6550 | Deft Inc. | 0.03 | 1.16 | 9.67 |
| Polyurethane Coating Gray | 8010-01-353-6551 | Deft Inc. | 0.94 | 1.19 | 9.94 |
| 17925 Gloss White Poly | 8010-01-265-9143 | Deft Inc. | 3.25 | 1.253 | 10.46 |
| **Subtotal** | | | **19.09** | | |
| **Total** | | | **26.57** | | |

Appendix B.5.4
Surface Coating Operations
Flightline Open Area Spraying

Table K-6
CY 2005 COATING SPECIFICATIONS AND USAGE (FLIGHTLINE AREA SPRAY PAINTING))

| Paint Description | Product Number | Manufacturer | Usage (gal/yr) | Specific Gravity | Density (lb/gal) |
|---|---|---|---|---|---|
| ENAMEL TOPCOATS | | | | | |
| Lord Aeroglaze Epoxy Primer | 8010P-9741 | Lord Corporation | 12.00 | 1.34 | 11.16 |
| 17925 Gloss White Poly | 8010-01-265-9143 | Deft Inc. | 0.25 | 1.25 | 10.46 |
| 37038 Flat Black Poly | 8010-01-285-3554 | Deft Inc. | 0.25 | 1.13 | 9.42 |
| 11136 Red Poly | 8010-01-265-9154 | Deft Inc. | 0.13 | 1.14 | 9.47 |
| Imron Off White | NA | DuPont | 12.00 | 0.90 | 7.50 |
| Imron Bright Green | NA | DuPont | 0.38 | 0.90 | 7.50 |
| Imron Dark Green | NA | DuPont | 1.00 | 0.90 | 7.50 |
| Imron light Green | NA | DuPont | 2.00 | 0.90 | 7.50 |
| Imron Tan | NA | DuPont | 2.00 | 0.90 | 7.50 |
| Total | | | 30.00 | | |

Table K-7
CY 2005 SPECIFICATIONS AND COATING USAGE (BUILDING 1100)

| Paint Description | Product Number | Manufacturer | Usage (gal/yr) | Specific Gravity | Density (lb/gal) |
|---|---|---|---|---|---|
| VEHICLE MAINTENANCE PAINTBOOTH (BLDG 1100) | | | | | |
| Chroma Clear | 7500S | Dupont | 3.38 | 0.963 | 8.03 |
| Chroma Base Enamel | 8272K | Dupont | 0.13 | 0.889 | 7.42 |
| Chroma Base Enamel | PN 9126K | Dupont | 0.25 | 0.925 | 7.72 |
| Chroma Base Enamel | PN 9174K | Dupont | 0.38 | 0.906 | 7.56 |
| Chroma Base Enamel | B9323K-H | Dupont | 0.25 | 0.923 | 7.7 |
| Chroma Base Enamel | PN B9348 (KN) | Dupont | 0.13 | 0.922 | 7.69 |
| Clear Activator | PN V7595-S | Dupont | 0.25 | 1.027 | 8.57 |
| Fill-In-Sand Lacquer Prime | PN 131S | Dupont | 0.75 | 1.337 | 11.15 |
| Enamel Reducer | PN 8096-S | Dupont | 0.50 | 0.815 | 6.8 |
| Centari Blue | PN 34840-A | Dupont | 3.75 | 0.95 | 7.93 |
| Chroma Base Enamel | PN B9145 | Dupont | 0.13 | 1.098 | 9.16 |
| Chroma Base Enamel | PN 9207 (LA) | Dupont | 0.25 | 0.926 | 7.75 |
| Chroma Base Enamel | PN 9321 | Dupont | 1.38 | 0.946 | 7.89 |
| Chroma Base Enamel | PN 9352 (KH) | Dupont | 0.25 | 0.928 | 7.74 |
| Chroma Base Enamel | PN 4897 | Dupont | 0.13 | 0.92 | 7.67 |
| Centari Green Semi-Gloss | PN-7498A | Dupont | 9.63 | 0.98 | 8.18 |
| Chroma Base Enamel | PN B9431 | Dupont | 0.13 | 0.943 | 7.87 |
| Chroma Base Enamel | PN M6620 | Dupont | 0.13 | 1.03 | 8.59 |
| Total | | | 21.8 | | |

