



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10  
1200 Sixth Avenue  
Seattle, WA 98101

Reply To  
Attn Of: OAQ-107

**MEMORANDUM**

SUBJECT: Elmendorf Air Force Base Emissions Inventory

FROM: Daniel L. Meyer  
Office of Air Quality (OAQ-107)

TO: Files

**SUMMARY:**

I was tasked to review the 1995 Elmendorf Air Force Base (EAFB) emission inventory (EI). More specifically, I was tasked to comment upon EAFB's methodology to estimate actual (not potential) emissions of hazardous air pollutants (HAP). HAP compounds are identified in §112(b)(1) of the Clean Air Act Amendments of 1990.

I reviewed EAFB's emission estimation procedures presented in the following documents: (1) 1995 HAP EI as created February 23, 1999 (Attachment 1); and (2) 1995 HAP EI as amended April 16, 1999 (Attachment 2). Note, I previously reviewed the original EI and provided comments to EAFB in a March 26, 1999, letter (Attachment 3).

I reviewed EAFB's emission estimation procedures in light of EPA's policy for estimating actual emissions. The policy is outlined in a January 25, 1995, memorandum entitled, "Options for Limiting the Potential to Emit (PTE) of a Stationary Source Under Section 112 and Title V of the Clean Air Act" (Attachment 4).

The original EI proposed that EAFB's 1995 HAP emissions were equal to 8.8 tons per year (TPY). The amended EI proposed that EAFB's 1995 HAP emissions were equal to 11.9 TPY.

For reasons later outlined in this memorandum, I conclude that EAFB's EI does not fully document its actual 1995 HAP emissions in accordance with EPA guidance. I do not concur that EAFB's actual 1995 HAP emissions are equal to or less than 11.9 TPY. Documentation submitted by EAFB suggests that its actual 1995 HAP emissions may be, at least, equal to 17.9 TPY as presented in Table 1 (below).

--	--	--	--

HAP EMISSION SOURCE	'95 HAP (TPY) Initial <sup>1</sup>	'95 HAP (TPY) Revised <sup>2</sup>	'95 HAP (TPY) Documented <sup>3</sup>
Aggregate Gasoline	0.2	1.0	>1.6
Aggregate Diesel Loading	0	0	?
Aggregate JP-8 Loading	0	0	?
Aggregate JP-4 Loading	0	0	?
Evaporative Losses	5.15	5.15	10.30
Jet Engine Testing	0.14	0.14	0.14
Power Plant Boilers	0.2	2.46	2.46
Boilers 10-100 MMBtu/hr	0.2	0.02	0.02
Boilers < 10 MMBtu/hr	0.02	0.02	0.02
Stationary Engines	0.0045	0.005	0.005
Insignificant Heaters/Boilers	0.035	0.154	0.154
Insignificant Engines	0.0044	0.013	0.013
Medical Waste Incinerator	1.2	1.22	1.52
Non-medical Waste Incinerators	0.14	0.05	0.05
Landfill Gas From Closed Landfill	0.96	1.21	1.21
Oil-Water Separators	0	0.002	0.002
SVE Remediation Systems	0	0	0
Ozone Depleting Chemical Usage	0.31	0.31	0.31

---

<sup>1</sup>February 23, 1999 EI

<sup>2</sup>April 16, 1999 EI

<sup>3</sup>EPA Region 10 Comments

De-Icer Evaporative Losses	0.2	0.10	0.10
TOTAL	8.8	11.9	17.9

**COMMENTS:**

My comments are presented here according to source category.

**AGGREGATE GASOLINE**

1. EAFB has excluded emissions from the Army and Air Force Exchange Service (AAFES) service station along with emissions from Summit Paving asphalt plant. EAFB indicated that neither activity is under its control per EPA guidance issued by EPA’s Office of Air Quality Planning and Standards (OAQPS) on August 2, 1996. EAFB has demonstrated that neither activity should be included in its EI. EAFB has provided information documenting its relationship with both operations (Attachment 2):

*Summit paving is allowed to operate on EAFB under contract number F6550197D0019. The owner/operator (3 Wing Commander) for this installation does not control the daily operations of the facility. The contract has conditions and requirements for which the contractor must comply but does not place its operations under Air Force control.*

*The AAFES organization is a Joint (Army and Air Force) level organization with its own command structure. The AAFES Commander has his own vested powers. The service station is part of that structure and allowed to operate on this installation in accordance with Air Force Joint Instruction (AFJI) 34-210 and Army Air Force Exchange Service Operations Policy, neither of which place AAFES service stations under the direct control of the owner/operator (3 Wing Commander) of this installation.*

The information provided by EAFB indicates that both Summit Paving and AAFES are not under the control of EAFB per the August 2, 1996 guidance issued by EPA’s OAQPS.