# 2005 Actual Emissions

Table K-9

***Calculation Name:*** SURFACE COATING

| Process ID | Process Name | Unique Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|---|---|
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0.3862 | 0.000193 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0.1605 | 0.00008 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | PM10 | PARTICULATE MATTER <10UM (PM10) | 2.7193 | 0.001359 |
| ICP1202133---SC1359 | STENCILING | 133 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0 | 0 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | PM10 | PARTICULATE MATTER <10UM (PM10) | 1.3518 | 0.000676 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0 | 0 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | PM10 | PARTICULATE MATTER <10UM (PM10) | 21.1106 | 0.010554 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | PM10 | PARTICULATE MATTER <10UM (PM10) | 37.2007 | 0.0186 |
| | | | | **Sum CAS: PM10** | **62.9291** | **0.031462** |
| | | | | | | |
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 16.9799 | 0.008491 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 6.6108 | 0.003306 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 24.9108 | 0.012457 |
| ICP1202133---SC1359 | STENCILING | 133 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 2.361 | 0.001181 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 70.2471 | 0.035124 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 18.4923 | 0.009246 |
| ICP12011168--SC1100 | PAINTING | 1168 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 8.3426 | 0.004172 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 4.1938 | 0.002098 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 7.2646 | 0.003632 |
| | | | | **Sum CAS: VOC** | **159.4029** | **0.079707** |

# 2005 HAP Actual Emissions

Table K-10

***Calculation Name:*** SURFACE COATING

| Process ID | Process Name | Unique Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|---|---|
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | 100414 | ETHYLBENZENE | 0.0173 | 0.000009 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | 100414 | ETHYLBENZENE | 0 | 0 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | 100414 | ETHYLBENZENE | 0.1621 | 0.000081 |
| ICP1202133---SC1359 | STENCILING | 133 | 100414 | ETHYLBENZENE | 0 | 0 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | 100414 | ETHYLBENZENE | 0.1505 | 0.000075 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | 100414 | ETHYLBENZENE | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | 100414 | ETHYLBENZENE | 0 | 0 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | 100414 | ETHYLBENZENE | 0.1619 | 0.00008 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | 100414 | ETHYLBENZENE | 0.6493 | 0.000326 |
| | | | | **Sum CAS: 100414** | **1.1411** | **0.000571** |
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | 108883 | TOLUENE | 0.4159 | 0.000208 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | 108883 | TOLUENE | 0.1944 | 0.000097 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | 108883 | TOLUENE | 2.1212 | 0.001061 |
| ICP1202133---SC1359 | STENCILING | 133 | 108883 | TOLUENE | 0.0222 | 0.000011 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | 108883 | TOLUENE | 0.0138 | 0.000007 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | 108883 | TOLUENE | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | 108883 | TOLUENE | 0.0871 | 0.000044 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | 108883 | TOLUENE | 0.2043 | 0.000103 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | 108883 | TOLUENE | 0.0523 | 0.000026 |
| | | | | **Sum CAS: 108883** | **3.1112** | **0.001557** |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | 1330207 | XYLENE (MIXED) | 0.7007 | 0.000352 |
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | 1330207 | XYLENE (MIXED) | 0.08 | 0.00004 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | 1330207 | XYLENE (MIXED) | 0.0275 | 0.000014 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | 1330207 | XYLENE (MIXED) | 1.8107 | 0.000906 |
| ICP1202133---SC1359 | STENCILING | 133 | 1330207 | XYLENE (MIXED) | 0.2376 | 0.000118 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | 1330207 | XYLENE (MIXED) | 0.4966 | 0.000249 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | 1330207 | XYLENE (MIXED) | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | 1330207 | XYLENE (MIXED) | 0.0912 | 0.000046 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | 1330207 | XYLENE (MIXED) | 0.235 | 0.000118 |
| | | | | **Sum CAS: 1330207** | **3.6793** | **0.001843** |