2. The original EI utilized information provided by the 1991 CARB Speciation Profiles to document HAP content of gasoline. EAFB has subsequently provided additional information to document the HAP content of its gasoline, and EAFB has amended its EI to reflect the new information. EAFB submitted Material Safety Data Sheet (MSDS) from the 1998 Department of Defense (DOD) Materials Information System. The DOD information provides the following data:

*MSDS was prepared in November 1985 based upon a gasoline fuel produced by Chevron of Richmond, California. The MSDS indicates a*

*range of concentrations for various HAP.*

*Benzene: 1 - 5 %*  
*Hexane: 1 - 5 %*  
*Toluene: 5 - 15%*  
*Xylene (M, P, O isomers): 5 - 15%*

The supplemental information provided by EAFB may not be fully representative of the gasoline utilized at EAFB in 1995. The information does not certify that the aforementioned MSDS was generated for fuels actually received at EAFB.

EAFB utilized a HAP concentration of 25 percent and a benzene concentration of 2.5 percent to recalculate HAP emissions due to gasoline handling. The MSDS noted above and utilized by EAFB suggests that HAP concentration in gasoline may be equal to 40 percent (5+5+15+15). By using a gasoline HAP concentration of 40 percent rather than 25 percent, I calculate a fuel handling HAP emission rate equal to 1.6 TPY.

3. The original EI utilized 1994 Air Force software entitled, TANKS 2, to model storage tank working and breathing losses. EAFB subsequently utilized TANKS 3.1 software to document emissions. The software has subsequently been updated to TANKS Version 4.0.

EAFB utilized TANKS 3.1 assuming that one tank receives all gasoline throughput. In reality, multiple tanks receive gasoline throughput. EAFB indicated that its approach was conservative and less time consuming. EAFB's approach is clearly less time consuming, but EAFB's approach may not be conservative. Storing gasoline in one large tank rather than in several smaller tanks decreases the amount of gasoline surface area exposed to evaporative losses.

### **AGGREGATE DIESEL, JP-8, AND JP-4 LOADING**

The original EI indicated that diesel, JP-4, and JP-8 fuels contain no HAP based upon 1991 CARB Speciation Profiles. EAFB has subsequently provided additional information to document the HAP content of its fuels, and EAFB has amended its EI to reflect the new information. EAFB submitted MSDS from the 1998 DOD Materials Information System. The DOD information provides the following data:

<i>Diesel</i>	<i>No data provided for diesel fuel.</i>
<i>JP-4/Jet B</i>	<i>MSDS was prepared in December 1985 based upon a turbine fuel produced by Berry Petroleum Company of Kilgore, Texas. The MSDS indicated that various hydrocarbons constitute greater than 99 percent of JP-4. No HAP-specific data was presented.</i>
<i>JP-8</i>	<i>MSDS was prepared in November 1985 based upon a turbine fuel produced by Shell Oil Company of Houston, Texas. The</i>

*MSDS indicated that kerosene constitutes greater than 99 percent of JP-8. No HAP-specific data was presented.*

The supplemental information provided by EAFB may not be completely representative of the fuels utilized at EAFB in 1995. The information does not certify that the aforementioned MSDS was generated for fuels actually received at EAFB.

The supplemental information provided by EAFB does not document a HAP concentration equal to 0 percent for diesel, JP-4, and JP-8 fuels. No information was provided for diesel fuel. The information provided for JP-4 and JP-8 fuels is not sufficient to quantify concentration of HAP.

### **BASE-WIDE EVAPORATIVE LOSSES FROM PURCHASED CHEMICALS, PAINTS, AND SOLVENTS**

EAFB's methodology to estimate HAP emissions due to chemical, paint, and solvent usage is outlined in its amended EI. EAFB purchased 20,572 pounds of HAP in 1995, and the HAP is utilized in chemicals, paints, and solvents. According to EAFB, "There are no records of how much of any paint, solvent, or other chemicals was actually used, let alone how much was released to the air." No records exist documenting the 1995 inventory of paint, solvent, or other chemicals.

A January 25, 1995 memorandum from John Seitz of EPA's OAQPS discusses, among other things, EPA's transition guidance for Title V and §112 of the Clean Air Act (Attachment 4). The memorandum discusses major source applicability based upon either potential or actual HAP emissions. The memorandum elaborates upon the recordkeeping requirements to support an actual HAP EI. According to the memorandum, "To qualify under this transition policy, sources must maintain adequate records on site to demonstrate that (actual) emissions are maintained below these thresholds for the entire transition period." The threshold being referred to here is 5 TPY individual HAP and 12.5 TPY aggregate HAP. The transition period began January 1, 1994.

The memorandum continues, "Consistent with the California approach, EPA believes it is appropriate for the amount of recordkeeping to vary according to the level of emissions." The memorandum refers to §§1.2 and 4.2 of the January 11, 1995 State of California Proposed Rule to Limit Potential to Emit (California Rule) (Attachment 5).

I have attempted to apply §§1.2 and 4.2 of the California Rule to EAFB's actual HAP EI so as to determine the amount of recordkeeping required to document HAP emissions due to base-wide evaporative losses from purchased chemicals, paints, and solvents. Section 1.2 defines de minimis emissions for stationary sources. De minimis stationary sources are exempt from recordkeeping and reporting provisions. Based upon information supplied by EAFB and the criteria presented in §1.2 of the California Rule, EAFB clearly does not qualify as a de minimis stationary source. EAFB's HAP emissions exceed the de minimis threshold of 5 TPY, and its regulated air pollutant emissions (excluding HAP) clearly exceed the de minimis level of 5 TPY. EAFB's annual solvent usage exceeds the de minimis level of 750 gallons, and its annual natural gas usage exceeds the de minimis level of 71,400,000 ft<sup>3</sup>. Section 4.2 presents the recordkeeping requirements for a non-deminimis stationary source

operating a coating/solvent emission unit. A stationary source, such as EAFB, would be required to keep and maintain the following records in order to document its actual emissions:

1. A current list of all coatings, solvents, inks and adhesives in use. This list shall include: information on the manufacturer, brand, product name or code, VOC content in grams per liter or pounds per gallon, HAPS content in grams per liter or pound per gallon, or manufacturer's product specifications, material VOC content reports or laboratory analyses providing this information;
2. A description of any equipment used during and after coating / solvent application, including type, make and model; maximum design process rate or throughput; control device(s) type and description (if any); and a description of the coating/solvent application/drying method(s) employed;
3. A monthly log of the consumption of each solvent (including solvent used in clean-up and surface preparation), coating, ink and adhesive used; and
4. All purchase order, invoices, and other documents to support information in the monthly log.

EAFB has not provided any of the records outlined in items 1 through 4, and EAFB has verbally communicated to EPA Region 10 that such records do not exist at EAFB.

Instead of providing the aforementioned records (consistent with EPA guidance), EAFB utilized an alternative approach to document its 1995 actual HAP emissions. According to EAFB, "Our approach was to contact the paint shops on base to retrieve waste shipment records and to also find out approximately how much paint and solvents likely stayed on the shelves for reuse in the subsequent years. With that information, we conservatively assumed that no more than 50 percent of the paint-related chemicals were emitted to the atmosphere."

The documentation to support EAFB's methodology to calculate HAP emissions due to chemical, paint, and solvent usage is clearly incomplete. The methodology is based undocumented assumptions and estimations. EAFB has indicated that its methodology is conservative based upon interviews with EAFB personnel. The interviews have not been documented.

EAFB's estimations are based, in part, on records of outgoing hazardous waste drums. EAFB has utilized hazardous waste profile sheets to document liquid HAP shipped off-site. Such liquids (sealed in drums) do not emit HAP to the atmosphere (while on-site). EAFB's methodology requires that outgoing hazardous waste drums contain 100 percent HAP. The hazardous waste profile sheets document drums with significant quantities of water and grit.