| | | | | | | |
|---|---|---|---|---|---|---|
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP1202133---SC1359 | STENCILING | 133 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | 123319 | HYDROQUINONE | 0 | 0 |
| | | | | **Sum CAS: 123319** | **0** | **0** |
| | | | | | | |
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | 108101 | METHYL ISOBUTYL KETONE | 0.0453 | 0.000023 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | 108101 | METHYL ISOBUTYL KETONE | 0.0275 | 0.000014 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | 108101 | METHYL ISOBUTYL KETONE | 0.1664 | 0.000083 |
| ICP1202133---SC1359 | STENCILING | 133 | 108101 | METHYL ISOBUTYL KETONE | 0.0399 | 0.000019 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | 108101 | METHYL ISOBUTYL KETONE | 0.6967 | 0.000349 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | 108101 | METHYL ISOBUTYL KETONE | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | 108101 | METHYL ISOBUTYL KETONE | 0 | 0 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | 108101 | METHYL ISOBUTYL KETONE | 11.1705 | 0.005586 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | 108101 | METHYL ISOBUTYL KETONE | 9.8163 | 0.004908 |
| | | | | **Sum CAS: 108101** | **21.9626** | **0.010982** |

| Table K-11<br>CY 2005 PTE ASSUMPTIONS FROM<br>SURFACE COATING OPERATIONS | | | |
|---|---|---|---|
| APIMS PROCESS ID | Source ID | Assumptions for PTE Criteria emissions | Assumptions for PTE HAP emissions |
| PC-10051174--SC1330 | SC1330.1 | PTC; 05/30/02 | Kp/a=4.21 |
| PC-10051173--SC1330 | SC1330.2 | PTC; 05/30/02 | Kp/a=4.21 |
| PC-10301168--SC1100 | SC1100 | PTC; 05/30/02 | Kp/a=4.21 |
| PC-10071172--SCFLIGH | SCFLIGHT | PTC; 05/30/02 | Kp/a=4.21 |

**Key:**
PTC = Permit To Construct

# 2005 Potential Emissions

Table K-12

***Calculation Name:*** SURFACE COATING

| Process ID | Process Name | Unique Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|---|---|
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0.5793 | 0.0002895 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0.24075 | 0.00012 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | PM10 | PARTICULATE MATTER <10UM (PM10) | 4.07895 | 0.0020385 |
| ICP1202133---SC1359 | STENCILING | 133 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0 | 0 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | PM10 | PARTICULATE MATTER <10UM (PM10) | 5.691078 | 0.00284596 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | PM10 | PARTICULATE MATTER <10UM (PM10) | 0 | 0 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | PM10 | PARTICULATE MATTER <10UM (PM10) | 88.875626 | 0.04443234 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | PM10 | PARTICULATE MATTER <10UM (PM10) | 156.614947 | 0.078306 |
| | | | | **Sum CAS: PM10** | **256.080651** | **0.1280323** |
| | | | | | | |
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 25.46985 | 0.0127365 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 9.9162 | 0.004959 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 37.3662 | 0.0186855 |
| ICP1202133---SC1359 | STENCILING | 133 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 3.5415 | 0.0017715 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 295.740291 | 0.14787204 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 27.73845 | 0.013869 |
| ICP12011168--SC1100 | PAINTING | 1168 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 35.122346 | 0.01756412 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 17.655898 | 0.00883258 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | VOC | VOLATILE ORGANIC COMPOUNDS (VOC) | 30.583966 | 0.01529072 |
| | | | | **Sum CAS: VOC** | **483.134701** | **0.24158096** |