### **JET ENGINE TESTING**

No further comments beyond those documented in my March 24, 1999, memorandum to the files.

### **POWER PLANT BOILERS (> 100 MMBtu/hr)**

The original EI utilized an emission factor, 0.172 lb HAP / MM ft<sup>3</sup> natural gas, to calculate an aggregate HAP emission rate equal to 0.2 TPY. EAFB has recalculated HAP emissions in its amended EI. EAFB utilized Table 1.4-3 of the most recent edition of AP-42 to formulate an aggregate HAP emission factor of 1.88 lb HAP / MM ft<sup>3</sup> natural gas. Utilizing the new emission factor, EAFB calculated an aggregate HAP emission rate equal to 2.5 TPY.

### **BOILERS 10-100 MMBtu/hr**

The original EI utilized an emission factor, 0.336 lb HAP / MM ft<sup>3</sup> natural gas, to calculate an aggregate HAP emission rate equal to 0.004 TPY. EAFB recalculated HAP emissions in its amended EI. EAFB utilized Table 1.4-3 of the most recent edition of AP-42 to formulate a HAP emission factor of 1.88 lb HAP / MM ft<sup>3</sup> natural gas. Utilizing the new emission factor, EAFB calculated an aggregate HAP emission rate equal to 0.02 TPY.

### **BOILERS < 10 MMBtu/hr**

The original EI utilized an emission factor, 0.424 lb HAP / MM ft<sup>3</sup> natural gas, to calculate an aggregate HAP emission rate equal to 0.019 TPY. EAFB recalculated HAP emissions in its amended EI. EAFB utilized Table 1.4-3 of the most recent edition of AP-42 to formulate a HAP emission factor of 1.88 lb HAP / MM ft<sup>3</sup> natural gas. Utilizing the new emission factor, EAFB calculated an aggregate HAP emission rate equal to 0.08 TPY.

### **STATIONARY (DIESEL) ENGINES**

The original EI utilized an emission factor, 0.0170 g HAP / hp-hr, to calculate an aggregate HAP emission rate equal to 0.0045 TPY. EAFB recalculated HAP emissions in its amended EI. EAFB utilized Table 3.3-3 of the most recent edition of AP-42 to formulate a HAP emission factor of 0.02 g / hr-hr. Utilizing the new emission factor, EAFB calculated an aggregate HAP emission rate equal to 0.01 TPY.

### **INSIGNIFICANT HEATERS/BOILERS**

The original EI utilized an emission factor, 0.424 lb HAP / MM ft<sup>3</sup> natural gas, to calculate an aggregate HAP emission rate equal to 0.035 TPY. EAFB recalculated HAP emissions in its amended EI. EAFB utilized Table 1.4-3 of the most recent edition of AP-42 to formulate a HAP emission factor of 1.88 lb HAP / MM ft<sup>3</sup> natural gas. Utilizing the new emission factor, EAFB calculated an aggregate HAP emission rate equal to 0.15 TPY.

## **INSIGNIFICANT ENGINES**

The original EI utilized an emission factor, 0.0064 g HAP / hp-hr, to calculate an aggregate HAP emission rate equal to 0.0044 TPY. EAFB recalculated HAP emissions in its amended EI. EAFB utilized Table 3.3-2 of the most recent edition of AP-42 to formulate a HAP emission factor of 0.0195 g HAP / hp-hr. Utilizing the new emission factor, EAFB calculated an aggregate HAP emission rate equal to 0.013 TPY.

## **MEDICAL WASTE INCINERATOR**

The original EI utilized an emission factor, 35.88 lb HAP / ton waste, to calculate an aggregate HAP emission rate equal to 1.2 TPY. The AP-42 emission factor was developed from emissions data gathered for uncontrolled excess air medical waste incinerators.

The AP-42 emission factors vary according to the type of medical waste incinerator. AP-42 distinguishes between controlled air, excess air, and rotary kiln medical waste incinerators. The original EI did not document the type of medical waste incinerator utilized by EAFB.

EAFB has provided supplemental information to EPA Region 10. The new information indicates that the medical waste incinerator, Model No. TR-12-P, is manufactured by Thermal Reduction Company, Inc. No further information was provided.

Tables 2.3-16 through 18 of AP-42 provide an uncontrolled rotary kiln medical waste incinerator aggregate HAP emission factor equal to 44.55 lb HAP / ton waste (Attachment 6). By using the 'rotary kiln' emission factor rather than an 'excess air' emission factor, I calculate an aggregate HAP emission rate equal to 1.52 TPY.

## **NON-MEDICAL WASTE INCINERATORS (2)**

The original EI utilized an emission factor, 2.17 lb HAP / ton waste, to calculate an aggregate HAP emission rate equal to 0.05 TPY. The AP-42 emission factor was developed from emissions data gathered for uncontrolled modular starved-air combustors.

EAFB has provided supplemental information to EPA Region 10. The new information indicates that the non-medical waste incinerators consist of a Model No. G-6 manufactured by Threm Tech and a Model No. J81-3 manufactured by John Zink. The information also indicated that the incinerators are equivalent to starved-air combustors.

## **LANDFILL GAS FROM CLOSED LANDFILL**

The original EI utilized a methane gas generation rate constant,  $k$ , equal to 0.02 / year. AP-42 recommends using a  $k$ -value of 0.02 / year only in areas of the country where annual precipitation is less than 25 inches. EAFB has provided new information documenting an annual average rainfall of 15.91 inches in Anchorage, Alaska.

The original EI utilized AP-42 information to account for HAP constituents in landfill gas, but the original EI did not accurately reflect information presented in Tables 2.4-1 and 2. EAFB has submitted an amended EI, and the amended EI accurately documents HAP constituents in landfill gas per AP-42.

The original EI calculated landfill gas emissions for 1998 rather than 1995 due to the use of an inaccurate input parameter referring to the time period since the landfill was closed. The amended EI calculates landfill gas emissions for 1995.

The original EI did not illustrate the methodology EAFB utilized to derive landfill gas concentrations for benzene and toluene. The concentrations for these constituents vary according to the type of waste accepted at the landfill. The amended EI indicates that the landfill received non-residential and industrial wastes. According to EAFB, the landfill was not a residential landfill.

The original EI did not illustrate the calculations required to compute HAP emissions. The amended EI illustrates HAP emission calculations.

Accounting for the aforementioned revisions, the EI now indicates landfill gas HAP emissions equal to 1.33 TPY

## **OIL-WATER SEPARATORS**

The original EI did not utilize wastewater sampling data to estimate HAP emissions due to oil-water separation. EAFB assumed that wastewater contained no HAP, and thus EAFB predicted that oil-water separation contributed no HAP to the EI. EAFB has since reviewed historical analytical data indicating the presence of HAP in wastewater, and EAFB has utilized the analytical data to amend its EI. The EI now estimates HAP emissions due to oil-water separation equal to 0.002 TPY.

## **SVE REMEDIATION SYSTEMS**

EAFB calculated emissions due to soil vapor extraction (SVE) at five separate locations. EAFB indicated contamination of the soil with JP-8 fuel. The original EI indicated that the JP-8 fuel at EAFB contains no HAP based upon 1991 CARB Speciation Profiles. EAFB has provided additional information to document the HAP content of JP-8 fuel. EAFB has submitted MSDS from the 1998 DOD Materials Information System. The DOD information indicates that JP-8

fuel contains greater than 99 percent kerosene. EAFB did not investigate the HAP content of kerosene.

The supplemental information provided by EAFB does not document a HAP concentration equal to 0 percent for JP-8 fuel. The information provided for JP-8 fuels is not sufficient to quantify concentration of HAP.

#### **OZONE DEPLETING CHEMICAL USAGE**

No further comments beyond those documented in my March 24, 1999, memorandum to the files.

#### **DE-ICER EVAPORATIVE LOSSES**

EAFB utilized EPA's May 1996 RMP Offsite Consequence Modeling Guidance and EPA's WATER8 model to calculate emissions due to ethylene glycol evaporation. The amended EI addresses comments documented in March 24, 1999, memorandum to the files.

## **ATTACHMENT 6**