# 2005 HAP Potential Emissions

Table K-13

***Calculation Name:*** SURFACE COATING

| Process ID | Process Name | Unique Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|---|---|
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | 100414 | ETHYLBENZENE | 0.02595 | 0.0000135 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | 100414 | ETHYLBENZENE | 0 | 0 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | 100414 | ETHYLBENZENE | 0.24315 | 0.0001215 |
| ICP1202133---SC1359 | STENCILING | 133 | 100414 | ETHYLBENZENE | 0 | 0 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | 100414 | ETHYLBENZENE | 0.633605 | 0.00031575 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | 100414 | ETHYLBENZENE | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | 100414 | ETHYLBENZENE | 0 | 0 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | 100414 | ETHYLBENZENE | 0.681599 | 0.0003368 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | 100414 | ETHYLBENZENE | 2.733553 | 0.00137246 |
| | | | | **Sum CAS: 100414** | **4.317857** | **0.00216001** |
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | 108883 | TOLUENE | 0.62385 | 0.000312 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | 108883 | TOLUENE | 0.2916 | 0.0001455 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | 108883 | TOLUENE | 3.1818 | 0.0015915 |
| ICP1202133---SC1359 | STENCILING | 133 | 108883 | TOLUENE | 0.0333 | 0.0000165 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | 108883 | TOLUENE | 0.058098 | 0.00002947 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | 108883 | TOLUENE | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | 108883 | TOLUENE | 0.366691 | 0.00018524 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | 108883 | TOLUENE | 0.860103 | 0.00043363 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | 108883 | TOLUENE | 0.220183 | 0.00010946 |
| | | | | **Sum CAS: 108883** | **5.635625** | **0.0028233** |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | 1330207 | XYLENE (MIXED) | 1.05105 | 0.000528 |
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | 1330207 | XYLENE (MIXED) | 0.12 | 0.00006 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | 1330207 | XYLENE (MIXED) | 0.04125 | 0.000021 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | 1330207 | XYLENE (MIXED) | 2.71605 | 0.001359 |
| ICP1202133---SC1359 | STENCILING | 133 | 1330207 | XYLENE (MIXED) | 1.000296 | 0.00049678 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | 1330207 | XYLENE (MIXED) | 0.7449 | 0.0003735 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | 1330207 | XYLENE (MIXED) | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | 1330207 | XYLENE (MIXED) | 0.383952 | 0.00019366 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | 1330207 | XYLENE (MIXED) | 0.98935 | 0.00049678 |
| | | | | **Sum CAS: 1330207** | **7.046848** | **0.00352872** |

# 2005 HAP Potential Emissions

Table K-13

***Calculation Name:*** SURFACE COATING

| Process ID | Process Name | Unique Process ID | CAS No. | Chem. Name | Emissions (LBS) | Emissions (Ton) |
|---|---|---|---|---|---|---|
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP1202133---SC1359 | STENCILING | 133 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | 123319 | HYDROQUINONE | 0 | 0 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | 123319 | HYDROQUINONE | 0 | 0 |
| | | | | **Sum CAS: 123319** | **0** | **0** |
| ICP1202421---SC3016 | STENCILING AND SPRAY PAINTING | 421 | 108101 | METHYL ISOBUTYL KETONE | 0.06795 | 0.0000345 |
| ICP12021231--SC3018 | TOUCH-UP INSPECTION - BLDG 3018 | 1231 | 108101 | METHYL ISOBUTYL KETONE | 0.04125 | 0.000021 |
| ICP1202149---SC3023 | PAINTING OPERATIONS | 149 | 108101 | METHYL ISOBUTYL KETONE | 0.2496 | 0.0001245 |
| ICP1202133---SC1359 | STENCILING | 133 | 108101 | METHYL ISOBUTYL KETONE | 0.05985 | 0.0000285 |
| ICP11921172--SCFLIGH | SURFACE COATING OPERATIONS FOR FLIGHTLINE BASEWIDE | 1172 | 108101 | METHYL ISOBUTYL KETONE | 2.933107 | 0.00146929 |
| ICP1192354---SC2806 | 211A: WOOD FINISHING | 354 | 108101 | METHYL ISOBUTYL KETONE | 0 | 0 |
| ICP12011168--SC1100 | PAINTING | 1168 | 108101 | METHYL ISOBUTYL KETONE | 0 | 0 |
| ICP12021173--SC1330 | 460A: SC1330.2 - SURF - PARTS BOOTH BLDG 1330 | 1173 | 108101 | METHYL ISOBUTYL KETONE | 47.027805 | 0.02351706 |
| ICP12021174--SC1330 | 460A: SC1330.1 - SURF - AIRCRAFT BOOTH BLDG 1330 | 1174 | 108101 | METHYL ISOBUTYL KETONE | 41.326623 | 0.02066268 |
| | | | | **Sum CAS: 108101** | **91.706185** | **0.04585753** |